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# PHASE I/PHASE II ASSESSMENT

**Norfolk Southern Railway Company**
**Former CF Right of Way**
**Gulf, Chatham County, North Carolina**

*January 15, 1998*

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MARSHALL MILLER & ASSOCIATES

## 1.0 INTRODUCTION

The following report was prepared by Marshall Miller & Associates, Inc. (MM&A) on behalf of the Norfolk Southern Railway Company (NS). This report summarizes the results of a soil sampling assessment performed along the former CF Greensboro-Sanford right of way (ROW) at Gulf, Chatham County, North Carolina. This ROW is located on the north side of NCSR 2145 and borders the former Southern Wood Piedmont Company (SWP) Gulf Facility, which is included on the North Carolina Department of Environment and Natural Resources, Division of Waste Management, Superfund Section's Inactive Hazardous Waste Site Priority List (NCD 053 488 557). MM&A's scope of work included assessment activities of the portion of the ROW beginning at the intersection of NCSR 2139 and NCSR 2145, continuing along the southern SWP property line for approximately one quarter of a mile. The ROW extends 100 feet along the southern SWP property line. **Figure 1** depicts the location of the site on an excerpt from the Gulf, NC, USGS 7.5 Minute Topographical Quadrangle Map. **Figure 2** is a map of the ROW assessment area. According to Norfolk Southern representatives, two interchange tracks are scheduled to be constructed on the ROW. The former CF track was removed in 1990.

The purpose of the assessment was to identify and characterize the potential for environmental impact to surface soils, which may have resulted from past activities at the adjacent Superfund site. The assessment was performed in order to determine the possible extent of soil contamination that would be encountered during associated railroad construction, including cut and fill activities. The assessment was performed in conformance with the scope of work outlined in the *Proposal for Phase I and Phase II, Proposed Gulf Facility, "Southern Wood Piedmont Company"*, dated November 11, 1997. This scope of work was based upon previous MM&A conversations with NS concerning the past activities of SWP and future construction activities scheduled for the ROW, in addition to a site inspection attended in November 1997 by representatives from MM&A and NS. The scope of work was amended as outlined in *Phase II Geoprobe Assessment, Proposed Gulf Facility, "Southern Wood Piedmont Company"* dated December 1, 1997. This amendment is based on the results of a Phase I records search of the NC

Superfund Section's file compiled on SWP. The scope of work was expanded to include additional borings and laboratory analysis for the presence of Total Petroleum Hydrocarbons (TPH) and dioxins/furans.

## 2.0 PHASE I RESULTS

The NC Superfund Section file for SWP was reviewed by MM&A personnel on November 25, 1997. The two major sources of information regarding SWP manufacturing operations and subsequent assessment activities were a Remedial Investigation Report (RI) submitted by Geraghty & Miller, Inc. on October 7, 1994, and an Expanded Site Inspection (ESI) completed by the NC Superfund Section in October 1997.

According to the ESI, the SWP was a wood treatment plant that operated from 1946 until 1980. The plant used creosote and pentachlorophenol (PCP) to treat railroad ties, utility poles, lumber, etc. The wood was coated with preservatives of creosote and PCP (dissolved in diesel fuel). The preservative was heated and applied to the wood in pressurized cylinders. The process included the use of storage tanks, piping, a boiler, vacuum systems, and a drip area. Treated wood was staged in the drip area to allow for excess preservative to drip onto the ground. The drip track area was located approximately 150 feet north of the ROW (**Figure 2**). Wastewater generated at the facility was allowed to settle in three lagoons. The nearest of these lagoons was located approximately 300 feet north of the ROW (**Figure 2**). Ultimately, the wastewater was either discharged into Cedar Creek, which flows adjacent to the northern SWP property boundary, or spread throughout a 40 acre spray irrigation area, which was located approximately 950 feet north of the ROW. (**Figure 2**). After the facility closed, the lagoons were drained and filled, and approximately 36,500 tons of soil were removed from the site (Superfund Section, 1997).

In addition, a fuel dispensing area was operated for the facility. The approximate location of this area is shown in **Figure 2**. The area previously contained above ground storage tanks (AST) for gasoline and diesel fuel. The size of the tanks is unknown. This fuel area will be referred to as

the AST Area for the remainder of this report. SWP is suspected to have excavated surface soil from the AST Area to use as fill for the former wastewater lagoons (Geraghty & Miller, 1994).

### 2.1 Previous Soil Investigation

The RI concluded that various areas of soil have been impacted throughout the SWP facility. Detected constituents are associated with creosote, mainly polycyclic aromatic hydrocarbons (PAHs). PCP was not detected in the RI assessment activities. Also, Total Petroleum Hydrocarbons (TPH) were measured above current action levels in the soils from the AST Area.

Assessment activities conducted as part of the ESI confirmed the presence of PAHs in soil at the SWP site. The Superfund Section did not sample soil in the former fuel storage area. Two background soil samples were taken during the ESI from a wooded area west of the property. The results of these samples (SW-001-SL and SW-002-SL) are included in **Tables 2 and 3**. The NC Superfund investigation included analysis for VOCs, SVOCs, inorganics, and dioxins/furans. The investigation revealed the following constituents at levels significantly above background levels in surface and/or subsurface soils (constituents in **bold** indicate levels "above EPA health-based benchmarks for soil exposure" and constituents in *italics* indicate levels above NC health based Remediation Goals for soil (Superfund Section, 1994)):

<u>*Inorganics*</u>

Aluminum, calcium, *chromium*, cobalt, manganese, mercury, nickel, and vanadium.

<u>*Extractable Organics*</u>

Naphthalene, 2-methyl naphthalene, *dibenzofuran*, fluorene, ***benzo(b,k)fluoranthene***, fluoranthene, acenaphthylene, ***PCP***, phenanthrene, anthracene, **carbazole**, pyrene, ***benzo(a)anthracene***, chrysene, ***benzo(a)pyrene***, benzo(g,h,i)perylene, ***dibenzo(a,h)anthracene***, and ***indeno(1,2,3-CD)pyrene***.

*Purgeable Organics*

Benzene, toluene, ethylbenzene, styrene, and xylenes.

*Dioxins/furans*

Isomers of **pentachlorodibenzodioxin (PCDD)**, **hexachlorodibenzodioxin (HCDD)**, **heptachlorodibenzodioxin (HpCDD)**, *octachlorodibenzodioxin* (*OCDD*), pentachlorodibenzofuran (PCDF), **hexachlorodibenzofuran (HCDF)**, **heptachlorodibenzofuran (HpCDF)**, and *octachlorodibenzofuran* (*OCDF*).

### 2.2 Previous Groundwater Investigation

RI assessment activities included the installation of a monitoring well network on and adjacent to the SWP site. Because the scope of work performed by MM&A was limited to soil assessment in the ROW, only a brief discussion of impacts to groundwater in the vicinity of the ROW will be included. **Figure 2** shows the location of the monitoring wells on or immediately adjacent to the ROW.

Groundwater samples from monitoring wells MW1A and MW1B (AST Area) were found to contain Volatile Organic Compounds (VOCs) during all sampling events. VOCs are common constituents of petroleum fuels. Semivolatile Organic Compounds (SVOCs), in the form of PAHs, were also detected in these wells during one sampling event (Geraghty & Miller, 1994). Sampling of monitoring wells MW5A and MW8A have not revealed constituents above laboratory detection levels (Virogroup, 1997).

Groundwater flow at the site is characterized by a divide/mounding effect to the north of the ROW area. Consequently, groundwater flows to the northwest on the north of this divide and generally southeast along the ROW (Geraghty & Miller, 1994). Surface runoff across the site is generally northeast toward a drainage ditch that empties into Cedar Creek (Superfund Section, 1994). Shallow drainage ditches are located on both sides of the former rail line in the ROW.

### 2.3 NC Superfund Section Conclusions

The Expanded Site Inspection concluded that the SWP site is a potential risk to human health and the environment. However, drinking water wells, wetlands, fisheries, or other sensitive habitats have not been found to be impacted from activities at the site. Furthermore, human exposure has been deemed minimal because the site is inactive and has no residents or laborers, and the Gulf, NC area is not populous. According to this risk assessment and assuming that the site remains unused and inactive, the NC Superfund section has recommended that further action as per CERCLA/SARA is not warranted (Superfund Section, 1997).

## 3.0 ASSESSMENT RESULTS

### 3.1 Sampling Method and Approach

In order to determine if soil in the ROW may have been impacted by SWP, MM&A conducted a surface and subsurface soil assessment using a Geoprobe®, which employs direct push technology. Nineteen Geoprobe® borings were advanced at the facility for the purpose of collecting discreet interval soil samples. Refer to **Figure 3** for boring locations. Based on the Remedial Investigation report by Geraghty & Miller, the water table in the vicinity of the ROW was determined to be approximately four feet Below Land Surface (BLS). Therefore, the majority of borings were extended to four feet BLS. However, borings B1 and B2 were installed to approximately eight feet BLS to view the local soil structure.

The borings along of the ROW were placed as close to the former track location as possible. Drainage ditches run parallel to the former rail bed. Along the northern side of the ROW, most of the borings were installed next to this drainage ditch. Because of dense vegetation, borings in the southern half of the ROW were placed on the edge of the ROW, approximately 50 feet from the center of the former rail bed (**Figure 3**).

Samples comprising the zero to two foot depth interval and the two foot to four foot interval were collected from each boring location. Each sample was transferred into a sealable plastic

bag for the purpose of visual description and screening for the presence of organic vapors using a Photoionization Detector (PID). The PID is a qualitative instrument that detects organic vapors emanating from a sample and can be used to indicate the potential presence and severity of organic contamination such as petroleum products, organic solvents, etc. The field screening consisted of inserting the probe of the PID instrument into the plastic bag thereby drawing a sample of the air in the headspace of the bag into the PID. The PID measured the concentration of organic vapors in the bagged sample in parts per million (ppm) above background levels. **Table 1** summarizes the results of the PID screening.

The sample revealing the highest PID reading from each boring was placed in soil jars for possible analysis. If both intervals were similar in organic vapor concentrations, generally the zero to two foot sample was contained for laboratory analysis. In these cases, the shallower sample was chosen for two reasons. First, future construction activities would be most likely be limited to the first three feet of soil. Second, the PID cannot distinguish between organic vapor emanating from soil and vapor originating from groundwater. Therefore, to ensure that the assessment would delineate possible soil contamination, the shallower samples were chosen for analysis. Upon boring completion, nine of the 19 samples were chosen, based on the PID results and spatial distribution, with the emphasis to delineate possible contamination along the entire ROW area bordering SWP property.

In addition, borings B12-B14 were installed in the portion of the ROW adjacent to the former AST Area. These samples were submitted to the laboratory for TPH analysis only.

### 3.2 QA/QC Field Procedures

All soil sampling equipment was decontaminated (triple rinse procedure) prior to use at each sample location using a proper mixture of water and Alconox laboratory grade non-phosphatic soap. Deionized water was used to rinse the equipment. Isopropyl alcohol (IPA) was not used as a rinsing agent to avoid sample contamination. According to representatives of Paradigm Analytical Laboratories, IPA has a tendency to degrade and form acetone. Acetone is one of the

target analytes included in EPA Method 8260. Therefore, only a triple rinse using Alconox and water was employed. The equipment Geoprobe® apparatus was allowed to air dry prior to collecting each sample. The actual boring cores were collected in disposable PVC cylinders. Disposable latex gloves were worn at each sample location during sample collection, and care was used to minimize contact with each sample. Fresh gloves were worn while packing soil samples in laboratory containers for analyses.

The PID was calibrated to ambient conditions at the site prior to sampling activities. The PID was also calibrated two additional times during the sampling event due to temperature changes during the assessment and to fluctuating ambient readings.

### 3.3 Site Lithology

The soil structure at the site was fairly consistent, ranging from clay to clayey sand. At approximately four feet below land surface (BLS), the soil structure begins to change into very stiff, dry clay. Geoprobe refusal was encountered at approximately eight feet. Groundwater ranged from at least three feet to greater than four feet BLS. Incidentally, concrete was encountered at approximately 3-4 feet in boring B18.

### 3.4 North Carolina Remediation Goals

The Superfund Section's Inactive Hazardous Waste Sites Branch has established soil Remediation Goals (RGs) for the Registered Environmental Consultant Program. The RGs are published in 15A NCAC 13C.0030, *Implementation Guidance*. Two soil RGs have been established. First, a health based goal has been determined for total concentrations of contaminants. Second, a groundwater based goal has been calculated for leachable concentrations of contaminants. Both remediation goals are to be followed, unless site specific levels have been established.

The health based soil RGs have been established for use as target cleanup levels and for delineation purposes. The health based goals were derived as per current US EPA risk

assessment guidance and are based on a lifetime cancer risk of $1 \times 10^{-6}$ for carcinogens and a hazard quotient of 0.2 for non-carcinogens. The hazard quotient is used to account for multiple non-carcinogens in the same "critical effect group". The *Implementation Guidance* further explains that some of the established health based goals may be less than naturally occurring background levels or below method detection limits. In these cases, remediation below background levels or below detection limits (for the laboratory methods outlined in the *Implementation Guidance*) is not mandated.

Furthermore, the groundwater based soil remediation goals are based on the possibility that impacted soils may leach contaminants into the groundwater. These values are calculated based on groundwater standards as per 15A NCAC 2L .0202, and through the use of Toxicity Characteristic Leachate Procedure (TCLP). TCLP analysis must be conducted and the groundwater based goals must be met unless one of the following conditions applies:

- Residual soil contamination for metals does not exceed background levels,
- Residual soil contamination from metals and organics does not exceed 20 times the groundwater remediation goals, and
- Residual soil contamination from metals and organics does not exceed the health based soil goals and either all site disposal practices stopped by 1980 and groundwater is free of contaminants, or groundwater remedial action will compensate for future leachate contamination.

The groundwater based RGs are generally more stringent than the health based RGs. For the purposes of this report, laboratory analyses will be compared to the more stringent RG for each compound.

### 3.5 Background Samples

In the discussion of laboratory results that follows, levels of contaminants detected during the MM&A Geoprobe® assessment/sampling are compared to two background soil samples that

were taken by the Superfund Section, as described in **Section 2.1**. These samples were taken to the north of the ROW. Comparisons were made based on order of magnitude similarities or differences. Statistical analysis was not performed due to the limited number of background samples and the small amount of samples sent to the laboratory for analysis. Examination of analytical data for the background samples is intended as a general overview, not as a comprehensive mathematical comparison.

### 3.6 Laboratory Results

All samples submitted to the laboratory were taken from the zero to two foot interval. Samples were placed in four ounce amber jars, packed in ice, and forwarded to Paradigm Analytical Laboratory, Wilmington, NC. The dioxin/furan analysis was subcontracted to Quanterra Environmental Services, Kentucky.

Samples B1, B4, B6, B10, and B18 were selected and analyzed for the following:

- The priority pollutant metals
- SVOCs by EPA Method 8270
- VOCs by EPA Method 8260
- Dioxins/Furans by EPA Method 8280

Samples B12, B13, and B14 (AST Area) were also selected and analyzed as follows:

- TPH as Diesel by EPA Method 3550
- TPH as Gasoline by EPA Method 5030

#### 3.6.1 INORGANICS

Arsenic, barium, cadmium, chromium, copper, lead, mercury, and nickel were detected in MM&A samples above the groundwater based remediation goal (RG) limits. RGs for aluminum and cobalt have not been established. Selenium and silver were not detected above laboratory detection limits in any of the MM&A samples. Refer to **Table 2** for the metals results.

Inorganics measured in the background samples obtained in the ESI were used to evaluate the metals detected in the MM&A samples (**Table 2**). Concentrations of aluminum, arsenic, barium, chromium, copper, lead, and nickel in the MM&A samples appear to correlate with background samples. These metals were detected in amounts at or near the same order of magnitude as background samples. It appears that cadmium, cobalt, and mercury are above background levels and consequently in excess of the groundwater RGs. More extensive background sampling and analysis will be necessary to determine if a release of these constituents has taken place or if they are also naturally occurring.

### 3.6.2 SVOCS

Samples B4 and B10 revealed the presence of several SVOCs (**Table 3**). The following SVOCs were detected in sample B4: Pyrene, benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, and fluoranthene. However, all of these SVOCs were below health based soil RGs and established groundwater based RGs. The following constituents were detected in sample B10: Pyrene, anthracene, benzo(a)anthracene, benzo(b)pyrene, benzo(b)fluoranthene, benzo(g,h)perylene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, fluoranthene, and indeno(1,2,3-cd)pyrene. Of these contaminants, benzo(b)pyrene, benzo(b)fluoranthene, dibenzo(a,h)anthracene, and indeno(1,2,3-cd)pyrene were detected at levels exceeding health based soil RGs. Also, benzo(a)anthracene was detected in excess of the groundwater based RG.

Background samples obtained during the ESI were below detection limits for all the above SVOCs (with the exception of benzo(b)fluoranthene, which was not included for analysis). However, the detection limits of the background samples were elevated. Therefore, comparison of the analysis conducted by MM&A to background is impractical.

### 3.6.3 VOCS

The only detected VOC was toluene in sample B1. The measured amount was well below health based and groundwater based RGs for toluene.

### 3.6.4 DIOXINS/FURANS

Several dioxin and furan compounds were identified in the samples obtained in the MM&A boring assessment. These compounds were also identified in the background samples obtained during the ESI. Constituent concentrations are sometimes estimated due to limitations related to GC/MS calibration and quantitation limits (**Table 4**). It should be noted that health based RGs for dioxins and furans have been established only for specific isomers of these compounds, specifically those containing the 2,3,7,8-isomer configuration, such as 2,3,7,8-hexachlorodibenzo-p-dioxin (2,3,7,8-HxCDD) and 2,3,7,8-heptachlorodibenzo-p-dioxin (2,3,7,8-HpCDD). Laboratory results are reported as estimations of total groups of dioxin/furan compounds, such as total HxCDD and total HpCDD. Also, the only groundwater based RG has been established for 2,3,7,8-tetrachlorodibenzodioxin (TCDD), because TCDD is the most toxic of the dioxin/furan compounds. All other RGs referred to in this section are health based. No TCDD was detected in the samples taken from the ROW.

Sample B1 was reported to contain the presence of 1,2,3,4,6,7,8- HpCDD, total HpCDD, and octachlorodibenzodioxin (OCDD). Only OCDD was at a level greater than health based soil RGs. All constituents in B1 were well below levels detected in background samples.

Sample B4 contained the presence of total TCDD, total HxCDD, total tetrachlorodibenzofuran (TCDF), total pentachlorodibenzofuran (PCDF), total hexachlorodibenzofuran (HxCDF), total heptachlorodibenzofuran (HpCDF), heptachlorodibenzofuran (OCDF), and OCDD. Only OCDD was detected at levels exceeding health based soil RGs. Again, all constituents detected in B1 were well below levels measured in background samples.
The analysis of sample B6 identified the presence of total HpCDD and OCD. OCDD was in excess of soil RGs, but both contaminants were below background levels.

Sample B10 contained individual isomers of HxCDD, HpCDD, HxCDF, and HpCDF, and totals of TCDF, PCDF, OCDF, and OCDD. The following constituents were detected at levels exceeding health based soil RGs: OCDD and isomers of HxCDD, HpCDD, HxCDF, and

HpCDF. Members of the HxCDF and HpCDF groups were not encountered in the background samples. However, the detection limits for these compounds for background samples was several times greater than the levels detected in the ROW samples. The remaining compounds were measured in much higher concentrations in the background samples than in the ROW samples.

Sample B19 also revealed the presence of OCDD at a level below the health based soil RG.

### 3.6.5 TOTAL PETROLEUM HYDROCARBONS

All of the TPH results were below detection limits, and the detection limits were below the NC action levels for petroleum impacted soil.

## 5.0 CONCLUSIONS

Based on the results of the assessment performed along the Right of Way (ROW) bordering the former Southern Wood Piedmont (SWP) facility, the following conclusions may be drawn:

- Based on the results of Total Petroleum Hydrocarbon analysis, the former AST Area does not appear or have impacted soil on the ROW,
- The ROW does not appear to have been impacted by VOCs,
- One pocket of contamination of soil with SVOCs was found in the vicinity of boring B10,
- Dioxin and furan contamination above health based remediation goals exists on the northern side of the ROW, i.e. the side bordering SWP.

The source of contamination is difficult to identify. Obviously, activities at the SWP facility impacted soil on that property with contamination associated with creosote and PCP preservatives (PAHs, dioxins). Because dioxin and furan compounds were detected almost exclusively along the edge of the ROW bordering SWP, this contamination is most likely

attributable to activities of the SWP facility. Further investigation would be required to more accurately delineate extent and sources of SVOC contamination.

Although the MM&A soil assessment is representative of the site, the spatial distribution of the sample locations should be taken into consideration. Sample locations were generally 300-400 feet apart along the ROW. From the laboratory analysis, it is fairly apparent that the site has contamination of OCDD along the north side of the ROW, and PAH and dioxin/furan contamination above health based RGs in the vicinity of B10. However, definitive conclusions cannot be drawn as to the areas between sample locations. Pockets of contamination, such as the area of B10, may exist in between the known sample locations. Also, the possible extent of the contamination east of the location of boring B10 has not been delineated. Again, Further investigation would be required to more accurately delineate extent of contamination.

In conclusion, soil contamination caused by PAHs and dioxins/furans above health based and groundwater based RGs exists along the ROW. Constituents identified by analysis of MM&A samples taken along and adjacent to the ROW indicated concentrations generally near or below constituent concentrations of the ESI background samples. Based on this comparison, compounds detected in ROW soils is most likely attributable to SWP facility operations. It is probable that constituents were transported from the SWP facility and distributed to adjacent properties by wind, rain, material transport, etc. Analysis of MM&A samples did not indicate uniform constituent concentrations that would be expected if the old railroad bed was the source of contamination. This tends to further indicate the SWP operation is a more probable source of contamination along the ROW. Proper safety precautions should be exercised during construction activities to minimize possible worker exposure.

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ViroGroup. Soil, Sediment, and DNAPL/Groundwater Remedial Action Plan, Southern Wood Piedmont Company, Gulf, North Carolina Facility, Draft 4.0. July, 1997.

