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FINAL SITE CHARACTERIZATION REPORT FOR SITE 2036 NAVAL ACTIVITY PUERTO RICO

7/1/2002

CH2M HILL

003

Final
Site Characterization Report
for
Site 2036

Prepared for

United States Navy
Roosevelt Roads Naval Station
Ceiba, Puerto Rico

Contract No. N62470-95-D-6007
CTO-229

Prepared by

CH2MHILL

Tampa, Florida

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List of Acronyms

bls	below land surface
BTEX	benzene-toluene-ethylbenzene-xylene
DRO	Diesel Range Organics
EPA	U.S. Environmental Protection Agency
GRO	Gasoline Range Organics
IDW	Investigation-derived waste
MSL	mean sea level
NFA	No Further Action
NTU	nephelometric turbidity unit
OVM	Organic Vapor Meter
ORP	Redox Potential
ppm	parts per million
PREQB	Puerto Rico Environmental Quality Board
QA/QC	Quality Assurance/Quality Control
RCI	Reactivity/Corrosivity/Ignitability
SC	Site Characterization
TCLP	Toxicity Characteristic Leaching Procedure
TPH	total petroleum hydrocarbons
UST	underground storage tank
USTMD	Underground Storage Tank Management Division
WTP	Water Treatment Plant

Executive Summary

The U.S. Navy has conducted a Site Characterization (SC) investigation of a former underground storage tank (UST) located near Building 2036 (Site 2036) at U.S. Naval Station (NAVSTA) Roosevelt Roads, Puerto Rico. The former UST at Site 2036 was a 550-gallon fiberglass tank that stored waste oil. The UST was removed in March 1999 because it was no longer in service. Following tank removal, samples were collected from the excavated soil and from the walls of the excavated pit and analyzed for total petroleum hydrocarbons (TPH) and benzene, toluene, ethylbenzene, and xylene (BTEX). Because the encountered TPH levels were above the 100 milligrams per kilogram (mg/Kg) target level established by the Puerto Rico Environmental Quality Board (PREQB) for soil, PREQB requested a SC investigation of the site.

The SC investigation at Site 2036 was conducted during February 15 to June 7, 2002. The primary objective of the SC investigation was to assess the horizontal and vertical extent of potential soil and groundwater contamination from the former 550-gallon waste oil UST and associated piping that were removed from the site. The SC investigation involved installing six exploratory soil borings and five permanent groundwater monitoring wells; collecting and analyzing soil and groundwater samples; and performing a qualitative risk assessment based on the investigation findings.

Samples from each exploratory soil boring were collected every 3 feet starting at 3 feet below land surface (bls) and terminating at 3 feet above groundwater depth. Collected soil samples were screened using an Organic Vapor Meter (OVM) and inspected for hydrocarbon staining and petroleum odor. Two soil samples (usually that had the highest OVM readings) were analyzed for TPH levels. One groundwater sample was collected from each soil boring and analyzed for TPH and BTEX. Groundwater samples collected from the newly installed monitoring wells were analyzed for TPH and BTEX.

Groundwater flow at Site 2036 is controlled hy slight elevation differences between the project site and nearby coastline. Based on water table elevation measurements taken during the SC investigation, groundwater flows predominantly in a southward direction away from the former UST. Groundwater at Site 2036 was encountered at depths ranging from 7.07 to 7.49 ft bls. The small differences in water table elevations at the site are attributed to the flat topography of the site.

The laboratory analytical results for groundwater samples collected during the SC investigation indicate that groundwater at Site 2036 is not contaminated by TPH or BTEX. The laboratory analytical results for soil samples collected during the SC investigation indicated that minor TPH contamination (260 mg/Kg) exists in the surface soil in the southwestern part of the site. The nature and extent of the detected soil contamination is minor and does not represent significant soil contamination that may have occurred as a result of possible leakage of the former UST and associated piping. This minor contamination appears to have been an isolated incident that may have resulted from a small spill during routine handling of waste oil or recovered petroleum-contact water at the site.

The results of the qualitative risk assessment indicate that the minor soil contamination at the site does not pose a significant risk to human health or the environment. The minor TPH levels in the surface soil are well below human direct exposure cleanup target level. Moreover, the soil contamination is covered by concrete pavement which prevents it from being exposed to air or downward infiltration of rain water.

Based on the findings of the SC investigation, No Further Action is recommended for Site 2036. Because of the absence of hydrocarbon contamination in the groundwater at the site, and the low levels of soil contamination that are expected to be reduced by natural biodegradation over time, no remediation measures are recommended for the site.

SECTION 1

Introduction

Pursuant to Navy CLEAN II Contract N62470-95-D-6007, CH2M HILL was authorized by the U.S. Navy to conduct a Site Characterization (SC) investigation of a former underground storage tank (UST) located near Building 2036 (Site 2036) at U.S. Naval Station (NAVSTA) Roosevelt Roads, Puerto Rico. The objective of the SC investigation was to assess the extent of potential petroleum contamination in the soil and groundwater where the UST was once located. This report presents the findings of the SC investigation conducted at Site 2036. This report will be submitted to the Underground Storage Tank Management Division (USTMD) of the Puerto Rico Environmental Quality Board (PREQB) for review.

1.1 Project Location

NAVSTA Roosevelt Roads is located near the town of Ceiba on the eastern end of Puerto Rico. The approximate location of the station is 18° 15′ 00″ North latitude and 65° 39′ 30″ West longitude (Figure 1-1). The approximate location of Site 2036 is shown on Figure 1-2. The former UST at Site 2036 was located adjacent to the existing Building 2036 which is used as the oil spill response facility at NAVSTA Roosevelt Roads. The site topography is shown on Figure 1-3.

1.2 Site Background

The former UST at Site 2036 was a 550-gallon fiberglass tank that stored waste oil. The UST was removed in March 1999 because it was no longer in service. Following tank removal, samples were collected from the excavated soil and from the walls of the excavated pit and analyzed for total petroleum hydrocarbons (TPH) and benzene, toluene, ethylbenzene, and xylene (BTEX). The grab sample taken from the excavated soil had a TPH concentration of 6,056 milligrams per kilogram (mg/Kg) and non-detectable BTEX. The grab samples taken from the walls of the excavated pit had TPH levels that ranged from < 10 to 1,050 mg/Kg and non-detectable BTEX.

1.3 Previous Investigations

No previous SC investigations have been conducted at Site 2036. The U.S. Navy requested that a SC investigation be conducted at Site 2036 to evaluate whether petroleum products once stored in the former UST have impacted the soil and groundwater at the site.

1.4 Project Objectives

The primary objective of the SC investigation at Site 2036 was to assess the horizontal and vertical extent of potential soil and groundwater contamination from the former 550-gallon

waste oil UST and associated piping that were removed from the site. The SC investigation involved installing exploratory soil borings and permanent groundwater monitoring wells; collecting and analyzing soil and groundwater samples; and performing a qualitative risk assessment (if necessary) based on the investigation findings.

A total of six (6) soil borings and five (5) permanent monitoring wells were installed at Site 2036 to meet the project objectives. Soil and groundwater samples collected from the soil borings and monitoring wells were analyzed by On Site Labs, Inc., of Caguas, Puerto Rico. The findings of the investigation were used to assess potential exposure to human health and the environment.

FIGURE 1-1
Site Location Map
U.S. Naval Station Roosevelt Roads

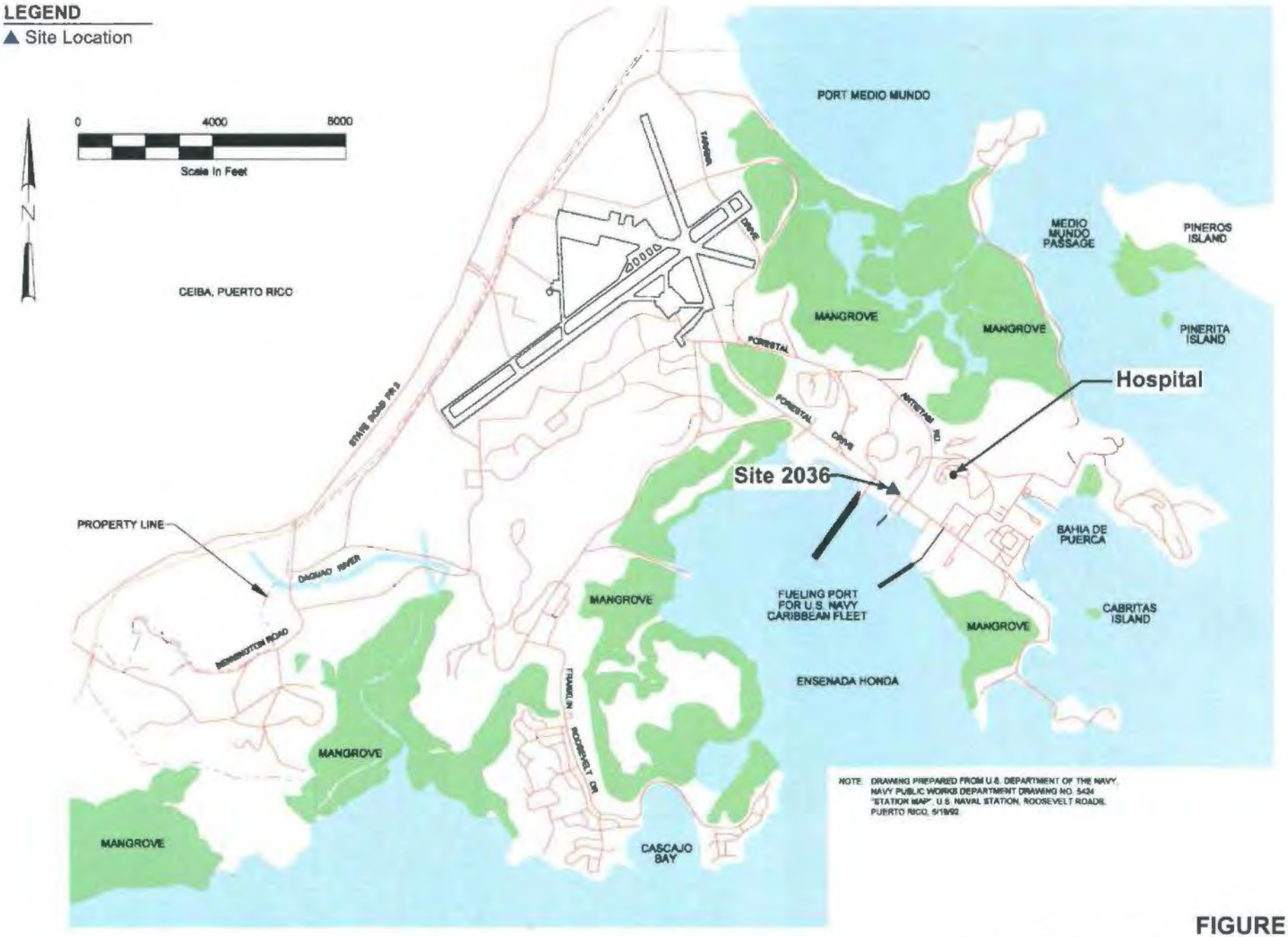

FIGURE 1-2
Approximate Location of Site 2036
U.S. Naval Station Roosevelt Roads

Scale in Feet
0 1000 2000

N

USGS Quad Map:
Punta Puerca, Puerto Rico - 1982

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FIGURE 1-3
Site 2036 Topographic Map
U.S. Naval Station Roosevelt Roads

SECTION 2

Investigation Methodology

The SC investigation at Site 2036 was conducted during February 15 to June 7, 2002 by two experienced CH2M HILL environmental engineers and a drilling subcontractor. The primary field activities involved installing soil borings and monitoring wells, and collecting and analyzing soil and groundwater samples. The standard operating procedures utilized during the SC investigation were presented in the Final Work Plan and Health & Safety Plan (CH2M HILL, 2002) prepared for the project.

2.1 Soil Borings

A total of six exploratory soil borings were installed at Site 2036 (Figure2-1). Completed soil boring logs for the project are provided as Appendix A. The locations of the first two or three soil borings were determined in the field based on site conditions and the expected groundwater flow direction. The remaining soil borings were located based on the results of the soil screening, and the soil and groundwater analytical results from the initial borings. The soil screening results and the analytical results for the soil and groundwater samples collected from the soil borings were also used to determine the locations of the permanent monitoring wells that were installed and sampled.

2.1.1 Soil Boring Installation

Soil boring installations at the site were initiated after utility clearance was obtained from NAVSTA Roosevelt Roads. As a safety precaution, the first five feet of each soil boring were installed with a hand auger to avoid accidentally puncturing underground pipes/conduits. The remaining length of each soil boring was advanced using a conventional split-spoon auger drill rig down to the depth of groundwater. An Organic Vapor Meter (OVM) was used to periodically measure organic vapor levels in the general breathing zone around each boring.

2.1.2 Soil Screening

Pre-cleaned, 3-inch diameter (2-foot-long) split spoon samples were collected every 3 feet in each soil boring, starting at 3 feet bls and terminating at 3 feet above groundwater depth. Collected soil samples were screened using an OVM and inspected for hydrocarbon staining and petroleum odor. For OVM screening, a 4-inch subsample was cut from the collected split-spoon sample and placed into a 1-gallon ziplock bag. After 10 minutes, the OVM probe was punched into the closed bag and the reading was taken.

The two samples with the highest OVM readings were analyzed for TPH levels by U.S. Environmental Protection Agency (EPA) Method 8015B for both Gasoline Range Organics (GRO) and Diesel Range Organics (DRO). The analytical laboratory provided a 24-hour turnaround time from sample delivery for the TPH analyses. The quick turnaround time

N

Scale in Feet

100 0 100

LEGEND

MW Monitoring Well

SB Soil Boring

FIGURE 2-1

Site 2036 Locations of Soil Borings and Monitoring Wells

U.S. Naval Station Roosevelt Roads

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allowed for rapid location of the next set of soil borings that were installed at the site to delineate the extent of potential contamination.

2.1.3 Groundwater Screening

For groundwater screening, one groundwater sample was collected from each soil boring using a peristaltic pump and analyzed for TPH by EPA Method 8015B for GRO and DRO and for BTEX by EPA Method 8020A. The analytical results were used to help locate additional exploratory soil borings to delineate the extent of potential groundwater contamination prior to installing the permanent groundwater monitoring wells.

2.2 Monitoring Wells

A total of five permanent groundwater monitoring wells were installed at Site 2036 (see Figure 2-1). The locations of the monitoring wells were determined from screening and analyses of soil and groundwater samples collected from the exploratory soil borings.

As shown on Figure 2-1, monitoring well 2036-MW1 was installed where the former UST was once located. One monitoring well (2036-MW2) was installed upgradient and three wells (2036-MW3, 2036-MW4, and 2036-MW5) were installed downgradient of the former UST.

2.2.1 Monitoring Well Construction

Completed well construction diagrams for the newly installed monitoring wells are provided as Appendix B. The permanent groundwater monitoring wells were installed using conventional hollow-stem auger drilling techniques. As a safety precaution, the first five feet of each monitoring well were installed with a hand auger to avoid accidentally puncturing underground pipes/conduits. An OVM was used to periodically measure organic vapor levels in the general breathing zone around each well borehole.

Table 2-1 provides a summary of the monitoring well completion data. All monitoring well casings were 2 inches in diameter, new, unused Schedule 40 PVC pipe. PVC casing sections had internal flush joined threaded joints. Monitor well screens were 2-inch diameter, Schedule 40, horizontal slotted PVC well screens. Screens were factory slotted to 0.010 inch and 10 feet in length for each screen section. A threaded PVC cap was placed at the bottom of the screen section.

The filter pack material was clean, bagged silica sand (supplier certified to be free of contaminants) that was inert, hard, well rounded, and free from roots, trash and other material. The filter pack was placed at the bottom of the borehole and extended up a minimum of two feet above the screened section. The tremie pipe method was used for placement of the filter pack where appropriate.

Because hollow stem augers were used during this project, the filter pack was placed as the augers were withdrawn from the borehole. Augers were pulled in 2- to 3-foot intervals during this process. Care was exercised while placing the filter pack through the augers to prevent bridging of the sand between the well casing and inside the augers. Frequent measurements were made to confirm that bridging had not occurred. Following filter pack tagging, a minimum 2-foot-thick layer of bentonite chips was placed above the filter pack material using the tremie pipe method to tightly seal the annular space.

Cement grout was placed from the bentonite seal to the ground surface. The grout was pumped through a tremie pipe and the length was no more than 5 feet from the top of the level of grout at all times. The grout seal was Portland cement conforming to ASTM C 150, Type II, with no more than 4 percent bentonite. The grout was mixed in the following proportions: 94 pounds (lbs) of type II Portland cement, up to 4 lbs of 100 percent sodium bentonite, and up to 8 gallons of potable water.

Steel, flush mount, bolt down, water tight, traffic bearing meter boxes were used to house the top of each monitoring well. The meter box was furnished with an 8.5-inch-diameter, traffic bearing cover centered in a 2-foot x 2-foot x 4-inch concrete pad. The installed pad was sloped gently away from the cover to allow for drainage. Water tight, locking caps (all keyed alike) were installed.

TABLE 2-1
Monitoring Well Completion Summary
Site 2036, U.S. Naval Station Roosevelt Roads

Well Designation	2036-MW1	2036-MW2	2036-MW3	2036-MW4	2036-MW5
Date Installed	02/21/2002	02/22/2002	02/25/2002	02/25/2002	02/25/2002
Total Well Depth (ft, bls)	15	15	15	15	15
Type of Completion	Flush	Flush	Flush	Flush	Flush
Top of Casing Elevation (ft)	107.97	107.91	108.17	108.25	108.07
Casing Type	Schedule 40 PVC	Schedule 40 PVC	Schedule 40 PVC	Schedule 40 PVC	Schedule 40 PVC
Casing Length (ft)	5	5	5	5	5
Screen Type	Schedule 40 PVC	Schedule 40 PVC	Schedule 40 PVC	Schedule 40 PVC	Schedule 40 PVC
Screen Slot Size (in)	0.01	0.01	0.01	0.01	0.01
Screen Length (ft)	10	10	10	10	10
Screen Interval (ft, bls)	5-15	5-15	5-15	5-15	5-15

Note: All monitoring wells are 2 inches in diameter
Top-of-casing elevations were referenced to the Roosevelt Roads datum
in = inch
ft = feet
msl = mean sea level
bls = below land surface

2.2.2 Monitoring Well Development

Completed well development logs for the newly installed monitoring wells are provided as Appendix C. The newly installed monitoring wells were developed with a surge block in conjunction with a bailer or pump. No air, detergents, soaps, acids, bleaches, or additives were used during development efforts. Well development efforts were initiated no sooner than 24 hours following well installation.

Well development continued until clear, sand free formation water was produced from the well and until pH, conductivity, and temperature measurements stabilized. For turbidity,

stabilization was defined as having two consecutive readings within 10 nephelometric turbidity units (NTUs) of each other.

Monitoring wells were purged prior to sampling using a peristaltic pump at a low flow rate. Conductivity, pH, temperature, and turbidity readings were collected during purging efforts. A minimum of three sets of readings were collected until two consecutive sets of readings for all parameters were within 10 percent of each other.

2.2.3 Groundwater Sampling

Completed well sampling logs for the newly installed monitoring wells are provided as Appendix D. After the monitoring wells were properly purged, groundwater samples were withdrawn using a peristaltic pump. The down-hole tubing used for sample collection was Teflon®. Approximately 6-inches of C-Flex® tubing was used at the rotary pump head to achieve efficient pumping. New tubing was used for each well.

Groundwater withdrawn for analyses was collected through a vacuum bottle. A special Teflon® lined transfer cap and pre-cleaned 1-liter amber sample bottle was installed in the suction tubing between the well and the peristaltic pump. The pump was then turned on to create a vacuum inside the 1-liter amber bottle, pulling the sample from the well into the 1-liter bottle. The required sample bottles were then filled directly from the 1-liter amber bottle.

Collected groundwater samples were analyzed for TPH using EPA Method 8015B for GRO and DRO and for BTEX by EPA Method 8020A.

2.3 Groundwater Elevation Measurements

The top-of-casing elevations of the five monitoring wells installed at Site 2036 were surveyed by a licensed surveyor and referenced to the NAVSTA Roosevelt Roads datum. Depth-to-water measurements were collected from the top-of-casing (north side) with an electronic water level probe. Table 2-2 presents the measured depth-to-water and monitoring well elevations. The water level measurements were used to generate the water table elevation contour map provided as Figure 2-2. As shown on the Figure 2-2, groundwater at Site 2036 flows predominantly in a southward direction away from the former UST location.

TABLE 2-2
Water Table Elevation Data
Site 2036 - U.S. Naval Station Roosevelt Roads

Well Designation	Date	Elevation of Top of Casing (ft, RRD)	Depth to Water (ft)	Water Level Elevation (ft, RRD)
2036-MW1	06/07/2002	107.97	6.77	101.20
2036-MW2	06/07/2002	107.91	6.70	101.21
2036-MW3	06/07/2002	108.17	7.00	101.17
2036-MW4	06/07/2002	108.25	7.09	101.16
2036-MW5	06/07/2002	108.07	6.96	101.11

Note: ft = feet
RRD = Roosevelt Roads datum (MSL + 100 ft)

2.4 Quality Assurance/Quality Control

Quality Assurance/Quality Control (QA/QC) samples for this project were collected according to the following standard guidelines:

- Field duplicates – 10 percent of total number of samples
- Equipment blank –10 percent of total number of samples/day
- 1 trip blank/trip

2.5 Investigation Derived Waste

Investigation-derived waste (IDW) generated during the soil boring and monitoring well installations was containerized in drums and stored in a designated storage area. Composite samples of the IDW were collected a rate of one sample per a maximum of five drums and analyzed as follows:

- IDW drums containing water – Reactivity/Corrosivity/Ignitability (RCI) and TPH (DRO and GRO)
- IDW drums containing soil – RCI, Toxicity Characteristic Leaching Procedure (TCLP) metals, and TCLP volatiles

The results of these analyses were submitted to the disposal contractor prior to drum pick-up.

Scale in Feet

100 0 100

LEGEND

MW Monitoring Well
SB Soil Boring
100.76 Groundwater Elevation
Groundwater Contour
Groundwater Flow Direction

FIGURE 2-2
Site 2036 Groundwater Flow Direction
U.S. Naval Station Roosevelt Roads

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SECTION 3

Site Geology/Hydrogeology

3.1 Regional Geology

The geology of NAVSTA Roosevelt Roads consists of a sequence of intrusive and extrusive volcanic and volcaniclastic lithologies of Cretaceous age. Much of NAVSTA Roosevelt Roads is underlain by the Daguao formation. The Daguao formation is characterized by interbedded volcanic breccia, laval, subordinate volcanic sandstone, and crystal tuff. The largest hills and ridges on the base are composed of the Daguao formation, and the highest elevations approach 300 feet above mean sea level (MSL). The Daguao formation is encountered at different depths across NAVSTA Roosevelt Roads. The irregular surface elevation of the Daguao formation may be related to its tectonic origin of emplacement. The hills are flanked by Quaternary and Holocene fanglomerate and swamp deposits. The broad low-lying areas of the NAVSTA Roosevelt Roads are composed of Quaternary alluvium, slopewash, and fanglomerate deposits.

3.1.1 Site Geology

The soil samples collected during the installations of soil borings and monitoring wells were used to describe the local shallow site geology. Lithologic descriptions are included within the soil boring logs and monitoring well construction diagrams which are presented in Appendices A and B, respectively.

As seen in Figure 2-1, Site 2036 lies within a facility and parking lot (approximately 8.5 feet above msl) with local generally flat topography. Beneath Site 2036, the encountered subsurface lithology consisted of shell, shelly sand, silty sand and silt from deposition and clay from highly weathered volcanic rock. The colors of encountered lithologies were primarily gray, greenish gray, dark grayish brown, yellowish brown. The colors of the soils were determined using the Munsell soil color system. The silts and clays were darker in color, greenish and grays, which are characteristic of the weathering and oxidation or reduction of iron-rich volcanic rock. These sediments generally possess high plasticity when moist. The unconsolidated shell and sands were light brown and gray. The geologic cross sections used for lithologic descriptions are shown on Figure 3-1 and the lithology illustrations are provided as Figures 3-2 and 3-3. The geologic cross section illustrations are based on the lithologic data collected during the installation of soil borings and monitoring wells for the SC investigation.

3.2 Site Hydrogeology

Groundwater flow at Site 2036 is controlled by slight elevation differences between the project site and nearby coastline. Groundwater flows predominantly in a southward direction away from the former UST (see Figure 2-2). Groundwater at Site 2036 was encountered at depths ranging from 7.07 to 7.49 ft bls. The small differences in water table elevations at the site are attributed to the flat topography of the site.

167722.US.RP 5/02 E052002006TPA

Scale in Feet

100 0 100

LEGEND

MW Monitoring Well
SB Soil Boring
A-A' Geologic Cross Section

FIGURE 3-1
Site 2036 Locations of
Geologic Cross Sections A-A' and B-B'
U.S. Naval Station Roosevelt Roads

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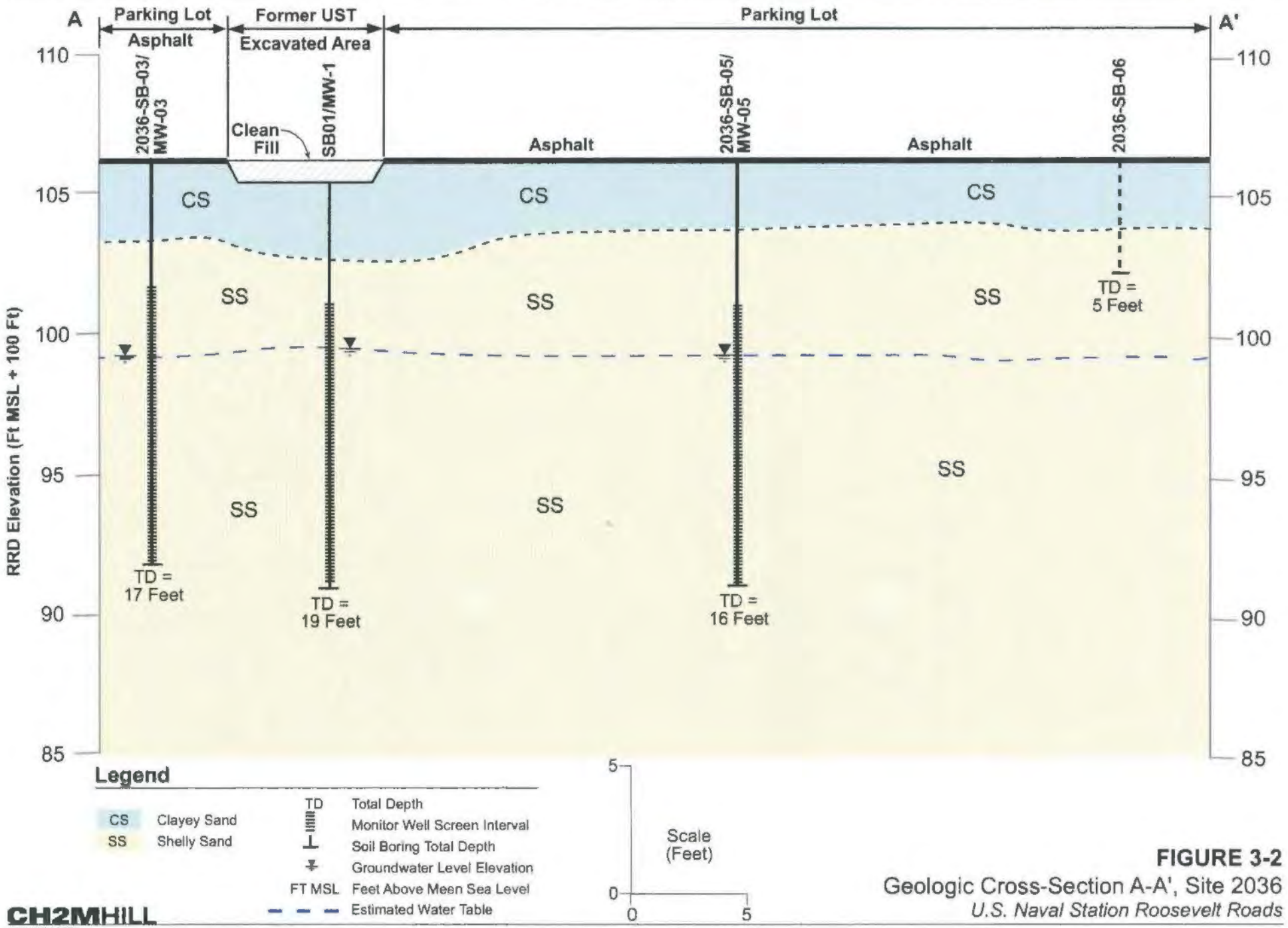

FIGURE 3-2
Geologic Cross-Section A-A', Site 2036
U.S. Naval Station Roosevelt Roads

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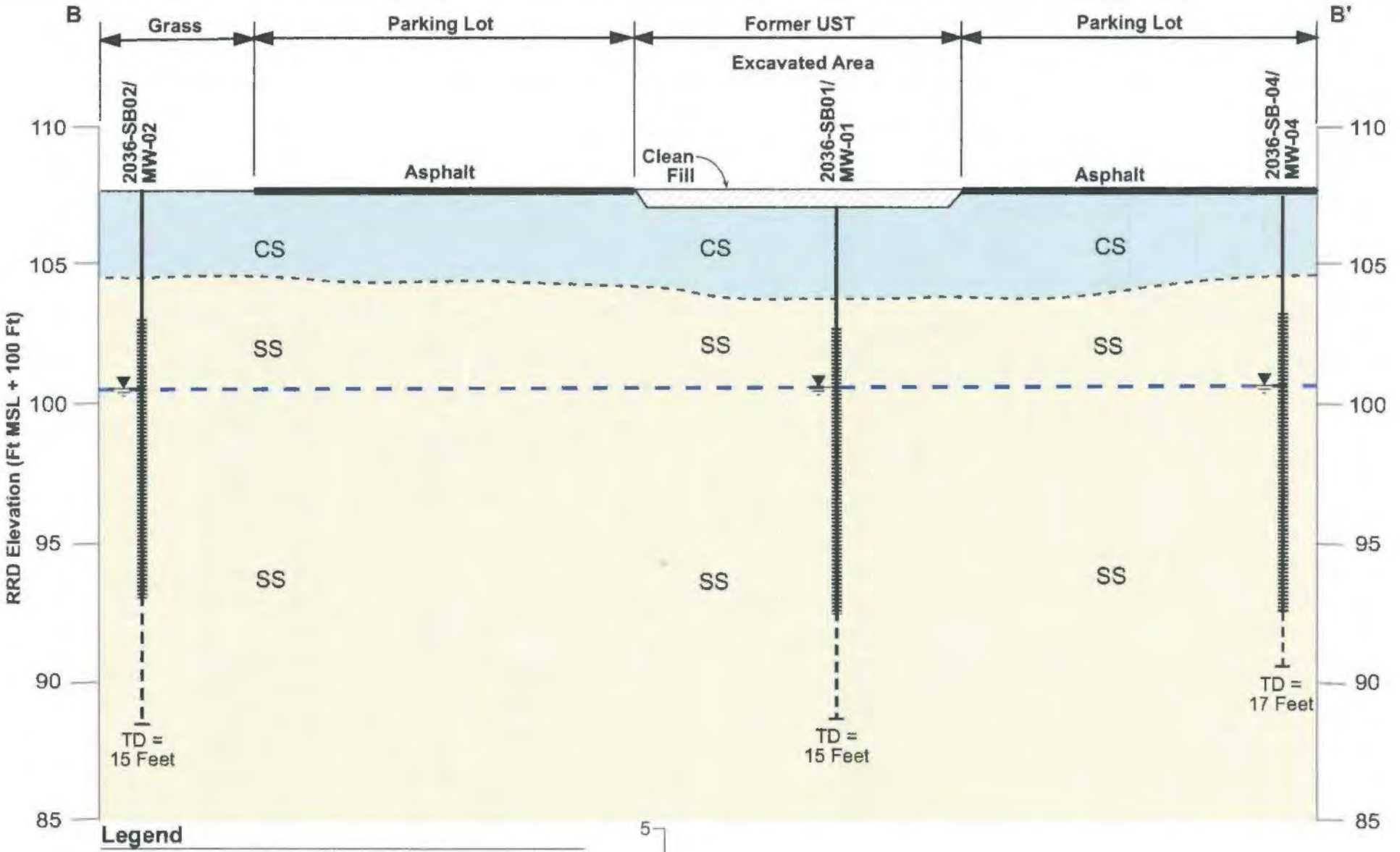

FIGURE 3-3
Geologic Cross-Section B-B', Site 2036
U.S. Naval Station Roosevelt Roads

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SECTION 4

Investigation Findings

The findings of the SC investigation of Site 2036 are presented in the following subsections. All QC sample results indicated that the laboratory analytical data were valid. The comprehensive analytical data for collected samples, including QC data, and chain-of-custody records are provided as Appendix E.

4.1 Soil Screening Results

The soil screening results for Site 2036 are presented in Table 4-1. As shown in Table 4-1, total organic vapors emitted from collected soil samples were very low for all soil borings. Total organic vapor levels ranged from 0 to 18.9 parts per million (ppm). OVM readings that are this low indicate negligible organic vapor levels from either hydrocarbons or methane. The two soil samples collected from each boring were also analyzed for TPH GRO and DRO as discussed in Section 4.3.

TABLE 4-1
Soil Screening Results
Site 2036, U.S. Naval Station Roosevelt Roads,

Sample Designation	Date Sampled	Sample Depth (ft BLS)	Total Organic Vapors (ppm)
2036-SB01	02/19/2002	0-1	0.2
	02/19/2002	3-4	0.2
2036-SB02	02/20/2002	0-1	0
	02/20/2002	3-4	0
2036-SB03	02/20/2002	0-1	18.9
	02/20/2002	3-4	0.5
2036-SB04	02/20/2002	0-1	0.2
	02/20/2002	3-4	0.5
2036-SB05	2/21/02	0-1	0
	2/21/02	3-4	0
2036-SB06	2/21/02	0-1	0
	2/21/02	3-4	0.1

Notes:
BLS = below land surface
ppm = parts per million

4.2 Groundwater Screening Results

The groundwater screening results for Site 2036 are presented in Table 4-2. As shown in Table 4-2, none of the groundwater samples collected from the soil borings installed at Site 2036 had detectable levels of TPH or BTEX.

TABLE 4-2
Groundwater Screening Results
Site 2036, U.S. Naval Station Roosevelt Roads

Soil Boring	Date Sampled	Sample Matrix	EPA Method 8015B (GRO) TPH (mg/kg)	EPA Method 8015B (DRO) TPH (mg/kg)	EPA Method 8020A Total BTEX (mg/kg)
2036-SB01	02/19/02	Water	ND	ND	ND
2036-SB02	02/20/02	Water	ND	ND	ND
2036-SB03	02/20/02	Water	ND	ND	ND
2036-SB04	02/20/02	Water	ND	ND	ND
2036-SB05	02/21/02	Water	ND	ND	ND

Notes: TPH = Total Petroleum Hydrocarbons
Total BTEX = Sum of Benzene, Toluene, Ethylbenzene, and Xylene Concentrations
mg/kg = Milligrams per Kilogram
UST = Underground Storage Tanks
ND = Non Detectable
EPA = Environmental Protection Agency
8015B (GRO) = EPA Method 8015B Gasoline Range Organics
8015B (DRO) = EPA Method 8015B Diesel Range Organics

4.3 Soil Analytical Results

The soil analytical results for Site 2036 are presented in Table 4-3. As shown in Table 4-3, five soil samples had detectable levels of DRO TPH. None of the soil samples had detectable levels of GRO TPH or BTEX. Of the soil samples that had detectable levels of DRO TPH, only one sample (2036-SB3) exceeded the PREQB target level of 100 mg/Kg for total TPH. The 0' - 1' depth interval in 2036-SB3 had a DRO TPH level of 260 mg/Kg.

The 2036 facility is used for oil spill response and recovery operations at NAVSTA Roosevelt Roads. Petroleum-contact water that is recovered from oil spill sites is stored in tanker trucks that are parked and offloaded at Site 2036. Small releases of petroleum-contact water during such operations may have occurred at the site in the past. As a result, the former UST may not be the source of the minor surface soil contamination at the site. The nature of the soil contamination, lack of groundwater contamination, and the ongoing oil spill response activities at the site suggest that the contamination source may be from routine handling of recovered petroleum-contact water instead of from the former UST.

TABLE 4-3
Soil Analytical Results
Site 2036, U.S. Naval Station Roosevelt Roads

Soil Boring	Date Sampled	Sample Matrix	EPA Method 8015B (GRO) TPH (mg/kg)	EPA Method 8015B (DRO) TPH (mg/kg)	EPA Method 8020A Total BTEX (mg/kg)
2036-SB01 (0-1)	02/19/02	Soil	ND	71	NA
2036-SB01 (3-4)	02/19/02	Soil	ND	ND	NA
2036-SB02 (0-1)	02/20/02	Soil	ND	ND	NA
2036-SB02 (3-4)	02/20/02	Soil	ND	31	NA
2036-SB03 (0-1)	02/20/02	Soil	ND	260	NA
2036-SB03 (3-4)	02/20/02	Soil	ND	27	NA
2036-SB04 (0-1)	02/20/02	Soil	ND	ND	NA
2036-SB04 (3-4)	02/20/02	Soil	ND	ND	NA
2036-SB05 (0-1)	02/21/02	Soil	ND	ND	NA
2036-SB05 (3-4)	02/21/02	Soil	ND	ND	NA
2036-SB06 (0-1)	02/21/02	Soil	ND	58	NA
2036-SB06 (3-4)	02/21/02	Soil	ND	ND	NA

Notes:
TPH = Total petroleum hydrocarbons
Total BTEX= Sum of benzene, toluene, ethylbenzene, and xylene concentrations
mg/kg = Milligrams per kilogram
UST = Underground storage tanks
ND = Non detectable
NA = Not applicable
EPA = Environmental Protection Agency
8015B (GRO) = EPA Method 8015B gasoline range organics
8015B (DRO) = EPA Method 8015B diesel range organics

4.4 Groundwater Analytical Results

The groundwater analytical results for Site 2036 are presented in Table 4-4. As shown in Table 4-4, none of the groundwater samples collected from the newly installed permanent monitoring wells had detectable levels of TPH or BTEX.

TABLE 4-4
Groundwater Analytical Results
Site 2036, U.S. Naval Station Roosevelt Roads

Parameters	PREQB Target Levels	2036-MW-1	2036-MW-2	2036-MW-3	2036-MW-4	2036-MW-5
Date Sampled		**03/06/02**	**03/09/02**	**03/05/02**	**03/05/02**	**03/05/02**
Benzene (µg/L)	5	ND	ND	ND	ND	ND
Toluene (µg/L)	1,000	ND	ND	ND	ND	ND
Ethylbenzene (µg/L)	700	ND	ND	ND	ND	ND
Total Xylenes (µg/L)	10,000	ND	ND	ND	ND	ND
Total BTEX (µg/L)	50	ND	ND	ND	ND	ND
TPH GRO (ug/L)	-	ND	ND	ND	ND	ND
TPH DRO (µg/L)	-	ND	ND	ND	ND	ND
Total TPH (µg/L)	50,000	ND	ND	ND	ND	ND

Notes:

µg/L = Micrograms per Liter
PREQB = Puerto Rico Environmental Quality Board
Total BTEX= Sum of Benzene, Toluene, Ethylbenzene, and Xylenes
TPH DRO= EPA Method 8015M Diesel Range Organics

SECTION 5

Qualitative Risk Assessment

The objective of this QRA is to identify the population that is potentially at risk of exposure to chemicals present in, or released from, soil and groundwater at Site 2036. The QRA presents a discussion of exposure pathways and a qualitative evaluation of the magnitude of the risk.

An exposure pathway is described as the route by which a chemical migrates from the contamination source to a potential receptor. To determine the exposure pathway, the chemical of concern, possible transport media, exposure routes (means by which a chemical comes in contact with a biological receptor), and potential receptors are taken into account. The results of the QRA are used to qualitatively determine the health risk to humans and environmental receptors from the contaminants found at Site 2036.

5.1 Nature and Extent of Release

Facility 2036 is used for oil spill response and recovery operations at NAVSTA Roosevelt Roads. Petroleum-contact water that is recovered from oil spill sites is stored in tanker trucks that are parked and offloaded at Site 2036.

As discussed in Section 4, none of the groundwater samples collected at Site 2036 had detectable petroleum contamination. DRO TPH was detected in five of the soil samples collected during the SC investigation. Only one soil sample, however, had a DRO TPH concentration (260 mg/Kg) that exceeded the PREQB target level of 100 mg/Kg for total TPH. This sample was a surface soil sample in the southwestern part of the site. The nature and extent of the detected soil contamination is minor and does not represent significant soil contamination that may have occurred as a result of possible leakage of the former UST and associated piping. This minor contamination appears to have been an isolated incident that may have resulted from a small spill during routine handling of waste oil or recovered petroleum-contact water at the site.

The minor soil contamination detected at the site does not represent a significant source of groundwater contamination for the following reasons:

- No petroleum contamination was detected in any of the groundwater samples collected at the site.
- The low level and isolated nature of the soil contamination does not represent a major source of contamination.
- All of the five soil samples with DRO TPH detections, including the sample with the highest concentration, are in areas covered by concrete pavement. As such, these areas are protected from downward infiltration of rain water. The surface soil contamination detected in SB03 likely infiltrated through the seal joint between the two slabs of concrete pavement where the soil boring is located.

5.2 Chemical of Concern

Petroleum contains a large number of compounds. The specific petroleum-based compounds that represent a potential risk to human health and the environment are volatile organic aromatics (consisting of benzene, toluene, ethylbenzene, and xylenes), and naphthalene. Toluene, ethylbenzene, xylenes, and naphthalene are non-carcinogenic compounds; benzene is a known human carcinogen.

DRO and GRO TPH compounds are non-carcinogenic. The industrial soil cleanup target level for human direct exposure to TPH is 2,500 mg/Kg. As mentioned above, the highest DRO TPH concentration detected in the soil samples was 260 mg/Kg, which is an order of magnitude less than the industrial soil cleanup target level.

5.3 Exposure Assessment

The exposure assessment examines the potential migratory pathways and the biological receptors affected by the chemical of concern. The exposure assessment also estimates both short and long term exposures in terms of doses by exposure routes.

5.3.1 Human Receptors

Site 2036 includes Buildings 2036 and 2036B, and associated parking and storage areas. These facilities are used for oil spill response and recovery operations at NAVSTA Roosevelt Roads. U.S. Naval personnel occupy the facilities during working hours. The potential for human contact with contaminants of concern at the facility is extremely low because of the following:

- The minor soil contamination detected at the facility is from TPH, which is non-carcinogenic. The levels of TPH at the site are well below human direct exposure cleanup target levels.
- The minor soil contamination is overlain by concrete pavement, preventing its exposure to human contact .
- The facility has restricted access (i.e., authorized personnel only)

5.3.2 Environmental Receptors

The potential for environmental receptor contact with contaminants of concern at the facility is extremely low because of the following:

- The TPH soil contamination detected at the facility is very localized and does not represent widespread or significant contamination.
- The minor soil contamination is overlain by concrete pavement, preventing its exposure to biological receptors .
- The facility does not provide any suitable habitat to any known wildlife species.
- Migration of contamination to the marine environment either by surface runoff or lateral migration of potentially contaminated groundwater is not expected to occur. This is

because the area is paved limiting the potential for contamination to migrate via surface runoff and by infiltration of rain water through the underlying soil to the groundwater. In addition, the groundwater sampling results indicate that the groundwater is not contaminated.

5.3.3 Exposure Pathways

Exposure pathways are defined as the route compounds follow from an original source to potential receptors. The mechanism by which the population can come into contact with the compound is also evaluated and taken into consideration by the exposure pathways. The following four elements are required to complete an exposure pathway:

- A source and mechanism of release for a compound of concern (e.g., storage tank leak).
- A feasible environmental transport route (e.g., dissolved groundwater constituents).
- An exposure point of potential contact with receptors (e.g., potable well).
- An exposure route allowing receptors to come into contact with the compounds (e.g., inhalation of vapors and ingestion of groundwater).

If any of these elements are not present, the exposure pathway is considered incomplete. At Site 2036, the only one of these four elements that exists is the low level TPH soil contamination, which is localized. None of the remaining three elements, however, have been shown to exist and, therefore, the exposure pathway is incomplete. A discussion of the potential exposure pathways is presented in the following sections.

5.3.4 Groundwater Consumption Pathway

The tropical rain forest, El Yunque, provides the primary source of potable water in eastern Puerto Rico. El Yunque is located approximately 5 miles west of NAVSTA Roosevelt Roads. NAVSTA Roosevelt Roads has a gravity feed distribution system from El Yunque to the Water Treatment Plant. Because of the availability of surface water in eastern Puerto Rico, groundwater is not exploited by the U.S. Navy as a source of potable water; therefore, this pathway is incomplete.

5.3.5 Ingestion and Inhalation Pathways

The only potential ingestion and inhalation pathways for chemicals of concern is if excavation or drilling activities were conducted at Site 2036. Workers may be exposed through direct contact with the soils during such activities. However, site access is restricted and any construction activities would require the approval of the U.S. Navy Engineering Command prior to work at the site. If any excavation or drilling activities were to be conducted at the site, proper health and safety precautions will be taken to control exposure to the low TPH levels detected in the soil. Therefore, the likelihood of an ingestion or inhalation pathway at the site is extremely low. Moreover, the DRO TPH levels at the site are well below human direct exposure cleanup target levels.

5.4 Risk Evaluation

The findings of the QRA indicate that all potential exposure pathways are incomplete at Site 2036 under current site conditions. The missing exposure pathway elements are either a viable exposure point and/or viable exposure route. The analytical results of the SC investigation indicate that benzene, which is the primary petroleum contaminant of concern for human health and the environment, is not present in the soil or groundwater at the site. The minor TPH levels in the surface soils are well below human direct exposure cleanup target levels. Moreover, this soil contamination is overlain by concrete pavement, limiting its exposure to human contact and to air and downward infiltration of rainwater. No groundwater contamination was detected at the site; therefore, lateral migration of contaminants in the groundwater is not a concern. For these reasons, Site 2036 does not pose a significant risk to human health or the environment.

SECTION 6

Remediation Assessment

6.1 No Further Action

6.1.1 Soils

Based on the laboratory analytical results, GRO TPH and BTEX were not detected in the soils at Site 2036. A DRO TPH concentration above the PREQB target level for total TPH was detected in one soil sample in the southwestern part of the site. Given that the identified contamination is minimal, localized, and restricted to the uppermost surface soil (which is overlain by concrete pavement), natural biodegradation is expected to reduce the TPH level to below the PREQB target level over time. Furthermore, the results of the qualitative risk assessment indicate that the minor soil contamination does not pose a significant risk to human health or the environment. The minor TPH levels in the surface soil are well below human direct exposure cleanup target levels. The soil contamination is covered by concrete pavement which prevents it from being exposed to air or downward infiltration of rain water. For these reasons, No Further Action is recommended for this site.

6.1.2 Groundwater

No groundwater contamination was detected at Site 2036. As a result, No Further Action is recommended for this site.

SECTION 7

Conclusions and Recommendations

7.1 Conclusions

The potential presence of petroleum hydrocarbons in soil and groundwater at Site 2036 was evaluated during this SC investigation. The findings of the SC investigation are as follows:

- The laboratory analytical results for groundwater samples collected during the SC investigation indicate that groundwater at Site 2036 is not contaminated by TPH or BTEX
- The laboratory analytical results for soil samples collected during the SC investigation indicated that minor DRO TPH contamination exists in the surface soil in the southwestern part of the site.
- The nature and extent of the minor soil contamination does not represent significant soil contamination that may have occurred as a result of possible leakage of the former UST and associated piping. This minor contamination may have resulted from a small spill during routine handling of waste oil or recovered petroleum-contact water at the site.
- The results of the qualitative risk assessment indicate that the minor soil contamination at the site does not pose a significant risk to human health or the environment. The minor TPH levels in the surface soil are well below human direct exposure cleanup target levels for TPH. Moreover, the soil contamination is covered by concrete pavement which prevents it from being exposed to air or downward infiltration of rain water.

7.2 Recommendations

Based on the findings of the SC investigation, CH2M HILL recommends No Further Action (NFA) for Site 2036. Because of the absence of hydrocarbon contamination in the groundwater at the site, and the low levels of soil contamination that are expected to be reduced by natural biodegradation over time, no remediation measures are recommended for the site.

APPENDIX A

Soil Boring Logs

CH2MHILL

Site Number	BORING NUMBER	
2036	2036-SB-01	SHEET 1 OF 1

SOIL BORING LOG

PROJECT : RRNAS Site 2036 LOCATION : Roosevelt Roads Naval Air Station, Ceiba PR
ELEVATION : DRILLING CONTRACTOR Geoworks, Inc.
DRILLING METHOD AND EQUIPMENT USED : SS Hand Auger, Mobile Drill Rig with 4.25" ID, 6.25" OD
WATER LEVELS : 7 feet START : 02/19/2002 END : 02/19/2002 LOGGER : HMH, EI

DEPTH BELOW SURFACE (FT) INTERVAL (FT)	RECOVERY (%) #/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
			Surface: 2" asphalt 2" Fill, some angular rocks up to 3" in diameter, some clayey silt, 3/1, very dark greenish gray, GLEY 1.	
1				0-1 foot OVM = 0.2 ppm
2				
3			3.5 ft: fine to coarse sand with some angular rocks up to 0.5-inch in diameter. Some shell fragments. 2.5Y, 6/4, light yellowish brown. Slightly moist.	
4				3-4 foot OVM = 0.2 ppm
5				
6			6.5 ft: same as above. Water at approx. 6.5 feet bls	
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
			End of boring at 19 feet bls	

CH2MHILL

Site Number	BORING NUMBER	
2036	2036-SB-02	SHEET 1 OF 1

SOIL BORING LOG

PROJECT : RRNAS Site 2036 LOCATION : Roosevelt Roads Naval Air Station, Ceiba PR

ELEVATION : DRILLING CONTRACTOR Geoworks, Inc.

DRILLING METHOD AND EQUIPMENT USED : SS Hand Auger, Mobile Drill Rig with 4.25" ID, 6.25" OD

WATER LEVELS : 7 feet START : 02/20/2002 END : 02/20/2002 LOGGER : HMH, EI

DEPTH BELOW SURFACE (FT) INTERVAL (FT)	RECOVERY (%)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
1				Surface: grass, angular rock fragments up to 3" in diameter 0-1' some roots, dry clayey silt. Some angular pebbles < 1" in diameter. 2.5Y, 5/4, light olive brown, some coarse gravel.	0-1 foot OVM = 0 ppm
2					
3				3' turning light yellowish brown, 6/3, 2.5Y, fine to coarse sand with shell fragments.	
4					3-4 foot OVM = 0 ppm
5					
6					
7				7' same as above. Water at approximately 7'	
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19				End of boring at 18' bls	

CH2MHILL

Site Number	BORING NUMBER	
2036	2036-SB-03	SHEET 1 OF 1

SOIL BORING LOG

PROJECT : RRNAS Site 2036 LOCATION : Roosevelt Roads Naval Air Station, Ceiba PR

ELEVATION : DRILLING CONTRACTOR Geoworks, Inc.

DRILLING METHOD AND EQUIPMENT USED : SS Hand Auger, Mobile Drill Rig with 4.25" ID, 6.25" OD

WATER LEVELS : 7 feet START : 02/20/2002 END : 02/20/2002 LOGGER : HMH, EI

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (%)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
					Surface: 2" asphalt	
1					0-1' GLEY 1, 4/1, dark greenish gray, some angular rocks up to 5" diameter. Clayey silt.	0-1' OVM = 18.9 ppm
					1'6" some limestone, fine to medium mix of 2.5Y, 7/4, pale yellow	
2					2' turning light yellowish brown, 6/3, 2.5Y, fine to coarse sand with shell fragments. Some large fragments of coral > 2" in diameter.	
3					3' same as above	
4						3-4' OVM = 0.5 ppm
5						
6						
7					7'. Water at approximately 7'	
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
					End of boring at 17' bls	
18						
19						

CH2MHILL

Site Number	BORING NUMBER	
2036	2036-SB-04	SHEET 1 OF 1

SOIL BORING LOG

PROJECT : RRNAS Site 2036 LOCATION : Roosevelt Roads Naval Air Station, Ceiba PR

ELEVATION : DRILLING CONTRACTOR Geoworks, Inc.

DRILLING METHOD AND EQUIPMENT USED : SS Hand Auger, Mobile Drill Rig with 4.25" ID, 6.25" OD

WATER LEVELS : 7 feet START : 2/20/02 END : 2/20/02 LOGGER : HMH, EI

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (%)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
					Surface: 3" asphalt	
1					0-1' GLEY 1, 4/1, dark greenish gray, some angular rocks up to 5" diameter. Clayey silt.	0-1' OVM = 0.2 ppm
2						
3					3' turning light yellowish brown, 6/3, 2.5Y, fine to coarse sand with shell fragments. Some large fragments of coral > 2" in diameter.	
4						3-4' OVM = 0.5 ppm
5						
6						
7					Water at approximately 7 ft bls	
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
					End of boring at 17' bls	
18						
19						

CH2MHILL

Site Number	BORING NUMBER	
2036	2036-SB-05	SHEET 1 OF 1

SOIL BORING LOG

PROJECT : RRNAS Site 2036 LOCATION : Roosevelt Roads Naval Air Station, Ceiba PR

ELEVATION : DRILLING CONTRACTOR Geoworks, Inc.

DRILLING METHOD AND EQUIPMENT USED : SS Hand Auger, Mobile Drill Rig with 4.25" ID, 6.25" OD

WATER LEVELS : 7 feet START : 2/21/02 END : 2/21/02 LOGGER : HMH, EI

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (%)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
					Surface: 3" asphalt	
1					0-1' GLEY 1, 4/1, dark greenish gray, some angular rocks up to 3" diameter.	0-1' OVM = 0 ppm
2					2.5' turning fine to medium mix, 2.5Y, 7/4, pale yellow, some shell fragments, coral as well. Slightly moist and angular fragments of rock < 2" in diameter.	
3					3' same as above	
4						3-4' OVM = 0 ppm
5						
6						
7					Water at approximately 7'	
8						
9						
10						
11						
12						
13						
14						
15						
16						
					End of boring at 16' bls	
17						
18						
19						

CH2MHILL

Site Number	BORING NUMBER	
2036	2036-SB-06	SHEET 1 OF 1

SOIL BORING LOG

PROJECT : RRNAS Site 2036 LOCATION : Roosevelt Roads Naval Air Station, Ceiba PR

ELEVATION : DRILLING CONTRACTOR Geoworks, Inc.

DRILLING METHOD AND EQUIPMENT USED : SS Hand Auger

WATER LEVELS : NA START : 2/21/02 END : 2/21/02 LOGGER : HMH, EI

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (%)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
	1				Surface: 3" asphalt 0-1' GLEY 1, 4/1, dark greenish gray, 50% angular rocks < 4" in diameter, sandy silt. 18" turning fine/medium mix of 2.5Y, 7/4, pale yellow silty sand. Some shell fragments and chunks of coral up to 4" in diameter.	0-1' OVM = 0 ppm
	2					
	3				3' same as above	
	4					3-4' OVM = 0.1 ppm
	5					
					Refusal at 5' bls	
	6					
	7					
	8					
	9					
	10					
	11					
	12					
	13					
	14					
	15					
	16					
	17					
	18					
	19					

APPENDIX B

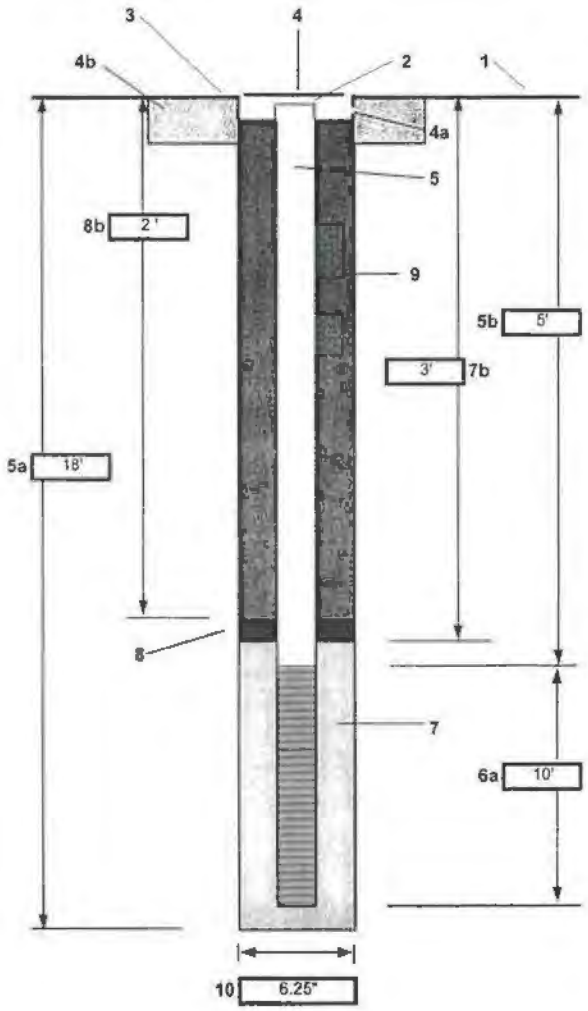
Monitoring Well Completion Diagrams

CH2MHILL

SITE	WELL ID
2036	2036-MW-01

WELL COMPLETION DIAGRAM-FLUSH MOUNT

LOCATION : Site 2036, Roosevelt Roads NAS
PROJECT NUMBER : 167722.FI.FQ
DRILLING CONTRACTOR : Geoworks Inc.
DRILLING METHOD AND EQUIPMENT USED : Mobile Drill Rig, 4.25" ID H.S.A.
DRILLING START DATE: 02/19/2002 DRILLING END DATE: 02/21/2002 LOGGER: Hector M. Hernandez, Erik Iser



1- Ground elevation at well	
2- Top of inner casing elevation	
3- Top of outer casing elevation	
4- Wellhead protection cover type	6" well vault
a) drain tube? (yes/no)	no
b) concrete pad dimensions	2'x2'x4"
5- Dia./type of well casing	2" SCH 40 PVC
a) Total depth	15 feet
b) Length of casing (less screen)	5 feet
6- Type/slot size of screen	SCH 40 PVC, 0.010" Slot
a) Length of screen	10 feet
7- Type screen filter	TEC Minerals Filter Media 100lb/bag
a) Quantity used	4.5 bags
b) Depth to top of filter pack (bls)	3 feet bls
8- Type of seal	Hole plug chips
a) Quantity used	1 foot (unhydrated)
b) Depth to top of seal (bls)	2 feet
9- Grout	
a) Grout mix used	Portland Cement
b) Method of placement	Pour
c) Vol. of well casing grout	2.3 ft^3
10- DD of auger	7.25 inches
Development method	Disposable Teflon bailer Geopump
Development time	1 hour 36 minutes
Estimated purge volume	51 gallons

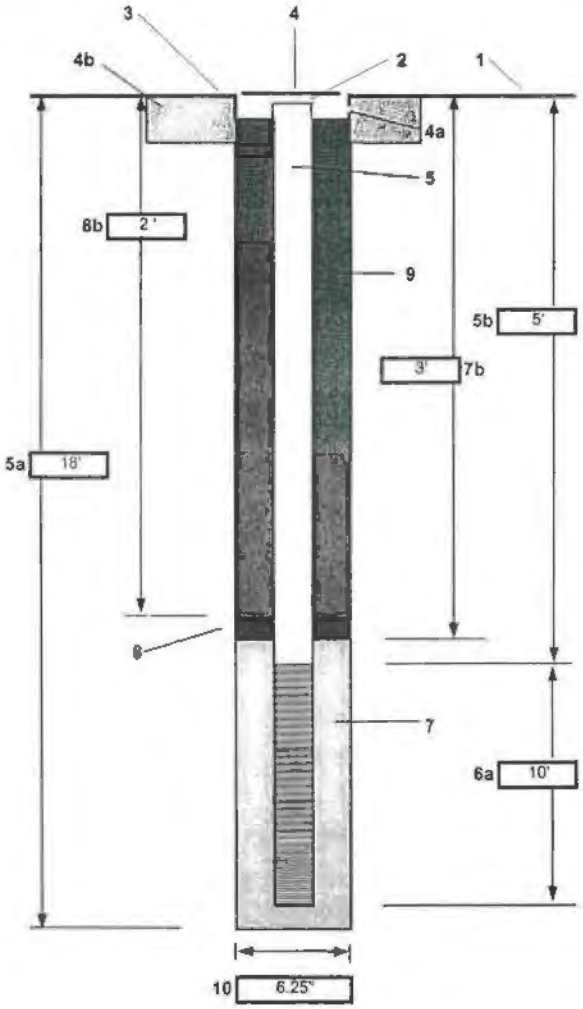
Comments

CH2MHILL

SITE	WELL ID
2036	2036-MW-02

WELL COMPLETION DIAGRAM-FLUSH MOUNT

LOCATION : Site 2036, Roosevelt Roads NAS
PROJECT NUMBER : 167722.FI.FS
DRILLING CONTRACTOR : Geoworks Inc.
DRILLING METHOD AND EQUIPMENT USED : Mobile Drill Rig, 4.25" ID H.S.A.
DRILLING START DATE: 02/20/2002 DRILLING END DATE: 02/22/2002 LOGGER: Hector M. Hernandez, Erik Iser



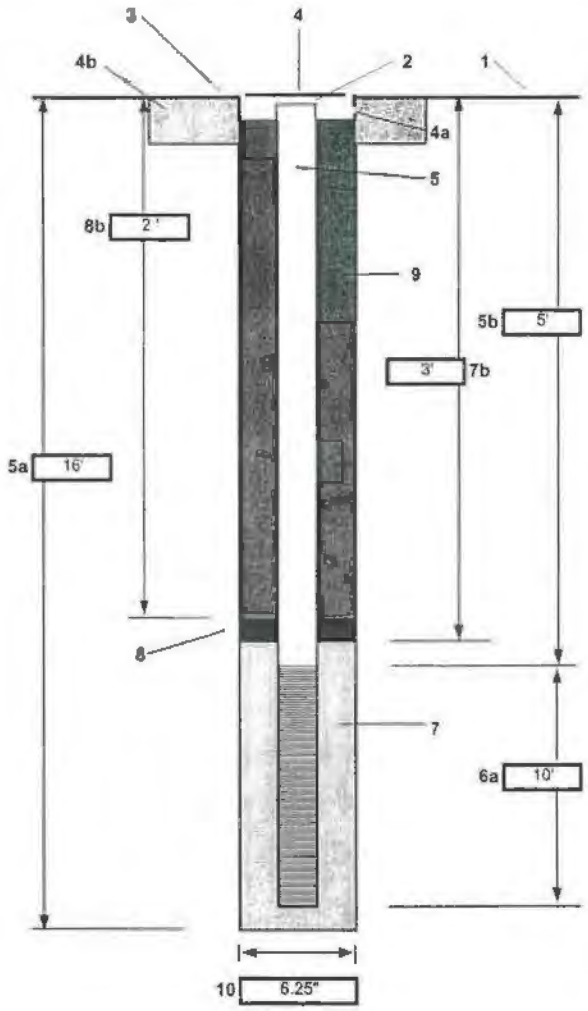
1- Ground elevation at well	
2- Top of inner casing elevation	
3- Top of outer casing elevation	
4- Wellhead protection cover type	8" well vault
a) drain tube? (yes/no)	no
b) concrete pad dimensions	2'x2'x4"
5- Dia./type of well casing	2" SCH 40 PVC
a) Total depth	15 feet
b) Length of casing (less screen)	5 feet
6- Type/slot size of screen	SCH 40 PVC, 0.010" Slot
a) Length of screen	10 feet
7- Type screen filter	TEC Minerals Filter Media 100lb/bag
a) Quantity used	4.5 bags
b) Depth to top of filter pack (bls)	3 feet bls
8- Type of seal	Hole plug chips
a) Quantity used	1 foot (unhydrated)
b) Depth to top of seal (bls)	2 feet
9- Grout	
a) Grout mix used	Portland Cement
b) Method of placement	Pour
c) Vol. of well casing grout	2.3 ft^3
10- OD of auger	7.25 inches
Development method	Disposable Teflon bailer Geopump
Development time	2 hours 17 minutes
Estimated purge volume	51 gallons
Comments	

CH2MHILL

SITE	WELL ID
2036	2036-MW-03

WELL COMPLETION DIAGRAM-FLUSH MOUNT

LOCATION : Site 2036, Roosevelt Roads NAS
PROJECT NUMBER : 167722.FI.FS
DRILLING CONTRACTOR : Geoworks Inc.
DRILLING METHOD AND EQUIPMENT USED : Mobile Drill Rig, 4.25" ID H.S.A.
DRILLING START DATE: 02/20/2002 DRILLING END DATE: 02/25/2002 LOGGER: Hector M. Hernandez, Erik Iser



1- Ground elevation at well	
2- Top of inner casing elevation	
3- Top of outer casing elevation	
4- Wellhead protection cover type	8" well vault
a) drain tube? (yes/no)	no
b) concrete pad dimensions	2'x2'x4"
5- Dia./type of well casing	2" SCH 40 PVC
a) Total depth	15 feet
b) Length of casing (less screen)	5 feet
6- Type/slot size of screen	SCH 40 PVC, 0.010" Slot
a) Length of screen	10 feet
7- Type screen filter	TEC Minerals Filter Media 100lb/bag
a) Quantity used	4 bags
b) Depth to top of filter pack (bls)	3 feet bls
8- Type of seal	Hole plug chips
a) Quantity used	1 foot (unhydrated)
b) Depth to top of seal (bls)	2 feet
9- Grout	
a) Grout mix used	Portland Cement
b) Method of placement	Pour
c) Vol. of well casing grout	2.3 ft^3
10- OD of auger	7.25 inches
Development method	Disposable Teflon bailer Geopump
Development time	2 hours 12 minutes
Estimated purge volume	51 gallons

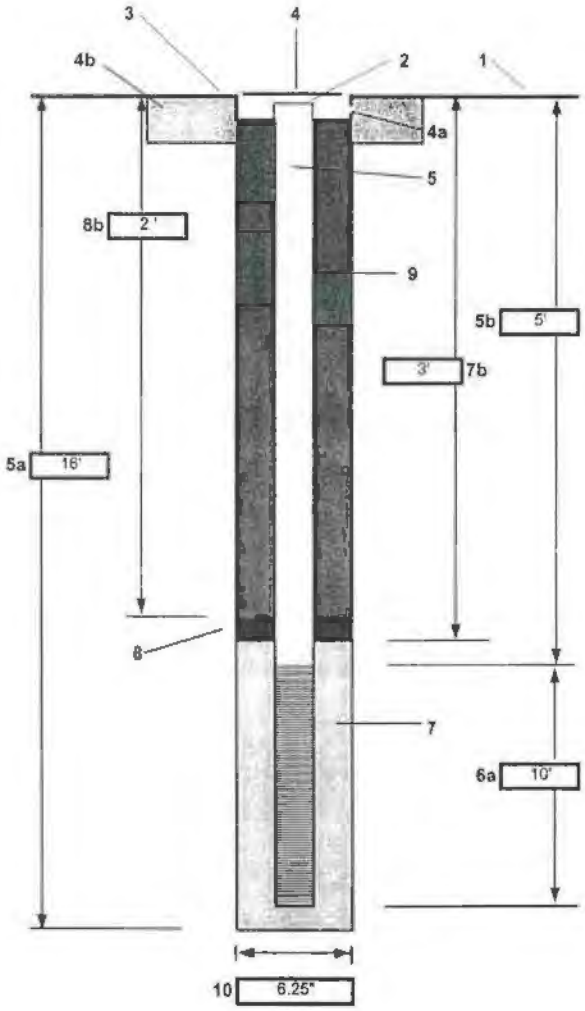
Comments

CH2MHILL

SITE	WELL ID
2036	2036-MW-04

WELL COMPLETION DIAGRAM-FLUSH MOUNT

LOCATION : Site 2036, Roosevelt Roads NAS
PROJECT NUMBER : 167722.FI.FS
DRILLING CONTRACTOR : Geoworks Inc.
DRILLING METHOD AND EQUIPMENT USED : Mobile Drill Rig, 4.25" ID H.S.A.
DRILLING START DATE: 02/20/2002 DRILLING END DATE: 02/25/2002 LOGGER: Hector M. Hernandez, Erik Iser



1- Ground elevation at well	
2- Top of inner casing elevation	
3- Top of outer casing elevation	
4- Wellhead protection cover type	8" well vault
a) drain tube? (yes/no)	no
b) concrete pad dimensions	2'x2'x4"
5- Dia./type of well casing	2" SCH 40 PVC
a) Total depth	15 feet
b) Length of casing (less screen)	5 feet
6- Type/slot size of screen	SCH 40 PVC, 0.010" Slot
a) Length of screen	10 feet
7- Type screen filter	TEC Minerals Filter Media 100lb/bag
a) Quantity used	4 bags
b) Depth to top of filter pack (bls)	3 feet bls
8- Type of seal	Hole plug chips
a) Quantity used	1 foot (unhydrated)
b) Depth to top of seal (bls)	2 feet
9- Grout	
a) Grout mix used	Portland Cement
b) Method of placement	Pour
c) Vol. of well casing grout	2.3 ft^3
10- OD of auger	7.25 inches
Development method	Disposable Teflon bailer Geopump
Development time	2 hours 7 minutes
Estimated purge volume	57 gallons

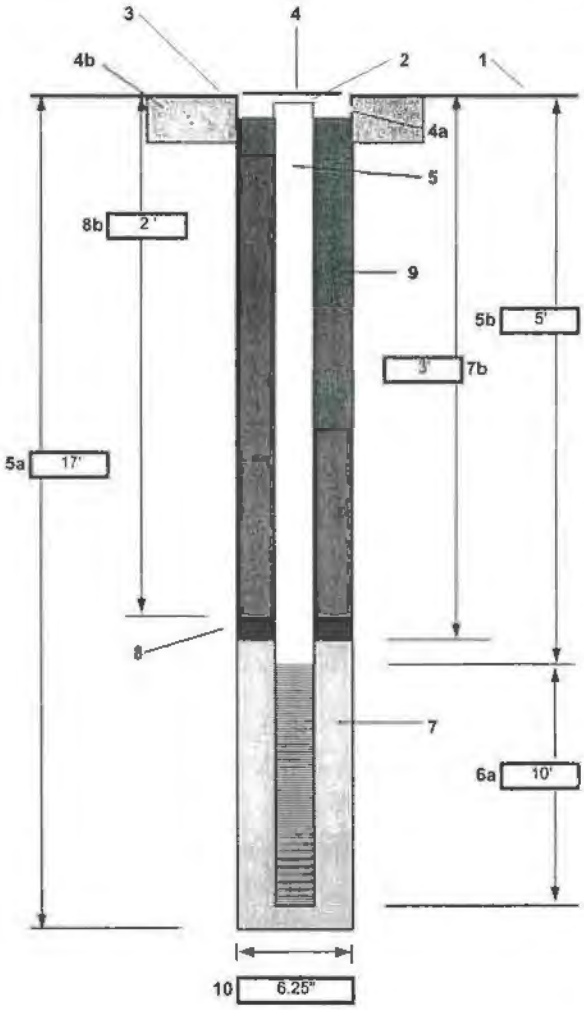
Comments

CH2MHILL

SITE	WELL ID
2036	2036-MW-05

WELL COMPLETION DIAGRAM-FLUSH MOUNT

LOCATION : Site 2036, Roosevelt Roads NAS
PROJECT NUMBER : 167722.FI.FS
DRILLING CONTRACTOR : Geoworks Inc.
DRILLING METHOD AND EQUIPMENT USED : Mobile Drill Rig, 4.25" ID H.S.A.
DRILLING START DATE: 02/21/2002 DRILLING END DATE: 02/25/2002 LOGGER: Hector M. Hernandez, Erik Iser



1-	Ground elevation at well	
2-	Top of inner casing elevation	
3-	Top of outer casing elevation	
4-	Wellhead protection cover type	8" well vault
	a) drain tube? (yes/no)	no
	b) concrete pad dimensions	2'x2'x4"
5-	Dia./type of well casing	2" SCH 40 PVC
	a) Total depth	15 feet
	b) Length of casing (less screen)	5 feet
6-	Type/slot size of screen	SCH 40 PVC, 0.010" Slot
	a) Length of screen	10 feet
7-	Type screen filter	TEC Minerals Filter Media 100lb/bag
	a) Quantity used	3 bags
	b) Depth to top of filter pack (bls)	3 feet bls
8-	Type of seal	Hole plug chips
	a) Quantity used	1 foot (unhydrated)
	b) Depth to top of seal (bls)	2 feet
9-	Grout	
	a) Grout mix used	Portland Cement
	b) Method of placement	Pour
	c) Vol. of well casing grout	2.3 ft^3
10-	OD of auger	7.25 inches
	Development method	Disposable Teflon bailer Geopump
	Development time	1 hour 35 minutes
	Estimated purge volume	50 gallons

Comments

APPENDIX C

Monitoring Well Development Logs

PROJECT NUMBER	WELL NUMBER	DATE
167722.FI.FQ	2036-MW-01	03/05/2002

WELL DEVELOPMENT LOG

PROJECT : RRNAS Site 2036 LOCATION : Roosevelt Roads NAS, Puerto Rico
DEVELOPMENT CONTRACTOR : CH2M Hill
DEVELOPMENT METHOD AND EQUIPMENT USED : Disposable Teflon Bailer to remove sediment and Geopump for development
TOTAL DEPTH: 15.18 START WATER LEVELS : 7.19 START : 8:31 END : 10:07 LOGGER: Hector M. Hernandez

MAXIMUM DRAWDOWN DURING PUMPING: 0.23 feet
RANGE AND AVERAGE DISCHARGE RATE: Approximately 0.25 gallons per minute
TOTAL QUANTITY OF WATER DISCHARGED: Approximately 30 gallons with disposable bailer and 21 gallons with Geopump
DISPOSITION OF DISCHARGE WATER: Milky gray in color, no odor, clearing up as development progressed.

Military Time	Water Volume Discharged (gallons)	Depth to Water (ft btoc)	Turbidity (NTU)	Temperature (C)	pH	Specific Conductivity (mS/cm)	Dissolved Oxygen (mg/L)	Salinity (%)	ORP (mV)	Remarks: color, sheen, odor
8:31	1.5	7.30	999+	31.56	7.31	9.9	2.34	0.5	156	Water is milky gray, no odor
8:37	3	7.38	999+	31.78	7.31	9.9	1.58	0.6	90	
8:43	4.5	7.38	491	31.80	7.31	9.9	1.09	0.6	65	
8:49	6	7.38	376	31.81	7.31	9.9	0.76	0.6	50	Water is tap water clear
8:55	7.5	7.38	322	31.81	7.30	9.9	0.58	0.6	40	
8:56	Surge well screen									Begin surging well screen
9:03	Surge well screen									End surging well screen
9:04	7.5	7.38	999+	32.02	7.36	9.7	1.62	0.5	53	Water is milky gray, no odor
9:10	9	7.40	999+	31.89	7.37	9.8	1.63	0.5	58	
9:16	10.5	7.40	596	31.84	7.34	9.90	0.95	0.6	50	Water is clearing up
9:22	12	7.39	377	31.88	7.32	10.1	0.53	0.6	37	
9:28	13.5	7.39	352	31.87	7.31	10.0	0.49	0.6	33	Water is tap water clear
9:29	Surge well screen									Begin surging well screen
9:36	Surge well screen									End surging well screen
9:37	13.5	7.42	999+	32.00	7.41	9.9	3.07	0.6	69	Water is milky gray, no odor, highly turbid
9:43	15	7.42	999+	31.94	7.38	10.0	1.63	0.6	58	
9:49	16.5	7.42	484	31.96	7.38	10.0	0.83	0.6	46	Water is tap water clear
9:55	18	7.41	299	31.83	7.33	10.2	0.52	0.6	39	
10:01	19.5	7.42	409	31.87	7.33	10.1	0.45	0.6	33	Water is tap water clear
10:07	21	7.42	416	31.88	7.33	10.1	0.46	0.6	31	
10:07										End of Development

1:36

PROJECT NUMBER	WELL NUMBER	DATE
167722.FI.FS	2036-MW-02	03/07/2002

WELL DEVELOPMENT LOG

PROJECT : RRNAS Site 2036 LOCATION : Roosevelt Roads NAS, Puerto Rico
DEVELOPMENT CONTRACTOR : CH2M Hill
DEVELOPMENT METHOD AND EQUIPMENT USED : Disposable Teflon Bailer to remove sediment and Geopump for development
TOTAL DEPTH: 15.33 START WATER LEVELS : 7.07 START : 03/07/2002 END : 03/07/2002 LOGGER: Erik Isem

MAXIMUM DRAWDOWN DURING PUMPING: 1.53 feet
RANGE AND AVERAGE DISCHARGE RATE: Approximately 0.25 gallons per minute
TOTAL QUANTITY OF WATER DISCHARGED: Purged approximately 20 gallons with the disposable bailer and 21 with the Geopump
DISPOSITION OF DISCHARGE WATER: Water began grayish brown cleared up towards end of development

Military Time	Water Volume Discharged (gallons)	Depth to Water (ft btoc)	Turbidity (NTU)	Temperature (C)	pH	Specific Conductivity (mS/cm)	Dissolved Oxygen (mg/L)	Salinity (%)	ORP (mV)	Remarks: color, sheen, odor
9:25	1.5	8.40	999+	30.66	7.29	9.70	12.26	0.5	65	
9:31	3	7.85	999+	30.11	7.34	9.90	10.35	0.6	9	Water is clearing up
9:37	4.5	8.41	526	30.05	7.43	9.20	5.83	0.5	-63	Water is murky light tan
9:43	6	8.50	999+	30.07	7.40	9.10	8.76	0.5	-42	
9:49	7.5	8.50	261	30.09	7.40	9.10	8.27	0.5	-82	
9:53	9	8.53	35.3	30.89	7.41	9.10	7.73	0.5	-84	
	Surge and bail well screen									Begin surging well screen
	Surge and bail well screen									End surging well screen
10:30	9	8.10	999+	30.53	7.07	11.4	11.36	0.7	-4	
10:36	10.5	8.23	999+	30.24	7.14	11.1	10.2	0.6	-5	
10:42	12	8.55	707	30.15	7.36	10.00	9.82	0.5	-14	Turning clear
10:48	13.5	8.60	420	30.13	7.35	9.85	10.05	0.6	-29	
10:52	15	8.60	264	30.08	7.33	9.82	9.26	0.6	-38	
	Surge and bail well screen									Begin surging well screen
	Surge and bail well screen									End surging well screen
11:20	15	7.58	999+	30.03	7.38	9.92	10.55	0.5	-36	
11:26	16.5	7.55	999+	29.99	7.43	9.37	8.73	0.5	-73	
11:32	18	7.55	330	30.00	7.42	8.85	8.88	0.5	-70	
11:38	19.5	7.54	269	30.04	7.39	8.74	8.71	0.5	-72	
11:42	21	7.54	238	30.05	7.39	8.66	8.42	0.5	-74	
										End of development final water quality is clear

2:17

PROJECT NUMBER	WELL NUMBER	DATE
167722.FI.FS	2036-MW-03	02/27/2002

WELL DEVELOPMENT LOG

PROJECT : RRNAS Site 2036 LOCATION : Roosevelt Roads NAS, Puerto Rico
DEVELOPMENT CONTRACTOR : CH2M Hill
DEVELOPMENT METHOD AND EQUIPMENT USED : Disposable Teflon Bailer to remove sediment and Geopump for development
TOTAL DEPTH: 15.98 START WATER LEVELS : 7.35 START : 13:34 END : 15:48 LOGGER: Hector M. Hernandez

MAXIMUM DRAWDOWN DURING PUMPING: 0.13 feet
RANGE AND AVERAGE DISCHARGE RATE: 0.25 gallons per minute
TOTAL QUANTITY OF WATER DISCHARGED: 35 gallons while removing sediments with bailer, and approximately 21 gallons with Geopump
DISPOSITION OF DISCHARGE WATER: Initially very milky gray color. Highly turbid. Tapwater clear towards end of development.

Military Time	Water Volume Discharged (gallons)	Depth to Water (ft btoc)	Turbidity (NTU)	Temperature (C)	pH	Specific Conductivity (mS/cm)	Dissolved Oxygen (mg/L)	Salinity (%)	ORP (mV)	Remarks: color, sheen, odor
13:37	1.5	7.35	999+	32.79	7.25	4.10	1.21	0.2	NR	Milky gray color, very turbid, no odor
14:00	3	NM	333	32.51	7.25	4.93	0.71	0.3	24	
14:06	4.5	NM	207	32.62	7.22	4.50	0.69	0.2	24	
14:12	6	7.48	227	32.58	7.22	4.31	0.69	0.2	8	
14:18	7.5	NM	669	32.68	7.22	4.18	0.69	0.2	-9	Water is clearing up
14:19	Surge well screen									Begin surging well screen
14:26	Surge well screen									End surging well screen
14:46	7.5	NM	999+	31.63	7.25	5.05	1.43	0.3	2	Milky gray color, very turbid, no odor
14:52	9	NM	413	32.63	7.24	4.64	0.72	0.2	-11	
14:58	10.5	NM	335	32.78	7.21	4.20	0.68	0.2	-34	
15:04	12	NM	259	32.75	7.20	4.06	0.65	0.2	-46	Water is clearing up
15:05	Surge well screen									Begin surging well screen
15:10	Surge well screen									End surging well screen
15:14	12	NR	999+	NR	NR	NR	NR	NR	NR	Milky gray color, very turbid, no odor
15:20	13.5	NM	999+	32.67	7.28	4.89	1.09	0.3	-59	
15:26	15	NM	999+	32.57	7.24	4.58	0.60	0.2	-41	
15:32	16.5	7.56	649	32.61	7.20	4.09	0.53	0.2	-44	
15:38	18	NM	477	32.66	7.19	3.90	0.54	0.2	-50	Water is tap water clear
15:42	19.5	NM	355	32.64	7.18	3.83	0.52	0.2	-53	Water is tap water clear
15:48	21	NM	280	32.63	7.16	3.79	0.51	0.2	-55	Water is tap water clear
15:49										End of Development

2:12

PROJECT NUMBER	WELL NUMBER	DATE
167722.FI.FS	2036-MW-04	02/27/2002

WELL DEVELOPMENT LOG

PROJECT : RRNAS Site 2036 LOCATION : Roosevelt Roads NAS, Puerto Rico
DEVELOPMENT CONTRACTOR : CH2M Hill
DEVELOPMENT METHOD AND EQUIPMENT USED : Disposable Teflon Bailer to remove sediment and Geopump for development
TOTAL DEPTH: 15.06 START WATER LEVELS : 7.45 START : 12:40 END : 14:57 LOGGER: Hector M. Hernandez

MAXIMUM DRAWDOWN DURING PUMPING: 0.11 feet
RANGE AND AVERAGE DISCHARGE RATE: 0.25 gallons per minute
TOTAL QUANTITY OF WATER DISCHARGED: 30 gallons while removing sediments with bailer, and approximately 27 gallons with Geopump
DISPOSITION OF DISCHARGE WATER: Initially very milky gray color. Highly turbid. Tapwater clear towards end of development.

Military Time	Water Volume Discharged (gallons)	Depth to Water (ft btoc)	Turbidity (NTU)	Temperature (C)	pH	Specific Conductivity (mS/cm)	Dissolved Oxygen (mg/L)	Salinity (%)	ORP (mV)	Remarks: color, sheen, odor
12:50	0	7.45	577	31.46	7.21	3.53	0.76	0.2	-164	Milky gray color, very turbid, no odor
12:54	1	NM	43.8	31.42	7.22	3.35	0.71	0.2	-166	
12:58	2	NM	39.8	31.41	7.24	3.34	0.69	0.2	-170	
13:02	3	NM	29.0	31.41	7.26	3.3	0.69	0.2	-173	Water clearing up
13:03	Surge well screen									Begin surging well screen
13:07	Surge well screen									End surging well screen
13:08	3	NM	999+	31.70	7.28	6.51	0.44	0.3	-182	Milky gray color, very turbid, no odor
13:12	4	NM	999+	31.57	7.35	4.07	0.07	0.2	-165	
13:16	5	NM	999+	31.44	7.26	3.00	0.45	0.1	-142	
13:20	6	NM	898	31.43	7.25	2.92	0.60	0.1	-142	
13:24	7	NM	83.7	31.34	7.30	3.06	1.31	0.1	-142	Removed sediment from flow through cell
13:29	8.25	NM	53.6	31.36	7.24	2.73	0.71	0.1	-140	
13:34	9.5	NM	28.7	31.36	7.23	2.71	0.66	0.1	-141	
13:39	10.75	7.55	13.1	31.35	7.23	2.71	0.56	0.1	-147	
13:44	12	NM	8.4	31.34	7.24	2.69	0.47	0.1	-151	Water is tap water clear
13:45	Surge well screen									Begin surging well screen
13:54	Surge well screen									End surging well screen
13:55	12	7.56	999+	31.52	7.24	5.35	0.34	0.3	-166	Milky gray color, very turbid, no odor
14:00	13.25	NM	999+	31.50	7.27	3.20	0.43	0.2	-118	
14:05	14.5	NM	999+	31.48	7.30	3.06	1.71	0.1	-119	Removed sediment from flow through cell
14:10	15.75	7.56	170	31.45	7.25	2.80	1.01	0.1	-128	
14:15	17	NM	70.6	31.41	7.24	2.70	0.75	0.1	-137	
14:20	18.25	NM	43.3	31.45	7.23	2.66	0.65	0.1	-142	
14:25	19.5	NM	15.7	31.37	7.22	2.59	0.54	0.1	-147	
14:30	20.75	NM	8.5	31.36	7.22	2.58	0.48	0.1	-151	
14:35	22	NM	6.7	31.38	7.22	2.58	0.45	0.1	-154	
14:40	23.25	NM	5.2	31.38	7.22	2.58	0.42	0.1	-157	
14:45	24.5	NM	5.8	31.37	7.22	2.58	0.40	0.1	-160	
14:50	25.75	NM	6.4	31.39	7.22	2.58	0.37	0.1	-164	
14:55	27	NM	5.9	31.39	7.22	2.59	0.34	0.1	-165	Water is tap water clear
14:57										End of Development

Military Time	Water Volume Discharged (gallons)	Depth to Water (ft btoc)	Turbidity (NTU)	Temperature (C)	pH	Specific Conductivity (mS/cm)	Dissolved Oxygen (mg/L)	Salinity (%)	ORP (mV)	Remarks: color, sheen, odor
12:50	0	7.45	577	31.46	7.21	3.53	0.76	0.2	-164	Milky gray color, very turbid, no odor
12:54	1	NM	43.8	31.42	7.22	3.35	0.71	0.2	-166	
12:58	2	NM	39.6	31.41	7.24	3.34	0.69	0.2	-170	
13:02	3	NM	29.0	31.41	7.26	3.3	0.69	0.2	-173	Water clearing up
13:03	Surge well screen									Begin surging well screen
13:07	Surge well screen									End surging well screen
13:08	3	NM	999+	31.70	7.28	6.51	0.44	0.3	-182	Milky gray color, very turbid, no odor
13:12	4	NM	999+	31.57	7.35	4.07	0.07	0.2	-165	
13:16	5	NM	999+	31.44	7.26	3.00	0.45	0.1	-142	
13:20	6	NM	898	31.43	7.25	2.92	0.60	0.1	-142	
13:24	7	NM	83.7	31.34	7.30	3.06	1.31	0.1	-142	Removed sediment from flow through cell
13:29	8.25	NM	53.6	31.36	7.24	2.73	0.71	0.1	-140	
13:34	9.5	NM	28.7	31.36	7.23	2.71	0.66	0.1	-141	
13:39	10.75	7.55	13.1	31.35	7.23	2.71	0.56	0.1	-147	
13:44	12	NM	8.4	31.34	7.24	2.69	0.47	0.1	-151	Water is tap water clear
13:45	Surge well screen									Begin surging well screen
13:54	Surge well screen									End surging well screen
13:55	12	7.56	999+	31.52	7.24	5.35	0.34	0.3	-166	Milky gray color, very turbid, no odor
14:00	13.25	NM	999+	31.50	7.27	3.20	0.43	0.2	-118	
14:05	14.5	NM	999+	31.48	7.30	3.06	1.71	0.1	-119	Removed sediment from flow through cell
14:10	15.75	7.56	170	31.45	7.25	2.80	1.01	0.1	-128	
14:15	17	NM	70.6	31.41	7.24	2.70	0.75	0.1	-137	
14:20	18.25	NM	43.3	31.45	7.23	2.66	0.65	0.1	-142	
14:25	19.5	NM	15.7	31.37	7.22	2.59	0.54	0.1	-147	
14:30	20.75	NM	8.5	31.36	7.22	2.58	0.48	0.1	-151	
14:35	22	NM	6.7	31.38	7.22	2.58	0.45	0.1	-154	
14:40	23.25	NM	5.2	31.38	7.22	2.58	0.42	0.1	-157	
14:45	24.5	NM	5.8	31.37	7.22	2.58	0.40	0.1	-160	
14:50	25.75	NM	6.4	31.39	7.22	2.58	0.37	0.1	-164	
14:55	27	NM	5.9	31.39	7.22	2.59	0.34	0.1	-165	Water is tap water clear
14:57										End of Development

2:07

PROJECT NUMBER	WELL NUMBER	DATE
167722.FI.FS	2036-MW-05	02/27/2002

WELL DEVELOPMENT LOG

PROJECT : RRNAS Site 2036 LOCATION : Roosevelt Roads NAS, Puerto Rico

DEVELOPMENT CONTRACTOR : CH2M Hill

DEVELOPMENT METHOD AND EQUIPMENT USED : Disposable Teflon Bailer to remove sediment and Geopump for development

TOTAL DEPTH: 14.25 START WATER LEVELS : 7.26 START : 15:10 END : 16:45 LOGGER: Hector M. Hernandez

MAXIMUM DRAWDOWN DURING PUMPING: 0.13 feet

RANGE AND AVERAGE DISCHARGE RATE: 0.25 gallons per minute

TOTAL QUANTITY OF WATER DISCHARGED: Approximately 30 gallons with the disposable bailer while removing sediment and 20 gallons with the Geopump

DISPOSITION OF DISCHARGE WATEF Water was a chocolate gray color initially and very turbid. Tap water clear towards end of development.

