TETRA TECH EC, INC.

November 19, 2010

Mr. John Spellman, P.E.
Project Manager
New York State Department of Environmental Conservation
Division of Environmental Remediation
625 Broadway
Albany, New York 12233

Subject: **National Grid Troy (Smith Ave.) Former MGP Site, OU-3**
<u>Final Feasibility Study Report</u>

Dear Mr. Spellman,

On behalf of National Grid, Tetra Tech EC, Inc. is pleased to provide you with two (2) copies of the Final Feasibility Study Report for the Troy (Smith Ave.) Site OU-3, enclosed herein. If you have any questions please contact Bill Jones of National Grid at 315-428-5690.

Sincerely,

Robert C. Cantagallo

Robert C. Cantagallo
Project Manager

cc: W. Jones, National Grid, w/encl
M. Schuck, NYSDOH, w/encl
W. Petronis, USACE, w/encl
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enclosure

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Final Feasibility Study Report

for the

Troy (Smith Ave.) Site OU-3

November 2010

TETRA TECH EC, INC.

CERTIFICATION STATEMENT

I, Brian M. Sielski, certify that I am currently a NYS registered professional engineer and that this Feasibility Study was prepared in accordance with all applicable statutes and regulations and in substantial conformance with the DER Technical Guidance for Site Investigation and Remediation (DER-10) and that all activities were performed in full accordance with the DER-approved work plan and any DER-approved modification.

TETRA TECH EC, INC.

BRIAN M. SIELSKI
Type/Printed Name

Signature

19 NOV 2010
Date

084250-1 09/30/2011
NY State PE Stamp and Seal #/Expiration Date

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

EXECUTIVE SUMMARY

This report presents the results of a Feasibility Study (FS) performed by Tetra Tech EC, Inc. (TtEC) on behalf of National Grid (NG) for Operable Unit No. 3 (OU-3) of the Troy (Smith Avenue) Former Manufactured Gas Plant (MGP) Site (the Site) in Troy, New York. The site is a Class 2 inactive hazardous waste disposal site (No. 4-42-030) and is adjacent to the United States Army Corps of Engineers (USACE) lock on the Hudson River. OU-3 of the site is the Hudson River sediments. The FS approach for OU-3 is based on the remedial investigation findings and was developed as an outcome of discussions and meetings with NG, the USACE and the New York State Department of Environmental Conservation (NYSDEC).

The FS satisfies requirements specified in the 2003 Order-On-Consent (Index #A4-0473-0000) between NG and the NYSDEC. This report was completed consistent with the NYSDEC "Draft DER-10 Technical Guidance for Site Investigation and Remediation" (2002).

Non-aqueous phase liquid (NAPL) has been observed in the Hudson River sediments immediately adjacent to the former gas holder area of Operable Unit No. 1 (OU-1). OU-1 is the location of the former MGP. The selected remedy for OU-1, as presented in the June 2007 Record of Decision (ROD) for the Troy (Smith Avenue) Site, OU-1, will mitigate potential NAPL migration to the River. The Hudson River sediments have been designated as OU-3 by the NYSDEC and remedial alternatives for OU-3 are addressed in this FS.

Investigation Summary

The dominant physical feature of OU-3 is the Troy lock and dam. The Troy lock is approximately 80 feet wide, and is located on the eastern shore of the Hudson River to provide passage above the Troy Dam, which extends west-southwest from the lock to the opposite shore of the River. A lock approach wall extends approximately 250 south from the lock, parallel to the shoreline, and is 80 feet west of the sheet pile bulkhead wall which marks the shoreline in this area. The river shoreline is highly urbanized in the vicinity of OU-3, with shoreline features that include the USACE facility, the NG service facility, a former junkyard, a boat launch, areas of historic fill and storm water discharges to the river. Immediately south of OU-3, the City of Troy is located along the eastern shore of the River.

The Hudson River is tidal up to the Troy lock and dam. Both flow regimes are influenced to some extent by tidal fluctuations in the river and also by the operations of Troy Lock No. 1.

The OU-3 sediments near the shoreline, including those near the bulkhead and to the south of the lock, typically consisted of gray to dark gray sand with gravel and silt, and varying amounts of organic material. In the area closer to the western lock approach wall, the sediments were primarily gravel, and to south and west of the lock approach wall (those areas greater than approximately 175 feet west of the river bank), the substrate appeared to be primarily cobbles, and no sediment was recovered.

The top of weathered shale bedrock occurs immediately beneath the sand, silt and gravel, at an elevation which is consistent with the approximate top of bedrock encountered during drilling activities at OU-1 (the former MGP area).

The nature and extent of MGP impacts to sediments at OU-3 have been characterized, and indicate the following:

- Evidence of NAPL presence in sediments was only observed within the lock approach.

- No NAPL was observed in the rock cores collected near the bulkhead.

- Polycyclic aromatic hydrocarbon (PAH) concentrations in sediments collected from outside the lock area are much lower, typically by an order of magnitude, than the PAH concentrations in sediments in the lock area. In the samples collected in 2006 and 2008, PAH concentrations in the surficial sediments (e.g., 0-0.5 feet) ranged from 0 to 20.64 mg/kg at those locations where no NAPL was observed. PAH concentrations in subsurface sediments in the samples collected in 2006 and 2008 ranged from 0 to 62.68 mg/kg at those locations where no NAPL was observed. The maximum PAH concentration at the upgradient background location was 2.87 mg/kg.

- Analysis of toxicity data, PAH data and benthic macroinvertebrate sampling and analysis data indicates that the surficial sediments, other than those locations within 15-20 feet of the bulkhead in the lock approach where NAPL was observed, are not toxic. The only exception was location TS20; however, no NAPL was observed in this sample, the PAH concentration was 6.48 mg/kg, and none of the sediment samples collected near TS20 exhibited toxicity. The toxicity indicated by the results of the toxicity test for this location may be due to the physical characteristics of the sediment.

Remedial Action Objectives

RAOs are identified based on potential public health and environmental concerns and on SCGs. The RAOs for OU-3 are as follows:

<u>RAO for Public Health</u>

- **Prevent direct contact with contaminated sediments**

PAH concentrations in sediments collected from outside the lock area are much lower, typically by an order of magnitude, than the PAH concentrations in sediments in the lock area. Analysis of toxicity data indicates that, with the exception of TS20 (as described in Section 1.2.5), only those surficial sediments at locations where NAPL was observed were toxic to *H. azteca*. Solid-phase microextraction (SPME) data and benthic macroinvertebrate sampling and analysis data further support the toxicity data, indicating that the surficial sediments in those areas where NAPL was not observed are not toxic to aquatic biota. No NAPL was observed in the sediment outside the lock approach area, and the urban nature of the shoreline and the presence of the Troy lock and dam preclude the use of the river adjacent to the Site for direct contact purposes (e.g., swimming). Therefore, the sediment outside the lock area currently meets the RAO for public health.

Evidence of NAPL in sediments was only observed within the lock approach within 40 feet of the bulkhead wall. Public access to sediment within the lock area is severely limited, as use of this area is restricted to boat passage through the lock, and therefore potential for direct contact in this area through recreational activities is almost non-existent. In addition, the USACE has not dredged within the lock approach or the area south of the lock approach in more than 50 years, and has no plans to do so. Therefore, the potential for public exposure to the sediments in the lock approach area is minimal. However, removal of those sediments where NAPL was observed would eliminate the potential for direct contact with COPCs in sediment within the lock approach, and would remove the potential for NAPL or dissolved constituent migration downstream to more readily accessible areas. Therefore removal of sediment within 40 feet of the bulkhead, where NAPL was observed, would meet the RAO for public health.

<u>RAOs for Environmental Protection</u>

- **Prevent contaminant releases from sediments that could result in surface water levels in excess of ambient water quality criteria**.

Surface water sampling conducted during the RI revealed that no contaminants were detected in surface water at concentrations exceeding criteria, with the exception of one semi-volatile compound (SVOC). Sheens were observed on some of the sediment samples and NAPL was observed only in some sediment samples collected within the lock approach. These sheen and NAPL observations were within the sediment samples. The presence of sheens or NAPL in water is a violation of Part 703: Surface Water and Groundwater Quality Standards and Groundwater Effluent Limitations, subpart 703.2, which specifies a standard of “no visible oil film” (e.g., sheen or oil). The lack of VOCs in the surface water samples, and the detection of only one, non-MGP related SVOC, bis(2-ethylhexyl)phthalate, at 1 ug/l, a concentration just above criteria (0.6 ug/l), indicates that no release of dissolved and potentially MGP-related VOC or SVOC constituents to surface water from sediments is occurring under current conditions.

Evidence of NAPL in sediments was only observed within the lock approach and within 40 feet of the bulkhead wall, and, with the exception of TS20, sediment toxicity was only observed and/or predicted for those locations where NAPL was observed. Removal of sediment within 40 feet of the bulkhead, where NAPL was observed, would meet this RAO for environmental protection.

- **Prevent impacts to biota from ingestion/direct contact with sediments causing toxicity or impacts from bioaccumulation through the aquatic food chain**.

Analysis of toxicity data indicates that, with the exception of TS20, only those surficial sediments at locations where NAPL was observed were toxic to *H. azteca*. No significant difference was observed between survival in the reference and control samples and survival in the sediment samples collected where no NAPL was observed. An analysis of benthic macroinvertebrate data supports the toxicity testing results, indicating that macroinvertebrate populations are similar to background and reference locations at all sample locations except those where NAPL was observed (and TS20). Furthermore, macroinvertebrates highly sensitive to pollution such as mayfly larvae, caddisfly larvae, and water penny (orders Ephemeroptera, Trichoptera, and Coleoptera) were found at most of the stations sampled.

In addition, SPME results predict no toxicity at locations other than those where NAPL was observed (except TS20), and PAH concentrations in sediments collected from outside the lock area are much lower, typically by an order of magnitude, than the PAH concentrations in sediments in the lock area where NAPL was observed. Therefore, this RAO has already been met outside the lock approach area, and this RAO can be achieved at those locations inside the lock approach where NAPL was observed by sediment removal.

- **Remediation of sediment exceeding background levels of PAHs, to the extent practicable**.

The highest PAH concentrations are found primarily in the lock approach area, which is the only area where NAPL was observed. However, PAH concentrations in sediment samples collected from some locations downstream of the Troy lock and dam exceed the PAH concentrations in sediment samples collected from a background location upstream of the lock and dam. Some of those PAH detections appear to be MGP-related, although other sources also appear to contribute to the PAH levels in sediments. Therefore, the NYSDEC has requested development of a remedial alternative that addresses the sediment in OU-3 with PAH concentrations exceeding background levels, based on proposed requirements in the DER-10 (2009) and 6 NYCRR Part 375-2.8(a).

This RAO can be achieved, potentially temporarily, by sediment removal within and downstream of the lock area. The maximum detected background concentration, at one sample location, was 2.87 mg/kg. This value was used for estimating the volume to be removed under this RAO. However, sampling to statistically establish a background concentration would likely need to be conducted, as indicated in Section 3.8.3 of the NYS Draft DER-10 (2009).

Comparison of the PAH concentrations in OU-3 to existing background data (i.e., a maximum PAH concentration of 2.87 mg/kg), would indicate the removal of sediment with very low concentrations of PAHs, resulting in the removal of all of the sediment to bedrock from the northern end of the lock approach and proceeding downstream a distance of approximately 1,000 feet. Sediment would be removed from the eastern shoreline out to the observed western extent of sediment, varying from 80 to 175 feet from the shoreline, resulting in the removal of over 21,000 CY of sediment.

Furthermore, attempting to satisfy the RAO of achieving background PAH concentrations would include addressing sediment impacted by other sources of the PAHs (e.g., boat traffic, discharges from storm drains and other anthropogenic activities) in the sediment. The sediment removal area would therefore be subject to other sources of PAH loading to the Hudson River sediments.

General Response Actions

To meet the RAOs developed for OU-3, the following GRAs for sediments have been identified:

- Alternative 1: No Action
- Alternative 2: Limited Action (Development of a Sediment Management Plan for the lock approach)
- Alternative 3: Removal of sediment within the lock approach area and off-site disposal.
- Alternative 4: Removal of sediment within, and downstream of, the lock approach area with PAHs exceeding background concentrations and off-site disposal.

Development of Alternatives

Remedial technology types and process options associated with each general response action were screened based on technical feasibility, considering site-specific conditions, contaminant types, and concentrations. Representative process options were selected for each technically feasible technology type by evaluating the process options qualitatively based on effectiveness, implementability, and cost. Based on this evaluation, specific process options were selected for development of the remedial alternatives. The following paragraphs briefly summarize each of the alternatives:

Alternative S-1 – No Action

No remedial action would be performed at OU-3. Evaluation of this alternative is a statutory requirement.

Alternative S-2 – Limited Action

This alternative would include managing potential risks at OU-3 through controls such as sediment management plan development and implementation, and health and safety plan (HASP) development and implementation.

Alternative S-3 –Removal of Sediment within the lock approach area and Off-Site Disposal

This alternative would include dredging of NAPL containing sediments to a depth of approximately 6 feet, to top of bedrock. The dredged sediments would be transported offsite for treatment/disposal. The estimated volume of contaminated sediments to be removed to is 4,000 yd^3.

Alternative S-4 – Removal of sediment within, and downstream of, the lock approach area with PAHs exceeding background concentrations and off-site disposal

The NYSDEC has requested development of a remedial alternative that addresses the sediment in OU-3 with PAH concentrations exceeding background levels, as indicated in an e-mail from Mr. John Spellman, P.E. of the NYSDEC, dated November 10, 2009, based on proposed requirements in the DER-10 (2009) and 6 NYCRR Part 375-2.8(a). A single representative background sediment location was sampled in 2006. Therefore, prior to implementing this alternative, sampling of upgradient sediment would be conducted to establish a statistically based background concentration as indicated in Section 3.8.3 of the NYS DER-10 (2009). This alternative would include dredging of sediments within OU-3 that have PAH concentrations exceeding background PAH concentrations, and disregards other sources of PAHs in the sediments (e.g., boat traffic, discharges from storm drains and other anthropogenic activities). There is no discernable gradient to the PAH concentrations, therefore sediment would likely be removed from the eastern shoreline out to the observed western extent of sediment, varying from 80 to 175 feet from the shoreline and to an estimated depth to bedrock of approximately 7 feet. This would result in the removal of over 21,000 CY of sediment.

Evaluation of Alternatives

The remedial alternatives identified above were first evaluated individually and then on a comparative basis using the following seven evaluation criteria:

1. Compliance with Standards, Criteria and Guidance (SCGs);
2. Overall Protection of Human Health and the Environment;
3. Short-Term Impact and Effectiveness;
4. Long-Term Effectiveness and Permanence;
5. Reduction of Toxicity, Mobility, and/or Volume;
6. Implementability; and
7. Cost.

Comparative Evaluation of Remedial Alternatives

Compliance with SCGs: The alternatives can all be accomplished in accordance with action- and location-specific SCGs. Alternative S-3 removes potential source material and eliminates toxicity to aquatic organisms by removal of sediment containing NAPL, while S-4 attempts to achieve background conditions by removal of all sediments within and 1,000 feet downstream of the lock approach, regardless of PAH origin. Alternative S-3 achieves removal of NAPL and the sediments conservatively demonstrated to be toxic to aquatic biota within a reasonable timeframe. Alternative S-4 would require much longer to implement. Alternatives S-1 and S-2 do not remove contamination from OU-3 and would take significantly longer to achieve SCGs through naturally occurring degradation processes.

Overall Protection of Human Health and the Environment: Alternatives S-3 and S-4 are both protective of human health and the environment. Alternative S-2 provides some reduction in the potential for human exposure. Alternative S-1 is the least protective, since it does not remove or treat contaminants nor reduce the potential for human or environmental exposure.

Short-Term Impact and Effectiveness: Alternatives S-1 and S-2 would have the lowest short-term impact. There would be no potential risks to workers or the public during implementation of these alternatives, since no active remediation would be performed. Alternatives S-3 and S-4 would have a higher short-term impact and lower short-term effectiveness, since dredging would disturb the sediments and any dredged material would need to be transported through off-site areas for off-site treatment/disposal. Each of these alternatives could potentially increase risk of exposure to workers. These impacts would be minimized through proper dredging and transportation procedures, engineering controls, and health and safety procedures. However, Alternative S-4 would require dredging and transportation of a large volume of sediment, approximately five times as much as S-3, thereby substantially increasing potential short term impacts, which would include (but may not be limited to) the suspension of sediment into the water column, elimination of benthic habitat, the inconvenience and increased carbon emissions from truck traffic, and noise from equipment and trucks. Coordination with USACE would be required for the design and implementation of Alternatives S-3 and S-4, to (for example) mitigate impacts to boat traffic through the lock.

Long-Term Effectiveness and Permanence: Alternatives S-3 and S-4 both reduce the potential for human exposure, as they both would entail removal of sediment containing NAPL. Alternative S-4 also removes all sediment with PAH concentrations above background. Alternative S-2 would not be as effective as S-3 and S-4, as it would reduce the potential for human exposure through administrative controls, but would not provide any protection to biota. Alternative S-1 would not be effective, since it would not reduce the potential for human exposure. Site reviews would be required for Alternatives S-1 and S-2.

Reduction of Toxicity, Mobility, and/or Volume: Alternative S-4 offers the most significant reduction in mobility, toxicity, and volume of PAHs in sediments, as it would remove PAHs above background, regardless of their origin. However, both S-3 and S-4 offer an equal reduction in the volume of sediment containing NAPL. Alternative S-3 offers a significant reduction in mobility, toxicity, and volume of contaminated sediments since sediments containing NAPL, which are located within the lock approach, would be dredged to bedrock (approximately 6 feet) for appropriate off-site treatment and disposal. Alternatives S-1 and S-2 offer no reduction in mobility, toxicity, or volume since no active remediation would be performed.

Implementability: All of the alternatives evaluated are technically feasible. Alternative S-1 is the easiest to implement, since no remedial activities are employed in this alternative. Alternative S-2 is also easy to implement, involving only institutional controls. Alternative S-3 is relatively straightforward to implement and would require careful coordination with the USACE to complete the dredging. Alternative S-4 would involve dredging and transporting a significantly larger volume of sediment, over a longer period of time, and would therefore be more difficult to implement.

Services, equipment, and materials are available for all alternatives. Alternatives S-1 and S-2 require no materials and limited services. Alternatives S-3 and S-4 require dredging services in addition to replacement sediments. Alternative S-4 would require transport and disposal of a substantial quantity of sediment.

All of the alternatives evaluated are administratively feasible. Alternative S-1 would be the easiest to implement (short-term) since no activity would be performed. Alternative S-2 would also be easy to implement (short-term) since limited activity would be performed. The remaining alternatives all involve dredging activities and associated administrative activities (e.g., permitting, public participation, and coordination, etc.). Alternative S-3 would have some additional coordination requirements for dredging and off-site transportation. Alternative S-4 would require a significant effort for coordination of dredging and off-site transportation of such a large volume of material. Site reviews would be associated with alternatives S-1 and S-2.

Cost: Alternative S-1 has no capital costs and limited O&M costs, associated only with periodic reviews. Alternative S-2 has the next lowest capital and O&M costs for implementation of controls. Alternative S-4 has the highest capital costs. Overall, the ranking of the alternatives based on net present value (capital and O&M) from lowest to highest is: Alternatives S-1, S-2, S-3 and S-4.

Recommendation

Based on the evaluation of alternatives, S-3, removal of sediment within the lock approach area, and off-site treatment/disposal, has been selected.

This alternative includes removal of sediments observed to contain NAPL, within the lock approach, from the shoreline to the guide wall, approximately 80 feet west of the bulkhead wall. Although NAPL has only been observed within 40 feet of the bulkhead, limited sampling was conducted from 40 to 80 feet west of the bulkhead. For FS estimating purposes, it is assumed that sediment will be removed from the bulkhead west to the lock approach guide wall (a distance of 80 feet). The estimated volume of sediments to be removed is 4,000 yd^3. The average depth of the sediment in the area to be dredged is approximately 6 feet (to top of bedrock). This alternative would also include the placement of clean sediments at the channel bottom to replace the sediment removed.

The dredged sediments would be dewatered and amended as-needed for moisture content, and subsequently transported to a commercial thermal desorption facility and/or non-hazardous landfill for treatment/disposal in accordance with applicable rules and regulations. Any hazardous materials encountered would be managed in accordance with the appropriate protocols for these materials (e.g., thermal treatment). No institutional controls or monitoring would be implemented because the sediments containing NAPL and those found to be toxic to aquatic biota would be removed.

The selection of alternative S-3 would meet the RAOs for public health and environmental protection, with the only exception of the RAO for environmental protection to remediate sediment with PAH concentrations exceeding background concentrations, to the extent practicable. Removal of sediment containing PAH concentrations exceeding background downstream of the lock approach would disregard the other sources of the PAHs (e.g., boat traffic, discharges from storm drains and other anthropogenic activities) in the sediment. In addition, achieving background conditions may be temporary, as other sources will continue to contribute PAH loads to the Hudson River sediments. Moreover, none of the sediment downstream of the lock approach were determined to be toxic to *H. azteca* (a conservative indicator of toxicity to aquatic biota) and macroinvertebrates highly sensitive to pollution such as mayfly larvae, caddisfly larvae, and water penny (orders Ephemeroptera, Trichoptera, and Coleoptera) were found at most of the stations sampled.

Alternative S-3 uses demonstrated technologies to effectively achieve, to the extent practicable, the remediation goals established for this operable unit in a reasonable timeframe. This alternative is protective of human health and the environment and achieves the best balance of the NYSDEC evaluation criteria for selection of remedy.

1.0 INTRODUCTION

This report presents the results of a Feasibility Study (FS) performed by Tetra Tech EC, Inc. (TtEC) on behalf of National Grid (NG) for Operable Unit 3 (OU-3) of the Troy (Smith Avenue) Site (the Site) in Troy, New York. The FS approach is based on OU-3 investigation findings and was developed as an outcome of discussions and meetings with NG, the United States Army Corps of Engineers (USACE) and the New York State Department of Environmental Conservation (NYSDEC).

The FS satisfies requirements specified in the 2003 Order-On-Consent (Index #A4-0473-0000) between NG and the NYSDEC. This report was completed consistent with the NYSDEC "Draft DER-10 Technical Guidance for Site Investigation and Remediation" (2002).

NAPL has been observed in the Hudson River sediments immediately adjacent to the former holder area of Operable Unit No. 1 (OU-1). The remedial alternatives for OU-1, as presented in the June 2007 Record of Decision for the Troy (Smith Avenue) Site, OU-1, will address NAPL migration to the River. The Hudson River sediments have been designated as OU-3 by the NYSDEC, as indicated in the ROD. Remedial alternatives for OU-3 are addressed in this FS.

1.1 Purpose and Organization of Report

The purpose of the FS is to identify and evaluate remedial alternatives for sediment at OU-3. This FS Report consists of seven sections, the contents of which are set forth below:

Section 1.0 Introduction – This section provides a description of the Site and its operating and compliance history, a summary of the Site assessment and investigation work that has been undertaken, a summary of OU-3 physical conditions, and a summary of OU-3 contaminant conditions.

Section 2.0 Identification of Remedial Action Objectives and Guidance– This section provides the applicable chemical-specific, action-specific, and location-specific standards, criteria and guidance (SCGs), the remedial action objectives (RAOs) and their development, and the general response actions (GRAs).

Section 3.0 Identification and Screening of Technologies and Selection of Process Options – This section describes the methodology and the results of the technology identification and screening, the selection of process options, the development of alternatives, and the preliminary alternatives screening work that was performed as a part of the FS activity.

Section 4.0 Detailed Analysis of Remedial Alternatives – This section provides a description of the seven criteria that were used in the analysis of the remedial alternatives, and the detailed analysis of the remedial alternatives.

Section 5.0 Comparative Analysis – This section provides a comparative analysis of the remedial alternatives using the seven criteria that were utilized for the Section 4.0 Detailed Analysis.

Section 6.0 Selection of Preferred Remedial Alternatives – This section provides the results of the selection process for the remedial alternatives.

Section 7.0 References – This section cites the references that were relied upon for information and guidance during the preparation of this FS Report.

1.2 Background Information

Relevant information concerning the Site conditions, the operating and compliance history, the investigation history, and OU-3 physical conditions is provided within this section.

1.2.1 Site Description

The Troy (Smith Avenue) Site is located adjacent to the Hudson River at Smith Avenue in Troy, Rensselaer County, New York. Figure 1 depicts the Site location (USGS - North Troy Quadrangle). The Site is located adjacent to the Hudson River at Smith Avenue in Troy, Rensselaer County, New York.

OU-1 consists of the upland portion of the Site, and occupies a total of approximately five acres comprising portions of two properties, one owned by NG and the other by the USACE. The southern and northeastern portions of the Site are owned by NG and are currently in use for operation of a natural gas distribution and service facility. The northwestern portion of the Site, bordering the Troy lock and dam on the Hudson River, is owned by the USACE. This property includes an active USACE field office that serves primarily to operate and maintain the Troy lock and dam. Mixed residential and urban/commercial land use areas are immediately adjacent to the Site boundaries. OU-3 consists of the reach of the Hudson River adjacent to OU-1. Ingalls Avenue has been designated as OU-2. OU-2 consists mostly of a former canal that was filled in the early 20th century, and is located south of the Troy (Smith Avenue) Site (Figure 2).

1.2.2 Site History

Site history information is presented below and is based upon information presented in the Remedial Investigation Report for the Troy (Smith Avenue) Site (May 1998).

In 1858, the Site consisted of vacant land in the City of Troy’s Thirteenth Ward. By 1876, the area of the Site contained some residential development.

The first commercial development of the Site was present in 1881, at which time the “Spring Works,” a large brick building, was present to the north of Smith Avenue (Hopkins Atlas, 1881) and the J.B. Carr & Company Chain Factory was present to the south of Smith Avenue.

In 1885, the Troy Fuel Gas Company purchased an exclusive license to use the Lowe water gas process to produce gas in Troy (Troy Fuel Gas Company minutes, 1885). Also in 1885, the Spring Works building was closed and two “tar kettles” were present in the J.B. Carr & Company building (Sanborn, 1885).

In 1886, the land parcel immediately north of Smith Avenue was conveyed from Manufacturers National Bank of Troy to the Troy Fuel Gas Company. The property contained an engine and boiler in the former spring works (Record of Deed, 10/1/1886).

By 1888, the water gas equipment began operation at the Smith Avenue Site (Troy Fuel Gas Company Minutes). In 1889, the Troy Fuel Gas Company consolidated into the Troy Gas Company and purchased three additional parcels north of Smith Avenue (Records of Deed; 10/21/1889, 11/15/1889, 11/15/1889).

By 1903, there were two gas holders west of the gas plant on the bank of the Hudson River, and a third gas holder and three oil tanks west of the plant. The plant consisted of a purifying house, two coal sheds, nine water gas generators, a condenser, a black smith shop, an engineering room, a store house and an office (Sanborn, 1903).

Between 1915 and 1916, the Troy dam and lock was relocated north on the Hudson River to a point adjacent to the northwestern side of the Site (Map of Troy, 1916). Also in 1915, the J. B. Carr & Company American Chain Cable Works, located to the south of Smith Avenue, was purchased by the Troy Gas Company (Record of Deed, 3/29/1915). Between 1915 and 1920, the Troy Gas Company purchased four additional parcels that bordered the Site (Records of Deed; 3/29/1915, 4/21/1915, 4/13/1917, 12/2/1920).

In 1925, the Smith Avenue gas plant ceased operation when the Hudson Valley Coke and Products Corporation gas plant began operation on Water Street in Troy to supply gas to the Troy Gas Company. The Smith Avenue gas plant was maintained on standby for emergencies (NYP&L Report to NYSPSC, 1931).

By 1928, there was a third gas holder on the former Carr property south of Smith Avenue and three tar settling tanks along the Hudson River (NYP&L property map, 1928; see Figure 1-2).

In 1928, the last gas was produced at the Smith Avenue gas plant. Thereafter, the Site was only used for gas storage (NYP&L Report to NYSPSC, 1934).

By 1951, the two large gas holders west of the gas plant had been removed. The smaller holder and oil tanks east of the plant were replaced by a garage (Sanborn, 1951).

In 1960, the last 1000 million cubic foot gas holder was removed from the Site (NG letter, 9/29/1959).

In 1965, NG conveyed a 0.64 acre parcel along the Hudson River, west of the former gas plant, to New York State which later transferred the property to the U.S. Government (New York State Department of Public Works, Acquisition of Property, 6/19/1965).

By 1986, the main gas building north of Smith Avenue had been removed from the Site (Aerial Photo, 1986).

1.2.3 Site Assessment and Investigation

A Remedial Investigation (RI) and Supplemental Remedial Investigations (SRI) were performed at OU-3 and have been used to support the FS. Surface water and sediment samples were collected from the Hudson River in 1997 as part of the RI. TtEC conducted a Supplemental Remedial Investigation (SRI) in 2006 to provide additional sediment data for OU-3. The purpose of the SRI was to evaluate the presence of non-aqueous phase liquid (NAPL), related to former manufactured gas plant (MGP) operations, in the Hudson River sediment. This work was done in accordance with the October 12, 2006 revised Supplemental Remedial Investigation Work Plan, which addressed comments received from the New York State Department of Environmental Conservation (NYSDEC) in a letter dated September 13, 2006. The revised Supplemental Remedial Investigation Work Plan was approved by the NYSDEC in a letter dated October 18, 2006.

TtEC conducted additional investigations of the Hudson River sediment in October 2007 to address comments on the 2006 SRI that the NYSDEC provided in a letter dated August 2, 2007. This work was completed in accordance with the September 21, 2007 Supplemental Remedial Investigation Work Plan, which was approved without comment by the NYSDEC in a letter dated October 11, 2007. The purpose of the 2007 investigation was to obtain additional data regarding depth to bedrock and toxicity information. In addition, TtEC and ENSR Corporation collected sediment samples as part of a study regarding PAH bioavailability.

TtEC conducted further investigations of the Hudson River sediment in July 2008 to obtain additional data regarding PAH concentration data and information regarding PAH toxicity. This work, discussed in an e-mail to NYSDEC on June 25, 2008, was approved in an e-mail from the NYSDEC dated June 27, 2008, and was completed in accordance with the methods described in the September 21, 2007 Supplemental Remedial Investigation Work Plan.

It should be noted that the process for the analysis of these sediment samples for PAHs in 2007 differed from the methods employed in 2006 and 2008. The analysis of sediment samples for PAH16 concentrations in 2006 and 2008 was conducted by Chemtech and TestAmerica, respectively, which are commercial, NYSDOH ELAP-certified laboratories. The university laboratory used in 2007 is not NYSDOH ELAP certified, and the methods varied between the ELAP approved and non-ELAP approved laboratories. For example, the sample extraction process employed by the Energy and Environment Research Center (EERC) at the University of North Dakota for PAH analysis of the samples in 2007 is more aggressive than the procedures used by the commercial laboratories. An 18-hour extraction process is used by EERC, and the process used by commercial ELAP-certified labs is typically 2 to 4 hours in duration. Information regarding the depth to bedrock, toxicity, and benthic macroinvertebrate sampling is presented below. The 2007 PAH data and bioavailability information is presented in the November 2008 SRI Report.

A summary of the programs and their findings is presented below, based upon information provided within the May 1998 Remedial Investigation Report provided by

Foster Wheeler Environmental Corporation (FWENC), and data presented in the November 2008 SRI Summary Report prepared by TtEC.

NYSDEC personnel were on hand periodically during all of the RI and SRI sampling events to observe sampling activities. The sample locations from each of the sampling events described below are shown on Figure 2.

1.2.3.1 Remedial Investigation

Surface water samples and sediment cores in OU-3 were collected during the OU-1 RI field investigation from a total of six (6) locations in the Hudson River (SD/SW-1 through SD/SW-6) to evaluate the potential migration of OU-1-related constituents into the river. Two of the sediment core-surface water pairs were collected to evaluate upgradient (SD/SW-5, upstream of the Site) and local (SD/SW-4, outboard of the lock channel adjacent to the Site) background levels of contamination. Sediment cores were advanced by a vessel-mounted vibratory coring rig to depths of approximately six feet below the sediment-water interface where possible. However, four of the six cores reached the bedrock at depths of less than or equal to three feet. Composite sediment samples were collected from the 0 to 3 foot depth interval and, where possible, from the 3 to 6 foot depth interval. Each of the composite samples was analyzed for TCL organics, TAL inorganics, TOC and grain size. Surface water samples were analyzed for TCL organics, TAL metals, cyanide, and hardness.

The OU-1 RI program is described in detail in the 1998 RI Report, and the results are summarized in this FS in Section 1.2.5 (Nature and Extent of Contamination).

1.2.3.2 Supplemental Remedial Investigations

<u>2006</u>

On October 31 and November 1, 2006, TtEC collected a series of sediment cores at 14 locations along the eastern shore of the Hudson River (Figure 2). Six cores were collected along the USACE bulkhead, adjacent to the location of the former gas holders, approximately 15 feet off the bulkhead. Five step-out cores were collected approximately 22 feet west of the first line of cores (37 feet off the bulkhead). These locations were positioned so as not to interfere with boat traffic through the Troy Lock. In addition, one core was collected upstream of the lock and one was collected downstream of the lock.

At each of the sediment core locations, three-inch diameter sediment cores were collected using Vibracore™ methods. The sediment cores were extended to refusal. The sediment cores were used to determine the presence or absence of NAPL along the eastern shore of the Hudson River adjacent to OU-1. Core samples were visually inspected for evidence of NAPL and screened with a PID. Samples were collected for laboratory analysis from the 0 to 6 inch, 12 to 18 inch, 24 to 32 inch, and 36 to 42 inch depth intervals (below top of sediment) for individual PAHs, total PAHs, black (soot) carbon and total organic carbon at each drilling location where visual inspection did not indicate the presence of NAPL. The intervals sampled for each core were dependent upon recovery in each interval, and the total length of the core. The elevation of the top of sediment was determined by measurement of water depth, and recording the water level on the tide gauge at the Troy lock, the surveyed elevation of which is 17.2 feet at the top of the lock wall.

A second core was extended to bedrock at locations Vibracore(V)-3, V-5, V-9, V-11 and V-12. Equipment malfunction prevented coring to bedrock at a sixth location. Multiple methodologies were used to determine the depth to bedrock. At locations V-5 and V-11, the Vibracore™ was advanced to refusal, and a casing installed to the refusal depth. Split spoons and/or a chisel bit were then used in an attempt to recover material from the core bottom. Rock coring was then conducted at locations V-3, V-9, and V-12. Core recovery was poor due to movement of the drilling platform, and resulting loss of recovery. Given the difficulties obtaining bedrock cores, and the results of the sediment core collection, additional investigation activities were conducted in 2007.

2007

On October 15-19, 2007, TtEC collected a series of cores at locations along the eastern shore of the Hudson River, as well as surface sediment grab samples. Sediment grabs for toxicity analysis were collected from four locations (TS2, TS4, TS7, and TS9) in the vicinity of the cores collected in 2006. Three sediment grabs (TS19, TS21, and TS22) were attempted west of the step-out locations advanced in 2006, and one (TS23) was collected south of the lock approach. Sediment grabs were collected at TS20 and TS30, near the V-13 location, to obtain information regarding sediment quality in the area where a sheen was observed in 2006. Attempts were made to collect sediment grabs at four step-out locations (TS25, TS26, TS27, and TS28) west of TS20 and TS24.

Sediment grabs for toxicity analysis were collected at two upstream field reference locations above the Troy Lock and Dam approximately 1,400 feet upstream of the northern boundary of OU-1 (TS15 and TS16). An additional two downstream field reference grab samples were collected approximately 230 feet downstream of the southern boundary of OU-1 (TS17 and TS18). Also, bedrock cores to confirm the depth to bedrock were collected at two of the locations, TS19 and TS20, as requested by the NYSDEC. The elevation of the top of sediment was determined by measurement of water depth, and recording the water level on the tide gauge at the Troy lock, the surveyed elevation of which is 17.2 feet at the top of the lock wall.

Toxicity testing was conducted on the surficial sediment grabs collected. In addition, samples observed to contain NAPL or sheens from the following sample locations underwent forensic analysis by META: TS02, TS04, TS17, TS18, TS20, TS24, TS29 and TS30.

Macroinvertebrate sampling and analysis was also conducted in 2007. Macroinvertebrates recovered from each sample were sorted, counted, and identified down to the lowest feasible taxonomic level (Genus) by Aquatec. A complete discussion of the macroinvertebrate sampling can be found in the November 2008 SRI Report.

The results of the 2007 supplemental investigation indicated that additional sampling was necessary to obtain more information regarding the distribution of PAHs in OU-3.

2008

In order to obtain additional information regarding the distribution of PAHs in OU-3 and verify some of the results obtained in 2007, supplemental investigation activities were conducted in OU-3 in 2008. On July 9-11, 2008, TtEC collected a series of sediment cores at locations along the eastern shore of the Hudson River, as well as surface sediment grab samples. Three cores (TS31, TS32, and TS33) were collected in the vicinity of cores TS30, TS17, and TS18, respectively, which were collected in 2007, in order to obtain additional information regarding PAH concentrations and toxicity in these sediments. Three transects of cores, parallel to the shoreline, were collected, extending north to south from the vicinity of TS17 and TS18 to the vicinity of Ingalls Avenue. TS34 through TS38 were collected approximately 50 feet from the shoreline, and were spaced approximately 50-60 apart. TS39 through TS44 were attempted 100 feet west of TS34 through TS38. However, at all of these locations, the substrate consisted of cobbles and gravel, and no sample was recovered. Therefore, a third row of sample locations, TS45 through TS48 was completed midway between these eastern and western transects. The elevation of the top of sediment was determined by measurement of water depth, and recording the water level on the tide gauge at the Troy lock, the surveyed elevation of which is 17.2 feet at the top of the lock wall. The grab samples were submitted for toxicity analysis only, and the sediment core samples were submitted for PAH analysis as described below.

The sediment cores were advanced and sampled as detailed in the NYSDEC-approved October 12, 2006 SRIWP, including visually inspecting the core samples for evidence of NAPL and screening them with a photoionization detector (PID), as described above. Samples were collected from the 0 to 6 inch, 12 to 18 inch, 24 to 32 inch, and 36 to 42 inch depth intervals (below top of sediment), for the 16 USEPA priority pollutant PAHs where cores could be advanced to these depths and sufficient recovery was obtained. The 16 USEPA priority pollutant PAHs (PAH16) are a subset of the PAH34.

1.2.4 Site Physical Conditions

Sediment core logs are provided in Appendix A. Based upon the PSA, RI, and SRI findings, the OU-3 physical conditions are summarized and described below.

OU-3 is the reach of the Hudson River adjacent to OU-1. The dominant physical feature of OU-3 is the Troy lock and dam (Figure 2). The Troy lock is approximately 80 feet wide, and is located on the eastern shore of the Hudson River to provide passage above the Troy Dam, which extends west-southwest from the lock to the opposite shore of the River. A lock approach wall extends approximately 250 south from the lock, parallel to the shoreline, and is 80 feet west of the sheet pile bulkhead wall which marks the shoreline in this area. The eastern shoreline along the northern portion of OU-1 is characterized by a steep slope down to the sheet piling wall of the lock, with a ground surface elevation of approximately 15 feet above MSL at the wall. South of the lock approach, the shoreline is characterized by a steep slope from the edge of the NG parking area (approximately 28 feet above MSL) down to the Hudson River. The river shoreline is highly urbanized in the vicinity of OU-3, with shoreline features that include the

USACE facility, the NG service facility, a former junkyard, a boat launch, areas of historic fill and storm water discharges to the river. Immediately south of OU-3, the City of Troy is located along the eastern shore of the River.

The Hudson River is tidal up to the Troy lock and dam. Both flow regimes are influenced to some extent by tidal fluctuations in the river and also by the operations of Troy Lock No. 1.

Figure 2 shows the locations of the cross sections presented in this FS, which provide a visual depiction of the sediment encountered in OU-3. Cross sections A-A' and B-B' (Figures 3 and 4) extend north to south, and cross sections C-C' and D-D' (Figures 5 and 6) extend east to west.

The OU-3 sediments near the shoreline, including those near the bulkhead and to the south of the lock, typically consisted of gray to dark gray sand with gravel and silt, and varying amounts of organic material. In the area closer to the western lock approach wall, the sediments were primarily gravel, and to south and west of the lock approach wall (those areas greater than approximately 175 feet west of the river bank), the substrate appeared to be primarily cobbles, and no sediment was recovered.

The top of weathered bedrock occurs immediately beneath the sand, silt and gravel, at an elevation which is consistent with the approximate top of bedrock encountered during drilling activities at OU-1 (the former MGP area). The shallow bedrock, gray to dark gray shale, consist of shale and shale fragments with highly weathered open fractures, to a depth of 5 to 10 feet below the bedrock surface. The unweathered bedrock below this depth had few, tight fractures and minimal signs of weathering. No NAPL was observed in the rock cores collected near the bulkhead.

1.2.5 Nature and Extent of Contamination

The nature and extent of the contamination in sediments is summarized below, based on the results of the Remedial Investigation (RI) and Supplemental Remedial Investigations (SRI). The nature and extent of the contamination has been evaluated with respect to existing standards and preliminary remediation goals, as presented in Section 2.0 of this FS Report.

1.2.5.1 Surface Water

No volatile organic compounds, pesticides, cyanide or PCBs were detected in the surface water samples. Bis(2-ethylhexyl)phthalate was detected at low concentrations (1 ppb) at two of the surface water locations. Selenium was the only metal detected at a concentration (3.8 ppb) exceeding NYSDEC criteria.

1.2.5.2 Sediments

Remedial Investigation

No volatile organic compounds were detected at concentrations greater than NYSDEC criteria in the sediments collected during the RI. Concentrations of eight semi-volatile organic compounds were detected, including acenaphthene, phenanthrene, benzo(a)anthracene, chrysene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, and indeno(1,2,3-cd)pyrene. No metals were detected above the Severe Effect Levels for sediments.

The RI report was completed and submitted in May 1998. Subsequent to submittal of the RI report, the NYSDEC issued revised guidance on evaluating sediments, including Technical Guidance for Screening Contaminated Sediments (1999) and Technical and Operational Guidance Series (TOGS) 5.1.9, In-Water and Riparian Management of Sediment and Dredged Material (2004). These documents provide a road map for the evaluation of impacted sediments. The TOGS guidance provides screening criteria for sediments, but indicates that the criteria are only for screening purposes, and are not meant to guide remediation. The guidance indicates that, upon establishing the presence and extent of impacts to sediments, an evaluation of the magnitude and nature of the impacts must be conducted. For example, the depth to contaminated sediments must be evaluated (e.g., are the impacts present within the biologically active zone?) and the toxicity should be evaluated. All of this information is then used to determine the appropriate remedial approach.

The results of the 2006, 2007 and 2008 sampling will be discussed in the context of this guidance, in order to evaluate the need for potential remediation.

Supplemental Remedial Investigation

PAHs

Figure 7 shows PAH16 concentrations detected in sediment samples collected from OU-3 in 2006 and 2008. PAH concentrations in sediments collected from outside the lock area are much lower, typically by an order of magnitude, than the PAH concentrations in sediments in the lock area. In the samples collected in 2006 and 2008, PAH concentrations in the surficial sediments (e.g., 0-0.5 feet) ranged from 0 to 20.64 mg/kg at those locations where no NAPL was observed. PAH16 concentrations in subsurface sediments in the samples collected in 2006 and 2008 ranged from 0 to 62.68 mg/kg at those locations where no NAPL was observed.

The November 2008 SRI Report provides a detailed discussion regarding the bioavailability and toxicity of the detected PAHs in sediment collected in 2007 from the Hudson River near the Troy Smith Avenue Site. The characterization of impact in surface sediments from Troy Smith Ave indicates that two sediment samples, TS02 and TS04, both of which were in the lock approach area at locations where NAPL was observed, were toxic to *H. azteca* and the toxicity may be attributed to PAHs present as a result of the NAPL in the sediments, as measured using SPME pore water PAH34 concentrations. Analysis of SPME data indicates that the surficial sediments, other than those locations within 15-20 feet of the bulkhead in the lock approach where NAPL was observed as described above, are not toxic as a result of OU-1 related impacts. Toxicity analysis and benthic macroinvertebrate evaluation are further discussed below.

The PAH concentrations in the upstream reference sample TS15 indicate that anthropogenic inputs (e.g., outfalls) may be responsible for a portion of the PAHs in sediments in the River. PAH concentrations in sediment samples collected near the bulkhead may be attributed to OU-1-related impacts. Further discussion of the relation of PAH concentration in sediments to OU-1 is provided below.

Toxicity Testing

Toxicity testing of sediments collected in 2007 and 2008 was conducted at all locations where surficial sediments could be recovered (Figure 8). Toxicity data is presented in Appendix B. Analysis of toxicity data from both sampling events indicates that the surficial sediments, other than those locations within 15-20 feet of the bulkhead in the lock approach where NAPL was observed, are not toxic, regardless of PAH concentration. The only exception was location TS20; however, no NAPL was observed in this sample, the PAH16 concentration was 6.48 mg/kg, and none of the sediment samples collected near TS20 exhibited toxicity. The toxicity indicated by the results of the toxicity test for this location may be due to the physical characteristics of the sediment.

NAPL

NAPL was noted in some of the sediment cores collected along the bulkhead (Figure 9). NAPL has only been observed in sediment along the bulkhead in the lock approach. To the west and south, either no evidence of NAPL or sheens were observed, or only trace sheens were observed, and the substrate west and southwest of the lock approach wall is primarily gravel and cobbles, with no recoverable sediment. No NAPL was observed in the bedrock cores collected near the bulkhead in 2006, or in 2008 as part of the OU-1 pre-design investigation. This indicates that the pathway for NAPL migration from OU-1 to OU-3 was most likely the overburden and the bulkhead directly to the sediment. A sheen was also observed at TS35, approximately 700 feet south of OU-1. No NAPL was observed in the sediment adjacent to locations on OU-1 where NAPL was observed during the RI in bedrock wells (MW-7D, MW-2A, MW-9D) at OU-1.

Forensic Analysis

META completed the forensic analysis of 17 sediment samples in 2007. The META report is provided in Appendix C. In addition, TtEC reviewed PAH ratios from the sediment samples collected in 2008.

Based on the results of the forensic analysis conducted by META, most of the 17 sediment samples collected in 2007 appear to contain some quantity of non-MGP related PAHs in varying proportions. The forensic analysis conducted by META indicated that

PAHS were due to a range of sources, including anthropogenic sources typical of urban background. The surficial samples from TS17 and TS18 appeared to consist of urban background impacts only. Urban background in sediment is characterized by various amounts of combustion-derived pyrogenic PAHs and an accumulation of a complex mixture of severely weathered petroleum products from runoff of fuel and lubricating oil onto roads, asphalt wear, and other sources. While there are indications of petroleum products in samples TS17 and TS18 (i.e., petroleum biomarker compounds), no specific type of product or combination of products was evident, a characteristic typical of urban background. Furthermore, the PAHs at TS29 and TS38, collected in 2008, also appear to be from unique urban background sources, completely unrelated to OU-1.

The remaining samples from 2007 displayed a range of impacts including MGP materials, from trace MGP impacts (TS20, TS24) to extensive (TS04 (1-1.8) and TS02 (4.5-5.5), and a mix of urban background inputs. The sediments that displayed MGP impacts had high levels of environmentally induced degradation (weathering) variability including dissolution and what appeared to be anaerobic bacterial degradation. The PAH data from those samples collected in 2008 indicates that all of these samples exhibit varying proportions of MGP related PAHs and other non-point sources of PAHs, as indicated by PAH ratios.

Benthic Macroinvertebrate Sampling

Analysis of the benthic macroinvertebrate data indicated that populations sampled were similar to reference/background locations, and therefore unimpacted by the PAHs, with the following exceptions:

The benthic macroinvertebrate populations in sediment samples TS02 and TS04, collected from locations where NAPL was observed and which exhibited toxicity to *H. azteca*, were clearly different from the upstream field reference samples and nontoxic site samples for diversity, PMA, and DOM. Sample TS20, which was also toxic to *H. azteca*, was consistently at the lower end of the range of upstream field references and nontoxic site samples for all 5 metrics. One downstream reference, TS18, which was nontoxic to *H. azteca*, tracked closely to TS02 and TS04 for diversity, PMA, and DOM. Richness and HBI indices did not provide sufficient discrimination between toxic and nontoxic samples or site samples and field references.

1.2.5.3 Summary of Nature and Extent

The top of weathered shale bedrock occurs immediately beneath the sand, silt, and gravel, at an elevation which is consistent with the approximate top of bedrock encountered during drilling activities at OU-1 (the former MGP area).

The nature and extent of MGP impacts to sediments at OU-3 have been characterized, and indicate the following:

- Evidence of NAPL presence in sediments was only observed within the lock approach.

- No NAPL was observed in the rock cores collected near the bulkhead.

- Polycyclic aromatic hydrocarbon (PAH) concentrations in sediments collected from outside the lock area are much lower, typically by an order of magnitude, than the PAH concentrations in sediments in the lock area. In the samples collected in 2006 and 2008, PAH concentrations in the surficial sediments (e.g., 0-0.5 feet) ranged from 0 to 20.64 mg/kg at those locations where no NAPL was observed. PAH concentrations in subsurface sediments in the samples collected in 2006 and 2008 ranged from 0 to 62.68 mg/kg at those locations where no NAPL was observed. The maximum PAH concentration at the upgradient background location was 2.87 mg/kg.

- Analysis of toxicity data, PAH data and benthic macroinvertebrate sampling and analysis data indicates that the surficial sediments, other than those locations within 15-20 feet of the bulkhead in the lock approach where NAPL was observed, are not toxic. The only exception was location TS20; however, no NAPL was observed in this sample, the PAH concentration was 6.48 mg/kg, and none of the sediment samples collected near TS20 exhibited toxicity. The toxicity indicated by the results of the toxicity test for this location may be due to the physical characteristics of the sediment.

2.0 IDENTIFICATION OF REMEDIAL ACTION OBJECTIVES AND GUIDANCE

This section discusses Standards, Criteria, and Guidance (SCGs), the development of Remedial Action Objectives (RAOs), and the General Response Actions to address the RAOs that are identified.

2.1 Standards, Criteria, and Guidance (SCGs)

The Troy (Smith Avenue) Site is categorized as a Class II Inactive Hazardous Waste site by the NYSDEC. Activities at OU-3 are being performed under an Order on Consent. In accordance with 6 NYCRR 375-1, NYSDEC-issued permits are not required for environmental remediation activities conducted at this Site. Rather, the activities are evaluated and implemented based on the substantive elements of the applicable and relevant and appropriate state environmental laws and regulations. Federal applicable, relevant and appropriate requirements (ARARs) must be complied with fully, including the requirements to obtain permits if necessary. These federal and state environmental laws, regulations, and guidance are collectively referred to as SCGs.

The SCGs that may guide the remedial action activities at OU-3 are addressed in this section. This includes both New York State SCGs, as well as federal standards that are more stringent than State SCGs. New York State SCGs are standards or requirements that implement the New York State Environmental Conservation Law. Remedial actions conducted in New York State are required to attain SCGs to the extent practicable.

SCGs are categorized as chemical-, location-, or action-specific:

- Chemical-specific SCGs set health or risk-based concentration limits or ranges in various environmental media for specific hazardous substances, pollutants or contaminants.
- Location-specific SCGs set restrictions on activities within specific locations, such as wetlands and floodplains, and depend on the characteristics of a site and its immediate environs.
- Action-specific SCGs set controls or restrictions on particular kinds of activities that may be selected to accomplish a remedy. These SCGs may specify particular performance levels, actions or technologies to be used to manage hazardous substances, pollutants or contaminants.

2.1.1 Chemical-Specific SCGs

Chemical-specific SCGs are health- or risk-based concentrations for specific hazardous substances, pollutants, or contaminants in various environmental media. Chemical-specific SCGs include remediation goals for chemicals of concern (COCs) in sediments. Statutes, regulations, and guidelines to be used in the identification of chemical-specific SCGs are listed in Table 2-1.

TABLE 2-1
CHEMICAL-SPECIFIC SCGs

2.1.2 Action-Specific SCGs

Action-specific SCGs are technology- or activity-based requirements or limitations. These SCGs are triggered by, and apply to, the implementation of particular remedial activities. Federal and state statutes, regulations, and guidelines used to identify action-specific SCGs for OU-3 are listed in Table 2-2.

Of primary consideration are the Resource Conservation and Recovery Act (RCRA) hazardous waste management regulations (and the NYSDEC equivalents). The Land Disposal Restriction (LDRs) requirements of the RCRA regulations (40 CFR 268) apply to the placement of hazardous waste in land disposal units. The RCRA LDRs are potential SCGs for the excavation and disposal of MGP-impacted sediments. Specifically, excavated sediments that are characterized as hazardous waste must meet stringent treatment standards prior to final land disposal.

Pursuant to the Phase IV amendments to the LDR regulations, sediments contaminated with hazardous wastes may be treated to meet LDRs or an alternate treatment standard. Under this Alternate Treatment Standards rule revision, hazardous waste constituents in sediments can be reduced by 90 percent capped at 10 times the applicable LDR Universal Treatment Standard. Prior approval for use of Alternative Treatment Standards for hazardous waste sediments is not required.

Additionally, the NYSDEC policy "Management of Coal Tar Waste and Coal Tar Contaminated Soils and Sediment" (DER-4) addresses the disposal of MGP-contaminated sediments. Sediments that do not contain purifier waste, do not contain any listed waste, or do not exhibit a characteristic of a hazardous waste (except for TCLP benzene), and are compatible with thermal treatment, may be decharacterized. Sediments exhibiting the D018 hazardous waste characteristic must be thermally treated at a permitted facility, and are exempt from hazardous waste management requirements (but subject to solid waste management requirements) in regards to:

- Excavation and storage at the point of generation;
- Transportation to the thermal treatment facility or unit;
- Handling and storage prior to thermal treatment at the facility;
- Thermal treatment; and
- Management of treated materials.

These sediments can be mixed with coal fines with coal fines and/or carbon to ensure proper operation of the treatment technology. While diluting hazardous waste sediments is not permitted, the mixing of sediments during consolidation activities is allowed. No solid waste management permit is required, provided treatment occurs at the site or off-site at a facility where regulatory requirements are met. Coal tar contaminated sediments which meet applicability requirements, and the treatment residuals, are not subject to LDRs.

TABLE 2-2
ACTION-SPECIFIC SCGs

Other Action-Specific SCGs that may apply to the remedial activities at OU-3 include the NYSDEC solid and hazardous waste handling, transportation and disposal regulations and ambient air quality standards and emission limitations.

2.1.3 Location-Specific SCGs

Location-specific SCGs are restrictions placed on the concentration of hazardous substances or the conduct of activities solely because they are in specific locations. Statutes, regulations, and guidelines to be used in the identification of location-specific SCGs are listed in Table 2-3.

2.2 Remedial Action Objectives

The RAOs are developed based on the contaminants of concern, potential exposure routes, receptors, and acceptable concentrations for each exposure route in order to protect human health and the environment.

2.2.1 Contaminants of Concern

The NYSDEC has designated OU-3 as the sediment of the Hudson River, and sediments are, by definition, the media of concern. Sampling during the RI indicated that the contaminants of concern were PAHs, and therefore PAHs were the focus of the SRI events. Therefore, the COPCs for OU-3 are PAHs.

2.2.2 Remedial Action Objectives

In this section, site-specific RAOs are identified based on public health and environmental concerns and on SCGs.

<u>RAO for Public Health</u>

- **Prevent direct contact with contaminated sediments**

PAH concentrations in sediments collected from outside the lock area are much lower, typically by an order of magnitude, than the PAH concentrations in sediments in the lock area. Analysis of toxicity data indicates that, with the exception of TS20 (as described in Section 1.2.5), only those surficial sediments at locations where NAPL was observed were toxic to *H. azteca*. SPME data and benthic macroinvertebrate sampling and analysis data further support the toxicity data, indicating that the surficial sediments in those areas where NAPL was not observed are not toxic to aquatic biota. No NAPL was observed in the sediment outside the lock approach area, and the urban nature of the shoreline and the presence of the Troy lock and dam preclude the use of the river adjacent to the Site for direct contact purposes (e.g., swimming). Therefore, the sediment outside the lock area currently meets the RAO for public health.

Evidence of NAPL in sediments was only observed within the lock approach within 40 feet of the bulkhead wall. Public access to sediment within the lock area is severely limited, as use of this area is restricted to boat passage through the lock, and therefore potential for direct contact in this area through recreational activities is almost non-

TABLE 2-3
LOCATION-SPECIFIC SCGs

existent. In addition, the USACE has not dredged within the lock approach or the area south of the lock approach in more than 50 years, and has no plans to do so. Therefore, the potential for public exposure to the sediments in the lock approach area is minimal. However, removal of those sediments where NAPL was observed would eliminate the potential for direct contact with COPCs in sediment within the lock approach. Therefore removal of sediment within the lock approach area, where NAPL was observed, would meet the RAO for public health.

<u>RAOs for Environmental Protection</u>

- **Prevent contaminant releases from sediments that could result in surface water levels in excess of ambient water quality criteria**.

Surface water sampling conducted during the RI revealed that no contaminants were detected in surface water at concentrations exceeding criteria, with the exception of one semi-volatile compound (SVOC). Sheens were observed on some of the sediment samples and NAPL was observed only in some sediment samples collected within the lock approach. These sheen and NAPL observations were within the sediment samples. The presence of sheens or NAPL in water is a violation of Part 703: Surface Water and Groundwater Quality Standards and Groundwater Effluent Limitations, subpart 703.2, which specifies a standard of "no visible oil film" (e.g., sheen or oil). The lack of VOCs in the surface water samples, and the detection of only one, non-MGP related SVOC, bis(2-ethylhexyl)phthalate, at 1 ug/l, a concentration just above criteria (0.6 ug/l), indicates that no release of dissolved and potentially MGP-related VOC or SVOC constituents to surface water from sediments is occurring under current conditions.

Evidence of NAPL in sediments was only observed within the lock approach and within 40 feet of the bulkhead wall, and, with the exception of TS20, sediment toxicity was only observed and/or predicted for those locations where NAPL was observed. Removal of sediment within 40 feet of the bulkhead, where NAPL was observed, would meet this RAO for environmental protection.

- **Prevent impacts to biota from ingestion/direct contact with sediments causing toxicity or impacts from bioaccumulation through the aquatic food chain**.

Analysis of toxicity data indicates that, with the exception of TS20, only those surficial sediments at locations where NAPL was observed were toxic to *H. azteca*. No significant difference was observed between survival in the reference and control samples and survival in the sediment samples collected where no NAPL was observed. An analysis of benthic macroinvertebrate data supports the toxicity testing results, indicating that macroinvertebrate populations are similar to background and reference locations at all sample locations except those where NAPL was observed (and TS20). Furthermore, macroinvertebrates highly sensitive to pollution such as mayfly larvae, caddisfly larvae, and water penny (orders Ephemeroptera, Trichoptera, and Coleoptera) were found at most of the stations sampled.

In addition, SPME results predict no toxicity at locations other than those where NAPL was observed (except TS20), and PAH concentrations in sediments collected from outside the lock area are much lower, typically by an order of magnitude, than the PAH concentrations in sediments in the lock area where NAPL was observed. Therefore, this RAO has already been met outside the lock approach area, and this RAO can be achieved at those locations inside the lock approach where NAPL was observed by sediment removal.

- **Remediation of sediment exceeding background levels of PAHs, to the extent practicable**.

The highest PAH concentrations are found primarily in the lock approach area, which is the only area where NAPL was observed. However, PAH concentrations in sediment samples collected from some locations downstream of the Troy lock and dam exceed the PAH concentrations in sediment samples collected from a background location upstream of the lock and dam. Some of those PAH detections appear to be MGP-related, although other sources also appear to contribute to the PAH levels in sediments. Therefore, the NYSDEC has requested development of a remedial alternative that addresses the sediment in OU-3 with PAH concentrations exceeding background levels, based on proposed requirements in the DER-10 (2009) and 6 NYCRR Part 375-2.8(a).

This RAO can be achieved, potentially temporarily, by sediment removal within and downstream of the lock area. The maximum detected background concentration, at one sample location, was 2.87 mg/kg. This value was used for estimating the volume to be removed under this RAO. However, sampling to statistically establish a background concentration would likely need to be conducted, as indicated in Section 3.8.3 of the NYS Draft DER-10 (2009).

Comparison of the PAH concentrations in OU-3 to existing background data (i.e., a maximum PAH concentration of 2.87 mg/kg), would indicate the removal of sediment with very low concentrations of PAHs, resulting in the removal of all of the sediment to bedrock from the northern end of the lock approach and proceeding downstream a distance of approximately 1,000 feet. Sediment would be removed from the eastern shoreline out to the observed western extent of sediment, varying from 80 to 175 feet from the shoreline, resulting in the removal of over 25,000 CY of sediment.

Furthermore, attempting to satisfy the RAO of achieving background PAH concentrations would include addressing sediment impacted by other sources of the PAHs (e.g., boat traffic, discharges from storm drains and other anthropogenic activities) in the sediment. The sediment removal area would therefore be subject to other sources of PAH loading to the Hudson River sediments.

2.3 General Response Actions

To meet the RAOs developed for OU-3, the following GRAs for sediments have been identified:

- Alternative 1: No Action
- Alternative 2: Limited Action (Development of a Sediment Management Plan for the lock approach)
- Alternative 3: Removal of sediment within the lock approach area.
- Alternative 4: Removal of sediment within, and downstream of, the lock approach area with PAHs exceeding background concentrations.

No Action involves no treatment but would include periodic reevaluation of OU-3 conditions. Limited Action involves measures that restrict access to contaminated sediments through physical and/or administrative measures, and includes long-term monitoring. Removal actions act to reduce the volume, toxicity and/or mobility of contaminants.

3.0 IDENTIFICATION AND SCREENING OF TECHNOLOGIES AND SELECTION OF PROCESS OPTIONS

The screening of remedial technologies is performed in two steps: (1) the identification and screening of technology types and process options for each general response action, and (2) the evaluation and selection of representative process options. The following sections discuss the results of these steps.

3.1 Identification and Screening of Technologies

The remedial technology types associated with each of the GRAs typically considered for the cleanup of contaminated soil were developed, in part, from the October 1988 Interim Final Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA (USEPA, 1988), the DER-15: Presumptive/Proven Remedial Technologies (NYSDEC, 2007), experience on other hazardous waste projects, and evaluation of new and emerging technologies. The potentially applicable technologies and process options are screened based on technical feasibility, considering site-specific conditions, contaminant types, and concentrations.

In this section, potential technologies for remediation of contaminated sediment are discussed and summarized with the results of the initial screening. For those technologies that were not retained for further evaluation, the rationale for their elimination is included. Table 3-1 summarizes the results of the preliminary screening of sediment technologies and process options discussed below.

3.1.1 No Action

Description: No Action is a response that does not include any remedial measures. No Action allows for periodic reviews of the site and reevaluation of the need for remedial action at periodic intervals.

Initial Screening: No active remediation or institutional controls are implemented under this option. Any reduction in the toxicity, mobility, or volume of contaminants would be the result of natural attenuation since no treatment would be implemented. The No Action alternative is retained for further evaluation as a baseline for comparison of other alternatives.

3.1.2 Limited Action

Limited Action consists of technologies that are generally passive, including monitoring, access restrictions (e.g., engineering controls such as warning signs) and institutional controls (e.g., environmental easements, Health and Safety Plans, Sediment Management Plans, etc.).

3.1.2.1 Use Restrictions

Description: Uses in contaminated areas would be restricted by affixing signs along the shore, and potentially on buoys, in the affected area. A Sediment Management Plan would be developed for OU-3.

Initial Screening: Physical barriers to restrict access could not be implemented, since access to sediment from the water (i.e., off-site) is possible; however, placement of signs could be performed to alert the public of potential hazards, and this process option is retained for further evaluation.

3.1.2.2 Sediment Management Plan

Description: This process option includes the preparation, implementation and maintenance of a Sediment Management Plan to manage future activities at OU-3. The plan, which could include a Health and Safety Plan, would require monitoring and use of personal protective equipment during construction/dredging activities.

Initial Screening: Plans would be required as the final step in the development of remedial alternatives that do not remediate the Site to conditions where use would be unrestricted. A Sediment Management Plan is retained as a process option.

3.1.2.3 Monitored Natural Recovery

Description: Natural recovery of impacted sediments is a process by which concentrations of contaminants in the upper sediment layers are reduced over a period of time following significant reduction or elimination of contaminant sources. Sediment quality improves through a combination of natural processes (e.g., biodegradation and sediment accumulation) and source control activities. This process option includes periodic data collection (e.g., semi-annual, annual, etc.) and review of the data to assess the current conditions at the Site. The data would be used to determine if implemented remedial activities have achieved the RAOs or are continuing to be protective of health and the environment as conditions improve towards achieving the RAOs. Should site reviews indicate conditions are worsening or the current conditions pose an unacceptable risk to health or the environment, additional activities could be implemented.

Initial Screening: The implementation of a remedial action at OU-1 will be a source control measure for potential NAPL migration to OU-3. Removal of sediment containing NAPL will remove those sediments found to be toxic to aquatic life. The concentrations of PAHs in the sediment are low, with a maximum of approximately 38 mg/kg total PAHs outside the lock approach, with typical concentrations of less than 10 mg/kg. In addition, other anthropogenic sources of PAHs (e.g., boat traffic, stormwater discharges, etc.) are present along the River. Therefore, monitored natural recovery would be expected to provide little or no value in reducing PAH concentrations in the sediment, and this process option is not retained for further evaluation.

3.1.2.4 Site Reviews

Description: Periodic reviews are required to ensure that a remedy has been effective and to establish a basis for close out. This process option includes a periodic review of the institutional controls to ensure their effectiveness and that they are continuing to be protective of health and the environment.

Initial Screening: Periodic reviews are required to assess any changes in the risk to human health and the environment under those remedial alternatives that do not remove all of the impacted media. Preparation of a Sediment Management Plan as a potential component of use restrictions in OU-3 would require periodic review of the plan and its effectiveness. Therefore, this process option is retained for further evaluation.

3.1.3 Containment

Containment provides isolation of contaminated sediment from potential receptors and/or uncontaminated media. Sediment capping and/or vertical barriers can be used to contain contaminated sediment, minimize exposure to contaminated sediment, control migration of contaminants, and reduce leaching of contaminants from sediment to surface water. Capping would be performed with layers of sediment and/or other materials suitable for an aquatic environment. Vertical barriers include sheet piling and grout curtains, which can be used to mitigate contaminant migration.

3.1.3.1 Sediment Cap

Description: In this process option, the sediment containing NAPL (i.e., within the lock approach) would be capped. Submerged contaminated sediments are covered by stable layers of sediment, gravel, rock, and/or synthetic materials. In certain conditions, the cap reduces contaminant mobility and subsequent interaction between aquatic organisms and the contaminants.

Initial Screening: Placement and maintenance of a sediment cap within the lock approach area could negatively impact access to the lock. Capping would require long-term maintenance, and, potentially, future replacement. Therefore, this option is not retained.

3.1.3.2 Sheet Piling

Description: Sheet piling driven into the sediment can be used as a barrier to mitigate NAPL migration. This technique could also be extended whereby coffer dams are created to aid in sediment removal alternatives. Steel or heavy gauge PVC sheet piling cutoffs require very little maintenance. Recent advances in jointing technology have made sheet piling relatively resistant to leakage.

Initial Screening: The thin layer of sediment in OU-3, in most places only four to six feet deep, would not provide sufficient embedment for a stable, permanent sheet pile wall. Furthermore, installation of a sheet pile barrier would severely restrict access to the lock and lock approach. Therefore, this process option is not retained.

3.1.3.3 Grouting

Grouting is typically accomplished by drilling a grout tool down to a given depth and then raising up the tool while injecting grout through the jet. The actual grouting injection locations may be at plan intervals close enough to ensure overlap of the known radius of a jet tool, or may be further apart based on the ability of the grout to penetrate undisturbed soils that are beyond the tool radius. This technique can be used to construct a full or partial vertical barrier.

Initial Screening: This process can be useful to provide a barrier to NAPL migration in sediment. The process typically results in an excess volume, and this material has to be managed. Furthermore, the presence of grouted barrier walls in the sediment of the lock approach would potentially hinder boating access or future USACE activities (e.g., dredging of the lock approach). Therefore, grouting is not retained.

3.1.4 Removal/Treatment/Disposal)

Removal technologies involve physical removal of contaminated sediment, usually with the intention of subsequent treatment and/or disposal. Treatment of contaminated sediments is typically conducted ex-situ, and are typically selected to facilitate the desired disposal option.

3.1.4.1 Removal (i.e., Dredging

Description: Dredging can be accomplished either by mechanical or hydraulic methods, depending on such factors as site access constraints, availability of adjacent upland space, and the final disposal destination. Dredged sediment can be loaded or pumped onto barges, or onto an adjacent upland space, and transported via barge, truck, rail, or pipeline to a final disposal facility.

Initial Screening: Dredging would be required as the initial material handling step in numerous remedial alternatives. The dredged areas would be restored with clean backfill which may serve as a physical barrier to subsurface contamination that may not be removed. Dredging is retained as a process option.

3.1.4.2 Ex Situ Treatment

Treatment technologies may be implemented *ex situ*, i.e., after removal of contaminated sediment. The process options for *ex situ* treatment technologies for off-site treatment that were evaluated included: thermal desorption and incineration.

Thermal Desorption

Description: The thermal desorption technology is a thermal stripping process. Prepared sediments are introduced into the enclosed heated chamber using a heated screw or belt conveyor. Direct or indirect heating methods are used to volatilize organics from the sediment. The off-gas containing the thermally stripped compounds is then combusted in an afterburner, adsorbed in a carbon adsorption unit or treated by catalytic oxidation designed to ensure removal of these compounds to acceptable levels. Typical operating temperatures for thermal stripping of organics are 400^{o}F to 900^{o}F; however, higher temperatures are achievable. Operating temperatures are selected based on the hydrocarbons present in the sediment.

Initial Screening: This process would be effective for PAHs in sediments. This technology is retained for evaluation as a process option.

Incineration

Description: Incineration is a thermal destruction method which can be used to destroy combustible waste materials including organic contaminants in sediments. Incineration systems such as multiple hearth, rotary kiln, infrared and fluidized bed can treat highly-contaminated sediments at high temperatures (1200^{o}F to 1800^{o}F in the primary chamber and at 1400^{o}F to 2400^{o}F in the secondary chamber). Infrared incineration systems are used primarily for solids or sludges.

Initial Screening: High temperature incineration is suitable for removal of organics in contaminated sediments. Therefore, incineration is retained as a process option for NAPL in sediments.

3.1.4.3 Disposal

This category of remedial process options refers to disposal of impacted sediment on or off-site, with or without any treatment. The disposal options are an upland landfill and near-shore disposal.

Upland Landfill

Description: Upland disposal facilities include either existing commercial or municipal landfills or landfills dedicated solely to the project. Upland disposal facilities accept sediment based on their chemical characterization and applicable rules and regulations (including the disposal facility's permit), and typically require dewatering of dredged sediments prior to their transport to the disposal facility. This in turn requires suitably sized, waterfront upland staging area(s) for the offloading and dewatering process. Dewatering can be accomplished by stockpiling dredge sediment for a suitable length of time and can also be accelerated by adding cement or lime admixtures to bind the water in the sediments. Such admixtures are often a cost-effective alternative because they significantly lessen the demand for available stockpiling area and speed up the disposal process.

Initial Screening: Off-site disposal to a landfill either directly or after treatment is a viable option. Both hazardous and non-hazardous materials may be encountered during remedial operations. Both materials would have to be managed and therefore this option is retained.

Near-shore Confined Disposal Facility

Description: Another potential option for dredged sediment disposal is a constructed Near-shore Confined Disposal Facility (or NCDF). A NCDF is a constructed enclosure that is designed specifically for the purpose of containing dredged sediment and physically confining it from the surrounding environment. The enclosure is typically created by building a specially engineered wall across the mouth of a slip or inlet, which is then filled with the dredged sediment and then capped with a suitable thickness of clean material.

Initial Screening: This disposal option is considered for on-site use only. The feasibility of an NCDF is dependent on the nature of the near-shore area of OU-3 (i.e., presence or ability to construct an inlet or slip). Due to the presence of the USACE bulkhead and the Troy lock, and flow conditions within the Hudson River, this disposal option is not retained.

TABLE 3-1
SCREENING OF SEDIMENT TECHNOLOGIES AND PROCESS OPTIONS

General Response Actions	Remedial Technology Types	Process Options	Technical Feasibility
No Action	No Action	Monitoring and Site Reviews	Retained
Limited Action	Use Restrictions	Use Restrictions	Retained
		Sediment Management Plan	Retained
	Monitoring	Monitored Natural Recovery	Not Retained
		Site Reviews	Retained
Containment	Capping	Sediment Cap	Not Retained
	Barrier Walls	Sheet Piling	Not Retained
		Grouting	Not Retained
Removal/Treatment/ Disposal	Removal	Dredging	Retained
	Ex-situ Treatment	Thermal Desorption	Retained
		Incineration	Retained
	Disposal	Upland Landfill	Retained
		Near-Shore Confined Disposal Facility	Not Retained

3.2 Selection of Process Options

Process options are evaluated on the basis of overall remedial effectiveness, technical implementability, and cost relative to site-specific conditions, contaminant types, and contaminant concentrations.

Process option effectiveness focuses on: 1) ability to process the estimated quantities of material and to meet contaminant reduction goals; 2) effectiveness of protecting human health and the environment during the construction and implementation phases; and 3) reliability of the technology with respect to contaminants and site conditions.

Implementability refers to how easy it will be to employ the process option based on site and contaminant characteristics.

The cost evaluation is preliminary and relies upon engineering judgment and vendor-provided information to generate a relative cost of process options within a technology type.

The initially screened and accepted sediment process options are evaluated qualitatively, based on effectiveness, implementability, and cost as described above. Comparisons are made within each technology type by assessing the effectiveness, implementability and cost of each process option as low, moderate, or high relative to other process options within the technology type. When significant variations between process options within a technology type do not exist, a moderate rating was assigned. Based on this evaluation, specific process options were selected for development of the remedial alternatives. Process options that are not selected are still technically feasible and may be substituted for the selected process option during remedial design. The results of the process option evaluation and selection are summarized in Tables 3-3.

TABLE 3-2
SELECTION OF SEDIMENT PROCESS OPTIONS

Process Option	Effectiveness	Implementability	Cost
***No Action**	Does not meet RAOs	Easy	Very low
Limited Action			
Use Restrictions	Prevents exposure to site contaminants	Easy	Low
*Health and Safety Plan and Sediment Management Plan	Protects workers during future activities and manages sediments.	Easy	Low
*Site Reviews	Ensures effectiveness of the Sediment Management Plan.	Easy	Low
Removal			
*Dredging	Effective for sediment removal for subsequent treatment and disposal	Easy	Moderate
Ex-situ treatment			
Thermal Desorption	Effective for removal of MGP-related contaminants	Easy	Moderate
*Incineration	Effective for destruction of MGP-related contaminants	Easy	High
Disposal			
*Upland landfill	Effective for final disposal of treated sediments	Easy; requires transportation coordination	Moderate
*Process options that have been selected for development of remedial alternatives. Non-selected process options are not included in remedial alternatives, but are technically feasible and may be used during design as alternatives to the selected process options.			

3.3 Development of Alternatives

Remedial technology types and process options associated with each general response action were screened based on technical feasibility, considering site-specific conditions, contaminant types, and concentrations. Representative process options were selected for each technically feasible technology type by evaluating the process options qualitatively based on effectiveness, implementability, and cost. Based on this evaluation, specific process options were selected for development of the remedial alternatives. Based on the screening and evaluation of technologies and process options, the following remedial alternatives were developed for OU-3:

- S-1: No Action
- S-2: Limited Action (Development of a Sediment Management Plan for the lock approach)
- S-3: Removal of sediment within the lock approach area with off-site disposal.
- S-4: Removal of sediment within, and downstream of, the lock approach area with PAHs exceeding background concentrations with off-site disposal.

3.4 Preliminary Screening of Alternatives

The next stage in the feasibility evaluation typically consists of a preliminary screening of potential remedial alternatives based on the general criteria of effectiveness, implementability, and cost. The purpose of the screening step is to reduce the number of alternatives requiring detailed evaluation by identifying those alternatives having sufficient merit to undergo detailed evaluation. This is achieved by eliminating remedial alternatives that have significant adverse environmental or public health impacts or cannot be successfully implemented. Costs may be used to discriminate between treatment alternatives in the screening process, but not between treatment and non-treatment alternatives. As a result of the relatively small number of feasible alternatives developed for OU-3, preliminary screening was not performed; all of the alternatives identified in the previous section were carried forward for detailed evaluation in Section 4.0.

4.0 DETAILED ANALYSIS OF REMEDIAL ALTERNATIVES

This section presents a detailed description and evaluation of the remedial alternatives previously developed. Section 4.1 discusses the evaluation criteria against which the remedial actions are analyzed. Section 4.2 presents detailed descriptions of each of the alternatives and the results of the analysis of each alternative with respect to each of the criteria.

4.1 Description of Analysis Criteria

The remedial alternatives developed in Section 4.1 are evaluated using the following seven criteria:

1. Compliance with Standards, Criteria, and Guidance (SCGs);
2. Overall Protection of Human Health and the Environment;
3. Short-Term Impacts and Effectiveness;
4. Long-Term Effectiveness and Permanence;
5. Reduction of Toxicity, Mobility, and/or Volume;
6. Implementability; and
7. Cost.

The seven criteria are described in the following sections.

4.1.1 Compliance with SCGs (as set forth in Section 2.0 of this report)

This criterion is used to determine how each remedial alternative complies with Standards, Criteria, and Guidance (SCGs). Each alternative is evaluated in detail for:

- Compliance with chemical-specific SCGs (e.g., NYSDEC Technical Guidance);
- Compliance with action-specific SCGs (e.g., RCRA minimum technology standards);
- Compliance with location-specific SCGs (e.g., floodplains); and

4.1.2 Overall Protection of Human Health and the Environment

This criterion provides an overall assessment of protection based on a composite of factors such as long-term and short-term effectiveness and compliance with SCGs. Evaluations of the overall protectiveness address:

- How well a specific site remedial action achieves protection over time;
- How well site risks are reduced; and
- How well each source of contamination is eliminated, reduced, or controlled for each remedial alternative.

4.1.3 Short-Term Impacts and Effectiveness

This criterion addresses the impacts of the action during the construction and implementation phase until the remedial action objectives have been met. Factors evaluated include protection of the community during the remedial actions; protection of workers during the remedial actions; environmental impacts resulting from the implementation of the remedial actions; and the time required to achieve protection.

4.1.4 Long-Term Effectiveness and Permanence

This criterion addresses the results of the remedial action in terms of the potential risk remaining at the site after the remedial action objectives have been met. The components of this criterion include the magnitude of the residual risks; the adequacy and suitability of controls used to manage treatment residuals or untreated wastes; and the long-term reliability of management controls for providing continued protection from residuals (i.e., the assessment of potential failure of the technical components).

4.1.5 Reduction of Toxicity, Mobility and/or Volume

This criterion addresses the statutory preference that treatment is used to result in the reduction of the total mass of toxic contaminants, the irreversible reduction in contaminant mobility, or the reduction of the total volume of contaminated media. Factors to be evaluated in this criterion include the treatment process employed; the amount of hazardous material destroyed or treated; the degree of reduction in toxicity, mobility or volume expected; and the type and quantity of treatment residuals.

4.1.6 Implementability

This criterion addresses the technical and administrative feasibility of implementing a remedial action and the availability of various services and materials required during its implementation. *Technical feasibility* factors include construction and operation difficulties; reliability of technology; ease of undertaking additional remedial actions; and the ability to monitor the effectiveness of the remedy. *Administrative feasibility* includes the ability and time required for permit approval and for activities needed to coordinate with other agencies. Factors employed in evaluating the availability of services and materials include availability of treatment, storage, and disposal services with required capacities; availability of equipment and specialists; and availability of prospective technologies for competitive bid.

4.1.7 Cost

The types of costs that would be addressed include: capital costs, operation and maintenance (O&M) costs, costs of five-year reviews (where required), present value of capital and O&M costs, and potential future remedial action costs. Capital costs consist of direct and indirect costs. Direct costs include expenditures for the equipment, labor, and materials necessary to install remedial actions. Indirect costs include expenditures for engineering, administrative, and other services required to complete the implementation of remedial alternatives. Annual O&M costs include auxiliary materials and energy, disposal of residues, purchased services, administrative costs, insurance, taxes, license costs, maintenance reserve and contingency funds, rehabilitation costs, and costs for long-term monitoring.

This assessment evaluates the costs of the remedial actions on the basis of present worth. Present worth analysis allows remedial actions to be compared on the basis of a single cost representing an amount that, if invested in the base year and disbursed as needed, would be sufficient to cover all costs associated with the remedial action over its planned life. A required operating performance period and a discount rate are assumed to calculate present worth cost. A discount rate of five percent is assumed for a base calculation. The discount rate represents the anticipated difference between the rate of investment return and inflation. The estimated costs provided for the remedial actions have an accuracy of -30 to +50 percent.

4.2 Detailed Analysis of Sediment Remedial Alternatives

This section presents the evaluation of the remedial alternatives for the sediment (OU-3). The following sections present descriptions of each of the remedial alternatives and the results of the evaluation of the alternatives against the seven criteria defined above.

4.2.1 Alternative S-1: No Action

The No Action alternative includes no active remediation at OU-3. All contaminated sediments would be left in place with no treatment or controls to prevent future exposure. Periodic reviews would be performed to assess any changes in the risk to human health and the environment. This alternative is developed as a basis of comparison for other alternatives.

4.2.1.1 Compliance with SCGs

The No Action alternative does not comply with chemical-specific SCGs since no contamination would be removed from OU-3. Action- and location-specific SCGs are not triggered, since no remedial activities would be performed.

4.2.1.2 Overall Protection of Human Health and the Environment

The No Action alternative would not remove, contain, or treat the contaminated sediment. Therefore, the potential for exposure to humans and biota resulting from contaminated sediments would remain unchanged. The potential for direct contact of sediments containing NAPL would persist. In addition, there is the continued potential for migration of contaminants.

4.2.1.3 Short-Term Impacts and Effectiveness

Under the No Action alternative there would be no short-term impacts to workers or the surrounding community. No remedial activities would be required for implementation of this alternative. Workers conducting reviews would potentially be exposed to contaminated sediments. This alternative would not result in any short-term improvement over current conditions. As no design or remedial activities are required for this alternative, it would take no time to implement.

4.2.1.4 Long-Term Effectiveness and Permanence

The No Action alternative would have no long-term effectiveness and/or permanence. The potential for exposure to humans and biota would be the same following implementation of this alternative. No engineering controls would be implemented to manage the remaining contaminated material.

4.2.1.5 Reduction of Mobility, Toxicity, and/or Volume
This alternative would not involve any containment, removal, treatment, or disposal of the contaminated sediments. Therefore, this alternative would not provide any reduction in the toxicity, mobility, and/or volume of contaminants.

4.2.1.6 Implementability
There are no technical feasibility concerns with the No Action alternative. The effectiveness of the remedy would be evaluated in periodic reviews and implementation of this alternative would not preclude further remedial action in the future.

There are no administrative feasibility concerns with this alternative. As this alternative involves no remediation activities, availability of resources and use of proven technologies is not applicable. Consulting services are readily available for reviews. Coordination with regulatory agencies would be required for making decisions regarding any future remedial alternatives. However, there are no concerns with the ability or time required to interact with regulatory agencies.

4.2.1.7 Cost
There is no capital cost or annual O&M cost for the No Action alternative. Small periodic costs associated with site reviews to assess current conditions may be incurred. The net present value of five-year reviews for a 30-year period is estimated at $56,000. See Appendix D for details.

4.2.2 Alternative S-2: Limited Action
The Limited Action alternative includes no active remediation at OU-3. All sediments containing NAPL would be left in place within the lock approach, with no treatment and limited controls to prevent future exposure to contaminated media. Under this alternative, signage (as necessary) would be put in place to serve as a warning to the public. A HASP and Sediment Management Plan would be developed and implemented to describe (for example) adequate control measures and PPE/monitoring to be implemented during dredging activities within areas where NAPL was observed in the sediment. Five-year reviews would also be performed to assess changes in the potential risk to human health and the environment posed by OU-3.

4.2.2.1 Compliance with SCGs
The Limited Action alternative addresses chemical-specific SCGs by limiting exposure through warning signs and providing plans for dredging activities. Action- and location-specific SCGs are not triggered, since no on-site remedial activities would be performed.

4.2.2.2 Overall Protection of Human Health and the Environment
The Limited Action alternative would not remove, contain, or treat the contaminated media. The potential for exposure to humans and biota resulting from contaminated sediments would be mitigated by institutional controls; signage would help mitigate potential risks associated with direct contact exposure. Proper implementation of the HASP and Sediment Management Plan would help mitigate risks. However, there is the potential for migration of contaminants.

4.2.2.3 Short-Term Impacts and Effectiveness

Under the Limited Action alternative there would be no short-term impacts to workers or the surrounding community. Minimal remedial activities would be required for implementation of this alternative. Through development and implementation of a HASP, direct contact risks would be minimized; use of PPE would be required during intrusive activities. The Sediment Management Plan would help to mitigate risks. The time required to implement this alternative would be approximately six months.

4.2.2.4 Long-Term Effectiveness and Permanence

The potential for exposure to humans and biota would be reduced by institutional controls following implementation of this alternative. Limited controls would be implemented to manage the remaining contaminated material, consisting of signage and restricting the use of dredged material. These controls would be effective at mitigating the potential for exposure to humans and biota, though there is the potential for violation of these controls. Risks at OU-3 would be re-evaluated periodically.

4.2.2.5 Reduction of Mobility, Toxicity, and/or Volume

This alternative would not involve any containment, removal, treatment, or disposal of the contaminated sediments. Therefore, this alternative would not provide any reduction in the toxicity, mobility, and/or volume of contaminants.

4.2.2.6 Implementability

There are no technical feasibility concerns with the Limited Action alternative for sediments. The effectiveness of the remedy would be reevaluated periodically. As this alternative involves limited remedial activities, availability of resources and use of proven technologies is not a concern. Consulting services are readily available for posting signs and development of a HASP and Sediment Management Plan. Services are also available for conducting periodic reviews.

4.2.2.7 Cost

The capital cost associated with negotiation and implementation of the required controls is $52,000. O&M cost to maintain this alternative is estimated to be $56,000 per year, for 5-year reviews. The net present cost of the alternative, based on a 30-year period of performance and a 5% discount rate is $108,000. See Appendix D for details.

4.2.3 Alternative S-3: Removal of sediment within the lock approach area and off-site disposal

This alternative includes removal of sediments observed to contain NAPL, within the approximately 225 feet length of the lock approach, from the shoreline to the guide wall, approximately 80 feet west of the bulkhead wall. Although NAPL has only been observed within 40 feet of the bulkhead, minimal sampling was conducted from 40 to 80 feet west of the bulkhead, therefore, for estimating purposes, it is assumed that sediment will be removed from the bulkhead west to the lock approach guide wall, a distance of 80 feet. NAPL-containing sediments would be dredged and dewatered and amended on site. The sediment would then be shipped off site for treatment (e.g., incineration) and disposal. The estimated volume of contaminated sediments to be removed is 4,000 yd^3. The area identified for dredging under this alternative is shown on Figure 10. The average depth of the sediment in the proposed area to be dredged is approximately 6 feet.

This alternative would also include the placement of clean sediments at the channel bottom to replace the sediment removed.

The dredged sediments could be dewatered and amended as-needed for moisture content, and the dredged material would be staged and transported to an incineration facility and/or non-hazardous landfill for treatment/disposal in accordance with applicable rules and regulations. Any hazardous materials encountered would be managed in accordance with the appropriate protocols for these materials (e.g., thermal treatment). No institutional controls or monitoring would be implemented because the sediments containing NAPL would be removed.

4.2.3.1 Compliance with SCGs

This alternative removes sediment containing NAPL and in doing so removes those sediments found to be toxic to aquatic biota. Some sediment with low concentrations of PAHs which exceed background concentrations of PAHs would not be addressed. Dredging with off-site treatment and/or disposal of dredged material would be performed in accordance with all applicable action- and location-specific SCGs.

4.2.3.2 Overall Protection of Human Health and the Environment

The removal of sediment containing NAPL would remove observed NAPL from within OU-3. Therefore, the potential for exposure to humans and biota resulting from NAPL in the sediments would be eliminated.

4.2.3.3 Short-Term Impacts and Effectiveness

This alternative would involve a moderate on-site dredging effort to remove sediments. There would be a minimal transportation risk from truck traffic through local commercial and residential areas. Off-site transportation would be performed in strict accordance with transportation plans to minimize impacts to neighborhoods through which contaminated sediments will be transported. Sediments would likely be loaded onto trucks at OU-1, which is upland of, and adjacent to, OU-3, for transportation to the final destination. Transport a short distance by barge may be necessary to move dredged sediment to OU-1. Risk to workers would be minimized by developing and implementing a HASP to provide protection for on-site workers. The timeframe required for implementation of this alternative is approximately 2 months.

4.2.3.4 Long-Term Effectiveness and Permanence

The dredging of sediment with NAPL would have significant long-term effectiveness and/or permanence. This alternative represents a permanent remedy. The human health and ecological risks from exposure to NAPL in sediment would be reduced following implementation of this alternative.

4.2.3.5 Reduction of Mobility, Toxicity, and/or Volume

This alternative would provide reduction in the volume and mobility of contaminants. Offsite treatment of the dredged material, if performed, would substantially reduce the toxicity of the NAPL by destruction. In addition, there would be a reduction in the volume of contaminants remaining following remedy implementation.

4.2.3.6 Implementability

The sediment removal and off-site disposal alternative requires a moderate level of effort, planning, and acceptance of short-term risk. Dredging with off-site disposal is a well developed technology. Planning, design, and risk mitigation efforts would be required to complete this alternative. There would be worker safety risks, risks of damage to equipment, risk of damage to USACE facilities, risks of contaminant release during the work, and risk due to seasonal storm events.

Equipment, labor, and materials are readily available for dredging, transportation, and sediment replacement. Consulting services are readily available for conducting five-year reviews. Coordination with local authorities would be required to establish an acceptable transportation plan for transportation of dredged material from OU-3. Coordination with regulatory agencies would also be required for five-year reviews. However, there are no concerns with the ability or time required to interact with local and regulatory agencies.

4.2.3.7 Cost

The capital cost of implementing this alternative is approximately $2,431,000. The net present cost of the alternative, based on a 30-year period of performance and a 5% discount rate is $2,431,000. See Appendix D for details

4.2.4 Alternative S-4: Removal of sediment within, and downstream of, the lock approach area with PAHs exceeding background concentrations and off-site disposal

The NYSDEC has requested development of a remedial alternative that addresses the sediment in OU-3 with PAH concentrations exceeding background levels, as indicated in an e-mail from John Spellman of the NYSDEC, dated November 10, 2009, based on proposed requirements in the DER-10 (2009) and 6 NYCRR Part 375-2.8(a). This alternative would include dredging of sediments within OU-3 that have PAH concentrations exceeding background PAH concentrations, to an estimated depth of approximately 7 feet. The maximum detected background concentration, at one sample location, was 2.87 mg/kg. This value was used for estimating the volume to be removed under this RAO. However, sampling to statistically establish a background concentration would likely need to be conducted, as indicated in Section 3.8.3 of the NYS Draft DER-10 (2009)

This alternative would include removal of sediment potentially impacted by MGP related activities, as well as sediment with PAH concentrations exceeding background as a result of other, non-MGP related activities (e.g., boat traffic, discharges from storm drains and other anthropogenic activities). Sediment samples would be collected upstream of the Troy lock and dam to establish a statistically based background concentration. There is no discernable gradient to the PAH concentrations, therefore sediment would likely be removed from the eastern shoreline out to the observed western extent of sediment, varying from 80 to 175 feet from the shoreline, resulting in the removal of over 25,000 CY of sediment. Only one upgradient background sediment location was sampled, in 2006, and therefore sampling of upgradient sediment would establish a statistically based background concentration as indicated in Section 3.8.3 of the NYS DER-10 (2009).

However, this alternative would disregard the other sources of the PAHs (e.g., boat traffic, discharges from storm drains and other anthropogenic activities) in the sediment.

Without addressing the other sources of PAHs in the sediments, both point and non-point, achieving background conditions would likely not be practicable, and would be, at best, temporary, until other sources once again contributed PAH loads to the Hudson River sediments.

Based on the 2006 investigation, the approximate extent of sediment removal would include sediment within the lock approach and extending approximately 1000 feet downstream, from the shoreline to approximately 80 feet west of the shoreline. The sediments would be dredged using a clamshell dredge, and would be dewatered on site. The sediment would then be shipped off site for treatment (e.g., incineration) and disposal. The estimated volume of contaminated sediments to be removed is 21,000 yd^3. The area identified for dredging under this alternative is shown on Figure 11. The average depth of the sediment in the proposed area to be dredged is approximately 7 feet. This alternative would also include the placement of clean sediments at the channel bottom to replace the sediment removed.

The dredged sediments could be amended as-needed for moisture content (e.g., addition of coal fines), and the dredged material would be staged and transported to a thermal de-sorption facility and non-hazardous landfill for disposal. Any hazardous materials encountered would be managed in accordance with the appropriate protocols for these materials. No institutional controls or monitoring would be implemented because all the sediments containing NAPL, as well as sediment with PAHs above background, would be removed.

4.2.4.1 Compliance with SCGs

This alternative complies with chemical-specific SCGs, as exceedances of background concentrations of PAHs, regardless of source, would be addressed. Dredging with off-site treatment and/or disposal of dredged material would be performed in accordance with applicable action- and location-specific SCGs.

4.2.4.2 Overall Protection of Human Health and the Environment

The removal of sediment containing PAHs exceeding background concentrations would remove source material from within OU-3, as well as all sediments with PAH concentrations greater than background, regardless of the source of the PAHs. Therefore, the potential for exposure to humans and biota from the sediments would be substantially reduced.

4.2.4.3 Short-Term Impacts and Effectiveness

This alternative would involve a significant dredging effort to remove a large volume of sediment. There would be an increased transportation risk, involving a large volume of truck traffic through commercial and residential areas. Off-site transportation would be performed in strict accordance with transportation plans to minimize impacts to neighborhoods through which contaminated sediments will be transported. Sediments would likely be loaded onto trucks at OU-1, which is upland of, and adjacent to, OU-3, for transportation to the final destination. Transport a short distance by barge may be necessary to move dredged sediment to OU-1. Risk to workers would be minimized by developing and implementing a HASP to provide protection for on-site workers. The timeframe required for implementation of this alternative is approximately 10 months.

4.2.4.4 Long-Term Effectiveness and Permanence

The dredging of sediment with PAH concentrations exceeding background would have significant long-term effectiveness and/or permanence. This alternative represents a permanent remedy. The potential for exposure to humans and biota to PAH concentrations above background in sediments would be significantly reduced across OU-3 following implementation of this alternative, as it would address sediment impacted by both MGP and non-MGP related sources.

4.2.4.5 Reduction of Mobility, Toxicity, and/or Volume

This alternative would provide reduction in the volume and mobility of contaminants. Offsite treatment of the dredged material, if performed, would substantially reduce the toxicity of the majority of contaminants by destruction. In addition, there would be a reduction in the volume of contaminants remaining following remedy implementation.

4.2.4.6 Implementability

This alternative requires a high level of effort, planning, and acceptance of short-term risk. Dredging with off-site disposal is a well developed technology. Extensive planning, design, and risk mitigation efforts would be required to complete this alternative, which would involve dredging and transporting a large volume of sediment. There would be worker safety risks, risks of damage to equipment, risk of damage to USACE facilities, risks of contaminant release during the work, and risk due to seasonal storm events.

Equipment, labor, and materials are readily available for dredging, transportation, and sediment replacement. Multiple facilities may need to be identified for treatment of dredged material. Coordination with local authorities would be required to establish an acceptable transportation plan for transportation of dredged material from OU-3.

4.2.4.7 Cost

The capital cost of implementing this alternative is approximately $9,789,000. The net present cost of the alternative, based on a 30-year period of performance and a 5% discount rate is $9,789,000. See Appendix D for details.

5.0 COMPARATIVE ANALYSIS

The following section compares the relative performance of each remedial alternative using the specific evaluation criteria presented in Section 4.1. Comparisons are presented in a qualitative manner, and identify substantive differences between the alternatives. As with the detailed evaluation, the following criteria are used for the comparative analysis.

- Compliance with SCGs;
- Overall Protection of Human Health and the Environment;
- Short-Term Impact and Effectiveness;
- Long-Term Effectiveness and Permanence;
- Reduction of Toxicity, Mobility, and/or Volume;
- Implementability; and
- Cost

5.1 Compliance with SCGs

The alternatives can all be accomplished in accordance with action- and location-specific SCGs. Alternative S-3 removes potential source material and eliminates toxicity to aquatic organisms by removal of sediment containing NAPL, while S-4 attempts to achieve background conditions by removal of all sediments within and 1,000 feet downstream of the lock approach, regardless of PAH origin. Alternative S-3 achieves removal of NAPL and the sediments conservatively demonstrated to be toxic to aquatic biota within a reasonable timeframe. Alternative S-4 would require much longer to implement. Alternatives S-1 and S-2 do not remove contamination from OU-3 and would take significantly longer to achieve SCGs through naturally occurring degradation processes.

5.2 Overall Protection of Human Health and the Environment

Alternatives S-3 and S-4 are both protective of human health and the environment. Alternative S-2 provides some reduction in the potential for human exposure. Alternative S-1 is the least protective, since it does not remove or treat contaminants nor reduce the potential for human or environmental exposure.

5.3 Short-Term Impact and Effectiveness

Alternatives S-1 and S-2 would have the lowest short-term impact. There would be no potential risks to workers or the public during implementation of these alternatives, since no active remediation would be performed. Alternatives S-3 and S-4 would have a higher short-term impact and lower short-term effectiveness, since dredging would disturb the sediments and any dredged material would need to be transported through off-site areas for off-site treatment/disposal. Each of these alternatives could potentially increase risk of exposure to workers. These impacts would be minimized through proper dredging and transportation procedures, engineering controls, and health and safety procedures. However, Alternative S-4 would require dredging and transportation of a large volume of sediment, approximately five times as much as S-3, thereby substantially increasing potential short term impacts, which would include (but may not be limited to) the suspension of sediment into the water column, elimination of benthic habitat, the inconvenience and increased carbon emissions from truck traffic, and noise from equipment and trucks. Coordination with USACE would be required for the design and implementation of Alternatives S-3 and S-4, to (for example) mitigate impacts to boat traffic through the lock.

5.4 Long-Term Effectiveness and Permanence

Alternatives S-3 and S-4 both reduce the potential for human exposure, as they both would entail removal of sediment containing NAPL. Alternative S-4 also removes all sediment with PAH concentrations above background. Alternative S-2 would not be as effective as S-3 and S-4, as it would reduce the potential for human exposure through administrative controls, but would not provide any protection to biota. Alternative S-1 would not be effective, since it would not reduce the potential for human exposure. Site reviews would be required for Alternatives S-1 and S-2.

5.5 Reduction of Mobility, Toxicity, and/ or Volume

Alternative S-4 offers the most significant reduction in mobility, toxicity, and volume of PAHs in sediments, as it would remove PAHs above background, regardless of their origin. However, both S-3 and S-4 offer and equal reduction in the volume of sediment containing NAPL. Alternative S-3 offers a significant reduction in mobility, toxicity, and volume of contaminated sediments since sediments containing NAPL, which are located within the lock approach, would be dredged to bedrock (approximately 6 feet) for appropriate off-site treatment and disposal. Alternatives S-1 and S-2 offer no reduction in mobility, toxicity, or volume since no active remediation would be performed.

5.6 Implementability

All of the alternatives evaluated are technically feasible. Alternative S-1 is the easiest to implement, since no remedial activities are employed in this alternative. Alternative S-2 is also easy to implement, involving only institutional controls. Alternative S-3 is relatively straightforward to implement and would require careful coordination with the USACE to complete the dredging. Alternative S-4 would involve dredging and transporting a significantly larger volume of sediment, over a longer period of time, and would therefore be more difficult to implement.

Services, equipment, and materials are available for all alternatives. Alternatives S-1 and S-2 require no materials and limited services. Alternatives S-3 and S-4 require dredging services in addition to replacement sediments. Alternative S-4 would require transport and disposal of a substantial quantity of sediment.

All of the alternatives evaluated are administratively feasible. Alternative S-1 would be the easiest to implement (short-term) since no activity would be performed. Alternative S-2 would also be easy to implement (short-term) since limited activity would be performed. The remaining alternatives all involve dredging activities and associated administrative activities (e.g., permitting, public participation, and coordination, etc.). Alternative S-3 would have some additional coordination requirements for dredging and off-site transportation. Alternative S-4 would require a significant effort for coordination of dredging and off-site transportation of such a large volume of material. Site reviews would be associated with alternatives S-1 and S-2.

5.7 Cost

Alternative S-1 has no capital costs and limited O&M costs, associated only with periodic reviews. Alternative S-2 has the next lowest capital and O&M costs for implementation of controls. Alternative S-4 has the highest capital costs. Overall, the ranking of the alternatives based on net present value (capital and O&M) from lowest to highest is: Alternatives S-1, S-2, S-3, and S-4.

6.0 SELECTION OF PREFERRED REMEDIAL ALTERNATIVE

This section presents the selected alternative based on the evaluations presented in the previous sections.

6.1 Sediment Remedial Alternative Selection

Based on the evaluation of alternatives, S-3, removal of sediment within the lock approach area, and off-site disposal, has been selected.

This alternative includes removal of sediments observed to contain NAPL, within the lock approach, from the shoreline to the guide wall, approximately 80 feet west of the bulkhead wall. Although NAPL has only been observed within 40 feet of the bulkhead, limited sampling was conducted from 40 to 80 feet west of the bulkhead, therefore, for FS estimating purposes, it is assumed that sediment will be removed from the bulkhead west to the lock approach guide wall, a distance of 80 feet. The estimated volume of sediments to be removed is 4,000 yd^3. The average depth of the sediment in the area to be dredged is approximately 6 feet (to top of bedrock). This alternative would also include the placement of clean sediments at the channel bottom to replace the sediment removed.

The dredged sediments would be dewatered and amended as-needed for moisture content, and subsequently transported to a commercial thermal desorption facility and/or non-hazardous landfill for treatment/disposal in accordance with applicable rules and regulations. Any hazardous materials encountered would be managed in accordance with the appropriate protocols for these materials (e.g., thermal treatment). No institutional controls or monitoring would be implemented because the sediments containing NAPL and those found to be toxic to aquatic biota would be removed.

The selection of alternative S-3 would meet the RAOs for public health and environmental protection, with the only exception of the RAO for environmental protection to remediate sediment with PAH concentrations exceeding background concentrations, to the extent practicable. Removal of sediment containing PAH concentrations exceeding background downstream of the lock approach would disregard the other sources of the PAHs (e.g., boat traffic, discharges from storm drains and other anthropogenic activities) in the sediment. In addition, achieving background conditions may be temporary, as other sources will continue to contribute PAH loads to the Hudson River sediments. Moreover, none of the sediment downstream of the lock approach were determined to be toxic to *H. azteca* (a conservative indicator of toxicity to aquatic biota) and macroinvertebrates highly sensitive to pollution such as mayfly larvae, caddisfly larvae, and water penny (orders Ephemeroptera, Trichoptera, and Coleoptera) were found at most of the stations sampled.

Alternative S-3 uses demonstrated technologies to effectively achieve, to the extent practicable, the remediation goals established for this operable unit in a reasonable timeframe. This alternative is protective of human health and the environment and achieves the best balance of the NYSDEC evaluation criteria for selection of remedy.

7.0 REFERENCES

Foster Wheeler Environmental Corporation. 1998. *Remedial Investigation Report for the Troy (Smith Avenue) Site, Troy, New York.* Foster Wheeler Environmental Corporation. May 1998

NYSDEC. 1999. *Surface Water and Groundwater Quality Standards and Groundwater Effluent Limitations.* Part 703 subpart 703.2. NYSDEC, Division of Water. August 1999.

NYSDEC. 2002. *Draft DER-10 Technical Guidance for Site Investigation and Remediation.* NYSDEC, Division of Environmental Remediation. December 2002.

NYSDEC. 2002. *Management of Coal Tar Waste and Coal Tar Contaminated Soils and Sediment From Former Manufactured Gas Plants (MGPs).* Program ID: DER-4 TAGM-4061. NYSDEC, Division of Environmental Remediation. January 2002.

NYSDEC. 2007. *DER-15: Presumptive/Proven Remedial Technologies. DEC Program Policy*. NYSDEC, Division of Environmental Remediation. February 2007.

TtEC, 2008. *Supplemental Remedial Investigation Report, Troy (Smith Avenue) OU-3.* Tetra Tech EC, Inc. November 2008

USEPA. 1988. Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA. October 1988.

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CERTIFICATION STATEMENT

I, ___________,certify that I am currently a NYS registered professional engineer and that this Feasibility Study was prepared in accordance with all applicable statutes and regulations and in substantial conformance with the DER Technical Guidance for Site Investigation and Remediation (DER-10) and that all activities were performed in full accordance with the DER-approved work plan and any DER-approved modification.

TETRA TECH EC, INC.

______________________________ ______________________________
Type/Printed Name Signature

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Date

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NY State PE Stamp and Seal #/Expiration Date

It is a violation of Education Law Article 145, Professional Engineering and Land Surveying, Section 7209, for any person, unless he is acting under the direction of a licensed professional engineer or land surveyor, to alter this item in any way. If an item bearing the seal of a professional engineer or land surveyor is altered, the altering engineer or land surveyor shall affix to this item his seal and the notation “altered by” followed by his signature and the date of such alteration, and a specific description of the alteration.

TABLE 2-1
CHEMICAL-SPECIFIC SCGs

ACTION	REQUIREMENTS	CITATION	DESCRIPTION	COMMENT
STATE				
Inactive Hazardous Waste Sites	Program for designating and managing inactive hazardous waste sites	Article 27, Title 13	Establishes general cleanup goals for environmental media to levels that will eliminate a significant threat to the environment. This allows NYSDEC to designate inactive hazardous waste disposal sites.	Sites are listed based on evidence of a significant threat posed by hazardous waste disposed of at the site. A significant adverse impact on the environment and/or a significantly increased risk to human health would constitute a significant threat. The Troy (Smith Ave.) site is classified as an Inactive Hazardous Waste Site.
Sediment Cleanup Goals	Draft DER-10 Technical Guidance for Site Investigation and Remediation. December 2002	DER-10, Section 4.1 - December 2002,	Guidance document developed by NYSDEC for implementing the Site Investigation and Remediation process.	Guidance for development of remedial action objectives.
	Division of Environmental Remediation, Environmental Remediation programs,	6 NYCRR Part 375-2.8(a)	Guidance document developed by NYSDEC for the development and implementation of remedial programs for inactive hazardous waste sites.	Guidance for development of remedial action objectives.

TABLE 2-2 (Sheet 1 of 7)
ACTION-SPECIFIC SCGs

ACTION	REQUIREMENTS	CITATION	DESCRIPTION	COMMENT
FEDERAL				
Generation, Management, and Treatment of Hazardous Waste	Resource Conservation and Recovery Act (RCRA) Subtitle C - Hazardous Waste Management Identification and Listing of Hazardous Wastes	40 U S C Section 6901 et seq. 40 CFR Part 261	Outlines criteria for determining if a solid waste is a hazardous waste and is subject to regulation under 40 CFR Parts 260-266	These regulations do not set clean-up standards, but would apply to the classification of all impacted material and residual waste streams generated during remedial activities.
	Hazardous Waste Determinations	40 CFR Part 262.11	Generators must characterize their wastes to determine if the waste is hazardous by listing (40 CFR 261, Subpart D) by characteristic (40 CFR 261, Subpart C) or excluded from regulation (40 CFR 261.4)	Dredged material may be classified as characteristic or listed hazardous wastes. By-products or residues from the treatment of contaminated sediments and water must also be characterized.
	Manifesting	40 CFR 262, Subpart B	Generators must prepare a Hazardous Waste Manifest (EPA form 8700-22) for all off-site shipments of hazardous waste to disposal or treatment facilities	Will apply to all off-site shipments of RCRA/NYSDEC hazardous wastes.
	Recordkeeping	40 CFR 262.40	Generators must retain copies of all hazardous waste manifests used for off-site disposal	Generator must retain copies of waste manifests for a minimum period of three years after shipment date.

TABLE 2-2 (Sheet 2 of 7)
ACTION-SPECIFIC SCGs

ACTION	REQUIREMENTS	CITATION	DESCRIPTION	COMMENT
Generation, Management, and Treatment of Hazardous Waste (cont'd)	Labeling and Marking	40 CFR 262, Subpart C	Species EPA marking, labeling and container requirements for off-site disposal of hazardous waste	Pre-transportation requirements for off-site shipments of hazardous wastes.
	Accumulation Limitations	40 CFR Part 262.34	Allows generators of hazardous waste to store and treat hazardous waste at the generation site for up to 90 days in tanks, containers, and containment buildings without having to obtain a RCRA hazardous waste permit.	Hazardous wastes may be stored for up to 90 days on-site without the need for a storage permit unless NYSDEC waives the 90-day limit as an administrative requirement.
	Standards for Owners/Operators of Hazardous Waste Treatment, Storage, Disposal (TSD) Facilities	40 CFR Part 264/265		
	General Facility Standards	Subpart B	General requirements for owners/operators of TSD facilities including general waste analysis and compatibility, notices and inspection requirements, location and construction standards, and security	These subpart standards would be applicable to the on-site management of hazardous waste sediments in tanks, containers or containment buildings.
	Closure and Post-Closure	Subpart G	Established closure and post-closure requirements for hazardous waste treatment and storage units	

TABLE 2-2 (Sheet 3 of 7)
ACTION-SPECIFIC SCGs

ACTION	REQUIREMENTS	CITATION	DESCRIPTION	COMMENT
	Container Management	Subpart I	Hazardous waste stored in containers must comply with management requirements, including types of containers used, waste compatibility and inspection requirements.	Applicable to storage and/or treatment of hazardous wastes in containers on-site.
	Tank Systems	Subpart J	Tank systems for the treatment or storage of hazardous wastes are to be designed and operated in a manner to prevent releases to the environment	Applicable for the tank treatment and/or storage of all site generated wastes classified as a hazardous waste.
	Containment Buildings	Subpart DD	Containment buildings must be designed, constructed, and operated to meet regulatory performance standards	Standards applicable to the construction of containment buildings used to treat and/or store hazardous waste.
Capping of Hazardous Waste	RCRA Subtitle C Standards for Capping Surface Impoundments Waste Piles Landfills	40 U S C Section 6901 et seq. 40 CFR Part 264/265 Subpart K Subpart L Subpart N	Regulations governing placement of caps or similar barriers over hazardous waste. Requirements for installation, permeability, maintenance of cover, elimination of free liquids or solidification, run-on/run-off damage control, and post-closure use of property	Requirements potentially applicable to the upland disposal of hazardous waste sediment.
Capping of Non-Hazardous Waste	RCRA Subtitle D Criteria for Classification of Solid Waste Disposal Facilities	42 U S C Section 6901 et seq. 40 CFR Part 257	Minimum criteria for siting, construction, operation, and closure of solid waste disposal facilities. Each State is to develop, permit, and enforce a solid waste management program based on USEPA requirements	Requirements potentially applicable to the on-site disposal of contaminated material and the upland disposal of any associated residual waste streams.

TABLE 2-2 (Sheet 4 of 7)
ACTION-SPECIFIC SCGs

ACTION	REQUIREMENTS	CITATION	DESCRIPTION	COMMENT
Water Quality Impacts	Clean Water Act	33 U S C Section 1251-1376		
	Ambient Water Quality Criteria Guidelines	40 CFR Part 131	Establishes toxicity-based surface water quality criteria for protection of aquatic organisms and human health.	Ambient water quality criteria would be potentially applicable in establishing discharge standards for treated water.
	Wastewater Discharge Permits, Effluent Guidelines, Best Available Technology (BAT) and BMPPT	40 CFR Parts 122, 125, 401	Permit requirements for point source discharges to waters of the United States, establishes effluent standards and requirements for preventing toxic releases	Potentially applicable for remedial activities involving a direct wastewater discharge to nearby surface water and/or diversions/disruptions of the surface water flow of the river that would impact water quality.
Air Emissions from a Point Source	Clean Air Act (CAA)	40 U S C Section 7401-7642		
	National Ambient Air Quality Standards (NAAQS)	40 CFR Part 50	Establishes ambient air quality standards for protection of public health	NAAQS may be applicable in evaluating whether there are air impacts at the site during remedial activities.
	New Source Review (NSR) and Prevention of Significant Deterioration (PSD) Requirements	40 CFR Part 52	New Sources or modifications which emit greater than the defined threshold for listed pollutants must perform ambient impact analysis and install controls which meet best available control technology (BACT)	These regulations are potentially applicable and would require a comparison of potential emissions from the remedial activity to the emission thresholds for NSR.
	National Emission Standards for Hazardous Air Pollutants (NESHAPs)	40 CFR Part 61 40 CFR Part 63	Source-specific regulations which establish emissions standards for hazardous air pollutants (HAPs)	NESHAPs may be applicable if emissions from remediation activities exceed the thresholds for compliance.

TABLE 2-2 (Sheet 5 of 7)
ACTION-SPECIFIC SCGs

ACTION	REQUIREMENTS	CITATION	DESCRIPTION	COMMENT
Transportation	Department of Transportation Regulations	49 CFR 107, 171-174 and 177-179	DOT requirements for hazardous waste transportation	Hazardous waste transport to off-site disposal facilities must be conducted in accordance with applicable DOT requirements.
Land Disposal of Hazardous Waste	RCRA Subtitle C	40 U S C Section 6901 et seq.		
	Land Disposal Restrictions (LDRs)	40 CFR Part 268	Restricts land disposal of hazardous wastes that exceed specific criteria. Establishes Universal Treatment Standards (UTSs) to which hazardous wastes must be treated to prior to land disposal. Phase IV rule revision establishes Alternate Treatment Standards for Soils containing hazardous wastes.	Wastes exhibiting a hazardous characteristic would need to be treated to meet UTS for all hazardous constituents present in the sediment prior to any upland disposal. Characteristically hazardous material can be treated to meet the UTS standards or to meet the alternative treatment standards for RCRA hazardous material.

TABLE 2-2 (Sheet 6 of 7)
ACTION-SPECIFIC SCGs

ACTION	REQUIREMENTS	CITATION	DESCRIPTION	COMMENT
STATE				
Generation, Management, and Treatment of Hazardous Waste	Siting of Industrial Hazardous Waste Facilities	6 NYCRR Part 361	Establishes procedures for selecting appropriate sites for hazardous waste facilities	These regulations are potentially applicable for remediation activities which would involve the construction of upland hazardous waste management facilities
	NYSDEC Division of Hazardous Substances Regulation Identification and Listing of Hazardous Wastes	6 NYCRR Part 371	Outlines criteria for determining if a solid waste is a hazardous waste and is subject to regulation under 6 NYCRR Parts 372-376	These regulations do not set clean-up standards, but would apply during the on-site management of excavated hazardous waste and the upland management of and residual waste streams generated during remediation activities.
	In Water and Riparian Management of Sediment and Dredged Material	TOGS 5.1.9	The document outlines recommended procedures to be followed during dredging and dredged material management in riparian or in-water locations.	This guidance is applicable for the removal of NAPL impacted sediments from OU-3.
	New York State Hazardous Waste Management Facility Regulations	6 NYCRR Part 370.373.372	Establishes New York State's USEPA equivalent hazardous waste management program. Includes regulations for hazardous waste facility construction, operation, and closure, and standards for hazardous waste generation, manifesting, and transport	[See RCRA Hazardous Waste Management Regulations. 40 CFR Parts 263 and 264/265 under Federal SCGs listed in this table]

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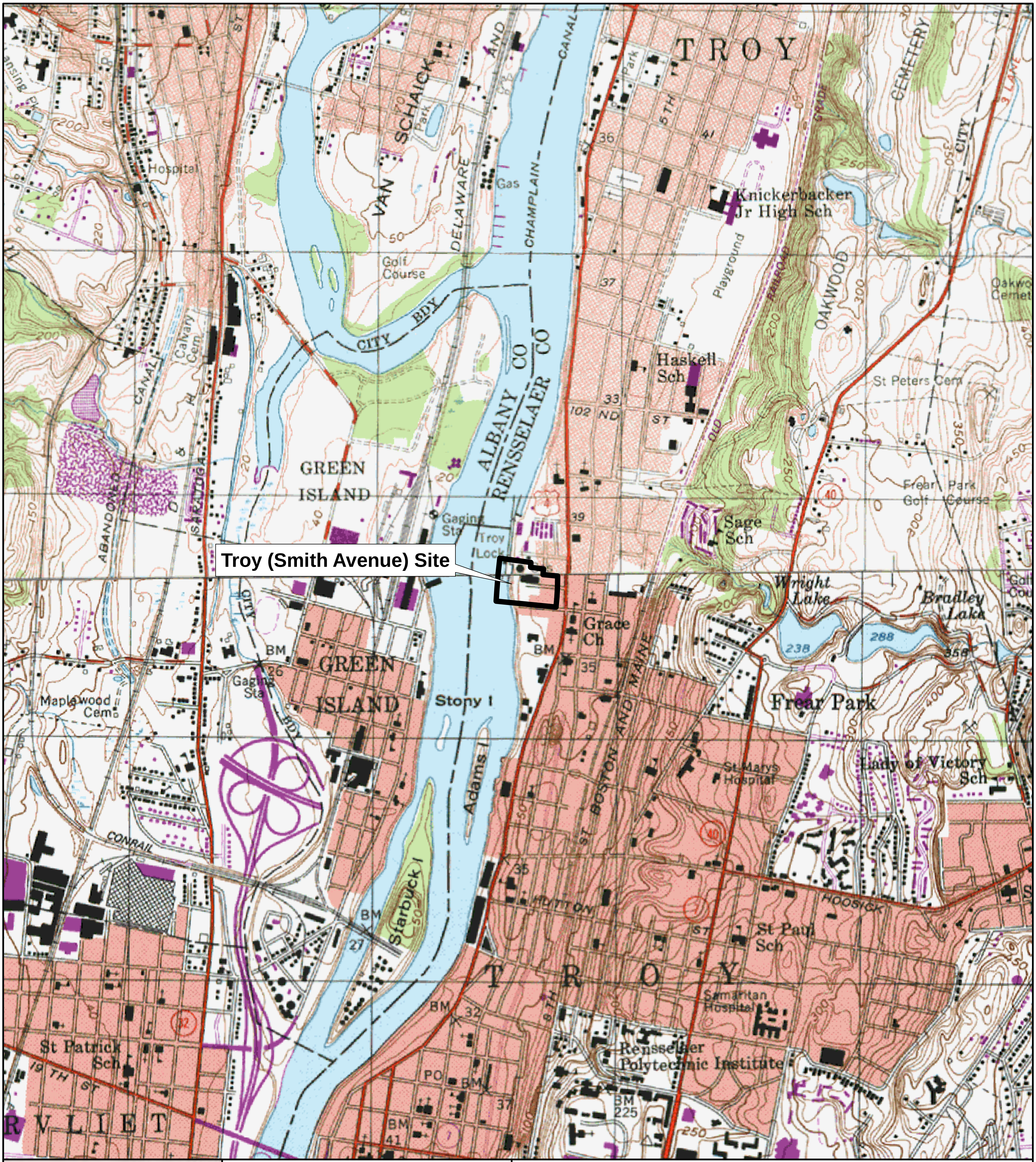
TABLE 2-2 (Sheet 7 of 7)
ACTION-SPECIFIC SCGs

ACTION	REQUIREMENTS	CITATION	DESCRIPTION	COMMENT
Disposal of Non-Hazardous Waste	New York State Solid Waste Management Facility Regulations	6 NYCRR Part 360, 364	Establishes New York State's USEPA equivalent solid waste management program. Includes regulations governing construction, operation, and closure of solid waste disposal facilities	These regulations are potentially applicable to remediation activities involving the upland management and disposal of non-hazardous wastes.
Water Treatment Discharge	New York State Regulations on the State Pollution Discharge Elimination System (SPDES)	6 NYCRR Parts 750-758	State Pollution Discharge Elimination System (SPDES) Permitting Requirements	May be applicable to discharge of treated water.
	New York State Water Classifications and Quality Standards NYSDEC Ambient Water Quality Standards and Guidance Values	6 NYCRR Parts 701, 702, 704 Division of Water Technical and Operational Guidance Series (TOGS) 1.1.1	Defines surface water classifications and ambient water quality standards that are the basis for establishing effluent limitations under the SPDES program. Provides a compilation of ambient water quality standards and guidance values for toxic and non-conventional pollutants for use in NYSDEC programs, including the SPDES permit program.	The Hudson River is classified as a Class C water body. These standards and guidance values are applicable in establishing discharge limitations to surface waters.
Air Emissions	New York State Air Pollution Control Regulations	6 NYCRR Parts 120, 200-203, 207, 211, 211, 212, 219 Air Guide-1	Establishes emissions standards for new sources of air pollutants and specific contaminants.	Requirements would be applicable to remediation alternatives that result in emissions of air contaminants, including particulate matter.
	New York State Ambient Air Quality Standards	6 NYCRR Part 257	Establishes state ambient air quality standards and guidelines for protection of public health.	May be applicable in evaluating air impacts during remediation activities. Establishes short-term action limits for occupational exposure.

TABLE 2-3 (Sheet 1 of 1)
LOCATION-SPECIFIC SCGs

LOCATION	REQUIREMENTS	CITATION	DESCRIPTION	COMMENT
FEDERAL				
Floodplains	Executive Order 11988 - Floodplain Management	40 CFR 6, Subpart A; 40 CFR 6.302	Activities taking place within floodplains must be done to avoid adverse impacts and preserve beneficial values in floodplains.	Activities may occur within the floodplain of the Hudson River.
Wetlands/Waters of the U.S.	Dredge and Fill in Wetlands and Navigable Waters Minimum Draft in Navigable Watercourse Construction of structures in or over navigable waters	33 CFR Parts 320-330/40 CFR Part 230 33 CFR 207.50 USACE Public Notice No. HR-AFO-09 33 CFR 322 Section 10	Dredge or fill material into wetlands and navigable waters must be evaluated based on specific criteria. Deep draft boats must clear the miter sills by at least three inches. The authorized depth of the Federal Navigation Channel from Dunn Memorial Bridge at Albany to the Federal Lock at Troy is 14 feet. Applicable to sheet piling within the Hudson River.	Would be applicable to remediation activities impacting jurisdictional wetlands and the Hudson River. Backfill of sediment in removal areas would extend vertically only to draft requirements.
	Clean Water Act	Section 404	Establishes permit requirements to regulate placement of fill and dredging in navigable waters.	Will provide requirements for dredging in the Hudson River.
Historic/Cultural Resources	National Historic Preservation act	16 USC 470	Establishes requirements for the identification and preservation of historic and cultural resources	Would be applicable to the management of historic or archeological artifacts identified on the site.
Critical Habitat	Endangered Species Act and Fish and Wildlife Coordination Act	16 USC 661 and 16 U.S.C. 1531	Actions must be taken to conserve critical habitat in areas where there are endangered or threatened species.	Requirements would be applicable if endangered or threatened species are identified on or adjacent to the site.
STATE				
Water Resources	Protection of Waters (Water Quality Certification)	6 NYCRR 608	Regulates removal or placement of fill materials within state waters.	Placement of fill materials and/or excavation of sediment within the Hudson River.
Floodplains	Floodplain Management Regulations	6 NYCRR Part 500	Establishes floodplain management requirements including limitations on projects, including placement of fill, which may result in an increase in flood levels or water surface elevations during a base flood discharge.	Remediation activities occur within the floodplain of the Hudson River.
Floodplain	TSD Facility Permitting Requirements	6 NYCRR Subpart 373-1	Facility must be designed and operated to avoid washout.	Requirements are potentially applicable to any upland treatment, storage or disposal of hazardous wastes within the floodplain of the Hudson River.



TETRA TECH EC, INC.

FIGURE 1

Site Location Map
Feasibility Study Report
Troy (Smith Avenue) Site

Source: USGS Quadrangle
Troy North 1954 & Troy South 1953.

T:\GIS\National_Grid\Troy_SmithAve_OU1\Spatial\MXD\Site_Location_Troy_Smith_Ave_120809.mxd

NOTES:

2007 Natural color ortho imagery:
NYS GIS Clearinghouse

OU-3 consists of the Hudson River sediments in the vicinity of the Troy (Smith Avenue) Site.

0 100 200
Feet

Legend

A - A'	RI SAMPLE LOCATIONS
B - B'	2006 SAMPLE LOCATIONS
C - C'	2007 SAMPLE LOCATIONS
D - D'	2008 SAMPLE LOCATIONS
	OPERABLE UNITS

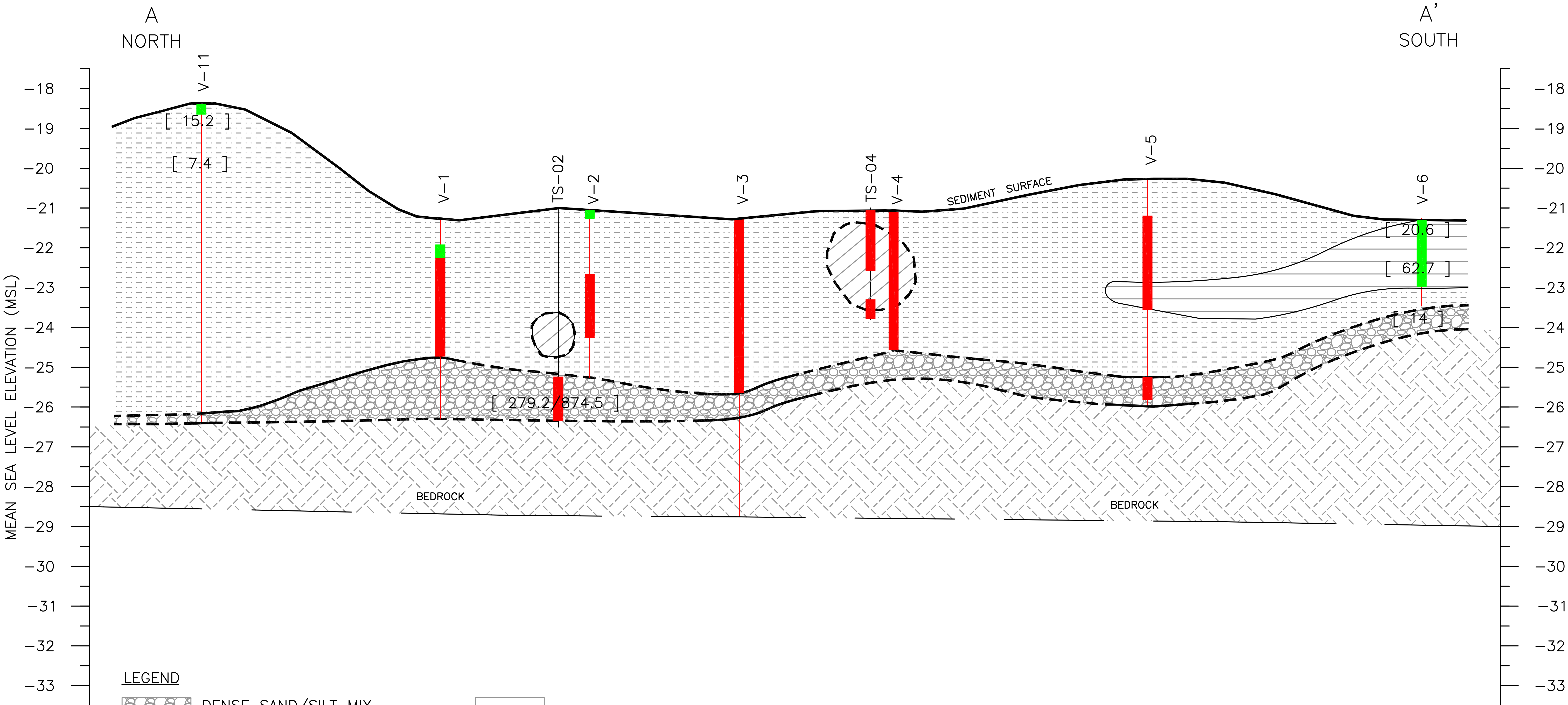
TETRA TECH EC, INC.

FIGURE 2

SITE PLAN

TROY (SMITH AVE.) OU-3
TROY, NY

T:\GIS\National_Grid\Troy_SmithAve_OU1\Spatial\MXD\Figure_2_Cross_Sections_091809.mxd



LEGEND

DENSE SAND/SILT MIX WITH FREQUENT AMOUNTS OF GRAVEL

LOOSE FINE TO COARSE SAND/GRAVEL WITH VARYING AMOUNTS OF SILT AND ORGANIC MATTER

WEATHERED SHALE

SILT WITH VARYING AMOUNTS OF SAND, GRAVEL AND ORGANIC MATTER

LOOSE FINE TO MEDIUM SAND, LITTLE SILT AND GRAVEL

NAPL SATURATION & NAPL GLOBULES IN SEDIMENT CORES

TRACE SHEEN

BORING

INFERRED CONTACT

CONTACT

[TOTAL PAH_{16} / PAH_{34} CONCENTRATIONS IN PPM]

0 20 40
SCALE IN FEET

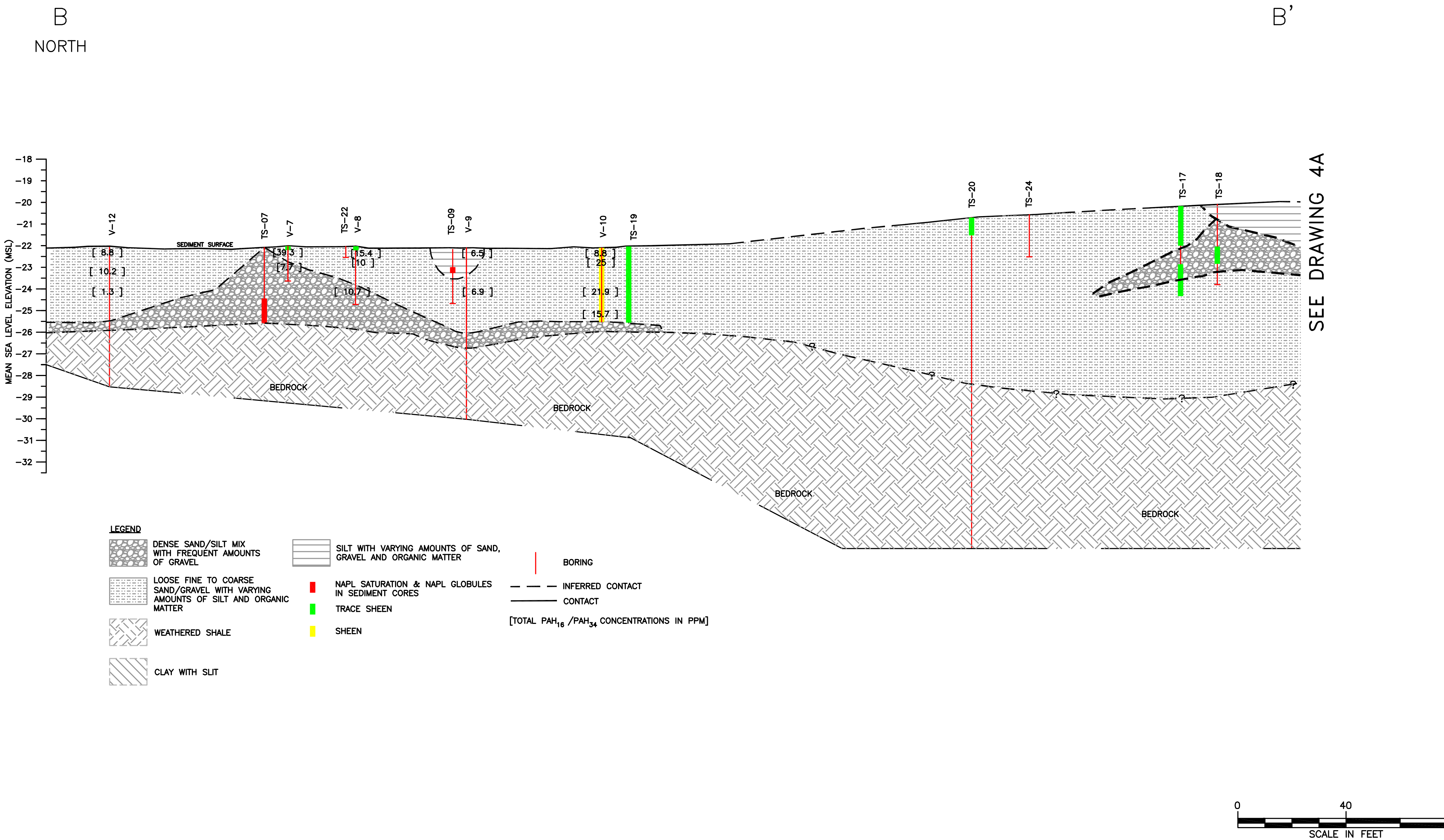
TETRA TECH EC, INC.

TITLE:
Cross Section A–A'

Troy (Smith Ave.) Former MGP Site

DWN.: DB/FGM	DATE: 03/04/08	PROJECT NO.:
CHKD: RC	DRAFT: 2	FIGURE NO.:
DES.: CJ	APPD: RC	3

P:\Troy-Smith Avenue Former MGP Site\CAD - GIS\GEOTECH\DWG\29070001FIG3 AND 5-CROSS_SECTION_AA_CC_REV 122209.dwg

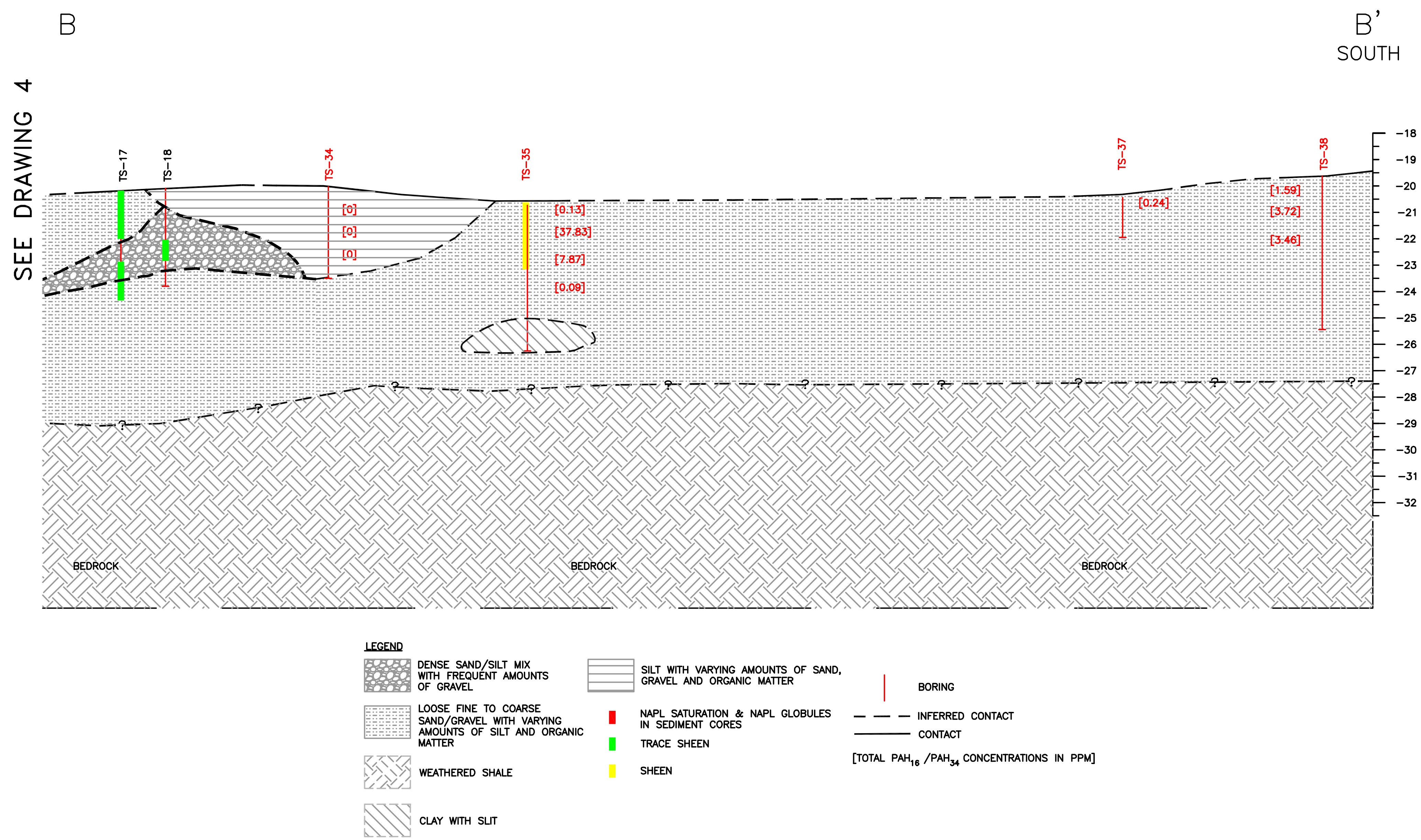


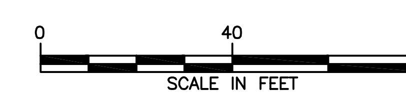
TETRA TECH EC, INC.	TITLE: Cross Section B–B' Troy (Smith Ave.) Former MGP Site	DWN.: DB/FGM	DATE: 03/04/08
		CHKD: RC	DRAFT: 2
		DES.: CJ	APPD: RC

PROJECT NO.:

FIGURE NO.: 4

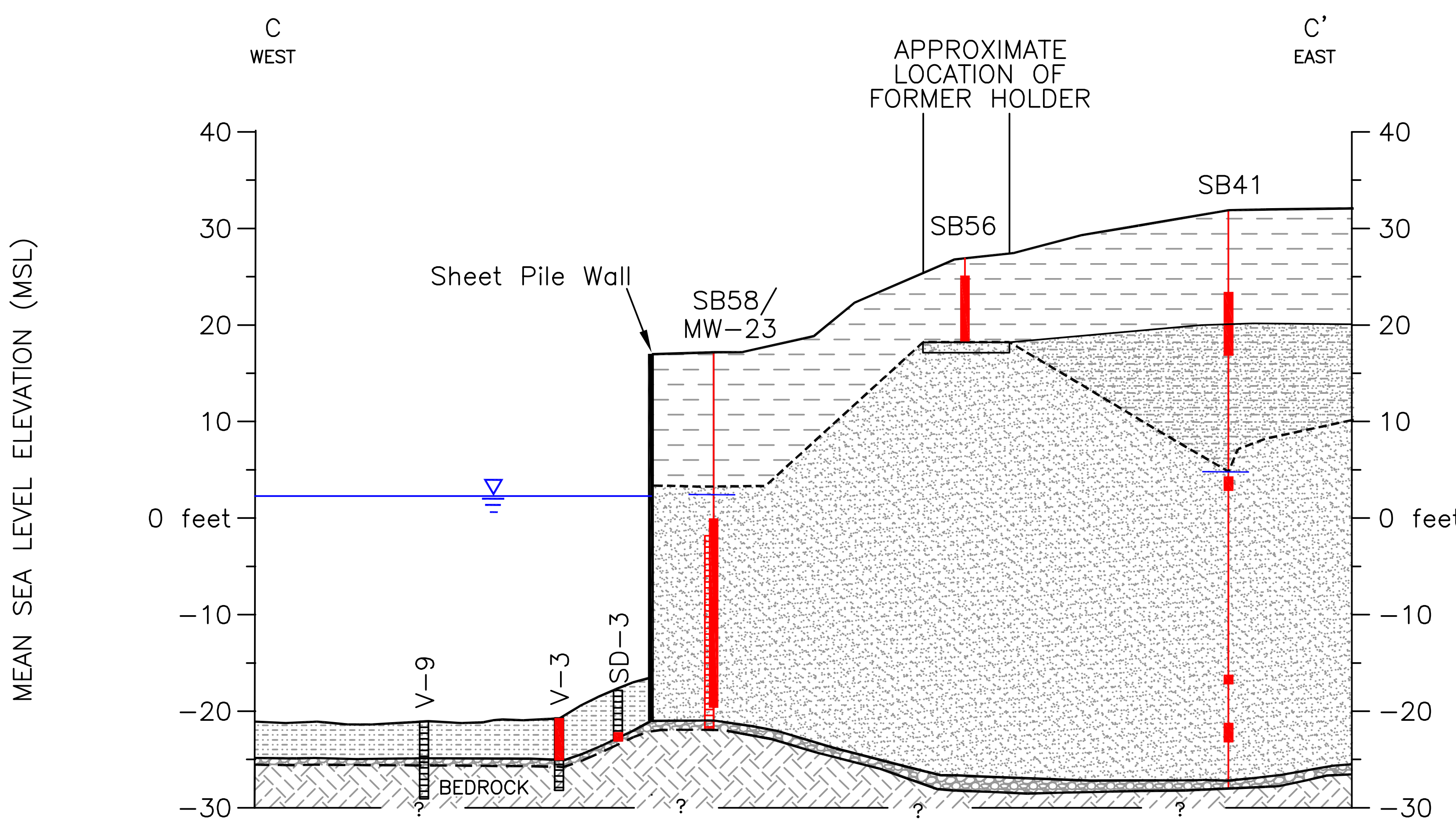
P:\Troy-Smith Avenue Former MGP Site\CAD - GIS\GEOTECH\DWG\29070001FIG4_4A-CROSS_SECTION_BB_REV 122209.dwg





P:\Troy-Smith Avenue Former MGP Site\CAD - GIS\GEOTECH\DWG\29070001FIG4_4A-CROSS_SECTION_BB_REV 122209.dwg

TETRA TECH EC, INC.	TITLE: Cross Section B–B' continued Troy (Smith Ave.) Former MGP Site	DWN.: DB/FGM	DATE: 03/04/08	PROJECT NO.:
		CHKD: RC	DRAFT: 2	FIGURE NO.: 4A
		DES.: CJ	APPD: RC	



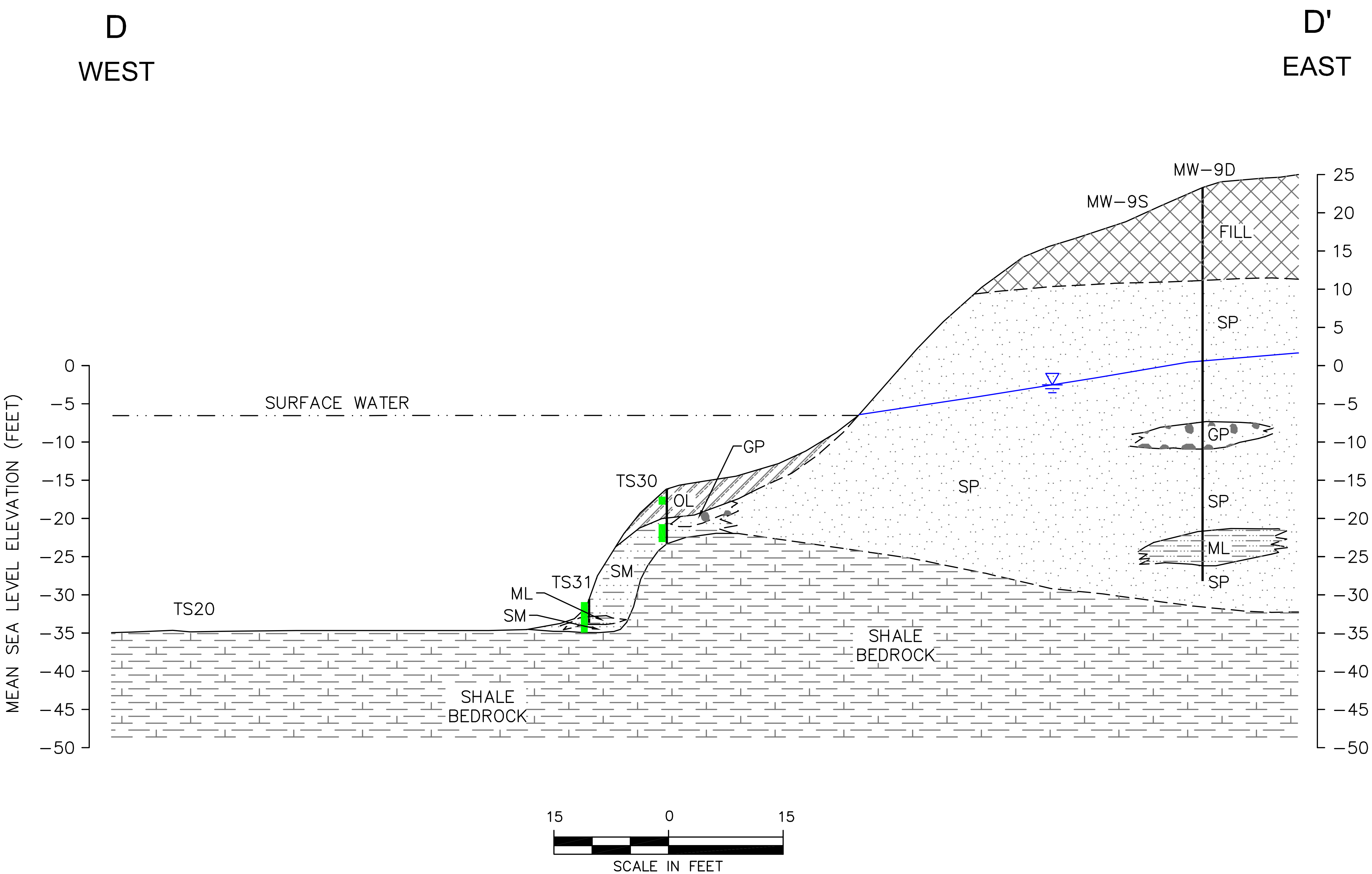
LEGEND

- FILL – FINE TO COARSE SAND WITH VARYING AMOUNTS OF SILT AND GRAVEL
- GLACIAL/FLUVIAL, OUTWASH DEPOSITS – FINE TO COARSE SAND AND GRAVEL WITH TRACE AMOUNTS OF SILT
- SOFT CLAYEY SILT WITH TRACE AMOUNTS OF GRAVEL
- FINE TO COARSE SAND AND GRAVEL WITH VARYING AMOUNTS OF SILT
- LOOSE SANDY SILT/SILTY SAND WITH VARYING AMOUNTS OF GRAVEL AND WOOD FRAGMENTS
- WEATHERED SHALE
- NAPL SATURATION & NAPL GLOBULES
- DEPTH AT WHICH SATURATED SOILS WERE OBSERVED
- BORING
- SCREEN INTERVAL
- SEDIMENT BORING
- APPROXIMATE 2006 WATER LEVEL
- CONTACT
- INFERRED CONTACT

NOTES:
1. V−3 LOCATED APPROXIMATELY 15 WEST OF BULKHEAD.
2. V−9 LOCATED APPROXIMATELY 37 FEET WEST OF BULKHEAD.

TETRA TECH EC, INC.	TITLE: Cross Section C−C' Troy (Smith Ave.) Former MGP Site	DWN.: DB/FGM CHKD: RC DES.: CJ	DATE: 03/04/08 DRAFT: 2 APPD: RC	PROJECT NO.: FIGURE NO.: 5

P:\Troy-Smith Avenue Former MGP Site\CAD - GIS\GEOTECH REPORT\DWG\29070001FIG3 AND 5-CROSS_SECTION_AA_CC.dwg



LEGEND:

ML	GRAY SILT WITH SOME CLAY, TRACE FINE SAND
SP	BROWN FINE SAND, TRACE SILT, TRACE CLAY
SM	VERY DARK GRAY SILTY SAND WITH GRAVEL
GP	BROWN AND GRAY COARSE−FINE GRAVEL, LITTLE SAND
OL	STICKS AND LEAVES
FILL	BROWN MEDIUM−FINE SAND WITH GRAVEL COMPOSED OF BRICK, CONCRETE AND STONE
▽	GROUND WATER LEVEL
———	INFERRED GROUNDWATER DEPTH
—·—·—	TOP OF SURFACE WATER
▮	SHEEN

NOTE:

1. DASHED LINES INDICATE INFERRED DEPTH.

TETRA TECH EC, INC.

TITLE: Cross Section D−D' Troy−Smith Avenue Former MGP Site	DWN.: DLB	DATE: 09/01/09	PROJECT NO.: 106−2907.0001
	CHKD.: RC	REV.: −	FIGURE NO.: 6
	DES.: CD	APPD.: RC	

P:\Troy-Smith Avenue Former MGP Site\CAD - GIS\GEOTECH REPORT\DWG\29070001FIG6-CROSS_SECTION_DD.dwg

NOTES:

- PAH CONCENTRATIONS IN mg/kg
- * NO RECOVERABLE SEDIMENT
- ** NO SAMPLE COLLECTED FOR PAH ANALYSIS DUE TO THE PRESENCE OF NAPL
- PAH ANALYSIS PERFORMED BY NYSDOH CERTIFIED LABORATORIES

0 125 250
Feet

Legend

- 2006 SAMPLE LOCATIONS
- 2008 SAMPLE LOCATIONS
- TROY SMITH AVE. OU-1

TETRA TECH EC, INC.

FIGURE 7

SEDIMENT SAMPLE LOCATIONS AND ASSOCIATED PAH CONCENTRATIONS

TROY (SMITH AVE.) OU-3
TROY, NY

T:\GIS\National_Grid\Troy_SmithAve_OU1\Spatial\MXD\Figure_7_Sediment_&_PAH_091709.mxd

NOTES:

Tox - Tox - SAMPLES COLLECTED FOR TOXICITY ANALYSIS AND WAS NOT TOXIC TO *H.azteca*

Tox+ - Tox+ - SAMPLES COLLECTED FOR TOXICITY ANALYSIS AND WAS TOXIC TO *H.azteca*

0 125 250

Feet

Legend

- 2006 SAMPLE LOCATIONS
- 2007 SAMPLE LOCATIONS
- 2008 SAMPLE LOCATIONS

TETRA TECH EC, INC.

FIGURE 8

TOXICITY SAMPLE RESULTS

TROY (SMITH AVE.) OU-3
TROY, NY

T:\GIS\National_Grid\Troy_SmithAve_OU1\Spatial\MXD\Figure_8_Sediment_Tox_Concentrations_121009.mxd

NOTES:

- * NO SAMPLES WERE TAKEN DUE TO LACK OF RECOVERABLE SEDIMENT
- (0-1) - INTERVAL BELOW TOP OF SEDIMENT

TETRA TECH EC, INC.

FIGURE 9

OBSERVED OCCURRENCE OF NAPL AND SHEENS IN SEDIMENT

TROY (SMITH AVE.) OU-3
TROY, NY

NOTES:

- PAH CONCENTRATIONS IN mg/kg
- * NO RECOVERABLE SEDIMENT
- ** NO SAMPLE COLLECTED FOR PAH ANALYSIS DUE TO THE PRESENCE OF NAPL
- PAH ANALYSIS PERFORMED BY NYSDOH CERTIFIED LABORATORIES

0 125 250
Feet

Legend
PROPOSED AREAL EXTENT OF SEDIMENT REMOVAL
2006 SAMPLE LOCATIONS
2007 SAMPLE LOCATIONS
2008 SAMPLE LOCATIONS
TROY SMITH AVE. OU-1

TETRA TECH EC, INC.

FIGURE 10

ALTERNATIVE S-3

TROY (SMITH AVE.)
TROY, NY

T:\GIS\National_Grid\Troy_SmithAve_OU1\Spatial\MXD\Figure_10_Alternative_S3_rev1_122109.mxd

NOTES:

- PAH CONCENTRATIONS IN mg/kg
- * NO RECOVERABLE SEDIMENT
- ** NO SAMPLE COLLECTED FOR PAH ANALYSIS DUE TO THE PRESENCE OF NAPL
- PAH ANALYSIS PERFORMED BY NYSDOH CERTIFIED LABORATORIES

0 125 250
Feet

Legend
PROPOSED AREAL EXTENT OF SEDIMENT REMOVAL FOR PRE-DISPOSAL ALTERNATIVE
2006 SAMPLE LOCATIONS
2008 SAMPLE LOCATIONS
TROY SMITH AVE. OU-1

TETRA TECH EC, INC.

FIGURE 11

ALTERNATIVE S-4

TROY (SMITH AVE.)
TROY, NY

T:\GIS\National_Grid\Troy_SmithAve_OU1\Spatial\MXD\Figure_11_Alternative_S4_120809.mxd

Appendix A

FIELD BORING LOG SHEET

BORING LOG SHEET

BORING NUMBER: V-1

TETRA TECH EC, INC

PROJECT:	National Grid-Troy (Smith Ave) OU-2	DATE STARTED:	11/01/06
PROJECT NO.:	2907.0001.0002.00000	DATE COMPLETED:	11/01/06
LOCATION:	V-1		
TOTAL DEPTH (FT):	4.7		
GEOLOGIST:	R. Funk	X COORDINATE:	73° 41' 07.602"
DRILLER:	Aqua Survey	Y COORDINATE:	42° 45' 01.029"
DRILLING/SAMPLING METHOD:	Vibracore	DATUM:	LOCAL TIDAL DATUM

Sample ID	Start Depth (feet)	End Depth (feet)	Recovery (ft)	Consoli-dated ? Y or N	USCS Soil Classification or Material	Color	Description	TIME	DATE	FID/PID (ppm)	Comments
	0.0	3.4	1.8	N	GW	dark gray	loose, GRAVEL, wet	11:35	11/01/06	10	NAPL from 1.86' from top of sediment to base of boring, strong naptha odor
	3.4	4.7	0.7	N	SP-SM	dark gray	medium dense, SAND (f), little silt and clay, wet	11:35	11/01/06	10	NAPL throughout, strong naptha odor Vibracore refusal at 4.7 feet below top of sediment.

NOTES: Second core. The first core was a complete core to 3.5 feet, and no NAPL was observed. Insufficient sample volume was collected for laboratory chemical analysis, therefore a second core was completed. NAPL was observed in the second core, presented here, therefore no samples were submitted for analysis.

FIELD BORING LOG SHEET

BORING LOG SHEET

BORING NUMBER: V-2

TETRA TECH EC, INC.

PROJECT: National Grid-Troy (Smith Ave) OU-2
PROJECT NO.: 2907.0001.0002.00000
LOCATION: V-2
TOTAL DEPTH (FT): 4
GEOLOGIST: R. Funk
DRILLER: Aqua Survey
DRILLING/SAMPLING METHOD: Vibracore

DATE STARTED: 10/310/6
DATE COMPLETED: 10/31/06

X COORDINATE: 73° 41' 07.529"
Y COORDINATE: 42° 45' 00.736"
DATUM: LOCAL TIDAL DATUM

Sample ID	Start Depth (feet)	End Depth (feet)	Recovery (ft)	Consolidated ? Y or N	USCS Soil Classification or Material	Color	Description	TIME	DATE	FID/PID (ppm)	Comments
	0	0.25	0.2	N	SP	gray	loose, SAND (f-c) and GRAVEL, wet	13:32	10/31/06	NAB	0.15-0.25': Odor and sheen upon core retrieval.
	0.25	1.6	1.2	N	SP	gray	loose, SAND (f), trace gravel, wet	nr	10/31/06	NAB	
	1.6	4	2.1	N	SP	dark gray	loose, SAND (m-c) and GRAVEL, wet	nr	10/31/06	NAB	1.4-3': Heavy NAPL sheen, little free product. Vibracore refusal at 4 feet below top of sediment.

NOTES: NAB-not above background nr-not recorded

FIELD BORING LOG SHEET

BORING LOG SHEET

BORING NUMBER: V-3

TETRA TECH EC, INC.

PROJECT:	National Grid-Troy (Smith Ave) OU-2	DATE STARTED:	10/31/06
PROJECT NO.:	2907.0001.0002.00000	DATE COMPLETED:	11/07/06
LOCATION:	V-3		
TOTAL DEPTH (FT):	7.5		
GEOLOGIST:	R. Funk	X COORDINATE:	73° 41' 07.671"
DRILLER:	Aqua Survey	Y COORDINATE:	42° 45' 00.456"
DRILLING/SAMPLING METHOD:	Vibracore	DATUM:	LOCAL TIDAL DATUM

Sample ID	Start Depth (feet)	End Depth (feet)	Recovery (ft)	Consolidated ? Y or N	USCS Soil Classification or Material	Color	Description	TIME	DATE	FID/PID (ppm)	Comments
	0	0.25	0.3	N	SP	dk gray	loose, SAND (f), wet	13:55	10/13/06	NAB	NAPL present. Moderate naphthalene odor
	0.25	1.2	1.0	N	SP	dk gray	loose, SAND and GRAVEL	nr	10/31/06	NAB	NAPL increases with depth to bottom of interval
	1.2	3.5	2.3	N	SP	dk gray	loose, SAND (f) with gravel (f), wet	nr	10/31/06	NAB	NAPL present. Gravel size increases with depth. Vibracore refusal at 3.5 feet below top of sediment.
	3.5	4.4	nm	N	SP	gray	loose, SAND (f-c) , wet	nr	11/07/06	NAB	Switch to hollow stem auger method, advance casing to 4.5 feet below top of sediment using split spoon sampling, Spoon 1 (first) contains NAPL globules.
	4.4	5	nm	N	ML	gray	very stiff, SILT and GRAVEL (angular), wet	nr	11/07/06	NAB	Spoon 2 (second) contains till at base.
	5	7.5	nm	Y	BEDROCK	gray	BEDROCK	nr	11/07/06	NAB	Core for 2.5 feet and bit advances as if in rock, but no recovery. Stopped advancing core at 2.5 ft, core bit damaged. Weathered bedrock at 5' from top of sediment.

NOTES: NAB-not above background nr-not recorded nm- not measured

FIELD BORING LOG SHEET

BORING LOG SHEET

BORING NUMBER: V-4

TETRA TECH EC, INC.

PROJECT: National Grid-Troy (Smith Ave) OU-2
PROJECT NO.: 2907.0001.0002.00000
LOCATION: V-4
TOTAL DEPTH (FT): 3.3
GEOLOGIST: R. Funk
DRILLER: Aqua Survey
DRILLING/SAMPLING METHOD: Vibracore

DATE STARTED: 10/31/06
DATE COMPLETED: 10/31/06

X COORDINATE: 73° 41' 07.736"
Y COORDINATE: 42° 45' 00.152"
DATUM: LOCAL TIDAL DATUM

Sample ID	Start Depth (feet)	End Depth (feet)	Recovery (ft)	Consoli-dated ? Y or N	USCS Soil Classification or Material	Color	Description	TIME	DATE	FID/PID (ppm)	Comments
	0	1.5	1.1	N	SP	dk gray	loose, SAND (f-c), and GRAVEL (f-c), wet	nr	10/31/06	15	Naptha odor on core retrieval. NAPL heavy throughout.
	1.5	3.3	2.5	N	SP	dk gray	loose, SAND (f-m), some gravel (f-c), wet	nr	10/31/06	15	NAPL heavy throughout core. Vibracore refusal at 3.3 feet below top of sediment.

NOTES: nr-not recorded

FIELD BORING LOG SHEET

BORING LOG SHEET

BORING NUMBER: V-5

TETRA TECH EC, INC.

PROJECT: National Grid-Troy (Smith Ave) OU-2
PROJECT NO.: 2907.0001.0002.00000
LOCATION: V-5
TOTAL DEPTH (FT): 5.7
GEOLOGIST: R. Funk
DRILLER: Aqua Survey
DRILLING/SAMPLING METHOD: Vibracore

DATE STARTED: 10/31/06
DATE COMPLETED: 11/03/06

X COORDINATE: 73° 41' 07.777"
Y COORDINATE: 42° 44' 59.652"
DATUM: LOCAL TIDAL DATUM

Sample ID	Start Depth (feet)	End Depth (feet)	Recovery (ft)	Consolidated ? Y or N	USCS Soil Classification or Material	Color	Description	TIME	DATE	FID/PID (ppm)	Comments
V-5 R2 0-2.9	0.0	0.7	0.5	N	SP	gray	loose, SAND (f-m) with gravel, wet	nr	10/31/06	NAB	Second core attempt.
	0.7	2.4	1.3	N	SP	gray	loose, SAND and GRAVEL (f-c), little cobble, wet	nr	10/31/06	7.2	NAPL present, strong naphthalene odor, trace slag in sample.
	2.4	2.9	0.4	N	ML	gray	stiff, SILT and GRAVEL (f), little sand, wet	nr	10/31/06	NAB	Vibracore refusal at 2.9 feet below top of sediment.
	3	5	nm	N	SP	gray	loose, SAND and GRAVEL (f-c), little cobble, wet	nr	11/03/06	NAB	Switch to hollow stem auger method, advance casing to 3' below the top of sediment to begin collecting samples by split spoon.
	5	5.6	nm	N	ML	gray	very stiff, SILT and GRAVEL (f), little sand, wet	nr	11/03/06	NAB	Spoon 1- advance casing to refusal at 4.2 feet below top of sediment. Spoon 2 - all material is fall-in from above, contains trace NAPL. Spoon 3 - no recovery (hammer with chisel bit).
	5.6	5.7	nm	Y	BEDROCK	nr	BEDROCK	nr	11/03/06	NAB	Possible weathered bedrock at 5.6' from top of sediment.

NOTES: NAB-not above background nr-not recorded nm- not measured

FIELD BORING LOG SHEET

BORING LOG SHEET

BORING NUMBER: V-6

TETRA TECH EC, INC.

PROJECT: National Grid-Troy (Smith Ave) OU-2
PROJECT NO.: 2907.0001.0002.00000
LOCATION: V-6
TOTAL DEPTH (FT): 2.2
GEOLOGIST: R. Funk
DRILLER: Aqua Survey
DRILLING/SAMPLING METHOD: Vibracore

DATE STARTED: 10/31/06
DATE COMPLETED: 11/01/06

X COORDINATE: 73° 41' 07.924"
Y COORDINATE: 42° 44' 59.122"
DATUM: LOCAL TIDAL DATUM

Sample ID	Start Depth (feet)	End Depth (feet)	Recovery (ft)	Consolidated ? Y or N	USCS Soil Classification or Material	Color	Description	TIME	DATE	FID/PID (ppm)	Comments
V6-10-31-06-0-6	0	1.5	1.4	N	ML	dark gray to black	very soft, SILT and SAND (f-c), little gravel (f-m), wet	15:25	10/31/06	NAB	Little sheen, slight odor.
V6-10-31-06-12-18	1	1.5	0.5	N	ML	dark gray to black	SAA	nr	11/01/06	NAB	Little sheen, slight odor.
V6-10-31-06-24-30	1.5	2.2	0.6	N	SP	dark gray	loose, SAND (f-c) and gravel (f-c), little cobble, wet	15:30	10/31/06	NAB	No odor. Vibracore refusal at 2.2 feet below top of sediment.

NOTES: NAB-not above background nr-not recorded SAA-same as above

FIELD BORING LOG SHEET

BORING LOG SHEET

BORING NUMBER: V-7

TETRA TECH EC, INC.

PROJECT: National Grid-Troy (Smith Ave) OU-2
PROJECT NO.: 2907.0001.0002.00000
LOCATION: V-7
TOTAL DEPTH (FT): 1.5
GEOLOGIST: R. Funk
DRILLER: Aqua Survey
DRILLING/SAMPLING METHOD: Vibracore

DATE STARTED: 11/01/06
DATE COMPLETED: 11/01/06

X COORDINATE: 73° 41' 07.975"
Y COORDINATE: 42° 45' 00.531"
DATUM: LOCAL TIDAL DATUM

Sample ID	Start Depth (feet)	End Depth (feet)	Recovery (ft)	Consolidated ? Y or N	USCS Soil Classification or Material	Color	Description	TIME	DATE	FID/PID (ppm)	Comments
V7-11-01-06-0-6	0	0.75	0.75	N	SP	dark gray	loose, SAND (f-m), little silt, wet	08:55	11/01/06	0.8	50% wood (sticks & twigs), trace sheen
V7-11-01-06-12-18	0.75	1.5	0.75	N	GP	dark gray	loose, GRAVEL (f-m) with sand (m-c), wet	nr	11/01/06	1	Trace wood. Note: Sampled collected from second attempt. First attempt, no recovery. Third attempt, no recovery, lost core catcher. Vibracore refusal at 1.5 feet below top of sediment

NOTES: nr-not recorded

FIELD BORING LOG SHEET

BORING LOG SHEET

BORING NUMBER: V-8

TETRA TECH EC, INC

PROJECT: National Grid-Troy (Smith Ave) OU-2
PROJECT NO.: 2907.0001.0002.00000
LOCATION: V-8
TOTAL DEPTH (FT): 2.7
GEOLOGIST: R. Funk
DRILLER: Aqua Survey
DRILLING/SAMPLING METHOD: Vibracore

DATE STARTED: 11/01/06
DATE COMPLETED: 11/01/06

X COORDINATE: 73° 41' 08.031"
Y COORDINATE: 42° 45' 00.294"
DATUM: LOCAL TIDAL DATUM

Sample ID	Start Depth (feet)	End Depth (feet)	Recovery (ft)	Consolidated ? Y or N	USCS Soil Classification or Material	Color	Description	TIME	DATE	FID/PID (ppm)	Comments
V8-11-01-06-0-6	0	1.0	0.8	N	ML	dark gray to black	very soft, SILT with sand (f-c), wet	09:50	11/01/06	NAB	Abundant wood, trace sheen on top 6"
V8-11-01-06-12-18	1	1.7	0.5	N	ML	dark gray to black	very soft, SILT with sand (f-c), wet	09:55	11/01/06	NAB	
V8-11-01-06-24-30	1.7	2.7	0.7	N	GM	dark gray to black	loose, SILT and GRAVEL, wet	10:00	11/01/06	NAB	Gravel is composed of shale fragments with trace wood fragments. Vibracore refusal at 2.7 feet below top of sediment.

NOTES: NAB-not above background

FIELD BORING LOG SHEET

BORING LOG SHEET

BORING NUMBER: V-9

TETRA TECH EC, INC.

PROJECT: National Grid-Troy (Smith Ave) OU-2
PROJECT NO.: 2907.0001.0002.00000
LOCATION: V-9
TOTAL DEPTH (FT): 8.0
GEOLOGIST: R. Funk
DRILLER: Aqua Survey
DRILLING/SAMPLING METHOD: Vibracore

DATE STARTED: 11/01/06
DATE COMPLETED: 11/06/06

X COORDINATE: 73° 41' 08.085"
Y COORDINATE: 42° 44' 59.891"
DATUM: LOCAL TIDAL DATUM

Sample ID	Start Depth (feet)	End Depth (feet)	Recovery (ft)	Consoli-dated ? Y or N	USCS Soil Classification or Material	Color	Description	TIME	DATE	FID/PID (ppm)	Comments
	0.0	0.5	0.3	N	OL-OH	brown	all wood	nr	11/01/06	NAB	Only wood in this interval.
V9-11-01-06-12-18	0.5	2.0	0.9	N	SP	dark gray	loose, SAND (f-m), little silt, wet	10:30	11/01/06	NAB	Little wood
V9-11-01-06-24-30	2.0	3.2	0.8	N	SP	dark gray	loose, SAND (f-c), with gravel, wet	10:35	11/01/06	NAB	Vibracore refusal at 3.2 feet below top of sediment.
	3.2	3.8	nm	N	SP	dark gray	SAA	nr	11/06/06	NAB	Switch to hollow stem auger method, advance casing to 4.5 feet below the top of sediment and use split spoon sampling.
	3.8	4.5	nm	N	GP	dark gray	dense, GRAVEL (angular) some silt, wet	nr	11/06/06	NAB	Weathered bedrock
	4.5	8	nr	Y	BEDROCK	gray	BEDROCK	nr	11/06/06	NAB	Core for 4', bit advances as if in rock, little core recovery. Weathered bedrock at 4.5' below top of sediment.

NOTES: NAB-not above background nr-not recorded SAA-same as above nm- not measured

FIELD BORING LOG SHEET

BORING LOG SHEET

BORING NUMBER: V-10

TETRA TECH EC, INC

PROJECT:	National Grid-Troy (Smith Ave) OU-2	DATE STARTED:	11/01/06
PROJECT NO.:	2907.0001.0002.00000	DATE COMPLETED:	11/01/06
LOCATION:	V-10		
TOTAL DEPTH (FT):	3.5		
GEOLOGIST:	R. Funk	X COORDINATE:	73° 41' 08.187"
DRILLER:	Aqua Survey	Y COORDINATE:	42° 44' 59.400"
DRILLING/SAMPLING METHOD:	Vibracore	DATUM:	LOCAL TIDAL DATUM

Sample ID	Start Depth (feet)	End Depth (feet)	Recovery (ft)	Consolidated ? Y or N	USCS Soil Classification or Material	Color	Description	TIME	DATE	FID/PID (ppm)	Comments
V10-11-01-06-0-6	0	0.5	0.3	N	ML	dark gray	very soft, SILT, little sand	11:05	11/01/06	NAB	Abundant wood fragments, moderate sheen
V10-11-01-06-12-18	0.5	2	0.9	N	ML	dark gray	SAA with less wood	11:10	11/01/06	NAB	Moderate sheen
V10-11-01-06-24-30	2	2.5	0.3	N	ML	dark gray	SAA	11:15	11/01/06	NAB	Moderate sheen
V10-11-01-06-36-42	3	3.5	0.3	N	GP	dark gray	loose, GRAVEL and SAND	11:20	11/01/06	NAB	Moderate sheen Vibracore refusal at 3.5 feet below top of sediment.

NOTES: NAB-not above background SAA-same as above

FIELD BORING LOG SHEET

BORING LOG SHEET

BORING NUMBER: V-11

TETRA TECH EC, INC.

PROJECT: National Grid-Troy (Smith Ave) OU-2
PROJECT NO.: 2907.0001.0002.00000
LOCATION: V-11
TOTAL DEPTH (FT): 8.0
GEOLOGIST: R. Funk
DRILLER: Aqua Survey
DRILLING/SAMPLING METHOD: Vibracore

DATE STARTED: 11/01/06
11/02/06
GROUND ELEVATION (FT):
X COORDINATE: 73° 41' 07.526"
Y COORDINATE: 42° 45' 01.501"
DATUM: LOCAL TIDAL DATUM

Sample ID	Start Depth (feet)	End Depth (feet)	Recovery (ft)	Consoli-dated ? Y or N	USCS Soil Classification or Material	Color	Description	TIME	DATE	FID/PID (ppm)	Comments
V11-11-01-06-0-6	0	0.5	0.5	N	ML	dark gray	very soft, SILT, wet	12:25	11/01/06	nr	Abundant wood, trace sheen
V11-11-01-06-12-18	0.5	1.5	1	N	GP	dark gray	loose, GRAVEL with Sand (f-m)	12:30	11/01/06	nr	
	1.5	3	0	na	na	na	no recovery	na	11/02/06	no recovery	Switch to hollow stem auger method. Vibracore refusal at 3 feet below top of sediment.
	3	5	nm	N	SP	dark gray	loose, SAND (f-c) and GRAVEL little Silt, wet	nr	11/02/06	NAB	Advance casing to 3' below the top of sediment and collect split spoon samples.
	5	7	nm	N	SP	dark gray	SAA	nr	11/02/06	5.6	
	7	7.6	nm	N	SP	dark gray	SAA	nr	11/02/06	1.8	
	7.6	7.9	nm	N	ML	gray	medium dense, SILT with gravel, wet	nr	11/02/06	NAB	Split spoon refusal at 7.9' below top of sediment.
	7.9	8	nm	Y	BEDROCK	gray	BEDROCK	nr	11/02/06	NAB	Possible weathered bedrock at 7.9' below top of sediment.

NOTES: NAB-not above background nr-not recorded na-not applicable SAA-same as above nm- not measured

FIELD BORING LOG SHEET

BORING LOG SHEET

BORING NUMBER: V-12

TETRA TECH EC, INC.

PROJECT: National Grid-Troy (Smith Ave) OU-2
PROJECT NO.: 2907.0001.0002.00000
LOCATION: V-12
TOTAL DEPTH (FT): 6.5
GEOLOGIST: R. Funk
DRILLER: Aqua Survey
DRILLING/SAMPLING METHOD: Vibracore

DATE STARTED: 11/01/06
DATE COMPLETED: 11/06/016

X COORDINATE: 73° 41' 07.877"
Y COORDINATE: 42° 45' 01.186"
DATUM: LOCAL TIDAL DATUM

Sample ID	Start Depth (feet)	End Depth (feet)	Recovery (ft)	Consoli-dated ? Y or N	USCS Soil Classification or Material	Color	Description	TIME	DATE	FID/PID (ppm)	Comments
V12-11-01-06-0-6	0	1	1.0	N	SP	light gray	loose, light gray SAND with silt, wet	13:35	11/01/06	NAB	
V12-11-01-06-12-18	1	2	1.0	N	SP	light gray	loose, SAND with silt, little gravel, wet	13:40	11/01/06	NAB	
V12-11-01-06-24-30	2	3	1.0	N	SP	light gray	loose, SAND with silt, wet	13:45	11/01/06	NAB	Vibracore refusal at 3 feet belwo top of sediment.
	3	3.5	nm	N	SP	light gray	SAA	NAB	11/06/06	NAB	Switch to hollow stem auger method. Split spoon contained weathered shale.
	3.5	6.5	0	Y	BEDROCK	gray	BEDROCK	NAB	11/06/06	NAB	Core for 3', bit advances as if in rock, but no recovery. Possible weathered bedrock at 3.5' below top of sediment.

NOTES: NAB-not above background SAA-same as above nm- not measured

FIELD BORING LOG SHEET

BORING LOG SHEET

BORING NUMBER: V-13

TETRA TECH EC, INC.

PROJECT: National Grid-Troy (Smith A
PROJECT NO.: 2907.0001.0002.00000
LOCATION: V-13
TOTAL DEPTH (FT): 4.6
GEOLOGIST: R. Funk
DRILLER: Aqua Survey
DRILLING/SAMPLING METHOD: Vibracore

DATE STARTED: 11/01/06
DATE COMPLETED: 11/01/06

X COORDINATE: 73° 41' 07.934"
Y COORDINATE: 42° 44' 54.711"
DATUM: LOCAL TIDAL DATUM

Sample ID	Start Depth (feet)	End Depth (feet)	Recovery (ft)	Consolidated ? Y or N	USCS Soil Classification or Material	Color	Description	TIME	DATE	FID/PID (ppm)	Comments
V13-11-01-06-0-6	0	1	0.7	N	SP	dark gray	loose,SAND (f) with silt, wet	13:55	11/01/06	NAB	Slight sheen
V13-11-01-06-12-18	1	2	0.7	N	SP	dark gray	loose, SAND (f-m) little silt trace gravel, wet	14:00	11/01/06	NAB	
V13-11-01-06-24-30	2	3	0.7	N	SP	dark gray	loose, SAND (f-c) with gravel, wet	14:05	11/01/06	NAB	
V13-11-01-06-36-42	3	4.6	1.0	N	GP	dark gray	loose, GRAVEL(f-c) with sand, wet	14:10	11/01/06	NAB	Concrete in sample, brick fragment in core catcher. Vibracore refusal at 4.6 feet below top of sediment.

NOTES: NAB-not above background

FIELD BORING LOG SHEET

BORING LOG SHEET

BORING NUMBER: V-14

TETRA TECH EC, INC

PROJECT:	National Grid-Troy (Smith Ave) OU-2	DATE STARTED:	11/01/06
PROJECT NO.:	2907.0001.0002.00000	DATE COMPLETED:	11/01/06
LOCATION:	V-14		
TOTAL DEPTH (FT):	6.5		
GEOLOGIST:	R. Funk	X COORDINATE:	73° 41' 03.200"
DRILLER:	Aqua Survey	Y COORDINATE:	42° 45' 14.560"
DRILLING/SAMPLING METHOD:	Vibracore	DATUM:	LOCAL TIDAL DATUM

Sample ID	Start Depth (feet)	End Depth (feet)	Recovery (ft)	Consoli-dated ? Y or N	USCS Soil Classification or Material	Color	Description	TIME	DATE	FID/PID (ppm)	Comments
V14-11-01-06-0-6	0	1	0.9	N	ML	dark gray	soft, SILT with sand (f-m), little gravel, wet	14:50	11/01/06	NAB	
V14-11-01-06-12-18	1	2	0.9	N	GP	dark gray	loose, SAND (f-m) and GRAVEL, little silt, wet	14:55	11/01/06	NAB	
V14-11-01-06-24-30	2	3	0.9	N	SP	dark gray	loose to medium dense, SAND (m-c), some gravel, trace silt, wet	15:00	11/01/06	NAB	
V14-11-01-06-36-42	3	4	0.9	N	SP	dark gray	medium dense, SAND (m-c), trace gravel (f), trace silt, wet	15:05	11/01/06	NAB	Sediment fining downwards from 3.5' to 4'.
	4	5	0.9	N	SP	dark gray	medium dense, SAND (f-m), trace gravel (f), trace silt, wet	nr	11/01/06	NAB	
	5	6.5	1.4	N	SP	dark gray	medium dense, SAND (f), trace silt, wet	nr	11/01/06	NAB	Sediment fining downwards from 5' to base of boring. Vibracore refusal at 6.5 feet below top of sediment.

NOTES: NAB-not above background nr-not recorded

FIELD BORING LOG SHEET

BORING LOG SHEET

BORING NUMBER: TS-31

TETRA TECH EC, INC.

PROJECT:	National Grid
PROJECT NO.:	106-2907
LOCATION (well or boring ID):	TS-31 (17)
TOTAL DEPTH (FT):	2.5
GEOLOGIST:	Tim Dwyer
DRILLER:	Aqua Survey
DRILLING/SAMPLING METHOD:	Rossfelder Vibracore
DATE STARTED:	07/08/08
DATE COMPLETED:	07/08/08
SURFACEWATER DEPTH (FT):	24.2
GROUND ELEVATION (FT):	
X COORDINATE:	
Y COORDINATE:	
DATUM:	

Sample ID	Start Depth (feet)	End Depth (feet)	BLOWS per 6"	Recovery (ft)	Consolidated ? Y or N	USCS Soil Classification or Material	Geologic Unit Code	Color	Description	TIME	DATE	Depth of PID/FID (ft)	FID (ppm)	PID (ppm)	Comments	Contact (A, H, U)
TS-31 (0-0.5)	0	1				SM			Very dark grey silty SAND with Gravel.	9:15	07/08/08	0.5		0.4	Hydrogren sulfide and petroleum odor in entire core. Very slight sheen. Bulk toxicity not collected. TS-31 (0-6), PAH 16, TOC, Soot Carbon	
TS-31 (1-1.5)	1	1.5				ML			Very dark grey clayey SILT with trace Gravel, and slightly plastic.	9:25	07/08/08	1.5		19.5	Very Slight sheen. TS-31 (1-1.5), PAH 16, TOC, Soot Carbon	
TS-31 (2-2.5)	1.5	2.5				SM			Very dark grey silty SAND with Gravel.	9:30	07/08/08	2.5		0.5	Very slight sheen TS-31 (2-2.5), PAH 16, TOC, Soot Carbon	

FIELD BORING LOG SHEET

BORING LOG SHEET

BORING NUMBER: TS-32

TETRA TECH EC, INC

PROJECT:	National Grid	DATE STARTED:	07/08/08
PROJECT NO.:	106-2907	DATE COMPLETED:	07/08/08
LOCATION (well or boring ID):	TS-32 (18)	SURFACEWATER DEPTH (FT):	24.5
TOTAL DEPTH (FT):	1.5	GROUND ELEVATION (FT):	
GEOLOGIST:	Tim Dwyer	X COORDINATE:	
DRILLER:	Aqua Survey	Y COORDINATE:	
DRILLING/SAMPLING METHOD:	Rossfelder Vibracore	DATUM:	

Sample ID	Start Depth (feet)	End Depth (feet)	BLOWS per 6"	Recovery (ft)	Consolidated ? Y or N	USCS Soil Classification or Material	Geologic Unit Code	Color	Description	TIME	DATE	Depth of PID/FID (ft)	FID (ppm)	PID (ppm)	Comments	Contact (A, H, U)
TS-32 (0-0.5)	0	0.5				GW/SW			Very dark grey coarse SAND with Gravel, some shells.	10:00	07/08/08	0.5		0.5	Hydrogen sulfide and petroleum odor throught entire core, slight sheen. Lots of shell hash. TS-32 (0-0.5), PAH 16, TOC, Soot Carbon	
TS-32 (1-1.5)	0.5	1.5				SW			Very dark grey coarse-medium SAND, trace Gravel, trace silt.	10:05	07/08/08	1.5		0.9	Slight sheen. TS-32 (1-1.5), PAH 16, TOC, Soot Carbon	

FIELD BORING LOG SHEET

BORING LOG SHEET

BORING NUMBER: TS-33

TETRA TECH EC, INC.

PROJECT:	National Grid	DATE STARTED:	07/08/08
PROJECT NO.:	106-2907	DATE COMPLETED:	07/08/08
LOCATION (well or boring ID):	TS-33	SURFACEWATER DEPTH (FT):	9.6
TOTAL DEPTH (FT):	1	GROUND ELEVATION (FT):	
GEOLOGIST:	Tim Dwyer	X COORDINATE:	
DRILLER:	Aqua Survey	Y COORDINATE:	
DRILLING/SAMPLING METHOD:	Rossfelder Vibracore	DATUM:	

Sample ID	Start Depth (feet)	End Depth (feet)	BLOWS per 6"	Recovery (ft)	Consolidated ? Y or N	USCS Soil Classification or Material	Geologic Unit Code	Color	Description	TIME	DATE	Depth of PID/FID (ft)	FID (ppm)	PID (ppm)	Comments	Contact (A, H, U)
TS-33 (0-0.5)	0	1				ML			Very dark grey SILT with Gravel to 3".	11:00	07/08/08	0.5		0.4	TS-33 (0-0.5), PAH 16, TOC, Soot Carbon	

FIELD BORING LOG SHEET

BORING LOG SHEET

BORING NUMBER: TS-34

TETRA TECH EC, INC

PROJECT:	National Grid	DATE STARTED:	07/08/08
PROJECT NO.:	106-2907	DATE COMPLETED:	07/08/08
LOCATION (well or boring ID):	TS-34	SURFACEWATER DEPTH (FT):	22.6
TOTAL DEPTH (FT):	3	GROUND ELEVATION (FT):	
GEOLOGIST:	Tim Dwyer	X COORDINATE:	
DRILLER:	Aqua Survey	Y COORDINATE:	
DRILLING/SAMPLING METHOD:	Rossfelder Vibracore	DATUM:	

Sample ID	Start Depth (feet)	End Depth (feet)	BLOWS per 6"	Recovery (ft)	Consolidated ? Y or N	USCS Soil Classification or Material	Geologic Unit Code	Color	Description	TIME	DATE	Depth of PID/FID (ft)	FID (ppm)	PID (ppm)	Comments	Contact (A, H, U)
TS-34 (0-0.5)	0	1				ML			Very dark grey clayey SILT, some shells, trace Gravel.	11:55	07/08/08	0.5		0.2	TS-34 (0-0.5), PAH 16, TOC, Soot Carbon.	
TS-34 (1-1.5)	1	2				ML			Very dark grey clayey SILT, some shells, trace Gravel.	12:00	07/08/08	1.5		0.7	TS-34 (1-1.5), PAH 16, TOC, Soot Carbon.	
TS-34 (2-2.5)	2	2.5				ML			Very dark grey clayey SILT, some shells, trace Gravel.	12:05	07/08/08	2.5		0.5	TS-34 (2-2.5), PAH 16, TOC, Soot Carbon.	
	2.5	3				SW			Very dark grey coarse-medium SAND, trace Gravel.		07/08/08					

FIELD BORING LOG SHEET

BORING LOG SHEET

BORING NUMBER: TS-35

TETRA TECH

PROJECT:	National Grid	DATE STARTED:	07/08/08
PROJECT NO.:	106-2907	DATE COMPLETED:	07/08/08
LOCATION (well or boring ID):	TS-35	SURFACEWATER DEPTH (FT):	21
TOTAL DEPTH (FT):	5.5	GROUND ELEVATION (FT):	
GEOLOGIST:	Tim Dwyer	X COORDINATE:	
DRILLER:	Aqua Survey	Y COORDINATE:	
DRILLING/SAMPLING METHOD:	Rossfelder Vibracore	DATUM:	

Sample ID	Start Depth (feet)	End Depth (feet)	BLOWS per 6"	Recovery (ft)	Consolidated ? Y or N	USCS Soil Classification or Material	Geologic Unit Code	Color	Description	TIME	DATE	Depth of PID/FID (ft)	FID (ppm)	PID (ppm)	Comments	Contact (A, H, U)
TS-35 (0-0.5)	0	1				SW			Very dark grey coarse-medium SAND, with Gravel, shell fragments.	13:45	07/08/08	0.5		1	Strong petroleum odor. Sheen noted. TS-35 (0-0.5), PAH 16, TOC, Soot Carbon.	
TS-35 (1-1.5)	1	1.5				SW			Very dark grey coarse-medium SAND, with Gravel, shell fragments.	13:50	07/08/08	1.5		3.9	Strong Petroleum Odor. Sheen. TS-35 (1-1.5), PAH 16, TOC, Soot Carbon.	
TS-35 (2-2.5)	1.5	3				SW			Very dark grey coarse-medium SAND, trace Gravel.	13:55	07/08/08	2.5		2.9	Strong Petroleum odor, sheen to 2.5 feet. TS 35 (2-2.5), PAH 16, TOC, Soot Carbon.	
TS-35 (3-3.5)	3	4.5				SW			Very dark grey coarse-medium SAND, trace Gravel.	14:00	07/08/08	3.5		46.2	TS-35 (3-3.5), PAH 16, TOC, Soot Carbon.	
	4.5	5.5				CH			4.5-5.5': Grey CLAY with Silt, and highly plastic.		07/08/08					

FIELD BORING LOG SHEET

BORING LOG SHEET

BORING NUMBER: TS-35

TETRA TECH EC, INC.

PROJECT: National Grid
PROJECT NO.: 106-2907
LOCATION (well or boring ID): TS-35
TOTAL DEPTH (FT): 5.5
GEOLOGIST: Tim Dwyer
DRILLER: Aqua Survey
DRILLING/SAMPLING METHOD: Rossfelder Vibracore

DATE STARTED: 07/08/08
DATE COMPLETED: 07/08/08
SURFACEWATER DEPTH (FT): 21
GROUND ELEVATION (FT):
X COORDINATE:
Y COORDINATE:
DATUM:

Sample ID	Start Depth (feet)	End Depth (feet)	BLOWS per 6"	Recovery (ft)	Consoli-dated ? Y or N	USCS Soil Classification or Material	Geologic Unit Code	Color	Description	TIME	DATE	Depth of PID/FID (ft)	FID (ppm)	PID (ppm)	Comments	Contact (A, H, U)

FIELD BORING LOG SHEET

BORING LOG SHEET

BORING NUMBER: TS-37

TETRA TECH EC, INC.

PROJECT:	National Grid	DATE STARTED:	07/09/08
PROJECT NO.:	106-2907	DATE COMPLETED:	07/09/08
LOCATION (well or boring ID):	TS-37	SURFACEWATER DEPTH (FT):	22.2
TOTAL DEPTH (FT):	1	GROUND ELEVATION (FT):	
GEOLOGIST:	Tim Dwyer	X COORDINATE:	
DRILLER:	Aqua Survey	Y COORDINATE:	
DRILLING/SAMPLING METHOD:	Rossfelder Vibracore	DATUM:	

Sample ID	Start Depth (feet)	End Depth (feet)	BLOWS per 6"	Recovery (ft)	Consolidated ? Y or N	USCS Soil Classification or Material	Geologic Unit Code	Color	Description	TIME	DATE	Depth of PID/FID (ft)	FID (ppm)	PID (ppm)	Comments	Contact (A, H, U)
TS-37 (0-0.5)	0	1				SW			Very dark grey coarse-medium SAND with Silt, some gravel to 2", and some shells.	8:58	07/09/08	0.5		0.9	TS-37 (0-0.5). PAH 16, TOC, Soot Carbon.	

FIELD BORING LOG SHEET

BORING LOG SHEET

BORING NUMBER: TS-38

TETRA TECH EC, INC.

PROJECT:	National Grid	DATE STARTED:	07/09/08
PROJECT NO.:	106-2907	DATE COMPLETED:	07/09/08
LOCATION (well or boring ID):	TS-38	SURFACEWATER DEPTH (FT):	3.4
TOTAL DEPTH (FT):	5	GROUND ELEVATION (FT):	
GEOLOGIST:	Tim Dwyer	X COORDINATE:	
DRILLER:	Aqua Survey	Y COORDINATE:	
DRILLING/SAMPLING METHOD:	Rossfelder Vibracore	DATUM:	

Sample ID	Start Depth (feet)	End Depth (feet)	BLOWS per 6"	Recovery (ft)	Consolidated ? Y or N	USCS Soil Classification or Material	Geologic Unit Code	Color	Description	TIME	DATE	Depth of PID/FID (ft)	FID (ppm)	PID (ppm)	Comments	Contact (A, H, U)
TS-38 (0-0.5)	0	1				SW			Dark brown coarse-medium SAND, some Gravel, little fines.	9:45	07/09/08	0.5		0.4	No shells. Highly disturbed material at tope of core, much gravel separation. TS-38 (0-0.5), PAH 16, TOC, Soot Carbon.	
TS-38 (1-1.5)	1	2				SW			Dark brown coarse-medium SAND, some Gravel, little fines.	9:50	07/09/08	1.5		0	TS-38 (1-1.5), PAH 16, TOC, Soot Carbon.	
TS-38 (2-2.5)	2	2.5				SW			Dark brown coarse-medium SAND, some Gravel, little fines.	9:55	07/09/08	2.5		0.6	TS-38 (2-2.5), PAH 16, TOC, Soot Carbon.	
	2.5	3				GW			Dark brown GRAVEL with coarse Sand.		07/09/08					
	3	5				SW			Dark brown coarse-medium SAND with Gravel, little fines.		07/09/08					

FIELD BORING LOG SHEET

BORING LOG SHEET

BORING NUMBER: TS-45

TETRA TECH EC, INC.

PROJECT:	National Grid	DATE STARTED:	07/09/08
PROJECT NO.:	106-2907	DATE COMPLETED:	07/09/08
LOCATION (well or boring ID):	TS-45	SURFACEWATER DEPTH (FT):	21.1
TOTAL DEPTH (FT):	6.5	GROUND ELEVATION (FT):	
GEOLOGIST:	Tim Dwyer	X COORDINATE:	
DRILLER:	Aqua Survey	Y COORDINATE:	
DRILLING/SAMPLING METHOD:	Rossfelder Vibracore	DATUM:	

Sample ID	Start Depth (feet)	End Depth (feet)	BLOWS per 6"	Recovery (ft)	Consolidated ? Y or N	USCS Soil Classification or Material	Geologic Unit Code	Color	Description	TIME	DATE	Depth of PID/FID (ft)	FID (ppm)	PID (ppm)	Comments	Contact (A, H, U)
TS-45 (0-0.5)	0	0.5				OL			Light grey clayey SILT with organic material and some fine-medium Sand.	8:40	07/09/08				TS-45 (0-0.5), PAH 16, TOC, Soot Carbon.	
TS-45 (1-1.5)	0.5	2				SM			Grey fine SAND, some Silt, and trace large gravel.	8:45	07/09/08				TS-45 (1-1.5), PAH 16, TOC, Soot Carbon.	
TS-45 (2-2.5)	2	3				SM			Grey fine SAND, some Silt, and trace large gravel.	8:50	07/09/08				TS-45 (2-2.5), PAH 16, TOC, Soot Carbon.	
TS-45 (3-3.5)	3	3.5				ML			Grey clayey SILT, some Sand, and trace gravel.	8:55	07/09/08				TS-45 (3-3.5), PAH 16, TOC, Soot Carbon.	
TS-45 (4-4.5)	3.5	6.5				ML			Grey clayey SILT, some Sand, and trace gravel.	8:45	07/09/08				TS-45 (4-4.5), PAH 16, TOC, Soot Carbon.	

FIELD BORING LOG SHEET

BORING LOG SHEET

BORING NUMBER: TS-46

TETRA TECH EC, INC.

PROJECT:	National Grid	DATE STARTED:	07/09/08
PROJECT NO.:	106-2907	DATE COMPLETED:	07/09/08
LOCATION (well or boring ID):	TS-46	SURFACEWATER DEPTH (FT):	21.3
TOTAL DEPTH (FT):	4	GROUND ELEVATION (FT):	
GEOLOGIST:	Tim Dwyer	X COORDINATE:	
DRILLER:	Aqua Survey	Y COORDINATE:	
DRILLING/SAMPLING METHOD:	Rossfelder Vibracore	DATUM:	

Sample ID	Start Depth (feet)	End Depth (feet)	BLOWS per 6"	Recovery (ft)	Consolidated ? Y or N	USCS Soil Classification or Material	Geologic Unit Code	Color	Description	TIME	DATE	Depth of PID/FID (ft)	FID (ppm)	PID (ppm)	Comments	Contact (A, H, U)
TS-46 (0-0.5)	0	0.5				GW/SW			0-0.5': Grey GRAVEL and coarse Sand, trace organic material.	9:30	07/09/08				Staff gauge - 2.3. Total penetration 4' and total recovery 2'. TS-46 (0-0.5), 9:30, PAH 16, TOC, Soot Carbon.	
TS-46 (1-1.5)	1	1.5				SW			1-1.5': Grey fine-medium grained SAND, trace gravel, trace silt.	9:35	07/09/08				TS-46 (1-1.5), 9:35, PAH 16, TOC, Soot Carbon.	
TS-46 (2-2.5)	2	2.5				ML			2-2.5': Grey fine SAND, some Silts, trace fine gravel.	9:40	07/09/08				TS-46 (2-2.5), 9:40, PAH 16, TOC, Soot Carbon.	

FIELD BORING LOG SHEET

BORING LOG SHEET

BORING NUMBER: TS-48

TETRA TECH

PROJECT:	National Grid	DATE STARTED:	07/09/08
PROJECT NO.:	106-2907	DATE COMPLETED:	07/09/08
LOCATION (well or boring ID):	TS-48	SURFACEWATER DEPTH (FT):	21.4
TOTAL DEPTH (FT):	5.5	GROUND ELEVATION (FT):	
GEOLOGIST:	Tim Dwyer	X COORDINATE:	
DRILLER:	Aqua Survey	Y COORDINATE:	
DRILLING/SAMPLING METHOD:	Rossfelder Vibracore	DATUM:	

Sample ID	Start Depth (feet)	End Depth (feet)	BLOWS per 6"	Recovery (ft)	Consoli-dated ? Y or N	USCS Soil Classification or Material	Geologic Unit Code	Color	Description	TIME	DATE	Depth of PID/FID (ft)	FID (ppm)	PID (ppm)	Comments	Contact (A, H, U)
TS-48 (0-0.5)	0	0.5				SW			Dark grey coarse-medium SAND, coarse-fine Gravel, coarse organic material (sticks and decomposing leaves).	10:10	07/09/08				TS-48 (0-0.5), PAH 16, TOC, Soot Carbon.	
TS-48 (1-1.5)	0.5	3				ML			Dark grey SILT and fine Sand, trace gravel, trace organic material.	10:15	07/09/08				TS-48 (1-1.5), PAH 16, TOC, Soot Carbon.	
	3	5.5				ML			Dark grey SILT, some fine Sand, trace gravel.		07/09/08					

Appendix B

CHRONIC TOXICITY ASSESSMENT OF AQUATIC SEDIMENTS FROM THE MANUFACTURED GAS PLANT SITE AT SMITH AVENUE IN TROY, NY USING THE FRESHWATER AMPHIPOD, HYALELLA AZTECA

Study Conducted for:

ENSR Corporation
1001 W. Seneca St., Suite 204
Ithaca, NY 14850-3342

Attn: Nick Azzolina

Study Conducted by:

AquaTox Research, Inc.
1201 East Fayette Street
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December 2007

TABLE OF CONTENTS

TABLE OF FIGURES

ABSTRACT

The freshwater amphipod, Hyalella azteca, was used to assess the chronic toxicity of sediments collected from a manufactured gas plant (MGP) at the Smith Avenue site in Troy, NY. The test design entailed the exposure of four (4) replicates of 10 amphipods each to 100 ml of control, reference and test sample sediment in 300 ml beakers for 28 days in accordance with standard protocols. Survival and dry weights of amphipods in each replicate were determined at the end of 28-day sediment exposure tests. Chemical analyses of fresh and aged overlying water were performed at regular intervals over the course of the test. Testing was conducted from October 23 to November 20, 2007.

There was 100% recovery of amphipods from the control sample (JAM07), all of the reference samples (TS15-TS18) and one test sample (TS09). Mean recovery from all other test samples ranged from 45 to 98% within each treatment. Mean dry weight of amphipods recovered from the control treatment was 0.416 mg with a low degree of variability among replicates within the control treatment with a coefficient-of-variation (CV) of 4.7%. In comparison, mean dry weights for amphipods from all reference sample sites ranged from a high of 0.374 mg (TS18) to a low of 0.309 mg (TS15) with CVs ranging from 5.4 to 20.1%. Dry weight determinations among amphipods exposed to test samples were limited to those groups exhibiting ≥75% survival. Among those test samples, mean dry weights of amphipods ranged from 0.177 to 0.513 mg with CVs of ≤12.5%.

Standard chemical parameters of fresh overlying water exhibited little to no trends over the course of each of the 28-day tests. Mean values for dissolved oxygen, pH, conductivity, alkalinity and hardness of fresh diluted Butternut Creek water determined on a weekly basis were relatively constant as expressed through CVs not exceeding 7.7%.

Mean dissolved oxygen levels for aged overlying water exceeded 3.7 mg/L for all samples. Initial total ammonia levels ranged from <0.10 to 1.59 mg/L declining to <0.10 mg/L in all treatments by the end of the test. Aged overlying water pH levels exhibited fairly linear trends within treatments with an absolute range of ~1.0 units (6.87-7.86) over the course of the test. Absolute conductivity levels declined over the course of the test with initial and final ranges of 374 to 442 umhos/cm and 310 to 378 umhos/cm, respectively. The range in alkalinity concentrations remained relatively stable through the course of the test with an overall absolute range of 106 to 152 mg/L. Hardness levels of aged overlying water also exhibited relatively linear trends over the course of the test with a total absolute range of 144 to 212 mg/L. Mean water temperatures from individual holding tanks were 22.5 ± 0.4 and 23.2 ± 0.5^{o}C with CVs of ≤2.2%.

INTRODUCTION

The objective of the test described in this report was to assess the chronic toxicity of sediments from a manufactured gas plant (MGP) at the Smith Avenue site in Troy, NY to the freshwater amphipod, Hyalella azteca, over a 28-day sediment exposure period in accordance with a standard published protocol (USEPA, 2000). Testing was conducted at the request of Mr. Nick Azzolina of ENSR Incorporated in Ithaca, NY under ENSR Purchase Order No. 2055099. Personnel from AquaTox Research, Inc. (ARI) in Syracuse, NY conducted the testing under the direction of Dr. Francis G. Doherty.

MATERIALS AND METHODS

Test Samples

Several liters of sediment were collected from each sampling location at Smith Avenue in Troy, NY from October 15 through 18, 2007. Shipments of various combinations of samples were delivered to the ARI facility on October 18 and 19, 2007. Samples were refrigerated upon receipt. Sediment collected from a local reservoir in Jamesville, NY in May 2007 was used for the control treatment. Jamesville Reservoir sediment was passed through a 2-mm mesh sieve and refrigerated immediately following collection.

Hyalella azteca Holding and Culture Approach

Amphipods (H. azteca) used in chronic testing activities were obtained from a test organism supplier (Environmental Consulting &Testing, Superior, WI). Testing was initiated on October 23, 2007 utilizing 7-day old amphipods (assigned Lot No. HA1007/024) received the day the test was initiated. Amphipods were acclimated to a temperature of ~23^{o}C for approximately four hours and fed a mixture of YCT (Yeast-Cerophyl-Trout Chow) and cultures of green algae (Selenastrum capricornutum) during holding prior to the start of the test.

Sediment Test Procedures

The test was initiated by first transferring approximately 100 ml of control (Jamesville Reservoir 07), four reference (TS15, 16, 17 and 18) and seven test sediments (TS02, 04, 09, 19, 20, 23 and 24) to each of four replicate 300 ml beakers per sample and covered with approximately 175 ml of DIW-diluted stream water (Butternut Creek, Dewitt, NY) 24 hours prior to the introduction of test organisms. Test beakers were held in covered, vented water bath holding tanks for 24 hours at a temperature ranging from 22 to 24^{o}C prior to the addition of test organisms. Ten 7-day old amphipods were transferred to each replicate beaker to initiate the test. Each beaker received 0.92 ml YCT daily as the primary food source. Amphipods in test beakers experienced a photoperiod of 16L:8D at an illuminance of approximately 500 lux.

At least 100 ml of overlying water was poured off and renewed once daily for the duration of the 28-day sediment exposure period. Overlying water temperature in one beaker from each water bath was determined daily. Chemistry of aged overlying water was measured either daily (dissolved oxygen) or intermittently (total ammonia, conductivity, pH, alkalinity and hardness). Chemistry of fresh diluted Butternut Creek water used to renew aged overlying water was measured weekly.