# TABLES

Table 1
Norfolk Southern - Former CF Right of Way
Gulf, North Carolina
Field Screening - PID Results
All results in ppm.

| | PID Result | |
|---|---|---|
| Boring | 0 ft - 2ft | 2 ft - 4 ft |
| B1 | 28.2 | 9.6 |
| B2 | 1.0 | 1.5 |
| B3 | 1.4 | 1.7 |
| B4 | 0.8 | 0.6 |
| B5 | 0.5 | 0.0 |
| B6 | 0.1 | 0.3 |
| B7 | 0.0 | 0.0 |
| B8 | 0.0 | 0.2 |
| B9 | 0.0 | 0.0 |
| B10 | 1.1 | 1.0 |
| B11 | 1.4 | 1.4 |
| B12 | 1.6 | 1.2 |
| B13 | 5.5 | 3.3 |
| B14 | 4.1 | 1.8 |
| B15 | 3.9 | 1.9 |
| B16 | 0.9 | 0.9 |
| B17 | 1.4 | 1.5 |
| B18 | 2.0 | 2.0 |
| B19 | 2.1 | 1.8 |

Table 2
Norfolk Southern - Former CF Right of Way
Gulf, North Carolina
Soil Analytical Samples - Metals
All results in mg/kg (ppm)

| Metal | NC Soil Remediation Goals: Health Based | NC Soil Remediation Goals: Groundwater Based | SW-001-SL | SW-002-SL | B1 | B4 | B6 | B10 | B15 | B18 |
|---|---|---|---|---|---|---|---|---|---|---|
| Aluminum | NE | NE | 1,600 | 9,500 | 12,200 | 3,540 | 4,190 | 7,740 | 4,580 | 15,700 |
| Arsenic | 4.6 | 1 | **6.1** | **3.2** | **7.15** | **2.83** | **2.41** | **5.75** | **3.79** | **2.35** |
| Barium | NE | 40 | **100** | **92** | **113** | 29.6 | 28.2 | **81.0** | **44.4** | **65.9** |
| Cadmium | 7.8 | 0.1 | $BQL^{0.30}$ | $BQL^{0.27}$ | 1.83 | $BQL^{0.586}$ | **0.869** | **1.42** | **0.994** | **1.52** |
| Chromium | 78 | 1 | **19** | **16** | **24.1** | **12.4** | **17.8** | **21.8** | **19.0** | **23.1** |
| Cobalt | NE | NE | $BQL^{10}$ | $BQL^{5}$ | 9.83 | 5.88 | 8.28 | 18.1 | 6.70 | 23.9 |
| Copper | NE | 20 | **59** | **62** | 10.6 | 10.0 | 4.21 | **29.8** | 1.58 | **43.4** |
| Lead | 400 | 0.30 | **11** | **11** | **9.59** | **10.8** | **6.11** | **13.4** | **9.81** | $BQL^{1.20}$ |
| Mercury | 4.6 | 0.022 | $BQL^{0.06}$ | $BQL^{0.05}$ | **0.0338** | **0.144** | **0.0460** | **0.0970** | **0.0264** | $BQL^{0.0233}$ |
| Nickel | 320 | 2 | **22** | **13** | **12.4** | **11.2** | $BQL^{4.82}$ | **37.0** | $BQL^{4.91}$ | **79** |
| Selenium | 78 | 1 | $BQL^{1}$ | $BQL^{0.48}$ | $BQL^{1.22}$ | $BQL^{1.17}$ | $BQL^{1.20}$ | $BQL^{1.23}$ | $BQL^{1.23}$ | $BQL^{1.20}$ |
| Silver | 78 | 0.36 | $BQL^{2}$ | $BQL^{1}$ | $BQL^{1.22}$ | $BQL^{1.17}$ | $BQL^{1.20}$ | $BQL^{1.23}$ | $BQL^{1.23}$ | $BQL^{1.20}$ |

$BQL^{X}$ = Below Quantitation Limit where X is the Quantitation Limit
Concentrations in **BOLD** indicate detected values above established Remediation Goals, either Health Based or Groundwater Based, as per 15A NCAC 13C .0300 Guidelines



MARSHALL MILLER & ASSOCIATES

Table 3
Norfolk Southern - Former CF Right of Way
Gulf, North Carolina
Soil Analytical Samples - EPA Method 8270 (Semivolatiles)
All results in ug/kg (ppb)

| *Sample B10* | | | | | |
|---|---|---|---|---|---|
| Compound | NC Soil Remediation Goals: Health Based | NC Soil Remediation Goals: Groundwater Based | SW-001-SL (Background) | SW-002-SL (Background) | B10 Result |
| Pyrene | 460 | 4,200 | 430 U | 400 U | 4.0 |
| Anthracene | 4,600 | 42,000 | 430 U | 400 U | 1.3 |
| Benzo(a)anthracene | 0.88 | 0.96 | 430 U | 400 U | **3.6** |
| Benzo(a)pyrene | 0.088 | NE | 430 U | 400 U | **2.6** |
| Benzo(b)fluoranthene | 0.88 | NE | NA | NA | **5.3** |
| Benzo(g,h)perylene | NE | NE | NA | NA | 1.7 |
| Benzo(k)fluoranthene | 8.8 | NE | NA | NA | 2.1 |
| Chrysene | 88 | 96 | 430 U | 400 U | 5.3 |
| Dibenzo(a,h)anthracene | 0.088 | NE | 430 U | 400 U | **0.6** |
| Fluoranthene | 620 | 5,600 | 430 U | 400 U | 4.8 |
| Indeno(1,2,3-c,d)pyrene | 0.88 | NE | 430 U | 400 U | **2.4** |

| *Sample B4* | | | | | |
|---|---|---|---|---|---|
| Compound | NC Soil Remediation Goals: Health Based | NC Soil Remediation Goals: Groundwater Based | SW-001-SL (Background) | SW-002-SL (Background) | B4 Result |
| Pyrene | 460 | 4,200 | 430 U | 400 U | 0.53 |
| Benzo(a)anthracene | 0.88 | 0.96 | 430 U | 400 U | 0.36 |
| Benzo(b)fluoranthene | 0.88 | NE | NA | NA | 0.70 |
| Benzo(k)fluoranthene | 8.8 | NE | NA | NA | 0.44 |
| Chrysene | 88 | 96 | 430 U | 400 U | 0.72 |
| Fluoranthene | 620 | 5,600 | 430 U | 400 U | 0.64 |

Concentrations in **BOLD** indicate detected values above established Remediation Goals, either Health Based or Groundwater Based,as per 15A NCAC 13C .0300 Guidelines

U = Below detection limit shown
J = Estimated result.

For a complete listing of target analytes and sample specific quantitation limits, refer to Laboratory report included in Appendix ?.

Table 4
Norfolk Southern - Former CF Right of Way -Gulf, North Carolina
Soil Analytical Samples - EPA Method 8280 (Dioxins/Furans)
All results in ng/g (ppb)

| Dioxin/Furan | Soil RG[1,2] | SW-001-SL (Background) | SW-002-SL (Background) | B1 | B4 | B6 | B10 | B15 | B19 |
|---|---|---|---|---|---|---|---|---|---|
| 2,3,7,8-TCDD | 0.004 | 5.0 U | 6.0 U | 0.018 U | 0.016 U | 0.028 U | 0.11 U | 0.029 U | 0.016 U |
| Total TCDD | NE | 1.5 J | 6.0 U,J | 0.018 U | 0.027 J | 0.028 U | 0.11 U | 0.029 U | 0.016 U |
| 1,2,3,7,8-PeCDD | 0.008 | 12 U | 15 U | 0.021 U | 0.039 U | 0.021 U | 0.097 U | 0.019 U | 0.025 U |
| Total PeCDD | NE | 12 U,J | 15 U,J | 0.10 U | 0.14 U | 0.11 U | 0.27 U | 0.038 U | 0.041 U |
| 1,2,3,4,7,8-HxCDD | 0.04 | 12 U | 15 U | 0.037 U | 0.029 U | 0.035 U | 0.098 U | 0.044 U | 0.031 U |
| 1,2,3,6,7,8-HxCDD | 0.04 | **1.7 J** | 15 U | 0.033 U | 0.027 U | 0.032 U | **0.10 J** | 0.040 U | 0.029 U |
| 1,2,3,7,8,9-HxCDD | 0.04 | **1.4 J** | 15 U | 0.034 U | 0.039 U | 0.032 U | **0.099 J** | 0.040 U | 0.029 U |
| Total HxCDD | NE | 13 J | 15 U,J | 0.035 U | 0.023 J | 0.033 U | 1.4 J | 0.041 U | 0.030 U |
| 1,2,3,4,6,7,8-HpCDD | 0.4 | **270** | **91** | 0.082 J,Q | 0.27 J,Q | 0.090 U | **4.6** | 0.10 U | 0.046 U |
| Total HpCDD | NE | 590 J | 220 J | 0.19 J,Q | 0.90 Q | 0.025 J,Q | 22 E | 0.10 U | 0.046 U |
| OCDD | 4.0 | **40,000 J** | **3,400** | **18** | **6.9** | **2.7** | **41 E** | 0.69 | 0.061 J,Q |
| 2,3,7,8-TCDF | 0.04 | 5.0 U | 6.0 U | 0.021 U | 0.041 U | 0.024 U | 0.029 U | 0.016 U | 0.024 U |
| Total TCDF | NE | 5.0 U,J | 6.0 U,J | 0.021 U | 0.038 J,Q | 0.024 U | 5.0 Q | 0.016 U | 0.024 U |
| 1,2,3,7,8-PeCDF | 0.08 | 12 U | 15 U | 0.026 U | 0.044 U | 0.025 U | 0.12 U | 0.019 U | 0.018 U |
| 2,3,4,7,8-PeCDF | 0.008 | 12 U | 15 U | 0.026 U | 0.043 U | 0.024 U | 0.12 U | 0.019 U | 0.018 U |
| Total PeCDF | NE | 12 U,J | 15 U,J | 0.026 U | 0.027 J,Q | 0.025 U | 6.8 Q | 0.019 U | 0.018 U |
| 1,2,3,4,7,8-HxCDF | 0.04 | 12 U | 15 U | 0.018 U | 0.034 U | 0.12 U | 0.080 U | 0.018 U | 0.016 U |
| 1,2,3,6,7,8-HxCDF | 0.04 | 12 U | 15 U | 0.017 U | 0.031 U | 0.11 U | **0.31 J,Q** | 0.017 U | 0.015 U |
| 2,3,4,6,7,8-HxCDF | 0.04 | 12 U | 15 U | 0.019 U | 0.035 U | 0.13 U | 0.081 U | 0.019 U | 0.017 U |
| 1,2,3,7,8,9-HxCDF | 0.04 | 12 U | 15 U | 0.020 U | 0.037 U | 0.14 U | 0.086 U | 0.020 U | 0.018 U |
| Total HxCDF | NE | 1.2 J | 15 U,J | 0.018 U | 0.069 J,Q | 0.13 U | 4.5 Q | 0.018 U | 0.016 U |
| 1,2,3,4,6,7,8-HpCDF | 0.4 | 12 U | 15 U | 0.037 U | 0.12 U | 0.065 U | **0.57** | 0.050 U | 0.042 U |
| 1,2,3,4,7,8,9-HpCDF | 0.4 | 12 U | 15 U | 0.037 U | 0.12 U | 0.66 U | 0.22 U | 0.051 U | 0.042 U |
| Total HpCDF | NE | 12 U,J | 15 U | 0.037 U | 0.17 J,Q | 0.065 U | 2.9 | 0.051 U | 0.042 U |
| OCDF | 4.0 | **20 J** | **15 U,J** | 0.020 U | 0.20 J | 0.038 U | 2.5 | 0.067 U | 0.080 U |

Concentrations in **BOLD** indicate detected values above established Remediation Goals (RGs).
U = Below detection limit shown
Q = Estimated maximum possible concentration
J = Estimated result. Result is below the GC/MS calibration range
E = Estimated result. Result is greater than the GC/MS calibration range
NE = No established RG

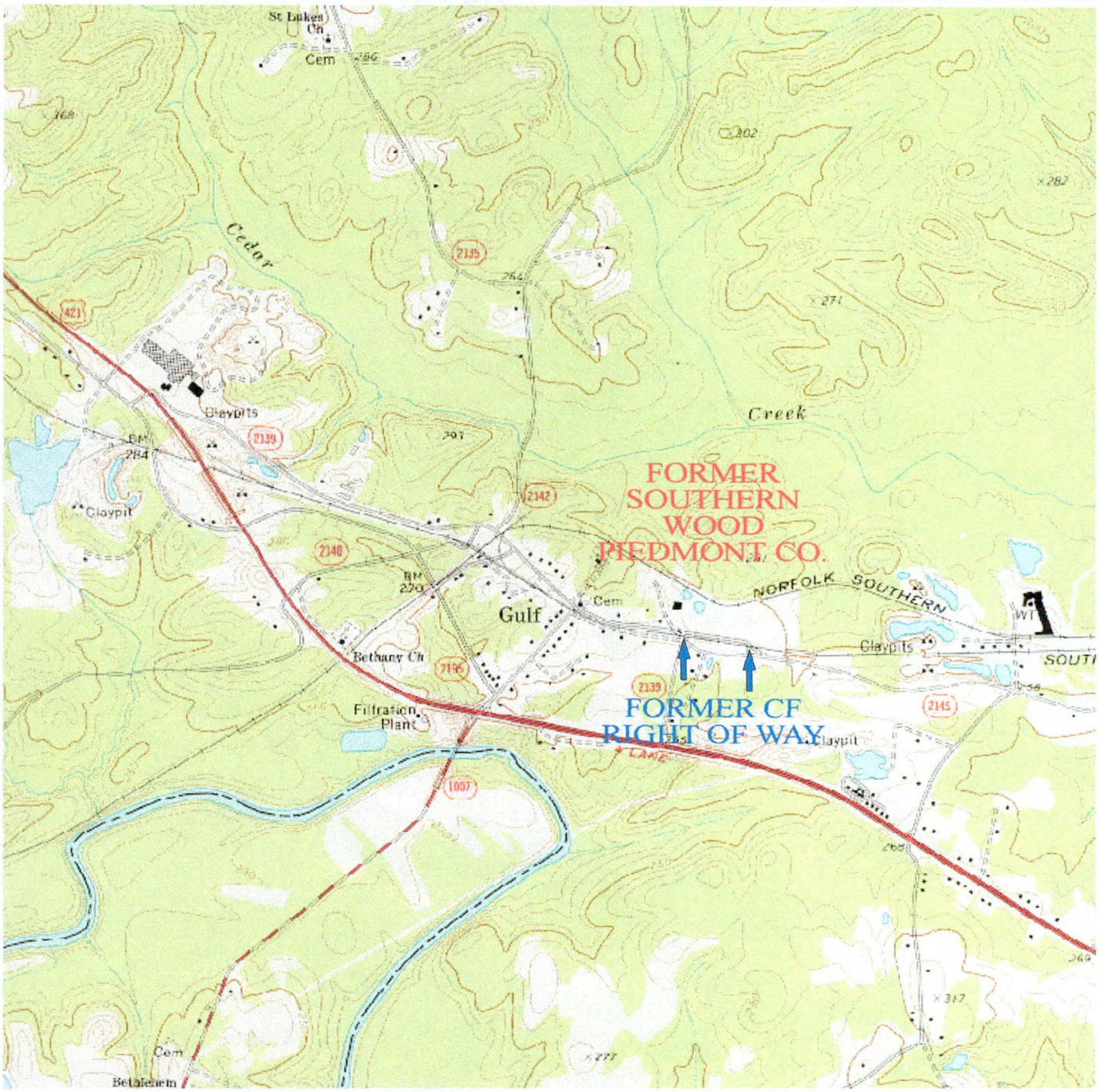
[1] Soil Remediation Goals as per 15A NCAC 13C .0300. RGs shown are the health based goals. Soil RGs must also meet criteria based on groundwater exposure due to leaching. To determine these soil RGs , the constituent's RG for Groundwater is multiplied by twenty to approximate TCLP estimates. The only dioxin/furan with an established groundwater goal is 2,3,7,8-TCDD.
The corresponding Soil RG based on groundwater goals for 2,3,7,8-TCDD is $4.40 \times 10^{-6}$ ppb.

[2] RGs listed for isomers of HxCDD, HxCDF, and HpCDF are for totals of all isomers containing the 2,3,7,8 configuration. These RGs would be totals for the shaded groups.



MARSHALL MILLER & ASSOCIATES

# FIGURES




N
W E
S

SCALE 1:24,000
1 INCH= 2,000 FEET

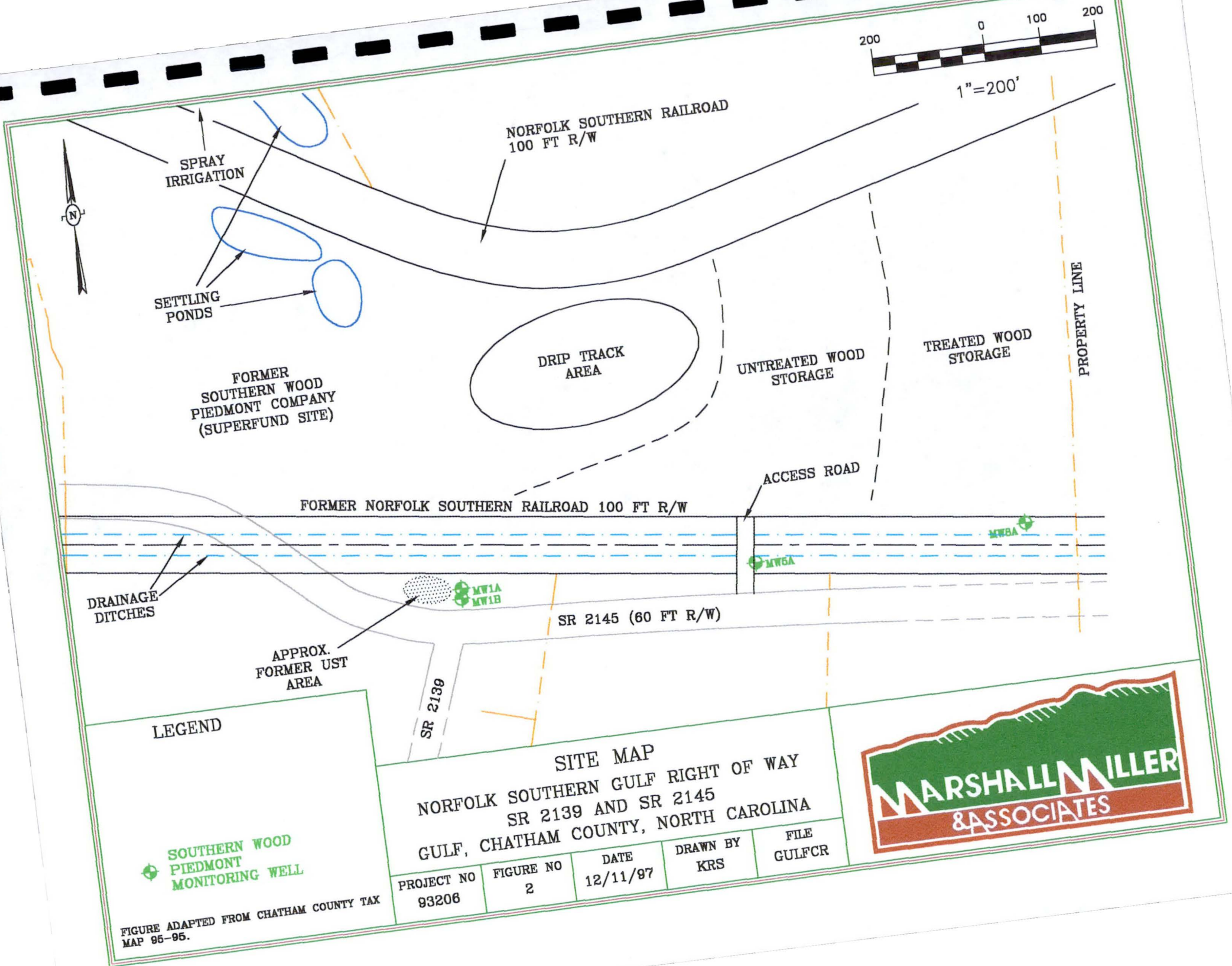
EXCERPT FROM USGS 7.5 MINUTE
GOLDSTON, NC QUADRANGLE
1970, PHOTOINSPECTED 1980

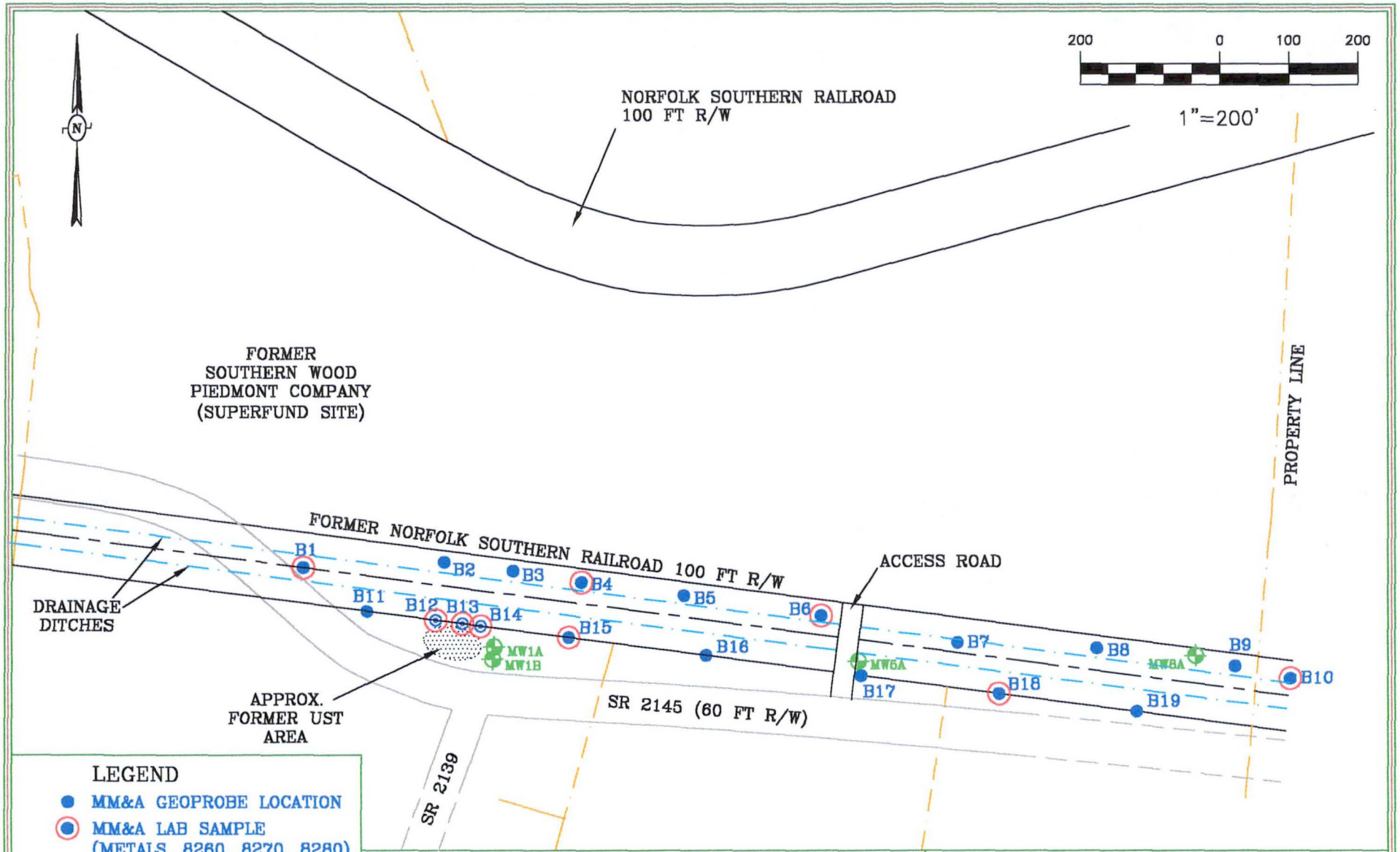
# FIGURE 1
# VICINITY MAP
# FORMER CF GREENSBORO-SANFORD RIGHT OF WAY

## SR 2145
## GULF, NORTH CAROLINA

MM&A PROJECT#: 93206 DATE: 11/19/97 DRAWING BY: KRS

MARSHALL MILLER & ASSOCIATES


200
0
100
200
1"=200'
NORFOLK SOUTHERN RAILROAD
100 FT R/W
SPRAY
IRRIGATION
N
SETTLING
PONDS
FORMER
SOUTHERN WOOD
PIEDMONT COMPANY
(SUPERFUND SITE)
DRIP TRACK
AREA
UNTREATED WOOD
STORAGE
TREATED WOOD
STORAGE
PROPERTY LINE
ACCESS ROAD
FORMER NORFOLK SOUTHERN RAILROAD 100 FT R/W
MW8A
MW6A
MW1A
MW1B
DRAINAGE
DITCHES
SR 2145 (60 FT R/W)
APPROX.
FORMER UST
AREA
SR 2139
LEGEND
SOUTHERN WOOD
PIEDMONT
MONITORING WELL
FIGURE ADAPTED FROM CHATHAM COUNTY TAX
MAP 95-95.
SITE MAP
NORFOLK SOUTHERN GULF RIGHT OF WAY
SR 2139 AND SR 2145
GULF, CHATHAM COUNTY, NORTH CAROLINA
PROJECT NO
93206
FIGURE NO
2
DATE
12/11/97
DRAWN BY
KRS
FILE
GULFCR
MARSHALL MILLER
&ASSOCIATES




LEGEND

- MM&A GEOPROBE LOCATION
- MM&A LAB SAMPLE (METALS, 8260, 8270, 8280)
- MM&A LAB SAMPLE (TPH 3550/5030)
- SOUTHERN WOOD PIEDMONT MONITORING WELL

FIGURE ADAPTED FROM CHATHAM COUNTY TAX MAP 95-95.

