N60087.AR.000735
NAS BRUNSWICK
5090.3a

Post-Excavation Summary Report
Fuel Seep Mitigation/Soil Excavation
Old Navy Fuel Farm
Naval Air Station, Brunswick, Maine

Contract No. N62472-92-D-1296
Contract Task Order No. 0035

U.S. NAVAL AIR STATION
BRUNSWICK, MAINE

Prepared for

Department of the Navy
Northern Division
Naval Facilities Engineering Command
10 Industrial Highway
Mail Stop No. 82
Lester, Pennsylvania 19113-2090

Prepared by

EA Engineering, Science, and Technology
The Maple Building
3 Washington Center
Newburgh, New York 12550

November 1998
FINAL
296.0035

Post-Excavation Summary Report
Fuel Seep Mitigation/Soil Excavation
Old Navy Fuel Farm
Naval Air Station, Brunswick, Maine

Contract No. N62472-92-D-1296
Contract Task Order No. 0035

Prepared for

Department of the Navy
Northern Division
Naval Facilities Engineering Command
10 Industrial Highway
Mail Stop No. 82
Lester, Pennsylvania 19113-2090

John A. Carnright
CTO Manager

Date 11/5/98

Charles R. Flynn, Jr. Ph.D., P.H.
Program Manager

Date 11/5/98

November 1998
FINAL
296.0035

QUALITY REVIEW STATEMENT

Contract No. N62472-92-D-1296 EA Project Number: 29600.35.5320
Contract Task Order No. 0035
Activity: Naval Air Station, Brunswick, Maine

Description of Report/Deliverable:

Post-Excavation Summary Report, Fuel Seep Mitigation/Soil Excavation, Old Navy Fuel Farm, Naval Air Station, Brunswick, Maine

EA CTO Manager: John A. Carnright

In compliance with EA's Quality Procedures for review of deliverables outlined in the Quality Management Plan, and as per State of Maine Law, this final deliverable has been reviewed for quality by the undersigned Senior Technical Reviewer and reviewed for its technical content by the undersigned Certified Geologist. The information presented in this report/deliverable has been prepared in accordance with the approved Implementation Plan for the Contract Task Order (CTO) and reflects a proper presentation of the data and/or the conclusions drawn and/or the analyses or design completed during the conduct of the work. This statement is based upon the standards identified in the CTO and/or the standard of care existing at the time of preparation.

Senior Technical Reviewer(s)

Michael S. Battle, P.G. 11/5/98
Senior Technical Reviewer (Date)

STATE OF MAINE PAUL W. HIGGINS No. 259 CERTIFIED GEOLOGIST

Paul W. Higgins, C.G. 11-3-98
(Date)

CONTENTS

Page

1. INTRODUCTION 1

2. FUEL SEEP DISCOVERY AND NOTIFICATION 1

3. REMEDIAL EXCAVATION 3

   3.1 Pre-Excavation Activities 3
   3.2 Remedial Excavation 3

4. POST-EXCAVATION SAMPLING PROGRAM 4

   4.1 Soil Sample Jar Headspace Analysis 4
   4.2 Offsite Laboratory Analysis 5

      4.2.1 Analytical Results 6

   4.3 Supplemental Soil Sampling 6

      4.3.1 Analytical Results 6

   4.4 Summary of Ground-Water Sampling Results 7
   4.5 Waste Disposal and Site Restoration 8

5. SUMMARY AND RECOMMENDATIONS 8

REFERENCES

APPENDIX A: PHOTOLOG AND PHOTOGRAPHS OF FUEL SEEP MITIGATION AND REMEDIAL CONSTRUCTION ACTIVITIES AT OLD NAVY FUEL FARM, NAVAL AIR STATION, BRUNSWICK, MAINE
APPENDIX B: MEDEP SPILL NO. P-368-97, INITIAL CLEANUP ACTION AGREEMENT/SOIL DISPOSAL LETTER
APPENDIX C: ANALYTICAL DATA
APPENDIX D: GENERATOR SPECIAL WASTE CERTIFICATE
APPENDIX E: MEDEP COMMENT LETTER DATED 27 FEBRUARY 1998 WITH ASSOCIATED NAVY RESPONSES

LIST OF FIGURES

Number	Title
1	Site plan, Old Navy Fuel Farm, Naval Air Station, Brunswick, Maine.
2	Excavation details and post-excavation soil sample locations, Old Navy Fuel Farm, Naval Air Station, Brunswick, Maine.
3	Analytical results for post-excavation soil samples collected 2 July 1997, Old Navy Fuel Farm, Naval Air Station, Brunswick, Maine.
4	Summary of analytical results of ground-water samples collected adjacent to soil excavation, Old Navy Fuel Farm, Naval Air Station, Brunswick, Maine.

LIST OF TABLES

Number	Title
1	Summary of head space measurements for soil samples collected on 2 July 1997 at the Old Navy Fuel Farm, Naval Air Station, Brunswick, Maine.
2	Summary of analytical results for soil samples collected on 2 July 1997 at the Old Navy Fuel Farm, Naval Air Station, Brunswick, Maine.
3	Summary of analytical results for soil samples collected 24 September 1997 at the Old Navy Fuel Farm, Naval Air Station, Brunswick, Maine.
4	Summary of analytical results for ground-water samples collected 24-25 June and 10-11 December 1997 at well point WP-01 and monitoring well MW-NASB-061R, Old Navy Fuel Farm, Naval Air Station, Brunswick, Maine.

1. INTRODUCTION

Under Contract No. N62472-92-D-1296, Northern Division, Naval Facilities Engineering Command issued Contract Task Order No. 0035 to EA Engineering, Science, and Technology to perform remediation activities in response to an observed petroleum seep at the Old Navy Fuel Farm, Naval Air Station (NAS) Brunswick, Maine. NAS Brunswick is located south of the Androscoggin River between Brunswick and Bath, Maine. NAS Brunswick is an active Naval air operations base owned and operated by the Federal government through the Department of the Navy. In 1987, NAS Brunswick was placed on the National Priorities List by the U.S. Environmental Protection Agency (EPA) and is currently participating in the Navy's Installation Restoration Program.

The Old Navy Fuel Farm is located on the northeast portion of NAS Brunswick grounds, and is bounded on the south by Fitch Avenue, on the west by 6th Street, and to the north and east by undeveloped land. The existing surface at the Old Navy Fuel Farm includes a level field, encompassing approximately eight grassed acres, within a fenced perimeter. The northwest quadrant of the site is transected from west to east by an asphalt-paved roadway. A general plan view of the Old Navy Fuel Farm is shown on Figure 1. The Fuel Farm was previously used as a petroleum bulk storage facility and decommissioned in 1993. Petroleum storage at the site is known to have included petroleum sludge, unleaded gasoline, aviation gasoline, ethylene glycol, and jet fuel (JP-5).

This report summarizes the results of a soil removal action and related site restoration work conducted to mitigate an active seep of petroleum-related compounds. Liquid phase petroleum was observed to have migrated vertically from subsurface strata to ground surface through cracks in the asphalt roadway located in the northwest portion of the Old Navy Fuel Farm. A remedial action was conducted with the primary objective of effectively removing petroleum-impacted soil from the seep area and improving the effectiveness of the existing storm water conveyance system. An additional objective was to assess post-excavation concentrations of petroleum-related compounds in soil relative to State of Maine Department of Environmental Protection (MEDEP), Bureau of Hazardous Material and Solid Waste Response Services Division soil cleanup guidelines: Procedural Guidelines for Establishing Standards for the Remediation of Oil Contaminated Soil and Ground Water in Maine (MEDEP 1995).

2. FUEL SEEP DISCOVERY AND NOTIFICATION

In August 1996, the operation of an *in situ* remediation system was initiated utilizing biosparging technology for reduction of petroleum-related hydrocarbon concentrations in site soil and ground water at the Old Navy Fuel Farm. During the performance of an operations and maintenance site visit on 15 May 1997, EA personnel observed a petroleum hydrocarbon seep emanating from cracks in the asphalt road (Appendix A, Photograph No.1). It is suspected that the presence of the seep was attributable to an elevated water table condition at the site, the result of a prolonged

wet weather period. An existing stormwater culvert located immediately east of the seep was observed to be receiving stormwater and light, non-aqueous phase liquid petroleum as stormwater run-off from the asphalt road surface (Appendix A, Photograph Nos. 2 and 3).

Based on the potential for impacted water and light, non-aqueous phase liquid to be conveyed through the stormwater system, the layout of the storm sewer was inspected to determine the outfall location. The outfall was verified on a utility plan obtained from NAS Brunswick Department of Public Works. The outfall is located immediately east of Board Road at its intersection with Avenue B as shown on Figure 1.

On 15 May 1997, the storm sewer outfall was inspected for evidence of a release of potentially impacted water, as well as light, non-aqueous phase liquid. No evidence of either impacted water or free-product was noted during the inspection. As a precautionary measure, however, sorbent boom and pad materials were placed at the outfall to recover potential discharged fluids. Monitoring of this outfall was conducted from 15 May 1997 through completion of the seep mitigation/soil excavation effort on 2 July 1997. During this period, no evidence of either impacted water or light, non-aqueous phase liquid was noted, therefore, no further actions were taken.

Following notification of the seep condition to NAS Brunswick Department of Public Works personnel, an Initial Clean-up Action Agreement was executed on 2 July 1997 between NAS Brunswick and the MEDEP under Spill No. P-368-97. The agreement included:

- Confirmation of the release of suspected petroleum-related compounds at the Old Navy Fuel Farm in the vicinity of the former loading racks.

- MEDEP guidance that intermediate soil clean-up goals are the regulatory objectives at the seep location, specifically a goal of 100 ppm total volatile hydrocarbons in soil as measured by approved photoionization detector (PID) and field headspace method (MEDEP 1997).

- MEDEP issuance of "virgin oil-contaminated" soil disposal letter; designating soil removed from the site as suitable for commercial recycling. The disposal letter names Bill Whorff and Sons, Inc., West Bath, Maine, as the soil transporter, and Commercial Recycling Systems of Scarborough, Maine, as the receiving facility. A soil weight limit specific to the agreement was established at 850 tons.

- MEDEP requirement for a summary report detailing the soil removal/disposal activities, and report conclusions/recommendations.

- MEDEP agreement that NAS Brunswick representatives manage the clean-up directly.

Appendix B provides a copy of the Initial Clean-up Actions agreement and accompanying soil disposal letter for MEDEP Spill No. P-368-97.

3. REMEDIAL EXCAVATION

3.1 PRE-EXCAVATION ACTIVITIES

In anticipation of remedial excavation at the Old Navy Fuel Farm, EA personnel initiated an Excavation Clearance Request (No. 92-D-1296) on 23 June 1997, as required by NAS Brunswick Department of Public Works. The approved clearance request was issued by NAS on 24 June 1997. A site drawing accompanying the approved excavation clearance request indicated the existence of a buried 8-in. water line in the vicinity of the proposed remedial excavation. No other utilities were known to exist in the proposed excavation area.

On 1 July 1997, a health and safety meeting was conducted at the Old Navy Fuel Farm to brief EA and subcontractor personnel representing Bill Whorff and Sons, Inc., of West Bath, Maine, on the activities to be carried out at the site. A review of the *Basewide Safety, Health, and Emergency Response Plan, Naval Air Station, Brunswick, Maine* (EA 1997a) was conducted, and site entry logs were signed and posted. General safety issues were discussed, including the emergency points-of-contact, the chemical constituents of concern likely to be encountered during excavation, known underground utilities, the physical/mechanical hazards associated with operation of excavating equipment, and monitoring requirements.

3.2 REMEDIAL EXCAVATION

Remedial excavation activities were conducted on 1 and 2 July 1997. Representatives of Bill Whorff and Sons, Inc., under contract with EA, operated excavating equipment as directed by an EA civil engineer. Figure 1 provides the general location of the excavation at the Old Navy Fuel Farm. During the excavation activity, EA provided engineering services and additional support to the project, including communication/coordination with MEDEP, health and safety oversight, ambient air monitoring, soil sample headspace analysis, and soil sampling.

Excavation commenced on 1 July 1997 at the storm sewer headwall (Figure 2). As work proceeded, the concrete headwall structure was observed to be in poor condition, with evidence of deterioration and cracking. The headwall, and a 20-ft section of 18-in. diameter galvanized steel culvert pipe, was excavated and staged for disposal. Provisions were made to install a new catch basin with storm sewer grate (installed at final surface grade) in lieu of the previous headwall and culvert structure. The soil adjacent to the headwall structure was observed to be visibly stained.

A Foxboro Model TVA-100 PID was calibrated in accordance with MEDEP guidance (MEDEP 1997) using recommended set-points for fuel-oil. PID screening of soil by the sample jar headspace method was initiated in order to differentiate petroleum-impacted soil. Total volatile hydrocarbon (TVH) concentrations in excess of 100 ppm were observed immediately below surface grade in the area 10 ft northeast of the former headwall structure. As the excavation proceeded, soil exhibiting TVH concentrations in excess of 100 ppm were segregated and stockpiled.

As the excavation depth increased in the vicinity of the headwall structure (approximately 2.75 ft below surface grade), ground water was observed entering the excavation. Based on the observation of petroleum-impacted soil and the presence of ground water in the excavation, MEDEP representatives were contacted to discuss conditions at the site. Work progress was reviewed with MEDEP representatives by telephone, and MEDEP was informed that TVH concentrations recorded by the PID using the set-point method appeared to be of questionable validity. Based on the preference to have MEDEP review the PID calibration and field screening procedure, it was agreed that work would be suspended for the day, and that a MEDEP representative would be dispatched to the site to observe existing conditions.

On 2 July 1997, Mr. Steve Brezinski, of the MEDEP, was onsite to review progress of the work. A discussion of the PID calibration set-point problems resulted in an agreement to perform standard (i.e., manufacturer's recommended) calibration and then apply a set point conversion factor to the PID results. The PID instrument was then calibrated in "normal" (i.e. without set-point correction) mode using a 102 ppm isobutylene standard calibration gas. Mr. Brezinski inspected the stockpiled soil and confirmed its suitability for recycling (via asphalt batching process) at Commercial Paving, Inc., Scarborough, Maine, owner/operators of Commercial Recycling Systems, an MEDEP-approved asphalt recycling facility.

Excavation of petroleum-impacted soil continued on 2 July 1997. Field PID screening and visual/olfactory observations were used to segregate petroleum-impacted soil. Soil excavation proceeded to the horizontal limits shown on Figure 2, where visual and/or olfactory evidence of petroleum in soil was absent. Excavation depth was limited to approximately 2.5 to 3-ft below surface grade due to the presence of ground water. The finished excavation encompassed an area approximately 18 ft × 180 ft. An estimated 320 yd^3 of petroleum-impacted soil was removed and stockpiled on polyethylene sheeting (Appendix A, Photograph No. 4). Site conditions following completion of the excavation are shown in Appendix A (Photograph No. 5).

4. POST-EXCAVATION SAMPLING PROGRAM

4.1 SOIL SAMPLE JAR HEADSPACE ANALYSIS

Following completion of the excavation on 2 July 1997, post-excavation soil samples were collected for screening and offsite laboratory analysis. One soil sample was collected in the

vicinity of the former stormwater headwall, and additional soil samples were collected from the sidewalls of the excavation at a frequency of one sample per 20 linear ft. Samples were collected from a consistent depth 2.5-3 ft below surface grade, the soil horizon exhibiting the most staining, and interpreted to represent the "smear zone" located nominally above the water table. Soil samples were not collected from the excavation bottom due to the presence of ponded ground water. In lieu of sampling the ponded ground water, ground-water samples collected on 24-25 June 1997 from adjacent upgradient well point WP-01 and adjacent downgradient monitoring well MW-NASB-061R were considered representative of ground-water quality at the time the excavation was accomplished. Ground-water sampling was conducted as part of the operations and monitoring program associated with the biosparging system, and is discussed in detail in EA (1997b). The results of these analyses are summarized in Section 4.4.

At each soil sampling location, a single grab sample was collected and divided into three aliquots (designated A, B, and C) for PID screening. Soil sampling locations and sample number designations are provided in Figure 2. Table 1 summarizes the results of the three soil headspace measurements and the average TVH concentration. Also provided in Table 1 are the adjusted average TVH concentrations based on the MEDEP-recommended conversion factor.

Soil sample TVH concentrations ranged from 0 ppm (PEX-180-2) to 1,386 ppm (PEX-0-1). Eleven samples exhibited TVH concentrations greater than 100 ppm, with concentrations ranging from 149 ppm to 1,386 ppm. Soil samples from the remaining 12 sample locations exhibited TVH concentrations less than 100 ppm. It should be noted that light, non-aqueous phase liquid was not identifiable through visual or olfactory observation at any of the post-excavation soil sample locations. However, soil discoloration was noted due to the high organic soil content and peat layering.

4.2 OFFSITE LABORATORY ANALYSIS

Eleven post-excavation soil samples were collected for offsite laboratory analysis. A duplicate soil sample was collected from sidewall location PEX-160-1. Soil samples were containerized in laboratory-clean jars and shipped via overnight courier under strict chain-of-custody procedures to EA Laboratories of Sparks, Maryland. One equipment rinsate blank was collected by running de-ionized water over the stainless steel hand trowel and directing the rinse water into laboratory-clean sample jars. To assess the potential for sample contamination during transport, one trip blank accompanied the sample shipment for laboratory analysis.

The post-excavation and duplicate soil samples (12 total), and the equipment rinsate blank were analyzed for benzene, toluene, ethylbenzene, and total xylenes (BTEX) and methyl tertiary-butyl ether (MTBE) by EPA Method 8020, total petroleum hydrocarbons (TPH) as Gasoline Range Organics (GRO) by Maine Department of Human Services (MDHS) Health and Environmental Testing Laboratory (HETL) Laboratory Operating Procedure (LOP) Method 4.2.17, and TPH as Diesel Range Organics (DRO) by the MDHS-HETL LOP Method 4.1.25. The trip blank sample was analyzed for the presence of BTEX and MTBE by EPA Method 8020 only.

4.2.1 Analytical Results

The analytical results for the post-excavation soil samples collected on 2 July 1997 are summarized in Table 2. Figure 3 provides the locations of the soil samples, along with the analytical detections. The complete laboratory analytical report narrative, chain-of-custody, and Form I (analytical results) are provided in Appendix C.

Results of the laboratory analyses indicate that MTBE was present in one soil sample (PEX-160-0-2) at a concentration of 3 μg/Kg. BTEX was not detected in any of the 11 soil samples, duplicate soil sample, trip blank, or equipment rinsate blank. TPH–GRO were not detected in any of the 11 soil samples or the duplicate soil sample. TPH–DRO were reported in the 11 soil samples at concentrations ranging from 17,000 μg/Kg (PEX-120-2) to 760,000 μg/Kg (PEX-160-1). TPH–DRO were also reported in the laboratory method blank associated with 10 of the 11 samples. The analytical results for the duplicate soil sample indicated general agreement with the original sample. TPH–DRO were not detected in the equipment rinsate blank.

4.3 SUPPLEMENTAL SOIL SAMPLING

On 24 September 1997, three additional soil samples were collected at the Old Navy Fuel Farm seep excavation site to confirm the reliability of the analytical results for the TPH–DRO by MDHS-HETL LOP Method 4.1.25. A comparative analysis of TPH by EPA Method 418.1 was performed. One soil sample was collected in the headwall culvert system (EX-01), a second sample (EX-02) was collected in the vicinity of previous sample PEX-160-01, and a third sample (EX-03) was collected upgradient of the excavation, in the vicinity of monitoring well MW-NASB-062. The location of sample EX-03 was selected to provide background (upgradient) TPH–DRO concentrations. A duplicate soil sample was collected at sample location EX-01. The soil samples, including duplicate and rinse blank samples, were containerized in laboratory-clean jars and shipped via overnight courier under strict chain-of-custody procedures to EA Laboratories of Sparks, Maryland. The three soil samples plus duplicate and rinsate blank were analyzed for semivolatile organic compounds (SVOC) by EPA Method 8270, TPH by EPA Method 418.1, and TPH–DRO by MDHS-HETL LOP Method 4.1.25. Table 3 provides the results of supplemental soil samples collected on 24 September 1997.

4.3.1 Analytical Results

A summary of the analytical results for supplemental soil samples collected on 24 September 1997 is provided in Table 3. The complete laboratory analytical report narrative, chain-of-custody, and Form I (analytical results) are provided in Appendix C. Figure 3 shows the relative location and associated TPH–DRO and TPH (EPA Method 418.1) concentrations of soil samples selected for offsite laboratory analysis.

Three SVOC were detected at estimated concentrations below the method detection limit in soil samples EX-01 (naphthalene) and EX-02 (fluoranthene and pyrene). No SVOC were detected in background soil sample EX-03, or in the EX-01 duplicate soil sample.

TPH by EPA Method 418.1 were reported in samples EX-01 and EX-02 at concentrations of 44.8 mg/Kg and 262 mg/Kg, respectively. TPH–DRO were reported in the 3 soil samples and the duplicate soil sample at concentrations ranging from 11,000 μg/Kg (EX-03) to 340,000 μg/Kg (EX-02). The rinsate blank contained a reported TPH–DRO concentration of 51 μg/L. The results indicate general agreement between TPH by EPA Method 418.1, and TPH–DRO by the MDHS-HETL LOP Method 4.1.25, suggesting the validity of analytical results for TPH–DRO by the MDHS-HETL LOP Method 4.1.25 from the sampling event conducted on 2 July 1997.

4.4 SUMMARY OF GROUND-WATER SAMPLING RESULTS

During 24-25 June and 10-11 December 1997, ground-water samples were obtained from monitoring wells and well points at the Old Navy Fuel Farm as part of the biosparging system operations and monitoring program (EA 1997b, 1998). During each sampling event, ground-water samples were analyzed for BTEX and MTBE by EPA Method 8020, TPH–GRO by MDHS-HETL LOP Method 4.2.17 and TPH–DRO by MDHS-HETL LOP Method 4.1.25. The analytical results for samples collected from adjacent upgradient well point WP-01 and adjacent downgradient monitoring well MW-NASB-061R are considered representative of ground-water quality prior to (24-25 June 1997) and following (10-11 December 1997) seep mitigation/soil excavation activities. Figure 4 shows the locations of well point WP-01 and monitoring well MW-NASB-061R in relation to the excavation footprint. Table 4 provides a summary of the analytical results. The analytical data are provided as appendixes in the bi-annual summary reports (EA 1997b, 1998).