Amphipods were harvested from sediments after 28 days by rinsing sediment through a stainless steel sieve with a mesh size of 710 um (USA Standard Test Sieve No. 25) with moderately hard, reconstituted water (MHRW). The sieve was transferred to a shallow glass dish containing MHRW and placed on a light box to collect surviving amphipods. Harvested amphipods from each replicate beaker were transferred to pre-weighed aluminum pans within hours of collection for drying at ~50^{o}C for 24 hours in order to determine dry weight. Tests were conducted in accordance with procedures outlined in Test Method 100.4 (USEPA, 2000) for a 28-day sediment exposure period. The test was terminated after 28 days at which time the surviving amphipods were harvested, counted and weighed. An extended 14-day reproductive phase using an observation period in clean water was not conducted.

Statistical Analyses

Staff of AquaTox Research, Inc. did not perform a formal statistical analysis of survival and dry weights of amphipods among treatments. Data processing was limited to the creation of bar graphs appearing in Figures 1 and 2.

RESULTS - TOXICITY

Survival

There was 100% recovery of amphipods from the control treatment (JAM07), each of the reference samples (TS15-18) and one test treatment (TS09). Mean recovery from all other test samples ranged from 45 to 98% within each treatment (Figure 1, Appendix A).

Growth

Mean dry weight of amphipods recovered from the JAM07 control treatment was 0.416 mg with a low level of variability (coefficient of variation, CV of 4.7%). Mean dry weights of amphipods recovered from the reference samples ranged from 0.309 to 0.375 mg with CVs of $\leq$20.1%. Dry weight determinations among amphipods exposed to test samples were limited to those groups exhibiting $\geq$75% survival. Among those test samples, mean dry weights of amphipods ranged from 0.177 to 0.513 mg with CVs of $\leq$12.5% (Figure 2, Appendix A).

RESULTS – WATER CHEMISTRY

Fresh Overlying Water

Standard chemical parameters of fresh diluted Butternut Creek water exhibited little to no trends over the course of the 28-day test (Appendix A). Variability of measured values for pH and dissolved oxygen varied by no more than 3.0% as expressed through the CV. Mean dissolved oxygen concentrations ranged from 7.3 to 7.8 mg/L while pH levels varied by less than 0.5 units (7.15-7.65 units). Conductivity and alkalinity levels exhibited extremely low levels of variability (CVs $\leq$2.4% while hardness levels exhibited a slightly higher level of variability (CV =7.7%) with absolute ranges of 358-367 umhos/cm, 101-106 mg/L and 144-172 mg/L, respectively.

Aged Overlying Water

Individual water temperature measurements ranged from 21.2 to 23.9^{o}C with means of 22.5$\pm$0.4 and 23.2$\pm$0.5 ^{o}C for individual water bath holding tanks (Appendix A). Dissolved oxygen levels of aged overlying water ranged from a daily low of 3.7 to a high of 6.9 mg/L. Dissolved oxygen levels within each treatment varied in a manner similar to that observed among all of the treatments as the test progressed through the 28-day exposure period (Figure 3, Appendix A). Total ammonia levels ranged from <0.10 to 1.59 mg/L at the start of the 28-day test, increased in nearly all of the treatments through Day 7 with an overall range of 0.35 to 2.46 mg/L then declined thereafter in all sediments to negligible levels (Figure 4, Appendix A).

The pH levels of all samples varied by <1.0 units with an overall absolute range of 6.91 to 7.86 units. Trends within each treatment (sample) exhibited relatively constant pH levels throughout the 28-day test (Appendix A). Alkalinity concentrations exhibited an overall absolute range of 106 to 152 mg/L at the start of the test that narrowed slightly to 115 to 152 mg/L at the end of the test. Hardness levels of aged overlying water exhibited relatively linear trends over the course of the test with a total absolute range of 144 to 212 mg/L. Absolute conductivity levels remained relatively constant during the first two weeks of ranging from 374-442 then declining to 310 to 378 umhos/cm by the end of the test. (Appendix A).

LITERATURE CITED

USEPA. 2000. Methods for Measuring the Toxicity and Bioaccumulation of Sediment-associated Contaminants with Freshwater Invertebrates. Second Edition. Office of Research and Development, Washington, DC. EPA/600/R-99/064.

Figure 1. Recovery of amphipods, Hyalella azteca, exposed to control (JAM07), reference (TS15, TS16, TS17 and TS18) and test (TS02-TS09 and TS19-TS24) sample sediments at Smith Avenue in Troy, NY collection site for 28 days.

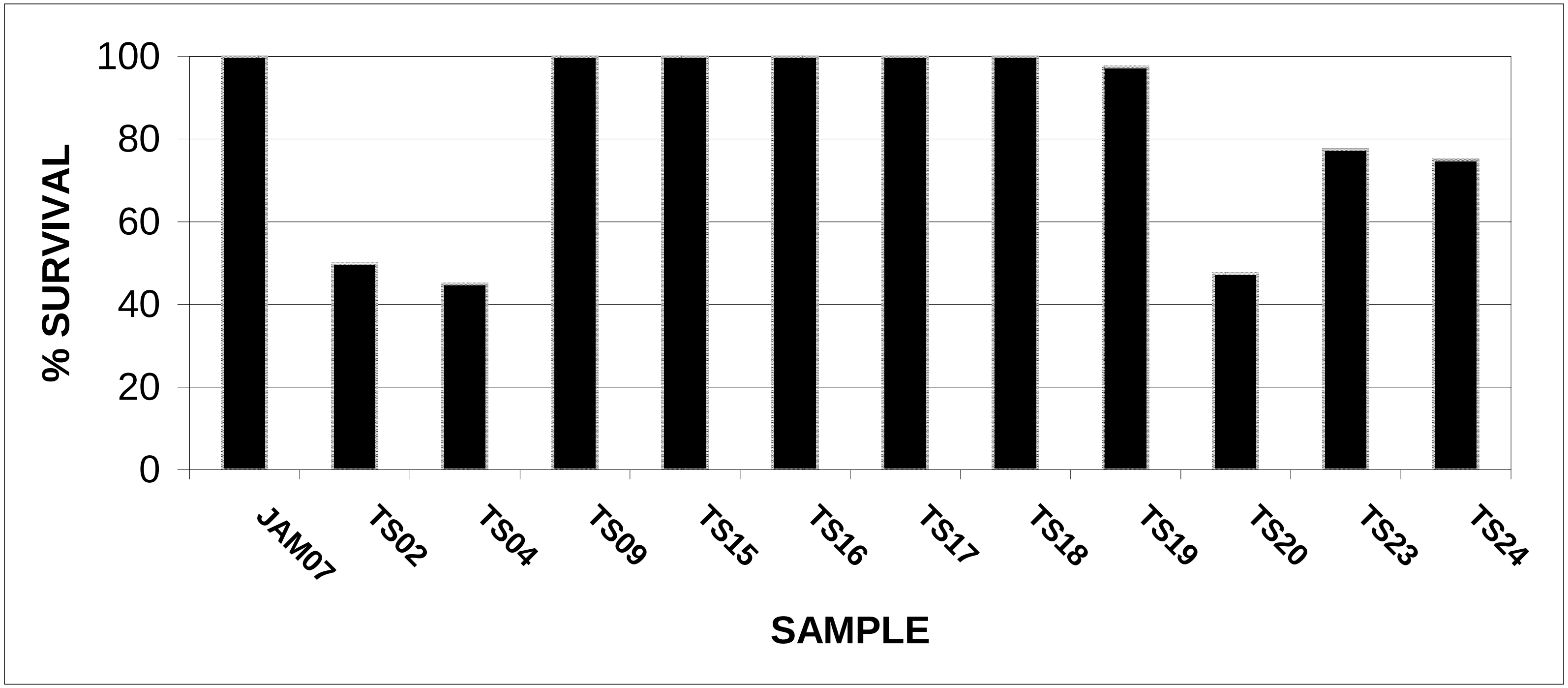


Figure 2. Dry weights of recovered amphipods, Hyalella azteca, exposed to control (JAM07), reference (TS15, TS16, TS17 and TS18) and test (TS02-TS09 and TS19-TS24) sample sediments at Smith Avenue in Troy, NY collection site for 28 days

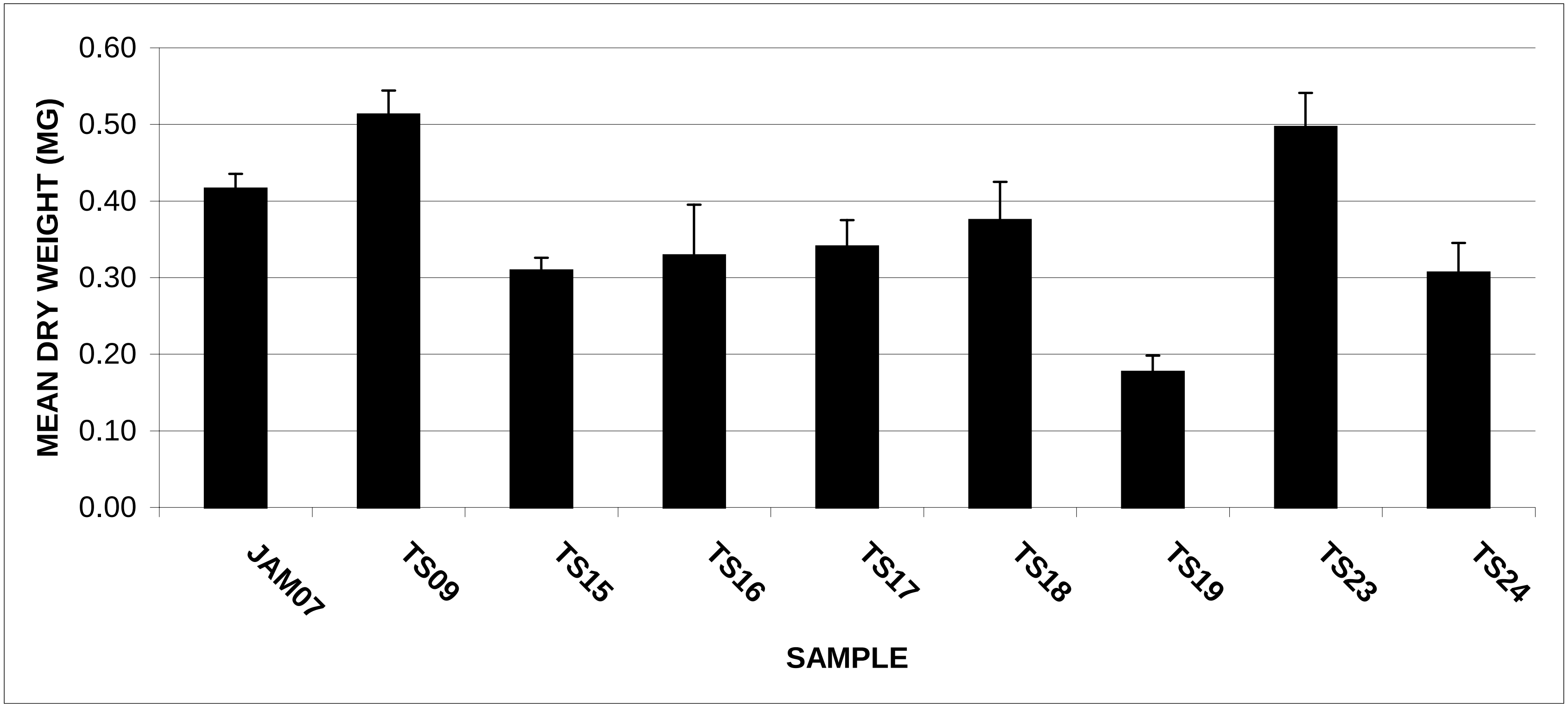


Figure 3. Dissolved oxygen trends of aged overlying water in tests exposing the freshwater amphipod, Hyalella azteca, to sediment from control (JAM07), reference (TS15, TS16, TS17 and TS18) and test (TS02-TS09 and TS19-TS24) sample sediments at Smith Avenue in Troy, NY collection site for 28 days

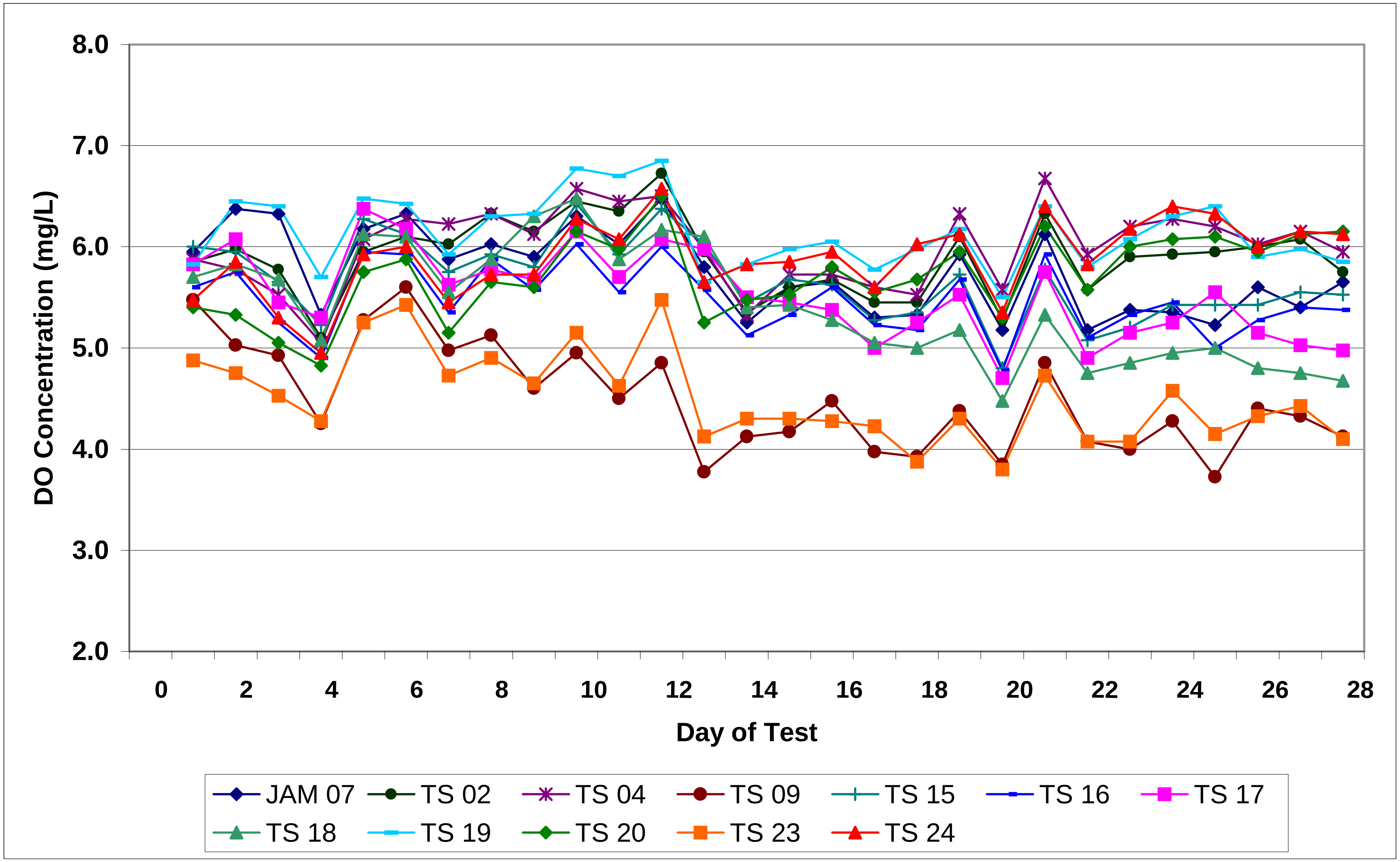
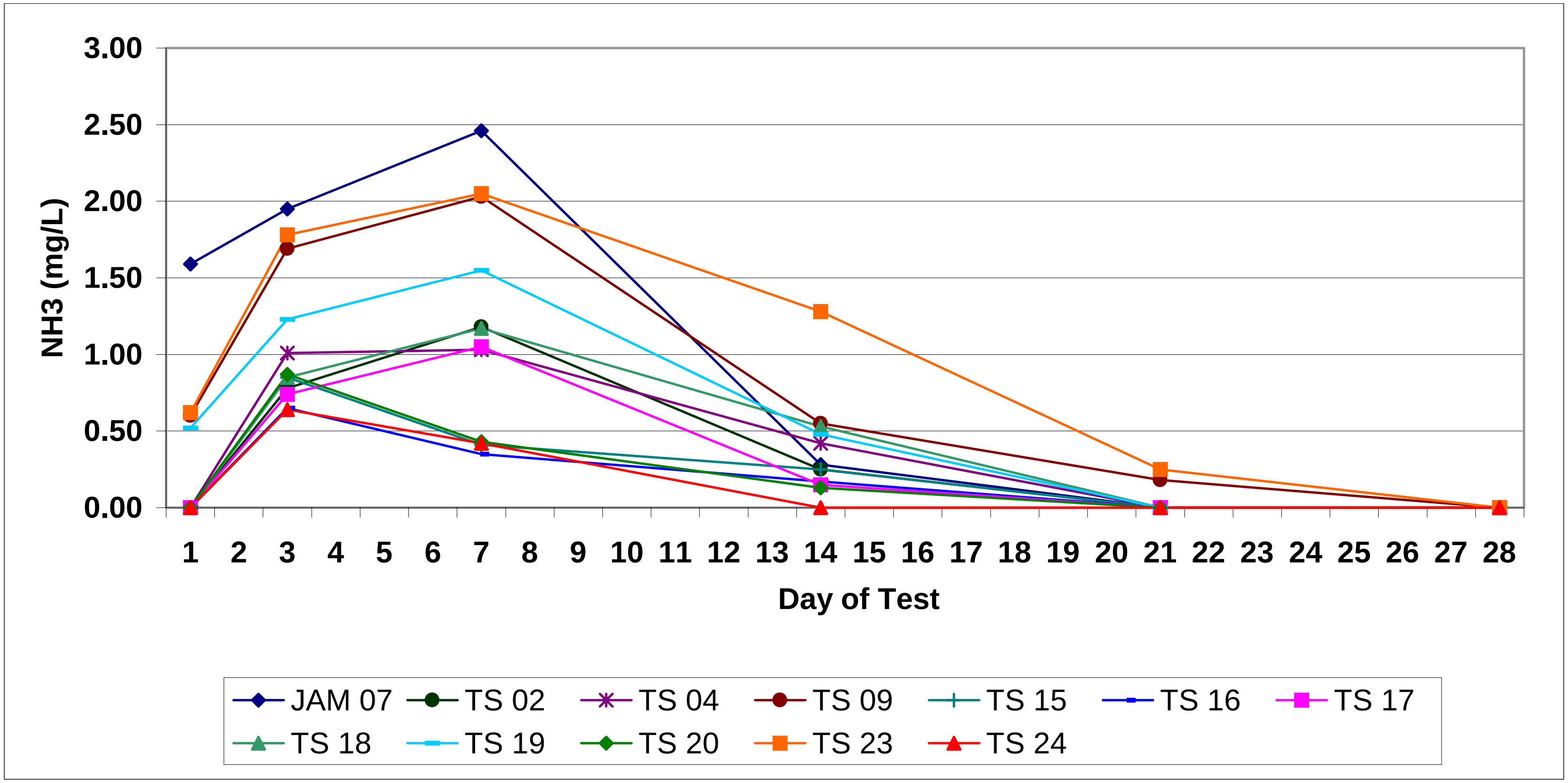


Figure 4. Total ammonia trends of aged overlying water in tests exposing the freshwater amphipod, Hyalella azteca, to sediment from control (JAM07), reference (TS15, TS16, TS17 and TS18) and test (TS02-TS09 and TS19-TS24) sample sediments at Smith Avenue in Troy, NY collection site for 28 days



STUDY SUMMARY AND APPROVAL SHEET

Study Title:	CHRONIC TOXICITY ASSESSMENT OF AQUATIC SEDIMENTS FROM THE MANUFACTIRED GAS PLANT SITE AT SMITH AVENUE IN TROY, NY USING THE FRESHWATER AMPHIPOD, HYALELLA AZTECA
Study Conducted For:	ENSR Corporation 1001 W. Seneca St., Suite 204 Ithaca, NY 14850-3342
Study Conducted By:	AquaTox Research, Inc. 1201 East Fayette Street Syracuse, NY 13210
Test Period:	October 23 to November 20, 2007
ARI Project No.:	P201-12
ENSR Purchase Order No.:	2055099

Testing Supervised and
Report Prepared By ______________________________ December 19, 2007

Francis G. Doherty, Ph.D.
Aquatic Toxicologist

Date

AquaTox Research, Inc. adheres to the current industry standards in the performance of its work as set forth in published guidelines. If we err, omit, or otherwise do not perform in accordance with the terms of the original proposal, we will gladly re-do the work at no additional cost, or will, at the client's option, refund fees charged for the work. The client agrees that AquaTox Research shall not be liable for damages to anyone arising in contract or tort actions; nor for any civil penalties arising under state or federal regulation; nor any other liability of whatever kind or nature, except for the repeat of work performed or refund of fess charged. In no event shall AquaTox Research be liable for any incidental or consequential damages. The client hereby waives the WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

APPENDIX A

Biological and Water Chemistry Data from a Chronic Sediment Toxicity Test with
Hyalella azteca on a Single Set of Samples from a Manufactured Gas Plant Site at Smith Avenue
in Troy, NY Conducted from October 23 through November 20, 2007

HYALELLA AZTECA SURVIVAL AND DRY WEIGHT - TROY SITE (11/07)

			% SURVIVAL						
DATE	**SAMPLE**	**TYPE**	**REP #1**	**REP #2**	**REP #3**	**REP #4**	**MEAN**	**SD**	**SIG**
11/20/2007	JAM	CONTROL	100	100	100	100	100	0.0	
11/20/2007	TS02	TEST	80	30	70	20	50	29.4	*
11/20/2007	TS04	TEST	50	50	60	20	45	17.3	*
11/20/2007	TS09	TEST	100	100	100	100	100	0.0	ns
11/20/2007	TS15	REFERENCE	100	100	100	100	100	0.0	ns
11/20/2007	TS16	REFERENCE	100	100	100	100	100	0.0	ns
11/20/2007	TS17	REFERENCE	100	100	100	100	100	0.0	ns
11/20/2007	TS18	REFERENCE	100	100	100	100	100	0.0	ns
11/20/2007	TS19	TEST	100	100	100	90	98	5.0	ns
11/20/2007	TS20	TEST	10	90	50	40	48	33.0	*
11/20/2007	TS23	TEST	10	100	100	100	78	45.0	ns
11/20/2007	TS24	TEST	100	70	50	80	75	20.8	ns

			DRY WEIGHT(MG)						
DATE	**SAMPLE**	**TYPE**	**REP #1**	**REP #2**	**REP #3**	**REP #4**	**MEAN**	**SD**	**CV**
11/20/2007	JAM	CONTROL	0.442	0.396	0.408	0.418	0.416	0.020	4.7
11/20/2007	TS09	TEST	0.473	0.503	0.536	0.540	0.513	0.031	6.1
11/20/2007	TS15	REFERENCE	0.304	0.323	0.322	0.288	0.309	0.017	5.4
11/20/2007	TS16	REFERENCE	0.409	0.339	0.320	0.248	0.329	0.066	20.1
11/20/2007	TS17	REFERENCE	0.305	0.323	0.383	0.352	0.341	0.034	10.0
11/20/2007	TS18	REFERENCE	0.328	0.349	0.380	0.443	0.375	0.050	13.4
11/20/2007	TS19	TEST	0.156	0.166	0.205	0.181	0.177	0.021	12.0
11/20/2007	TS23	TEST	0.450	0.471	0.549	0.516	0.497	0.045	9.0
11/20/2007	TS24	TEST	0.252	0.326	0.310	0.339	0.307	0.038	12.5

CHEMISTRY OF FRESH OVERLYING CONTROL WATER - TROY 10/07

	Date	pH	DO	Cond	Alk	Hard
	10/24/07	7.65	7.8	358	101	168
	10/30/07	7.56	7.3	367	106	172
	11/06/07	7.54	7.4	358	106	160
	11/13/07	7.15	7.4	358	106	144
MEAN		**7.48**	**7.5**	**360**	**105**	**161**
SD		**0.22**	**0.2**	**5**	**3**	**12**
CV		**3.0**	**3.0**	**1.2**	**2.4**	**7.7**

OVERLYING WATER TEMPERATURE (^oC) FROM CONTROL BEAKERS - TROY 10/07

TANK 1		TANK 2	
Date	**Temp**	**Date**	**Temp**
10/23/2007	22.2	10/23/2007	22.9
10/24/2007	22.2	10/24/2007	22.7
10/25/2007	21.6	10/25/2007	22.2
10/26/2007	21.2	10/26/2007	21.7
10/27/2007	22.7	10/27/2007	23.3
10/28/2007	22.3	10/28/2007	22.7
10/29/2007	22.2	10/29/2007	22.6
10/30/2007	22.7	10/30/2007	23.3
10/31/2007	22.8	10/31/2007	23.3
11/1/2007	22.2	11/1/2007	23.1
11/2/2007	22.8	11/2/2007	23.3
11/3/2007	22.5	11/3/2007	23.2
11/4/2007	22.6	11/4/2007	23.2
11/5/2007	22.7	11/5/2007	23.2
11/6/2007	22.7	11/6/2007	23.2
11/7/2007	22.6	11/7/2007	23.0
11/8/2007	22.8	11/8/2007	23.1
11/9/2007	22.8	11/9/2007	23.5
11/10/2007	23.0	11/10/2007	23.8
11/11/2007	22.4	11/11/2007	23.3
11/12/2007	23.0	11/12/2007	23.9
11/13/2007	23.0	11/13/2007	23.8
11/14/2007	22.5	11/14/2007	23.0
11/15/2007	23.0	11/15/2007	23.5
11/16/2007	22.5	11/16/2007	22.5
11/17/2007	22.7	11/17/2007	23.7
11/18/2007	22.6	11/18/2007	23.5
11/19/2007	22.5	11/19/2007	23.8
11/20/2007	22.6	11/20/2007	23.7
Mean	**22.5**		**23.2**
SD	**0.40**		**0.51**
CV	**1.8**		**2.2**

Overlying Dissolved Oxygen Levels

				Replicate (Beaker) ID #					
Sample	**Species**	**Date**	**DAY**	**01**	**02**	**03**	**04**	**MEAN**	**SD**
JAM 07	HA	10/23/2007	**0**						
JAM 07	HA	10/24/2007	**1**	6.1	5.9	5.8	6.0	**6.0**	**0.1**
JAM 07	HA	10/25/2007	**2**	6.5	6.4	6.3	6.3	**6.4**	**0.1**
JAM 07	HA	10/26/2007	**3**	6.3	6.3	6.3	6.4	**6.3**	**0.1**
JAM 07	HA	10/27/2007	**4**	5.5	5.5	5.2	5.1	**5.3**	**0.2**
JAM 07	HA	10/28/2007	**5**	6.1	6.3	6.1	6.2	**6.2**	**0.1**
JAM 07	HA	10/29/2007	**6**	6.2	6.5	6.3	6.3	**6.3**	**0.1**
JAM 07	HA	10/30/2007	**7**	5.9	6.2	5.7	5.7	**5.9**	**0.2**
JAM 07	HA	10/31/2007	**8**	6.1	6.2	5.9	5.9	**6.0**	**0.1**
JAM 07	HA	11/1/2007	**9**	5.8	6.0	5.9	5.9	**5.9**	**0.1**
JAM 07	HA	11/2/2007	**10**	6.4	6.4	6.2	6.2	**6.3**	**0.1**
JAM 07	HA	11/3/2007	**11**	6.1	6.1	5.9	6.0	**6.0**	**0.1**
JAM 07	HA	11/4/2007	**12**	6.5	6.5	6.2	6.7	**6.5**	**0.2**
JAM 07	HA	11/5/2007	**13**	6.2	6.0	5.6	5.8	**5.8**	**0.3**
JAM 07	HA	11/6/2007	**14**	5.5	5.2	5.1	5.2	**5.3**	**0.2**
JAM 07	HA	11/7/2007	**15**	5.8	5.6	5.5	5.5	**5.6**	**0.1**
JAM 07	HA	11/8/2007	**16**	5.9	5.8	5.7	5.2	**5.7**	**0.3**
JAM 07	HA	11/9/2007	**17**	5.4	5.4	5.3	5.1	**5.3**	**0.1**
JAM 07	HA	11/10/2007	**18**	5.6	5.4	5.3	5.0	**5.3**	**0.2**
JAM 07	HA	11/11/2007	**19**	6.1	5.9	6.0	5.7	**5.9**	**0.2**
JAM 07	HA	11/12/2007	**20**	5.3	5.2	5.1	5.1	**5.2**	**0.1**
JAM 07	HA	11/13/2007	**21**	6.2	6.3	6.1	5.9	**6.1**	**0.2**
JAM 07	HA	11/14/2007	**22**	5.3	5.3	5.1	5.0	**5.2**	**0.2**
JAM 07	HA	11/15/2007	**23**	5.5	5.5	5.2	5.3	**5.4**	**0.2**
JAM 07	HA	11/16/2007	**24**	5.5	5.5	5.3	5.1	**5.4**	**0.2**
JAM 07	HA	11/17/2007	**25**	5.8	5.3	4.9	4.9	**5.2**	**0.4**
JAM 07	HA	11/18/2007	**26**	5.7	5.8	5.4	5.5	**5.6**	**0.2**
JAM 07	HA	11/19/2007	**27**	5.6	5.6	5.2	5.2	**5.4**	**0.2**
JAM 07	HA	11/20/2007	**28**	5.9	5.9	5.5	5.3	**5.7**	**0.3**

				Replicate (Beaker) ID #					
Sample	**Species**	**Date**	**DAY**	**01**	**02**	**03**	**04**	**MEAN**	**SD**
TS 02	HA	10/23/2007	**0**						
TS 02	HA	10/24/2007	**1**	6.2	5.7	5.8	5.7	**5.9**	**0.2**
TS 02	HA	10/25/2007	**2**	6.0	5.7	6.2	6.0	**6.0**	**0.2**
TS 02	HA	10/26/2007	**3**	5.7	5.9	5.8	5.7	**5.8**	**0.1**
TS 02	HA	10/27/2007	**4**	5.0	4.9	5.2	5.3	**5.1**	**0.2**
TS 02	HA	10/28/2007	**5**	5.8	5.8	6.1	6.1	**6.0**	**0.2**
TS 02	HA	10/29/2007	**6**	6.3	5.9	6.1	6.1	**6.1**	**0.2**
TS 02	HA	10/30/2007	**7**	6.2	5.9	6.0	6.0	**6.0**	**0.1**
TS 02	HA	10/31/2007	**8**	6.4	6.4	6.4	6.1	**6.3**	**0.1**
TS 02	HA	11/1/2007	**9**	6.2	6.3	6.1	6.0	**6.2**	**0.1**
TS 02	HA	11/2/2007	**10**	6.4	6.5	6.5	6.4	**6.5**	**0.1**
TS 02	HA	11/3/2007	**11**	6.3	6.3	6.4	6.4	**6.4**	**0.1**
TS 02	HA	11/4/2007	**12**	6.7	6.7	6.8	6.7	**6.7**	**0.0**

TS 02	HA	11/5/2007	**13**	5.8	5.8	6.2	6.0	**6.0**	**0.2**
TS 02	HA	11/6/2007	**14**	5.4	5.3	5.4	5.3	**5.4**	**0.1**
TS 02	HA	11/7/2007	**15**	5.6	5.6	5.6	5.6	**5.6**	**0.0**
TS 02	HA	11/8/2007	**16**	5.6	5.7	5.7	5.7	**5.7**	**0.1**
TS 02	HA	11/9/2007	**17**	5.4	5.3	5.6	5.5	**5.5**	**0.1**
TS 02	HA	11/10/2007	**18**	5.4	5.5	5.5	5.4	**5.5**	**0.1**
TS 02	HA	11/11/2007	**19**	6.2	6.1	6.1	6.0	**6.1**	**0.1**
TS 02	HA	11/12/2007	**20**	5.5	5.2	5.3	5.1	**5.3**	**0.2**
TS 02	HA	11/13/2007	**21**	6.5	6.3	6.3	6.2	**6.3**	**0.1**
TS 02	HA	11/14/2007	**22**	5.5	5.6	5.6	5.6	**5.6**	**0.1**
TS 02	HA	11/15/2007	**23**	6.0	5.9	6.0	5.7	**5.9**	**0.1**
TS 02	HA	11/16/2007	**24**	6.1	6.0	5.7	5.9	**5.9**	**0.2**
TS 02	HA	11/17/2007	**25**	6.0	5.9	5.9	6.0	**6.0**	**0.1**
TS 02	HA	11/18/2007	**26**	6.0	5.9	6.0	6.1	**6.0**	**0.1**
TS 02	HA	11/19/2007	**27**	6.2	5.9	6.0	6.2	**6.1**	**0.1**
TS 02	HA	11/20/2007	**28**	5.9	5.6	5.7	5.8	**5.8**	**0.1**

				Replicate (Beaker) ID #					
Sample	**Species**	**Date**	**DAY**	**01**	**02**	**03**	**04**	**MEAN**	**SD**
TS 04	HA	10/23/2007	**0**						
TS 04	HA	10/24/2007	**1**	5.9	5.9	5.9	5.8	**5.9**	**0.0**
TS 04	HA	10/25/2007	**2**	5.9	5.8	5.9	5.5	**5.8**	**0.2**
TS 04	HA	10/26/2007	**3**	5.6	5.5	5.5	5.5	**5.5**	**0.0**
TS 04	HA	10/27/2007	**4**	5.0	5.0	5.1	5.1	**5.1**	**0.1**
TS 04	HA	10/28/2007	**5**	6.0	6.0	6.2	6.1	**6.1**	**0.1**
TS 04	HA	10/29/2007	**6**	6.2	6.3	6.3	6.3	**6.3**	**0.0**
TS 04	HA	10/30/2007	**7**	6.1	6.3	6.3	6.2	**6.2**	**0.1**
TS 04	HA	10/31/2007	**8**	6.4	6.3	6.2	6.4	**6.3**	**0.1**
TS 04	HA	11/1/2007	**9**	6.2	6.2	6.1	6.0	**6.1**	**0.1**
TS 04	HA	11/2/2007	**10**	6.6	6.6	6.7	6.4	**6.6**	**0.1**
TS 04	HA	11/3/2007	**11**	6.4	6.5	6.5	6.4	**6.5**	**0.1**
TS 04	HA	11/4/2007	**12**	6.5	6.4	6.6	6.5	**6.5**	**0.1**
TS 04	HA	11/5/2007	**13**	6.2	6.0	6.0	5.7	**6.0**	**0.2**
TS 04	HA	11/6/2007	**14**	5.3	5.4	5.4	5.2	**5.3**	**0.1**
TS 04	HA	11/7/2007	**15**	5.8	5.7	5.7	5.7	**5.7**	**0.1**
TS 04	HA	11/8/2007	**16**	5.8	5.8	5.7	5.6	**5.7**	**0.1**
TS 04	HA	11/9/2007	**17**	5.8	5.6	5.6	5.4	**5.6**	**0.2**
TS 04	HA	11/10/2007	**18**	5.7	5.4	5.6	5.4	**5.5**	**0.1**
TS 04	HA	11/11/2007	**19**	6.8	6.3	6.2	6.0	**6.3**	**0.3**
TS 04	HA	11/12/2007	**20**	6.0	5.6	5.3	5.4	**5.6**	**0.3**
TS 04	HA	11/13/2007	**21**	6.9	6.8	6.5	6.5	**6.7**	**0.2**
TS 04	HA	11/14/2007	**22**	6.3	6.2	5.6	5.6	**5.9**	**0.4**
TS 04	HA	11/15/2007	**23**	6.4	6.6	5.9	5.9	**6.2**	**0.4**
TS 04	HA	11/16/2007	**24**	6.5	6.5	6.1	6.0	**6.3**	**0.3**
TS 04	HA	11/17/2007	**25**	6.6	6.3	6.1	5.8	**6.2**	**0.3**
TS 04	HA	11/18/2007	**26**	6.2	6.2	5.8	5.9	**6.0**	**0.2**
TS 04	HA	11/19/2007	**27**	6.5	6.3	6.0	5.8	**6.2**	**0.3**
TS 04	HA	11/20/2007	**28**	6.4	6.3	5.5	5.6	**6.0**	**0.5**

				Replicate (Beaker) ID #					
Sample	**Species**	**Date**	**DAY**	**01**	**02**	**03**	**04**	**MEAN**	**SD**
TS 09	HA	10/23/2007	**0**						
TS 09	HA	10/24/2007	**1**	5.7	5.6	5.1	5.5	**5.5**	**0.3**
TS 09	HA	10/25/2007	**2**	5.2	5.1	4.7	5.1	**5.0**	**0.2**
TS 09	HA	10/26/2007	**3**	5.2	5.0	4.4	5.1	**4.9**	**0.4**
TS 09	HA	10/27/2007	**4**	4.3	4.5	3.6	4.6	**4.3**	**0.5**
TS 09	HA	10/28/2007	**5**	5.4	5.5	4.7	5.5	**5.3**	**0.4**
TS 09	HA	10/29/2007	**6**	5.7	5.7	5.3	5.7	**5.6**	**0.2**
TS 09	HA	10/30/2007	**7**	5.2	5.3	4.3	5.1	**5.0**	**0.5**
TS 09	HA	10/31/2007	**8**	5.3	5.4	4.5	5.3	**5.1**	**0.4**
TS 09	HA	11/1/2007	**9**	4.8	4.9	3.8	4.9	**4.6**	**0.5**
TS 09	HA	11/2/2007	**10**	5.0	5.2	4.5	5.1	**5.0**	**0.3**
TS 09	HA	11/3/2007	**11**	4.6	5.0	4.1	4.3	**4.5**	**0.4**
TS 09	HA	11/4/2007	**12**	5.2	5.4	4.8	4.0	**4.9**	**0.6**
TS 09	HA	11/5/2007	**13**	4.2	4.2	3.2	3.5	**3.8**	**0.5**
TS 09	HA	11/6/2007	**14**	4.3	4.2	3.6	4.4	**4.1**	**0.4**
TS 09	HA	11/7/2007	**15**	4.1	4.2	4.0	4.4	**4.2**	**0.2**
TS 09	HA	11/8/2007	**16**	4.3	4.4	4.5	4.7	**4.5**	**0.2**
TS 09	HA	11/9/2007	**17**	4.0	3.6	4.1	4.2	**4.0**	**0.3**
TS 09	HA	11/10/2007	**18**	3.9	3.5	4.1	4.2	**3.9**	**0.3**
TS 09	HA	11/11/2007	**19**	4.2	4.1	4.5	4.7	**4.4**	**0.3**
TS 09	HA	11/12/2007	**20**	3.7	3.8	3.9	4.0	**3.9**	**0.1**
TS 09	HA	11/13/2007	**21**	4.6	4.8	4.9	5.1	**4.9**	**0.2**
TS 09	HA	11/14/2007	**22**	3.9	3.9	4.2	4.3	**4.1**	**0.2**
TS 09	HA	11/15/2007	**23**	3.9	3.6	4.2	4.3	**4.0**	**0.3**
TS 09	HA	11/16/2007	**24**	4.1	4.0	4.5	4.5	**4.3**	**0.3**
TS 09	HA	11/17/2007	**25**	3.5	3.4	4.1	3.9	**3.7**	**0.3**
TS 09	HA	11/18/2007	**26**	4.4	4.2	4.6	4.4	**4.4**	**0.2**
TS 09	HA	11/19/2007	**27**	4.5	4.1	4.4	4.3	**4.3**	**0.2**
TS 09	HA	11/20/2007	**28**	4.1	3.7	4.4	4.3	**4.1**	**0.3**

				Replicate (Beaker) ID #					
Sample	**Species**	**Date**	**DAY**	**01**	**02**	**03**	**04**	**MEAN**	**SD**
TS 15	HA	10/23/2007	**0**						
TS 15	HA	10/24/2007	**1**	6.0	5.9	6.0	6.1	**6.0**	**0.1**
TS 15	HA	10/25/2007	**2**	5.9	6.0	5.9	6.0	**6.0**	**0.1**
TS 15	HA	10/26/2007	**3**	5.7	5.6	5.6	5.7	**5.7**	**0.1**
TS 15	HA	10/27/2007	**4**	5.3	5.3	5.1	5.2	**5.2**	**0.1**
TS 15	HA	10/28/2007	**5**	6.4	6.2	6.2	6.3	**6.3**	**0.1**
TS 15	HA	10/29/2007	**6**	6.2	6.1	6.1	6.1	**6.1**	**0.0**
TS 15	HA	10/30/2007	**7**	5.8	6.0	5.7	5.5	**5.8**	**0.2**
TS 15	HA	10/31/2007	**8**	5.9	6.0	5.9	5.9	**5.9**	**0.0**
TS 15	HA	11/1/2007	**9**	5.8	5.8	5.8	5.8	**5.8**	**0.0**
TS 15	HA	11/2/2007	**10**	6.6	6.4	6.3	6.4	**6.4**	**0.1**
TS 15	HA	11/3/2007	**11**	6.1	5.9	5.9	5.8	**5.9**	**0.1**
TS 15	HA	11/4/2007	**12**	6.5	6.3	6.4	6.3	**6.4**	**0.1**
TS 15	HA	11/5/2007	**13**	6.1	6.0	6.0	6.0	**6.0**	**0.0**
TS 15	HA	11/6/2007	**14**	5.6	5.3	5.5	5.4	**5.5**	**0.1**

TS 15	HA	11/7/2007	**15**	5.8	5.7	5.7	5.5	**5.7**	**0.1**
TS 15	HA	11/8/2007	**16**	5.7	5.5	5.7	5.6	**5.6**	**0.1**
TS 15	HA	11/9/2007	**17**	5.3	5.2	5.3	5.3	**5.3**	**0.0**
TS 15	HA	11/10/2007	**18**	5.4	5.3	5.4	5.3	**5.4**	**0.1**
TS 15	HA	11/11/2007	**19**	6.0	5.7	5.6	5.6	**5.7**	**0.2**
TS 15	HA	11/12/2007	**20**	4.9	4.8	4.7	4.8	**4.8**	**0.1**
TS 15	HA	11/13/2007	**21**	5.9	5.7	5.8	5.7	**5.8**	**0.1**
TS 15	HA	11/14/2007	**22**	5.3	5.0	5.0	5.0	**5.1**	**0.1**
TS 15	HA	11/15/2007	**23**	5.3	5.1	5.2	5.2	**5.2**	**0.1**
TS 15	HA	11/16/2007	**24**	5.7	5.3	5.4	5.3	**5.4**	**0.2**
TS 15	HA	11/17/2007	**25**	5.5	5.5	5.4	5.3	**5.4**	**0.1**
TS 15	HA	11/18/2007	**26**	5.9	5.3	5.3	5.2	**5.4**	**0.3**
TS 15	HA	11/19/2007	**27**	6.1	5.5	5.3	5.3	**5.6**	**0.4**
TS 15	HA	11/20/2007	**28**	6.0	5.5	5.3	5.3	**5.5**	**0.3**

				Replicate (Beaker) ID #					
Sample	**Species**	**Date**	**DAY**	**01**	**02**	**03**	**04**	**MEAN**	**SD**
TS 16	HA	10/23/2007	**0**						
TS 16	HA	10/24/2007	**1**	5.8	5.6	5.5	5.5	**5.6**	**0.1**
TS 16	HA	10/25/2007	**2**	5.8	5.8	5.6	5.8	**5.8**	**0.1**
TS 16	HA	10/26/2007	**3**	5.1	5.5	5.0	5.4	**5.3**	**0.2**
TS 16	HA	10/27/2007	**4**	4.7	4.9	5.0	5.0	**4.9**	**0.1**
TS 16	HA	10/28/2007	**5**	5.8	6.0	6.0	6.0	**6.0**	**0.1**
TS 16	HA	10/29/2007	**6**	5.9	6.1	5.9	5.8	**5.9**	**0.1**
TS 16	HA	10/30/2007	**7**	5.4	5.6	5.2	5.2	**5.4**	**0.2**
TS 16	HA	10/31/2007	**8**	5.9	5.9	5.9	5.8	**5.9**	**0.0**
TS 16	HA	11/1/2007	**9**	5.6	5.6	5.5	5.6	**5.6**	**0.1**
TS 16	HA	11/2/2007	**10**	6.0	6.0	6.1	6.0	**6.0**	**0.0**
TS 16	HA	11/3/2007	**11**	5.4	5.5	5.6	5.7	**5.6**	**0.1**
TS 16	HA	11/4/2007	**12**	6.0	5.9	6.1	6.0	**6.0**	**0.1**
TS 16	HA	11/5/2007	**13**	5.6	5.5	5.6	5.6	**5.6**	**0.1**
TS 16	HA	11/6/2007	**14**	5.0	5.2	5.2	5.1	**5.1**	**0.1**
TS 16	HA	11/7/2007	**15**	5.3	5.4	5.4	5.2	**5.3**	**0.1**
TS 16	HA	11/8/2007	**16**	5.6	5.7	5.6	5.5	**5.6**	**0.1**
TS 16	HA	11/9/2007	**17**	5.5	5.2	5.1	5.1	**5.2**	**0.2**
TS 16	HA	11/10/2007	**18**	5.2	5.3	5.1	5.1	**5.2**	**0.1**
TS 16	HA	11/11/2007	**19**	5.8	5.7	5.7	5.5	**5.7**	**0.1**
TS 16	HA	11/12/2007	**20**	4.9	4.8	4.7	4.7	**4.8**	**0.1**
TS 16	HA	11/13/2007	**21**	6.0	5.9	5.8	6.0	**5.9**	**0.1**
TS 16	HA	11/14/2007	**22**	5.2	5.2	5.0	5.0	**5.1**	**0.1**
TS 16	HA	11/15/2007	**23**	5.5	5.5	5.2	5.1	**5.3**	**0.2**
TS 16	HA	11/16/2007	**24**	5.9	5.5	5.2	5.2	**5.5**	**0.3**
TS 16	HA	11/17/2007	**25**	5.4	5.2	4.8	4.6	**5.0**	**0.4**
TS 16	HA	11/18/2007	**26**	5.6	5.4	5.1	5.0	**5.3**	**0.3**
TS 16	HA	11/19/2007	**27**	5.9	5.6	5.0	5.1	**5.4**	**0.4**
TS 16	HA	11/20/2007	**28**	5.8	5.6	5.1	5.0	**5.4**	**0.4**

				Replicate (Beaker) ID #					
Sample	**Species**	**Date**	**DAY**	**01**	**02**	**03**	**04**	**MEAN**	**SD**
TS 17	HA	10/23/2007	**0**						
TS 17	HA	10/24/2007	**1**	6.0	5.7	5.9	5.7	**5.8**	**0.2**
TS 17	HA	10/25/2007	**2**	6.1	6.0	6.2	6.0	**6.1**	**0.1**
TS 17	HA	10/26/2007	**3**	5.6	5.4	5.5	5.3	**5.5**	**0.1**
TS 17	HA	10/27/2007	**4**	5.4	5.2	5.4	5.2	**5.3**	**0.1**
TS 17	HA	10/28/2007	**5**	6.4	6.5	6.3	6.3	**6.4**	**0.1**
TS 17	HA	10/29/2007	**6**	6.2	6.2	6.1	6.2	**6.2**	**0.1**
TS 17	HA	10/30/2007	**7**	5.8	5.6	5.6	5.5	**5.6**	**0.1**
TS 17	HA	10/31/2007	**8**	6.1	5.8	5.6	5.6	**5.8**	**0.2**
TS 17	HA	11/1/2007	**9**	6.0	5.6	5.4	5.7	**5.7**	**0.3**
TS 17	HA	11/2/2007	**10**	6.4	6.2	5.9	6.1	**6.2**	**0.2**
TS 17	HA	11/3/2007	**11**	5.8	5.6	5.7	5.7	**5.7**	**0.1**
TS 17	HA	11/4/2007	**12**	6.1	6.1	6.1	6.0	**6.1**	**0.1**
TS 17	HA	11/5/2007	**13**	6.0	6.0	6.0	5.9	**6.0**	**0.1**
TS 17	HA	11/6/2007	**14**	5.6	5.6	5.4	5.4	**5.5**	**0.1**
TS 17	HA	11/7/2007	**15**	5.5	5.4	5.4	5.5	**5.5**	**0.1**
TS 17	HA	11/8/2007	**16**	5.5	5.5	5.3	5.2	**5.4**	**0.2**
TS 17	HA	11/9/2007	**17**	5.3	5.0	4.8	4.9	**5.0**	**0.2**
TS 17	HA	11/10/2007	**18**	5.4	5.2	5.2	5.2	**5.3**	**0.1**
TS 17	HA	11/11/2007	**19**	5.8	5.6	5.3	5.4	**5.5**	**0.2**
TS 17	HA	11/12/2007	**20**	4.9	4.7	4.5	4.7	**4.7**	**0.2**
TS 17	HA	11/13/2007	**21**	5.8	5.9	5.7	5.6	**5.8**	**0.1**
TS 17	HA	11/14/2007	**22**	5.1	4.9	4.7	4.9	**4.9**	**0.2**
TS 17	HA	11/15/2007	**23**	5.4	5.2	5.0	5.0	**5.2**	**0.2**
TS 17	HA	11/16/2007	**24**	5.6	5.4	5.0	5.0	**5.3**	**0.3**
TS 17	HA	11/17/2007	**25**	5.7	5.6	5.5	5.4	**5.6**	**0.1**
TS 17	HA	11/18/2007	**26**	5.3	5.2	5.2	4.9	**5.2**	**0.2**
TS 17	HA	11/19/2007	**27**	5.1	5.1	5.1	4.8	**5.0**	**0.2**
TS 17	HA	11/20/2007	**28**	5.2	5.0	5.0	4.7	**5.0**	**0.2**

				Replicate (Beaker) ID #					
Sample	**Species**	**Date**	**DAY**	**01**	**02**	**03**	**04**	**MEAN**	**SD**
TS 18	HA	10/23/2007	**0**						
TS 18	HA	10/24/2007	**1**	5.8	5.9	5.5	5.6	**5.7**	**0.2**
TS 18	HA	10/25/2007	**2**	6.1	5.8	5.7	5.7	**5.8**	**0.2**
TS 18	HA	10/26/2007	**3**	5.9	5.8	5.3	5.7	**5.7**	**0.3**
TS 18	HA	10/27/2007	**4**	5.1	5.3	4.7	5.2	**5.1**	**0.3**
TS 18	HA	10/28/2007	**5**	6.3	6.3	5.9	6.0	**6.1**	**0.2**
TS 18	HA	10/29/2007	**6**	6.3	6.2	5.9	6.0	**6.1**	**0.2**
TS 18	HA	10/30/2007	**7**	5.9	5.6	5.3	5.4	**5.6**	**0.3**
TS 18	HA	10/31/2007	**8**	6.0	6.0	5.7	5.8	**5.9**	**0.1**
TS 18	HA	11/1/2007	**9**	6.0	5.9	5.8	5.6	**6.3**	**6.4**
TS 18	HA	11/2/2007	**10**	6.5	6.3	6.7	6.4	**6.5**	**0.2**
TS 18	HA	11/3/2007	**11**	5.8	5.8	6.1	5.8	**5.9**	**0.1**
TS 18	HA	11/4/2007	**12**	-	6.1	6.1	6.3	**6.2**	**0.1**
TS 18	HA	11/5/2007	**13**	6.1	6.0	6.0	6.3	**6.1**	**0.1**
TS 18	HA	11/6/2007	**14**	5.5	5.2	5.4	5.5	**5.4**	**0.1**

TS 18	HA	11/7/2007	**15**	5.5	5.4	5.2	5.6	**5.4**	**0.2**
TS 18	HA	11/8/2007	**16**	5.2	5.3	5.1	5.5	**5.3**	**0.2**
TS 18	HA	11/9/2007	**17**	4.9	5.1	5.0	5.2	**5.1**	**0.1**
TS 18	HA	11/10/2007	**18**	5.0	5.1	4.9	5.0	**5.0**	**0.1**
TS 18	HA	11/11/2007	**19**	5.2	5.2	5.2	5.1	**5.2**	**0.0**
TS 18	HA	11/12/2007	**20**	4.6	4.4	4.4	4.5	**4.5**	**0.1**
TS 18	HA	11/13/2007	**21**	5.5	5.2	5.2	5.4	**5.3**	**0.2**
TS 18	HA	11/14/2007	**22**	5.0	4.7	4.6	4.7	**4.8**	**0.2**
TS 18	HA	11/15/2007	**23**	5.2	4.8	4.6	4.8	**4.9**	**0.3**
TS 18	HA	11/16/2007	**24**	5.3	4.9	4.7	4.9	**5.0**	**0.3**
TS 18	HA	11/17/2007	**25**	5.0	5.1	5.0	4.9	**5.0**	**0.1**
TS 18	HA	11/18/2007	**26**	4.8	4.9	4.7	4.8	**4.8**	**0.1**
TS 18	HA	11/19/2007	**27**	4.9	4.8	4.6	4.7	**4.8**	**0.1**
TS 18	HA	11/20/2007	**28**	4.9	4.7	4.6	4.5	**4.7**	**0.2**

				Replicate (Beaker) ID #					
Sample	**Species**	**Date**	**DAY**	**01**	**02**	**03**	**04**	**MEAN**	**SD**
TS 19	HA	10/23/2007	**0**						
TS 19	HA	10/24/2007	**1**	5.7	5.9	5.9	5.8	**5.8**	**0.1**
TS 19	HA	10/25/2007	**2**	6.4	6.4	6.3	6.7	**6.5**	**0.2**
TS 19	HA	10/26/2007	**3**	6.2	6.2	6.4	6.8	**6.4**	**0.3**
TS 19	HA	10/27/2007	**4**	5.8	5.6	5.7	5.7	**5.7**	**0.1**
TS 19	HA	10/28/2007	**5**	6.4	6.5	6.5	6.5	**6.5**	**0.1**
TS 19	HA	10/29/2007	**6**	6.3	6.5	6.5	6.4	**6.4**	**0.1**
TS 19	HA	10/30/2007	**7**	6.0	5.9	5.9	5.9	**5.9**	**0.0**
TS 19	HA	10/31/2007	**8**	6.1	6.3	6.4	6.4	**6.3**	**0.1**
TS 19	HA	11/1/2007	**9**	6.2	6.3	6.4	6.4	**6.3**	**0.1**
TS 19	HA	11/2/2007	**10**	6.7	6.8	6.8	6.8	**6.8**	**0.0**
TS 19	HA	11/3/2007	**11**	6.7	6.6	6.7	6.8	**6.7**	**0.1**
TS 19	HA	11/4/2007	**12**	6.8	6.8	6.9	6.9	**6.9**	**0.1**
TS 19	HA	11/5/2007	**13**	5.6	5.6	5.7	5.7	**5.7**	**0.1**
TS 19	HA	11/6/2007	**14**	5.9	5.7	5.8	5.9	**5.8**	**0.1**
TS 19	HA	11/7/2007	**15**	6.1	5.9	5.9	6.0	**6.0**	**0.1**
TS 19	HA	11/8/2007	**16**	6.2	6.0	6.0	6.0	**6.1**	**0.1**
TS 19	HA	11/9/2007	**17**	5.8	5.7	5.8	5.8	**5.8**	**0.0**
TS 19	HA	11/10/2007	**18**	5.9	5.8	6.1	6.1	**6.0**	**0.2**
TS 19	HA	11/11/2007	**19**	6.2	5.9	6.3	6.3	**6.2**	**0.2**
TS 19	HA	11/12/2007	**20**	5.5	5.3	5.6	5.6	**5.5**	**0.1**
TS 19	HA	11/13/2007	**21**	6.3	6.3	6.5	6.5	**6.4**	**0.1**
TS 19	HA	11/14/2007	**22**	5.9	5.6	5.8	5.9	**5.8**	**0.1**
TS 19	HA	11/15/2007	**23**	6.0	6.0	6.2	6.1	**6.1**	**0.1**
TS 19	HA	11/16/2007	**24**	6.3	6.2	6.4	6.3	**6.3**	**0.1**
TS 19	HA	11/17/2007	**25**	6.4	6.4	6.5	6.3	**6.4**	**0.1**
TS 19	HA	11/18/2007	**26**	5.8	5.9	6.0	5.9	**5.9**	**0.1**
TS 19	HA	11/19/2007	**27**	5.9	5.9	6.0	6.1	**6.0**	**0.1**
TS 19	HA	11/20/2007	**28**	5.9	5.8	5.9	5.8	**5.9**	**0.1**

				Replicate (Beaker) ID #					
Sample	**Species**	**Date**	**DAY**	**01**	**02**	**03**	**04**	**MEAN**	**SD**
TS 20	HA	10/23/2007	**0**						
TS 20	HA	10/24/2007	**1**	5.4	5.4	5.4	5.4	**5.4**	**0.0**
TS 20	HA	10/25/2007	**2**	5.6	5.3	5.2	5.2	**5.3**	**0.2**
TS 20	HA	10/26/2007	**3**	5.1	5.1	5.0	5.0	**5.1**	**0.1**
TS 20	HA	10/27/2007	**4**	5.0	4.7	4.8	4.8	**4.8**	**0.1**
TS 20	HA	10/28/2007	**5**	5.9	5.8	5.6	5.7	**5.8**	**0.1**
TS 20	HA	10/29/2007	**6**	6.2	5.9	5.6	5.8	**5.9**	**0.2**
TS 20	HA	10/30/2007	**7**	5.4	5.2	5.0	5.0	**5.2**	**0.2**
TS 20	HA	10/31/2007	**8**	5.8	5.7	5.6	5.5	**5.7**	**0.1**
TS 20	HA	11/1/2007	**9**	5.7	5.7	5.5	5.5	**5.6**	**0.1**
TS 20	HA	11/2/2007	**10**	6.2	6.2	6.1	6.1	**6.2**	**0.1**
TS 20	HA	11/3/2007	**11**	6.0	6.0	6.0	5.9	**6.0**	**0.1**
TS 20	HA	11/4/2007	**12**	6.5	6.6	6.4	6.5	**6.5**	**0.1**
TS 20	HA	11/5/2007	**13**	5.4	5.3	5.1	5.2	**5.3**	**0.1**
TS 20	HA	11/6/2007	**14**	5.6	5.6	5.3	5.4	**5.5**	**0.2**
TS 20	HA	11/7/2007	**15**	5.7	5.5	5.4	5.5	**5.5**	**0.1**
TS 20	HA	11/8/2007	**16**	6.0	5.8	5.5	5.9	**5.8**	**0.2**
TS 20	HA	11/9/2007	**17**	5.6	5.5	5.4	5.7	**5.6**	**0.1**
TS 20	HA	11/10/2007	**18**	6.0	5.5	5.5	5.7	**5.7**	**0.2**
TS 20	HA	11/11/2007	**19**	6.1	5.8	5.8	6.1	**6.0**	**0.2**
TS 20	HA	11/12/2007	**20**	5.4	5.2	5.1	5.5	**5.3**	**0.2**
TS 20	HA	11/13/2007	**21**	6.3	6.1	6.0	6.4	**6.2**	**0.2**
TS 20	HA	11/14/2007	**22**	5.8	5.6	5.2	5.7	**5.6**	**0.3**
TS 20	HA	11/15/2007	**23**	6.2	6.0	5.8	6.0	**6.0**	**0.2**
TS 20	HA	11/16/2007	**24**	6.2	6.0	5.9	6.2	**6.1**	**0.1**
TS 20	HA	11/17/2007	**25**	6.2	5.9	5.9	6.4	**6.1**	**0.2**
TS 20	HA	11/18/2007	**26**	6.0	5.8	5.7	6.3	**6.0**	**0.3**
TS 20	HA	11/19/2007	**27**	6.1	5.9	6.0	6.5	**6.1**	**0.3**
TS 20	HA	11/20/2007	**28**	6.2	6.0	5.9	6.5	**6.2**	**0.3**

				Replicate (Beaker) ID #					
Sample	**Species**	**Date**	**DAY**	**01**	**02**	**03**	**04**	**MEAN**	**SD**
TS 23	HA	10/23/2007	**0**						
TS 23	HA	10/24/2007	**1**	5.2	4.7	4.9	4.7	**4.9**	**0.2**
TS 23	HA	10/25/2007	**2**	5.0	4.7	4.7	4.6	**4.8**	**0.2**
TS 23	HA	10/26/2007	**3**	4.6	4.4	4.7	4.4	**4.5**	**0.1**
TS 23	HA	10/27/2007	**4**	4.4	3.8	4.6	4.3	**4.3**	**0.3**
TS 23	HA	10/28/2007	**5**	5.0	4.9	5.5	5.6	**5.3**	**0.4**
TS 23	HA	10/29/2007	**6**	5.3	5.3	5.4	5.7	**5.4**	**0.2**
TS 23	HA	10/30/2007	**7**	4.6	4.5	4.7	5.1	**4.7**	**0.3**
TS 23	HA	10/31/2007	**8**	4.8	4.8	4.8	5.2	**4.9**	**0.2**
TS 23	HA	11/1/2007	**9**	4.7	4.7	4.4	4.8	**4.7**	**0.2**
TS 23	HA	11/2/2007	**10**	5.2	5.1	5.0	5.3	**5.2**	**0.1**
TS 23	HA	11/3/2007	**11**	4.5	4.9	4.4	4.7	**4.6**	**0.2**
TS 23	HA	11/4/2007	**12**	5.4	5.6	5.6	5.3	**5.5**	**0.1**
TS 23	HA	11/5/2007	**13**	4.2	4.2	4.2	3.9	**4.1**	**0.1**
TS 23	HA	11/6/2007	**14**	4.2	4.3	4.4	4.3	**4.3**	**0.1**

TS 23	HA	11/7/2007	**15**	4.3	4.2	4.4	4.3	**4.3**	**0.1**
TS 23	HA	11/8/2007	**16**	4.4	4.0	4.4	4.3	**4.3**	**0.2**
TS 23	HA	11/9/2007	**17**	4.2	4.1	4.4	4.2	**4.2**	**0.1**
TS 23	HA	11/10/2007	**18**	4.0	3.6	4.0	3.9	**3.9**	**0.2**
TS 23	HA	11/11/2007	**19**	4.2	4.1	4.4	4.5	**4.3**	**0.2**
TS 23	HA	11/12/2007	**20**	3.6	3.7	4.0	3.9	**3.8**	**0.2**
TS 23	HA	11/13/2007	**21**	4.6	4.6	4.8	4.9	**4.7**	**0.2**
TS 23	HA	11/14/2007	**22**	4.6	3.8	3.8	4.1	**4.1**	**0.4**
TS 23	HA	11/15/2007	**23**	4.6	3.5	4.1	4.1	**4.1**	**0.5**
TS 23	HA	11/16/2007	**24**	5.3	4.2	4.5	4.3	**4.6**	**0.5**
TS 23	HA	11/17/2007	**25**	4.6	3.8	4.3	3.9	**4.2**	**0.4**
TS 23	HA	11/18/2007	**26**	4.6	4.2	4.5	4.0	**4.3**	**0.3**
TS 23	HA	11/19/2007	**27**	4.7	4.3	4.6	4.1	**4.4**	**0.3**
TS 23	HA	11/20/2007	**28**	4.6	3.8	4.5	3.5	**4.1**	**0.5**

				Replicate (Beaker) ID #					
Sample	**Species**	**Date**	**DAY**	**01**	**02**	**03**	**04**	**MEAN**	**SD**
TS 24	HA	10/23/2007	**0**						
TS 24	HA	10/24/2007	**1**	5.5	5.6	5.4	5.4	**5.5**	**0.1**
TS 24	HA	10/25/2007	**2**	5.9	5.9	5.8	5.8	**5.9**	**0.1**
TS 24	HA	10/26/2007	**3**	5.3	5.3	5.2	5.4	**5.3**	**0.1**
TS 24	HA	10/27/2007	**4**	5.0	5.0	4.9	4.9	**5.0**	**0.1**
TS 24	HA	10/28/2007	**5**	6.0	6.0	5.9	5.8	**5.9**	**0.1**
TS 24	HA	10/29/2007	**6**	6.1	6.1	5.9	5.9	**6.0**	**0.1**
TS 24	HA	10/30/2007	**7**	5.7	5.4	5.4	5.3	**5.5**	**0.2**
TS 24	HA	10/31/2007	**8**	5.8	5.7	5.7	5.7	**5.7**	**0.1**
TS 24	HA	11/1/2007	**9**	5.9	5.8	5.6	5.6	**5.7**	**0.1**
TS 24	HA	11/2/2007	**10**	6.3	6.4	6.2	6.2	**6.3**	**0.1**
TS 24	HA	11/3/2007	**11**	6.0	6.2	6.0	6.1	**6.1**	**0.1**
TS 24	HA	11/4/2007	**12**	6.6	6.7	6.6	6.4	**6.6**	**0.1**
TS 24	HA	11/5/2007	**13**	5.8	5.7	5.6	5.5	**5.7**	**0.1**
TS 24	HA	11/6/2007	**14**	5.9	5.9	5.7	5.8	**5.8**	**0.1**
TS 24	HA	11/7/2007	**15**	6.0	5.9	5.8	5.7	**5.9**	**0.1**
TS 24	HA	11/8/2007	**16**	6.0	6.1	5.9	5.8	**6.0**	**0.1**
TS 24	HA	11/9/2007	**17**	5.5	5.6	5.6	5.7	**5.6**	**0.1**
TS 24	HA	11/10/2007	**18**	6.0	6.1	5.9	6.1	**6.0**	**0.1**
TS 24	HA	11/11/2007	**19**	6.0	6.2	6.1	6.2	**6.1**	**0.1**
TS 24	HA	11/12/2007	**20**	5.3	5.4	5.3	5.4	**5.4**	**0.1**
TS 24	HA	11/13/2007	**21**	6.3	6.4	6.5	6.4	**6.4**	**0.1**
TS 24	HA	11/14/2007	**22**	5.9	5.8	5.8	5.8	**5.8**	**0.1**
TS 24	HA	11/15/2007	**23**	6.2	6.2	6.1	6.2	**6.2**	**0.1**
TS 24	HA	11/16/2007	**24**	6.5	6.5	6.3	6.3	**6.4**	**0.1**
TS 24	HA	11/17/2007	**25**	6.2	6.5	6.4	6.2	**6.3**	**0.1**
TS 24	HA	11/18/2007	**26**	5.8	5.9	6.1	6.2	**6.0**	**0.2**
TS 24	HA	11/19/2007	**27**	6.1	6.0	6.2	6.3	**6.2**	**0.1**
TS 24	HA	11/20/2007	**28**	6.0	6.1	6.1	6.3	**6.1**	**0.1**

Sediment Overlying Water Ammonia Levels

				Replicate (Beaker) ID #				
Sample	**Species**	**Date**	**DAY**	**01**	**02**	**03**	**04**	**AMMONIA**
JAM 07	HA	10/24/2007	**1**		1.59			1.59
JAM 07	HA	10/26/2007	**3**			1.95		1.95
JAM 07	HA	10/30/2007	**7**				2.46	2.46
JAM 07	HA	11/6/200	**14**	0.28				0.28
JAM 07	HA	11/13/2007	**21**		<0.10			<0.10
JAM 07	HA	11/20/2007	**28**			<0.10		<0.10

				Replicate (Beaker) ID #				
Sample	**Species**	**Date**	**DAY**	**01**	**02**	**03**	**04**	**AMMONIA**
TS 02	HA	10/24/2007	**1**		<0.10			<0.10
TS 02	HA	10/26/2007	**3**			0.78		0.78
TS 02	HA	10/30/2007	**7**				1.18	1.18
TS 02	HA	11/6/2007	**14**	0.25				0.25
TS 02	HA	11/13/2007	**21**		<0.10			<0.10
TS 02	HA	11/20/2007	**28**			<0.10		<0.10

				Replicate (Beaker) ID #				
Sample	**Species**	**Date**	**DAY**	**01**	**02**	**03**	**04**	**AMMONIA**
TS 04	HA	10/24/2007	**1**		<0.10			<0.10
TS 04	HA	10/26/2007	**3**			1.01		1.01
TS 04	HA	10/30/2007	**7**				1.03	1.03
TS 04	HA	11/6/2007	**14**	0.42				0.42
TS 04	HA	11/13/2007	**21**		<0.10			<0.10
TS 04	HA	11/20/2007	**28**			<0.10		<0.10

				Replicate (Beaker) ID #				
Sample	**Species**	**Date**	**DAY**	**01**	**02**	**03**	**04**	**AMMONIA**
TS 09	HA	10/24/2007	**1**		0.60			0.60
TS 09	HA	10/26/2007	**3**			1.69		1.69
TS 09	HA	10/30/2007	**7**				2.03	2.03
TS 09	HA	11/6/2007	**14**	0.55				0.55
TS 09	HA	11/13/2007	**21**		0.18			0.18
TS 09	HA	11/20/2007	**28**			<0.10		<0.10

				Replicate (Beaker) ID #				
Sample	**Species**	**Date**	**DAY**	**01**	**02**	**03**	**04**	**AMMONIA**
TS 15	HA	10/24/2007	**1**		<0.10			<0.10
TS 15	HA	10/26/2007	**3**			0.85		0.85
TS 15	HA	10/30/2007	**7**				0.41	0.41
TS 15	HA	11/6/2007	**14**	0.25				0.25
TS 15	HA	11/13/2007	**21**		<0.10			<0.10
TS 15	HA	11/20/2007	**28**			<0.10		<0.10

				Replicate (Beaker) ID #				
Sample	**Species**	**Date**	**DAY**	**01**	**02**	**03**	**04**	**AMMONIA**
TS 16	HA	10/24/2007	**1**		<0.10			<0.10
TS 16	HA	10/26/2007	**3**			0.65		0.65
TS 16	HA	10/30/2007	**7**				0.35	0.35
TS 16	HA	11/6/2007	**14**	0.17				0.17
TS 16	HA	11/13/2007	**21**		<0.10			<0.10
TS 16	HA	11/20/2007	**28**			<0.10		<0.10

				Replicate (Beaker) ID #				
Sample	**Species**	**Date**	**DAY**	**01**	**02**	**03**	**04**	**AMMONIA**
TS 17	HA	10/24/2007	**1**		<0.10			<0.10
TS 17	HA	10/26/2007	**3**			0.74		0.74
TS 17	HA	10/30/2007	**7**				1.05	1.05
TS 17	HA	11/6/2007	**14**	0.15				0.15
TS 17	HA	11/13/2007	**21**		<0.10			<0.10
TS 17	HA	11/20/2007	**28**			<0.10		<0.10

				Replicate (Beaker) ID #				
Sample	**Species**	**Date**	**DAY**	**01**	**02**	**03**	**04**	**AMMONIA**
TS 18	HA	10/24/2007	**1**		<0.10			<0.10
TS 18	HA	10/26/2007	**3**			0.85		0.85
TS 18	HA	10/30/2007	**7**				1.17	1.17
TS 18	HA	11/6/2007	**14**	0.53				0.53
TS 18	HA	11/13/2007	**21**		<0.10			<0.10
TS 18	HA	11/20/2007	**28**			<0.10		<0.10

				Replicate (Beaker) ID #				
Sample	**Species**	**Date**	**DAY**	**01**	**02**	**03**	**04**	**AMMONIA**
TS 19	HA	10/24/2007	**1**		0.52			0.52
TS 19	HA	10/26/2007	**3**			1.23		1.23
TS 19	HA	10/30/2007	**7**				1.55	1.55
TS 19	HA	11/6/2007	**14**	0.48				0.48
TS 19	HA	11/13/2007	**21**		<0.10			<0.10
TS 19	HA	11/20/2007	**28**			<0.10		<0.10

				Replicate (Beaker) ID #				
Sample	**Species**	**Date**	**DAY**	**01**	**02**	**03**	**04**	**AMMONIA**
TS 20	HA	10/24/2007	**1**		<0.10			<0.10
TS 20	HA	10/26/2007	**3**			0.87		0.87
TS 20	HA	10/30/2007	**7**				0.43	0.43
TS 20	HA	11/6/2007	**14**	0.13				0.13
TS 20	HA	11/13/2007	**21**		<0.10			<0.10
TS 20	HA	11/20/2007	**28**			<0.10		<0.10

				Replicate (Beaker) ID #				
Sample	**Species**	**Date**	**DAY**	**01**	**02**	**03**	**04**	**AMMONIA**
TS 23	HA	10/24/2007	**1**		0.62			0.62
TS 23	HA	10/26/2007	**3**			1.78		1.78
TS 23	HA	10/30/2007	**7**				2.05	2.05
TS 23	HA	11/6/2007	**14**	1.28				1.28
TS 23	HA	11/13/2007	**21**		0.25			0.25
TS 23	HA	11/20/2007	**28**			<0.10		<0.10

				Replicate (Beaker) ID #				
Sample	**Species**	**Date**	**DAY**	**01**	**02**	**03**	**04**	**AMMONIA**
TS 24	HA	10/24/2007	**1**		<0.10			<0.10
TS 24	HA	10/26/2007	**3**			0.64		0.64
TS 24	HA	10/30/2007	**7**				0.42	0.42
TS 24	HA	11/6/2007	**14**	<0.10				<0.10
TS 24	HA	11/13/2007	**21**		<0.10			<0.10
TS 24	HA	11/20/2007	**28**			<0.10		<0.10

Sediment Overlying pH Levels

				Replicate (Beaker) ID #					
Sample	**Species**	**Date**	**DAY**	**01**	**02**	**03**	**04**	**MEAN**	**SD**
JAM 07	HA	10/24/2007	**1**	7.27	7.29	7.29	7.30	**7.29**	**0.01**
JAM 07	HA	10/26/2007	**3**	6.93	7.05	7.14	7.19	**7.08**	**0.11**
JAM 07	HA	10/30/2007	**7**	7.38	7.45	7.48	7.46	**7.44**	**0.04**
JAM 07	HA	11/6/2007	**14**	7.08	7.21	7.21	7.26	**7.19**	**0.08**
JAM 07	HA	11/13/2007	**21**	7.20	7.28	7.26	7.25	**7.25**	**0.03**
JAM 07	HA	11/20/2007	**28**	7.49	7.34	7.45	7.37	**7.41**	**0.07**

				Replicate (Beaker) ID #					
Sample	**Species**	**Date**	**DAY**	**01**	**02**	**03**	**04**	**MEAN**	**SD**
TS 02	HA	10/24/2007	**1**	7.41	7.38	7.40	7.40	**7.40**	**0.01**
TS 02	HA	10/26/2007	**3**	6.95	7.10	7.13	7.20	**7.10**	**0.11**
TS 02	HA	10/30/2007	**7**	7.18	7.26	7.31	7.36	**7.28**	**0.08**
TS 02	HA	11/6/2007	**14**	7.11	7.17	7.26	7.26	**7.20**	**0.07**
TS 02	HA	11/13/2007	**21**	7.30	7.28	7.29	7.32	**7.30**	**0.02**
TS 02	HA	11/20/2007	**28**	7.06	7.09	7.18	7.22	**7.14**	**0.08**

				Replicate (Beaker) ID #					
Sample	**Species**	**Date**	**DAY**	**01**	**02**	**03**	**04**	**MEAN**	**SD**
TS 04	HA	10/24/2007	**1**	7.44	7.45	7.44	7.42	**7.44**	**0.01**
TS 04	HA	10/26/2007	**3**	6.95	7.06	7.11	7.16	**7.07**	**0.09**
TS 04	HA	10/30/2007	**7**	7.23	7.37	7.45	7.44	**7.37**	**0.10**
TS 04	HA	11/6/2007	**14**	7.14	7.26	7.31	7.30	**7.25**	**0.08**
TS 04	HA	11/13/2007	**21**	7.42	7.40	7.38	7.41	**7.40**	**0.02**
TS 04	HA	11/20/2007	**28**	7.19	7.14	7.12	7.14	**7.15**	**0.03**

Sediment Overlying pH Levels

Sample	Species	Date	DAY	Replicate (Beaker) ID # 01	02	03	04	MEAN	SD
TS 09	HA	10/24/2007	**1**	7.27	7.25	7.20	7.23	**7.24**	**0.03**
TS 09	HA	10/26/2007	**3**	6.76	6.87	6.89	7.00	**6.88**	**0.10**
TS 09	HA	10/30/2007	**7**	6.92	7.08	7.00	7.19	**7.05**	**0.12**
TS 09	HA	11/6/2007	**14**	6.82	6.93	6.90	7.15	**6.95**	**0.14**
TS 09	HA	11/13/2007	**21**	6.88	7.01	7.08	7.13	**7.03**	**0.11**
TS 09	HA	11/20/2007	**28**	7.01	7.04	7.12	7.18	**7.09**	**0.08**

Sample	Species	Date	DAY	Replicate (Beaker) ID # 01	02	03	04	MEAN	SD
TS 15	HA	10/24/2007	**1**	7.30	7.28	7.29	7.31	**7.30**	**0.01**
TS 15	HA	10/26/2007	**3**	6.80	6.93	6.97	7.02	**6.93**	**0.09**
TS 15	HA	10/30/2007	**7**	6.89	7.04	7.14	7.16	**7.06**	**0.12**
TS 15	HA	11/6/2007	**14**	7.32	7.38	7.35	7.37	**7.36**	**0.03**
TS 15	HA	11/13/2007	**21**	7.08	7.54	7.60	7.48	**7.43**	**0.24**
TS 15	HA	11/20/2007	**28**	7.94	7.93	7.71	7.79	**7.84**	**0.11**

Sample	Species	Date	DAY	Replicate (Beaker) ID # 01	02	03	04	MEAN	SD
TS 16	HA	10/24/2007	**1**	7.27	7.26	7.27	7.27	**7.27**	**0.00**
TS 16	HA	10/26/2007	**3**	6.74	6.88	6.94	6.99	**6.89**	**0.11**
TS 16	HA	10/30/2007	**7**	7.00	7.12	7.12	7.16	**7.10**	**0.07**
TS 16	HA	11/6/2007	**14**	7.22	7.28	7.31	7.36	**7.29**	**0.06**
TS 16	HA	11/13/2007	**21**	7.26	7.57	7.54	7.53	**7.48**	**0.14**
TS 16	HA	11/20/2007	**28**	7.45	7.50	7.62	7.43	**7.50**	**0.09**

Sample	Species	Date	DAY	Replicate (Beaker) ID # 01	02	03	04	MEAN	SD
TS 17	HA	10/24/2007	**1**	7.38	7.39	7.42	7.41	**7.40**	**0.02**
TS 17	HA	10/26/2007	**3**	6.76	6.88	6.88	6.94	**6.87**	**0.08**
TS 17	HA	10/30/2007	**7**	7.25	7.31	7.38	7.40	**7.34**	**0.07**
TS 17	HA	11/6/2007	**14**	7.51	7.58	7.69	7.80	**7.65**	**0.13**
TS 17	HA	11/13/2007	**21**	7.37	7.79	7.92	7.90	**7.75**	**0.26**
TS 17	HA	11/20/2007	**28**	7.64	7.84	7.80	7.69	**7.74**	**0.09**

Sample	Species	Date	DAY	Replicate (Beaker) ID # 01	02	03	04	MEAN	SD
TS 18	HA	10/24/2007	**1**	7.42	7.43	7.39	7.42	**7.42**	**0.02**
TS 18	HA	10/26/2007	**3**	6.88	6.93	6.97	7.03	**6.95**	**0.06**
TS 18	HA	10/30/2007	**7**	7.22	7.34	7.48	7.44	**7.37**	**0.12**
TS 18	HA	11/6/2007	**14**	7.46	7.75	7.97	7.98	**7.79**	**0.24**
TS 18	HA	11/13/2007	**21**	7.60	7.86	7.95	8.03	**7.86**	**0.19**
TS 18	HA	11/20/2007	**28**	7.66	7.68	7.91	7.88	**7.78**	**0.13**

Sediment Overlying pH Levels

Sample	Species	Date	DAY	Replicate (Beaker) ID # 01	02	03	04	MEAN	SD
TS 19	HA	10/24/2007	**1**	7.62	7.64	7.68	7.68	**7.66**	**0.03**
TS 19	HA	10/26/2007	**3**	7.30	7.36	7.42	7.44	**7.38**	**0.06**
TS 19	HA	10/30/2007	**7**	7.32	7.46	7.54	7.56	**7.47**	**0.11**
TS 19	HA	11/6/2007	**14**	7.32	7.34	7.40	7.52	**7.40**	**0.09**
TS 19	HA	11/13/2007	**21**	7.24	7.37	7.43	7.48	**7.38**	**0.10**
TS 19	HA	11/20/2007	**28**	7.15	7.26	7.30	7.33	**7.26**	**0.08**

Sample	Species	Date	DAY	Replicate (Beaker) ID # 01	02	03	04	MEAN	SD
TS 20	HA	10/24/2007	**1**	7.50	7.49	7.48	7.48	**7.49**	**0.01**
TS 20	HA	10/26/2007	**3**	6.84	6.96	7.02	7.06	**6.97**	**0.10**
TS 20	HA	10/30/2007	**7**	6.98	7.08	7.15	7.21	**7.11**	**0.10**
TS 20	HA	11/6/2007	**14**	7.09	7.18	7.22	7.29	**7.20**	**0.08**
TS 20	HA	11/13/2007	**21**	7.06	7.19	7.25	7.33	**7.21**	**0.11**
TS 20	HA	11/20/2007	**28**	6.94	7.09	7.13	7.28	**7.11**	**0.14**

Sample	Species	Date	DAY	Replicate (Beaker) ID # 01	02	03	04	MEAN	SD
TS 23	HA	10/24/2007	**1**	7.42	7.38	7.42	7.42	**7.41**	**0.02**
TS 23	HA	10/26/2007	**3**	6.82	6.88	6.96	6.97	**6.91**	**0.07**
TS 23	HA	10/30/2007	**7**	7.17	7.24	7.25	7.31	**7.24**	**0.06**
TS 23	HA	11/6/2007	**14**	7.43	7.35	7.28	7.24	**7.33**	**0.08**
TS 23	HA	11/13/2007	**21**	7.38	7.29	7.26	7.36	**7.32**	**0.06**
TS 23	HA	11/20/2007	**28**	6.96	7.05	6.94	7.08	**7.01**	**0.07**

Sample	Species	Date	DAY	Replicate (Beaker) ID # 01	02	03	04	MEAN	SD
TS 24	HA	10/24/2007	**1**	7.48	7.47	7.47	7.48	**7.48**	**0.01**
TS 24	HA	10/26/2007	**3**	6.88	6.96	6.99	7.02	**6.96**	**0.06**
TS 24	HA	10/30/2007	**7**	6.98	7.12	7.16	7.18	**7.11**	**0.09**
TS 24	HA	11/6/2007	**14**	7.03	7.13	7.21	7.23	**7.15**	**0.09**
TS 24	HA	11/13/2007	**21**	7.40	7.43	7.43	7.42	**7.42**	**0.01**
TS 24	HA	11/20/2007	**28**	7.19	7.26	7.32	7.38	**7.29**	**0.08**

Sediment Overlying Water Conductivity Levels

Sample	Species	Date	DAY	Replicate (Beaker) ID # 01	02	03	04	MEAN	SD
JAM 07	HA	10/24/2007	**1**	442	442	438	444	**442**	**3**
JAM 07	HA	10/26/2007	**3**	424	424	426	428	**426**	**2**
JAM 07	HA	10/30/2007	**7**	418	423	426	437	**426**	**8**
JAM 07	HA	11/6/2007	**14**	413	413	417	420	**416**	**3**
JAM 07	HA	11/13/2007	**21**	358	374	371	382	**371**	**10**
JAM 07	HA	11/20/2007	**28**	339	340	343	219	**310**	**61**

Sediment Overlying Water Conductivity Levels

Sample	Species	Date	DAY	Replicate (Beaker) ID # 01	02	03	04	MEAN	SD
TS 02	HA	10/24/2007	**1**	416	446	431	429	**431**	**12**
TS 02	HA	10/26/2007	**3**	424	437	424	428	**428**	**6**
TS 02	HA	10/30/2007	**7**	425	425	427	415	**423**	**5**
TS 02	HA	11/6/2007	**14**	413	408	422	411	**414**	**6**
TS 02	HA	11/13/2007	**21**	361	355	359	357	**358**	**3**
TS 02	HA	11/20/2007	**28**	327	319	331	331	**327**	**6**

Sample	Species	Date	DAY	Replicate (Beaker) ID # 01	02	03	04	MEAN	SD
TS 04	HA	10/24/2007	**1**	414	417	409	411	**413**	**4**
TS 04	HA	10/26/2007	**3**	410	418	420	412	**415**	**5**
TS 04	HA	10/30/2007	**7**	415	420	415	403	**413**	**7**
TS 04	HA	11/6/2007	**14**	403	404	406	413	**407**	**5**
TS 04	HA	11/13/2007	**21**	361	364	357	359	**360**	**3**
TS 04	HA	11/20/2007	**28**	326	323	328	326	**326**	**2**

Sample	Species	Date	DAY	Replicate (Beaker) ID # 01	02	03	04	MEAN	SD
TS 09	HA	10/24/2007	**1**	389	387	386	382	**386**	**3**
TS 09	HA	10/26/2007	**3**	402	400	399	383	**396**	**9**
TS 09	HA	10/30/2007	**7**	427	424	401	418	**418**	**12**
TS 09	HA	11/6/2007	**14**	414	423	379	404	**405**	**19**
TS 09	HA	11/13/2007	**21**	370	354	355	356	**359**	**8**
TS 09	HA	11/20/2007	**28**	349	302	308	334	**323**	**22**

Sample	Species	Date	DAY	Replicate (Beaker) ID # 01	02	03	04	MEAN	SD
TS 15	HA	10/24/2007	**1**	374	376	374	372	**374**	**2**
TS 15	HA	10/26/2007	**3**	386	383	380	378	**382**	**4**
TS 15	HA	10/30/2007	**7**	404	398	394	390	**397**	**6**
TS 15	HA	11/6/2007	**14**	399	395	386	386	**392**	**7**
TS 15	HA	11/13/2007	**21**	371	369	349	336	**356**	**17**
TS 15	HA	11/20/2007	**28**	343	347	336	334	**340**	**6**

Sample	Species	Date	DAY	Replicate (Beaker) ID # 01	02	03	04	MEAN	SD
TS 16	HA	10/24/2007	**1**	373	373	376	372	**374**	**2**
TS 16	HA	10/26/2007	**3**	382	380	379	380	**380**	**1**
TS 16	HA	10/30/2007	**7**	398	394	392	393	**394**	**3**
TS 16	HA	11/6/2007	**14**	396	394	394	392	**394**	**2**
TS 16	HA	11/13/2007	**21**	352	349	345	344	**348**	**0**
TS 16	HA	11/20/2007	**28**	336	326	340	327	**332**	**7**

Sediment Overlying Water Conductivity Levels

Sample	Species	Date	DAY	Replicate (Beaker) ID # 01	02	03	04	MEAN	SD
TS 17	HA	10/24/2007	**1**	392	394	388	389	**391**	**3**
TS 17	HA	10/26/2007	**3**	386	391	384	388	**387**	**3**
TS 17	HA	10/30/2007	**7**	409	415	413	415	**413**	**3**
TS 17	HA	11/6/2007	**14**	411	411	408	412	**411**	**2**
TS 17	HA	11/13/2007	**21**	379	374	372	372	**374**	**3**
TS 17	HA	11/20/2007	**28**	370	367	371	367	**369**	**2**

Sample	Species	Date	DAY	Replicate (Beaker) ID # 01	02	03	04	MEAN	SD
TS 18	HA	10/24/2007	**1**	406	409	416	416	**412**	**5**
TS 18	HA	10/26/2007	**3**	396	397	407	411	**403**	**7**
TS 18	HA	10/30/2007	**7**	414	411	423	419	**417**	**5**
TS 18	HA	11/6/2007	**14**	420	420	429	420	**422**	**5**
TS 18	HA	11/13/2007	**21**	364	378	378	372	**373**	**7**
TS 18	HA	11/20/2007	**28**	367	375	383	387	**378**	**9**

Sample	Species	Date	DAY	Replicate (Beaker) ID # 01	02	03	04	MEAN	SD
TS 19	HA	10/24/2007	**1**	393	400	409	405	**402**	**7**
TS 19	HA	10/26/2007	**3**	393	402	418	414	**407**	**11**
TS 19	HA	10/30/2007	**7**	409	423	430	427	**422**	**9**
TS 19	HA	11/6/2007	**14**	400	412	420	418	**413**	**9**
TS 19	HA	11/13/2007	**21**	334	339	337	342	**338**	**3**
TS 19	HA	11/20/2007	**28**	323	327	334	338	**331**	**7**

Sample	Species	Date	DAY	Replicate (Beaker) ID # 01	02	03	04	MEAN	SD
TS 20	HA	10/24/2007	**1**	388	396	394	396	**394**	**4**
TS 20	HA	10/26/2007	**3**	390	405	407	407	**402**	**8**
TS 20	HA	10/30/2007	**7**	404	418	418	420	**415**	**7**
TS 20	HA	11/6/2007	**14**	394	407	408	411	**405**	**8**
TS 20	HA	11/13/2007	**21**	325	341	341	339	**337**	**8**
TS 20	HA	11/20/2007	**28**	316	331	336	330	**328**	**9**

Sample	Species	Date	DAY	Replicate (Beaker) ID # 01	02	03	04	MEAN	SD
TS 23	HA	10/24/2007	**1**	393	396	401	402	**398**	**4**
TS 23	HA	10/26/2007	**3**	398	404	411	413	**407**	**7**
TS 23	HA	10/30/2007	**7**	420	431	433	434	**430**	**6**
TS 23	HA	11/6/2007	**14**	440	424	422	424	**428**	**8**
TS 23	HA	11/13/2007	**21**	368	353	343	355	**355**	**10**
TS 23	HA	11/20/2007	**28**	354	362	324	369	**352**	**20**

Sediment Overlying Water Conductivity Levels

Sample	Species	Date	DAY	Replicate (Beaker) ID # 01	02	03	04	MEAN	SD
TS 24	HA	10/24/2007	**1**	378	381	383	386	**382**	**3**
TS 24	HA	10/26/2007	**3**	388	391	394	397	**393**	**4**
TS 24	HA	10/30/2007	**7**	399	404	408	408	**405**	**4**
TS 24	HA	11/6/2007	**14**	394	398	400	401	**398**	**3**
TS 24	HA	11/13/2007	**21**	319	322	324	324	**322**	**2**
TS 24	HA	11/20/2007	**28**	316	321	324	325	**322**	**4**

Sediment Overlying Water Hardness Levels

Sample	Species	Date	DAY	Replicate (Beaker) ID # 01	02	03	04	HARD
JAM 07	HA	10/24/2007	**1**	212				212
JAM 07	HA	10/26/2007	**3**		192			192
JAM 07	HA	10/30/2007	**7**			180		180
JAM 07	HA	11/6/2007	**14**				188	188
JAM 07	HA	11/13/2007	**21**	160				160
JAM 07	HA	11/20/2007	**28**		156			156

Sample	Species	Date	DAY	Replicate (Beaker) ID # 01	02	03	04	HARD
TS 02	HA	10/24/2007	**1**	196				196
TS 02	HA	10/26/2007	**3**		196			196
TS 02	HA	10/30/2007	**7**			196		196
TS 02	HA	11/6/2007	**14**				192	192
TS 02	HA	11/13/2007	**21**	168				168
TS 02	HA	11/20/2007	**28**		148			148

Sample	Species	Date	DAY	Replicate (Beaker) ID # 01	02	03	04	HARD
TS 04	HA	10/24/2007	**1**	172				172
TS 04	HA	10/26/2007	**3**		180			180
TS 04	HA	10/30/2007	**7**			188		188
TS 04	HA	11/6/2007	**14**				180	180
TS 04	HA	11/13/2007	**21**	160				160
TS 04	HA	11/20/2007	**28**		148			148

Sample	Species	Date	DAY	Replicate (Beaker) ID # 01	02	03	04	HARD
TS 09	HA	10/24/2007	**1**	176				176
TS 09	HA	10/26/2007	**3**		192			192
TS 09	HA	10/30/2007	**7**			184		184
TS 09	HA	11/6/2007	**14**				180	180
TS 09	HA	11/13/2007	**21**	160				160
TS 09	HA	11/20/2007	**28**		156			156

Sediment Overlying Water Hardness Levels

Sample	Species	Date	DAY	Replicate (Beaker) ID # 01	02	03	04	HARD
TS 15	HA	10/24/2007	**1**	172				172
TS 15	HA	10/26/2007	**3**		172			172
TS 15	HA	10/30/2007	**7**			168		168
TS 15	HA	11/6/2007	**14**				184	184
TS 15	HA	11/13/2007	**21**	164				164
TS 15	HA	11/20/2007	**28**		168			168

Sample	Species	Date	DAY	Replicate (Beaker) ID # 01	02	03	04	HARD
TS 16	HA	10/24/2007	**1**	176				176
TS 16	HA	10/26/2007	**3**		180			180
TS 16	HA	10/30/2007	**7**			176		176
TS 16	HA	11/6/2007	**14**				184	184
TS 16	HA	11/13/200/	**21**	160				160
TS 16	HA	11/20/2007	**28**		152			152

Sample	Species	Date	DAY	Replicate (Beaker) ID # 01	02	03	04	HARD
TS 17	HA	10/24/2007	**1**	180				180
TS 17	HA	10/26/2007	**3**		184			184
TS 17	HA	10/30/2007	**7**			192		192
TS 17	HA	11/6/2007	**14**				192	192
TS 17	HA	11/13/2007	**21**	180				180
TS 17	HA	11/20/2007	**28**		184			184

Sample	Species	Date	DAY	Replicate (Beaker) ID # 01	02	03	04	HARD
TS 18	HA	10/24/2007	**1**	188				188
TS 18	HA	10/26/2007	**3**		180			180
TS 18	HA	10/30/2007	**7**			188		188
TS 18	HA	11/6/2007	**14**				200	200
TS 18	HA	11/13/2007	**21**	180				180
TS 18	HA	11/20/2007	**28**		200			200

Sample	Species	Date	DAY	Replicate (Beaker) ID # 01	02	03	04	HARD
TS 19	HA	10/24/2007	**1**	176				176
TS 19	HA	10/26/2007	**3**		188			188
TS 19	HA	10/30/2007	**7**			204		204
TS 19	HA	11/6/2007	**14**				180	180
TS 19	HA	11/13/2007	**21**	160				160
TS 19	HA	11/20/2007	**28**		168			168

Sediment Overlying Water Hardness Levels

				Replicate (Beaker) ID #				
Sample	**Species**	**Date**	**DAY**	**01**	**02**	**03**	**04**	**HARD**
TS 20	HA	10/24/2007	**1**	180				180
TS 20	HA	10/26/2007	**3**		176			176
TS 20	HA	10/30/2007	**7**			180		180
TS 20	HA	11/6/2007	**14**				192	192
TS 20	HA	11/13/2007	**21**	164				164
TS 20	HA	11/20/2007	**28**		148			148

				Replicate (Beaker) ID #				
Sample	**Species**	**Date**	**DAY**	**01**	**02**	**03**	**04**	**HARD**
TS 23	HA	10/24/2007	**1**	180				180
TS 23	HA	10/26/2007	**3**		176			176
TS 23	HA	10/30/2007	**7**			200		200
TS 23	HA	11/6/2007	**14**				196	196
TS 23	HA	11/13/2007	**21**	168				168
TS 23	HA	11/20/2007	**28**		172			172

				Replicate (Beaker) ID #				
Sample	**Species**	**Date**	**DAY**	**01**	**02**	**03**	**04**	**HARD**
TS 24	HA	10/24/2007	**1**	180				180
TS 24	HA	10/26/2007	**3**		176			176
TS 24	HA	10/30/2007	**7**			184		184
TS 24	HA	11/6/2007	**14**				184	184
TS 24	HA	11/13/2007	**21**	144				144
TS 24	HA	11/20/2007	**28**		156			156

Sediment Overlying Water Alkalinity Levels

				Replicate (Beaker) ID #				
Sample	**Species**	**Date**	**DAY**	**01**	**02**	**03**	**04**	**ALK**
JAM 07	HA	10/24/2007	**1**	152				152
JAM 07	HA	10/26/2007	**3**		143			143
JAM 07	HA	10/30/2007	**7**			147		147
JAM 07	HA	11/6/2007	**14**				133	133
JAM 07	HA	11/13/2007	**21**	124				124
JAM 07	HA	11/20/2007	**28**		129			129

				Replicate (Beaker) ID #				
Sample	**Species**	**Date**	**DAY**	**01**	**02**	**03**	**04**	**ALK**
TS 02	HA	10/24/2007	**1**	120				120
TS 02	HA	10/26/2007	**3**		124			124
TS 02	HA	10/30/2007	**7**			120		120
TS 02	HA	11/6/2007	**14**				115	115
TS 02	HA	11/13/2007	**21**	115				115
TS 02	HA	11/20/2007	**28**		115			115

Sediment Overlying Water Alkalinity Levels

				Replicate (Beaker) ID #				
Sample	**Species**	**Date**	**DAY**	**01**	**02**	**03**	**04**	**ALK**
TS 04	HA	10/24/2007	**1**	110				110
TS 04	HA	10/26/2007	**3**		120			120
TS 04	HA	10/30/2007	**7**			115		115
TS 04	HA	11/6/2007	**14**				115	115
TS 04	HA	11/13/2007	**21**	110				110
TS 04	HA	11/20/2007	**28**		120			120

				Replicate (Beaker) ID #				
Sample	**Species**	**Date**	**DAY**	**01**	**02**	**03**	**04**	**ALK**
TS 09	HA	10/24/2007	**1**	110				110
TS 09	HA	10/26/2007	**3**		133			133
TS 09	HA	10/30/2007	**7**			133		133
TS 09	HA	11/6/2007	**14**				124	124
TS 09	HA	11/13/2007	**21**	115				115
TS 09	HA	11/20/2007	**28**		129			129

				Replicate (Beaker) ID #				
Sample	**Species**	**Date**	**DAY**	**01**	**02**	**03**	**04**	**ALK**
TS 15	HA	10/24/2007	**1**	110				110
TS 15	HA	10/26/2007	**3**		115			115
TS 15	HA	10/30/2007	**7**			110		110
TS 15	HA	11/6/2007	**14**				110	110
TS 15	HA	11/13/2007	**21**	138				138
TS 15	HA	11/20/2007	**28**		138			138

				Replicate (Beaker) ID #				
Sample	**Species**	**Date**	**DAY**	**01**	**02**	**03**	**04**	**ALK**
TS 16	HA	10/24/2007	**1**	110				110
TS 16	HA	10/26/2007	**3**		110			110
TS 16	HA	10/30/2007	**7**			110		110
TS 16	HA	11/6/2007	**14**				110	110
TS 16	HA	11/13/2007	**21**	129				129
TS 16	HA	11/20/2007	**28**		133			133

				Replicate (Beaker) ID #				
Sample	**Species**	**Date**	**DAY**	**01**	**02**	**03**	**04**	**ALK**
TS 17	HA	10/24/2007	**1**	110				110
TS 17	HA	10/26/2007	**3**		115			115
TS 17	HA	10/30/2007	**7**			124		124
TS 17	HA	11/6/2007	**14**				124	124
TS 17	HA	11/13/2007	**21**	133				133
TS 17	HA	11/20/2007	**28**		152			152

Sediment Overlying Water Alkalinity Levels

Sample	Species	Date	DAY	01	02	03	04	ALK
				Replicate (Beaker) ID #				
TS 18	HA	10/24/2007	**1**	110				110
TS 18	HA	10/26/2007	**3**		106			106
TS 18	HA	10/30/2007	**7**			129		129
TS 18	HA	11/6/2007	**14**				129	129
TS 18	HA	11/13/2007	**21**	129				129
TS 18	HA	11/20/2007	**28**		152			152

Sample	Species	Date	DAY	01	02	03	04	ALK
				Replicate (Beaker) ID #				
TS 19	HA	10/24/2007	**1**	115				115
TS 19	HA	10/26/2007	**3**		120			120
TS 19	HA	10/30/2007	**7**			124		124
TS 19	HA	11/6/2007	**14**				124	124
TS 19	HA	11/13/2007	**21**	115				115
TS 19	HA	11/20/2007	**28**		124			124

Sample	Species	Date	DAY	01	02	03	04	ALK
				Replicate (Beaker) ID #				
TS 20	HA	10/24/2007	**1**	115				115
TS 20	HA	10/26/2007	**3**		120			120
TS 20	HA	10/30/2007	**7**			106		106
TS 20	HA	11/6/2007	**14**				110	110
TS 20	HA	11/13/2007	**21**	115				115
TS 20	HA	11/20/2007	**28**		115			115

Sample	Species	Date	DAY	01	02	03	04	ALK
				Replicate (Beaker) ID #				
TS 23	HA	10/24/2007	**1**	129				129
TS 23	HA	10/26/2007	**3**		120			120
TS 23	HA	10/30/2007	**7**			143		143
TS 23	HA	11/6/2007	**14**				138	138
TS 23	HA	11/13/2007	**21**	138				138
TS 23	HA	11/20/2007	**28**		138			138

Sample	Species	Date	DAY	01	02	03	04	ALK
				Replicate (Beaker) ID #				
TS 24	HA	10/24/2007	**1**	106				106
TS 24	HA	10/26/2007	**3**		120			120
TS 24	HA	10/30/2007	**7**			110		110
TS 24	HA	11/6/2007	**14**				106	106
TS 24	HA	11/13/2007	**21**	110				110
TS 24	HA	11/20/2007	**28**		115			115

CETIS Analysis Detail

Hyalella 42-d Survival, Growth, and Reproduction Sediment Test	Retec, Inc.

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
28d Proportion Survived	Comparison	02-9054-3159	02-9054-3159	29 Nov-07 12:30 PM	CETISv1.1.2

Method	Alt H	Data Transform	Zeta	NOEL	LOEL	TOEL	Toxic Units	PMSD
Dunnett's Multiple Comparison	C > T	Angular (Corrected)					N/A	37.47%

Group Comparisons

Sample	vs	Sample	Statistic	Critical	P-Value	MSD	Decision(0.05)
TS_JAM		TS02	3.11078	2.48194	0.0130	0.49995	Significant Effect
		TS04	3.38515	2.48194	0.0069	0.49995	Significant Effect
		TS09	0	2.48194	0.8750	0.49995	Non-Significant Effect
		TS19	0.20226	2.48194	0.8174	0.49995	Non-Significant Effect
		TS20	3.23573	2.48194	0.0098	0.49995	Significant Effect
		TS23	1.35313	2.48194	0.3248	0.49995	Non-Significant Effect
		TS24	1.67839	2.48194	0.2074	0.49995	Non-Significant Effect

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	2.480347	0.3543353	7	4.37	0.00301	Significant Effect
Error	1.947638	0.0811516	24			
Total	4.42798567	0.4354869	31			

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Modified Levene	1.09381	3.49593	0.39812	Equal Variances
Distribution	Shapiro-Wilk W	0.91420		0.01452	Normal Distribution

Data Summary

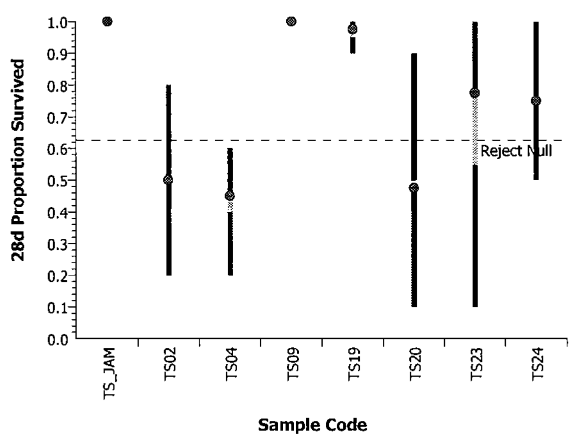
		Original Data				Transformed Data			
Sample Code	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
TS_JAM	4	1.00000	1.00000	1.00000	0.00000	1.41202	1.41202	1.41202	0.00027
TS02	4	0.50000	0.20000	0.80000	0.29439	0.78540	0.46365	1.10715	0.31183
TS04	4	0.45000	0.20000	0.60000	0.17321	0.73013	0.46365	0.88608	0.18389
TS09	4	1.00000	1.00000	1.00000	0.00000	1.41202	1.41202	1.41202	0.00027
TS19	4	0.97500	0.90000	1.00000	0.05000	1.37127	1.24905	1.41202	0.08149
TS20	4	0.47500	0.10000	0.90000	0.33040	0.76023	0.32175	1.24905	0.38190
TS23	4	0.77500	0.10000	1.00000	0.45000	1.13945	0.32175	1.41202	0.54513
TS24	4	0.75000	0.50000	1.00000	0.20817	1.07393	0.78540	1.41202	0.26173

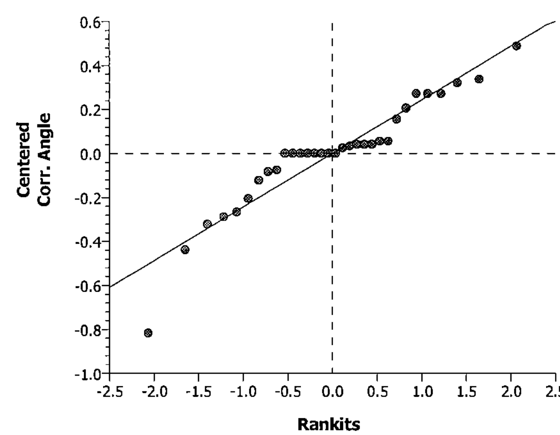
CETIS Analysis Detail

Data Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
TS_JAM	1.00000	1.00000	1.00000	1.00000						
TS02	0.80000	0.30000	0.70000	0.20000						
TS04	0.50000	0.50000	0.60000	0.20000						
TS09	1.00000	1.00000	1.00000	1.00000						
TS19	1.00000	1.00000	1.00000	0.90000						
TS20	0.10000	0.90000	0.50000	0.40000						
TS23	0.10000	1.00000	1.00000	1.00000						
TS24	1.00000	0.70000	0.50000	0.80000						

Graphics





CETIS Analysis Detail

Hyalella 42-d Survival, Growth, and Reproduction Sediment Test	Retec, Inc.

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
28d Proportion Survived	Comparison	02-9054-3159	02-9054-3159	29 Nov-07 12:31 PM	CETISv1.1.2

Method	Alt H	Data Transform	Zeta	NOEL	LOEL	TOEL	Toxic Units	PMSD
Wilcoxon/Bonferroni	C > T	Rank					N/A	22.45%

Group Comparisons

Sample	vs	Sample	Statistic	Critical	P-Value	Ties	Decision(0.05)
TR_Ref		TS02	10		0.0012	0	Significant Effect
		TS04	10		0.0012	0	Significant Effect
		TS09	42		1.0000	1	Non-Significant Effect
		TS19	34		1.0000	1	Non-Significant Effect
		TS20	10		0.0012	0	Significant Effect
		TS23	34		1.0000	1	Non-Significant Effect
		TS24	18		0.0656	1	Non-Significant Effect

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	3.410471	0.4872102	7	9.01	0.00000	Significant Effect
Error	1.947638	0.0541011	36			
Total	5.35810924	0.5413112	43			

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Modified Levene	2.35695	3.18286	0.04332	Equal Variances
Distribution	Shapiro-Wilk W	0.83325		0.00002	Non-normal Distribution

Data Summary

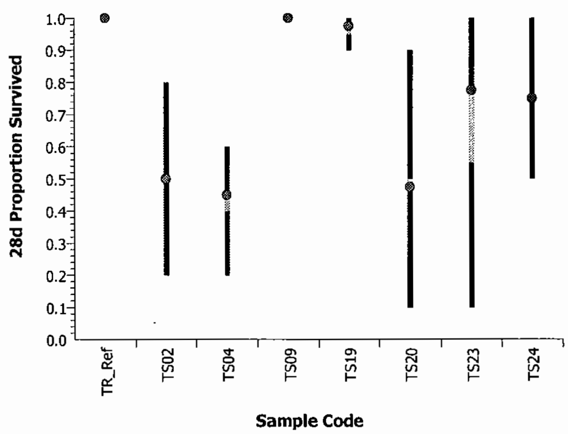
		Original Data				Transformed Data			
Sample Code	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
TR_Ref	16	1.00000	1.00000	1.00000	0.00000	31	31	31	0
TS02	4	0.50000	0.20000	0.80000	0.29439	8.875	3.5	14.5	5.4371
TS04	4	0.45000	0.20000	0.60000	0.17321	7.875	3.5	11	3.1458
TS09	4	1.00000	1.00000	1.00000	0.00000	31	31	31	0
TS19	4	0.97500	0.90000	1.00000	0.05000	27.375	16.5	31	7.25
TS20	4	0.47500	0.10000	0.90000	0.33040	8.125	1.5	16.5	6.2899
TS23	4	0.77500	0.10000	1.00000	0.45000	23.625	1.5	31	14.75
TS24	4	0.75000	0.50000	1.00000	0.20817	16.625	8.5	31	9.9027

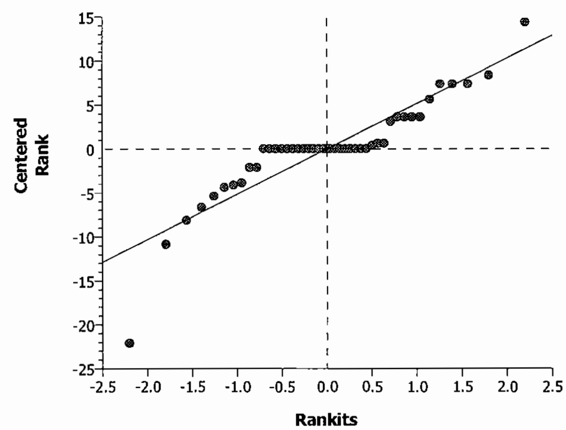
CETIS Analysis Detail

Data Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
TR_Ref	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000
	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000				
TS02	0.80000	0.30000	0.70000	0.20000						
TS04	0.50000	0.50000	0.60000	0.20000						
TS09	1.00000	1.00000	1.00000	1.00000						
TS19	1.00000	1.00000	1.00000	0.90000						
TS20	0.10000	0.90000	0.50000	0.40000						
TS23	0.10000	1.00000	1.00000	1.00000						
TS24	1.00000	0.70000	0.50000	0.80000						

Graphics





CETIS Analysis Detail

Hyalella 42-d Survival, Growth, and Reproduction Sediment Test — **Retec, Inc.**

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
28d Mean Dry Weight	Comparison	02-9054-3159	02-9054-3159	29 Nov-07 12:32 PM	CETISv1.1.2

Method	Alt H	Data Transform	Zeta	NOEL	LOEL	TOEL	Toxic Units	PMSD
Dunnett's Multiple Comparison	C > T	Untransformed					N/A	12.06%

Group Comparisons

Sample	vs	Sample	Statistic	Critical	P-Value	MSD	Decision(0.05)
TS_JAM		TS02	5.28532	2.35615	0.0002	0.05015	Significant Effect
		TS04	4.29873	2.35615	0.0011	0.05015	Significant Effect
		TS09	-4.5571	2.35615	1.0000	0.05015	Non-Significant Effect
		TS19	11.2284	2.35615	0.0000	0.05015	Significant Effect

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	0.2544612	0.0636153	4	70.21	0.00000	Significant Effect
Error	0.013592	0.0009061	15			
Total	0.26805323	0.0645214	19			

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Bartlett	2.47942	13.27670	0.64833	Equal Variances
Distribution	Shapiro-Wilk W	0.95644		0.47544	Normal Distribution

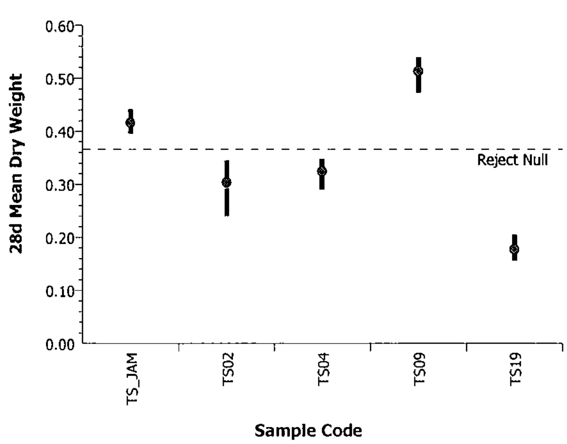
Data Summary

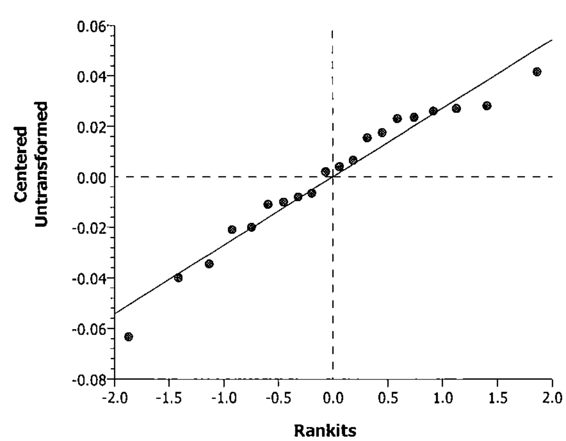
		Original Data				Transformed Data			
Sample Code	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
TS_JAM	4	0.41600	0.39600	0.44200	0.01953				
TS02	4	0.30350	0.24000	0.34500	0.04486				
TS04	4	0.32450	0.29000	0.34800	0.02640				
TS09	4	0.51300	0.47300	0.54000	0.03140				
TS19	4	0.17700	0.15600	0.20500	0.02131				

Data Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
TS_JAM	0.44200	0.39600	0.40800	0.41800						
TS02	0.24000	0.31000	0.31900	0.34500						
TS04	0.34200	0.34800	0.31800	0.29000						
TS09	0.47300	0.50300	0.53600	0.54000						
TS19	0.15600	0.16600	0.20500	0.18100						

Graphics





Report Date: 29 Nov-07 12:32 PM
Analysis: 03-3724-7521

CETIS Analysis Detail

Hyalella 42-d Survival, Growth, and Reproduction Sediment Test **Retec, Inc.**

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
28d Mean Dry Weight	Comparison	02-9054-3159	02-9054-3159	29 Nov-07 12:32 PM	CETISv1.1.2

Method	Alt H	Data Transform	Zeta	NOEL	LOEL	TOEL	Toxic Units	PMSD
Steel Many-One Rank	C > T	Rank					N/A	33.16%

Group Comparisons

Sample	vs	Sample	Statistic	Critical	P-Value	Ties	Decision(0.05)
TS_JAM		TS20	14	10	0.2626	0	Non-Significant Effect
		TS23	26	10	0.9996	0	Non-Significant Effect
		TS24	10	10	0.0277	0	Significant Effect

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	0.1319225	0.0439742	3	6.04	0.00949	Significant Effect
Error	0.0873085	0.0072757	12			
Total	0.21923098	0.0512499	15			

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Bartlett	12.11957	11.34487	0.00698	Unequal Variances
Distribution	Shapiro-Wilk W	0.87733		0.03527	Normal Distribution

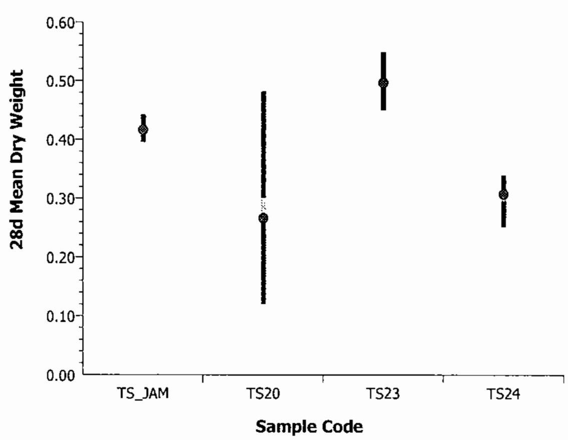
Data Summary

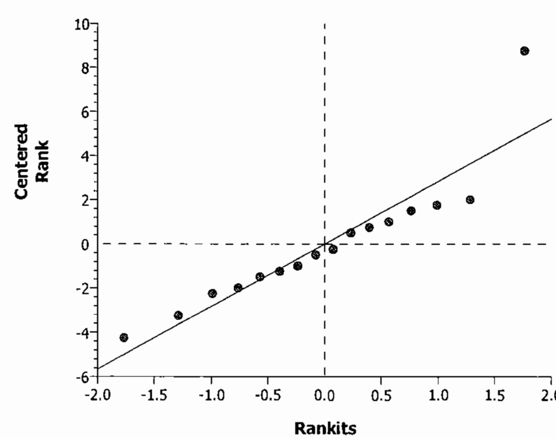
		Original Data				Transformed Data			
Sample Code	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
TS_JAM	4	0.41600	0.39600	0.44200	0.01953	9.5	8	11	1.291
TS20	4	0.26575	0.12000	0.48200	0.15895	5.25	1	14	5.9652
TS23	4	0.49650	0.45000	0.54900	0.04453	14	12	16	1.8257
TS24	4	0.30675	0.25200	0.33900	0.03838	5.25	3	7	1.7078

Data Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
TS_JAM	0.44200	0.39600	0.40800	0.41800						
TS20	0.12000	0.17900	0.28200	0.48200						
TS23	0.45000	0.47100	0.54900	0.51600						
TS24	0.25200	0.32600	0.31000	0.33900						

Graphics





CETIS Analysis Detail

Hyalella 42-d Survival, Growth, and Reproduction Sediment Test	Retec, Inc.

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
28d Mean Dry Weight	Comparison	02-9054-3159	02-9054-3159	29 Nov-07 12:31 PM	CETISv1.1.2

Method	Alt H	Data Transform	Zeta	NOEL	LOEL	TOEL	Toxic Units	PMSD
Wilcoxon/Bonferroni	C > T	Rank					N/A	25.82%

Group Comparisons

Sample	vs	Sample	Statistic	Critical	P-Value	Ties	Decision(0.05)
TR_Ref		TS02	28		0.6341	0	Non-Significant Effect
		TS04	36		1.0000	0	Non-Significant Effect
		TS09	74		1.0000	0	Non-Significant Effect
		TS19	10		0.0012	0	Significant Effect
		TS20	27		0.5325	0	Non-Significant Effect
		TS23	74		1.0000	0	Non-Significant Effect
		TS24	32		1.0000	0	Non-Significant Effect

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	0.3567612	0.0509659	7	13.82	0.00000	Significant Effect
Error	0.1327565	0.0036877	36			
Total	0.48951766	0.0546536	43			

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Bartlett	20.78620	18.47531	0.00410	Unequal Variances
Distribution	Shapiro-Wilk W	0.90819		0.00196	Non-normal Distribution

Data Summary

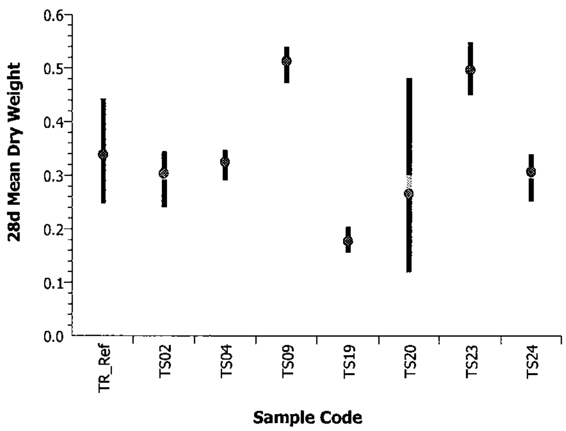
		Original Data				Transformed Data			
Sample Code	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
TR_Ref	16	0.33850	0.24800	0.44300	0.04771	23.313	8	35	8.7443
TS02	4	0.30350	0.24000	0.34500	0.04486	17.125	7	28	8.6446
TS04	4	0.32450	0.29000	0.34800	0.02640	21.25	12	29	8.0984
TS09	4	0.51300	0.47300	0.54000	0.03140	40.75	38	43	2.2174
TS19	4	0.17700	0.15600	0.20500	0.02131	4	2	6	1.8257
TS20	4	0.26575	0.12000	0.48200	0.15895	13.5	1	39	17.407
TS23	4	0.49650	0.45000	0.54900	0.04453	39.5	36	44	3.6968
TS24	4	0.30675	0.25200	0.33900	0.03838	18.125	9	25	7.3300

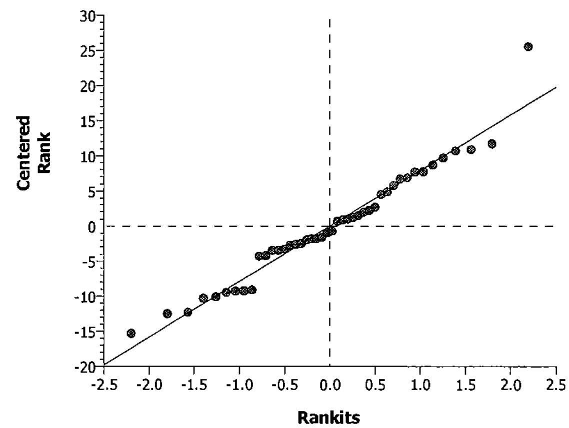
CETIS Analysis Detail

Data Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
TR_Ref	0.30400	0.32300	0.32200	0.28800	0.40900	0.33900	0.32000	0.24800	0.30500	0.32300
	0.38300	0.35200	0.32800	0.34900	0.38000	0.44300				
TS02	0.24000	0.31000	0.31900	0.34500						
TS04	0.34200	0.34800	0.31800	0.29000						
TS09	0.47300	0.50300	0.53600	0.54000						
TS19	0.15600	0.16600	0.20500	0.18100						
TS20	0.12000	0.17900	0.28200	0.48200						
TS23	0.45000	0.47100	0.54900	0.51600						
TS24	0.25200	0.32600	0.31000	0.33900						

Graphics





Aquatec Biological Sciences

Ecology | Environmental Toxicology | Natural Resource Assessments | Microbiology

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Date : 1/9/2008
BTR No. : 10789
Project No. : 07089
No. of Samples : 19
Date Received : 10/18/2007

Laboratory Sample ID : 36523
Client Sample ID : TS-15
Remarks :

Date/Time Sample Collected : 10/15/2007 @ 4:45:00
Percent Examined: : 100
Sampling Depth (m) : Not Reported

Phylum	Class	Order	Family	Sub-Family	Tribe	Genus/Species/Variety	# Counted	Total/ Sample
Nematoda							4	4
Annelida	Hirudinea	Rhynchobdellida	Glossiphoniidae			*Gloiobdella elongata*	1	1
	Oligochaeta	Lumbriculida	Lumbriculidae				2	2
		Tubificida	Tubificidae				4	4
						Limnodrilus hoffmeisteri	2	2
						Quistadrilus multisetosus	1	1
Mollusca	Gastropoda					*Goniobasis sp.*	1	1
	Pelecypoda	Prionodesmacea	Sphaeriidae			*Musculium sp.*	5	5
						Sphaerium sp.	1	1
		Veneroida	Dreissenidae			*Dreissena polymorpha*	9	9
Arthropoda	Crustacea	Amphipoda	Gammaridae			*Gammarus sp.*	8	8
	Insecta	Coleoptera	Elmidae			*Oulimnius sp.*	1	1
		Diptera	Ceratopogonidae			*Probezzia sp.*	5	5
			Chaoboridae			*Chaoborus sp.*	3	3
			Chironomidae	Chironominae	Chironomini	*Microtendipes caelum*	4	4
						Polypedilum sp.	1	1
						Tribelos sp.	3	3
					Tanytarsini	*Tanytarsus guerlus*	1	1
				Tanypodinae	Coelotanypodini	*Coelotanypus sp.*	41	41
					Procladiini	*Procladius sp.*	18	18
		Ephemeroptera	Caenidae			*Caenis sp.*	1	1
			Ephemeridae			*Hexagenia sp.*	3	3

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Date : 1/9/2008
BTR No. : 10789
Project No. : 07089
No. of Samples : 19
Date Received : 10/18/2007

Laboratory Sample ID : 36523
Client Sample ID : TS-15
Remarks :

Date/Time Sample Collected : 10/15/2007 @ 4:45:00
Percent Examined: : 100
Sampling Depth (m) : Not Reported

Phylum	Class	Order	Family	Sub-Family	Tribe	Genus/Species/Variety	# Counted	Total/ Sample
Arthropoda	Insecta	Megaloptera	Sialidae			*Sialis sp.*	1	1
		Odonata	Coenagrionidae			*Enallagma sp.*	1	1
		Trichoptera	Leptoceridae			*Mystacides sp.*	3	3
						Oecetis sp.	7	7
			Polycentropodidae			*Phylocentropus sp.*	1	1
						Sub-Total:	132	132
						Grand Total:	132	132

Nick Azzolina	Date : 1/9/2008
RETEC Group, Inc.	BTR No. : 10789
1001 W. Seneca Street	Project No. : 07089
Suite 204	No. of Samples : 19
Ithaca, NY 14850-3342	Date Received : 10/18/2007
Reference: Troy, NY Smith Ave.	

Laboratory Sample ID : 36524	Date/Time Sample Collected : 10/15/2007 @ 5:00:00
Client Sample ID : TS-16	Percent Examined: : 100
Remarks :	Sampling Depth (m) : Not Reported

Phylum	Class	Order	Family	Sub-Family	Tribe	Genus/Species/Variety	# Counted	Total/ Sample
Annelida	Oligochaeta	Tubificida	Tubificidae				7	7
						Aulodrilus sp.	5	5
						Ilyodrilus sp.	3	3
	Polychaeta	Sabellida	Sabellidae			*Manayunkia speciosa*	17	17
Mollusca	Pelecypoda	Prionodesmacea	Sphaeriidae			*Musculium sp.*	3	3
						Pisidium sp.	2	2
						Sphaerium sp.	20	20
		Veneroida	Dreissenidae			*Dreissena polymorpha*	6	6
Arthropoda	Crustacea	Amphipoda	Gammaridae			*Gammarus sp.*	37	37
		Isopoda	Asellidae			*Caecidotea communis*	1	1
	Hydrachnidia						1	1
	Insecta	Coleoptera	Elmidae			*Dubiraphia sp.*	5	5
						Oulimnius sp.	3	3
						Stenelmis sp.	6	6
		Diptera	Ceratopogonidae			*Bezzia sp.*	16	16
						Probezzia sp.	7	7
			Chironomidae	Chironominae	Chironomini	*Cladopelma sp.*	4	4
						Microtendipes caelum	13	13
						Polypedilum sp.	2	2
						Tribelos sp.	6	6
					Tanytarsini	*Paratanytarsus sp.*	7	7
						Tanytarsus sp.	2	2
				Tanypodinae	Coelotanypodini	*Coelotanypus sp.*	42	42
					Procladiini	*Procladius sp.*	20	20
		Ephemeroptera	Ephemeridae			*Hexagenia sp.*	7	7
		Megaloptera	Sialidae			*Sialis sp.*	1	1

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Date : 1/9/2008
BTR No. : 10789
Project No. : 07089
No. of Samples : 19
Date Received : 10/18/2007

Laboratory Sample ID : 36524
Client Sample ID : TS-16
Remarks :

Date/Time Sample Collected : 10/15/2007 @ 5:00:00
Percent Examined: : 100
Sampling Depth (m) : Not Reported

Phylum	Class	Order	Family	Sub-Family	Tribe	Genus/Species/Variety	# Counted	Total/ Sample
Arthropoda	Insecta	Trichoptera	Leptoceridae			*Mystacides sp.*	5	5
						Oecetis sp.	17	17
			Polycentropodidae			*Phylocentropus sp.*	6	6
						Sub-Total:	271	271
						Grand Total:	271	271

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Date : 1/9/2008
BTR No. : 10789
Project No. : 07089
No. of Samples : 19
Date Received : 10/18/2007

Laboratory Sample ID : 36525
Client Sample ID : TS-17
Remarks :

Date/Time Sample Collected : 10/15/2007 @ 5:30:00
Percent Examined: : 50
Sampling Depth (m) : Not Reported

Phylum	Class	Order	Family	Sub-Family	Tribe	Genus/Species/Variety	# Counted	Total/ Sample
Annelida	Oligochaeta	Tubificida	Tubificidae				4	8
	Polychaeta	Sabellida	Sabellidae			*Manayunkia speciosa*	18	36
Mollusca	Gastropoda	Mesogastropoda	Bithyniidae			*Bithynia tentaculata*	1	2
	Pelecypoda	Prionodesmacea	Sphaeriidae			*Sphaerium sp.*	5	10
		Veneroida	Dreissenidae			*Dreissena polymorpha*	8	16
Arthropoda	Insecta	Diptera	Ceratopogonidae			*Bezzia sp.*	4	8
						Probezzia sp.	1	2
			Chironomidae	Chironominae	Chironomini		1	2
						Microtendipes caelum	8	16
						Tribelos sp.	2	4
					Tanytarsini	*Paratanytarsus sp.*	1	2
						Tanytarsus guerlus	3	6
				Tanypodinae	Coelotanypodini	*Coelotanypus sp.*	34	68
					Procladiini	*Procladius sp.*	2	4
		Ephemeroptera	Ephemeridae			*Hexagenia sp.*	3	6
		Trichoptera	Leptoceridae			*Oecetis sp.*	4	8
			Polycentropodidae			*Phylocentropus sp.*	2	4
						Sub-Total:	**101**	**202**
						Grand Total:	**101**	**202**

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Date : 1/9/2008
BTR No. : 10789
Project No. : 07089
No. of Samples : 19
Date Received : 10/18/2007

Laboratory Sample ID : 36526
Client Sample ID : TS-18
Remarks :

Date/Time Sample Collected : 10/15/2007 @ 5:45:00
Percent Examined: : 100
Sampling Depth (m) : Not Reported

Phylum	Class	Order	Family	Sub-Family	Tribe	Genus/Species/Variety	# Counted	Total/ Sample
Annelida	Oligochaeta	Lumbriculida	Lumbriculidae				2	2
Mollusca	Gastropoda					*Goniobasis sp.*	1	1
		Mesogastropoda	Bithyniidae			*Bithynia tentaculata*	1	1
	Pelecypoda	Prionodesmacea	Sphaeriidae			*Sphaerium sp.*	1	1
		Veneroida	Dreissenidae			*Dreissena polymorpha*	1	1
Arthropoda	Crustacea	Amphipoda	Gammaridae			*Gammarus sp.*	1	1
	Insecta	Coleoptera	Elmidae			*Dubiraphia sp.*	1	1
		Diptera	Ceratopogonidae			*Bezzia sp.*	3	3
			Chaoboridae			*Chaoborus sp.*	2	2
			Chironomidae	Chironominae	Chironomini	*Tribelos sp.*	1	1
				Tanypodinae	Coelotanypodini	*Coelotanypus sp.*	43	43
					Procladiini	*Procladius sp.*	1	1
		Trichoptera	Leptoceridae			*Oecetis sp.*	1	1
						Sub-Total:	59	59
						Grand Total:	59	59

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Date : 1/9/2008
BTR No. : 10789
Project No. : 07089
No. of Samples : 19
Date Received : 10/18/2007

Laboratory Sample ID : 36529
Client Sample ID : TS-19
Remarks :

Date/Time Sample Collected : 10/17/2007 @ 9:50:00
Percent Examined: : 100
Sampling Depth (m) : Not Reported

Phylum	Class	Order	Family	Sub-Family	Tribe	Genus/Species/Variety	# Counted	Total/ Sample
Annelida	Polychaeta	Sabellida	Sabellidae			*Manayunkia speciosa*	98	98
Mollusca	Gastropoda	Mesogastropoda	Hydrobiidae			*Amnicola limosa*	1	1
	Pelecypoda	Prionodesmacea	Sphaeriidae			*Sphaerium sp.*	1	1
		Veneroida	Dreissenidae			*Dreissena sp.*	1	1
						Dreissena polymorpha	24	24
Arthropoda	Crustacea	Amphipoda	Gammaridae			*Gammarus sp.*	14	14
	Insecta	Coleoptera	Elmidae			*Dubiraphia sp.*	1	1
						Oulimnius sp.	3	3
						Stenelmis sp.	7	7
		Diptera	Chironomidae	Chironominae	Chironomini		1	1
						Cryptochironomus sp.	1	1
						Dicrotendipes sp.	8	8
						Microtendipes caelum	18	18
						Nilothauma sp.	1	1
					Tanytarsini		2	2
						Paratanytarsus sp.	3	3
						Tanytarsus sp.	8	8
				Tanypodinae		*Conchapelopia sp.*	15	15
					Procladiini	*Procladius sp.*	1	1
			Empididae				1	1
		Ephemeroptera	Caenidae			*Caenis sp.*	2	2
		Neuroptera	Sisyridae			*Climacia sp.*	1	1
		Trichoptera	Leptoceridae			*Oecetis sp.*	4	4
						Sub-Total:	216	216
						Grand Total:	216	216

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Date : 1/9/2008
BTR No. : 10789
Project No. : 07089
No. of Samples : 19
Date Received : 10/18/2007

Laboratory Sample ID : 36530
Client Sample ID : TS-23
Remarks :

Date/Time Sample Collected : 10/17/2007 @ 10:35:00
Percent Examined: : 100
Sampling Depth (m) : Not Reported

Phylum	Class	Order	Family	Sub-Family	Tribe	Genus/Species/Variety	# Counted	Total/ Sample
Annelida	Oligochaeta	Tubificida	Tubificidae				9	9
						Ilyodrilus sp.	1	1
	Polychaeta	Sabellida	Sabellidae			*Manayunkia speciosa*	45	45
Mollusca	Gastropoda						1	1
		Basommatophora	Planorbidae			*Menetus dilatatus*	1	1
	Pelecypoda	Prionodesmacea	Sphaeriidae			*Pisidium sp.*	8	8
			Unionidae			*Elliptio sp.*	4	4
		Veneroida	Dreissenidae			*Dreissena polymorpha*	4	4
Arthropoda	Crustacea	Amphipoda	Gammaridae			*Gammarus sp.*	5	5
		Isopoda	Asellidae			*Caecidotea communis*	1	1
	Insecta	Coleoptera	Elmidae			*Dubiraphia sp.*	3	3
		Diptera	Ceratopogonidae			*Bezzia sp.*	3	3
			Chironomidae	Chironominae	Chironomini		5	5
						Chironomus sp.	1	1
						Cryptochironomus sp.	22	22
						Polypedilum sp.	13	13
						Tribelos sp.	41	41
					Tanytarsini	*Tanytarsus sp.*	13	13
						Tanytarsus guerlus	7	7
				Tanypodinae	Coelotanypodini	*Coelotanypus sp.*	31	31
					Procladiini	*Procladius sp.*	21	21
		Ephemeroptera	Ephemeridae			*Hexagenia sp.*	1	1
		Megaloptera	Sialidae			*Sialis sp.*	1	1
		Trichoptera	Leptoceridae			*Mystacides sp.*	1	1
						Oecetis sp.	8	8
			Polycentropodidae			*Phylocentropus sp.*	2	2

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Date : 1/9/2008
BTR No. : 10789
Project No. : 07089
No. of Samples : 19
Date Received : 10/18/2007

Laboratory Sample ID : 36530
Client Sample ID : TS-23
Remarks :

Date/Time Sample Collected : 10/17/2007 @ 10:35:00
Percent Examined: : 100
Sampling Depth (m) : Not Reported

Phylum	Class	Order	Family	Sub-Family	Tribe	Genus/Species/Variety	# Counted	Total/ Sample
						Sub-Total:	252	252
						Grand Total:	252	252

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Date : 1/9/2008
BTR No. : 10789
Project No. : 07089
No. of Samples : 19
Date Received : 10/18/2007

Laboratory Sample ID : 36531
Client Sample ID : TS-20
Remarks :

Date/Time Sample Collected : 10/17/2007 @ 11:15:00
Percent Examined: : 100
Sampling Depth (m) : Not Reported

Phylum	Class	Order	Family	Sub-Family	Tribe	Genus/Species/Variety	# Counted	Total/ Sample
Annelida	Oligochaeta	Tubificida	Tubificidae				20	20
						Ilyodrilus sp.	5	5
	Polychaeta	Sabellida	Sabellidae			*Manayunkia speciosa*	50	50
Mollusca	Gastropoda	Mesogastropoda	Hydrobiidae			*Amnicola limosa*	1	1
	Pelecypoda	Veneroida	Dreissenidae			*Dreissena polymorpha*	1	1
Arthropoda	Crustacea	Amphipoda	Gammaridae			*Gammarus sp.*	2	2
	Insecta	Diptera	Ceratopogonidae			*Bezzia sp.*	1	1
			Chironomidae	Chironominae	Chironomini		2	2
						Chironomus sp.	6	6
						Microtendipes caelum	3	3
						Tribelos sp.	3	3
					Tanytarsini	*Tanytarsus sp.*	1	1
				Tanypodinae	Procladiini	*Procladius sp.*	4	4
		Trichoptera	Leptoceridae			*Oecetis sp.*	3	3
						Sub-Total:	**102**	**102**
						Grand Total:	**102**	**102**

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Date : 1/9/2008
BTR No. : 10789
Project No. : 07089
No. of Samples : 19
Date Received : 10/18/2007

Laboratory Sample ID : 36532
Client Sample ID : TS-2
Remarks :

Date/Time Sample Collected : 10/17/2007 @ 12:20:00
Percent Examined: : 100
Sampling Depth (m) : Not Reported

Phylum	Class	Order	Family	Sub-Family	Tribe	Genus/Species/Variety	# Counted	Total/ Sample
Annelida	Oligochaeta	Lumbriculida	Lumbriculidae				2	2
		Tubificida	Tubificidae				4	4
	Polychaeta	Sabellida	Sabellidae			*Manayunkia speciosa*	275	275
Mollusca	Gastropoda	Basommatophora	Ancylidae			*Ferrissia sp.*	2	2
			Physidae			*Physella sp.*	1	1
			Planorbidae			*Promenetus sp.*	1	1
	Pelecypoda	Prionodesmacea	Sphaeriidae			*Sphaerium sp.*	1	1
		Veneroida	Dreissenidae			*Dreissena polymorpha*	44	44
Arthropoda	Crustacea	Amphipoda	Gammaridae			*Gammarus sp.*	7	7
		Isopoda	Asellidae			*Caecidotea communis*	2	2
	Insecta	Coleoptera	Elmidae			*Stenelmis sp.*	1	1
		Diptera	Chironomidae	Chironominae	Chironomini	*Cryptochironomus sp.*	2	2
						Dicrotendipes sp.	1	1
						Microtendipes caelum	9	9
					Tanytarsini	*Paratanytarsus sp.*	7	7
						Rheotanytarsus sp.	1	1
						Tanytarsus sp.	1	1
				Tanypodinae	Coelotanypodini	*Coelotanypus sp.*	1	1
		Ephemeroptera	Caenidae			*Caenis sp.*	1	1
		Trichoptera	Leptoceridae			*Oecetis sp.*	1	1
			Polycentropodidae			*Cyrnellus sp.*	1	1
						Sub-Total:	365	365
						Grand Total:	365	365

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Date : 1/9/2008
BTR No. : 10789
Project No. : 07089
No. of Samples : 19
Date Received : 10/18/2007

Laboratory Sample ID : 36533
Client Sample ID : TS-4
Remarks :

Date/Time Sample Collected : 10/17/2007 @ 12:40:00
Percent Examined: : 100
Sampling Depth (m) : Not Reported

Phylum	Class	Order	Family	Sub-Family	Tribe	Genus/Species/Variety	# Counted	Total/ Sample
Annelida	Oligochaeta	Tubificida	Tubificidae				3	3
	Polychaeta	Sabellida	Sabellidae			*Manayunkia speciosa*	90	90
Mollusca	Gastropoda	Basommatophora	Physidae			*Physella sp.*	2	2
	Pelecypoda	Prionodesmacea	Sphaeriidae			*Pisidium sp.*	1	1
		Veneroida	Dreissenidae			*Dreissena polymorpha*	1	1
Arthropoda	Insecta	Diptera	Chironomidae	Chironominae	Chironomini	*Microtendipes caelum*	5	5
					Tanytarsini	*Rheotanytarsus sp.*	1	1
				Tanypodinae		*Conchapelopia sp.*	1	1
		Trichoptera	Leptoceridae			*Mystacides sp.*	1	1
						Oecetis sp.	2	2
						Sub-Total:	107	107
						Grand Total:	107	107

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Date : 1/9/2008
BTR No. : 10789
Project No. : 07089
No. of Samples : 19
Date Received : 10/18/2007

Laboratory Sample ID : 36534
Client Sample ID : TS-24
Remarks :

Date/Time Sample Collected : 10/17/2007 @ 1:20:00
Percent Examined: : 100
Sampling Depth (m) : Not Reported

Phylum	Class	Order	Family	Sub-Family	Tribe	Genus/Species/Variety	# Counted	Total/ Sample
Annelida	Oligochaeta	Tubificida	Tubificidae				5	5
						Aulodrilus pigueti	1	1
						Ilyodrilus sp.	4	4
	Polychaeta	Sabellida	Sabellidae			*Manayunkia speciosa*	18	18
Mollusca	Pelecypoda	Prionodesmacea	Sphaeriidae			*Pisidium sp.*	1	1
			Unionidae			*Elliptio complanata*	5	5
		Veneroida	Dreissenidae			*Dreissena polymorpha*	8	8
Arthropoda	Insecta	Coleoptera	Elmidae			*Dubiraphia sp.*	2	2
						Stenelmis sp.	1	1
		Diptera	Ceratopogonidae			*Bezzia sp.*	1	1
						Probezzia sp.	2	2
			Chironomidae	Chironominae	Chironomini	*Cryptochironomus sp.*	1	1
						Endochironomus sp.	1	1
						Microtendipes caelum	13	13
						Parachironomus sp.	2	2
						Polypedilum sp.	2	2
					Tanytarsini	*Tanytarsus sp.*	1	1
						Tanytarsus guerlus	1	1
				Orthocladiinae			1	1
				Tanypodinae	Coelotanypodini	*Coelotanypus sp.*	47	47
					Procladiini	*Procladius sp.*	6	6
		Ephemeroptera	Caenidae			*Caenis sp.*	2	2
		Megaloptera	Sialidae			*Sialis sp.*	2	2
		Trichoptera	Leptoceridae			*Oecetis sp.*	5	5
			Polycentropodidae			*Phylocentropus sp.*	1	1
						Sub-Total:	133	133
						Grand Total:	133	133

Nick Azzolina
RETEC Group, Inc.
1001 W. Seneca Street
Suite 204
Ithaca, NY 14850-3342
Reference: Troy, NY Smith Ave.

Date : 1/9/2008
BTR No. : 10789
Project No. : 07089
No. of Samples : 19
Date Received : 10/18/2007

Laboratory Sample ID : 36535
Client Sample ID : TS-9
Remarks :

Date/Time Sample Collected : 10/18/2007 @ 10:10:00
Percent Examined: : 100
Sampling Depth (m) : Not Reported

Phylum	Class	Order	Family	Sub-Family	Tribe	Genus/Species/Variety	# Counted	Total/ Sample
Annelida	Oligochaeta	Tubificida	Tubificidae				12	12
						Limnodrilus hoffmeisteri	5	5
	Polychaeta	Sabellida	Sabellidae			*Manayunkia sp.*	1	1
Mollusca	Gastropoda	Basommatophora	Ancylidae			*Ferrissia sp.*	1	1
			Planorbidae			*Gyraulus deflectus*	1	1
		Mesogastropoda	Hydrobiidae			*Amnicola limosa*	1	1
	Pelecypoda	Prionodesmacea	Sphaeriidae			*Pisidium sp.*	1	1
						Sphaerium sp.	1	1
		Veneroida	Dreissenidae			*Dreissena polymorpha*	2	2
Arthropoda	Crustacea	Amphipoda	Gammaridae			*Gammarus sp.*	22	22
		Isopoda	Asellidae			*Caecidotea communis*	9	9
	Insecta	Coleoptera	Elmidae			*Dubiraphia sp.*	2	2
		Diptera	Ceratopogonidae			*Bezzia sp.*	2	2
			Chaoboridae			*Chaoborus sp.*	2	2
			Chironomidae	Chironominae	Chironomini	*Chironomus sp.*	1	1
						Cryptochironomus sp.	2	2
						Polypedilum sp.	4	4
						Tribelos sp.	15	15
					Tanytarsini	*Rheotanytarsus sp.*	1	1
				Tanypodinae	Coelotanypodini	*Coelotanypus sp.*	27	27
					Procladiini	*Procladius sp.*	2	2
		Trichoptera	Polycentropodidae			*Phylocentropus sp.*	1	1
						Sub-Total:	**115**	**115**
						Grand Total:	**115**	**115**

Submitted By: Philip C Downey

Aqua Survey, Inc.

Technical Report
Toxicological Evaluation
of
Freshwater Sediment Collected from
the National Grid
Troy, New York

28 Day *Hyalella azteca* Study

Tetra Tech ECI
1000 The American Road
Morris Plains, NJ 07950

September 24, 2008

ASI Job No. 28-227

469 Point Breeze Road
Flemington, NJ 08822

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mail@aquasurvey.com
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Aqua Survey, Inc.

Table of Contents

Tables

Appendices

Signature Page

Technical Report
Toxicological Evaluation of Freshwater Sediment
Collected from the National Grid
Troy, New York

28 Day *Hyalella azteca* Study

The report as well as all records and raw data were audited and found to be an accurate reflection of the study. Copies of the raw data will be maintained by Aqua Survey, Inc., 469 Point Breeze Road, Flemington, New Jersey, 08822.

9/24/08

Robert M. Fristrom
Quality Assurance Officer

Date

9/24/08

Michelle Thomas
Laboratory Manager

Date

9-24-08

Jon Doi, Ph.D.
Executive Vice President

Date

Technical Report
Toxicological Evaluation of Freshwater Sediment
Collected from the National Grid
Troy, New York

28 Day *Hyalella azteca* Study

Study Initiation Date

July 10, 2008

Study Completion Date

September 24, 2008

Performing Laboratory

Aqua Survey, Inc.
469 Point Breeze Road
Flemington, New Jersey 08822

Sponsor

Tetra Tech ECI
1000 The American Road
Morris Plains, NJ 07950

Laboratory Project ID

ASI Job No. 28-227

I. INTRODUCTION

The objective of this study was to provide toxicological data assessment of sediment collected from the National Grid Troy Site in Troy, New York. A long-term (28 day) sediment exposure on whole-sediment was conducted to measure the effect on survival and growth of the freshwater amphipod, *Hyalella azteca.* This bioassay was conducted in accordance with USEPA document, *Methods for Measuring the Toxicity and Bioaccumulation of Sediment-Associated Contaminants with Freshwater Invertebrates,* (EPA 600/R-99/024, March 2000).

II. TEST ADMINISTRATION

A. Sponsor

Tetra Tech ECI
1000 The American Road
Morris Plains, NJ 07950

B. Testing Facility

Aqua Survey, Inc.
469 Point Breeze Road
Flemington, New Jersey 08822

C. Dates of Experimentation

Study Exposure Initiation: July 23, 2008
Study Exposure Completion: August 20, 2008

D. Study Participants

Jon Doi, Ph.D.	Executive Vice-President
Robert Fristrom	Quality Assurance Officer
G. Stephen Hornberger	Scientist
Elizabeth Horn	Scientist
Michelle Thomas	Laboratory Manager

III. MATERIALS AND METHODS

All testing was performed as defined in the USEPA document, *Methods for Measuring the Toxicity and Bioaccumulation of Sediment-Associated Contaminants with Freshwater Invertebrates* (EPA 600/R-99/024, March 2000). The methods employed for this study followed guidelines outlined by the American Society of Testing Materials, Standard Guide for Conducting Sediment Toxicity Tests with Freshwater Invertebrates, ASTM E1706-96; the 42-Day Test Using *Hyalella azteca* for Measuring the Effects of Sediment Associated Contaminants on Survival, Growth, and Reproduction (ASI/SOP/SED/1800). A 28 day exposure duration was selected to be consistent with historical studies performed for this site (National Grid, 2008).

A. Sampling

Nine sediment samples were collected by ASI personnel on July 9 and 10, 2008. All samples were received in good condition at ASI in Flemington, New Jersey on July 11, 2008 and stored in the dark at 4°C until used in testing. Upon arrival at ASI, the samples were logged in and assigned unique ASI sample identification numbers.

Table 1 Sample Identification and Description

Sample	ASI ID #	Description of Material
TS-48	20080826	sandy gravel with cobble
TS-32	20080827	mussel/stone/gravel
TS-33	20080828	decaying matter/mussels/silt/cobble
TS-34	20080829	gravel/sand/cobble/mussels
TS-37	20080830	sandy gravel
TS-35	20080831	sandy gravel/cobbles/mussels
TS-31	20080832	sandy gravel/cobbles/mussels
TS-45	20080833	sandy gravel/cobble
TS-46	20080834	sandy gravel
ASI Pond Mud	20080847	silty

B. Sample Preparation and Reconditioning

No test samples were sieved prior to test initiation. The negative control sediment (ASI Pond Mud) was sieved through a 0.5mm sieve. All samples were homogenized by hand for approximately five minutes. Observations were made as to the color, odor and consistency of each sample. The sample identification numbers and description of each sediment sample are listed in Table 1. Twenty-four hours before the tests were initiated 100-milliliter replicates of each sample and control sediment were set out. One-hundred-and-seventy-five-milliliters of overlay water were added to each exposure chamber. Organisms were added the following day. Ten (10) organisms per replicate were added to each chamber.

C. Toxicity Testing *Hyalella azteca*

Whole sediment toxicity was assessed through a 28 day exposure with the freshwater amphipod *Hyalella azteca,* a representative benthic species.

The *H. azteca* used in testing were cultured at 23.0 ± 1.0 °C in-house at ASI. The organisms were 7 – 8 days of age at test initiation (Organism Distribution Forms can be found in the Biological Raw Data section, Appendix C). Sieved pond sediment from ASI property was used as the control sediment. ASI well water was used as the overlay water. The test temperature was 23.0 ± 1.0 °C with a 16L : 8D photoperiod at approximately 100-1,000 lux.

Daily water quality, observations and physical parameters were monitored as per EPA 600/R-99/024. Water quality monitoring revealed no abnormal trends during the test. On day 14, DO levels fell below 2.5 mg/L in the TS-33 sediment treatment (ASI ID # 20080828). Light aeration was initiated in all chambers. Ammonia readings were inadvertently not taken at study initiation. All ammonia readings taken at study termination were "Non Detects". Due to this fact and the observation that there was little toxicity with test or control samples, we believe that ammonia concentrations had no impact on the toxicity results of this study.

Water exchanges were performed twice daily, 200 milliliters per exchange. Organisms were fed once daily, by adding 1.0 ml YCT to each exposure chamber. In addition, observations were conducted daily to note anything unusual.

On day 28, the test was terminated. All the surviving organisms were collected by sieving the sediment through a 0.425 millimeter mesh. Dry weight determinations were conducted on the surviving adults. Dry weight-determinations were made by drying each replicate at 60°C for 24 hours.

The endpoints of this test were 28 day survival and growth. Survival data and dry weight data can be found in Table 2. Water quality parameters can be found in Tables 3 through 5.

A standard reference toxicant (SRT) test was performed. The reference toxicant data was entered into a program developed by Tidepool Scientific Software and Michael Ives to compute point and interval (i.e. confidence interval) estimate of the LC_{50} value. The program requires the concentration of the reference toxicant, the number of organisms exposed and the number of organisms that died. The Trimmed Spearman Karber method was used to determine this result. The results of this SRT fell outside of the upper control limit. After evaluating this data it was determined that since this SRT's LC_{50} value was 3-4 times higher than the established mean LC_{50} value, this result should be considered an outlier and therefore not be included on the Control Chart. (Technician mix-out error was suspected, but could not be confirmed.) Since the controls were fine in both the SRT and definitive toxicity test, we believe the results of *the H. azteca* toxicity test are valid. The results of the SRT can be found in the biological raw data section (Appendix C) along with the control chart.

IV. RESULTS

A. Results of the *Hyalella azteca* Bioassay

The control organism survival was 86%. Control survival on day 28 is recommended to be 80 percent or greater for an acceptable test.

At test termination, mean dry weight was calculated for all replicates. The organisms were dried at 60°C for 24 hours. The mean weight of each surviving organism was then determined. The mean dry weight of the control organisms on day 28 was 0.18 mg per surviving organism. The survival live count and dry weight data can be found in Table 2.

Table 2 Survival and Dry Weight Summary
28 Day Sediment Exposure Study
Initial Live Count 10

Species: *H. azteca*
Job #: 28-227

Sample ID	Code #	Chamber #	Empty Pan Wt.(mg)	Pan + Org. Dry Wt. (mg)	Dry Wt. of Org. (mg)	28-Day Live Count	% Survival	Wt. per surviving Org. (mg)	Mean Wt. per surviving Org. (mg)
Ha Control	1.1	6	1153.71	1155.44	1.73	10		0.17	
20080847	1.2	3	1160.11	1161.84	1.73	9		0.19	
	1.3	75	1171.60	1172.99	1.39	8		0.17	
	1.4	61	1160.83	1162.74	1.91	10		0.19	
	1.5	60	1165.11	1167.04	1.93	9		0.21	
	1.6	56	1162.12	1163.61	1.49	9		0.17	
	1.7	63	1170.11	1170.86	0.75	6		0.13	
	1.8	69	1148.56	1149.9	1.34	8	86%	0.17	0.18
TS-48	2.1	33	1169.27	1171.02	1.75	10		0.18	
20080826	2.2	21	1167.37	1169.87	2.50	10		0.25	
	2.3	12	1176.41	1179.19	2.78	10		0.28	
	2.4	17	1165.02	1166.71	1.69	8		0.21	
	2.5	42	1172.66	1174.49	1.83	9		0.20	
	2.6	76	1172.53	1174.86	2.33	10		0.23	
	2.7	5	1164.99	1167.28	2.29	9		0.25	
	2.8	30	1166.69	1168.83	2.14	10	95%	0.21	0.23
TS-32	3.1	52	1164.03	1166.21	2.18	7		0.31	
20080827	3.2	67	1175.03	1178.42	3.39	10		0.34	
	3.3	4	1161.43	1164.78	3.35	10		0.33	
	3.4	73	1168.40	1171.21	2.81	10		0.28	
	3.5	20	1160.12	1162.78	2.66	8		0.33	
	3.6	2	1158.38	1161.28	2.90	10		0.29	
	3.7	31	1162.90	1166.28	3.38	10		0.34	
	3.8	58	1164.32	1167.19	2.87	10	94%	0.29	0.31
TS-33	4.1	34	1165.10	1167.58	2.48	9		0.28	
20080828	4.2	16	1161.22	1164.12	2.90	10		0.29	
	4.3	41	1170.37	1172.39	2.02	9		0.22	
	4.4	53	1171.98	1174.43	2.45	9		0.27	
	4.5	74	1158.03	1160.19	2.16	10		0.22	
	4.6	22	1153.62	1156.33	2.71	10		0.27	
	4.7	62	1148.71	1148.9	0.19	1		0.19	
	4.8	48	1173.96	1176.44	2.48	9	84%	0.28	0.25
TS-34	5.1	38	1156.55	1158.55	2.00	8		0.25	
20080829	5.2	59	1169.03	1171.78	2.75	9		0.31	
	5.3	36	1169.04	1171.15	2.11	10		0.21	
	5.4	28	1167.48	1169.48	2.00	9		0.22	
	5.5	71	1166.20	1168.46	2.26	10		0.23	
	5.6	72	1170.97	1173.29	2.32	10		0.23	
	5.7	65	1176.44	1178.6	2.16	9		0.24	
	5.8	64	1175.71	1177.42	1.71	10	94%	0.17	0.23

RJ

Table 2-cont. Survival and Dry Weight Summary
28 Day Sediment Exposure Study
Initial Live Count 10

Species: *H. azteca*
Job #: 28-227

Sample ID	Code #	Chamber #	Empty Pan Wt.(mg)	Pan + Org. Dry Wt. (mg)	Dry Wt. of Org.	28-Day Live Count	% Survival	Wt. per surviving Org. (mg)	Mean Wt. per surviving Org. (mg)
TS-37	6.1	1	1148.99	1151.28	2.29	10		0.23	
20080830	6.2	46	1160.55	1162.36	1.81	9		0.20	
	6.3	25	1165.80	1168.11	2.31	10		0.23	
	6.4	9	1164.86	1166.96	2.10	10		0.21	
	6.5	24	1170.49	1172.67	2.18	10		0.22	
	6.6	78	1168.58	1170.31	1.73	9		0.19	
	6.7	32	1149.05	1150.94	1.89	10		0.19	
	6.8	66	1159.42	1161.5	2.08	8	95%	0.26	0.22
TS-35	7.1	54	1171.13	1173.48	2.35	9		0.26	
20080831	7.2	43	1170.93	1172.23	1.30	6		0.22	
	7.3	7	1158.94	1161.07	2.13	8		0.27	
	7.4	10	1165.50	1167.9	2.40	10		0.24	
	7.5	27	1171.35	1173.14	1.79	8		0.22	
	7.6	51	1153.81	1155.88	2.07	10		0.21	
	7.7	26	1159.15	1161.35	2.20	9		0.24	
	7.8	13	1169.39	1171.65	2.26	10	88%	0.23	0.24
TS-31	8.1	68	1154.90	1157.54	2.64	10		0.26	
20080832	8.2	49	1166.00	1168.36	2.36	10		0.24	
	8.3	47	1161.86	1163.84	1.98	10		0.20	
	8.4	55	1170.21	1172.44	2.23	10		0.22	
	8.5	11	1161.50	1163.94	2.44	8		0.31	
	8.6	19	1156.79	1158.33	1.54	8		0.19	
	8.7	45	1160.09	1162.22	2.13	8		0.27	
	8.8	39	1158.42	1160.76	2.34	9	91%	0.26	0.24
TS-45	9.1	70	1166.50	1168.57	2.07	9		0.23	
20080833	9.2	18	1167.04	1169.57	2.53	10		0.25	
	9.3	40	1162.07	1163.54	1.47	8		0.18	
	9.4	37	1160.22	1162.83	2.61	10		0.26	
	9.5	8	1161.10	1163.44	2.34	10		0.23	
	9.6	14	1162.56	1164.6	2.04	10		0.20	
	9.7	44	1175.01	1177.1	2.09	10		0.21	
	9.8	57	1170.06	1172.29	2.23	10	96%	0.22	0.22
TS-46	10.1	77	1163.76	1165.76	2.00	8		0.25	
20080834	10.2	15	1166.26	1168.9	2.64	9		0.29	
	10.3	50	1159.10	1161.31	2.21	9		0.25	
	10.4	79	1163.92	1165.68	1.76	10		0.18	
	10.5	23	1152.14	1154.84	2.70	9		0.30	
	10.6	80	1163.92	1165.92	2.00	9		0.22	
	10.7	29	1154.21	1156.25	2.04	8		0.25	
	10.8	35	1162.93	1165.3	2.37	10	90%	0.24	0.25

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Table 3 **Water Quality Readings: Temperature (°C)** **Species:** *H. azteca*

28 Day Sediment Exposure Study **Job #:** 28-227

Sample	ASI ID #	Day 0	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Control	20080847	23.4	23.7	22.5	22.7	23.0	23.0	23.0	22.9	22.8	23.5	22.5	22.4	22.8	22.3	22.5
TS-48	20080826	23.5	24.0	22.6	22.8	23.0	23.0	23.1	23.0	22.8	23.6	22.8	22.6	22.8	22.6	22.8
TS-32	20080827	23.4	23.9	22.6	22.9	23.0	23.1	23.2	23.0	23.0	23.7	22.9	22.8	22.9	22.8	22.9
TS-33	20080828	23.2	23.9	22.6	22.9	23.0	23.1	23.2	23.0	22.9	23.8	22.8	22.8	22.9	22.8	23.0
TS-34	20080829	23.3	23.9	22.6	22.9	23.0	23.0	23.2	23.0	22.9	23.8	22.8	22.8	22.7	22.8	23.0
TS-37	20080830	23.2	23.8	22.5	22.8	23.0	23.0	23.1	23.0	22.8	23.8	22.8	22.8	22.7	22.8	22.8
TS-35	20080831	22.9	23.8	22.4	22.8	23.0	23.0	23.1	23.0	22.7	23.7	22.8	22.6	22.6	22.7	22.6
TS-31	20080832	22.9	23.6	22.6	22.9	23.1	23.1	23.2	23.1	23.0	23.7	22.9	22.7	22.9	22.7	22.6
TS-45	20080833	23.1	23.7	22.6	22.9	23.1	23.1	23.2	23.1	23.0	23.7	22.9	22.7	22.9	22.8	22.8
TS-46	20080834	23.0	23.9	22.6	22.8	23.0	23.0	23.1	23.1	22.9	23.8	22.8	22.7	22.9	22.7	22.9

Sample	ASI ID #	15	16	17	18	19	20	21	22	23	24	25	26	27	28
Control	20080847	22.9	22.3	22.4	22.4	22.5	22.8	23.0	23.0	22.1	22.6	22.8	23.1	22.4	22.0
TS-48	20080826	23.0	22.5	22.4	22.5	22.6	22.8	23.1	23.0	22.4	22.8	22.9	23.1	22.8	22.4
TS-32	20080827	23.1	22.7	22.5	22.6	22.7	23.0	23.2	23.1	22.5	22.9	23.0	23.1	23.0	22.4
TS-33	20080828	23.0	22.8	22.5	22.7	22.7	23.0	23.1	23.1	22.5	22.9	23.0	23.1	23.0	22.4
TS-34	20080829	23.0	22.8	22.5	22.7	22.6	22.9	23.1	23.1	22.5	22.9	23.0	23.0	23.0	22.4
TS-37	20080830	22.9	22.8	22.5	22.3	22.5	22.8	23.1	23.0	22.5	22.8	22.8	23.0	22.8	22.4
TS-35	20080831	22.9	22.7	22.3	22.4	22.5	22.8	23.0	22.9	22.6	22.8	22.8	22.9	22.7	22.5
TS-31	20080832	23.0	22.6	22.5	22.5	22.6	22.9	23.1	22.9	22.6	22.8	22.9	22.9	22.9	22.5
TS-45	20080833	23.0	22.6	22.6	22.5	22.6	22.9	23.1	23.0	22.7	22.9	22.9	22.9	22.8	22.5
TS-46	20080834	22.9	22.8	22.4	22.5	22.6	22.8	23.1	22.9	22.7	22.7	22.8	22.9	22.8	22.4
												Range			**22.0** – **24.0**

Table 4 **Water Quality Readings: DO (mg/L)** **Species:** *H. azteca*

28 Day Sediment Exposure Study **Job #:** 28-227

Sample	ASI ID #	Day 0	1	2	3	4	5	6	7	8	9	10	11	12	13	14*
Control	20080847	6.93	5.99	5.14	4.64	4.42	4.18	4.54	4.50	4.75	5.57	5.55	5.73	5.05	5.68	5.48
TS-48	20080826	5.63	4.88	4.77	4.78	4.58	4.92	5.36	5.12	5.14	5.42	5.52	5.84	4.96	5.33	5.18
TS-32	20080827	2.61	2.73	4.21	3.41	3.31	3.44	3.73	3.56	4.40	4.63	5.40	3.71	4.34	3.66	3.46
TS-33	20080828	4.78	3.76	3.85	3.46	3.34	3.22	3.35	3.17	3.25	4.27	3.05	3.23	2.72	2.75	2.54
TS-34	20080829	5.51	3.68	3.79	3.92	3.77	3.93	3.95	3.85	4.04	4.73	4.62	4.03	4.06	3.97	3.74
TS-37	20080830	6.11	4.90	4.71	4.69	4.44	4.38	4.44	4.45	4.65	5.52	5.29	4.65	4.71	3.97	4.73
TS-35	20080831	4.95	4.07	3.74	3.46	3.04	3.52	3.91	3.80	4.54	5.37	3.77	4.32	4.07	4.50	4.49
TS-31	20080832	4.86	4.66	4.14	4.14	4.01	4.00	4.22	4.03	4.00	4.84	3.69	4.52	3.92	3.92	3.47
TS-45	20080833	6.08	4.98	5.04	4.95	5.33	5.04	5.25	5.24	5.30	5.56	5.07	5.46	5.05	5.61	4.74
TS-46	20080834	6.50	5.41	5.43	5.19	5.11	5.00	5.15	5.02	5.41	5.70	5.52	5.10	5.00	5.45	5.35

Sample	ASI ID #	15	16	17	18	19	20	21	22	23	24	25	26	27	28
Control	20080847	7.82	7.88	7.67	7.94	7.45	6.64	8.02	7.42	7.71	7.22	6.78	7.14	7.06	8.01
TS-48	20080826	7.92	7.67	7.84	7.96	7.52	6.73	8.01	7.28	7.76	7.24	6.88	7.06	6.96	7.91
TS-32	20080827	7.60	7.51	7.65	7.86	7.23	6.52	7.58	7.00	7.62	7.07	6.71	7.11	6.88	7.88
TS-33	20080828	6.49	7.40	7.44	7.67	7.04	6.37	7.38	6.80	7.55	6.91	6.56	6.94	6.77	7.78
TS-34	20080829	7.23	7.35	7.47	7.64	7.24	6.52	7.56	6.93	7.56	7.01	6.63	6.98	6.80	7.78
TS-37	20080830	7.64	7.40	7.59	7.90	7.36	6.65	7.69	7.03	7.61	7.11	6.70	7.08	6.88	7.80
TS-35	20080831	7.87	7.47	7.78	8.03	7.42	6.78	7.66	7.11	7.64	7.20	5.92	7.16	6.97	7.80
TS-31	20080832	7.64	7.50	7.79	7.96	7.35	6.57	7.54	7.06	7.58	7.18	6.57	7.16	6.87	7.73
TS-45	20080833	7.76	7.49	7.75	7.95	7.40	6.75	7.58	7.05	7.55	7.15	6.77	7.15	7.20	7.69
TS-46	20080834	7.85	7.49	7.80	7.98	7.41	6.77	7.52	7.02	7.61	7.17	6.82	7.15	7.06	7.73
												Range			**2.54** – **8.03**

* Aeration initiated.

Please note: a representative exposure chamber from the sediment sample was monitored daily for water quality throughout the test.

Table 5 **Water Quality Readings: pH (SU)** **Species:** ***H. azteca***

28 Day Sediment Exposure Study **Job #:** **28-227**

		Day														
Sample	ASI ID #	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Control	20080847	7.61		7.84	7.57		7.79		7.63		7.85			7.95		7.99
TS-48	20080826	7.90		7.99	7.85		7.92		7.85		8.09			8.08		8.07
TS-32	20080827	7.79		7.96	7.82		7.93		7.96		8.13			8.09		8.38
TS-33	20080828	7.93		7.93	7.83		7.86		7.78		7.99			7.83		7.99
TS-34	20080829	8.00		7.98	7.88		7.96		7.85		8.16			8.32		8.17
TS-37	20080830	8.01		8.01	7.93		7.98		7.87		8.10			8.17		8.20
TS-35	20080831	8.00		7.96	7.85		7.90		7.86		8.13			8.67		8.06
TS-31	20080832	7.98		8.00	7.93		8.13		8.24		8.55			8.20		8.57
TS-45	20080833	8.07		8.07	8.00		8.12		8.05		8.33			8.11		8.43
TS-46	20080834	8.11		8.12	8.03		8.06		7.94		8.23			8.07		8.21
Sample	ASI ID #	15	16	17	18	19	20	21	22	23	24	25	26	27	28	
Control	20080847		8.52			8.44		8.27		8.61			8.66		8.78	
TS-48	20080826		8.53			8.48		8.39		8.62			8.61		8.74	
TS-32	20080827		8.59			8.48		8.43		8.58			8.53		8.66	
TS-33	20080828		8.61			8.47		8.37		8.61			8.54		8.69	
TS-34	20080829		8.60			8.53		8.43		8.65			8.55		8.71	
TS-37	20080830		8.63			8.52		8.44		8.67			8.60		8.74	
TS-35	20080831		8.61			8.52		8.44		8.65			8.61		8.74	
TS-31	20080832		8.64			8.59		8.51		8.62			8.58		8.70	
TS-45	20080833		8.69			8.59		8.52		8.69			8.65		8.79	
TS-46	20080834		8.66			8.53		8.45		8.66			8.64		8.76	
												Range			7.57	8.79

Please note: a representative exposure chamber from the sediment sample was monitored daily for water quality throughout the test.

Table 6 **Water Quality Readings**
Alkalinity, Hardness, Conductivity and NH3
28 Day Sediment Exposure Study

Species: ***H. azteca***
Job #: 28-227

Sample ID	ASI ID #	Alkalinity Initial	Alkalinity Day 28	Hardness Initial	Hardness Day 28
Control	20080847	140	184	70	98
TS-48	20080826	200	196	116	104
TS-32	20080827	270	212	196	152
TS-33	20080828	160	212	132	120
TS-34	20080829	196	208	124	120
TS-37	20080830	184	200	118	112
TS-35	20080831	212	188	128	104
TS-31	20080832	208	222	136	156
TS-45	20080833	188	194	110	104
TS-46	20080834	188	190	112	108

Sample ID	ASI ID #	Conductivity Initial	Conductivity Day 28	NH_3 Initial *	NH_3 Day 28
Control	20080847	370	479		<0.50
TS-48	20080826	481	462		<0.50
TS-32	20080827	609	552		<0.50
TS-33	20080828	470	493		<0.50
TS-34	20080829	482	491		<0.50
TS-37	20080830	480	476		<0.50
TS-35	20080831	486	466		<0.50
TS-31	20080832	502	555		<0.50
TS-45	20080833	453	467		<0.50
TS-46	20080834	457	464		<0.50

* Readings inadvertently not taken.

Alkalinity = mg/L Ca CO3
Hardness = mg/L CaCO3
Conductivity = µmho/cm
NH3 = (mg/L) total ammonia

APPENDICES

Appendix A

Chain of Custody

28-198 (sampling)

CHAIN OF CUSTODY RECORD

28-227 (TESTING)

FACILITY/LOCATION: NATIONAL GRID Troy, NY	METHOD OF SHIPMENT: TO FROM ASI Truck
SAMPLING AND ANALYSES AUTHORIZED BY: Tetra Tech EC HJ	DATE: 7/11/08

SAMPLE #	SAMPLING LOCATION AND DESCRIPTION	DATE	TIME	SAMPLE TYPE C	G	SOLID	# OF CONT.	ANALYSES REQUIRED
TS-48	20080826	7/10/08			✓	✓	1	bioassay
TS-32	20080827	7/9/08			✓	✓	1	↓
TS-33	20080828	7/9/08			✓	✓	1	
TS-34	20080829	7/10/08			✓	✓	1	
TS-37	20080830	7/9/08			✓	✓	1	
TS-35	20080831	7/10/08			✓	✓	1	
TS-31	20080832	7/9/08			✓	✓	1	
TS-45	20080833	7/10/08			✓	✓	1	
TS-46	20080834	7/10/08			✓	✓	1	↓

SAMPLE COLLECTED BY: ASI	EXACT SAMPLING LOCATION: NATIONAL GRID TROY, NY		
SAMPLE RELINQUISHED BY: [signature]	SAMPLE RECEIVED BY: Tom Dolce	DATE 7/11/08	TIME 12:00
SAMPLE RELINQUISHED BY:	SAMPLE RECEIVED BY:	DATE	TIME
SAMPLE RELINQUISHED BY:	SAMPLE RECEIVED BY:	DATE	TIME
SAMPLE RELINQUISHED BY:	SAMPLE RECEIVED BY:	DATE	TIME

SAMPLE RELINQUISHED AFTER ANALYSES:	ANALYZED SAMPLE RECEIVED BY:	DATE	TIME
SAMPLE DESCRIPTION:	# OF CONTAINERS:		

asi

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(908) 788-8700

Appendix B

Sample Use Forms

AQUA SURVEY, INC.
SPECIAL STUDIES DEPARTMENT
SAMPLE USE FORM

Job #: 28-227 **Client:** Tetra Tech- Troy **ASI Sample #:** 20080826 **Sample ID:** TS- 48

SEDIMENT CHARACTERIZATION

Odor: ~~Marine~~ fishy decay Color: overlay water olivegrey

Consistency (sandy, silty, clayey): Sandy gravel w/cobble

HOMOGENIZATION/ COMPOSITING/ AMENDING

Method Used: drill Duration of Mixing: ~2min

If Composite, list all constituent ASI sample #'s:
(Also provide the amount of each sample used, of the number of cores)

Total Sample Volume: ~1.5 gal w/overlay Date/ Initials: 7/22/08 [initials]

NOTES:

RECORD OF SAMPLE USE

DATE	AMOUNT USED	AMOUNT REMAINING	USED FOR	INITIALS
7/22/08	~800mL		**28 day Ha Sed Tox Study**	[initials]

AQUA SURVEY, INC.
SPECIAL STUDIES DEPARTMENT
SAMPLE USE FORM

Job #: 28-227 **Client:** Tetra Tech- Troy **ASI Sample #:** 20080 827 **Sample ID:** TS- 32

SEDIMENT CHARACTERIZATION

Odor: Strong decay Color: Black overlax

Consistency (sandy, silty, clayey): mussel/stone/gravel

HOMOGENIZATION/ COMPOSITING/ AMENDING

Method Used: drill Duration of Mixing: ~1 min

If Composite, list all constituent ASI sample #'s:
(~~Also provide the amount of each sample used, of the number of cores~~)

Total Sample Volume: .75 gal Date/ Initials: 7/ /08

NOTES:

RECORD OF SAMPLE USE

DATE	AMOUNT USED	AMOUNT REMAINING	USED FOR	INITIALS
7/22 /08	~800mL		**28 day Ha Sed Tox Study**	[illegible]

AQUA SURVEY, INC.
SPECIAL STUDIES DEPARTMENT
SAMPLE USE FORM

Job #: 28-227 **Client:** Tetra Tech- Troy **ASI Sample #:** 20080828 **Sample ID:** TS-33

SEDIMENT CHARACTERIZATION

Odor: decay Color: olive brown overlay

Consistency (sandy, silty, clayey): decaying matter/mussels/silt/cobble

HOMOGENIZATION/ COMPOSITING/ AMENDING

Method Used: drill Duration of Mixing: ~1min

If Composite, list all constituent ASI sample #'s:
(Also provide the amount of each sample used, of the number of cores)

Total Sample Volume: ~1.5gal Date/ Initials: 7/22/08 [initials]

NOTES:

RECORD OF SAMPLE USE

DATE	AMOUNT USED	AMOUNT REMAINING	USED FOR	INITIALS
7/22/08	~800mL		**28 day Ha Sed Tox Study**	[initials]

AQUA SURVEY, INC.
SPECIAL STUDIES DEPARTMENT
SAMPLE USE FORM

Job #: 28-227 **Client:** Tetra Tech- Troy **ASI Sample #:** 20080829 **Sample ID:** TS- 34

SEDIMENT CHARACTERIZATION

Odor: decay Color: Darkgrey

Consistency (sandy, silty, clayey): gravel/sand/cobble / mussels

HOMOGENIZATION/ COMPOSITING/ AMENDING

Method Used: drill Duration of Mixing: ~2min

If Composite, list all constituent ASI sample #'s:
(Also provide the amount of each sample used, of the number of cores)

Total Sample Volume: ~1.7 gal Date/ Initials: 7/22/08 [initials]

NOTES:

RECORD OF SAMPLE USE

DATE	AMOUNT USED	AMOUNT REMAINING	USED FOR	INITIALS
7/22 /08	~800mL		**28 day Ha Sed Tox Study**	[initials]

AQUA SURVEY, INC.
SPECIAL STUDIES DEPARTMENT
SAMPLE USE FORM

Job #: 28-227 **Client:** Tetra Tech- Troy **ASI Sample #:** 20080830 **Sample ID:** TS- 37

SEDIMENT CHARACTERIZATION

Odor: Slight Color: Dark olive grey

Consistency (sandy, silty, clayey): Sandy gravel

HOMOGENIZATION/ COMPOSITING/ AMENDING

Method Used: drill Duration of Mixing: ~ 5 min

If Composite, list all constituent ASI sample #'s:
(Also provide the amount of each sample used, of the number of cores)

Total Sample Volume: ~1 gal Date/ Initials: 7/22/08 JMA

NOTES:

RECORD OF SAMPLE USE

DATE	AMOUNT USED	AMOUNT REMAINING	USED FOR	INITIALS
7/22/08	~800mL		**28 day Ha Sed Tox Study**	A

AQUA SURVEY, INC.
SPECIAL STUDIES DEPARTMENT
SAMPLE USE FORM

Job #: 28-227 **Client:** Tetra Tech- Troy **ASI Sample #:** 20080831 **Sample ID:** TS-35

SEDIMENT CHARACTERIZATION

Odor: slight decal Color: dark grey

Consistency (sandy, silty, clayey): sandy gravel / cobble / mussels

HOMOGENIZATION/ COMPOSITING/ AMENDING

Method Used: drill Duration of Mixing: ~3min

If Composite, list all constituent ASI sample #'s:
(Also provide the amount of each sample used, of the number of cores)

Total Sample Volume: ~ 2 gal Date/ Initials: 7/22/08 MA

NOTES:

RECORD OF SAMPLE USE

DATE	AMOUNT USED	AMOUNT REMAINING	USED FOR	INITIALS
7/22/08	~800mL		**28 day Ha Sed Tox Study**	M

AQUA SURVEY, INC.
SPECIAL STUDIES DEPARTMENT
SAMPLE USE FORM

Job #: 28-227 **Client:** Tetra Tech- Troy **ASI Sample #:** 20080832 **Sample ID:** TS- 31

SEDIMENT CHARACTERIZATION

Odor: decay Color: Dark grey black

Consistency (sandy, silty, clayey): sandy gravel / cobble / mussels

HOMOGENIZATION/ COMPOSITING/ AMENDING

Method Used: drill Duration of Mixing: ~1 min

If Composite, list all constituent ASI sample #'s:
(Also provide the amount of each sample used, of the number of cores)

Total Sample Volume: ~ 1.5 gal Date/ Initials: 7/22/08 [initials]

NOTES:

RECORD OF SAMPLE USE

DATE	AMOUNT USED	AMOUNT REMAINING	USED FOR	INITIALS
7/22 /08	~800 mL		28 day Ha Sed Tox Study	[initials]

AQUA SURVEY, INC.
SPECIAL STUDIES DEPARTMENT
SAMPLE USE FORM

Job #: 28-227 **Client:** Tetra Tech- Troy **ASI Sample #:** 20080 833 **Sample ID:** TS- 45

SEDIMENT CHARACTERIZATION

Odor: slight Color: brown

Consistency (sandy, silty, clayey): sandy gravel /cobble

HOMOGENIZATION/ COMPOSITING/ AMENDING

Method Used: drill Duration of Mixing: ~1 min

If Composite, list all constituent ASI sample #'s:
(Also provide the amount of each sample used, of the number of cores)

Total Sample Volume: 2 gal Date/ Initials: 7/27/08 [illegible]

NOTES:

RECORD OF SAMPLE USE

DATE	AMOUNT USED	AMOUNT REMAINING	USED FOR	INITIALS
7/22 /08	~800mL		**28 day Ha Sed Tox Study**	[illegible]

AQUA SURVEY, INC.
SPECIAL STUDIES DEPARTMENT
SAMPLE USE FORM

Job #: 28-227 **Client:** Tetra Tech- Troy **ASI Sample #:** 20080834 **Sample ID:** TS-46

SEDIMENT CHARACTERIZATION

Odor: None Color: brown

Consistency (sandy, silty, clayey): Sandy gravel

HOMOGENIZATION/ COMPOSITING/ AMENDING

Method Used: drill Duration of Mixing: ~1 min

If Composite, list all constituent ASI sample #'s:
(Also provide the amount of each sample used, of the number of cores)

Total Sample Volume: ~2 gal Date/ Initials: 7/22/08

NOTES:

RECORD OF SAMPLE USE

DATE	AMOUNT USED	AMOUNT REMAINING	USED FOR	INITIALS
7/22/08	~800mL		**28 day Ha Sed Tox Study**	

AQUA SURVEY, INC.
SPECIAL STUDIES DEPARTMENT
SAMPLE USE FORM

Job #: 28-227 **Client:** Tetra Tech- Troy **ASI Sample #:** 20080847 **Sample ID:** Ha Control (ASI Pond Mud)

SEDIMENT CHARACTERIZATION

Odor: Organic/Natural Color: Brown

Consistency (sandy, silty, clayey): Silty

HOMOGENIZATION/ COMPOSITING/ AMENDING

Method Used: hand Duration of Mixing: ~ 5 min

If Composite, list all constituent ASI sample #'s:
(Also provide the amount of each sample used, of the number of cores)

Total Sample Volume: 2gallons Date/ Initials: 7/22/08

NOTES: Sieved thru 0.5mm (2)L used for testing.