# GEOPROBE®/SAMPLE LOCATIONS

NORFOLK SOUTHERN GULF RIGHT OF WAY
SR 2139 AND SR 2145
GULF, CHATHAM COUNTY, NORTH CAROLINA

| PROJECT NO | FIGURE NO | DATE | DRAWN BY | FILE |
|---|---|---|---|---|
| 93206 | 3 | 12/11/97 | KRS | GULFCR |

MARSHALL MILLER & ASSOCIATES

# APPENDIX A
# LABORATORY RESULTS

MARSHALL MILLER & ASSOCIATES

PARADIGM ANALYTICAL LABORATORIES, INC.
2627 Northchase Parkway S.E.
Wilmington, North Carolina 28405
(910) 350-1903
Fax (910) 350-1557

Mr. Kevin Saylor
Marshall Miller & Associates, Inc.
5900 Triangle Drive
Raleigh, NC 27612

Date 12-17-97

Report Number: G145-187

Client Project ID : NS-Gulf; 93206

Dear Mr. Saylor:

Enclosed are the results of the analytical services performed under the referenced project. Copies of this report and supporting data will be retained in our files for a period of five years in the event they are required for future reference. Any samples submitted to our laboratory will be retained for a maximum of thirty (30) days from date of this report unless other arrangements are requested.

If there are any questions about the report or the services performed during this project, please call for assistance. We will be happy to answer any questions or concerns which you may have.

Thank you for using Paradigm Analytical Labs for your analytical service projects. We look forward to working with you again on any additional needs which you may have.

Sincerely,

Paradigm Analytical Laboratories

Laboratory Director
Mark Randall

# PARADIGM ANALYTICAL LABORATORIES, INC.

**Results for Volatiles**
*by GCMS 8260B*

Client Sample ID: B1
Client Project ID: NS-Gulf
Lab Sample ID: 33591
Lab Project ID: G145-187
Matrix: Soil %Solids: 81.8

Date Analyzed: 12/11/97
Analyzed By: LAW
Date Collected: 12/5/97
Date Received: 12/5/97
Dilution: 1

| Compound | Quantitation Limit (ug/KG) | Result (ug/KG) |
|---|---|---|
| Acetone | 59 | BQL |
| Acrolein | 120 | BQL |
| Acrylonitrile | 120 | BQL |
| Benzene | 12 | BQL |
| Bromobenzene | 12 | BQL |
| Bromochloromethane | 12 | BQL |
| Bromodichloromethane | 12 | BQL |
| Bromoform | 12 | BQL |
| Bromomethane | 12 | BQL |
| 2-Butanone | 29 | BQL |
| n-Butylbenzene | 12 | BQL |
| sec-Butylbenzene | 12 | BQL |
| tert-Butylbenzene | 12 | BQL |
| Carbon disulfide | 12 | BQL |
| Carbon tetrachloride | 12 | BQL |
| Chlorobenzene | 12 | BQL |
| Chloroethane | 12 | BQL |
| 2-Chloroethyl vinyl ether | 12 | BQL |
| Chloroform | 12 | BQL |
| Chloromethane | 12 | BQL |
| 2-Chlorotoluene | 12 | BQL |
| 4-Chlorotoluene | 12 | BQL |
| Dibromochloromethane | 12 | BQL |
| 1,2-Dibromo-3-chloropropane | 12 | BQL |
| Dibromomethane | 12 | BQL |
| 1,2-Dibromoethane (EDB) | 12 | BQL |
| 1,2-Dichlorobenzene | 12 | BQL |
| 1,3-Dichlorobenzene | 12 | BQL |
| 1,4-Dichlorobenzene | 12 | BQL |
| trans-1,4-Dichloro-2-butene | 12 | BQL |
| 1,1-Dichloroethane | 12 | BQL |
| 1,1-Dichloroethene | 12 | BQL |
| 1,2-Dichloroethane | 12 | BQL |
| cis-1,2-Dichloroethene | 12 | BQL |
| trans-1,2-dichloroethene | 12 | BQL |
| 1,2-Dichloropropane | 12 | BQL |
| 1,3-Dichloropropane | 12 | BQL |
| 2,2-Dichloropropane | 12 | BQL |
| 1,1-Dichloropropene | 12 | BQL |
| cis-1,3-Dichloropropene | 12 | BQL |
| trans-1,3-Dichloropropene | 12 | BQL |
| Dichlorodifluoromethane | 12 | BQL |
| Diisopropyl ether (DIPE) | 12 | BQL |
| Ethylbenzene | 12 | BQL |
| Hexachlorobutadiene | 12 | BQL |
| 2-Hexanone | 12 | BQL |
| Iodomethane | 12 | BQL |
| Isopropylbenzene | 12 | BQL |

Reviewed by: [illegible]

Flags: BQL = Below Quantitation Limit

# PARADIGM ANALYTICAL LABORATORIES, INC.

## Results for Volatiles
*by GCMS 8260B*

| | | | |
|---|---|---|---|
| Client Sample ID: | B1 | Date Analyzed: | 12/11/97 |
| Client Project ID: | NS-Gulf | Analyzed By: | LAW |
| Lab Sample ID: | 33591 | Date Collected: | 12/5/97 |
| Lab Project ID: | G145-187 | Date Received: | 12/5/97 |
| Matrix: | Soil %Solids: 81.8 | Dilution: | 1 |

| Compound | Quantitation Limit (ug/KG) | Result (ug/KG) |
|---|---|---|
| 4-Isopropyltoluene | 12 | BQL |
| Methylene chloride | 24 | BQL |
| 4-Methyl-2-pentanone | 12 | BQL |
| Methyl-tert-butyl ether (MTBE) | 12 | BQL |
| Naphthalene | 12 | BQL |
| n-Propyl benzene | 12 | BQL |
| Styrene | 12 | BQL |
| 1,1,1,2-Tetrachloroethane | 12 | BQL |
| 1,1,2,2-Tetrachloroethane | 12 | BQL |
| Tetrachloroethene | 12 | BQL |
| Toluene | 12 | 28 |
| 1,2,3-Trichlorobenzene | 12 | BQL |
| 1,2,4-Trichlorobenzene | 12 | BQL |
| Trichloroethene | 12 | BQL |
| 1,1,1-Trichloroethane | 12 | BQL |
| 1,1,2-Trichloroethane | 12 | BQL |
| Trichlorofluoromethane | 12 | BQL |
| 1,2,3-Trichloropropane | 12 | BQL |
| 1,2,4-Trimethylbenzene | 12 | BQL |
| 1,3,5-Trimethylbenzene | 12 | BQL |
| Vinyl chloride | 12 | BQL |
| m-,p-Xylene | 24 | BQL |
| o-Xylene | 12 | BQL |

| Surrogate Spike Recoveries<br>Compound | Spike Added (ug/KG) | Surrogate Result (ug/KG) | %Rec |
|---|---|---|---|
| Bromofluorobenzene | 50 | 53.4 | 107 |
| 1,2-Dichloroethane-d4 | 50 | 51.6 | 103 |
| Toluene-d8 | 50 | 50.3 | 101 |

**Comments:**

All results are corrected for dilution.

Reviewed by: _____

**Flags:** BQL = Below Quantitation Limit

# PARADIGM ANALYTICAL LABORATORIES, INC.

## Results for Volatiles
*by GCMS 8260B*

Client Sample ID: B4
Client Project ID: NS-Gulf
Lab Sample ID: 33592
Lab Project ID: G145-187
Matrix: Soil %Solids: 88.9

Date Analyzed: 12/11/97
Analyzed By: LAW
Date Collected: 12/5/97
Date Received: 12/5/97
Dilution: 1

| Compound | Quantitation Limit (ug/KG) | Result (ug/KG) |
|---|---|---|
| Acetone | 55 | 70 |
| Acrolein | 110 | BQL |
| Acrylonitrile | 110 | BQL |
| Benzene | 11 | BQL |
| Bromobenzene | 11 | BQL |
| Bromochloromethane | 11 | BQL |
| Bromodichloromethane | 11 | BQL |
| Bromoform | 11 | BQL |
| Bromomethane | 11 | BQL |
| 2-Butanone | 28 | BQL |
| n-Butylbenzene | 11 | BQL |
| sec-Butylbenzene | 11 | BQL |
| tert-Butylbenzene | 11 | BQL |
| Carbon disulfide | 11 | BQL |
| Carbon tetrachloride | 11 | BQL |
| Chlorobenzene | 11 | BQL |
| Chloroethane | 11 | BQL |
| 2-Chloroethyl vinyl ether | 11 | BQL |
| Chloroform | 11 | BQL |
| Chloromethane | 11 | BQL |
| 2-Chlorotoluene | 11 | BQL |
| 4-Chlorotoluene | 11 | BQL |
| Dibromochloromethane | 11 | BQL |
| 1,2-Dibromo-3-chloropropane | 11 | BQL |
| Dibromomethane | 11 | BQL |
| 1,2-Dibromoethane (EDB) | 11 | BQL |
| 1,2-Dichlorobenzene | 11 | BQL |
| 1,3-Dichlorobenzene | 11 | BQL |
| 1,4-Dichlorobenzene | 11 | BQL |
| trans-1,4-Dichloro-2-butene | 11 | BQL |
| 1,1-Dichloroethane | 11 | BQL |
| 1,1-Dichloroethene | 11 | BQL |
| 1,2-Dichloroethane | 11 | BQL |
| cis-1,2-Dichloroethene | 11 | BQL |
| trans-1,2-dichloroethene | 11 | BQL |
| 1,2-Dichloropropane | 11 | BQL |
| 1,3-Dichloropropane | 11 | BQL |
| 2,2-Dichloropropane | 11 | BQL |
| 1,1-Dichloropropene | 11 | BQL |
| cis-1,3-Dichloropropene | 11 | BQL |
| trans-1,3-Dichloropropene | 11 | BQL |
| Dichlorodifluoromethane | 11 | BQL |
| Diisopropyl ether (DIPE) | 11 | BQL |
| Ethylbenzene | 11 | BQL |
| Hexachlorobutadiene | 11 | BQL |
| 2-Hexanone | 11 | BQL |
| Iodomethane | 11 | BQL |
| Isopropylbenzene | 11 | BQL |

Reviewed by: [illegible]

Flags: BQL = Below Quantitation Limit

# PARADIGM ANALYTICAL LABORATORIES, INC.

**Results for Volatiles**
*by GCMS 8260B*

| | | | |
|---|---|---|---|
| Client Sample ID: | B4 | Date Analyzed: | 12/11/97 |
| Client Project ID: | NS-Gulf | Analyzed By: | LAW |
| Lab Sample ID: | 33592 | Date Collected: | 12/5/97 |
| Lab Project ID: | G145-187 | Date Received: | 12/5/97 |
| Matrix: | Soil %Solids: 88.9 | Dilution: | 1 |

| Compound | Quantitation Limit (ug/KG) | Result (ug/KG) |
|---|---|---|
| 4-Isopropyltoluene | 11 | BQL |
| Methylene chloride | 22 | BQL |
| 4-Methyl-2-pentanone | 11 | BQL |
| Methyl-tert-butyl ether (MTBE) | 11 | BQL |
| Naphthalene | 11 | BQL |
| n-Propyl benzene | 11 | BQL |
| Styrene | 11 | BQL |
| 1,1,1,2-Tetrachloroethane | 11 | BQL |
| 1,1,2,2-Tetrachloroethane | 11 | BQL |
| Tetrachloroethene | 11 | BQL |
| Toluene | 11 | BQL |
| 1,2,3-Trichlorobenzene | 11 | BQL |
| 1,2,4-Trichlorobenzene | 11 | BQL |
| Trichloroethene | 11 | BQL |
| 1,1,1-Trichloroethane | 11 | BQL |
| 1,1,2-Trichloroethane | 11 | BQL |
| Trichlorofluoromethane | 11 | BQL |
| 1,2,3-Trichloropropane | 11 | BQL |
| 1,2,4-Trimethylbenzene | 11 | BQL |
| 1,3,5-Trimethylbenzene | 11 | BQL |
| Vinyl chloride | 11 | BQL |
| m-,p-Xylene | 22 | BQL |
| o-Xylene | 11 | BQL |

| Surrogate Spike Recoveries<br>Compound | Spike Added (ug/KG) | Surrogate Result (ug/KG) | %Rec |
|---|---|---|---|
| Bromofluorobenzene | 50 | 53.0 | 106 |
| 1,2-Dichloroethane-d4 | 50 | 58.0 | 116 |
| Toluene-d8 | 50 | 51.5 | 103 |

**Comments:**

All results are corrected for dilution.

Reviewed by: [illegible]

**Flags:** BQL = Below Quantitation Limit

# PARADIGM ANALYTICAL LABORATORIES, INC.

## Results for Volatiles
*by GCMS 8260B*

| | | | |
|---|---|---|---|
| Client Sample ID: | B6 | Date Analyzed: | 12/11/97 |
| Client Project ID: | NS-Gulf | Analyzed By: | LAW |
| Lab Sample ID: | 33593 | Date Collected: | 12/5/97 |
| Lab Project ID: | G145-187 | Date Received: | 12/5/97 |
| Matrix: | Soil %Solids: 81.3 | Dilution: | 1 |

| Compound | Quantitation Limit (ug/KG) | Result (ug/KG) |
|---|---|---|
| Acetone | 61 | BQL |
| Acrolein | 120 | BQL |
| Acrylonitrile | 120 | BQL |
| Benzene | 12 | BQL |
| Bromobenzene | 12 | BQL |
| Bromochloromethane | 12 | BQL |
| Bromodichloromethane | 12 | BQL |
| Bromoform | 12 | BQL |
| Bromomethane | 12 | BQL |
| 2-Butanone | 31 | BQL |
| n-Butylbenzene | 12 | BQL |
| sec-Butylbenzene | 12 | BQL |
| tert-Butylbenzene | 12 | BQL |
| Carbon disulfide | 12 | BQL |
| Carbon tetrachloride | 12 | BQL |
| Chlorobenzene | 12 | BQL |
| Chloroethane | 12 | BQL |
| 2-Chloroethyl vinyl ether | 12 | BQL |
| Chloroform | 12 | BQL |
| Chloromethane | 12 | BQL |
| 2-Chlorotoluene | 12 | BQL |
| 4-Chlorotoluene | 12 | BQL |
| Dibromochloromethane | 12 | BQL |
| 1,2-Dibromo-3-chloropropane | 12 | BQL |
| Dibromomethane | 12 | BQL |
| 1,2-Dibromoethane (EDB) | 12 | BQL |
| 1,2-Dichlorobenzene | 12 | BQL |
| 1,3-Dichlorobenzene | 12 | BQL |
| 1,4-Dichlorobenzene | 12 | BQL |
| trans-1,4-Dichloro-2-butene | 12 | BQL |
| 1,1-Dichloroethane | 12 | BQL |
| 1,1-Dichloroethene | 12 | BQL |
| 1,2-Dichloroethane | 12 | BQL |
| cis-1,2-Dichloroethene | 12 | BQL |
| trans-1,2-dichloroethene | 12 | BQL |
| 1,2-Dichloropropane | 12 | BQL |
| 1,3-Dichloropropane | 12 | BQL |
| 2,2-Dichloropropane | 12 | BQL |
| 1,1-Dichloropropene | 12 | BQL |
| cis-1,3-Dichloropropene | 12 | BQL |
| trans-1,3-Dichloropropene | 12 | BQL |
| Dichlorodifluoromethane | 12 | BQL |
| Diisopropyl ether (DIPE) | 12 | BQL |
| Ethylbenzene | 12 | BQL |
| Hexachlorobutadiene | 12 | BQL |
| 2-Hexanone | 12 | BQL |
| Iodomethane | 12 | BQL |
| Isopropylbenzene | 12 | BQL |

Reviewed by: [illegible]

**Flags:** BQL = Below Quantitation Limit

# PARADIGM ANALYTICAL LABORATORIES, INC.

## Results for Volatiles
*by GCMS 8260B*

| | | | |
|---|---|---|---|
| Client Sample ID: | B6 | Date Analyzed: | 12/11/97 |
| Client Project ID: | NS-Gulf | Analyzed By: | LAW |
| Lab Sample ID: | 33593 | Date Collected: | 12/5/97 |
| Lab Project ID: | G145-187 | Date Received: | 12/5/97 |
| Matrix: | Soil %Solids: 81.3 | Dilution: | 1 |

| Compound | Quantitation Limit (ug/KG) | Result (ug/KG) |
|---|---|---|
| 4-Isopropyltoluene | 12 | BQL |
| Methylene chloride | 24 | BQL |
| 4-Methyl-2-pentanone | 12 | BQL |
| Methyl-tert-butyl ether (MTBE) | 12 | BQL |
| Naphthalene | 12 | BQL |
| n-Propyl benzene | 12 | BQL |
| Styrene | 12 | BQL |
| 1,1,1,2-Tetrachloroethane | 12 | BQL |
| 1,1,2,2-Tetrachloroethane | 12 | BQL |
| Tetrachloroethene | 12 | BQL |
| Toluene | 12 | BQL |
| 1,2,3-Trichlorobenzene | 12 | BQL |
| 1,2,4-Trichlorobenzene | 12 | BQL |
| Trichloroethene | 12 | BQL |
| 1,1,1-Trichloroethane | 12 | BQL |
| 1,1,2-Trichloroethane | 12 | BQL |
| Trichlorofluoromethane | 12 | BQL |
| 1,2,3-Trichloropropane | 12 | BQL |
| 1,2,4-Trimethylbenzene | 12 | BQL |
| 1,3,5-Trimethylbenzene | 12 | BQL |
| Vinyl chloride | 12 | BQL |
| m-,p-Xylene | 24 | BQL |
| o-Xylene | 12 | BQL |

| Surrogate Spike Recoveries<br>Compound | Spike Added (ug/KG) | Surrogate Result (ug/KG) | %Rec |
|---|---|---|---|
| Bromofluorobenzene | 50 | 53.7 | 107 |
| 1,2-Dichloroethane-d4 | 50 | 53.8 | 108 |
| Toluene-d8 | 50 | 52.7 | 105 |

**Comments:**

All results are corrected for dilution.

Reviewed by: [illegible]

**Flags:** BQL = Below Quantitation Limit

# PARADIGM ANALYTICAL LABORATORIES, INC.

**Results for Volatiles**
*by GCMS 8260B*

Client Sample ID: B10
Client Project ID: NS-Gulf
Lab Sample ID: 33594
Lab Project ID: G145-187
Matrix: Soil %Solids: 81.5

Date Analyzed: 12/11/97
Analyzed By: LAW
Date Collected: 12/5/97
Date Received: 12/5/97
Dilution: 1

| Compound | Quantitation Limit (ug/KG) | Result (ug/KG) |
|---|---|---|
| Acetone | 61 | BQL |
| Acrolein | 120 | BQL |
| Acrylonitrile | 120 | BQL |
| Benzene | 12 | BQL |
| Bromobenzene | 12 | BQL |
| Bromochloromethane | 12 | BQL |
| Bromodichloromethane | 12 | BQL |
| Bromoform | 12 | BQL |
| Bromomethane | 12 | BQL |
| 2-Butanone | 31 | BQL |
| n-Butylbenzene | 12 | BQL |
| sec-Butylbenzene | 12 | BQL |
| tert-Butylbenzene | 12 | BQL |
| Carbon disulfide | 12 | BQL |
| Carbon tetrachloride | 12 | BQL |
| Chlorobenzene | 12 | BQL |
| Chloroethane | 12 | BQL |
| 2-Chloroethyl vinyl ether | 12 | BQL |
| Chloroform | 12 | BQL |
| Chloromethane | 12 | BQL |
| 2-Chlorotoluene | 12 | BQL |
| 4-Chlorotoluene | 12 | BQL |
| Dibromochloromethane | 12 | BQL |
| 1,2-Dibromo-3-chloropropane | 12 | BQL |
| Dibromomethane | 12 | BQL |
| 1,2-Dibromoethane (EDB) | 12 | BQL |
| 1,2-Dichlorobenzene | 12 | BQL |
| 1,3-Dichlorobenzene | 12 | BQL |
| 1,4-Dichlorobenzene | 12 | BQL |
| trans-1,4-Dichloro-2-butene | 12 | BQL |
| 1,1-Dichloroethane | 12 | BQL |
| 1,1-Dichloroethene | 12 | BQL |
| 1,2-Dichloroethane | 12 | BQL |
| cis-1,2-Dichloroethene | 12 | BQL |
| trans-1,2-dichloroethene | 12 | BQL |
| 1,2-Dichloropropane | 12 | BQL |
| 1,3-Dichloropropane | 12 | BQL |
| 2,2-Dichloropropane | 12 | BQL |
| 1,1-Dichloropropene | 12 | BQL |
| cis-1,3-Dichloropropene | 12 | BQL |
| trans-1,3-Dichloropropene | 12 | BQL |
| Dichlorodifluoromethane | 12 | BQL |
| Diisopropyl ether (DIPE) | 12 | BQL |
| Ethylbenzene | 12 | BQL |
| Hexachlorobutadiene | 12 | BQL |
| 2-Hexanone | 12 | BQL |
| Iodomethane | 12 | BQL |
| Isopropylbenzene | 12 | BQL |

Reviewed by: [illegible]

Flags: BQL = Below Quantitation Limit

# PARADIGM ANALYTICAL LABORATORIES, INC.

## Results for Volatiles
*by GCMS 8260B*

| | | | |
|---|---|---|---|
| Client Sample ID: | B10 | Date Analyzed: | 12/11/97 |
| Client Project ID: | NS-Gulf | Analyzed By: | LAW |
| Lab Sample ID: | 33594 | Date Collected: | 12/5/97 |
| Lab Project ID: | G145-187 | Date Received: | 12/5/97 |
| Matrix: | Soil %Solids: 81.5 | Dilution: | 1 |

| Compound | Quantitation Limit (ug/KG) | Result (ug/KG) |
|---|---|---|
| 4-Isopropyltoluene | 12 | BQL |
| Methylene chloride | 24 | BQL |
| 4-Methyl-2-pentanone | 12 | BQL |
| Methyl-tert-butyl ether (MTBE) | 12 | BQL |
| Naphthalene | 12 | BQL |
| n-Propyl benzene | 12 | BQL |
| Styrene | 12 | BQL |
| 1,1,1,2-Tetrachloroethane | 12 | BQL |
| 1,1,2,2-Tetrachloroethane | 12 | BQL |
| Tetrachloroethene | 12 | BQL |
| Toluene | 12 | BQL |
| 1,2,3-Trichlorobenzene | 12 | BQL |
| 1,2,4-Trichlorobenzene | 12 | BQL |
| Trichloroethene | 12 | BQL |
| 1,1,1-Trichloroethane | 12 | BQL |
| 1,1,2-Trichloroethane | 12 | BQL |
| Trichlorofluoromethane | 12 | BQL |
| 1,2,3-Trichloropropane | 12 | BQL |
| 1,2,4-Trimethylbenzene | 12 | BQL |
| 1,3,5-Trimethylbenzene | 12 | BQL |
| Vinyl chloride | 12 | BQL |
| m-,p-Xylene | 24 | BQL |
| o-Xylene | 12 | BQL |

| Surrogate Spike Recoveries<br>Compound | Spike Added (ug/KG) | Surrogate Result (ug/KG) | %Rec |
|---|---|---|---|
| Bromofluorobenzene | 50 | 49.3 | 99 |
| 1,2-Dichloroethane-d4 | 50 | 52.1 | 104 |
| Toluene-d8 | 50 | 50.4 | 101 |

**Comments:**

All results are corrected for dilution.