Military Time	Water Volume Discharged (gallons)	Depth to Water (ft btoc)	Turbidity (NTU)	Temperature (C)	pH	Specific Conductivity (mS/cm)	Dissolved Oxygen (mg/L)	Salinity (%)	ORP (mV)	Remarks: color, sheen, odor
15:10	1.25	7.26	999+	31.41	7.60	5.96	4.95	0.3	-113	Water is chocolate gray in color, no odor
15:15	2.5	NM	198	31.37	7.47	3.57	0.73	0.2	-119	
15:20	3.75	NM	49.9	31.34	7.45	3.42	0.67	0.2	-147	
15:25	5	7.39	23.1	31.32	7.45	3.32	0.61	0.2	-153	
15:30	6.25	NM	14.8	31.33	7.45	3.20	0.49	0.2	-157	Water is almost tap water clear
15:31	Surge well screen									Begin surging well screen
15:35	Surge well screen									End surging well screen
15:36	6.25	NM	999+	31.37	7.56	3.84	1.03	0.2	-109	Water is chocolate gray in color, no odor
15:41	7.5	NM	999+	31.34	7.56	3.78	0.96	0.2	-110	
15:46	8.75	NM	999+	31.35	7.48	3.20	0.69	0.2	-141	
15:51	10	NM	999+	31.33	7.45	2.97	0.47	0.1	-155	
15:56	11.25	NM	999+	31.32	7.45	2.99	0.44	0.1	-157	Water is chocolate gray in color, no odor
15:57	Surge well screen									Begin surging well screen
16:07	Surge well screen									End surging well screen
16:08	11.25	NM	999+	31.36	7.67	4.45	0.08	0.2	-144	Water is chocolate gray in color, no odor
16:13	12.5	7.39	999+	31.35	7.55	3.49	0.76	0.2	-118	
16:20	13.75	NM	595	31.14	7.61	3.26	4.41	0.2	-123	Removed sediment from flow through cell
16:25	15	NM	109	31.27	7.48	2.92	0.63	0.1	-145	
16:30	16.25	NM	18.3	31.31	7.46	2.82	0.41	0.1	-157	
16:35	17.5	NM	10.7	31.31	7.45	2.75	0.28	0.1	-161	
16:40	18.75	NM	2	31.31	7.44	2.72	0.21	0.1	-164	
16:45	20	7.31	1.3	31.32	7.44	2.7	0.20	0.1	-165	Water is tap water clear
16:45										End of Development

1:35

APPENDIX D

Monitoring Well Sampling Logs

Roosevelt Roads Naval Air Station Field Data Information Log for Groundwater Sampling

Date (mm/dd/yy)	03/06/2002	Casing Diameter	2"
Field Personnel	Hector M. Hernandez, Erik Isern	Casing Material	PVC
Site Name	RRNAS Site 2036	Measuring Point Elevation	
Job Number	167722.FI.FQ	Height of Riser (above land surface)	0"
Well ID #	2036-MW-01	Land Surface Elevation	
Weather Conditions	Partly cloudy	Screened Interval	5-15' bls
Air Temperature		Dedicated Pump of Bailer	Dedicated Teflon tubing
Total Well Depth (TWD)	15.20	Steel Guard Pipe Around Casing	no
Depth to Groundwater (DGW)	7.16	Locking Cap	yes
Length of Water Column (LWC) = TWD - DGW =	8.04	Protective Post/Abutment	8" steel well cover
1 Casing Volume = LWC x	0.163	Well Integrity Satisfactory	yes
Standard Evacuation Volume =	1.31	Well Yield	good
Method of Well Evacuation	Geopump through Teflon tubing	Comments/Observations:	
Method of Sample Collection	Geopump through Teflon tubing	Water was tapwater clear throughout	
Total Volume of Water Removed (gallons)	7.5 gallons		

Field Parameters

Volume Purged (gallons)	Start	1	2	3	4	5				
Pumping Rate (gpm)	0.25	0.25	0.25	0.25	0.25	0.25				
Time (military)	7:55	8:01	8:07	8:13	8:20	8:27				
pH	7.21	7.21	7.21	7.23	7.24	7.25				
Specific Conductivity (mS/cm)	11	10.9	10.8	10.7	10.7	10.7				
Temperature (°C)	31.46	31.59	31.61	31.67	31.66	31.67				
Turbidity (NTU)	424	508	493	430	453	420				
Dissolved Oxygen (mg/L)	3.62	1.05	1.11	0.98	0.87	0.72				
ORP	116	76	64	58	51	48				
Salinity	0.6	0.6	0.6	0.6	0.6	0.6				
DTW (ft btoc)	7.16	7.40	7.41	7.40	7.40	7.40				

Additional Comments/Observations

Sample ID HLA030

Sample Time: 08:28

Roosevelt Roads Naval Air Station Field Data Information Log for Groundwater Sampling

Date (mm/dd/yy)	03/11/2002	Casing Diameter	2"
Field Personnel	Hector M. Hernandez, Erik Isern	Casing Material	PVC
Site Name	RRNAS Site 2036	Measuring Point Elevation	
Job Number	167722.FI.FQ	Height of Riser (above land surface)	0"
Well ID #	2036-MW-02	Land Surface Elevation	
Weather Conditions		Screened Interval	5-15' bls
Air Temperature		Dedicated Pump of Bailer	Dedicated Teflon tubing
Total Well Depth (TWD)	15.32	Steel Guard Pipe Around Casing	no
Depth to Groundwater (DGW)	7.13	Locking Cap	yes
Length of Water Column (LWC) = TWD - DGW =	8.19	Protective Post/Abutment	8" steel well cover
1 Casing Volume = LWC x	0.163	Well Integrity Satisfactory	yes
Standard Evacuation Volume =	1.34	Well Yield	good
Method of Well Evacuation	Geopump through Teflon tubing	Comments/Observations:	
Method of Sample Collection	Geopump through Teflon tubing		
Total Volume of Water Removed (gallons)	7.5 gallons		

Field Parameters

Volume Purged (gallons)	Start	1	2	3	4	5				
Pumping Rate (gpm)	0.25	0.25	0.25	0.25	0.25	0.25				
Time (military)	13:58	14:04	14:10	14:16	14:22	14:28				
pH	6.97	6.92	6.97	7	7.02	7.04				
Specific Conductivity (mS/cm)	17.5	16.3	15.3	14.8	14.7	14.5				
Temperature (°C)	31.3	30.8	30.7	30.7	30.7	30.7				
Turbidity (NTU)	43.4	40.8	21	20.2	8.9	4.1				
Dissolved Oxygen (mg/L)	16.82	10.23	8.35	7.06	6.15	5.85				
ORP	154	130	98	56	18	-14				
Salinity	1.0	1.0	0.9	0.9	0.9	0.8				
DTW (ft btoc)	7.18	7.52	7.53	7.51	7.52	7.52				

Additional Comments/Observations

Sample ID HLA031

Sample Time:14:30

Roosevelt Roads Naval Air Station Field Data Information Log for Groundwater Sampling

Date (mm/dd/yy)	03/05/2002	Casing Diameter	2"
Field Personnel	Hector M. Hernandez, Erik Isern	Casing Material	PVC
Site Name	RRNAS Site 2036	Measuring Point Elevation	
Job Number	167722.FI.FQ	Height of Riser (above land surface)	0"
Well ID #	2036-MW-03	Land Surface Elevation	
Weather Conditions		Screened Interval	5-15' bls
Air Temperature		Dedicated Pump of Bailer	Dedicated Teflon tubing
Total Well Depth (TWD)	14.32	Steel Guard Pipe Around Casing	no
Depth to Groundwater (DGW)	7.42	Locking Cap	yes
Length of Water Column (LWC) = TWD - DGW =	6.90	Protective Post/Abutment	8" steel well cover
1 Casing Volume = LWC x	0.163	Well Integrity Satisfactory	yes
Standard Evacuation Volume =	1.12	Well Yield	good
Method of Well Evacuation	Geopump through Teflon tubing	Comments/Observations:	
Method of Sample Collection	Geopump through Teflon tubing	Water was milky-gray, highly turbid, no odor, clearing up quickly.	
Total Volume of Water Removed (gallons)	6.25 gallons	Water was described as tapwater clear at 13:20	

Field Parameters

Volume Purged (gallons)	Start	1	2	3	4	5				
Pumping Rate (gpm)	0.25	0.25	0.25	0.25	0.25	0.25				
Time (military)	13:10	13:15	13:20	13:25	13:30	13:35				
pH	7.07	7.09	7.06	7.06	7.06	7.06				
Specific Conductivity (mS/cm)	4.60	3.74	3.73	3.69	3.70	3.69				
Temperature (°C)	32.65	32.64	32.63	32.60	32.62	32.61				
Turbidity (NTU)	999+	286	486	447	498	411				
Dissolved Oxygen (mg/L)	1.34	0.51	0.39	0.35	0.33	0.3				
ORP	26	1	-23	-50	-63	-73				
Salinity	0.2	0.2	0.2	0.2	0.2	0.2				
DTW (ft btoc)	7.47	7.48	7.48	7.48	7.48	7.48				

Additional Comments/Observations

Sample ID HLA026

Sample Time:13:36

Roosevelt Roads Naval Air Station Field Data Information Log for Groundwater Sampling

Date (mm/dd/yy)	03/05/2002	Casing Diameter	2"
Field Personnel	Hector M. Hernandez, Erik Isern	Casing Material	PVC
Site Name	RRNAS Site 2036	Measuring Point Elevation	
Job Number	167722.FI.FQ	Height of Riser (above land surface)	0"
Well ID #	2036-MW-04	Land Surface Elevation	
Weather Conditions		Screened Interval	5-15' bls
Air Temperature		Dedicated Pump of Bailer	Dedicated Teflon tubing
Total Well Depth (TWD)	15.05	Steel Guard Pipe Around Casing	no
Depth to Groundwater (DGW)	7.49	Locking Cap	yes
Length of Water Column (LWC) = TWD - DGW =	7.56	Protective Post/Abutment	8" steel well cover
1 Casing Volume = LWC x	0.163	Well Integrity Satisfactory	yes
Standard Evacuation Volume =	1.23	Well Yield	good
Method of Well Evacuation	Geopump through Teflon tubing	Comments/Observations:	
Method of Sample Collection	Geopump through Teflon tubing	Water was tapwater clear after start reading	
Total Volume of Water Removed (gallons)	6.25 gallons		

Field Parameters

Volume Purged (gallons)	Start	1	2	3	4	5				
Pumping Rate (gpm)	0.25	0.25	0.25	0.25	0.25	0.25				
Time (military)	11:32	11:37	11:42	11:47	11:52	11:57				
pH	7.13	6.91	6.91	6.91	6.92	6.93				
Specific Conductivity (mS/cm)	12.6	2.43	2.41	2.47	2.49	2.51				
Temperature (°C)	32.19	31.72	31.71	31.70	31.70	31.71				
Turbidity (NTU)	360	289	239	355	380	520				
Dissolved Oxygen (mg/L)	2.08	0.41	0.33	0.30	0.29	0.27				
ORP	-208	-170	-158	-157	-159	-161				
Salinity	0.7	0.1	0.1	0.1	0.1	0.1				
DTW (ft btoc)	7.54	7.56	7.56	7.56	7.56	7.56				

Additional Comments/Observations

Sample ID HLA025

Sample Time:11:58

Roosevelt Roads Naval Air Station Field Data Information Log for Groundwater Sampling

Date (mm/dd/yy)	03/05/2002	Casing Diameter	2"
Field Personnel	Hector M. Hernandez, Erik Isern	Casing Material	PVC
Site Name	RRNAS Site 2036	Measuring Point Elevation	
Job Number	167722.FI.FQ	Height of Riser (above land surface)	0"
Well ID #	2036-MW-05	Land Surface Elevation	
Weather Conditions		Screened Interval	5-15' bls
Air Temperature		Dedicated Pump of Bailer	Dedicated Teflon tubing
Total Well Depth (TWD)	15.03	Steel Guard Pipe Around Casing	no
Depth to Groundwater (DGW)	7.31	Locking Cap	yes
Length of Water Column (LWC) = TWD - DGW =	7.72	Protective Post/Abutment	8" steel well cover
1 Casing Volume = LWC x	0.163	Well Integrity Satisfactory	yes
Standard Evacuation Volume =	1.26	Well Yield	good
Method of Well Evacuation	Geopump through Teflon tubing	Comments/Observations:	
Method of Sample Collection	Geopump through Teflon tubing		
Total Volume of Water Removed (gallons)	7.5 gallons		

Field Parameters

Volume Purged (gallons)	Start	1	2	3	4	5				
Pumping Rate (gpm)	0.25	0.25	0.25	0.25	0.25	0.25				
Time (military)	10:47	10:55	11:00	11:05	11:10	11:15				
pH	7.24	7.15	7.15	7.15	7.15	7.15				
Specific Conductivity (mS/cm)	20.1	3.65	3.37	3.24	3.15	3.10				
Temperature (°C)	32.2	31.74	31.73	31.82	31.74	31.77				
Turbidity (NTU)	750	417	373	412	383	517				
Dissolved Oxygen (mg/L)	1.35	0.51	0.4	0.35	0.33	0.31				
ORP	-92	-76	-104	-120	-128	-136				
Salinity	1.2	0.2	0.2	0.2	0.2	0.2				
DTW (ft btoc)	7.31	7.41	7.42	7.42	7.42	7.41				

Additional Comments/Observations

Sample ID HLA024 and Field Dupe HLA027FD3

Sample Time:11:16

APPENDIX E

Laboratory Chain of Custody Forms and Analytical Data

teg Puerto Rico

Chain of Custody Record

PO # _____

Client: CH2M HILL, TAMPA
Address: 4350 W. CYPRESS SUITE 600
Phone: 813-874-6522 FAX: 813-874-3056
Client Project #: 167722.FI.FS Project Manager: TUNCIT ORSOY

Date: FEB 20 2002 Page 1 of 1
TEG Project #: 02I0220CH2M Control#: 2037
Location: RRMAS SITE 2036
Collector: HMH ET Date of Collection: FEB 19 & 20, 02

Sample Name	Depth	Time	Sample Matrix	Container Type	"Grab or Composite"	8021	8020 A (BTEX)	VOL 8260	SEMI VOL 8270	TRPH 418.1	TPH 8015 B (gasoline)	TPH 8015 B (diesel)	TPH 8015 B (gas & diesel)	TPH 8015 B (motor oil)	TPH 8015 B (full range)	TOTAL LEAD	TCLP LEAD	METALS	RCI	8082-PCBS	8082-Pesticide	PNA 610/8100	TCLP METALS			FIELD NOTES / PRESERVATION	Total # of Containers
HLA001	0-1	1415	SOIL	2oz JAR									X													2036-SB01-(0-1)	1
HLA002	3-4	1434	SOIL	2oz JAR									X													2036-SB01-(3-4)	1
HLA003	NA	0758	GW	40mL VOA			X						X													2036-SB01	2
HLA004	0-1	0845	SOIL	2oz JAR									X													2036-SB02-(0-1)	1
HLA005	3-4	0903	SOIL	2oz JAR									X													2036-SB02-(3-4)	1
HLA006	NA	1224	GW	40mL VOA			X						X													2036-SB02	2
HLA007	0-1	1307	SOIL	2oz JAR									X													2036-SB03-(0-1)	1
HLA008	3-4	1327	SOIL	2oz JAR									X													2036-SB03-(3-4)	1
HLA010 FD1	NA	NA	SOIL	2oz JAR									X													FIELD DUPE 1	1
HLA012	0-1	1440	SOIL	2oz JAR									X													2036-SB04-(0-1)	1
HLA013	3-4	1512	SOIL	2oz JAR									X													2036-SB04-(3-4)	1
HLA014 TB1	NA	1528	QC	40mL VOA			X																			TRIP BLANK 1	2
HLA015 EB1	NA	1542	QC	40mL VOA			X						X													EQUIP BLANK 1	2

RELINQUISHED BY (signature): [signature] Date/Time: FEB 20 1800
RECEIVED BY (signature): [signature] Date/Time: 2/20/02 1800

RELINQUISHED BY (signature) Date/Time
RECEIVED BY (signature) Date/Time

Total # of containers: 57
Chain of Custody seals Y / N / NA: —
Seals intact? Y / N / NA: —
Received good conditions / cold: YES

TEMPERATURE: 10°C

RUSH

G=Grab C=Composite S=Soil W=Aqueous

On Site Labs, Inc.

Chain of Custody Record

PO # _____

Client: CH2M HILL TAMPA
Address: 4350 W. CYPRESS SUITE 600, 33607
Phone: 813-874-6522 FAX: 813-874-3056
Client Project #: 167722.FI.FS Project Manager: TURCIT OKSOY

Date: FEBRUARY 21, 2002 Page 1 of 1
LAB Project #: 02T0221CH2M Control#: 2041
Location: RRNAS SITE 2036
Collector: HMH EE Date of Collection: FEB 21, 02

Sample Name	Depth	Time	Sample Matrix	Container Type	Grab or Composite*	8021	8020 A (BTEX)	VOL 8260	SEMI VOL 8270	TRPH 418.1	TPH 8015 B (gasoline)	TPH 8015 B (diesel)	TPH 8015 B (gas & diesel)	TPH 8015 B (motor oil)	TPH 8015 B (full range)	TOTAL LEAD	TCLP LEAD	METALS	RCI	8082-PCBS	8082-Pesticide	PNA 610/8100	TCLP METALS			FIELD NOTES / PRESERVATION	Total # of Containers
HLA009	NA	0754	GW	40 ML			X						X													2036SB03	2
HLA011FD2	NA	NA	GW	40ML			X						X													FIELD DUPE	2
HLA016	NA	0893	GW	40ML			X						X													2036SB04	2
HLA017	(0-1) ~~NA~~	1035	SOIL	2oz Jar									X													2036-SB05(0-1)	1
HLA018	(3-4)	1058	SOIL	2oz Jar									X													2036-SB05-(3-4)	1
HLA019	NA	1247	GW	40ML			X						X													2036-SB05	2
HLA020EB2	NA	1242	QC	40ML			X						X													EQUIPMENT BLANK	2
HLA021TB2	NA	1419	QC	40ML			X																			TRIP BLANK 2	2
HLA022	0-1	1440	SOIL	2oz Jar									X													2036SB06(0-1)	1
HLA023	3-4	1455	SOIL	2oz Jar									X													2036SB06(3-4)	1

RELINQUISHED BY (signature)	Date/Time	RECEIVED BY (signature)	Date/Time
[signature]	FEB 21 02 1731	[signature]	2/21/02 17:31
RELINQUISHED BY (signature)	Date/Time	RECEIVED BY (signature)	Date/Time

Total # of containers	16	TEMPERATURE
Chain of Custody seals Y / N / NA	—	Iced
Seals Intact? Y / N / NA	—	4°C
Received good conditions / cold	YES	

G=Grab =Composite S=Soil W=Aqueous

On Site Labs, Inc.

Chain of Custody Record

PO # _____

Client: CH2M HILL TAMPA
Address: 4350 W CYPRESS SUITE 600
Phone: 813-874-6522 FAX: 813-874-3056
Client Project #: 167722 FT. FG Project Manager: TURKIT CRSOY

Date: MARCH 5 2002 Page 1 of 1
LAB Project #: 02I0305 CH2M Control#: _____
Location: IRNAS SITE 2036
Collector: HMH EI Date of Collection: MARCH 5 2002

Sample Name	Depth	Time	Sample Matrix	Container Type	"Grab Composite"	8021	8020 A (BTEX)	VOL 8260	SEMI VOL 8270	TRPH 418.1	TPH 8015 B (gasoline)	TPH 8015 B (diesel)	TPH 8015 B (gas & diesel)	TPH 8015 B (motor oil)	TPH 8015 B (full range)	TOTAL LEAD	TCLP LEAD	METALS	RCI	8082-PCBS	8082-Pesticide	PNA 610/8100	TCLP METALS			FIELD NOTES / PRESERVATION	Total # of Containers
HCA024	–	1116	GW	40mL			X						X													MW05	2
HCA025	–	1158	GW	40mL			X						X													MW04	2
HCA026	–	1336	GW	40mL			X						X													MW03	2
HCA027FD3	–	NA	GW	40mL			X						X													FIELD DUPE	2
HCA028 ~~EB3~~ TB3 HMH	–	1538	GW	40mL			X																			TRIP BLANK	2
HCA029 EB3	–	1545	GW	40mL			X						X													EQUIP BLANK	2

RELINQUISHED BY (signature)	Date/Time	RECEIVED BY (signature)	Date/Time
[signature]	MARCH 5 2002 1805	[signature]	3/5/02 18:05
RELINQUISHED BY (signature)	Date/Time	RECEIVED BY (signature)	Date/Time

	1	2
Total # of containers		
Chain of Custody seals Y / N (NA)	—	
Seals intact? Y / N (NA)	—	
Received good conditions / Cold	YES	

TEMPERATURE: ice bath

G=Grab C=Composite S=Soil W=Aqueous

On Site Labs, Inc.

Chain of Custody Record

PO # _____

Client: CH2M HILL TAMPA
Address: 4350 W. CYPRESS SUITE 600
Phone: 813-874-6522 FAX: 813-874-3056
Client Project #: 167722.FI.FQ Project Manager: TUNCH ORSOY

Date: MARCH 9, 2002 Page 1 of 1
LAB Project #: 02I0308CH2M Control#: _____
Location: RRNAS SITES 2036 & 88
Collector: HMA FI Date of Collection: MARCH 6 & 7

Sample Name	Depth	Time	Sample Matrix	Container Type	"Grab" or "Composite"	8021	8020 A (BTEX)	VOL 8260	SEMI VOL 8270	TRPH 418.1	TPH 8015 B (gasoline)	TPH 8015 B (diesel)	TPH 8015 B (gas & diesel)	TPH 8015 B (motor oil)	TPH 8015 B (full range)	TOTAL LEAD	TCLP LEAD	METALS	RCI	8082-PCBS	8082-Pesticide	PNA 610/8100	TCLP METALS			FIELD NOTES / PRESERVATION	Total # of Containers
HLA036	NA	0828	GW	40ml			X						X													2036 MW01	2
JLA001	0-1	1120	SOIL	2oz									X													1970 SB01 (01)	1
JLA002	3-3.5	1128	SOIL	2oz									X													1970 SB01 (3-3.5)	1
JLA003	0-1	1330	SOIL	2oz									X													1970SB02 (01)	1
JLA004	7-9	1508	SOIL	2oz									X													1970SB02 (7-9)	1
JLA005	0-1	1525	SOIL	2oz									X													1970SB03 (01)	1
JLA006	7-9	1642	SOIL	2oz									X													1970SB03 (7-9)	1
JLA007	0-1	0826	SOIL	2oz									X													1970 SB04 (01)	1
JLA008	3-4	0906	SOIL	2oz									X													1970 SB04 (3-4)	1
JLA009	0-1	1440	SOIL	2oz									X													1970SB05 (0-1)	1
JLA010	3-4	1625	SOIL	2oz									X													1970SB05 (3-4)	1
JLA011 TB1	—	1726	QC SOIL	40ml			X						X													TRIP BLANK	2
JLA012 EB1	—	1732	QC	40ml			X						X													EQUIP BLANK	2

RELINQUISHED BY (signature): [signature] Date/Time: MARCH 02 0730
RECEIVED BY (signature): [signature] Date/Time: 3/8/02 0730
RELINQUISHED BY (signature): Date/Time:
RECEIVED BY (signature): Date/Time:

Total # of containers: 1 4
Chain of Custody seals Y / N / (NA): —
Seals intact? Y / N / (NA): —
Received good conditions / (Cold): YES

TEMPERATURE: ICE [illegible]

G=Grab C=Composite S=Soil W=Aqueous

On Site Labs, Inc.

Chain of Custody Record

PO # _____

Client: CHEM HILL TAMPA
Address: 4350 WEST CYPRESS SUITE 600
Phone: 813-874-6522 FAX: 813 874 3056
Client Project #: 16T122.FI.FS Project Manager: TUNCH ORSP

Date: MARCH 11, 02 Page 1 of 1
LAB Project #: 02I0311C112M Control#: 2057
Location: SITES 1970, 88, 2036
Collector: HMH EI Date of Collection: 3/8/10/11 2002

Sample Name	Depth	Time	Sample Matrix	Container Type	Grab Composite	8021	8020 A (BTEX)	VOL 8260	SEMI VOL 8270	TRPH 418.1	TPH 8015 B (gasoline)	TPH 8015 B (diesel)	TPH 8015 B (gas & diesel)	TPH 8015 B (motor oil)	TPH 8015 B (full range)	TOTAL LEAD	TCLP LEAD	METALS	RCI	8082-PCBS	8082-Pesticide	PNA 610/8100	TCLP METALS		[illegible]	FIELD NOTES / PRESERVATION	Total # of Containers
HLA031	—	1430	GW	40mL			X						X													2036 MW 02	3
JLA020	7-9	0943	SOIL	2oz									X													1970 SB08 7-9	1
JLA021	17-19	1046	SOIL	2oz									X													1970 SB08 17-19	1
JLA022	7-9	0932	SOIL	2oz									X													1970 SB09	1
JLA023	17-19	1010	SOIL	2oz									X													1970 SB09 17-19	1
JLA024	—	1317	GW	40mL			X						X													1970 SB08	2
JLA025	—	1335	GW	40mL			X						X													1970 SB09	2
JLA026FD3	NA	NA	SOIL	2oz									X													FIELD DUPE	1
JLA027 EB3	—	1315	QC	40mL			X						X													~~FIELD DUPE~~ EQUIP BLANK	2
JLA028 TB3	—	1333	QC	40mL			X																			TRIP BLANK	2
JLA017	3-4	0854	SOIL	2oz									X													88 SB06 3-4	1
JLA018	7-9	0939	SOIL	2oz									X													88 SB06 7-9	1
JLA019	—	1208	GW	40mL			X						X													88 MW 01	3

RELINQUISHED BY (signature)	Date/Time	RECEIVED BY (signature)	Date/Time
[signature]	MARCH 11 02 1558	K Shelburne	3/11/02 16:00
RELINQUISHED BY (signature)	Date/Time	RECEIVED BY (signature)	Date/Time

Total # of containers: 21
Chain of Custody seals Y / N / NA: —
Seals Intact? Y / N / NA: —
Received good conditions / cold: YES

TEMPERATURE: ice bath 4.5°C

G=Grab C=Composite S=Soil W=Aqueous

On Site Labs, Inc.

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CH2M HILL PROJECT NO. 167722.FI.FS
RRNAS SITE 2036
CEIBA, P.R.

TEG Project #02I0220CH2M

TPH (Mod. EPA Method 8015B) ANALYSES OF SOIL

SAMPLE NUMBER	DATE ANALYZED	TPH-GAS C_5 - C_{12} (mg/Kg)	TPH-DIESEL C_{13} - C_{24} (mg/Kg)
METHOD BLANK	02/21/02	ND	ND
HLA001	02/21/02	ND	71
HLA002	02/21/02	ND	ND
HLA004	02/21/02	ND	BDL
HLA005	02/21/02	ND	31
HLA007	02/21/02	ND	**260**
HLA008	02/21/02	ND	27
HLA010 FD1	02/21/02	ND	27
HLA012	02/21/02	ND	BDL
HLA013	02/21/02	ND	ND
DETECTION LIMIT (mg/Kg)		10	25

TPH (Mod. EPA Method 8015B) ANALYSES OF WATER

SAMPLE NUMBER	DATE ANALYZED	TPH-GAS C_5 - C_{12} (mg/L)	TPH-DIESEL C_{13} - C_{24} (mg/L)
METHOD BLANK	02/21/02	ND	ND
HLA003	02/21/02	ND	ND
HLA006	02/21/02	ND	ND
HLA015 EB1	02/21/02	ND	ND
DETECTION LIMIT (mg/L)		10	25

mg/L = MILLIGRAMS PER LITER
mg/Kg = MILLIGRAMS PER KILOGRAM
CONCENTRATIONS BASED ON DRY WEIGHT
"BDL" INDICATES ANALYTE PRESENT BELOW THE LISTED DETECTION LIMIT
"ND" INDICATES ANALYTE NOT DETECTED AT OR ABOVE THE LISTED DETECTION LIMIT
SAMPLING PERFORMED BY: CH2M HILL PERSONNEL
ANALYSES PERFORMED BY: MARCO A. PEDRAZA
DATA REVIEWED BY: KEVIN SHELBURNE

CH2M HILL PROJECT NO. 167722.FI.FS
RRNAS SITE 2036
CEIBA, P.R.

TEG Project #02I0220CH2M

BTEX (Mod. EPA Method 8020A) ANALYSES OF WATER

SAMPLE NUMBER	DATE ANALYZED	BENZENE (µg/L)	TOLUENE (µg/L)	ETHYL-BENZENE (µg/L)	TOTAL XYLENES (µg/L)
METHOD BLANK	02/21/02	ND	ND	ND	ND
HLA003	02/21/02	ND	ND	ND	ND
HLA006	02/21/02	ND	ND	ND	ND
HLA014 TB1	02/21/02	ND	ND	ND	ND
HLA015 EB1	02/21/02	ND	ND	ND	ND
DETECTION LIMIT (µg/L)		1.0	1.0	1.0	3.0

µg/L = MICROGRAMS PER LITER
"ND" INDICATES ANALYTE NOT DETECTED AT OR ABOVE THE LISTED DETECTION LIMIT

SAMPLING PERFORMED BY: CH2M HILL PERSONNEL
ANALYSES PERFORMED BY: MARCO A. PEDRAZA
DATA REVIEWED BY: KEVIN SHELBURNE

Marco A. Pedraza
Laboratory Manager

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CH2M HILL PROJECT NO. 167722.FI.FS
RRNAS SITE 2036
CEIBA, P.R.

TEG Project #02I0221CH2M

TPH (Mod. EPA Method 8015B) ANALYSES OF SOIL

SAMPLE NUMBER	DATE ANALYZED	TPH-GAS C_5 - C_{12} (mg/Kg)	TPH-DIESEL C_{13} - C_{24} (mg/Kg)
METHOD BLANK	02/22/02	ND	ND
HLA017	02/22/02	ND	ND
HLA018	02/22/02	ND	ND
HLA022	02/22/02	ND	58
HLA023	02/22/02	ND	ND
DETECTION LIMIT (mg/Kg)		10	25

TPH (Mod. EPA Method 8015B) ANALYSES OF WATER

SAMPLE NUMBER	DATE ANALYZED	TPH-GAS C_5 - C_{12} (mg/L)	TPH-DIESEL C_{13} - C_{24} (mg/L)
METHOD BLANK	02/22/02	ND	ND
HLA009	02/22/02	ND	ND
HLA011 FD2	02/22/02	ND	ND
HLA016	02/22/02	ND	ND
HLA019	02/22/02	ND	ND
HLA020 EB2	02/22/02	ND	ND
DETECTION LIMIT (mg/L)		10	25

mg/L = MILLIGRAMS PER LITER
mg/Kg = MILLIGRAMS PER KILOGRAM
CONCENTRATIONS BASED ON DRY WEIGHT
"BDL" INDICATES ANALYTE PRESENT BELOW THE LISTED DETECTION LIMIT
"ND" INDICATES ANALYTE NOT DETECTED AT OR ABOVE THE LISTED DETECTION LIMIT
SAMPLING PERFORMED BY: CH2M HILL PERSONNEL
ANALYSES PERFORMED BY: MARCO A. PEDRAZA
DATA REVIEWED BY: KEVIN SHELBURNE

CH2M HILL PROJECT NO. 167722.FI.FS
RRNAS SITE 2036
CEIBA, P.R.

TEG Project #02I0221CH2M

BTEX (Mod. EPA Method 8020A) ANALYSES OF WATER

SAMPLE NUMBER	DATE ANALYZED	BENZENE (µg/L)	TOLUENE (µg/L)	ETHYL-BENZENE (µg/L)	TOTAL XYLENES (µg/L)
METHOD BLANK	02/22/02	ND	ND	ND	ND
HLA009	02/22/02	ND	ND	ND	ND
HLA011 FD2	02/22/02	ND	ND	ND	ND
HLA016	02/22/02	ND	ND	ND	ND
HLA019	02/22/02	ND	ND	ND	ND
HLA020 EB2	02/22/02	ND	ND	ND	ND
HLA021 TB2	02/22/02	ND	ND	ND	ND
DETECTION LIMIT (µg/L)		1.0	1.0	1.0	3.0

µg/L = MICROGRAMS PER LITER
"ND" INDICATES ANALYTE NOT DETECTED AT OR ABOVE THE LISTED DETECTION LIMIT

SAMPLING PERFORMED BY: CH2M HILL PERSONNEL
ANALYSES PERFORMED BY: MARCO A. PEDRAZA
DATA REVIEWED BY: KEVIN SHELBURNE

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Kevin Shelburne
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CH2M HILL PROJECT NO. 167722.FI.FS
RRNAS SITE 2036
CEIBA, P.R.

OSL Project #02I0305CH2M

BTEX (Mod. EPA Method 8020A) ANALYSES OF WATER

SAMPLE NUMBER	DATE ANALYZED	BENZENE (µg/L)	TOLUENE (µg/L)	ETHYL-BENZENE (µg/L)	TOTAL XYLENES (µg/L)
METHOD BLANK	03/18/02	ND	ND	ND	ND
HLA 024	03/18/02	ND	ND	ND	ND
HLA 025	03/18/02	ND	ND	ND	ND
HLA 026	03/18/02	ND	ND	ND	ND
HLA 027 FD3	03/18/02	ND	ND	ND	ND
HLA 028 TB3	03/18/02	ND	ND	ND	ND
HLA 029 EB3	03/18/02	ND	ND	ND	ND
DETECTION LIMIT (µg/L)		1.0	1.0	1.0	3.0

µg/L = MICROGRAMS PER LITER
"ND" INDICATES ANALYTE NOT DETECTED AT OR ABOVE THE LISTED DETECTION LIMIT

SAMPLING PERFORMED BY: CH2M HILL PERSONNEL
ANALYSES PERFORMED BY: MARCO A. PEDRAZA
DATA REVIEWED BY: KEVIN SHELBURNE

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CH2M HILL PROJECT NO. 167722.FI.FS
RRNAS SITE 2036
CEIBA, P.R.

OSL Project #02I0305CH2M

TPH (Mod. EPA Method 8015B) ANALYSES OF WATER

SAMPLE NUMBER	DATE ANALYZED	TPH-GAS C_5 - C_{12} (mg/L)	TPH-DIESEL C_{13} - C_{24} (mg/L)
METHOD BLANK	03/18/02	ND	ND
HLA 024	03/18/02	ND	ND
HLA 025	03/18/02	ND	ND
HLA 026	03/18/02	ND	ND
HLA 027 FD3	03/18/02	ND	ND
HLA 029 EB3	03/18/02	ND	ND
DETECTION LIMIT (mg/L)		10	25

mg/L = MILLIGRAMS PER LITER
"ND" INDICATES ANALYTE NOT DETECTED AT OR ABOVE THE LISTED DETECTION LIMIT
SAMPLING PERFORMED BY: CH2M HILL PERSONNEL
ANALYSES PERFORMED BY: MARCO A. PEDRAZA
DATA REVIEWED BY: KEVIN SHELBURNE

CH2M HILL PROJECT NO. 167722.FI.FS
RRNAS SITES 88 AND 2036
CEIBA, P.R.

OSL Project #02I0308CH2M

BTEX (Mod. EPA Method 8020A) ANALYSES OF WATER

SAMPLE NUMBER	DATE ANALYZED	BENZENE (µg/L)	TOLUENE (µg/L)	ETHYL-BENZENE (µg/L)	TOTAL XYLENES (µg/L)
METHOD BLANK	03/08/02	ND	ND	ND	ND
JLA011TB1	03/08/02	ND	1.3	ND	ND
JLA012EB1	03/08/02	ND	1.2	ND	ND
HLA030	03/08/02	ND	ND	ND	ND
DETECTION LIMIT (µg/L)		1.0	1.0	1.0	3.0

µg/L = MICROGRAMS PER LITER
"ND" INDICATES ANALYTE NOT DETECTED AT OR ABOVE THE LISTED DETECTION LIMIT

SAMPLING PERFORMED BY: CH2M HILL PERSONNEL
ANALYSES PERFORMED BY: MARCO A. PEDRAZA
DATA REVIEWED BY: KEVIN SHELBURNE

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CH2M HILL PROJECT NO. 167722.FI.FS
RRNAS SITES 88, 1970 AND 2036
CEIBA, P.R.

OSL Project #02I0311CH2M

BTEX (Mod. EPA Method 8020A) ANALYSES OF WATER

SAMPLE NUMBER	DATE ANALYZED	BENZENE (µg/L)	TOLUENE (µg/L)	ETHYL-BENZENE (µg/L)	TOTAL XYLENES (µg/L)
METHOD BLANK	03/18/02	ND	ND	ND	ND
HLA031	03/18/02	ND	ND	ND	ND
JLA024	03/18/02	ND	ND	ND	ND
JLA025	03/18/02	ND	ND	ND	ND
JLA027 EB3	03/18/02	ND	ND	ND	ND
ILA019	03/18/02	ND	ND	ND	ND
JLA028 TB3	03/18/02	ND	ND	ND	ND
DETECTION LIMIT (µg/L)		1.0	1.0	1.0	3.0

µg/L = MICROGRAMS PER LITER
"ND" INDICATES ANALYTE NOT DETECTED AT OR ABOVE THE LISTED DETECTION LIMIT

SAMPLING PERFORMED BY: CH2M HILL PERSONNEL
ANALYSES PERFORMED BY: MARCO A. PEDRAZA
DATA REVIEWED BY: KEVIN SHELBURNE

Marco A. Pedraza
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CH2M HILL PROJECT NO. 167722.FI.FS
RRNAS SITES 88 AND 2036
CEIBA, P.R.

OSL Project #02I0308CH2M

TPH (Mod. EPA Method 8015B) ANALYSES OF SOIL

SAMPLE NUMBER	DATE ANALYZED	TPH-GAS C_5 - C_{12} (mg/Kg)	TPH-DIESEL C_{13} - C_{24} (mg/Kg)
METHOD BLANK	03/08/02	ND	ND
JLA001	03/08/02	ND	ND
JLA002	03/08/02	ND	ND
JLA003	03/08/02	ND	ND
JLA004	03/08/02	ND	ND
JLA005	03/08/02	ND	ND
JLA006	03/08/02	ND	ND
JLA007	03/08/02	ND	ND
JLA008	03/08/02	ND	ND
JLA009	03/08/02	ND	ND
JLA010	03/08/02	ND	ND
DETECTION LIMIT (mg/Kg)		10	25

TPH (Mod. EPA Method 8015B) ANALYSES OF WATER

SAMPLE NUMBER	DATE ANALYZED	TPH-GAS C_5 - C_{12} (mg/L)	TPH-DIESEL C_{13} - C_{24} (mg/L)
METHOD BLANK	03/08/02	ND	ND
JLA012EB1	03/08/02	ND	ND
HLA030	03/08/02	ND	ND
DETECTION LIMIT (mg/L)		10	25

mg/L = MILLIGRAMS PER LITER
mg/Kg = MILLIGRAMS PER KILOGRAM
CONCENTRATIONS BASED ON DRY WEIGHT
"ND" INDICATES ANALYTE NOT DETECTED AT OR ABOVE THE LISTED DETECTION LIMIT
SAMPLING PERFORMED BY: CH2M HILL PERSONNEL

ANALYSES PERFORMED BY: MARCO A. PEDRAZA
DATA REVIEWED BY: KEVIN SHELBURNE

CH2M HILL PROJECT NO. 167722.FI.FS
RRNAS SITES 88 AND 2036
CEIBA, P.R.

OSL Project #02I0308CH2M

BTEX (Mod. EPA Method 8020A) ANALYSES OF WATER

SAMPLE NUMBER	DATE ANALYZED	BENZENE (µg/L)	TOLUENE (µg/L)	ETHYL-BENZENE (µg/L)	TOTAL XYLENES (µg/L)
METHOD BLANK	03/08/02	ND	ND	ND	ND
JLA011TB1	03/08/02	ND	1.3	ND	ND
JLA012EB1	03/08/02	ND	1.2	ND	ND
HLA030	03/08/02	ND	ND	ND	ND
DETECTION LIMIT (µg/L)		1.0	1.0	1.0	3.0

µg/L = MICROGRAMS PER LITER
"ND" INDICATES ANALYTE NOT DETECTED AT OR ABOVE THE LISTED DETECTION LIMIT

SAMPLING PERFORMED BY: CH2M HILL PERSONNEL
ANALYSES PERFORMED BY: MARCO A. PEDRAZA
DATA REVIEWED BY: KEVIN SHELBURNE

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Kevin Shelburne
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CH2M HILL PROJECT NO. 167722.FI.FS
RRNAS SITES 88, 1970 AND 2036
CEIBA, P.R.

OSL Project #02I0311CH2M

TPH (Mod. EPA Method 8015B) ANALYSES OF SOIL

SAMPLE NUMBER	DATE ANALYZED	TPH-GAS C_5 - C_{12} (mg/Kg)	TPH-DIESEL C_{13} - C_{24} (mg/Kg)
METHOD BLANK	03/12/02	ND	ND
JLA020	03/12/02	ND	ND
JLA021	03/12/02	ND	ND
JLA022	03/12/02	ND	ND
JLA023	03/12/02	ND	ND
JLA026 FD3	03/12/02	ND	ND
ILA017	03/12/02	ND	ND
ILA018	03/12/02	ND	ND
DETECTION LIMIT (mg/Kg)		10	25

TPH (Mod. EPA Method 8015B) ANALYSES OF WATER

SAMPLE NUMBER	DATE ANALYZED	TPH-GAS C_5 - C_{12} (mg/L)	TPH-DIESEL C_{13} - C_{24} (mg/L)
METHOD BLANK	03/12/02	ND	ND
METHOD BLANK	03/18/02	ND	ND
HLA031	03/18/02	ND	ND
JLA024	03/18/02	ND	ND
JLA025	03/18/02	ND	ND
JLA027 EB3	03/18/02	ND	ND
ILA019	03/12/02	ND	ND
DETECTION LIMIT (mg/L)		10	25

mg/L = MILLIGRAMS PER LITER
mg/Kg = MILLIGRAMS PER KILOGRAM
CONCENTRATIONS BASED ON DRY WEIGHT
"ND" INDICATES ANALYTE NOT DETECTED AT OR ABOVE THE LISTED DETECTION LIMIT
SAMPLING PERFORMED BY: CH2M HILL PERSONNEL

ANALYSES PERFORMED BY: MARCO A. PEDRAZA
DATA REVIEWED BY: KEVIN SHELBURNE

CH2M HILL PROJECT NO. 167722.FI.FS
RRNAS SITES 88, 1970 AND 2036
CEIBA, P.R.

OSL Project #02I0311CH2M

BTEX (Mod. EPA Method 8020A) ANALYSES OF WATER

SAMPLE NUMBER	DATE ANALYZED	BENZENE (µg/L)	TOLUENE (µg/L)	ETHYL-BENZENE (µg/L)	TOTAL XYLENES (µg/L)
METHOD BLANK	03/18/02	ND	ND	ND	ND
HLA031	03/18/02	ND	ND	ND	ND
JLA024	03/18/02	ND	ND	ND	ND
JLA025	03/18/02	ND	ND	ND	ND
JLA027 EB3	03/18/02	ND	ND	ND	ND
ILA019	03/18/02	ND	ND	ND	ND
JLA028 TB3	03/18/02	ND	ND	ND	ND
DETECTION LIMIT (µg/L)		1.0	1.0	1.0	3.0

µg/L = MICROGRAMS PER LITER
"ND" INDICATES ANALYTE NOT DETECTED AT OR ABOVE THE LISTED DETECTION LIMIT

SAMPLING PERFORMED BY: CH2M HILL PERSONNEL
ANALYSES PERFORMED BY: MARCO A. PEDRAZA
DATA REVIEWED BY: KEVIN SHELBURNE

Marco A. Pedraza
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Kevin Shelburne
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March 20, 2002
OSL Projects #02I0311CH2M

Mr. Tunch Orsoy
CH2M HILL
4350 W. Cypress Street, Suite 600
Tampa, Florida 33607

**SUBJECT: DATA REPORT - CH2M HILL PROJECT NO. 167722.FI.FS
SITES 88, 1970 AND 2036 ROOSEVELT ROADS NAS
CEIBA, PUERTO RICO**

Dear Mr. Orsoy:

Please find enclosed the analytical report for the samples collected by CH2M HILL personnel from the above-referenced site and delivered to On Site Labs' (OSL) facility under the proper chain-of-custody protocol. An OSL Puerto Rico certified-chemist performed the following analyses:

- 7 soil samples analyzed for TPH-gas/diesel by modified EPA test method 8015B.
- 4 water sample analyzed for TPH-gas/diesel by modified EPA test method 8015B.
- 1 equipment blank water sample analyzed for TPH-gas/diesel.
- 4 water samples analyzed for BTEX by modified EPA test method 8020A.
- 1 trip and 1 equipment blank water sample analyzed for BTEX.
- Laboratory QA/QC analyses for TPH-gas/diesel and BTEX.

The analytical results are summarized in the attached table. Applicable detection limits, QA/QC data, chromatograms, a chain-of-custody and an invoice are attached.

OSL appreciates the opportunity to provide analytical services for this project. If you have any questions relating to the data or report, please do not hesitate to contact us.

Sincerely,
On Site Labs, Inc.

Kevin Shelburne
Principal

Attachments

QA/QC REPORT - CALIBRATION DATA

OSL Project #02I0311CH2M
DAILY CALIBRATION DATE: 03/12/02

CH2M HILL PROJECT NO. 167722.FI.FS
PROJECT NAME: RRNAS SITES 88, 1970 AND 2036

			INITIAL		OPENING			CLOSING		
COMPOUND	DETECTOR	CALIB RANGE	RF	%RSD	AREA	RF	%DIFF	AREA	RF	%DIFF
TPH GASOLINE	FID #2 (gc5)	10 - 30,000	0.26	17.6%	46.40	0.23	9.4%	48.16	0.24	5.9%
TPH GASOLINE	FID #3 (gc5)	10 - 30,000	0.36	15.0%	131.44	0.33	9.2%	264.80	0.33	8.6%
TPH GASOLINE	FID #4 (gc5)	10 - 30,000	0.31	15.4%	116.59	0.29	4.7%	116.22	0.29	5.0%
TPH DIESEL	FID #2 (gc5)	25 - 20,000	0.69	14.1%	260.20	0.65	6.3%	276.06	0.69	0.6%
TPH DIESEL	FID #3 (gc5)	25 - 20,000	0.74	13.6%	590.77	0.74	0.1%	1322.14	0.83	11.8%
TPH DIESEL	FID #4 (gc5)	25 - 20,000	0.61	11.1%	508.65	0.64	4.9%	536.63	0.67	10.7%

CALIB RANGE - RANGE OF CALIBRATION CURVE IN ppm
INITIAL RF - AVERAGE RESPONSE FACTOR FROM MULTIPOINT CALIBRATION CURVE
% RSD - LINEARITY OF MULTIPOINT CALIBRATION CURVE (+/- 20% ACCEPTABLE LIMITS)
AREA - AREA COUNTS FROM DAILY CALIBRATION STANDARD
RF - DETECTOR RESPONSE FACTOR FROM MID-POINT CALIBRATION STANDARD
% DIFF - DIFFERENCE, IN PERCENT, BETWEEN THE AVERAGE RF AND THE OPENING OR CLOSING RF (+/- 15% ACCEPTABLE LIMITS)
OPENING - MID-POINT CALIBRATION STANDARD ANALYZED BEFORE SAMPLE ANALYSES BEGIN
CLOSING - MID-POINT CALIBRATION STANDARD ANALYZED AFTER SAMPLES ANALYSES ARE COMPLETE

ANALYSES PERFORMED BY MARCO A PEDRAZA
DATA REVIEWED BY KEVIN SHELBURNE

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QA/QC REPORT - MS/MSD DATA

MATRIX SPIKE (MS)/MATRIX SPIKE DUPLICATE (MSD)

OSL Project #02I0311CH2M
DATE: 03/12/02

CH2M HILL PROJECT NO. 167722.FI.FS
PROJECT NAME: RRNAS SITES 88, 1970 AND 2036

COMPOUND	SPK CON (ppm)	MS CONC (ppm)	%REC MS	MSD CONC (ppm)	%REC MSD	RPD	ACCEPTABLE RPD	ACCEPTABLE RECOVERY
TPH-GASOLINE	100	98	98%	96	96%	2%	15%	81% - 126%

ppm = PARTS PER MILLION
MS CONC - ANALYZED CONCENTRATION OF SPIKED SAMPLE
% REC - PERCENT RECOVERY OF SPIKE FROM MATRIX
RPD - RELATIVE PERCENT DIFFERENCE BETWEEN MATRIX SPIKE AND MATRIX SPIKE DUPLICATE RECOVERIES

ANALYSES PERFORMED BY MARCO A. PEDRAZA
DATA REVIEWED BY KEVIN SHELBURNE

ON SITE LABS, INC
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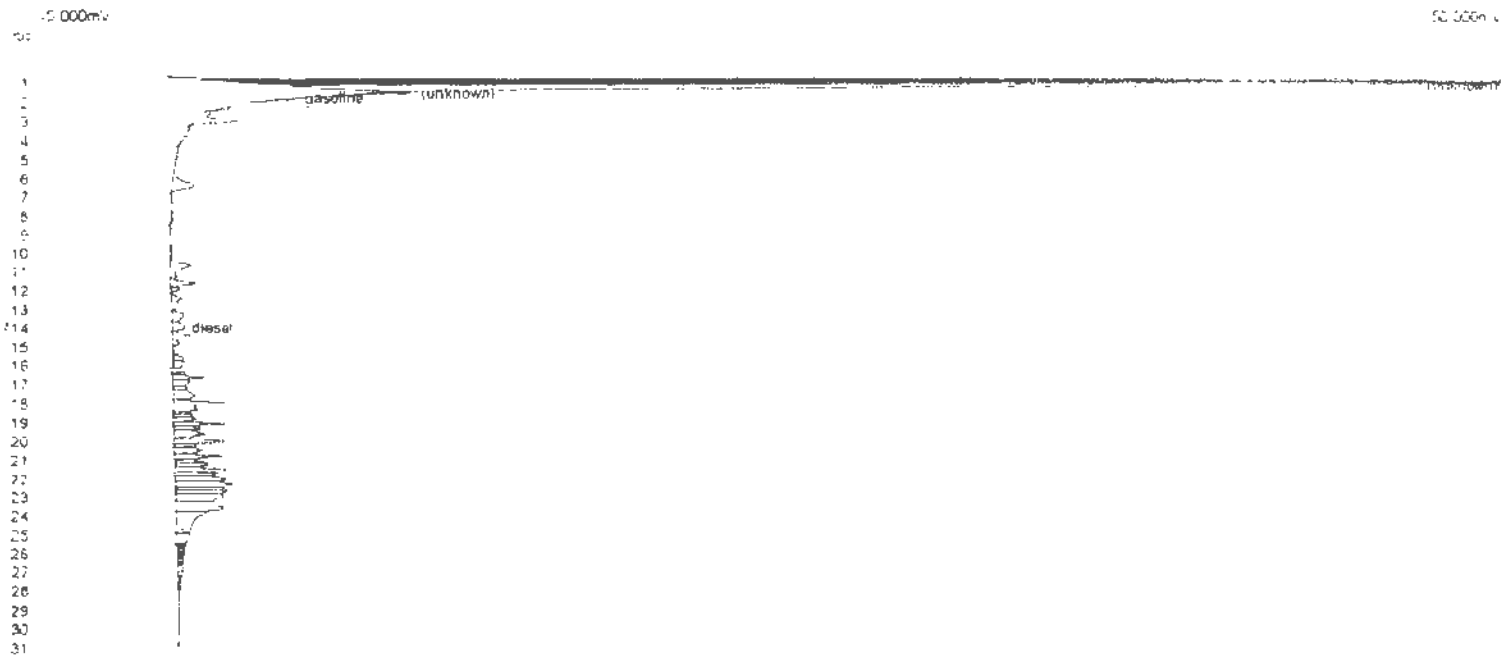
Lab name: On Site Labs Inc
alysis date. 03/12/2002 11:42:56
Method: EPA 8015B mod.
Lab ID: GC - 5
Description: FID2 - Ch. 2
Column: XTI-5, 30m, 0.53mm, 1.5um
Carrier: N2
Data file: 0312FB3.chr ()
Sample: 50/100 ppm G/D OPEN
Operator: MAP

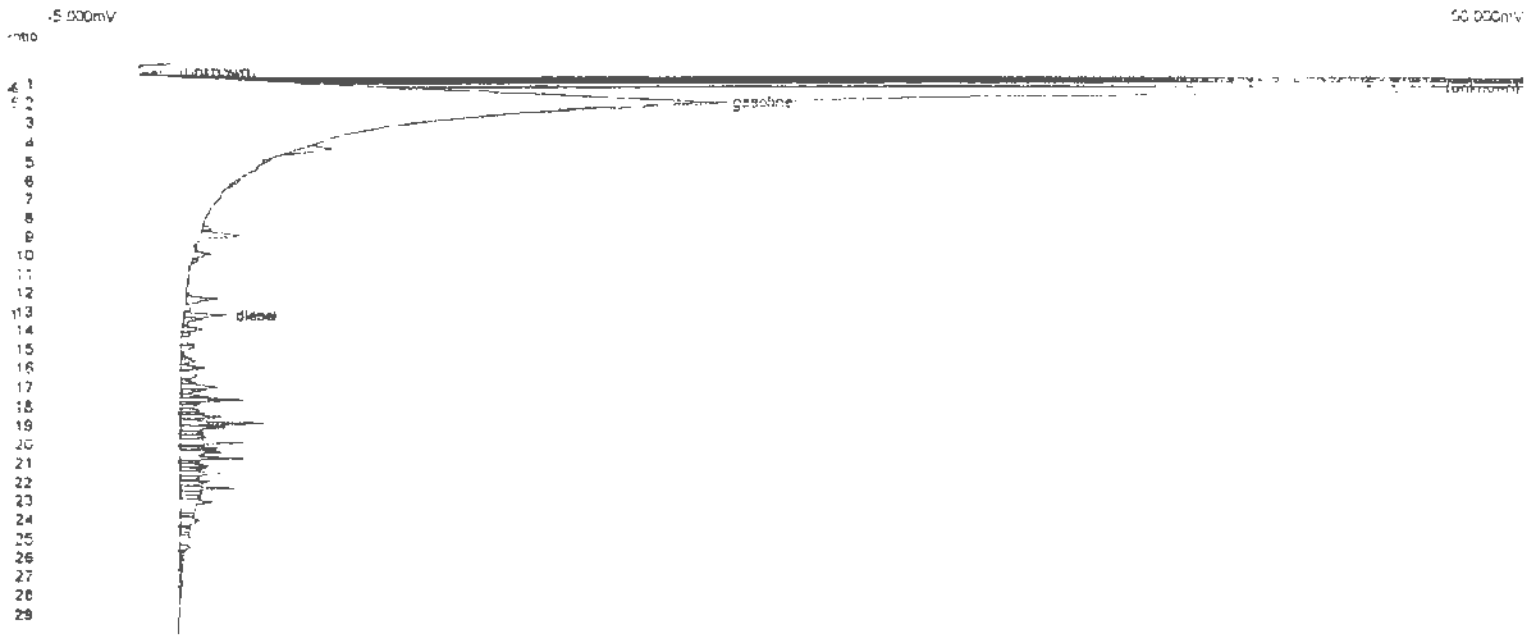
Component	Retention	Area	External	Units
oline	2.833	46.401	45.31	
el	10.033	260.198	93.73	ppm
		306.600	139.05	

.ab name: On Site Labs Inc
lyses date: 03/12/2002 10:08:45
Method: EPA 8015B mod.
Lab ID GC - 5
escription: FID 3 - Ch. 3
Column: XTI-5, 30m, 0.53mm, 1.5um
C N2
D 0312fc1.CHR ()
Sa e 100/200 ppm G/D open
Operator MAP



C ent	Retention	Area	External	Units
asoline	1.716	131.436	90.77	
esel	13.883	590.769	199.85	ppm
		722.205	290.62	

Lab name On Site Labs Inc
alysis date 03/12/2002 10:48.47
Method EPA 8015B mod.
Lab ID GC - 5
Description FID 4 - Ch. 4
Column XTI-5, 30m, 0.53mm, 1.5um
Carrier N2
Data file 0312fd2.CHR ()
Sample 100/200 ppm G/D open
Operator MAP

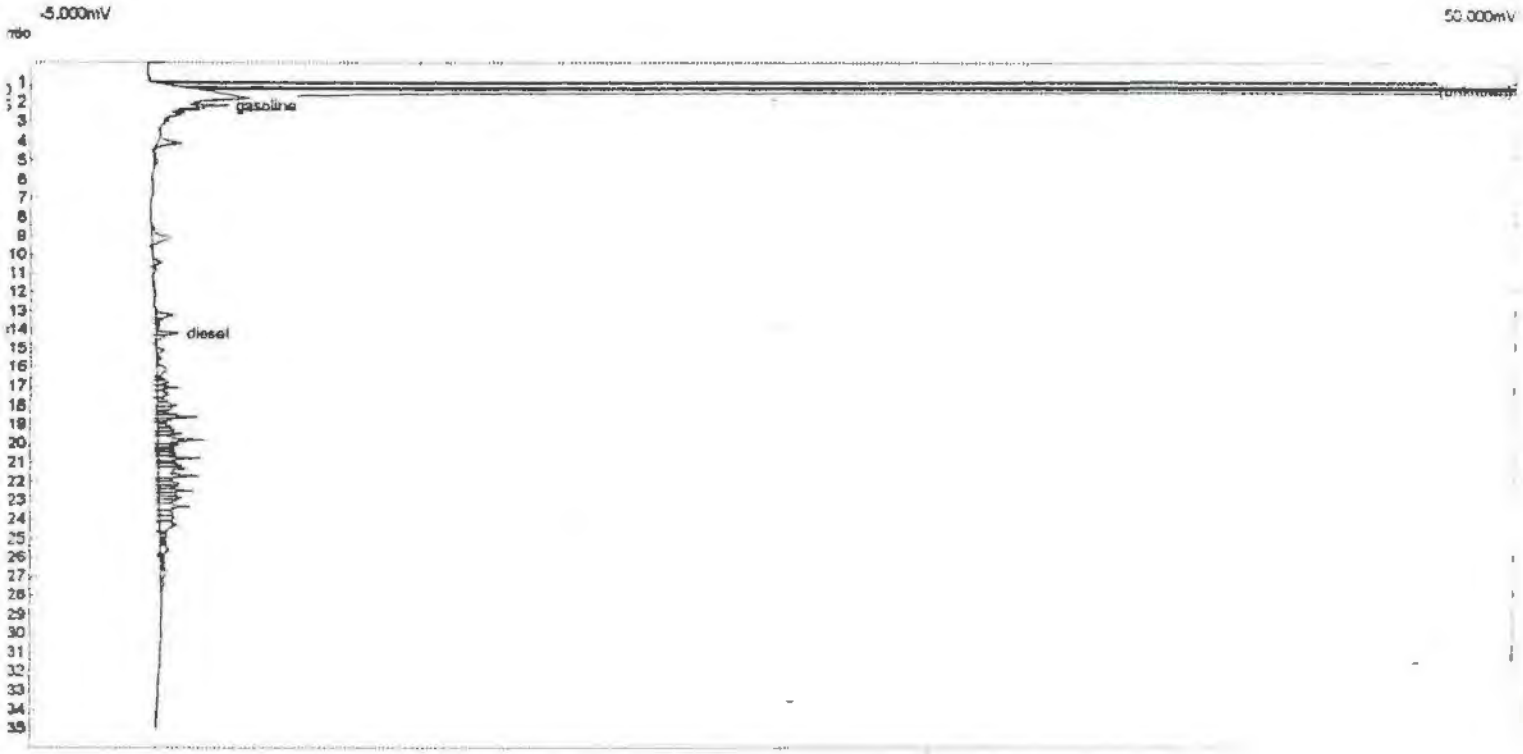


Component	Retention	Area	External	Units
soline	1.916	116.589	95.25	
sel	13.116	508.650	209.84	ppm
		625.239	305.09	

Lab name: On Site Labs Inc
alysis date: 03/12/2002 18:39.55
Method: EPA 8015B mod
Lab ID: GC - 5
Description: FID2 - Ch. 2
Column: XTI-5, 30m, 0.53mm, 1.5um
r: N2
e: 0312fb16.CHR ()
ple: 50/100 ppm G/D CLOSE
Operator: MAP

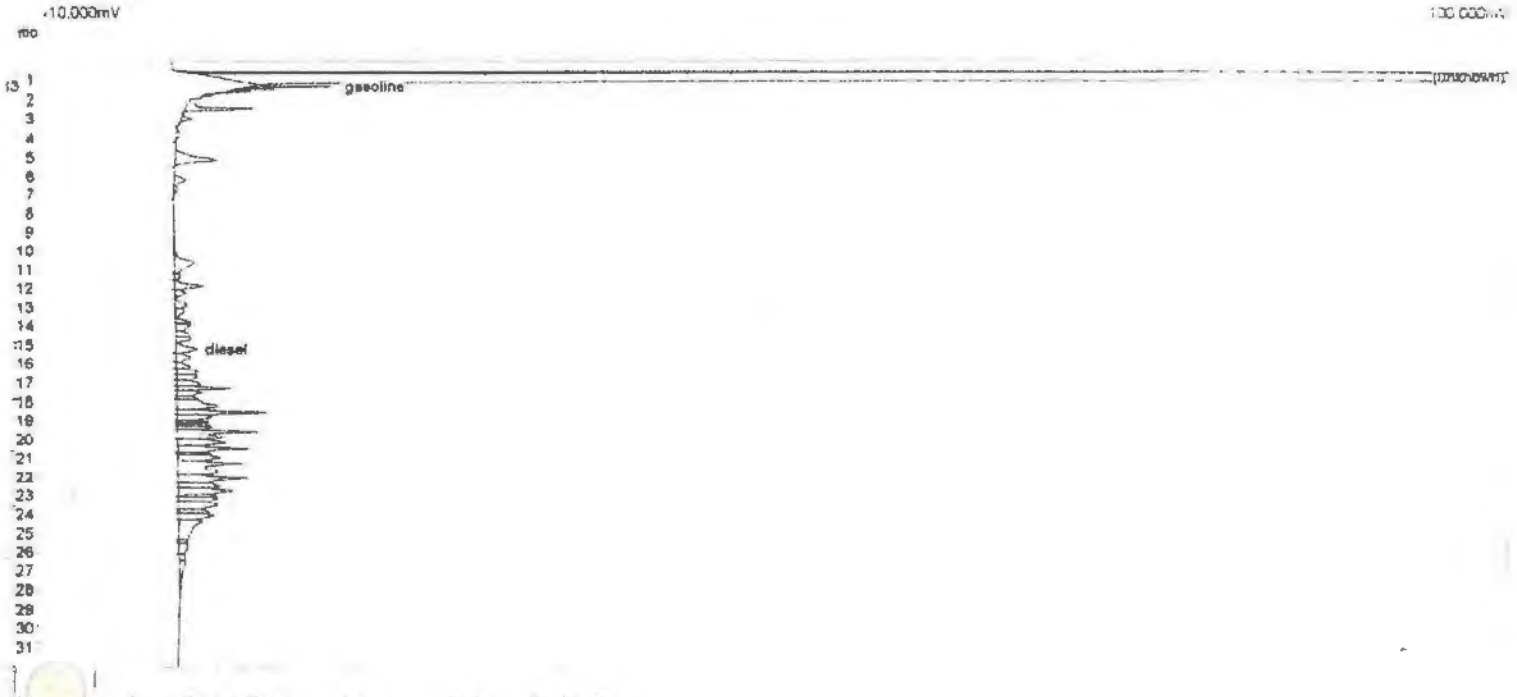
Component	Retention	Area	External	Units
soline	2.166	48.162	47.03	
esel	14.183	276.055	99.44	ppm
		324.217	146.48	

Lab name: On Site Labs Inc
alysis date: 03/12/2002 18:39:55
Method: EPA 8015B mod.
Lab ID: GC - 5
Description: FID2 - Ch. 2
Column: XTI-5, 30m, 0.53mm, 1.5um
Carrier: N2
Data file: 0312fb18.CHR ()
Sample: 50/100 ppm G/D CLOSE
Operator: MAP



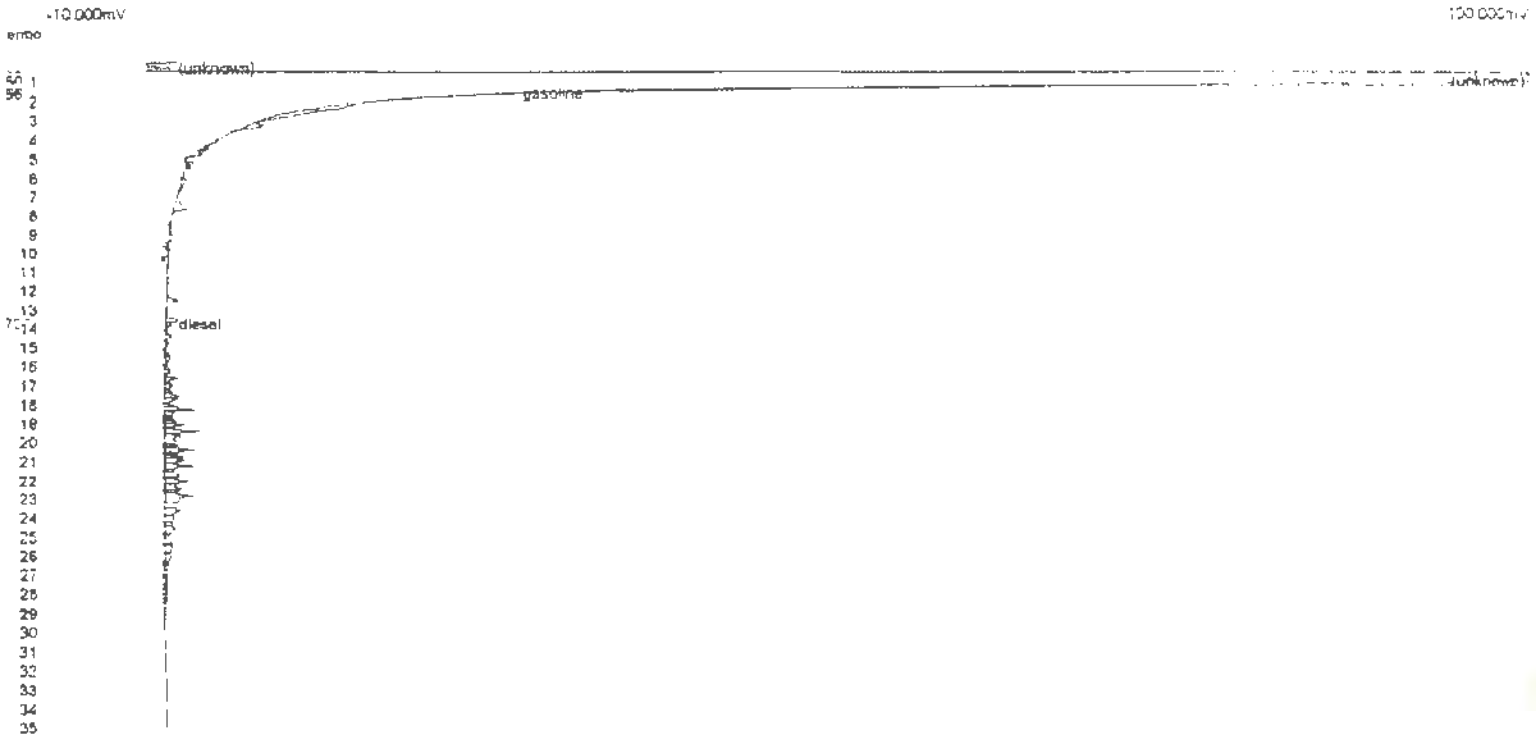
Component	Retention	Area	External	Units
oline	2.166	48.162	47.03	
sel	14.183	276.055	99.44	ppm
		324.217	146.48	

Lab name: On Site Labs Inc
alysis date: 03/12/2002 16:39:55
Method: EPA 8015B mod.
Lab ID: GC - 5
Description: FID 3 - Ch. 3
Column: XTI-5, 30m, 0.53mm, 1.5um
r: N2
le: 0312fc16.CHR ()
Sample: 200/400 ppm G/D CLOSE
Operator: MAP



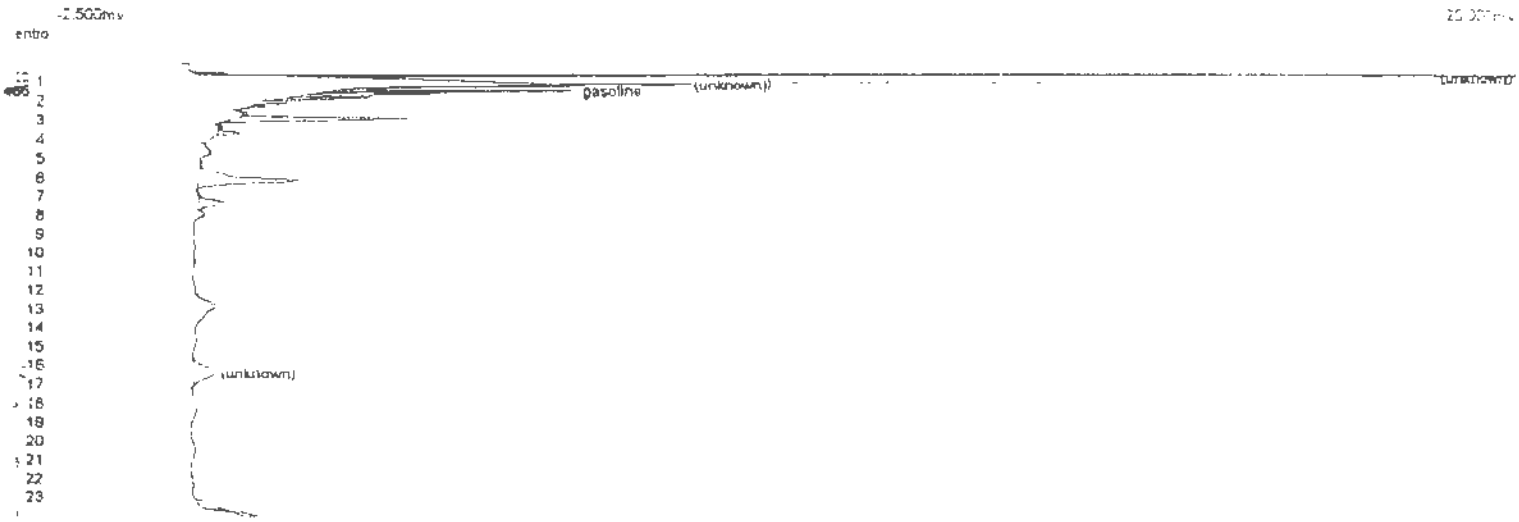
nent	Retention	Area	External	Units
asoline	1.283	264.803	182.87	
sel	15.150	1322.143	447.27	ppm
		1586.946	630.15	

Lab name On Site Labs Inc
nalysis date. 03/12/2002 18:39:55
Method EPA 8015B mod.
Lab ID: GC - 5
Description: FID 4 - Ch. 4
Column: XTI-5, 30m, 0.53mm, 1.5um
Carrier: N2
Data file: 0312fd16.CHR ()
Sample: 100/200 ppm G/D CLOSE
Operator: MAP



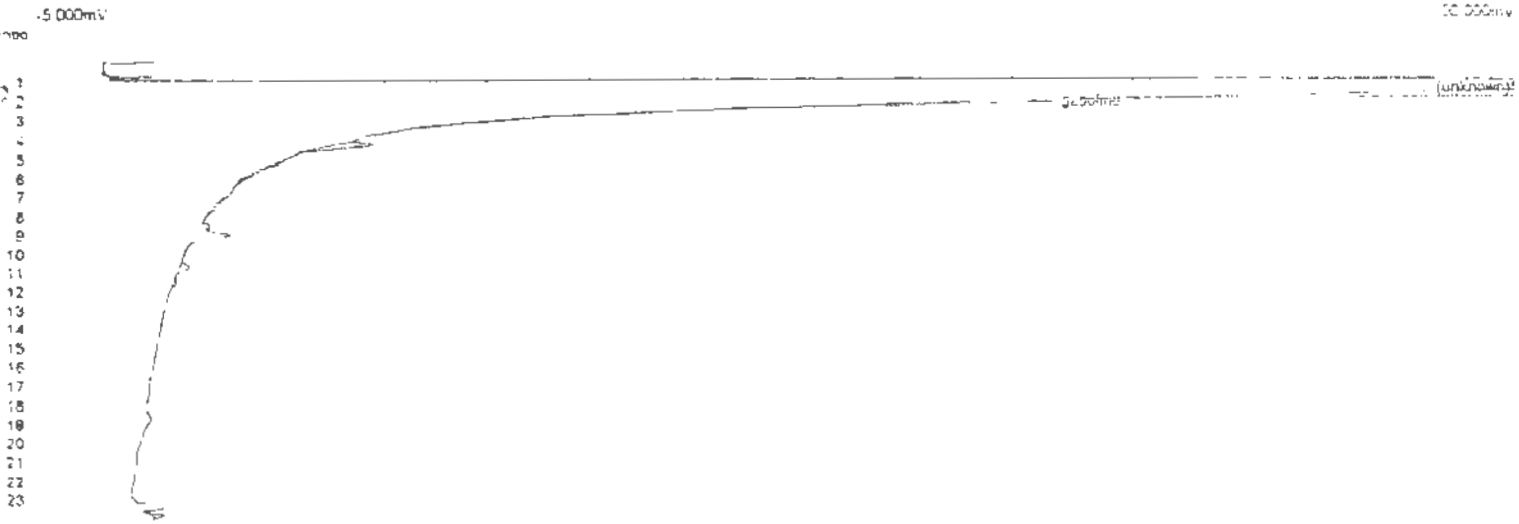
Component	Retention	Area	External	Units
isoline	1.566	116.221	94.95	
esel	13.733	536.627	221.38	ppm
		652.848	316.33	

Lab name: On Site Labs Inc
nalysis date: 03/12/2002 18:13:18
Method: EPA 8015B mod.
Lab ID: GC - 5
Description: FID 3 - Ch. 3
Column: XTI-5, 30m, 0.53mm, 1.5um
rier: N2
file: 0312fc12.CHR ()
Sample: CA-S-80matrx spike
Operator: MAP



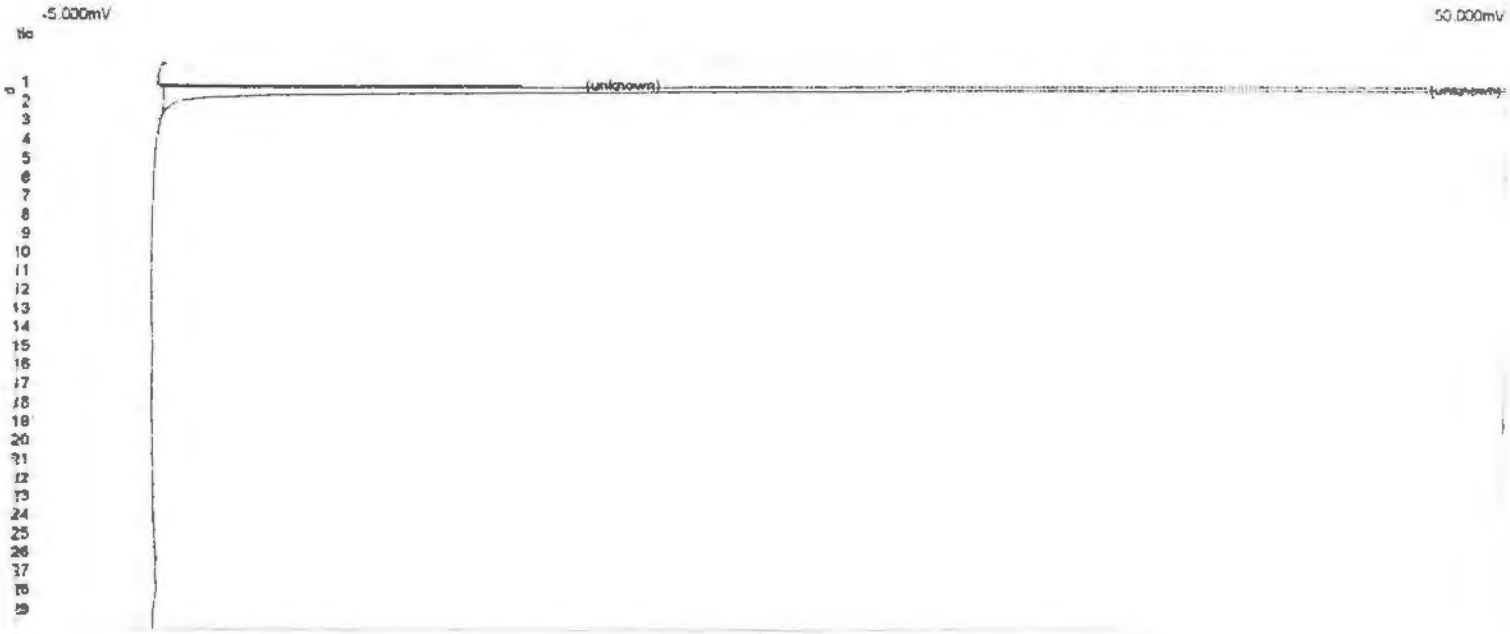
Component	Retention	Area	External	Units
soline	1.466	141,900	98.00	
		141,900	98.00	

Lab name On Site Labs Inc
alysis date. 03/12/2002 16:13:16
Method: EPA 8015B mod
Lab ID: GC - 5
Description FID 4 - Ch. 4
Column: XTI-5, 30m, 0.53mm, 1.5um
Carrier: N2
Data file: 0312fd12.CHR ()
Sample: CA-S-80matrix spike dupl
Operator: MAP



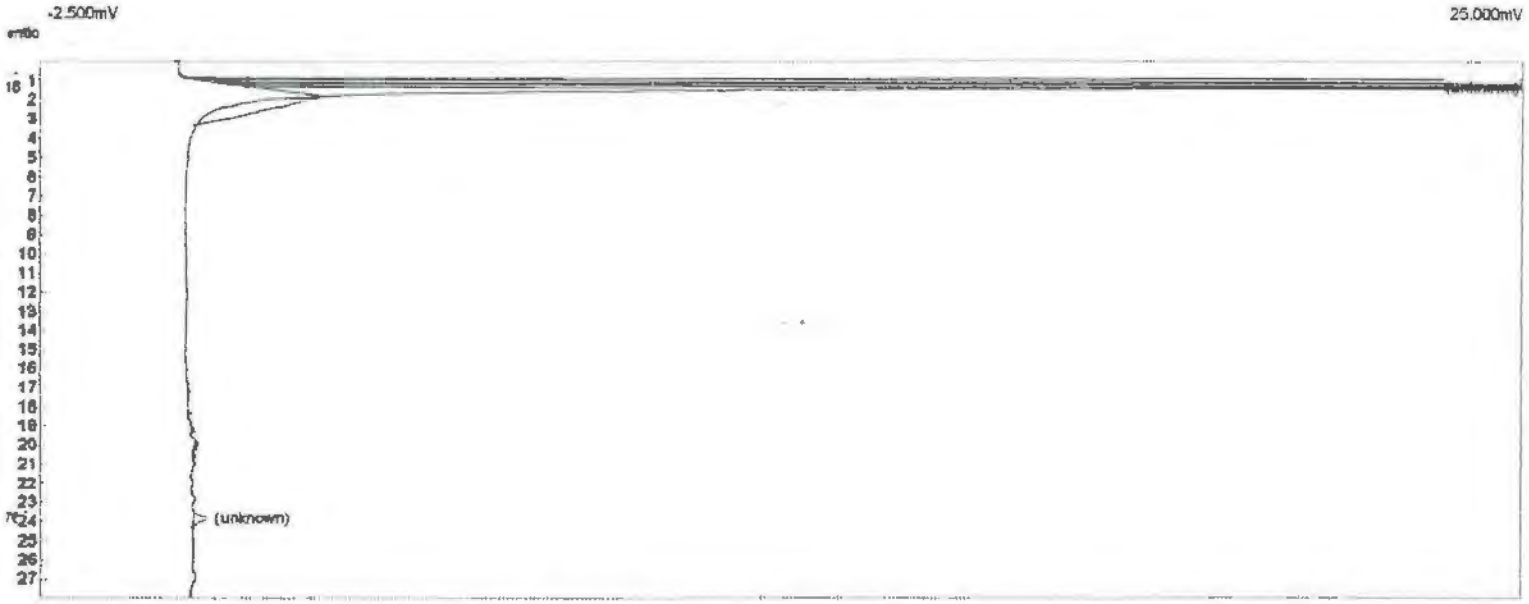
Component	Retention	Area	External	Units
oline	2.066	117.382	95.90	
		117.382	95.90	

Lab name: On Site Labs Inc
Analysis date: 03/12/2002 12:29:19
Method: EPA 8015B mod.
Lab ID: GC - 5
Description: FID2 - Ch. 2
Column: XTI-5, 30m, 0.53mm, 1.5um
[illegible]r: N2
D[illegible]e: 0312fb4.CHR ()
Sample: METHOD BLANK
Operator: MAP



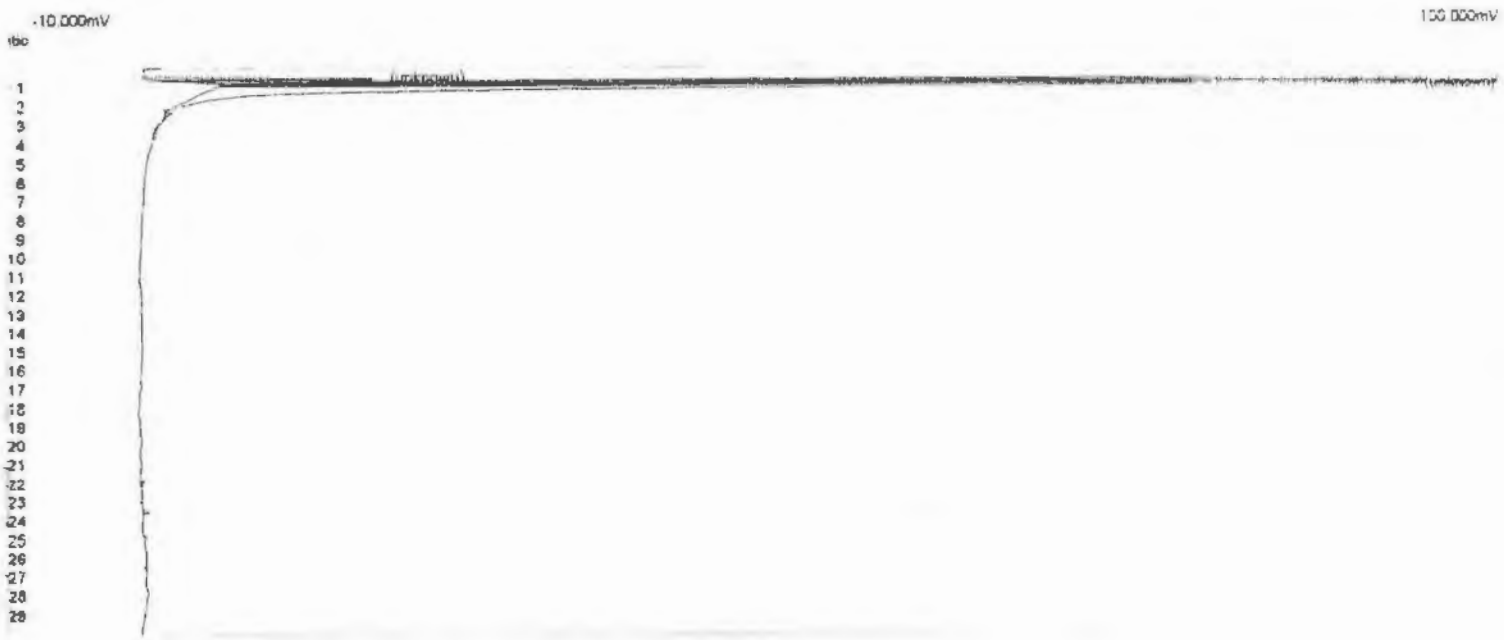
Component	Retention	Area	External	Units
		0.000	0.00	

Lab name: On Site Labs Inc
Analysis date: 03/12/2002 17:06:30
Method: EPA 8015B mod.
Lab ID: GC - 5
Description: FID 3 - Ch. 3
Column: XTI-5, 30m, 0.53mm, 1.5um
Carrier: N2
Data file: 0312fc13.CHR ()
Sample: METHOD BLANK
Operator: MAP



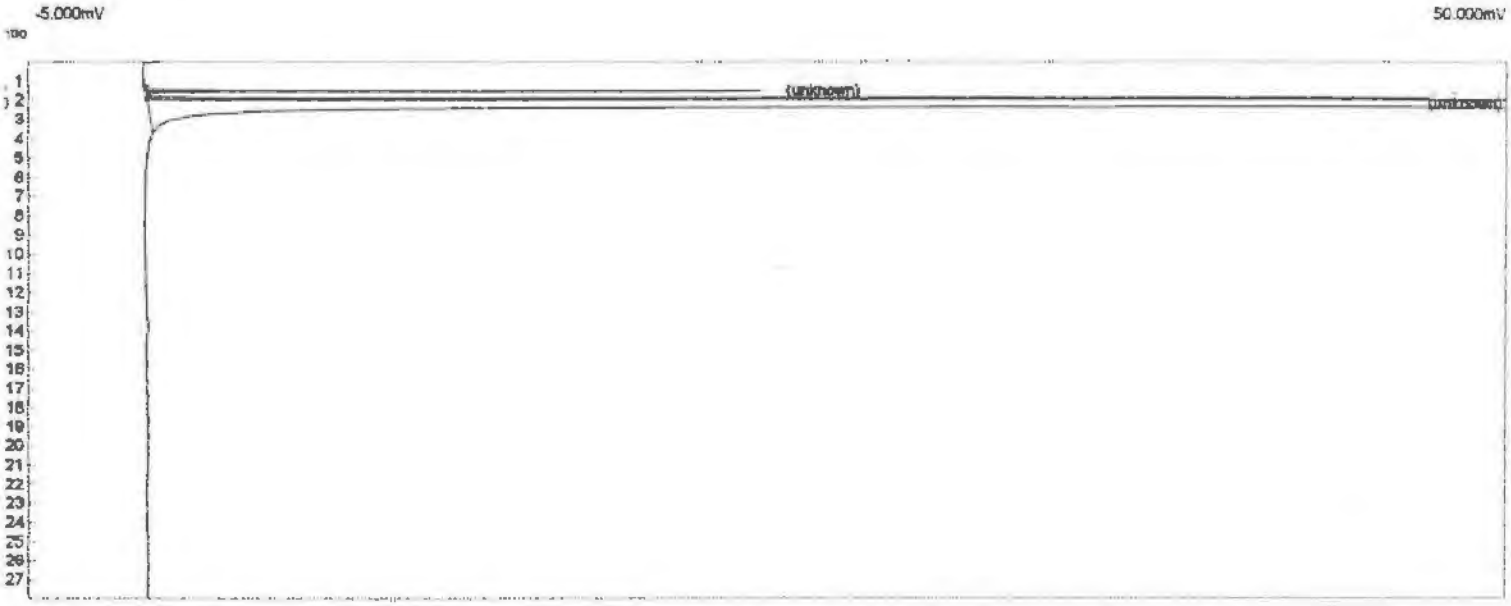
Component	Retention	Area	External	Units
		0.000	0.00	

Lab name: On Site Labs Inc
alysis date: 03/12/2002 12:29:19
Method: EPA 8015B mod.
Lab ID: GC - 5
Description: FID 4 - Ch. 4
Column: XTI-5, 30m, 0.53mm, 1.5um
C]: N2
D s: 0312fd4.CHR ()
Sample: METHOD BLANK
Operator: MAP



Com nent	Retention	Area	External	Units
		0.000	0.00	

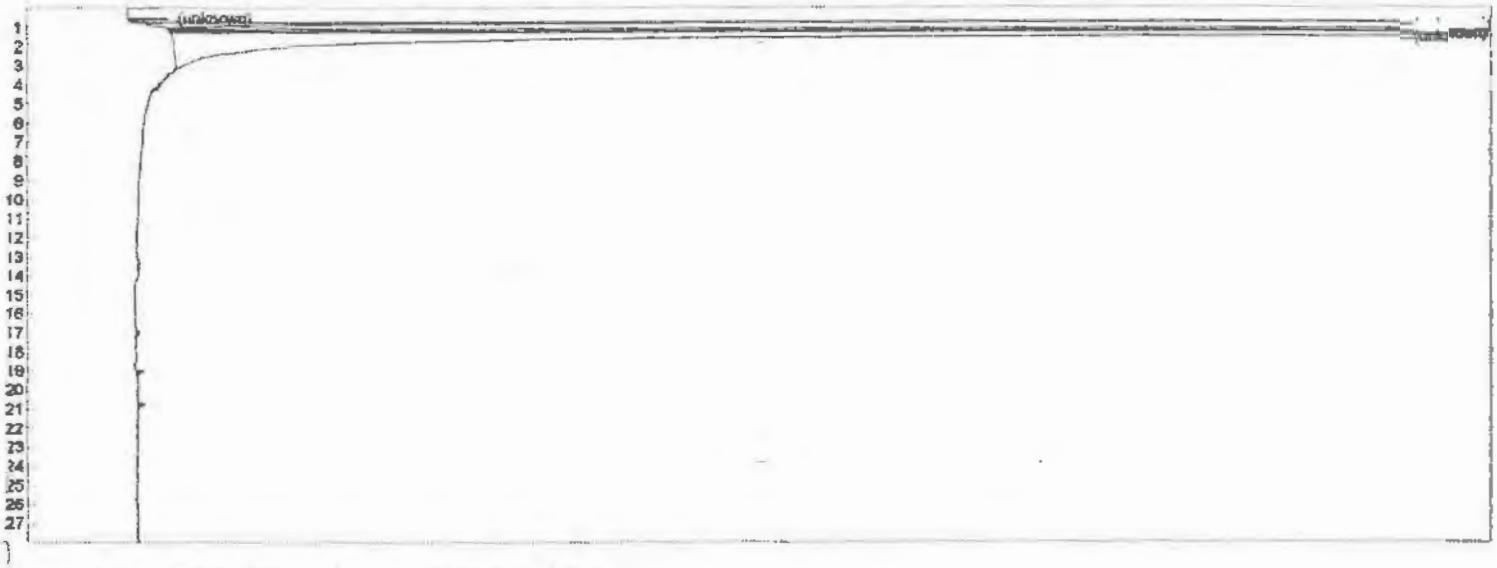
Lab name: On Site Labs Inc
alysis date: 03/12/2002 17:06:30
Method: EPA 8015B mod.
Lab ID: GC - 5
Description: FID2 - Ch. 2
Column: XTI-5, 30m, 0.53mm, 1.5um
Carrier: N2
Data file: 0312fb13.CHR ()
Sample: JLA020/0311CH2M
Operator: MAP



Component	Retention	Area	External	Units
		0.000	0.00	

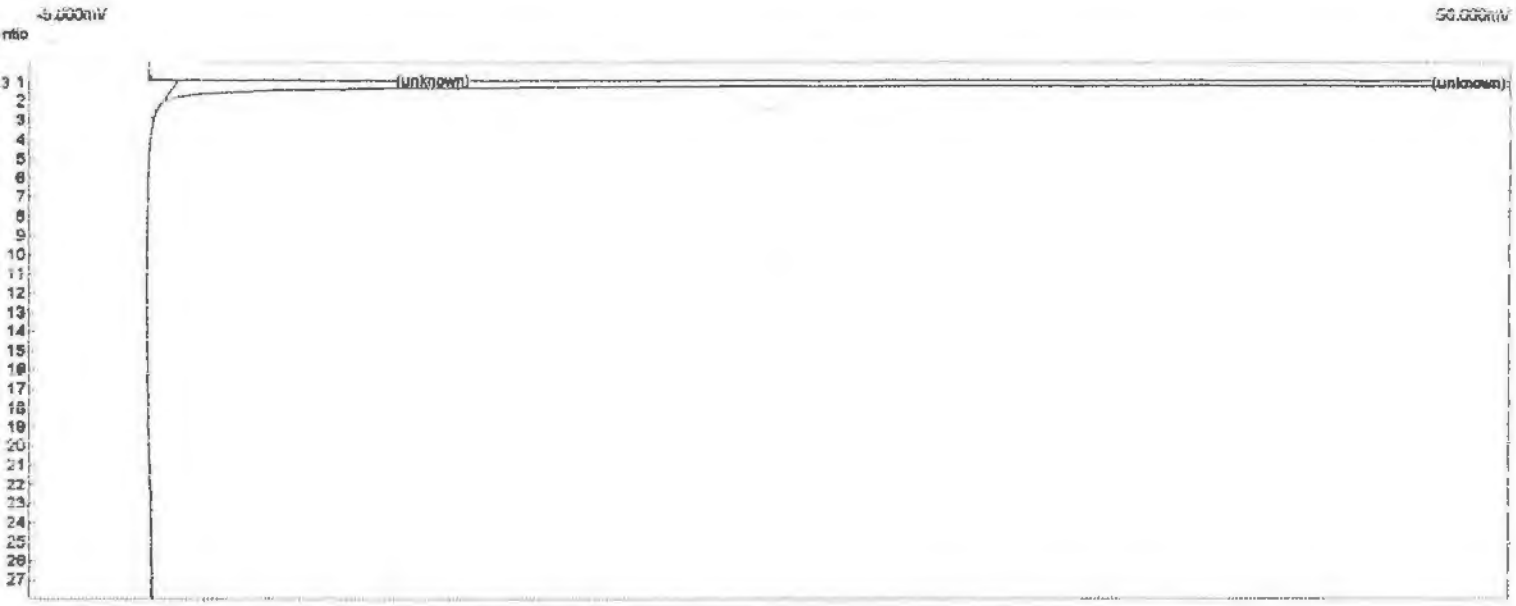
.ab name: On Site Labs Inc
lysis date: 03/12/2002 17:06:30
Method: EPA 8015B mod.
Lab ID: GC - 5
escription: FID 4 - Ch. 4
Column: XTI-5, 30m, 0.53mm, 1.5um
Carrier: N2
D: 0312fd13.CHR ()
S: JLA021/0311CH2M
Operator: MAP