RECORD OF SAMPLE USE

DATE	AMOUNT USED	AMOUNT REMAINING	USED FOR	INITIALS
7/22/08	~800mL		**28 day Ha Sed Tox Study**	

Appendix C

Hyalella azteca
Biological Raw Data

28-227 TetraTech 28 Day Sed Tox Study H. azteca

Test Start Date: 7/23/08

Waterbath: #1

Chamber	Sample	code
6	Control	1.1
3	#20080847	1.2
75		1.3
61		1.4
60		1.5
56		1.6
63		1.7
69		1.8
33	TS-48	2.1
21	#20080826	2.2
12		2.3
17		2.4
42		2.5
76		2.6
5		2.7
30		2.8
52	TS-32	3.1
67	#20080827	3.2
4		3.3
73		3.4
20		3.5
2		3.6
31		3.7
58		3.8
34	TS-33	4.1
16	#20080828	4.2
41		4.3
53		4.4
74		4.5
22		4.6
62		4.7
48		4.8
38	TS-34	5.1
59	#20080829	5.2
36		5.3
28		5.4
71		5.5
72		5.6
65		5.7
64		5.8
1	TS-37	6.1
46	#20080830	6.2
25		6.3
9		6.4
24		6.5
78		6.6
32		6.7
66		6.8
54	TS-35	7.1
43	#20080831	7.2
7		7.3
10		7.4
27		7.5
51		7.6
26		7.7
13		7.8
68	TS-31	8.1
49	#20080832	8.2
47		8.3
55		8.4
11		8.5
19		8.6
45		8.7
39		8.8
70	TS-45	9.1
18	#20080833	9.2
40		9.3
37		9.4
8		9.5
14		9.6
44		9.7
57		9.8
77	TS-46	10.1
15	#20080834	10.2
50		10.3
79		10.4
23		10.5
80		10.6
29		10.7
35		10.8

Aqua Survey, Inc.
Special Studies Department

Weight Data Form (Day 28)

Job #: 28-227	**Client: Tetra Tech**		**Test Dates:**
Organism: ***H. azteca***			**Initial #/ Rep: 10**
Weigh Date: 8/23/08	**Oven:** #2	**Oven Temp (°C):** 60°C	**Drying Time (hr):** 24hrs

Chamber #	Wt. Of Oven Dried Pan (mg)	Wt. Of Pan + Oven Dried Organisms (mg)	Dried Wt. Of Organisms (mg)	Number of Surviving Organisms	Mean Wt. Per Surviving Organisms (mg)
1	1148.99	1151.28		10	
2	1158.38	1161.28		10	
3	1,16011	1161.84		9	
4	1,161.43	1164.78		10	
5	1164.99	1167.28		9	
6	1153.71	1155.44		10	
7	1158.94	1161.07		8	
8	1161.10	1163.44		10	
9	1164.86	1166.96		10	
10	1165.50	1167.90		10	
11	1161.50	1163.94		8	
12	1176.41	1179.19		10	
13	1169.39	1171.65		10	
14	1162.56	1164.60		10	
15	1166.26	1168.90		9	
16	1161.22	1164.12		10	
17	1165.02	1166.71		8	
18	1167.04	1169.57		10	
19	1156.79	1158.33		8	
20	1160.12	1162.78		8	
21	1167.37	1169.87		10	
22	1153.62	1156.33		10	
23	1152.14	1154.84		9	
24	1170.49	1172.67		10	
25	1165.80	1168.11		10	
26	1159.15	1161.35		9	
27	1171.35	1173.14		8	
28	1167.48	1169.48		9	
29	1154.21	1156.25		8	
30	1166.69	1168.83		10	
Initials/ Date	AH 8/21/8	AH 8/23/8		[illegible] 8/20/08	

Aqua Survey, Inc.
Special Studies Department

Weight Data Form (Day 28)

Job #: 28-227	Client: Tetra Tech		Test Dates:
Organism: *H. azteca*			Initial #/ Rep: 10
Weigh Date: 8/23/08	Oven: #2	Oven Temp (°C): 60°C	Drying Time (hr): 24hrs

Chamber #	Wt. Of Oven Dried Pan (mg)	Wt. Of Pan + Oven Dried Organisms (mg)	Dried Wt. Of Organisms (mg)	Number of Surviving Organisms	Mean Wt. Per Surviving Organisms (mg)
31	1162.90	1166.28		10	
32	1149.05	1150.94		10	
33	1169.27	1171.02		10	
34	1165.10	1167.58		9	
35	1162.93	1165.30		10	
36	1169.04	1171.15		10	
37	1160.22	1162.83		10	
38	1156.55	1158.55		8	
39	1158.42	1160.76		9	
40	1162.07	1163.54		8	
41	1170.37	1172.39		9	
42	1172.66	1174.49		9	
43	1170.93	1172.23		6	
44	1175.01	1177.10		10	
45	1160.09	1162.22		8	
46	1160.55	1162.36		9	
47	1161.86	1163.84		10	
48	1173.96	1176.44		9	
49	1166.00	1168.36		10	
50	1159.10	1161.31		~~10~~ 9	
51	1153.81	1155.88		10	
52	1164.03	1166.21		7	
53	1171.98	1174.43		9	
54	1171.13	1173.48		9	
55	1170.21	1172.44		10	
56	1162.12	1163.61		9	
57	1170.06	1172.29		10	
58	1164.32	1167.19		10	
59	1169.03	1171.78		9	
60	1165.11	1167.04		9	
Initials/ Date	AH 8/21/08	AH 8/23/08		8/20/08	

Aqua Survey, Inc.
Special Studies Department

Weight Data Form (Day 28)

Job #: 28-227	Client: Tetra Tech		Test Dates:
Organism: *H. azteca*			Initial #/ Rep: 10
Weigh Date: 8/23/08	Oven: #2	Oven Temp (°C): 60°C	Drying Time (hr): 24hrs

Chamber #	Wt. Of Oven Dried Pan (mg)	Wt. Of Pan + Oven Dried Organisms (mg)	Dried Wt. Of Organisms (mg)	Number of Surviving Organisms	Mean Wt. Per Surviving Organisms (mg)
61	1160.83	1162.74		10	
62	1148.71	1148.90		~~6~~ 1 8/20/08	
63	1170.11	1170.86		6	
64	1175.71	1177.42		10	
65	1176.44	1178.60		9	
66	1159.42	1161.50		8	
67	1175.03	1178.42		10	
68	1154.90	1157.54		10	
69	1148.56	1149.90		8	
70	1166.50	1168.57		9	
71	1166.20	1168.46		10	
72	1170.97	1173.29		10	
73	1168.40	1171.21		10	
74	1158.03	1160.19		10	
75	1171.60	1172.99		8	
76	1172.53	1174.86		10	
77	1163.76	1165.76		8	
78	1168.58	1170.31		9	
79	1163.92	1165.68		10	
80	1163.92	1165.92		9	
Initials/ Date	AH 8/21/8	AH 8/23/8		8/20/08	

Aqua Survey, Inc.
Special Studies Department
Feeding and Exchanges

Job #: 28-227
Client: Tetra Tech

Organism: *H. azteca*
Test Start Date: 7/23/08

Day	Date	Exchanges: Well Water (200mL) 1st (Time/ Initials)	Exchanges: Well Water (200mL) 2nd (Time/ Initials)	Feeding YCT (1mL/ Chamber) (Time/ Initials)	Notes
-1	7/22/08	–		–	
0	7/23/08	0920	1350	1630	Test Start Time: 1530
1	7/24/08	1120	1700	1705	
2	7/25/08	1015	1600	1630	
3	7/26/08	1000	1430	1500	
4	7/27/08	0940	1545	1615	
5	7/28/08	1045	1645	1715	
6	7/29/08	0940	1630	1620	
7	7/30/08	1015	1650	1655	
8	7/31/08	0930	1635	1650	
9	8/1/08	1200	1640	1700	
10	8/2/08	1130	1500	1505	
11	8/3/08	1000	1310	1325	
12	8/4/08	0925	1630	1650	
13	8/5/08	1005	1615	1620	
14	8/6/08	1030	1510	1550	
15	8/7/08	1000	1640	1710	
16	8/8/08	1135	1705	1725	
17	8/9/08	0925	1625	1640	
18	8/10/08	1030	1630	1645	
19	8/11/08	1000	1705	1710	
20	8/12/08	1135	1705	1715	
21	8/13/08	1010	1555	1600	
22	8/14/08	0940	1550	1615	
23	8/15/08	1000	1635	1640	
24	8/16/08	0735	1200	1220	
25	8/17/08	0745	1700	1705	
26	8/18/08	1300	1635 KS	1700	
27	8/19/08	0930	1605	1610	
28		TEST END			

Aqua Survey, Inc.
Special Studies Department
Observations

Job #: 28-227 **Organism:** *H. azteca*

Client: TetraTech **Initial # of Organisms:** 10 **Test Start Date:** 7/23/08

Obeservations Key: D= Dead S=Surface/ Swimming N= Nothing Unusual

Day → Chamber ↓	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
2	N														
3	N														
4	N														
5	N														
6	N														
7	N														
8	N														
9	N														
10	N														
11	N														
12	N														
13	N														
14	N														
15	N														
16	N														
17	N														
18	N														
19	N														
20	N														
21	N														
22	N														
23	N														
24	N														
25	N														
26	N														
27	N														
28	N														
29	N														
30	N														
31	N														
32	N														
33	N														
34	N														
35	N														
36	N														
37	N														
38	N														
39	N														
40	N														
Initials/ Date	[illegible] 7/23/08	[illegible] 7/24/08	[illegible] 7/25/08	[illegible] 7/26/08	[illegible] 7/27/08	[illegible] 7/28/08	[illegible] 7/29/08	[illegible] 7/30/08	[illegible] 7/31/08	[illegible] 8/1/08	[illegible] 8/2/08	[illegible] 8/3/08	[illegible] 8/4/08	[illegible] 8/5/08	[illegible] 8/6/08

Aqua Survey, Inc.
Special Studies Department
Observations

Job #: 28-227 **Organism:** *H. azteca*

Client: TetraTech **Initial # of Organisms:** 10 **Test Start Date:** 7/23/08

Obeservations Key: D= Dead S=Surface/ Swimming N= Nothing Unusual

Day → Chamber ↓	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14
41	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
42	N														
43	N														
44	N														
45	N														
46	N														
47	N														
48	N														
49	N														
50	N														
51	N														
52	N														
53	N														
54	N														
55	N														
56	N														
57	N														
58	N														
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62	N														
63	N														
64	N														
65	N														
66	N														
67	N														
68	N														
69	N														
70	N														
71	N														
72	N														
73	N														
74	N														
75	N														
76	N														
77	N														
78	N														
79	N														
80	N														
Initials/ Date	m 7/23/08	m 7/24/08	m 7/25/08	m 7/26/08	m 7/27/08	m 7/28/08	m 7/29/08	m 7/30/08	m 7/31/08	m 8/1/08	[illegible] 8/2/08	[illegible] 8/3/08	m 8/4/08	[illegible] 8/5/08	m 8/6/08

Aqua Survey, Inc.
Special Studies Department
Observations

Job #: 28-227 **Organism:** *H. azteca*

Client: TetraTech **Initial # of Organisms:** 10 **Test Start Date:** 7/23/08

Obeservations Key: D= Dead S=Surface/ Swimming N= Nothing Unusual

Day → Chamber ↓	15	16	17	18	19	20	21	22	23	24	25	26	27	28
41	N	N	N	N	N	N	N	N	N	N	N	N	N	N
42														
43														
44														
45														
46														
47														
48														
49														
50														
51														
52								1S						
53								N						
54														
55														
56														
57														
58														
59														
60														
61														
62														
63														
64														
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69														
70														
71														
72														
73														
74														
75														
76														
77														
78														
79														
80														
Initials/ Date	8/7/08	8/8/08	8/9/08	8/10/08	8/11/08	8/12/08	8/13/08	8/14/08	8/15/08	8/16/08	8/17/08	8/18	8/19/08	8/20/08

Aqua Survey, Inc.
Special Studies Department
Observations

Job #: 28-227 **Organism:** *H. azteca*

Client: TetraTech **Initial # of Organisms:** 10 **Test Start Date:** 7/23/08

Obeservations Key: D= Dead S=Surface/ Swimming N= Nothing Unusual

Day → Chamber ↓	15	16	17	18	19	20	21	22	23	24	25	26	27	28
1	N	N	N	N	N	N	N	N	N	N	N	N	N	N
2														
3														
4														
5														
6														
7														
8														
9														
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36														
37														
38														
39														
40														
Initials/ Date	m 8/7/08	m 8/8/08	[illegible] 8/9/08	[illegible] 8/9/08	m 8/11/08	m 8/12/08	m 8/13/08	m 8/14/08	m 8/15/08	m 8/16/08	m 8/17/08	[illegible] 8/18	m 8/19/08	m 8/20/08

Aqua Survey, Inc.
Special Studies Department
Water Quality

Job #: 28-227 **Organism:** *H. azteca*

Client: Tetra Tech **Test Start Date:** 7/23/08

		Day 0			Day 28			
Sample	**ASI #**	**Alkalinity mg/L**	**Hardness mg/L**	**Conductivity us/cm**	**Alkalinity mg/L**	**Hardness mg/L**	**Conductivity us/cm**	**NH_3 mg/L**
Control	20080847	140	70	370	184	98	479	<0.50
TS-48	20080826	200	116	481	196	104	462	<0.50
TS-32	20080827	270	196	609	212	152	552	<0.50
TS-33	20080828	160	132	470	212	120	493	<0.50
TS-34	20080829	196	124	482	208	120	491	<0.50
TS-37	20080830	184	118	480	200	112	476	<0.50
TS-35	20080831	212	128	486	188	104	466	<0.50
TS-31	20080832	208	136	502	222	156	555	<0.50
TS-45	20080833	188	110	453	194	104	467	<0.50
TS-46	20080834	188	112	457	190	108	464	<0.50
Initials/ Date	[illegible] 7/23/08	[illegible] 7/23/8 →	→	→	[illegible] 8/20/8 →	→	→	→

227HA0.DAT

	DateTime	Temp	SpCond	Salinity	DO Conc	pH
	M/D/Y	C	uS/cm	ppt	mg/L	
0 Control	07/23/08 09:22:49	23.44	370.0	0.18	6.93	7.61
1 TS-48	07/23/08 09:24:33	23.52	481.0	0.23	5.63	7.90
2 TS-32	07/23/08 09:26:36	23.38	609.0	0.29	2.61	7.79
3 TS-33	07/23/08 09:27:24	23.23	470.0	0.23	4.78	7.93
4 TS-34	07/23/08 09:28:12	23.26	482.0	0.23	5.51	8.00
5 TS-37	07/23/08 09:28:48	23.15	480.0	0.23	6.11	8.01
6 TS-35	07/23/08 09:29:55	22.92	486.0	0.23	4.95	8.00
7 TS-31	07/23/08 09:30:36	22.94	502.0	0.24	4.86	7.98
8 TS-45	07/23/08 09:31:20	23.08	453.0	0.22	6.08	8.07
9 TS-46	07/23/08 09:32:06	22.99	457.0	0.22	6.50	8.11

Project #: 08-227 Test type: ☐ Acute ☐ Chronic ☑ 28 Day Sed Tox ☐ OTHER: ________ Date: 7/23/08

Species: ☐ *A. bahia* ☐ *C. dubia* ☐ *C. tentans* ☑ *H. azteca* ☐ *M. beryllina* ☐ *P. promelas* ☐ OTHER: ________

Day of Study: 0

OPERATIONAL RANGE: Check if OK

Temperature: ☐ 18 – 22 °C ☐ 24 – 26 °C ☐ 25 – 27 °C ☑ 22 – 24 °C

Salinity: ☐ 23 – 27 ppt ☐ 28 – 32 ppt ☐ _____ – _____ ppt

Dissolved Oxygen: ☐ >4.0 mg/L ☑ > 2.5 mg/L

pH: ☐ 7.3 to 8.3 ☑ 6.0 to 9.0 ☐ _____ to _____

Meter Used:

Blue ☑

Red ☐

Green ☐

Actions taken:

See deviation summary sheet ☐

C-11 Initials: [initials]

227HA1.DAT

	DateTime	Temp	DO Conc
	M/D/Y	C	mg/L
0	07/24/08 10:57:12	23.65	5.99
1	07/24/08 11:00:48	23.99	4.88
2	07/24/08 11:04:00	23.91	2.73
3	07/24/08 11:05:20	23.90	3.76
4	07/24/08 11:06:18	23.87	3.68
5	07/24/08 11:07:31	23.76	4.90
6	07/24/08 11:13:08	23.81	4.07
7	07/24/08 11:14:59	23.55	4.66
8	07/24/08 11:16:03	23.70	4.98
9	07/24/08 11:17:00	23.93	5.41

Project #: 08-227 Test type: ☐ Acute ☐ Chronic ☑ 28 Day Sed Tox ☐ OTHER: ________ Date: 7/24/08

Species: ☐ *A. bahia* ☐ *C. dubia* ☐ *C. tentans* ☑ *H. azteca* ☐ *M. beryllina* ☐ *P. promelas* ☐ OTHER: ________

Day of Study: 1

OPERATIONAL RANGE: Check if OK

Meter Used:

Temperature:	☐ 18 –22 °C	☐ 24 –26 °C	☐ 25 –27 °C	☑ 22 – 24 °C	Blue ☑
Salinity:	☐ 23 –27 ppt	☐ 28 –32 ppt	☐ ____ – ____ ppt		Red ☐
Dissolved Oxygen:	☐ >4.0 mg/L	☑ >2.5 mg/L			Green ☐
pH:	☐ 7.3 to 8.3	☑ 6.0 to 9.0	☐ ____ to ____		

Actions taken:

~~Thu Jul 24 17:25:14 2008~~ ~~Page 1 of 1~~

See deviation summary sheet ☐

C-12

Initials: [illegible]

227HA2.DAT

	DateTime	Temp	DO Conc	pH
	M/D/Y	C	mg/L	
0	07/25/08 09:38:30	22.52	5.14	7.84
1	07/25/08 09:41:31	22.55	4.77	7.99
2	07/25/08 09:43:46	22.57	4.21	7.96
3	07/25/08 09:45:03	22.59	3.85	7.93
4	07/25/08 09:47:28	22.59	3.79	7.98
5	07/25/08 09:50:16	22.53	4.71	8.01
6	07/25/08 09:53:50	22.44	3.74	7.96
7	07/25/08 09:55:58	22.57	4.14	8.00
8	07/25/08 09:57:19	22.62	5.04	8.07
9	07/25/08 09:59:03	22.60	5.43	8.12

Project #: 28-227 Test type: ☐ Acute ☐ Chronic ☑ 28 Day Sed Tox ☐ OTHER: ______ Date: 7/25/08

Species: ☐ *A. bahia* ☐ *C. dubia* ☐ *C. tentans* ☑ *H. azteca* ☐ *M. beryllina* ☐ *P. promelas* ☐ OTHER: ______

Day of Study: 2

OPERATIONAL RANGE: Check if OK

Temperature: ☐ 18 – 22 °C ☐ 24 – 26 °C ☐ 25 – 27 °C ☑ 22 – 24 °C

Salinity: ☐ 23 – 27 ppt ☐ 28 – 32 ppt ☐ ____ – ____ ppt

Dissolved Oxygen: ☐ >4.0 mg/L ☑ > 2.5 mg/L

pH: ☐ 7.3 to 8.3 ☑ 6.0 to 9.0 ☐ ____ to ____

Meter Used:

Blue ☑

Red ☐

Green ☐

Actions taken:

Fri Jul 25 10:58:56 2008

See deviation summary sheet ☐

Initials: M

227HA3.DAT

	DateTime	Temp	DO Conc	pH
	M/D/Y	C	mg/L	
0	07/26/08 09:46:19	22.73	4.64	7.57
1	07/26/08 09:48:18	22.81	4.78	7.85
2	07/26/08 09:50:19	22.90	3.41	7.82
3	07/26/08 09:51:23	22.88	3.46	7.83
4	07/26/08 09:52:11	22.88	3.92	7.88
5	07/26/08 09:52:49	22.77	4.69	7.93
6	07/26/08 09:55:19	22.80	3.46	7.85
7	07/26/08 09:56:40	22.85	4.14	7.93
8	07/26/08 09:57:20	22.88	4.95	8.00
9	07/26/08 09:58:33	22.81	5.19	8.03

Project #: 08-227 Test type: ☐ Acute ☐ Chronic ☑ 28 Day Sed Tox ☐ OTHER: ______ Date: 7/26/08

Species: ☐ *A. bahia* ☐ *C. dubia* ☐ *C. tentans* ☑ *H. azteca* ☐ *M. beryllina* ☐ *P. promelas* ☐ OTHER: ______

Day of Study: 13

OPERATIONAL RANGE: Check if OK

Meter Used:

Temperature: ☐ 18 –22 °C ☐ 24 –26 °C ☐ 25 –27 °C ☑ 22 – 24 °C

Blue ☑

Salinity: ☐ 23 –27 ppt ☐ 28 –32 ppt ☐ ____ – ____ ppt

Red ☐

Dissolved Oxygen: ☐ >4.0 mg/L ☑ >2.5 mg/L

Green ☐

pH: ☐ 7.3 to 8.3 ☑ 6.0 to 9.0 ☐ ____ to ____

Actions taken:

~~Sat Jul 26 14:48:53 2008~~ ~~Page 1 of 1~~

See deviation summary sheet ☐

Initials: m

227HA4.DAT

	DateTime	Temp	DO Conc
	M/D/Y	C	mg/L
0	07/27/08 09:18:04	22.99	4.42
1	07/27/08 09:19:44	22.99	4.58
2	07/27/08 09:22:05	23.04	3.31
3	07/27/08 09:23:08	23.03	3.34
4	07/27/08 09:24:15	23.02	3.77
5	07/27/08 09:25:22	23.04	4.44
6	07/27/08 09:28:29	23.01	3.04
7	07/27/08 09:29:40	23.06	4.01
8	07/27/08 09:31:23	23.07	5.33
9	07/27/08 09:32:29	23.02	5.11

Project #: 08-227 Test type: ☐ Acute ☐ Chronic ☑ 28 Day Sed Tox ☐ OTHER: ________ Date: 7/27/08

Species: ☐ *A. bahia* ☐ *C. dubia* ☐ *C. tentans* ☑ *H. azteca* ☐ *M. beryllina* ☐ *P. promelas* ☐ OTHER: ________

Day of Study: 4

OPERATIONAL RANGE: Check if OK

Meter Used:

Temperature: ☐ 18 – 22 °C ☐ 24 – 26 °C ☐ 25 – 27 °C ☑ 22 – 24 °C

Blue ☑

Salinity: ☐ 23 – 27 ppt ☐ 28 – 32 ppt ☐ _____ – _____ ppt

Red ☐

Dissolved Oxygen: ☐ >4.0 mg/L ☑ >2.5 mg/L

Green ☐

pH: ☐ 7.3 to 8.3 ☑ 6.0 to 9.0 ☐ _____ to _____

Actions taken:

See deviation summary sheet ☐

Initials: M

227HA5.DAT

	DateTime	Temp	DO Conc	pH
	M/D/Y	C	mg/L	
0	07/28/08 10:22:30	22.95	4.18	7.79
1	07/28/08 10:24:04	23.00	4.92	7.92
2	07/28/08 10:26:25	23.07	3.44	7.93
3	07/28/08 10:27:47	23.05	3.22	7.86
4	07/28/08 10:28:59	23.04	3.93	7.96
5	07/28/08 10:30:15	22.99	4.38	7.98
6	07/28/08 10:32:27	23.03	3.52	7.90
7	07/28/08 10:33:31	23.09	4.00	8.13
8	07/28/08 10:34:36	23.13	5.04	8.12
9	07/28/08 10:36:14	23.02	5.00	8.06

Project #: 08-227 Test type: ☐ Acute ☐ Chronic ☑ 28 Day Sed Tox ☐ OTHER: ________ Date: 7/28/08

Species: ☐ *A. bahia* ☐ *C. dubia* ☐ *C. tentans* ☑ *H. azteca* ☐ *M. beryllina* ☐ *P. promelas* ☐ OTHER: ________

Day of Study: 5

OPERATIONAL RANGE: Check if OK

Meter Used:

Temperature: ☐ 18 – 22 °C ☐ 24 – 26 °C ☐ 25 – 27 °C ☑ 22 – 24 °C

Blue ☑

Salinity: ☐ 23 – 27 ppt ☐ 28 – 32 ppt ☐ ____ – ____ ppt

Red ☐

Dissolved Oxygen: ☐ >4.0 mg/L ☑ >2.5 mg/L

Green ☐

pH: ☐ 7.3 to 8.3 ☑ 6.0 to 9.0 ☐ ____ to ____

Actions taken:

~~Mon Jul 28 14:20:27 2008~~

See deviation summary sheet ☐

Initials: [illegible]

227HA6.DAT

	DateTime	Temp	DO Conc
	M/D/Y	C	mg/L
0	07/29/08 09:20:06	22.98	4.54
1	07/29/08 09:21:23	23.10	5.36
2	07/29/08 09:23:09	23.16	3.73
3	07/29/08 09:24:30	23.21	3.35
4	07/29/08 09:25:36	23.16	3.95
5	07/29/08 09:26:34	23.05	4.44
6	07/29/08 09:29:46	23.08	3.91
7	07/29/08 09:30:45	23.18	4.22
8	07/29/08 09:31:45	23.17	5.25
9	07/29/08 09:33:22	23.11	5.15

Project #: 08-227 Test type: ☐ Acute ☐ Chronic ☑ 28 Day Sed Tox ☐ OTHER: ______ Date: 7/29/08

Species: ☐ *A. bahia* ☐ *C. dubia* ☐ *C. tentans* ☑ *H. azteca* ☐ *M. beryllina* ☐ *P. promelas* ☐ OTHER: ______

Day of Study: 6

OPERATIONAL RANGE: Check if OK

Meter Used:

Temperature: ☐ 18 – 22 °C ☐ 24 – 26 °C ☐ 25 – 27 °C ☑ 22 – 24 °C

Blue ☑

Salinity: ☐ 23 – 27 ppt ☐ 28 – 32 ppt ☐ ____ – ____ ppt

Red ☐

Dissolved Oxygen: ☐ >4.0 mg/L ☑ > 2.5 mg/L

Green ☐

pH: ☐ 7.3 to 8.3 ☑ 6.0 to 9.0 ☐ ____ to ____

Actions taken:

Tue Jul 29 10:11:14 2008

See deviation summary sheet ☐

Initials: [initials]

227HA7.DAT

	DateTime	Temp	DO Conc	pH
	M/D/Y	C	mg/L	
0	07/30/08 09:41:37	22.88	4.50	7.63
1	07/30/08 09:43:18	22.98	5.12	7.85
2	07/30/08 09:45:09	23.00	3.56	7.96
3	07/30/08 09:46:20	23.01	3.17	7.78
4	07/30/08 09:47:33	22.99	3.85	7.85
5	07/30/08 09:48:33	23.02	4.45	7.87
6	07/30/08 09:51:13	23.02	3.80	7.86
7	07/30/08 09:52:37	23.06	4.03	8.24
8	07/30/08 09:54:00	23.10	5.24	8.05
9	07/30/08 09:55:40	23.05	5.02	7.94

Project #: 08-227 Test type: ☐ Acute ☐ Chronic ☑ 28 Day Sed Tox ☐ OTHER: ____________ Date: 7/30/08

Species: ☐ *A. bahia* ☐ *C. dubia* ☐ *C. tentans* ☑ *H. azteca* ☐ *M. beryllina* ☐ *P. promelas* ☐ OTHER: ____________

Day of Study: 7

OPERATIONAL RANGE: Check if OK

Meter Used:

Temperature: ☐ 18 – 22 °C ☐ 24 – 26 °C ☐ 25 – 27 °C ☑ 22 – 24 °C

Blue ☐

Salinity: ☐ 23 – 27 ppt ☐ 28 – 32 ppt ☐ _____ – _____ ppt

Red ☐

Dissolved Oxygen: ☐ >4.0 mg/L ☑ >2.5 mg/L

Green ☑

pH: ☐ 7.3 to 8.3 ☑ 6.0 to 9.0 ☐ _____ to _____

Actions taken:

See deviation summary sheet ☐

 Initials: [illegible]

227HA8.DAT

	DateTime	Temp	DO Conc
	M/D/Y	C	mg/L
0	07/31/08 09:09:48	22.76	4.75
1	07/31/08 09:11:32	22.81	5.14
2	07/31/08 09:12:28	22.96	4.40
3	07/31/08 09:14:12	22.90	3.25
4	07/31/08 09:15:18	22.91	4.04
5	07/31/08 09:16:24	22.80	4.65
6	07/31/08 09:19:31	22.71	4.54
7	07/31/08 09:20:58	22.97	4.00
8	07/31/08 09:21:56	23.01	5.30
9	07/31/08 09:23:01	22.93	5.41

Project #: 08-227 Test type: ☐ Acute ☐ Chronic ☑ 28 Day Sed Tox ☐ OTHER: ______ Date: 7/31/08

Species: ☐ *A. bahia* ☐ *C. dubia* ☐ *C. tentans* ☑ *H. azteca* ☐ *M. beryllina* ☐ *P. promelas* ☐ OTHER: ______

Day of Study: 8

OPERATIONAL RANGE: Check if OK

Temperature: ☐ 18 –22 °C ☐ 24 –26 °C ☐ 25 –27 °C ☑ 22 – 24 °C

Salinity: ☐ 23 –27 ppt ☐ 28 –32 ppt ☐ ____ – ____ ppt

Dissolved Oxygen: ☐ >4.0 mg/L ☑ > 2.5 mg/L

pH: ☐ 7.3 to 8.3 ☑ 6.0 to 9.0 ☐ ____ to ____

Meter Used:

Blue ☐

Red ☐

Green ☑

Actions taken:

~~Thu Aug 07 15:58:52 2008~~

~~Page 1 of 1~~

See deviation summary sheet ☐

Initials: M

227HA9.DAT

	DateTime	Temp	SpCond	Salinity	DO Conc	pH
	M/D/Y	C	uS/cm	ppt	mg/L	
0	08/01/08 11:21:08	23.46	437.0	0.21	5.57	7.85
1	08/01/08 11:41:27	23.62	466.0	0.22	5.42	8.09
2	08/01/08 11:42:52	23.67	489.0	0.24	4.63	8.13
3	08/01/08 11:43:37	23.75	472.0	0.23	4.27	7.99
4	08/01/08 11:44:25	23.77	483.0	0.23	4.73	8.16
5	08/01/08 11:46:25	23.79	465.0	0.22	5.52	8.10
6	08/01/08 11:47:41	23.72	473.0	0.23	5.37	8.13
7	08/01/08 11:48:31	23.74	523.0	0.25	4.84	8.55
8	08/01/08 11:49:19	23.74	466.0	0.22	5.56	8.33
9	08/01/08 11:49:51	23.80	464.0	0.22	5.70	8.23

Project #: 28-227 Test type: ☐ Acute ☐ Chronic ☑ 28 Day Sed Tox ☐ OTHER: ________ Date: 8/1/08

Species: ☐ *A. bahia* ☐ *C. dubia* ☐ *C. tentans* ☑ *H. azteca* ☐ *M. beryllina* ☐ *P. promelas* ☐ OTHER: ________

Day of Study: 9

OPERATIONAL RANGE: Check if OK

Meter Used:

Temperature: ☐ 18 –22 °C ☐ 24 –26 °C ☐ 25 –27 °C ☑ 22 – 24 °C

Blue ☑

Salinity: ☐ 23 –27 ppt ☐ 28 –32 ppt ☐ _____ – _____ ppt

Red ☐

Dissolved Oxygen: ☐ >4.0 mg/L ☑ >2.5 mg/L

Green ☑

pH: ☐ 7.3 to 8.3 ☑ 6.0 to 9.0 ☐ _____ to _____

Actions taken:

Fri ~~Aug 01 17:50:12 2008~~ ~~Page 1 of 1~~

See deviation summary sheet ☐

C-20 Initials: nf

227HA10.DAT

	DateTime	Temp	DO Conc
	M/D/Y	C	mg/L
0	08/02/08 11:13:58	22.48	5.55
1	08/02/08 11:14:51	22.75	5.52
2	08/02/08 11:15:21	22.85	5.40
3	08/02/08 11:17:02	22.83	3.05
4	08/02/08 11:18:42	22.76	4.62
5	08/02/08 11:19:41	22.77	5.29
6	08/02/08 11:21:30	22.79	3.77
7	08/02/08 11:23:29	22.85	3.69
8	08/02/08 11:24:05	22.89	5.07
9	08/02/08 11:24:50	22.80	5.52

Project #: 28-227 Test type: ☐ Acute ☐ Chronic ☑ 28 Day Sed Tox ☐ OTHER: ________ Date: 8/2/08

Species: ☐ *A. bahia* ☐ *C. dubia* ☐ *C. tentans* ☒ *H. azteca* ☐ *M. beryllina* ☐ *P. promelas* ☐ OTHER: ________

Day of Study: 10

OPERATIONAL RANGE: Check if OK

Meter Used:

Temperature: ☐ 18 –22 °C ☐ 24 –26 °C ☐ 25 –27 °C ☑ 22 – 24 °C

Blue ☐

Salinity: ~~☐ 23 –27 ppt ☐ 28 –32 ppt ☐ ____ – ____ ppt~~

Red ☐

Dissolved Oxygen: ☐ >4.0 mg/L ☒ > 2.5 mg/L

Green ☑

pH: ~~☐ 7.3 to 8.3 ☐ 6.0 to 9.0 ☐ ____ to ____~~

Actions taken:

~~Sat Aug 02 11:42:25 2008~~ ~~Page 1 of 1~~

See deviation summary sheet ☐

~~C-21~~ Initials: MR

227HA11.DAT

	DateTime	Temp	DO Conc
	M/D/Y	C	mg/L
0	08/03/08 09:38:58	22.41	5.73
1	08/03/08 09:39:54	22.64	5.84
2	08/03/08 09:42:26	22.77	3.71
3	08/03/08 09:43:44	22.84	3.23
4	08/03/08 09:44:26	22.84	4.03
5	08/03/08 09:45:03	22.76	4.65
6	08/03/08 09:46:54	22.61	4.32
7	08/03/08 09:48:18	22.67	4.52
8	08/03/08 09:49:28	22.68	5.46
9	08/03/08 09:50:47	22.71	5.10

Project #: 28-227 Test type: ☐ Bioaccumulation ☒ Solid Phase 28 day ☐ SPP ☐ OTHER: ______ Date: 8/3/08

Species: ☐ *A. abdita* ☐ *M. bahia* ☐ *M. beryllina* ☐ *M. nasuta* ☐ *N. virens* ☒ OTHER: H-Azteca Day of Study: 11

OPERATIONAL RANGE: Check if OK

Meter Used:

Temperature: ☐ 12 – 14 °C ☐ 18 – 22 °C ☒ 22 – 24 °C

Blue ☐

Salinity: ☐ 26 – 30 ppt ☐ 28 – 32 ppt ☐ ____ – ____ ppt

Red ☐

Dissolved Oxygen: ☐ >4.0 mg/L ☒ > 2.5 mg/L

Green ☒

pH: ☐ 7.3 to 8.3 ☒ 6.0 to 9.0 ☐ ____ to ____

Actions taken:

See deviation summary sheet ☐

Initials: AP

227HA12.DAT

	DateTime	Temp	DO Conc	pH
	M/D/Y	C	mg/L	
0	08/04/08 08:54:32	22.80	5.05	7.95
1	08/04/08 08:57:02	22.81	4.96	8.08
2	08/04/08 08:58:42	22.93	4.34	8.09
3	08/04/08 09:01:08	22.89	2.72	7.83
4	08/04/08 09:03:54	22.70	4.06	8.32
5	08/04/08 09:04:48	22.69	4.71	8.17
6	08/04/08 09:06:45	22.56	4.07	8.67
7	08/04/08 09:08:36	22.86	3.92	8.20
8	08/04/08 09:11:19	22.86	5.05	8.11
9	08/04/08 09:12:44	22.88	5.00	8.07

Project #: 28-104 Test type: ☐ Acute ☐ Chronic ☑ 28 Day Sed Tox ☐ OTHER: ________ Date: 8/4/08

Species: ☐ *A. bahia* ☐ *C. dubia* ☐ *C. tentans* ☑ *H. azteca* ☐ *M. beryllina* ☐ *P. promelas* ☐ OTHER: ________

Day of Study: 12

OPERATIONAL RANGE: Check if OK

Temperature: ☐ 18 –22 °C ☐ 24 –26 °C ☐ 25 –27 °C ☑ 22 – 24 °C

Salinity: ☐ 23 –27 ppt ☐ 28 –32 ppt ☐ _____ – _____ ppt

Dissolved Oxygen: ☐ >4.0 mg/L ☑ > 2.5 mg/L

pH: ☐ 7.3 to 8.3 ☑ 6.0 to 9.0 ☐ _____ to _____

Meter Used:

Blue ☐

Red ☐

Green ☑

Actions taken:

~~Mon Aug 04 14:55:26 2008~~ Page 1 of 1

See deviation summary sheet ☐

~~C-23~~ Initials: [illegible]

227HA13.DAT

	DateTime	Temp	DO Conc
	M/D/Y	C	mg/L
0	08/05/08 09:40:44	22.32	5.68
1	08/05/08 09:42:16	22.62	5.33
2	08/05/08 09:44:12	22.75	3.66
3	08/05/08 09:46:11	22.76	2.75
4	08/05/08 09:47:00	22.80	3.97
5	08/05/08 09:47:02	22.79	3.97
6	08/05/08 09:50:48	22.66	4.50
7	08/05/08 09:52:52	22.71	3.92
8	08/05/08 09:54:01	22.77	5.61
9	08/05/08 09:55:16	22.71	5.45

Project #: 28-227 Test type: ☐ Acute ☐ Chronic ☒ 28 Day Sed Tox ☐ OTHER: ________ Date: 8/5/08

Species: ☐ *A. bahia* ☐ *C. dubia* ☐ *C. tentans* ☒ *H. azteca* ☐ *M. beryllina* ☐ *P. promelas* ☐ OTHER: ________

Day of Study: 13

OPERATIONAL RANGE: Check if OK

Temperature: ☐ 18 –22 °C ☐ 24 –26 °C ☐ 25 –27 °C ☒ 22 – 24 °C

Salinity: ☐ 23 –27 ppt ☐ 28 –32 ppt ☐ _____ – _____ ppt

Dissolved Oxygen: ☐ >4.0 mg/L ☒ >2.5 mg/L

pH: ☐ 7.3 to 8.3 ☒ 6.0 to 9.0 ☐ _____ to _____

Meter Used:

Blue ☐

Red ☐

Green ☒

Actions taken:

~~Tue Aug 05 10:08:59 2008~~ ~~Page 1 of 1~~

See deviation summary sheet ☐

Initials: AM

227HA14.DAT

	DateTime	Temp	DO Conc	pH
	M/D/Y	C	mg/L	
0	08/06/08 09:41:59	22.48	5.48	7.99
1	08/06/08 09:43:04	22.80	5.18	8.07
2	08/06/08 09:45:24	22.94	3.46	8.38
3	08/06/08 09:47:29	23.01	①2.54	7.99
4	08/06/08 09:48:12	22.96	3.74	8.17
5	08/06/08 09:48:48	22.84	4.73	8.20
6	08/06/08 09:54:52	22.63	4.49	8.06
7	08/06/08 09:57:09	22.55	3.47	8.57
8	08/06/08 09:57:44	22.82	4.74	8.43
9	08/06/08 09:59:01	22.85	5.35	8.21

① Checked D.O in chambers from same treatment D.O's ranged from 2.37-3.23; test aeration initiated

Project #: 28-227 Test type: ☐ Acute ☐ Chronic ☒ 28 Day Sed Tox ☐ OTHER: ______ Date: 8/6/08

Species: ☐ *A. bahia* ☐ *C. dubia* ☐ *C. tentans* ☒ *H. azteca* ☐ *M. beryllina* ☐ *P. promelas* ☐ OTHER: ______

Day of Study: 14

OPERATIONAL RANGE: Check if OK

Meter Used:

Temperature: ☐ 18 –22 °C ☐ 24 –26 °C ☐ 25 –27 °C ☒ 22 – 24 °C

Blue ☐

Salinity: ☐ 23 –27 ppt ☐ 28 –32 ppt ☐ ____ – ____ ppt

Red ☐

Dissolved Oxygen: ☐ >4.0 mg/L ☐ > 2.5 mg/L

Green ☒

pH: ☐ 7.3 to 8.3 ☒ 6.0 to 9.0 ☐ ____ to ____

Actions taken:

~~Wed Aug 06 10:01:45 2008~~ Aeration started ~~Page 1 of 1~~

See deviation summary sheet ☐

C-25 Initials: AR

227HA15.DAT

	DateTime	Temp	DO Conc
	M/D/Y	C	mg/L
0	08/07/08 10:14:09	22.92	7.82
1	08/07/08 10:15:18	22.95	7.92
2	08/07/08 10:16:16	23.05	7.60
3	08/07/08 10:16:49	23.02	6.49
4	08/07/08 10:17:29	22.96	7.23
5	08/07/08 10:18:08	22.94	7.64
6	08/07/08 10:19:38	22.86	7.87
7	08/07/08 10:20:28	23.00	7.64
8	08/07/08 10:20:57	22.97	7.76
9	08/07/08 10:21:30	22.93	7.85

Project #: 08-227 Test type: ☐ Acute ☐ Chronic ☒ 28 Day Sed Tox ☐ OTHER: ________ Date: 8/7/08

Species: ☐ *A. bahia* ☐ *C. dubia* ☐ *C. tentans* ☒ *H. azteca* ☐ *M. beryllina* ☐ *P. promelas* ☐ OTHER: ________

Day of Study: 15

OPERATIONAL RANGE: Check if OK

Meter Used:

Temperature: ☐ 18 – 22 °C ☐ 24 – 26 °C ☐ 25 – 27 °C ☒ 22 – 24 °C

Blue ☐

Salinity: ☐ 23 – 27 ppt ☐ 28 – 32 ppt ☐ ____ – ____ ppt

Red ☐

Dissolved Oxygen: ☐ >4.0 mg/L ☒ > 2.5 mg/L

Green ☒

pH: ☐ 7.3 to 8.3 ☒ 6.0 to 9.0 ☐ ____ to ____

Actions taken:

~~Thu Aug 07 15:59:14 2008~~

~~Page 1 of 1~~

See deviation summary sheet ☐

Initials: AT

227HA16.DAT

	DateTime	Temp	SpCond	Salinity	DO Conc	pH
	M/D/Y	C	uS/cm	ppt	mg/L	
0	08/08/08 11:53:57	22.29	483.0	0.23	7.88	8.52
1	08/08/08 11:55:08	22.48	468.0	0.23	7.67	8.53
2	08/08/08 11:55:24	22.67	534.0	0.26	7.51	8.59
3	08/08/08 11:55:38	22.80	484.0	0.23	7.40	8.61
4	08/08/08 11:55:58	22.84	504.0	0.24	7.35	8.60
5	08/08/08 11:56:13	22.83	475.0	0.23	7.40	8.63
6	08/08/08 11:56:26	22.66	469.0	0.23	7.47	8.61
7	08/08/08 11:56:40	22.60	532.0	0.26	7.50	8.64
8	08/08/08 11:56:55	22.60	468.0	0.23	7.49	8.69
9	08/08/08 11:57:08	22.75	468.0	0.22	7.49	8.66

Project #: 28-227 Test type: ☐ Bioaccumulation ☒ Solid Phase 28 Day ☐ SPP ☐ OTHER: ______ Date: 8/8/08

Species: ☐ *A. abdita* ☐ *A. bahia* ☐ *M. beryllina* ☐ *M. nasuta* ☐ *N. virens* ☒ OTHER: HA. Day of Study: 16

OPERATIONAL RANGE: Check if OK

Meter Used:

Temperature: ☐ 12 – 14 °C ☐ 18 – 22 °C ☒ 22 – 24 °C

Blue ☐

Salinity: ☐ 26 – 30 ppt ☐ 28 – 32 ppt ☐ ____ – ____ ppt

Red ☐

Dissolved Oxygen: ☐ >4.0 mg/L ☒ > 7.5 mg/L

Green ☒

pH: ☐ 7.3 to 8.3 ☒ 6.0 to 9.0 ☐ ____ to ____

Actions taken:

See deviation summary sheet ☐

Initials: [initials]

227HA17.DAT

	DateTime	Temp	DO Conc
	M/D/Y	C	mg/L
0	08/09/08 08:00:27	22.36	7.67
1	08/09/08 08:01:34	22.37	7.84
2	08/09/08 08:02:26	22.50	7.65
3	08/09/08 08:03:08	22.52	7.44
4	08/09/08 08:03:31	22.49	7.47
5	08/09/08 08:03:49	22.45	7.59
6	08/09/08 08:05:19	22.34	7.78
7	08/09/08 08:05:55	22.45	7.79
8	08/09/08 08:06:30	22.63	7.75
9	08/09/08 08:07:14	22.37	7.80

Project #: 28-227 Test type: ☐ Bioaccumulation ☐ Solid Phase ☐ SPP ☑ OTHER: 28 day Study Date: 8/9/08

Species: ☐ *A. abdita* ☐ *A. bahia* ☐ *M. beryllina* ☐ *M. nasuta* ☐ *N. virens* ☑ OTHER: A. azteca Day of Study: 17

OPERATIONAL RANGE: Check if OK

Meter Used:

Temperature: ☐ 12 – 14 °C ☐ 18 – 22 °C ☑ 22 – 24 °C

Blue ☐

Salinity: ☐ 26 – 30 ppt ☐ 28 – 32 ppt ☐ _____ – _____ ppt

Red ☐

Dissolved Oxygen: ☑ >4.0 mg/L ☐ > _____ mg/L

Green ☑

pH: ☐ 7.3 to 8.3 ☐ 6.0 to 9.0 ☐ _____ to _____

Actions taken:

See deviation summary sheet ☐

Initials: [illegible]

227HA18.DAT

	DateTime	Temp	DO Conc
	M/D/Y	C	mg/L
0	08/10/08 09:06:43	22.35	7.94
1	08/10/08 09:08:06	22.47	7.96
2	08/10/08 09:08:41	22.60	7.86
3	08/10/08 09:09:12	22.65	7.67
4	08/10/08 09:09:28	22.65	7.64
5	08/10/08 09:10:10	22.34	7.90
6	08/10/08 09:11:20	22.36	8.03
7	08/10/08 09:12:01	22.48	7.96
8	08/10/08 09:12:26	22.53	7.95
9	08/10/08 09:13:06	22.49	7.98

Project #: 08-227 Test type: ☐ Acute ☐ Chronic ☑ 28 Day Sed Tox ☐ OTHER: ________ Date: 8/10/08

Species: ☐ *A. bahia* ☐ *C. dubia* ☐ *C. tentans* ☑ *H. azteca* ☐ *M. beryllina* ☐ *P. promelas* ☐ OTHER: ________

Day of Study: 18

OPERATIONAL RANGE: Check if OK

Temperature: ☐ 18 –22 °C ☐ 24 –26 °C ☐ 25 –27 °C ☑ 22 – 24 °C

Salinity: ☐ 23 –27 ppt ☐ 28 –32 ppt ☐ _____ – _____ ppt

Dissolved Oxygen: ☑ >4.0 mg/L ☐ > _____ mg/L

pH: ☑ 7.3 to 8.3 ☐ 6.0 to 9.0 ☐ _____ to _____

Meter Used:

Blue ☐

Red ☐

Green ☑

Actions taken:

See deviation summary sheet ☐

Initials: JOB

227HA19.DAT

	DateTime	Temp	DO Conc	pH
	M/D/Y	C	mg/L	
0	08/11/08 09:49:29	22.45	7.45	8.44
1	08/11/08 09:50:37	22.55	7.52	8.48
2	08/11/08 09:51:25	22.72	7.23	8.48
3	08/11/08 09:52:29	22.66	7.04	8.47
4	08/11/08 09:53:15	22.62	7.24	8.53
5	08/11/08 09:54:06	22.53	7.36	8.52
6	08/11/08 09:56:06	22.54	7.42	8.52
7	08/11/08 09:57:08	22.55	7.35	8.59
8	08/11/08 09:57:51	22.63	7.40	8.59
9	08/11/08 09:58:39	22.58	7.41	8.53

Project #: 28-227 Test type: ☐ Acute ☐ Chronic ☑ 28 Day Sed Tox ☐ OTHER: ______ Date: 8/11/08

Species: ☐ *A. bahia* ☐ *C. dubia* ☐ *C. tentans* ☑ *H. azteca* ☐ *M. beryllina* ☐ *P. promelas* ☐ OTHER: ______

Day of Study: 19

OPERATIONAL RANGE: Check if OK

Temperature: ☐ 18 – 22 °C ☐ 24 – 26 °C ☐ 25 – 27 °C ☑ 22 – 24 °C

Salinity: ☐ 23 – 27 ppt ☐ 28 – 32 ppt ☐ ___ – ___ ppt

Dissolved Oxygen: ☐ >4.0 mg/L ☑ > 2.5 mg/L

pH: ☐ 7.3 to 8.3 ☑ 6.0 to 9.0 ☐ ___ to ___

Meter Used:

Blue ☐

Red ☐

Green ☑

Actions taken:

Thu Aug 14 16:29:50 2008

See deviation summary sheet ☐

C-30 Initials: M

227HA20.DAT

	DateTime	Temp	DO Conc
	M/D/Y	C	mg/L
0	08/12/08 11:09:02	22.79	6.64
1	08/12/08 11:10:37	22.76	6.73
2	08/12/08 11:11:29	22.99	6.52
3	08/12/08 11:12:07	22.97	6.37
4	08/12/08 11:12:46	22.93	6.52
5	08/12/08 11:13:19	22.83	6.65
6	08/12/08 11:14:30	22.79	6.78
7	08/12/08 11:14:58	22.89	6.57
8	08/12/08 11:15:59	22.88	6.75
9	08/12/08 11:16:43	22.84	6.77

Project #: 08-227 Test type: ☐ Acute ☐ Chronic ☑ 28 Day Sed Tox ☐ OTHER: ________ Date: 8/12/08

Species: ☐ *A. bahia* ☐ *C. dubia* ☐ *C. tentans* ☑ *H. azteca* ☐ *M. beryllina* ☐ *P. promelas* ☐ OTHER: ________

Day of Study: 20

OPERATIONAL RANGE: Check if OK

Meter Used:

Temperature: ☐ 18 – 22 °C ☐ 24 – 26 °C ☐ 25 – 27 °C ☑ 22 – 24 °C

Blue ☐

Salinity: ☐ 23 – 27 ppt ☐ 28 – 32 ppt ☐ ____ – ____ ppt

Red ☐

Dissolved Oxygen: ☐ >4.0 mg/L ☑ > 2.5 mg/L

Green ☑

pH: ☐ 7.3 to 8.3 ☑ 6.0 to 9.0 ☐ ____ to ____

Actions taken:

See deviation summary sheet ☐

Initials: [illegible]

227HA21.DAT

	DateTime	Temp	DO Conc	pH
	M/D/Y	C	mg/L	
0	08/13/08 09:45:06	22.97	8.02	8.27
1	08/13/08 09:46:18	23.06	8.01	8.39
2	08/13/08 09:47:21	23.19	7.58	8.43
3	08/13/08 09:48:01	23.14	7.38	8.37
4	08/13/08 09:48:31	23.13	7.56	8.43
5	08/13/08 09:49:08	23.06	7.69	8.44
6	08/13/08 09:50:54	23.04	7.66	8.44
7	08/13/08 09:51:55	23.05	7.54	8.51
8	08/13/08 09:52:30	23.12	7.58	8.52
9	08/13/08 09:53:15	23.06	7.52	8.45

Project #: 28-227 Test type: ☐ Acute ☐ Chronic ☑ 28 Day Sed Tox ☐ OTHER: ________ Date: 8/13/08

Species: ☐ *A. bahia* ☐ *C. dubia* ☐ *C. tentans* ☒ *H. azteca* ☐ *M. beryllina* ☐ *P. promelas* ☐ OTHER: ________

Day of Study: 21

OPERATIONAL RANGE: Check if OK

Meter Used:

Temperature: ☐ 18 –22 °C ☐ 24 –26 °C ☐ 25 –27 °C ☑ 22 – 24 °C

Blue ☐

Salinity: ☐ 23 –27 ppt ☐ 28 –32 ppt ☐ ____ – ____ ppt

Red ☐

Dissolved Oxygen: ☐ >4.0 mg/L ☑ > 2.5 mg/L

Green ☑

pH: ☐ 7.3 to 8.3 ☑ 6.0 to 9.0 ☐ ____ to ____

Actions taken:

~~Wed Aug 13 10:41:13 2008~~

See deviation summary sheet ☐

Initials: [illegible]

227HA22.DAT

	DateTime	Temp	DO Conc
	M/D/Y	C	mg/L
0	08/14/08 09:18:56	23.00	7.42
1	08/14/08 09:20:21	23.00	7.28
2	08/14/08 09:21:08	23.08	7.00
3	08/14/08 09:21:52	23.09	6.80
4	08/14/08 09:22:19	23.06	6.93
5	08/14/08 09:22:45	23.02	7.03
6	08/14/08 09:24:04	22.87	7.11
7	08/14/08 09:24:41	22.89	7.06
8	08/14/08 09:25:14	22.96	7.05
9	08/14/08 09:25:52	22.88	7.02

Project #: 28-227 Test type: ☐ Acute ☐ Chronic ☒ 28 Day Sed Tox ☐ OTHER: ________ Date: 8/14/08

Species: ☐ *A. bahia* ☐ *C. dubia* ☐ *C. tentans* ☒ *H. azteca* ☐ *M. beryllina* ☐ *P. promelas* ☐ OTHER: ________

Day of Study: 22

OPERATIONAL RANGE: Check if OK

Meter Used:

Temperature: ☐ 18 –22 °C ☐ 24 –26 °C ☐ 25 –27 °C ☒ 22 – 24 °C

Blue ☐

Salinity: ☐ 23 –27 ppt ☐ 28 –32 ppt ☐ ____ – ____ ppt

Red ☐

Dissolved Oxygen: ☐ >4.0 mg/L ☒ > 2.5 mg/L

Green ☒

pH: ☐ 7.3 to 8.3 ☒ 6.0 to 9.0 ☐ ____ to ____

Actions taken:

~~Thu Aug 14 09:40:12 2008~~

See deviation summary sheet ☐

Initials: [illegible]

227HA23.DAT

	DateTime	Temp	SpCond	Salinity	DO Conc	pH
	M/D/Y	C	uS/cm	ppt	mg/L	
0	08/15/08 09:15:05	22.13	514.2	0.25	7.71	8.61
1	08/15/08 09:16:04	22.37	472.7	0.23	7.76	8.62
2	08/15/08 09:16:36	22.45	588.7	0.29	7.62	8.58
3	08/15/08 09:16:57	22.51	517.6	0.25	7.55	8.61
4	08/15/08 09:17:18	22.53	500.6	0.24	7.56	8.65
5	08/15/08 09:17:40	22.52	478.7	0.23	7.61	8.67
6	08/15/08 09:17:56	22.57	475.0	0.23	7.64	8.65
7	08/15/08 09:18:16	22.63	570.8	0.28	7.58	8.62
8	08/15/08 09:18:41	22.66	472.1	0.23	7.55	8.69
9	08/15/08 09:19:23	22.66	467.9	0.22	7.61	8.66

Project #: 28-227 Test type: ☐ Acute ☐ Chronic ☑ 28 Day Sed Tox ☐ OTHER: ________ Date: 8/15/08

Species: ☐ *A. bahia* ☐ *C. dubia* ☐ *C. tentans* ☑ *H. azteca* ☐ *M. beryllina* ☐ *P. promelas* ☐ OTHER: ________

Day of Study: 23

OPERATIONAL RANGE: Check if OK

Meter Used:

Temperature: ☐ 18 – 22 °C ☐ 24 – 26 °C ☐ 25 – 27 °C ☑ 22 – 24 °C

Blue ☐

Salinity: ☐ 23 – 27 ppt ☐ 28 – 32 ppt ☐ ____ – ____ ppt

Red ☐

Dissolved Oxygen: ☐ >4.0 mg/L ☑ >2.5 mg/L

Green ☑

pH: ☐ 7.3 to 8.3 ☑ 6.0 to 9.0 ☐ ____ to ____

Actions taken:

See deviation summary sheet ☐

C-34 Initials: [illegible]

227HA24.DAT

	DateTime	Temp	DO Conc
	M/D/Y	C	mg/L
0	08/16/08 07:28:44	22.62	7.22
1	08/16/08 07:29:31	22.82	7.24
2	08/16/08 07:30:26	22.85	7.07
3	08/16/08 07:30:54	22.92	6.91
4	08/16/08 07:31:21	22.89	7.01
5	08/16/08 07:31:43	22.79	7.11
6	08/16/08 07:32:41	22.79	7.20
7	08/16/08 07:33:22	22.81	7.18
8	08/16/08 07:33:38	22.86	7.15
9	08/16/08 07:34:06	22.69	7.17

Project #: 08-227 Test type: ☐ Acute ☐ Chronic ☑ 28 Day Sed Tox ☐ OTHER: ________ Date: 8/16/08

Species: ☐ *A. bahia* ☐ *C. dubia* ☐ *C. tentans* ☑ *H. azteca* ☐ *M. beryllina* ☐ *P. promelas* ☐ OTHER: ________

Day of Study: 24

OPERATIONAL RANGE: Check if OK

Meter Used:

Temperature: ☐ 18 –22 °C ☐ 24 –26 °C ☐ 25 –27 °C ☑ 22 – 24 °C

Blue ☐

Salinity: ☐ 23 –27 ppt ☐ 28 –32 ppt ☐ _____ – _____ ppt

Red ☐

Dissolved Oxygen: ☐ >4.0 mg/L ☑ >2.5 mg/L

Green ☑

pH: ☐ 7.3 to 8.3 ☑ 6.0 to 9.0 ☐ _____ to _____

Actions taken:

See deviation summary sheet ☐

C-35 Initials: [illegible]

227HA25.DAT

	DateTime	Temp	DO Conc
	M/D/Y	C	mg/L
0	08/17/08 07:24:36	22.81	6.78
1	08/17/08 07:25:53	22.86	6.88
2	08/17/08 07:26:24	23.04	6.71
3	08/17/08 07:26:57	22.96	6.56
4	08/17/08 07:27:26	22.95	6.63
5	08/17/08 07:27:55	22.81	6.70
6	08/17/08 07:28:54	22.84	5.92
7	08/17/08 07:29:38	22.89	6.57
8	08/17/08 07:30:08	22.93	6.77
9	08/17/08 07:30:42	22.80	6.82

Project #: 08-227 Test type: ☐ Acute ☐ Chronic ☑ 28 Day Sed Tox ☐ OTHER: ________ Date: 8/17/08

Species: ☐ *A. bahia* ☐ *C. dubia* ☐ *C. tentans* ☑ *H. azteca* ☐ *M. beryllina* ☐ *P. promelas* ☐ OTHER: ________

Day of Study: 25

OPERATIONAL RANGE: Check if OK

Meter Used:

Temperature: ☐ 18 –22 °C ☐ 24 –26 °C ☐ 25 –27 °C ☑ 22 – 24 °C

Blue ☐

Salinity: ☐ 23 –27 ppt ☐ 28 –32 ppt ☐ _____ – _____ ppt

Red ☐

Dissolved Oxygen: ☐ >4.0 mg/L ☑ >2.5 mg/L

Green ☑

pH: ☐ 7.3 to 8.3 ☑ 6.0 to 9.0 ☐ _____ to _____

Actions taken:

See deviation summary sheet ☐

C-36 Initials: m

227HA26.DAT

	DateTime	Temp	DO Conc	pH
	M/D/Y	C	mg/L	
0	08/18/08 10:23:53	23.06	7.14	8.66
1	08/18/08 10:24:35	23.05	7.06	8.61
2	08/18/08 10:25:10	23.13	7.11	8.53
3	08/18/08 10:25:41	23.08	6.94	8.54
4	08/18/08 10:26:13	23.02	6.98	8.55
5	08/18/08 10:26:49	22.95	7.08	8.60
6	08/18/08 10:27:48	22.93	7.16	8.61
7	08/18/08 10:28:12	22.87	7.16	8.58
8	08/18/08 10:28:51	22.91	7.15	8.65
9	08/18/08 10:29:15	22.94	7.15	8.64

Project #: 28-227 Test type: ☐ Bioaccumulation ☐ Solid Phase ☐ SPP ☒ OTHER: 28 Day Date: 8/18/08

Species: ☐ *A. abdita* ☐ *A. bahia* ☐ *M. beryllina* ☐ *M. nasuta* ☐ *N. virens* ☒ OTHER: HA Day of Study: 26

OPERATIONAL RANGE: Check if OK

Meter Used:

Temperature: ☐ 12 – 14 °C ☐ 18 – 22 °C ☒ 22 – 24 °C

Blue ☐

Salinity: ☐ ~~26 – 30 ppt~~ ☐ ~~28 – 32 ppt~~ ☐ ~~____ – ____ ppt~~

Red ☐

Dissolved Oxygen: ☐ >4.0 mg/L ☒ > 2.5 mg/L

Green ☒

pH: ☐ 7.3 to 8.3 ☒ 6.0 to 9.0 ☐ ____ to ____

Actions taken:

See deviation summary sheet ☐

Initials: MM

227HA27.DAT

	DateTime	Temp	DO Conc
	M/D/Y	C	mg/L
0	08/19/08 09:03:03	22.41	7.06
1	08/19/08 09:04:02	22.81	6.96
2	08/19/08 09:04:31	23.00	6.88
3	08/19/08 09:05:01	22.99	6.77
4	08/19/08 09:05:31	22.97	6.80
5	08/19/08 09:06:00	22.81	6.88
6	08/19/08 09:06:58	22.66	6.97
7	08/19/08 09:07:36	22.88	6.87
8	08/19/08 09:09:04	22.77	7.20
9	08/19/08 09:09:36	22.76	7.06

Project #: 08-227 Test type: ☐ Acute ☐ Chronic ☑ 28 Day Sed Tox ☐ OTHER: ______ Date: 8/19/08

Species: ☐ *A. bahia* ☐ *C. dubia* ☐ *C. tentans* ☑ *H. azteca* ☐ *M. beryllina* ☐ *P. promelas* ☐ OTHER: ______

Day of Study: 27

OPERATIONAL RANGE: Check if OK

Temperature: ☐ 18 –22 °C ☐ 24 –26 °C ☐ 25 –27 °C ☑ 22 – 24 °C

Salinity: ☐ 23 –27 ppt ☐ 28 –32 ppt ☐ ____ – ____ ppt

Dissolved Oxygen: ☐ >4.0 mg/L ☑ > 2.5 mg/L

pH: ☐ 7.3 to 8.3 ☑ 6.0 to 9.0 ☐ ____ to ____

Meter Used:

Blue ☐

Red ☐

Green ☑

Actions taken:

See deviation summary sheet ☐

C-38 Initials:

227HA28.DAT

	DateTime	Temp	SpCond	DO Conc	pH
	M/D/Y	C	uS/cm	mg/L	
0	08/20/08 09:21:09	22.04	479.0	8.01	8.78
1	08/20/08 09:22:06	22.36	462.0	7.91	8.74
2	08/20/08 09:22:30	22.37	552.0	7.88	8.66
3	08/20/08 09:22:54	22.39	493.0	7.78	8.69
4	08/20/08 09:23:16	22.37	491.0	7.78	8.71
5	08/20/08 09:23:36	22.35	476.0	7.80	8.74
6	08/20/08 09:23:59	22.49	466.0	7.80	8.74
7	08/20/08 09:24:23	22.51	555.0	7.73	8.70
8	08/20/08 09:24:50	22.49	467.0	7.69	8.79
9	08/20/08 09:25:18	22.44	464.0	7.73	8.76

Project #: 08-227 Test type: ☐ Acute ☐ Chronic ☑ 28 Day Sed Tox ☐ OTHER: ________ Date: 8/20/08

Species: ☐ *A. bahia* ☐ *C. dubia* ☐ *C. tentans* ☑ *H. azteca* ☐ *M. beryllina* ☐ *P. promelas* ☐ OTHER: ________

Day of Study: 28

OPERATIONAL RANGE: Check if OK

Meter Used:

Temperature: ☐ 18 –22 °C ☐ 24 –26 °C ☐ 25 –27 °C ☑ 22 – 24 °C

Blue ☐

Salinity: ☐ 23 –27 ppt ☐ 28 –32 ppt ☐ ____ – ____ ppt

Red ☐

Dissolved Oxygen: ☐ >4.0 mg/L ☑ > 2.5 mg/L

Green ☑

pH: ☐ 7.3 to 8.3 ☑ 6.0 to 9.0 ☐____ to ____

Actions taken:

Wed Aug 20 09:23:06 2008

See deviation summary sheet ☐

C-39 Initials: JF

Aqua Survey, Inc.
CULTURE ORGANISM DISTRIBUTION FORM

DATE: 7/23/08

TEST JOB #: 28-227/ SRT CLIENT: TetraTech

TEST LOCATION: IN- LAB [X] FIELD [ ]

TEST SPECIES: *H. azteca*

TOTAL NUMBER OF ORGANISMS TRANSFERRED: 900+

AQUA SURVEY, INC. CULUTRE LAB INVESTIGATORS: MAT

A. ORGANISMS

1. ASI CULTURE/HOLDING UNIT: (3) 4L Contianers
2. RECEIVING LOG #: N/A
3. CULTURE LOG #: 28-0065
4. AGE/SIZE INFORMATION HD: 7/15-16/08; 7-8 Days Old

B. WATER PARAMETERS: HOLDING [X] CULTURE [ ]

1. TEMPERATURE: 23.0° C
2. SALINITY: N/A
3. WATER SOURCE: Filtered Well Water

C. TRANSFER CUSTODY & TRANSFER

1. LIVESTOCK RELINQUISHMENT: DATE: 7/23/08 TIME: 1300 BY: M
2. LIVESTOCK RECEIVING: DATE: 7/23/08 TIME: 1300 BY: M
3. CULTURE SUPERVISOR OR SENIOR TECH. INITIALS: M

REMARKS:

SRT_Ha_Bath_5.hobo

#	Time, GMT-04:00	Temp, °C	Coupler Detached	Coupler Attached	Host Connected	Stopped	End Of File
1	07/24/08 08:07:35 AM	20.865					
2	07/24/08 08:07:38 AM		Logged				
3	07/24/08 09:07:35 AM	23.761					
4	07/24/08 10:07:35 AM	23.905					
5	07/24/08 11:07:35 AM	23.954					
6	07/24/08 12:07:35 PM	24.219					
7	07/24/08 01:07:35 PM	24.436					
8	07/24/08 02:07:35 PM	24.484					
9	07/24/08 03:07:35 PM	24.339					
10	07/24/08 04:07:35 PM	24.195					
11	07/24/08 05:07:35 PM	24.074					
12	07/24/08 06:07:35 PM	24.026					
13	07/24/08 07:07:35 PM	24.243					
14	07/24/08 08:07:35 PM	24.363					
15	07/24/08 09:07:35 PM	24.388					
16	07/24/08 10:07:35 PM	24.315					
17	07/24/08 11:07:35 PM	24.050					
18	07/25/08 12:07:35 AM	23.833					
19	07/25/08 01:07:35 AM	23.641					
20	07/25/08 02:07:35 AM	23.497					
21	07/25/08 03:07:35 AM	23.400					
22	07/25/08 04:07:35 AM	23.328					
23	07/25/08 05:07:35 AM	23.280					
24	07/25/08 06:07:35 AM	23.232					
25	07/25/08 07:07:35 AM	23.328					
26	07/25/08 08:07:35 AM	23.400					
27	07/25/08 09:07:35 AM	23.497					

SRT_Ha_Bath_5.hobo

#	Time, GMT-04:00	Temp, °C	Coupler Detached	Coupler Attached	Host Connected	Stopped	End Of File
28	07/25/08 10:07:35 AM	23.617					
29	07/25/08 11:07:35 AM	23.689					
30	07/25/08 12:07:35 PM	23.930					
31	07/25/08 01:07:35 PM	24.195					
32	07/25/08 02:07:35 PM	24.243					
33	07/25/08 03:07:35 PM	24.291					
34	07/25/08 04:07:35 PM	24.267					
35	07/25/08 05:07:35 PM	24.412					
36	07/25/08 06:07:35 PM	24.436					
37	07/25/08 07:07:35 PM	24.388					
38	07/25/08 08:07:35 PM	24.339					
39	07/25/08 09:07:35 PM	24.267					
40	07/25/08 10:07:35 PM	24.122					
41	07/25/08 11:07:35 PM	23.930					
42	07/26/08 12:07:35 AM	23.785					
43	07/26/08 01:07:35 AM	23.689					
44	07/26/08 02:07:35 AM	23.593					
45	07/26/08 03:07:35 AM	23.545					
46	07/26/08 04:07:35 AM	23.497					
47	07/26/08 05:07:35 AM	23.424					
48	07/26/08 06:07:35 AM	23.400					
49	07/26/08 07:07:35 AM	23.497					
50	07/26/08 08:07:35 AM	23.545					
51	07/26/08 09:07:35 AM	23.641					
52	07/26/08 10:07:35 AM	23.689					
53	07/26/08 11:07:35 AM	23.545					
54	07/26/08 12:07:35 PM	23.545					

SRT_Ha_Bath_5.hobo

#	Time, GMT-04:00	Temp, °C	Coupler Detached	Coupler Attached	Host Connected	Stopped	End Of File
55	07/26/08 01:07:35 PM	23.569					
56	07/26/08 02:07:35 PM	23.641					
57	07/26/08 03:07:35 PM	23.809					
58	07/26/08 04:07:35 PM	23.833					
59	07/26/08 05:07:35 PM	23.857					
60	07/26/08 06:07:35 PM	23.833					
61	07/26/08 07:07:35 PM	23.809					
62	07/26/08 08:07:35 PM	23.857					
63	07/26/08 09:07:35 PM	23.809					
64	07/26/08 10:07:35 PM	23.761					
65	07/26/08 11:07:35 PM	23.665					
66	07/27/08 12:07:35 AM	23.569					
67	07/27/08 01:07:35 AM	23.472					
68	07/27/08 02:07:35 AM	23.400					
69	07/27/08 03:07:35 AM	23.376					
70	07/27/08 04:07:35 AM	23.328					
71	07/27/08 05:07:35 AM	23.328					
72	07/27/08 06:07:35 AM	23.328					
73	07/27/08 07:07:35 AM	23.424					
74	07/27/08 08:07:35 AM	23.448					
75	07/27/08 09:07:35 AM	23.521					
76	07/27/08 10:07:35 AM	23.569					
77	07/27/08 11:07:35 AM	23.617					
78	07/27/08 12:07:35 PM	23.641					
79	07/27/08 01:07:35 PM	23.689					
80	07/27/08 02:07:35 PM	23.689					
81	07/27/08 03:07:35 PM	23.737					

SRT_Ha_Bath_5.hobo

#	Time, GMT-04:00	Temp, °C	Coupler Detached	Coupler Attached	Host Connected	Stopped	End Of File
82	07/27/08 04:07:35 PM	23.737					
83	07/27/08 05:07:35 PM	23.617					
84	07/27/08 06:07:35 PM	23.521					
85	07/27/08 07:07:35 PM	23.448					
86	07/27/08 08:07:35 PM	23.400					
87	07/27/08 09:07:35 PM	23.352					
88	07/27/08 10:07:35 PM	23.328					
89	07/27/08 11:07:35 PM	23.160					
90	07/28/08 12:07:35 AM	23.088					
91	07/28/08 01:07:35 AM	23.040					
92	07/28/08 02:07:35 AM	22.968					
93	07/28/08 03:07:35 AM	22.896					
94	07/28/08 04:07:35 AM	22.824					
95	07/28/08 05:07:35 AM	22.824					
96	07/28/08 06:07:35 AM	22.800					
97	07/28/08 07:07:35 AM	22.920					
98	07/28/08 08:07:35 AM	22.992					
99	07/28/08 09:07:35 AM	23.088					
100	07/28/08 10:07:35 AM	23.136					
101	07/28/08 11:07:35 AM	23.184					
102	07/28/08 12:07:35 PM	23.232					
103	07/28/08 01:07:35 PM	23.208					
104	07/28/08 02:07:35 PM	23.232					
105	07/28/08 03:07:35 PM	23.280					
106	07/28/08 04:07:35 PM	23.545					
107	07/28/08 05:07:35 PM	23.737					
108	07/28/08 06:07:35 PM	23.809					

SRT_Ha_Bath_5.hobo

#	Time, GMT-04:00	Temp, °C	Coupler Detached	Coupler Attached	Host Connected	Stopped	End Of File
109	07/28/08 07:07:35 PM	23.761					
110	07/28/08 08:07:35 PM	23.641					
111	07/28/08 09:07:35 PM	23.617					
112	07/28/08 10:07:35 PM	23.472					
113	07/28/08 11:07:35 PM	23.280					
114	07/29/08 12:07:35 AM	23.160					
115	07/29/08 01:07:35 AM	23.040					
116	07/29/08 02:07:35 AM	22.944					
117	07/29/08 03:07:35 AM	22.896					
118	07/29/08 04:07:35 AM	22.848					
119	07/29/08 05:07:35 AM	22.824					
120	07/29/08 06:07:35 AM	22.800					
121	07/29/08 07:07:35 AM	22.944					
122	07/29/08 08:07:35 AM	22.992					
123	07/29/08 09:07:35 AM	23.184					
124	07/29/08 10:07:35 AM	23.617					
125	07/29/08 11:07:35 AM	23.857					
126	07/29/08 12:07:35 PM	24.171					
127	07/29/08 01:07:35 PM	24.363					
128	07/29/08 02:07:35 PM	24.412					
129	07/29/08 03:07:35 PM	24.460					
130	07/29/08 04:07:35 PM	24.484					
131	07/29/08 05:07:35 PM	24.508					
132	07/29/08 06:07:35 PM	24.557					
133	07/29/08 07:07:35 PM	24.774					
134	07/29/08 08:07:35 PM	24.895					
135	07/29/08 09:07:35 PM	24.895					

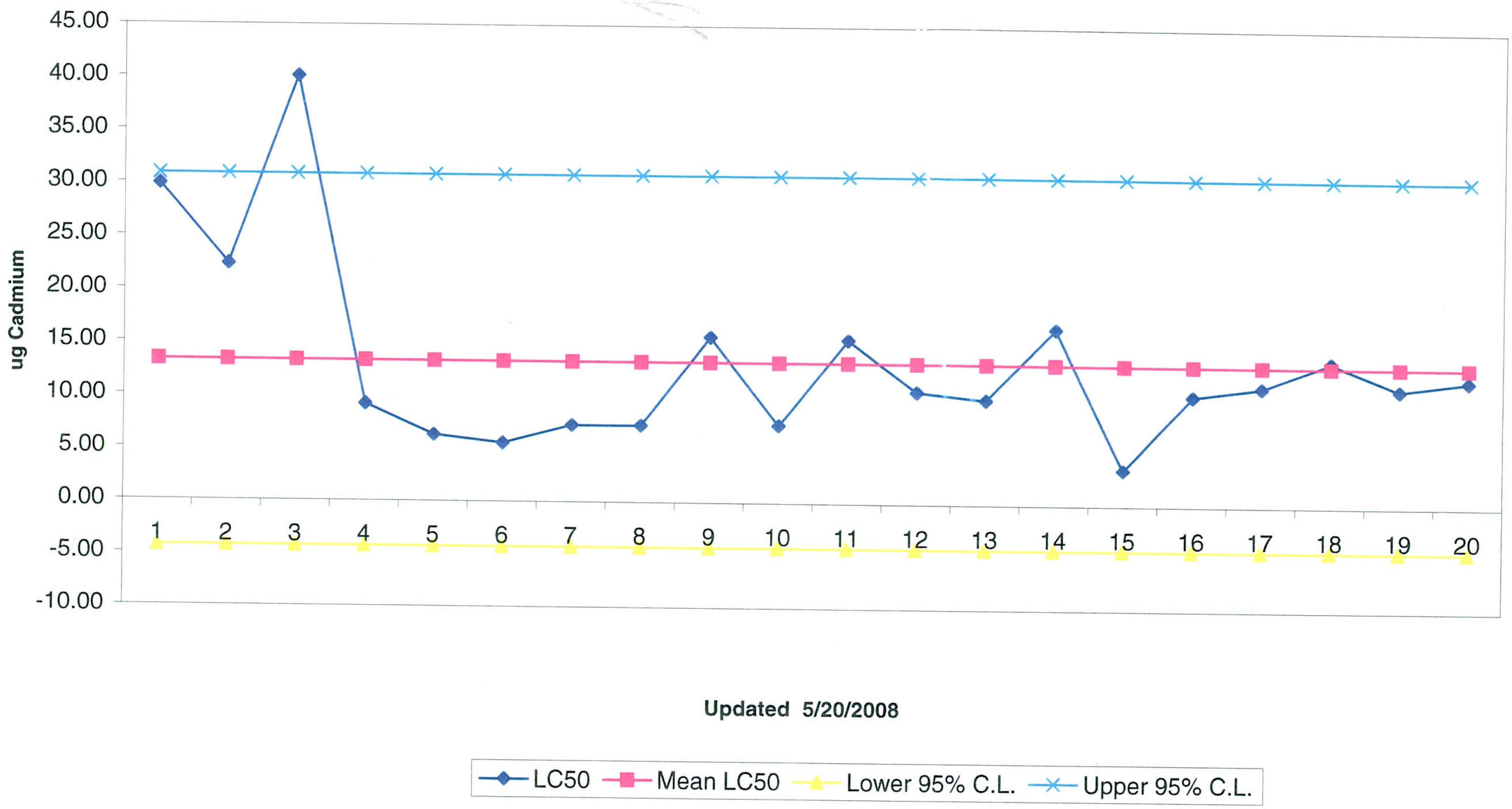
SRT_Ha_Bath_5.hobo

#	Time, GMT-04:00	Temp, °C	Coupler Detached	Coupler Attached	Host Connected	Stopped	End Of File
136	07/29/08 10:07:35 PM	24.798					
137	07/29/08 11:07:35 PM	24.532					
138	07/30/08 12:07:35 AM	24.267					
139	07/30/08 01:07:35 AM	24.002					
140	07/30/08 02:07:35 AM	23.737					
141	07/30/08 03:07:35 AM	23.569					
142	07/30/08 04:07:35 AM	23.376					
143	07/30/08 05:07:35 AM	23.256					
144	07/30/08 06:07:35 AM	23.160					
145	07/30/08 07:07:35 AM	23.184					
146	07/30/08 08:07:35 AM	23.184					
147	07/30/08 09:07:35 AM	23.280					
148	07/30/08 10:07:35 AM	23.400					
149	07/30/08 11:07:35 AM	23.617					
150	07/30/08 12:07:35 PM	23.905					
151	07/30/08 01:07:35 PM	24.146					
152	07/30/08 02:07:35 PM	24.243					
153	07/30/08 03:07:35 PM	24.315					
154	07/30/08 04:07:35 PM	24.363					
155	07/30/08 05:07:35 PM	24.460					
156	07/30/08 06:07:35 PM	24.243					
157	07/30/08 07:07:35 PM	24.243					
158	07/30/08 08:07:35 PM	24.002					
159	07/30/08 09:07:35 PM	23.761					
160	07/30/08 10:07:35 PM	23.569					
161	07/30/08 11:07:35 PM	23.424					
162	07/31/08 12:07:35 AM	23.352					

SRT_Ha_Bath_5.hobo

#	Time, GMT-04:00	Temp, °C	Coupler Detached	Coupler Attached	Host Connected	Stopped	End Of File
163	07/31/08 01:07:35 AM	23.328					
164	07/31/08 02:07:35 AM	23.256					
165	07/31/08 03:07:35 AM	23.208					
166	07/31/08 04:07:35 AM	23.184					
167	07/31/08 05:07:35 AM	23.112					
168	07/31/08 06:07:35 AM	23.088					
169	07/31/08 07:07:35 AM	23.136					
170	07/31/08 08:07:35 AM	23.136					
171	07/31/08 09:07:35 AM	23.232					
172	07/31/08 09:13:58 AM			Logged			
173	07/31/08 09:13:59 AM				Logged		
174	07/31/08 09:14:04 AM					Logged	Logged

Control Chart LC50 Values, Acute SRT With H. azteca



Prep Sheet for Freshwater SRTs

Chironomus tentans/ Hyalella azteca

10 replicates per concentration
20 mL per replicate
1 organism per replicate

Working Stock Solution

Add 0.064 grams of Cadmium chloride to 100 mL **DI water**.
This will give you a 320 mg Cadmium/ L stock solution.

This srt was determined to be an outlier and therefore was not included on the control chart.

RF 9/5/08

Hyalella azteca

Add **1 mL** of the working stock solution to 1L of **Well water**.
This will give you a 32 µg Cadmium/ L stock solution.

Concentration (µg/ L)	Stock (mL)	Total (mL)
0	0	250
4	3.125	250
8	6.25	250
16	12.5	250
32	25	250
64	50	250

Chironomus tentans

Add **100 mL** of the working stock solution to 1L of **Recon**.
This will give you a 32 mg Cadmium/ L stock solution.

Concentration (mg/ L)	Stock (mL)	Total (mL)
0	0	250
0.2	1.6	250
0.6	4.7	250
1.6	12.5	250
5	39	250
15	117	250

H. azteca requires a small piece of nitex screen in each cup; feed each cup2-3 drops YCT
C. tentans feed each cup 2-3 drops slurry

Standard Reference Toxicant
Live Counts

For Job #: 28-227 | Start Date: 7/23/08 | End Date: 7/27/08

Organism C. tentans/H. azteca | Organism Log #: 28-0065 | Starting Time: 1715

Dose	Initial	1	2	3	4	Dose	Initial	1	2	3	4
Con A	1	1	1	1	1	16 A	1	1	1	1	1
B	1	1	1	1	1	B	1	1	1	1	1
C	1	1	1	1	1	C	1	1	1	1	1
D	1	1	1	1	1	D	1	1	1	1	1
E	1	1	1	1	1	E	1	1	1	1	1
F	1	1	1	1	1	F	1	1	1	1	1
G	1	1	1	1	1	G	1	1	1	1	1
H	1	1	1	1	1	H	1	1	1	1	1
I	1	1	1	1	1	I	1	1	1	1	1
J	1	1	1	1	1	J	1	1	1	1	1
4 A	1	1	1	1	1	32 A	1	1	1	1	1
B	1	1	1	1	1	B	1	1	1	1	1
C	1	1	1	1	1	C	1	1	1	1	1
D	1	1	1	1	1	D	1	1	1	1	1
E	1	1	1	1	1	E	1	1	1	1	1
F	1	1	1	1	1	F	1	1	1	1	1
G	1	1	X	—	—	G	1	1	1	1	1
H	1	1	1	1	1	H	1	1	1	1	1
I	1	1	1	1	1	I	1	1	1	X	—
J	1	1	1	1	1	J	1	1	1	1	1
8 A	1	1	1	1	1	64 A	1	1	X	—	—
B	1	1	1	1	X	B	1	1	X	—	—
C	1	1	1	1	1	C	1	X	—	—	—
D	1	1	1	1	1	D	1	1	1	X	—
E	1	1	1	1	1	E	1	1	X	—	—
F	1	1	1	1	1	F	1	1	1	X	—
G	1	1	1	1	1	G	1	1	X	—	—
H	1	1	1	1	1	H	1	1	X	—	—
I	1	1	1	1	1	I	1	1	1	X	—
J	1	1	1	1	1	J	1	1	X	—	—
Initial	M	M	M	M	M		M	M	M	M	M
Date	7/23/08	7/24/08	7/25/08	7/26/08	7/27/08		7/23/08	7/24/08	7/25/08	7/26/08	7/27/08

Test: AA-Acute Amphipod	Test ID: SRTha8227
Species: HA-Hyalella azteca	Protocol: EPAA 91-EPA Acute
Sample ID: REF-Ref Toxicant	Sample Type: CDCL-Cadmium chloride
Start Date: 7/23/2008 End Date: 7/27/2008	Lab ID: ASI Aqua Survey, Inc.

Pos	ID	Rep	Group	Start	24 Hr	48 Hr	72 Hr	96 Hr	Notes
	1	1	Control	1				1	
	2	2	Control	1				1	
	3	3	Control	1				1	
	4	4	Control	1				1	
	5	5	Control	1				1	
	6	6	Control	1				1	
	7	7	Control	1				1	
	8	8	Control	1				1	
	9	9	Control	1				1	
	10	10	Control	1				1	
	11	1	4	1				1	
	12	2	4	1				1	
	13	3	4	1				1	
	14	4	4	1				1	
	15	5	4	1				1	
	16	6	4	1				1	
	17	7	4	1				0	
	18	8	4	1				1	
	19	9	4	1				1	
	20	10	4	1				1	
	21	1	8	1				1	
	22	2	8	1				0	
	23	3	8	1				1	
	24	4	8	1				1	
	25	5	8	1				1	
	26	6	8	1				1	
	27	7	8	1				1	
	28	8	8	1				1	
	29	9	8	1				1	
	30	10	8	1				1	
	31	1	16	1				1	
	32	2	16	1				1	
	33	3	16	1				1	
	34	4	16	1				1	
	35	5	16	1				1	
	36	6	16	1				1	
	37	7	16	1				1	
	38	8	16	1				1	
	39	9	16	1				1	
	40	10	16	1				1	
	41	1	32	1				1	
	42	2	32	1				1	
	43	3	32	1				1	
	44	4	32	1				1	
	45	5	32	1				1	
	46	6	32	1				1	
	47	7	32	1				1	
	48	8	32	1				1	
	49	9	32	1				0	
	50	10	32	1				1	
	51	1	64	1				0	
	52	2	64	1				0	
	53	3	64	1				0	

Reviewed by: KJ

Test: AA-Acute Amphipod								Test ID: SRTha8227	
Species: HA-Hyalella azteca								Protocol: EPAA 91-EPA Acute	
Sample ID: REF-Ref Toxicant								Sample Type: CDCL-Cadmium chloride	
Start Date: 7/23/2008				End Date: 7/27/2008				Lab ID: ASI Aqua Survey, Inc.	

Pos	ID	Rep	Group	Start	24 Hr	48 Hr	72 Hr	96 Hr	Notes
	54	4	64	1				0	
	55	5	64	1				0	
	56	6	64	1				0	
	57	7	64	1				0	
	58	8	64	1				0	
	59	9	64	1				0	
	60	10	64	1				0	

Comments:

Reviewed by: RF

Acute Amphipod-96 Hr Survival

Start Date:	7/23/2008	Test ID:	SRTha8227	Sample ID:	REF-Ref Toxicant
End Date:	7/27/2008	Lab ID:	ASI Aqua Survey, Inc.	Sample Type:	CDCL-Cadmium chloride
Sample Date:		Protocol:	EPAA 91-EPA Acute	Test Species:	HA-Hyalella azteca
Comments:					

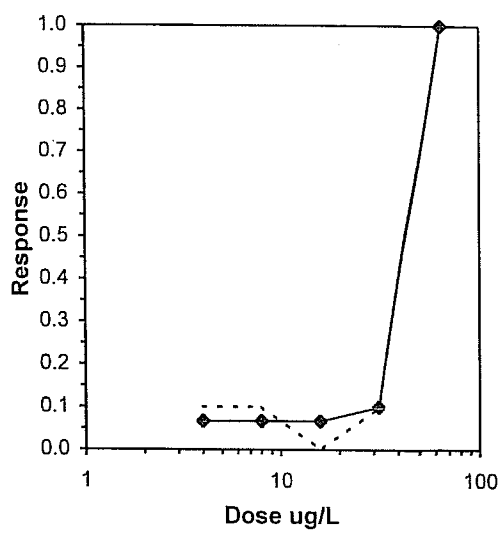
Conc-ug/L	1	2	3	4	5	6	7	8	9	10
Control	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
4	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000
8	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
16	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
32	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000
64	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Conc-ug/L	Mean	N-Mean	Resp	Not Resp	Total	N	Fisher's Exact P	1-Tailed Critical	Number Resp	Total Number
Control	1.0000	1.0000	0	10	10	10			0	10
4	0.9000	0.9000	1	9	10	10	0.5000	0.0500	1	10
8	0.9000	0.9000	1	9	10	10	0.5000	0.0500	1	10
16	1.0000	1.0000	0	10	10	10	1.0000	0.0500	0	10
32	0.9000	0.9000	1	9	10	10	0.5000	0.0500	1	10
64	0.0000	0.0000	10	0	10	10			10	10

Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU
Fisher's Exact Test	32	64	45.2548	
Treatments vs Control				

Trimmed Spearman-Karber

Trim Level	EC50	95% CL	
0.0%			
5.0%			
10.0%	43.545	40.150	47.228
20.0%	43.545	40.150	47.228
Auto-6.7%	42.990	36.489	50.649



Reviewed by: [signature]

SRTHA0.DAT

	DateTime	Temp	SpCond	Salinity	DO Conc	pH
	M/D/Y	C	uS/cm	ppt	mg/L	
0	07/23/08 15:30:09	22.77	455.0	0.22	7.99	8.48
1	07/23/08 15:30:47	22.75	449.0	0.22	7.96	8.46
2	07/23/08 15:31:10	22.78	449.0	0.22	7.93	8.47
3	07/23/08 15:31:38	22.78	448.0	0.21	7.91	8.50
4	07/23/08 15:31:56	22.76	448.0	0.21	7.91	8.50
5	07/23/08 15:32:15	22.82	448.0	0.22	7.92	8.50

Project #: SRT Test type: ☑ Acute ☐ Chronic ☐ ___Day Sed Tox ☐ OTHER: ________ Date: 7/23/08

Species: ☐ *A. bahia* ☐ *C. dubia* ☐ *C. tentans* ☑ *H. azteca* ☐ *M. beryllina* ☐ *P. promelas* ☐ OTHER: ________

Day of Study: 0 hours

OPERATIONAL RANGE: Check if OK

Meter Used:

Temperature: ☐ 18 –22 °C ☐ 24 –26 °C ☐ 25 –27 °C ☑ 22 – 24 °C

Blue ☐

Salinity: ☐ 23 –27 ppt ☐ 28 –32 ppt ☐ _____– _____ ppt

Red ☐

Dissolved Oxygen: ☐ >4.0 mg/L ☑ > 2.5 mg/L

Green ☑

pH: ☐ 7.3 to 8.3 ☑ 6.0 to 9.0 ☐_____ to _____

Actions taken:

Wed Jul 23 17:11:26 2008

See deviation summary sheet ☐

Initials: [illegible]

SRTHA24.DAT

	DateTime	Temp	DO Conc	pH
	M/D/Y	C	mg/L	
0	07/24/08 11:31:32	23.06	7.89	8.58
1	07/24/08 11:32:08	23.20	7.86	8.63
2	07/24/08 11:32:31	23.40	7.80	8.65
3	07/24/08 11:32:50	23.49	7.80	8.64
4	07/24/08 11:33:04	23.31	7.86	8.65
5	07/24/08 11:33:17	23.37	7.87	8.65

Project #: SRT Test type: ☒ Acute ☐ Chronic ☐ ___Day Sed Tox ☐ OTHER: ________ Date: 7/24/08

Species: ☐ *A. bahia* ☐ *C. dubia* ☐ *C. tentans* ☒ *H. azteca* ☐ *M. beryllina* ☐ *P. promelas* ☐ OTHER: ________

Day of Study: 0

OPERATIONAL RANGE: Check if OK

Meter Used:

Temperature: ~~☒ 18 – 22 °C~~ ☐ 24 – 26 °C ☐ 25 – 27 °C ☒ 22 – 24 °C

Blue ☐

Salinity: ☐ 23 – 27 ppt ☐ 28 – 32 ppt ☐ ____ – ____ ppt

Red ☐

Dissolved Oxygen: ☐ >4.0 mg/L ☒ > 2.5 mg/L

Green ☒

pH: ☐ 7.3 to 8.3 ☒ 6.0 to 9.0 ☐ ____ to ____

Actions taken:

See deviation summary sheet ☐

Initials: [illegible]

SRTHA48.DAT

	DateTime	Temp	DO Conc	pH
	M/D/Y	C	mg/L	
0	07/25/08 10:02:17	22.72	7.69	8.56
1	07/25/08 10:02:49	23.02	7.59	8.59
2	07/25/08 10:03:01	23.13	7.67	8.61
3	07/25/08 10:03:21	23.16	7.72	8.63
4	07/25/08 10:03:38	22.99	7.79	8.66
5	07/25/08 10:03:55	23.18	7.78	8.66

Project #: SRT Test type: ☒ Acute ☐ Chronic ☐ ___Day Sed Tox ☐ OTHER: ________ Date: 7/25/08

Species: ☐ *A. bahia* ☐ *C. dubia* ☐ *C. tentans* ☒ *H. azteca* ☐ *M. beryllina* ☐ *P. promelas* ☐ OTHER: ________

Day of Study: 48 hours

OPERATIONAL RANGE: Check if OK

Meter Used:

Temperature: ☐ 18 –22 °C ☐ 24 –26 °C ☐ 25 –27 °C ☒ 22 – 24 °C

Blue ☐

Salinity: ☐ 23 –27 ppt ☐ 28 –32 ppt ☐ _____– _____ ppt

Red ☐

Dissolved Oxygen: ☐ >4.0 mg/L ☒ > 2.5 mg/L

Green ☒

pH: ☐ 7.3 to 8.3 ☒ 6.0 to 9.0 ☐ _____ to _____

Actions taken:

See deviation summary sheet ☐

Initials: M

SRTHA72.DAT

	DateTime	Temp	DO Conc	pH
	M/D/Y	C	mg/L	
0	07/26/08 10:05:29	23.13	7.23	8.56
1	07/26/08 10:06:02	23.37	7.31	8.59
2	07/26/08 10:06:16	23.46	7.50	8.58
3	07/26/08 10:06:27	23.46	7.59	8.58
4	07/26/08 10:06:41	23.20	7.73	8.60
5	07/26/08 10:06:56	23.32	7.68	8.57

Project #: SRT Test type: ☒ Acute ☐ Chronic ☐ ___Day Sed Tox ☐ OTHER: ________ Date: 7/26/08

Species: ☐ *A. bahia* ☐ *C. dubia* ☐ *C. tentans* ☒ *H. azteca* ☐ *M. beryllina* ☐ *P. promelas* ☐ OTHER: ________

Day of Study: 72 hrs

OPERATIONAL RANGE: Check if OK

Temperature: ☐ 18 –22 °C ☐ 24 –26 °C ☐ 25 –27 °C ☒ 22 – 24 °C

Salinity: ☐ 23 –27 ppt ☐ 28 –32 ppt ☐ ____ – ____ ppt

Dissolved Oxygen: ☐ >4.0 mg/L ☒ > 2.5 mg/L

pH: ☐ 7.3 to 8.3 ☒ 6.0 to 9.0 ☐ ____ to ____

Meter Used:

Blue ☐

Red ☐

Green ☒

Actions taken:

Fri Sep 05 09:56:08 2008

See deviation summary sheet ☐

C-57 Initials: [illegible]

SRTHA96.DAT

	DateTime	Temp	DO Conc	pH
	M/D/Y	C	mg/L	
0	07/27/08 09:47:06	23.19	7.61	8.70
1	07/27/08 09:47:52	23.06	7.60	8.72
2	07/27/08 09:48:11	23.09	7.62	8.71
3	07/27/08 09:48:25	23.07	7.66	8.71
4	07/27/08 09:48:46	22.95	7.69	8.65

Project #: SRT Test type: ☑ Acute ☐ Chronic ☐ ___Day Sed Tox ☐ OTHER: ___________ Date: 7/27/08

Species: ☐ *A. bahia* ☐ *C. dubia* ☐ *C. tentans* ☑ *H. azteca* ☐ *M. beryllina* ☐ *P. promelas* ☐ OTHER: ___________

Day of Study: 96 hours

OPERATIONAL RANGE: Check if OK

Temperature: ☐ 18 –22 °C ☐ 24 –26 °C ☐ 25 –27 °C ☑ 22 – 24 °C

Salinity: ☐ 23 –27 ppt ☐ 28 –32 ppt ☐ _____ – _____ ppt

Dissolved Oxygen: ☐ >4.0 mg/L ☑ >2.5 mg/L

pH: ☐ 7.3 to 8.3 ☑ 6.0 to 9.0 ☐ _____ to _____

Meter Used:

Blue ☐

Red ☐

Green ☑

Actions taken:

See deviation summary sheet ☐

Initials: [illegible]

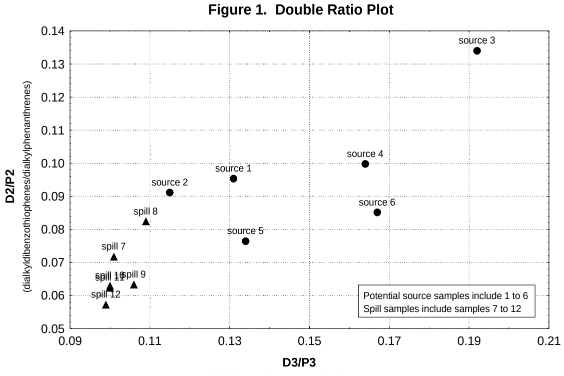
Appendix C

Environmental Forensic Report

Troy – Smith Ave.

SDGs: EK080415, EK080417

Figure 1. Double Ratio Plot



Report To:

ENSR
1001 W. Seneca Street
Suite 204
Ithaca, NY 14850

Report By:

META Environmental, Inc.
49 Clarendon Street
Watertown, MA 02472

May 14, 2008

Identifying and allocating sources of pollutants in complex environments.

META Environmental, Inc.
ENGINEERING & CHEMISTRY

Final Laboratory Report

META Environmental, Inc.
49 Clarendon Street
Watertown, MA 02472
Phone: 617-923-4662
Fax: 617-923-4610
E-Mail meta@metaenv.com

Certification

This certifies that this package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed herein. The results included in this data report relate only to the samples as received and analyzed by the laboratory.

Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager and Quality Assurance Officer, as verified by the following signatures.

James A. Roush — 5/14/2008

James A. Roush — Date
Environmental Scientist, Laboratory Manager

David M. Mauro — 5/14/2008

David M. Mauro — Date
Senior Scientist, Quality Assurance Officer

Sample Delivery Group Narrative

Project:	Troy – Smith Ave.
Client	ENSR 1001 W. Seneca Street, Suite 204 Ithaca, NY 14850
Report Contact:	Nick Azzolina
Dates of Receipt:	April 15th and 17th of 2008
Sample Summary:	The samples received for this project are summarized in the attached sample login forms.
META Project Number:	E02016
SDG No.:	EK080415 and EK080417
Total Pages in Report:	293

Chain of Custody

The samples were received in good condition. The internal temperature of one of the shipping containers was above the recommended 2-6°C range and was as follows:

Samples received: 03/04/2008	5.6°C	Blue-ice packs present
Samples received: 03/04/2008	8.2°C	Blue-ice packs present

Internal chain of custody procedures were followed after sample receipt. Samples were stored in a locked refrigerator. A sample custody logbook contains the record of sample removal from the secure sample storage area to the sample preparation laboratory. The custody record for the sample extracts is present on the sample extraction logbook page. The disposal of samples and extracts will be authorized one month after the release of this data report. Sample disposal will be documented.

Methods

The sediment samples were prepared by solvent extraction (EPA 3570) using dichloromethane (DCM). The extracts were spiked with internal standard and analyzed by GC/FID (EPA 8100M) for fingerprinting and by GC/MS/SIM (EPA 8270M) for mono- and polycyclic aromatic hydrocarbons (MAHs and PAHs), alkyl PAH homologues and other selected compounds.

Results

Sample results are presented in several appendices which follow this narrative.

Appendix B: GC/FID Fingerprints
Appendix C: MAH/PAH Concentrations
Appendix D: Extended MAH/PAH Profiles - Histograms
Appendix E: Extracted Ion Current Profiles (EICPs)

Quality Control

Analyte Flags

The detection limits were determined as the sample equivalent of the lowest linear initial calibration standard. Analytes measured between 50% and 100% of the lowest standard were reported as "estimated" and flagged with the letter "J." Undetected analytes were reported as null and flagged with the letter, "U." Analytes marked with a "B" were detected in the associated blank and should be reviewed for a possible positive bias. No deviations were thought significant enough to compromise the integrity of the reported values.

Holding Times

The sediment samples were extracted approximately 6 months outside the recommended holding times. The samples and extracts were stored at 4°C ± 2°C prior to extraction and analysis. The extracts were analyzed within 40 days of sample preparation.

Surrogate Spikes

Extraction surrogates were added to all samples prior to extraction. All surrogate compounds were recovered within the 50%-120% acceptable criterion.

Blanks

Benzene, toluene and styrene were detected above the reporting limit (RL) in the soil blank. Concentrations for these compounds should be reviewed in the field samples for potential positive bias.

Blank Spikes

A blank spike sample was extracted with each soil batch. All spiked compounds were recovered within criteria.

Duplicates

Sample TS18 was extracted and analyzed in duplicate. Relative percent differences are reported with the sample results in Appendix C. Duplicate results for many compounds were significantly different and are indicative of a heterogeneous sample matrix. All samples were hand-mixed by the laboratory prior to extraction.

Internal Standards

Internal standards were recovered within acceptable QC limits (50%-200%) relative to the continuing calibration standards.

Interpretation

Introduction

Nineteen sediment samples were received by META from the Troy – Smith Ave. site on April 15th and April 17th of 2008. Seventeen of the nineteen samples were selected and analyzed for hydrocarbon fingerprinting and an expanded list of MAHs and PAHs.

This report summarizes the findings and compares the samples.

Sources of MAHs and PAHs in the Environment

Aromatic hydrocarbons include MAHs such as benzene, toluene, xylenes, and alkylated benzenes, and PAHs such as naphthalene, phenanthrene, and pyrene. MAHs and PAHs originate from many sources and exist at many sites. This section briefly reviews the sources of MAHs and PAHs in urban soils and sediment.

Crude petroleum, many of its refined products, coal, coal tar, and many coal tar products consist primarily of hydrocarbons. Hydrocarbons are organic molecules that are made up of only carbon and hydrogen atoms. Some simple hydrocarbons include hexane and benzene. There are several types of hydrocarbons that are commonly grouped by similar chemical structures, such as alkanes, cyclic alkanes, and aromatic hydrocarbons.

MAHs and PAHs are one group of hydrocarbons that are present at high relative amounts in crude oil, coal, coal tar, and many of their products. In environmental forensic chemistry and geochemistry, MAHs and PAHs are placed in subgroups according to their origins. These groups include diagenic, or recently produced, petrogenic, produced at relatively low temperatures over long periods of time, and pyrogenic, produced at high temperatures with a shortage of oxygen. Petrogenic PAHs are those found in crude oil and similar materials. Pyrogenic PAHs are those found in coal tar and related substances, and from the incomplete combustion of organic matter.

Some PAHs can be formed by natural biological and chemical processes at ambient temperatures. When present, these PAHs are found at very low concentrations. Further, these

PAHs are rarely the subjects of environmental investigations and few, if any, are regulated.

PAHs also can be formed at relatively low temperatures. In particular, crude oils contain MAHs and PAHs that formed over millions of years at temperatures as low as 100°C to 150°C. MAHs and PAHs formed during crude oil maturation and similar processes are called petrogenic. Similarly, coal was formed at low temperatures over long periods of time and therefore is included in the petrogenic group. Both crude oil and coal contain hundreds of different MAH and PAH compounds, including many that are the subject of environmental investigations and are regulated.

Petrogenic MAHs and PAHs have been released into urban environments from numerous anthropogenic sources over the past two centuries. For example, it has been a common practice to spray roads with oil to manage dust. Asphalt is produced from petroleum and the small particles that are created as roads wear away contain PAHs. Cars and trucks drip fuels and lubricating oils that contain petrogenic MAHs and PAHs. Many industries have stored and ultimately spilled petroleum products that range from gasoline to heavy oils. Further, the potential impacts from coal cannot be ignored. For many years, residential and commercial buildings were heated with coal and small amounts of coal and coal dust accumulated wherever coal was handled. All of these sources of petrogenic PAHs, and many others, contributed to a pervasive background of PAHs in urban settings. Because many releases occurred years ago at unanticipated locations and because soil was moved around as the urban environment expanded and was modified for various uses, it is difficult to predict where and at what levels MAHs and PAHs might be found.

Finally, MAHs and PAHs are formed whenever organic substances are exposed to high temperatures under low oxygen or no oxygen conditions in a process called pyrolysis. Pyrolytic processes occur intentionally, such as in the destructive distillation of coal into coke and coal tar, or the thermal cracking of petroleum residuals into lighter hydrocarbons and oil tar. Similar processes occur unintentionally, such as the incomplete combustion of motor fuels in cars and trucks, the incomplete combustion of wood in forest fires and fireplaces, and the incomplete combustion of fuel oils in heating systems. These processes occur at temperatures that range from about 350°C to more than 1200°C, and their products are called pyrogenic.

Like petrogenic MAHs and PAHs, pyrogenic MAHs and PAHs have been released into urban environments from numerous sources. These include some obvious sources, such as building fires and industrial smoke stacks. They also include less obvious sources, such as debris from coal tar-treated roofing and building materials. The incomplete combustion of gasoline and diesel fuel in cars, trucks, and buses produces substantial amounts of pyrogenic PAHs that attach to small particles and accumulate along roadsides. Any industry that utilized high temperatures in their operation probably produced PAHs. These included such industries as foundries, steel mills, coke plants, smelters, and others. Similar to petrogenic MAHs and PAHs, pyrogenic MAHs and PAHs accumulated in soil and are found throughout all urban areas.

Much modern gasoline is unusual in that it contains both petrogenic substances (the light distillate of crude oil) and pyrogenic substances (the light hydrocarbons from thermal cracking of oil). For the purposes of this report, all motor gasoline is considered petrogenic.

Composition of Pyrogenic and Petrogenic Materials

Both pyrogenic and petrogenic sources of PAHs have been found to contain hundreds of individual MAHs and PAH compounds in generally predictable patterns. For example, it is known that the temperature of formation of MAHs and PAHs largely determines the distribution of the various parent and alkylated PAHs. Variations in these MAH and PAH distributions are measured using gas chromatography (GC) methods, particularly GC/MS. The visual interpretation of the results from GC/MS testing is a chromatogram. Variations in chromatograms are used to identify the sources of those MAH and PAHs.

Of particular importance to environmental forensic chemistry is the fact that petrogenic and pyrogenic substances from different sources can have measurably different amounts of MAHs and PAHs. For example, crude oils from different reservoirs can exhibit notably different ratios of trialkylated dibenzothiophenes to trialkylated phenanthrenes. Similarly, the ratio of dialkylated chrysene to chrysene varies among certain pyrogenic sources. Consequently, the determination of PAH profiles forms an important component of environmental forensic studies where hydrocarbon releases, either petrogenic or pyrogenic, are known or suspected to be involved.

In addition to MAHs and PAHs, pyrogenic and petrogenic substances can contain paraffinic hydrocarbons, olefinic hydrocarbons, naphthenic hydrocarbons, and other types of compounds. The presence and relative amounts of these compounds also is used to identify the nature and source of hydrocarbon-based materials in environmental samples.

Description of Chemical Fingerprinting Methodology

PAHs commonly form the basis for source attribution and allocation at sites involving petrogenic or pyrogenic materials. Studies have shown that the pattern of PAHs clearly distinguishes petrogenic from pyrogenic substances and can be used to identify and classify petrogenic or pyrogenic substances of different origins. For example, ASTM Method D 5739-95 is the method used extensively by the U.S. Coast Guard to determine the source of oil spilled in public waterways. That method relies on the determination of selected PAHs in oil, soil, or water samples by gas chromatography with mass spectrometric detection (GC/MS) and the use of the qualitative patterns and quantitative ratios of those PAHs to determine which oil samples have a common origin. Similarly, work by META Environmental, Inc. (META) has shown that the same methodology can be used to identify the sources of PAHs at former MGP sites, coke plants, tar refineries and wood treating facilities. Further, META has modified the typical sample preparation and analysis procedures for hydrocarbon fingerprinting to include MAHs as well as PAHs.

An approach based on MAH/PAH profiling has been used to investigate the sources of hydrocarbons at the Troy – Smith Ave. site, which is the topic of this report. Therefore, a more detailed discussion of the forensic methods used is presented in the next subsection as background.

GC/FID Fingerprinting

All sediment samples in this study were analyzed by gas chromatography with flame ionization detection (GC/FID). With GC/FID, organic compounds in a sample are vaporized and then separated in a long, narrow fused silica capillary column. Separation follows boiling point approximately with the most volatile compounds exiting the column first followed by increasingly less volatile compounds. Therefore, certain refined petroleum products, generated by the distillation of crude oil and which differ in their boiling point ranges, are distinguishable by where they appear on a chromatogram. Once they exit the column, the compounds are detected using the flame ionization technique. As the compounds exit and are detected, their responses are recorded and shown as peaks on a continuous plot. The height and area of a peak are proportional to the concentration of that compound in the sample. When done in a controlled and reproducible manner, the GC/FID method produces a "fingerprint" of a sample where the presence and relative amounts of the compounds are immediately visible as peaks of varying height appearing at different times. GC/FID fingerprints for the samples analyzed are provided in Appendix B.

GC/FID methods are commonly used for fingerprinting in a number of forensic fields. The patterns of individual peaks and the sizes and shapes of any baseline features are examined qualitatively for similarities and differences among samples.

The instrumental conditions for the GC/FID analyses in this study were adjusted so that compounds with boiling points between about hexane (C6) and n-tetracontane (C40) were detectable in one analytical run. This range includes most of the VOCs and all of the SVOCs commonly measured in environmental investigations. In particular, it includes benzene, toluene, ethylbenzene, xylenes, and the 16 priority pollutant PAHs that comprise a major portion of MGP tars and other pyrogenic substances. It also includes the range of compounds that are measurable in pyrogenic substances by gas chromatographic methods. Finally, META's GC/FID conditions detect most of the constituents of gasoline, as well as all of the constituents of higher boiling petroleum products (e.g., kerosene, diesel, refined oils).

Source identification using GC/FID is mostly qualitatively applied. An experienced chemist examines the chromatograms, compares them to those of reference materials, and makes a judgment regarding the nature and source of the contamination in the sample. The chemist might go "peak-by-peak" looking for similarities and differences, comparing peak ratios, and looking for indicator compounds.

For some samples, GC/FID fingerprinting is accurate and sufficient. However, the reliability of GC/FID fingerprinting decreases when multiple sources are present in a sample and when the sample composition becomes extensively altered by environmental weathering processes. Other testing methods, such as GC/MS, are complementary for source identification under these conditions.

Extended PAH Profiles (EPPs) by GC/MS

Samples from the Troy – Smith Ave. site also were analyzed by GC/MS for an expanded list of

MAHs and PAHs (EPPs). Separation was accomplished with gas chromatography using a method similar to the GC/FID method discussed previously. However, in GC/MS, once compounds exit the column, they are detected using a mass spectrometer. In the mass spectrometer, the molecules of each compound are ionized at high temperature and vacuum. The ionic fragments are unstable and fragment into smaller ions. The ions are then counted and the mass spectrum recorded. Thus, the mass spectrum for a compound is the pattern of ionic fragments that forms when that compound is ionized. Mass spectra vary widely and are characteristic of their source compound. For example, the mass spectrum of hexane is very different from the mass spectrum of benzene even though both compounds contain six carbon atoms plus hydrogen atoms.

In GC/MS, one obtains both a chromatogram of peaks and additional compound-specific information in the mass spectrum. When executed in a controlled and reproducible manner, the GC/MS method produces multiple "fingerprints" of a sample when specific fragment ions are isolated.

GC/MS is utilized in two general ways in environmental forensic chemistry. First, samples are analyzed under the conditions required by various standard methods, particularly EPA Methods 8260 and 8270 (U.S. EPA SW-846). The concentrations of certain target compounds are determined and the mass spectrum of each peak in the chromatogram is generated and stored. These mass spectra can be used to identify non-target compounds or to generate extracted ion current profiles (EICPs). Second, various specialty methods are utilized where the GC/MS operating conditions are setup to measure only certain groups of compounds. For example, the method described in 40 CFR Subchapter J Part 300 Subpart L Appendix C for PAHs, alkylated PAHs, and biomarkers is used extensively in oil spill and UST release analyses. This method is similar to ASTM Method D 5739-95, "Standard Practice for Oil Spill Source Identification by Gas Chromatography and Positive Ion Electron Impact Low Resolution Mass Spectrometry."

GC/MS data are used both qualitatively and quantitatively. An experienced chemist examines the chromatograms, compares them to those of reference materials, and makes judgments regarding the nature and source of the contamination in the sample. The chemist might go "peak-by-peak" looking for similarities and differences, comparing peak ratios, and looking for indicator compounds. This process is described in detail in ASTM Method D 5739-95.

GC/MS data are more commonly used quantitatively by calculating the concentrations of selected compounds, by comparing peak area ratios, or by applying chemometric or pattern recognition techniques to the raw or adjusted data. These data analysis methods are used extensively with extended PAH profiles (MAHs, PAHs and alkylated PAHs) and with biomarker compound data. Various degrees of statistical confidence can be achieved by examining chemical concentrations and compound ratios or patterns from multiple samples and replicate samples. This characteristic of GC/MS quantitative data is particularly valuable when assessing the degree of similarity or difference between samples, particularly when multiple sources of hydrocarbons are present in the sample or when environmental weathering has altered the original distributions of hydrocarbons.

Finally, the mass spectra of selected compounds also can be examined to determine whether any diagnostic or indicator chemicals are present in the sample. For example, the PAH retene (1-methyl-7-isopropylphenanthrene) is present in significant concentrations in coal, but at much lower concentrations in coal tar or petroleum products. Thus, the ratio of retene to chrysene can be used to determine whether coal fines are present in a soil sample and to explain some of the hydrocarbon patterns observed at sites where coal was used extensively. Further, unknown compounds can be identified and their presence used as clues to the source(s) of the chemicals.

The GC/MS data in this study were reported and utilized both qualitatively and quantitatively. First, the concentrations of MAHs, PAHs and alkylated PAHs were calculated and included in Appendix C. These concentrations were utilized to estimate contaminant levels in samples, to generate bar graphs (Appendix D) and compare compound ratios. The ratios were used to generate plots for identifying samples with similar compositions.

The GC/MS data also were used qualitatively by generating extracted ion current profiles (EICPs) for selected compounds and compound groups of forensic value (Appendix E). For example, the EICPs for selected "biomarker" compounds including normal alkanes, isoprenoid hydrocarbons, alkylcyclohexanes, triterpanes and steranes are shown on the first page of the EICP report for each sample. These compound groups are commonly used in hydrocarbon source identifications and weathering evaluations. For example, the estimated boiling point range of a refined petroleum product, as indicated by the location of the alkanes and unresolved complex mixture (UCM) on the chromatogram, can be used to determine whether the material is kerosene, diesel, No. 6 fuel oil, or some other product. Similarly, triterpanes and steranes are known to be present in crude oils and some refined petroleum products, but not found in coke oven tars and rarely found in MGP tars. Therefore, the presence of triterpanes and steranes is monitored to confirm and refine the petrogenic verses pyrogenic assessment conducted with the PAH profiles.

Sample-Specific Observations

Each GC/FID fingerprint, as well as the GC/MS EICPs, histograms and concentration data were examined and the important features summarized in Table 1. The PAH class (pyrogenic or petrogenic) was indicated, the fluoranthene to pyrene ratio (Fl/Py) identified, and a tentative source identification provided.

Table 1. Summary of Observations and Tentative Identification

Laboratory ID	Field ID	Observations	Class	Fl/Py Ratio	Tentative Identification[1]
EK080415-01	TS04 (1.8-2.4)	Wide molecular weight-range PAHs; substituted 2-ring and parent 3-ring PAHs dominant; total PAH(16)[1]: 21.6 mg/kg	Pyrogenic	0.732	Possible water-soluble fraction (WSF) tar ; weathered
EK080415-03	TS17 (3-4)	Wide range of PAHs; 2-ring, 3-ring and 4-ring PAHs dominant; BTEX present; low levels of sesquiterpane petroleum biomarkers present; total PAH(16): 27.4 mg/kg	Pyrogenic	0.532	Possible CWG tar
EK080415-04	TS30 (1-2)	Wide molecular weight-range PAHs; substituted 2-ring and parent 3-ring PAHs dominant; total PAH(16): 46.5 mg/kg	Pyrogenic	1.048	Possible WSF tar; weathered/ background
EK080415-05	TS04 (1-1.8)	Wide range of PAHs; substituted and parent 2-ring, 3-ring and 4-ring PAHs dominant; sesquiterpane petroleum biomarkers present; total PAH(16): 205 mg/kg	Pyrogenic	0.708	Possible CWG tar
EK080415-06	TS18 (2-3)	Wide range of PAHs; 2-ring, 3-ring and 4-ring PAHs dominant; BTEX present; low levels of sesquiterpane petroleum biomarkers present; total PAH(16): 52 mg/kg	Pyrogenic	0.635	Possible CWG tar
EK080415-08	TS30 (3-4)	Wide range of PAHs; substituted 2-ring and parent 3-ring PAHs dominant; low levels of sesquiterpane, terpane and sterane petroleum biomarkers present; total PAH(16): 56.8 mg/kg	Pyrogenic	0.975	Possible WSF of tar /background
EK080415-09	TS29 (1.5-2.5)	Low concentrations of low to mid molecular weight PAHs; acenaphthene and pyrene dominant; low levels of terpane and sterane petroleum biomarkers present; total PAH(16): 6.48 mg/kg	Pyrogenic	0.163	Unknown
EK080415-10	TS18 (1-2)	Wide range of PAHs; 2-ring, 3-ring and 4-ring PAHs dominant; BTEX present; low levels of sesquiterpane petroleum biomarkers present; total PAH(16): 65.1 mg/kg	Pyrogenic	0.671	Possible CWG tar

Laboratory ID	Field ID	Observations	Class	Fl/Py Ratio	Tentative Identification[1]
EK080415-11	TS17 (2-3)	Wide range of PAHs; 2-ring, 3-ring and 4-ring PAHs dominant; BTEX present; low levels of sesquiterpane, terpane and sterane petroleum biomarkers present; total PAH(16): 67.2 mg/kg	Pyrogenic	0.590	Possible CWG tar
EK080415-12	TS02	Wide range of PAHs; 3-ring and 4-ring PAHs dominant; total PAH(16): 13.7 mg/kg	Pyrogenic	0.671	Possible CWG tar
EK080415-13	TS17	Low concentrations of high molecular weight PAHs; 4-ring to 6-ring PAHs dominant; high relative toluene; low levels of terpane and sterane biomarkers; total PAH(16): 1.77 mg/kg	Pyrogenic	1.126	Background
EK080415-14	TS24 (1-1.5)	Low molecular weight PAHs; acenaphthene dominant; low levels of terpane and sterane biomarkers; total PAH(16): 9.61 mg/kg	Pyrogenic	0.876	Possible WSF of Tar /background
EK080415-15	TS18	Low concentrations of mid to high molecular weight PAHs; 3-ring and 4-ring PAHs dominant; high relative toluene; low levels of terpane and sterane biomarkers; total PAH(16): 3.6 mg/kg	Pyrogenic	0.900	Background
EK080415-16	TS24	Low concentrations of full range of MAHs and PAHs; substituted 2-ring and parent 3-ring PAHs dominant; high relative toluene; total PAH(16): 0.787 mg/kg	Pyrogenic	1.070	WSF of Tar /background
EK080415-17	TS20	Low concentrations of low molecular weight PAHs; acenaphthene dominant; 1.16 mg/kg	Pyrogenic	0.939	WSF of Tar /background
EK080417-01	TS02(4.5-5.5)	Wide range of PAHs; substituted and parent 2-ring, 3-ring and 4-ring PAHs dominant; sesquiterpane petroleum biomarkers present; total PAH(16): 416 mg/kg	Pyrogenic	0.727	Possible CWG tar
EK080417-02	TS04	Wide range PAHs; substituted 2-ring, and parent and substituted 3-ring PAHs dominant; total PAH(16): 22.7 mg/kg	Pyrogenic	0.801	Possible CWG tar

1 – total PAH(16) is the sum of the 16 US EPA priority pollutant parent PAHs

Discussion

All seventeen sediment samples showed pyrogenic characteristics in both the GC/FID fingerprints (Appendix B) and the diagnostic ratios (Table 1) in several general patterns.

First, samples TS04 (1-1.8) and TS02 (4.5-5.5) contained a wide range of primarily parent PAHs in a tar-like pattern. The total PAH concentrations were relatively high (205 and 416 mg/kg respectively) and the fluoranthene/pyrene (Fl/Py) ratios were similar (0.708 and 0.727 respectively - Table 2). These characteristics are typical of samples containing tarry residues from former MGPs operating the carbureted water gas (CWG) process. The surface sediments for these two locations show PAH distributions that are also pyrogenic in nature, however the concentrations are substantially lower. TS02 and TS04 have Fl/Py ratios of 0.671 and 0.801 respectively. The slightly higher 0.801 Fl/Py ratio of TS04 suggests there is some degree of mixing with urban background runoff sources [The Fl/Py ratios of urban background-derived PAHs tends to be higher than those of residues from former CWG plants].

Five samples including TS04 (1.8-2.4), TS30 (1-2), TS30 (3-4), TS24 (1-1.5), and TS20 contained low to very low concentrations of naphthalene, methylnaphthalenes, and acenaphthene, with much lower concentrations of other PAHs. This PAH pattern is consistent with the water soluble fraction (WSF) of tarry material, and suggests migration of dissolved PAHs in pore water passing between tar impacted sedimentary zones and less impacted sediment layers. Sample TS24 had a similar signature to the five samples listed above, however, the concentrations of PAHs, particularly the methylnaphthalenes and acenaphthene, were lower.

Four samples from two boring locations TS17 (2-3), TS17 (3-4), TS18 (1-2), and TS18 (2-3) showed similar pyrogenic characteristics with dominant 2-, 3- and 4-ring PAHs present and lower relative BTEX concentrations. The average fluoranthene/pyrene (Fl/Py) ratio among these samples was 0.607 with a 9.9% relative standard deviation (RSD). This signature is indicative of CWG impacted sediment, however, the Fl/Py ratios appear significantly lower than the 0.71 – 0.73 seen in the samples with higher concentrations (TS04 (1-1.8) and TS02 (4.5-5.5)).

The surface sediments at locations TS17 and TS18 are characterized by very low levels of high molecular weight PAHs and Fl/Py ratios greater than about 1.0, indicative of urban background. The source of elevated toluene levels relative to the PAHs could not be determined.

Sample TS29 (1.5-2.5) had a chemical profile unlike the others. Acenaphthene and pyrene were the only prominent PAHs. The high acenaphthene is consistent with other samples in this set, particularly the WSF impacted samples, however, the Fl/Py ratio was very low at 0.163. This ratio is in the range of petroleum products but only trace petroleum biomarkers are present, not enough to justify the higher concentration of pyrene relative to fluoranthene.

Conclusions

Based on the hydrocarbon fingerprints, histograms (Appendix D), Figures 1, 2, and 3 and the PAH ratios discussed above, 15 of 17 sediment samples appear to have some MGP related impacts ranging from trace (TS20, TS24) to extensive (TS04 (1-1.8) and TS02(4.5-5.5)). Two samples TS17 and TS18 appeared to consist of urban background impacts only. Urban background in sediment is characterized by various amounts of combustion-derived pyrogenic PAHs and an accumulation of a complex mixture of severely weathered petroleum products from runoff of fuel and lubricating oil onto roads, asphalt wear, and other sources. While there are indications of petroleum products in samples TS17 and TS18 (i.e., petroleum biomarker compounds), no specific type of product or combination of products was evident, a characteristic typical of urban background.

The remaining samples displayed a range of impacts including MGP materials mixed with urban background inputs.

The sediments that displayed MGP impacts had high levels of environmentally induced degradation (weathering) variability including dissolution and what appeared to be anaerobic bacterial degradation. No substantial petroleum sources were noted in those samples.

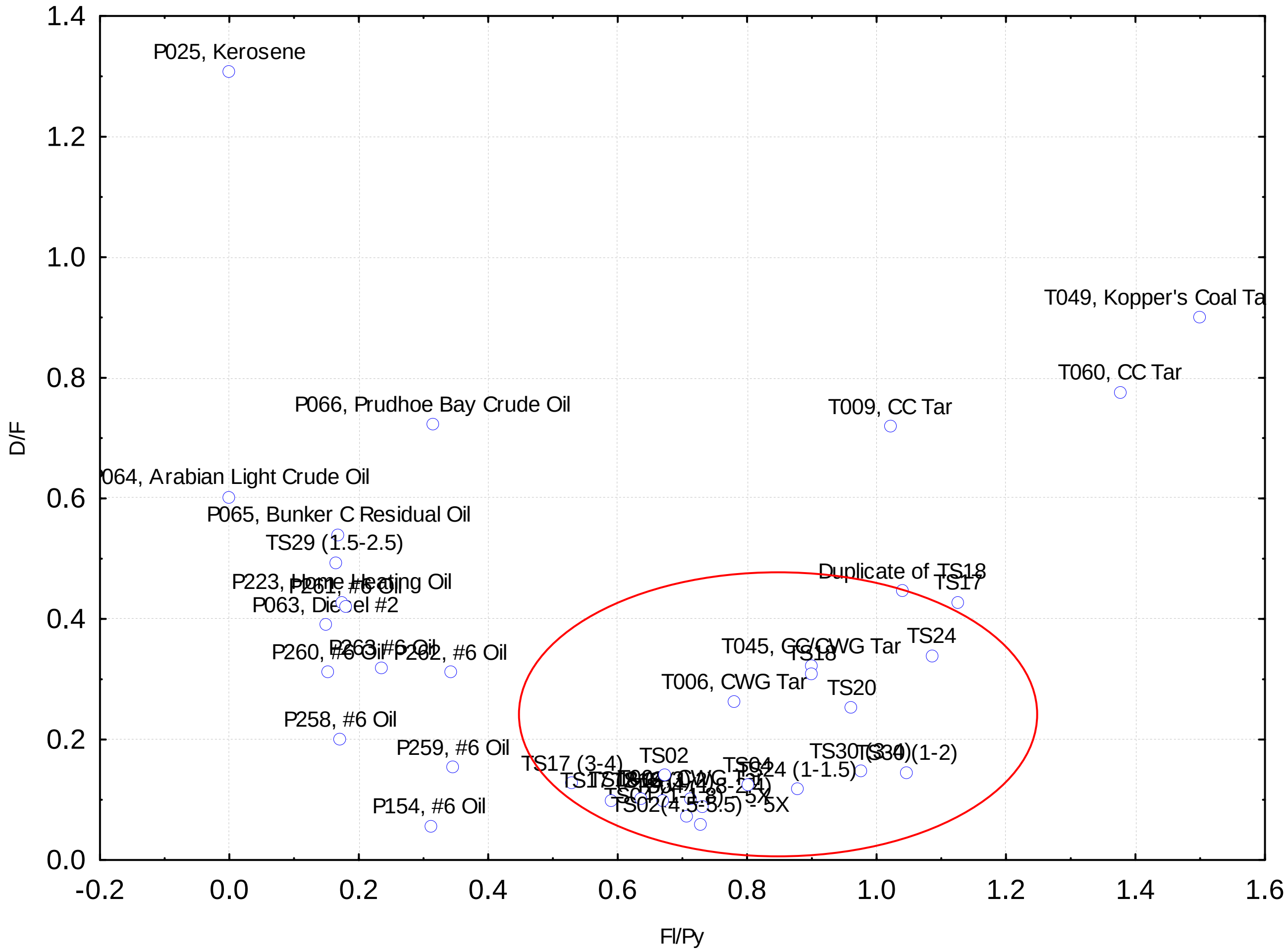
Table 2. Selected Source and Weathering Ratios

Field ID	Fl/Py	D/F	C3D/C3PA	C2D/C2PA	BF/MP	BF/2MP	2MP/4MP	2MP/1MP	P/A	BaA/Chr	BaA/BaP	BbF/BkF	Chr/BaP
TS04 (1.8-2.4)	0.732	0.090	0.391	0.254	0.434	1.232	1.250	0.962	1.479	1.000	1.406	0.686	1.405
TS17 (3-4)	0.530	0.127	0.372	0.283	0.309	0.929	1.001	0.990	1.896	0.896	1.186	0.832	1.324
TS30 (1-2)	1.047	0.145	0.401	0.227	0.727	1.996	1.181	1.115	2.054	0.909	1.146	0.965	1.260
TS04 (1-1.8)	0.707	0.074	0.403	0.262	0.420	1.298	1.110	0.844	1.960	1.028	1.322	0.673	1.286
TS18 (2-3)	0.635	0.100	0.322	0.263	0.304	0.959	0.922	0.932	1.907	0.896	1.145	0.841	1.278
TS30 (3-4)	0.975	0.148	0.357	0.270	0.631	1.667	1.244	1.190	2.517	0.976	1.560	0.900	1.599
TS29 (1.5-2.5)	0.163	0.494	0.428	0.388	0.628	1.703	1.099	1.252	1.142	0.770	1.098	0.934	1.427
TS18 (1-2)	0.670	0.099	0.356	0.276	0.322	1.036	0.909	0.896	1.988	0.880	1.131	0.803	1.285
TS17 (2-3)	0.590	0.099	0.366	0.272	0.326	1.053	0.906	0.889	1.771	0.843	1.078	0.775	1.279
TS02	0.671	0.140	0.378	0.282	0.396	1.179	1.157	0.897	1.051	0.883	1.270	0.842	1.438
TS17	1.126	0.428	0.402	0.225	0.659	1.621	1.282	1.472	2.547	0.932	1.065	0.891	1.143
TS24 (1-1.5)	0.877	0.117	0.503	0.302	0.467	1.240	1.181	1.237	2.356	0.801	1.805	0.739	2.253
TS18	0.900	0.311	0.262	0.158	0.293	0.727	1.240	1.484	3.184	0.959	1.109	0.770	1.156
Duplicate of TS18	1.040	0.446	0.480	0.321	0.375	1.001	1.115	1.294	2.519	0.808	0.868	0.882	1.074
TS24	1.085	0.339	0.604	0.324	0.302	0.794	1.066	1.446	1.226	0.778	1.035	0.898	1.331
TS20	0.961	0.253	0.532	0.333	0.322	0.914	0.970	1.235	1.994	0.710	0.955	0.947	1.344
TS02(4.5-5.5)	0.727	0.059	0.466	0.312	0.399	1.259	1.107	0.796	0.927	0.995	1.276	0.724	1.283
TS04	0.800	0.124	0.372	0.263	0.545	1.589	1.467	0.809	1.620	0.900	2.735	0.814	3.038

Ratios:

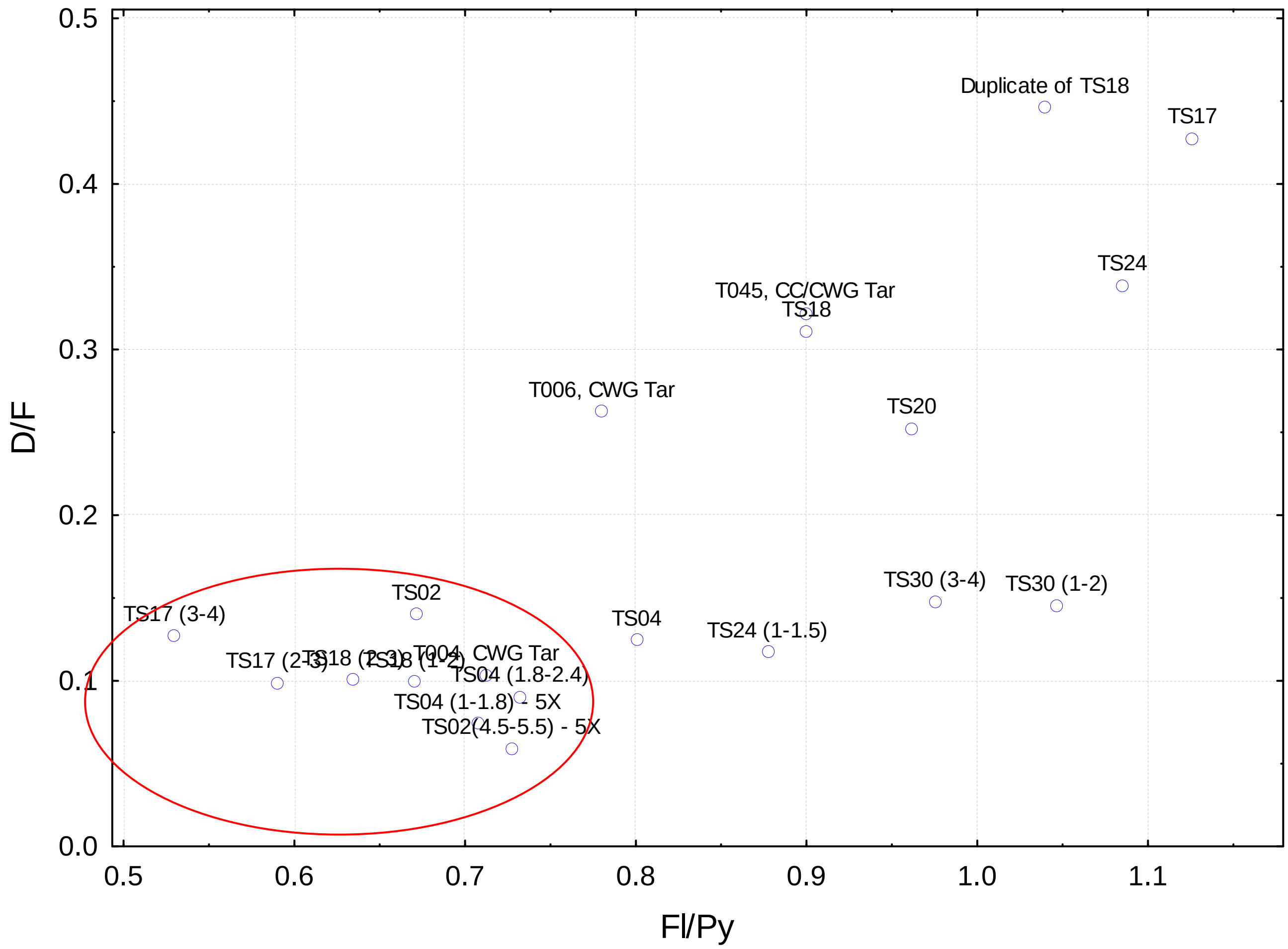
Fl/Py	fluoranthene/pyrene
D/F	dibenzofuran/fluorene
C3D/C3PA	trialkyldibenzothiophenes/trialkylphenanthrenes/anthracenes
C2D/C2PA	dialkyldibenzothiophenes/dialkylphenanthrenes/anthracenes
BF/MP	benzofluorenes/methylpyrenes
BF/2MP	benzofluorenes/2-methylpyrene
2MP/4MP	2-methylpyrene/4-methylpyrene
2MP/1MP	2-methylpyrene/1-methylpyrene
P/A	phenanthrene/anthracene
BaA/Chr	benz(a)anthracene/chrysene
BaA/BaP	benz(a)anthracene/Benzo(a)pyrene
BbF/BkF	benzo(b)fluoranthene/benzo(k)fluoranthene
Chr/BaP	chrysene/benzo(a)pyrene
NC	Not calculable

Figure 1. Selected Diagnostic Ratios – Fl/Py v. D/F



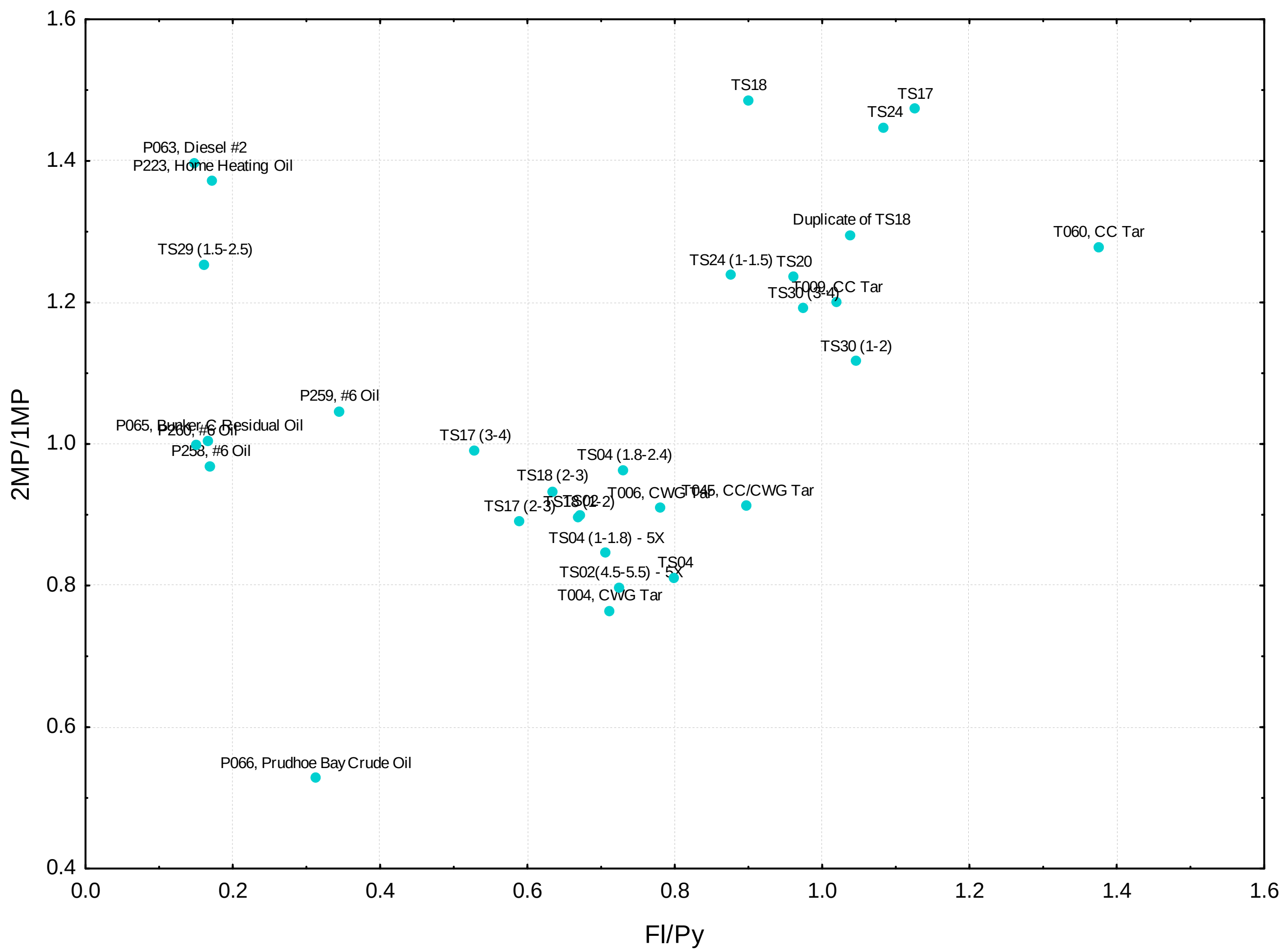
TXXX Tar Sample from META's in house source library
CC Coal Carbonization Tar
CO Coke Oven Tar
CR Creosote
CWG Carbureted Water Gas Tar

Figure 1A. Selected Diagnostic Ratios – Fl/Py v. D/F - Zoomed



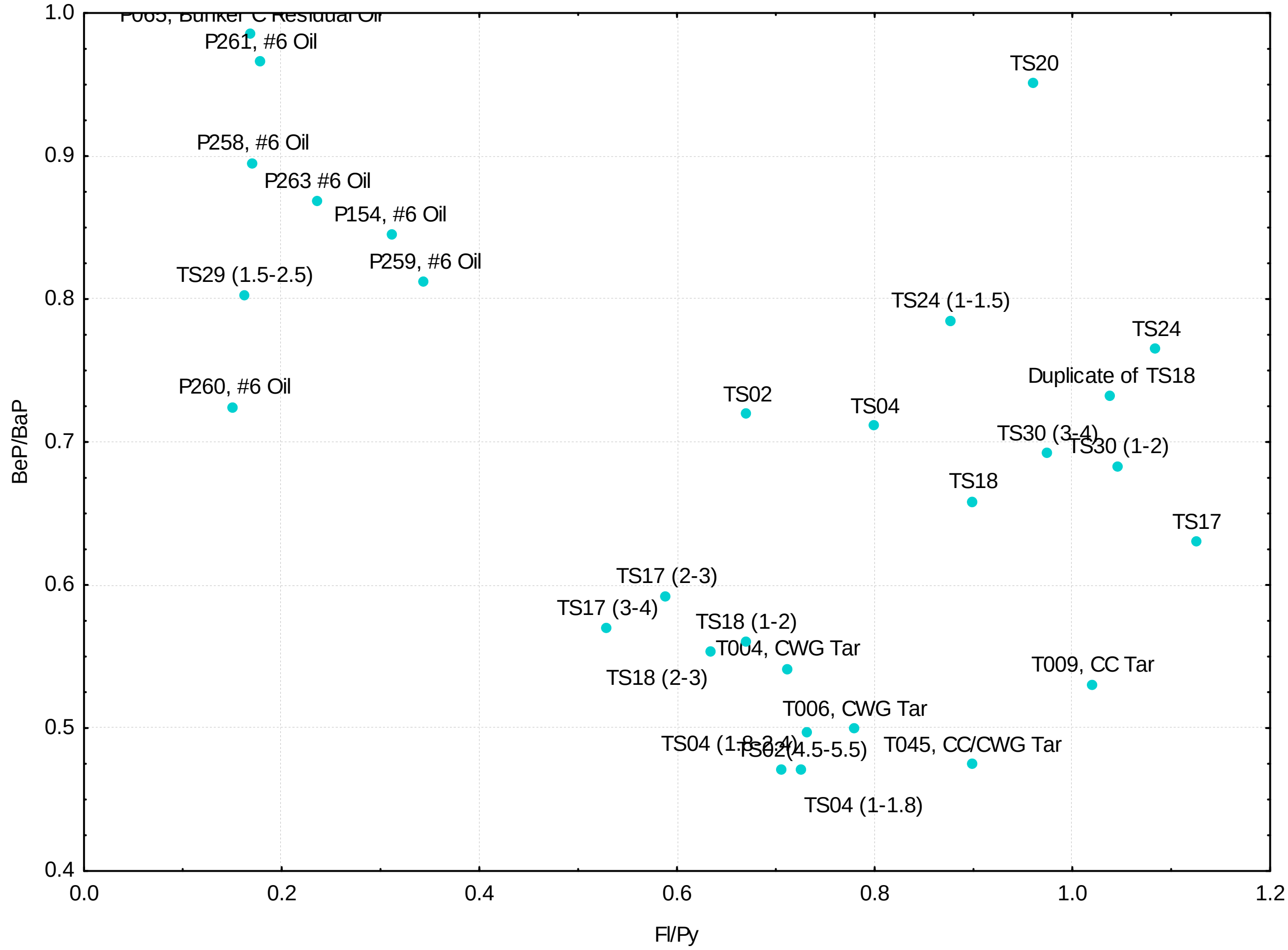
TXXX Tar Sample from META's in house source library
CC Coal Carbonization Tar
CO Coke Oven Tar
CR Creosote
CWG Carbureted Water Gas Tar

Figure 2. Selected Diagnostic Ratios – Fl/Py v. 2MP/1MP



TXXX	Tar Sample from META's in house source library
CC	Coal Carbonization Tar
CO	Coke Oven Tar
CR	Creosote
CWG	Carbureted Water Gas Tar

Figure 3. Selected Diagnostic Ratios – Fl/Py v. BeP/BaP



TXXX Tar Sample from META's in house source library
CC Coal Carbonization Tar
CO Coke Oven Tar
CR Creosote
CWG Carbureted Water Gas Tar

Definitions

Pyrogenic substances are complex mixtures of primarily hydrocarbons produced from organic matter subjected to high temperatures but with insufficient oxygen for complete combustion. Pyrogenic materials are produced by fires, internal combustion engines, and furnaces. They also are formed when coke or gas are produced from coal or oil. Coal-tar based products, such as roofing, pavement sealers, waterproofing, pesticides, and some shampoos contain pyrogenic materials.

Petrogenic substances include crude oil and crude oil derivatives such as gasoline, heating oil, and asphalt.

Pitch is the semi-solid or solid material consisting of high molecular weight hydrocarbons that remain following coal tar distillation.

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Appendix A

Chain of Custody

Chain of Custody Record

№ 0892

The RETEC Group, Inc.
1001 W. Seneca Street, Suite 204 • Ithaca, NY 14850-3342
(607) 277-5716 Phone • (607) 277-9057 Fax
www.retec.com

RETEC

Project Name:	Project Number:
Send Report To:	Sampler (Print Name):
Address:	Sampler (Print Name):
	Shipment Method:
	Airbill Number:
Phone:	Laboratory Receiving:
Fax:	

Analysis Requested

Page____of____

Purchase Order #:________

Field Sample ID	Sample Date	Sample Time	Sample Matrix	Number of Containers											Comments, Special Instructions, etc.	Lab Sample ID (to be completed by lab)
TS04(1.8-2.4)				1												EK080415-01
TS16				1												-02
TS17 (3-4)				1												-03
TS30(1-2)				1												-04
TS04 (1-1.8)				1												-05
TS18 (2-3)				1												-06
TS15				1												-07
TS30(3-4)				1												-08
TS29 (1.5-2.5)				1												-09
TS18(1-2)				1												-10
TS17(2-3)				1												-11
TS02				1												-12
TS17				1												-13
TS24(1-1.5)				1												-14
TS18				1												-15
TS24				1												-16
TS20				1												-17

Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:
[signature] 4/14/08	[signature]	4/15/08	09:38
Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:
Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:

Sample Custodian Remarks (Completed By Laboratory):

QA/QC Level		Turnaround		Sample Receipt	
				Total # Containers Received?	
Level I	☐	Routine	☐	COC Seals Present?	
Level II	☐	24 Hour	☐	COC Seals Intact?	
Level III	☐	1 Week	☐	Received Containers Intact?	
Other	☐	Other ____		Temperature?	5.6

White: Lab Copy Yellow: PM Copy Pink: Field Copy Gold: PM/QA/QC Copy

META Environmental, Inc.

Sample Receipt Log

Lab ID	Field ID	Matrix	Prep Method	Cleanup Method	Analysis Method	Date Sampled	Date Received	Project #	Container	Comments	Client Name	Project Name
EK080415-01	TS04 (1.8-2.4)	Sediment	2508		4007/4008	10/18/2007	4/15/2008	E02016-60	1 x 16 oz jar		ENSR	Troy-Smith Ave
EK080415-02	TS16	Sediment	2508		4007/4008	10/15/2007	4/15/2008	E02016-60	1 x 16 oz jar	Hold	ENSR	Troy-Smith Ave
EK080415-03	TS17 (3-4)	Sediment	2508		4007/4008	10/19/2007	4/15/2008	E02016-60	1 x 16 oz jar		ENSR	Troy-Smith Ave
EK080415-04	TS30 (1-2)	Sediment	2508		4007/4008	10/18/2007	4/15/2008	E02016-60	1 x 16 oz jar		ENSR	Troy-Smith Ave
EK080415-05	TS04 (1-1.8)	Sediment	2508		4007/4008	10/18/2007	4/15/2008	E02016-60	1 x 16 oz jar		ENSR	Troy-Smith Ave
EK080415-06	TS18 (2-3)	Sediment	2508		4007/4008	10/18/2007	4/15/2008	E02016-60	1 x 16 oz jar		ENSR	Troy-Smith Ave
EK080415-07	TS15	Sediment	2508		4007/4008	10/15/2007	4/15/2008	E02016-60	1 x 16 oz jar	Hold	ENSR	Troy-Smith Ave
EK080415-08	TS30 (3-4)	Sediment	2508		4007/4008	10/18/2007	4/15/2008	E02016-60	1 x 16 oz jar		ENSR	Troy-Smith Ave
EK080415-09	TS29 (1.5-2.5)	Sediment	2508		4007/4008	10/18/2007	4/15/2008	E02016-60	1 x 16 oz jar		ENSR	Troy-Smith Ave
EK080415-10	TS18 (1-2)	Sediment	2508		4007/4008	10/18/2007	4/15/2008	E02016-60	1 x 16 oz jar		ENSR	Troy-Smith Ave
EK080415-11	TS17 (2-3)	Sediment	2508		4007/4008	10/19/2007	4/15/2008	E02016-60	1 x 16 oz jar		ENSR	Troy-Smith Ave
EK080415-12	TS02	Sediment	2508		4007/4008	10/17/2007	4/15/2008	E02016-60	1 x 16 oz jar		ENSR	Troy-Smith Ave
EK080415-13	TS17	Sediment	2508		4007/4008	10/15/2007	4/15/2008	E02016-60	1 x 16 oz jar		ENSR	Troy-Smith Ave
EK080415-14	TS24 (1-1.5)	Sediment	2508		4007/4008	10/19/2007	4/15/2008	E02016-60	1 x 16 oz jar		ENSR	Troy-Smith Ave
EK080415-15	TS18	Sediment	2508		4007/4008	10/15/2007	4/15/2008	E02016-60	1 x 16 oz jar		ENSR	Troy-Smith Ave
EK080415-16	TS24	Sediment	2508		4007/4008	10/17/2007	4/15/2008	E02016-60	1 x 16 oz jar		ENSR	Troy-Smith Ave
EK080415-17	TS20	Sediment	2508		4007/4008	10/17/2007	4/15/2008	E02016-60	1 x 16 oz jar		ENSR	Troy-Smith Ave

Logged By: ll

Date: 4/29/08

Reviewed By: JR

Date: 4/28/08

META Environmental, Inc.

Sample Receipt Checklist

Receipt date: 4/15/2008

Login date: ↓

Login personnel: LAURIE A. LARKIN

Client Information:.

Company Name: ~~RETEC~~ ENSR

Project Manager: NICK AZZOLINA

Project Name: TROY - SMITH AVE

Shipping Information:

How were samples received? UPS ~~FedEx~~ DHL Other:

Number of coolers: 1

Internal temperature of coolers: 5.6 c

Was ice present? Yes / No ICE PACKS

Note: if cooler is outside the 2-6° range, META's project manager should be notified.

Documentation:

Was a Chain of Custody present? Yes / No

Was it signed? Yes / No

Was all project information present on the COC? Yes / No

Was a bill of lading or shipping label retained? Yes / No

Sample Information:

Number of sample containers: 17

Does this match the COC? Yes / No

Were all sample containers Intact? Yes / No

If no, list samples and problems:

Note: if samples are damaged, META's project manager should be notified.

For aqueous 40ml Voas; was headspace present? Yes / No / NA

Comments:

Custodian: Laurie A. Larkin

Project Manager: [signature]

Chain of Custody Record

№ 0892

The RETEC Group, Inc.
1001 W. Seneca Street, Suite 204 • Ithaca, NY 14850-3342
(607) 277-5716 Phone • (607) 277-9057 Fax
www.retec.com

RETEC

Project Name:	Project Number:
Send Report To:	Sampler (Print Name):
Address:	Sampler (Print Name):
	Shipment Method:
	Airbill Number:
Phone:	Laboratory Receiving:
Fax:	

Analysis Requested

Page ____ of ____

Purchase Order #: ____________

Field Sample ID	Sample Date	Sample Time	Sample Matrix	Number of Containers												Comments, Special Instructions, etc.	Lab Sample ID (to be completed by lab)
TS02(4.5-5.5)																	EK080417-01
TS04																	↓ -02

Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:
[signature] 4/16/08	Laurie A. Larkin	4/17/08	10:00
Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:
Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:

Sample Custodian Remarks (Completed By Laboratory):

QA/QC Level	Turnaround
Level I ☐	Routine ☐
Level II ☐	24 Hour ☐
Level III ☐	1 Week ☐
Other ☐	Other ____

Sample Receipt	
Total # Containers Received?	2
COC Seals Present?	Y
COC Seals Intact?	Y
Received Containers Intact?	Y
Temperature?	8.2

White: Lab Copy Yellow: PM Copy Pink: Field Copy Gold: PM/QA/QC Copy

META Environmental, Inc.

Sample Receipt Log

Lab ID	Field ID	Matrix	Prep Method	Cleanup Method	Analysis Method	Date Sampled	Date Received	Project #	Container	Comments	Client Name	Project Name
EK080417-01	TS02(4.5-5.5)	Sediment	2508		4007/4008	10/18/2007	4/17/2008	E02016-60	1 x 2 oz jar		ENSR	Troy-Smith Ave
EK080417-02	TS04	Sediment	2508		4007/4008	10/17/2007	4/17/2008	E02016-60	1 x 2 oz jar		ENSR	Troy-Smith Ave

Logged By: JK

Date: 4/29/08

Reviewed By: JK

Date: 4/28/08

META Environmental, Inc.

Sample Receipt Checklist

Receipt date: 4/17/2008

Login date: 6

Login personnel: LAURIE A LARKIN

Client Information:

Company Name: ENSR

Project Manager: NICK AZZOLINA

Project Name: TROY-SMITH AVE

Shipping Information:

How were samples received? UPS FedEx DHL Other:

Number of coolers: 1

Internal temperature of coolers: 8.2'c

Was ice present? Yes / No ICE PACKS

Note: if cooler is outside the 2-6° range, META's project manager should be notified.

Documentation:

Was a Chain of Custody present? Yes / No

Was it signed? Yes / No

Was all project information present on the COC? Yes / No

Was a bill of lading or shipping label retained? Yes / No

Sample Information:

Number of sample containers: 2

Does this match the COC? Yes / No

Were all sample containers Intact? Yes / No

If no, list samples and problems:

Note: if samples are damaged, META's project manager should be notified.

For aqueous 40ml Voas; was headspace present? Yes / No / NA

Comments:

Custodian: Laurie A. Larkin

Project Manager: [signature]

Chain of Custody Record

№ 0321

The RETEC Group, Inc.
1001 W. Seneca Street, Suite 204 • Ithaca, NY 14850-3342
(607) 277-5716 Phone • (607) 277-9057 Fax
www.retec.com

RETEC

Project Name: Troy Smith Ave	Project Number: 04940-144
Send Report To: Nick Azzolina	Sampler (Print Name): H. Jones
Address: 1001 W. Seneca St Suite 204 Ithaca NY 14850	Sampler (Print Name): J. Lloyd
	Shipment Method: FedEx
	Airbill Number:
Phone: 607-277-5716	Laboratory Receiving: EERC
Fax: 607-277-9057	

Page 1 of 1

Purchase Order #:

Analysis Requested: total Soxhlet SPME pore water; TOC; SOC; DOC

Field Sample ID	Sample Date	Sample Time	Sample Matrix	Number of Containers	total Soxhlet SPME pore water	TOC	SOC	DOC								Comments, Special Instructions, etc.	Lab Sample ID (to be completed by lab)
TS15 1C	10/15/07	1600	Sed	1													
TS16 1C	↓	1615	↓	↓													
TS17 3C	↓	1700	↓	↓													
TS18 1C	↓	1716	↓	↓													

Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:
Helen J. Jones	[signature]	10/16/07	9:35a
Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:
Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:

Sample Custodian Remarks (Completed By Laboratory):

QA/QC Level	Turnaround	Sample Receipt	
Level I	Routine	Total # Containers Received?	
Level II	24 Hour	COC Seals Present?	
Level III	1 Week	COC Seals Intact?	
Other	Other ______	Received Containers Intact?	
		Temperature?	

White: Lab Copy   Yellow: PM Copy   Pink: Field Copy   Gold: PM/QA/QC Copy

Chain of Custody Record

№ 0324

The RETEC Group, Inc.
1001 W. Seneca Street, Suite 204 • Ithaca, NY 14850-3342
(607) 277-5716 Phone • (607) 277-9057 Fax
www.retec.com

RETEC

Project Name: Troy Smith Ave	Project Number: 04940-144
Send Report To: Nick Azzolina	Sampler (Print Name): H. Jones
Address: 1001 W. Seneca St	Sampler (Print Name): J. Lloyd
Suite 204	Shipment Method: Fed Ex
Ithaca NY 14850	Airbill Number:
Phone: 607-277-5716	Laboratory Receiving: EERC
Fax: 607-277-9057	

Analysis Requested: total Soxhlet, SPME Pore Water, TOC, SOC, DOC

Page 1 of 1

Purchase Order #:

Field Sample ID	Sample Date	Sample Time	Sample Matrix	Number of Containers	total Soxhlet	SPME Pore Water	TOC	SOC	DOC							Comments, Special Instructions, etc.	Lab Sample ID (to be completed by lab)
TS19 4C	10/17/07	0940	Sed	1													
TS23 5C	↓	1025	↓	↓													
TS20 3C		1100															
TS02 1C		1145															
TS04 3C		1210															
TS24 6C		1250															

Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:
Helen A. J[illegible]	David [illegible]	10/18/07	9:50a
Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:
Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:

Sample Custodian Remarks (Completed By Laboratory):

QA/QC Level	Turnaround	Sample Receipt	
Level I ☐	Routine ☐	Total # Containers Received?	
Level II ☐	24 Hour ☐	COC Seals Present?	
Level III ☐	1 Week ☐	COC Seals Intact?	
Other ☐	Other ____	Received Containers Intact?	
		Temperature?	

White: Lab Copy Yellow: PM Copy Pink: Field Copy Gold: PM/QA/QC Copy

Chain of Custody Record

№ 0361

The RETEC Group, Inc.
1001 W. Seneca Street, Suite 204 • Ithaca, NY 14850-3342
(607) 277-5716 Phone • (607) 277-9057 Fax
www.retec.com

RETEC

Project Name: Troy Smith Ave	Project Number: 04940-144-200
Send Report To: Nick Azzolina	Sampler (Print Name): H. Jones
Address: 1001 W. Seneca St.	Sampler (Print Name): J. Lloyd
Suite 204	Shipment Method: FedEx
Ithaca NY 14850	Airbill Number:
Phone: 607-277-5716	Laboratory Receiving: EBRG
Fax: 607-277-9057	

Analysis Requested: Soxhlet; SPME pore water; TOC; SOC; DOC

Page 1 of 1

Purchase Order #:

Field Sample ID		Sample Date	Sample Time	Sample Matrix	Number of Containers	Comments, Special Instructions, etc.	Lab Sample ID (to be completed by lab)
TS09	12C	10/18/07	0940	sed	1		
TS09 (12-18)	9C		0940				
TS09 (24-32)	10C		0940				
TS07 (12-24)	11C		1050				
TS07 (24-36)	11C		1050				
TS02 (12-24)	11C		1125				
TS02 (30-42)	10C		1130				
TS02 (4.5-5.5)	10C		1135				
TS04 (1-1.8)	7C		1340				
TS04 (1.8-2.4)	5C		1345				
TS30 (1-2)	8C		1600				
TS30 (3-4)	6C		1615				
TS29 (1.5-2.5)	6C		1630				
TS18 (1-2)	10C		1715				
TS18 (2-3)	10C	↓	1725	↓	↓	TS-18 (2-3) Broken upon arrival transferred to New Jar	

Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:
Helen J. Jones	David Miller	9:10a	10/19/07
Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:
Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:

Sample Custodian Remarks (Completed By Laboratory):

QA/QC Level	Turnaround	Sample Receipt	
Level I ☐	Routine ☐	Total # Containers Received?	
Level II ☐	24 Hour ☐	COC Seals Present?	
Level III ☐	1 Week ☐	COC Seals Intact?	
Other ☐	Other ____	Received Containers Intact?	
		Temperature?	

White: Lab Copy Yellow: PM Copy Pink: Field Copy Gold: PM/QA/QC Copy

Chain of Custody Record

№ 0371

The RETEC Group, Inc.
1001 W. Seneca Street, Suite 204 • Ithaca, NY 14850-3342
(607) 277-5716 Phone • (607) 277-9057 Fax
www.retec.com

RETEC

Project Name: Troy Smith Ave	Project Number: 04940-144	Analysis Requested: Soxhlet SPME pore water TOC SOC DOC	Page 1 of 1
Send Report To: Nick Azzolina	Sampler (Print Name): H. Jones		
Address: 1001 W. Seneca St	Sampler (Print Name): D. Sero		
Suite 204	Shipment Method: FedEx		
Ithaca NY 14850	Airbill Number:		Purchase Order #:
Phone: 607-277-5716	Laboratory Receiving: EERC		
Fax: 607-277-9057			

Field Sample ID	Sample Date	Sample Time	Sample Matrix	Number of Containers	Comments, Special Instructions, etc.	Lab Sample ID (to be completed by lab)
TS16 (1.5-2) 15C	10/19/07	0745	Sed	1		
TS16 (2.1-3.5) 14C	↓	0750	↓	↓		
TS15 (1-2) 14C	↓	0800	↓	↓		
TS15 (3-4) 15C	↓	0805	↓	↓		
TS17 (2-3) 14C	↓	0815	↓	↓		
TS17 (3-4) 15C	↓	0820	↓	↓		
TS24 (1-1.5) 14C	↓	1000	↓	↓		

Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:
Helen A. Jones	[signature]	10/22/07	9:38a

Sample Custodian Remarks (Completed By Laboratory):

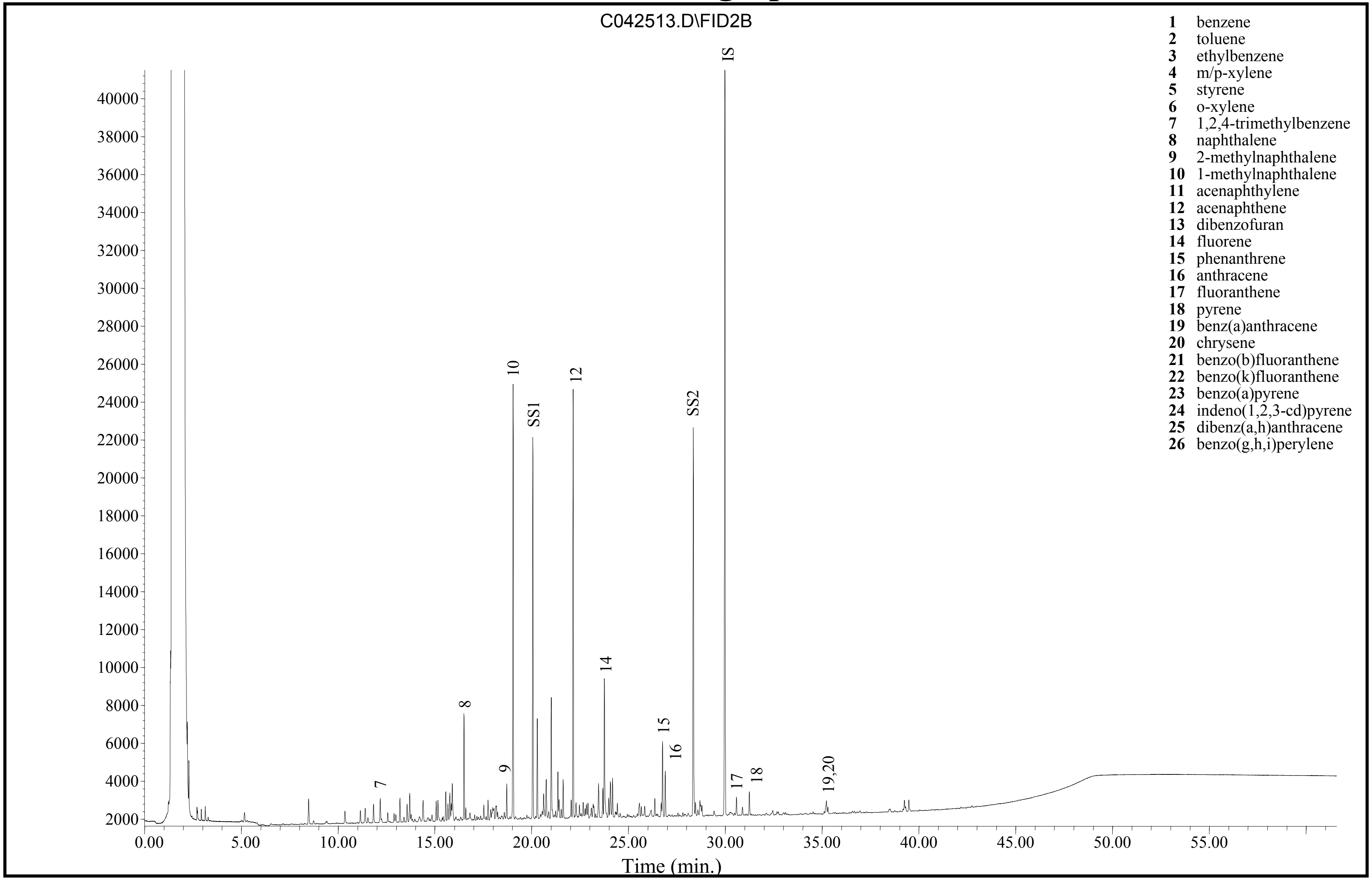
QA/QC Level	Turnaround	Sample Receipt	
Level I ☐	Routine ☐	Total # Containers Received?	
Level II ☐	24 Hour ☐	COC Seals Present?	
Level III ☐	1 Week ☐	COC Seals Intact?	
Other ☐	Other ____	Received Containers Intact?	
		Temperature?	

White: Lab Copy Yellow: PM Copy Pink: Field Copy Gold: PM/QA/QC Copy

Appendix B

GC/FID Fingerprints

GC/FID Fingerprint

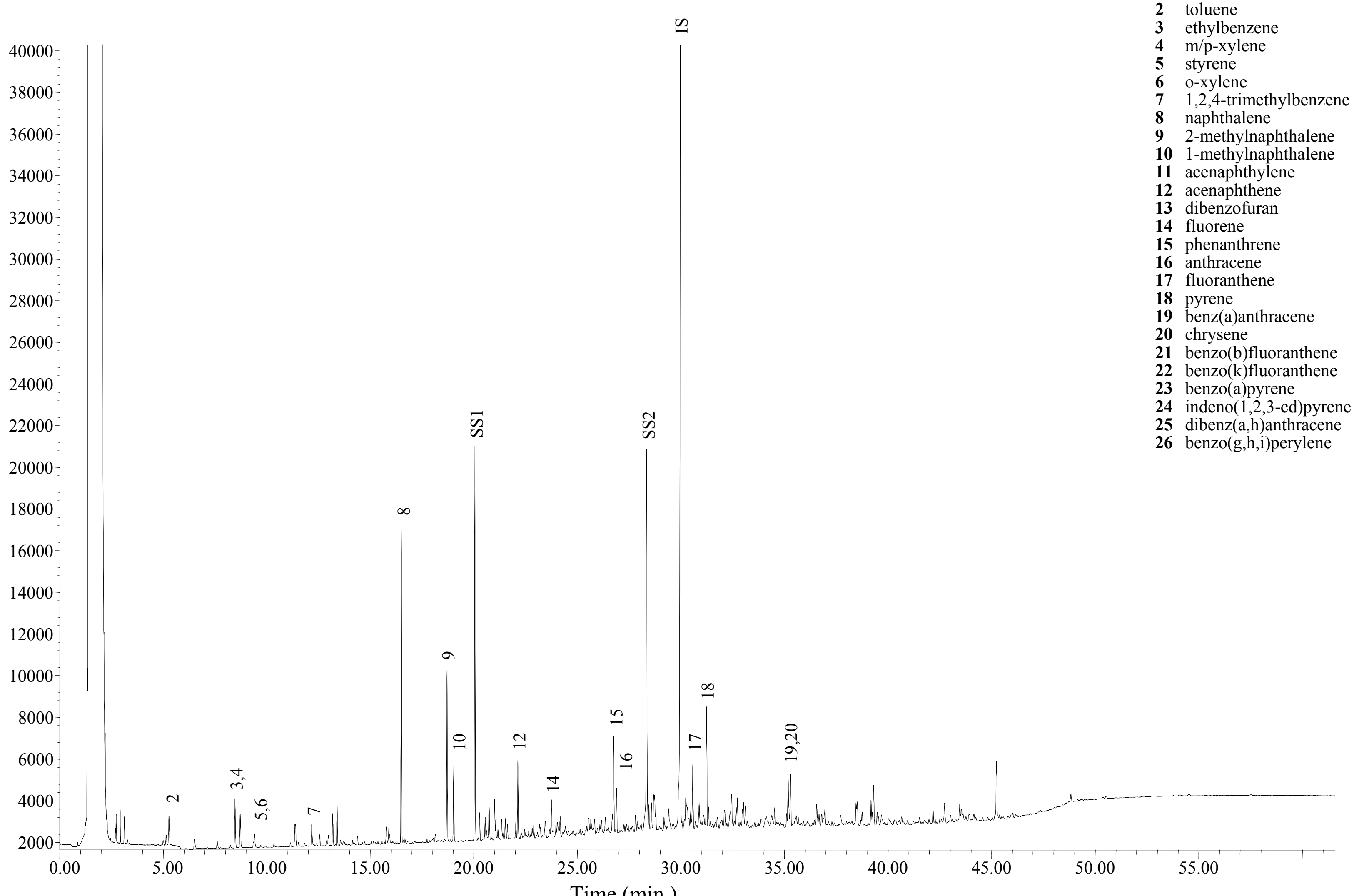


Extraction Date: 04/24/2008
Analysis Date: 04/26/2008

IS – 5-a-androstane
SS1 – 2-fluorobiphenyl
SS2 – o-terphenyl

Field ID: TS04 (1.8-2.4)
Laboratory ID: EK080415-01
Method: EPA 8100M

GC/FID Fingerprint



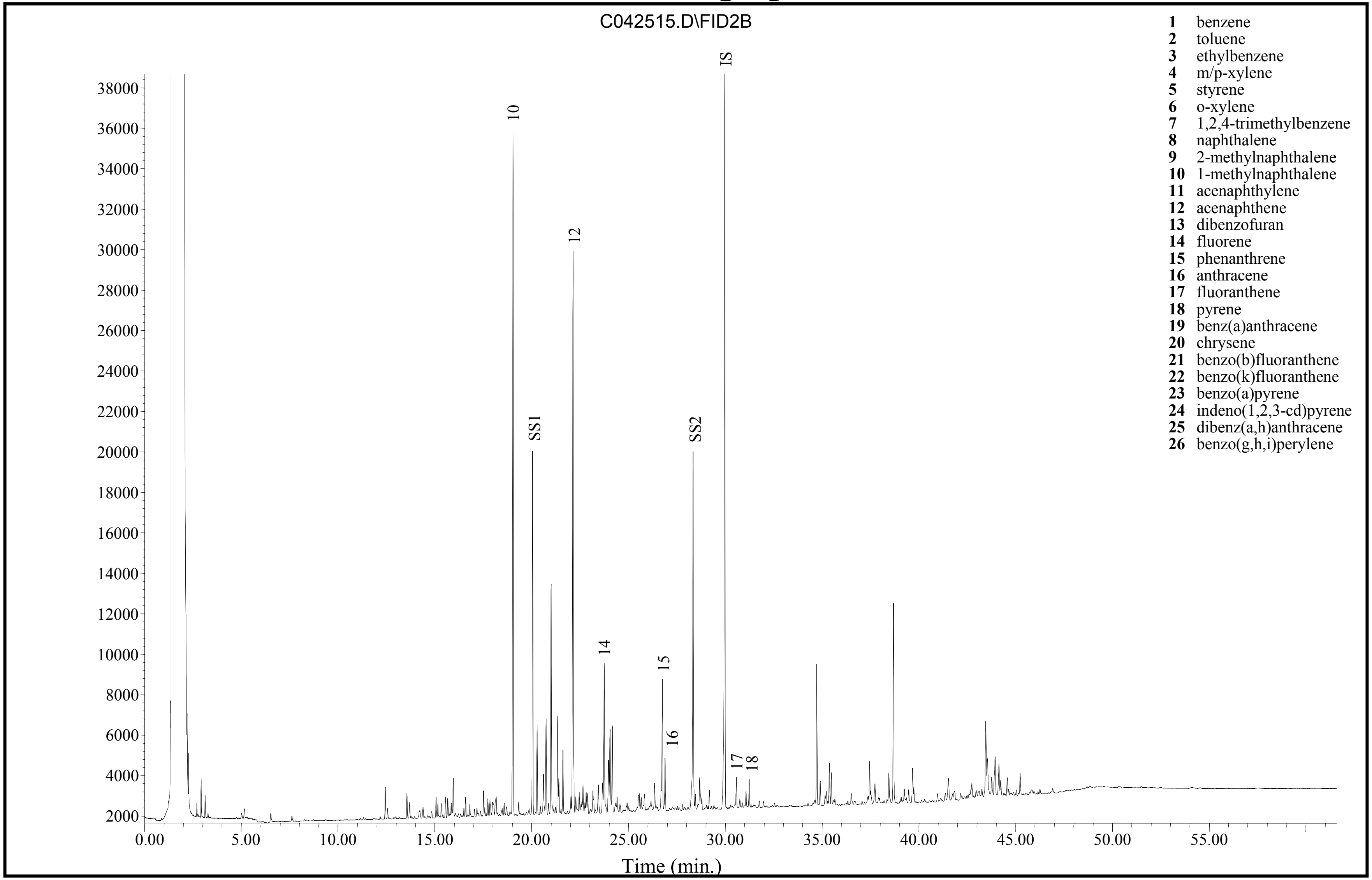
1 benzene
2 toluene
3 ethylbenzene
4 m/p-xylene
5 styrene
6 o-xylene
7 1,2,4-trimethylbenzene
8 naphthalene
9 2-methylnaphthalene
10 1-methylnaphthalene
11 acenaphthylene
12 acenaphthene
13 dibenzofuran
14 fluorene
15 phenanthrene
16 anthracene
17 fluoranthene
18 pyrene
19 benz(a)anthracene
20 chrysene
21 benzo(b)fluoranthene
22 benzo(k)fluoranthene
23 benzo(a)pyrene
24 indeno(1,2,3-cd)pyrene
25 dibenz(a,h)anthracene
26 benzo(g,h,i)perylene

Extraction Date: 04/24/2008
Analysis Date: 04/26/2008

Field ID: **TS17 (3-4)**
Laboratory ID: EK080415-03
Method: EPA 8100M

IS – 5-a-androstane
SS1 – 2-fluorobiphenyl
SS2 – o-terphenyl

GC/FID Fingerprint

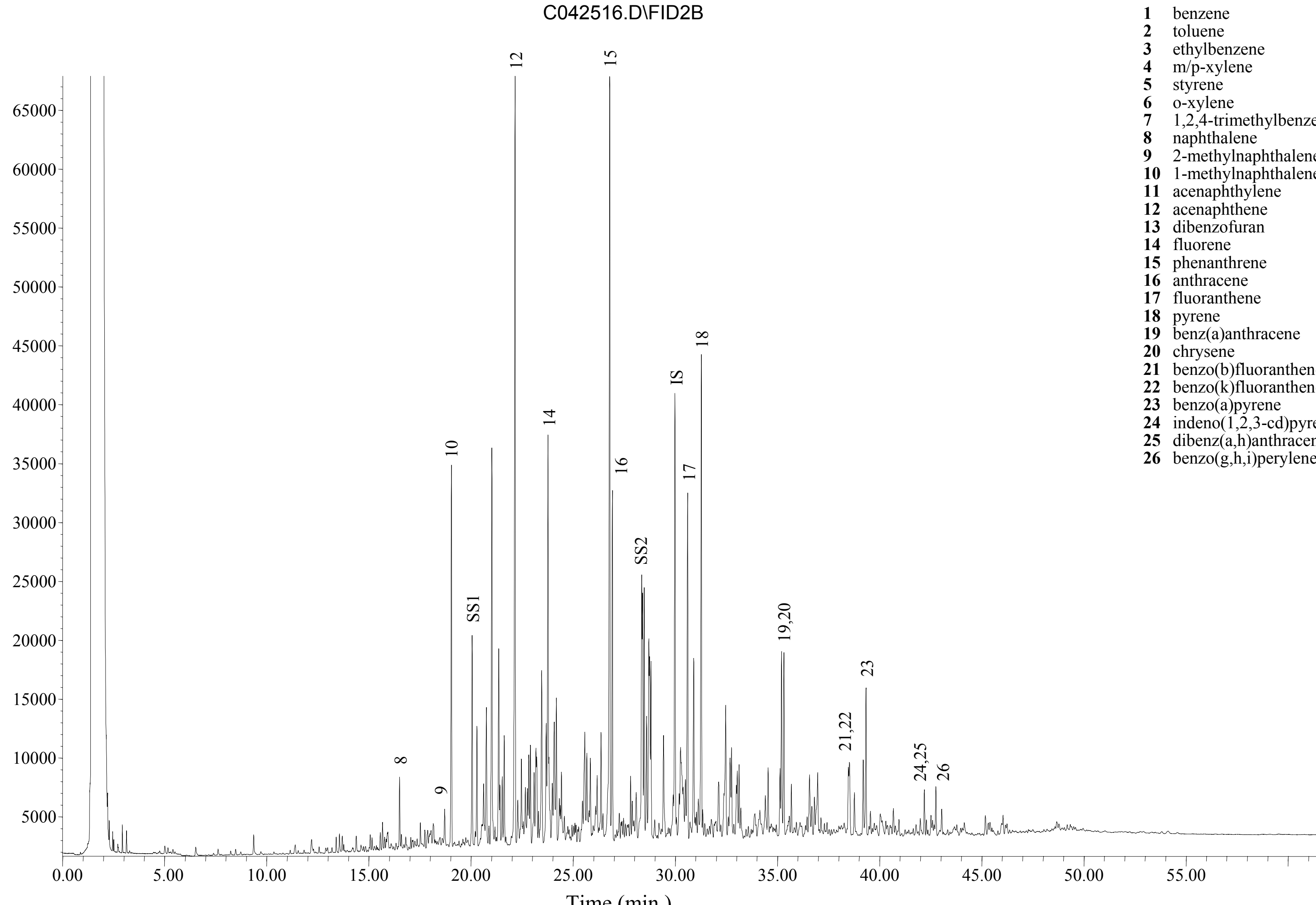


Extraction Date: 04/24/2008
Analysis Date: 04/26/2008

IS – 5-a-androstane
SS1 – 2-fluorobiphenyl
SS2 – o-terphenyl

Field ID:	**TS30 (1-2)**
Laboratory ID:	EK080415-04
Method:	EPA 8100M

GC/FID Fingerprint



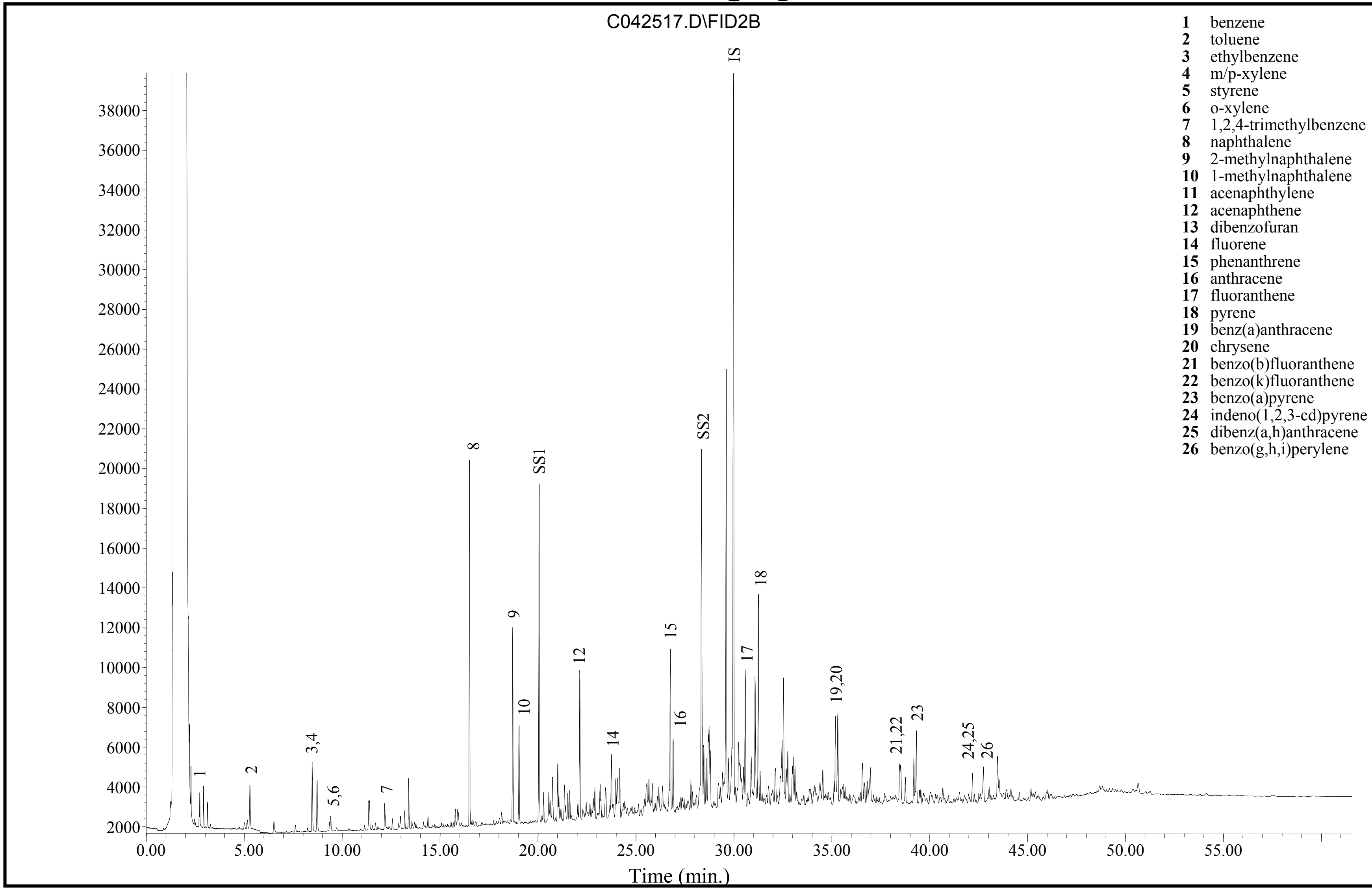
1 benzene
2 toluene
3 ethylbenzene
4 m/p-xylene
5 styrene
6 o-xylene
7 1,2,4-trimethylbenzene
8 naphthalene
9 2-methylnaphthalene
10 1-methylnaphthalene
11 acenaphthylene
12 acenaphthene
13 dibenzofuran
14 fluorene
15 phenanthrene
16 anthracene
17 fluoranthene
18 pyrene
19 benz(a)anthracene
20 chrysene
21 benzo(b)fluoranthene
22 benzo(k)fluoranthene
23 benzo(a)pyrene
24 indeno(1,2,3-cd)pyrene
25 dibenz(a,h)anthracene
26 benzo(g,h,i)perylene

Extraction Date: 04/24/2008
Analysis Date: 04/26/2008

IS – 5-a-androstane
SS1 – 2-fluorobiphenyl
SS2 – o-terphenyl

Field ID: **TS04 (1-1.8)**
Laboratory ID: EK080415-05
Method: EPA 8100M

GC/FID Fingerprint

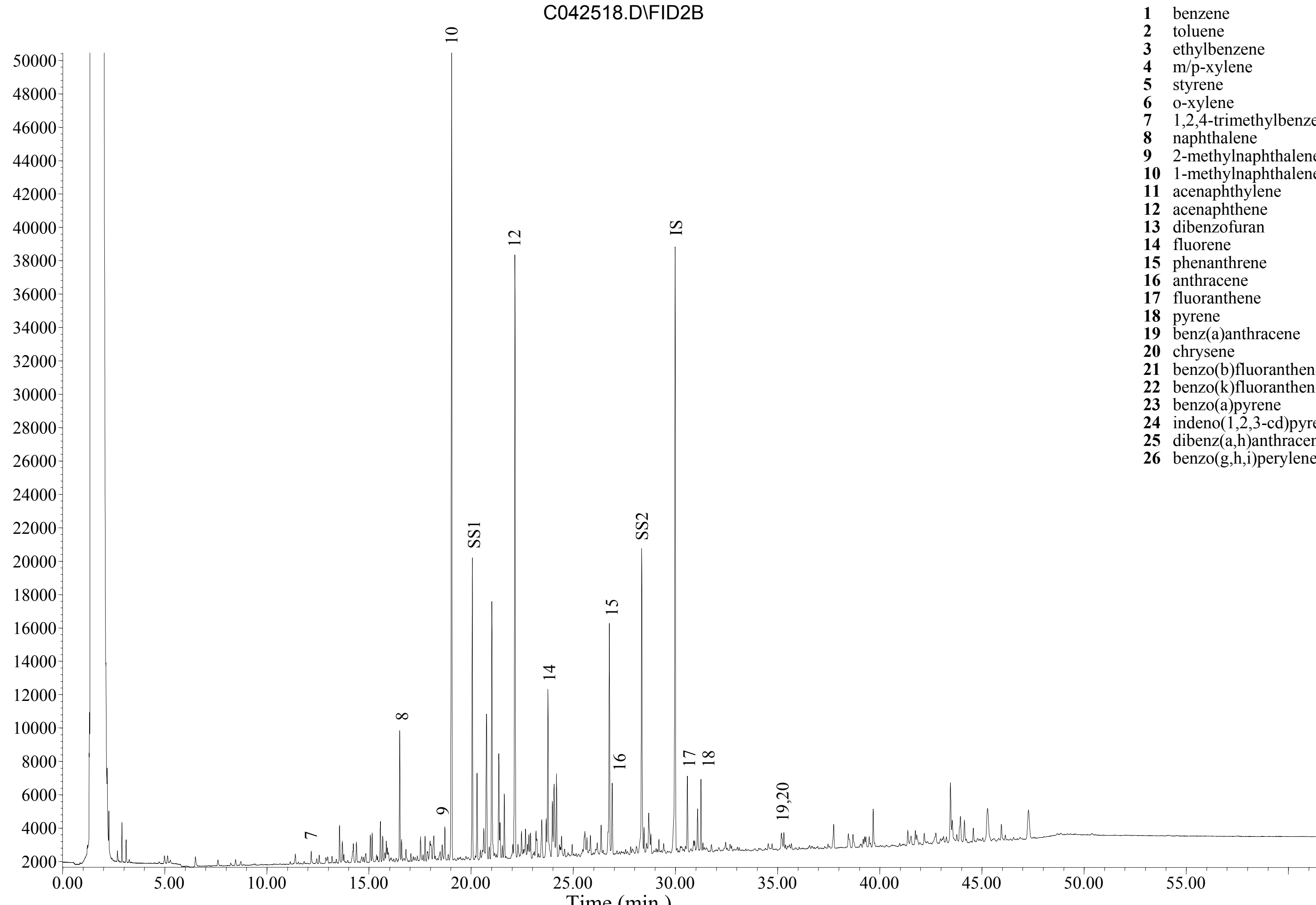


Extraction Date: 04/24/2008
Analysis Date: 04/26/2008

Field ID:	TS18 (2-3)
Laboratory ID:	EK080415-06
Method:	EPA 8100M

IS – 5-a-androstane
SS1 – 2-fluorobiphenyl
SS2 – o-terphenyl

GC/FID Fingerprint



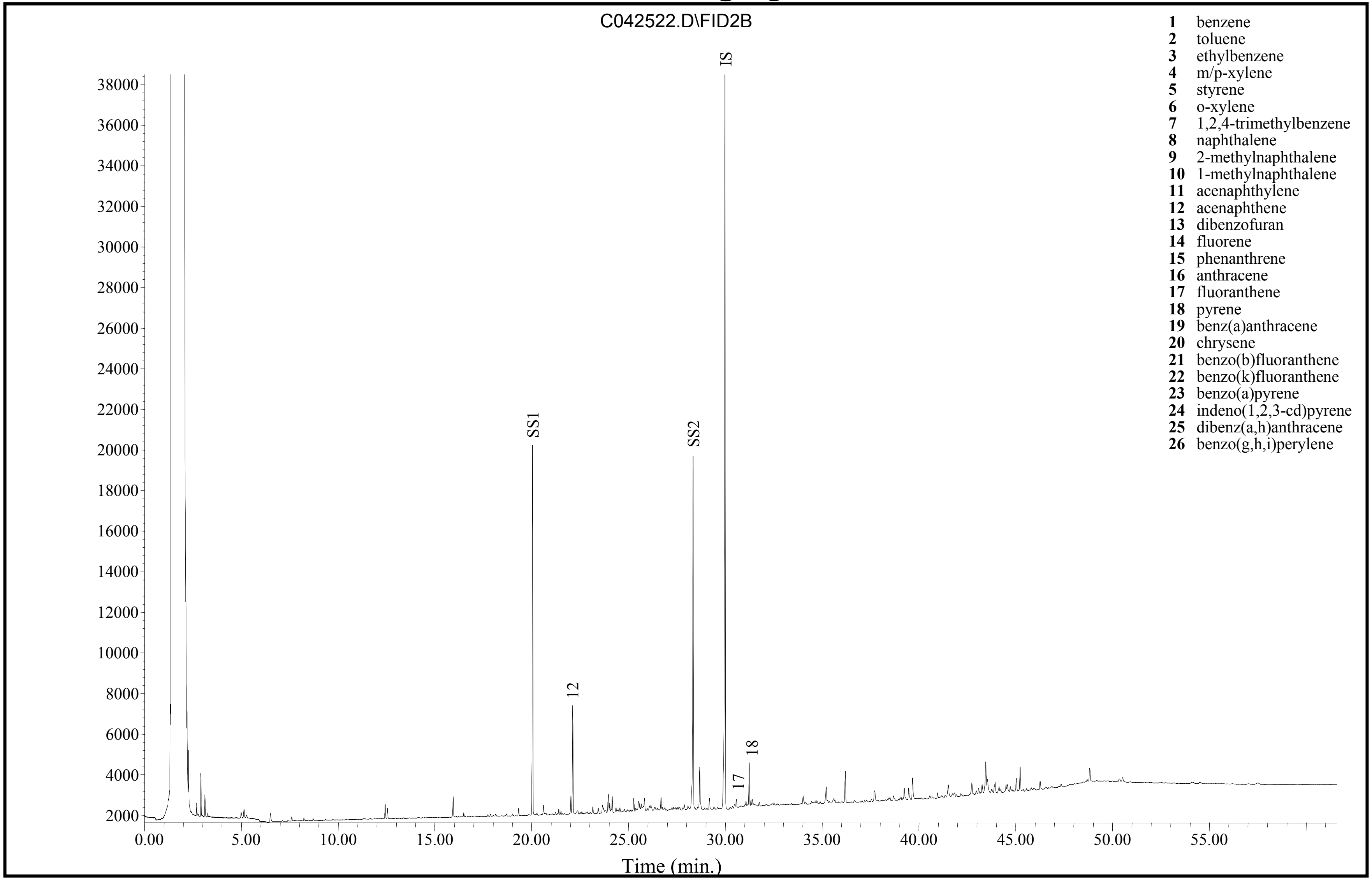
1 benzene
2 toluene
3 ethylbenzene
4 m/p-xylene
5 styrene
6 o-xylene
7 1,2,4-trimethylbenzene
8 naphthalene
9 2-methylnaphthalene
10 1-methylnaphthalene
11 acenaphthylene
12 acenaphthene
13 dibenzofuran
14 fluorene
15 phenanthrene
16 anthracene
17 fluoranthene
18 pyrene
19 benz(a)anthracene
20 chrysene
21 benzo(b)fluoranthene
22 benzo(k)fluoranthene
23 benzo(a)pyrene
24 indeno(1,2,3-cd)pyrene
25 dibenz(a,h)anthracene
26 benzo(g,h,i)perylene

Extraction Date: 04/24/2008
Analysis Date: 04/26/2008

IS – 5-a-androstane
SS1 – 2-fluorobiphenyl
SS2 – o-terphenyl

Field ID: **TS30 (3-4)**
Laboratory ID: EK080415-08
Method: EPA 8100M

GC/FID Fingerprint

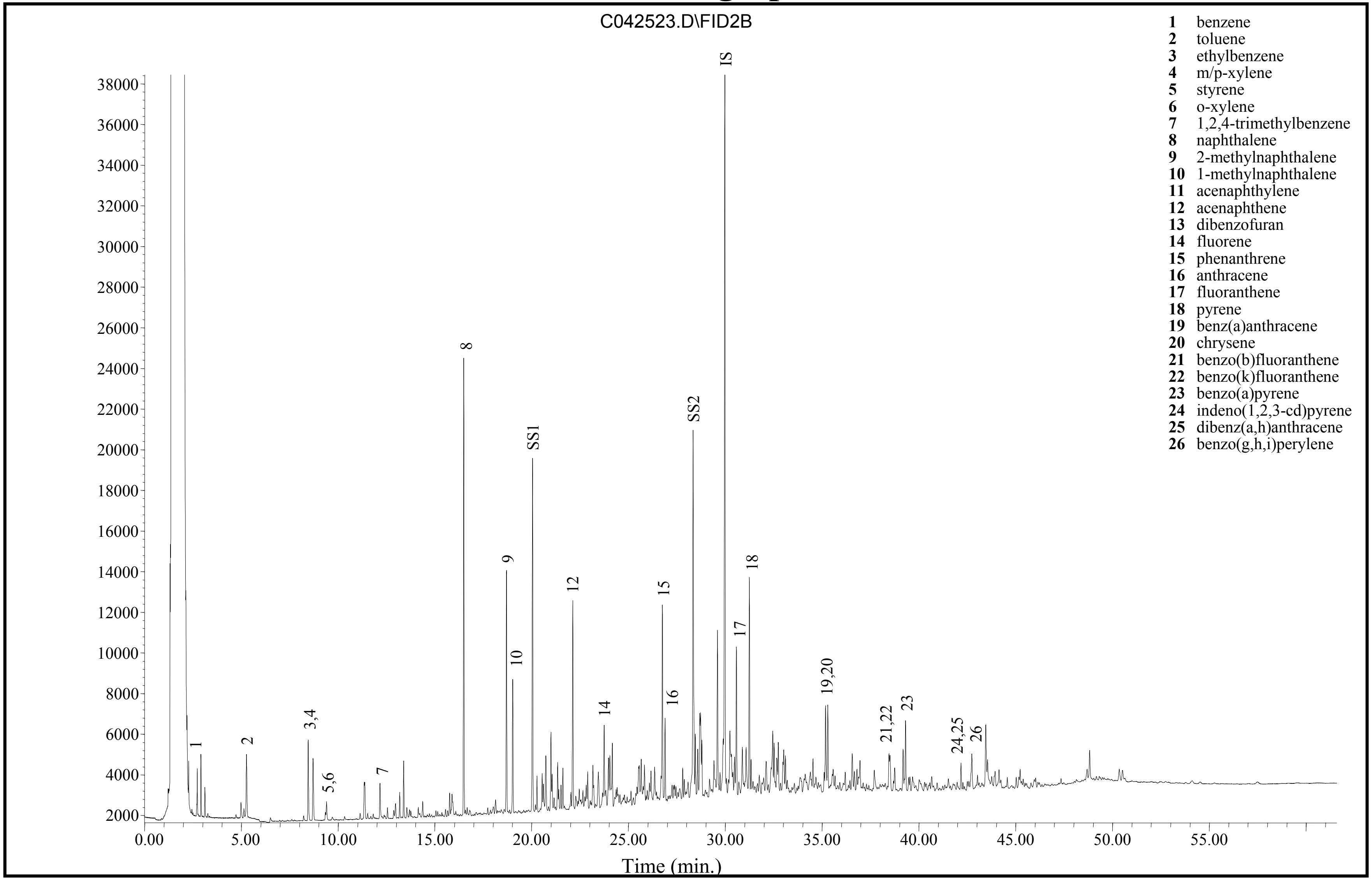


Extraction Date: 04/24/2008
Analysis Date: 04/26/2008

Field ID: **TS29 (1.5-2.5)**
Laboratory ID: EK080415-09
Method: EPA 8100M

IS – 5-a-androstane
SS1 – 2-fluorobiphenyl
SS2 – o-terphenyl

GC/FID Fingerprint

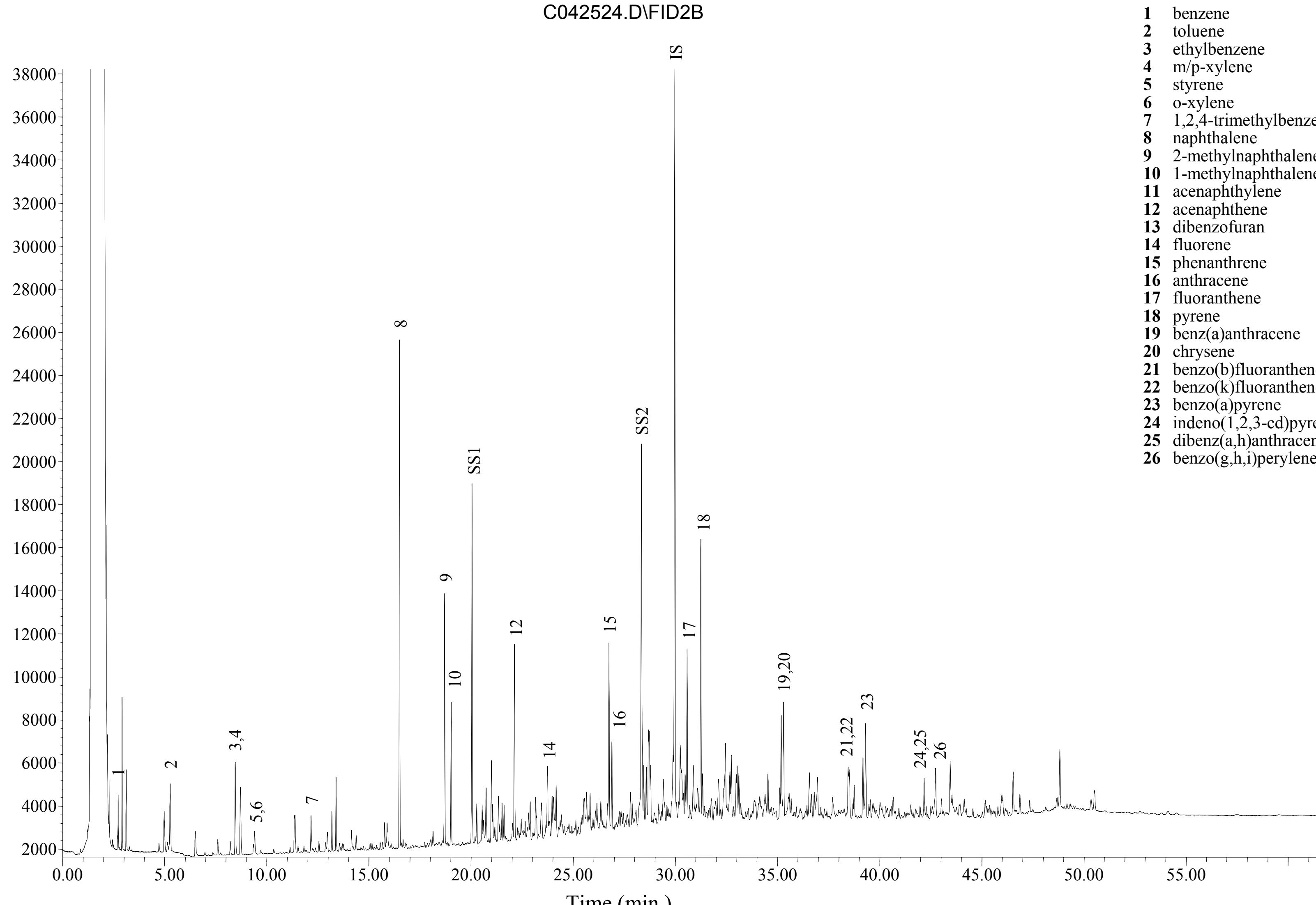


Extraction Date: 04/24/2008
Analysis Date: 04/26/2008

Field ID: TS18 (1-2)
Laboratory ID: EK080415-10
Method: EPA 8100M

IS – 5-a-androstane
SS1 – 2-fluorobiphenyl
SS2 – o-terphenyl

GC/FID Fingerprint



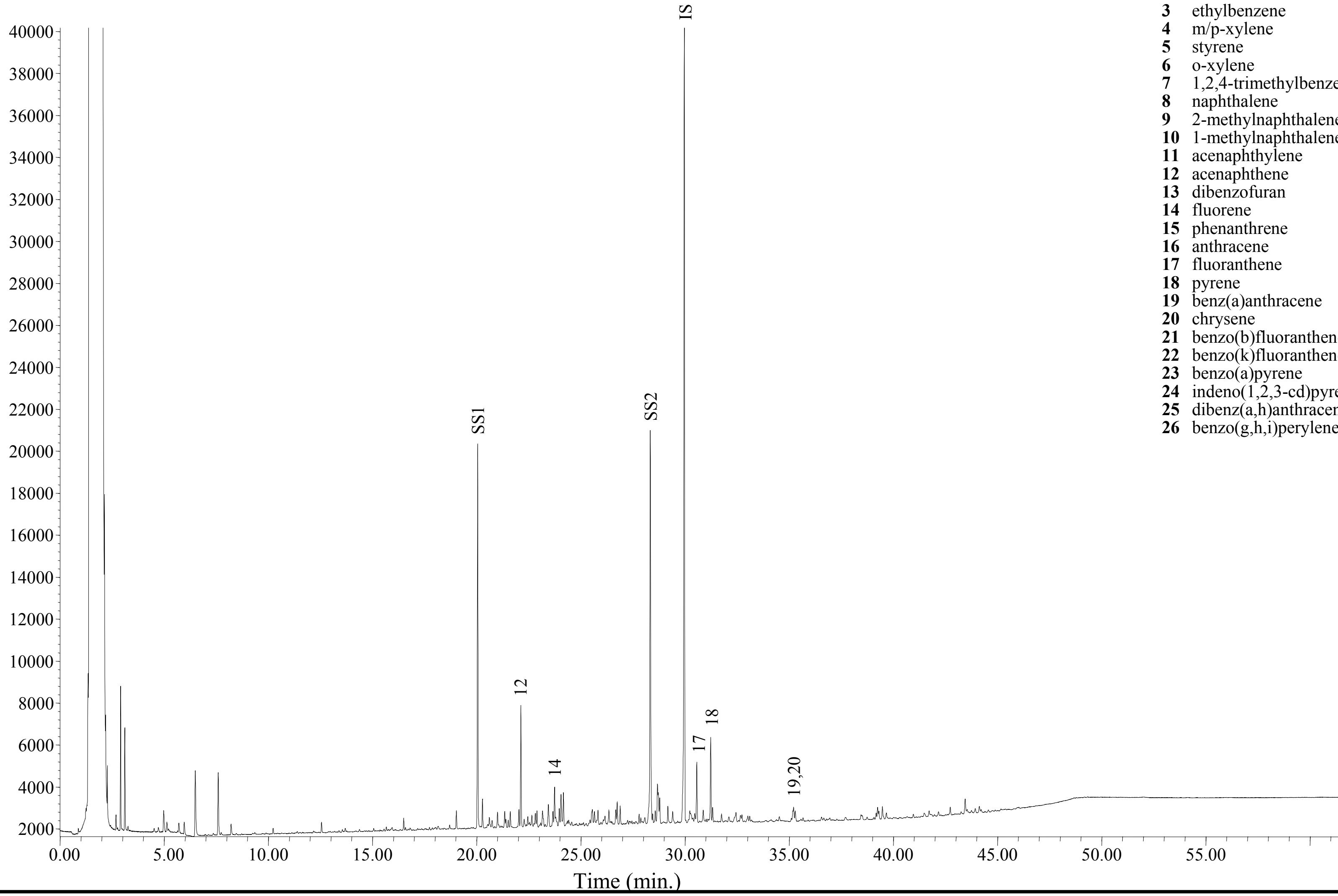
1	benzene
2	toluene
3	ethylbenzene
4	m/p-xylene
5	styrene
6	o-xylene
7	1,2,4-trimethylbenzene
8	naphthalene
9	2-methylnaphthalene
10	1-methylnaphthalene
11	acenaphthylene
12	acenaphthene
13	dibenzofuran
14	fluorene
15	phenanthrene
16	anthracene
17	fluoranthene
18	pyrene
19	benz(a)anthracene
20	chrysene
21	benzo(b)fluoranthene
22	benzo(k)fluoranthene
23	benzo(a)pyrene
24	indeno(1,2,3-cd)pyrene
25	dibenz(a,h)anthracene
26	benzo(g,h,i)perylene

Extraction Date: 04/24/2008
Analysis Date: 04/26/2008

IS – 5-a-androstane
SS1 – 2-fluorobiphenyl
SS2 – o-terphenyl

Field ID:	**TS17 (2-3)**
Laboratory ID:	EK080415-11
Method:	EPA 8100M

GC/FID Fingerprint



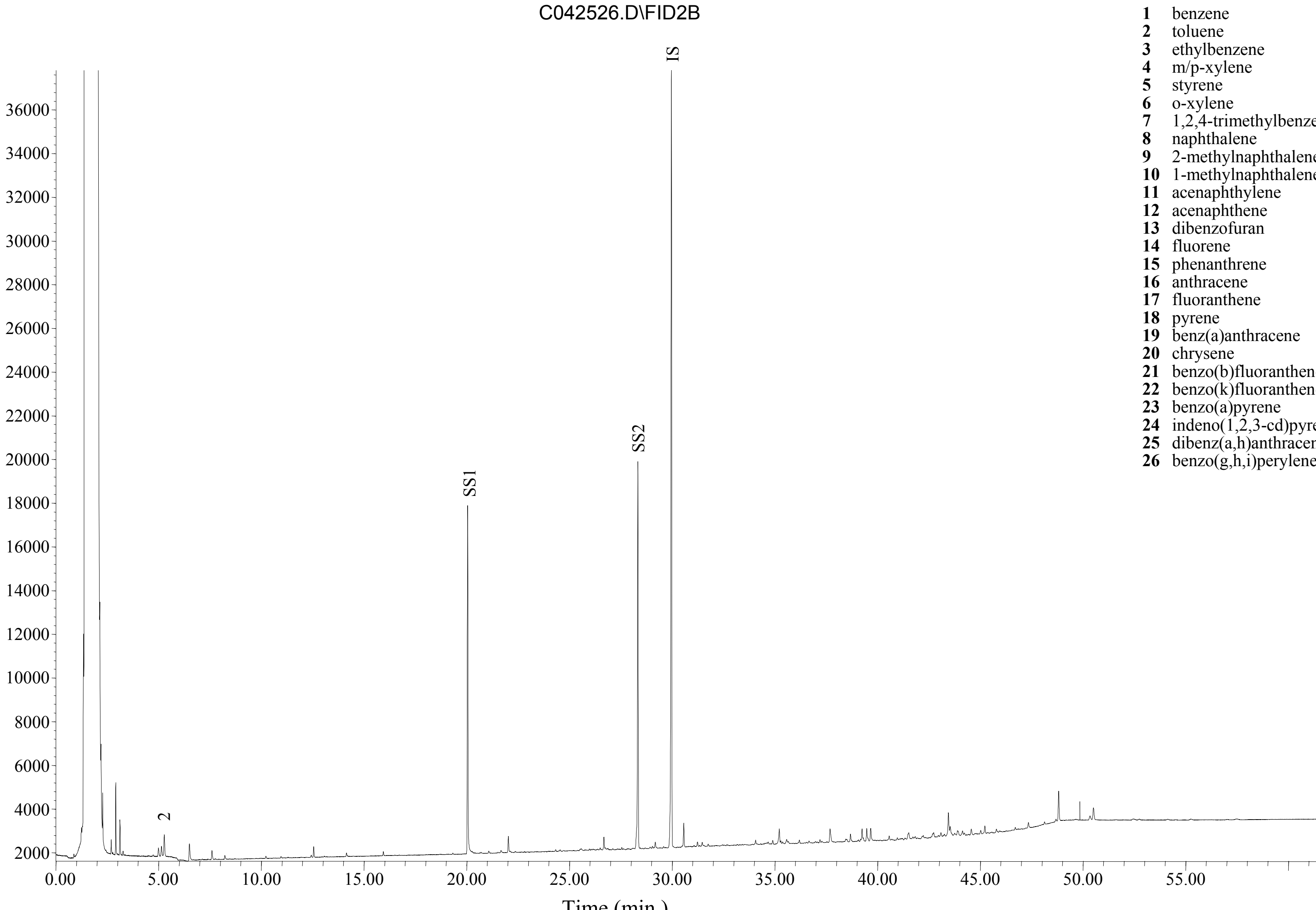
1 benzene
2 toluene
3 ethylbenzene
4 m/p-xylene
5 styrene
6 o-xylene
7 1,2,4-trimethylbenzene
8 naphthalene
9 2-methylnaphthalene
10 1-methylnaphthalene
11 acenaphthylene
12 acenaphthene
13 dibenzofuran
14 fluorene
15 phenanthrene
16 anthracene
17 fluoranthene
18 pyrene
19 benz(a)anthracene
20 chrysene
21 benzo(b)fluoranthene
22 benzo(k)fluoranthene
23 benzo(a)pyrene
24 indeno(1,2,3-cd)pyrene
25 dibenz(a,h)anthracene
26 benzo(g,h,i)perylene

Extraction Date: 04/24/2008
Analysis Date: 04/26/2008

IS – 5-a-androstane
SS1 – 2-fluorobiphenyl
SS2 – o-terphenyl

Field ID: TS02
Laboratory ID: EK080415-12
Method: EPA 8100M

GC/FID Fingerprint



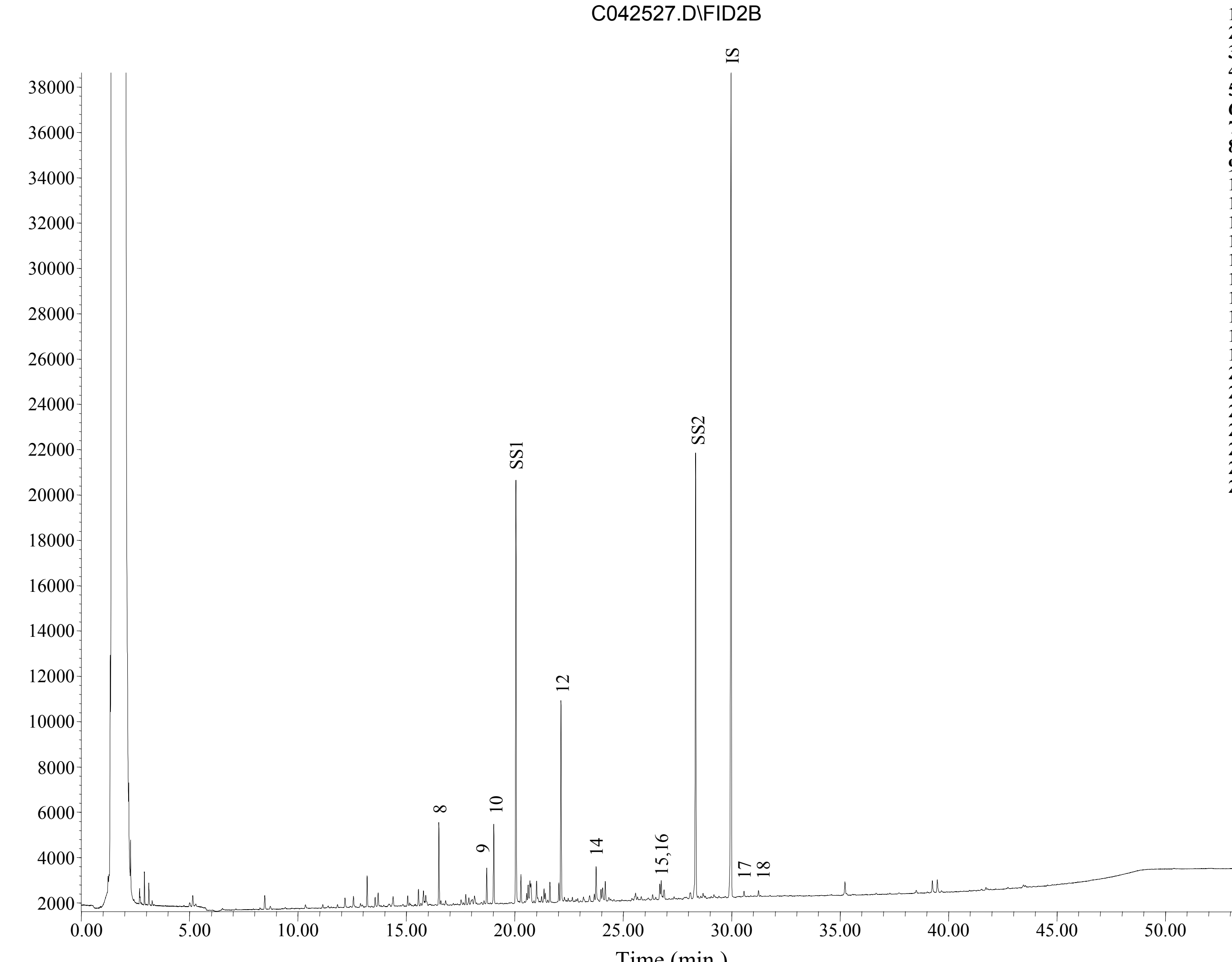
1 benzene
2 toluene
3 ethylbenzene
4 m/p-xylene
5 styrene
6 o-xylene
7 1,2,4-trimethylbenzene
8 naphthalene
9 2-methylnaphthalene
10 1-methylnaphthalene
11 acenaphthylene
12 acenaphthene
13 dibenzofuran
14 fluorene
15 phenanthrene
16 anthracene
17 fluoranthene
18 pyrene
19 benz(a)anthracene
20 chrysene
21 benzo(b)fluoranthene
22 benzo(k)fluoranthene
23 benzo(a)pyrene
24 indeno(1,2,3-cd)pyrene
25 dibenz(a,h)anthracene
26 benzo(g,h,i)perylene

Extraction Date: 04/24/2008
Analysis Date: 04/26/2008

Field ID: **TS17**
Laboratory ID: EK080415-13
Method: EPA 8100M

IS – 5-a-androstane
SS1 – 2-fluorobiphenyl
SS2 – o-terphenyl

GC/FID Fingerprint



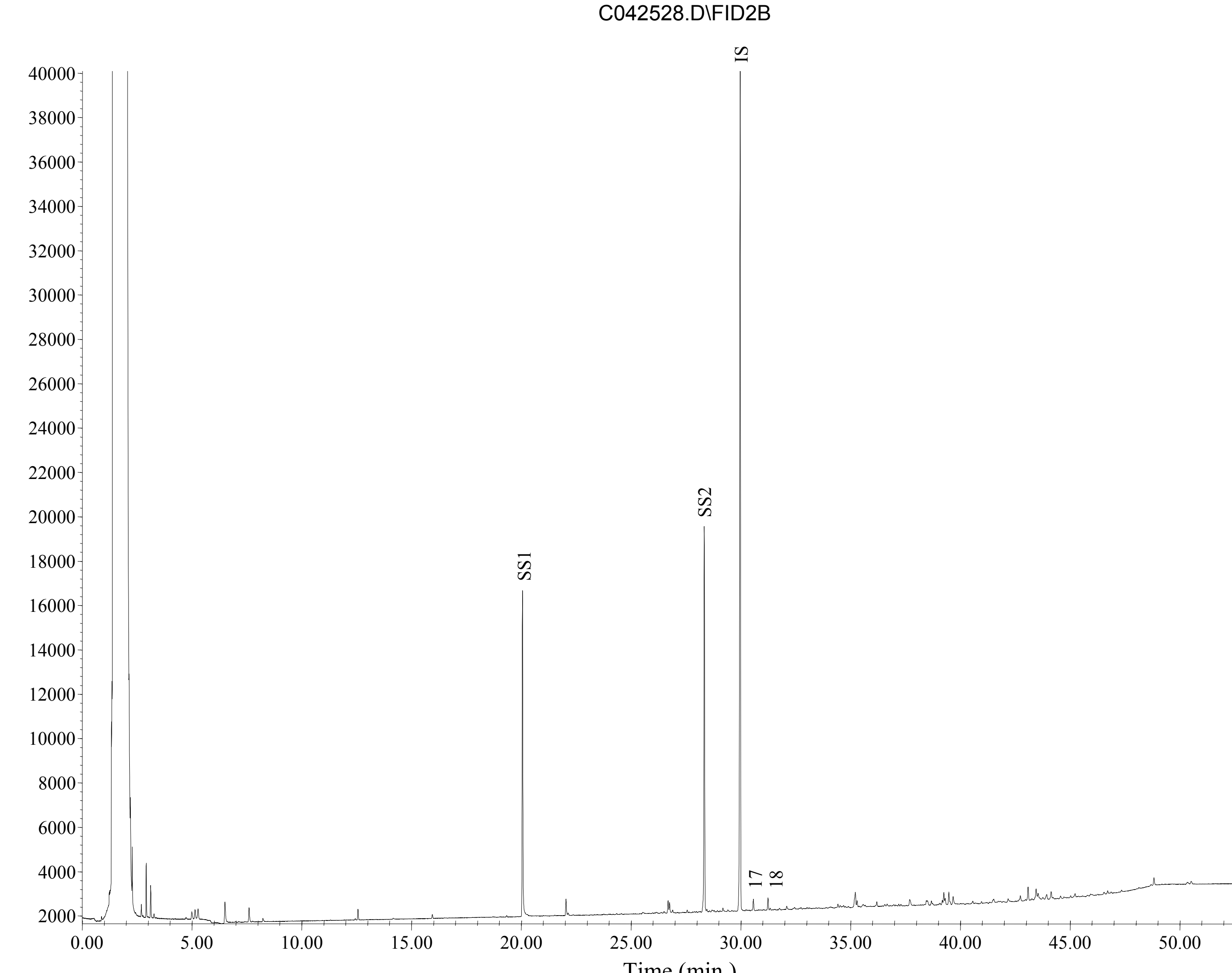
1 benzene
2 toluene
3 ethylbenzene
4 m/p-xylene
5 styrene
6 o-xylene
7 1,2,4-trimethylbenzene
8 naphthalene
9 2-methylnaphthalene
10 1-methylnaphthalene
11 acenaphthylene
12 acenaphthene
13 dibenzofuran
14 fluorene
15 phenanthrene
16 anthracene
17 fluoranthene
18 pyrene
19 benz(a)anthracene
20 chrysene
21 benzo(b)fluoranthene
22 benzo(k)fluoranthene
23 benzo(a)pyrene
24 indeno(1,2,3-cd)pyrene
25 dibenz(a,h)anthracene
26 benzo(g,h,i)perylene

Extraction Date: 04/24/2008
Analysis Date: 04/26/2008

Field ID: **TS24 (1-1.5)**
Laboratory ID: EK080415-14
Method: EPA 8100M

IS – 5-a-androstane
SS1 – 2-fluorobiphenyl
SS2 – o-terphenyl

GC/FID Fingerprint



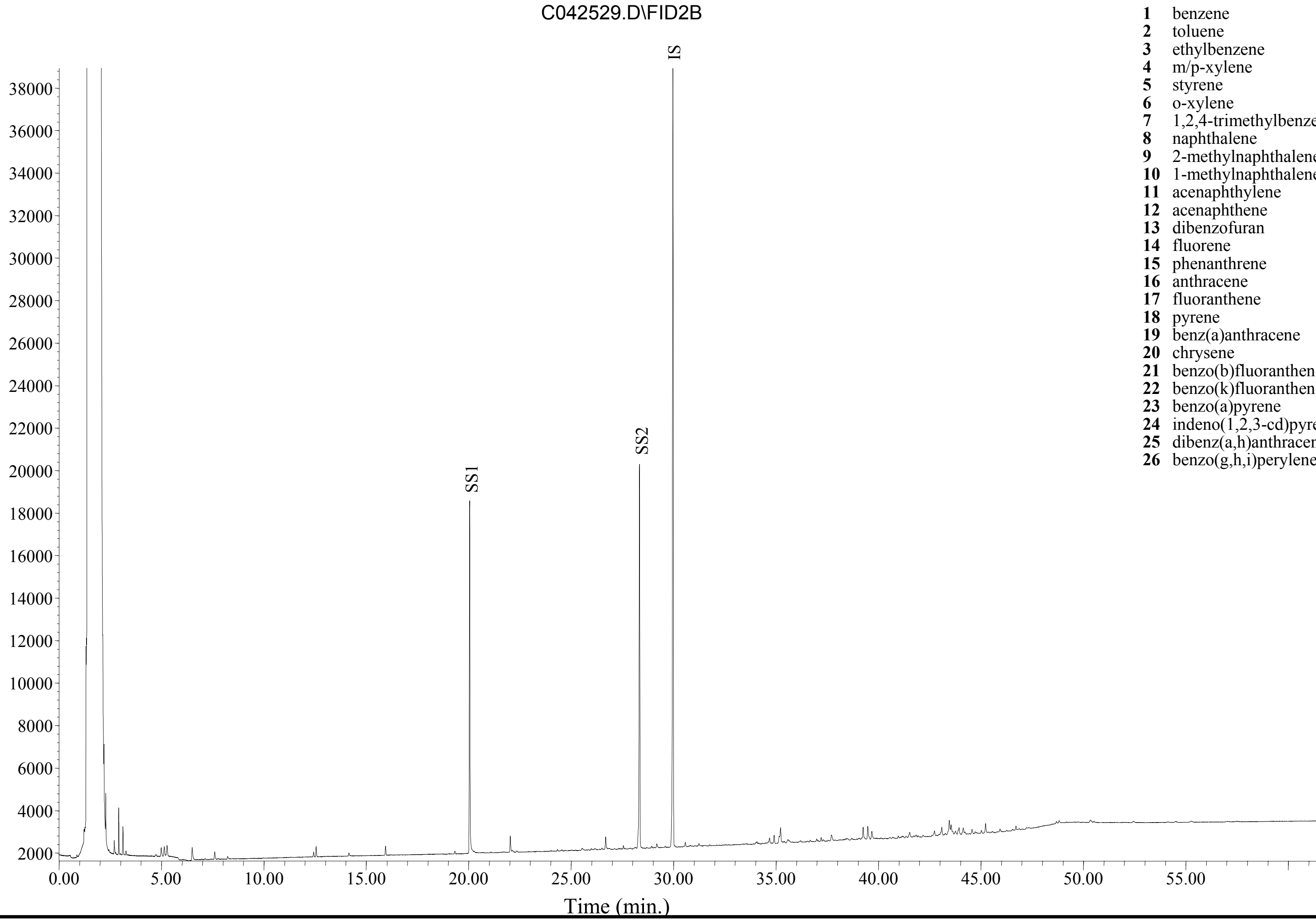
1 benzene
2 toluene
3 ethylbenzene
4 m/p-xylene
5 styrene
6 o-xylene
7 1,2,4-trimethylbenzene
8 naphthalene
9 2-methylnaphthalene
10 1-methylnaphthalene
11 acenaphthylene
12 acenaphthene
13 dibenzofuran
14 fluorene
15 phenanthrene
16 anthracene
17 fluoranthene
18 pyrene
19 benz(a)anthracene
20 chrysene
21 benzo(b)fluoranthene
22 benzo(k)fluoranthene
23 benzo(a)pyrene
24 indeno(1,2,3-cd)pyrene
25 dibenz(a,h)anthracene
26 benzo(g,h,i)perylene

Extraction Date: 04/24/2008
Analysis Date: 04/26/2008

IS – 5-a-androstane
SS1 – 2-fluorobiphenyl
SS2 – o-terphenyl

Field ID: TS18
Laboratory ID: EK080415-15
Method: EPA 8100M

GC/FID Fingerprint



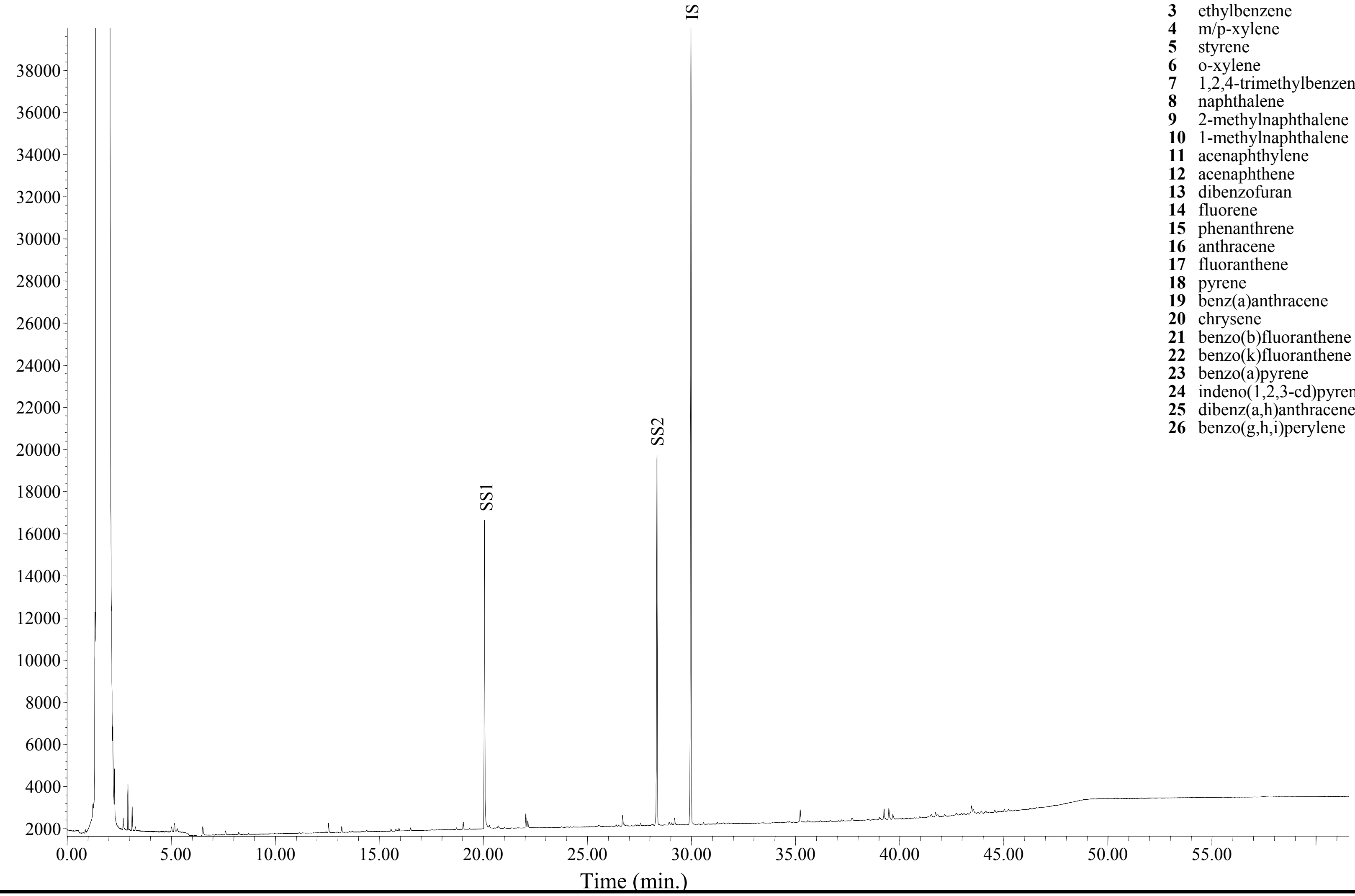
1 benzene
2 toluene
3 ethylbenzene
4 m/p-xylene
5 styrene
6 o-xylene
7 1,2,4-trimethylbenzene
8 naphthalene
9 2-methylnaphthalene
10 1-methylnaphthalene
11 acenaphthylene
12 acenaphthene
13 dibenzofuran
14 fluorene
15 phenanthrene
16 anthracene
17 fluoranthene
18 pyrene
19 benz(a)anthracene
20 chrysene
21 benzo(b)fluoranthene
22 benzo(k)fluoranthene
23 benzo(a)pyrene
24 indeno(1,2,3-cd)pyrene
25 dibenz(a,h)anthracene
26 benzo(g,h,i)perylene

Extraction Date: 04/24/2008
Analysis Date: 04/26/2008

IS – 5-a-androstane
SS1 – 2-fluorobiphenyl
SS2 – o-terphenyl

Field ID: TS18
Laboratory ID: EK080415-15DUP
Method: EPA 8100M

GC/FID Fingerprint



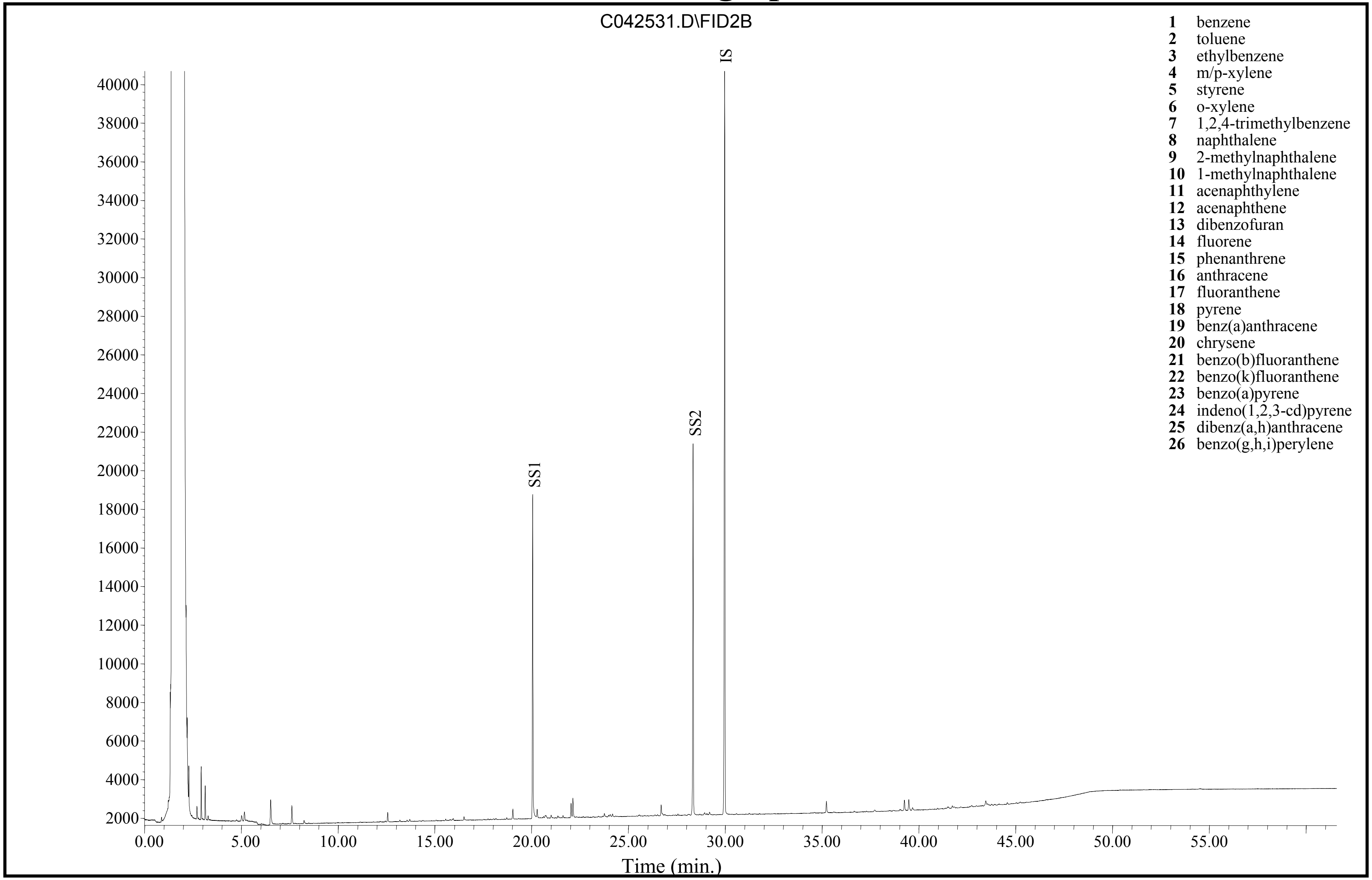
1 benzene
2 toluene
3 ethylbenzene
4 m/p-xylene
5 styrene
6 o-xylene
7 1,2,4-trimethylbenzene
8 naphthalene
9 2-methylnaphthalene
10 1-methylnaphthalene
11 acenaphthylene
12 acenaphthene
13 dibenzofuran
14 fluorene
15 phenanthrene
16 anthracene
17 fluoranthene
18 pyrene
19 benz(a)anthracene
20 chrysene
21 benzo(b)fluoranthene
22 benzo(k)fluoranthene
23 benzo(a)pyrene
24 indeno(1,2,3-cd)pyrene
25 dibenz(a,h)anthracene
26 benzo(g,h,i)perylene

Extraction Date: 04/24/2008
Analysis Date: 04/26/2008

Field ID: TS24
Laboratory ID: EK080415-16
Method: EPA 8100M

IS – 5-a-androstane
SS1 – 2-fluorobiphenyl
SS2 – o-terphenyl

GC/FID Fingerprint

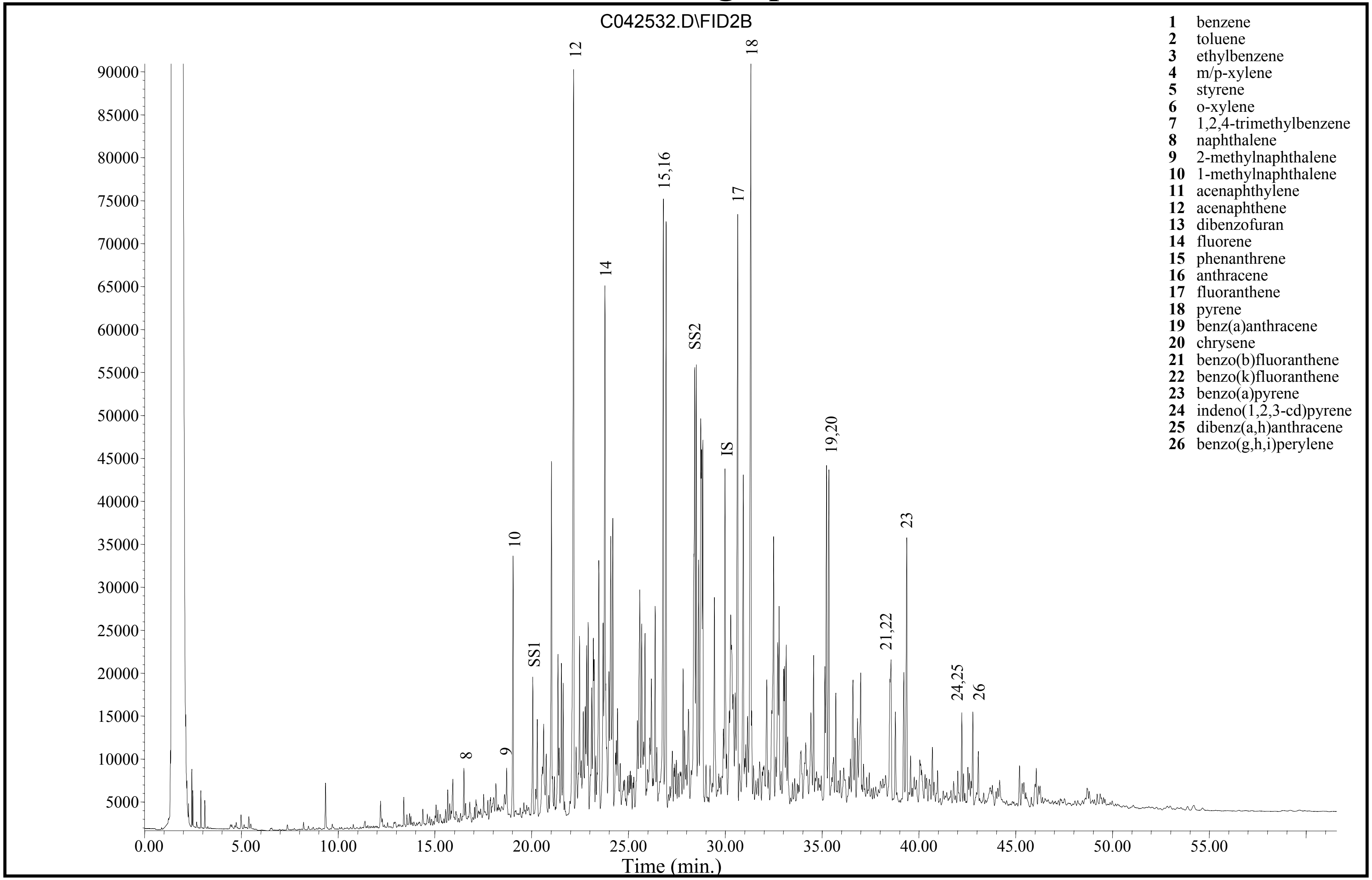


Extraction Date: 04/25/2008
Analysis Date: 04/27/2008

IS – 5-a-androstane
SS1 – 2-fluorobiphenyl
SS2 – o-terphenyl

Field ID: TS20
Laboratory ID: EK080415-17
Method: EPA 8100M

GC/FID Fingerprint

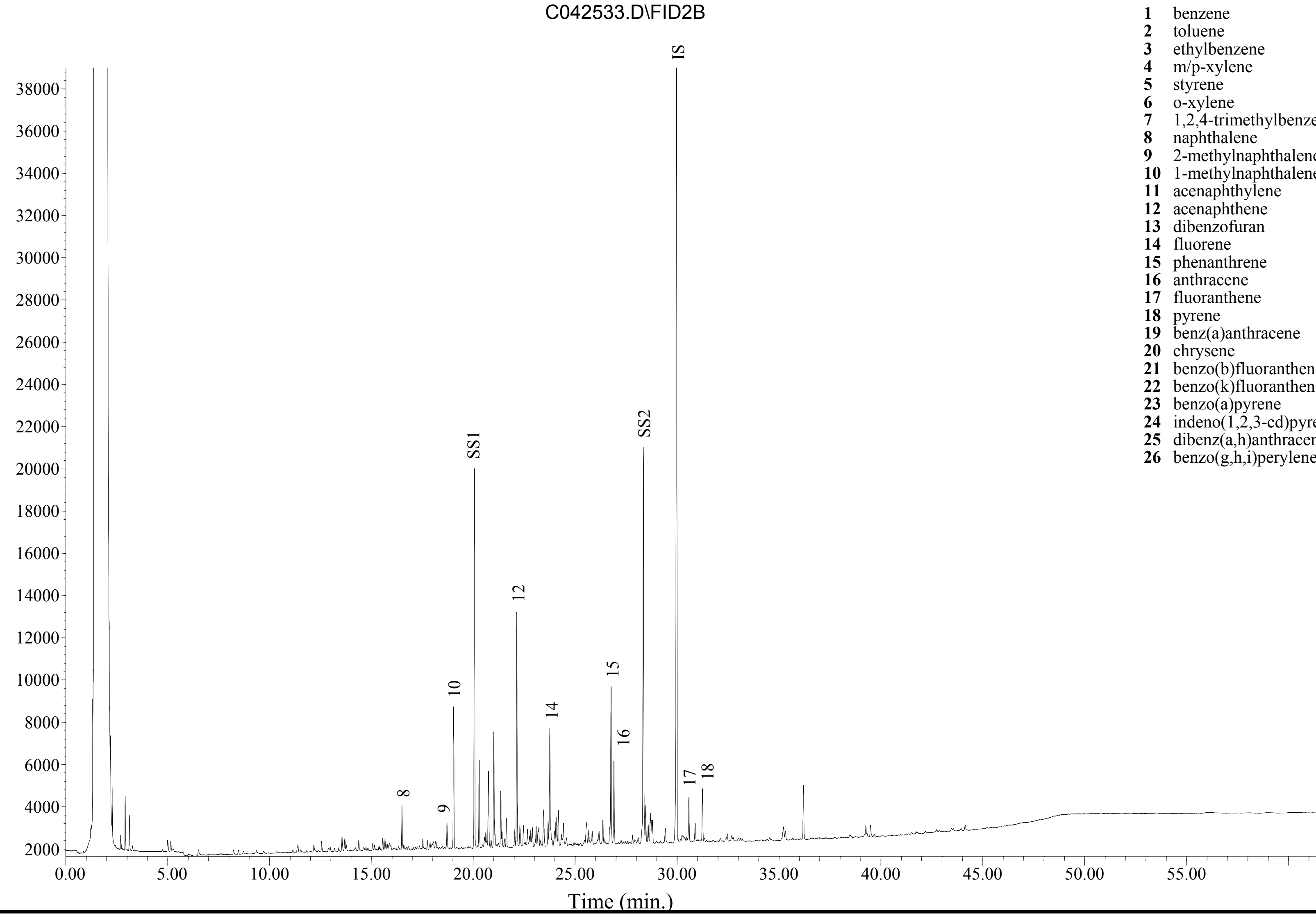


Extraction Date: 04/24/2008
Analysis Date: 04/27/2008

IS – 5-a-androstane
SS1 – 2-fluorobiphenyl
SS2 – o-terphenyl

Field ID: **TS02(4.5-5.5)**
Laboratory ID: EK080417-01
Method: EPA 8100M

GC/FID Fingerprint



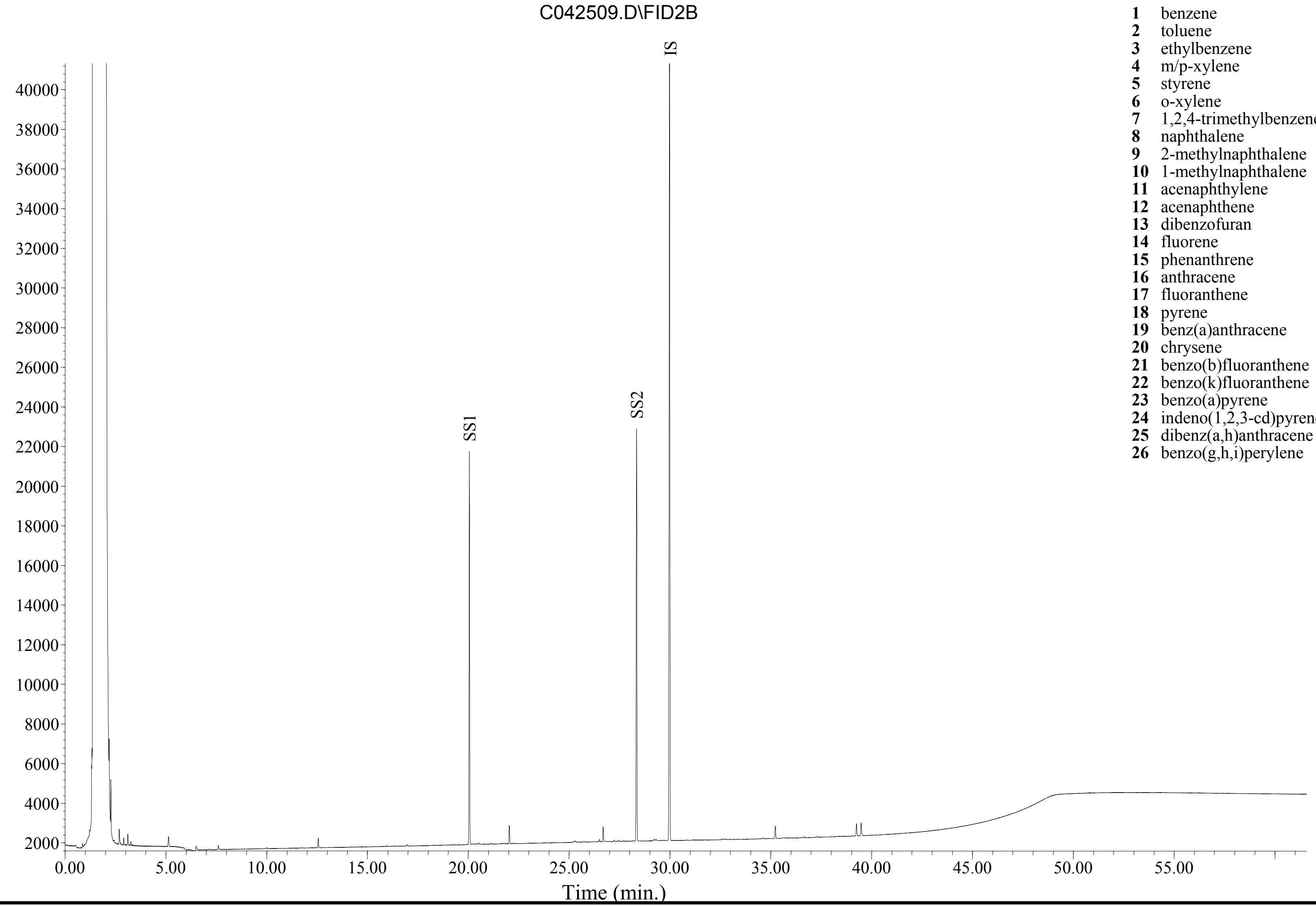
1	benzene
2	toluene
3	ethylbenzene
4	m/p-xylene
5	styrene
6	o-xylene
7	1,2,4-trimethylbenzene
8	naphthalene
9	2-methylnaphthalene
10	1-methylnaphthalene
11	acenaphthylene
12	acenaphthene
13	dibenzofuran
14	fluorene
15	phenanthrene
16	anthracene
17	fluoranthene
18	pyrene
19	benz(a)anthracene
20	chrysene
21	benzo(b)fluoranthene
22	benzo(k)fluoranthene
23	benzo(a)pyrene
24	indeno(1,2,3-cd)pyrene
25	dibenz(a,h)anthracene
26	benzo(g,h,i)perylene

Extraction Date: 04/24/2008
Analysis Date: 04/27/2008

Field ID: **TS04**
Laboratory ID: EK080417-02
Method: EPA 8100M

IS – 5-a-androstane
SS1 – 2-fluorobiphenyl
SS2 – o-terphenyl

GC/FID Fingerprint



1 benzene
2 toluene
3 ethylbenzene
4 m/p-xylene
5 styrene
6 o-xylene
7 1,2,4-trimethylbenzene
8 naphthalene
9 2-methylnaphthalene
10 1-methylnaphthalene
11 acenaphthylene
12 acenaphthene
13 dibenzofuran
14 fluorene
15 phenanthrene
16 anthracene
17 fluoranthene
18 pyrene
19 benz(a)anthracene
20 chrysene
21 benzo(b)fluoranthene
22 benzo(k)fluoranthene
23 benzo(a)pyrene
24 indeno(1,2,3-cd)pyrene
25 dibenz(a,h)anthracene
26 benzo(g,h,i)perylene

Extraction Date: 04/24/2008
Analysis Date: 04/25/2008

Field ID: **Soil Blank**
Laboratory ID: QC080424-SB
Method: EPA 8100M

IS – 5-a-androstane
SS1 – 2-fluorobiphenyl
SS2 – o-terphenyl

Appendix C

MAH/PAH Concentrations

Analytical Results for Volatile and Semivolatile Organics
META Environmental, Inc.