Reviewed by: [illegible]

**Flags:** BQL = Below Quantitation Limit

# PARADIGM ANALYTICAL LABORATORIES, INC.

## Results for Volatiles
*by GCMS 8260B*

Client Sample ID: B15
Client Project ID: NS-Gulf
Lab Sample ID: 33595
Lab Project ID: G145-187
Matrix: Soil %Solids: 84.0

Date Analyzed: 12/11/97
Analyzed By: LAW
Date Collected: 12/5/97
Date Received: 12/5/97
Dilution: 1

| Compound | Quantitation Limit (ug/KG) | Result (ug/KG) |
|---|---|---|
| Acetone | 60 | BQL |
| Acrolein | 120 | BQL |
| Acrylonitrile | 120 | BQL |
| Benzene | 12 | BQL |
| Bromobenzene | 12 | BQL |
| Bromochloromethane | 12 | BQL |
| Bromodichloromethane | 12 | BQL |
| Bromoform | 12 | BQL |
| Bromomethane | 12 | BQL |
| 2-Butanone | 30 | BQL |
| n-Butylbenzene | 12 | BQL |
| sec-Butylbenzene | 12 | BQL |
| tert-Butylbenzene | 12 | BQL |
| Carbon disulfide | 12 | BQL |
| Carbon tetrachloride | 12 | BQL |
| Chlorobenzene | 12 | BQL |
| Chloroethane | 12 | BQL |
| 2-Chloroethyl vinyl ether | 12 | BQL |
| Chloroform | 12 | BQL |
| Chloromethane | 12 | BQL |
| 2-Chlorotoluene | 12 | BQL |
| 4-Chlorotoluene | 12 | BQL |
| Dibromochloromethane | 12 | BQL |
| 1,2-Dibromo-3-chloropropane | 12 | BQL |
| Dibromomethane | 12 | BQL |
| 1,2-Dibromoethane (EDB) | 12 | BQL |
| 1,2-Dichlorobenzene | 12 | BQL |
| 1,3-Dichlorobenzene | 12 | BQL |
| 1,4-Dichlorobenzene | 12 | BQL |
| trans-1,4-Dichloro-2-butene | 12 | BQL |
| 1,1-Dichloroethane | 12 | BQL |
| 1,1-Dichloroethene | 12 | BQL |
| 1,2-Dichloroethane | 12 | BQL |
| cis-1,2-Dichloroethene | 12 | BQL |
| trans-1,2-dichloroethene | 12 | BQL |
| 1,2-Dichloropropane | 12 | BQL |
| 1,3-Dichloropropane | 12 | BQL |
| 2,2-Dichloropropane | 12 | BQL |
| 1,1-Dichloropropene | 12 | BQL |
| cis-1,3-Dichloropropene | 12 | BQL |
| trans-1,3-Dichloropropene | 12 | BQL |
| Dichlorodifluoromethane | 12 | BQL |
| Diisopropyl ether (DIPE) | 12 | BQL |
| Ethylbenzene | 12 | BQL |
| Hexachlorobutadiene | 12 | BQL |
| 2-Hexanone | 12 | BQL |
| Iodomethane | 12 | BQL |
| Isopropylbenzene | 12 | BQL |

Reviewed by: Mon

Flags: BQL = Below Quantitation Limit

# PARADIGM ANALYTICAL LABORATORIES, INC.

## Results for Volatiles
*by GCMS 8260B*

| | | | |
|---|---|---|---|
| Client Sample ID: | B15 | Date Analyzed: | 12/11/97 |
| Client Project ID: | NS-Gulf | Analyzed By: | LAW |
| Lab Sample ID: | 33595 | Date Collected: | 12/5/97 |
| Lab Project ID: | G145-187 | Date Received: | 12/5/97 |
| Matrix: | Soil %Solids: 84.0 | Dilution: | 1 |

| Compound | Quantitation Limit (ug/KG) | Result (ug/KG) |
|---|---|---|
| 4-Isopropyltoluene | 12 | BQL |
| Methylene chloride | 24 | BQL |
| 4-Methyl-2-pentanone | 12 | BQL |
| Methyl-tert-butyl ether (MTBE) | 12 | BQL |
| Naphthalene | 12 | BQL |
| n-Propyl benzene | 12 | BQL |
| Styrene | 12 | BQL |
| 1,1,1,2-Tetrachloroethane | 12 | BQL |
| 1,1,2,2-Tetrachloroethane | 12 | BQL |
| Tetrachloroethene | 12 | BQL |
| Toluene | 12 | BQL |
| 1,2,3-Trichlorobenzene | 12 | BQL |
| 1,2,4-Trichlorobenzene | 12 | BQL |
| Trichloroethene | 12 | BQL |
| 1,1,1-Trichloroethane | 12 | BQL |
| 1,1,2-Trichloroethane | 12 | BQL |
| Trichlorofluoromethane | 12 | BQL |
| 1,2,3-Trichloropropane | 12 | BQL |
| 1,2,4-Trimethylbenzene | 12 | BQL |
| 1,3,5-Trimethylbenzene | 12 | BQL |
| Vinyl chloride | 12 | BQL |
| m-,p-Xylene | 24 | BQL |
| o-Xylene | 12 | BQL |

| Surrogate Spike Recoveries<br>Compound | Spike Added (ug/KG) | Surrogate Result (ug/KG) | %Rec |
|---|---|---|---|
| Bromofluorobenzene | 50 | 52.2 | 104 |
| 1,2-Dichloroethane-d4 | 50 | 54.2 | 108 |
| Toluene-d8 | 50 | 50.1 | 100 |

**Comments:**

All results are corrected for dilution.

Reviewed by: [illegible]

**Flags:** BQL = Below Quantitation Limit

# PARADIGM ANALYTICAL LABORATORIES, INC.

**Results for Volatiles**
*by GCMS 8260B*

| | | | |
|---|---|---|---|
| Client Sample ID: | B18 | Date Analyzed: | 12/11/97 |
| Client Project ID: | NS-Gulf | Analyzed By: | LAW |
| Lab Sample ID: | 33596 | Date Collected: | 12/5/97 |
| Lab Project ID: | G145-187 | Date Received: | 12/5/97 |
| Matrix: | Soil %Solids: 83.5 | Dilution: | 1 |

| Compound | Quantitation Limit (ug/KG) | Result (ug/KG) |
|---|---|---|
| Acetone | 60 | BQL |
| Acrolein | 120 | BQL |
| Acrylonitrile | 120 | BQL |
| Benzene | 12 | BQL |
| Bromobenzene | 12 | BQL |
| Bromochloromethane | 12 | BQL |
| Bromodichloromethane | 12 | BQL |
| Bromoform | 12 | BQL |
| Bromomethane | 12 | BQL |
| 2-Butanone | 30 | BQL |
| n-Butylbenzene | 12 | BQL |
| sec-Butylbenzene | 12 | BQL |
| tert-Butylbenzene | 12 | BQL |
| Carbon disulfide | 12 | BQL |
| Carbon tetrachloride | 12 | BQL |
| Chlorobenzene | 12 | BQL |
| Chloroethane | 12 | BQL |
| 2-Chloroethyl vinyl ether | 12 | BQL |
| Chloroform | 12 | BQL |
| Chloromethane | 12 | BQL |
| 2-Chlorotoluene | 12 | BQL |
| 4-Chlorotoluene | 12 | BQL |
| Dibromochloromethane | 12 | BQL |
| 1,2-Dibromo-3-chloropropane | 12 | BQL |
| Dibromomethane | 12 | BQL |
| 1,2-Dibromoethane (EDB) | 12 | BQL |
| 1,2-Dichlorobenzene | 12 | BQL |
| 1,3-Dichlorobenzene | 12 | BQL |
| 1,4-Dichlorobenzene | 12 | BQL |
| trans-1,4-Dichloro-2-butene | 12 | BQL |
| 1,1-Dichloroethane | 12 | BQL |
| 1,1-Dichloroethene | 12 | BQL |
| 1,2-Dichloroethane | 12 | BQL |
| cis-1,2-Dichloroethene | 12 | BQL |
| trans-1,2-dichloroethene | 12 | BQL |
| 1,2-Dichloropropane | 12 | BQL |
| 1,3-Dichloropropane | 12 | BQL |
| 2,2-Dichloropropane | 12 | BQL |
| 1,1-Dichloropropene | 12 | BQL |
| cis-1,3-Dichloropropene | 12 | BQL |
| trans-1,3-Dichloropropene | 12 | BQL |
| Dichlorodifluoromethane | 12 | BQL |
| Diisopropyl ether (DIPE) | 12 | BQL |
| Ethylbenzene | 12 | BQL |
| Hexachlorobutadiene | 12 | BQL |
| 2-Hexanone | 12 | BQL |
| Iodomethane | 12 | BQL |
| Isopropylbenzene | 12 | BQL |

Reviewed by: ma

**Flags:** BQL = Below Quantitation Limit

# PARADIGM ANALYTICAL LABORATORIES, INC.

**Results for Volatiles**
*by GCMS 8260B*

| | | | |
|---|---|---|---|
| Client Sample ID: | B18 | Date Analyzed: | 12/11/97 |
| Client Project ID: | NS-Gulf | Analyzed By: | LAW |
| Lab Sample ID: | 33596 | Date Collected: | 12/5/97 |
| Lab Project ID: | G145-187 | Date Received: | 12/5/97 |
| Matrix: | Soil %Solids: 83.5 | Dilution: | 1 |

| Compound | Quantitation Limit (ug/KG) | Result (ug/KG) |
|---|---|---|
| 4-Isopropyltoluene | 12 | BQL |
| Methylene chloride | 24 | BQL |
| 4-Methyl-2-pentanone | 12 | BQL |
| Methyl-tert-butyl ether (MTBE) | 12 | BQL |
| Naphthalene | 12 | BQL |
| n-Propyl benzene | 12 | BQL |
| Styrene | 12 | BQL |
| 1,1,1,2-Tetrachloroethane | 12 | BQL |
| 1,1,2,2-Tetrachloroethane | 12 | BQL |
| Tetrachloroethene | 12 | BQL |
| Toluene | 12 | BQL |
| 1,2,3-Trichlorobenzene | 12 | BQL |
| 1,2,4-Trichlorobenzene | 12 | BQL |
| Trichloroethene | 12 | BQL |
| 1,1,1-Trichloroethane | 12 | BQL |
| 1,1,2-Trichloroethane | 12 | BQL |
| Trichlorofluoromethane | 12 | BQL |
| 1,2,3-Trichloropropane | 12 | BQL |
| 1,2,4-Trimethylbenzene | 12 | BQL |
| 1,3,5-Trimethylbenzene | 12 | BQL |
| Vinyl chloride | 12 | BQL |
| m-,p-Xylene | 24 | BQL |
| o-Xylene | 12 | BQL |

| Surrogate Spike Recoveries<br>Compound | Spike Added (ug/KG) | Surrogate Result (ug/KG) | %Rec |
|---|---|---|---|
| Bromofluorobenzene | 50 | 52.4 | 105 |
| 1,2-Dichloroethane-d4 | 50 | 53.6 | 107 |
| Toluene-d8 | 50 | 52.0 | 104 |

**Comments:**
All results are corrected for dilution.

Reviewed by: [signature]

**Flags:** BQL = Below Quantitation Limit

# PARADIGM ANALYTICAL LABORATORIES, INC.

**Results for Semivolatiles**
by GCMS 8270

Client Sample ID: B1
Client Project ID: NS-Gulf
Lab Sample ID: 33591
Lab Project ID: G145-187
Matrix: Soil %Solids: 81.8

Date Collected: 12/3/97
Date Received: 12/5/97
Date Analyzed: 12/11/97
Date Extracted: 12/10/97
Dilution: 1

| Compound | Quantitation Limit (ug/KG) | Result (ug/KG) |
|---|---|---|
| Acenaphthene | 360 | BQL |
| Acenaphthylene | 360 | BQL |
| Anthracene | 360 | BQL |
| Benzo[a]anthracene | 360 | BQL |
| Benzo[a]pyrene | 360 | BQL |
| Benzo[b]fluoranthene | 360 | BQL |
| Benzo[g,h,i]perylene | 360 | BQL |
| Benzo[k]fluoranthene | 360 | BQL |
| Benzoic Acid | 710 | BQL |
| Benzyl Alcohol | 360 | BQL |
| Bis(2-chloroethoxy)methane | 360 | BQL |
| Bis(2-chloroethyl)ether | 360 | BQL |
| Bis(2-chloroisopropyl)ether | 360 | BQL |
| Bis(2-ethylhexyl)phthalate | 360 | BQL |
| 4-bromophenyl phenyl ether | 360 | BQL |
| Butylbenzylphthalate | 360 | BQL |
| 4-Chloroaniline | 360 | BQL |
| 4-Chloro-3-methylphenol | 360 | BQL |
| 2-Chloronaphthalene | 360 | BQL |
| 2-Chlorophenol | 360 | BQL |
| 4-Chlorophenyl phenyl ether | 360 | BQL |
| Chrysene | 360 | BQL |
| Di-n-Butylphthalate | 360 | BQL |
| Di-n-octylphthalate | 360 | BQL |
| Dibenzo[a,h]anthracene | 360 | BQL |
| Dibenzofuran | 360 | BQL |
| 1,2-Dichlorobenzene | 360 | BQL |
| 1,3-Dichlorobenzene | 360 | BQL |
| 1,4-Dichlorobenzene | 360 | BQL |
| 3,3'-Dichlorobenzidine | 710 | BQL |
| 2,4-Dichlorophenol | 360 | BQL |
| Diethylphthalate | 710 | BQL |
| 2,4-Dimethylphenol | 360 | BQL |
| Dimethylphthalate | 360 | BQL |
| 4,6-Dinitro-2-methylphenol | 1800 | BQL |
| 2,4-Dinitrophenol | 1800 | BQL |
| 2,4-Dinitrotoluene | 360 | BQL |
| 2,6-Dinitrotoluene | 360 | BQL |
| Fluoranthene | 360 | BQL |
| Fluorene | 360 | BQL |
| Hexachlorobenzene | 360 | BQL |
| Hexachlorobutadiene | 360 | BQL |
| Hexachlorocyclopentadiene | 710 | BQL |
| Hexachloroethane | 360 | BQL |
| Indeno(1,2,3-c,d)pyrene | 360 | BQL |

# PARADIGM ANALYTICAL LABORATORIES, INC.

**Results for Semivolatiles**
by GCMS 8270

Client Sample ID: B1
Client Project ID: NS-Gulf
Lab Sample ID: 33591
Lab Project ID: G145-187
Matrix: Soil %Solids: 81.8

Date Collected: 12/3/97
Date Received: 12/5/97
Date Analyzed: 12/11/97
Date Extracted: 12/10/97
Dilution: 1

| Compound | Quantitation Limit (ug/KG) | Result (ug/KG) |
|---|---|---|
| Isophorone | 360 | BQL |
| 2-Methylnaphthalene | 360 | BQL |
| 2-Methylphenol | 360 | BQL |
| 4-Methylphenol | 360 | BQL |
| N-Nitrosodi-n-propylamine | 360 | BQL |
| N-Nitrosodiphenylamine | 360 | BQL |
| Naphthalene | 360 | BQL |
| 2-Nitroaniline | 360 | BQL |
| 3-Nitroaniline | 360 | BQL |
| 4-Nitroaniline | 360 | BQL |
| Nitrobenzene | 360 | BQL |
| 2-Nitrophenol | 360 | BQL |
| 4-Nitrophenol | 1800 | BQL |
| Pentachlorophenol | 1800 | BQL |
| Phenanthrene | 360 | BQL |
| Phenol | 360 | BQL |
| Pyrene | 360 | BQL |
| 1,2,4-Trichlorobenzene | 360 | BQL |
| 2,4,5-Trichlorophenol | 360 | BQL |
| 2,4,6-Trichlorophenol | 360 | BQL |

| Surrogate Spike Recoveries | Spike Added | Spike Result | Percent Recovered |
|---|---|---|---|
| 2,4,6-Tribromophenol | 100 | 120 | 120 |
| 2-Fluorobiphenyl | 100 | 98 | 98 |
| 2-Fluorophenol | 100 | 84 | 84 |
| 4-Terphenyl-d14 | 100 | 100 | 100 |
| Nitrobenzene-d5 | 100 | 110 | 110 |
| Phenol-d6 | 100 | 87 | 87 |

**Comments:**

Results are corrected for %solids and dilution where applicable.
Analyzed By: JPW

**Flags:**

BQL = Below Quantitation Limit.
J = Detected below the quantitation limit.

Reviewed By: Ma

# PARADIGM ANALYTICAL LABORATORIES, INC.

**Results for Semivolatiles**
by GCMS 8270

Client Sample ID: B4
Client Project ID: NS-Gulf
Lab Sample ID: 33592
Lab Project ID: G145-187
Matrix: Soil %Solids: 88.9

Date Collected: 12/3/97
Date Received: 12/5/97
Date Analyzed: 12/11/97
Date Extracted: 12/10/97
Dilution: 1

| Compound | Quantitation Limit (ug/KG) | Result (ug/KG) |
|---|---|---|
| Acenaphthene | 340 | BQL |
| Acenaphthylene | 340 | BQL |
| Anthracene | 340 | BQL |
| Benzo[a]anthracene | 340 | **360** |
| Benzo[a]pyrene | 340 | BQL |
| Benzo[b]fluoranthene | 340 | **700** |
| Benzo[g,h,i]perylene | 340 | BQL |
| Benzo[k]fluoranthene | 340 | **440** |
| Benzoic Acid | 690 | BQL |
| Benzyl Alcohol | 340 | BQL |
| Bis(2-chloroethoxy)methane | 340 | BQL |
| Bis(2-chloroethyl)ether | 340 | BQL |
| Bis(2-chloroisopropyl)ether | 340 | BQL |
| Bis(2-ethylhexyl)phthalate | 340 | BQL |
| 4-bromophenyl phenyl ether | 340 | BQL |
| Butylbenzylphthalate | 340 | BQL |
| 4-Chloroaniline | 340 | BQL |
| 4-Chloro-3-methylphenol | 340 | BQL |
| 2-Chloronaphthalene | 340 | BQL |
| 2-Chlorophenol | 340 | BQL |
| 4-Chlorophenyl phenyl ether | 340 | BQL |
| Chrysene | 340 | **720** |
| Di-n-Butylphthalate | 340 | BQL |
| Di-n-octylphthalate | 340 | BQL |
| Dibenzo[a,h]anthracene | 340 | BQL |
| Dibenzofuran | 340 | BQL |
| 1,2-Dichlorobenzene | 340 | BQL |
| 1,3-Dichlorobenzene | 340 | BQL |
| 1,4-Dichlorobenzene | 340 | BQL |
| 3,3'-Dichlorobenzidine | 690 | BQL |
| 2,4-Dichlorophenol | 340 | BQL |
| Diethylphthalate | 690 | BQL |
| 2,4-Dimethylphenol | 340 | BQL |
| Dimethylphthalate | 340 | BQL |
| 4,6-Dinitro-2-methylphenol | 1700 | BQL |
| 2,4-Dinitrophenol | 1700 | BQL |
| 2,4-Dinitrotoluene | 340 | BQL |
| 2,6-Dinitrotoluene | 340 | BQL |
| Fluoranthene | 340 | **640** |
| Fluorene | 340 | BQL |
| Hexachlorobenzene | 340 | BQL |
| Hexachlorobutadiene | 340 | BQL |
| Hexachlorocyclopentadiene | 690 | BQL |
| Hexachloroethane | 340 | BQL |
| Indeno(1,2,3-c,d)pyrene | 340 | BQL |

# PARADIGM ANALYTICAL LABORATORIES, INC.

## Results for Semivolatiles
by GCMS 8270

Client Sample ID: B4
Client Project ID: NS-Gulf
Lab Sample ID: 33592
Lab Project ID: G145-187
Matrix: Soil %Solids: 88.9

Date Collected: 12/3/97
Date Received: 12/5/97
Date Analyzed: 12/11/97
Date Extracted: 12/10/97
Dilution: 1

| Compound | Quantitation Limit (ug/KG) | Result (ug/KG) |
|---|---|---|
| Isophorone | 340 | BQL |
| 2-Methylnaphthalene | 340 | BQL |
| 2-Methylphenol | 340 | BQL |
| 4-Methylphenol | 340 | BQL |
| N-Nitrosodi-n-propylamine | 340 | BQL |
| N-Nitrosodiphenylamine | 340 | BQL |
| Naphthalene | 340 | BQL |
| 2-Nitroaniline | 340 | BQL |
| 3-Nitroaniline | 340 | BQL |
| 4-Nitroaniline | 340 | BQL |
| Nitrobenzene | 340 | BQL |
| 2-Nitrophenol | 340 | BQL |
| 4-Nitrophenol | 1700 | BQL |
| Pentachlorophenol | 1700 | BQL |
| Phenanthrene | 340 | BQL |
| Phenol | 340 | BQL |
| Pyrene | 340 | 530 |
| 1,2,4-Trichlorobenzene | 340 | BQL |
| 2,4,5-Trichlorophenol | 340 | BQL |
| 2,4,6-Trichlorophenol | 340 | BQL |

| Surrogate Spike Recoveries | Spike Added | Spike Result | Percent Recovered |
|---|---|---|---|
| 2,4,6-Tribromophenol | 100 | 130 | 130 |
| 2-Fluorobiphenyl | 100 | 99 | 99 |
| 2-Fluorophenol | 100 | 78 | 78 |
| 4-Terphenyl-d14 | 100 | 100 | 100 |
| Nitrobenzene-d5 | 100 | 110 | 110 |
| Phenol-d6 | 100 | 78 | 78 |

**Comments:**

Results are corrected for %solids and dilution where applicable.
Analyzed By: JPW

**Flags:**

BQL = Below Quantitation Limit.
J = Detected below the quantitation limit.