-10.000mV 100.000mV



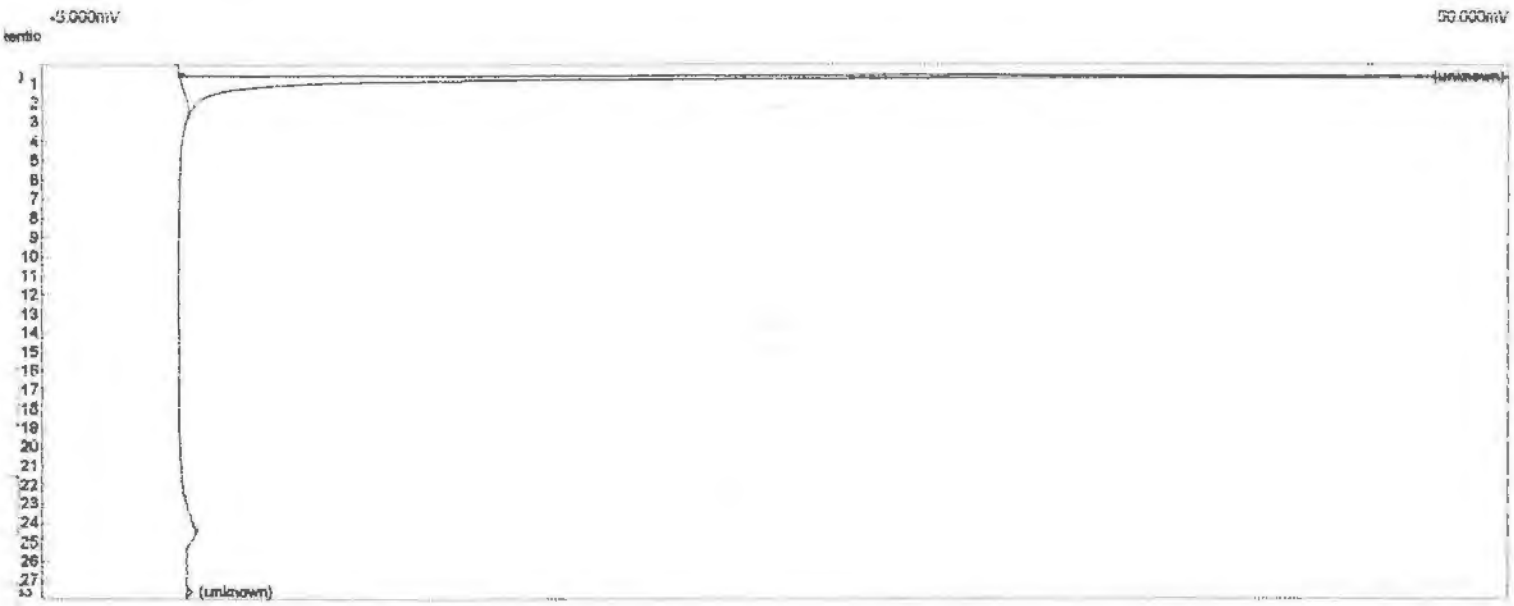
Component	Retention	Area	External	Units
		0.000	0.00	

Lab name: On Site Labs Inc
alysis date: 03/12/2002 17:36:44
Method: EPA 8015B mod.
Lab ID: GC - 5
Description: FID2 - Ch. 2
Column: XTI-5, 30m, 0.53mm, 1.5um
Carrier: N2
Data file: 0312fb14.CHR ()
Sample: JLA022/0311CH2M
Operator: MAP



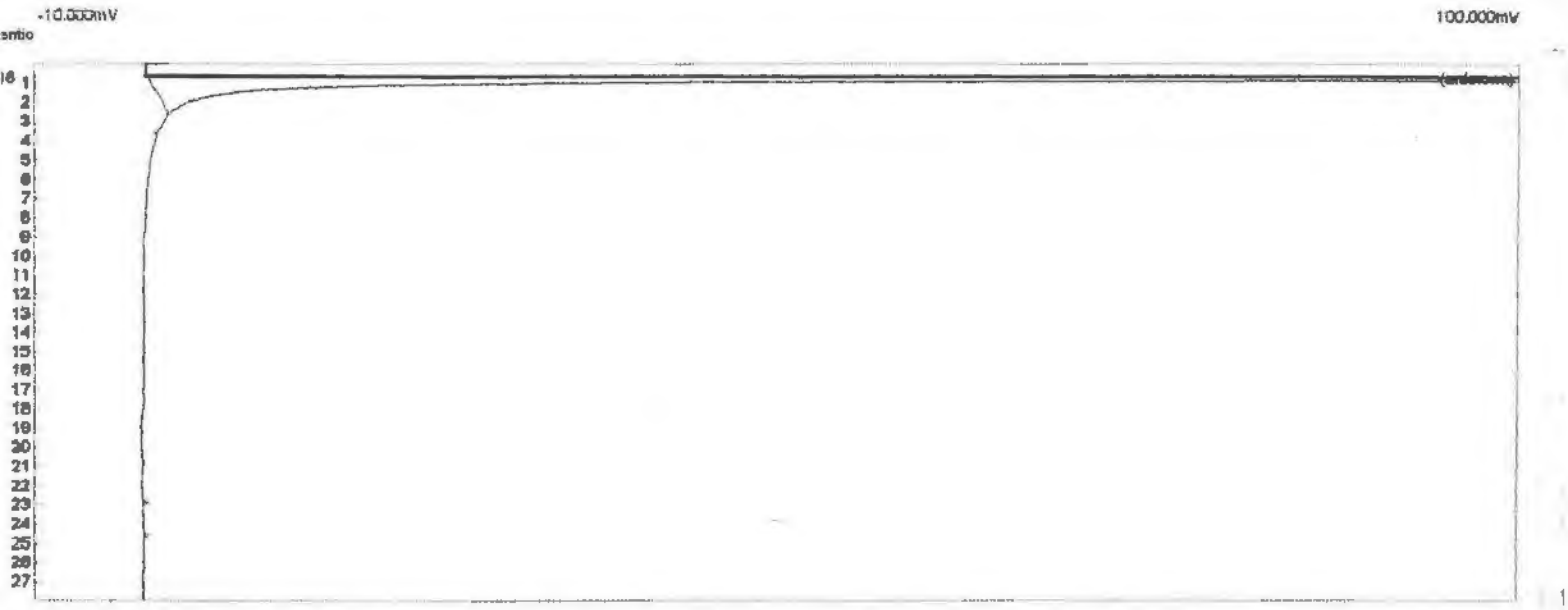
Component	Retention	Area	External	Units
		0.000	0.00	

Lab name: On Site Labs Inc
alysis date: 03/12/2002 17:36:44
Method: EPA 8015B mod.
Lab ID: GC - 5
Description: FID 3 - Ch. 3
Column: XTI-5, 30m, 0.53mm, 1.5um
C ier: N2
le: 0312fc14.CHR ()
ple: JLA023/0311CH2M
Operator: MAP



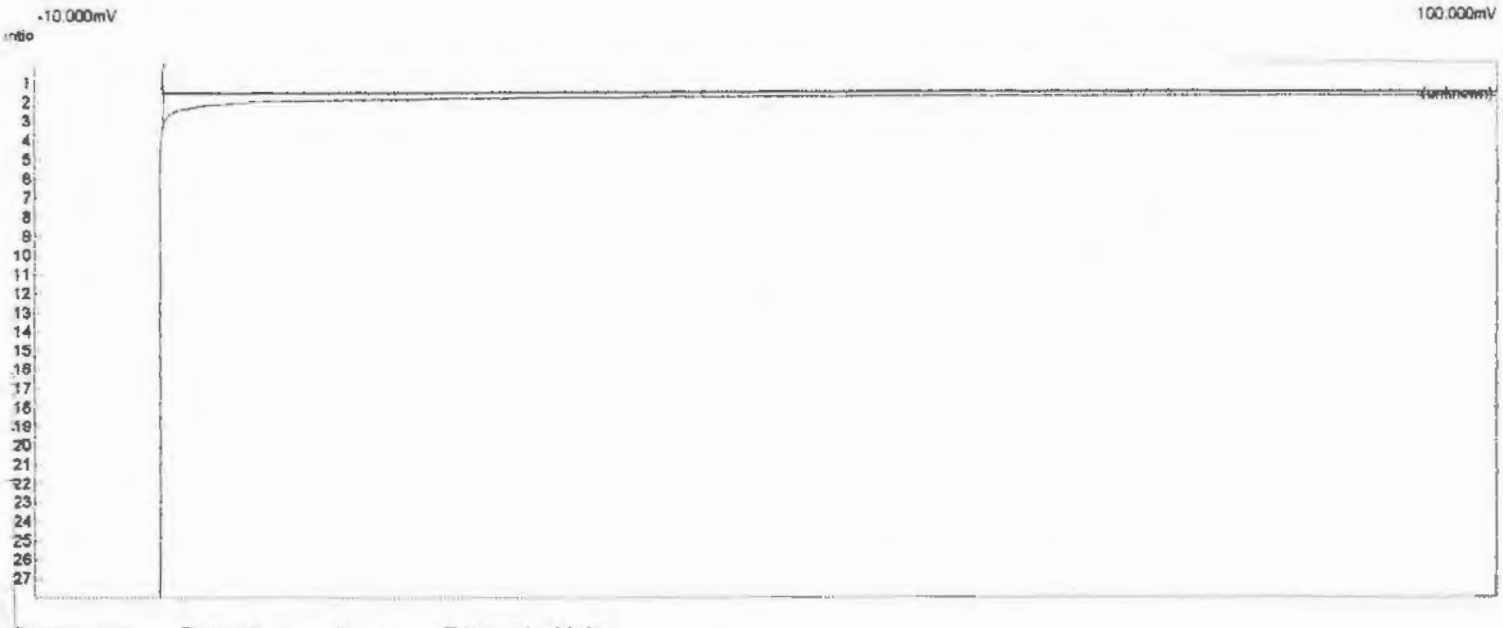
Component	Retention	Area	External	Units
		0.000	0.00	

Lab name: On Site Labs Inc
nalysis date: 03/12/2002 17:36:44
Method: EPA 8015B mod.
Lab ID: GC - 5
Description: FID 4 - Ch. 4
Column: XTI-5, 30m, 0.53mm, 1.5um
Carrier: N2
Data file: 0312fd14.CHR ()
Sample: JLA026FD3/0311CH2M
Operator: MAP



Component	Retention	Area	External	Units
		0.000	0.00	

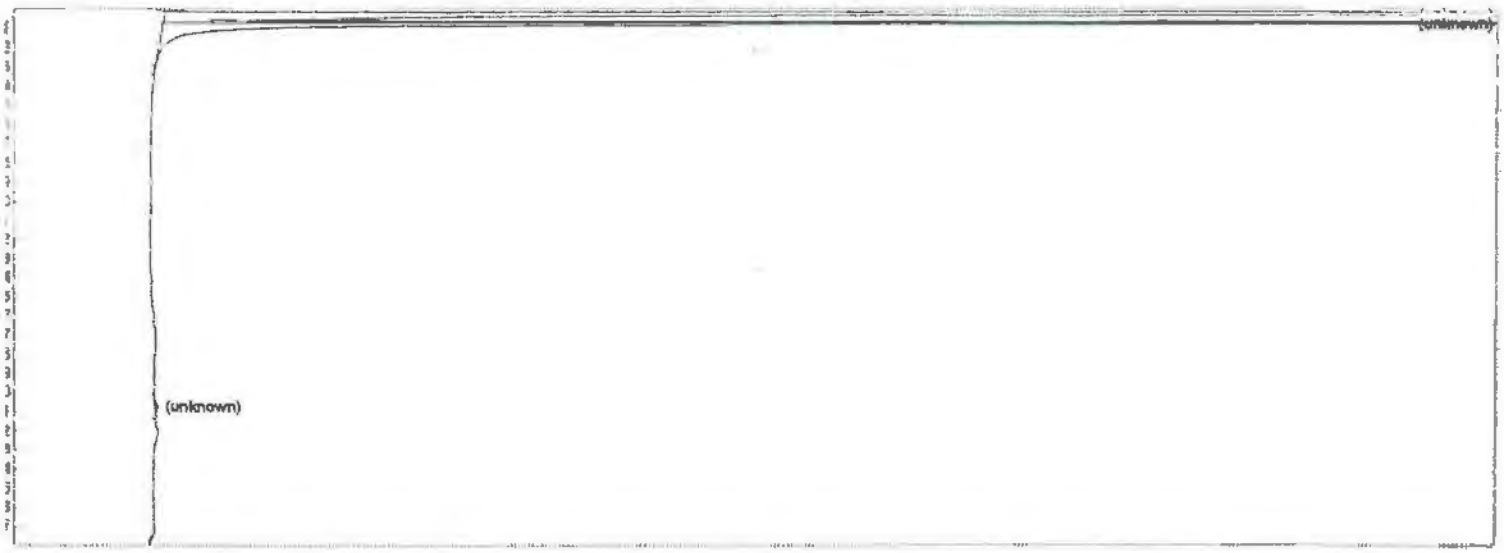
Lab name: On Site Labs inc
lysis date: 03/12/2002 16:09:42
Method: EPA 8015B mod.
Lab ID: GC - 5
Description: FID2 - Ch. 2
Column: XTI-5, 30m, 0.53mm, 1.5um
Carrier: N2
F[illegible]: 0312fb15.CHR 0
[illegible]e: ILA017/0311CH2M
Operator: MAP



Component	Retention	Area	External	Units
		0.000	0.00	

ab name: On Site Labs Inc
ysis date: 03/12/2002 18:09:42
Method: EPA 8015B mod.
Lab ID: GC - 5
escription: FID 3 - Ch. 3
Column: XTI-5, 30m, 0.53mm, 1.5um
Carrier: N2
Data file: 0312fc15.CHR ()
Sample: ILA018/0311CH2iM
Operator: MAP

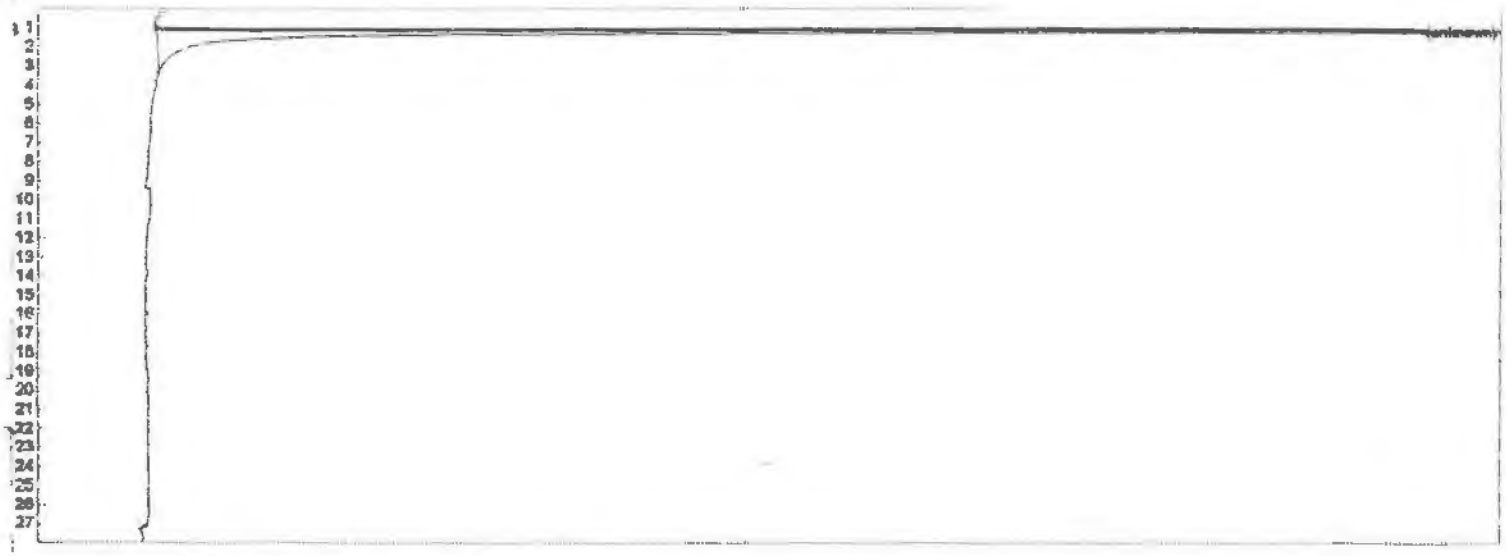
-10.000mV 100.000mV



omponent	Retention	Area	External	Units
		0.000	0.00	

Lab name: On Site Labs Inc
alysis date: 03/12/2002 18:09:42
Method: EPA 8015B mod.
Lab ID: GC - 5
Description: FID 4 - Ch. 4
Column: XTI-5, 30m, 0.53mm, 1.5um
Carrier: N2
D[illegible]e: 0312fd15.CHR ()
[illegible]e: ILA019/0311CH2M
Operator: MAP

-10.000mV 100.000mV



Component	Retention	Area	External	Units
		0.000	0.00	

QA/QC REPORT - CALIBRATION DATA

OSL Project #02I0311CH2M
DAILY CALIBRATION DATE: 03/18/02

CH2M HILL PROJECT NO. 167722.FI.FS
PROJECT NAME: RRNAS SITES 88, 1970 AND 2036

			INITIAL			OPENING			CLOSING	
COMPOUND	DETECTOR	CALIB RANGE	RF	%RSD	AREA	RF	%DIFF	AREA	RF	%DIFF
TPH GASOLINE	FID #2 (gc5)	10 - 30,000	0.26	17.6%	210.68	0.26	2.9%	210.39	0.26	2.7%
TPH GASOLINE	FID #3 (gc5)	10 - 30,000	0.36	15.0%	63.33	0.32	12.5%	138.73	0.35	4.2%
TPH GASOLINE	FID #4 (gc5)	10 - 30,000	0.31	15.4%	260.33	0.33	6.3%	258.56	0.32	5.6%
TPH DIESEL	FID #2 (gc5)	25 - 20,000	0.69	14.1%	1040.89	0.65	6.3%	1218.97	0.76	9.8%
TPH DIESEL	FID #3 (gc5)	25 - 20,000	0.74	13.6%	327.45	0.82	10.8%	614.26	0.77	3.9%
TPH DIESEL	FID #4 (gc5)	25 - 20,000	0.61	11.1%	1067.23	0.67	10.1%	1051.81	0.66	8.5%

CALIB RANGE - RANGE OF CALIBRATION CURVE IN ppm
INITIAL RF - AVERAGE RESPONSE FACTOR FROM MULTIPOINT CALIBRATION CURVE
% RSD - LINEARITY OF MULTIPOINT CALIBRATION CURVE (+/- 20% ACCEPTABLE LIMITS)
AREA - AREA COUNTS FROM DAILY CALIBRATION STANDARD
RF - DETECTOR RESPONSE FACTOR FROM MID-POINT CALIBRATION STANDARD
% DIFF - DIFFERENCE, IN PERCENT, BETWEEN THE AVERAGE RF AND THE OPENING OR CLOSING RF (+/- 15% ACCEPTABLE LIMITS)
OPENING - MID-POINT CALIBRATION STANDARD ANALYZED BEFORE SAMPLE ANALYSES BEGIN
CLOSING - MID-POINT CALIBRATION STANDARD ANALYZED AFTER SAMPLES ANALYSES ARE COMPLETE

ANALYSES PERFORMED BY MARCO A. PEDRAZA
DATA REVIEWED BY KEVIN SHELBURNE

QA/QC REPORT - MS/MSD DATA

MATRIX SPIKE (MS)/MATRIX SPIKE DUPLICATE (MSD)

OSL Project #02I0311CH2M
DATE: 03/18/02

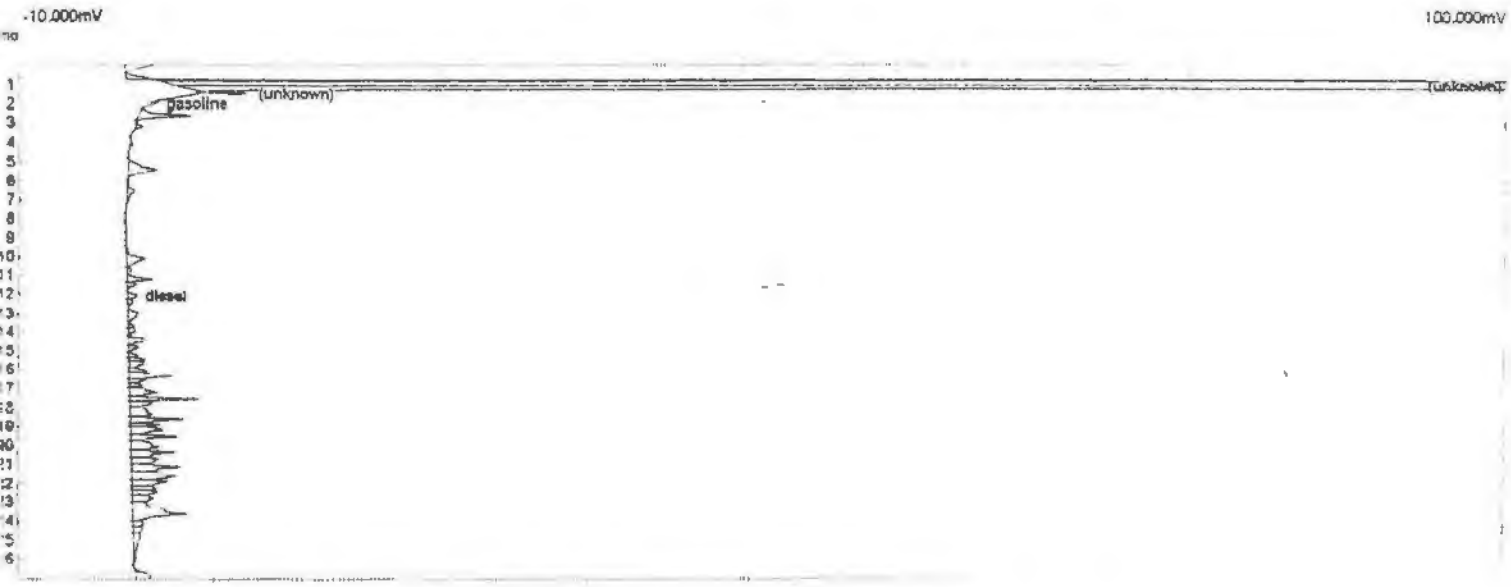
CH2M HILL PROJECT NO. 167722.FI.FS
PROJECT NAME: RRNAS SITES 88, 1970 AND 2036

COMPOUND	SPK CON (ppm)	MS CONC (ppm)	%REC MS	MSD CONC (ppm)	%REC MSD	RPD	ACCEPTABLE RPD	ACCEPTABLE RECOVERY
TPH-GASOLINE	200	194	97%	179	90%	8%	15%	81% - 126%
TPH-DIESEL	400	437	109%	444	111%	2%	15%	74% - 131%

ppm = PARTS PER MILLION
MS CONC - ANALYZED CONCENTRATION OF SPIKED SAMPLE
% REC - PERCENT RECOVERY OF SPIKE FROM MATRIX
RPD - RELATIVE PERCENT DIFFERENCE BETWEEN MATRIX SPIKE AND MATRIX SPIKE DUPLICATE RECOVERIES

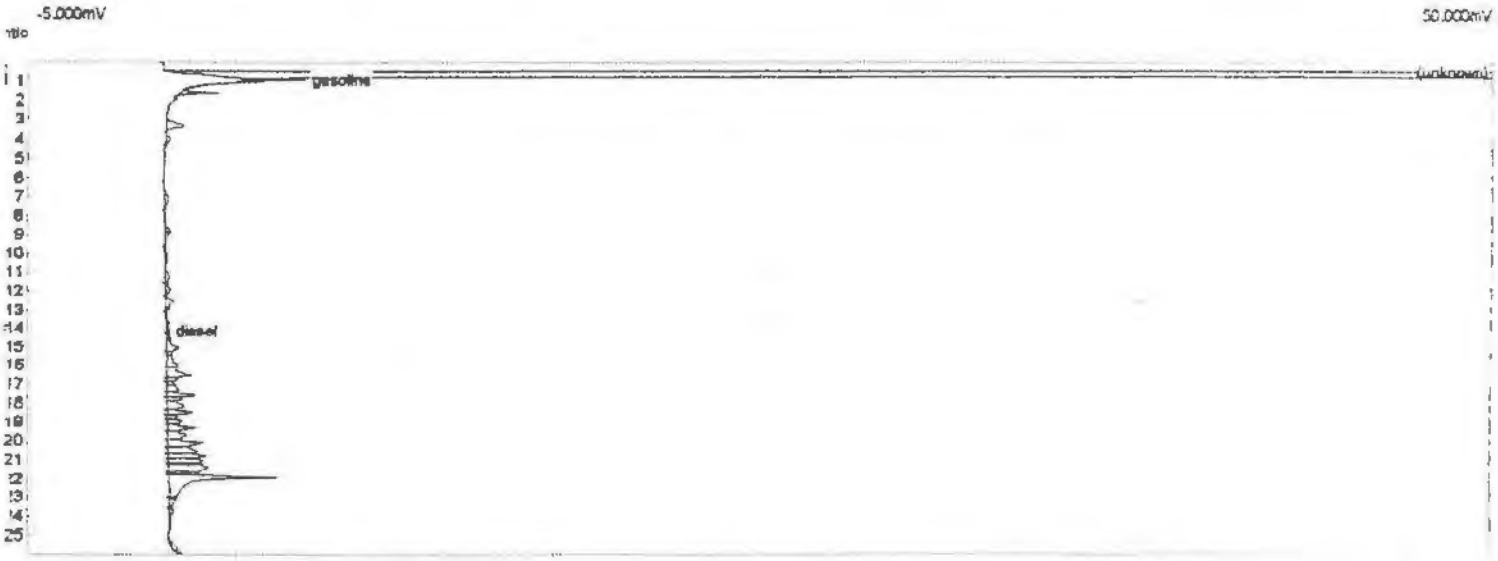
ANALYSES PERFORMED BY MARCO A PEDRAZA
DATA REVIEWED BY KEVIN SHELBURNE

Lab name: On Site Labs Inc
alysis date: 03/18/2002 11:57:03
Method: EPA 8015B mod.
Lab ID: GC - 5
escription: FID2 - Ch. 2
Column: XTI-5, 30m, 0.53mm, 1.5um
Carrier: N2
Data file: 0318fb2.CHR ()
Sample: 200/400 ppm G/D open
Operator: MAP



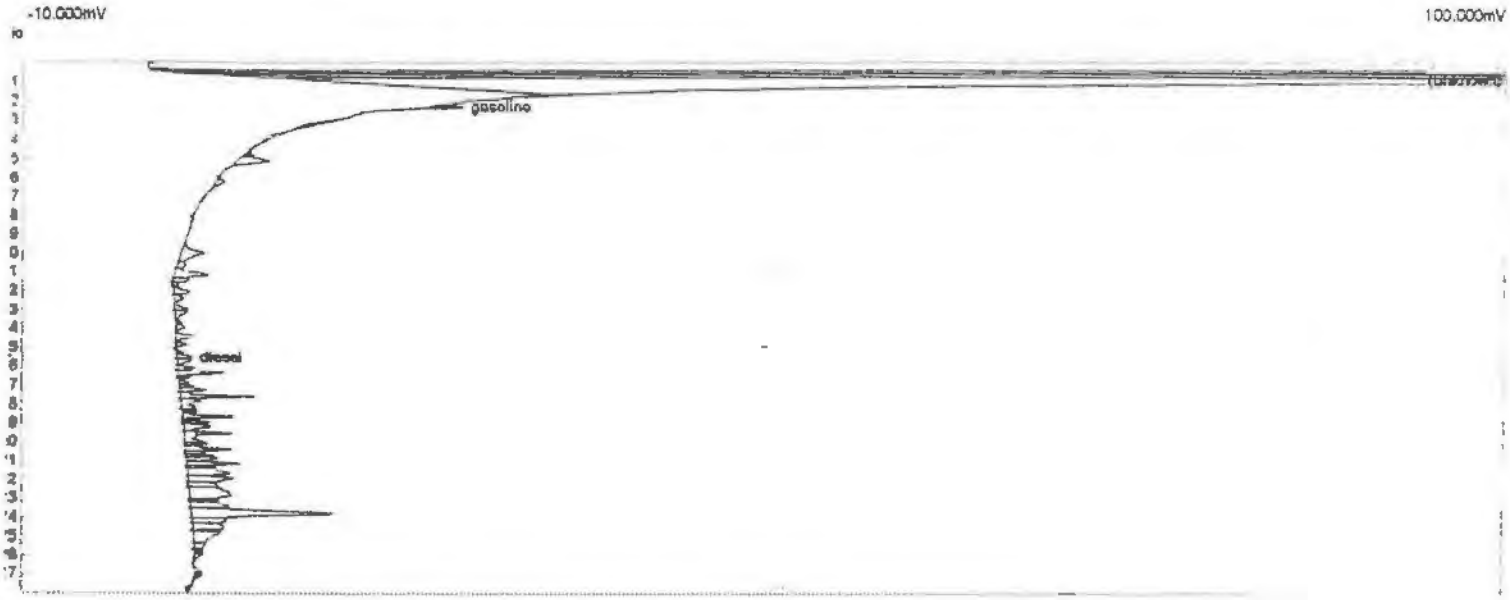
Component	Retention	Area	External	Units
iine	1.966	210.681	205.74	
el	12.066	1040.886	374.96	ppm
		1251.567	580.70	

Lab name: On Site Labs Inc
alysis date: 03/18/2002 11:57:03
Method: EPA 8015B mod.
Lab ID: GC - 5
Description: FID 3 - Ch. 3
Column: XTI-5, 30m, 0.53mm, 1.5um
C r: N2
D s: 0318fc2.CHR ()
Sample: 50/100 ppm G/D open
Operator: MAP



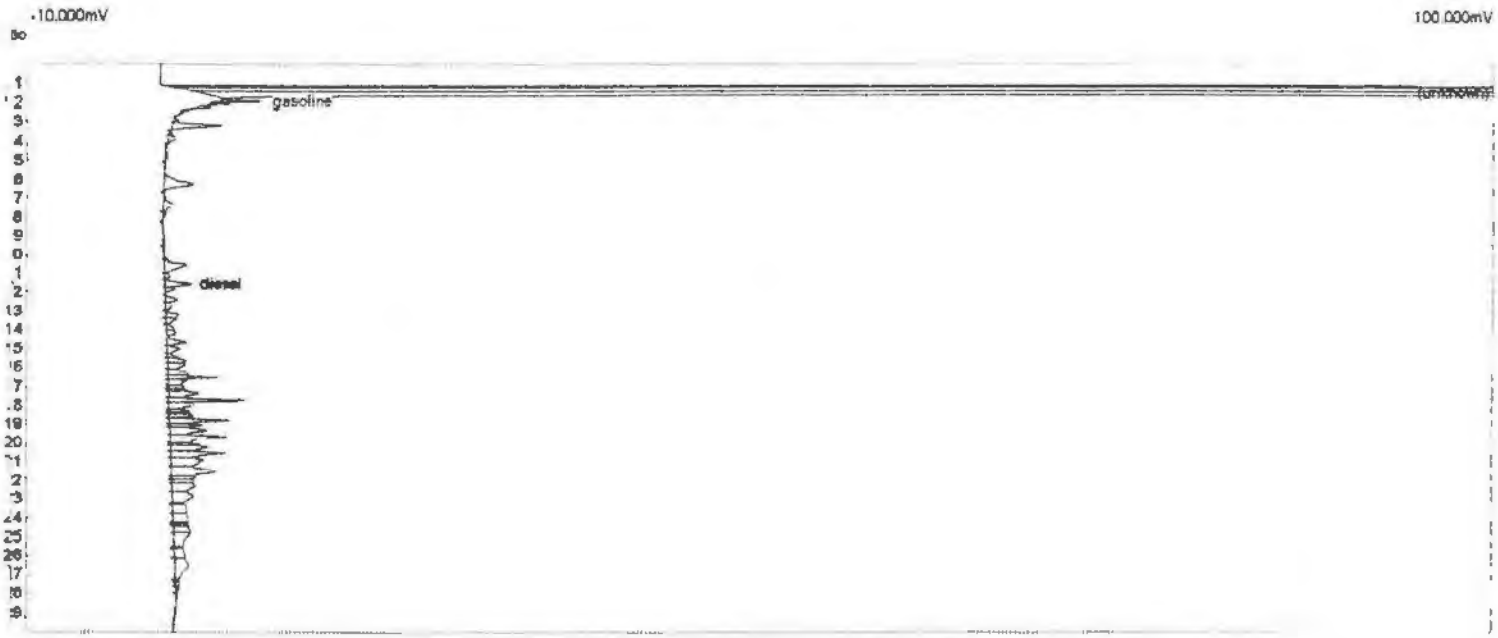
Component	Retention	Area	External	Units
oline	0.883	63.328	43.73	
sel	14.133	327.451	110.78	ppm
		390.779	154.51	

ab name: On Site Labs Inc
lysis date: 03/18/2002 11:57:03
Method: EPA 8015B mod.
Lab ID: GC - 5
escription: FID 4 - Ch. 4
Column: XTI-5, 30m, 0.53mm, 1.5um
Carrier: N2
Data file: 0318FD2.chr ()
Sample: 200/400 G/D OPEN STD
Operator: MAP



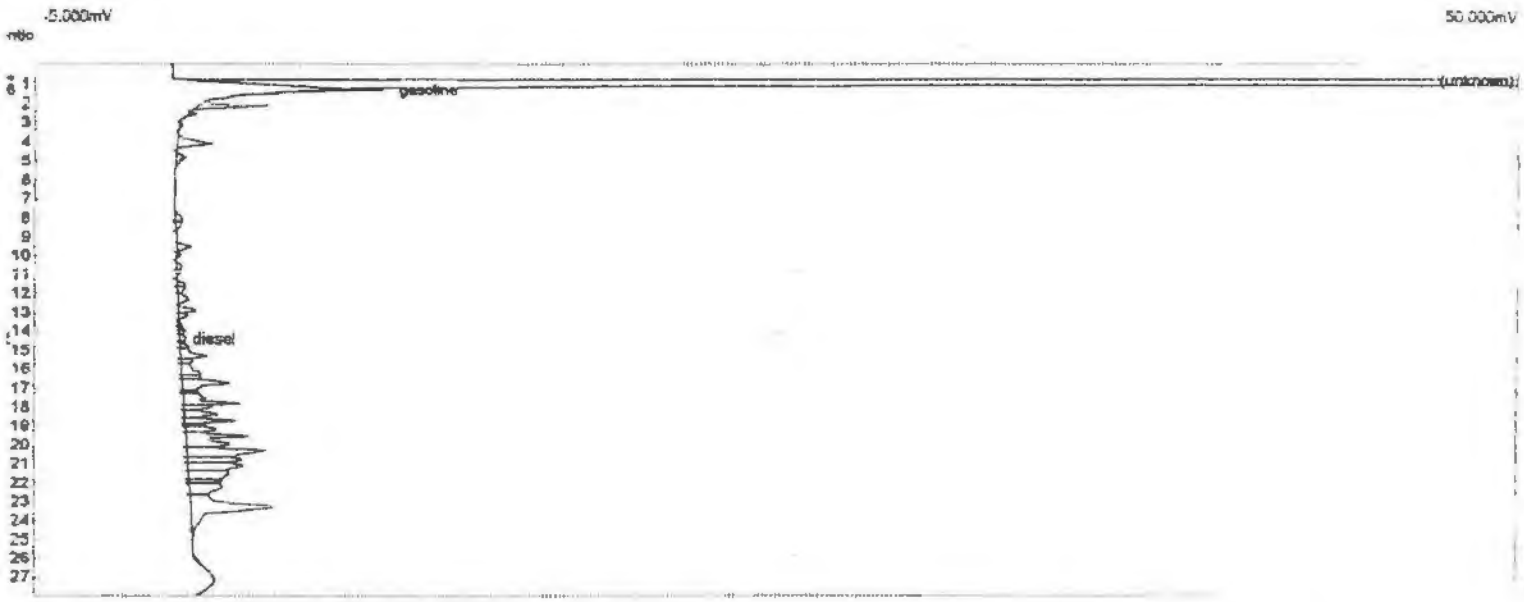
Component	Retention	Area	External	Units
oline	2.250	260.332	212.69	
el	15.483	1067.232	440.28	ppm
		1327.564	652.97	

Lab name: On Site Labs Inc
lysis date: 03/18/2002 18:48:09
Method: EPA 8015B mod.
Lab ID: GC - 5
escription: FID2 - Ch. 2
Column: XTI-5, 30m, 0.53mm, 1.5um
: N2
D e: 0318fb17.CHR ()
Sample: 200/400 ppm G/D close
Operator: MAP



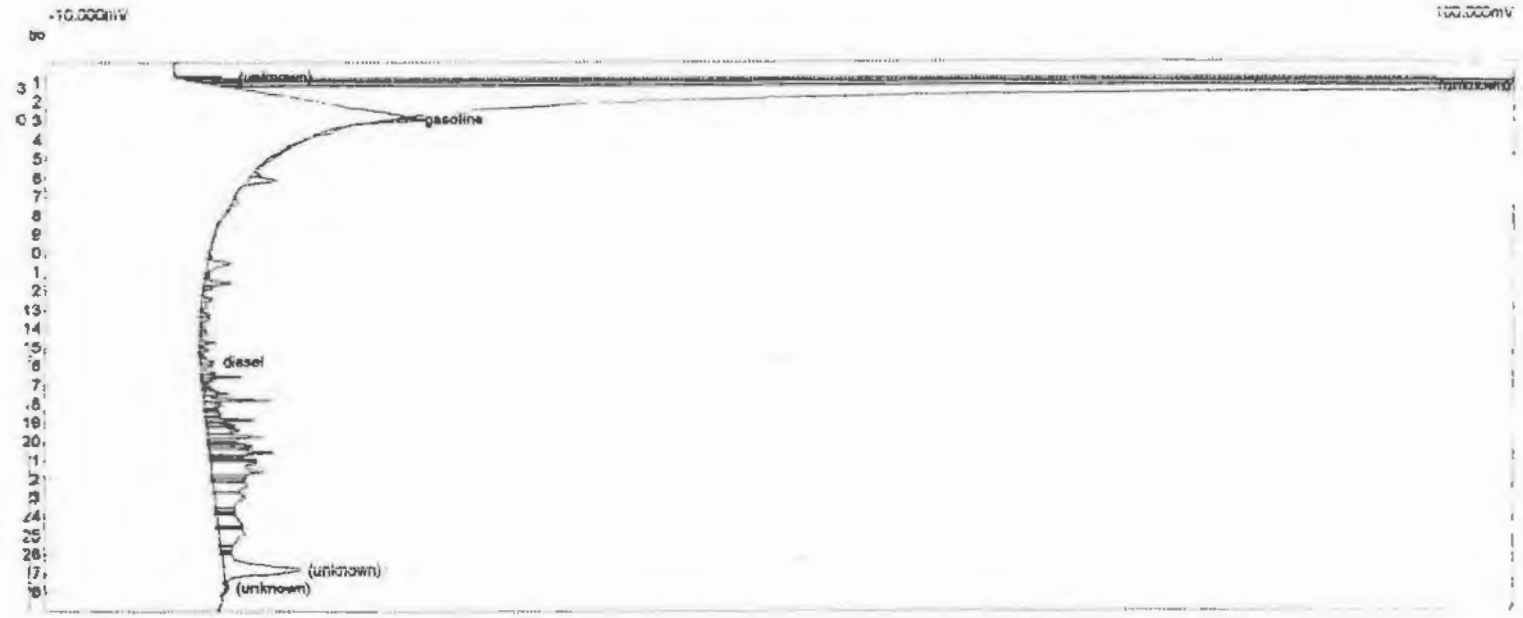
Com ent	Retention	Area	External	Units
oline	1.883	210.391	205.46	
sel	11.516	1218.967	439.11	ppm
		1429.359	644.57	

Lab name: On Site Labs Inc
alysis date: 03/18/2002 18:48:09
Method: EPA 8015B mod.
Lab ID: GC - 5
Description: FID 3 - Ch. 3
Column: XTI-5, 30m, 0.53mm, 1.5um
Carrier: N2
Data file: 0318fc17.CHR ()
Sample: 100/200 ppm G/D close
Operator: MAP



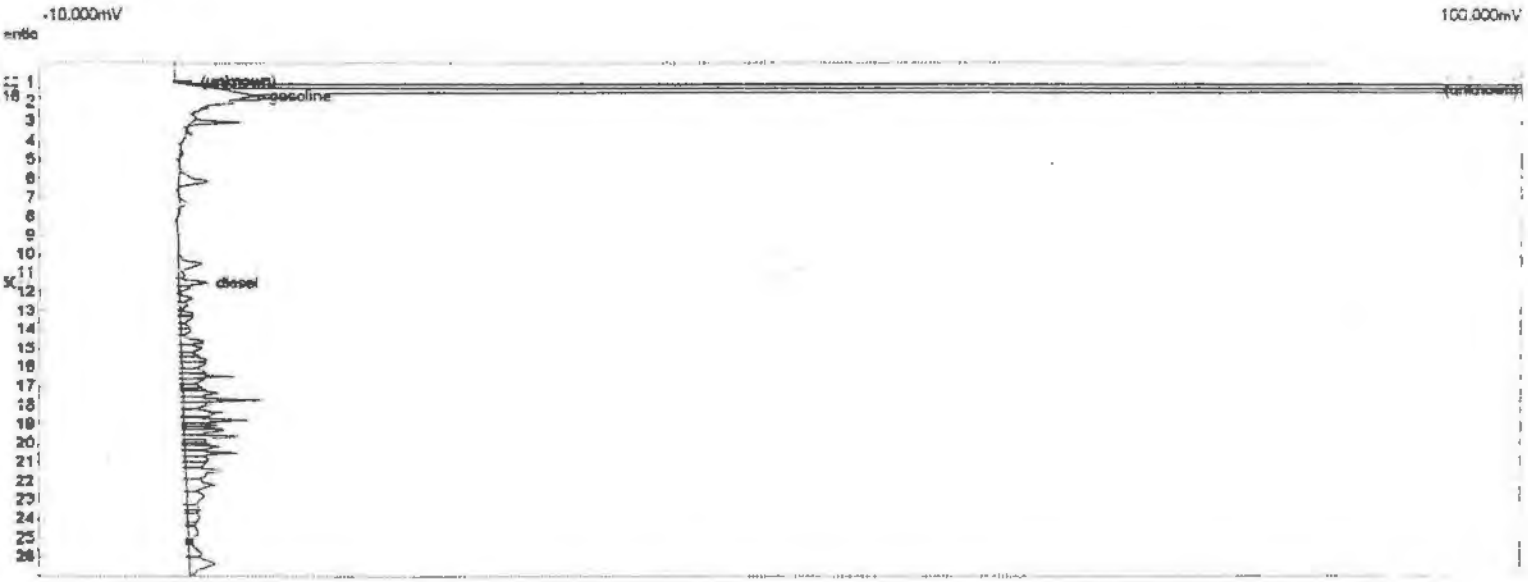
Component	Retention	Area	External	Units
soline	1.316	138.731	95.81	
sel	14.350	614.261	207.60	ppm
		752.991	303.61	

Lab name: On Site Labs inc
lysis date: 03/18/2002 18:48:09
Method: EPA 8015B mod.
Lab ID: GC - 5
escription: FID 4 - Ch. 4
Column: XTI-5, 30m, 0.53mm, 1.5um
r: N2
L ae: 0318fd17.CHR ()
Sample: 200/400 ppm G/D close
Operator: MAP



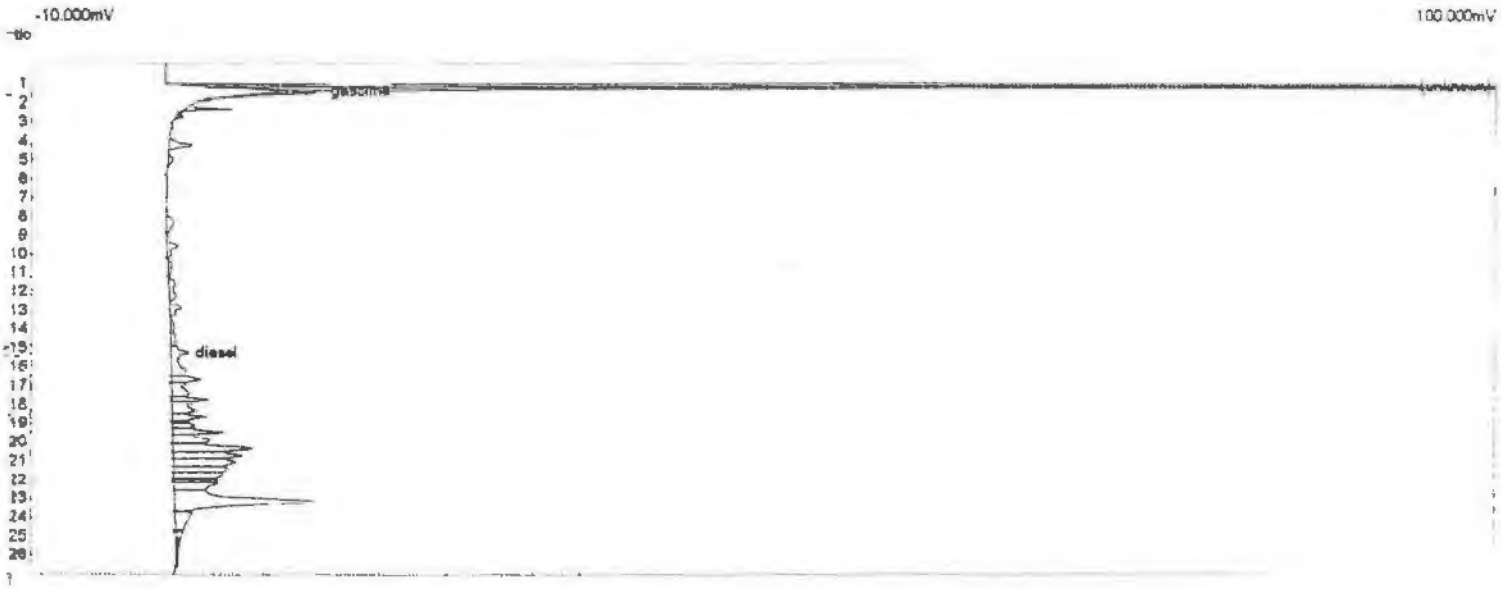
Component	Retention	Area	External	Units
	2.900	258.564	211.24	
	15.750	1051.809	433.91	ppm
		1310.372	645.16	

Lab name: On Site Labs Inc
nalysis date: 03/18/2002 18:17:30
Method: EPA 8015B mod.
Lab ID: GC - 5
Description: FID2 - Ch. 2
Column: XTI-5, 30m, 0.53mm, 1.5um
Carrier: N2
Data file: 0318fb16.CHR ()
Sample: HLA03matrix spike
Operator: MAP



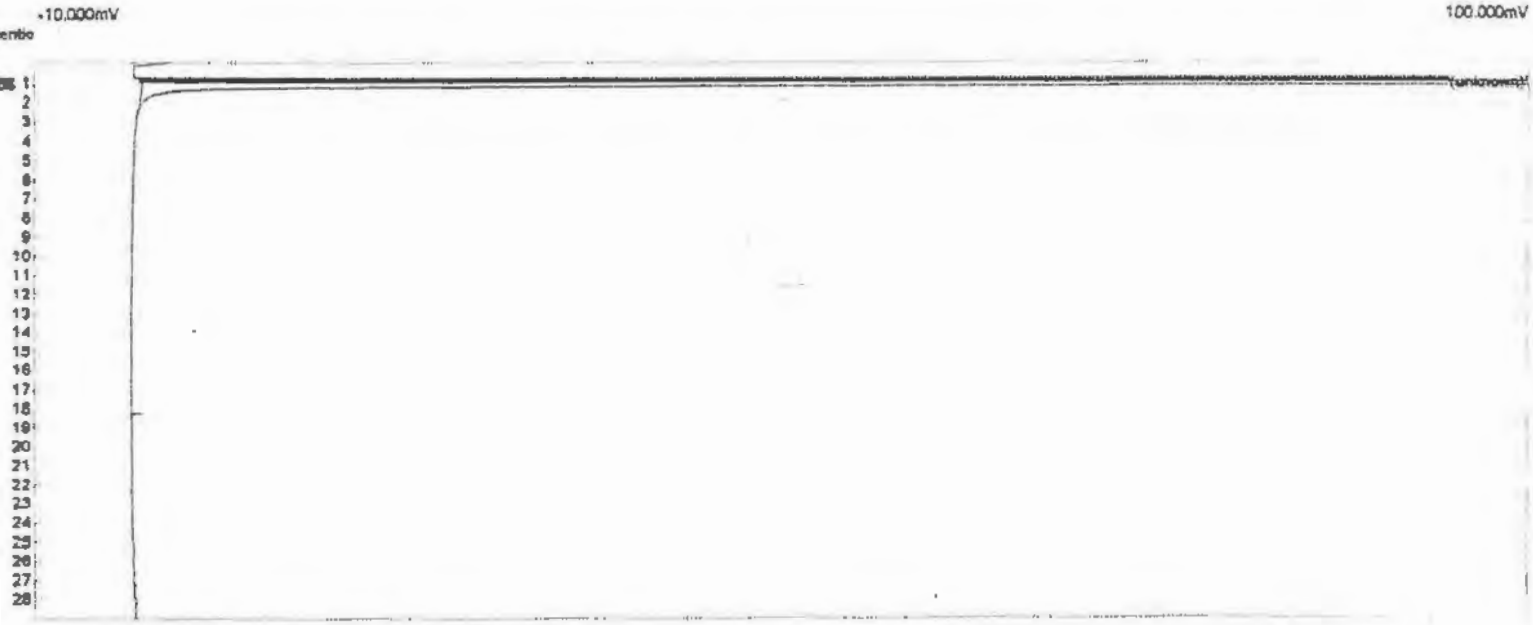
Component	Retention	Area	External	Units
soline	1.716	196.609	193.95	
sel	11.500	1214.061	437.34	ppm
		1412.670	631.30	

Lab name: On Site Labs Inc
alysis date: 03/18/2002 18:17:30
Method: EPA 8015B mod.
Lab ID: GC - 5
Description: FID 3 - Ch. 3
Column: XTI-5, 30m, 0.53mm, 1.5um
[illegible]: N2
[illegible]: 0318fc18.CHR ()
Sample: HLA03matrix spike duplicat
Operator: MAP



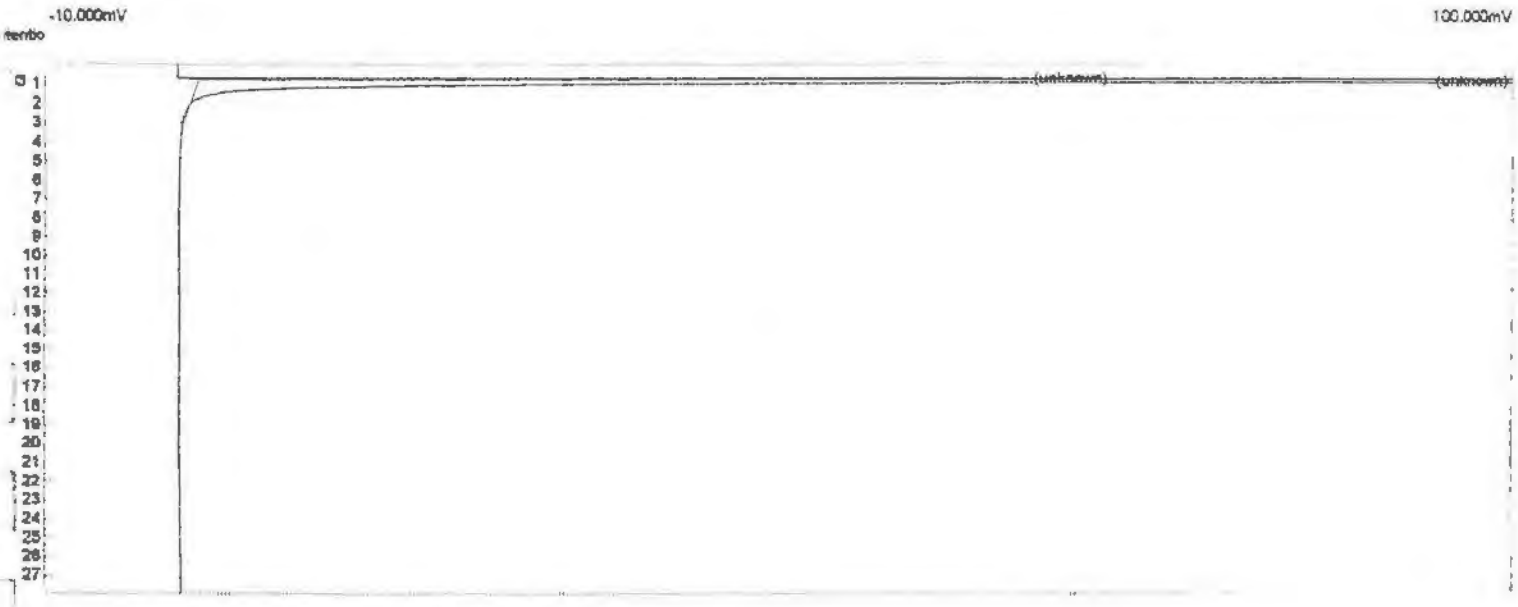
Component	Retention	Area	External	Units
soline	1.416	258.561	178.56	
iel	15.233	1313.525	444.36	ppm
		1572.086	622.92	

Lab name: On Site Labs Inc
nalysis date: 03/18/2002 13:14:19
Method: EPA 8015B mod.
Lab ID: GC - 5
Description: FID2 - Ch. 2
Column: XTI-5, 30m, 0.53mm, 1.5um
Carrier: N2
Data file: 0318fb4.CHR ()
Sample: method blank
Operator: MAP



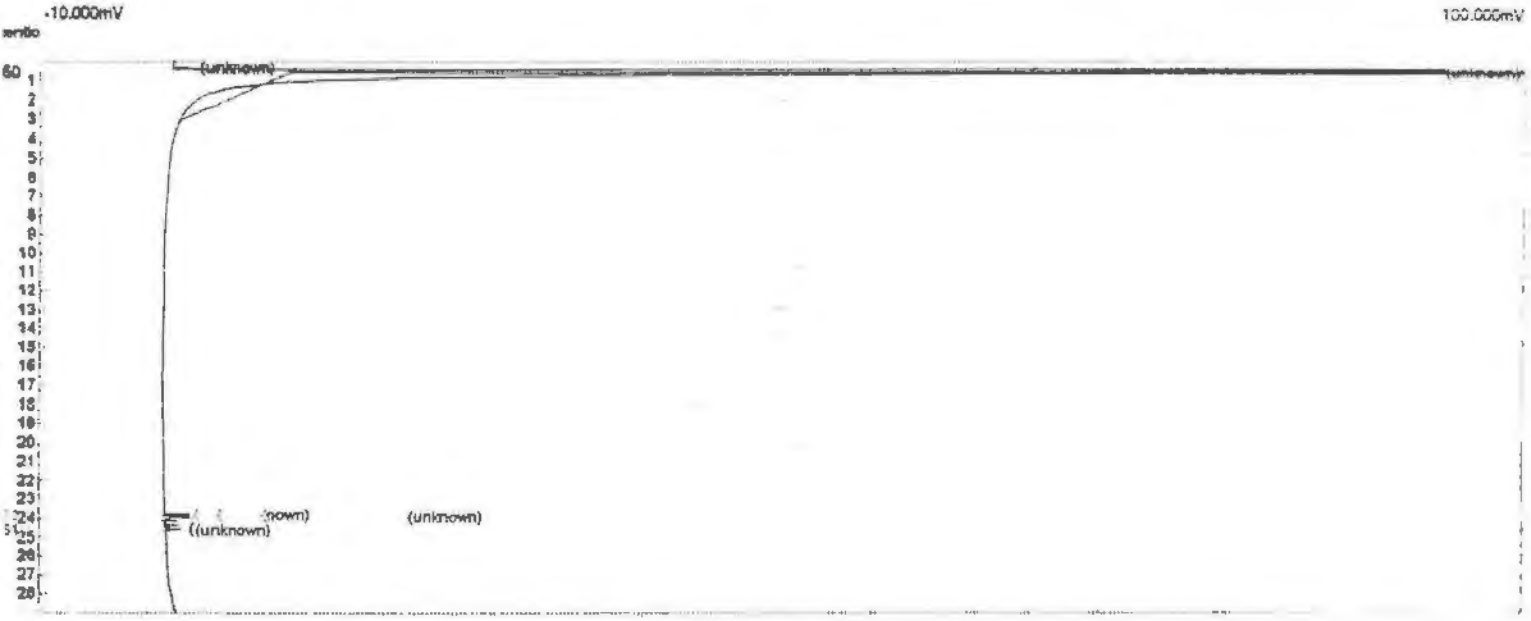
Component	Retention	Area	External	Units
		0.000	0.00	

Lab name: On Site Labs Inc
alysis date: 03/18/2002 13:54:41
Method: EPA 8015B mod.
Lab ID: GC - 5
Description: FID 3 - Ch. 3
Column: XTI-5, 30m, 0.53mm, 1.5um
ier: N2
ile: 0318fc8.CHR ()
ple: method blank
Operator: MAP



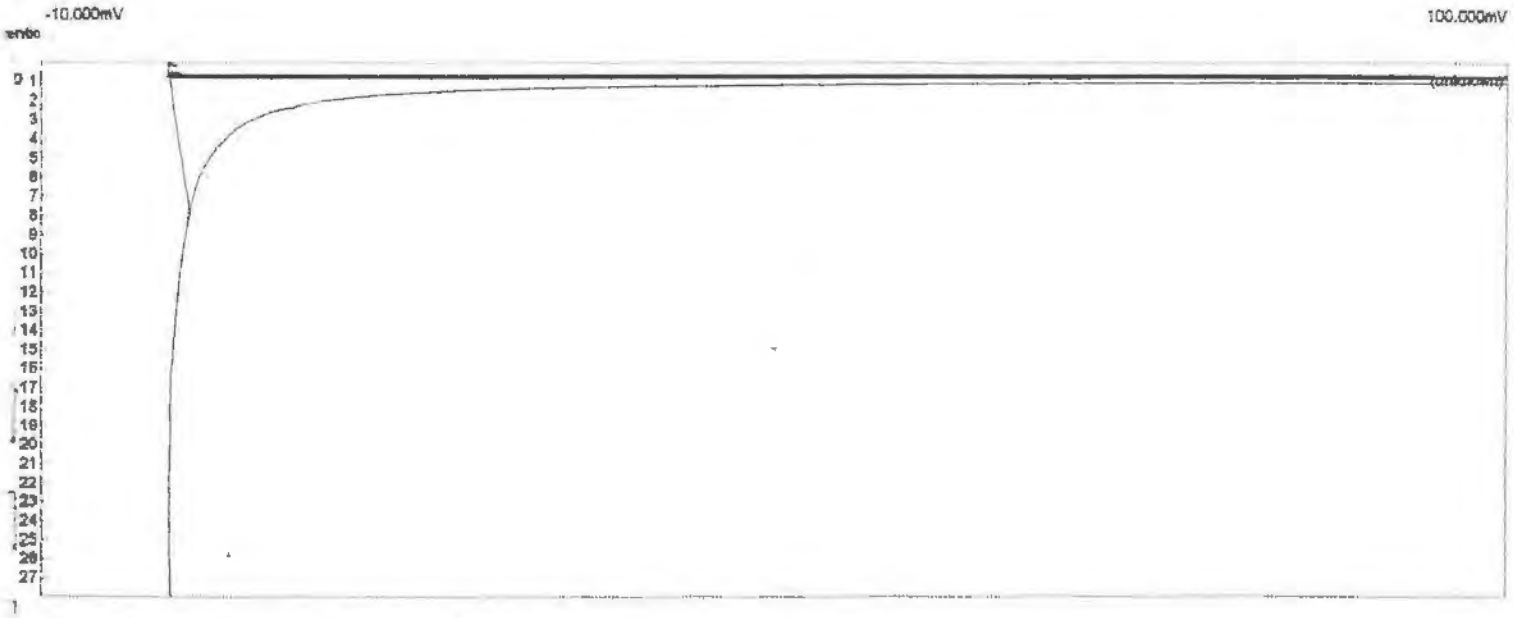
Component	Retention	Area	External	Units
		0.000	0.00	

Lab name: On Site Labs Inc
nalysis date: 03/18/2002 13:14:19
Method: EPA 8015B mod.
Lab ID: GC - 5
Description: FID 4 - Ch. 4
Column: XTI-5, 30m, 0.53mm, 1.5um
Carrier: N2
Data file: 0318fd4.CHR ()
Sample: method blank
Operator: MAP



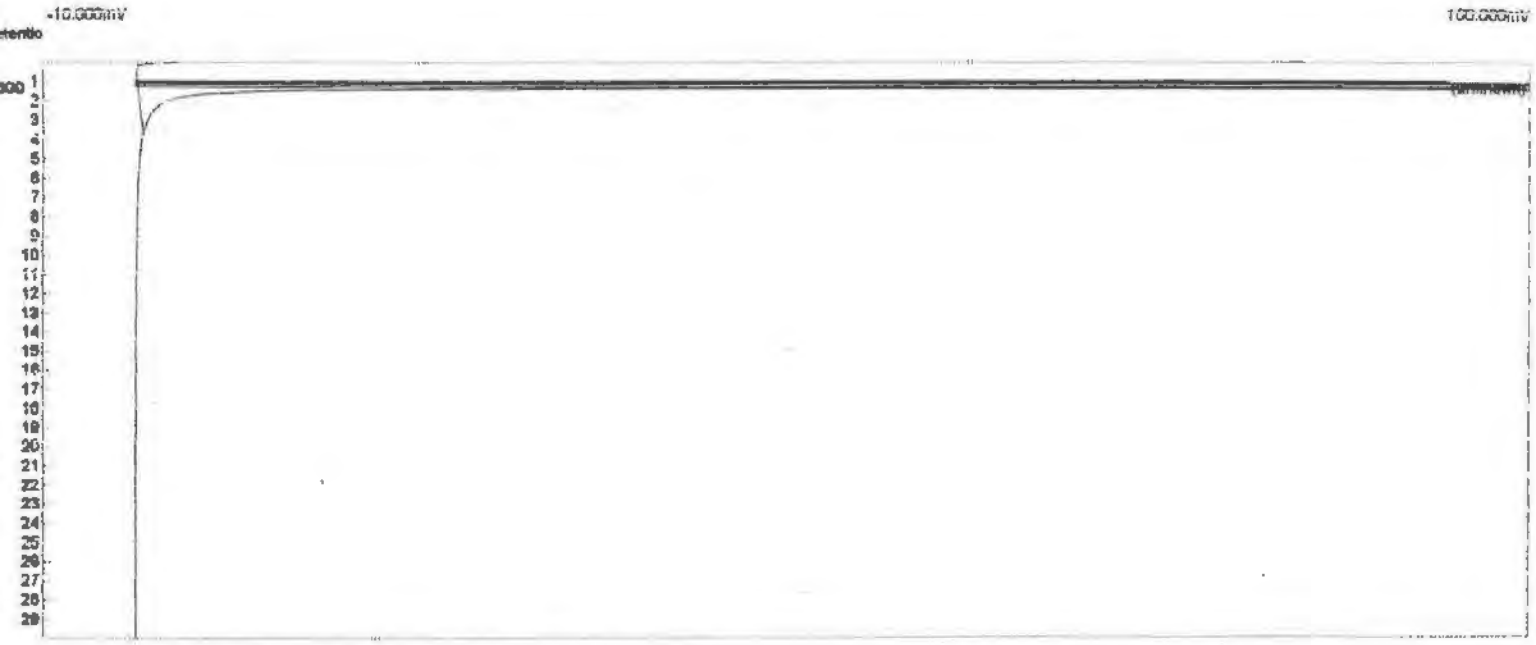
Component	Retention	Area	External	Units
		0.000	0.00	

Lab name: On Site Labs Inc
nalysis date: 03/18/2002 16:44:14
Method: EPA 8015B mod.
Lab ID: GC - 5
Description: FID 4 - Ch. 4
Column: XTI-5, 30m, 0.53mm, 1.5um
Carrier: N2
D[illegible]le: 0318FD13.chr ()
[illegible]le: HLA031/0311CH2M
O[illegible]ator: MAP



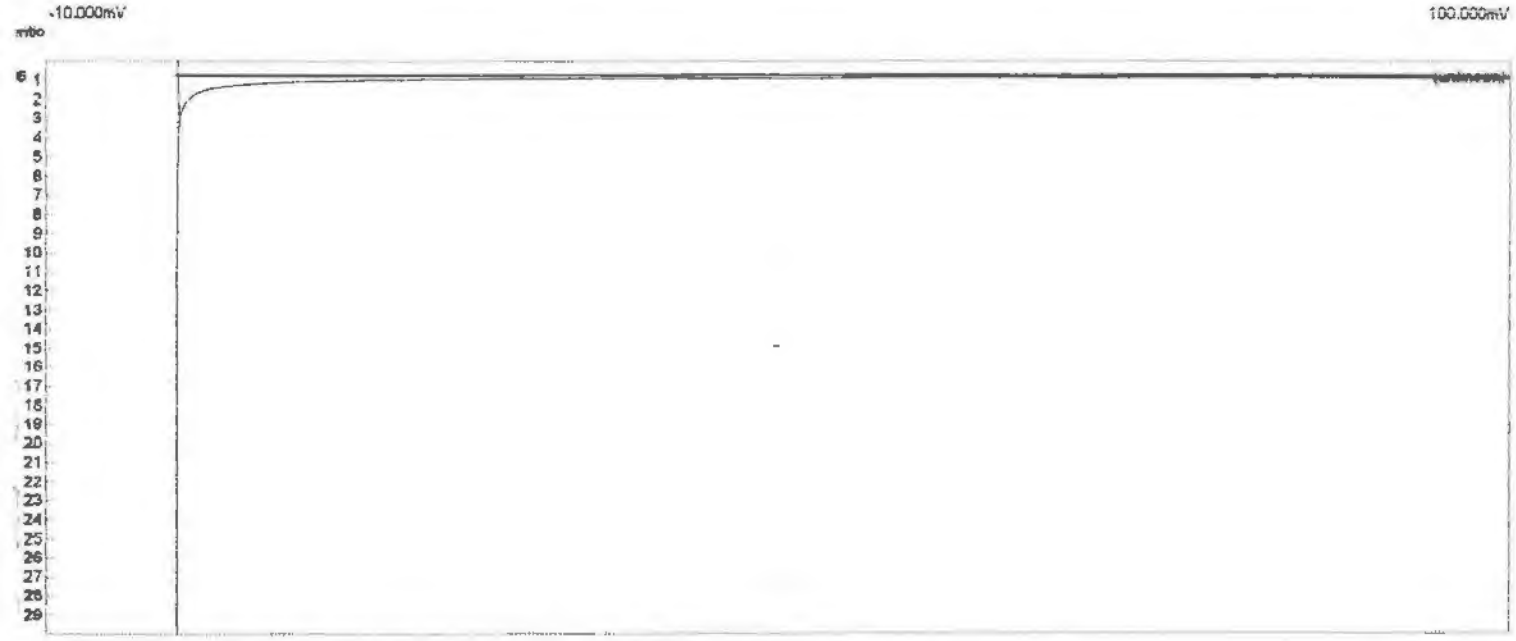
Component	Retention	Area	External	Units
		0.000	0.00	

Lab name: On Site Labs Inc
Analysis date: 03/18/2002 17:15:27
Method: EPA 8015B mod.
Lab ID: GC - 5
Description: FID2 - Ch. 2
Column: XTI-5, 30m, 0.53mm, 1.5um
Carrier: N2
Data file: 0318FB14.chr ()
Sample: JLA024/0311CH2M
Operator: MAP



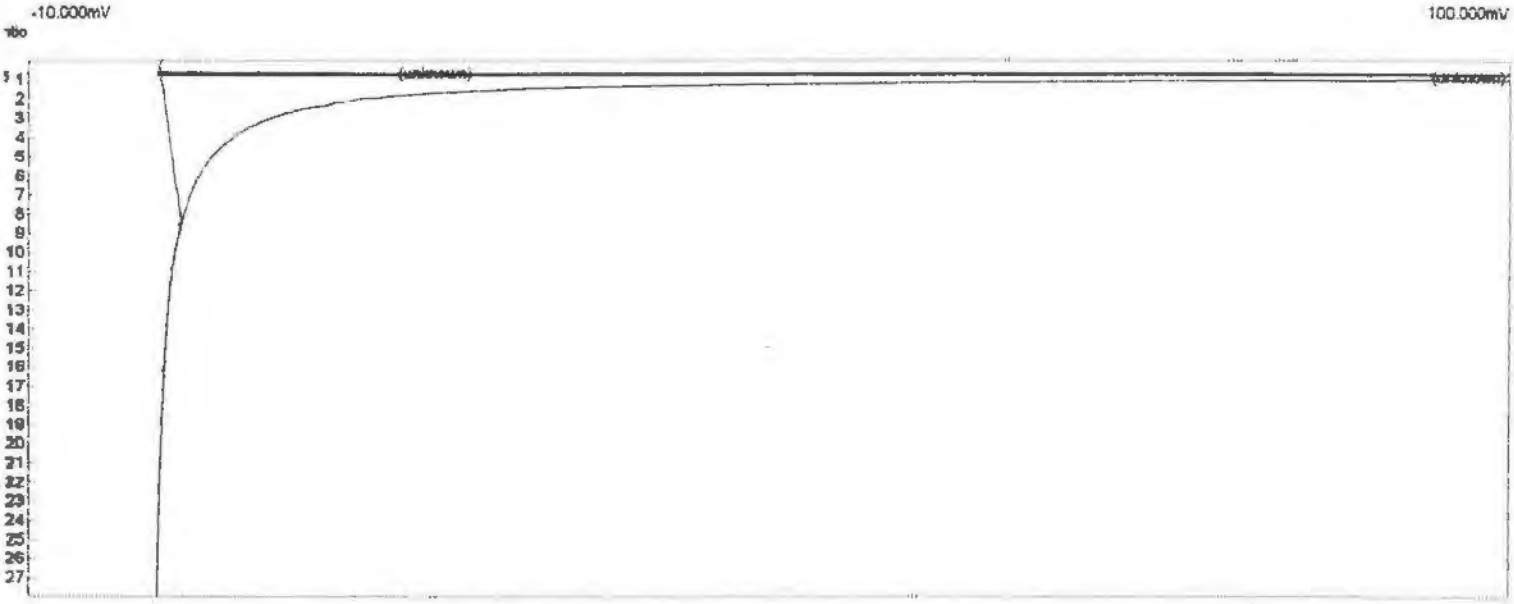
Component	Retention	Area	External	Units
		0.000	0.00	

Lab name: On Site Labs Inc
ıalysis date: 03/18/2002 17:15:27
Method: EPA 8015B mod.
Lab ID: GC - 5
Description: FID 3 - Ch. 3
Column: XTI-5, 30m, 0.53mm, 1.5um
Carrier: N2
D ᵉ: 0318FC14.chr ()
ᵉ: JLA025/0311CH2M
Operator: MAP



Component	Retention	Area	External	Units
		0.000	0.00	

Lab name: On Site Labs Inc
alysis date: 03/18/2002 17:15:27
Method: EPA 8015B mod.
Lab ID: GC - 5
Description: FID 4 - Ch. 4
Column: XTI-5, 30m, 0.53mm, 1.5um
Carrier: N2
Data file: 0318FD14.chr ()
Sample: JLA027EB3/0305CH2M
Operator: MAP



Component	Retention	Area	External	Units
		0.000	0.00	

QA/QC REPORT - CALIBRATION DATA

OSL Project #02I0311CH2M
DAILY CALIBRATION DATE: 03/18/02

CH2M HILL PROJECT NO. 167722.FI.FS
PROJECT NAME: RRNAS SITES 88, 1970 AND 2036, CEIBA

			INITIAL		OPENING			CLOSING		
COMPOUND	DETECTOR	CALIB RANGE	RF	%RSD	AREA	RF	%DIFF	AREA	RF	%DIFF
BENZENE	P&T - GC3	0.5 - 75.0	85.78	8.1%	727.06	90.88	5.9%	716.49	89.56	4.4%
TOLUENE	P&T - GC3	0.5 - 75.0	81.33	8.2%	689.17	86.15	5.9%	681.21	85.15	4.7%
ETHYLBENZENE	P&T - GC3	0.5 - 75.0	65.84	13.6%	467.28	58.41	11.3%	478.09	59.76	9.2%
m&p-XYLENES	P&T - GC3	1.0 - 150	98.46	16.8%	1614.99	100.94	2.5%	1625.49	101.59	3.2%
o-XYLENES	P&T - GC3	0.5 - 75.0	73.19	17.4%	566.88	70.86	3.2%	607.29	75.91	3.7%

CALIB RANGE - RANGE OF CALIBRATION CURVE IN ppb
INITIAL RF - AVERAGE RESPONSE FACTOR FROM MULTIPOINT CALIBRATION CURVE
% RSD - LINEARITY OF MULTIPOINT CALIBRATION CURVE (+/- 20% ACCEPTABLE LIMITS)
AREA - AREA COUNTS FROM DAILY CALIBRATION STANDARD
RF - DETECTOR RESPONSE FACTOR FROM MID-POINT CALIBRATION STANDARD
% DIFF - DIFFERENCE, IN PERCENT, BETWEEN THE AVERAGE RF AND THE OPENING OR CLOSING RF (+/- 20% ACCEPTABLE LIMITS)
OPENING - MID-POINT CALIBRATION STANDARD ANALYZED BEFORE SAMPLE ANALYSES BEGIN
CLOSING - MID-POINT CALIBRATION STANDARD ANALYZED AFTER SAMPLES ANALYSES ARE COMPLETE

ANALYSES PERFORMED BY MARCO A PEDRAZA
DATA REVIEWED BY KEVIN SHELBURNE

QA/QC REPORT - MS/MSD DATA

MATRIX SPIKE (MS)/MATRIX SPIKE DUPLICATE (MSD)

OSL PROJECT #02I0311CH2M
DATE. 03/18/02

CH2M HILL PROJECT NO. 167722.FI.FS
PROJECT NAME: RRNAS SITES 88, 1970 AND 2036

COMPOUND	SPK CONC (ppb)	MS CONC (ppb)	%REC MS	MSD CONC (ppb)	%REC MSD	RPD	ACCEPTABLE RPD	ACCEPTABLE RECOVERY
BENZENE	8.0	9.3	117%	9.3	117%	0%	20%	82% - 117%
TOLUENE	8.0	9.5	119%	9.3	117%	2%	20%	87% - 120%
ETHYLBENZENE	8.0	8.0	99%	8.0	100%	1%	20%	83% - 131%
TOTAL XYLENES	24.0	28.2	117%	28.1	117%	0%	20%	87% - 123%

ppb = PARTS PER BILLION
MS CONC - ANALYZED CONCENTRATION OF SPIKED SAMPLE
% REC - PERCENT RECOVERY OF SPIKE FROM MATRIX
RPD - RELATIVE PERCENT DIFFERENCE BETWEEN MATRIX SPIKE AND MATRIX SPIKE DUPLICATE RECOVERIES

ANALYSES PERFORMED BY MARCO A. PEDRAZA
DATA REVIEWED BY. KEVIN SHELBURNE

ON SITE LABS, INC
PMB 627, HC-01 BOX 29030 CAGUAS, P.R. 00725
TELEPHONE (787) 720-0329 FAX 789-3858

LABORATORY QA/QC

CH2M HILL

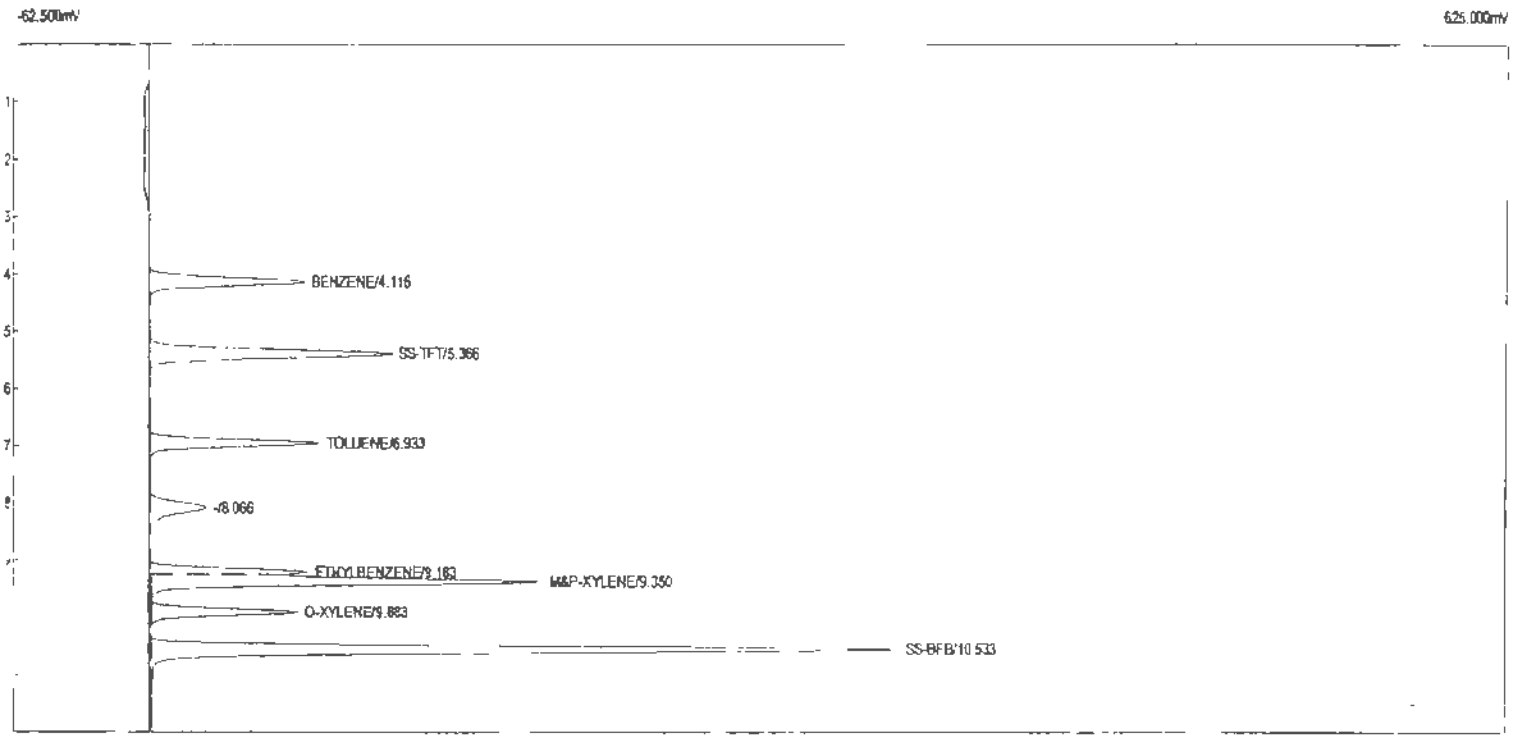
OSL Project #02I0311CH2M

BTEX (Mod. EPA Method 8020A) ANALYSES OF WATER

SAMPLE NUMBER	DATE ANALYZED	BENZENE (µg/L)	TOLUENE (µg/L)	ETHYL-BENZENE (µg/L)	TOTAL XYLENES (µg/L)
ILA019	03/18/02	ND	ND	ND	ND
ILA019 DUP.	03/18/02	ND	ND	ND	ND
DETECTION LIMIT (µg/L)		1.0	1.0	1.0	3.0

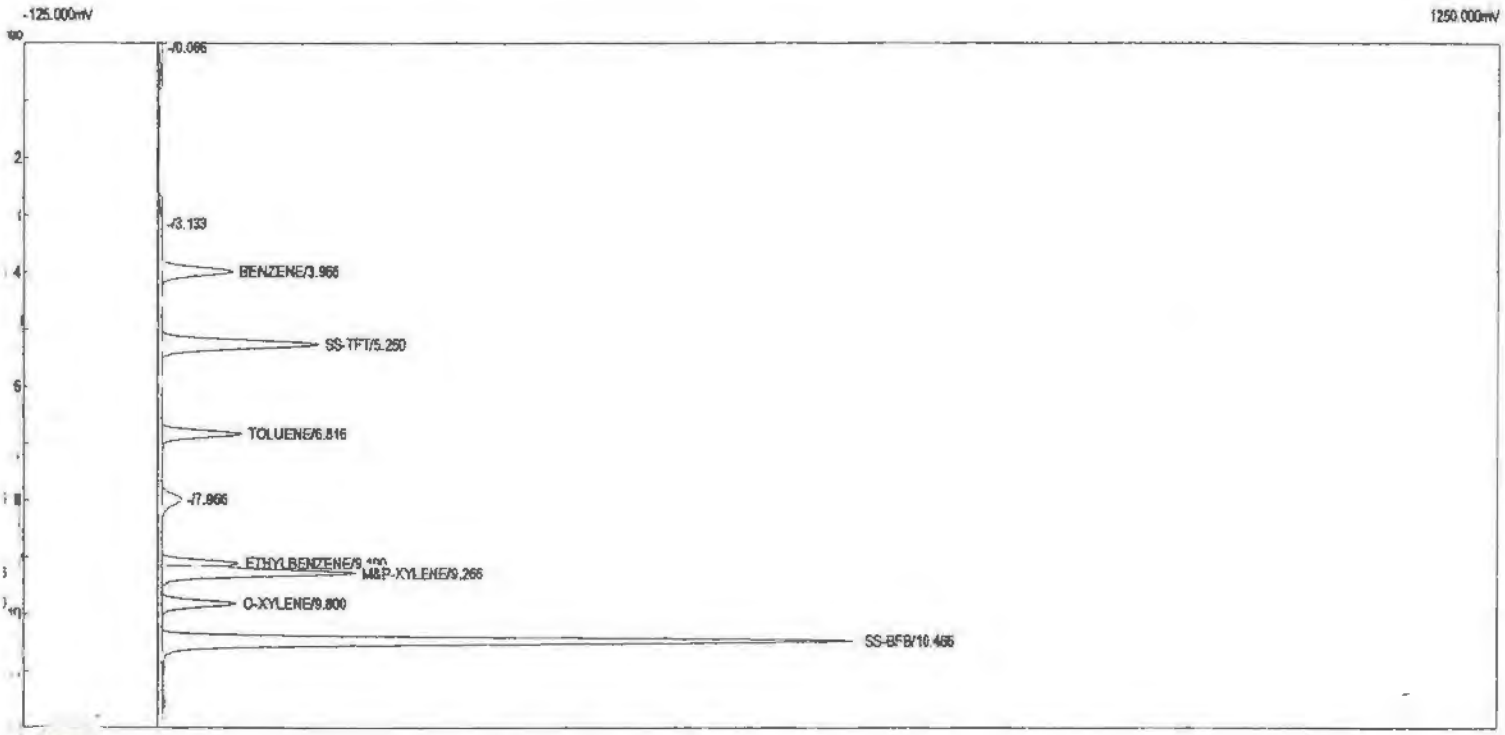
"ND" INDICATES ANALYTE NOT DETECTED AT OR ABOVE THE LISTED DETECTION LIMIT
DUP = LABORATORY DUPLICATE
µg/L = MICROGRAMS PER LITER
ANALYSES PERFORMED BY: MARCO A. PEDRAZA
DATA REVIEWED BY KEVIN SHELBURNE

ysis date: 03/18/2002 10:39:59
Method: EPA 8020A mod.
Lab ID: GC-3-P&T
escription: PID1-CHANNEL 1
Column: Rtx-5, 30m,ID.53mm,5um
Carrier: Nitrogen 1 kg/cm3
Data file: 0318P1 CHR ()
Sample: 8 ppb BTEX OPEN STD
Operator: MAP



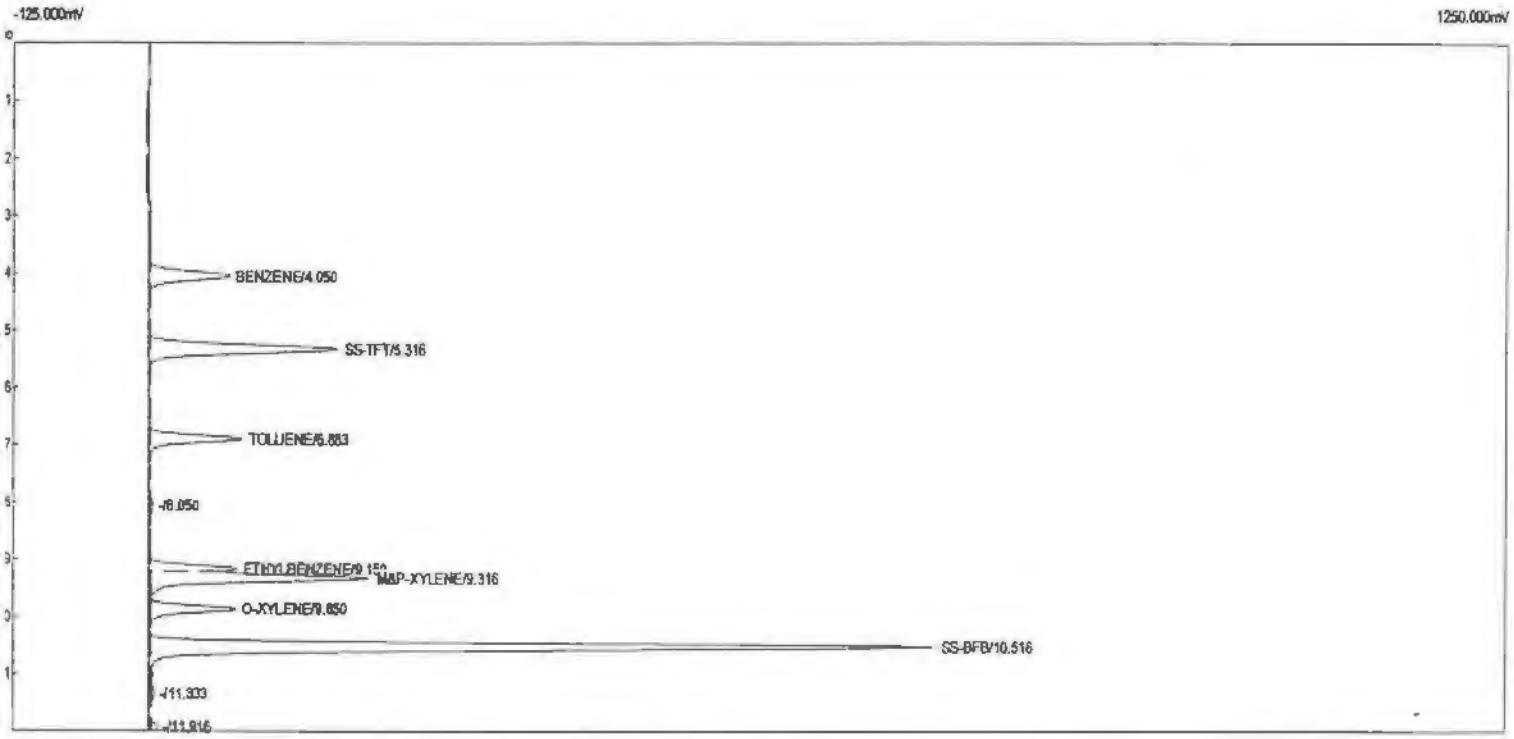
omponent	Retention	Height	Area	External	Internal	Units
ZENE	4.116	71.676	727.064	8.48	8.4759	ppb
FT	5.366	111.960	1188.597	13.29	13.2923	ppb
UENE	6.933	78.680	689.170	8.47	8.4737	ppb
YLBENZENE	9.163	72.818	467.283	7.10	7.0972	ppb
-XYLENE	9.350	181.067	1614.985	16.40	16.4024	ppb
YLENE	9.883	67.820	566.881	7.75	7.7453	ppb
BFB	10.533	345.781	2848.708	12.49	12.4943	ppb
			8102.667	73.98	73.9813	

Lab Name: CH Grid Labs Inc.
Analysis date: 03/18/2002 19:14:50
Method: EPA 8020A mod.
Lab ID: GC-3-P&T
Description: PID1-CHANNEL 1
Column: Rtx-5, 30m,ID.53mm,5um
Carrier: Nitrogen 1 kg/cm3
Data file: 0318P22.CHR ()
[illegible]: 8 ppb BTEX CLOSE STD
C[illegible]or: MAP



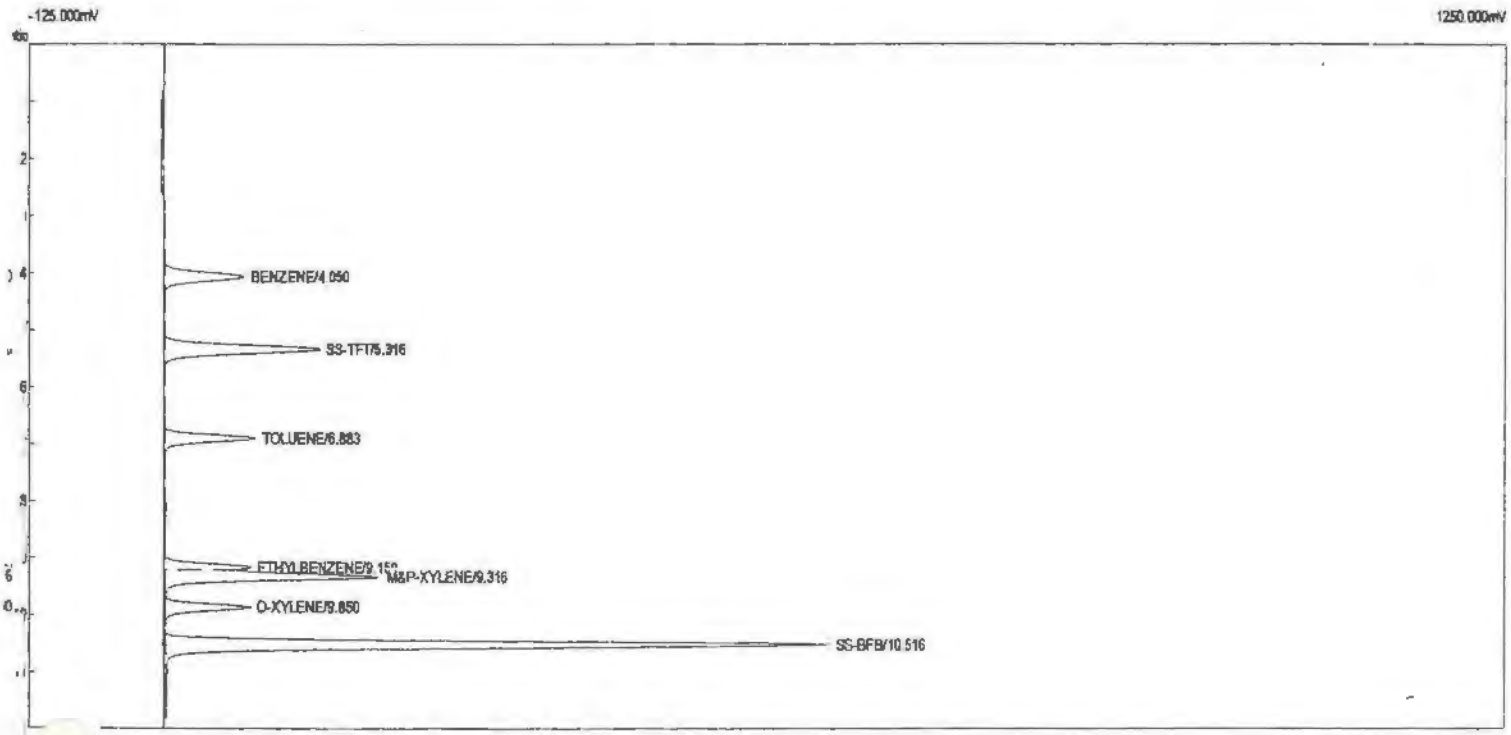
[illegible]ent	Retention	Height	Area	External	Internal	Units
NZENE	3.966	67.088	716.491	8.35	8.3527	ppb
FT	5.250	146.375	1564.790	17.50	17.4993	ppb
UENE	6.816	75.591	681.207	8.38	8.3758	ppb
YLBENZENE	9.100	72.519	478.088	7.26	7.2614	ppb
P-XYLENE	9.266	180.475	1625.490	16.51	16.5091	ppb
YLENE	9.800	70.658	607.294	8.30	8.2975	ppb
FB	10.466	646.805	5237.193	22.97	22.9701	ppb
			10910.553	89.27	89.2660	

alysis date: 03/18/2002 18:02:40
Method: EPA 8020A mod.
Lab ID: GC-3-P&T
Description: PID1-CHANNEL 1
Column: Rtx-5, 30m,ID.53mm,5um
Carrier: Nitrogen 1 kg/cm3
Data file: 0318P20.CHR ()
Sample: ILA019matrix spike ~~duplica~~
Operator: MAP