As shown in Table 4, with the exception of a reported BTEX concentration of 1 μg/L in MW-NASB-061R during the 24-25 June 1997 sampling event, BTEX and MTBE were not reported in well point WP-01 or well MW-NASB-061R during either sampling event. Concentrations of TPH–GRO and TPH–DRO were reported in exceedance of corresponding MEDEP remediation standards in the samples collected prior to, and following, seep mitigation/soil excavation activities at well point WP-01 and monitoring well MW-NASB-061R, although lower overall concentrations were observed in the 10-11 December 1997 ground-water samples. The TPH–GRO concentration at well MW-NASB-061R increased slightly from 32 μg/L to 75 μg/L during the June and December 1997 sampling events. It cannot be ascertained whether the overall decreases in TPH concentrations are attributable to the soil removal action, or seasonal trends in ground-water quality.

4.5 WASTE DISPOSAL AND SITE RESTORATION

During the remedial excavation conducted on 2 July 1997, approximately 445 tons of petroleum-impacted soil, and related asphalt and concrete debris, was stockpiled on and covered with polyethylene sheeting. On 10, 15, 16, and 17 July 1997, Bill Whorff and Sons, Inc., West Bath, Maine provided soil loading and transportation services to Commercial Recycling Systems, Scarborough, Maine, a MEDEP-approved recycling facility operating as an asphalt pug mill. Additional solid waste, including asphalt debris and reinforced concrete, was also transported to the same location for recycling. Appendix D provides the Generator Special Waste Certificate completed by the recycling facility.

Site restoration was completed by Bill Whorff and Sons, Inc., West Bath, Maine under the supervision of an EA civil engineer. The work include repair of the storm sewer connection in the vicinity of the former concrete headwall, and backfilling, compaction, and paving of the disturbed area. A 3-ft × 3-ft × 2-ft (depth) precast concrete catch basin fitted with surface-mounted 2-ft × 2-ft cast iron storm grate was selected to replace the former reinforced concrete headwall and culvert system. The new catch basin was connected directly to the existing 18-in. storm sewer piping (Appendix A, Photograph No. 6). The excavation was then backfilled, compacted, and repaved. Final grading conformed to the original surface grading, with the new storm sewer grate established as the low point to receive localized run-off from the western portion of the asphalt road. Final site restoration is shown in Appendix A, Photograph Nos. 7 and 8. Figure 3 shows the location of the new catch basin and storm sewer connection.

5. SUMMARY AND RECOMMENDATIONS

The objectives set forth in June 1997 for mitigating the source of the petroleum seep, excavating and disposing of visibly impacted soil, and repairing the stormwater conveyance system, were achieved. The seep mitigation/soil excavation effort completed on 2 July 1997 at the Old Navy Fuel Farm encompassed an area approximately 18-ft × 180-ft × 2.5-ft (depth) and resulted in the disposal of approximately 445 tons of petroleum-impacted soil, asphalt, and concrete debris at a MEDEP-approved recycling facility for beneficial re-use. Depth of excavation was limited due to the presence of ground water at approximately 2.75 ft below surface grade; thus, only excavation sidewall samples were collected. Replacement of the stormwater culvert system, in conjunction with the soil excavation activity, has reduced the potential for migration of light, non-aqueous phase liquid from subsurface soil to the stormwater collection system. Installation of the new catch basin, and asphalt paving, will ensure that stormwater is collected and conveyed offsite without contacting petroleum-impacted soil.

Twenty-three soil samples collected from the excavation sidewalls were screened in accordance with MEDEP guidance for PID headspace analysis. Results of PID screening indicate that 11 samples exceeded TVH concentrations of 100 ppm (adjusted per MEDEP calibration set points). Eleven soil samples, plus one duplicate soil sample and an equipment rinse blank, were

submitted for offsite laboratory analysis for BTEX and MTBE by EPA Method 8020, TPH-GRO by MDHS-HETL LOP Method 4.2.17, and TPH-DRO by MDHS-HETL LOP Method 4.1.25. A trip blank was analyzed for BTEX and MTBE by EPA Method 8020 only.

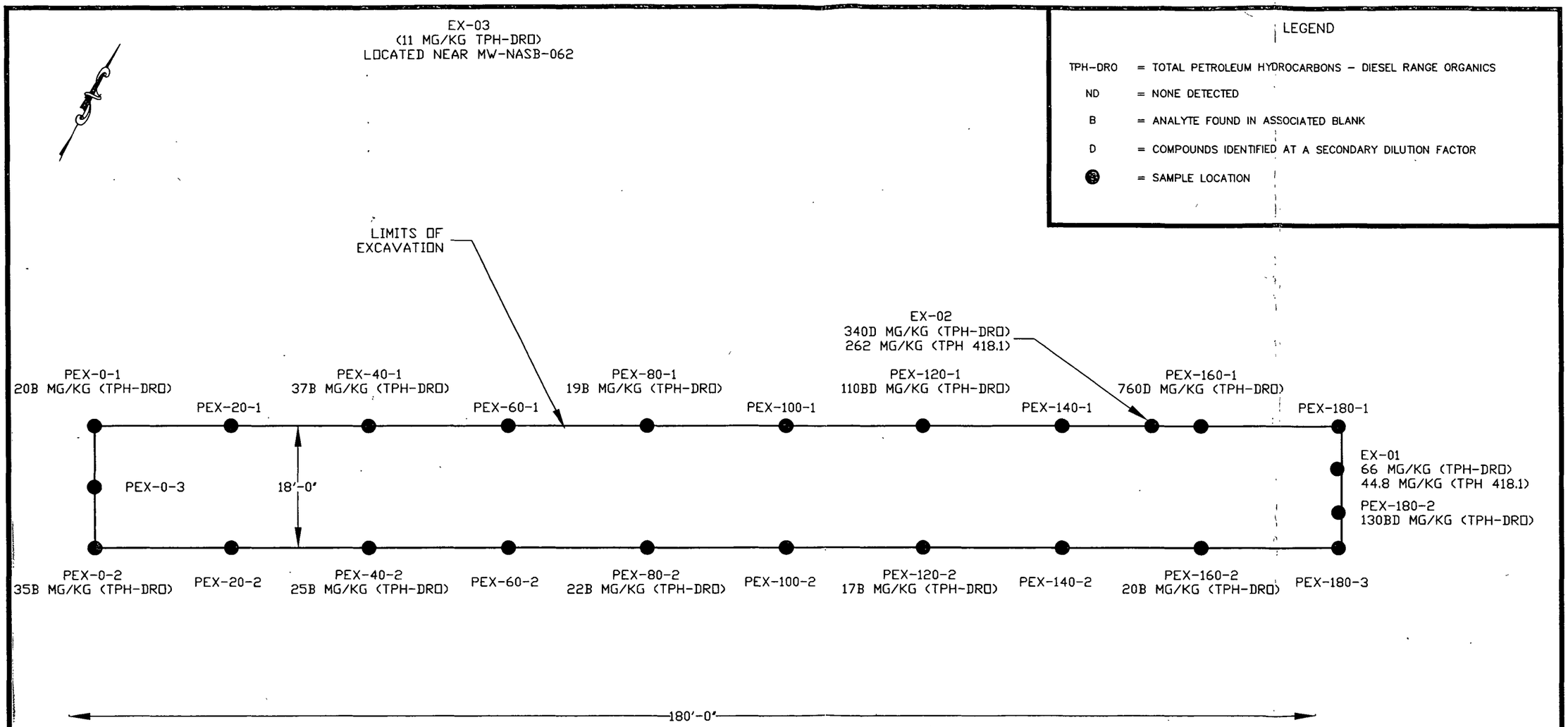
Results of the laboratory analyses indicate BTEX and MTBE were not detected in the soil samples, equipment rinse blank, or trip blank. Similarly, TPH-GRO were not detected in the soil samples, or the equipment rinsate blank. TPH-DRO were detected in the 11 post-excavation soil samples at concentrations ranging from 17,000 μg/Kg to 760,000 μg/Kg. TPH-DRO were also reported in the rinsate blank at 51 μg/L, and in the method blanks associated with 10 of 11 soil samples. To verify these results, comparative analyses of supplemental samples were conducted. Three additional samples were collected on 24 September 1997 and analyzed for TPH-DRO (MDHS-HETL LOP Method 4.1.25), TPH (EPA Method 418.1) and SVOC by EPA Method 8270. In general, low detections of only 3 SVOC were reported, and the TPH data for the two methods indicated general agreement.

Based on the MEDEP intermediate soil remediation standard of 10,000 μg/Kg for TPH-DRO, the 11 soil sampling locations exceeded the regulatory standard, with the highest concentrations reported in samples collected from the northeastern quadrant of the excavation. The low detections of SVOC in the 2 soil samples collected adjacent to the excavation area on 24 September 1997 do not correlate well to soil containing elevated concentrations of TPH-DRO.

Ground-water samples were collected at the adjacent, upgradient well point WP-01, and monitoring well MW-NASB-061R, located immediately downgradient of the center of the excavated area, less than 10 days prior to the seep mitigation/soil excavation activity. Samples were also collected from the locations in December 1997. With the exception of a reported BTEX concentration of 1 μg/L in MW-NASB-061R during the 24-25 June 1997 sampling event, BTEX and MTBE were not reported in well point WP-01 or monitoring well MW-NASB-061R during either sampling event. Concentrations of TPH-GRO and TPH-DRO were reported in exceedance of corresponding MEDEP remediation standards in the samples collected prior to, and following seep mitigation/soil excavation activities at both locations, although lower overall concentrations were observed in the December 1997 ground-water samples.

Based on the soil and ground-water data presented in this report, ongoing biosparging system operations, and associated long-term ground-water sampling, are warranted to continue the restoration of soil and ground water quality. The Old Navy Fuel Farm seep excavation area is located immediately north of the active *in situ* remediation system which utilizes biosparging technology for reduction of petroleum-related hydrocarbon concentrations in soil and ground water. Should it be deemed necessary, extension of biosparging system piping to encompass the area occupied by the former loading racks can be accomplished to enhance bioremediation.

Appendix E includes the MEDEP comments letter on the Draft Post-Excavation Summary Report, Fuel Seep Mitigation/Soil Excavation (January 1998). Also included in Appendix E are the Navy responses associated with the MEDEP comments.



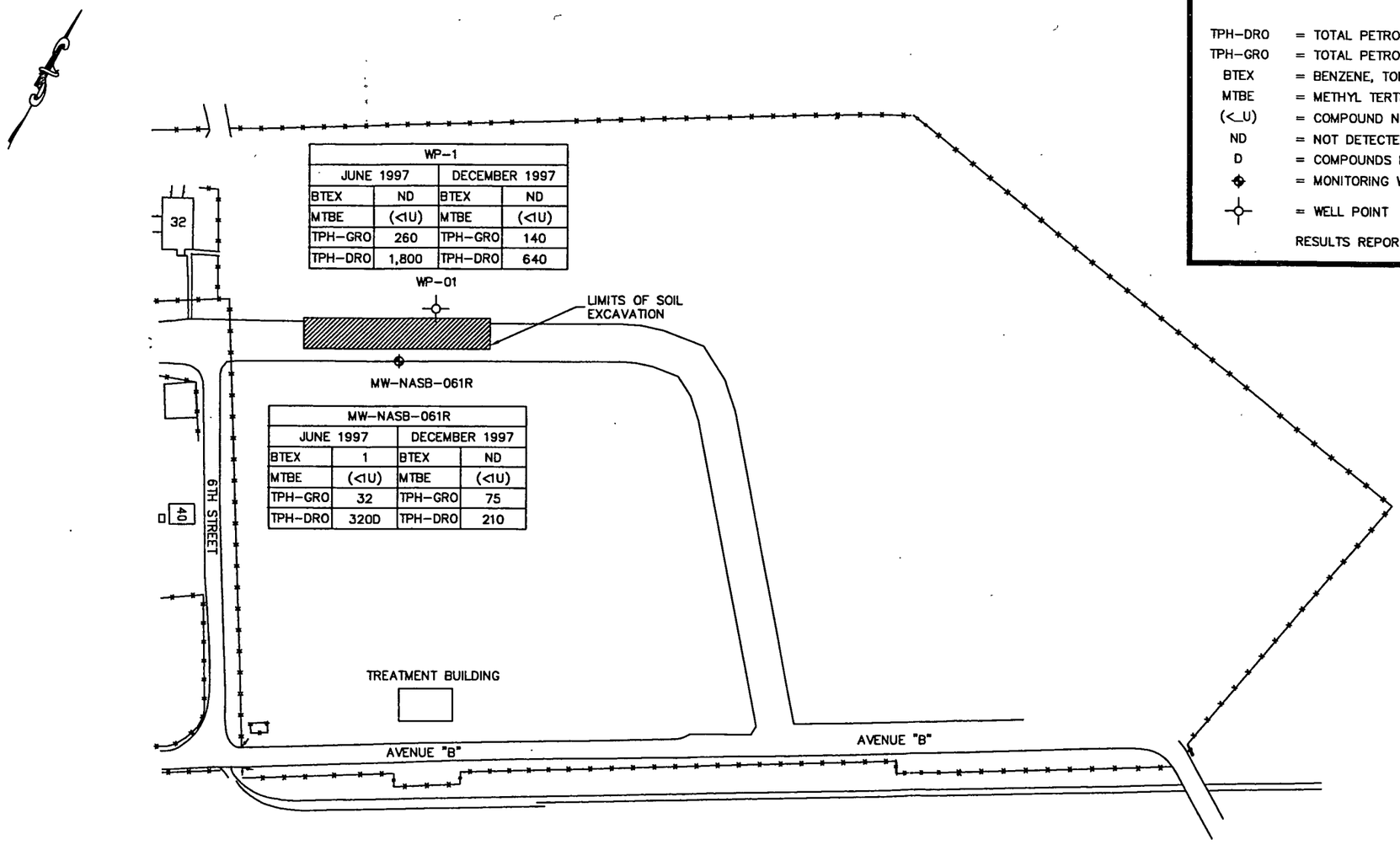
NOTE:

TPH-GRO WERE NOT DETECTED IN ANY SAMPLE
BTEX WERE NOT DETECTED IN ANY SAMPLE
EXCAVATION DIMENSIONS ARE APPROXIMATE.
RESULTS PROVIDED IN MG/KG.

F:\CAD\29600\35\POSTEX-3.DWG

FIGURE 3
ANALYTICAL RESULTS FOR POST EXCAVATION
SOIL SAMPLES COLLECTED 2 JULY 1997

DATE 7 JAN 1998	OLD NAVY FUEL FARM NAVAL AIR STATION BRUNSWICK, MAINE	FILE NAME POSTEX-3
DESIGNED BY CEM		PROJECT NO 29600.35
DRAWN BY CEM	EA ENGINEERING, SCIENCE, AND TECHNOLOGY	SCALE AS SHOWN
CHECKED BY MSB		FILE NO –
PROJECT MGR JAC		SHEET NUMBER 1 OF 1



WP-1			
JUNE 1997		DECEMBER 1997	
BTEX	ND	BTEX	ND
MTBE	(<1U)	MTBE	(<1U)
TPH-GRO	260	TPH-GRO	140
TPH-DRO	1,800	TPH-DRO	640

MW-NASB-061R			
JUNE 1997		DECEMBER 1997	
BTEX	1	BTEX	ND
MTBE	(<1U)	MTBE	(<1U)
TPH-GRO	32	TPH-GRO	75
TPH-DRO	320D	TPH-DRO	210

LEGEND

TPH-DRO	= TOTAL PETROLEUM HYDROCARBONS – DIESEL RANGE ORGANICS
TPH-GRO	= TOTAL PETROLEUM HYDROCARBONS – GASOLINE RANGE ORGANICS
BTEX	= BENZENE, TOLUENE, ETHYLBENZENE, AND TOTAL XYLENES
MTBE	= METHYL TERTIARY BUTYL ETHER
(<_U)	= COMPOUND NOT DETECTED ABOVE REPORTING LIMIT SHOWN
ND	= NOT DETECTED
D	= COMPOUNDS IDENTIFIED AT A SECONDARY DILUTION FACTOR
⊕	= MONITORING WELL
⊹	= WELL POINT

RESULTS REPORTED IN ug/L

120' 0 120'

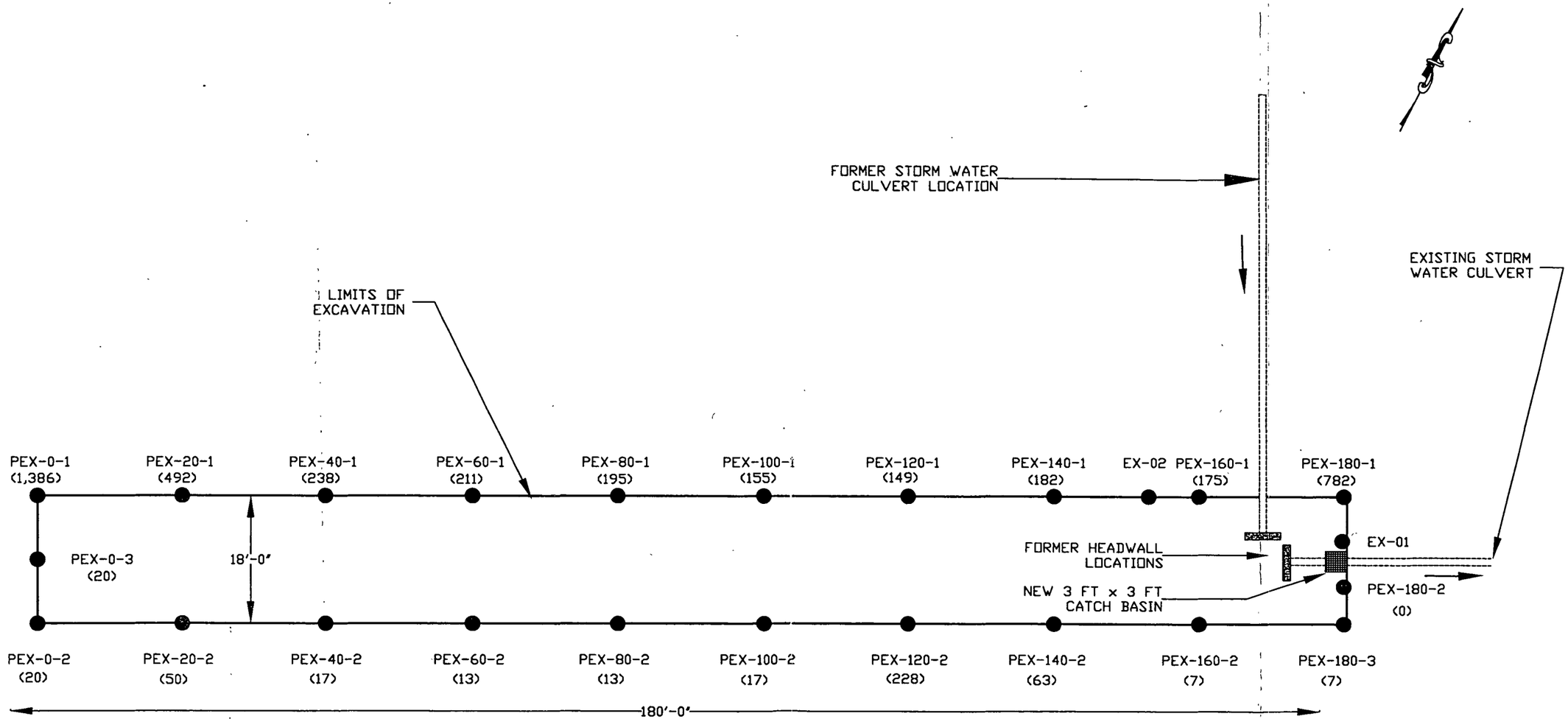
APPROXIMATE SCALE

F:\CAD\29600\35\POSTEX-4.DWG

FIGURE 4

SUMMARY OF ANALYTICAL RESULTS OF GROUND-WATER SAMPLES COLLECTED ADJACENT TO SOIL EXCAVATION

DATE 24 JUN 1998	OLD NAVY FUEL FARM NAVAL AIR STATION BRUNSWICK, MAINE	FILE NAME POSTEX-4
DESIGNED BY CEM		PROJECT NO 29600.35
DRAWN BY SAP	EA ENGINEERING, SCIENCE, AND TECHNOLOGY	SCALE AS SHOWN
CHECKED BY MSB		FILE NO –
PROJECT MGR JAC		SHEET NUMBER 1 OF 1



LEGEND

(20) = SAMPLE LOCATION
TOTAL VOLATILE HYDROCARBONS, (PPMv)

→ = STORM WATER FLOW

NOTE:

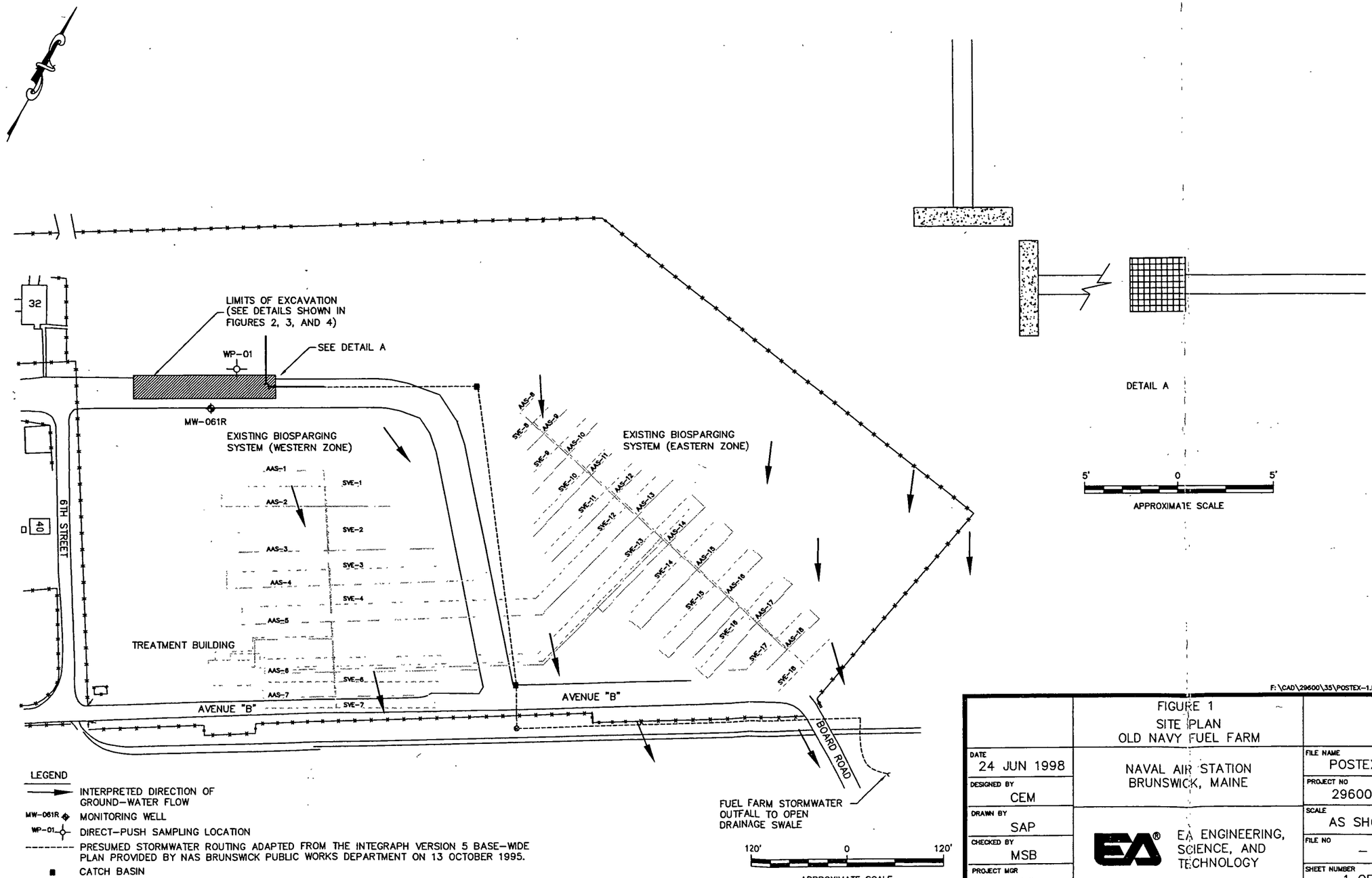
1. THE FORMER HEADWALLS AND CORRUGATED METAL PIPE WERE REMOVED AND REPLACED BY A 3-FT BY 3-FT CATCH BASIN

15' 0 15'
APPROXIMATE SCALE

F:\CAD\29600\35\POSTEX-2.DWG

FIGURE 2
EXCAVATION DETAILS AND POST EXCAVATION SOIL SAMPLE LOCATIONS

DATE 24 JUN 1998	NAVAL AIR STATION BRUNSWICK, MAINE	FILE NAME POSTEX-2
DESIGNED BY CEM		PROJECT NO 29600.35
DRAWN BY SAP	EA ENGINEERING, SCIENCE, AND TECHNOLOGY	SCALE 1"=15'
CHECKED BY MSB		FILE NO –
PROJECT MGR JAC		SHEET NUMBER 1 OF 1



F:\CAD\29600\35\POSTEX-1.DWG

	FIGURE 1 SITE PLAN OLD NAVY FUEL FARM	
DATE 24 JUN 1998	NAVAL AIR STATION BRUNSWICK, MAINE	FILE NAME POSTEX-1
DESIGNED BY CEM		PROJECT NO 29600.35
DRAWN BY SAP	EA ENGINEERING, SCIENCE, AND TECHNOLOGY	SCALE AS SHOWN
CHECKED BY MSB		FILE NO –
PROJECT MGR JAC		SHEET NUMBER 1 OF 1

TABLE 1 SUMMARY OF HEAD SPACE MEASUREMENTS FOR SOIL SAMPLES COLLECTED ON 2 JULY 1997 AT THE OLD NAVY FUEL FARM NAVAL AIR STATION, BRUNSWICK, MAINE

Sample Location	Sample Identification				
	A	B	C	Average	Adjusted[a]
PHOTOIONIZATION DETECTOR HEAD SPACE (ppm)					
PEX-0-1	500	510	250	420	1,386
PEX-20-1	185	133	130	149	492
PEX-40-1	40	95	80	72	238
PEX-60-1	50	73	70	64	211
PEX-80-1	60	60	57	59	195
PEX-100-1	42	50	50	47	155
PEX-120-1	41	46	48	45	149
PEX-140-1	55	52	58	55	182
PEX-160-1	56	51	52	53	175
PEX-180-1	272	218	220	237	782
PEX-180-2	0	0	0	0	0
PEX-160-2	2	2	2	2	7
PEX-140-2	40	10	8	19	63
PEX-120-2	145	25	36	69	228
PEX-100-2	6	5	5	5	17
PEX-80-2	4	4	5	4	13
PEX-60-2	4	4	5	4	13
PEX-40-2	5	5	5	5	17
PEX-20-2	14	14	16	15	50
PEX-0-2	6	6	6	6	20
PEX-0-3	6	6	5	6	20
PEX-180-3	0	2	3	2	7
FIELD BLANK	0.7	0.8	1.0	1	3

(a) All values adjusted per the State of Maine Department of Environmental Protection guidelines for calibration set points.

NOTE: All head space analysis performed utilizing a Foxboro T-1000 photoionization detector calibrated to 100 ppm isobutylene.
State of Maine Department of Environmental Protection notification level (ppm) for field photoionization detector headspace analysis is 100 ppm TVH for kerosene and fuel oil.

TABLE 2 SUMMARY OF ANALYTICAL RESULTS FOR SOIL SAMPLES COLLECTED ON 2 JULY 1997 AT THE OLD NAVY FUEL FARM, NAVAL AIR STATION, BRUNSWICK, MAINE

Parameter	Sample Location						MEDEP Remediation Standards[a]
	PEX-0-1	PEX-40-1	PEX-80-1	PEX-120-1	PEX-160-1	PEX-160-1 DUP	
VOLATILE ORGANIC COMPOUNDS BY EPA METHOD 8020 (μg/Kg)							
MTBE	(<1U)	(<1U)	(<1U)	(<1U)	(<2U)	(<4U)	-
Benzene	(<1U)	(<1U)	(<1U)	(<1U)	(<2U)	(<4U)	-
Toluene	(<1U)	(<1U)	(<1U)	(<1U)	(<2U)	(<4U)	-
Ethylbenzene	(<1U)	(<1U)	(<1U)	(<1U)	(<2U)	(<4U)	-
Total xylene	(<1U)	(<1U)	(<1U)	(<1U)	(<2U)	(<4U)	-
Total BTEX	ND	ND	ND	ND	ND	ND	-
TPH–GRO BY MDHS-HETL LOP 4.2.17 (μg/Kg)							
TPH–GRO	(<1,500U)	(<1,600U)	(<1,500U)	(<1,500U)	(<2,600U)	(<4,500U)	5,000
TPH–DRO BY MDHS-HETL LOP 4.1.25 (μg/Kg)							
TPH–DRO	**20,000B**	**73,000B**	**19,000B**	**110,000BD**	**760,000D**	**330,000BD**	10,000

Parameter	Sample Location						MEDEP Remediation Standards[a]
	PEX-0-2	PEX-40-2	PEX-80-2	PEX-120-2	PEX-160-2	PEX-180-2	
VOLATILE ORGANIC COMPOUNDS BY EPA METHOD 8020 (μg/Kg)							
MTBE	(<1U)	(<1U)	(<1U)	(<1U)	3	(<1U)	-
Benzene	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	-
Toluene	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	-
Ethylbenzene	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	-
Total Xylene	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	-
Total BTEX	ND	ND	ND	ND	ND	ND	-
TPH–GRO BY MDHS-HETL LOP 4.2.17 (μg/Kg)							
TPH–GRO	(<1,300U)	(<1,500U)	(<1,500U)	(<1,500U)	(<1,500U)	(<1,700U)	5,000
TPH–DRO BY MDHS-HETL LOP 4.1.25 (μg/Kg)							
TPH–DRO	**35,000B**	**25,000B**	**22,000B**	**17,000B**	**20,000B**	**130,000BD**	10,000

(a) MEDEP (1995) procedural guidelines for establishing standards for the remediation of oil contaminated soils and ground water in Maine. Results in bold denote exceedances of standard.

NOTE:
- BTEX = Benzene, toluene, ethylbenzene, and total xylenes.
- MTBE = Methyl tertiary-butyl ether.
- TPH = Total petroleum hydrocarbons.
- GRO = Gasoline range organics.
- DRO = Diesel range organics.
- MEDEP = Maine Department of Environmental Protection.
- MDHS = Maine Department of Human Services.
- HETL = Health and Environmental Testing Laboratory.
- LOP = Laboratory Operating Procedure.
- ND = None detected.
- (<__U) = Compound not detected above reporting limit shown.
- D = Compounds identified at a secondary dilution factor
- B = Analyte found in associated blank.

No volatile organic compounds were reported in the rinsate and trip blanks.

TABLE 3 SUMMARY OF ANALYTICAL RESULTS FOR SOIL SAMPLES COLLECTED 24 SEPTEMBER 1997 AT THE OLD NAVY FUEL FARM, NAVAL AIR STATION, BRUNSWICK, MAINE

Parameter	Sample Location				
	EX-01	EX-01 DUP	EX-02	EX-03	EX-RB (Rinsate Blank)
SVOC by EPA Method 8270 (μg/Kg)					
Naphthalene	120J	(<410U)	(<670U)	(<340U)	(<10U)
Fluoranthene	(<430U)	(<410U)	230J	(<340U)	(<10U)
Pyrene	(<430U)	(<410U)	210J	(<340U)	(<10U)
TPH by EPA Method 418.1 (μg/Kg)					
TPH	44,800	(<25,000U)	262,000	(<25,000U)	(<1,000U)
TPH–DRO BY MDHS-HETL LOP 4.1.25 (μg/Kg)					
TPH–DRO	66,000	49,000	340,000D	11,000	51

NOTE:
- TPH = Total petroleum hydrocarbons.
- SVOC = Semivolatile organic compounds.
- DRO = Diesel range organics.
- MDHS = Maine Department of Human Services.
- HETL = Health and Environmental Testing Laboraotry.
- LOP = Laboratory Operating Procedure.
- (<__U) = Compound not detected above reporting limit shown.
- J = Estimated concentration below the detection limit.
- D = Compounds identified at a secondary dilution factor

Results for rinsate blank reported in μg/L.

TABLE 4 SUMMARY OF ANALYTICAL RESULTS FOR GROUND-WATER SAMPLES COLLECTED 24-25 JUNE AND 10-11 DECEMBER 1997 AT WELL POINT WP-01 AND MONITORING WELL MW-NASB-061R, OLD NAVY FUEL FARM, NAVAL AIR STATION, BRUNSWICK, MAINE

Parameter	24-25 JUN 1997 (Pre-Excavation Event)	10-11 DEC 1997 (Post-Excavation Event)
Well Point WP-01		
BTEX	ND	ND
MTBE	(<1U)	(<1U)
TPH–GRO	260	140
TPH–DRO	1,800	640
Monitoring Well MW-NASB-061R		
BTEX	1	ND
MTBE	(<1U)	(<1U)
TPH–GRO	32	75
TPH–DRO	320D	210

NOTE:
TPH = Total petroleum hydrocarbons.
BTEX = Benzene, toluene, ethylbenzene, and total xylenes by EPA Method 8020.
MTBE = Methyl tertiary-butyl ether by EPA Method 8020.
GRO = Gasoline range organics by Maine Department of Human Services, Health and Environmental Testing Laboratory Method 4.2.17.
DRO = Diesel range organics by Maine Department of Human Services, Health and Environmental Testing Laboratory Method 4.1.25.
(<__U) = Compound not detected above reporting limit shown.
ND = Not detected.
D = Compounds identified at a secondary dilution factor.
Results reported in μg/L.

REFERENCES

EA Engineering, Science, and Technology. 1997a. *Basewide Safety, Health, and Emergency Response Plan, Naval Air Station, Brunswick, Maine.* Prepared for Department of the Navy, Northern Division, Naval Facilities Engineering Command, Lester, Pennsylvania. June.

EA. 1997b. Summary Report, Biosparging System Operations at Old Navy Fuel Farm, January-June 1997, Naval Air Station, Brunswick, Maine. Prepared for Department of the Navy, Northern Division, Naval Facilities Engineering Command, Lester, Pennsylvania. August.

EA. 1998. Summary Report, Biosparging System Operations at Old Navy Fuel Farm, July-December 1997, Naval Air Station, Brunswick, Maine. Prepared for Department of the Navy, Northern Division, Naval Facilities Engineering Command, Lester, Pennsylvania. In Progress.

Maine Department of Environmental Protection (MEDEP). 1995. Procedural Guidelines for Establishing Standards for the Remediation of Oil Contaminated Soil and Ground Water in Maine.

MEDEP. 1997. Calibration Set Points for Photoionization (PIDs) and Flame Ionization Detectors (FIDs) Used in Field Headspace Determinations at Maine UST and LUST Sites. September.

Appendix A

Photolog and Photographs of Fuel Seep Mitigation and Remedial Construction Activities at Old Navy Fuel Farm, Naval Air Station, Brunswick, Maine

APPENDIX A

PHOTOLOG AND PHOTOGRAPHS OF FUEL SEEP MITIGATION AND REMEDIAL CONSTRUCTION ACTIVITIES AT OLD NAVY FUEL FARM, NAVAL AIR STATION BRUNSWICK, MAINE

Photo No.	Description
1	Pre-construction site conditions: view east showing seepage of ground water and LNAPL petroleum through existing asphalt road.
2-3	Pre-construction site conditions: wide view and detail view of reinforced concrete head wall and storm sewer culvert.
4	View northwest showing an estimated 320 yd^3 of excavated petroleum-impacted soil stockpiled on (and covered with) polyethylene sheeting.
5	View northwest showing post-excavation site conditions at the seep location.
6	Detail view of new catch basin connected directly to the existing 18-in. storm sewer piping.
7-8	Views east: detail and wide view of site restoration and new storm sewer catch basin.

Photo No. 1. Pre-construction site conditions: view east showing seepage of ground water and LNAPL petroleum through existing asphalt road.

Photo Nos. 2-3. Pre-construction site conditions: wide view and detail view of reinforced concrete head wall and storm sewer culvert.

Photo No. 4. View northwest showing an estimated 320 yd^3 of excavated petroleum-impacted soil stockpiled on (and covered with) polyethylene sheeting.

Photo No. 5. View northwest showing post-excavation site conditions at the seep location.

Appendix B

MEDEP Spill No. P-368-97
Initial Cleanup Action Agreement/
Soil Disposal Letter

Initial Clean-up Actions Agreement

DEPT. OF ENVIRONMENTAL PROTECTION

BUREAU OF HAZARDOUS MATERIAL & SOLID WASTE
RESPONSE SERVICES DIVISION

Facility Name: BNAS Tank farm Address: Brunswick

Owner: US Navy, BNAS Attn Jim Carruthers.

Registration No. ____ DEP Spill No. P-368-97

Date: 7/2/97

I SG Brezinski (signature of DEP Rep) have investigated BNAS former UST tank farm (facility name).

site and find the following clean-up actions necessary before site closure. (specify an agreed date)

① DEP confirms oil contamination in the vicinity of the former tank farm loading rack,

② DEP understands at present that the site falls within an Intermediate Clean-Up Goal, with a soil clean-up level of 100 ppm using an approved PID w/ headspace method and Set Points.

③ DEP has issued a virgin contam. disposal letter for oil contam. soil disposal to Commercial Recycling.

④ Upon completion of clean-up actions for this location (soil removal & disposal), BNAS shall submit a report to Maine DEP, copy to Richard Heath, and to Stephen Brezinski Portland office.

⑤ Richard Heath and Claudia Salt are primary DEP contacts.

⑥ DEP understands that BNAS will manage the clean-up directly.

cc: Claudia Salt, Richard Heath, DEP
Michael Battle, EA

I understand that compliance with the above does not define the limits of remediation or release the facility owner from responsibility for further remediation.

OWNER OR REPRESENTATIVE ____ DATE 7/2/97

White - Licensing & Enforcement Copy; Canary - Investigator's Copy; Pink - Owner's Copy

CLUPAGREE 1/92

Date 7/2/97 DEP SPILL # P 368-97

GENERATOR Brunswick Naval Air Sta. Attn Jim Carothers

TRANSPORTER Bill Worff & Sons, Inc. 921-244

REFERENCE: SHIPMENT OF OIL SPILL DEBRIS

ON 7/2/97 (date) S Brezinski (DEP representative) OBSERVED THE

clean up of oil spill debris at BNAS 100 and 200 Series Tank (location)

Farm loading rack,

which resulted from leakage of UST facility piping (description of incident)

and/or tanks

This shipment consists of upto 850 (eight hundred fifty) (quantity) yards

and/or ~~drums~~ of solid contaminated with

virgin JP 5 fuel (contaminant)

Solids consist of (check as appropriate)

- X sand, gravel or soil
- ___ speedy-dri
- ___ sorbent
- ___ other Sand fill (descibe or lists)

Facility is (check One)

- ___ Landfill
- ___ Land Spreading Site
- ___ Asphalt Plant
- X Asphalt Pug Mill
- ___ other Commercial Recycling, Scarboro (describe) 883-3325

S G Brezinski

Signature- DEP Representative

Signature-Facility Representative

white - DEP Representative
Pink - Generator
Canary - Transporter
Goldenrod - Receiving facility

Appendix C

Analytical Data

EA Laboratories

19 Loveton Circle
Sparks, MD 21152
Telephone: 410-771-4920
Fax: 410-771-4407

August 8, 1997

Mr. Mike Battle
EA Engineering, Science, & Technology, Inc.
3 Washington Center
Newburgh, NY 12550

RECEIVED
AUG 11 1997
EA Engineering, Science, & Technology, Inc.
Newburgh, NY 12550

Re: NAS Brunswick-Fuel Farm (29600.35)

Dear Mr. Battle:

Enclosed is our report on the analysis of 12 soil and two water samples collected for the NAS Brunswick- Fuel Farm project on 2 July 1997. The invoice is included.

Please contact me if you have any questions or require further information and refer to report 970971. Unless other arrangements are made, we reserve the right to dispose of your samples sixty (60) days from the date of this letter. We will retain the raw data for seven years from this date.

Sincerely,

Mary E. Asper
Laboratory Project Manager

enclosure

LABORATORY DATA REPORT

Prepared for:

NAS Brunswick - Fuel Farm
29600.35

Prepared by:

EA Laboratories
19 Loveton Circle
Sparks, MD 21152
(410) 771-4920

Report 970971

August 1997

TABLE OF CONTENTS
NAS Brunswick
EA Laboratories Report 970971

Section	Page
1. NARRATIVE	
2. CHAIN OF CUSTODY	
3. ORGANIC DATA	
A. Volatiles	
B. TPH-Gas	
C. TPH-Diesel	

1. NARRATIVE

EA Laboratories
ANALYTICAL NARRATIVE

Client: **EA Engineering**
Site: **NAS Brunswick**
Project number: **29600.35**

Laboratory Project Manager: **David F. Brennan**
EA Laboratories Report: **970971**
Date: 8 August 1997

This report contains the results of the analysis of 12 soil and two water samples collected on 2 July 1997 in support of the referenced project.

SAMPLE RECEIPT

The samples arrived by Federal Express at EA Laboratories on 3 July 1997. Upon receipt, the samples blank were inspected and compared with the chain-of-custody record. The samples were then logged into the laboratory computer system with assigned laboratory accession numbers and released for analysis. Operating under a variance from NFESC laboratory QA guidance, EA Laboratories stores aqueous samples for the determination of metals at 4C± 2C until disposal.

Client Sample Designation	EA Lab Number
BN-FF-PEX-180-2	9707249
BN-FF-PEX-160-2	9707250
BN-FF-PEX-120-2	9707251
BN-FF-PEX-RB-1	9707252
BN-FF-PEX-01	9707253
BN-FF-PEX-40-1	9707254
BN-FF-PEX-160-1	9707255
BN-FF-PEX-120-1	9707256
BN-FF-PEX-XD-1	9707257
BN-FF-PEX-80-1	9707258
BN-FF-PEX-0-2	9707259
BN-FF-PEX-80-2	9707260
BN-FF-PEX-40-2	9707261
BN-FF-PEX-QT001	9707262

Following this narrative section are a list of analyical methods used (Table 1), a glossary of data qualifiers used in this report (Table 2), and the original chain-of-custody record. Analytical results and quality control information are summarized in the appended data package which has been formatted to be consistent with the deliverable requirements of this project.

QUALITY CONTROL

The following sections are ordered as the data appears in this report. They contain observations made during sample analysis, summarize the results of quality control measurements, and address the

impact on data usability based upon project Data Quality Objectives. For each fractional analysis the narrative includes:

Sample chronology: This section summarizes the sample history by fraction including the sample preparation method and date, analytical method, and analysis date. Anything unusual about the samples, digestates, or extracts is identified. Holding time compliance is evaluated in this section.

Laboratory method performance: All quality control criteria for method performance must be met for all target analytes for data to be reported. These criteria generally apply to instrument tune, calibration, method blanks, and Laboratory Control Samples (LCS). In some instances where method criteria fail, useable data can be obtained and are reported with client approval. The narrative will then include a thorough discussion of the impact on data quality.

