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FINAL SITE CHARACTERIZATION REPORT FOR SITE 88 NAVAL ACTIVITY PUERTO RICO

7/1/2002

CH2M HILL

Final
Site Characterization Report
for
Site 88

Prepared for

United States Navy
Roosevelt Roads Naval Station
Ceiba, Puerto Rico

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

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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
ORP	Redox Potential
OVM	Organic Vapor Meter
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 88 (Site 88) at U.S. Naval Station (NAVSTA) Roosevelt Roads, Puerto Rico. The former UST at Site 88 was a 1,000-gallon fiberglass tank that stored diesel fuel. The UST was removed in May 1999 as a best management practice. 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 88 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 1,000-gallon diesel fuel UST and associated piping that were removed from the site. The SC investigation involved installing nine exploratory soil borings and three permanent groundwater monitoring wells; collecting and analyzing soil and groundwater samples; and providing recommendations for the site 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 88 is controlled by elevation differences between the project site and the surrounding hilly terrain. Groundwater flows predominantly in a northwesterly direction away from the former UST. Groundwater at Site 88 was encountered at depths ranging from 7.3 to 24.6 ft bls. Groundwater is at greater depths immediately upgradient of the former UST. The exact groundwater depth could not be ascertained in this upgradient location (refusal at 41 ft bls) or in some areas downgradient of the former UST because hard, weathered volcanic rock associated with the Daguoa formation prevented the drill rig from reaching the water table in these areas.

The soil and groundwater screening results indicate the absence of significant soil or groundwater contamination at Site 88. The analytical results for collected soil and groundwater samples indicate non-detectable levels of TPH or BTEX in the soil and groundwater, and confirm the absence of significant petroleum contamination at the site.

Based on the findings of the SC investigation, No Further Action (NFA) is recommended for Site 88. Because of the absence of hydrocarbons in soil and groundwater at the site, no remediation measures are necessary.

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 88 (Site 88) 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 88. 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 88 is shown on Figure 1-2. The former UST at Site 88 was located adjacent to the existing Water Treatment Plant (WTP) that services NAVSTA Roosevelt Roads. The site topography is shown on Figure 1-3.

1.2 Site Background

The former UST at Site 88 was a 1,000-gallon fiberglass tank that stored diesel fuel. The UST was removed in May 1999 as a best management practice. 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 3,295 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 124 mg/ kg to 408 mg/kg and non-detectable BTEX.

1.3 Previous Investigations

No previous SC investigations have been conducted at Site 88. The U.S. Navy requested that a SC investigation be conducted at Site 88 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 88 was to assess the horizontal and vertical extent of potential soil and groundwater contamination from the former 1,000-gallon diesel 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 nine (9) soil borings and three (3) permanent monitoring wells were installed at Site 88 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

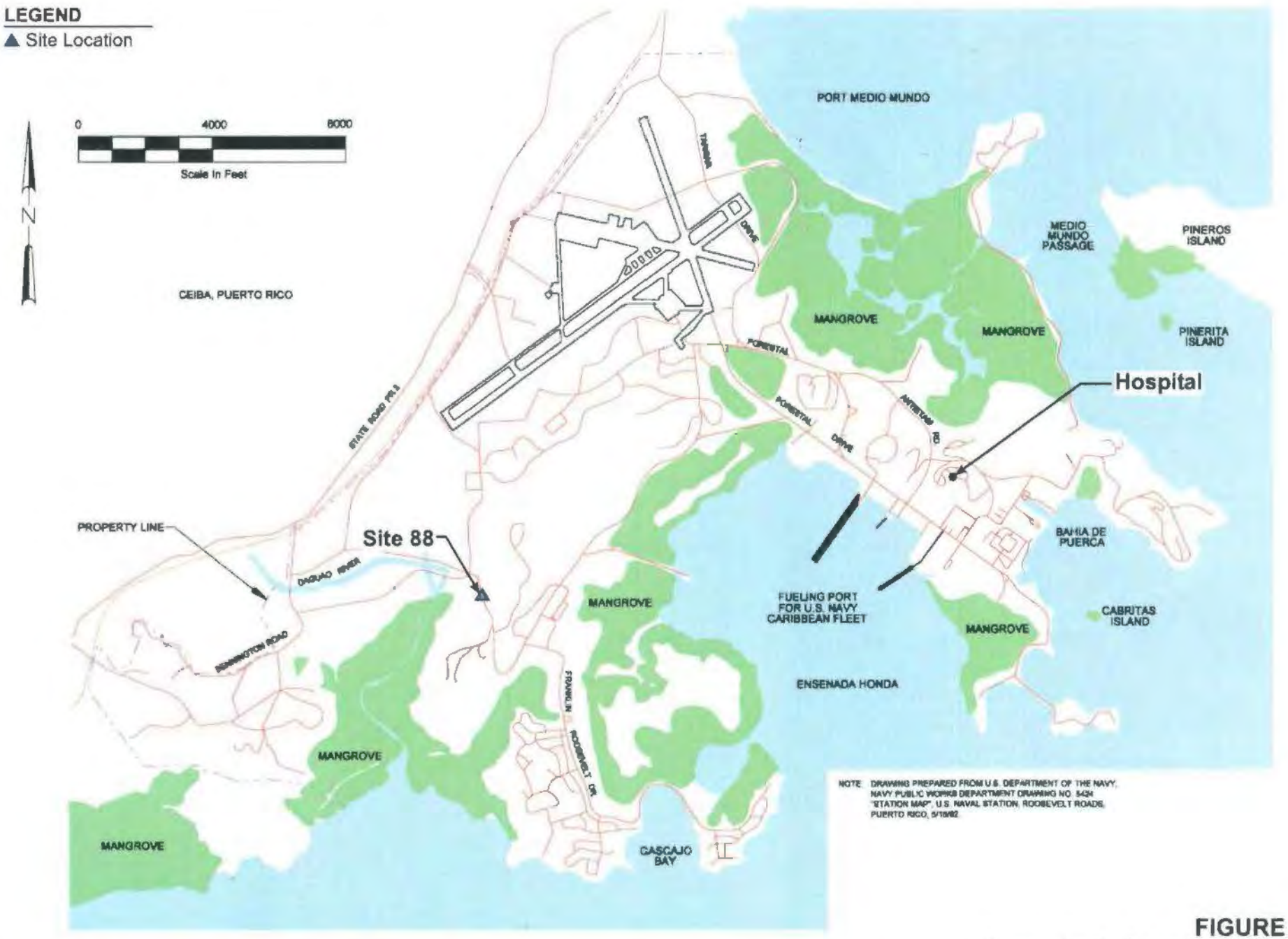

FIGURE 1-2
Approximate Location of Site 88
U.S. Naval Station Roosevelt Roads

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USGS Quad Map:
Naguabo, Puerto Rico - 1982

FIGURE 1-3
Site 88 Topographic Map
U.S. Naval Station Roosevelt Roads

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SECTION 2

Investigation Methodology

The SC investigation at Site 88 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 nine exploratory soil borings were installed at Site 88 (Figure 2-1). 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 below land surface (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 allowed for rapid location of the next set of soil borings that were installed at the site to delineate the extent of potential contamination.

Scale in Feet

100 0 100

LEGEND

MW Monitoring Well

SB Soil Boring

FIGURE 2-1

Site 88 Locations of Soil Borings and Monitoring Wells

U.S. Naval Station Roosevelt Roads

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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 three permanent groundwater monitoring wells were installed at Site 88 (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 88-MW1 was installed where the former UST was once located. This spot sits on top of a steep hill that overlooks the WTP facility. The other two monitoring wells (88-MW2 and 88-MW3) were installed downgradient of the former UST, north of the WTP. Attempts were made to install two additional monitoring wells immediately downgradient of the former UST; however, the drill rig could not be used in this area because of an existing underground clear well associated with the WTP (soil borings were installed in this area using a lighter trailer-mounted rig). Further downgradient of the WTP, the drill rig experienced refusal before reaching groundwater except in the areas where 88-MW2 and 88-MW3 were installed. Attempts were also made to install a monitoring well upgradient of the former UST; however, the drill rig experienced refusal at 41 ft bls before reaching groundwater.

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 2foot 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 88, U.S. Naval Station Roosevelt Roads

Well Designation	88-MW1	88-MW2	88-MW3
Date Installed	03/05/2002	03/14/2002	03/14/2002
Total Well Depth (ft, bls)	15	31	33
Type of Completion	Flush	Flush	Flush
Top of Casing Elevation (ft)	146.72	126.03	132.47
Casing Type	Schedule 40 PVC	Schedule 40 PVC	Schedule 40 PVC
Casing Length (ft)	5	16	23
Screen Type	Schedule 40 PVC	Schedule 40 PVC	Schedule 40 PVC
Screen Slot Size (in)	0.01	0.01	0.01
Screen Length (ft)	10	15	10
Screen Interval (ft, bls)	5-15	21-31	23-33

Notes:
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

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 1liter 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 three monitoring wells installed at Site 88 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 Figure 2-2, groundwater at Site 88 flows predominantly in a northwesterly direction away from the former UST location.

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Scale in Feet

100 0 100

LEGEND

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

FIGURE 2-2
Site 88 Groundwater Flow Direction
U.S. Naval Station Roosevelt Roads

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TABLE 2-2
Water Table Elevation Data
Site 88, 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)
88-MW1	06/07/2002	146.72	6.72	140.00
88-MW2	06/07/2002	126.03	17.29	108.74
88-MW3	06/07/2002	132.47	24.11	108.36

Notes:
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.

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.

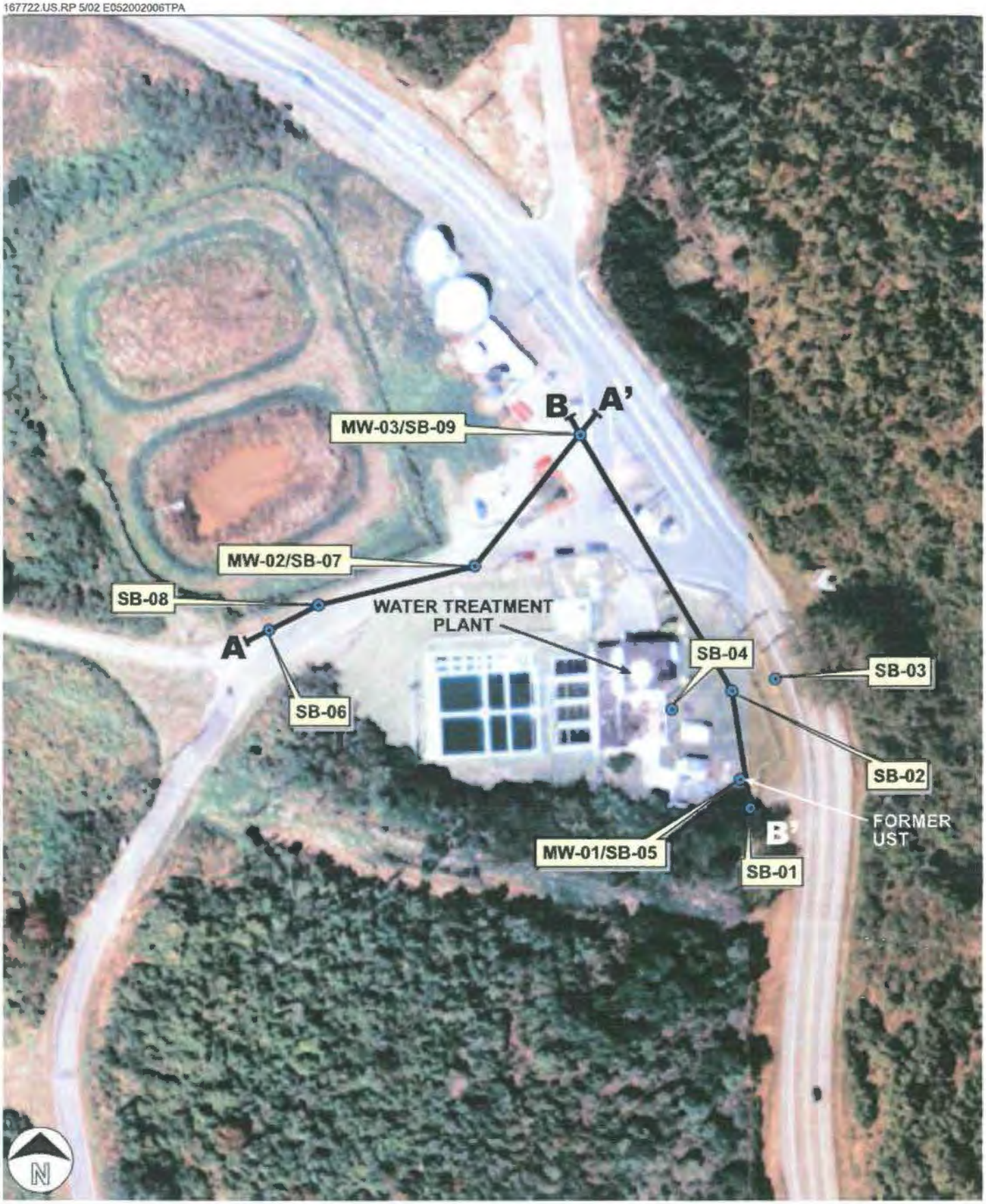
As seen in Figure 2-1, Site 88 lies within a facility and parking lot (approximately 46 feet above msl) with local rolling topography. Beneath Site 88, the encountered subsurface lithology consisted of shell, shelly sand, silty sand and silt from deposition and clay from highly weathered volcanic rock were encountered. 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 88 is controlled by elevation differences between the project site and the surrounding hilly terrain. Groundwater flows predominantly in a northwesterly direction away from the former UST (see Figure 2-2). Groundwater at Site 88 was encountered at depths ranging from 7.3 to 24.6 ft bls. Groundwater is at greater depths immediately upgradient of the former UST. The exact groundwater depth could not be ascertained in this upgradient location

(refusal at 41 ft bls) or in some areas downgradient of the former UST because hard, weathered volcanic rock associated with the Daguoa formation prevented the drill rig from reaching the water table in these areas.



Scale in Feet

100 0 100

LEGEND

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

FIGURE 3-1
Site 88 Locations of
Geologic Cross Sections A-A' and B-B'
U.S. Naval Station Roosevelt Roads

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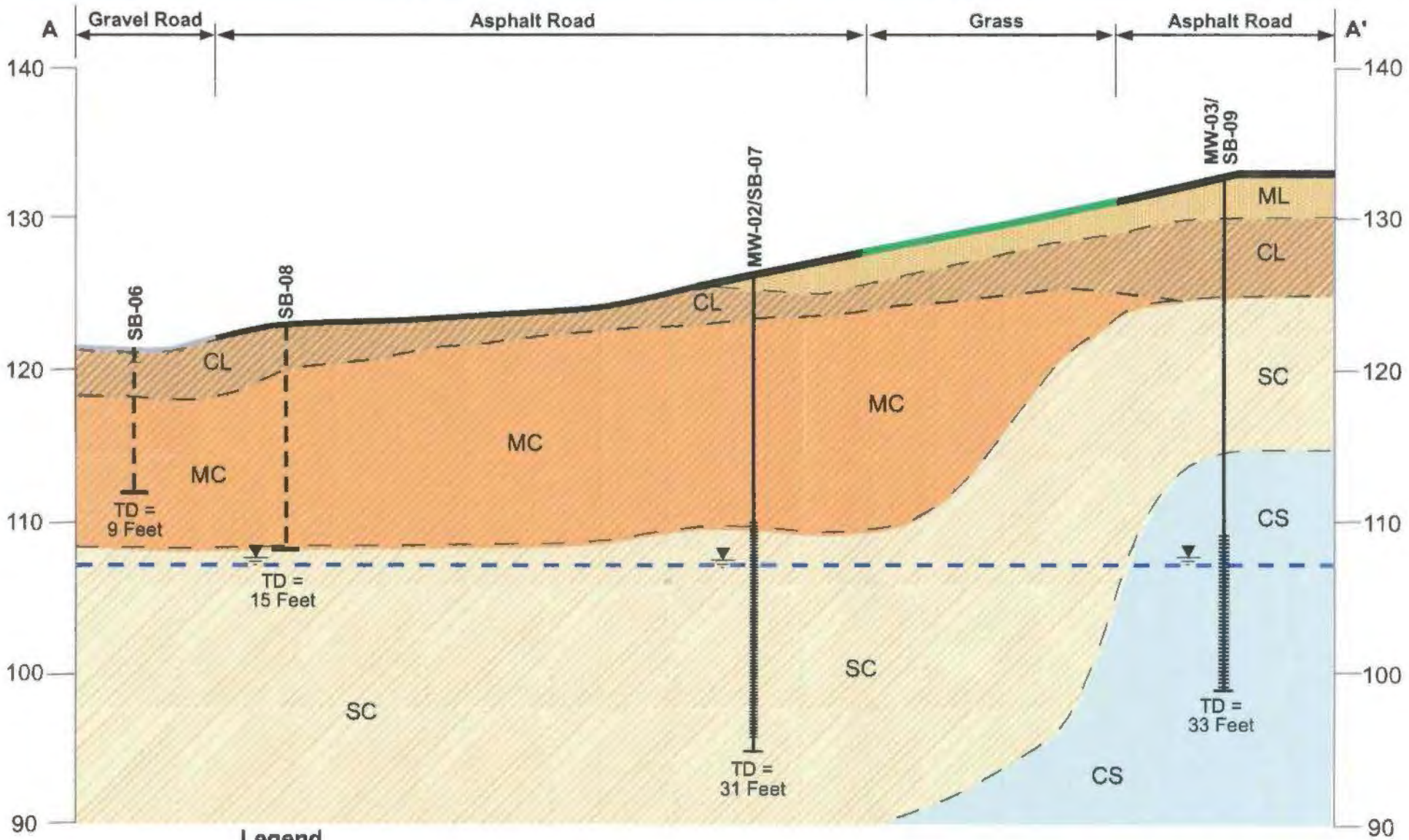

Legend

ML	Silt	TD	Total Depth
SC	Silty Clay		Monitor Well Screen Interval
CL	Lean Clay		Soil Boring Total Depth
MC	Medium Clay		Groundwater Level Elevation
CS	Clayey Sand	FT MSL	Feet Above Mean Sea Level
			Estimated Water Table

Scale (Feet): 0, 5; 0, 30, 60

FIGURE 3-2
Geologic Cross-Section A-A', Site 88
U.S. Naval Station Roosevelt Roads

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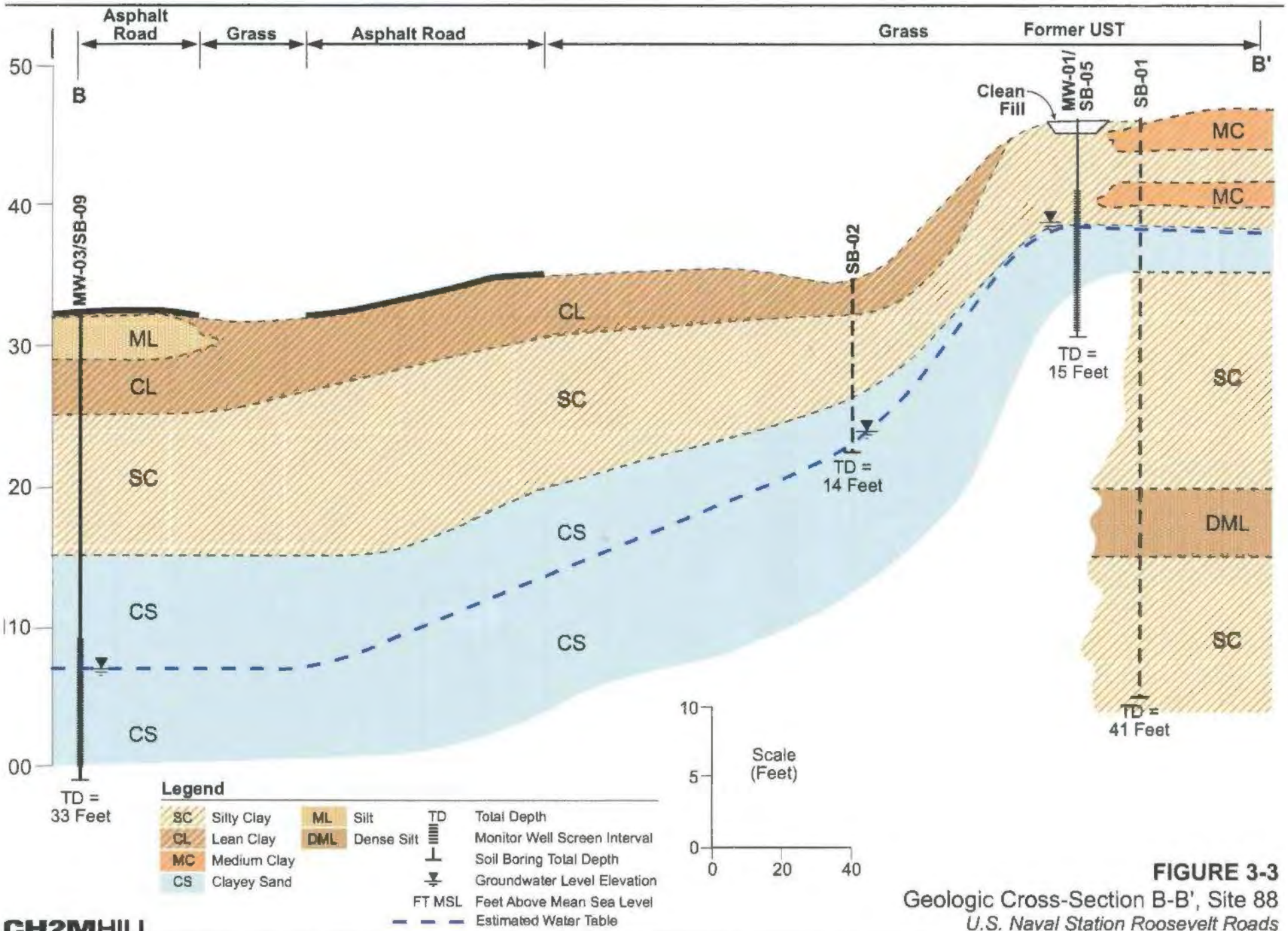

FIGURE 3-3
Geologic Cross-Section B-B', Site 88
U.S. Naval Station Roosevelt Roads

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052002006TPA

SECTION 4

Investigation Findings

The findings of the SC investigation of Site 88 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 88 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 1.5 parts per million (ppm). OVM readings that are this low indicate negligible organic vapor levels from either hydrocarbons or methane. The two soil samples from each boring (usually that had the highest OVM readings) were analyzed for TPH GRO and DRO (see Table 4-1).

TABLE 4-1
Soil Screening Results (Samples analyzed for TPH are in bold
Site 88, U.S. Naval Station Roosevelt Roads

Sample Designation	Date Sampled	Sample Depth (ft bls)	Total Organic Vapors (ppm)
88-SB01	02/26/02	**0-1**	0
	02/26/02	**3-4**	0
	02/26/02	6-8	0
	02/26/02	11-13	0.3
	02/26/02	16-18	0.7
	02/28/02	18-31	NA
	02/28/02	31-50	0
88-SBO2	02/28/02	**0-1**	0.2
	02/28/02	3-4	0.2
	02/28/02	**7-9**	NA
	02/28/02	12-14	0.2
88-SBO3	03/01/02	0-1	0.3
	03/01/02	3-4	0.1
	03/01/02	**7-9**	1.3
	03/01/02	**12-14**	1.1
	03/01/02	17-19	0.6
88-SBO4	03/01/02	0-1	0.1
	03/01/02	3-4	0.1
	03/01/02	**7-9**	0.1
	03/01/02	**12-14**	NA
88-SBO5	03/01/02	**0-1**	0.1
	03/01/02	**3-4**	0.1

TABLE 4-1
Soil Screening Results (Samples analyzed for TPH are in bold
Site 88, U.S. Naval Station Roosevelt Roads

Sample Designation	Date Sampled	Sample Depth (ft bls)	Total Organic Vapors (ppm)
88-SB06	03/11/02	**0-1**	NA
	03/11/02	**3-4**	NA
88-SB07	03/12/02	0-1	0
	03/12/02	3-4	0
	03/12/02	**7-9**	0.7
	03/12/02	12-14	0
	03/12/02	17-19	1.2
	03/12/02	22-24	0
	03/12/02	**27-29**	0
88-SB08	03/13/02	0-1	NA
	03/13/02	3-4	NA
	03/13/02	12-14	1.2
88-SB09	03/13/02	3-4	1.2
	03/13/02	**7-9**	1.5
	03/13/02	**12-14**	1.3
	03/13/02	17-19	0
	03/13/02	22-24	0
	03/13/02	27-29	0

Notes:
NA = Not Analyzed
bls = below land surface
ppm = parts per million

4.2 Groundwater Screening Results

The groundwater screening results for Site 88 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 88 had detectable levels of TPH or BTEX.

TABLE 4-2
Groundwater Screening Results
Site 88, 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)
88-SB02	02/28/02	Water	ND	ND	ND
88-SB05	03/02/02	Water	ND	ND	ND
88-SB07	03/11/02	Water	ND	ND	ND
88-SB09	03/12/02	Water	ND	ND	ND

Notes: TPH = Total Petroleum Hydrocarbons
Total BTEX = Sum of Benzene, Toluene, Ethylbenzene, and Xylene Concentrations
mg/kg = Milligrams per Kilogram
ND = Non Detectable
EPA = U.S. Environmental Protection Agency
GRO = Gasoline Range Organics
DRO = Diesel Range Organics

4.3 Soil Analytical Results

The soil analytical results for Site 88 are presented in Table 4-3. As shown in Table 4-3, none of the soil samples collected from the soil borings installed at Site 88 had detectable levels of TPH.

TABLE 4-3
Soil Analytical Results
Site 88, 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)
88-SB01 (0-1)	02/26/02	Soil	ND	ND
88-SB01 (3-4)	02/26/02	Soil	ND	ND
88-SB02 (0-1)	02/28/02	Soil	ND	ND
88-SB02 (7-9)	02/28/02	Soil	ND	ND
88-SB03 (7-9)	03/01/02	Soil	ND	ND
88-SB03 (12-14)	03/01/02	Soil	ND	ND
88-SB04 (7-9)	03/01/02	Soil	ND	ND
88-SB04 (12-14)	03/01/02	Soil	ND	ND
88-SB05 (0-1)	03/01/02	Soil	ND	ND
88-SB05 (3-4)	03/01/02	Soil	ND	ND
88-SB06 (3-4)	03/11/02	Soil	ND	ND

TABLE 4-3
Soil Analytical Results
Site 88, 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)
88-SB06 (7-9)	03/11/02	Soil	ND	ND
88-SB07(7-9)	03/11/02	Soil	ND	ND
88-SB07 (27-29)	03/11/02	Soil	ND	ND
88-SB09 (7-9)	03/12/02	Soil	ND	ND
88-SB09 (12-14)	03/12/02	Soil	ND	ND

Notes: TPH = Total Petroleum Hydrocarbons
mg/Kg = Milligrams per Kilogram
ND = Non Detectable
EPA = U.S. Environmental Protection Agency
GRO = Gasoline Range Organics
DRO = Diesel Range Organics

4.4 Groundwater Analytical Results

The groundwater analytical results for Site 88 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 88, U.S. Naval Station Roosevelt Roads

Parameters	PREBQ Target Levels	88-MW-1	88-MW-2	88-MW-3
Date Sampled		**03/11/02**	**03/16/02**	**03/16/02**
Benzene (µg/L)	5	ND	ND	ND
Toluene (µg/L)	1,000	ND	ND	ND
Ethylbenzene (µg/L)	700	ND	ND	ND
Total Xylenes (µg/L)	10,000	ND	ND	ND
Total BTEX (µg/L)	50	ND	ND	ND
TPH GRO (ug/L)	-	ND	ND	ND
TPH DRO (µg/L)	-	ND	ND	ND
Total TPH (µg/L)	50,000	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
ND = Non detect

SECTION 5

Conclusions and Recommendations

5.1 Conclusions

The potential presence of petroleum hydrocarbons in soil and groundwater at Site 88 was evaluated during this SC investigation. The findings of the SC investigation are as follows:

- The OVM soil screening results indicate negligible concentrations of hydrocarbons or methane in collected soil samples, and the absence of significant soil contamination at the site
- The laboratory analytical results for the soil samples collected during the SC investigation indicate non-detectable levels of TPH, and the absence of significant soil contamination at the site.
- The laboratory analytical results for the groundwater samples collected during the SC investigation indicate non-detectable levels of TPH and BTEX, and the absence of significant groundwater contamination at the site.

5.2 Recommendations

Based on the findings of the SC investigation, CH2M HILL recommends No Further Action (NFA) for Site 88. Because of the absence of hydrocarbons in soil and groundwater at the site, no remediation measures are necessary. Any residual levels of hydrocarbons that may exist at the site are negligible and would be further reduced by natural biodegradation.

APPENDIX A

Soil Boring Logs

CH2MHILL

Site Number	BORING NUMBER	
88	88-SB-02	SHEET 1 OF 1

SOIL BORING LOG

PROJECT : RRNAS Site 88 LOCATION : Roosevelt Roads Naval Air Station, Ceiba PR

ELEVATION : DRILLING CONTRACTOR Geoworks, Inc.

DRILLING METHOD AND EQUIPMENT USED : SS Hand Auger, Sinco 2800 HT with solid stem 3.25" augers

WATER LEVELS : 11.6' START : 02/28/2002 END : 02/28/2002 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: grass Some angular rocks (15%), < 1" diameter. 2.5 Y, olive brown, 4/4 slightly moist clay	0-1 foot OVM = 0.2 ppm
1						
2						
3					2.5 Y light olive brown, 5/4 Some angular rocks (5%) < 2" in diameter.	3-4 foot OVM = 0.2 ppm
4						
5						
6						
7		48%		4-2-2-3	10 YR, 5/4, yellowish brown coarse sand (<3%) moist clay. Some silt, cohesive, very soft. Some angular fragments of rock <1" diam.	7-9' OVM = NM
8						
9						
10						
11					11.6' water	
12		100%		2-3-3-3	SS is saturated. 5Y, 4/2, olive gray, very soft saturated clay.	12-14' OVM = 0.2 ppm
13						
14						
					End of boring at 14 ft bls	
15						
16						
17						
18						
19						
20						

CH2MHILL

Site Number	BORING NUMBER	
88	88-SB-03	SHEET 1 OF 1

SOIL BORING LOG

PROJECT : RRNAS Site 88 LOCATION : Roosevelt Roads Naval Air Station, Ceiba PR

ELEVATION : DRILLING CONTRACTOR Geoworks, Inc.

DRILLING METHOD AND EQUIPMENT USED : SS Hand Auger, Sinco 2800 HT with solid stem 3.25" augers

WATER LEVELS : NA START : 03/01/2002 END : 03/01/2002 LOGGER : HMH

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: grass 7.5 YR, 3/2, dark brown silty medium clay, roots, slightly moist. 1' turning 5/4, yellowish brown, 10 YR, silty medium clay.	0-1 foot OVM = 0.3 ppm
1						
2						
3					Turning dark brown 3/3, 10 YR, silty medium clay	3-4 foot OVM = 0.1 ppm
4						
5						
6						
7		37%		2-2-3-3	10 YR, 4/3, brown soft clay. Some small angular rocks <1" in diam.	7-9' OVM = 1.3 ppm
8						
9						
10						
11						
12		42%		3-3-4-4	First 8" same as above, moist. Last 2" 10 YR, 2/1, black medium clay	12-14' OVM = 1.1 ppm
13						
14						
15						
16						
17		100%		6-13-19-20	Top 2" 10 YR, 4/3, moist clay 19" of very fine mottled silt some clayey content (<3%) 1" of fragmented angular rock <1" in diameter Bottom 2" mottled clayey silt, <3% clay content	17-19' OVM = 0.6 ppm
18						
19						
20					End of boring at 19 ft bls	

CH2MHILL

Site Number	BORING NUMBER	
88	88-SB-04	SHEET 1 OF 1

SOIL BORING LOG

PROJECT : RRNAS Site 88 LOCATION : Roosevelt Roads Naval Air Station, Ceiba PR

ELEVATION : DRILLING CONTRACTOR Geoworks, Inc.

DRILLING METHOD AND EQUIPMENT USED : SS Hand Auger, Sinco 2800 HT with solid stem 3.25" augers

WATER LEVELS : NA START : 03/01/2002 END : 03/01/2002 LOGGER : HMH

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: grass Dark grayish brown, medium clay, 4/2, 10 YR	0-1 foot OVM = 0.1 ppm
1						
2						
3					4/3, 10 YR, brown soft clay, fairly moist with some angular rocks up to 2" in diameter.	3-4 foot OVM = 0.1 ppm
4						
5						
6						
7		38%		3-2-2-3	2.5 Y, 5/4, light olive brown, soft clay with some angular rocks <1" in diameter, moist	7-9' OVM = 0.1 ppm
8						
9						
10						
11						
12		75%		6-12-16-17	Top 2" very moist 10 YR, 4/3, clay 10" very fine mottled dense silt. 4" of angular small rocks mixed with a clayey mottled silt, yellowish brown.	12-14' OVM = NR
13						
14						
					End of boring at 14 feet	
15						
16						
17						
18						
19						
20						

CH2MHILL

Site Number	BORING NUMBER	
88	88-SB-05	SHEET 1 OF 1

SOIL BORING LOG

PROJECT : RRNAS Site 88 LOCATION : Roosevelt Roads Naval Air Station, Ceiba PR

ELEVATION : DRILLING CONTRACTOR Geoworks, Inc.

DRILLING METHOD AND EQUIPMENT USED : SS Hand Auger, Sinco 2800 HT with solid stem 3.25" augers

WATER LEVELS : 7 feet START : 03/01/2002 END : 03/04/2002 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 Large rocks up to 6" in diameter mixed with 10 YR, 3/2, very dark grayish brown clayey silt.	0-1 foot OVM = 0.1 ppm
2					
3				Same as above	3-4 foot OVM = 0.1 ppm
4					
5					
6					
7	0%		4-2-1-3	Zero recovery, but split spoon was saturated	
8					
9					
10					
11					
12					
13					
14					
				End of boring at 14 feet	
15					
16					
17					
18					
19					
20					

CH2MHILL

Site Number	BORING NUMBER	
88	88-SB-06	SHEET 1 OF 1

SOIL BORING LOG

PROJECT : RRNAS Site 88 LOCATION : Roosevelt Roads Naval Air Station, Ceiba PR

ELEVATION : DRILLING CONTRACTOR Geoworks, Inc.

DRILLING METHOD AND EQUIPMENT USED : SS Hand Auger, Mobile Rig with 4.25" ID and 6.25" OD H.S.A.

WATER LEVELS : START : 03/11/2002 END : 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: grass and some asphalt, silt with some subangular to angular rocks up to 4" in diameter.	0-1 foot OVM = NR
1					25% subangular to angular rock fragments, fine silty clay 2.5 Y, 4/2, dark grayish brown	
2						
3					20% subangular, fine to coarse gravel, mostly soft to medium clay with silt. 2.5Y, 4/2, dark grayish brown.	3-4 foot OVM = NR
4						
5						
6						
7		33%		4-18-14-37	Some fine gravel and rock, subangular to angular, silty clay, soft to medium. 2.5Y, 5/3, light olive brown.	
8						
9					Refusal at 9 feet bls.	
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						

CH2MHILL

Site Number	BORING NUMBER	
88	88-SB-07	SHEET 1 OF 2

SOIL BORING LOG

PROJECT : RRNAS Site 88 LOCATION : Roosevelt Roads Naval Air Station, Ceiba PR

ELEVATION : DRILLING CONTRACTOR Geoworks, Inc.

DRILLING METHOD AND EQUIPMENT USED : SS Hand Auger, Mobile Rig with 4.25" ID and 6.25" OD H.S.A.

WATER LEVELS : START : 03/12/2002 END : 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 Fist 7" a mix of asphalt and subbase turning to 2.5Y, 4/2, dark grayish brown silty clay. Some fine to coarse gravel subrounded to angular.	0-1 foot OVM = 0 ppm
1						
2						
3					2.5Y, 4/2, dark grayish brown silty clay. Some fine to coarse gravel subrounded to angular	3-4 foot OVM = 0 ppm
4						
5						
6						
7		58%		5-5-6-6	2.5Y, 2.5/1, black medium clay <2% coarse gravel, subangular.	7-9 foot OVM = 0.7 ppm
8						
9						
10						
11						
12		92%		5-5-8-8		12-14 foot OVM = 0 ppm
13						
14						
15						
16						
17		88%		5-9-12-13	2.5Y, 6/4, light yellowish brown cylayey silt. Mostly silt, slightly moist	17-19 foot OVM = 1.2 ppm
18						
19						
20						

CH2MHILL

Site Number	BORING NUMBER	
88	88-SB-07	SHEET 2 OF 2

SOIL BORING LOG

PROJECT : RRNAS Site 88 LOCATI Roosevelt Roads Naval Air Station, Ceiba PR
ELEVATION : DRILLING CONTRACTC Geoworks, Inc.
DRILLING METHOD AND EQUIPMENT USED : SS Hand Auger, Mobile Rig with 4.25" ID and 6.25" OD H.S.A.
WATER LEVELS : START : 03/12/2002 END : 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.
21					
22	75%		7-15-24-30	2.5Y, 6/4, light yellowish brown cylayey silt. Mostly silt,	22-24 foot OVM = 0 ppm
23					
24					
25					
26					
27	83%		9-12-15-19	2.5Y, 6/4 light yellowish brown clayey silt. Mostly silt, sli	27-29 foot OVM = 0 ppm
28					
29					
30					
31					
				End of boring at 31 ft bls	
32					

CH2MHILL

Site Number	BORING NUMBER	
88	88-SB-08	SHEET 1 OF 1

SOIL BORING LOG

PROJECT : RRNAS Site 88 LOCATION : Roosevelt Roads Naval Air Station, Ceiba PR

ELEVATION : DRILLING CONTRACTOR Geoworks, Inc.

DRILLING METHOD AND EQUIPMENT USED : SS Hand Auger, Mobile Rig with 4.25" ID and 6.25" OD H.S.A.

WATER LEVELS : NA START : 03/13/2002 END : 03/13/2002 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: asphalt and grass , silt with some subangular to angular rocks up to 4" in diameter. 25% subangular to angular rock fragments, fine silty clay 2.5 Y, 4/2, dark grayish brown	0-1 foot OVM = NR
2					
3				20% subangular, fine to coarse gravel, mostly soft to medium clay with silt. 2.5Y, 4/2, dark grayish brown.	3-4 foot OVM = NR
4					
5					
6					
7					
8					
9					
10					
11					
12	38%		3-4-8-15	2.5Y, 4/4, olive brown, slightly moist, medium clay	12-14 foot OVM = 1.2 ppm
13					
14					
15					
				Refusal at 15 ft bls	
16					
17					
18					
19					
20					

CH2MHILL

Site Number	BORING NUMBER	
88	88-SB-09	SHEET 1 OF 2

SOIL BORING LOG

PROJECT : RRNAS Site 88 LOCATION : Roosevelt Roads Naval Air Station, Ceiba PR

ELEVATION : DRILLING CONTRACTOR Geoworks, Inc.

DRILLING METHOD AND EQUIPMENT USED : SS Hand Auger, Mobile Rig with 4.25" ID and 6.25" OD H.S.A.

WATER LEVELS : 28 ft bls START : 03/13/2002 END : 03/13/2002 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-2.5" asphalt mixed with angular to subangular rocks and gravel.	
1						
2						
3					10YR, 4/2, dark grayish brown silty clay. Some rock fragments up to 2" in diameter	3-4 foot OVM = 1.2 ppm
4						
5						
6						
7		75%		5-5-7-9	10 YR, 6/4, slightly moist, light yellowish brown, clayey silt	7-9 foot OVM = 1.5 ppm
8						
9						
10						
11						
12		88%		6-9-12-13	2.5Y, 6/4, light yellowish brown clayey silt	12-14 foot OVM = 1.3 ppm
13						
14						
15						
16						
17		83%		9-18-20-23	Top 12" same as above Bottom 8" Gley 1, 6/1, greenish gray	17-19 foot OVM = 0 ppm
18						
19						
20						

CH2MHILL

Site Number	BORING NUMBER	
88	88-SB-09	SHEET 2 OF 2

SOIL BORING LOG

PROJECT : RRNAS Site 88 LOCATI(Roosevelt Roads Naval Air Station, Ceiba PR

ELEVATION : DRILLING CONTRACTC Geoworks, Inc.

DRILLING METHOD AND EQUIPMENT USED : SS Hand Auger, Mobile Rig with 4.25" ID and 6.25" OD H.S.A.

WATER LEVELS : 28 ft bls START : 03/13/2002 END : 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.
	21					
	22	92%		8-9-14-14	5Y, 6/2, light olive gray, slightly moist, clayey silt, mostl	22-24 foot OVM = 0 ppm
	23					
	24					
	25					
	26					
	27	96%		7-15-40-50	2.5Y, 6/4 light yellowish brown clayey silt. Mostly silt, sil	27-29 foot OVM = 0 ppm
	28				1" thick layer of dense light olive gray silty clay.	
	29					
	30					
	31					
	32					
					End of boring at 32 ft bls	

APPENDIX B

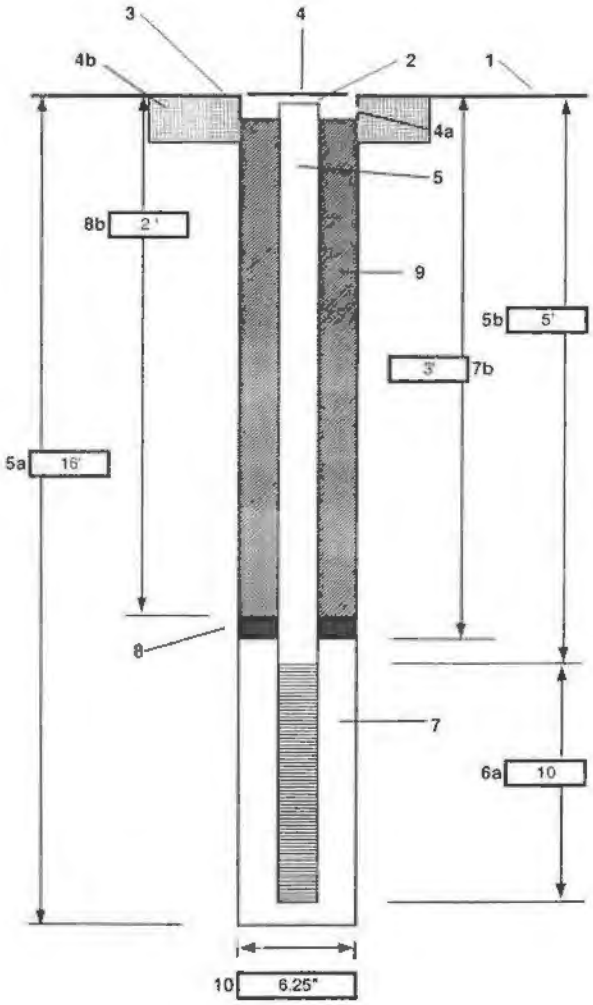
Monitoring Well Completion Diagrams

CH2MHILL

SITE	WELL ID
88	88-MW-01

WELL COMPLETION DIAGRAM-FLUSH MOUNT

LOCATION : Site 88, 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: 03/01/2002 DRILLING END DATE: 03/05/2002 LOGGER: Hector M. Hernandez, Erik Isen



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	0.43 ft^3
10- OD of auger	6.25 inches
Development method	Disposable Teflon baller Geopump
Development time	18 minutes
Estimated purge volume	4 gallons

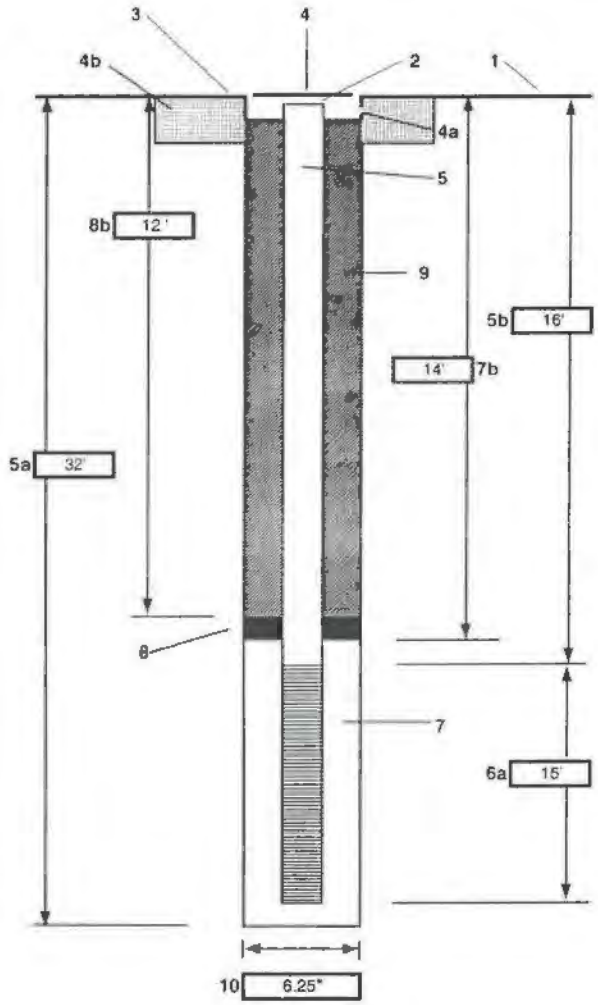
Comments

CH2MHILL

SITE	WELL ID
88	88-MW-02

WELL COMPLETION DIAGRAM-FLUSH MOUNT

LOCATION : Site 88, 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: DRILLING END DATE: 03/14/2002 LOGGER: Hector M. Hernandez, Erik Iseri



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	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	15 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	2.55 ft^3
10- OD of auger	6.25 inches
Development method	Disposable Teflon bailer Geopump
Development time	24 minutes
Estimated purge volume	6 gallons

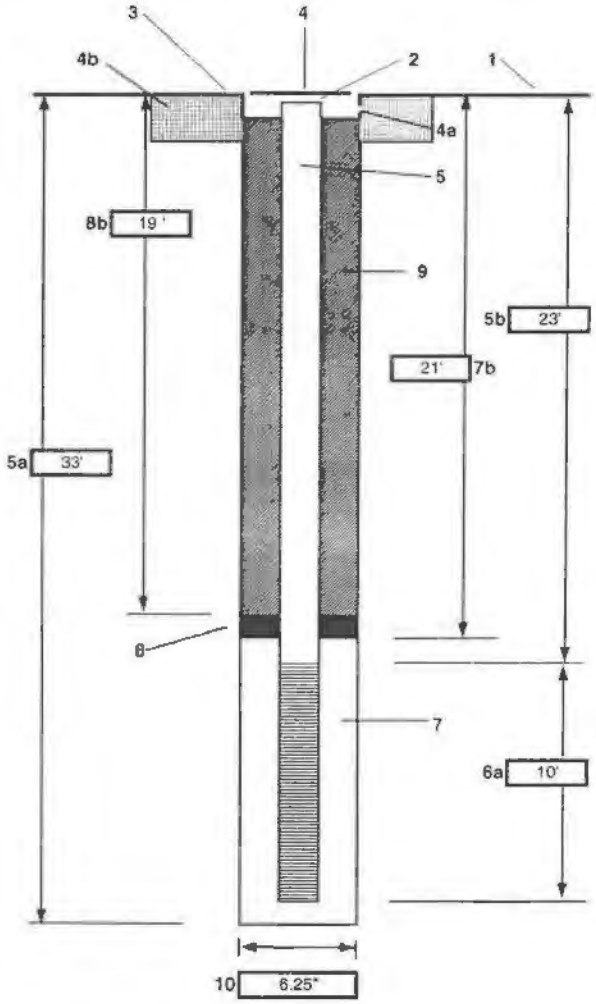
Comments

CH2MHILL

SITE	WELL ID
88	88-MW-03

WELL COMPLETION DIAGRAM-FLUSH MOUNT

LOCATION : Site 88, 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: DRILLING END DATE: 03/14/2002 LOGGER: Hector M. Hernandez, Erik Isen



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	33 feet
b) Length of casing (less screen)	23 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)	23 feet bls
8- Type of seal	Hole plug chips
a) Quantity used	2 feet (unhydrated)
b) Depth to top of seal (bls)	8 feet
9- Grout	
a) Grout mix used	Portland Cement
b) Method of placement	Pour
c) Vol. of well casing grout	4 ft^3
10- OD of auger	6.25 inches
Development method	Disposable Teflon bailer Geopump
Development time	27 minutes
Estimated purge volume	4 gallons

Comments

APPENDIX C

Monitoring Well Development Logs

PROJECT NUMBER	WELL NUMBER	DATE
167722.FI.FQ	88-MW-01	03/07/2002

WELL DEVELOPMENT LOG

PROJECT : RRNAS Site 88 LOCATION : Roosevelt Roads NAS, Puerto Rico
DEVELOPMENT CONTRACTOR : CH2M Hill
DEVELOPMENT METHOD AND EQUIPMENT USED : Disposable Teflon Bailer to remove sediment and Goepump for development
TOTAL DEPTH: 15.07 START WATER LEVELS : 7.01 START : 03/07/2002 END : 03/07/2002 LOGGER: Erik Isem

MAXIMUM DRAWDOWN DURING PUMPING: 0.37 feet
RANGE AND AVERAGE DISCHARGE RATE: 0.25 gallons per minute with Geopump
TOTAL QUANTITY OF WATER DISCHARGED: Approximately 15 gallons with disposable bailer and 19.5 gallons with Geopump
DISPOSITION OF DISCHARGE WATER: Water started milky tan color, very fine sediments (sand), turning clear, no odor.

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
14:54	1.5	7.23	999+	27.83	7.19	2.72	16.06	0.1	106	Milky tan few very fine sand
15:00	3	7.26	272	27.42	7.14	2.67	10.51	0.1	-42	
15:06	4.5	7.26	314	27.38	7.13	2.65	8.98	0.1	-79	
15:12	6	7.27	334	27.40	7.15	2.63	10.38	0.1	-86	
15:18	7.5	7.29	282	27.38	7.13	2.63	9.85	0.1	-88	turning clear
	Surge and bail well screen									Begin surging well screen
	Surge and bail well screen									End surging well screen
15:43	7.5	7.31	999+	27.42	7.09	2.65	8.7	0.1	32	Murky, light tan, no odor
15:49	9	7.32	999+	27.47	7.11	2.63	10.69	0.1	47	
15:55	10.5	7.33	478	27.35	7.11	2.61	7.41	0.1	29	
16:01	12	7.33	347	27.38	7.13	2.59	8.25	0.1	106	
16:07	13.5	7.35	270	27.31	7.12	2.58	8.07	0.1	-25	
	Surge and bail well screen									Begin surging well screen
	Surge and bail well screen									End surging well screen
16:30	13.5	7.35	999+	27.50	7.07	2.67	7.14	0.1	50	
16:36	15	7.36	999+	27.35	7.10	2.62	5.48	0.1	50	
16:42	16.5	7.36	580	27.34	7.11	2.58	5.22	0.1	39	
16:48	18	7.37	330	27.38	7.13	2.57	4.67	0.1	3	
16:53	19.5	7.38	299	27.36	7.13	2.55	4.67	0.1	-9	
										End of Development

1:59

PROJECT NUMBER	WELL NUMBER	DATE
167722.FI.FQ	88-MW-02	03/15/2002

WELL DEVELOPMENT LOG

PROJECT : RRNAS Site 88 LOCATION : Roosevelt Roads NAS, Puerto Rico
DEVELOPMENT CONTRACTOR : CH2M Hill
DEVELOPMENT METHOD AND EQUIPMENT USED : Disposable Teflon Bailer to remove sediment and Goepump for development
TOTAL DEPTH: 32.74 START WATER LEVELS : 24.54 START : 03/15/2002 END : 03/15/2002 LOGGER: Erik Isern

3

MAXIMUM DRAWDOWN DURING PUMPING: 0.82 feet
RANGE AND AVERAGE DISCHARGE RATE: Used disposable Teflon Bailer and surge block
TOTAL QUANTITY OF WATER DISCHARGED: Approximately 27 gallons with disposable bailer
DISPOSITION OF DISCHARGE WATER:

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
13:36	9	24.12	999+	34.00	7.31	2.59	3.64	0.1	-18	
13:40	10.25	25.15	999+	32.86	7.27	2.53	2.83	0.1	-20	
13:45	12	25.02	999+	32.08	7.25	2.56	2.69	0.1	-37	
13:49	13.25	25.28	999+	31.88	7.25	2.54	2.56	0.1	-45	
13:52	14.75	25.20	999+	31.48	7.3	2.54	3.26	0.1	-14	
13:56	16	25.36	999+	30.90	7.27	2.54	2.54	0.1	-15	
14:10	Surge and bail well screen									Begin surging well screen
	Surge and bail well screen									End surging well screen
14:11	16	24.66	999+	32.02	7.25	2.7	3.54	0.1	-54	
14:16	17.3	25.30	999+	31.18	7.27	2.6	3.14	0.1	-49	
14:20	18.6	25.25	999+	31.04	7.31	2.59	3.82	0.1	-13	
14:24	19.9	25.24	999+	31.05	7.27	2.5	2.77	0.1	-13	
14:28	21.2	25.20	999+	30.56	7.30	2.57	3.02	0.1	-10	
14:35	Surge and bail well screen									Begin surging well screen
	Surge and bail well screen									End surging well screen
14:38	21.2	24.68	999+	31.06	7.5	2.61	5.32	0.1	7	
14:43	22.5	25.20	999+	30.88	7.37	2.59	4.57	0.1	12	
14:47	23.8	25.20	999+	30.87	7.32	2.55	3.30	0.1	4	
14:50	25.1	25.35	999+	30.71	7.33	2.49	3.42	0.1	9	
14:54	26.4	25.27	999+	30.45	7.28	2.60	2.83	0.1	-18	
										End of Development

1:18

PROJECT NUMBER	WELL NUMBER	DATE
167722.FI.FQ	88-MW-03	03/15/2002

WELL DEVELOPMENT LOG

PROJECT : RRNAS Site 88 LOCATION : Roosevelt Roads NAS, Puerto Rico
DEVELOPMENT CONTRACTOR : CH2M Hill
DEVELOPMENT METHOD AND EQUIPMENT USED : Disposable Teflon Bailer to remove sediment and Goepump for development
TOTAL DEPTH: 18.21 START WATER LEVELS : 11.14 START : 03/15/2002 END : 03/15/2002 LOGGER: Erik Isem

MAXIMUM DRAWDOWN DURING PUMPING: 0.82 feet
RANGE AND AVERAGE DISCHARGE RATE: Used disposable Teflon Bailer and surge block
TOTAL QUANTITY OF WATER DISCHARGED: Approximately 42 gallons with disposable bailer
DISPOSITION OF DISCHARGE WATER: Minute silt particles in the well. Well did not clear up

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
15:12	26	19.05	999+	30.32	7.58	2.10	5.52	0.1	50	
15:19	28	20.45	999+	29.89	7.48	2.11	4.85	0.1	47	
15:26	30	20.85	999+	29.56	7.46	2.12	4.04	0.1	42	
15:31	32	21.08	999+	29.23	7.38	2.08	3.28	0.1	39	
15:36	34	21.30	999+	29.04	7.42	2.13	3.36	0.1	43	
15:40	Surge and bail well screen									Begin surging well screen
	Surge and bail well screen									End surging well screen
15:55	34	19.11	999+	29.21	7.61	2.16	6.26	0.1	41	
15:57	36	20.50	999+	29.34	7.46	2.13	4.7	0.1	53	
16:00	38	21.37	999+	29.05	7.40	2.12	3.29	0.1	54	
16:05	40	21.85	999+	28.92	7.37	2.08	3.65	0.1	60	
16:10	42	21.90	999+	28.89	7.37	2.13	2.83	0.1	51	
										End of Development well did not clear up

0:58

APPENDIX D

Monitoring Well Sampling Logs

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 88	Measuring Point Elevation	
Job Number	167722.FI.FQ	Height of Riser (above land surface)	0"
Well ID #	88-MW-01	Land Surface Elevation	
Weather Conditions		Screened Interval	
Air Temperature		Dedicated Pump of Bailer	Dedicated Teflon tubing
Total Well Depth (TWD)	15.22	Steel Guard Pipe Around Casing	no
Depth to Groundwater (DGW)	7.27	Locking Cap	yes
Length of Water Column (LWC) = TWD - DGW =	7.95	Protective Post/Abutment	8" steel well cover
1 Casing Volume = LWC x	0.163	Well Integrity Satisfactory	yes
Standard Evacuation Volume =	1.30	Well Yield	moderate
Method of Well Evacuation	Geopump through Teflon tubing	Comments/Observations:	
Method of Sample Collection	Geopump through Teflon tubing	Water: Turbid yellowish brown at start. Turned tapwater clear	
Total Volume of Water Removed (gallons)	6.5 gallons	between second and third readings.	