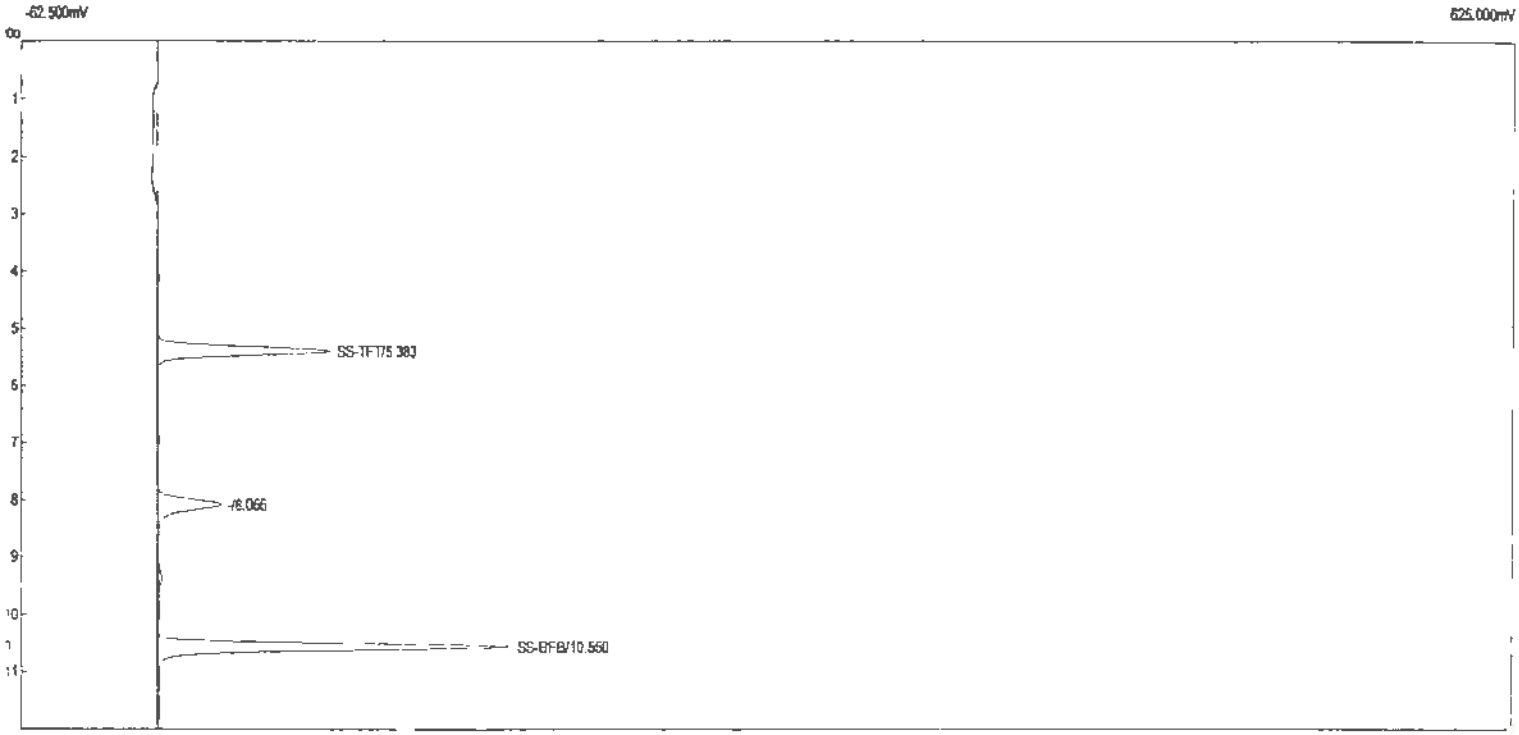
omponent	Retention	Height	Area	External	Internal	Units
IZENE	4.050	74.053	799.540	9.32	9.3208	ppb
TFT	5.316	172.946	1836.926	20.54	20.5427	ppb
UENE	6.883	85.754	774.375	9.52	9.5214	ppb
YLBENZENE	9.150	80.379	523.459	7.95	7.9505	ppb
-XYLENE	9.316	201.816	1857.134	18.86	18.8618	ppb
YLENE	9.850	78.554	680.146	9.29	9.2929	ppb
BFB	10.516	724.062	5972.136	26.19	26.1936	ppb
			12443.716	101.68	101.6836	

Lab name: On Site Labs Inc.
alysis date: 03/18/2002 18:20:30
Method: EPA 8020A mod.
Lab ID: GC-3-P&T
Description: PID1-CHANNEL 1
Column: Rtx-5, 30m,ID.53mm,5um
Carrier: Nitrogen 1 kg/cm3
Data file: 0318P21.CHR ()
e: ILA019matrix spike duplica
C or: MAP



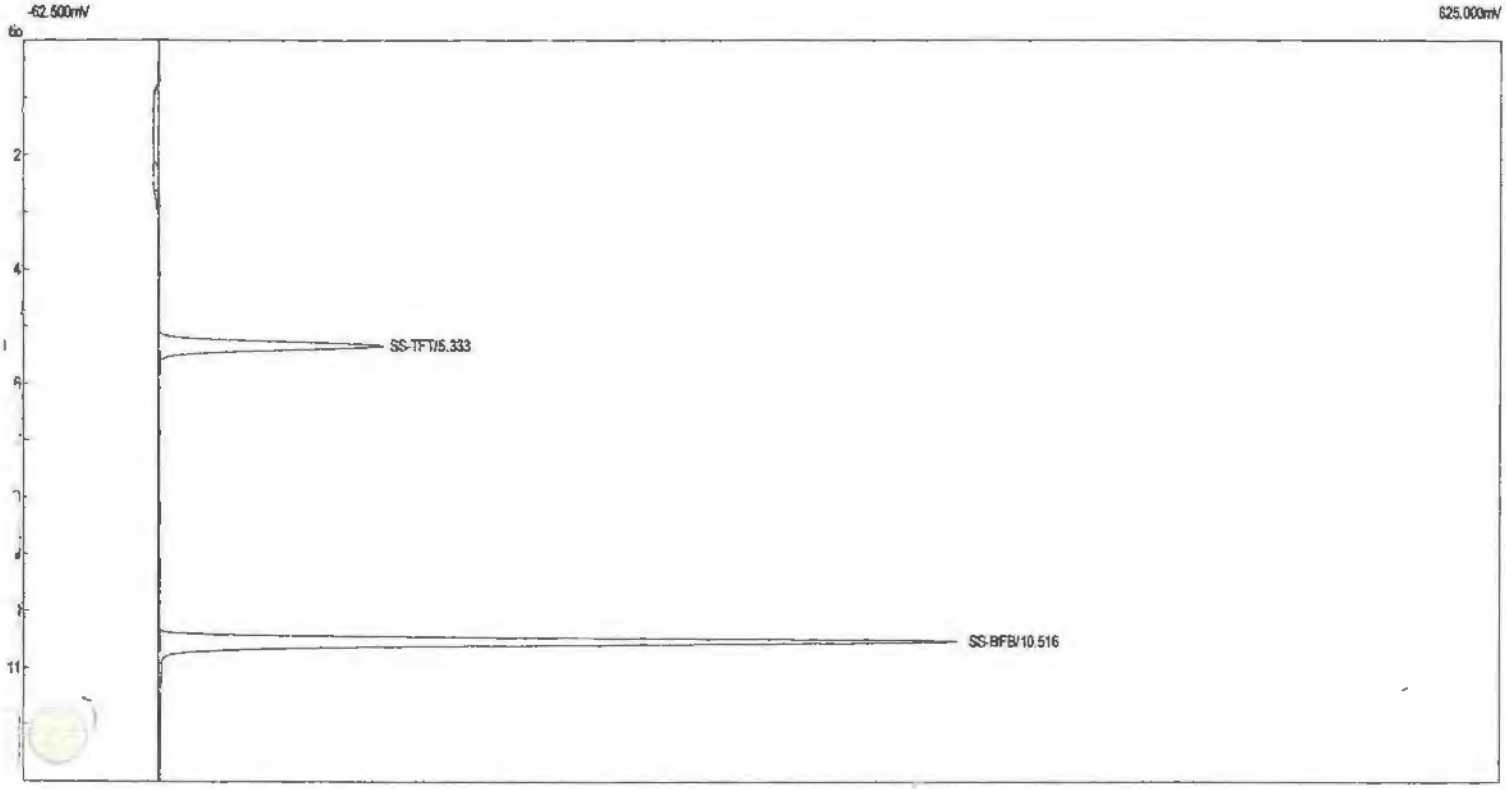
ent	Retention	Height	Area	External	Internal	Units
ENZENE	4.050	74.807	801.364	9.34	9.3421	ppb
TFT	5.316	145.040	1533.984	17.15	17.1548	ppb
UENE	6.883	85.370	759.008	9.33	9.3324	ppb
YLBENZENE	9.150	80.800	528.273	8.02	8.0236	ppb
&P-XYLENE	9.316	201.783	1835.918	18.65	18.6463	ppb
YLENE	9.850	79.993	689.524	9.42	9.4210	ppb
BFB	10.516	618.143	5082.878	22.29	22.2933	ppb
			11230.948	94.21	94.2136	

alysis date: 03/18/2002 11:30:48
Method: EPA 8020A mod.
Lab ID: GC-3-P&T
Description: PID1-CHANNEL 1
Column: Rtx-5, 30m,ID.53mm,5um
Carrier: Nitrogen 1 kg/cm3
Data file: 0318P2.CHR ()
Sample: method blank
Operator: MAP



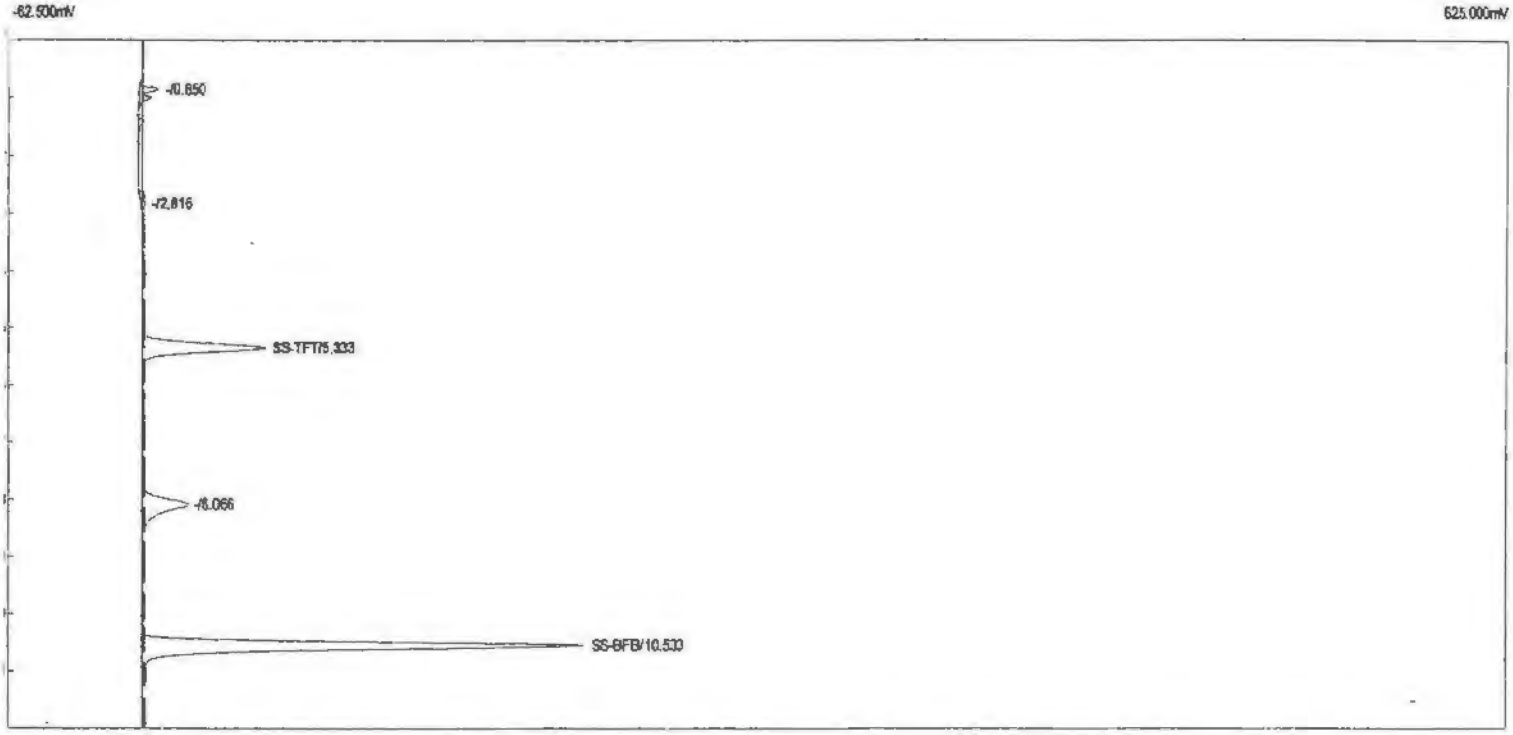
omponent	Retention	Height	Area	External	Internal	Units
TFT	5.383	79.558	837.175	9.36	9.3623	ppb
BFB	10.550	163.309	1406.245	6.17	6.1677	ppb
			2243.420	15.53	15.5300	

alysis date: 03/18/2002 15:48:30
Method: EPA 8020A mod.
Lab ID: GC-3-P&T
Description: PID1-CHANNEL 1
Column: Rtx-5, 30m,ID.53mm,5um
Carrier: Nitrogen 1 kg/cm3
Data: 0318P13.CHR ()
: HLA0319/0311CH2M
Operator: MAP



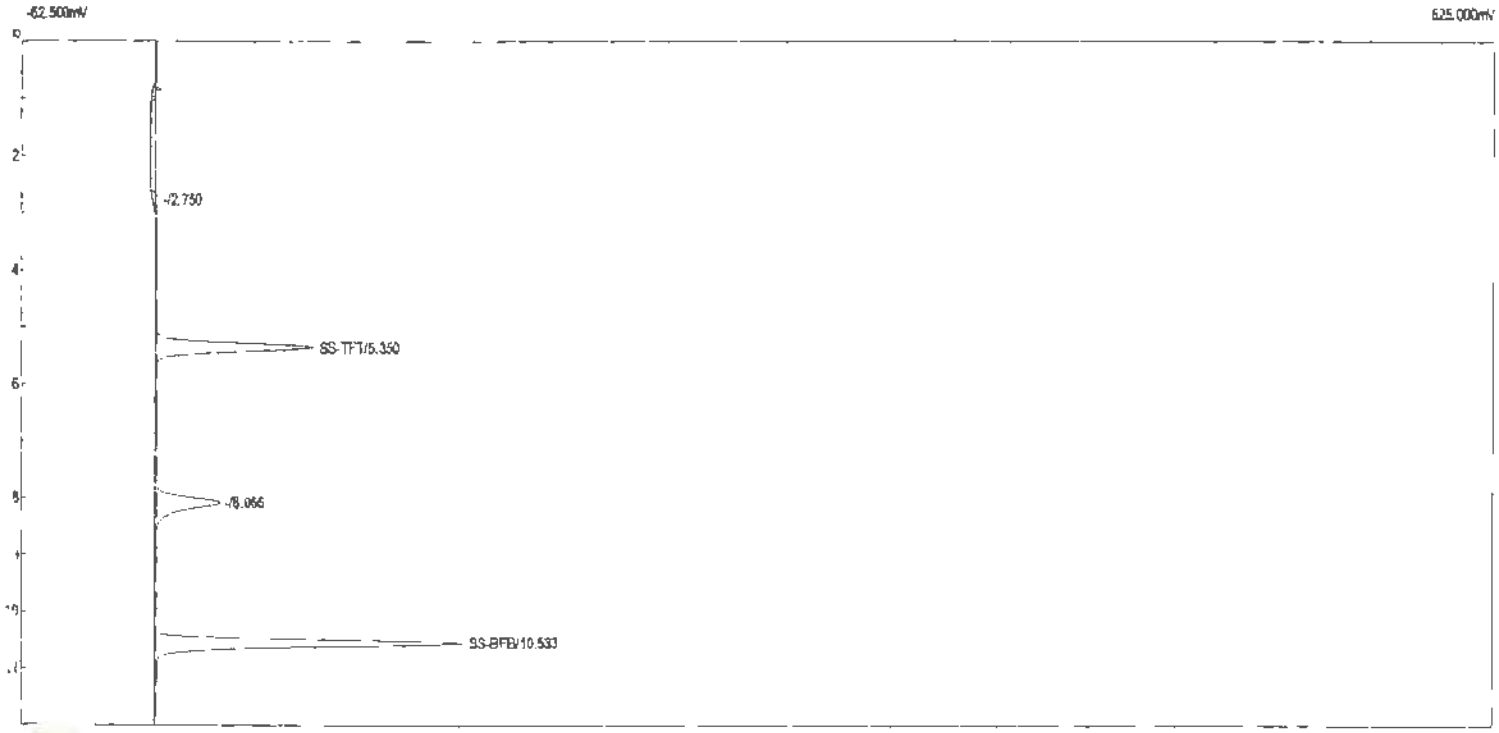
Component	Retention	Height	Area	External	Internal	Units
TFT	5.333	104.844	1105.736	12.37	12.3656	ppb
S-BFB	10.516	373.626	3273.720	14.36	14.3584	ppb
			4379.456	26.72	26.7241	

Lab name: On Site Labs Inc.
alysis date: 03/18/2002 14:42:18
Method: EPA 8020A mod.
Lab ID: GC-3-P&T
escription: PID1-CHANNEL 1
Column: Rtx-5, 30m,ID.53mm,5um
Carrier: Nitrogen 1 kg/cm3
Data file: 0318P10.CHR ()
Sample: JLA024/~~0305~~CH2M
Operator: MAP 0311



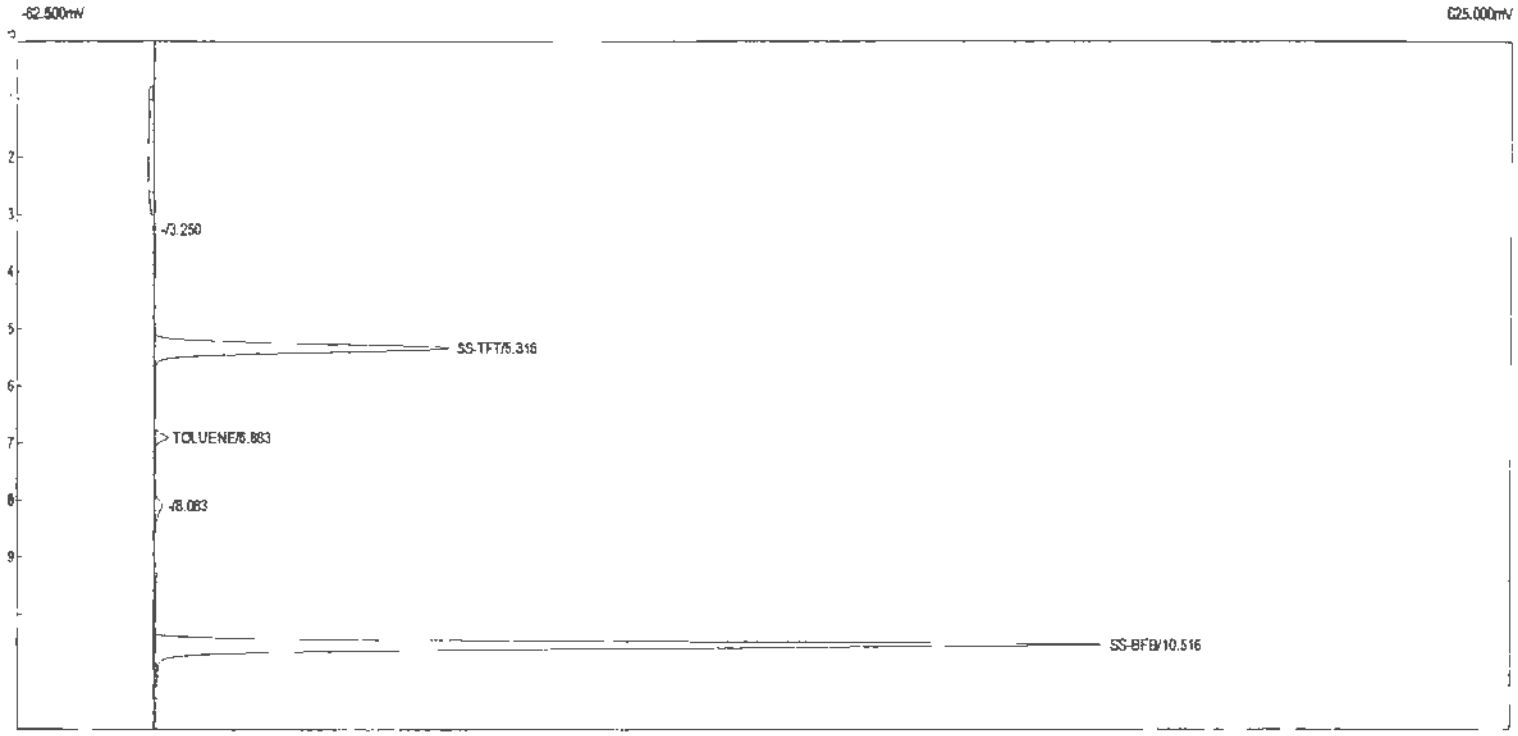
omponent	Retention	Height	Area	External	Internal	Units
TFT	5.333	55.701	596.424	6.67	6.6699	ppb
BFB	10.533	202.204	1846.796	8.10	8.1000	ppb
			2443.220	14.77	14.7699	

Lab name: On Site Labs Inc.
Analysis date: 03/18/2002 15:05:56
Method: EPA 8020A mod.
Lab ID: GC-3-P&T
Description: PID1-CHANNEL 1
Column: Rtx-5, 30m,ID.53mm,5um
Carrier: Nitrogen 1 kg/cm3
Data File: 0318P11.CHR ()
S[illegible]: JLA025/0305CH2M
C[illegible]: MAP [illegible]



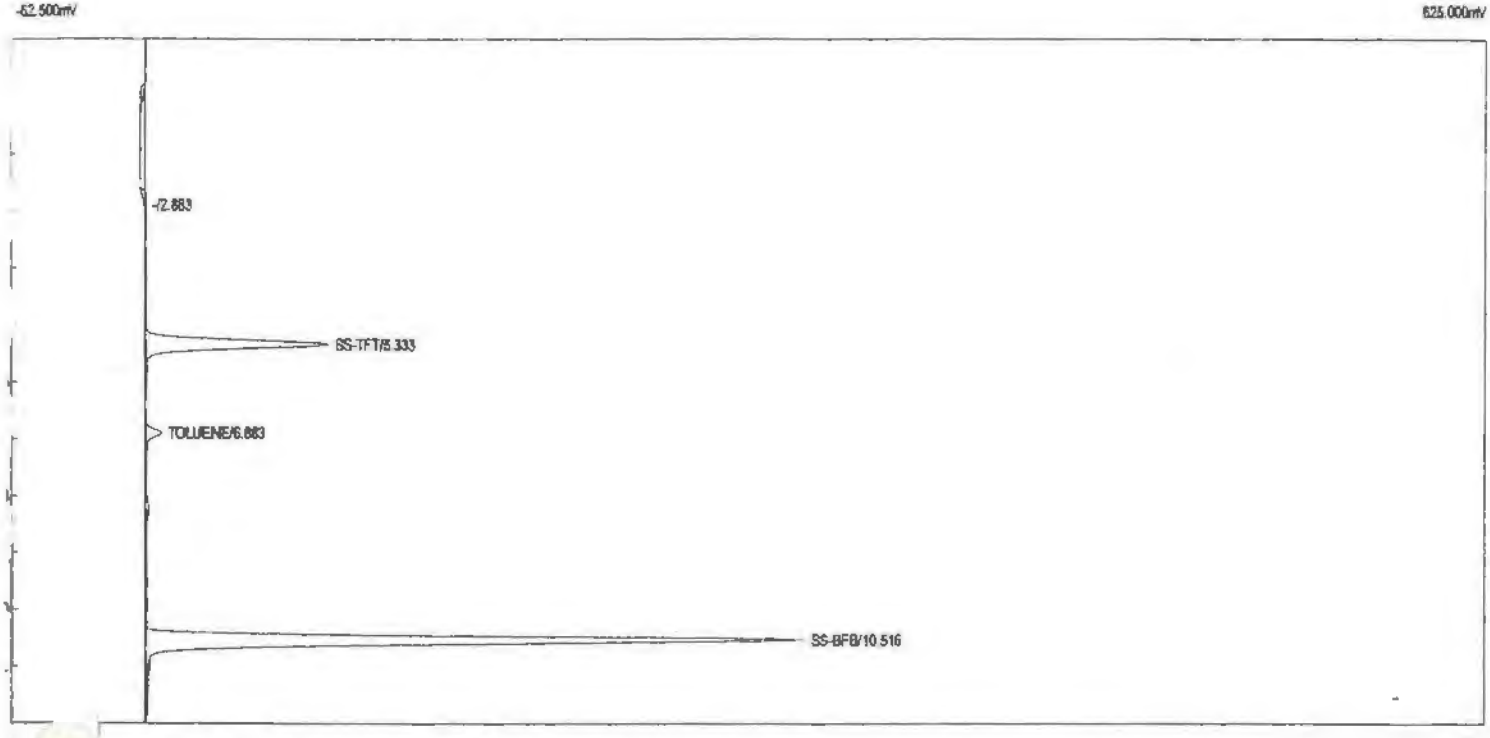
[illegible]ent	Retention	Height	Area	External	Internal	Units
[illegible]-TFT	5.350	73.717	791.054	8.85	8.8465	ppb
[illegible]BFB	10.533	143.708	1309.928	5.75	5.7453	ppb
			2100.982	14.59	14.5918	

alysis date: 03/18/2002 16:43:00
Method: EPA 8020A mod.
Lab ID: GC-3-P&T
Description: PID1-CHANNEL 1
Column: Rbx-5, 30m,ID.53mm,5um
Carrier: Nitrogen 1 kg/cm3
Data file: 0318P16.CHR ()
Sample: JLA027EB3/0305CH2M
Operator: MAP



Component	Retention	Height	Area	External	Internal	Units
TFT	5.316	136.660	1458.655	16.31	16.3124	ppb
LUENE	6.883	5.946	54.392	0.67	0.6688	ppb
BFB	10.516	437.579	3754.789	16.47	16.4684	ppb
			5267.836	33.45	33.4496	

lysis date: 03/18/2002 17:02:34
Method: EPA 8020A mod.
Lab ID: GC-3-P&T
escription: PID1-CHANNEL 1
Column: Rtx-5, 30m,ID.53mm,5um
Carrier: Nitrogen 1 kg/cm3
Data file: 0318P17.CHR ()
S JLA028TB3/0305CH2M
Op MAP

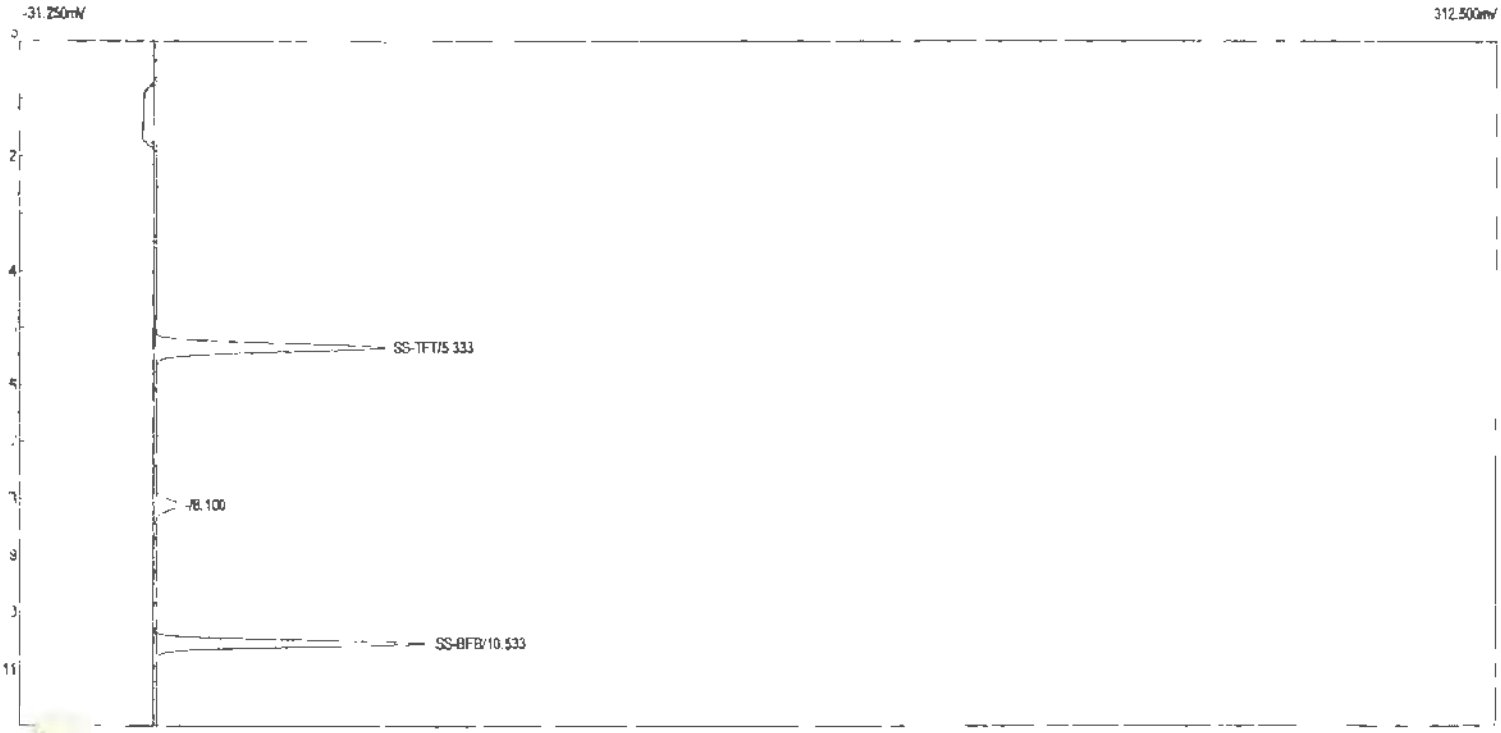


om t	Retention	Height	Area	External	Internal	Units
TFT	5.333	85.165	911.518	10.19	10.1937	ppb
UENE	6.883	7.381	68.152	0.84	0.8380	ppb
FB	10.516	306.718	2912.570	12.77	12.7744	ppb
			3892.240	23.81	23.8061	

alysis date: 03/18/2002 15:28:14
Method: EPA 8020A mod.
Lab ID: GC-3-P&T
escription: PID1-CHANNEL 1
Column: Rbx-5, 30m,ID.53mm,5um
Carrier: Nitrogen 1 kg/cm3
Data file: 0318P12.CHR ()
Sample: ILA019/0311CH2M
Operator: MAP

Component	Retention	Height	Area	External	Internal	Units
TFT	5.333	59.784	638.917	7.15	7.1451	ppb
BFB	10.533	125.292	1197.936	5.25	5.2541	ppb
			1836.853	12.40	12.3992	

Lab name: On Site Labs Inc
lysis date: 03/18/2002 16:25.14
Method: EPA 8020A mod.
Lab ID: GC-3-P&T
escription: PID1-CHANNEL 1
Column: Rtx-5, 30m,ID.53mm,5um
Carrier: Nitrogen 1 kg/cm3
Dat: 0318P15.CHR ()
S . ILA019/0305CH2M DUP
Op c: MAP



Co ent	Retention	Height	Area	External	Internal	Units
:-TFT	5.333	54.209	584.744	6.54	6.5393	ppb
BFB	10.533	63.848	548.181	2.40	2.4043	ppb
			1132.925	8.94	8.9436	

On Site Labs, Inc.

PMB 627, HC-01 Box 29030, Caguas, PR 00725
Telephone 787-720-0329 Fax 787-789-3858

February 23, 2002
OSL Projects #02I0221CH2M

Mr. Tunch Orsoy
CH2M HILL
4350 W. Cypress Street, Suite 600
Tampa, Florida 33607

SUBJECT: DATA REPORT - CH2M HILL PROJECT NO. 167722.FI.FS ROOSEVELT ROADS NAS, CEIBA, PUERTO RICO

Dear Mr. Orsoy:

Please find enclosed the analytical report for the samples collected by CH2M HILL personnel from the above-referenced site and delivered to On Site Labs (OSL) under the proper chain-of-custody protocol. An OSL Puerto Rico certified-chemist performed the following analyses:

- 4 soil samples analyzed for TPH-gas/diesel by modified EPA test method 8015B.
- 4 water samples analyzed for TPH-gas/diesel by modified EPA test method 8015B.
- 1 equipment blank water sample analyzed for TPH-gas/diesel.
- 4 water samples analyzed for BTEX by modified EPA test method 8020A.
- 1 trip and 1 equipment blank water sample analyzed for BTEX.
- Laboratory QA/QC analyses for TPH-gas/diesel and BTEX.

The analytical results are summarized in the attached table. Applicable detection limits, QA/QC data, chromatograms, a chain-of-custody and an invoice are attached.

OSL appreciates the opportunity to provide analytical services for this project. If you have any questions relating to the data or report, please do not hesitate to contact us.

Sincerely,
On Site Labs, Inc.

Kevin Shelburne
Principal

Attachments

QA/QC REPORT - CALIBRATION DATA

TEG Project #02I0221CH2M
DAILY CALIBRATION DATE: 02/22/02

CH2M HILL PROJECT NO. 167722.FI.FS
PROJECT NAME: RRNAS SITE 2036

			INITIAL			OPENING			CLOSING	
COMPOUND	DETECTOR	CALIB RANGE	RF	%RSD	AREA	RF	%DIFF	AREA	RF	%DIFF
TPH GASOLINE	FID #3 (gc5)	10 - 30,000	0.36	17.4%	741.13	0.37	2.4%	765.81	0.38	5.8%
TPH GASOLINE	FID #4 (gc5)	10 - 30,000	0.31	9.6%	652.41	0.33	6.6%	694.18	0.35	13.4%
TPH DIESEL	FID #3 (gc5)	25 - 20,000	0.74	13.6%	3271.60	0.82	10.5%	2986.52	0.75	0.9%
TPH DIESEL	FID #4 (gc5)	25 - 20,000	0.61	11.1%	2672.29	0.67	9.5%	2657.19	0.66	8.9%

CALIB RANGE - RANGE OF CALIBRATION CURVE IN ppm
INITIAL RF - AVERAGE RESPONSE FACTOR FROM MULTIPOINT CALIBRATION CURVE
% RSD - LINEARITY OF MULTIPOINT CALIBRATION CURVE (+/- 20% ACCEPTABLE LIMITS)
AREA - AREA COUNTS FROM DAILY CALIBRATION STANDARD
RF - DETECTOR RESPONSE FACTOR FROM MID-POINT CALIBRATION STANDARD
% DIFF - DIFFERENCE, IN PERCENT, BETWEEN THE AVERAGE RF AND THE OPENING OR CLOSING RF (+/- 15% ACCEPTABLE LIMITS)
OPENING - MID-POINT CALIBRATION STANDARD ANALYZED BEFORE SAMPLE ANALYSES BEGIN
CLOSING - MID-POINT CALIBRATION STANDARD ANALYZED AFTER SAMPLES ANALYSES ARE COMPLETE

ANALYSES PERFORMED BY: MARCO A. PEDRAZA
DATA REVIEWED BY: KEVIN SHELBURNE

ON SITE LABS, INC
PMB 627, HC-01 BOX 29030, CAGUAS, P.R. 00725
TELEPHONE (787) 720-0329 FAX 789-3858

QA/QC REPORT - MS/MSD DATA

MATRIX SPIKE (MS)/MATRIX SPIKE DUPLICATE (MSD)

TEG Project #02I0221CH2M
DATE: 02/22/02

CH2M HILL PROJECT NO. 167722.FI FS
PROJECT NAME: RRNAS SITE 2036

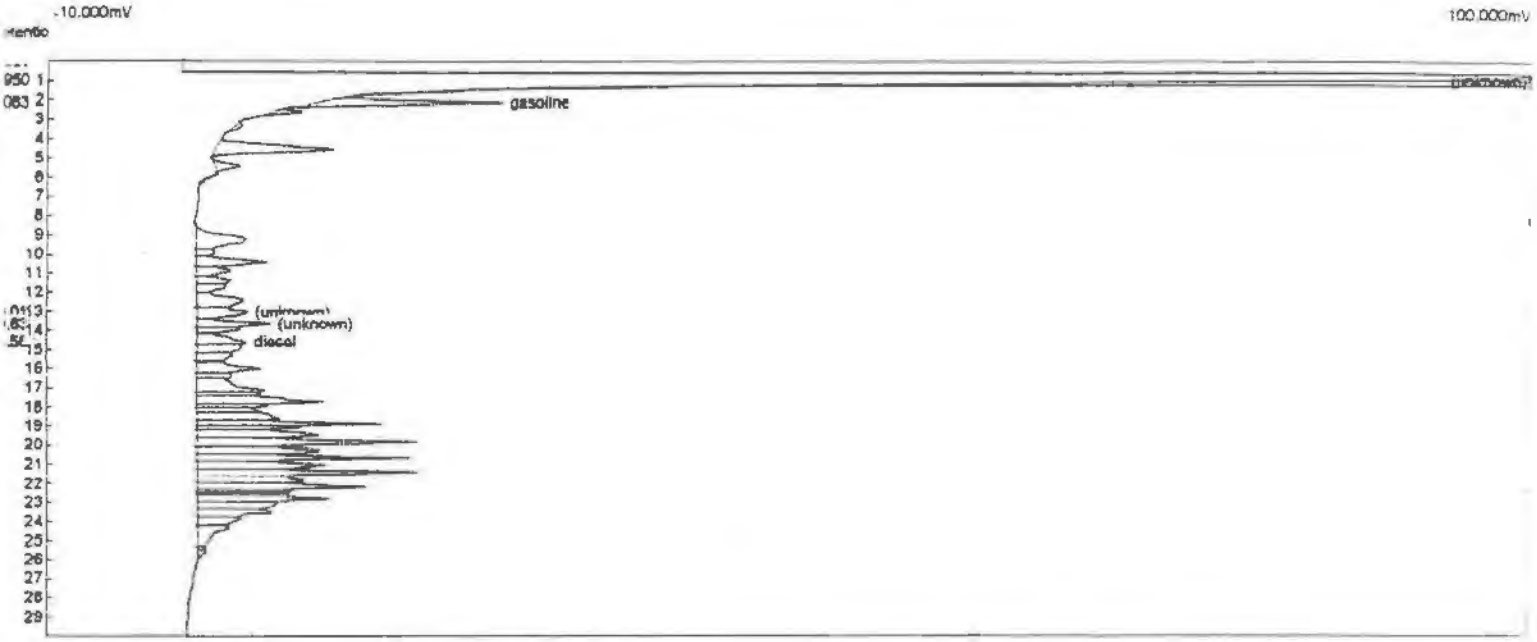
COMPOUND	SPK CON (ppm)	MS CONC (ppm)	%REC MS	MSD CONC (ppm)	%REC MSD	RPD	ACCEPTABLE RPD	ACCEPTABLE RECOVERY
TPH-GASOLINE	500	412	82%	477	95%	15%	15%	81% - 126%
TPH-DIESEL	1,000	878	88%	1020	102%	15%	15%	74% - 131%

ppm = PARTS PER MILLION
MS CONC - ANALYZED CONCENTRATION OF SPIKED SAMPLE
% REC - PERCENT RECOVERY OF SPIKE FROM MATRIX
RPD - RELATIVE PERCENT DIFFERENCE BETWEEN MATRIX SPIKE AND MATRIX SPIKE DUPLICATE RECOVERIES

ANALYSES PERFORMED BY MARCO A PEDRAZA
DATA REVIEWED BY KEVIN SHELBURNE

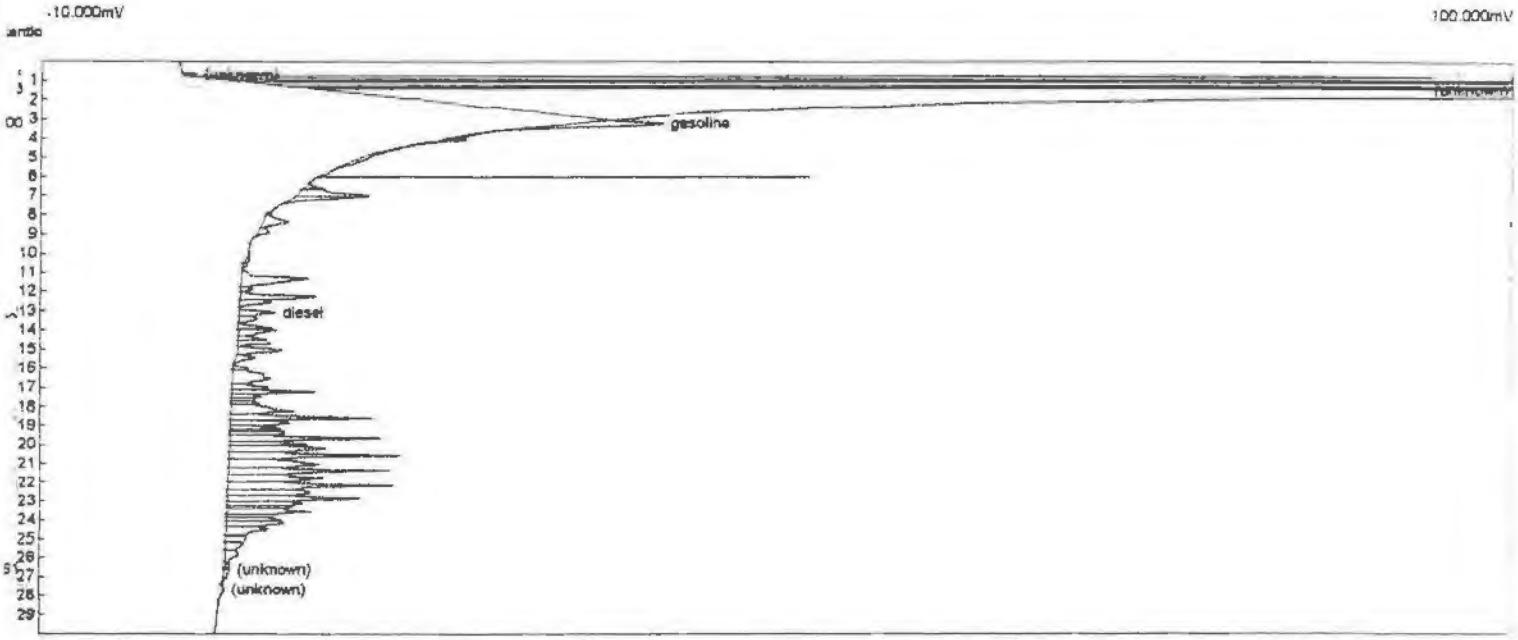
ON SITE LABS, INC
PMB 627, HC-01 BOX 29030, CAGUAS, P R 00725
TELEPHONE (787) 720-0329 FAX 789-3858

Lab name: ~~TEG-PUERTO RICO~~ Onsite Labs Inc
Analysis date: 02/22/2002 06:12:31
Method: EPA 8015B mod.
Lab ID: GC - 5
Description: FID 3 - Ch. 3
Column: XTI-5, 30m, 0.53mm, 1.5um
Carrier: N2
Data file: 0222fc1.CHR ()
Sample: 500/1000 ppm G/D open
Operator: MAP
Comments:



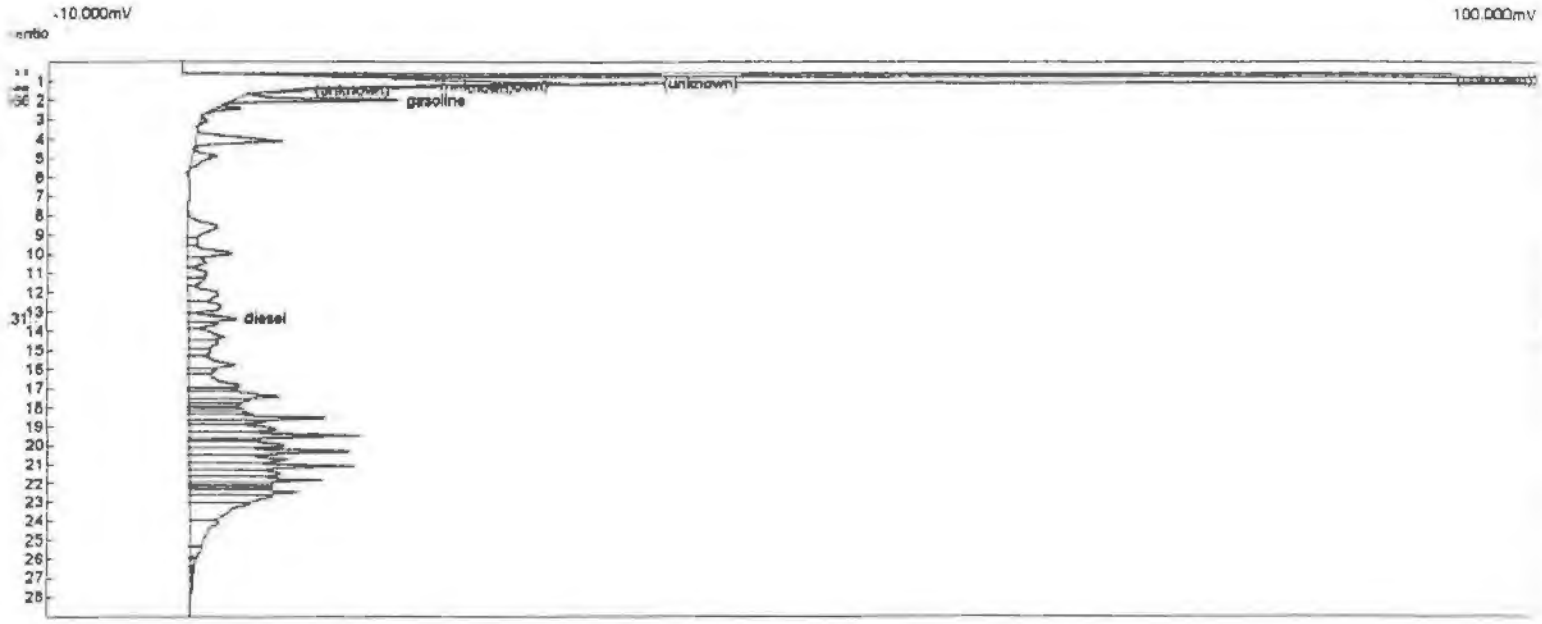
Component	Retention	Area	External	Internal	Units
gasoline	2.083	741.134	511.83	511.8329	
diesel	14.583	3271.602	1106.77	1106.7666	ppm
		4012.736	1618.60	1618.5994	

Lab name: TEG ~~PUERTO RICO~~ Onsite Labs Inc.
Analysis date: 02/22/2002 06:12:31
Method: EPA 8015B mod.
Lab ID: GC - 5
Description: FID 4 - Ch. 4
Column: XTI-5, 30m, 0.53mm, 1.5um
Carrier: N2
File: 0222fd1.CHR ()
Sample: 500/1000 ppm G/D open
Operator: MAP
Comments:



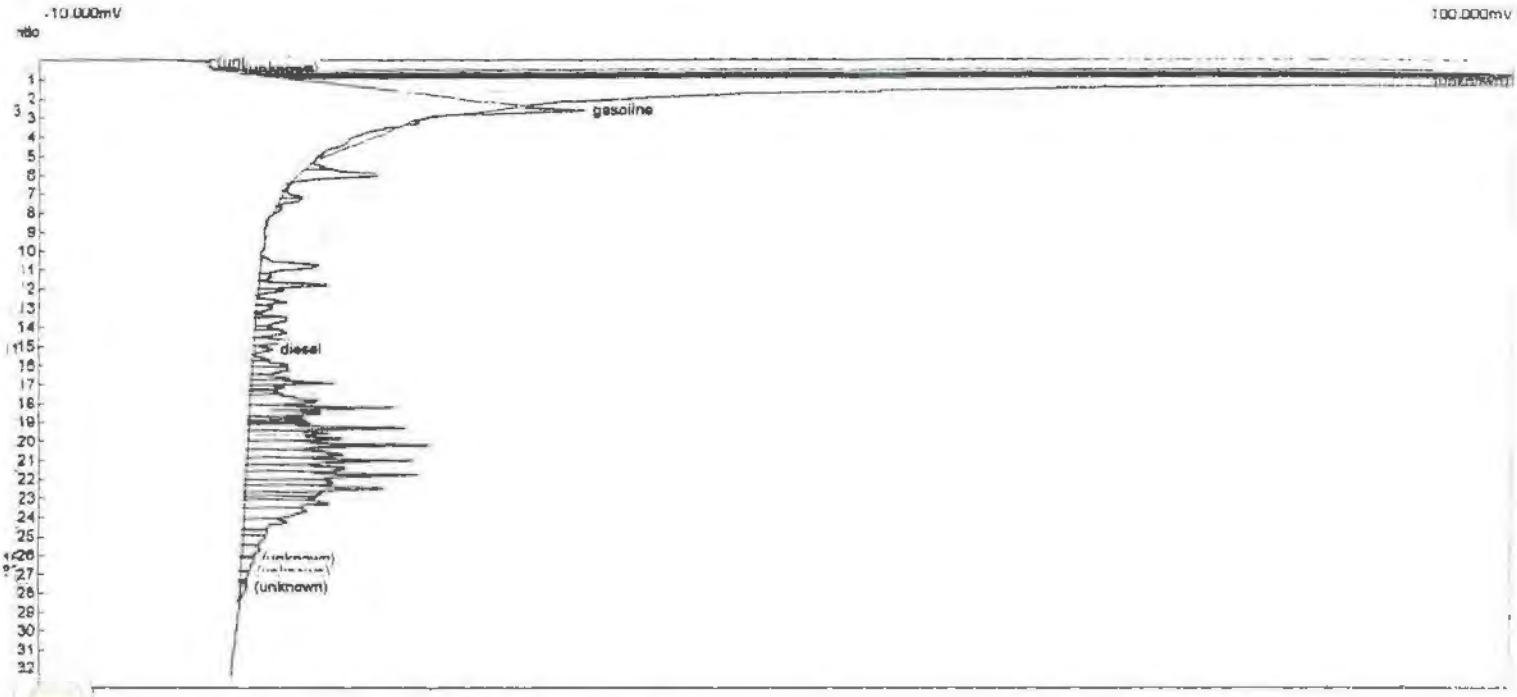
Component	Retention	Area	External	Internal	Units
gasoline	3.200	652.407	533.01	533.0118	
diesel	13.066	2672.290	1102.43	1102.4297	ppm
		3324.696	1635.44	1635.4415	

Lab name: On Site Labs Inc
nalysis date: 02/22/2002 12:47:43
Method: EPA 8015B mod.
Lab ID: GC - 5
Description: FID 3 - Ch. 3
Column: XTI-5, 30m, 0.53mm, 1.5um
Carrier: N2
Data file: 0222fc14.chr ()
Sample: 500/1000 ppm G/D CLOSE
Operator: MAP
Comments:



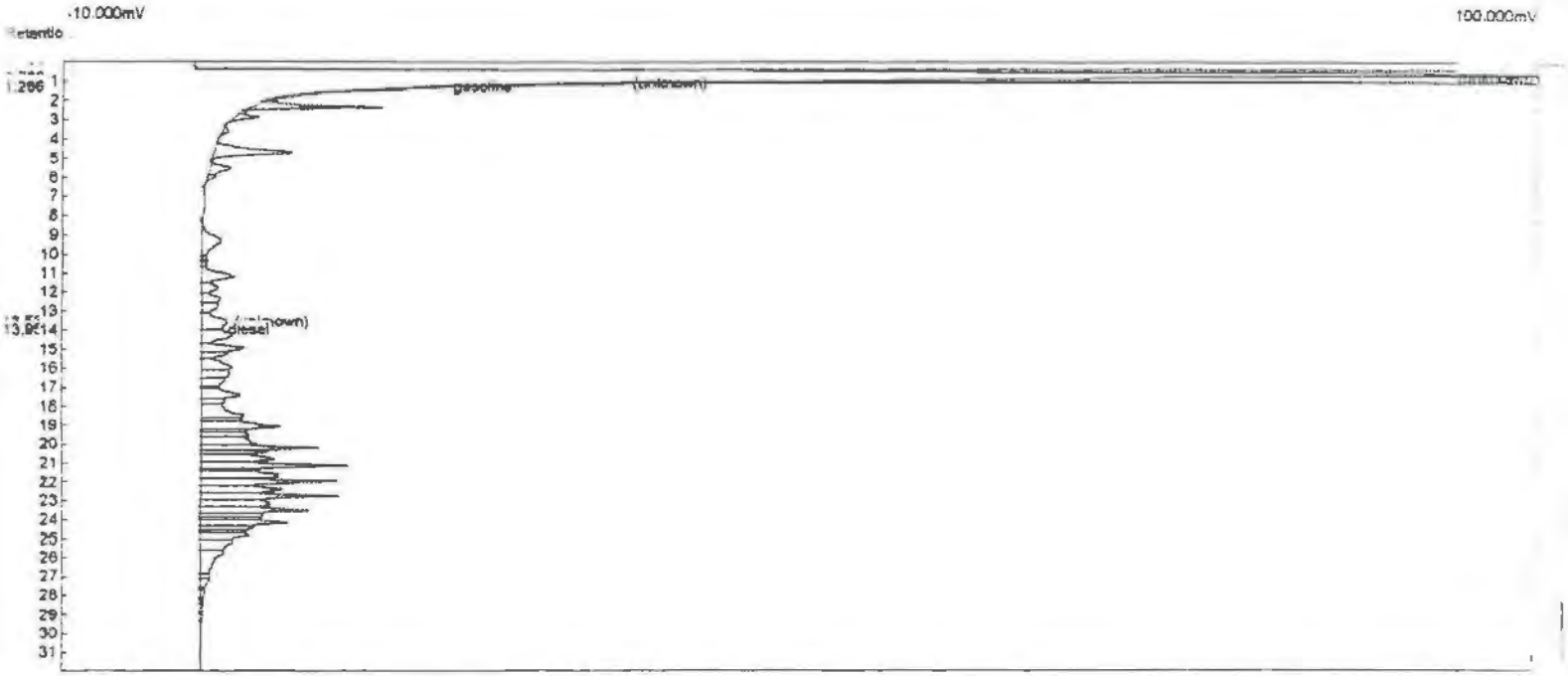
Component	Retention	Area	External	Internal	Units
soline	1.988	765.805	528.87	528.8712	
sel	13.316	2986.524	1010.33	1010.3261	ppm
		3752.330	1539.20	1539.1973	

Job name: On Site Labs Inc
Analysis date: 02/22/2002 12:47:43
Method: EPA 8015B mod.
Lab ID: GC - 5
Description: FID 4 - Ch. 4
Column: XTI-5, 30m, 0.53mm, 1.5um
Carrier: N2
Data file: 0222fd14.CHR ()
Sample: 500/1000 ppm G/D CLOSE
Operator: MAP
Comments:



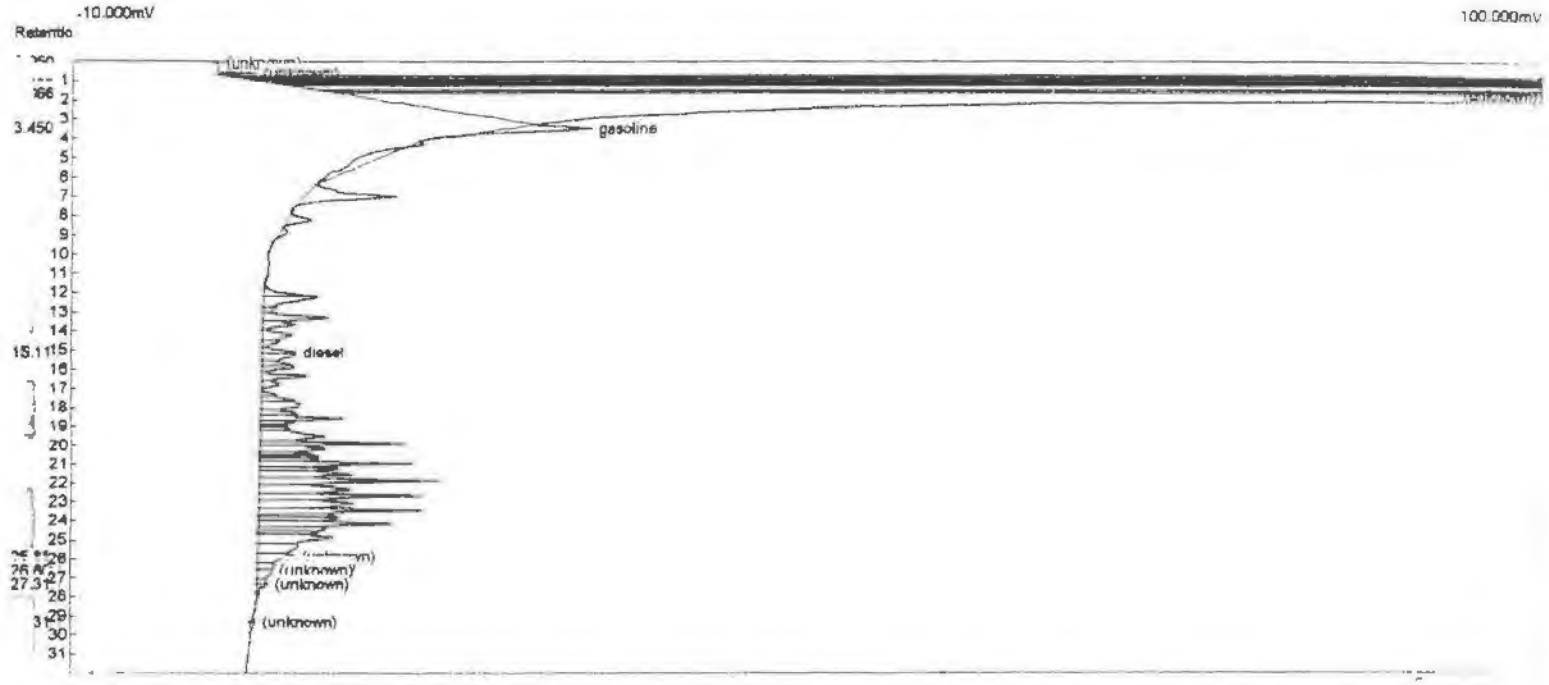
Component	Retention	Area	External	Internal	Units
gasoline	2.583	694.175	567.14	567.1300	
diesel	15.116	2657.186	1096.20	1096.1986	ppm
		3351.361	1663.34	1663.3355	

Lab name: On Site Labs Inc
Analysis date: 02/22/2002 06:54:26
Method: EPA 8015B mod.
Lab ID: GC - 5
Description: FID 3 - Ch. 3
Column: XTI-5, 30m, 0.53mm, 1.5um
Carrier: N2
Data file: 0222fc2.CHR ()
Sample: blank matrix spike
Operator: MAP
Comments:



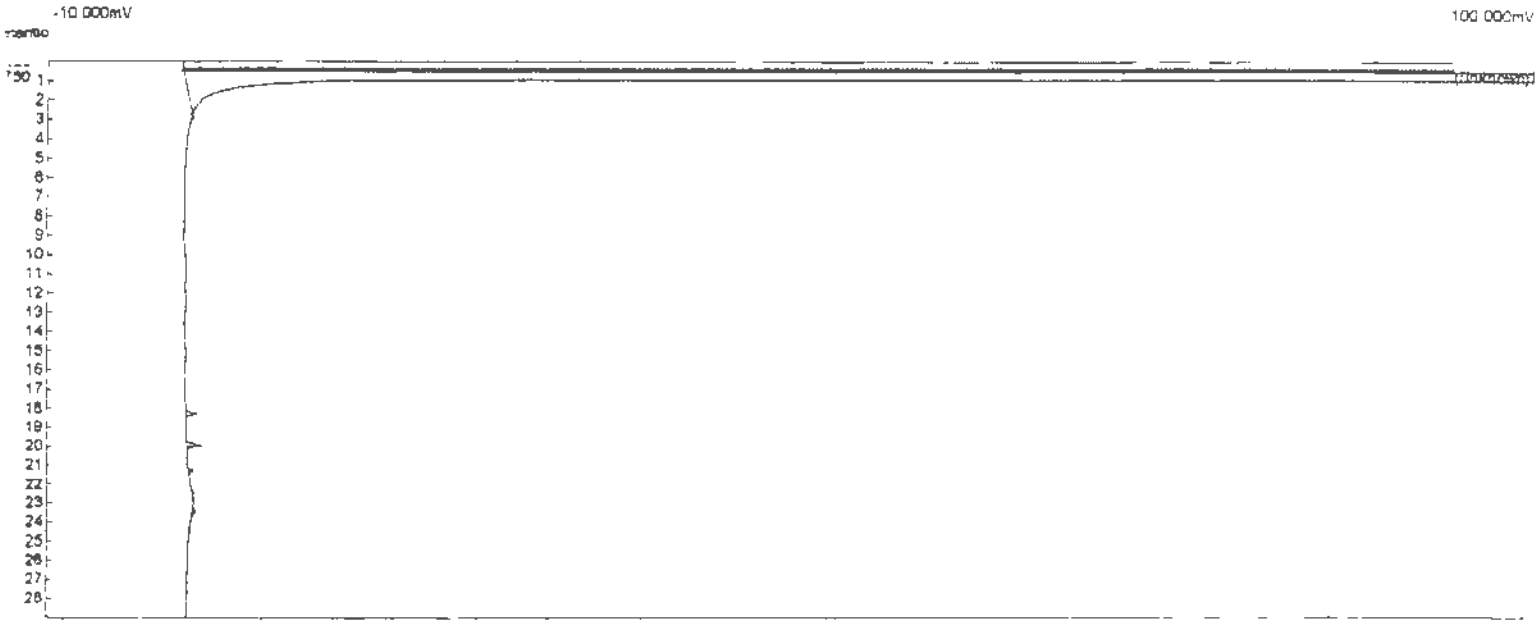
Component	Retention	Area	External	Internal	Units
gasoline	1.266	597.011	412.30	412.3004	
diesel	13.950	2594.333	877.65	877.6497	ppm
		3191.344	1289.95	1289.9501	

Lab name: On Site Labs Inc
Analysis date: 02/22/2002 06:54:26
Method: EPA 8015B mod.
Lab ID: GC - 5
Description: FID 4 - Ch. 4
Column: XTI-5, 30m, 0.53mm, 1.5um
Carrier: N2
file: 0222fd2.CHR ()
nple: blank matrix spike duplica
erator: MAP
Comments:



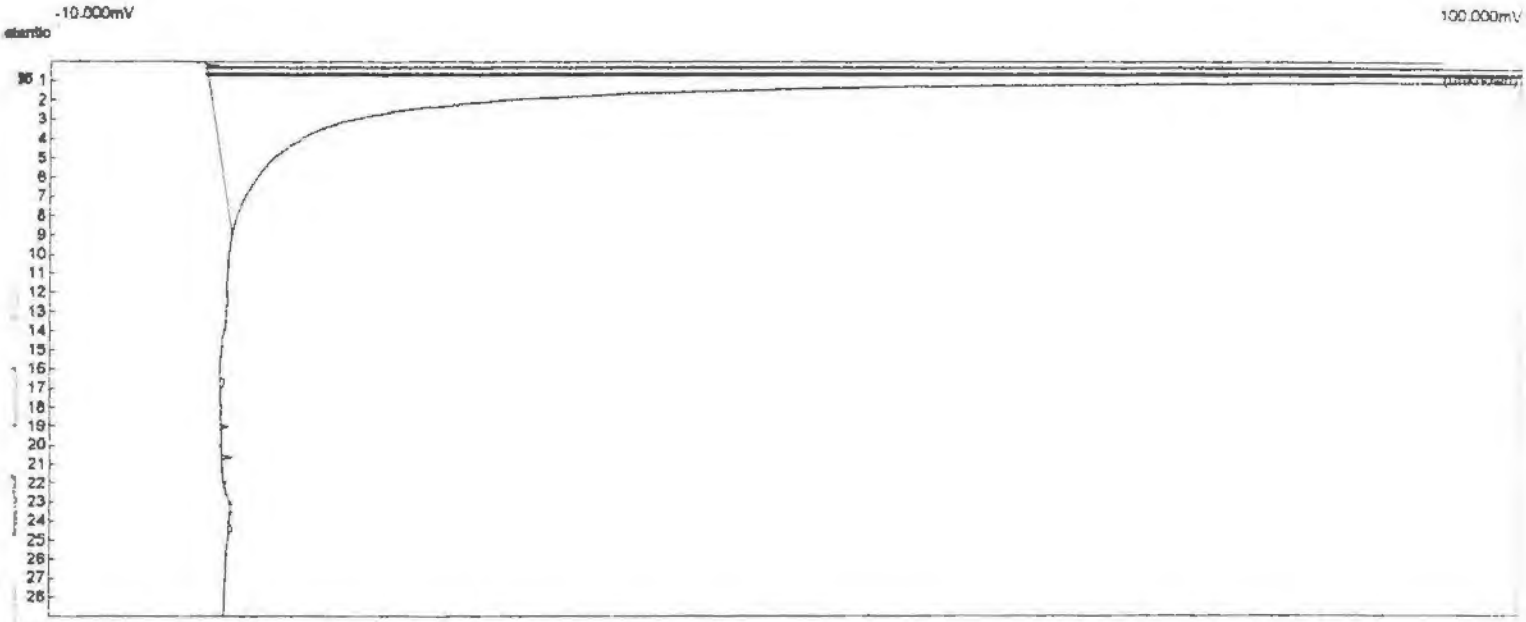
C nent	Retention	Area	External	Internal	Units
gasoline	3.450	583.535	476.74	476.7447	
diesel	15.116	2472.348	1019.95	1019.9455	ppm
1					
		3055.884	1496.69	1496.6902	

Lab name: On Site Labs Inc
Analysis date: 02/22/2002 07:37:40
Method: EPA 8015B mod.
Lab ID: GC - 5
Description: FID 3 - Ch. 3
Column: XTI-5, 30m, 0.53mm, 1.5um
Carrier: N2
Data file: 02221c3.CHR ()
Sample: METHOD BLANK
Operator: MAP
Comments:



Component	Retention	Area	External	Internal	Units
		0.000	0.00	0.0000	

Lab name: On Site Labs Inc
nalysis date: 02/22/2002 07:37:40
Method: EPA 8015B mod.
Lab ID: GC - 5
Description: FID 4 - Ch. 4
Column: XTI-5, 30m, 0.53mm, 1.5um
Carrier: N2
File: 0222fd3.CHR ()
mple: METHOD BLANK
Operator: MAP
Comments:



Component	Retention	Area	External	Internal	Units
		0.000	0.00	0.0000	

LABORATORY QA/QC

CH2M HILL

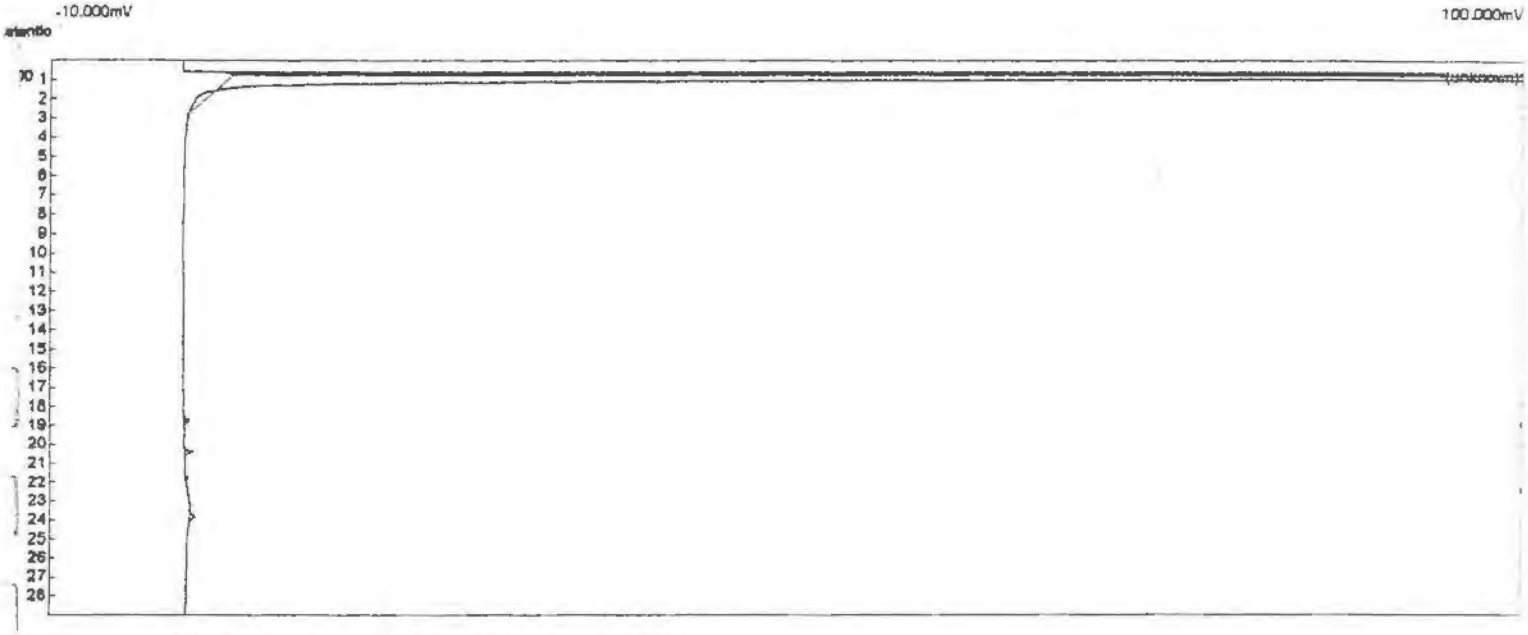
TEG Project #02I0221CH2M

TPH (Mod. EPA Method 8015B) ANALYSES OF WATER

SAMPLE NUMBER	DATE ANALYZED	TPH-GAS C_5 - C_{12} (mg/L)	TPH-DIESEL C_{13} - C_{24} (mg/L)
HLA009	02/22/02	ND	ND
HLA009 REP	02/22/02	ND	ND
DETECTION LIMIT (mg/L)		10	25

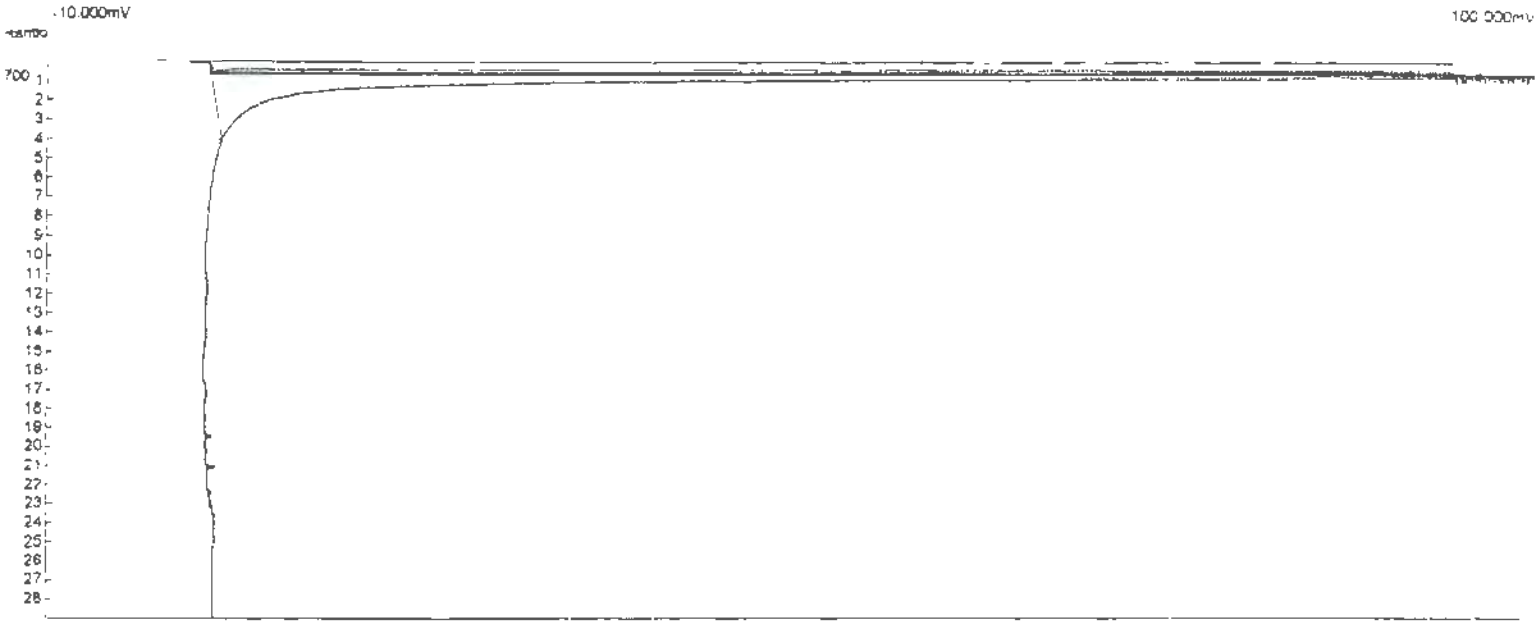
mg/L = MILLIGRAMS PER LITER
REP = LABORATORY REPLICATE
"ND" INDICATES ANALYTE NOT DETECTED AT OR ABOVE THE LISTED DETECTION LIMIT
ANALYSES PERFORMED BY MARCO A PEDRAZA
DATA REVIEWED BY KEVIN SHELBURNE

Lab name: On Site Labs Inc
nalysis date: 02/22/2002 08:13:53
Method: EPA 8015B mod.
Lab ID: GC - 5
Description: FID 3 - Ch. 3
Column: XTI-5, 30m, 0.53mm, 1.5um
Carrier: N2
File: 0222fc4.CHR ()
mple: HLA017/0221CH2M
Operator: MAP
Comments:



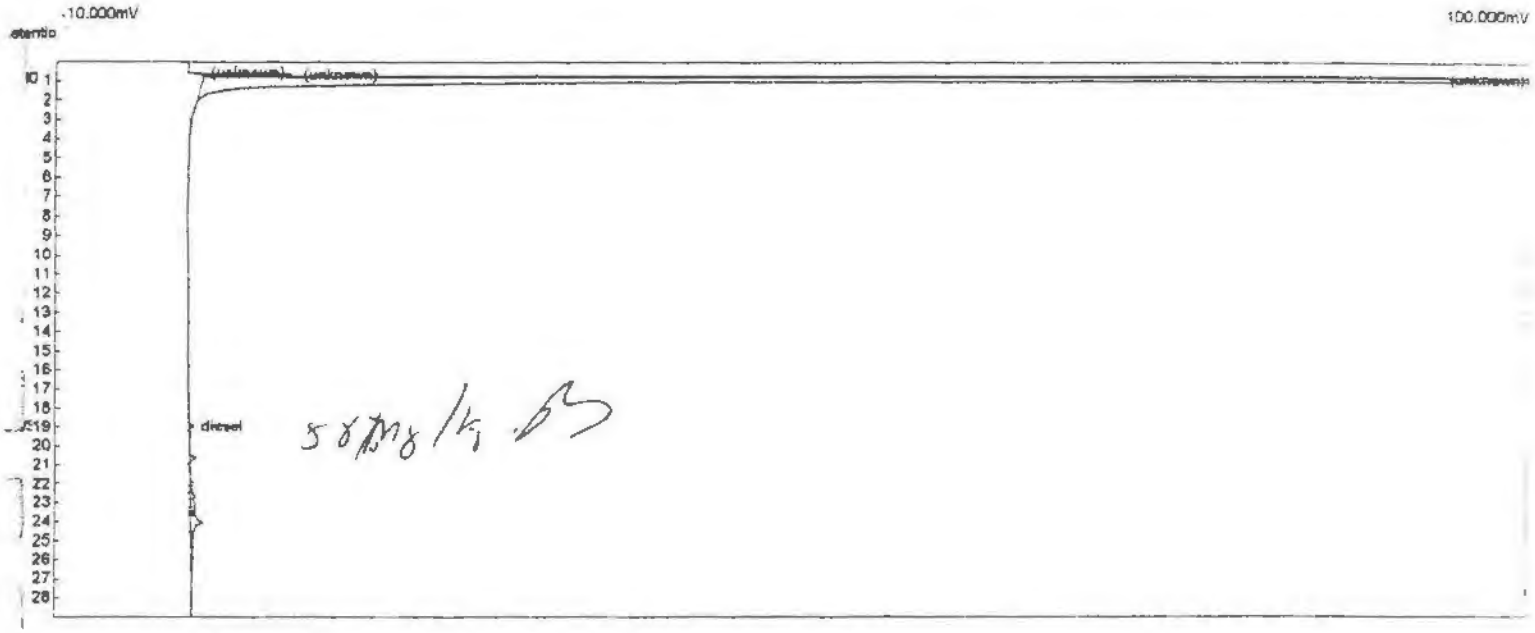
Component	Retention	Area	External	Internal	Units
		0.000	0.00	0.0000	ND

Lab name: On Site Labs Inc
Analysis date: 02/22/2002 08:13:53
Method: EPA 8015B mod.
Lab ID: GC - 5
Description: FID 4 - Ch. 4
Column: XTI-5, 30m, 0.53mm, 1.5um
Carrier: N2
Data file: 0222fd4.CHR ()
Sample: HLA018/0221CH2M
Operator: MAP
Comments:



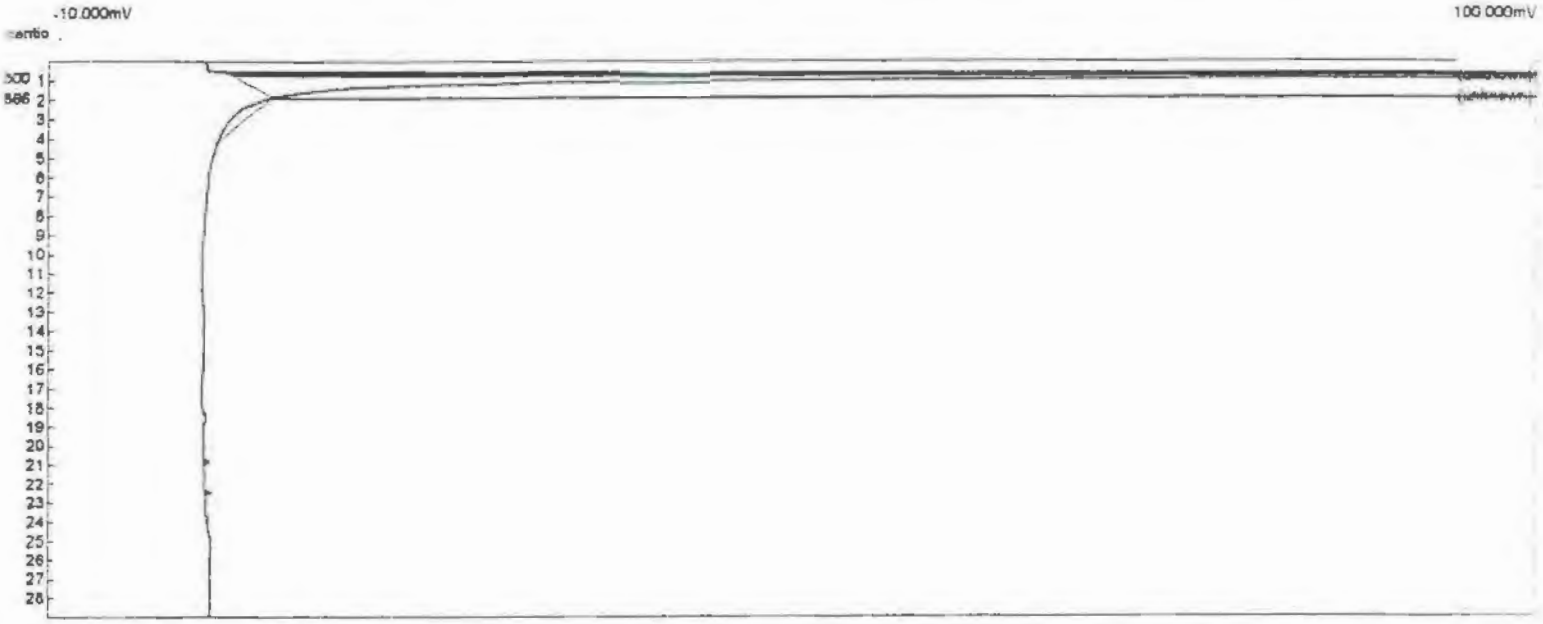
Component	Retention	Area	External	Internal	Units
		0.000	0.00	0.0000	

Lab name: On Site Labs Inc
alysis date: 02/22/2002 09:55:38
Method: EPA 8015B mod.
Lab ID: GC - 5
Description: FID 3 - Ch. 3
Column: XTI-5, 30m, 0.53mm, 1.5um
Carrier: N2
File: 0222fc7.CHR ()
ple: HLA022/0221CH2M
Operator: MAP
Comments:



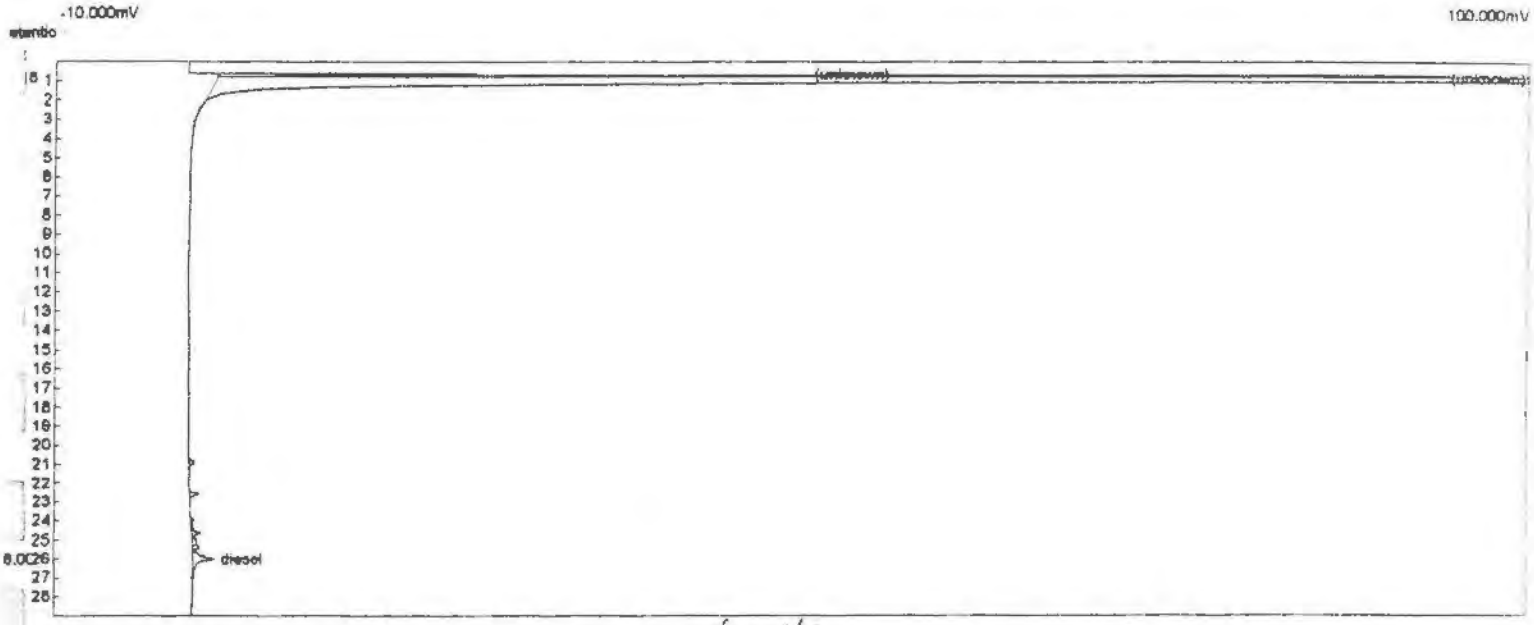
Component	Retention	Area	External	Internal	Units	DF/% sol.
	18.933	76.352	25.83	25.8293	ppm	2.892 = 57.9132
		76.352	25.83	25.8293		

Lab name: On Site Labs Inc
Analysis date: 02/22/2002 08:47:50
Method: EPA 8015B mod.
Lab ID: GC - 5
Description: FID 4 - Ch. 4
Column: XTI-5, 30m, 0.53mm, 1.5um
Carrier: N2
Data file: 0222fd5.CHR ()
Sample: HLA023/0221CH2M
Operator: MAP
Comments:



Component	Retention	Area	External	Internal	Units
		0.000	0.00	0.0000	

Lab name: On Site Labs Inc
Analysis date: 02/22/2002 09:21:01
Method: EPA 8015B mod.
Lab ID: GC - 5
Description: FID 3 - Ch. 3
Column: XTI-5, 30m, 0.53mm, 1.5um
Carrier: N2
File: 0222fc6.CHR ()
Sample: HLA009/0221CH2M
Operator: MAP
Comments:

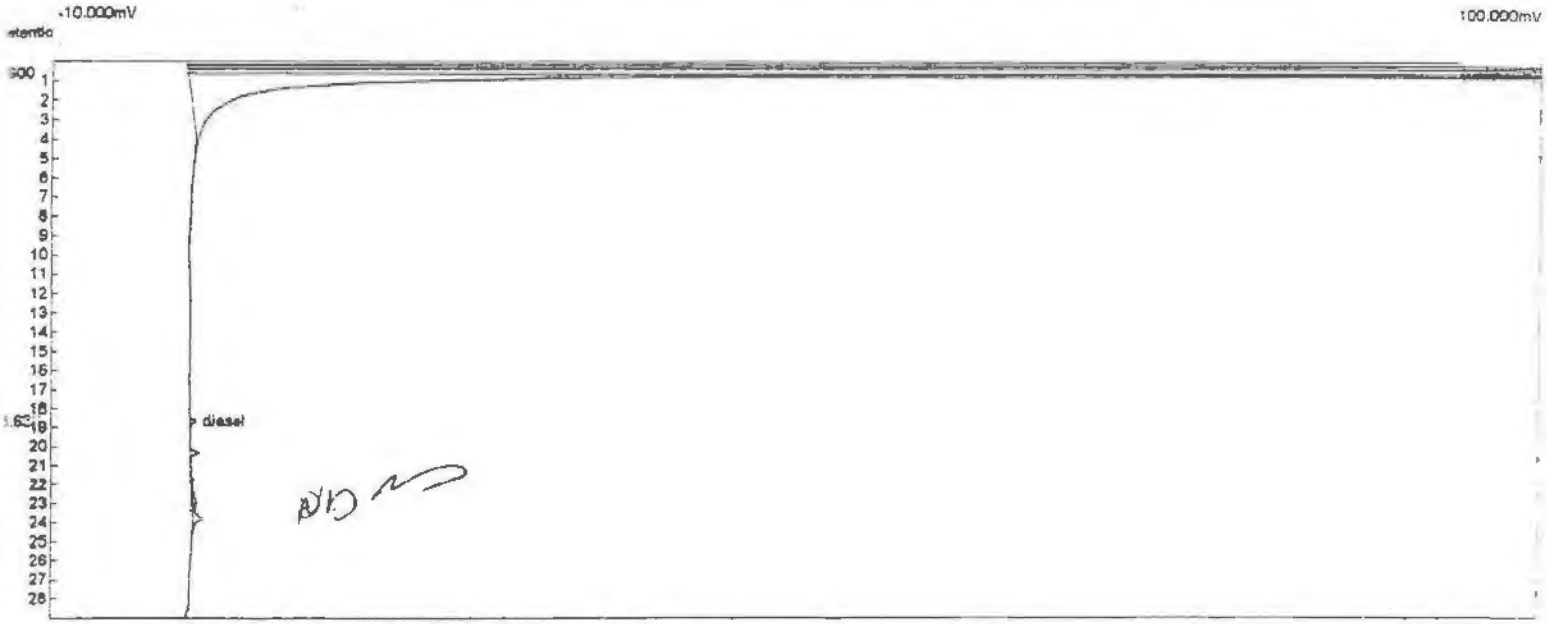


Component	Retention	Area	External	Internal	Units
Diesel	26.000	35.478	12.00	12.0020	ppm
		35.478	12.00	12.0020	

DF = 1/2

2.003 mg/L ND

Lab name: On Site Labs Inc
Analysis date: 02/22/2002 10:28:01
Method: EPA 8015B mod.
Lab ID: GC - 5
Description: FID 3 - Ch. 3
Column: XTI-5, 30m, 0.53mm, 1.5um
Carrier: N2
Data file: 0222fc8.CHR ()
Sample: HLA009/0221CH2M REP
Operator: MAP
Comments:

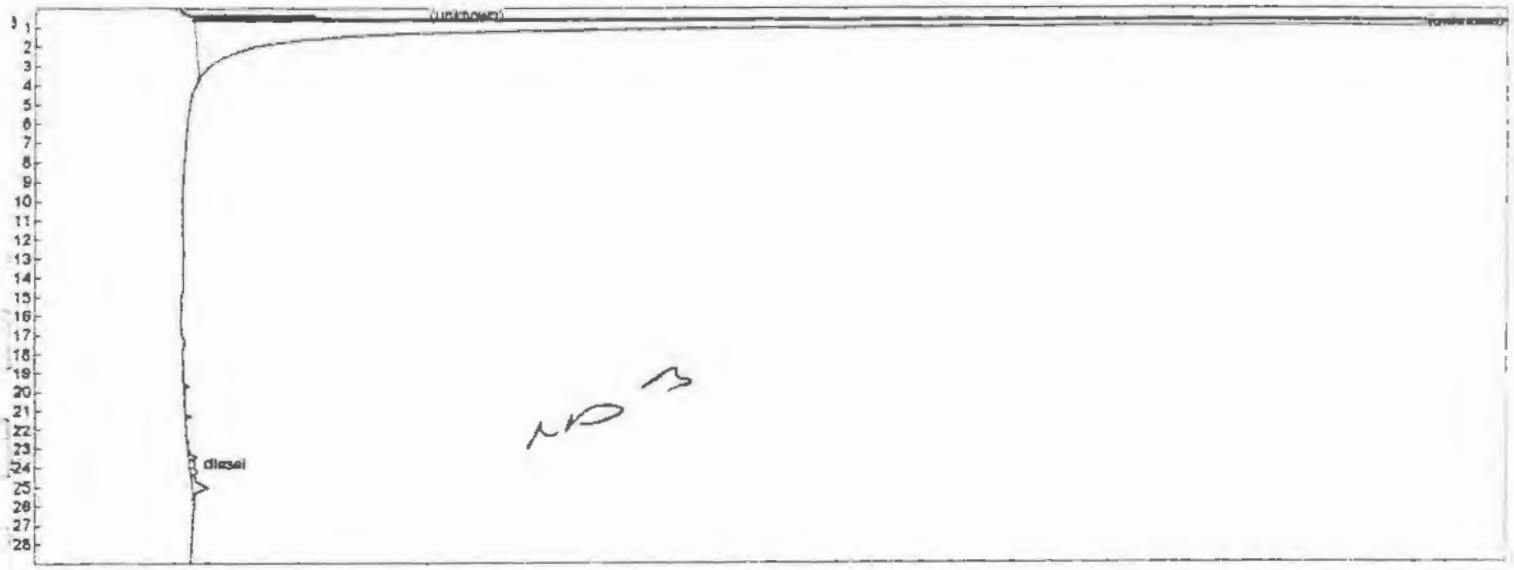


Component	Retention	Area	External	Internal	Units
esel	18.633	49.963	16.90	16.9022	ppm
		49.963	16.90	16.9022	