Sample performance: Quality control field samples are analyzed to determine any measurement bias due to the sample matrix based on evaluation of matrix spikes (MS), matrix spike duplicates (MSD), and laboratory duplicates (D). If acceptance criteria are not met, matrix interferences are confirmed either by reanalysis or by inspection of the LCS results to verify that laboratory method performance is in control. Data are reported with appropriate qualifiers or discussion.

AROMATIC VOLATILES by GC - SOIL (EA9707249 - EA9707251, EA9707253 - EA9707261)

Sample Chronology: Twelve soil samples and associated quality control were analyzed on 14-16 July 1997 by SW-846 Methods 5030/8020 for BTEX plus methyl tert-butyl ether (MTBE). All holding times were met.

Laboratory Method Performance: All laboratory method performance criteria were met for the reported samples with the following exception:

- The continuing calibration verification standard (CCV) analyzed at the beginning of the 15-16 July 1997 analytical sequence had the percent difference (%D) greater than the method limit of 15% for the target analyte MTBE on the confirmation column only; the primary column CCV was within acceptable limits. Data from the confirmation column is used for qualitative identification only; therefore, data usability should not be impacted.

- Only BTEX and MTBE were included in the continuing calibration verification standards run with

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

Client ID No.: 0-1

Lab Name: EA LABORATORIES Report#: 970971

Lab Code: EA ENG Case No.: _____ Method: 8020 SDG No.: _____

Matrix: (soil/water) SOIL Lab Sample ID: 9707253

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: VG7I209F.D

Level: (low/med) LOW Date Received: 7/3/97

% Moisture: not dec. 17 Date Analyzed: 7/15/97

GC Column: DB-VRX ID: 0.45 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

CAS No.	Compound	Concentration Units: (ug/L or ug/Kg) ug/Kg	Q
1634-04-4	Methyl t-Butyl Ether	1	U
71-43-2	Benzene	1	U
108-88-3	Toluene	1	U
100-41-4	Ethylbenzene	1	U
	m&p-Xylenes	1	U
95-47-6	o-Xylene	1	U

FORM I VOA

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

Client ID No.: 40-1

Lab Name: EA LABORATORIES Report#: 970971

ıde: EA ENG Case No.: _____ Method: 8020 SDG No.: _____

Matrix: (soil/water) SOIL Lab Sample ID: 9707254

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: VG7I210F.D

Level: (low/med) LOW Date Received: 7/3/97

% Moisture: not dec. 21 Date Analyzed: 7/15/97

GC Column: DB-VRX ID: 0.45 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

Concentration Units: (ug/L or ug/Kg) ug/Kg

CAS No.	Compound		Q
1634-04-4	Methyl t-Butyl Ether	1	U
71-43-2	Benzene	1	U
108-88-3	Toluene	1	U
100-41-4	Ethylbenzene	1	U
	m&p-Xylenes	1	U
95-47-6	o-Xylene	1	U

the analytical sequences; therefore, chlorobenzene was not monitored for recovery in the matrix spikes nor in the laboratory control samples. Data usability should not be affected.

Sample Performance: All quality control criteria were met for the reported samples.

AROMATIC VOLATILES by GC - WATER (EA9707252, EA9707262)

Sample Chronology: Two samples and associated quality control were analyzed on 9 July 1997 by SW-846 Methods 5030/8020 for BTEX plus methyl tert-butyl ether (MTBE).. All holding times were met.

Laboratory Method Performance: All laboratory method performance criteria were met for the reported samples with the following exception:

- The continuing calibration verification standard (CCV) analyzed at the beginning of the analytical sequence had the percent differences (%D) greater than the method limit of 15% for the target analytes MTBE and benzene on the confirmation column only. The %D was within criteria for the primary column and the data from the confirmation column was used for qualitative confirmation only. Data usability should not be impacted.

Sample Performance: All quality control criteria were met for the reported samples.

EXTRACTABLE TPH by GC - SOIL (EA9707249 - EA9707251, EA9707253 - EA9707261)

Sample Chronology: Twelve soil samples and associated quality control were analyzed by the Maine Method 4.2.17 on 15-16 July 1997 for gasoline range organics (GRO). All holding times were met.

Laboratory Method Performance: All laboratory method performance criteria were met for the reported samples.

Sample Performance: All quality control criteria were met for the reported samples.

EXTRACTABLE TPH by GC - WATER (EA9707250)

Sample Chronology: One water sample and associated quality control were analyzed by the Maine Method 4.2.17 on 9 July 1997 for gasoline range organics (GRO). All holding times were met.

- The batch matrix spike/matrix spike duplicate (MS/MSD) was performed on another Brunswick sample, NASB-FF-03-WP003. All data pertaining to the sample, MS, and MSD are included in the report package.

Laboratory Method Performance: All laboratory method performance criteria were met for the reported sample with the following exception:

- The laboratory's reporting limit of 25 ug/L exceeded the minimum required detection limit of 10 ug/L.

Sample Performance: All quality control criteria were met for the reported sample.

EXTRACTABLE TPH by GC - WATER (EA9707252)

Sample Chronology: One water sample and associated quality control extracts were prepared according to Maine Method 4.1.25 (continuous extraction) on 8 July 1997. The sample extracts and associated quality control extracts were analyzed by the same method on 16-17 July 1997 for diesel range organics (DRO). All holding times were met.

In accordance with the method protocols, no batch matrix spike/matrix spike duplicate (MS/MSD) was performed on the sample. Rather, duplicate laboratory control samples (LCSs) spiked with diesel components at the method-specified concentration were extracted with the samples, as were duplicate LCSs spiked with commercial diesel at the method reporting limit. Results for all spiked extract analyses are included herewith.

Laboratory Method Performance: All laboratory method performance criteria were met for the reported samples with the following exceptions:

- while the duplicate diesel component spikes (C_{10} - C_{28} evens) were recovered within the method limits, they did indicate a slight precision deficit with a relative percent difference (%RPD) result in excess of the method limit of 20% at 29 percent.

Sample Performance: All quality control criteria were met for the reported sample, with the following exception:

- the initial pH of the sample was recorded at 2.3, therefore the sample pH was adjusted with

1:1 HCl in reagent water to a value of less than 2 immediately prior to extraction.

EXTRACTABLE TPH by GC - SOIL (EA9707249-EA9707251; EA9707253-EA9707261)

Sample Chronology: Twelve soil samples and associated quality control extracts were prepared according to Maine Method 4.1.25 (sonication extraction) on 15 July 1997. The sample extracts and associated quality control extracts were analyzed by the same method on 22-24 July 1997 for diesel range organics (DRO). In this analysis, the samples and the laboratory blank were observed to yield late-eluting chromatographic response (within the DRO integration range) that does not correspond to a petroleum product. The extracts were submitted for GC/MS analysis in order to identify the potential source of the laboratory contamination. The spectral data were inconclusive, as no matches resulted in the library search for the samples, rather the spectral identification software indicated a possible alcohol or an amide. Investigation is ongoing to isolate, define, and eliminate the source of the contamination. The samples were subsequently re-extracted on 28 July 1997, twelve days outside of the method-prescribed holding time. The laboratory contamination was not evident in the re-extracted sample analyses. All holding times were met for the initial extraction. Both sets of data are included in this report.
In accordance with the method protocols, no batch matrix spike/matrix spike duplicate (MS/MSD) was performed on the sample. Rather, duplicate laboratory control samples (LCSs) spiked with diesel components at the method-specified concentration were extracted with the samples, as were duplicate LCSs spiked with commercial diesel at the method reporting limit. Results for all spiked extract analyses are included herewith.

Laboratory Method Performance: All laboratory method performance criteria were met for the reported samples with the exception of the laboratory contamination and subsequent holding time violation detailed previously.

Sample Performance: All quality control criteria were met for the reported samples.

CERTIFICATION OF RESULTS

The Laboratory certifies that this report meets the project requirements for analytical data as stated in the Analytical Task Order (ATO) and the chain-of-custody. In addition, the Laboratory certifies that the data as reported meet the Data Quality Objectives for precision, accuracy, and completeness specified for this project or as stated in EA Laboratories Quality Assurance program for other than the conditions detailed above. It is recommended by the Laboratory that this analytical report should

EA Laboratories
ANALYTICAL NARRATIVE

Client: **EA Engineering**
Site: **NAS Brunswick**
Project number: **29600.35**

Laboratory Project Manager: **Mary E. Asper**
EA Laboratories Report: **970971**
Date: **8 August 1997**

---

only be reproduced in its entirety. EA Laboratories is not responsible for any assumptions of data quality if partial packages are used to interpret data. Release of the data contained in this report has been authorized by the appropriate Laboratory Manager as verified by the following signature.

Mary E Asper 8 August 1997
Mary E. Asper, Laboratory Project Manager

TABLE 1. ANALYTICAL METHODS

Parameter	Method	Reference Method	EAL Method SOP	Matrix	Reference
ORGANICS					
Purgeable Aromatics	Gas Chromatography - PID	8020A	EAL-M-8020A	W,SO	EPA, 1995
Total Petroleum Hydrocarbons Maine	Gas Chromatography - FID	4.2.17 GRO	_____	W,SO	MEGRO, 1995
Total Petroleum Hydrocarbons Maine	Gas Chromatography - FID	4.2.25 DRO	_____	W,SO	MEDRO, 1995

Matrix codes:

W - Estuarine water, ground water, leachates, ocean water, surface water, and wastewater
SO - Soils, sludges, sediments, wastes

References:

EPA, 1995. United States Environmental Protection Agency. January 1995. Test Methods for Evaluating Solid Waste. Physical/Chemical Methods. EPA SW-846, 3rd edition. including UPDATE IIB. U.S. EPA, Washington, D.C.

MEGRO, 1995 State of Maine Department of Environmental Protection. 09/06/95. Maine Health and Environmental Testing Laboratory; Method 4.2.17; Modified Method for Determining Gasoline Range Organics.

MEDRO,1995 State of Maine Department of Environmental Protection. 09/06/1995. Maine Health and Environmental Testing Laboratory; Method 4.2.25; Modified Method for Determining Diesel Range Organics.

TABLE 2. ORGANIC ANALYSIS DATA QUALIFIERS

ND or U Indicates a compound on the target compound list (TCL) was analyzed for but not detected. The sample quantitation limit must be corrected for dilution and, if a soil sample, for percent moisture. For example, 10 U is used for phenol in water if the sample final volume is the protocol-specified final volume. If a 1-to-10 dilution of the extract was necessary, the reported limit is (10 x 10 U) or 100 U. For a soil sample, the value is also adjusted for percent moisture. For example, if the sample had 24% moisture and a 1-to-10 dilution factor, the soil sample quantitation limit for phenol (330 U) would be corrected as follows:

Reported limit = (330 U) x df / D

where: df = dilution factor = 10

D = (100 - % moisture) / 100 (At 24% moisture, D = (100-24) / 100 = 0.76)

Reported limit = (330 U) x 10 / 0.76 = 4300 U (rounded to two significant figures)

For soil samples subjected to gel permeation chromatography (GPC) cleanup procedures, the contract required quantitation limit (CRQL) is also multiplied by 2 to account for the fact that only half of the extract is recovered. Note: If GPC procedures are employed, the factor of 2 is not included in the dilution factor reported; a "Y" is entered for GPC (Y/N).

TR or J Indicates an estimated value. This flag is used under the following circumstances: 1) when estimating a concentration for tentatively identified compounds where a 1:1 response is assumed, 2) when the mass spectral and retention time data indicate the presence of a compound that meets the volatile and semivolatile GC/MS identification criteria, and the result is less than the CRQL but greater than zero, 3) when the retention time data indicate the presence of a compound that meets the pesticide/Aroclor identification criteria and the result is less than the CRQL but greater than zero. Note: the "J" code is not used and the compound is not reported as being identified for pesticide/Aroclor results less than the CRQL, if the technical judgement of the pesticide residue analysis expert determines that the peaks used for compound identification resulted from instrument noise or other interferences (column bleed, solvent contamination, etc.). For example, if the sample quantitation limit is 10 ug/L but a concentration of 3 ug/L is calculated, report it as 3 J. The sample quantitation limit must be adjusted for dilution as discussed for the U flag

C This flag applies to pesticide results where the identification has been confirmed by GC/MS. Single component pesticides with concentration equal to or greater than 10 ng/uL in the final extract must be confirmed by GC/MS.

B This flag is used when the analyte is found in the associated blank as well as in the sample. It indicates possible/probable blank contamination and warns the data user to take appropriate action. This flag is used for a TIC as well as for a positively identified TCL compound.

E This flag identifies compounds whose concentrations exceed the calibration range of the GC/MS instrument for that specific analysis. This flag does not apply to pesticides/PCBs analyzed by GC/EC methods. If one or more compounds have a response greater that full scale, the sample or extract must be diluted and reanalyzed according to the specifications listed in the SOW. All such compounds with a response greater than full scale should have a concentration flagged with an "E" on Form I for the original analysis. If the dilution of the extract causes any compounds identified in the first analysis to be below the calibration range in the second analysis, then the results of both analyses are reported on separate Forms I. The Form I for the diluted sample will have the "DL" suffix appended to the sample number. NOTE: For total xylenes, where three isomers are quantified as two peaks, the calibration range of each peak is considered separately; e.g., a diluted analysis is not required for total xylenes unless the concentration of either peak separately exceeds 200 ug/L.

D This flag identifies all compounds identified in the analysis at a secondary dilution factor. If a sample or extract is reanalyzed at a higher dilution factor, as in the "E" flag above, the "DL" suffix is appended to the sample number on the Form I for the diluted sample, and all concentration values reported on that Form I are flagged with the "D" flag.

A This flag indicates that a TIC is a suspected aldol-condensation product.

X Other specific flags may be required to properly define the results. If used, they are fully described and such description attached to the Sample Data Summary Package and the Case Narrative. The flags begin by using "X". If more that one flag is required, "Y" and "Z" are used, as needed. For instance, the "X" flag might combine the "A", "B", and "D" flags for some sample.

N Indicates presumptive evidence of a compound. This flag is only used for tentatively identified compounds, where the identification is based on a mass spectral library search. It is applied to all TIC results. For generic characterization of a TIC, such as chlorinated hydrocarbon, the N code is not used.

P This flag is used for GC analyses when there is greater than 25% difference for detected concentrations between the two GC columns. The lower of the two values is reported on Form 1 and flagged with a "P".

2. CHAIN OF CUSTODY

911

Company Name:	Project Manager or Contact:
EA Engineering-NY	Michael Battle Phone: (914) 565-8100
Project No. 29600.35 Dept.: 2151 Task: 5320	Project Name: Brunswick, me Fuel Farm
Sample Storage Location: E7	ATO Number: 5027
Page of	Report #: 970971

Parameter Method Numbers for Analysis

Chain of Custody Record

EA Laboratories
19 Loveton Circle
Sparks, MD 21152
Telephone: (410) 771-4920
Fax: (410) 771-4407

Report Deliverables: 1 2 3 ~~4~~ D E 7/3/97 none required

EDD: Yes/No ~~Summary Tables~~

DUE TO CLIENT: Standard

Date	Time	Water	Soil	Sample Identification 19 Characters	No. of Containers	BTEX/MTBE by EPA 8020	TPH-GRO by MEDEP LOP 4.2.17	TPH-DRO by MEDEP LOP 4.1.25		EA Labs Accession Number	Remarks
07/02/97	1600		X	BN-FF-PEX-180-2	2	X	X	X		9707249	LPM: Mary E. Aspey
07/02/97	1610		X	BN-FF-PEX-160-2	2	X	X	X		9707250	
07/02/97	1622		X	BN-FF-PEX-120-2	2	X	X	X		9707251	Any questions,
07/02/97	1630	X		BN-FF-PEX-RB-1	6	X	X	X		9707252	please call
07/02/97	1350		X	BN-FF-PEX-Q1	2	X	X	X		9707253	Mike Battle
07/02/97	1410		X	BN-FF-PEX-40-1	2	X	X	X		9707254	
07/02/97	1500		X	BN-FF-PEX-160-1	2	X	X	X		9707255	BTEX/MTBE
07/02/97	1440		X	BN-FF-PEX-120-1	2	X	X	X		9707256	EPA method 8020
07/02/97	—		X	BN-FF-PEX-XD-1	2	X	X	X		9707257	
07/02/97	1420		X	BN-FF-PEX-80-1	2	X	X	X		9707258	TPH-GRO
07/02/97	1715		X	BN-FF-PEX-0-2	2	X	X	X		9707259	MEDEP LOP 4.2.17
07/02/97	1647		X	BN-FF-PEX-80-2 ms/msD	4	X	X	X	KR	9707260	
07/02/97	1705		X	BN-FF-PEX-40-2	2	X	X	X		9707261	TPH-DRO
07/02/97	1410	X		BN-FF-PEX-QTOO1	2	X				9707262	MEDEP LOP 4.1.25
											L11962
				Make Sure we follow the MEDEP methods!							
											CC0000 1036
				Follow Project Summary							Temp blank in cooler

Samples by: (Signature)	Date/Time	Relinquished by: (Signature)	Date/Time	Received by: (Signature)	Date/Time
Karen A. Kwoszyk	07/02/97 1720	Karen A. Kwoszyk	07/02/97 1900		
Relinquished by: (Signature)	**Date/Time**	**Received by Laboratory: (Signature)**	**Date/Time**	**Airbill Number:**	**Sample Shipped by: (Circle)**
		Sheryl Smith	7/3/97 1000		Fed Ex. Puro. UPS Hand Carried Other:

Cool rT mp. 2.1 C pH: X Yes ☐ No Comments: Custody Seals Intact X Yes ☐ No

NOTE: Please indicate method number for analyses requ sted. This will help clarify any questions with laboratory techniqu s.

WHITE—EA Laboratories YELLOW—EA Laborat ri s PINK—Project Manag r *Shaded Areas for Lab Use Only*

3. ORGANIC DATA

A. Volatiles

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

Client ID No.: 180-2

Lab Name: EA LABORATORIES Report#: 970971

Lab Code: EA ENG Case No.: _____ Method: 8020 SDG No.: _____

Matrix: (soil/water) SOIL Lab Sample ID: 9707249

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: VG7I204F.D

Level: (low/med) LOW Date Received: 7/3/97

% Moisture: not dec. 28 Date Analyzed: 7/14/97

GC Column: DB-VRX ID: 0.45 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

Concentration Units: (ug/L or ug/Kg) ug/Kg

CAS No.	Compound		Q
1634-04-4	Methyl t-Butyl Ether	1	U
71-43-2	Benzene	1	U
108-88-3	Toluene	1	U
100-41-4	Ethylbenzene	1	U
	m&p-Xylenes	1	U
95-47-6	o-Xylene	1	U

FORM I VOA

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

Client ID No.: 160-2

Lab Name: EA LABORATORIES Report#: 970971

Mode: EA ENG Case No.: _____ Method: 8020 SDG No.: _____

Matrix: (soil/water) SOIL Lab Sample ID: 9707250

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: VG7I207F.D

Level: (low/med) LOW Date Received: 7/3/97

% Moisture: not dec. 18 Date Analyzed: 7/14/97

GC Column: DB-VRX ID: 0.45 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

Concentration Units: (ug/L or ug/Kg) ug/Kg

CAS No.	Compound		Q
1634-04-4	Methyl t-Butyl Ether	3	
71-43-2	Benzene	1	U
108-88-3	Toluene	1	U
100-41-4	Ethylbenzene	1	U
	m&p-Xylenes	1	U
95-47-6	o-Xylene	1	U

FORM I VOA

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

Client ID No.: 120-2

Lab Name: EA LABORATORIES Report#: 970971

Lab Code: EA ENG Case No.: _____ Method: 8020 SDG No.: _____

Matrix: (soil/water) SOIL Lab Sample ID: 9707251

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: VG7I208F.D

Level: (low/med) LOW Date Received: 7/3/97

% Moisture: not dec. 18 Date Analyzed: 7/15/97

GC Column: DB-VRX ID: 0.45 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

Concentration Units: (ug/L or ug/Kg) ug/Kg

CAS No.	Compound		Q
1634-04-4	Methyl t-Butyl Ether	1	U
71-43-2	Benzene	1	U
108-88-3	Toluene	1	U
100-41-4	Ethylbenzene	1	U
	m&p-Xylenes	1	U
95-47-6	o-Xylene	1	U

FORM I VOA

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

Client ID No.: RB1

Lab Name: EA LABORATORIES Report#: 970971

Lab Code: EA ENG Case No.: _____ Method: 8020 SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: 9707252

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: VG7I165F.D

Level: (low/med) _____ Date Received: _____

% Moisture: not dec. _____ Date Analyzed: 7/9/97

GC Column: DB-VRX ID: 0.45 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

Concentration Units: (ug/L or ug/Kg) ug/L

CAS No.	Compound		Q
1634-04-4	Methyl t-Butyl Ether	1	U
71-43-2	Benzene	1	U
108-88-3	Toluene	1	U
100-41-4	Ethylbenzene	1	U
	m&p-Xylenes	1	U
95-47-6	o-Xylene	1	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

Client ID No.: 160-1RE

Lab Name: EA LABORATORIES Report#: 970971

Lab Code: EA ENG Case No.: _____ Method: 8020 SDG No.: _____

Matrix: (soil/water) SOIL Lab Sample ID: 9707255RE

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: VG7I224F.D

Level: (low/med) LOW Date Received: 7/3/97

% Moisture: not dec. 52 Date Analyzed: 7/16/97

GC Column: DB-VRX ID: 0.45 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

Concentration Units: (ug/L or ug/Kg) ug/Kg

CAS No.	Compound		Q
1634-04-4	Methyl t-Butyl Ether	2	U
71-43-2	Benzene	2	U
108-88-3	Toluene	2	U
100-41-4	Ethylbenzene	2	U
	m&p-Xylenes	2	U
95-47-6	o-Xylene	2	U