Field Parameters

Volume Purged (gallons)	Start	1	2	3	4	5				
Pumping Rate (gpm)	0.22	0.22	0.22	0.22	0.22	0.22				
Time (military)	7:28	7:34	7:40	7:46	7:52	7:58				
pH	7.10	7.11	7.09	7.08	7.07	7.08				
Specific Conductivity (mS/cm)	3.02	2.87	2.75	2.64	2.67	2.66				
Temperature (°C)	28	27.8	27.8	27.8	27.8	27.8				
Turbidity (NTU)	313	323	147	103	122	80.3				
Dissolved Oxygen (mg/L)	11.24	9.28	8.30	7.50	7.18	6.99				
ORP	172	9	-22	-27	-29	-30				
Salinity	0.1	0.1	0.1	0.1	0.1	0.1				
DTW (ft btoc)	7.27	7.33	7.34	7.35	7.36	7.37				

Additional Comments/Observations

Sample ID ILA019

Sample Time: 12:08

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

Date (mm/dd/yy)	03/16/2002	Casing Diameter	2"
Field Personnel	Hector M. Hernandez, Erik Isern	Casing Material	PVC
Site Name	RRNAS Site 88	Measuring Point Elevation	
Job Number	167722.FI.FQ	Height of Riser (above land surface)	0"
Well ID #	88-MW-02	Land Surface Elevation	
Weather Conditions	Sunny, humid	Screened Interval	
Air Temperature	Mid 80's F	Dedicated Pump of Bailer	Dedicated Teflon tubing
Total Well Depth (TWD)	30.86	Steel Guard Pipe Around Casing	no
Depth to Groundwater (DGW)	18.25	Locking Cap	yes
Length of Water Column (LWC) = TWD - DGW =	12.61	Protective Post/Abutment	8" steel well cover
1 Casing Volume = LWC x	0.163	Well Integrity Satisfactory	yes
Standard Evacuation Volume =	2.06	Well Yield	moderate
Method of Well Evacuation	Geopump through Teflon tubing	Comments/Observations:	
Method of Sample Collection	Geopump through Teflon tubing	Water: Highly turbid at start. Clearing up tapwater clear at 14:38	
Total Volume of Water Removed (gallons)	6.35 gallons		

Field Parameters

Volume Purged (gallons)	Start	1	2	3	4	5				
Pumping Rate (gpm)	0.26	0.26	0.21	0.16	0.15	0.17				
Time (military)	14:07	14:15	14:25	14:38	14:52	15:04				
pH	7.13	7.14	7.15	7.18	7.17	7.18				
Specific Conductivity (mS/cm)	1.79	1.74	1.71	1.73	1.75	1.88				
Temperature (°C)	30.0	29.8	29.7	29.7	29.7	29.6				
Turbidity (NTU)	956	232	146	69.5	76.3	33.6				
Dissolved Oxygen (mg/L)	6.86	4.84	4.44	3.97	3.68	3.42				
ORP	176	151	133	115	102	96				
Salinity	0.1	0.1	0.1	0.1	0.1	0.1				
DTW (ft btoc)	18.25	19.12	19.18	19.19	19.13	19.13				

Additional Comments/Observations

Sample ID ILA029

Sample Time: 15:05

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

Date (mm/dd/yy)	03/16/2002	Casing Diameter	2"
Field Personnel	Hector M. Hernandez, Erik Isern	Casing Material	PVC
Site Name	RRNAS Site 88	Measuring Point Elevation	
Job Number	167722.FI.FQ	Height of Riser (above land surface)	0"
Well ID #	88-MW-03	Land Surface Elevation	
Weather Conditions	Sunny, humid	Screened Interval	
Air Temperature	Mid 80's F	Dedicated Pump of Bailer	Dedicated Teflon tubing
Total Well Depth (TWD)	32.40	Steel Guard Pipe Around Casing	no
Depth to Groundwater (DGW)	24.6	Locking Cap	yes
Length of Water Column (LWC) = TWD - DGW =	7.80	Protective Post/Abutment	8" steel well cover
1 Casing Volume = LWC x	0.163	Well Integrity Satisfactory	yes
Standard Evacuation Volume =	1.27	Well Yield	moderate
Method of Well Evacuation	Geopump through Teflon tubing	Comments/Observations:	
Method of Sample Collection	Geopump through Teflon tubing	Water:Turbid at start, cleared up.	
Total Volume of Water Removed (gallons)	6.35 gallons		

Field Parameters

Volume Purged (gallons)	Start	1	2	3	4	5				
Pumping Rate (gpm)	0.14	0.14	0.12	0.13	0.13	0.13				
Time (military)	14:03	14:12	14:23	14:33	14:43	14:53				
pH	7.14	7.10	7.14	7.151	7.16	7.16				
Specific Conductivity (mS/cm)	2.25	2.41	2.35	2.38	2.33	3.82				
Temperature (°C)	35.73	32.48	31.90	31.90	32.03	32.05				
Turbidity (NTU)	470	73.1	21.6	10.9	12.4	11.6				
Dissolved Oxygen (mg/L)	1.16	0.75	0.67	0.58	0.54	0.54				
ORP	101	-10	46	-34	-41	-51				
Salinity	0.1	0.1	0.1	0.1	0.1	0.2				
DTW (ft btoc)	24.60	24.90	24.89	24.88	24.88	24.88				

Additional Comments/Observations

Sample ID ILA030

Sample Time: 14:57

APPENDIX E

Laboratory Chain of Custody Forms and Analytical Data

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.FS Project Manager: TUNCH ORSOY

Date: MARCH 2, 2002 Page 1 of 1
LAB Project #: 02I0302CH2M Control#: 2051
Location: RRNAS SITE 88
Collector: HMH EI Date of Collection: 2/26/28

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
ILA001	0-1	1018	SOIL	2oz JAR	C								X													88-SB-01-(0-1)	1
ILA002	3-4	1043	SOIL	2oz JAR	C								X													88-SB-01-(3-4)	1
ILA003	0-1	1432	SOIL	2oz JAR	C								X													88-SB-02-(0-1)	1
ILA004	7-9	1514	SOIL	2oz JAR	C								X													88-SB-02-(7-9)	1
ILA005	NA	1558	GW	40mL	G		X						X													88-SB-02	2
ILA006TB1	NA		QC	40mL			X																			TRIP BLANK	
ILA007EB1	NA		QC	40mL			X						X													EQUIP BLANK	

RELINQUISHED BY (signature)	Date/Time	RECEIVED BY (signature)	Date/Time
[signature]	MARCH 2, 2002	[signature]	3/2/02 9:00 AM
RELINQUISHED BY (signature)	Date/Time	RECEIVED BY (signature)	Date/Time

Total # of containers: 10
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.FS Project Manager: TUNCH ONSOY

Date: MARCH 4, 2002 Page 1 of 1
LAB Project #: 02J0304CH2M Control#: 2052
Location: RRNAS SITE 88 2/28/02
Collector: MMH, EC Date of Collection: 3/1 & 4/02

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
ILA008	7-9	0929	SOIL	2oz JAR									X													88-SB-03-(7-9)	1
ILA009	12-14	0945	SOIL	2oz JAR									X													88-SB-03-(12-14)	1
ILA010	7-9	1332	SOIL	2oz JAR									X													88-SB-04-(7-9)	1
ILA011	12-14	1402	SOIL	2oz JAR									X													88-SB-04-(12-14)	1
ILA012	0-1	1600	SOIL	2oz JAR									X													88-SB-05-(0-1)	1
ILA013	3-4	1620	SOIL	2oz JAR									X													88-SB-05-(3-4)	1
ILA014	NA	1325	GW	40mL			X						X													88-SB-05	2
ILA015TB2	NA	1655	QC	40mL			X						~~X~~ HMH													TRIP BLANK 2	2
ILA016EB2	NA	1701	QC	40mL			X						X													EQUIP BLANK 2	2

RELINQUISHED BY (signature)	Date/Time	RECEIVED BY (signature)	Date/Time
[signature]	MARCH 4, 02 1810	[signature]	3/4/02 1810
RELINQUISHED BY (signature)	Date/Time	RECEIVED BY (signature)	Date/Time

Total # of containers: 1 | 2
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 WEST CYPRESS SUITE 600
Phone: 813-874-6522 FAX: 813 874 3056
Client Project #: 167122.FI.FS Project Manager: TUNCIT ORSB

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		QUICK NEW	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
JLA02CFD3	NA	NA	SOIL	2oz									X													FIELD DUPE	1
JLA027 EB3	—	1315	QC	40mL			X						X													EQUIP BLANK ~~FIELD DUPE~~	2
JLA028 TB3	—	1333	QC	40mL			X																			TRIP BLANK	2
ILA017	3-4	0854	SOIL	2oz									X													88 SB06 3-4	1
ILA018	7-9	0939	SOIL	2oz									X													88 SB06 7-9	1
ILA019	—	1208	GW	40mL			X						X													88 MW 01	3

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

Chain of Custody Record

PO # _____

Client: CH2M HILL TAMPA
Address: 4350 WEST CYPRESS SUITE 600
Phone: 813-874-6522 FAX: 813-874-3056
Client Project #: 167722 FLFS Project Manager: TURNER ORSOY

Date: 3/14/02 Page 1 of 1
LAB Project #: 02ID314CH2M Control#: _____
Location: SITES 88 & 1970
Collector: HMH, EI Date of Collection: 3/12/13/14/02

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		Quick Turn	FIELD NOTES / PRESERVATION	Total # of Containers
JUA029	NA	1550	GW	40mL	G		X						X													SITE 1970 MW-1	3
JCA030	NA	1627	GW	40mL	G		X						X													SITE 1970 MW-2	3
ILA020	7-9	1659	SOIL	2oz	C								X												X	88-SB07-	1
ILA021	27-29	0848	SOIL	2oz	C								X												X	88-SB07-	1
ILA022	7-9	1457	SOIL	2oz	C								X												X	88-SB09-	1
ILA023	12-14	1315	SOIL	2oz	C								X												X	88-SB09-	1
ILA024	NA	0835	GW	40mL	G		X						X												X	88-SB07	3
ILA025	NA	0840	GW	40mL	G		X						X												X	88-SB09	3
ILA026	NA	NA	SOIL	2oz	C								X												X	FIELD DUPE	1
JLA031	NA	0925	QC	40mL	G		X						X													EQUIP BLANK	3
ILA027	NA	0928	QC	40mL	G		X						X													EQUIP BLANK	3
ILA028	NA	NA	QC	4mL	G		X																			TRIP BLANK (LAB PROVIDED)	2

RELINQUISHED BY (signature): [signature] Date/Time: 3/14/02 1700
RECEIVED BY (signature): K Shelburne Date/Time: 3/14/02 17:00
RELINQUISHED BY (signature): Date/Time:
RECEIVED BY (signature): Date/Time:

Total # of containers	25	TEMPERATURE
Chain of Custody seals Y / N / NA	—	
Seals Intact? Y / N / NA	—	
Received good conditions (cold)	YES	

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

On Site Labs, Inc.

Chain of Custody Record

PO # _____

Client: CH2M HILL TAMPA

Address: 4350 WEST CYPRESS ST SUITE 600

Phone: 813-874-6522 FAX: 813-874-3056

Client Project #: 167722.FI.FQ Project Manager: TIMMACH ORSOY

Date: MARCH 18, 2002 Page 1 of 1

LAB Project #: 02I0318CH2M-3 Control#: 2065

Location: RRNAS SITES 1970 & 88

Collector: NMN EI. Date of Collection: 3/16/02

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
ILA029		1505	GW	40ml			X						X													88 MW 02	3
ILA030		1457	GW	40ml			X						X													88 MW 03	3
JLA032		1029	GW	40ml			X						X													1970 MW 03	3

RELINQUISHED BY (signature)	Date/Time	RECEIVED BY (signature)	Date/Time
[signature]	MARCH 18 2002 1150	[signature]	3/18/02 1:30
RELINQUISHED BY (signature)	Date/Time	RECEIVED BY (signature)	Date/Time

Total # of containers	09	TEMPERATURE
Chain of Custody seals Y / N / NA	—	iced
Seals Intact? Y / N / NA	—	
Received good conditions / Cold	YES	

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 88
CEIBA, P.R.

TEG Project #02I0302CH2M

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	03/04/02	ND	ND
ILA001	03/04/02	ND	ND
ILA002	03/04/02	ND	ND
ILA003	03/04/02	ND	ND
ILA004	03/04/02	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	03/04/02	ND	ND
ILA005	03/04/02	ND	ND
ILA007 EB1	03/04/02	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 SITE 88
CEIBA, P.R.

TEG Project #02I0302CH2M

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	03/04/02	ND	ND	ND	ND
ILA005	03/04/02	ND	ND	ND	ND
ILA006 TB1	03/04/02	ND	3.2	ND	ND
ILA007 EB1	03/04/02	ND	2.6	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

Kevin Shelburne
Principal

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CH2M HILL PROJECT NO. 167722.FI.FS
RRNAS SITE 88
CEIBA, P.R.

OSL Project #02I0304CH2M

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	03/05/02	ND	ND
ILA008	03/05/02	ND	ND
ILA009	03/05/02	ND	ND
ILA010	03/05/02	ND	ND
ILA011	03/05/02	ND	ND
ILA012	03/05/02	ND	ND
ILA013	03/05/02	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	03/05/02	ND	ND
ILA014	03/05/02	ND	ND
ILA016 EB2	03/05/02	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 SITE 88
CEIBA, P.R.

OSL Project #02I0304CH2M

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	03/05/02	ND	ND	ND	ND
ILA014	03/05/02	ND	ND	ND	ND
ILA015 TB2	03/05/02	ND	3.1	ND	ND
ILA016 EB2	03/05/02	ND	2.3	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

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

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

OSL Project #02I0314CH2M

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	03/19/02	ND	ND
ILA020	03/19/02	ND	ND
ILA021	03/19/02	ND	ND
ILA022	03/19/02	ND	ND
ILA023	03/19/02	ND	ND
ILA026	03/19/02	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	03/19/02	ND	ND
ILA024	03/19/02	ND	ND
ILA025	03/19/02	ND	ND
ILA027	03/19/02	ND	ND
JLA029	03/19/02	ND	ND
JLA030	03/19/02	ND	ND
JLA031	03/19/02	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 1970
CEIBA, P.R.

OSL Project #02I0314CH2M

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	03/19/02	ND	ND	ND	ND
ILA024	03/19/02	ND	ND	ND	ND
ILA025	03/19/02	ND	ND	ND	ND
ILA027	03/19/02	ND	ND	ND	ND
ILA028	03/19/02	ND	ND	ND	ND
JLA029	03/19/02	ND	ND	ND	ND
JLA030	03/19/02	ND	ND	ND	ND
JLA031	03/19/02	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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CH2M HILL PROJECT NO. 167722.FI.FQ
RRNAS SITES 1970 AND 88
CEIBA, P.R.

OSL Project #02I0318CH2M-3

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	03/21/02	ND	ND
ILA029	03/21/02	ND	ND
ILA030	03/21/02	ND	ND
JLA032	03/21/02	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.FQ
RRNAS SITES 1970 AND 88
CEIBA, P.R.

OSL Project #02I0318CH2M-3

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	03/21/02	ND	ND	ND	ND
ILA029	03/21/02	ND	ND	ND	ND
ILA030	03/21/02	ND	ND	ND	ND
JLA032	03/21/02	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
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Kevin Shelburne
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March 20, 2002
OSL Projects #02I0314CH2M

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 1970 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:

- 5 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.
- 2 equipment blank water samples analyzed for TPH-gas/diesel.
- 4 water samples analyzed for BTEX by modified EPA test method 8020A.
- 1 trip and 2 equipment blank water samples 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 #02I0314CH2M
DAILY CALIBRATION DATE: 03/19/02

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

			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%	220.67	0.28	7.8%	231.71	0.29	13.1%
TPH GASOLINE	FID #3 (gc5)	10 - 30,000	0.36	15.0%	249.90	0.31	13.7%	261.74	0.33	9.6%
TPH GASOLINE	FID #4 (gc5)	10 - 30,000	0.31	15.4%	243.04	0.30	0.7%	229.66	0.29	6.2%
TPH DIESEL	FID #2 (gc5)	25 - 20,000	0.69	14.1%	1099.53	0.69	1.0%	1114.15	0.70	0.3%
TPH DIESEL	FID #3 (gc5)	25 - 20,000	0.74	13.6%	1088.22	0.68	8.0%	1085.39	0.68	8.2%
TPH DIESEL	FID #4 (gc5)	25 - 20,000	0.61	11.1%	907.99	0.57	6.4%	1036.36	0.65	6.9%

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

QA/QC REPORT - MS/MSD DATA

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

OSL Project #02I0314CH2M
DATE: 03/19/02

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

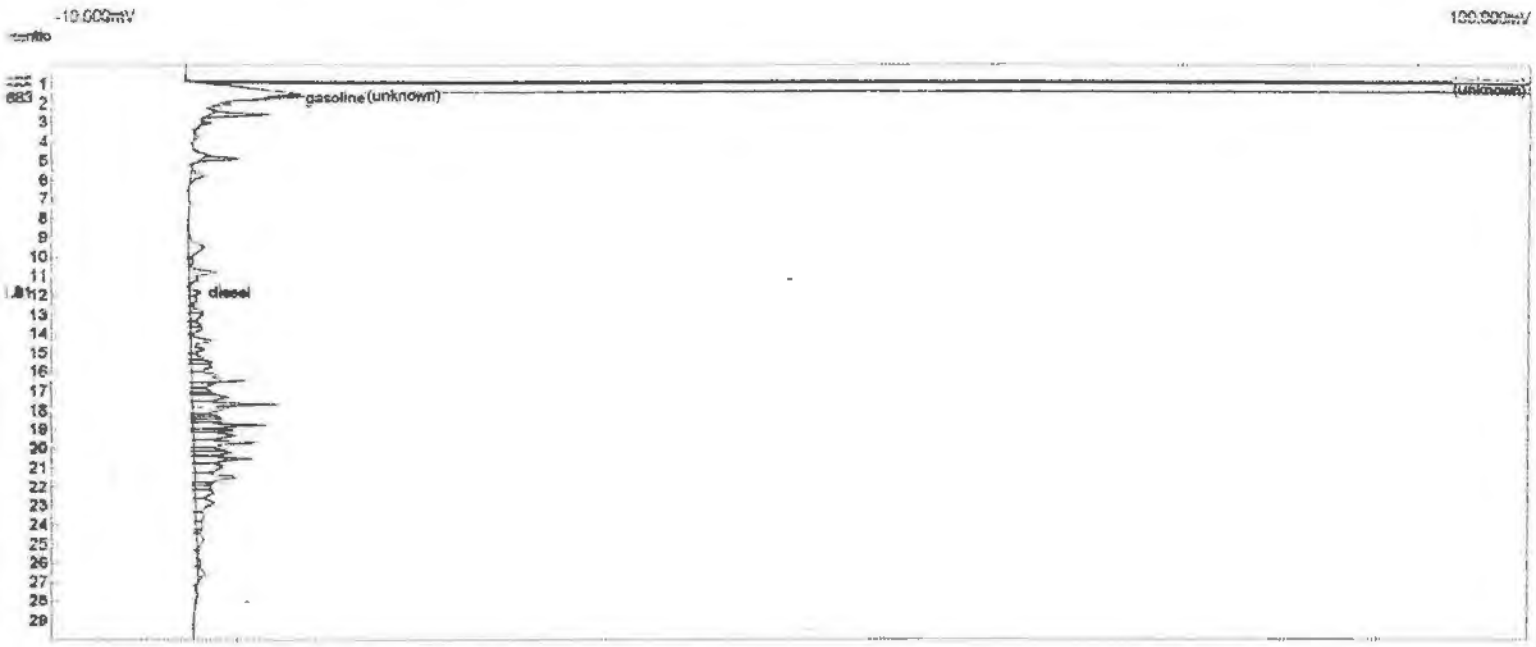
COMPOUND	SPK CON (ppm)	MS CONC (ppm)	%REC MS	MSD CONC (ppm)	%REC MSD	RPD	ACCEPTABLE RPD	ACCEPTABLE RECOVERY
TPH-GASOLINE	200	178	89%	177	89%	1%	15%	81% - 126%
TPH-DIESEL	400	410	103%	400	100%	2%	15%	74% - 131%

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

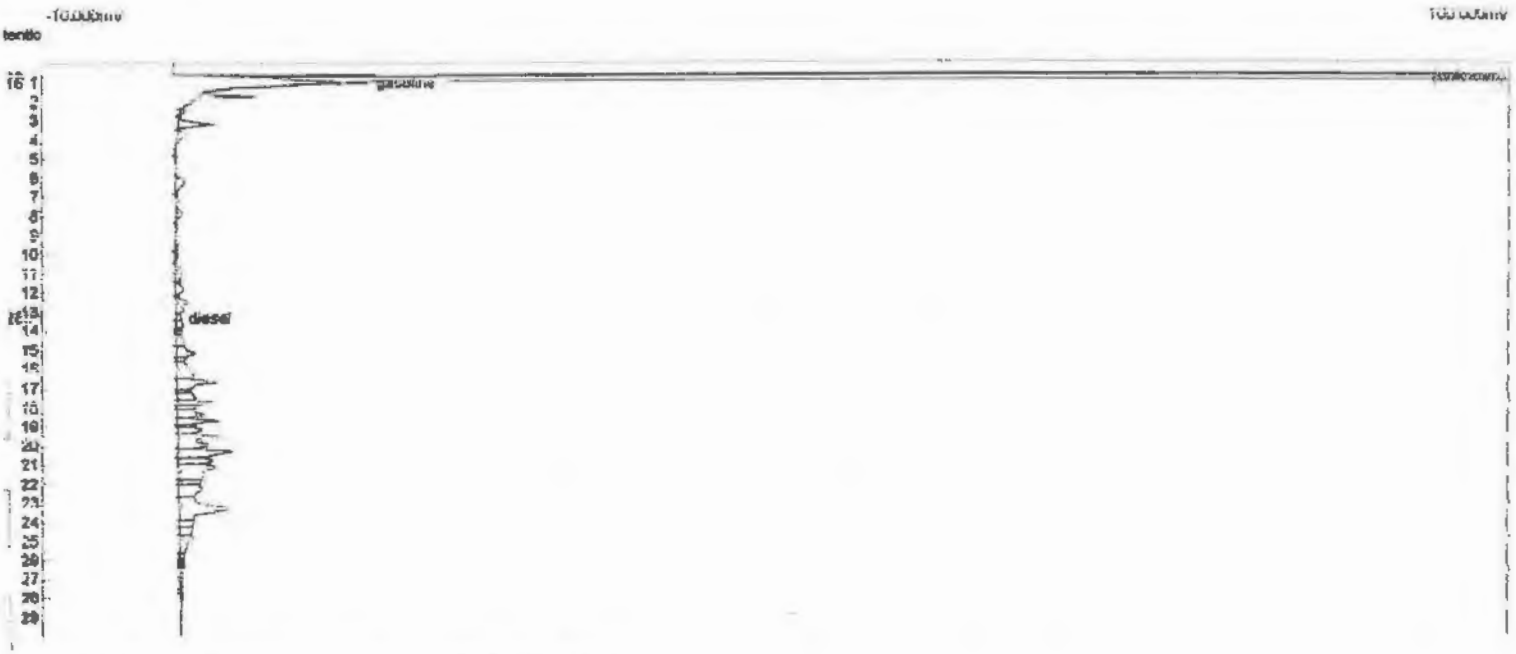
ON SITE LABS, INC
PMB 627, HC-01 BOX 29030, CAGUAS, P.R. 00725
TELEPHONE (787) 720-0329 FAX 789-3858

Lab name: On Site Labs Inc
Analysis date: 03/19/2002 11:25:49
Method: EPA 8015B mod.
Lab ID: GC - 5
Description: FID2 - Ch. 2
Column: XTI-5, 30m, 0.53mm, 1.5um
Carrier: N2
Data file: 0319fb1.CHR ()
Sample: 200/400 ppm G/D open
Operator: MAP



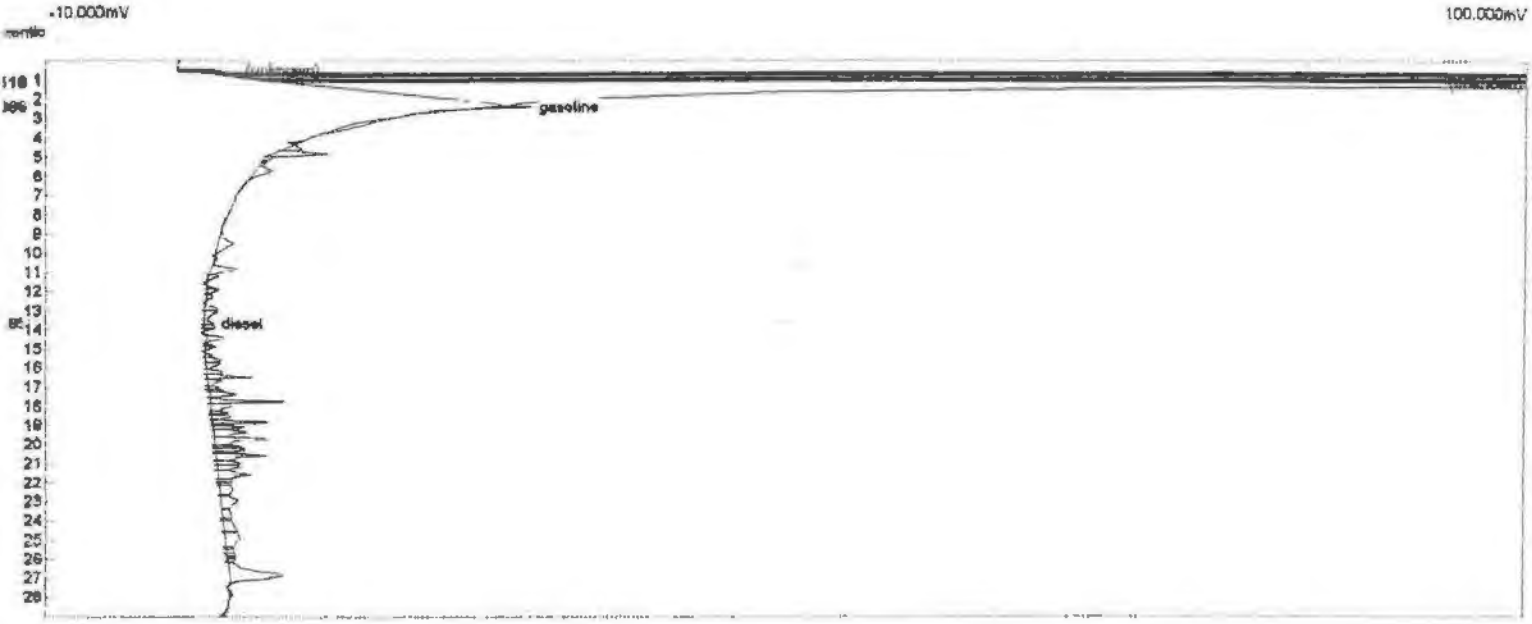
Component	Retention	Area	External	Units
asoline	1.683	220.673	215.50	
iesel	11.616	1099.529	396.08	ppm
		1320.202	611.58	

Lab name: On Site Labs Inc
nalysis date: 03/19/2002 11:25:49
Method: EPA 8015B mod.
Lab ID: GC - 5
Description: FID 3 - Ch. 3
Column: XTI-5, 30m, 0.53mm, 1.5um
Carrier: N2
D[illegible]le: 0319fc1.CHR ()
[illegible]le: 200/400 ppm G/D open
[illegible]tion: MAP



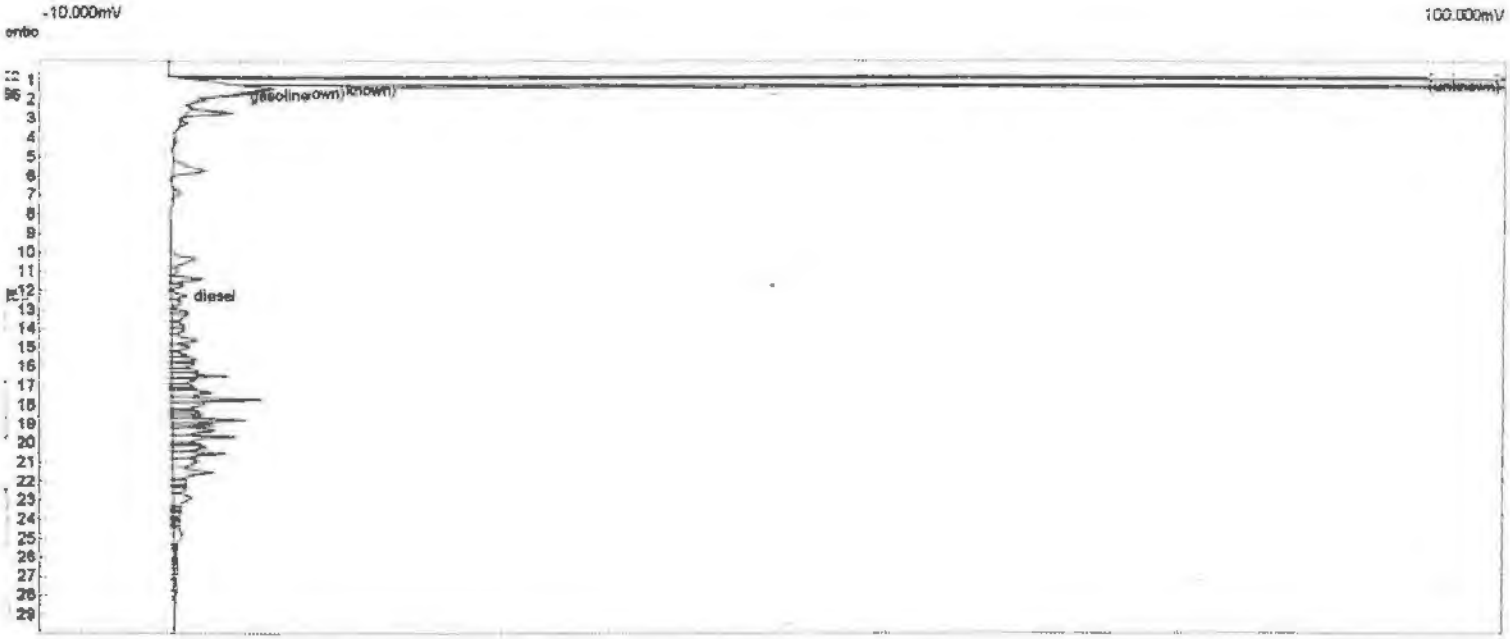
Component	Retention	Area	External	Units
[illegible]	1.016	249.895	172.58	
[illegible]	15.283	1088.223	368.14	ppm
		1338.117	540.72	

Lab name: On Site Labs Inc
Analysis date: 03/19/2002 11:25:49
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: 0319fd1.CHR ()
Sample: 200/400 ppm G/D open
Operator: MAP



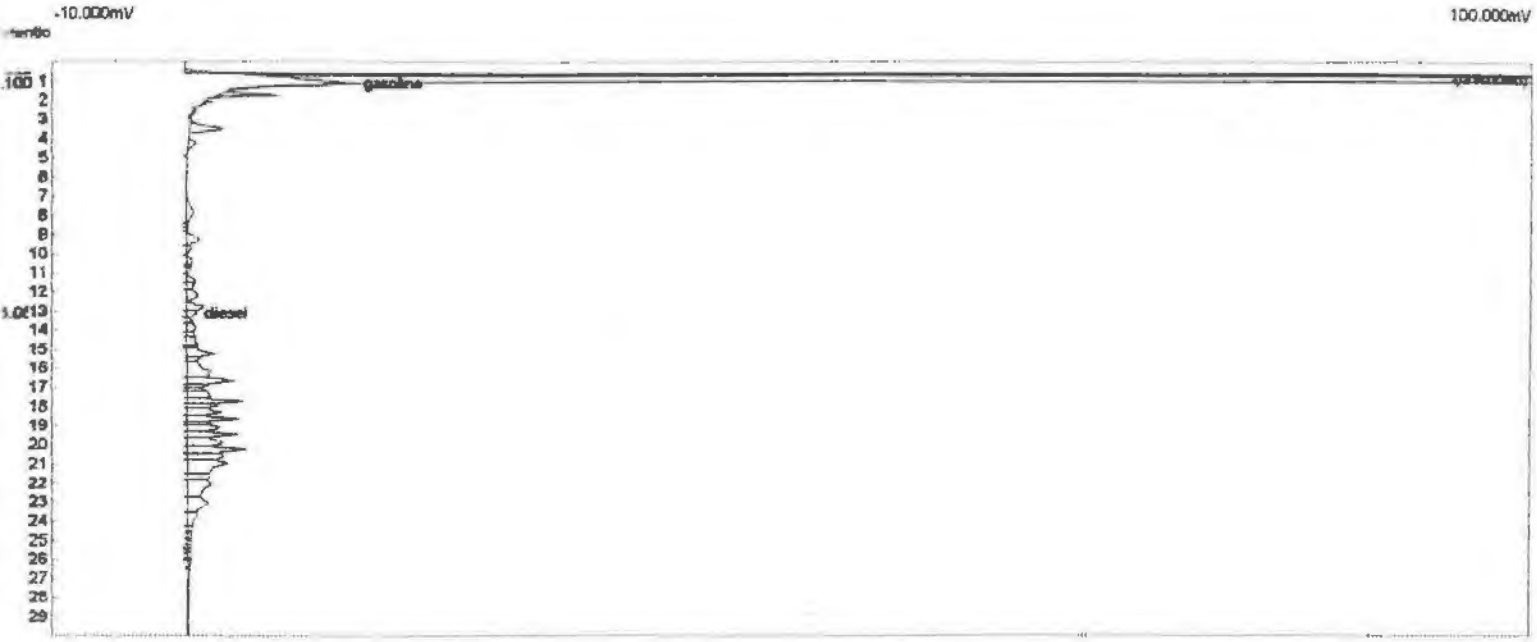
Component	Retention	Area	External	Units
isoline	2.366	243.035	198.56	
esel	13.650	907.990	374.58	ppm
		1151.024	573.14	

Lab name: On Site Labs Inc
Analysis date: 03/19/2002 16:58:03
Method: EPA 8015B mod.
Lab ID: GC - 5
Description: FID2 - Ch. 2
Column: XTI-5, 30m, 0.53mm, 1.5um
Carrier: N2
File: 0319fb10.CHR ()
Note: 200/400 ppm G/D CLOSE
Operator: MAP



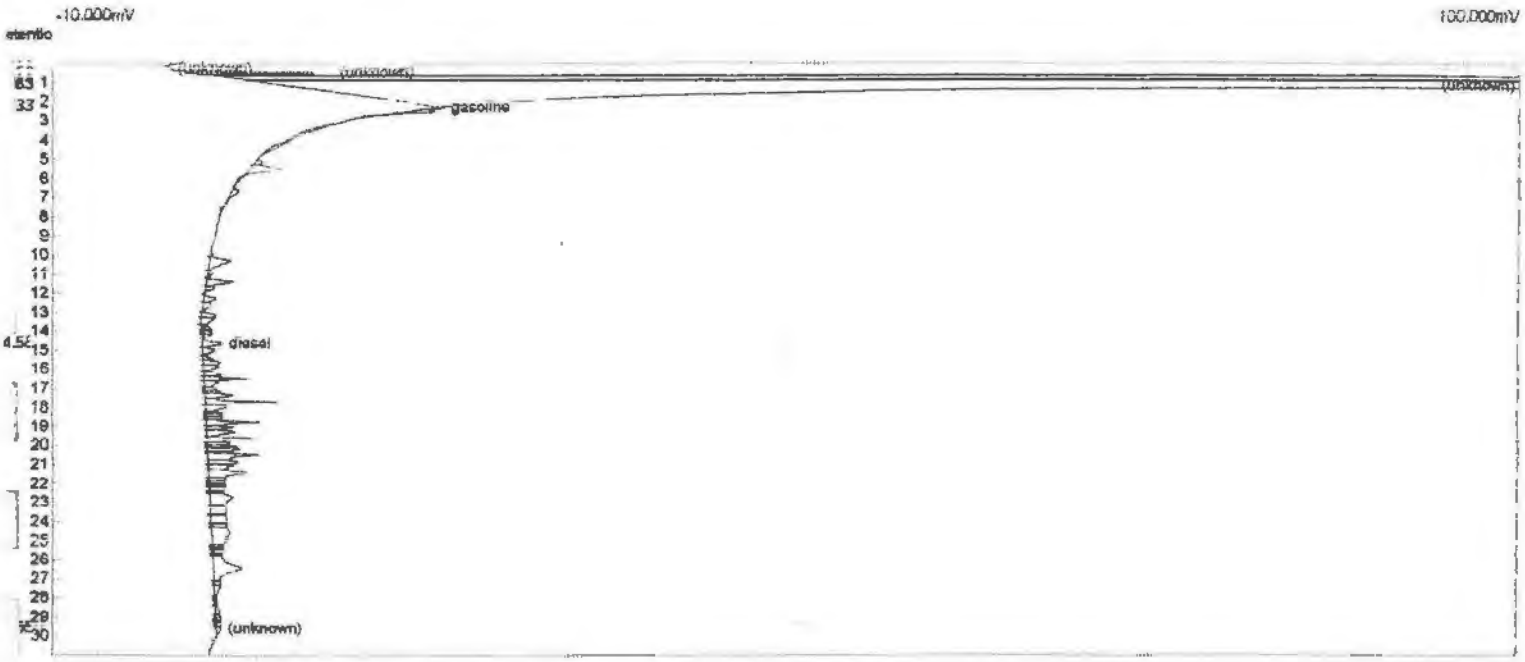
Component	Retention	Area	External	Units
sc	1.766	231.708	226.28	
ise	12.250	1114.150	401.35	ppm
		1345.857	627.63	

Lab name: On Site Labs Inc
Analysis date: 03/19/2002 16:58:03
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: 0319fc10.CHR ()
Sample: 200/400 ppm G/D CLOSE
Operator: MAP



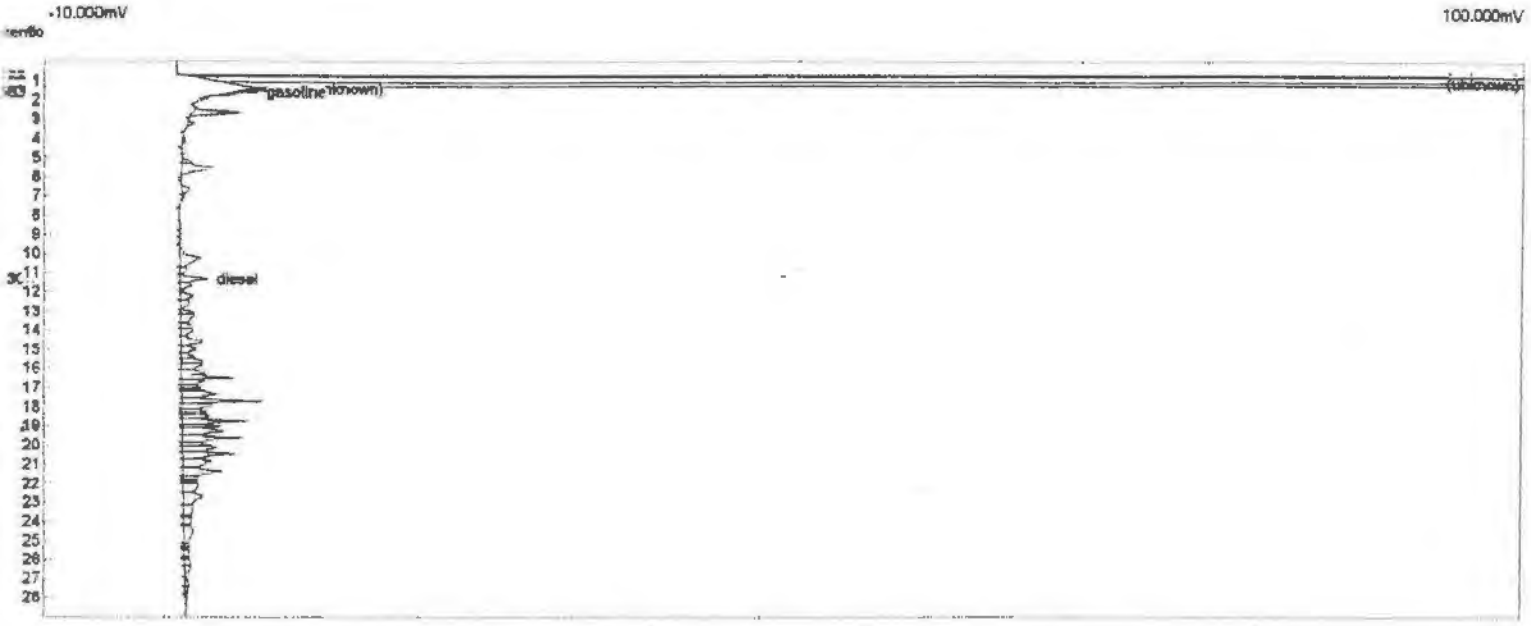
Component	Retention	Area	External	Units
asoline	1.100	261.738	180.76	
esel	13.066	1085.391	367.18	ppm
		1347.130	547.94	

Lab name: On Site Labs Inc
Analysis date: 03/19/2002 16:58:03
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: 0319fd10.CHR ()
Sample: 200/400 ppm G/D CLOSE
Operator: MAP



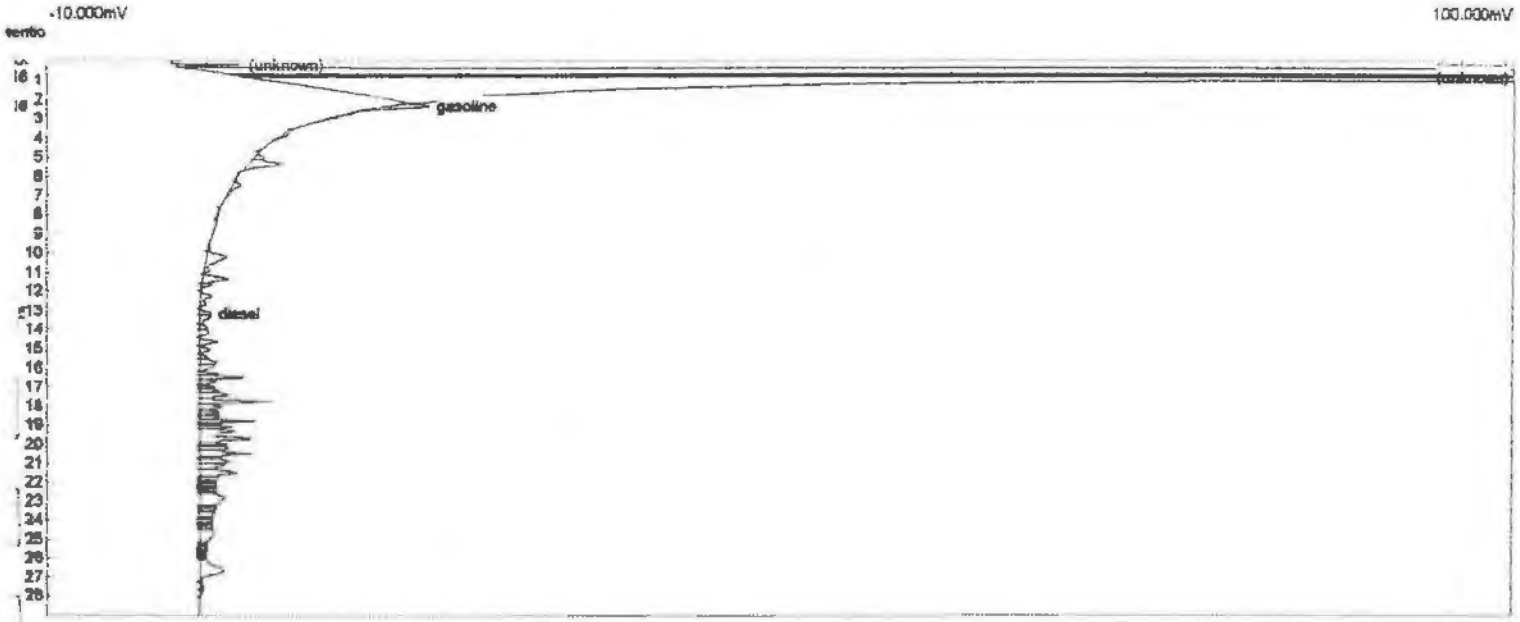
Component	Retention	Area	External	Units
	2.233	229.656	187.63	
diesel	14.583	1036.356	427.54	ppm
		1266.012	615.17	

Lab name: On Site Labs Inc
nalysis date: 03/19/2002 12:08:22
Method: EPA 8015B mod.
Lab ID: GC - 5
Description: FID2 - Ch. 2
Column: XTI-5, 30m, 0.53mm, 1.5um
Carrier: N2
Data file: D319fb2.CHR ()
Sample: blank matrix spike
Operator: MAP



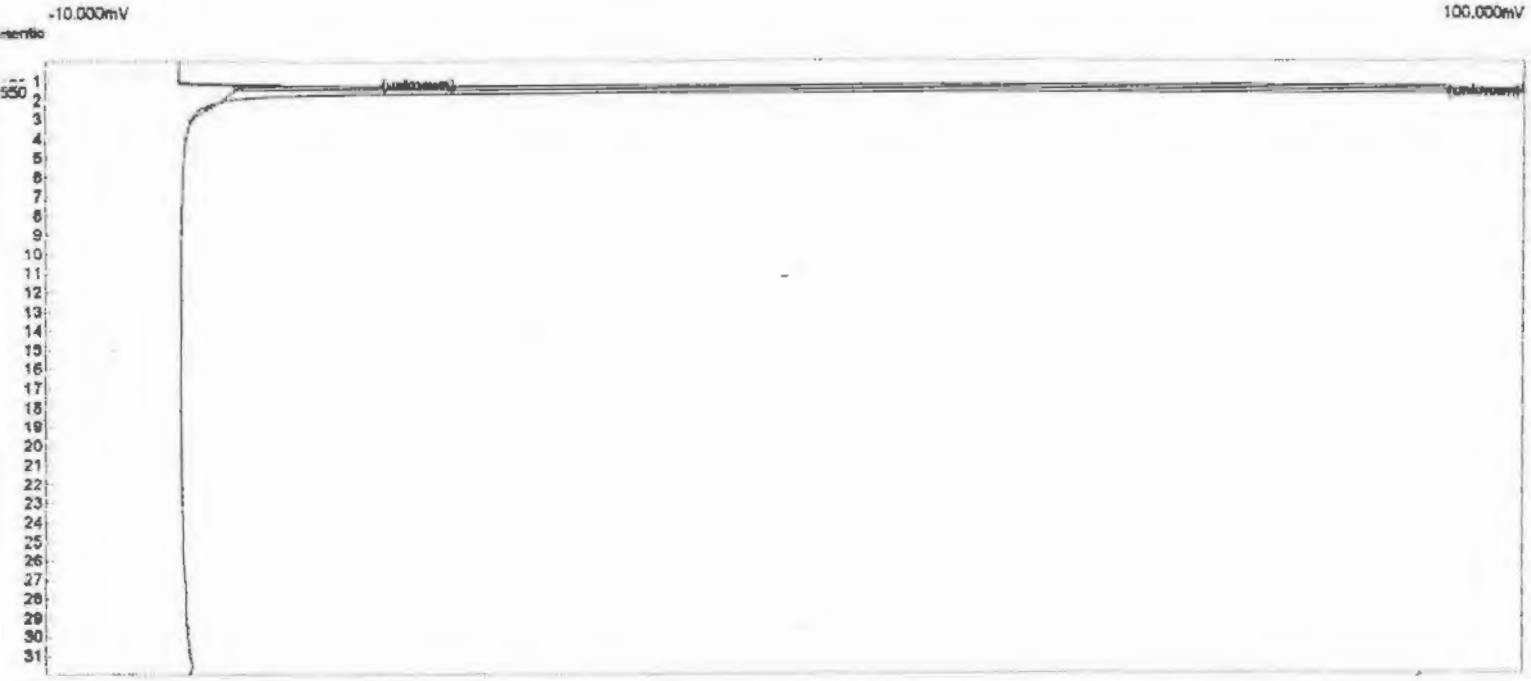
Component	Retention	Area	External	Units
soline	1.583	181.818	177.56	
sel	11.300	1138.494	410.12	ppm
		1320.312	587.68	

Lab name: On Site Labs Inc
nalysis date: 03/19/2002 12:08:22
Method: EPA 8015B mod.
Lab ID: GC - 5
Description: FID 4 - Ch. 4
Column: XTI-5, 30m, 0.53mm, 1.5um
Carrier: N2
D le: 0319fd2.CHR ()
ple: blank matrix spike duplicat
ator: MAP



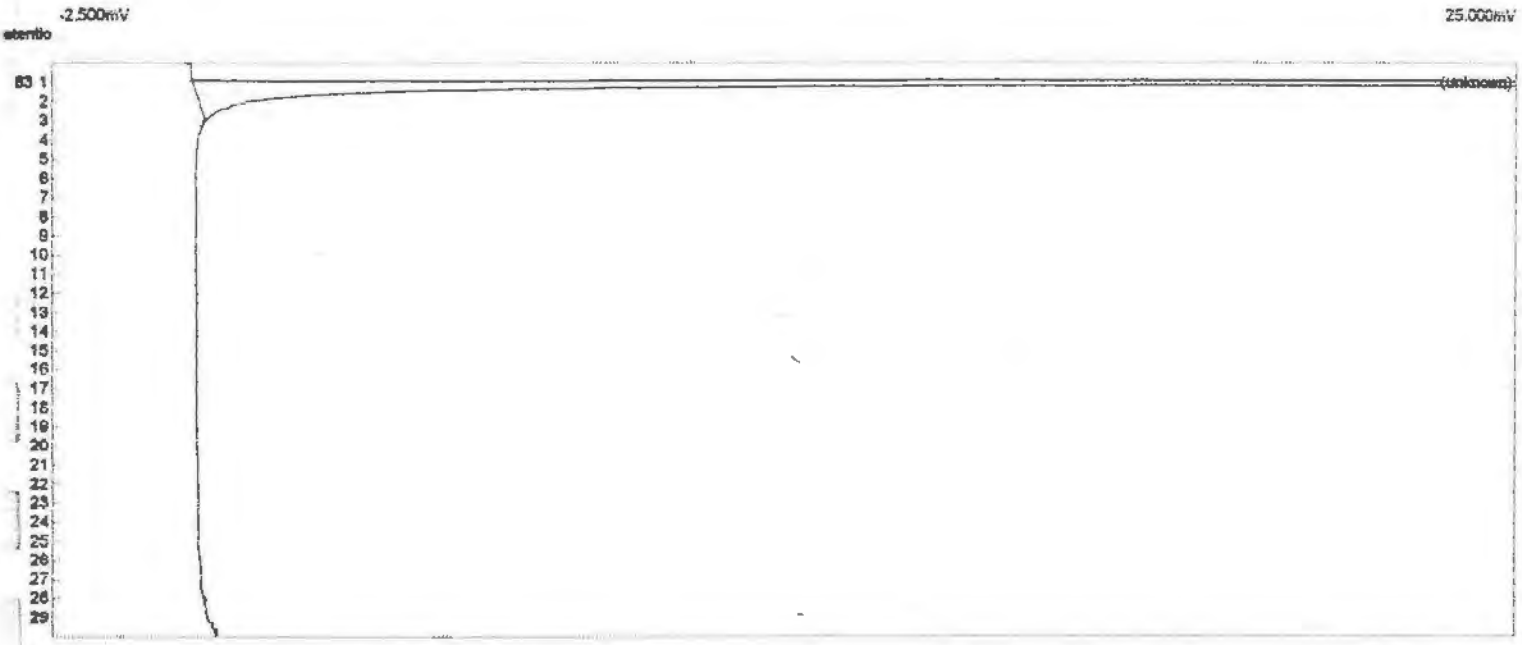
Component	Retention	Area	External	Units
oli	2.316	216.164	176.60	
	13.150	970.295	400.29	ppm
		1186.459	576.89	

Lab name: On Site Labs Inc
Analysis date: 03/19/2002 12:47:09
Method: EPA 8015B mod.
Lab ID: GC - 5
Description: FID2 - Ch. 2
Column: XTI-5, 30m, 0.53mm, 1.5um
Carrier: N2
Data file: 0319fb3.CHR ()
Sample: METHOD BLANK
Operator: MAP



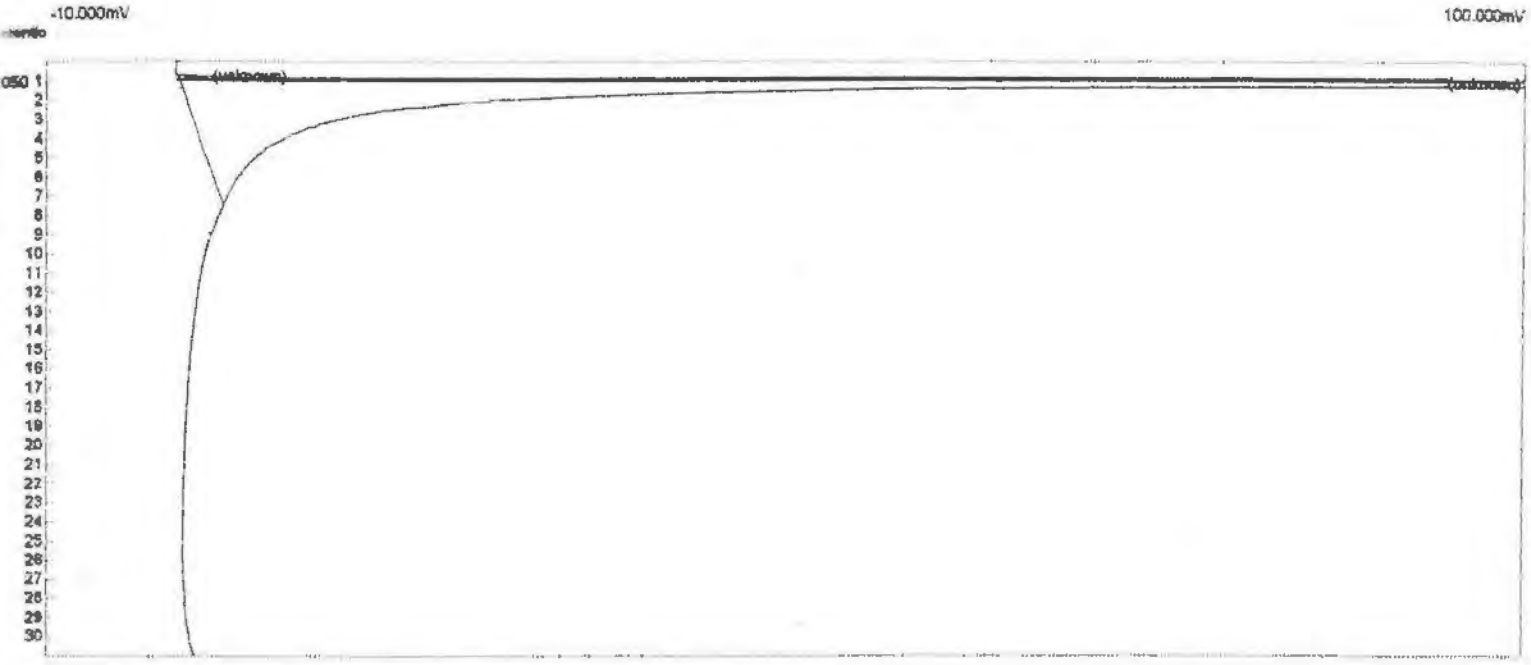
Component	Retention	Area	External	Units
		0.000	0.00	

Lab name: On Site Labs Inc
Analysis date: 03/19/2002 12:47:09
Method: EPA 8015B mod.
Lab ID: GC - 5
Description: FID 3 - Ch. 3
Column: XTI-5, 30m, 0.53mm, 1.5um
Carrier: N2
[illegible]file: 0319fc3.CHR ()
[illegible]ple: METHOD BLANK
[illegible]rator: MAP



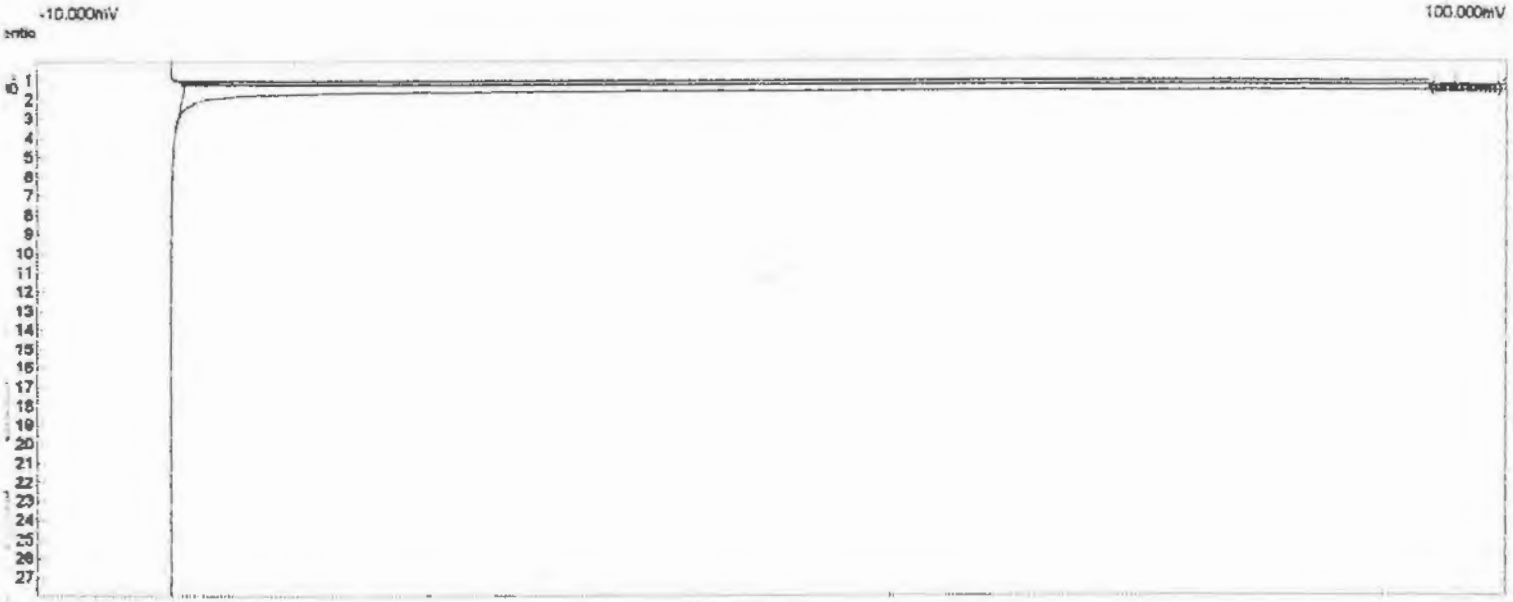
Component	Retention	Area	External	Units
		0.000	0.00	

Lab name: On Site Labs Inc
Analysis date: 03/19/2002 12:47:09
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: 0319fd3.CHR ()
Sample: METHOD BLANK
Operator: MAP



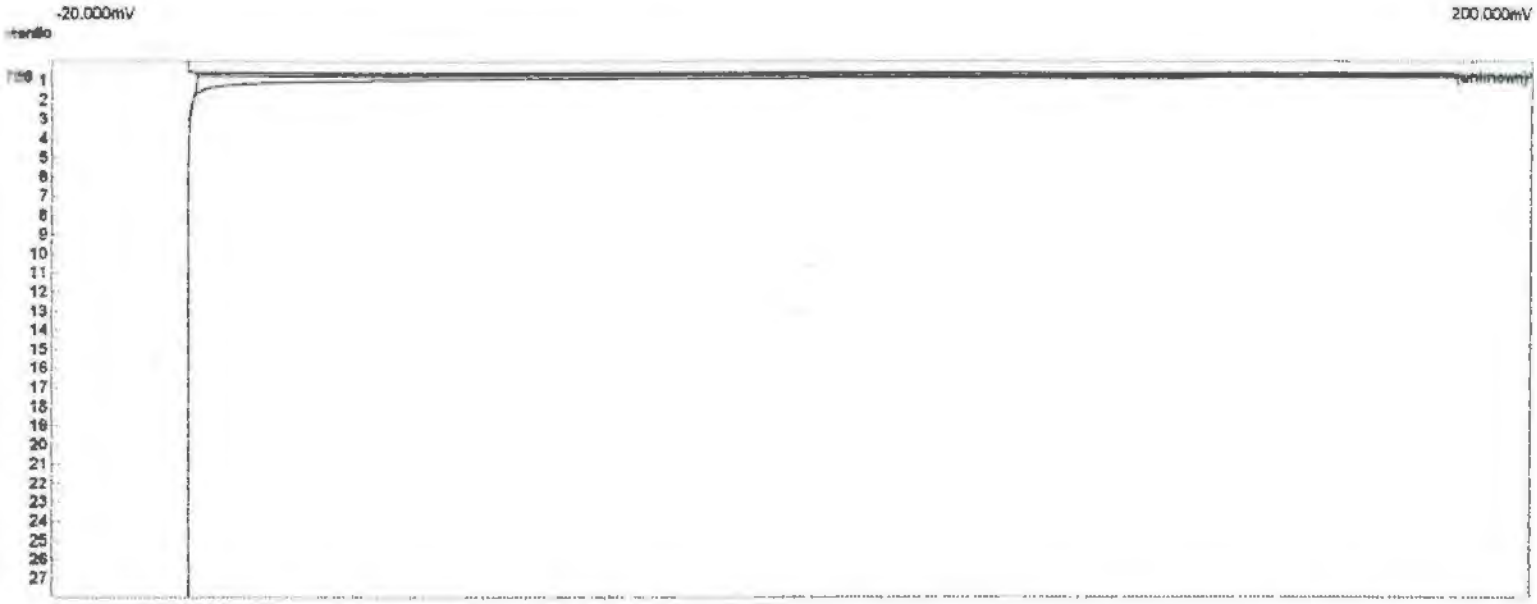
Component	Retention	Area	External	Units
		0.000	0.00	