Reviewed By: Ma

# PARADIGM ANALYTICAL LABORATORIES, INC.

## Results for Semivolatiles
by GCMS 8270

Client Sample ID: B6
Client Project ID: NS-Gulf
Lab Sample ID: 33593
Lab Project ID: G145-187
Matrix: Soil %Solids: 81.3

Date Collected: 12/3/97
Date Received: 12/5/97
Date Analyzed: 12/11/97
Date Extracted: 12/10/97
Dilution: 1

| Compound | Quantitation Limit (ug/KG) | Result (ug/KG) |
|---|---|---|
| Acenaphthene | 350 | BQL |
| Acenaphthylene | 350 | BQL |
| Anthracene | 350 | BQL |
| Benzo[a]anthracene | 350 | BQL |
| Benzo[a]pyrene | 350 | BQL |
| Benzo[b]fluoranthene | 350 | BQL |
| Benzo[g,h,i]perylene | 350 | BQL |
| Benzo[k]fluoranthene | 350 | BQL |
| Benzoic Acid | 700 | BQL |
| Benzyl Alcohol | 350 | BQL |
| Bis(2-chloroethoxy)methane | 350 | BQL |
| Bis(2-chloroethyl)ether | 350 | BQL |
| Bis(2-chloroisopropyl)ether | 350 | BQL |
| Bis(2-ethylhexyl)phthalate | 350 | BQL |
| 4-bromophenyl phenyl ether | 350 | BQL |
| Butylbenzylphthalate | 350 | BQL |
| 4-Chloroaniline | 350 | BQL |
| 4-Chloro-3-methylphenol | 350 | BQL |
| 2-Chloronaphthalene | 350 | BQL |
| 2-Chlorophenol | 350 | BQL |
| 4-Chlorophenyl phenyl ether | 350 | BQL |
| Chrysene | 350 | BQL |
| Di-n-Butylphthalate | 350 | BQL |
| Di-n-octylphthalate | 350 | BQL |
| Dibenzo[a,h]anthracene | 350 | BQL |
| Dibenzofuran | 350 | BQL |
| 1,2-Dichlorobenzene | 350 | BQL |
| 1,3-Dichlorobenzene | 350 | BQL |
| 1,4-Dichlorobenzene | 350 | BQL |
| 3,3'-Dichlorobenzidine | 700 | BQL |
| 2,4-Dichlorophenol | 350 | BQL |
| Diethylphthalate | 700 | BQL |
| 2,4-Dimethylphenol | 350 | BQL |
| Dimethylphthalate | 350 | BQL |
| 4,6-Dinitro-2-methylphenol | 1800 | BQL |
| 2,4-Dinitrophenol | 1800 | BQL |
| 2,4-Dinitrotoluene | 350 | BQL |
| 2,6-Dinitrotoluene | 350 | BQL |
| Fluoranthene | 350 | BQL |
| Fluorene | 350 | BQL |
| Hexachlorobenzene | 350 | BQL |
| Hexachlorobutadiene | 350 | BQL |
| Hexachlorocyclopentadiene | 700 | BQL |
| Hexachloroethane | 350 | BQL |
| Indeno(1,2,3-c,d)pyrene | 350 | BQL |

# PARADIGM ANALYTICAL LABORATORIES, INC.

**Results for Semivolatiles**
by GCMS 8270

Client Sample ID: B6
Client Project ID: NS-Gulf
Lab Sample ID: 33593
Lab Project ID: G145-187
Matrix: Soil %Solids: 81.3

Date Collected: 12/3/97
Date Received: 12/5/97
Date Analyzed: 12/11/97
Date Extracted: 12/10/97
Dilution: 1

| Compound | Quantitation Limit (ug/KG) | Result (ug/KG) |
|---|---|---|
| Isophorone | 350 | BQL |
| 2-Methylnaphthalene | 350 | BQL |
| 2-Methylphenol | 350 | BQL |
| 4-Methylphenol | 350 | BQL |
| N-Nitrosodi-n-propylamine | 350 | BQL |
| N-Nitrosodiphenylamine | 350 | BQL |
| Naphthalene | 350 | BQL |
| 2-Nitroaniline | 350 | BQL |
| 3-Nitroaniline | 350 | BQL |
| 4-Nitroaniline | 350 | BQL |
| Nitrobenzene | 350 | BQL |
| 2-Nitrophenol | 350 | BQL |
| 4-Nitrophenol | 1800 | BQL |
| Pentachlorophenol | 1800 | BQL |
| Phenanthrene | 350 | BQL |
| Phenol | 350 | BQL |
| Pyrene | 350 | BQL |
| 1,2,4-Trichlorobenzene | 350 | BQL |
| 2,4,5-Trichlorophenol | 350 | BQL |
| 2,4,6-Trichlorophenol | 350 | BQL |

| Surrogate Spike Recoveries | Spike Added | Spike Result | Percent Recovered |
|---|---|---|---|
| 2,4,6-Tribromophenol | 100 | 120 | 120 |
| 2-Fluorobiphenyl | 100 | 88 | 88 |
| 2-Fluorophenol | 100 | 71 | 71 |
| 4-Terphenyl-d14 | 100 | 100 | 100 |
| Nitrobenzene-d5 | 100 | 89 | 89 |
| Phenol-d6 | 100 | 75 | 75 |

**Comments:**

Results are corrected for %solids and dilution where applicable.
Analyzed By: JPW

**Flags:**

BQL = Below Quantitation Limit.
J = Detected below the quantitation limit.

Reviewed By: Ma

# PARADIGM ANALYTICAL LABORATORIES, INC.

## Results for Semivolatiles
by GCMS 8270

Client Sample ID: B10
Client Project ID: NS-Gulf
Lab Sample ID: 33594
Lab Project ID: G145-187
Matrix: Soil %Solids: 81.5

Date Collected: 12/3/97
Date Received: 12/5/97
Date Analyzed: 12/11/97
Date Extracted: 12/10/97
Dilution: 1

| Compound | Quantitation Limit (ug/KG) | Result (ug/KG) |
|---|---|---|
| Acenaphthene | 370 | BQL |
| Acenaphthylene | 370 | BQL |
| Anthracene | 370 | 1300 |
| Benzo[a]anthracene | 370 | 3600 |
| Benzo[a]pyrene | 370 | 2600 |
| Benzo[b]fluoranthene | 370 | 5300 |
| Benzo[g,h,i]perylene | 370 | 1700 |
| Benzo[k]fluoranthene | 370 | 2100 |
| Benzoic Acid | 750 | BQL |
| Benzyl Alcohol | 370 | BQL |
| Bis(2-chloroethoxy)methane | 370 | BQL |
| Bis(2-chloroethyl)ether | 370 | BQL |
| Bis(2-chloroisopropyl)ether | 370 | BQL |
| Bis(2-ethylhexyl)phthalate | 370 | BQL |
| 4-bromophenyl phenyl ether | 370 | BQL |
| Butylbenzylphthalate | 370 | BQL |
| 4-Chloroaniline | 370 | BQL |
| 4-Chloro-3-methylphenol | 370 | BQL |
| 2-Chloronaphthalene | 370 | BQL |
| 2-Chlorophenol | 370 | BQL |
| 4-Chlorophenyl phenyl ether | 370 | BQL |
| Chrysene | 370 | 5300 |
| Di-n-Butylphthalate | 370 | BQL |
| Di-n-octylphthalate | 370 | BQL |
| Dibenzo[a,h]anthracene | 370 | 560 |
| Dibenzofuran | 370 | BQL |
| 1,2-Dichlorobenzene | 370 | BQL |
| 1,3-Dichlorobenzene | 370 | BQL |
| 1,4-Dichlorobenzene | 370 | BQL |
| 3,3'-Dichlorobenzidine | 750 | BQL |
| 2,4-Dichlorophenol | 370 | BQL |
| Diethylphthalate | 750 | BQL |
| 2,4-Dimethylphenol | 370 | BQL |
| Dimethylphthalate | 370 | BQL |
| 4,6-Dinitro-2-methylphenol | 1900 | BQL |
| 2,4-Dinitrophenol | 1900 | BQL |
| 2,4-Dinitrotoluene | 370 | BQL |
| 2,6-Dinitrotoluene | 370 | BQL |
| Fluoranthene | 370 | 4800 |
| Fluorene | 370 | BQL |
| Hexachlorobenzene | 370 | BQL |
| Hexachlorobutadiene | 370 | BQL |
| Hexachlorocyclopentadiene | 750 | BQL |
| Hexachloroethane | 370 | BQL |
| Indeno(1,2,3-c,d)pyrene | 370 | 2400 |

# PARADIGM ANALYTICAL LABORATORIES, INC.

**Results for Semivolatiles**
by GCMS 8270

Client Sample ID: B10
Client Project ID: NS-Gulf
Lab Sample ID: 33594
Lab Project ID: G145-187
Matrix: Soil %Solids: 81.5

Date Collected: 12/3/97
Date Received: 12/5/97
Date Analyzed: 12/11/97
Date Extracted: 12/10/97
Dilution: 1

| Compound | Quantitation Limit (ug/KG) | Result (ug/KG) |
|---|---|---|
| Isophorone | 370 | BQL |
| 2-Methylnaphthalene | 370 | BQL |
| 2-Methylphenol | 370 | BQL |
| 4-Methylphenol | 370 | BQL |
| N-Nitrosodi-n-propylamine | 370 | BQL |
| N-Nitrosodiphenylamine | 370 | BQL |
| Naphthalene | 370 | BQL |
| 2-Nitroaniline | 370 | BQL |
| 3-Nitroaniline | 370 | BQL |
| 4-Nitroaniline | 370 | BQL |
| Nitrobenzene | 370 | BQL |
| 2-Nitrophenol | 370 | BQL |
| 4-Nitrophenol | 1900 | BQL |
| Pentachlorophenol | 1900 | BQL |
| Phenanthrene | 370 | BQL |
| Phenol | 370 | BQL |
| Pyrene | 370 | **4000** |
| 1,2,4-Trichlorobenzene | 370 | BQL |
| 2,4,5-Trichlorophenol | 370 | BQL |
| 2,4,6-Trichlorophenol | 370 | BQL |

| Surrogate Spike Recoveries | Spike Added | Spike Result | Percent Recovered |
|---|---|---|---|
| 2,4,6-Tribromophenol | 100 | 130 | 130 |
| 2-Fluorobiphenyl | 100 | 92 | 92 |
| 2-Fluorophenol | 100 | 78 | 78 |
| 4-Terphenyl-d14 | 100 | 10 | 10 |
| Nitrobenzene-d5 | 100 | 89 | 89 |
| Phenol-d6 | 100 | 78 | 78 |

**Comments:**

Results are corrected for %solids and dilution where applicable.
Analyzed By: JPW

**Flags:**

BQL = Below Quantitation Limit.
J = Detected below the quantitation limit.

Reviewed By: [illegible]

# PARADIGM ANALYTICAL LABORATORIES, INC.

**Results for Semivolatiles**
by GCMS 8270

Client Sample ID: B15
Client Project ID: NS-Gulf
Lab Sample ID: 33595
Lab Project ID: G145-187
Matrix: Soil %Solids: 84.0

Date Collected: 12/3/97
Date Received: 12/5/97
Date Analyzed: 12/11/97
Date Extracted: 12/10/97
Dilution: 1

| Compound | Quantitation Limit (ug/KG) | Result (ug/KG) |
|---|---|---|
| Acenaphthene | 350 | BQL |
| Acenaphthylene | 350 | BQL |
| Anthracene | 350 | BQL |
| Benzo[a]anthracene | 350 | BQL |
| Benzo[a]pyrene | 350 | BQL |
| Benzo[b]fluoranthene | 350 | BQL |
| Benzo[g,h,i]perylene | 350 | BQL |
| Benzo[k]fluoranthene | 350 | BQL |
| Benzoic Acid | 700 | BQL |
| Benzyl Alcohol | 350 | BQL |
| Bis(2-chloroethoxy)methane | 350 | BQL |
| Bis(2-chloroethyl)ether | 350 | BQL |
| Bis(2-chloroisopropyl)ether | 350 | BQL |
| Bis(2-ethylhexyl)phthalate | 350 | BQL |
| 4-bromophenyl phenyl ether | 350 | BQL |
| Butylbenzylphthalate | 350 | BQL |
| 4-Chloroaniline | 350 | BQL |
| 4-Chloro-3-methylphenol | 350 | BQL |
| 2-Chloronaphthalene | 350 | BQL |
| 2-Chlorophenol | 350 | BQL |
| 4-Chlorophenyl phenyl ether | 350 | BQL |
| Chrysene | 350 | BQL |
| Di-n-Butylphthalate | 350 | BQL |
| Di-n-octylphthalate | 350 | BQL |
| Dibenzo[a,h]anthracene | 350 | BQL |
| Dibenzofuran | 350 | BQL |
| 1,2-Dichlorobenzene | 350 | BQL |
| 1,3-Dichlorobenzene | 350 | BQL |
| 1,4-Dichlorobenzene | 350 | BQL |
| 3,3'-Dichlorobenzidine | 700 | BQL |
| 2,4-Dichlorophenol | 350 | BQL |
| Diethylphthalate | 700 | BQL |
| 2,4-Dimethylphenol | 350 | BQL |
| Dimethylphthalate | 350 | BQL |
| 4,6-Dinitro-2-methylphenol | 1700 | BQL |
| 2,4-Dinitrophenol | 1700 | BQL |
| 2,4-Dinitrotoluene | 350 | BQL |
| 2,6-Dinitrotoluene | 350 | BQL |
| Fluoranthene | 350 | BQL |
| Fluorene | 350 | BQL |
| Hexachlorobenzene | 350 | BQL |
| Hexachlorobutadiene | 350 | BQL |
| Hexachlorocyclopentadiene | 700 | BQL |
| Hexachloroethane | 350 | BQL |
| Indeno(1,2,3-c,d)pyrene | 350 | BQL |

# PARADIGM ANALYTICAL LABORATORIES, INC.

## Results for Semivolatiles
by GCMS 8270

Client Sample ID: B15
Client Project ID: NS-Gulf
Lab Sample ID: 33595
Lab Project ID: G145-187
Matrix: Soil %Solids: 84.0

Date Collected: 12/3/97
Date Received: 12/5/97
Date Analyzed: 12/11/97
Date Extracted: 12/10/97
Dilution: 1

| Compound | Quantitation Limit (ug/KG) | Result (ug/KG) |
|---|---|---|
| Isophorone | 350 | BQL |
| 2-Methylnaphthalene | 350 | BQL |
| 2-Methylphenol | 350 | BQL |
| 4-Methylphenol | 350 | BQL |
| N-Nitrosodi-n-propylamine | 350 | BQL |
| N-Nitrosodiphenylamine | 350 | BQL |
| Naphthalene | 350 | BQL |
| 2-Nitroaniline | 350 | BQL |
| 3-Nitroaniline | 350 | BQL |
| 4-Nitroaniline | 350 | BQL |
| Nitrobenzene | 350 | BQL |
| 2-Nitrophenol | 350 | BQL |
| 4-Nitrophenol | 1700 | BQL |
| Pentachlorophenol | 1700 | BQL |
| Phenanthrene | 350 | BQL |
| Phenol | 350 | BQL |
| Pyrene | 350 | BQL |
| 1,2,4-Trichlorobenzene | 350 | BQL |
| 2,4,5-Trichlorophenol | 350 | BQL |
| 2,4,6-Trichlorophenol | 350 | BQL |

| Surrogate Spike Recoveries | Spike Added | Spike Result | Percent Recovered |
|---|---|---|---|
| 2,4,6-Tribromophenol | 100 | 130 | 130 |
| 2-Fluorobiphenyl | 100 | 95 | 95 |
| 2-Fluorophenol | 100 | 85 | 85 |
| 4-Terphenyl-d14 | 100 | 110 | 110 |
| Nitrobenzene-d5 | 100 | 110 | 110 |
| Phenol-d6 | 100 | 88 | 88 |

**Comments:**

Results are corrected for %solids and dilution where applicable.
Analyzed By: JPW

**Flags:**

BQL = Below Quantitation Limit.
J = Detected below the quantitation limit.

Reviewed By: Mw

# PARADIGM ANALYTICAL LABORATORIES, INC.

**Results for Semivolatiles**
by GCMS 8270

Client Sample ID: B18
Client Project ID: NS-Gulf
Lab Sample ID: 33596
Lab Project ID: G145-187
Matrix: Soil %Solids: 83.5

Date Collected: 12/3/97
Date Received: 12/5/97
Date Analyzed: 12/11/97
Date Extracted: 12/10/97
Dilution: 1

| Compound | Quantitation Limit (ug/KG) | Result (ug/KG) |
|---|---|---|
| Acenaphthene | 360 | BQL |
| Acenaphthylene | 360 | BQL |
| Anthracene | 360 | BQL |
| Benzo[a]anthracene | 360 | BQL |
| Benzo[a]pyrene | 360 | BQL |
| Benzo[b]fluoranthene | 360 | BQL |
| Benzo[g,h,i]perylene | 360 | BQL |
| Benzo[k]fluoranthene | 360 | BQL |
| Benzoic Acid | 710 | BQL |
| Benzyl Alcohol | 360 | BQL |
| Bis(2-chloroethoxy)methane | 360 | BQL |
| Bis(2-chloroethyl)ether | 360 | BQL |
| Bis(2-chloroisopropyl)ether | 360 | BQL |
| Bis(2-ethylhexyl)phthalate | 360 | BQL |
| 4-bromophenyl phenyl ether | 360 | BQL |
| Butylbenzylphthalate | 360 | BQL |
| 4-Chloroaniline | 360 | BQL |
| 4-Chloro-3-methylphenol | 360 | BQL |
| 2-Chloronaphthalene | 360 | BQL |
| 2-Chlorophenol | 360 | BQL |
| 4-Chlorophenyl phenyl ether | 360 | BQL |
| Chrysene | 360 | BQL |
| Di-n-Butylphthalate | 360 | BQL |
| Di-n-octylphthalate | 360 | BQL |
| Dibenzo[a,h]anthracene | 360 | BQL |
| Dibenzofuran | 360 | BQL |
| 1,2-Dichlorobenzene | 360 | BQL |
| 1,3-Dichlorobenzene | 360 | BQL |
| 1,4-Dichlorobenzene | 360 | BQL |
| 3,3'-Dichlorobenzidine | 710 | BQL |
| 2,4-Dichlorophenol | 360 | BQL |
| Diethylphthalate | 710 | BQL |
| 2,4-Dimethylphenol | 360 | BQL |
| Dimethylphthalate | 360 | BQL |
| 4,6-Dinitro-2-methylphenol | 1800 | BQL |
| 2,4-Dinitrophenol | 1800 | BQL |
| 2,4-Dinitrotoluene | 360 | BQL |
| 2,6-Dinitrotoluene | 360 | BQL |
| Fluoranthene | 360 | BQL |
| Fluorene | 360 | BQL |
| Hexachlorobenzene | 360 | BQL |
| Hexachlorobutadiene | 360 | BQL |
| Hexachlorocyclopentadiene | 710 | BQL |
| Hexachloroethane | 360 | BQL |
| Indeno(1,2,3-c,d)pyrene | 360 | BQL |

# PARADIGM ANALYTICAL LABORATORIES, INC.

## Results for Semivolatiles
by GCMS 8270

Client Sample ID: B18
Client Project ID: NS-Gulf
Lab Sample ID: 33596
Lab Project ID: G145-187
Matrix: Soil %Solids: 83.5

Date Collected: 12/3/97
Date Received: 12/5/97
Date Analyzed: 12/11/97
Date Extracted: 12/10/97
Dilution: 1

| Compound | Quantitation Limit (ug/KG) | Result (ug/KG) |
|---|---|---|
| Isophorone | 360 | BQL |
| 2-Methylnaphthalene | 360 | BQL |
| 2-Methylphenol | 360 | BQL |
| 4-Methylphenol | 360 | BQL |
| N-Nitrosodi-n-propylamine | 360 | BQL |
| N-Nitrosodiphenylamine | 360 | BQL |
| Naphthalene | 360 | BQL |
| 2-Nitroaniline | 360 | BQL |
| 3-Nitroaniline | 360 | BQL |
| 4-Nitroaniline | 360 | BQL |
| Nitrobenzene | 360 | BQL |
| 2-Nitrophenol | 360 | BQL |
| 4-Nitrophenol | 1800 | BQL |
| Pentachlorophenol | 1800 | BQL |
| Phenanthrene | 360 | BQL |
| Phenol | 360 | BQL |
| Pyrene | 360 | BQL |
| 1,2,4-Trichlorobenzene | 360 | BQL |
| 2,4,5-Trichlorophenol | 360 | BQL |
| 2,4,6-Trichlorophenol | 360 | BQL |

| Surrogate Spike Recoveries | Spike Added | Spike Result | Percent Recovered |
|---|---|---|---|
| 2,4,6-Tribromophenol | 100 | 110 | 110 |
| 2-Fluorobiphenyl | 100 | 91 | 91 |
| 2-Fluorophenol | 100 | 75 | 75 |
| 4-Terphenyl-d14 | 100 | 97 | 97 |
| Nitrobenzene-d5 | 100 | 82 | 82 |
| Phenol-d6 | 100 | 76 | 76 |

**Comments:**

Results are corrected for %solids and dilution where applicable.
Analyzed By: JPW

**Flags:**

BQL = Below Quantitation Limit.
J = Detected below the quantitation limit.