Field ID: TS04 (1.8-2.4)

Client:	ENSR	Preparation Method:	EPA 3570
Project:	Troy - Smith Ave.	Cleanup Method(s):	NA
		Analysis Method:	EPA 8270M
Lab ID	EK080415-01		
File ID:	E050214.D	Matrix:	Sediment
		Preservation:	None
Date Sampled:	10/18/2007	Decanted:	None
Date Received:	4/15/2008		
Date Prepared:	4/24/2008	Sample Size (g):	4.23
Date Cleanup:	NA	Percent Solid:	90%
Date Analyzed:	5/3/2008	Extract Volume (µl):	2000
Instrument:	El Camino	Prep DF:	1.00
Operator:	JAR	Analysis DF:	1.00
		Injection Volume (µl):	1.00
Batch QC:	QC080424-SB		

Analyte	Concentration (mg/kg dry wt.)	RL	EDL	Comments
MAH & PAH COMPOUNDS:				
Benzene	0.142 B	0.003	0.001	
Toluene	0.062 B	0.003	0.001	
Ethylbenzene	0.868	0.003	0.001	
m/p-Xylenes	0.120	0.003	0.001	
Styrene	0.115 B	0.003	0.001	
o-Xylene	0.092	0.003	0.001	
Isopropylbenzene	0.492	0.003	0.001	
n-Propylbenzene	0.400	0.003	0.001	
1,3,5-Trimethylbenzene	0.187	0.003	0.001	
1,2,4-Trimethylbenzene	0.706	0.003	0.001	
t-Butylbenzene	U	0.003	0.001	
sec-Butylbenzene	0.024	0.003	0.001	
p-Isopropyltoluene	0.090	0.003	0.001	
n-Butylbenzene	0.314	0.003	0.001	
C1 - Benzene	0.043 B	0.003	0.001	
C2 - Benzene	0.496	0.003	0.001	
C3 - Benzene	1.5	0.003	0.001	
C4 - Benzene	2.14	0.003	0.001	
C5 - Benzene	0.719	0.003	0.001	
trans-Decalin	0.009	0.003	0.001	
cis-Decalin	U	0.003	0.001	
Naphthalene	2.47 B	0.003	0.001	
2-Methylnaphthalene	0.853	0.003	0.001	
1-Methylnaphthalene	9.84	0.003	0.001	
C1 - Naphthalene	6.55 B	0.003	0.001	
C2 - Naphthalene	4.08	0.003	0.001	
C3- Naphthalene	1.34	0.003	0.001	
C4- Naphthalene	0.125	0.003	0.001	
Acenaphthylene	0.364	0.003	0.001	
Acenaphthene	9.58	0.003	0.001	
Dibenzofuran	0.338	0.003	0.001	
Fluorene	3.73	0.003	0.001	
C1 - Fluorene	0.809	0.003	0.001	
C2 - Fluorene	0.147	0.003	0.001	
C3 - Fluorene	0.040	0.003	0.001	
Phenanthrene	2.04	0.003	0.001	
Anthracene	1.38	0.003	0.001	

Analytical Results for Volatile and Semivolatile Organics
META Environmental, Inc.

Field ID: TS04 (1.8-2.4)

Client:	ENSR	Preparation Method:	EPA 3570
Project:	Troy - Smith Ave.	Cleanup Method(s):	NA
		Analysis Method:	EPA 8270M
Lab ID	EK080415-01		
File ID:	E050214.D	Matrix:	Sediment
		Preservation:	None
Date Sampled:	10/18/2007	Decanted:	None
Date Received:	4/15/2008		
Date Prepared:	4/24/2008	Sample Size (g):	4.23
Date Cleanup:	NA	Percent Solid:	90%
Date Analyzed:	5/3/2008	Extract Volume (µl):	2000
Instrument:	El Camino	Prep DF:	1.00
Operator:	JAR	Analysis DF:	1.00
		Injection Volume (µl):	1.00
Batch QC:	QC080424-SB		

Analyte	Concentration (mg/kg dry wt.)	RL	EDL	Comments
C1 - Phenanthrene/Anthracene	1.25	0.003	0.001	
C2 - Phenanthrene/Anthracene	0.300	0.003	0.001	
C3 - Phenanthrene/Anthracene	0.060	0.003	0.001	
C4 - Phenanthrene/Anthracene	0.013	0.003	0.001	
Dibenzothiophene	0.640	0.003	0.001	
C1 - Dibenzothiophene	0.246	0.003	0.001	
C2 - Dibenzothiophene	0.076	0.003	0.001	
C3 - Dibenzothiophene	0.023	0.003	0.001	
C4 - Dibenzothiophene	0.006	0.003	0.001	
Benzo(b)naphtho(2,1-d)thiophene	0.027	0.003	0.001	
Fluoranthene	0.528	0.003	0.001	
Pyrene	0.721	0.003	0.001	
C1 - Fluoranthene/Pyrene	0.470	0.003	0.001	
C2 - Fluoranthene/Pyrene	0.121	0.003	0.001	
C3 - Fluoranthene/Pyrene	0.029	0.003	0.001	
Benz[a]anthracene	0.204	0.003	0.001	
Chrysene*	0.204	0.003	0.001	
C1 - Benz(a)anthracene/Chrysene	0.137	0.003	0.001	
C2 - Benz(a)anthracene/Chrysene	0.047	0.003	0.001	
C3 - Benz(a)anthracene/Chrysene	0.016	0.003	0.001	
C4 - Benz(a)anthracene/Chrysene	U	0.003	0.001	
Benzo[b]fluoranthene	0.061	0.003	0.001	
Benzo[j/k]fluoranthene	0.089	0.003	0.001	
Benzo(e)pyrene	0.072	0.003	0.001	
Benzo[a]pyrene	0.145	0.003	0.001	
Perylene	0.020	0.003	0.001	
Indeno[1,2,3-cd]pyrene	0.039	0.003	0.001	
Dibenz[a,h]anthracene	0.017	0.003	0.001	
Benzo[g,h,i]perylene	0.047	0.003	0.001	
Coronene	0.010	0.003	0.001	
Retene	U	0.003	0.001	
Benzo(b/c)fluorenes	0.078	0.003	0.001	
2-Methylpyrene	0.063	0.003	0.001	
4-Methylpyrene	0.051	0.003	0.001	
1-Methylpyrene	0.066	0.003	0.001	
Heptadecane	U	0.005	0.003	
Pristane	0.009	0.003	0.001	
Octadecane	U	0.005	0.003	
Phytane	0.006	0.003	0.001	

Analytical Results for Volatile and Semivolatile Organics
META Environmental, Inc.

Field ID: TS04 (1.8-2.4)

Client:	ENSR	Preparation Method:	EPA 3570
Project:	Troy - Smith Ave.	Cleanup Method(s):	NA
		Analysis Method:	EPA 8270M
Lab ID	EK080415-01		
File ID:	E050214.D	Matrix:	Sediment
		Preservation:	None
Date Sampled:	10/18/2007	Decanted:	None
Date Received:	4/15/2008		
Date Prepared:	4/24/2008	Sample Size (g):	4.23
Date Cleanup:	NA	Percent Solid:	90%
Date Analyzed:	5/3/2008	Extract Volume (µl):	2000
Instrument:	El Camino	Prep DF:	1.00
Operator:	JAR	Analysis DF:	1.00
		Injection Volume (µl):	1.00
Batch QC:	QC080424-SB		

Analyte	Concentration (mg/kg dry wt.)	RL	EDL	Comments
2,6,10-trimethyldodecane	0.007	0.003	0.001	
2,6,10-trimethyltridecane	0.006	0.003	0.001	
Norpristane	0.017	0.003	0.001	
Tetraethyl lead	U	0.005	0.003	
Total PAH (16)	21.6	0.003	0.001	
Total PAH (42)	38.6	0.003	0.001	

Extraction Surrogate Recoveries (%)		Limits
Toluene-d8	73	50 - 120
Phenanthrene-d10	83	50 - 120
Perylene-d12	64	50 - 120
Benzo(a)pyrene-d12	73	50 - 120

NA - Not applicable.
B - Analyte detected in the Blank.
J - Estimated value; detected between the RL and DL.
U - Analyte not detected above DL.
D - Analyte reported from a diluted extract.
E - Estimate, result detected above calibration range.
I - Concentration/Peak ID uncertain due to potential interference.
RL - Reporting limit is the sample equivalent of the lowest linear calibration concentration.
EDL - Estimated detection limit is 50% of RL.
* - Triphenylene is known to coelute with this compound.

Analytical Results for Volatile and Semivolatile Organics
META Environmental, Inc.

Field ID: TS17 (3-4)

Client:	ENSR	Preparation Method:	EPA 3570
Project:	Troy - Smith Ave.	Cleanup Method(s):	NA
		Analysis Method:	EPA 8270M
Lab ID	EK080415-03		
File ID:	E050216.D	Matrix:	Sediment
		Preservation:	None
Date Sampled:	10/19/2007	Decanted:	None
Date Received:	4/15/2008		
Date Prepared:	4/24/2008	Sample Size (g):	4.22
Date Cleanup:	NA	Percent Solid:	84%
Date Analyzed:	5/3/2008	Extract Volume (µl):	2000
Instrument:	El Camino	Prep DF:	1.00
Operator:	JAR	Analysis DF:	1.00
		Injection Volume (µl):	1.00
Batch QC:	QC080424-SB		

Analyte	Concentration (mg/kg dry wt.)	RL	EDL	Comments
MAH & PAH COMPOUNDS:				
Benzene	0.497 B	0.003	0.001	
Toluene	1.09 B	0.003	0.001	
Ethylbenzene	1.58	0.003	0.001	
m/p-Xylenes	1.25	0.003	0.001	
Styrene	0.217 B	0.003	0.001	
o-Xylene	0.427	0.003	0.001	
Isopropylbenzene	0.125	0.003	0.001	
n-Propylbenzene	0.122	0.003	0.001	
1,3,5-Trimethylbenzene	0.144	0.003	0.001	
1,2,4-Trimethylbenzene	0.596	0.003	0.001	
t-Butylbenzene	U	0.003	0.001	
sec-Butylbenzene	0.005	0.003	0.001	
p-Isopropyltoluene	0.130	0.003	0.001	
n-Butylbenzene	0.074	0.003	0.001	
C1 - Benzene	0.768 B	0.003	0.001	
C2 - Benzene	1.64	0.003	0.001	
C3 - Benzene	1.19	0.003	0.001	
C4 - Benzene	0.538	0.003	0.001	
C5 - Benzene	0.168	0.003	0.001	
trans-Decalin	0.006	0.003	0.001	
cis-Decalin	U	0.003	0.001	
Naphthalene	6.6 B	0.003	0.001	
2-Methylnaphthalene	4.42	0.003	0.001	
1-Methylnaphthalene	2.02	0.003	0.001	
C1 - Naphthalene	3.98 B	0.003	0.001	
C2 - Naphthalene	2.42	0.003	0.001	
C3- Naphthalene	1.31	0.003	0.001	
C4- Naphthalene	0.765	0.003	0.001	
Acenaphthylene	0.722	0.003	0.001	
Acenaphthene	1.8	0.003	0.001	
Dibenzofuran	0.133	0.003	0.001	
Fluorene	1.05	0.003	0.001	
C1 - Fluorene	1.11	0.003	0.001	
C2 - Fluorene	1.14	0.003	0.001	
C3 - Fluorene	0.622	0.003	0.001	
Phenanthrene	2.89	0.003	0.001	
Anthracene	1.52	0.003	0.001	

Analytical Results for Volatile and Semivolatile Organics
META Environmental, Inc.

Field ID: TS17 (3-4)

Client:	ENSR	Preparation Method:	EPA 3570
Project:	Troy - Smith Ave.	Cleanup Method(s):	NA
		Analysis Method:	EPA 8270M
Lab ID	EK080415-03		
File ID:	E050216.D	Matrix:	Sediment
		Preservation:	None
Date Sampled:	10/19/2007	Decanted:	None
Date Received:	4/15/2008		
Date Prepared:	4/24/2008	Sample Size (g):	4.22
Date Cleanup:	NA	Percent Solid:	84%
Date Analyzed:	5/3/2008	Extract Volume (µl):	2000
Instrument:	El Camino	Prep DF:	1.00
Operator:	JAR	Analysis DF:	1.00
		Injection Volume (µl):	1.00
Batch QC:	QC080424-SB		

Analyte	Concentration (mg/kg dry wt.)	RL	EDL	Comments
C1 - Phenanthrene/Anthracene	3.45	0.003	0.001	
C2 - Phenanthrene/Anthracene	3.04	0.003	0.001	
C3 - Phenanthrene/Anthracene	1.26	0.003	0.001	
C4 - Phenanthrene/Anthracene	0.338	0.003	0.001	
Dibenzothiophene	0.528	0.003	0.001	
C1 - Dibenzothiophene	0.796	0.003	0.001	
C2 - Dibenzothiophene	0.859	0.003	0.001	
C3 - Dibenzothiophene	0.470	0.003	0.001	
C4 - Dibenzothiophene	0.157	0.003	0.001	
Benzo(b)naphtho(2,1-d)thiophene	0.259	0.003	0.001	
Fluoranthene	2.01	0.003	0.001	
Pyrene	3.78	0.003	0.001	
C1 - Fluoranthene/Pyrene	4.48	0.003	0.001	
C2 - Fluoranthene/Pyrene	1.89	0.003	0.001	
C3 - Fluoranthene/Pyrene	0.677	0.003	0.001	
Benz[a]anthracene	1.51	0.003	0.001	
Chrysene*	1.69	0.003	0.001	
C1 - Benz(a)anthracene/Chrysene	1.67	0.003	0.001	
C2 - Benz(a)anthracene/Chrysene	0.753	0.003	0.001	
C3 - Benz(a)anthracene/Chrysene	0.309	0.003	0.001	
C4 - Benz(a)anthracene/Chrysene	0.096	0.003	0.001	
Benzo[b]fluoranthene	0.649	0.003	0.001	
Benzo[j/k]fluoranthene	0.781	0.003	0.001	
Benzo(e)pyrene	0.727	0.003	0.001	
Benzo[a]pyrene	1.28	0.003	0.001	
Perylene	0.221	0.003	0.001	
Indeno[1,2,3-cd]pyrene	0.406	0.003	0.001	
Dibenz[a,h]anthracene	0.160	0.003	0.001	
Benzo[g,h,i]perylene	0.510	0.003	0.001	
Coronene	0.122	0.003	0.001	
Retene	0.122	0.003	0.001	
Benzo(b/c)fluorenes	0.578	0.003	0.001	
2-Methylpyrene	0.622	0.003	0.001	
4-Methylpyrene	0.621	0.003	0.001	
1-Methylpyrene	0.628	0.003	0.001	
Heptadecane	0.089	0.006	0.003	
Pristane	0.078	0.003	0.001	
Octadecane	0.057	0.006	0.003	
Phytane	0.069	0.003	0.001	

Analytical Results for Volatile and Semivolatile Organics
META Environmental, Inc.

Field ID: TS17 (3-4)

Client:	ENSR	Preparation Method:	EPA 3570
Project:	Troy - Smith Ave.	Cleanup Method(s):	NA
		Analysis Method:	EPA 8270M
Lab ID	EK080415-03		
File ID:	E050216.D	Matrix:	Sediment
		Preservation:	None
Date Sampled:	10/19/2007	Decanted:	None
Date Received:	4/15/2008		
Date Prepared:	4/24/2008	Sample Size (g):	4.22
Date Cleanup:	NA	Percent Solid:	84%
Date Analyzed:	5/3/2008	Extract Volume (µl):	2000
Instrument:	El Camino	Prep DF:	1.00
Operator:	JAR	Analysis DF:	1.00
		Injection Volume (µl):	1.00
Batch QC:	QC080424-SB		

Analyte	Concentration (mg/kg dry wt.)	RL	EDL	Comments
2,6,10-trimethyldodecane	0.031	0.003	0.001	
2,6,10-trimethyltridecane	0.046	0.003	0.001	
Norpristane	0.051	0.003	0.001	
Tetraethyl lead	U	0.006	0.003	
Total PAH (16)	27.4	0.003	0.001	
Total PAH (42)	60.6	0.003	0.001	

Extraction Surrogate Recoveries (%)		Limits
Toluene-d8	73	50 - 120
Phenanthrene-d10	83	50 - 120
Perylene-d12	67	50 - 120
Benzo(a)pyrene-d12	76	50 - 120

NA - Not applicable.
B - Analyte detected in the Blank.
J - Estimated value; detected between the RL and DL.
U - Analyte not detected above DL.
D - Analyte reported from a diluted extract.
E - Estimate, result detected above calibration range.
I - Concentration/Peak ID uncertain due to potential interference.
RL - Reporting limit is the sample equivalent of the lowest linear calibration concentration.
EDL - Estimated detection limit is 50% of RL.
* - Triphenylene is known to coelute with this compound.

Analytical Results for Volatile and Semivolatile Organics
META Environmental, Inc.

Field ID: TS30 (1-2)

Client:	ENSR	Preparation Method:	EPA 3570
Project:	Troy - Smith Ave.	Cleanup Method(s):	NA
		Analysis Method:	EPA 8270M
Lab ID	EK080415-04		
File ID:	E050217.D	Matrix:	Sediment
		Preservation:	None
Date Sampled:	10/18/2007	Decanted:	None
Date Received:	4/15/2008		
Date Prepared:	4/24/2008	Sample Size (g):	4.06
Date Cleanup:	NA	Percent Solid:	56%
Date Analyzed:	5/3/2008	Extract Volume (µl):	2000
Instrument:	El Camino	Prep DF:	1.00
Operator:	JAR	Analysis DF:	1.00
		Injection Volume (µl):	1.00
Batch QC:	QC080424-SB		

Analyte	Concentration (mg/kg dry wt.)		RL	EDL	Comments
MAH & PAH COMPOUNDS:					
Benzene	0.082	B	0.004	0.002	
Toluene	0.125	B	0.004	0.002	
Ethylbenzene	0.027		0.004	0.002	
m/p-Xylenes	0.213		0.004	0.002	
Styrene	0.145	B	0.004	0.002	
o-Xylene	0.008		0.004	0.002	
Isopropylbenzene	0.036		0.004	0.002	
n-Propylbenzene	0.050		0.004	0.002	
1,3,5-Trimethylbenzene	0.012		0.004	0.002	
1,2,4-Trimethylbenzene	0.112		0.004	0.002	
t-Butylbenzene		U	0.004	0.002	
sec-Butylbenzene	0.026		0.004	0.002	
p-Isopropyltoluene	0.027		0.004	0.002	
n-Butylbenzene	0.242		0.004	0.002	
C1 - Benzene	0.087	B	0.004	0.002	
C2 - Benzene	0.140		0.004	0.002	
C3 - Benzene	0.213		0.004	0.002	
C4 - Benzene	2.85		0.004	0.002	
C5 - Benzene	1.49		0.004	0.002	
trans-Decalin	0.032		0.004	0.002	
cis-Decalin		U	0.004	0.002	
Naphthalene	0.126	B	0.004	0.002	
2-Methylnaphthalene	0.033	D	0.004	0.002	
1-Methylnaphthalene	30.0	D	0.004	0.002	
C1 - Naphthalene	18.3	DB	0.004	0.002	
C2 - Naphthalene	12.7		0.004	0.002	
C3- Naphthalene	3.52		0.004	0.002	
C4- Naphthalene	0.427		0.004	0.002	
Acenaphthylene	0.272		0.004	0.002	
Acenaphthene	25.8	D	0.004	0.002	
Dibenzofuran	1.04		0.004	0.002	
Fluorene	7.16		0.004	0.002	
C1 - Fluorene	2.05		0.004	0.002	
C2 - Fluorene	0.442		0.004	0.002	
C3 - Fluorene	0.079		0.004	0.002	
Phenanthrene	6.19		0.004	0.002	
Anthracene	3.02		0.004	0.002	

Analytical Results for Volatile and Semivolatile Organics
META Environmental, Inc.

Field ID: TS30 (1-2)

Client:	ENSR	Preparation Method:	EPA 3570
Project:	Troy - Smith Ave.	Cleanup Method(s):	NA
		Analysis Method:	EPA 8270M
Lab ID	EK080415-04		
File ID:	E050217.D	Matrix:	Sediment
		Preservation:	None
Date Sampled:	10/18/2007	Decanted:	None
Date Received:	4/15/2008		
Date Prepared:	4/24/2008	Sample Size (g):	4.06
Date Cleanup:	NA	Percent Solid:	56%
Date Analyzed:	5/3/2008	Extract Volume (µl):	2000
Instrument:	El Camino	Prep DF:	1.00
Operator:	JAR	Analysis DF:	1.00
		Injection Volume (µl):	1.00
Batch QC:	QC080424-SB		

Analyte	Concentration (mg/kg dry wt.)	RL	EDL	Comments
C1 - Phenanthrene/Anthracene	2.78	0.004	0.002	
C2 - Phenanthrene/Anthracene	0.337	0.004	0.002	
C3 - Phenanthrene/Anthracene	0.065	0.004	0.002	
C4 - Phenanthrene/Anthracene	0.032	0.004	0.002	
Dibenzothiophene	1.63	0.004	0.002	
C1 - Dibenzothiophene	0.473	0.004	0.002	
C2 - Dibenzothiophene	0.077	0.004	0.002	
C3 - Dibenzothiophene	0.026	0.004	0.002	
C4 - Dibenzothiophene	0.013	0.004	0.002	
Benzo(b)naphtho(2,1-d)thiophene	0.025	0.004	0.002	
Fluoranthene	1.54	0.004	0.002	
Pyrene	1.47	0.004	0.002	
C1 - Fluoranthene/Pyrene	0.351	0.004	0.002	
C2 - Fluoranthene/Pyrene	0.090	0.004	0.002	
C3 - Fluoranthene/Pyrene	0.034	0.004	0.002	
Benz[a]anthracene	0.168	0.004	0.002	
Chrysene*	0.185	0.004	0.002	
C1 - Benz(a)anthracene/Chrysene	0.089	0.004	0.002	
C2 - Benz(a)anthracene/Chrysene	0.046	0.004	0.002	
C3 - Benz(a)anthracene/Chrysene	0.022	0.004	0.002	
C4 - Benz(a)anthracene/Chrysene	U	0.004	0.002	
Benzo[b]fluoranthene	0.118	0.004	0.002	
Benzo[j/k]fluoranthene	0.122	0.004	0.002	
Benzo(e)pyrene	0.100	0.004	0.002	
Benzo[a]pyrene	0.147	0.004	0.002	
Perylene	0.036	0.004	0.002	
Indeno[1,2,3-cd]pyrene	0.085	0.004	0.002	
Dibenz[a,h]anthracene	0.027	0.004	0.002	
Benzo[g,h,i]perylene	0.092	0.004	0.002	
Coronene	0.023	0.004	0.002	
Retene	0.070	0.004	0.002	
Benzo(b/c)fluorenes	0.076	0.004	0.002	
2-Methylpyrene	0.038	0.004	0.002	
4-Methylpyrene	0.032	0.004	0.002	
1-Methylpyrene	0.034	0.004	0.002	
Heptadecane	0.129	0.009	0.004	
Pristane	0.058	0.004	0.002	
Octadecane	0.043	0.009	0.004	
Phytane	0.051	0.004	0.002	

Analytical Results for Volatile and Semivolatile Organics
META Environmental, Inc.

Field ID: TS30 (1-2)

Client:	ENSR	Preparation Method:	EPA 3570
Project:	Troy - Smith Ave.	Cleanup Method(s):	NA
		Analysis Method:	EPA 8270M
Lab ID	EK080415-04		
File ID:	E050217.D	Matrix:	Sediment
		Preservation:	None
Date Sampled:	10/18/2007	Decanted:	None
Date Received:	4/15/2008		
Date Prepared:	4/24/2008	Sample Size (g):	4.06
Date Cleanup:	NA	Percent Solid:	56%
Date Analyzed:	5/3/2008	Extract Volume (µl):	2000
Instrument:	El Camino	Prep DF:	1.00
Operator:	JAR	Analysis DF:	1.00
		Injection Volume (µl):	1.00
Batch QC:	QC080424-SB		

Analyte	Concentration (mg/kg dry wt.)	RL	EDL	Comments
2,6,10-trimethyldodecane	0.031	0.004	0.002	
2,6,10-trimethyltridecane	0.042	0.004	0.002	
Norpristane	0.079	0.004	0.002	
Tetraethyl lead	U	0.009	0.004	
Total PAH (16)	46.5	0.004	0.002	
Total PAH (42)	91.3	0.004	0.002	

Extraction Surrogate Recoveries (%)		Limits
Toluene-d8	71	50 - 120
Phenanthrene-d10	85	50 - 120
Perylene-d12	71	50 - 120
Benzo(a)pyrene-d12	79	50 - 120

NA - Not applicable.
B - Analyte detected in the Blank.
J - Estimated value; detected between the RL and DL.
U - Analyte not detected above DL.
D - Analyte reported from a diluted extract.
E - Estimate, result detected above calibration range.
I - Concentration/Peak ID uncertain due to potential interference.
RL - Reporting limit is the sample equivalent of the lowest linear calibration concentration.
EDL - Estimated detection limit is 50% of RL.
* - Triphenylene is known to coelute with this compound.

Analytical Results for Volatile and Semivolatile Organics
META Environmental, Inc.

Field ID: TS04 (1-1.8) - 5X

Client:	ENSR	Preparation Method:	EPA 3570
Project:	Troy - Smith Ave.	Cleanup Method(s):	NA
		Analysis Method:	EPA 8270M
Lab ID	EK080415-05-D		
File ID:	E050219.D	Matrix:	Sediment
		Preservation:	None
Date Sampled:	10/18/2007	Decanted:	None
Date Received:	4/15/2008		
Date Prepared:	4/24/2008	Sample Size (g):	4.33
Date Cleanup:	NA	Percent Solid:	91%
Date Analyzed:	5/3/2008	Extract Volume (µl):	2000
Instrument:	El Camino	Prep DF:	1.00
Operator:	JAR	Analysis DF:	5.00
		Injection Volume (µl):	1.00
Batch QC:	QC080424-SB		

Analyte	Concentration (mg/kg dry wt.)	RL	EDL	Comments
MAH & PAH COMPOUNDS:				
Benzene	0.152 B	0.013	0.006	
Toluene	0.110 B	0.013	0.006	
Ethylbenzene	0.307	0.013	0.006	
m/p-Xylenes	0.162	0.013	0.006	
Styrene	2.21 B	0.013	0.006	
o-Xylene	0.089	0.013	0.006	
Isopropylbenzene	0.142	0.013	0.006	
n-Propylbenzene	0.156	0.013	0.006	
1,3,5-Trimethylbenzene	0.179	0.013	0.006	
1,2,4-Trimethylbenzene	0.360	0.013	0.006	
t-Butylbenzene	U	0.013	0.006	
sec-Butylbenzene	0.015	0.013	0.006	
p-Isopropyltoluene	0.073	0.013	0.006	
n-Butylbenzene	0.313	0.013	0.006	
C1 - Benzene	0.088 B	0.013	0.006	
C2 - Benzene	0.353	0.013	0.006	
C3 - Benzene	0.921	0.013	0.006	
C4 - Benzene	2.42	0.013	0.006	
C5 - Benzene	2.09	0.013	0.006	
trans-Decalin	0.049	0.013	0.006	
cis-Decalin	U	0.013	0.006	
Naphthalene	2.58 B	0.013	0.006	
2-Methylnaphthalene	1.36	0.013	0.006	
1-Methylnaphthalene	17.3	0.013	0.006	
C1 - Naphthalene	11.4 B	0.013	0.006	
C2 - Naphthalene	25.2	0.013	0.006	
C3- Naphthalene	15.7	0.013	0.006	
C4- Naphthalene	2.88	0.013	0.006	
Acenaphthylene	5.92	0.013	0.006	
Acenaphthene	35.6	0.013	0.006	
Dibenzofuran	1.51	0.013	0.006	
Fluorene	20.4	0.013	0.006	
C1 - Fluorene	11.8	0.013	0.006	
C2 - Fluorene	5.03	0.013	0.006	
C3 - Fluorene	1.52	0.013	0.006	
Phenanthrene	38.2	0.013	0.006	
Anthracene	19.5	0.013	0.006	

Analytical Results for Volatile and Semivolatile Organics
META Environmental, Inc.

Field ID: **TS04 (1-1.8) - 5X**

Client:	ENSR	Preparation Method:	EPA 3570
Project:	Troy - Smith Ave.	Cleanup Method(s):	NA
		Analysis Method:	EPA 8270M
Lab ID	EK080415-05-D		
File ID:	E050219.D	Matrix:	Sediment
		Preservation:	None
Date Sampled:	10/18/2007	Decanted:	None
Date Received:	4/15/2008		
Date Prepared:	4/24/2008	Sample Size (g):	4.33
Date Cleanup:	NA	Percent Solid:	91%
Date Analyzed:	5/3/2008	Extract Volume (µl):	2000
Instrument:	El Camino	Prep DF:	1.00
Operator:	JAR	Analysis DF:	5.00
		Injection Volume (µl):	1.00
Batch QC:	QC080424-SB		

Analyte	Concentration (mg/kg dry wt.)	RL	EDL	Comments
C1 - Phenanthrene/Anthracene	36.6	0.013	0.006	
C2 - Phenanthrene/Anthracene	12.6	0.013	0.006	
C3 - Phenanthrene/Anthracene	2.88	0.013	0.006	
C4 - Phenanthrene/Anthracene	0.578	0.013	0.006	
Dibenzothiophene	6.18	0.013	0.006	
C1 - Dibenzothiophene	5.84	0.013	0.006	
C2 - Dibenzothiophene	3.31	0.013	0.006	
C3 - Dibenzothiophene	1.16	0.013	0.006	
C4 - Dibenzothiophene	0.264	0.013	0.006	
Benzo(b)naphtho(2,1-d)thiophene	1.3	0.013	0.006	
Fluoranthene	17.9	0.013	0.006	
Pyrene	25.3	0.013	0.006	
C1 - Fluoranthene/Pyrene	24.8	0.013	0.006	
C2 - Fluoranthene/Pyrene	6.49	0.013	0.006	
C3 - Fluoranthene/Pyrene	1.64	0.013	0.006	
Benz[a]anthracene	9.75	0.013	0.006	
Chrysene*	9.48	0.013	0.006	
C1 - Benz(a)anthracene/Chrysene	6.91	0.013	0.006	
C2 - Benz(a)anthracene/Chrysene	2.34	0.013	0.006	
C3 - Benz(a)anthracene/Chrysene	0.605	0.013	0.006	
C4 - Benz(a)anthracene/Chrysene	0.199	0.013	0.006	
Benzo[b]fluoranthene	3.09	0.013	0.006	
Benzo[j/k]fluoranthene	4.59	0.013	0.006	
Benzo(e)pyrene	3.46	0.013	0.006	
Benzo[a]pyrene	7.37	0.013	0.006	
Perylene	1.01	0.013	0.006	
Indeno[1,2,3-cd]pyrene	2.07	0.013	0.006	
Dibenz[a,h]anthracene	0.846	0.013	0.006	
Benzo[g,h,i]perylene	2.39	0.013	0.006	
Coronene	0.558	0.013	0.006	
Retene	U	0.013	0.006	
Benzo(b/c)fluorenes	4.02	0.013	0.006	
2-Methylpyrene	3.1	0.013	0.006	
4-Methylpyrene	2.79	0.013	0.006	
1-Methylpyrene	3.67	0.013	0.006	
Heptadecane	U	0.025	0.013	
Pristane	0.442	0.013	0.006	
Octadecane	U	0.025	0.013	
Phytane	0.258	0.013	0.006	

Analytical Results for Volatile and Semivolatile Organics
META Environmental, Inc.

Field ID: TS04 (1-1.8) - 5X

Client:	ENSR	Preparation Method:	EPA 3570
Project:	Troy - Smith Ave.	Cleanup Method(s):	NA
		Analysis Method:	EPA 8270M
Lab ID	EK080415-05-D		
File ID:	E050219.D	Matrix:	Sediment
		Preservation:	None
Date Sampled:	10/18/2007	Decanted:	None
Date Received:	4/15/2008		
Date Prepared:	4/24/2008	Sample Size (g):	4.33
Date Cleanup:	NA	Percent Solid:	91%
Date Analyzed:	5/3/2008	Extract Volume (µl):	2000
Instrument:	El Camino	Prep DF:	1.00
Operator:	JAR	Analysis DF:	5.00
		Injection Volume (µl):	1.00
Batch QC:	QC080424-SB		

Analyte	Concentration (mg/kg dry wt.)	RL	EDL	Comments
2,6,10-trimethyldodecane	0.283	0.013	0.006	
2,6,10-trimethyltridecane	0.306	0.013	0.006	
Norpristane	0.338	0.013	0.006	
Tetraethyl lead	U	0.025	0.013	
Total PAH (16)	205	0.013	0.006	
Total PAH (42)	397	0.013	0.006	

Extraction Surrogate Recoveries (%)		Limits
Toluene-d8	75	50 - 120
Phenanthrene-d10	84	50 - 120
Perylene-d12	69	50 - 120
Benzo(a)pyrene-d12	82	50 - 120

NA - Not applicable.
B - Analyte detected in the Blank.
J - Estimated value; detected between the RL and DL.
U - Analyte not detected above DL.
D - Analyte reported from a diluted extract.
E - Estimate, result detected above calibration range.
I - Concentration/Peak ID uncertain due to potential interference.
RL - Reporting limit is the sample equivalent of the lowest linear calibration concentration.
EDL - Estimated detection limit is 50% of RL.
* - Triphenylene is known to coelute with this compound.

Analytical Results for Volatile and Semivolatile Organics
META Environmental, Inc.

Field ID: TS18 (2-3)

Client:	ENSR	Preparation Method:	EPA 3570
Project:	Troy - Smith Ave.	Cleanup Method(s):	NA
		Analysis Method:	EPA 8270M
Lab ID	EK080415-06		
File ID:	E050220.D	Matrix:	Sediment
		Preservation:	None
Date Sampled:	10/18/2007	Decanted:	None
Date Received:	4/15/2008		
Date Prepared:	4/24/2008	Sample Size (g):	4.20
Date Cleanup:	NA	Percent Solid:	77%
Date Analyzed:	5/3/2008	Extract Volume (µl):	2000
Instrument:	El Camino	Prep DF:	1.00
Operator:	JAR	Analysis DF:	1.00
		Injection Volume (µl):	1.00
Batch QC:	QC080424-SB		

Analyte	Concentration (mg/kg dry wt.)	RL	EDL	Comments
MAH & PAH COMPOUNDS:				
Benzene	0.748 B	0.003	0.002	
Toluene	1.81 B	0.003	0.002	
Ethylbenzene	2.52	0.003	0.002	
m/p-Xylenes	2.19	0.003	0.002	
Styrene	0.456 B	0.003	0.002	
o-Xylene	0.554	0.003	0.002	
Isopropylbenzene	0.110	0.003	0.002	
n-Propylbenzene	0.167	0.003	0.002	
1,3,5-Trimethylbenzene	0.179	0.003	0.002	
1,2,4-Trimethylbenzene	0.804	0.003	0.002	
t-Butylbenzene	U	0.003	0.002	
sec-Butylbenzene	0.007	0.003	0.002	
p-Isopropyltoluene	0.150	0.003	0.002	
n-Butylbenzene	0.116	0.003	0.002	
C1 - Benzene	1.29 B	0.003	0.002	
C2 - Benzene	2.67	0.003	0.002	
C3 - Benzene	1.66	0.003	0.002	
C4 - Benzene	0.830	0.003	0.002	
C5 - Benzene	0.359	0.003	0.002	
trans-Decalin	0.019	0.003	0.002	
cis-Decalin	U	0.003	0.002	
Naphthalene	8.68 B	0.003	0.002	
2-Methylnaphthalene	5.77	0.003	0.002	
1-Methylnaphthalene	3.08	0.003	0.002	
C1 - Naphthalene	5.47 B	0.003	0.002	
C2 - Naphthalene	4.41	0.003	0.002	
C3- Naphthalene	3.49	0.003	0.002	
C4- Naphthalene	1.83	0.003	0.002	
Acenaphthylene	1.23	0.003	0.002	
Acenaphthene	4.36	0.003	0.002	
Dibenzofuran	0.217	0.003	0.002	
Fluorene	2.16	0.003	0.002	
C1 - Fluorene	2.7	0.003	0.002	
C2 - Fluorene	2.64	0.003	0.002	
C3 - Fluorene	1.22	0.003	0.002	
Phenanthrene	5.73	0.003	0.002	
Anthracene	3.0	0.003	0.002	

Analytical Results for Volatile and Semivolatile Organics
META Environmental, Inc.

Field ID: TS18 (2-3)

Client:	ENSR	Preparation Method:	EPA 3570
Project:	Troy - Smith Ave.	Cleanup Method(s):	NA
		Analysis Method:	EPA 8270M
Lab ID	EK080415-06		
File ID:	E050220.D	Matrix:	Sediment
		Preservation:	None
Date Sampled:	10/18/2007	Decanted:	None
Date Received:	4/15/2008		
Date Prepared:	4/24/2008	Sample Size (g):	4.20
Date Cleanup:	NA	Percent Solid:	77%
Date Analyzed:	5/3/2008	Extract Volume (µl):	2000
Instrument:	El Camino	Prep DF:	1.00
Operator:	JAR	Analysis DF:	1.00
		Injection Volume (µl):	1.00
Batch QC:	QC080424-SB		

Analyte	Concentration (mg/kg dry wt.)	RL	EDL	Comments
C1 - Phenanthrene/Anthracene	9.28	0.003	0.002	
C2 - Phenanthrene/Anthracene	6.84	0.003	0.002	
C3 - Phenanthrene/Anthracene	3.03	0.003	0.002	
C4 - Phenanthrene/Anthracene	2.11	0.003	0.002	
Dibenzothiophene	1.12	0.003	0.002	
C1 - Dibenzothiophene	1.79	0.003	0.002	
C2 - Dibenzothiophene	1.8	0.003	0.002	
C3 - Dibenzothiophene	0.978	0.003	0.002	
C4 - Dibenzothiophene	0.325	0.003	0.002	
Benzo(b)naphtho(2,1-d)thiophene	0.543	0.003	0.002	
Fluoranthene	4.75	0.003	0.002	
Pyrene	7.48	0.003	0.002	
C1 - Fluoranthene/Pyrene	9.82	0.003	0.002	
C2 - Fluoranthene/Pyrene	4.07	0.003	0.002	
C3 - Fluoranthene/Pyrene	1.45	0.003	0.002	
Benz[a]anthracene	3.14	0.003	0.002	
Chrysene*	3.5	0.003	0.002	
C1 - Benz(a)anthracene/Chrysene	3.58	0.003	0.002	
C2 - Benz(a)anthracene/Chrysene	1.62	0.003	0.002	
C3 - Benz(a)anthracene/Chrysene	0.566	0.003	0.002	
C4 - Benz(a)anthracene/Chrysene	0.181	0.003	0.002	
Benzo[b]fluoranthene	1.34	0.003	0.002	
Benzo[j/k]fluoranthene	1.59	0.003	0.002	
Benzo(e)pyrene	1.51	0.003	0.002	
Benzo[a]pyrene	2.74	0.003	0.002	
Perylene	0.463	0.003	0.002	
Indeno[1,2,3-cd]pyrene	0.887	0.003	0.002	
Dibenz[a,h]anthracene	0.356	0.003	0.002	
Benzo[g,h,i]perylene	1.07	0.003	0.002	
Coronene	0.255	0.003	0.002	
Retene	7.06	0.003	0.002	
Benzo(b/c)fluorenes	1.24	0.003	0.002	
2-Methylpyrene	1.29	0.003	0.002	
4-Methylpyrene	1.4	0.003	0.002	
1-Methylpyrene	1.39	0.003	0.002	
Heptadecane	0.147	0.006	0.003	
Pristane	0.326	0.003	0.002	
Octadecane	0.081	0.006	0.003	
Phytane	0.236	0.003	0.002	

Analytical Results for Volatile and Semivolatile Organics
META Environmental, Inc.

Field ID: TS18 (2-3)

Client:	ENSR	Preparation Method:	EPA 3570
Project:	Troy - Smith Ave.	Cleanup Method(s):	NA
		Analysis Method:	EPA 8270M
Lab ID	EK080415-06		
File ID:	E050220.D	Matrix:	Sediment
		Preservation:	None
Date Sampled:	10/18/2007	Decanted:	None
Date Received:	4/15/2008		
Date Prepared:	4/24/2008	Sample Size (g):	4.20
Date Cleanup:	NA	Percent Solid:	77%
Date Analyzed:	5/3/2008	Extract Volume (µl):	2000
Instrument:	El Camino	Prep DF:	1.00
Operator:	JAR	Analysis DF:	1.00
		Injection Volume (µl):	1.00
Batch QC:	QC080424-SB		

Analyte	Concentration (mg/kg dry wt.)	RL	EDL	Comments
2,6,10-trimethyldodecane	0.103	0.003	0.002	
2,6,10-trimethyltridecane	0.144	0.003	0.002	
Norpristane	0.195	0.003	0.002	
Tetraethyl lead	U	0.006	0.003	
Total PAH (16)	52.0	0.003	0.002	
Total PAH (42)	124	0.003	0.002	

Extraction Surrogate Recoveries (%)		Limits
Toluene-d8	69	50 - 120
Phenanthrene-d10	83	50 - 120
Perylene-d12	70	50 - 120
Benzo(a)pyrene-d12	81	50 - 120

NA - Not applicable.
B - Analyte detected in the Blank.
J - Estimated value; detected between the RL and DL.
U - Analyte not detected above DL.
D - Analyte reported from a diluted extract.
E - Estimate, result detected above calibration range.
I - Concentration/Peak ID uncertain due to potential interference.
RL - Reporting limit is the sample equivalent of the lowest linear calibration concentration.
EDL - Estimated detection limit is 50% of RL.
* - Triphenylene is known to coelute with this compound.

Analytical Results for Volatile and Semivolatile Organics
META Environmental, Inc.

Field ID: **TS30 (3-4)**

Client:	ENSR	Preparation Method:	EPA 3570
Project:	Troy - Smith Ave.	Cleanup Method(s):	NA
		Analysis Method:	EPA 8270M
Lab ID	EK080415-08		
File ID:	E050221.D	Matrix:	Sediment
		Preservation:	None
Date Sampled:	10/18/2007	Decanted:	None
Date Received:	4/15/2008		
Date Prepared:	4/24/2008	Sample Size (g):	4.19
Date Cleanup:	NA	Percent Solid:	78%
Date Analyzed:	5/3/2008	Extract Volume (µl):	2000
Instrument:	El Camino	Prep DF:	1.00
Operator:	JAR	Analysis DF:	1.00
		Injection Volume (µl):	1.00
Batch QC:	QC080424-SB		

Analyte	Concentration (mg/kg dry wt.)	RL	EDL	Comments
MAH & PAH COMPOUNDS:				
Benzene	0.095 B	0.003	0.002	
Toluene	0.198 B	0.003	0.002	
Ethylbenzene	0.278	0.003	0.002	
m/p-Xylenes	0.256	0.003	0.002	
Styrene	0.108 B	0.003	0.002	
o-Xylene	0.059	0.003	0.002	
Isopropylbenzene	0.057	0.003	0.002	
n-Propylbenzene	0.084	0.003	0.002	
1,3,5-Trimethylbenzene	0.107	0.003	0.002	
1,2,4-Trimethylbenzene	0.494	0.003	0.002	
t-Butylbenzene	U	0.003	0.002	
sec-Butylbenzene	0.013	0.003	0.002	
p-Isopropyltoluene	0.068	0.003	0.002	
n-Butylbenzene	0.291	0.003	0.002	
C1 - Benzene	0.137 B	0.003	0.002	
C2 - Benzene	0.299	0.003	0.002	
C3 - Benzene	0.780	0.003	0.002	
C4 - Benzene	3.91	0.003	0.002	
C5 - Benzene	1.45	0.003	0.002	
trans-Decalin	0.038	0.003	0.002	
cis-Decalin	U	0.003	0.002	
Naphthalene	3.96 B	0.003	0.002	
2-Methylnaphthalene	0.989 D	0.003	0.002	
1-Methylnaphthalene	31.7 D	0.003	0.002	
C1 - Naphthalene	20.0 DB	0.003	0.002	
C2 - Naphthalene	13.5	0.003	0.002	
C3- Naphthalene	3.68	0.003	0.002	
C4- Naphthalene	0.554	0.003	0.002	
Acenaphthylene	0.766	0.003	0.002	
Acenaphthene	23.9 D	0.003	0.002	
Dibenzofuran	0.976	0.003	0.002	
Fluorene	6.6	0.003	0.002	
C1 - Fluorene	2.15	0.003	0.002	
C2 - Fluorene	0.539	0.003	0.002	
C3 - Fluorene	0.191	0.003	0.002	
Phenanthrene	8.62	0.003	0.002	
Anthracene	3.43	0.003	0.002	

Analytical Results for Volatile and Semivolatile Organics
META Environmental, Inc.

Field ID: TS30 (3-4)

Client:	ENSR	Preparation Method:	EPA 3570
Project:	Troy - Smith Ave.	Cleanup Method(s):	NA
		Analysis Method:	EPA 8270M
Lab ID	EK080415-08		
File ID:	E050221.D	Matrix:	Sediment
		Preservation:	None
Date Sampled:	10/18/2007	Decanted:	None
Date Received:	4/15/2008		
Date Prepared:	4/24/2008	Sample Size (g):	4.19
Date Cleanup:	NA	Percent Solid:	78%
Date Analyzed:	5/3/2008	Extract Volume (µl):	2000
Instrument:	El Camino	Prep DF:	1.00
Operator:	JAR	Analysis DF:	1.00
		Injection Volume (µl):	1.00
Batch QC:	QC080424-SB		

Analyte	Concentration (mg/kg dry wt.)	RL	EDL	Comments
C1 - Phenanthrene/Anthracene	3.64	0.003	0.002	
C2 - Phenanthrene/Anthracene	0.783	0.003	0.002	
C3 - Phenanthrene/Anthracene	0.252	0.003	0.002	
C4 - Phenanthrene/Anthracene	0.106	0.003	0.002	
Dibenzothiophene	1.57	0.003	0.002	
C1 - Dibenzothiophene	0.584	0.003	0.002	
C2 - Dibenzothiophene	0.211	0.003	0.002	
C3 - Dibenzothiophene	0.090	0.003	0.002	
C4 - Dibenzothiophene	0.032	0.003	0.002	
Benzo(b)naphtho(2,1-d)thiophene	0.092	0.003	0.002	
Fluoranthene	3.07	0.003	0.002	
Pyrene	3.15	0.003	0.002	
C1 - Fluoranthene/Pyrene	1.29	0.003	0.002	
C2 - Fluoranthene/Pyrene	0.362	0.003	0.002	
C3 - Fluoranthene/Pyrene	0.121	0.003	0.002	
Benz[a]anthracene	0.718	0.003	0.002	
Chrysene*	0.736	0.003	0.002	
C1 - Benz(a)anthracene/Chrysene	0.318	0.003	0.002	
C2 - Benz(a)anthracene/Chrysene	0.132	0.003	0.002	
C3 - Benz(a)anthracene/Chrysene	0.073	0.003	0.002	
C4 - Benz(a)anthracene/Chrysene	0.038	0.003	0.002	
Benzo[b]fluoranthene	0.391	0.003	0.002	
Benzo[j/k]fluoranthene	0.435	0.003	0.002	
Benzo(e)pyrene	0.318	0.003	0.002	
Benzo[a]pyrene	0.460	0.003	0.002	
Perylene	0.112	0.003	0.002	
Indeno[1,2,3-cd]pyrene	0.223	0.003	0.002	
Dibenz[a,h]anthracene	0.070	0.003	0.002	
Benzo[g,h,i]perylene	0.239	0.003	0.002	
Coronene	0.056	0.003	0.002	
Retene	0.222	0.003	0.002	
Benzo(b/c)fluorenes	0.259	0.003	0.002	
2-Methylpyrene	0.155	0.003	0.002	
4-Methylpyrene	0.125	0.003	0.002	
1-Methylpyrene	0.130	0.003	0.002	
Heptadecane	0.159	0.006	0.003	
Pristane	0.251	0.003	0.002	
Octadecane	0.085	0.006	0.003	
Phytane	0.133	0.003	0.002	

Analytical Results for Volatile and Semivolatile Organics
META Environmental, Inc.

Field ID: TS30 (3-4)

Client:	ENSR	Preparation Method:	EPA 3570
Project:	Troy - Smith Ave.	Cleanup Method(s):	NA
		Analysis Method:	EPA 8270M
Lab ID	EK080415-08		
File ID:	E050221.D	Matrix:	Sediment
		Preservation:	None
Date Sampled:	10/18/2007	Decanted:	None
Date Received:	4/15/2008		
Date Prepared:	4/24/2008	Sample Size (g):	4.19
Date Cleanup:	NA	Percent Solid:	78%
Date Analyzed:	5/3/2008	Extract Volume (µl):	2000
Instrument:	El Camino	Prep DF:	1.00
Operator:	JAR	Analysis DF:	1.00
		Injection Volume (µl):	1.00
Batch QC:	QC080424-SB		

Analyte	Concentration (mg/kg dry wt.)	RL	EDL	Comments
2,6,10-trimethyldodecane	0.057	0.003	0.002	
2,6,10-trimethyltridecane	0.098	0.003	0.002	
Norpristane	0.118	0.003	0.002	
Tetraethyl lead	U	0.006	0.003	
Total PAH (16)	56.8	0.003	0.002	
Total PAH (42)	108	0.003	0.002	

Extraction Surrogate Recoveries (%)		Limits
Toluene-d8	70	50 - 120
Phenanthrene-d10	88	50 - 120
Perylene-d12	73	50 - 120
Benzo(a)pyrene-d12	81	50 - 120

NA - Not applicable.
B - Analyte detected in the Blank.
J - Estimated value; detected between the RL and DL.
U - Analyte not detected above DL.
D - Analyte reported from a diluted extract.
E - Estimate, result detected above calibration range.
I - Concentration/Peak ID uncertain due to potential interference.
RL - Reporting limit is the sample equivalent of the lowest linear calibration concentration.
EDL - Estimated detection limit is 50% of RL.
* - Triphenylene is known to coelute with this compound.

Analytical Results for Volatile and Semivolatile Organics
META Environmental, Inc.

Field ID: TS29 (1.5-2.5)

Client:	ENSR	Preparation Method:	EPA 3570
Project:	Troy - Smith Ave.	Cleanup Method(s):	NA
		Analysis Method:	EPA 8270M
Lab ID	EK080415-09		
File ID:	E050225.D	Matrix:	Sediment
		Preservation:	None
Date Sampled:	10/18/2007	Decanted:	None
Date Received:	4/15/2008		
Date Prepared:	4/24/2008	Sample Size (g):	4.18
Date Cleanup:	NA	Percent Solid:	75%
Date Analyzed:	5/3/2008	Extract Volume (µl):	2000
Instrument:	El Camino	Prep DF:	1.00
Operator:	JAR	Analysis DF:	1.00
		Injection Volume (µl):	1.00
Batch QC:	QC080424-SB		

Analyte	Concentration (mg/kg dry wt.)	RL	EDL	Comments
MAH & PAH COMPOUNDS:				
Benzene	0.089 B	0.003	0.002	
Toluene	0.184 B	0.003	0.002	
Ethylbenzene	0.025	0.003	0.002	
m/p-Xylenes	0.124	0.003	0.002	
Styrene	0.103 B	0.003	0.002	
o-Xylene	0.012	0.003	0.002	
Isopropylbenzene	0.003	0.003	0.002	
n-Propylbenzene	0.011	0.003	0.002	
1,3,5-Trimethylbenzene	0.006	0.003	0.002	
1,2,4-Trimethylbenzene	0.015	0.003	0.002	
t-Butylbenzene	0.003	0.003	0.002	
sec-Butylbenzene	0.002 J	0.003	0.002	
p-Isopropyltoluene	0.010	0.003	0.002	
n-Butylbenzene	0.011	0.003	0.002	
C1 - Benzene	0.129 B	0.003	0.002	
C2 - Benzene	0.092	0.003	0.002	
C3 - Benzene	0.042	0.003	0.002	
C4 - Benzene	0.043	0.003	0.002	
C5 - Benzene	0.069	0.003	0.002	
trans-Decalin	0.006	0.003	0.002	
cis-Decalin	U	0.003	0.002	
Naphthalene	0.138 B	0.003	0.002	
2-Methylnaphthalene	0.055	0.003	0.002	
1-Methylnaphthalene	0.067	0.003	0.002	
C1 - Naphthalene	0.075 B	0.003	0.002	
C2 - Naphthalene	0.276	0.003	0.002	
C3- Naphthalene	0.396	0.003	0.002	
C4- Naphthalene	0.388	0.003	0.002	
Acenaphthylene	0.122	0.003	0.002	
Acenaphthene	3.41	0.003	0.002	
Dibenzofuran	0.013	0.003	0.002	
Fluorene	0.026	0.003	0.002	
C1 - Fluorene	0.783	0.003	0.002	
C2 - Fluorene	0.330	0.003	0.002	
C3 - Fluorene	0.085	0.003	0.002	
Phenanthrene	0.105	0.003	0.002	
Anthracene	0.092	0.003	0.002	

Analytical Results for Volatile and Semivolatile Organics
META Environmental, Inc.

Field ID: TS29 (1.5-2.5)

Client:	ENSR	Preparation Method:	EPA 3570
Project:	Troy - Smith Ave.	Cleanup Method(s):	NA
		Analysis Method:	EPA 8270M
Lab ID	EK080415-09		
File ID:	E050225.D	Matrix:	Sediment
		Preservation:	None
Date Sampled:	10/18/2007	Decanted:	None
Date Received:	4/15/2008		
Date Prepared:	4/24/2008	Sample Size (g):	4.18
Date Cleanup:	NA	Percent Solid:	75%
Date Analyzed:	5/3/2008	Extract Volume (µl):	2000
Instrument:	El Camino	Prep DF:	1.00
Operator:	JAR	Analysis DF:	1.00
		Injection Volume (µl):	1.00
Batch QC:	QC080424-SB		

Analyte	Concentration (mg/kg dry wt.)	RL	EDL	Comments
C1 - Phenanthrene/Anthracene	0.464	0.003	0.002	
C2 - Phenanthrene/Anthracene	0.221	0.003	0.002	
C3 - Phenanthrene/Anthracene	0.057	0.003	0.002	
C4 - Phenanthrene/Anthracene	0.042	0.003	0.002	
Dibenzothiophene	0.104	0.003	0.002	
C1 - Dibenzothiophene	0.240	0.003	0.002	
C2 - Dibenzothiophene	0.086	0.003	0.002	
C3 - Dibenzothiophene	0.024	0.003	0.002	
C4 - Dibenzothiophene	0.014	0.003	0.002	
Benzo(b)naphtho(2,1-d)thiophene	0.015	0.003	0.002	
Fluoranthene	0.280	0.003	0.002	
Pyrene	1.72	0.003	0.002	
C1 - Fluoranthene/Pyrene	0.249	0.003	0.002	
C2 - Fluoranthene/Pyrene	0.079	0.003	0.002	
C3 - Fluoranthene/Pyrene	0.029	0.003	0.002	
Benz[a]anthracene	0.093	0.003	0.002	
Chrysene*	0.121	0.003	0.002	
C1 - Benz(a)anthracene/Chrysene	0.057	0.003	0.002	
C2 - Benz(a)anthracene/Chrysene	0.036	0.003	0.002	
C3 - Benz(a)anthracene/Chrysene	0.027	0.003	0.002	
C4 - Benz(a)anthracene/Chrysene	0.021	0.003	0.002	
Benzo[b]fluoranthene	0.077	0.003	0.002	
Benzo[j/k]fluoranthene	0.082	0.003	0.002	
Benzo(e)pyrene	0.068	0.003	0.002	
Benzo[a]pyrene	0.085	0.003	0.002	
Perylene	0.031	0.003	0.002	
Indeno[1,2,3-cd]pyrene	0.051	0.003	0.002	
Dibenz[a,h]anthracene	0.016	0.003	0.002	
Benzo[g,h,i]perylene	0.059	0.003	0.002	
Coronene	0.016	0.003	0.002	
Retene	0.130	0.003	0.002	
Benzo(b/c)fluorenes	0.047	0.003	0.002	
2-Methylpyrene	0.028	0.003	0.002	
4-Methylpyrene	0.025	0.003	0.002	
1-Methylpyrene	0.022	0.003	0.002	
Heptadecane	0.148	0.006	0.003	
Pristane	0.027	0.003	0.002	
Octadecane	0.025	0.006	0.003	
Phytane	0.030	0.003	0.002	

Analytical Results for Volatile and Semivolatile Organics
META Environmental, Inc.

Field ID: TS29 (1.5-2.5)

Client:	ENSR	Preparation Method:	EPA 3570
Project:	Troy - Smith Ave.	Cleanup Method(s):	NA
		Analysis Method:	EPA 8270M
Lab ID	EK080415-09		
File ID:	E050225.D	Matrix:	Sediment
		Preservation:	None
Date Sampled:	10/18/2007	Decanted:	None
Date Received:	4/15/2008		
Date Prepared:	4/24/2008	Sample Size (g):	4.18
Date Cleanup:	NA	Percent Solid:	75%
Date Analyzed:	5/3/2008	Extract Volume (µl):	2000
Instrument:	El Camino	Prep DF:	1.00
Operator:	JAR	Analysis DF:	1.00
		Injection Volume (µl):	1.00
Batch QC:	QC080424-SB		

Analyte	Concentration (mg/kg dry wt.)	RL	EDL	Comments
2,6,10-trimethyldodecane	0.011	0.003	0.002	
2,6,10-trimethyltridecane	0.014	0.003	0.002	
Norpristane	0.011	0.003	0.002	
Tetraethyl lead	U	0.006	0.003	
Total PAH (16)	6.48	0.003	0.002	
Total PAH (42)	10.7	0.003	0.002	

Extraction Surrogate Recoveries (%)		Limits
Toluene-d8	69	50 - 120
Phenanthrene-d10	84	50 - 120
Perylene-d12	67	50 - 120
Benzo(a)pyrene-d12	76	50 - 120

NA - Not applicable.
B - Analyte detected in the Blank.
J - Estimated value; detected between the RL and DL.
U - Analyte not detected above DL.
D - Analyte reported from a diluted extract.
E - Estimate, result detected above calibration range.
I - Concentration/Peak ID uncertain due to potential interference.
RL - Reporting limit is the sample equivalent of the lowest linear calibration concentration.
EDL - Estimated detection limit is 50% of RL.
* - Triphenylene is known to coelute with this compound.

Analytical Results for Volatile and Semivolatile Organics
META Environmental, Inc.

Field ID: TS18 (1-2)

Client:	ENSR	Preparation Method:	EPA 3570
Project:	Troy - Smith Ave.	Cleanup Method(s):	NA
		Analysis Method:	EPA 8270M
Lab ID	EK080415-10		
File ID:	E050226.D	Matrix:	Sediment
		Preservation:	None
Date Sampled:	10/18/2007	Decanted:	None
Date Received:	4/15/2008		
Date Prepared:	4/24/2008	Sample Size (g):	4.18
Date Cleanup:	NA	Percent Solid:	66%
Date Analyzed:	5/3/2008	Extract Volume (µl):	2000
Instrument:	El Camino	Prep DF:	1.00
Operator:	JAR	Analysis DF:	1.00
		Injection Volume (µl):	1.00
Batch QC:	QC080424-SB		

Analyte	Concentration (mg/kg dry wt.)	RL	EDL	Comments
MAH & PAH COMPOUNDS:				
Benzene	1.16 B	0.004	0.002	
Toluene	3.11 B	0.004	0.002	
Ethylbenzene	3.43	0.004	0.002	
m/p-Xylenes	3.09	0.004	0.002	
Styrene	0.533 B	0.004	0.002	
o-Xylene	0.814	0.004	0.002	
Isopropylbenzene	0.178	0.004	0.002	
n-Propylbenzene	0.245	0.004	0.002	
1,3,5-Trimethylbenzene	0.278	0.004	0.002	
1,2,4-Trimethylbenzene	1.26	0.004	0.002	
t-Butylbenzene	U	0.004	0.002	
sec-Butylbenzene	0.012	0.004	0.002	
p-Isopropyltoluene	0.290	0.004	0.002	
n-Butylbenzene	0.171	0.004	0.002	
C1 - Benzene	2.2 B	0.004	0.002	
C2 - Benzene	3.76	0.004	0.002	
C3 - Benzene	2.53	0.004	0.002	
C4 - Benzene	1.36	0.004	0.002	
C5 - Benzene	0.544	0.004	0.002	
trans-Decalin	0.022	0.004	0.002	
cis-Decalin	U	0.004	0.002	
Naphthalene	12.0 B	0.004	0.002	
2-Methylnaphthalene	8.11	0.004	0.002	
1-Methylnaphthalene	4.76	0.004	0.002	
C1 - Naphthalene	5.0 B	0.004	0.002	
C2 - Naphthalene	6.8	0.004	0.002	
C3- Naphthalene	4.91	0.004	0.002	
C4- Naphthalene	2.4	0.004	0.002	
Acenaphthylene	1.65	0.004	0.002	
Acenaphthene	6.82	0.004	0.002	
Dibenzofuran	0.318	0.004	0.002	
Fluorene	3.2	0.004	0.002	
C1 - Fluorene	3.9	0.004	0.002	
C2 - Fluorene	3.09	0.004	0.002	
C3 - Fluorene	1.4	0.004	0.002	
Phenanthrene	7.55	0.004	0.002	
Anthracene	3.8	0.004	0.002	

Analytical Results for Volatile and Semivolatile Organics
META Environmental, Inc.

Field ID: TS18 (1-2)

Client:	ENSR	Preparation Method:	EPA 3570
Project:	Troy - Smith Ave.	Cleanup Method(s):	NA
		Analysis Method:	EPA 8270M
Lab ID	EK080415-10		
File ID:	E050226.D	Matrix:	Sediment
		Preservation:	None
Date Sampled:	10/18/2007	Decanted:	None
Date Received:	4/15/2008		
Date Prepared:	4/24/2008	Sample Size (g):	4.18
Date Cleanup:	NA	Percent Solid:	66%
Date Analyzed:	5/3/2008	Extract Volume (µl):	2000
Instrument:	El Camino	Prep DF:	1.00
Operator:	JAR	Analysis DF:	1.00
		Injection Volume (µl):	1.00
Batch QC:	QC080424-SB		

Analyte	Concentration (mg/kg dry wt.)	RL	EDL	Comments
C1 - Phenanthrene/Anthracene	10.7	0.004	0.002	
C2 - Phenanthrene/Anthracene	7.76	0.004	0.002	
C3 - Phenanthrene/Anthracene	3.07	0.004	0.002	
C4 - Phenanthrene/Anthracene	1.39	0.004	0.002	
Dibenzothiophene	1.64	0.004	0.002	
C1 - Dibenzothiophene	2.31	0.004	0.002	
C2 - Dibenzothiophene	2.14	0.004	0.002	
C3 - Dibenzothiophene	1.09	0.004	0.002	
C4 - Dibenzothiophene	0.367	0.004	0.002	
Benzo(b)naphtho(2,1-d)thiophene	0.598	0.004	0.002	
Fluoranthene	5.64	0.004	0.002	
Pyrene	8.41	0.004	0.002	
C1 - Fluoranthene/Pyrene	10.8	0.004	0.002	
C2 - Fluoranthene/Pyrene	4.38	0.004	0.002	
C3 - Fluoranthene/Pyrene	1.64	0.004	0.002	
Benz[a]anthracene	3.35	0.004	0.002	
Chrysene*	3.81	0.004	0.002	
C1 - Benz(a)anthracene/Chrysene	3.84	0.004	0.002	
C2 - Benz(a)anthracene/Chrysene	1.75	0.004	0.002	
C3 - Benz(a)anthracene/Chrysene	0.638	0.004	0.002	
C4 - Benz(a)anthracene/Chrysene	0.212	0.004	0.002	
Benzo[b]fluoranthene	1.46	0.004	0.002	
Benzo[j/k]fluoranthene	1.81	0.004	0.002	
Benzo(e)pyrene	1.66	0.004	0.002	
Benzo[a]pyrene	2.96	0.004	0.002	
Perylene	0.500	0.004	0.002	
Indeno[1,2,3-cd]pyrene	0.987	0.004	0.002	
Dibenz[a,h]anthracene	0.393	0.004	0.002	
Benzo[g,h,i]perylene	1.22	0.004	0.002	
Coronene	0.305	0.004	0.002	
Retene	3.32	0.004	0.002	
Benzo(b/c)fluorenes	1.44	0.004	0.002	
2-Methylpyrene	1.39	0.004	0.002	
4-Methylpyrene	1.53	0.004	0.002	
1-Methylpyrene	1.55	0.004	0.002	
Heptadecane	0.196	0.007	0.004	
Pristane	0.253	0.004	0.002	
Octadecane	0.076	0.007	0.004	
Phytane	0.210	0.004	0.002	

Analytical Results for Volatile and Semivolatile Organics
META Environmental, Inc.

Field ID: TS18 (1-2)

Client:	ENSR	Preparation Method:	EPA 3570
Project:	Troy - Smith Ave.	Cleanup Method(s):	NA
		Analysis Method:	EPA 8270M
Lab ID	EK080415-10		
File ID:	E050226.D	Matrix:	Sediment
		Preservation:	None
Date Sampled:	10/18/2007	Decanted:	None
Date Received:	4/15/2008		
Date Prepared:	4/24/2008	Sample Size (g):	4.18
Date Cleanup:	NA	Percent Solid:	66%
Date Analyzed:	5/3/2008	Extract Volume (µl):	2000
Instrument:	El Camino	Prep DF:	1.00
Operator:	JAR	Analysis DF:	1.00
		Injection Volume (µl):	1.00
Batch QC:	QC080424-SB		

Analyte	Concentration (mg/kg dry wt.)	RL	EDL	Comments
2,6,10-trimethyldodecane	0.088	0.004	0.002	
2,6,10-trimethyltridecane	0.137	0.004	0.002	
Norpristane	0.158	0.004	0.002	
Tetraethyl lead	U	0.007	0.004	
Total PAH (16)	65.1	0.004	0.002	
Total PAH (42)	149	0.004	0.002	

Extraction Surrogate Recoveries (%)		Limits
Toluene-d8	70	50 - 120
Phenanthrene-d10	85	50 - 120
Perylene-d12	71	50 - 120
Benzo(a)pyrene-d12	80	50 - 120

NA - Not applicable.
B - Analyte detected in the Blank.
J - Estimated value; detected between the RL and DL.
U - Analyte not detected above DL.
D - Analyte reported from a diluted extract.
E - Estimate, result detected above calibration range.
I - Concentration/Peak ID uncertain due to potential interference.
RL - Reporting limit is the sample equivalent of the lowest linear calibration concentration.
EDL - Estimated detection limit is 50% of RL.
* - Triphenylene is known to coelute with this compound.

Analytical Results for Volatile and Semivolatile Organics
META Environmental, Inc.

Field ID: TS17 (2-3)

Client:	ENSR	Preparation Method:	EPA 3570
Project:	Troy - Smith Ave.	Cleanup Method(s):	NA
		Analysis Method:	EPA 8270M
Lab ID	EK080415-11		
File ID:	E050228.D	Matrix:	Sediment
		Preservation:	None
Date Sampled:	10/19/2007	Decanted:	None
Date Received:	4/15/2008		
Date Prepared:	4/24/2008	Sample Size (g):	4.22
Date Cleanup:	NA	Percent Solid:	71%
Date Analyzed:	5/4/2008	Extract Volume (µl):	2000
Instrument:	El Camino	Prep DF:	1.00
Operator:	JAR	Analysis DF:	1.00
		Injection Volume (µl):	1.00
Batch QC:	QC080424-SB		

Analyte	Concentration (mg/kg dry wt.)	RL	EDL	Comments
MAH & PAH COMPOUNDS:				
Benzene	1.15 B	0.003	0.002	
Toluene	2.91 B	0.003	0.002	
Ethylbenzene	3.41	0.003	0.002	
m/p-Xylenes	2.96	0.003	0.002	
Styrene	0.584 B	0.003	0.002	
o-Xylene	0.866	0.003	0.002	
Isopropylbenzene	0.213	0.003	0.002	
n-Propylbenzene	0.225	0.003	0.002	
1,3,5-Trimethylbenzene	0.275	0.003	0.002	
1,2,4-Trimethylbenzene	1.13	0.003	0.002	
t-Butylbenzene	U	0.003	0.002	
sec-Butylbenzene	0.009	0.003	0.002	
p-Isopropyltoluene	0.313	0.003	0.002	
n-Butylbenzene	0.137	0.003	0.002	
C1 - Benzene	2.06 B	0.003	0.002	
C2 - Benzene	3.71	0.003	0.002	
C3 - Benzene	2.33	0.003	0.002	
C4 - Benzene	1.22	0.003	0.002	
C5 - Benzene	0.490	0.003	0.002	
trans-Decalin	0.019	0.003	0.002	
cis-Decalin	U	0.003	0.002	
Naphthalene	12.0 B	0.003	0.002	
2-Methylnaphthalene	7.58	0.003	0.002	
1-Methylnaphthalene	4.55	0.003	0.002	
C1 - Naphthalene	7.51 B	0.003	0.002	
C2 - Naphthalene	5.98	0.003	0.002	
C3- Naphthalene	4.36	0.003	0.002	
C4- Naphthalene	2.4	0.003	0.002	
Acenaphthylene	2.08	0.003	0.002	
Acenaphthene	5.68	0.003	0.002	
Dibenzofuran	0.248	0.003	0.002	
Fluorene	2.51	0.003	0.002	
C1 - Fluorene	3.28	0.003	0.002	
C2 - Fluorene	3.18	0.003	0.002	
C3 - Fluorene	1.63	0.003	0.002	
Phenanthrene	6.62	0.003	0.002	
Anthracene	3.74	0.003	0.002	

Analytical Results for Volatile and Semivolatile Organics
META Environmental, Inc.

Field ID: **TS17 (2-3)**

Client:	ENSR	Preparation Method:	EPA 3570
Project:	Troy - Smith Ave.	Cleanup Method(s):	NA
		Analysis Method:	EPA 8270M
Lab ID	EK080415-11		
File ID:	E050228.D	Matrix:	Sediment
		Preservation:	None
Date Sampled:	10/19/2007	Decanted:	None
Date Received:	4/15/2008		
Date Prepared:	4/24/2008	Sample Size (g):	4.22
Date Cleanup:	NA	Percent Solid:	71%
Date Analyzed:	5/4/2008	Extract Volume (µl):	2000
Instrument:	El Camino	Prep DF:	1.00
Operator:	JAR	Analysis DF:	1.00
		Injection Volume (µl):	1.00
Batch QC:	QC080424-SB		

Analyte	Concentration (mg/kg dry wt.)	RL	EDL	Comments
C1 - Phenanthrene/Anthracene	10.0	0.003	0.002	
C2 - Phenanthrene/Anthracene	8.3	0.003	0.002	
C3 - Phenanthrene/Anthracene	3.3	0.003	0.002	
C4 - Phenanthrene/Anthracene	0.970	0.003	0.002	
Dibenzothiophene	1.28	0.003	0.002	
C1 - Dibenzothiophene	2.15	0.003	0.002	
C2 - Dibenzothiophene	2.26	0.003	0.002	
C3 - Dibenzothiophene	1.2	0.003	0.002	
C4 - Dibenzothiophene	0.408	0.003	0.002	
Benzo(b)naphtho(2,1-d)thiophene	0.650	0.003	0.002	
Fluoranthene	5.65	0.003	0.002	
Pyrene	9.58	0.003	0.002	
C1 - Fluoranthene/Pyrene	12.4	0.003	0.002	
C2 - Fluoranthene/Pyrene	4.89	0.003	0.002	
C3 - Fluoranthene/Pyrene	1.8	0.003	0.002	
Benz[a]anthracene	3.81	0.003	0.002	
Chrysene*	4.52	0.003	0.002	
C1 - Benz(a)anthracene/Chrysene	4.28	0.003	0.002	
C2 - Benz(a)anthracene/Chrysene	2.0	0.003	0.002	
C3 - Benz(a)anthracene/Chrysene	0.723	0.003	0.002	
C4 - Benz(a)anthracene/Chrysene	0.283	0.003	0.002	
Benzo[b]fluoranthene	1.76	0.003	0.002	
Benzo[j/k]fluoranthene	2.27	0.003	0.002	
Benzo(e)pyrene	2.09	0.003	0.002	
Benzo[a]pyrene	3.53	0.003	0.002	
Perylene	0.602	0.003	0.002	
Indeno[1,2,3-cd]pyrene	1.32	0.003	0.002	
Dibenz[a,h]anthracene	0.498	0.003	0.002	
Benzo[g,h,i]perylene	1.69	0.003	0.002	
Coronene	0.433	0.003	0.002	
Retene	0.699	0.003	0.002	
Benzo(b/c)fluorenes	1.68	0.003	0.002	
2-Methylpyrene	1.6	0.003	0.002	
4-Methylpyrene	1.76	0.003	0.002	
1-Methylpyrene	1.79	0.003	0.002	
Heptadecane	0.199	0.007	0.003	
Pristane	0.370	0.003	0.002	
Octadecane	0.114	0.007	0.003	
Phytane	0.291	0.003	0.002	

Analytical Results for Volatile and Semivolatile Organics
META Environmental, Inc.

Field ID: TS17 (2-3)

Client:	ENSR	Preparation Method:	EPA 3570
Project:	Troy - Smith Ave.	Cleanup Method(s):	NA
		Analysis Method:	EPA 8270M
Lab ID	EK080415-11		
File ID:	E050228.D	Matrix:	Sediment
		Preservation:	None
Date Sampled:	10/19/2007	Decanted:	None
Date Received:	4/15/2008		
Date Prepared:	4/24/2008	Sample Size (g):	4.22
Date Cleanup:	NA	Percent Solid:	71%
Date Analyzed:	5/4/2008	Extract Volume (µl):	2000
Instrument:	El Camino	Prep DF:	1.00
Operator:	JAR	Analysis DF:	1.00
		Injection Volume (µl):	1.00
Batch QC:	QC080424-SB		

Analyte	Concentration (mg/kg dry wt.)	RL	EDL	Comments
2,6,10-trimethyldodecane	0.108	0.003	0.002	
2,6,10-trimethyltridecane	0.167	0.003	0.002	
Norpristane	0.193	0.003	0.002	
Tetraethyl lead	U	0.007	0.003	
Total PAH (16)	67.2	0.003	0.002	
Total PAH (42)	155	0.003	0.002	

Extraction Surrogate Recoveries (%)		Limits
Toluene-d8	70	50 - 120
Phenanthrene-d10	83	50 - 120
Perylene-d12	67	50 - 120
Benzo(a)pyrene-d12	78	50 - 120

NA - Not applicable.
B - Analyte detected in the Blank.
J - Estimated value; detected between the RL and DL.
U - Analyte not detected above DL.
D - Analyte reported from a diluted extract.
E - Estimate, result detected above calibration range.
I - Concentration/Peak ID uncertain due to potential interference.
RL - Reporting limit is the sample equivalent of the lowest linear calibration concentration.
EDL - Estimated detection limit is 50% of RL.
* - Triphenylene is known to coelute with this compound.

Analytical Results for Volatile and Semivolatile Organics
META Environmental, Inc.

Field ID: TS02

Client:	ENSR	Preparation Method:	EPA 3570
Project:	Troy - Smith Ave.	Cleanup Method(s):	NA
		Analysis Method:	EPA 8270M
Lab ID	EK080415-12		
File ID:	E050230.D	Matrix:	Sediment
		Preservation:	None
Date Sampled:	10/17/2007	Decanted:	None
Date Received:	4/15/2008		
Date Prepared:	4/24/2008	Sample Size (g):	4.13
Date Cleanup:	NA	Percent Solid:	80%
Date Analyzed:	5/4/2008	Extract Volume (µl):	2000
Instrument:	El Camino	Prep DF:	1.00
Operator:	JAR	Analysis DF:	1.00
		Injection Volume (µl):	1.00
Batch QC:	QC080424-SB		

Analyte	Concentration (mg/kg dry wt.)	RL	EDL	Comments
MAH & PAH COMPOUNDS:				
Benzene	0.047 B	0.003	0.002	
Toluene	0.060 B	0.003	0.002	
Ethylbenzene	0.047	0.003	0.002	
m/p-Xylenes	0.050	0.003	0.002	
Styrene	0.153 B	0.003	0.002	
o-Xylene	0.014	0.003	0.002	
Isopropylbenzene	0.021	0.003	0.002	
n-Propylbenzene	0.021	0.003	0.002	
1,3,5-Trimethylbenzene	0.027	0.003	0.002	
1,2,4-Trimethylbenzene	0.053	0.003	0.002	
t-Butylbenzene	U	0.003	0.002	
sec-Butylbenzene	0.004	0.003	0.002	
p-Isopropyltoluene	0.011	0.003	0.002	
n-Butylbenzene	0.041	0.003	0.002	
C1 - Benzene	0.042 B	0.003	0.002	
C2 - Benzene	0.061	0.003	0.002	
C3 - Benzene	0.119	0.003	0.002	
C4 - Benzene	0.263	0.003	0.002	
C5 - Benzene	0.242	0.003	0.002	
trans-Decalin	0.021	0.003	0.002	
cis-Decalin	U	0.003	0.002	
Naphthalene	0.325 B	0.003	0.002	
2-Methylnaphthalene	0.115	0.003	0.002	
1-Methylnaphthalene	0.552	0.003	0.002	
C1 - Naphthalene	0.412 B	0.003	0.002	
C2 - Naphthalene	1.2	0.003	0.002	
C3- Naphthalene	1.62	0.003	0.002	
C4- Naphthalene	0.415	0.003	0.002	
Acenaphthylene	0.342	0.003	0.002	
Acenaphthene	3.5	0.003	0.002	
Dibenzofuran	0.171	0.003	0.002	
Fluorene	1.22	0.003	0.002	
C1 - Fluorene	1.23	0.003	0.002	
C2 - Fluorene	0.628	0.003	0.002	
C3 - Fluorene	0.153	0.003	0.002	
Phenanthrene	0.785	0.003	0.002	
Anthracene	0.747	0.003	0.002	

Analytical Results for Volatile and Semivolatile Organics
META Environmental, Inc.

Field ID: TS02

Client:	ENSR	Preparation Method:	EPA 3570
Project:	Troy - Smith Ave.	Cleanup Method(s):	NA
		Analysis Method:	EPA 8270M
Lab ID	EK080415-12		
File ID:	E050230.D	Matrix:	Sediment
		Preservation:	None
Date Sampled:	10/17/2007	Decanted:	None
Date Received:	4/15/2008		
Date Prepared:	4/24/2008	Sample Size (g):	4.13
Date Cleanup:	NA	Percent Solid:	80%
Date Analyzed:	5/4/2008	Extract Volume (µl):	2000
Instrument:	El Camino	Prep DF:	1.00
Operator:	JAR	Analysis DF:	1.00
		Injection Volume (µl):	1.00
Batch QC:	QC080424-SB		

Analyte	Concentration (mg/kg dry wt.)	RL	EDL	Comments
C1 - Phenanthrene/Anthracene	3.18	0.003	0.002	
C2 - Phenanthrene/Anthracene	1.14	0.003	0.002	
C3 - Phenanthrene/Anthracene	0.188	0.003	0.002	
C4 - Phenanthrene/Anthracene	0.041	0.003	0.002	
Dibenzothiophene	0.584	0.003	0.002	
C1 - Dibenzothiophene	0.654	0.003	0.002	
C2 - Dibenzothiophene	0.321	0.003	0.002	
C3 - Dibenzothiophene	0.071	0.003	0.002	
C4 - Dibenzothiophene	0.020	0.003	0.002	
Benzo(b)naphtho(2,1-d)thiophene	0.047	0.003	0.002	
Fluoranthene	2.08	0.003	0.002	
Pyrene	3.1	0.003	0.002	
C1 - Fluoranthene/Pyrene	1.41	0.003	0.002	
C2 - Fluoranthene/Pyrene	0.324	0.003	0.002	
C3 - Fluoranthene/Pyrene	0.091	0.003	0.002	
Benz[a]anthracene	0.331	0.003	0.002	
Chrysene*	0.375	0.003	0.002	
C1 - Benz(a)anthracene/Chrysene	0.280	0.003	0.002	
C2 - Benz(a)anthracene/Chrysene	0.128	0.003	0.002	
C3 - Benz(a)anthracene/Chrysene	0.045	0.003	0.002	
C4 - Benz(a)anthracene/Chrysene	0.022	0.003	0.002	
Benzo[b]fluoranthene	0.153	0.003	0.002	
Benzo[j/k]fluoranthene	0.182	0.003	0.002	
Benzo(e)pyrene	0.187	0.003	0.002	
Benzo[a]pyrene	0.261	0.003	0.002	
Perylene	0.045	0.003	0.002	
Indeno[1,2,3-cd]pyrene	0.120	0.003	0.002	
Dibenz[a,h]anthracene	0.041	0.003	0.002	
Benzo[g,h,i]perylene	0.160	0.003	0.002	
Coronene	0.042	0.003	0.002	
Retene	0.020	0.003	0.002	
Benzo(b/c)fluorenes	0.216	0.003	0.002	
2-Methylpyrene	0.183	0.003	0.002	
4-Methylpyrene	0.158	0.003	0.002	
1-Methylpyrene	0.204	0.003	0.002	
Heptadecane	0.037	0.006	0.003	
Pristane	0.029	0.003	0.002	
Octadecane	0.030	0.006	0.003	
Phytane	0.025	0.003	0.002	

Analytical Results for Volatile and Semivolatile Organics
META Environmental, Inc.

Field ID: TS02

Client:	ENSR	Preparation Method:	EPA 3570
Project:	Troy - Smith Ave.	Cleanup Method(s):	NA
		Analysis Method:	EPA 8270M
Lab ID	EK080415-12		
File ID:	E050230.D	Matrix:	Sediment
		Preservation:	None
Date Sampled:	10/17/2007	Decanted:	None
Date Received:	4/15/2008		
Date Prepared:	4/24/2008	Sample Size (g):	4.13
Date Cleanup:	NA	Percent Solid:	80%
Date Analyzed:	5/4/2008	Extract Volume (µl):	2000
Instrument:	El Camino	Prep DF:	1.00
Operator:	JAR	Analysis DF:	1.00
		Injection Volume (µl):	1.00
Batch QC:	QC080424-SB		

Analyte	Concentration (mg/kg dry wt.)	RL	EDL	Comments
2,6,10-trimethyldodecane	0.007	0.003	0.002	
2,6,10-trimethyltridecane	0.012	0.003	0.002	
Norpristane	0.023	0.003	0.002	
Tetraethyl lead	U	0.006	0.003	
Total PAH (16)	13.7	0.003	0.002	
Total PAH (42)	28.3	0.003	0.002	

Extraction Surrogate Recoveries (%)		Limits
Toluene-d8	73	50 - 120
Phenanthrene-d10	87	50 - 120
Perylene-d12	66	50 - 120
Benzo(a)pyrene-d12	78	50 - 120

NA - Not applicable.
B - Analyte detected in the Blank.
J - Estimated value; detected between the RL and DL.
U - Analyte not detected above DL.
D - Analyte reported from a diluted extract.
E - Estimate, result detected above calibration range.
I - Concentration/Peak ID uncertain due to potential interference.
RL - Reporting limit is the sample equivalent of the lowest linear calibration concentration.
EDL - Estimated detection limit is 50% of RL.
* - Triphenylene is known to coelute with this compound.

Analytical Results for Volatile and Semivolatile Organics
META Environmental, Inc.

Field ID: TS17

Client:	ENSR	Preparation Method:	EPA 3570
Project:	Troy - Smith Ave.	Cleanup Method(s):	NA
		Analysis Method:	EPA 8270M
Lab ID	EK080415-13		
File ID:	E050231.D	Matrix:	Sediment
		Preservation:	None
Date Sampled:	10/15/2007	Decanted:	None
Date Received:	4/15/2008		
Date Prepared:	4/24/2008	Sample Size (g):	4.17
Date Cleanup:	NA	Percent Solid:	51%
Date Analyzed:	5/4/2008	Extract Volume (µl):	2000
Instrument:	El Camino	Prep DF:	1.00
Operator:	JAR	Analysis DF:	1.00
		Injection Volume (µl):	1.00
Batch QC:	QC080424-SB		

Analyte	Concentration (mg/kg dry wt.)	RL	EDL	Comments
MAH & PAH COMPOUNDS:				
Benzene	0.043 B	0.005	0.002	
Toluene	1.38 B	0.005	0.002	
Ethylbenzene	0.011	0.005	0.002	
m/p-Xylenes	0.044	0.005	0.002	
Styrene	0.008 B	0.005	0.002	
o-Xylene	0.007	0.005	0.002	
Isopropylbenzene	0.010	0.005	0.002	
n-Propylbenzene	0.008	0.005	0.002	
1,3,5-Trimethylbenzene	0.004 J	0.005	0.002	
1,2,4-Trimethylbenzene	0.007	0.005	0.002	
t-Butylbenzene	U	0.005	0.002	
sec-Butylbenzene	U	0.005	0.002	
p-Isopropyltoluene	0.016	0.005	0.002	
n-Butylbenzene	0.005 J	0.005	0.002	
C1 - Benzene	0.974 B	0.005	0.002	
C2 - Benzene	0.035	0.005	0.002	
C3 - Benzene	0.026	0.005	0.002	
C4 - Benzene	0.026	0.005	0.002	
C5 - Benzene	0.018	0.005	0.002	
trans-Decalin	U	0.005	0.002	
cis-Decalin	U	0.005	0.002	
Naphthalene	0.029 B	0.005	0.002	
2-Methylnaphthalene	0.016	0.005	0.002	
1-Methylnaphthalene	0.013	0.005	0.002	
C1 - Naphthalene	0.010 B	0.005	0.002	
C2 - Naphthalene	0.023	0.005	0.002	
C3- Naphthalene	0.022	0.005	0.002	
C4- Naphthalene	0.019	0.005	0.002	
Acenaphthylene	0.024	0.005	0.002	
Acenaphthene	0.051	0.005	0.002	
Dibenzofuran	0.005	0.005	0.002	
Fluorene	0.012	0.005	0.002	
C1 - Fluorene	0.014	0.005	0.002	
C2 - Fluorene	0.025	0.005	0.002	
C3 - Fluorene	0.022	0.005	0.002	
Phenanthrene	0.108	0.005	0.002	
Anthracene	0.042	0.005	0.002	

Analytical Results for Volatile and Semivolatile Organics
META Environmental, Inc.

Field ID: TS17

Client:	ENSR	Preparation Method:	EPA 3570
Project:	Troy - Smith Ave.	Cleanup Method(s):	NA
		Analysis Method:	EPA 8270M
Lab ID	EK080415-13		
File ID:	E050231.D	Matrix:	Sediment
		Preservation:	None
Date Sampled:	10/15/2007	Decanted:	None
Date Received:	4/15/2008		
Date Prepared:	4/24/2008	Sample Size (g):	4.17
Date Cleanup:	NA	Percent Solid:	51%
Date Analyzed:	5/4/2008	Extract Volume (µl):	2000
Instrument:	El Camino	Prep DF:	1.00
Operator:	JAR	Analysis DF:	1.00
		Injection Volume (µl):	1.00
Batch QC:	QC080424-SB		

Analyte	Concentration (mg/kg dry wt.)	RL	EDL	Comments
C1 - Phenanthrene/Anthracene	0.091	0.005	0.002	
C2 - Phenanthrene/Anthracene	0.086	0.005	0.002	
C3 - Phenanthrene/Anthracene	0.042	0.005	0.002	
C4 - Phenanthrene/Anthracene	0.033	0.005	0.002	
Dibenzothiophene	0.007	0.005	0.002	
C1 - Dibenzothiophene	0.012	0.005	0.002	
C2 - Dibenzothiophene	0.019	0.005	0.002	
C3 - Dibenzothiophene	0.017	0.005	0.002	
C4 - Dibenzothiophene	0.012	0.005	0.002	
Benzo(b)naphtho(2,1-d)thiophene	0.020	0.005	0.002	
Fluoranthene	0.294	0.005	0.002	
Pyrene	0.261	0.005	0.002	
C1 - Fluoranthene/Pyrene	0.181	0.005	0.002	
C2 - Fluoranthene/Pyrene	0.076	0.005	0.002	
C3 - Fluoranthene/Pyrene	0.033	0.005	0.002	
Benz[a]anthracene	0.162	0.005	0.002	
Chrysene*	0.174	0.005	0.002	
C1 - Benz(a)anthracene/Chrysene	0.082	0.005	0.002	
C2 - Benz(a)anthracene/Chrysene	0.043	0.005	0.002	
C3 - Benz(a)anthracene/Chrysene	0.023	0.005	0.002	
C4 - Benz(a)anthracene/Chrysene	0.019	0.005	0.002	
Benzo[b]fluoranthene	0.125	0.005	0.002	
Benzo[j/k]fluoranthene	0.140	0.005	0.002	
Benzo(e)pyrene	0.096	0.005	0.002	
Benzo[a]pyrene	0.152	0.005	0.002	
Perylene	0.090	0.005	0.002	
Indeno[1,2,3-cd]pyrene	0.082	0.005	0.002	
Dibenz[a,h]anthracene	0.026	0.005	0.002	
Benzo[g,h,i]perylene	0.085	0.005	0.002	
Coronene	0.020	0.005	0.002	
Retene	0.073	0.005	0.002	
Benzo(b/c)fluorenes	0.035	0.005	0.002	
2-Methylpyrene	0.021	0.005	0.002	
4-Methylpyrene	0.017	0.005	0.002	
1-Methylpyrene	0.015	0.005	0.002	
Heptadecane	0.092	0.009	0.005	
Pristane	0.050	0.005	0.002	
Octadecane	0.016	0.009	0.005	
Phytane	0.048	0.005	0.002	

Analytical Results for Volatile and Semivolatile Organics
META Environmental, Inc.

Field ID: TS17

Client:	ENSR	Preparation Method:	EPA 3570
Project:	Troy - Smith Ave.	Cleanup Method(s):	NA
		Analysis Method:	EPA 8270M
Lab ID	EK080415-13		
File ID:	E050231.D	Matrix:	Sediment
		Preservation:	None
Date Sampled:	10/15/2007	Decanted:	None
Date Received:	4/15/2008		
Date Prepared:	4/24/2008	Sample Size (g):	4.17
Date Cleanup:	NA	Percent Solid:	51%
Date Analyzed:	5/4/2008	Extract Volume (µl):	2000
Instrument:	El Camino	Prep DF:	1.00
Operator:	JAR	Analysis DF:	1.00
		Injection Volume (µl):	1.00
Batch QC:	QC080424-SB		

Analyte	Concentration (mg/kg dry wt.)	RL	EDL	Comments
2,6,10-trimethyldodecane	0.017	0.005	0.002	
2,6,10-trimethyltridecane	0.030	0.005	0.002	
Norpristane	0.015	0.005	0.002	
Tetraethyl lead	U	0.009	0.005	
Total PAH (16)	1.77	0.005	0.002	
Total PAH (42)	2.87	0.005	0.002	

Extraction Surrogate Recoveries (%)		Limits
Toluene-d8	71	50 - 120
Phenanthrene-d10	81	50 - 120
Perylene-d12	69	50 - 120
Benzo(a)pyrene-d12	78	50 - 120

NA - Not applicable.
B - Analyte detected in the Blank.
J - Estimated value; detected between the RL and DL.
U - Analyte not detected above DL.
D - Analyte reported from a diluted extract.
E - Estimate, result detected above calibration range.
I - Concentration/Peak ID uncertain due to potential interference.
RL - Reporting limit is the sample equivalent of the lowest linear calibration concentration.
EDL - Estimated detection limit is 50% of RL.
* - Triphenylene is known to coelute with this compound.

Analytical Results for Volatile and Semivolatile Organics
META Environmental, Inc.

Field ID: TS24 (1-1.5)

Client:	ENSR	Preparation Method:	EPA 3570
Project:	Troy - Smith Ave.	Cleanup Method(s):	NA
		Analysis Method:	EPA 8270M
Lab ID	EK080415-14		
File ID:	E050232.D	Matrix:	Sediment
		Preservation:	None
Date Sampled:	10/19/2007	Decanted:	None
Date Received:	4/15/2008		
Date Prepared:	4/24/2008	Sample Size (g):	4.01
Date Cleanup:	NA	Percent Solid:	85%
Date Analyzed:	5/4/2008	Extract Volume (µl):	2000
Instrument:	El Camino	Prep DF:	1.00
Operator:	JAR	Analysis DF:	1.00
		Injection Volume (µl):	1.00
Batch QC:	QC080424-SB		

Analyte	Concentration (mg/kg dry wt.)	RL	EDL	Comments
MAH & PAH COMPOUNDS:				
Benzene	0.106 B	0.003	0.001	
Toluene	0.106 B	0.003	0.001	
Ethylbenzene	0.453	0.003	0.001	
m/p-Xylenes	0.108	0.003	0.001	
Styrene	0.014 B	0.003	0.001	
o-Xylene	0.049	0.003	0.001	
Isopropylbenzene	0.148	0.003	0.001	
n-Propylbenzene	0.107	0.003	0.001	
1,3,5-Trimethylbenzene	0.041	0.003	0.001	
1,2,4-Trimethylbenzene	0.273	0.003	0.001	
t-Butylbenzene	U	0.003	0.001	
sec-Butylbenzene	0.017	0.003	0.001	
p-Isopropyltoluene	0.041	0.003	0.001	
n-Butylbenzene	0.105	0.003	0.001	
C1 - Benzene	0.074 B	0.003	0.001	
C2 - Benzene	0.288	0.003	0.001	
C3 - Benzene	0.416	0.003	0.001	
C4 - Benzene	0.803	0.003	0.001	
C5 - Benzene	0.254	0.003	0.001	
trans-Decalin	0.012	0.003	0.001	
cis-Decalin	U	0.003	0.001	
Naphthalene	2.04 B	0.003	0.001	
2-Methylnaphthalene	0.941	0.003	0.001	
1-Methylnaphthalene	2.1	0.003	0.001	
C1 - Naphthalene	1.87 B	0.003	0.001	
C2 - Naphthalene	1.55	0.003	0.001	
C3- Naphthalene	0.394	0.003	0.001	
C4- Naphthalene	0.072	0.003	0.001	
Acenaphthylene	0.111	0.003	0.001	
Acenaphthene	5.11	0.003	0.001	
Dibenzofuran	0.118	0.003	0.001	
Fluorene	1.01	0.003	0.001	
C1 - Fluorene	0.261	0.003	0.001	
C2 - Fluorene	0.073	0.003	0.001	
C3 - Fluorene	0.035	0.003	0.001	
Phenanthrene	0.558	0.003	0.001	
Anthracene	0.237	0.003	0.001	

Analytical Results for Volatile and Semivolatile Organics
META Environmental, Inc.

Field ID: **TS24 (1-1.5)**

Client:	ENSR	Preparation Method:	EPA 3570
Project:	Troy - Smith Ave.	Cleanup Method(s):	NA
		Analysis Method:	EPA 8270M
Lab ID	EK080415-14		
File ID:	E050232.D	Matrix:	Sediment
		Preservation:	None
Date Sampled:	10/19/2007	Decanted:	None
Date Received:	4/15/2008		
Date Prepared:	4/24/2008	Sample Size (g):	4.01
Date Cleanup:	NA	Percent Solid:	85%
Date Analyzed:	5/4/2008	Extract Volume (µl):	2000
Instrument:	El Camino	Prep DF:	1.00
Operator:	JAR	Analysis DF:	1.00
		Injection Volume (µl):	1.00
Batch QC:	QC080424-SB		

Analyte	Concentration (mg/kg dry wt.)	RL	EDL	Comments
C1 - Phenanthrene/Anthracene	0.261	0.003	0.001	
C2 - Phenanthrene/Anthracene	0.102	0.003	0.001	
C3 - Phenanthrene/Anthracene	0.032	0.003	0.001	
C4 - Phenanthrene/Anthracene	0.015	0.003	0.001	
Dibenzothiophene	0.194	0.003	0.001	
C1 - Dibenzothiophene	0.082	0.003	0.001	
C2 - Dibenzothiophene	0.031	0.003	0.001	
C3 - Dibenzothiophene	0.016	0.003	0.001	
C4 - Dibenzothiophene	0.007	0.003	0.001	
Benzo(b)naphtho(2,1-d)thiophene	0.009	0.003	0.001	
Fluoranthene	0.169	0.003	0.001	
Pyrene	0.193	0.003	0.001	
C1 - Fluoranthene/Pyrene	0.104	0.003	0.001	
C2 - Fluoranthene/Pyrene	0.045	0.003	0.001	
C3 - Fluoranthene/Pyrene	0.025	0.003	0.001	
Benz[a]anthracene	0.042	0.003	0.001	
Chrysene*	0.052	0.003	0.001	
C1 - Benz(a)anthracene/Chrysene	0.036	0.003	0.001	
C2 - Benz(a)anthracene/Chrysene	0.022	0.003	0.001	
C3 - Benz(a)anthracene/Chrysene	0.014	0.003	0.001	
C4 - Benz(a)anthracene/Chrysene	U	0.003	0.001	
Benzo[b]fluoranthene	0.017	0.003	0.001	
Benzo[j/k]fluoranthene	0.024	0.003	0.001	
Benzo(e)pyrene	0.018	0.003	0.001	
Benzo[a]pyrene	0.023	0.003	0.001	
Perylene	0.007	0.003	0.001	
Indeno[1,2,3-cd]pyrene	0.009	0.003	0.001	
Dibenz[a,h]anthracene	0.003	0.003	0.001	
Benzo[g,h,i]perylene	0.011	0.003	0.001	
Coronene	0.004	0.003	0.001	
Retene	0.021	0.003	0.001	
Benzo(b/c)fluorenes	0.016	0.003	0.001	
2-Methylpyrene	0.013	0.003	0.001	
4-Methylpyrene	0.011	0.003	0.001	
1-Methylpyrene	0.011	0.003	0.001	
Heptadecane	0.032	0.006	0.003	
Pristane	0.016	0.003	0.001	
Octadecane	0.019	0.006	0.003	
Phytane	0.009	0.003	0.001	

Analytical Results for Volatile and Semivolatile Organics
META Environmental, Inc.

Field ID: TS24 (1-1.5)

Client:	ENSR	Preparation Method:	EPA 3570
Project:	Troy - Smith Ave.	Cleanup Method(s):	NA
		Analysis Method:	EPA 8270M
Lab ID	EK080415-14		
File ID:	E050232.D	Matrix:	Sediment
		Preservation:	None
Date Sampled:	10/19/2007	Decanted:	None
Date Received:	4/15/2008		
Date Prepared:	4/24/2008	Sample Size (g):	4.01
Date Cleanup:	NA	Percent Solid:	85%
Date Analyzed:	5/4/2008	Extract Volume (µl):	2000
Instrument:	El Camino	Prep DF:	1.00
Operator:	JAR	Analysis DF:	1.00
		Injection Volume (µl):	1.00
Batch QC:	QC080424-SB		

Analyte	Concentration (mg/kg dry wt.)	RL	EDL	Comments
2,6,10-trimethyldodecane	0.008	0.003	0.001	
2,6,10-trimethyltridecane	0.009	0.003	0.001	
Norpristane	0.011	0.003	0.001	
Tetraethyl lead	U	0.006	0.003	
Total PAH (16)	9.61	0.003	0.001	
Total PAH (42)	15.0	0.003	0.001	

Extraction Surrogate Recoveries (%)		Limits
Toluene-d8	70	50 - 120
Phenanthrene-d10	87	50 - 120
Perylene-d12	67	50 - 120
Benzo(a)pyrene-d12	77	50 - 120

NA - Not applicable.
B - Analyte detected in the Blank.
J - Estimated value; detected between the RL and DL.
U - Analyte not detected above DL.
D - Analyte reported from a diluted extract.
E - Estimate, result detected above calibration range.
I - Concentration/Peak ID uncertain due to potential interference.
RL - Reporting limit is the sample equivalent of the lowest linear calibration concentration.
EDL - Estimated detection limit is 50% of RL.
* - Triphenylene is known to coelute with this compound.

Analytical Results for Volatile and Semivolatile Organics
META Environmental, Inc.

Field ID: TS18

Client:	ENSR	Preparation Method:	EPA 3570
Project:	Troy - Smith Ave.	Cleanup Method(s):	NA
		Analysis Method:	EPA 8270M
Lab ID	EK080415-15		
File ID:	E050233.D	Matrix:	Sediment
		Preservation:	None
Date Sampled:	10/15/2007	Decanted:	None
Date Received:	4/15/2008		
Date Prepared:	4/24/2008	Sample Size (g):	4.08
Date Cleanup:	NA	Percent Solid:	58%
Date Analyzed:	5/4/2008	Extract Volume (µl):	2000
Instrument:	El Camino	Prep DF:	1.00
Operator:	JAR	Analysis DF:	1.00
		Injection Volume (µl):	1.00
Batch QC:	QC080424-SB		

Analyte	Concentration (mg/kg dry wt.)	RL	EDL	Comments
MAH & PAH COMPOUNDS:				
Benzene	0.029 B	0.004	0.002	
Toluene	0.609 B	0.004	0.002	
Ethylbenzene	0.005	0.004	0.002	
m/p-Xylenes	0.021	0.004	0.002	
Styrene	0.008 B	0.004	0.002	
o-Xylene	0.003 J	0.004	0.002	
Isopropylbenzene	U	0.004	0.002	
n-Propylbenzene	0.002 J	0.004	0.002	
1,3,5-Trimethylbenzene	0.004 J	0.004	0.002	
1,2,4-Trimethylbenzene	0.003 J	0.004	0.002	
t-Butylbenzene	U	0.004	0.002	
sec-Butylbenzene	U	0.004	0.002	
p-Isopropyltoluene	0.006	0.004	0.002	
n-Butylbenzene	0.002 J	0.004	0.002	
C1 - Benzene	0.429 B	0.004	0.002	
C2 - Benzene	0.018	0.004	0.002	
C3 - Benzene	0.012	0.004	0.002	
C4 - Benzene	0.016	0.004	0.002	
C5 - Benzene	0.012	0.004	0.002	
trans-Decalin	U	0.004	0.002	
cis-Decalin	U	0.004	0.002	
Naphthalene	0.020 B	0.004	0.002	
2-Methylnaphthalene	0.019	0.004	0.002	
1-Methylnaphthalene	0.021	0.004	0.002	
C1 - Naphthalene	0.025 B	0.004	0.002	
C2 - Naphthalene	0.048	0.004	0.002	
C3- Naphthalene	0.044	0.004	0.002	
C4- Naphthalene	0.027	0.004	0.002	
Acenaphthylene	0.040	0.004	0.002	
Acenaphthene	0.092	0.004	0.002	
Dibenzofuran	0.012	0.004	0.002	
Fluorene	0.037	0.004	0.002	
C1 - Fluorene	0.030	0.004	0.002	
C2 - Fluorene	0.031	0.004	0.002	
C3 - Fluorene	0.035	0.004	0.002	
Phenanthrene	0.482	0.004	0.002	
Anthracene	0.151	0.004	0.002	

Analytical Results for Volatile and Semivolatile Organics
META Environmental, Inc.

Field ID: TS18

Client:	ENSR	Preparation Method:	EPA 3570
Project:	Troy - Smith Ave.	Cleanup Method(s):	NA
		Analysis Method:	EPA 8270M
Lab ID	EK080415-15		
File ID:	E050233.D	Matrix:	Sediment
		Preservation:	None
Date Sampled:	10/15/2007	Decanted:	None
Date Received:	4/15/2008		
Date Prepared:	4/24/2008	Sample Size (g):	4.08
Date Cleanup:	NA	Percent Solid:	58%
Date Analyzed:	5/4/2008	Extract Volume (µl):	2000
Instrument:	El Camino	Prep DF:	1.00
Operator:	JAR	Analysis DF:	1.00
		Injection Volume (µl):	1.00
Batch QC:	QC080424-SB		

Analyte	Concentration (mg/kg dry wt.)	RL	EDL	Comments
C1 - Phenanthrene/Anthracene	0.305	0.004	0.002	
C2 - Phenanthrene/Anthracene	0.193	0.004	0.002	
C3 - Phenanthrene/Anthracene	0.074	0.004	0.002	
C4 - Phenanthrene/Anthracene	0.029	0.004	0.002	
Dibenzothiophene	0.027	0.004	0.002	
C1 - Dibenzothiophene	0.027	0.004	0.002	
C2 - Dibenzothiophene	0.031	0.004	0.002	
C3 - Dibenzothiophene	0.019	0.004	0.002	
C4 - Dibenzothiophene	0.012	0.004	0.002	
Benzo(b)naphtho(2,1-d)thiophene	0.037	0.004	0.002	
Fluoranthene	0.531	0.004	0.002	
Pyrene	0.590	0.004	0.002	
C1 - Fluoranthene/Pyrene	0.336	0.004	0.002	
C2 - Fluoranthene/Pyrene	0.154	0.004	0.002	
C3 - Fluoranthene/Pyrene	0.062	0.004	0.002	
Benz[a]anthracene	0.312	0.004	0.002	
Chrysene*	0.325	0.004	0.002	
C1 - Benz(a)anthracene/Chrysene	0.189	0.004	0.002	
C2 - Benz(a)anthracene/Chrysene	0.085	0.004	0.002	
C3 - Benz(a)anthracene/Chrysene	0.033	0.004	0.002	
C4 - Benz(a)anthracene/Chrysene	0.024	0.004	0.002	
Benzo[b]fluoranthene	0.185	0.004	0.002	
Benzo[j/k]fluoranthene	0.241	0.004	0.002	
Benzo(e)pyrene	0.185	0.004	0.002	
Benzo[a]pyrene	0.281	0.004	0.002	
Perylene	0.078	0.004	0.002	
Indeno[1,2,3-cd]pyrene	0.124	0.004	0.002	
Dibenz[a,h]anthracene	0.036	0.004	0.002	
Benzo[g,h,i]perylene	0.152	0.004	0.002	
Coronene	0.034	0.004	0.002	
Retene	0.026	0.004	0.002	
Benzo(b/c)fluorenes	0.038	0.004	0.002	
2-Methylpyrene	0.053	0.004	0.002	
4-Methylpyrene	0.043	0.004	0.002	
1-Methylpyrene	0.036	0.004	0.002	
Heptadecane	0.074	0.008	0.004	
Pristane	0.018	0.004	0.002	
Octadecane	0.015	0.008	0.004	
Phytane	0.017	0.004	0.002	

Analytical Results for Volatile and Semivolatile Organics
META Environmental, Inc.

Field ID: TS18

Client:	ENSR	Preparation Method:	EPA 3570
Project:	Troy - Smith Ave.	Cleanup Method(s):	NA
		Analysis Method:	EPA 8270M
Lab ID	EK080415-15		
File ID:	E050233.D	Matrix:	Sediment
		Preservation:	None
Date Sampled:	10/15/2007	Decanted:	None
Date Received:	4/15/2008		
Date Prepared:	4/24/2008	Sample Size (g):	4.08
Date Cleanup:	NA	Percent Solid:	58%
Date Analyzed:	5/4/2008	Extract Volume (µl):	2000
Instrument:	El Camino	Prep DF:	1.00
Operator:	JAR	Analysis DF:	1.00
		Injection Volume (µl):	1.00
Batch QC:	QC080424-SB		

Analyte	Concentration (mg/kg dry wt.)	RL	EDL	Comments
2,6,10-trimethyldodecane	0.005	0.004	0.002	
2,6,10-trimethyltridecane	0.009	0.004	0.002	
Norpristane	U	0.004	0.002	
Tetraethyl lead	U	0.008	0.004	
Total PAH (16)	3.6	0.004	0.002	
Total PAH (42)	5.71	0.004	0.002	

Extraction Surrogate Recoveries (%)		Limits
Toluene-d8	68	50 - 120
Phenanthrene-d10	77	50 - 120
Perylene-d12	66	50 - 120
Benzo(a)pyrene-d12	74	50 - 120

NA - Not applicable.
B - Analyte detected in the Blank.
J - Estimated value; detected between the RL and DL.
U - Analyte not detected above DL.
D - Analyte reported from a diluted extract.
E - Estimate, result detected above calibration range.
I - Concentration/Peak ID uncertain due to potential interference.
RL - Reporting limit is the sample equivalent of the lowest linear calibration concentration.
EDL - Estimated detection limit is 50% of RL.
* - Triphenylene is known to coelute with this compound.

Analytical Results for Volatile and Semivolatile Organics
META Environmental, Inc.

Field ID: TS24

Client:	ENSR	Preparation Method:	EPA 3570
Project:	Troy - Smith Ave.	Cleanup Method(s):	NA
		Analysis Method:	EPA 8270M
Lab ID	EK080415-16		
File ID:	E050237.D	Matrix:	Sediment
		Preservation:	None
Date Sampled:	10/17/2007	Decanted:	None
Date Received:	4/15/2008		
Date Prepared:	4/24/2008	Sample Size (g):	4.13
Date Cleanup:	NA	Percent Solid:	81%
Date Analyzed:	5/4/2008	Extract Volume (µl):	2000
Instrument:	El Camino	Prep DF:	1.00
Operator:	JAR	Analysis DF:	1.00
		Injection Volume (µl):	1.00
Batch QC:	QC080424-SB		

Analyte	Concentration (mg/kg dry wt.)	RL	EDL	Comments
MAH & PAH COMPOUNDS:				
Benzene	0.046 B	0.003	0.001	
Toluene	0.164 B	0.003	0.001	
Ethylbenzene	0.015	0.003	0.001	
m/p-Xylenes	0.039	0.003	0.001	
Styrene	0.011 B	0.003	0.001	
o-Xylene	0.007	0.003	0.001	
Isopropylbenzene	0.028	0.003	0.001	
n-Propylbenzene	0.025	0.003	0.001	
1,3,5-Trimethylbenzene	0.006	0.003	0.001	
1,2,4-Trimethylbenzene	0.020	0.003	0.001	
t-Butylbenzene	U	0.003	0.001	
sec-Butylbenzene	0.002 J	0.003	0.001	
p-Isopropyltoluene	0.016	0.003	0.001	
n-Butylbenzene	0.011	0.003	0.001	
C1 - Benzene	0.115 B	0.003	0.001	
C2 - Benzene	0.036	0.003	0.001	
C3 - Benzene	0.057	0.003	0.001	
C4 - Benzene	0.086	0.003	0.001	
C5 - Benzene	0.022	0.003	0.001	
trans-Decalin	0.001 J	0.003	0.001	
cis-Decalin	U	0.003	0.001	
Naphthalene	0.112 B	0.003	0.001	
2-Methylnaphthalene	0.059	0.003	0.001	
1-Methylnaphthalene	0.244	0.003	0.001	
C1 - Naphthalene	0.037 B	0.003	0.001	
C2 - Naphthalene	0.075	0.003	0.001	
C3- Naphthalene	0.022	0.003	0.001	
C4- Naphthalene	0.009	0.003	0.001	
Acenaphthylene	0.009	0.003	0.001	
Acenaphthene	0.239	0.003	0.001	
Dibenzofuran	0.011	0.003	0.001	
Fluorene	0.033	0.003	0.001	
C1 - Fluorene	0.011	0.003	0.001	
C2 - Fluorene	0.008	0.003	0.001	
C3 - Fluorene	U	0.003	0.001	
Phenanthrene	0.072	0.003	0.001	
Anthracene	0.058	0.003	0.001	

Analytical Results for Volatile and Semivolatile Organics
META Environmental, Inc.

Field ID: TS24

Client:	ENSR	Preparation Method:	EPA 3570
Project:	Troy - Smith Ave.	Cleanup Method(s):	NA
		Analysis Method:	EPA 8270M
Lab ID	EK080415-16		
File ID:	E050237.D	Matrix:	Sediment
		Preservation:	None
Date Sampled:	10/17/2007	Decanted:	None
Date Received:	4/15/2008		
Date Prepared:	4/24/2008	Sample Size (g):	4.13
Date Cleanup:	NA	Percent Solid:	81%
Date Analyzed:	5/4/2008	Extract Volume (µl):	2000
Instrument:	El Camino	Prep DF:	1.00
Operator:	JAR	Analysis DF:	1.00
		Injection Volume (µl):	1.00
Batch QC:	QC080424-SB		

Analyte	Concentration (mg/kg dry wt.)	RL	EDL	Comments
C1 - Phenanthrene/Anthracene	0.032	0.003	0.001	
C2 - Phenanthrene/Anthracene	0.022	0.003	0.001	
C3 - Phenanthrene/Anthracene	0.010	0.003	0.001	
C4 - Phenanthrene/Anthracene	0.008	0.003	0.001	
Dibenzothiophene	0.011	0.003	0.001	
C1 - Dibenzothiophene	0.006	0.003	0.001	
C2 - Dibenzothiophene	0.007	0.003	0.001	
C3 - Dibenzothiophene	0.006	0.003	0.001	
C4 - Dibenzothiophene	0.003	0.003	0.001	
Benzo(b)naphtho(2,1-d)thiophene	0.004	0.003	0.001	
Fluoranthene	0.061	0.003	0.001	
Pyrene	0.057	0.003	0.001	
C1 - Fluoranthene/Pyrene	0.029	0.003	0.001	
C2 - Fluoranthene/Pyrene	0.018	0.003	0.001	
C3 - Fluoranthene/Pyrene	0.009	0.003	0.001	
Benz[a]anthracene	0.023	0.003	0.001	
Chrysene*	0.029	0.003	0.001	
C1 - Benz(a)anthracene/Chrysene	0.015	0.003	0.001	
C2 - Benz(a)anthracene/Chrysene	0.011	0.003	0.001	
C3 - Benz(a)anthracene/Chrysene	0.008	0.003	0.001	
C4 - Benz(a)anthracene/Chrysene	U	0.003	0.001	
Benzo[b]fluoranthene	0.020	0.003	0.001	
Benzo[j/k]fluoranthene	0.022	0.003	0.001	
Benzo(e)pyrene	0.017	0.003	0.001	
Benzo[a]pyrene	0.022	0.003	0.001	
Perylene	0.017	0.003	0.001	
Indeno[1,2,3-cd]pyrene	0.012	0.003	0.001	
Dibenz[a,h]anthracene	0.004	0.003	0.001	
Benzo[g,h,i]perylene	0.014	0.003	0.001	
Coronene	0.004	0.003	0.001	
Retene	0.014	0.003	0.001	
Benzo(b/c)fluorenes	0.003	0.003	0.001	
2-Methylpyrene	0.004	0.003	0.001	
4-Methylpyrene	0.004	0.003	0.001	
1-Methylpyrene	0.003 J	0.003	0.001	
Heptadecane	0.050	0.006	0.003	
Pristane	0.008	0.003	0.001	
Octadecane	0.008	0.006	0.003	
Phytane	0.008	0.003	0.001	

Analytical Results for Volatile and Semivolatile Organics
META Environmental, Inc.

Field ID: TS24

Client:	ENSR	Preparation Method:	EPA 3570
Project:	Troy - Smith Ave.	Cleanup Method(s):	NA
		Analysis Method:	EPA 8270M
Lab ID	EK080415-16		
File ID:	E050237.D	Matrix:	Sediment
		Preservation:	None
Date Sampled:	10/17/2007	Decanted:	None
Date Received:	4/15/2008		
Date Prepared:	4/24/2008	Sample Size (g):	4.13
Date Cleanup:	NA	Percent Solid:	81%
Date Analyzed:	5/4/2008	Extract Volume (µl):	2000
Instrument:	El Camino	Prep DF:	1.00
Operator:	JAR	Analysis DF:	1.00
		Injection Volume (µl):	1.00
Batch QC:	QC080424-SB		

Analyte	Concentration (mg/kg dry wt.)	RL	EDL	Comments
2,6,10-trimethyldodecane	0.004	0.003	0.001	
2,6,10-trimethyltridecane	0.004	0.003	0.001	
Norpristane	U	0.003	0.001	
Tetraethyl lead	U	0.006	0.003	
Total PAH (16)	0.787	0.003	0.001	
Total PAH (42)	1.19	0.003	0.001	

Extraction Surrogate Recoveries (%)		Limits
Toluene-d8	71	50 - 120
Phenanthrene-d10	77	50 - 120
Perylene-d12	65	50 - 120
Benzo(a)pyrene-d12	74	50 - 120

NA - Not applicable.
B - Analyte detected in the Blank.
J - Estimated value; detected between the RL and DL.
U - Analyte not detected above DL.
D - Analyte reported from a diluted extract.
E - Estimate, result detected above calibration range.
I - Concentration/Peak ID uncertain due to potential interference.
RL - Reporting limit is the sample equivalent of the lowest linear calibration concentration.
EDL - Estimated detection limit is 50% of RL.
* - Triphenylene is known to coelute with this compound.

Analytical Results for Volatile and Semivolatile Organics
META Environmental, Inc.

Field ID: TS20

Client:	ENSR	Preparation Method:	EPA 3570
Project:	Troy - Smith Ave.	Cleanup Method(s):	NA
		Analysis Method:	EPA 8270M
Lab ID	EK080415-17		
File ID:	E050238.D	Matrix:	Sediment
		Preservation:	None
Date Sampled:	10/17/2007	Decanted:	None
Date Received:	4/15/2008		
Date Prepared:	4/24/2008	Sample Size (g):	4.15
Date Cleanup:	NA	Percent Solid:	82%
Date Analyzed:	5/4/2008	Extract Volume (µl):	2000
Instrument:	El Camino	Prep DF:	1.00
Operator:	JAR	Analysis DF:	1.00
		Injection Volume (µl):	1.00
Batch QC:	QC080424-SB		

Analyte	Concentration (mg/kg dry wt.)	RL	EDL	Comments
MAH & PAH COMPOUNDS:				
Benzene	0.025 B	0.003	0.001	
Toluene	0.056 B	0.003	0.001	
Ethylbenzene	0.019	0.003	0.001	
m/p-Xylenes	0.016	0.003	0.001	
Styrene	0.008 B	0.003	0.001	
o-Xylene	0.012	0.003	0.001	
Isopropylbenzene	0.016	0.003	0.001	
n-Propylbenzene	0.017	0.003	0.001	
1,3,5-Trimethylbenzene	0.006	0.003	0.001	
1,2,4-Trimethylbenzene	0.023	0.003	0.001	
t-Butylbenzene	U	0.003	0.001	
sec-Butylbenzene	0.002 J	0.003	0.001	
p-Isopropyltoluene	0.009	0.003	0.001	
n-Butylbenzene	0.019	0.003	0.001	
C1 - Benzene	0.039 B	0.003	0.001	
C2 - Benzene	0.026	0.003	0.001	
C3 - Benzene	0.049	0.003	0.001	
C4 - Benzene	0.118	0.003	0.001	
C5 - Benzene	0.046	0.003	0.001	
trans-Decalin	0.002 J	0.003	0.001	
cis-Decalin	U	0.003	0.001	
Naphthalene	0.126 B	0.003	0.001	
2-Methylnaphthalene	0.047	0.003	0.001	
1-Methylnaphthalene	0.326	0.003	0.001	
C1 - Naphthalene	0.231 B	0.003	0.001	
C2 - Naphthalene	0.246	0.003	0.001	
C3- Naphthalene	0.072	0.003	0.001	
C4- Naphthalene	0.013	0.003	0.001	
Acenaphthylene	0.021	0.003	0.001	
Acenaphthene	0.700	0.003	0.001	
Dibenzofuran	0.030	0.003	0.001	
Fluorene	0.119	0.003	0.001	
C1 - Fluorene	0.042	0.003	0.001	
C2 - Fluorene	0.009	0.003	0.001	
C3 - Fluorene	U	0.003	0.001	
Phenanthrene	0.055	0.003	0.001	
Anthracene	0.028	0.003	0.001	

Analytical Results for Volatile and Semivolatile Organics
META Environmental, Inc.

Field ID: TS20

Client:	ENSR	Preparation Method:	EPA 3570
Project:	Troy - Smith Ave.	Cleanup Method(s):	NA
		Analysis Method:	EPA 8270M
Lab ID	EK080415-17		
File ID:	E050238.D	Matrix:	Sediment
		Preservation:	None
Date Sampled:	10/17/2007	Decanted:	None
Date Received:	4/15/2008		
Date Prepared:	4/24/2008	Sample Size (g):	4.15
Date Cleanup:	NA	Percent Solid:	82%
Date Analyzed:	5/4/2008	Extract Volume (µl):	2000
Instrument:	El Camino	Prep DF:	1.00
Operator:	JAR	Analysis DF:	1.00
		Injection Volume (µl):	1.00
Batch QC:	QC080424-SB		

Analyte	Concentration (mg/kg dry wt.)	RL	EDL	Comments
C1 - Phenanthrene/Anthracene	0.035	0.003	0.001	
C2 - Phenanthrene/Anthracene	0.017	0.003	0.001	
C3 - Phenanthrene/Anthracene	0.007	0.003	0.001	
C4 - Phenanthrene/Anthracene	0.006	0.003	0.001	
Dibenzothiophene	0.036	0.003	0.001	
C1 - Dibenzothiophene	0.007	0.003	0.001	
C2 - Dibenzothiophene	0.006	0.003	0.001	
C3 - Dibenzothiophene	0.003	0.003	0.001	
C4 - Dibenzothiophene	U	0.003	0.001	
Benzo(b)naphtho(2,1-d)thiophene	0.001 J	0.003	0.001	
Fluoranthene	0.031	0.003	0.001	
Pyrene	0.033	0.003	0.001	
C1 - Fluoranthene/Pyrene	0.015	0.003	0.001	
C2 - Fluoranthene/Pyrene	0.007	0.003	0.001	
C3 - Fluoranthene/Pyrene	0.004	0.003	0.001	
Benz[a]anthracene	0.007	0.003	0.001	
Chrysene*	0.010	0.003	0.001	
C1 - Benz(a)anthracene/Chrysene	0.006	0.003	0.001	
C2 - Benz(a)anthracene/Chrysene	0.005	0.003	0.001	
C3 - Benz(a)anthracene/Chrysene	U	0.003	0.001	
C4 - Benz(a)anthracene/Chrysene	U	0.003	0.001	
Benzo[b]fluoranthene	0.007	0.003	0.001	
Benzo[j/k]fluoranthene	0.008	0.003	0.001	
Benzo(e)pyrene	0.007	0.003	0.001	
Benzo[a]pyrene	0.008	0.003	0.001	
Perylene	0.003	0.003	0.001	
Indeno[1,2,3-cd]pyrene	0.005	0.003	0.001	
Dibenz[a,h]anthracene	0.001 J	0.003	0.001	
Benzo[g,h,i]perylene	0.007	0.003	0.001	
Coronene	0.002 J	0.003	0.001	
Retene	0.020	0.003	0.001	
Benzo(b/c)fluorenes	0.002 J	0.003	0.001	
2-Methylpyrene	0.002 J	0.003	0.001	
4-Methylpyrene	0.002 J	0.003	0.001	
1-Methylpyrene	0.001 J	0.003	0.001	
Heptadecane	0.025	0.006	0.003	
Pristane	U	0.003	0.001	
Octadecane	0.005 J	0.006	0.003	
Phytane	U	0.003	0.001	

Analytical Results for Volatile and Semivolatile Organics
META Environmental, Inc.

Field ID: TS20

Client:	ENSR	Preparation Method:	EPA 3570
Project:	Troy - Smith Ave.	Cleanup Method(s):	NA
		Analysis Method:	EPA 8270M
Lab ID	EK080415-17		
File ID:	E050238.D	Matrix:	Sediment
		Preservation:	None
Date Sampled:	10/17/2007	Decanted:	None
Date Received:	4/15/2008		
Date Prepared:	4/24/2008	Sample Size (g):	4.15
Date Cleanup:	NA	Percent Solid:	82%
Date Analyzed:	5/4/2008	Extract Volume (µl):	2000
Instrument:	El Camino	Prep DF:	1.00
Operator:	JAR	Analysis DF:	1.00
		Injection Volume (µl):	1.00
Batch QC:	QC080424-SB		

Analyte	Concentration (mg/kg dry wt.)	RL	EDL	Comments
2,6,10-trimethyldodecane	0.003 J	0.003	0.001	
2,6,10-trimethyltridecane	U	0.003	0.001	
Norpristane	U	0.003	0.001	
Tetraethyl lead	U	0.006	0.003	
Total PAH (16)	1.16	0.003	0.001	
Total PAH (42)	1.97	0.003	0.001	

Extraction Surrogate Recoveries (%)		Limits
Toluene-d8	70	50 - 120
Phenanthrene-d10	78	50 - 120
Perylene-d12	64	50 - 120
Benzo(a)pyrene-d12	74	50 - 120

NA - Not applicable.
B - Analyte detected in the Blank.
J - Estimated value; detected between the RL and DL.
U - Analyte not detected above DL.
D - Analyte reported from a diluted extract.
E - Estimate, result detected above calibration range.
I - Concentration/Peak ID uncertain due to potential interference.
RL - Reporting limit is the sample equivalent of the lowest linear calibration concentration.
EDL - Estimated detection limit is 50% of RL.
* - Triphenylene is known to coelute with this compound.

Analytical Results for Volatile and Semivolatile Organics
META Environmental, Inc.

Field ID: TS02(4.5-5.5) - 5X

Client:	ENSR	Preparation Method:	EPA 3570
Project:	Troy - Smith Ave.	Cleanup Method(s):	NA
		Analysis Method:	EPA 8270M
Lab ID	EK080417-01-D		
File ID:	E050239.D	Matrix:	Sediment
		Preservation:	None
Date Sampled:	10/18/2007	Decanted:	None
Date Received:	4/17/2008		
Date Prepared:	4/24/2008	Sample Size (g):	4.24
Date Cleanup:	NA	Percent Solid:	90%
Date Analyzed:	5/4/2008	Extract Volume (µl):	2000
Instrument:	El Camino	Prep DF:	1.00
Operator:	JAR	Analysis DF:	5.00
		Injection Volume (µl):	1.00
Batch QC:	QC080424-SB		

Analyte	Concentration (mg/kg dry wt.)		RL	EDL	Comments
MAH & PAH COMPOUNDS:					
Benzene	0.098	B	0.013	0.007	
Toluene	0.132	B	0.013	0.007	
Ethylbenzene	0.266		0.013	0.007	
m/p-Xylenes	0.208		0.013	0.007	
Styrene	5.66	B	0.013	0.007	
o-Xylene	0.061		0.013	0.007	
Isopropylbenzene	0.094		0.013	0.007	
n-Propylbenzene	0.090		0.013	0.007	
1,3,5-Trimethylbenzene	0.223		0.013	0.007	
1,2,4-Trimethylbenzene	0.311		0.013	0.007	
t-Butylbenzene		U	0.013	0.007	
sec-Butylbenzene	0.015		0.013	0.007	
p-Isopropyltoluene	0.085		0.013	0.007	
n-Butylbenzene	0.296		0.013	0.007	
C1 - Benzene	0.090	B	0.013	0.007	
C2 - Benzene	0.681		0.013	0.007	
C3 - Benzene	1.0		0.013	0.007	
C4 - Benzene	3.32		0.013	0.007	
C5 - Benzene	3.92		0.013	0.007	
trans-Decalin	0.161		0.013	0.007	
cis-Decalin	0.029		0.013	0.007	
Naphthalene	2.65	B	0.013	0.007	
2-Methylnaphthalene	2.44		0.013	0.007	
1-Methylnaphthalene	18.2		0.013	0.007	
C1 - Naphthalene	12.7	B	0.013	0.007	
C2 - Naphthalene	33.5		0.013	0.007	
C3- Naphthalene	46.3		0.013	0.007	
C4- Naphthalene	8.67		0.013	0.007	
Acenaphthylene	14.3		0.013	0.007	
Acenaphthene	54.0		0.013	0.007	
Dibenzofuran	2.4		0.013	0.007	
Fluorene	40.7		0.013	0.007	
C1 - Fluorene	36.1		0.013	0.007	
C2 - Fluorene	15.9		0.013	0.007	
C3 - Fluorene	4.84		0.013	0.007	
Phenanthrene	43.2		0.013	0.007	
Anthracene	46.6		0.013	0.007	

Analytical Results for Volatile and Semivolatile Organics
META Environmental, Inc.

Field ID: TS02(4.5-5.5) - 5X

Client:	ENSR	Preparation Method:	EPA 3570
Project:	Troy - Smith Ave.	Cleanup Method(s):	NA
		Analysis Method:	EPA 8270M
Lab ID	EK080417-01-D		
File ID:	E050239.D	Matrix:	Sediment
		Preservation:	None
Date Sampled:	10/18/2007	Decanted:	None
Date Received:	4/17/2008		
Date Prepared:	4/24/2008	Sample Size (g):	4.24
Date Cleanup:	NA	Percent Solid:	90%
Date Analyzed:	5/4/2008	Extract Volume (µl):	2000
Instrument:	El Camino	Prep DF:	1.00
Operator:	JAR	Analysis DF:	5.00
		Injection Volume (µl):	1.00
Batch QC:	QC080424-SB		

Analyte	Concentration (mg/kg dry wt.)	RL	EDL	Comments
C1 - Phenanthrene/Anthracene	100	0.013	0.007	
C2 - Phenanthrene/Anthracene	39.7	0.013	0.007	
C3 - Phenanthrene/Anthracene	9.2	0.013	0.007	
C4 - Phenanthrene/Anthracene	1.89	0.013	0.007	
Dibenzothiophene	17.0	0.013	0.007	
C1 - Dibenzothiophene	19.2	0.013	0.007	
C2 - Dibenzothiophene	12.4	0.013	0.007	
C3 - Dibenzothiophene	4.29	0.013	0.007	
C4 - Dibenzothiophene	0.939	0.013	0.007	
Benzo(b)naphtho(2,1-d)thiophene	4.28	0.013	0.007	
Fluoranthene	44.0	0.013	0.007	
Pyrene	60.5	0.013	0.007	
C1 - Fluoranthene/Pyrene	75.8	0.013	0.007	
C2 - Fluoranthene/Pyrene	22.1	0.013	0.007	
C3 - Fluoranthene/Pyrene	5.55	0.013	0.007	
Benz[a]anthracene	26.3	0.013	0.007	
Chrysene*	26.4	0.013	0.007	
C1 - Benz(a)anthracene/Chrysene	21.1	0.013	0.007	
C2 - Benz(a)anthracene/Chrysene	7.34	0.013	0.007	
C3 - Benz(a)anthracene/Chrysene	2.09	0.013	0.007	
C4 - Benz(a)anthracene/Chrysene	0.575	0.013	0.007	
Benzo[b]fluoranthene	9.05	0.013	0.007	
Benzo[j/k]fluoranthene	12.5	0.013	0.007	
Benzo(e)pyrene	9.68	0.013	0.007	
Benzo[a]pyrene	20.6	0.013	0.007	
Perylene	2.97	0.013	0.007	
Indeno[1,2,3-cd]pyrene	5.91	0.013	0.007	
Dibenz[a,h]anthracene	2.37	0.013	0.007	
Benzo[g,h,i]perylene	6.65	0.013	0.007	
Coronene	1.65	0.013	0.007	
Retene	U	0.013	0.007	
Benzo(b/c)fluorenes	11.7	0.013	0.007	
2-Methylpyrene	9.29	0.013	0.007	
4-Methylpyrene	8.39	0.013	0.007	
1-Methylpyrene	11.7	0.013	0.007	
Heptadecane	U	0.026	0.013	
Pristane	1.11	0.013	0.007	
Octadecane	U	0.026	0.013	
Phytane	0.725	0.013	0.007	

Analytical Results for Volatile and Semivolatile Organics
META Environmental, Inc.

Field ID: TS02(4.5-5.5) - 5X

Client:	ENSR	Preparation Method:	EPA 3570
Project:	Troy - Smith Ave.	Cleanup Method(s):	NA
		Analysis Method:	EPA 8270M
Lab ID	EK080417-01-D		
File ID:	E050239.D	Matrix:	Sediment
		Preservation:	None
Date Sampled:	10/18/2007	Decanted:	None
Date Received:	4/17/2008		
Date Prepared:	4/24/2008	Sample Size (g):	4.24
Date Cleanup:	NA	Percent Solid:	90%
Date Analyzed:	5/4/2008	Extract Volume (µl):	2000
Instrument:	El Camino	Prep DF:	1.00
Operator:	JAR	Analysis DF:	5.00
		Injection Volume (µl):	1.00
Batch QC:	QC080424-SB		

Analyte	Concentration (mg/kg dry wt.)	RL	EDL	Comments
2,6,10-trimethyldodecane	0.723	0.013	0.007	
2,6,10-trimethyltridecane	0.739	0.013	0.007	
Norpristane	0.866	0.013	0.007	
Tetraethyl lead	U	0.026	0.013	
Total PAH (16)	416	0.013	0.007	
Total PAH (42)	928	0.013	0.007	

Extraction Surrogate Recoveries (%)		Limits
Toluene-d8	72	50 - 120
Phenanthrene-d10	83	50 - 120
Perylene-d12	68	50 - 120
Benzo(a)pyrene-d12	92	50 - 120

NA - Not applicable.
B - Analyte detected in the Blank.
J - Estimated value; detected between the RL and DL.
U - Analyte not detected above DL.
D - Analyte reported from a diluted extract.
E - Estimate, result detected above calibration range.
I - Concentration/Peak ID uncertain due to potential interference.
RL - Reporting limit is the sample equivalent of the lowest linear calibration concentration.
EDL - Estimated detection limit is 50% of RL.
* - Triphenylene is known to coelute with this compound.

Analytical Results for Volatile and Semivolatile Organics
META Environmental, Inc.

Field ID: TS04

Client:	ENSR	Preparation Method:	EPA 3570
Project:	Troy - Smith Ave.	Cleanup Method(s):	NA
		Analysis Method:	EPA 8270M
Lab ID	EK080417-02		
File ID:	E050240.D	Matrix:	Sediment
		Preservation:	None
Date Sampled:	10/17/2007	Decanted:	None
Date Received:	4/17/2008		
Date Prepared:	4/24/2008	Sample Size (g):	4.16
Date Cleanup:	NA	Percent Solid:	83%
Date Analyzed:	5/4/2008	Extract Volume (µl):	2000
Instrument:	El Camino	Prep DF:	1.00
Operator:	JAR	Analysis DF:	1.00
		Injection Volume (µl):	1.00
Batch QC:	QC080424-SB		

Analyte	Concentration (mg/kg dry wt.)	RL	EDL	Comments
MAH & PAH COMPOUNDS:				
Benzene	0.079 B	0.003	0.001	
Toluene	0.114 B	0.003	0.001	
Ethylbenzene	0.150	0.003	0.001	
m/p-Xylenes	0.107	0.003	0.001	
Styrene	0.182 B	0.003	0.001	
o-Xylene	0.042	0.003	0.001	
Isopropylbenzene	0.058	0.003	0.001	
n-Propylbenzene	0.076	0.003	0.001	
1,3,5-Trimethylbenzene	0.107	0.003	0.001	
1,2,4-Trimethylbenzene	0.186	0.003	0.001	
t-Butylbenzene	U	0.003	0.001	
sec-Butylbenzene	0.009	0.003	0.001	
p-Isopropyltoluene	0.040	0.003	0.001	
n-Butylbenzene	0.179	0.003	0.001	
C1 - Benzene	0.080 B	0.003	0.001	
C2 - Benzene	0.153	0.003	0.001	
C3 - Benzene	0.452	0.003	0.001	
C4 - Benzene	1.03	0.003	0.001	
C5 - Benzene	0.549	0.003	0.001	
trans-Decalin	0.015	0.003	0.001	
cis-Decalin	U	0.003	0.001	
Naphthalene	1.08 B	0.003	0.001	
2-Methylnaphthalene	0.679	0.003	0.001	
1-Methylnaphthalene	3.96	0.003	0.001	
C1 - Naphthalene	2.86 B	0.003	0.001	
C2 - Naphthalene	5.33	0.003	0.001	
C3- Naphthalene	1.94	0.003	0.001	
C4- Naphthalene	0.276	0.003	0.001	
Acenaphthylene	0.337	0.003	0.001	
Acenaphthene	5.84	0.003	0.001	
Dibenzofuran	0.444	0.003	0.001	
Fluorene	3.57	0.003	0.001	
C1 - Fluorene	1.4	0.003	0.001	
C2 - Fluorene	0.501	0.003	0.001	
C3 - Fluorene	0.124	0.003	0.001	
Phenanthrene	4.75	0.003	0.001	
Anthracene	2.93	0.003	0.001	

Analytical Results for Volatile and Semivolatile Organics
META Environmental, Inc.

Field ID: TS04

Client:	ENSR	Preparation Method:	EPA 3570
Project:	Troy - Smith Ave.	Cleanup Method(s):	NA
		Analysis Method:	EPA 8270M
Lab ID	EK080417-02		
File ID:	E050240.D	Matrix:	Sediment
		Preservation:	None
Date Sampled:	10/17/2007	Decanted:	None
Date Received:	4/17/2008		
Date Prepared:	4/24/2008	Sample Size (g):	4.16
Date Cleanup:	NA	Percent Solid:	83%
Date Analyzed:	5/4/2008	Extract Volume (µl):	2000
Instrument:	El Camino	Prep DF:	1.00
Operator:	JAR	Analysis DF:	1.00
		Injection Volume (µl):	1.00
Batch QC:	QC080424-SB		

Analyte	Concentration (mg/kg dry wt.)	RL	EDL	Comments
C1 - Phenanthrene/Anthracene	3.43	0.003	0.001	
C2 - Phenanthrene/Anthracene	0.728	0.003	0.001	
C3 - Phenanthrene/Anthracene	0.112	0.003	0.001	
C4 - Phenanthrene/Anthracene	0.023	0.003	0.001	
Dibenzothiophene	0.963	0.003	0.001	
C1 - Dibenzothiophene	0.590	0.003	0.001	
C2 - Dibenzothiophene	0.192	0.003	0.001	
C3 - Dibenzothiophene	0.042	0.003	0.001	
C4 - Dibenzothiophene	0.011	0.003	0.001	
Benzo(b)naphtho(2,1-d)thiophene	0.042	0.003	0.001	
Fluoranthene	1.49	0.003	0.001	
Pyrene	1.86	0.003	0.001	
C1 - Fluoranthene/Pyrene	0.909	0.003	0.001	
C2 - Fluoranthene/Pyrene	0.161	0.003	0.001	
C3 - Fluoranthene/Pyrene	0.069	0.003	0.001	
Benz[a]anthracene	0.253	0.003	0.001	
Chrysene*	0.281	0.003	0.001	
C1 - Benz(a)anthracene/Chrysene	0.114	0.003	0.001	
C2 - Benz(a)anthracene/Chrysene	0.052	0.003	0.001	
C3 - Benz(a)anthracene/Chrysene	0.033	0.003	0.001	
C4 - Benz(a)anthracene/Chrysene	0.019	0.003	0.001	
Benzo[b]fluoranthene	0.065	0.003	0.001	
Benzo[j/k]fluoranthene	0.079	0.003	0.001	
Benzo(e)pyrene	0.066	0.003	0.001	
Benzo[a]pyrene	0.093	0.003	0.001	
Perylene	0.020	0.003	0.001	
Indeno[1,2,3-cd]pyrene	0.044	0.003	0.001	
Dibenz[a,h]anthracene	0.015	0.003	0.001	
Benzo[g,h,i]perylene	0.053	0.003	0.001	
Coronene	0.014	0.003	0.001	
Retene	0.012	0.003	0.001	
Benzo(b/c)fluorenes	0.170	0.003	0.001	
2-Methylpyrene	0.107	0.003	0.001	
4-Methylpyrene	0.073	0.003	0.001	
1-Methylpyrene	0.133	0.003	0.001	
Heptadecane	0.034	0.006	0.003	
Pristane	0.026	0.003	0.001	
Octadecane	0.020	0.006	0.003	
Phytane	0.017	0.003	0.001	

Analytical Results for Volatile and Semivolatile Organics
META Environmental, Inc.

Field ID: TS04

Client:	ENSR	Preparation Method:	EPA 3570
Project:	Troy - Smith Ave.	Cleanup Method(s):	NA
		Analysis Method:	EPA 8270M
Lab ID	EK080417-02		
File ID:	E050240.D	Matrix:	Sediment
		Preservation:	None
Date Sampled:	10/17/2007	Decanted:	None
Date Received:	4/17/2008		
Date Prepared:	4/24/2008	Sample Size (g):	4.16
Date Cleanup:	NA	Percent Solid:	83%
Date Analyzed:	5/4/2008	Extract Volume (µl):	2000
Instrument:	El Camino	Prep DF:	1.00
Operator:	JAR	Analysis DF:	1.00
		Injection Volume (µl):	1.00
Batch QC:	QC080424-SB		

Analyte	Concentration (mg/kg dry wt.)	RL	EDL	Comments
2,6,10-trimethyldodecane	0.010	0.003	0.001	
2,6,10-trimethyltridecane	0.013	0.003	0.001	
Norpristane	0.022	0.003	0.001	
Tetraethyl lead	U	0.006	0.003	
Total PAH (16)	22.7	0.003	0.001	
Total PAH (42)	43.1	0.003	0.001	

Extraction Surrogate Recoveries (%)		Limits
Toluene-d8	73	50 - 120
Phenanthrene-d10	86	50 - 120
Perylene-d12	67	50 - 120
Benzo(a)pyrene-d12	77	50 - 120

NA - Not applicable.
B - Analyte detected in the Blank.
J - Estimated value; detected between the RL and DL.
U - Analyte not detected above DL.
D - Analyte reported from a diluted extract.
E - Estimate, result detected above calibration range.
I - Concentration/Peak ID uncertain due to potential interference.
RL - Reporting limit is the sample equivalent of the lowest linear calibration concentration.
EDL - Estimated detection limit is 50% of RL.
* - Triphenylene is known to coelute with this compound.

Analytical Results for Volatile and Semivolatile Organics
META Environmental, Inc.

Field ID: Soil Blank

Client:	ENSR	Preparation Method:	EPA 3570
Project:	Troy - Smith Ave.	Cleanup Method(s):	NA
		Analysis Method:	EPA 8270M
Lab ID	QC080424-SB		
File ID:	E050212.D	Matrix:	Sediment
		Preservation:	None
Date Sampled:	NA	Decanted:	None
Date Received:	NA		
Date Prepared:	4/24/2008	Sample Size (g):	4.00
Date Cleanup:	NA	Percent Solid:	100%
Date Analyzed:	5/3/2008	Extract Volume (µl):	2000
Instrument:	El Camino	Prep DF:	1.00
Operator:	JAR	Analysis DF:	1.00
		Injection Volume (µl):	1.00
Batch QC:	QC080424-SB		

Analyte	Concentration (mg/kg dry wt.)	RL	EDL	Comments
MAH & PAH COMPOUNDS:				
Benzene	0.008	0.003	0.001	
Toluene	0.008	0.003	0.001	
Ethylbenzene	U	0.003	0.001	
m/p-Xylenes	U	0.003	0.001	
Styrene	0.003	0.003	0.001	
o-Xylene	U	0.003	0.001	
Isopropylbenzene	U	0.003	0.001	
n-Propylbenzene	U	0.003	0.001	
1,3,5-Trimethylbenzene	U	0.003	0.001	
1,2,4-Trimethylbenzene	U	0.003	0.001	
t-Butylbenzene	U	0.003	0.001	
sec-Butylbenzene	U	0.003	0.001	
p-Isopropyltoluene	U	0.003	0.001	
n-Butylbenzene	U	0.003	0.001	
C1 - Benzene	0.006	0.003	0.001	
C2 - Benzene	U	0.003	0.001	
C3 - Benzene	U	0.003	0.001	
C4 - Benzene	U	0.003	0.001	
C5 - Benzene	U	0.003	0.001	
trans-Decalin	U	0.003	0.001	
cis-Decalin	U	0.003	0.001	
Naphthalene	0.001 J	0.003	0.001	
2-Methylnaphthalene	U	0.003	0.001	
1-Methylnaphthalene	U	0.003	0.001	
C1 - Naphthalene	0.001 J	0.003	0.001	
C2 - Naphthalene	U	0.003	0.001	
C3- Naphthalene	U	0.003	0.001	
C4- Naphthalene	U	0.003	0.001	
Acenaphthylene	U	0.003	0.001	
Acenaphthene	U	0.003	0.001	
Dibenzofuran	U	0.003	0.001	
Fluorene	U	0.003	0.001	
C1 - Fluorene	U	0.003	0.001	
C2 - Fluorene	U	0.003	0.001	
C3 - Fluorene	U	0.003	0.001	
Phenanthrene	U	0.003	0.001	
Anthracene	U	0.003	0.001	

Analytical Results for Volatile and Semivolatile Organics
META Environmental, Inc.

Field ID: Soil Blank

Client:	ENSR	Preparation Method:	EPA 3570
Project:	Troy - Smith Ave.	Cleanup Method(s):	NA
		Analysis Method:	EPA 8270M
Lab ID	QC080424-SB		
File ID:	E050212.D	Matrix:	Sediment
		Preservation:	None
Date Sampled:	NA	Decanted:	None
Date Received:	NA		
Date Prepared:	4/24/2008	Sample Size (g):	4.00
Date Cleanup:	NA	Percent Solid:	100%
Date Analyzed:	5/3/2008	Extract Volume (µl):	2000
Instrument:	El Camino	Prep DF:	1.00
Operator:	JAR	Analysis DF:	1.00
		Injection Volume (µl):	1.00
Batch QC:	QC080424-SB		

Analyte	Concentration (mg/kg dry wt.)	RL	EDL	Comments
C1 - Phenanthrene/Anthracene	U	0.003	0.001	
C2 - Phenanthrene/Anthracene	U	0.003	0.001	
C3 - Phenanthrene/Anthracene	U	0.003	0.001	
C4 - Phenanthrene/Anthracene	U	0.003	0.001	
Dibenzothiophene	U	0.003	0.001	
C1 - Dibenzothiophene	U	0.003	0.001	
C2 - Dibenzothiophene	U	0.003	0.001	
C3 - Dibenzothiophene	U	0.003	0.001	
C4 - Dibenzothiophene	U	0.003	0.001	
Benzo(b)naphtho(2,1-d)thiophene	U	0.003	0.001	
Fluoranthene	U	0.003	0.001	
Pyrene	U	0.003	0.001	
C1 - Fluoranthene/Pyrene	U	0.003	0.001	
C2 - Fluoranthene/Pyrene	U	0.003	0.001	
C3 - Fluoranthene/Pyrene	U	0.003	0.001	
Benz[a]anthracene	U	0.003	0.001	
Chrysene*	U	0.003	0.001	
C1 - Benz(a)anthracene/Chrysene	U	0.003	0.001	
C2 - Benz(a)anthracene/Chrysene	U	0.003	0.001	
C3 - Benz(a)anthracene/Chrysene	U	0.003	0.001	
C4 - Benz(a)anthracene/Chrysene	U	0.003	0.001	
Benzo[b]fluoranthene	U	0.003	0.001	
Benzo[j/k]fluoranthene	U	0.003	0.001	
Benzo(e)pyrene	U	0.003	0.001	
Benzo[a]pyrene	U	0.003	0.001	
Perylene	U	0.003	0.001	
Indeno[1,2,3-cd]pyrene	U	0.003	0.001	
Dibenz[a,h]anthracene	U	0.003	0.001	
Benzo[g,h,i]perylene	U	0.003	0.001	
Coronene	U	0.003	0.001	
Retene	U	0.003	0.001	
Benzo(b/c)fluorenes	U	0.003	0.001	
2-Methylpyrene	U	0.003	0.001	
4-Methylpyrene	U	0.003	0.001	
1-Methylpyrene	U	0.003	0.001	
Heptadecane	U	0.005	0.003	
Pristane	U	0.003	0.001	
Octadecane	U	0.005	0.003	
Phytane	U	0.003	0.001	

Analytical Results for Volatile and Semivolatile Organics
META Environmental, Inc.

Field ID: Soil Blank

Client:	ENSR	Preparation Method:	EPA 3570
Project:	Troy - Smith Ave.	Cleanup Method(s):	NA
		Analysis Method:	EPA 8270M
Lab ID	QC080424-SB		
File ID:	E050212.D	Matrix:	Sediment
		Preservation:	None
Date Sampled:	NA	Decanted:	None
Date Received:	NA		
Date Prepared:	4/24/2008	Sample Size (g):	4.00
Date Cleanup:	NA	Percent Solid:	100%
Date Analyzed:	5/3/2008	Extract Volume (µl):	2000
Instrument:	El Camino	Prep DF:	1.00
Operator:	JAR	Analysis DF:	1.00
		Injection Volume (µl):	1.00
Batch QC:	QC080424-SB		

Analyte	Concentration (mg/kg dry wt.)	RL	EDL	Comments
2,6,10-trimethyldodecane	U	0.003	0.001	
2,6,10-trimethyltridecane	U	0.003	0.001	
Norpristane	U	0.003	0.001	
Tetraethyl lead	U	0.005	0.003	
Total PAH (16)	0.001	0.003	0.001	
Total PAH (42)	0.002	0.003	0.001	

Extraction Surrogate Recoveries (%)		Limits
Toluene-d8	80	50 - 120
Phenanthrene-d10	86	50 - 120
Perylene-d12	67	50 - 120
Benzo(a)pyrene-d12	77	50 - 120

NA - Not applicable.
B - Analyte detected in the Blank.
J - Estimated value; detected between the RL and DL.
U - Analyte not detected above DL.
D - Analyte reported from a diluted extract.
E - Estimate, result detected above calibration range.
I - Concentration/Peak ID uncertain due to potential interference.
RL - Reporting limit is the sample equivalent of the lowest linear calibration concentration.
EDL - Estimated detection limit is 50% of RL.
* - Triphenylene is known to coelute with this compound.

Analytical Results for Volatile and Semivolatile Organics
META Environmental, Inc.

Field ID: Soil Blank Spike

Client:	ENSR	Preparation Method:	EPA 3570
Project:	Troy - Smith Ave.	Cleanup Method(s):	NA
		Analysis Method:	EPA 8270M
Lab ID	QC080424-SBS		
File ID:	E050213.D	Matrix:	Sediment
		Preservation:	None
Date Sampled:	NA	Decanted:	None
Date Received:	NA		
Date Prepared:	4/24/2008	Sample Size (g):	4.00
Date Cleanup:	NA	Percent Solid:	100%
Date Analyzed:	5/3/2008	Extract Volume (µl):	2000
Instrument:	El Camino	Prep DF:	1.00
Operator:	JAR	Analysis DF:	1.00
		Injection Volume (µl):	1.00
Batch QC:	QC080424-SB		

Analyte		Concentration (mg/kg dry wt.)		RL	EDL	Comments
MAH & PAH COMPOUNDS:	Spike Amount					% Recovery
Benzene	2.50	2.04	B	0.003	0.001	82
Toluene	2.50	2.32	B	0.003	0.001	93
Ethylbenzene	2.50	2.38		0.003	0.001	95
m/p-Xylenes	2.50	2.38		0.003	0.001	95
Styrene	2.50	2.56	B	0.003	0.001	102
o-Xylene	2.50	2.38		0.003	0.001	95
Isopropylbenzene	2.50	2.26		0.003	0.001	90
n-Propylbenzene	2.50	2.28		0.003	0.001	91
1,3,5-Trimethylbenzene	2.50	2.29		0.003	0.001	92
1,2,4-Trimethylbenzene	2.50	2.26		0.003	0.001	90
t-Butylbenzene			U	0.003	0.001	
sec-Butylbenzene	2.50	2.28		0.003	0.001	91
p-Isopropyltoluene	2.50	2.3		0.003	0.001	92
n-Butylbenzene	2.50	2.25		0.003	0.001	90
C1 - Benzene			BU	0.003	0.001	
C2 - Benzene			U	0.003	0.001	
C3 - Benzene			U	0.003	0.001	
C4 - Benzene			U	0.003	0.001	
C5 - Benzene			U	0.003	0.001	
trans-Decalin			U	0.003	0.001	
cis-Decalin			U	0.003	0.001	
Naphthalene	2.50	2.22	B	0.003	0.001	89
2-Methylnaphthalene	2.50	2.28		0.003	0.001	91
1-Methylnaphthalene	2.50	2.34		0.003	0.001	94
C1 - Naphthalene			BU	0.003	0.001	
C2 - Naphthalene			U	0.003	0.001	
C3- Naphthalene			U	0.003	0.001	
C4- Naphthalene			U	0.003	0.001	
Acenaphthylene	2.50	2.31		0.003	0.001	92
Acenaphthene	2.50	2.3		0.003	0.001	92
Dibenzofuran	2.50	2.38		0.003	0.001	95
Fluorene	2.50	2.36		0.003	0.001	94
C1 - Fluorene			U	0.003	0.001	
C2 - Fluorene			U	0.003	0.001	
C3 - Fluorene			U	0.003	0.001	
Phenanthrene	2.50	2.34		0.003	0.001	94
Anthracene	2.50	2.41		0.003	0.001	96

Analytical Results for Volatile and Semivolatile Organics
META Environmental, Inc.

Field ID: Soil Blank Spike

Client:	ENSR	Preparation Method:	EPA 3570
Project:	Troy - Smith Ave.	Cleanup Method(s):	NA
		Analysis Method:	EPA 8270M
Lab ID	QC080424-SBS		
File ID:	E050213.D	Matrix:	Sediment
		Preservation:	None
Date Sampled:	NA	Decanted:	None
Date Received:	NA		
Date Prepared:	4/24/2008	Sample Size (g):	4.00
Date Cleanup:	NA	Percent Solid:	100%
Date Analyzed:	5/3/2008	Extract Volume (µl):	2000
Instrument:	El Camino	Prep DF:	1.00
Operator:	JAR	Analysis DF:	1.00
		Injection Volume (µl):	1.00
Batch QC:	QC080424-SB		

Analyte		Concentration (mg/kg dry wt.)	RL	EDL	Comments
C1 - Phenanthrene/Anthracene		U	0.003	0.001	
C2 - Phenanthrene/Anthracene		U	0.003	0.001	
C3 - Phenanthrene/Anthracene		U	0.003	0.001	
C4 - Phenanthrene/Anthracene		U	0.003	0.001	
Dibenzothiophene	2.50	2.39	0.003	0.001	96
C1 - Dibenzothiophene		U	0.003	0.001	
C2 - Dibenzothiophene		U	0.003	0.001	
C3 - Dibenzothiophene		U	0.003	0.001	
C4 - Dibenzothiophene		U	0.003	0.001	
Benzo(b)naphtho(2,1-d)thiophene		U	0.003	0.001	
Fluoranthene	2.50	2.37	0.003	0.001	95
Pyrene	2.50	2.38	0.003	0.001	95
C1 - Fluoranthene/Pyrene		U	0.003	0.001	
C2 - Fluoranthene/Pyrene		U	0.003	0.001	
C3 - Fluoranthene/Pyrene		U	0.003	0.001	
Benz[a]anthracene	2.50	2.26	0.003	0.001	90
Chrysene*	2.50	2.39	0.003	0.001	96
C1 - Benz(a)anthracene/Chrysene		U	0.003	0.001	
C2 - Benz(a)anthracene/Chrysene		U	0.003	0.001	
C3 - Benz(a)anthracene/Chrysene		U	0.003	0.001	
C4 - Benz(a)anthracene/Chrysene		U	0.003	0.001	
Benzo[b]fluoranthene	2.50	2.33	0.003	0.001	93
Benzo[j/k]fluoranthene	2.50	2.45	0.003	0.001	98
Benzo(e)pyrene	2.50	2.24	0.003	0.001	90
Benzo[a]pyrene	2.50	2.15	0.003	0.001	86
Perylene		U	0.003	0.001	
Indeno[1,2,3-cd]pyrene	2.50	2.31	0.003	0.001	92
Dibenz[a,h]anthracene	2.50	2.26	0.003	0.001	90
Benzo[g,h,i]perylene	2.50	2.19	0.003	0.001	88
Coronene		U	0.003	0.001	
Retene		U	0.003	0.001	
Benzo(b/c)fluorenes		U	0.003	0.001	
2-Methylpyrene		U	0.003	0.001	
4-Methylpyrene		U	0.003	0.001	
1-Methylpyrene		U	0.003	0.001	
Heptadecane		U	0.005	0.003	
Pristane		U	0.003	0.001	
Octadecane		U	0.005	0.003	
Phytane		U	0.003	0.001	

Analytical Results for Volatile and Semivolatile Organics
META Environmental, Inc.

Field ID: **Soil Blank Spike**

Client:	ENSR	Preparation Method:	EPA 3570
Project:	Troy - Smith Ave.	Cleanup Method(s):	NA
		Analysis Method:	EPA 8270M
Lab ID	QC080424-SBS		
File ID:	E050213.D	Matrix:	Sediment
		Preservation:	None
Date Sampled:	NA	Decanted:	None
Date Received:	NA		
Date Prepared:	4/24/2008	Sample Size (g):	4.00
Date Cleanup:	NA	Percent Solid:	100%
Date Analyzed:	5/3/2008	Extract Volume (µl):	2000
Instrument:	El Camino	Prep DF:	1.00
Operator:	JAR	Analysis DF:	1.00
		Injection Volume (µl):	1.00
Batch QC:	QC080424-SB		

Analyte	Concentration (mg/kg dry wt.)	RL	EDL	Comments
2,6,10-trimethyldodecane	U	0.003	0.001	
2,6,10-trimethyltridecane	U	0.003	0.001	
Norpristane	U	0.003	0.001	
Tetraethyl lead	U	0.005	0.003	

Extraction Surrogate Recoveries (%)		Limits
Toluene-d8	79	50 - 120
Phenanthrene-d10	89	50 - 120
Perylene-d12	75	50 - 120
Benzo(a)pyrene-d12	81	50 - 120

NA - Not applicable.
B - Analyte detected in the Blank.
J - Estimated value; detected between the RL and DL.
U - Analyte not detected above DL.
D - Analyte reported from a diluted extract.
E - Estimate, result detected above calibration range.
I - Concentration/Peak ID uncertain due to potential interference.
RL - Reporting limit is the sample equivalent of the lowest linear calibration concentration.
EDL - Estimated detection limit is 50% of RL.
* - Triphenylene is known to coelute with this compound.

Analytical Results for Volatile and Semivolatile Organics
META Environmental, Inc.

Field ID: Duplicate of TS18

Client:	ENSR	Preparation Method:	EPA 3570
Project:	Troy - Smith Ave.	Cleanup Method(s):	NA
		Analysis Method:	EPA 8270M
Lab ID	EK080415-15DUP		
File ID:	E050236.D	Matrix:	Sediment
		Preservation:	None
Date Sampled:	10/15/2007	Decanted:	None
Date Received:	4/15/2008		
Date Prepared:	4/24/2008	Sample Size (g):	4.02
Date Cleanup:	NA	Percent Solid:	58%
Date Analyzed:	5/4/2008	Extract Volume (µl):	2000
Instrument:	El Camino	Prep DF:	1.00
Operator:	JAR	Analysis DF:	1.00
		Injection Volume (µl):	1.00
Batch QC:	QC080424-SB		

Analyte	Concentration (mg/kg dry wt.)		RL	EDL	Comments
MAH & PAH COMPOUNDS:					RPD
Benzene	0.036	B	0.004	0.002	21.5
Toluene	0.658	B	0.004	0.002	7.7
Ethylbenzene	0.008		0.004	0.002	46.2
m/p-Xylenes	0.041		0.004	0.002	64.5
Styrene	0.015	B	0.004	0.002	60.9
o-Xylene	0.004		0.004	0.002	28.6
Isopropylbenzene		U	0.004	0.002	NA
n-Propylbenzene	0.005		0.004	0.002	85.7
1,3,5-Trimethylbenzene	0.006		0.004	0.002	40
1,2,4-Trimethylbenzene	0.004		0.004	0.002	28.6
t-Butylbenzene		U	0.004	0.002	NA
sec-Butylbenzene		U	0.004	0.002	NA
p-Isopropyltoluene	0.012		0.004	0.002	66.7
n-Butylbenzene	0.004		0.004	0.002	66.7
C1 - Benzene	0.463	B	0.004	0.002	7.6
C2 - Benzene	0.023		0.004	0.002	24.4
C3 - Benzene	0.021		0.004	0.002	54.5
C4 - Benzene	0.021		0.004	0.002	27
C5 - Benzene	0.021		0.004	0.002	54.5
trans-Decalin		U	0.004	0.002	NA
cis-Decalin		U	0.004	0.002	NA
Naphthalene	0.017	B	0.004	0.002	16.2
2-Methylnaphthalene	0.010		0.004	0.002	62.1
1-Methylnaphthalene	0.009		0.004	0.002	80
C1 - Naphthalene	0.012	B	0.004	0.002	70.3
C2 - Naphthalene	0.020		0.004	0.002	82.4
C3- Naphthalene	0.017		0.004	0.002	88.5
C4- Naphthalene	0.014		0.004	0.002	63.4
Acenaphthylene	0.022		0.004	0.002	58.1
Acenaphthene	0.077		0.004	0.002	17.8
Dibenzofuran	0.004	J	0.004	0.002	100
Fluorene	0.009		0.004	0.002	121.7
C1 - Fluorene	0.012		0.004	0.002	85.7
C2 - Fluorene	0.013		0.004	0.002	81.8
C3 - Fluorene	0.018		0.004	0.002	64.2
Phenanthrene	0.067		0.004	0.002	151.2
Anthracene	0.027		0.004	0.002	139.3

Analytical Results for Volatile and Semivolatile Organics
META Environmental, Inc.

Field ID: Duplicate of TS18

Client:	ENSR	Preparation Method:	EPA 3570
Project:	Troy - Smith Ave.	Cleanup Method(s):	NA
		Analysis Method:	EPA 8270M
Lab ID	EK080415-15DUP		
File ID:	E050236.D	Matrix:	Sediment
		Preservation:	None
Date Sampled:	10/15/2007	Decanted:	None
Date Received:	4/15/2008		
Date Prepared:	4/24/2008	Sample Size (g):	4.02
Date Cleanup:	NA	Percent Solid:	58%
Date Analyzed:	5/4/2008	Extract Volume (µl):	2000
Instrument:	El Camino	Prep DF:	1.00
Operator:	JAR	Analysis DF:	1.00
		Injection Volume (µl):	1.00
Batch QC:	QC080424-SB		

Analyte	Concentration (mg/kg dry wt.)	RL	EDL	Comments
C1 - Phenanthrene/Anthracene	0.043	0.004	0.002	150.6
C2 - Phenanthrene/Anthracene	0.041	0.004	0.002	129.9
C3 - Phenanthrene/Anthracene	0.023	0.004	0.002	105.2
C4 - Phenanthrene/Anthracene	0.019	0.004	0.002	41.7
Dibenzothiophene	0.006	0.004	0.002	127.3
C1 - Dibenzothiophene	0.008	0.004	0.002	108.6
C2 - Dibenzothiophene	0.013	0.004	0.002	81.8
C3 - Dibenzothiophene	0.011	0.004	0.002	53.3
C4 - Dibenzothiophene	0.010	0.004	0.002	18.2
Benzo(b)naphtho(2,1-d)thiophene	0.010	0.004	0.002	114.9
Fluoranthene	0.136	0.004	0.002	118.4
Pyrene	0.130	0.004	0.002	127.8
C1 - Fluoranthene/Pyrene	0.075	0.004	0.002	127
C2 - Fluoranthene/Pyrene	0.041	0.004	0.002	115.9
C3 - Fluoranthene/Pyrene	0.020	0.004	0.002	102.4
Benz[a]anthracene	0.062	0.004	0.002	133.7
Chrysene*	0.077	0.004	0.002	123.4
C1 - Benz(a)anthracene/Chrysene	0.040	0.004	0.002	130.1
C2 - Benz(a)anthracene/Chrysene	0.025	0.004	0.002	109.1
C3 - Benz(a)anthracene/Chrysene	0.018	0.004	0.002	58.8
C4 - Benz(a)anthracene/Chrysene	U	0.004	0.002	NA
Benzo[b]fluoranthene	0.063	0.004	0.002	98.4
Benzo[j/k]fluoranthene	0.071	0.004	0.002	109
Benzo(e)pyrene	0.052	0.004	0.002	112.2
Benzo[a]pyrene	0.071	0.004	0.002	119.3
Perylene	0.052	0.004	0.002	40
Indeno[1,2,3-cd]pyrene	0.044	0.004	0.002	95.2
Dibenz[a,h]anthracene	0.012	0.004	0.002	100
Benzo[g,h,i]perylene	0.050	0.004	0.002	101
Coronene	0.012	0.004	0.002	95.7
Retene	0.034	0.004	0.002	26.7
Benzo(b/c)fluorenes	0.010	0.004	0.002	116.7
2-Methylpyrene	0.010	0.004	0.002	136.5
4-Methylpyrene	0.009	0.004	0.002	130.8
1-Methylpyrene	0.008	0.004	0.002	127.3
Heptadecane	0.121	0.009	0.004	48.2
Pristane	0.024	0.004	0.002	28.6
Octadecane	0.014	0.009	0.004	6.9
Phytane	0.029	0.004	0.002	52.2

Analytical Results for Volatile and Semivolatile Organics
META Environmental, Inc.

Field ID: Duplicate of TS18

Client:	ENSR	Preparation Method:	EPA 3570
Project:	Troy - Smith Ave.	Cleanup Method(s):	NA
		Analysis Method:	EPA 8270M
Lab ID	EK080415-15DUP		
File ID:	E050236.D	Matrix:	Sediment
		Preservation:	None
Date Sampled:	10/15/2007	Decanted:	None
Date Received:	4/15/2008		
Date Prepared:	4/24/2008	Sample Size (g):	4.02
Date Cleanup:	NA	Percent Solid:	58%
Date Analyzed:	5/4/2008	Extract Volume (µl):	2000
Instrument:	El Camino	Prep DF:	1.00
Operator:	JAR	Analysis DF:	1.00
		Injection Volume (µl):	1.00
Batch QC:	QC080424-SB		

Analyte	Concentration (mg/kg dry wt.)	RL	EDL	Comments
2,6,10-trimethyldodecane	0.008	0.004	0.002	46.2
2,6,10-trimethyltridecane	0.015	0.004	0.002	50
Norpristane	U	0.004	0.002	NA
Tetraethyl lead	U	0.009	0.004	NA
Total PAH (16)	0.935	0.004	0.002	117.5
Total PAH (42)	1.54	0.004	0.002	115

Extraction Surrogate Recoveries (%)		Limits
Toluene-d8	71	50 - 120
Phenanthrene-d10	78	50 - 120
Perylene-d12	66	50 - 120
Benzo(a)pyrene-d12	75	50 - 120

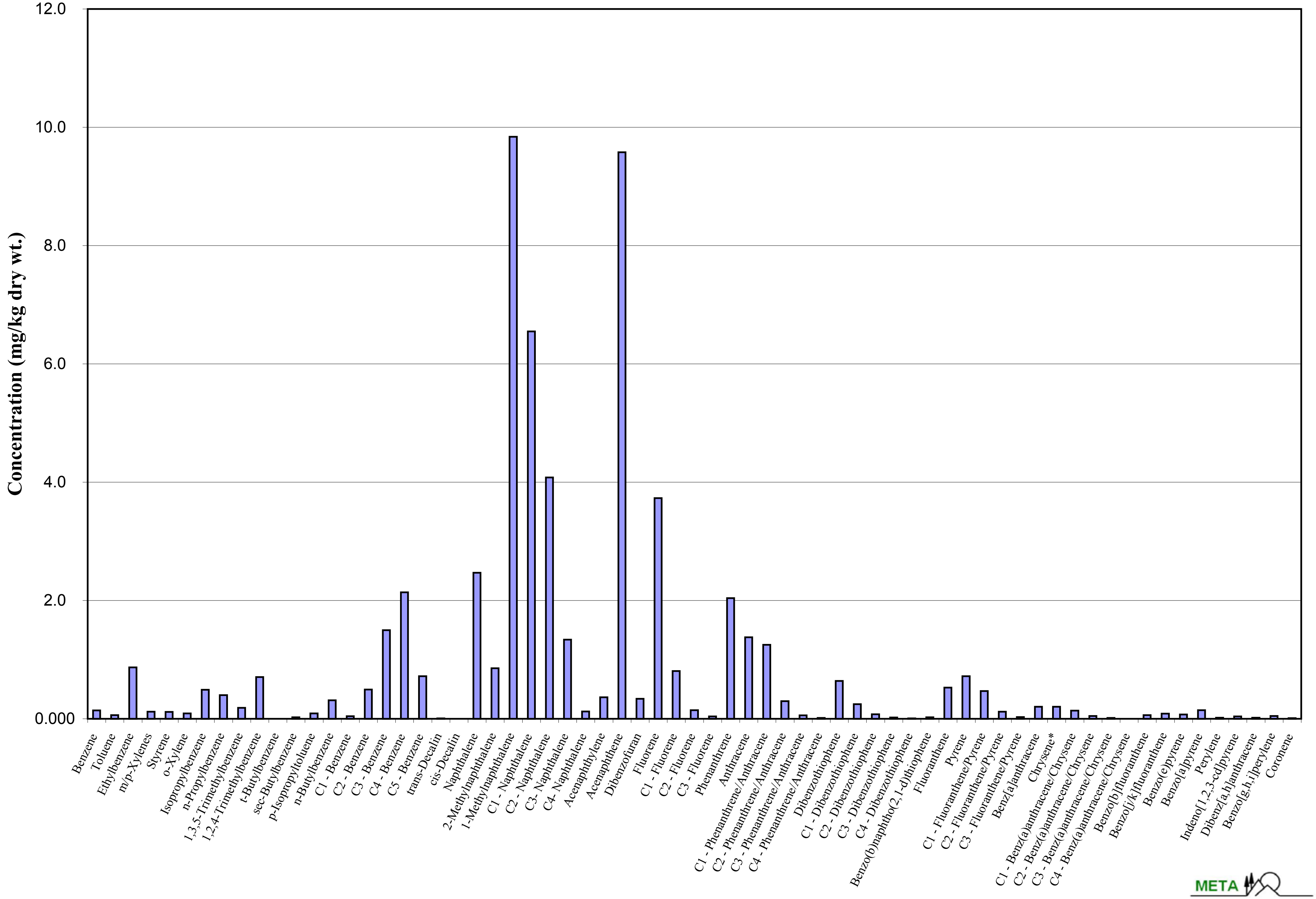
NA - Not applicable.
B - Analyte detected in the Blank.
J - Estimated value; detected between the RL and DL.
U - Analyte not detected above DL.
D - Analyte reported from a diluted extract.
E - Estimate, result detected above calibration range.
I - Concentration/Peak ID uncertain due to potential interference.
RL - Reporting limit is the sample equivalent of the lowest linear calibration concentration.
EDL - Estimated detection limit is 50% of RL.
* - Triphenylene is known to coelute with this compound.