Lab name: On Site Labs Inc
nalysis date: 03/19/2002 13:24:43
Method: EPA 8015B mod.
Lab ID: GC - 5
Description: FID2 - Ch. 2
Column: XTI-5, 30m, 0.53mm, 1.5um
Carrier: N2
Da e: 0319fb4.CHR ()
e: ILA020/0314CH2M
C tor: MAP



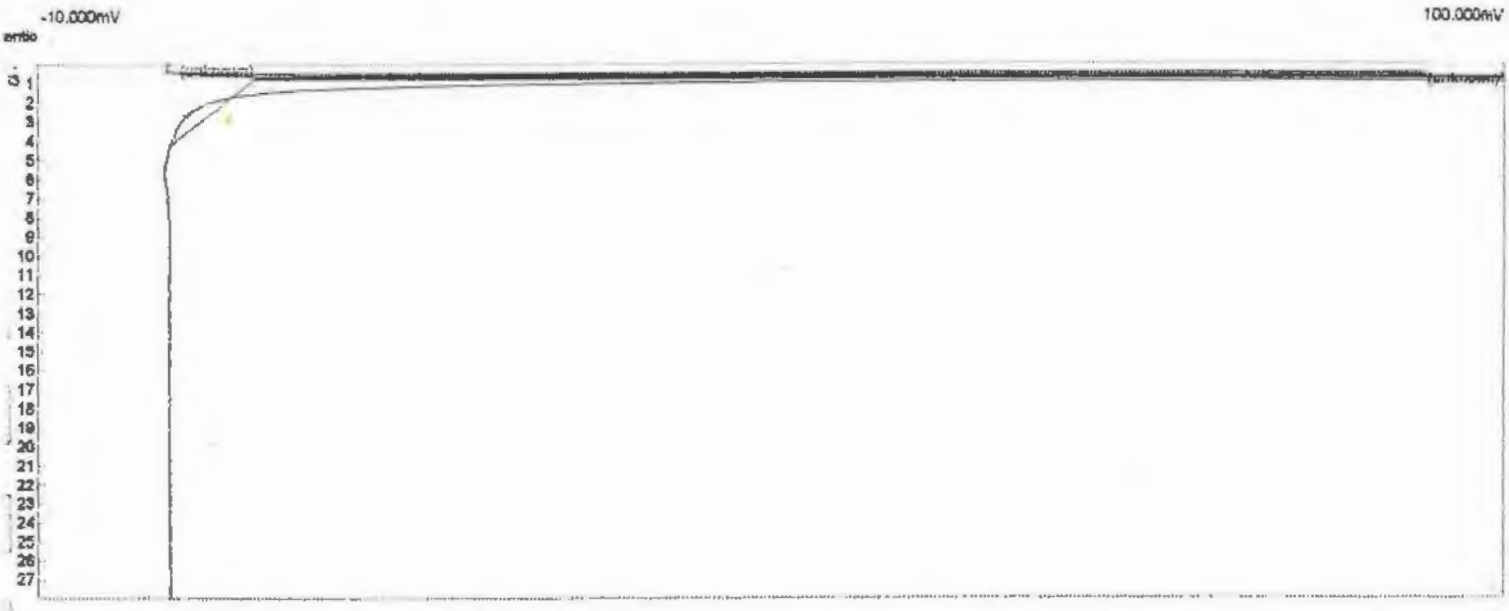
Component	Retention	Area	External	Units
		0.000	0.00	

Lab name: On Site Labs Inc
Analysis date: 03/19/2002 13:24:43
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: 0319fc4.CHR ()
Sample: ILA021/0314CH2M
Operator: MAP



Component	Retention	Area	External	Units
		0.000	0.00	

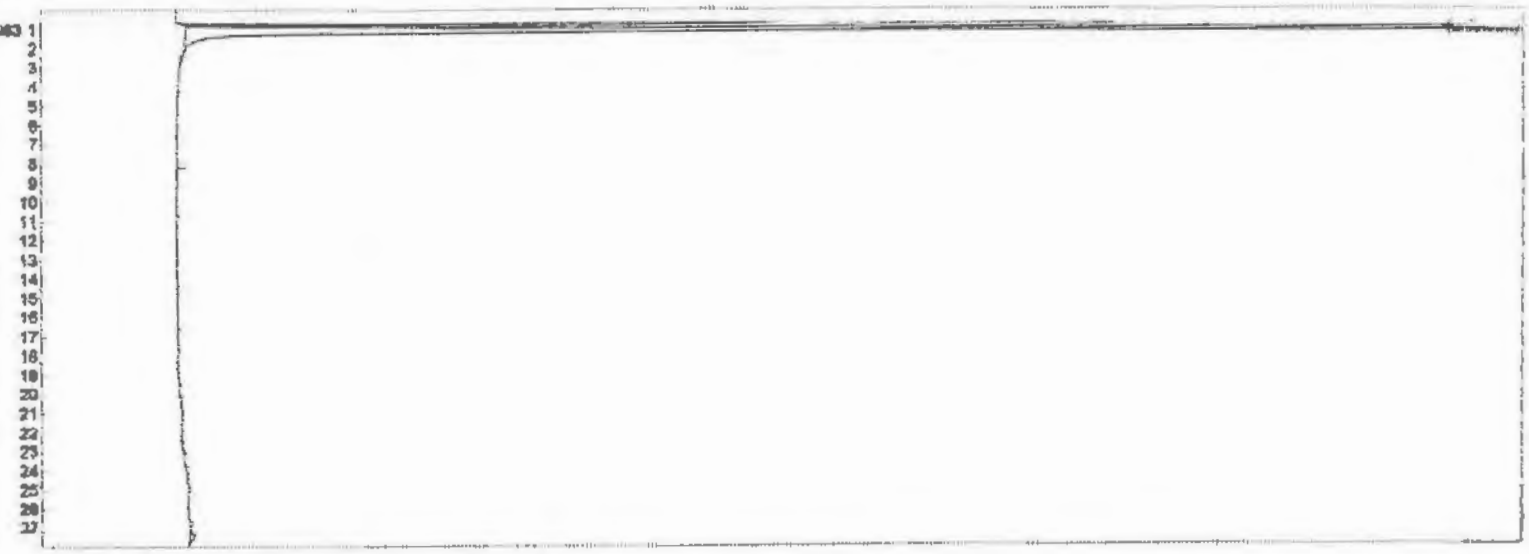
Lab name: On Site Labs Inc
nalysis date: 03/19/2002 13:24:43
Method: EPA 8015B mod.
Lab ID: GC - 5
Description: FID 4 - Ch. 4
Column: XTI-5, 30m, 0.53mm, 1.5um
Carrier: N2
Da[illegible]le: 0319fd4.CHR ()
[illegible]le: ILA022/0314CH2M
[illegible]tor: MAP



Component	Retention	Area	External	Units
		0.000	0.00	

Lab name: Cm Bio Labs Inc
Analysis date: 03/19/2002 13:57:52
Method: EPA 8015B mod.
Lab ID: GC - 5
Description: FID2 - Ch. 2
Column: XTI-5, 30m, 0.53mm, 1.5um
Carrier: N2
Data file: 0319fb5.CHR ()
Sample: ILA023/0014CH12M
Operator: MAP

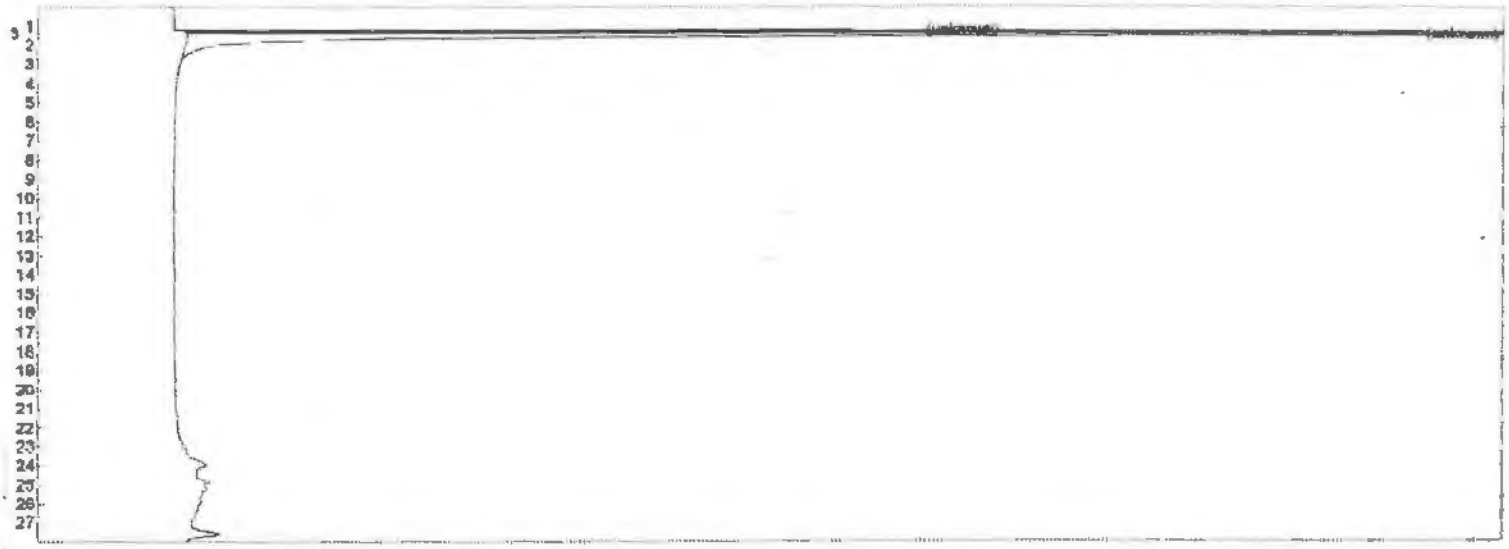
-10.000mV 100.000mV



Component	Retention	Area	External	Units
		0.000	0.00	

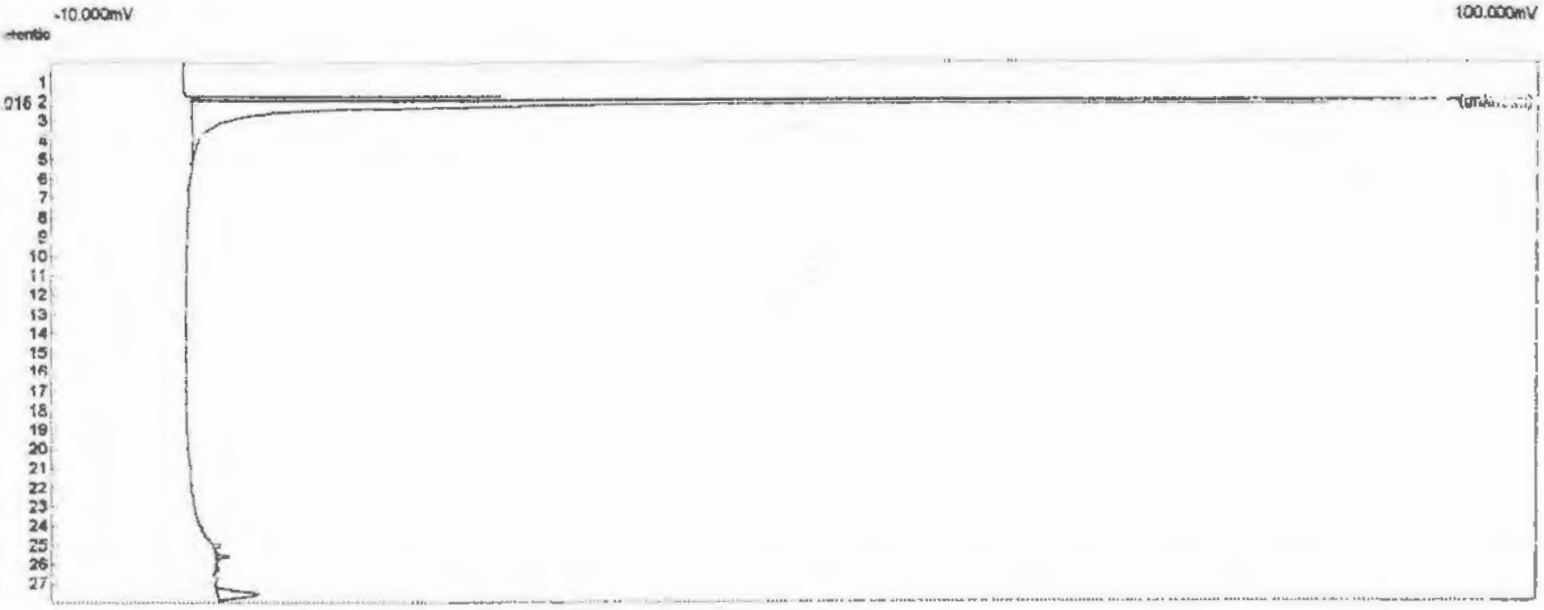
Lab name: On Site Labs Inc
alysis date: 03/19/2002 13:57:52
Method: EPA 8015B mod.
Lab ID: GC - 5
Description: FID 3 - Ch. 3
Column: XTI-5, 30m, 0.53mm, 1.5um
Carrier: N2
D[illegible]: 0319fc5.CHR ()
[illegible]e: ILA024/0314CH2M
Op[illegible]or: MAP

-10.000mV 100.000mV



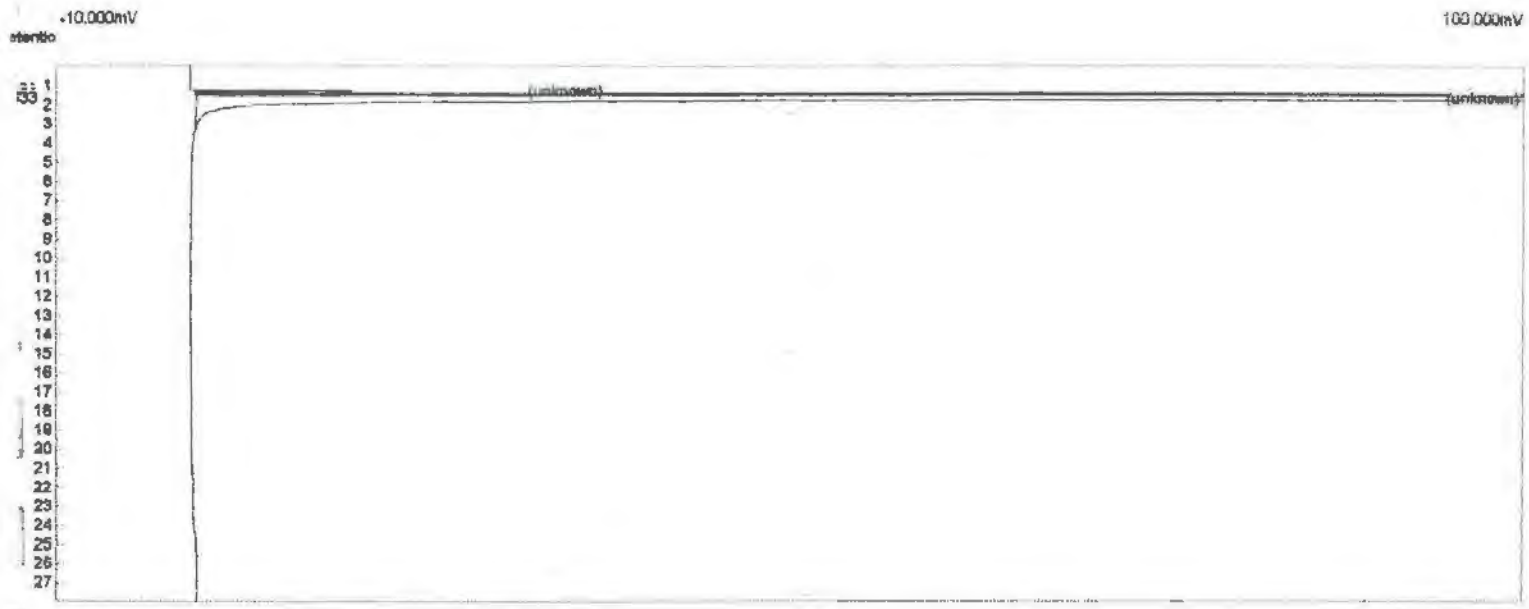
Component	Retention	Area	External	Units
		0.000	0.00	

Lab name: On Site Labs Inc
Analysis date: 03/19/2002 13:57:52
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: 0319fd5.CHR ()
Sample: ILA025/0314CH2M
Operator: MAP



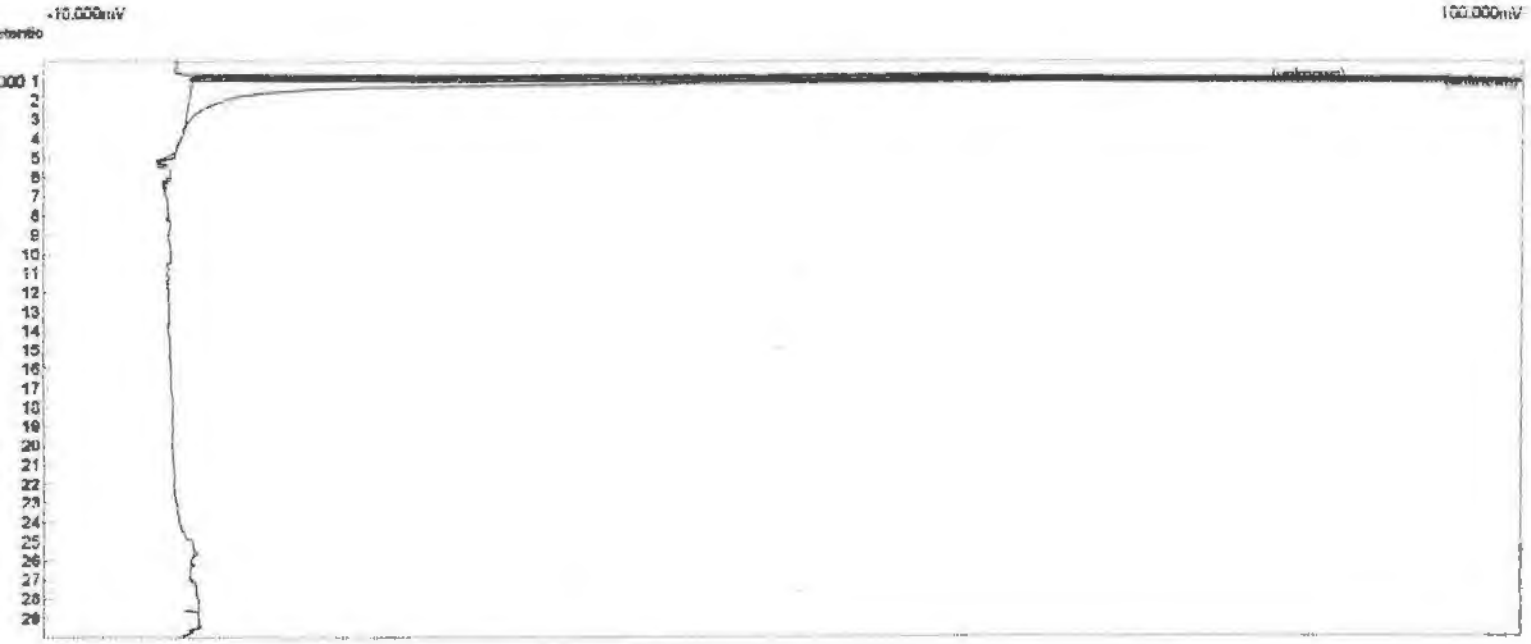
Component	Retention	Area	External	Units
		0.000	0.00	

Lab name: On Site Labs Inc
Analysis date: 03/19/2002 14:34:27
Method: EPA 8015B mod.
Lab ID: GC - 5
Description: FID2 - Ch. 2
Column: XTI-5, 30m, 0.53mm, 1.5um
Carrier: N2
D[illegible]file: 0319FB8.CHR ()
[illegible]ple: ILA026/0314CH2M
[illegible]tor: MAP



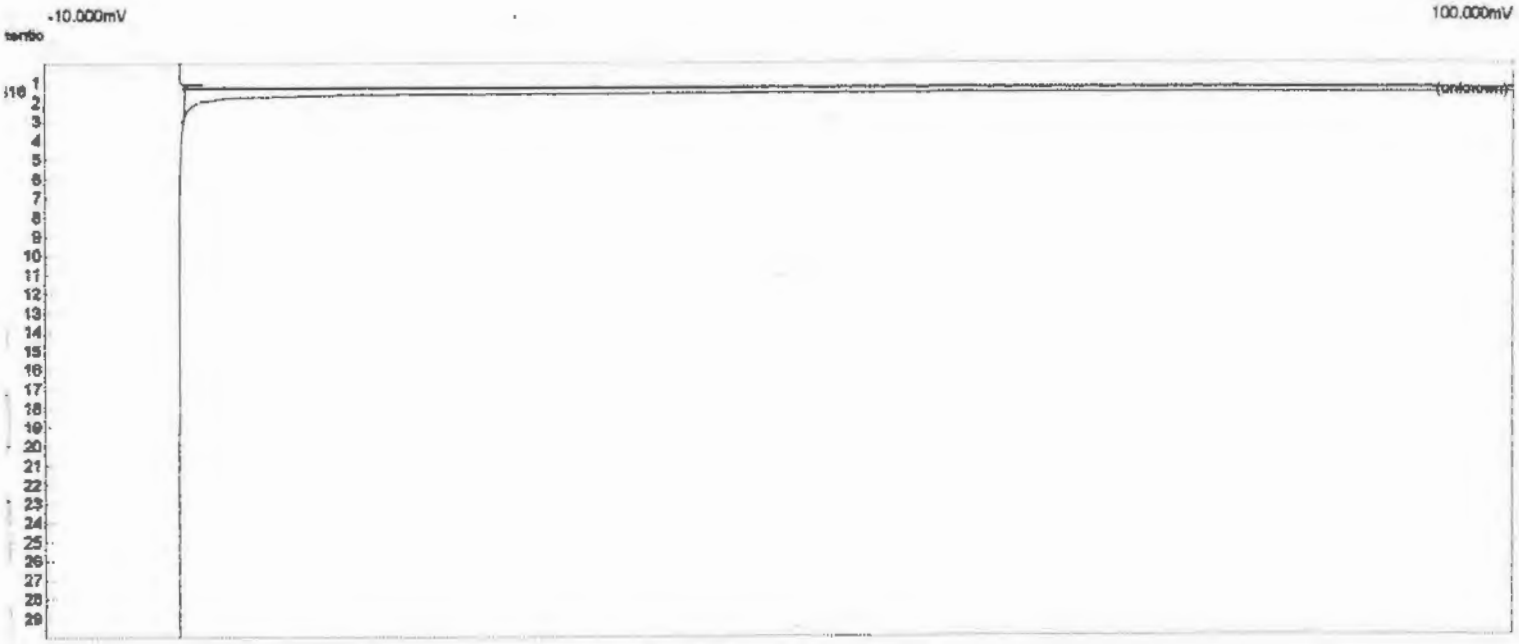
Component	Retention	Area	External	Units
		0.000	0.00	

Lab name: On Site Labs Inc
Analysis date: 03/19/2002 14:04:27
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: 0319FD6.chr ()
Sample: ILA027/0314CH2M
Operator: MAP



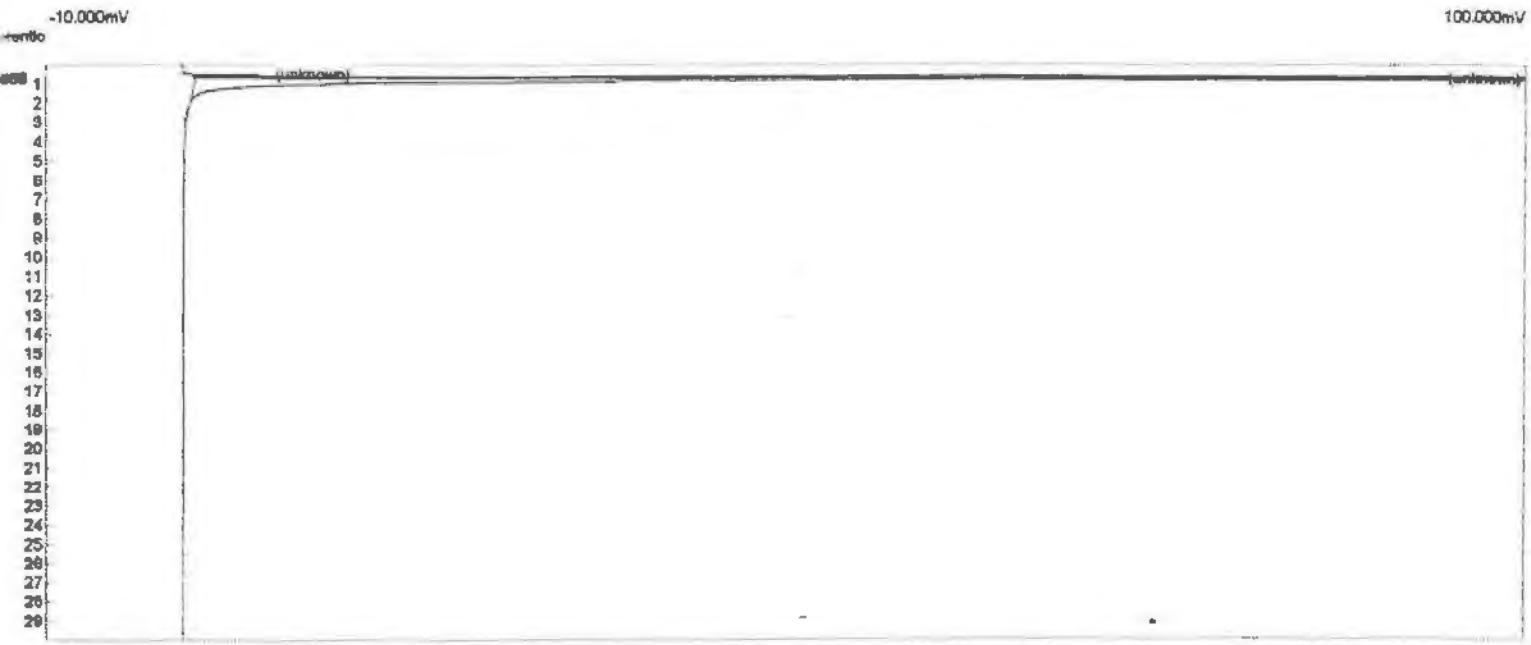
Component	Retention	Area	External	Units
		0.000	0.00	

Lab name: On Site Labs Inc
nalysis date: 03/19/2002 15:06:52
Method: EPA 8015B mod.
Lab ID: GC - 5
Description: FID2 - Ch. 2
Column: XTI-5, 30m, 0.53mm, 1.5um
Carrier: N2
D[illegible]le: 0319fb7.CHR ()
[illegible]le: JLA029/0314CH2M
[illegible]ator: MAP



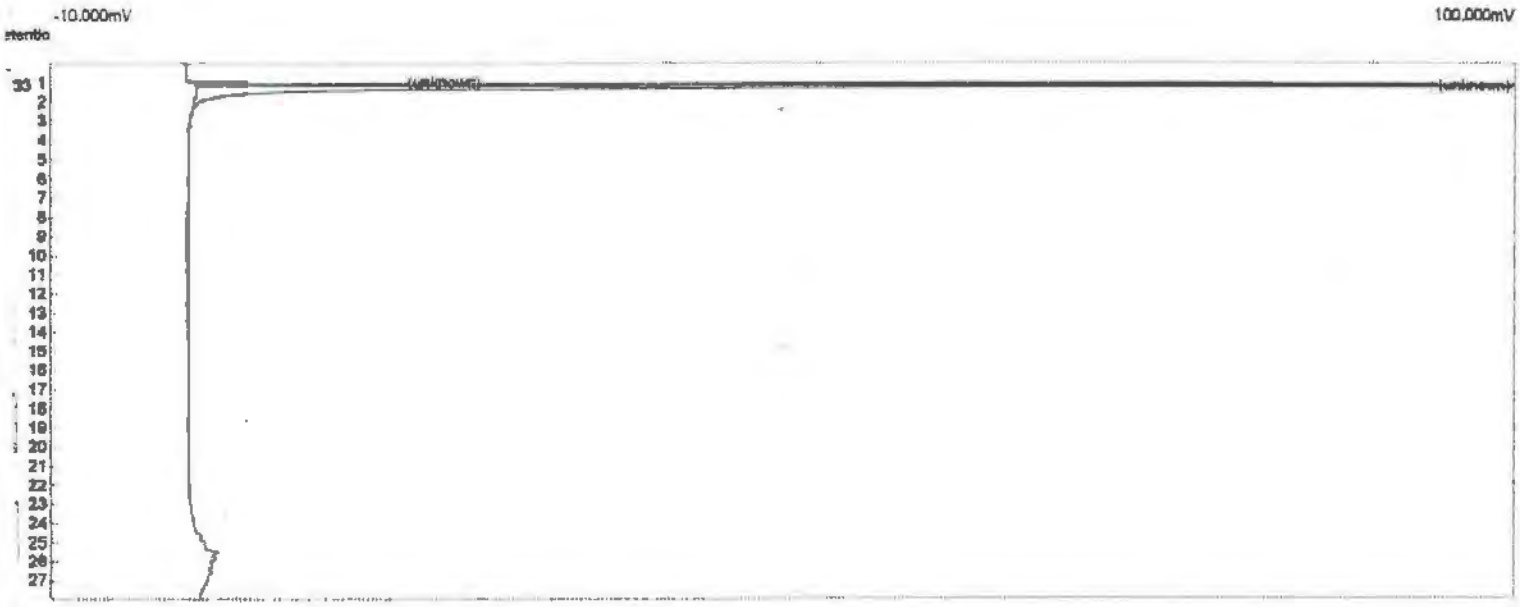
Component	Retention	Area	External	Units
		0.000	0.00	

Lab name: On Site Labs Inc
Analysis date: 03/19/2002 15:06:52
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: 0319fc7.CHR ()
Sample: JLA030/0314CH2M
Operator: MAP



Component	Retention	Area	External	Units
		0.000	0.00	

Lab name: On Site Labs Inc
Analysis date: 03/19/2002 14:34:27
Method: EPA 8015B mod.
Lab ID: GC - 5
Description: FID 3 - Ch. 3
Column: XTI-5, 30m, 0.53mm, 1.5um
Carrier: N2
D[illegible]file: 0319FC8.chr ()
[illegible]ple: JLA031/0314CH2M
[illegible]ator: MAP



Component	Retention	Area	External	Units
		0.000	0.00	

QA/QC REPORT - CALIBRATION DATA

OSL Project #02I0314CH2M
DAILY CALIBRATION DATE: 03/19/02

CH2M HILL PROJECT NO. 167722.FI.FS
PROJECT NAME: RRNAS SITES 88 AND 1970, 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%	750.34	83.37	2.8%	552.01	92.00	7.3%
TOLUENE	P&T - GC3	0.5 - 75.0	81.33	8.2%	716.29	79.59	2.1%	535.26	89.21	9.7%
ETHYLBENZENE	P&T - GC3	0.5 - 75.0	65.84	13.6%	529.98	58.89	10.6%	422.17	70.36	6.9%
m&p-XYLENES	P&T - GC3	1.0 - 150	98.46	16.8%	1689.61	93.87	4.7%	1240.29	103.36	5.0%
o-XYLENES	P&T - GC3	0.5 - 75.0	73.19	17.4%	639.28	71.03	2.9%	467.43	77.90	6.4%

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)

OSL PROJECT #02I0314CH2M
DATE: 03/19/02

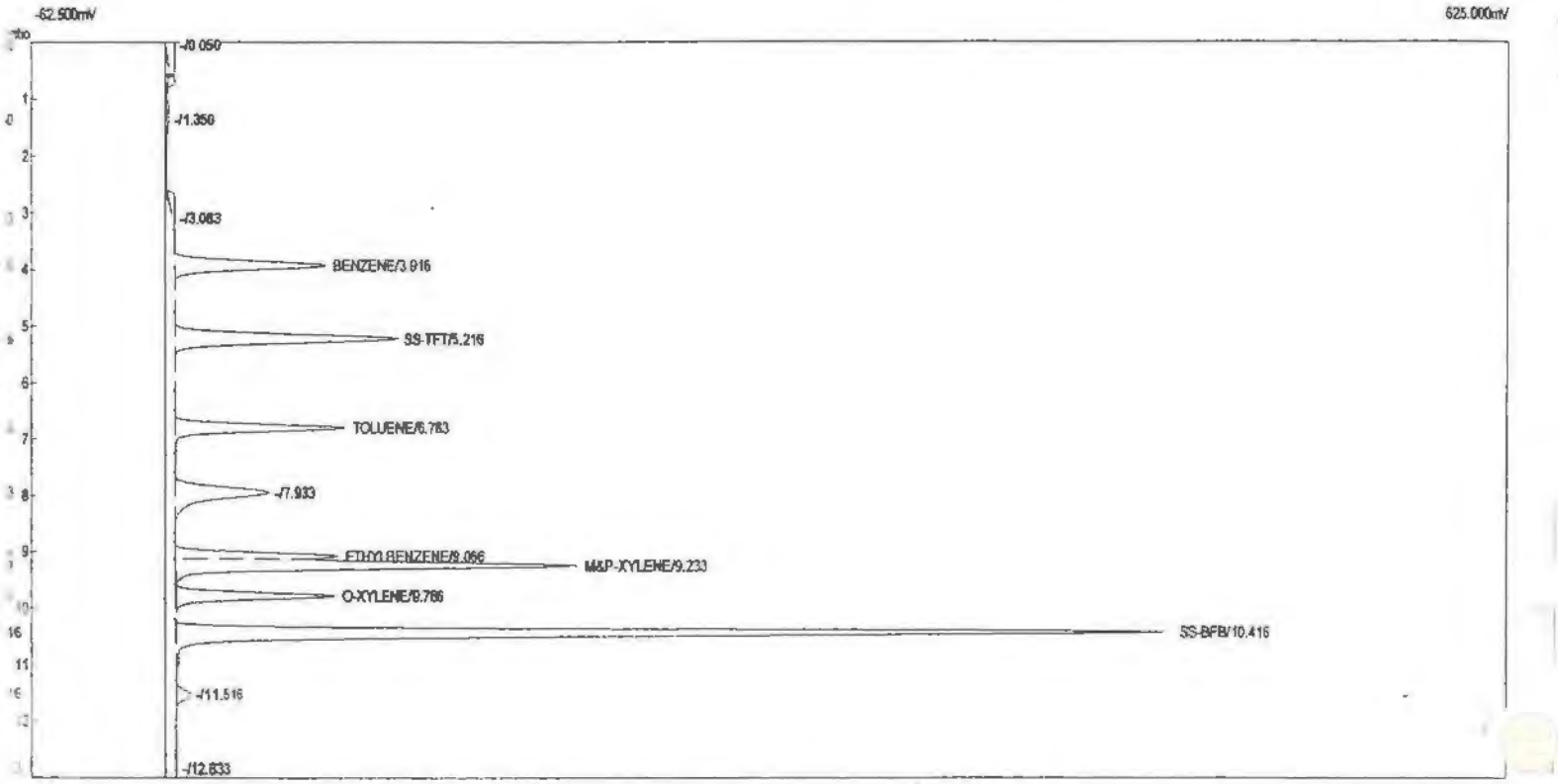
CH2M HILL PROJECT NO. 167722.FI.FS
PROJECT NAME: RRNAS SITES 88 AND 1970

COMPOUND	SPK CONC (ppb)	MS CONC (ppb)	%REC MS	MSD CONC (ppb)	%REC MSD	RPD	ACCEPTABLE RPD	ACCEPTABLE RECOVERY
BENZENE	6.0	6.2	103%	5.4	90%	14%	20%	82% - 117%
TOLUENE	6.0	6.3	105%	5.4	89%	16%	20%	87% - 120%
ETHYLBENZENE	6.0	5.6	94%	5.0	83%	12%	20%	83% - 131%
TOTAL XYLENES	18.0	19.1	106%	15.7	87%	20%	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

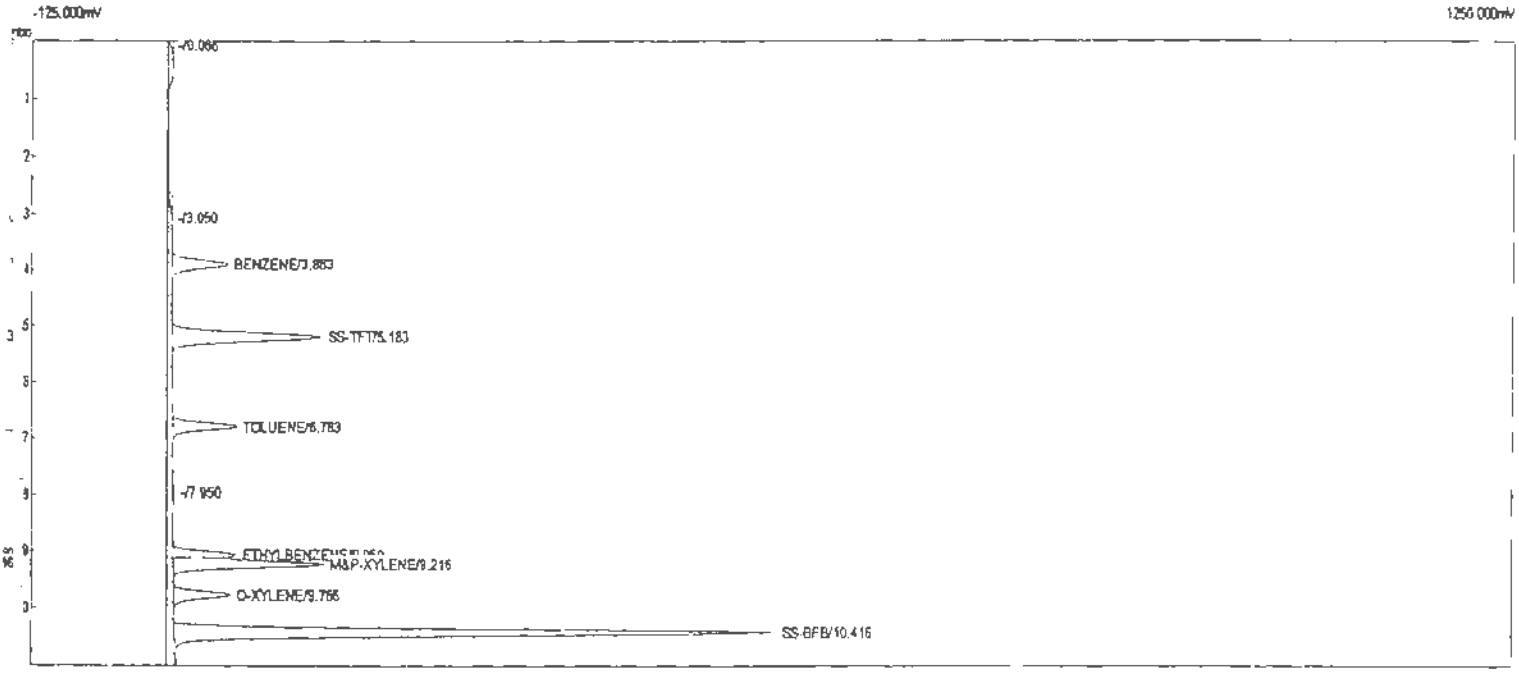
ANALYSES PERFORMED BY MARCO A. PEDRAZA
DATA REVIEWED BY KEVIN SHELBURNE

nalysis date: 03/19/2002 10:42:39
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: 0318P23.CHR ()
Sample: 9 ppb BTEX OPEN STD
Operator: MAP



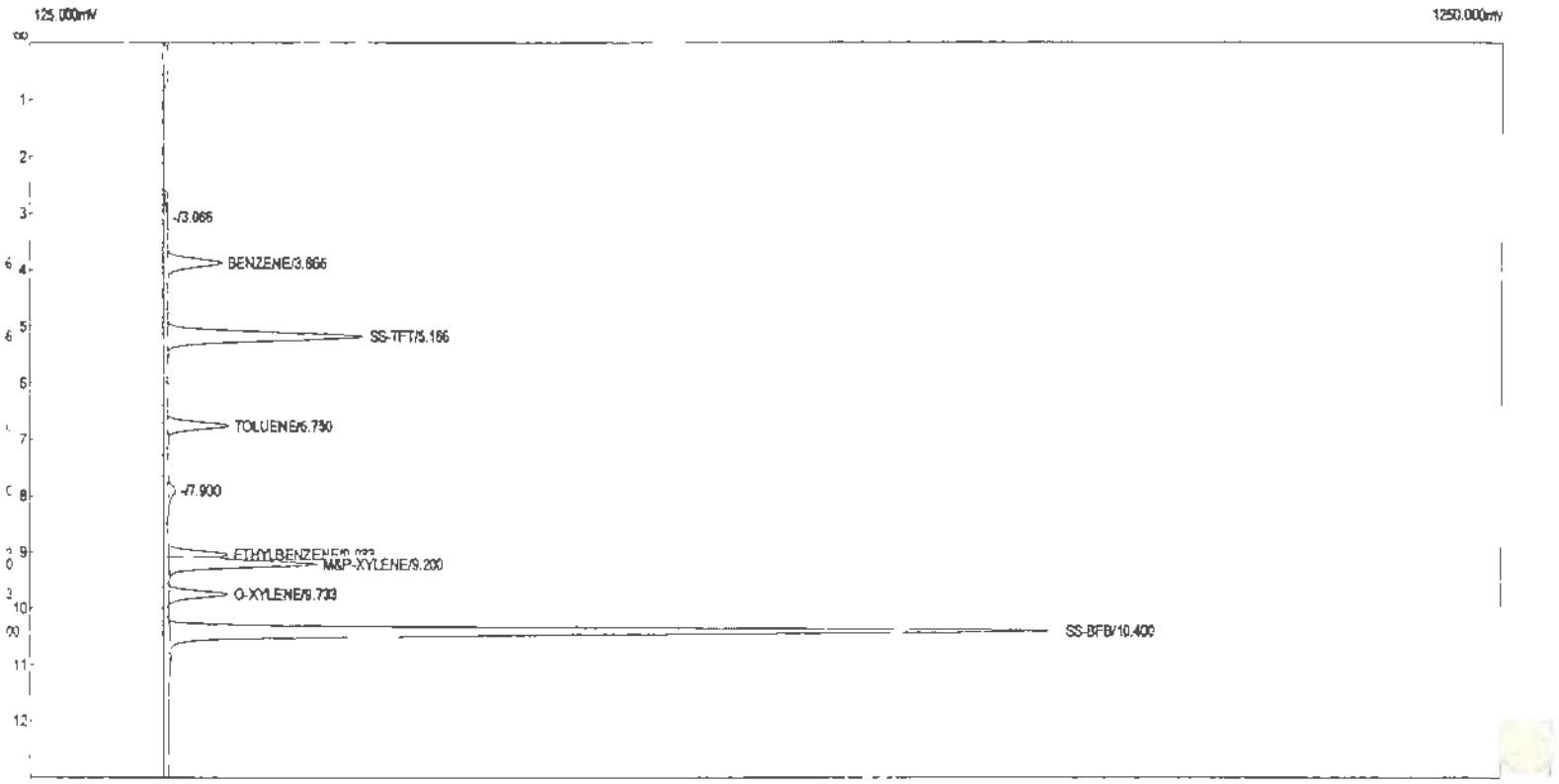
Component	Retention	Height	Area	External	Internal	Units
NZENE	3.916	70.705	750.343	8.75	8.7473	ppb
-TFT	5.216	104.217	1123.736	12.57	12.5669	ppb
LUENE	6.783	79.883	716.291	8.81	8.8072	ppb
HYLBENZENE	9.066	76.214	529.984	8.05	8.0496	ppb
P-XYLENE	9.233	187.987	1689.608	17.16	17.1603	ppb
XYLENE	9.766	74.925	639.280	8.73	8.7345	ppb
-BFB	10.416	465.025	3841.746	16.85	16.8498	ppb
			9290.988	80.92	80.9157	

Lab name: On Site Labs Inc.
alysis date: 03/19/2002 18:02:05
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
D: e: 0318P42.CHR ()
e: 6 ppb BTEX CLOSE
C, tor: MAP



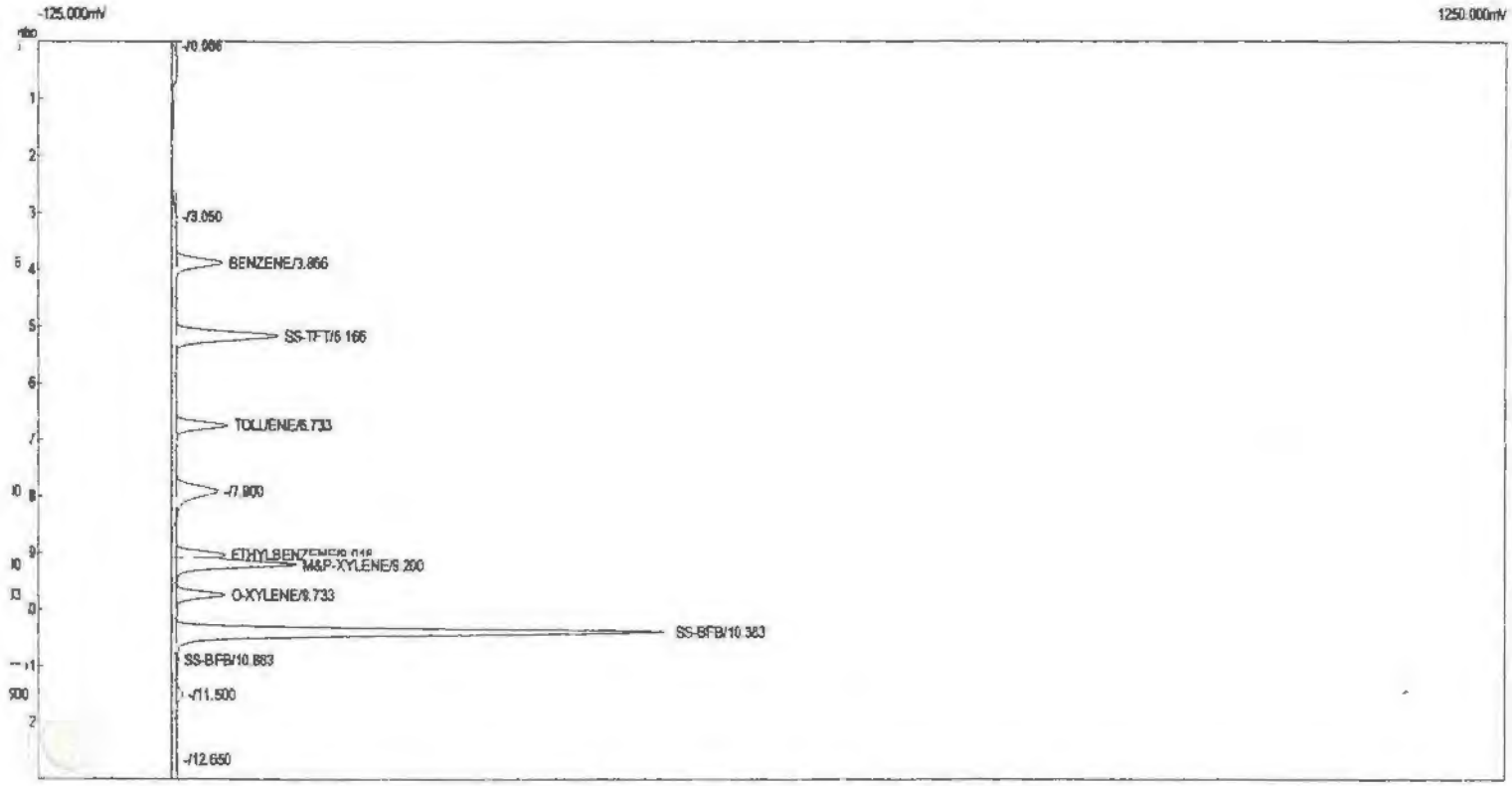
Co nt	Retention	Area	External	Internal	Units
42	3.883	552.014	6.44	6.4352	ppb
S-TFT	5.183	1516.293	16.96	16.9570	ppb
UENE	6.783	535.264	6.58	6.5814	ppb
YLBENZENE	9.050	422.168	6.41	6.4120	ppb
-XYLENE	9.216	1240.290	12.60	12.5969	ppb
-XYLENE	9.766	467.429	6.39	6.3865	ppb
S-BFB	10.416	4459.536	19.56	19.5594	ppb
		9192.994	74.93	74.9284	

nalysis date: 03/19/2002 11:01:29
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: 0318P24.CHR ()
Sample: ~~LA018~~matrix spike
Operator: MAP BANN matrix spike



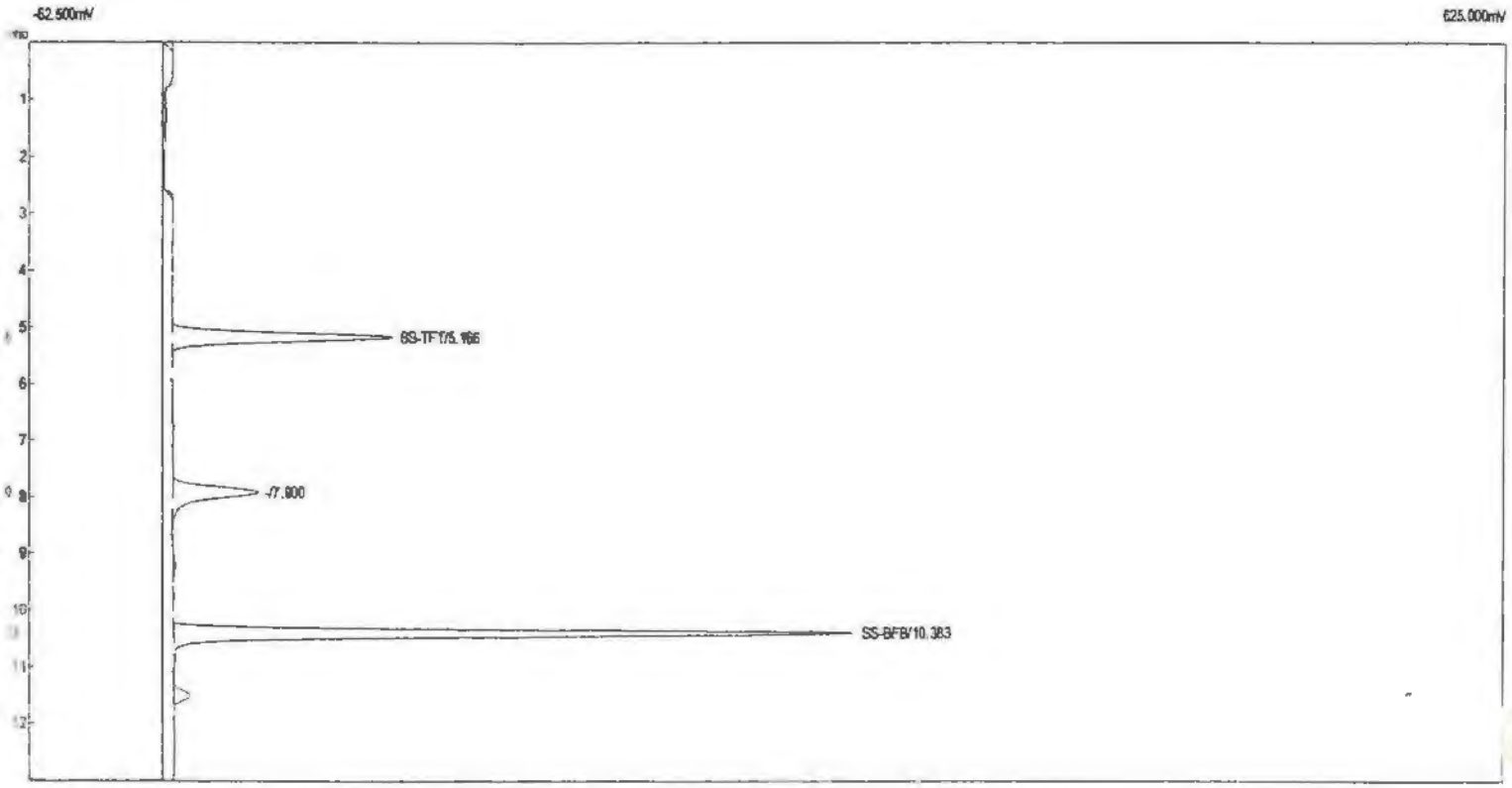
Component	Retention	Area	External	Internal	Units
.NZENE	3.866	532.138	6.20	6.2035	ppb
-TFT	5.166	1959.194	21.91	21.9100	ppb
LUENE	6.750	512.010	6.30	6.2955	ppb
THYLBENZENE	9.033	369.856	5.62	5.6175	ppb
&P-XYLENE	9.200	1254.893	12.75	12.7452	ppb
XYLENE	9.733	466.953	6.38	6.3800	ppb
-BFB	10.400	6726.937	29.50	29.5041	ppb
		11621.981	88.66	88.6558	

Lab name: On Site Labs Inc.
alysis date: 03/19/2002 11:33:26
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
Da[illegible]e: 0318P25.CHR ()
[illegible]: blank matrix spike duplicat
C[illegible]or: MAP



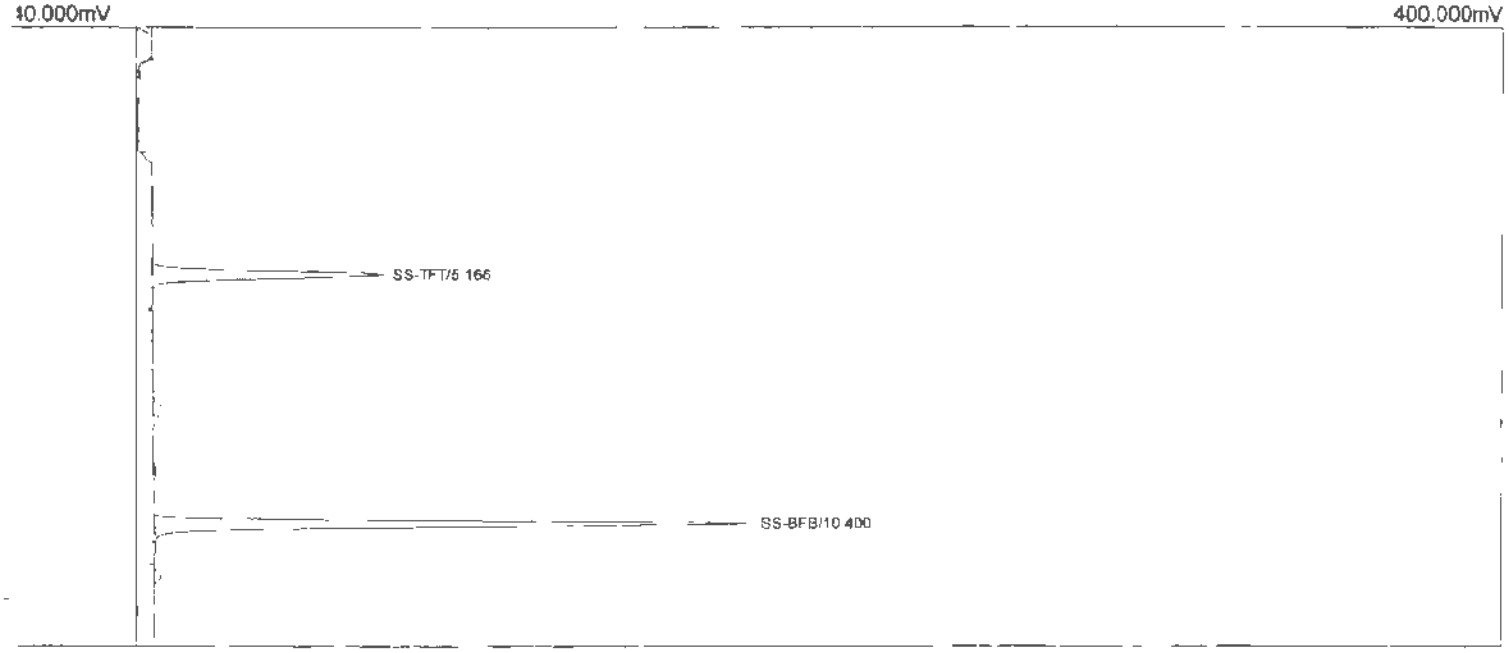
Component	Retention	Height	Area	External	Internal	Units
IZENE	3.866	43.635	460.600	5.37	5.3696	ppb
S-TFT	5.166	95.756	1033.290	11.56	11.5555	ppb
OLUENE	6.733	47.816	435.686	5.36	5.3570	ppb
YLBENZENE	9.016	45.348	326.324	4.96	4.9563	ppb
-XYLENE	9.200	111.955	1014.997	10.31	10.3087	ppb
-XYLENE	9.733	45.552	396.738	5.42	5.4207	ppb
S-BFB	10.383	461.366	3826.613	16.78	16.7834	ppb
BFB	10.883	1.834	28.444	0.12	0.1248	ppb
			7522.690	59.88	59.8759	

alysis date: 03/19/2002 12:02:36
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: 0318P26.CHR ()
Sample: METHOD BLANK
Operator: MAP