1/6 = 2.817

Lab name: On Site Labs Inc
alysis date: 02/22/2002 09:55:36
Method: EPA 8015B mod.
Lab ID: GC - 5
Description: FID 4 - Ch. 4
Column: XTI-5, 30m, 0.53mm, 1.5um
C[illegible]r: N2
D[illegible]e: 0222fd7.CHR 0
[illegible]le: HLA011FD 20221CH2M
Operator: MAP
Comments: KM

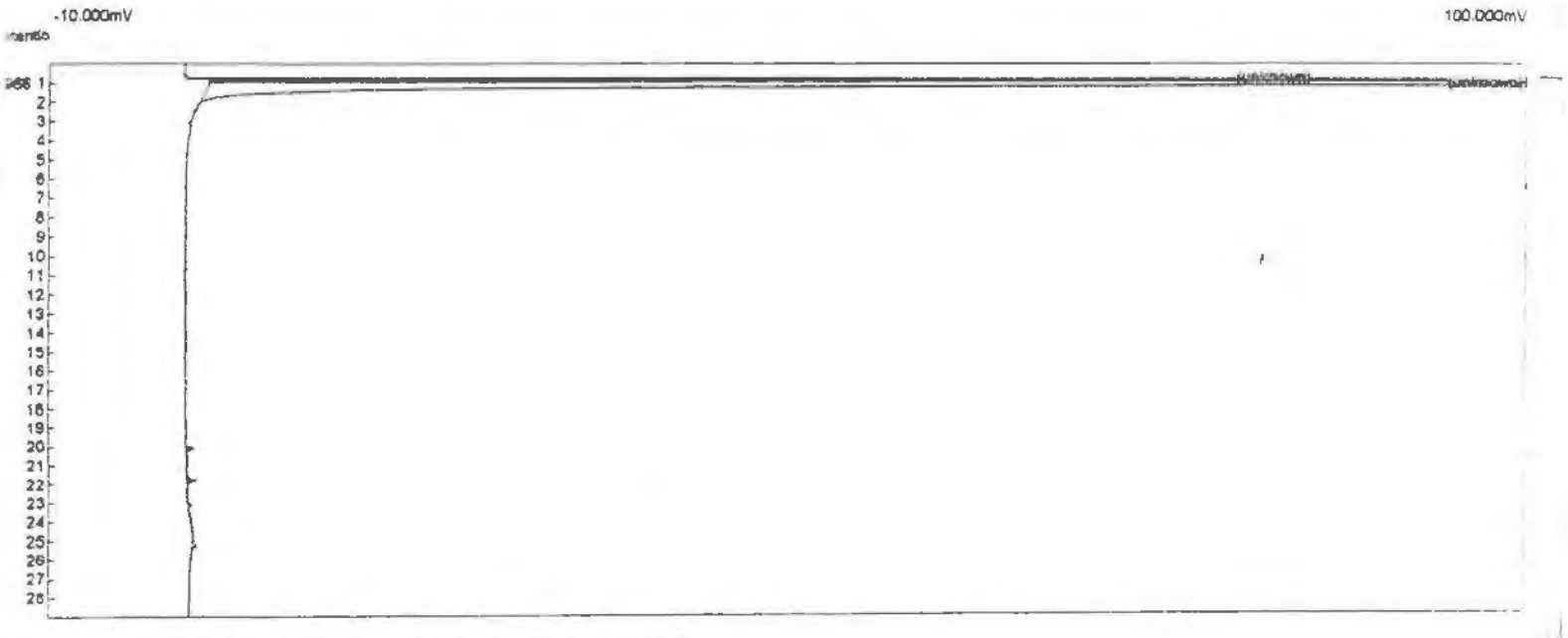
-10.000mV 100.000mV



Component	Retention	Area	External	Internal	Units
[illegible]el	23.766	38.861	16.03	16.0320	ppm
		38.861	16.03	16.0320	

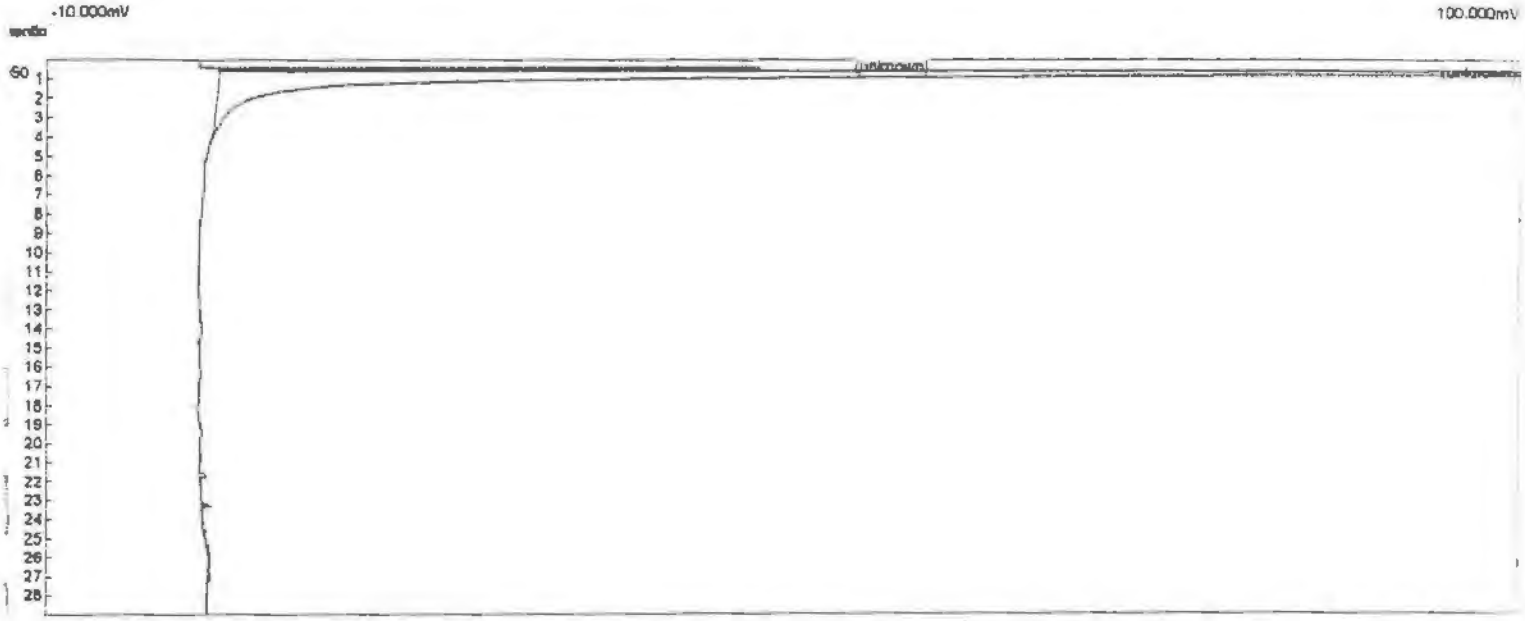
F.F = 1/L = 2672

Analysis date: 02/22/2002 08:47:50
Method: EPA 8015B mod.
Lab ID: GC - 5
Description: FID 3 - Ch. 3
Column: XTI-5, 30m, 0.53mm, 1.5um
Carrier: N2
Data file: 0222fc5.CHR ()
Sample: HLA016/0221CH2M
Operator: MAP
Comments:



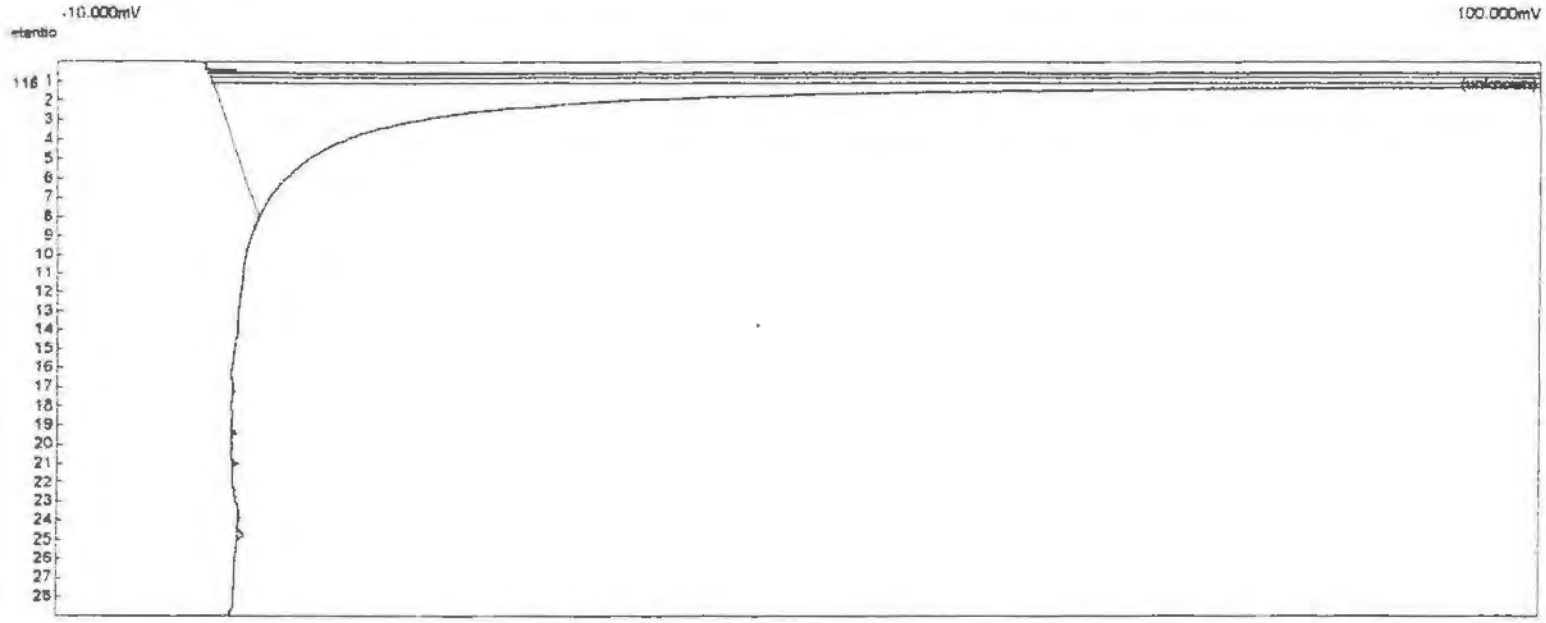
Component	Retention	Area	External	Internal	Units
		0.000	0.00	0.0000	

Lab name: On Site Labs Inc
nalysis date: 02/22/2002 09:21:01
Method: EPA 8015B mod.
Lab ID: GC - 5
Description: FID 4 - Ch. 4
Column: XTI-5, 30m, 0.53mm, 1.5um
C rrier: N2
le: 0222fd6.CHR ()
ple: HLA019/0221CH2M
Operator: MAP
Comments:



Component	Retention	Area	External	Internal	Units
		0.000	0.00	0.0000	

Lab name: On Site Labs Inc
Analysis date: 02/22/2002 10:28:01
Method: EPA 8015B mod.
Lab ID: GC - 5
Description: FID 4 - Ch. 4
Column: XTI-5, 30m, 0.53mm, 1.5um
Carrier: N2
Data file: 0222fd8.CHR ()
Sample: HLA0~~12EB~~1/0221CH2M
Operator: MAP HLA020 EB2 ~~1~~
Comments:



Component	Retention	Area	External	Internal	Units
		0.000	0.00	0.0000	

QA/QC REPORT - CALIBRATION DATA

On Site Project #02I0221CH2M
DAILY CALIBRATION DATE: 02/22/02

CH2M HILL PROJECT NO. 167722.F1.FS
PROJECT NAME: RRNAS SITE 2036, CEIBA

			INITIAL		OPENING			CLOSING		
COMPOUND	DETECTOR	CALIB RANGE	RF	%RSD	AREA	RF	%DIFF	AREA	RF	%DIFF
BENZENE	PID1 - GC2	0.5 - 100	1.66	12.0%	35.01	1.40	15.7%	31.47	1.57	5.2%
TOLUENE	PID1 - GC2	0.5 - 100	1.62	12.3%	37 07	1.48	8.5%	33.72	1.69	4.1%
ETHYLBENZENE	PID1 - GC2	0.5 - 100	1.17	16.6%	32 72	1.31	11.9%	24.32	1.22	3.9%
m&p-XYLENES	PID1 - GC2	1.0 - 200	1.80	15.9%	85.46	1.71	5.1%	76.90	1.92	6.8%
o-XYLENES	PID1 - GC2	0.5 - 100	1.36	12.1%	33.95	1.36	0.2%	29.43	1.47	8.2%

CALIB RANGE - RANGE OF CALIBRATION CURVE IN ppb
INITIAL RF - AVERAGE RESPONSE FACTOR FROM MULTIPOINT CALIBRATION CURVE
% RSD - LINEARITY OF MULTIPOINT CALIBRATION CURVE (+/- 20% ACCEPTABLE LIMITS)
AREA - AREA COUNTS FROM DAILY CALIBRATION STANDARD
RF - DETECTOR RESPONSE FACTOR FROM MID-POINT CALIBRATION STANDARD
% DIFF - DIFFERENCE, IN PERCENT, BETWEEN THE AVERAGE RF AND THE OPENING OR CLOSING RF (+/- 20% ACCEPTABLE LIMITS)
OPENING - MID-POINT CALIBRATION STANDARD ANALYZED BEFORE SAMPLE ANALYSES BEGIN
CLOSING - MID-POINT CALIBRATION STANDARD ANALYZED AFTER SAMPLES ANALYSES ARE COMPLETE

ANALYSES PERFORMED BY MARCO A PEDRAZA
DATA REVIEWED BY KEVIN SHELBURNE

On Site Labs, Inc
PMB 627, HC-01 BOX 29030, CAGUAS, P R 00725
TELEPHONE (7[illegible] 0329 FAX 789-3858

QA/QC REPORT - MS/MSD DATA

MATRIX SPIKE (MS)/MATRIX SPIKE DUPLICATE (MSD)

On Site Project #02I0221CH2M
DATE: 02/22/02

CH2M HILL PROJECT NO. 167722.FI.FS
PROJECT NAME: RRNAS SITE 2036

COMPOUND	SPK CONC (ppb)	MS CONC (ppb)	%REC MS	MSD CONC (ppb)	%REC MSD	RPD	ACCEPTABLE RPD	ACCEPTABLE RECOVERY
BENZENE	12.0	12.6	105%	10.3	86%	20%	20%	82% - 117%
TOLUENE	12.0	13.6	113%	12.1	101%	12%	20%	87% - 120%
ETHYLBENZENE	12.0	14.6	122%	13.0	108%	12%	20%	83% - 131%
TOTAL XYLENES	36.0	43.8	122%	37.6	104%	15%	20%	87% - 123%

ppb = PARTS PER BILLION

MS CONC - ANALYZED CONCENTRATION OF SPIKED SAMPLE

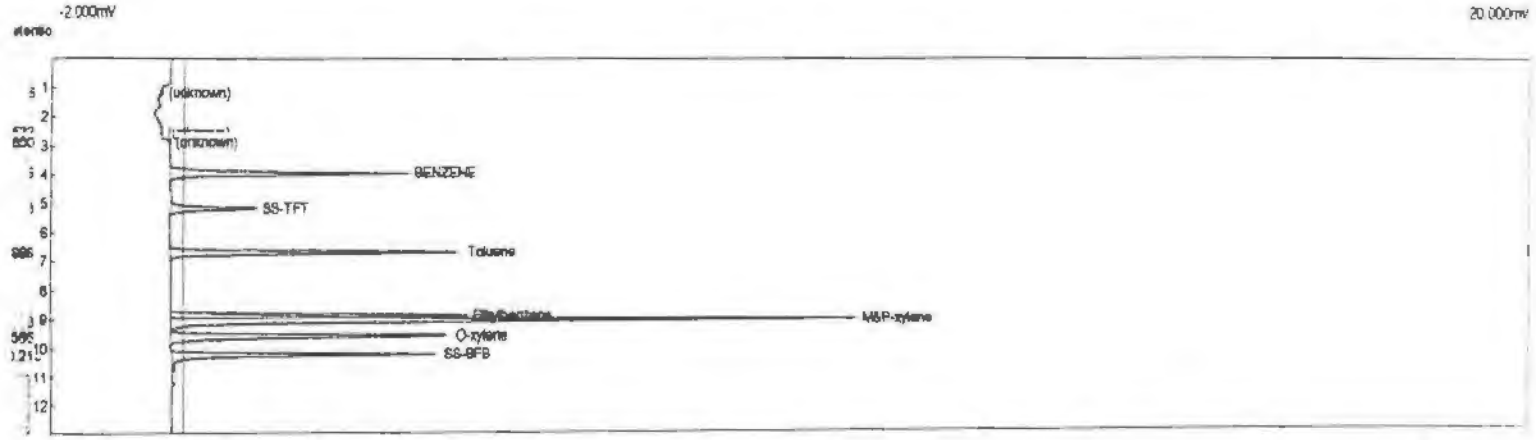
% REC - PERCENT RECOVERY OF SPIKE FROM MATRIX

RPD - RELATIVE PERCENT DIFFERENCE BETWEEN MATRIX SPIKE AND MATRIX SPIKE DUPLICATE RECOVERIES

ANALYSES PERFORMED BY MARCO A PEDRAZA
DATA REVIEWED BY KEVIN SHELBURNE

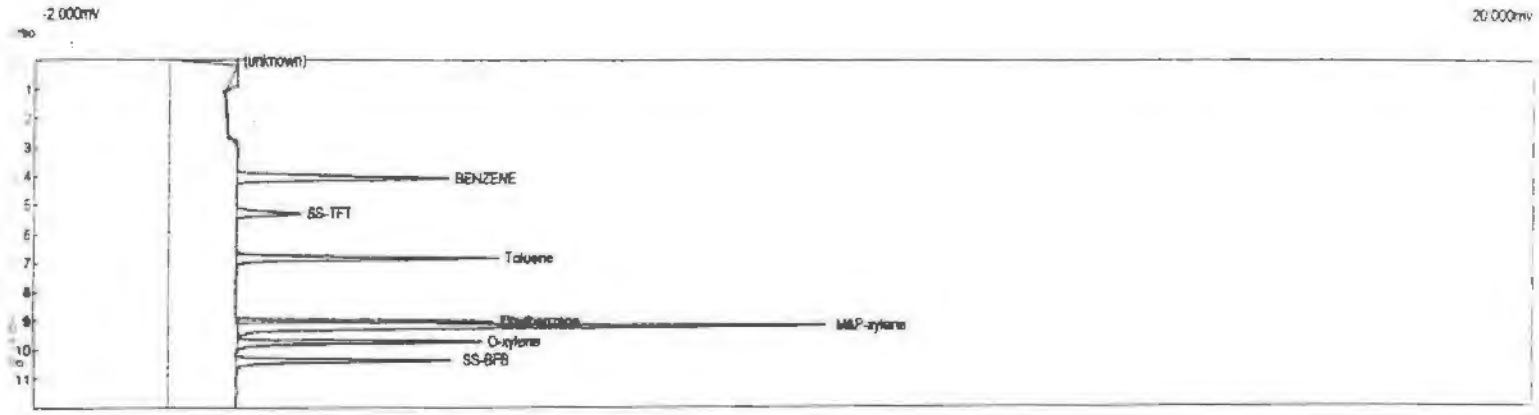
ON SITE LABS, INC
PMB 627, HC-01 BOX 29030, CAGUAS, P R 00725
TELEPHONE (787) 720-0329 FAX 789-3858

Lab name: On Site Labs Inc
Analysis date: 02/22/2002 09:34:26
Method: EPA 8021 mod.
Lab ID: GC-2
Description: PID - Ch. 1
Column: Rtx-5,30m,5.0um,0.53mm
Carrier: N2
[illegible] file: 0222pt1.chr ()
[illegible]nple: 25 ppb BTEX OPEN STD
[illegible]erator: MAP



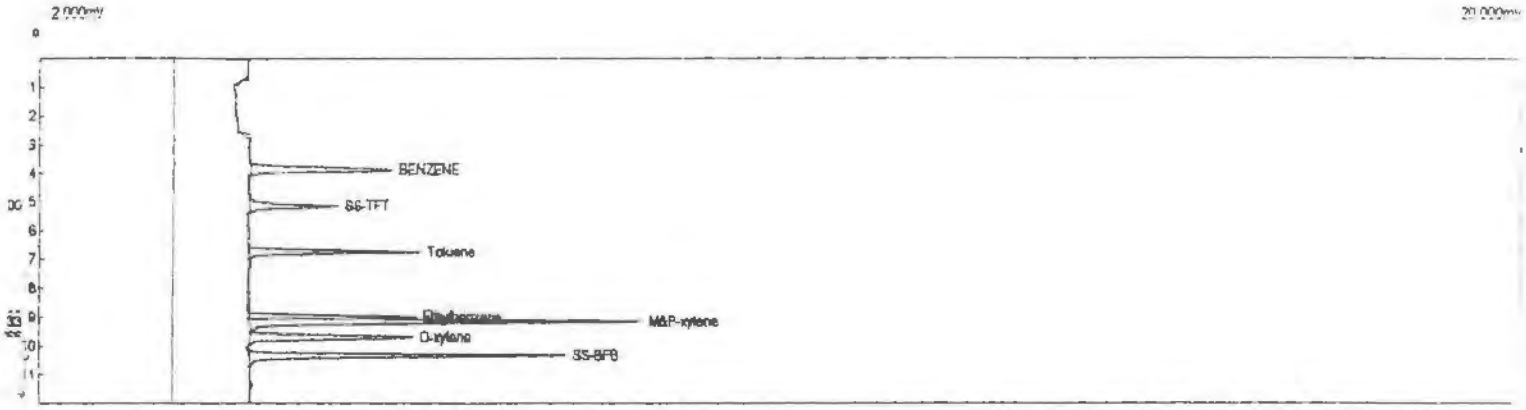
Component	Retention	Area	External	Internal	Units
[illegible]NZENE	3.916	35.005	21.09	21.0873	ppb
[illegible]S-TFT	5.133	13.242	9.58	9.5818	ppb
[illegible]luene	6.666	37.068	22.88	22.8815	ppb
[illegible]ylbenzene	8.883	32.718	27.96	27.9637	
[illegible]P-xylene	9.050	85.455	47.48	47.4750	
[illegible]-xylene	9.566	33.949	24.96	24.9625	ppb
[illegible]BF[illegible]	10.216	32.322	10.46	10.4600	ppb
		269.758	164.41	164.4118	

nalysis date: 02/22/2002 16:42:36
Method: EPA 8021 mod.
Lab ID: GC-2
Description: PID - Ch. 1
Column: Rtx-5,30m,5.0um,0.53mm
Carrier: N2
Data file: 0222pt14.chr ()
Sample: 20 ppb BTEX CLOSE STD
Operator: MAP



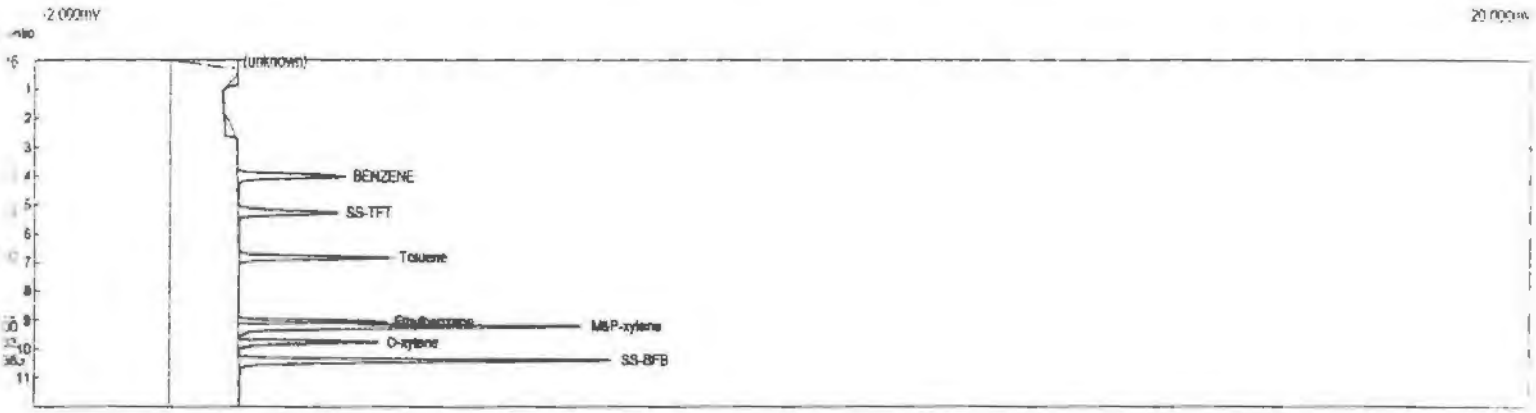
Component	Retention	Area	External	Internal	Units
NZENE	4.033	31.466	18.96	18.9554	ppb
-TFT	5.250	10.031	7.26	7.2583	ppb
luene	6.816	33.723	20.82	20.8167	ppb
ylbenzene	9.033	24.319	20.79	20.7855	
P-xylene	9.200	76.902	42.72	42.7233	
ylene	9.716	29.426	21.64	21.6368	ppb
BFB	10.366	26.358	8.53	8.5301	ppb
		232.225	140.71	140.7061	

Lab name: On Site Labs Inc
Analysis date: 02/22/2002 10:08:24
Method: EPA 8021 mod.
Lab ID: GC-2
Description: PID - Ch. 1
Column: Rtx-5,30m,5.0um,0.53mm
Carrier: N2
File: 0222pt3.chr ()
Sample: blank matrix spike
Operator: MAP



Component	Retention	Area	External	Internal	Units
BENZENE	3.833	20.874	12.57	12.5747	ppb
SS-TFT	5.100	14.051	10.17	10.1671	ppb
Toluene	6.700	22.044	13.61	13.6074	ppb
Ethylbenzene	8.966	17.074	14.59	14.5932	
M&P-xylene	9.133	52.098	28.94	28.9433	
O-xylene	9.666	20.266	14.90	14.9015	ppb
SS-BFB	10.300	38.611	12.50	12.4955	ppb
		185.018	107.28	107.2827	

Lab name: On Site Labs Inc
nalysis date: 02/22/2002 14:18:24
Method: EPA 8021 mod.
Lab ID: GC-2
Description: PID - Ch. 1
Column: Rtx-5,30m,5.0um,0.53mm
Carrier: N2
Data file: 0222pt12.chr ()
Sample: blank matrix spike duplicat
Operator: MAP



Component	Retention	Area	External	Internal	Units
ENZENE	3.983	17.044	10.27	10.2672	ppb
S-TFT	5.233	16.296	11.79	11.7916	ppb
oluene	6.800	19.595	12.10	12.0957	ppb
thylbenzene	9.033	15.152	12.95	12.9504	
&P-xylene	9.200	44.685	24.83	24.8253	
xylene	9.733	17.331	12.74	12.7434	ppb
S-BFB	10.383	45.698	14.79	14.7890	ppb
		175.801	99.46	99.4625	

Lab name: On Site Labs Inc
nalysis date: 02/22/2002 11:03:16
Method: EPA 8021 mod.
Lab ID: GC-2
Description: PID - Ch. 1
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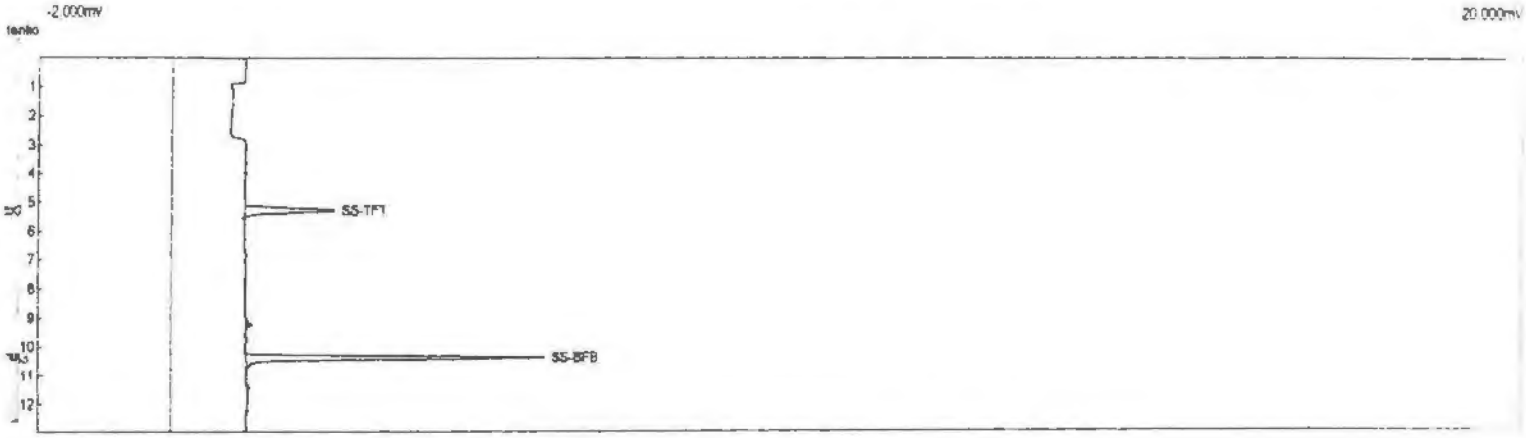
Carrier: N2
file: 0222pt4.chr ()
nple: METHOD BLANK
Operator: MAP



Component	Retention	Area	External	Internal	Units
S-TFT	5.250	13.685	9.90	9.9023	ppb
S-BFB	10.383	34.644	11.21	11.2117	ppb
		48.329	21.11	21.1140	

LABORATORY QA/QC

CH2M HILL

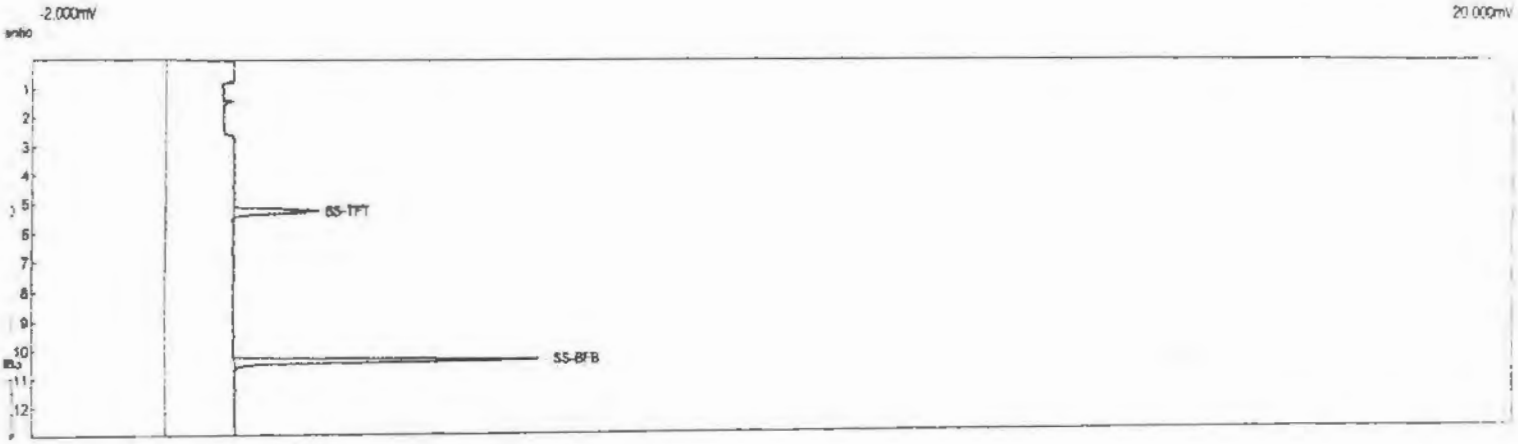
TEG Project #02I0221CH2M

BTEX (Mod. EPA Method 8020A) ANALYSES OF WATER

SAMPLE NUMBER	DATE ANALYZED	BENZENE (µg/L)	TOLUENE (µg/L)	ETHYL-BENZENE (µg/L)	TOTAL XYLENES (µg/L)
HLA009	02/22/02	ND	ND	ND	ND
HLA009 DUP	02/22/02	ND	ND	ND	ND
DETECTION LIMIT (µg/L)		1.0	1.0	1.0	3.0

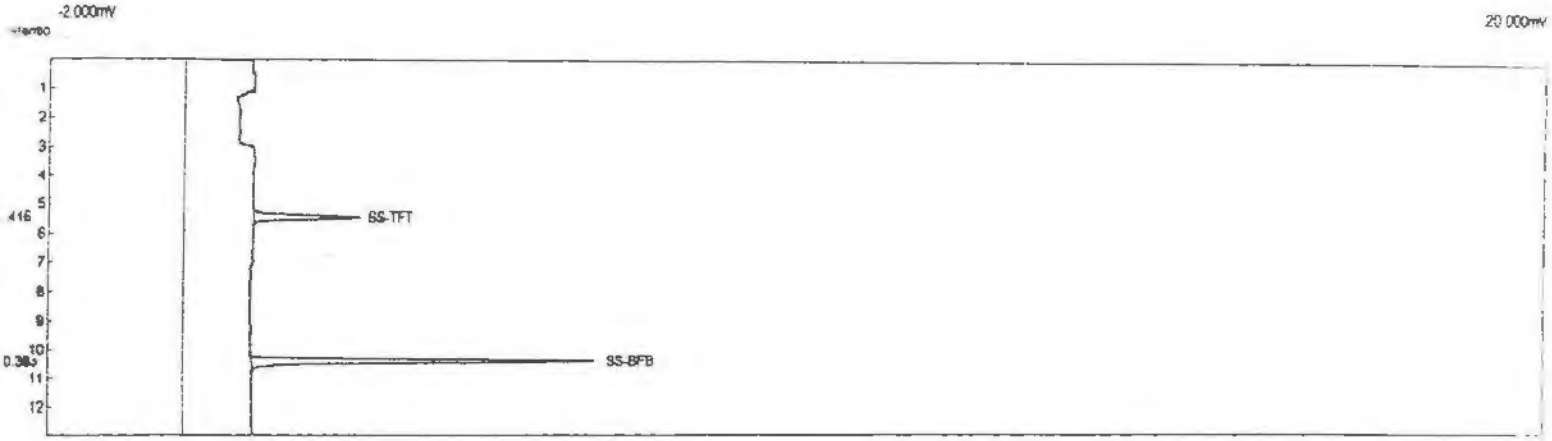
µg/L = MICROGRAMS PER LITER
DUP = LABORATORY DUPLICATE
ANALYSES PERFORMED BY: MAPCO A. PEDRAZA
DATA REVIEWED BY: KEVIN SHELBURNE

Lab name: On Site Labs Inc
Analysis date: 02/22/2002 11:43:27
Method: EPA 8021 mod.
Lab ID: GC-2
Description: PID - Ch. 1
Column: Rtx-5,30m,5.0um,0.53mm
Carrier: N2
Data file: 0222pt5.chr ()
Sample: HLA009/0221CH2M
Operator: MAP



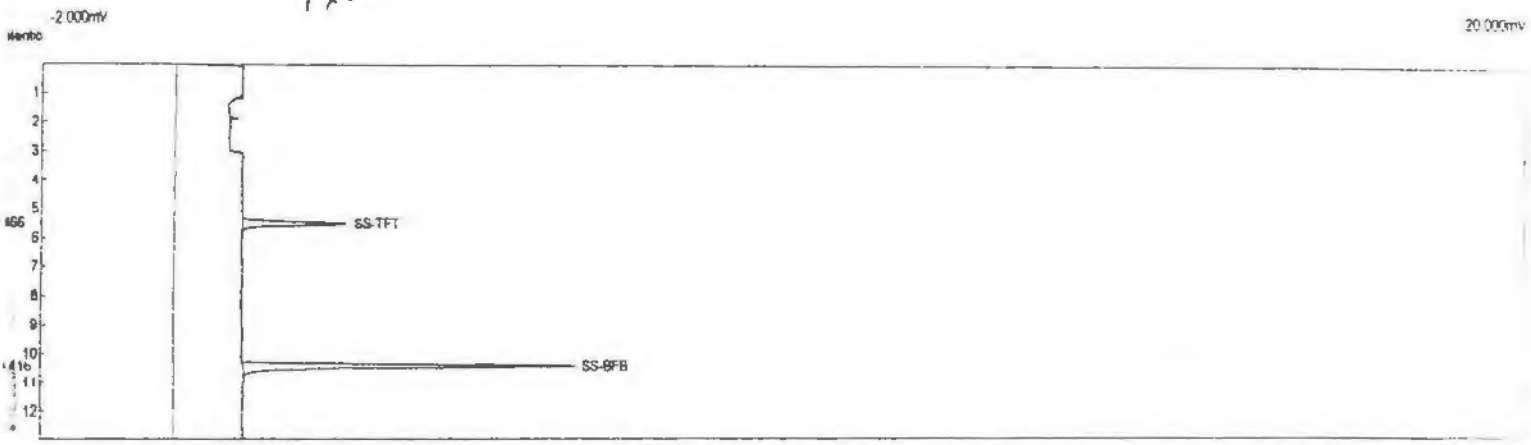
Component	Retention	Area	External	Internal	Units
SS-TFT	5.200	13.095	9.48	9.4754	ppb
SS-BFB	10.383	36.138	11.70	11.6951	ppb
		49.233	21.17	21.1705	

Analysis date: 02/22/2002 13:57:56
Method: EPA 8021 mod.
Lab ID: GC-2
Description: PID - Ch. 1
Column: Rtx-5,30m,5.0um,0.53mm
Carrier: N2
Data file: 0222pt11.chr ()
Sample: HLA009/0221CH2M DUP
Operator: MAP



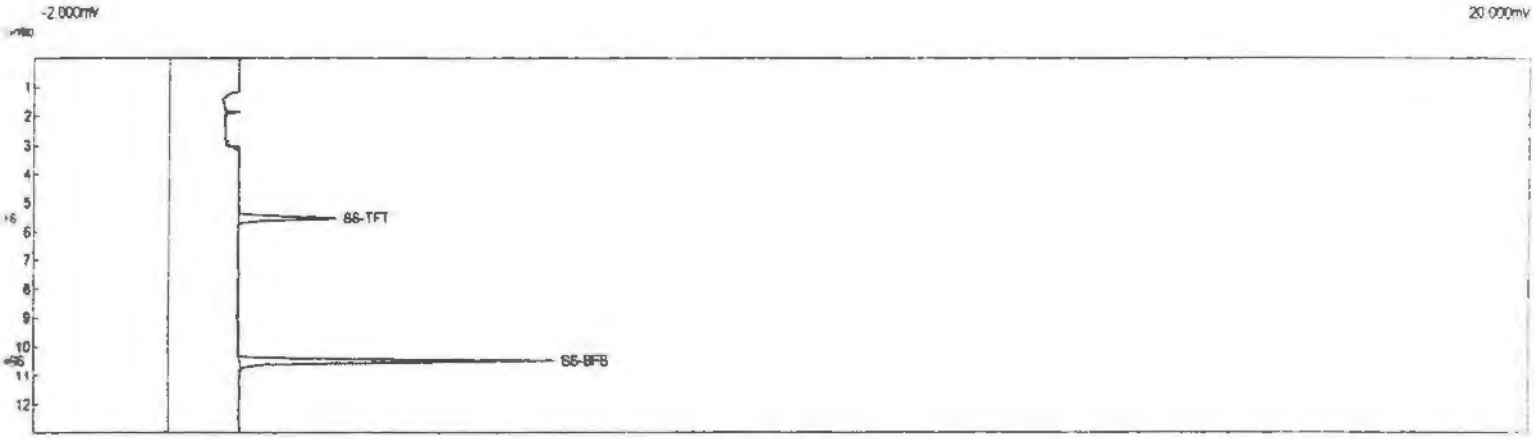
Component	Retention	Area	External	Internal	Units
SS-TFT	5.416	15.496	11.21	11.2127	ppb
SS-BFB	10.383	41.904	13.56	13.5612	ppb
		57.400	24.77	24.7739	

Lab name: On Site Labs Inc
Analysis date: 02/22/2002 12:52:32
Method: EPA 8021 mod.
Lab ID: GC-2
Description: PID - Ch. 1
Column: Rtx-5,30m,5.0um,0.53mm
Carrier: N2
) file: 0222pt8.chr ()
.mple: ~~HLA012FD2~~/0221CH2M
Operator: MAP ~~HLA00~~ HLA011 FD2
TKZ



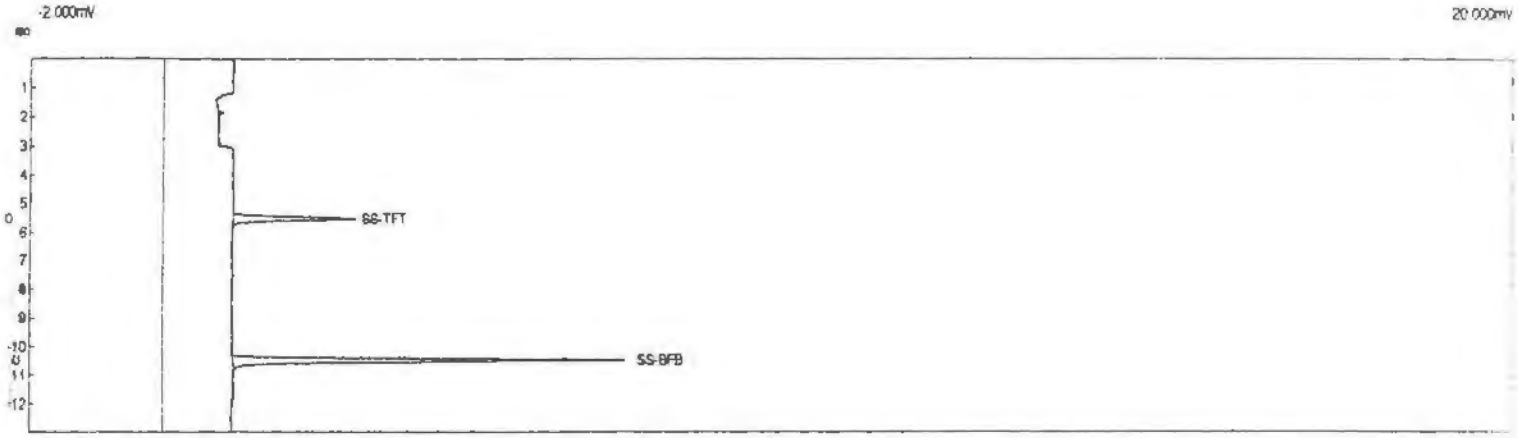
Component	Retention	Area	External	Internal	Units
S-TFT	5.466	15.026	10.87	10.8726	ppb
S-BFB	10.416	41.273	13.36	13.3570	ppb
		56.299	24.23	24.2296	

Lab name: On Site Labs Inc
Analysis date: 02/22/2002 12:14:24
Method: EPA 8021 mod.
Lab ID: GC-2
Description: PID - Ch. 1
Column: Rtx-5,30m,5.0um,0.53mm
Carrier: N2
Data file: 0222pt6.chr ()
Sample: HLA016/0221CH2M
Operator: MAP



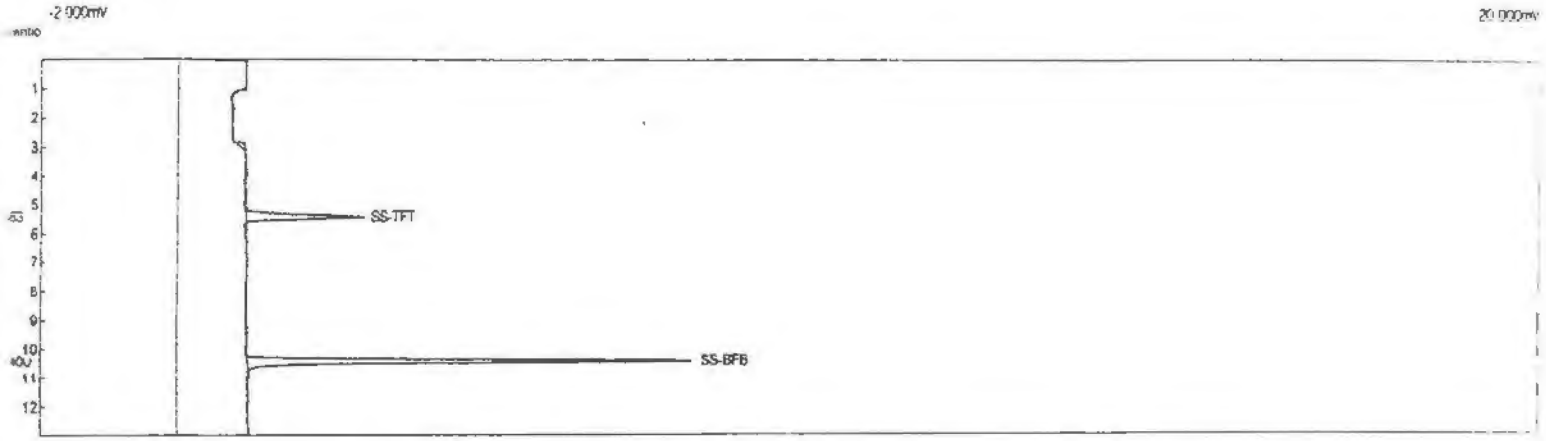
Component	Retention	Area	External	Internal	Units
6-TFT	5.516	13.878	10.04	10.0420	ppb
5-BFB	10.466	36.807	11.91	11.9117	ppb
		50.685	21.95	21.9536	

Lab name: On Site Labs Inc
alysis date: 02/22/2002 12:35:49
Method: EPA 8021 mod.
Lab ID: GC-2
Description: PID - Ch. 1
Column: Rtx-5,30m,5.0um,0.53mm
er: N2
ile: 0222pt7.chr ()
nple: HLA019/0221CH2M
Operator: MAP



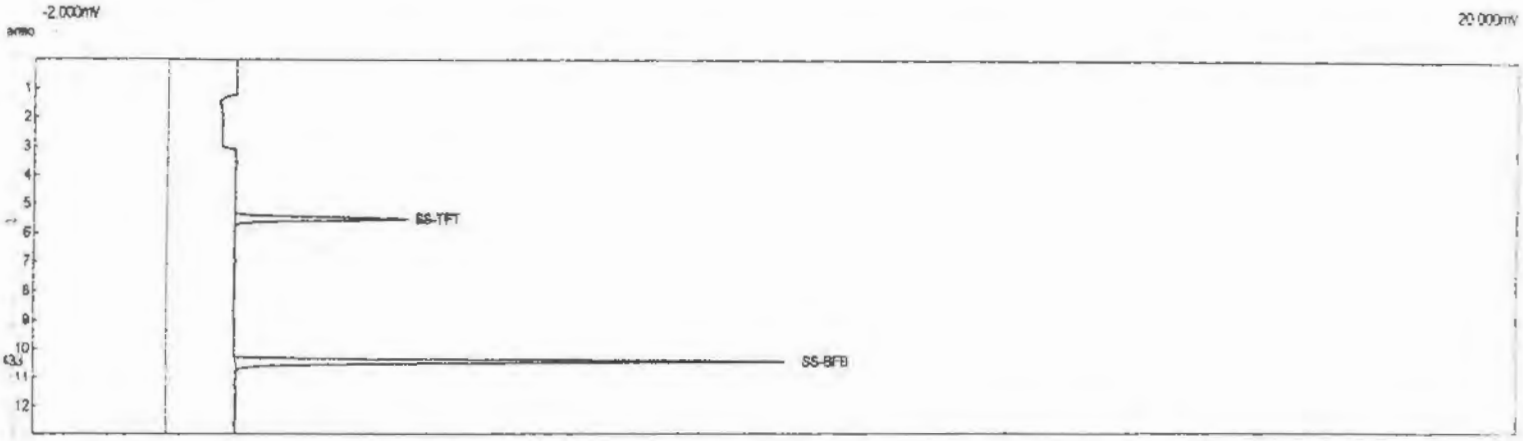
Component	Retention	Area	External	Internal	Units
S-TFT	5.500	17.664	12.78	12.7815	ppb
S-BFB	10.450	47.628	15.41	15.4136	ppb
		65.292	28.20	28.1951	

Analysis date: 02/22/2002 13:18:47
Method: EPA 8021 mod.
Lab ID: GC-2
Description: PID - Ch. 1
Column: Rtx-5,30m,5.0um,0.53mm
Carrier: N2
Data file: 0222pt9.chr ()
Sample: HLA020EB2/0221CH2M
Operator: MAP



Component	Retention	Area	External	Internal	Units
S-TFT	5.383	17.552	12.70	12.7004	ppb
S-BFB	10.400	53.064	17.17	17.1728	ppb
		70.616	29.87	29.8732	

Lab name: On site Labs inc
Analysis date: 02/22/2002 13:42:55
Method: EPA 8021 mod.
Lab ID: GC-2
Description: PID - Ch. 1
Column: Rtx-5,30m,5.0um,0.53mm
Carrier: N2
Data file: 0222pt10.chr ()
Sample: HLA021TB2/0221CH2M
Operator: MAP



Component	Retention	Area	External	Internal	Units
TFT	5.483	24.360	17.63	17.6266	ppb
S-BFB	10.433	66.228	21.43	21.4330	ppb
		90.588	39.06	39.0596	

On Site Labs, Inc.

PMB 627, HC-01 Box 29030, Caguas, PR 00725
Telephone 787-720-0329 Fax 787-789-3858

February 23, 2002
OSL Projects #02I0220CH2M

Mr. Tunch Orsoy
CH2M HILL
4350 W. Cypress Street, Suite 600
Tampa, Florida 33607

SUBJECT: DATA REPORT - CH2M HILL PROJECT NO. 167722.FI.FS ROOSEVELT ROADS NAS, CEIBA, PUERTO RICO

Dear Mr. Orsoy:

Please find enclosed the analytical report for the samples collected by CH2M HILL personnel from the above-referenced site and delivered to On Site Labs (OSL) under the proper chain-of-custody protocol. An OSL Puerto Rico certified-chemist performed the following analyses:

- 9 soil samples analyzed for TPH-gas/diesel by modified EPA test method 8015B.
- 2 water samples analyzed for TPH-gas/diesel by modified EPA test method 8015B.
- 1 equipment blank water sample analyzed for TPH-gas/diesel.
- 2 water samples analyzed for BTEX by modified EPA test method 8020A.
- 1 trip and 1 equipment blank water sample analyzed for BTEX.
- Laboratory QA/QC analyses for TPH-gas/diesel and BTEX.

The analytical results are summarized in the attached table. Applicable detection limits, QA/QC data, chromatograms, a chain-of-custody and an invoice are attached.

OSL appreciates the opportunity to provide analytical services for this project. If you have any questions relating to the data or report, please do not hesitate to contact us.

Sincerely,
On Site Labs, Inc.

Kevin Shelburne
Principal

Attachments

QA/QC REPORT - CALIBRATION DATA

TEG Project #02I0220CH2M
DAILY CALIBRATION DATE: 02/21/02

CH2M HILL PROJECT NO. 167722.FI.FS
PROJECT NAME: RRNAS SITE 2036

			INITIAL		OPENING			CLOSING		
COMPOUND	DETECTOR	CALIB RANGE	RF	%RSD	AREA	RF	%DIFF	AREA	RF	%DIFF
TPH GASOLINE	FID #3 (gc5)	10 - 30,000	0.36	15.0%	1460.54	0.37	0.9%	1247.65	0.31	13.8%
TPH GASOLINE	FID #4 (gc5)	10 - 30,000	0.31	15.4%	1082.76	0.27	11.5%	1065.07	0.27	13.0%
TPH DIESEL	FID #3 (gc5)	25 - 20,000	0.74	13.6%	3371.73	0.84	14.1%	3356.31	0.84	13.5%
TPH DIESEL	FID #4 (gc5)	25 - 20,000	0.61	11.1%	2702.75	0.68	11.5%	2708.46	0.68	11.7%

CALIB RANGE - RANGE OF CALIBRATION CURVE IN ppm
INITIAL RF - AVERAGE RESPONSE FACTOR FROM MULTIPOINT CALIBRATION CURVE
% RSD - LINEARITY OF MULTIPOINT CALIBRATION CURVE (+/- 20% ACCEPTABLE LIMITS)
AREA - AREA COUNTS FROM DAILY CALIBRATION STANDARD
RF - DETECTOR RESPONSE FACTOR FROM MID-POINT CALIBRATION STANDARD
% DIFF - DIFFERENCE, IN PERCENT, BETWEEN THE AVERAGE RF AND THE OPENING OR CLOSING RF (+/- 15% ACCEPTABLE LIMITS)
OPENING - MID-POINT CALIBRATION STANDARD ANALYZED BEFORE SAMPLE ANALYSES BEGIN
CLOSING - MID-POINT CALIBRATION STANDARD ANALYZED AFTER SAMPLES ANALYSES ARE COMPLETE

ANALYSES PERFORMED BY MARCO A PEDRAZA
DATA REVIEWED BY KEVIN SHELBURNE

ON SITE LABS, INC
PMB 627, HC-01 BOX 29030, CAGUAS, P R 00725
TELEPHONE (787) 720-0329 FAX 789-3858

QA/QC REPORT - MS/MSD DATA

MATRIX SPIKE (MS)/MATRIX SPIKE DUPLICATE (MSD)

TEG Project #02I0220CH2M
DATE: 02/21/02

CH2M HILL PROJECT NO. 167722.FI.FS
PROJECT NAME: RRNAS SITE 2036

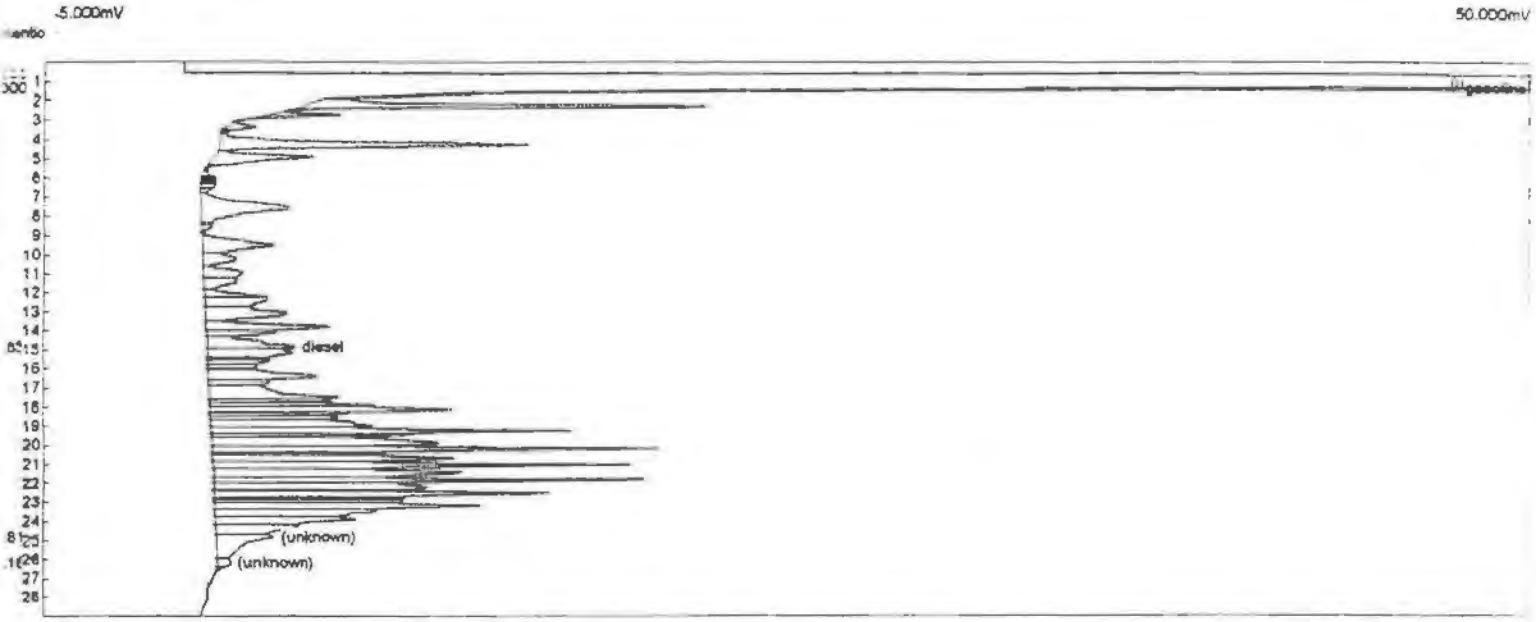
COMPOUND	SPK CON (ppm)	MS CONC (ppm)	%REC MS	MSD CONC (ppm)	%REC MSD	RPD	ACCEPTABLE RPD	ACCEPTABLE RECOVERY
TPH-GASOLINE	500	564	113%	540	108%	4%	15%	81% - 126%
TPH-DIESEL	1,000	1007	101%	1092	109%	8%	15%	74% - 131%

ppm = PARTS PER MILLION
MS CONC - ANALYZED CONCENTRATION OF SPIKED SAMPLE
% REC - PERCENT RECOVERY OF SPIKE FROM MATRIX
RPD - RELATIVE PERCENT DIFFERENCE BETWEEN MATRIX SPIKE AND MATRIX SPIKE DUPLICATE RECOVERIES

ANALYSES PERFORMED BY MARCO A PEDRAZA
DATA REVIEWED BY KEVIN SHELBURNE

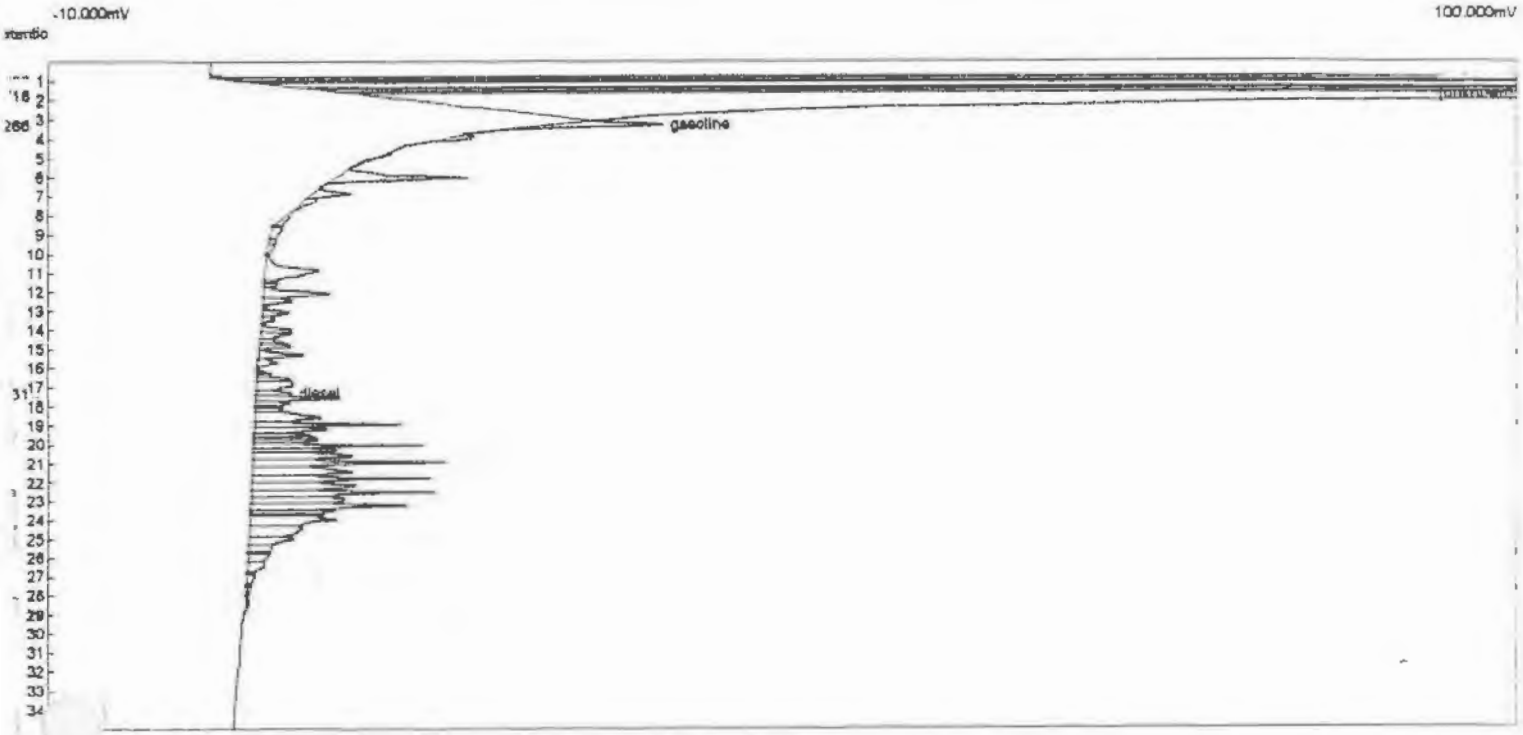
ON SITE LABS, INC
PMB 627, HC-01 BOX 29030, CAGUAS, P R 00725
TELEPHONE (787) 720-0329 FAX 789-3858

Lab name: ~~TEG-PUERTO RICO~~ On Site Lab Inc
Analysis date: 02/21/2002 10:51:05
Method: EPA 8015B mod.
Lab ID: GC - 5
Description: FID 3 - Ch. 3
Column: XTI-5, 30m, 0.53mm, 1.5um
Carrier: N2
Data file: 0221fc2.CHR ()
Sample: 1000/1000 ppm G/D open
Operator: MAP
Comments:



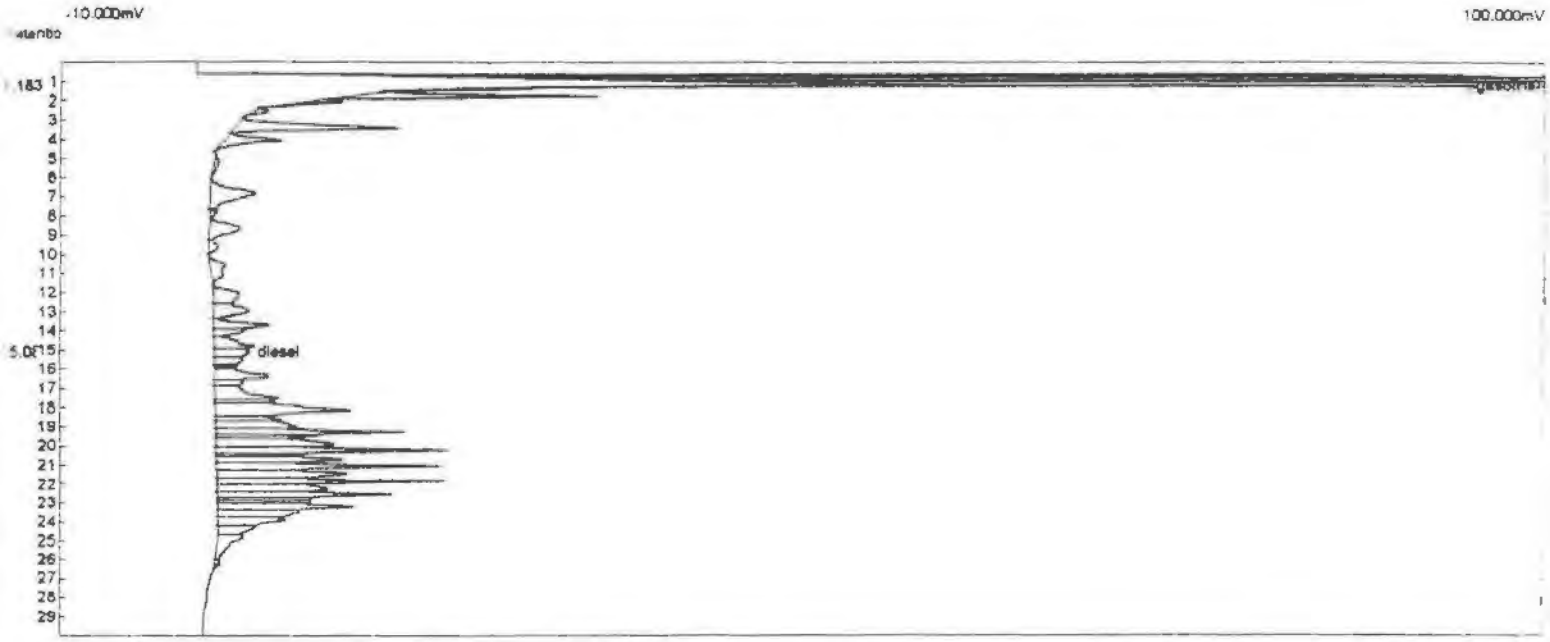
Component	Retention	Area	External	Internal	Units
soline	1.300	1460.544	1008.86	1008.8630	
sel	14.833	3371.726	1140.64	1140.6380	ppm
		4832.270	2149.30	2149.3010	

Lab name: TEG ~~PUERTO RICO~~ On Site Labs Inc.
Analysis date: 02/21/2002 10:51:05
Method: EPA 8015B mod.
Lab ID: GC - 5
Description: FID 4 - Ch. 4
Column: XTI-5, 30m, 0.53mm, 1.5um
Carrier: N2
File: 0221FD2.CHR ()
Sample: 1000/1000 ppm G/D open
Operator: MAP
Comments:



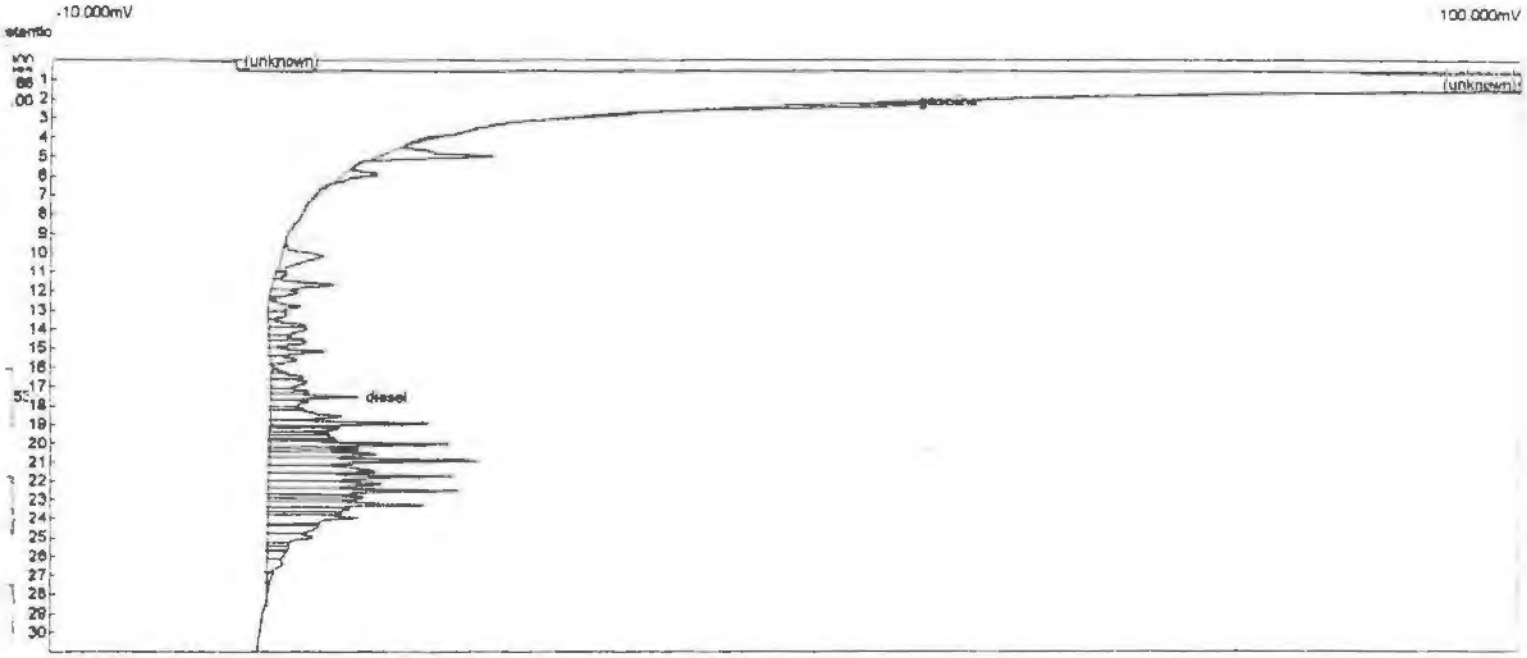
Component	Retention	Area	External	Internal	Units
soline	3.266	1082.764	884.61	884.6115	
sel	17.316	2702.753	1115.00	1114.9969	ppm
		3785.517	1999.61	1999.6084	

Lab name: On Site Labs Inc
Analysis date: 02/21/2002 17:25:52
Method: EPA 8015B mod.
Lab ID: GC - 5
Description: FID 3 - Ch. 3
Column: XTI-5, 30m, 0.53mm, 1.5um
Carrier: N2
Data file: 0221fc13.CHR ()
Sample: 1000/1000 ppm G/D close
Operator: MAP
Comments:



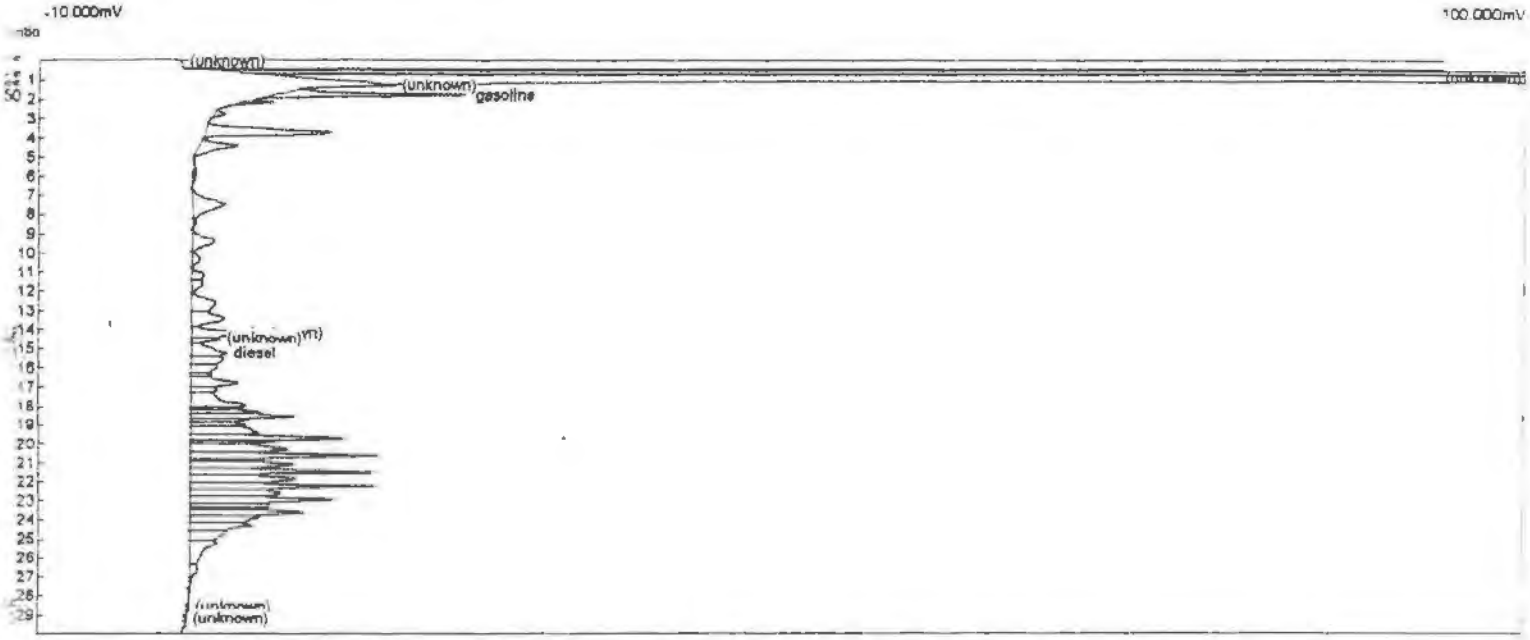
Component	Retention	Area	External	Internal	Units
esoline	1.183	1247.645	861.63	861.6333	
iesel	15.083	3356.311	1135.42	1135.4234	ppm
		4603.956	1997.06	1997.0567	

Lab name: On Site Labs Inc
Analysis date: 02/21/2002 17:25:52
Method: EPA 8015B mod.
Lab ID: GC - 5
Description: FID 4 - Ch. 4
Column: XTI-5, 30m, 0.53mm, 1.5um
Carrier: N2
File: 0221FD13.CHR ()
Sample: 1000/1000 ppm G/D close
Operator: MAP
Comments:



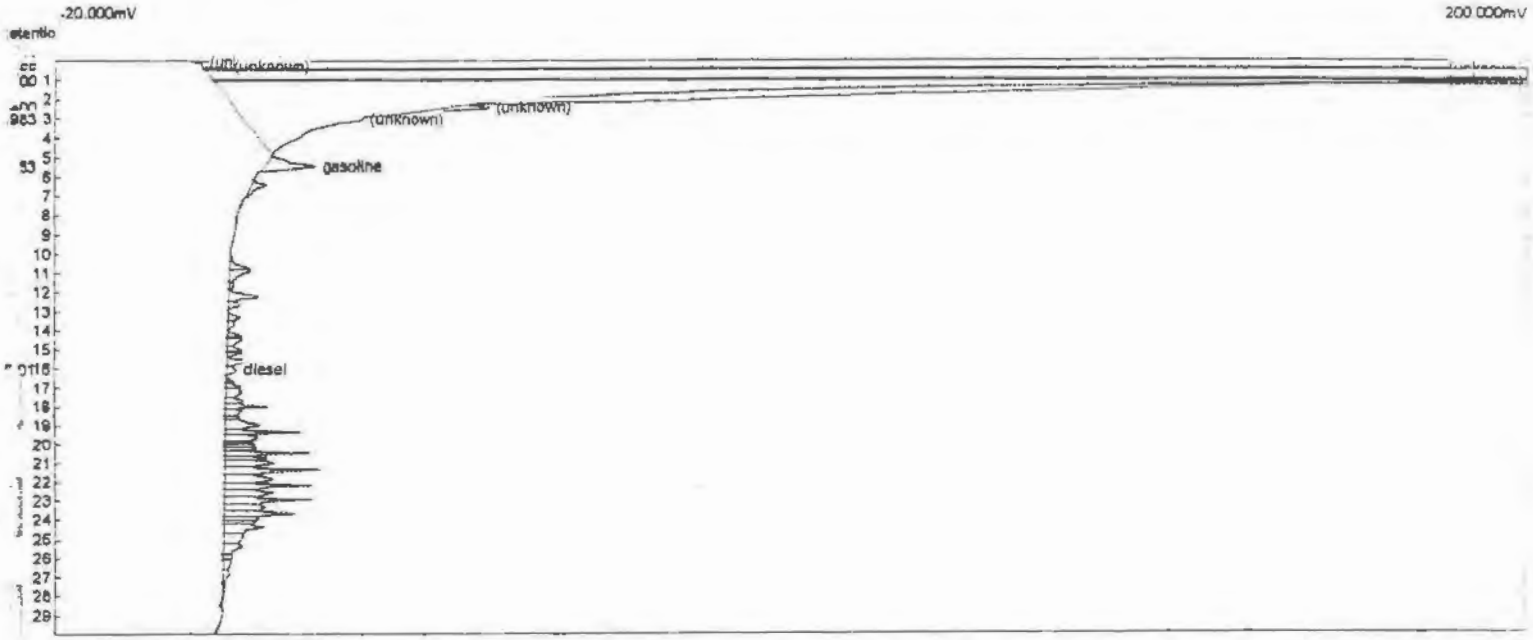
Component	Retention	Area	External	Internal	Units
Isomer	2.100	1065.074	870.16	870.1585	
diesel	17.533	2708.455	1117.35	1117.3494	ppm
		3773.529	1987.51	1987.5079	

Lab name: On Site Labs Inc
alysis date: 02/21/2002 16:33:51
Method: EPA 8015B mod.
Lab ID: GC - 5
Description: FID 3 - Ch. 3
Column: XTI-5, 30m, 0.53mm, 1.5um
Carrier: N2
Data file: 0221fc11.CHR ()
Sample: hla008matrix spike
Operator: MAP
Comments:



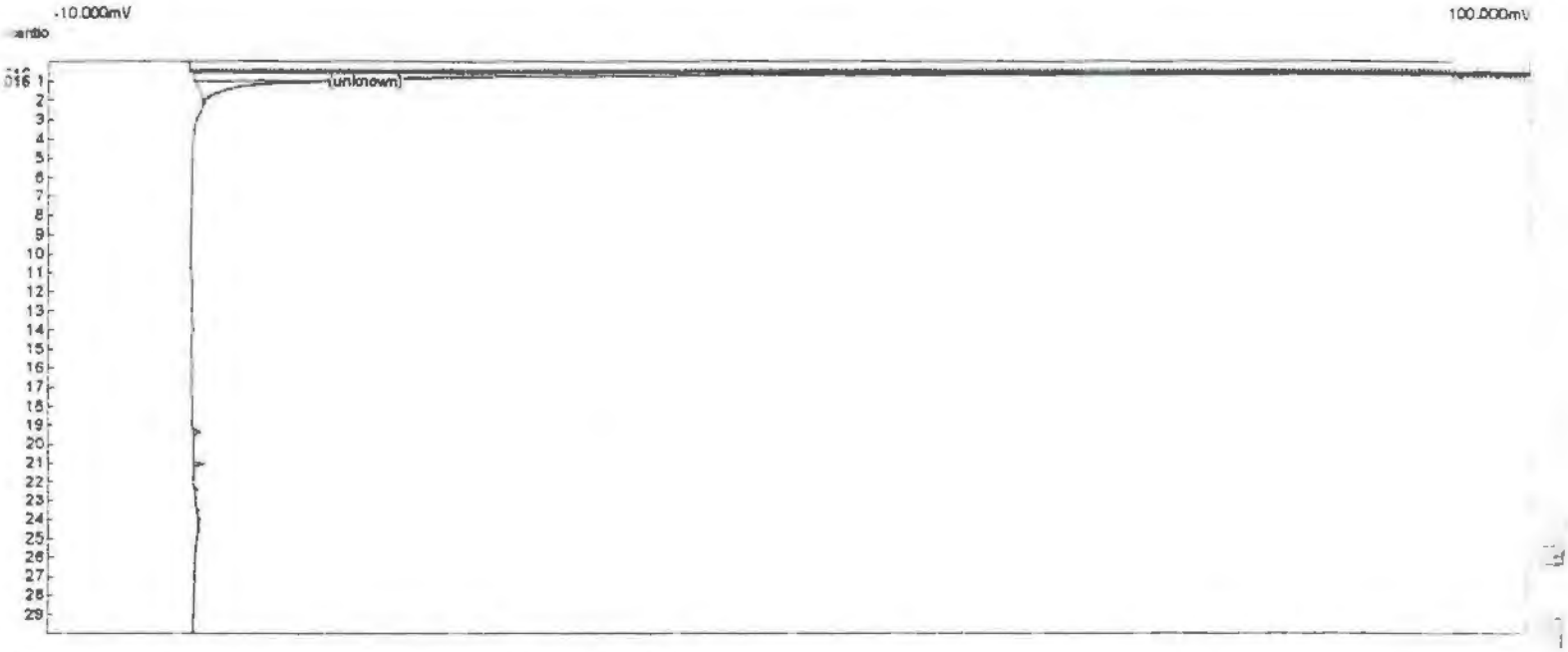
Component	Retention	Area	External	Internal	Units
oline	1.750	816.034	563.56	563.5590	
sel	15.216	2975.390	1006.56	1006.5595	ppm
		3791.423	1570.12	1570.1186	

Lab name: On Site Labs Inc
nalysis date: 02/21/2002 16:33:51
Method: EPA 8015B mod.
Lab ID: GC - 5
Description: FID 4 - Ch. 4
Column: XTI-5, 30m, 0.53mm, 1.5um
Carrier: N2
File: 0221FD11.CHR ()
nple: hla008matrix spike duplica
Operator: MAP
Comments:



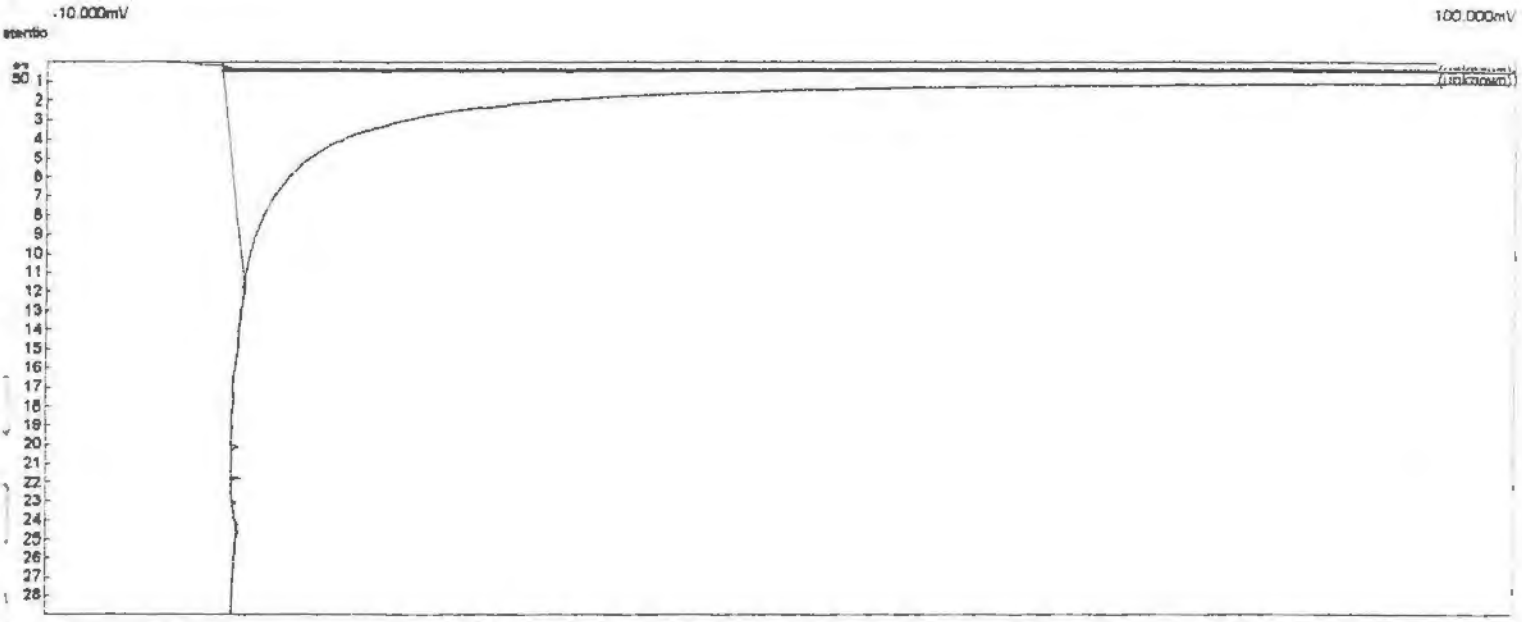
Component	Retention	Area	External	Internal	Units
	5.383	660.848	539.91	539.9089	
	16.016	2645.875	1091.53	1091.5324	ppm
		3306.723	1631.44	1631.4413	

Lab name: On Site Labs Inc
Analysis date: 02/21/2002 12:20:28
Method: EPA 8015B mod.
Lab ID: GC - 5
Description: FID 3 - Ch. 3
Column: XTI-5, 30m, 0.53mm, 1.5um
Carrier: N2
Data file: 0221fc4.chr ()
Sample: method blank
Operator: MAP
Comments:



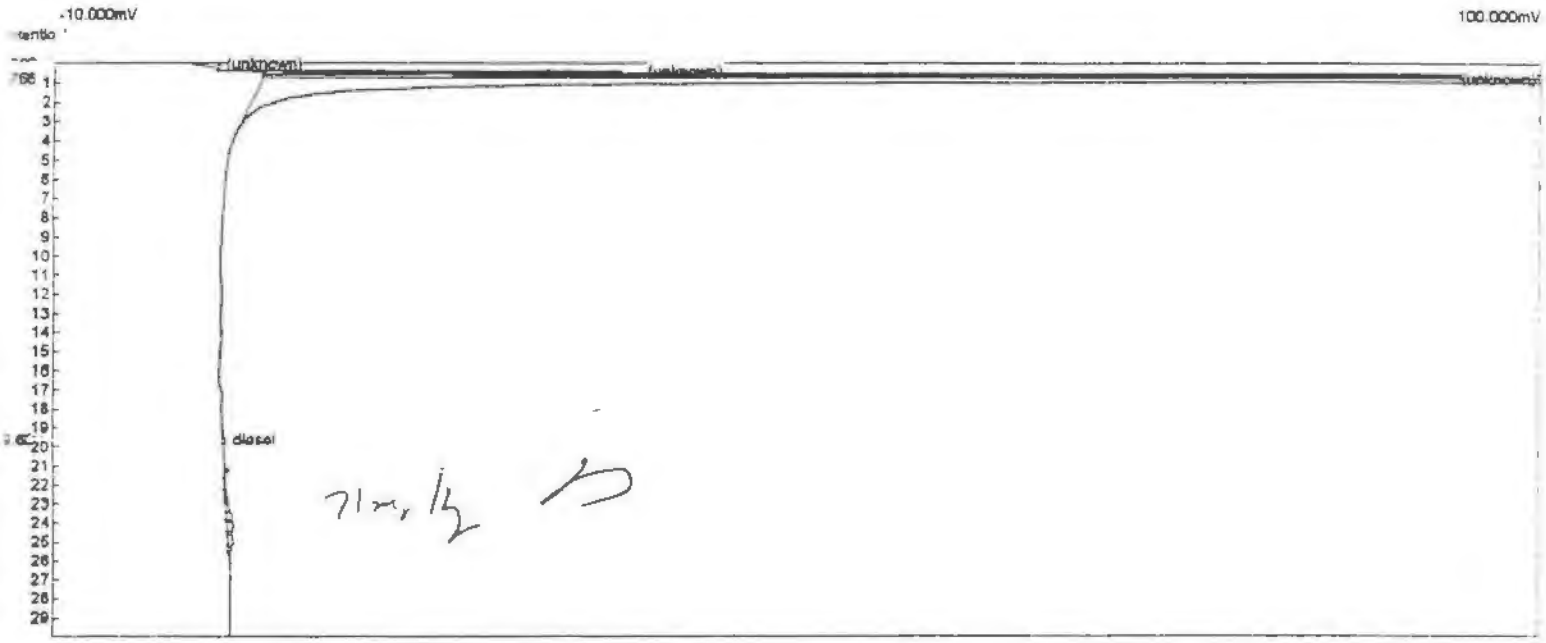
Component	Retention	Area	External	Internal	Units
		0.000	0.00	0.0000	

Lab name: On Site Labs Inc
nalysis date: 02/21/2002 12:20:28
Method: EPA 8015B mod.
Lab ID: GC - 5
Description: FID 4 - Ch. 4
Column: XTI-5, 30m, 0.53mm, 1.5um
Carrier: N2
le: 0221fd4.chr ()
ple: method blank
Operator: MAP
Comments:



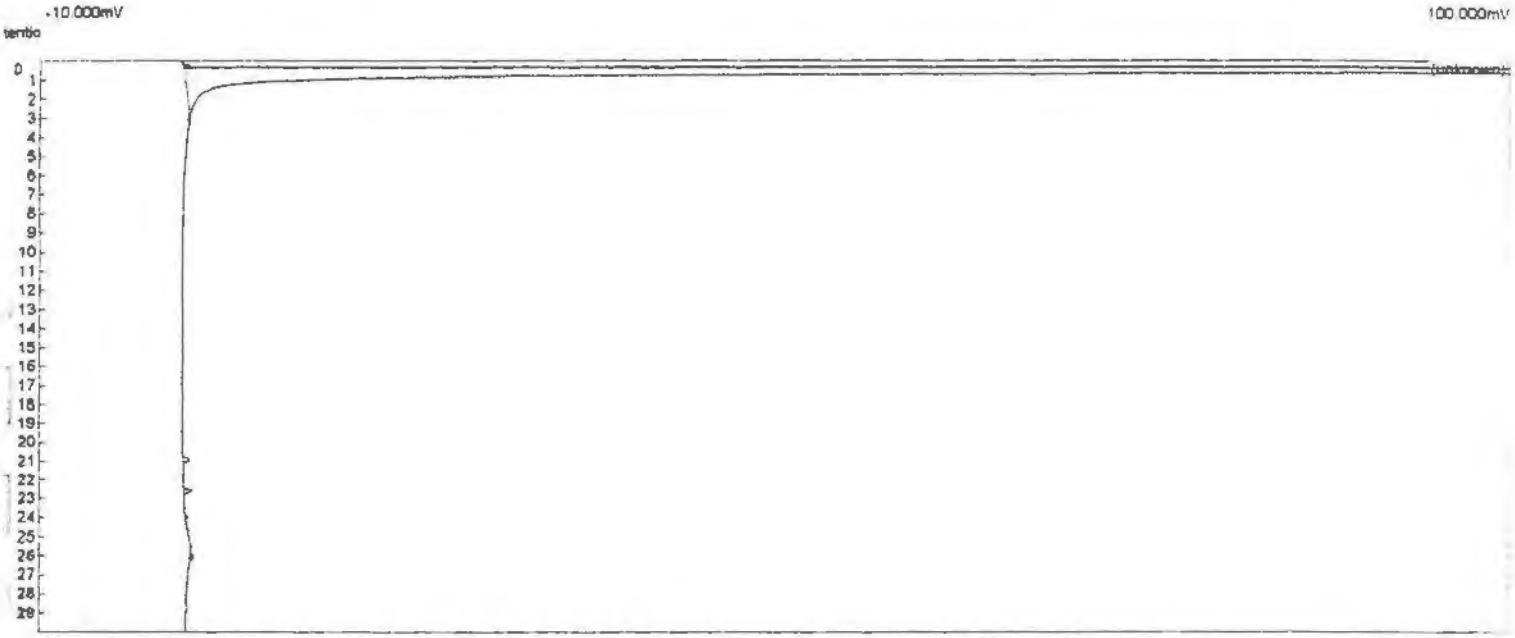
Component	Retention	Area	External	Internal	Units
		0.000	0.00	0.0000	

Lab name: On Site Labs Inc
Analysis date: 02/21/2002 15:58:15
Method: EPA 8015B mod.
Lab ID: GC - 5
Description: FID 4 - Ch. 4
Column: XTI-5, 30m, 0.53mm, 1.5um
Carrier: N2
Data file: 0221fd10.chr ()
Sample: HLA001/0220CH2M
Operator: MAP
Comments:



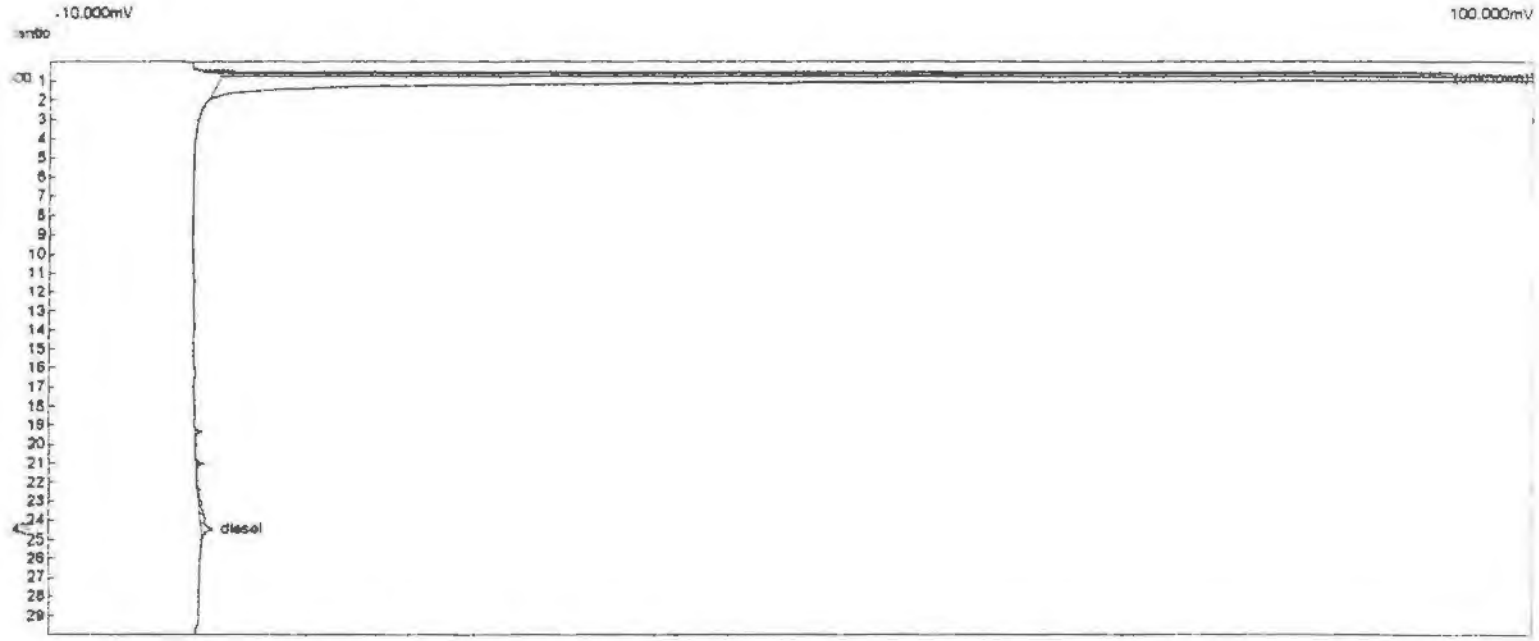
Component	Retention	Area	External	Internal	Units	
iesel	19.600	71.414	29.46	29.4614	ppm	21.835 70.5662
		71.414	29.46	29.4614		

Lab name: On Site Labs Inc
alysis date: 02/21/2002 12:53:20
Method: EPA 8015B mod.
Lab ID: GC - 5
Description: FID 3 - Ch. 3
Column: XTI-5, 30m, 0.53mm, 1.5um
Carrier: N2
e: 0221fc5.chr ()
ple: HLA002/0220CH2M
Operator: MAP
Comments:



Component	Retention	Area	External	Internal	Units
		0.000	0.00	0.0000	

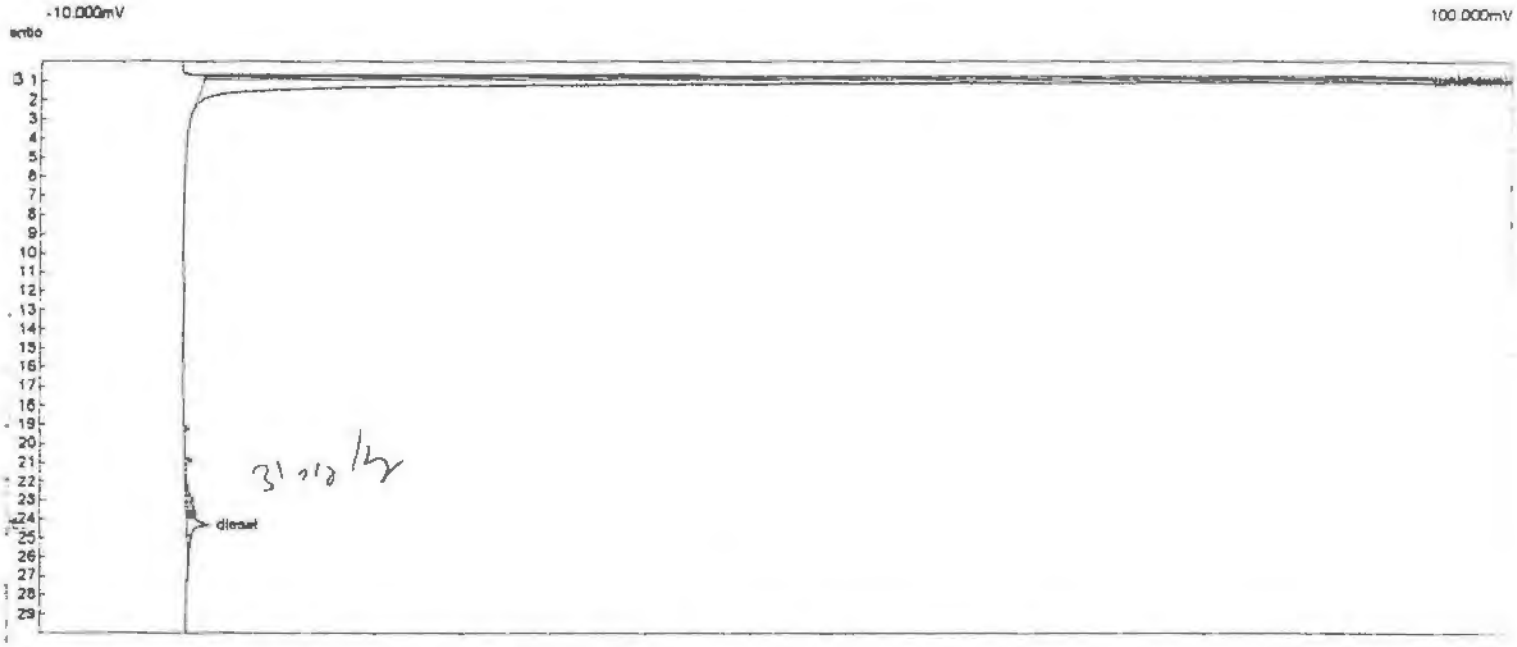
Lab name: On Site Labs Inc
alysis date: 02/21/2002 13:30:32
Method: EPA 8015B mod.
Lab ID: GC - 5
Description: FID 3 - Ch. 3
Column: XTI-5, 30m, 0.53mm, 1.5um
Carrier: N2
Data file: 0221fc6.chr ()
Sample: HLA004/0220CH2M
Operator: MAP
Comments:



Component	Retention	Area	External	Internal	Units
ccel	24.433	21.230	7.18	7.1820	ppm
		21.230	7.18	7.1820	

BDL
2/594 - 14 1/5 67

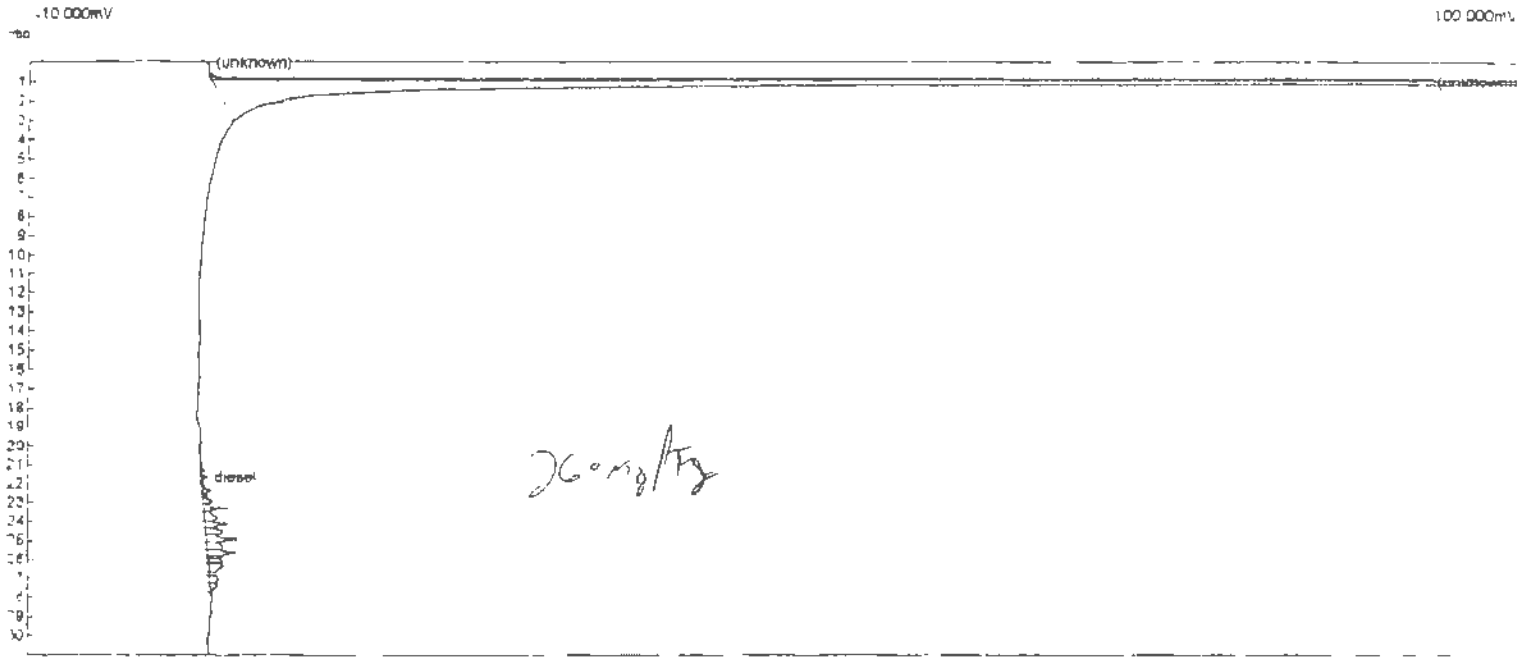
Lab name: On Site Labs Inc
alysis date: 02/21/2002 14:04:06
Method: EPA 8015B mod.
Lab ID: GC - 5
Description: FID 3 - Ch. 3
Column: XTI-5, 30m, 0.53mm, 1.5um
Carrier: N2
File: 0221fc7.chr ()
Sample: HLA005/0220CH2M
Operator: MAP
Comments:



Component	Retention	Area	External	Internal	Units
[illegible]	24.266	45.481	15.39	15.3860	ppm
		45.481	15.39	15.3860	

21.911 = 31.05

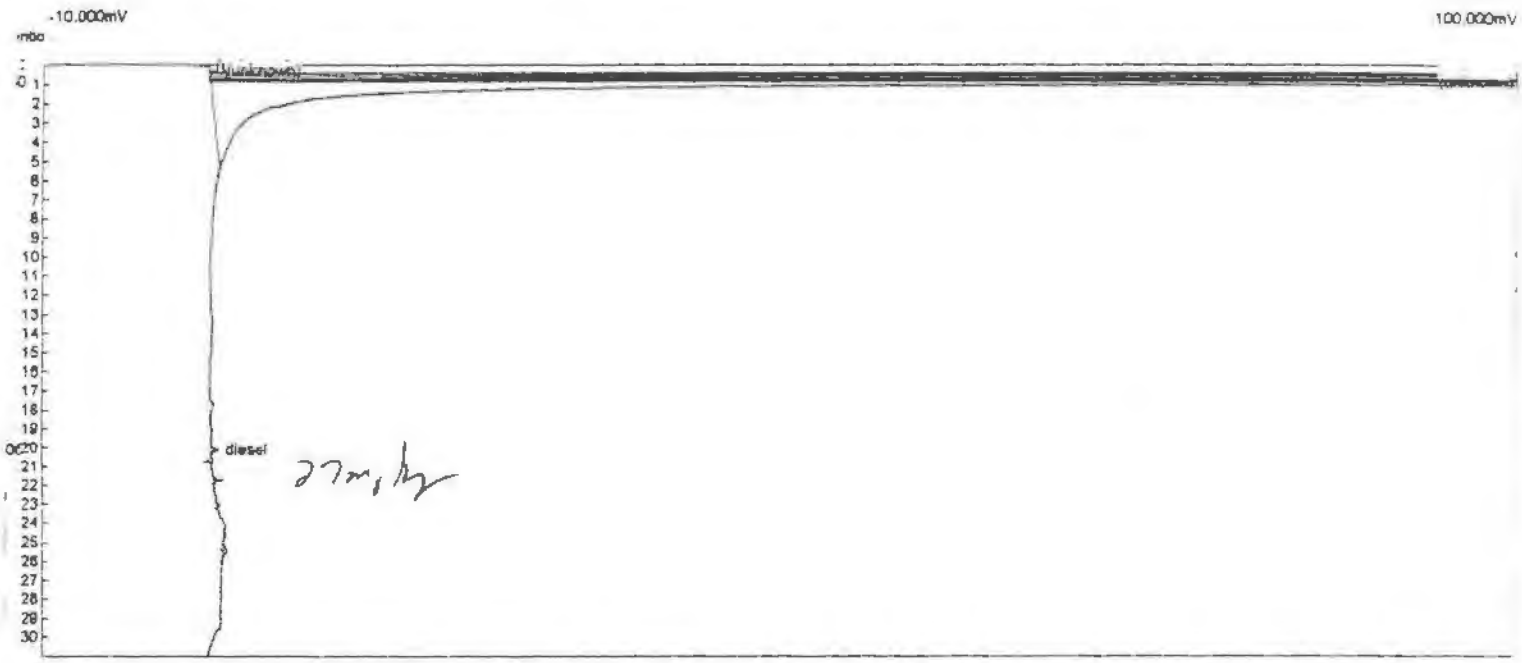
Lab name: On Site Labs Inc
Analysis date: 02/21/2002 12:53:20
Method: EPA 8015B mod.
Lab ID: GC - 5
Description: FID 4 - Ch. 4
Column: XTI-5, 30m, 0.53mm, 1.5um
Carrier: N2
Data file: 0221fd5.chr ()
Sample: HLA007/0220CH2M
Operator: MAP
Comments



Component	Retention	Area	External	Internal	Units
Total	21.650	262.694	108.37	108.3721	ppm
		262.694	108.37	108.3721	

10/.847 = 258.096

Lab name: On Site Labs Inc
alysis date: 02/21/2002 13:30:32
Method: EPA 8015B mod.
Lab ID: GC - 5
Description: FID 4 - Ch. 4
Column: XTI-5, 30m, 0.53mm, 1.5um
Carrier: N2
D[illegible]: 0221fd8.chr ()
[illegible]e: HLA008/0220CH2M
Operator: MAP
Comments:

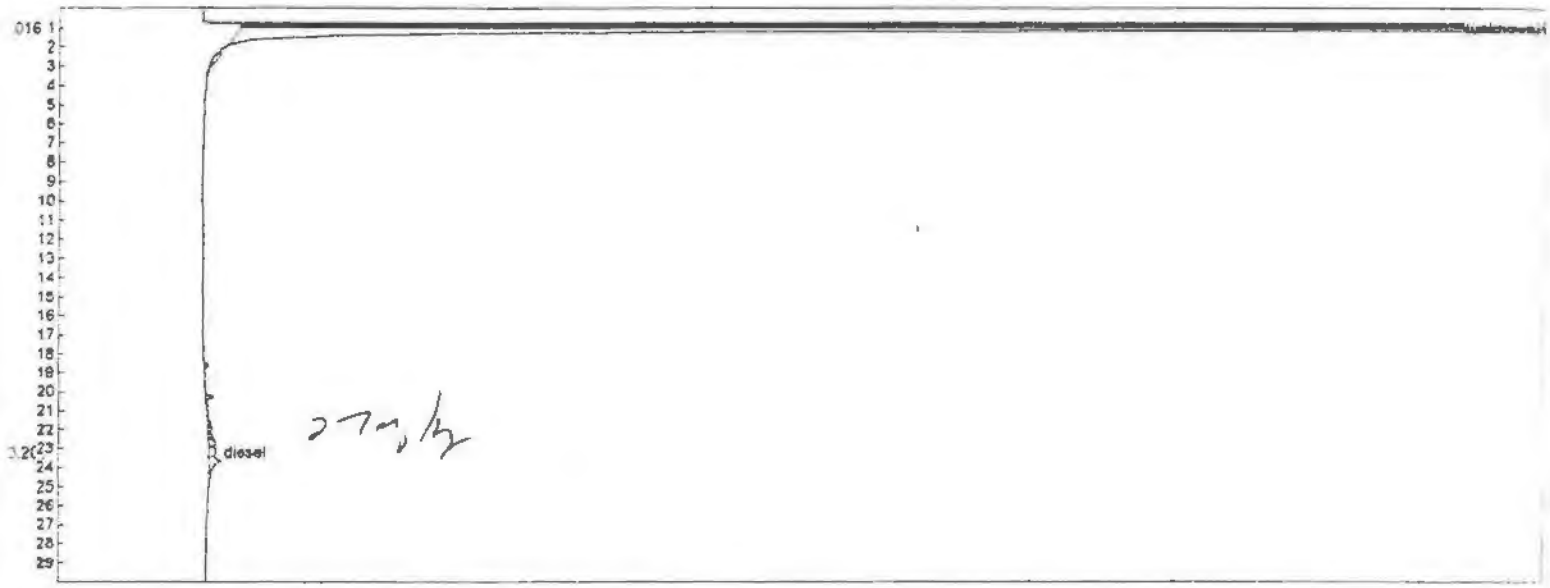


Component	Retention	Area	External	Internal	Units
[illegible]	20.066	29.131	12.02	12.0175	ppm 0/8 8 r 0206174
		29.131	12.02	12.0175	

Lab name: On Site Labs Inc
Analysis date: 02/21/2002 14:38:52
Method: EPA 8015B mod.
Lab ID: GC - 5
Description: FID 3 - Ch. 3
Column: XTI-5, 30m, 0.53mm, 1.5um
Carrier: N2
Data file: 0221fc8.chr ()
Sample: ~~HLA040~~/0220CH2M
Operator: MAP
Comments: HLAØ1Ø FD1

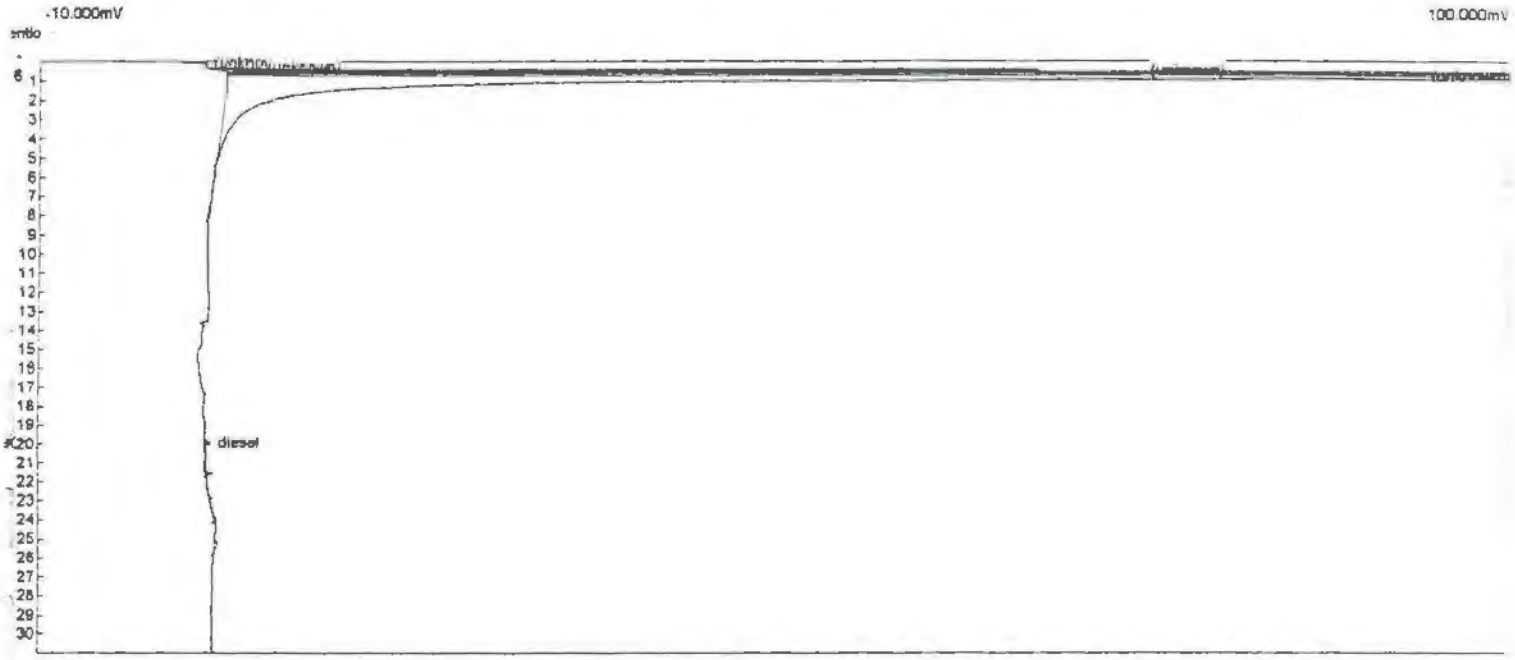
KA

-10.000mV 100.000mV



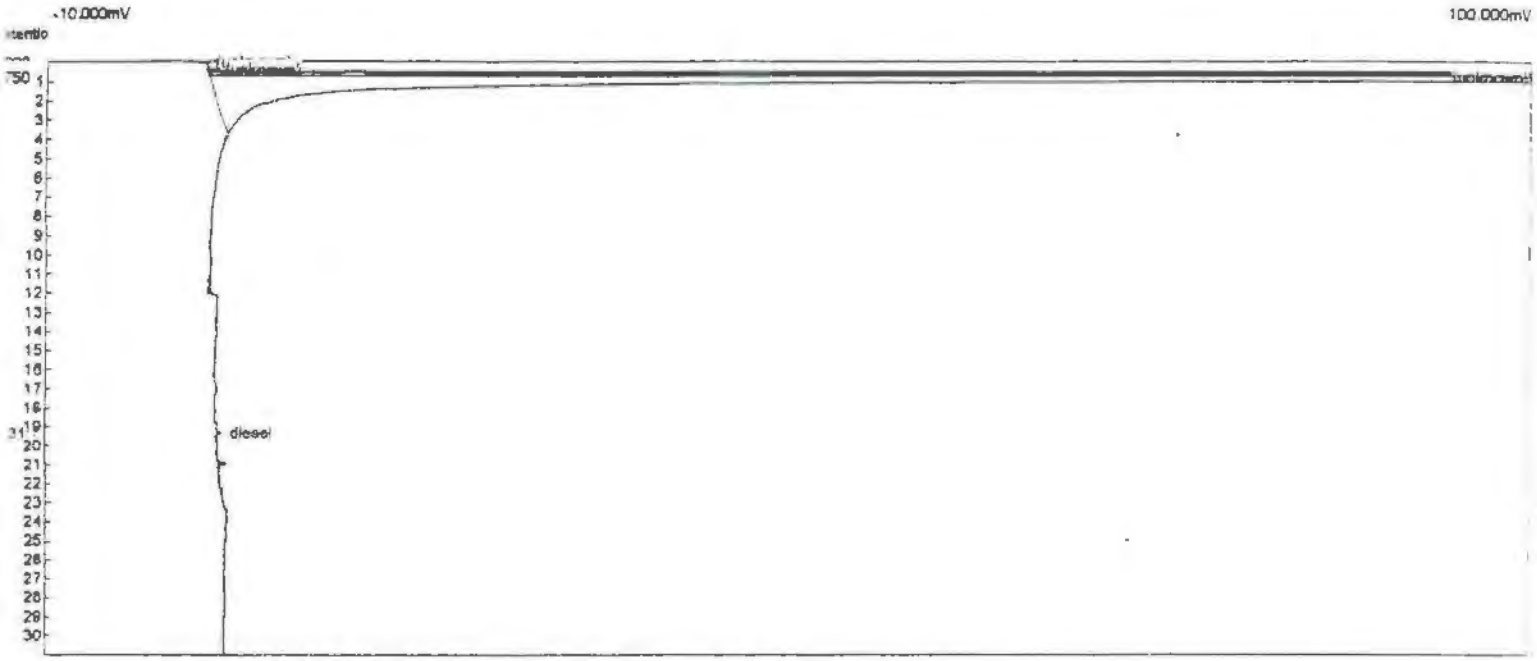
Component	Retention	Area	External	Internal	Units
diesel	23.200	35.074	11.87	11.8652	ppm 27.502 = 26.502
		35.074	11.87	11.8652	

Lab name: On Site Labs Inc
alysis date: 02/21/2002 14:04:06
Method: EPA 8015B mod.
Lab ID: GC - 5
Description: FID 4 - Ch. 4
Column: XTI-5, 30m, 0.53mm, 1.5um
Carrier: N2
[illegible]e: 0221fd7.chr ()
[illegible]e: HLA012/0220CH2M
Operator: MAP
Comments:



Comment	Retention	Area	External	Internal	Units
iel	19.900	17.290	7.13	7.1328	ppm 21.914 ~~17.590~~
		17.290	7.13	7.1328	

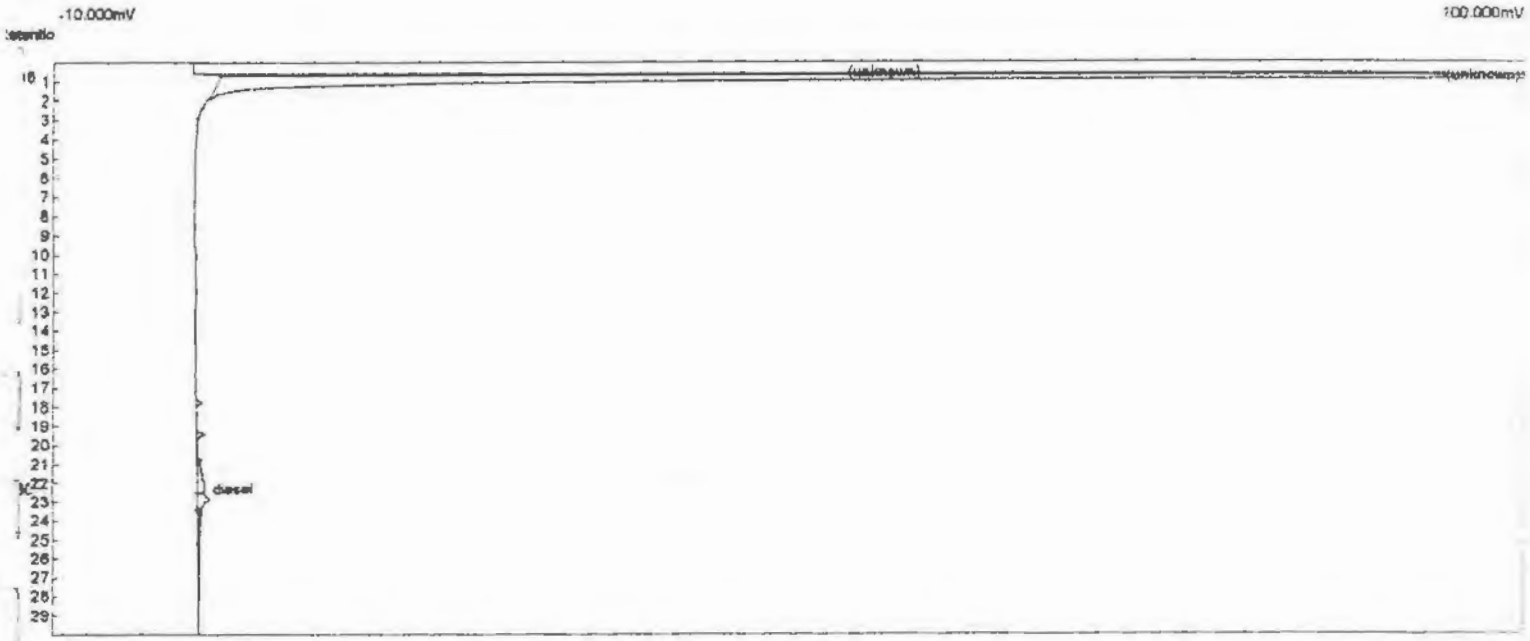
Lab name: On Site Labs Inc
Analysis date: 02/21/2002 14:38:52
Method: EPA 8015B mod.
Lab ID: GC - 5
Description: FID 4 - Ch. 4
Column: XTI-5, 30m, 0.53mm, 1.5um
Carrier: N2
Data file: 0221fd8.chr ()
Sample: HLA013/0220CH2M
Operator: MAP
Comments:



Component	Retention	Area	External	Internal	Units
diesel	19.316	7.927	3.27	3.2702	ppm
		7.927	3.27	3.2702	

ND

Lab name: On Site Labs Inc
ıalysis date: 02/21/2002 15:22:27
Method: EPA 8015B mod.
Lab ID: GC - 5
Description: FID 3 - Ch. 3
Column: XTI-5, 30m, 0.53mm, 1.5um
Carrier: N2
File: 0221fc9.chr ()
Sample: HLA003/0220CH2M
Operator: MAP
Comments:

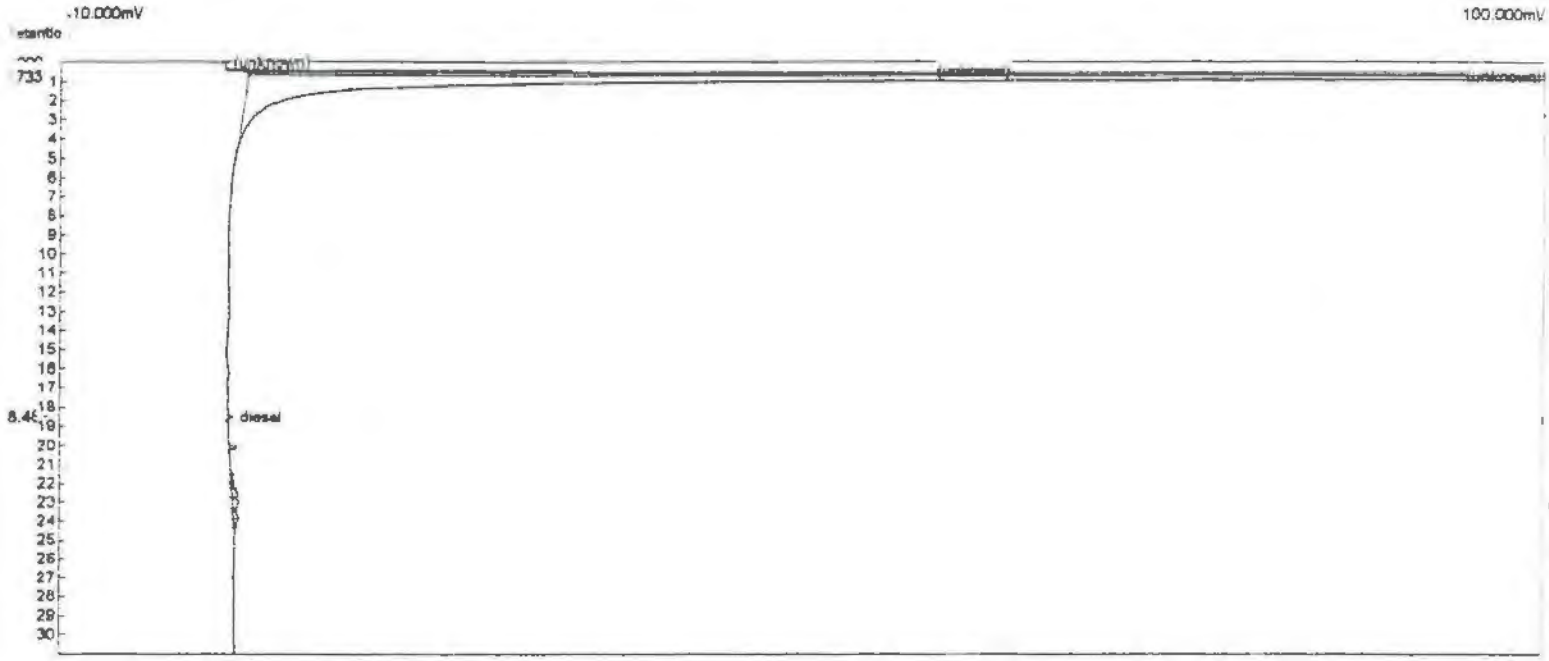


Component	Retention	Area	External	Internal	Units
	22.300	68.165	23.06	23.0597	ppm
		68.165	23.06	23.0597	

1/6 = 3.84 - 7.10

3

Lab name: On Site Labs Inc
Analysis date: 02/21/2002 15:22:27
Method: EPA 8015B mod.
Lab ID: GC - 5
Description: FID 4 - Ch. 4
Column: XTI-5, 30m, 0.53mm, 1.5um
Carrier: N2
Data file: 0221fd9.chr ()
Sample: HLA006/0220CH2M
Operator: MAP
Comments:



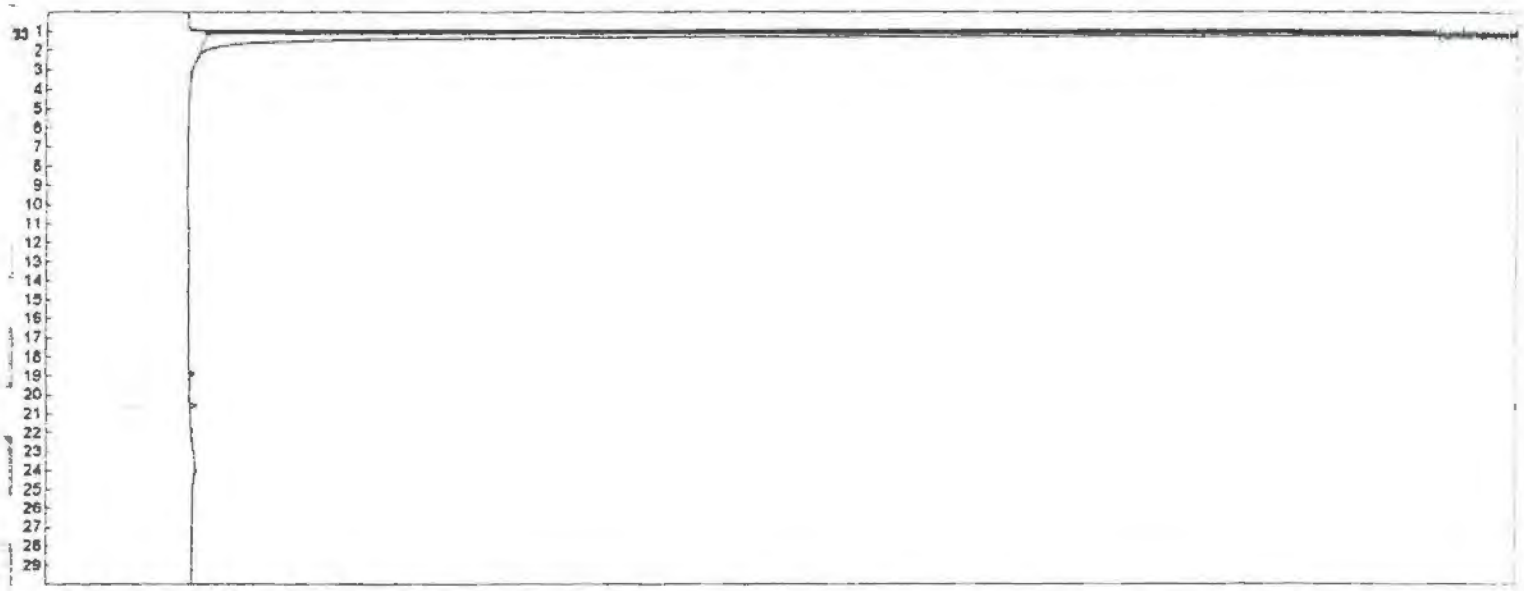
Component	Retention	Area	External	Internal	Units
esel	18.483	55.615	22.94	22.9435	ppm
		55.615	22.94	22.9435	

1/0 → 3.823 – ND

Lab name: On Site Labs Inc
nalysis date: 02/21/2002 15:56:15
Method: EPA 8015B mod.
Lab ID: GC - 5
Description: FID 3 - Ch. 3
Column: XTI-5, 30m, 0.53mm, 1.5um
Carrier: N2
file: 0221fc10.chr ()
ple: ~~HLA015~~/0220CH2M
Operator: MAP
Comments: HLA ϕ15 EB1

KA

-10.000mV 100.000mV



Component	Retention	Area	External	Internal	Units
		0.000	0.00	0.0000	

QA/QC REPORT - CALIBRATION DATA

On Site Project #02I0220CH2M
DAILY CALIBRATION DATE 02/21/02

CH2M HILL PROJECT NO. 167722.FI.FS
PROJECT NAME: RRNAS SITE 2036, CEIBA

			INITIAL		OPENING			CLOSING		
COMPOUND	DETECTOR	CALIB RANGE	RF	%RSD	AREA	RF	%DIFF	AREA	RF	%DIFF
BENZENE	PID1 - GC2	0.5 - 100.0	1.66	12.0%	69.85	1.40	15.8%	40.32	1.61	2.8%
TOLUENE	PID1 - GC2	0.5 - 100.0	1.62	12.3%	75.51	1.51	6.8%	41.13	1.65	1.6%
ETHYLBENZENE	PID1 - GC2	0.5 - 100.0	1.17	16.6%	65.13	1.30	11.3%	31.21	1.25	6.7%
m&p-XYLENES	PID1 - GC2	1.0 - 200	1.80	15.9%	177.01	1.77	1.7%	92.88	1.86	3.2%
o-XYLENES	PID1 - GC2	0.5 - 100.0	1.36	12.1%	71.25	1.43	4.8%	35.69	1.43	5.0%

CALIB RANGE - RANGE OF CALIBRATION CURVE IN ppb
INITIAL RF - AVERAGE RESPONSE FACTOR FROM MULTIPOINT CALIBRATION CURVE
% RSD - LINEARITY OF MULTIPOINT CALIBRATION CURVE (+/- 20% ACCEPTABLE LIMITS)
AREA AREA COUNTS FROM DAILY CALIBRATION STANDARD
RF - DETECTOR RESPONSE FACTOR FROM MID-POINT CALIBRATION STANDARD
% DIFF - DIFFERENCE, IN PERCENT, BETWEEN THE AVERAGE RF AND THE OPENING OR CLOSING RF (+/- 20% ACCEPTABLE LIMITS)
OPENING MID-POINT CALIBRATION STANDARD ANALYZED BEFORE SAMPLE ANALYSES BEGIN
CLOSING - MID-POINT CALIBRATION STANDARD ANALYZED AFTER SAMPLES ANALYSES ARE COMPLETE

ANALYSES PERFORMED BY MARCO A PEDRAZA
DATA REVIEWED BY KEVIN SHELBURNE

On Site Labs, Inc
PMB 627, HC-01 BOX 29030, CAGUAS, P R 00725
TELEPHONE (787) 720 0329 FAX 789-3858

QA/QC REPORT - MS/MSD DATA

MATRIX SPIKE (MS)/MATRIX SPIKE DUPLICATE (MSD)

On Site Project #0210220CH2M
DATE: 02/21/02

CH2M HILL PROJECT NO. 167722 FI FS
PROJECT NAME: RRNAS SITE 2036

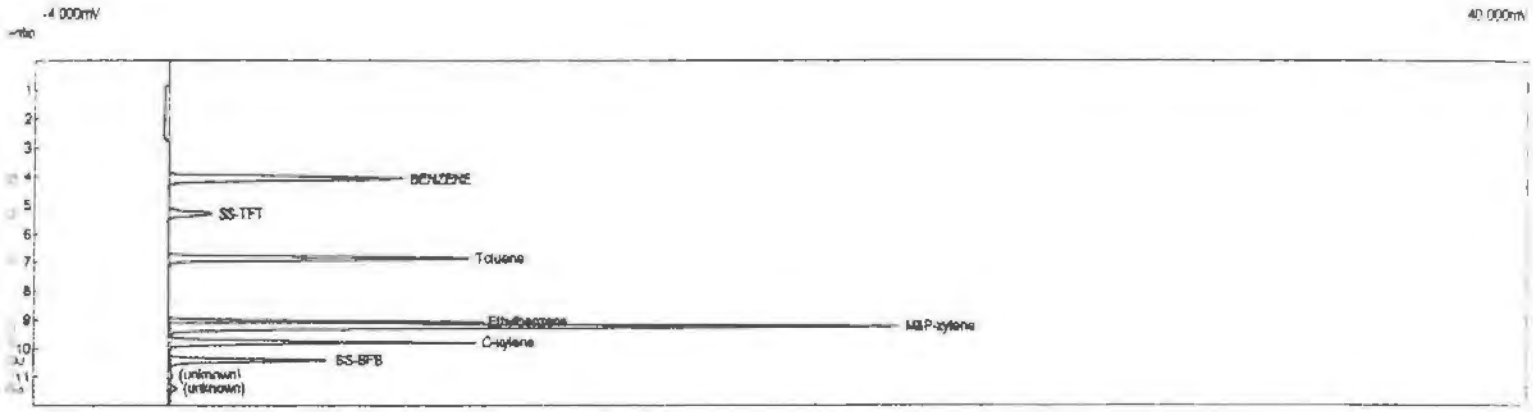
COMPOUND	SPK CONC (ppb)	MS CONC (ppb)	%REC MS	MSD CONC (ppb)	%REC MSD	RPD	ACCEPTABLE RPD	ACCEPTABLE RECOVERY
BENZENE	15.0	13.0	87%	12.6	84%	3%	20%	82% - 117%
TOLUENE	15.0	14.4	96%	13.7	91%	5%	20%	87% - 120%
ETHYLBENZENE	15.0	16.6	111%	14.1	94%	16%	20%	83% - 131%
TOTAL XYLENES	45 0	46.8	104%	42.4	94%	10%	20%	87% - 123%

ppb = PARTS PER BILLION
MS CONC - ANALYZED CONCENTRATION OF SPIKED SAMPLE
% REC - PERCENT RECOVERY OF SPIKE FROM MATRIX
RPD - RELATIVE PERCENT DIFFERENCE BETWEEN MATRIX SPIKE AND MATRIX SPIKE DUPLICATE RECOVERIES

ANALYSES PERFORMED BY MARCO A PEDRAZA
DATA REVIEWED BY KEVIN SHELBURNE

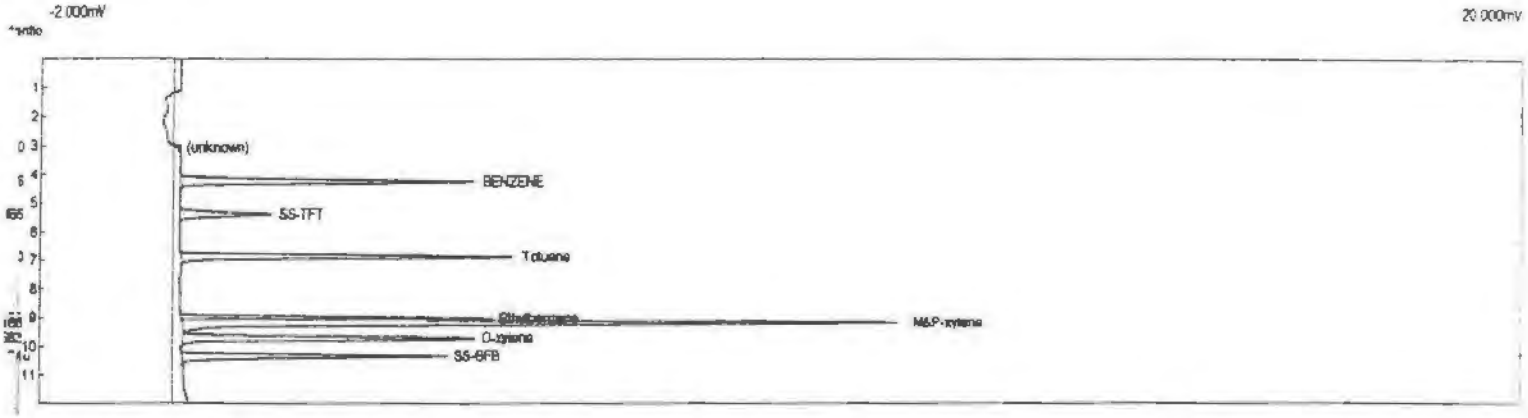
On Site Labs, Inc
PMB 627, HC-01 BOX 29030, CAGUAS, P R 00725
TELEPHONE (787) 720-0329 FAX 789 3858

Lab name: On Site Labs Inc
nalysis date: 02/21/2002 13:25:47
Method: EPA 8021 mod.
Lab ID: GC-2
Description: PID - Ch. 1
Column: Rtx-5,30m,5.0um,0.53mm
Carrier: N2
Data file: 0221pt1.chr ()
Sample: 50 ppb BTEX OPEN STD
Operator: MAP



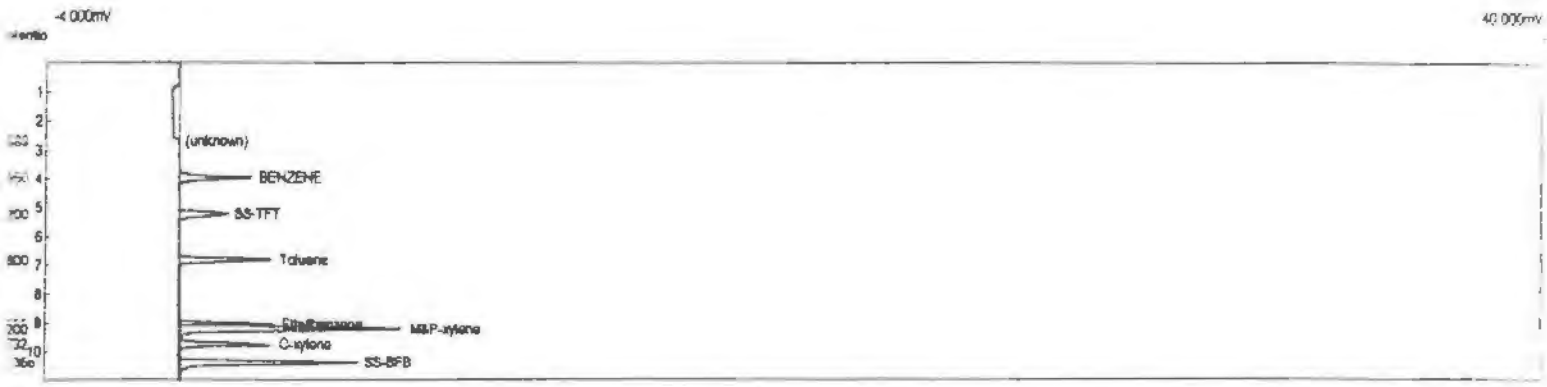
Component	Retention	Area	External	Internal	Units
NZENE	4.050	69.847	42.08	42.0765	ppb
-TFT	5.283	12.992	9.40	9.4009	ppb
uene	6.850	75.510	46.61	46.6111	ppb
ylbenzene	9.066	65.125	55.66	55.6624	
P-xylene	9.233	177.013	98.34	98.3406	
ylene	9.766	71.250	52.39	52.3897	ppb
BFB	10.400	36.186	11.71	11.7107	ppb
		507.923	316.19	316.1918	

Lab name: On Site Labs Inc
nalysis date: 02/21/2002 18:05:52
Method: EPA 8021 mod.
Lab ID: GC-2
Description: PID - Ch. 1
Column: Rtx-5,30m,5.0um,0.53mm
rrier: N2
/ file: 0221pt10.chr ()
ample: 25 ppb BTEX CLOSE STD
Operator: MAP



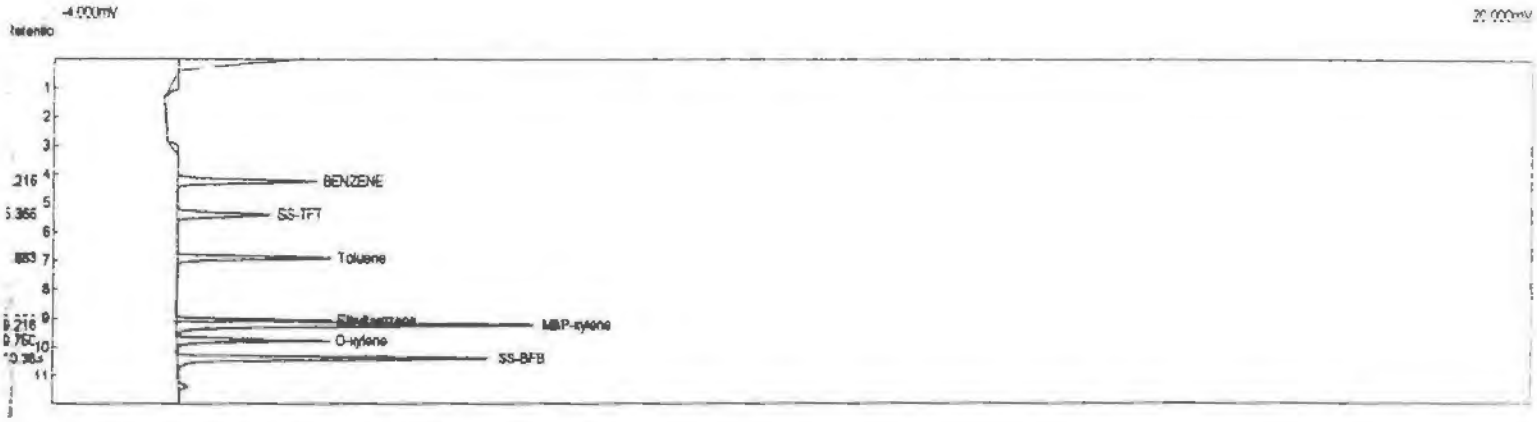
Component	Retention	Area	External	Internal	Units
NZENE	4.216	40.322	24.29	24.2904	ppb
S-TFT	5.366	13.218	9.56	9.5644	ppb
oluene	6.850	41.134	25.39	25.3914	ppb
ylbenzene	9.000	31.210	26.68	26.6752	
P-xylene	9.166	92.876	51.60	51.5978	
-xylene	9.683	35.690	26.24	26.2426	ppb
S-BFB	10.316	32.216	10.43	10.4259	ppb
		286.666	174.19	174.1876	

Lab name: On Site Labs Inc
Analysis date: 02/21/2002 13:51:42
Method: EPA 8021 mod.
Lab ID: GC-2
Description: PID - Ch. 1
Column: Rtx-5,30m,5.0um,0.53mm
Carrier: N2
Data file: 0221pt2.chr ()
Sample: blank matrix spike
Operator: MAP



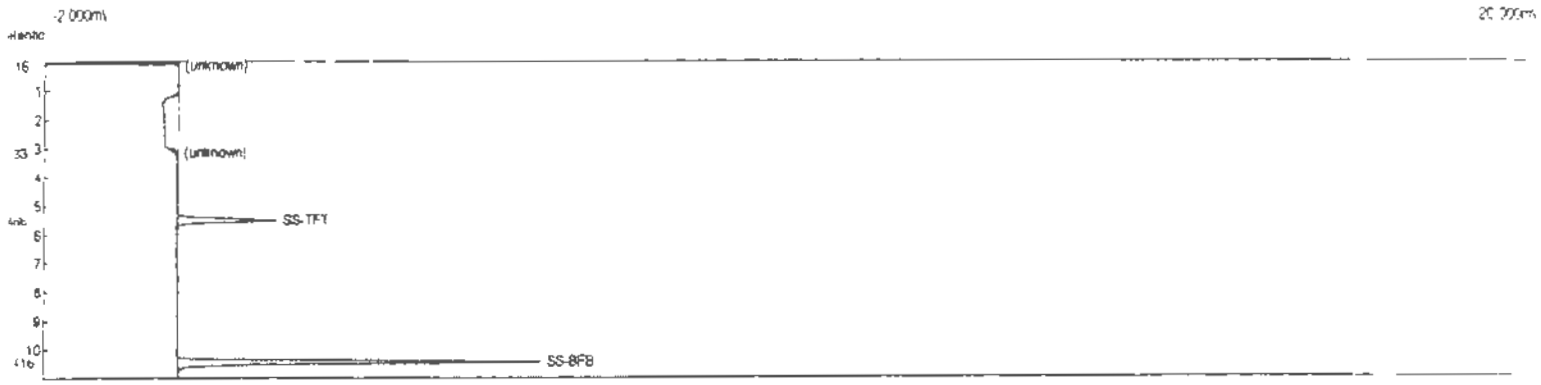
Component	Retention	Area	External	Internal	Units
NZENE	3.950	21.570	12.99	12.9940	ppb
-TFT	5.200	15.062	10.90	10.8987	ppb
uene	6.600	23.272	14.37	14.3654	ppb
ylbenzene	9.033	19.425	16.60	16.6026	
P-xylene	9.200	55.181	30.66	30.6564	
xylene	9.733	21.949	16.14	16.1390	ppb
BFB	10.366	41.862	13.55	13.5476	ppb
		198.321	115.20	115.2036	

Lab name: On Site Labs Inc
Analysis date: 02/21/2002 14:17:03
Method: EPA 8021 mod.
Lab ID: GC-2
Description: PID - Ch. 1
Column: Rtx-5,30m,5.0um,0.53mm
Carrier: N2
Data file: 0221pt3.chr ()
Sample: blank matrix spike duplicat
Operator: MAP



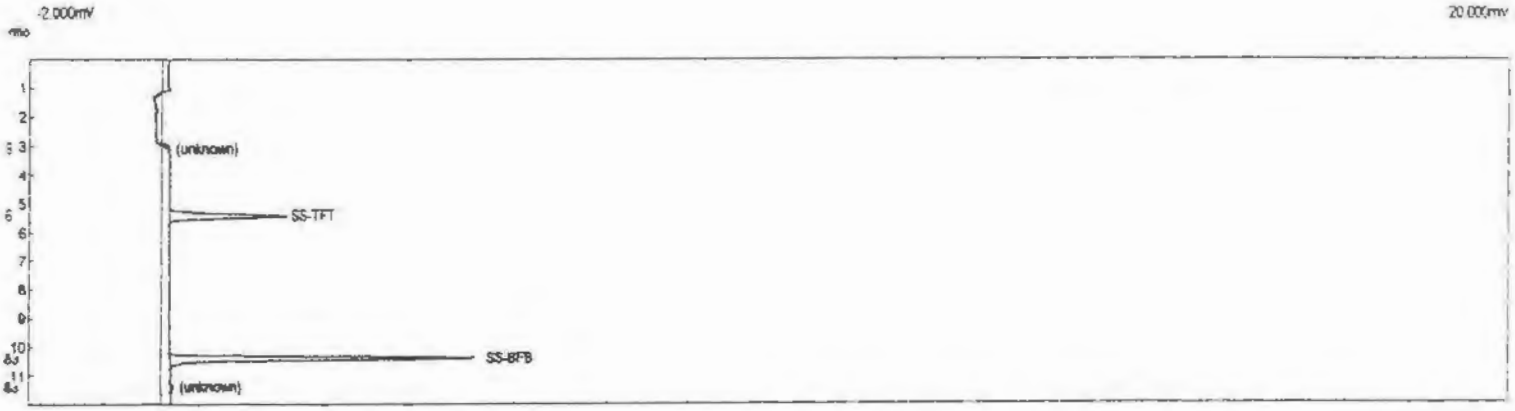
Component	Retention	Area	External	Internal	Units
BENZENE	4.216	20.946	12.62	12.6181	ppb
SS-TFT	5.366	15.336	11.10	11.0970	ppb
Toluene	6.883	22.140	13.67	13.6670	ppb
Ethylbenzene	9.066	16.466	14.07	14.0735	
M&P-xylene	9.216	49.934	27.74	27.7411	
O-xylene	9.750	19.921	14.65	14.6474	ppb
SS-BFB	10.383	40.946	13.25	13.2511	ppb
		185.689	107.10	107.0952	

Lab name: On Site Labs Inc
Analysis date: 02/21/2002 16:10:41
Method: EPA 8021 mod.
Lab ID: GC-2
Description: PID - Ch. 1
Column: Rtx-5,30m,5.0um,0.53mm
Carrier: N2
Data file: 0221pt5.chr ()
Sample: METHOD BLANK
Operator: MAP



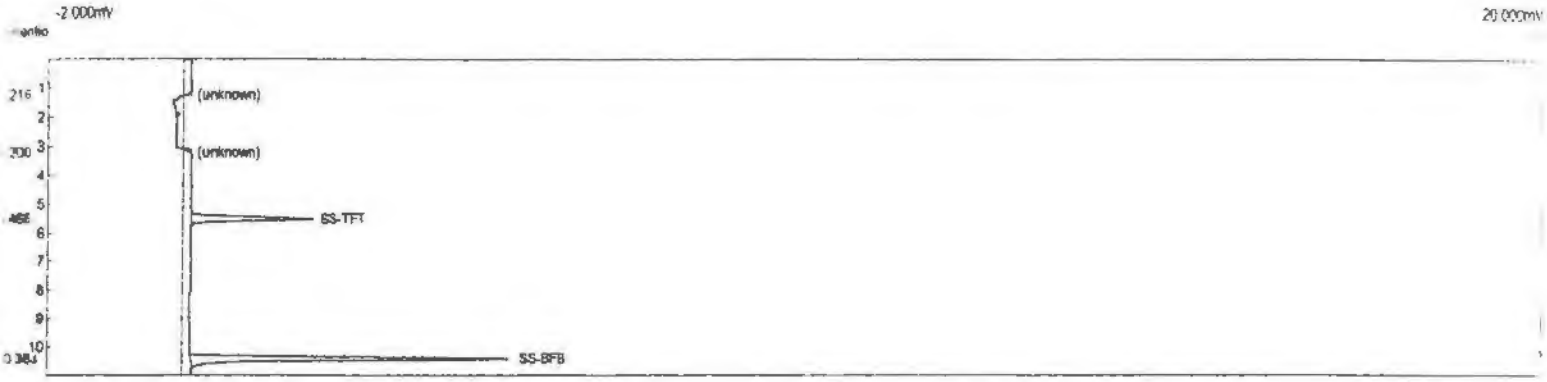
Component	Retention	Area	External	Internal	Units
-TFT	5.466	14.065	10.18	10.1773	ppb
BFB	10.416	41.194	13.33	13.3314	ppb
		55.259	23.51	23.5087	

Lab name: On Site Labs Inc
nalysis date: 02/21/2002 16:54:00
Method: EPA 8021 mod.
Lab ID: GC-2
Description: PID - Ch. 1
Column: Rtx-5,30m,5.0um,0.53mm
ier: N2
ile: 0221pt7.chr ()
ample: HLA003/0220CH2M
Operator: MAP



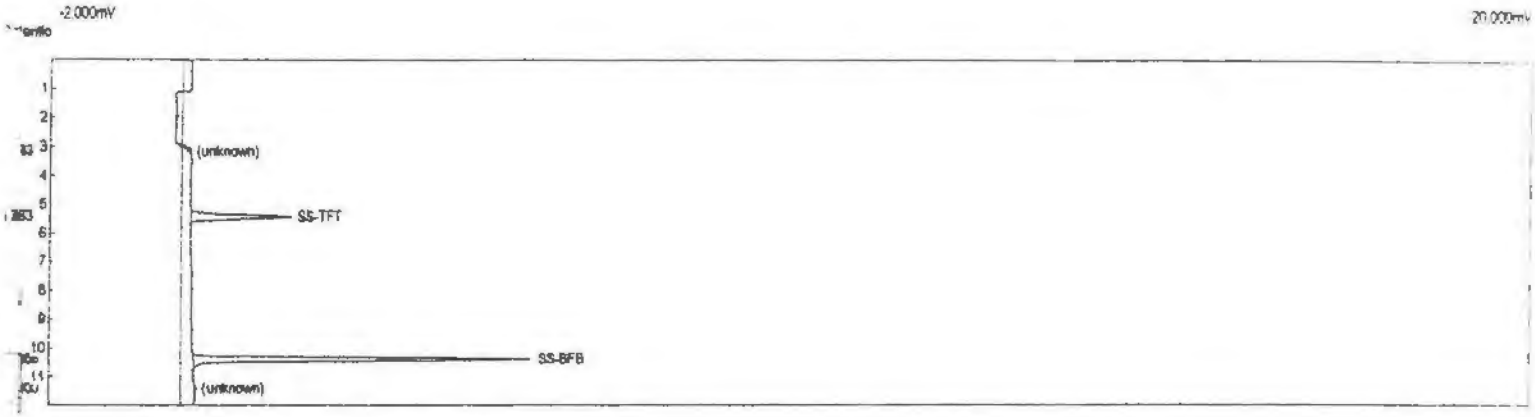
Component	Retention	Area	External	Internal	Units
-TFT	5.366	16.744	12.12	12.1158	ppb
-BFB	10.383	36.802	11.91	11.9100	ppb
		53.546	24.03	24.0258	

Lab name: On Site Labs Inc
Analysis date: 02/21/2002 16:29:16
Method: EPA 8021 mod.
Lab ID: GC-2
Description: PID - Ch. 1
Column: Rtx-5,30m,5.0um,0.53mm
Carrier: N2
Data file: 0221pt6.chr ()
Sample: HLA006/0220CH2M
Operator: MAP



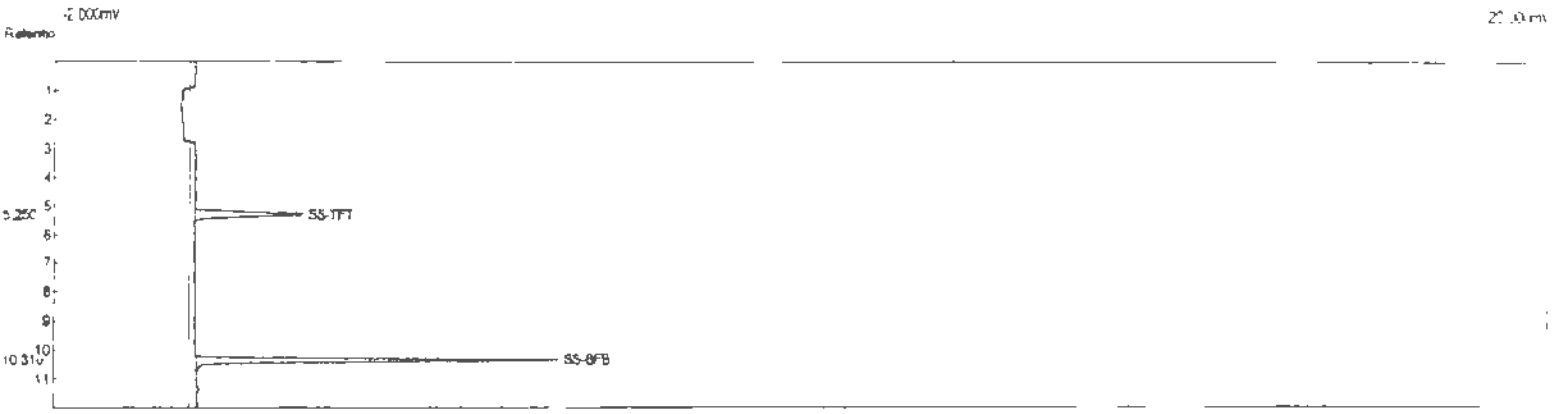
Component	Retention	Area	External	Internal	Units
SS-TFT	5.466	17.342	12.55	12.5485	ppb
SS-BFB	10.383	38.826	12.57	12.5650	ppb
		56.168	25.11	25.1135	

Lab name: On Site Labs Inc
Analysis date: 02/21/2002 17:18:51
Method: EPA 8021 mod.
Lab ID: GC-2
Description: PID - Ch. 1
Column: Rtx-5,30m,5.0um,0.53mm
Carrier: N2
Data file: 0221pt8.chr ()
Sample: HLA014TB1/0220CH2M
Operator: MAP



Component	Retention	Area	External	Internal	Units
SS-TFT	5.383	14.510	10.50	10.4993	ppb
SS-BFB	10.366	38.547	12.47	12.4748	ppb
		53.057	22.97	22.9740	

Lab name: On Site Labs Inc
Analysis date: 02/21/2002 17:43:14
Method: EPA 8021 mod.
Lab ID: GC-2
Description: PID - Ch. 1
Column: Rtx-5,30m,5.0um,0.53mm
Carrier: N2
Data file. 0221pt9.chr ()
Sample. HLA015EB1/0220CH2M
Operator: MAP



Component	Retention	Area	External	Internal	Units
SS-TFT	5.250	15.944	11.54	11.5369	ppb
SS-BFB	10.316	40.948	13.25	13.2518	ppb
		56.892	24.79	24.7887	

On Site Labs, Inc.

PMB 627, HC-01 Box 29030, Caguas, PR 00725
Telephone 787-720-0329 Fax 787-789-3858

March 20, 2002
OSL Projects #02I0305CH2M

Mr Tunch Orsoy
CH2M HILL
4350 W. Cypress Street, Suite 600
Tampa, Florida 33607

SUBJECT: DATA REPORT - CH2M HILL PROJECT NO. 167722.FI.FS
SITE 2036 ROOSEVELT ROADS NAS, CEIBA, PUERTO RICO

Dear Mr. Orsoy:

Please find enclosed the analytical report for the samples collected by CH2M HILL personnel from the above-referenced site and delivered to On Site Labs (OSL) under the proper chain-of-custody protocol. An OSL Puerto Rico certified-chemist performed the following analyses:

- 4 water samples analyzed for TPH-gas/diesel by modified EPA test method 8015B.
- 1 equipment blank water sample analyzed for TPH-gas/diesel.
- 4 water samples analyzed for BTEX by modified EPA test method 8020A.
- 1 trip and 1 equipment blank water sample analyzed for BTEX.
- Laboratory QA/QC analyses for TPH-gas/diesel and BTEX.

The analytical results are summarized in the attached table. Applicable detection limits, QA/QC data, chromatograms, a chain-of-custody and an invoice are attached.

OSL appreciates the opportunity to provide analytical services for this project. If you have any questions relating to the data or report, please do not hesitate to contact us.

Sincerely,
On Site Labs, Inc.

Kevin Shelburne
Principal

Attachments

QA/QC REPORT - CALIBRATION DATA

OSL Project #02I0305CH2M
DAILY CALIBRATION DATE: 03/18/02

CH2M HILL PROJECT NO. 167722.FI.FS
PROJECT NAME: RRNAS SITE 2036

			INITIAL			OPENING			CLOSING	
COMPOUND	DETECTOR	CALIB RANGE	RF	%RSD	AREA	RF	%DIFF	AREA	RF	%DIFF
TPH GASOLINE	FID #2 (gc5)	10 - 30,000	0.26	17.6%	210.68	0.26	2.9%	210.39	0.26	2.7%
TPH GASOLINE	FID #3 (gc5)	10 - 30,000	0.36	15.0%	63.33	0.32	12.5%	138.73	0.35	4.2%
TPH GASOLINE	FID #4 (gc5)	10 - 30,000	0.31	15.4%	260.33	0.33	6.3%	258.56	0.32	5.6%
TPH DIESEL	FID #2 (gc5)	25 - 20,000	0.69	14.1%	1040.89	0.65	6.3%	1218.97	0.76	9.8%
TPH DIESEL	FID #3 (gc5)	25 - 20,000	0.74	13.6%	327.45	0.82	10.8%	614.26	0.77	3.9%
TPH DIESEL	FID #4 (gc5)	25 - 20,000	0.61	11.1%	1067.23	0.67	10.1%	1051.81	0.66	8.5%

CALIB RANGE - RANGE OF CALIBRATION CURVE IN ppm
INITIAL RF - AVERAGE RESPONSE FACTOR FROM MULTIPOINT CALIBRATION CURVE
% RSD - LINEARITY OF MULTIPOINT CALIBRATION CURVE (+/- 20% ACCEPTABLE LIMITS)
AREA - AREA COUNTS FROM DAILY CALIBRATION STANDARD
RF - DETECTOR RESPONSE FACTOR FROM MID-POINT CALIBRATION STANDARD
% DIFF - DIFFERENCE, IN PERCENT, BETWEEN THE AVERAGE RF AND THE OPENING OR CLOSING RF (+/- 15% ACCEPTABLE LIMITS)
OPENING - MID-POINT CALIBRATION STANDARD ANALYZED BEFORE SAMPLE ANALYSES BEGIN
CLOSING - MID-POINT CALIBRATION STANDARD ANALYZED AFTER SAMPLES ANALYSES ARE COMPLETE

ANALYSES PERFORMED BY MARCO A PEDRAZA
DATA REVIEWED BY KEVIN SHELBURNE

QA/QC REPORT - MS/MSD DATA

MATRIX SPIKE (MS)/MATRIX SPIKE DUPLICATE (MSD)

OSL Project #02I0305CH2M
DATE: 03/18/02

CH2M HILL PROJECT NO. 167722.FI.FS
PROJECT NAME: RRNAS SITE 2036

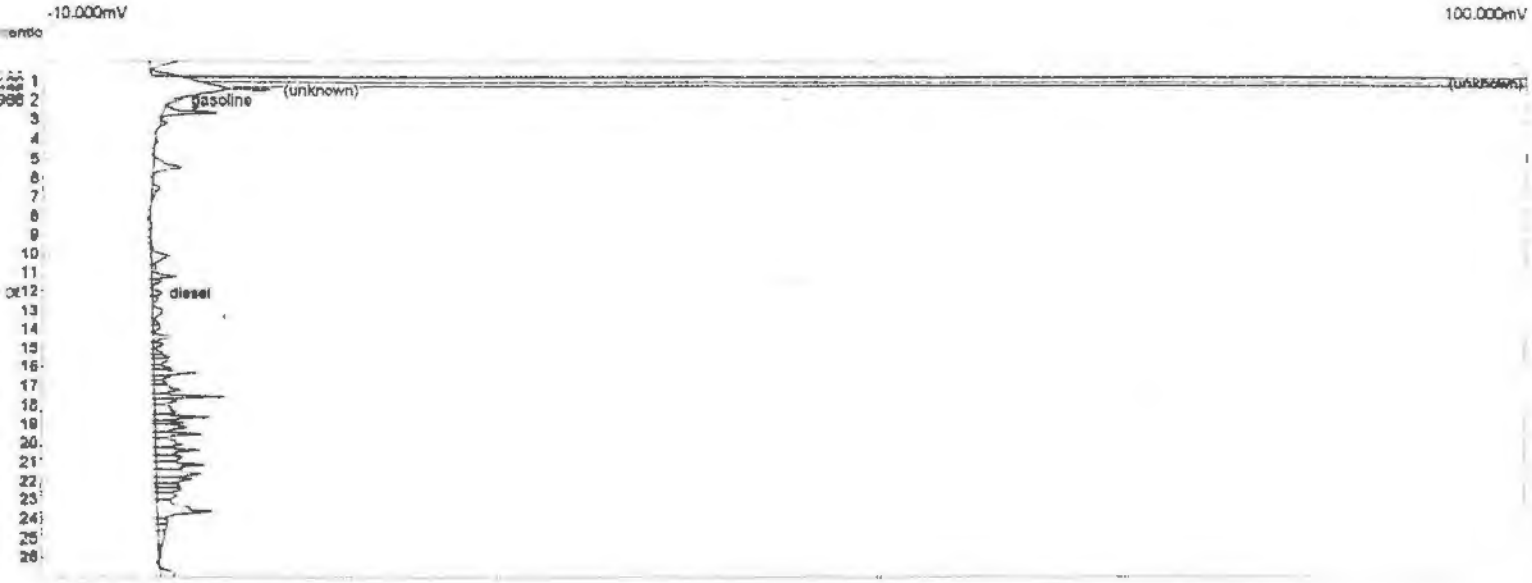
COMPOUND	SPK CON (ppm)	MS CONC (ppm)	%REC MS	MSD CONC (ppm)	%REC MSD	RPD	ACCEPTABLE RPD	ACCEPTABLE RECOVERY
TPH-GASOLINE	200	194	97%	179	90%	8%	15%	81% - 126%
TPH-DIESEL	400	437	109%	444	111%	2%	15%	74% - 131%

ppm = PARTS PER MILLION
MS CONC - ANALYZED CONCENTRATION OF SPIKED SAMPLE
% REC - PERCENT RECOVERY OF SPIKE FROM MATRIX
RPD - RELATIVE PERCENT DIFFERENCE BETWEEN MATRIX SPIKE AND MATRIX SPIKE DUPLICATE RECOVERIES

ANALYSES PERFORMED BY MARCO A PEDRAZA
DATA REVIEWED BY KEVIN SHELBURNE

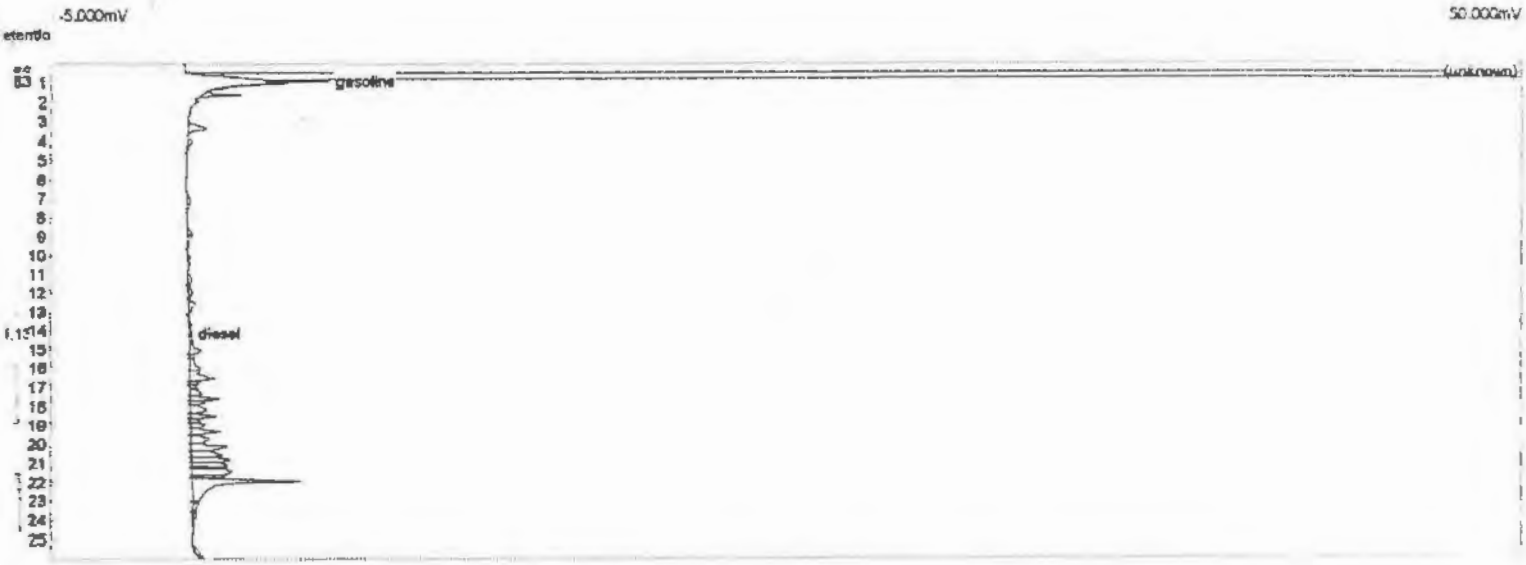
ON SITE LABS, INC
PMB 627, HC 01 BOX 29030, CAGUAS, P.R. 00725
TELEPHONE (0329 FAX 789-3858

Lab name: On Site Labs Inc
Analysis date: 03/18/2002 11:57:03
Method: EPA 8015B mod.
Lab ID: GC - 5
Description: FID2 - Ch. 2
Column: XTI-5, 30m, 0.53mm, 1.5um
Carrier: N2
Data file: 0318fb2.CHR ()
Sample: 200/400 ppm G/D open
Operator: MAP



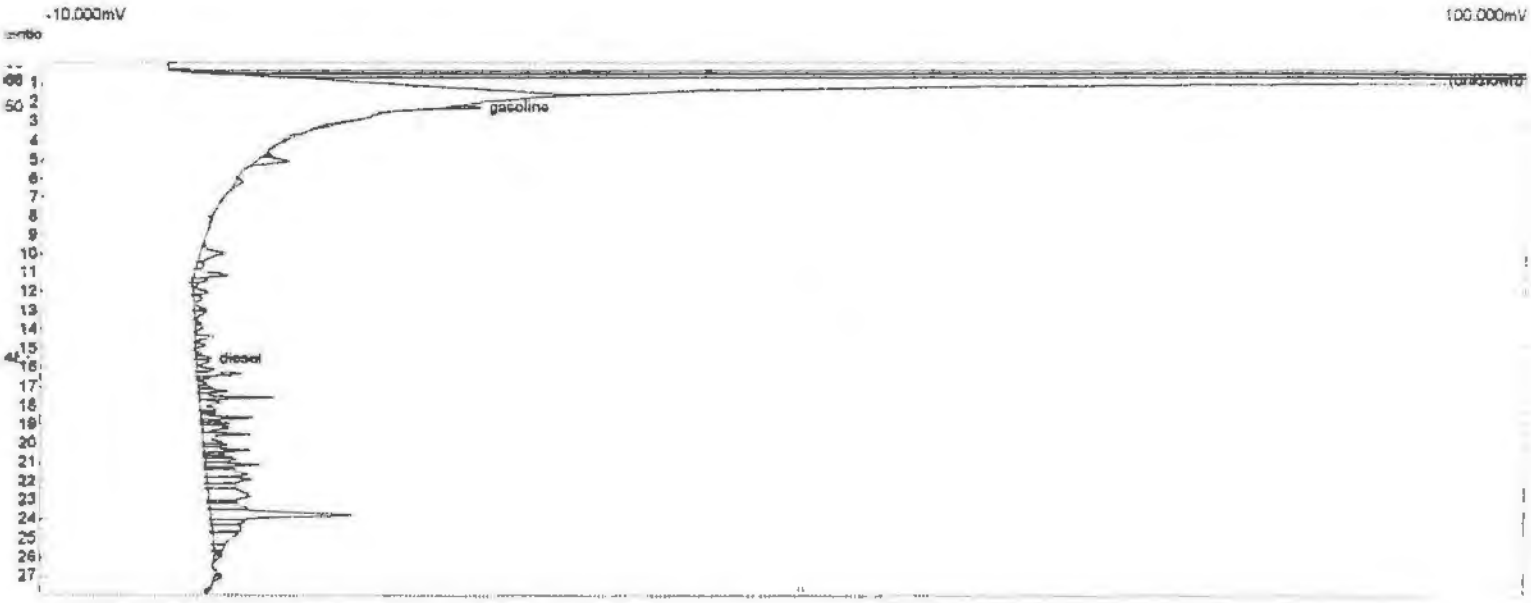
Component	Retention	Area	External	Units
gasoline	1.966	210.681	205.74	
diesel	12.066	1040.886	374.96	ppm
		1251.567	580.70	

Lab name: On Site Labs Inc
nalysis date: 03/16/2002 11:57:03
Method: EPA 8015B mod.
Lab ID: GC - 5
Description: FID 3 - Ch. 3
Column: XTI-5, 30m, 0.53mm, 1.5um
rier: N2
file: 0316fc2.CHR 0
mple: 50/100 ppm G/D open
Operator: MAP



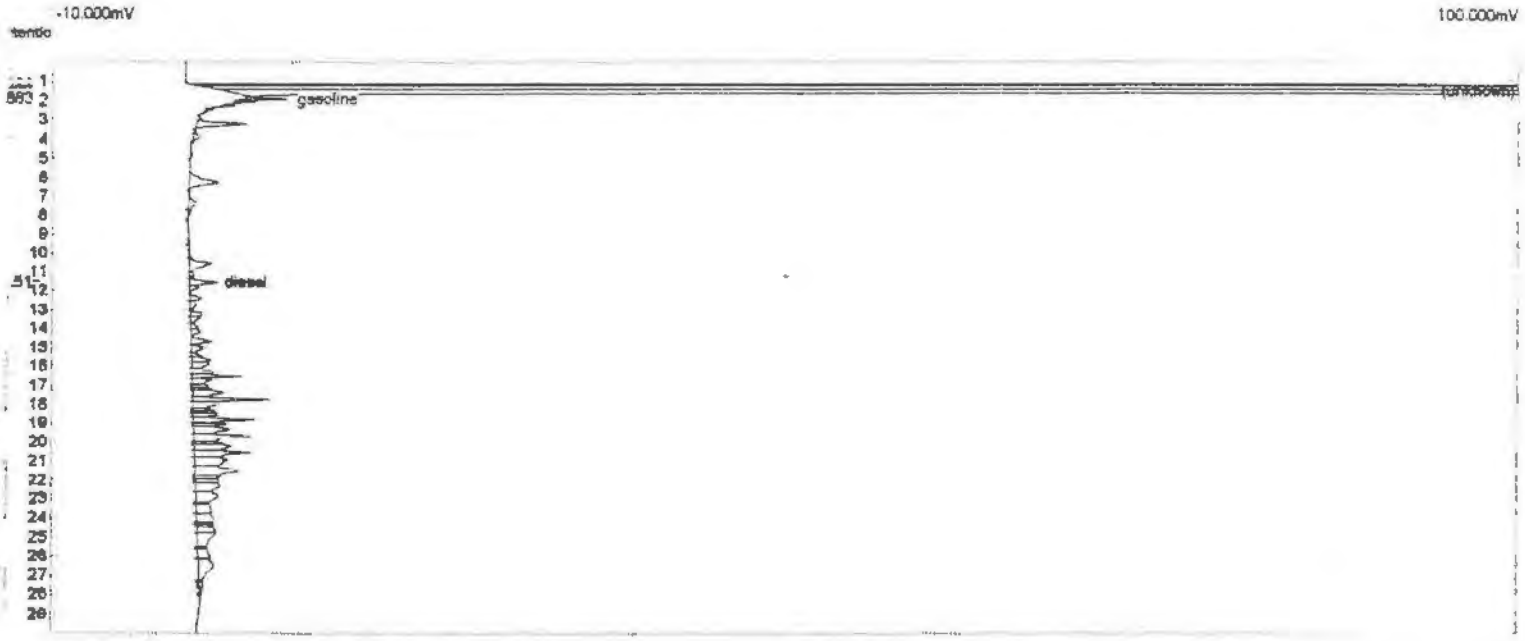
Component	Retention	Area	External	Units
asoline	0.883	63.328	43.73	
esel	14.133	327.451	110.78	ppm
		390.779	154.51	

Lab name: On Site Labs Inc
nalysis date: 03/18/2002 11:57:03
Method: EPA 8015B mod.
Lab ID: GC - 5
Description: FID 4 - Ch. 4
Column: XTI-5, 30m, 0.53mm, 1.5um
Carrier: N2
Data file: 0318FD2.chr ()
Sample: 200/400 G/D OPEN STD
Operator: MAP



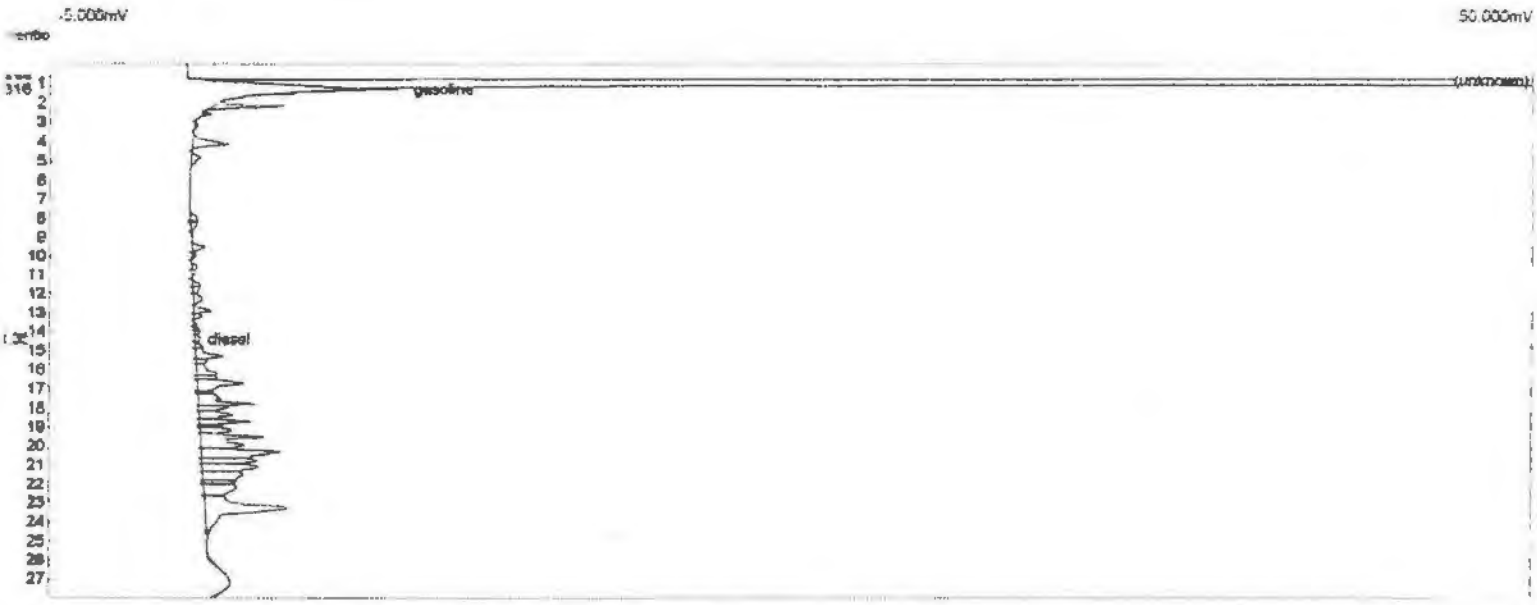
Component	Retention	Area	External	Units
soline	2.250	260.332	212.69	
esel	15.483	1067.232	440.28	ppm
		1327.564	652.97	

Lab name: On Site Labs Inc
nalysis date: 03/18/2002 18:48:09
Method: EPA 8015B mod.
Lab ID: GC - 5
Description: FID2 - Ch. 2
Column: XTI-5, 30m, 0.53mm, 1.5um
ier: N2
file: 0318fb17.CHR ()
Sample: 200/400 ppm G/D close
Operator: MAP



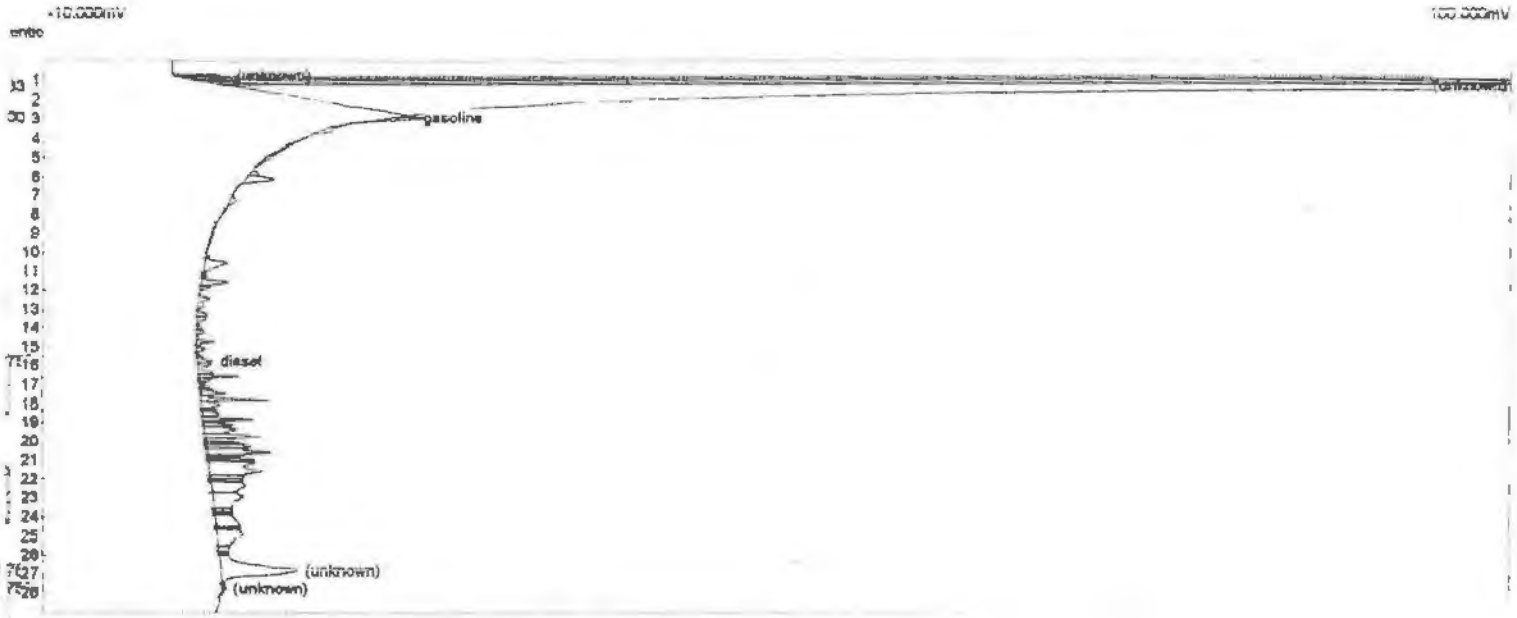
onent	Retention	Area	External	Units
asoline	1.883	210.391	205.46	
diesel	11.516	1218.967	439.11	ppm
		1429.359	644.57	

Lab name: On Site Labs Inc
nalysis date: 03/18/2002 18:48:09
Method: EPA 8015B mod.
Lab ID: GC - 5
Description: FID 3 - Ch. 3
Column: XTI-5, 30m, 0.53mm, 1.5um
Carrier: N2
Data file: 0318fc17.CHR ()
Sample: 100/200 ppm G/D close
Operator: MAP



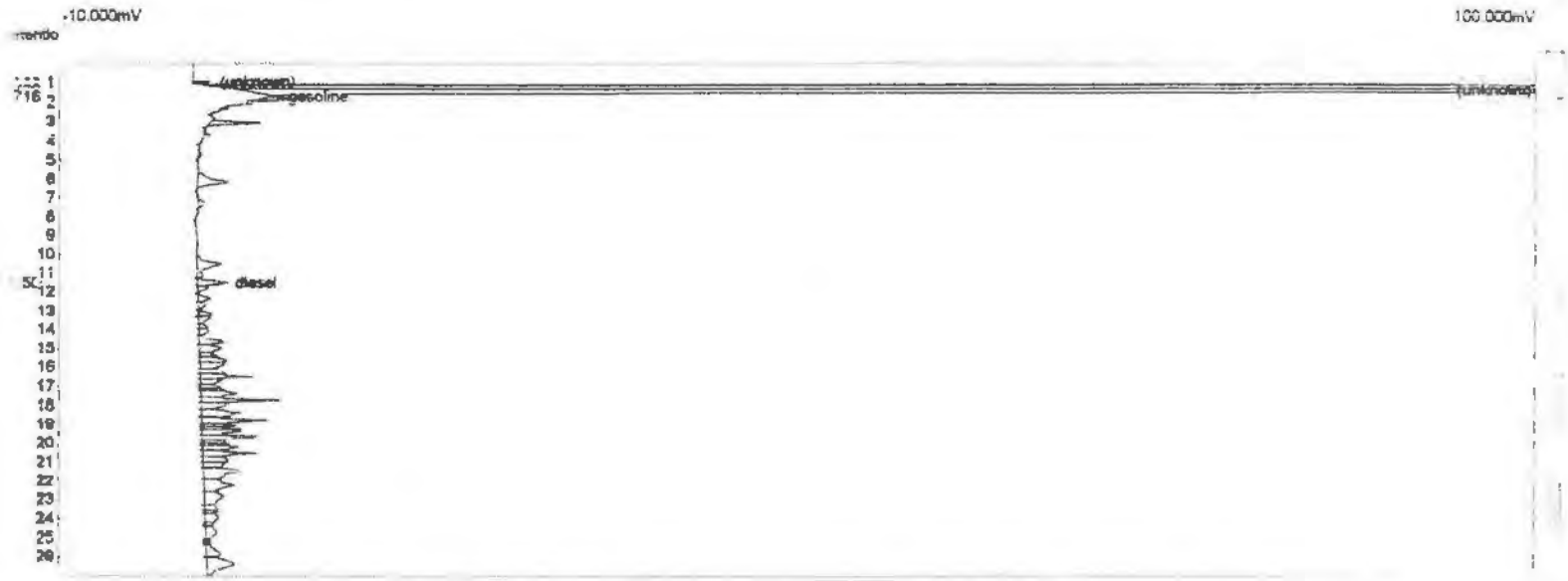
Component	Retention	Area	External	Units
ssoline	1.316	138.731	95.81	
esel	14.350	614.251	207.80	ppm
		752.981	303.61	