FORM I VOA

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

Client ID No.: 120-1

Lab Name: EA LABORATORIES Report#: 970971

Lab Code: EA ENG Case No.: _____ Method: 8020 SDG No.: _____

Matrix: (soil/water) SOIL Lab Sample ID: 9707256

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: VG7I217F.D

Level: (low/med) LOW Date Received: 7/3/97

% Moisture: not dec. 19 Date Analyzed: 7/15/97

GC Column: DB-VRX ID: 0.45 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

Concentration Units: (ug/L or ug/Kg) ug/Kg

CAS No.	Compound		Q
1634-04-4	Methyl t-Butyl Ether	1	U
71-43-2	Benzene	1	U
108-88-3	Toluene	1	U
100-41-4	Ethylbenzene	1	U
	m&p-Xylenes	1	U
95-47-6	o-Xylene	1	U

FORM I VOA

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

Client ID No.: XD-1

Lab Name: EA LABORATORIES Report#: 970971

Lab Code: EA ENG Case No.: _____ Method: 8020 SDG No.: _____

Matrix: (soil/water) SOIL Lab Sample ID: 9707257

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: VG7I226F.D

Level: (low/med) LOW Date Received: 7/3/97

% Moisture: not dec. 72 Date Analyzed: 7/16/97

GC Column: DB-VRX ID: 0.45 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

Concentration Units: (ug/L or ug/Kg) ug/Kg

CAS No.	Compound		Q
1634-04-4	Methyl t-Butyl Ether	4	U
71-43-2	Benzene	4	U
108-88-3	Toluene	4	U
100-41-4	Ethylbenzene	4	U
	m&p-Xylenes	4	U
95-47-6	o-Xylene	4	U

FORM I VOA

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

Client ID No.: 80-1

Lab Name: EA LABORATORIES Report#: 970971

Lab Code: EA ENG Case No.: _____ Method: 8020 SDG No.: _____

Matrix: (soil/water) SOIL Lab Sample ID: 9707258

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: VG7I221F.D

Level: (low/med) LOW Date Received: 7/3/97

% Moisture: not dec. 15 Date Analyzed: 7/16/97

GC Column: DB-VRX ID: 0.45 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

Concentration Units: (ug/L or ug/Kg) ug/Kg

CAS No.	Compound		Q
1634-04-4	Methyl t-Butyl Ether	1	U
71-43-2	Benzene	1	U
108-88-3	Toluene	1	U
100-41-4	Ethylbenzene	1	U
	m&p-Xylenes	1	U
95-47-6	o-Xylene	1	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

Client ID No.: 0-2

Lab Name: EA LABORATORIES Report#: 970971

Lab Code: EA ENG Case No.: _____ Method: 8020 SDG No.: _____

Matrix: (soil/water) SOIL Lab Sample ID: 9707259

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: VG7I222F.D

Level: (low/med) LOW Date Received: 7/3/97

% Moisture: not dec. 3 Date Analyzed: 7/16/97

GC Column: DB-VRX ID: 0.45 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

CAS No.	Compound	Concentration Units: (ug/L or ug/Kg) ug/Kg	Q
1634-04-4	Methyl t-Butyl Ether	1	U
71-43-2	Benzene	1	U
108-88-3	Toluene	1	U
100-41-4	Ethylbenzene	1	U
	m&p-Xylenes	1	U
95-47-6	o-Xylene	1	U

FORM I VOA

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

Client ID No.: 80-2

Lab Name: EA LABORATORIES Report#: 970971

Lab Code: EA ENG Case No.: ____ Method: 8020 SDG No.: ____

Matrix: (soil/water) SOIL Lab Sample ID: 9707260

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: VG7I218F.D

Level: (low/med) LOW Date Received: 7/3/97

% Moisture: not dec. 14 Date Analyzed: 7/15/97

GC Column: DB-VRX ID: 0.45 (mm) Dilution Factor: 1.0

Soil Extract Volume: ____ (uL) Soil Aliquot Volume: ____ (uL)

Concentration Units: (ug/L or ug/Kg) ug/Kg

CAS No.	Compound		Q
1634-04-4	Methyl t-Butyl Ether	1	U
71-43-2	Benzene	1	U
108-88-3	Toluene	1	U
100-41-4	Ethylbenzene	1	U
	m&p-Xylenes	1	U
95-47-6	o-Xylene	1	U

FORM I VOA

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

Client ID No.
40-2

Lab Name: EA LABORATORIES Report#: 970971

Lab Code: EA ENG Case No.: _____ Method: 8020 SDG No.: _____

Matrix: (soil/water) SOIL Lab Sample ID: 9707261

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: VG7I223F.D

Level: (low/med) LOW Date Received: 7/3/97

% Moisture: not dec. 16 Date Analyzed: 7/16/97

GC Column: DB-VRX ID: 0.45 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

Concentration Units: (ug/L or ug/Kg) ug/Kg

CAS No.	Compound		Q
1634-04-4	Methyl t-Butyl Ether	1	U
71-43-2	Benzene	1	U
108-88-3	Toluene	1	U
100-41-4	Ethylbenzene	1	U
	m&p-Xylenes	1	U
95-47-6	o-Xylene	1	U

FORM I VOA

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

Client ID No.: QT001

Lab Name: EA LABORATORIES Report#: 970971

Lab Code: EA ENG Case No.: Method: 8020 SDG No.:

Matrix: (soil/water) WATER Lab Sample ID: 9707262

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: VG7I168F.D

Level: (low/med) Date Received:

% Moisture: not dec. Date Analyzed: 7/9/97

GC Column: DB-VRX ID: 0.45 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Concentration Units: (ug/L or ug/Kg) ug/L

CAS No.	Compound		Q
1634-04-4	Methyl t-Butyl Ether	1	U
71-43-2	Benzene	1	U
108-88-3	Toluene	1	U
100-41-4	Ethylbenzene	1	U
	m&p-Xylenes	1	U
95-47-6	o-Xylene	1	U

FORM I VOA

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

Client ID No.

VBLK01

~~VBLK02~~ 01

~~VBLK02~~

Lab Name: EA LABORATORIES Report#: 970971

Lab Code: EA ENG Case No.: _____ Method: 8020 SDG No.: Hg 7/28/97

Matrix: (soil/water) SOIL Lab Sample ID: VB707143

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: VG7I203F.D

Level: (low/med) LOW Date Received: _____

% Moisture: not dec. _____ Date Analyzed: 7/14/97

GC Column: DB-VRX ID: 0.45 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

Concentration Units: (ug/L or ug/Kg) ug/L

CAS No.	Compound		Q
1634-04-4	Methyl t-Butyl Ether	1	U
71-43-2	Benzene	1	U
108-88-3	Toluene	1	U
100-41-4	Ethylbenzene	1	U
	m&p-Xylenes	1	U
95-47-6	o-Xylene	1	U

FORM I VOA

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

Client ID No.
~~VBLK03~~
VBLK02

Lab Name: EA LABORATORIES Report#: 970971

Code: EA ENG Case No.: Method: 8020 SDG No.: HG 7/28/97

x: (soil/water) SOIL Lab Sample ID: VB707154

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: VG7I216F.D

Level: (low/med) LOW Date Received:

% Moisture: not dec. 0 Date Analyzed: 7/15/97

GC Column: DB-VRX ID: 0.45 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CAS No.	Compound	Concentration Units: (ug/L or ug/Kg) ug/L	Q
1634-04-4	Methyl t-Butyl Ether	1	U
71-43-2	Benzene	1	U
108-88-3	Toluene	1	U
100-41-4	Ethylbenzene	1	U
	m&p-Xylenes	1	U
95-47-6	o-Xylene	1	U

FORM I VOA

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

Client ID No.: VBLK01

Lab Name: EA LABORATORIES Report#: 970971

Lab Code: EA ENG Case No.: _____ Method: 8020 SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: VB707094

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: VG7I161F.D

Level: (low/med) _____ Date Received: _____

% Moisture: not dec. _____ Date Analyzed: 7/9/97

GC Column: DB-VRX ID: 0.45 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

Concentration Units: (ug/L or ug/Kg) ug/L

CAS No.	Compound		Q
1634-04-4	Methyl t-Butyl Ether	1	U
71-43-2	Benzene	1	U
108-88-3	Toluene	1	U
100-41-4	Ethylbenzene	1	U
	m&p-Xylenes	1	U
95-47-6	o-Xylene	1	U

FORM I VOA

B. TPH-Gas

1A
VOLATILE COMPOUNDS ORGANICS ANALYSIS SHEET

EPA SAMPLE NO.

BNFFPEXRB1

Lab Name: EA LABS Contract:NAS BRUNSWICK

Lab Code: EAENG Case No:4217 SAS No: _____ SDG No:

Matrix: (soil/water)WATER Lab Sample ID: 9707252

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: VD4J376

Level: (low/med) LOW Date Received: / /

% Moisture: not dec. _____ Date Analyzed: 07/10/97

GC Column:RTX1 ID:0.53 (mm) Dilution Factor: 1

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS (ug/L or ug/Kg) ug/L	Q
	----------TPH	25	U

1A

VOLATILE COMPOUNDS ORGANICS ANALYSIS SHEET

EPA SAMPLE NO.

BNFFPEX1802

Name: EA LABS Contract: NAS BRUNSWICK

Lab Code: EAENG Case No: 4217 SAS No: _____ SDG No:

Matrix: (soil/water) SOIL Lab Sample ID: 9707249

Sample wt/vol: 5.0 (g/mL) G Lab File ID: VD4J396

Level: (low/med) LOW Date Received: / /

% Moisture: not dec. 28 Date Analyzed: 07/15/97

GC Column: RTX1 ID: 0.53 (mm) Dilution Factor: 50

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS (ug/L or ug/Kg) ug/Kg	Q
	TPH	1700	U

1A1A
VOLATILE COMPOUNDS ORGANICS ANALYSIS SHEET

EPA SAMPLE NO.

BNFFPEX1602

Lab Name: EA LABS Contract:NAS BRUNSWICK

Lab Code: EAENG Case No:4217 SAS No: _____ SDG No:

Matrix: (soil/water)SOIL Lab Sample ID: 9707250

Sample wt/vol: 5.0 (g/mL) G Lab File ID: VD4J397

Level: (low/med) LOW Date Received: / /

% Moisture: not dec. 18 Date Analyzed: 07/15/97

GC Column:RTX1 ID:0.53 (mm) Dilution Factor: 50

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS (ug/L or ug/Kg) ug/Kg	Q
----------	TPH	1500	U

1A
VOLATILE COMPOUNDS ORGANICS ANALYSIS SHEET

EPA SAMPLE NO.

BNFFPEX1202

Name: EA LABS Contract: NAS BRUNSWICK

Code: EAENG Case No: 4217 SAS No: _____ SDG No:

Matrix: (soil/water) SOIL Lab Sample ID: 9707251

Sample wt/vol: 5.0 (g/mL) G Lab File ID: VD4J398

Level: (low/med) LOW Date Received: / /

% Moisture: not dec. 18 Date Analyzed: 07/15/97

GC Column: RTX1 ID: 0.53 (mm) Dilution Factor: 50

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS (ug/L or ug/Kg) ug/Kg	Q
	TPH	1500	U

1A
VOLATILE COMPOUNDS ORGANICS ANALYSIS SHEET

EPA SAMPLE NO.

BNFFPEX01

Lab Name: EA LABS Contract: NAS BRUNSWICK

Lab Code: EAENG Case No: 4217 SAS No: _____ SDG No:

Matrix: (soil/water) SOIL Lab Sample ID: 9707253

Sample wt/vol: 5.0 (g/mL) G Lab File ID: VD4J399

Level: (low/med) LOW Date Received: / /

% Moisture: not dec. 17 Date Analyzed: 07/15/97

GC Column: RTX1 ID: 0.53 (mm) Dilution Factor: 50

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS (ug/L or ug/Kg) ug/Kg	Q
----------	TPH	1500	U

1A

VOLATILE COMPOUNDS ORGANICS ANALYSIS SHEET

EPA SAMPLE NO.

BNFFPEX401

Name: EA LABS Contract: NAS BRUNSWICK

Lab Code: EAENG Case No: 4217 SAS No: _____ SDG No:

Matrix: (soil/water) SOIL Lab Sample ID: 9707254

Sample wt/vol: 5.0 (g/mL) G Lab File ID: VD4J400

Level: (low/med) LOW Date Received: / /

% Moisture: not dec. 21 Date Analyzed: 07/15/97

GC Column: RTX1 ID: 0.53 (mm) Dilution Factor: 50

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS (ug/L or ug/Kg) ug/Kg	Q
	TPH	1600	U

1A
VOLATILE COMPOUNDS ORGANICS ANALYSIS SHEET

EPA SAMPLE NO.

BNFFPEX1601

Lab Name: EA LABS Contract: NAS BRUNSWICK

Lab Code: EAENG Case No: 4217 SAS No: _____ SDG No:

Matrix: (soil/water) SOIL Lab Sample ID: 9707255

Sample wt/vol: 5.0 (g/mL) G Lab File ID: VD4J401

Level: (low/med) LOW Date Received: / /

% Moisture: not dec. 52 Date Analyzed: 07/15/97

GC Column: RTX1 ID: 0.53 (mm) Dilution Factor: 50

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS (ug/L or ug/Kg) ug/Kg	Q
----------	TPH	2600	U

1A
VOLATILE COMPOUNDS ORGANICS ANALYSIS SHEET

EPA SAMPLE NO.

BNFFPEX1201

Name: EA LABS Contract: NAS BRUNSWICK

Lab Code: EAENG Case No: 4217 SAS No: _____ SDG No:

Matrix: (soil/water) SOIL Lab Sample ID: 9707256

Sample wt/vol: 5.0 (g/mL) G Lab File ID: VD4J402

Level: (low/med) LOW Date Received: / /

% Moisture: not dec. 19 Date Analyzed: 07/15/97

GC Column: RTX1 ID: 0.53 (mm) Dilution Factor: 50

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS (ug/L or ug/Kg) ug/Kg	Q
	TPH	1500	U

1A
VOLATILE COMPOUNDS ORGANICS ANALYSIS SHEET

EPA SAMPLE NO.

BNFFPEXXD1

Lab Name: EA LABS Contract: NAS BRUNSWICK

Lab Code: EAENG Case No: 4217 SAS No: _____ SDG No:

Matrix: (soil/water) SOIL Lab Sample ID: 9707257

Sample wt/vol: 5.0 (g/mL) G Lab File ID: VD4J405

Level: (low/med) LOW Date Received: / /

% Moisture: not dec. 72 Date Analyzed: 07/15/97

GC Column: RTX1 ID: 0.53 (mm) Dilution Factor: 50

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS (ug/L or ug/Kg) ug/Kg	Q
----------	TPH	4500	U

1A
VOLATILE COMPOUNDS ORGANICS ANALYSIS SHEET

EPA SAMPLE NO.

BNFFPEX801

Name: EA LABS Contract: NAS BRUNSWICK

Lab Code: EAENG Case No: 4217 SAS No: _____ SDG No:

Matrix: (soil/water) SOIL Lab Sample ID: 9707258

Sample wt/vol: 5.0 (g/mL) G Lab File ID: VD4J408

Level: (low/med) LOW Date Received: / /

% Moisture: not dec. 15 Date Analyzed: 07/15/97

GC Column: RTX1 ID: 0.53 (mm) Dilution Factor: 50

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS (ug/L or ug/Kg) ug/Kg	Q
----------	TPH	1500	U

1A
VOLATILE COMPOUNDS ORGANICS ANALYSIS SHEET

EPA SAMPLE NO.

BNFFPEX02

Lab Name: EA LABS Contract: NAS BRUNSWICK

Lab Code: EAENG Case No: 4217 SAS No: _____ SDG No:

Matrix: (soil/water) SOIL Lab Sample ID: 9707259

Sample wt/vol: 5.0 (g/mL) G Lab File ID: VD4J409

Level: (low/med) LOW Date Received: / /

% Moisture: not dec. 3 Date Analyzed: 07/15/97

GC Column: RTX1 ID: 0.53 (mm) Dilution Factor: 50

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS (ug/L or ug/Kg) ug/Kg	Q
	TPH	1300	U

1A
VOLATILE COMPOUNDS ORGANICS ANALYSIS SHEET

EPA SAMPLE NO.

BNFFPEX802

Name: EA LABS Contract: NAS BRUNSWICK

Lab Code: EAENG Case No: 4217 SAS No: _____ SDG No:

Matrix: (soil/water) SOIL Lab Sample ID: 9707260

Sample wt/vol: 5.0 (g/mL) G Lab File ID: VD4J410

Level: (low/med) LOW Date Received: / /

% Moisture: not dec. 14 Date Analyzed: 07/16/97

GC Column: RTX1 ID: 0.53 (mm) Dilution Factor: 50

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS (ug/L or ug/Kg) ug/Kg	Q
	TPH	1500	U

1A
VOLATILE COMPOUNDS ORGANICS ANALYSIS SHEET

EPA SAMPLE NO.

BNFFPEX402

Lab Name: EA LABS Contract: NAS BRUNSWICK

Lab Code: EAENG Case No: 4217 SAS No: _____ SDG No:

Matrix: (soil/water) SOIL Lab Sample ID: 9707261

Sample wt/vol: 5.0 (g/mL) G Lab File ID: VD4J411

Level: (low/med) LOW Date Received: / /

% Moisture: not dec. 16 Date Analyzed: 07/16/97

GC Column: RTX1 ID: 0.53 (mm) Dilution Factor: 50

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS (ug/L or ug/Kg) ug/Kg	Q
----------	TPH	1500	U

1A
VOLATILE COMPOUNDS ORGANICS ANALYSIS SHEET

EPA SAMPLE NO.

VBLK01

Name: EA LABS Contract: NAS BRUNSWICK

Lab Code: EAENG Case No: 4217 SAS No: _____ SDG No:

Matrix: (soil/water) WATER Lab Sample ID: VB707091

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: VD4J354

Level: (low/med) LOW Date Received: / /

% Moisture: not dec. _____ Date Analyzed: 07/09/97

GC Column: RTX1 ID: 0.53 (mm) Dilution Factor: 1

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS (ug/L or ug/Kg) ug/L	Q
	TPH	25	U

1A

VOLATILE COMPOUNDS ORGANICS ANALYSIS SHEET

EPA SAMPLE NO.

VBLK01

Lab Name: EA LABS Contract: NAS BRUNSWICK

Lab Code: EAENG Case No: 4217 SAS No: _____ SDG No:

Matrix: (soil/water) SOIL Lab Sample ID: VB707153

Sample wt/vol: 5.0 (g/mL) G Lab File ID: VD4J395

Level: (low/med) LOW Date Received: / /

% Moisture: not dec. _____ Date Analyzed: 07/15/97

GC Column: RTX1 ID: 0.53 (mm) Dilution Factor: 50

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS (ug/L or ug/Kg) ug/Kg	Q
	TPH	1200	U

C. TPH-Diesel

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BN-FF-PEX-RB-1

Lab Name: EA LABS Contract: BRUNSWIC

Lab Code: EAENG Case No.: 970971 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: 9707252

Sample wt/vol: 1000 (g/ml) ML Lab File ID: SW3R060F.D

Level: (low/med) LOW Date Received: 07/03/97

% Moisture: _____ decanted:(Y/N) N Date Extracted: 07/08/97

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 07/17/97

Injection Volume: 1.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: _____

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/L	Q
	DIESEL RANGE ORGANICS	50	U

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

TB707081

Lab Name: EA LABS Contract: BRUNSWIC

Lab Code: EAENG Case No.: 970971 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: TB707081

Sample wt/vol: 1000 (g/ml) ML Lab File ID: SW3R055F.D

Level: (low/med) LOW Date Received: 07/03/97

% Moisture: _____ decanted:(Y/N) N Date Extracted: 07/08/97

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 07/16/97

Injection Volume: 1.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: _____

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/L	Q
	DIESEL RANGE ORGANICS	50	U

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

'180-2

Lab Name: EA LABS Contract: BRUNSWIC

Lab Code: EAENG Case No.: 970971 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) SOIL Lab Sample ID: 9707249

Sample wt/vol: 25 (g/ml) G Lab File ID: SX4G654F.D

Level: (low/med) LOW Date Received: 07/03/97

% Moisture: 28 decanted:(Y/N) N Date Extracted: 07/~~28~~15/97 AD 8/8/97

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 07/22/97

Injection Volume: 1.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: _____

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/KG	Q
	C10-C28 EVEN	120000	EB

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

'180-2 DL

Lab Name: EA LABS Contract: BRUNSWIC

Lab Code: EAENG Case No.: 970971 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) SOIL Lab Sample ID: 9707249DL

Sample wt/vol: 25 (g/ml) G Lab File ID: SX4G672F.D

Level: (low/med) LOW Date Received: 07/03/97

% Moisture: 28 decanted:(Y/N) N Date Extracted: 07/~~28~~15/97 4OD 8/01/97

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 07/23/97

Injection Volume: 1.0 (uL) Dilution Factor: 2.0

GPC Cleanup: (Y/N) N pH: _____

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/KG	Q
	C10-C28 EVEN	130000	BD

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

'160-2

Lab Name: EA LABS Contract: BRUNSWIC

Lab Code: EAENG Case No.: 970971 SAS No.: SDG No.:

Matrix: (soil/water) SOIL Lab Sample ID: 9707250

Sample wt/vol: 25 (g/ml) G Lab File ID: SX4G655F.D

Level: (low/med) LOW Date Received: 07/03/97

% Moisture: 18 decanted:(Y/N) N Date Extracted: 07/~~28~~15/97

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 07/22/97

Injection Volume: 1.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH:

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/KG	Q
	C10-C28 EVEN	20000	B

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

'120-2

Lab Name: EA LABS Contract: BRUNSWIC

Lab Code: EAENG Case No.: 970971 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) SOIL Lab Sample ID: 9707251

Sample wt/vol: 25 (g/ml) G Lab File ID: SX4G656F.D

Level: (low/med) LOW Date Received: 07/03/97

% Moisture: 18 decanted:(Y/N) N Date Extracted: 07/~~28~~15/97 4D 8/6/97

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 07/22/97

Injection Volume: 1.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: _____

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
	C10-C28 EVEN	17000	B

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

'0-1

Lab Name: EA LABS Contract: BRUNSWIC

Lab Code: EAENG Case No.: 970971 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) SOIL Lab Sample ID: 9707253