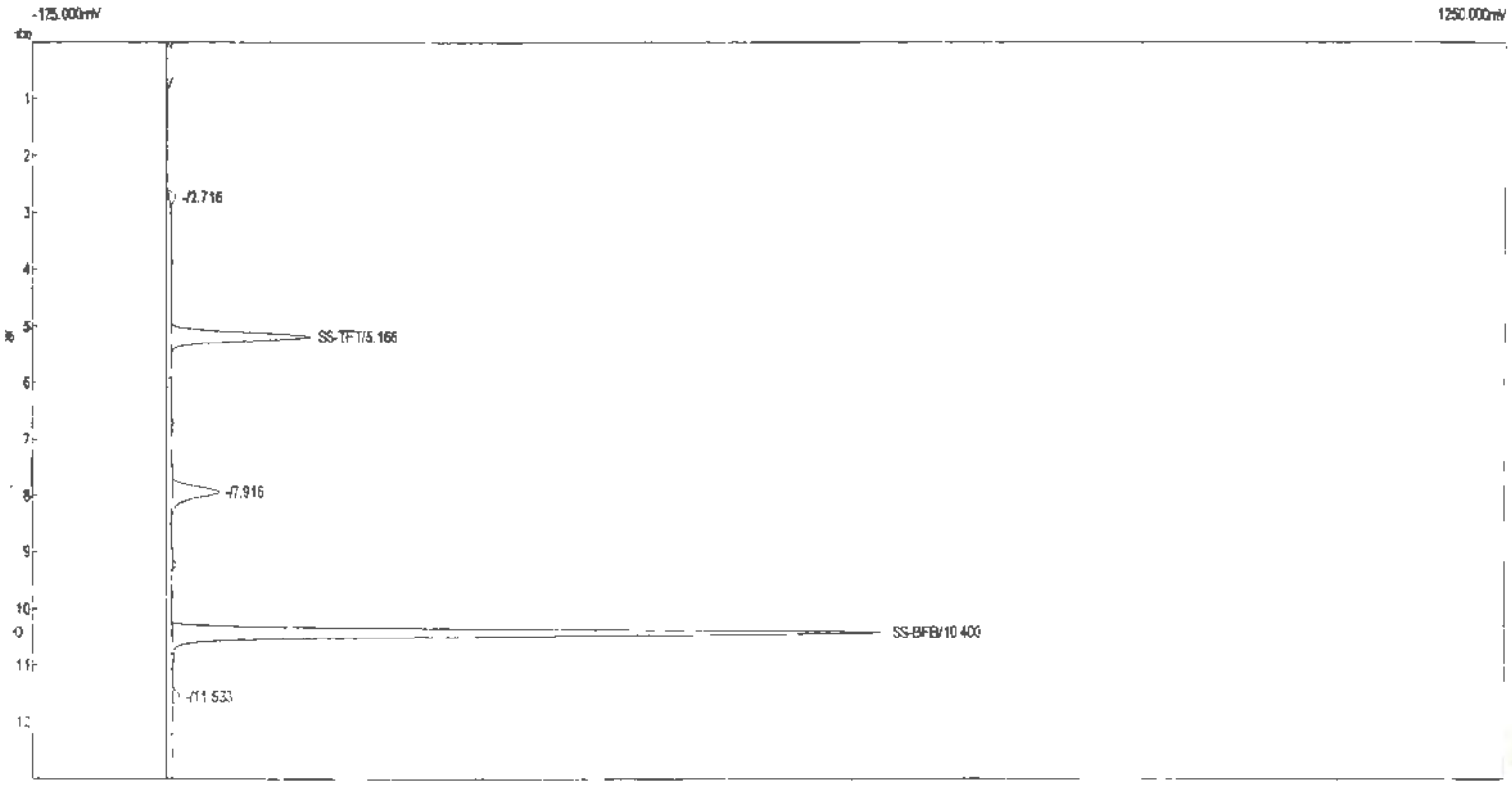
Component	Retention	Height	Area	External	Internal	Units
-TFT	5.166	103.299	1119.418	12.52	12.5187	ppb
-BFB	10.383	317.288	2646.296	11.61	11.6066	ppb
			3765.714	24.13	24.1252	

Lab name: On-Site Lab Inc.
alysis date: 03/19/2002 12:36:44
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: 0318P27.CHR ()
: ILA024/0314CH2M
or: MAP



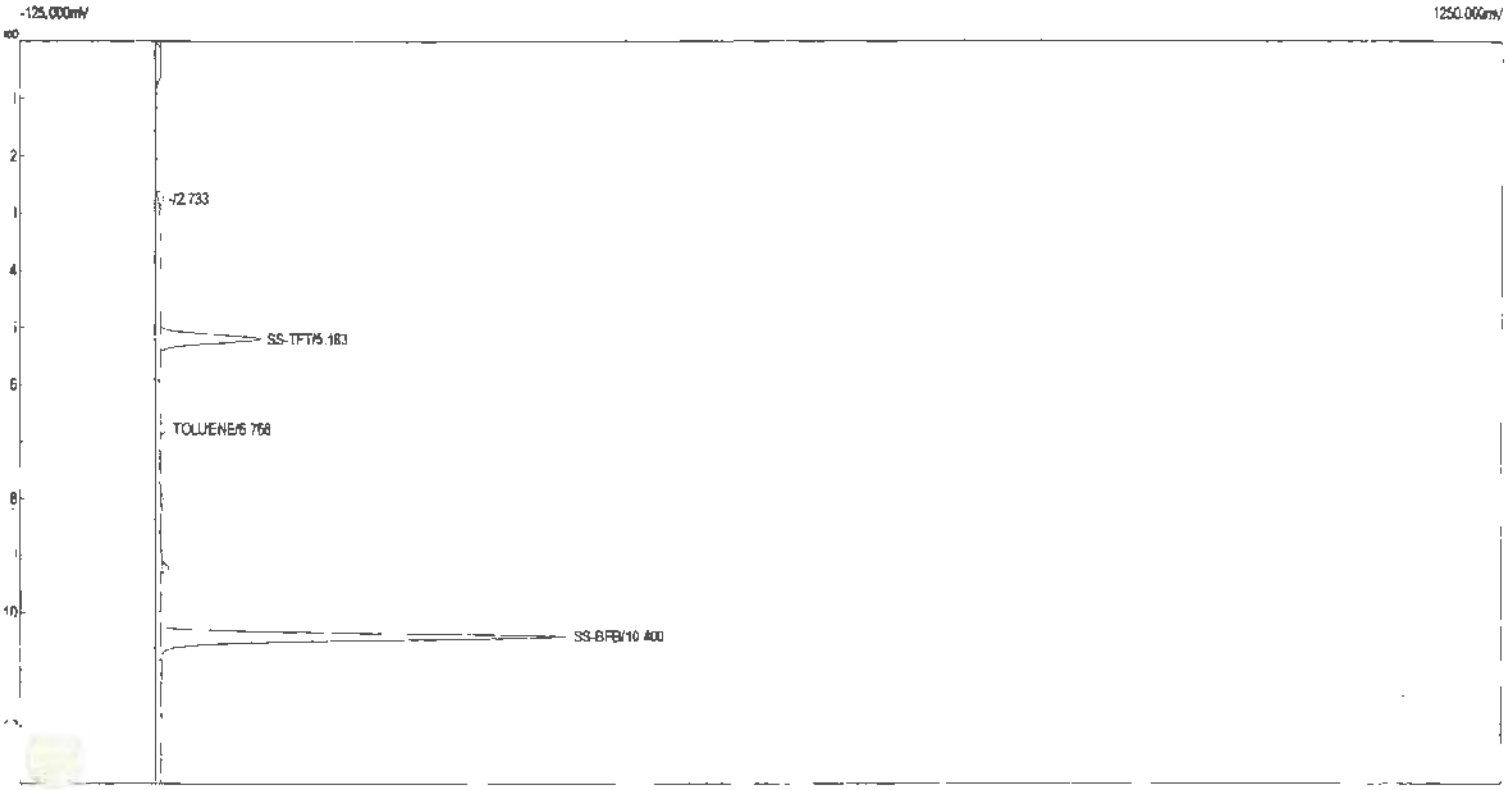
Component	Retention	Area	External	Internal	Units
TT	5.166	741.399	8.29	8.2912	ppb
3!	10.400	1505.316	6.60	6.6023	ppb
		2246.715	14.89	14.8935	

nalysis date: 03/19/2002 13:17.19
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: 0318P28.CHR ()
Sample: ILA025/0314CH2M
Operator: MAP



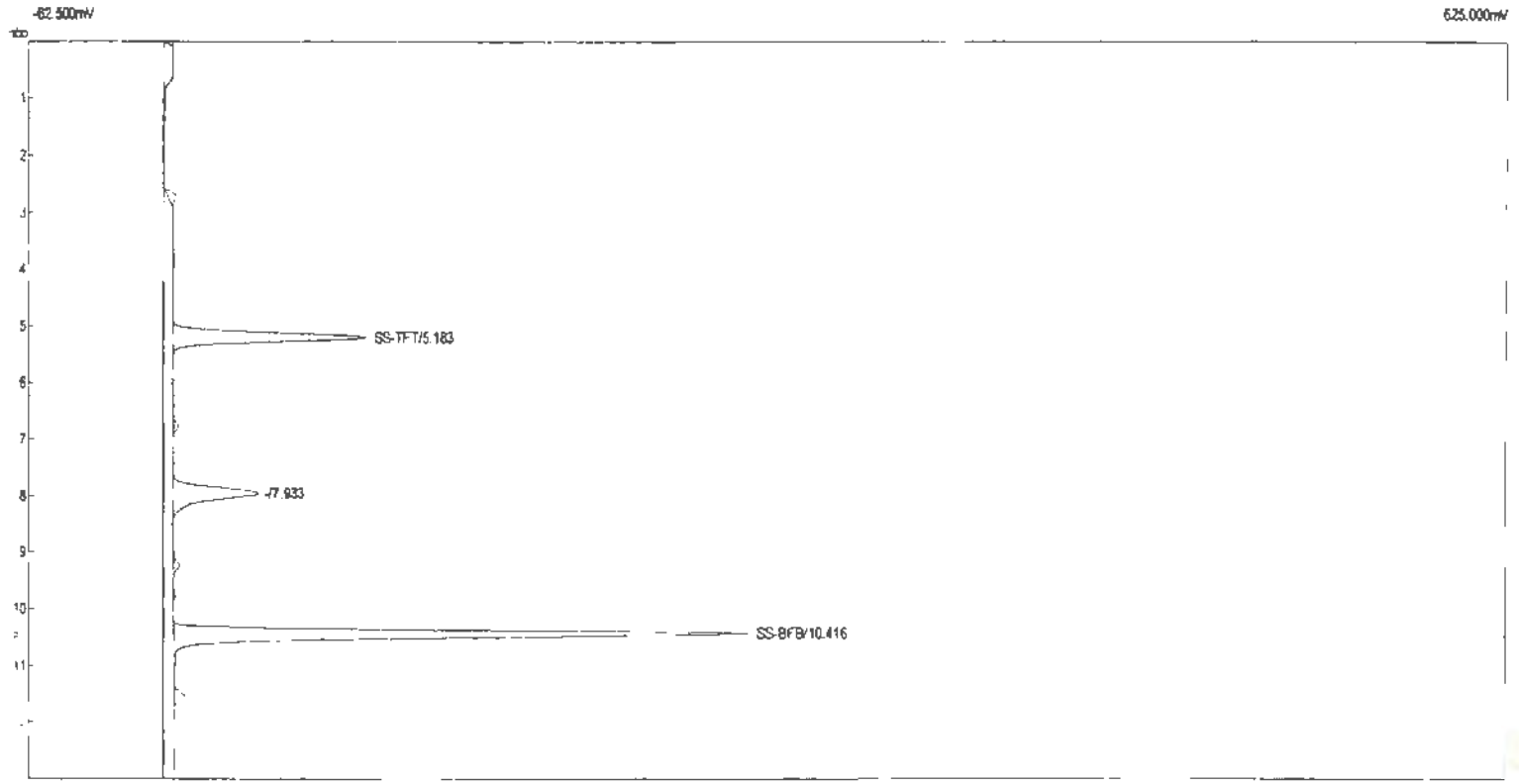
Component	Retention	Height	Area	External	Internal	Units
TFT	5.166	131.148	1416.602	15.84	15.8421	ppb
BFB	10.400	665.429	5551.930	24.35	24.3506	ppb
			6968.532	40.19	40.1927	

ıalysis date. 03/19/2002 13.33:32
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: 0318P29.CHR ()
S : ILA027/0314CH2M
(or: MAP



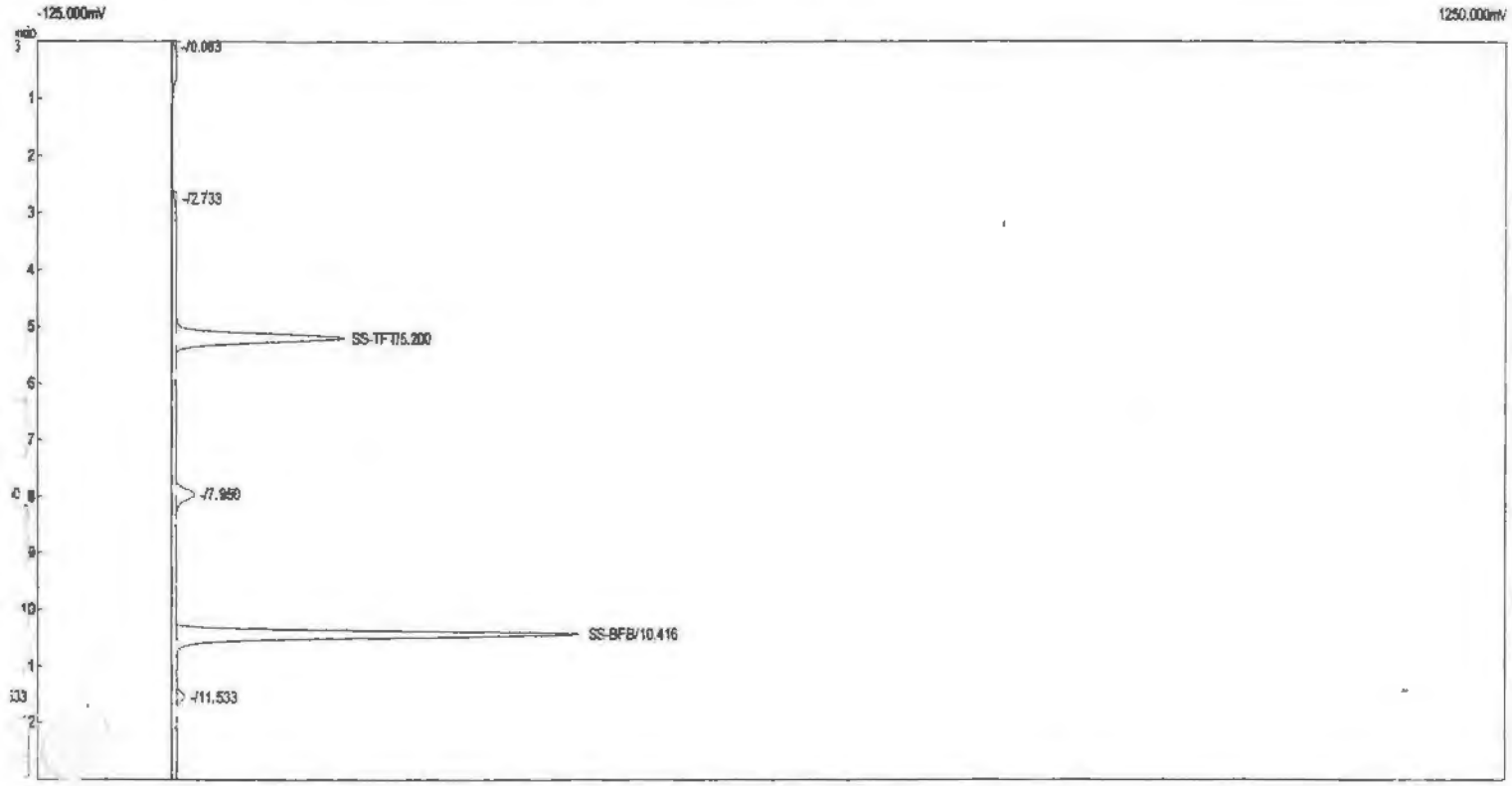
Component	Retention	Height	Area	External	Internal	Units
TFT	5.163	94.418	1014.244	11.34	11.3425	ppb
LUENE	6.766	7.133	65.064	0.80	0.8000	ppb
-BFB	10.400	379.078	3321.164	14.57	14.5665	ppb
			4400.472	26.71	26.7090	

nalysis date: 03/19/2002 14:06:48
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: 0316P30.CHR ()
Sample: ILA028/0314CH2M
Operator: MAP



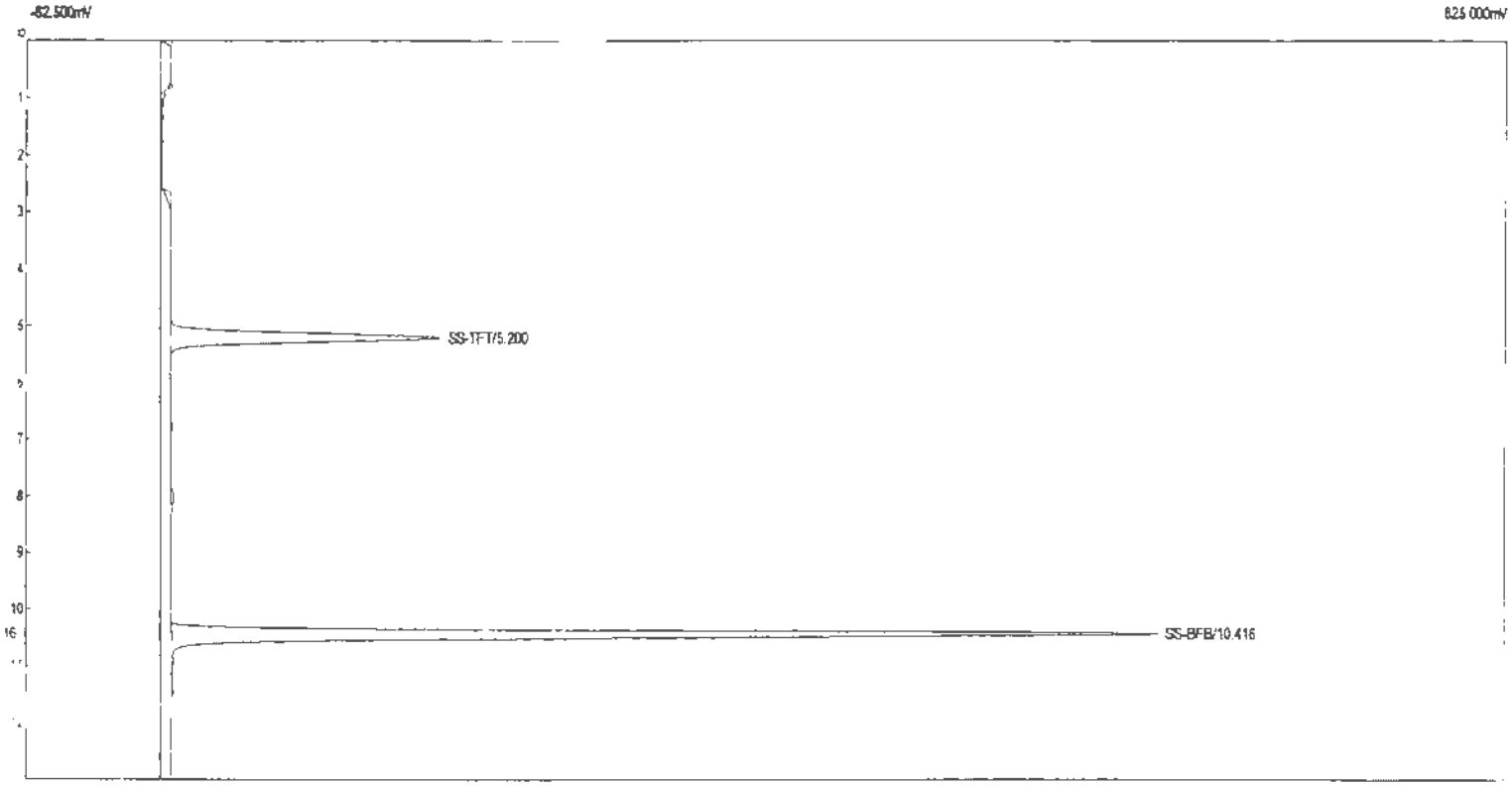
Component	Retention	Height	Area	External	Internal	Units
-TFT	5.183	90.932	983.713	11.00	11.0010	ppb
-BFB	10.416	268.227	2401.838	10.53	10.5344	ppb
			3385.551	21.54	21.5354	

nalysis date: 03/19/2002 14:36:54
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: 0318P31.CHR ()
S[illegible]e: JLA029/0314CH2M
[illegible]or: MAP



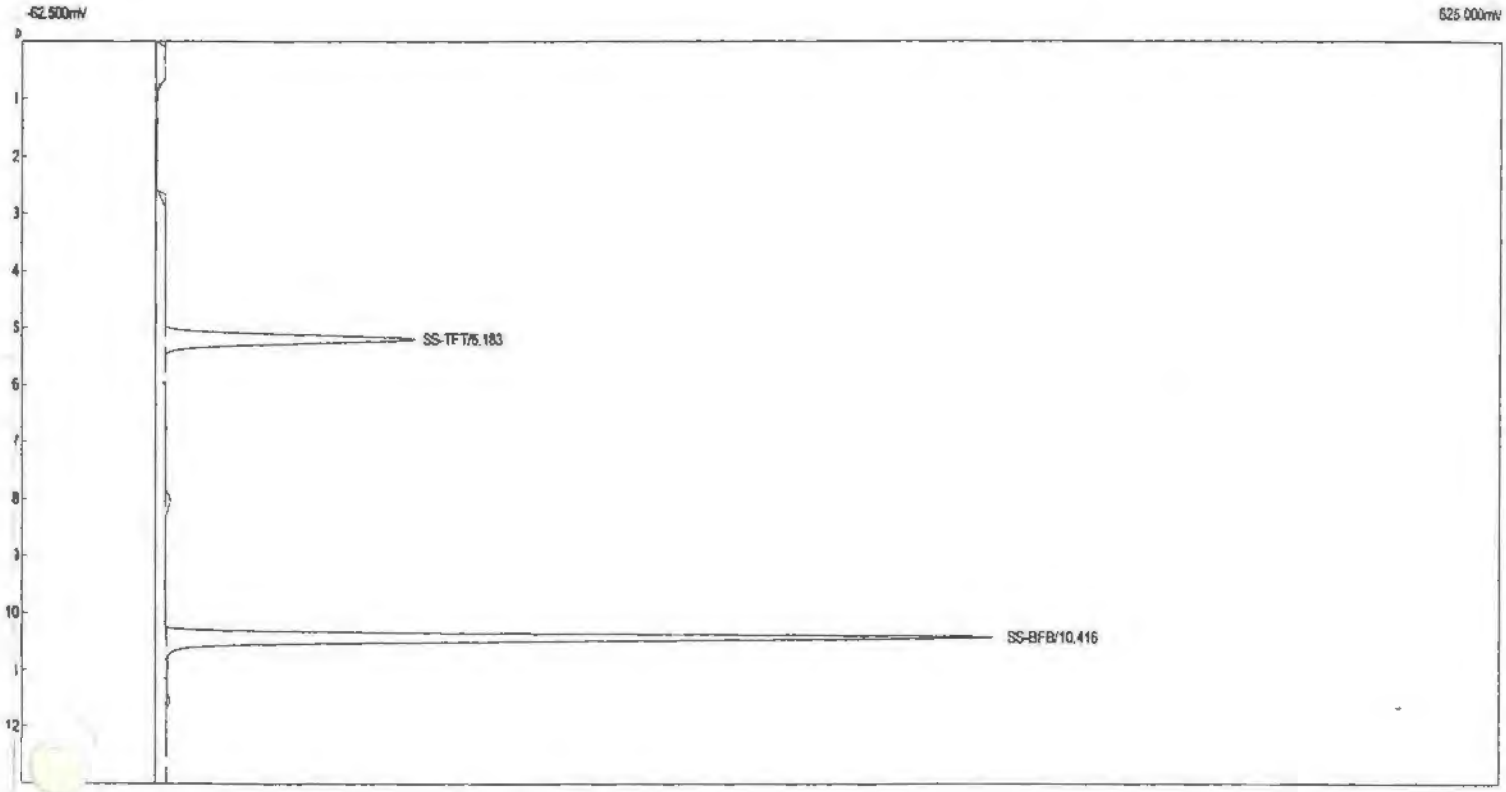
Component	Retention	Area	External	Internal	Units
TFT	5.200	1724.620	19.29	19.2890	ppb
S-BFB	10.416	3253.286	14.27	14.2688	ppb
		4978.106	33.56	33.5578	

alysis date: 03/19/2002 14:58:02
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: 0318P32.CHR ()
Sample: JLA030/0314CH2M
Operator: MAP



Component	Retention	Area	External	Internal	Units
-TFT	5.200	1353.578	15.14	15.1373	ppb
-BFB	10.416	3879.734	17.02	17.0164	ppb
		5233.312	32.15	32.1537	

ıalysis date: 03/19/2002 15:20:11
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: 0318P33.CHR ()
Sr[illegible]: JLA031/0314CH2M
C[illegible]r: MAP



Component	Retention	Area	External	Internal	Units
TFT	5.183	1262.136	14.11	14.1147	ppb
BFB	10.416	3234.040	14.18	14.1844	ppb
		4496.176	28.30	28.2991	

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

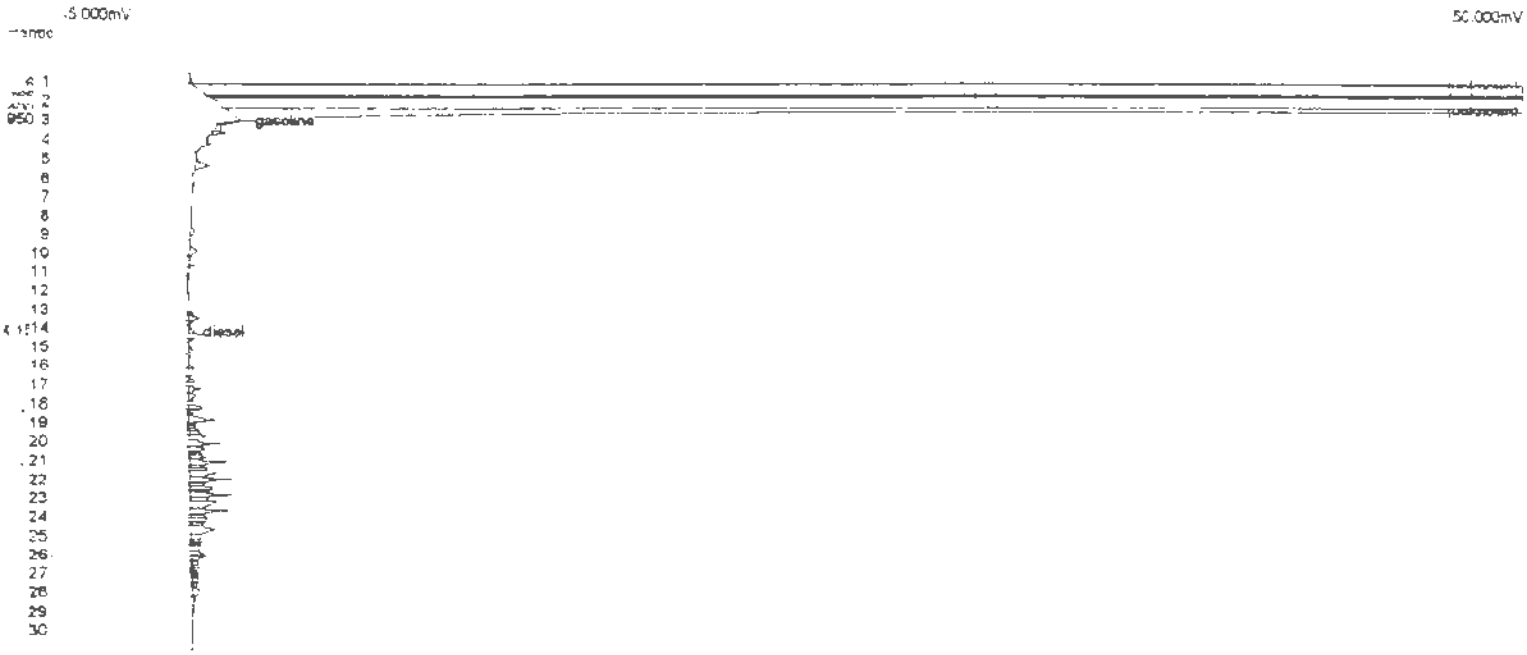
			INITIAL		OPENING			CLOSING		
COMPOUND	DETECTOR	CALIB RANGE	RF	%RSD	AREA	RF	%DIFF	AREA	RF	%DIFF
TPH GASOLINE	FID #2 (gc5)	10 - 30,000	0.26	17.6%	46.95	0.23	8.3%	47.54	0.24	7.1%
TPH GASOLINE	FID #3 (gc5)	10 - 30,000	0.36	15.0%	141.49	0.35	2.3%	73.67	0.37	1.7%
TPH GASOLINE	FID #4 (gc5)	10 - 30,000	0.31	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

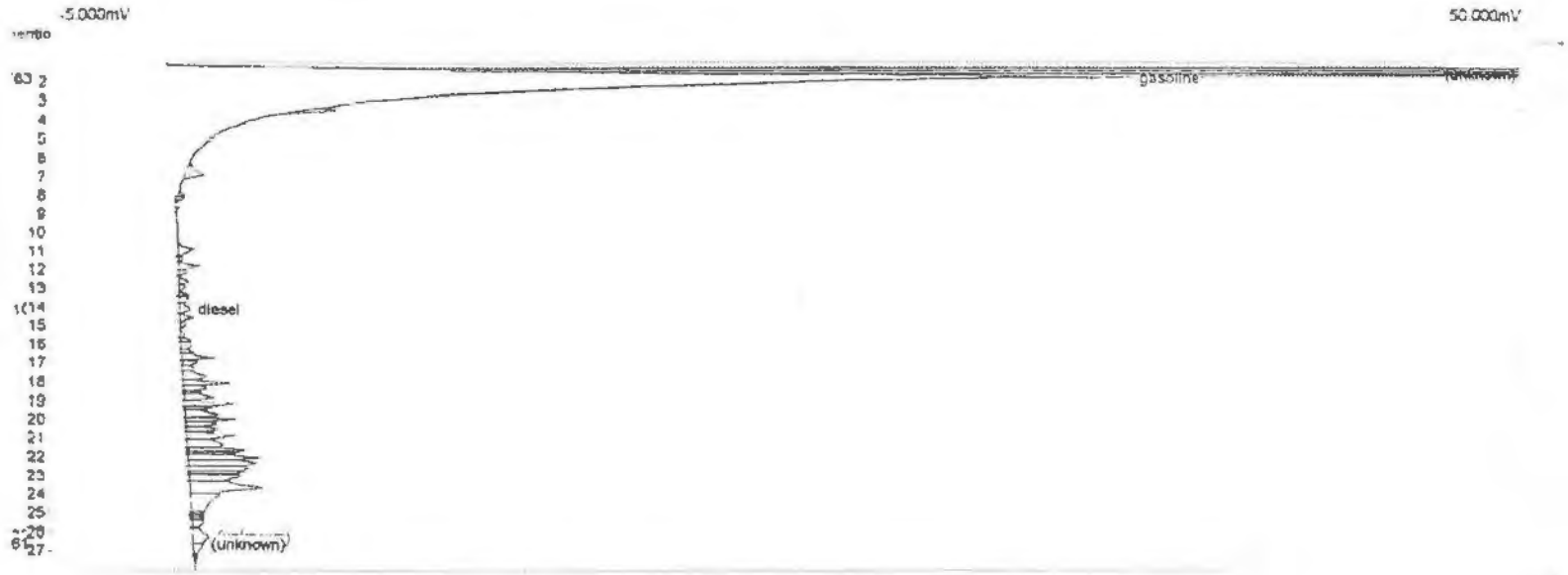
ON SITE LABS, INC.
PMB 627 HC-01 BOX 29030 CAGUAS P.R. 00725
TELEPHONE (787) 72[illegible]-0329 FAX 789-3858

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
ner: N2
. file: 0308fb2.CHR ()
.mple: 50/100 ppm G/D OPEN
Operator: MAP



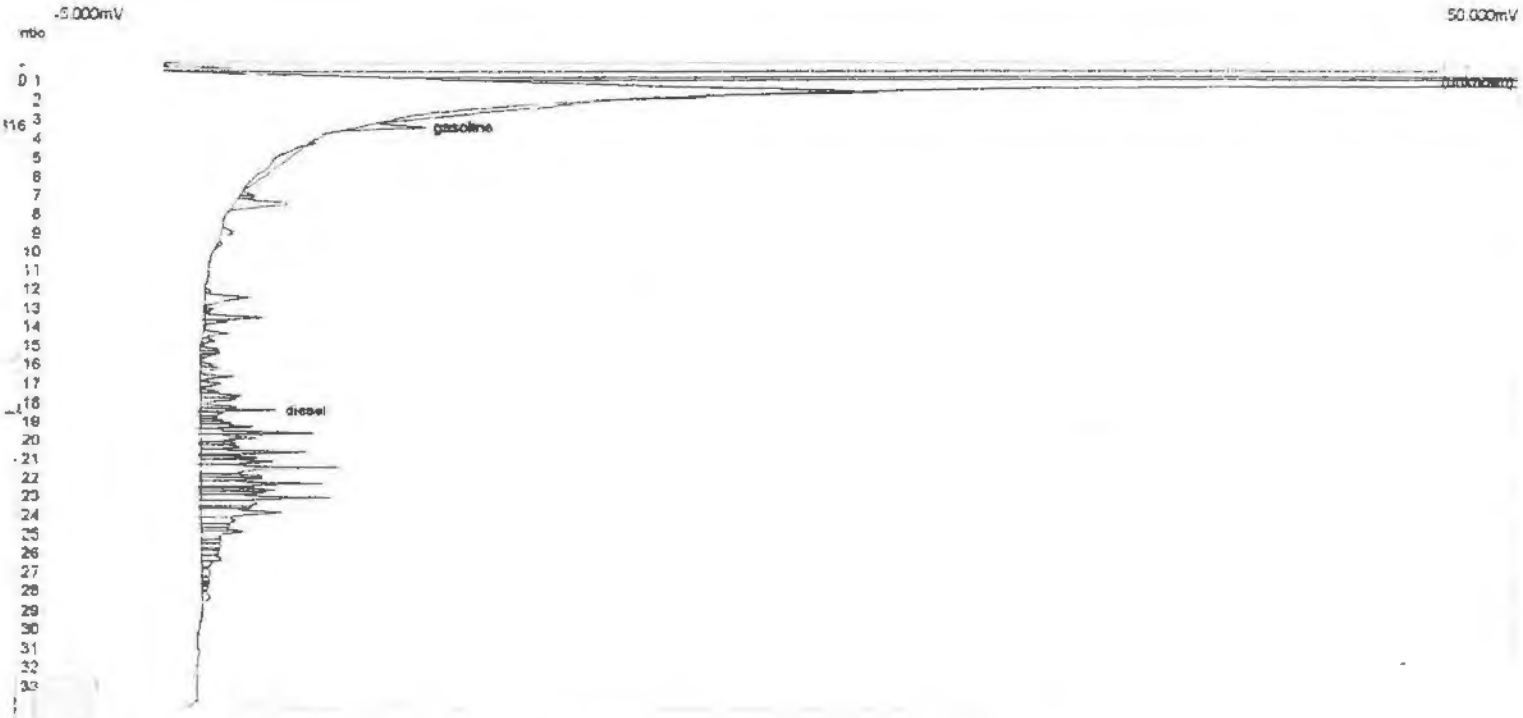
C nent	Retention	Area	External	Units
asoline	2.950	46.953	45.85	
iesel	14.150	310.697	111.92	ppm
		357.651	157.76	

Lab name: On Site Labs Inc
alysis 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



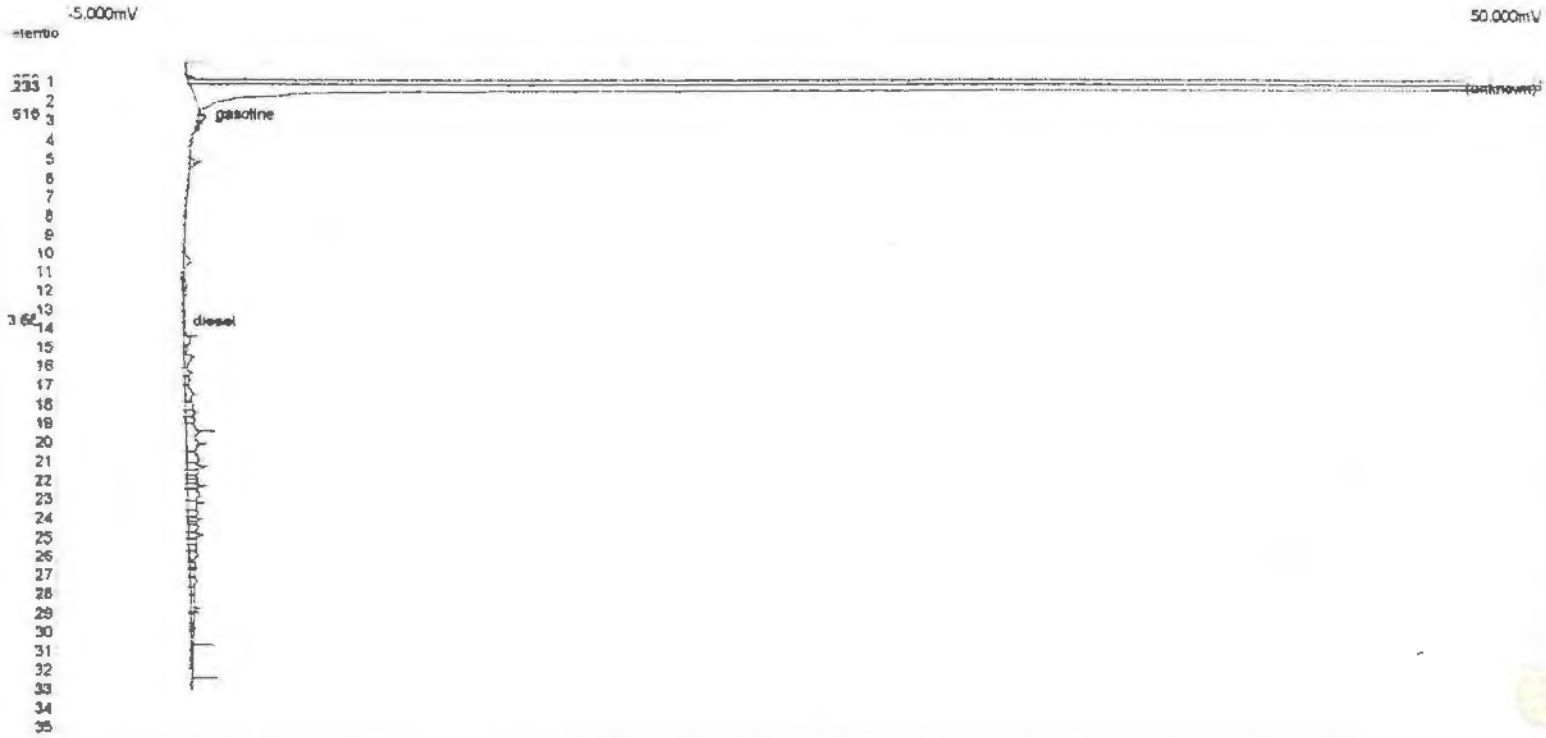
Component	Retention	Area	External	Units
asoline	1.783	141.486	97.71	
esel	14.100	669.089	226.35	ppm
		810.575	324.06	

Lab name: On Site Labs Inc
alysis 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
ile: 0308fd2.CHR ()
nple: 100/200 ppm G/D open
Operator: MAP



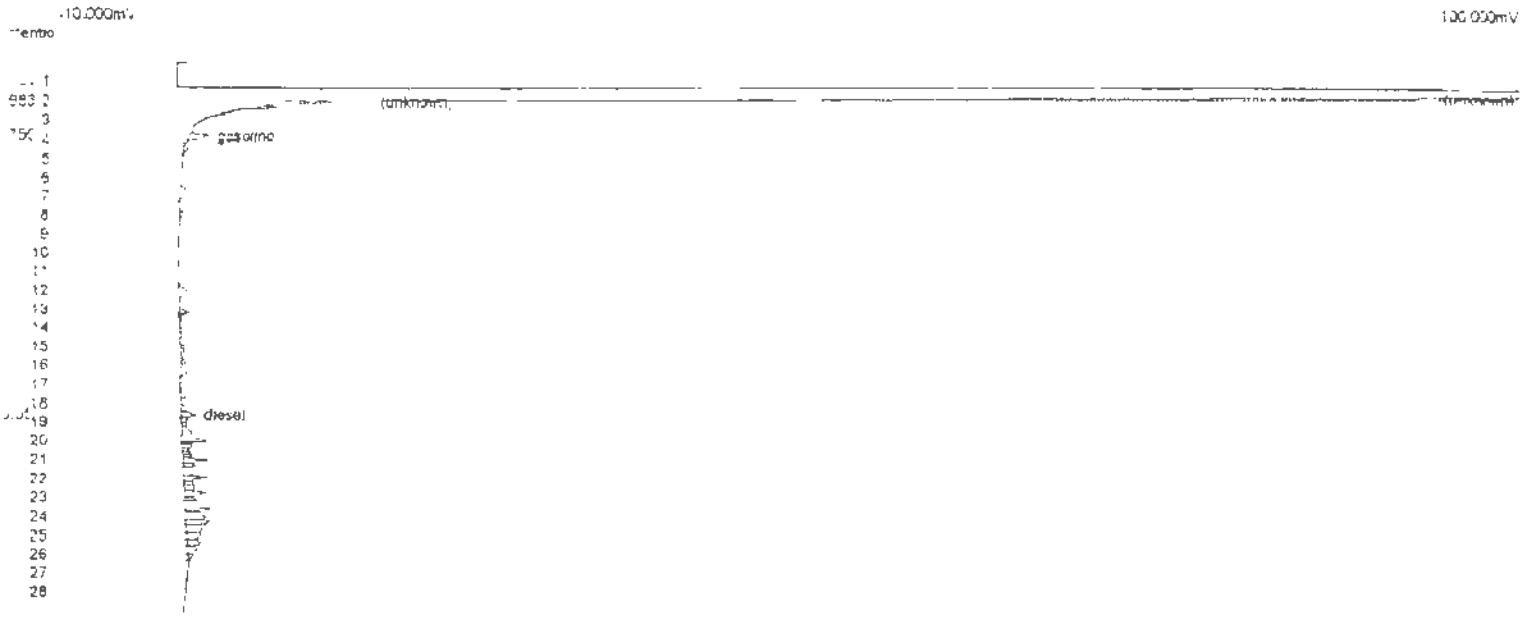
Component	Retention	Area	External	Units
soline	3.316	123.920	101.24	
sel	18.266	548.526	226.29	ppm
		672.446	327.53	

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



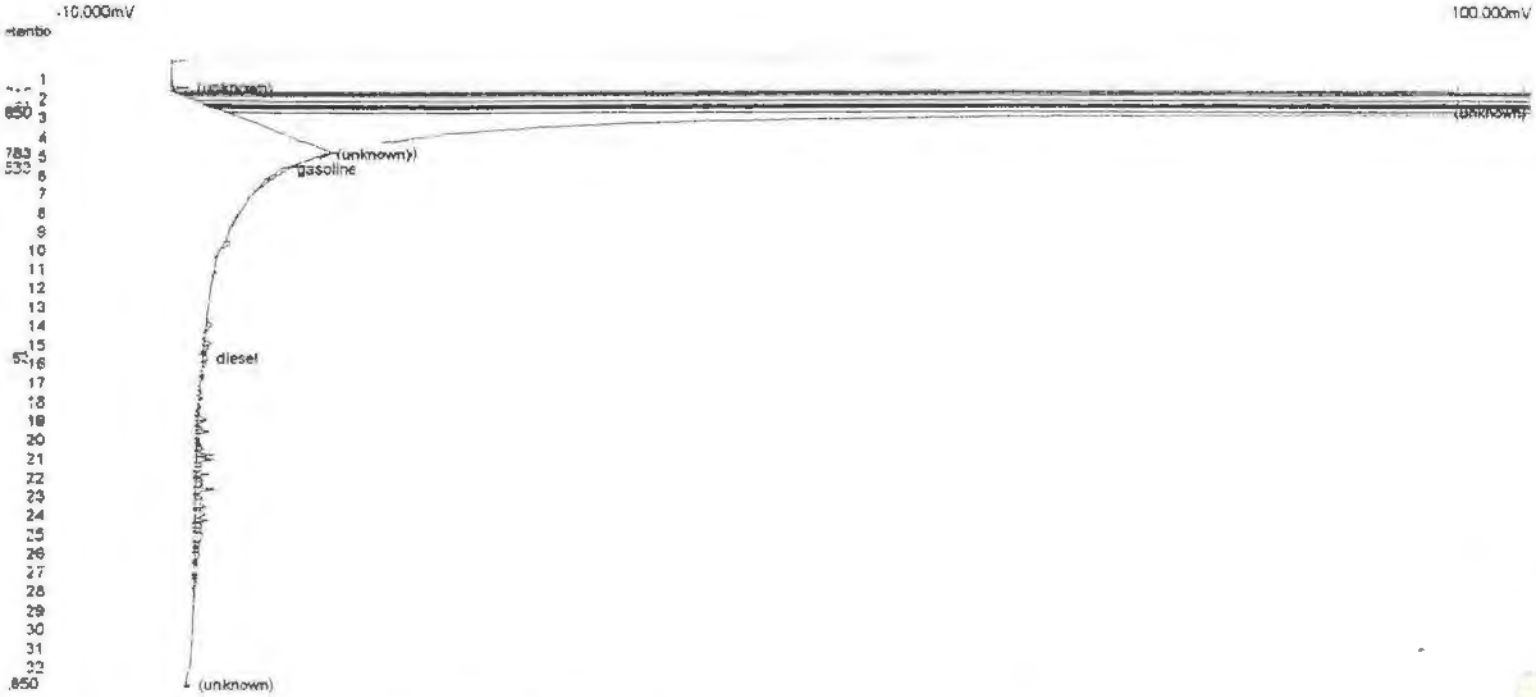
Component	Retention	Area	External	Units
asoline	2.816	47.544	46.43	
iesel	13.550	275.384	99.20	ppm
		322.928	145.63	

Lab name: On Site Labs Inc
nalysis 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
ner: N2
file: 0308fc18.CHR ()
nple: 50/100 ppm G/D CLOSE
Operator: MAP



Component	Retention	Area	External	Units
8	3.750	73.665	50.87	
JS+	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

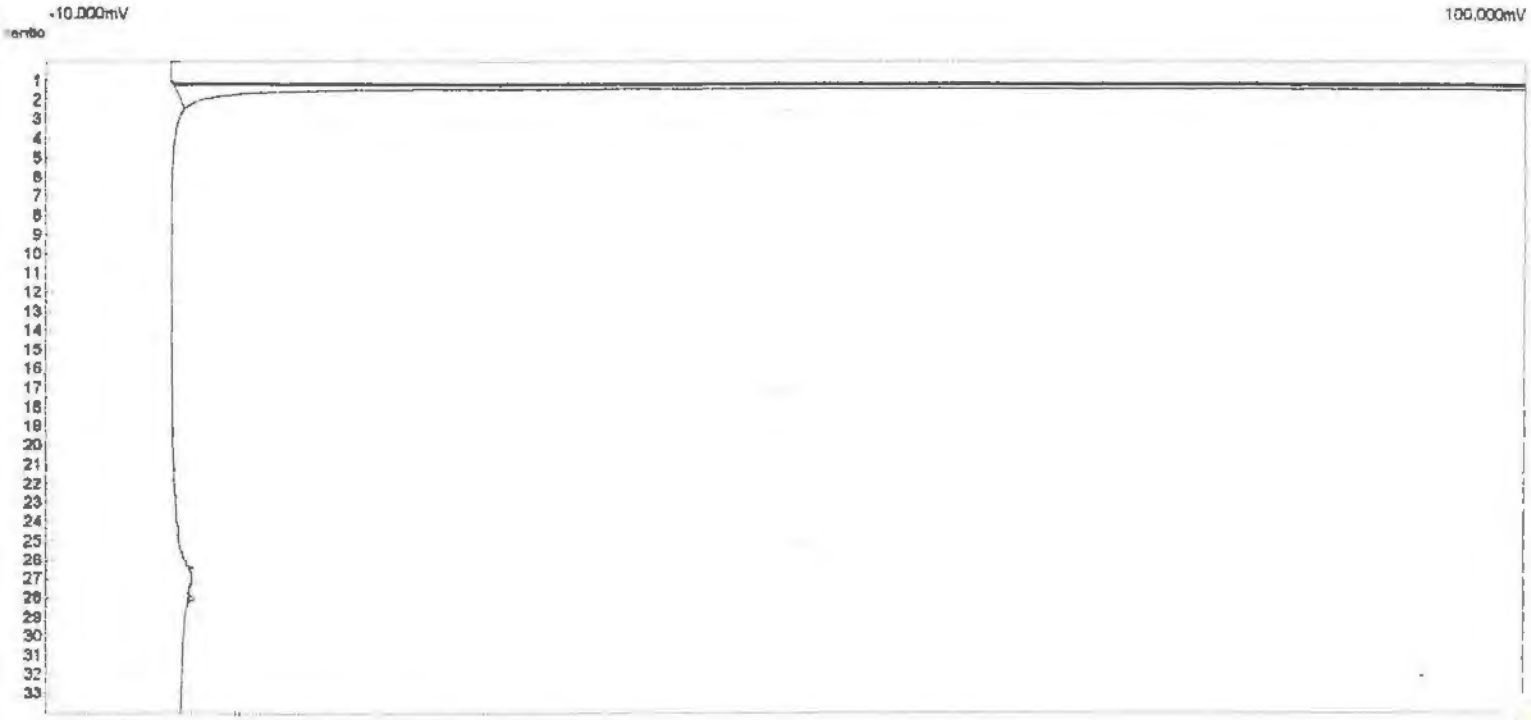


Component	Retention	Area	External	Units
asoline	5.533	57.456	46.94	
esel	15.633	257.443	106.21	ppm
		314.899	153.15	

Lab name: On Site Labs Inc
Analysis 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
[illegible] file: 0308fb13.CHR ()
[illegible]ple: METHOD BLANK
[illegible]tor: MAP

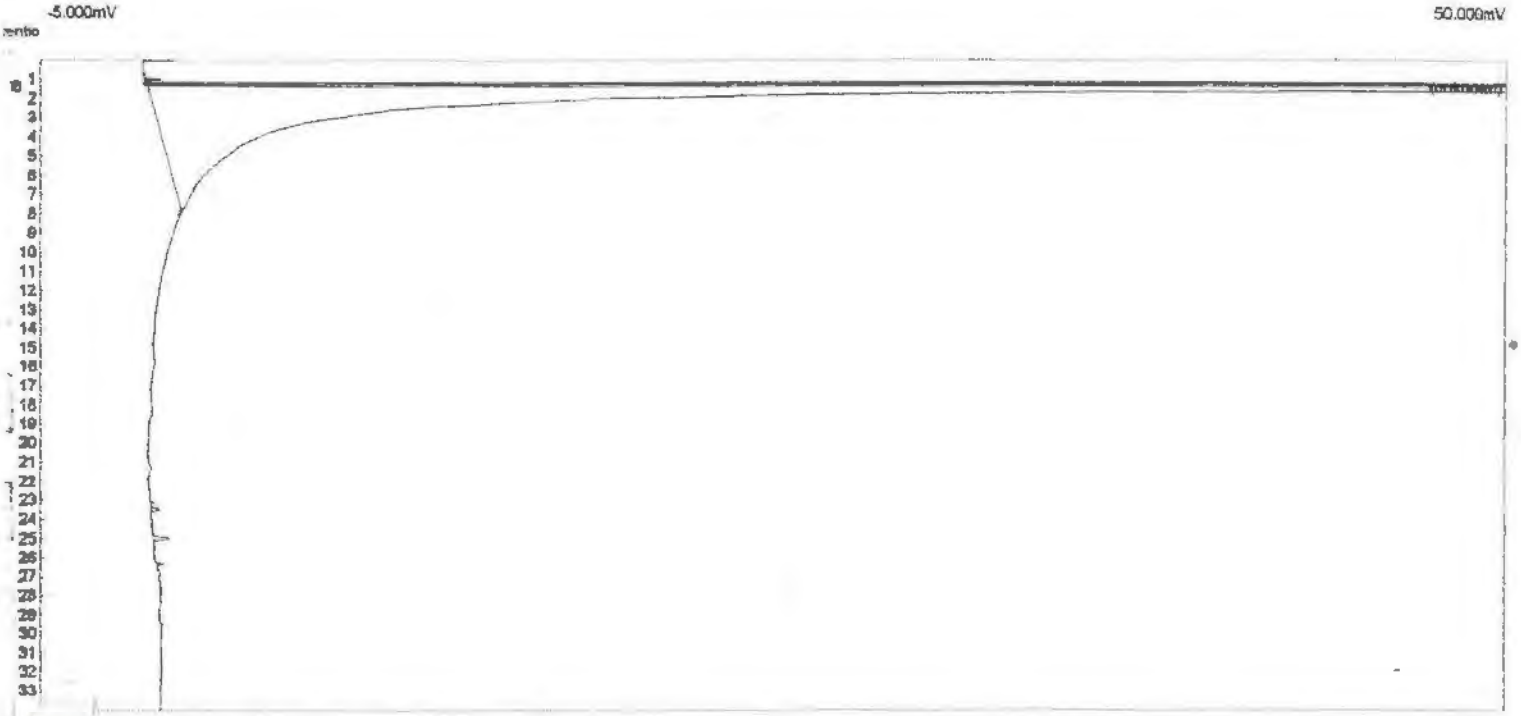
[illegible]onent	Retention	Area	External	Units
		0.000	0.00	

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	

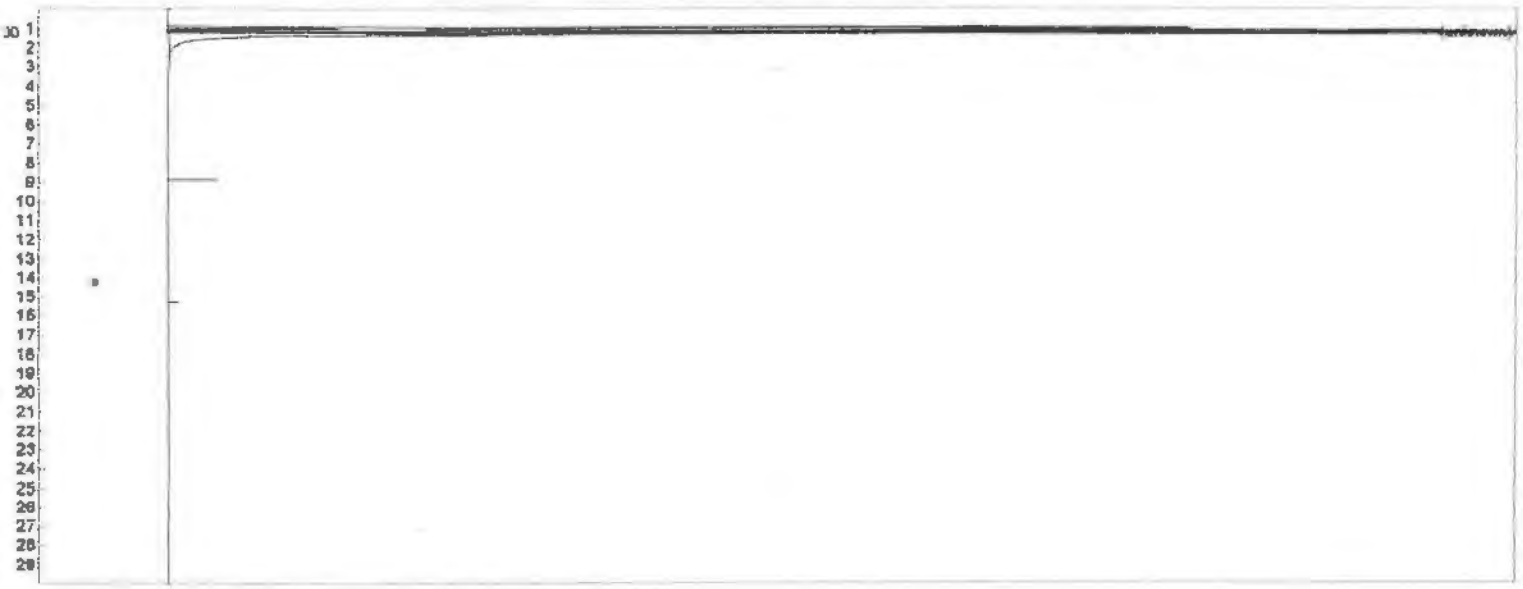
Lab name: On Site Labs Inc
alysis date: 03/08/2002 15:27:04
Method: EPA 8015B mod.
Lab ID: GC - 5
Description: FID 4 - Ch. 4
Column: XTI-5, 30m, 0.53mm, 1.5um
Carrier: N2
e: 0308fd13.CHR ()
le: METHOD BLANK
Operator: MAP



Component	Retention	Area	External	Units
		0.000	0.00	

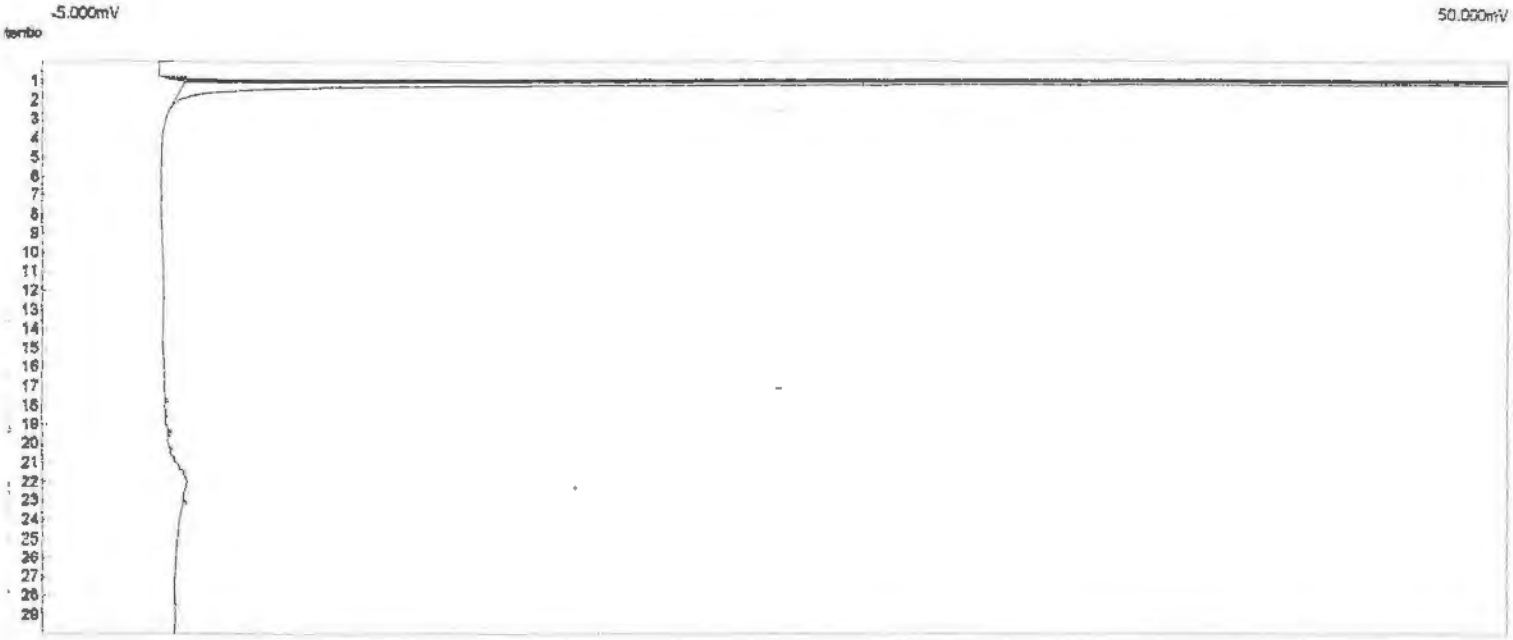
Lab name: On Site Labs Inc
nalysis date: 03/08/2002 16:07:09
Method: EPA 8015B mod.
Lab ID: GC - 5
Description: FID2 - Ch. 2
Column: XTI-5, 30m, 0.53mm, 1.5um
Carrier: N2
Data file: 0308fb14.CHR ()
Sample: JLA001/0308CH2M
Operator: MAP