Lab name: On Site Labs inc
alysis date: 03/18/2002 18:48:09
Method: EPA 8015B mod.
Lab ID: GC - 5
Description: FID 4 - Ch. 4
Column: XTI-5, 30m, 0.53mm, 1.5um
r: N2
e: 0318fd17.CHR ()
Sample: 200/400 ppm G/D close
Operator: MAP



Component	Retention	Area	External	Units
so	2.900	258.564	211.24	
sel	15.750	1051.809	433.91	ppm
		1310.372	645.16	

Lab name: On Site Labs Inc
Analysis date: 03/18/2002 18:17:30
Method: EPA 8015B mod.
Lab ID: GC - 5
Description: FID2 - Ch. 2
Column: XTI-5, 30m, 0.53mm, 1.5um
Carrier: N2
Data file: 0318fb18.CHR ()
Sample: HLA03matrix spike
Operator: MAP

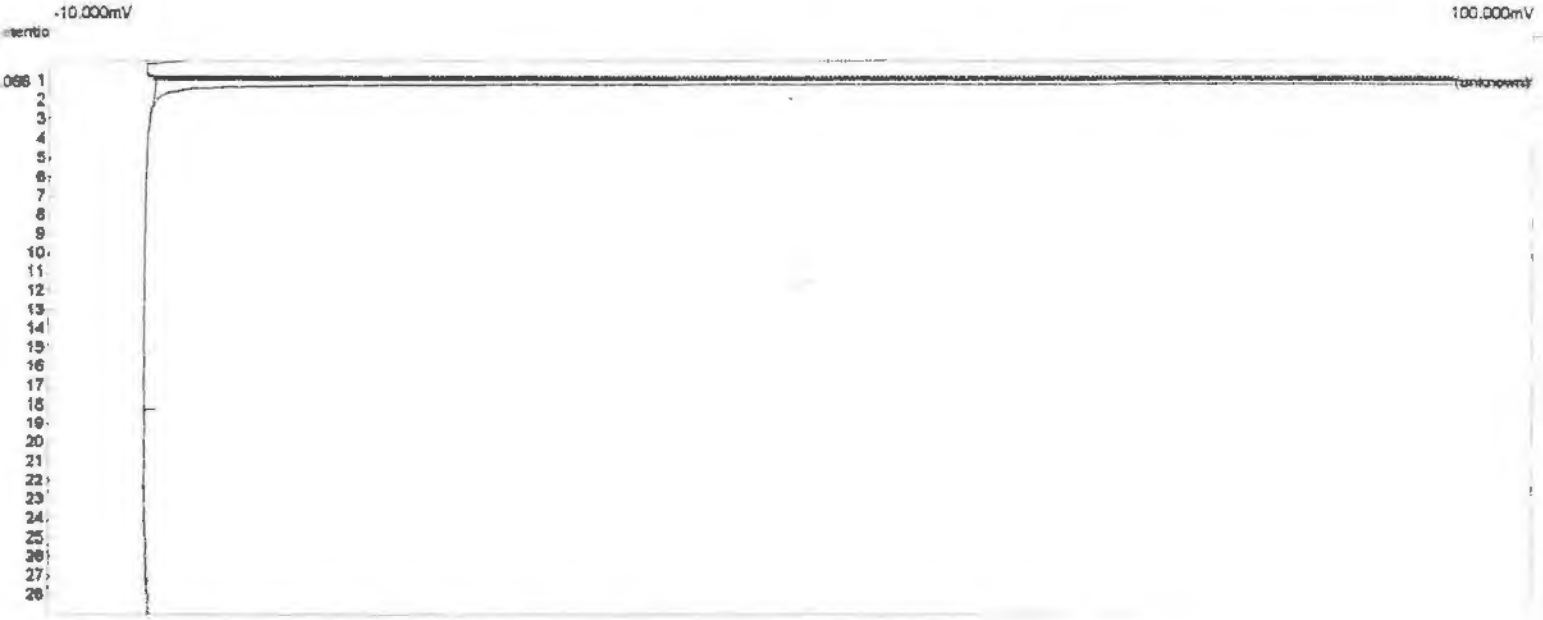


Component	Retention	Area	External	Units
asoline	1.716	198.609	193.95	
iesel	11.500	1214.061	437.34	ppm
		1412.670	631.30	

Lab name: On Site Labs Inc
Analysis date: 03/18/2002 18:17:30
Method: EPA 8015B mod.
Lab ID: GC - 5
Description: FID 3 - Ch. 3
Column: XTI-5, 30m, 0.53mm, 1.5um
Carrier: N2
Data file: 0318fc16.CHR ()
Sample: HLA03matrix spike duplicat
Operator: MAP

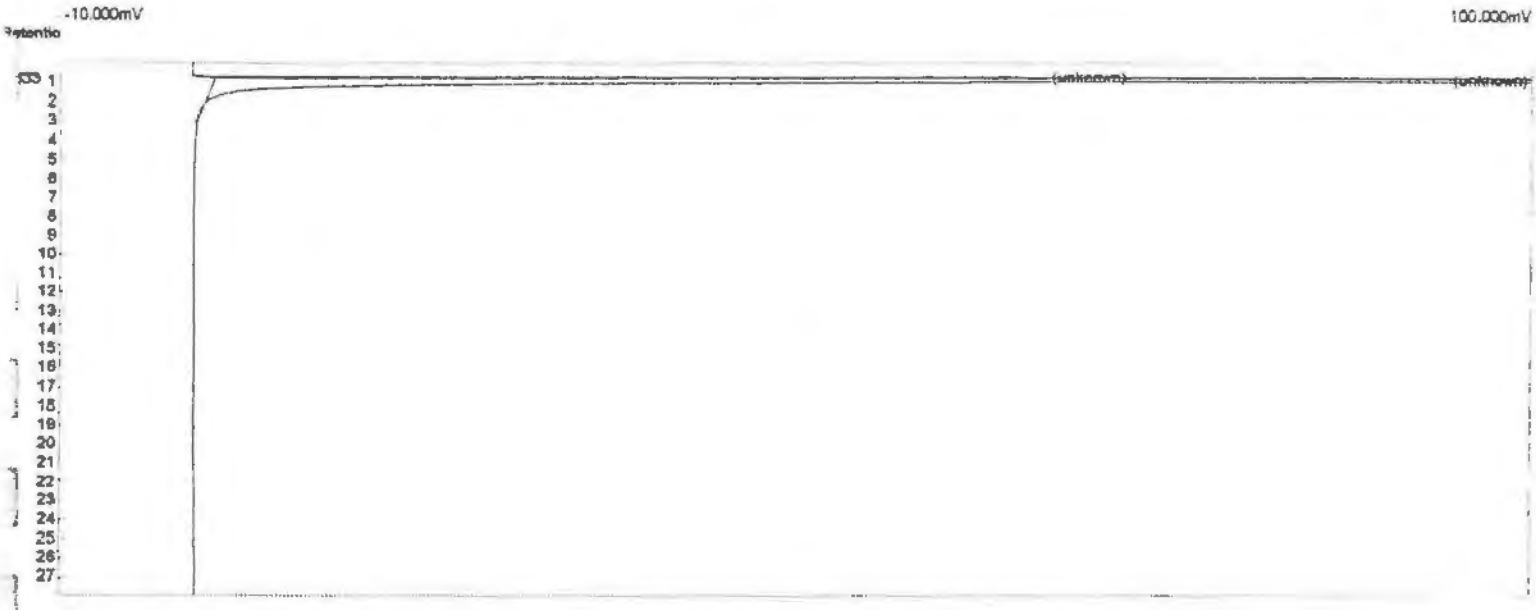
Component	Retention	Area	External	Units
gasoline	1.416	258.561	178.56	
diesel	15.233	1313.525	444.36	ppm
		1572.086	622.92	

Lab name: On Site Labs Inc
Analysis date: 03/16/2002 13:14:19
Method: EPA 8015B mod.
Lab ID: GC - 5
Description: FID2 - Ch. 2
Column: XTI-5, 30m, 0.53mm, 1.5um
Carrier: N2
Data file: 0318fb4.CHR ()
Sample: method blank
Operator: MAP



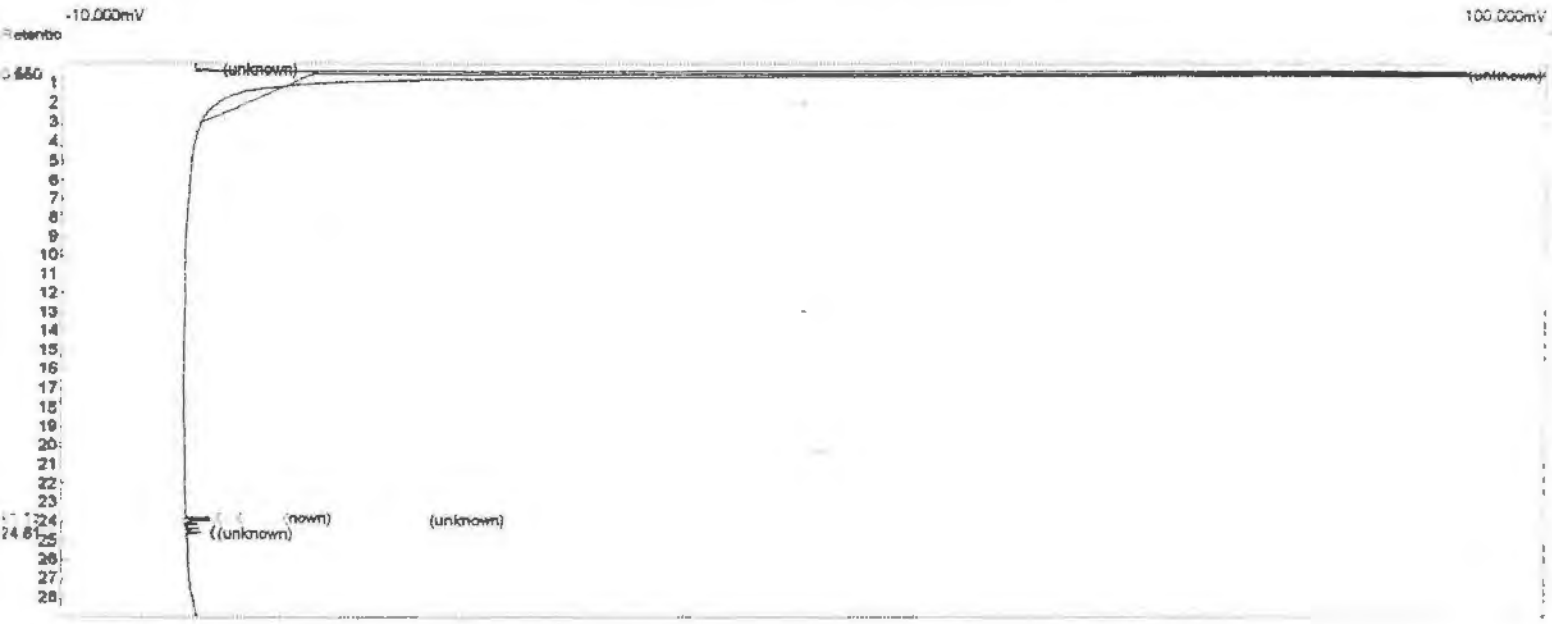
Component	Retention	Area	External	Units
		0.000	0.00	

Lab name: On Site Labs Inc
Analysis date: 03/18/2002 13:54:41
Method: EPA 8015B mod.
Lab ID: GC - 5
Description: FID 3 - Ch. 3
Column: XTI-5, 30m, 0.53mm, 1.5um
Carrier: N2
Data file: 0318fc6.CHR ()
Sample: method blank
Operator: MAP



Component	Retention	Area	External	Units
		0.000	0.00	

Lab name: On Site Labs Inc
Analysis date: 03/18/2002 13:14:19
Method: EPA 8015B mod.
Lab ID: GC - 5
Description: FID 4 - Ch. 4
Column: XTI-5, 30m, 0.53mm, 1.5um
Carrier: N2
Data file: 0318fd4.CHR ()
Sample: method blank
Operator: MAP

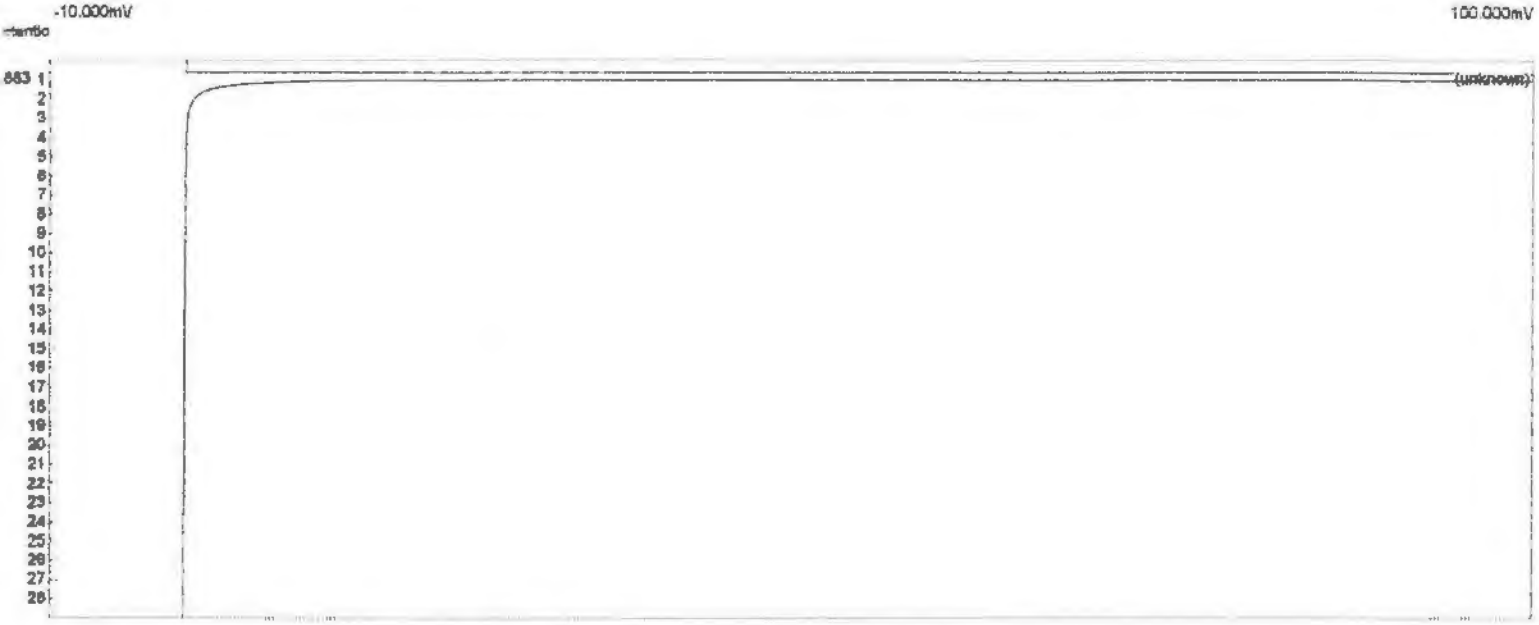


Component	Retention	Area	External	Units
		0.000	0.00	

Lab name: On Site Labs Inc
Analysis date: 03/18/2002 18:14:24
Method: EPA 8015B mod.
Lab ID: GC - 5
Description: FID2 - Ch. 2
Column: XTI-5, 30m, 0.53mm, 1.5um
Carrier: N2
File: 0318FB12.chr ()
Sample: HLA024/0305CH2M
Operator: MAP

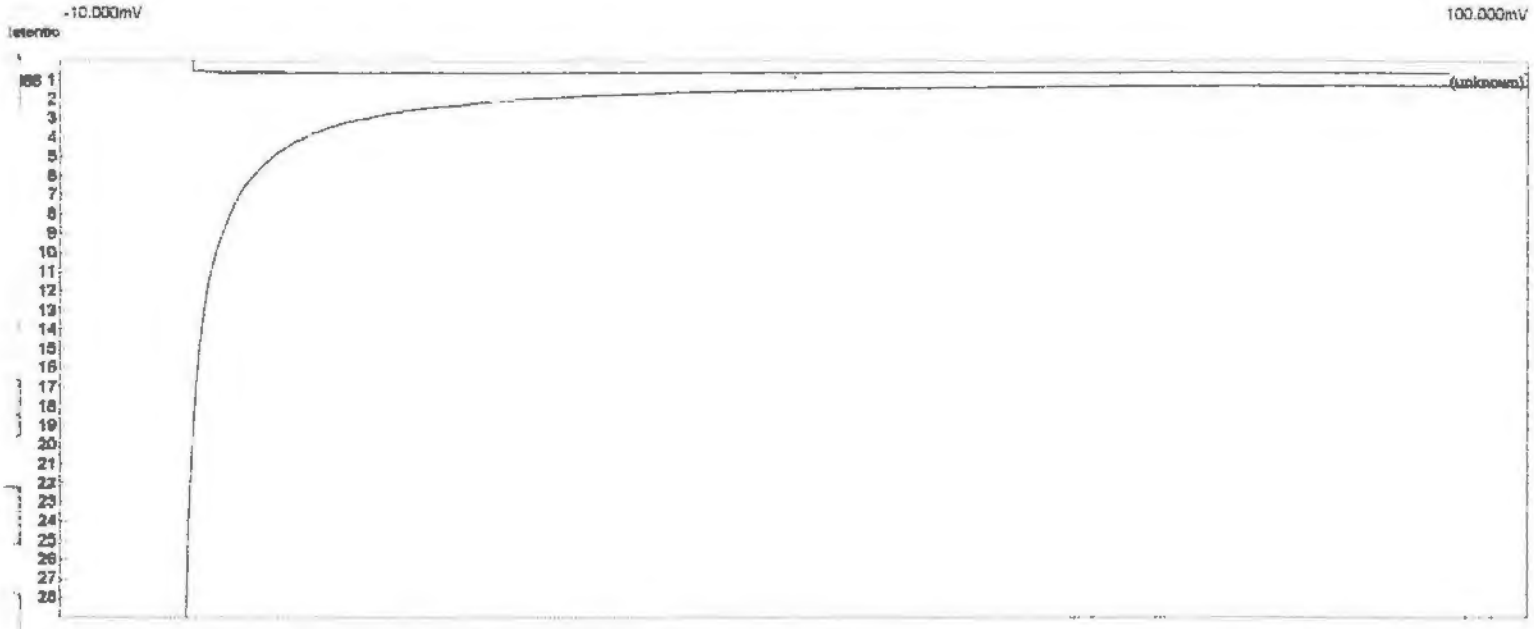
Component	Retention	Area	External	Units
		0.000	0.00	

Lab name: On Site Labs Inc
Analysis date: 03/18/2002 16:14:24
Method: EPA 8015B mod.
Lab ID: GC - 5
Description: FID 3 - Ch. 3
Column: XTi-5, 30m, 0.53mm, 1.5um
Carrier: N2
Data file: 0318FC12.chr ()
Sample: HLA025/0305CH2M
Operator: MAP



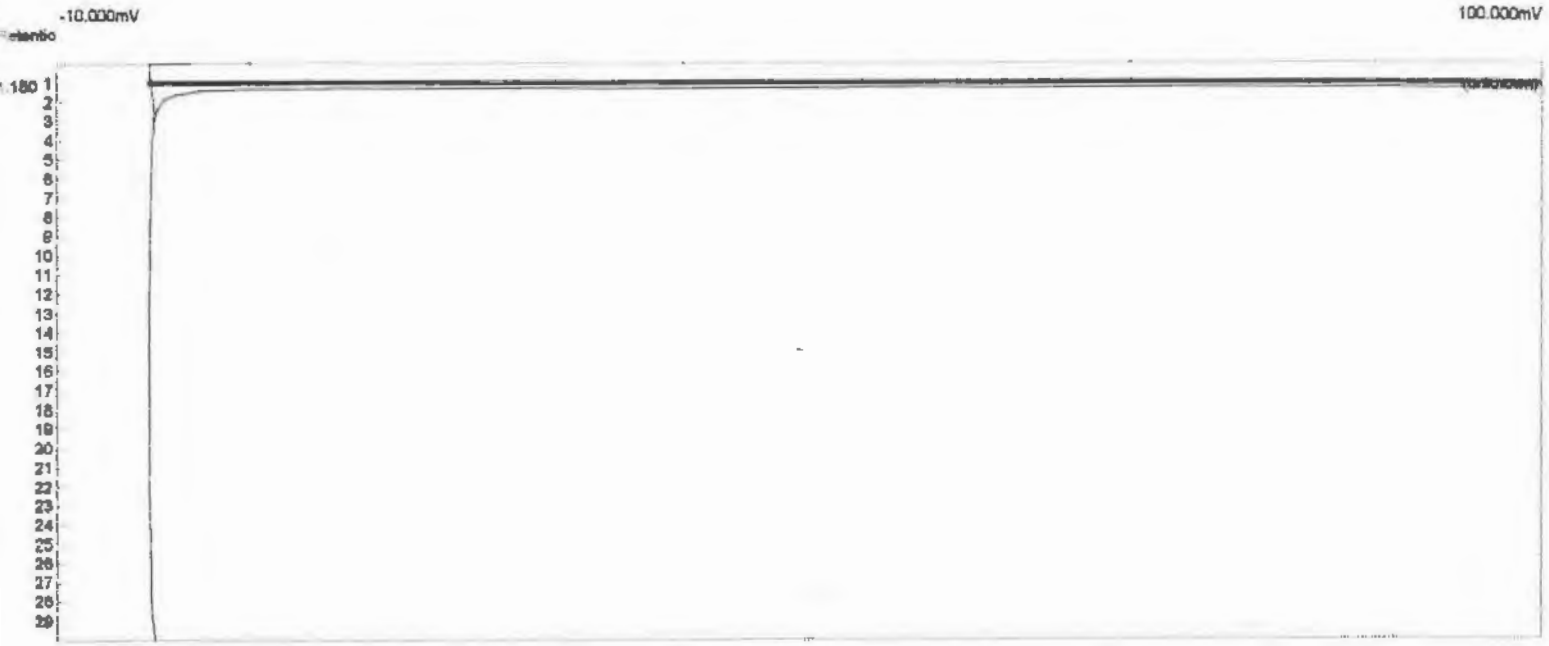
Component	Retention	Area	External	Units
		0.000	0.00	

Lab name: On Site Labs Inc
Analysis date: 03/18/2002 16:14:24
Method: EPA 8015B mod.
Lab ID: GC - 5
Description: FID 4 - Ch. 4
Column: XTI-5, 30m, 0.53mm, 1.5um
Carrier: N2
File: 0318FD12.chr ()
Sample: HLA026/0305CH2M
Operator: MAP



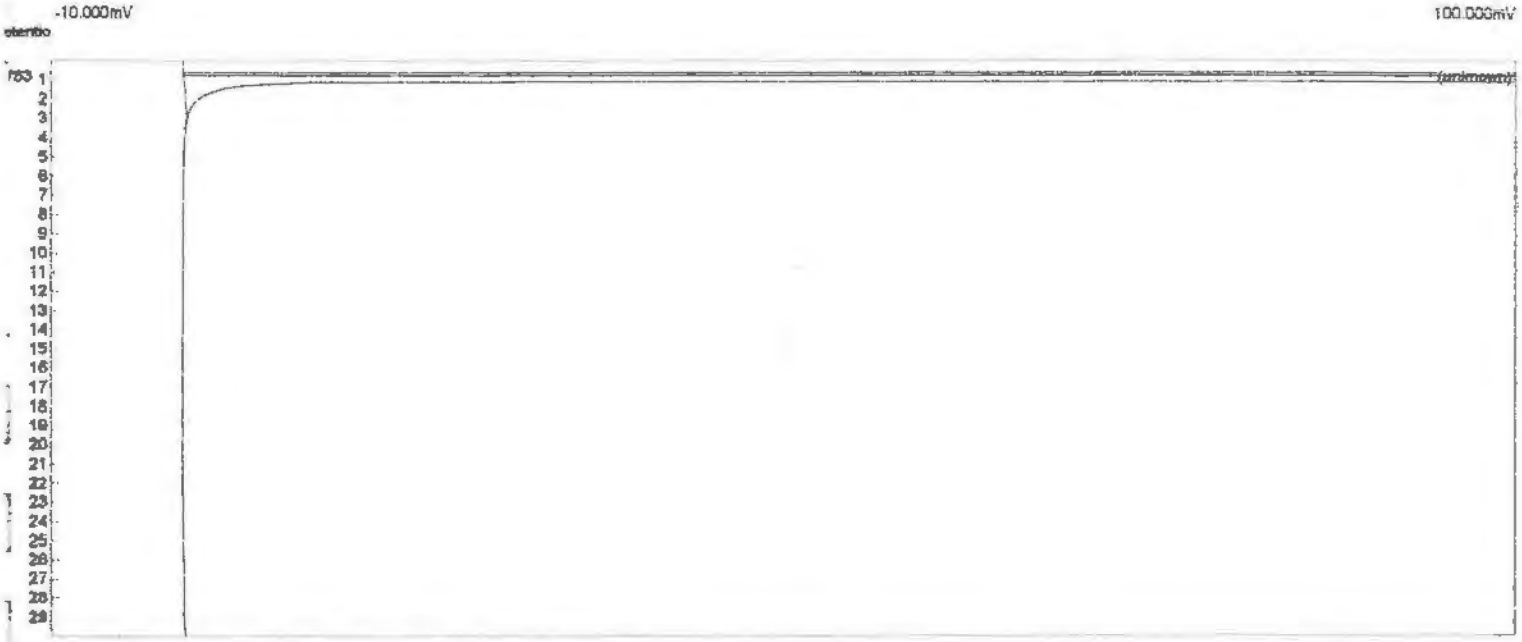
Component	Retention	Area	External	Units
		0.000	0.00	

Lab name: On Site Labs Inc
Analysis date: 03/18/2002 16:44:14
Method: EPA 8015B mod.
Lab ID: GC - 5
Description: FID2 - Ch. 2
Column: XTI-5, 30m, 0.53mm, 1.5um
Carrier: N2
Data file: 0318FB13.chr ()
Sample: HLA027FD3/0305CH2M
Operator: MAP



Component	Retention	Area	External	Units
		0.000	0.00	

Lab name: On Site Labs Inc
Analysis date: 03/18/2002 16:44:14
Method: EPA 8015B mod.
Lab ID: GC - 5
Description: FID 3 - Ch. 3
Column: XTI-5, 30m, 0.53mm, 1.5um
Carrier: N2
File: 0318FC13.chr ()
Sample: HLA029EB3/0305CH2M
Operator: MAP



Component	Retention	Area	External	Units
		0.000	0.00	

QA/QC REPORT - CALIBRATION DATA

OSL Project #02I0305CH2M
DAILY CALIBRATION DATE: 03/18/02

CH2M HILL PROJECT NO. 167722.FI.FS
PROJECT NAME: RRNAS SITE 2036, CEIBA

			INITIAL		OPENING			CLOSING		
COMPOUND	DETECTOR	CALIB RANGE	RF	%RSD	AREA	RF	%DIFF	AREA	RF	%DIFF
BENZENE	PID1 - GC2	0.5 - 75.0	85.78	8.1%	727.06	90.88	5.9%	716.49	89.56	4.4%
TOLUENE	PID1 - GC2	0.5 - 75.0	81.33	8.2%	689.17	86.15	5.9%	681.21	85.15	4.7%
ETHYLBENZENE	PID1 - GC2	0.5 - 75.0	65.84	13.6%	467.28	58.41	11.3%	478.09	59.76	9.2%
m&p-XYLENES	PID1 - GC2	1.0 - 150	98.46	16.8%	1614.99	100.94	2.5%	1625.49	101.59	3.2%
o-XYLENES	PID1 - GC2	0.5 - 75.0	73.19	17.4%	566.88	70.86	3.2%	607.29	75.91	3.7%

CALIB RANGE - RANGE OF CALIBRATION CURVE IN ppb
INITIAL RF - AVERAGE RESPONSE FACTOR FROM MULTIPOINT CALIBRATION CURVE
% RSD - LINEARITY OF MULTIPOINT CALIBRATION CURVE (+/- 20% ACCEPTABLE LIMITS)
AREA - AREA COUNTS FROM DAILY CALIBRATION STANDARD
RF - DETECTOR RESPONSE FACTOR FROM MID-POINT CALIBRATION STANDARD
% DIFF - DIFFERENCE, IN PERCENT, BETWEEN THE AVERAGE RF AND THE OPENING OR CLOSING RF (+/- 20% ACCEPTABLE LIMITS)
OPENING - MID-POINT CALIBRATION STANDARD ANALYZED BEFORE SAMPLE ANALYSES BEGIN
CLOSING - MID-POINT CALIBRATION STANDARD ANALYZED AFTER SAMPLES ANALYSES ARE COMPLETE

ANALYSES PERFORMED BY MARCO A. PEDRAZA
DATA REVIEWED BY: KEVIN SHELBURNE

QA/QC REPORT - MS/MSD DATA

MATRIX SPIKE (MS)/MATRIX SPIKE DUPLICATE (MSD)

OSL PROJECT #02I0305CH2M
DATE: 03/18/02

CH2M HILL PROJECT NO. 167722.FI.FS
PROJECT NAME: RRNAS SITE 2036

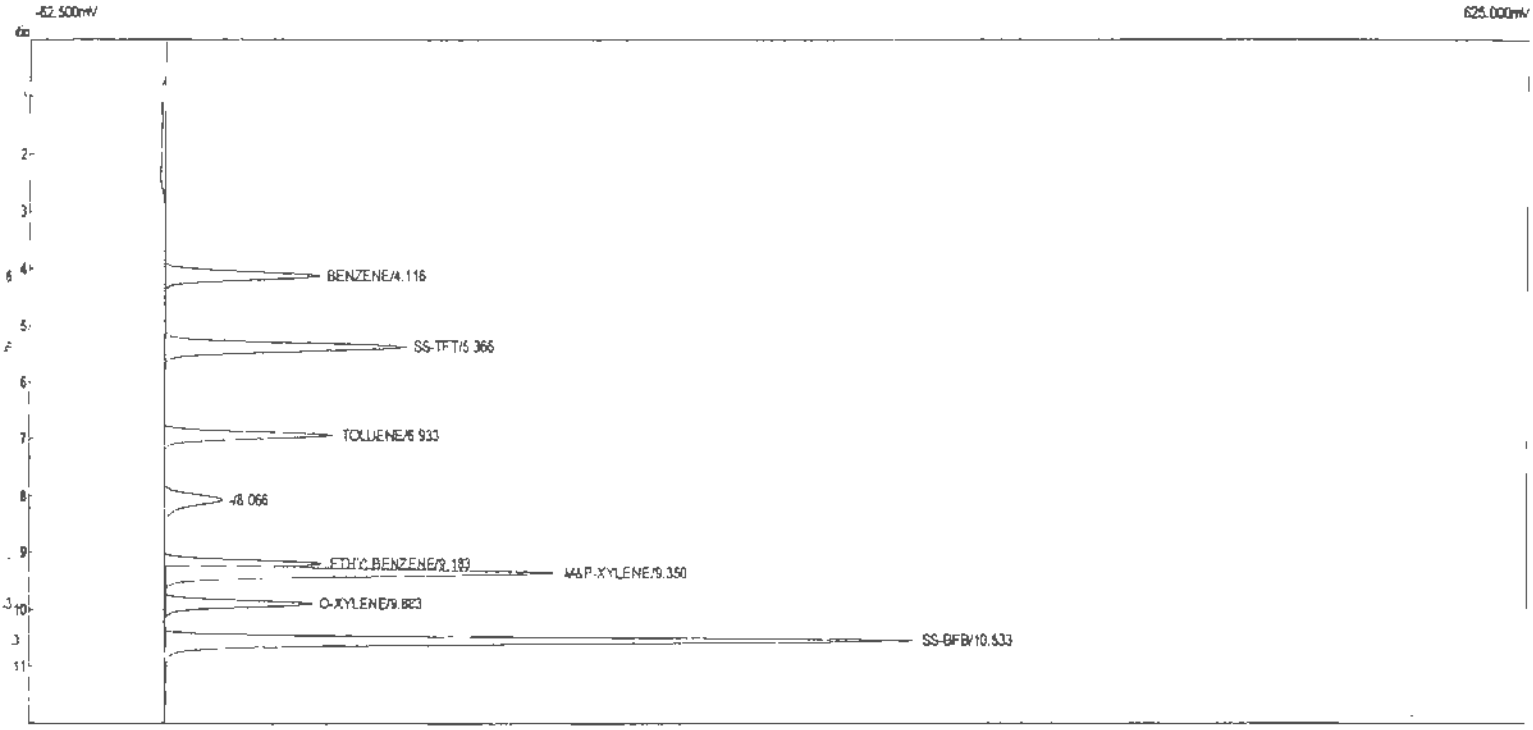
COMPOUND	SPK CONC (ppb)	MS CONC (ppb)	%REC MS	MSD CONC (ppb)	%REC MSD	RPD	ACCEPTABLE RPD	ACCEPTABLE RECOVERY
BENZENE	8.0	9.3	117%	9.3	117%	0%	20%	82% - 117%
TOLUENE	8.0	9.5	119%	9.3	117%	2%	20%	87% - 120%
ETHYLBENZENE	8.0	8.0	99%	8.0	100%	1%	20%	83% - 131%
TOTAL XYLENES	24.0	28.2	117%	28.1	117%	0%	20%	87% - 123%

ppb = PARTS PER BILLION
MS CONC - ANALYZED CONCENTRATION OF SPIKED SAMPLE
% REC - PERCENT RECOVERY OF SPIKE FROM MATRIX
RPD - RELATIVE PERCENT DIFFERENCE BETWEEN MATRIX SPIKE AND MATRIX SPIKE DUPLICATE RECOVERIES

ANALYSES PERFORMED BY MARCO A PEDRAZA
DATA REVIEWED BY KEVIN SHELBURNE

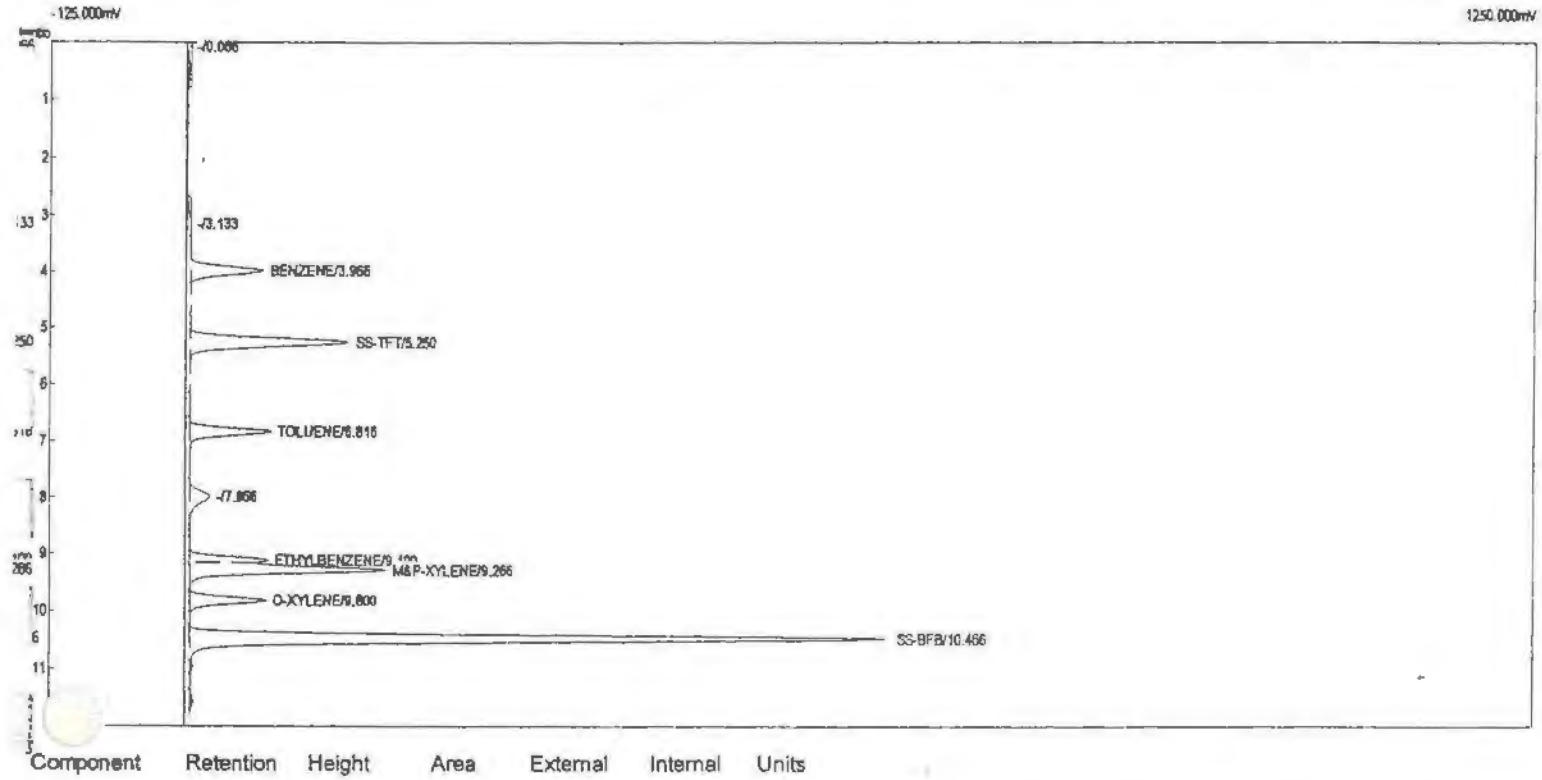
ON SITE LABS, INC
PMB 627, HC-01 BOX 29030, CAGUAS, P R 00725
TELEPHONE (787- [illegible] 329 FAX 789-3858

nalysis date. 03/18/2002 10:39:59
Method. EPA 8020A mod
Lab ID. GC-3-P&T
Description: PID1-CHANNEL 1
Column: Rtx-5, 30m,ID.53mm,5um
Carrier: Nitrogen 1 kg/cm3
Data file: 0318P1.CHR ()
Sample: 8 ppb BTEX OPEN STD
Operator: MAP



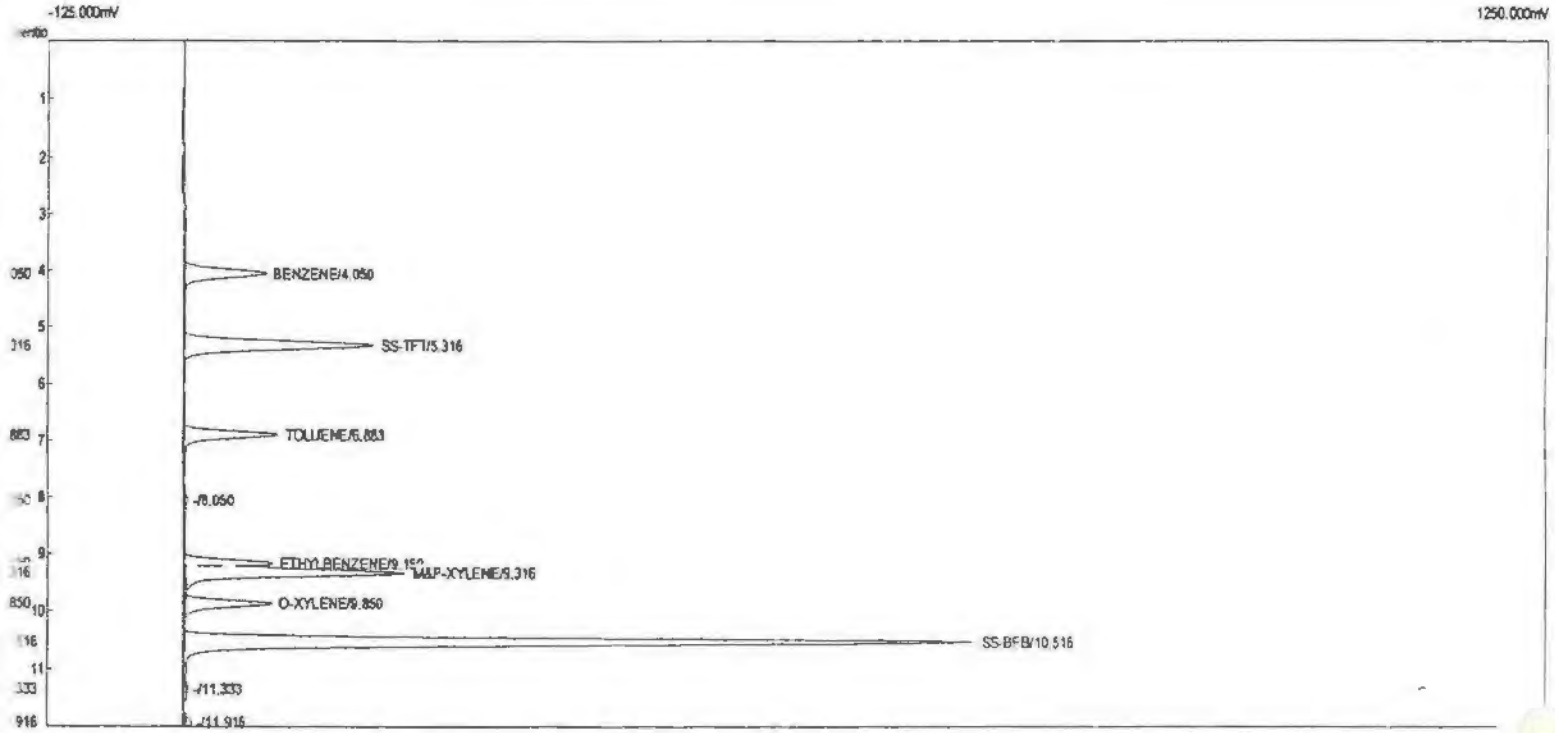
Component	Retention	Height	Area	External	Internal	Units
NZENE	4.116	71.676	727.064	8.48	8.4759	ppb
-TFT	5.366	111.960	1188.597	13.29	13.2923	ppb
OLUENE	6.933	78.680	689.170	8.47	8.4737	ppb
THYLBENZENE	9.183	72.818	467.283	7.10	7.0972	ppb
&P-XYLENE	9.350	181.067	1614.985	16.40	16.4024	ppb
-XYLENE	9.883	67.820	566.881	7.75	7.7453	ppb
S-BFB	10.533	345.781	2848.708	12.49	12.4943	ppb
			8102.687	73.98	73.9813	

Lab name: On Site Labs Inc.
alysis date: 03/18/2002 19:14:50
Method: EPA 8020A mod.
Lab ID: GC-3-P&T
Description: PID1-CHANNEL 1
Column: Rtx-5, 30m,ID.53mm,5um
Carrier: Nitrogen 1 kg/cm3
ile: 0318P22.CHR ()
iple: 8 ppb BTEX CLOSE STD
Operator: MAP



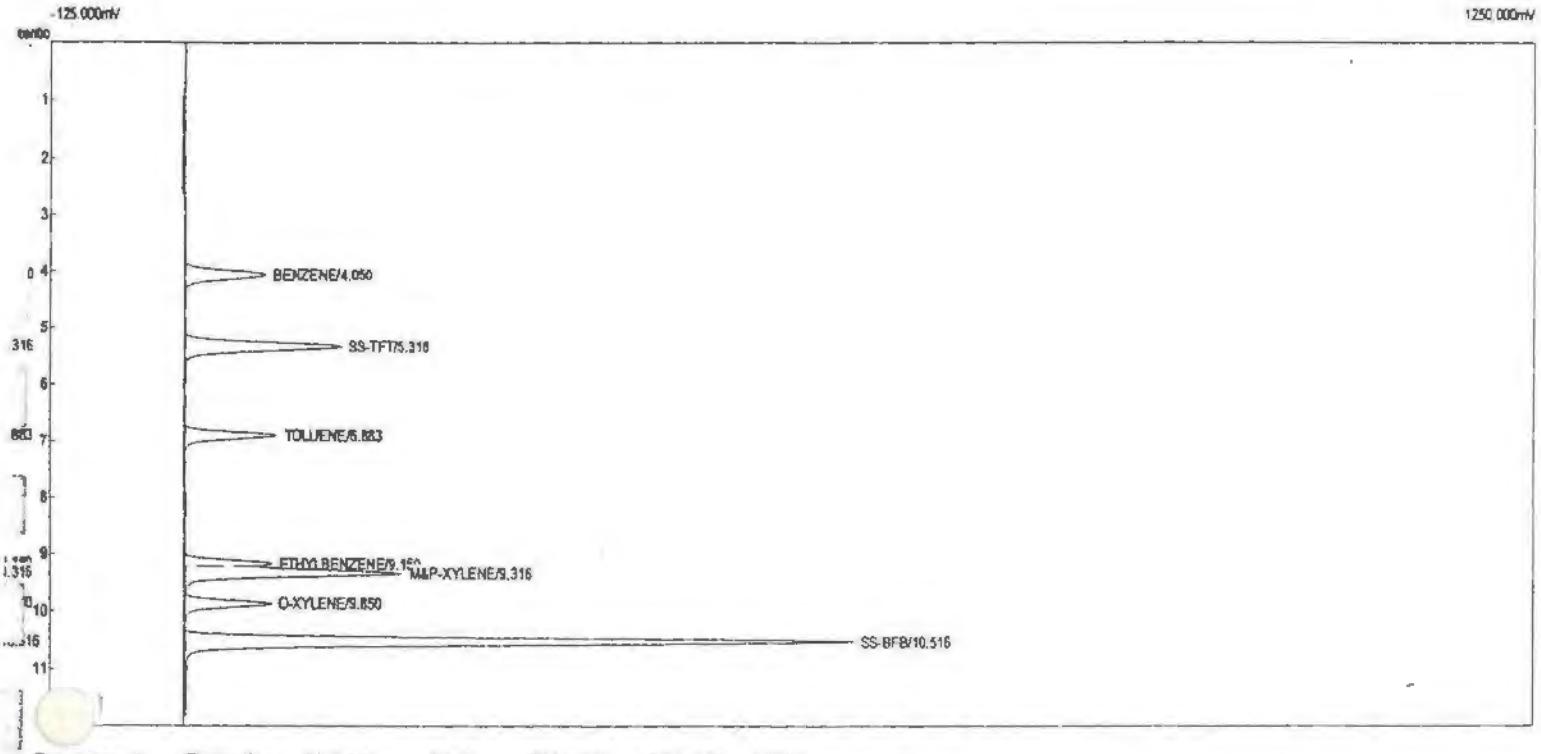
Component	Retention	Height	Area	External	Internal	Units
NZENE	3.966	67.088	716.491	8.35	8.3527	ppb
-TFT	5.250	146.375	1564.790	17.50	17.4993	ppb
OLUENE	6.816	75.591	681.207	8.38	8.3758	ppb
THYLBENZENE	9.100	72.519	478.088	7.26	7.2614	ppb
P-XYLENE	9.266	180.475	1625.490	16.51	16.5091	ppb
YLENE	9.800	70.658	607.294	8.30	8.2975	ppb
-BFB	10.466	646.805	5237.193	22.97	22.9701	ppb
			10910.553	89.27	89.2660	

Lab name: On Site Labs Inc.
Analysis date: 03/18/2002 18:02:40
Method: EPA 8020A mod.
Lab ID: GC-3-P&T
Description: PID1-CHANNEL 1
Column: Rtx-5, 30m,ID.53mm,5um
Carrier: Nitrogen 1 kg/cm3
Data file: 0318P20.CHR ()
Sample: ILA019matrix spike ~~duplica~~
Operator: MAP



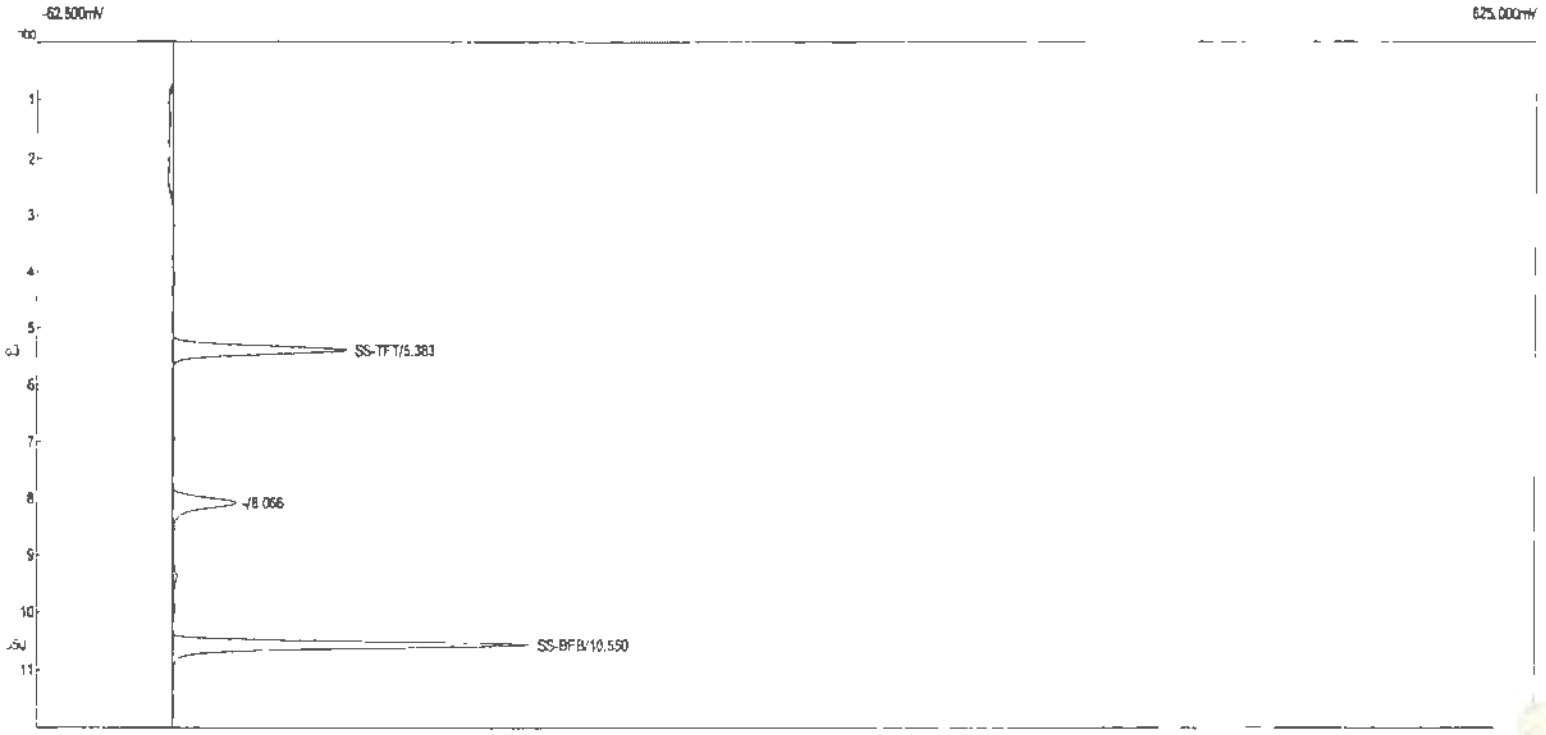
Component	Retention	Height	Area	External	Internal	Units
BENZENE	4.050	74.053	799.540	9.32	9.3208	ppb
SS-TFT	5.316	172.946	1836.926	20.54	20.5427	ppb
TOLUENE	6.883	85.754	774.375	9.52	9.5214	ppb
ETHYLBENZENE	9.150	80.379	523.459	7.95	7.9505	ppb
M&P-XYLENE	9.316	201.816	1857.134	18.86	18.8618	ppb
O-XYLENE	9.850	78.554	680.146	9.29	9.2929	ppb
SS-BFB	10.516	724.062	5972.136	26.19	26.1936	ppb
			12443.716	101.68	101.6836	

Lab name: On Site Labs Inc.
ıalysis date: 03/18/2002 18:20:30
Method: EPA 8020A mod.
Lab ID: GC-3-P&T
Description: PID1-CHANNEL 1
Column: Rtx-5, 30m,ID.53mm,5um
Carrier: Nitrogen 1 kg/cm3
File: 0318P21.CHR ()
ıple: ILA019matrix spike duplica
Operator: MAP



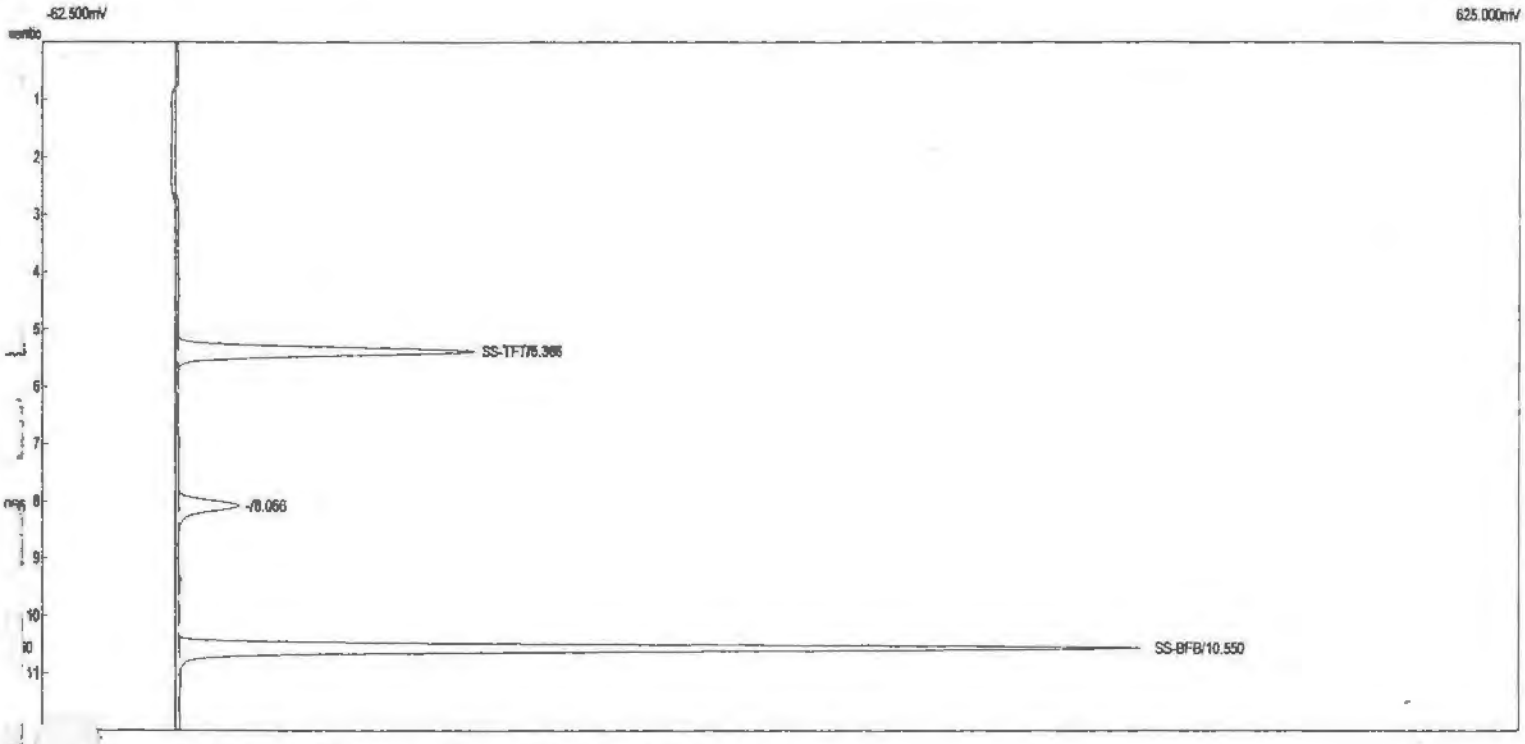
Component	Retention	Height	Area	External	Internal	Units
ENZENE	4.050	74.807	801.364	9.34	9.3421	ppb
S-TFT	5.316	145.040	1533.984	17.15	17.1548	ppb
OLUENE	6.883	85.370	759.008	9.33	9.3324	ppb
ETHYLBENZENE	9.150	80.800	528.273	8.02	8.0236	ppb
&P-XYLENE	9.316	201.783	1835.918	18.65	18.6463	ppb
XYLENE	9.850	79.993	689.524	9.42	9.4210	ppb
S-BFB	10.516	618.143	5082.878	22.29	22.2933	ppb
			11230.948	94.21	94.2136	

Lab name: On Site Labs Inc.
Analysis date: 03/18/2002 11:30:48
Method: EPA 8020A mod.
Lab ID: GC-3-P&T
Description: PID1-CHANNEL 1
Column: Rtx-5, 30m,ID.53mm,5um
Carrier: Nitrogen 1 kg/cm3
Data file: 0318P2.CHR ()
Sample: method blank
Operator: MAP



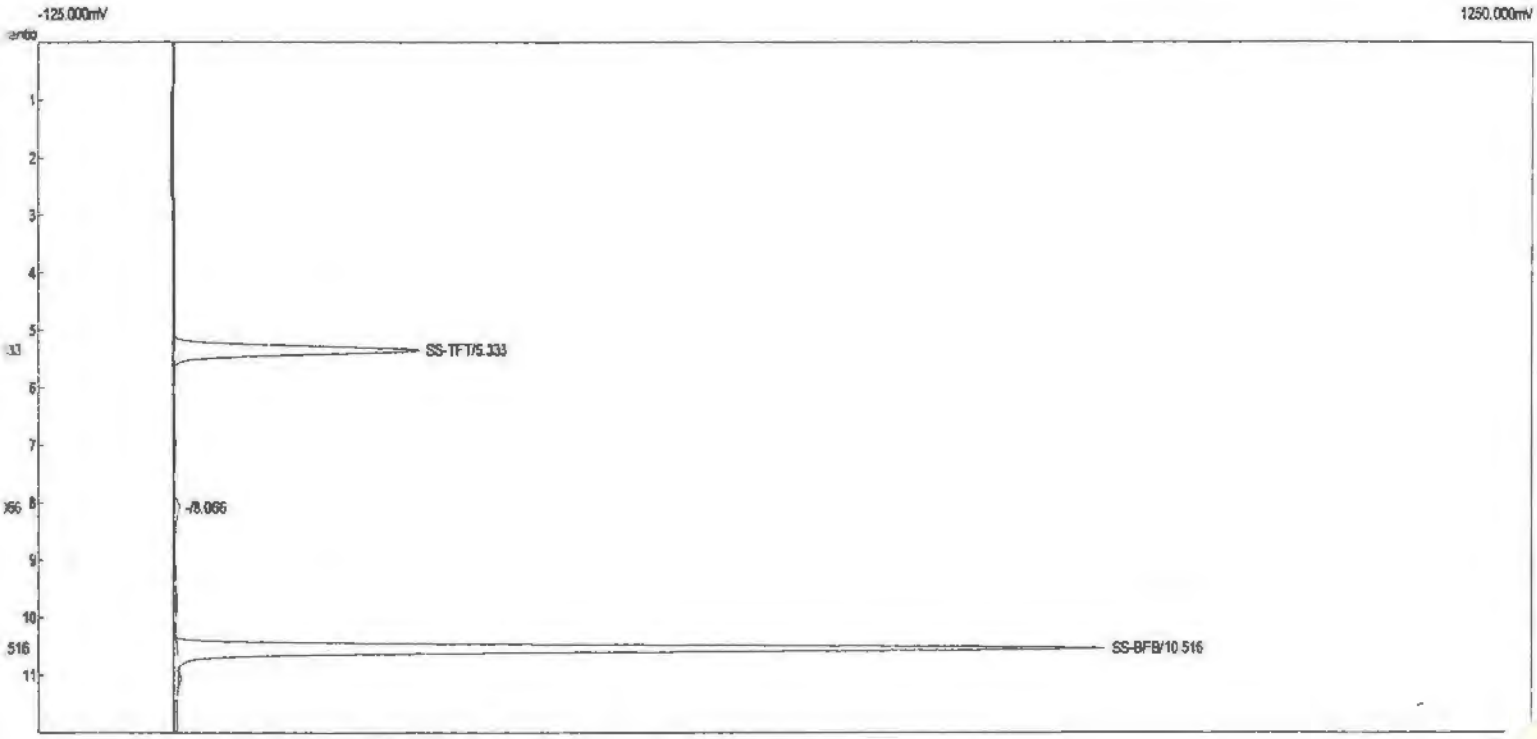
Component	Retention	Height	Area	External	Internal	Units
-TFT	5.383	79.558	837.175	9.36	9.3623	ppb
-BFB	10.550	163.309	1406.245	6.17	6.1677	ppb
			2243.420	15.53	15.5300	

Lab name: On Site Labs Inc.
Analysis date: 03/18/2002 12:29:38
Method: EPA 8020A mod.
Lab ID: GC-3-P&T
Description: PID1-CHANNEL 1
Column: Rtx-5, 30m,ID.53mm,5um
Carrier: Nitrogen 1 kg/cm3
Data file: 0318P4.CHR ()
Sample: HLA024/0305CH2M
Operator: MAP



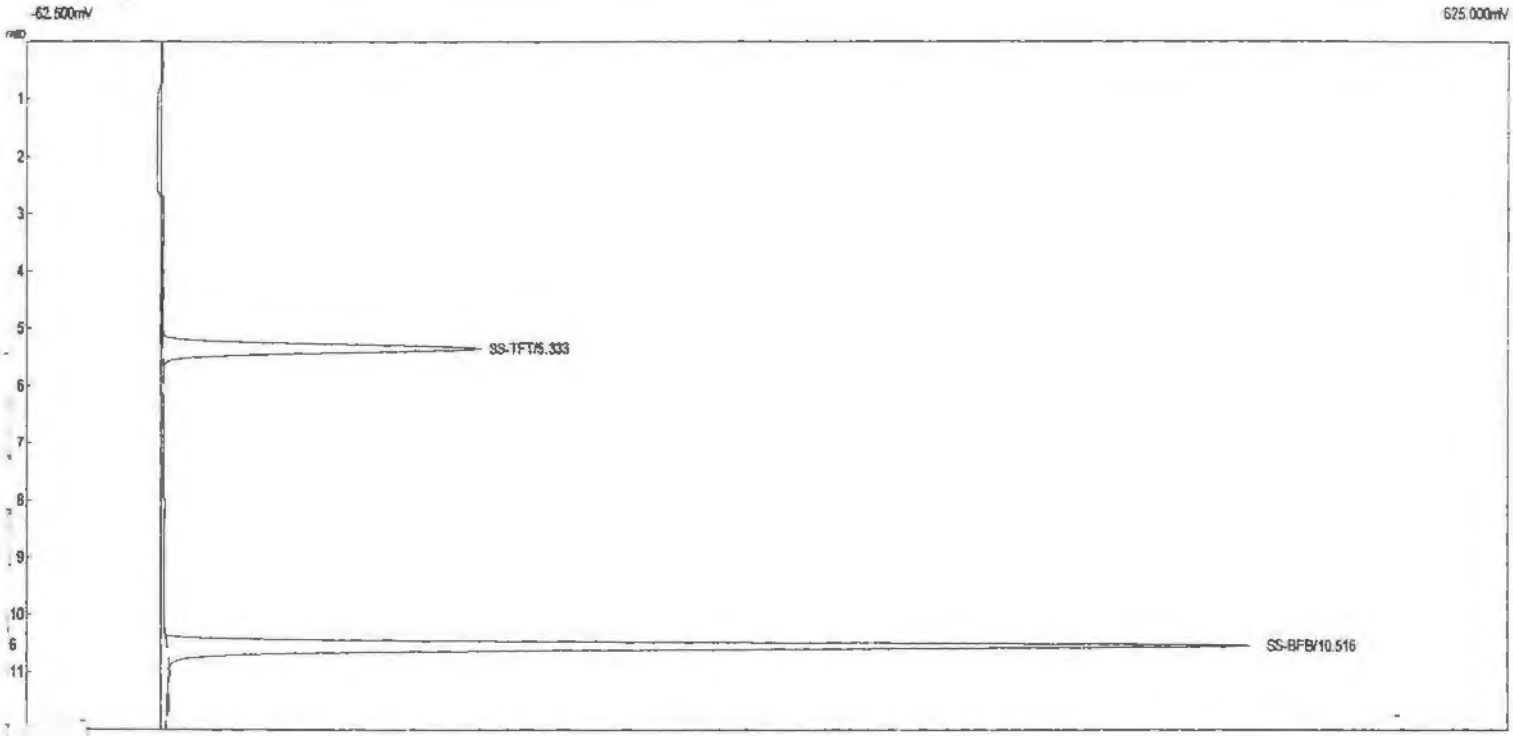
Component	Retention	Height	Area	External	Internal	Units
SS-TFT	5.366	138.614	1453.342	16.25	16.2530	ppb
SS-BFB	10.550	451.269	3643.015	15.98	15.9781	ppb
			5096.357	32.23	32.2311	

Analysis date: 03/18/2002 12:53:22
Method: EPA 8020A mod.
Lab ID: GC-3-P&T
Description: PID1-CHANNEL 1
Column: Rtx-5, 30m,ID.53mm,5um
Carrier: Nitrogen 1 kg/cm3
Data file: 0318P5.CHR ()
Sample: HLA025/0305CH2M
Operator: MAP



Component	Retention	Height	Area	External	Internal	Units
S-TFT	5.333	224.571	2351.706	26.30	26.2996	ppb
S-BFB	10.516	855.531	7011.032	30.75	30.7501	ppb
			9362.738	57.05	57.0497	

alysis date: 03/18/2002 13:14:51
Method: EPA 8020A mod.
Lab ID: GC-3-P&T
Description: PID1-CHANNEL 1
Column: Rtx-5, 30m,ID.53mm,5um
Carrier: Nitrogen 1 kg/cm3
Data file: 0318P6.CHR ()
e: HLA026/0305CH2M
or: MAP



Co nent	Retention	Height	Area	External	Internal	Units
S-TFT	5.333	148.371	1558.350	17.43	17.4273	ppb
-BFB	10.516	507.962	4328.625	18.99	18.9852	ppb
			5886.975	36.41	36.4125	

nalysis date: 03/18/2002 13:34:11
Method: EPA 8020A mod.
Lab ID: GC-3-P&T
Description: PID1-CHANNEL 1
Column: Rtx-5, 30m,ID.53mm,5um
Carrier: Nitrogen 1 kg/cm3
Data file: 0318P7.CHR ()
Sample: HLA027/0305CH2M
Operator: MAP

027F03

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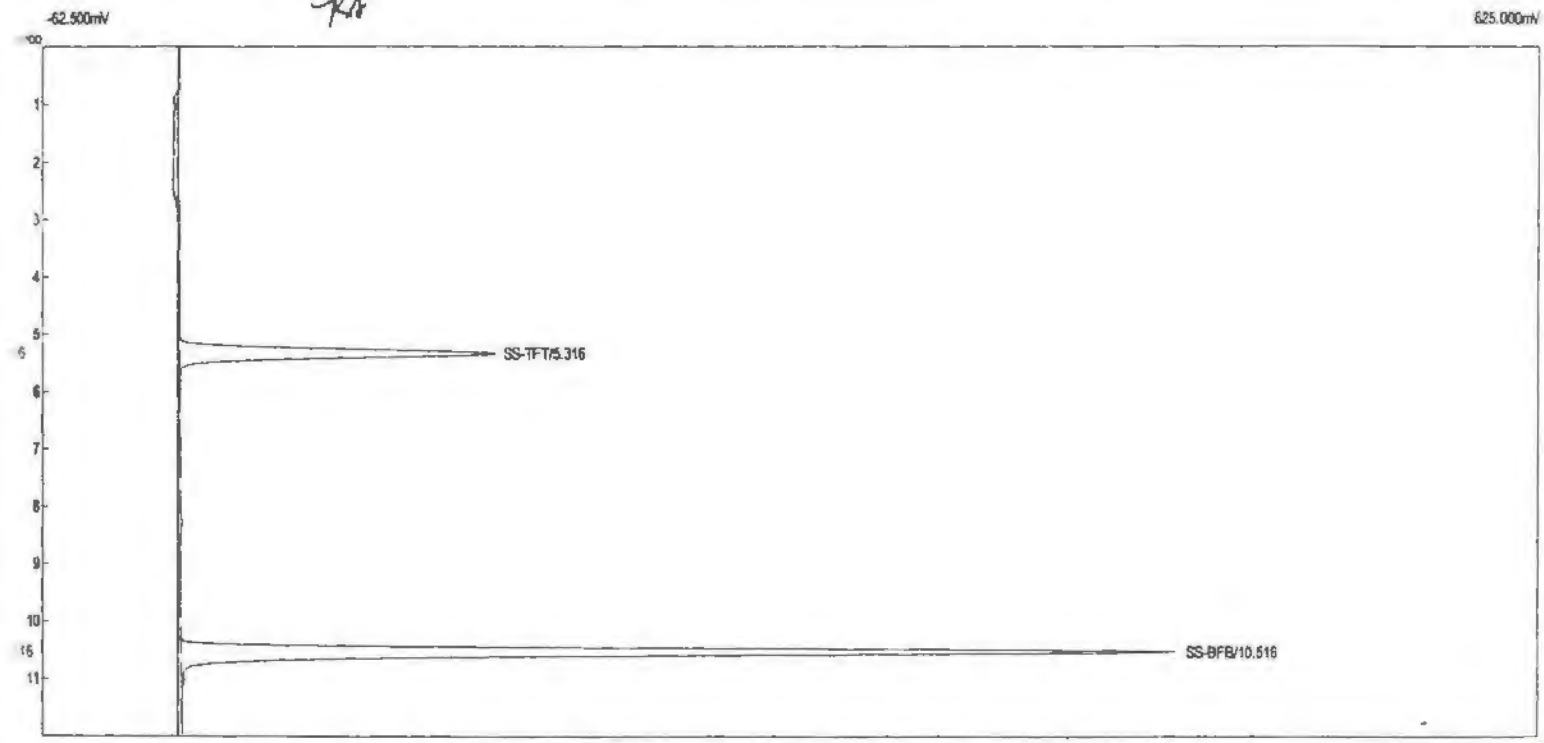

Component	Retention	Height	Area	External	Internal	Units
S-TFT	5.316	145.907	1550.202	17.34	17.3362	ppb
S-BFB	10.516	459.399	4045.462	17.74	17.7433	ppb
			5595.664	35.08	35.0794	

nalysis date: 03/18/2002 13:54:50
Method: EPA 8020A mod.
Lab ID: GC-3-P&T
Description: PID1-CHANNEL 1
Column: Rtx-5, 30m,ID.53mm,5um
Carrier: Nitrogen 1 kg/cm3
Data file: 0318P8.CHR ()
le: HLA028/0305CH2M
or: MAP 028 TB3

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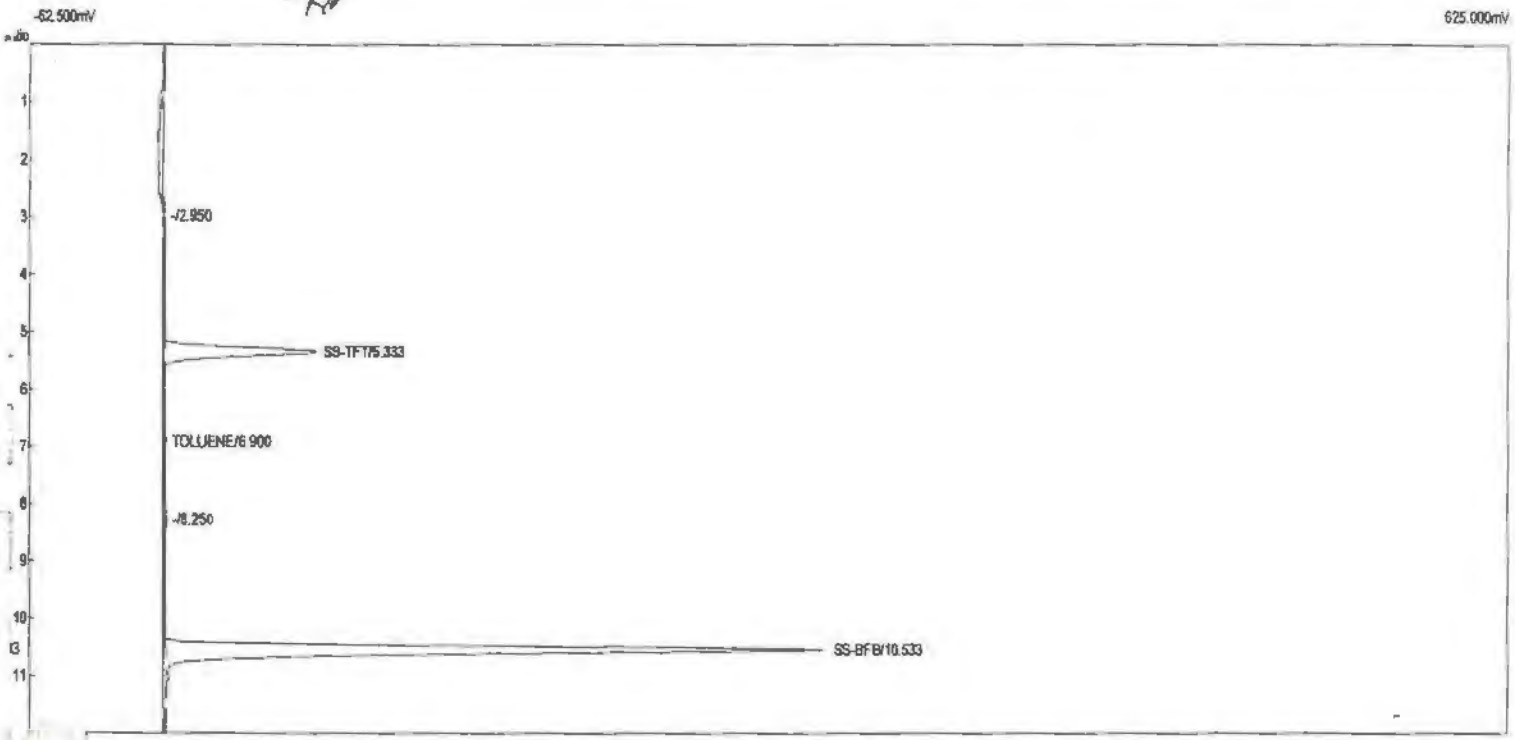
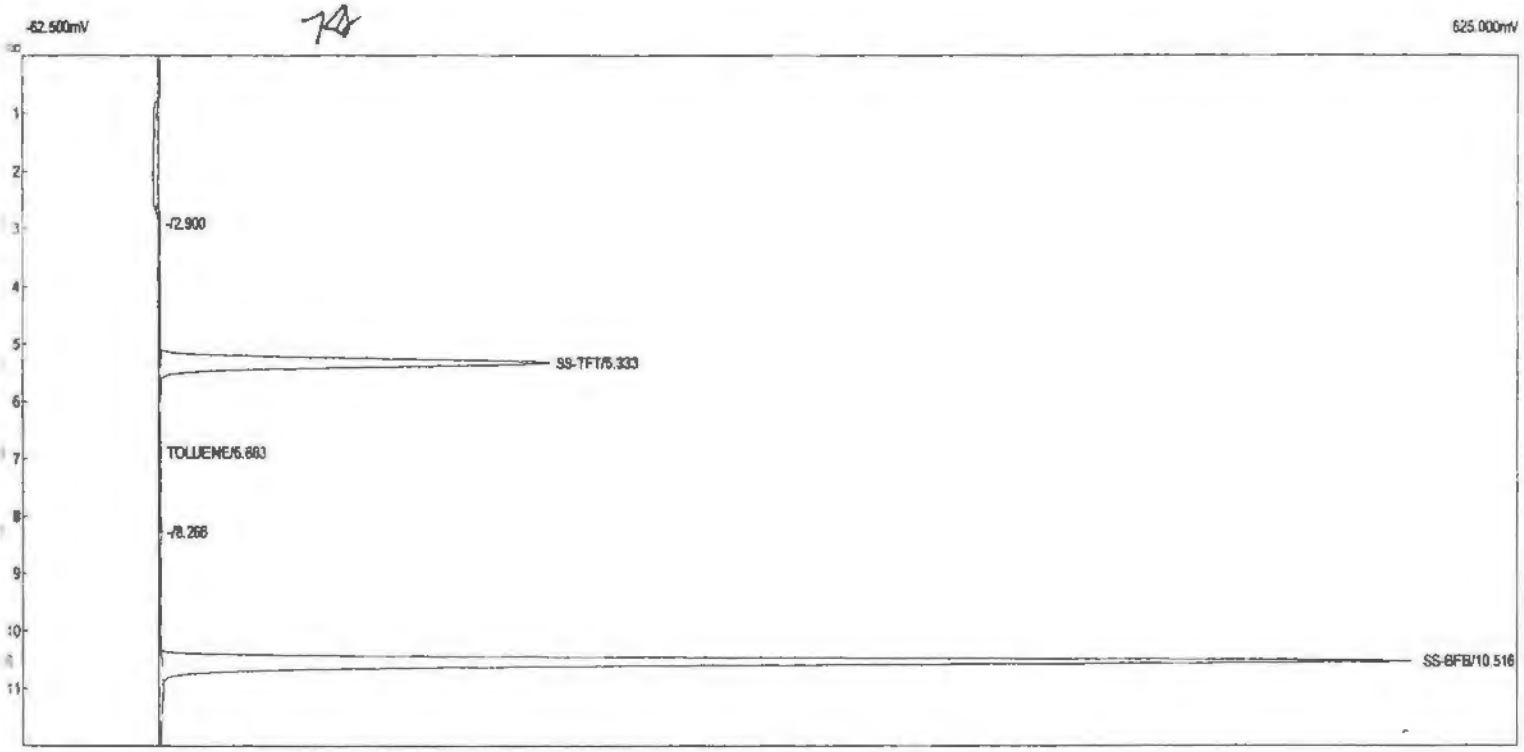


C nent	Retention	Height	Area	External	Internal	Units
SS-TFT	5.333	70.349	746.268	8.35	8.3456	ppb
LUENE	6.900	0.710	6.184	0.08	0.0760	ppb
-BFB	10.533	306.720	2780.128	12.19	12.1935	ppb
			3532.580	20.62	20.6152	

alysis date: 03/18/2002 14:13:47
Method: EPA 8020A mod.
Lab ID: GC-3-P&T
Description: PID1-CHANNEL 1
Column: Rtx-5, 30m,ID.53mm,5um
Carrier: Nitrogen 1 kg/cm3
Data file: 0318P9.CHR ()
Sample: HLA029/0305CH2M
Operator: MAP

029 EB3



Component	Retention	Height	Area	External	Internal	Units
TFT	5.333	179.369	1909.638	21.36	21.3558	ppb
LUENE	6.883	0.596	5.238	0.06	0.0644	ppb
BFB	10.516	582.445	4945.615	21.69	21.6913	ppb
			6860.491	43.11	43.1115	

On Site Labs, Inc.

PMB 627, HC-01 Box 29030, Caguas, PR 00725
Telephone 787-720-0329 Fax 787-789-3858

March 8, 2002
OSL Projects #02I0308CH2M

Mr. Tunch Orsoy
CH2M HILL
4350 W. Cypress Street, Suite 600
Tampa, Florida 33607

SUBJECT: DATA REPORT - CH2M HILL PROJECT NO. 167722.FI.FS
SITES 88 AND 2036 ROOSEVELT ROADS NAS, CEIBA, PUERTO RICO

Dear Mr. Orsoy:

Please find enclosed the analytical report for the samples collected by CH2M HILL personnel from the above-referenced site and delivered to On Site Labs (OSL) under the proper chain-of-custody protocol. An OSL Puerto Rico certified-chemist performed the following analyses:

- 10 soil samples analyzed for TPH-gas/diesel by modified EPA test method 8015B.
- 1 water sample analyzed for TPH-gas/diesel by modified EPA test method 8015B.
- 1 equipment blank water sample analyzed for TPH-gas/diesel.
- 1 water sample analyzed for BTEX by modified EPA test method 8020A.
- 1 trip and 1 equipment blank water sample analyzed for BTEX.
- Laboratory QA/QC analyses for TPH-gas/diesel and BTEX.

The analytical results are summarized in the attached table. Applicable detection limits, QA/QC data, chromatograms, a chain-of-custody and an invoice are attached.

OSL appreciates the opportunity to provide analytical services for this project. If you have any questions relating to the data or report, please do not hesitate to contact us.

Sincerely,
On Site Labs, Inc.