Reviewed By: Ma

# PARADIGM ANALYTICAL LABORATORIES, INC.

## Results for Inorganics

| | | | |
|---|---|---|---|
| Client Sample ID: | B1 | Analyzed By: | JMF |
| Client Project ID: | NS-Gulf | Date Collected: | 12/3/97 |
| Lab Sample ID: | 33591 | Date Received: | 12/5/97 |
| Lab Project ID: | G145-187 | Matrix: | Soil |

Solids 81.83

| Metals | Result | Quantitation Limit | Units | Procedure | Date Analyzed |
|---|---|---|---|---|---|
| Aluminum | **12200** | 24.4 | MG/KG | 6010A | 12/11/97 |
| Arsenic | **7.15** | 1.22 | MG/KG | 6010A | 12/11/97 |
| Barium | **113** | 12.2 | MG/KG | 6010A | 12/11/97 |
| Cadmium | **1.83** | 0.611 | MG/KG | 6010A | 12/11/97 |
| Chromium | **24.1** | 1.22 | MG/KG | 6010A | 12/11/97 |
| Cobalt | **9.83** | 1.22 | MG/KG | 6010A | 12/11/97 |
| Copper | **10.6** | 1.22 | MG/KG | 6010A | 12/11/97 |
| Lead | **9.59** | 1.22 | MG/KG | 6010A | 12/11/97 |
| Mercury | **0.0338** | 0.0233 | MG/KG | 7471 | 12/11/97 |
| Nickel | **12.4** | 4.89 | MG/KG | 6010A | 12/11/97 |
| Selenium | BQL | 1.22 | MG/KG | 6010A | 12/11/97 |
| Silver | BQL | 1.22 | MG/KG | 6010A | 12/11/97 |

**Comments**
BQL = Below Quantitation Limits

Reviewed By: mw

# PARADIGM ANALYTICAL LABORATORIES, INC.

## Results for Inorganics

| | | | |
|---|---|---|---|
| Client Sample ID: | B4 | Analyzed By: | JMF |
| Client Project ID: | NS-Gulf | Date Collected: | 12/3/97 |
| Lab Sample ID: | 33592 | Date Received: | 12/5/97 |
| Lab Project ID: | G145-187 | Matrix: | Soil |

Solids 88.91

| Metals | Result | Quantitation Limit | Units | Procedure | Date Analyzed |
|---|---|---|---|---|---|
| Aluminum | **3540** | 23.4 | MG/KG | 6010A | 12/11/97 |
| Arsenic | **2.83** | 1.17 | MG/KG | 6010A | 12/11/97 |
| Barium | **29.6** | 11.7 | MG/KG | 6010A | 12/11/97 |
| Cadmium | BQL | 0.586 | MG/KG | 6010A | 12/11/97 |
| Chromium | **12.4** | 1.17 | MG/KG | 6010A | 12/11/97 |
| Cobalt | **5.88** | 1.17 | MG/KG | 6010A | 12/11/97 |
| Copper | **10.0** | 1.17 | MG/KG | 6010A | 12/11/97 |
| Lead | **10.8** | 1.17 | MG/KG | 6010A | 12/11/97 |
| Mercury | **0.144** | 0.0223 | MG/KG | 7471 | 12/11/97 |
| Nickel | **11.2** | 4.69 | MG/KG | 6010A | 12/11/97 |
| Selenium | BQL | 1.17 | MG/KG | 6010A | 12/11/97 |
| Silver | BQL | 1.17 | MG/KG | 6010A | 12/11/97 |

**Comments**
BQL = Below Quantitation Limits

Reviewed By: MW

# PARADIGM ANALYTICAL LABORATORIES, INC.

## Results for Inorganics

| | | | |
|---|---|---|---|
| Client Sample ID: | B6 | Analyzed By: | JMF |
| Client Project ID: | NS-Gulf | Date Collected: | 12/3/97 |
| Lab Sample ID: | 33593 | Date Received: | 12/5/97 |
| Lab Project ID: | G145-187 | Matrix: | Soil |

Solids 81.31

| Metals | Result | Quantitation Limit | Units | Procedure | Date Analyzed |
|---|---|---|---|---|---|
| Aluminum | **4190** | 24.1 | MG/KG | 6010A | 12/11/97 |
| Arsenic | **2.41** | 1.20 | MG/KG | 6010A | 12/11/97 |
| Barium | **28.2** | 12.0 | MG/KG | 6010A | 12/11/97 |
| Cadmium | **0.869** | 0.603 | MG/KG | 6010A | 12/11/97 |
| Chromium | **17.8** | 1.20 | MG/KG | 6010A | 12/11/97 |
| Cobalt | **8.28** | 1.20 | MG/KG | 6010A | 12/11/97 |
| Copper | **4.21** | 1.20 | MG/KG | 6010A | 12/11/97 |
| Lead | **6.11** | 1.20 | MG/KG | 6010A | 12/11/97 |
| Mercury | **0.0460** | 0.0239 | MG/KG | 7471 | 12/11/97 |
| Nickel | BQL | 4.82 | MG/KG | 6010A | 12/11/97 |
| Selenium | BQL | 1.20 | MG/KG | 6010A | 12/11/97 |
| Silver | BQL | 1.20 | MG/KG | 6010A | 12/11/97 |

**Comments**
BQL = Below Quantitation Limits

Reviewed By: _____

# PARADIGM ANALYTICAL LABORATORIES, INC.

## Results for Inorganics

| | | | |
|---|---|---|---|
| Client Sample ID: | B10 | Analyzed By: | JMF |
| Client Project ID: | NS-Gulf | Date Collected: | 12/3/97 |
| Lab Sample ID: | 33594 | Date Received: | 12/5/97 |
| Lab Project ID: | G145-187 | Matrix: | Soil |

Solids 81.45

| Metals | Result | Quantitation Limit | Units | Procedure | Date Analyzed |
|---|---|---|---|---|---|
| Aluminum | **7740** | 24.6 | MG/KG | 6010A | 12/11/97 |
| Arsenic | **5.75** | 1.23 | MG/KG | 6010A | 12/11/97 |
| Barium | **81.0** | 12.3 | MG/KG | 6010A | 12/11/97 |
| Cadmium | **1.42** | 0.614 | MG/KG | 6010A | 12/11/97 |
| Chromium | **21.8** | 1.23 | MG/KG | 6010A | 12/11/97 |
| Cobalt | **18.1** | 1.23 | MG/KG | 6010A | 12/11/97 |
| Copper | **29.8** | 1.23 | MG/KG | 6010A | 12/11/97 |
| Lead | **13.4** | 1.23 | MG/KG | 6010A | 12/11/97 |
| Mercury | **0.0970** | 0.0246 | MG/KG | 7471 | 12/11/97 |
| Nickel | **37.0** | 4.91 | MG/KG | 6010A | 12/11/97 |
| Selenium | BQL | 1.23 | MG/KG | 6010A | 12/11/97 |
| Silver | BQL | 1.23 | MG/KG | 6010A | 12/11/97 |

**Comments**
BQL = Below Quantitation Limits

Reviewed By: _____

# PARADIGM ANALYTICAL LABORATORIES, INC.

## Results for Inorganics

| | | | |
|---|---|---|---|
| Client Sample ID: | B15 | Analyzed By: | JMF |
| Client Project ID: | NS-Gulf | Date Collected: | 12/3/97 |
| Lab Sample ID: | 33595 | Date Received: | 12/5/97 |
| Lab Project ID: | G145-187 | Matrix: | Soil |

Solids 81.45

| Metals | Result | Quantitation Limit | Units | Procedure | Date Analyzed |
|---|---|---|---|---|---|
| Aluminum | **4580** | 24.6 | MG/KG | 6010A | 12/11/97 |
| Arsenic | **3.79** | 1.23 | MG/KG | 6010A | 12/11/97 |
| Barium | **44.4** | 12.3 | MG/KG | 6010A | 12/11/97 |
| Cadmium | **0.994** | 0.614 | MG/KG | 6010A | 12/11/97 |
| Chromium | **19.0** | 1.23 | MG/KG | 6010A | 12/11/97 |
| Cobalt | **6.70** | 1.23 | MG/KG | 6010A | 12/11/97 |
| Copper | **1.58** | 1.23 | MG/KG | 6010A | 12/11/97 |
| Lead | **9.81** | 1.23 | MG/KG | 6010A | 12/11/97 |
| Mercury | **0.0264** | 0.0246 | MG/KG | 7471 | 12/11/97 |
| Nickel | BQL | 4.91 | MG/KG | 6010A | 12/11/97 |
| Selenium | BQL | 1.23 | MG/KG | 6010A | 12/11/97 |
| Silver | BQL | 1.23 | MG/KG | 6010A | 12/11/97 |

**Comments**
BQL = Below Quantitation Limits

Reviewed By: JMF

# PARADIGM ANALYTICAL LABORATORIES, INC.

## Results for Inorganics

| | | | |
|---|---|---|---|
| Client Sample ID: | B18 | Analyzed By: | JMF |
| Client Project ID: | NS-Gulf | Date Collected: | 12/3/97 |
| Lab Sample ID: | 33596 | Date Received: | 12/5/97 |
| Lab Project ID: | G145-187 | Matrix: | Soil |

Solids 83.46

| Metals | Result | Quantitation Limit | Units | Procedure | Date Analyzed |
|---|---|---|---|---|---|
| Aluminum | **15700** | 24.0 | MG/KG | 6010A | 12/11/97 |
| Arsenic | **2.35** | 1.20 | MG/KG | 6010A | 12/11/97 |
| Barium | **65.9** | 12.0 | MG/KG | 6010A | 12/11/97 |
| Cadmium | **1.52** | 0.599 | MG/KG | 6010A | 12/11/97 |
| Chromium | **23.1** | 1.20 | MG/KG | 6010A | 12/11/97 |
| Cobalt | **23.9** | 1.20 | MG/KG | 6010A | 12/11/97 |
| Copper | **43.4** | 1.20 | MG/KG | 6010A | 12/11/97 |
| Lead | BQL | 1.20 | MG/KG | 6010A | 12/11/97 |
| Mercury | BQL | 0.0233 | MG/KG | 7471 | 12/11/97 |
| Nickel | **79.0** | 4.79 | MG/KG | 6010A | 12/11/97 |
| Selenium | BQL | 1.20 | MG/KG | 6010A | 12/11/97 |
| Silver | BQL | 1.20 | MG/KG | 6010A | 12/11/97 |

**Comments**
BQL = Below Quantitation Limits

Reviewed By: _____

# PARADIGM ANALYTICAL LABORATORIES, INC.

## Results for Total Petroleum Hydrocarbons by GC

| | | | |
|---|---|---|---|
| Client Sample ID: | B12 | Date Collected: | 12/3/97 |
| Client Project ID: | NS-Gulf | Date Received: | 12/5/97 |
| Lab Sample ID: | 33597 | Analyzed By: | JPW |
| Lab Project ID: | G145-187 | %Solids: | 80.5 |
| Matrix: | Soil | | |

| Compound | Result (MG/KG) | Quantitation Limit | Method | Dilution Factor | Date Analyzed |
|---|---|---|---|---|---|
| Gasoline | BQL | 7.8 | 5030 | 1.0 | 12/15/97 |
| Diesel#2 | BQL | 35 | 3550 | 1.0 | 12/10/97 |

**Comments:**

Quantitation Limits are fully calculated using dilution factors and % solids.
BQL = Undetected or below quantitation limit.

Reviewed By: NS

# PARADIGM ANALYTICAL LABORATORIES, INC.

## Results for Total Petroleum Hydrocarbons by GC

| | | | |
|---|---|---|---|
| Client Sample ID: | B13 | Date Collected: | 12/3/97 |
| Client Project ID: | NS-Gulf | Date Received: | 12/5/97 |
| Lab Sample ID: | 33598 | Analyzed By: | JPW |
| Lab Project ID: | G145-187 | %Solids: | 85.4 |
| Matrix: | Soil | | |

| Compound | Result (MG/KG) | Quantitation Limit | Method | Dilution Factor | Date Analyzed |
|---|---|---|---|---|---|
| Gasoline | BQL | 7.3 | 5030 | 1.0 | 12/15/97 |
| Diesel#2 | BQL | 33 | 3550 | 1.0 | 12/10/97 |

**Comments:**

Quantitation Limits are fully calculated using dilution factors and % solids.
BQL = Undetected or below quantitation limit.

Reviewed By: _____

# PARADIGM ANALYTICAL LABORATORIES, INC.

## Results for Total Petroleum Hydrocarbons by GC

| | | | |
|---|---|---|---|
| Client Sample ID: | B14 | Date Collected: | 12/3/97 |
| Client Project ID: | NS-Gulf | Date Received: | 12/5/97 |
| Lab Sample ID: | 33599 | Analyzed By: | JPW |
| Lab Project ID: | G145-187 | %Solids: | 76.0 |
| Matrix: | Soil | | |

| Compound | Result (MG/KG) | Quantitation Limit | Method | Dilution Factor | Date Analyzed |
|---|---|---|---|---|---|
| Gasoline | BQL | 8.2 | 5030 | 1.0 | 12/15/97 |
| Diesel#2 | BQL | 37 | 3550 | 1.0 | 12/10/97 |

**Comments:**

Quantitation Limits are fully calculated using dilution factors and % solids.
BQL = Undetected or below quantitation limit.

Reviewed By: _____

**PARADIGM ANALYTICAL LABORATORIES, INC.**
2627 Northchase Parkway SE, Wilmington, NC 28405
Phone: (910)-350-1903 FAX: (910)-350-1557

Chain-of Custody Record & Analytical Request

COC# 11109

Page 1 of 1

lient: Marshall Miller - Associates
ddress: 5900 Triangle Dr
ddress: Raleigh NC 27612
uote #: Asperquote on 11-10-97

Project ID: NS-Gulf
P.O. Number: 461
Contact: Kevin Saylor
Phone: 919.786.1414

Date: 12-4-97
Turnaround: 14 Day for 8280 / Dec 12, 1997 All else.
Job Number: 93206

Report To: Kevin Saylor
5900 Triangle Dr
Raleigh NC 27612

Invoice To:

| Sample ID | Date | Time | Matrix | Preservatives | | | | Analyses: 8260 | 8270 | 8280 | 8 RCRA Metals + Cu, Al, Ni, Co | TPH 3550 | TPH 8030 | | | | Comments: Please specify any special reporting requirements |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | | | | G145-187 |
| B1 | 12/3/97 | 8:45 | Soil | | | | | X | X | X | X | X | | | | | * 14 DAY TAT FOR |
| B4 | ↓ | 10:30 | ↓ | | | | | X | X | X | X | X | | | | | 8280, |
| B6 | | 11:20 | | | | | | X | X | X | X | X | | | | | * 12-12-97 Results of |
| B10 | | 13:45 | | NONE | | | | X | X | X | X | X | | | | | all else |
| B15 | | 15:15 | | | | | | X | X | X | X | X | | | | | |
| B18 | | 16:30 | | | | | | X | X | X | X | X | | | | | |
| B12 | | 14:30 | | | | | | | | | | | X | X | | | |
| B13 | | 15:00 | | | | | | | | | | | X | X | | | |
| B14 | ↓ | 15:00 | ↓ | | | | | | | | | | X | X | | | |

| Relinquished By | Date | Time | Received By | Date | Time | Temperature | Sampled By | Airbill # |
|---|---|---|---|---|---|---|---|---|
| Kevin Saylor | 12-4-97 | 11:30 | Bruce Bruce | 12/5/97 | 1045 | received on ice | Kevin Saylor | |

ORIGINAL

Quanterra
Environmental Services

# ANALYTICAL REPORT

Lot #: H7L100119

Ray Porter

Paradigm Analytical Labs

QUANTERRA INCORPORATED

Patricia M. Parsly

Patricia M. Parsly
Project Manager

December 16, 1997

Quanterra
Environmental Services

Paul Lane
Specialized Assays, Inc.
Quanterra Lot Number: H7K010130
Date: December 8, 1997

# PROJECT NARRATIVE

**Introduction** - Six (6) solid samples were received on 10-Dec-97 for the analysis of analysis of 2,3,7,8-TCDD/TCDF and total tetra through octa ($Cl_4$-$Cl_8$) dioxin and furan homologs. An estimation of all 2,3,7,8-substituted isomers was also requested. The samples and the blank were spiked with an internal standard mixture containing 10 ng each of $^{13}$C-TCDD, $^{13}$C-TCDF, $^{13}$C-PeCDD, $^{13}$C-HxCDD, and 20 ng each of $^{13}$C-HpCDD, and $^{13}$C-OCDD. The samples and the blank were analyzed using the EPA reference method described in RCRA SW-846, Method 8280. Extracts were analyzed by GC/MS operating in the selected ion monitoring mode for enhanced sensitivity. The results reported herein are applicable to the samples submitted for analysis only. It is recommended that if this report is reproduced, it is reproduced in its entirety.

Sample 33594 exhibited levels of HpCDD and OCDD which exceeded the linear calibration range of the instrument. In order to bring these analytes into calibration range, the sample was analyzed at a 1/10 dilution. The concentration of both analytes did not significantly vary between analysis. The results for both analysis are reported.

The OCDD concentration of sample 33591 exceeded the linear calibration range of the instrument. In order to bring the OCDD into calibration range, the sample was analyzed at a 1/10 dilution. The concentration of the analyte did not significantly vary between analysis. The results for both analysis are reported.

The calibration standard analyzed on 12-Dec-97 exhibited elevated $^{13}$C-HxCDD and $^{13}$C-OCDD instrument response. Daily $^{13}$C- HxCDD and $^{13}$C-OCDD response factor were calculated and used for all samples analyzed on that day. The native HxCDD and OCDD were not affected.

The matrix spike and matrix spike duplicate exhibited OCDD/OCDF recoveries that were outside the QA/QC limits. However, the laboratory control sample, also analyzed in the same QA/QC batch, met all QA/QC criteria indicating that the analysis was in control.

**Sample Preparation** -A 10 gram aliquot of each sample and 10 grams of quartz sand (for the blank) were weighed into separate Soxhlet thimbles. The samples and the blank were spiked with the internal standard mixture, followed by a Soxhlet extraction with toluene for sixteen hours. The resulting extracts were filtered into a KD flask and the volume reduced to approximately 1 ml.

**Sample Cleanup** -The sample and blank extracts were washed with 20% KOH and distilled water followed by three concentrated $H_2SO_4$ washes. Further cleanup consisted of a dual column system utilizing acid-modified silica gel followed by neutral alumina. Final extracts were concentrated to near dryness and raised to 20 µl with nonane containing 10 ng of $^{13}$C-1,2,3,4-TCDD which was used as a recovery standard.

Quanterra
Environmental Services

Paul Lane
Specialized Assays, Inc.
Quanterra Lot Number: H7K010130
Date: December 8, 1997

# PROJECT NARRATIVE

**Total Dioxin and Furan** - The samples and the blank were analyzed for total dioxin and furan homologs from $Cl_4$-$Cl_8$. The standard analyzed each shift consisted of:

| Dioxins | Dibenzofurans |
|---|---|
| $^{13}$C-2,3,7,8-TCDD | $^{13}$C-2,3,7,8-TCDF |
| $^{13}$C-1,2,3,4-TCDD | 2,3,7,8-TCDF |
| $^{13}$C-1,2,3,7,8-PeCDD | 1,2,3,7,8-PeCDF |
| $^{13}$C-1,2,3,6,7,8-HxCDD | 2,3,4,7,8-PeCDF |
| $^{13}$C-1,2,3,4,6,7,8-HpCDD | 1,2,3,4,7,8-HxCDF |
| $^{13}$C-OCDD | 1,2,3,6,7,8-HxCDF |
| 2,3,7,8-TCDD | 2,3,4,6,7,8-HxCDF |
| 1,2,3,7,8-PeCDD | 1,2,3,7,8,9-HxCDF |
| 1,2,3,4,7,8-HxCDD | 1,2,3,4,6,7,8-HpCDF |
| 1,2,3,6,7,8-HxCDD | 1,2,3,4,7,8,9-HpCDF |
| 1,2,3,7,8,9-HxCDD | OCDF |
| 1,2,3,4,6,7,8-HpCDD | |
| OCDD | |

Response factors were calculated for each compound in the standard relative to its $^{13}$C labeled - dioxin homolog; the same response was assumed applicable to all isomers in each homologous group. Native TCDF is calculated against $^{13}$C-TCDF. A five-point calibration plot was analyzed in triplicate. The mean response factors obtained from this fifteen-point calibration were used for all subsequent calculations. The shift standard, analyzed on the same day as the samples, produced a response factor within 30% of the multipoint for all native analytes.

The extracts were analyzed using HRGC/LRMS scanning in the selected ion monitoring mode for enhanced sensitivity. The column used for the analysis was a 60 m DB-5 type fused silica capillary column.

The results for the analysis are reported in ng/g.

**Detection Limits** - When an analyte is not detected, a sample specific detection limit is calculated for that analyte. This is done by first determining the GC/MS peak height of the noise or interferent in the expected region of the analyte signal. This value is multiplied by the number 2.5 which serves as a safety factor. The 2.5 safety factor is disregarded if the noise present in the analyte region is a result of chemical interferences. The resulting signal response value is then used to estimate the minimum detectable analyte amount. The result is the estimated sample detection limit.

**QA/QC** - Routine laboratory QA/QC was followed. Recoveries for the internal standards for each sample are presented with the sample analysis data.

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Environmental Services

# ANALYTICAL METHODS SUMMARY

**H7L100119**

| PARAMETER | ANALYTICAL METHOD |
|---|---|
| Dioxins/Furans HRGC/LRMS | SW846 8280 |
| Percent Moisture | MCAWW 160.3 MOD |

**References:**

MCAWW "Methods for Chemical Analysis of Water and Wastes", EPA-600/4-79-020, March 1983 and subsequent revisions.

SW846 "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 and its updates.

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# SAMPLE SUMMARY

H7L100119

| WO # | SAMPLE# | CLIENT SAMPLE ID | DATE | TIME |
|---|---|---|---|---|
| CEFP0 | 001 | 33591 | 12/03/97 | 08:45 |
| CEFP1 | 002 | 33592 | 12/03/97 | 10:30 |
| CEFP2 | 003 | 33593 | 12/03/97 | 11:20 |
| CEFP3 | 004 | 33594 | 12/03/97 | 13:45 |
| CEFP4 | 005 | 33595 | 12/03/97 | 15:15 |
| CEFP5 | 006 | 33596 | 12/03/97 | 16:30 |

**NOTE(S):**

- The analytical results of the samples listed above are presented on the following pages.
- All calculations are performed before rounding to avoid round-off errors in calculated results.
- Results noted as "ND" were not detected at or above the stated limit.
- This report must not be reproduced, except in full, without the written approval of the laboratory.
- Results for the following parameters are never reported on a dry weight basis: color, corrosivity, density, flashpoint, ignitability, layers, odor, paint filter test, pH, porosity pressure, reactivity, redox potential, specific gravity, spot tests, solids, solubility, temperature, viscosity, and weight.

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Environmental Services

PARADIGM ANALYTICAL LABS

Client Sample ID: 33591

Dioxins

Lot-Sample #...: H7L100119-001 Work Order #...: CEFP0102 Matrix.....: SOLID
Date Sampled...: 12/03/97 Date Received..: 12/10/97
Prep Date.....: 12/10/97 Analysis Date..: 12/14/97
Prep Batch #...: 7344194
Dilution Factor: 1
% Moisture.....: 24

| PARAMETER | RESULT | DETECTION LIMIT | UNITS | METHOD |
|---|---|---|---|---|
| 2,3,7,8-TCDD | ND | 0.018 | ng/g | SW846 8280 |
| Total TCDD | ND | 0.018 | ng/g | SW846 8280 |
| 1,2,3,7,8-PeCDD | ND | 0.021 | ng/g | SW846 8280 |
| Total PeCDD | ND | 0.10 | ng/g | SW846 8280 |
| 1,2,3,4,7,8-HxCDD | ND | 0.037 | ng/g | SW846 8280 |
| 1,2,3,6,7,8-HxCDD | ND | 0.033 | ng/g | SW846 8280 |
| 1,2,3,7,8,9-HxCDD | ND | 0.034 | ng/g | SW846 8280 |
| Total HxCDD | ND | 0.035 | ng/g | SW846 8280 |
| 1,2,3,4,6,7,8-HpCDD | 0.082 J,Q | | ng/g | SW846 8280 |
| Total HpCDD | 0.19 J,Q | | ng/g | SW846 8280 |
| OCDD | 18 | | ng/g | SW846 8280 |
| 2,3,7,8-TCDF | ND | 0.021 | ng/g | SW846 8280 |
| Total TCDF | ND | 0.021 | ng/g | SW846 8280 |
| 1,2,3,7,8-PeCDF | ND | 0.026 | ng/g | SW846 8280 |
| 2,3,4,7,8-PeCDF | ND | 0.026 | ng/g | SW846 8280 |
| Total PeCDF | ND | 0.026 | ng/g | SW846 8280 |
| 1,2,3,4,7,8-HxCDF | ND | 0.018 | ng/g | SW846 8280 |
| 1,2,3,6,7,8-HxCDF | ND | 0.017 | ng/g | SW846 8280 |
| 2,3,4,6,7,8-HxCDF | ND | 0.019 | ng/g | SW846 8280 |
| 1,2,3,7,8,9-HxCDF | ND | 0.020 | ng/g | SW846 8280 |
| Total HxCDF | ND | 0.018 | ng/g | SW846 8280 |
| 1,2,3,4,6,7,8-HpCDF | ND | 0.037 | ng/g | SW846 8280 |
| 1,2,3,4,7,8,9-HpCDF | ND | 0.037 | ng/g | SW846 8280 |
| Total HpCDF | ND | 0.037 | ng/g | SW846 8280 |
| OCDF | ND | 0.020 | ng/g | SW846 8280 |

| INTERNAL STANDARDS | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C-2,3,7,8-TCDD | 89 | (25 - 160) |
| 13C-2,3,7,8-TCDF | 91 | (25 - 160) |
| 13C-1,2,3,7,8-PeCDD | 93 | (25 - 160) |
| 13C-1,2,3,6,7,8-HxCDD | 101 | (25 - 160) |
| 13C-1,2,3,4,6,7,8-HpCDD | 82 | (25 - 160) |
| 13C-OCDD | 86 | (25 - 160) |

NOTE(S):

Results and reporting limits have been adjusted for dry weight.