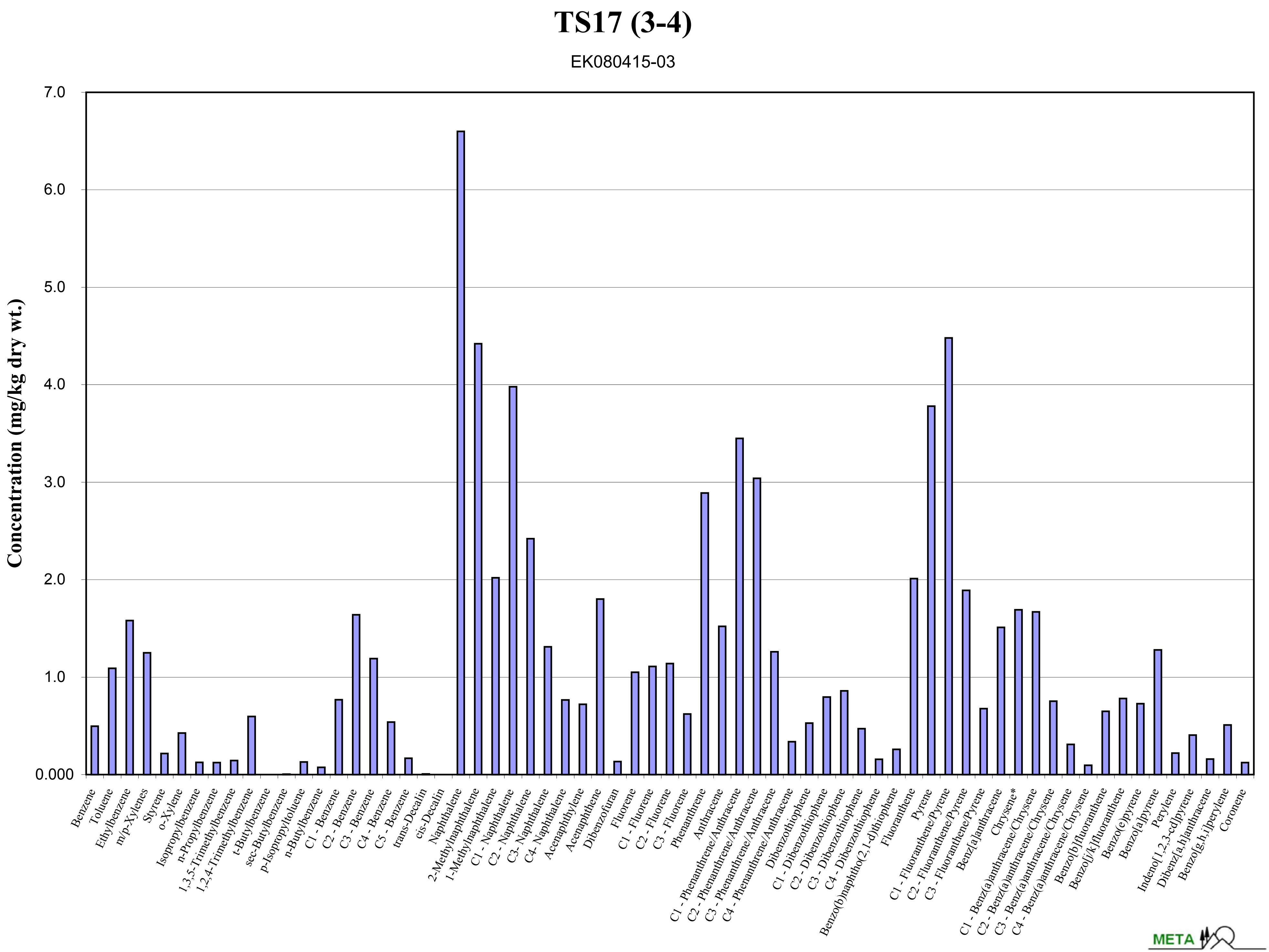
Appendix D

Extended MAH/PAH Profiles – Histograms

TS04 (1.8-2.4)

EK080415-01

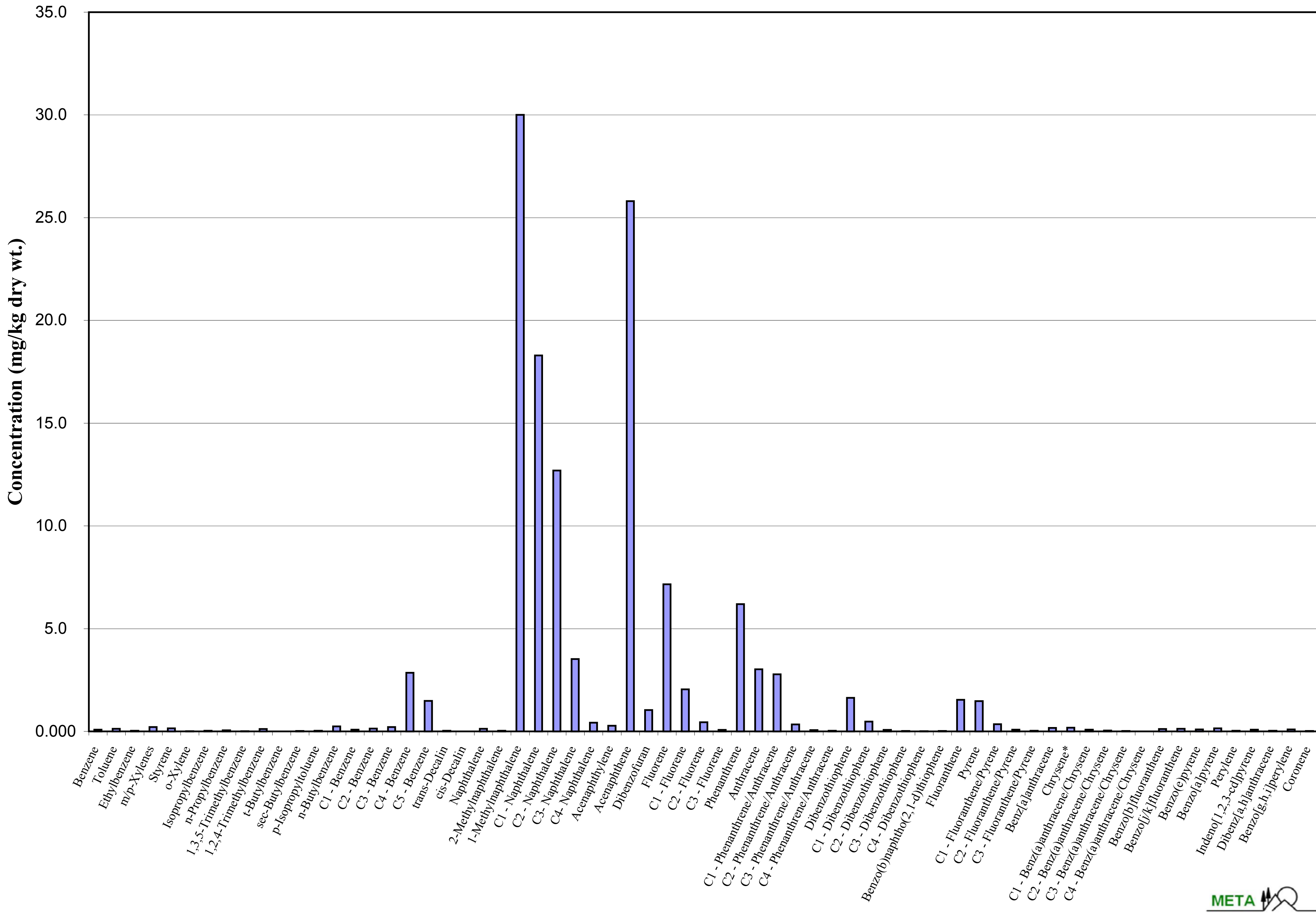




TS17 (3-4)
EK080415-03
Concentration (mg/kg dry wt.)
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.000
Benzene
Toluene
Ethylbenzene
m/p-Xylenes
Styrene
o-Xylene
Isopropylbenzene
n-Propylbenzene
1,3,5-Trimethylbenzene
1,2,4-Trimethylbenzene
t-Butylbenzene
sec-Butylbenzene
p-Isopropyltoluene
n-Butylbenzene
C1 - Benzene
C2 - Benzene
C3 - Benzene
C4 - Benzene
C5 - Benzene
trans-Decalin
cis-Decalin
Naphthalene
2-Methylnaphthalene
1-Methylnaphthalene
C1 - Naphthalene
C2 - Naphthalene
C3- Naphthalene
C4- Naphthalene
Acenaphthylene
Acenaphthene
Dibenzofuran
Fluorene
C1 - Fluorene
C2 - Fluorene
C3 - Fluorene
Phenanthrene
Anthracene
C1 - Phenanthrene/Anthracene
C2 - Phenanthrene/Anthracene
C3 - Phenanthrene/Anthracene
C4 - Phenanthrene/Anthracene
Dibenzothiophene
C1 - Dibenzothiophene
C2 - Dibenzothiophene
C3 - Dibenzothiophene
C4 - Dibenzothiophene
Benzo(b)naphtho(2,1-d)thiophene
Fluoranthene
Pyrene
C1 - Fluoranthene/Pyrene
C2 - Fluoranthene/Pyrene
C3 - Fluoranthene/Pyrene
Benz[a]anthracene
Chrysene*
C1 - Benz(a)anthracene/Chrysene
C2 - Benz(a)anthracene/Chrysene
C3 - Benz(a)anthracene/Chrysene
C4 - Benz(a)anthracene/Chrysene
Benzo[b]fluoranthene
Benzo[j/k]fluoranthene
Benzo(e)pyrene
Benzo[a]pyrene
Perylene
Indeno[1,2,3-cd]pyrene
Dibenz[a,h]anthracene
Benzo[g,h,i]perylene
Coronene
META

TS30 (1-2)

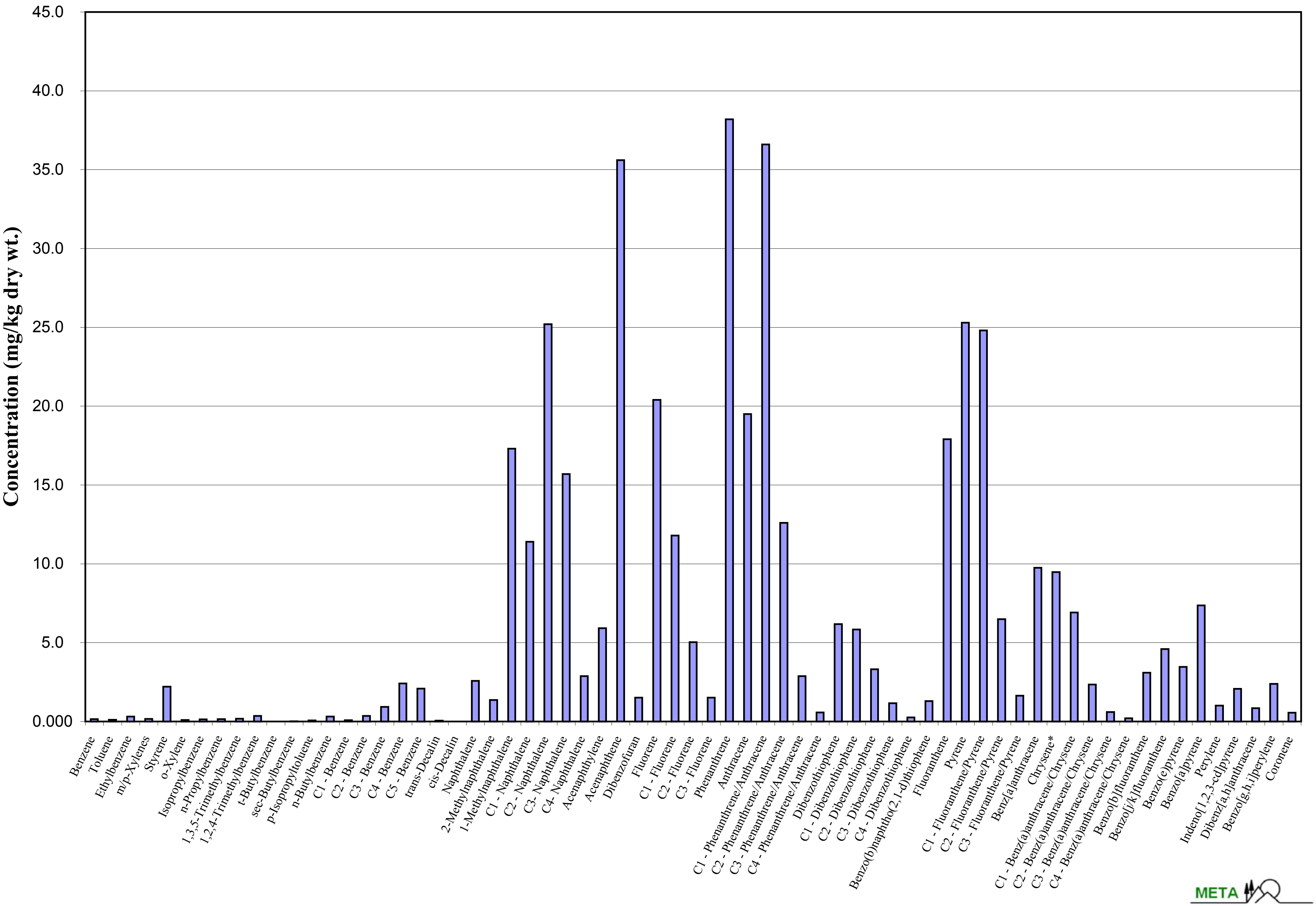
EK080415-04



META

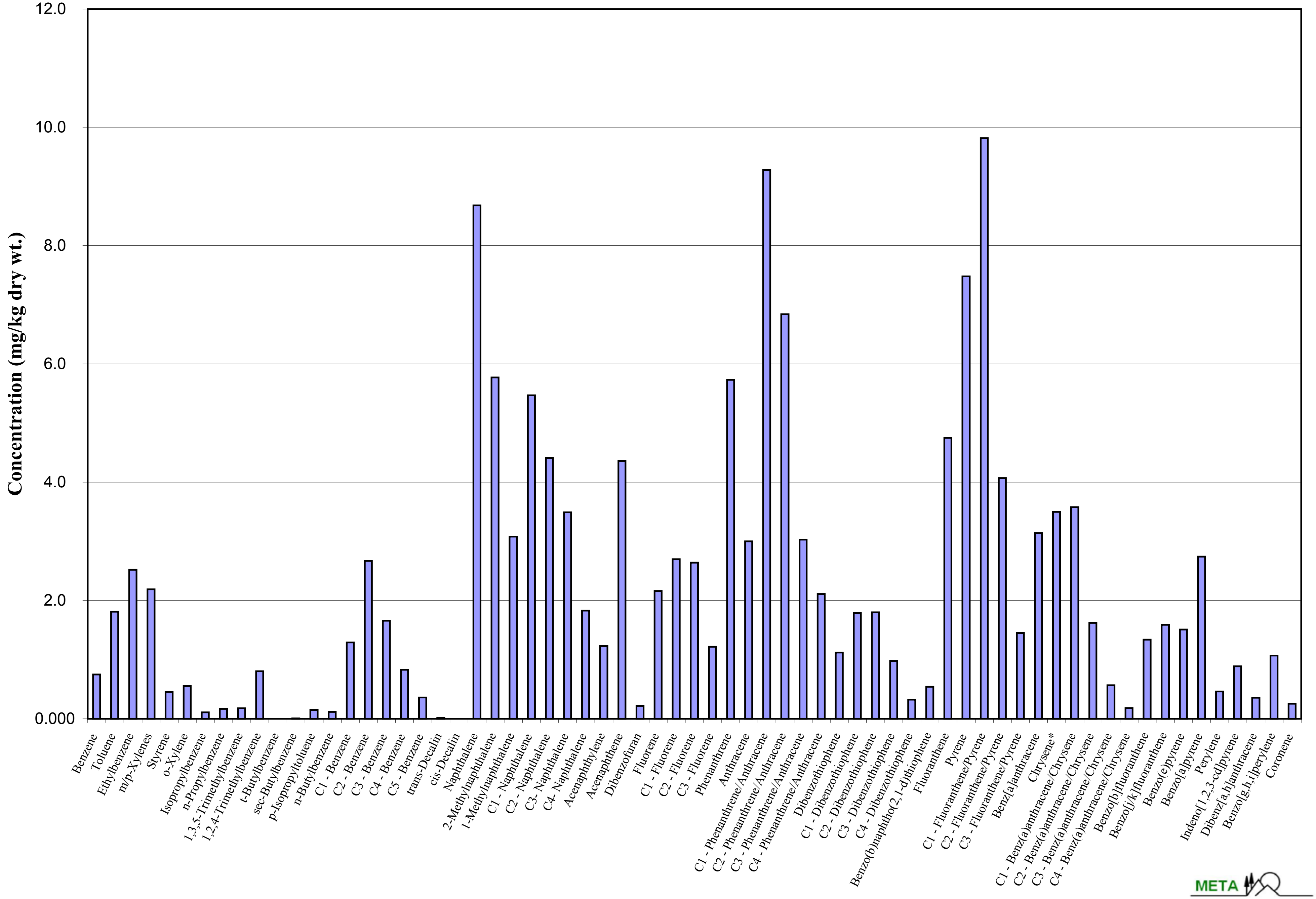
TS04 (1-1.8) - 5X

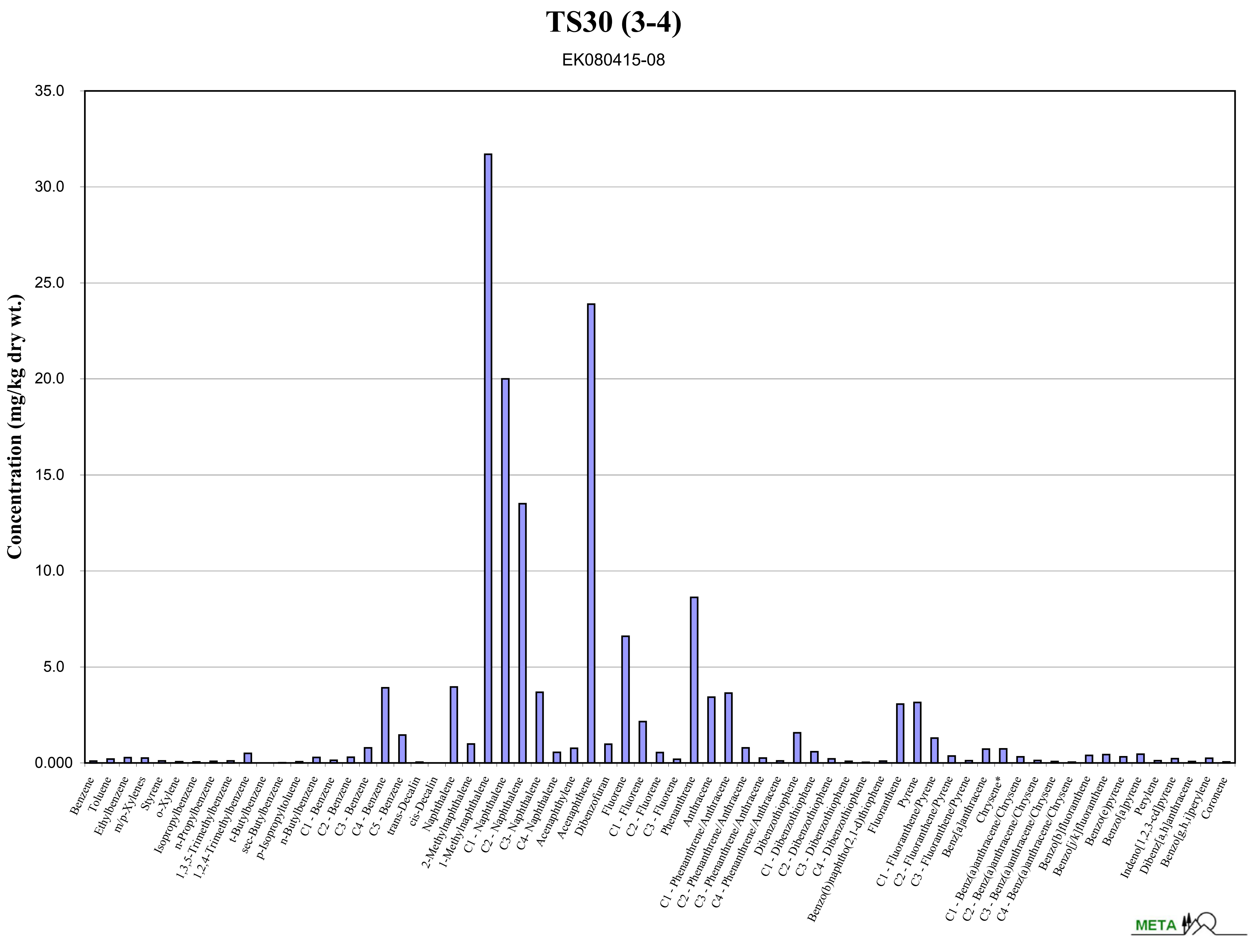
EK080415-05-D

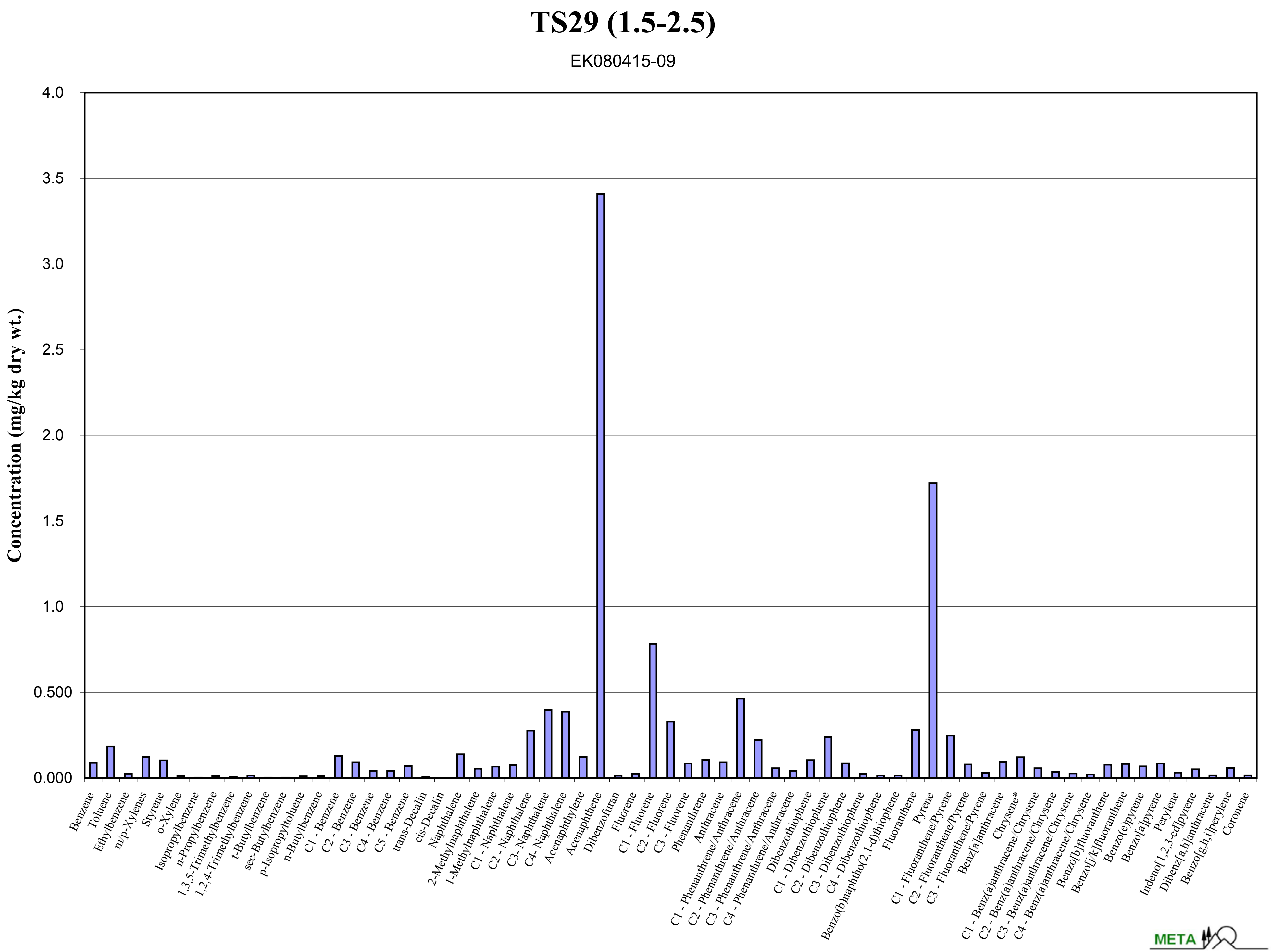


TS18 (2-3)

EK080415-06



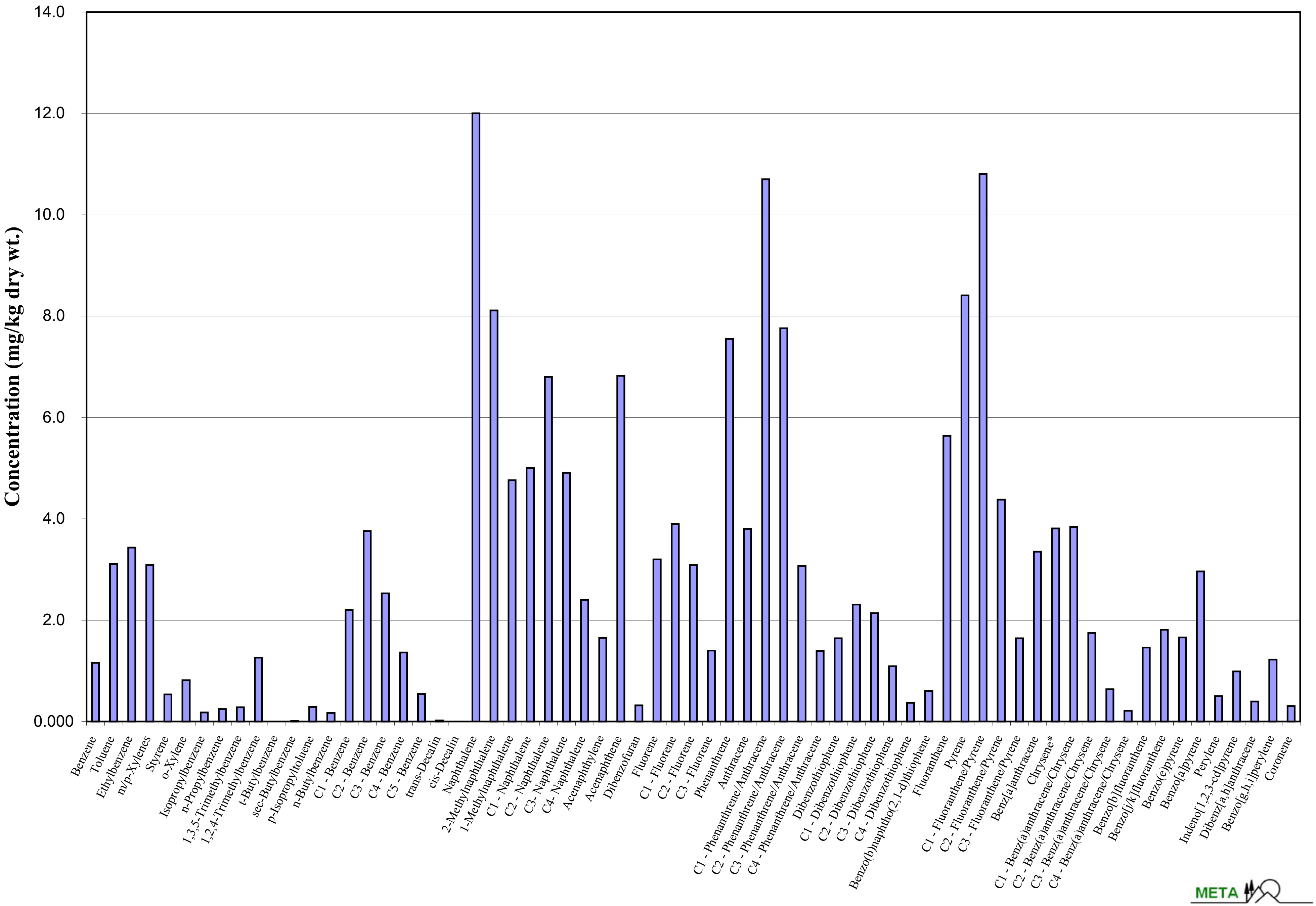

TS30 (3-4)
EK080415-08
Concentration (mg/kg dry wt.)
35.0
30.0
25.0
20.0
15.0
10.0
5.0
0.000
Benzene
Toluene
Ethylbenzene
m/p-Xylenes
Styrene
o-Xylene
Isopropylbenzene
n-Propylbenzene
1,3,5-Trimethylbenzene
1,2,4-Trimethylbenzene
t-Butylbenzene
sec-Butylbenzene
p-Isopropyltoluene
n-Butylbenzene
C1 - Benzene
C2 - Benzene
C3 - Benzene
C4 - Benzene
C5 - Benzene
trans-Decalin
cis-Decalin
Naphthalene
2-Methylnaphthalene
1-Methylnaphthalene
C1 - Naphthalene
C2 - Naphthalene
C3- Naphthalene
C4- Naphthalene
Acenaphthylene
Acenaphthene
Dibenzofuran
Fluorene
C1 - Fluorene
C2 - Fluorene
C3 - Fluorene
Phenanthrene
Anthracene
C1 - Phenanthrene/Anthracene
C2 - Phenanthrene/Anthracene
C3 - Phenanthrene/Anthracene
C4 - Phenanthrene/Anthracene
Dibenzothiophene
C1 - Dibenzothiophene
C2 - Dibenzothiophene
C3 - Dibenzothiophene
C4 - Dibenzothiophene
Benzo(b)naphtho(2,1-d)thiophene
Fluoranthene
Pyrene
C1 - Fluoranthene/Pyrene
C2 - Fluoranthene/Pyrene
C3 - Fluoranthene/Pyrene
Benz[a]anthracene
Chrysene*
C1 - Benz(a)anthracene/Chrysene
C2 - Benz(a)anthracene/Chrysene
C3 - Benz(a)anthracene/Chrysene
C4 - Benz(a)anthracene/Chrysene
Benzo[b]fluoranthene
Benzo[j/k]fluoranthene
Benzo(e)pyrene
Benzo[a]pyrene
Perylene
Indeno[1,2,3-cd]pyrene
Dibenz[a,h]anthracene
Benzo[g,h,i]perylene
Coronene
META

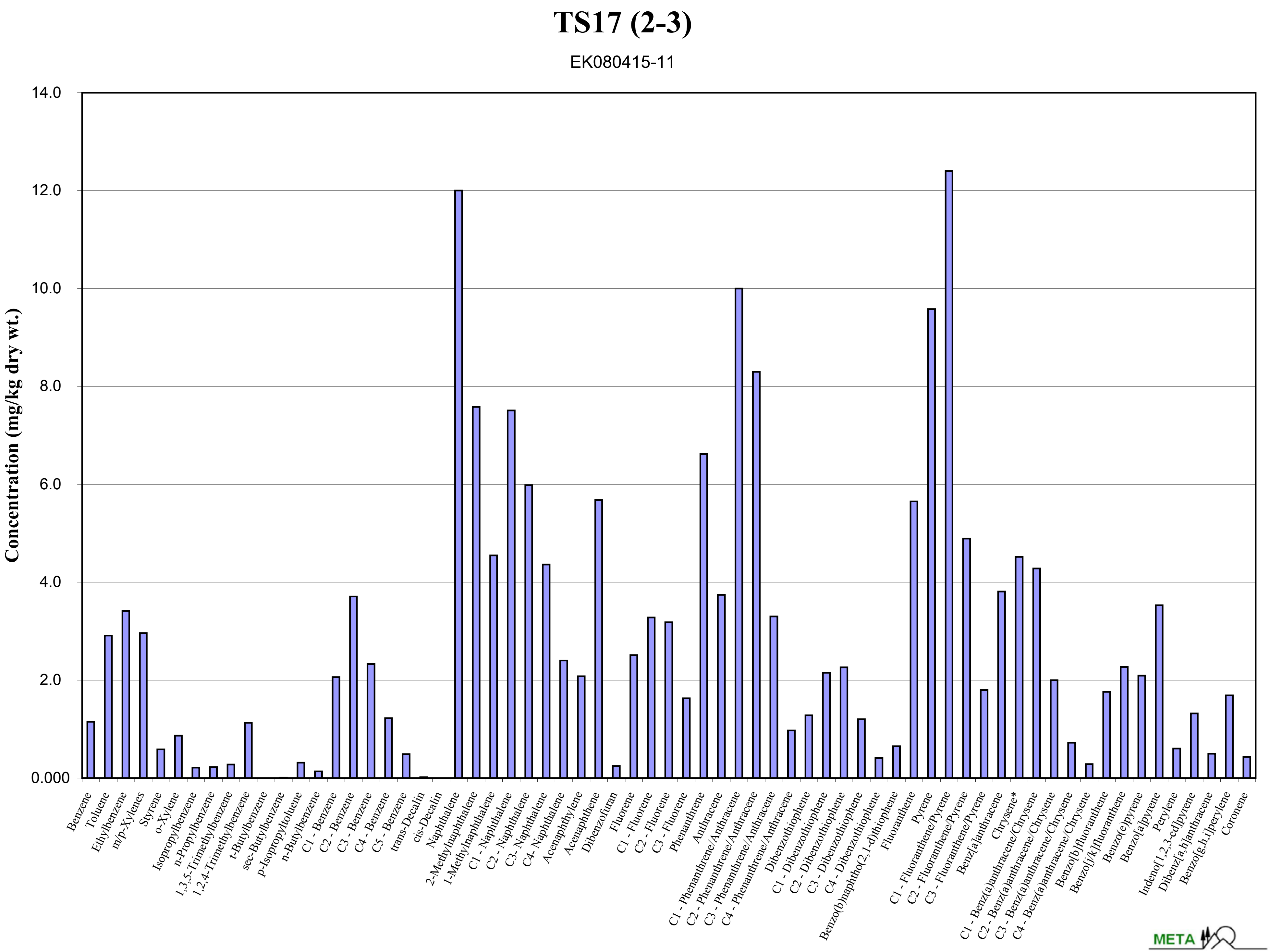


TS29 (1.5-2.5)
EK080415-09
Concentration (mg/kg dry wt.)
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.500
0.000
Benzene
Toluene
Ethylbenzene
m/p-Xylenes
Styrene
o-Xylene
Isopropylbenzene
n-Propylbenzene
1,3,5-Trimethylbenzene
1,2,4-Trimethylbenzene
t-Butylbenzene
sec-Butylbenzene
p-Isopropyltoluene
n-Butylbenzene
C1 - Benzene
C2 - Benzene
C3 - Benzene
C4 - Benzene
C5 - Benzene
trans-Decalin
cis-Decalin
Naphthalene
2-Methylnaphthalene
1-Methylnaphthalene
C1 - Naphthalene
C2 - Naphthalene
C3- Naphthalene
C4- Naphthalene
Acenaphthylene
Acenaphthene
Dibenzofuran
Fluorene
C1 - Fluorene
C2 - Fluorene
C3 - Fluorene
Phenanthrene
Anthracene
C1 - Phenanthrene/Anthracene
C2 - Phenanthrene/Anthracene
C3 - Phenanthrene/Anthracene
C4 - Phenanthrene/Anthracene
Dibenzothiophene
C1 - Dibenzothiophene
C2 - Dibenzothiophene
C3 - Dibenzothiophene
C4 - Dibenzothiophene
Benzo(b)naphtho(2,1-d)thiophene
Fluoranthene
Pyrene
C1 - Fluoranthene/Pyrene
C2 - Fluoranthene/Pyrene
C3 - Fluoranthene/Pyrene
Benz[a]anthracene
Chrysene*
C1 - Benz(a)anthracene/Chrysene
C2 - Benz(a)anthracene/Chrysene
C3 - Benz(a)anthracene/Chrysene
C4 - Benz(a)anthracene/Chrysene
Benzo[b]fluoranthene
Benzo[j/k]fluoranthene
Benzo(e)pyrene
Benzo[a]pyrene
Perylene
Indeno[1,2,3-cd]pyrene
Dibenz[a,h]anthracene
Benzo[g,h,i]perylene
Coronene
META

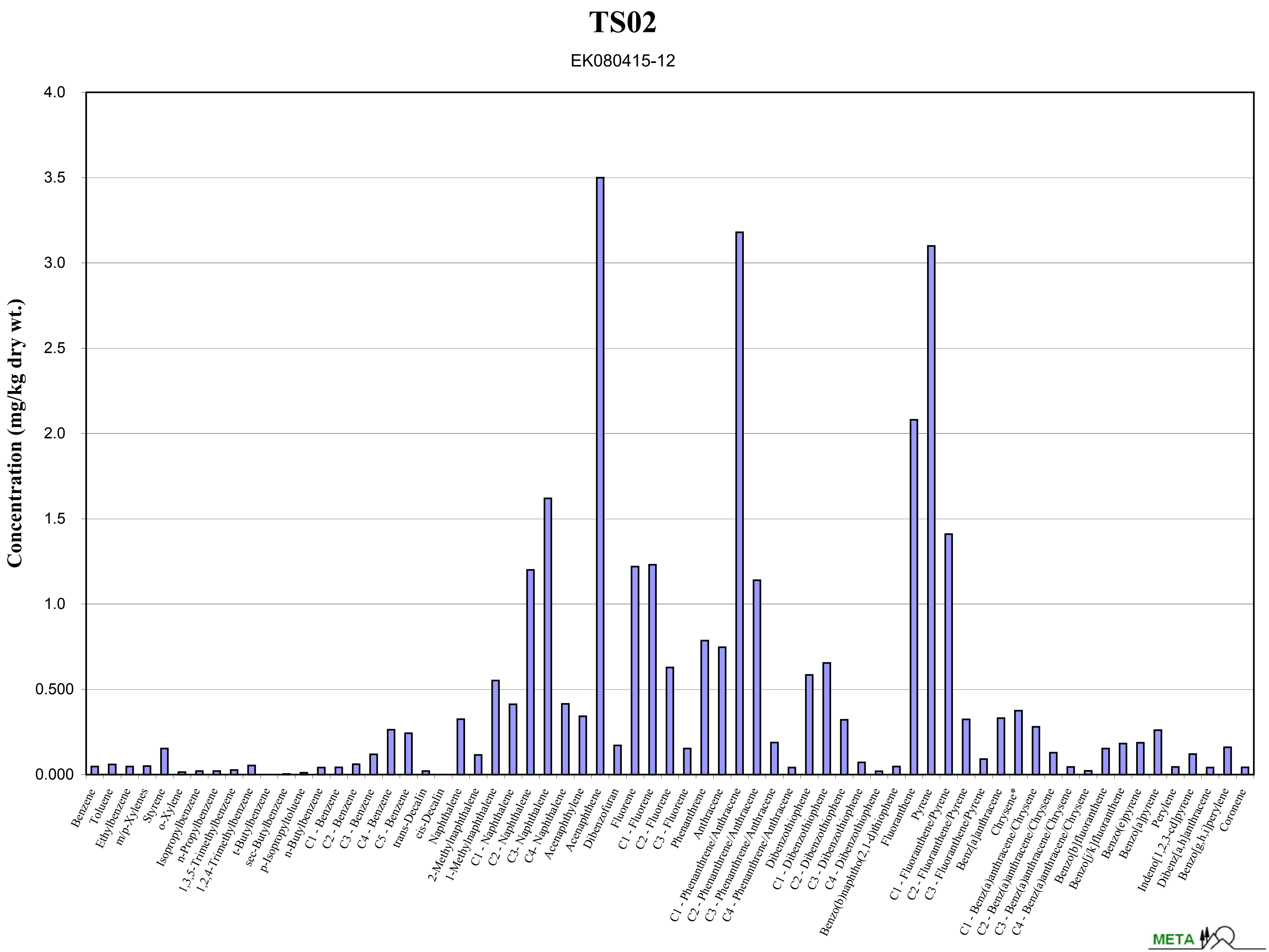
TS18 (1-2)

EK080415-10

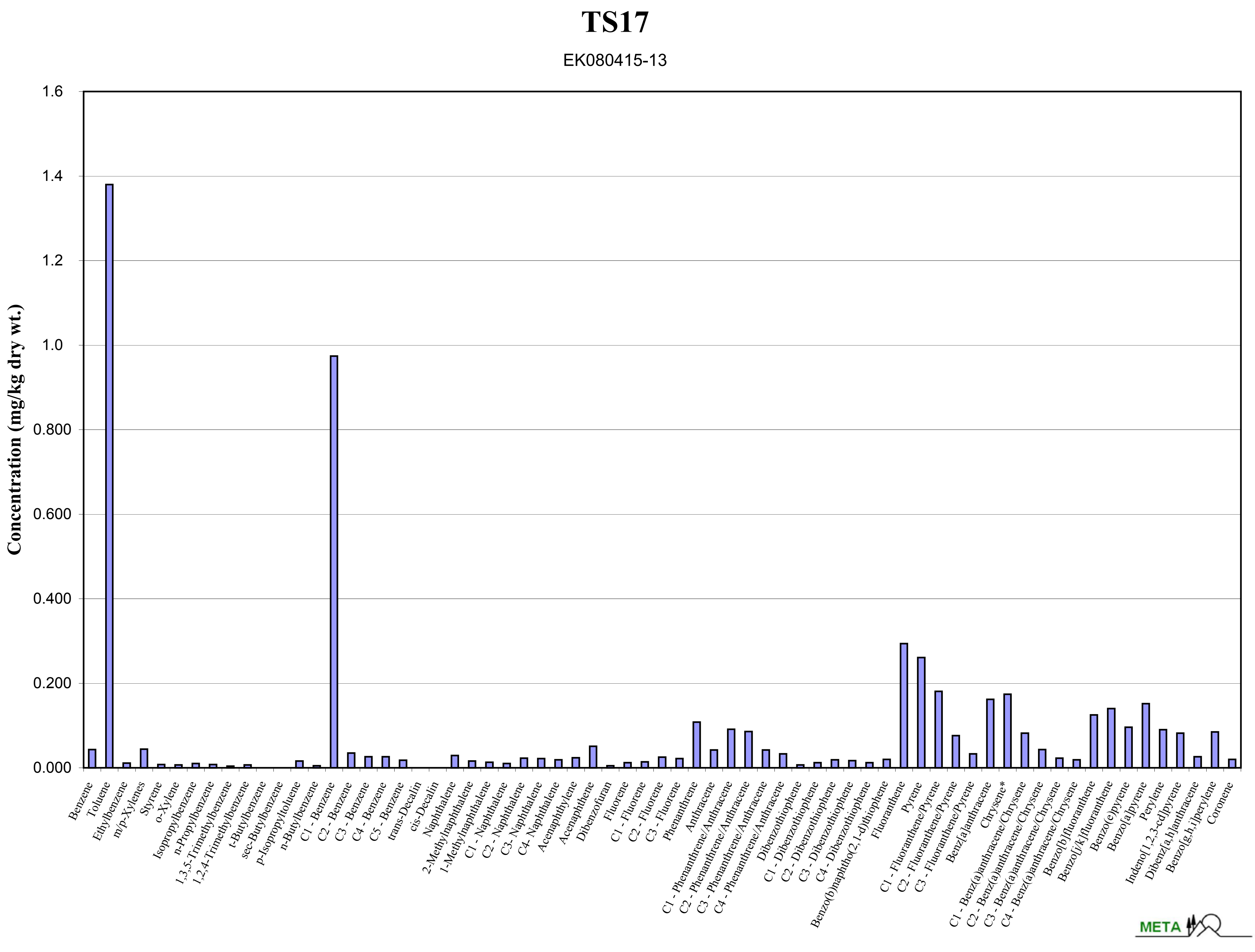




TS17 (2-3)
EK080415-11
Concentration (mg/kg dry wt.)
14.0
12.0
10.0
8.0
6.0
4.0
2.0
0.000
Benzene
Toluene
Ethylbenzene
m/p-Xylenes
Styrene
o-Xylene
Isopropylbenzene
n-Propylbenzene
1,3,5-Trimethylbenzene
1,2,4-Trimethylbenzene
t-Butylbenzene
sec-Butylbenzene
p-Isopropyltoluene
n-Butylbenzene
C1 - Benzene
C2 - Benzene
C3 - Benzene
C4 - Benzene
C5 - Benzene
trans-Decalin
cis-Decalin
Naphthalene
2-Methylnaphthalene
1-Methylnaphthalene
C1 - Naphthalene
C2 - Naphthalene
C3- Naphthalene
C4- Naphthalene
Acenaphthylene
Acenaphthene
Dibenzofuran
Fluorene
C1 - Fluorene
C2 - Fluorene
C3 - Fluorene
Phenanthrene
Anthracene
C1 - Phenanthrene/Anthracene
C2 - Phenanthrene/Anthracene
C3 - Phenanthrene/Anthracene
C4 - Phenanthrene/Anthracene
Dibenzothiophene
C1 - Dibenzothiophene
C2 - Dibenzothiophene
C3 - Dibenzothiophene
C4 - Dibenzothiophene
Benzo(b)naphtho(2,1-d)thiophene
Fluoranthene
Pyrene
C1 - Fluoranthene/Pyrene
C2 - Fluoranthene/Pyrene
C3 - Fluoranthene/Pyrene
Benz[a]anthracene
Chrysene*
C1 - Benz(a)anthracene/Chrysene
C2 - Benz(a)anthracene/Chrysene
C3 - Benz(a)anthracene/Chrysene
C4 - Benz(a)anthracene/Chrysene
Benzo[b]fluoranthene
Benzo[j/k]fluoranthene
Benzo(e)pyrene
Benzo[a]pyrene
Perylene
Indeno[1,2,3-cd]pyrene
Dibenz[a,h]anthracene
Benzo[g,h,i]perylene
Coronene
META



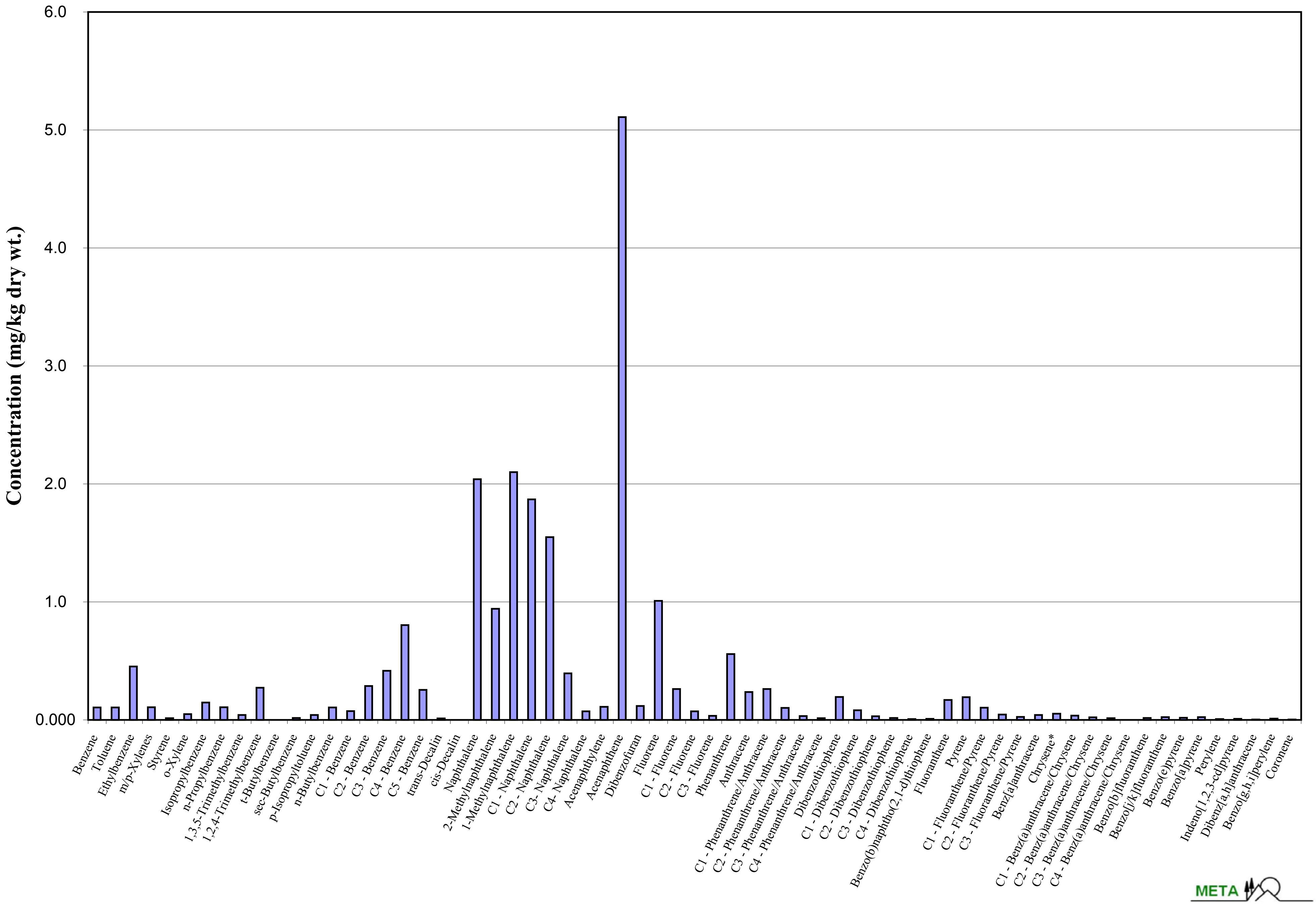
TS02
EK080415-12
Concentration (mg/kg dry wt.)
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.500
0.000
Benzene
Toluene
Ethylbenzene
m/p-Xylenes
Styrene
o-Xylene
Isopropylbenzene
n-Propylbenzene
1,3,5-Trimethylbenzene
1,2,4-Trimethylbenzene
t-Butylbenzene
sec-Butylbenzene
p-Isopropyltoluene
n-Butylbenzene
C1 - Benzene
C2 - Benzene
C3 - Benzene
C4 - Benzene
C5 - Benzene
trans-Decalin
cis-Decalin
Naphthalene
2-Methylnaphthalene
1-Methylnaphthalene
C1 - Naphthalene
C2 - Naphthalene
C3- Naphthalene
C4- Naphthalene
Acenaphthylene
Acenaphthene
Dibenzofuran
Fluorene
C1 - Fluorene
C2 - Fluorene
C3 - Fluorene
Phenanthrene
Anthracene
C1 - Phenanthrene/Anthracene
C2 - Phenanthrene/Anthracene
C3 - Phenanthrene/Anthracene
C4 - Phenanthrene/Anthracene
Dibenzothiophene
C1 - Dibenzothiophene
C2 - Dibenzothiophene
C3 - Dibenzothiophene
C4 - Dibenzothiophene
Benzo(b)naphtho(2,1-d)thiophene
Fluoranthene
Pyrene
C1 - Fluoranthene/Pyrene
C2 - Fluoranthene/Pyrene
C3 - Fluoranthene/Pyrene
Benz[a]anthracene
Chrysene*
C1 - Benz(a)anthracene/Chrysene
C2 - Benz(a)anthracene/Chrysene
C3 - Benz(a)anthracene/Chrysene
C4 - Benz(a)anthracene/Chrysene
Benzo[b]fluoranthene
Benzo[j/k]fluoranthene
Benzo(e)pyrene
Benzo[a]pyrene
Perylene
Indeno[1,2,3-cd]pyrene
Dibenz[a,h]anthracene
Benzo[g,h,i]perylene
Coronene
META



TS17
EK080415-13
Concentration (mg/kg dry wt.)
1.6
1.4
1.2
1.0
0.800
0.600
0.400
0.200
0.000
Benzene
Toluene
Ethylbenzene
m/p-Xylenes
Styrene
o-Xylene
Isopropylbenzene
n-Propylbenzene
1,3,5-Trimethylbenzene
1,2,4-Trimethylbenzene
t-Butylbenzene
sec-Butylbenzene
p-Isopropyltoluene
n-Butylbenzene
C1 - Benzene
C2 - Benzene
C3 - Benzene
C4 - Benzene
C5 - Benzene
trans-Decalin
cis-Decalin
Naphthalene
2-Methylnaphthalene
1-Methylnaphthalene
C1 - Naphthalene
C2 - Naphthalene
C3- Naphthalene
C4- Naphthalene
Acenaphthylene
Acenaphthene
Dibenzofuran
Fluorene
C1 - Fluorene
C2 - Fluorene
C3 - Fluorene
Phenanthrene
Anthracene
C1 - Phenanthrene/Anthracene
C2 - Phenanthrene/Anthracene
C3 - Phenanthrene/Anthracene
C4 - Phenanthrene/Anthracene
Dibenzothiophene
C1 - Dibenzothiophene
C2 - Dibenzothiophene
C3 - Dibenzothiophene
C4 - Dibenzothiophene
Benzo(b)naphtho(2,1-d)thiophene
Fluoranthene
Pyrene
C1 - Fluoranthene/Pyrene
C2 - Fluoranthene/Pyrene
C3 - Fluoranthene/Pyrene
Benz[a]anthracene
Chrysene*
C1 - Benz(a)anthracene/Chrysene
C2 - Benz(a)anthracene/Chrysene
C3 - Benz(a)anthracene/Chrysene
C4 - Benz(a)anthracene/Chrysene
Benzo[b]fluoranthene
Benzo[j/k]fluoranthene
Benzo(e)pyrene
Benzo[a]pyrene
Perylene
Indeno[1,2,3-cd]pyrene
Dibenz[a,h]anthracene
Benzo[g,h,i]perylene
Coronene
META

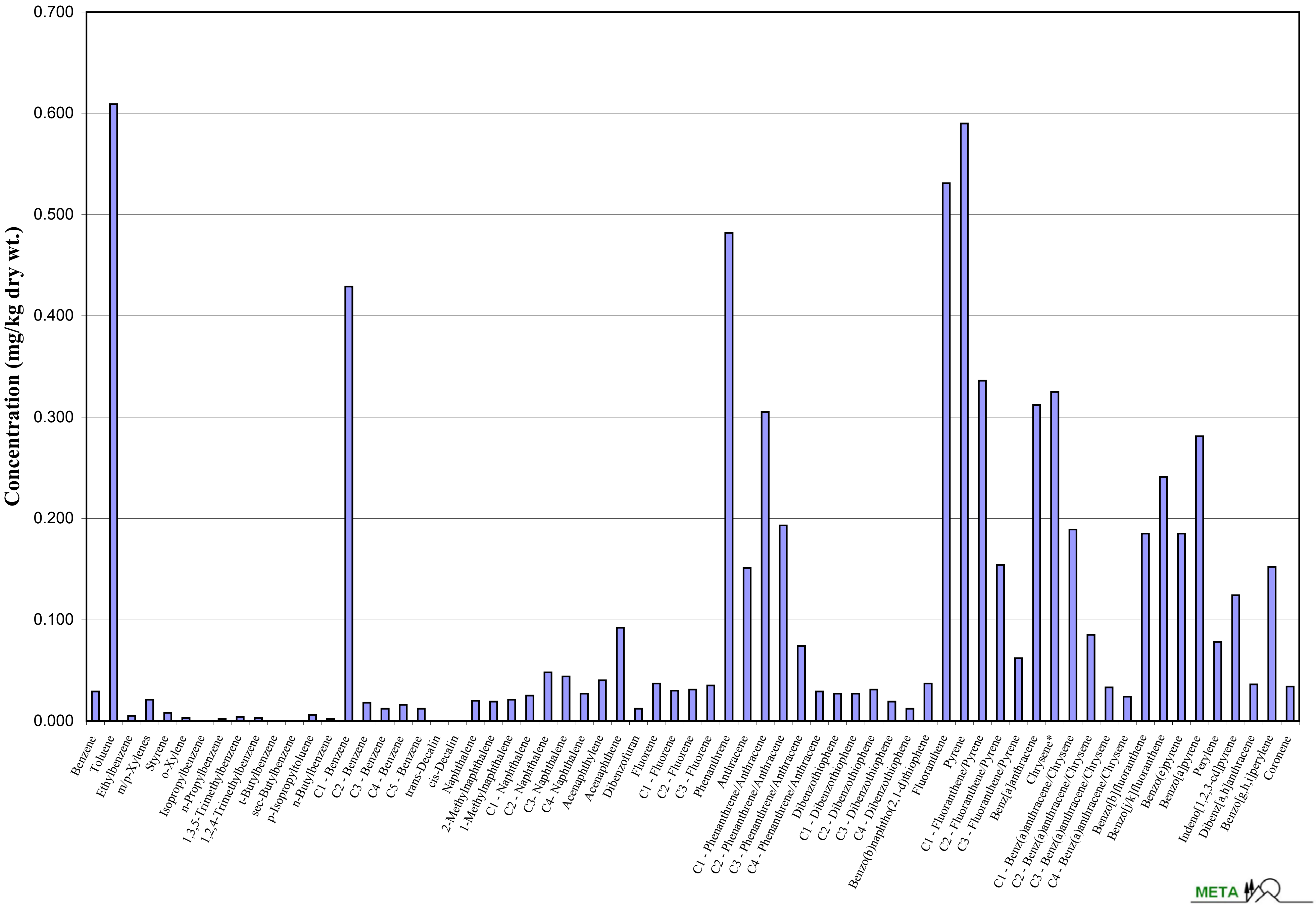
TS24 (1-1.5)

EK080415-14



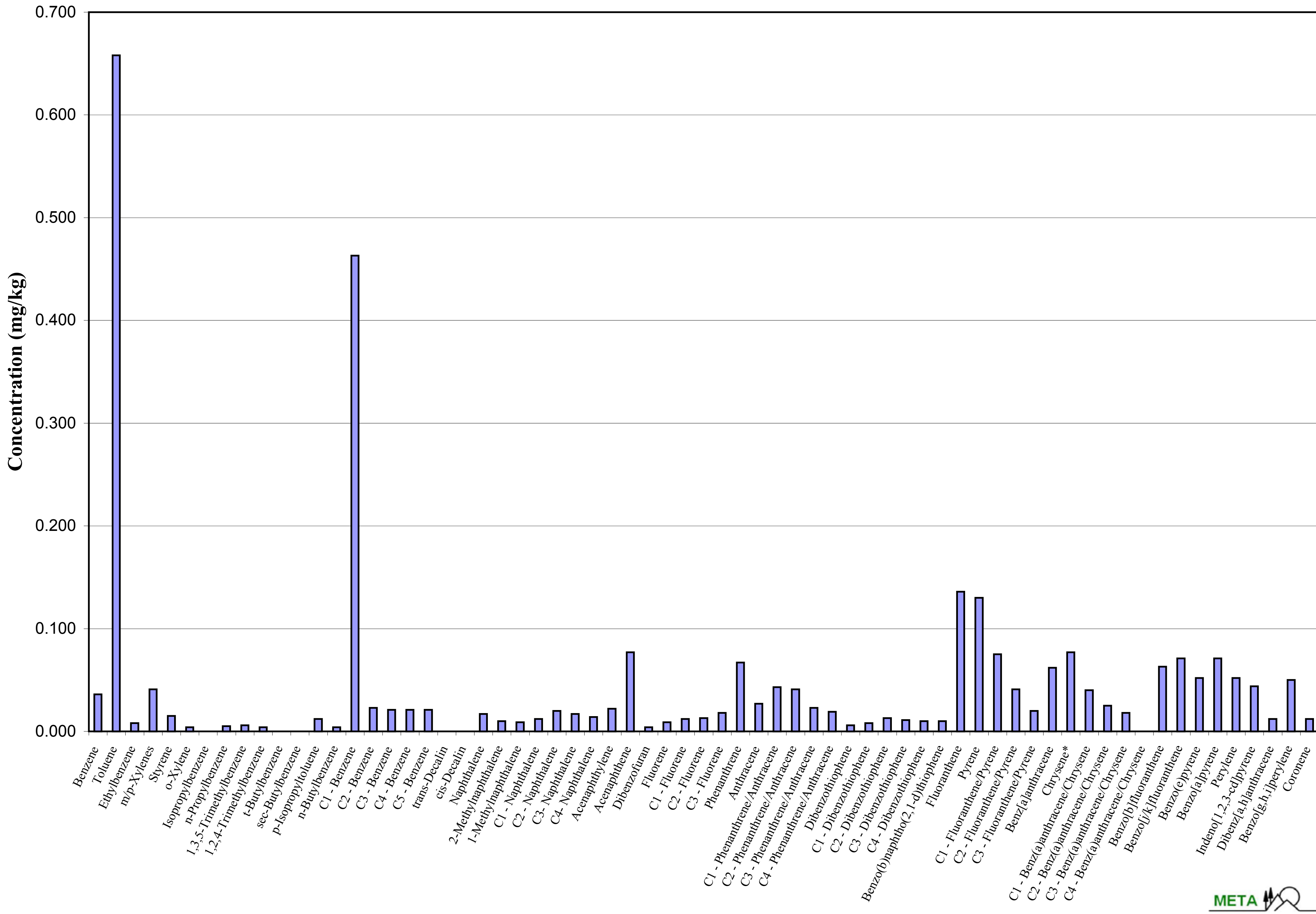
TS18

EK080415-15



Duplicate of TS18

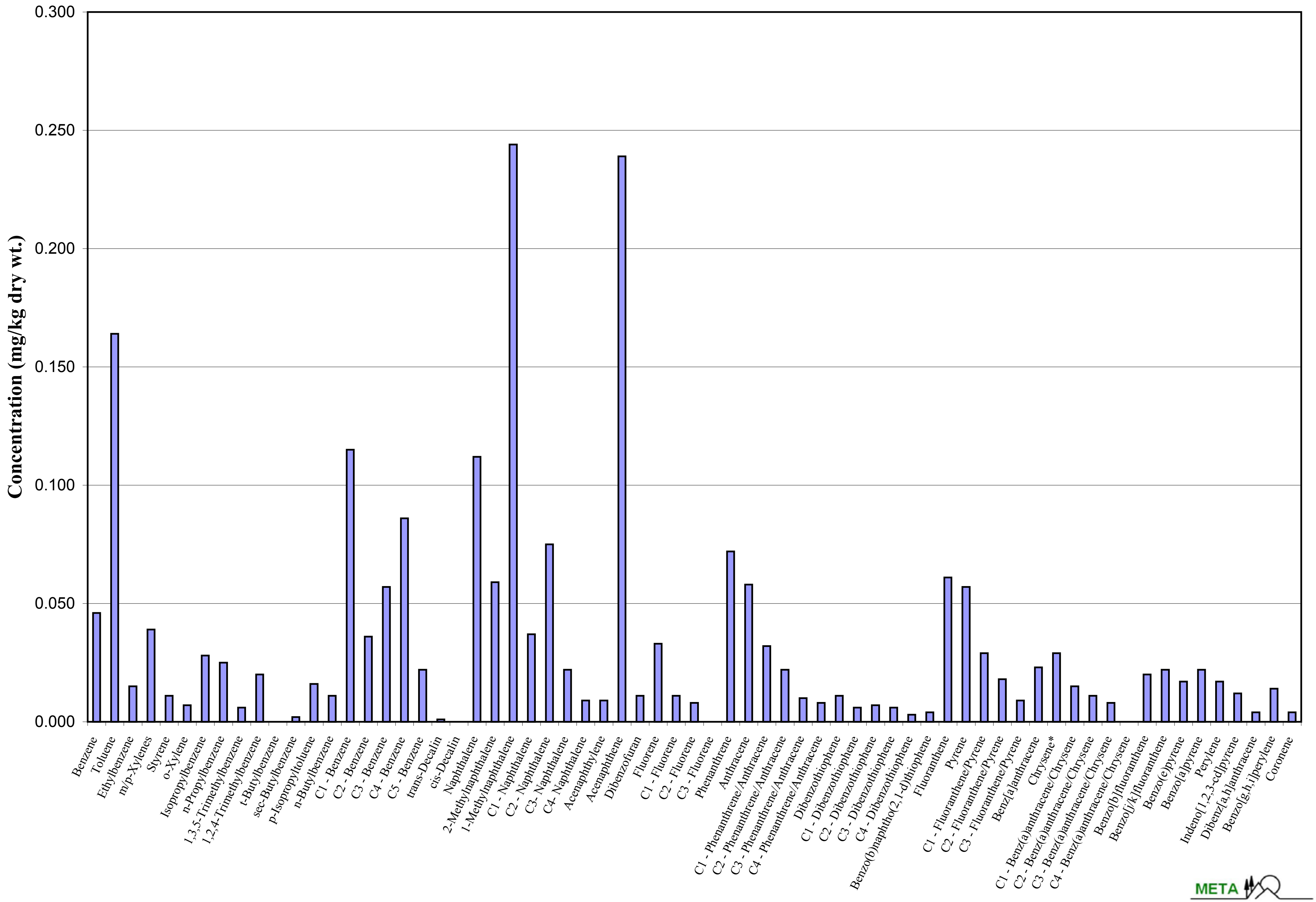
EK080415-15DUP

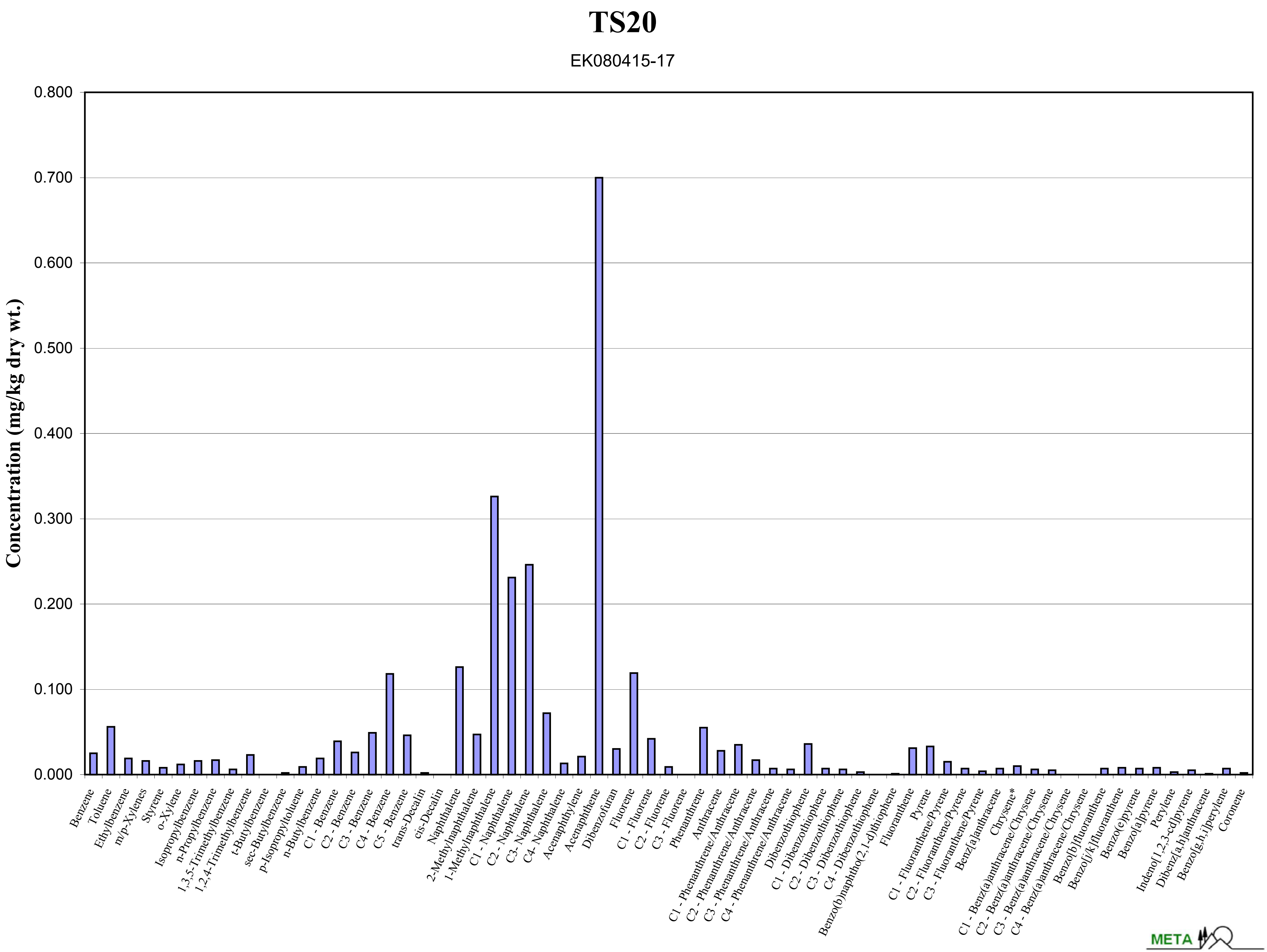


META

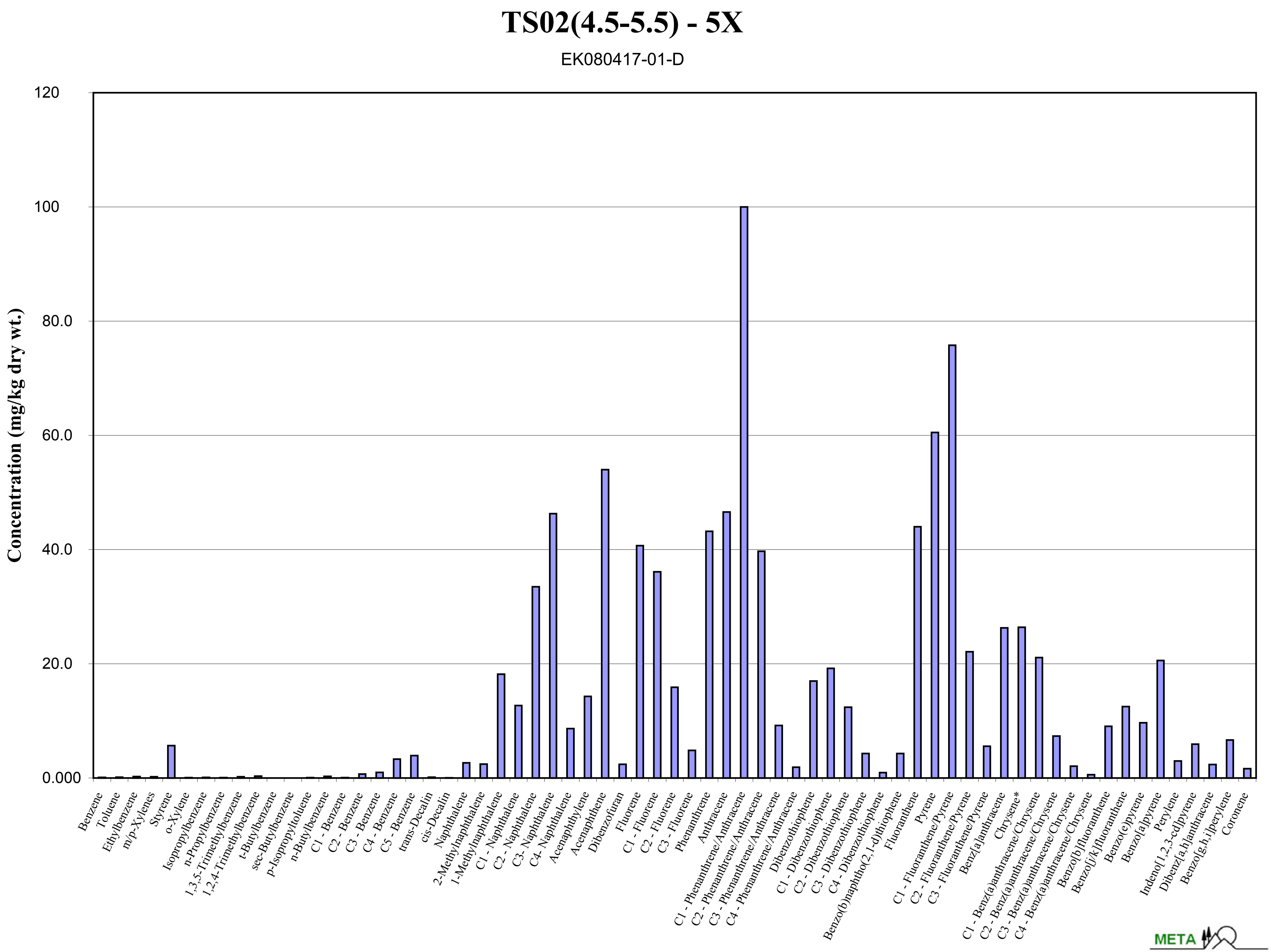
TS24

EK080415-16





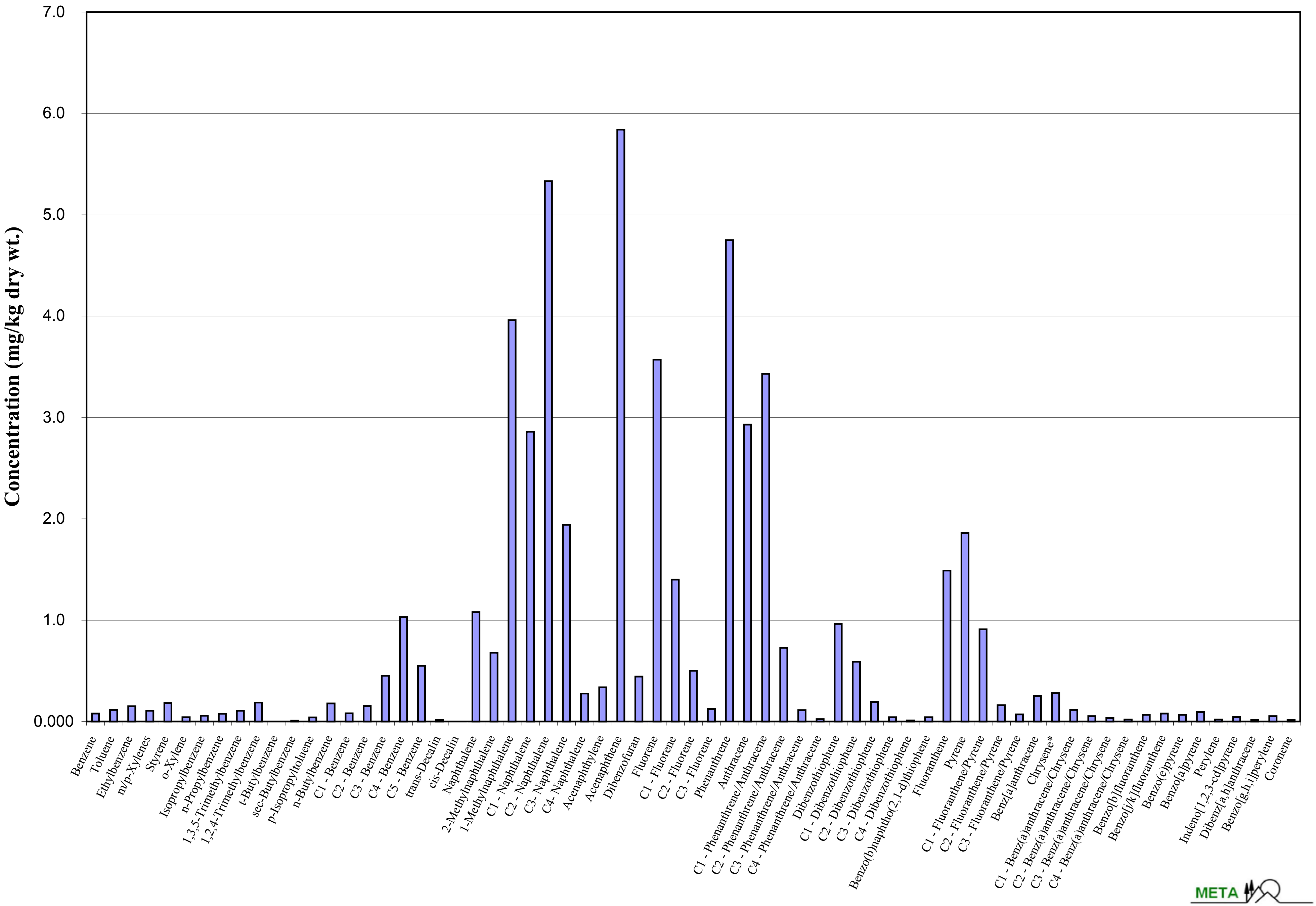
TS20
EK080415-17
Concentration (mg/kg dry wt.)
0.800
0.700
0.600
0.500
0.400
0.300
0.200
0.100
0.000
Benzene
Toluene
Ethylbenzene
m/p-Xylenes
Styrene
o-Xylene
Isopropylbenzene
n-Propylbenzene
1,3,5-Trimethylbenzene
1,2,4-Trimethylbenzene
t-Butylbenzene
sec-Butylbenzene
p-Isopropyltoluene
n-Butylbenzene
C1 - Benzene
C2 - Benzene
C3 - Benzene
C4 - Benzene
C5 - Benzene
trans-Decalin
cis-Decalin
Naphthalene
2-Methylnaphthalene
1-Methylnaphthalene
C1 - Naphthalene
C2 - Naphthalene
C3- Naphthalene
C4- Naphthalene
Acenaphthylene
Acenaphthene
Dibenzofuran
Fluorene
C1 - Fluorene
C2 - Fluorene
C3 - Fluorene
Phenanthrene
Anthracene
C1 - Phenanthrene/Anthracene
C2 - Phenanthrene/Anthracene
C3 - Phenanthrene/Anthracene
C4 - Phenanthrene/Anthracene
Dibenzothiophene
C1 - Dibenzothiophene
C2 - Dibenzothiophene
C3 - Dibenzothiophene
C4 - Dibenzothiophene
Benzo(b)naphtho(2,1-d)thiophene
Fluoranthene
Pyrene
C1 - Fluoranthene/Pyrene
C2 - Fluoranthene/Pyrene
C3 - Fluoranthene/Pyrene
Benz[a]anthracene
Chrysene*
C1 - Benz(a)anthracene/Chrysene
C2 - Benz(a)anthracene/Chrysene
C3 - Benz(a)anthracene/Chrysene
C4 - Benz(a)anthracene/Chrysene
Benzo[b]fluoranthene
Benzo[j/k]fluoranthene
Benzo(e)pyrene
Benzo[a]pyrene
Perylene
Indeno[1,2,3-cd]pyrene
Dibenz[a,h]anthracene
Benzo[g,h,i]perylene
Coronene
META



TS02(4.5-5.5) - 5X
EK080417-01-D
Concentration (mg/kg dry wt.)
120
100
80.0
60.0
40.0
20.0
0.000
Benzene
Toluene
Ethylbenzene
m/p-Xylenes
Styrene
o-Xylene
Isopropylbenzene
n-Propylbenzene
1,3,5-Trimethylbenzene
1,2,4-Trimethylbenzene
t-Butylbenzene
sec-Butylbenzene
p-Isopropyltoluene
n-Butylbenzene
C1 - Benzene
C2 - Benzene
C3 - Benzene
C4 - Benzene
C5 - Benzene
trans-Decalin
cis-Decalin
Naphthalene
2-Methylnaphthalene
1-Methylnaphthalene
C1 - Naphthalene
C2 - Naphthalene
C3- Naphthalene
C4- Naphthalene
Acenaphthylene
Acenaphthene
Dibenzofuran
Fluorene
C1 - Fluorene
C2 - Fluorene
C3 - Fluorene
Phenanthrene
Anthracene
C1 - Phenanthrene/Anthracene
C2 - Phenanthrene/Anthracene
C3 - Phenanthrene/Anthracene
C4 - Phenanthrene/Anthracene
Dibenzothiophene
C1 - Dibenzothiophene
C2 - Dibenzothiophene
C3 - Dibenzothiophene
C4 - Dibenzothiophene
Benzo(b)naphtho(2,1-d)thiophene
Fluoranthene
Pyrene
C1 - Fluoranthene/Pyrene
C2 - Fluoranthene/Pyrene
C3 - Fluoranthene/Pyrene
Benz[a]anthracene
Chrysene*
C1 - Benz(a)anthracene/Chrysene
C2 - Benz(a)anthracene/Chrysene
C3 - Benz(a)anthracene/Chrysene
C4 - Benz(a)anthracene/Chrysene
Benzo[b]fluoranthene
Benzo[j/k]fluoranthene
Benzo(e)pyrene
Benzo[a]pyrene
Perylene
Indeno[1,2,3-cd]pyrene
Dibenz[a,h]anthracene
Benzo[g,h,i]perylene
Coronene
META

TS04

EK080417-02



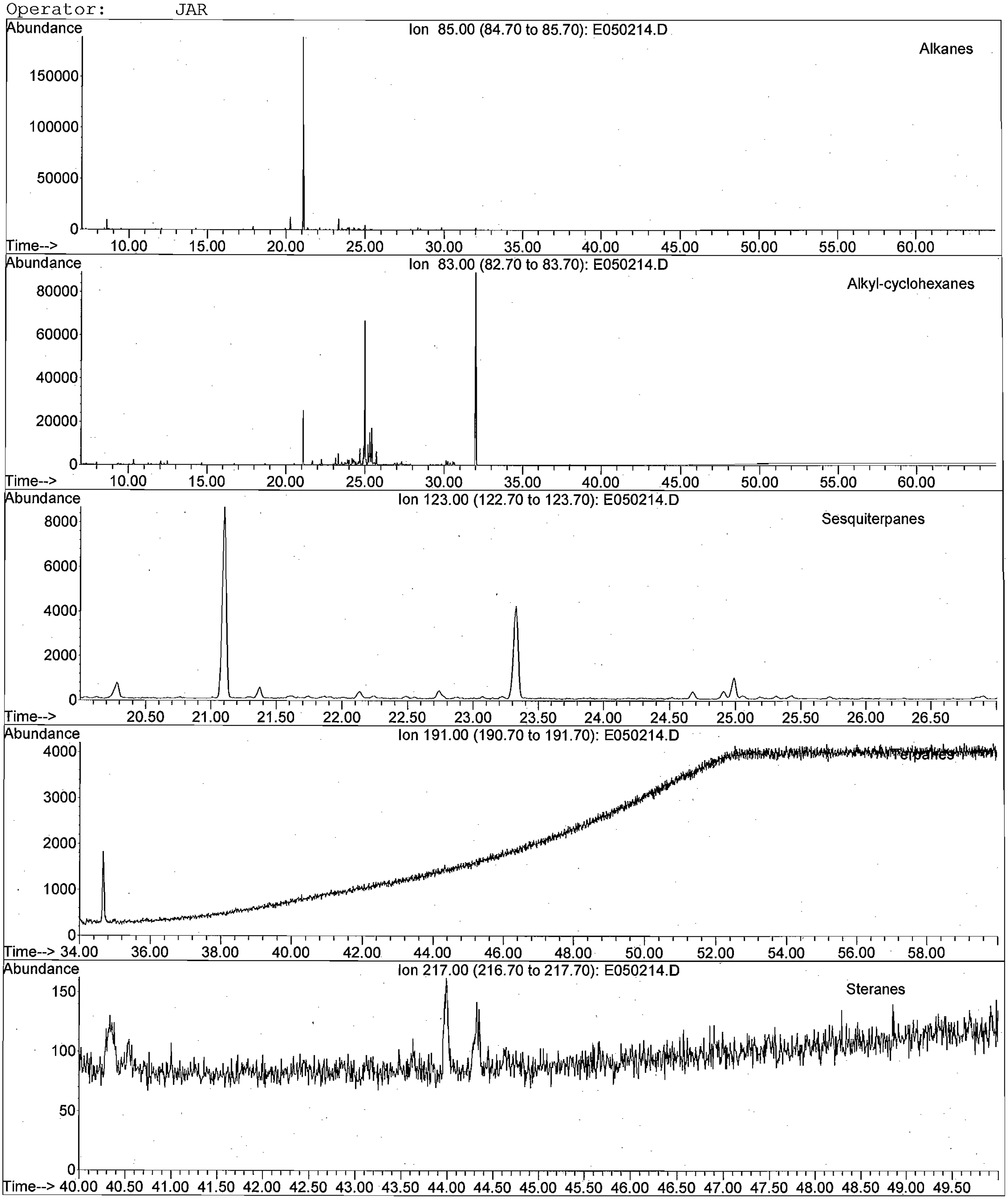
Appendix E

Extracted Ion Current Profiles (EICPs)

META Environmental, Inc.

GC/MS EXTRACTED ION CHROMATOGRAM

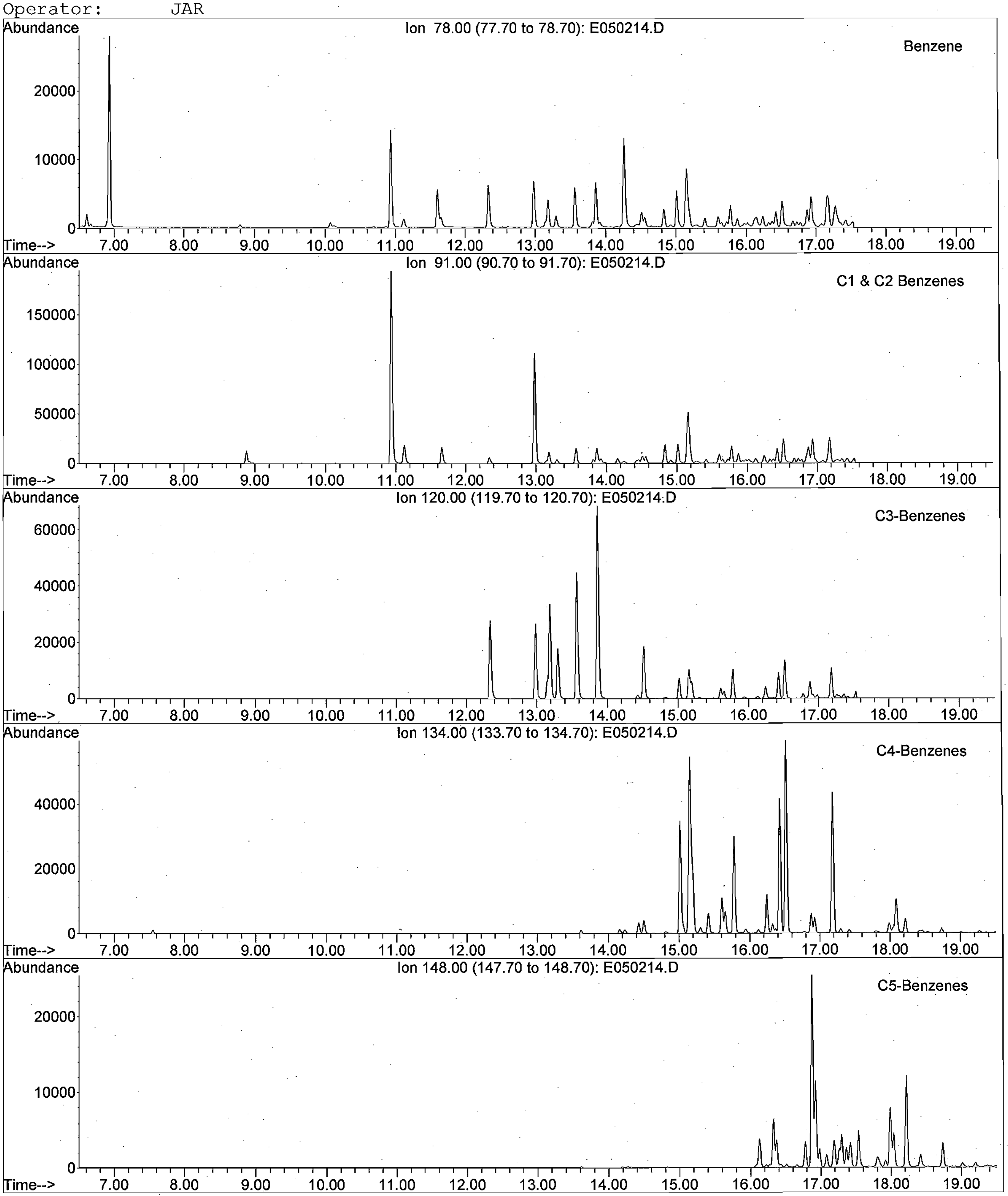
File: J:\1\DATA\E080502\E050214.D
Date Acquired: 3 May 2008 7:32 am
Method File: 4008SIMA.M
Sample Name: EK080415-01
Misc Info: TS04 (1.8-2.4)
Operator: JAR



META Environmental, Inc.

GC/MS EXTRACTED ION CHROMATOGRAM

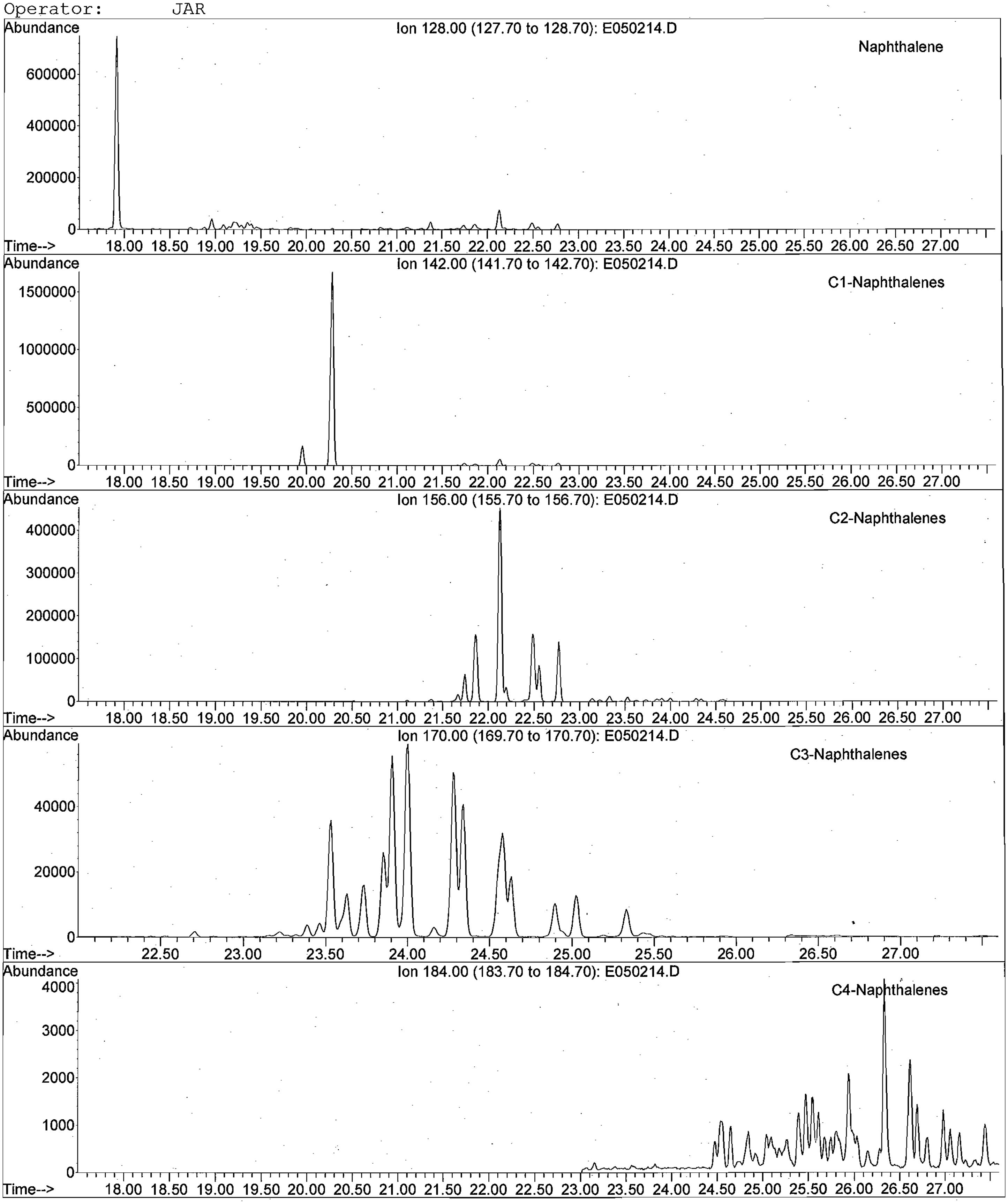
File: J:\1\DATA\E080502\E050214.D
Date Acquired: 3 May 2008 7:32 am
Method File: 4008SIMA.M
Sample Name: EK080415-01
Misc Info: TS04 (1.8-2.4)
Operator: JAR



META Environmental, Inc.

GC/MS EXTRACTED ION CHROMATOGRAM

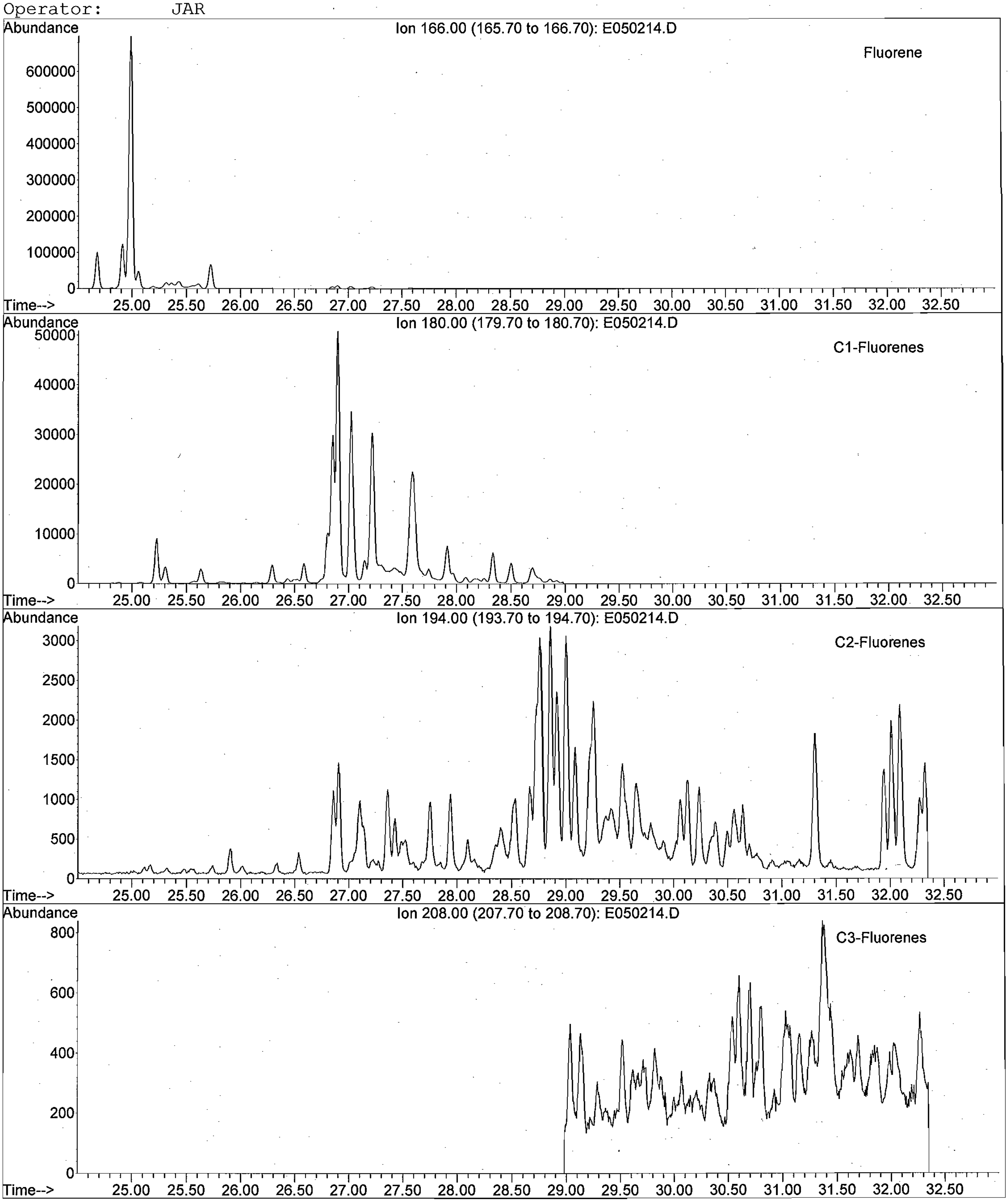
File: J:\1\DATA\E080502\E050214.D
Date Acquired: 3 May 2008 7:32 am
Method File: 4008SIMA.M
Sample Name: EK080415-01
Misc Info: TS04 (1.8-2.4)
Operator: JAR



META Environmental, Inc.

GC/MS EXTRACTED ION CHROMATOGRAM

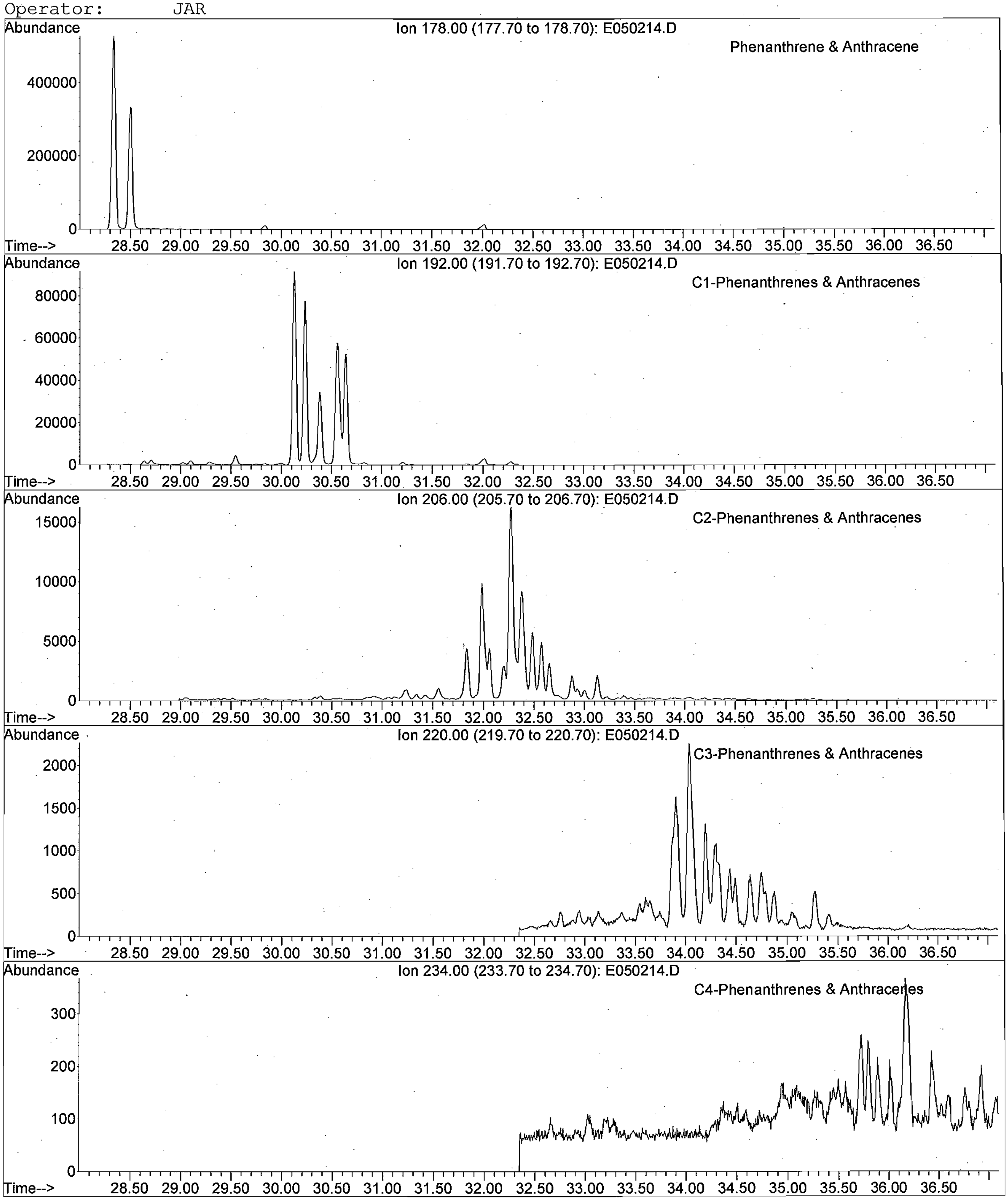
File: J:\1\DATA\E080502\E050214.D
Date Acquired: 3 May 2008 7:32 am
Method File: 4008SIMA.M
Sample Name: EK080415-01
Misc Info: TS04 (1.8-2.4)
Operator: JAR



META Environmental, Inc.

GC/MS EXTRACTED ION CHROMATOGRAM

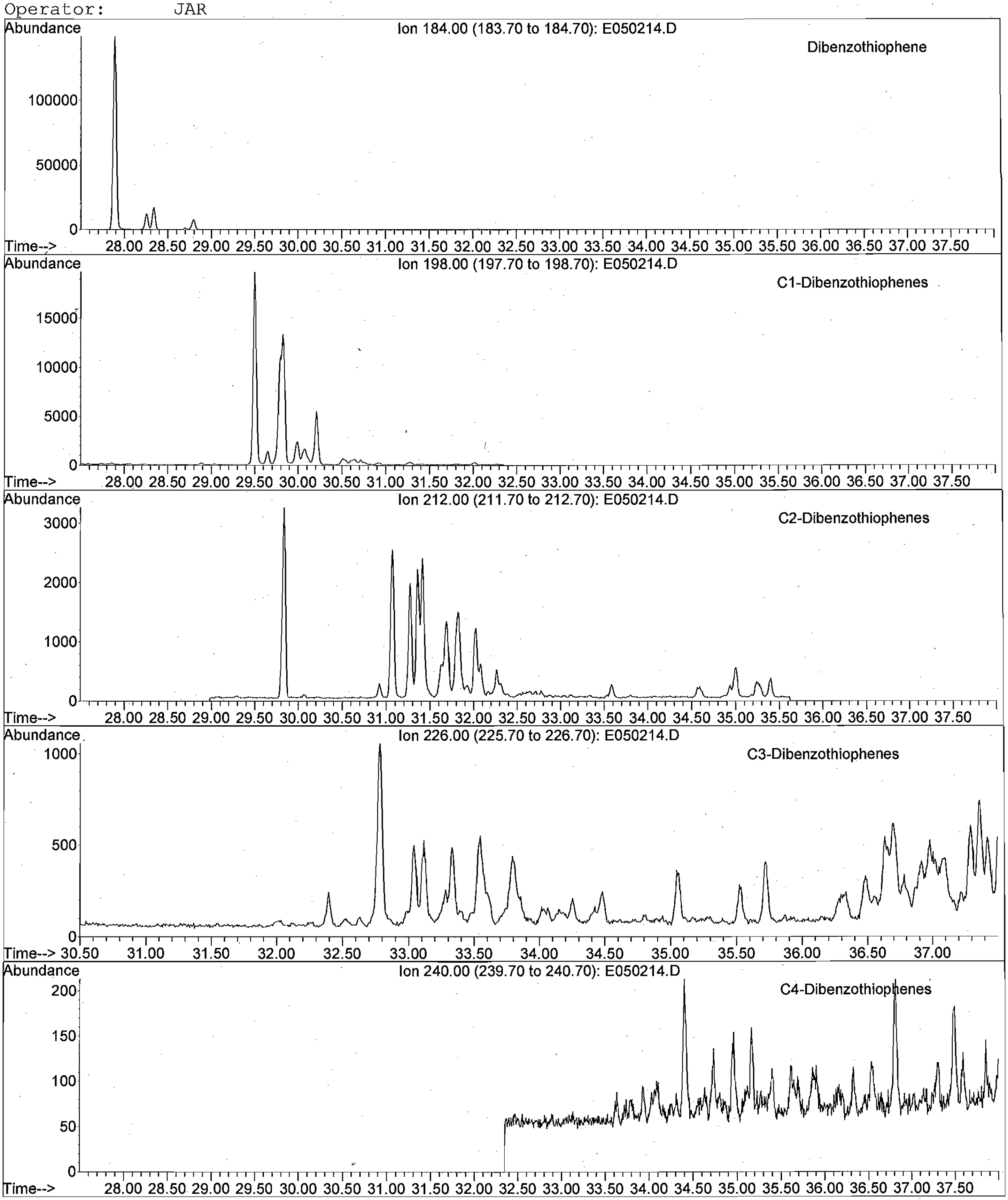
File: J:\1\DATA\E080502\E050214.D
Date Acquired: 3 May 2008 7:32 am
Method File: 4008SIMA.M
Sample Name: EK080415-01
Misc Info: TS04 (1.8-2.4)
Operator: JAR



META Environmental, Inc.

GC/MS EXTRACTED ION CHROMATOGRAM

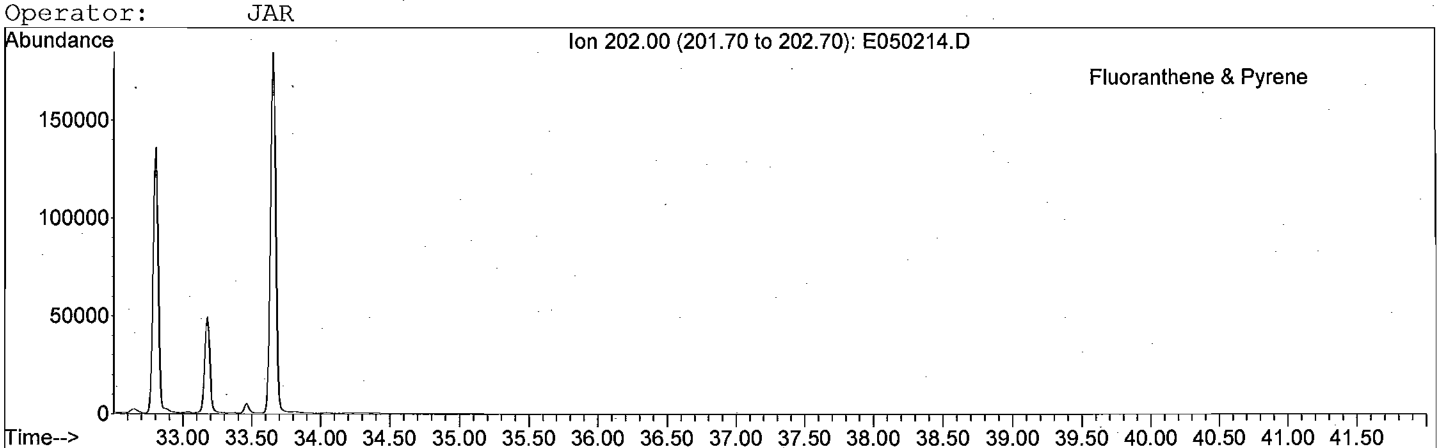
File: J:\1\DATA\E080502\E050214.D
Date Acquired: 3 May 2008 7:32 am
Method File: 4008SIMA.M
Sample Name: EK080415-01
Misc Info: TS04 (1.8-2.4)
Operator: JAR

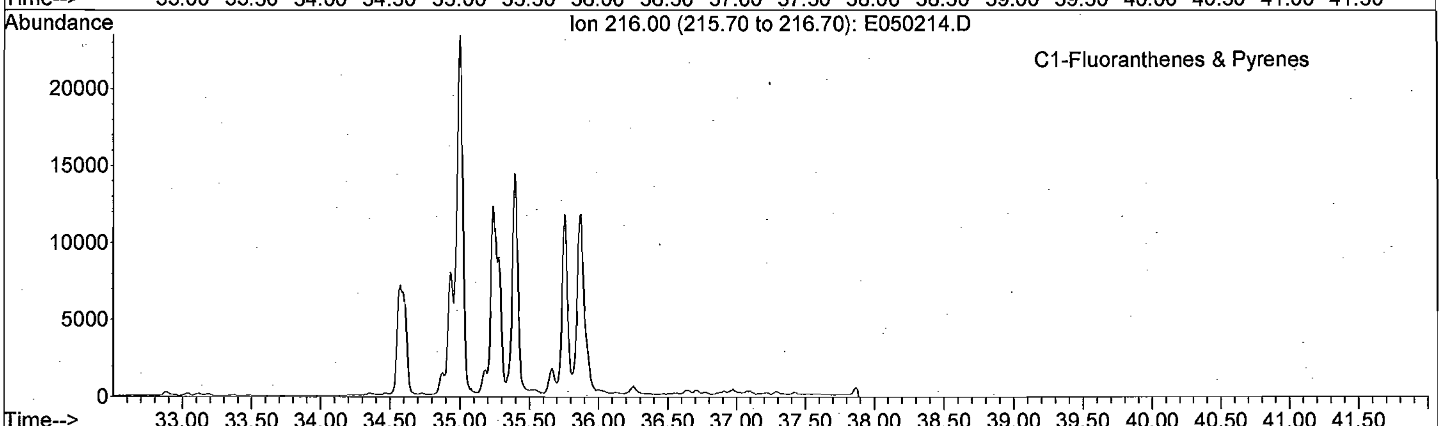


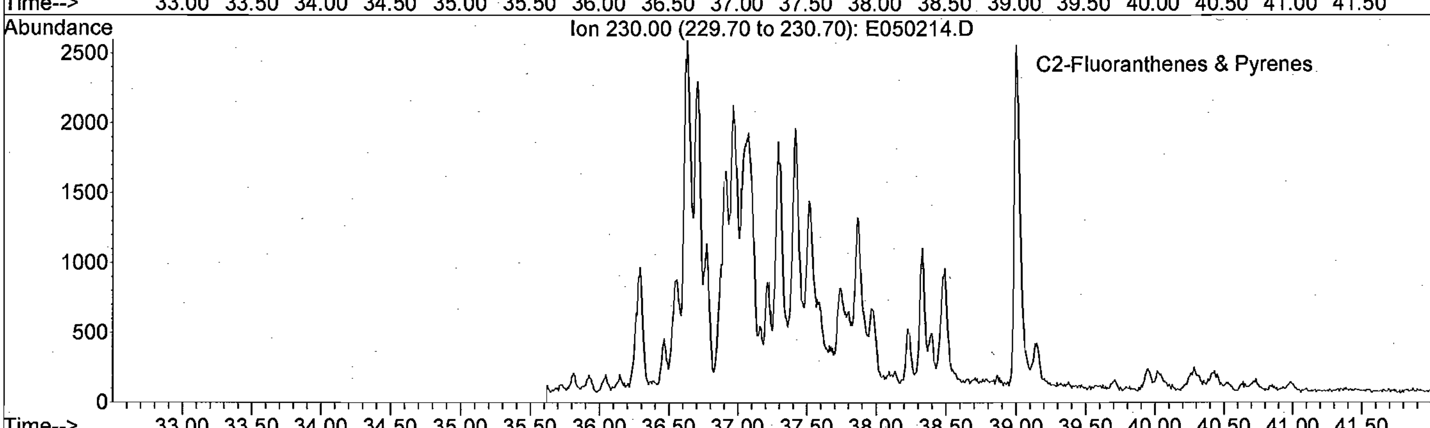
META Environmental, Inc.

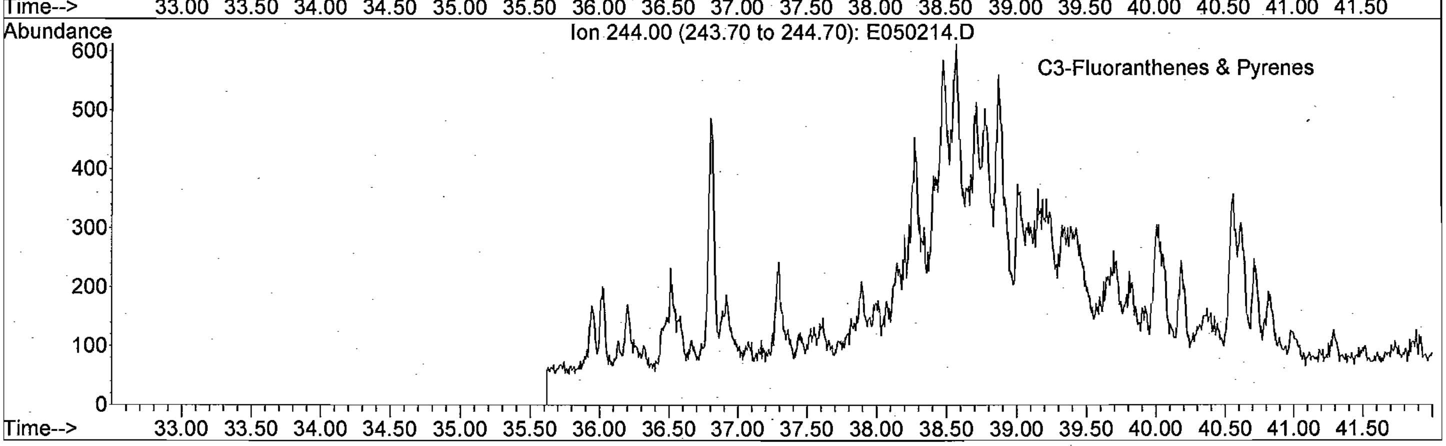
GC/MS EXTRACTED ION CHROMATOGRAM

File: J:\1\DATA\E080502\E050214.D
Date Acquired: 3 May 2008 7:32 am
Method File: 4008SIMA.M
Sample Name: EK080415-01
Misc Info: TS04 (1.8-2.4)
Operator: JAR





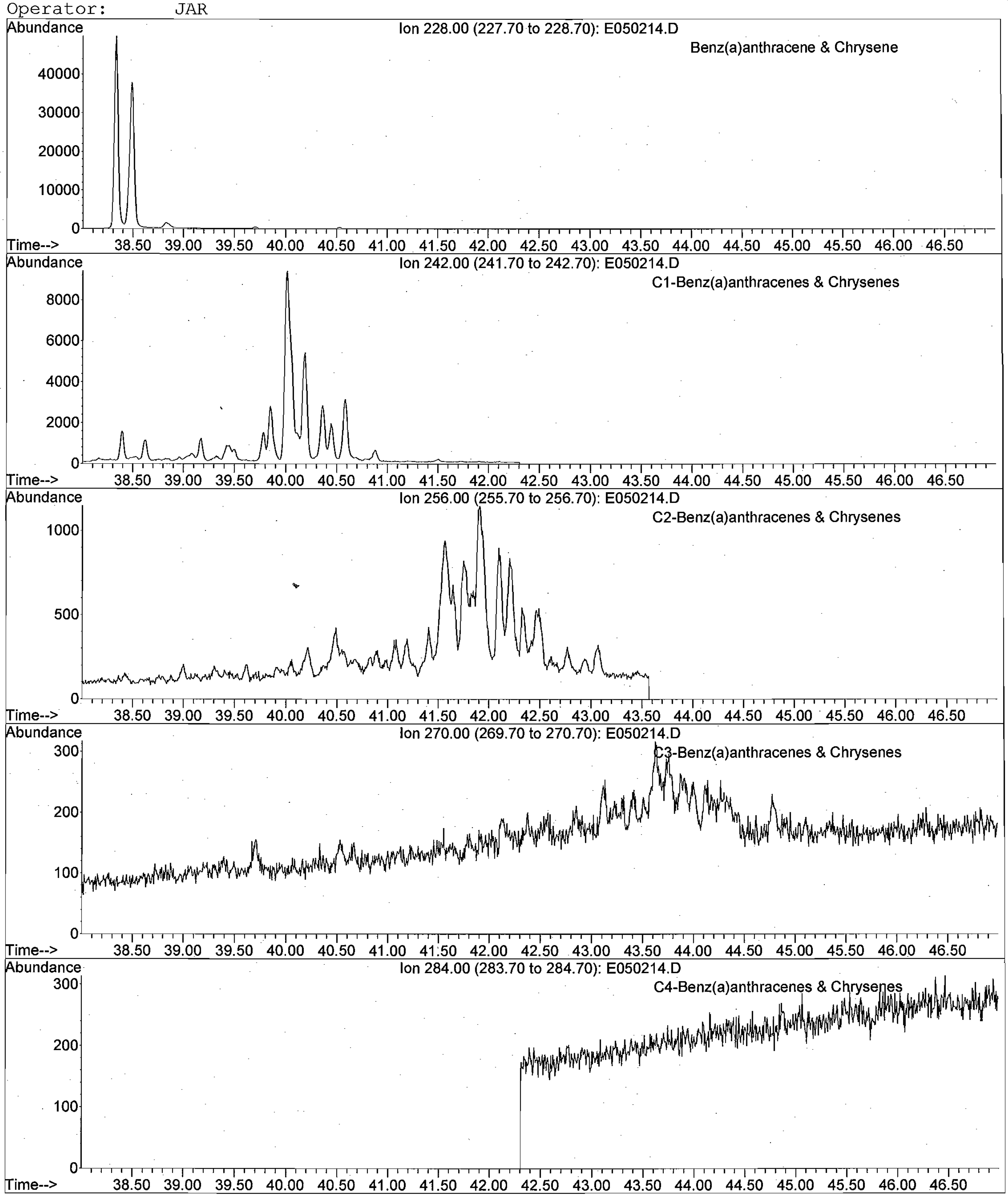




META Environmental, Inc.

GC/MS EXTRACTED ION CHROMATOGRAM

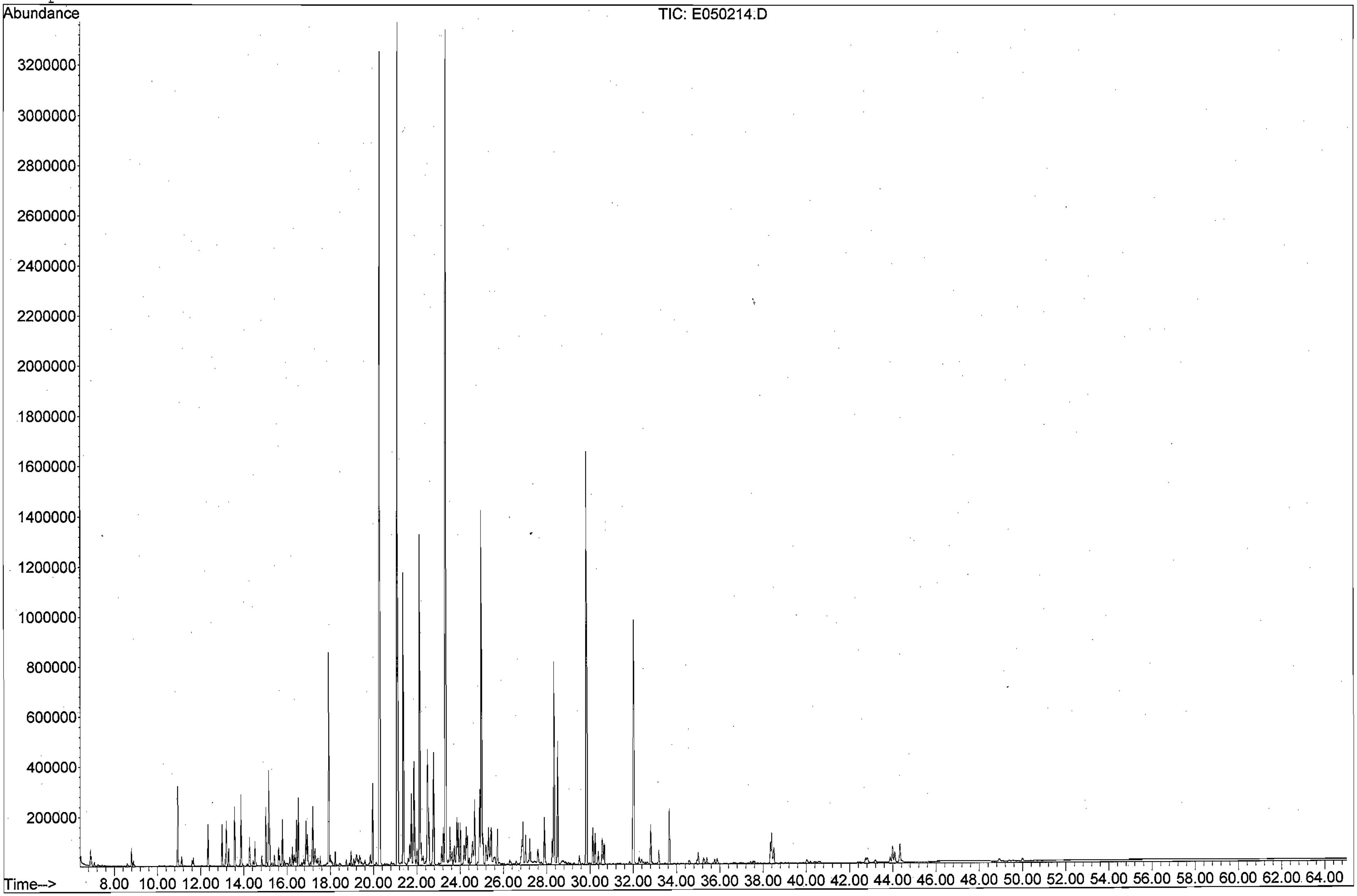
File: J:\1\DATA\E080502\E050214.D
Date Acquired: 3 May 2008 7:32 am
Method File: 4008SIMA.M
Sample Name: EK080415-01
Misc Info: TS04 (1.8-2.4)
Operator: JAR



META Environmental, Inc.

GC/MS TOTAL ION CHROMATOGRAM

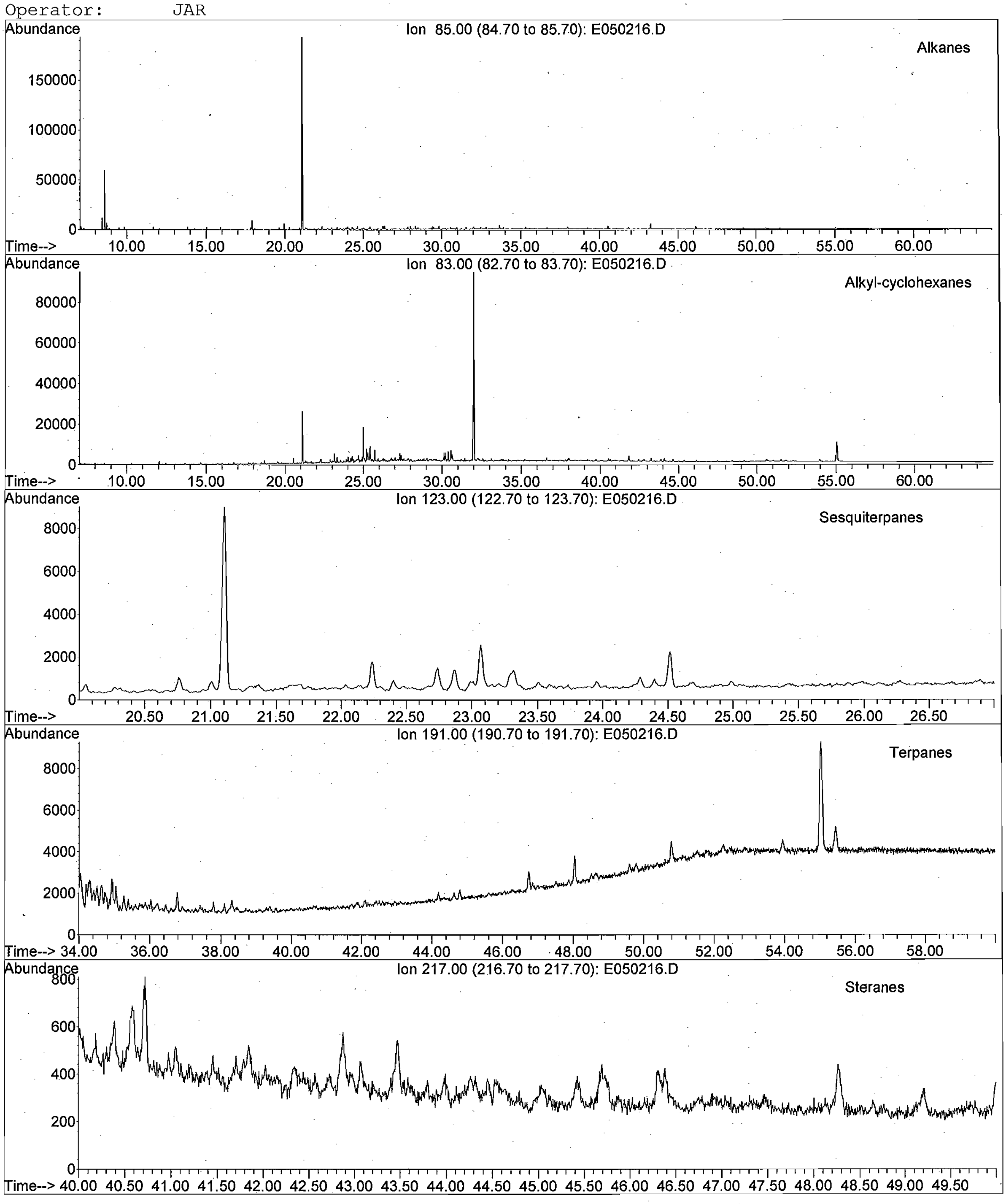
File: J:\1\DATA\E080502\E050214.D
Date Acquired: 3 May 2008 7:32 am
Method File: 4008SIMA.M
Sample Name: EK080415-01
Misc Info: TS04 (1.8-2.4)
Operator: JAR



META Environmental, Inc.

GC/MS EXTRACTED ION CHROMATOGRAM

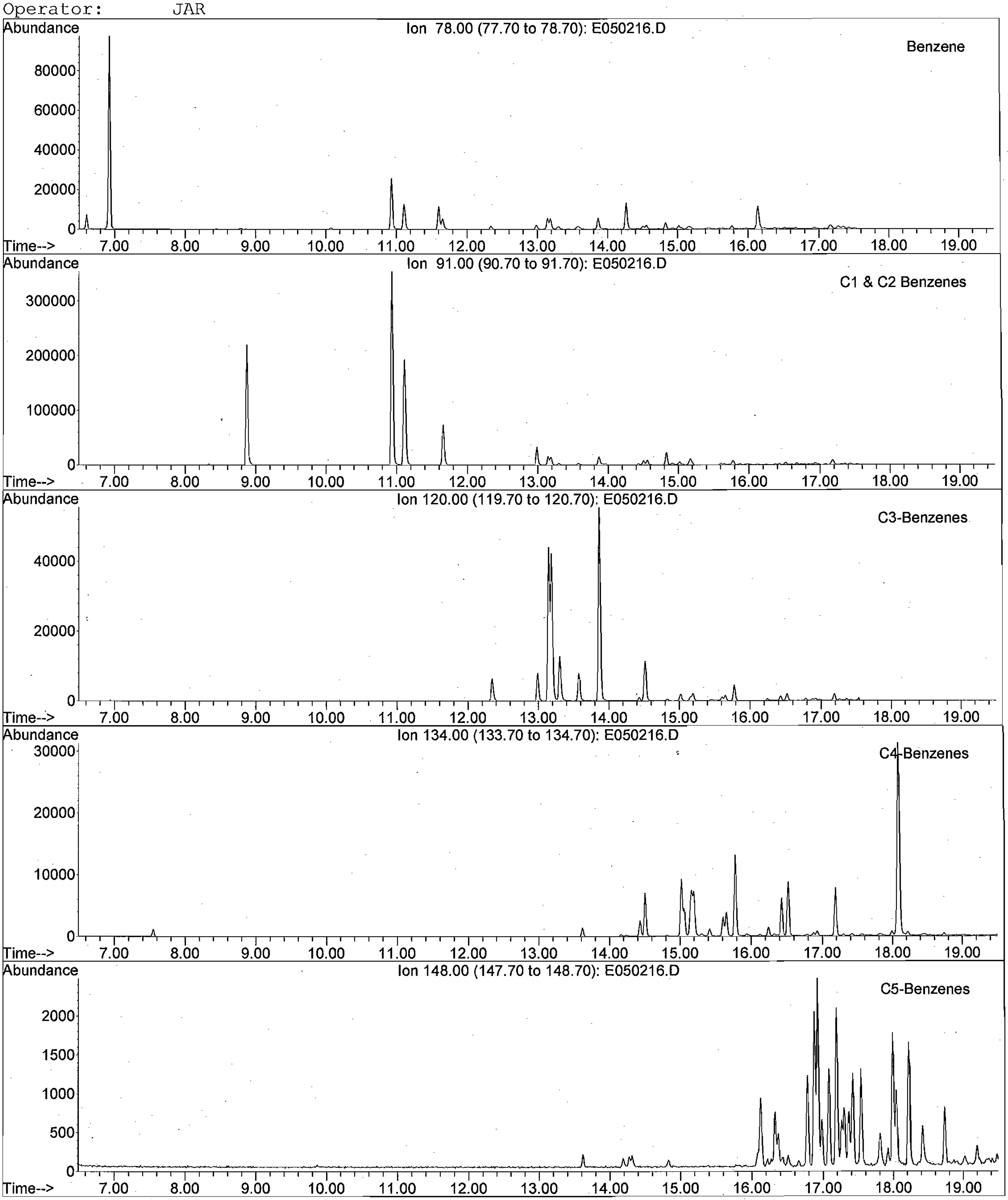
File: J:\1\DATA\E080502\E050216.D
Date Acquired: 3 May 2008 10:02 am
Method File: 4008SIMA.M
Sample Name: EK080415-03
Misc Info: TS17 (3-4)
Operator: JAR



META Environmental, Inc.

GC/MS EXTRACTED ION CHROMATOGRAM

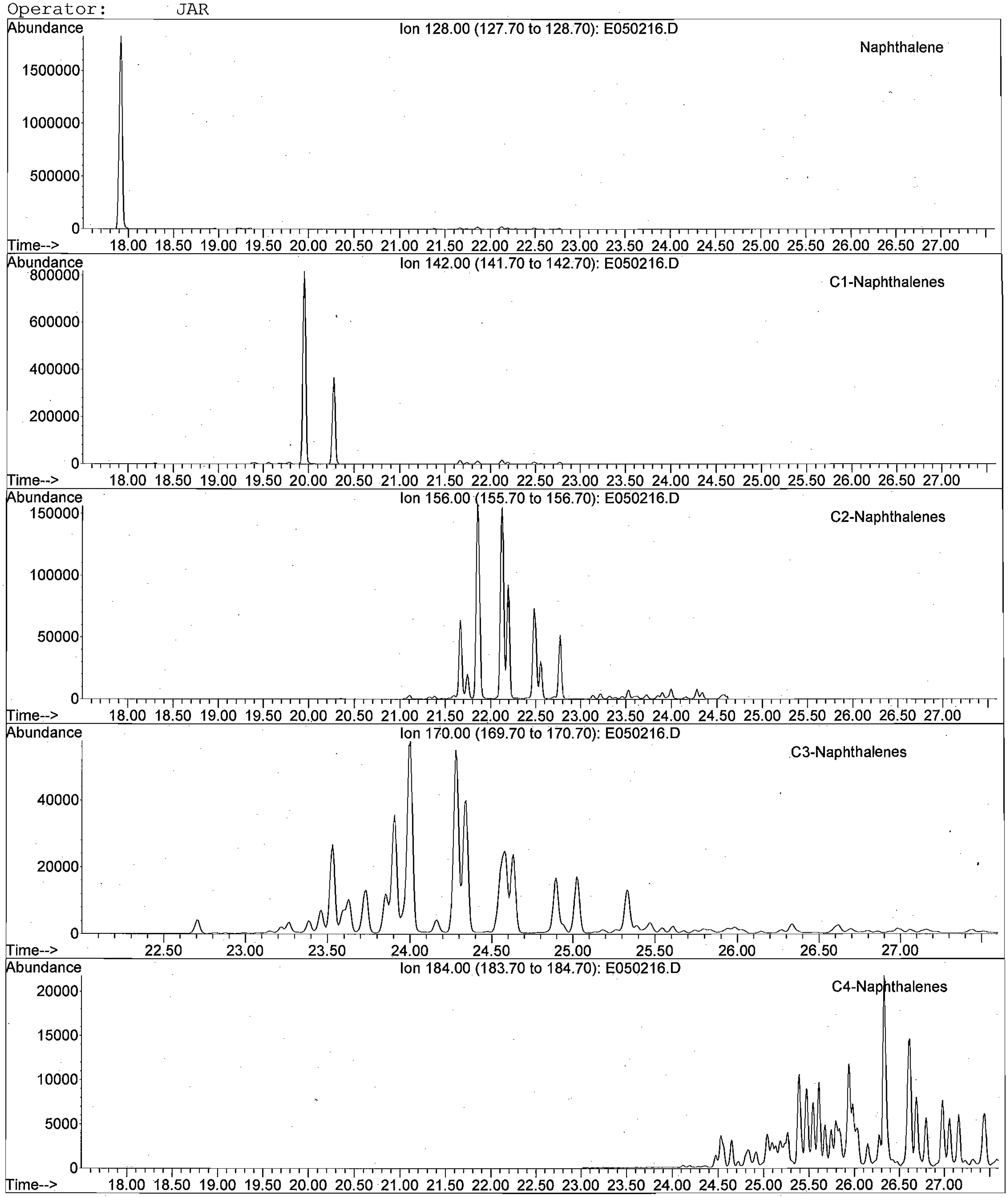
File: J:\1\DATA\E080502\E050216.D
Date Acquired: 3 May 2008 10:02 am
Method File: 4008SIMA.M
Sample Name: EK080415-03
Misc Info: TS17 (3-4)
Operator: JAR



META Environmental, Inc.

GC/MS EXTRACTED ION CHROMATOGRAM

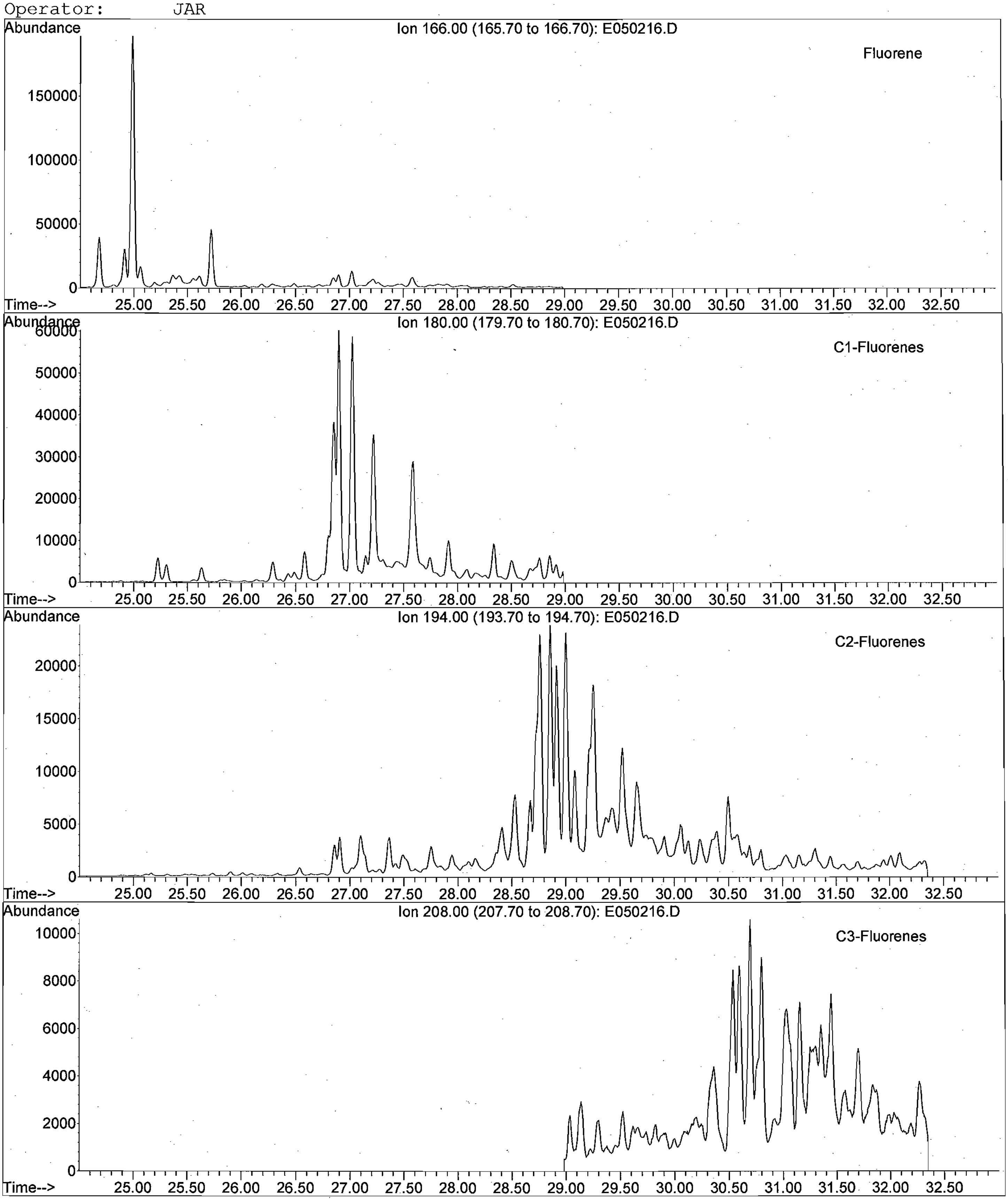
File: J:\1\DATA\E080502\E050216.D
Date Acquired: 3 May 2008 10:02 am
Method File: 4008SIMA.M
Sample Name: EK080415-03
Misc Info: TS17 (3-4)
Operator: JAR



META Environmental, Inc.

GC/MS EXTRACTED ION CHROMATOGRAM

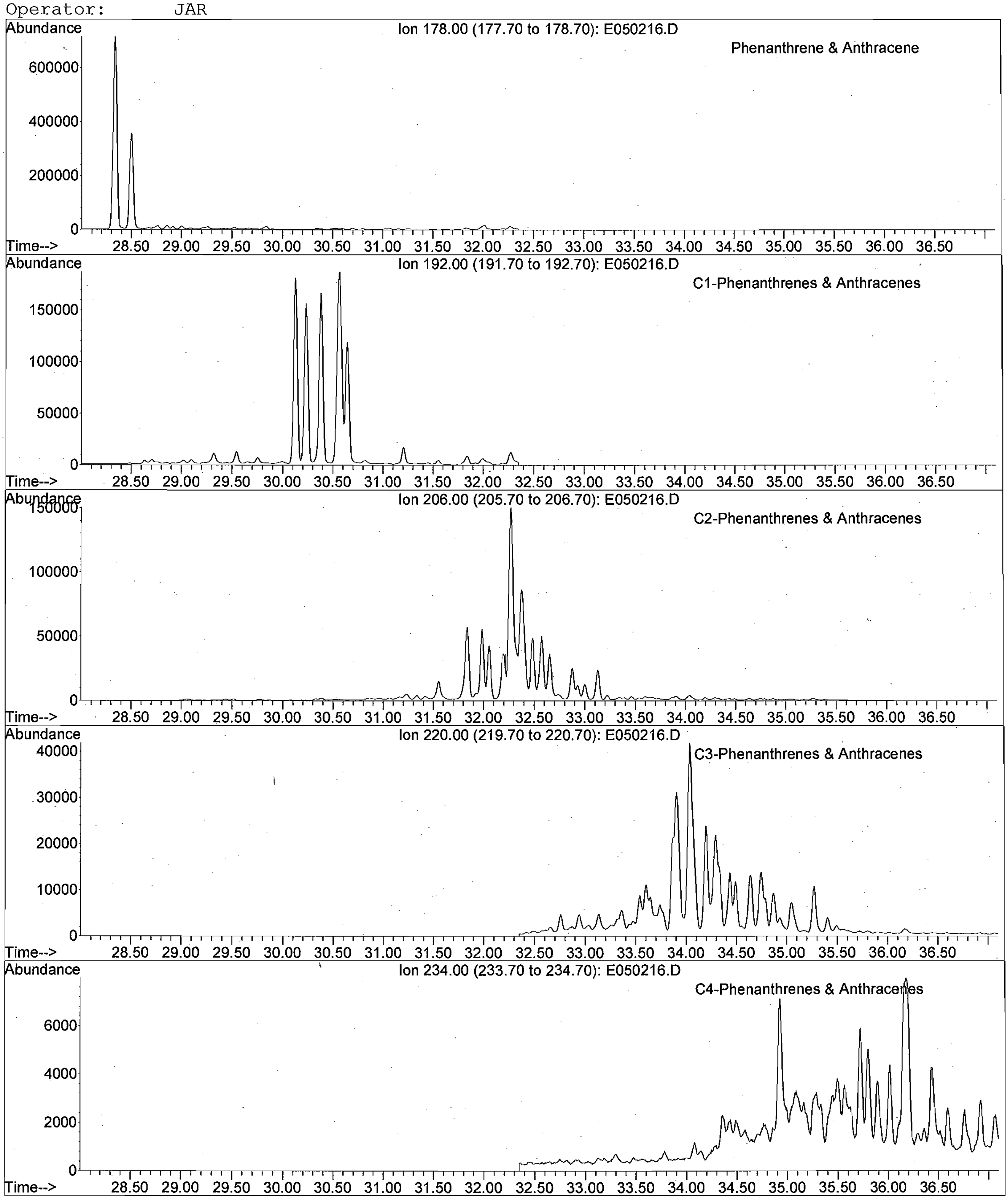
File: J:\1\DATA\E080502\E050216.D
Date Acquired: 3 May 2008 10:02 am
Method File: 4008SIMA.M
Sample Name: EK080415-03
Misc Info: TS17 (3-4)
Operator: JAR



META Environmental, Inc.

GC/MS EXTRACTED ION CHROMATOGRAM

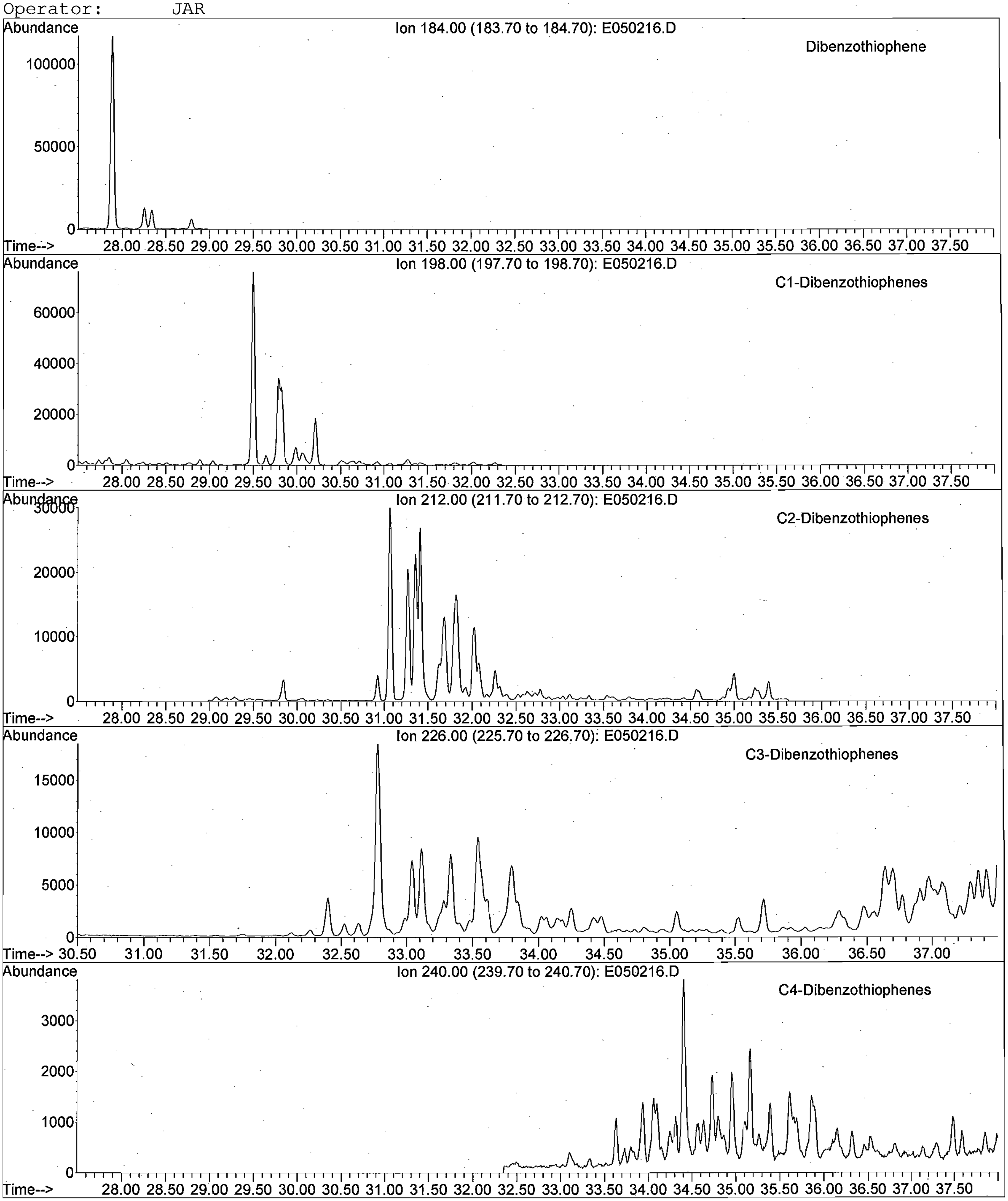
File: J:\1\DATA\E080502\E050216.D
Date Acquired: 3 May 2008 10:02 am
Method File: 4008SIMA.M
Sample Name: EK080415-03
Misc Info: TS17 (3-4)
Operator: JAR



META Environmental, Inc.

GC/MS EXTRACTED ION CHROMATOGRAM

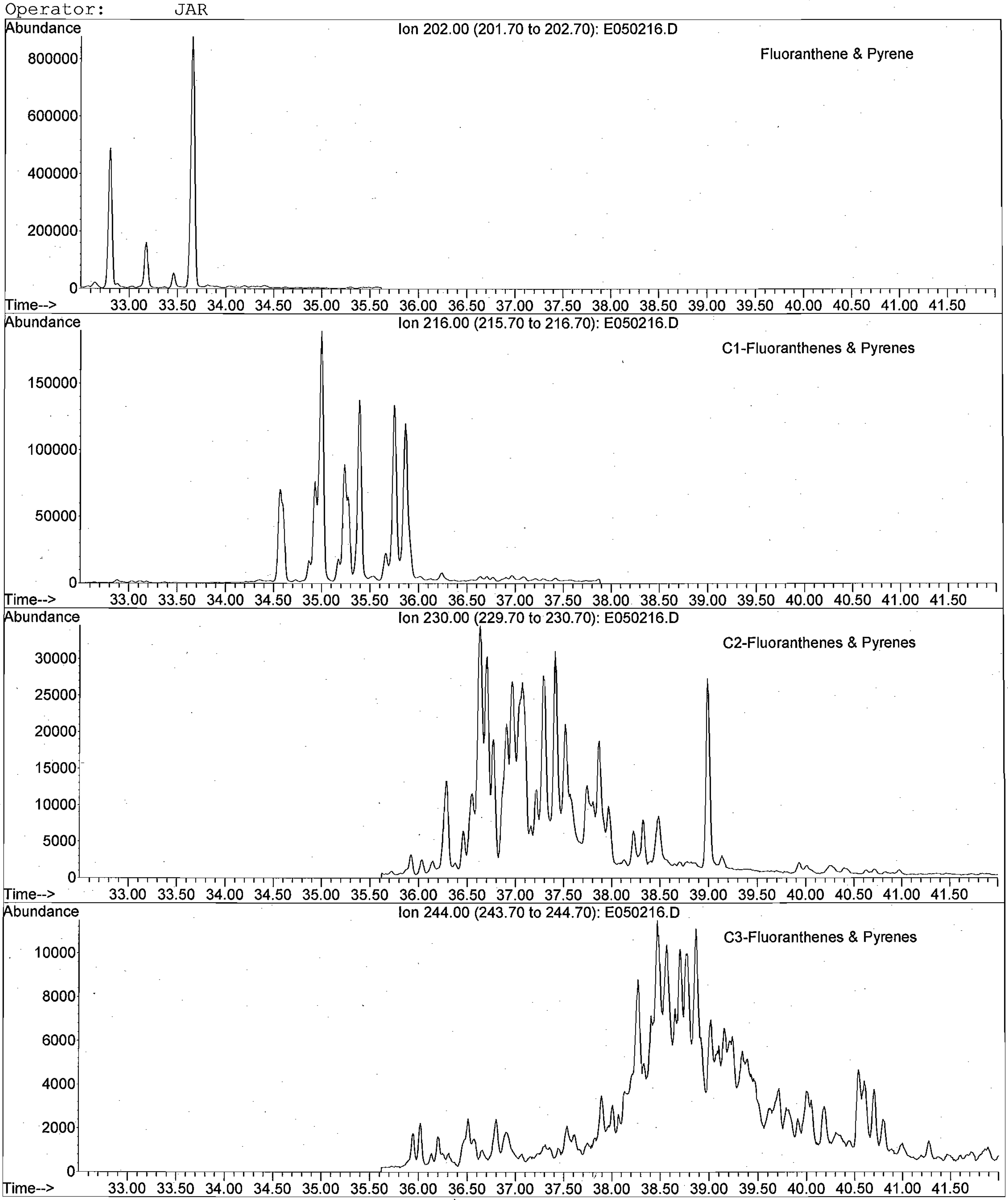
File: J:\1\DATA\E080502\E050216.D
Date Acquired: 3 May 2008 10:02 am
Method File: 4008SIMA.M
Sample Name: EK080415-03
Misc Info: TS17 (3-4)
Operator: JAR



META Environmental, Inc.

GC/MS EXTRACTED ION CHROMATOGRAM

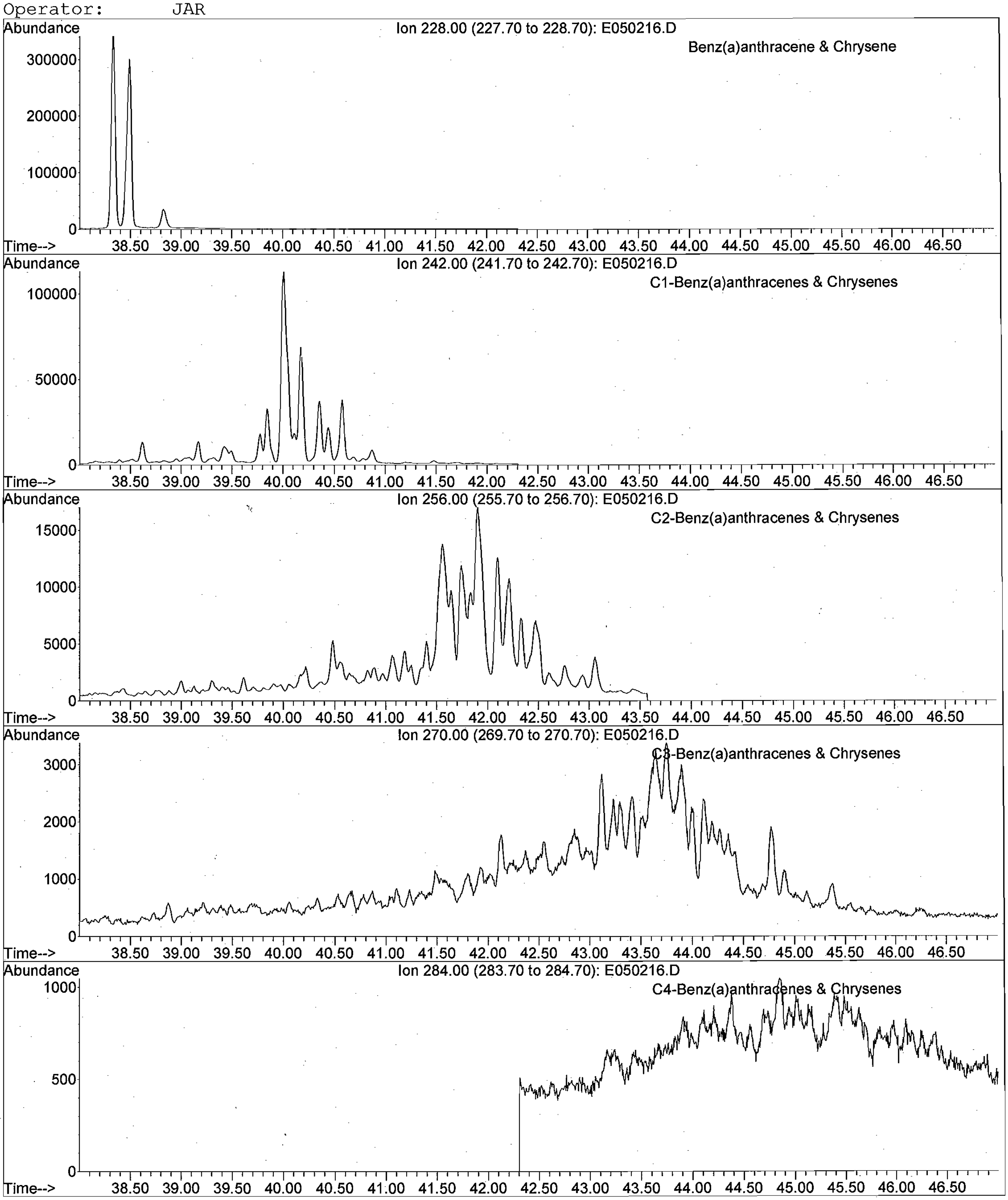
File: J:\1\DATA\E080502\E050216.D
Date Acquired: 3 May 2008 10:02 am
Method File: 4008SIMA.M
Sample Name: EK080415-03
Misc Info: TS17 (3-4)
Operator: JAR



META Environmental, Inc.

GC/MS EXTRACTED ION CHROMATOGRAM

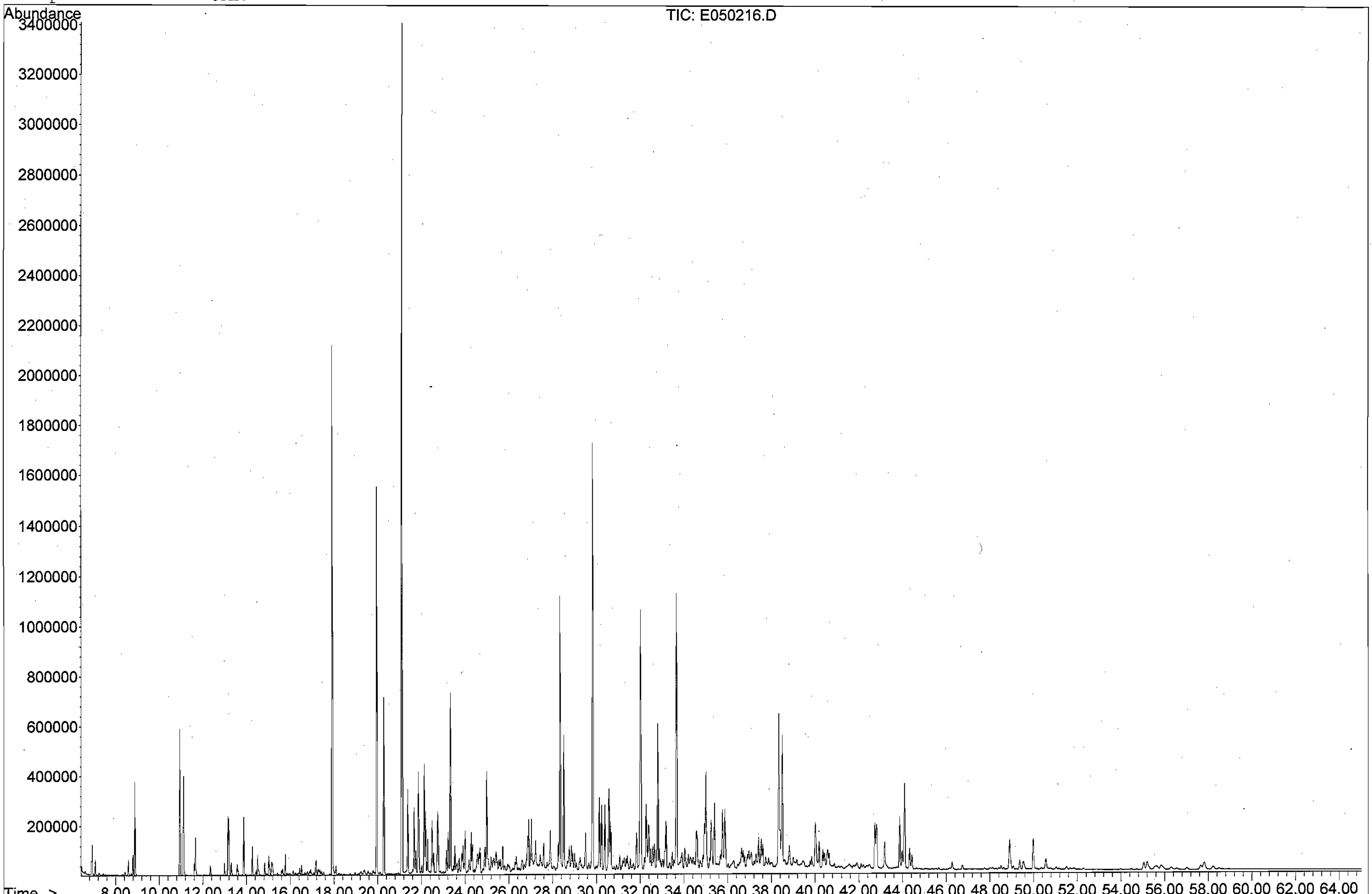
File: J:\1\DATA\E080502\E050216.D
Date Acquired: 3 May 2008 10:02 am
Method File: 4008SIMA.M
Sample Name: EK080415-03
Misc Info: TS17 (3-4)
Operator: JAR



META Environmental, Inc.

GC/MS TOTAL ION CHROMATOGRAM

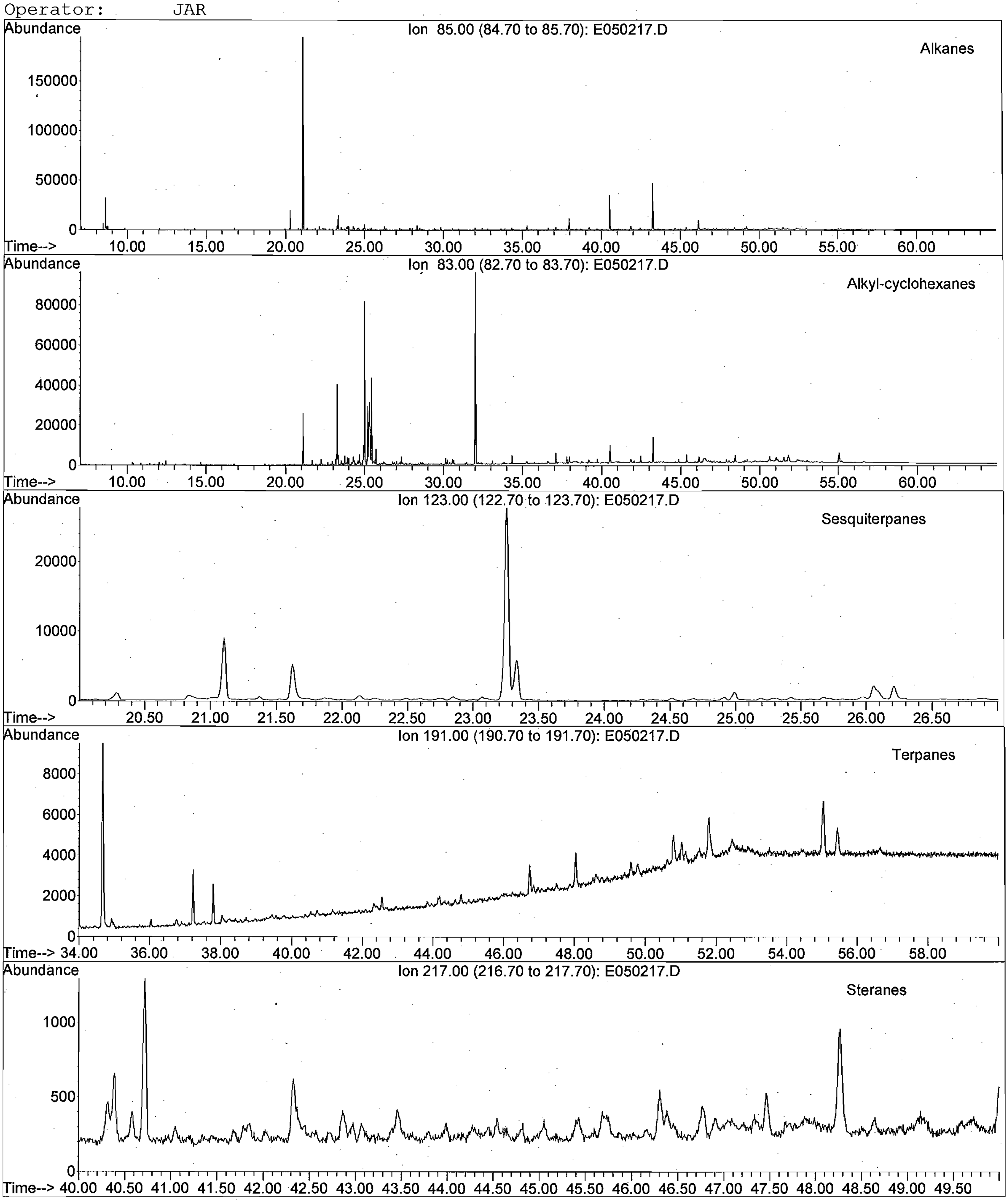
File: J:\1\DATA\E080502\E050216.D
Date Acquired: 3 May 2008 10:02 am
Method File: 4008SIMA.M
Sample Name: EK080415-03
Misc Info: TS17 (3-4)
Operator: JAR



META Environmental, Inc.

GC/MS EXTRACTED ION CHROMATOGRAM

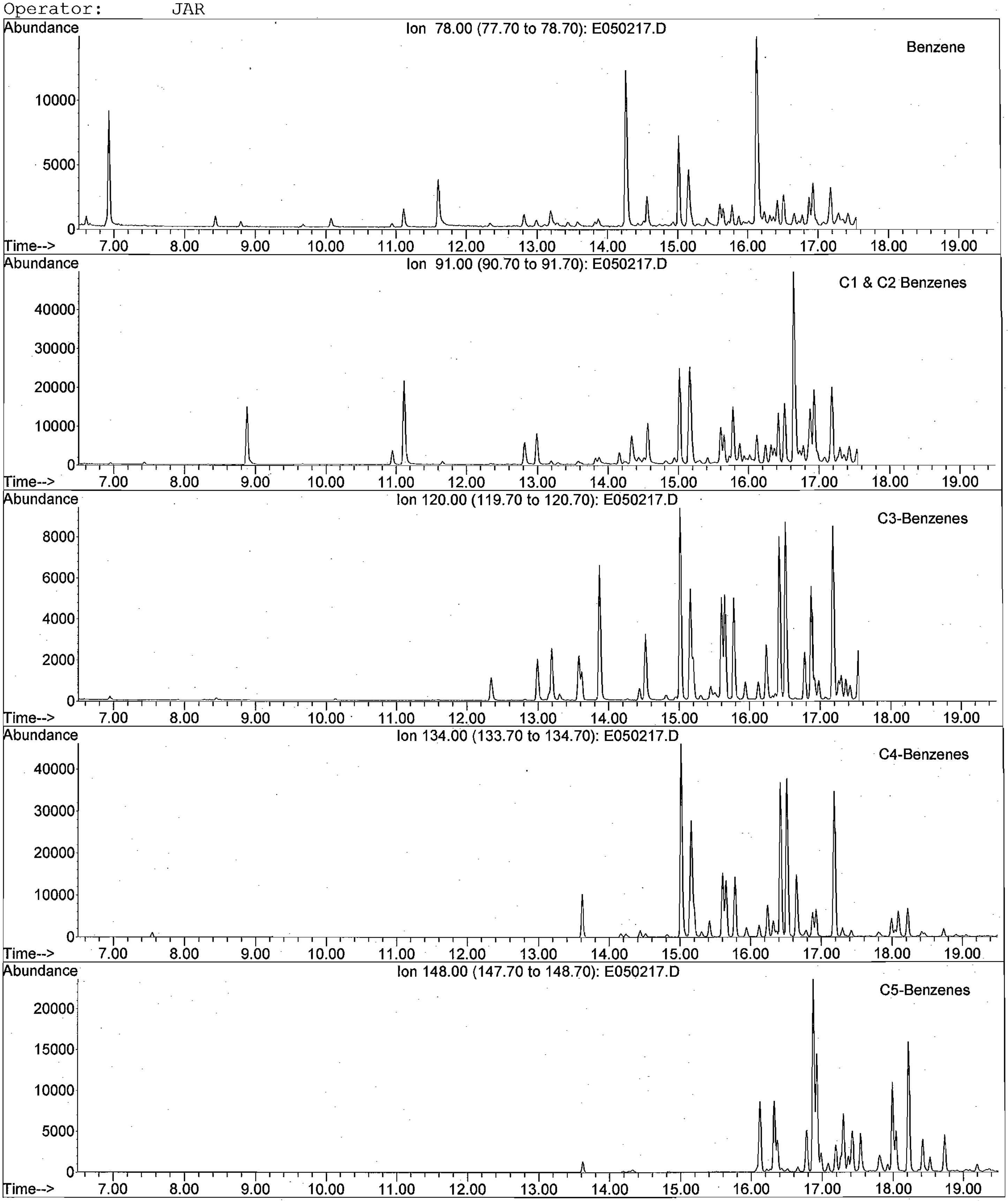
File: J:\1\DATA\E080502\E050217.D
Date Acquired: 3 May 2008 11:18 am
Method File: 4008SIMA.M
Sample Name: EK080415-04
Misc Info: TS30 (1-2)
Operator: JAR



META Environmental, Inc.

GC/MS EXTRACTED ION CHROMATOGRAM

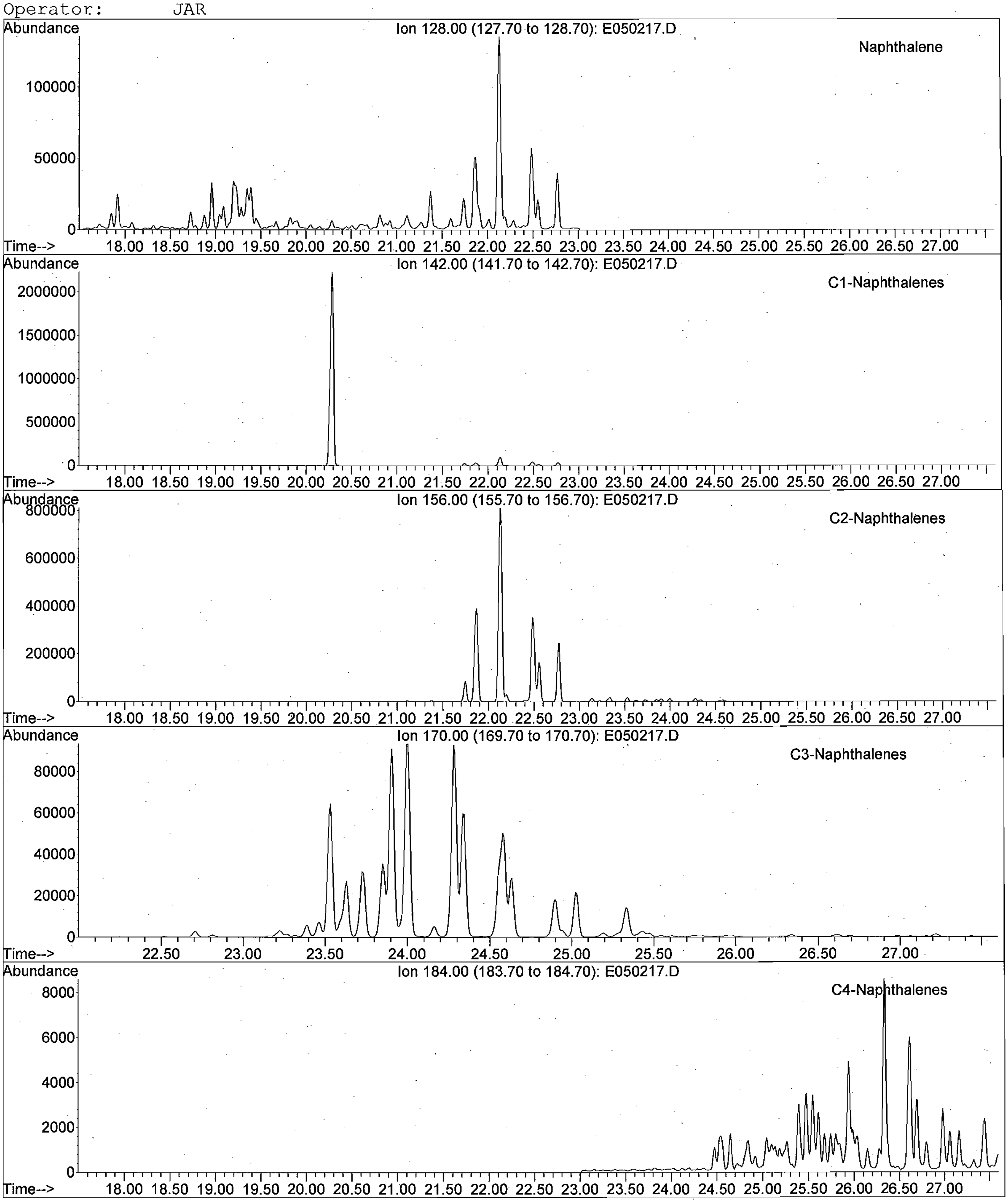
File: J:\1\DATA\E080502\E050217.D
Date Acquired: 3 May 2008 11:18 am
Method File: 4008SIMA.M
Sample Name: EK080415-04
Misc Info: TS30 (1-2)
Operator: JAR



META Environmental, Inc.

GC/MS EXTRACTED ION CHROMATOGRAM

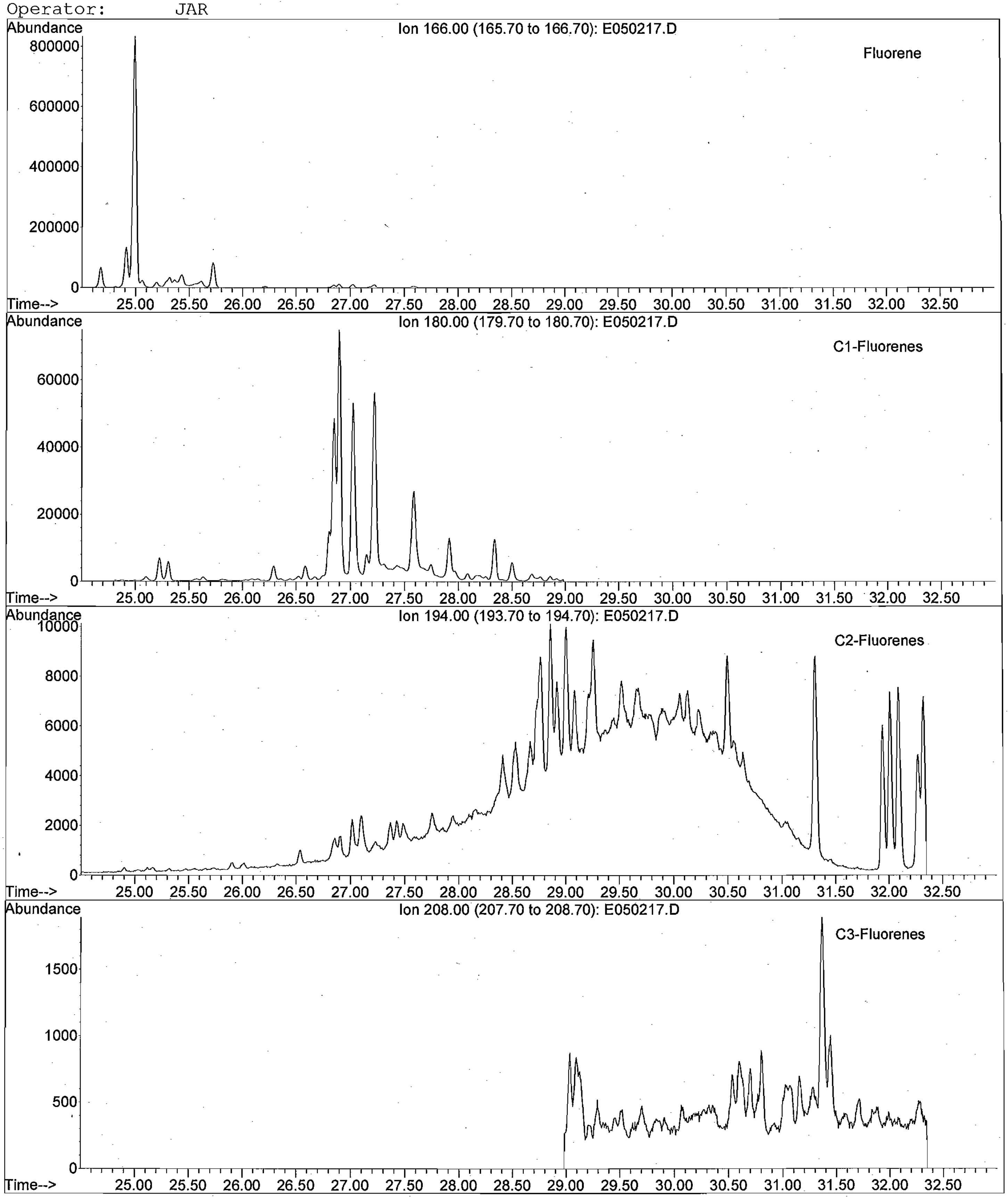
File: J:\1\DATA\E080502\E050217.D
Date Acquired: 3 May 2008 11:18 am
Method File: 4008SIMA.M
Sample Name: EK080415-04
Misc Info: TS30 (1-2)
Operator: JAR



META Environmental, Inc.

GC/MS EXTRACTED ION CHROMATOGRAM

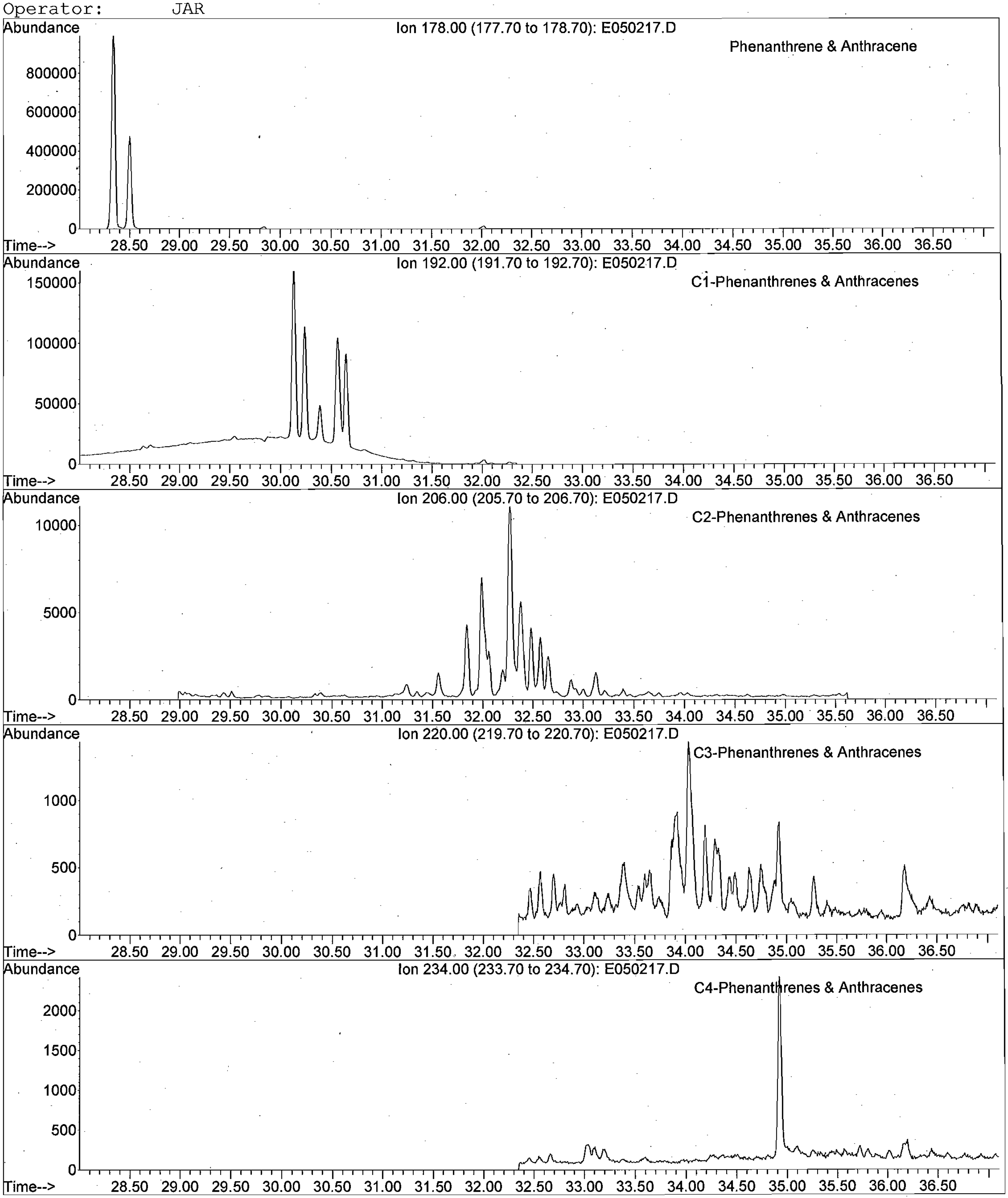
File: J:\1\DATA\E080502\E050217.D
Date Acquired: 3 May 2008 11:18 am
Method File: 4008SIMA.M
Sample Name: EK080415-04
Misc Info: TS30 (1-2)
Operator: JAR



META Environmental, Inc.

GC/MS EXTRACTED ION CHROMATOGRAM

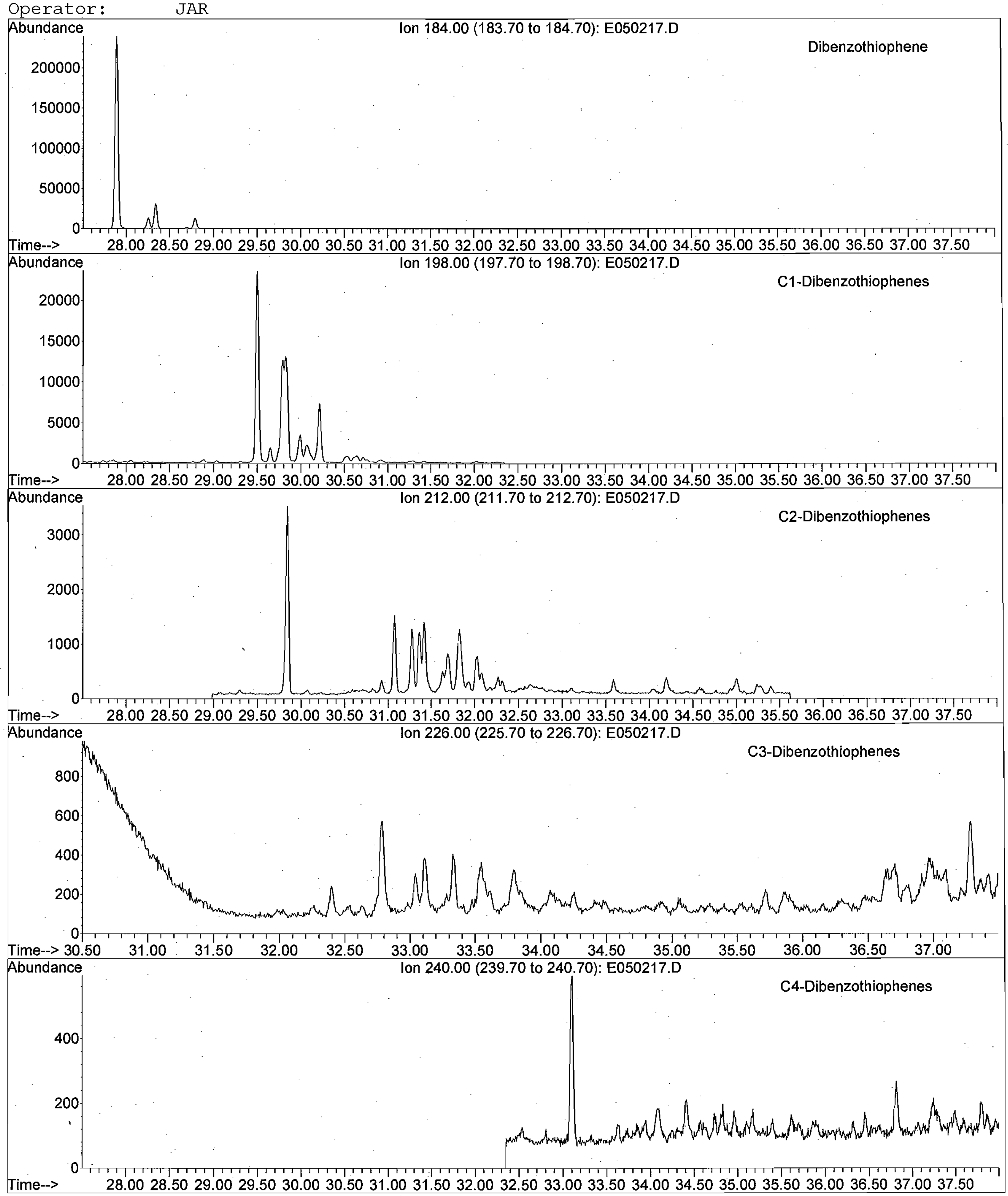
File: J:\1\DATA\E080502\E050217.D
Date Acquired: 3 May 2008 11:18 am
Method File: 4008SIMA.M
Sample Name: EK080415-04
Misc Info: TS30 (1-2)
Operator: JAR



META Environmental, Inc.

GC/MS EXTRACTED ION CHROMATOGRAM

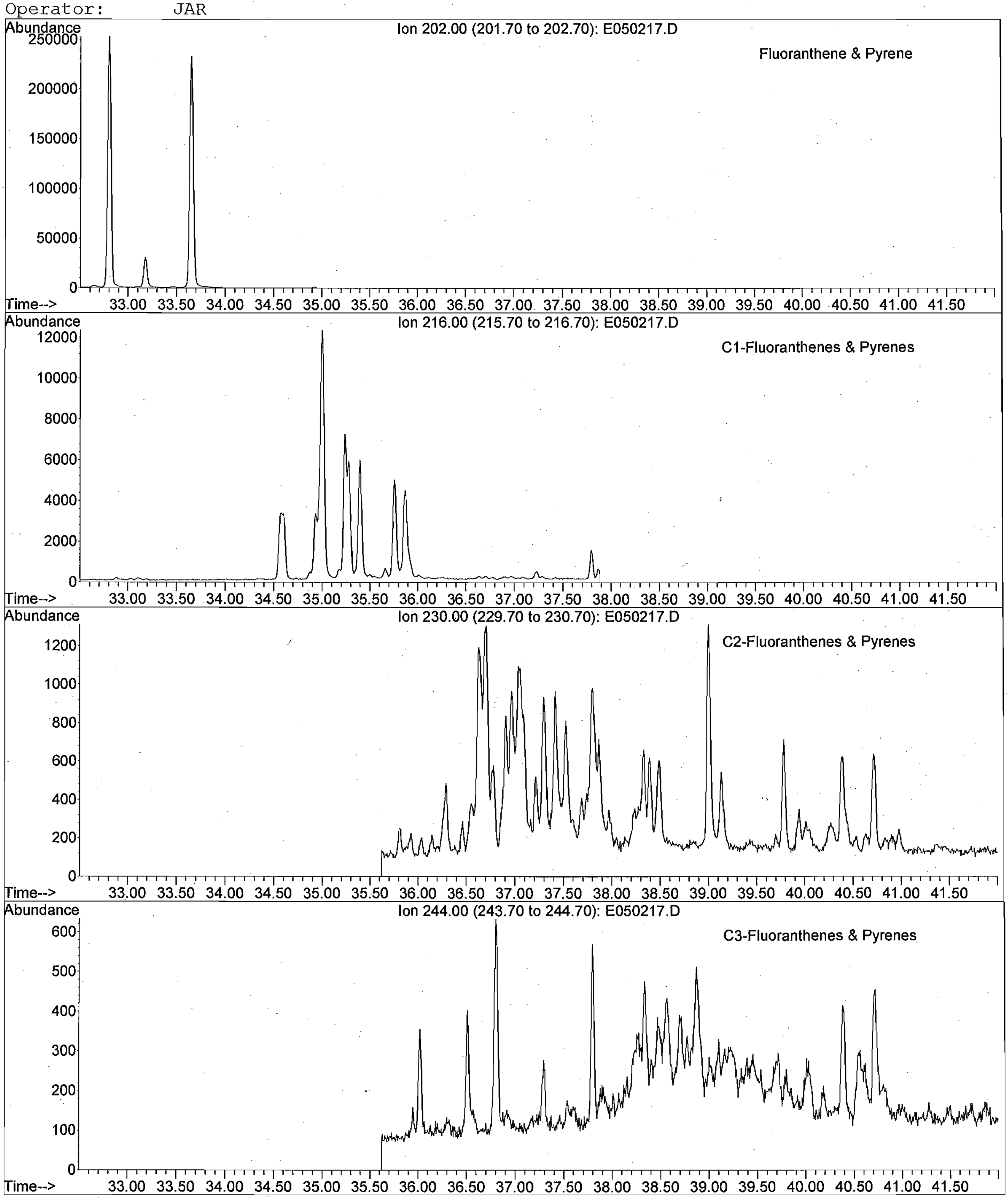
File: J:\1\DATA\E080502\E050217.D
Date Acquired: 3 May 2008 11:18 am
Method File: 4008SIMA.M
Sample Name: EK080415-04
Misc Info: TS30 (1-2)
Operator: JAR



META Environmental, Inc.

GC/MS EXTRACTED ION CHROMATOGRAM

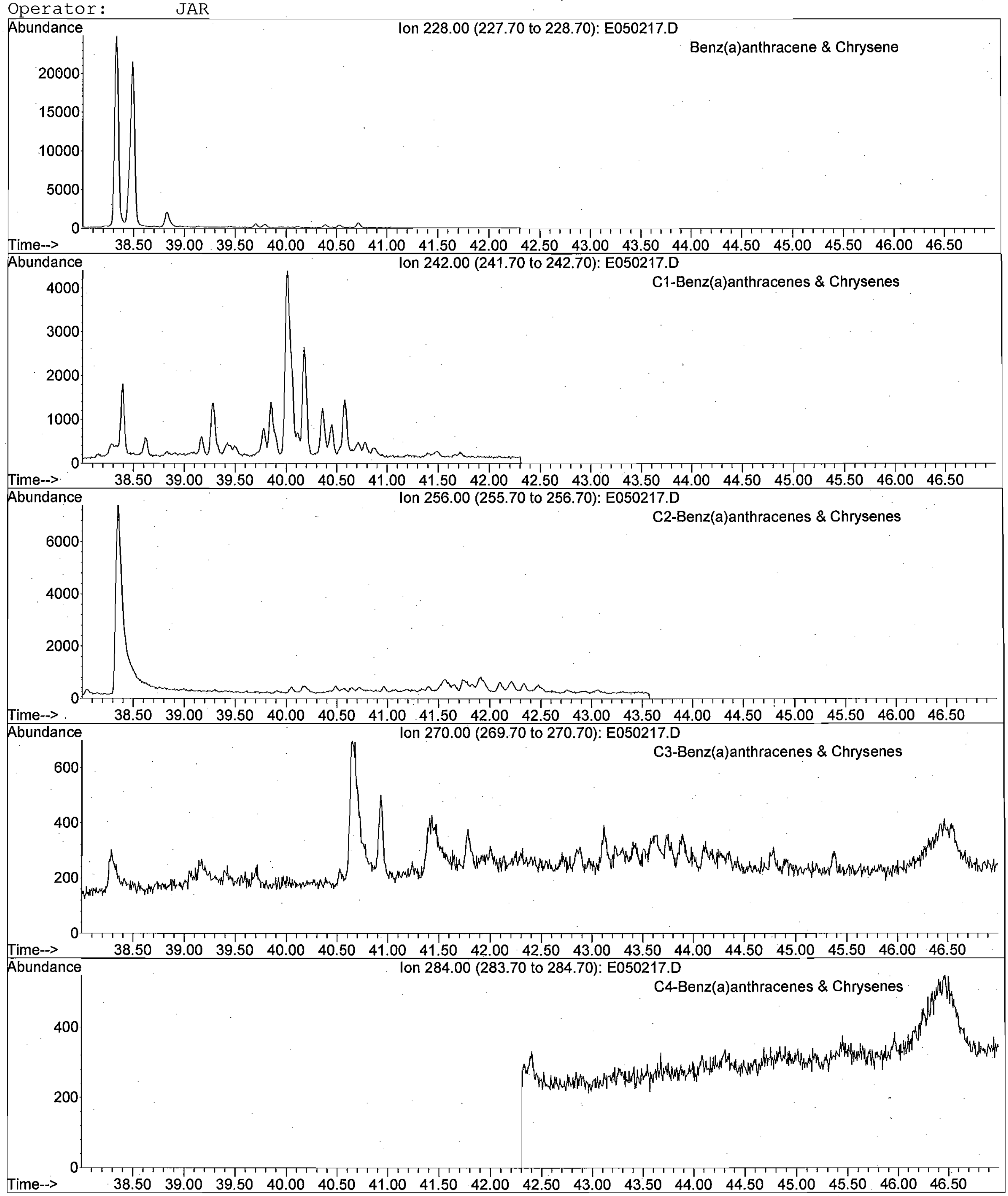
File: J:\1\DATA\E080502\E050217.D
Date Acquired: 3 May 2008 11:18 am
Method File: 4008SIMA.M
Sample Name: EK080415-04
Misc Info: TS30 (1-2)
Operator: JAR



META Environmental, Inc.

GC/MS EXTRACTED ION CHROMATOGRAM

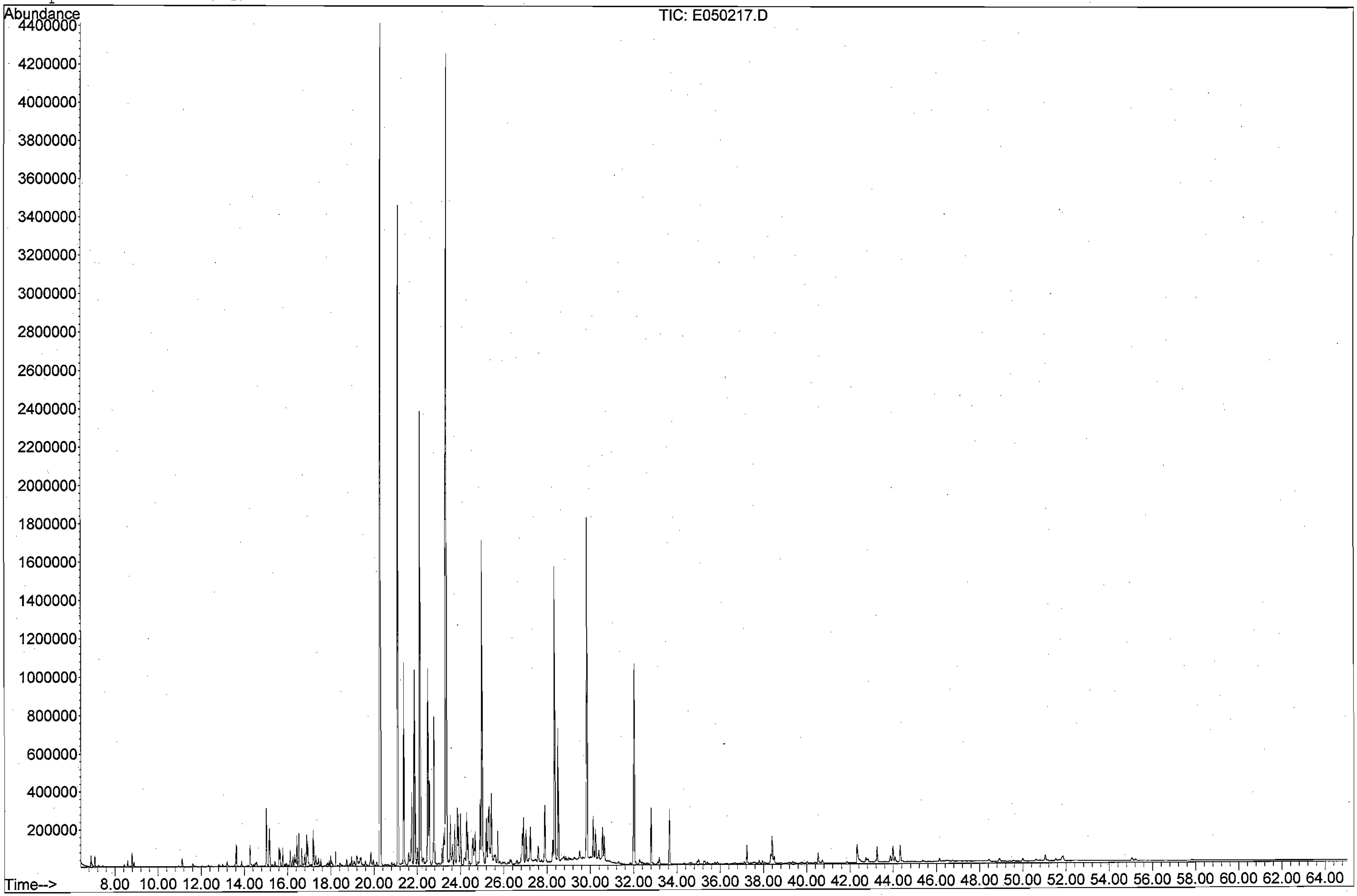
File: J:\1\DATA\E080502\E050217.D
Date Acquired: 3 May 2008 11:18 am
Method File: 4008SIMA.M
Sample Name: EK080415-04
Misc Info: TS30 (1-2)
Operator: JAR



META Environmental, Inc.

GC/MS TOTAL ION CHROMATOGRAM

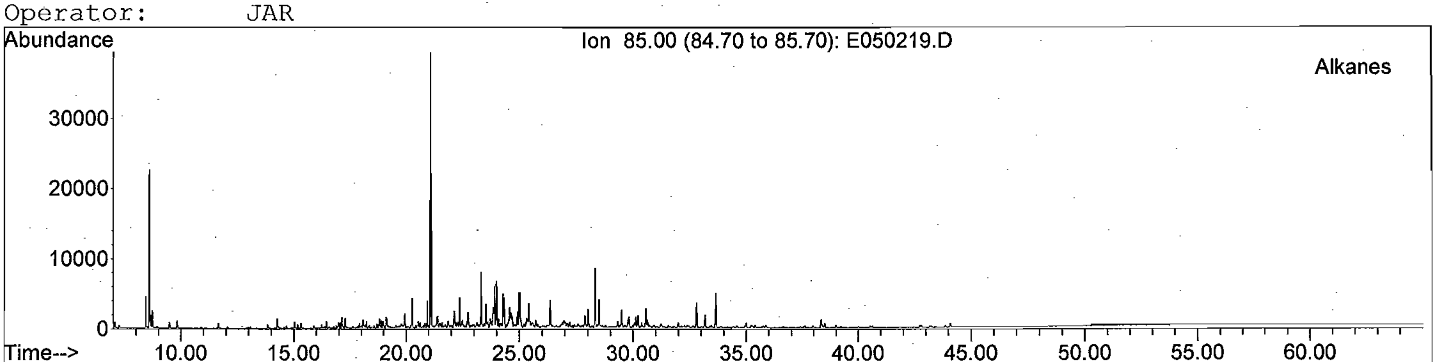
File: J:\1\DATA\E080502\E050217.D
Date Acquired: 3 May 2008 11:18 am
Method File: 4008SIMA.M
Sample Name: EK080415-04
Misc Info: TS30 (1-2)
Operator: JAR

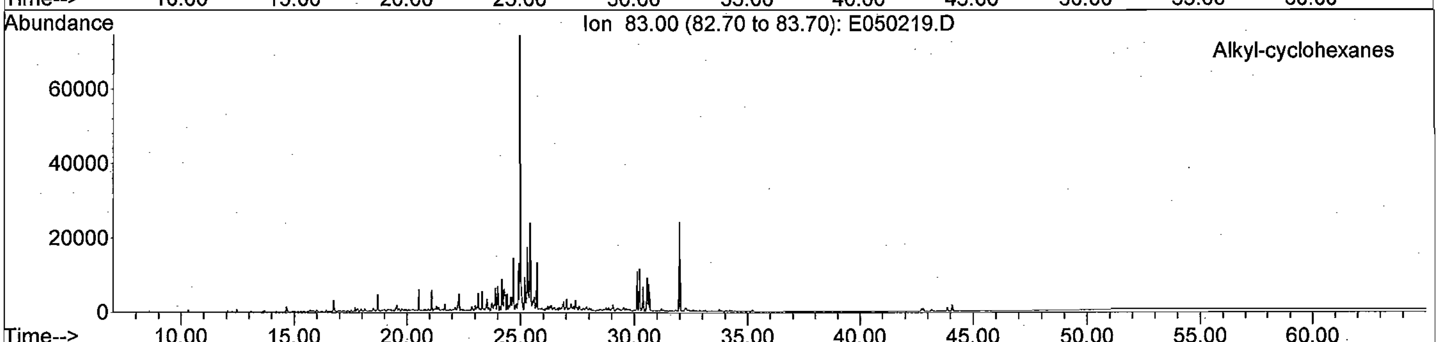


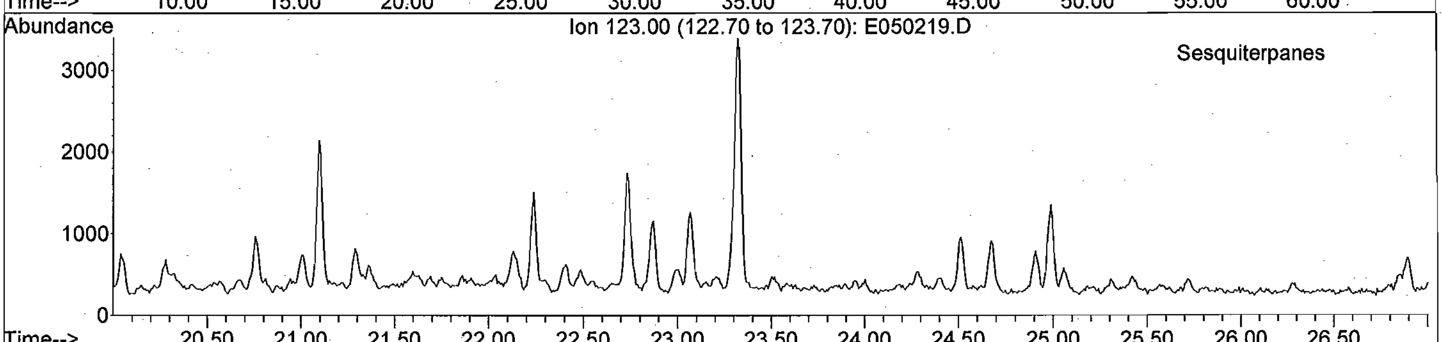
META Environmental, Inc.

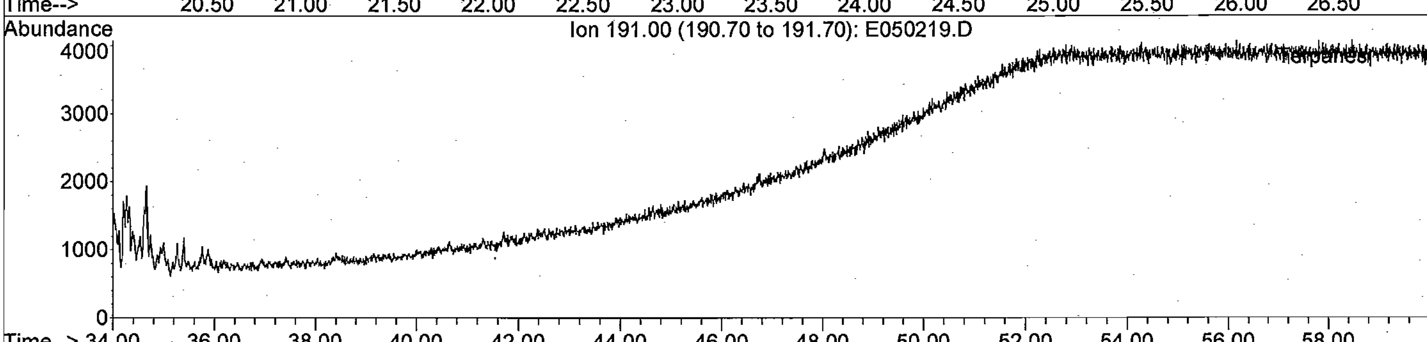
GC/MS EXTRACTED ION CHROMATOGRAM

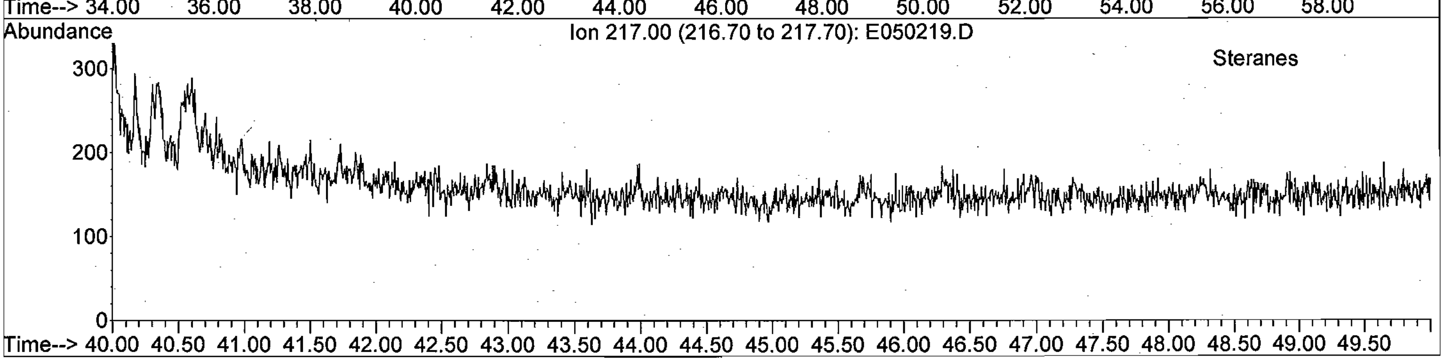
File: J:\1\DATA\E080502\E050219.D
Date Acquired: 3 May 2008 1:48 pm
Method File: 4008SIMA.M
Sample Name: EK080415-05-D
Misc Info: TS04 (1-1.8) - 5X
Operator: JAR







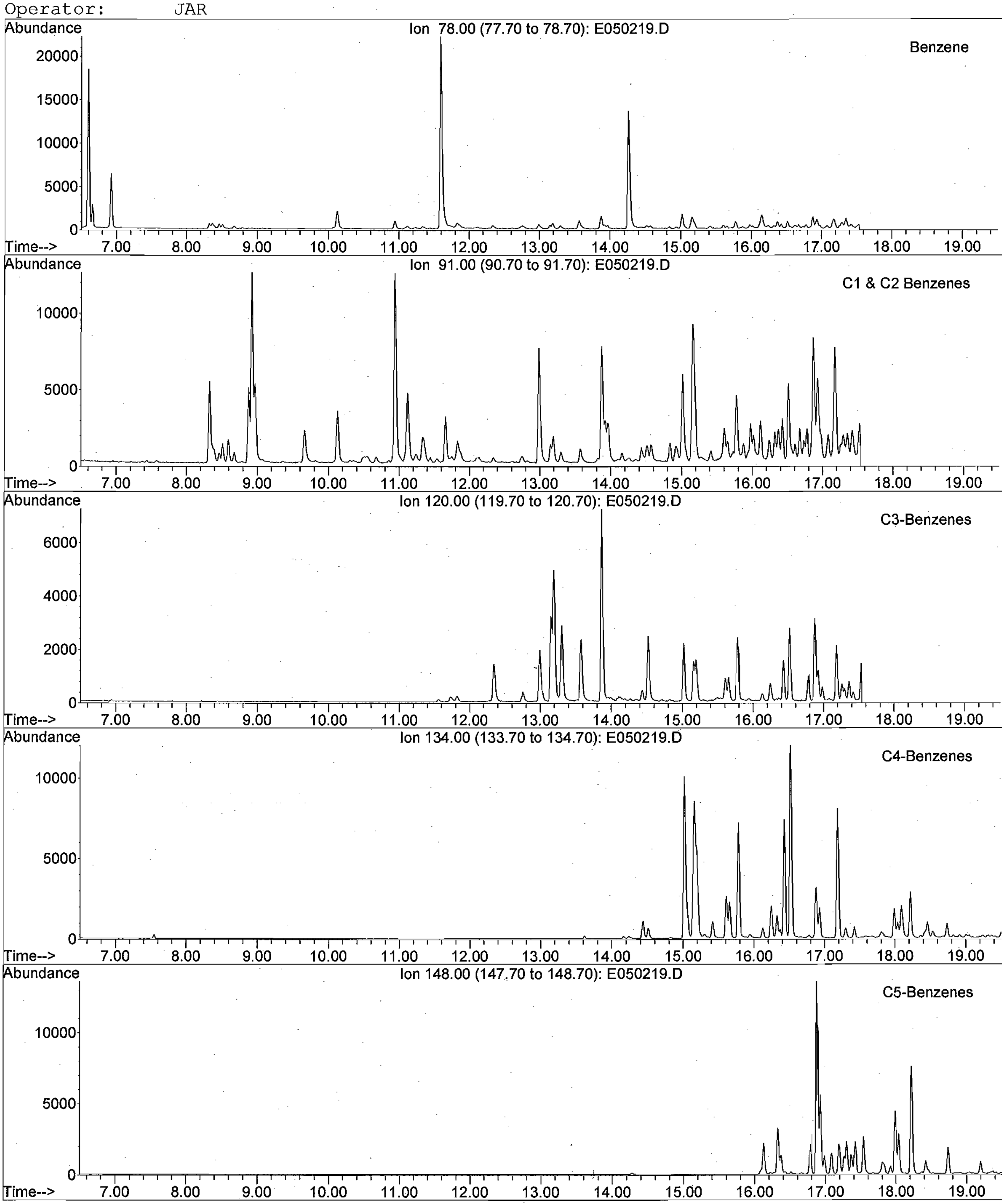




META Environmental, Inc.

GC/MS EXTRACTED ION CHROMATOGRAM

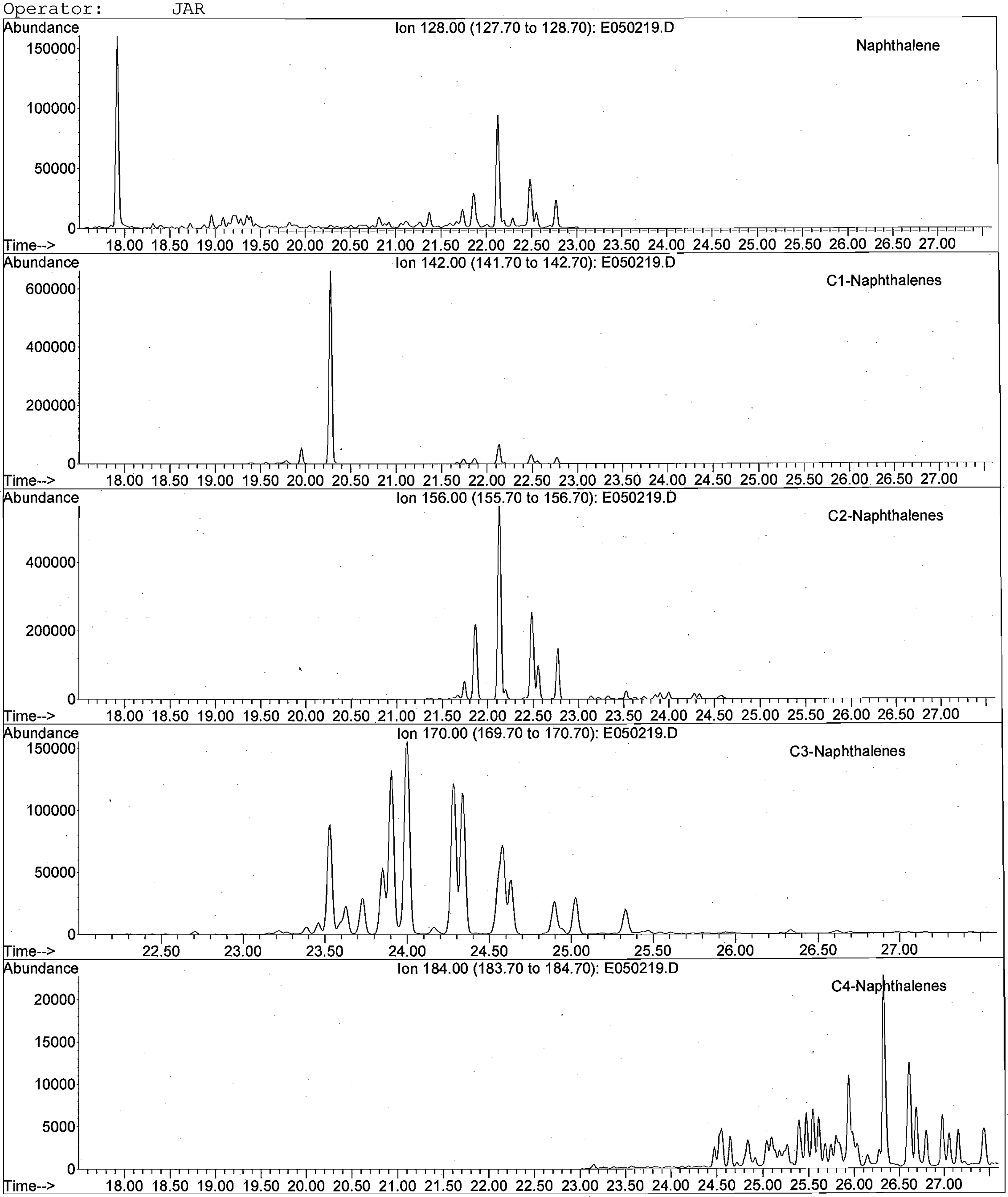
File: J:\1\DATA\E080502\E050219.D
Date Acquired: 3 May 2008 1:48 pm
Method File: 4008SIMA.M
Sample Name: EK080415-05-D
Misc Info: TS04 (1-1.8) - 5X
Operator: JAR



META Environmental, Inc.