Sample wt/vol: 25 (g/ml) G Lab File ID: SX4G657F.D

Level: (low/med) LOW Date Received: 07/03/97

% Moisture: 17 decanted:(Y/N) N Date Extracted: 07/~~28~~15/97 4/08/97

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 07/23/97

Injection Volume: 1.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: _____

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/KG	Q
	C10-C28 EVEN	20000	B

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

'40-1

Lab Name: EA LABS Contract: BRUNSWIC

Lab Code: EAENG Case No.: 970971 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) SOIL Lab Sample ID: 9707254

Sample wt/vol: 25 (g/ml) G Lab File ID: SX4G658F.D

Level: (low/med) LOW Date Received: 07/03/97

% Moisture: 21 decanted:(Y/N) N Date Extracted: 07/~~20~~15/97 4DD 8/12/97

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 07/23/97

Injection Volume: 1.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: _____

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
	C10-C28 EVEN	73000	B

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

'160-1

Lab Name: EA LABS Contract: BRUNSWIC

Lab Code: EAENG Case No.: 970971 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) SOIL Lab Sample ID: 9707255

Sample wt/vol: 25 (g/ml) G Lab File ID: SX4G660F.D

Level: (low/med) LOW Date Received: 07/03/97

% Moisture: 52 decanted:(Y/N) N Date Extracted: 07/~~20~~15/97 ~~7/8/97~~

Concentrated Extract Volume: 5000 (uL) Date Analyzed: 07/23/97

Injection Volume: 1.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: _____

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/KG	Q
	C10-C28 EVEN	1000000	E

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

'160-1 DL

Lab Name: EA LABS Contract: BRUNSWIC

Lab Code: EAENG Case No.: 970971 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) SOIL Lab Sample ID: 9707255 DL

Sample wt/vol: 25 (g/ml) G Lab File ID: SX4G673F.D

Level: (low/med) LOW Date Received: 07/03/97

% Moisture: 52 decanted:(Y/N) N Date Extracted: 07/~~28~~ 15/97 AD 8/5/97

Concentrated Extract Volume: 5000 (uL) Date Analyzed: 07/23/97

Injection Volume: 1.0 (uL) Dilution Factor: 2.0

GPC Cleanup: (Y/N) N pH: _____

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/KG	Q
	C10-C28 EVEN	760000	D

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

'120-1

Lab Name: EA LABS Contract: BRUNSWIC

Lab Code: EAENG Case No.: 970971 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) SOIL Lab Sample ID: 9707256

Sample wt/vol: 25 (g/ml) G Lab File ID: SX4G661F.D

Level: (low/med) LOW Date Received: 07/03/97

% Moisture: 19 decanted:(Y/N) N Date Extracted: 07/~~28~~15/97 ~~07/07~~

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 07/23/97

Injection Volume: 1.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: _____

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
	C10-C28 EVEN	110000	EB

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

'120-1 DL

Lab Name: EA LABS Contract: BRUNSWIC

Lab Code: EAENG Case No.: 970971 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) SOIL Lab Sample ID: 9707256 DL

Sample wt/vol: 25 (g/ml) G Lab File ID: SX4G674F.D

Level: (low/med) LOW Date Received: 07/03/97

% Moisture: 19 decanted:(Y/N) N Date Extracted: 07/~~28~~15/97

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 07/23/97

Injection Volume: 1.0 (uL) Dilution Factor: 2.0

GPC Cleanup: (Y/N) N pH: _____

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/KG	Q
	C10-C28 EVEN	110000	BD

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

'XD-1

Lab Name: EA LABS Contract: BRUNSWIC

Lab Code: EAENG Case No.: 970971 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) SOIL Lab Sample ID: 9707257

Sample wt/vol: 25 (g/ml) G Lab File ID: SX4G662F.D

Level: (low/med) LOW Date Received: 07/03/97

% Moisture: 72 decanted:(Y/N) N Date Extracted: 07/~~28~~15/97 AP 7/23/97

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 07/23/97

Injection Volume: 1.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: _____

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/KG	Q
	C10-C28 EVEN	330000	EB

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

'XD-1 DL

Lab Name: EA LABS Contract: BRUNSWIC

Lab Code: EAENG Case No.: 970971 SAS No.: SDG No.:

Matrix: (soil/water) SOIL Lab Sample ID: 9707257 DL

Sample wt/vol: 25 (g/ml) G Lab File ID: SX4G675F.D

Level: (low/med) LOW Date Received: 07/03/97

% Moisture: 72 decanted:(Y/N) N Date Extracted: 07/~~28~~15/97

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 07/24/97

Injection Volume: 1.0 (uL) Dilution Factor: 2.0

GPC Cleanup: (Y/N) N pH:

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/KG	Q
	C10-C28 EVEN	330000	BD

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

'80-1

Lab Name: EA LABS Contract: BRUNSWIC

Lab Code: EAENG Case No.: 970971 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) SOIL Lab Sample ID: 9707258

Sample wt/vol: 25 (g/ml) G Lab File ID: SX4G663F.D

Level: (low/med) LOW Date Received: 07/03/97

% Moisture: 15 decanted:(Y/N) N Date Extracted: 07/~~28~~15/97 ~~8/8/97~~

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 07/23/97

Injection Volume: 1.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: _____

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/KG	Q
	C10-C28 EVEN	19000	B

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

'0-2

Lab Name: EA LABS Contract: BRUNSWIC

Lab Code: EAENG Case No.: 970971 SAS No.: SDG No.:

Matrix: (soil/water) SOIL Lab Sample ID: 9707259

Sample wt/vol: 25 (g/ml) G Lab File ID: SX4G664F.D

Level: (low/med) LOW Date Received: 07/03/97

% Moisture: 3 decanted:(Y/N) N Date Extracted: 07/~~26~~15/97 AD 7/8/97

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 07/23/97

Injection Volume: 1.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH:

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/KG	Q
	C10-C28 EVEN	35000	B

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

'80-2

Lab Name: EA LABS Contract: BRUNSWIC

Lab Code: EAENG Case No.: 970971 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) SOIL Lab Sample ID: 9707260

Sample wt/vol: 25 (g/ml) G Lab File ID: SX4G665F.D

Level: (low/med) LOW Date Received: 07/03/97

% Moisture: 14 decanted:(Y/N) N Date Extracted: 07/~~28~~15/97

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 07/23/97

Injection Volume: 1.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: _____

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/KG	Q
	C10-C28 EVEN	22000	B

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

'40-2

Lab Name: EA LABS Contract: BRUNSWIC

Lab Code: EAENG Case No.: 970971 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) SOIL Lab Sample ID: 9707261

Sample wt/vol: 25 (g/ml) G Lab File ID: SX4G668F.D

Level: (low/med) LOW Date Received: 07/03/97

% Moisture: 16 decanted:(Y/N) N Date Extracted: 07/~~28~~15/97

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 07/23/97

Injection Volume: 1.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: _____

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/KG	Q
	C10-C28 EVEN	25000	B

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

TB707152

Lab Name: EA LABS Contract: BRUNSWIC

Lab Code: EAENG Case No.: 970971 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) SOIL Lab Sample ID: TB707152

Sample wt/vol: 25 (g/ml) G Lab File ID: SX4G649F.D

Level: (low/med) LOW Date Received: 07/03/97

% Moisture: 0 decanted:(Y/N) N Date Extracted: 07/~~28~~ 15/97

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 07/22/97

Injection Volume: 1.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: _____

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/KG	Q
	C10-C28 EVEN	14000	

EA Laboratories

19 Loveton Circle
Sparks, MD 21152
Telephone: 410-771-4920
Fax: 410-771-4407

October 21, 1997

Mr. Chip McLeod
EA Engineering, Science, & Technology, Inc.
3 Washington Center
Newburgh, NY 12550

Re: NAS Brunswick-Fuel Farm (29600.35)

Dear Mr. McLeod:

Enclosed is our report on the analysis of one water sample and four soil samples collected for the NAS Brunswick Fuel Farm project on 24 September 1997. The invoice is included.

Please contact me if you have any questions or require further information and refer to report 971403. Unless other arrangements are made, we reserve the right to dispose of your samples sixty (60) days from the date of this letter. We will retain the raw data for seven years from this date.

Sincerely,

Mary E. Asper
Laboratory Project Manager

enclosure

LABORATORY DATA REPORT

Prepared for:

NAS Brunswick - Fuel Farm
29600.35

Prepared by:

EA Laboratories
19 Loveton Circle
Sparks, MD 21152
(410) 771-4920

Report 971403

October 1997

TABLE OF CONTENTS
NAS Brunswick
EA Laboratories Report 971403

---

1. NARRATIVE

2. CHAIN OF CUSTODY

3. ORGANIC DATA

   A. Semi-Volatiles
   B. TPH-DRO

4. INORGANICS DATA

   A. General Chemistry

1. NARRATIVE

EA Laboratories
ANALYTICAL NARRATIVE

Client: **EA Eng., Sci., & Tech., Inc.**
Site: **NAS Brunswick**
Project number: **29600.35**

Laboratory Project Manager: **Mary E. Asper**
EA Laboratories Report: **971403**
Date: **21 October 1997**

This report contains the results of the analysis of one water sample and four soil samples collected on 24 September 1997 in support of the referenced project.

SAMPLE RECEIPT

The samples arrived by Federal Express at EA Laboratories on 25 September 1997. Upon receipt, the samples were inspected and compared with the chain-of-custody record. The samples were then logged into the laboratory computer system with assigned laboratory accession numbers and released for analysis.

Client Sample Designation	EA Lab Number
NASB-FF-EX-RB	9710238
NASB-FF-EX-01	9710239
NASB-FF-EX-02	9710240
NASB-FF-EX-03	9710241
NASB-FF-EX-XD	9710242

Following this narrative section are a table of analytical methods used (Table 1), a glossary of data qualifiers used in this report (Table 2) and the original chain-of-custody record. Analytical results and quality control information are summarized in the appended data package which has been formatted to be consistent with the deliverable requirements of this project.

QUALITY CONTROL

The following sections are ordered as the data appears in this report. They contain observations made during sample analysis, summarize the results of quality control measurements, and address the impact on data usability based upon project Data Quality Objectives. For each fractional analysis the narrative includes:

Sample chronology: This section summarizes the sample history by fraction including the sample preparation method and date, analytical method, and analysis date. Anything unusual about the samples, digestates, or extracts is identified. Holding time compliance is evaluated in this section.

Laboratory method performance: All quality control criteria for method performance must be met for all target analytes for data to be reported. These criteria generally apply to instrument

tune, calibration, method blanks, and Laboratory Control Samples (LCS). In some instances where method criteria fail, useable data can be obtained and are reported with client approval. The narrative will then include a thorough discussion of the impact on data quality.

Sample performance: Quality control field samples are analyzed to determine any measurement bias due to the sample matrix based on evaluation of matrix spikes (MS), matrix spike duplicates (MSD), and laboratory duplicates (D). If acceptance criteria are not met, matrix interferences are confirmed either by reanalysis or by inspection of the LCS results to verify that laboratory method performance is in control. Data are reported with appropriate qualifiers or discussion.

SEMIVOLATILES by GC/MS - WATER (EA9710238)

Sample Chronology: One sample and associated quality control were extracted on 29 September 1997 by USEPA SW-846, Method 3520A. The sample extract and associated quality control extracts were analyzed on 13 and 14 October 1997 for the method analyte list by USEPA SW-846, Method 8270B. All holding times were met.

The batch MS/MSD was performed on another client's sample.

Laboratory Method Performance: All laboratory method performance criteria were met for the reported samples.

Sample Performance: All quality control criteria were met for the reported samples.

SEMIVOLATILES by GC/MS - SOIL (EA9710239 - EA9710242)

Sample Chronology: Four samples and associated quality control were extracted on 8 October 1997 by USEPA SW-846, Method 3540A. The sample extracts and associated quality control extracts were analyzed on 16 and 17 October 1997 for the method analyte list by USEPA SW-846, Method 8270B. All holding times were met.

Laboratory Method Performance: All laboratory method performance criteria were met for the reported samples.

Sample Performance: All quality control criteria were met for the reported samples.

EA Laboratories
ANALYTICAL NARRATIVE

Client: **EA Eng., Sci., & Tech., Inc.**
Site: **NAS Brunswick**
Project number: **29600.35**

Laboratory Project Manager: **Mary E. Asper**
EA Laboratories Report: **971403**
Date: **21 October 1997**

EXTRACTABLE TPH by GC - WATER (EA9710238)

Sample Chronology: One sample and associated quality control were extracted on 30 September 1997 and analyzed on 8 October 1997 for diesel range organics (DRO) by Maine 4.1.25. All holding times were met.

Laboratory Method Performance: All laboratory method performance criteria were met for the reported samples.

Sample Performance: All quality control criteria were met for the reported samples.

EXTRACTABLE TPH by GC - SOIL (EA9710239 - EA9710242)

Sample Chronology: Four samples and associated quality control were extracted on 8 October 1997 and analyzed on 16 October 1997 for diesel range organics (DRO) by Maine 4.1.25. All holding times were met.

Sample NASB-FF-EX-02 required a 4X dilution in order to achieve concentrations of DRO within instrument calibration range.

Laboratory Method Performance: All laboratory method performance criteria were met for the reported samples.

Sample Performance: All quality control criteria were met for the reported samples.

The chromatographic patterns for these samples do not appear to be indicative of diesel fuel, but of a later eluting petroleum product such as motor oil.

GENERAL CHEMISTRY - WATER (EA9710238)

Sample Chronology: One sample was extracted and analyzed for TPH (USEPA Method 418.1) on 10 October 1997. The holding time was met.

Laboratory Method Performance: All laboratory method performance criteria were met.

Sample Performance: All quality control criteria were met.

EA Laboratories
ANALYTICAL NARRATIVE

Client: **EA Eng., Sci., & Tech., Inc.**
Site: **NAS Brunswick**
Project number: **29600.35**

Laboratory Project Manager: **Mary E. Asper**
EA Laboratories Report: **971403**
Date: **21 October 1997**

GENERAL CHEMISTRY - SOIL (EA9710239-EA9710242)

Sample Chronology: Four samples were extracted and analyzed for TPH (USEPA Method 418.1) *on 30 September 1997 and 6 October 1997, respectively. The holding time was met.*

Laboratory Method Performance: All laboratory method performance criteria were met.

Sample Performance: All quality control criteria were met.

CERTIFICATION OF RESULTS

The Laboratory certifies that this report meets the project requirements for analytical data as stated in the Analytical Task Order (ATO) and the chain-of-custody. In addition, the Laboratory certifies that the data as reported meet the Data Quality Objectives for precision, accuracy, and completeness specified for this project or as stated in EA Laboratories Quality Assurance program for other than the conditions detailed above. It is recommended by the Laboratory that this analytical report should only be reproduced in its entirety. EA Laboratories is not responsible for any assumptions of data quality if partial packages are used to interpret data. Release of the data contained in this report has been authorized by the appropriate Laborator.y Manager as verified by the following signature.

Mary E. Asper 21 October 1997
Mary E. Asper, Laboratory Project Manager

TABLE 1. ANALYTICAL METHODS

Parameter	Method	Reference Number	EAL Method SOP	Matrix	Reference
SAMPLE PREPARATION					
Semivolatile Organics Extraction	Continuous Extraction	3520A	EAL-M-3520A	W,SO	EPA, 1997
Semivolatile Organics Extraction	Soxhlet Extraction	3540A	EAL-M-3540A	W,SO	EPA, 1997
ORGANICS					
Acid Extractable Organics	Gas Chromatography/Mass Spectrometry	8270B	EAL-M-8270B	W,SO	EPA, 1997
Base-Neutral Extractable Organics	Gas Chromatography/Mass Spectrometry	8270B	EAL-M-8270B	W,SO	EPA, 1997
Total Petroleum Hydrocarbons Maine	Gas Chromatography - FID	4.2.25 DRO	_____	W,SO	MEDRO, 1995
Total Petroleum Hydrocarbons	Spectrophotometric - Infrared	418.1	EAL-M-418.1	W	EPA, 1983

Matrix codes:

W - Estuarine water, ground water, leachates, ocean water, surface water, and wastewater

SO - soils, sludges, sediments, wastes

TABLE 1. ANALYTICAL METHODS

Parameter	Method	Reference Number	EAL Method SOP	Matrix	Reference

References:

United States Environmental Protection Agency. 1986. Test Methods for Evaluating Solid Waste. Physical/Chemical Methods. EPA SW-846, 3rd edition. U.S. EPA, Washington, D.C.

EPA, 1987. United States Environmental Protection Agency. 1987. Methods for the organic chemical analysis of municipal and industrial wastes. 40 CFR Part 136, Appendix A.

MEDRO,1995 State of Maine Department of Environmental Protection. 09/06/1995. Maine Health and Environmental Testing Laboratory; Method 4.2.25; Modified Method for Determining Diesel Range Organics.

TABLE 2. ORGANIC ANALYSIS DATA QUALIFIERS

ND or U Indicates a compound on the target compound list (TCL) was analyzed for but not detected. The sample quantitation limit must be corrected for dilution and, if a soil sample, for percent moisture. For example, 10 U is used for phenol in water if the sample final volume is the protocol-specified final volume. If a 1-to-10 dilution of the extract was necessary, the reported limit is (10 x 10 U) or 100 U. For a soil sample, the value is also adjusted for percent moisture. For example, if the sample had 24% moisture and a 1-to-10 dilution factor, the soil sample quantitation limit for phenol (330 U) would be corrected as follows:

Reported limit = (330 U) x df / D

where: df = dilution factor = 10

D = (100 - % moisture) / 100 (At 24% moisture, D = (100-24) / 100 = 0.76)

Reported limit = (330 U) x 10 / 0.76 = 4300 U (rounded to two significant figures)

For soil samples subjected to gel permeation chromatography (GPC) cleanup procedures, the contract required quantitation limit (CRQL) is also multiplied by 2 to account for the fact that only half of the extract is recovered. Note: If GPC procedures are employed, the factor of 2 is not included in the dilution factor reported; a "Y" is entered for GPC (Y/N).

TR or J Indicates an estimated value. This flag is used under the following circumstances: 1) when estimating a concentration for tentatively identified compounds where a 1:1 response is assumed, 2) when the mass spectral and retention time data indicate the presence of a compound that meets the volatile and semivolatile GC/MS identification criteria, and the result is less than the CRQL but greater than zero, 3) when the retention time data indicate the presence of a compound that meets the pesticide/Aroclor identification criteria and the result is less than the CRQL but greater than zero. Note: the "J" code is not used and the compound is not reported as being identified for pesticide/Aroclor results less than the CRQL, if the technical judgement of the pesticide residue analysis expert determines that the peaks used for compound identification resulted from instrument noise or other interferences (column bleed, solvent contamination, etc.) For example, if the sample quantitation limit is 10 ug/L but a concentration of 3 ug/L is calculated, report it as 3 J. The sample quantitation limit must be adjusted for dilution as discussed for the U flag

C This flag applies to pesticide results where the identification has been confirmed by GC/MS. Single component pesticides with concentration equal to or greater than 10 ng/uL in the final extract must be confirmed by GC/MS.

B This flag is used when the analyte is found in the associated blank as well as in the sample. It indicates possible/probable blank contamination and warns the data user to take appropriate action. This flag is used for a TIC as well as for a positively identified TCL compound.

E This flag identifies compounds whose concentrations exceed the calibration range of the GC/MS instrument for that specific analysis. This flag does not apply to pesticides/PCBs analyzed by GC/EC methods. If one or more compounds have a response greater that full scale, the sample or extract must be diluted and reanalyzed according to the specifications listed in the SOW. All such compounds with a response greater than full scale should have a concentration flagged with an "E" on Form I for the original analysis. If the dilution of the extract causes any compounds identified in the first analysis to be below the calibration range in the second analysis, then the results of both analyses are reported on separate Forms I. The Form I for the diluted sample will have the "DL" suffix appended to the sample number. NOTE: For total xylenes, where three isomers are quantified as two peaks, the calibration range of each peak is considered separately; e.g., a diluted analysis is not required for total xylenes unless the concentration of either peak separately exceeds 200 ug/L.

D This flag identifies all compounds identified in the analysis at a secondary dilution factor. If a sample or extract is reanalyzed at a higher dilution factor, as in the "E" flag above, the "DL" suffix is appended to the sample number on the Form I for the diluted sample, and all concentration values reported on that Form I are flagged with the "D" flag.

A This flag indicates that a TIC is a suspected aldol-condensation product.

X Other specific flags may be required to properly define the results. If used, they are fully described and such description attached to the Sample Data Summary Package and the Case Narrative. The flags begin by using "X". If more that one flag is required, "Y" and "Z" are used, as needed. For instance, the "X" flag might combine the "A", "B", and "D" flags for some sample.

N Indicates presumptive evidence of a compound. This flag is only used for tentatively identified compounds, where the identification is based on a mass spectral library search. It is applied to all TIC results. For generic characterization of a TIC, such as chlorinated hydrocarbon, the N code is not used.

P This flag is used for GC analyses when there is greater than 25% difference for detected concentrations between the two GC columns. The lower of the two values is reported on Form 1 and flagged with a "P".