J Estimated result. Result is less than the reporting limit.

Q Estimated maximum possible concentration (EMPC).

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Environmental Services

PARADIGM ANALYTICAL LABS

Client Sample ID: 33591

Dioxins

Lot-Sample #...: H7L100119-001 Work Order #...: CEFP0202 Matrix.....: SOLID
Date Sampled...: 12/03/97 Date Received..: 12/10/97
Prep Date.....: 12/10/97 Analysis Date..: 12/15/97
Prep Batch #...: 7344194
Dilution Factor: 2
% Moisture.....: 24

| PARAMETER | RESULT | DETECTION LIMIT | UNITS | METHOD |
|---|---|---|---|---|
| OCDD | 18 | | ng/g | SW846 8280 |

| INTERNAL STANDARDS | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C-OCDD | 78 | (25 - 160) |

NOTE(S):

Results and reporting limits have been adjusted for dry weight.

Quanterra
Environmental Services

PARADIGM ANALYTICAL LABS

Client Sample ID: 33592

Dioxins

Lot-Sample #...: H7L100119-002 Work Order #...: CEFP1102 Matrix.....: SOLID
Date Sampled...: 12/03/97 Date Received..: 12/10/97
Prep Date.....: 12/10/97 Analysis Date..: 12/14/97
Prep Batch #...: 7344194
Dilution Factor: 1
% Moisture.....: 19

| PARAMETER | RESULT | DETECTION LIMIT | UNITS | METHOD |
|---|---|---|---|---|
| 2,3,7,8-TCDD | ND | 0.016 | ng/g | SW846 8280 |
| Total TCDD | 0.027 J | | ng/g | SW846 8280 |
| 1,2,3,7,8-PeCDD | ND | 0.039 | ng/g | SW846 8280 |
| Total PeCDD | ND | 0.14 | ng/g | SW846 8280 |
| 1,2,3,4,7,8-HxCDD | ND | 0.029 | ng/g | SW846 8280 |
| 1,2,3,6,7,8-HxCDD | ND | 0.027 | ng/g | SW846 8280 |
| 1,2,3,7,8,9-HxCDD | ND | 0.039 | ng/g | SW846 8280 |
| Total HxCDD | 0.023 J | | ng/g | SW846 8280 |
| 1,2,3,4,6,7,8-HpCDD | 0.27 J,Q | | ng/g | SW846 8280 |
| Total HpCDD | 0.90 Q | | ng/g | SW846 8280 |
| OCDD | 6.9 | | ng/g | SW846 8280 |
| 2,3,7,8-TCDF | ND | 0.041 | ng/g | SW846 8280 |
| Total TCDF | 0.038 J,Q | | ng/g | SW846 8280 |
| 1,2,3,7,8-PeCDF | ND | 0.044 | ng/g | SW846 8280 |
| 2,3,4,7,8-PeCDF | ND | 0.043 | ng/g | SW846 8280 |
| Total PeCDF | 0.027 J,Q | | ng/g | SW846 8280 |
| 1,2,3,4,7,8-HxCDF | ND | 0.034 | ng/g | SW846 8280 |
| 1,2,3,6,7,8-HxCDF | ND | 0.031 | ng/g | SW846 8280 |
| 2,3,4,6,7,8-HxCDF | ND | 0.035 | ng/g | SW846 8280 |
| 1,2,3,7,8,9-HxCDF | ND | 0.037 | ng/g | SW846 8280 |
| Total HxCDF | 0.069 J,Q | | ng/g | SW846 8280 |
| 1,2,3,4,6,7,8-HpCDF | ND | 0.12 | ng/g | SW846 8280 |
| 1,2,3,4,7,8,9-HpCDF | ND | 0.12 | ng/g | SW846 8280 |
| Total HpCDF | 0.17 J,Q | | ng/g | SW846 8280 |
| OCDF | 0.20 J | | ng/g | SW846 8280 |

| INTERNAL STANDARDS | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C-2,3,7,8-TCDD | 74 | (25 - 160) |
| 13C-2,3,7,8-TCDF | 82 | (25 - 160) |
| 13C-1,2,3,7,8-PeCDD | 87 | (25 - 160) |
| 13C-1,2,3,6,7,8-HxCDD | 88 | (25 - 160) |
| 13C-1,2,3,4,6,7,8-HpCDD | 67 | (25 - 160) |
| 13C-OCDD | 58 | (25 - 160) |

NOTE(S):

Results and reporting limits have been adjusted for dry weight.

J Estimated result. Result is less than the reporting limit.

Q Estimated maximum possible concentration (EMPC).

Quanterra
Environmental Services

PARADIGM ANALYTICAL LABS

Client Sample ID: 33593

Dioxins

Lot-Sample #...: H7L100119-003 Work Order #...: CEFP2102 Matrix.....: SOLID
Date Sampled...: 12/03/97 Date Received..: 12/10/97
Prep Date.....: 12/10/97 Analysis Date..: 12/14/97
Prep Batch #...: 7344194
Dilution Factor: 1
% Moisture.....: 27

| PARAMETER | RESULT | DETECTION LIMIT | UNITS | METHOD |
|---|---|---|---|---|
| 2,3,7,8-TCDD | ND | 0.028 | ng/g | SW846 8280 |
| Total TCDD | ND | 0.028 | ng/g | SW846 8280 |
| 1,2,3,7,8-PeCDD | ND | 0.021 | ng/g | SW846 8280 |
| Total PeCDD | ND | 0.11 | ng/g | SW846 8280 |
| 1,2,3,4,7,8-HxCDD | ND | 0.035 | ng/g | SW846 8280 |
| 1,2,3,6,7,8-HxCDD | ND | 0.032 | ng/g | SW846 8280 |
| 1,2,3,7,8,9-HxCDD | ND | 0.032 | ng/g | SW846 8280 |
| Total HxCDD | ND | 0.033 | ng/g | SW846 8280 |
| 1,2,3,4,6,7,8-HpCDD | ND | 0.090 | ng/g | SW846 8280 |
| Total HpCDD | 0.025 J,Q | | ng/g | SW846 8280 |
| OCDD | 2.7 | | ng/g | SW846 8280 |
| 2,3,7,8-TCDF | ND | 0.024 | ng/g | SW846 8280 |
| Total TCDF | ND | 0.024 | ng/g | SW846 8280 |
| 1,2,3,7,8-PeCDF | ND | 0.025 | ng/g | SW846 8280 |
| 2,3,4,7,8-PeCDF | ND | 0.024 | ng/g | SW846 8280 |
| Total PeCDF | ND | 0.025 | ng/g | SW846 8280 |
| 1,2,3,4,7,8-HxCDF | ND | 0.12 | ng/g | SW846 8280 |
| 1,2,3,6,7,8-HxCDF | ND | 0.11 | ng/g | SW846 8280 |
| 2,3,4,6,7,8-HxCDF | ND | 0.13 | ng/g | SW846 8280 |
| 1,2,3,7,8,9-HxCDF | ND | 0.14 | ng/g | SW846 8280 |
| Total HxCDF | ND | 0.13 | ng/g | SW846 8280 |
| 1,2,3,4,6,7,8-HpCDF | ND | 0.065 | ng/g | SW846 8280 |
| 1,2,3,4,7,8,9-HpCDF | ND | 0.66 | ng/g | SW846 8280 |
| Total HpCDF | ND | 0.065 | ng/g | SW846 8280 |
| OCDF | ND | 0.038 | ng/g | SW846 8280 |

| INTERNAL STANDARDS | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C-2,3,7,8-TCDD | 88 | (25 - 160) |
| 13C-2,3,7,8-TCDF | 92 | (25 - 160) |
| 13C-1,2,3,7,8-PeCDD | 103 | (25 - 160) |
| 13C-1,2,3,6,7,8-HxCDD | 111 | (25 - 160) |
| 13C-1,2,3,4,6,7,8-HpCDD | 90 | (25 - 160) |
| 13C-OCDD | 72 | (25 - 160) |

NOTE(S):

*Results and reporting limits have been adjusted for dry weight.*

J Estimated result. Result is less than the reporting limit.

Q Estimated maximum possible concentration (EMPC).

Quanterra
Environmental Services

PARADIGM ANALYTICAL LABS

Client Sample ID: 33594

Dioxins

Lot-Sample #...: H7L100119-004 Work Order #...: CEFP3102 Matrix.....: SOLID
Date Sampled...: 12/03/97 Date Received..: 12/10/97
Prep Date.....: 12/10/97 Analysis Date..: 12/14/97
Prep Batch #...: 7344194
Dilution Factor: 1
% Moisture.....: 21

| PARAMETER | RESULT | DETECTION LIMIT | UNITS | METHOD |
|---|---|---|---|---|
| 2,3,7,8-TCDD | ND | 0.11 | ng/g | SW846 8280 |
| Total TCDD | ND | 0.11 | ng/g | SW846 8280 |
| 1,2,3,7,8-PeCDD | ND | 0.097 | ng/g | SW846 8280 |
| Total PeCDD | ND | 0.27 | ng/g | SW846 8280 |
| 1,2,3,4,7,8-HxCDD | ND | 0.098 | ng/g | SW846 8280 |
| 1,2,3,6,7,8-HxCDD | 0.10 J | | ng/g | SW846 8280 |
| 1,2,3,7,8,9-HxCDD | 0.099 J | | ng/g | SW846 8280 |
| Total HxCDD | 1.4 J | | ng/g | SW846 8280 |
| 1,2,3,4,6,7,8-HpCDD | 4.6 | | ng/g | SW846 8280 |
| Total HpCDD | 22 E | | ng/g | SW846 8280 |
| OCDD | 41 E | | ng/g | SW846 8280 |
| 2,3,7,8-TCDF | ND | 0.029 | ng/g | SW846 8280 |
| Total TCDF | 5.0 Q | | ng/g | SW846 8280 |
| 1,2,3,7,8-PeCDF | ND | 0.12 | ng/g | SW846 8280 |
| 2,3,4,7,8-PeCDF | ND | 0.12 | ng/g | SW846 8280 |
| Total PeCDF | 6.8 Q | | ng/g | SW846 8280 |
| 1,2,3,4,7,8-HxCDF | ND | 0.080 | ng/g | SW846 8280 |
| 1,2,3,6,7,8-HxCDF | 0.31 J,Q | | ng/g | SW846 8280 |
| 2,3,4,6,7,8-HxCDF | ND | 0.081 | ng/g | SW846 8280 |
| 1,2,3,7,8,9-HxCDF | ND | 0.086 | ng/g | SW846 8280 |
| Total HxCDF | 4.5 Q | | ng/g | SW846 8280 |
| 1,2,3,4,6,7,8-HpCDF | 0.57 | | ng/g | SW846 8280 |
| 1,2,3,4,7,8,9-HpCDF | ND | 0.22 | ng/g | SW846 8280 |
| Total HpCDF | 2.9 | | ng/g | SW846 8280 |
| OCDF | 2.5 | | ng/g | SW846 8280 |

| INTERNAL STANDARDS | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C-2,3,7,8-TCDD | 89 | (25 - 160) |
| 13C-2,3,7,8-TCDF | 97 | (25 - 160) |
| 13C-1,2,3,7,8-PeCDD | 110 | (25 - 160) |
| 13C-1,2,3,6,7,8-HxCDD | 119 | (25 - 160) |
| 13C-1,2,3,4,6,7,8-HpCDD | 103 | (25 - 160) |
| 13C-OCDD | 87 | (25 - 160) |

NOTE(S):

Results and reporting limits have been adjusted for dry weight.

J Estimated result. Result is less than the reporting limit.

E Estimated result. Result concentration exceeds the calibration range.

Q Estimated maximum possible concentration (EMPC).

Quanterra
Environmental Services

PARADIGM ANALYTICAL LABS

Client Sample ID: 33594

Dioxins

Lot-Sample #...: H7L100119-004 Work Order #...: CEFP3202 Matrix.....: SOLID
Date Sampled...: 12/03/97 Date Received..: 12/10/97
Prep Date.....: 12/10/97 Analysis Date..: 12/15/97
Prep Batch #...: 7344194
Dilution Factor: 5
% Moisture.....: 21

| PARAMETER | RESULT | DETECTION LIMIT | UNITS | METHOD |
|---|---|---|---|---|
| 1,2,3,4,6,7,8-HpCDD | 5.4 | | ng/g | SW846 8280 |
| Total HpCDD | 24 | | ng/g | SW846 8280 |
| OCDD | 38 | | ng/g | SW846 8280 |

| INTERNAL STANDARDS | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C-1,2,3,4,6,7,8-HpCDD | 85 | (25 - 160) |
| 13C-OCDD | 73 | (25 - 160) |

NOTE(S):

Results and reporting limits have been adjusted for dry weight.

Quanterra
Environmental Services

PARADIGM ANALYTICAL LABS

Client Sample ID: 33595

Dioxins

Lot-Sample #...: H7L100119-005 Work Order #...: CEFP4102 Matrix.....: SOLID
Date Sampled...: 12/03/97 Date Received..: 12/10/97
Prep Date.....: 12/10/97 Analysis Date..: 12/14/97
Prep Batch #...: 7344194
Dilution Factor: 1
% Moisture.....: 16

| PARAMETER | RESULT | DETECTION LIMIT | UNITS | METHOD |
|---|---|---|---|---|
| 2,3,7,8-TCDD | ND | 0.029 | ng/g | SW846 8280 |
| Total TCDD | ND | 0.029 | ng/g | SW846 8280 |
| 1,2,3,7,8-PeCDD | ND | 0.019 | ng/g | SW846 8280 |
| Total PeCDD | ND | 0.038 | ng/g | SW846 8280 |
| 1,2,3,4,7,8-HxCDD | ND | 0.044 | ng/g | SW846 8280 |
| 1,2,3,6,7,8-HxCDD | ND | 0.040 | ng/g | SW846 8280 |
| 1,2,3,7,8,9-HxCDD | ND | 0.040 | ng/g | SW846 8280 |
| Total HxCDD | ND | 0.041 | ng/g | SW846 8280 |
| 1,2,3,4,6,7,8-HpCDD | ND | 0.10 | ng/g | SW846 8280 |
| Total HpCDD | ND | 0.10 | ng/g | SW846 8280 |
| OCDD | 0.69 | | ng/g | SW846 8280 |
| 2,3,7,8-TCDF | ND | 0.016 | ng/g | SW846 8280 |
| Total TCDF | ND | 0.016 | ng/g | SW846 8280 |
| 1,2,3,7,8-PeCDF | ND | 0.019 | ng/g | SW846 8280 |
| 2,3,4,7,8-PeCDF | ND | 0.019 | ng/g | SW846 8280 |
| Total PeCDF | ND | 0.019 | ng/g | SW846 8280 |
| 1,2,3,4,7,8-HxCDF | ND | 0.018 | ng/g | SW846 8280 |
| 1,2,3,6,7,8-HxCDF | ND | 0.017 | ng/g | SW846 8280 |
| 2,3,4,6,7,8-HxCDF | ND | 0.019 | ng/g | SW846 8280 |
| 1,2,3,7,8,9-HxCDF | ND | 0.020 | ng/g | SW846 8280 |
| Total HxCDF | ND | 0.018 | ng/g | SW846 8280 |
| 1,2,3,4,6,7,8-HpCDF | ND | 0.050 | ng/g | SW846 8280 |
| 1,2,3,4,7,8,9-HpCDF | ND | 0.051 | ng/g | SW846 8280 |
| Total HpCDF | ND | 0.051 | ng/g | SW846 8280 |
| OCDF | ND | 0.067 | ng/g | SW846 8280 |

| INTERNAL STANDARDS | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C-2,3,7,8-TCDD | 88 | (25 - 160) |
| 13C-2,3,7,8-TCDF | 95 | (25 - 160) |
| 13C-1,2,3,7,8-PeCDD | 102 | (25 - 160) |
| 13C-1,2,3,6,7,8-HxCDD | 114 | (25 - 160) |
| 13C-1,2,3,4,6,7,8-HpCDD | 89 | (25 - 160) |
| 13C-OCDD | 61 | (25 - 160) |

NOTE(S):

Results and reporting limits have been adjusted for dry weight.

Quanterra Environmental Services

PARADIGM ANALYTICAL LABS

Client Sample ID: 33596

Dioxins

Lot-Sample #...: H7L100119-006 Work Order #...: CEFP5102 Matrix.....: SOLID
Date Sampled...: 12/03/97 Date Received..: 12/10/97
Prep Date.....: 12/10/97 Analysis Date..: 12/14/97
Prep Batch #...: 7344194
Dilution Factor: 1
% Moisture.....: 20

| PARAMETER | RESULT | DETECTION LIMIT | UNITS | METHOD |
|---|---|---|---|---|
| 2,3,7,8-TCDD | ND | 0.016 | ng/g | SW846 8280 |
| Total TCDD | ND | 0.016 | ng/g | SW846 8280 |
| 1,2,3,7,8-PeCDD | ND | 0.025 | ng/g | SW846 8280 |
| Total PeCDD | ND | 0.041 | ng/g | SW846 8280 |
| 1,2,3,4,7,8-HxCDD | ND | 0.031 | ng/g | SW846 8280 |
| 1,2,3,6,7,8-HxCDD | ND | 0.029 | ng/g | SW846 8280 |
| 1,2,3,7,8,9-HxCDD | ND | 0.029 | ng/g | SW846 8280 |
| Total HxCDD | ND | 0.030 | ng/g | SW846 8280 |
| 1,2,3,4,6,7,8-HpCDD | ND | 0.046 | ng/g | SW846 8280 |
| Total HpCDD | ND | 0.046 | ng/g | SW846 8280 |
| OCDD | 0.061 Q,J | | ng/g | SW846 8280 |
| 2,3,7,8-TCDF | ND | 0.024 | ng/g | SW846 8280 |
| Total TCDF | ND | 0.024 | ng/g | SW846 8280 |
| 1,2,3,7,8-PeCDF | ND | 0.018 | ng/g | SW846 8280 |
| 2,3,4,7,8-PeCDF | ND | 0.018 | ng/g | SW846 8280 |
| Total PeCDF | ND | 0.018 | ng/g | SW846 8280 |
| 1,2,3,4,7,8-HxCDF | ND | 0.016 | ng/g | SW846 8280 |
| 1,2,3,6,7,8-HxCDF | ND | 0.015 | ng/g | SW846 8280 |
| 2,3,4,6,7,8-HxCDF | ND | 0.017 | ng/g | SW846 8280 |
| 1,2,3,7,8,9-HxCDF | ND | 0.018 | ng/g | SW846 8280 |
| Total HxCDF | ND | 0.016 | ng/g | SW846 8280 |
| 1,2,3,4,6,7,8-HpCDF | ND | 0.042 | ng/g | SW846 8280 |
| 1,2,3,4,7,8,9-HpCDF | ND | 0.042 | ng/g | SW846 8280 |
| Total HpCDF | ND | 0.042 | ng/g | SW846 8280 |
| OCDF | ND | 0.080 | ng/g | SW846 8280 |

| INTERNAL STANDARDS | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C-2,3,7,8-TCDD | 92 | (25 - 160) |
| 13C-2,3,7,8-TCDF | 95 | (25 - 160) |
| 13C-1,2,3,7,8-PeCDD | 103 | (25 - 160) |
| 13C-1,2,3,6,7,8-HxCDD | 115 | (25 - 160) |
| 13C-1,2,3,4,6,7,8-HpCDD | 93 | (25 - 160) |
| 13C-OCDD | 69 | (25 - 160) |

NOTE(S):

Results and reporting limits have been adjusted for dry weight.

Q Estimated maximum possible concentration (EMPC).

J Estimated result. Result is less than the reporting limit.