-10.000mV 100.000mV



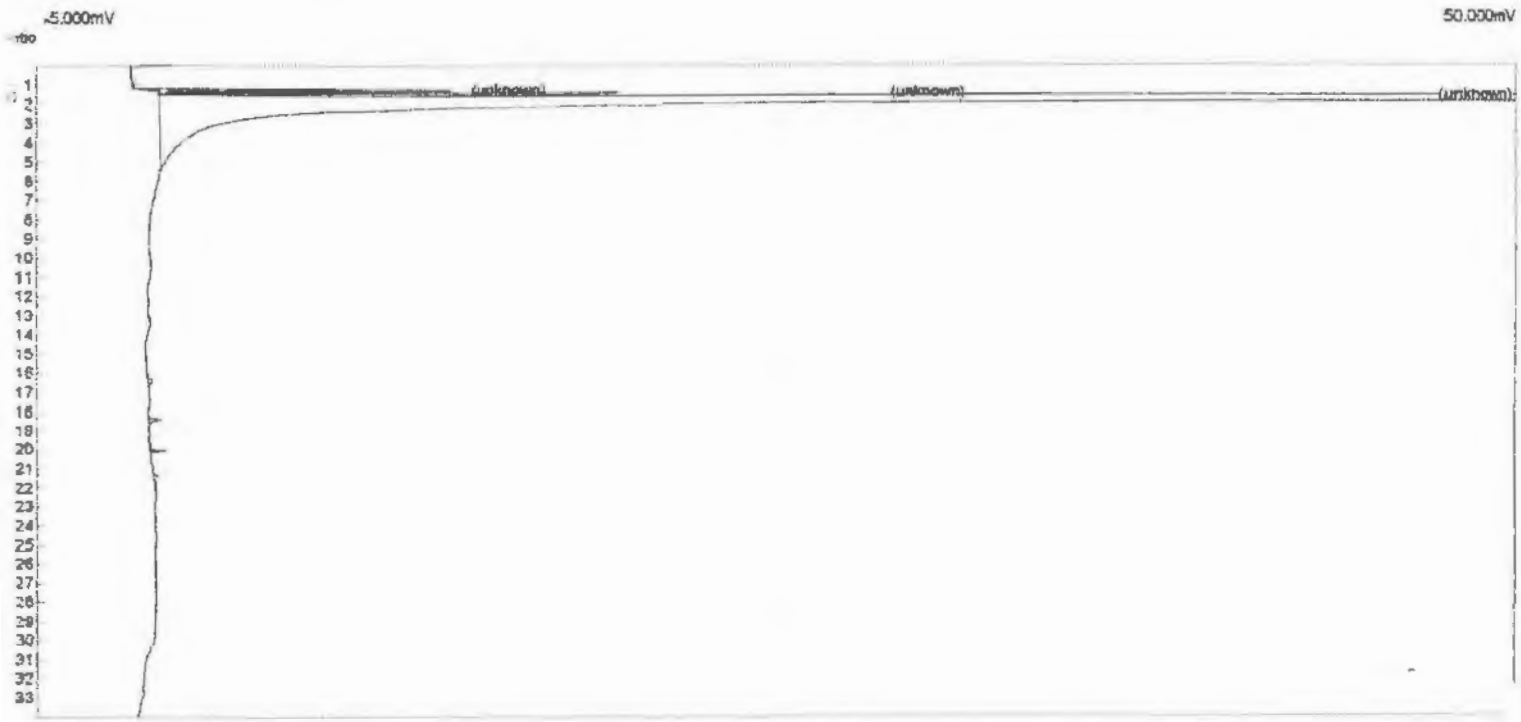
Component	Retention	Area	External	Units
		0.000	0.00	

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
D le: 0308fc14.CHR ()
ple: JLA002/0308CH2M
Operator: MAP



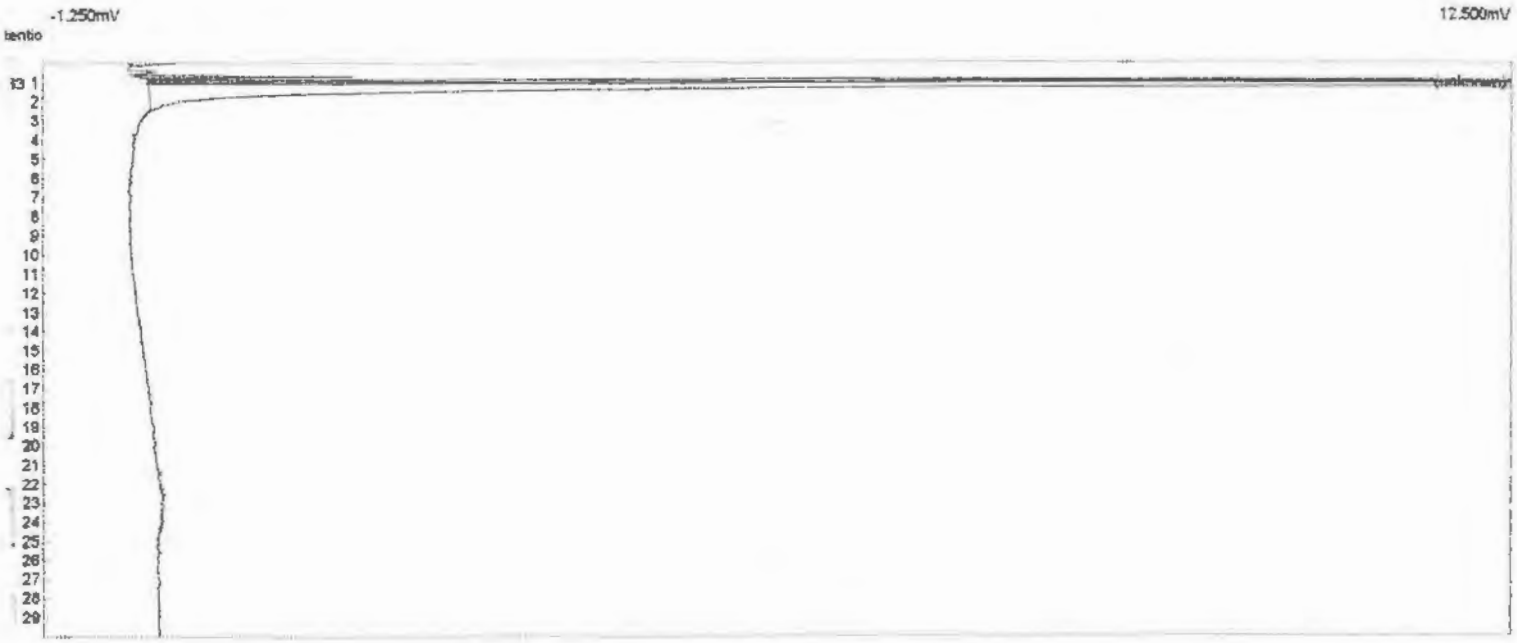
Component	Retention	Area	External	Units
		0.000	0.00	

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



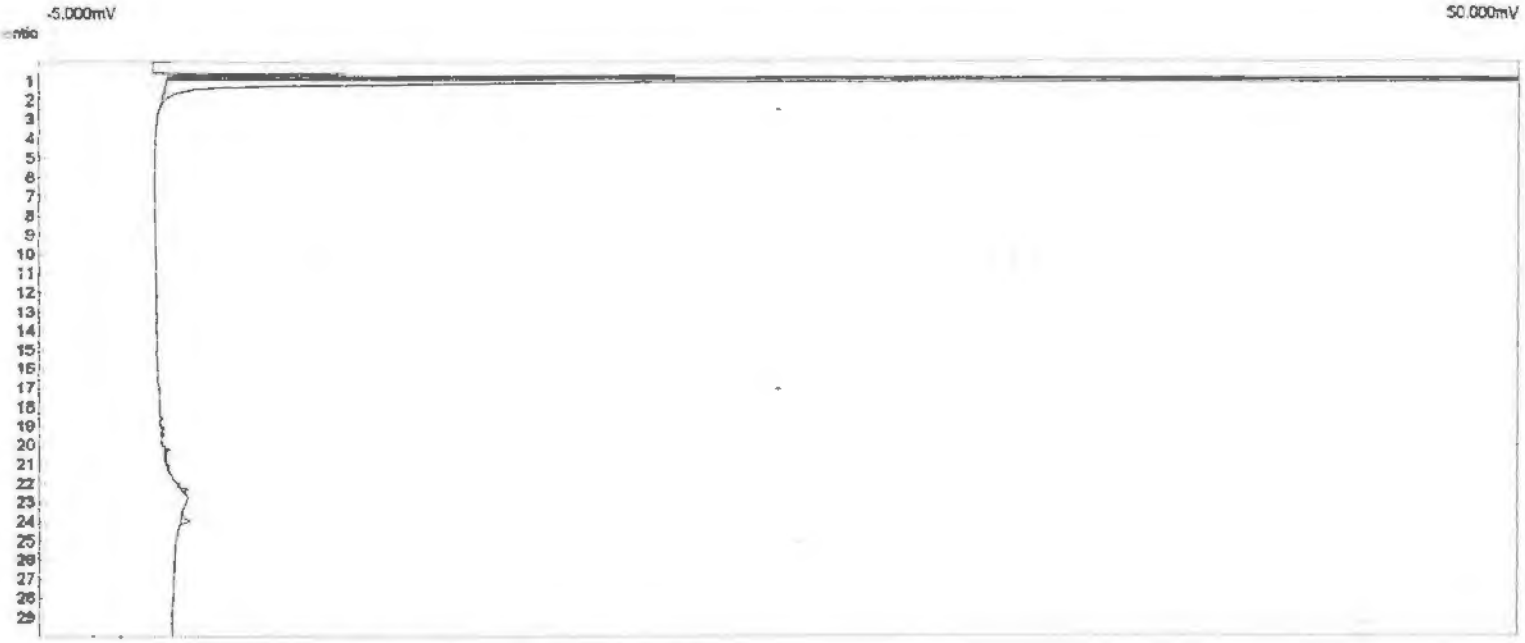
Component	Retention	Area	External	Units
		0.000	0.00	

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
[illegible]e: 0308fb15.CHR ()
[illegible]le: JLA004/0308CH2M
Operator: MAP



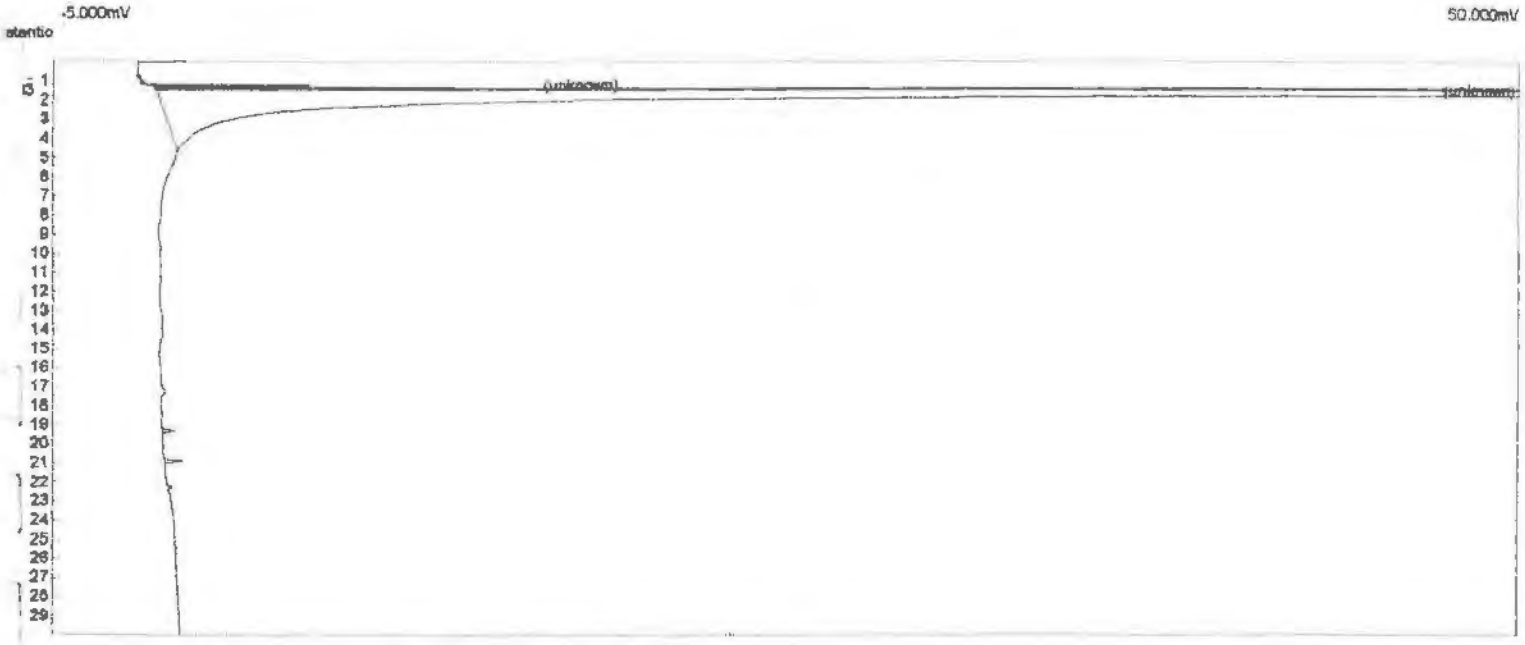
Component	Retention	Area	External	Units
		0.000	0.00	

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	

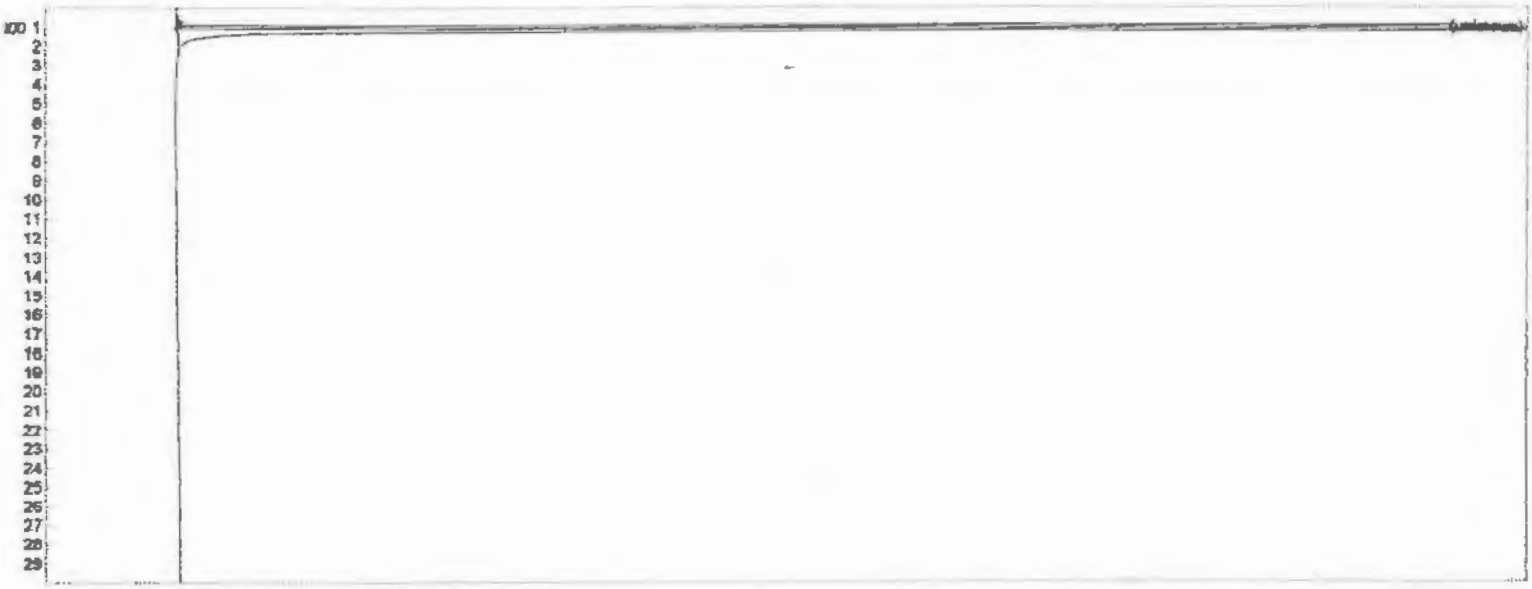
Lab name: On Site Labs Inc
ıalysis date: 03/08/2002 16:46:25
Method: EPA 8015B mod.
Lab ID: GC - 5
Description: FID 4 - Ch. 4
Column: XTI-5, 30m, 0.53mm, 1.5um
Carrier: N2
File: 0308fd15.CHR ()
Sample: JLA006/0308CH2M
Operator: MAP



Component	Retention	Area	External	Units
		0.000	0.00	

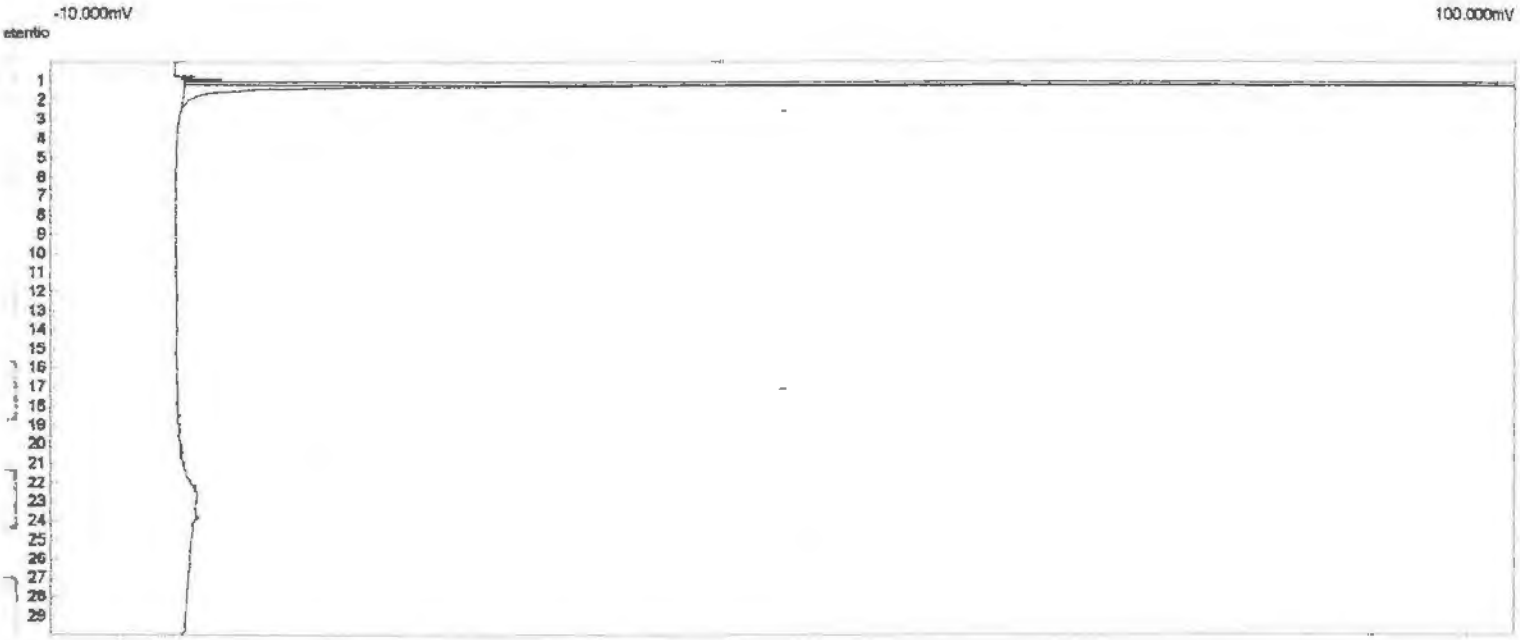
Lab name: On Site Labs Inc
alysis date: 03/08/2002 17:29:13
Method: EPA 8015B mod.
Lab ID: GC - 5
Description: FID2 - Ch. 2
Column: XTI-5, 30m, 0.53mm, 1.5um
Carrier: N2
Data file: 0308fb18.CHR ()
Sample: JLA007/0308CH2M
Operator: MAP

-10.000mV 100.000mV



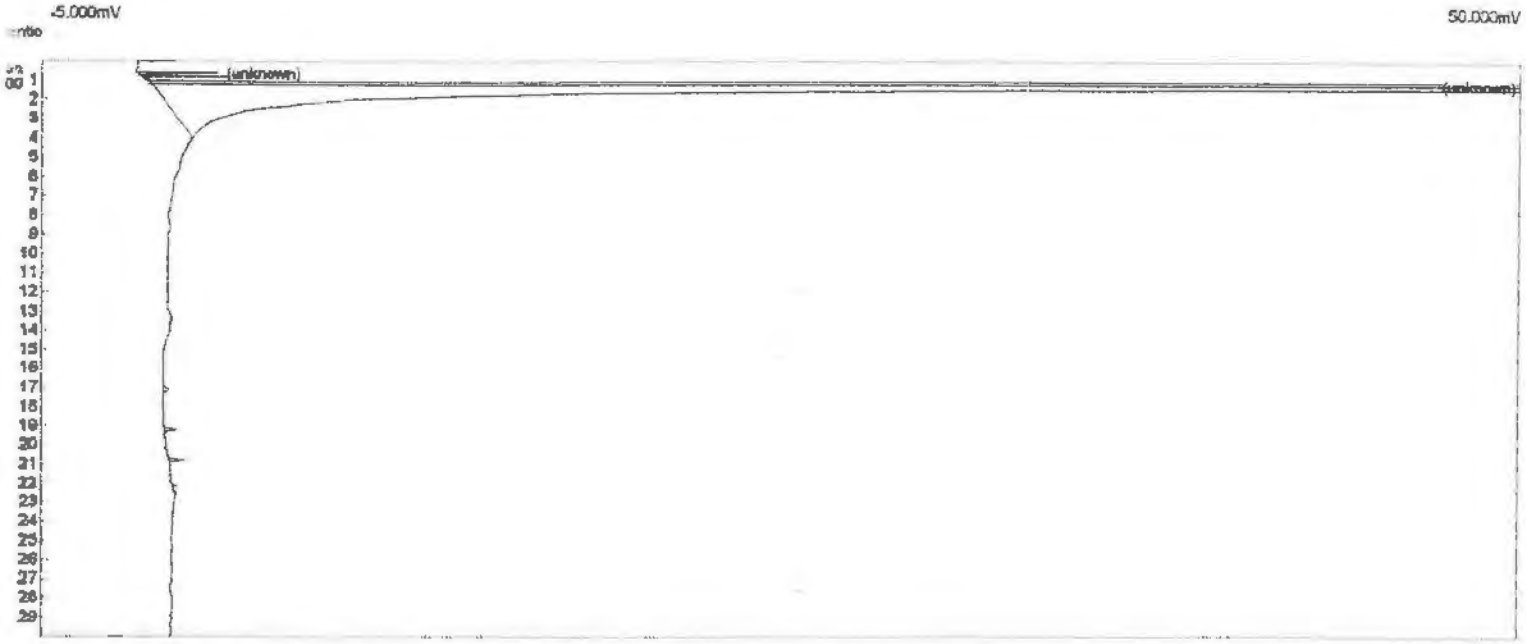
Component	Retention	Area	External	Units
		0.000	0.00	

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
ier: N2
ile: 0308fc16.CHR ()
ple: JLA008/0308CH2M
Operator: MAP



Co nent	Retention	Area	External	Units
		0.000	0.00	

Lab name: On Site Labs Inc
alysis 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

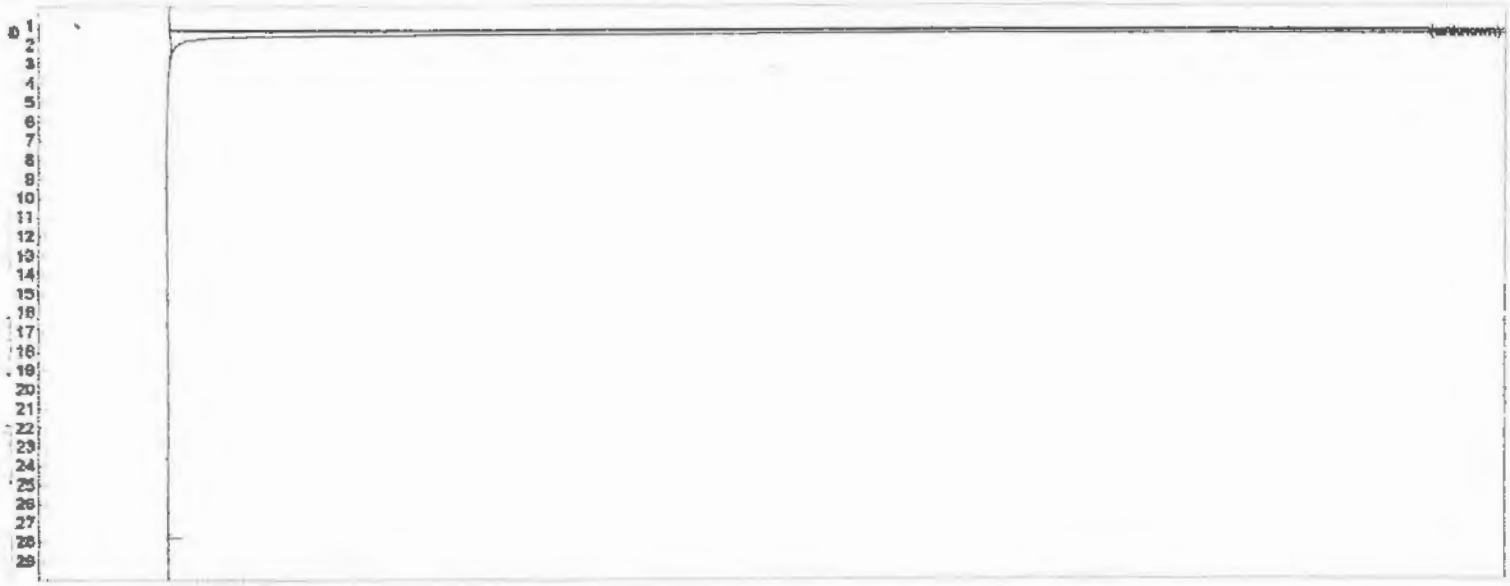


Component	Retention	Area	External	Units
		0.000	0.00	

Lab name: On Site Labs Inc
alysis 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: JLA0970308CH2M
Operator: MAP

JLAØ1Ø K2

-10.000mV 100.000mV
Potentio



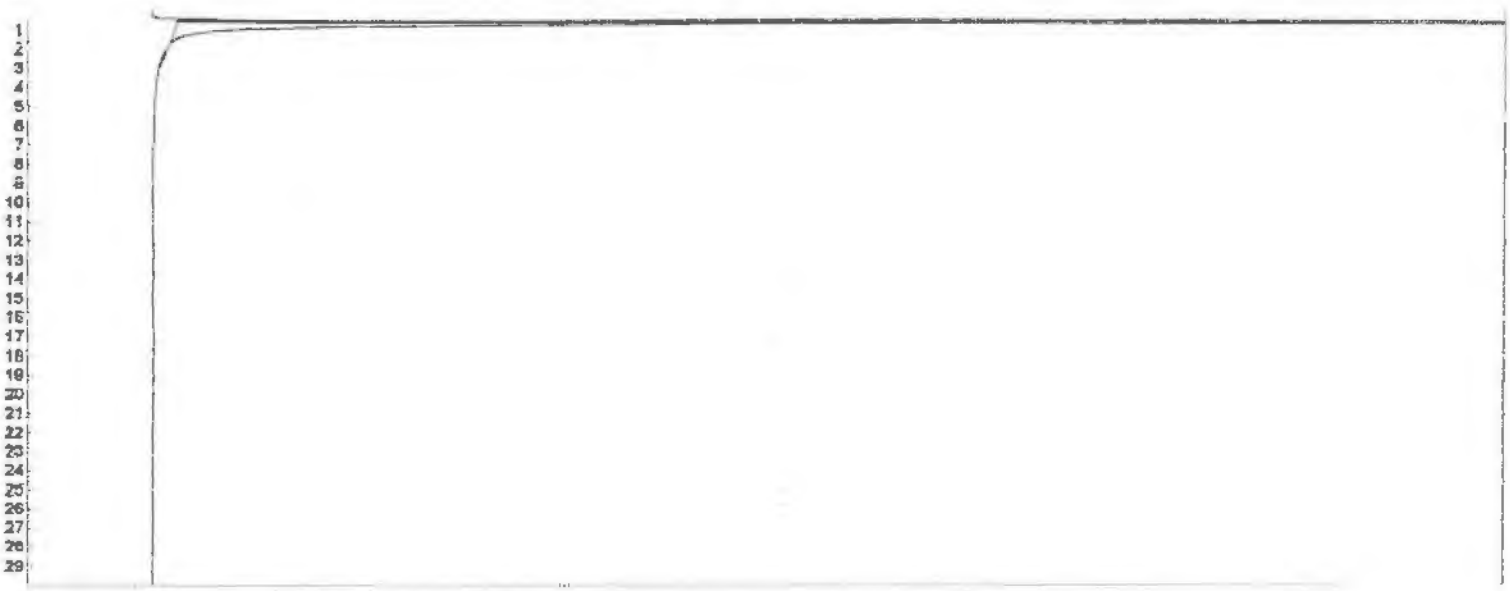
Component	Retention	Area	External	Units
		0.000	0.00	

Lab name: On Site Labs Inc
Analysis date: 03/08/2002 16:02:23
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
Retentio

100.000mV



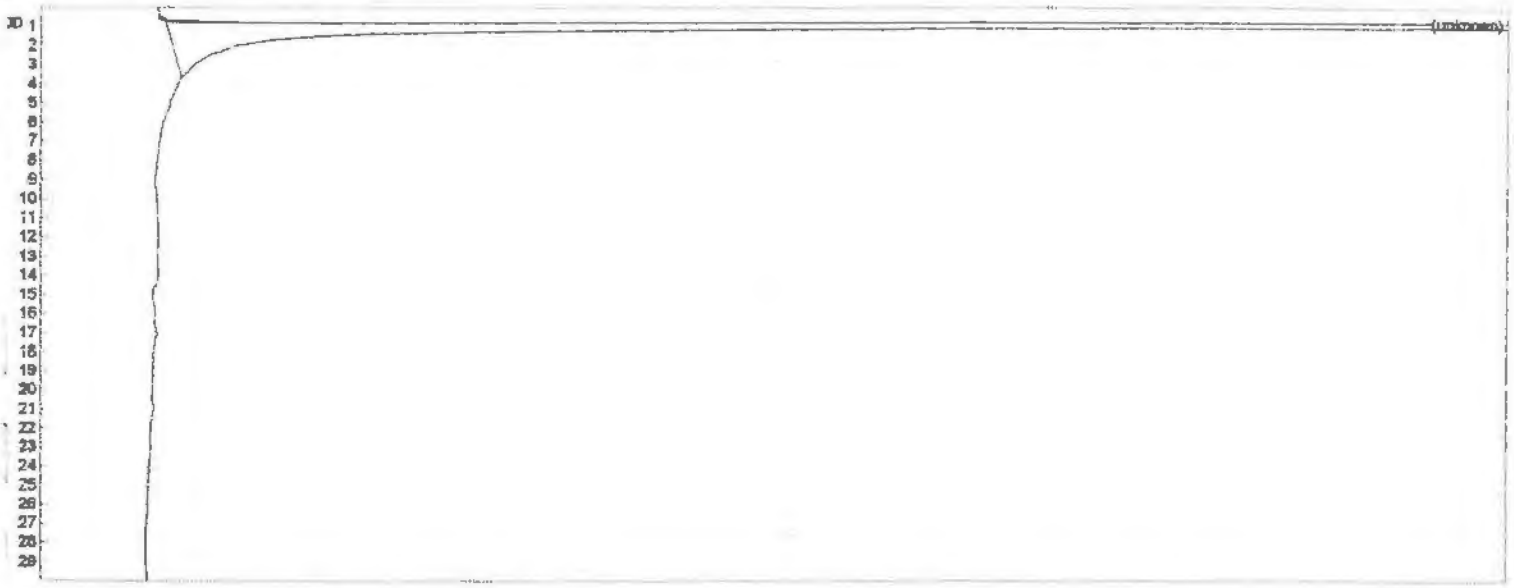
Component	Retention	Area	External	Units
		0.000	0.00	

Lab name: On Site Labs Inc
nalysis 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
D[illegible]e: 0308fd17.CHR ()
[illegible]ple: ~~JLA009~~/0308CH2M
Operator: MAP

HLA030
KA

-0.000mV
entio

50.000mV



Component	Retention	Area	External	Units
		0.000	0.00	

QA/QC REPORT - CALIBRATION DATA

OSL Project #0210308CH2M
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

ON SITE LABS, INC
PMB 627 HC-01 BOX 29030, CAGUAS, P.R. 00725
TELEPHONE (787) 720-0320 FAX 789-3858

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

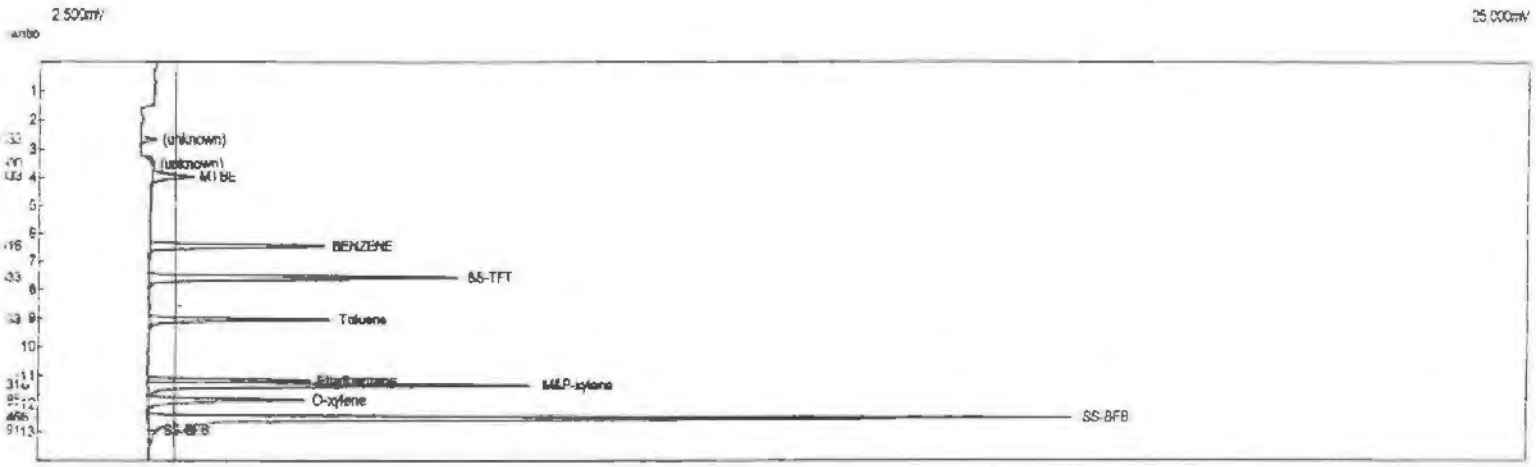
COMPOUND	SPK CONC (ppb)	MS CONC (ppb)	%REC MS	MSD CONC (ppb)	%REC MSD	RPD	ACCEPTABLE RPD	ACCEPTABLE RECOVERY
BENZENE	10	11.7	117%	12.1	121%	3%	20%	82% - 117%
TOLUENE	10	12.2	122%	12.8	128%	5%	20%	87% - 120%
ETHYLBENZENE	10	13.1	131%	13.2	132%	1%	20%	83% - 131%
TOTAL XYLENES	30	39.0	130%	39.9	133%	2%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

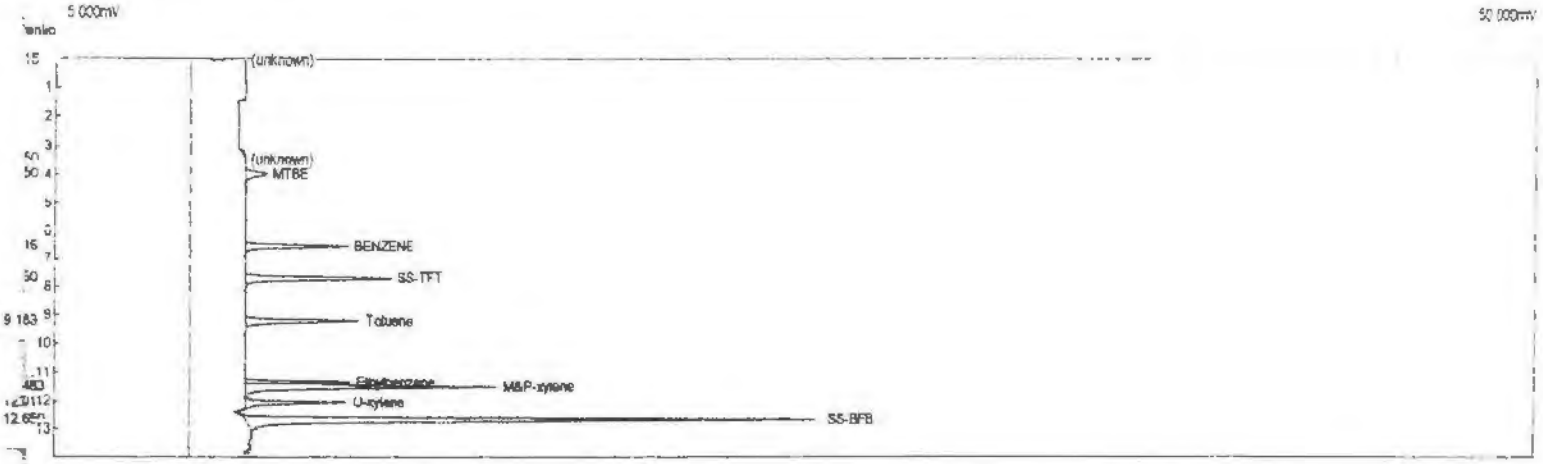
ON SITE LABS, INC
PMB 627, RC-01 BOX 29030, CAGUAS, P.R. 00725
TELEPHONE (787) 720-0329 FAX 789-3858

Lab name: On Site Labs Inc
nalysis 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



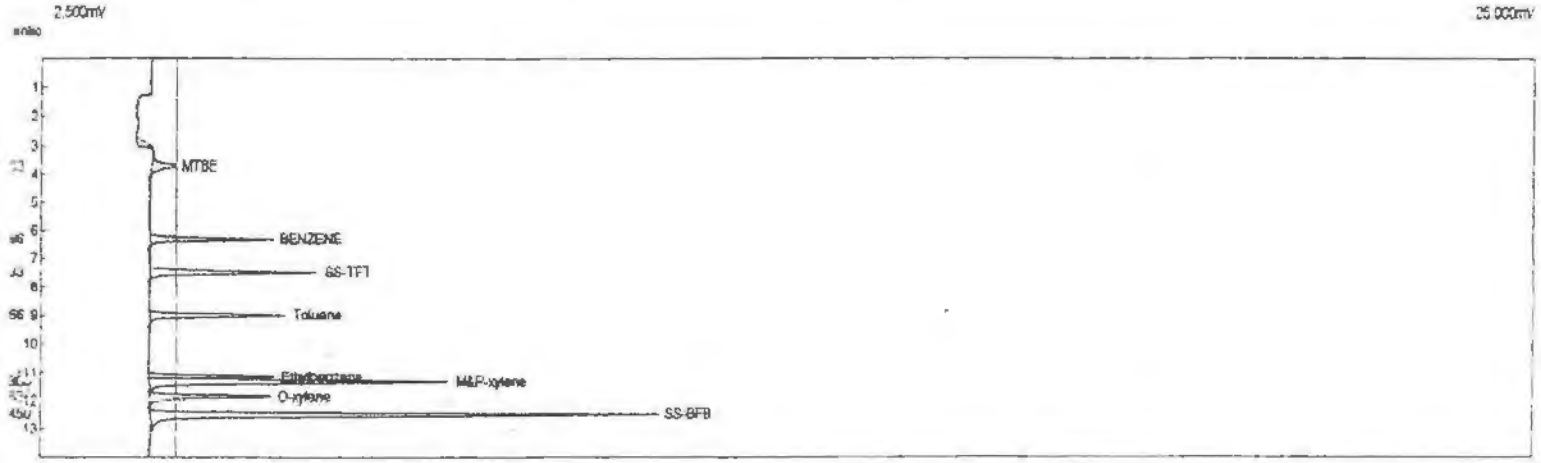
Component	Retention	Area	External	Internal	Units
TBE	3.933	9.238	18.85	18.8531	ppb
ENZENE	6.416	27.088	16.32	16.3181	ppb
-TFT	7.533	51.362	37.16	37.1650	ppb
luene	9.033	26.313	16.24	16.2426	ppb
hylbenzene	11.166	19.844	16.96	16.9607	
&P-xylene	11.316	59.138	32.85	32.8544	ppb
xylene	11.850	23.519	17.29	17.2934	ppb
S-BFB	12.466	137.372	44.46	44.4570	ppb
S-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
Carrier: N2
Data file: 0308pt34.CHR ()
Sample: 20 ppb BTEX-MTBE close
Operator: MAP



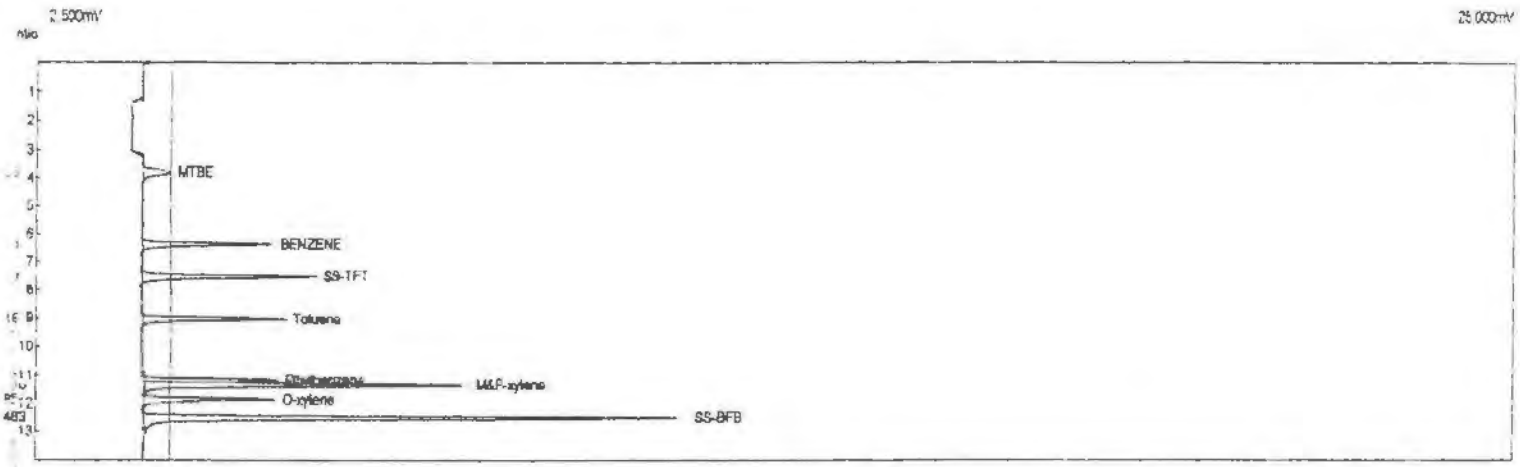
Component	Retention	Area	External	Internal	Units
MTBE	3.950	10.298	21.02	21.0163	ppb
BENZENE	6.516	32.070	19.32	19.3193	ppb
SS-TFT	7.650	48.696	35.24	35.2359	ppb
Toluene	9.183	33.508	20.68	20.6840	ppb
Ethylbenzene	11.333	25.298	21.62	21.6222	
M&P-xylene	11.483	77.940	43.30	43.3000	ppb
O-xylene	12.016	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
nalysis 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



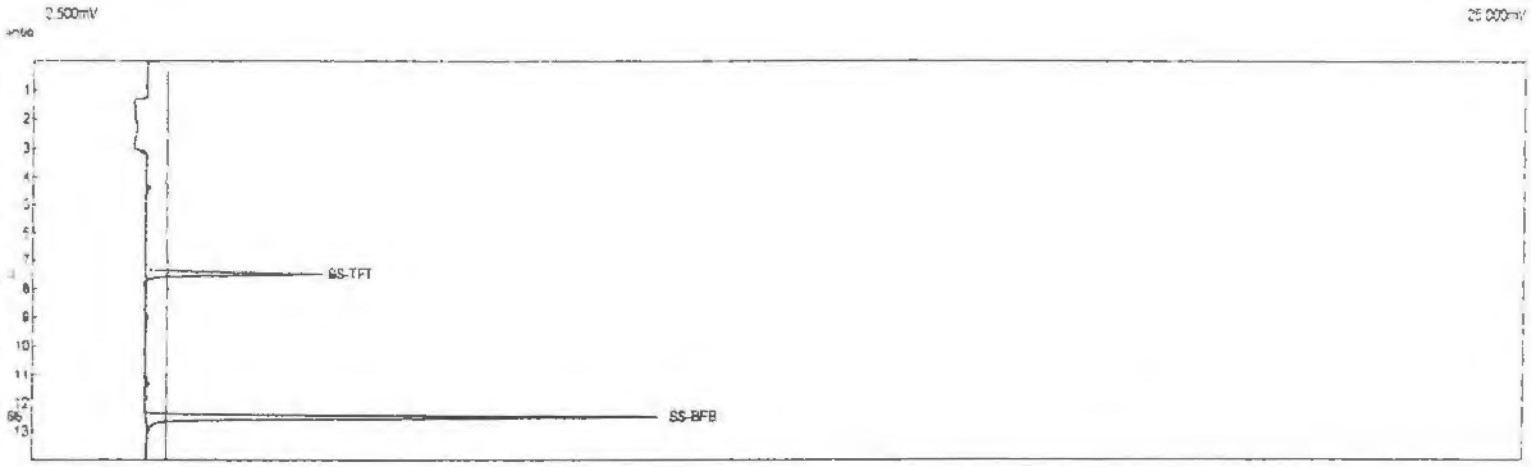
Component	Retention	Area	External	Internal	Units
TBE	3.683	6.199	12.65	12.6500	ppb
ENZENE	6.266	19.476	11.73	11.7325	ppb
S-TFT	7.433	27.629	19.99	19.9920	ppb
oluene	8.966	19.782	12.21	12.2111	ppb
hylbenzene	11.133	15.328	13.10	13.1009	
&P-xylene	11.300	46.424	25.79	25.7911	ppb
-xylene	11.833	17.918	13.17	13.1750	ppb
S-BFB	12.450	73.718	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
C mn: Rtx-5,30m,5.0um,0.53mm
ier: N2
file: 0308pt3.CHR ()
Sample: CA-S-29 matrix spike duplic
Operator: MAP



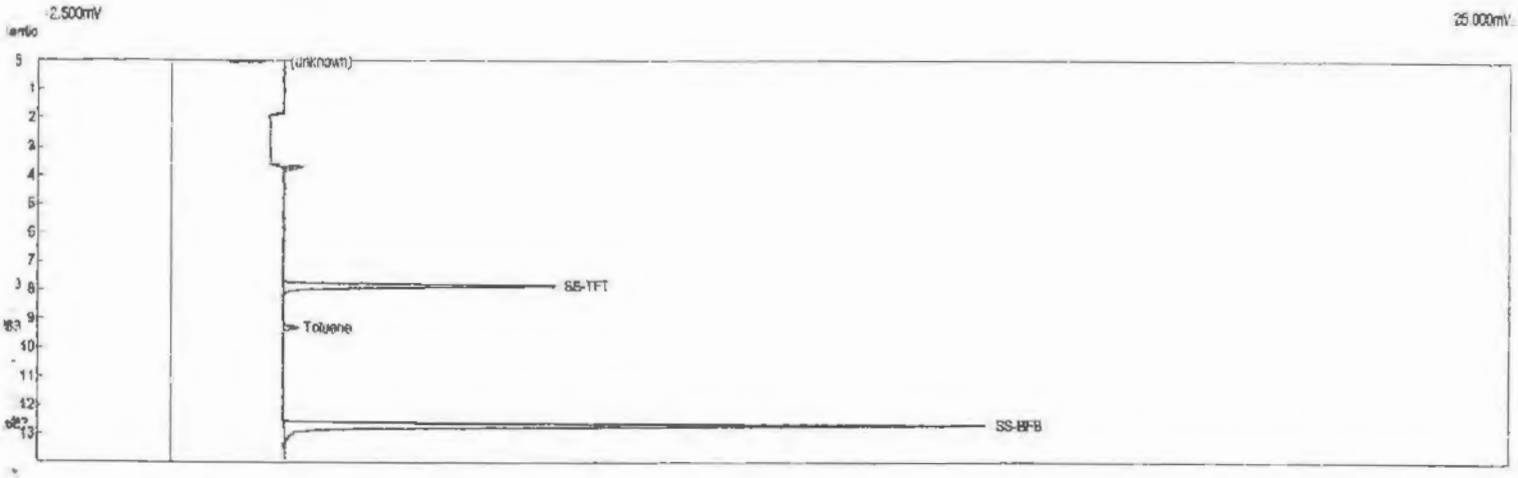
Component	Retention	Area	External	Internal	Units
BE	3.783	6.461	13.19	13.1857	ppb
NZENE	6.333	20.096	12.11	12.1060	ppb
S-TFT	7.483	28.158	20.37	20.3748	ppb
oluene	9.016	20.774	12.82	12.8235	ppb
yl	11.166	15.452	13.21	13.2068	
P-x	11.316	47.257	26.25	26.2536	ppb
-xylene	11.850	18.545	13.64	13.6360	ppb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

Lab name: On Site Labs Inc
nalysis 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



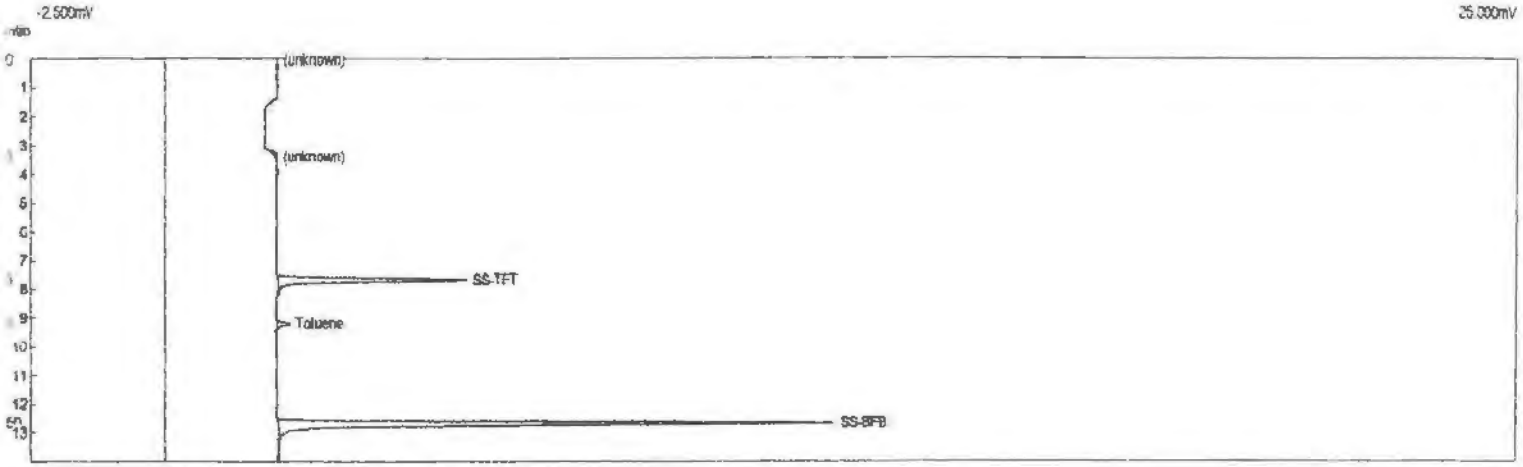
Component	Retention	Area	External	Internal	Units
-TFT	7.433	28.454	20.59	20.5890	ppb
-BFB	12.466	72.981	23.62	23.6184	ppb
		101.435	44.21	44.2074	

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 ()
nple: JLA11TB1/0308CH2M
Operator: MAP



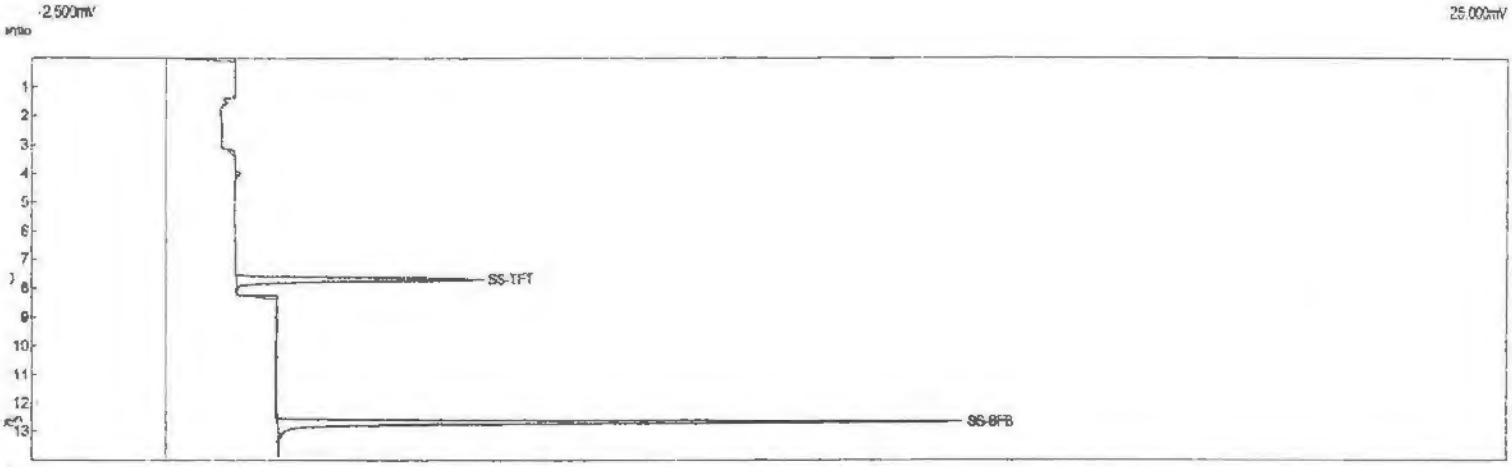
Component	Retention	Area	External	Internal	Units
S-TFT	7.800	44.010	31.85	31.8452	ppb
uene	9.283	2.140	1.32	1.3210	ppb
-BFB	12.683	101.824	32.95	32.9528	ppb
		147.974	66.12	66.1189	

Lab name: On Site Labs Inc
nalysis date: 03/08/2002 18:59:51
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
-TFT	7.633	31.944	23.11	23.1143	ppb
uene	9.166	1.916	1.18	1.1827	ppb
-BFB	12.650	83.868	27.14	27.1417	ppb
		117.728	51.44	51.4386	

Lab name: On Site Labs Inc
nalysis date: 03/08/2002 18:45:06
Method: EPA 8021 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
-TFT	7.650	40.524	29.32	29.3227	ppb
-BFB	12.650	102.123	33.05	33.0495	ppb
		142.647	62.37	62.3722	

On Site Labs, Inc.