Kevin Shelburne
Principal

Attachments

QA/QC REPORT - CALIBRATION DATA

OSL Project #02I0308CH2M
DAILY CALIBRATION DATE: 03/08/02

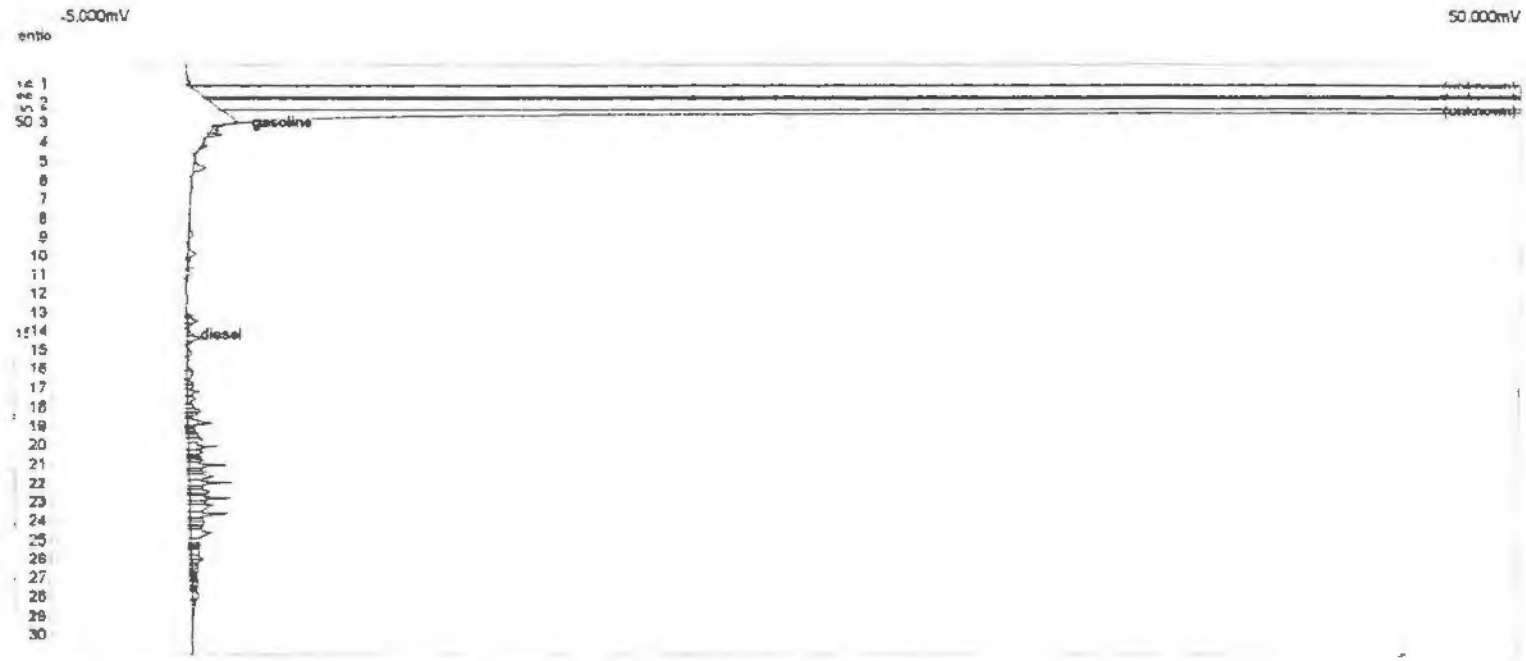
CH2M HILL PROJECT NO. 167722.FI.FS
PROJECT NAME: RRNAS SITES 88 AND 2036

			INITIAL		OPENING			CLOSING		
COMPOUND	DETECTOR	CALIB RANGE	RF	%RSD	AREA	RF	%DIFF	AREA	RF	%DIFF
TPH GASOLINE	FID #2 (gc5)	10 - 30,000	0.26	17.6%	46.95	0.23	8.3%	47.54	0.24	7.1%
TPH GASOLINE	FID #3 (gc5)	10 - 30,000	0.36	15.0%	141.49	0.35	2.3%	73.67	0.37	1.7%
TPH GASOLINE	FID #4 (gc5)	10 - 30,000	0.31	15.4%	123.92	0.31	1.2%	57.46	0.29	6.1%
TPH DIESEL	FID #2 (gc5)	25 - 20,000	0.69	14.1%	310.70	0.78	11.9%	275.38	0.69	0.8%
TPH DIESEL	FID #3 (gc5)	25 - 20,000	0.74	13.6%	669.09	0.84	13.2%	316.89	0.79	7.2%
TPH DIESEL	FID #4 (gc5)	25 - 20,000	0.61	11.1%	548.53	0.69	13.1%	257.44	0.64	6.2%

CALIB RANGE - RANGE OF CALIBRATION CURVE IN ppm
INITIAL RF - AVERAGE RESPONSE FACTOR FROM MULTIPOINT CALIBRATION CURVE
% RSD - LINEARITY OF MULTIPOINT CALIBRATION CURVE (+/- 20% ACCEPTABLE LIMITS)
AREA - AREA COUNTS FROM DAILY CALIBRATION STANDARD
RF - DETECTOR RESPONSE FACTOR FROM MID-POINT CALIBRATION STANDARD
% DIFF - DIFFERENCE, IN PERCENT, BETWEEN THE AVERAGE RF AND THE OPENING OR CLOSING RF (+/- 15% ACCEPTABLE LIMITS)
OPENING - MID-POINT CALIBRATION STANDARD ANALYZED BEFORE SAMPLE ANALYSES BEGIN
CLOSING - MID-POINT CALIBRATION STANDARD ANALYZED AFTER SAMPLES ANALYSES ARE COMPLETE

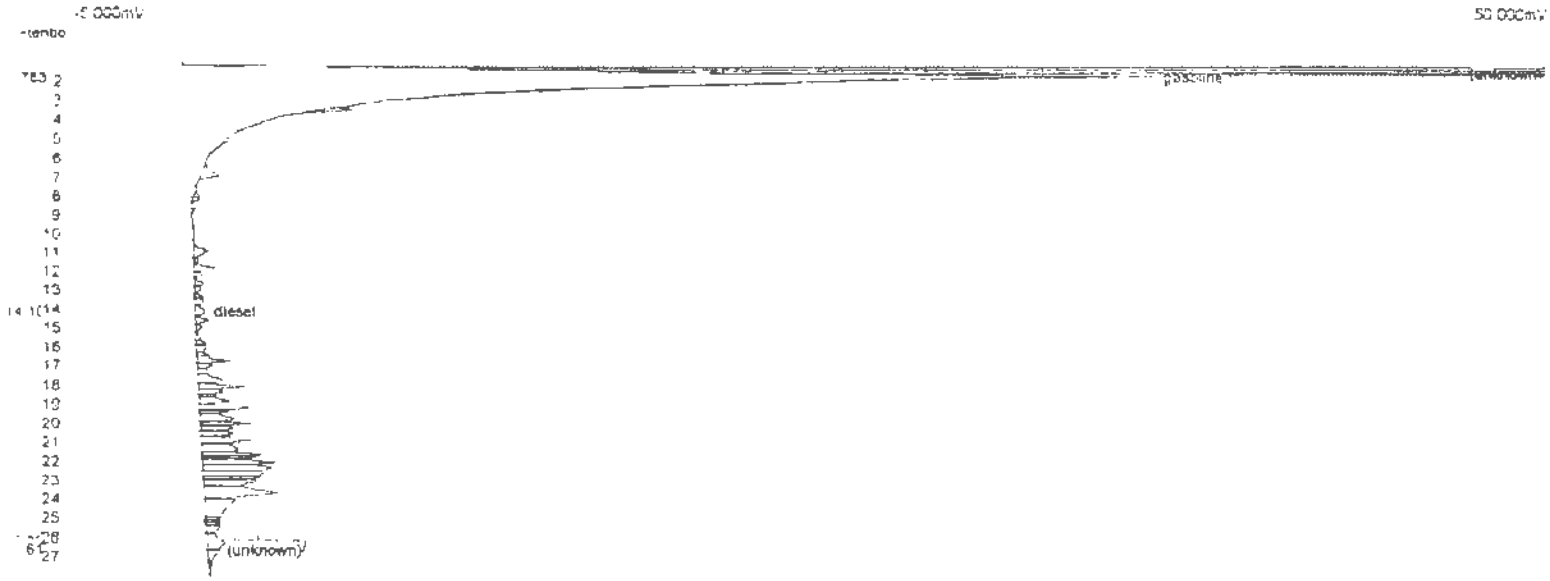
ANALYSES PERFORMED BY MARCO A PEDRAZA
DATA REVIEWED BY KEVIN SHELBURNE

Lab name: On Site Labs Inc
nalysis date: 03/08/2002 10:01:21
Method: EPA 8015B mod.
Lab ID: GC - 5
Description: FID2 - Ch. 2
Column: XTI-5, 30m, 0.53mm, 1.5um
er: N2
le: 0308fb2.CHR ()
ple: 50/100 ppm G/D OPEN
Operator: MAP



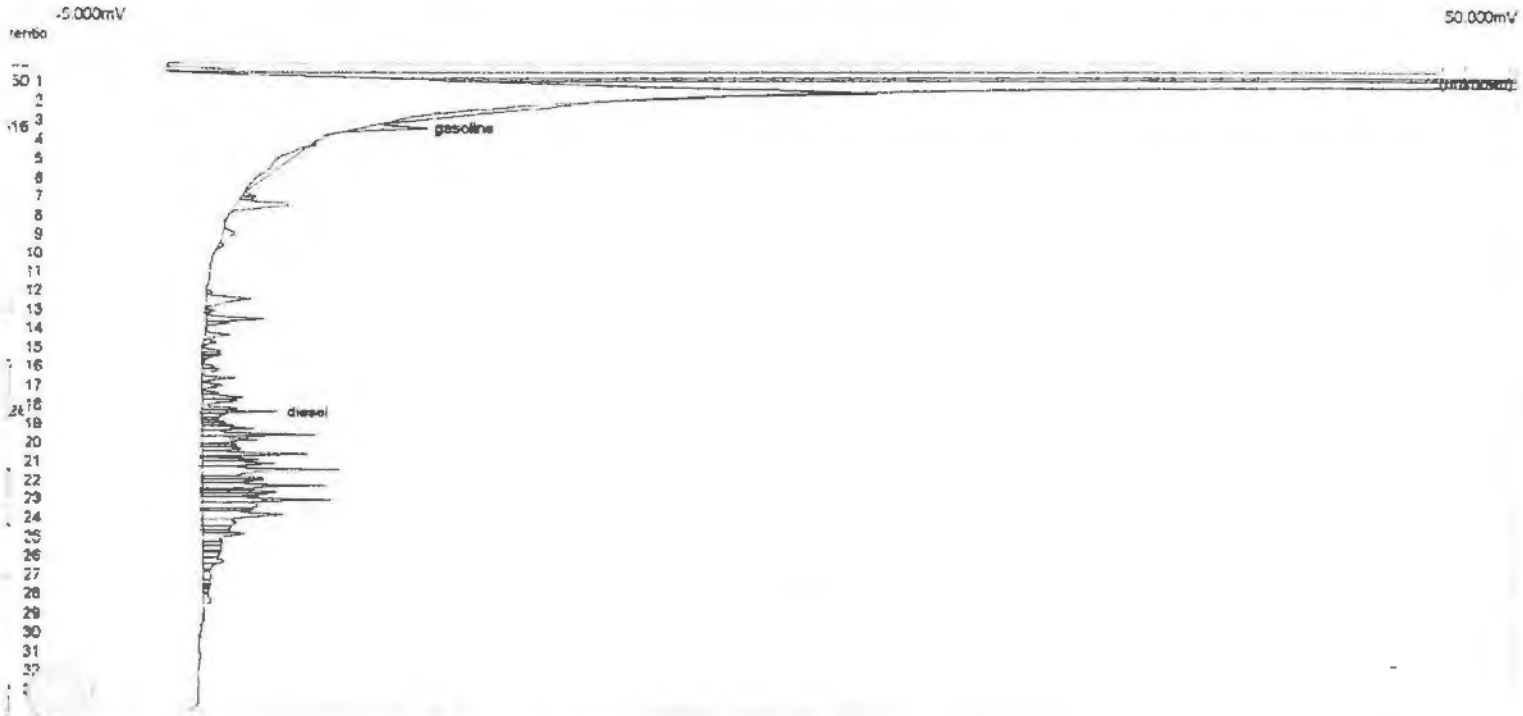
C hent	Retention	Area	External	Units
asoline	2.950	46.953	45.85	
esel	14.150	310.697	111.92	ppm
		357.651	157.78	

Lab name On Site Labs Inc
Analysis date 03/08/2002 10:55.44
Method EPA 8015B mod.
Lab ID GC - 5
Description FID 3 - Ch. 3
Column. XTI-5, 30m, 0.53mm, 1.5um
Carrier. N2
Data file 0308fc3.CHR ()
Sample. 100/200 ppm G/D OPEN
Operator MAP



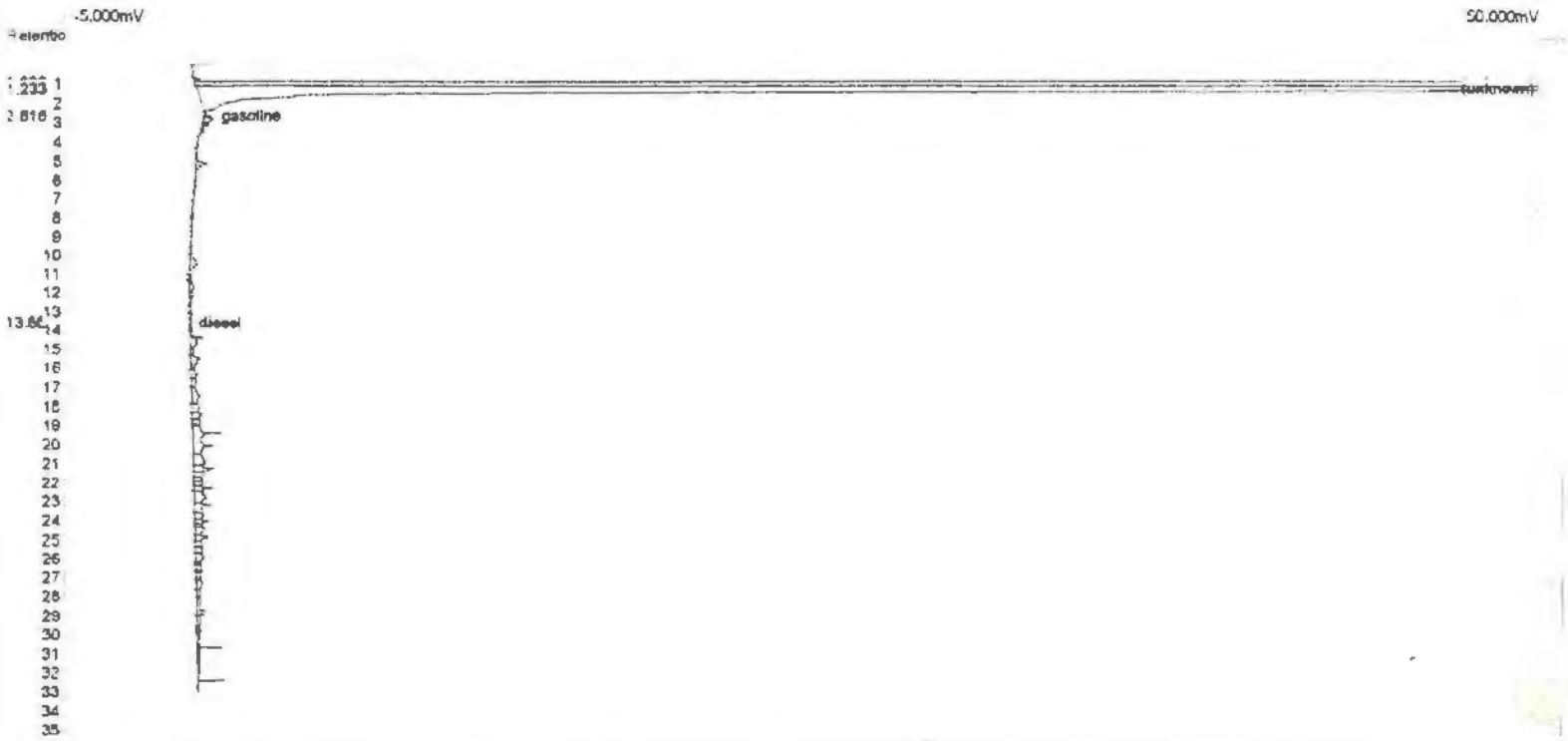
Component	Retention	Area	External	Units
asoline	1.783	141.486	97.71	
iesel	14.100	669.089	226.35	ppm
		810.575	324.06	

Lab name: On Site Labs inc
nalysis date: 03/08/2002 10:01:21
Method: EPA 8015B mod.
Lab ID: GC - 5
Description: FID 4 - Ch. 4
Column: XTI-5, 30m, 0.53mm, 1.5um
er: N2
le: 0308fd2.CHR ()
Sample: 100/200 ppm G/D open
Operator: MAP



Component	Retention	Area	External	Units
soline	3.316	123.920	101.24	
esel	18.266	548.526	226.29	ppm
		672.446	327.53	

Lab name: On Site Labs Inc
Analysis date: 03/08/2002 18:33:56
Method: EPA 8015B mod.
Lab ID: GC - 5
Description: FID2 - Ch. 2
Column: XTI-5, 30m, 0.53mm, 1.5um
Carrier: N2
Data file: 0308fb18.CHR ()
Sample: 50/100 ppm G/D CLOSE
Operator: MAP

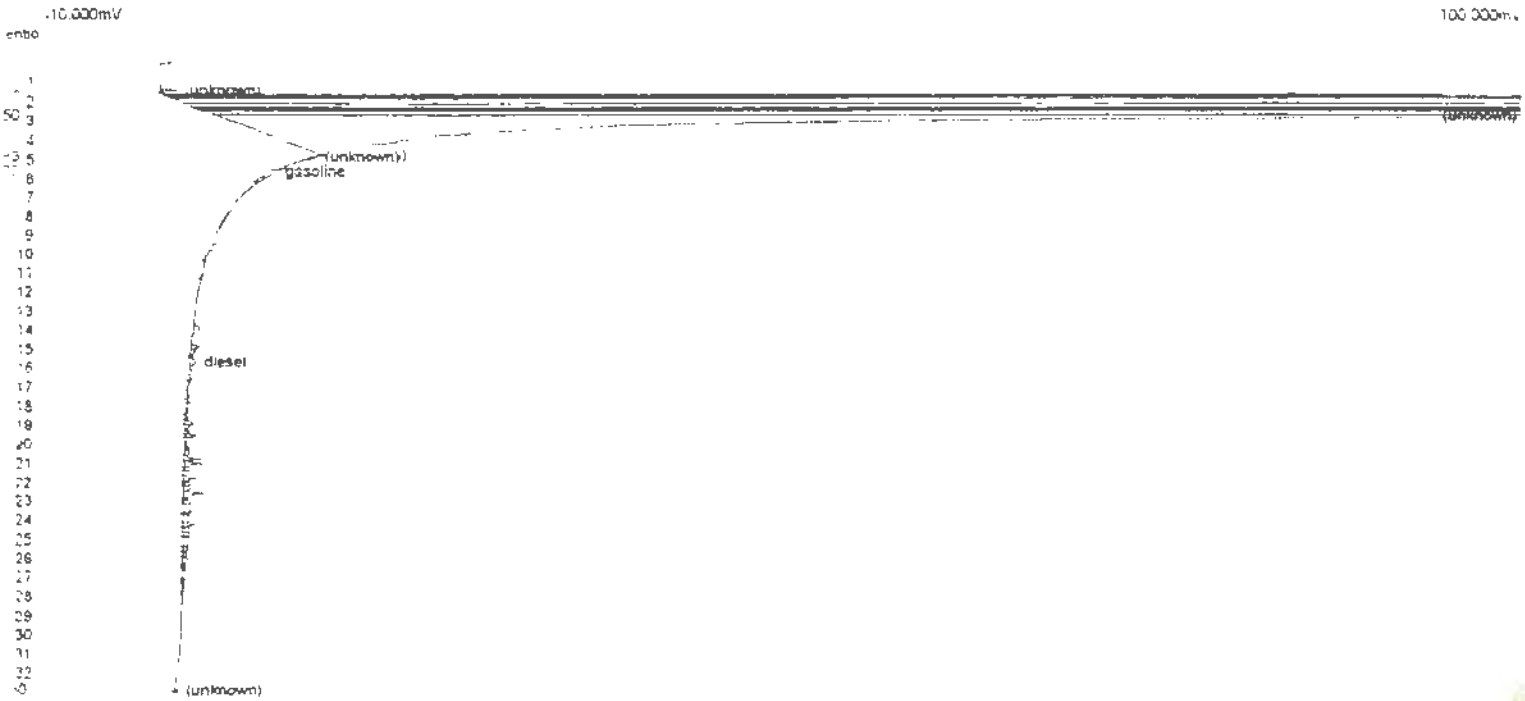


Component	Retention	Area	External	Units
asoline	2.616	47.544	46.43	
iesel	13.550	275.384	99.20	ppm
		322.928	145.63	

Lab name: On Site Labs Inc
Analysis date: 03/08/2002 18:33:56
Method: EPA 8015B mod.
Lab ID: GC - 5
Description: FID 3 - Ch. 3
Column: XTI-5, 30m, 0.53mm, 1.5um
Carrier: N2
File: 0308fc18.CHR ()
Sample: 50/100 ppm G/D CLOSE
Operator: MAP

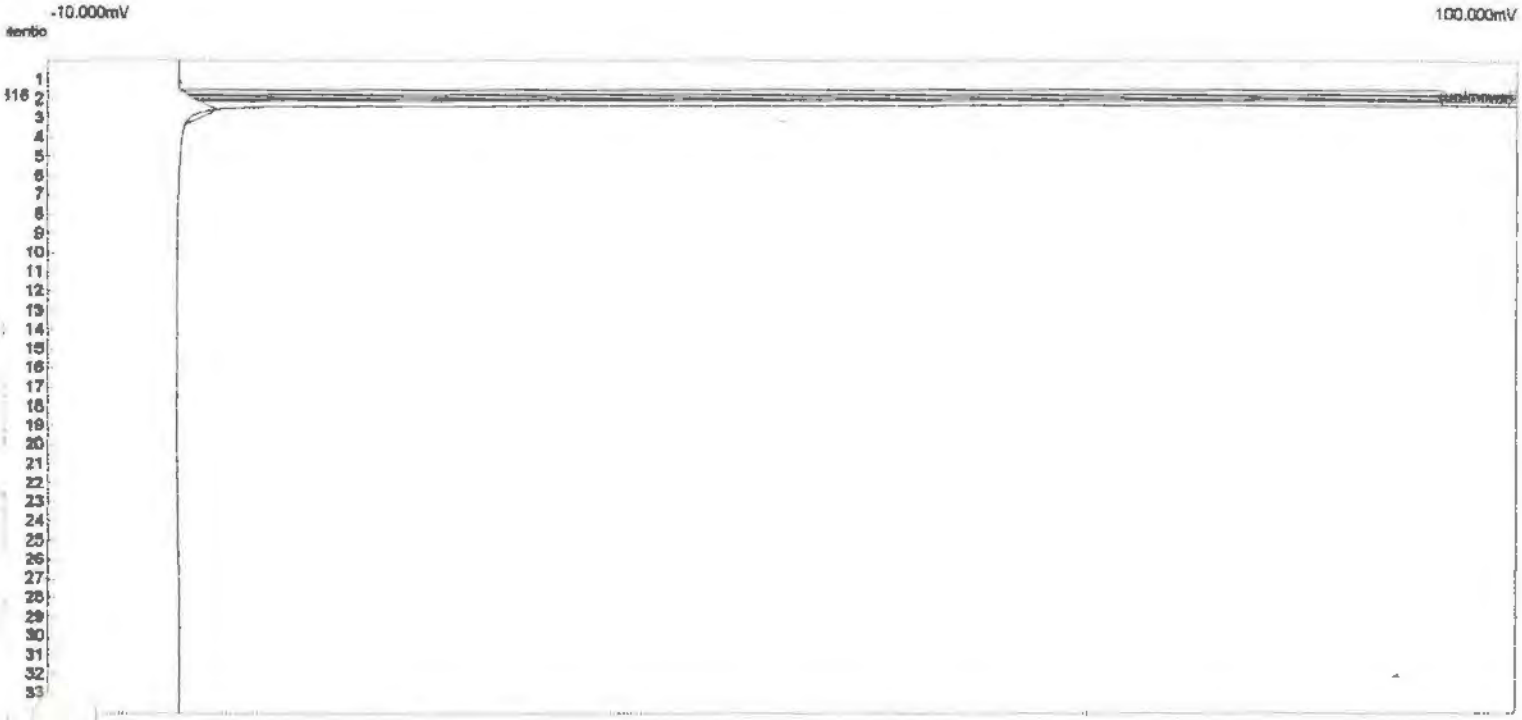
Component	Retention	Area	External	Units
gas	3.750	73.665	50.87	
diesel	18.550	316.894	107.20	ppm
		390.558	158.08	

Lab name On Site Labs Inc
Analysis date 03/08/2002 18:33:58
Method EPA 8015B mod.
Lab ID: GC - 5
Description. FID 4 - Ch. 4
Column: XTI-5, 30m, 0.53mm, 1.5um
Carrier: N2
Data file: 0308fd18.CHR ()
Sample 50/100 ppm G/D CLOSE
Operator MAP



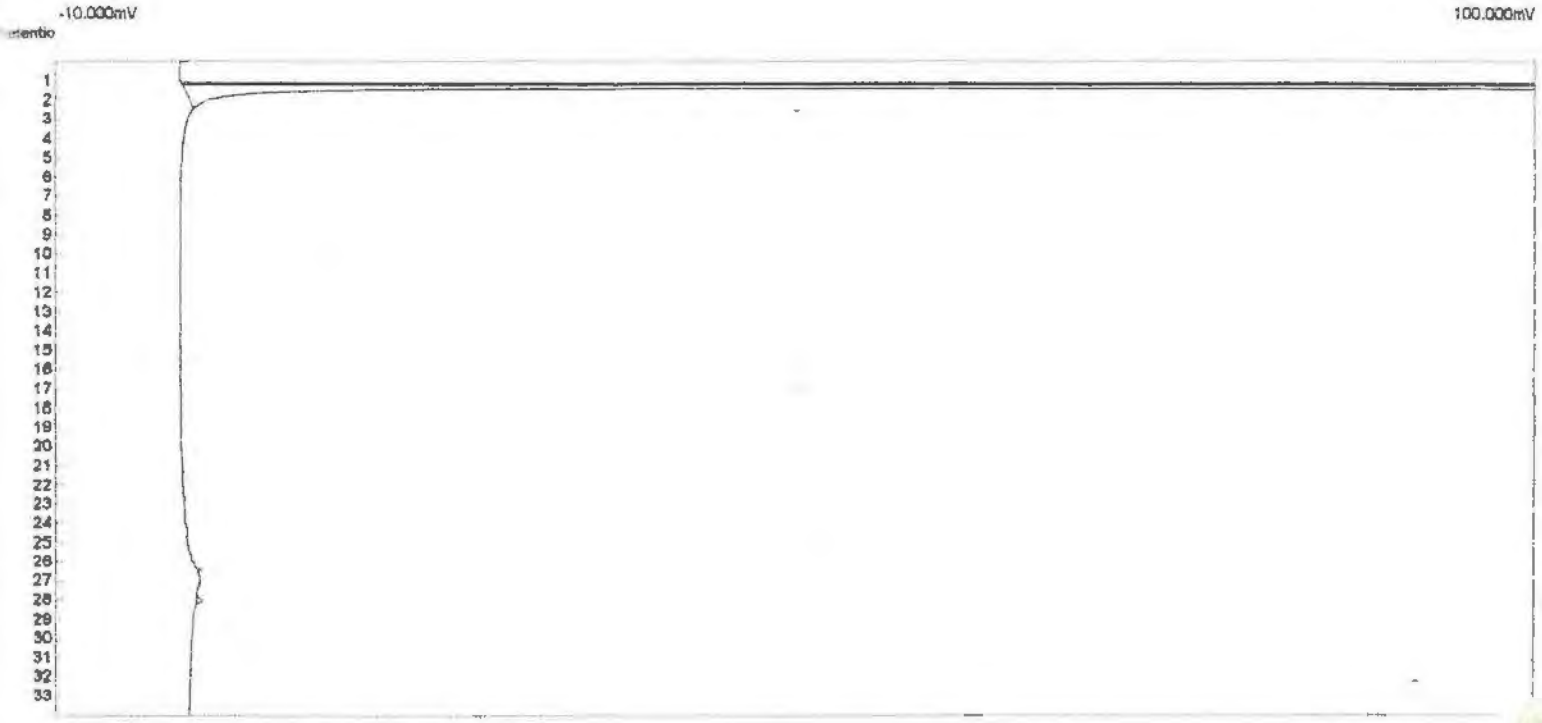
Component	Retention	Area	External	Units
oline	5.533	57.456	46.94	
sel	15.633	257.443	106.21	ppm
		314.899	153.15	

Lab name: On Site Labs Inc
nalysis date: 03/08/2002 15:27:04
Method: EPA 8015B mod.
Lab ID: GC - 5
Description: FID2 - Ch. 2
Column: XTI-5, 30m, 0.53mm, 1.5um
Carrier: N2
le: 0308fb13.CHR ()
le: METHOD BLANK
Operator: MAP



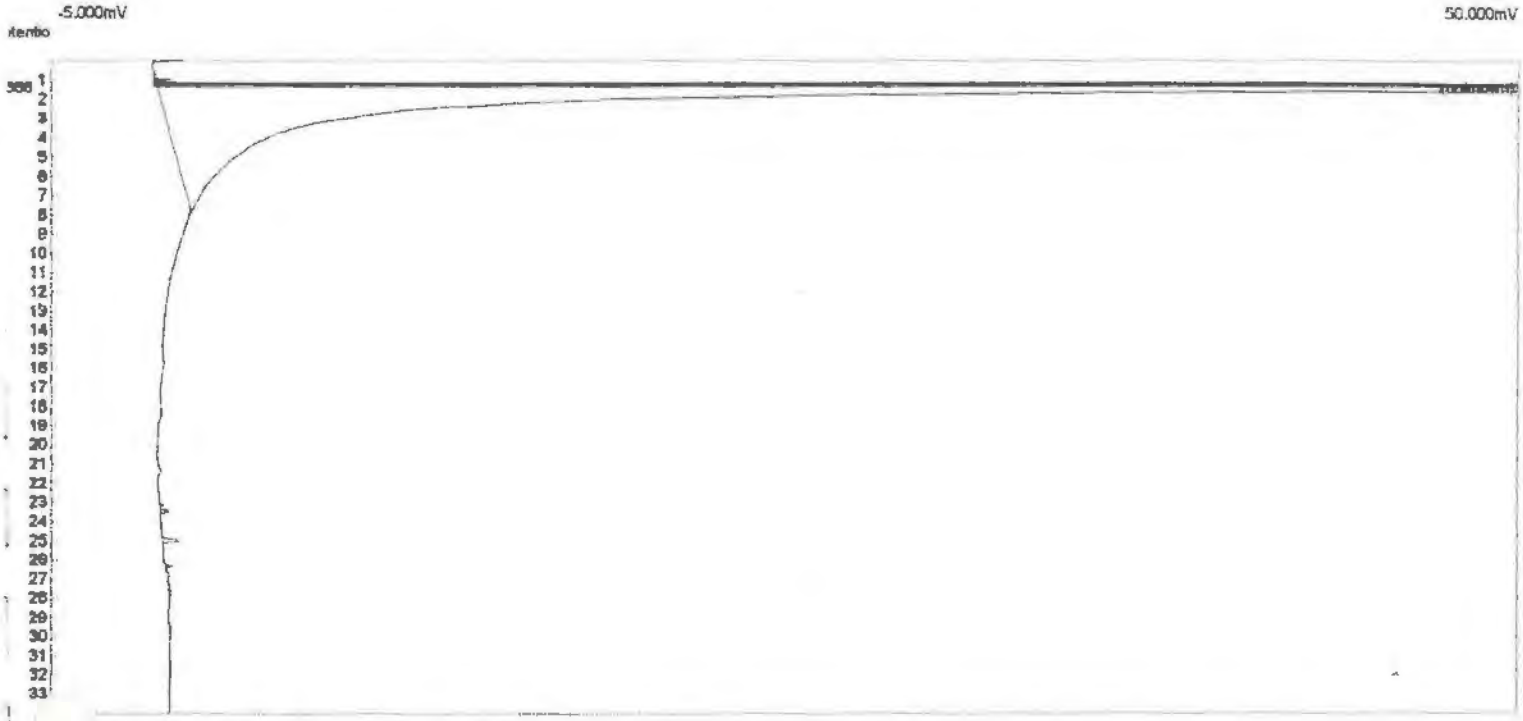
Component	Retention	Area	External	Units
		0.000	0.00	

Lab name: On Site Labs Inc
Analysis date: 03/08/2002 15:27:04
Method: EPA 8015B mod.
Lab ID: GC - 5
Description: FID 3 - Ch. 3
Column: XTI-5, 30m, 0.53mm, 1.5um
Carrier: N2
Data file: 0308fc13.CHR ()
Sample: METHOD BLANK
Operator: MAP



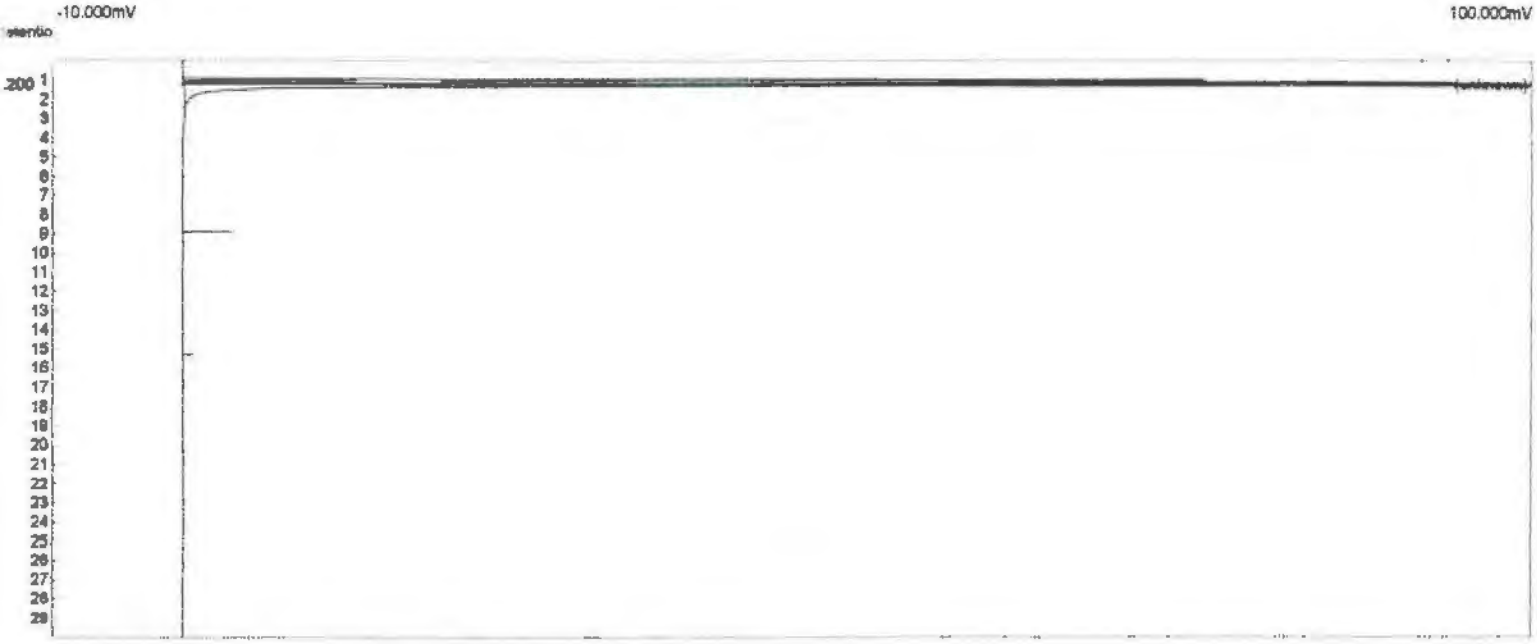
Component	Retention	Area	External	Units
		0.000	0.00	

Lab name: On Site Labs Inc
Analysis date: 03/08/2002 15:27:04
Method: EPA 8015B mod.
Lab ID: GC - 5
Description: FID 4 - Ch. 4
Column: XTI-5, 30m, 0.53mm, 1.5um
Carrier: N2
File: 0308fd13.CHR ()
Sample: METHOD BLANK
Operator: MAP



Component	Retention	Area	External	Units
		0.000	0.00	

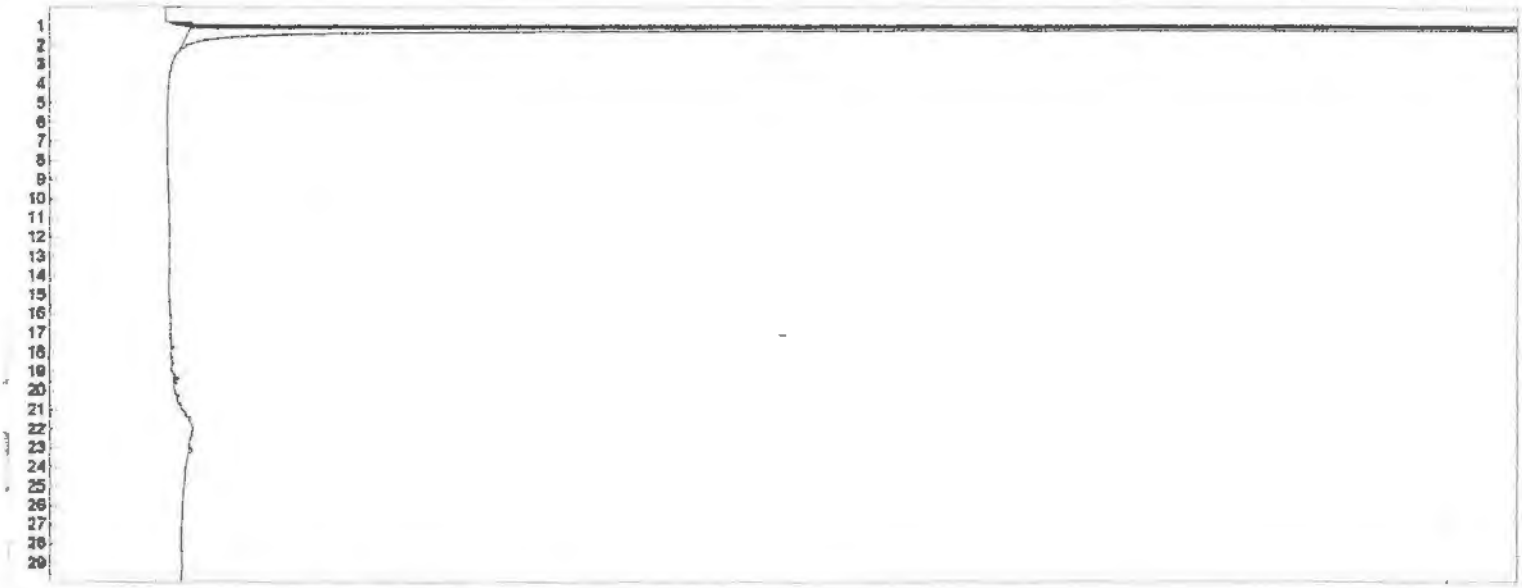
Lab name: On Site Labs Inc
Analysis date: 03/08/2002 16:07:09
Method: EPA 8015B mod.
Lab ID: GC - 5
Description: FID2 - Ch. 2
Column: XTI-5, 30m, 0.53mm, 1.5um
Carrier: N2
Data file: 0308fb14.CHR ()
Sample: JLA001/0308CH2M
Operator: MAP



Component	Retention	Area	External	Units
		0.000	0.00	

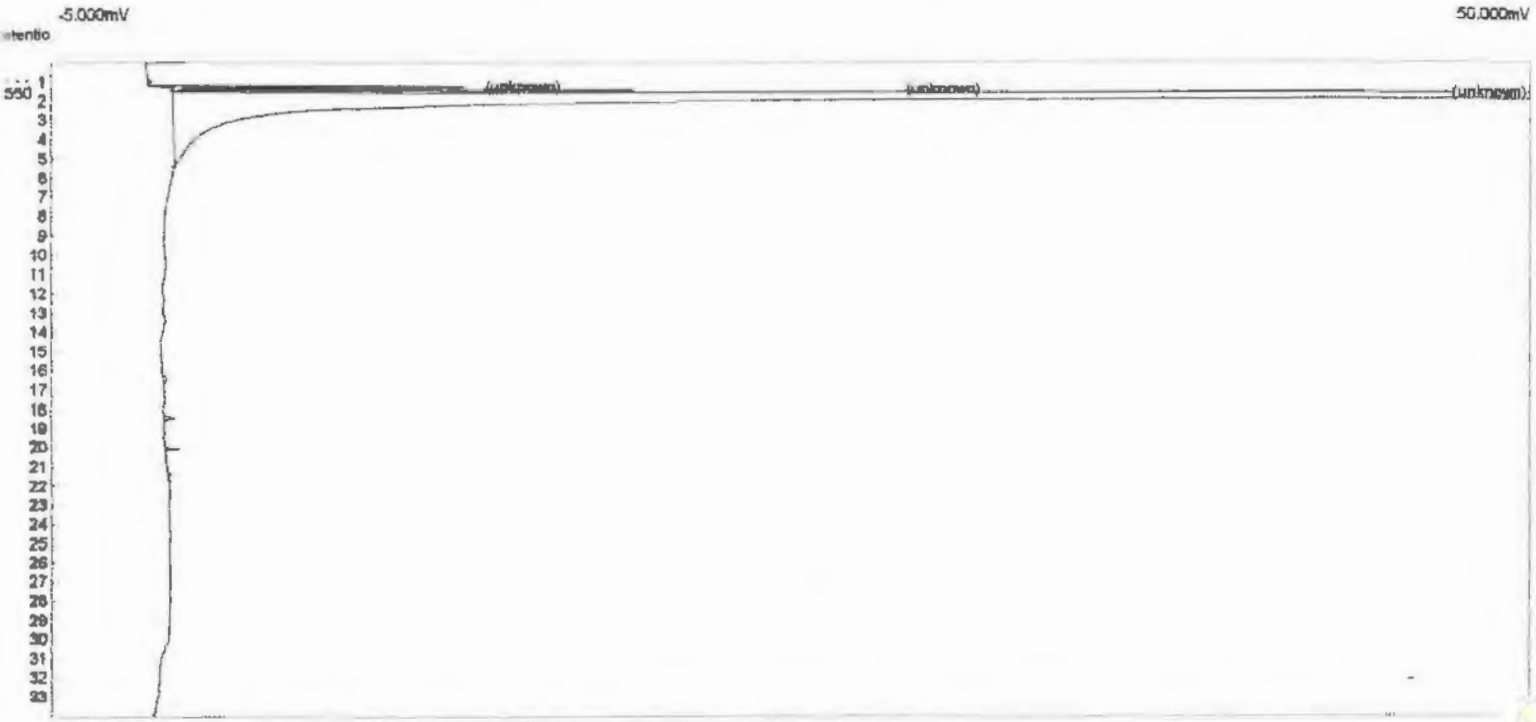
Lab name: On Site Labs Inc
nalysis date: 03/08/2002 16:07:09
Method: EPA 8015B mod.
Lab ID: GC - 5
Description: FID 3 - Ch. 3
Column: XTI-5, 30m, 0.53mm, 1.5um
Carrier: N2
le: 0308fc14.CHR ()
ple: JLA002/0308CH2M
Operator: MAP

-5.000mV 50.000mV
ntentio



Component	Retention	Area	External	Units
		0.000	0.00	

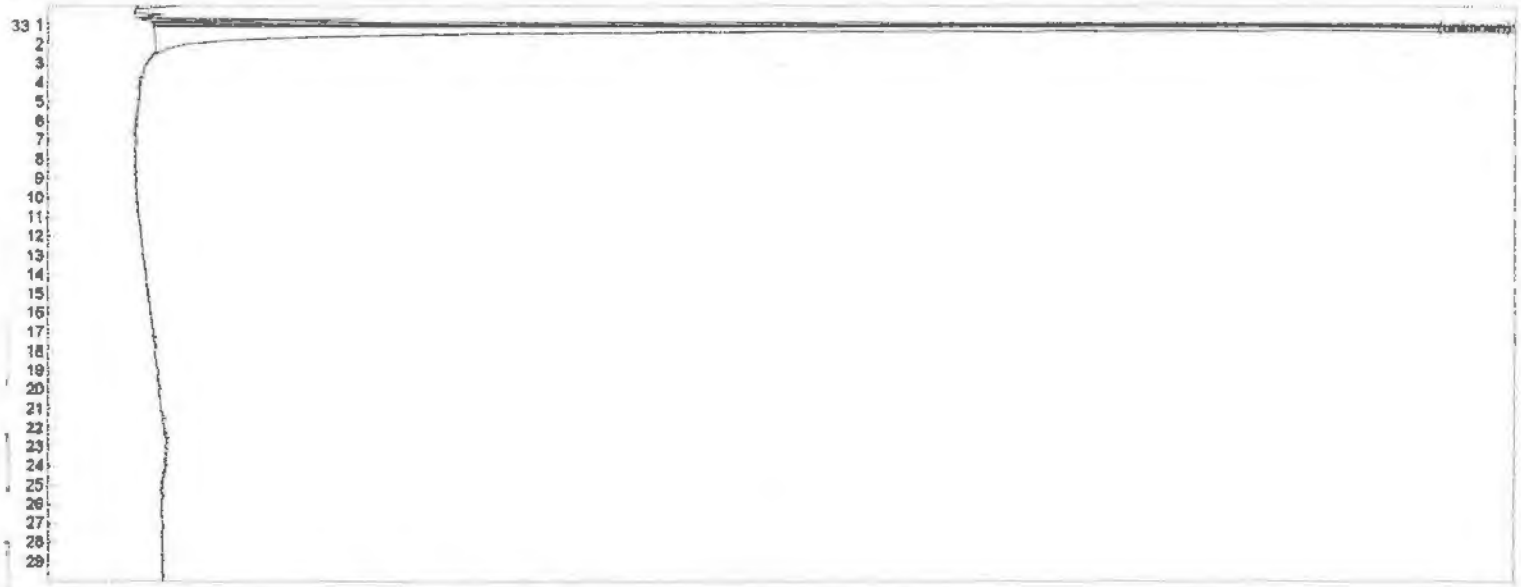
Lab name: On Site Labs Inc
Analysis date: 03/08/2002 16:07:09
Method: EPA 8015B mod.
Lab ID: GC - 5
Description: FID 4 - Ch. 4
Column: XTI-5, 30m, 0.53mm, 1.5um
Carrier: N2
Data file: 0308fd14.CHR ()
Sample: JLA003/0308CH2M
Operator: MAP



Component	Retention	Area	External	Units
		0.000	0.00	

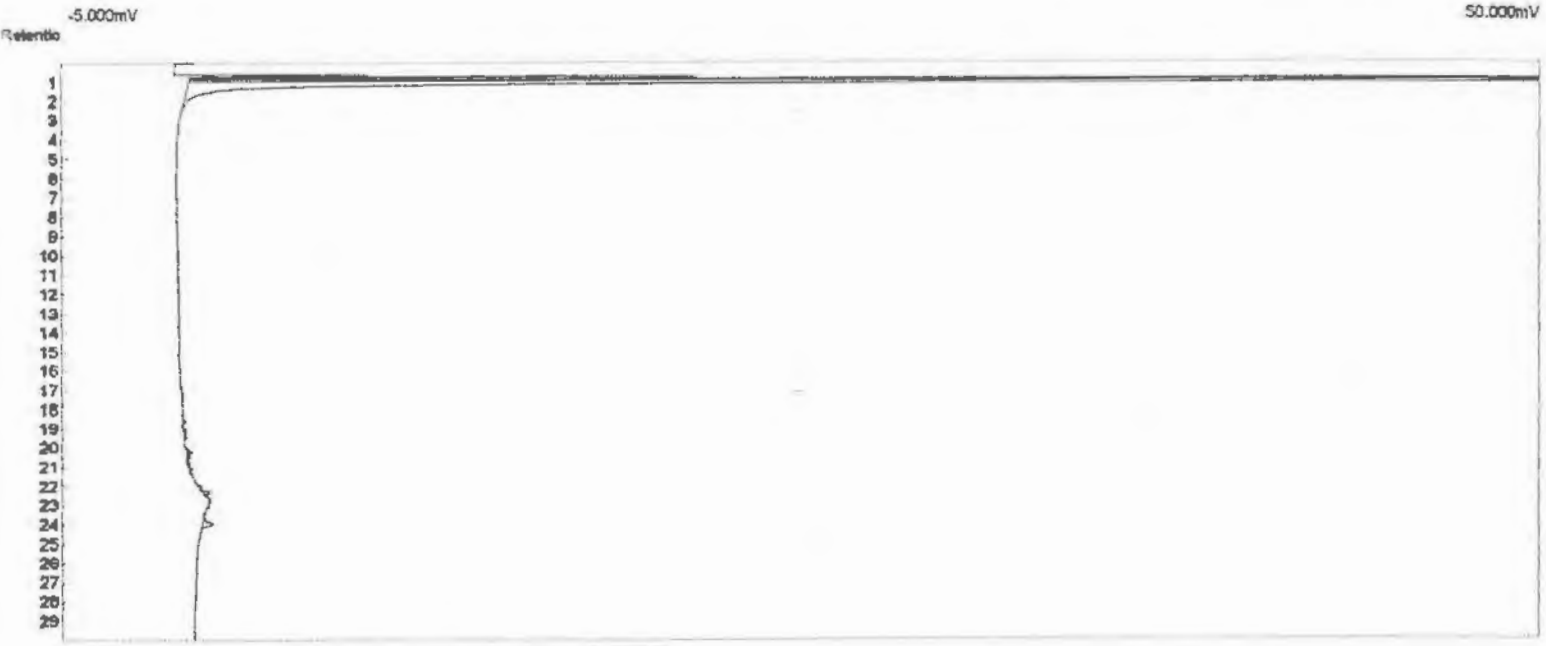
Lab name: On Site Labs Inc
nalysis date: 03/08/2002 16:46:25
Method: EPA 8015B mod.
Lab ID: GC - 5
Description: FID2 - Ch. 2
Column: XTI-5, 30m, 0.53mm, 1.5um
Carrier: N2
D[illegible]e: 0308fb15.CHR ()
[illegible]le: JLA004/0308CH2M
Op[illegible]tor: MAP

-1.250mV 12.500mV



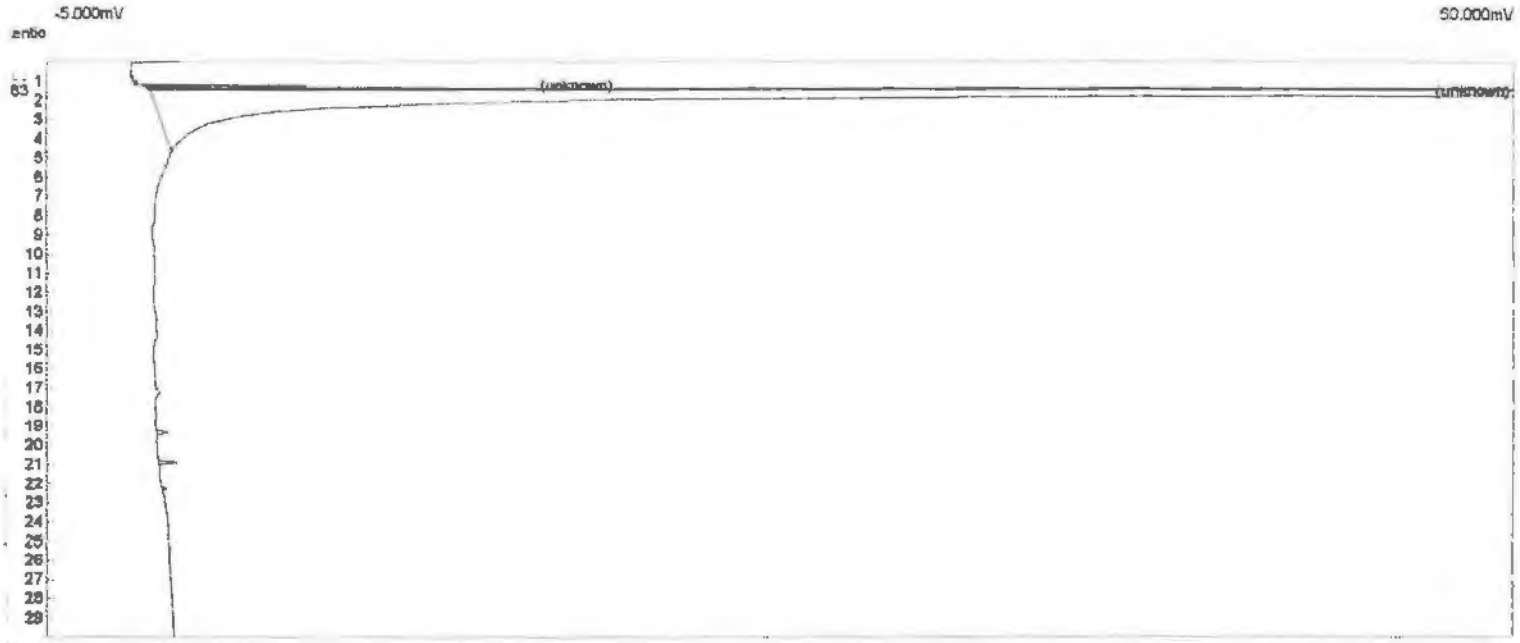
Component	Retention	Area	External	Units
		0.000	0.00	

Lab name: On Site Labs Inc
Analysis date: 03/08/2002 16:46:25
Method: EPA 8015B mod.
Lab ID: GC - 5
Description: FID 3 - Ch. 3
Column: XTI-5, 30m, 0.53mm, 1.5um
Carrier: N2
Data file: 0308fc15.CHR ()
Sample: JLA005/0308CH2M
Operator: MAP



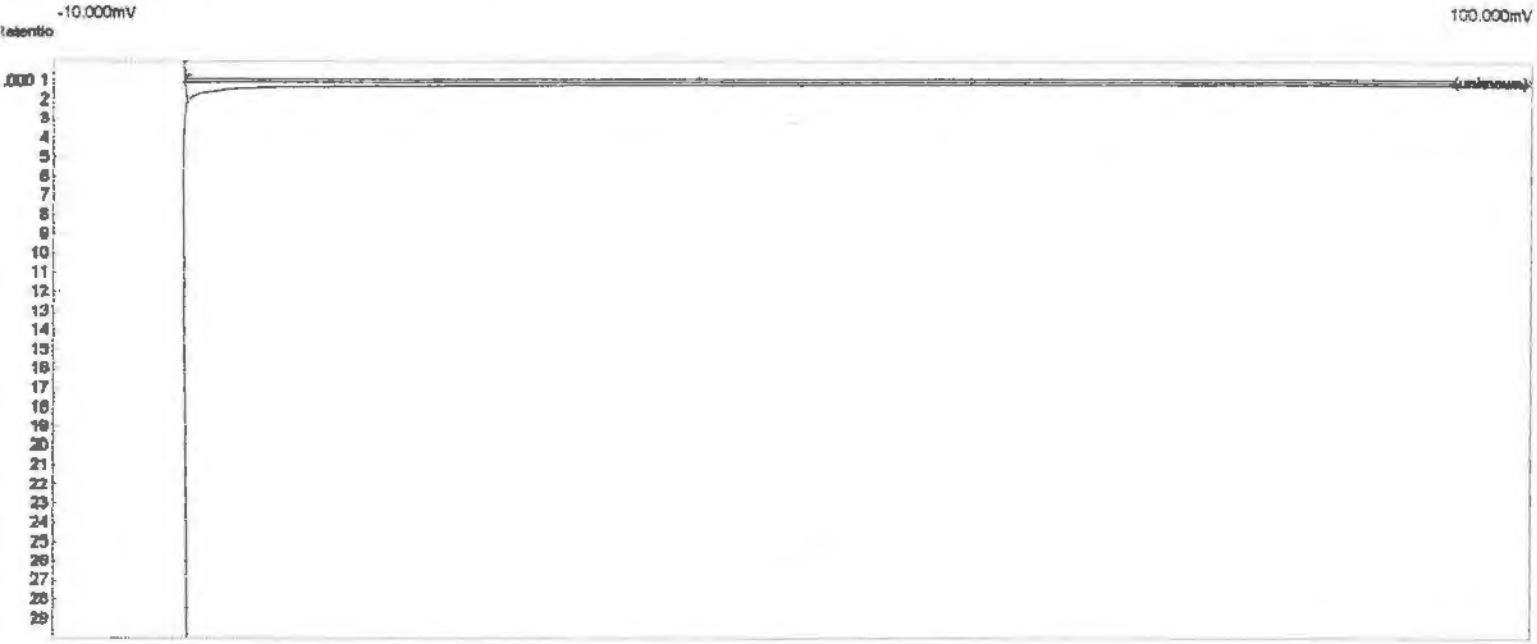
Component	Retention	Area	External	Units
		0.000	0.00	

Lab name: On Site Labs Inc
Analysis date: 03/08/2002 18:46:25
Method: EPA 8015B mod.
Lab ID: GC - 5
Description: FID 4 - Ch. 4
Column: XTI-5, 30m, 0.53mm, 1.5um
Carrier: N2
File: 0308fd15.CHR ()
Sample: JLA006/0308CH2M
Operator: MAP



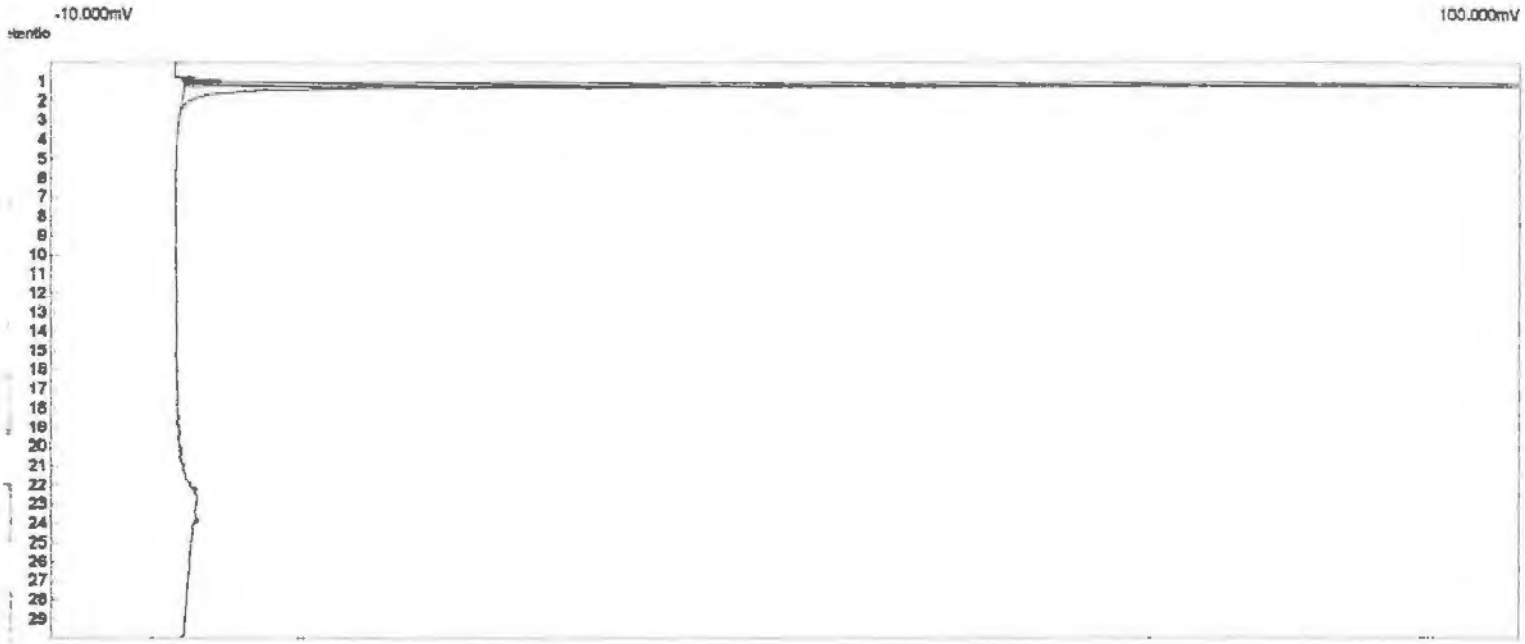
Component	Retention	Area	External	Units
		0.000	0.00	

Lab name: On Site Labs Inc
Analysis date: 03/08/2002 17:29:13
Method: EPA 8015B mod.
Lab ID: GC - 5
Description: FID2 - Ch. 2
Column: XTI-5, 30m, 0.53mm, 1.5um
Carrier: N2
Data file: 0308fb16.CHR ()
Sample: JLA007/0308CH2M
Operator: MAP



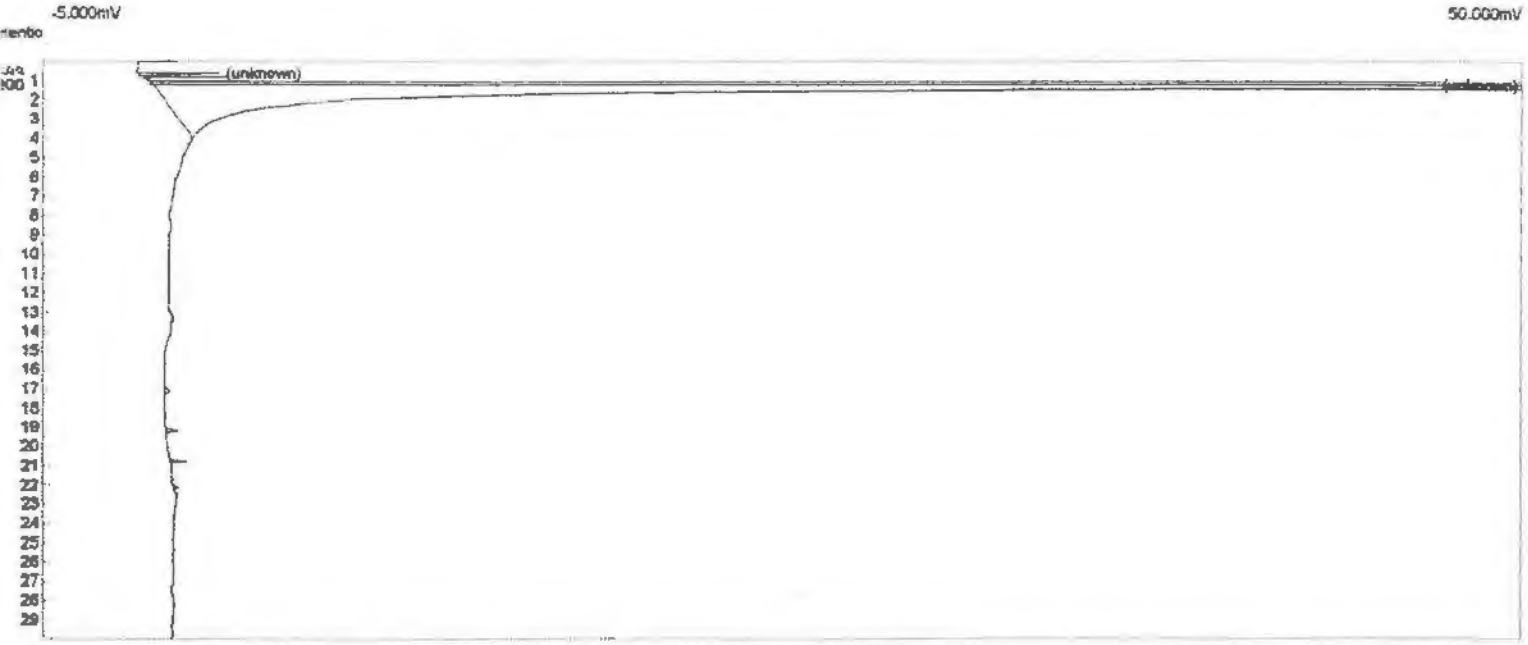
Component	Retention	Area	External	Units
		0.000	0.00	

Lab name: On Site Labs Inc
nalysis date: 03/08/2002 17:29:13
Method: EPA 8015B mod.
Lab ID: GC - 5
Description: FID 3 - Ch. 3
Column: XTI-5, 30m, 0.53mm, 1.5um
Carrier: N2
le: 0308fc16.CHR ()
ple: JLA008/0308CH2M
Operator: MAP



Component	Retention	Area	External	Units
		0.000	0.00	

Lab name: On Site Labs Inc
Analysis date: 03/08/2002 17:29:13
Method: EPA 8015B mod.
Lab ID: GC - 5
Description: FID 4 - Ch. 4
Column: XTI-5, 30m, 0.53mm, 1.5um
Carrier: N2
Data file: 0308fd16.CHR ()
Sample: JLA009/0308CH2M
Operator: MAP

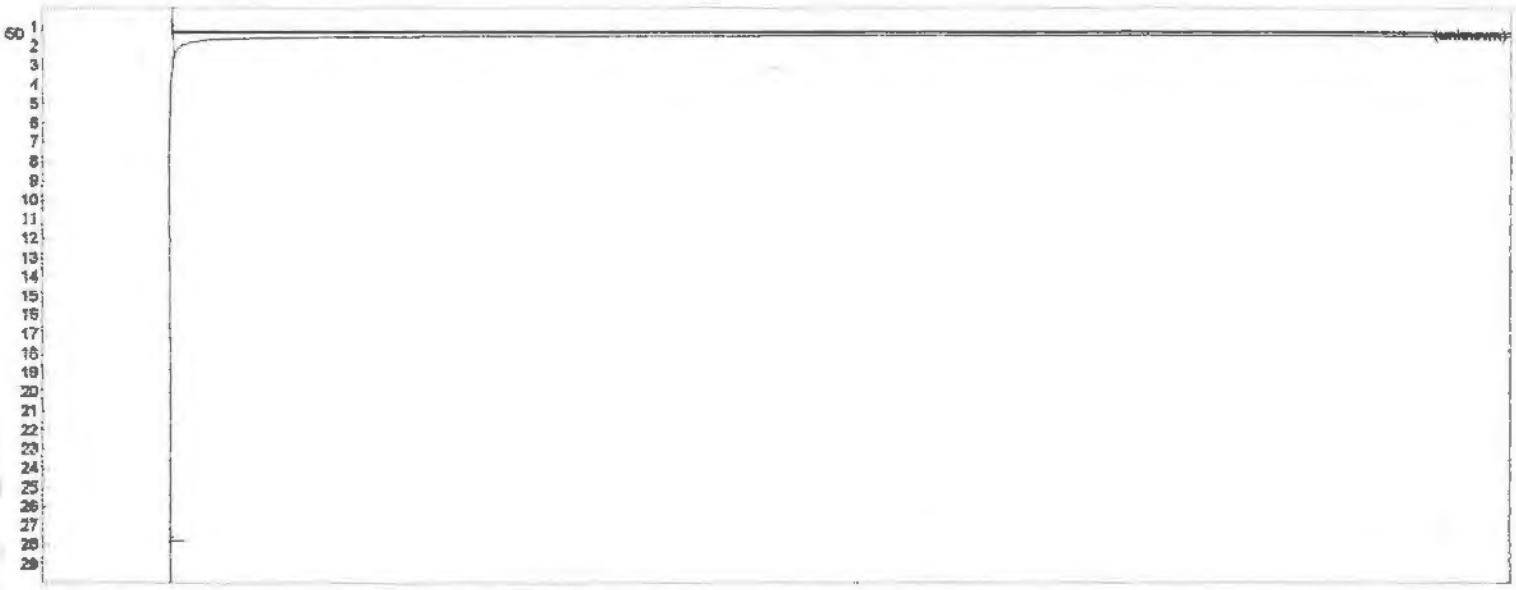


Component	Retention	Area	External	Units
		0.000	0.00	

Lab name: On Site Labs Inc
Analysis date: 03/08/2002 18:02:23
Method: EPA 8015B mod.
Lab ID: GC - 5
Description: FID2 - Ch. 2
Column: XTI-5, 30m, 0.53mm, 1.5um
Carrier: N2
File: 0308fb17.CHR ()
Sample: JLA0970306CH2ivi
Operator: MAP

JLAØ1Ø K2

-10.000mV
Retention
100.000mV



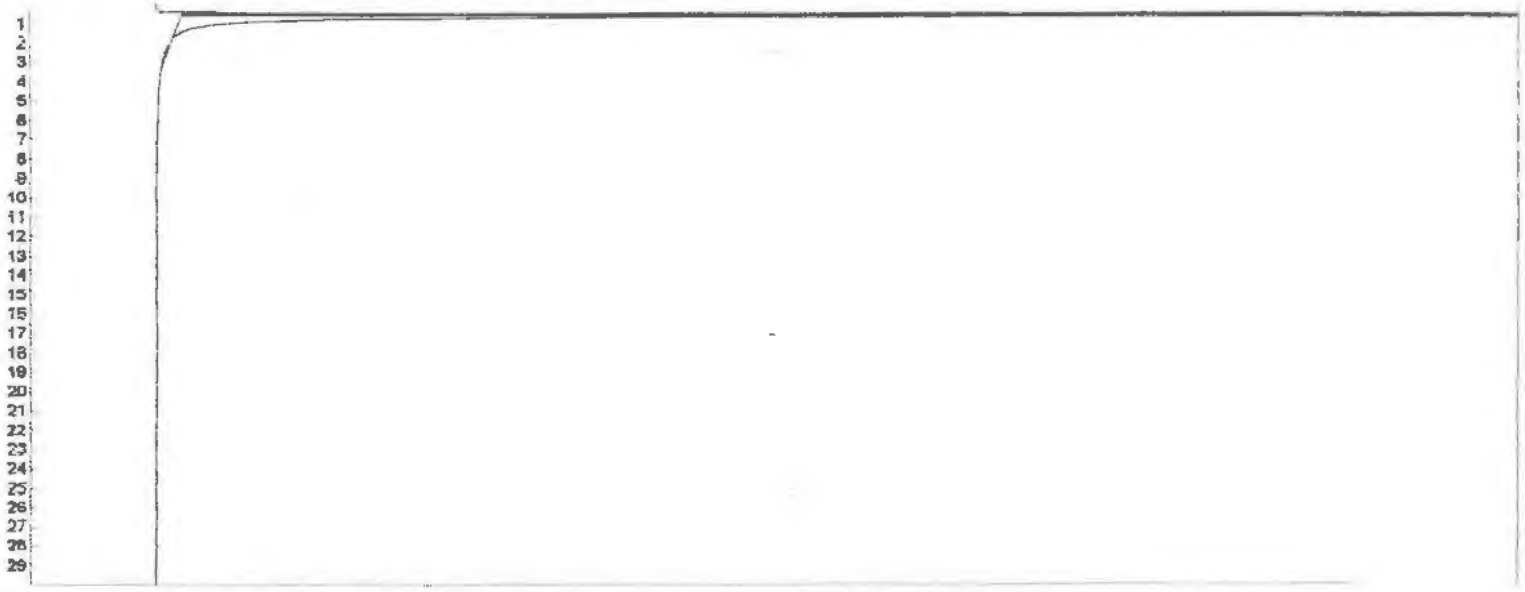
Component	Retention	Area	External	Units
		0.000	0.00	

Lab name: On Site Labs Inc
Analysis date: 03/08/2002 18:02:23
Method: EPA 8015B mod.
Lab ID: GC - 5
Description: FID 3 - Ch. 3
Column: XTI-5, 30m, 0.53mm, 1.5um
Carrier: N2
Data file: 0308fc17.CHR ()
Sample: JLA006/0306CH2M
Operator: MAP

JLA012EB1
KR

-10.000mV 100.000mV

Retentio

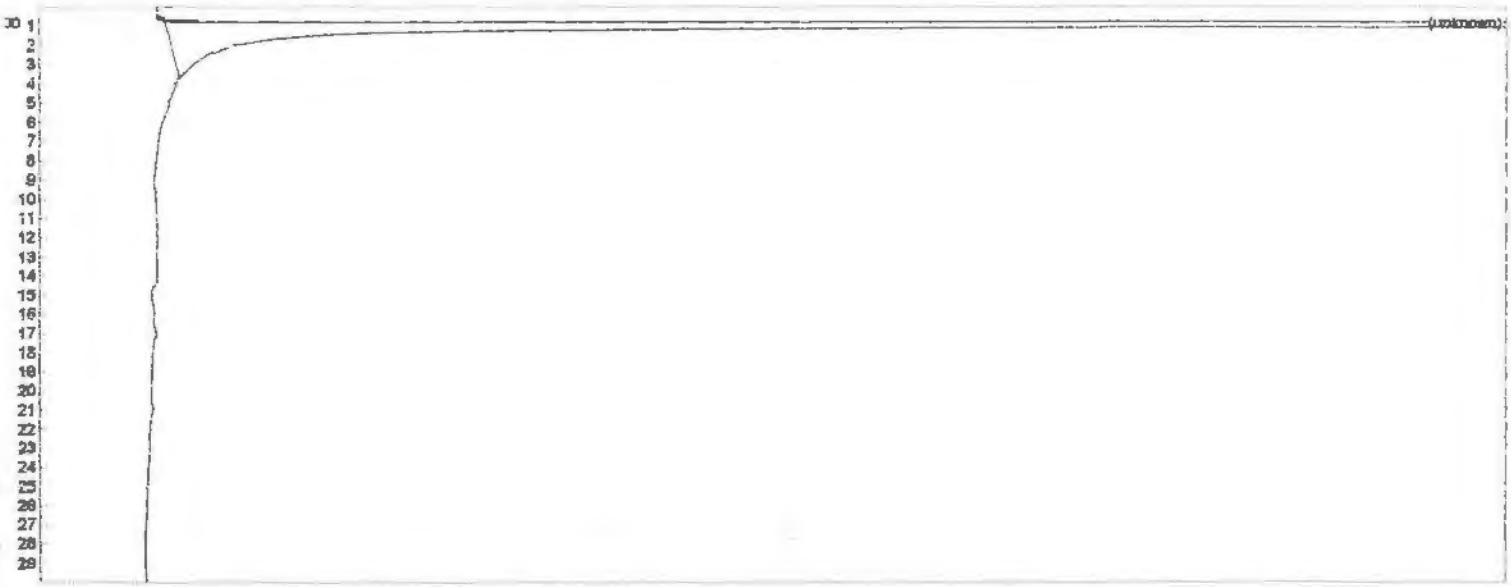


Component	Retention	Area	External	Units
		0.000	0.00	

Lab name: On Site Labs Inc
alysis date: 03/08/2002 18:02:23
Method: EPA 8015B mod.
Lab ID: GC - 5
Description: FID 4 - Ch. 4
Column: XTI-5, 30m, 0.53mm, 1.5um
Carrier: N2
e: 0308fd17.CHR ()
le: JLA000/0308CH2M
Operator: MAP

HLA030
KD

-5.000mV 30.000mV



Component	Retention	Area	External	Units
		0.000	0.00	

QA/QC REPORT - CALIBRATION DATA

OSL Project #02I0308CH2M
DAILY CALIBRATION DATE: 03/08/02

CH2M HILL PROJECT NO. 167722.FI.FS
PROJECT NAME: RRNAS SITES 88 AND 2036, CEIBA

			INITIAL		OPENING			CLOSING		
COMPOUND	DETECTOR	CALIB RANGE	RF	%RSD	AREA	RF	%DIFF	AREA	RF	%DIFF
BENZENE	PID1 - GC2	0.5 - 75.0	1.66	9.0%	27.09	1.35	18.4%	32.07	1.60	3.4%
TOLUENE	PID1 - GC2	0.5 - 75.0	1.62	6.6%	26.31	1.32	18.8%	33.51	1.68	3.4%
ETHYLBENZENE	PID1 - GC2	0.5 - 75.0	1.17	11.4%	19.84	0.99	15.2%	25.30	1.26	8.1%
m&p-XYLENES	PID1 - GC2	1.0 - 150	1.80	10.4%	59.14	1.48	17.9%	77.94	1.95	8.3%
o-XYLENES	PID1 - GC2	0.5 - 75.0	1.36	8.6%	23.52	1.18	13.5%	30.33	1.52	11.5%

CALIB RANGE - RANGE OF CALIBRATION CURVE IN ppb
INITIAL RF - AVERAGE RESPONSE FACTOR FROM MULTIPOINT CALIBRATION CURVE
% RSD - LINEARITY OF MULTIPOINT CALIBRATION CURVE (+/- 20% ACCEPTABLE LIMITS)
AREA - AREA COUNTS FROM DAILY CALIBRATION STANDARD
RF - DETECTOR RESPONSE FACTOR FROM MID-POINT CALIBRATION STANDARD
% DIFF - DIFFERENCE, IN PERCENT, BETWEEN THE AVERAGE RF AND THE OPENING OR CLOSING RF (+/- 20% ACCEPTABLE LIMITS)
OPENING - MID-POINT CALIBRATION STANDARD ANALYZED BEFORE SAMPLE ANALYSES BEGIN
CLOSING - MID-POINT CALIBRATION STANDARD ANALYZED AFTER SAMPLES ANALYSES ARE COMPLETE

ANALYSES PERFORMED BY MARCO A PEDRAZA
DATA REVIEWED BY KEVIN SHELBURNE

QA/QC REPORT - MS/MSD DATA

MATRIX SPIKE (MS)/MATRIX SPIKE DUPLICATE (MSD)

OSL PROJECT #02I0308CH2M
DATE: 03/08/02

CH2M HILL PROJECT NO. 167722.FI FS
PROJECT NAME: RRNAS SITES 88 AND 2036

COMPOUND	SPK CONC (ppb)	MS CONC (ppb)	%REC MS	MSD CONC (ppb)	%REC MSD	RPD	ACCEPTABLE RPD	ACCEPTABLE RECOVERY
BENZENE	10	11.7	117%	12.1	121%	3%	20%	82% - 117%
TOLUENE	10	12.2	122%	12.8	128%	5%	20%	87% - 120%
ETHYLBENZENE	10	13.1	131%	13.2	132%	1%	20%	83% - 131%
TOTAL XYLENES	30	39.0	130%	39.9	133%	2%	20%	87% - 123%

ppb = PARTS PER BILLION

MS CONC - ANALYZED CONCENTRATION OF SPIKED SAMPLE

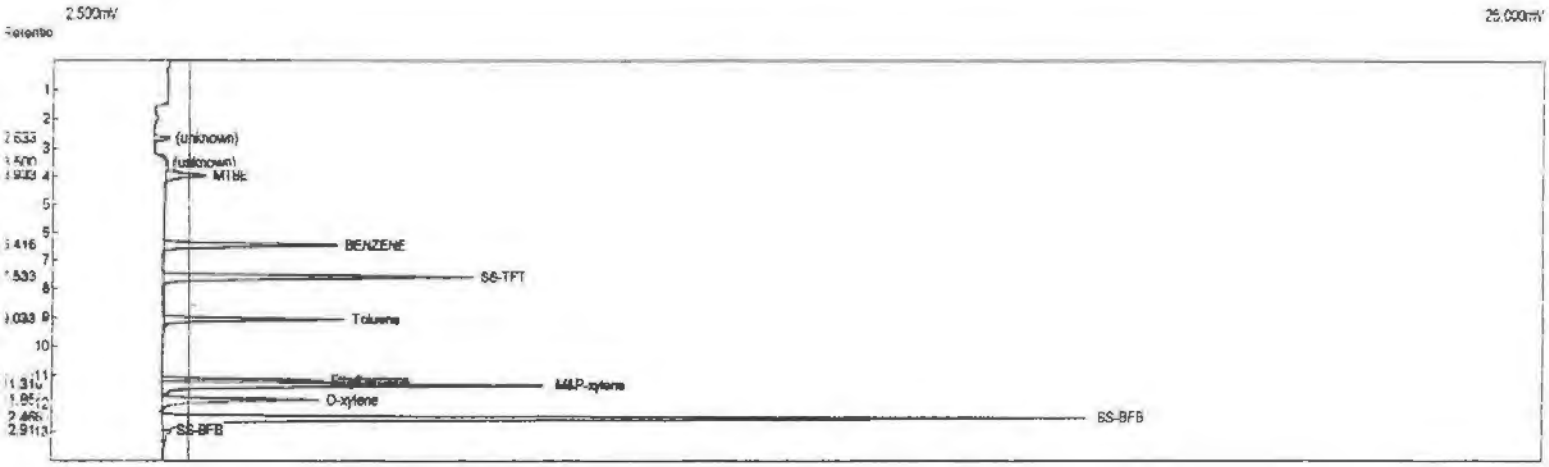
% REC - PERCENT RECOVERY OF SPIKE FROM MATRIX

RPD - RELATIVE PERCENT DIFFERENCE BETWEEN MATRIX SPIKE AND MATRIX SPIKE DUPLICATE RECOVERIES

ANALYSES PERFORMED BY MARCO A PEDRAZA
DATA REVIEWED BY KEVIN SHELBURNE

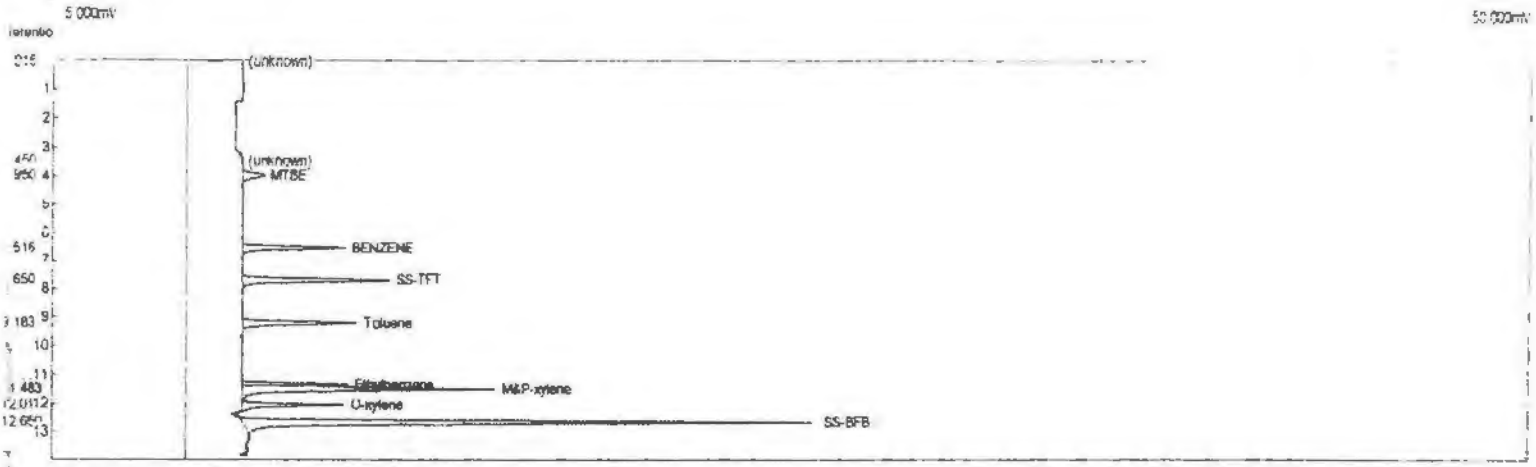
ON SITE LABS, INC
PMB 627, HC-01 BOX 29030, CAGUAS, P R 00725
TELEPHONE (7[illegible] 0329 FAX 789-3858

Lab name: On Site Labs Inc
Analysis date: 03/08/2002 09:05:01
Method: EPA 8021 mod.
Lab ID: GC-2
Description: PID - Ch. 1
Column: Rtx-5,30m,5.0um,0.53mm
Carrier: N2
Data file: 0308pt1.chr ()
Sample: 20 ppb BTEX-MTBE OPEN
Operator: MAP



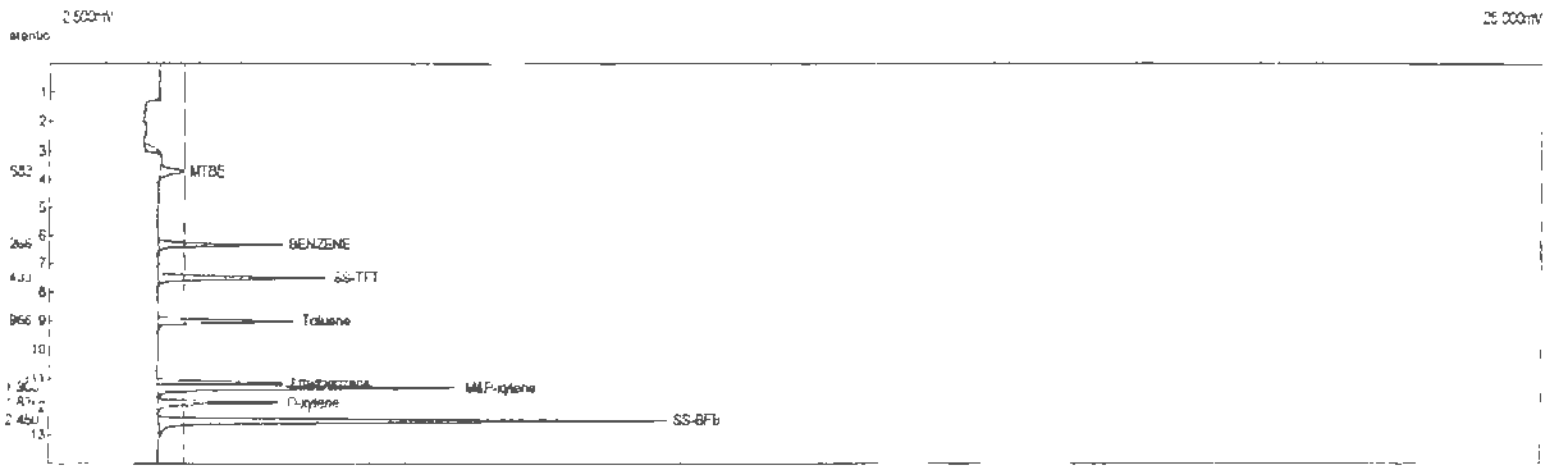
Component	Retention	Area	External	Internal	Units
MTBE	3.933	9.238	18.85	18.8531	ppb
BENZENE	6.416	27.088	16.32	16.3181	ppb
SS-TFT	7.533	51.362	37.16	37.1650	ppb
Toluene	9.033	26.313	16.24	16.2426	ppb
Ethylbenzene	11.166	19.844	16.96	16.9607	
M&P-xylene	11.316	59.138	32.85	32.8544	ppb
O-xylene	11.850	23.519	17.29	17.2934	ppb
SS-BFB	12.466	137.372	44.46	44.4570	ppb
SS-BFB	12.916	1.882	0.61	0.6091	ppb
		355.756	200.75	200.7532	

Lab name: On Site Labs Inc
Analysis date: 03/08/2002 19:33:31
Method: EPA 8021 mod.
Lab ID: GC-2
Description: PID - Ch. 1
Column: Rtx-5,30m,5.0um,0.53mm
rrier: N2
a file: 0308pt34.CHR ()
Sample: 20 ppb BTEX-MTBE close
Operator: MAP



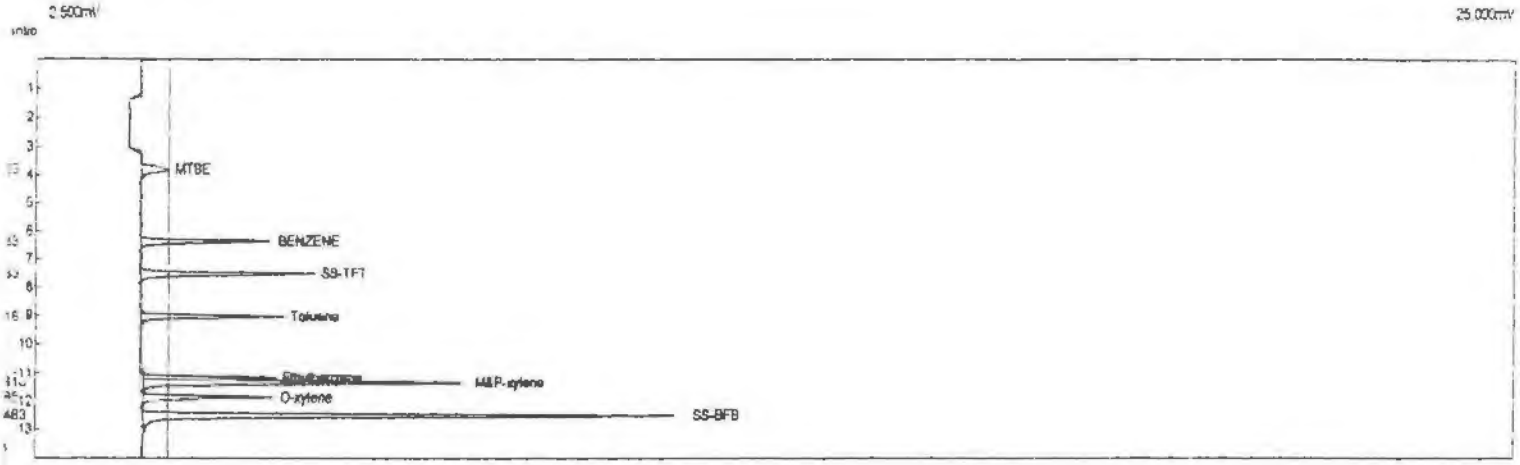
Component	Retention	Area	External	Internal	Units
MTBE	3.950	10.298	21.02	21.0163	ppb
BENZENE	6.516	32.070	19.32	19.3193	ppb
SS-TFT	7.650	48.696	35.24	35.2359	ppb
Toluene	9.183	33.508	20.68	20.6840	ppb
Eth ne	11.333	25.298	21.62	21.6222	
M& e	11.483	77.940	43.30	43.3000	ppb
O-xylene	12.016	30.333	22.30	22.3037	ppb
SS-BFB	12.650	164.616	53.27	53.2738	ppb
		422.759	236.76	236.7551	

Lab name: On Site Labs Inc
Analysis date: 03/08/2002 09.21.31
Method. EPA 8021 mod.
Lab ID: GC-2
Description: PID - Ch. 1
Column: Rtx-5,30m,5.0um,0.53mm
Carrier: N2
Data file: 0308pt2.chr ()
Sample: CA-S-29 matrix spike
Operator: MAP



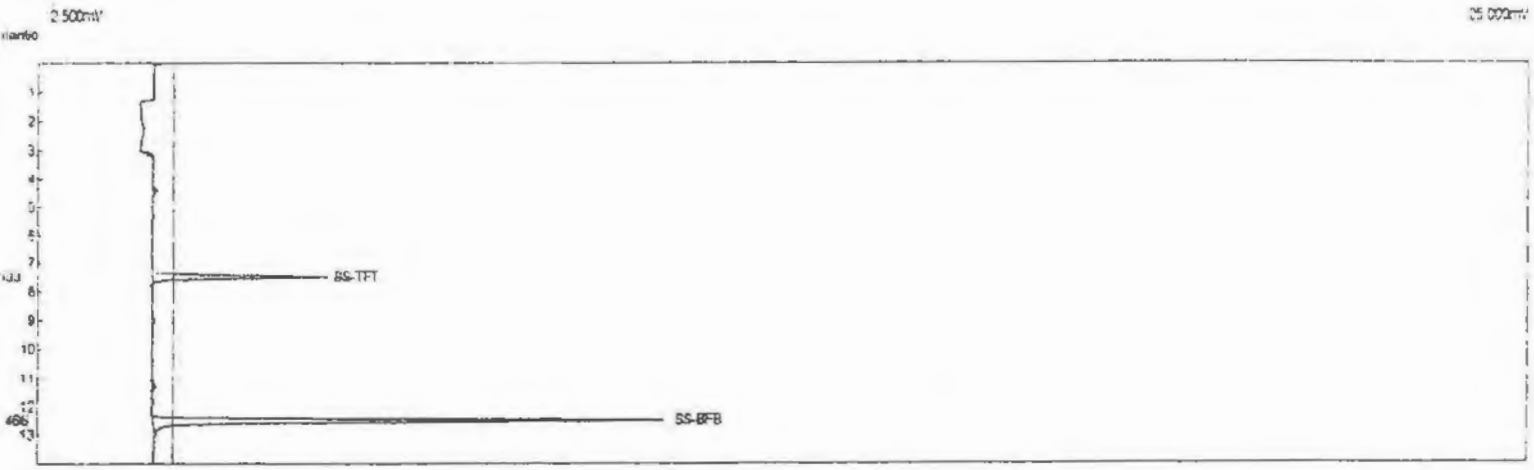
Component	Retention	Area	External	Internal	Units
MTBE	3.683	6.199	12.65	12.6500	ppb
BENZENE	6.266	19.476	11.73	11.7325	ppb
SS-TFT	7.433	27.629	19.99	19.9920	ppb
Toluene	8.966	19.782	12.21	12.2111	ppb
Ethylbenzene	11.133	15.328	13.10	13.1009	
M&P-xylene	11.300	46.424	25.79	25.7911	ppb
O-xylene	11.833	17.918	13.17	13.1750	ppb
SS-BFB	12.450	73.716	23.86	23.8570	ppb
		226.474	132.51	132.5096	

Lab name: On Site Labs Inc
nalysis date: 03/08/2002 09:38:50
Method: EPA 8021 mod.
Lab ID: GC-2
Description: PID - Ch. 1
Column: Rtx-5,30m,5.0um,0.53mm
ier: N2
file: 0308pt3.CHR ()
Sample: CA-S-29 matrix spike duplic
Operator: MAP



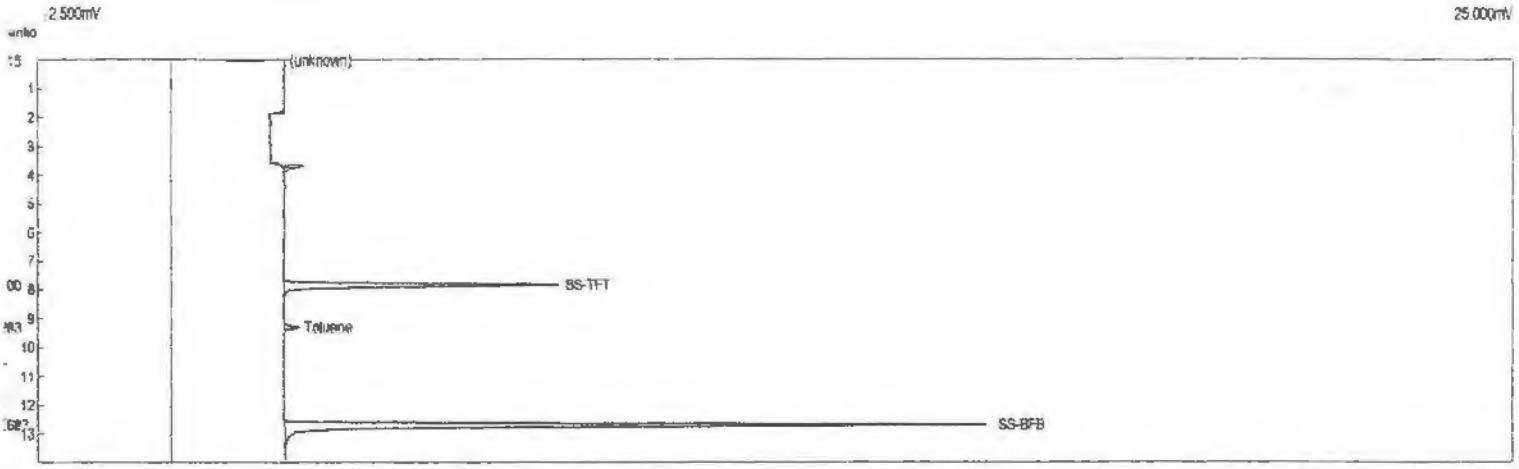
Component	Retention	Area	External	Internal	Units
TBE	3.783	6.461	13.19	13.1857	ppb
ENZENE	6.333	20.096	12.11	12.1060	ppb
S-TFT	7.483	28.158	20.37	20.3748	ppb
oluene	9.016	20.774	12.82	12.8235	ppb
nyl[illegible]	11.166	15.452	13.21	13.2068	
&P-[illegible]	11.316	47.257	26.25	26.2536	ppb
-xylene	11.850	18.545	13.64	13.6360	ppb
S-BFB	12.483	77.740	25.16	25.1586	ppb
		234.483	136.75	136.7451	

Lab name: On Site Labs Inc
Analysis date: 03/08/2002 10:03:23
Method: EPA 8021 mod.
Lab ID: GC-2
Description: PID - Ch. 1
Column: Rtx-5,30m,5.0um,0.53mm
Carrier: N2
Data file: 0308pt4.CHR ()
Sample: METHOD BLANK
Operator: MAP



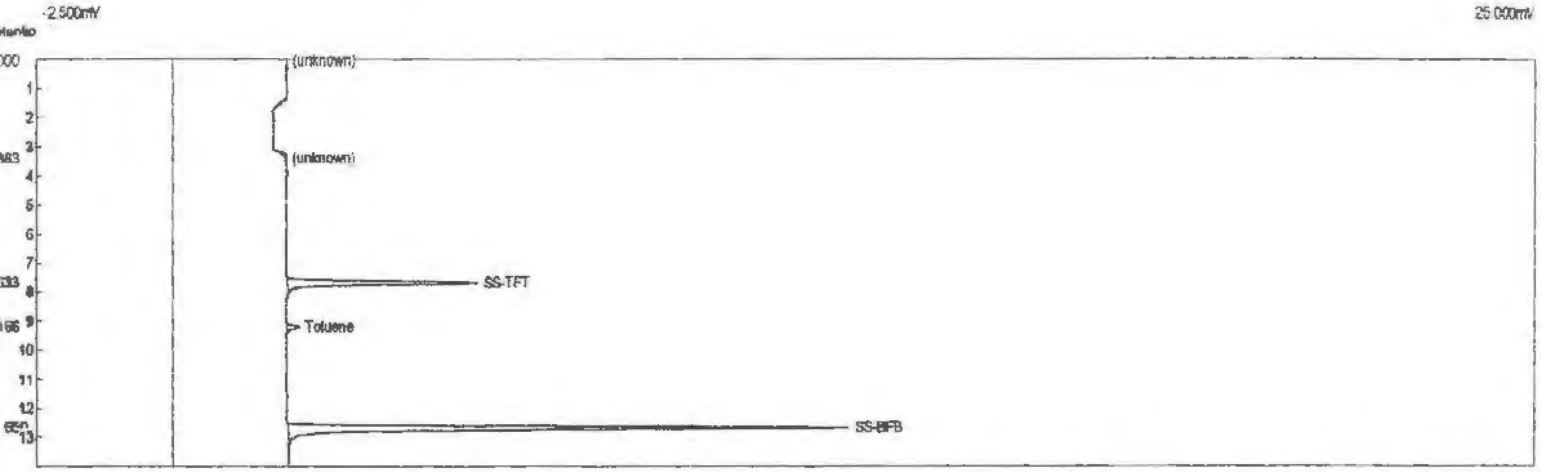
Component	Retention	Area	External	Internal	Units
-TFT	7.433	28.454	20.59	20.5890	ppb
-BFB	12.466	72.981	23.62	23.6184	ppb
		101.435	44.21	44.2074	

Lab name: On Site Labs Inc
nalysis date: 03/08/2002 19:14:57
Method: EPA 8021 mod.
Lab ID: GC-2
Description: PID - Ch. 1
Column: Rtx-5,30m,5.0um,0.53mm
Carrier: N2
File: 0308pt33.CHR ()
mple: JLA11TB1/0308CH2M
Operator: MAP



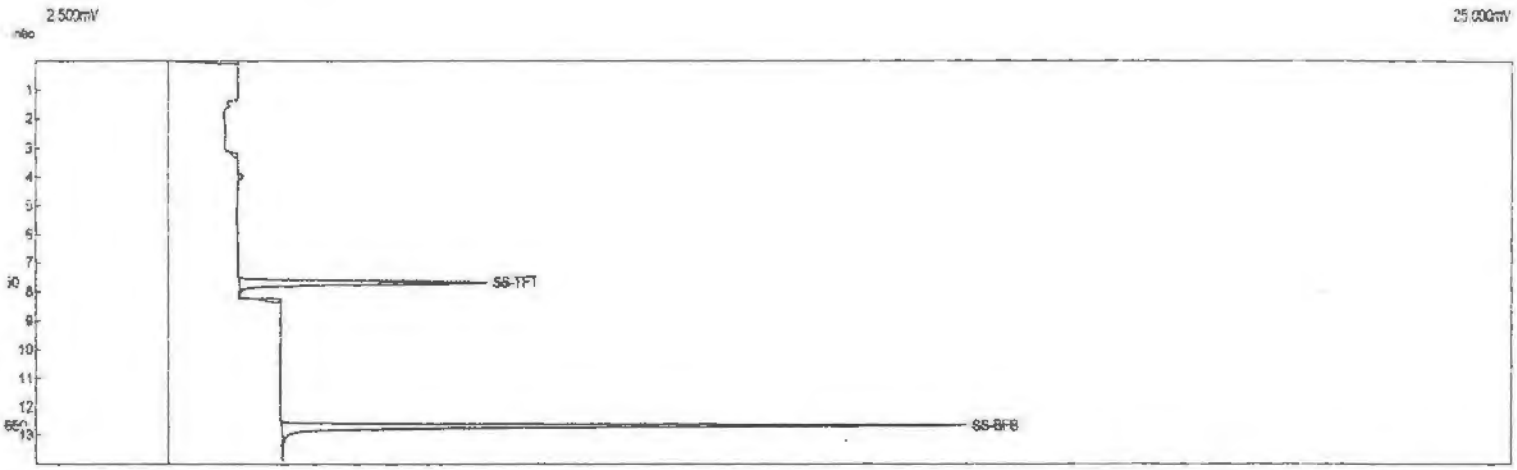
Component	Retention	Area	External	Internal	Units
S-TFT	7.800	44.010	31.85	31.8452	ppb
luene	9.283	2.140	1.32	1.3210	ppb
S-BFB	12.683	101.824	32.95	32.9528	ppb
		147.974	66.12	66.1189	

Lab name: On Site Labs Inc
Analysis date: 03/08/2002 16:59:51
Method: EPA 8021 mod.
Lab ID: GC-2
Description: PID - Ch. 1
Column: Rtx-5,30m,5.0um,0.53mm
Carrier: N2
Data file: 0308pt32.CHR ()
Sample: JLA012EB1/0308CH2M
Operator: MAP



Component	Retention	Area	External	Internal	Units
S-TFT	7.633	31.944	23.11	23.1143	ppb
oluene	9.166	1.916	1.18	1.1827	ppb
S-BFB	12.650	83.868	27.14	27.1417	ppb
		117.728	51.44	51.4388	

Lab name: On Site Labs Inc
alysis date: 03/08/2002 18:45:06
Method: EPA 6021 mod.
Lab ID: GC-2
Description: PID - Ch. 1
Column: Rtx-5,30m,5.0um,0.53mm
Carrier: N2
File: 0308pt31.CHR ()
Sample: HLA030/0308CH2M
Operator: MAP



Component	Retention	Area	External	Internal	Units
S-TFT	7.650	40.524	29.32	29.3227	ppb
S-BFB	12.650	102.123	33.05	33.0495	ppb
		142.647	62.37	62.3722	