2. CHAIN OF CUSTODY

Chain of Custody Record

EA Laboratories
19 Loveton Circle
Sparks, MD 21152
Telephone: (410) 771-4920
Fax: (410) 771-4407

Company Name: EA Engineering

Project Manager or Contact: Chip McLeod
Phone: 914 565-8100

Project No.: 29600035

Project Name: Fuel Farm

Dept.: 2192 Task: 5320

Sample Storage Location: CC 4°C

ATO Number:

Page 1 of 1

Report #: 971403

Report Deliverables: 1 2 3 4 D E

EDD: Yes No

DUE TO CLIENT: 10/16/97

Date	Time	Water	Soil	Sample Identification 19 Characters	No. of Containers	TPH 418.1	TPH DRO MADEP Air-1	8270 (SVOC) PCBs	List									EA Labs Accession Number	Remarks
9/24/97	930	X		NASB-FF-EX-RB	6	X	X	X										9710238	LPM: MEA
9/24/97	1130		X	NASB-FF-EX-01	2	X	X	X										9710239	
9/24/97	1100		X	NASB-FF-EX-02	2	X	X	X										9710240	EAL-PS-065
9/24/97	1300		X	NASB-FF-EX-03	2	X	X	X										9710241	
9/24/97	—		X	NASB-FF-EX-XD	2	X	X	X										9710242	

For analysis such as TPH 418.1's method list 8270 that is not in one PS-065 Chip McLeod has instructed us to run with normal QC's DL requirements for the lab, there is no special requirements for the additional analyses. MEA

L12439 See Attached Email from Chip McLeod, COC 00483

Samples by: (Signature)	Date/Time	Relinquished by: (Signature)	Date/Time	Received by: (Signature)	Date/Time
Susan Chase	9/24/97 1300	Susan Chase	9/24/97 1400		
Relinquished by: (Signature)	**Date/Time**	**Received by Laboratory: (Signature)**	**Date/Time**	**Airbill Number:**	
		Sherry Smith	9/25/97 1000		

Sample Shipped by: (Circle) Fed Ex. Puro. UPS Hand Carried Other:

Cooler Temp. 4 C pH: ☒ Yes ☐ No Comments: Custody Seals Intact ☒ Yes ☐ No

NOTE: Please indicate method number for analyses requested. This will help clarify any questions regarding laboratory techniques.

WHITE—Original; YELLOW—EA Laboratories; PINK—Project Manager; Shaded Areas for EA Use Only

3. ORGANIC DATA

A. Semi-Volatiles

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO:

FF-EX-RB

Name: EA LABS Contract:

Lab Code: EAENG Case No: SAS No.: _____ SDG No:

Matrix: (soil/water) WATER Lab Sample ID: 9710238

Sample wt/vol: 1000 (g/mL) ML Lab File ID: SA1B7342

Level: (low/med) LOW Date Received: 09/25/97

% Moisture: _____ decanted: (Y/N) N Date Extracted: 09/29/97

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 10/14/97

Injection Volume: 1.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N)N pH: _____

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg)ug/L	Q
100-02-7	4-Nitrophenol	50	U
132-64-9	Dibenzofuran	10	U
121-14-2	2,4-Dinitrotoluene	10	U
606-20-2	2,6-Dinitrotoluene	10	U
84-66-2	Diethylphthalate	10	U
7005-72-3	4-Chlorophenyl-phenylether	10	U
86-73-7	Fluorene	10	U
100-01-6	4-Nitroaniline	50	U
534-52-1	4,6-Dinitro-2-methylphenol	50	U
86-30-6	N-Nitrosodiphenylamine	10	U
101-55-3	4-Bromophenyl-phenylether	10	U
118-74-1	Hexachlorobenzene	10	U
87-86-5	Pentachlorophenol	50	U
85-01-8	Phenanthrene	10	U
120-12-7	Anthracene	10	U
84-74-2	Di-n-butyl phthalate	10	U
206-44-0	Fluoranthene	10	U
129-00-0	Pyrene	10	U
85-68-7	Butylbenzylphthalate	10	U
91-94-1	3,3'-Dichlorobenzidine	10	U
56-55-3	Benzo(a)anthracene	10	U
117-81-7	bis(2-Ethylhexyl)phthalate	10	U
218-01-9	Chrysene	10	U
117-84-0	Di-n-octyl phthalate	10	U
205-99-2	Benzo(b)fluoranthene	10	U
207-08-9	Benzo(k)fluoranthene	10	U
50-32-8	Benzo(a)pyrene	10	U
193-39-5	Indeno(1,2,3-cd)pyrene	10	U
53-70-3	Dibenz(a,h)anthracene	10	U
191-24-2	Benzo(g,h,i)perylene	10	U

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO:

FF-EX-RB

Lab Name: EA LABS Contract:

Lab Code: EAENG Case No: SAS No.: _____ SDG No:

Matrix: (soil/water) WATER Lab Sample ID: 9710238

Sample wt/vol: 1000 (g/mL) ML Lab File ID: SA1B7342

Level: (low/med) LOW Date Received: 09/25/97

% Moisture: _____ decanted: (Y/N) N Date Extracted: 09/29/97

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 10/14/97

Injection Volume: 1.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N)N pH: ____

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg)ug/L	Q
108-95-2	Phenol	10	U
111-44-4	bis(2-Chloroethyl)ether	10	U
95-57-8	2-Chlorophenol	10	U
541-73-1	1,3-Dichlorobenzene	10	U
106-46-7	1,4-Dichlorobenzene	10	U
100-51-6	Benzyl Alcohol	10	U
95-50-1	1,2-Dichlorobenzene	10	U
95-48-7	2-Methylphenol	10	U
108-60-1	2,2'-oxybis(1-Chloropropane)	10	U
106-44-5	4-Methylphenol	10	U
621-64-7	N-Nitroso-Di-n-propylamine	10	U
67-72-1	Hexachloroethane	10	U
98-95-3	Nitrobenzene	10	U
78-59-1	Isophorone	10	U
88-75-5	2-Nitrophenol	10	U
105-67-9	2,4-Dimethylphenol	10	U
65-85-0	Benzoic acid	50	U
111-91-1	bis(2-Chloroethoxy)methane	10	U
120-83-2	2,4-Dichlorophenol	10	U
120-82-1	1,2,4-Trichlorobenzene	10	U
91-20-3	Naphthalene	10	U
106-47-8	4-Chloroaniline	10	U
87-68-3	Hexachlorobutadiene	10	U
59-50-7	4-Chloro-3-methylphenol	10	U
91-57-6	2-Methylnaphthalene	10	U
77-47-4	Hexachlorocyclopentadiene	10	U
88-06-2	2,4,6-Trichlorophenol	10	U
95-95-4	2,4,5-Trichlorophenol	50	U
91-58-7	2-Chloronaphthalene	10	U
88-74-4	2-Nitroaniline	50	U
131-11-3	Dimethylphthalate	10	U
208-96-8	Acenaphthylene	10	U
99-09-2	3-Nitroaniline	50	U
83-32-9	Acenaphthene	10	U
51-28-5	2,4-Dinitrophenol	50	U

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO:

FF-EX-01

Name: EA LABS Contract:

Lab Code: EAENG Case No: SAS No.: _____ SDG No:

Matrix: (soil/water) SOIL Lab Sample ID: 9710239

Sample wt/vol: 30.0 (g/ml) G Lab File ID: SC3B5176

Level: (low/med) LOW Date Received: 09/25/97

% Moisture: 23 decanted: (Y/N) N Date Extracted: 10/08/97

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 10/17/97

Injection Volume: 1.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N)N pH: ____

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg)ug/Kg	Q
108-95-2	Phenol	430	U
111-44-4	bis-(2-Chloroethyl) ether	430	U
95-57-8	2-Chlorophenol	430	U
541-73-1	1,3-Dichlorobenzene	430	U
106-46-7	1,4-Dichlorobenzene	430	U
100-51-6	Benzyl alcohol	430	U
95-50-1	1,2-Dichlorobenzene	430	U
95-48-7	2-Methylphenol	430	U
108-60-1	2,2'-Oxybis(1-chloropropane)	430	U
106-44-5	4-Methylphenol	430	U
621-64-7	N-Nitroso-Di-n-propylamine	430	U
67-72-1	Hexachloroethane	430	U
98-95-3	Nitrobenzene	430	U
78-59-1	Isophorone	430	U
88-75-5	2-Nitrophenol	430	U
105-67-9	2,4-Dimethylphenol	430	U
65-85-0	Benzoic acid	2200	U
111-91-1	bis(2-Chloroethoxy)methane	430	U
120-83-2	2,4-Dichlorophenol	430	U
120-82-1	1,2,4-Trichlorobenzene	430	U
91-20-3	Naphthalene	120	J
106-47-8	4-Chloroaniline	430	U
87-68-3	Hexachlorobutadiene	430	U
59-50-7	4-Chloro-3-methylphenol	430	U
91-57-6	2-Methylnaphthalene	430	U
77-47-4	Hexachlorocyclopentadiene	430	U
88-06-2	2,4,6-Trichlorophenol	430	U
95-95-4	2,4,5-Trichlorophenol	2200	U
91-58-7	2-Chloronaphthalene	430	U
88-74-4	2-Nitroaniline	2200	U
131-11-3	Dimethylphthalate	430	U
208-96-8	Acenaphthylene	430	U
99-09-2	3-Nitroaniline	2200	U
83-32-9	Acenaphthene	430	U
51-28-5	2,4-Dinitrophenol	2200	U

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO:

FF-EX-01

Lab Name: EA LABS Contract:

Lab Code: EAENG Case No: SAS No.: _____ SDG No:

Matrix: (soil/water) SOIL Lab Sample ID: 9710239

Sample wt/vol: 30.0 (g/ml) G Lab File ID: SC3B5176

Level: (low/med) LOW Date Received: 09/25/97

% Moisture: 23 decanted: (Y/N) N Date Extracted: 10/08/97

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 10/17/97

Injection Volume: 1.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N)N pH: ____

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg)ug/Kg	Q
100-02-7	4-Nitrophenol	2200	U
132-64-9	Dibenzofuran	430	U
121-14-2	2,4-Dinitrotoluene	430	U
606-20-2	2,6-Dinitrotoluene	430	U
84-66-2	Diethylphthalate	430	U
7005-72-3	4-Chlorophenyl-phenylether	430	U
86-73-7	Fluorene	430	U
100-01-6	4-Nitroaniline	2200	U
534-52-1	4,6-Dinitro-2-methylphenol	2200	U
86-30-6	N-Nitrosodiphenylamine	430	U
101-55-3	4-Bromophenyl-phenylether	430	U
118-74-1	Hexachlorobenzene	430	U
87-86-5	Pentachlorophenol	2200	U
85-01-8	Phenanthrene	430	U
120-12-7	Anthracene	430	U
84-74-2	Di-n-butyl phthalate	430	U
206-44-0	Fluoranthene	430	U
129-00-0	Pyrene	430	U
85-68-7	Butylbenzyl phthalate	430	U
91-94-1	3,3'-Dichlorobenzidine	430	U
56-55-3	Benz[a]anthracene	430	U
117-81-7	bis(2-Ethylhexyl)phthalate	430	U
218-01-9	Chrysene	430	U
117-84-0	Di-n-octyl phthalate	430	U
205-99-2	Benzo[b]fluoranthene	430	U
207-08-9	Benzo[k]fluoranthene	430	U
50-32-8	Benzo[a]pyrene	430	U
193-39-5	Indeno[1,2,3-cd]pyrene	430	U
53-70-3	Dibenz[ah]anthracene	430	U
191-24-2	Benzo[ghi]perylene	430	U

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO:

FF-EX-02

Name: EA LABS Contract:

Lab Code: EAENG Case No: SAS No.: _____ SDG No:

Matrix: (soil/water) SOIL Lab Sample ID: 9710240

Sample wt/vol: 30.0 (g/ml) G Lab File ID: SC3B5177

Level: (low/med) LOW Date Received: 09/25/97

% Moisture: 51 decanted: (Y/N) N Date Extracted: 10/08/97

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 10/17/97

Injection Volume: 1.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N)N pH: ____

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg)ug/Kg	Q
108-95-2	Phenol	670	U
111-44-4	bis-(2-Chloroethyl) ether	670	U
95-57-8	2-Chlorophenol	670	U
541-73-1	1,3-Dichlorobenzene	670	U
106-46-7	1,4-Dichlorobenzene	670	U
100-51-6	Benzyl alcohol	670	U
95-50-1	1,2-Dichlorobenzene	670	U
95-48-7	2-Methylphenol	670	U
108-60-1	2,2'-Oxybis(1-chloropropane)	670	U
106-44-5	4-Methylphenol	670	U
621-64-7	N-Nitroso-Di-n-propylamine	670	U
67-72-1	Hexachloroethane	670	U
98-95-3	Nitrobenzene	670	U
78-59-1	Isophorone	670	U
88-75-5	2-Nitrophenol	670	U
105-67-9	2,4-Dimethylphenol	670	U
65-85-0	Benzoic acid	3500	U
111-91-1	bis(2-Chloroethoxy)methane	670	U
120-83-2	2,4-Dichlorophenol	670	U
120-82-1	1,2,4-Trichlorobenzene	670	U
91-20-3	Naphthalene	670	U
106-47-8	4-Chloroaniline	670	U
87-68-3	Hexachlorobutadiene	670	U
59-50-7	4-Chloro-3-methylphenol	670	U
91-57-6	2-Methylnaphthalene	670	U
77-47-4	Hexachlorocyclopentadiene	670	U
88-06-2	2,4,6-Trichlorophenol	670	U
95-95-4	2,4,5-Trichlorophenol	3500	U
91-58-7	2-Chloronaphthalene	670	U
88-74-4	2-Nitroaniline	3500	U
131-11-3	Dimethylphthalate	670	U
208-96-8	Acenaphthylene	670	U
99-09-2	3-Nitroaniline	3500	U
83-32-9	Acenaphthene	670	U
51-28-5	2,4-Dinitrophenol	3500	U

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO:

FF-EX-02

Lab Name: EA LABS Contract:

Lab Code: EAENG Case No: SAS No.: _____ SDG No:

Matrix: (soil/water) SOIL Lab Sample ID: 9710240

Sample wt/vol: 30.0 (g/ml) G Lab File ID: SC3B5177

Level: (low/med) LOW Date Received: 09/25/97

% Moisture: 51 decanted: (Y/N) N Date Extracted: 10/08/97

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 10/17/97

Injection Volume: 1.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N)N pH: ____

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg)ug/Kg	Q
100-02-7	4-Nitrophenol	3500	U
132-64-9	Dibenzofuran	670	U
121-14-2	2,4-Dinitrotoluene	670	U
606-20-2	2,6-Dinitrotoluene	670	U
84-66-2	Diethylphthalate	670	U
7005-72-3	4-Chlorophenyl-phenylether	670	U
86-73-7	Fluorene	670	U
100-01-6	4-Nitroaniline	3500	U
534-52-1	4,6-Dinitro-2-methylphenol	3500	U
86-30-6	N-Nitrosodiphenylamine	670	U
101-55-3	4-Bromophenyl-phenylether	670	U
118-74-1	Hexachlorobenzene	670	U
87-86-5	Pentachlorophenol	3500	U
85-01-8	Phenanthrene	670	U
120-12-7	Anthracene	670	U
84-74-2	Di-n-butyl phthalate	670	U
206-44-0	Fluoranthene	230	J
129-00-0	Pyrene	210	J
85-68-7	Butylbenzyl phthalate	670	U
91-94-1	3,3'-Dichlorobenzidine	670	U
56-55-3	Benz[a]anthracene	670	U
117-81-7	bis(2-Ethylhexyl)phthalate	670	U
218-01-9	Chrysene	670	U
117-84-0	Di-n-octyl phthalate	670	U
205-99-2	Benzo[b]fluoranthene	670	U
207-08-9	Benzo[k]fluoranthene	670	U
50-32-8	Benzo[a]pyrene	670	U
193-39-5	Indeno[1,2,3-cd]pyrene	670	U
53-70-3	Dibenz[ah]anthracene	670	U
191-24-2	Benzo[ghi]perylene	670	U

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO:

FF-EX-03

Name: EA LABS Contract:

Lab Code: EAENG Case No: SAS No.: _____ SDG No:

Matrix: (soil/water) SOIL Lab Sample ID: 9710241

Sample wt/vol: 30.0 (g/ml) G Lab File ID: SC3B5172

Level: (low/med) LOW Date Received: 09/25/97

% Moisture: 4 decanted: (Y/N) N Date Extracted: 10/08/97

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 10/17/97

Injection Volume: 1.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N)N pH: ____

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg)ug/Kg	Q
108-95-2	Phenol	340	U
111-44-4	bis-(2-Chloroethyl) ether	340	U
95-57-8	2-Chlorophenol	340	U
541-73-1	1,3-Dichlorobenzene	340	U
106-46-7	1,4-Dichlorobenzene	340	U
100-51-6	Benzyl alcohol	340	U
95-50-1	1,2-Dichlorobenzene	340	U
95-48-7	2-Methylphenol	340	U
108-60-1	2,2'-Oxybis(1-chloropropane)	340	U
106-44-5	4-Methylphenol	340	U
621-64-7	N-Nitroso-Di-n-propylamine	340	U
67-72-1	Hexachloroethane	340	U
98-95-3	Nitrobenzene	340	U
78-59-1	Isophorone	340	U
88-75-5	2-Nitrophenol	340	U
105-67-9	2,4-Dimethylphenol	340	U
65-85-0	Benzoic acid	1800	U
111-91-1	bis(2-Chloroethoxy)methane	340	U
120-83-2	2,4-Dichlorophenol	340	U
120-82-1	1,2,4-Trichlorobenzene	340	U
91-20-3	Naphthalene	340	U
106-47-8	4-Chloroaniline	340	U
87-68-3	Hexachlorobutadiene	340	U
59-50-7	4-Chloro-3-methylphenol	340	U
91-57-6	2-Methylnaphthalene	340	U
77-47-4	Hexachlorocyclopentadiene	340	U
88-06-2	2,4,6-Trichlorophenol	340	U
95-95-4	2,4,5-Trichlorophenol	1800	U
91-58-7	2-Chloronaphthalene	340	U
88-74-4	2-Nitroaniline	1800	U
131-11-3	Dimethylphthalate	340	U
208-96-8	Acenaphthylene	340	U
99-09-2	3-Nitroaniline	1800	U
83-32-9	Acenaphthene	340	U
51-28-5	2,4-Dinitrophenol	1800	U

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO:

FF-EX-03

Lab Name: EA LABS Contract:

Lab Code: EAENG Case No: SAS No.: _____ SDG No:

Matrix: (soil/water) SOIL Lab Sample ID: 9710241

Sample wt/vol: 30.0 (g/ml) G Lab File ID: SC3B5172

Level: (low/med) LOW Date Received: 09/25/97

% Moisture: 4 decanted: (Y/N) N Date Extracted: 10/08/97

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 10/17/97

Injection Volume: 1.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N)N pH: ____

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg)ug/Kg	Q
100-02-7	4-Nitrophenol	1800	U
132-64-9	Dibenzofuran	340	U
121-14-2	2,4-Dinitrotoluene	340	U
606-20-2	2,6-Dinitrotoluene	340	U
84-66-2	Diethylphthalate	340	U
7005-72-3	4-Chlorophenyl-phenylether	340	U
86-73-7	Fluorene	340	U
100-01-6	4-Nitroaniline	1800	U
534-52-1	4,6-Dinitro-2-methylphenol	1800	U
86-30-6	N-Nitrosodiphenylamine	340	U
101-55-3	4-Bromophenyl-phenylether	340	U
118-74-1	Hexachlorobenzene	340	U
87-86-5	Pentachlorophenol	1800	U
85-01-8	Phenanthrene	340	U
120-12-7	Anthracene	340	U
84-74-2	Di-n-butyl phthalate	340	U
206-44-0	Fluoranthene	340	U
129-00-0	Pyrene	340	U
85-68-7	Butylbenzyl phthalate	340	U
91-94-1	3,3'-Dichlorobenzidine	340	U
56-55-3	Benz[a]anthracene	340	U
117-81-7	bis(2-Ethylhexyl)phthalate	340	U
218-01-9	Chrysene	340	U
117-84-0	Di-n-octyl phthalate	340	U
205-99-2	Benzo[b]fluoranthene	340	U
207-08-9	Benzo[k]fluoranthene	340	U
50-32-8	Benzo[a]pyrene	340	U
193-39-5	Indeno[1,2,3-cd]pyrene	340	U
53-70-3	Dibenz[ah]anthracene	340	U
191-24-2	Benzo[ghi]perylene	340	U

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO:

FF-EX-XD

Name: EA LABS Contract:

Lab Code: EAENG Case No: SAS No.: _____ SDG No:

Matrix: (soil/water) SOIL Lab Sample ID: 9710242

Sample wt/vol: 30.0 (g/ml) G Lab File ID: SC3B5175

Level: (low/med) LOW Date Received: 09/25/97

% Moisture: 19 decanted: (Y/N) N Date Extracted: 10/08/97

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 10/17/97

Injection Volume: 1.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N)N pH: ____

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg)ug/Kg	Q
108-95-2	Phenol	410	U
111-44-4	bis-(2-Chloroethyl) ether	410	U
95-57-8	2-Chlorophenol	410	U
541-73-1	1,3-Dichlorobenzene	410	U
106-46-7	1,4-Dichlorobenzene	410	U
100-51-6	Benzyl alcohol	410	U
95-50-1	1,2-Dichlorobenzene	410	U
95-48-7	2-Methylphenol	410	U
108-60-1	2,2'-Oxybis(1-chloropropane)	410	U
106-44-5	4-Methylphenol	410	U
621-64-7	N-Nitroso-Di-n-propylamine	410	U
67-72-1	Hexachloroethane	410	U
98-95-3	Nitrobenzene	410	U
78-59-1	Isophorone	410	U
88-75-5	2-Nitrophenol	410	U
105-67-9	2,4-Dimethylphenol	410	U
65-85-0	Benzoic acid	2100	U
111-91-1	bis(2-Chloroethoxy)methane	410	U
120-83-2	2,4-Dichlorophenol	410	U
120-82-1	1,2,4-Trichlorobenzene	410	U
91-20-3	Naphthalene	410	U
106-47-8	4-Chloroaniline	410	U
87-68-3	Hexachlorobutadiene	410	U
59-50-7	4-Chloro-3-methylphenol	410	U
91-57-6	2-Methylnaphthalene	410	U
77-47-4	Hexachlorocyclopentadiene	410	U
88-06-2	2,4,6-Trichlorophenol	410	U
95-95-4	2,4,5-Trichlorophenol	2100	U
91-58-7	2-Chloronaphthalene	410	U
88-74-4	2-Nitroaniline	2100	U
131-11-3	Dimethylphthalate	410	U
208-96-8	Acenaphthylene	410	U
99-09-2	3-Nitroaniline	2100	U
83-32-9	Acenaphthene	410	U
51-28-5	2,4-Dinitrophenol	2100	U