GC/MS EXTRACTED ION CHROMATOGRAM

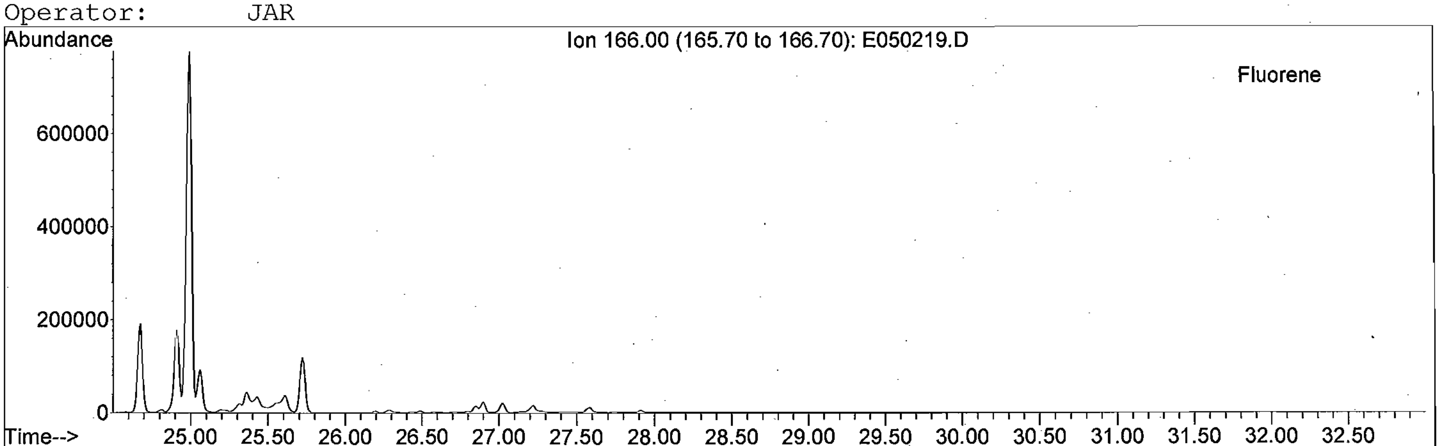
File: J:\1\DATA\E080502\E050219.D
Date Acquired: 3 May 2008 1:48 pm
Method File: 4008SIMA.M
Sample Name: EK080415-05-D
Misc Info: TS04 (1-1.8) - 5X
Operator: JAR

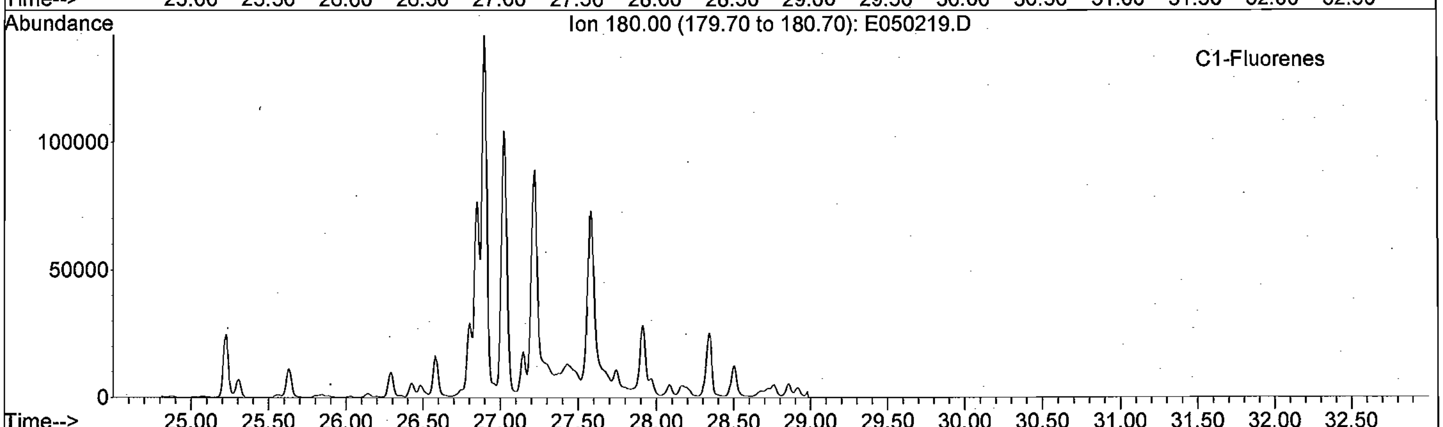


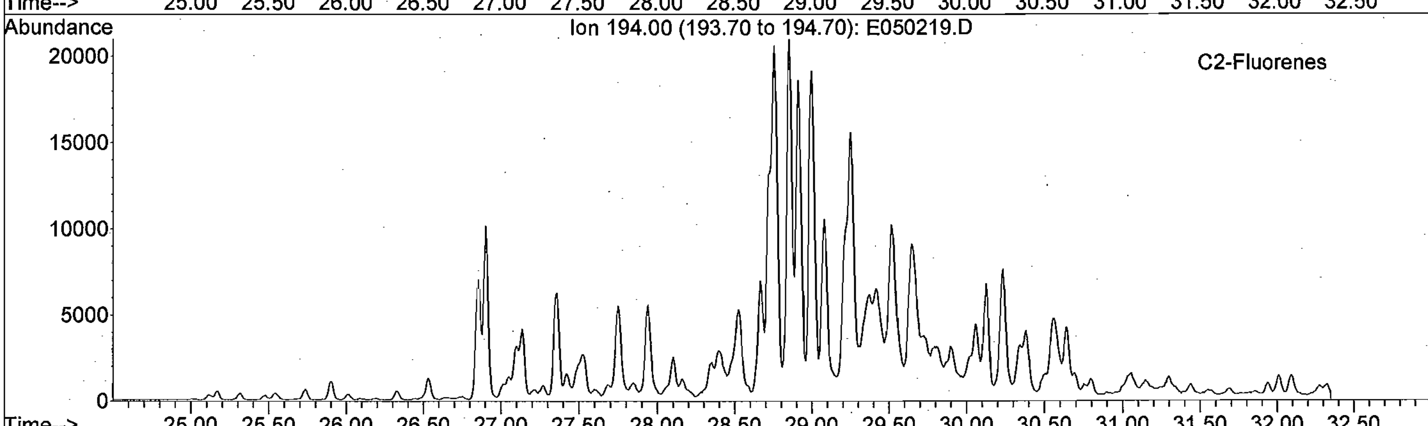
META Environmental, Inc.

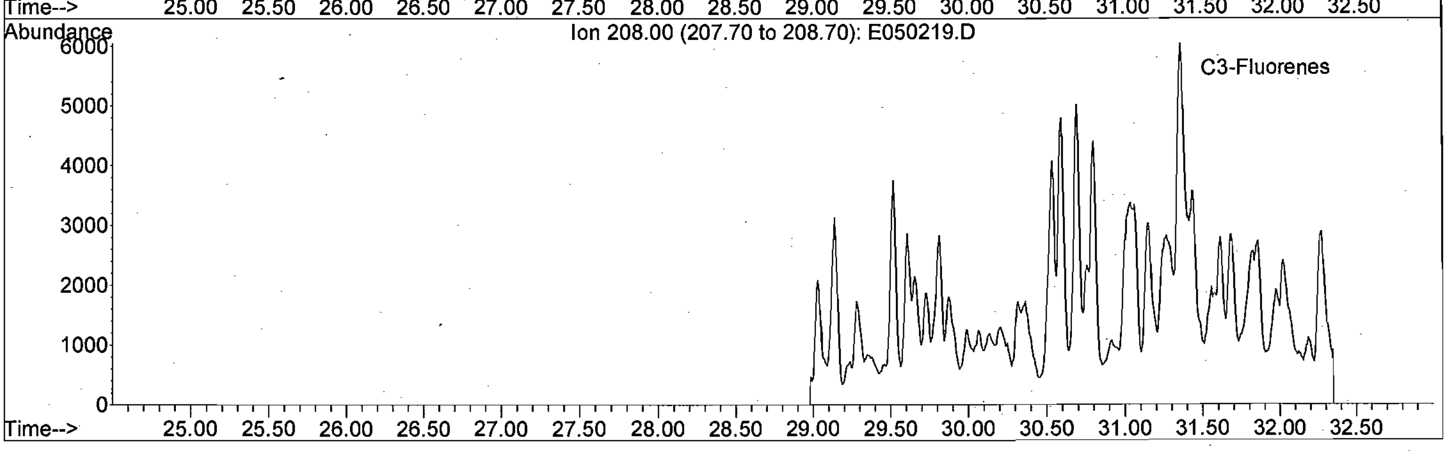
GC/MS EXTRACTED ION CHROMATOGRAM

File: J:\1\DATA\E080502\E050219.D
Date Acquired: 3 May 2008 1:48 pm
Method File: 4008SIMA.M
Sample Name: EK080415-05-D
Misc Info: TS04 (1-1.8) - 5X
Operator: JAR





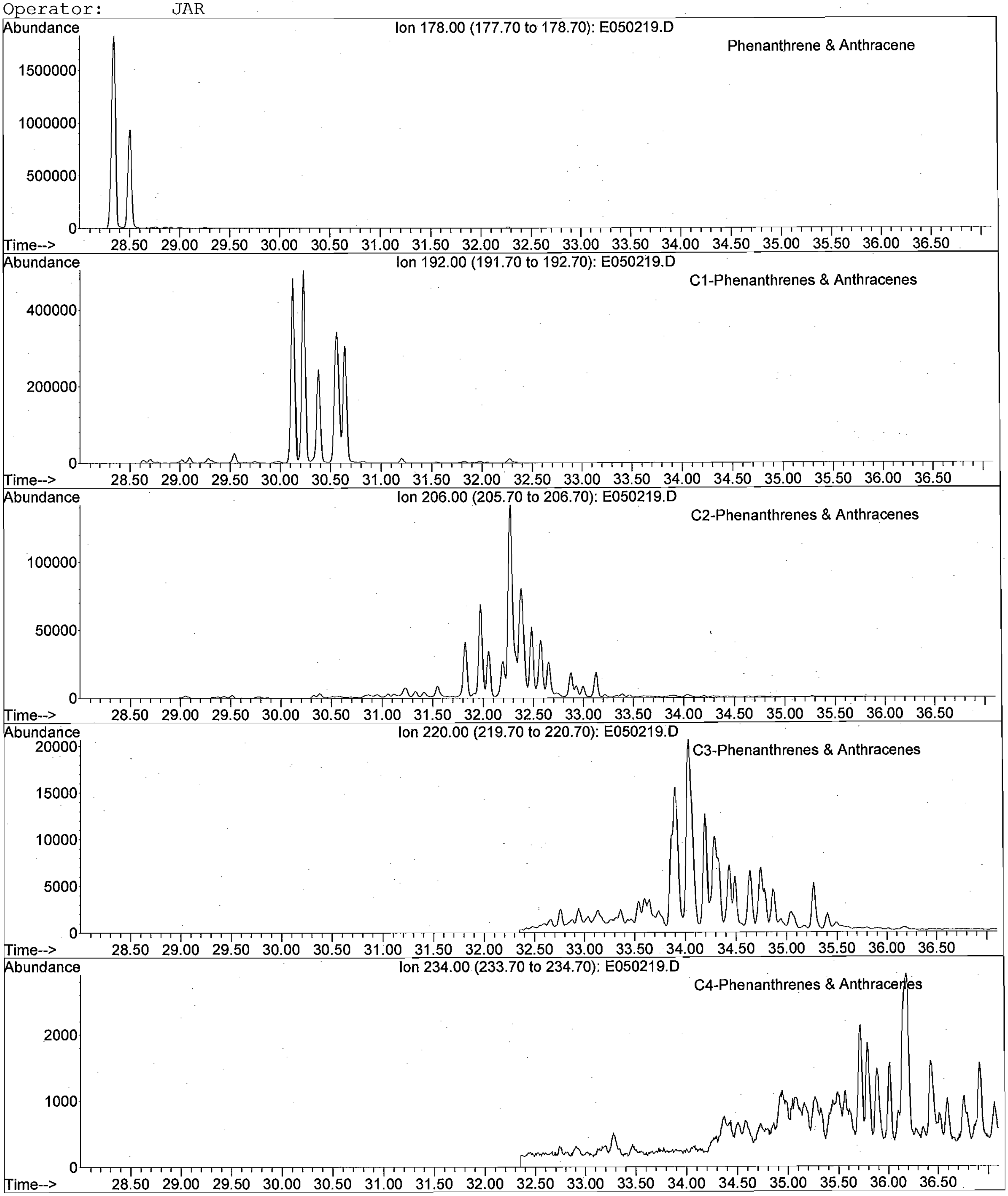




META Environmental, Inc.

GC/MS EXTRACTED ION CHROMATOGRAM

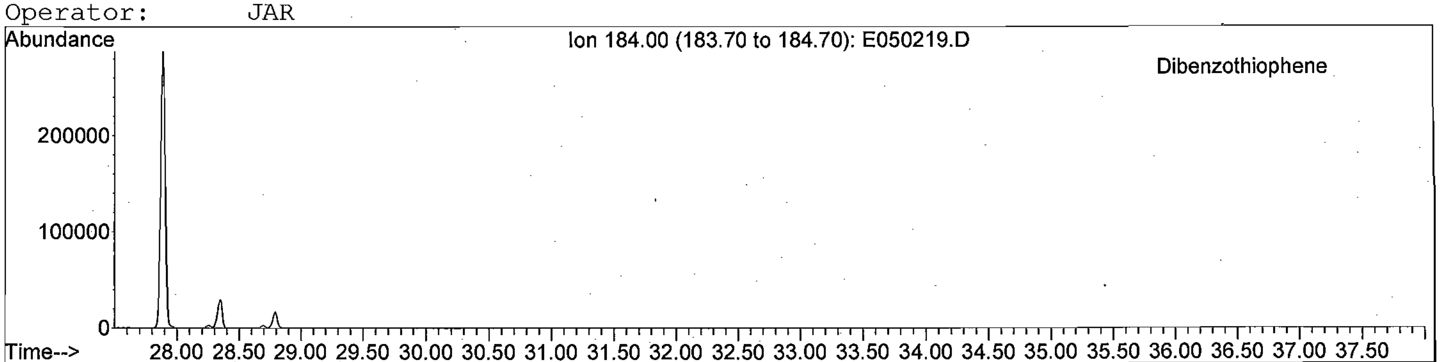
File: J:\1\DATA\E080502\E050219.D
Date Acquired: 3 May 2008 1:48 pm
Method File: 4008SIMA.M
Sample Name: EK080415-05-D
Misc Info: TS04 (1-1.8) - 5X
Operator: JAR

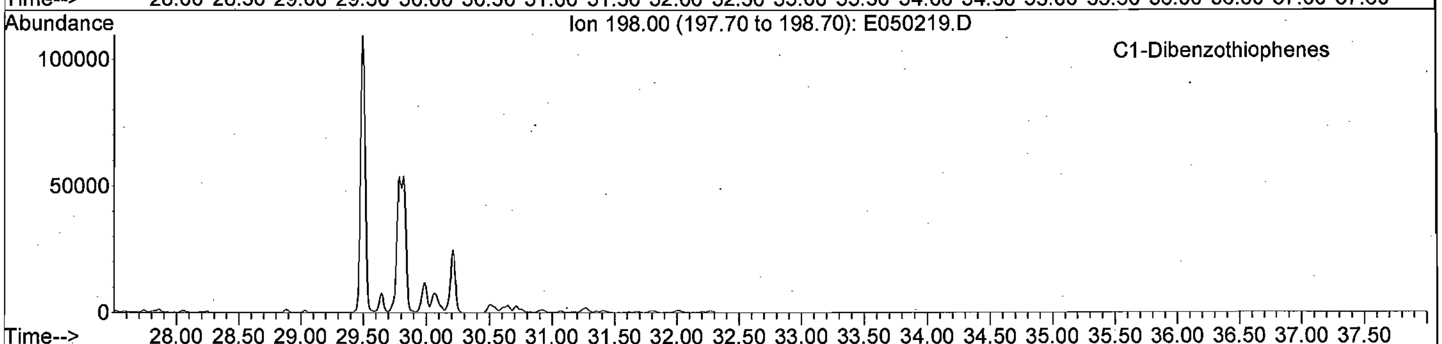


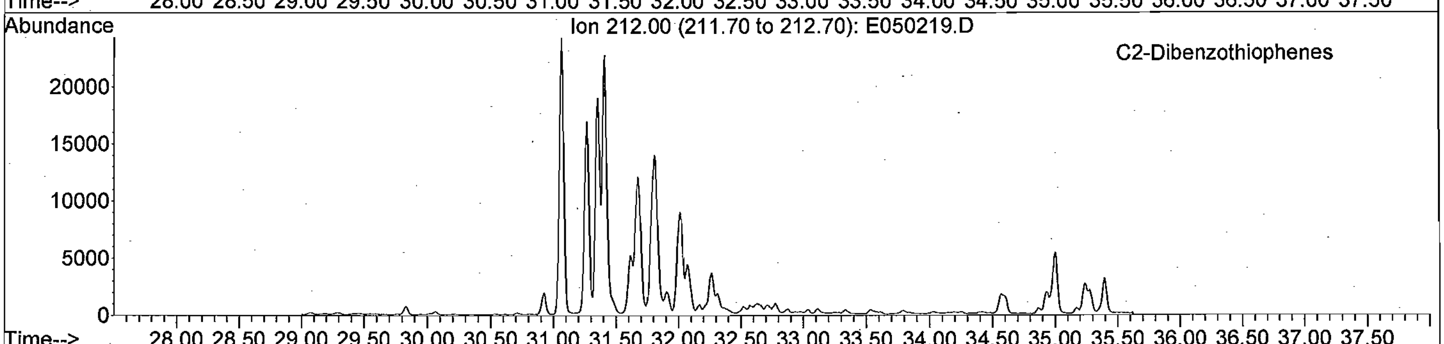
META Environmental, Inc.

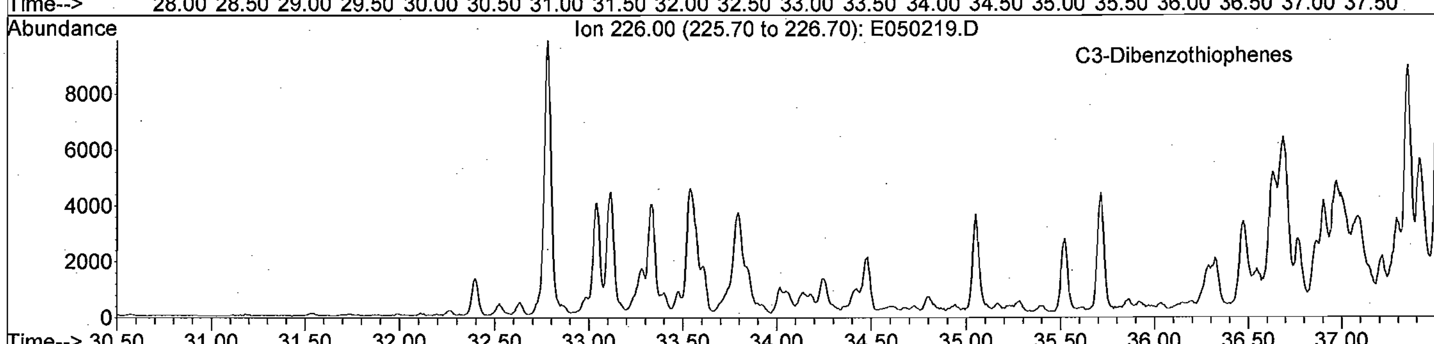
GC/MS EXTRACTED ION CHROMATOGRAM

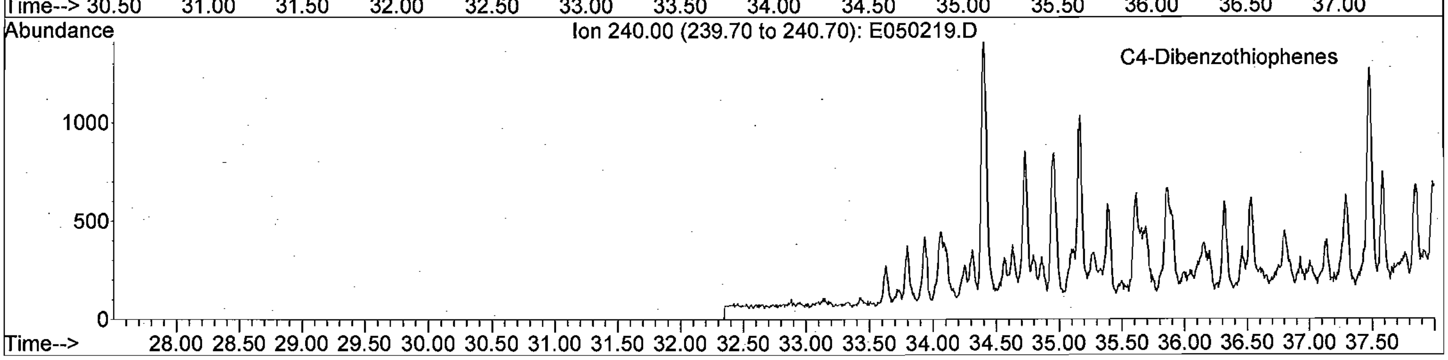
File: J:\1\DATA\E080502\E050219.D
Date Acquired: 3 May 2008 1:48 pm
Method File: 4008SIMA.M
Sample Name: EK080415-05-D
Misc Info: TS04 (1-1.8) - 5X
Operator: JAR







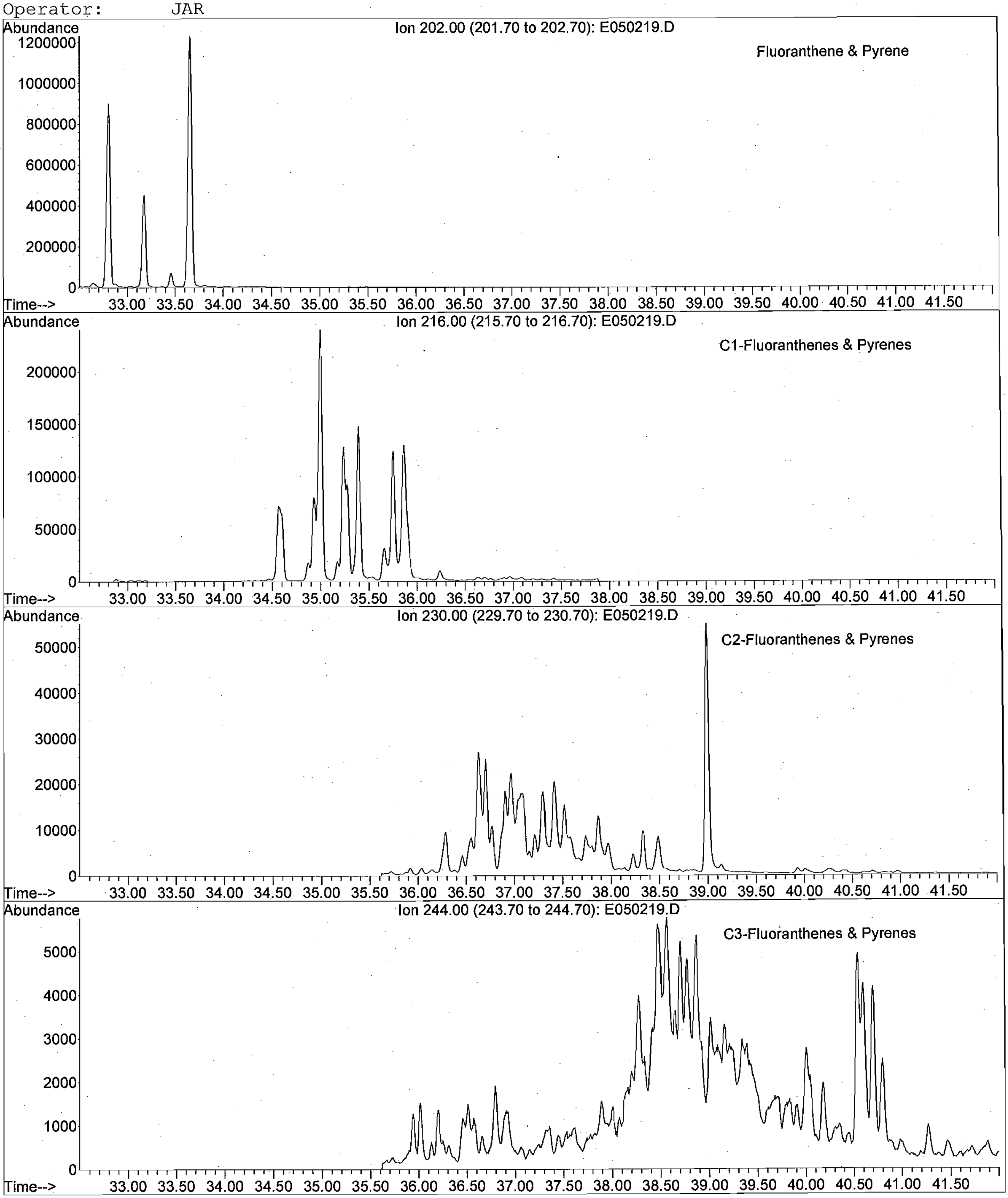




META Environmental, Inc.

GC/MS EXTRACTED ION CHROMATOGRAM

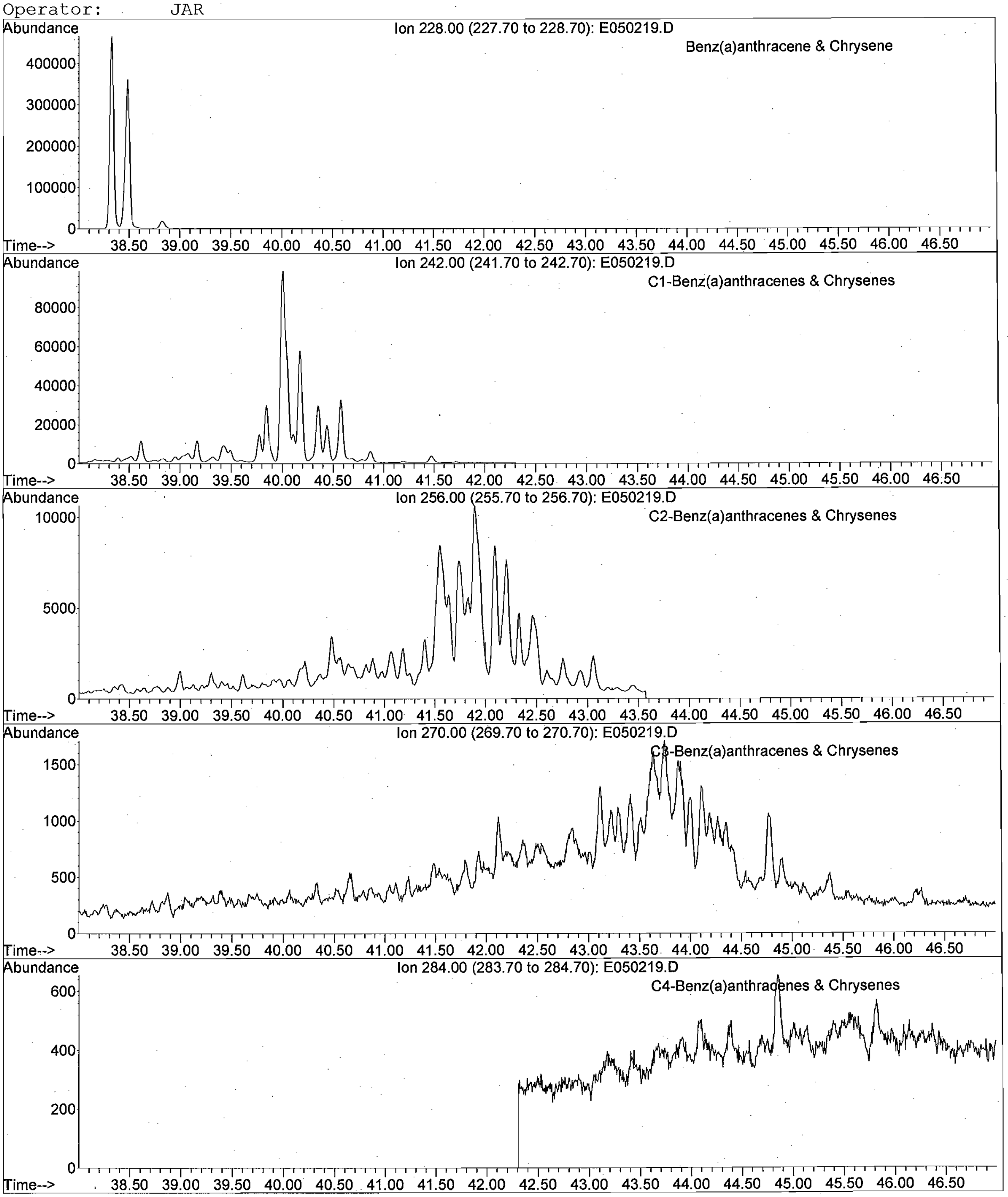
File: J:\1\DATA\E080502\E050219.D
Date Acquired: 3 May 2008 1:48 pm
Method File: 4008SIMA.M
Sample Name: EK080415-05-D
Misc Info: TS04 (1-1.8) - 5X
Operator: JAR



META Environmental, Inc.

GC/MS EXTRACTED ION CHROMATOGRAM

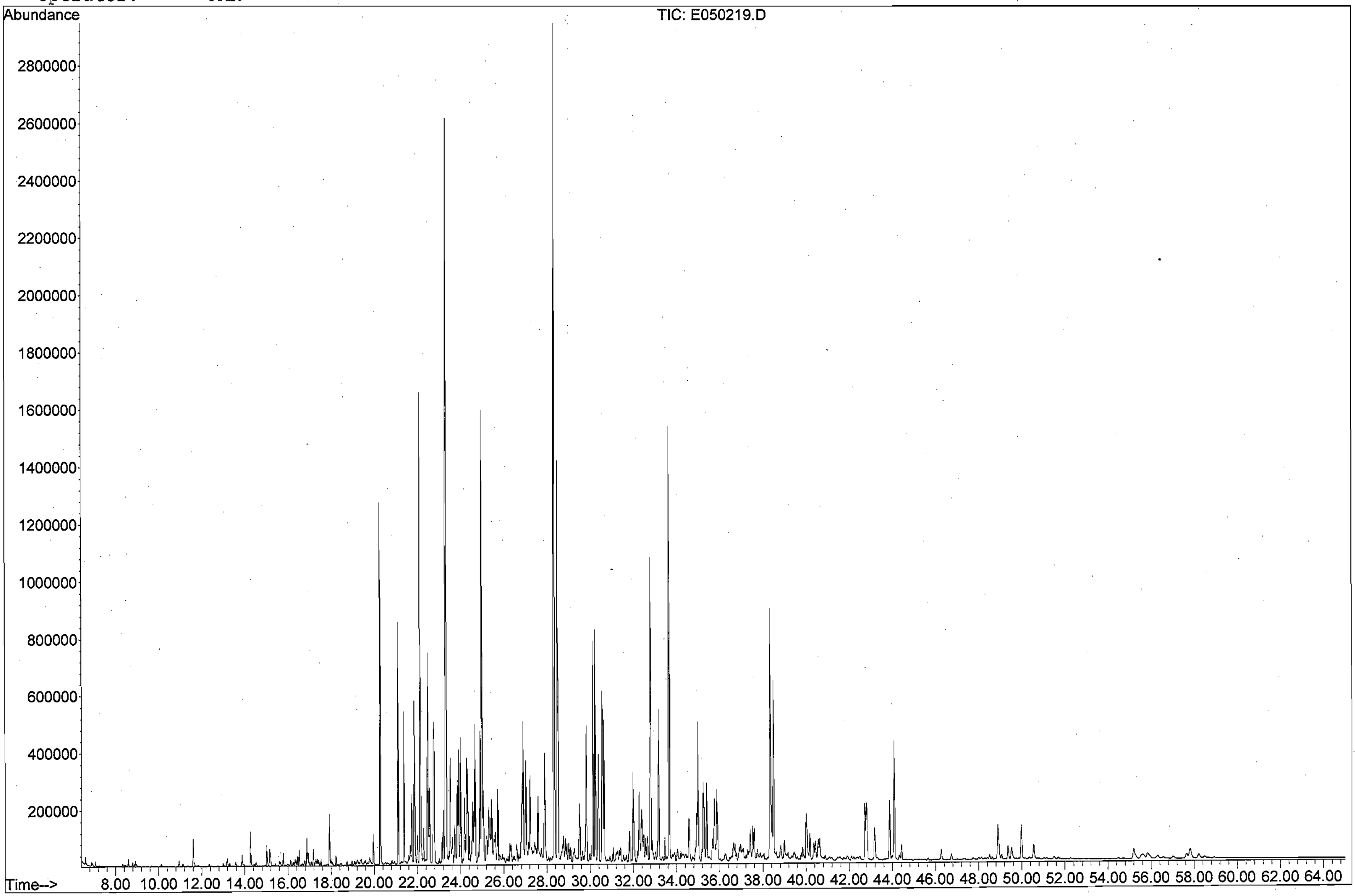
File: J:\1\DATA\E080502\E050219.D
Date Acquired: 3 May 2008 1:48 pm
Method File: 4008SIMA.M
Sample Name: EK080415-05-D
Misc Info: TS04 (1-1.8) - 5X
Operator: JAR



META Environmental, Inc.

GC/MS TOTAL ION CHROMATOGRAM

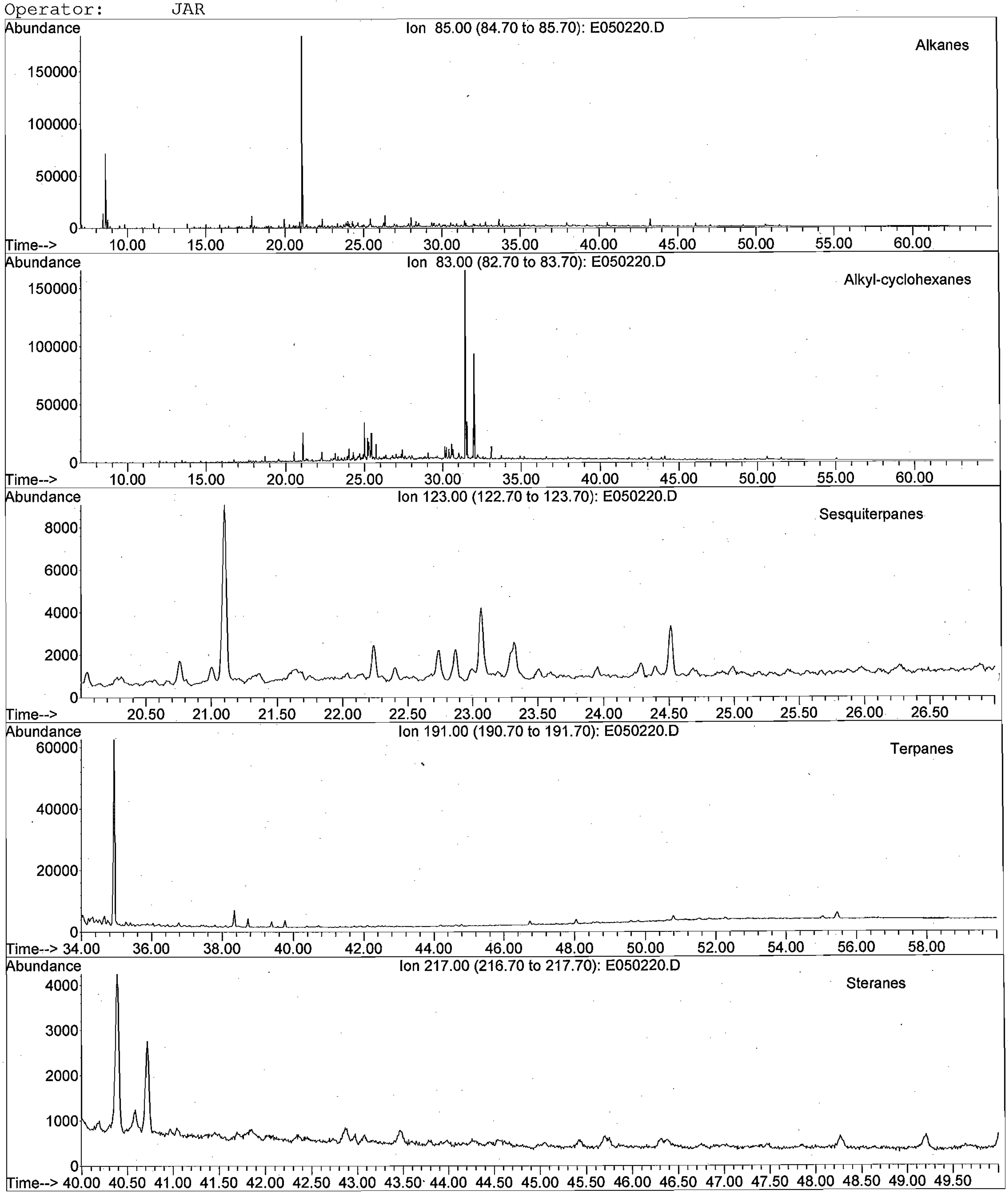
File: J:\1\DATA\E080502\E050219.D
Date Acquired: 3 May 2008 1:48 pm
Method File: 4008SIMA.M
Sample Name: EK080415-05-D
Misc Info: TS04 (1-1.8) - 5X
Operator: JAR



META Environmental, Inc.

GC/MS EXTRACTED ION CHROMATOGRAM

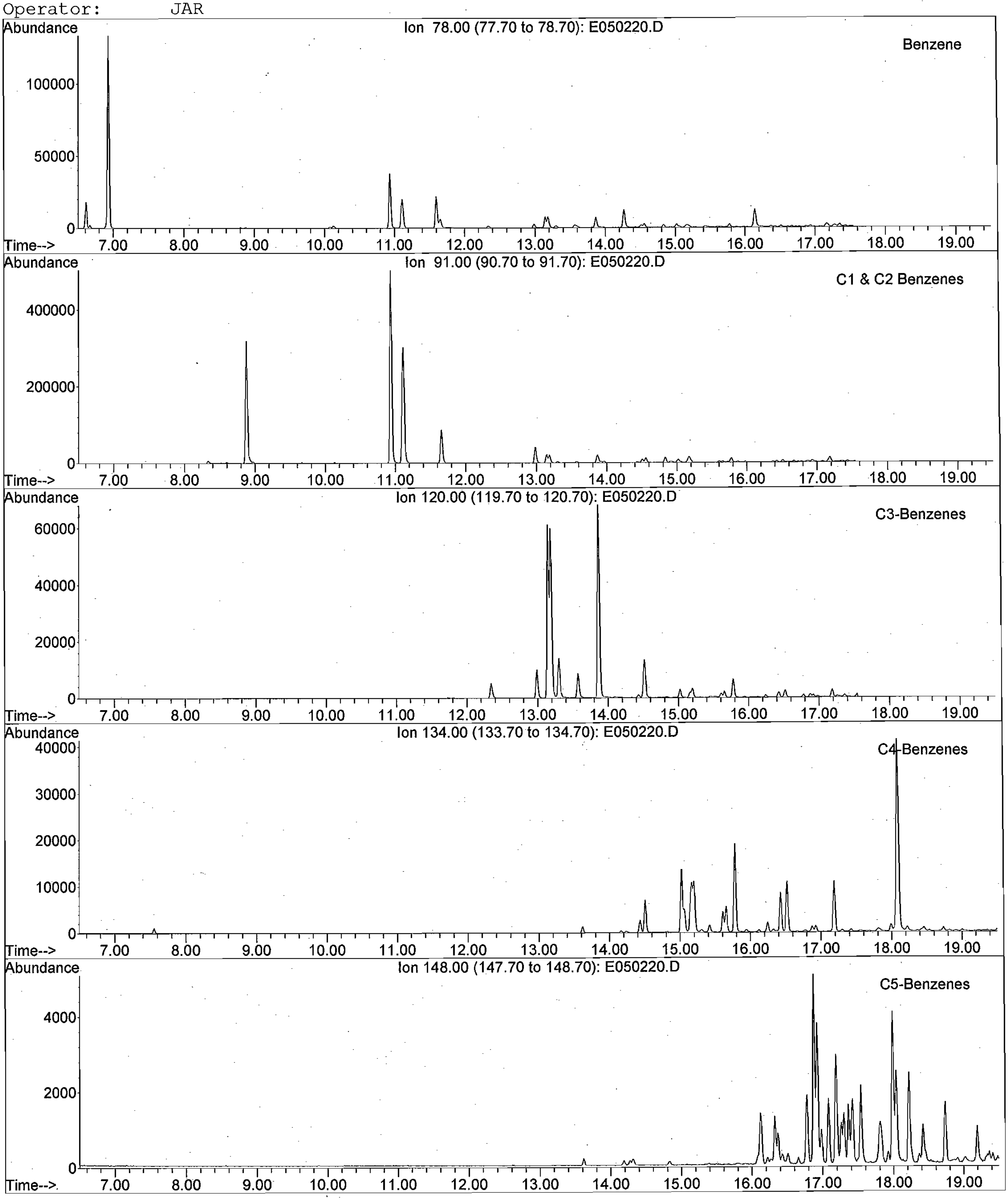
File: J:\1\DATA\E080502\E050220.D
Date Acquired: 3 May 2008 3:03 pm
Method File: 4008SIMA.M
Sample Name: EK080415-06
Misc Info: TS18 (2-3)
Operator: JAR



META Environmental, Inc.

GC/MS EXTRACTED ION CHROMATOGRAM

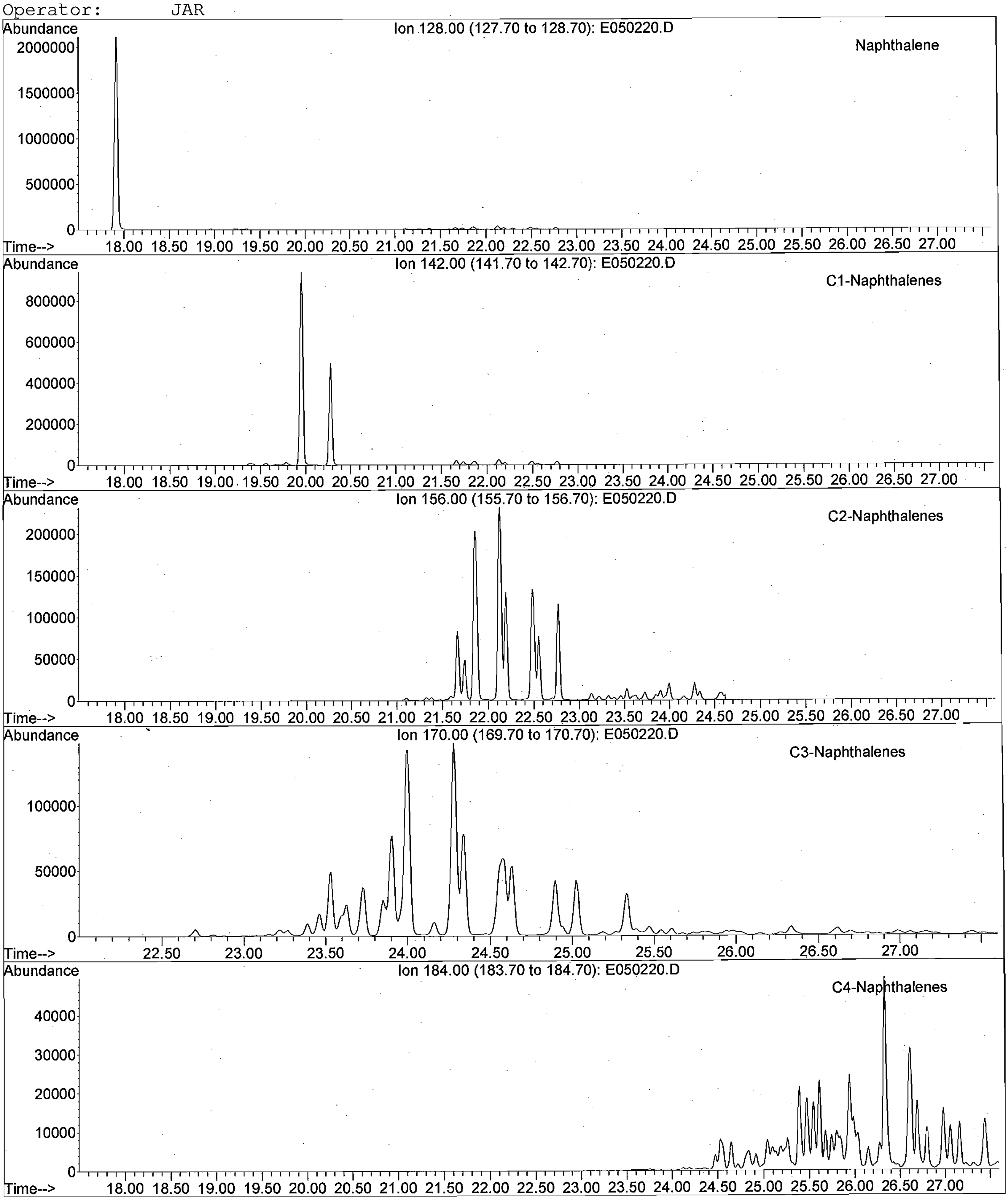
File: J:\1\DATA\E080502\E050220.D
Date Acquired: 3 May 2008 3:03 pm
Method File: 4008SIMA.M
Sample Name: EK080415-06
Misc Info: TS18 (2-3)
Operator: JAR



META Environmental, Inc.

GC/MS EXTRACTED ION CHROMATOGRAM

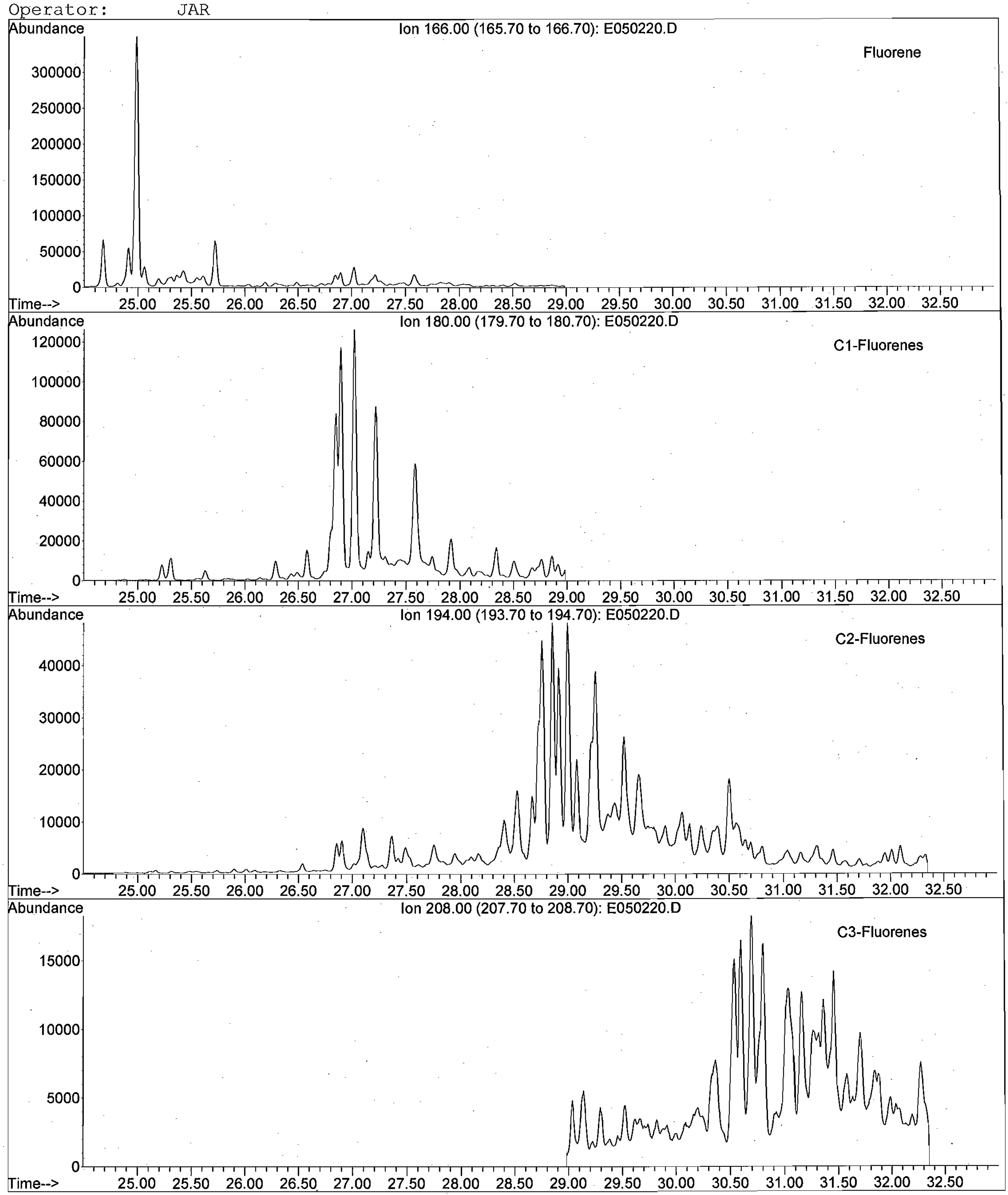
File: J:\1\DATA\E080502\E050220.D
Date Acquired: 3 May 2008 3:03 pm
Method File: 4008SIMA.M
Sample Name: EK080415-06
Misc Info: TS18 (2-3)
Operator: JAR



META Environmental, Inc.

GC/MS EXTRACTED ION CHROMATOGRAM

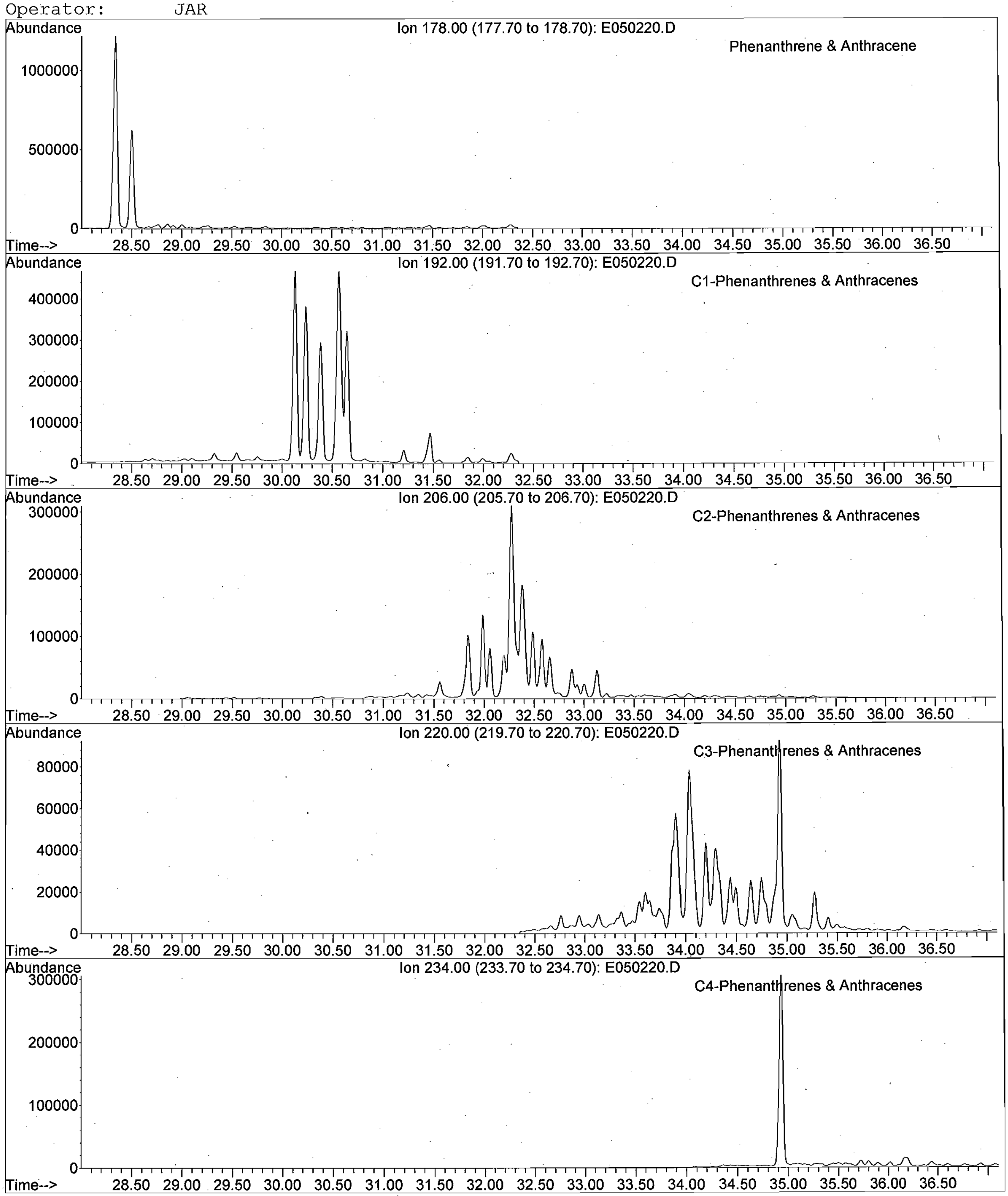
File: J:\1\DATA\E080502\E050220.D
Date Acquired: 3 May 2008 3:03 pm
Method File: 4008SIMA.M
Sample Name: EK080415-06
Misc Info: TS18 (2-3)
Operator: JAR



META Environmental, Inc.

GC/MS EXTRACTED ION CHROMATOGRAM

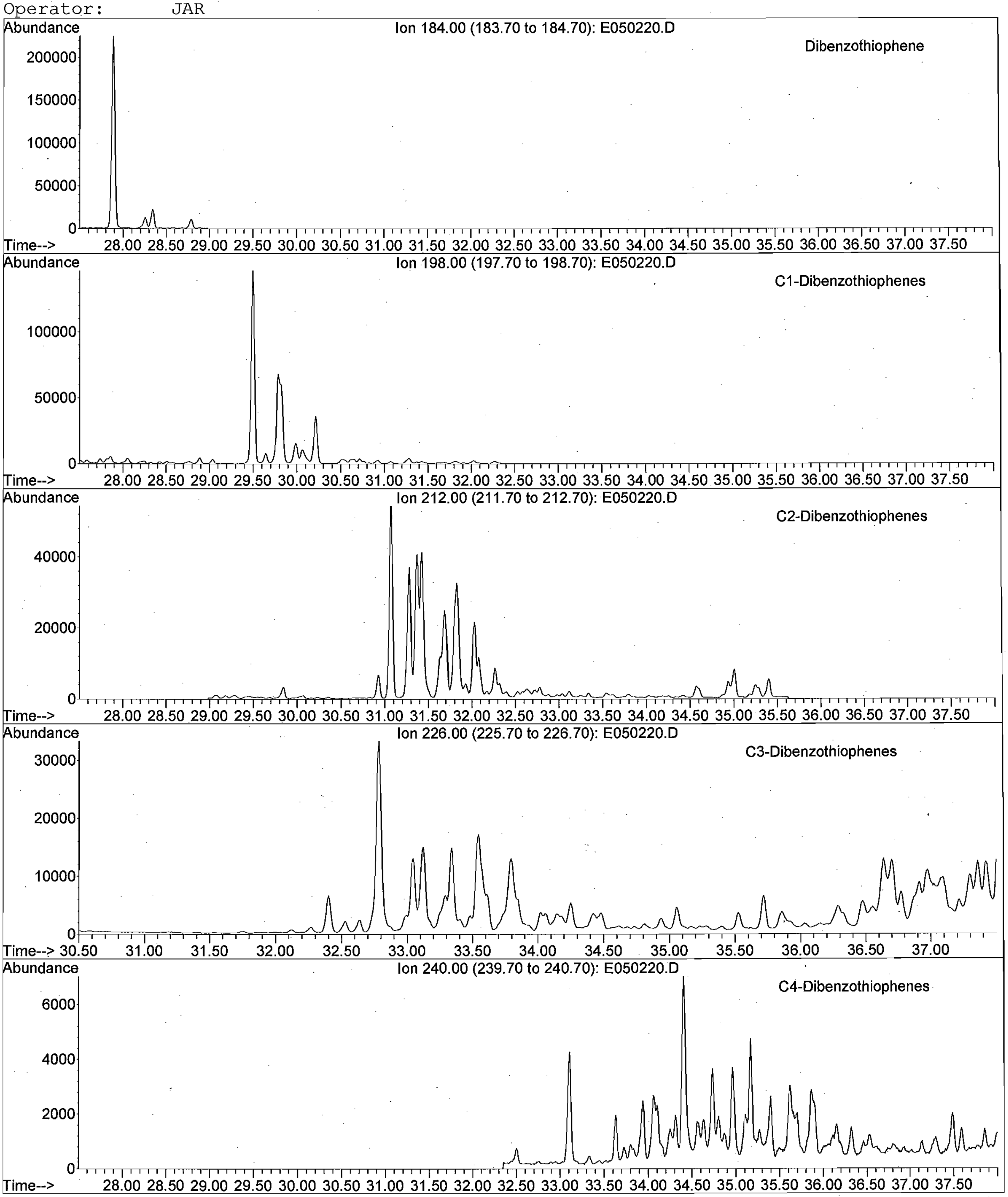
File: J:\1\DATA\E080502\E050220.D
Date Acquired: 3 May 2008 3:03 pm
Method File: 4008SIMA.M
Sample Name: EK080415-06
Misc Info: TS18 (2-3)
Operator: JAR



META Environmental, Inc.

GC/MS EXTRACTED ION CHROMATOGRAM

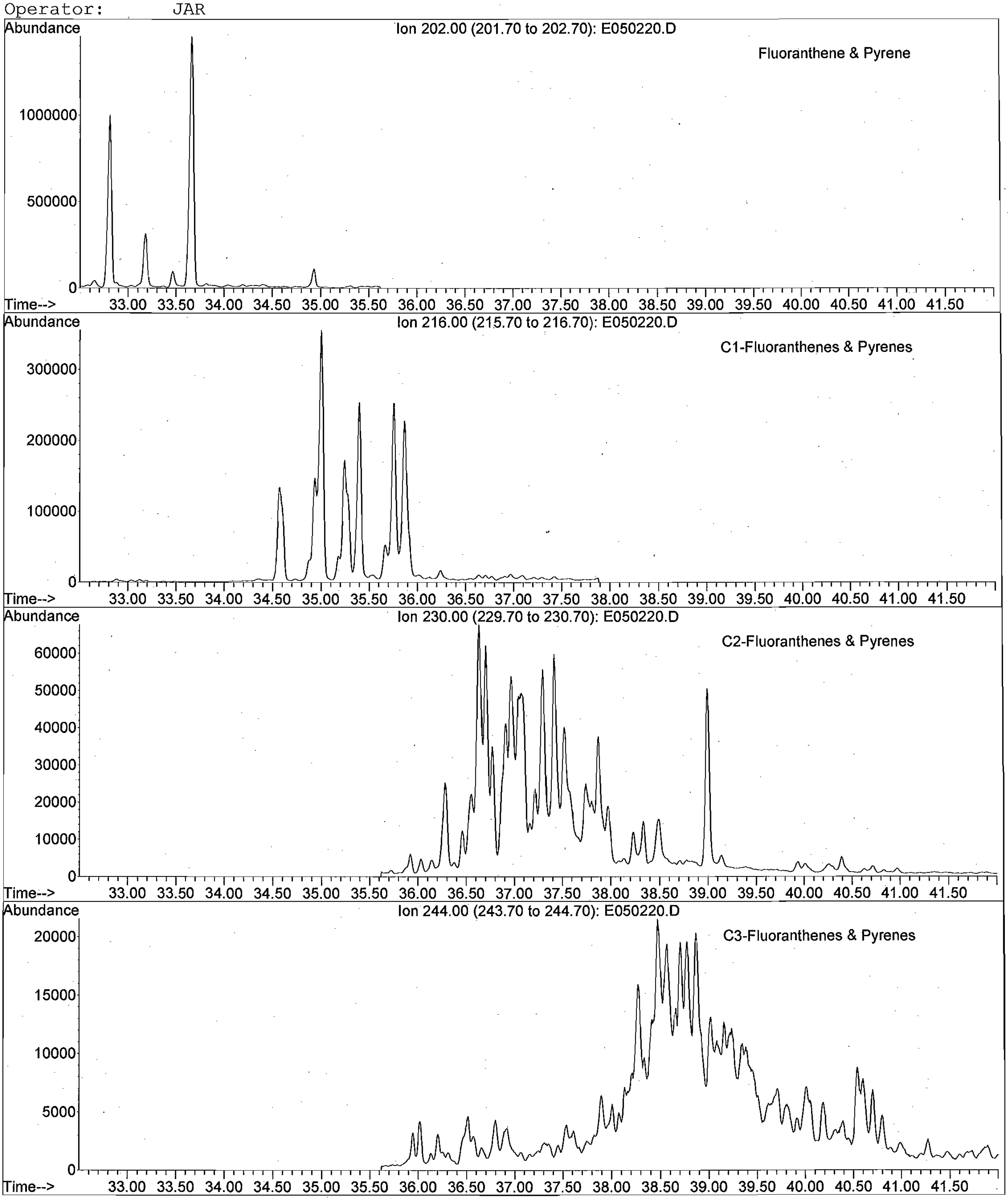
File: J:\1\DATA\E080502\E050220.D
Date Acquired: 3 May 2008 3:03 pm
Method File: 4008SIMA.M
Sample Name: EK080415-06
Misc Info: TS18 (2-3)
Operator: JAR



META Environmental, Inc.

GC/MS EXTRACTED ION CHROMATOGRAM

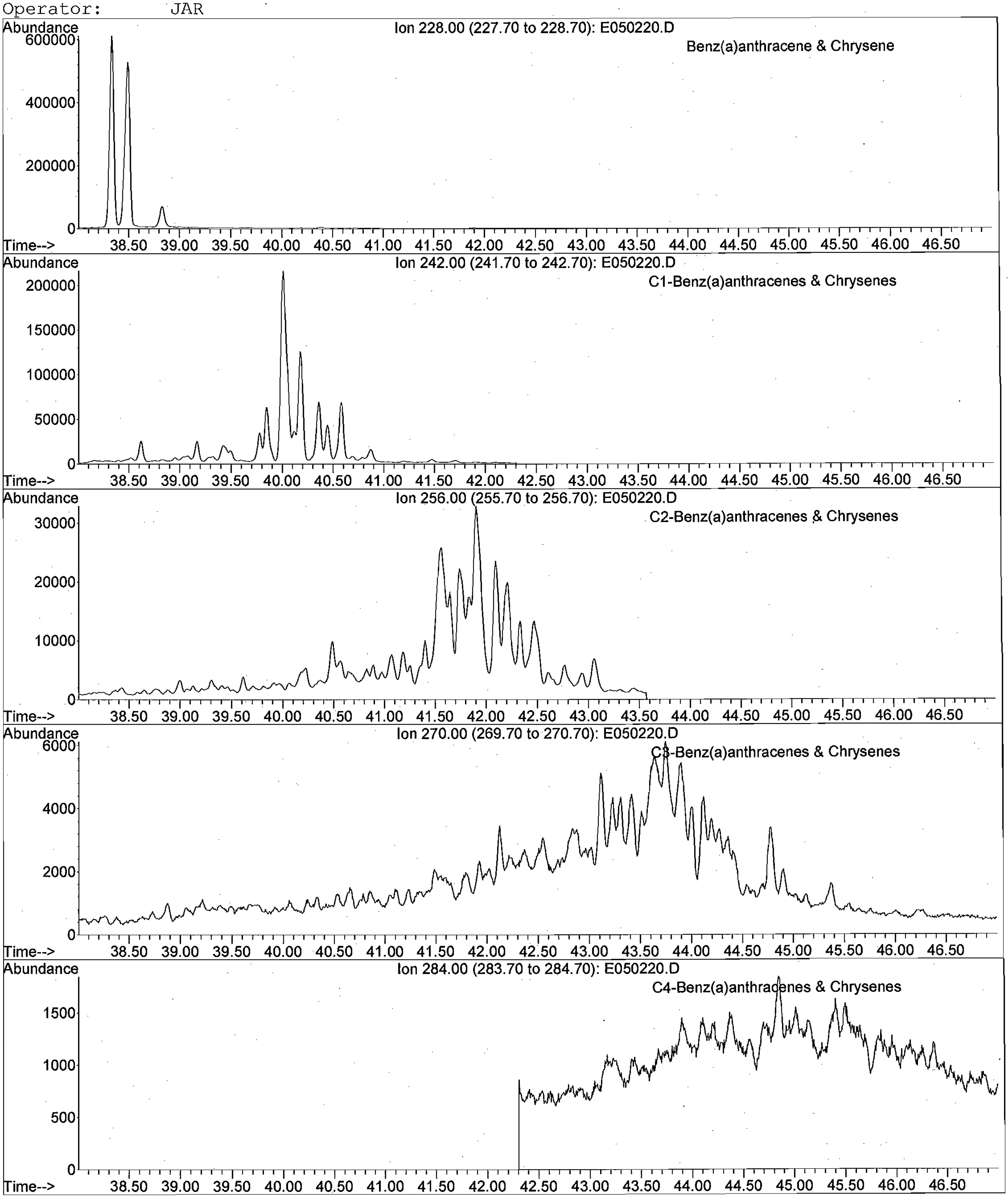
File: J:\1\DATA\E080502\E050220.D
Date Acquired: 3 May 2008 3:03 pm
Method File: 4008SIMA.M
Sample Name: EK080415-06
Misc Info: TS18 (2-3)
Operator: JAR



META Environmental, Inc.

GC/MS EXTRACTED ION CHROMATOGRAM

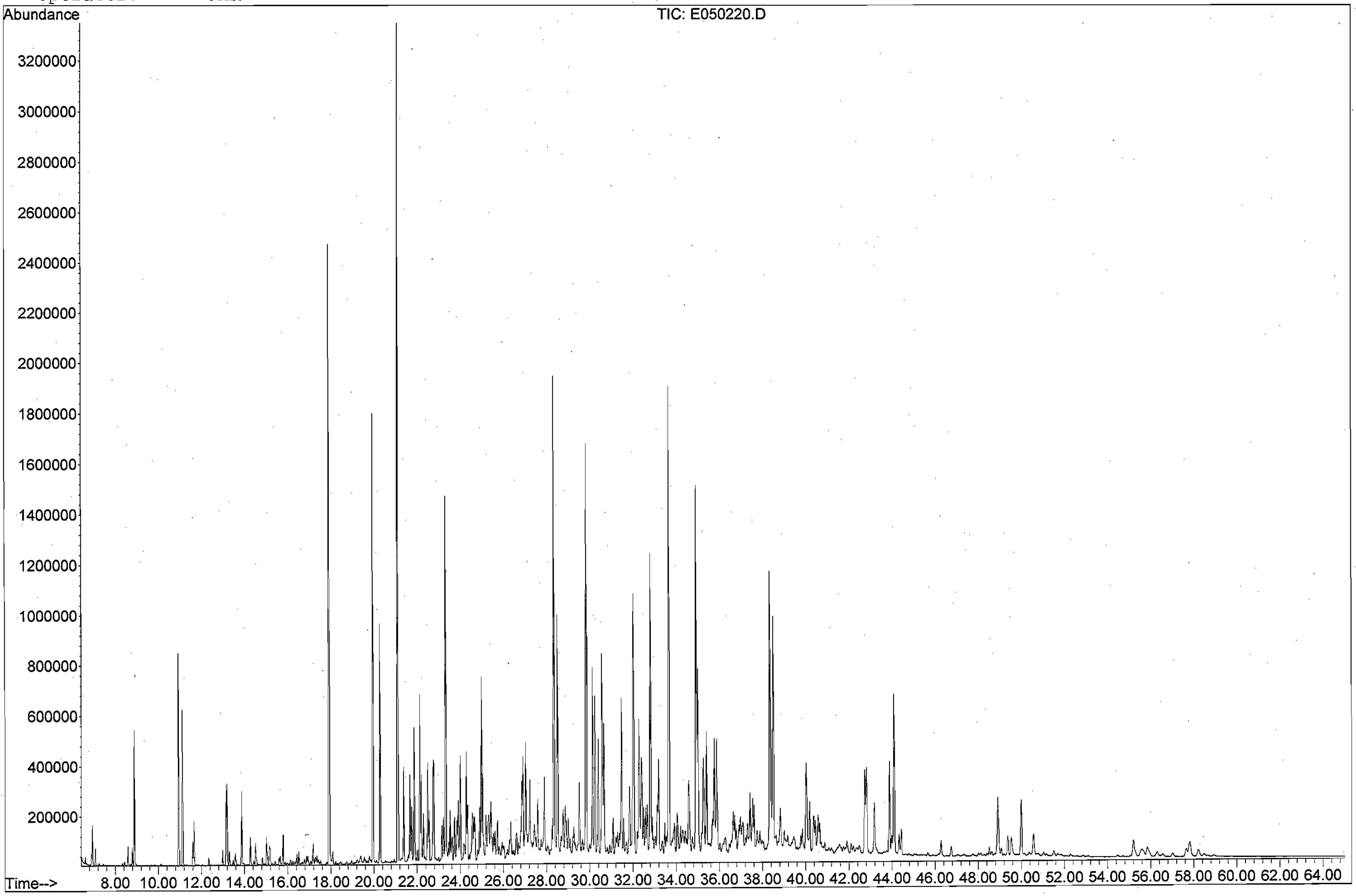
File: J:\1\DATA\E080502\E050220.D
Date Acquired: 3 May 2008 3:03 pm
Method File: 4008SIMA.M
Sample Name: EK080415-06
Misc Info: TS18 (2-3)
Operator: JAR



META Environmental, Inc.

GC/MS TOTAL ION CHROMATOGRAM

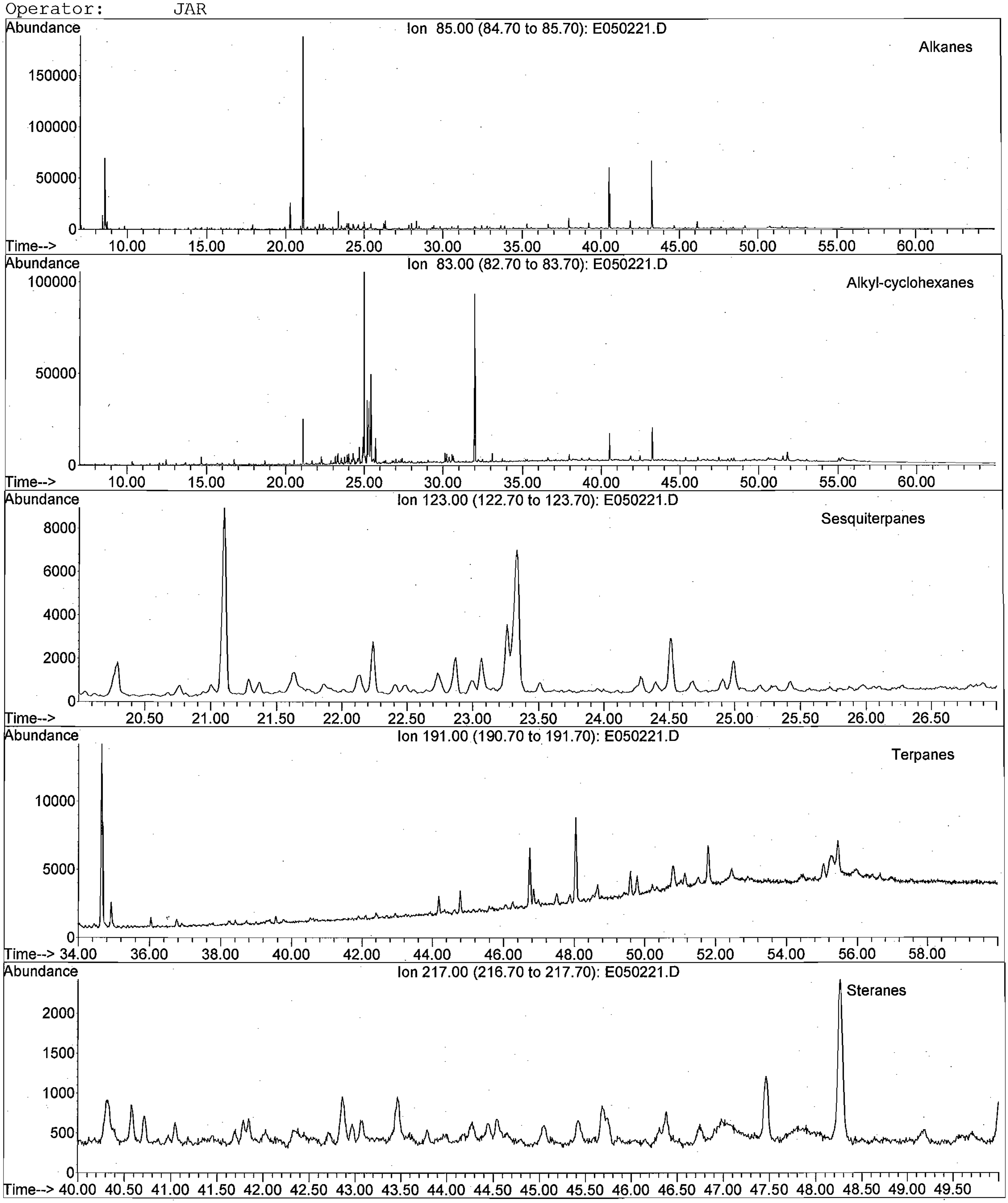
File: J:\1\DATA\E080502\E050220.D
Date Acquired: 3 May 2008 3:03 pm
Method File: 4008SIMA.M
Sample Name: EK080415-06
Misc Info: TS18 (2-3)
Operator: JAR



META Environmental, Inc.

GC/MS EXTRACTED ION CHROMATOGRAM

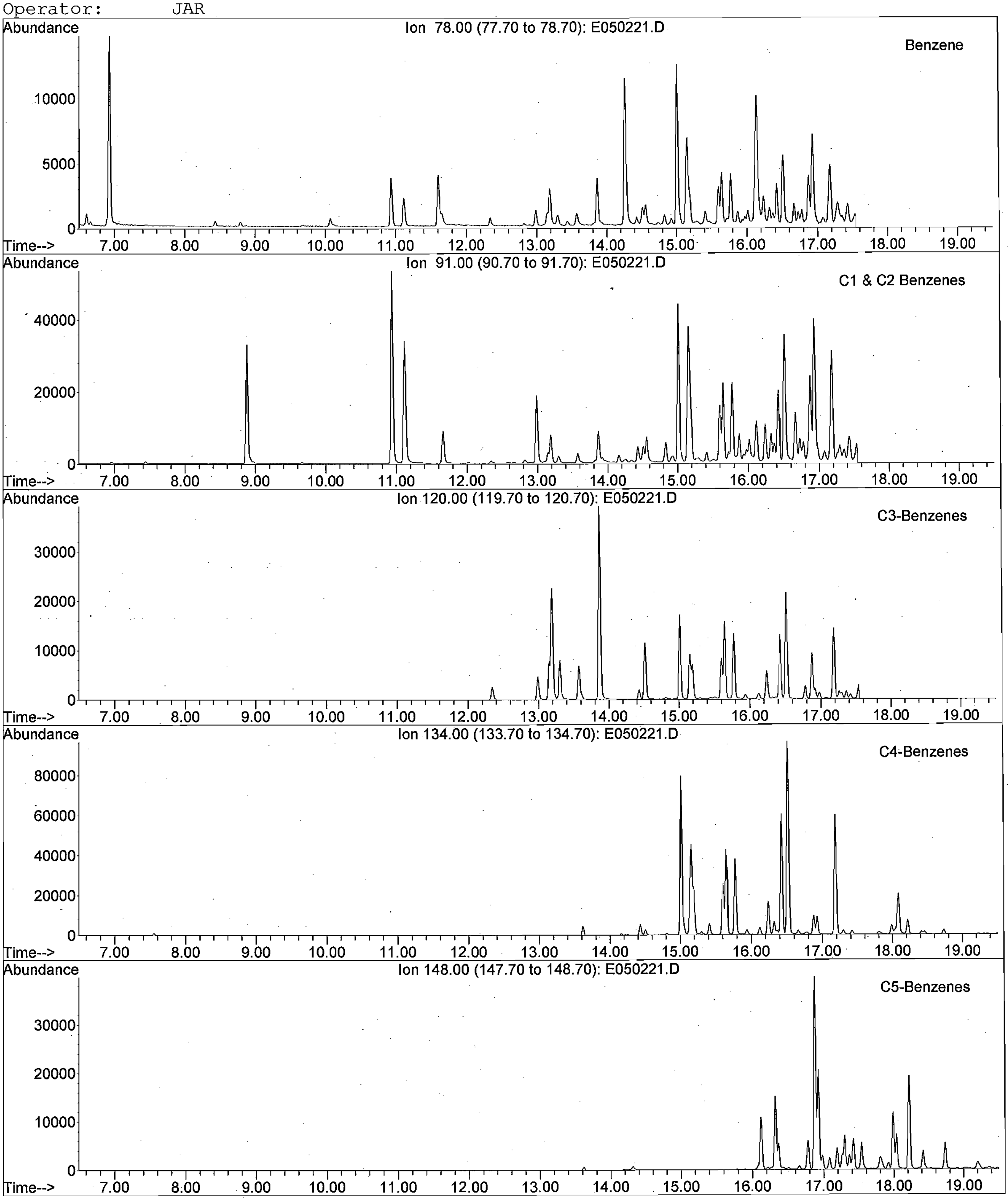
File: J:\1\DATA\E080502\E050221.D
Date Acquired: 3 May 2008 4:18 pm
Method File: 4008SIMA.M
Sample Name: EK080415-08
Misc Info: TS30 (3-4)
Operator: JAR



META Environmental, Inc.

GC/MS EXTRACTED ION CHROMATOGRAM

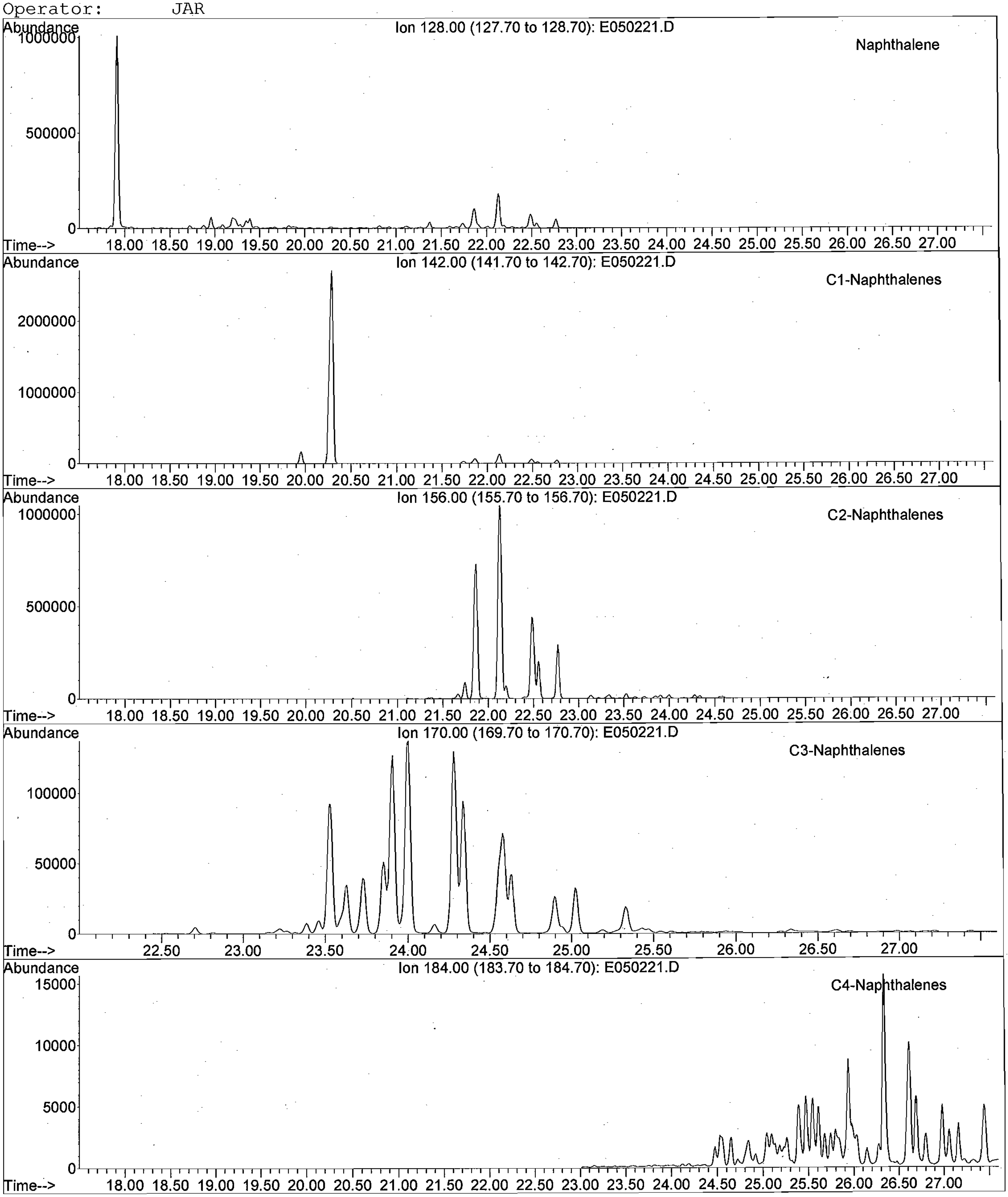
File: J:\1\DATA\E080502\E050221.D
Date Acquired: 3 May 2008 4:18 pm
Method File: 4008SIMA.M
Sample Name: EK080415-08
Misc Info: TS30 (3-4)
Operator: JAR



META Environmental, Inc.

GC/MS EXTRACTED ION CHROMATOGRAM

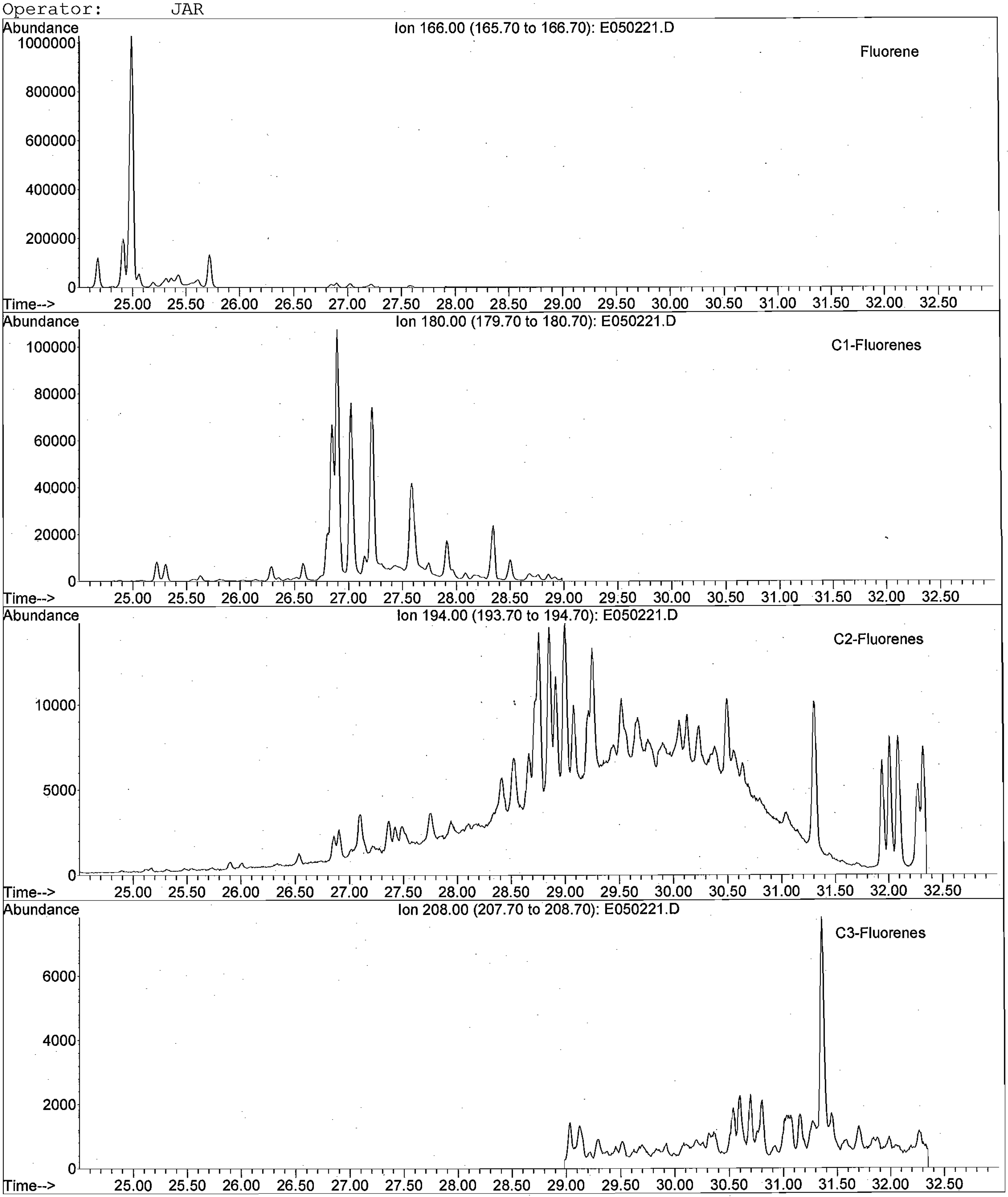
File: J:\1\DATA\E080502\E050221.D
Date Acquired: 3 May 2008 4:18 pm
Method File: 4008SIMA.M
Sample Name: EK080415-08
Misc Info: TS30 (3-4)
Operator: JAR



META Environmental, Inc.

GC/MS EXTRACTED ION CHROMATOGRAM

File: J:\1\DATA\E080502\E050221.D
Date Acquired: 3 May 2008 4:18 pm
Method File: 4008SIMA.M
Sample Name: EK080415-08
Misc Info: TS30 (3-4)
Operator: JAR



META Environmental, Inc.

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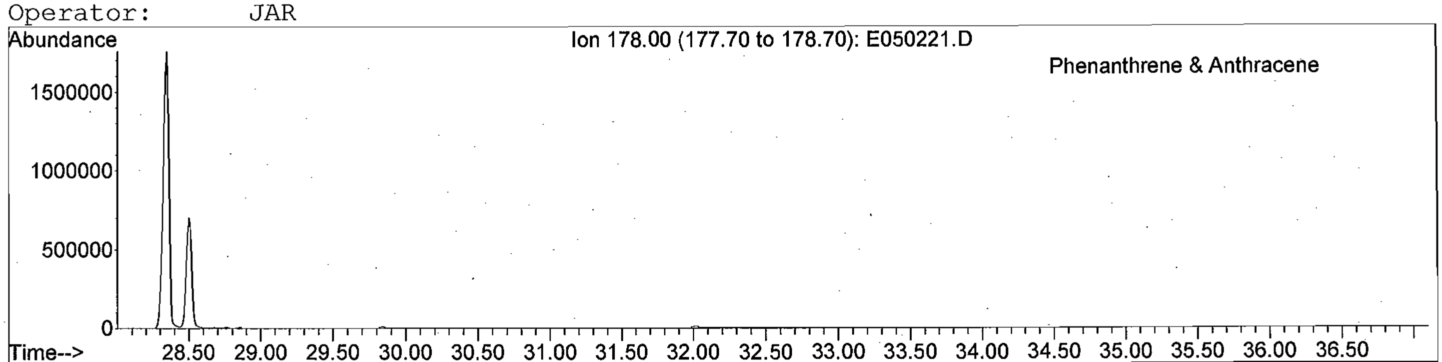
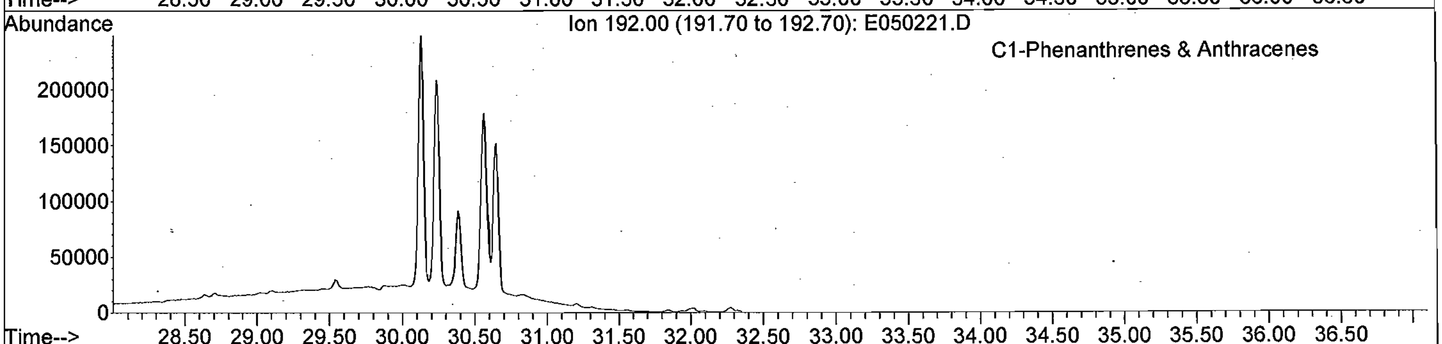
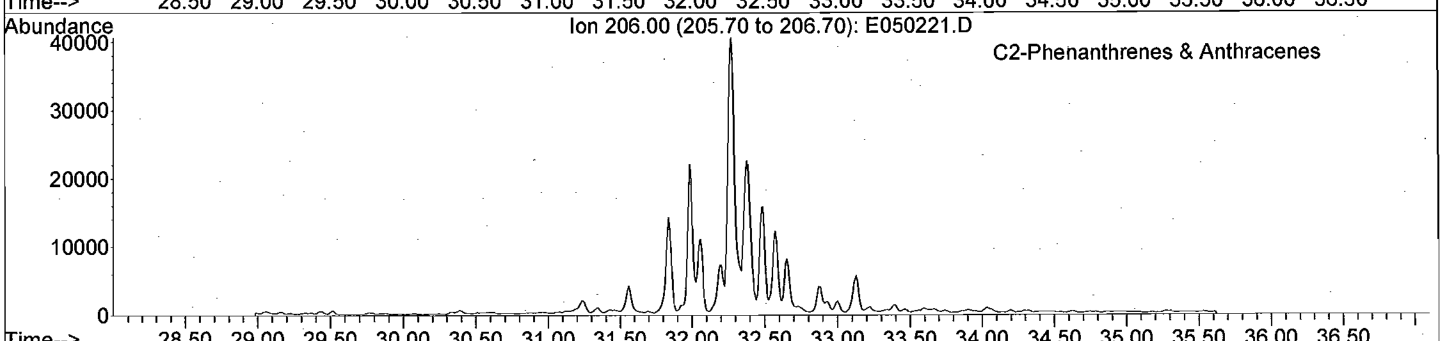
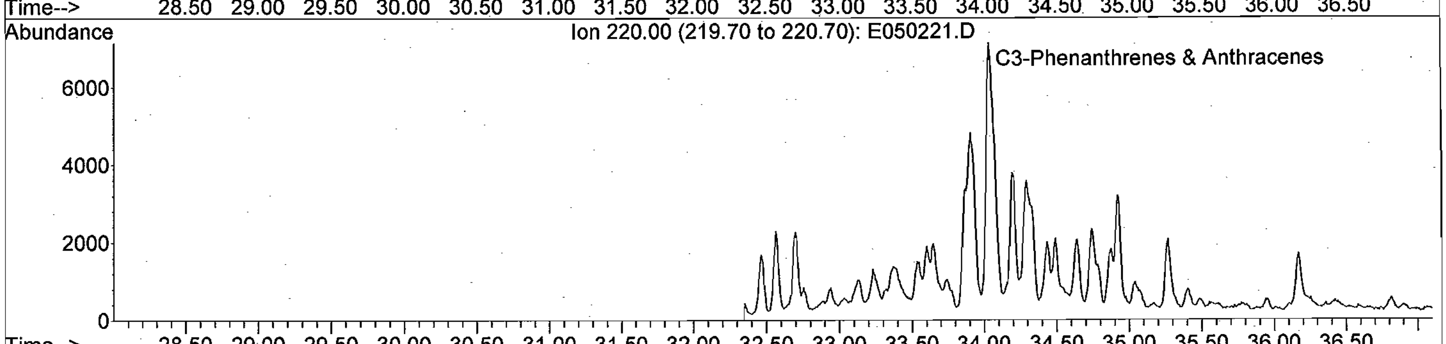
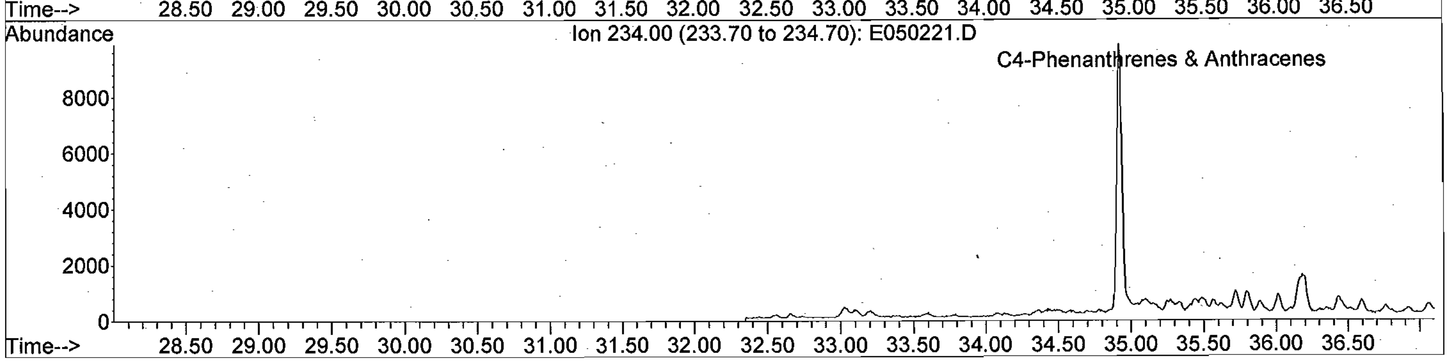
Method File: 4008SIMA.M
Sample Name: EK080415-08
Misc Info: TS30 (3-4)
Operator: JAR











META Environmental, Inc.

GC/MS EXTRACTED ION CHROMATOGRAM

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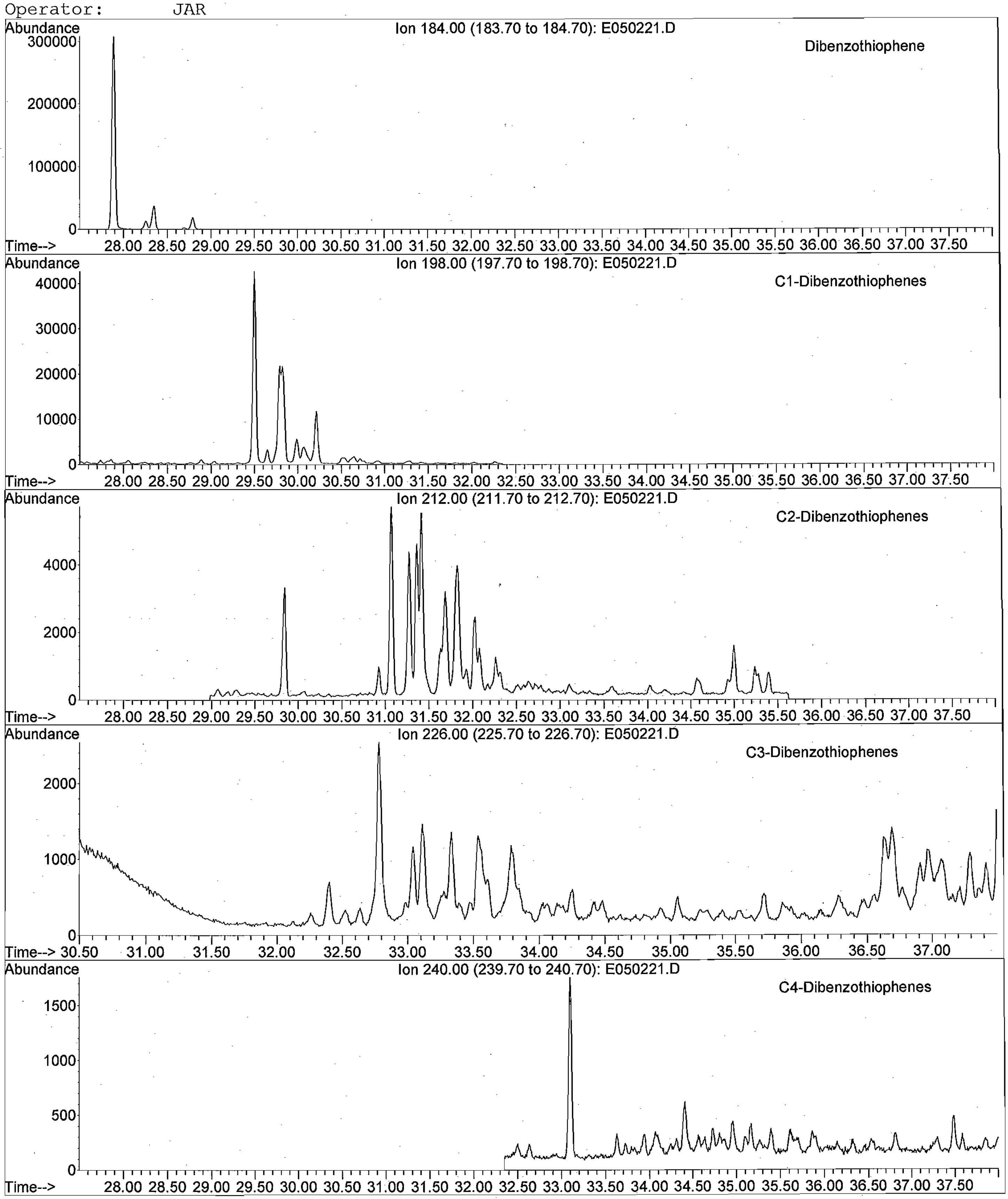

META Environmental, Inc.

GC/MS EXTRACTED ION CHROMATOGRAM

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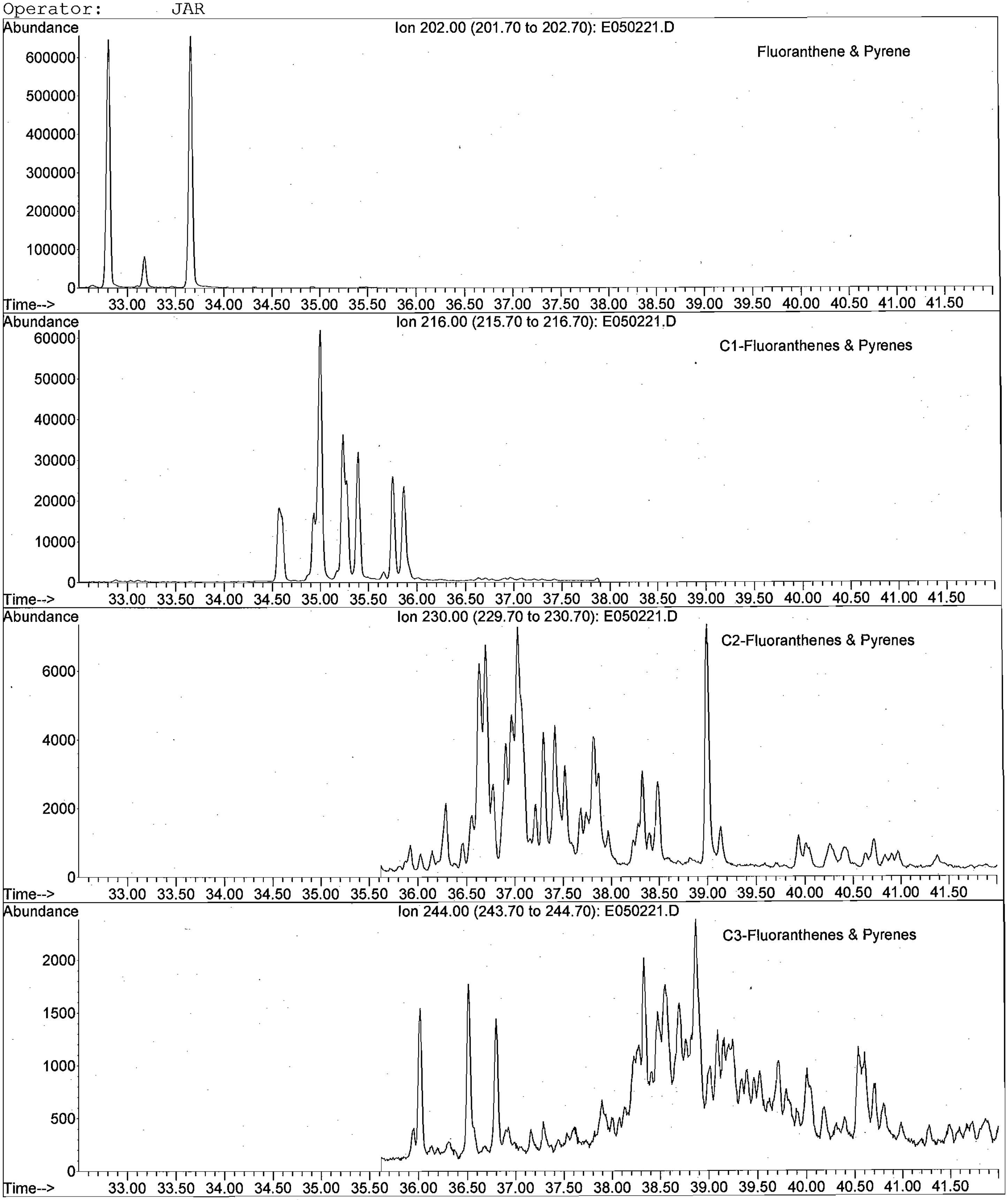

META Environmental, Inc.

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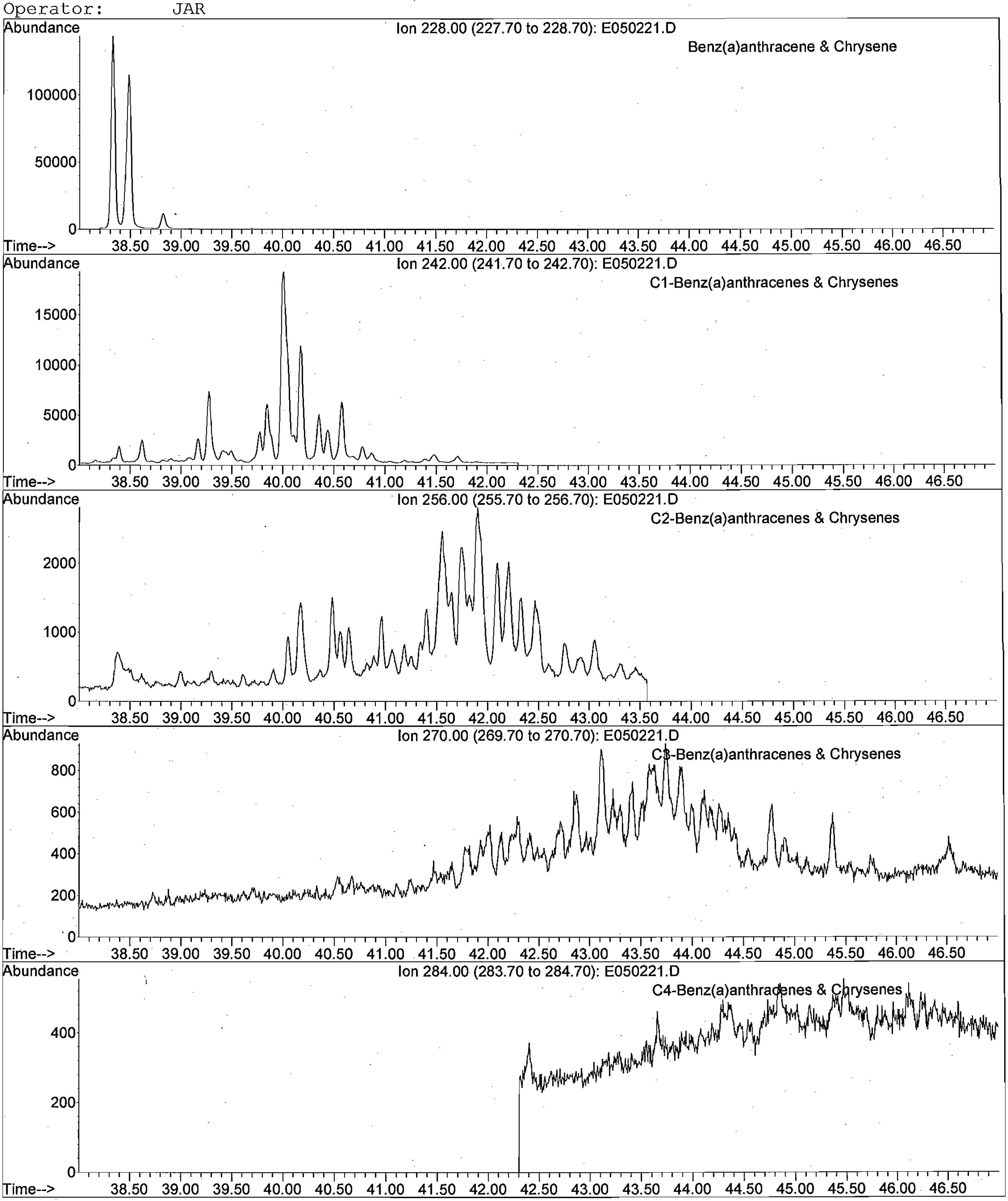

META Environmental, Inc.

GC/MS TOTAL ION CHROMATOGRAM

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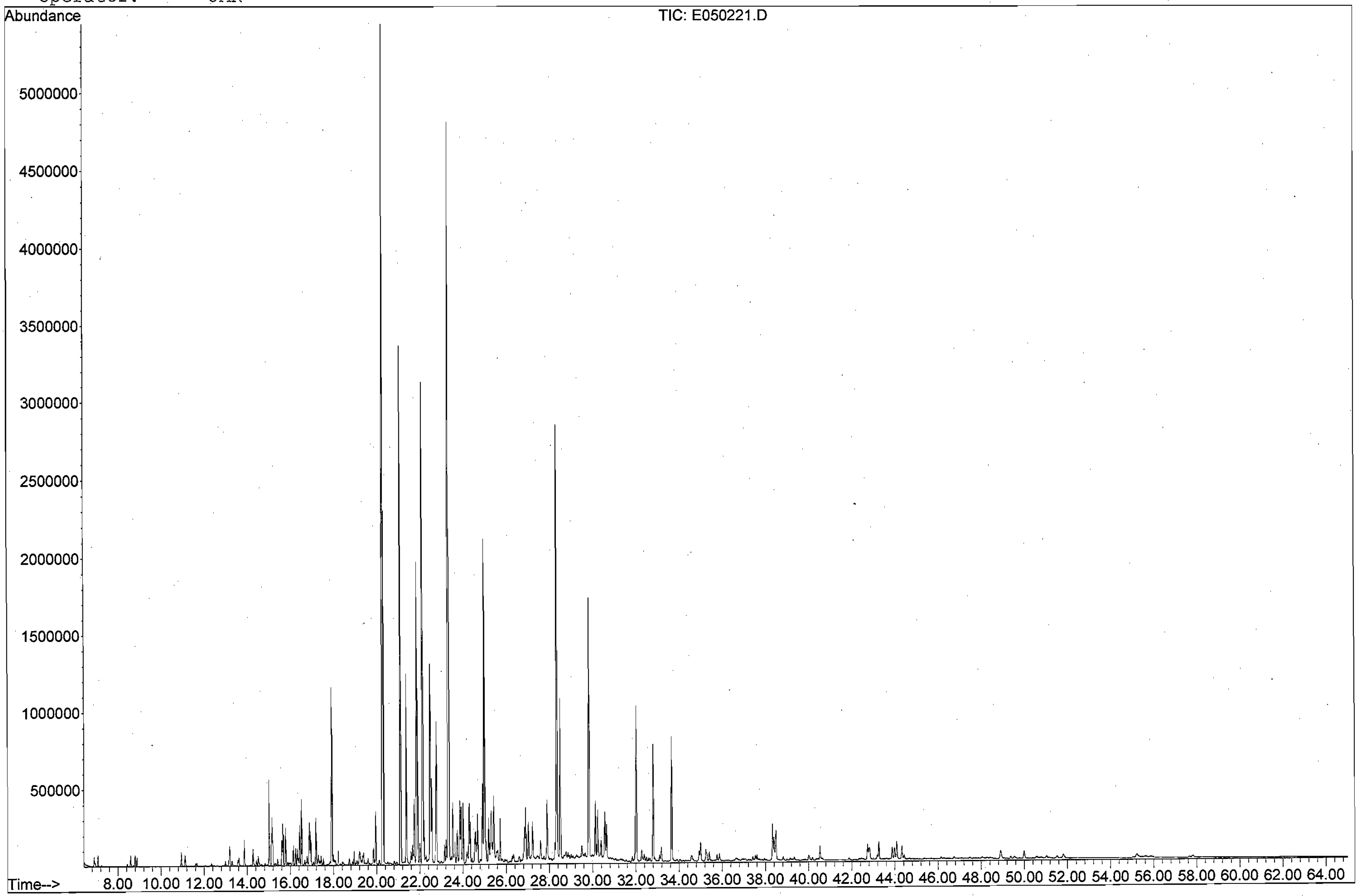
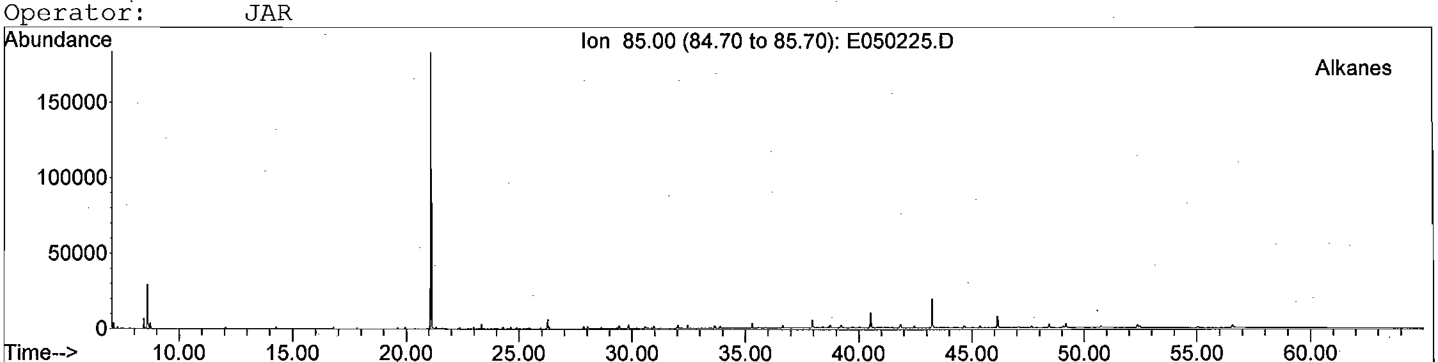
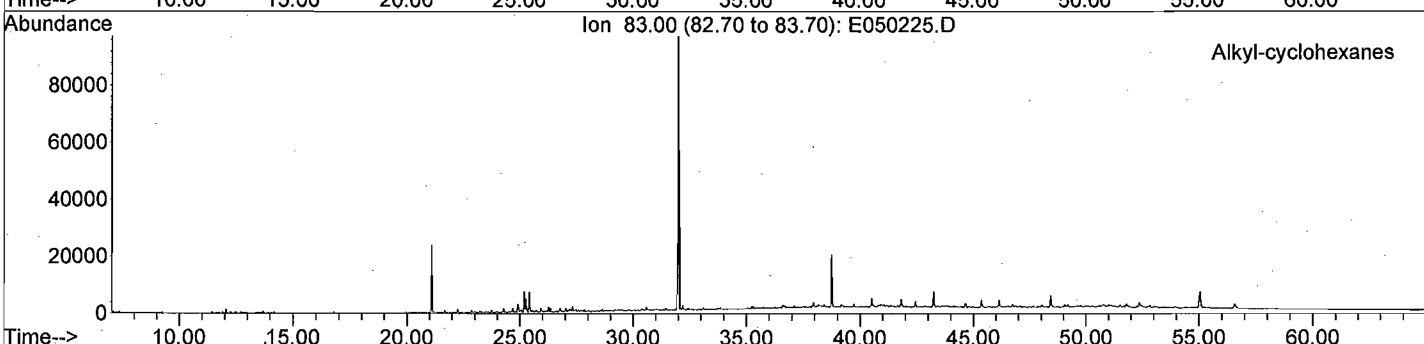


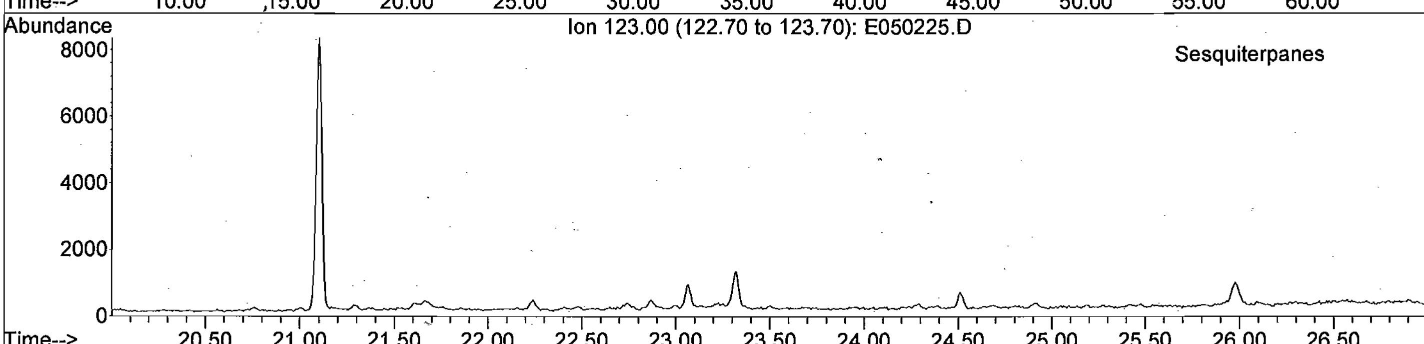
META Environmental, Inc.

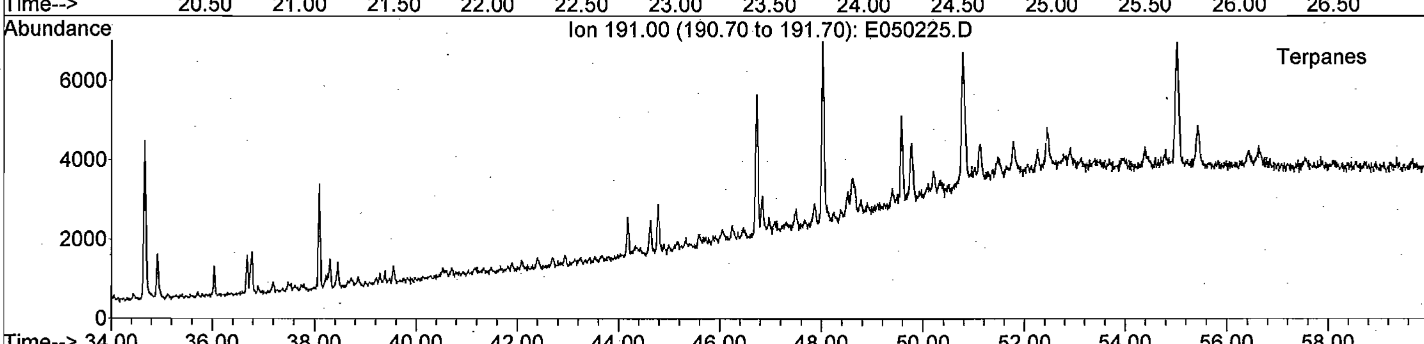
GC/MS EXTRACTED ION CHROMATOGRAM

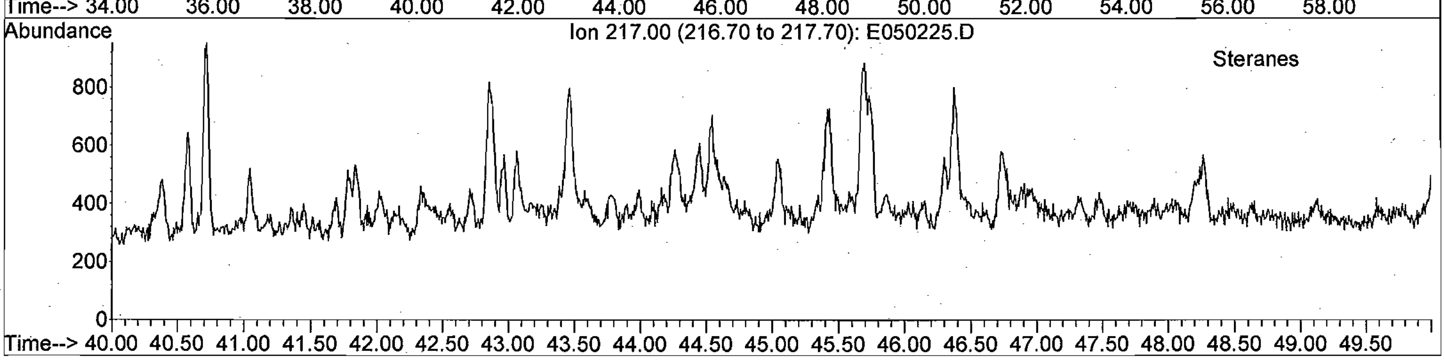
File: J:\1\DATA\E080502\E050225.D
Date Acquired: 3 May 2008 9:17 pm
Method File: 4008SIMA.M
Sample Name: EK080415-09
Misc Info: TS29 (1.5-2.5) - 5X
Operator: JAR











META Environmental, Inc.

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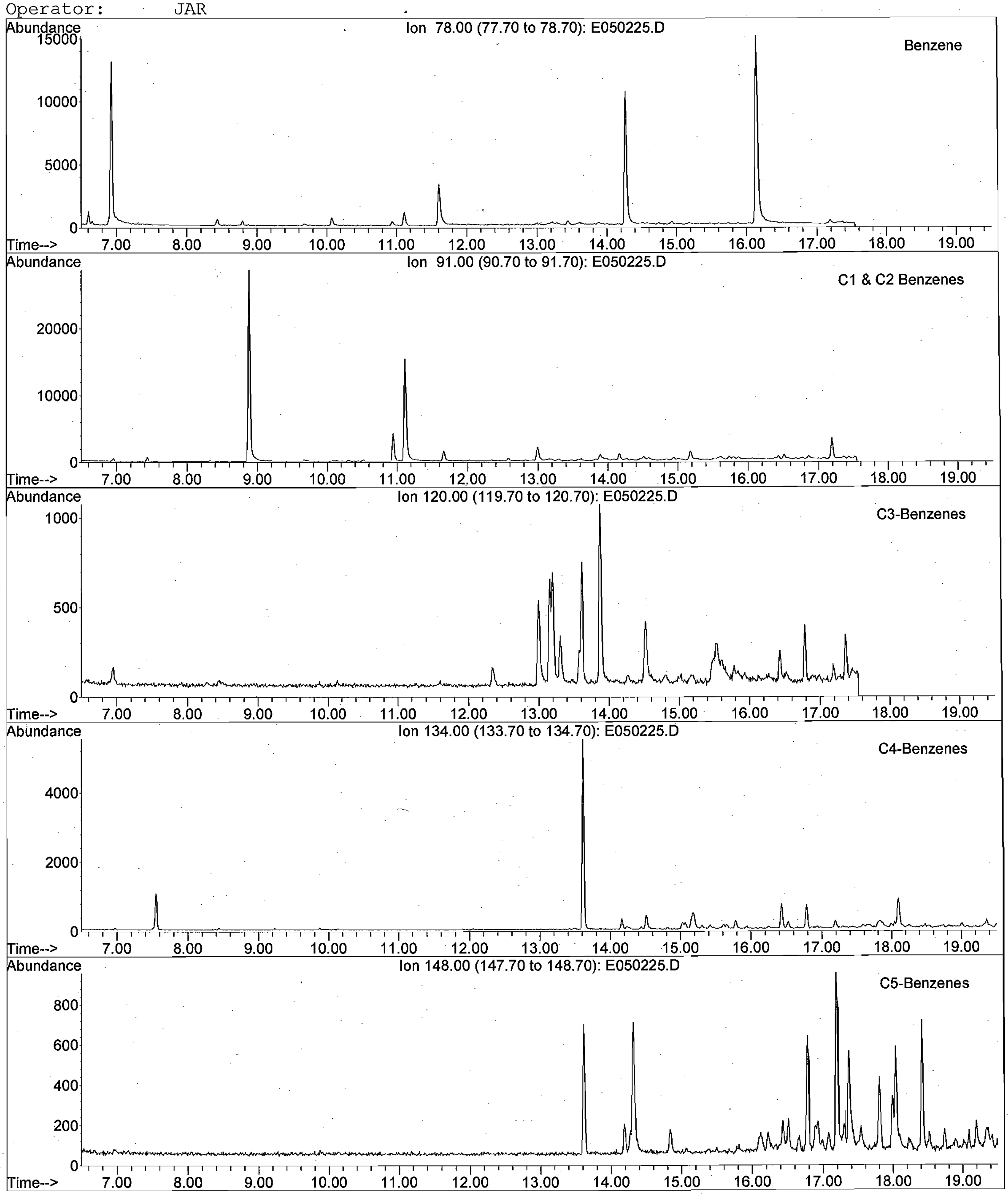

META Environmental, Inc.

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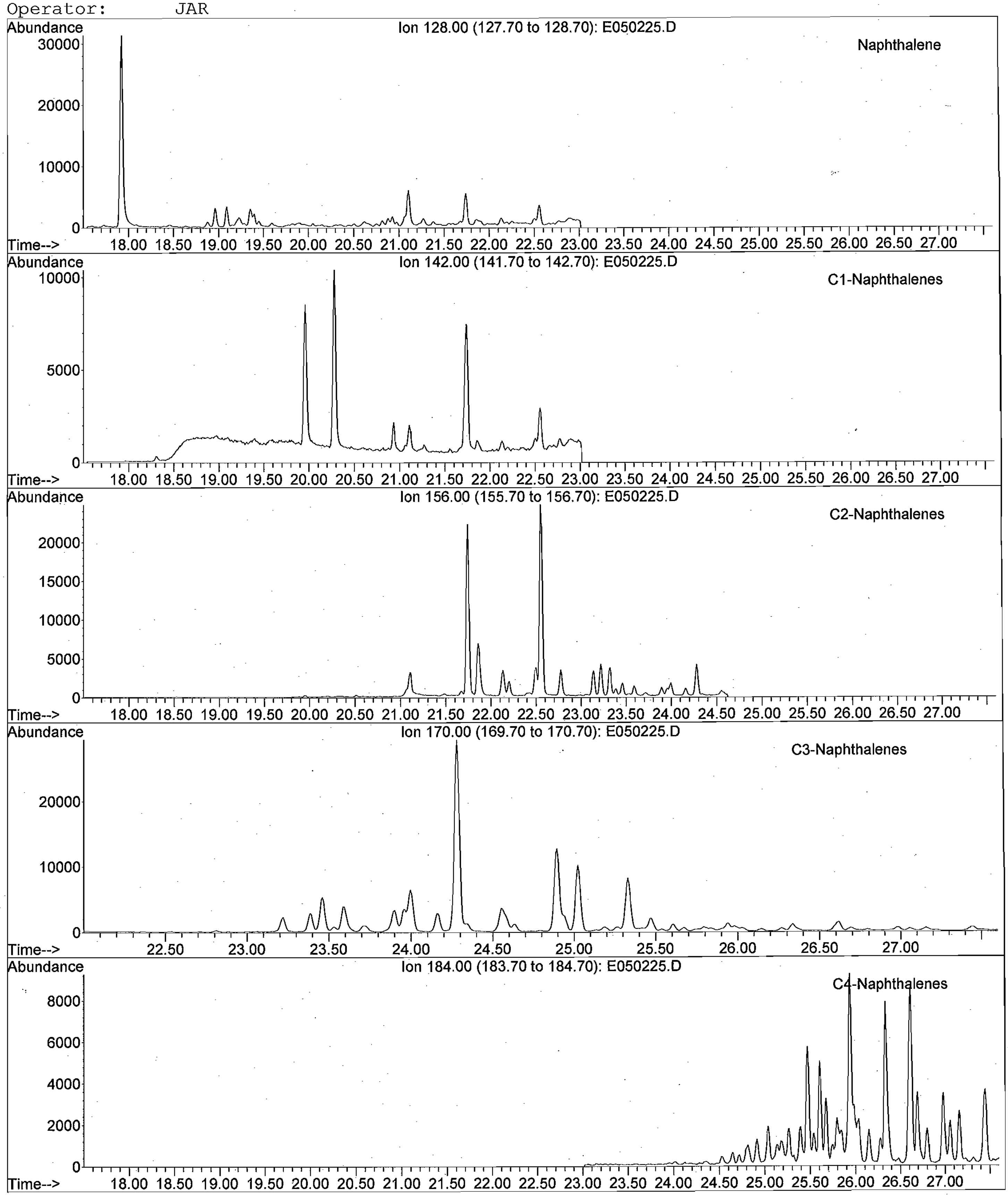

META Environmental, Inc.

GC/MS EXTRACTED ION CHROMATOGRAM

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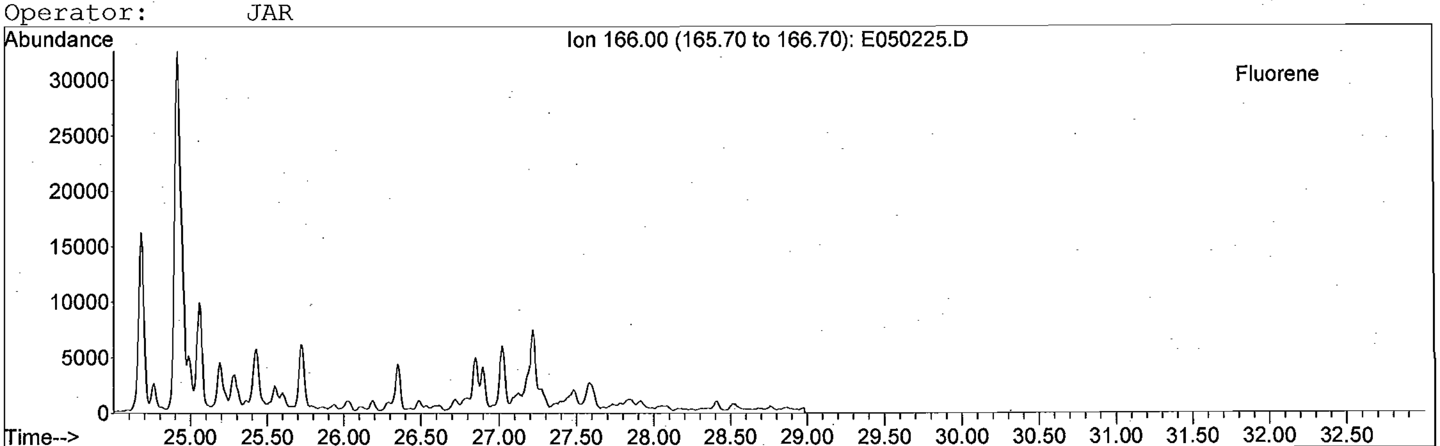

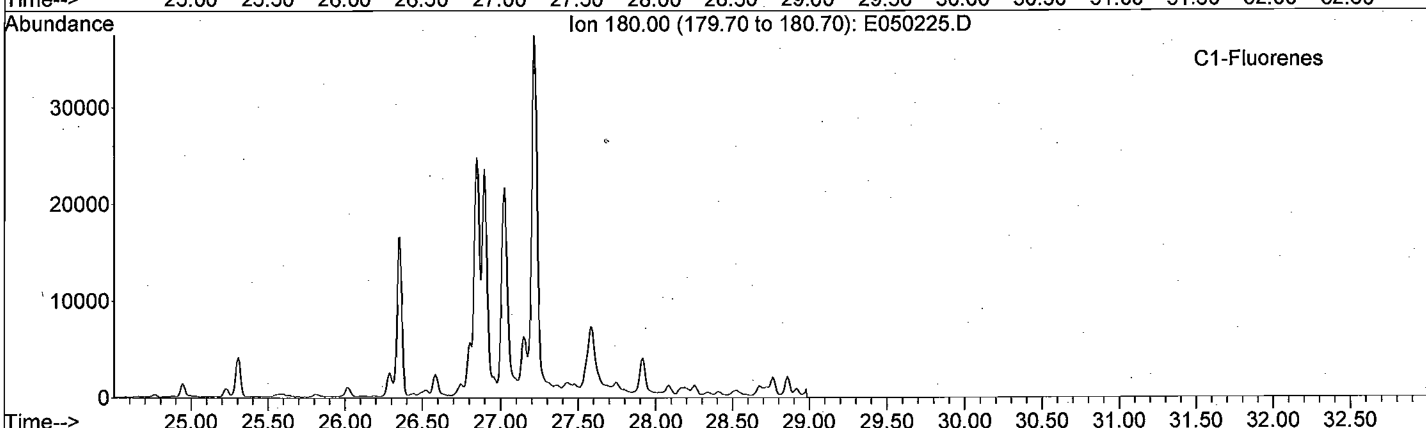

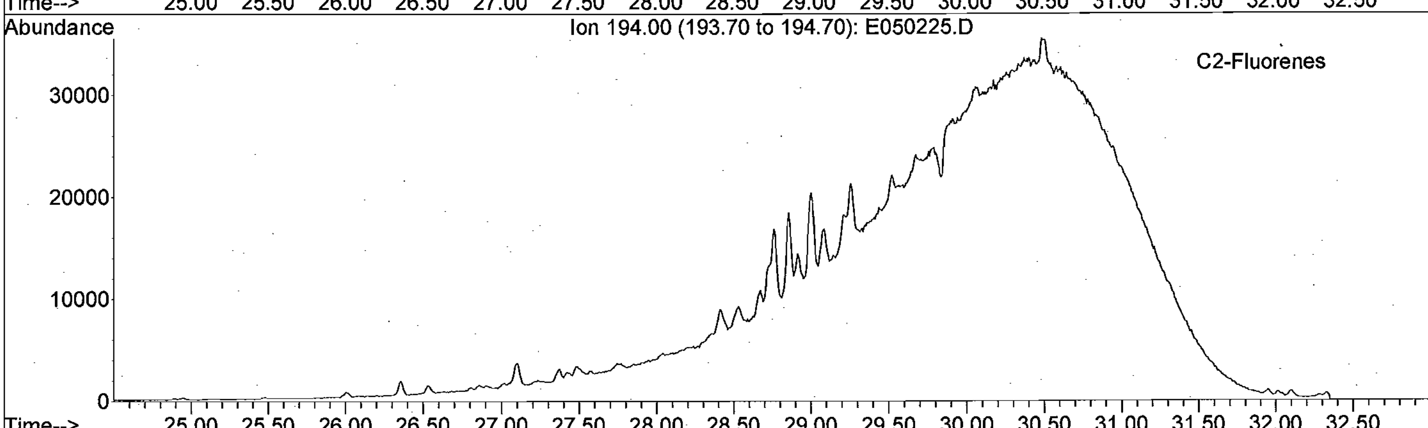

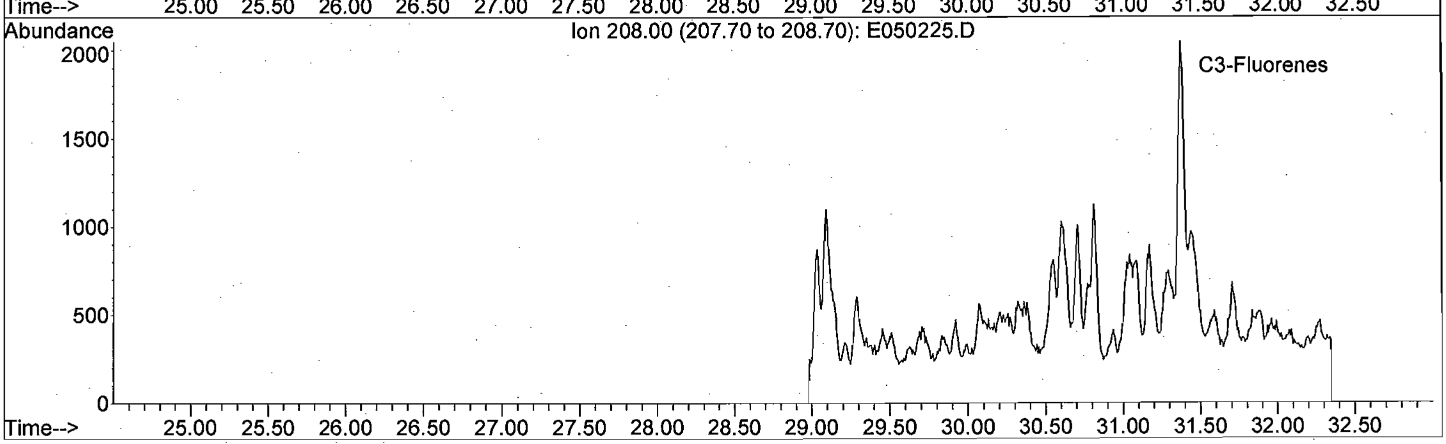

META Environmental, Inc.

GC/MS EXTRACTED ION CHROMATOGRAM

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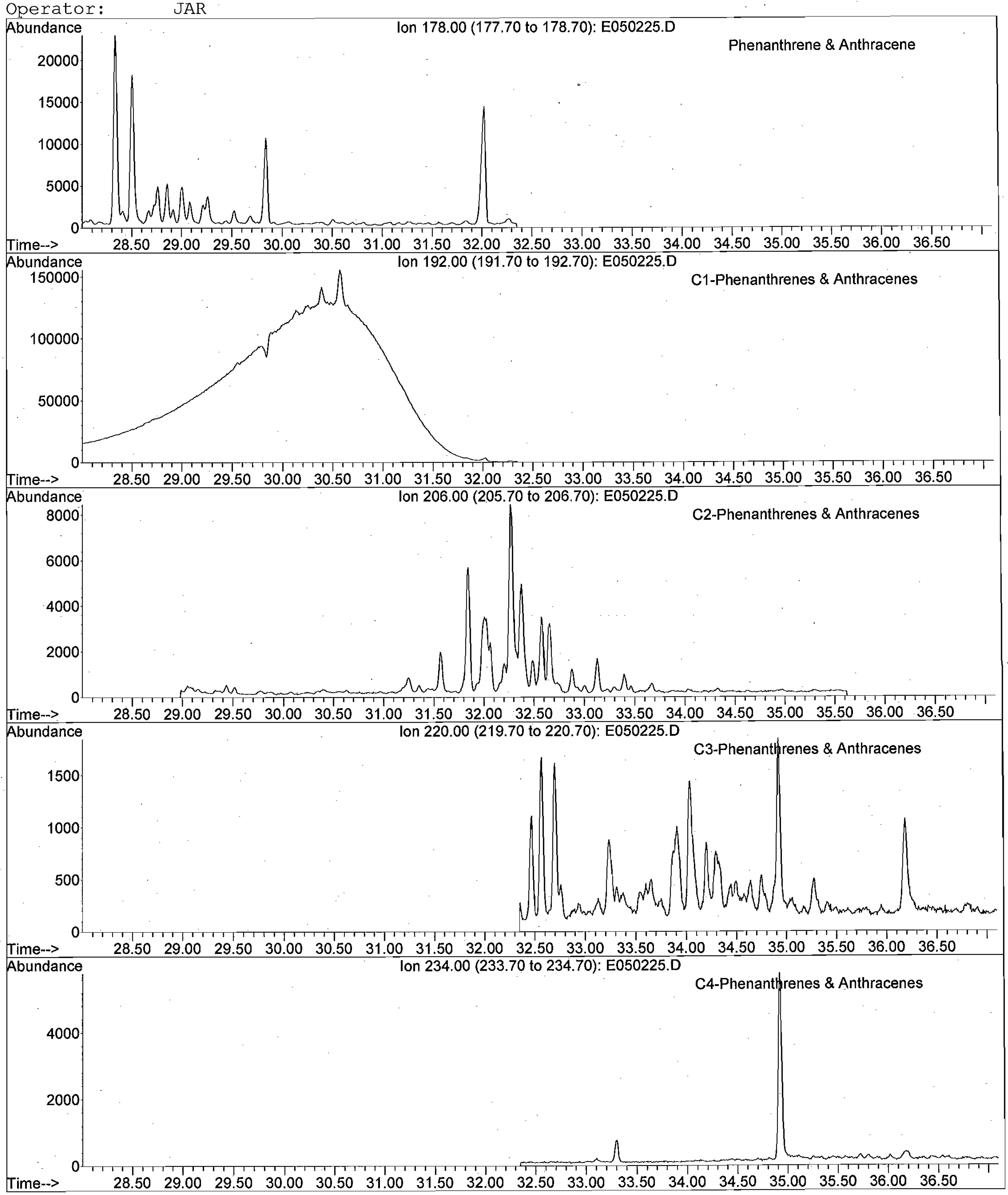

META Environmental, Inc.

GC/MS EXTRACTED ION CHROMATOGRAM

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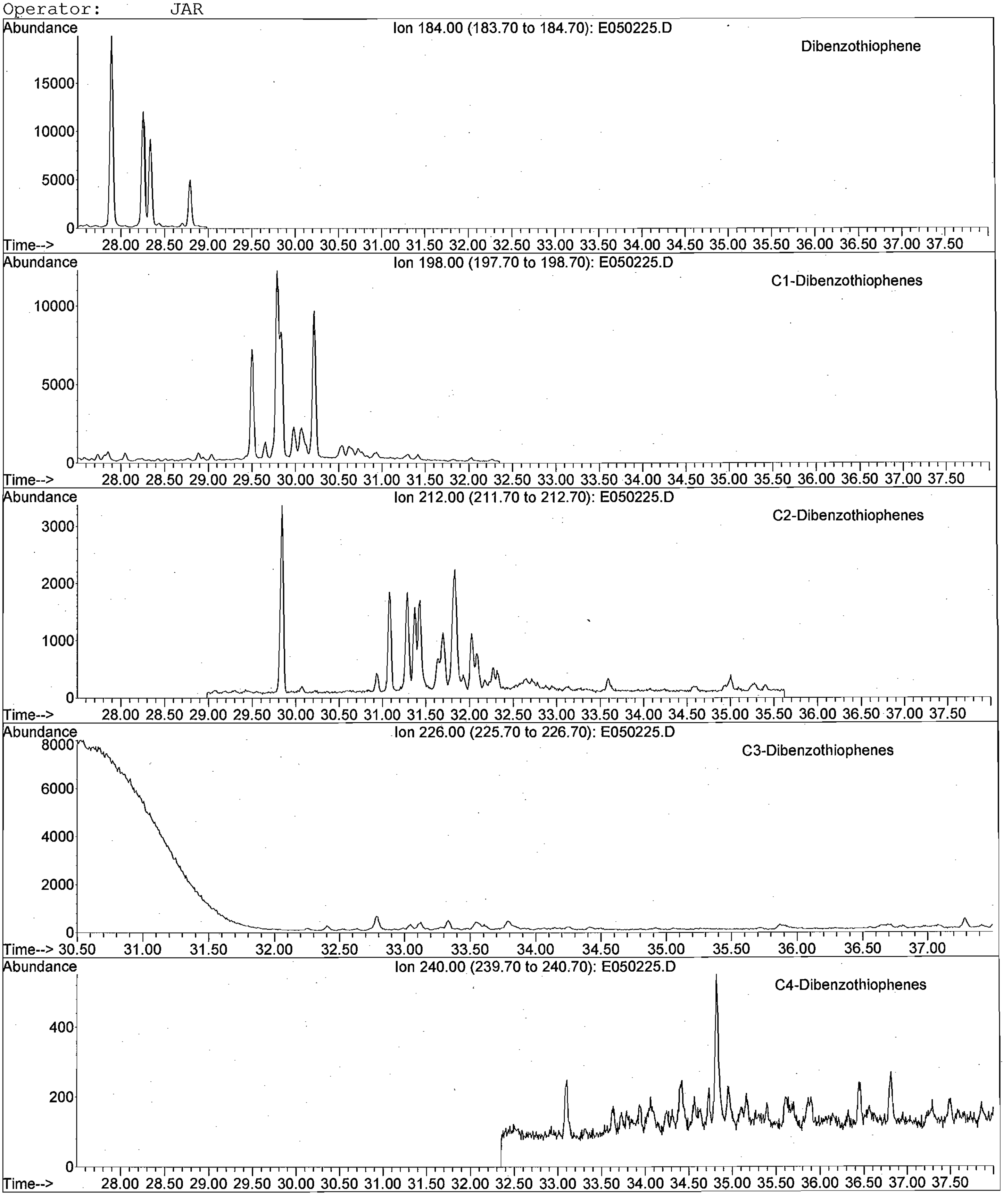

META Environmental, Inc.

GC/MS EXTRACTED ION CHROMATOGRAM

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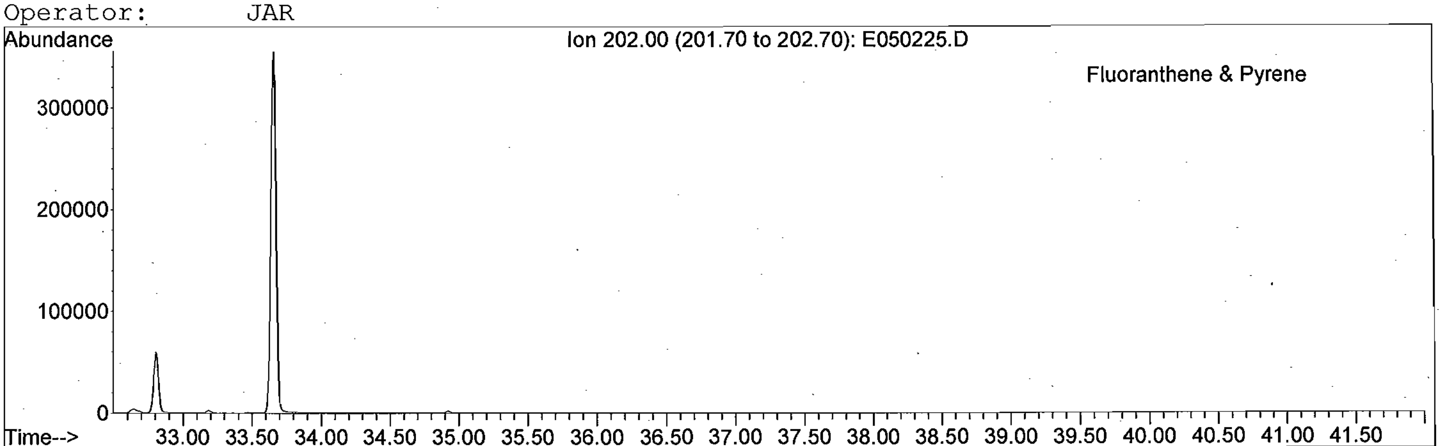

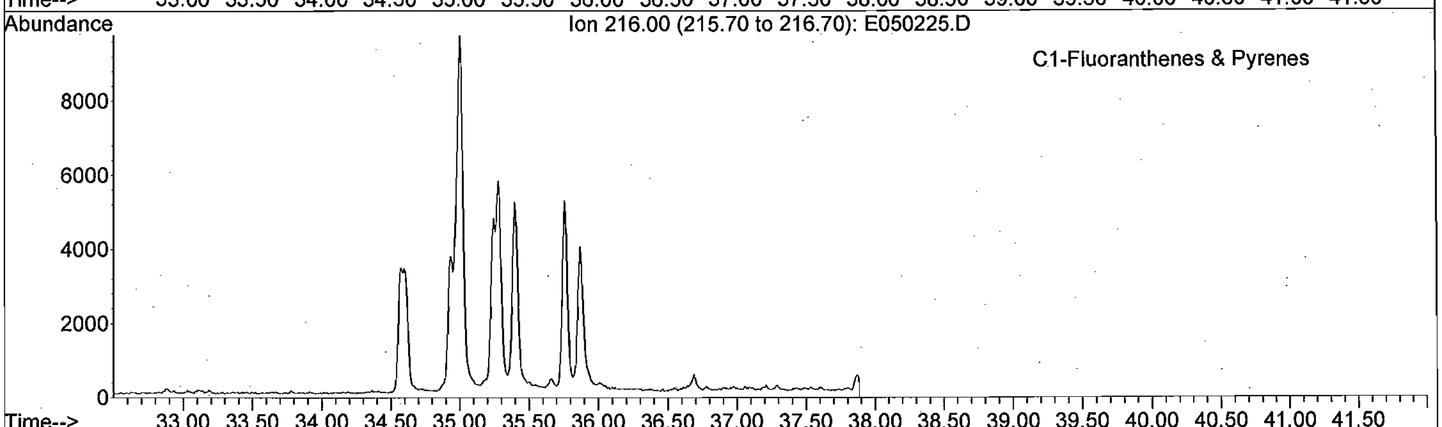

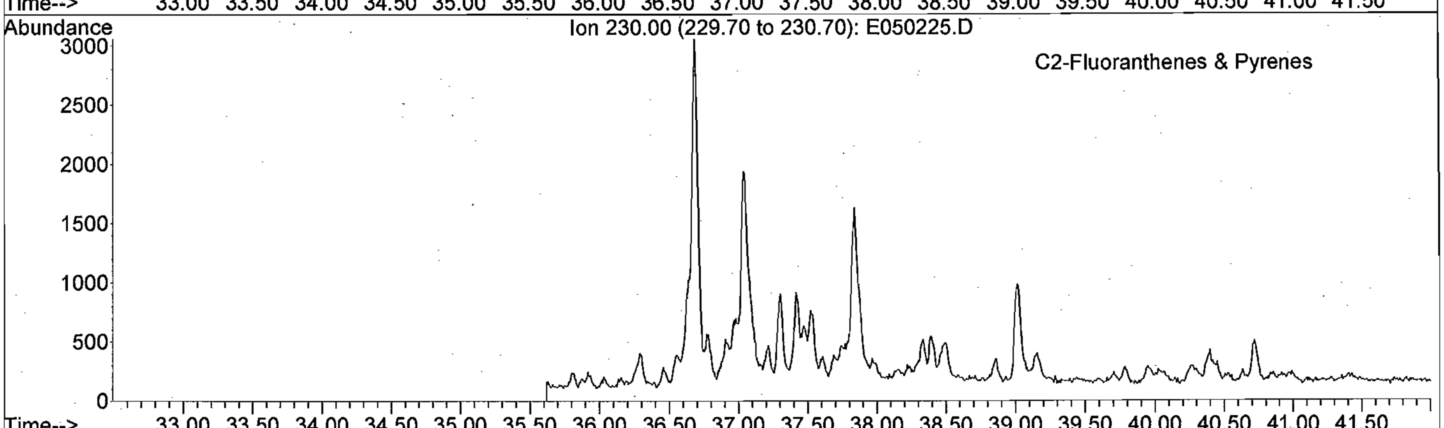

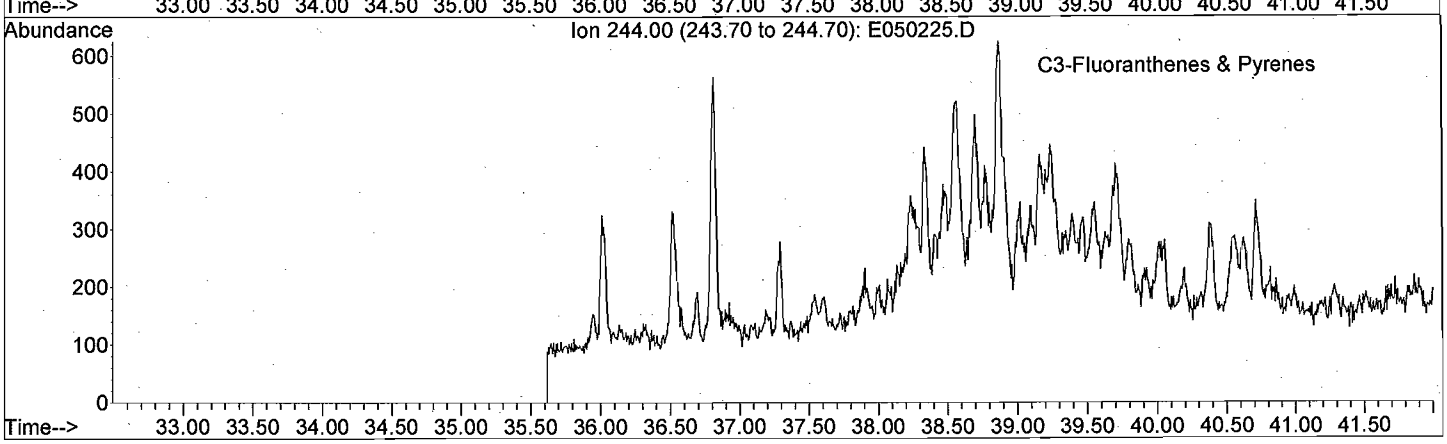

META Environmental, Inc.

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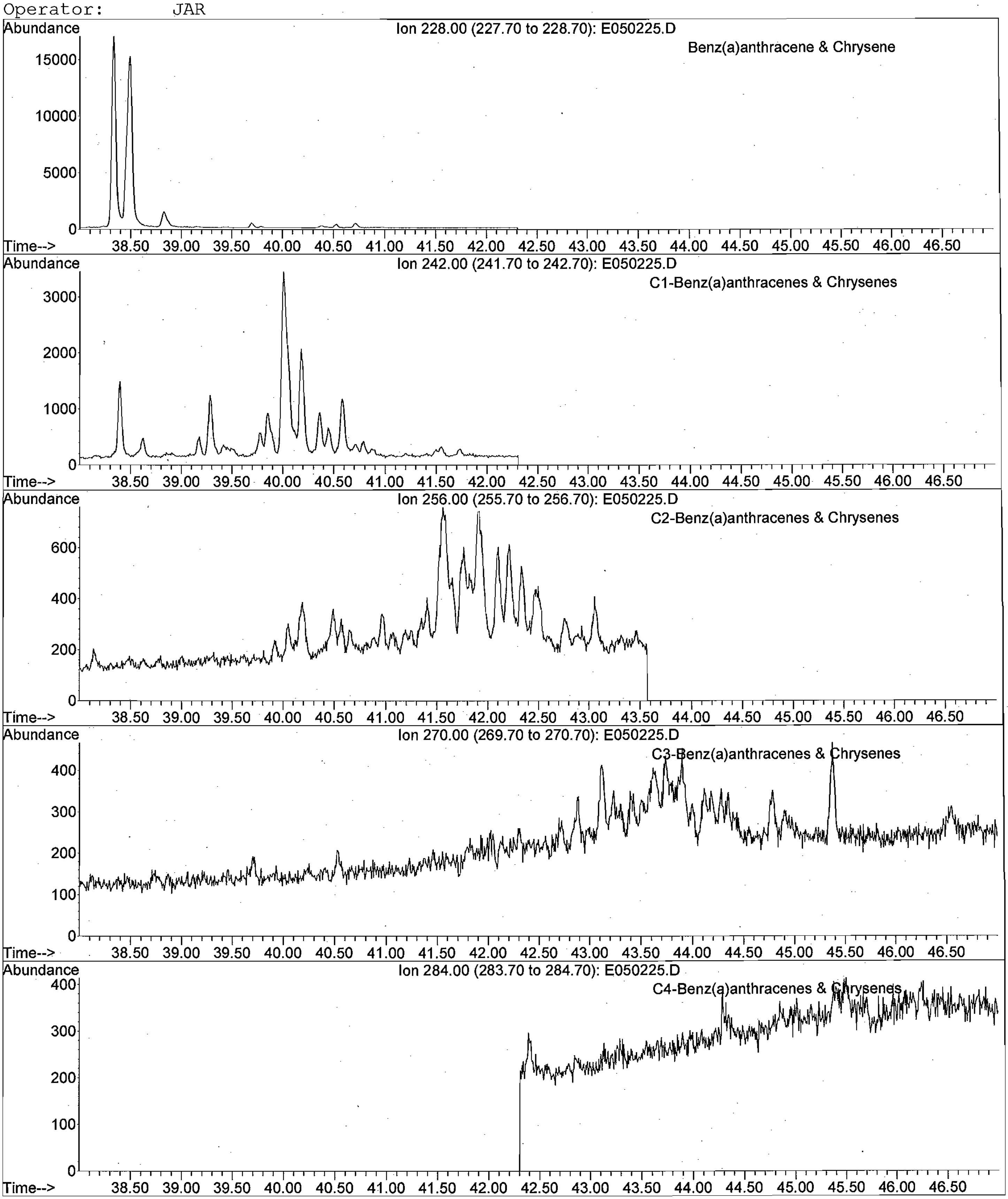

META Environmental, Inc.

GC/MS TOTAL ION CHROMATOGRAM

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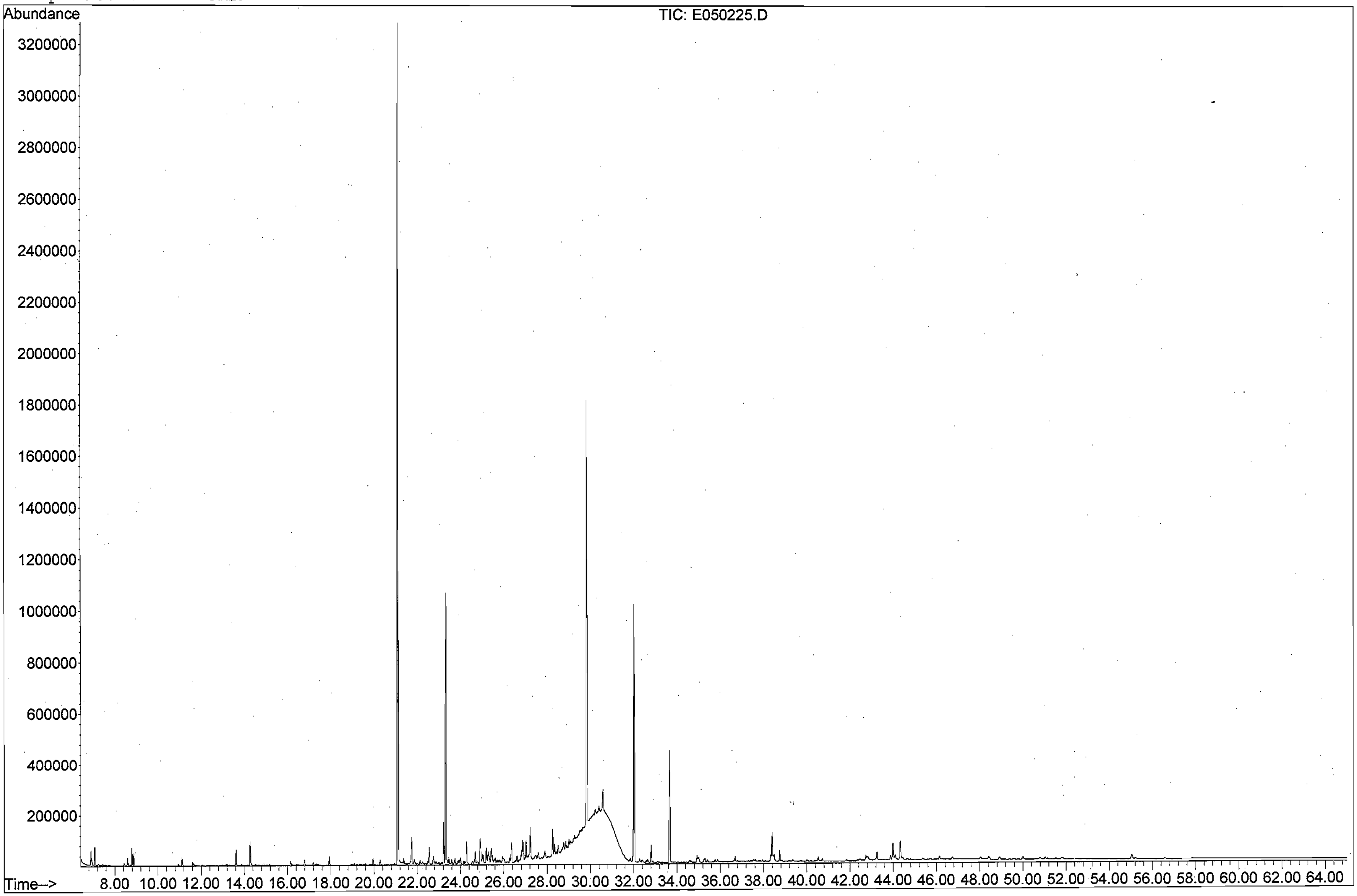
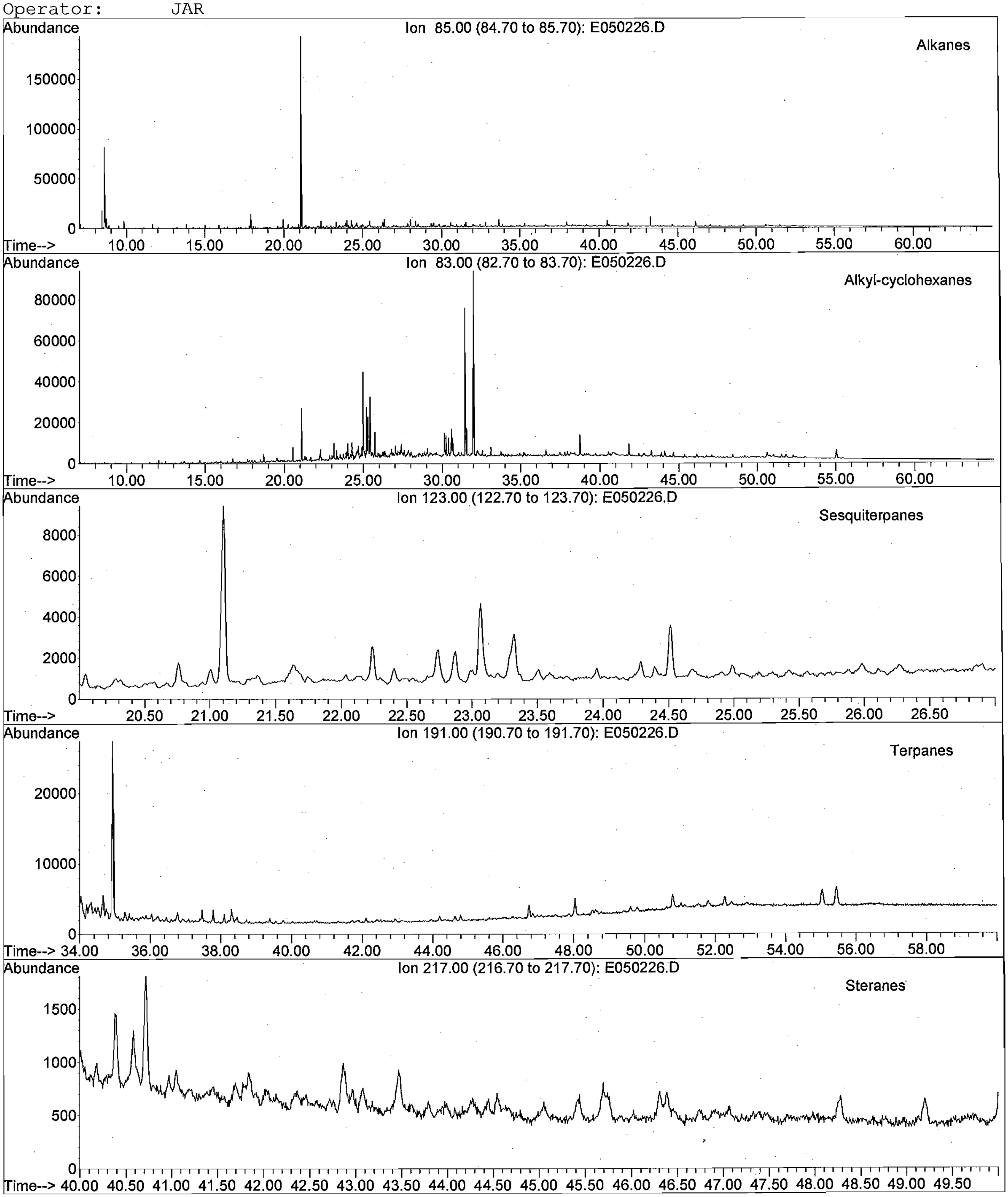
Operator: JAR



META Environmental, Inc.

GC/MS EXTRACTED ION CHROMATOGRAM

File: J:\1\DATA\E080502\E050226.D
Date Acquired: 3 May 2008 10:32 pm
Method File: 4008SIMA.M
Sample Name: EK080415-10
Misc Info: TS18 (1-2)
Operator: JAR



META Environmental, Inc.

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Sample Name: EK080415-10
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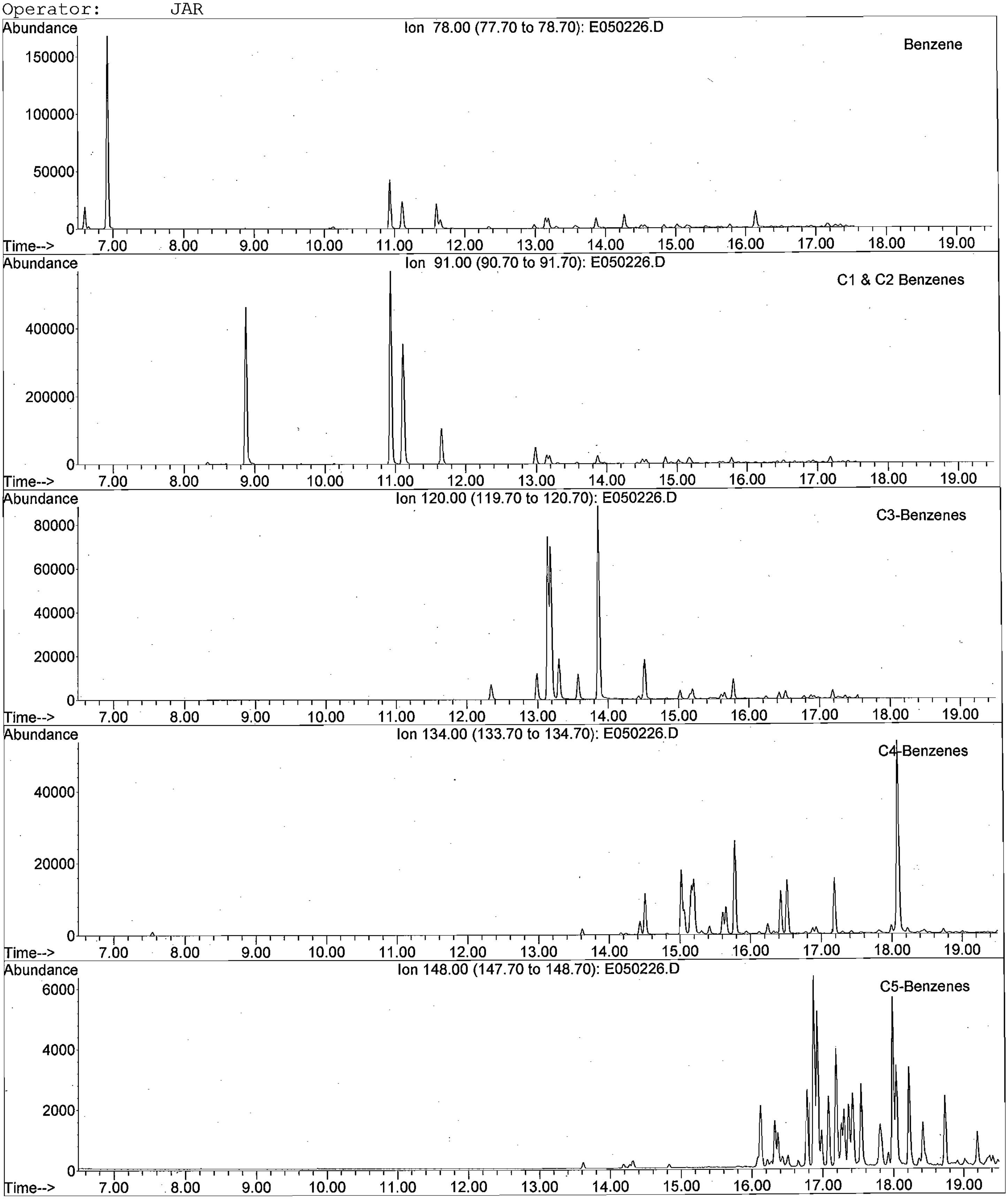
Operator: JAR



META Environmental, Inc.

GC/MS EXTRACTED ION CHROMATOGRAM

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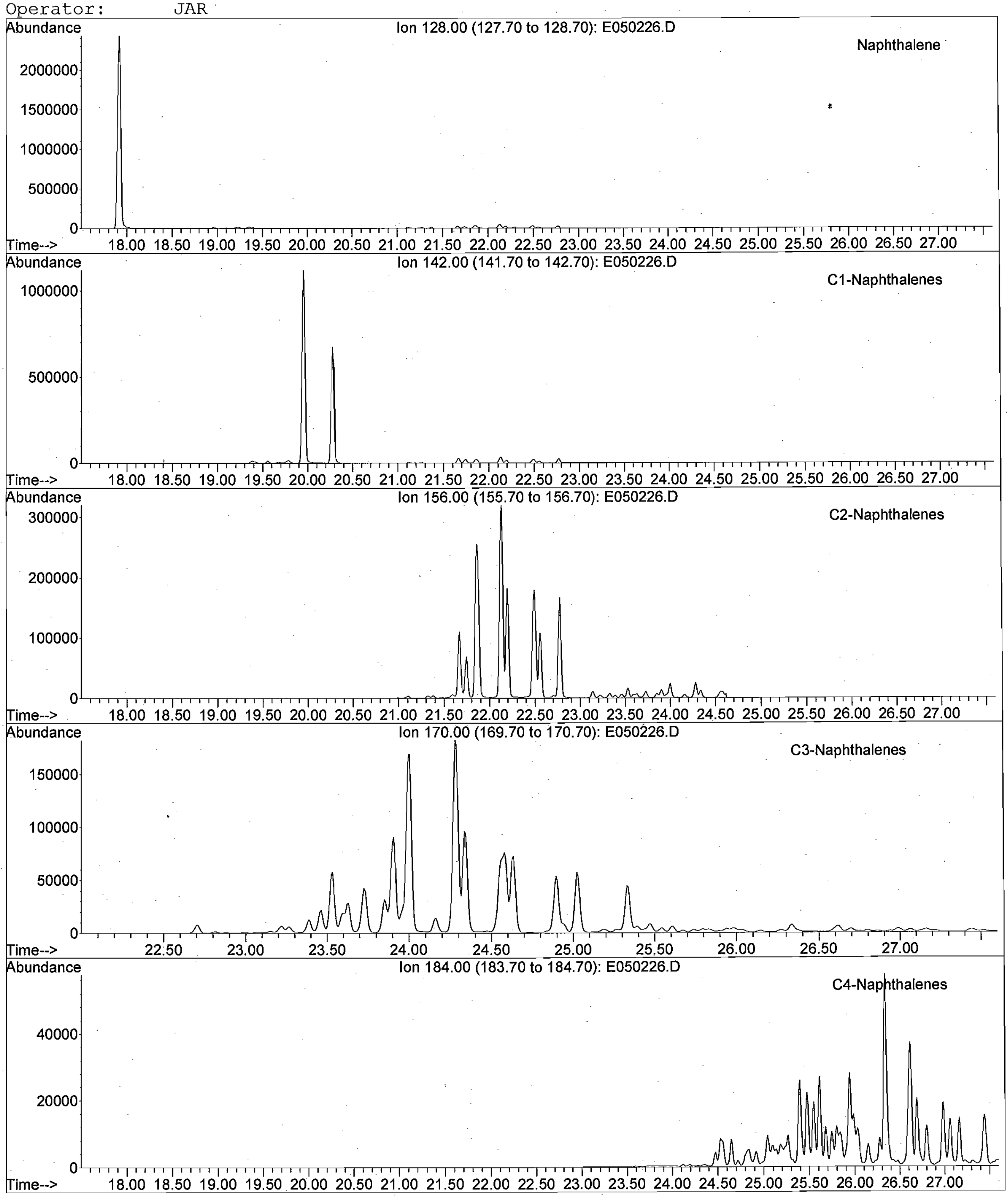

META Environmental, Inc.

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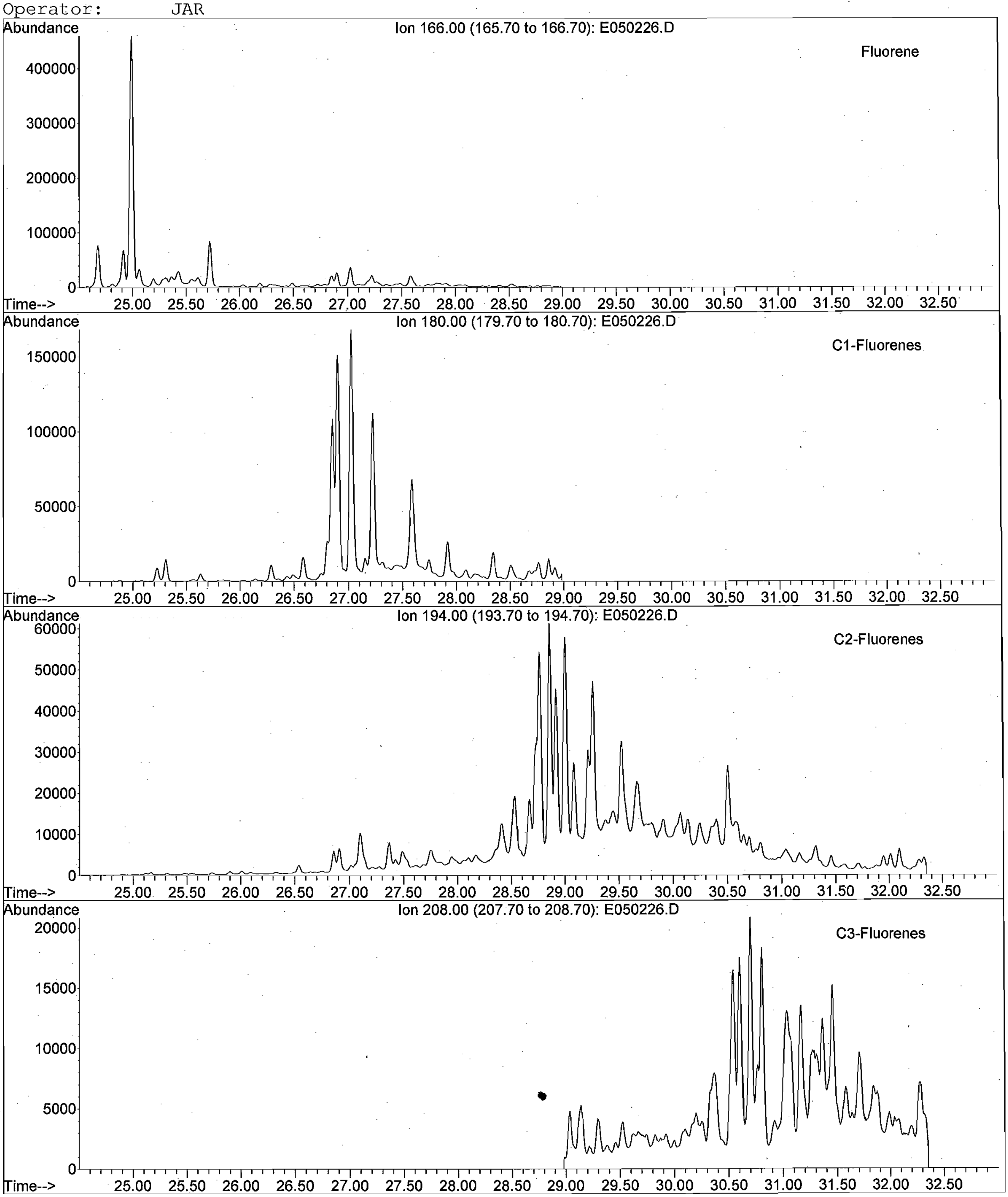

META Environmental, Inc.

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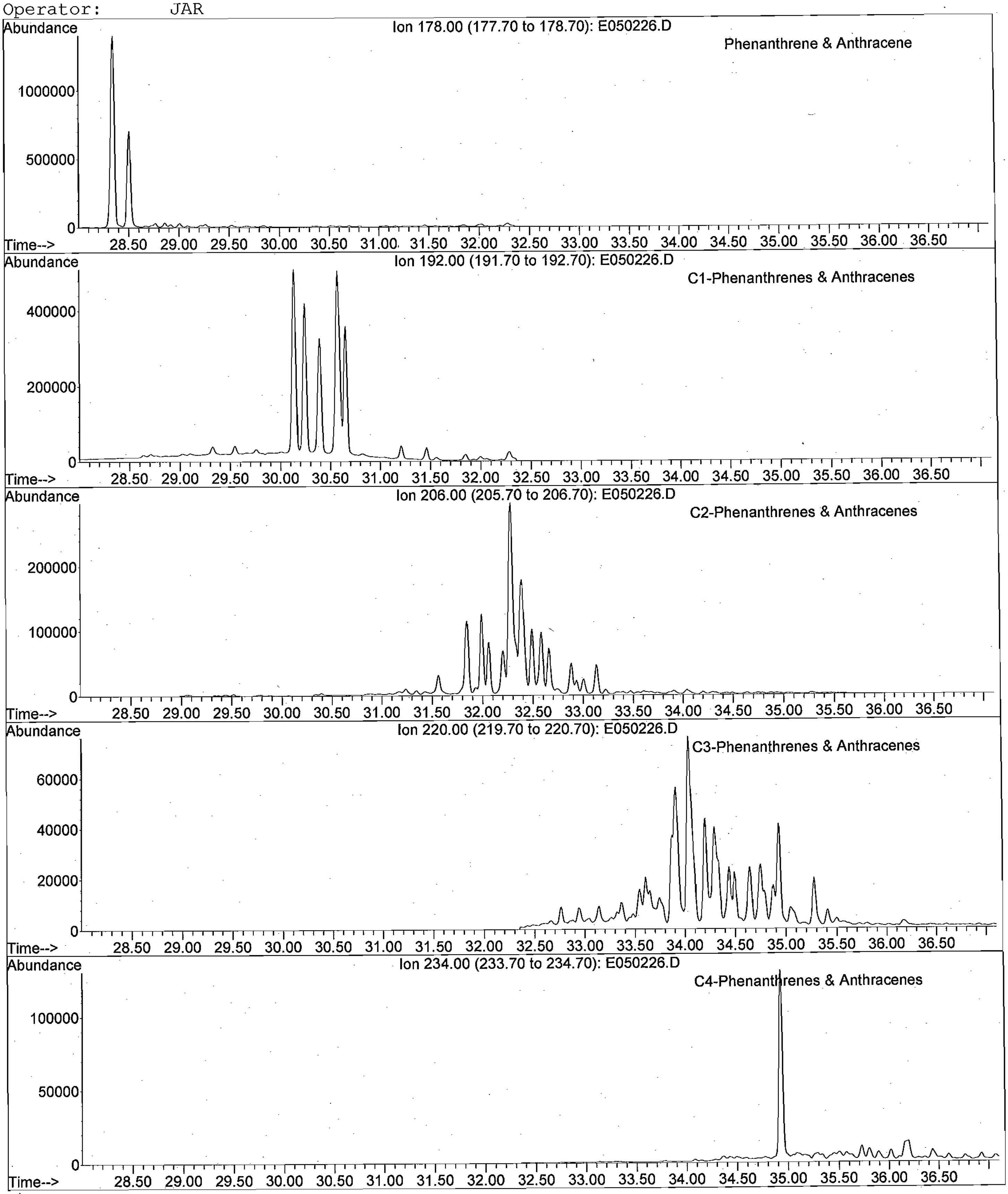

META Environmental, Inc.

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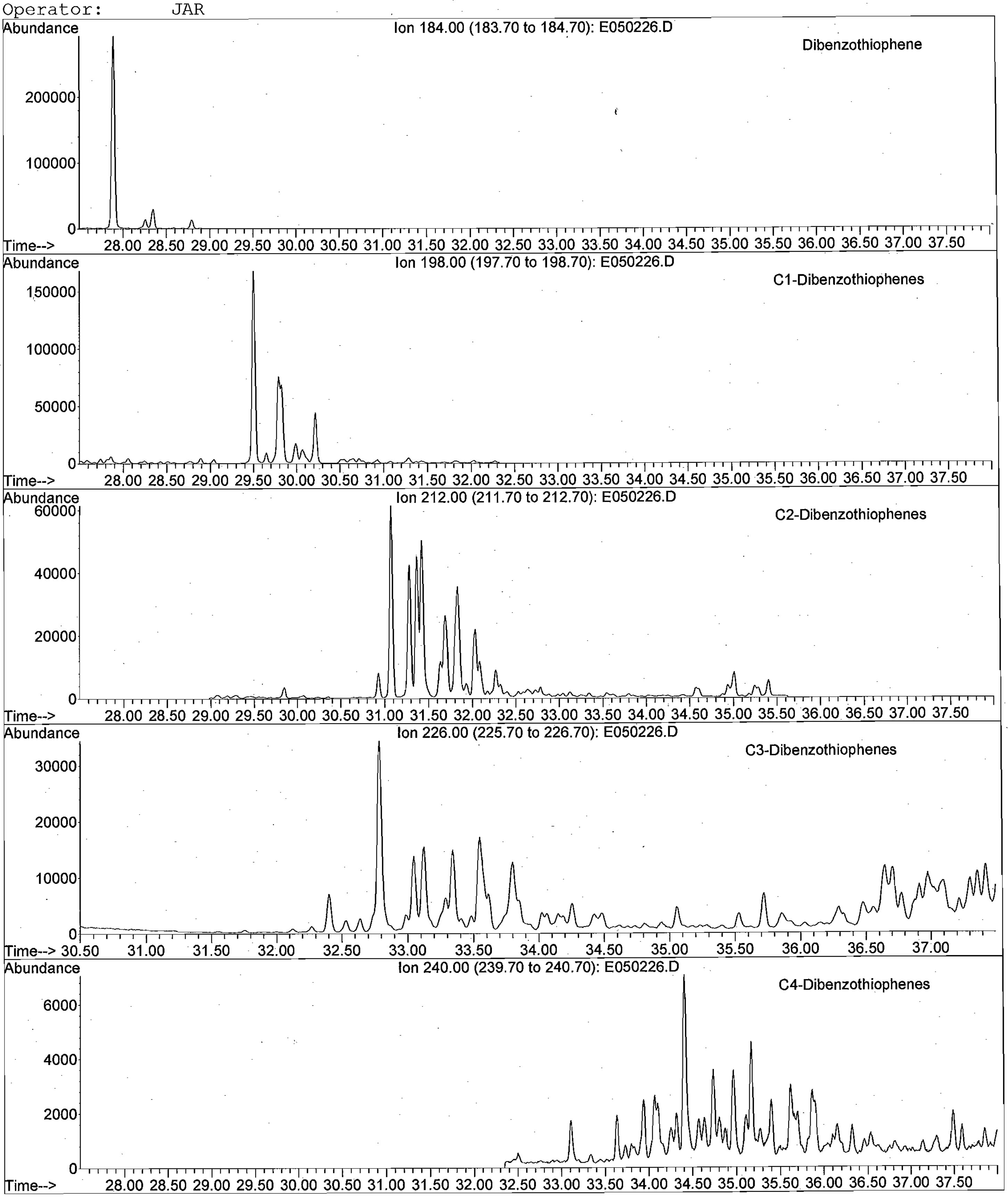

META Environmental, Inc.

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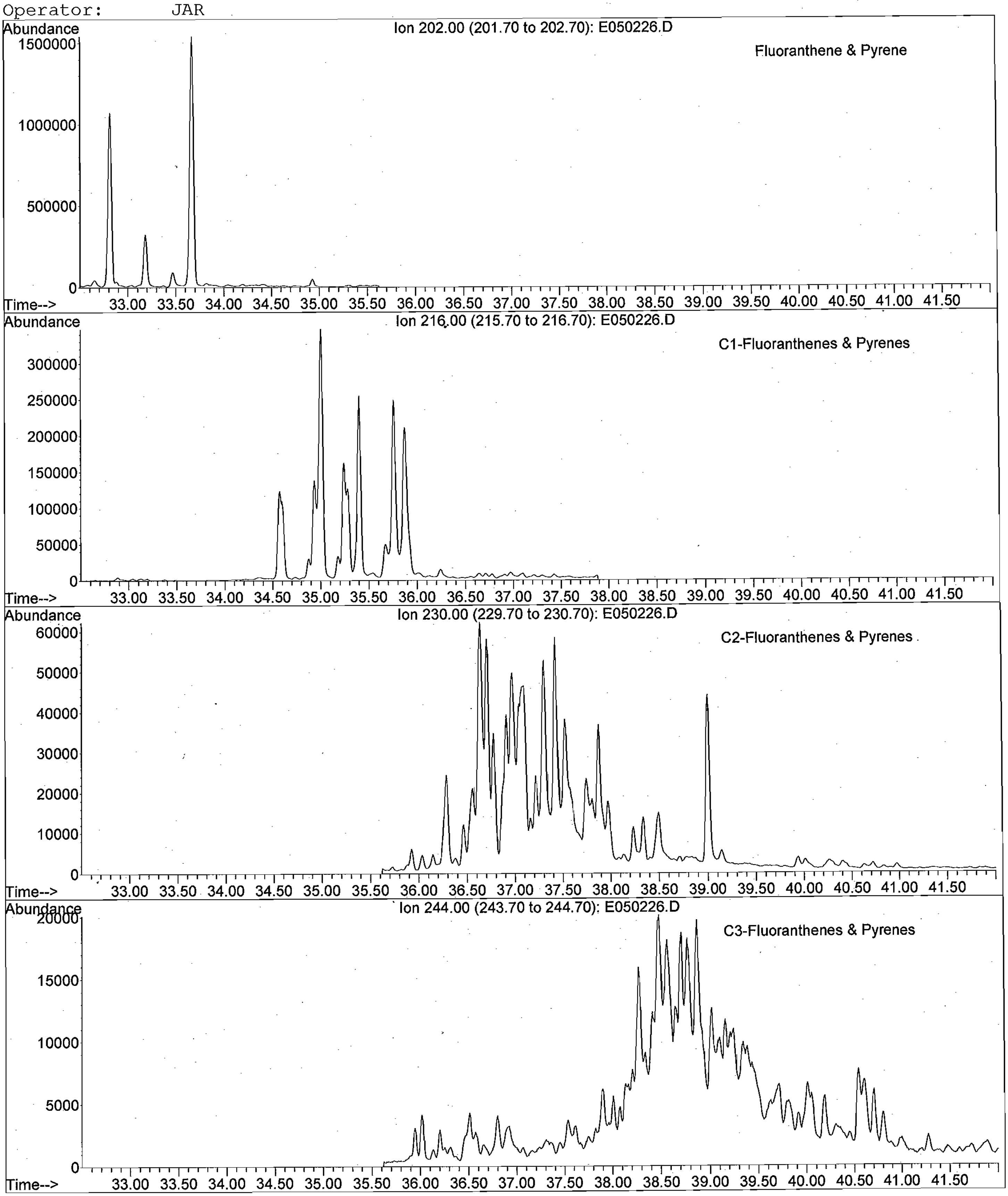

META Environmental, Inc.

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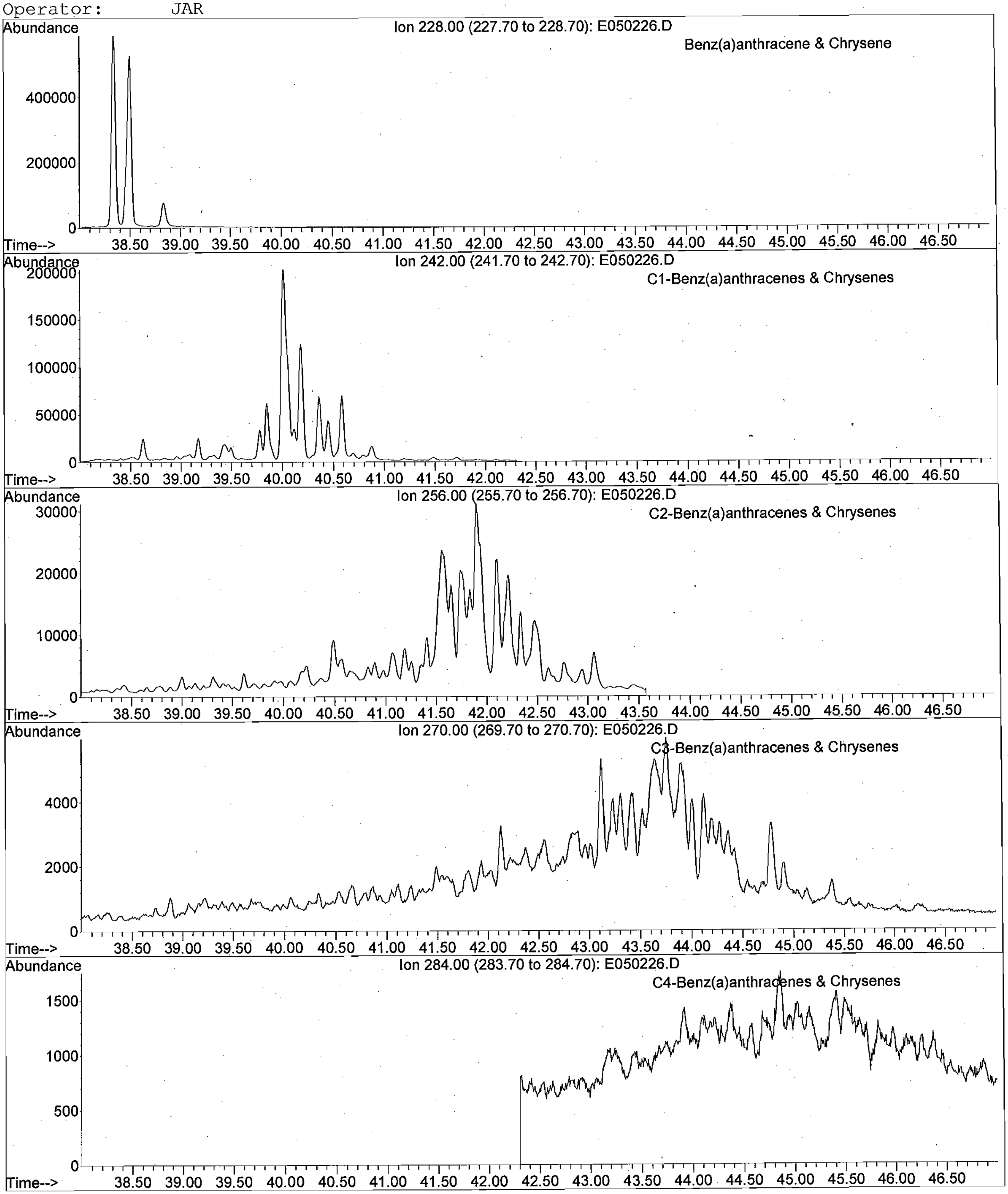

META Environmental, Inc.

GC/MS TOTAL ION CHROMATOGRAM

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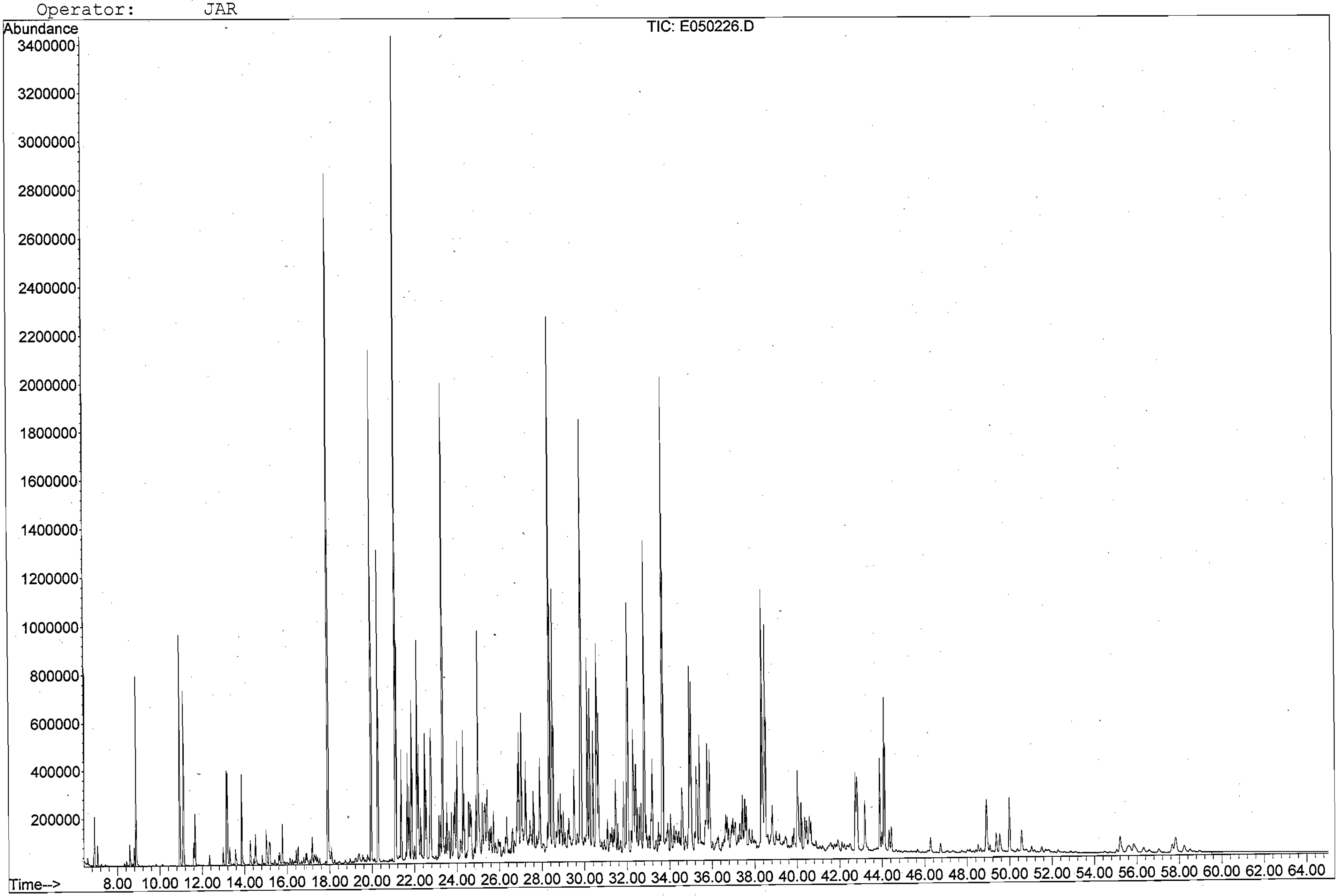
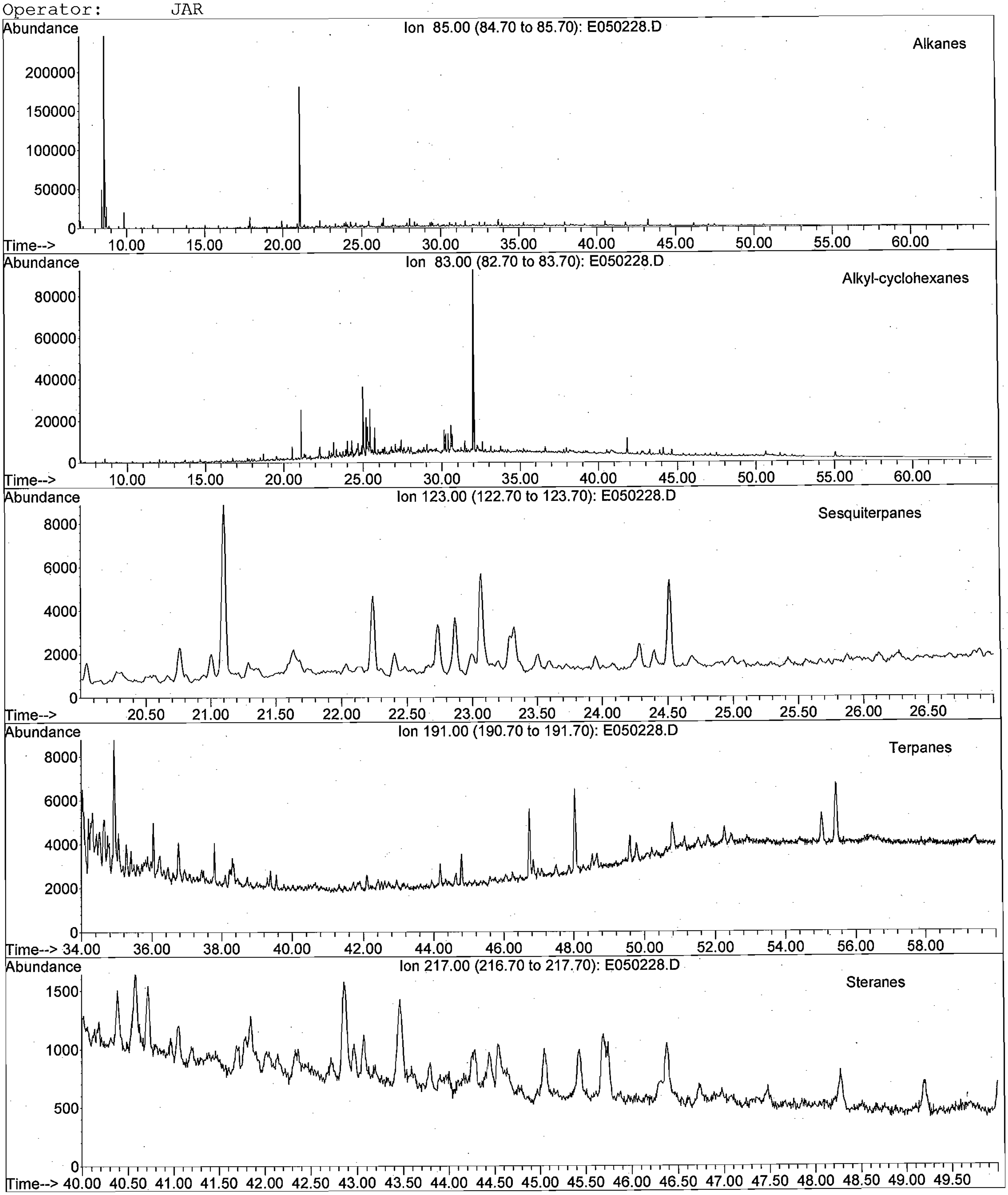


META Environmental, Inc.

GC/MS EXTRACTED ION CHROMATOGRAM

File: J:\1\DATA\E080502\E050228.D
Date Acquired: 4 May 2008 1:02 am
Method File: 4008SIMA.M
Sample Name: EK080415-11
Misc Info: TS17 (2-3)
Operator: JAR



META Environmental, Inc.

GC/MS EXTRACTED ION CHROMATOGRAM

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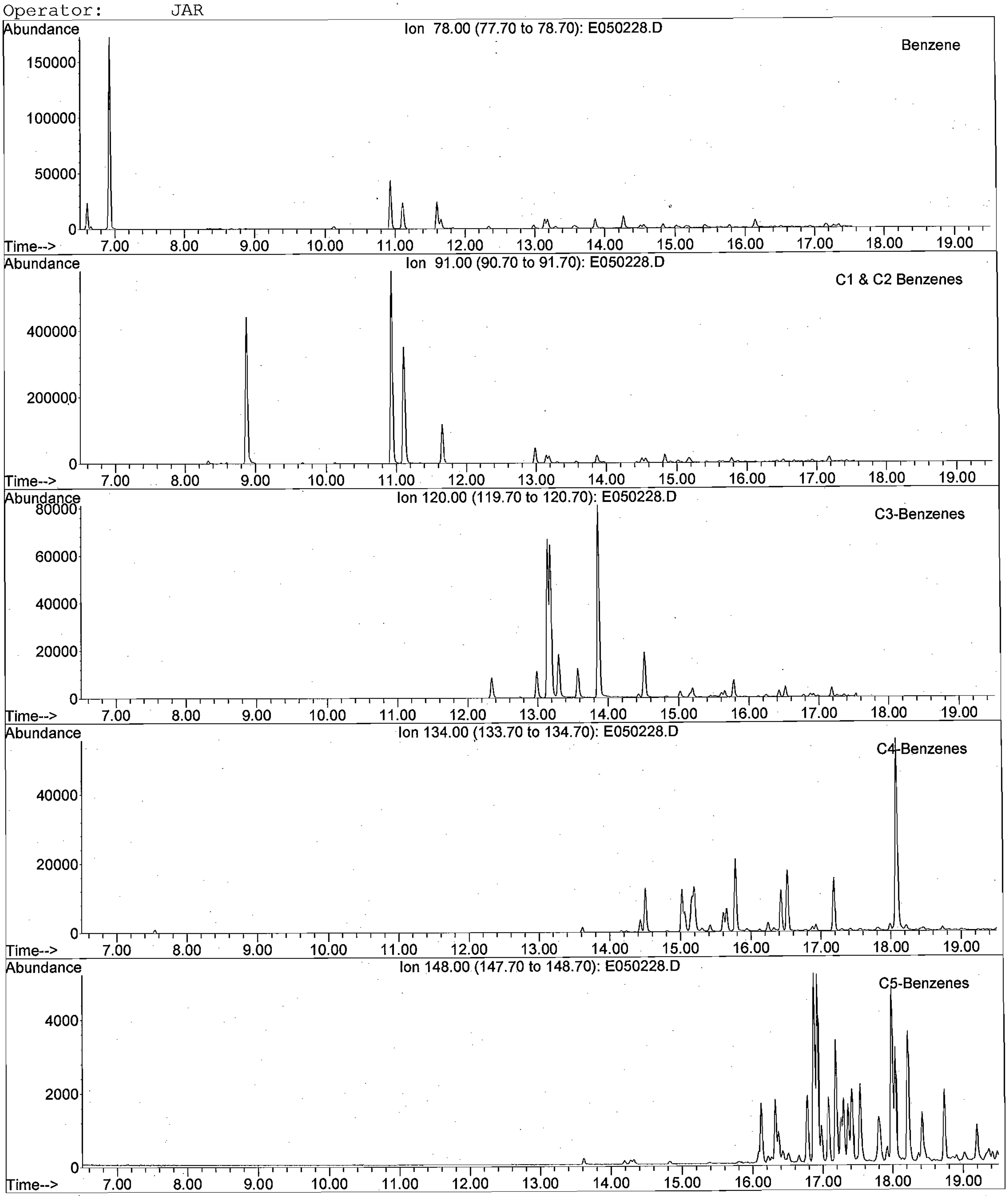
Operator: JAR



META Environmental, Inc.