Quanterra
Environmental Services

PARADIGM ANALYTICAL LABS

Client Sample ID: 33591

General Chemistry

Lot-Sample #...: H7L100119-001 Work Order #...: CEFP0 Matrix.....: SOLID
Date Sampled...: 12/03/97 Date Received..: 12/10/97
% Moisture.....: 24

| PARAMETER | RESULT | RL | UNITS | METHOD | PREPARATION-ANALYSIS DATE | PREP BATCH # |
|---|---|---|---|---|---|---|
| Percent Moisture | 23.5 | 0.10 | % | MCAWW 160.3 MOD | 12/11-12/12/97 | 7346173 |

Dilution Factor: 1

Quanterra
Environmental Services

PARADIGM ANALYTICAL LABS

Client Sample ID: 33592

General Chemistry

Lot-Sample #...: H7L100119-002 Work Order #...: CEFP1 Matrix.....: SOLID
Date Sampled...: 12/03/97 Date Received..: 12/10/97
% Moisture.....: 19

| PARAMETER | RESULT | RL | UNITS | METHOD | PREPARATION-ANALYSIS DATE | PREP BATCH # |
|---|---|---|---|---|---|---|
| Percent Moisture | 19.3 | 0.10 | % | MCAWW 160.3 MOD | 12/11-12/12/97 | 7346173 |

Dilution Factor: 1

Quanterra
Environmental Services

PARADIGM ANALYTICAL LABS

Client Sample ID: 33593

General Chemistry

Lot-Sample #...: H7L100119-003 Work Order #...: CEFP2 Matrix.....: SOLID
Date Sampled...: 12/03/97 Date Received..: 12/10/97
% Moisture.....: 27

| PARAMETER | RESULT | RL | UNITS | METHOD | PREPARATION-ANALYSIS DATE | PREP BATCH # |
|---|---|---|---|---|---|---|
| Percent Moisture | 26.6 | 0.10 | % | MCAWW 160.3 MOD | 12/11-12/12/97 | 7346173 |

Dilution Factor: 1

Quanterra
Environmental Services

PARADIGM ANALYTICAL LABS

Client Sample ID: 33594

General Chemistry

Lot-Sample #...: H7L100119-004 Work Order #...: CEFP3 Matrix.....: SOLID
Date Sampled...: 12/03/97 Date Received..: 12/10/97
% Moisture.....: 21

| PARAMETER | RESULT | RL | UNITS | METHOD | PREPARATION-ANALYSIS DATE | PREP BATCH # |
|---|---|---|---|---|---|---|
| Percent Moisture | 20.8 | 0.10 | % | MCAWW 160.3 MOD | 12/11-12/12/97 | 7346173 |

Dilution Factor: 1

Quanterra
Environmental Services

PARADIGM ANALYTICAL LABS

Client Sample ID: 33595

General Chemistry

Lot-Sample #...: H7L100119-005 Work Order #...: CEFP4 Matrix.....: SOLID
Date Sampled...: 12/03/97 Date Received..: 12/10/97
% Moisture.....: 16

| PARAMETER | RESULT | RL | UNITS | METHOD | PREPARATION-ANALYSIS DATE | PREP BATCH # |
|---|---|---|---|---|---|---|
| Percent Moisture | 16.3 | 0.10 | % | MCAWW 160.3 MOD | 12/11-12/12/97 | 7346173 |

Dilution Factor: 1

Quanterra
Environmental Services

PARADIGM ANALYTICAL LABS

Client Sample ID: 33596

General Chemistry

Lot-Sample #...: H7L100119-006 Work Order #...: CEFP5 Matrix.....: SOLID
Date Sampled...: 12/03/97 Date Received..: 12/10/97
% Moisture.....: 20

| PARAMETER | RESULT | RL | UNITS | METHOD | PREPARATION-ANALYSIS DATE | PREP BATCH # |
|---|---|---|---|---|---|---|
| Percent Moisture | 20.3 | 0.10 | % | MCAWW 160.3 MOD | 12/11-12/12/97 | 7346173 |

Dilution Factor: 1

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Environmental Services

# METHOD BLANK REPORT

## Dioxins

Client Lot #...: H7L100119
MB Lot-Sample #: H7L100000-194
Work Order #...: CEFPH101
Matrix.....: SOLID
Prep Date.....: 12/10/97
Analysis Date..: 12/14/97
Prep Batch #...: 7344194
Dilution Factor: 1

| PARAMETER | RESULT | DETECTION LIMIT | UNITS | METHOD |
|---|---|---|---|---|
| 2,3,7,8-TCDD | ND | 0.012 | ng/g | SW846 8280 |
| Total TCDD | ND | 0.012 | ng/g | SW846 8280 |
| 1,2,3,7,8-PeCDD | ND | 0.015 | ng/g | SW846 8280 |
| Total PeCDD | ND | 0.031 | ng/g | SW846 8280 |
| 1,2,3,4,7,8-HxCDD | ND | 0.020 | ng/g | SW846 8280 |
| 1,2,3,6,7,8-HxCDD | ND | 0.018 | ng/g | SW846 8280 |
| 1,2,3,7,8,9-HxCDD | ND | 0.018 | ng/g | SW846 8280 |
| Total HxCDD | ND | 0.019 | ng/g | SW846 8280 |
| 1,2,3,4,6,7,8-HpCDD | ND | 0.022 | ng/g | SW846 8280 |
| Total HpCDD | ND | 0.022 | ng/g | SW846 8280 |
| OCDD | ND | 0.024 | ng/g | SW846 8280 |
| 2,3,7,8-TCDF | ND | 0.014 | ng/g | SW846 8280 |
| Total TCDF | ND | 0.014 | ng/g | SW846 8280 |
| 1,2,3,7,8-PeCDF | ND | 0.012 | ng/g | SW846 8280 |
| 2,3,4,7,8-PeCDF | ND | 0.012 | ng/g | SW846 8280 |
| Total PeCDF | ND | 0.012 | ng/g | SW846 8280 |
| 1,2,3,4,7,8-HxCDF | ND | 0.012 | ng/g | SW846 8280 |
| 1,2,3,6,7,8-HxCDF | ND | 0.011 | ng/g | SW846 8280 |
| 2,3,4,6,7,8-HxCDF | ND | 0.012 | ng/g | SW846 8280 |
| 1,2,3,7,8,9-HxCDF | ND | 0.013 | ng/g | SW846 8280 |
| Total HxCDF | ND | 0.012 | ng/g | SW846 8280 |
| 1,2,3,4,6,7,8-HpCDF | ND | 0.018 | ng/g | SW846 8280 |
| 1,2,3,4,7,8,9-HpCDF | ND | 0.019 | ng/g | SW846 8280 |
| Total HpCDF | ND | 0.018 | ng/g | SW846 8280 |
| OCDF | ND | 0.020 | ng/g | SW846 8280 |

| INTERNAL STANDARDS | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C-2,3,7,8-TCDD | 91 | (25 - 160) |
| 13C-2,3,7,8-TCDF | 96 | (25 - 160) |
| 13C-1,2,3,7,8-PeCDD | 97 | (25 - 160) |
| 13C-1,2,3,6,7,8-HxCDD | 103 | (25 - 160) |
| 13C-1,2,3,4,6,7,8-HpCDD | 83 | (25 - 160) |
| 13C-OCDD | 80 | (25 - 160) |

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

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# LABORATORY CONTROL SAMPLE DATA REPORT

## Dioxins

Client Lot #...: H7L100119 Work Order #...: CEFPH102 Matrix.....: SOLID
LCS Lot-Sample#: H7L100000-194
Prep Date.....: 12/10/97 Analysis Date..: 12/12/97
Prep Batch #...: 7344194
Dilution Factor: 1

| PARAMETER | SPIKE AMOUNT | MEASURED AMOUNT | UNITS | PERCENT RECOVERY | METHOD |
|---|---|---|---|---|---|
| 2,3,7,8-TCDD | 1.0 | 0.91 | ng/g | 91 | SW846 8280 |
| 2,3,7,8-TCDF | 1.0 | 0.91 | ng/g | 91 | SW846 8280 |
| 1,2,3,7,8-PeCDD | 1.0 | 0.89 | ng/g | 89 | SW846 8280 |
| 1,2,3,7,8-PeCDF | 1.0 | 0.77 | ng/g | 77 | SW846 8280 |
| 2,3,4,7,8-PeCDF | 1.0 | 0.79 | ng/g | 79 | SW846 8280 |
| 1,2,3,4,7,8-HxCDD | 1.0 | 0.84 | ng/g | 84 | SW846 8280 |
| 1,2,3,6,7,8-HxCDD | 1.0 | 0.95 | ng/g | 95 | SW846 8280 |
| 1,2,3,7,8,9-HxCDD | 1.0 | 0.89 | ng/g | 89 | SW846 8280 |
| 1,2,3,4,7,8-HxCDF | 1.0 | 0.79 | ng/g | 79 | SW846 8280 |
| 1,2,3,6,7,8-HxCDF | 1.0 | 0.86 | ng/g | 86 | SW846 8280 |
| 2,3,4,6,7,8-HxCDF | 1.0 | 0.85 | ng/g | 85 | SW846 8280 |
| 1,2,3,7,8,9-HxCDF | 1.0 | 0.86 | ng/g | 86 | SW846 8280 |
| 1,2,3,4,6,7,8-HpCDD | 1.0 | 1.1 | ng/g | 111 | SW846 8280 |
| 1,2,3,4,6,7,8-HpCDF | 1.0 | 1.2 | ng/g | 120 | SW846 8280 |
| 1,2,3,4,7,8,9-HpCDF | 1.0 | 1.1 | ng/g | 112 | SW846 8280 |
| OCDD | 1.0 | 0.75 | ng/g | 75 | SW846 8280 |
| OCDF | 1.0 | 0.64 | ng/g | 64 | SW846 8280 |

| INTERNAL STANDARD | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C-2,3,7,8-TCDD | 94 | (25 - 160) |
| 13C-2,3,7,8-TCDF | 93 | (25 - 160) |
| 13C-1,2,3,7,8-PeCDD | 101 | (25 - 160) |
| 13C-1,2,3,6,7,8-HxCDD | 77 | (25 - 160) |
| 13C-1,2,3,4,6,7,8-HpCDD | 81 | (25 - 160) |
| 13C-OCDD | 87 | (25 - 160) |

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

*Bold print denotes control parameters*

Quanterra
Environmental Services

# LABORATORY CONTROL SAMPLE EVALUATION REPORT

## Dioxins

Client Lot #...: H7L100119 Work Order #...: CEFPH102 Matrix.....: SOLID
LCS Lot-Sample#: H7L100000-194
Prep Date.....: 12/10/97 Analysis Date..: 12/12/97
Prep Batch #...: 7344194
Dilution Factor: 1

| PARAMETER | PERCENT RECOVERY | RECOVERY LIMITS | METHOD |
|---|---|---|---|
| 2,3,7,8-TCDD | 91 | (60 - 140) | SW846 8280 |
| 2,3,7,8-TCDF | 91 | (60 - 140) | SW846 8280 |
| 1,2,3,7,8-PeCDD | 89 | (60 - 140) | SW846 8280 |
| 1,2,3,7,8-PeCDF | 77 | (60 - 140) | SW846 8280 |
| 2,3,4,7,8-PeCDF | 79 | (60 - 140) | SW846 8280 |
| 1,2,3,4,7,8-HxCDD | 84 | (60 - 140) | SW846 8280 |
| 1,2,3,6,7,8-HxCDD | 95 | (60 - 140) | SW846 8280 |
| 1,2,3,7,8,9-HxCDD | 89 | (60 - 140) | SW846 8280 |
| 1,2,3,4,7,8-HxCDF | 79 | (60 - 140) | SW846 8280 |
| 1,2,3,6,7,8-HxCDF | 86 | (60 - 140) | SW846 8280 |
| 2,3,4,6,7,8-HxCDF | 85 | (60 - 140) | SW846 8280 |
| 1,2,3,7,8,9-HxCDF | 86 | (60 - 140) | SW846 8280 |
| 1,2,3,4,6,7,8-HpCDD | 111 | (60 - 140) | SW846 8280 |
| 1,2,3,4,6,7,8-HpCDF | 120 | (60 - 140) | SW846 8280 |
| 1,2,3,4,7,8,9-HpCDF | 112 | (60 - 140) | SW846 8280 |
| OCDD | 75 | (60 - 140) | SW846 8280 |
| OCDF | 64 | (60 - 140) | SW846 8280 |

| INTERNAL STANDARD | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C-2,3,7,8-TCDD | 94 | (25 - 160) |
| 13C-2,3,7,8-TCDF | 93 | (25 - 160) |
| 13C-1,2,3,7,8-PeCDD | 101 | (25 - 160) |
| 13C-1,2,3,6,7,8-HxCDD | 77 | (25 - 160) |
| 13C-1,2,3,4,6,7,8-HpCDD | 81 | (25 - 160) |
| 13C-OCDD | 87 | (25 - 160) |

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

Bold print denotes control parameters

Quanterra
Environmental Services

# MATRIX SPIKE SAMPLE DATA REPORT

## Dioxins

Client Lot #...: H7L100119 Work Order #...: CEFP0103-MS Matrix.....: SOLID
MS Lot-Sample #: H7L100119-001 CEFP0104-MSD
Date Sampled...: 12/03/97 Date Received..: 12/10/97
Prep Date.....: 12/10/97 Analysis Date..: 12/12/97
Prep Batch #...: 7344194
Dilution Factor: 1 % Moisture.....: 24

| PARAMETER | SAMPLE AMOUNT | SPIKE AMT | MEASRD AMOUNT | UNITS | PERCENT RECOVERY | RPD | METHOD |
|---|---|---|---|---|---|---|---|
| 2,3,7,8-TCDD | ND | 1.3 | 1.2 | ng/g | 90 | | SW846 8280 |
| | ND | 1.3 | 1.2 | ng/g | 91 | 0.83 | SW846 8280 |
| 1,2,3,7,8-PeCDD | ND | 1.3 | 1.2 | ng/g | 89 | | SW846 8280 |
| | ND | 1.3 | 1.2 | ng/g | 94 | 5.6 | SW846 8280 |
| 1,2,3,4,7,8-HxCDD | ND | 1.3 | 1.2 | ng/g | 88 | | SW846 8280 |
| | ND | 1.3 | 1.2 | ng/g | 89 | 0.77 | SW846 8280 |
| 1,2,3,6,7,8-HxCDD | ND | 1.3 | 1.2 | ng/g | 93 | | SW846 8280 |
| | ND | 1.3 | 1.3 | ng/g | 99 | 6.6 | SW846 8280 |
| 1,2,3,7,8,9-HxCDD | ND | 1.3 | 1.2 | ng/g | 95 | | SW846 8280 |
| | ND | 1.3 | 1.3 | ng/g | 96 | 1.5 | SW846 8280 |
| 1,2,3,4,6,7,8-HpCDD | 0.082 | 1.3 | 1.4 | ng/g | 101 | | SW846 8280 |
| | 0.082 | 1.3 | 1.4 | ng/g | 104 | 2.7 | SW846 8280 |
| OCDD | 18 | 1.3 | 15 a | ng/g | 0.0 | | SW846 8280 |
| | 18 | 1.3 | 17 a | ng/g | 0.0 | 0.0 | SW846 8280 |
| 2,3,7,8-TCDF | ND | 1.3 | 1.2 | ng/g | 90 | | SW846 8280 |
| | ND | 1.3 | 1.2 | ng/g | 93 | 3.2 | SW846 8280 |
| 1,2,3,7,8-PeCDF | ND | 1.3 | 1.1 | ng/g | 86 | | SW846 8280 |
| | ND | 1.3 | 1.1 | ng/g | 87 | 1.8 | SW846 8280 |
| 2,3,4,7,8-PeCDF | ND | 1.3 | 1.1 | ng/g | 82 | | SW846 8280 |
| | ND | 1.3 | 1.1 | ng/g | 86 | 5.3 | SW846 8280 |
| 1,2,3,4,7,8-HxCDF | ND | 1.3 | 1.1 | ng/g | 87 | | SW846 8280 |
| | ND | 1.3 | 1.2 | ng/g | 95 | 9.3 | SW846 8280 |
| 1,2,3,6,7,8-HxCDF | ND | 1.3 | 1.2 | ng/g | 90 | | SW846 8280 |
| | ND | 1.3 | 1.3 | ng/g | 100 | 9.9 | SW846 8280 |
| 2,3,4,6,7,8-HxCDF | ND | 1.3 | 1.2 | ng/g | 92 | | SW846 8280 |
| | ND | 1.3 | 1.3 | ng/g | 97 | 5.7 | SW846 8280 |
| 1,2,3,7,8,9-HxCDF | ND | 1.3 | 1.2 | ng/g | 88 | | SW846 8280 |
| | ND | 1.3 | 1.3 | ng/g | 96 | 8.3 | SW846 8280 |
| 1,2,3,4,6,7,8-HpCDF | ND | 1.3 | 1.6 | ng/g | 125 | | SW846 8280 |
| | ND | 1.3 | 1.7 | ng/g | 126 | 1.0 | SW846 8280 |
| 1,2,3,4,7,8,9-HpCDF | ND | 1.3 | 1.5 | ng/g | 112 | | SW846 8280 |
| | ND | 1.3 | 1.5 | ng/g | 114 | 2.0 | SW846 8280 |
| OCDF | ND | 1.3 | 0.72 a | ng/g | 55 | | SW846 8280 |
| | ND | 1.3 | 0.76 a | ng/g | 58 | 5.0 | SW846 8280 |

| INTERNAL STANDARDS | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C-2,3,7,8-TCDD | 97 | (25 - 160) |
| | 93 | (25 - 160) |

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Quanterra
Environmental Services

# MATRIX SPIKE SAMPLE DATA REPORT

## Dioxins

**Client Lot #...:** H7L100119 **Work Order #...:** CEFP0103-MS **Matrix.....:** SOLID
**MS Lot-Sample #:** H7L100119-001 CEFP0104-MSD

| INTERNAL STANDARDS | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C-2,3,7,8-TCDF | 93 | (25 - 160) |
| | 89 | (25 - 160) |
| 13C-1,2,3,7,8-PeCDD | 94 | (25 - 160) |
| | 93 | (25 - 160) |
| 13C-1,2,3,6,7,8-HxCDD | 67 | (25 - 160) |
| | 63 | (25 - 160) |
| 13C-1,2,3,4,6,7,8-HpCDD | 80 | (25 - 160) |
| | 79 | (25 - 160) |
| 13C-OCDD | 78 | (25 - 160) |
| | 70 | (25 - 160) |

**NOTE(S):**

Calculations are performed before rounding to avoid round-off errors in calculated results.

Bold print denotes control parameters

Results and reporting limits have been adjusted for dry weight.

a Spiked analyte recovery is outside stated control limits.

Quanterra Environmental Services

# MATRIX SPIKE SAMPLE EVALUATION REPORT

## Dioxins

Client Lot #...: H7L100119 Work Order #...: CEFP0103-MS Matrix.....: SOLID
MS Lot-Sample #: H7L100119-001 CEFP0104-MSD
Date Sampled...: 12/03/97 Date Received..: 12/10/97
Prep Date.....: 12/10/97 Analysis Date..: 12/12/97
Prep Batch #...: 7344194
Dilution Factor: 1 % Moisture.....: 24

| PARAMETER | PERCENT RECOVERY | RECOVERY LIMITS | RPD | RPD LIMITS | METHOD |
|---|---|---|---|---|---|
| 2,3,7,8-TCDD | 90 | (60 - 140) | | | SW846 8280 |
| | 91 | (60 - 140) | 0.83 | (0-50) | SW846 8280 |
| 1,2,3,7,8-PeCDD | 89 | (60 - 140) | | | SW846 8280 |
| | 94 | (60 - 140) | 5.6 | (0-50) | SW846 8280 |
| 1,2,3,4,7,8-HxCDD | 88 | (60 - 140) | | | SW846 8280 |
| | 89 | (60 - 140) | 0.77 | (0-50) | SW846 8280 |
| 1,2,3,6,7,8-HxCDD | 93 | (60 - 140) | | | SW846 8280 |
| | 99 | (60 - 140) | 6.6 | (0-50) | SW846 8280 |
| 1,2,3,7,8,9-HxCDD | 95 | (60 - 140) | | | SW846 8280 |
| | 96 | (60 - 140) | 1.5 | (0-50) | SW846 8280 |
| 1,2,3,4,6,7,8-HpCDD | 101 | (60 - 140) | | | SW846 8280 |
| | 104 | (60 - 140) | 2.7 | (0-50) | SW846 8280 |
| OCDD | 0.0 a | (60 - 140) | | | SW846 8280 |
| | 0.0 a | (60 - 140) | 0.0 | (0-50) | SW846 8280 |
| 2,3,7,8-TCDF | 90 | (60 - 140) | | | SW846 8280 |
| | 93 | (60 - 140) | 3.2 | (0-50) | SW846 8280 |
| 1,2,3,7,8-PeCDF | 86 | (60 - 140) | | | SW846 8280 |
| | 87 | (60 - 140) | 1.8 | (0-50) | SW846 8280 |
| 2,3,4,7,8-PeCDF | 82 | (60 - 140) | | | SW846 8280 |
| | 86 | (60 - 140) | 5.3 | (0-50) | SW846 8280 |
| 1,2,3,4,7,8-HxCDF | 87 | (60 - 140) | | | SW846 8280 |
| | 95 | (60 - 140) | 9.3 | (0-50) | SW846 8280 |
| 1,2,3,6,7,8-HxCDF | 90 | (60 - 140) | | | SW846 8280 |
| | 100 | (60 - 140) | 9.9 | (0-50) | SW846 8280 |
| 2,3,4,6,7,8-HxCDF | 92 | (60 - 140) | | | SW846 8280 |
| | 97 | (60 - 140) | 5.7 | (0-50) | SW846 8280 |
| 1,2,3,7,8,9-HxCDF | 88 | (60 - 140) | | | SW846 8280 |
| | 96 | (60 - 140) | 8.3 | (0-50) | SW846 8280 |
| 1,2,3,4,6,7,8-HpCDF | 125 | (60 - 140) | | | SW846 8280 |
| | 126 | (60 - 140) | 1.0 | (0-50) | SW846 8280 |
| 1,2,3,4,7,8,9-HpCDF | 112 | (60 - 140) | | | SW846 8280 |
| | 114 | (60 - 140) | 2.0 | (0-50) | SW846 8280 |
| OCDF | 55 a | (60 - 140) | | | SW846 8280 |
| | 58 a | (60 - 140) | 5.0 | (0-50) | SW846 8280 |

| INTERNAL STANDARDS | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C-2,3,7,8-TCDD | 97 | (25 - 160) |
| | 93 | (25 - 160) |

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Quanterra
Environmental Services

# MATRIX SPIKE SAMPLE EVALUATION REPORT

## Dioxins

**Client Lot #...:** H7L100119 **Work Order #...:** CEFP0103-MS **Matrix.....:** SOLID
**MS Lot-Sample #:** H7L100119-001 CEFP0104-MSD

| INTERNAL STANDARDS | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C-2,3,7,8-TCDF | 93 | (25 - 160) |
| | 89 | (25 - 160) |
| 13C-1,2,3,7,8-PeCDD | 94 | (25 - 160) |
| | 93 | (25 - 160) |
| 13C-1,2,3,6,7,8-HxCDD | 67 | (25 - 160) |
| | 63 | (25 - 160) |
| 13C-1,2,3,4,6,7,8-HpCDD | 80 | (25 - 160) |
| | 79 | (25 - 160) |
| 13C-OCDD | 78 | (25 - 160) |
| | 70 | (25 - 160) |

**NOTE(S):**

Calculations are performed before rounding to avoid round-off errors in calculated results.

Bold print denotes control parameters

Results and reporting limits have been adjusted for dry weight.

a Spiked analyte recovery is outside stated control limits.

PARADIGM ANALYTICAL LABORATORIES, INC.
2627 Northchase Parkway SE, Wilmington, NC 28405
Phone: (910)-350-1903 FAX: (910)-350-1557

H7L100119 COC# 13153

Chain-of Custody Record & Analytical Request

Page 1 of 1

Client: Paradigm
Address:
Address:
Quote #: Quanterra

Project ID: G145-187
P.O. Number:
Contact: Ray Porter
Phone: 910 350 1903

Date: 12-9-97
Turnaround: on or before 12/15/97
Job Number:

Report To: Ray Porter
Invoice To:

| Sample ID | Date | Time | Matrix | Preservatives: ice | | | Analyses: 8280 | | | | | | | | | Comments: Please specify any special reporting requirements |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 33591 | 12/3/97 | 845 | Soil | X | | | X | | | | | | | | | |
| 33592 | ↓ | 1030 | ↓ | X | | | X | | | | | | | | | |
| 33593 | | 1120 | | X | | | X | | | | | | | | | |
| 33594 | | 1345 | | X | | | X | | | | | | | | | |
| 33595 | | 1515 | | X | | | X | | | | | | | | | No custody seals noted at 2°C BMD 12-10-97 |
| 33596 | ✓ | 1630 | ✓ | X | | | X | | | | | | | | | |

| Relinquished By | Date | Time | Received By | Date | Time | Temperature | Sampled By | Airbill # |
|---|---|---|---|---|---|---|---|---|
| Erica Price | 12/9/97 | | Benjamin Dawson | 12-10-97 | 11:30 | 2°C | | |
| | | | | | | | | |
| | | | | | | | | |