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO:

FF-EX-XD

Lab Name: EA LABS Contract:

Lab Code: EAENG Case No: SAS No.: _____ SDG No:

Matrix: (soil/water) SOIL Lab Sample ID: 9710242

Sample wt/vol: 30.0 (g/ml) G Lab File ID: SC3B5175

Level: (low/med) LOW Date Received: 09/25/97

% Moisture: 19 decanted: (Y/N) N Date Extracted: 10/08/97

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 10/17/97

Injection Volume: 1.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N)N pH: ____

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg)ug/Kg	Q
100-02-7	4-Nitrophenol	2100	U
132-64-9	Dibenzofuran	410	U
121-14-2	2,4-Dinitrotoluene	410	U
606-20-2	2,6-Dinitrotoluene	410	U
84-66-2	Diethylphthalate	410	U
7005-72-3	4-Chlorophenyl-phenylether	410	U
86-73-7	Fluorene	410	U
100-01-6	4-Nitroaniline	2100	U
534-52-1	4,6-Dinitro-2-methylphenol	2100	U
86-30-6	N-Nitrosodiphenylamine	410	U
101-55-3	4-Bromophenyl-phenylether	410	U
118-74-1	Hexachlorobenzene	410	U
87-86-5	Pentachlorophenol	2100	U
85-01-8	Phenanthrene	410	U
120-12-7	Anthracene	410	U
84-74-2	Di-n-butyl phthalate	410	U
206-44-0	Fluoranthene	410	U
129-00-0	Pyrene	410	U
85-68-7	Butylbenzyl phthalate	410	U
91-94-1	3,3'-Dichlorobenzidine	410	U
56-55-3	Benz[a]anthracene	410	U
117-81-7	bis(2-Ethylhexyl)phthalate	410	U
218-01-9	Chrysene	410	U
117-84-0	Di-n-octyl phthalate	410	U
205-99-2	Benzo[b]fluoranthene	410	U
207-08-9	Benzo[k]fluoranthene	410	U
50-32-8	Benzo[a]pyrene	410	U
193-39-5	Indeno[1,2,3-cd]pyrene	410	U
53-70-3	Dibenz[ah]anthracene	410	U
191-24-2	Benzo[ghi]perylene	410	U

B. TPH-Diesel

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

NASB-FF-EX-RB

Lab Name: EA LABS Contract: BRUNSWIC

Lab Code: EAENG Case No.: 971403 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: 9710238

Sample wt/vol: 1000 (g/ml) ML Lab File ID: SW3R866F.D

Level: (low/med) LOW Date Received: 09/25/97

% Moisture: _____ decanted:(Y/N) N Date Extracted: 09/30/97

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 10/08/97

Injection Volume: 1.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: _____

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/L	Q
	DIESEL RANGE ORGANICS	51	

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

NASB-FF-EX-01

Lab Name: EA LABS Contract: BRUNSWIC

Lab Code: EAENG Case No.: 971403 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) SOIL Lab Sample ID: 9710239

Sample wt/vol: 25 (g/ml) G Lab File ID: SW3S011F.D

Level: (low/med) LOW Date Received: 09/25/97

% Moisture: 23 decanted:(Y/N) N Date Extracted: 10/08/97

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 10/16/97

Injection Volume: 1.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: _____

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/KG	Q
	DIESEL RANGE ORGANICS	66000	

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

NASB-FF-EX-02

Lab Name: EA LABS Contract: BRUNSWIC

Lab Code: EAENG Case No.: 971403 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) SOIL Lab Sample ID: 9710240

Sample wt/vol: 25 (g/ml) G Lab File ID: SW3S012F.D

Level: (low/med) LOW Date Received: 09/25/97

% Moisture: 51 decanted:(Y/N) N Date Extracted: 10/08/97

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 10/16/97

Injection Volume: 1.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: _____

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
	DIESEL RANGE ORGANICS	330000	E

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

ASB-FF-EX-02DL

Lab Name: EA LABS Contract: BRUNSWIC

Lab Code: EAENG Case No.: 971403 SAS No.: SDG No.:

Matrix: (soil/water) SOIL Lab Sample ID: 9710240DL

Sample wt/vol: 25 (g/ml) G Lab File ID: SW3S034F.D

Level: (low/med) LOW Date Received: 09/25/97

% Moisture: 51 decanted:(Y/N) N Date Extracted: 10/08/97

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 10/16/97

Injection Volume: 1.0 (uL) Dilution Factor: 4.0

GPC Cleanup: (Y/N) N pH:

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG

CAS NO.	COMPOUND		Q
	DIESEL RANGE ORGANICS	340000	D

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

NASB-FF-EX-03

Lab Name: EA LABS Contract: BRUNSWIC

Lab Code: EAENG Case No.: 971403 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) SOIL Lab Sample ID: 9710241

Sample wt/vol: 25 (g/ml) G Lab File ID: SW3S013F.D

Level: (low/med) LOW Date Received: 09/25/97

% Moisture: 4 decanted:(Y/N) N Date Extracted: 10/08/97

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 10/16/97

Injection Volume: 1.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: _____

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/KG	Q
	DIESEL RANGE ORGANICS	11000	

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

NASB-FF-EX-XD

Lab Name: EA LABS Contract: BRUNSWIC

Lab Code: EAENG Case No.: 971403 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) SOIL Lab Sample ID: 9710242

Sample wt/vol: 25 (g/ml) G Lab File ID: SW3S014F.D

Level: (low/med) LOW Date Received: 09/25/97

% Moisture: 19 decanted:(Y/N) N Date Extracted: 10/08/97

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 10/16/97

Injection Volume: 1.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: _____

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/KG	Q
	DIESEL RANGE ORGANICS	49000	

4. INORGANICS DATA

A. General Chemistry

FORM I
SAMPLE ANALYSIS RESULTS

Lab Name: EA Laboratories
SAS Case No.: 2960035
EPA Sample No.: NASBFFEXRB
Sample matrix: WATER
Total Solids: %

Contract: NAS BRUNS
SDG No.: 9710238
Lab Sample ID No.: 9710238
Date Received: 09/25/97

Lab ID	Parameter	Sample Conc.	Concentration Units	Analyzed Date
9710238	TPH	<1.0	mg/L	10/10/97

FORM I
SAMPLE ANALYSIS RESULTS

Name: EA Laboratories
Case No.: 2960035
Sample No.: NASBFFEXD1
Sample matrix: SOIL
Total Solids: 76.6%

Contract: NAS BRUNS
SDG No.: 9710238
Lab Sample ID No.: 9710239
Date Received: 09/25/97

Lab ID	Parameter	Sample Conc.	Concentration Units	Analyzed Date
9710239	TPH	44.8	mg/Kg(DRY)	10/06/97

FORM I
SAMPLE ANALYSIS RESULTS

Lab Name: EA Laboratories
SAS Case No.: 2960035
EPA Sample No.: NASBFFEX02
Sample matrix: SOIL
Total Solids: 49.0%

Contract: NAS BRUNS
SDG No.: 9710238
Lab Sample ID No.: 9710240
Date Received: 09/25/97

Lab ID	Parameter	Sample Conc.	Concentration Units	Analyzed Date
9710240	TPH	262	mg/Kg(DRY)_	10/06/97

FORM I
SAMPLE ANALYSIS RESULTS

Name: EA Laboratories
Case No.: 2960035
Sample No.: NASBFFEX03
Sample matrix: SOIL
Total Solids: 96.3%

Contract: NAS BRUNS
SDG No.: 9710238
Lab Sample ID No.: 9710241
Date Received: 09/25/97

Lab ID	Parameter	Sample Conc.	Concentration Units	Analyzed Date
9710241	TPH	<25.0	mg/Kg(DRY)	10/06/97

FORM I
SAMPLE ANALYSIS RESULTS

Lab Name: EA Laboratories
SAS Case No.: 2960035
EPA Sample No.: NASBFFEXXD
Sample matrix: SOIL
Total Solids: 81.1%

Contract: NAS BRUNS
SDG No.: 9710238
Lab Sample ID No.: 9710242
Date Received: 09/25/97

Lab ID	Parameter	Sample Conc.	Concentration Units	Analyzed Date
9710242	TPH	<25.0	mg/Kg(DRY)_	10/06/97

Appendix D

Generator Special Waste Certificate

Commercial Recycling Systems

GENERATOR SPECIAL WASTE PROCESSING INFORMATION

I GENERATOR INFORMATION:

a) Gen rator Brunswick Naval Air Station Contact
Address Brunswick, Maine Phone#
b) Process Generating the Waste UST Leakage
c) Sit of Generation same as generator
d) Contracting Firm Whorff Trucking & Exc., Inc. Contact Jim Whorff
Address Foster Point Rd., West Bath, ME 04530 Phone# 443-9724
e) DEP On Site Representative Steve Brezinski Spill# P-368-97

II PROCESSING INFORMATION:

a) Typ of Waste Material Processed Virgin JP-5 Containing Soil
b) Amount of Waste Received Cu Yds 445.04 Tons
Date Waste Received 7/10, 7/15, 7/16 & 7/17/97
c) Amount of Additional Material Needed Cu Yds Tons
d) Total Amount of Material Processed Cu Yds 445.04 Tons
e) Date Processed 7/10/97 & 7/18/97
f) Processing Site Commercial Recycling Systems, Scarborough, Maine
g) Stockpile Site for Processed Material CRS, Scarborough, Maine
Amount of Waste Material Stockpiled Cu Yds 445.04 Tons
Date Waste Material Stockpiled 7/10/97 & 7/18/97
h) Final Disposition of Processed Material Stockpiled
Amount of Processed Material Cu Yds 445.04 Tons
Date of Final Disposition 7/10/97 & 7/18/97
i) Commercial Recycling Systems Job# 33428

III WASTE CHARACTERIZATION:

Stockpiled material to be used as road base or base paving material.

Joseph Henday (Signature) — Recycling Coordinator (Title)

Attach A Copy of MEDEP Spill Letter

Appendix E

MEDEP Comment Letter Dated 27 February 1998 with Associated Navy Responses

STATE OF MAINE
DEPARTMENT OF ENVIRONMENTAL PROTECTION

ANGUS S. KING, JR.
GOVERNOR

EDWARD O. SULLIVAN
COMMISSIONER

February 27, 1998

RECEIVED
MAR 01 1998
EA Engineering, Science, & Technology, Inc.
Newtown, NJ 18940

Mr. Emil Klawitter
Code 1823 EK
Department of the Navy, Northern Division
Naval Facilities Engineering Command
10 Industrial Highway, Mail Stop 82
Lester, PA 19112-2090

Re: Post-Excavation Summary Report, Fuel Seep Mitigation/Soil Excavation
Old Navy Fuel Farm (January 1998)- Naval Air Station, Brunswick

Dear Emil:

The Department of Environmental Protection (DEP or Department) has received the report entitled "Post-Excavation Summary Report, Fuel Seep Mitigation/Soil Excavation, Old Navy Fuel Farm (January 1998)" prepared by EA Engineering, Science, and Technology. Based on that review the Department has the following comments and issues:

Observations:

Based on MEDEP guidance, the Navy determined an intermediate soil clean up standard was appropriate for the petroleum contaminated soils slated for excavation. According to the *Initial Clean-up Actions Agreement* in Appendix B, the Department set the clean-up level at 100 ppm using an approved photoionization instrument and set points. About half of the samples field screened with a photoionization detector (PID) exceeded the 100 ppm cleanup level. The field screening data is plotted on the attached figure. Based on the numerous exceedances along the northern edge of the excavation, it is clear the clean-up level was not achieved.

The Navy collected 11 soil samples for laboratory analysis. Although none of the samples contained BTEX or Gasoline Range Organics (GRO) above the respective detection limits, all the samples exceeded the 10 mg/Kg intermediate clean-up goal for Diesel Range Organics (DRO).

The presence of GRO and DRO in excess of the State's drinking water standards in the upgradient well suggest the petroleum contaminated soils observed along the northern edge of the excavation extend northward beyond the upgradient well.

UGUSTA
17 STATE HOUSE STATION
AUGUSTA, MAINE 04333-0017
(207) 287-7688
RAY BLDG., HOSPITAL ST.

BANGOR
106 HOGAN ROAD
BANGOR, MAINE 04401
(207) 941-4570 FAX: (207) 941-4584

PORTLAND
312 CANCO ROAD
PORTLAND, MAINE 04103
(207) 822-6300 FAX: (207) 822-6303

PRESQUE ISLE
1235 CENTRAL DRIVE, SKYWAY PARK
PRESQUE ISLE, MAINE 04769-2094
(207) 764-0477 FAX: (207) 764-1507

web site: www.state.me.us/dep

printed on recycled paper

1. **Soil Sample Jar Headspace Analysis**, Section 4.1, Pg 4:

   After completing the excavation, the Navy collected soil samples from the excavation sidewall for field screening and laboratory analysis. The report indicates the Navy collected no samples from the bottom of the excavation due to the presence of groundwater. In the future, the Navy must not allow the presence of water saturated soils prevent the characterization of subsurface soils. The presence of water saturated soils does not preclude the usefulness of soil analyses. In fact, knowledge of both soil and groundwater concentrations can yield valuable information about how petroleum partitions between the soil and groundwater. This type of information enables one to evaluate the extent to which the petroleum contaminated soil within the saturated zone may contribute to dissolved phase petroleum contamination.

2. **Summary of Ground-Water Sampling Results**, Section 4.4, Page 7:

   Before undertaking the excavation and shortly thereafter, the Navy sampled a monitor well upgradient (WP-01) and one downgradient (MW-061R) of the excavation. The Navy characterized the GRO and DRO concentration in both wells as **low**. This characterization is inaccurate. While these concentrations may be low relative to concentrations observed in groundwater where the Navy is currently biosparging, the concentrations exceed the State's Maximum Exposure Guidelines (MEGs). The upgradient well (WP-01) exceeded both the GRO and DRO MEG before and after excavation. In June (before excavation) the combined GRO/DRO in WP-01 was 3060 ug/L compared to 780 ug/L after completing the excavation. Similarly, after the excavation, MW-061R contained a combined GRO/DRO of 285 ug/L.

3. **Summary and Recommendations**, Section 5.0, page 8:

   Petroleum contaminated water and perhaps free product discharged from the former storm sewer culvert. Was the storm sewer connected to the sanitary sewer? If it is not connected to the sanitary sewer, where did it outlet and has anyone evaluated the discharge area? It may be necessary to characterize petroleum contamination in the vicinity of the discharge area.

4. **Summary and Recommendations**, Section 5.0, page 9:

   At this time the Navy does not recommend additional soil removal or expansion of the biosparging system. Before the Department could agree to no further action at this site, further characterization of the area north of the trench is required.

   Some form of direct push technology, such as GeoProbe (trademark symbol), may permit the Navy to inexpensively characterize the extent of petroleum contaminated soil. Characterizing the subsurface petroleum contamination north of the trench will help the Department and the Navy evaluate the need for additional remedial action.

Please feel free to call me at (207) 287-7713 if you have any questions or comments regarding this matter.

Respectfully,

Claudia Sait

Claudia Sait
Project Manager-Federal Facilities
Bureau of Remediation & Waste Management

cf: File
Richard Behr-DEP
Michael Barry-EPA
Carolyn Lepage-Lepage Environmental Associates
Jim Caruthers-BNAS
Susan Weddle
Peter Nimmer-EA Engineering, Science & Technology
Jeffrey Brandow-ABB Envronmental Services, Inc.
Jeff Dale-NAVFAC

RESPONSE TO STATE OF MAINE DEPARTMENT OF ENVIRONMENTAL PROTECTION COMMENTS ON DRAFT POST-EXCAVATION SUMMARY REPORT, FUEL SEEP MITIGATION/SOIL EXCAVATION, OLD NAVY FUEL FARM, NAVAL AIR STATION, BRUNSWICK, JANUARY 1998

OBSERVATIONS

Based on Maine Department of Environmental Protection (MEDEP) guidance, the Navy determined an intermediate soil cleanup standard was appropriate for the petroleum contaminated soils slated for excavation. According to the *Initial Cleanup Actions Agreement* in Appendix B, the Department set the cleanup level at 100 ppm using an approved photoionization instrument and set points. About half of the samples field screened with a photoionization detector exceeded the 100 ppm cleanup level. The field screening data are plotted on the attached figure. Based on the numerous exceedances along the northern edge of the excavation, it is clear that the cleanup level was not achieved.

The Navy collected 11 soil samples for laboratory analysis. Although none of the samples contained BTEX or gasoline range organics (GRO) above the respective detection limits, all the samples exceeded the 10 mg/Kg intermediate cleanup goal for diesel range organics (DRO).

The presence of GRO and DRO in excess of the State's drinking water standards in the upgradient well suggests the petroleum contaminated soils observed along the northern edge of the excavation extend northward beyond the upgradient well.

Comment No. 1: Soil Sample Jar Headspace Analysis, Section 4.1, Page 4—After completing the excavation, the Navy collected soil samples from the excavation sidewall for field screening and laboratory analysis. The report indicates the Navy collected no samples from the bottom of the excavation due to the presence of ground water. In the future, the Navy must not allow the presence of water saturated soils to prevent the characterization of subsurface soils. The presence of water saturated soils does not preclude the usefulness of soil analyses. In fact, knowledge of both soil and ground-water concentrations can yield valuable information about how petroleum partitions between the soil and ground water. This type of information enables one to evaluate the extent to which the petroleum contaminated soil within the saturated zone may contribute to dissolved-phase petroleum contamination.

Response—The Navy did not collect soil samples from within the saturated zone since it was felt that the data generated would not enhance the reviewers' ability to accurately assess site conditions. It was felt that ground-water sampling data collected from two adjacent ground-water sampling locations would more accurately indicate the degree to which petroleum hydrocarbons partition between soil and ground water (i.e., since such data represent an actual case scenario). Further, soil samples saturated with ground water could have potentially affected the calibration of the photoionization detector, since the bulb is sensitive to humidity and subject to damage by excessive moisture build-up.

Comment No. 2: Summary of Ground-Water Sampling Results, Section 4.4, Page 7—Before undertaking the excavation and shortly thereafter, the Navy sampled a monitoring well upgradient (WP-01) and one downgradient (MW-061R) of the excavation. The Navy characterized the GRO and DRO concentration in both wells as **low.** This characterization is inaccurate. While these concentrations may be low relative to concentrations observed in ground water where the Navy is currently biosparging, the concentrations exceed the State's Maximum Exposure Guidelines (MEGs). The upgradient well (WP-01) exceeded both the GRO and DRO MEG before and after excavation. In June (before excavation), the combined GRO/DRO in WP-01 was 3,060 μg/L compared to 780 μg/L after completing the excavation. Similarly, after the excavation, MW-061R contained a combined GRO/DRO of 285 μg/L.

Response—Comment noted. The reference to the GRO and DRO concentrations as low will be stricken, and the text revised as follows:

> "...during either sampling event. ~~Low c~~ *C*oncentrations of TPH-GRO and TPH-DRO were reported *above corresponding MEDEP remediation standards* in the samples collected prior to, and following, seep mitigation/soil excavation activities at ...."

Similar text appearing as the last sentence in the fifth paragraph of Section 5 will be revised as shown above.

Comment No. 3: Summary and Recommendations, Section 5.0, Page 8—Petroleum contaminated water and perhaps free-product discharged from the former storm sewer culvert. Was the storm sewer connected to the sanitary sewer? If it is not connected to the sanitary sewer, where did it outlet and has anyone evaluated the discharge area? It may be necessary to characterize petroleum contamination in the vicinity of the discharge area.

Response—Immediately upon discovery of the fuel seeps on 15 May 1997, the storm sewer outfall was inspected for evidence of a release of potentially impacted water, as well as free-product. No evidence of either impacted water or free-product was noted during this inspection. As a precautionary measure, however, sorbent materials were placed at the storm sewer inlet and outfall to prevent free-product from entering the storm sewer and to capture any potential discharged fluids at the outfall. Monitoring of this outfall was conducted from 15 May through completion of the remedial measures on 2 July 1997. No evidence of free-product at the outfall was observed. Prior to completing the seep mitigation/soil excavation effort, the storm sewer inlet was reconstructed incorporating a new 3-ft × 3-ft concrete box culvert. The culvert conveys surface water from the paved areas into the storm sewer. This was performed to prevent ground water and any potential free-product from entering the storm sewer. The storm sewer collection system currently discharges to surface water southeast of the site across Fitch Avenue and adjacent to the Quarters "B" residence. No modifications to this outfall were performed.

This information will be included in Sections 2 and 3 of the report.

Comment No. 4: Summary and Recommendations, Section 5.0, Page 9—At this time, the Navy does not recommend additional soil removal or expansion of the biosparging system. Before the Department could agree to no further action at this site, further characterization of the area north of the trench is required.

Some form of direct-push technology, such as GeoProbe®, may permit the Navy to inexpensively characterize the extent of petroleum contaminated soil. Characterizing the subsurface petroleum contamination north of the trench will help the Department and the Navy evaluate the need for additional remedial action.

Response—As documented in the report, it is the Navy's belief that the goals of the seep mitigation/soil excavation were achieved. Specifically, two objectives, the mitigation of the source of the petroleum seep (via bulk excavation of impacted soil) and the reconfiguration of the storm water conveyance system, were successfully executed.

Sampling conducted following the seep mitigation effort confirmed the absence of BTEX and TPH-GRO constituents in soil. Confirmatory soil sampling conducted to assess the composition of TPH-DRO confirmed low or non-detect concentrations of semivolatile organic compounds, most notably polycyclic aromatic hydrocarbons.

The Navy does not concur with the need for further investigation in the vicinity of the mitigated fuel seep.