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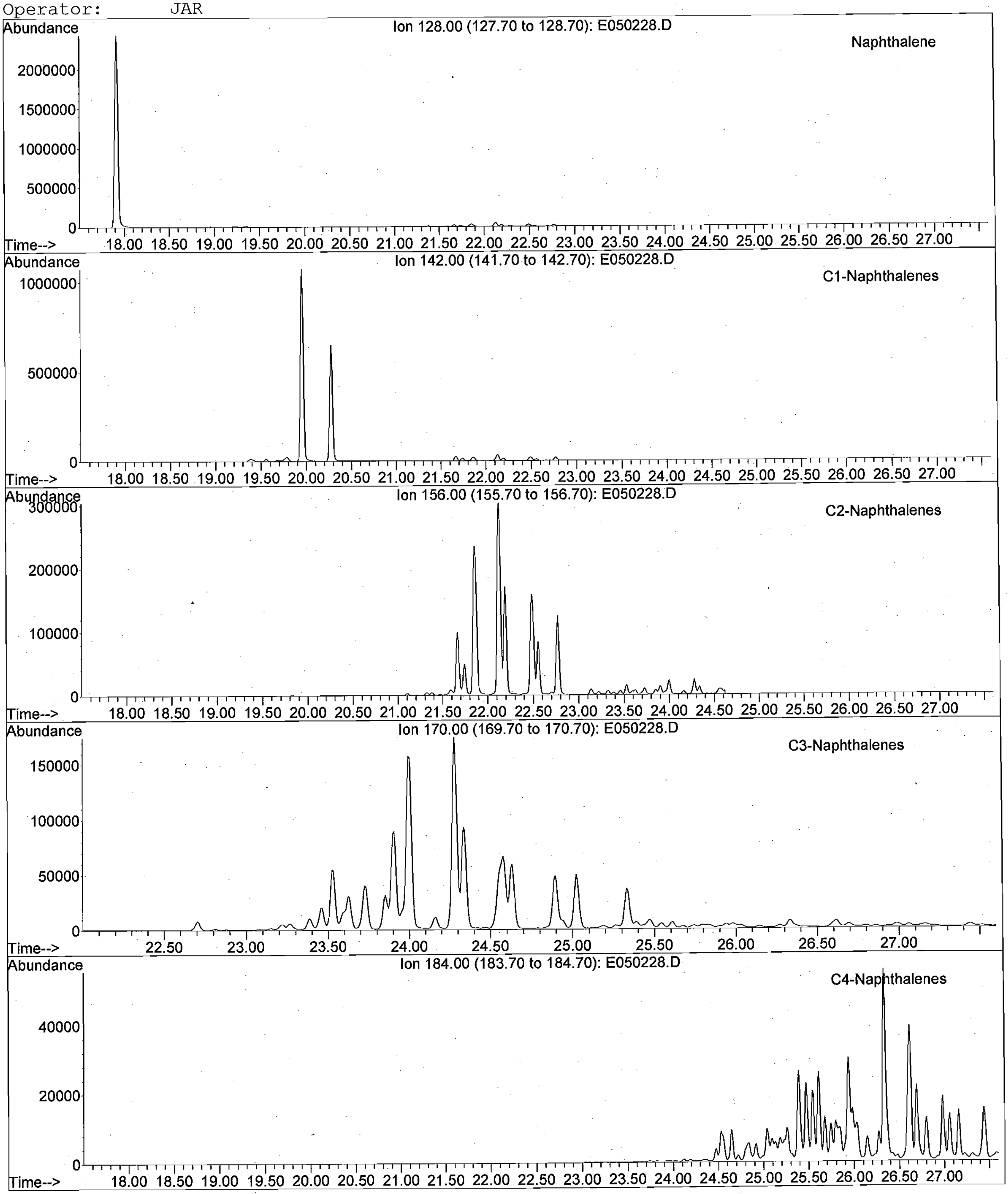

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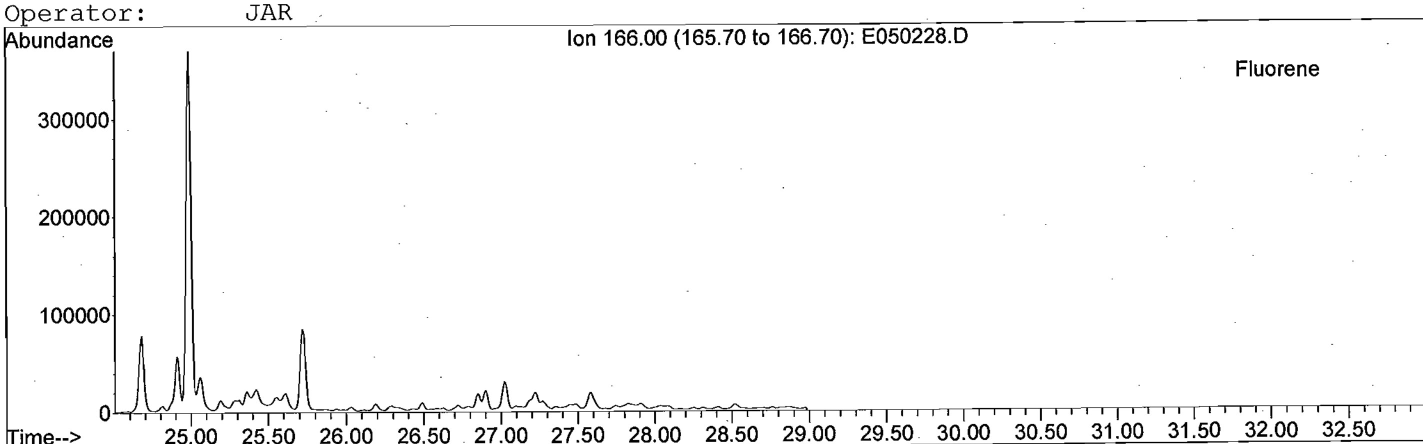

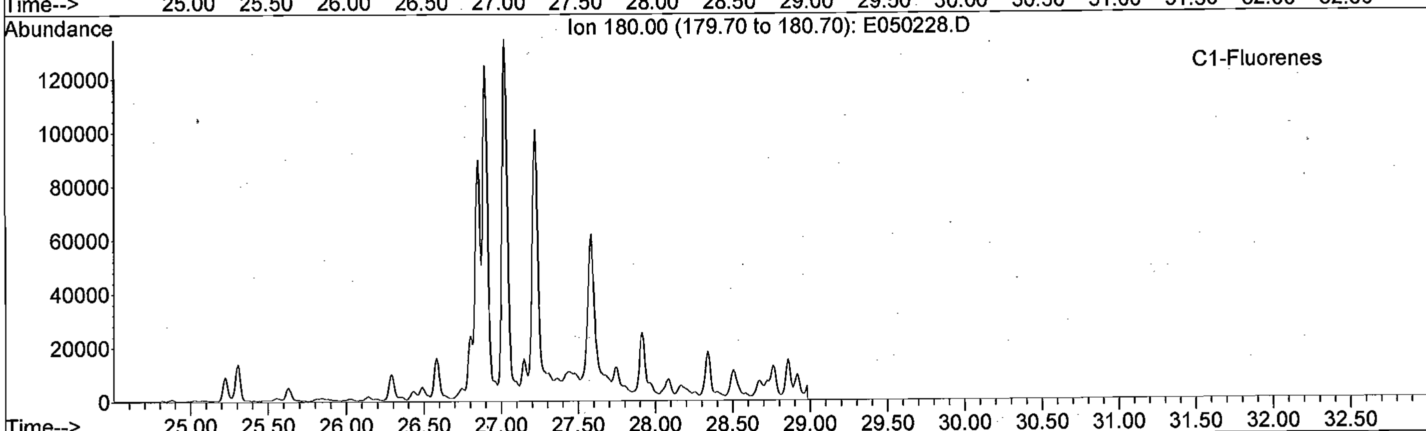

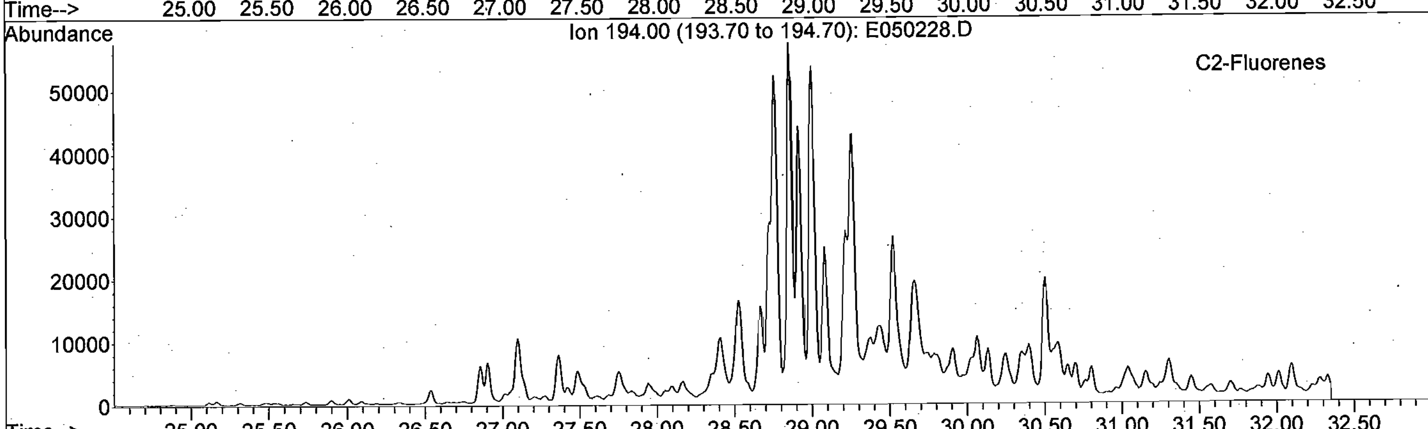

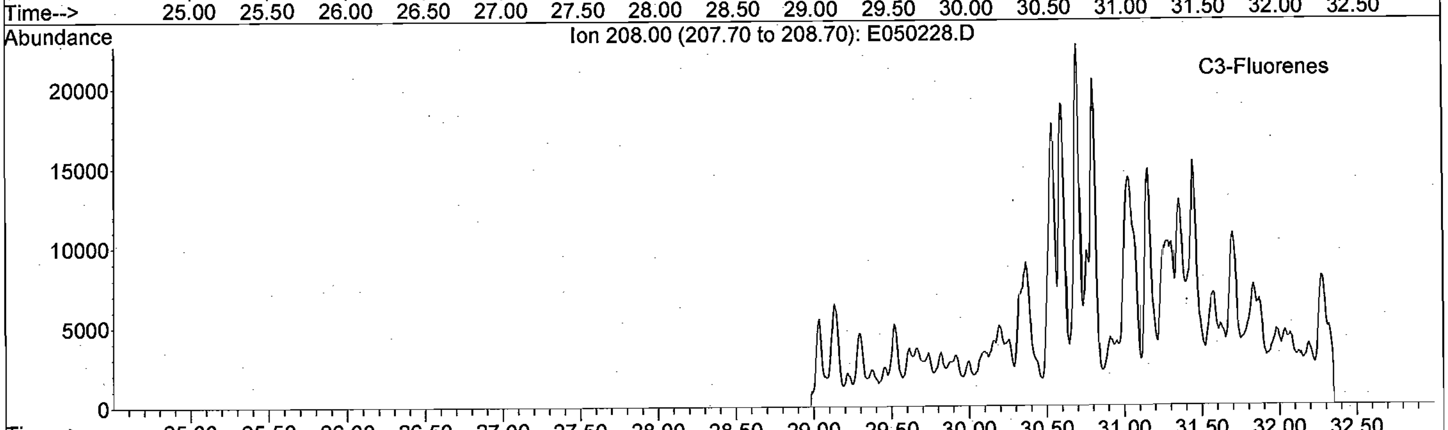

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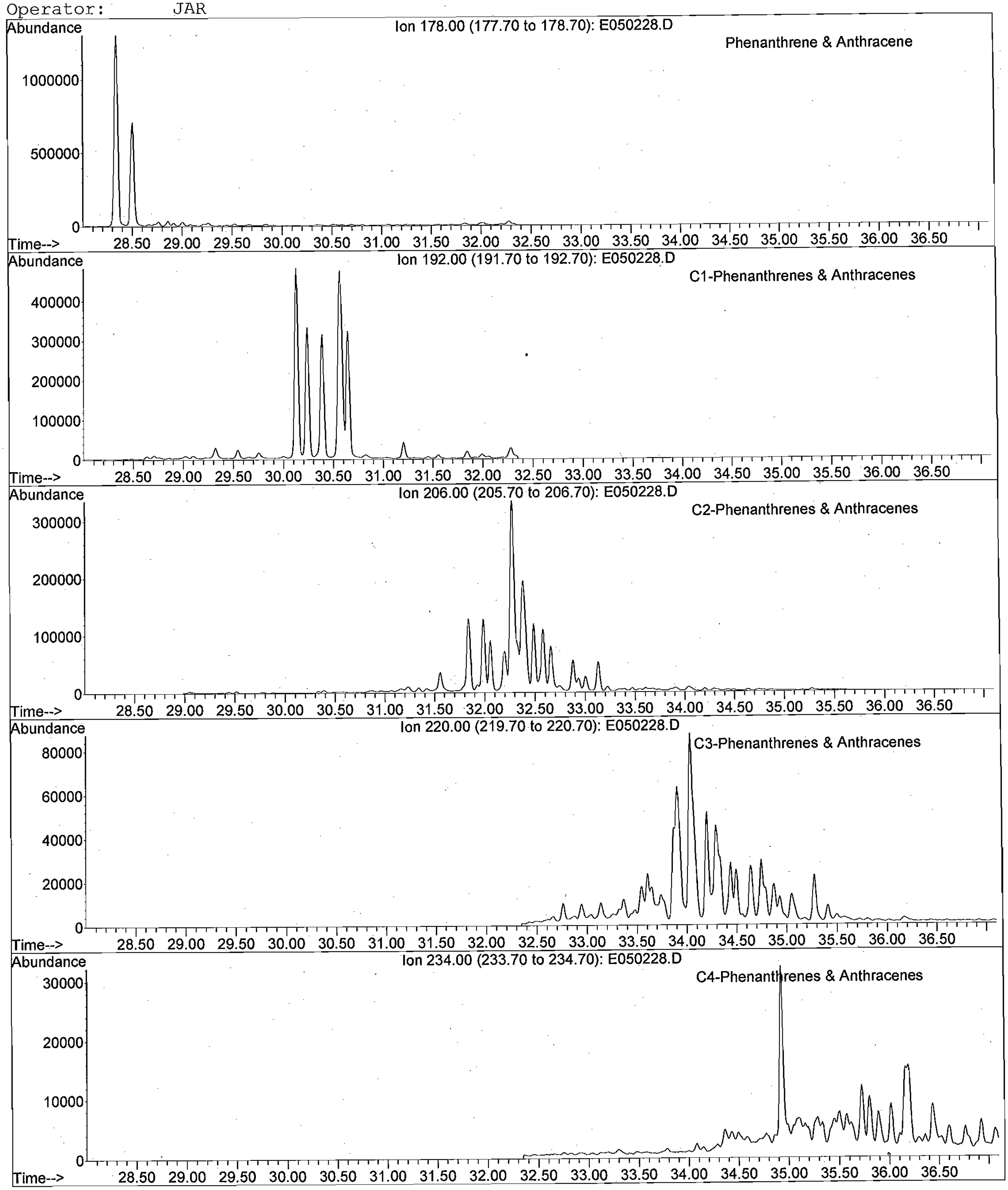

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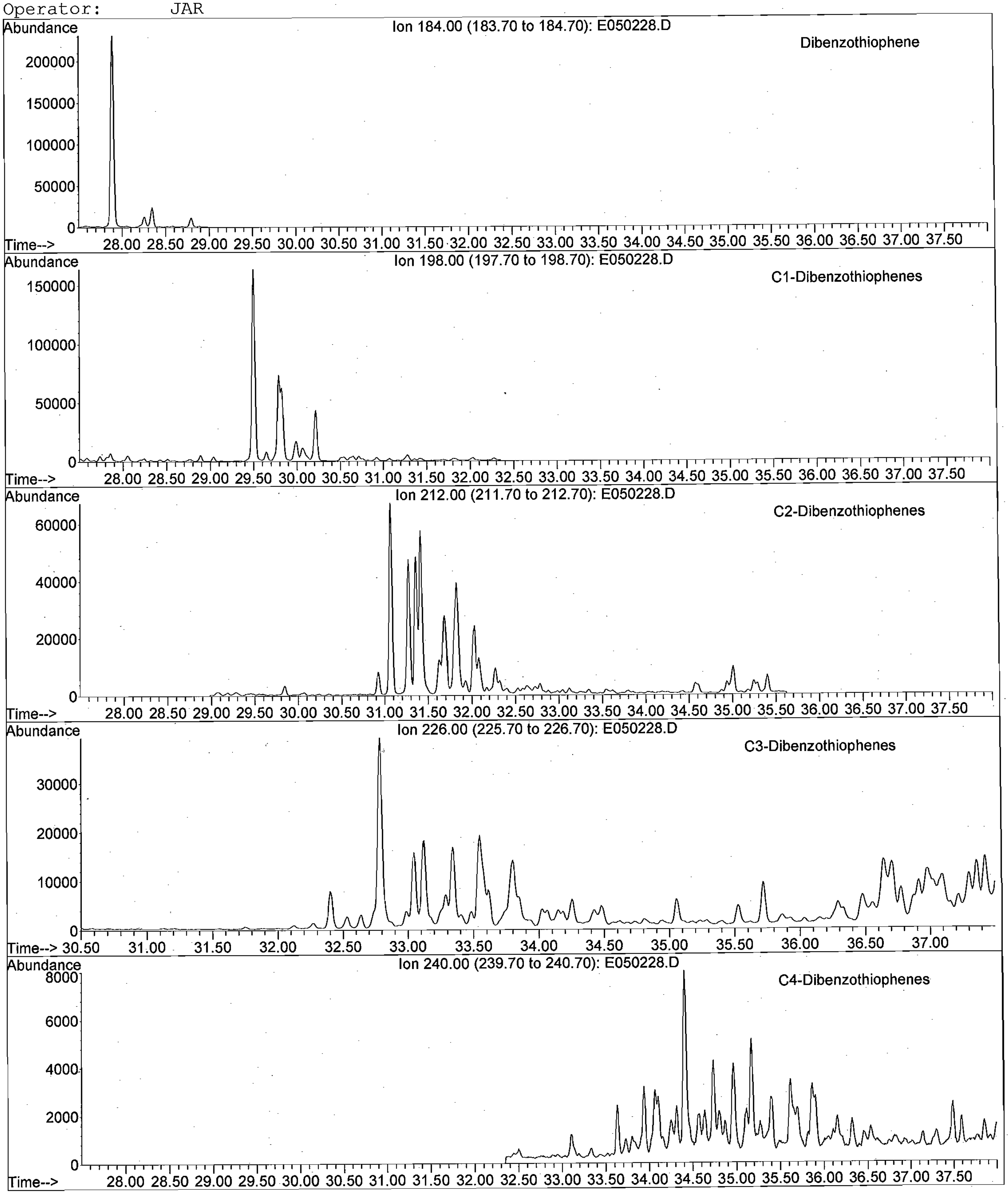

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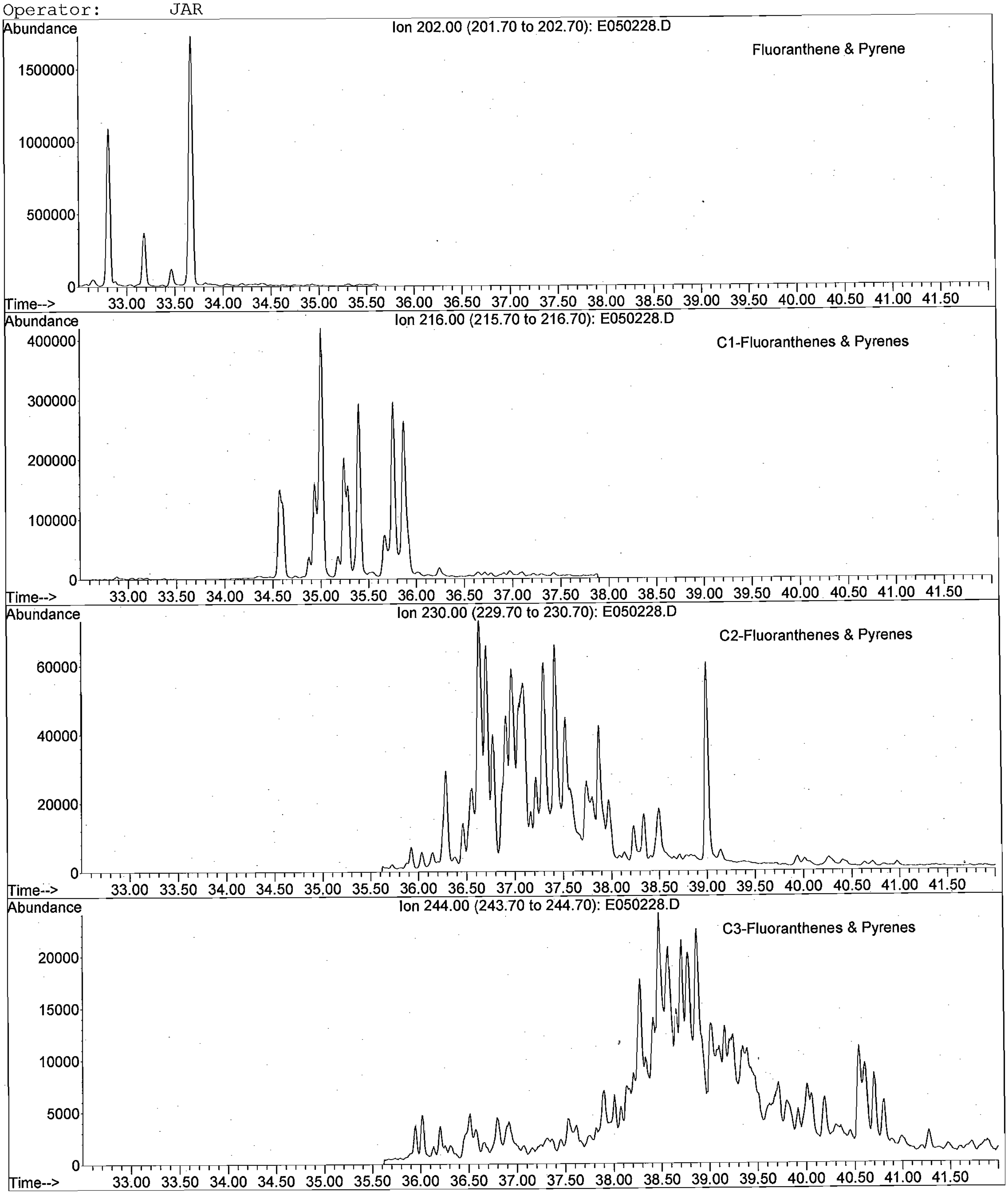
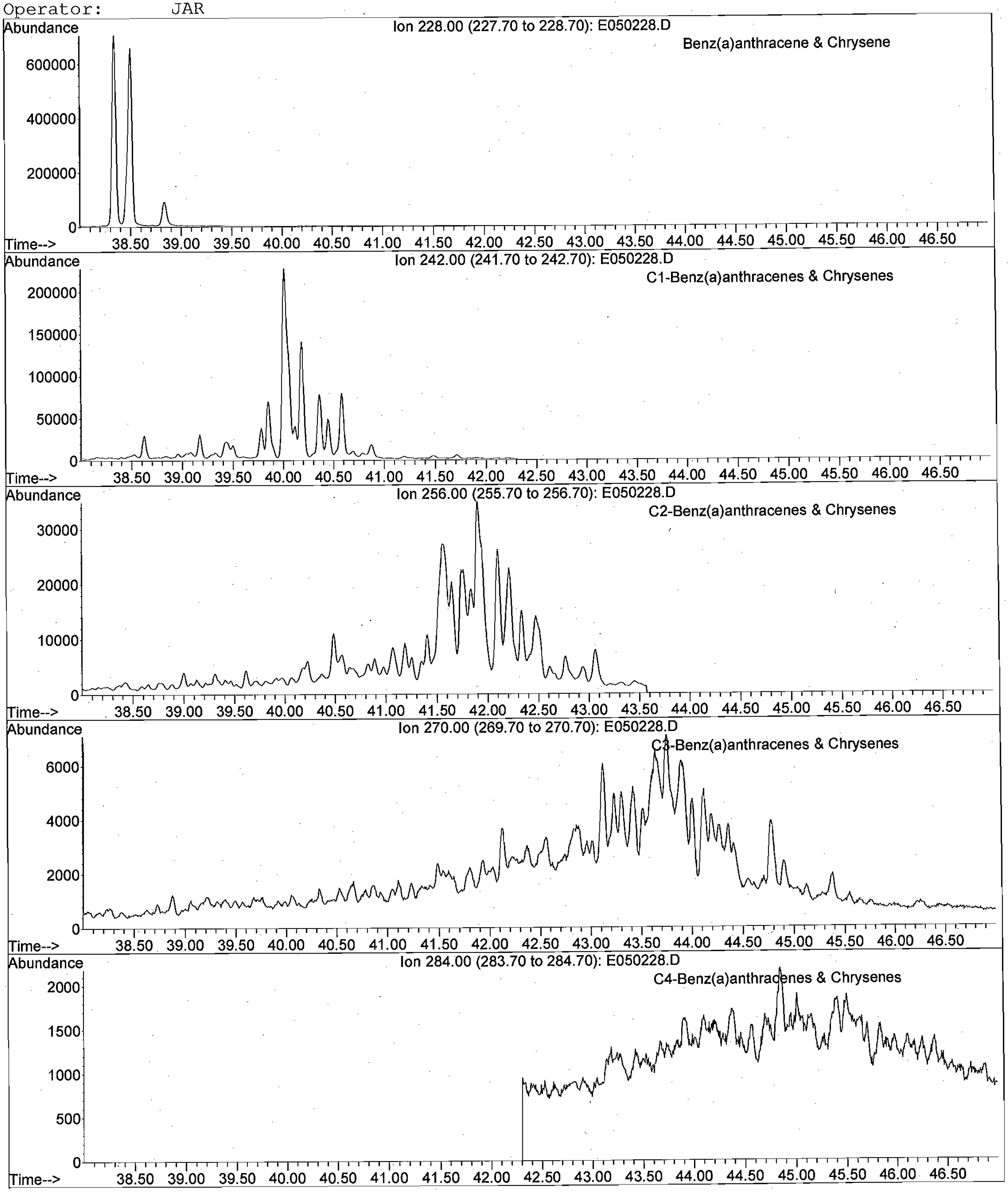


META Environmental, Inc.

GC/MS EXTRACTED ION CHROMATOGRAM

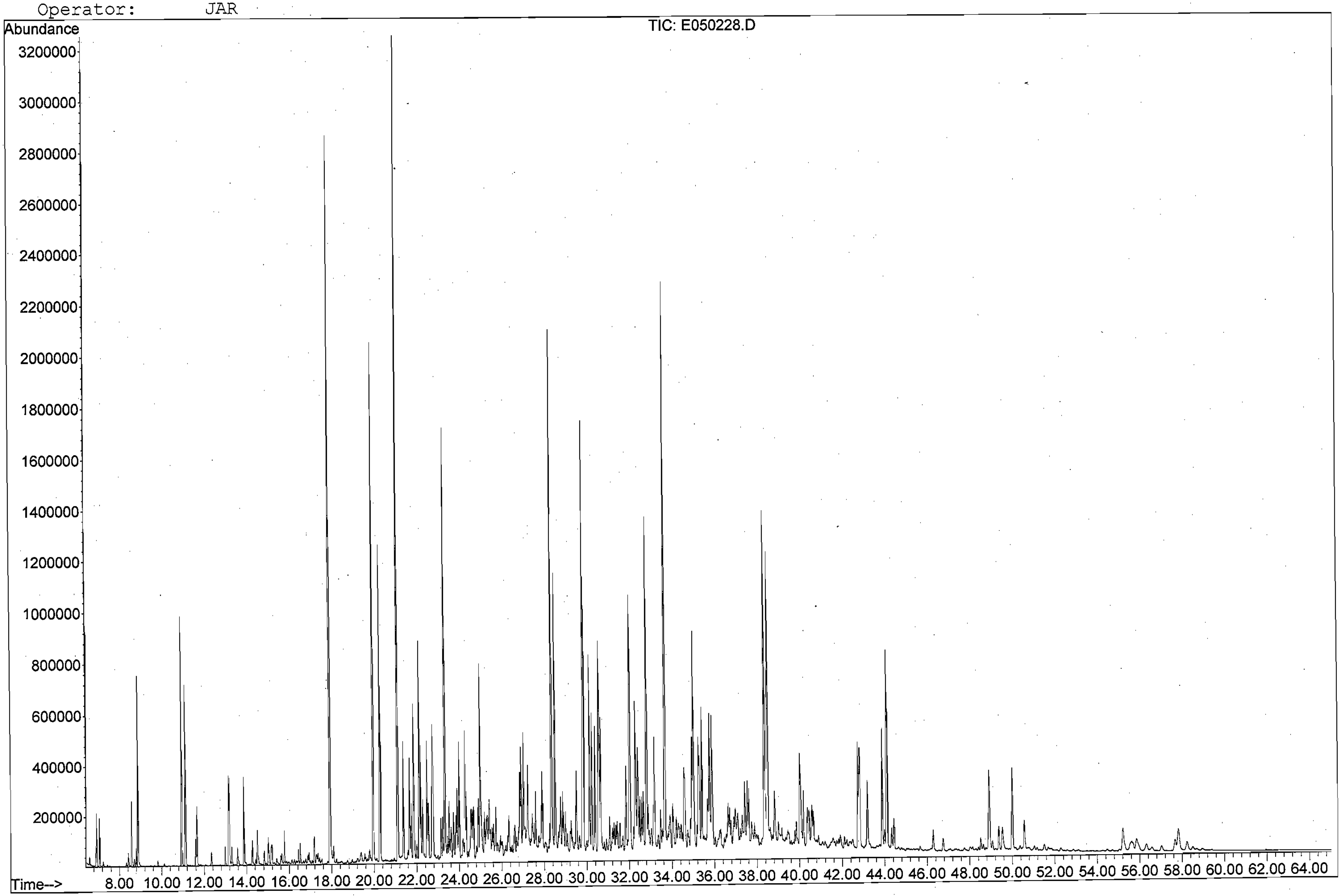
File: J:\1\DATA\E080502\E050228.D
Date Acquired: 4 May 2008 1:02 am
Method File: 4008SIMA.M
Sample Name: EK080415-11
Misc Info: TS17 (2-3)
Operator: JAR



META Environmental, Inc.

GC/MS TOTAL ION CHROMATOGRAM

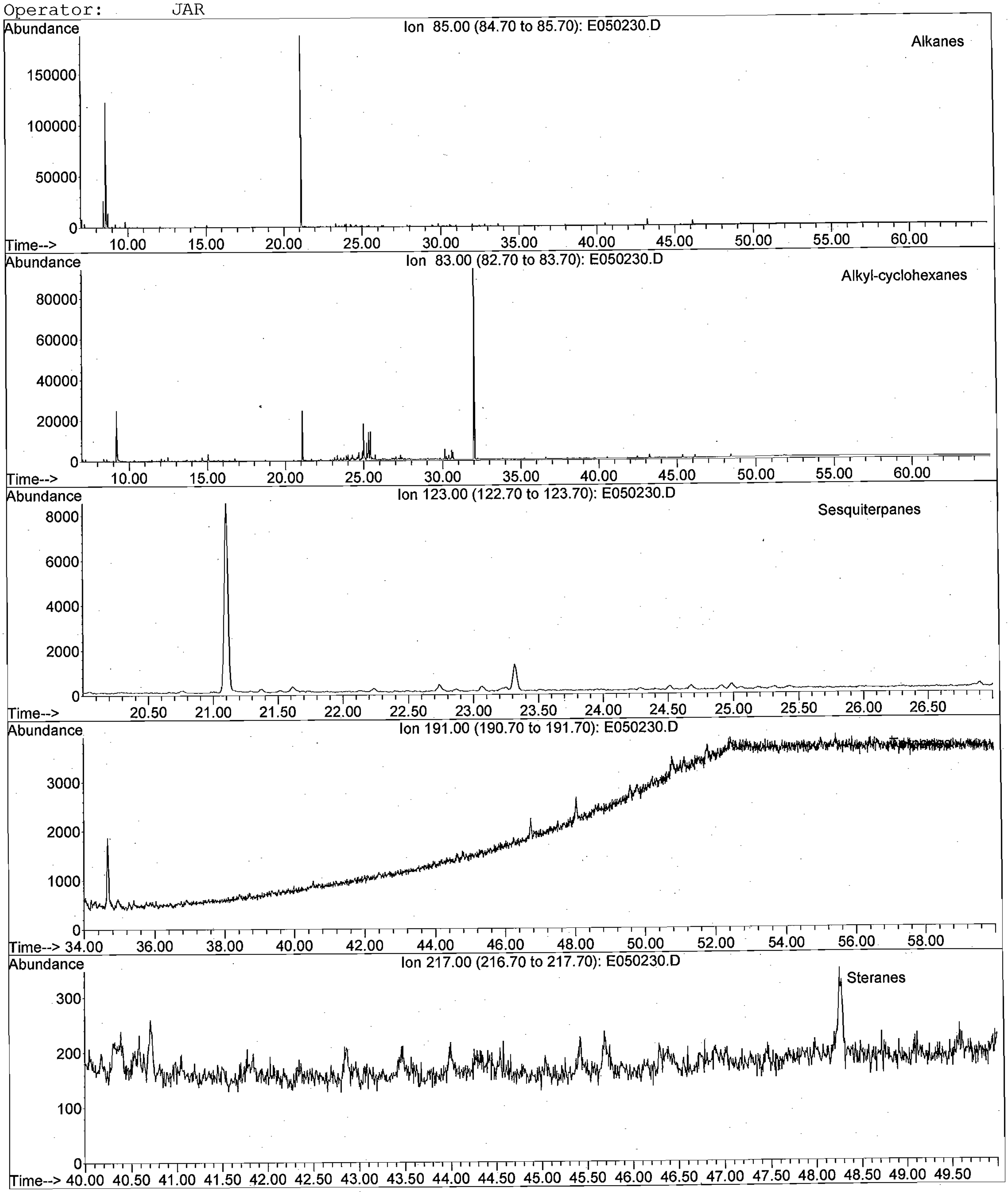
File: J:\1\DATA\E080502\E050228.D
Date Acquired: 4 May 2008 1:02 am
Method File: 4008SIMA.M
Sample Name: EK080415-11
Misc Info: TS17 (2-3)
Operator: JAR



META Environmental, Inc.

GC/MS EXTRACTED ION CHROMATOGRAM

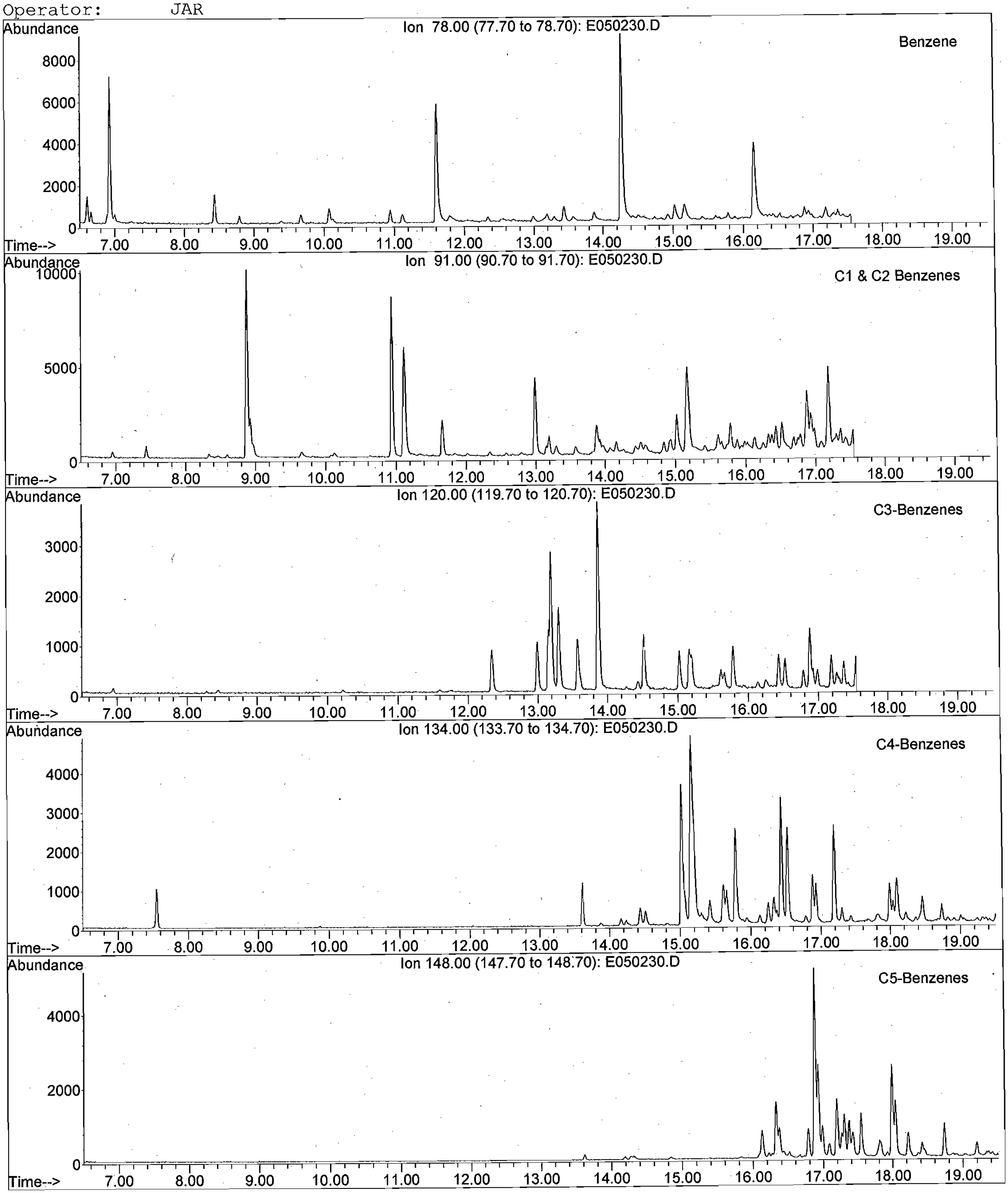
File: J:\1\DATA\E080502\E050230.D
Date Acquired: 4 May 2008 3:31 am
Method File: 4008SIMA.M
Sample Name: EK080415-12
Misc Info: TS02
Operator: JAR



META Environmental, Inc.

GC/MS EXTRACTED ION CHROMATOGRAM

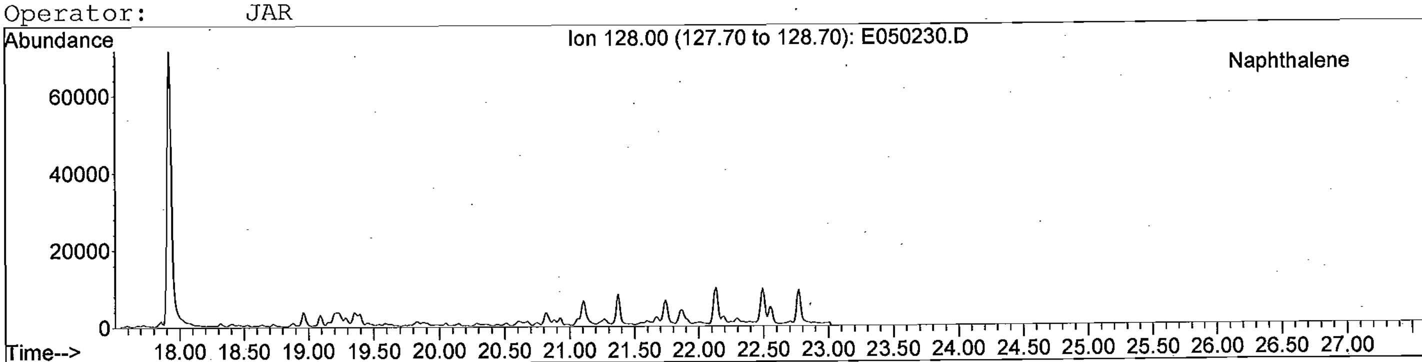
File: J:\1\DATA\E080502\E050230.D
Date Acquired: 4 May 2008 3:31 am
Method File: 4008SIMA.M
Sample Name: EK080415-12
Misc Info: TS02
Operator: JAR

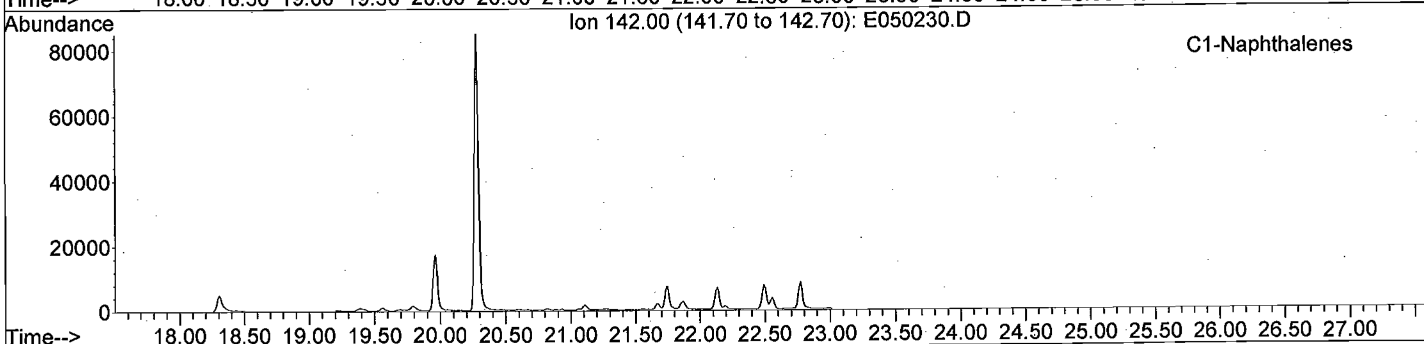


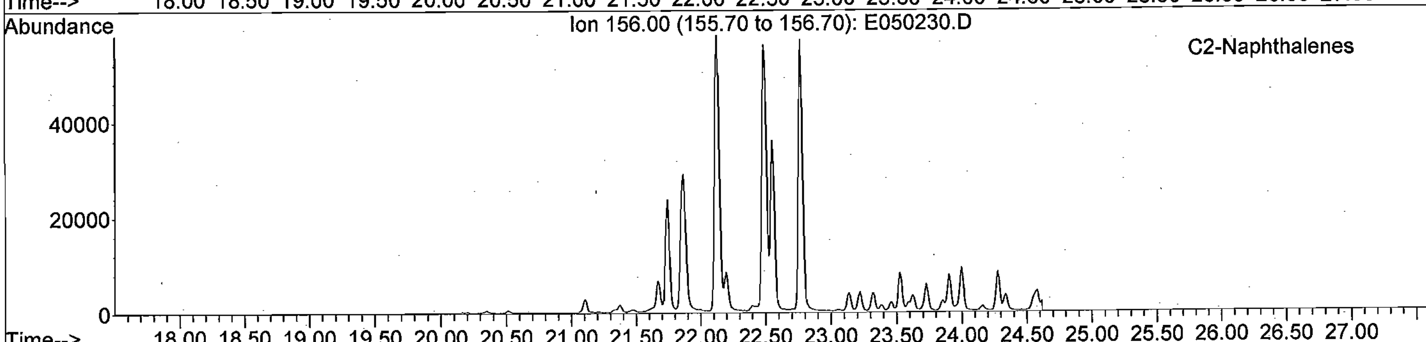
META Environmental, Inc.

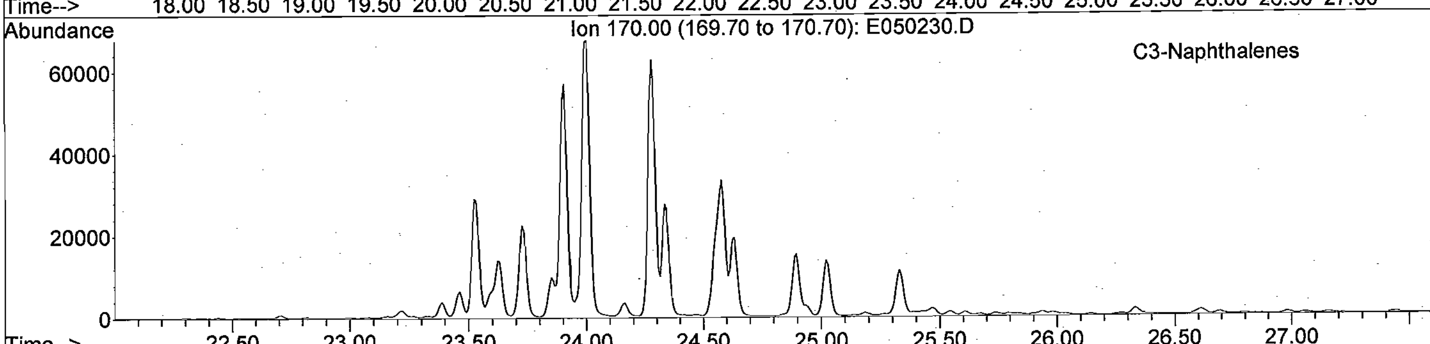
GC/MS EXTRACTED ION CHROMATOGRAM

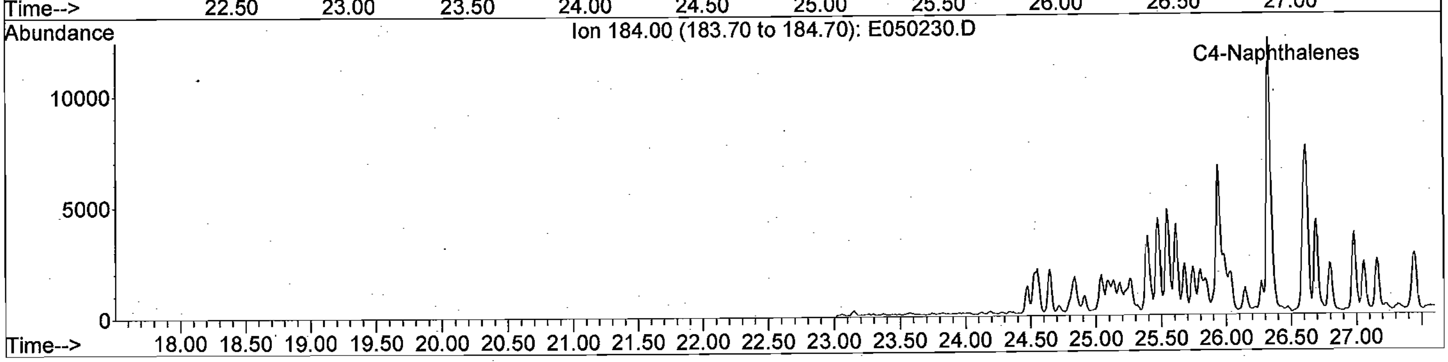
File: J:\1\DATA\E080502\E050230.D
Date Acquired: 4 May 2008 3:31 am
Method File: 4008SIMA.M
Sample Name: EK080415-12
Misc Info: TS02
Operator: JAR







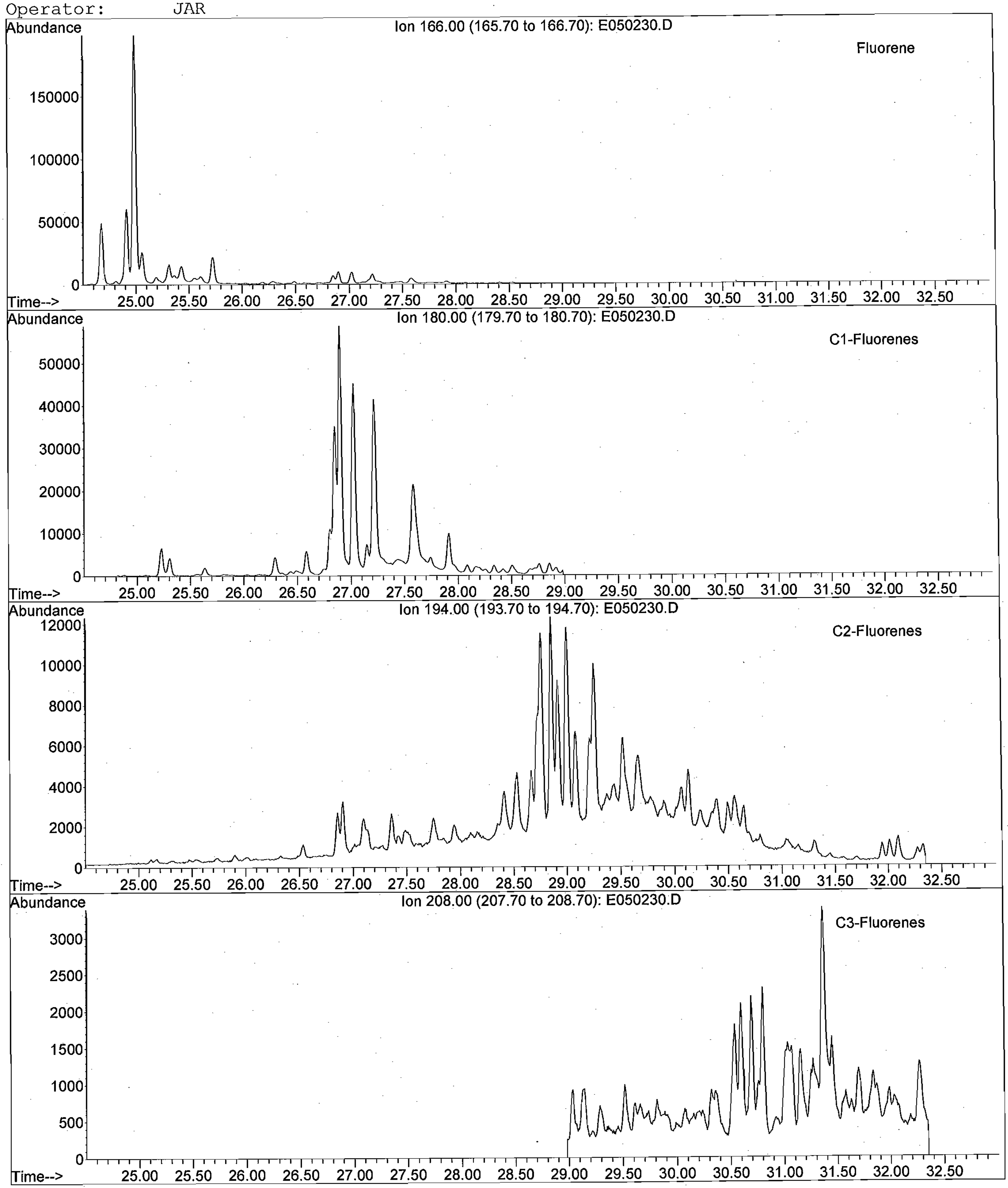




META Environmental, Inc.

GC/MS EXTRACTED ION CHROMATOGRAM

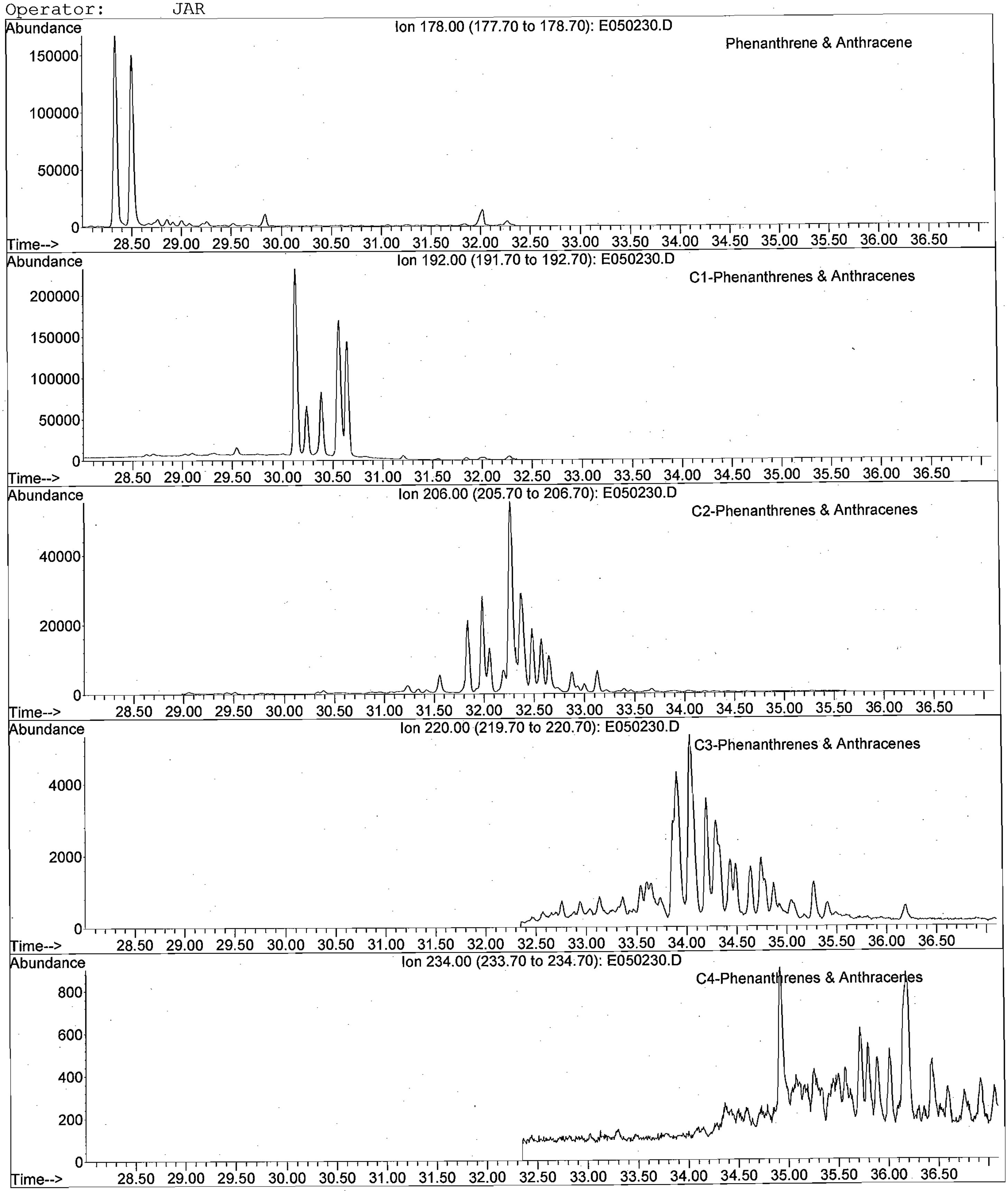
File: J:\1\DATA\E080502\E050230.D
Date Acquired: 4 May 2008 3:31 am
Method File: 4008SIMA.M
Sample Name: EK080415-12
Misc Info: TS02
Operator: JAR



META Environmental, Inc.

GC/MS EXTRACTED ION CHROMATOGRAM

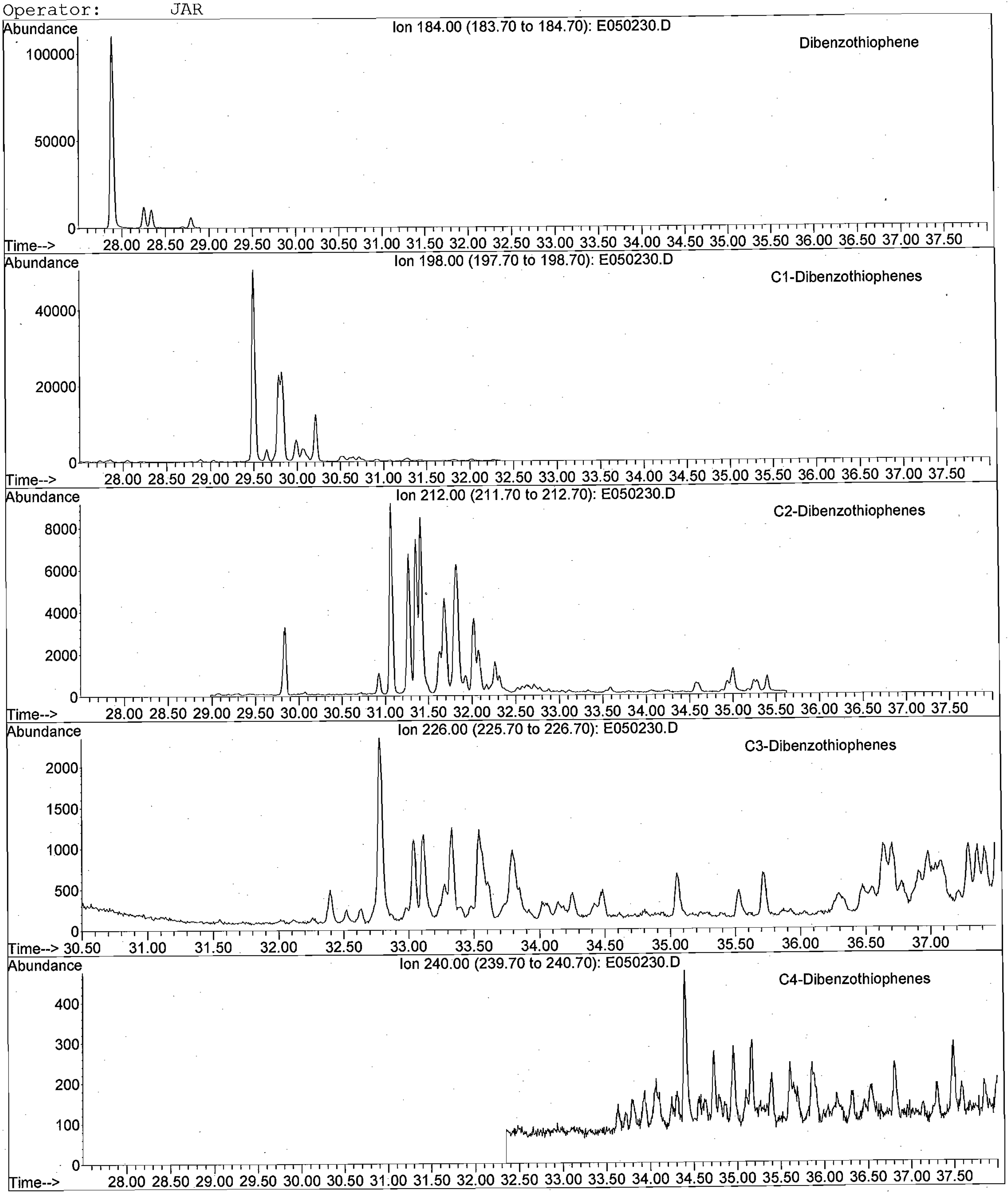
File: J:\1\DATA\E080502\E050230.D
Date Acquired: 4 May 2008 3:31 am
Method File: 4008SIMA.M
Sample Name: EK080415-12
Misc Info: TS02
Operator: JAR



META Environmental, Inc.

GC/MS EXTRACTED ION CHROMATOGRAM

File: J:\1\DATA\E080502\E050230.D
Date Acquired: 4 May 2008 3:31 am
Method File: 4008SIMA.M
Sample Name: EK080415-12
Misc Info: TS02
Operator: JAR



META Environmental, Inc.

GC/MS EXTRACTED ION CHROMATOGRAM

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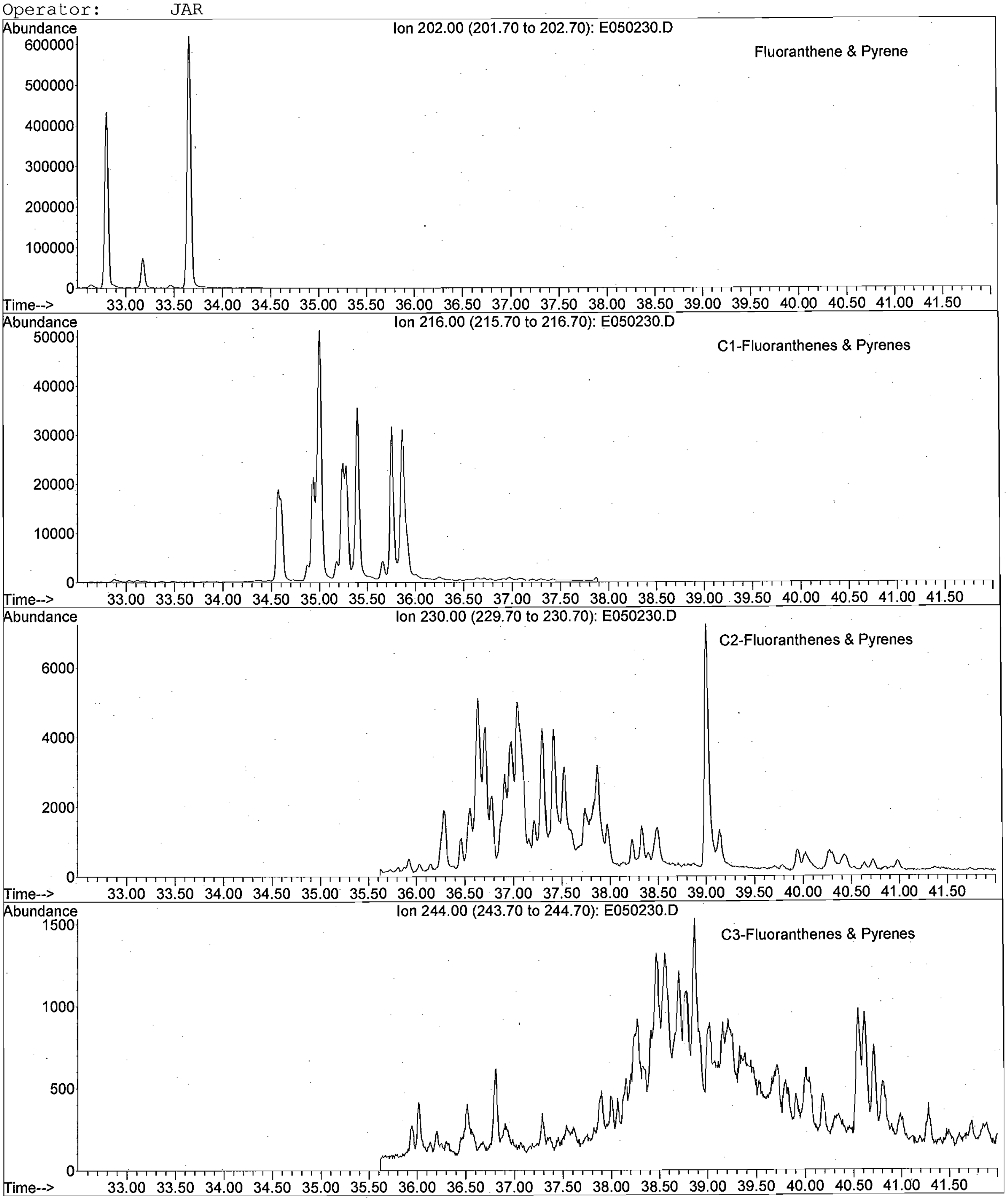
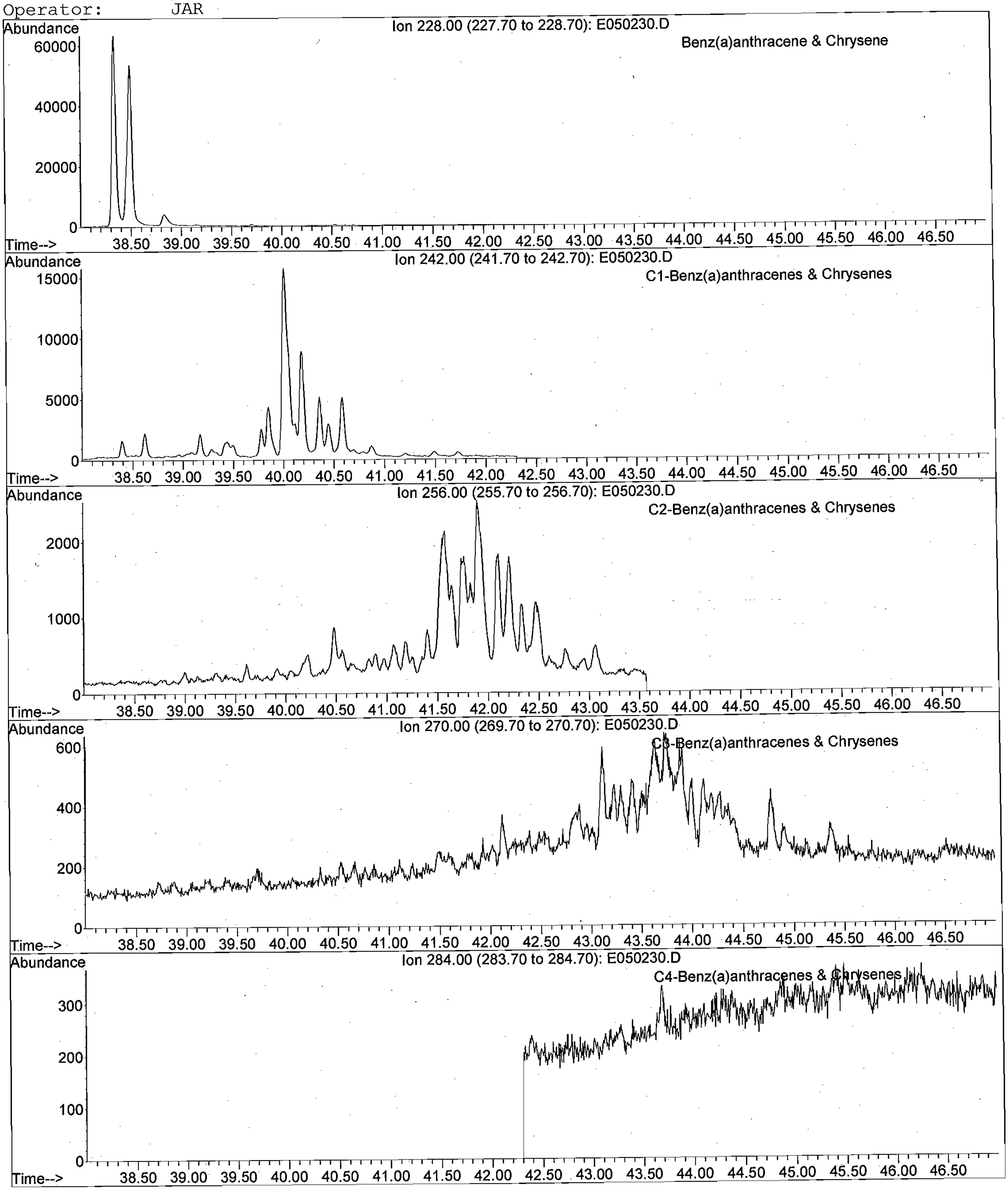
Date Acquired: 4 May 2008 3:31 am
Method File: 4008SIMA.M
Sample Name: EK080415-12
Misc Info: TS02
Operator: JAR



META Environmental, Inc.

GC/MS EXTRACTED ION CHROMATOGRAM

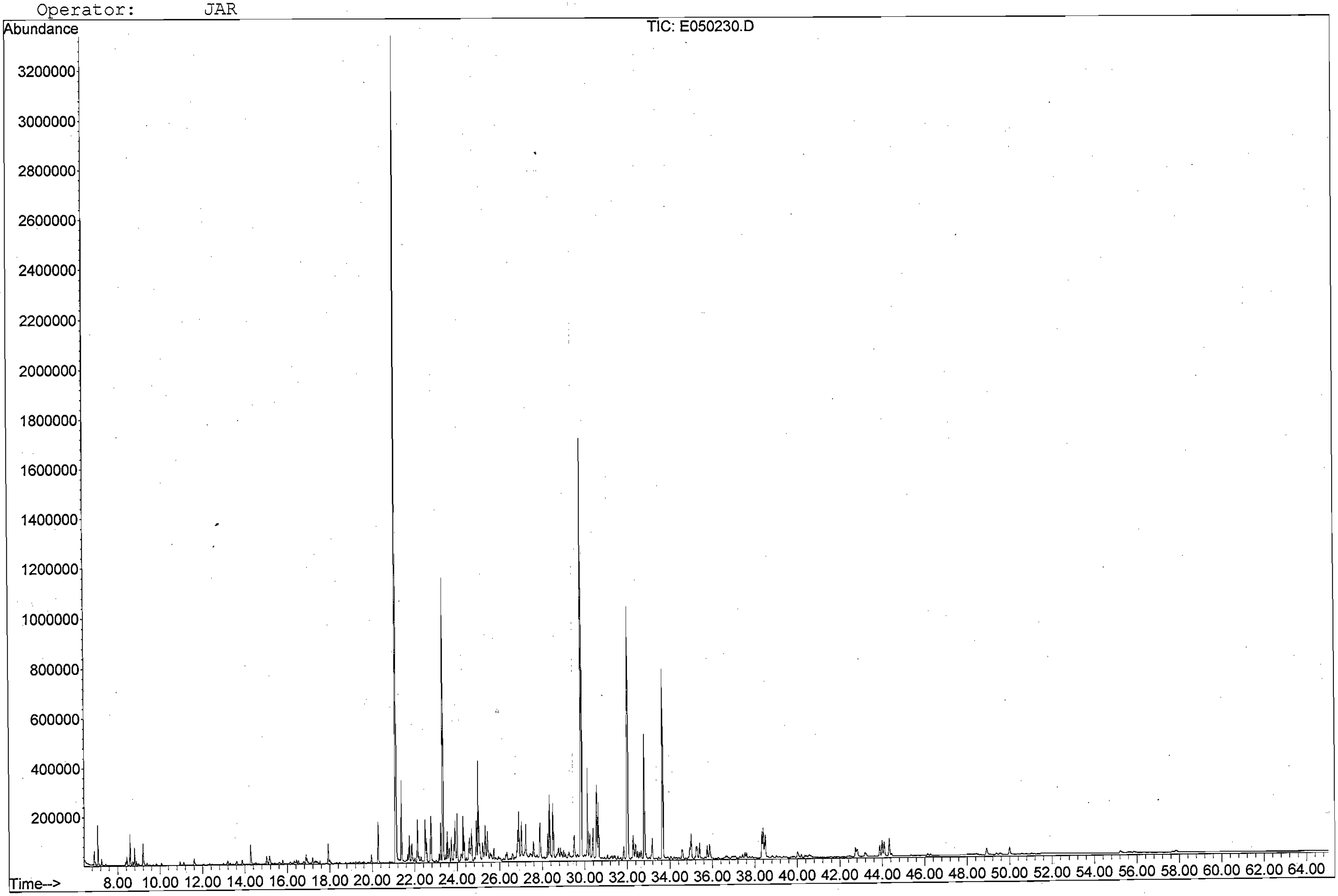
File: J:\1\DATA\E080502\E050230.D
Date Acquired: 4 May 2008 3:31 am
Method File: 4008SIMA.M
Sample Name: EK080415-12
Misc Info: TS02
Operator: JAR



META Environmental, Inc.

GC/MS TOTAL ION CHROMATOGRAM

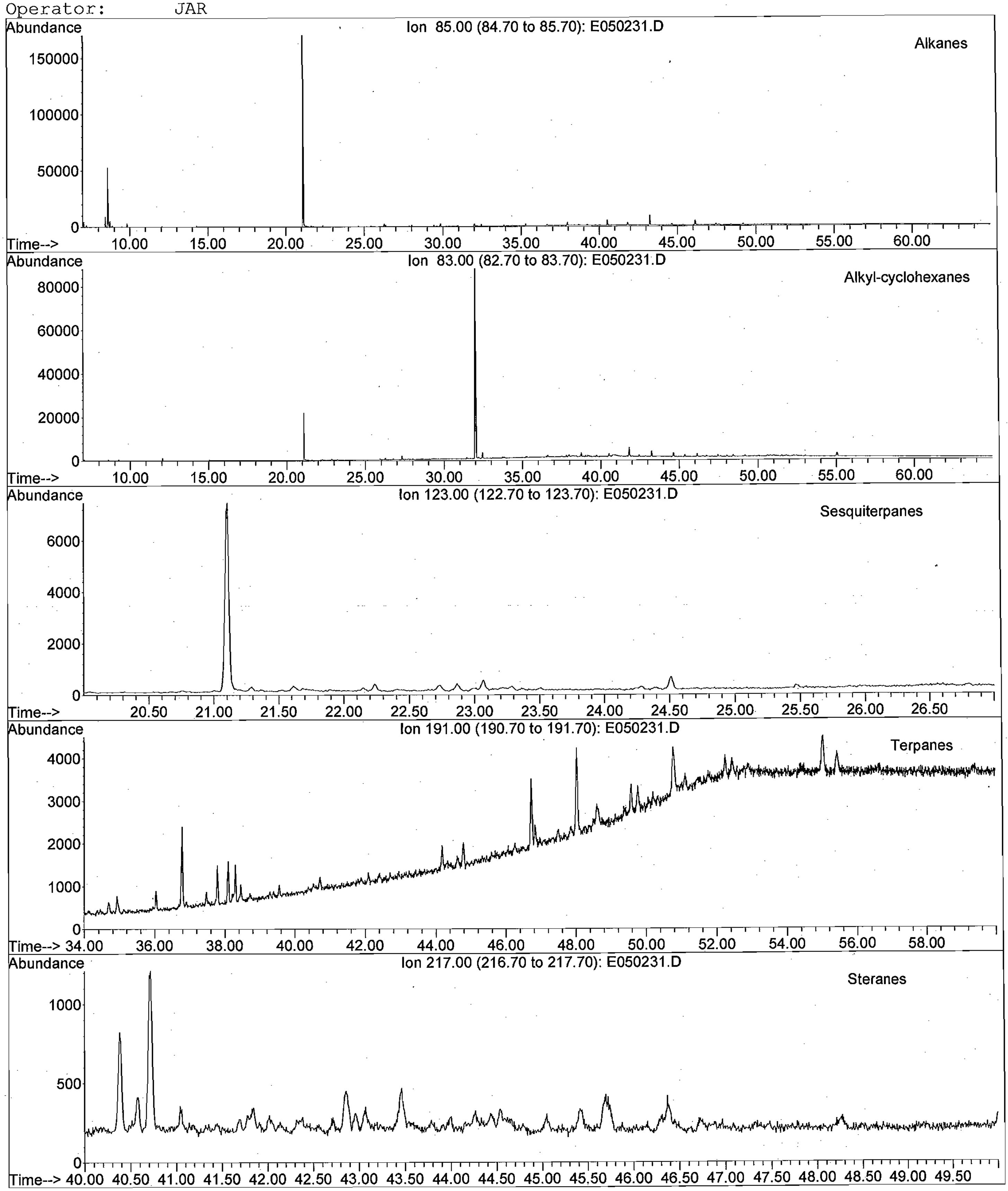
File: J:\1\DATA\E080502\E050230.D
Date Acquired: 4 May 2008 3:31 am
Method File: 4008SIMA.M
Sample Name: EK080415-12
Misc Info: TS02
Operator: JAR



META Environmental, Inc.

GC/MS EXTRACTED ION CHROMATOGRAM

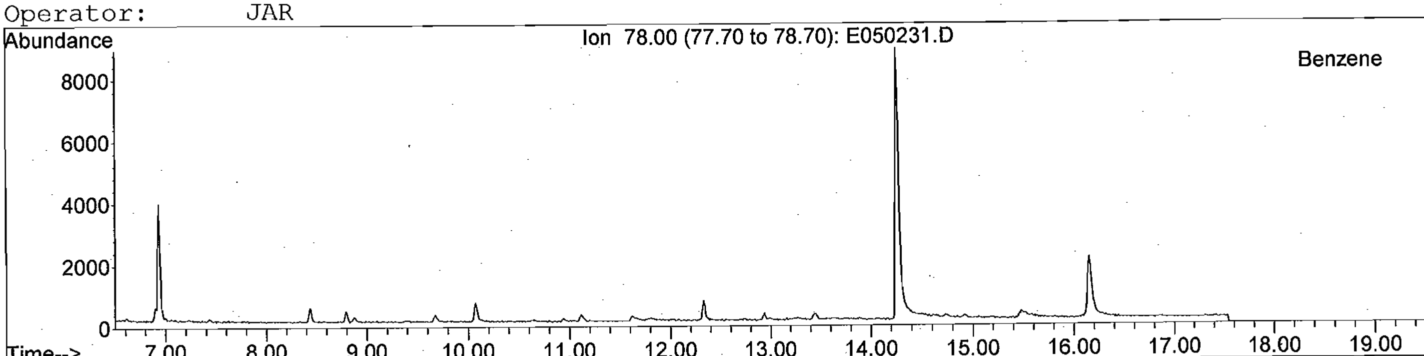
File: J:\1\DATA\E080502\E050231.D
Date Acquired: 4 May 2008 4:46 am
Method File: 4008SIMA.M
Sample Name: EK080415-13
Misc Info: TS17
Operator: JAR

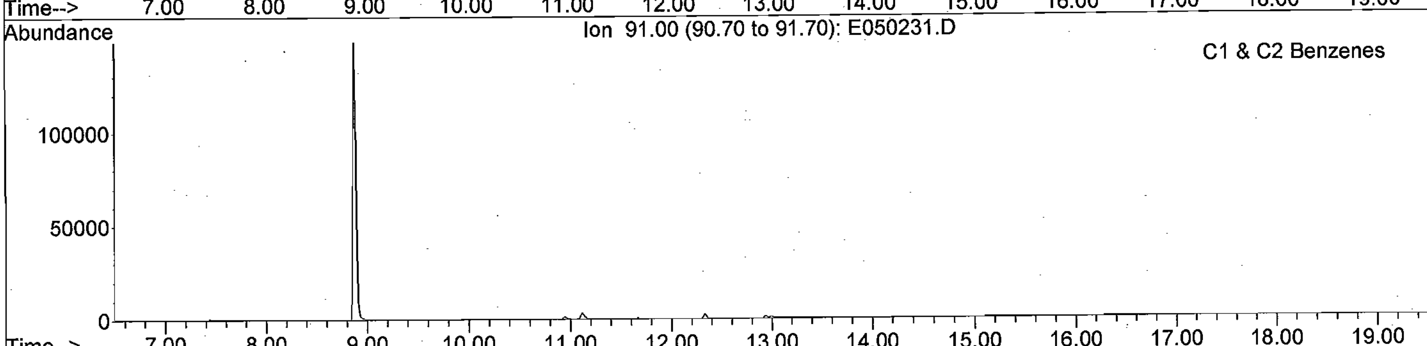


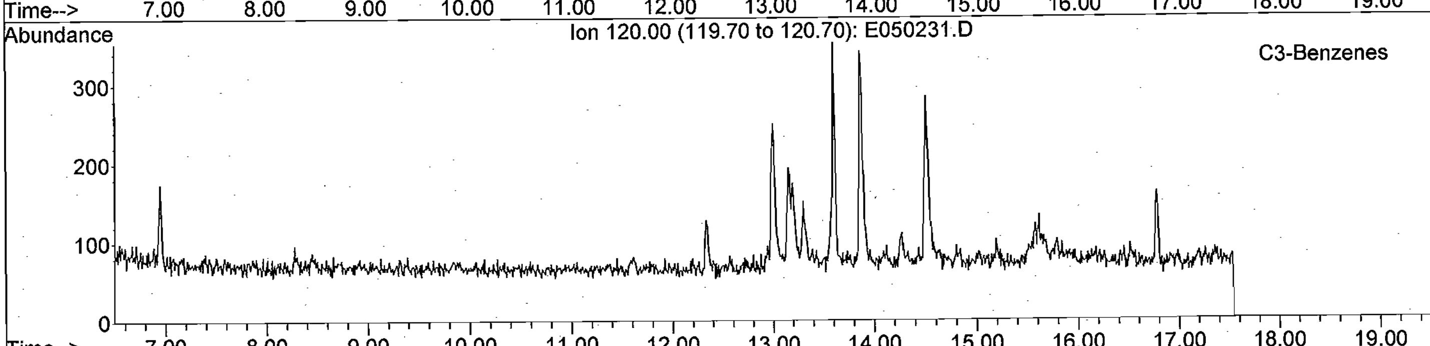
META Environmental, Inc.

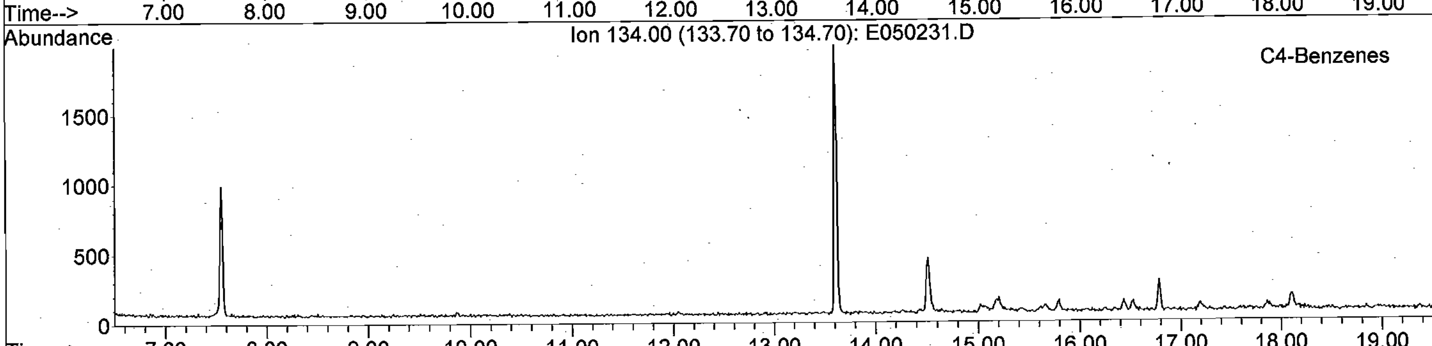
GC/MS EXTRACTED ION CHROMATOGRAM

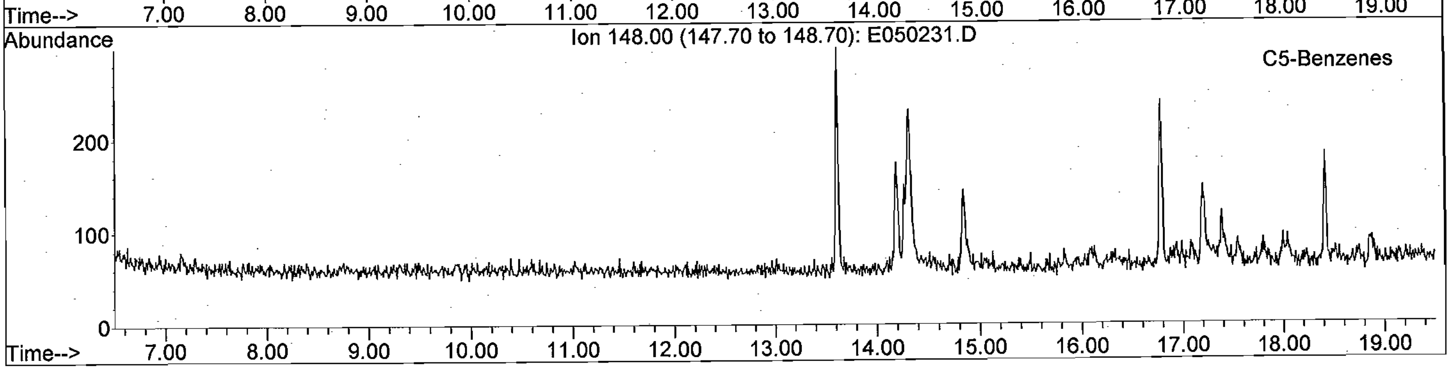
File: J:\1\DATA\E080502\E050231.D
Date Acquired: 4 May 2008 4:46 am
Method File: 4008SIMA.M
Sample Name: EK080415-13
Misc Info: TS17
Operator: JAR







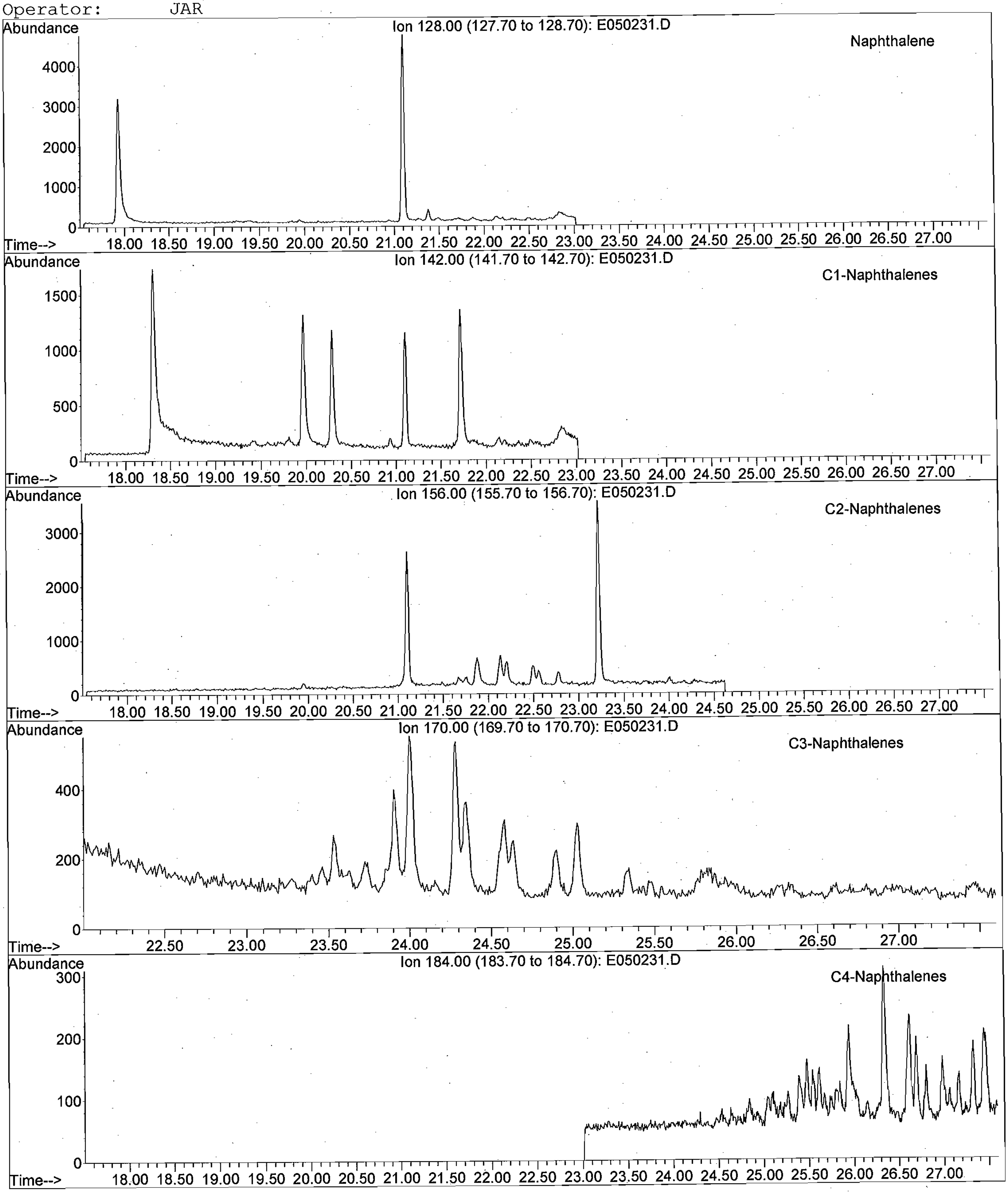




META Environmental, Inc.

GC/MS EXTRACTED ION CHROMATOGRAM

File: J:\1\DATA\E080502\E050231.D
Date Acquired: 4 May 2008 4:46 am
Method File: 4008SIMA.M
Sample Name: EK080415-13
Misc Info: TS17
Operator: JAR



META Environmental, Inc.

GC/MS EXTRACTED ION CHROMATOGRAM

File: J:\1\DATA\E080502\E050231.D
Date Acquired: 4 May 2008 4:46 am
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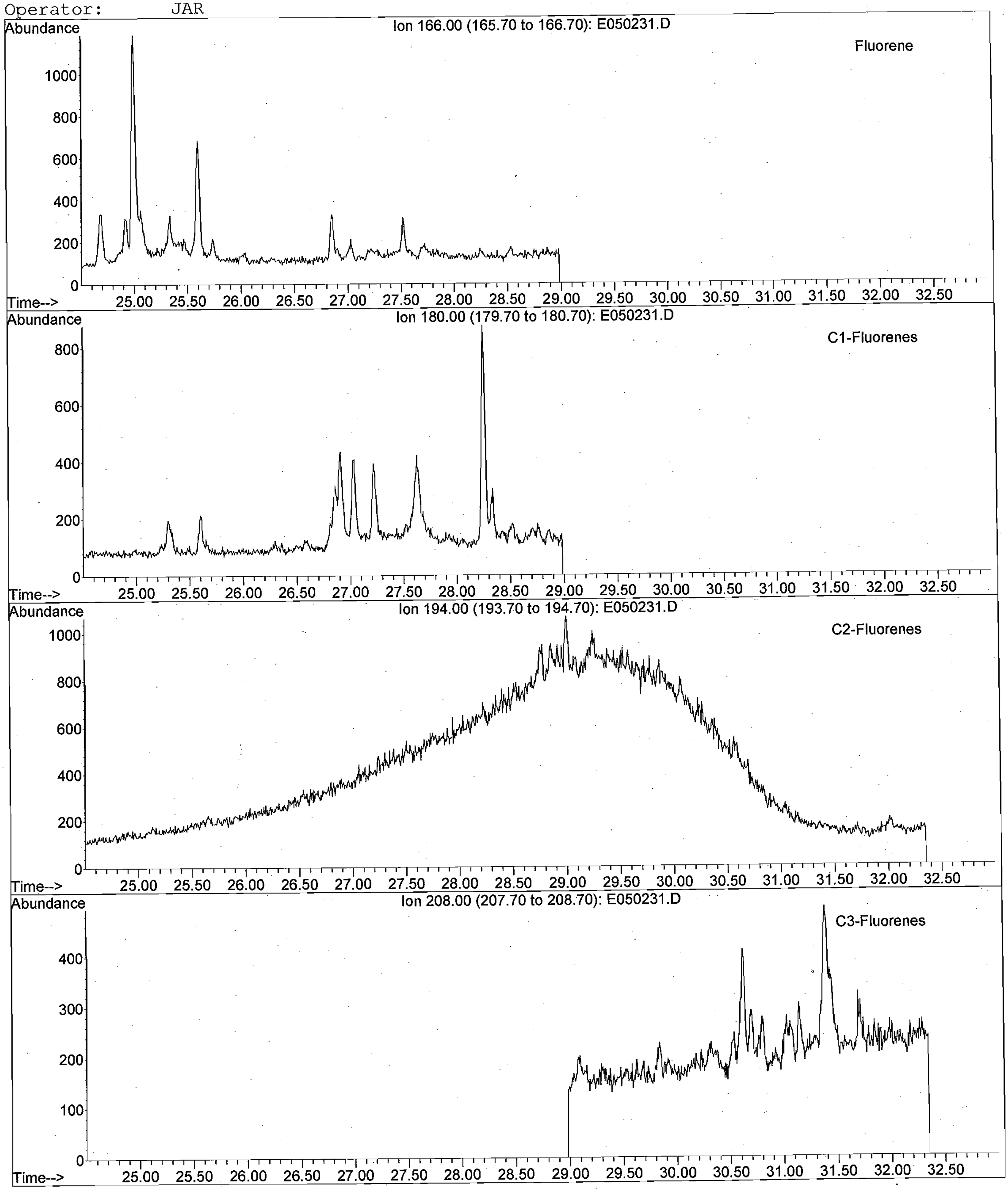
Sample Name: EK080415-13
Misc Info: TS17
Operator: JAR



META Environmental, Inc.

GC/MS EXTRACTED ION CHROMATOGRAM

File: J:\1\DATA\E080502\E050231.D
Date Acquired: 4 May 2008 4:46 am
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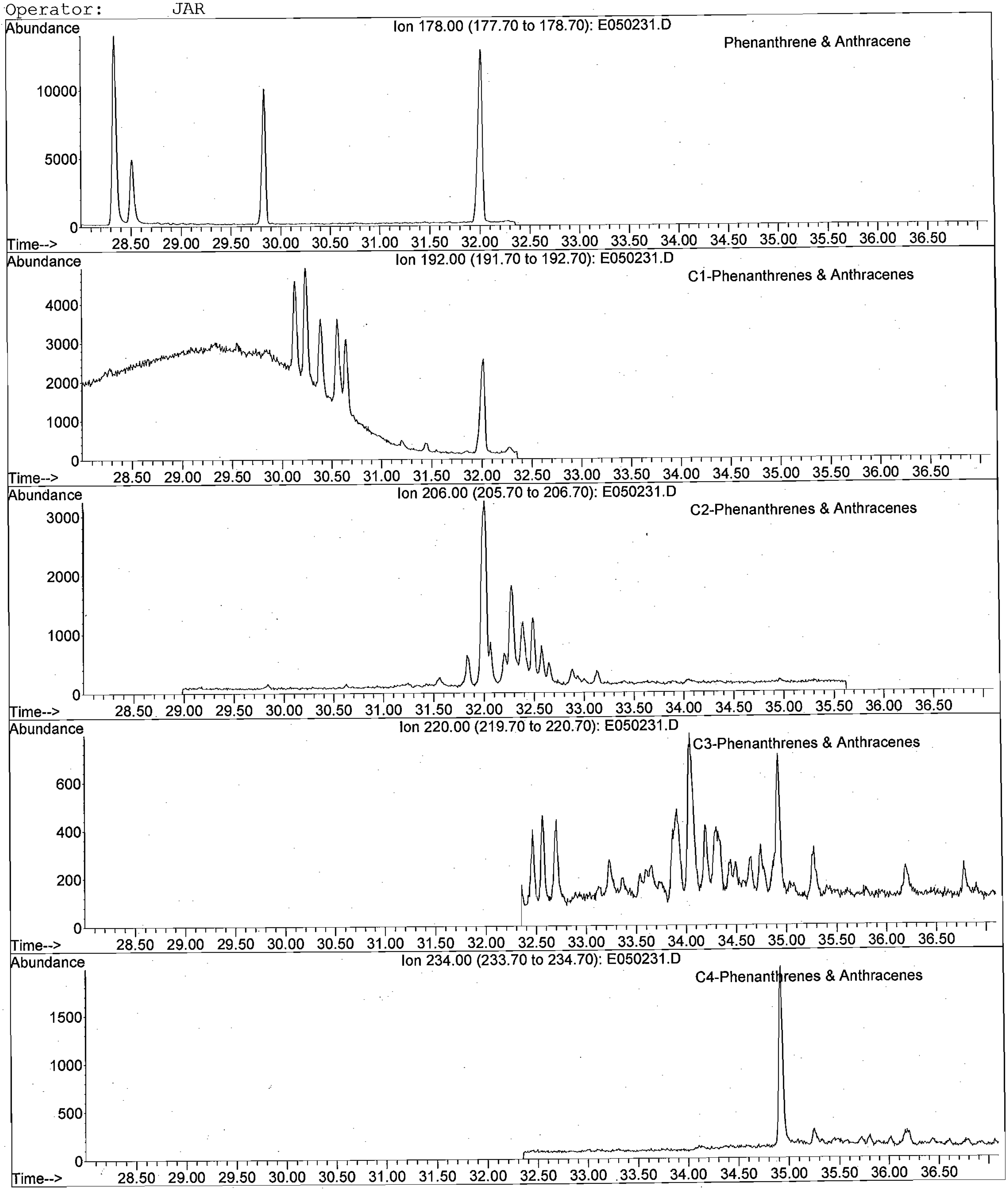
Sample Name: EK080415-13
Misc Info: TS17
Operator: JAR



META Environmental, Inc.

GC/MS EXTRACTED ION CHROMATOGRAM

File: J:\1\DATA\E080502\E050231.D
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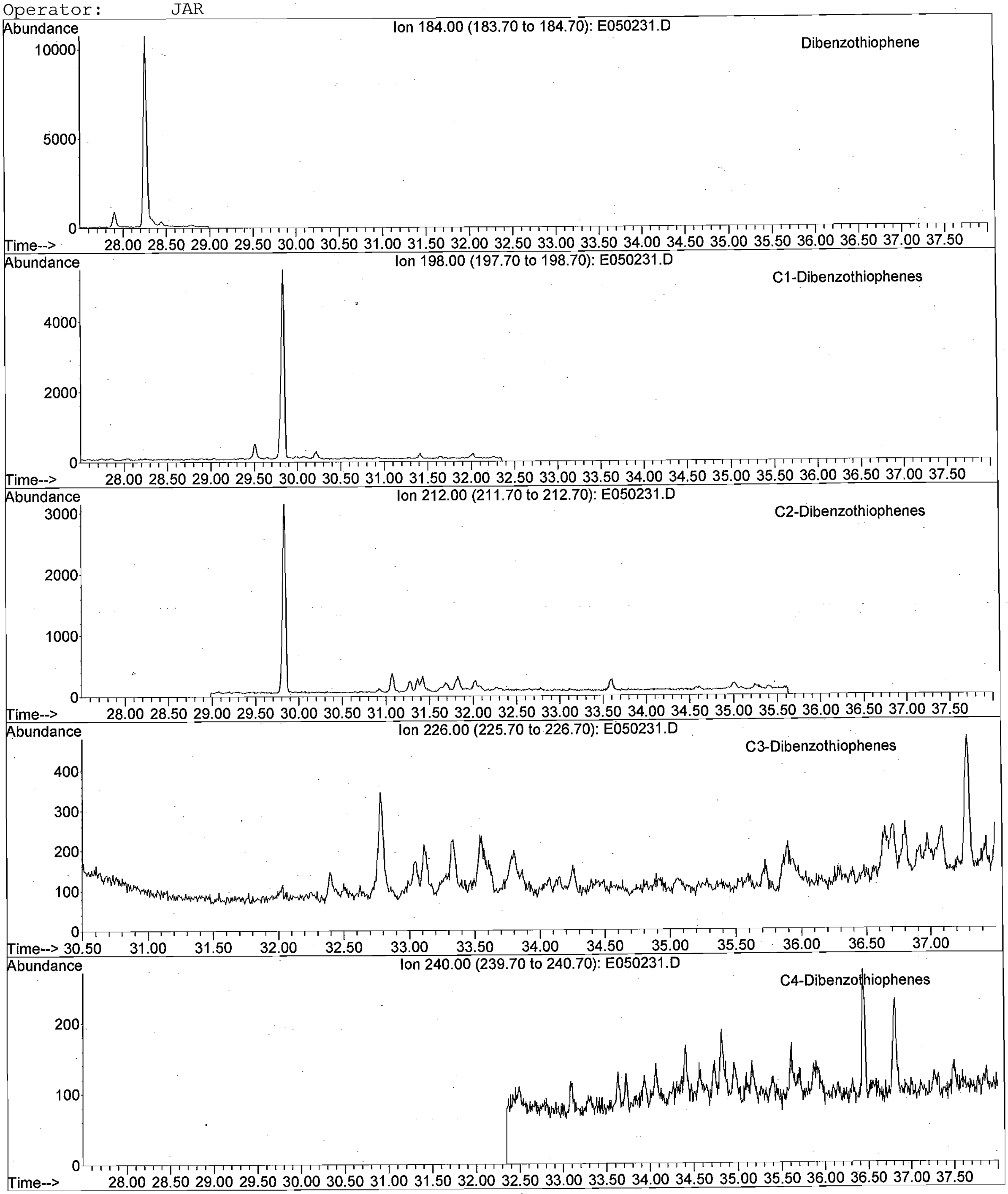
Sample Name: EK080415-13
Misc Info: TS17
Operator: JAR



META Environmental, Inc.

GC/MS EXTRACTED ION CHROMATOGRAM

File: J:\1\DATA\E080502\E050231.D
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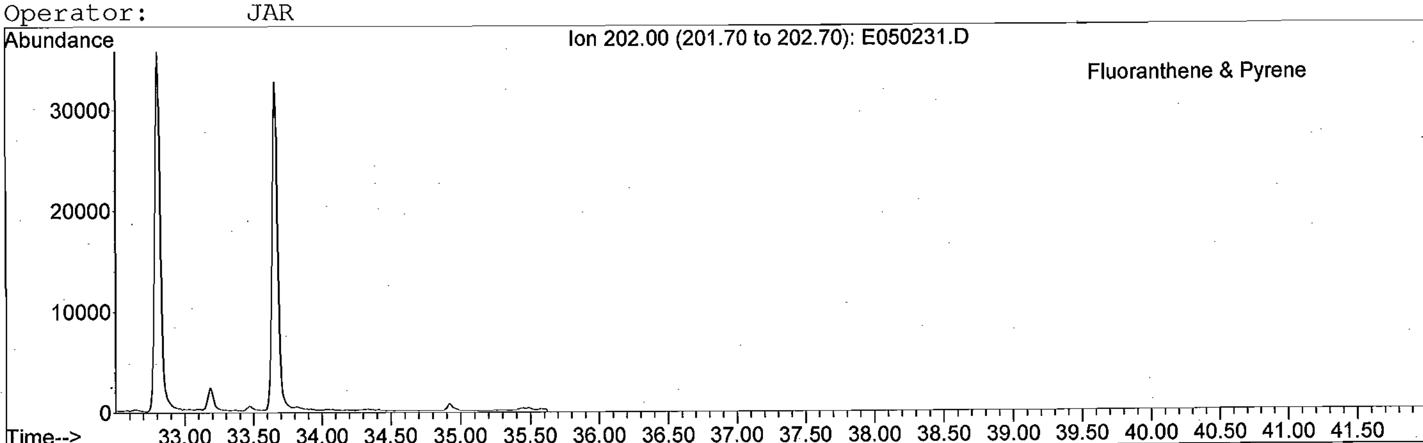
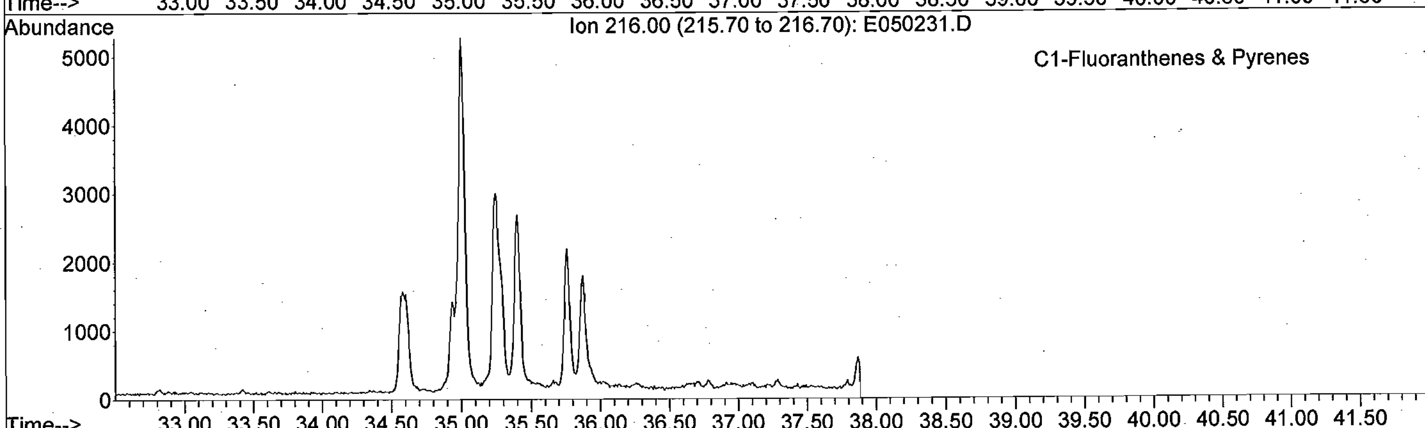
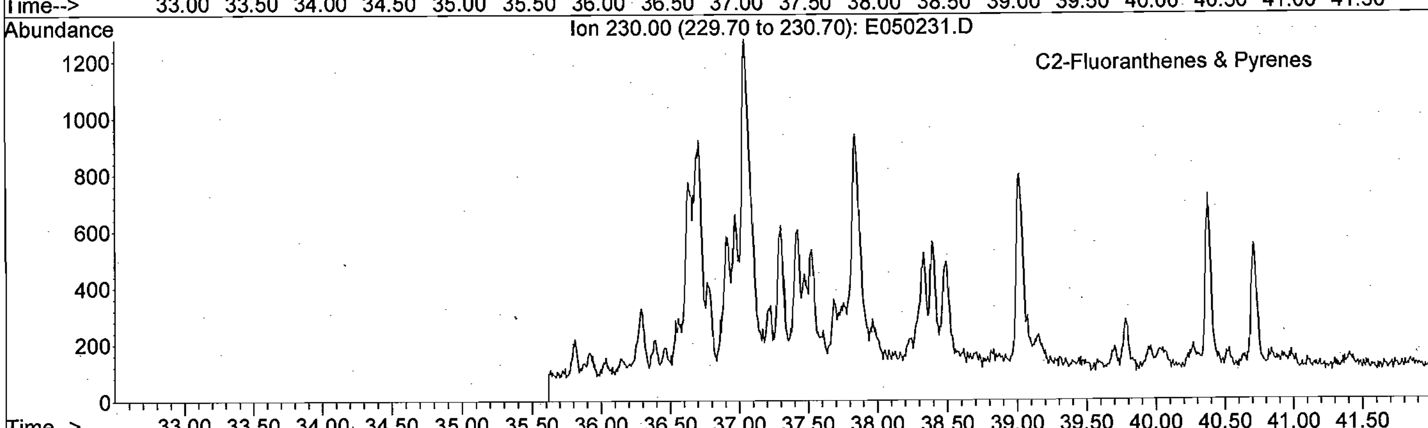
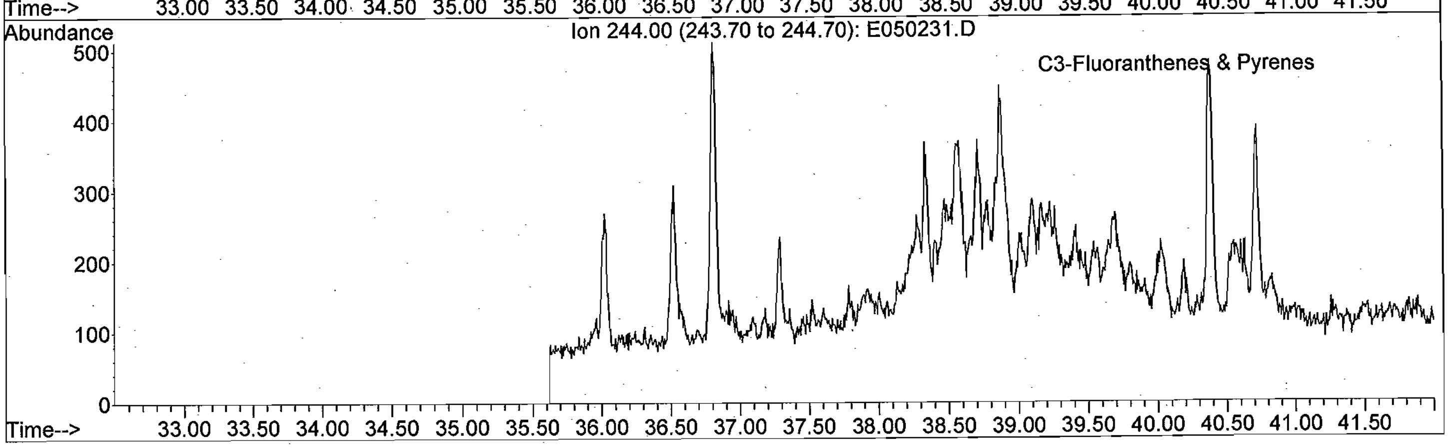
Sample Name: EK080415-13
Misc Info: TS17
Operator: JAR









META Environmental, Inc.

GC/MS EXTRACTED ION CHROMATOGRAM

File: J:\1\DATA\E080502\E050231.D
Date Acquired: 4 May 2008 4:46 am
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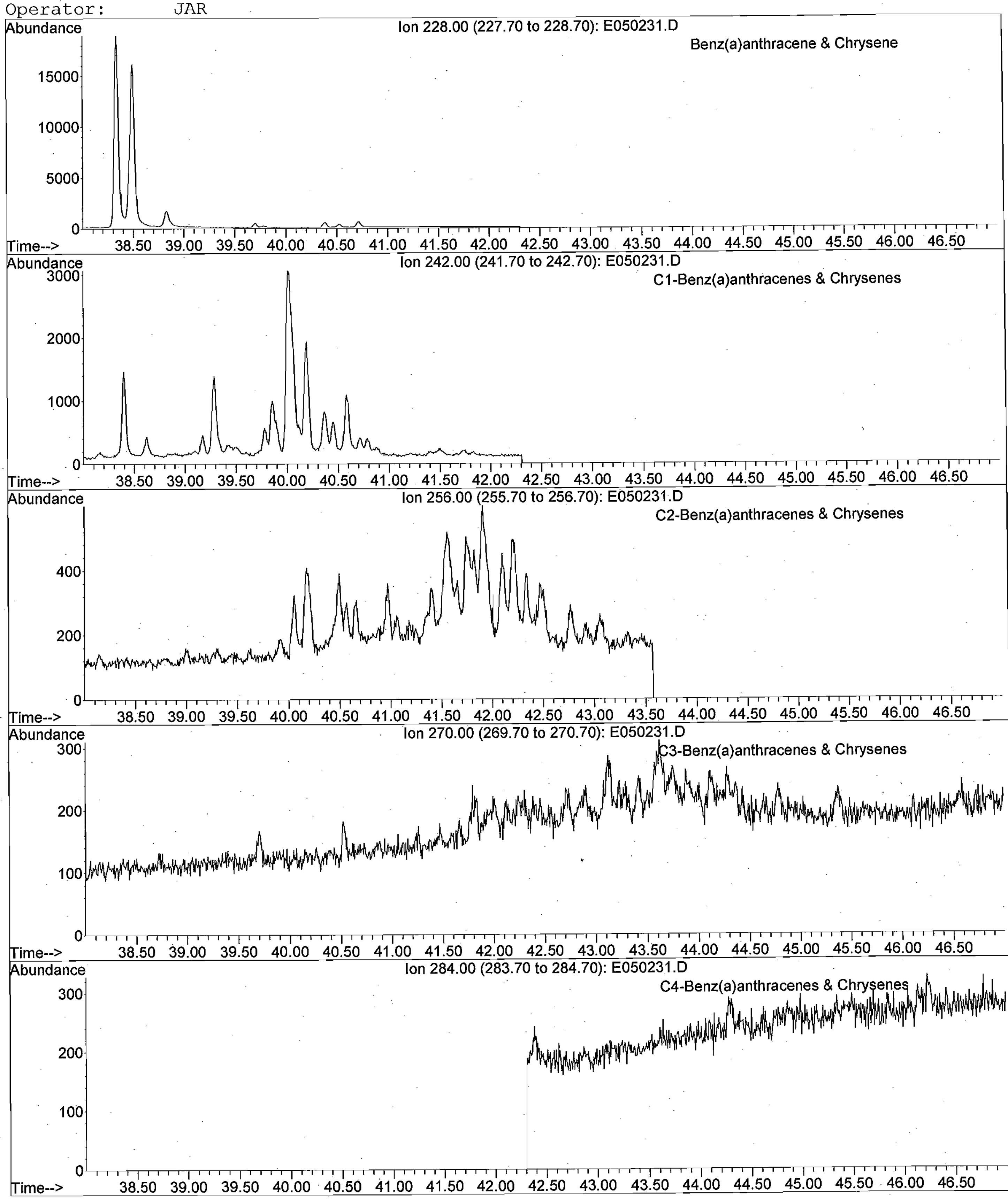
Sample Name: EK080415-13
Misc Info: TS17
Operator: JAR



META Environmental, Inc.

GC/MS TOTAL ION CHROMATOGRAM

File: J:\1\DATA\E080502\E050231.D
Date Acquired: 4 May 2008 4:46 am
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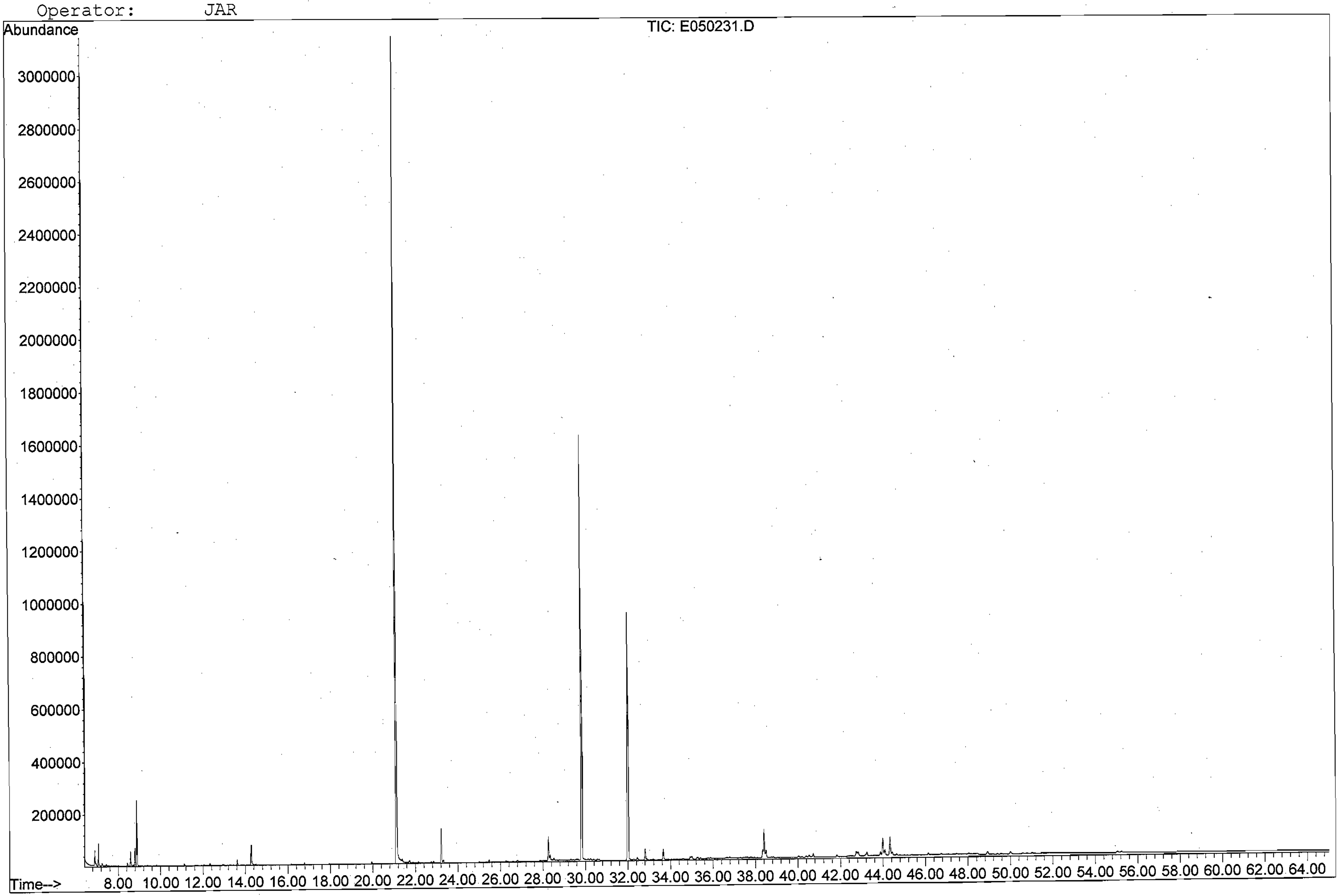
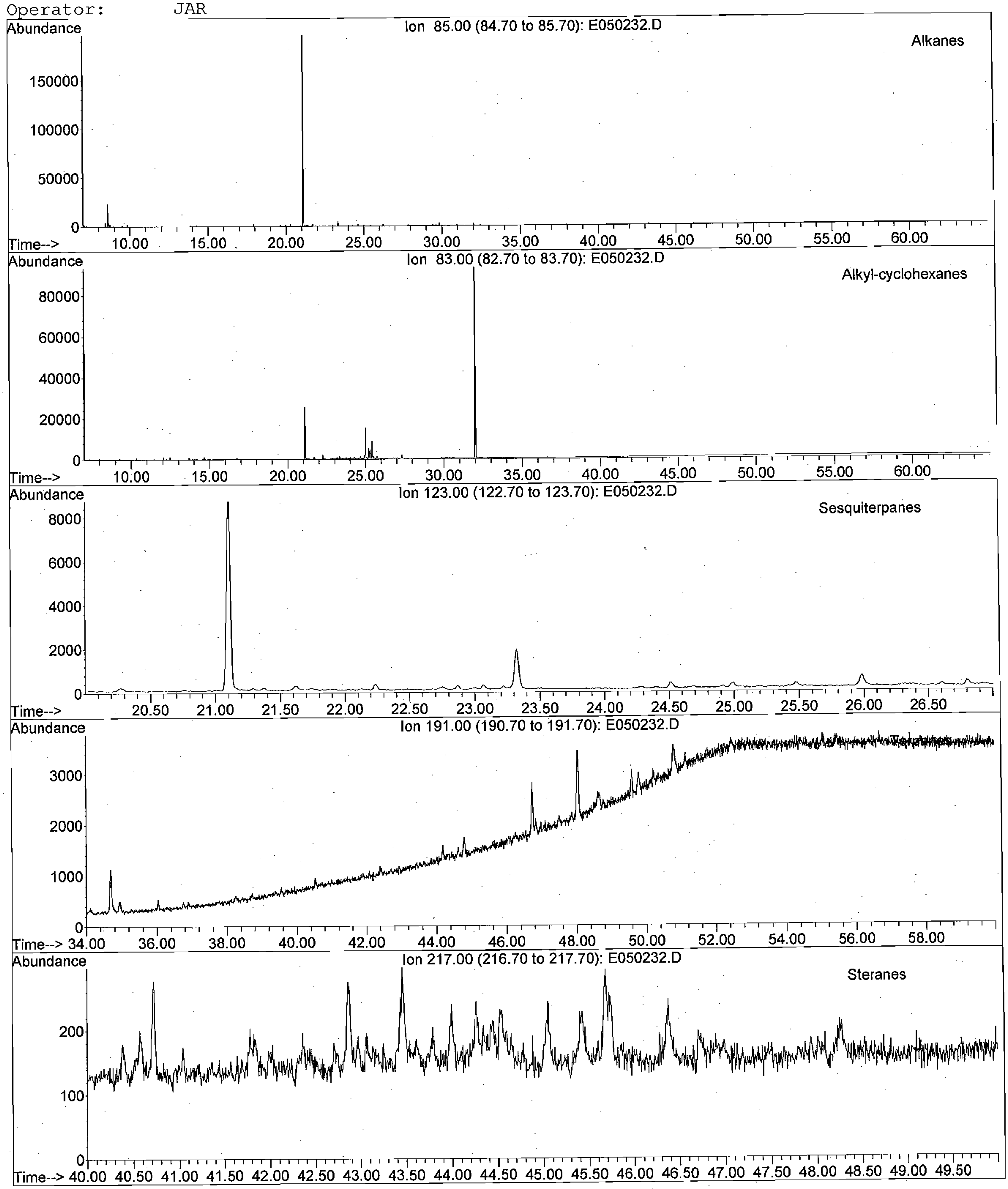
Sample Name: EK080415-13
Misc Info: TS17
Operator: JAR



META Environmental, Inc.

GC/MS EXTRACTED ION CHROMATOGRAM

File: J:\1\DATA\E080502\E050232.D
Date Acquired: 4 May 2008 6:01 am
Method File: 4008SIMA.M
Sample Name: EK080415-14
Misc Info: TS24 (1-1.5)
Operator: JAR



META Environmental, Inc.

GC/MS EXTRACTED ION CHROMATOGRAM

File: J:\1\DATA\E080502\E050232.D
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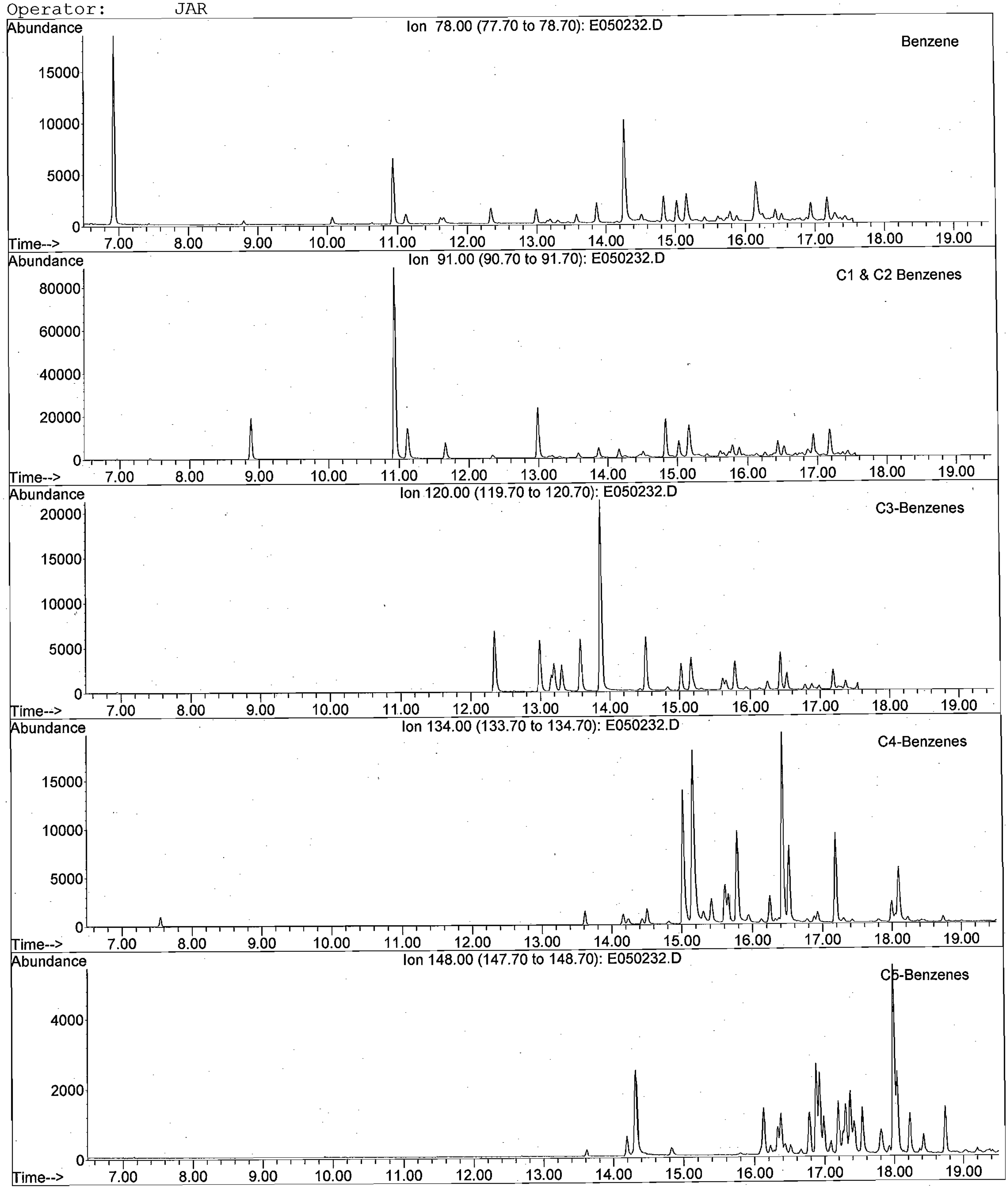
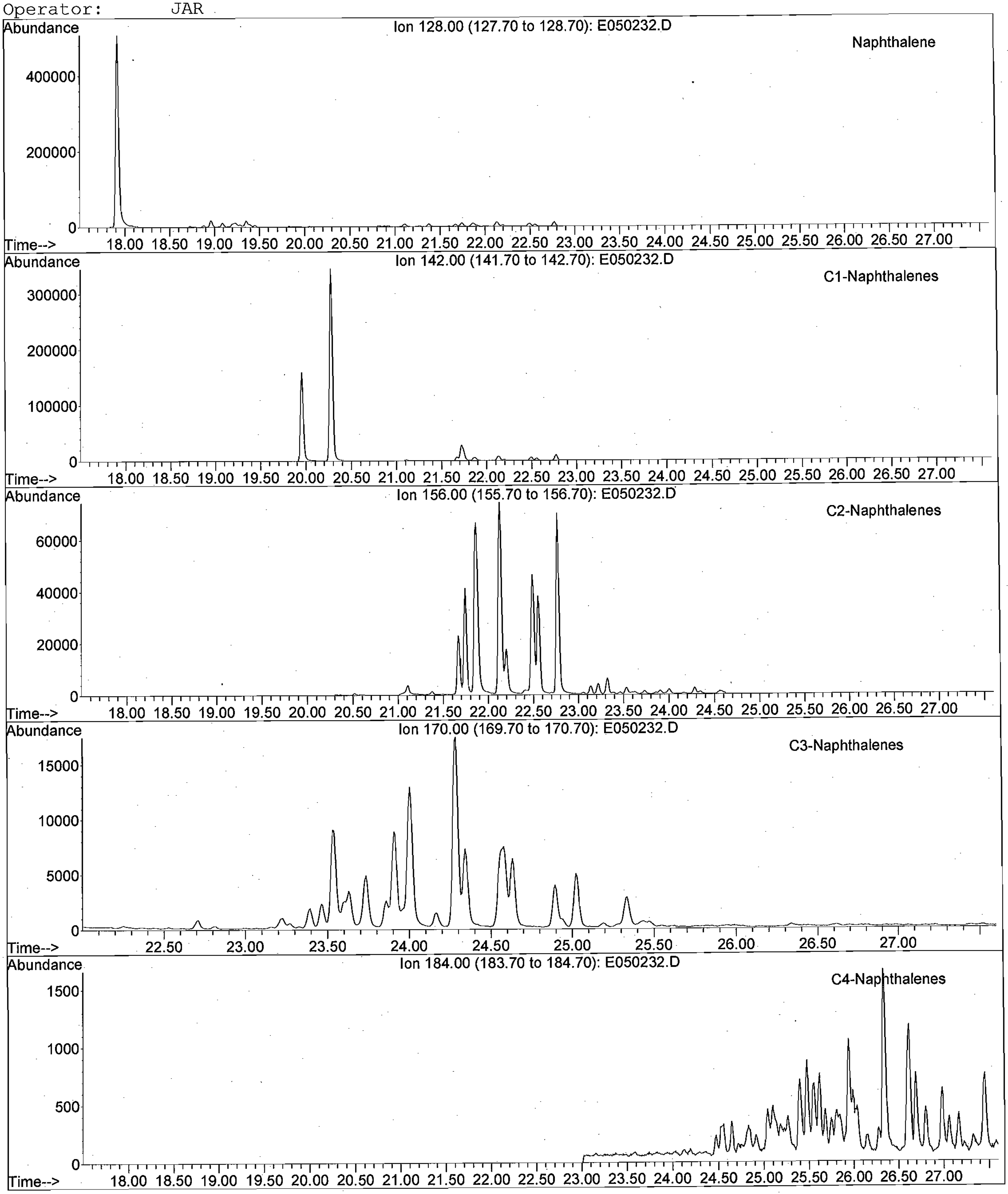
Sample Name: EK080415-14
Misc Info: TS24 (1-1.5)
Operator: JAR



META Environmental, Inc.

GC/MS EXTRACTED ION CHROMATOGRAM

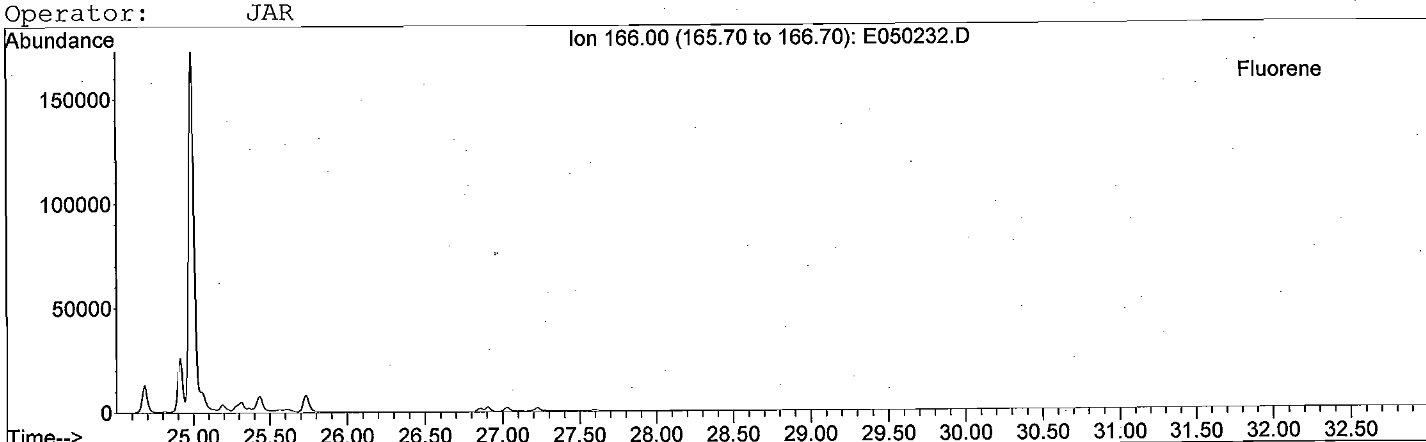
File: J:\1\DATA\E080502\E050232.D
Date Acquired: 4 May 2008 6:01 am
Method File: 4008SIMA.M
Sample Name: EK080415-14
Misc Info: TS24 (1-1.5)
Operator: JAR

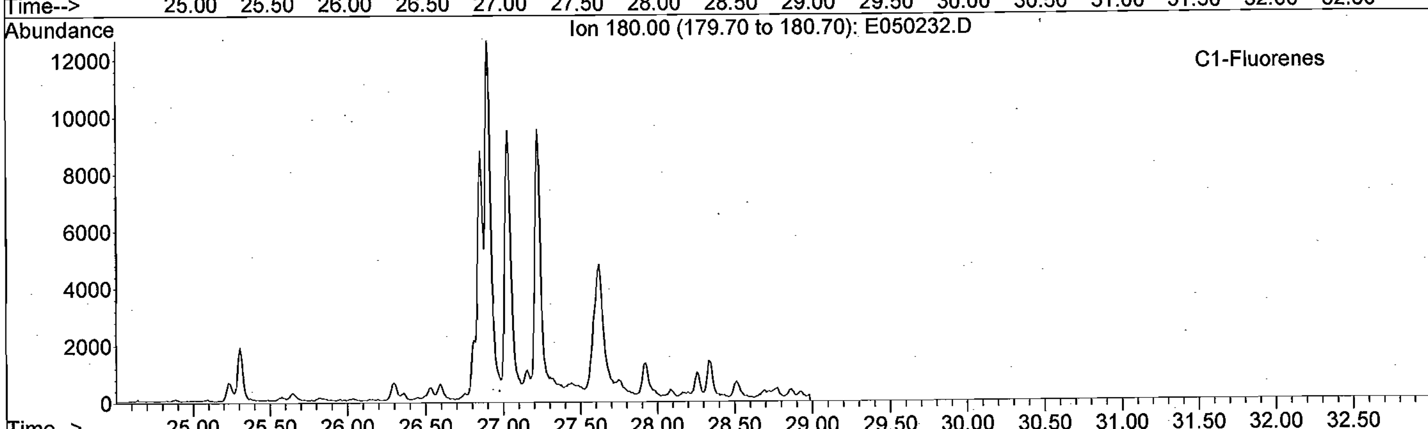


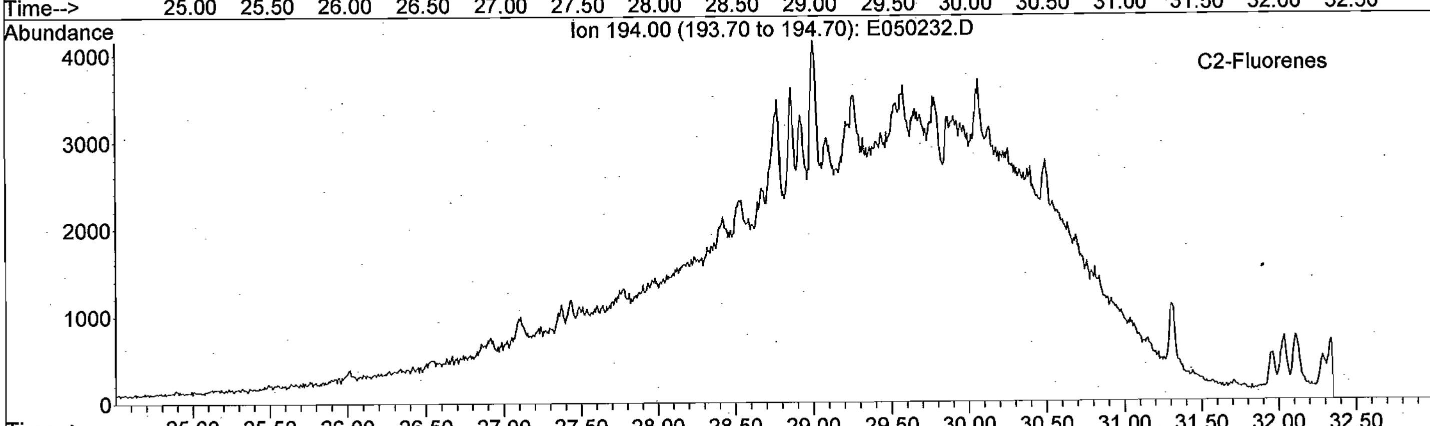
META Environmental, Inc.

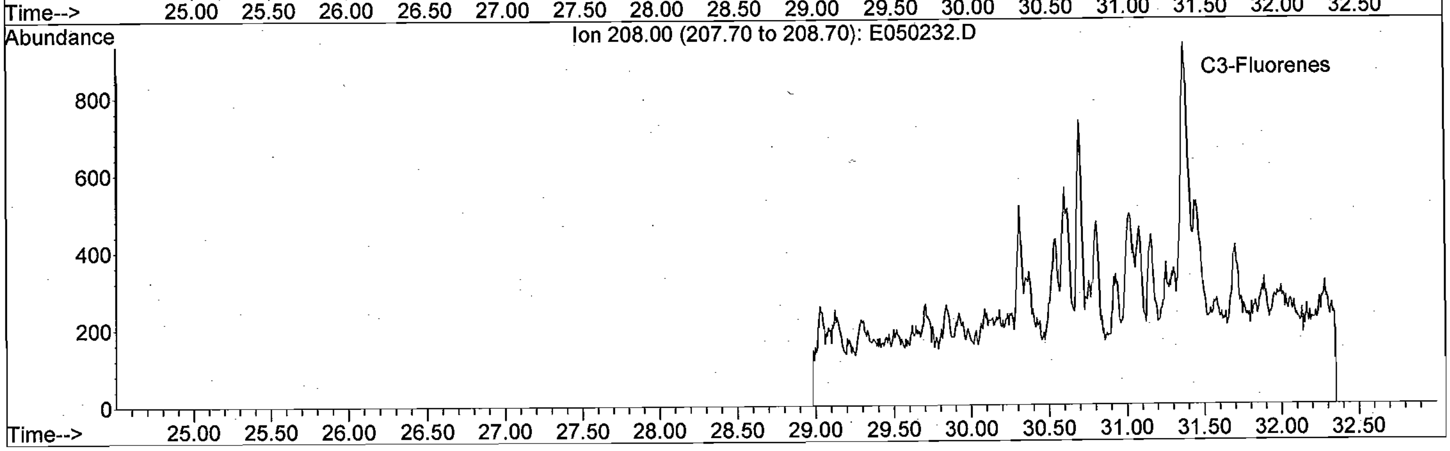
GC/MS EXTRACTED ION CHROMATOGRAM

File: J:\1\DATA\E080502\E050232.D
Date Acquired: 4 May 2008 6:01 am
Method File: 4008SIMA.M
Sample Name: EK080415-14
Misc Info: TS24 (1-1.5)
Operator: JAR





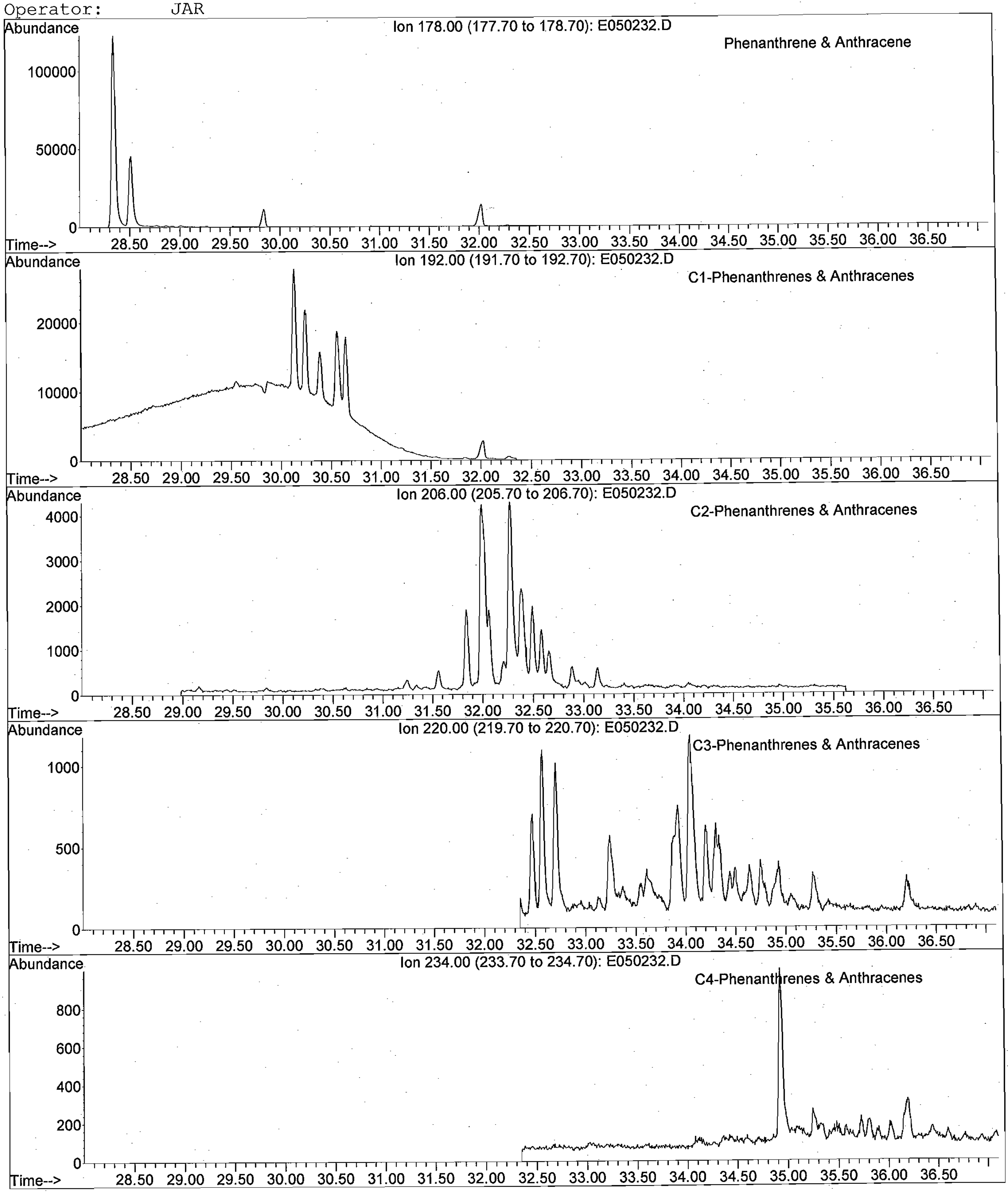




META Environmental, Inc.

GC/MS EXTRACTED ION CHROMATOGRAM

File: J:\1\DATA\E080502\E050232.D
Date Acquired: 4 May 2008 6:01 am
Method File: 4008SIMA.M
Sample Name: EK080415-14
Misc Info: TS24 (1-1.5)
Operator: JAR



META Environmental, Inc.

GC/MS EXTRACTED ION CHROMATOGRAM

File: J:\1\DATA\E080502\E050232.D
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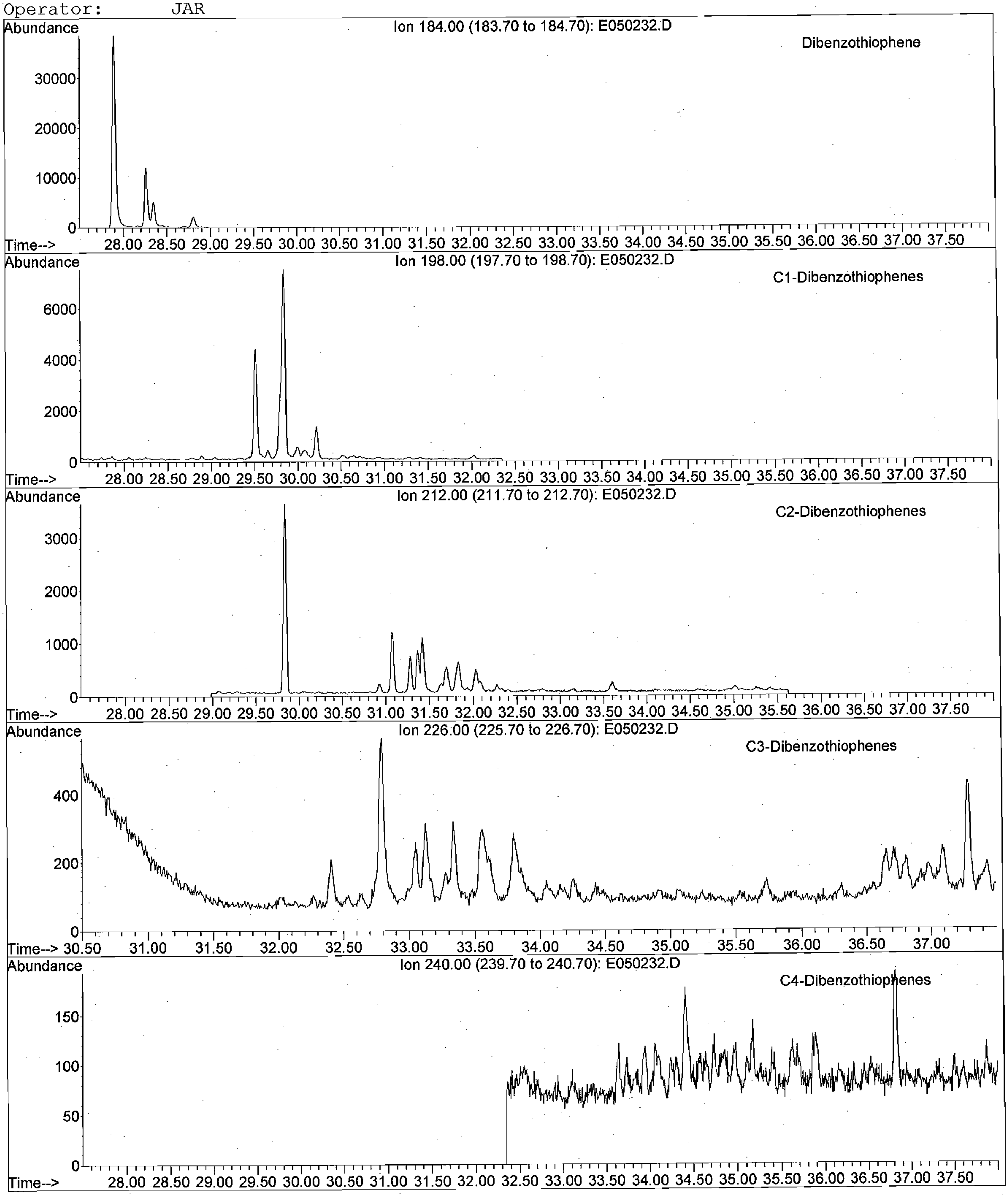
Method File: 4008SIMA.M
Sample Name: EK080415-14
Misc Info: TS24 (1-1.5)
Operator: JAR



META Environmental, Inc.

GC/MS EXTRACTED ION CHROMATOGRAM

File: J:\1\DATA\E080502\E050232.D
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Method File: 4008SIMA.M
Sample Name: EK080415-14
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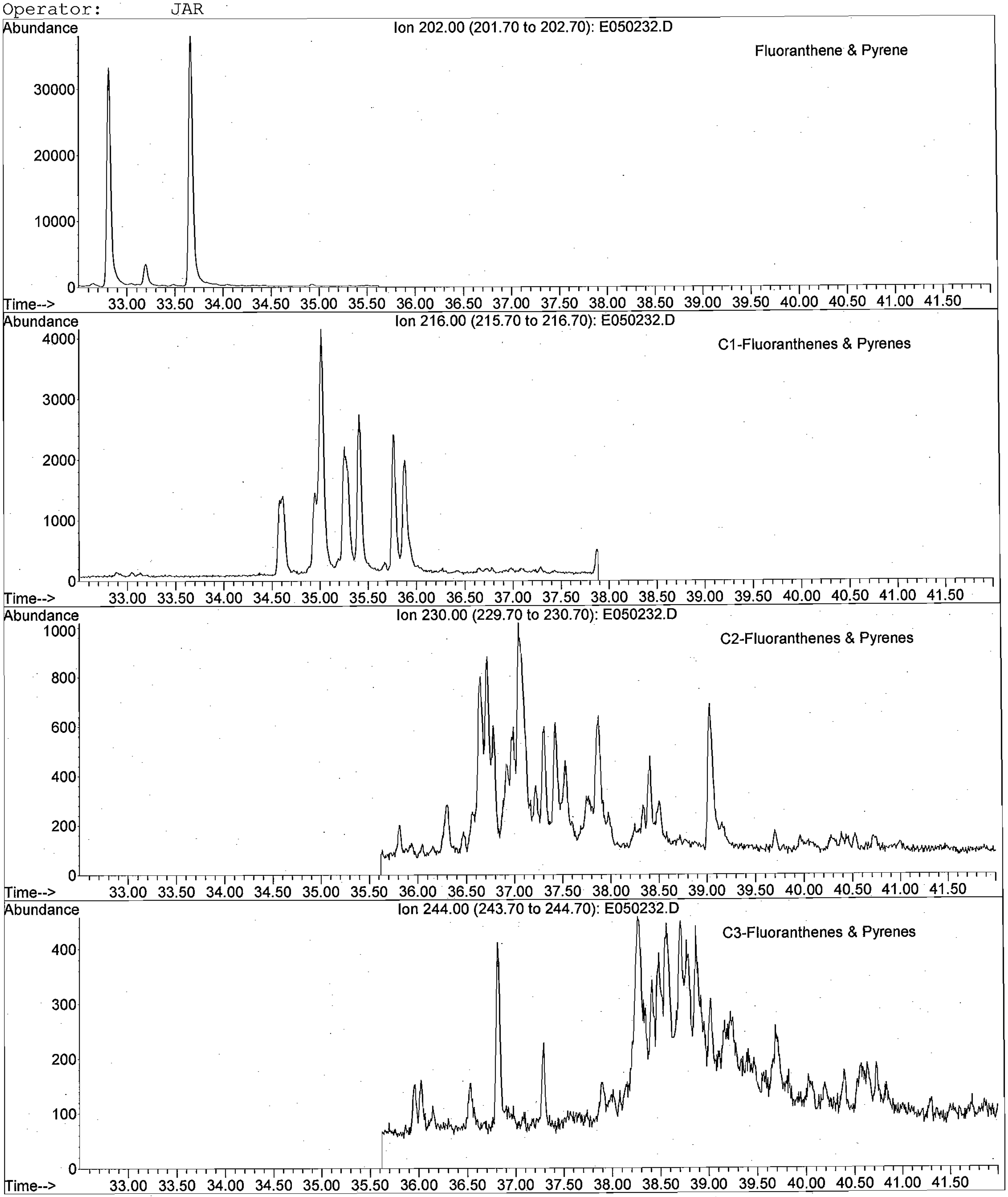
Operator: JAR



META Environmental, Inc.

GC/MS EXTRACTED ION CHROMATOGRAM

File: J:\1\DATA\E080502\E050232.D
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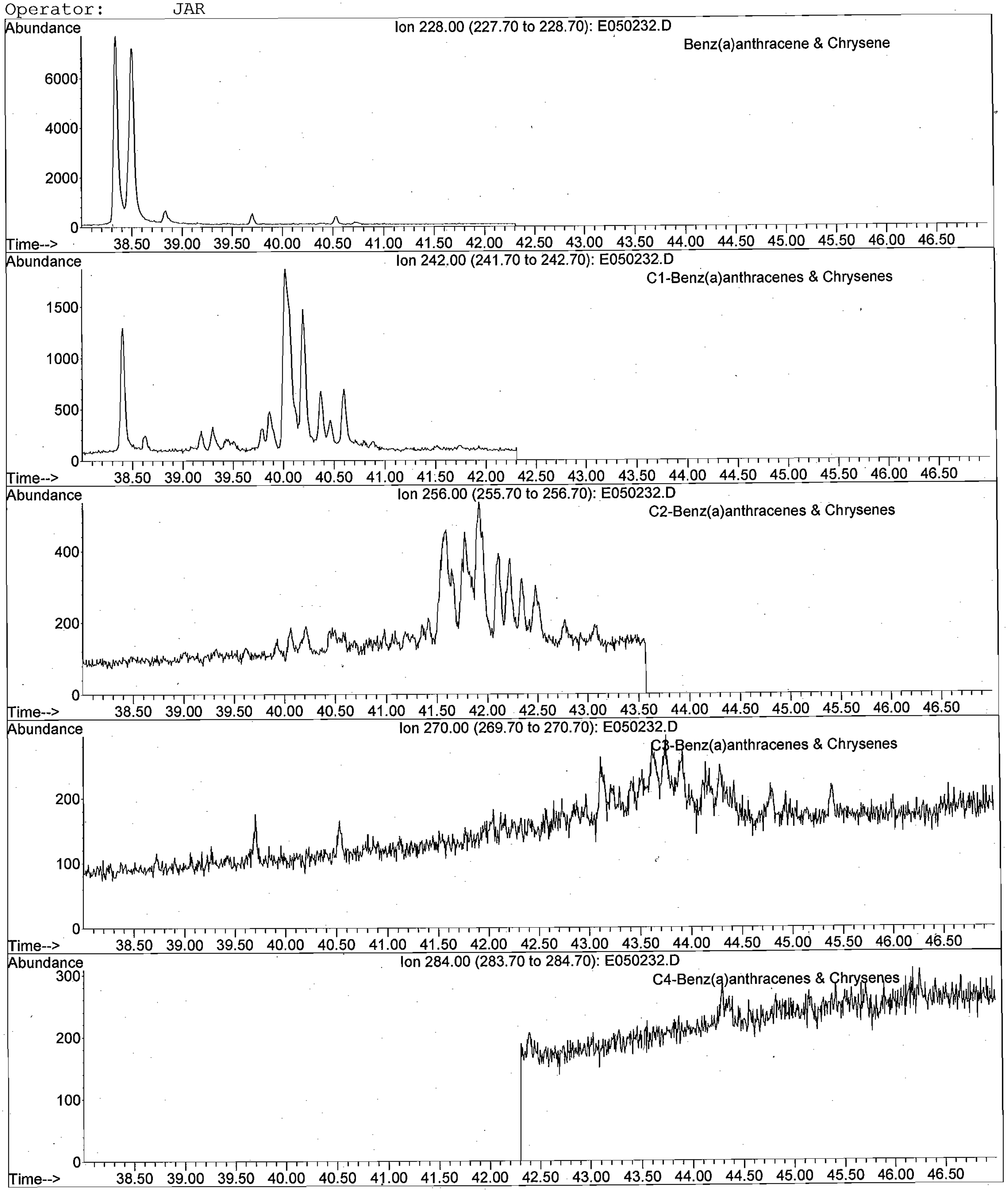
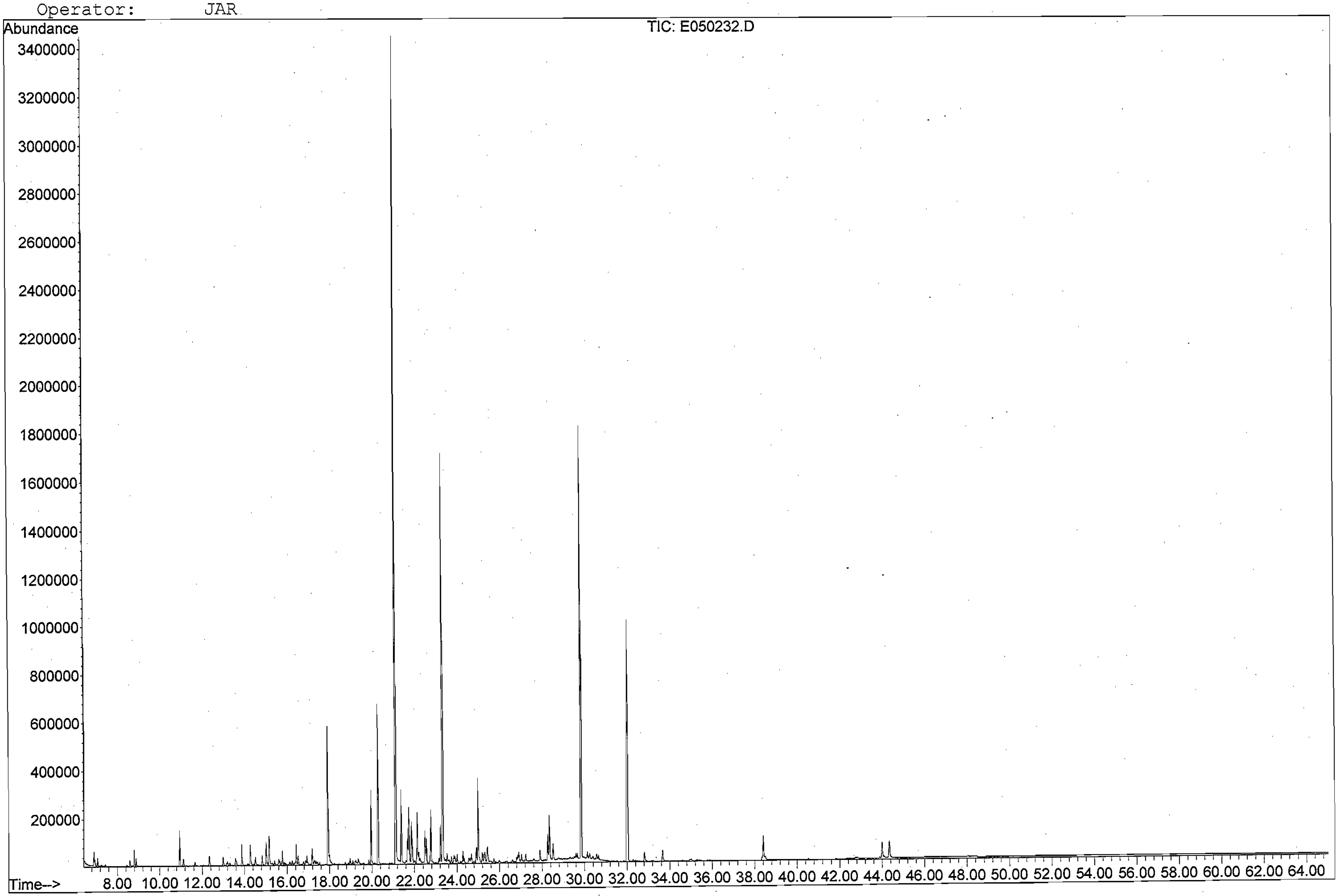
Method File: 4008SIMA.M
Sample Name: EK080415-14
Misc Info: TS24 (1-1.5)
Operator: JAR



META Environmental, Inc.

GC/MS TOTAL ION CHROMATOGRAM

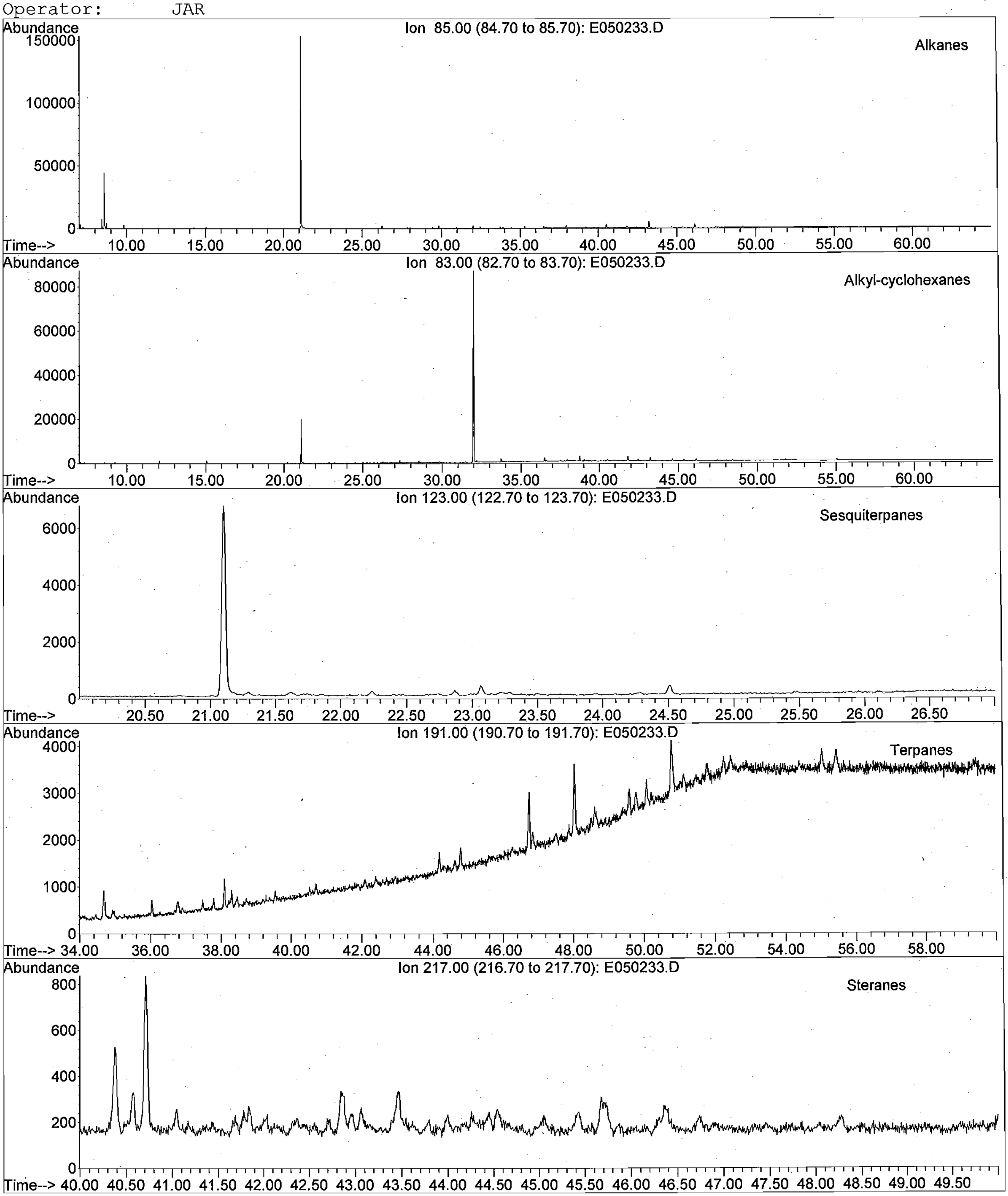
File: J:\1\DATA\E080502\E050232.D
Date Acquired: 4 May 2008 6:01 am
Method File: 4008SIMA.M
Sample Name: EK080415-14
Misc Info: TS24 (1-1.5)
Operator: JAR



META Environmental, Inc.

GC/MS EXTRACTED ION CHROMATOGRAM

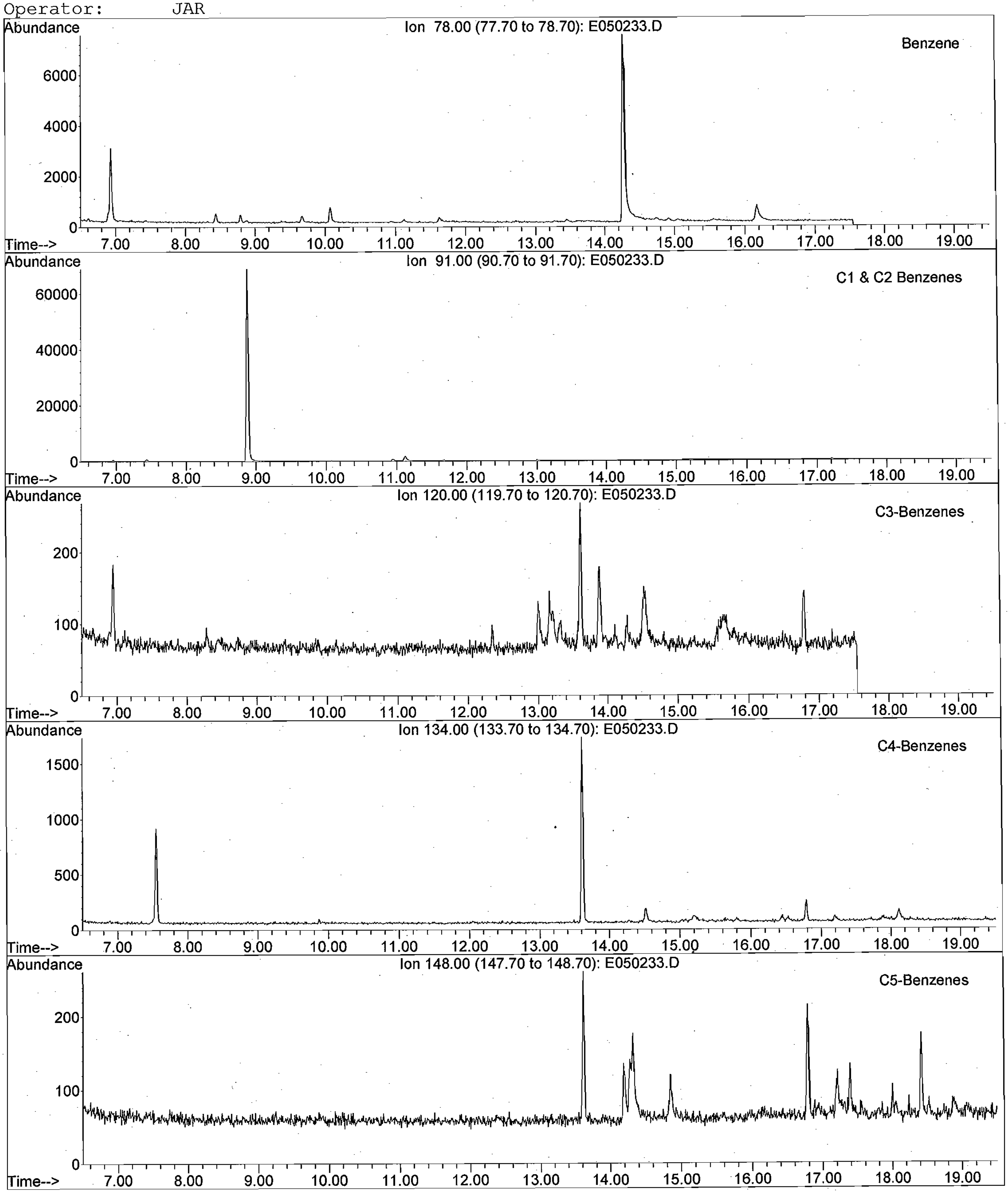
File: J:\1\DATA\E080502\E050233.D
Date Acquired: 4 May 2008 7:16 am
Method File: 4008SIMA.M
Sample Name: EK080415-15
Misc Info: TS18
Operator: JAR



META Environmental, Inc.

GC/MS EXTRACTED ION CHROMATOGRAM

File: J:\1\DATA\E080502\E050233.D
Date Acquired: 4 May 2008 7:16 am
Method File: 4008SIMA.M
Sample Name: EK080415-15
Misc Info: TS18
Operator: JAR



META Environmental, Inc.

GC/MS EXTRACTED ION CHROMATOGRAM

File: J:\1\DATA\E080502\E050233.D
Date Acquired: 4 May 2008 7:16 am
Method File: 4008SIMA.M
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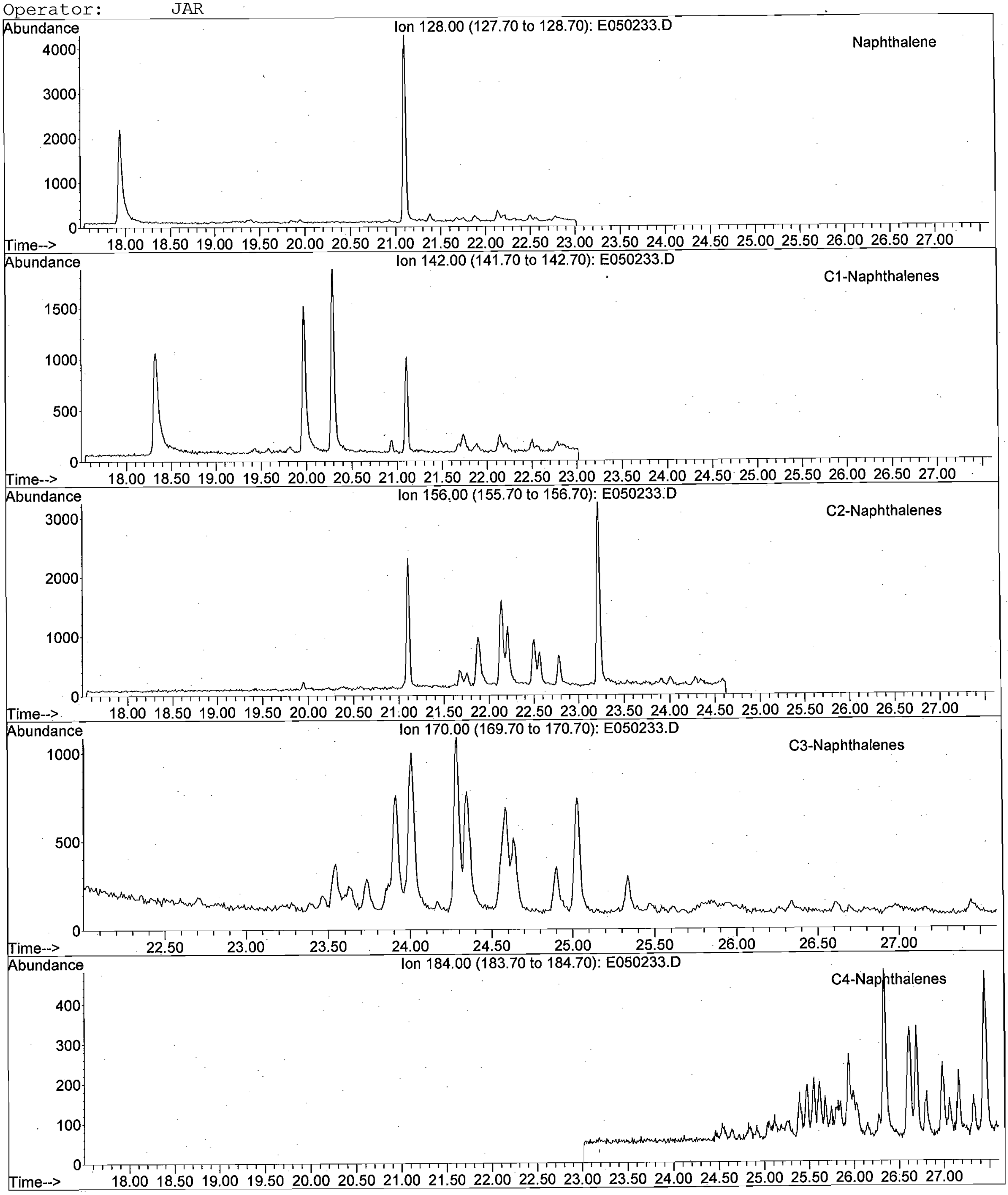
Misc Info: TS18
Operator: JAR



META Environmental, Inc.

GC/MS EXTRACTED ION CHROMATOGRAM

File: J:\1\DATA\E080502\E050233.D
Date Acquired: 4 May 2008 7:16 am
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Sample Name: EK080415-15
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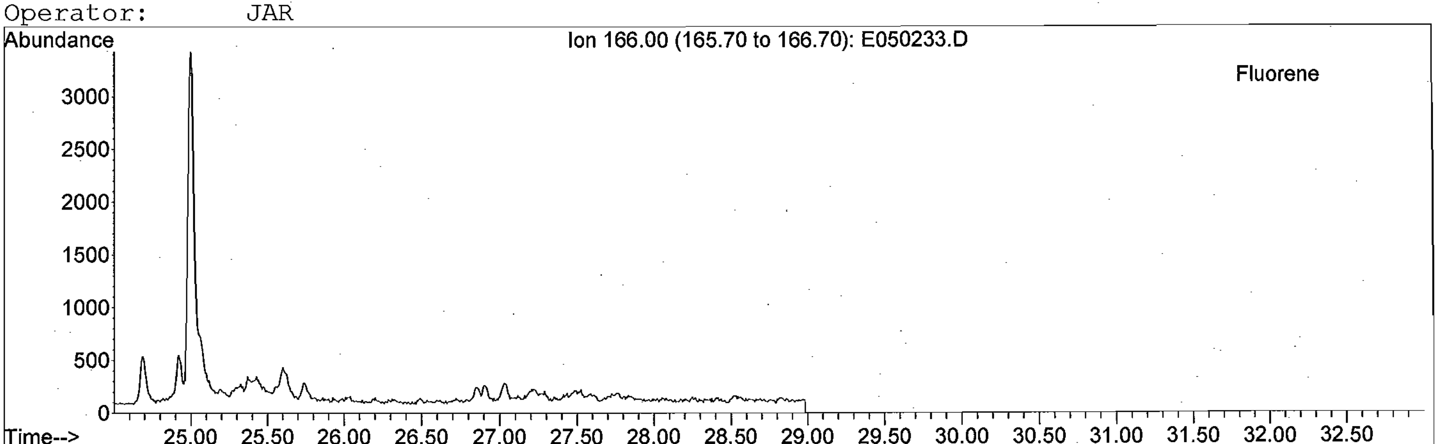
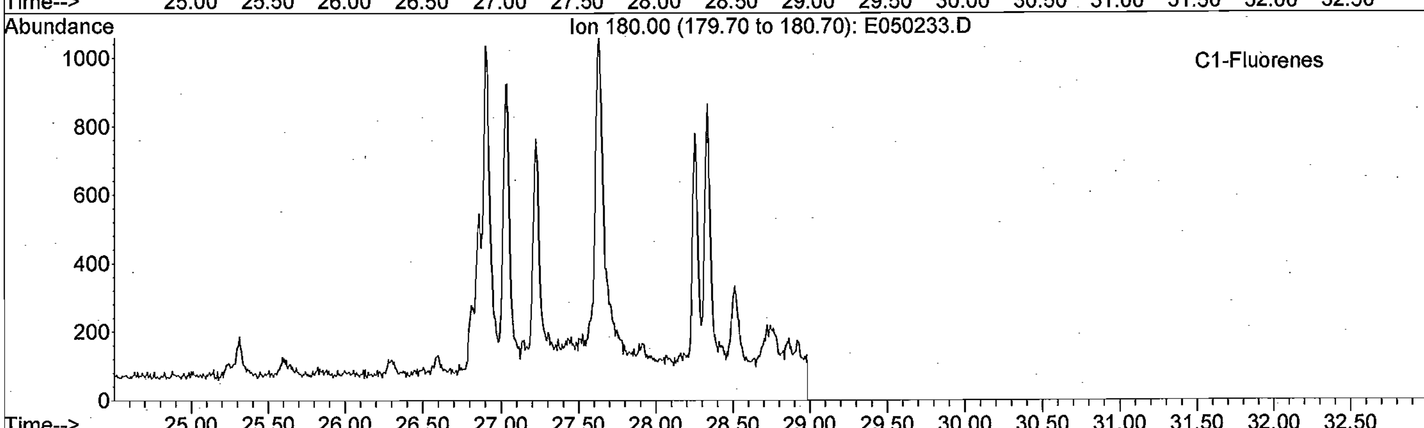
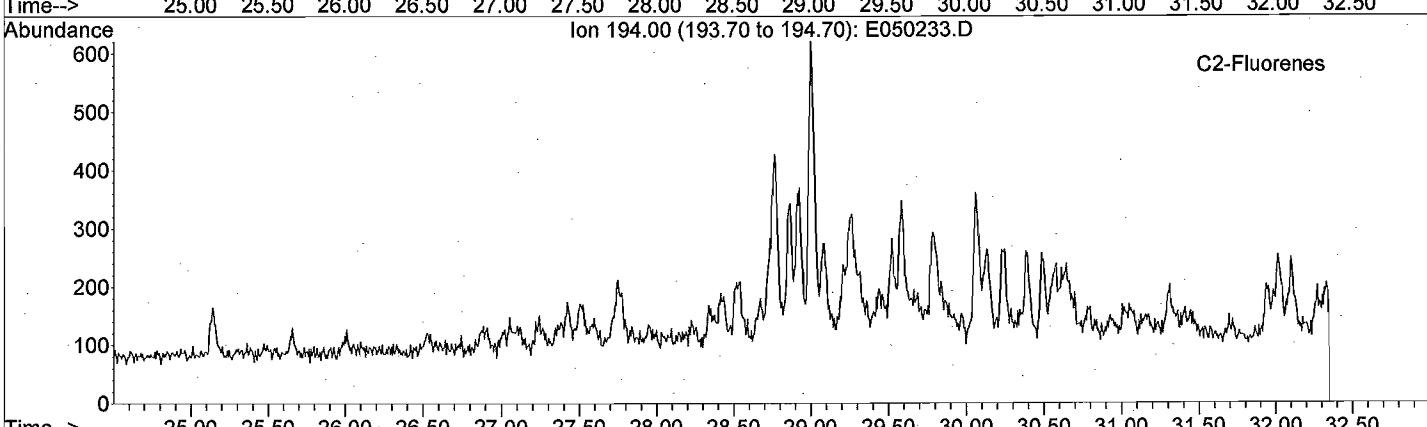
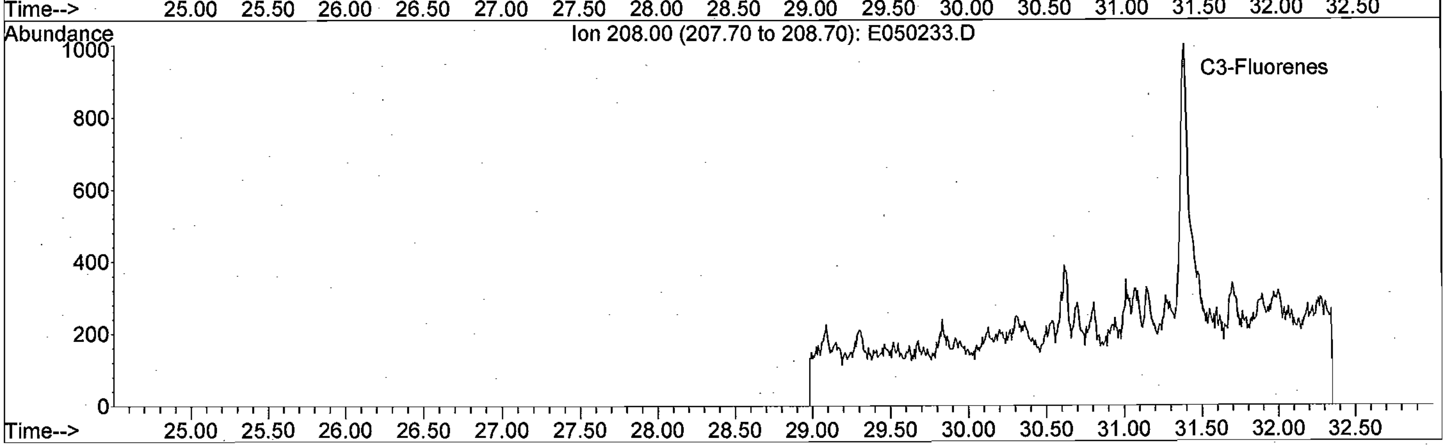
Operator: JAR





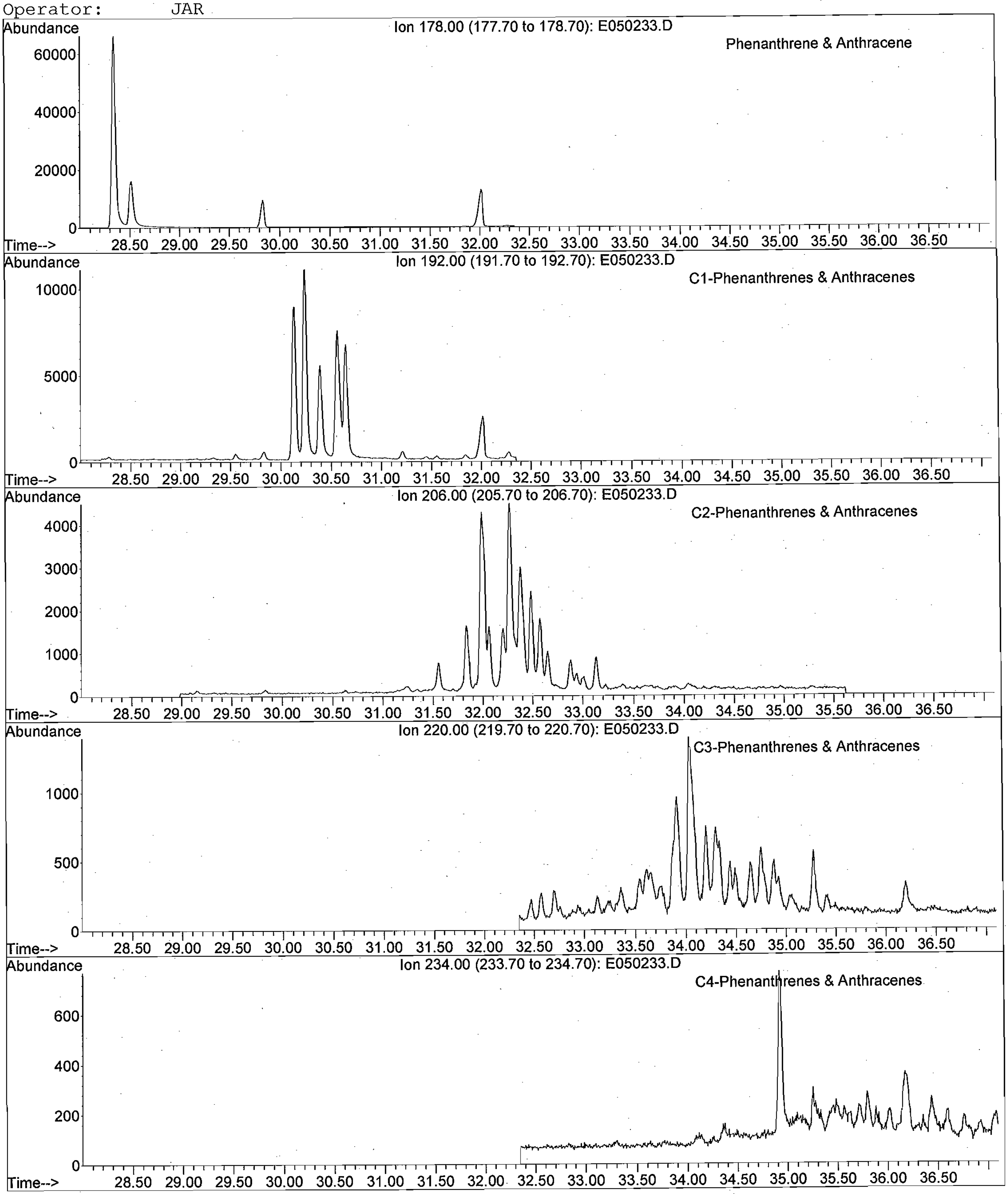




META Environmental, Inc.

GC/MS EXTRACTED ION CHROMATOGRAM

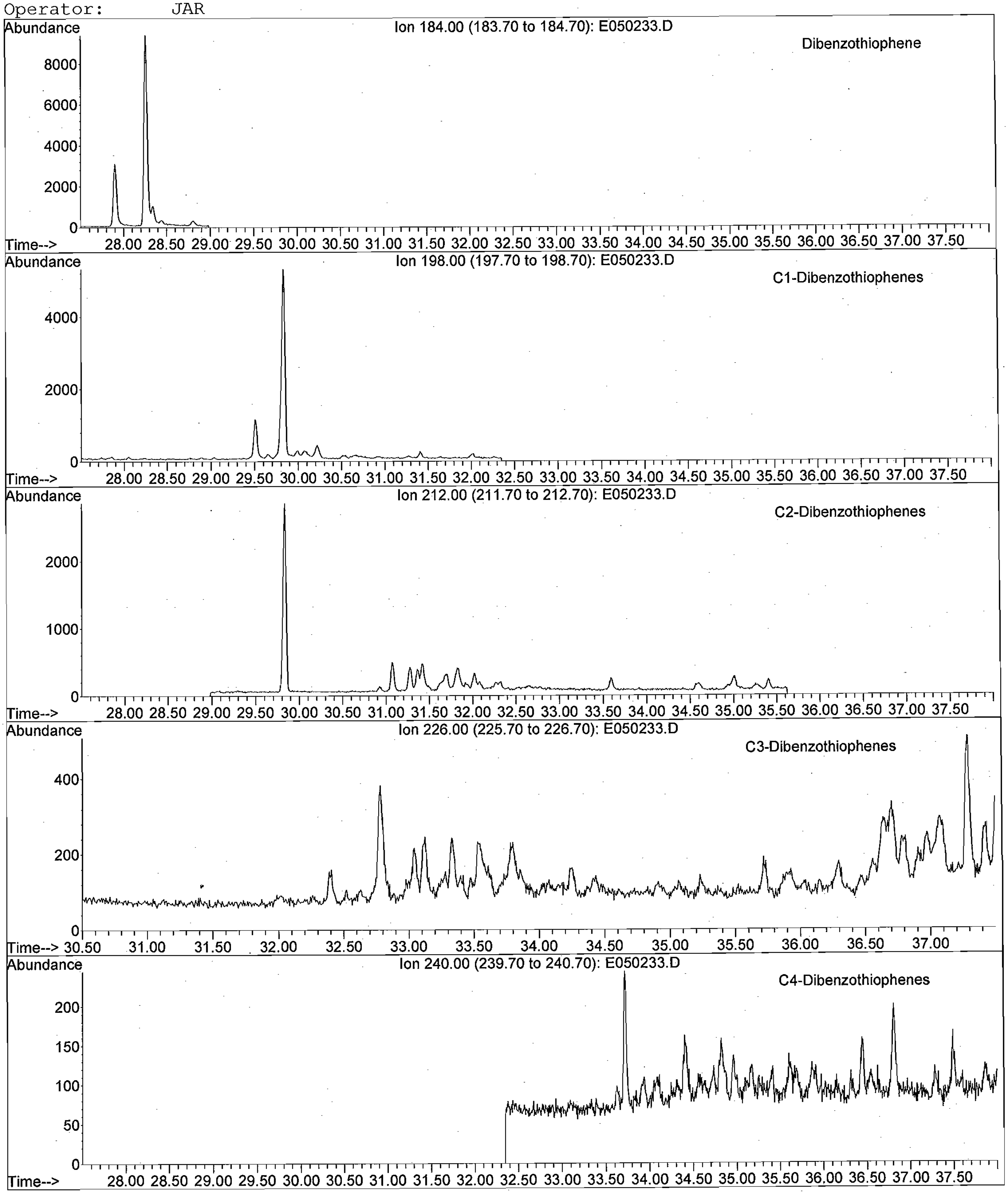
File: J:\1\DATA\E080502\E050233.D
Date Acquired: 4 May 2008 7:16 am
Method File: 4008SIMA.M
Sample Name: EK080415-15
Misc Info: TS18
Operator: JAR



META Environmental, Inc.

GC/MS EXTRACTED ION CHROMATOGRAM

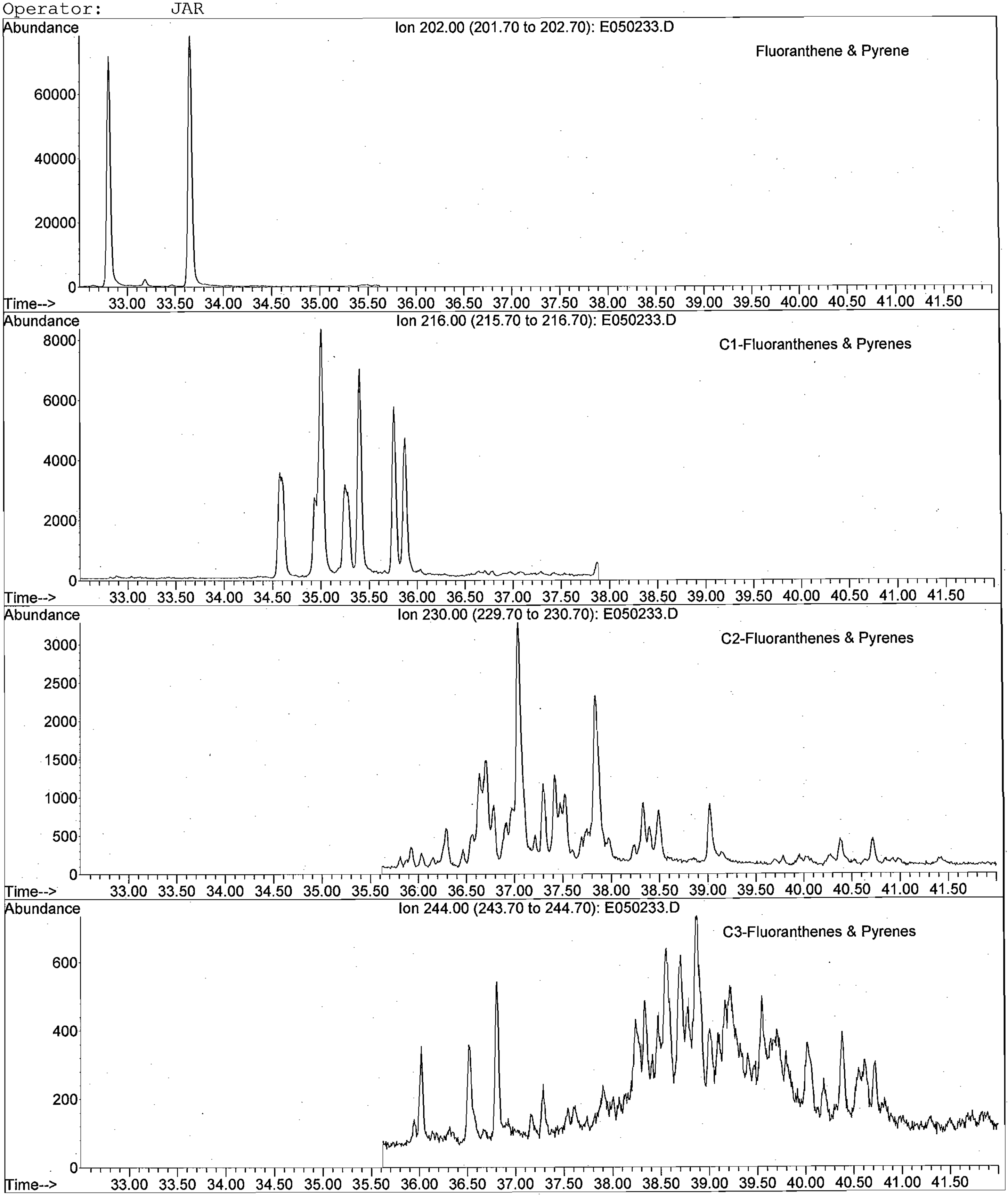
File: J:\1\DATA\E080502\E050233.D
Date Acquired: 4 May 2008 7:16 am
Method File: 4008SIMA.M
Sample Name: EK080415-15
Misc Info: TS18
Operator: JAR



META Environmental, Inc.

GC/MS EXTRACTED ION CHROMATOGRAM

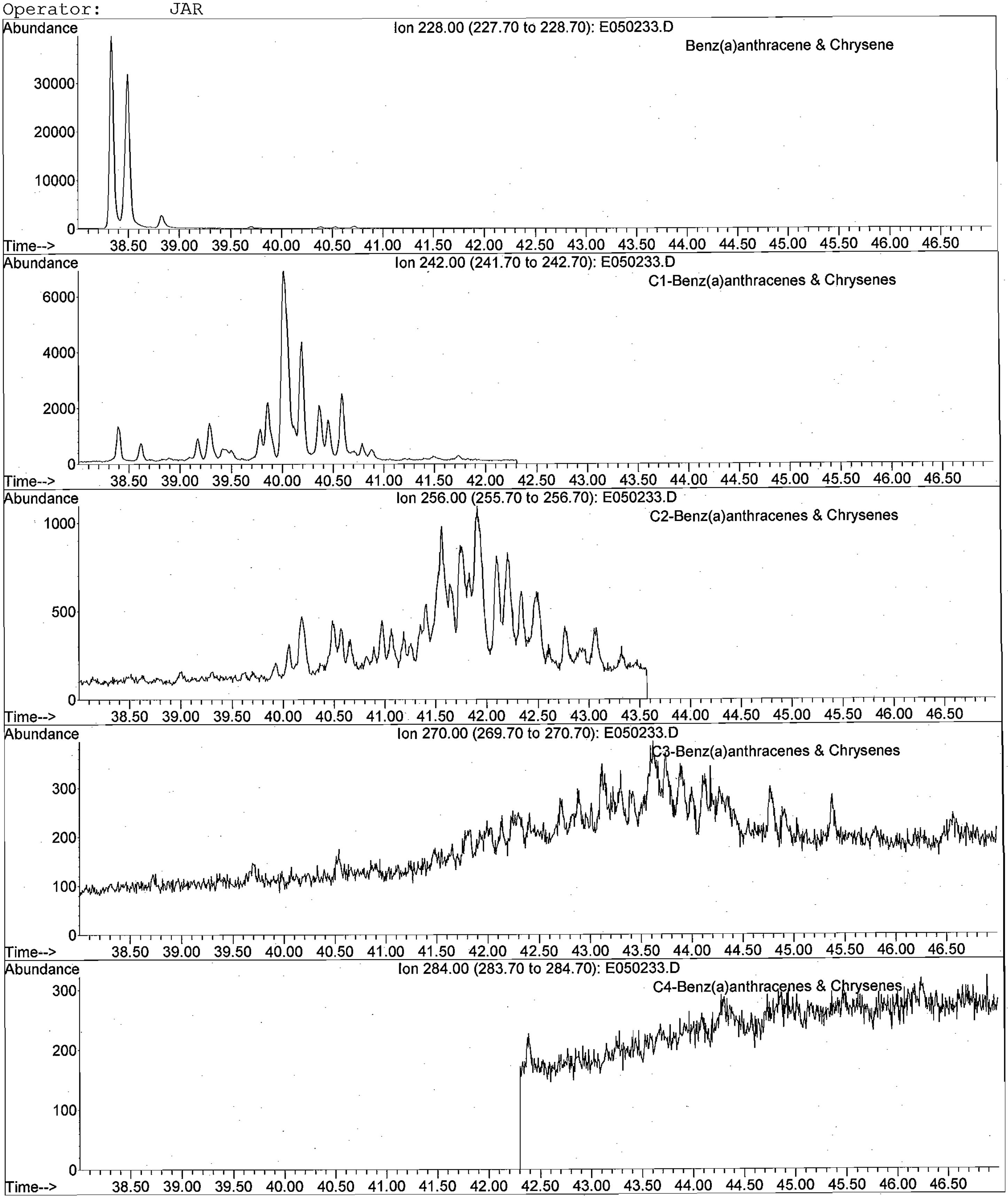
File: J:\1\DATA\E080502\E050233.D
Date Acquired: 4 May 2008 7:16 am
Method File: 4008SIMA.M
Sample Name: EK080415-15
Misc Info: TS18
Operator: JAR



META Environmental, Inc.

GC/MS EXTRACTED ION CHROMATOGRAM

File: J:\1\DATA\E080502\E050233.D
Date Acquired: 4 May 2008 7:16 am
Method File: 4008SIMA.M
Sample Name: EK080415-15
Misc Info: TS18
Operator: JAR



META Environmental, Inc.

GC/MS TOTAL ION CHROMATOGRAM

File: J:\1\DATA\E080502\E050233.D
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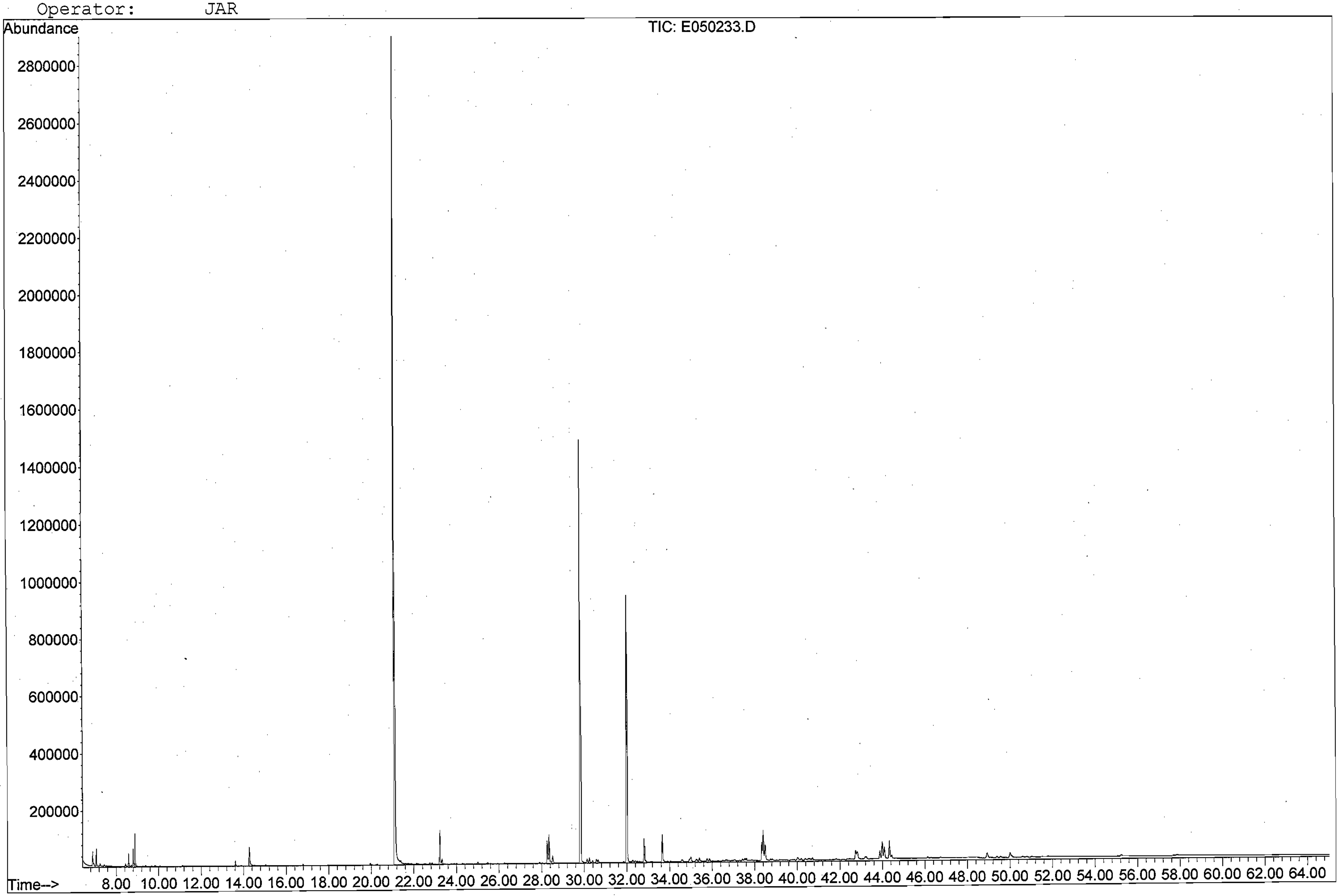
Method File: 4008SIMA.M
Sample Name: EK080415-15
Misc Info: TS18
Operator: JAR



META Environmental, Inc.

GC/MS EXTRACTED ION CHROMATOGRAM

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Method File: 4008SIMA.M
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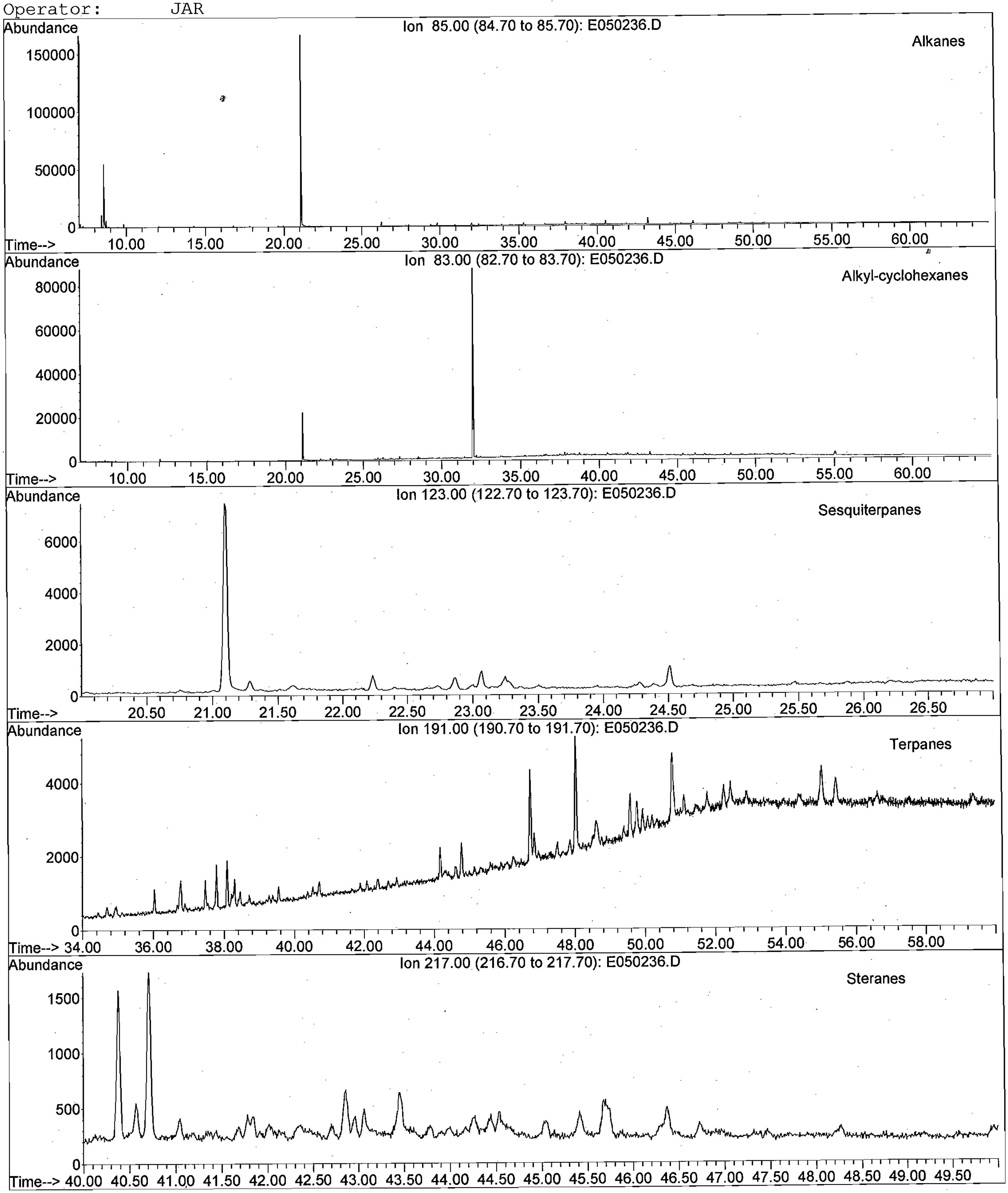
Operator: JAR



META Environmental, Inc.

GC/MS EXTRACTED ION CHROMATOGRAM

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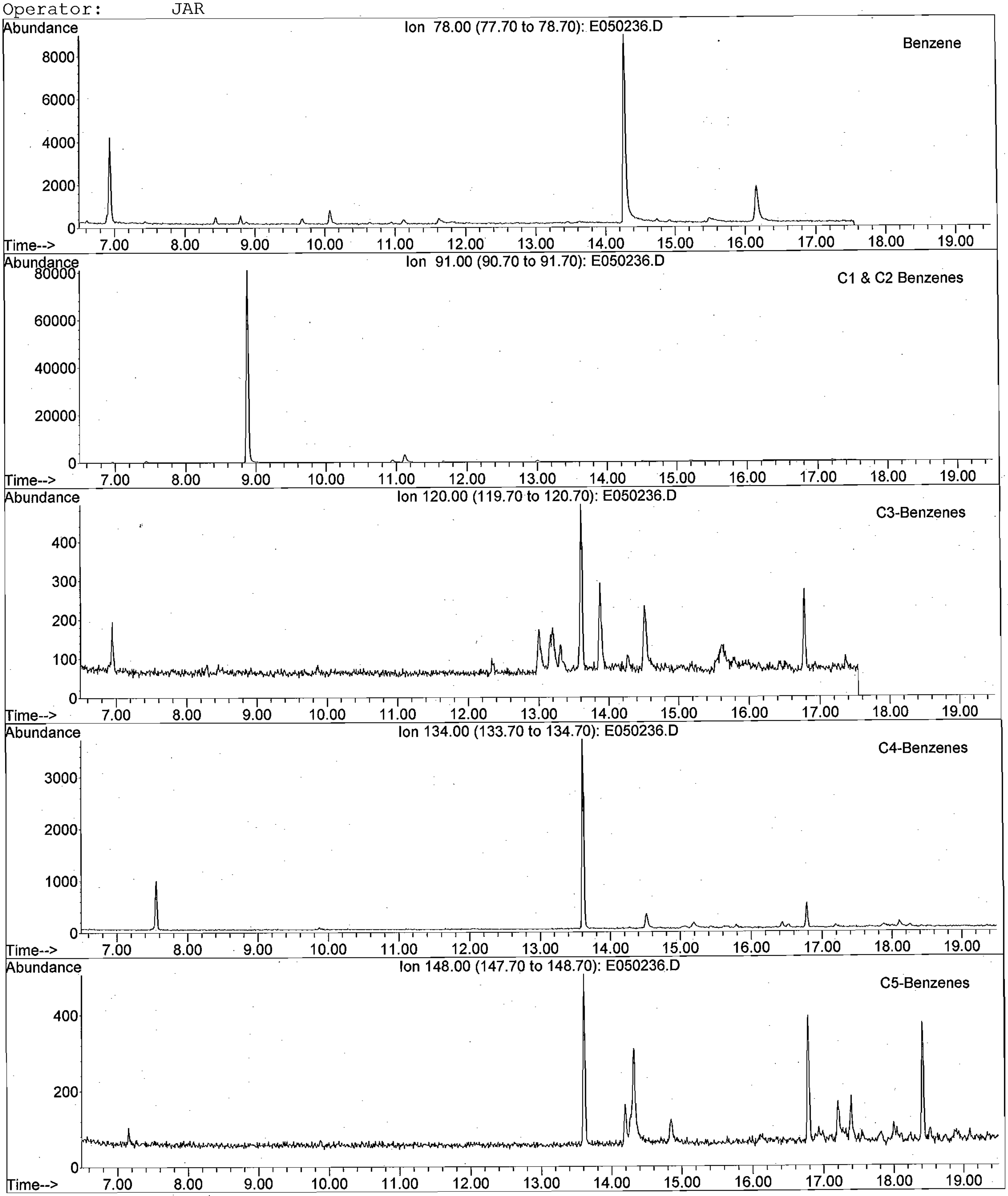

META Environmental, Inc.

GC/MS EXTRACTED ION CHROMATOGRAM

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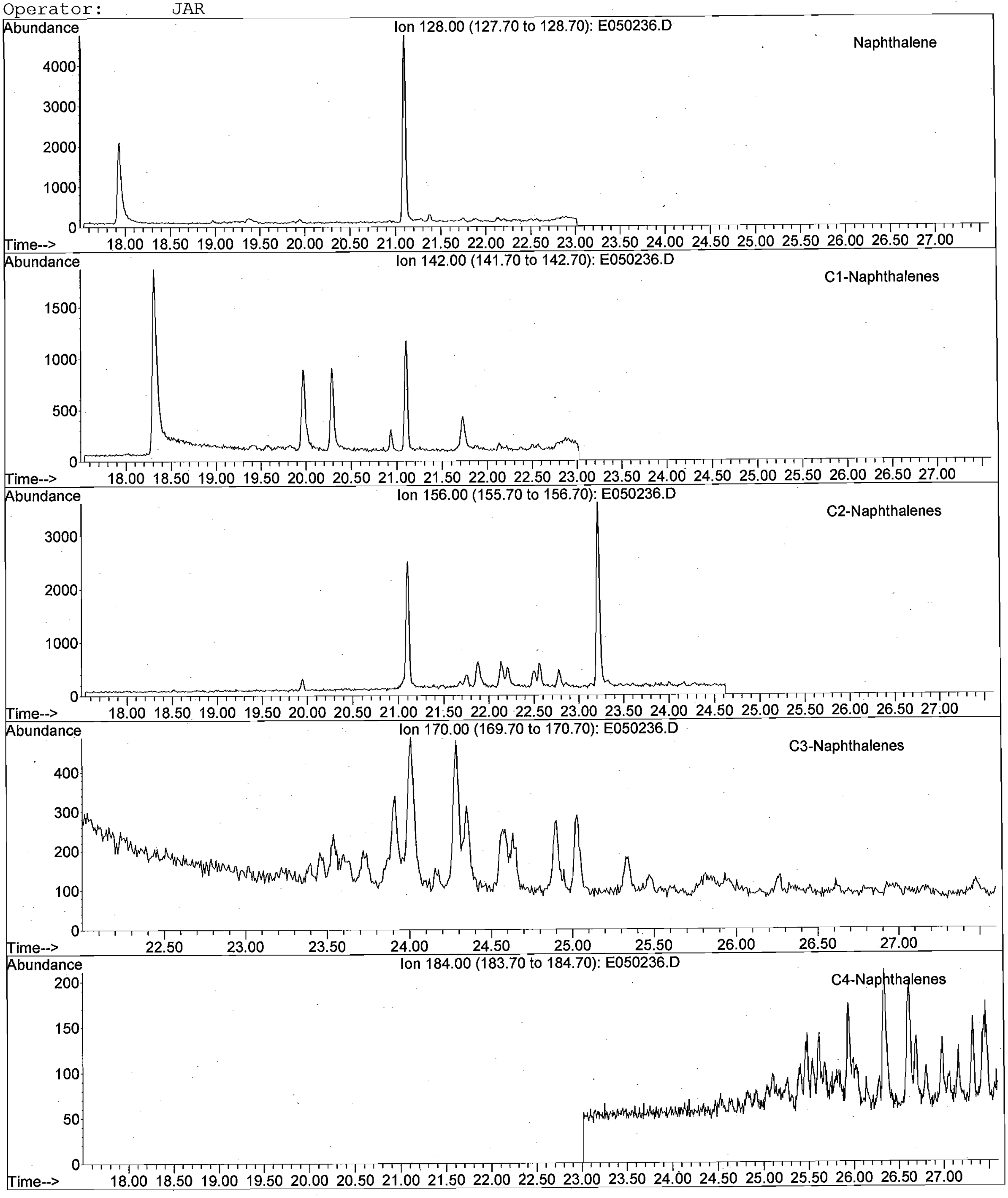
Operator: JAR



META Environmental, Inc.

GC/MS EXTRACTED ION CHROMATOGRAM

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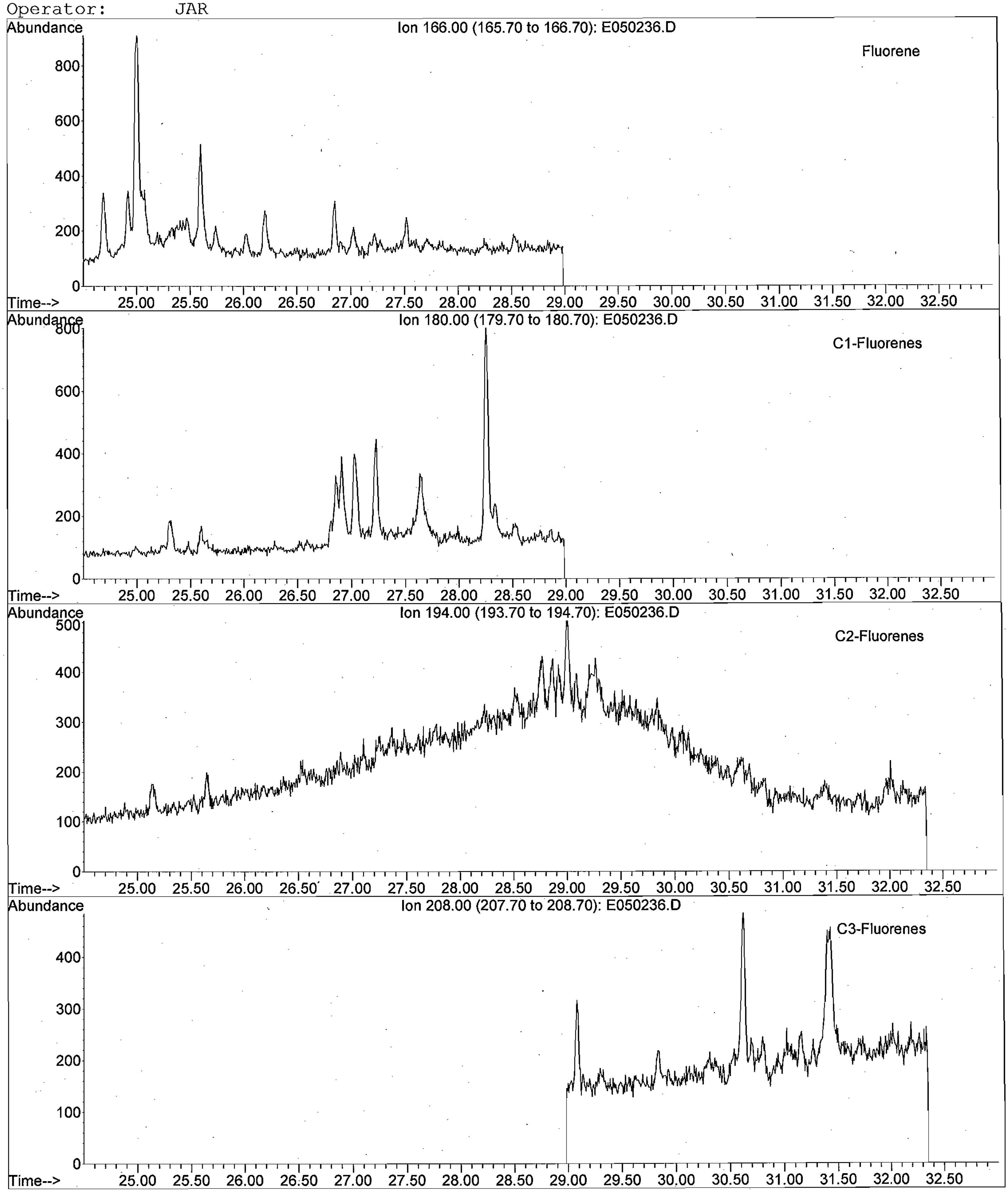
Operator: JAR



META Environmental, Inc.

GC/MS EXTRACTED ION CHROMATOGRAM

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Method File: 4008SIMA.M
Sample Name: EK080415-15DUP
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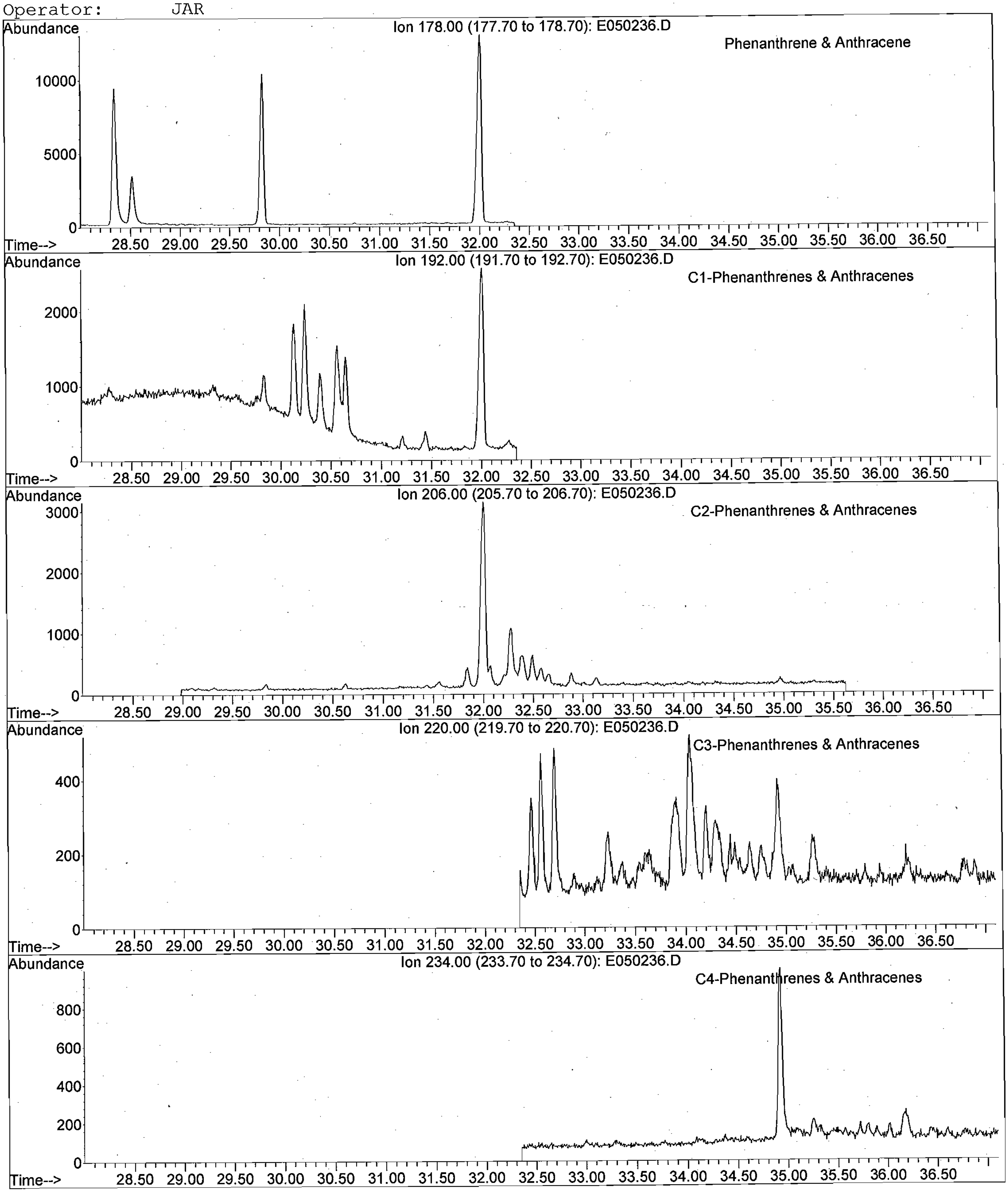
Operator: JAR



META Environmental, Inc.

GC/MS EXTRACTED ION CHROMATOGRAM

File: J:\1\DATA\E080502\E050236.D
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Method File: 4008SIMA.M
Sample Name: EK080415-15DUP
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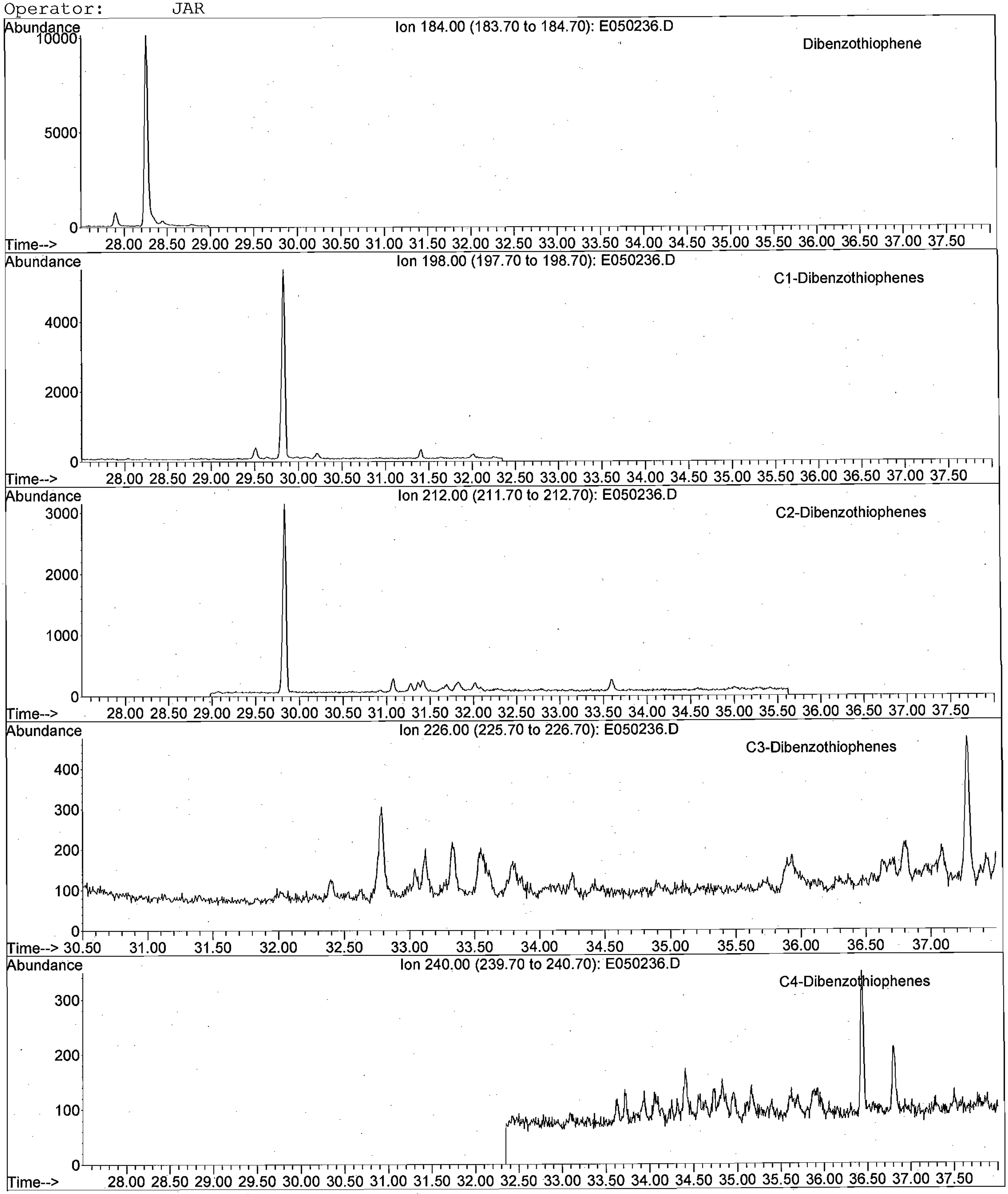
Operator: JAR



META Environmental, Inc.

GC/MS EXTRACTED ION CHROMATOGRAM

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Method File: 4008SIMA.M
Sample Name: EK080415-15DUP
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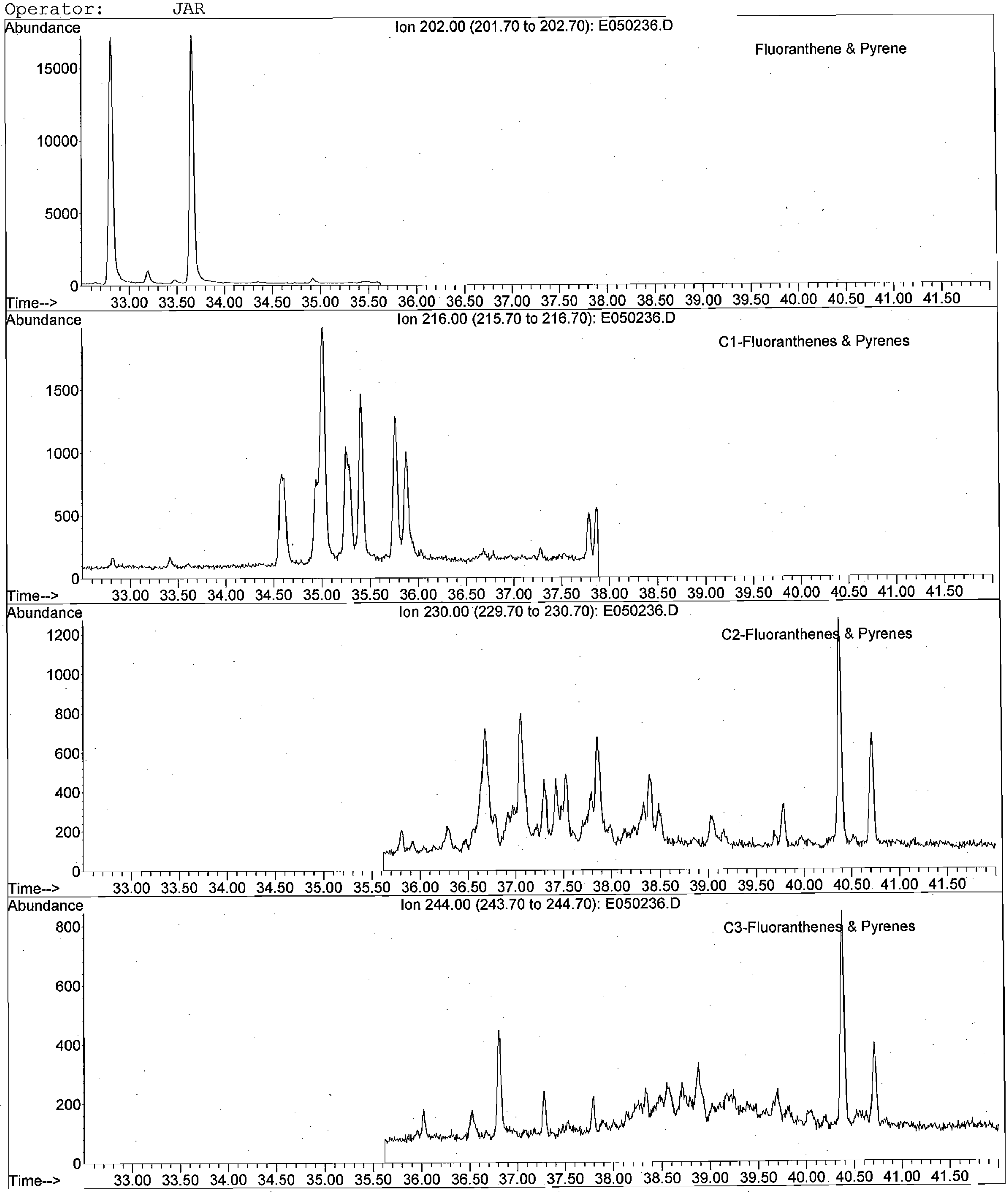
Operator: JAR



META Environmental, Inc.

GC/MS EXTRACTED ION CHROMATOGRAM

File: J:\1\DATA\E080502\E050236.D
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Sample Name: EK080415-15DUP
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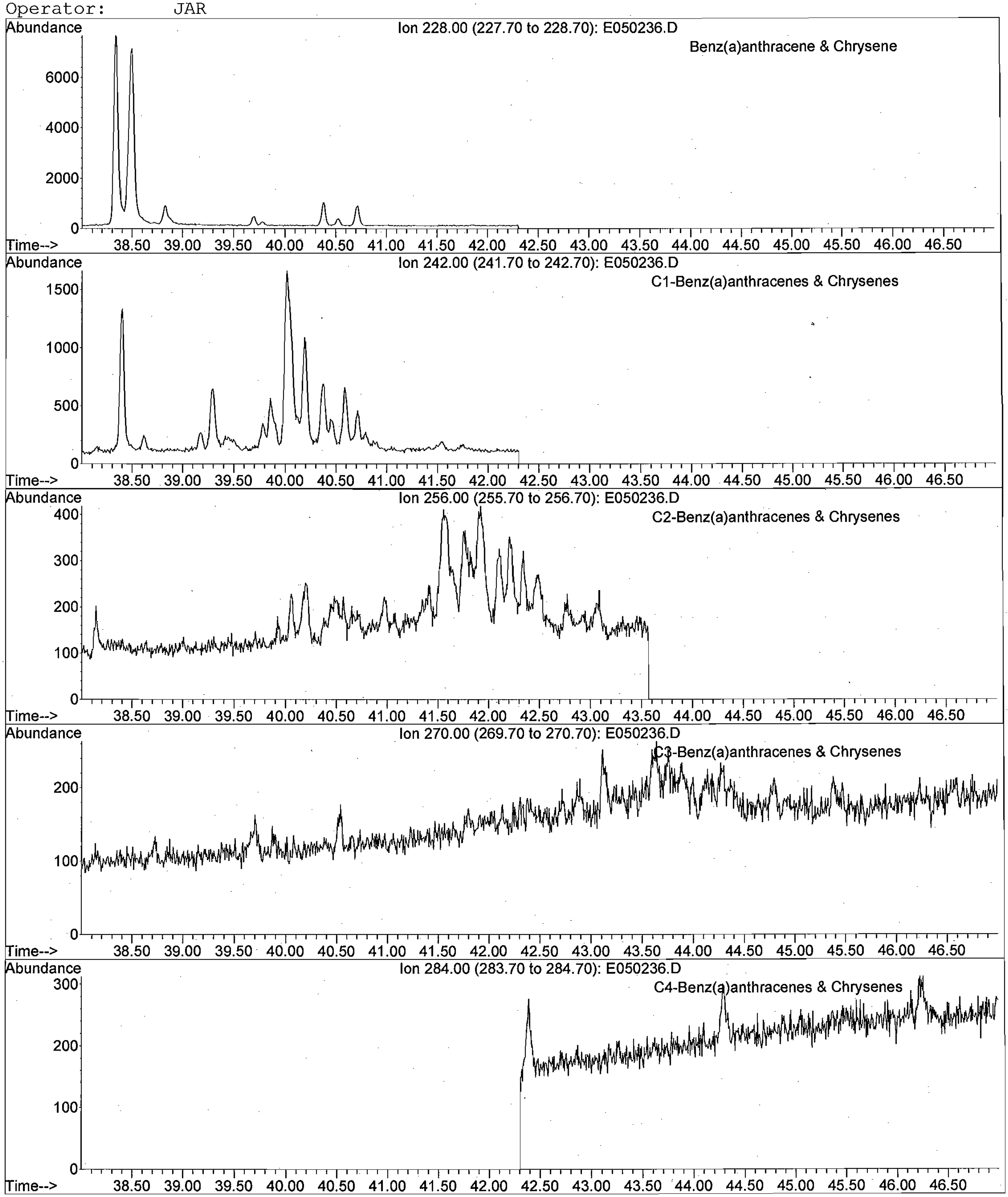
Operator: JAR



META Environmental, Inc.

GC/MS TOTAL ION CHROMATOGRAM

File: J:\1\DATA\E080502\E050236.D
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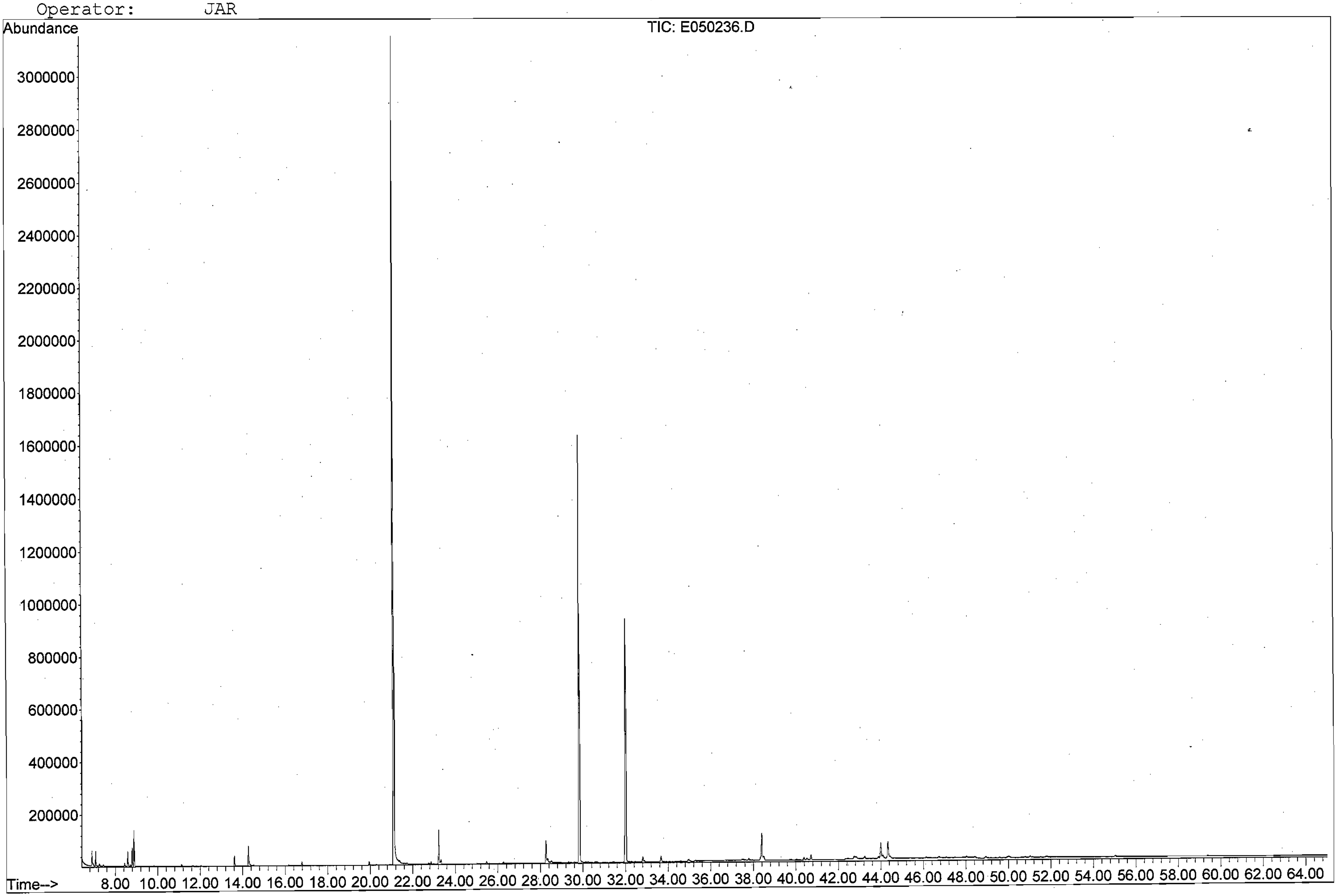
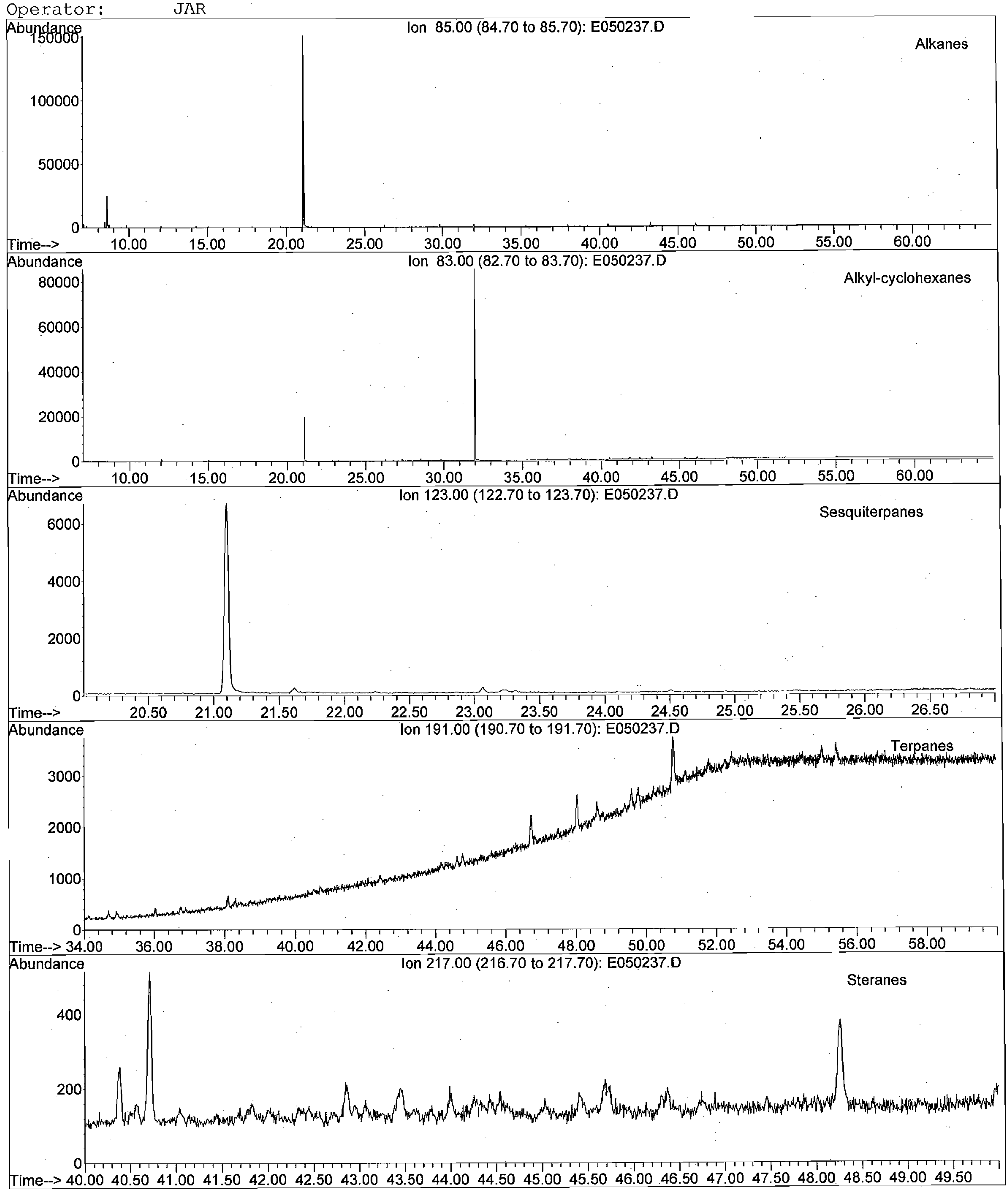
Method File: 4008SIMA.M
Sample Name: EK080415-15DUP
Misc Info: Duplicate of TS18
Operator: JAR



META Environmental, Inc.

GC/MS EXTRACTED ION CHROMATOGRAM

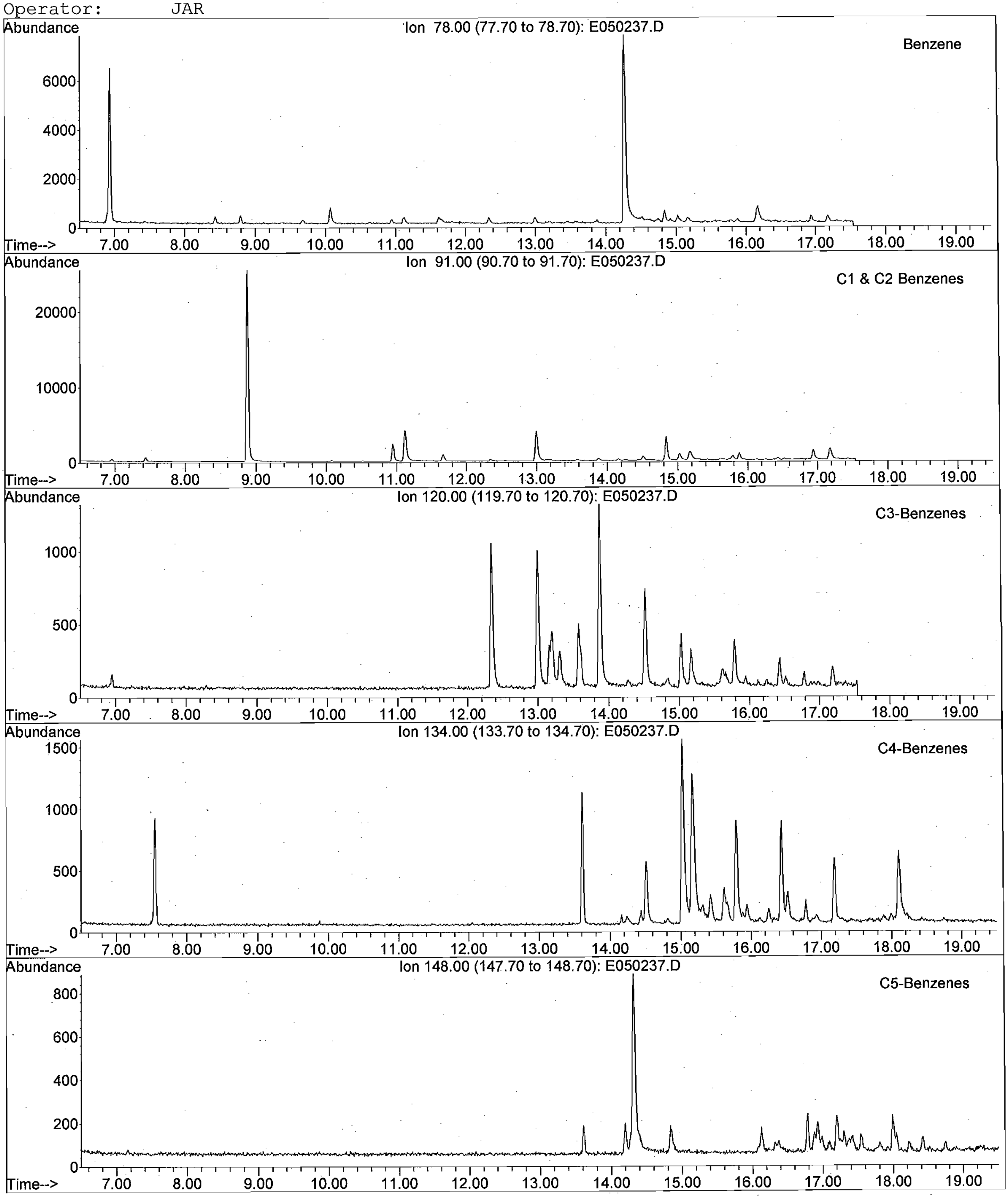
File: J:\1\DATA\E080502\E050237.D
Date Acquired: 4 May 2008 12:15 pm
Method File: 4008SIMA.M
Sample Name: EK080415-16
Misc Info: TS24
Operator: JAR



META Environmental, Inc.

GC/MS EXTRACTED ION CHROMATOGRAM

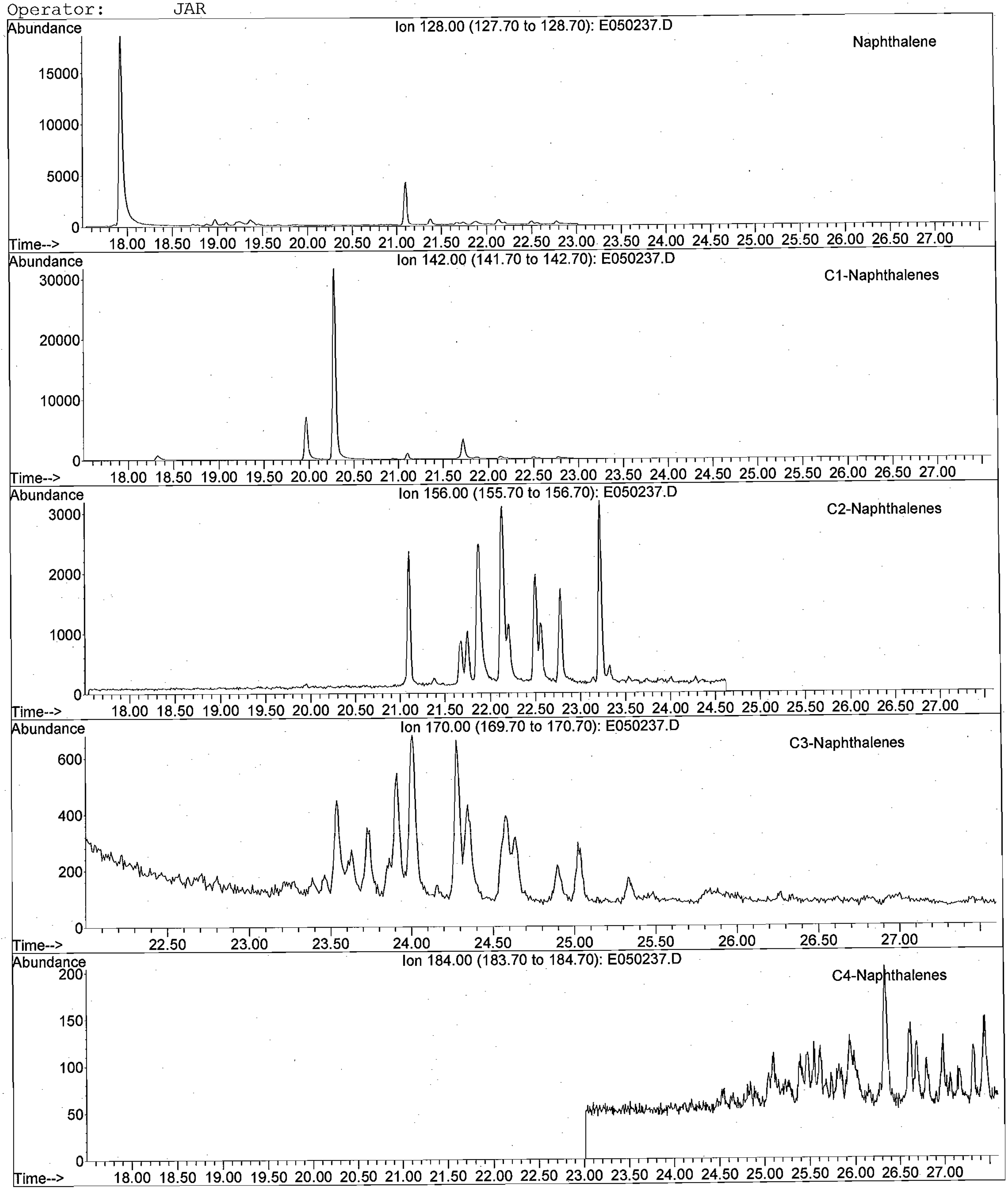
File: J:\1\DATA\E080502\E050237.D
Date Acquired: 4 May 2008 12:15 pm
Method File: 4008SIMA.M
Sample Name: EK080415-16
Misc Info: TS24
Operator: JAR



META Environmental, Inc.

GC/MS EXTRACTED ION CHROMATOGRAM

File: J:\1\DATA\E080502\E050237.D
Date Acquired: 4 May 2008 12:15 pm
Method File: 4008SIMA.M
Sample Name: EK080415-16
Misc Info: TS24
Operator: JAR



META Environmental, Inc.

GC/MS EXTRACTED ION CHROMATOGRAM

File: J:\1\DATA\E080502\E050237.D
Date Acquired: 4 May 2008 12:15 pm
Method File: 4008SIMA.M
Sample Name: EK080415-16
Misc Info: TS24
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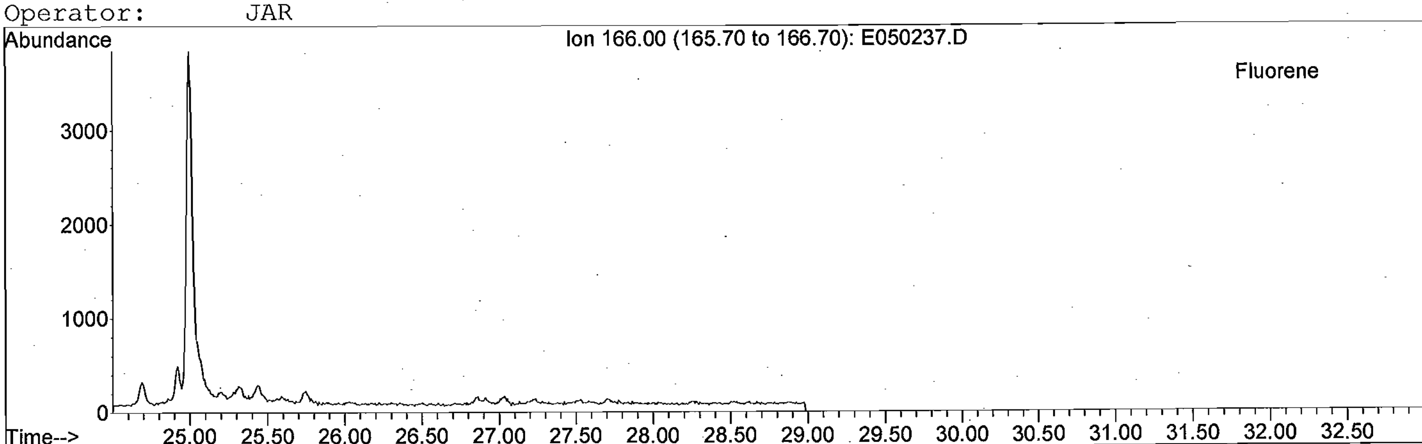

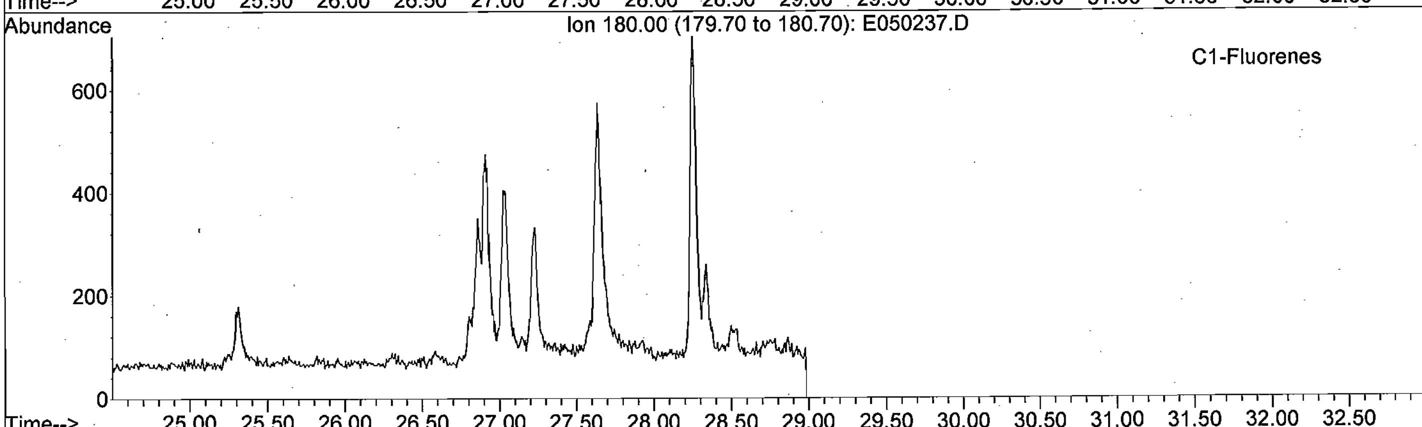

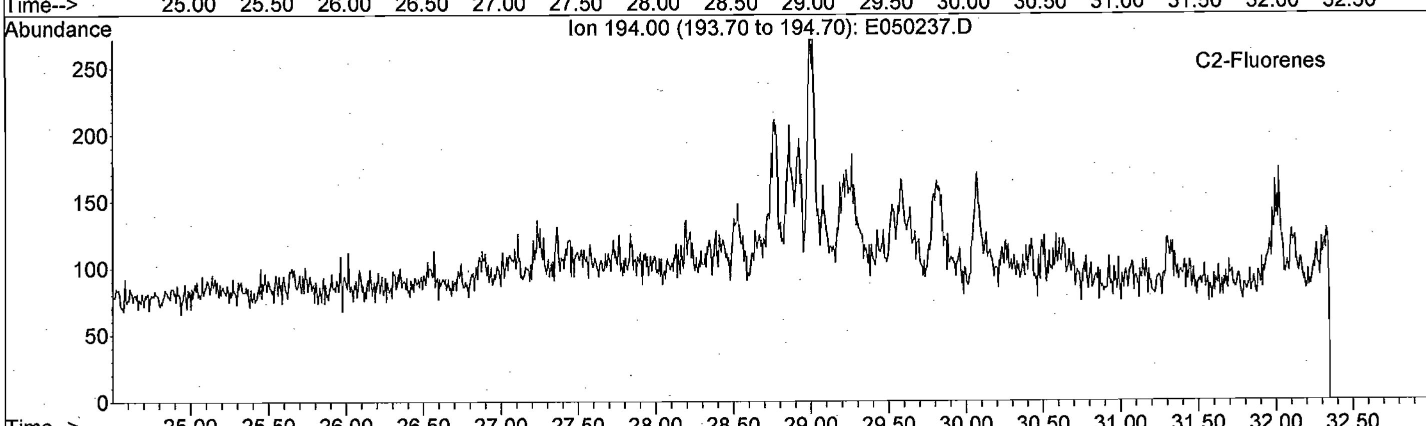

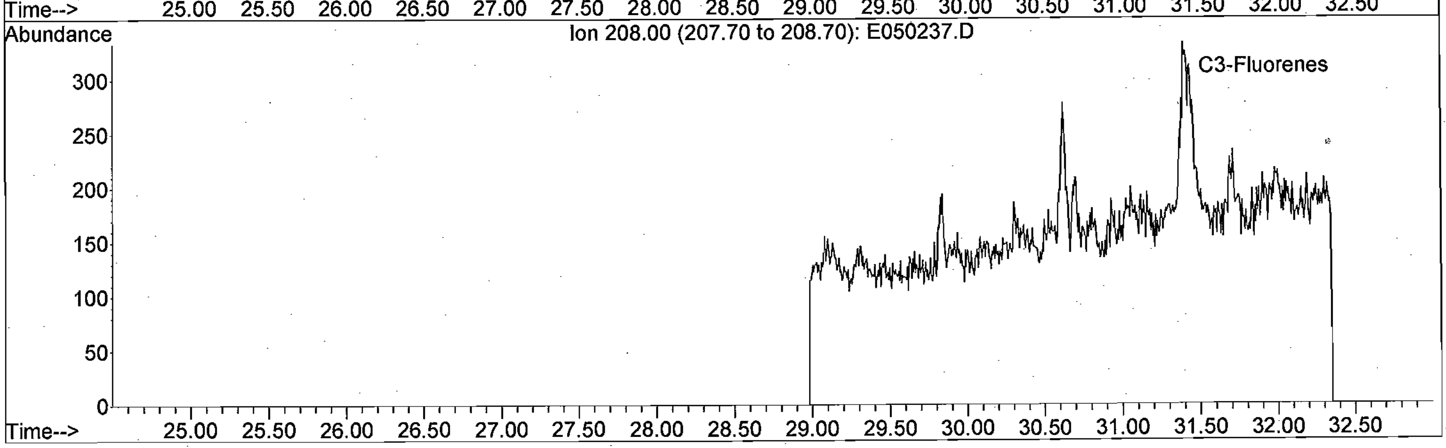

META Environmental, Inc.

GC/MS EXTRACTED ION CHROMATOGRAM

File: J:\1\DATA\E080502\E050237.D
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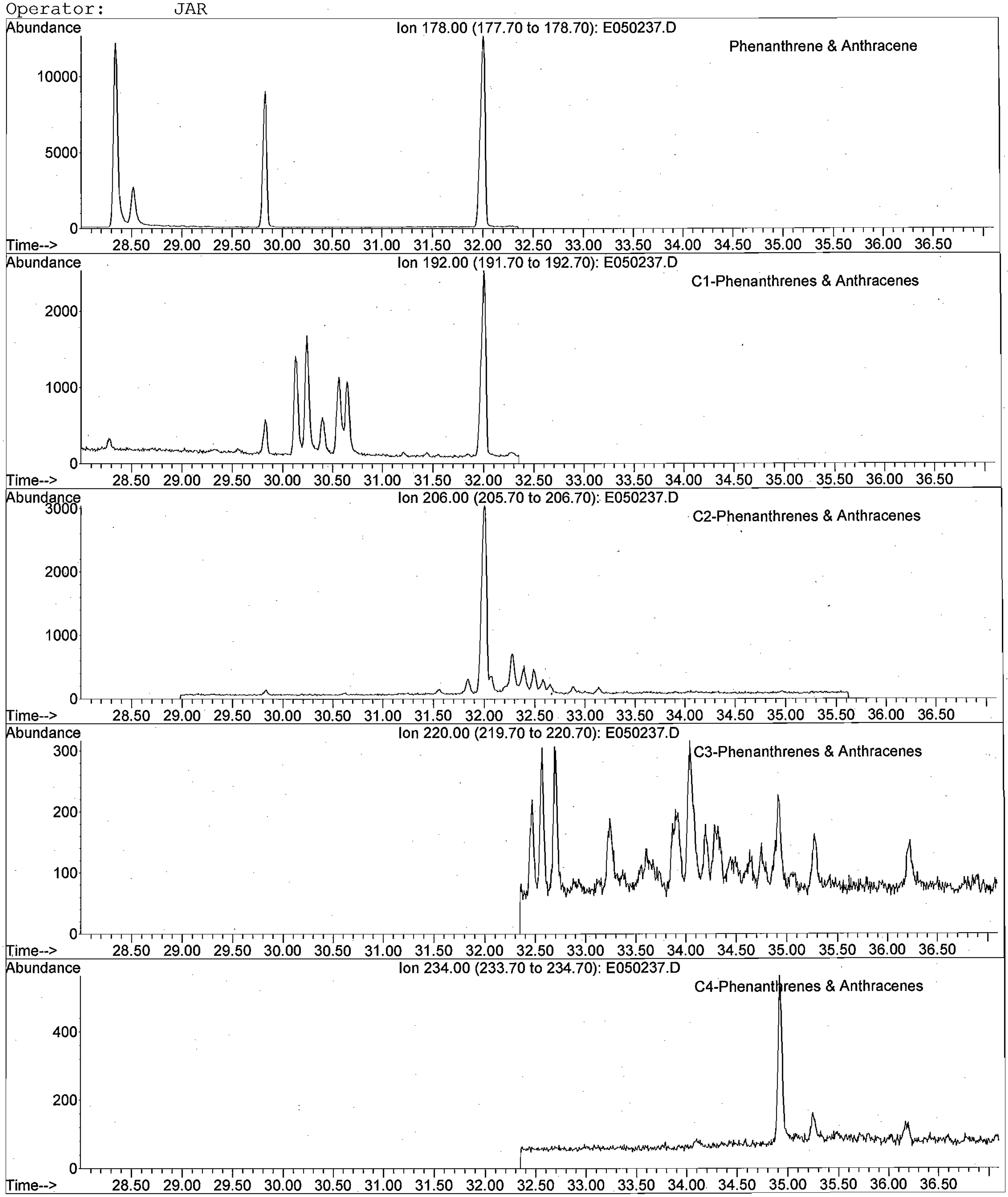
Sample Name: EK080415-16
Misc Info: TS24
Operator: JAR



META Environmental, Inc.

GC/MS EXTRACTED ION CHROMATOGRAM

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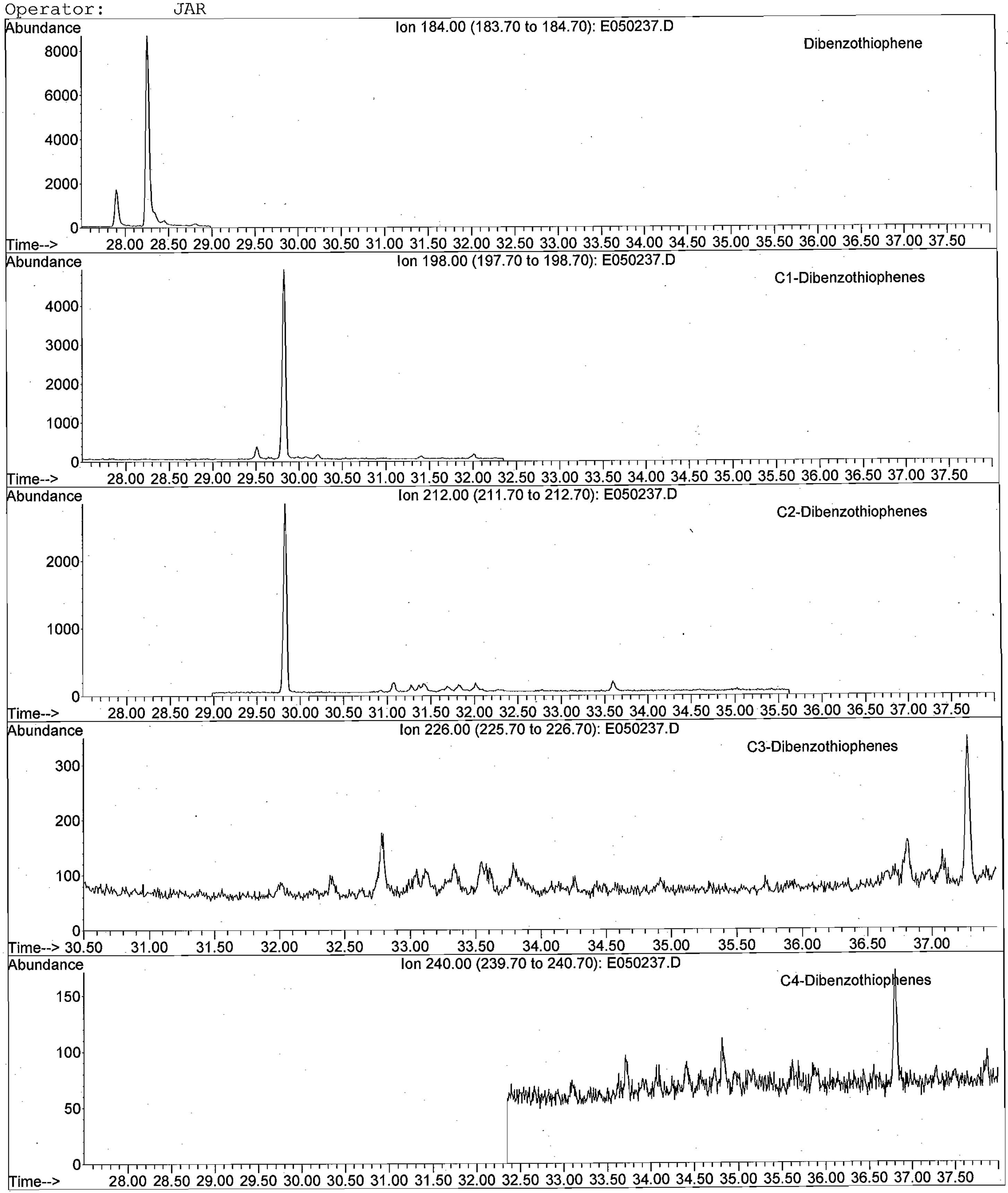
Date Acquired:	4 May 2008 12:15 pm
Method File:	4008SIMA.M
Sample Name:	EK080415-16
Misc Info:	TS24
Operator:	JAR



META Environmental, Inc.

GC/MS EXTRACTED ION CHROMATOGRAM

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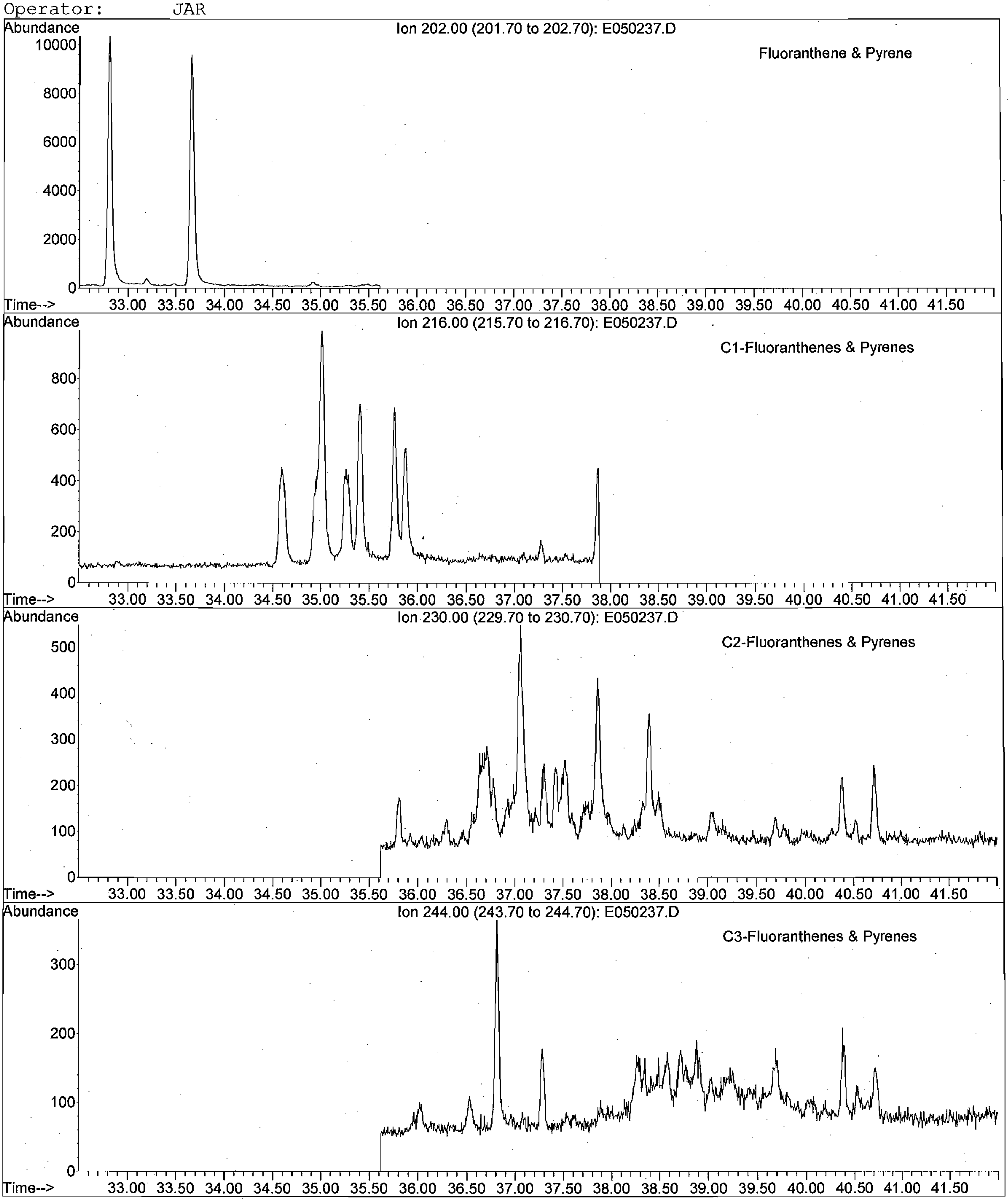
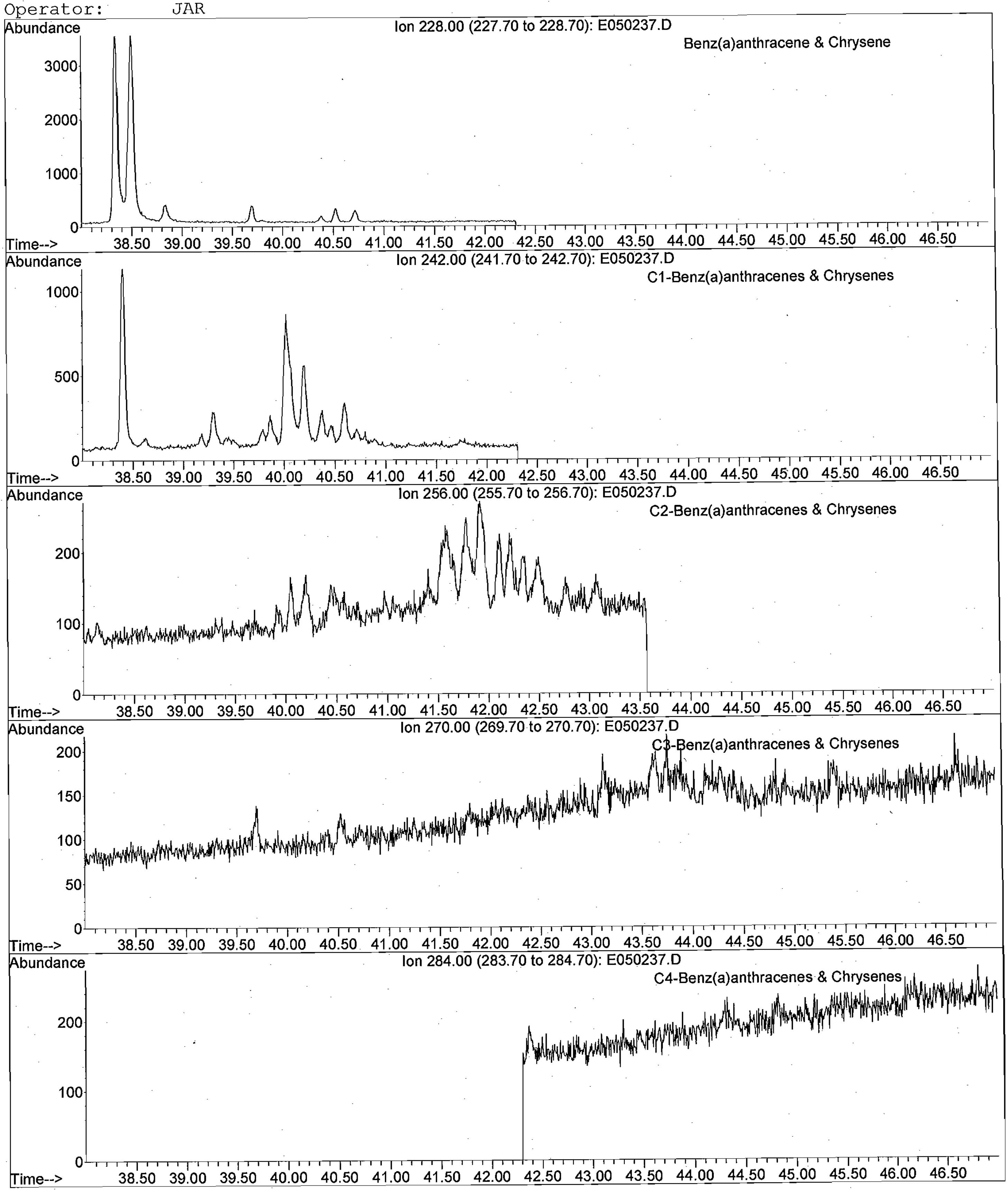
Date Acquired: 4 May 2008 12:15 pm
Method File: 4008SIMA.M
Sample Name: EK080415-16
Misc Info: TS24
Operator: JAR



META Environmental, Inc.

GC/MS EXTRACTED ION CHROMATOGRAM

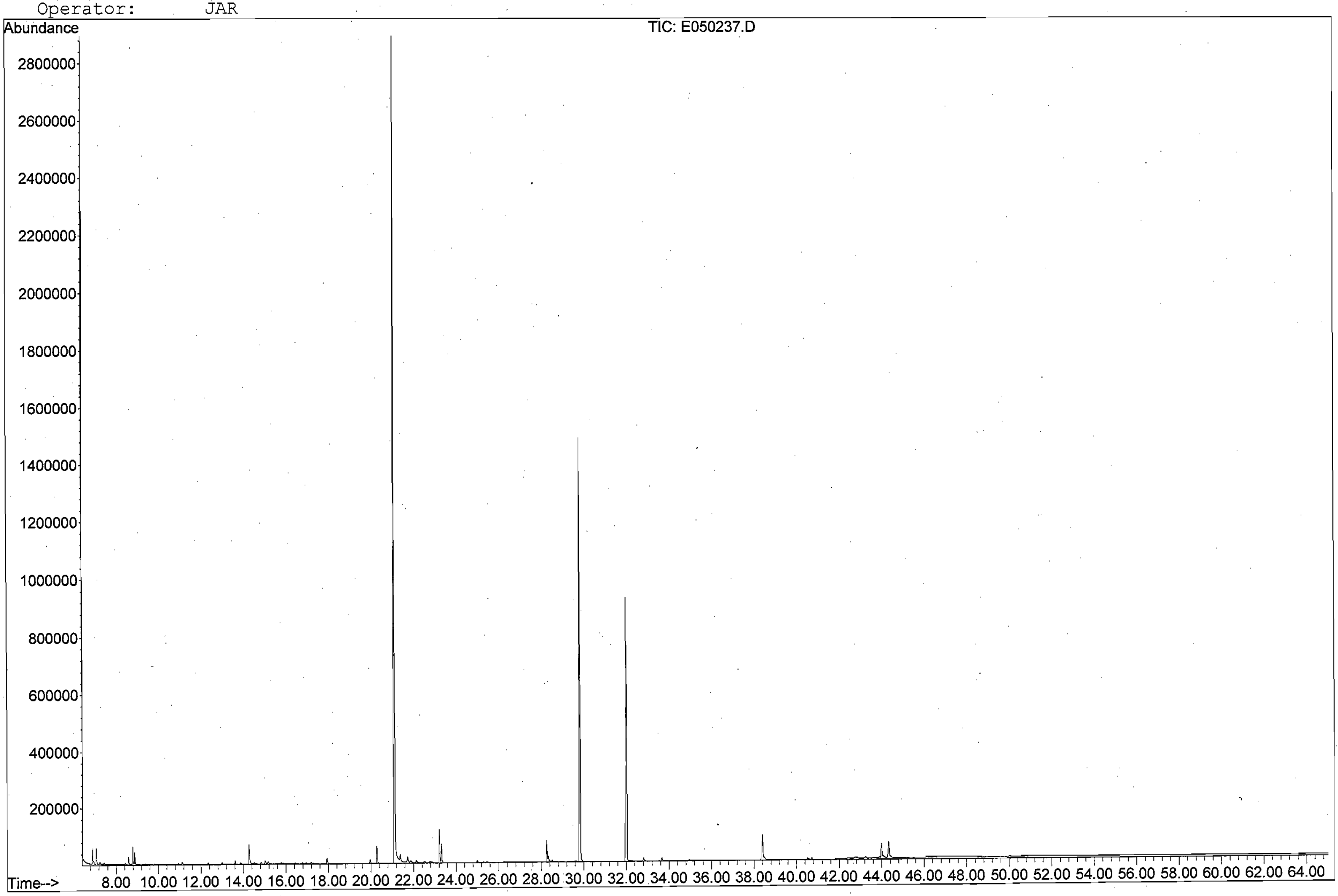
File: J:\1\DATA\E080502\E050237.D
Date Acquired: 4 May 2008 12:15 pm
Method File: 4008SIMA.M
Sample Name: EK080415-16
Misc Info: TS24
Operator: JAR



META Environmental, Inc.

GC/MS TOTAL ION CHROMATOGRAM

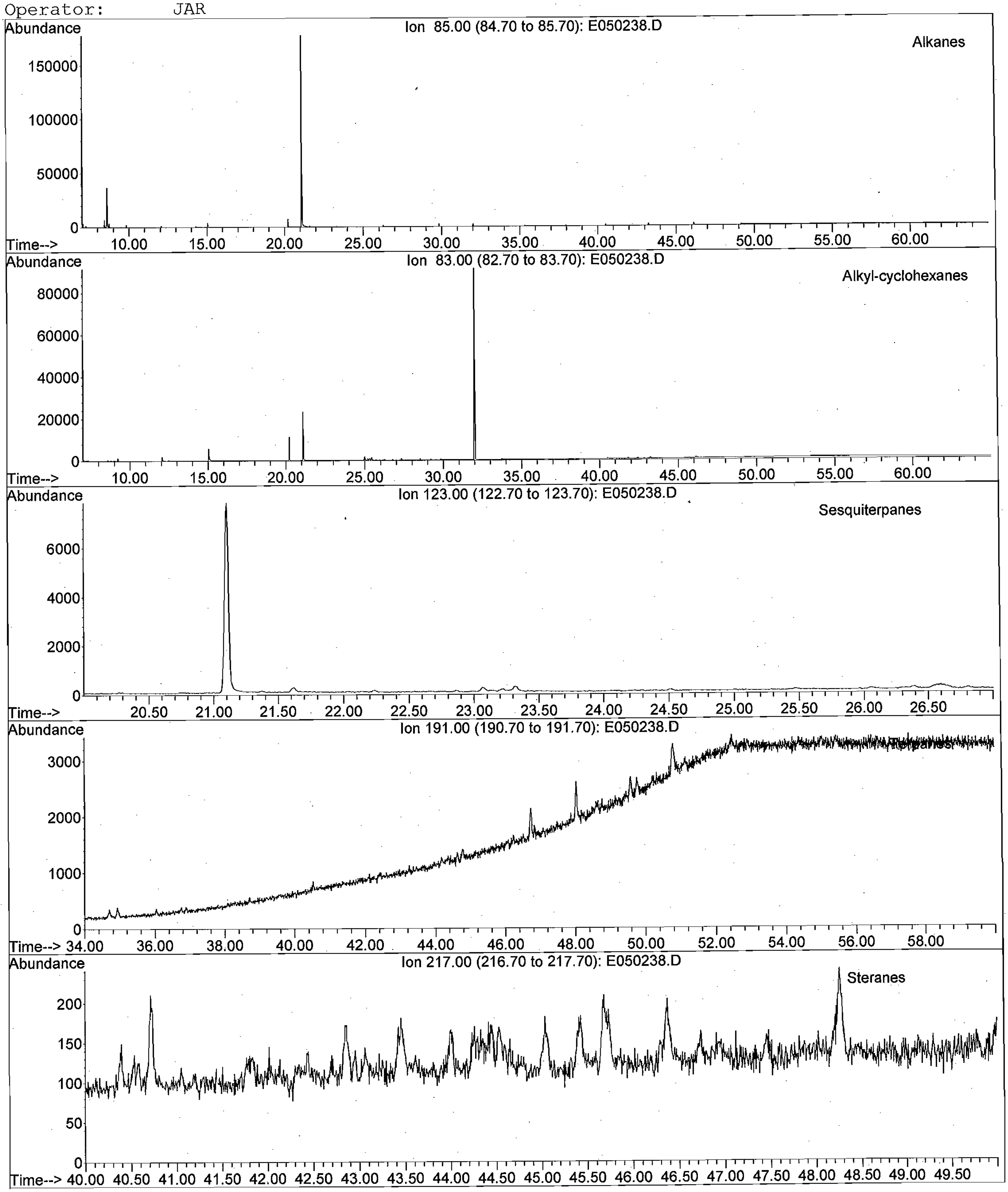
File: J:\1\DATA\E080502\E050237.D
Date Acquired: 4 May 2008 12:15 pm
Method File: 4008SIMA.M
Sample Name: EK080415-16
Misc Info: TS24
Operator: JAR



META Environmental, Inc.

GC/MS EXTRACTED ION CHROMATOGRAM

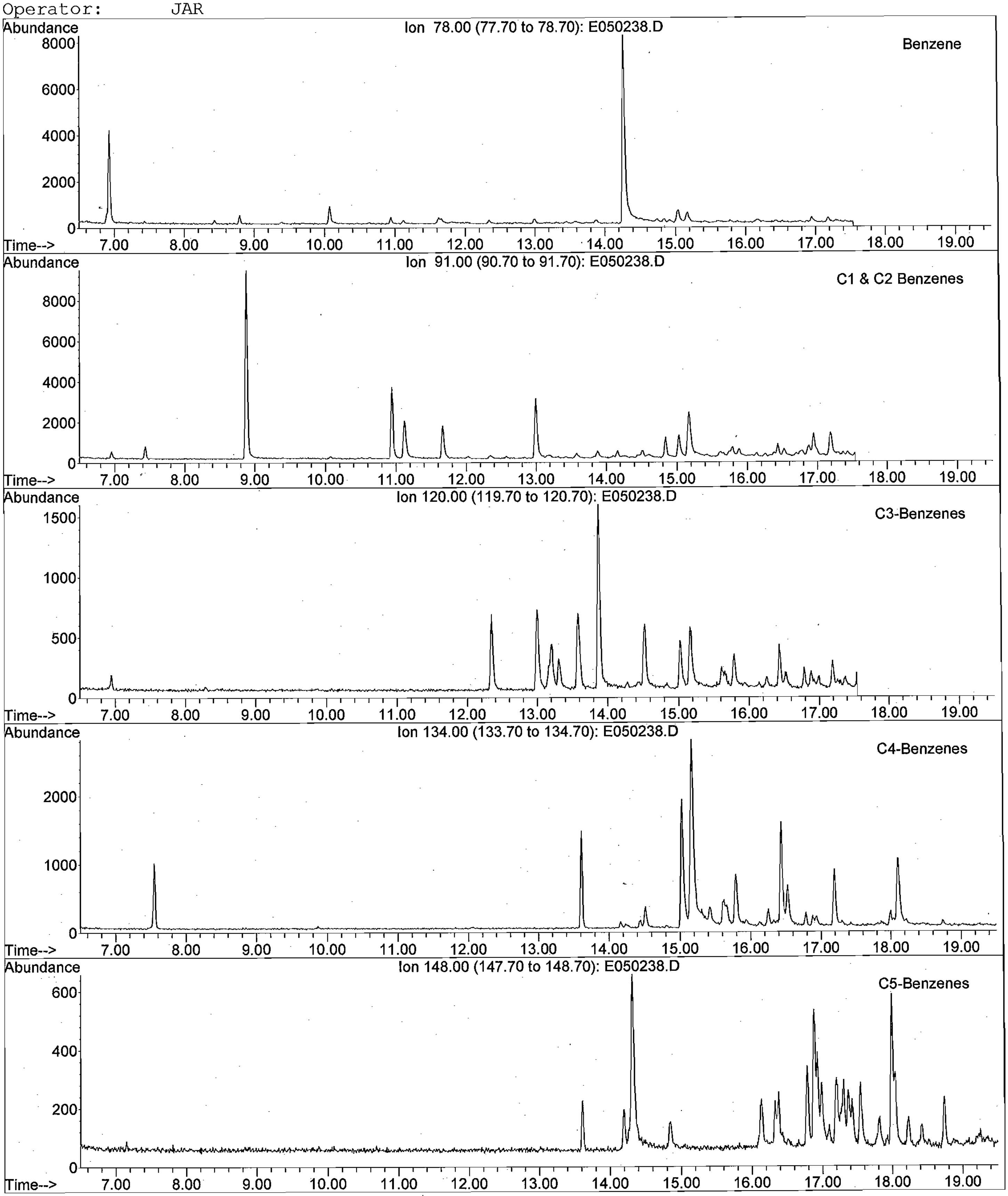
File: J:\1\DATA\E080502\E050238.D
Date Acquired: 4 May 2008 1:29 pm
Method File: 4008SIMA.M
Sample Name: EK080415-17
Misc Info: TS20
Operator: JAR



META Environmental, Inc.

GC/MS EXTRACTED ION CHROMATOGRAM

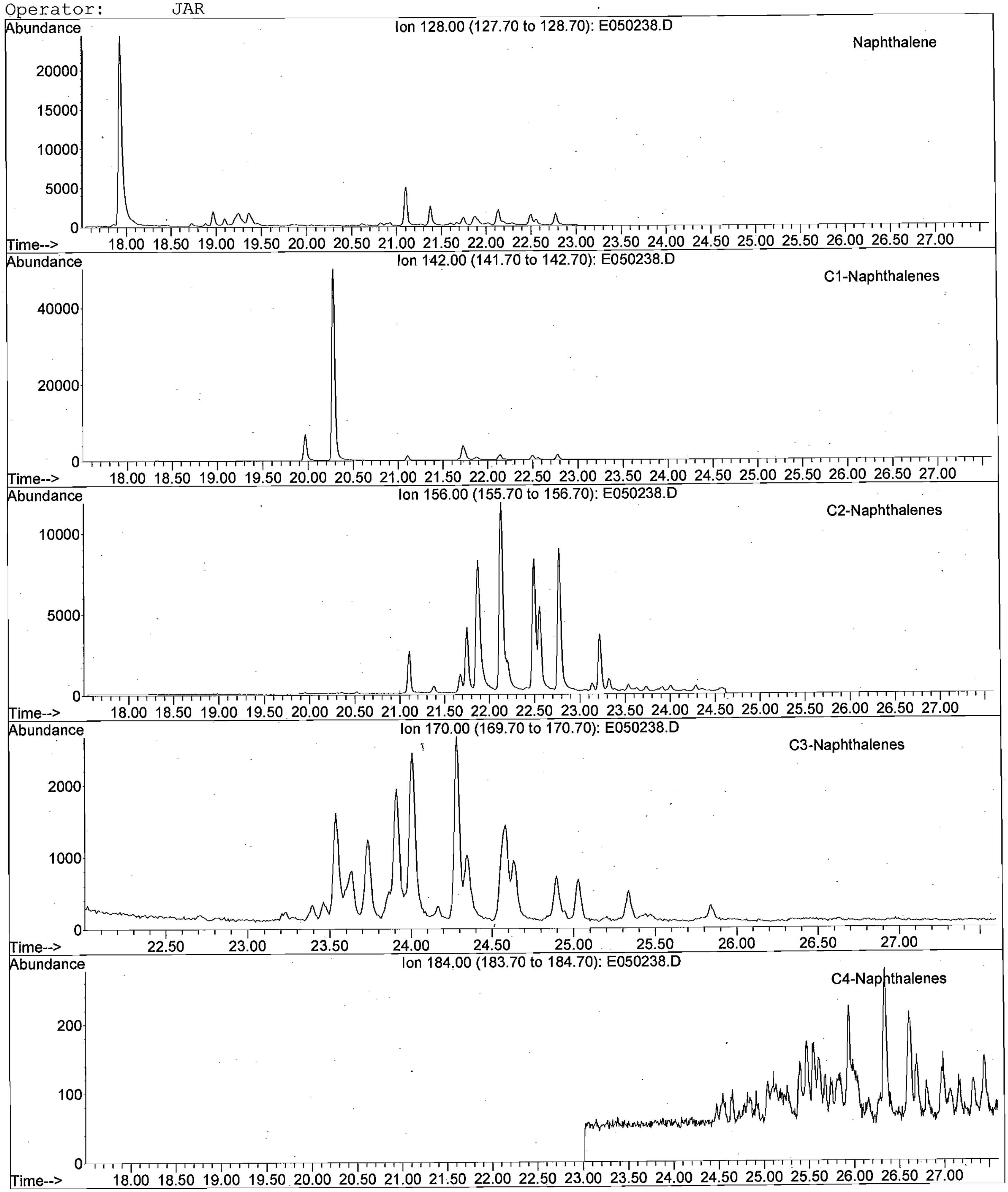
File: J:\1\DATA\E080502\E050238.D
Date Acquired: 4 May 2008 1:29 pm
Method File: 4008SIMA.M
Sample Name: EK080415-17
Misc Info: TS20
Operator: JAR



META Environmental, Inc.

GC/MS EXTRACTED ION CHROMATOGRAM

File: J:\1\DATA\E080502\E050238.D
Date Acquired: 4 May 2008 1:29 pm
Method File: 4008SIMA.M
Sample Name: EK080415-17
Misc Info: TS20
Operator: JAR



META Environmental, Inc.

GC/MS EXTRACTED ION CHROMATOGRAM

File: J:\1\DATA\E080502\E050238.D
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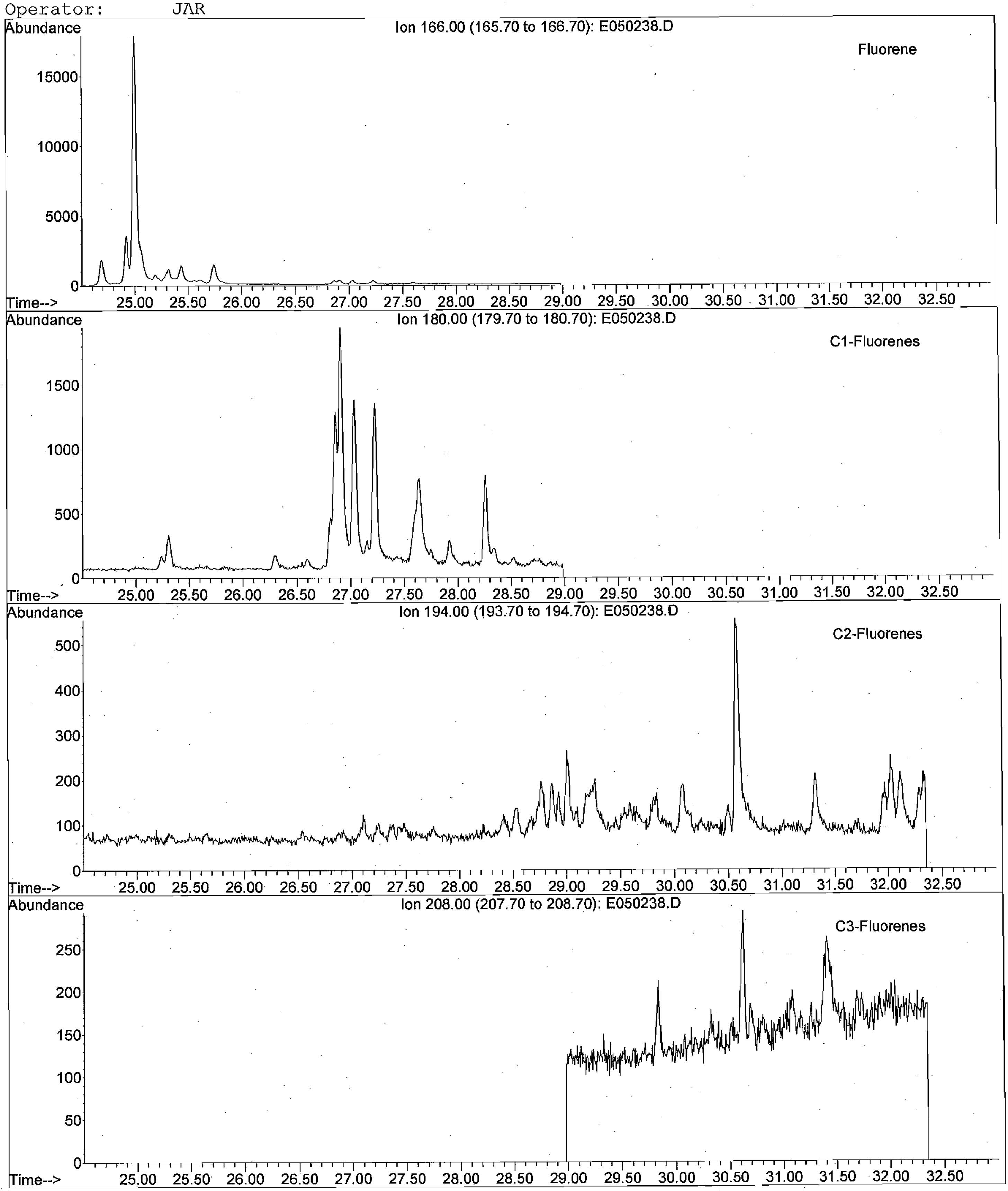
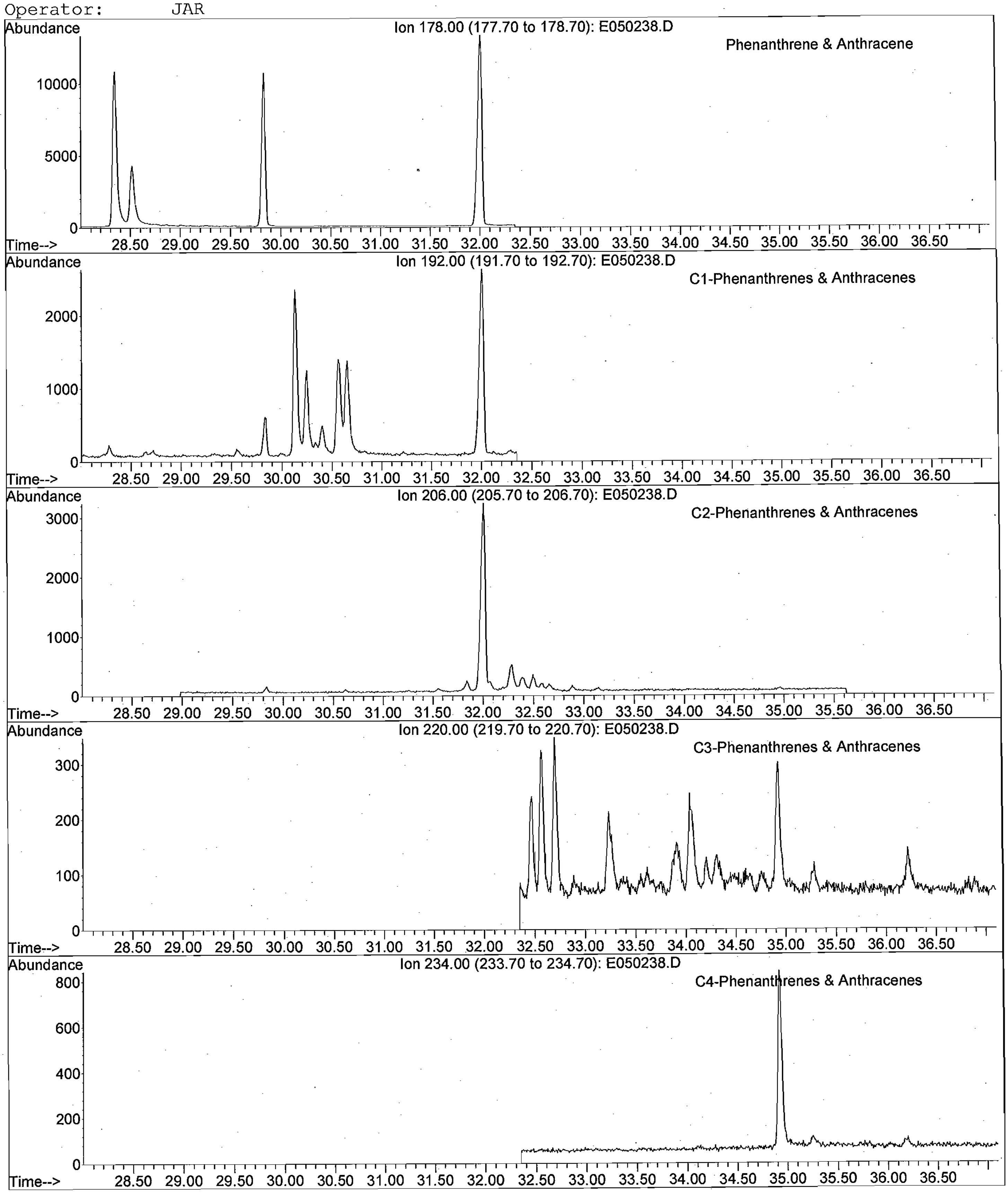
Sample Name: EK080415-17
Misc Info: TS20
Operator: JAR



META Environmental, Inc.

GC/MS EXTRACTED ION CHROMATOGRAM

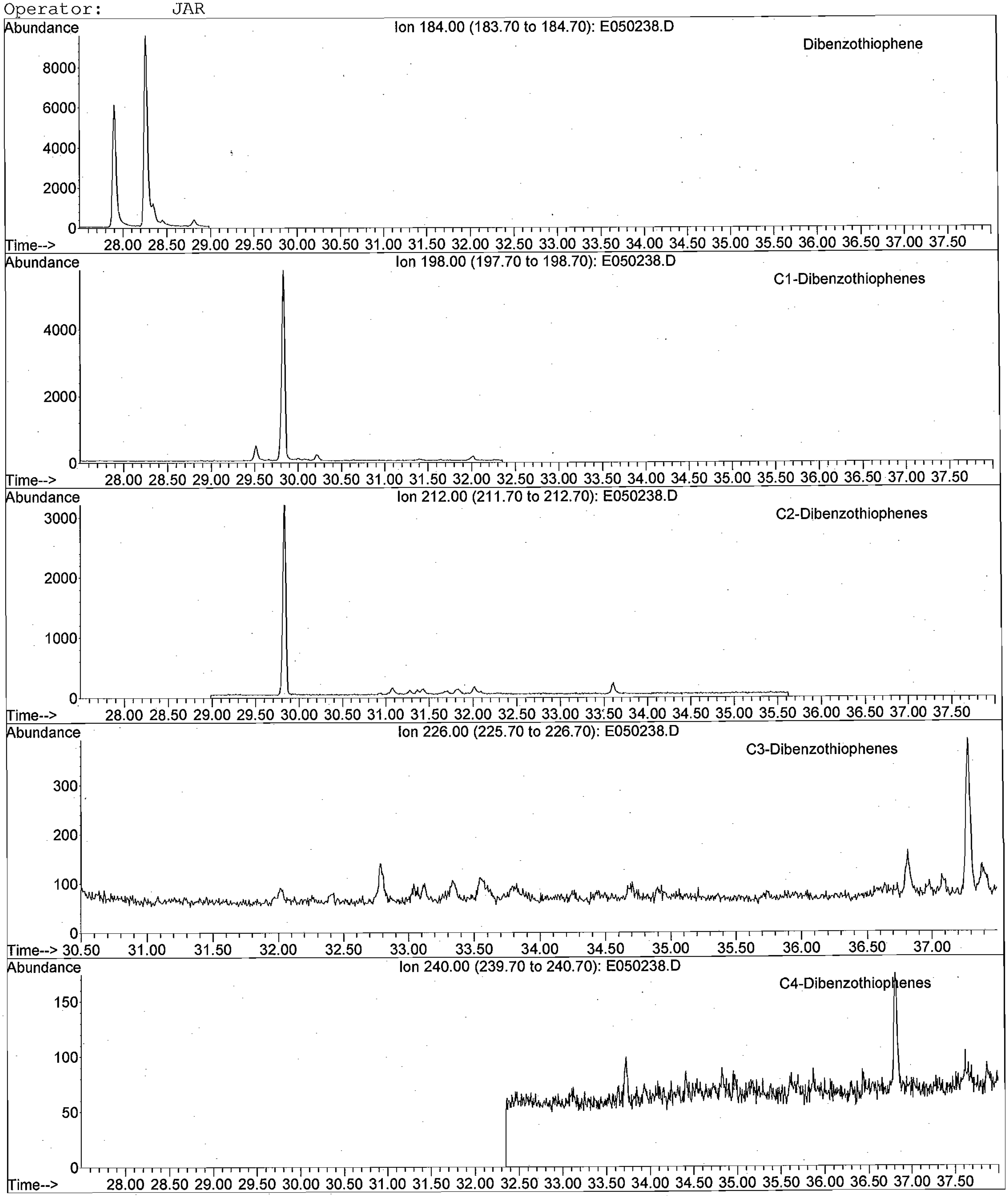
File: J:\1\DATA\E080502\E050238.D
Date Acquired: 4 May 2008 1:29 pm
Method File: 4008SIMA.M
Sample Name: EK080415-17
Misc Info: TS20
Operator: JAR



META Environmental, Inc.

GC/MS EXTRACTED ION CHROMATOGRAM

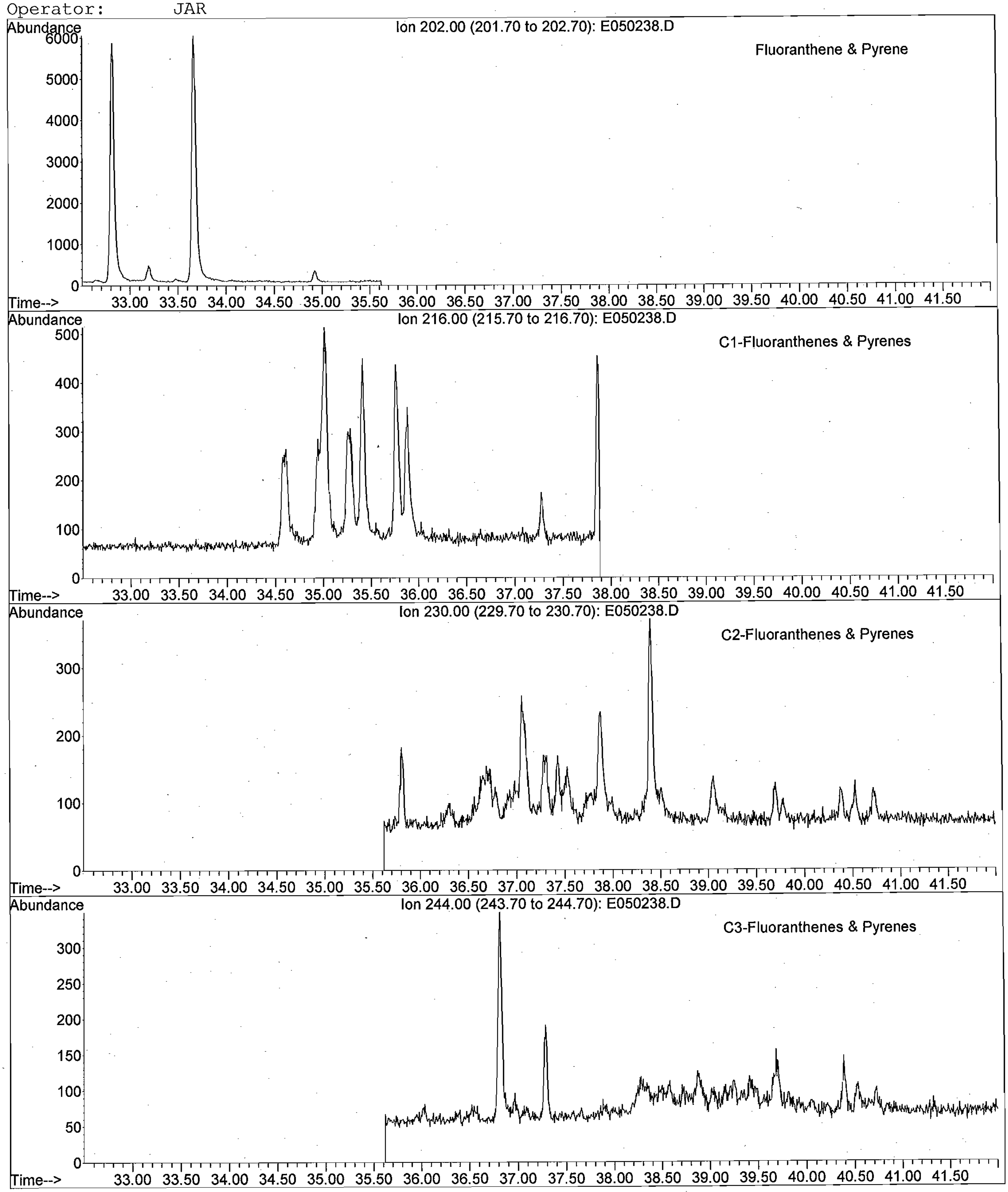
File: J:\1\DATA\E080502\E050238.D
Date Acquired: 4 May 2008 1:29 pm
Method File: 4008SIMA.M
Sample Name: EK080415-17
Misc Info: TS20
Operator: JAR



META Environmental, Inc.

GC/MS EXTRACTED ION CHROMATOGRAM

File: J:\1\DATA\E080502\E050238.D
Date Acquired: 4 May 2008 1:29 pm
Method File: 4008SIMA.M
Sample Name: EK080415-17
Misc Info: TS20
Operator: JAR



META Environmental, Inc.

GC/MS EXTRACTED ION CHROMATOGRAM

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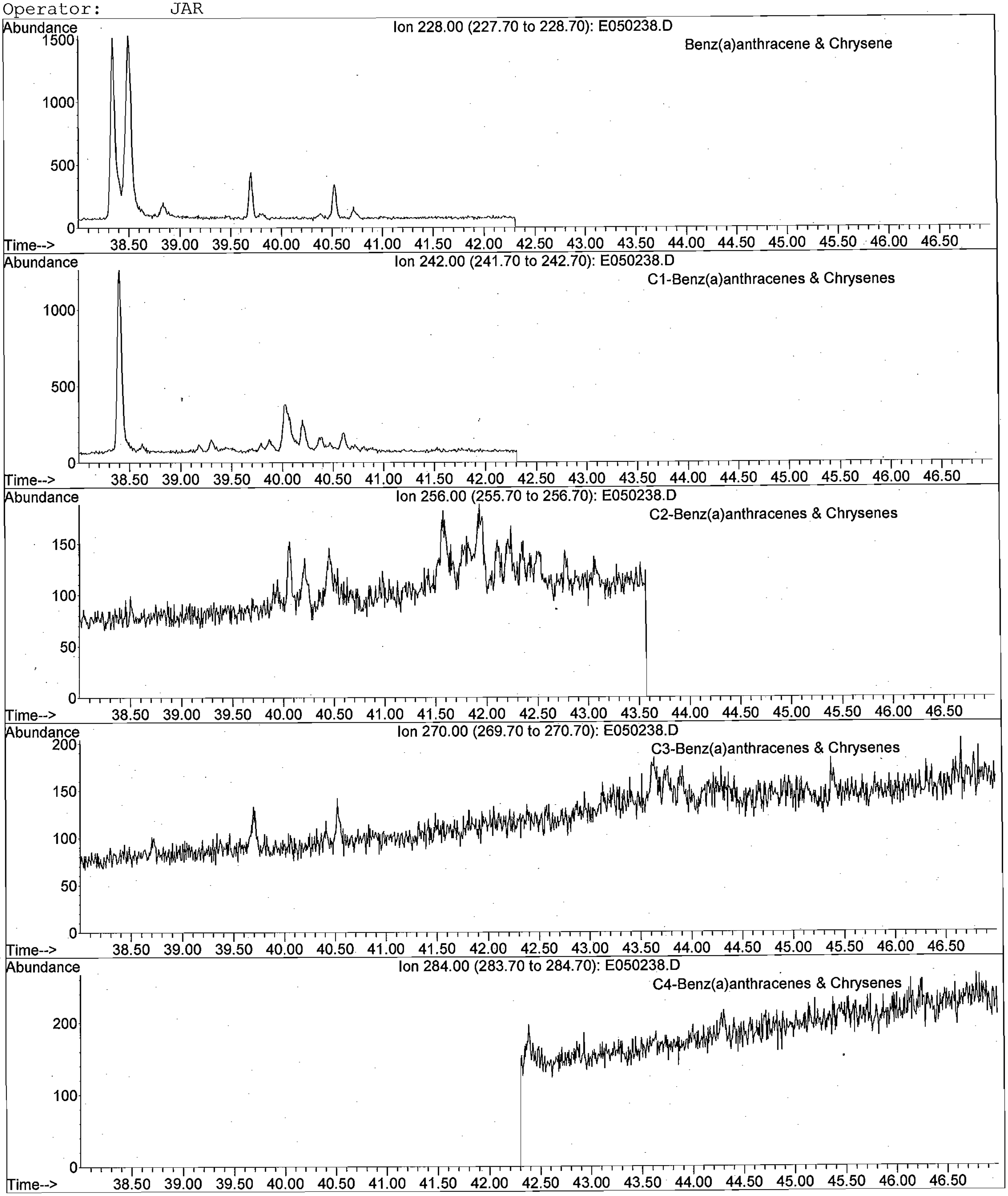
Method File: 4008SIMA.M
Sample Name: EK080415-17
Misc Info: TS20
Operator: JAR



META Environmental, Inc.

GC/MS TOTAL ION CHROMATOGRAM

File: J:\1\DATA\E080502\E050238.D
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Method File: 4008SIMA.M
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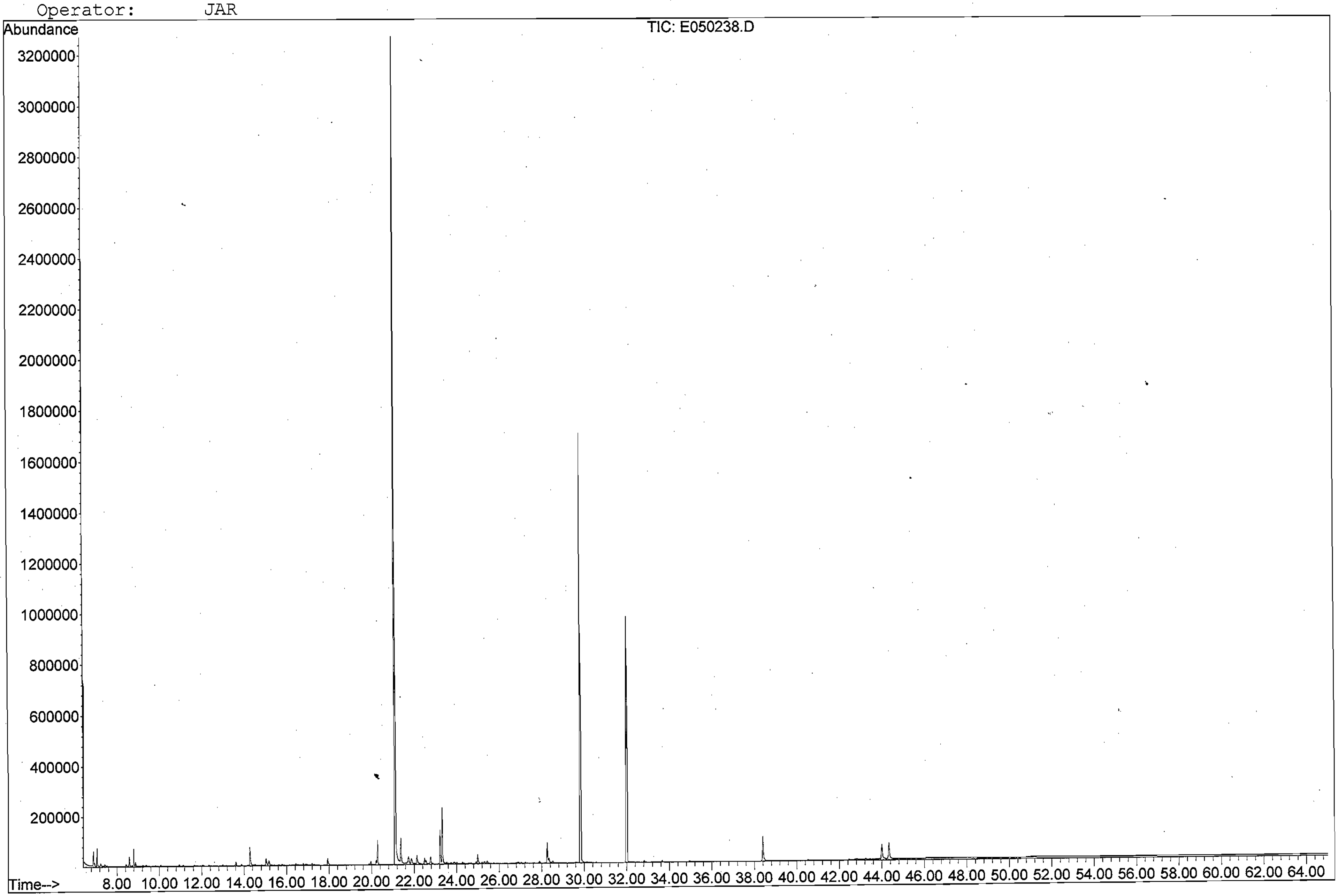
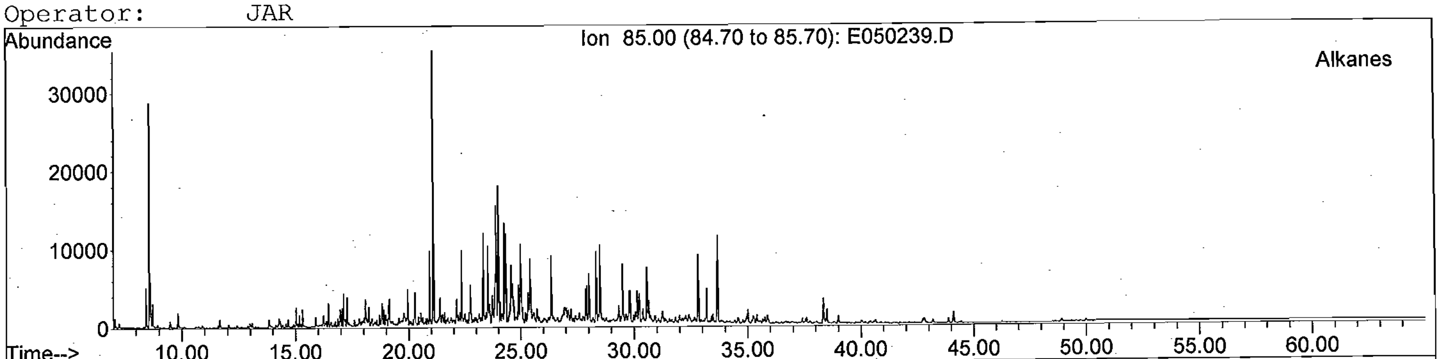
Misc Info: TS20
Operator: JAR

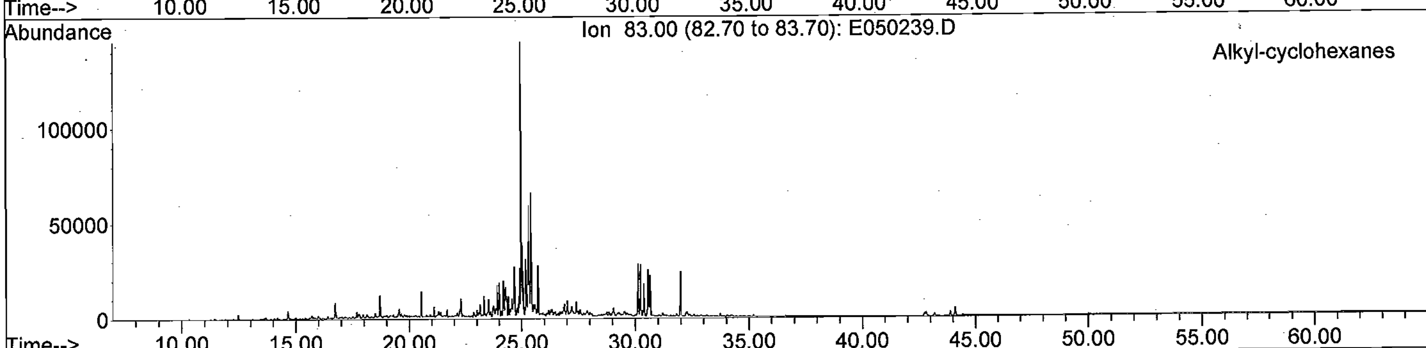


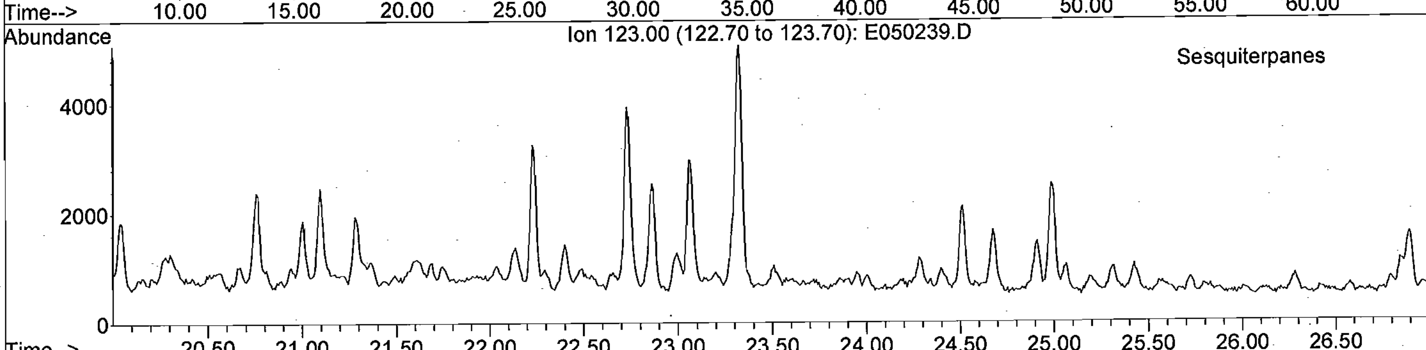
META Environmental, Inc.

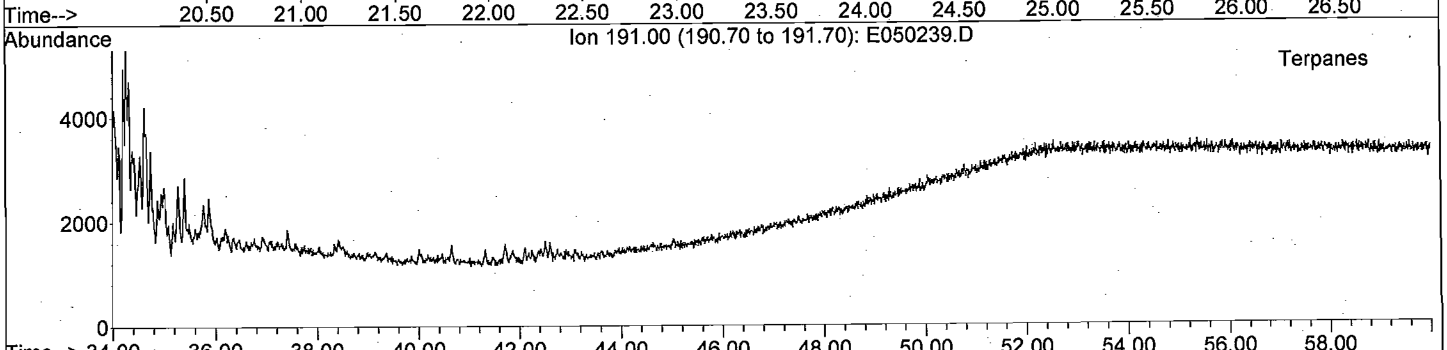
GC/MS EXTRACTED ION CHROMATOGRAM

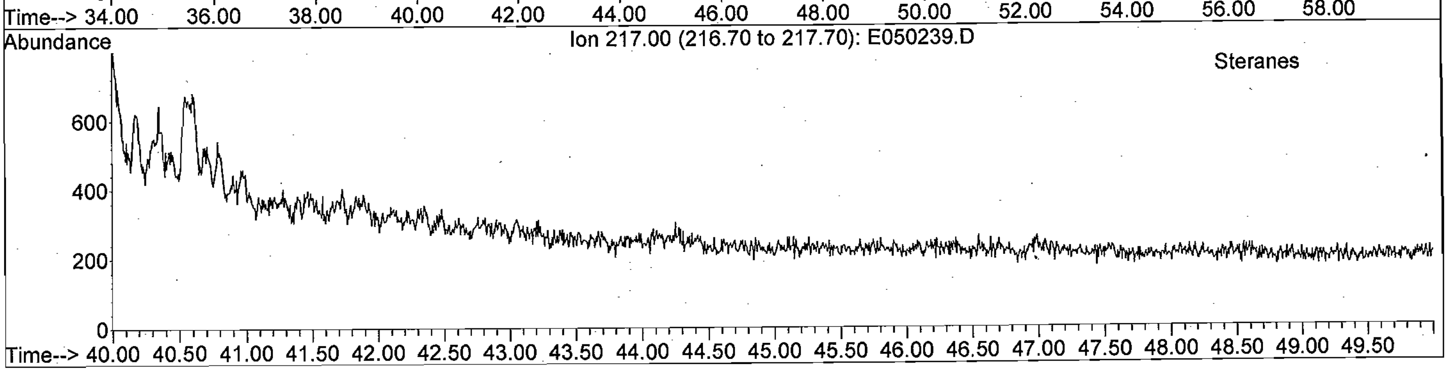
File: J:\1\DATA\E080502\E050239.D
Date Acquired: 4 May 2008 2:44 pm
Method File: 4008SIMA.M
Sample Name: EK080417-01-D
Misc Info: TS02(4.5-5.5) - 5X
Operator: JAR







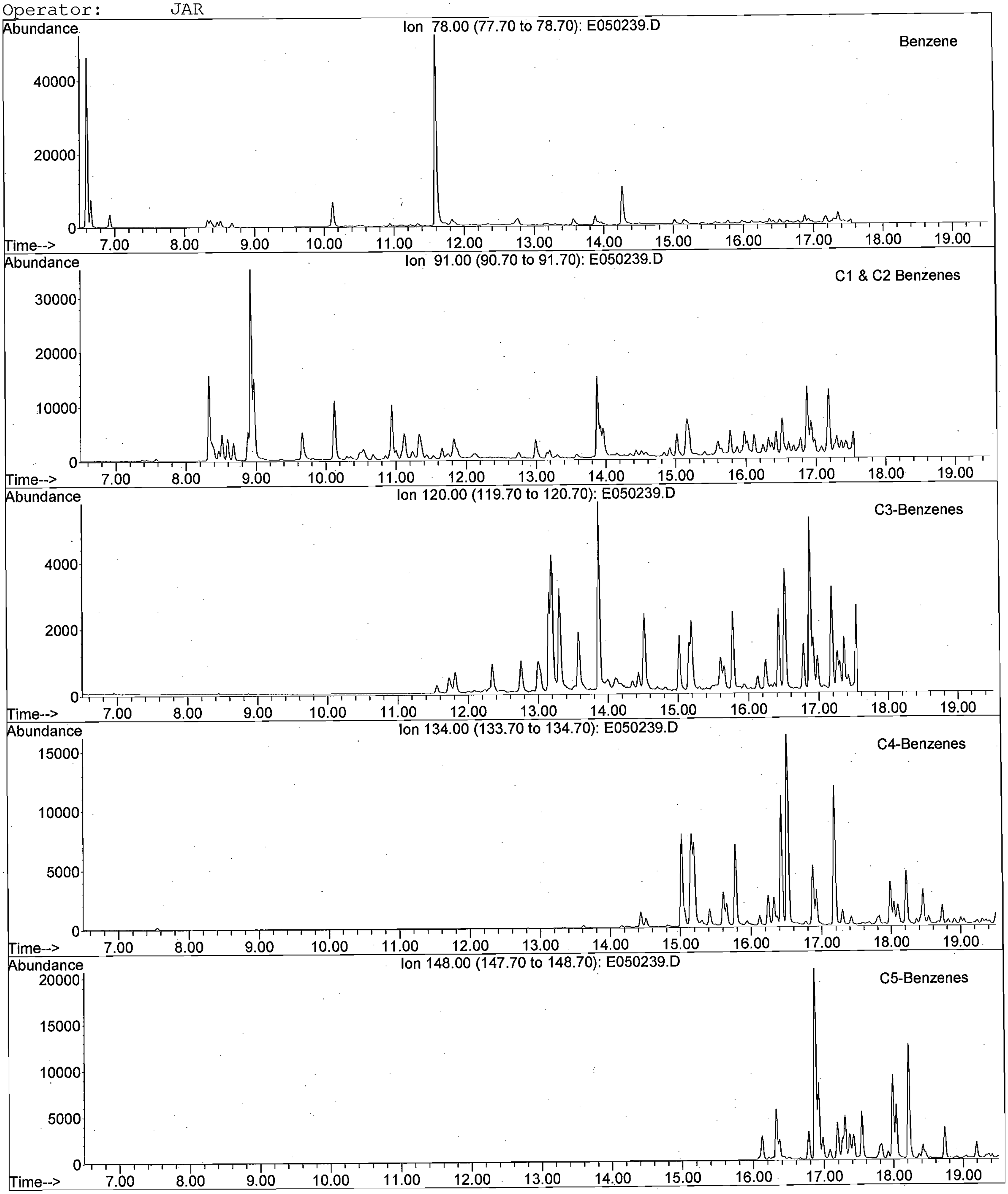




META Environmental, Inc.

GC/MS EXTRACTED ION CHROMATOGRAM

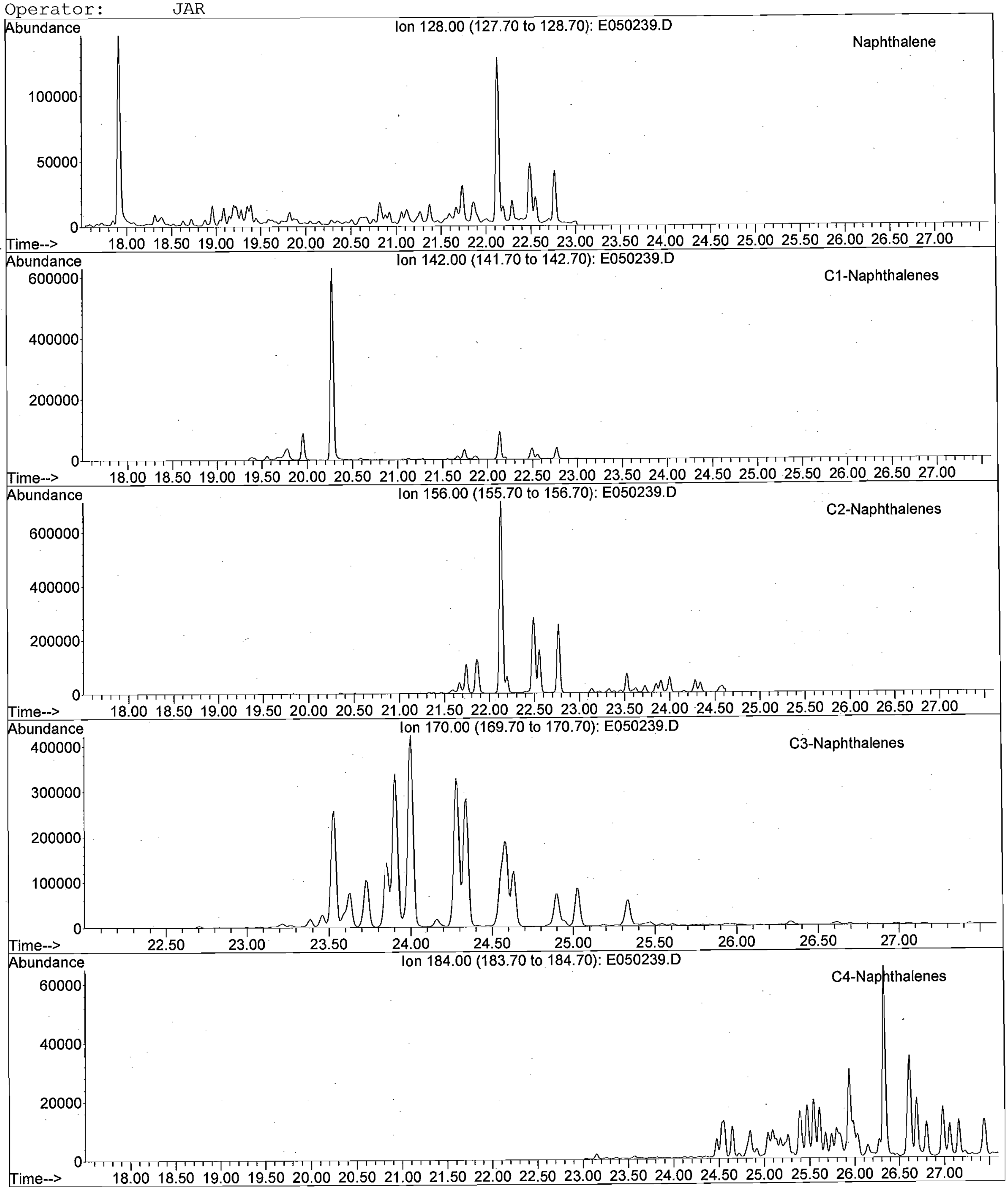
File: J:\1\DATA\E080502\E050239.D
Date Acquired: 4 May 2008 2:44 pm
Method File: 4008SIMA.M
Sample Name: EK080417-01-D
Misc Info: TS02(4.5-5.5) - 5X
Operator: JAR



META Environmental, Inc.

GC/MS EXTRACTED ION CHROMATOGRAM

File: J:\1\DATA\E080502\E050239.D
Date Acquired: 4 May 2008 2:44 pm
Method File: 4008SIMA.M
Sample Name: EK080417-01-D
Misc Info: TS02(4.5-5.5) - 5X
Operator: JAR



META Environmental, Inc.

GC/MS EXTRACTED ION CHROMATOGRAM

File: J:\1\DATA\E080502\E050239.D
Date Acquired: 4 May 2008 2:44 pm
Method File: 4008SIMA.M
Sample Name: EK080417-01-D
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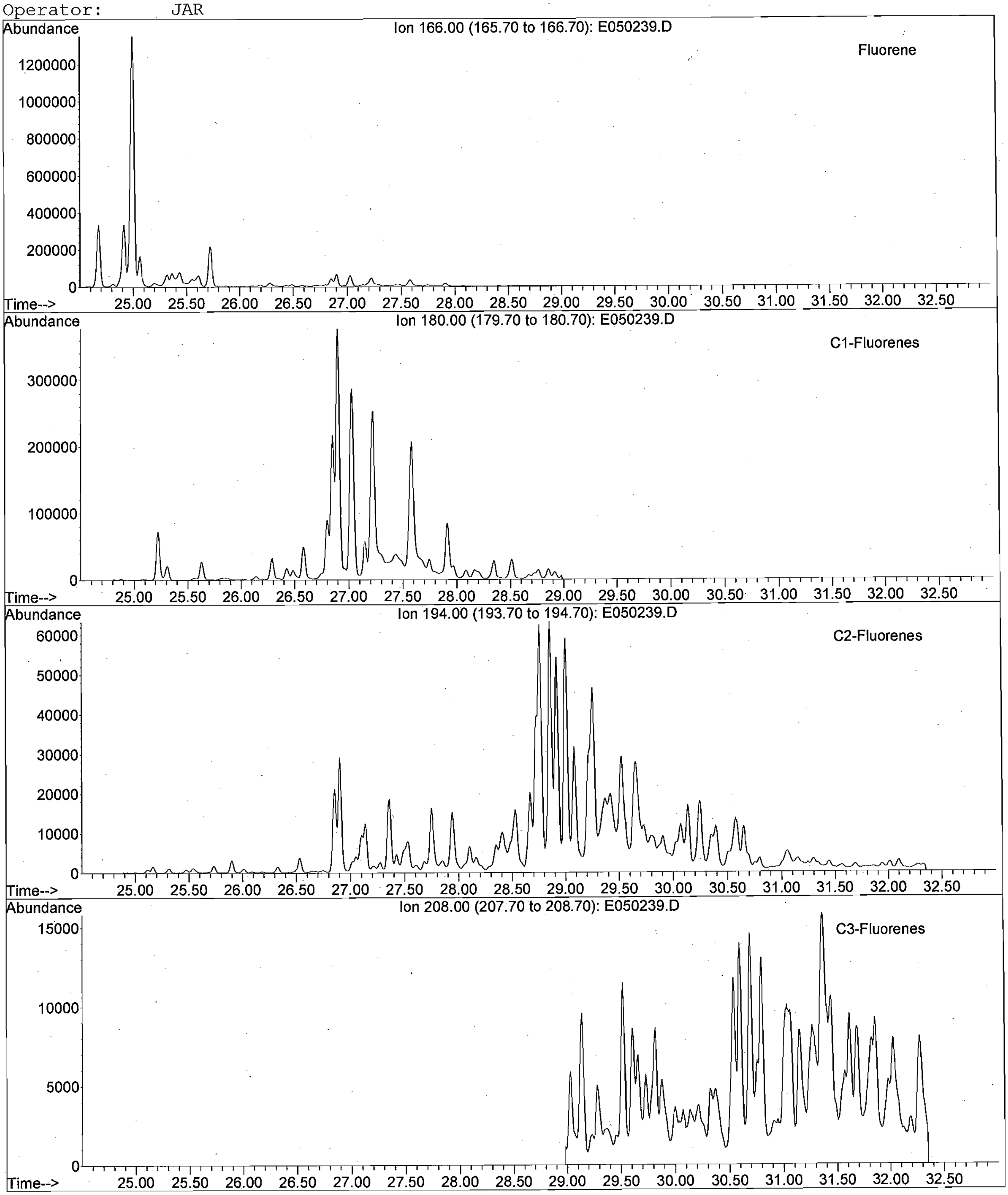
Operator: JAR



META Environmental, Inc.

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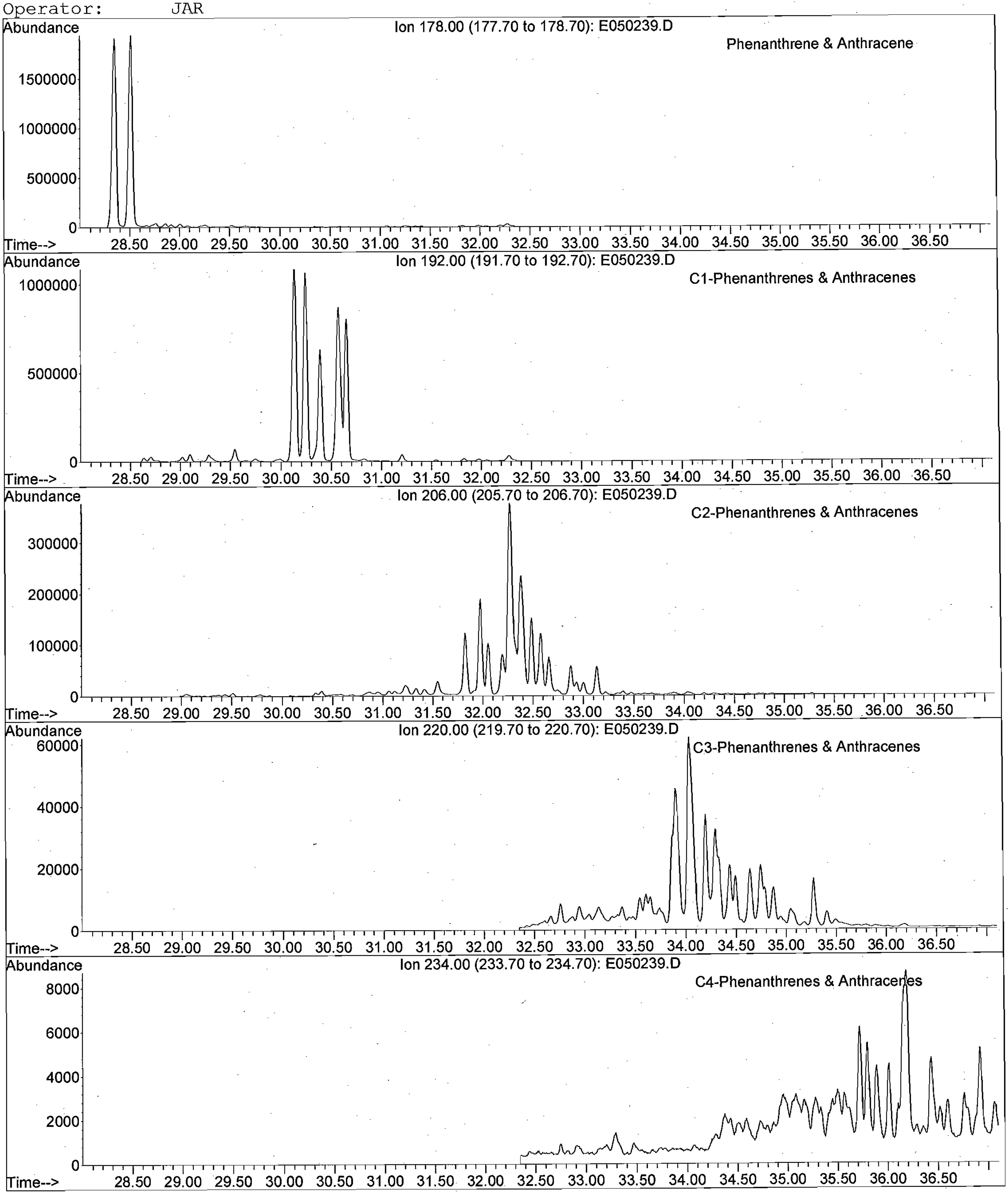

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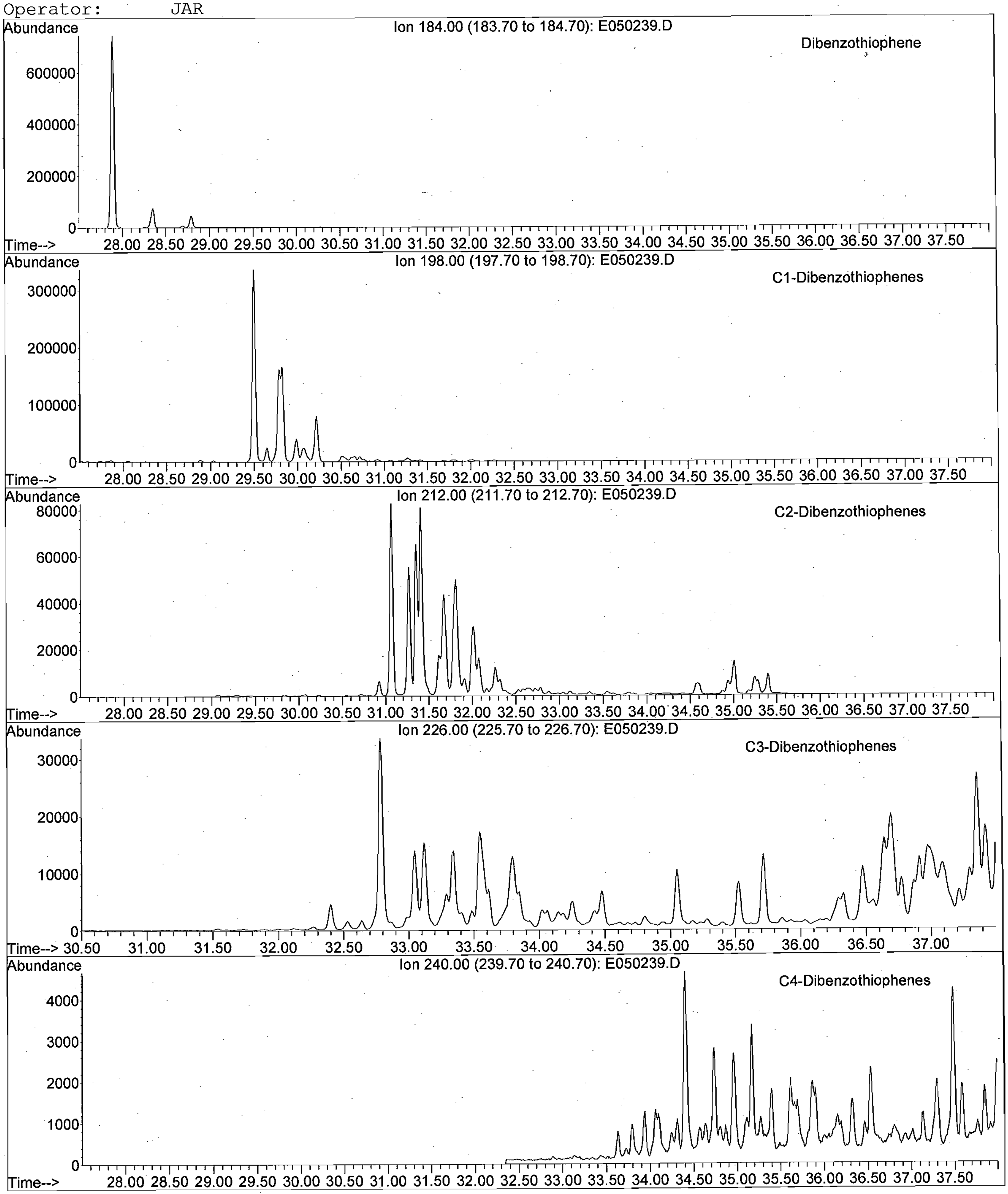

META Environmental, Inc.

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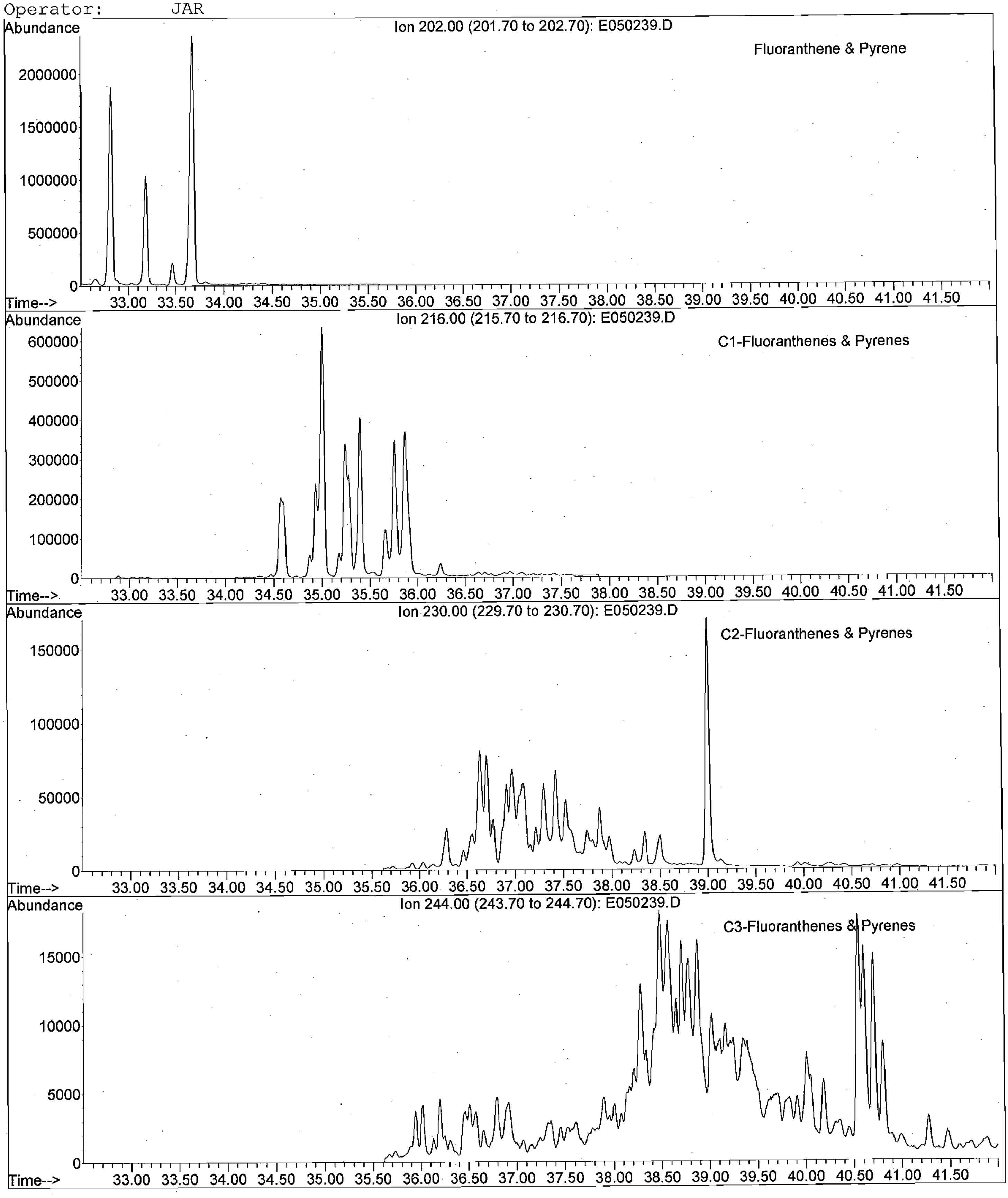

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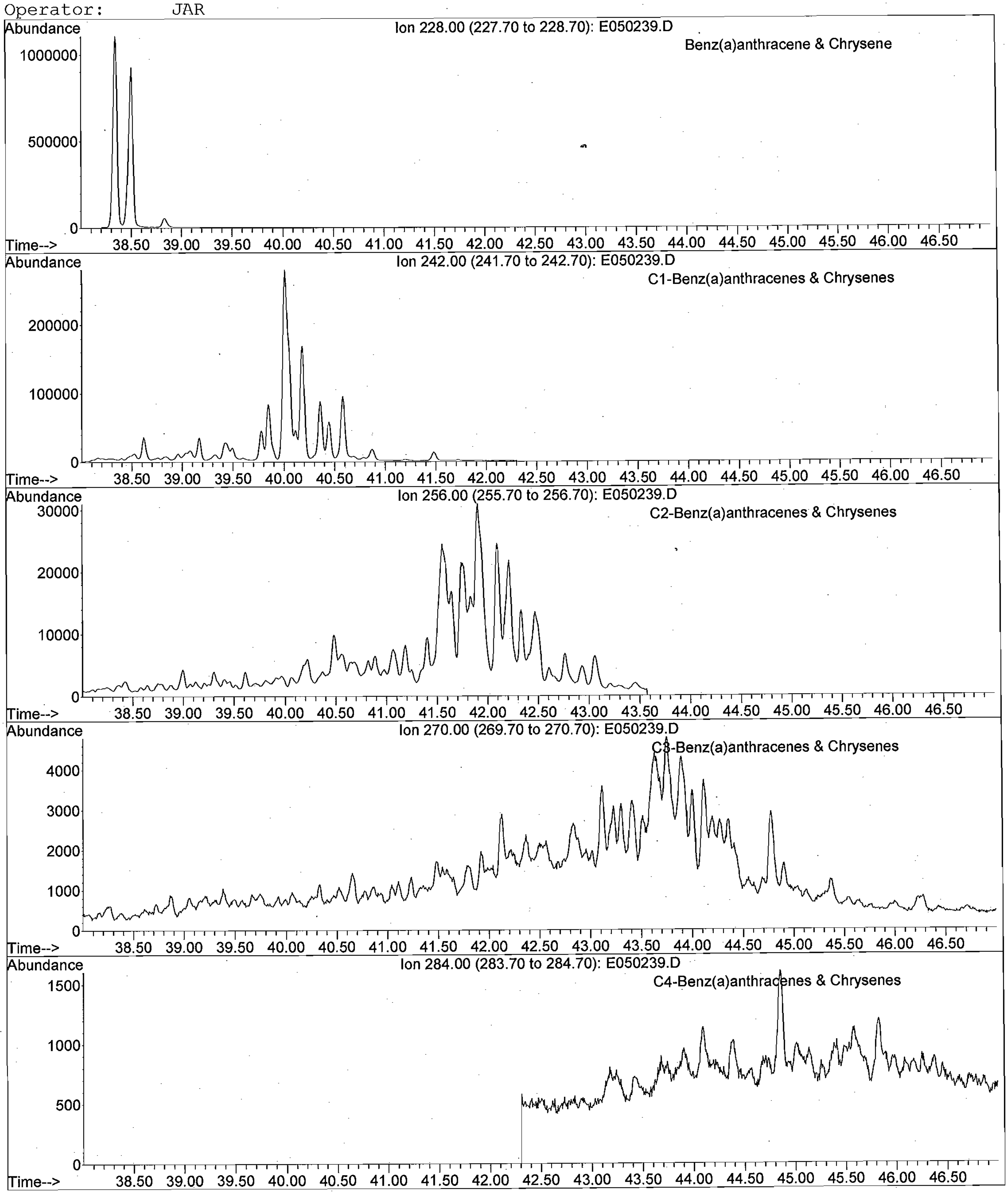

META Environmental, Inc.

GC/MS TOTAL ION CHROMATOGRAM

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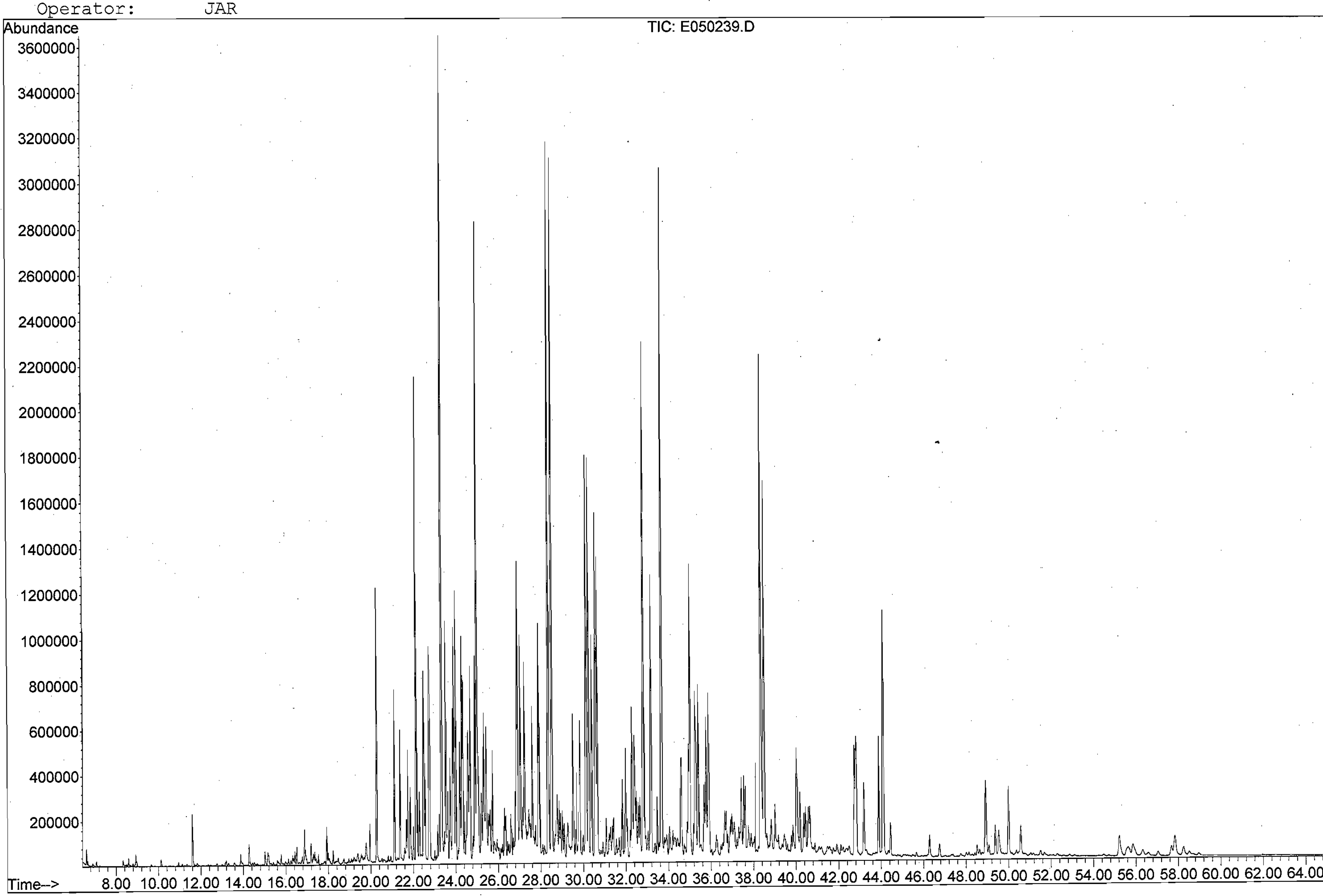

META Environmental, Inc.

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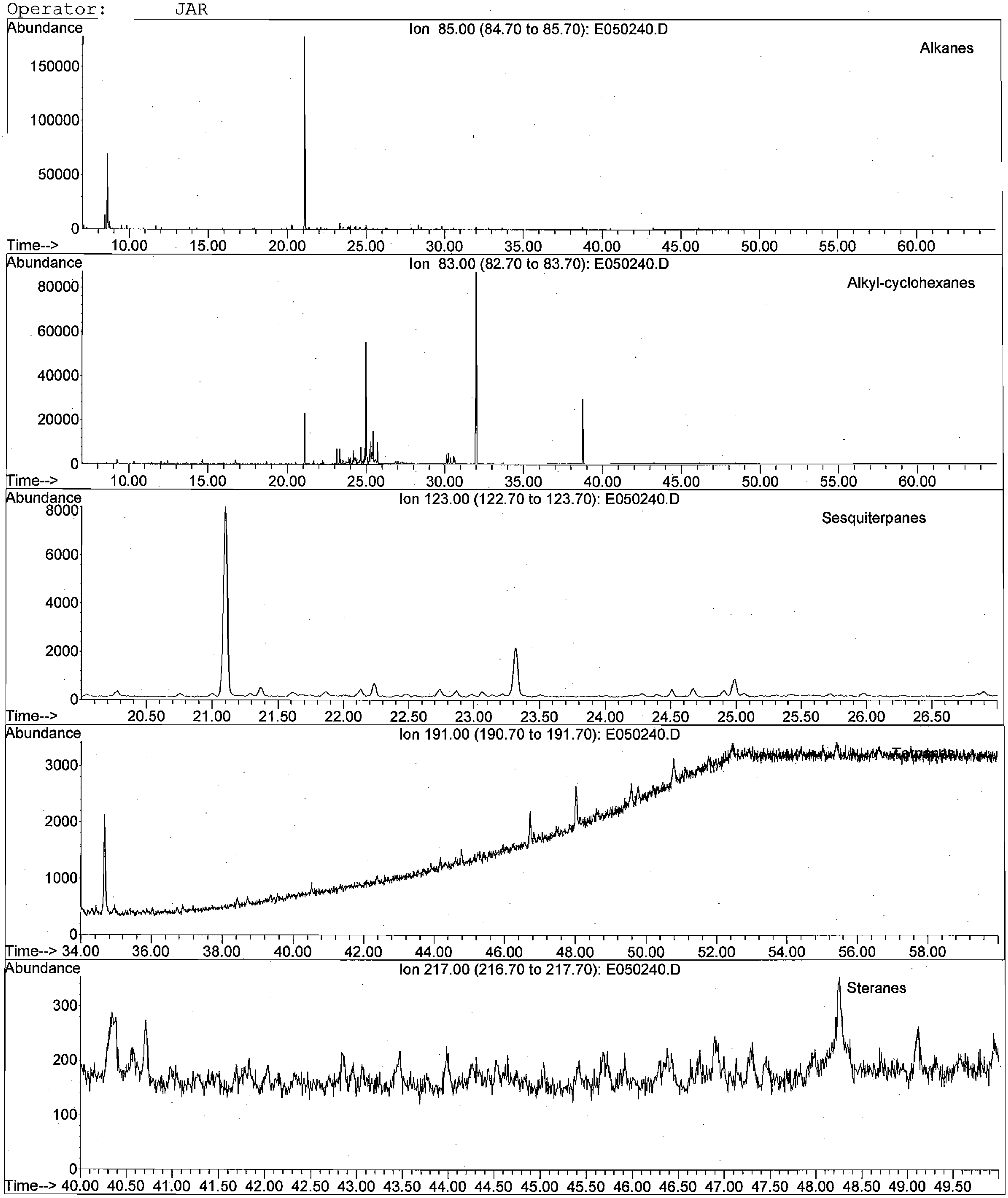

META Environmental, Inc.

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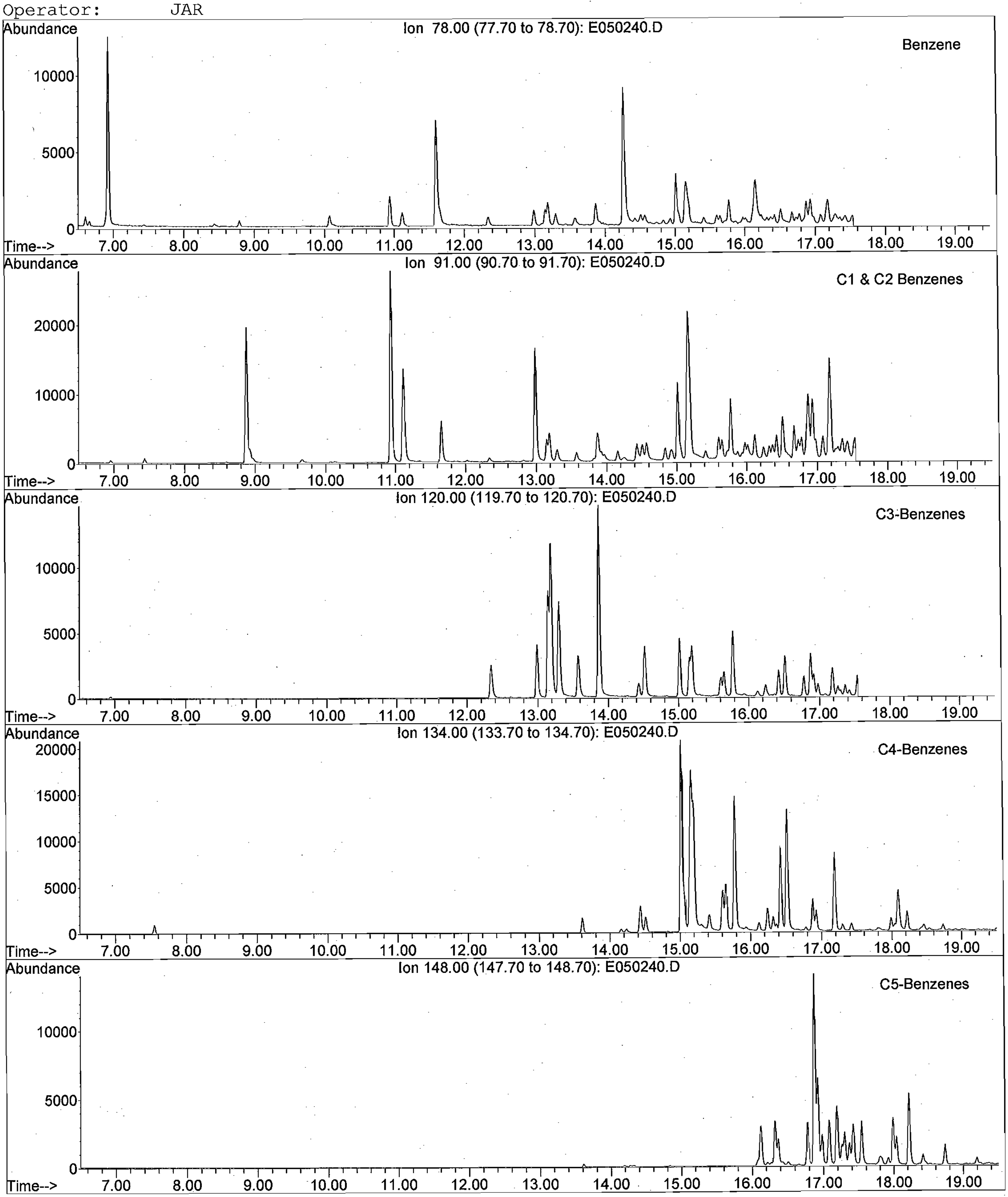
Operator: JAR



META Environmental, Inc.

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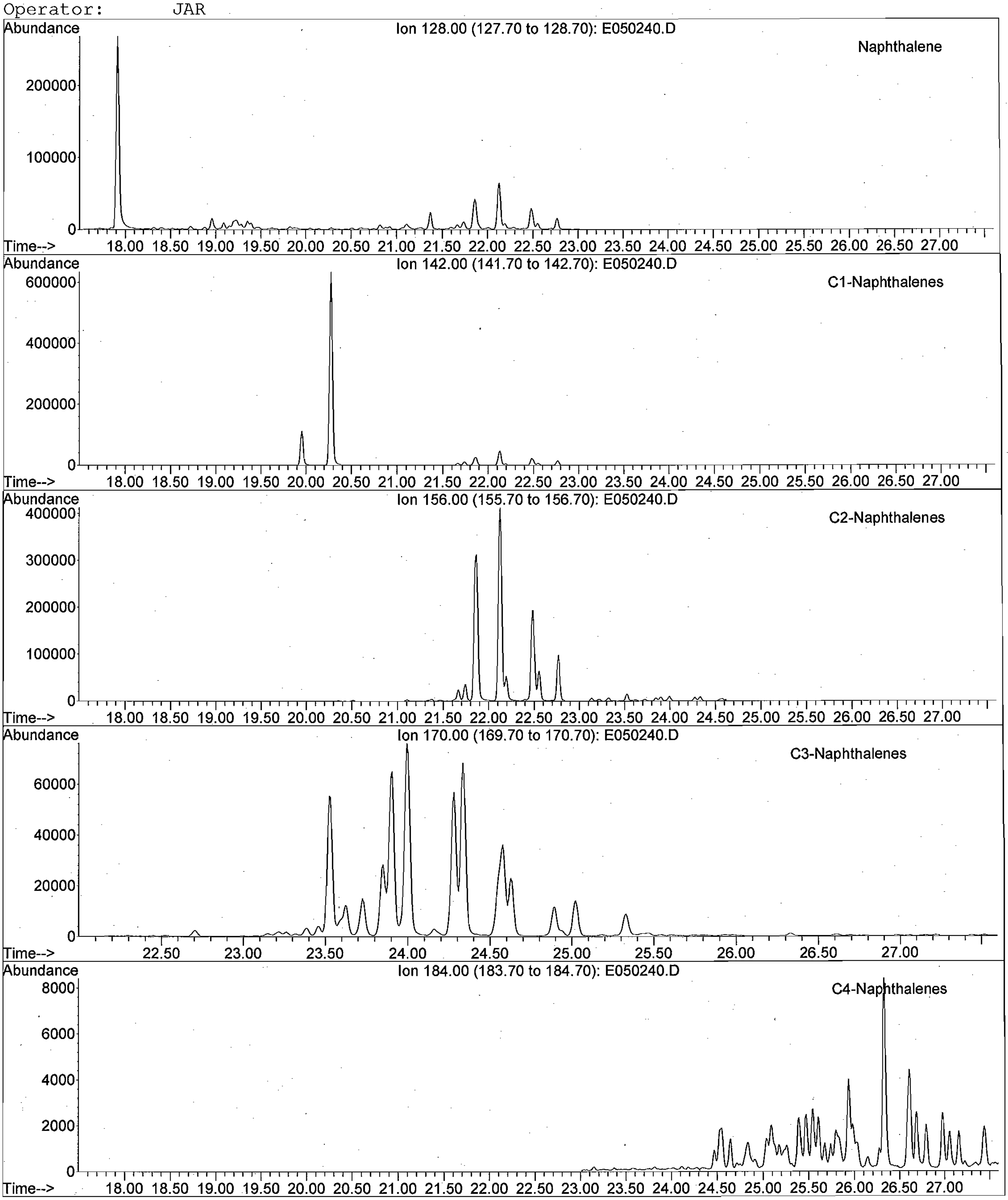

META Environmental, Inc.

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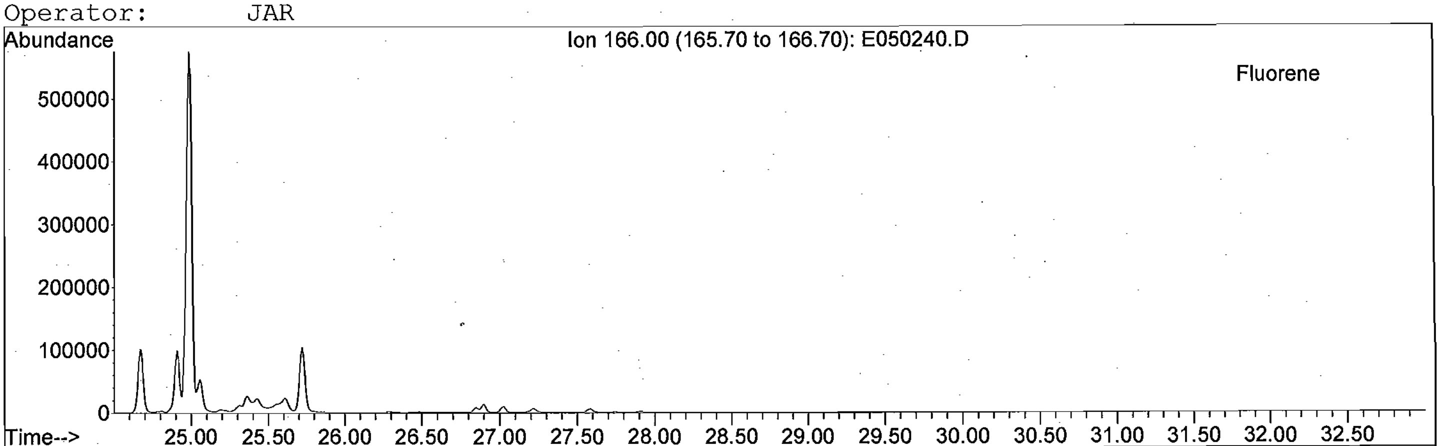
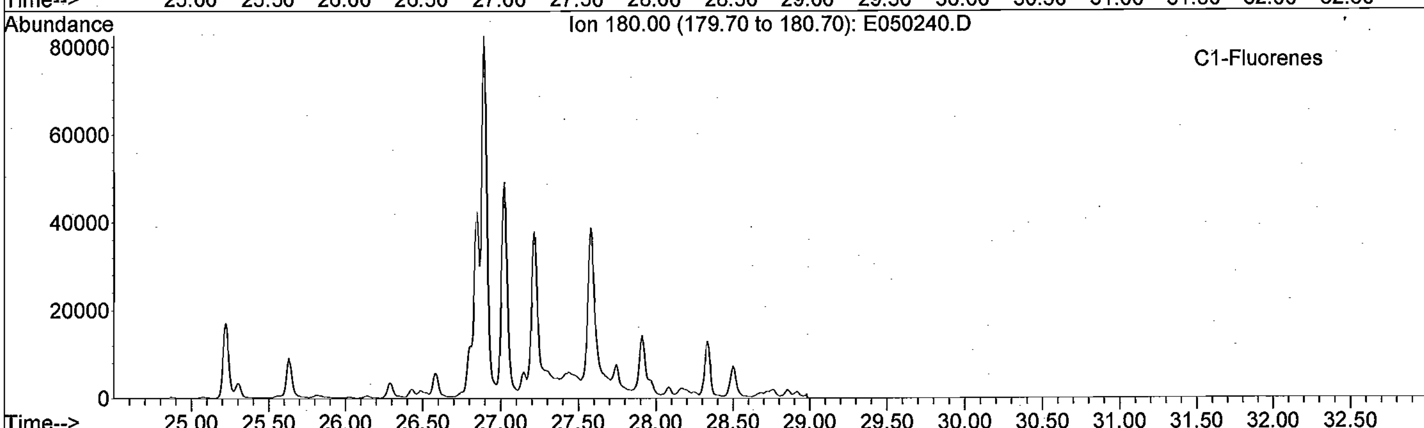
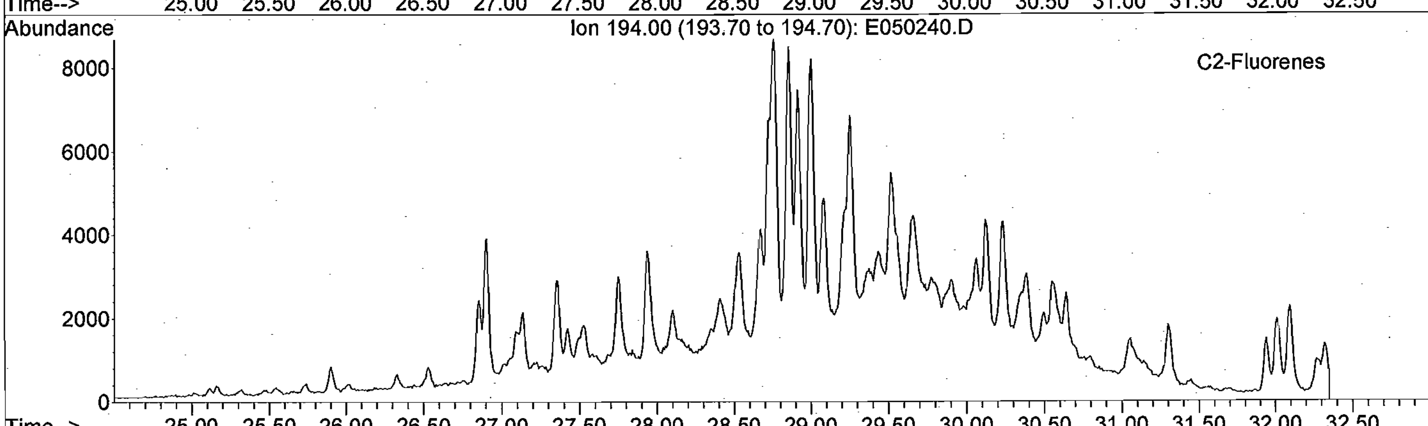
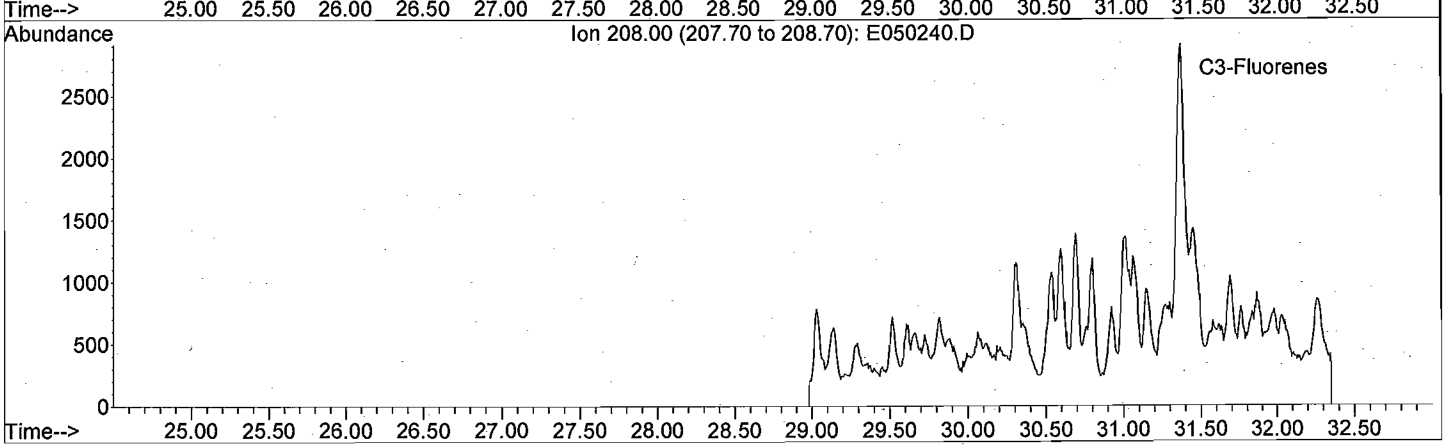
Operator: JAR









META Environmental, Inc.

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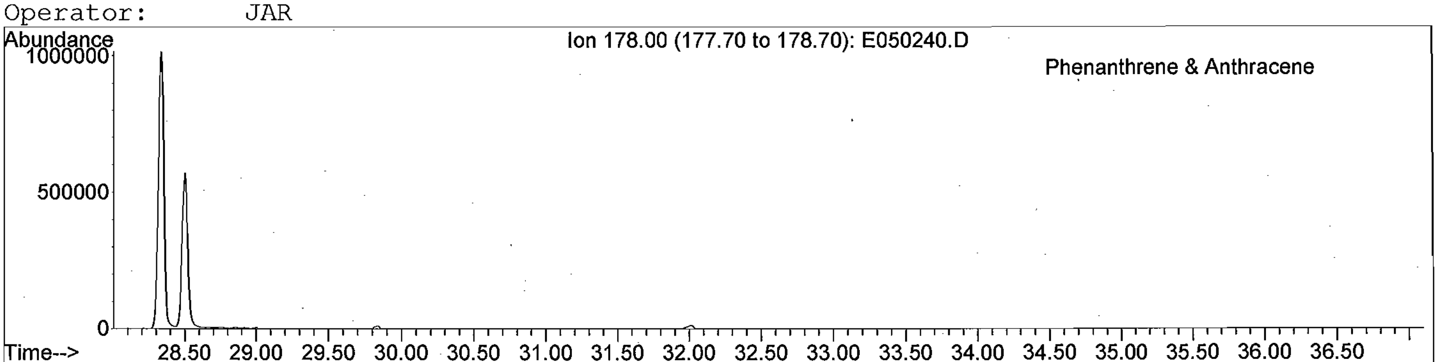

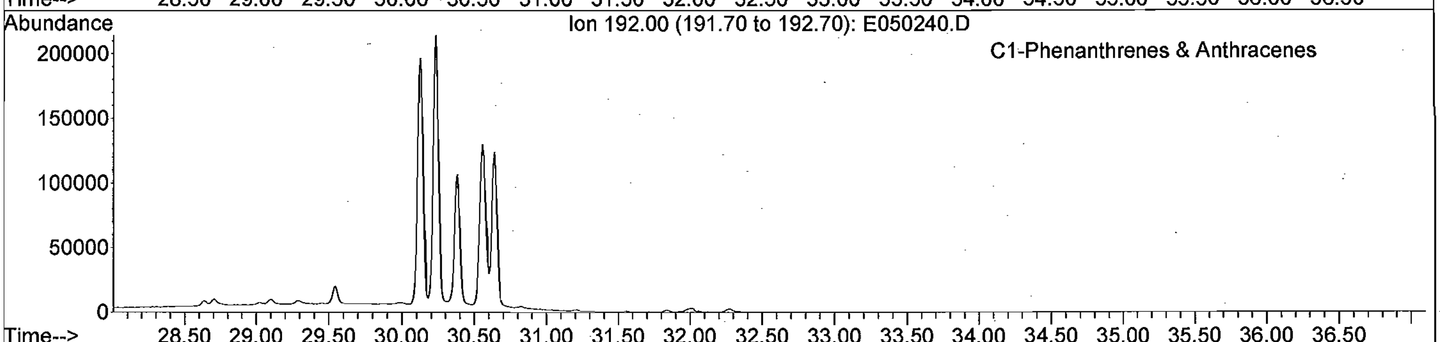

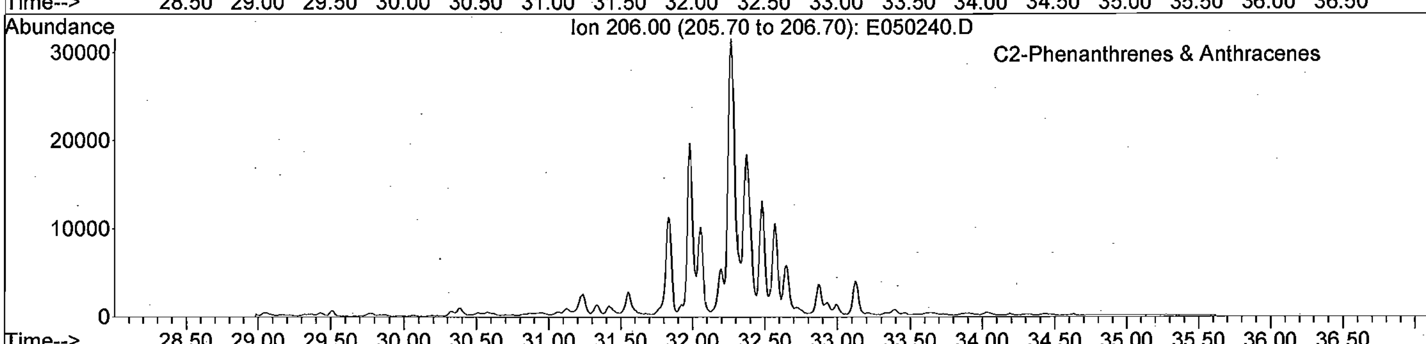

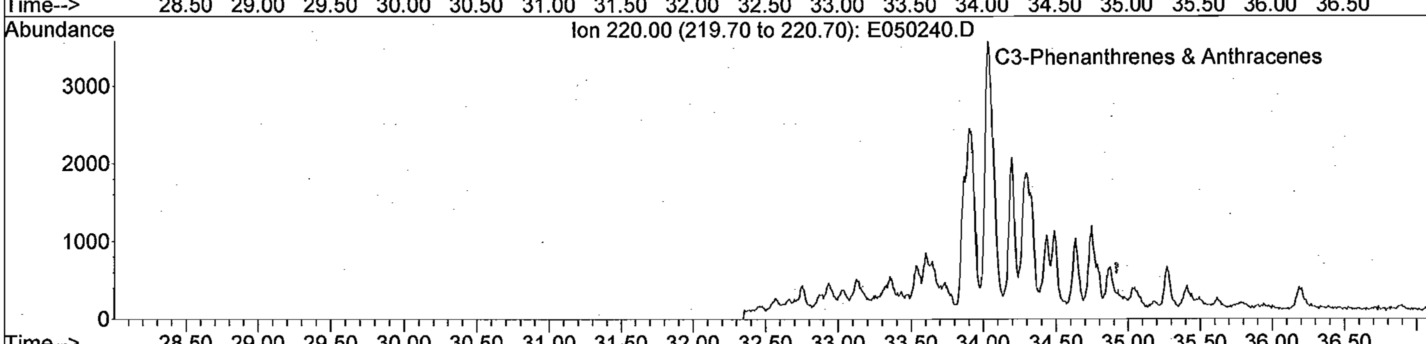

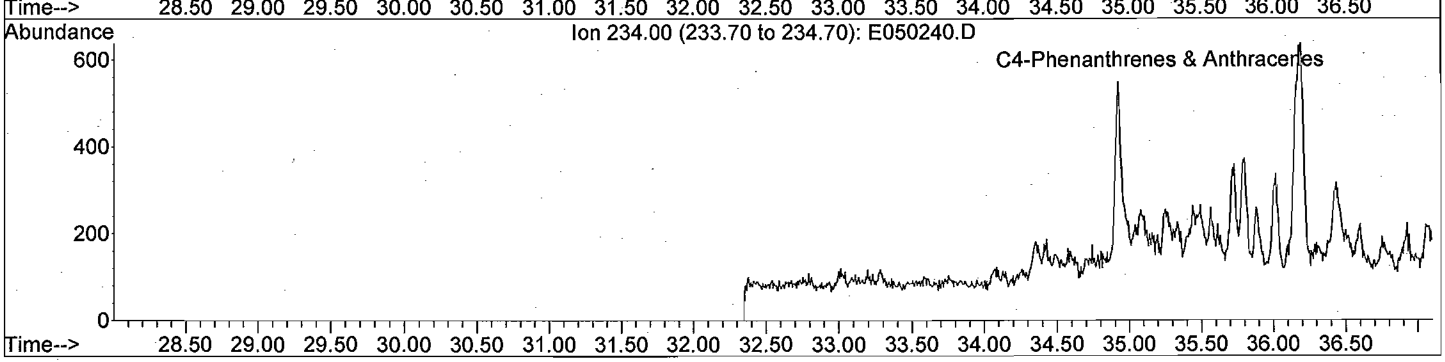

META Environmental, Inc.

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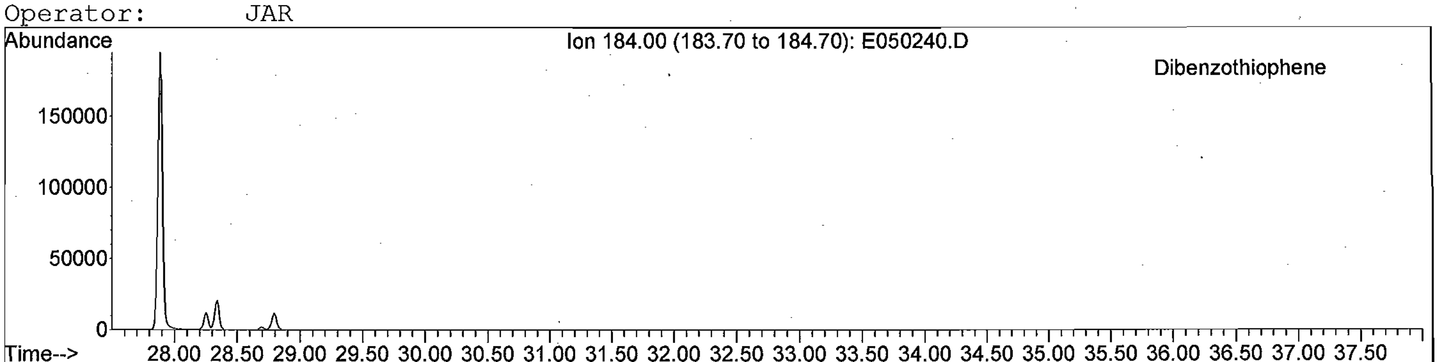

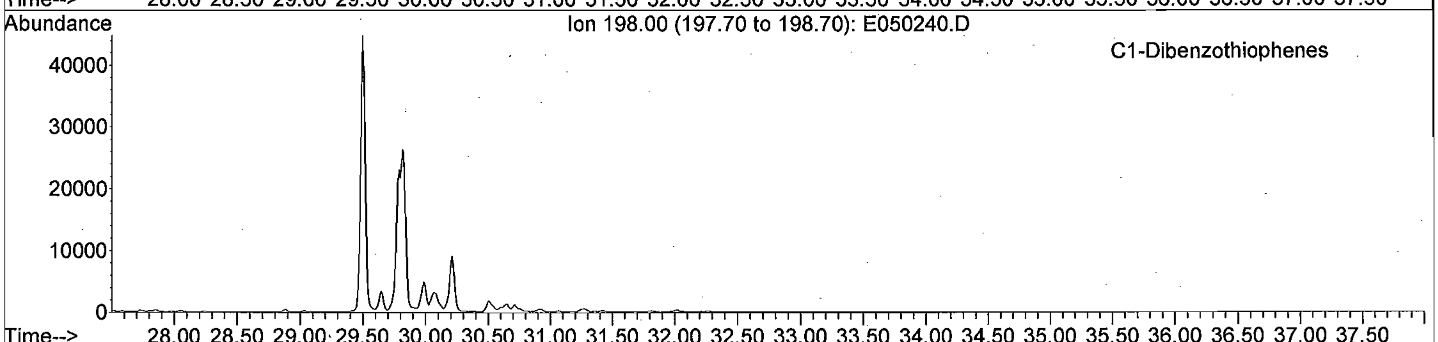

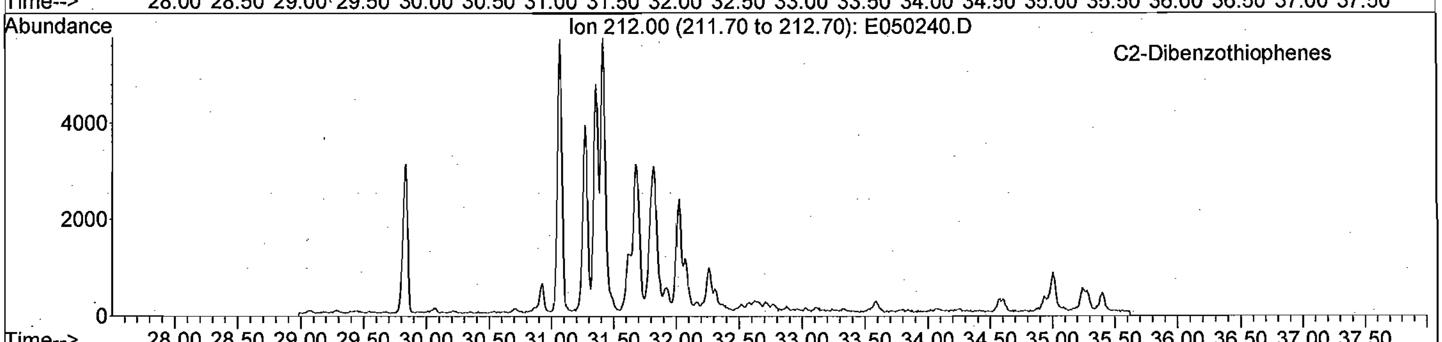

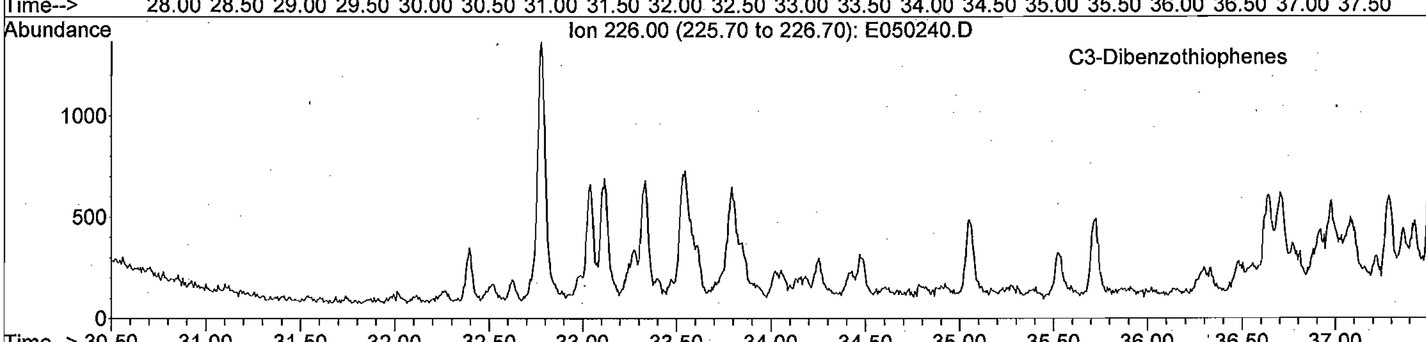

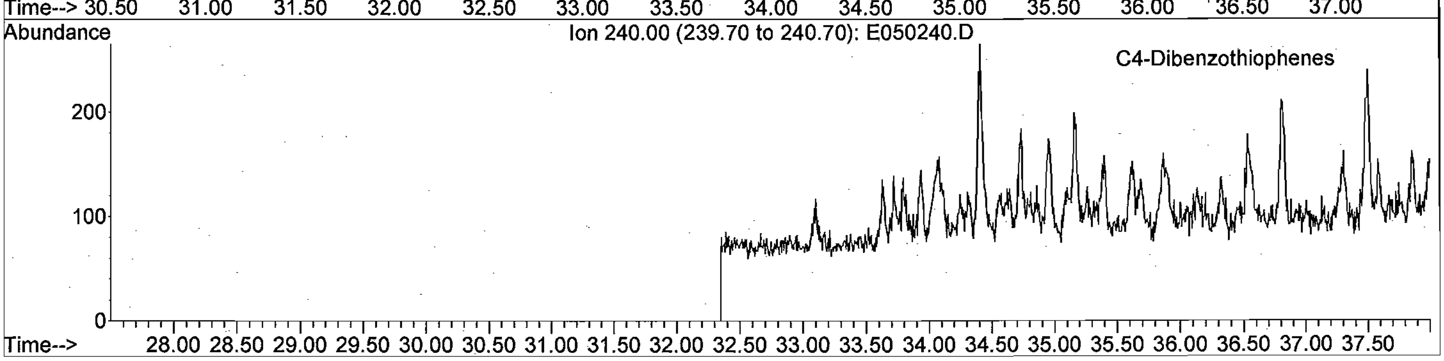

META Environmental, Inc.

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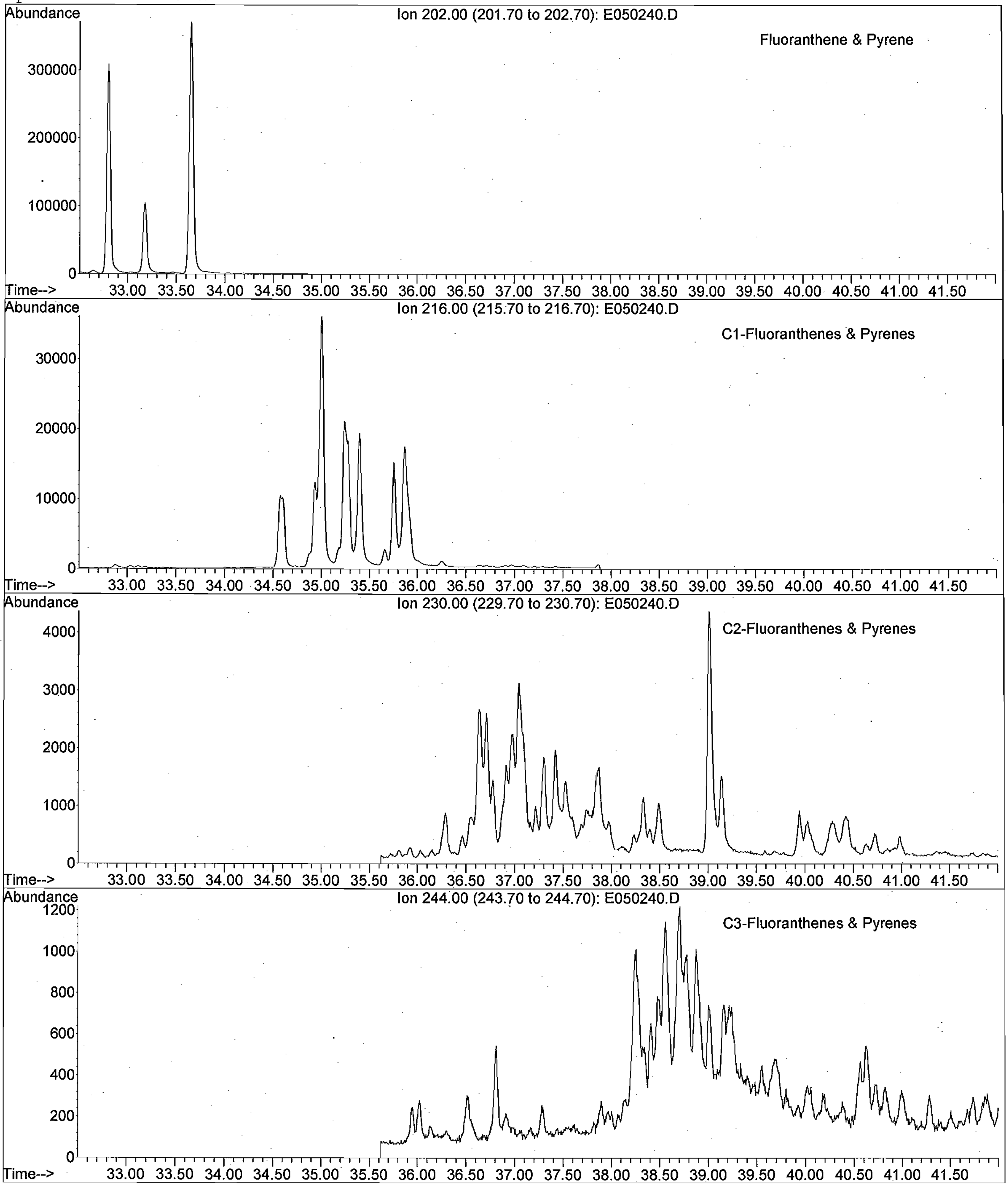

META Environmental, Inc.

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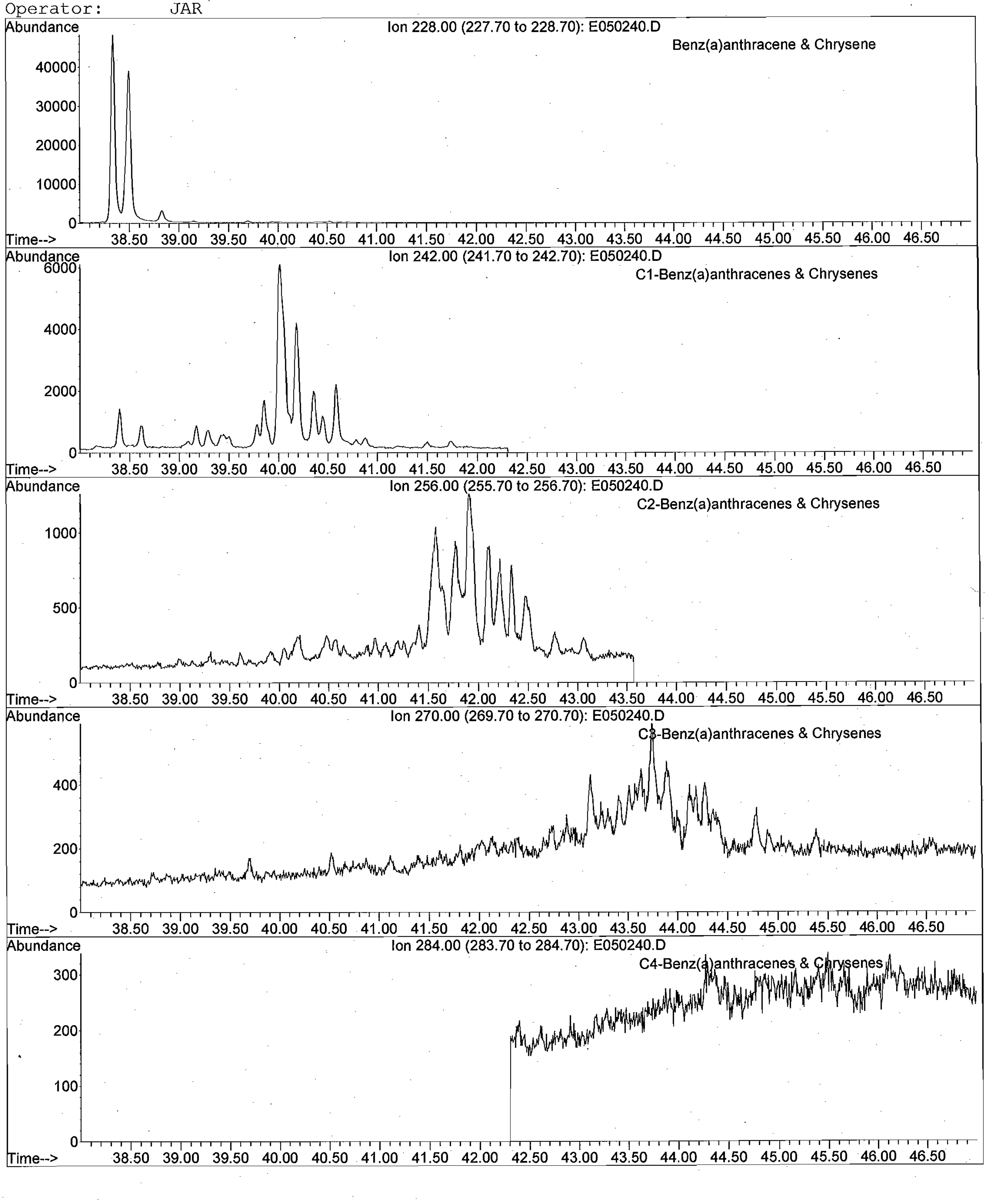

META Environmental, Inc.

GC/MS TOTAL ION CHROMATOGRAM

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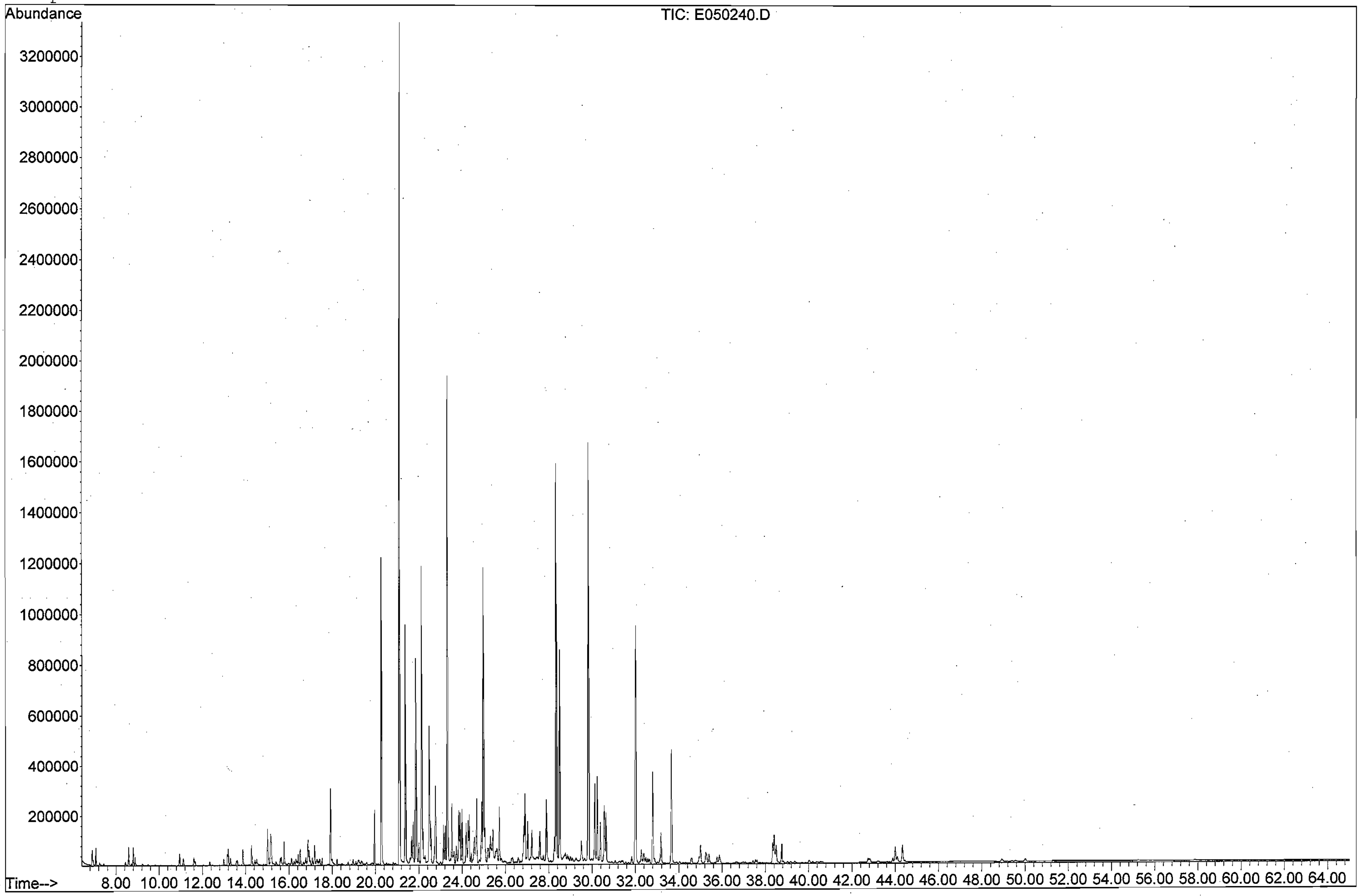
Method File: 4008SIMA.M
Sample Name: EK080417-02
Misc Info: TS04
Operator: JAR



Appendix D

TABLE D-1
TROY (SMITH AVE) OU-3 FS
ALTERNATIVE COST ESTIMATE SUMMARY

Alternative	**Capital**	**O&M (Annual)**	**Annual O&M NPV**	**Reviews NPV**	**Total O&M NPV**	**Total NPV**
S-1 (No Action)	0	0	0	56,000	56,000	56,000
S-2 (Limited Action)	52,000	0	0	56,000	56,000	108,000
S-3 (Dredging and Off-Site Disposal) *	2,431,000	0	0	0	0	2,431,000
S-4 (Sediment Remove to Pre-Release Conditions and Off-Site Disposal)	9,789,000	0	0	0	0	9,789,000

TABLE D-2
TROY (SMITH AVE) OU-3 FS
ALTERNATIVE S-2 CAPITAL COST ESTIMATE

Item #	Description	Estimated Quantity	Unit of Measure	Unit Cost (material and labor)	Estimated Cost
	ADMINISTRATIVE ACTIONS				
	Institutional Controls	1	LS	15,000	15,000
	Health and Safety Plan	1	LS	10,000	10,000
	Sediment Management Plan	1	LS	15,000	15,000
				Subtotal	$ 40,000
				Contingency (20%)	$ 8,000
				Engineering (N/A)	$ -
				Legal and Administrative (10%)	$ 4,000
				Grand Total	**$ 52,000**

TABLE D-3
TROY (SMITH AVE) OU-3 FS
ALTERNATIVE S-3 CAPITAL COST ESTIMATE

Item #	Description	Estimated Quantity	Unit of Measure	Unit Cost (material and labor)	Estimated Cost
	MOBILIZATION/DEMOBILIZATION				
	Mobilization	1	LS	$ 350,000	$ 350,000
	ADMINISTRATIVE ACTIONS				
	Institutional Controls	1	LS	15,000	15,000
	Health and Safety Plan	1	LS	10,000	10,000
	Sediment Management Plan	1	LS	15,000	15,000
	SUPPORT FACILITIES				
	Office trailers	1	LS	$ 15,000	$ 15,000
	Decon trailer	1	LS	$ 10,500	$ 10,500
	DREDGING				
	Dredging	4000	CY	$ 95	$ 380,000
	Staging area	1	LS	$ 30,000	$ 30,000
	SAMPLING OF DREDGE SPOILS				
	Sampling	27	EA	$ 450	$ 12,150
	OFF-SITE TREATMENT & DISPOSAL				
	Non-hazardous sediment	6000	Ton	$ 100	$ 600,000
	Hazardous sediment	0	Ton	$ 280	$ -
	FILL PLACEMENT				
	Clean fill	4000	CY	$ 15	$ 60,000
	Placement	4000	CY	$ 30	$ 120,000
	MISCELLANEOUS				
	Pre-design Investigation	1	LS	$ 100,000	$ 100,000
	Misc. Disposal	1	LS	$ 3,750	$ 3,750
	Health and Safety Oversight	2	MO	$ 12,000	$ 24,000
				Subtotal	$ 1,745,400
				Contingency (20%)	$ 424,080
				Engineering (10%)	$ 174,500
				Legal and Administrative (5%)	$ 87,300
				Grand Total	**$ 2,431,280**

Notes and Assumptions:
1. Dredging assumes area 300 ft by 80 ft, average depth of sediment=6 ft, and barge-mounted clamshell, spoils pumped to shore.
2. Cost estimate provided by contractor. Assumes one mobilization, work will proceed north to south
3. Dredging unit cost includes in water controls (e.g., silt curtains) and dewatering activities within an enclosure
4. Two month project duration, from beginning of mobilization through final cleanup
5. Pre-design investigation includes collection of sediment cores from lock approach and batch sediment for processing
6. Dredge spoil sampling assumes one sample per 150 tons (weight of sediments 1.5 tons / cy).
7. Sediment is non-hazardous.

TABLE D-4
TROY (SMITH AVE) OU-3 FS
ALTERNATIVE S-4 CAPITAL COST ESTIMATE

Item #	Description	Estimated Quantity	Unit of Measure	Unit Cost (material and labor)	Estimated Cost
	MOBILIZATION/DEMOBILIZATION				
	Mobilization	1	LS	$ 700,000	$ 700,000
	ADMINISTRATIVE ACTIONS				
	Institutional Controls	1	LS	15,000	15,000
	Health and Safety Plan	1	LS	10,000	10,000
	Sediment Management Plan	1	LS	15,000	15,000
	SUPPORT FACILITIES				
	Office trailers	1	LS	$ 60,000	$ 60,000
	Decon trailer	1	LS	$ 42,000	$ 42,000
	DREDGING				
	Dredging	21000	CY	$ 95	$ 1,995,000
	Staging area	1	LS	$ 30,000	$ 30,000
	SAMPLING OF DREDGE SPOILS				
	Sampling	146	EA	$ 450	$ 65,700
	OFF-SITE TREATMENT & DISPOSAL				
	Non-hazardous sediment	31500	Ton	$ 100	$ 3,150,000
	Hazardous sediment	0	Ton	$ 280	$ -
	FILL PLACEMENT				
	Clean fill	21000	CY	$ 15	$ 315,000
	Placement	21000	CY	$ 30	$ 630,000
	MISCELLANEOUS				
	Pre-design Investigation	1	LS	$ 100,000	$ 100,000
	Misc. Disposal	1	LS	$ 3,750	$ 3,750
	Health and Safety Oversight	10	MO	$ 12,000	$ 120,000
				Subtotal	$ 7,251,450
				Contingency (20%)	$ 1,450,290
				Engineering (10%)	$ 725,100
				Legal and Administrative (5%)	$ 362,600
				Grand Total	**$ 9,789,440**

Notes and Assumptions:
1. Dredging assumes the following excavation areas:
   a) 960 ft. length, 80 ft. width, and 7 ft. depth
   b) 125 ft. length, 100 ft. width, and 7.5 ft. depth
   c) 65 ft. length, 65 ft. width, and 8 ft. depth
2. Dredging unit cost assumes barge-mounted clamshell, spoils pumped to shore. Cost from RSMeans, Site Workand Landscape Cost Data, 2008, item35 20 23.13 0500.
3. Cost estimate provided by contractor. Assumes two mobilizations, work will proceed north to south
4. Dredging unit cost includes in water controls (e.g., silt curtains) and dewatering activities within an enclosure
5. Ten month project duration, from beginning of mobilization through final cleanup
6. Pre-design investigation includes collection of sediment cores upstream of the Troy lock and dam and batch sediment for processing
7. Dredge spoil sampling assumes one sample per 150 tons (weight of sediments 1.5 tons / cy).

TABLE D-5
TROY (SMITH AVE) OU-3 FS
ALTERNATIVE S-1 O&M COST ESTIMATE

Item #	Description	Estimated Quantity	Unit of Measure	Unit Cost (material and labor)	Estimated Annual Cost
	MISCELLANEOUS				
	Maintenance		% of Capital	-	-
	Contingency		% of O&M	-	-
	5-year reviews	6	EA	20,000	N/A

Annual O&M (excl. 5-yr reviews)	$ -
Project duration (years)	30
Interest rate	5%
NPV Annual O&M	$ -
NPV Reviews	$ 55,600
Total NPV O&M	**$ 55,600**

Assumptions:
1) Periodic reviews would occur every five years.

TABLE D-6
TROY (SMITH AVE) OU-3 FS
ALTERNATIVE S-2 O&M COST ESTIMATE

Item #	Description	Estimated Quantity	Unit of Measure	Unit Cost (material and labor)	Estimated Annual Cost
	MISCELLANEOUS				
	Maintenance		% of Capital	-	-
	Contingency		% of O&M	-	-
	5-year reviews	6	EA	20,000	N/A

Annual O&M (excl. 5-yr reviews)	$ -
Project duration (years)	30
Interest rate	5%
NPV Annual O&M	$ -
NPV Reviews	$ 55,600
Total NPV O&M	**$ 55,600**

Assumptions:
1) Periodic reviews would occur every five years.

Appendix E

October 18, 2010

Mr. John Spellman, P.E.
Project Manager
New York State Department of Environmental Conservation
Division of Environmental Remediation
625 Broadway
Albany, New York 12233

Subject: **National Grid Troy (Smith Ave.) Former MGP Site, OU-3**
Draft Feasibility Study Report
Response to Comments

Dear Mr. Spellman,

The Troy (Smith Ave.) Former MGP Site, OU-3 Draft Feasibility Study (FS) will be revised to reflect the NYSDEC June 29, 2010 comment letter, as follows:

Comment 1: *Table 2-3. A federally-mandated minimum draft applies to the navigable watercourse, which includes the lock approach and the area south of the lock approach. Thus, the report should identify the draft requirements. For the purpose of the report it can be assumed that backfill in any sediment removal areas would extend vertically back to the existing mudline, but only if the existing mudline satisfies the draft requirements.*

Response: The Revised FS will identify the minimum draft requirements, as requested. In addition, the FS will state that backfill of sediment in removal areas will extend vertically only to draft requirements.

Comment 2: *Page 23. While there are specific examples of ecological thresholds being more conservative than human health criteria, the statement: "Ecological criteria and exposure thresholds are typically more conservative than human health criteria, often by orders of magnitude", this is not necessarily accurate. Contaminants that bioaccumulate generally have much lower cleanup guidelines for human health protection as compared to benthic organism protection. Also, given the rather limited data set for the site-specific PAH bioavailability testing, it is not appropriate to conclude that the "if sediment is found to be nontoxic to aquatic organisms, this can indicate that protection of human* limited, as indicated by the depths of sediment cores collected along the shoreline, typically only 2.5 to 3 feet deep at these locations.

Please feel free to contact me at 973-630-8132, or at Robert.cantagallo@tetratech.com if you have any questions.

Sincerely,

Robert C. Cantagallo

Robert C. Cantagallo
Project Manager

cc: W. Jones, National Grid
file

enclosure

New York State Department of Environmental Conservation
Division of Environmental Remediation
Remedial Bureau C, 11th Floor
625 Broadway, Albany, New York 12233-7014
Phone: (518) 402-9662 • **Fax:** (518) 402-9679
Website: www.dec.ny.gov

October 28, 2010

Robert Cantagallo
Senior Project Manager
Tetra Tech EC, Inc.
1000 The American Road
Morris Plains, New Jersey 07950

RE: Troy Smith Ave. MGP Site, Troy, Rensselaer Co.
Site 4-42-030
OU3 Feasibility Study

Dear Mr. Cantagallo:

Thank you for your October 18, 2010 response to the New York State Department of Environmental Conservation's (Department) comments regarding the "Draft Feasibility Study Report for the Troy (Smith Avenue) Site – OU3 [Hudson River sediments]". The Department has concluded the following:

1. The Feasibility Study (Study) is approved. The Study provides sufficient information for the Department to develop a proposed remedial action plan for the operable unit. Note however, the Department is not in complete agreement with all of the statements made within the Study, in particular items 2 and 3 below.

2. Response to Comment 4. The Department agrees that should Alternative S-3 be selected as a remedy, it is unlikely the removal of NAPL-containing sediment would extend well beyond the lock approach, based on the data presented to date. However, the Department maintains its position that the southern limit of NAPL-contaminated sediment needs be more accurately delineated in a pre-design program. Contrary to Tetra Tech's statement that "no sheens were observed, only trace sheens," samples V-6 and V-10 were observed with sheen. The Department's intent is not to debate the degree of sheen in these samples, or to require removal of sediments containing trace sheens, but rather to point out that these observances were made proximal to both sediment and upland areas containing NAPL, and thus the sheen may be an indication of NAPL extending further than that shown on Figure 10 of the Feasibility Study.

3. Response to Comment 5. The Department agrees the thickness of soft sediment is limited