PMB 627, HC-01 Box 29030, Caguas, PR 00725
Telephone 787-720-0329 Fax 787-788-3856

March 5, 2002
OSL Projects #0210302CH2M

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 88 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.
- 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

TEG Project #02I0302CH2M
DAILY CALIBRATION DATE: 03/04/02

CH2M HILL PROJECT NO. 167722.FI.FS
PROJECT NAME: RRNAS SITE 88

			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%	99.67	0.25	2.7%	181.10	0.23	11.6%
TPH GASOLINE	FID #3 (gc5)	10 - 30,000	0.36	15.0%	271.71	0.34	6.2%	298.97	0.37	3.2%
TPH GASOLINE	FID #4 (gc5)	10 - 30,000	0.31	15.4%	217.59	0.27	11.1%	233.18	0.29	4.7%
TPH DIESEL	FID #2 (gc5)	25 - 20,000	0.69	14.1%	609.81	0.76	9.8%	1110.50	0.69	0.0%
TPH DIESEL	FID #3 (gc5)	25 - 20,000	0.74	13.6%	1350.79	0.84	14.2%	1333.78	0.83	12.8%
TPH DIESEL	FID #4 (gc5)	25 - 20,000	0.61	11.1%	1085.03	0.68	11.9%	867.01	0.54	10.6%

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) 720-1329 FAX 788-3859

QA/QC REPORT - MS/MSD DATA

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

TEG Project #02I0302CH2M
DATE: 03/04/02

CH2M HILL PROJECT NO. 167722.FI.FS
PROJECT NAME: RRNAS SITE 88

COMPOUND	SPK CON (ppm)	MS CONC (ppm)	%REC MS	MSD CONC (ppm)	%REC MSD	RPD	ACCEPTABLE RPD	ACCEPTABLE RECOVERY
TPH-GASOLINE	200	173	87%	165	83%	5%	15%	81% - 126%
TPH-DIESEL	400	367	92%	372	93%	1%	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

LABORATORY QA/QC

CH2M HILL

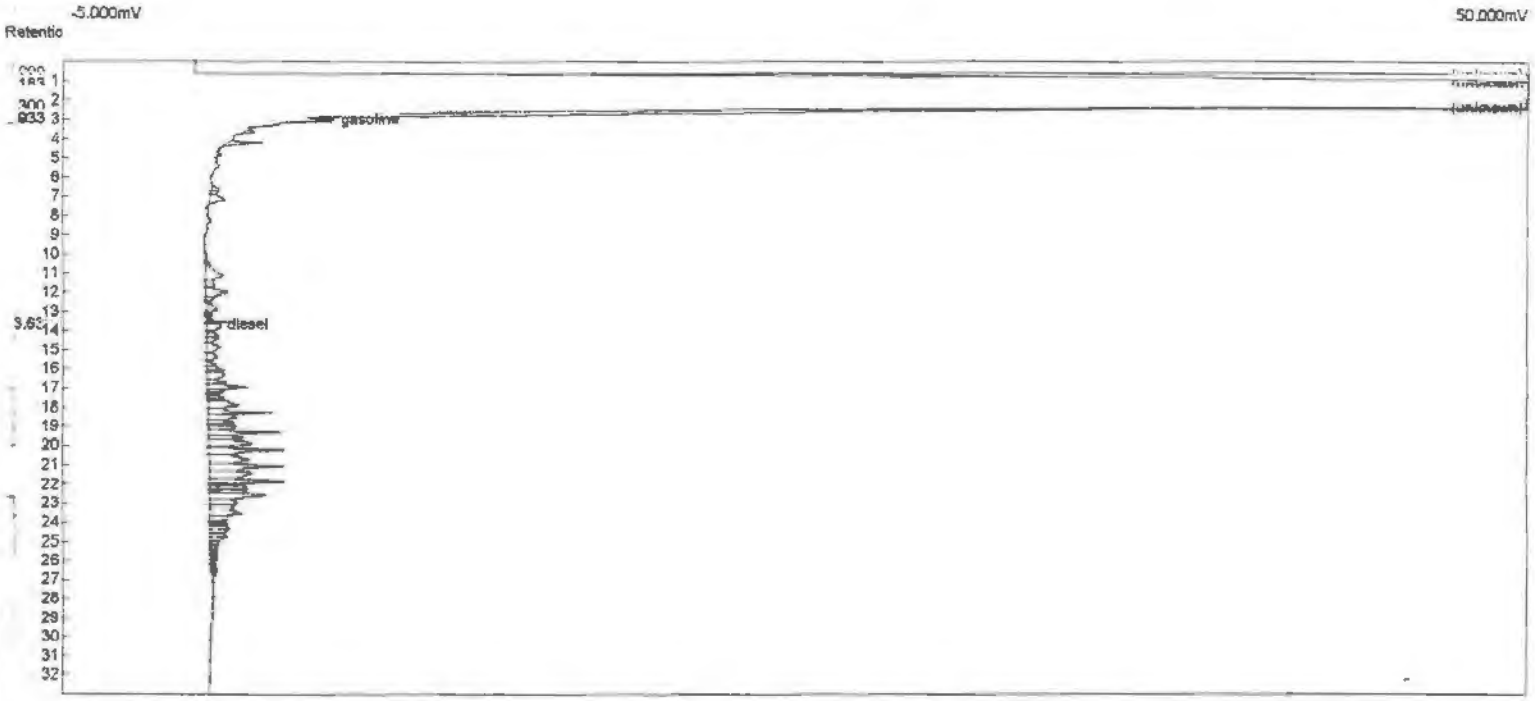
TEG Project #02I0302CH2M

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)
ILA001	3/04/02	ND	ND
ILA001 REP.	3/04/02	ND	ND
DETECTION LIMIT (mg/Kg)		10	25

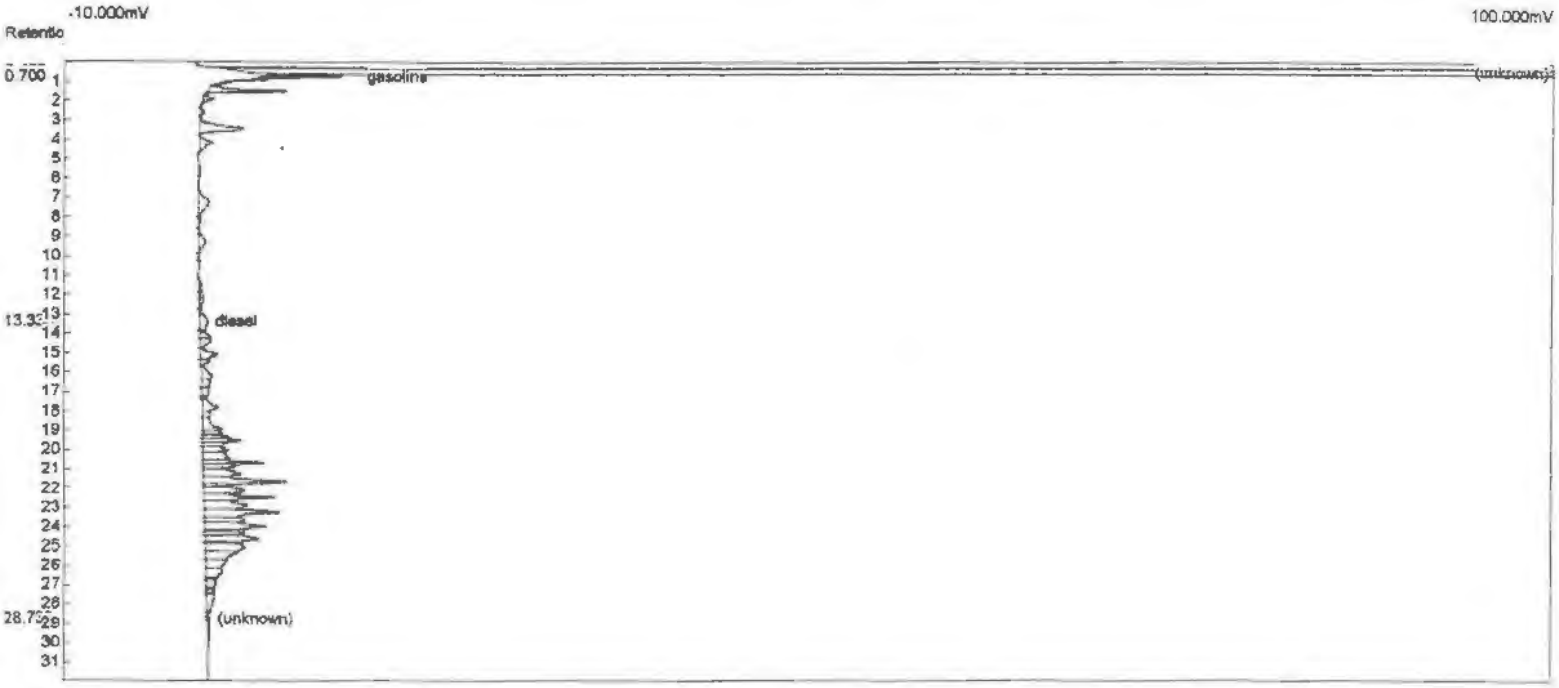
mg/Kg = MILLIGRAMS PER KILOGRAM
DUP = LABORATORY DUPLICATE
"ND" INDICATES ANALYTE NOT DETECTED AT OR ABOVE THE LISTED DETECTION LIMIT
ANALYSES PERFORMED BY MARCO A. PEDRAZA
DATA REVIEWED BY KEVIN SHELBURNE

Lab name: On Site Labs Inc
Analysis date: 03/04/2002 11:35:25
Method: EPA 8015B mod.
Lab ID: GC - 5
Description: FID2 - Ch. 2
Column: XTI-5, 30m, 0.53mm, 1.5um
Carrier: N2
ta file: 0304fb2.chr ()
mple: 100/200 ppm G/D OPEN
erator: MAP
Comments:



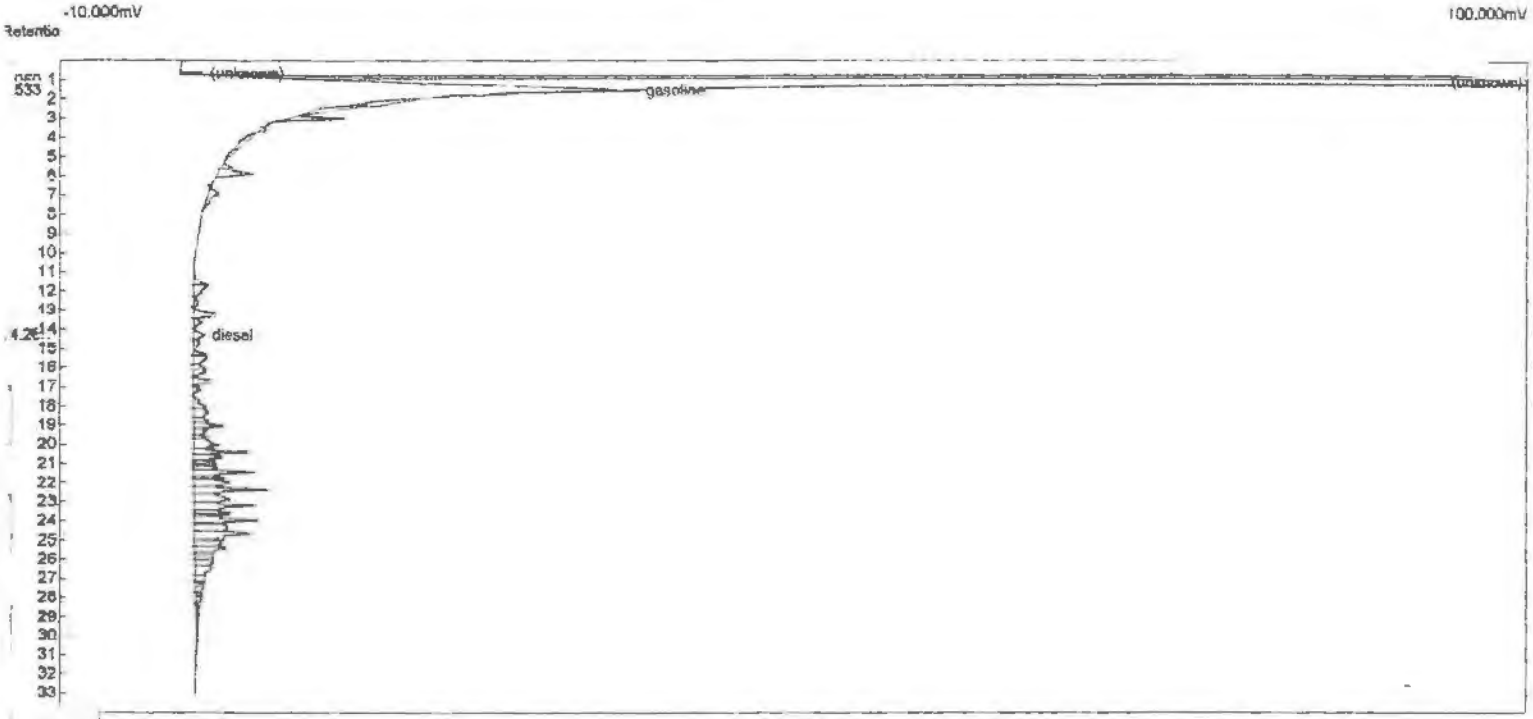
onent	Retention	Area	External	Internal	Units
gasoline	2.933	99.673	97.34	97.3374	
diesel	13.633	609.810	219.67	219.6724	ppm
		709.484	317.01	317.0098	

Lab name: On Site Labs Inc
Analysis date: 03/04/2002 10:49:19
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: 0304fc1.CHR ()
Sample: 200/400 ppm G/D OPEN
Operator: MAP
Comments:



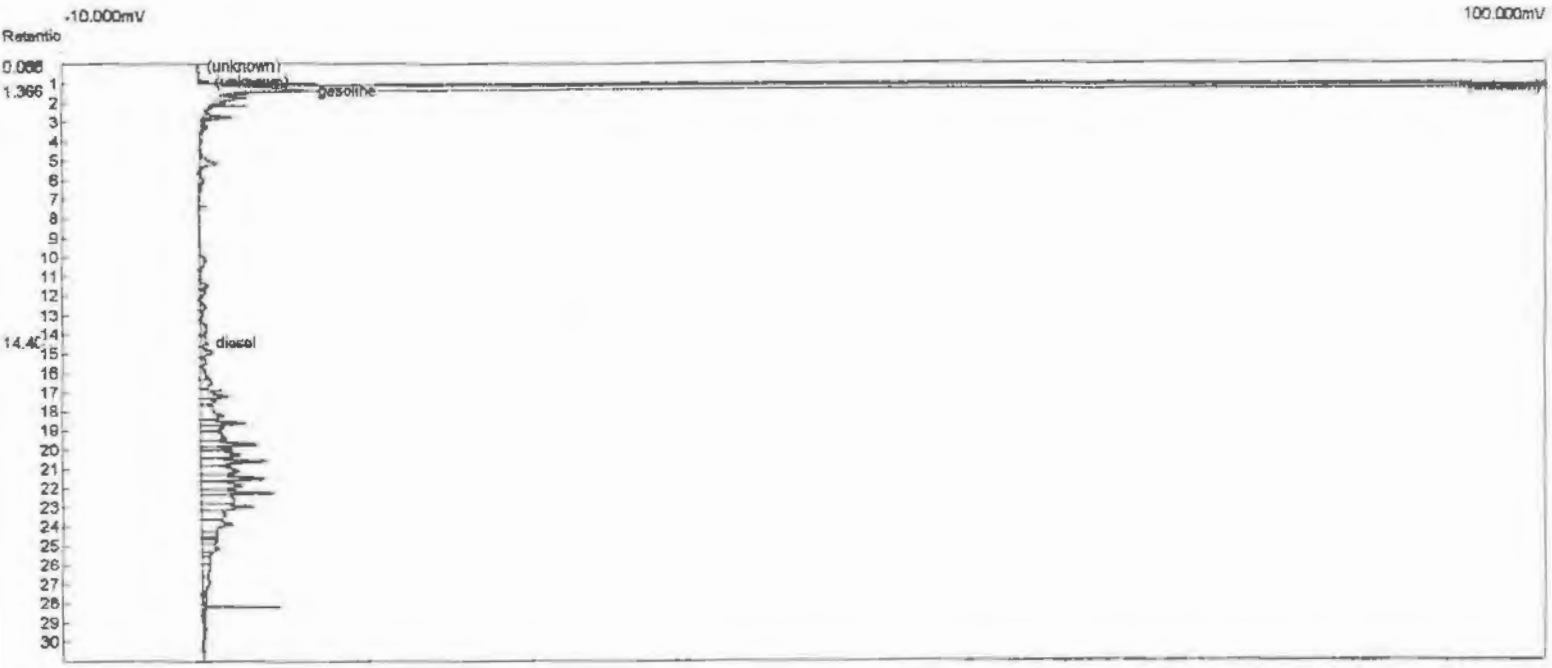
Component	Retention	Area	External	Internal	Units
gasoline	0.700	271.709	187.64	187.6440	
diesel	13.333	1350.794	456.97	456.9670	ppm
		1622.503	644.61	644.6110	

Lab name: On Site Labs Inc
Analysis date: 03/04/2002 10:49:19
Method: EPA 8015B mod.
Lab ID: GC - 5
Description: FID 4 - Ch. 4
Column: XTI-5, 30m, 0.53mm, 1.5um
Carrier: N2
Profile: 0304fd1.CHR ()
Sample: 200/400 ppm S/D OPEN
Operator: MAP
Comments:



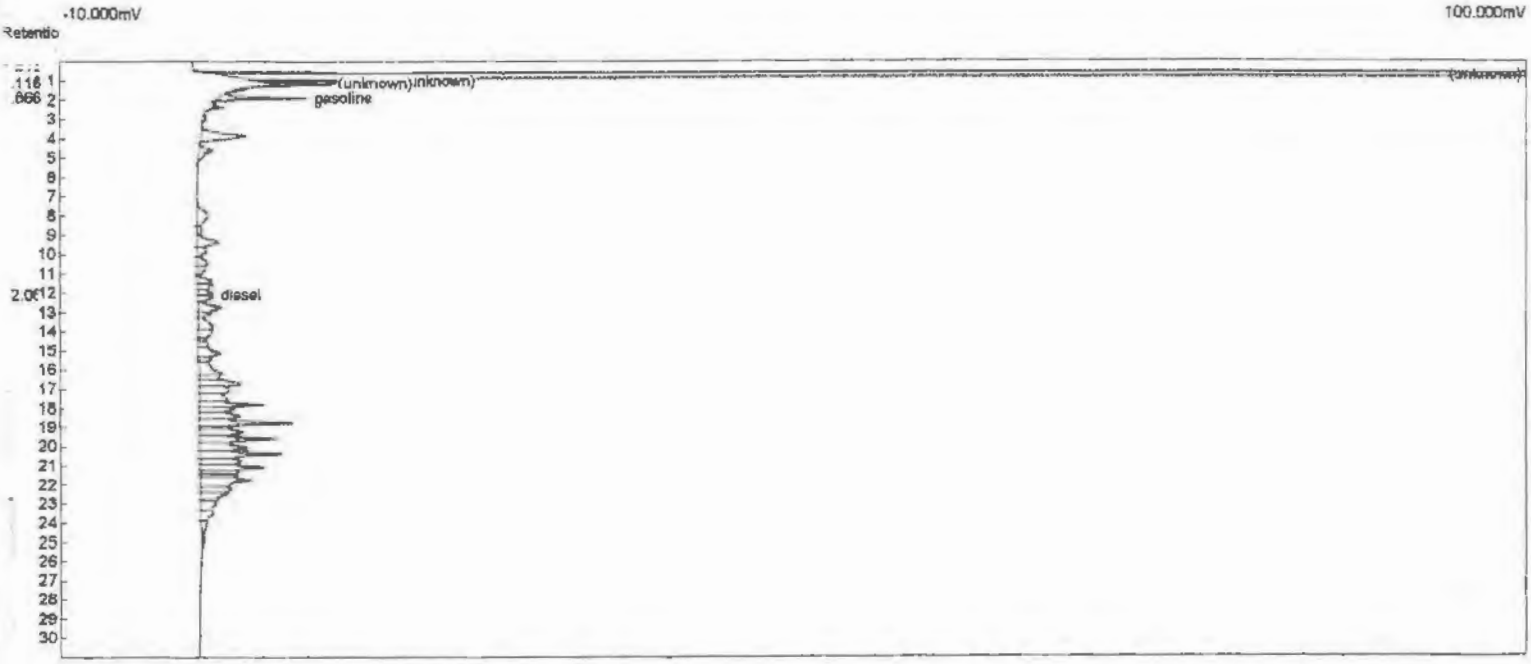
Peak	Retention	Area	External	Internal	Units
gasoline	1.533	217.586	177.77	177.7660	
diesel	14.200	1066.019	447.61	447.6149	ppm
		1302.605	625.38	625.3809	

Lab name: On Site Labs Inc
Analysis date: 03/04/2002 15:07:50
Method: EPA 8015B mod.
Lab ID: GC - 5
Description: FID2 - Ch. 2
Column: XTI-5, 30m, 0.53mm, 1.5um
Carrier: N2
Data file: 0304fb7.CHR ()
Sample: 200/400 ppm G/D CLOSE
Operator: MAP
Comments:



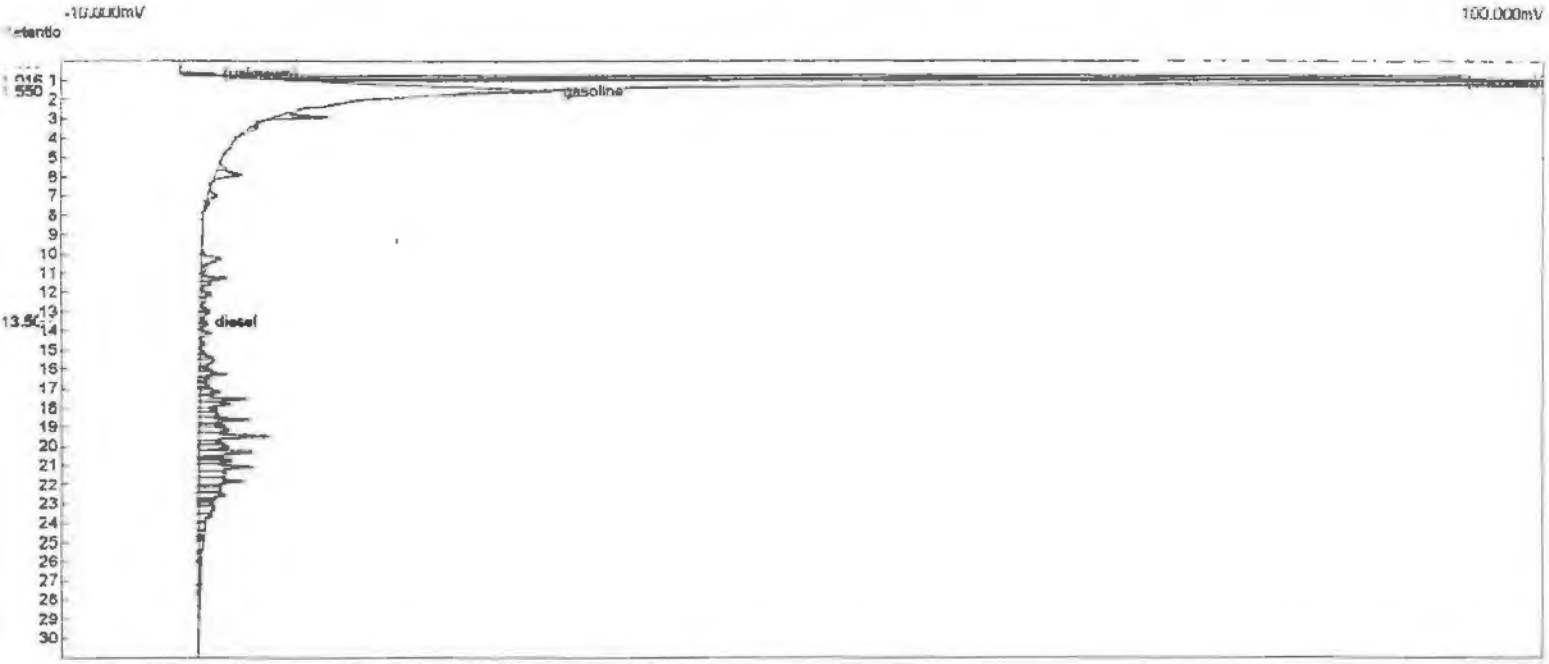
Component	Retention	Area	External	Internal	Units
gasoline	1.366	181.101	176.88	176.8564	
diesel	14.400	1110.499	400.04	400.0358	ppm
		1291.600	576.89	576.8923	

Lab name: On Site Labs Inc
Analysis date: 03/04/2002 16:13:03
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: 0304fc8.CHR ()
Sample: 200/400 ppm G/D CLOSE
Operator: MAP
Comments:



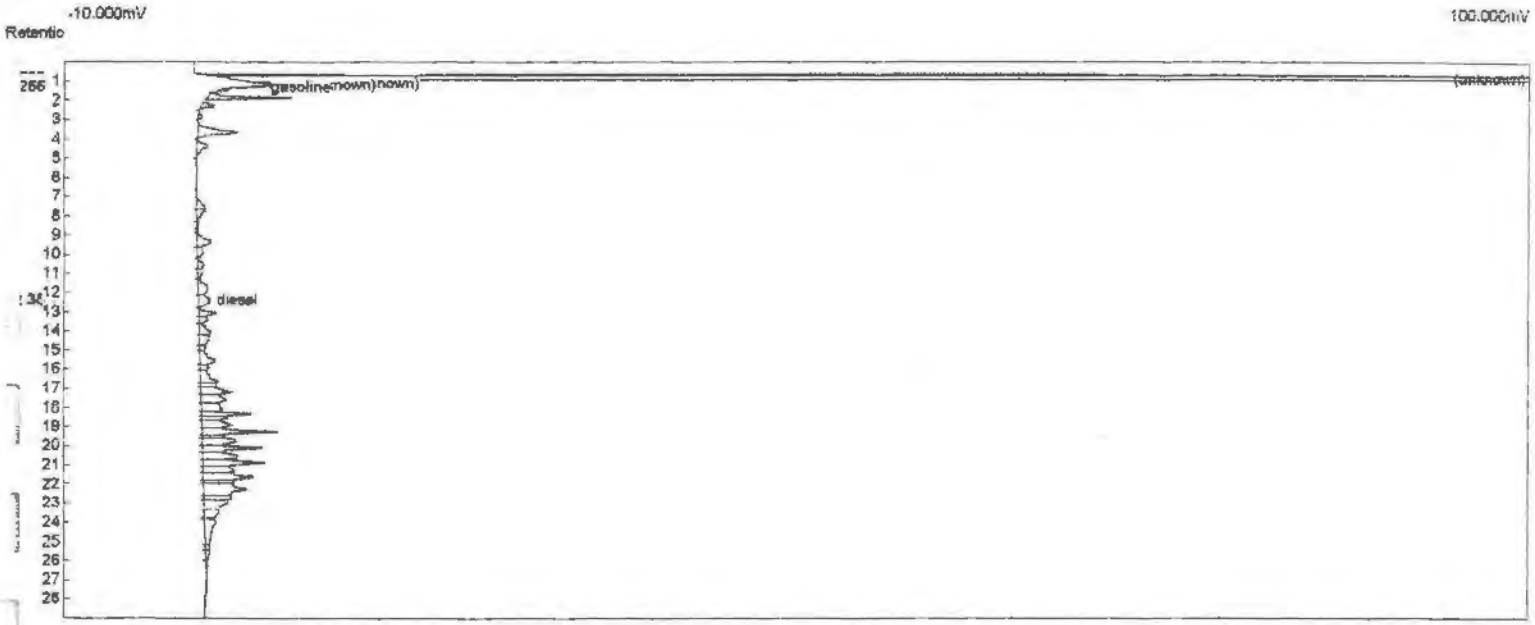
Component	Retention	Area	External	Internal	Units
Gas	1.866	298.971	206.47	206.4717	
Diesel	12.066	1333.783	451.21	451.2123	ppm
		1632.754	657.68	657.6840	

Lab name: On Site Labs Inc
Analysis date: 03/04/2002 16:13:03
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: 0304fd8.CHR ()
Sample: 200/400 ppm G/D CLOSE
Operator: MAP
Comments:



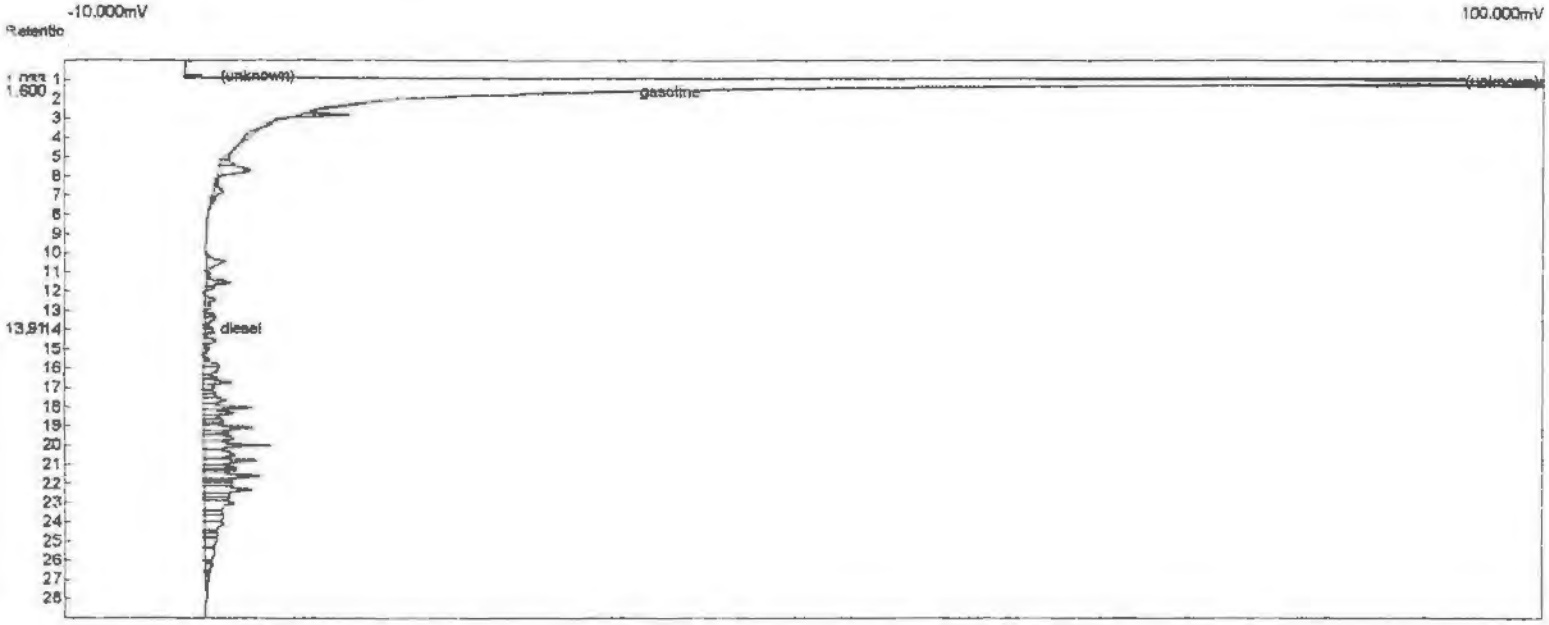
Component	Retention	Area	External	Internal	Units
gasoline	1.550	233.184	190.51	190.5094	
diesel	13.500	867.006	357.68	357.6757	ppm
		1100.190	548.19	548.1851	

Lab name: On Site Labs Inc
Analysis date: 03/04/2002 11:35:25
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: 0304fc2.CHR ()
Sample: blank matrix spike
Operator: MAP
Comments:



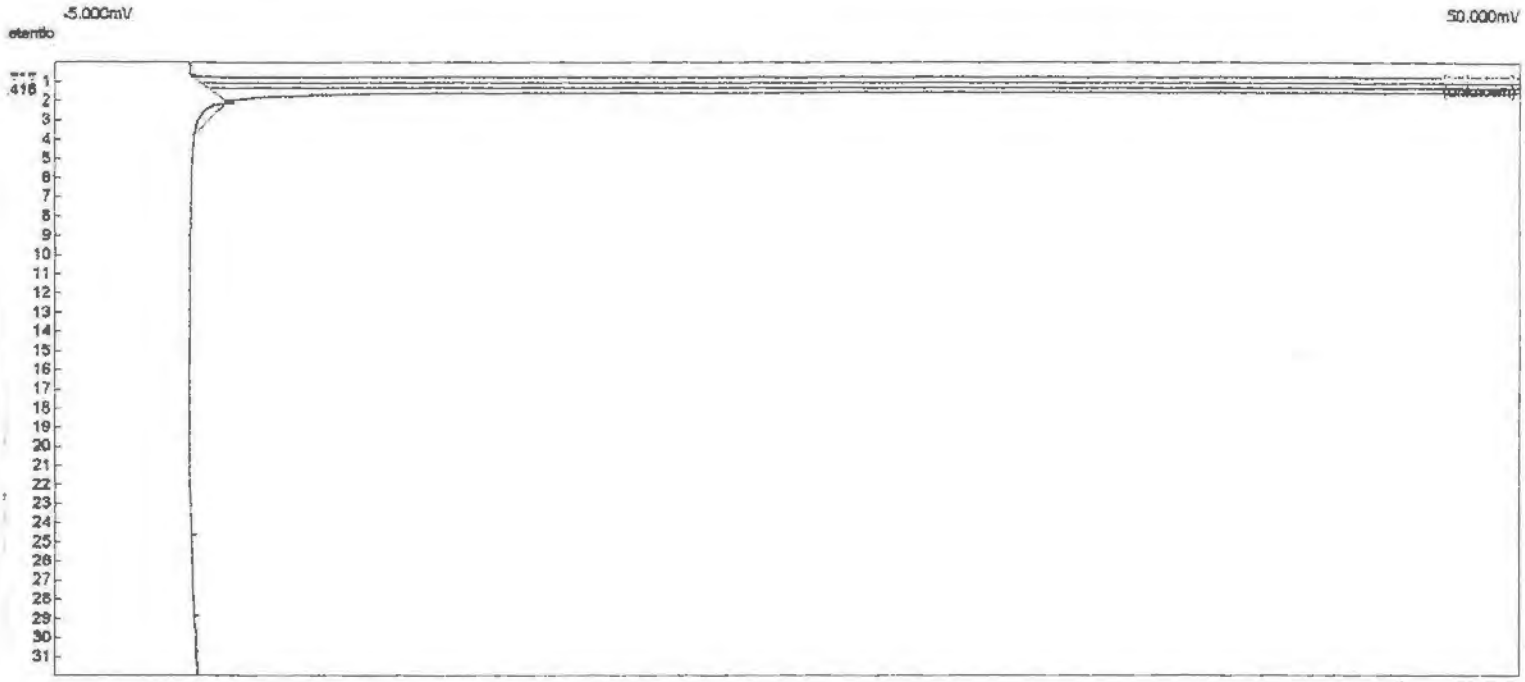
Component	Retention	Area	External	Internal	Units
gasoline	1.266	250.766	173.18	173.1813	
diesel	12.383	1086.000	367.39	367.3882	ppm
		1336.766	540.57	540.5695	

Analysis date: 03/04/2002 11:35:25
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: 0304fd2.CHR ()
Sample: blank matrix spike duplica
Operator: MAP
Comments:



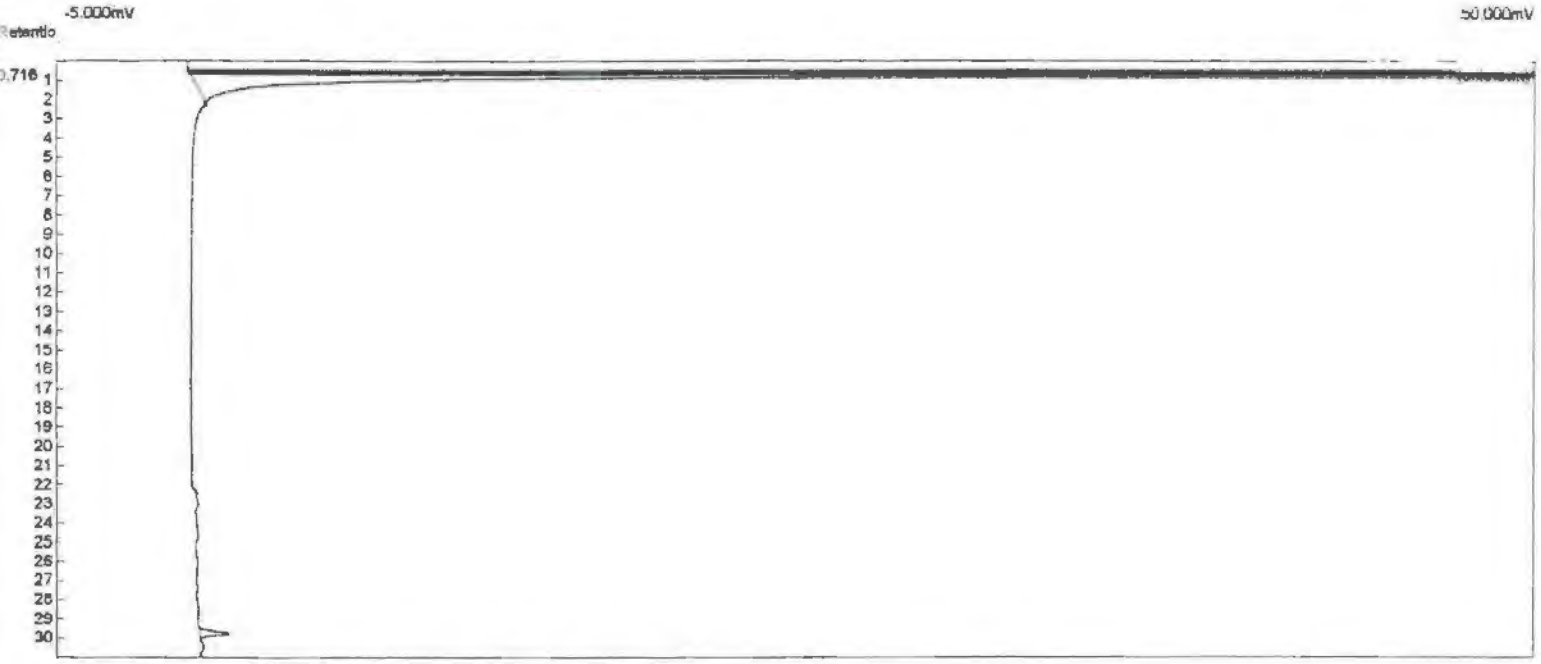
Component	Retention	Area	External	Internal	Units
gasoline	1.800	201.894	164.95	164.9461	
diesel	13.916	901.602	371.95	371.9480	ppm
		1103.496	536.89	536.8941	

Lab name: On Site Labs Inc
Analysis date: 03/04/2002 12:18:42
Method: EPA 8015B mod.
Lab ID: GC - 5
Description: FID2 - Ch. 2
Column: XTI-5, 30m, 0.53mm, 1.5um
Carrier: N2
[illegible]file: 0304fb3.CHR ()
[illegible]ple: METHOD BLANK
[illegible]ator: MAP
Comments:



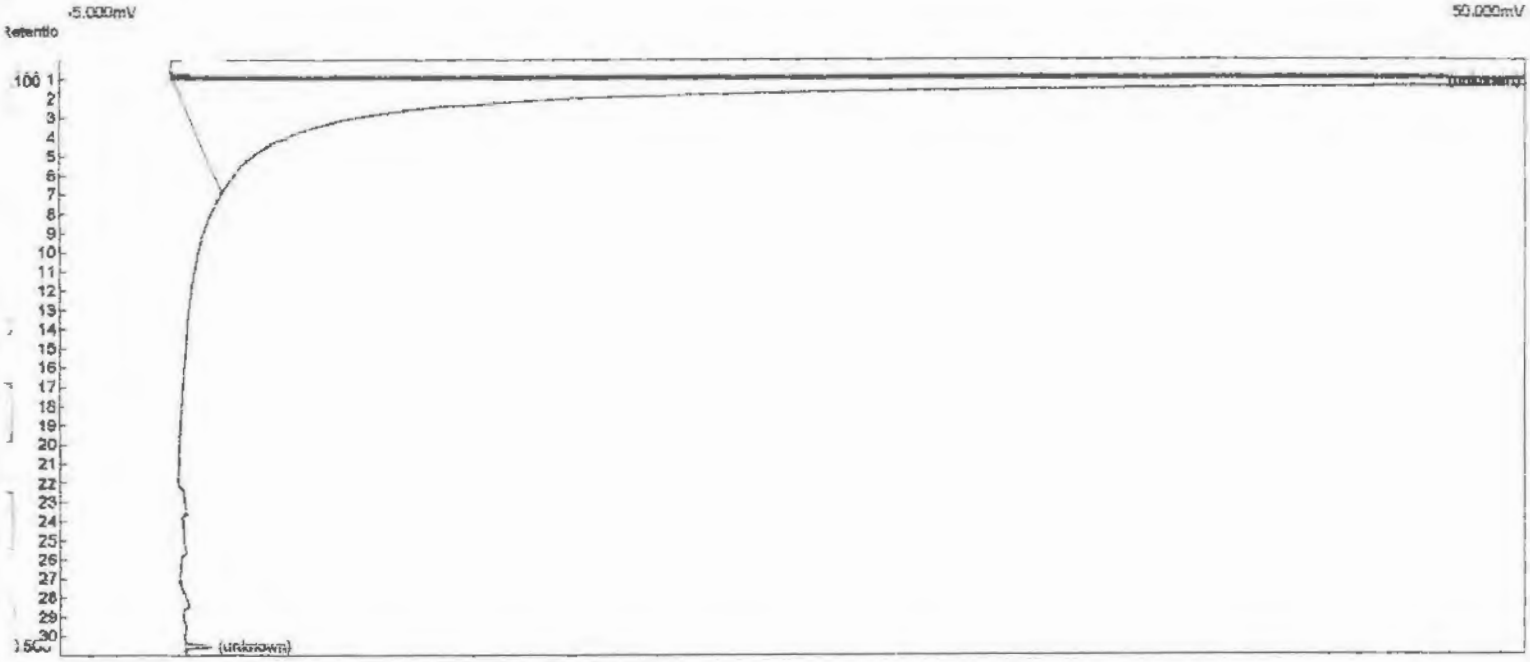
Co[illegible]nent	Retention	Area	External	Internal	Units
		0.000	0.00	0.0000	

Lab name: On Site Labs Inc
Analysis date: 03/04/2002 12:18:42
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: 0304fc3.CHR ()
Sample: METHOD BLANK
Operator: MAP
Comments:



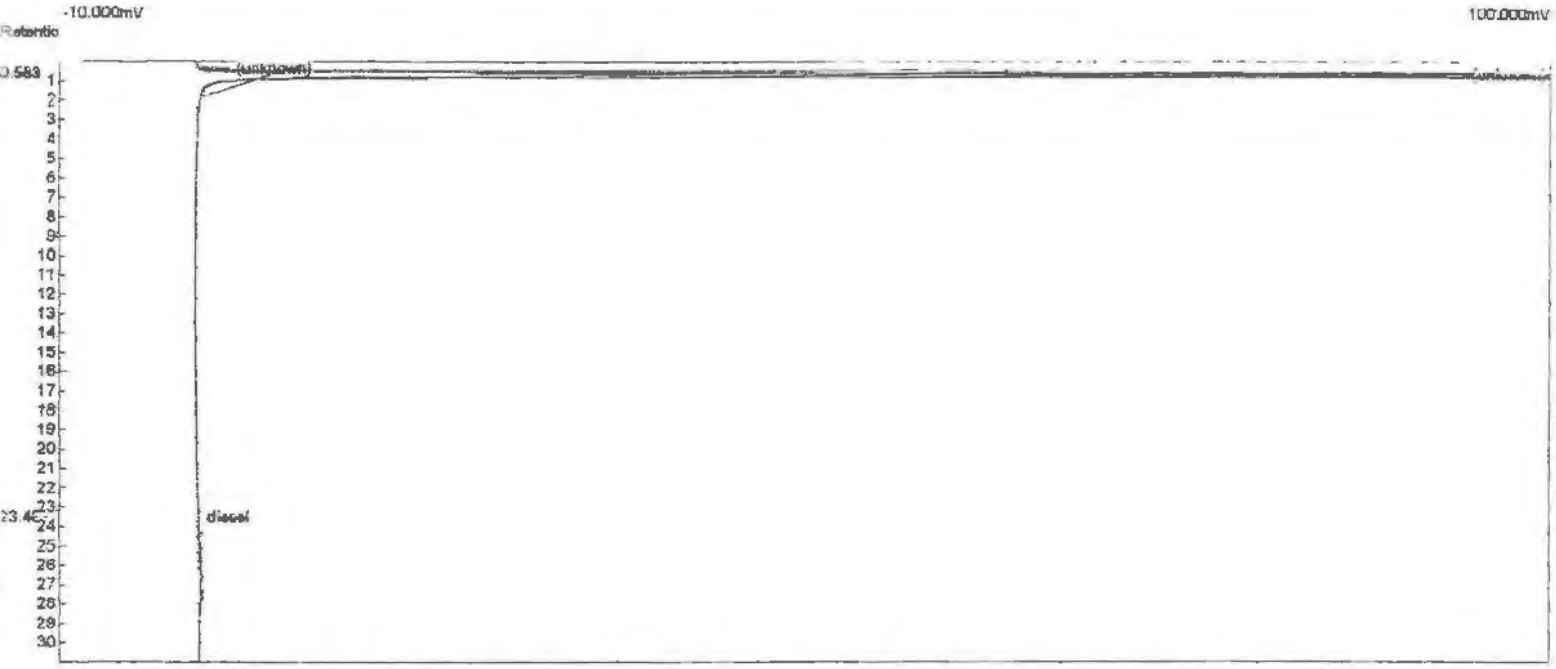
Component	Retention	Area	External	Internal	Units
		0.000	0.00	0.0000	

Lab name: On Site Labs Inc
Analysis date: 03/04/2002 12:16:42
Method: EPA 8015B mod.
Lab ID: GC - 5
Description: FID 4 - Ch. 4
Column: XTI-5, 30m, 0.53mm, 1.5um
Carrier: N2
F file: 0304fd3.CHR ()
.ple: METHOD BLANK
rator: MAP
Comments:



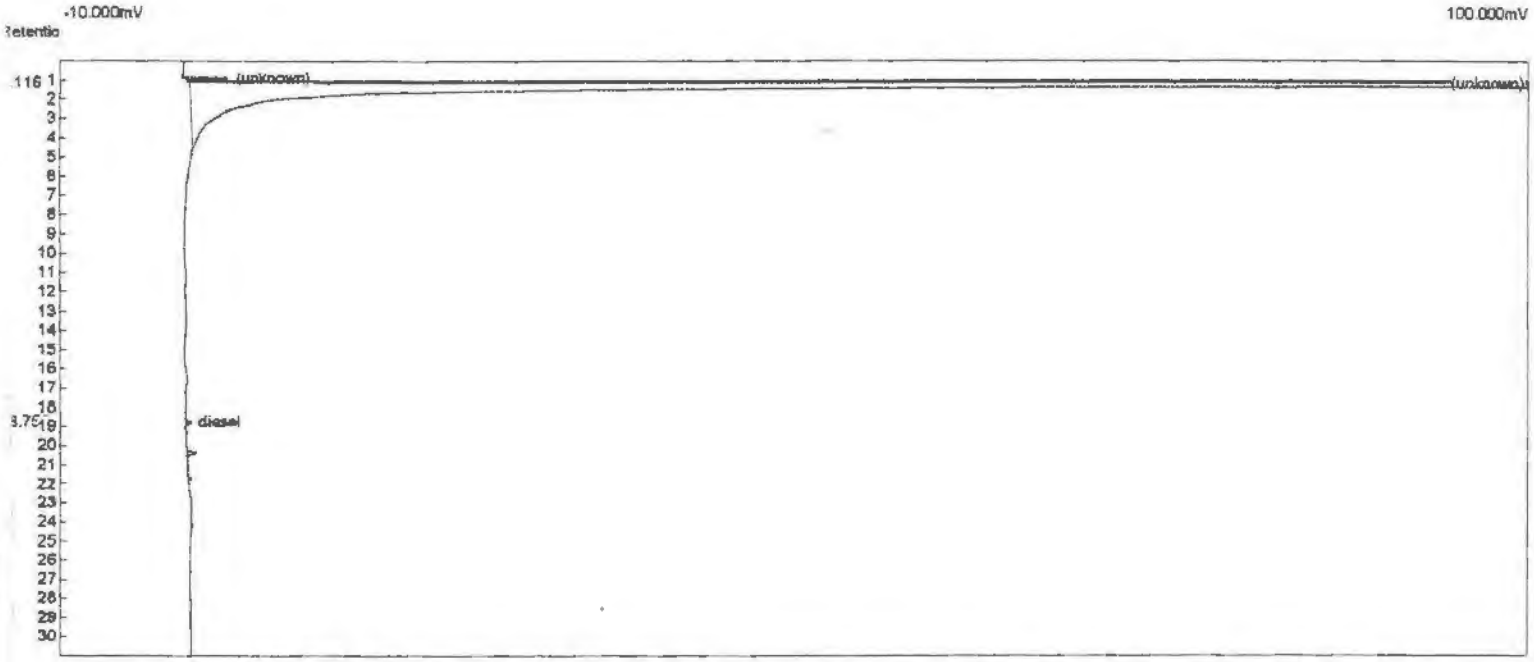
Component	Retention	Area	External	Internal	Units
		0.000	0.00	0.0000	

Analysis date: 03/04/2002 13:05:11
Method: EPA 8015B mod.
Lab ID: GC - 5
Description: FID2 - Ch. 2
Column: XTI-5, 30m, 0.53mm, 1.5um
Carrier: N2
Data file: 0304fb4.CHR ()
Sample: ILA001/0302C/ (2ul)
Operator: MAP
Comments:



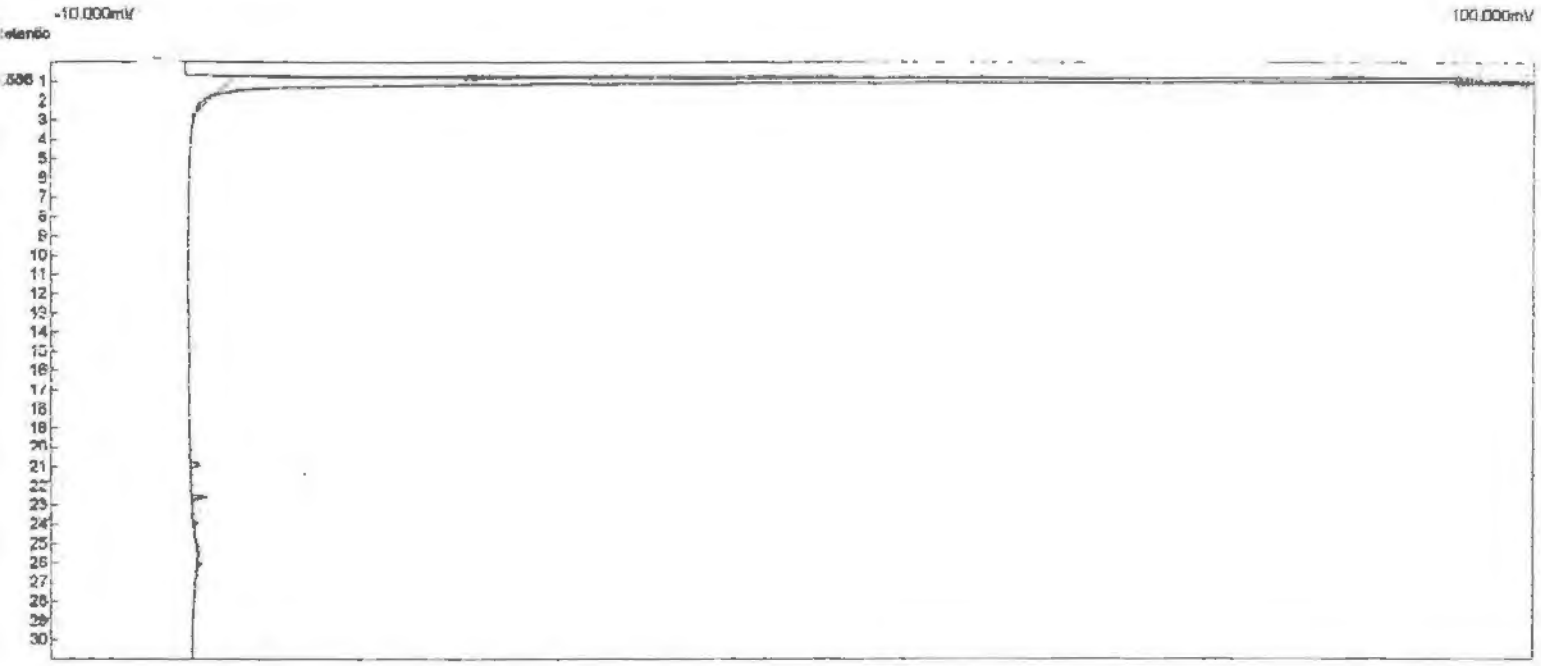
Component	Retention	Area	External	Internal	Units
diesel	23.483	10.737	3.87	3.8675	ppm
		10.737	3.87	3.8675	

Lab name: On Site Labs Inc
Analysis date: 03/04/2002 14:31:05
Method: EPA 8015B mod.
Lab ID: GC - 5
Description: FID 4 - Ch. 4
Column: XTI-5, 30m, 0.53mm, 1.5um
Carrier: N2
[illegible] file: 0304fd8.CHR ()
[illegible]ple: ILA001/0302CH2M REP
[illegible]rator: MAP
Comments:



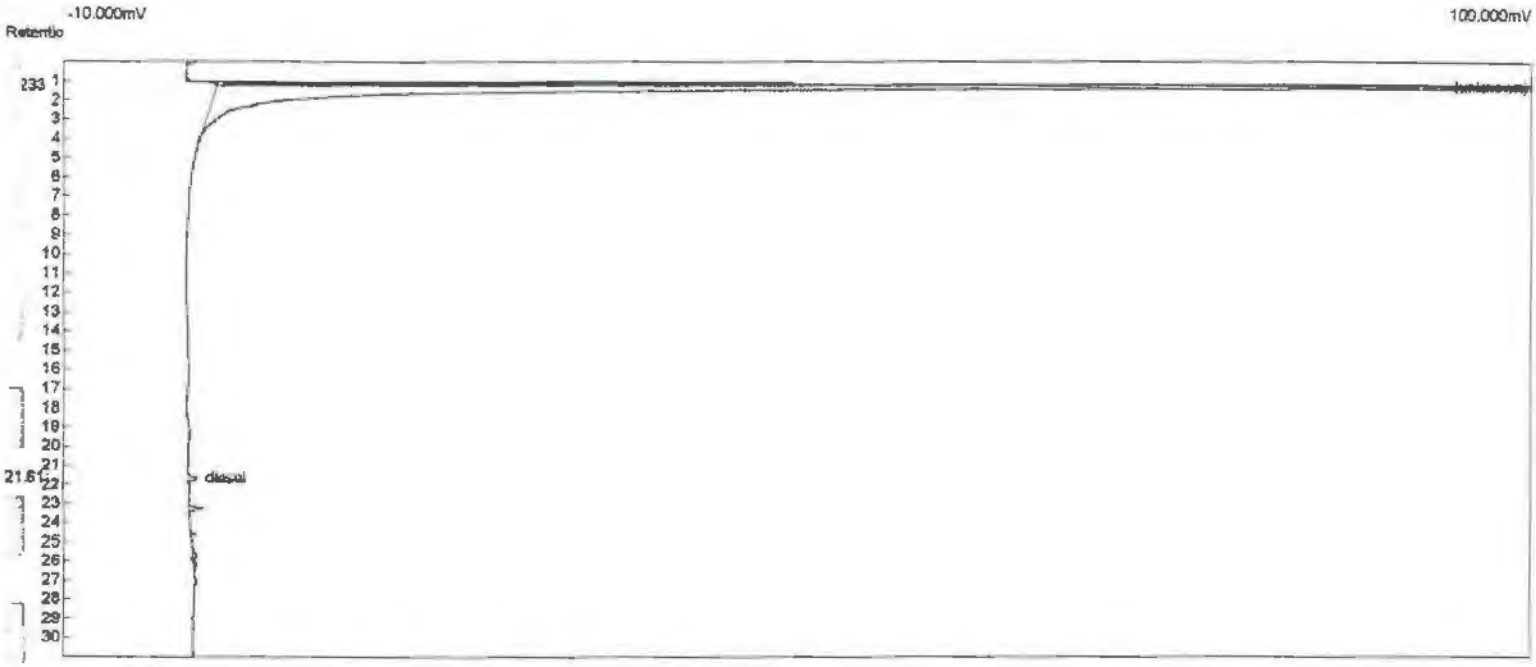
Component	Retention	Area	External	Internal	Units
[illegible]	18.750	11.341	4.68	4.6786	ppm
		11.341	4.68	4.6786	

Lab name: [illegible] Labs Inc
Analysis date: 03/04/2002 13:05:11
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: 0304fc4.CHR ()
Sample: ILA662/[illegible]
Operator: MAP
Comments:



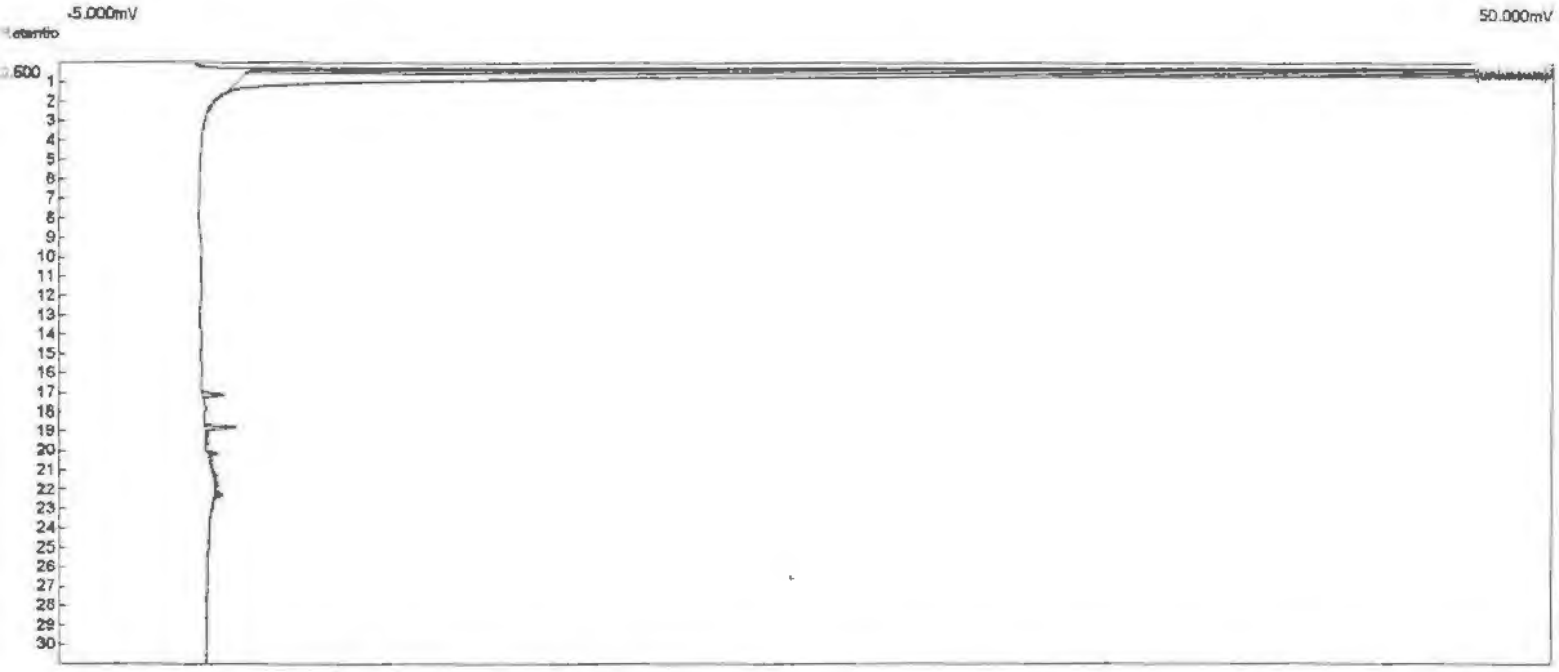
Compound	Retention	Area	External	Internal	Units
		0.000	0.00	0.0000	

Lab name: On Site Labs Inc
Analysis date: 03/04/2002 13:05:11
Method: EPA 8015B mod.
Lab ID: GC - 5
Description: FID 4 - Ch. 4
Column: XTI-5, 30m, 0.53mm, 1.5um
Carrier: N2
[illegible] file: 0304fd4.CHR ()
[illegible]mple: ILA003/0302CH2M
[illegible]rator: MAP
Comments:



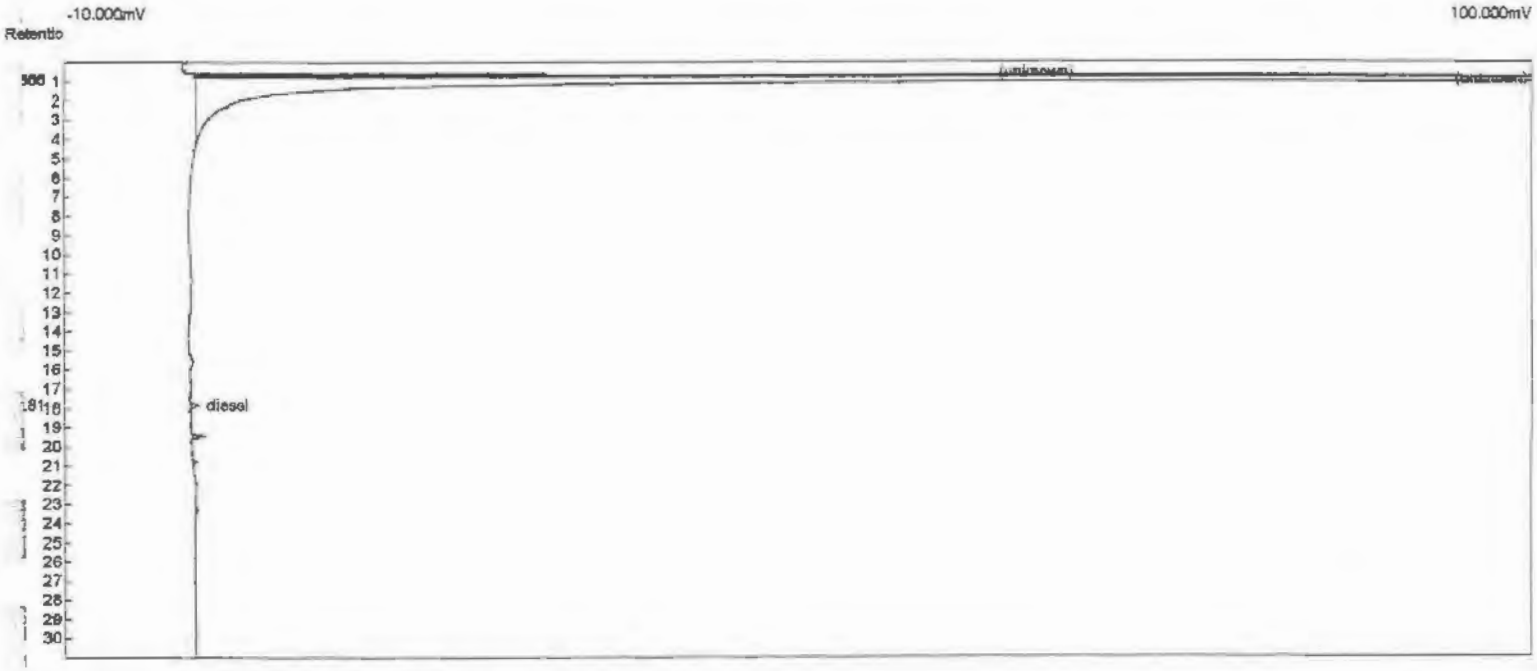
Component	Retention	Area	External	Internal	Units
[illegible]	21.616	21.700	8.95	8.9521	ppm
		21.700	8.95	8.9521	

Lab name: On Site Labs Inc
Analysis date: 03/04/2002 13:51:22
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: 0304fc5.CHR ()
Sample: ILA004/0302CH2M
Operator: MAP
Comments:



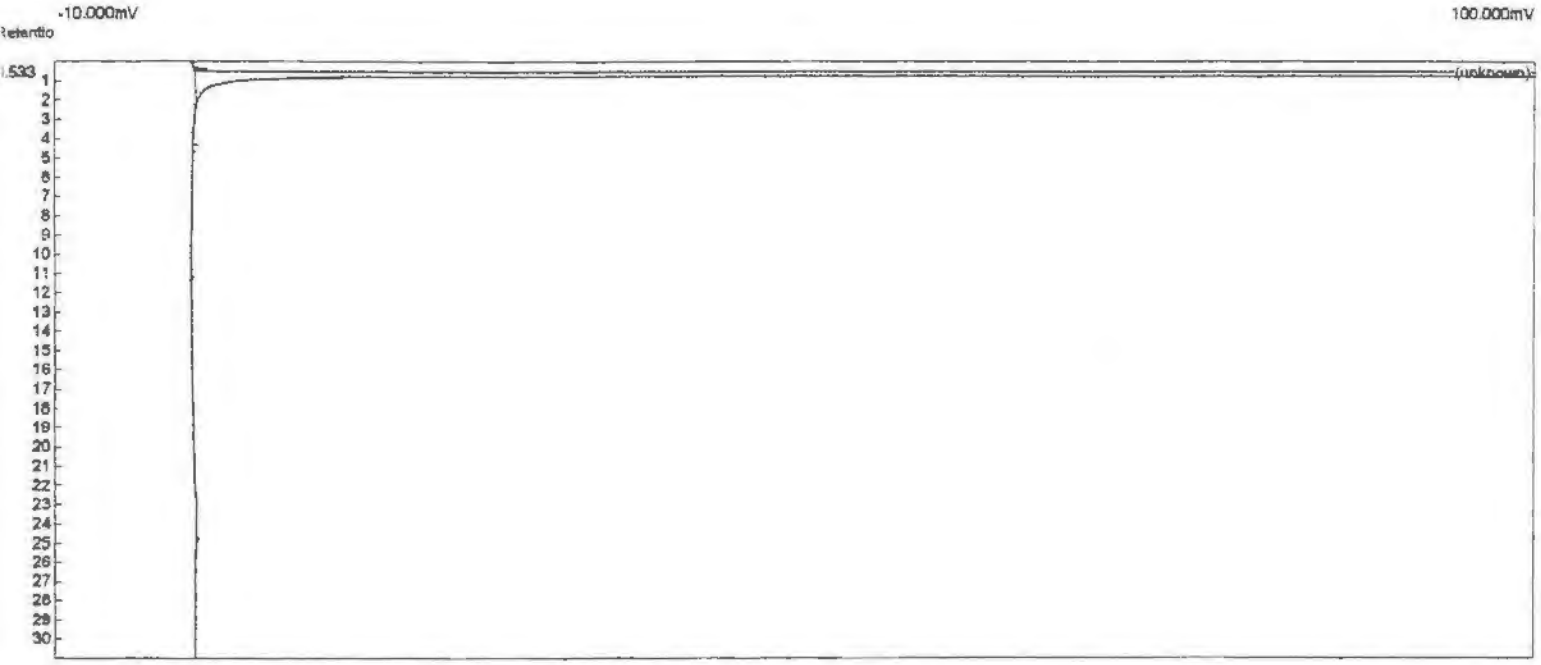
Component	Retention	Area	External	Internal	Units
		0.000	0.00	0.0000	

Lab name: On Site Labs Inc
Analysis date: 03/04/2002 13:51:22
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: 0304fd5.CHR ()
Sample: ILA005/0302CH2M
Operator: MAP
Comments:



Component	Retention	Area	External	Internal	Units
	17.816	15.640	6.45	6.4521	ppm
		15.640	6.45	6.4521	

Lab name: On Site Labs Inc
Analysis date: 03/04/2002 14:31:05
Method: EPA 8015B mod.
Lab ID: GC - 5
Description: FID2 - Ch. 2
Column: XTI-5, 30m, 0.53mm, 1.5um
Carrier: N2
Data file: 0304fb6.CHR ()
Sample: ILA007EB1/0302CH2M
Operator: MAP
Comments:



Component	Retention	Area	External	Internal	Units
		0.000	0.00	0.0000	

QA/QC REPORT - CALIBRATION DATA

On Site Project #02I0302CH2M
DAILY CALIBRATION DATE: 03/04/02

CH2M HILL PROJECT NO. 167722.FI.FS
PROJECT NAME: RRNAS SITE 88, 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%	54.87	1.37	17.4%	15.63	1.56	5.8%
TOLUENE	PID1 - GC2	0.5 - 75.0	1.62	6.6%	56.55	1.41	12.7%	16.29	1.63	0.6%
ETHYLBENZENE	PID1 - GC2	0.5 - 75.0	1.17	11.4%	44.87	1.12	4.1%	12.62	1.26	7.9%
m&p-XYLENES	PID1 - GC2	1.0 - 150	1.80	10.4%	128.23	1.60	11.0%	38.61	1.93	7.2%
o-XYLENES	PID1 - GC2	0.5 - 75.0	1.36	8.6%	51.47	1.29	5.4%	15.10	1.51	11.1%

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 #02I0302CH2M
DATE: 03/04/02

CH2M HILL PROJECT NO 167722 FI.FS
PROJECT NAME: RRNAS SITE 88

COMPOUND	SPK CONC (ppb)	MS CONC (ppb)	%REC MS	MSD CONC (ppb)	%REC MSD	RPD	ACCEPTABLE RPD	ACCEPTABLE RECOVERY
BENZENE	18.0	16.9	94%	16.1	89%	5%	20%	82% - 117%
TOLUENE	18.0	17.3	96%	17.9	100%	3%	20%	87% - 120%
ETHYLBENZENE	18.0	19.8	110%	18.9	105%	5%	20%	83% - 131%
TOTAL XYLENES	54.0	54.7	101%	55.4	103%	1%	20%	87% - 123%

ppb = PARTS PER BILLION

MS CONC - ANALYZED CONCENTRATION OF SPIKED SAMPLE

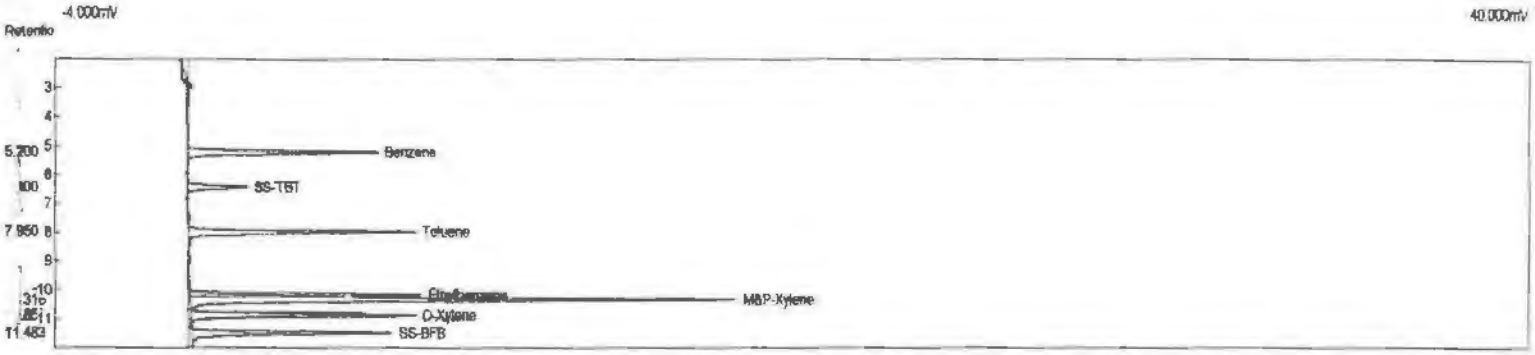
% REC - PERCENT RECOVERY OF SPIKE FROM MATRIX

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

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

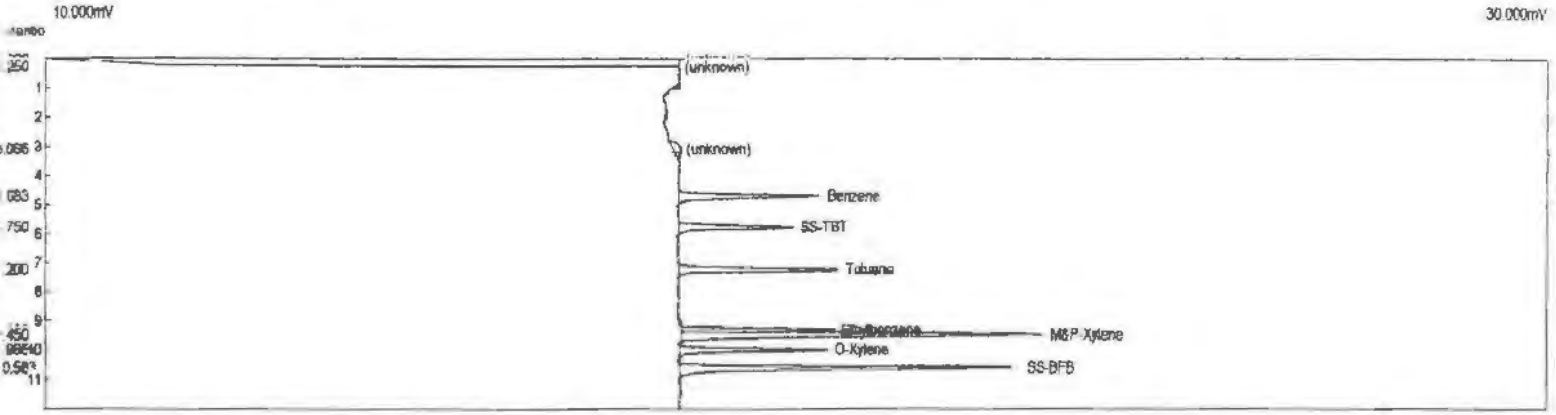
ON SITE LABS, INC
PMB 627, HC-01 BOX 29030, CAGUAS, P R 00725
TELEPHONE (787) 720-0329 FAX 789-3858

Lab name: On Site Labs Inc
Analysis date: 03/04/2002 12:27:40
Method: EPA 8021 mod.
Lab ID: GC-2
Description: PID - Ch. 1
Column: Rtx-5,30m,5.0um,0.53mm
Carrier: N2
e file: 0304pt1.chr ()
ample: 40 ppb BTEX OPEN STD
Operator: MAP



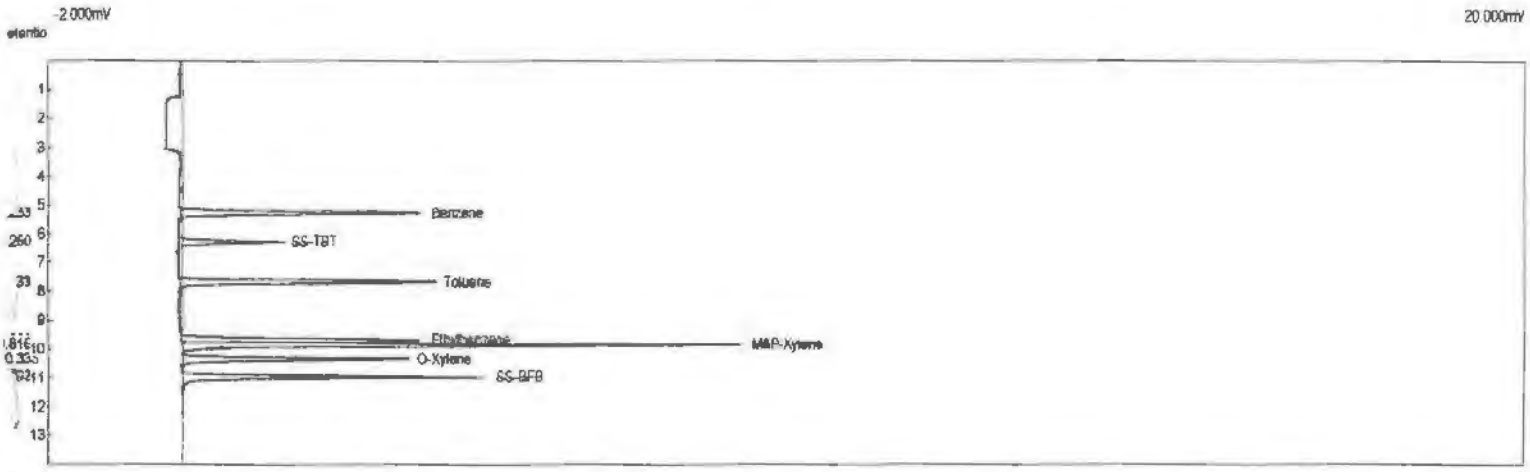
Component	Retention	Area	External	Internal	Units
Benzene	5.200	54.866	33.05	33.0518	ppb
SS-TBT	6.400	17.172	13.01	13.0087	ppm
luene	7.950	56.547	34.91	34.9056	ppb
hylbenzene	10.150	44.865	38.35	38.3462	ppb
M&P-Xylene	10.316	128.231	71.24	71.2392	ppb
-Xylene	10.850	51.469	37.84	37.8449	ppb
S-BFB	11.483	44.638	10.94	10.9407	ppm
		397.787	239.34	239.3369	

Lab name: On Site Labs Inc
Analysis date: 03/04/2002 18:02:29
Method: EPA 8021 mod.
Lab ID: GC-2
Description: PID - Ch. 1
Column: Rtx-5,30m,5.0um,0.53mm
Carrier: N2
Data file: 0304pt11.chr ()
Sample: 10 ppb BTEX CLOSE
Operator: MAP



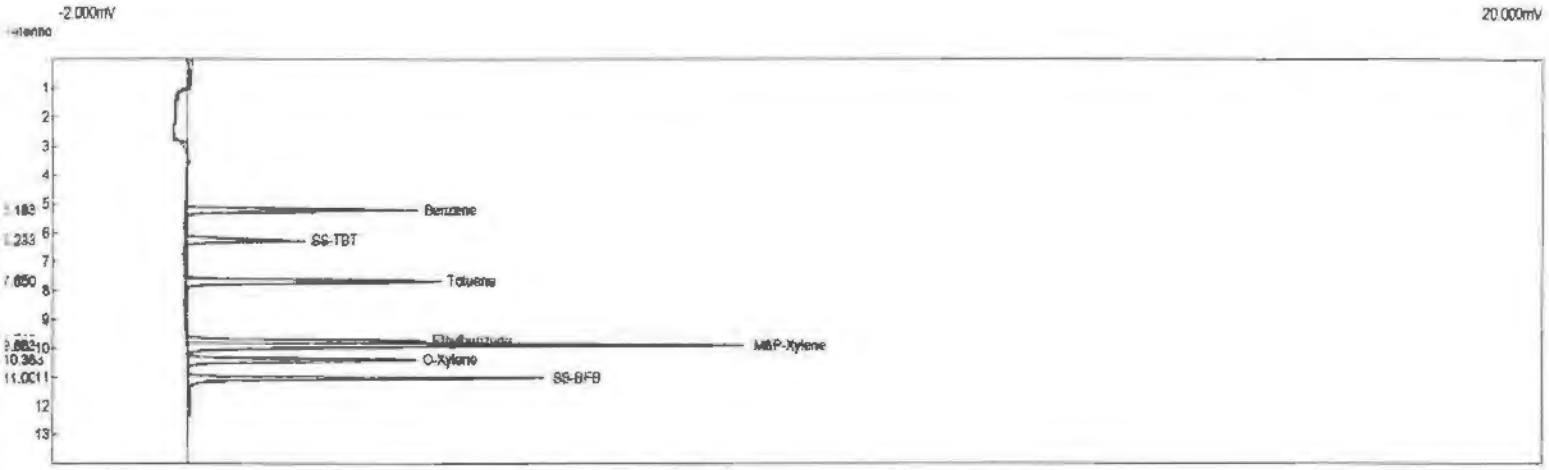
Component	Retention	Area	External	Internal	Units
enzene	4.683	15.633	9.42	9.4175	ppm
S-TBT	5.750	13.522	10.24	10.2439	ppm
oluene	7.200	16.290	10.06	10.0556	ppm
thylbenzene	9.300	12.619	10.79	10.7850	ppm
&P-Xylene	9.450	38.607	21.45	21.4483	ppm
Xylene	9.966	15.104	11.11	11.1062	ppm
S-BFB	10.583	34.235	8.39	8.3909	ppm
		146.010	81.45	81.4475	

Lab name: On Site Labs Inc
Analysis date: 03/04/2002 16:53:43
Method: EPA 8021 mod.
Lab ID: GC-2
Description: PID - Ch. 1
Column: Rtx-5,30m,5.0um,0.53mm
Carrier: N2
) file: 0304pt8.chr ()
mple: ILA005matrix spike duplica
Operator: MAP



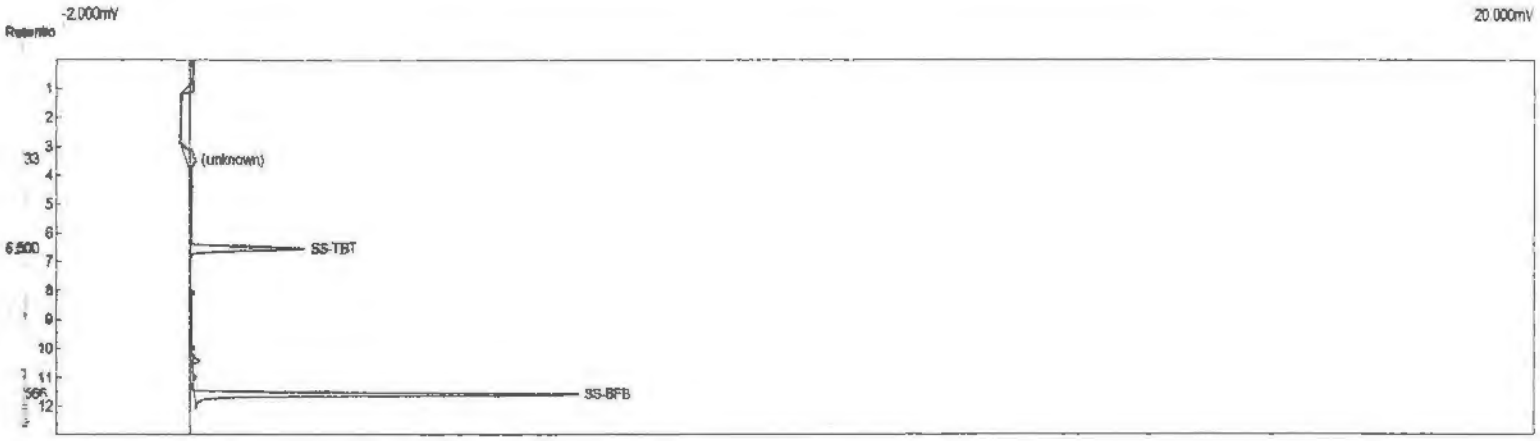
Component	Retention	Area	External	Internal	Units
Benzene	5.233	28.087	16.92	16.9199	ppb
S-TBT	6.250	13.194	10.00	9.9955	ppm
luene	7.633	28.080	17.33	17.3333	ppb
thylbenzene	9.666	23.216	19.84	19.8427	ppb
M&P-Xylene	9.816	64.892	36.05	36.0511	ppb
X	10.333	25.351	18.64	18.6404	ppb
	10.933	33.717	8.26	8.2640	ppm
		216.537	127.05	127.0469	

Lab name: On Site Labs Inc
Analysis date: 03/04/2002 17:45:42
Method: EPA 8021 mod.
Lab ID: GC-2
Description: PID - Ch. 1
Column: Rtx-5,30m,5.0um,0.53mm
Carrier: N2
Data file: 0304pt10.chr ()
Sample: ILA005matrix spike duplica
Operator: MAP



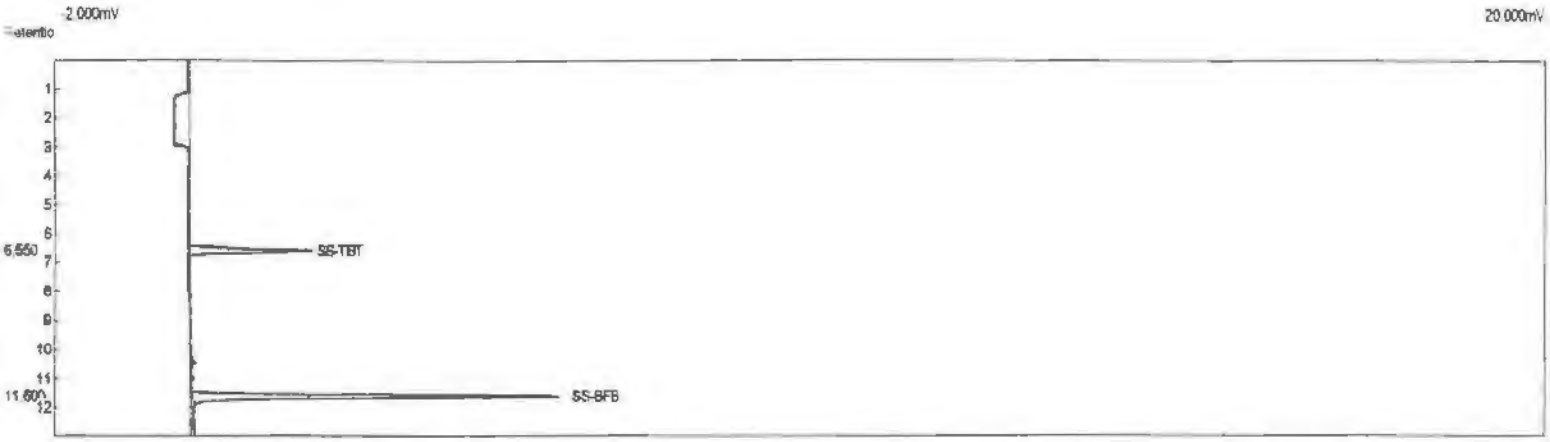
Component	Retention	Area	External	Internal	Units
Benzene	5.183	26.726	16.10	16.1000	ppb
SS-TBT	6.233	15.372	11.65	11.6455	ppm
Toluene	7.650	29.042	17.93	17.9272	ppb
Ethylbenzene	9.716	22.074	18.87	18.8667	ppb
M&P-Xylene	9.883	65.836	36.58	36.5756	ppb
O-Xylene	10.383	25.567	18.80	18.7993	ppb
SS-BFB	11.000	39.115	9.59	9.5870	ppm
		223.732	129.50	129.5011	

Lab name: On Site Labs Inc
Analysis date: 03/04/2002 13:19:23
Method: EPA 8021 mod.
Lab ID: GC-2
Description: PID - Ch. 1
Column: Rtx-5,30m,5.0um,0.53mm
Carrier: N2
a file: 0304pt3.CHR ()
ample: METHOD BLANK
Operator: MAP



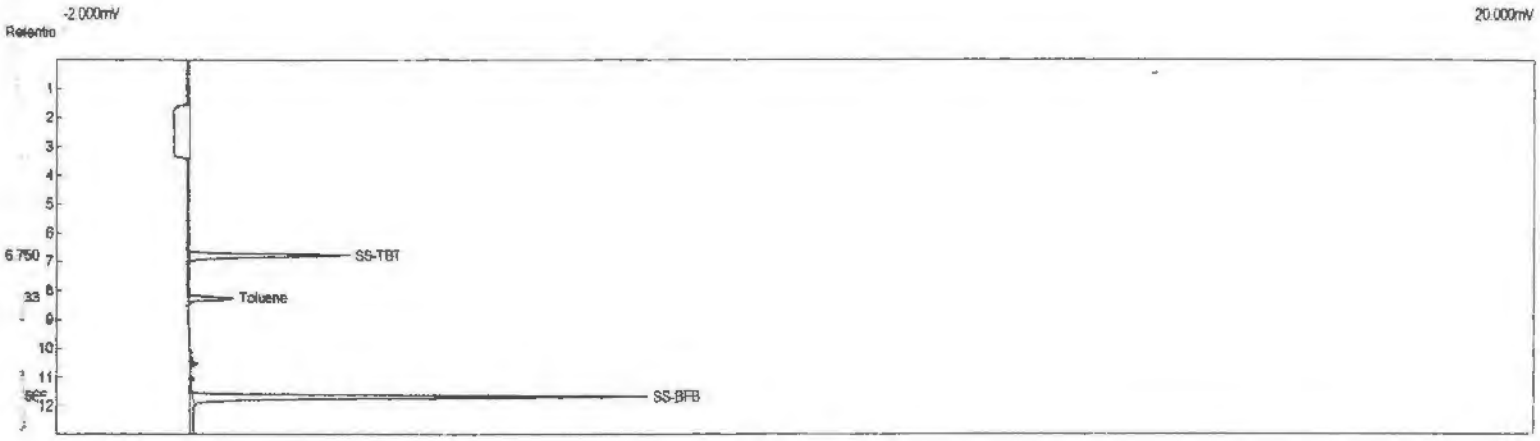
Component	Retention	Area	External	Internal	Units
-TBT	6.500	15.353	11.63	11.6311	ppm
SS-BFB	11.566	41.649	10.21	10.2081	ppm
		57.002	21.84	21.8391	

Lab name: On Site Labs Inc
Analysis date: 03/04/2002 13:57:21
Method: EPA 8021 mod.
Lab ID: GC-2
Description: PID - Ch. 1
Column: Rtx-5,30m,5.0um,0.53mm
Carrier: N2
Data file: 0304pt4.CHR ()
Sample: ILA005/0302CH2M
Operator: MAP



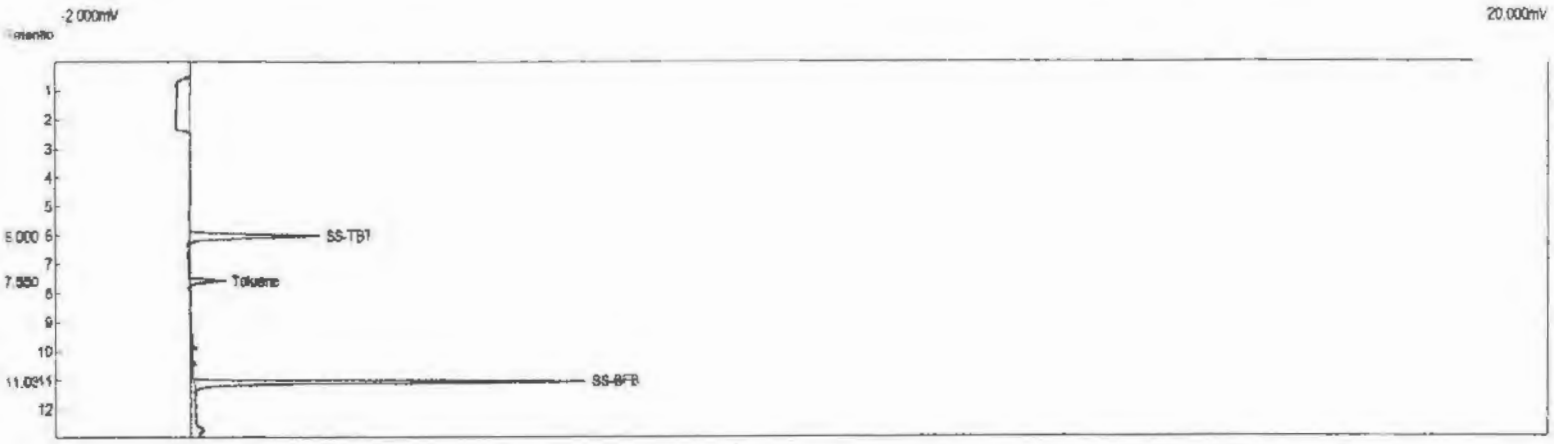
Component	Retention	Area	External	Internal	Units
SS-TBT	6.550	16.600	12.58	12.5758	ppm
SS-BFB	11.600	40.848	10.01	10.0118	ppm
		57.448	22.59	22.5875	

Lab name: On Site Labs Inc
Analysis date: 03/04/2002 14:41:10
Method: EPA 8021 mod.
Lab ID: GC-2
Description: PID - Ch. 1
Column: Rtx-5,30m,5.0um,0.53mm
Carrier: N2
a file: 0304pt5.CHR ()
ample: ILA006TB1/0302CH2M
Operator: MAP



Component	Retention	Area	External	Internal	Units
-TBT	6.750	20.668	15.66	15.6576	ppm
Toluene	8.233	5.247	3.24	3.2389	ppb
-BFB	11.666	50.392	12.35	12.3510	ppm
		76.307	31.25	31.2474	

Lab name: On Site Labs Inc
Analysis date: 03/04/2002 15:11:57
Method: EPA 8021 mod.
Lab ID: GC-2
Description: PID - Ch. 1
Column: Rtx-5,30m,5.0um,0.53mm
Carrier: N2
Data file: 0304pt6.chr ()
Sample: ILA007EB1/0302CH2M
Operator: MAP



Component	Retention	Area	External	Internal	Units
SS-TBT	6.000	17.442	13.21	13.2136	ppb
Toluene	7.550	4.201	2.59	2.5932	ppb
SS-BFB	11.033	42.921	10.52	10.5199	ppb
		64.564	26.33	26.3267	

On Site Labs, Inc.

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

March 10, 2002
OSL Projects #02J0304CH2M

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 88 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:

- 6 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 #02I0304CH2M
DAILY CALIBRATION DATE: 03/05/02

CH2M HILL PROJECT NO. 167722.FI.FS
PROJECT NAME: RRNAS SITE 88

			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%	190.66	0.24	6.9%	192.88	0.24	5.8%
TPH GASOLINE	FID #3 (gc5)	10 - 30,000	0.36	15.0%	311.35	0.39	7.5%	251.12	0.31	13.3%
TPH GASOLINE	FID #4 (gc5)	10 - 30,000	0.31	15.4%	231.00	0.29	5.6%	211.13	0.26	13.8%
TPH DIESEL	FID #2 (gc5)	25 - 20,000	0.69	14.1%	962.06	0.60	13.4%	1005.30	0.63	9.5%
TPH DIESEL	FID #3 (gc5)	25 - 20,000	0.74	13.6%	1168.00	0.73	1.2%	1066.20	0.67	9.8%
TPH DIESEL	FID #4 (gc5)	25 - 20,000	0.61	11.1%	854.36	0.53	11.9%	878.68	0.55	9.4%

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)

OSL Project #02!0304CH2M
DATE: 03/05/02

CH2M HILL PROJECT NO. 167722.FI.FS
PROJECT NAME: RRNAS SITE 88

COMPOUND	SPK CON (ppm)	MS CONC (ppm)	%REC MS	MSD CONC (ppm)	%REC MSD	RPD	ACCEPTABLE RPD	ACCEPTABLE RECOVERY
TPH-GASOLINE	200	186	93%	179	90%	4%	15%	81% - 126%
TPH-DIESEL	400	380	95%	377	94%	1%	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

LABORATORY QA/QC

CH2M HILL

OSL Project #02I0304CH2M

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

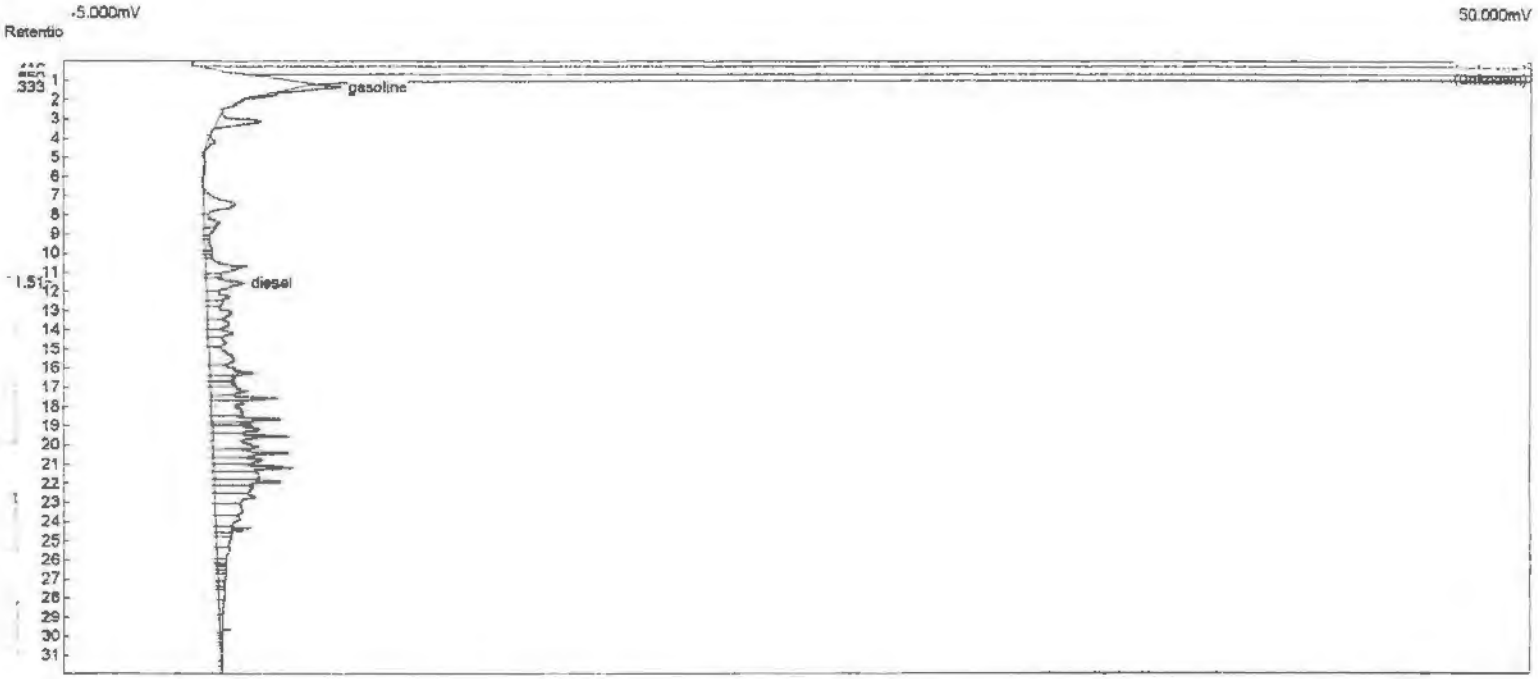
SAMPLE NUMBER	DATE ANALYZED	TPH-GAS C_5 - C_{12} (mg/Kg)	TPH-DIESEL C_{13} - C_{24} (mg/Kg)
ILA010	03/05/02	ND	ND
ILA010 REP.	03/05/02	ND	ND
DETECTION LIMIT (mg/Kg)		10	25

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)
ILA014	03/05/02	ND	ND
ILA014 REP.	03/05/02	ND	ND
DETECTION LIMIT (mg/L)		10	25

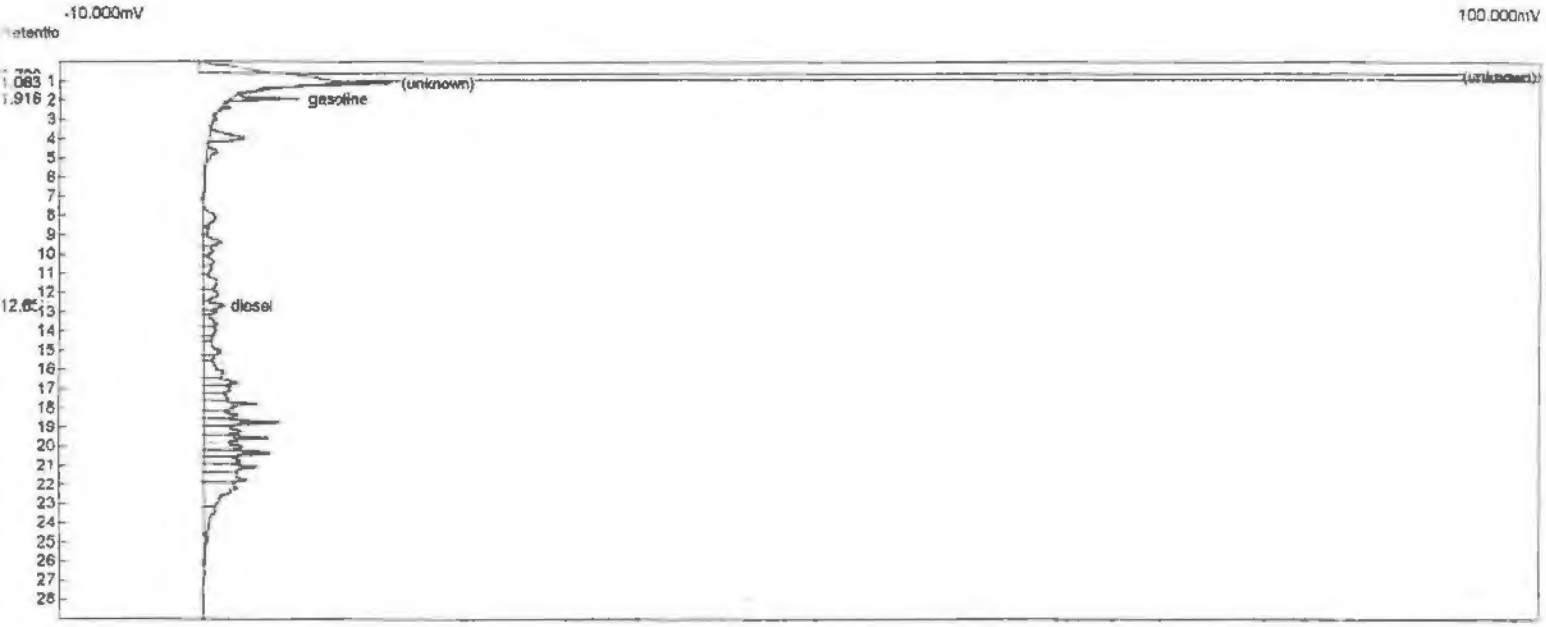
mg/L = MILLIGRAMS PER LITER
mg/Kg = MILLIGRAMS PER KILOGRAM
CONCENTRATIONS BASED ON DRY WEIGHT
REP = LABORATORY REPLICATE
"ND" INDICATES ANALYTE NOT DETECTED AT OR ABOVE THE LISTED DETECTION LIMIT
ANALYSES PERFORMED BY: MARCO A. PEDRAZA
DATA REVIEWED BY: KEVIN SHELBURNE

Lab name: TEG-PUERTO RICO
Analysis date: 03/05/2002 09:58:26
Method: EPA 8015B mod.
Lab ID: GC - 5
Description: FID2 - Ch. 2
Column: XTI-5, 30m, 0.53mm, 1.5um
Carrier: N2
a file: 0305fb1.CHR ()
mple: 200/400 ppm G/D OPEN
erator: MAP
Comments:



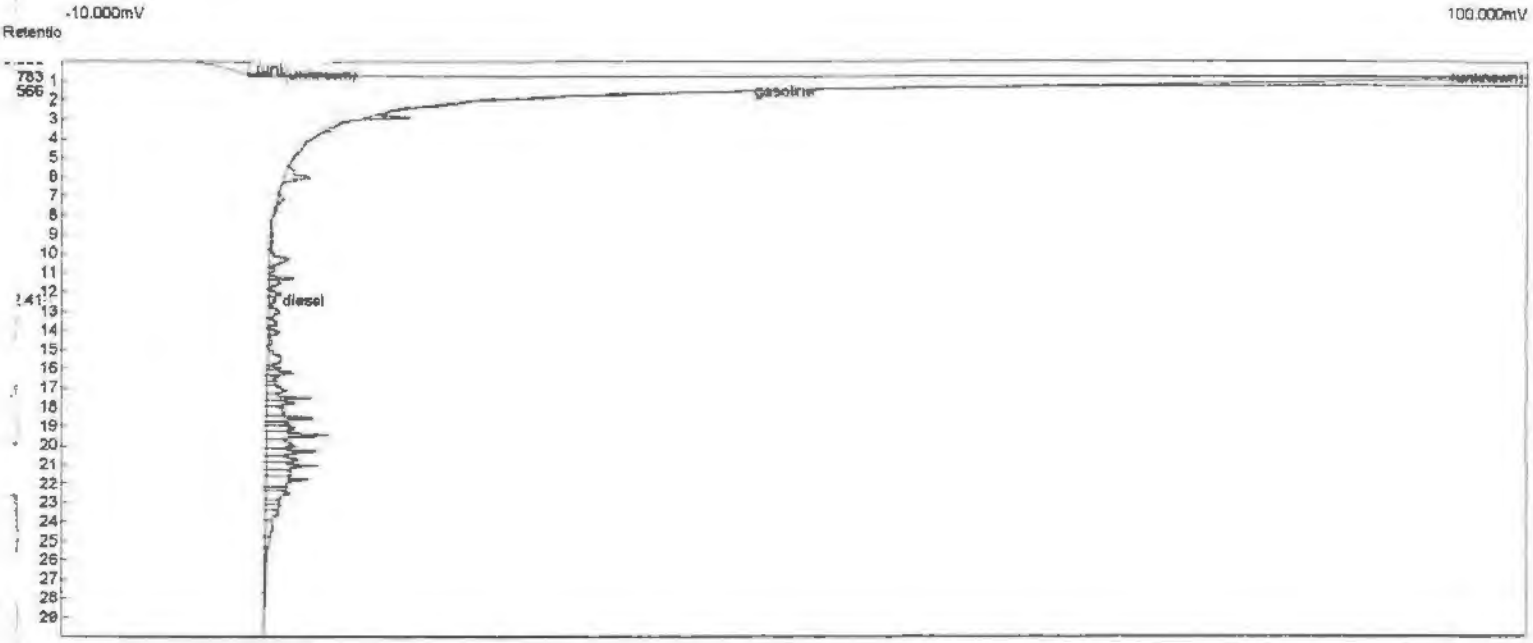
C nnent	Retention	Area	External	Internal	Units
as	1.333	190.660	186.19	186.1909	
diesel	11.516	962.055	346.56	346.5614	ppm
		1152.714	532.75	532.7523	

Lab name: TEG-PUERTO RICO
Analysis date: 03/05/2002 10:56:19
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: 0305fc2.CHR ()
Sample: 200/400ppm G/D open std
Operator: MAP
Comments:



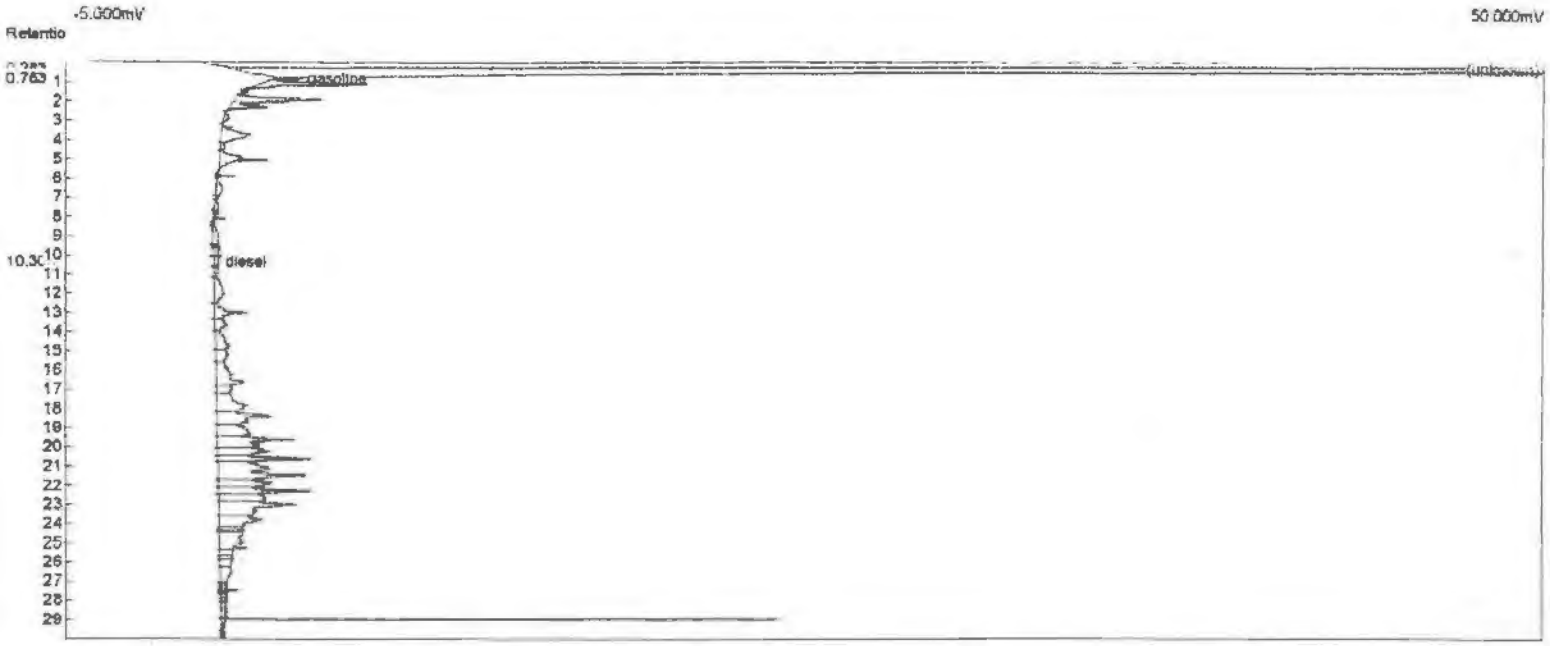
Component	Retention	Area	External	Internal	Units
gasoline	1.916	311.348	215.02	215.0190	
diesel	12.650	1168.001	395.13	395.1289	ppm
		1479.349	610.15	610.1479	

Lab name: TEG-PUERTO RICO
Analysis date: 03/05/2002 10:56:19
Method: EPA 8015B mod.
Lab ID: GC - 5
Description: FID 4 - Ch. 4
Column: XTI-5, 30m, 0.53mm, 1.5µm
Carrier: N2
[illegible] file: 0305FD2.CHR ()
[illegible]mple: 200/400 ppm G/D open
[illegible]erator: MAP
Comments:



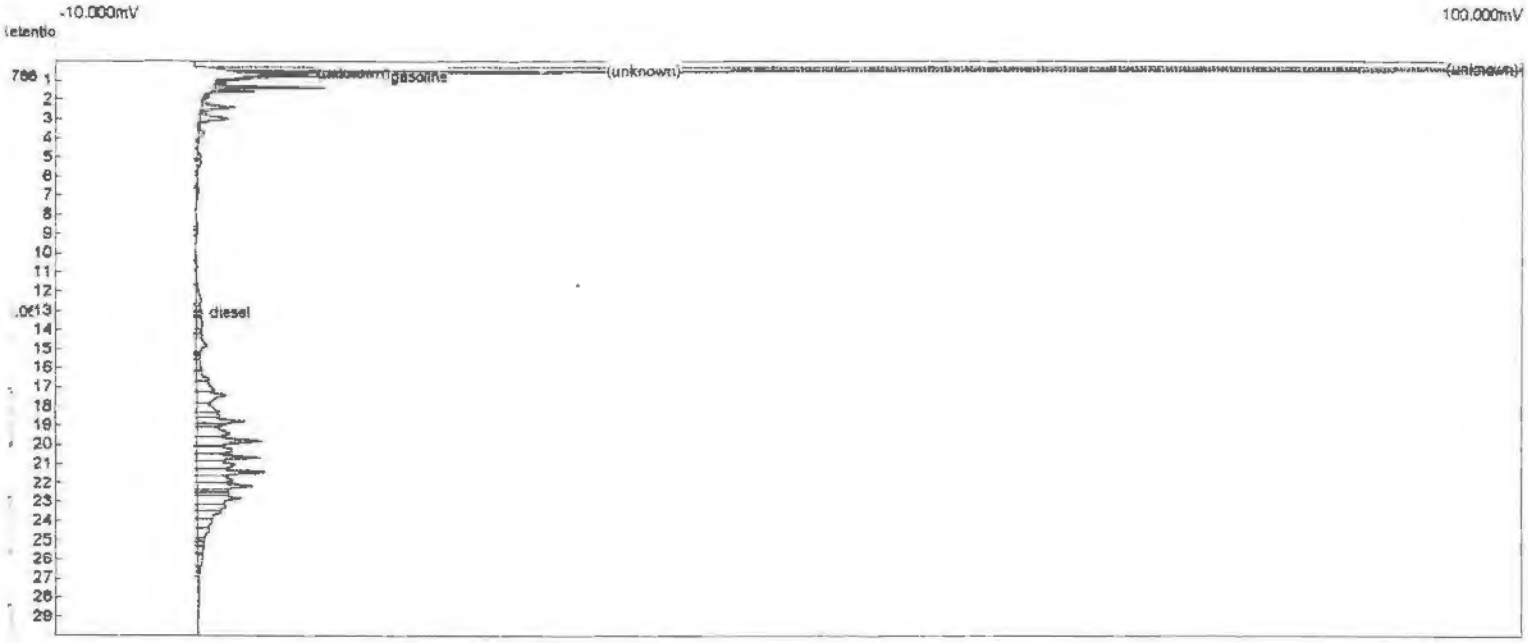
Component	Retention	Area	External	Internal	Units
[illegible]	1.566	231.003	188.73	188.7279	
[illegible]	12.416	854.363	352.46	352.4598	ppm
		1085.366	541.19	541.1877	

Lab name: On Site Labs Inc.
Analysis date: 03/05/2002 16:13:19
Method: EPA 8015B mod.
Lab ID: GC - 5
Description: FID2 - Ch. 2
Column: XTI-5, 30m, 0.53mm, 1.5um
Carrier: N2
Data file: 0305fb9.chr ()
Sample: 200/400 ppm G/D CLOSE
Operator: MAP
Comments:



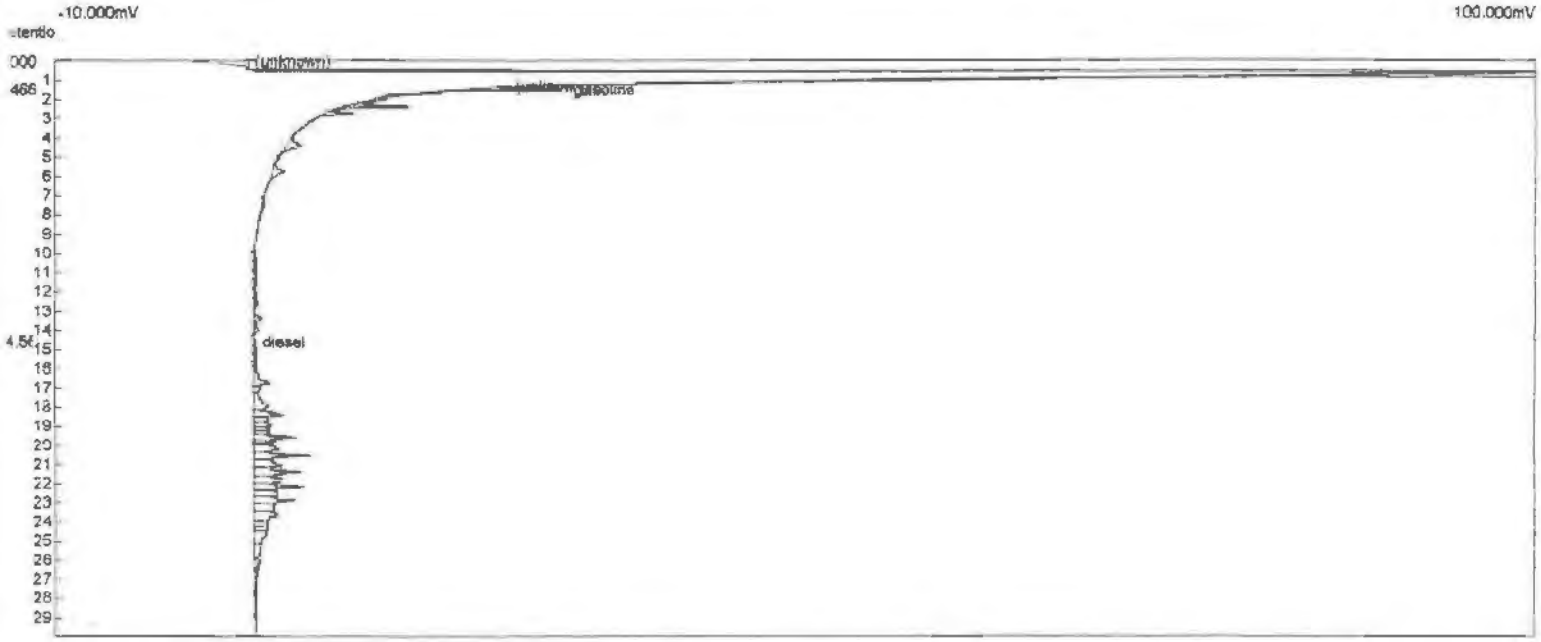
Component	Retention	Area	External	Internal	Units
gasoline	0.763	192.877	188.36	188.3560	
diesel	10.303	1005.299	362.14	362.1394	ppm
		1198.176	550.50	550.4954	

Lab name: On Site Labs Inc.
Analysis date: 03/05/2002 16:13:19
Method: EPA 8015B mod.
Lab ID: GC - 5
Description: FID 3 - Ch. 3
Column: XTI-5, 30m, 0.53mm, 1.5um
Carrier: N2
D[illegible] file: 0305fc9.CHR ()
[illegible]ple: 200/400 ppm G/D CLOSE
[illegible]ator: MAP
Co[illegible]ments:



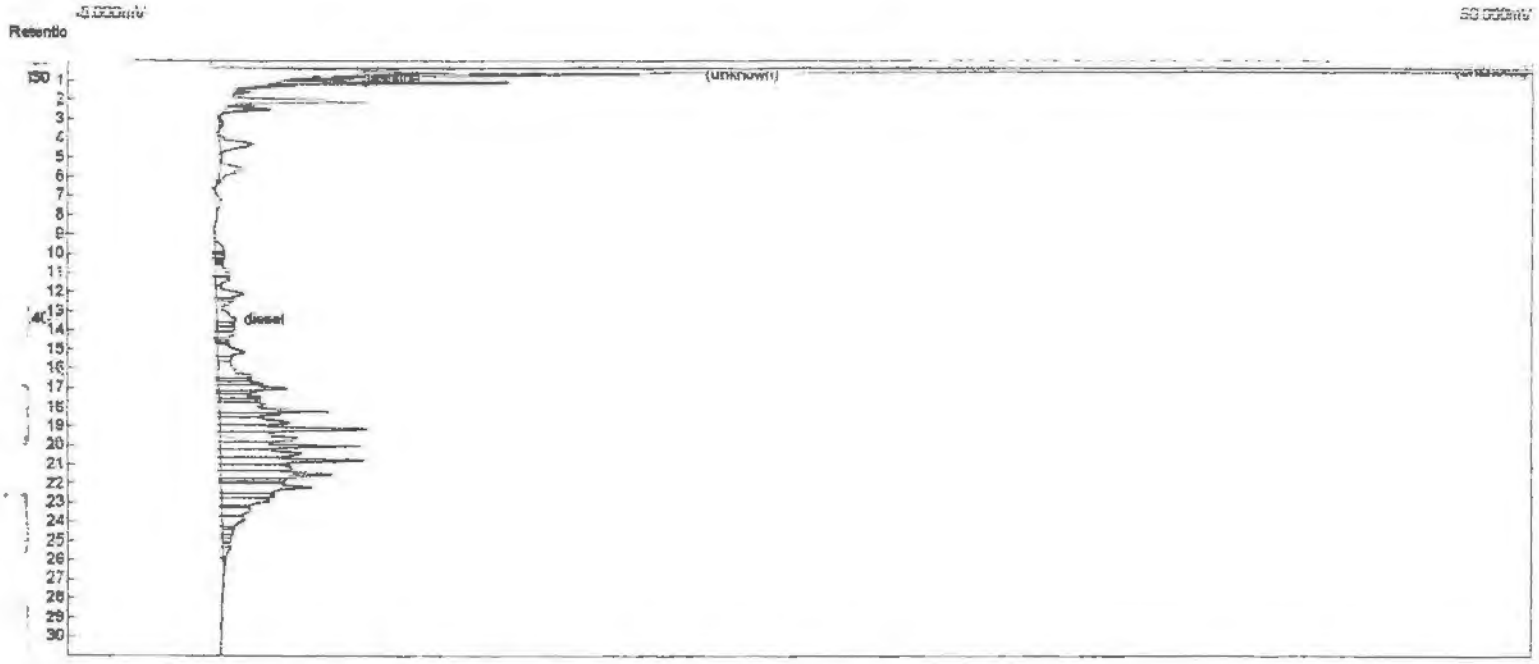
Component	Retention	Area	External	Internal	Units
[illegible]soli	0.766	251.124	173.43	173.4262	
[illegible]	13.066	1066.201	360.69	360.6905	ppm
		1317.325	534.12	534.1186	

Lab name: On Site Labs Inc.
nalysis date: 03/05/2002 16:13:19
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: 0305FD9.CHR ()
Sample: 200/400 ppm G/D CLOSE
Operator: MAP
Comments:



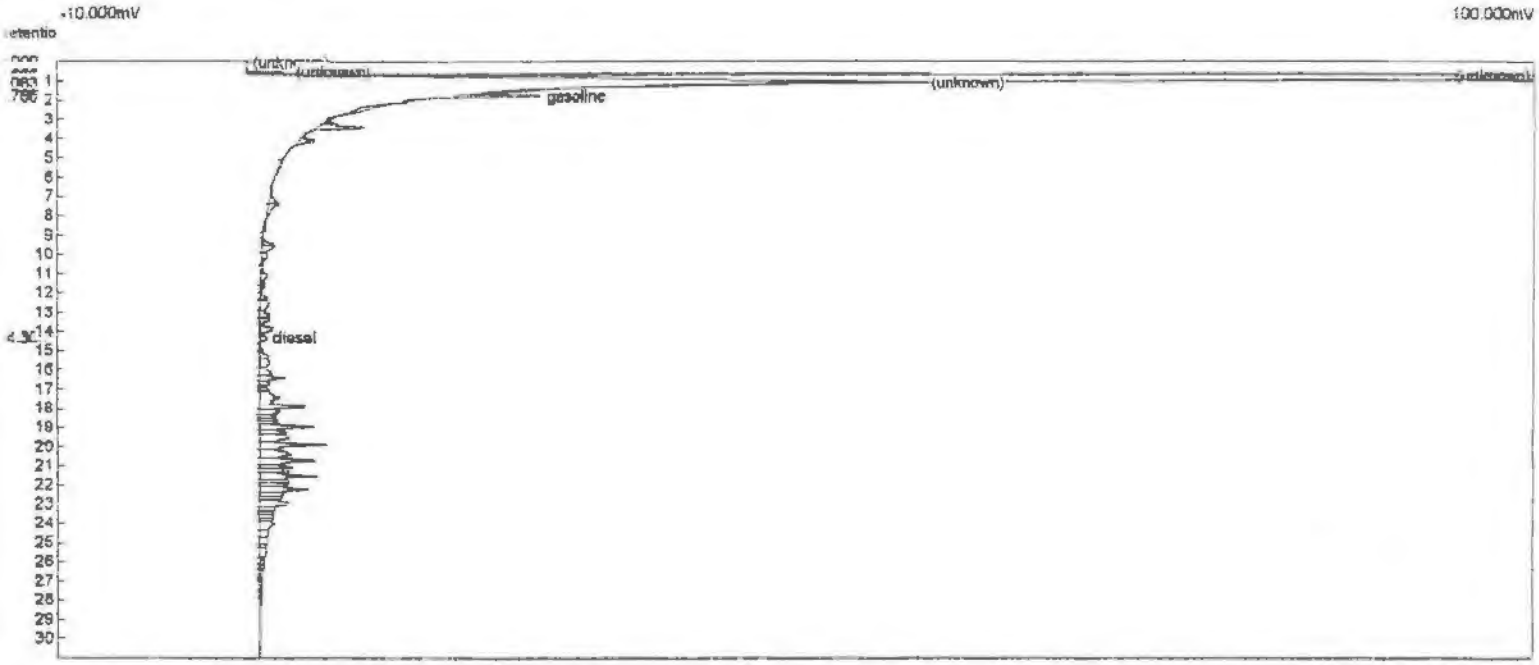
Component	Retention	Area	External	Internal	Units
asoline	1.466	211.131	172.49	172.4922	
iesel	14.566	878.684	362.49	362.4934	ppm
		1089.814	534.99	534.9856	

Lab name: On Site Labs Inc.
Analysis date: 03/05/2002 15:38:07
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: 0305fc8.CHR ()
Sample: lla010 matrix spike
Operator: MAP
Comments:



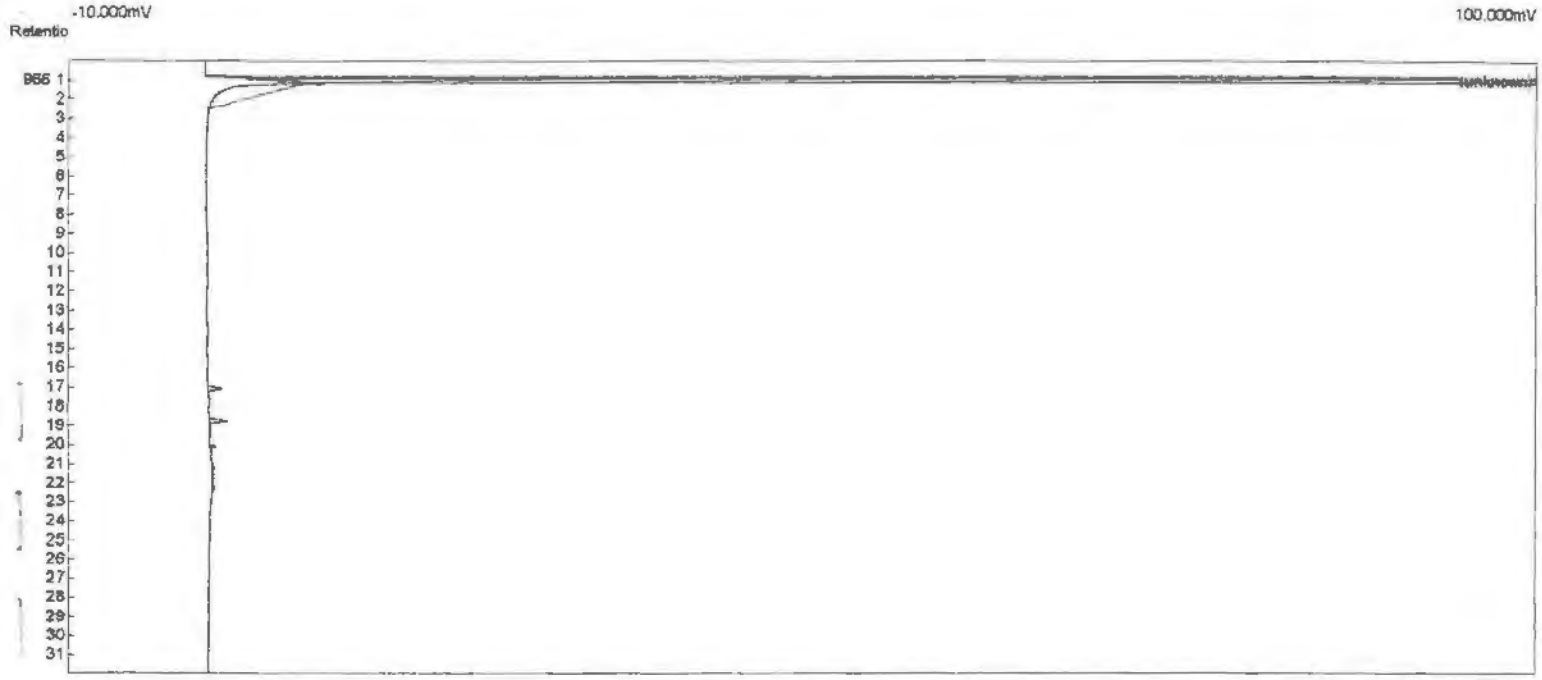
Component	Retention	Area	External	Internal	Units
	0.850	269.900	186.40	186.3974	
	13.400	1123.448	380.06	380.0568	ppm
		1393.351	566.45	566.4543	

Lab name: On Site Labs Inc.
Analysis date: 03/05/2002 15:38:07
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: 0305FD8.CHR ()
Sample: ila010 matrix spike duplica
Operator: MAP
Comments:



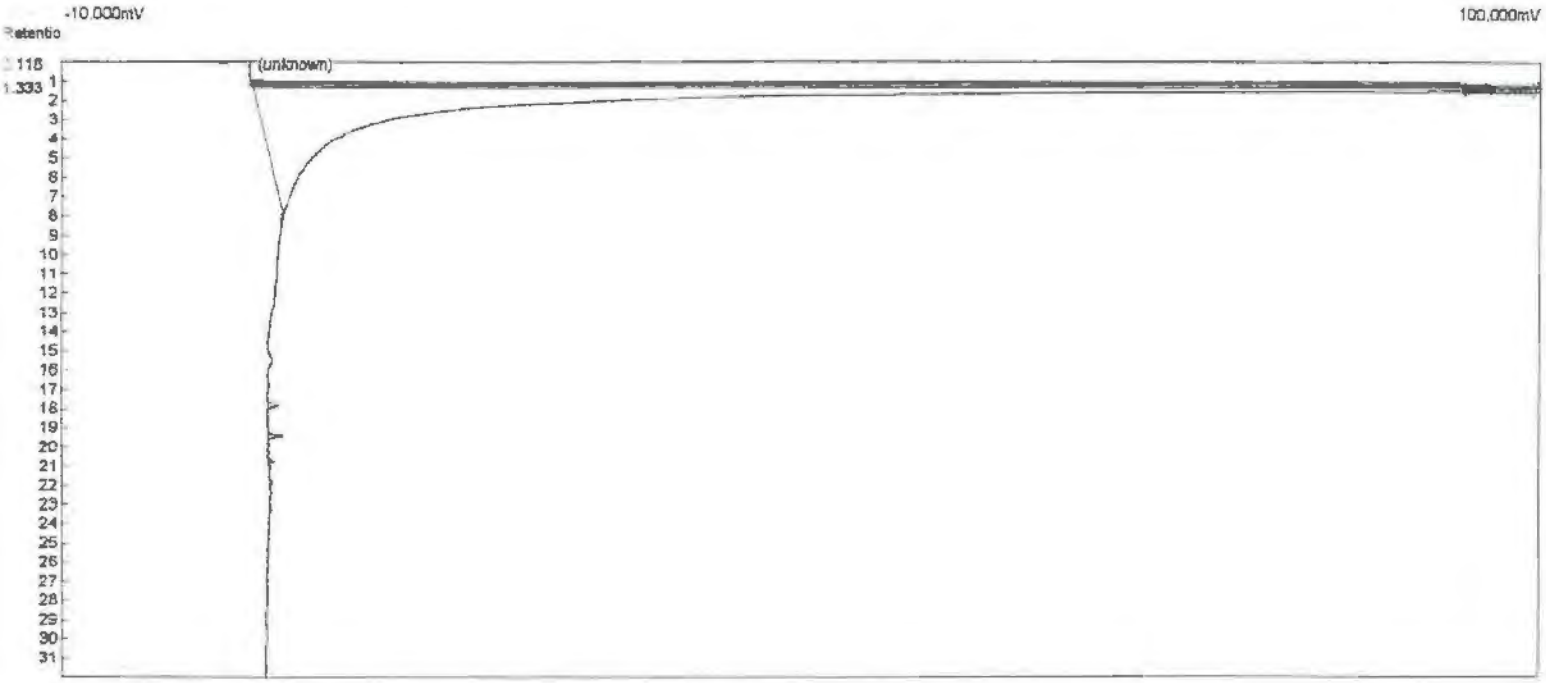
Component	Retention	Area	External	Internal	Units
asoline	1.766	218.579	178.58	178.5776	
iesel	14.300	914.185	377.14	377.1388	ppm
		1132.764	555.72	555.7164	

Analysis date: 03/05/2002 11:43:57
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: 0305fc3.CHR ()
nple: METHOD BLANK
rator: MAP
ments:



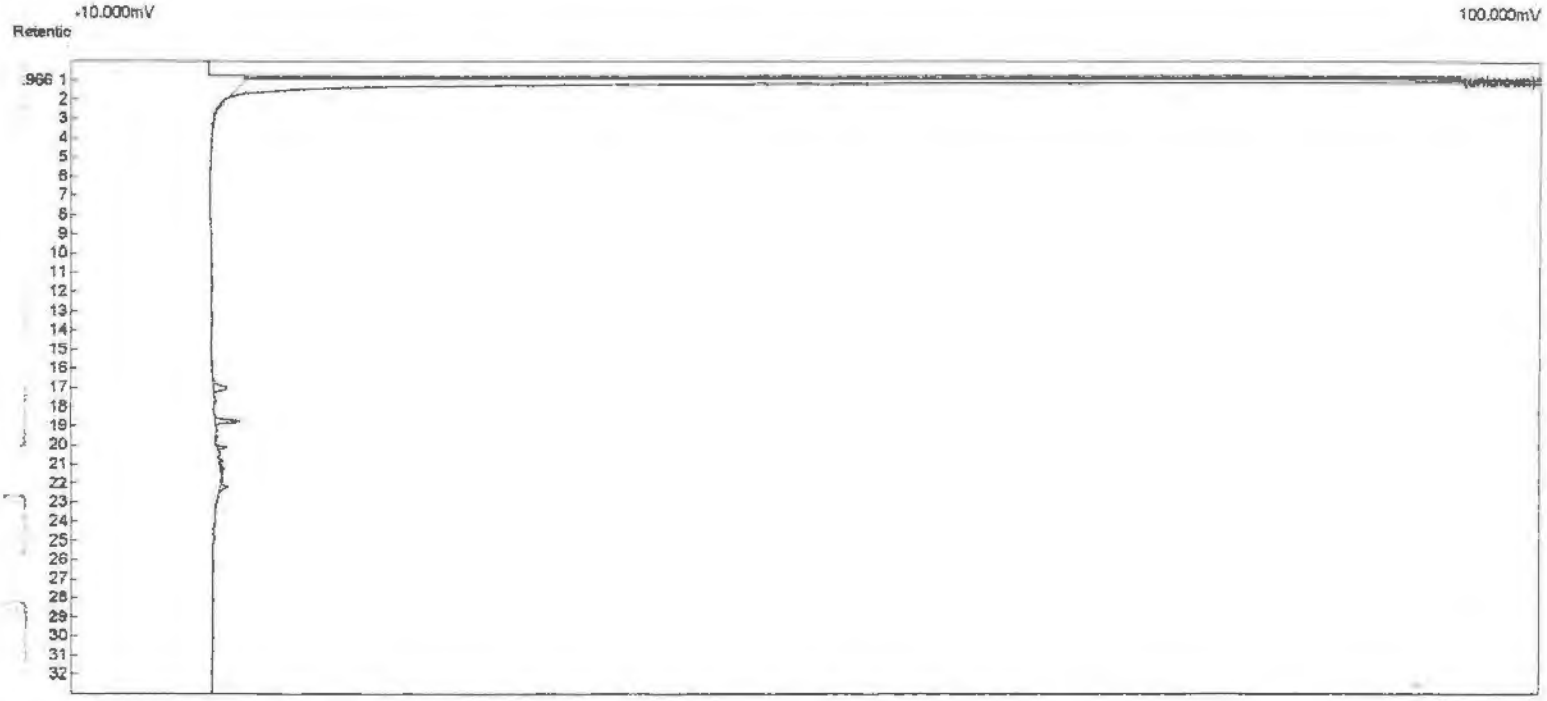
Component	Retention	Area	External	Internal	Units
		0.000	0.00	0.0000	

Lab name: On Site Labs Inc.
Analysis date: 03/05/2002 11:43:57
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: 0305FD3.CHR ()
Sample: METHOD BLANK
Operator: MAP
Comments:



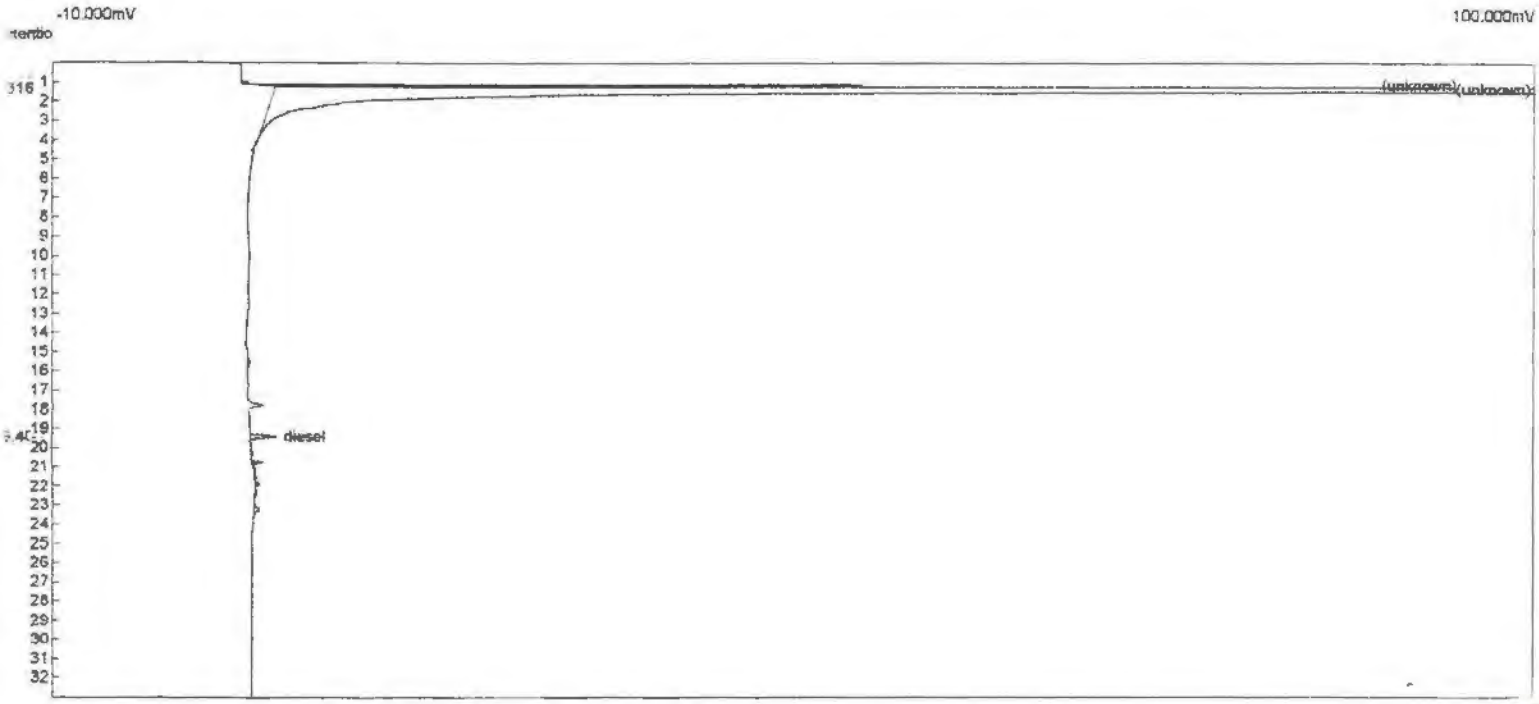
Component	Retention	Area	External	Internal	Units
		0.000	0.00	0.0000	

Lab name: On Site Labs Inc.
Analysis date: 03/05/2002 12:58:17
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: 0305fc4.CHR ()
mple: ILA008/0304CH2M
erator: MAP
Comments:



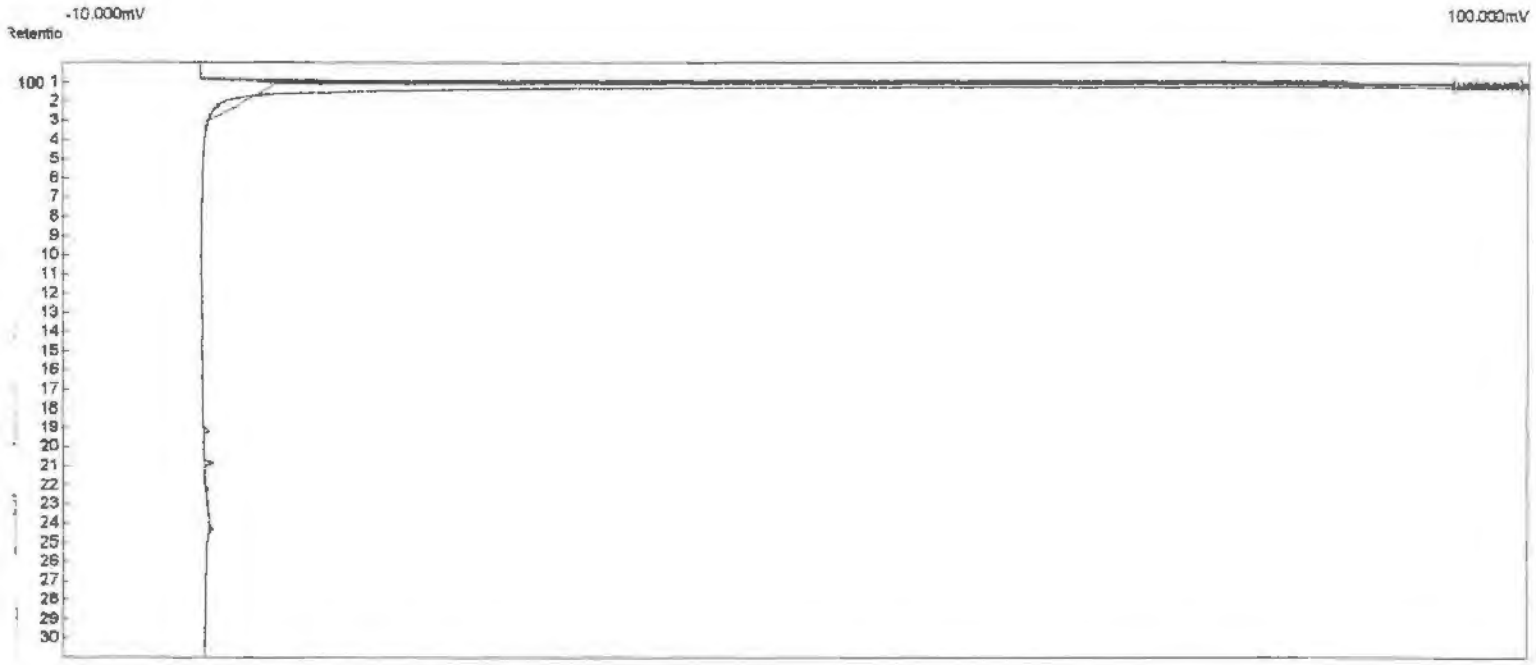
onent	Retention	Area	External	Internal	Units
		0.000	0.00	0.0000	

Lab name: On Site Labs Inc.
Analysis date: 03/05/2002 12:58:17
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: 0305FD4.CHR ()
Sample: ILA009/0304CH2M
Operator: MAP
Comments:



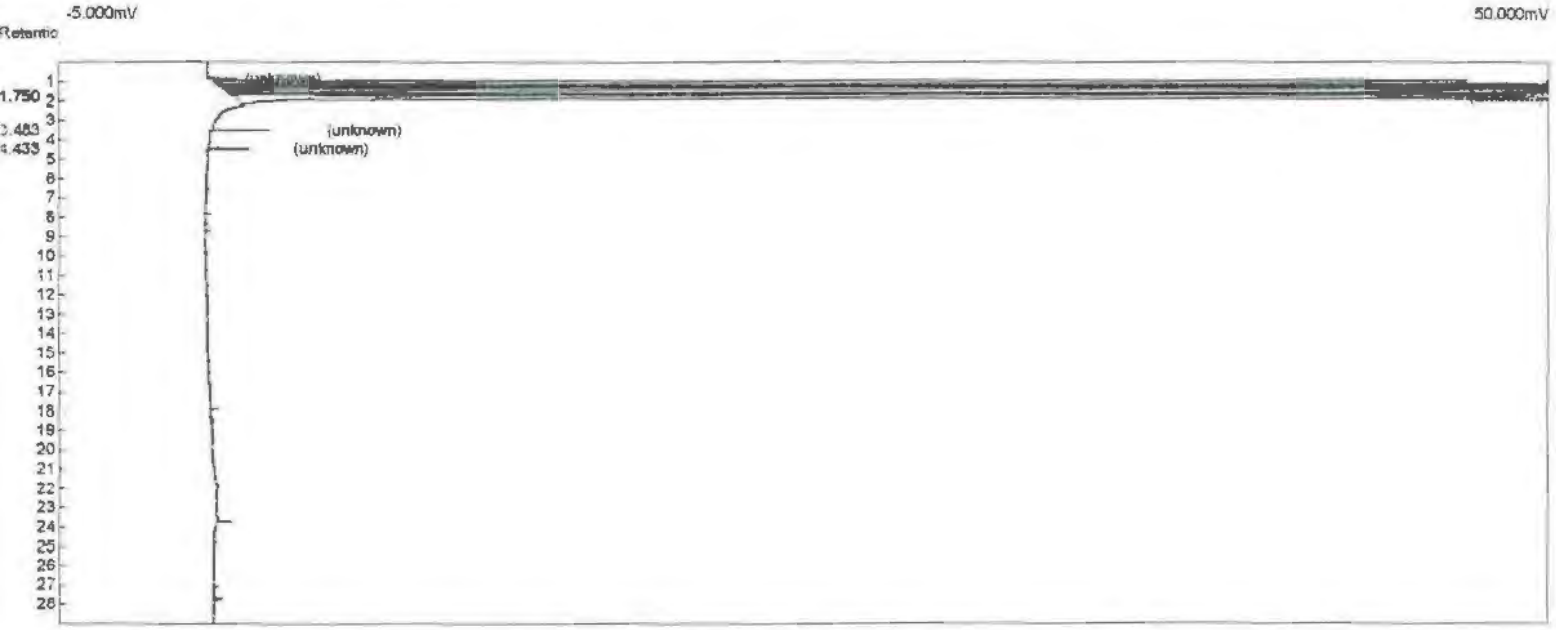
Component	Retention	Area	External	Internal	Units
iesel	19.400	16.690	6.89	6.8853	ppm
		16.690	6.89	6.8853	

Lab name: On Site Labs Inc.
Analysis date: 03/05/2002 14:14:24
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: 0305fc8.CHR ()
Sample: ILA010/0304CH2M
Operator: MAP
Comments:



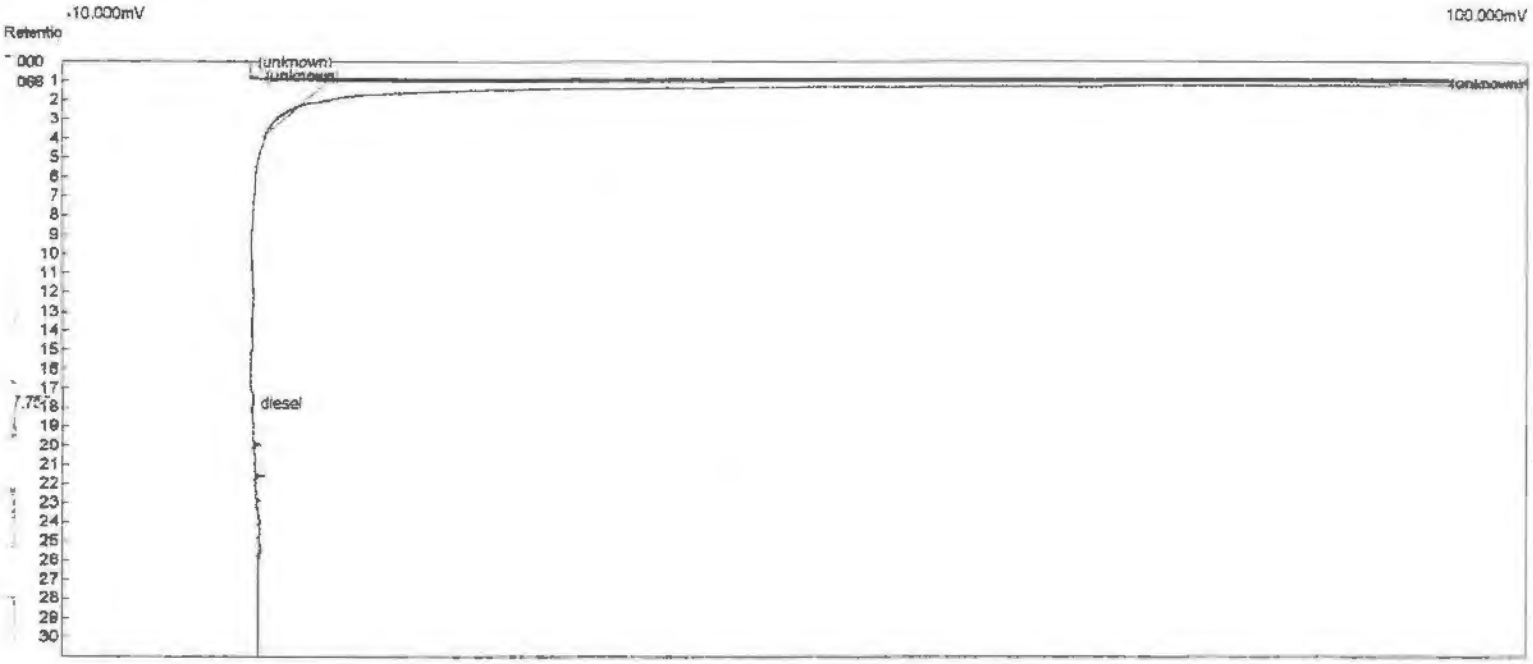
Component	Retention	Area	External	Internal	Units
		0.000	0.00	0.0000	

Lab name: On Site Labs Inc.
Analysis date: 03/05/2002 15:05:28
Method: EPA 8015B mod.
Lab ID: GC - 5
Description: FID2 - Ch. 2
Column: XTI-5, 30m, 0.53mm, 1.5um
Carrier: N2
Data file: 0305fb7.CHR ()
Sample: ILA010/0304CH2M REP
Operator: MAP
Comments:



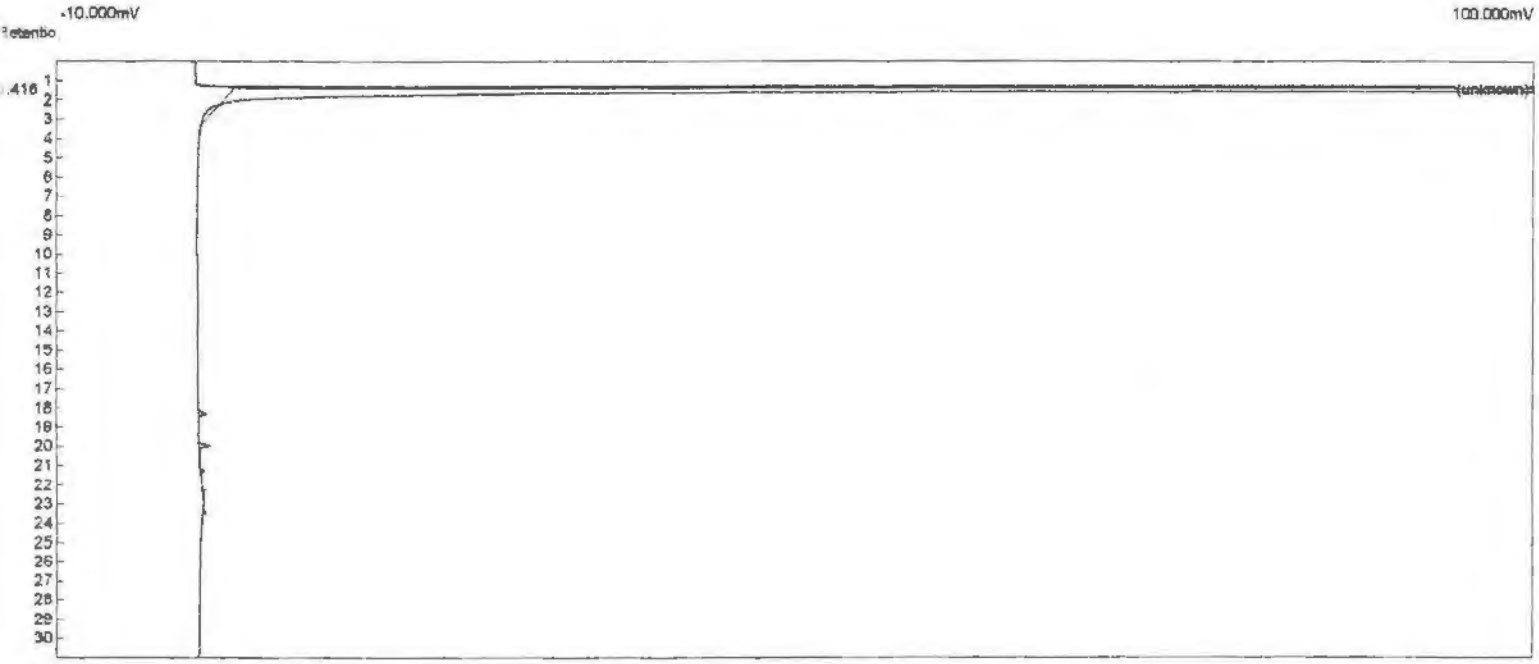
Component	Retention	Area	External	Internal	Units
		0.000	0.00	0.0000	

Lab name: On Site Labs Inc.
Analysis date: 03/05/2002 14:14:24
Method: EPA 8015B mod.
Lab ID: GC - 5
Description: FID 4 - Ch. 4
Column: XTI-5, 30m, 0.53mm, 1.5um
Carrier: N2
[illegible] file: 0305FD6.CHR ()
[illegible]mple: ILA011/0304CH2M
[illegible]rator: MAP
Comments:



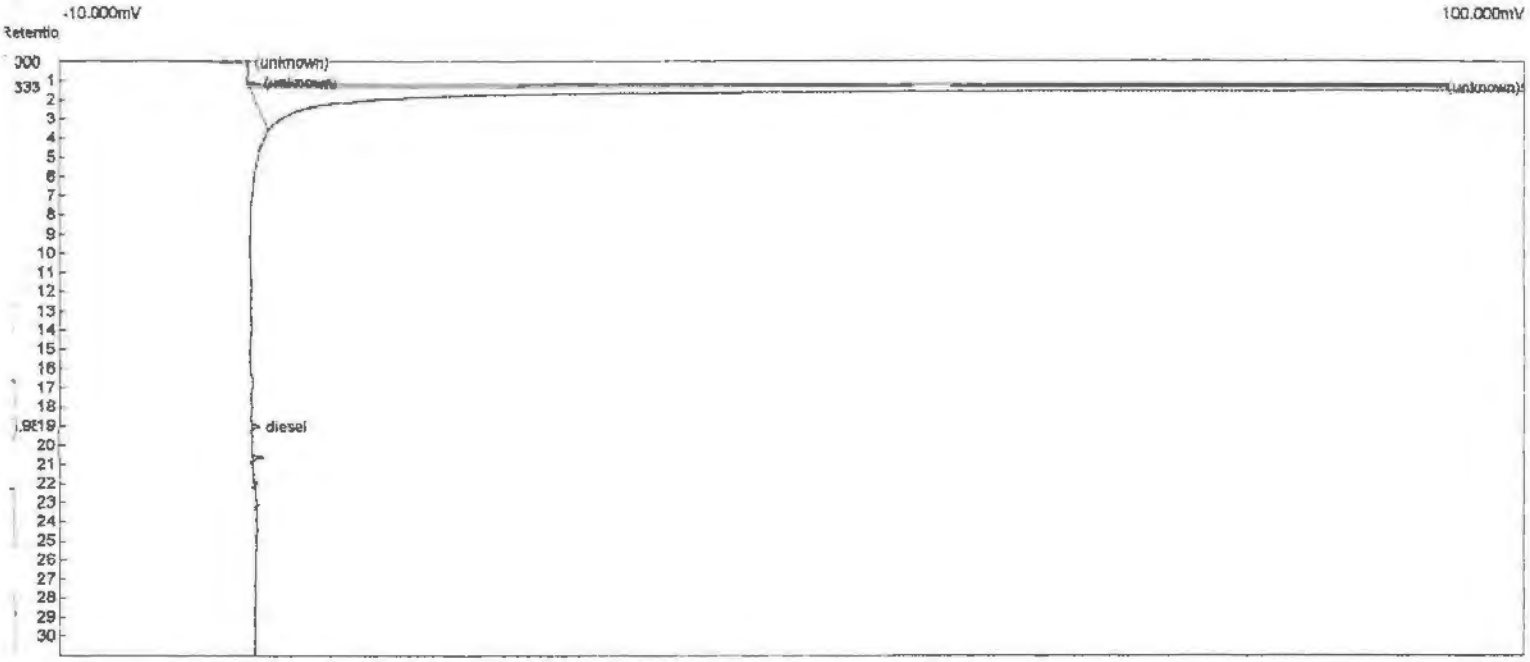
Component	Retention	Area	External	Internal	Units
[illegible]	17.750	22.026	9.09	9.0866	ppm
		22.026	9.09	9.0866	

Lab name: On Site Labs Inc.
Analysis date: 03/05/2002 13:41:11
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: 0305fc5.CHR ()
Sample: ILA012/0304CH2M
Operator: MAP
Comments:



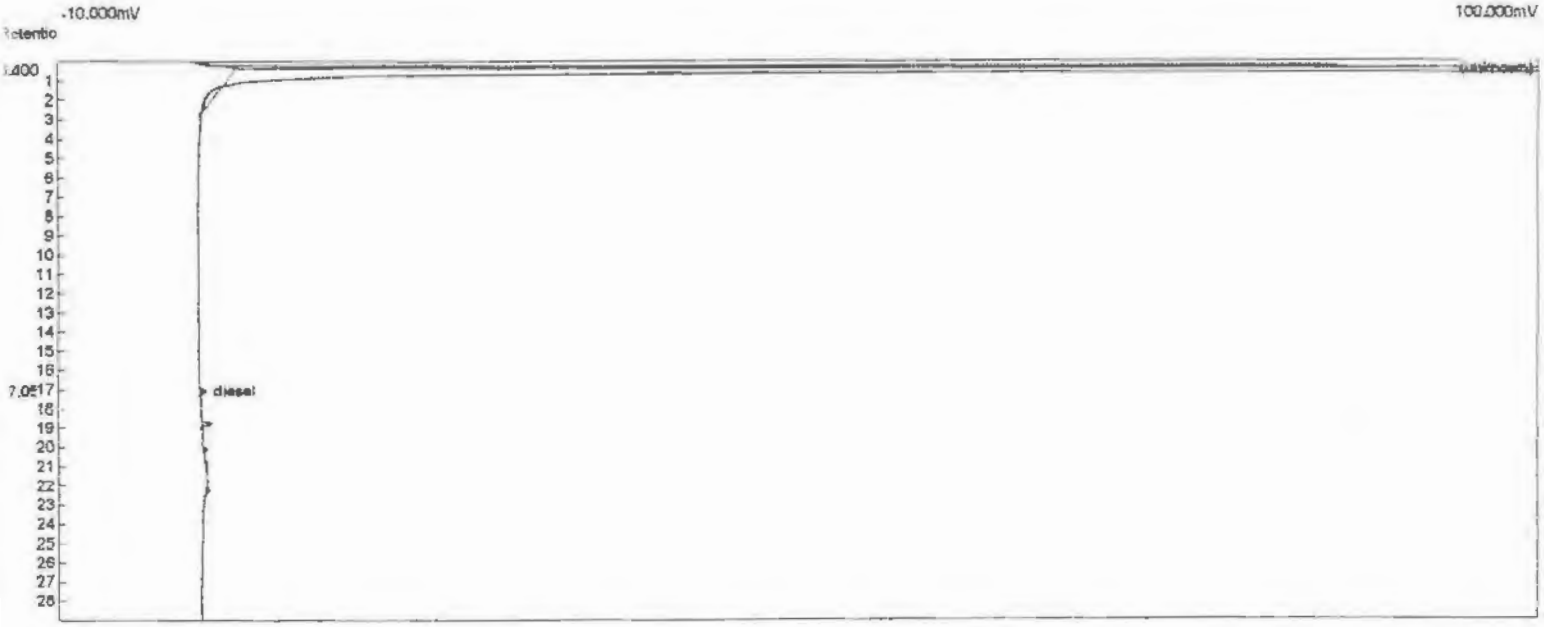
Component	Retention	Area	External	Internal	Units
		0.000	0.00	0.0000	

Lab name: On Site Labs Inc.
Analysis date: 03/05/2002 13:41:11
Method: EPA 8015B mod.
Lab ID: GC - 5
Description: FID 4 - Ch. 4
Column: XTI-5, 30m, 0.53mm, 1.5um
Carrier: N2
[illegible] file: 0305FD5.CHR ()
[illegible]mple: ILA013/0304CH2M
[illegible]rator: MAP
Comments:



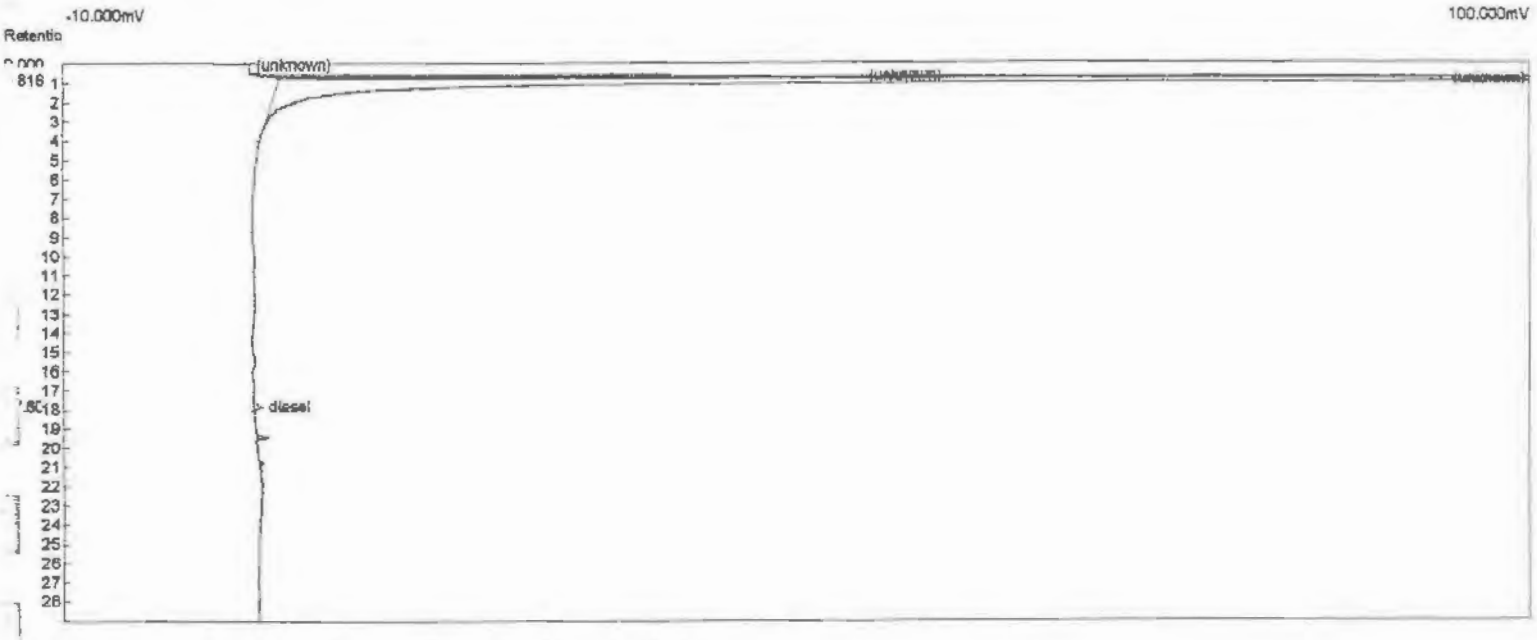
Component	Retention	Area	External	Internal	Units
[illegible]	18.983	19.474	8.03	8.0338	ppm
		19.474	8.03	8.0338	

Lab name: On Site Labs Inc.
Analysis date: 03/05/2002 15:05:28
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: 0305fc7.CHR ()
Sample: ILA014/0304CH2M
Operator: MAP
Comments:



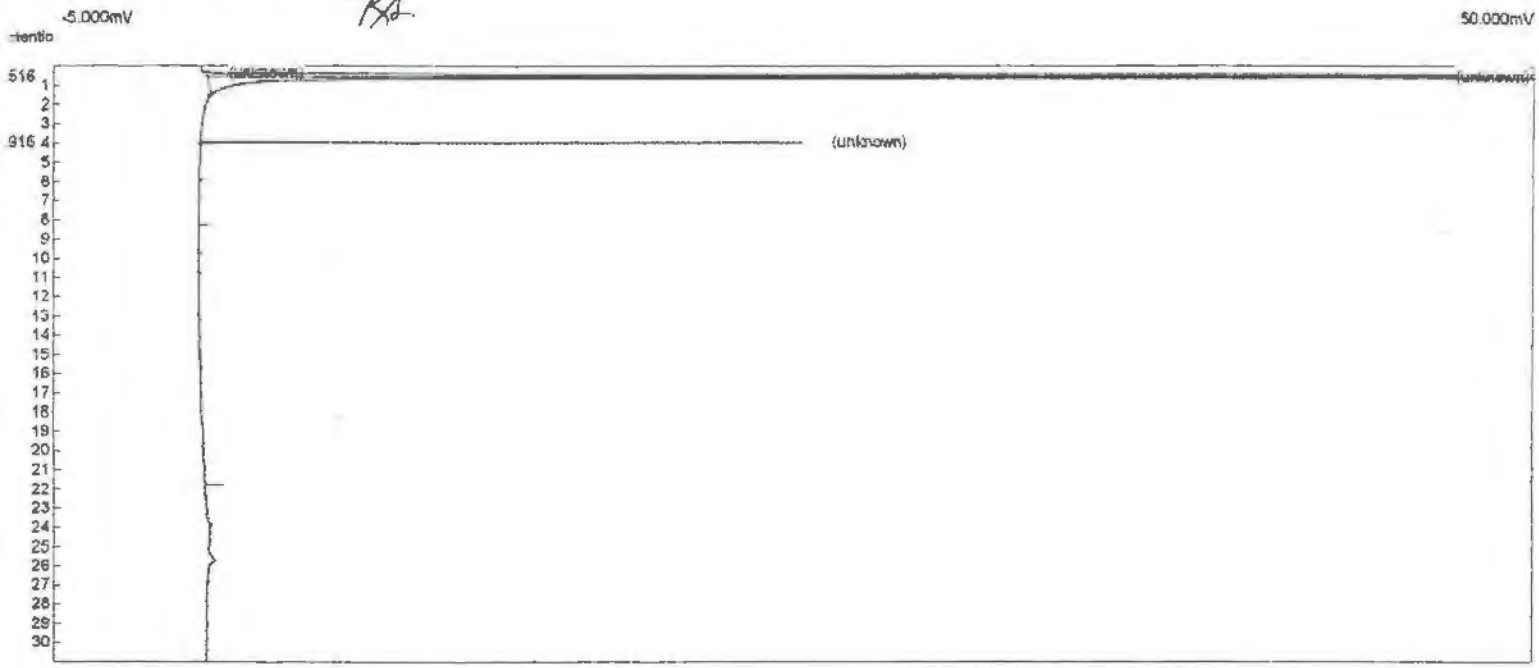
Component	Retention	Area	External	Internal	Units
iesel	17.050	19.858	6.72	6.7179	ppm
		19.858	6.72	6.7179	

Lab name: On Site Labs Inc.
Analysis date: 03/05/2002 15:05:28
Method: EPA 8015B mod.
Lab ID: GC - 5
Description: FID 4 - Ch. 4
Column: XTI-5, 30m, 0.53mm, 1.5um
Carrier: N2
file: 0305FD7.CHR ()
nple: ILA014/0304CH2M REP
rator: MAP
Comments:



Component	Retention	Area	External	Internal	Units
diesel	17.800	13.505	5.57	5.5714	ppm
		13.505	5.57	5.5714	

Lab name: On Site Labs Inc.
Analysis date: 03/05/2002 14:14:24
Method: EPA 8015B mod.
Lab ID: GC - 5
Description: FID2 - Ch. 2
Column: XTI-5, 30m, 0.53mm, 1.5um
Carrier: N2
Data file: 0305fb6.CHR ()
Sample: ILA016EB1/0304CH2M
Operator: MAP
Comments: 16EB2 KA



Component	Retention	Area	External	Internal	Units
		0.000	0.00	0.0000	

QA/QC REPORT - CALIBRATION DATA

OSL Project #02I0304CH2M
DAILY CALIBRATION DATE: 03/05/02

CH2M HILL PROJECT NO. 167722.FI.FS
PROJECT NAME: RRNAS SITE 88, 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%	13.94	1.39	16.0%	23.02	1.53	7.6%
TOLUENE	PID1 - GC2	0.5 - 75.0	1.62	6.6%	14.44	1.44	10.9%	24.75	1.65	1.9%
ETHYLBENZENE	PID1 - GC2	0.5 - 75.0	1.17	11.4%	11.52	1.15	1.6%	18.54	1.24	5.7%
m&p-XYLENES	PID1 - GC2	1.0 - 150	1.80	10.4%	34.32	1.72	4.7%	56.15	1.87	4.0%
o-XYLENES	PID1 - GC2	0.5 - 75.0	1.36	8.6%	13.31	1.33	2.1%	21.89	1.46	7.3%

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 #02I0304CH2M
DATE: 03/05/02

CH2M HILL PROJECT NO. 167722.FI.FS
PROJECT NAME: RRNAS SITE 88

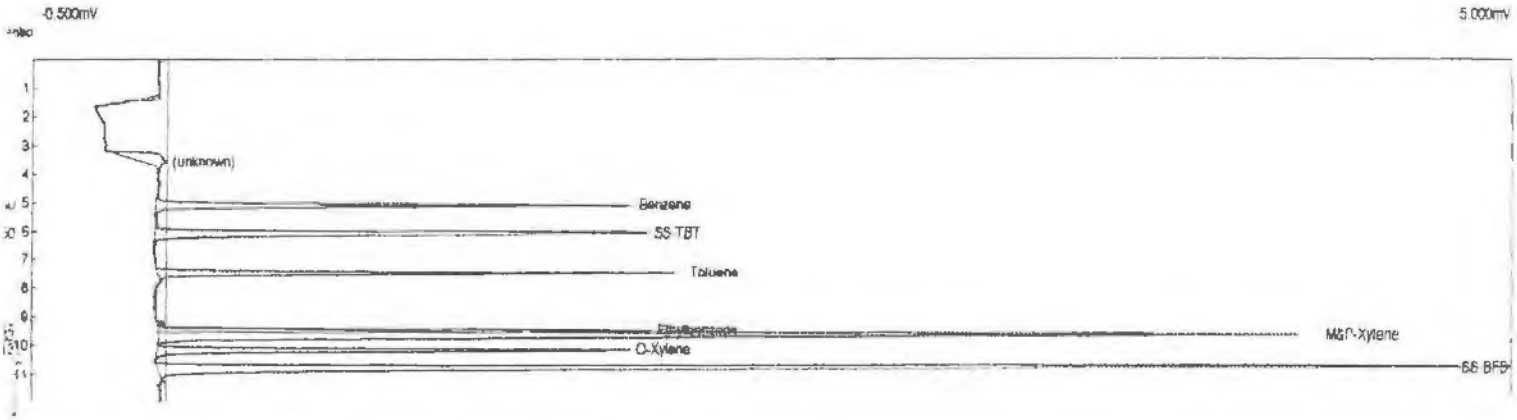
COMPOUND	SPK CONC (ppb)	MS CONC (ppb)	%REC MS	MSD CONC (ppb)	%REC MSD	RPD	ACCEPTABLE RPD	ACCEPTABLE RECOVERY
BENZENE	15.0	13.9	93%	12.9	86%	8%	20%	82% - 117%
TOLUENE	15.0	15.3	102%	13.3	89%	14%	20%	87% - 120%
ETHYLBENZENE	15.0	15.4	103%	13.6	91%	12%	20%	83% - 131%
TOTAL XYLENES	45.0	50.4	112%	45.7	102%	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

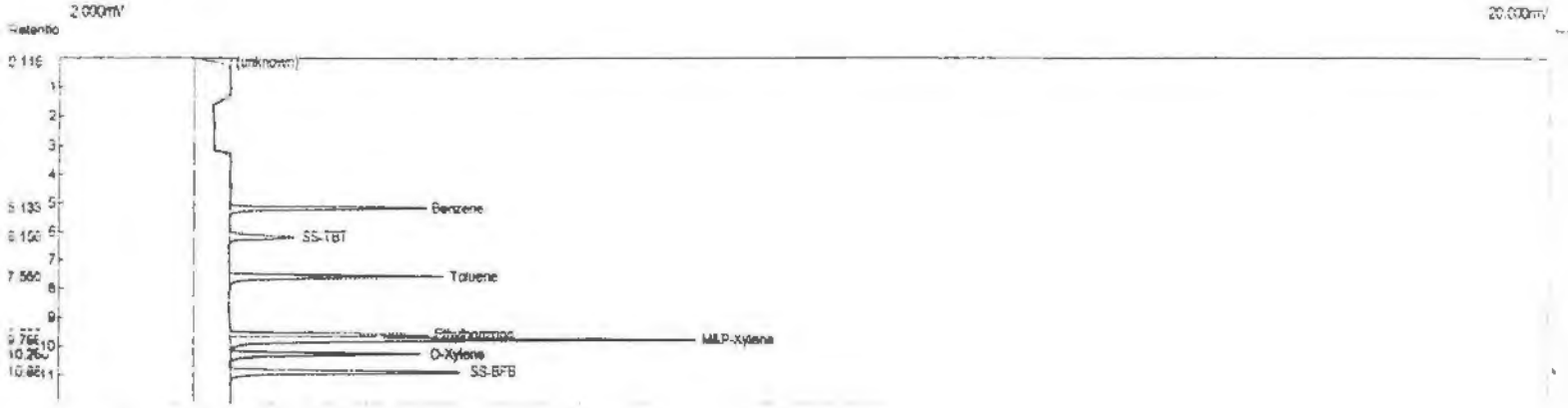
ON SITE LABS, INC
PMB 627, HC-01 BOX 29030, CAGUAS, P.R. 00725
TELEPHONE (787) 720-0329 FAX 789-3858

Lab name: On Site Labs Inc
alysis date: 03/05/2002 11:06:53
Method: EPA 8021 mod.
Lab ID: GC-2
Description: PID - Ch. 1
Column: Rtx-5,30m,5.0um,0.53mm
ier: N2
file: 0305pt1.chr ()
ple: 10 ppb BTEX OPEN STD
Operator: MAP



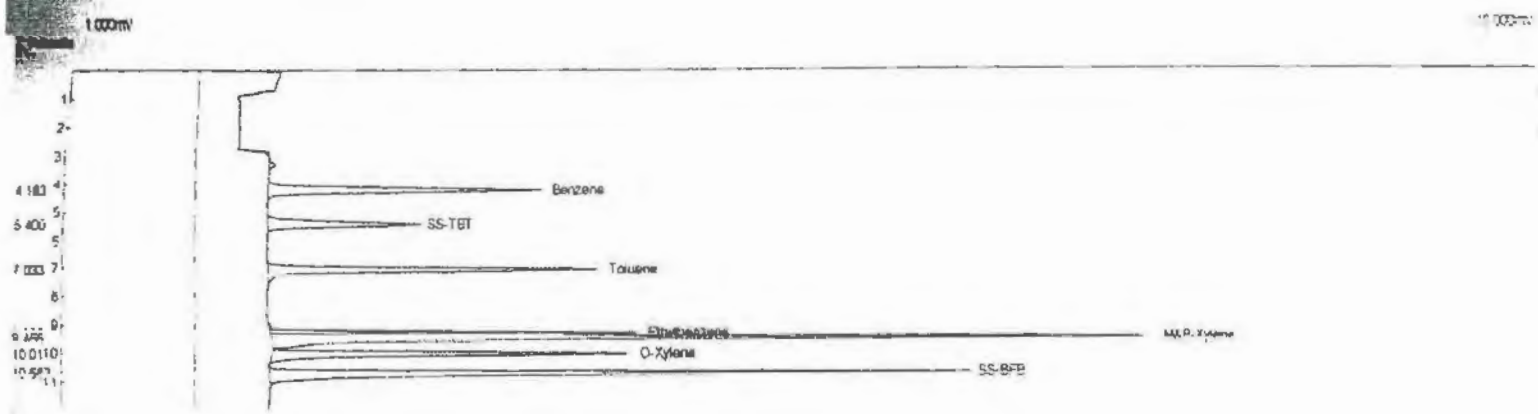
Component	Retention	Area	External	Internal	Units
zene	5.050	13.936	8.40	8.3952	ppm
-TBT	6.050	15.408	11.67	11.6727	ppm
luene	7.433	14.438	8.91	8.9123	ppm
ylbenzene	9.466	11.517	9.84	9.8436	ppm
P-Xylene	9.633	34.316	19.06	19.0647	ppm
Xylene	10.133	13.308	9.79	9.7853	ppm
S-BFB	10.750	39.503	9.68	9.6821	ppm
		142.426	77.36	77.3560	

Lab name: On Site Labs Inc
Analysis date: 03/05/2002 17:24:50
Method: EPA 8021 mod.
Lab ID: GC-2
Description: PID - Ch. 1
Column: Rtx-5,30m,5.0um,0.53mm
Carrier: N2
Data file: 0305pt16.CHR ()
Sample: 15 ppb BTEX CLOSE STD
Operator: MAP



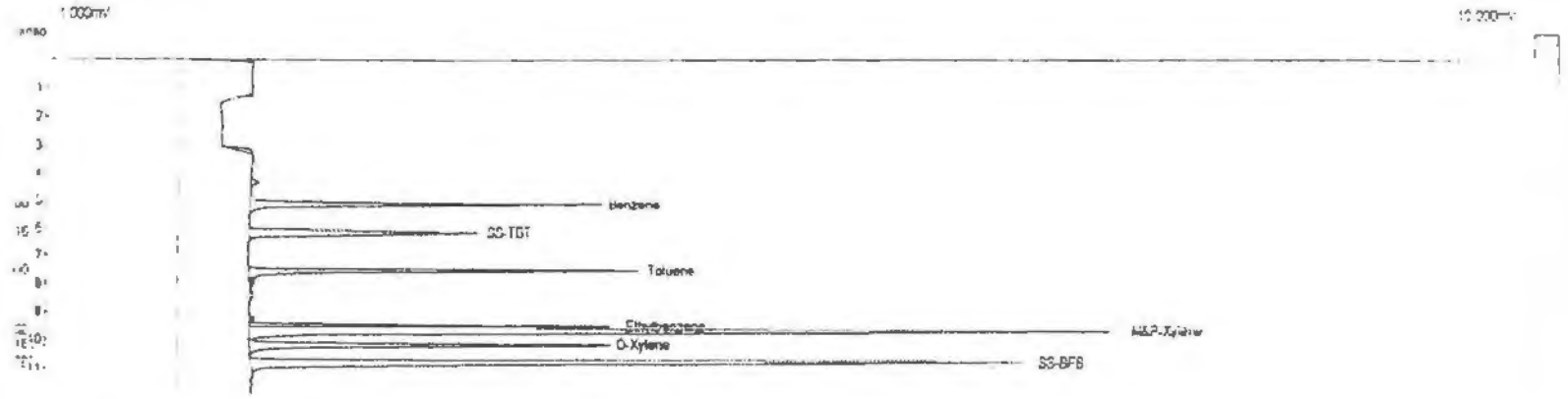
Component	Retention	Area	External	Internal	Units
Benzene	5.133	23.018	13.87	13.8663	ppm
SS-TBT	6.150	8.488	6.43	6.4303	ppb
Toluene	7.550	24.754	15.28	15.2802	ppm
Ethylbenzene	9.600	18.543	15.85	15.8487	ppm
M&P-Xylene	9.766	56.152	31.20	31.1956	ppm
O-Xylene	10.266	21.890	16.10	16.0956	ppm
SS-BFB	10.883	26.262	6.44	6.4368	ppb
		179.107	105.15	105.1534	

Carrier: N2
Data file: 0305pt14.chr ()
Sample: et-in matrix spike
Operator: MAP



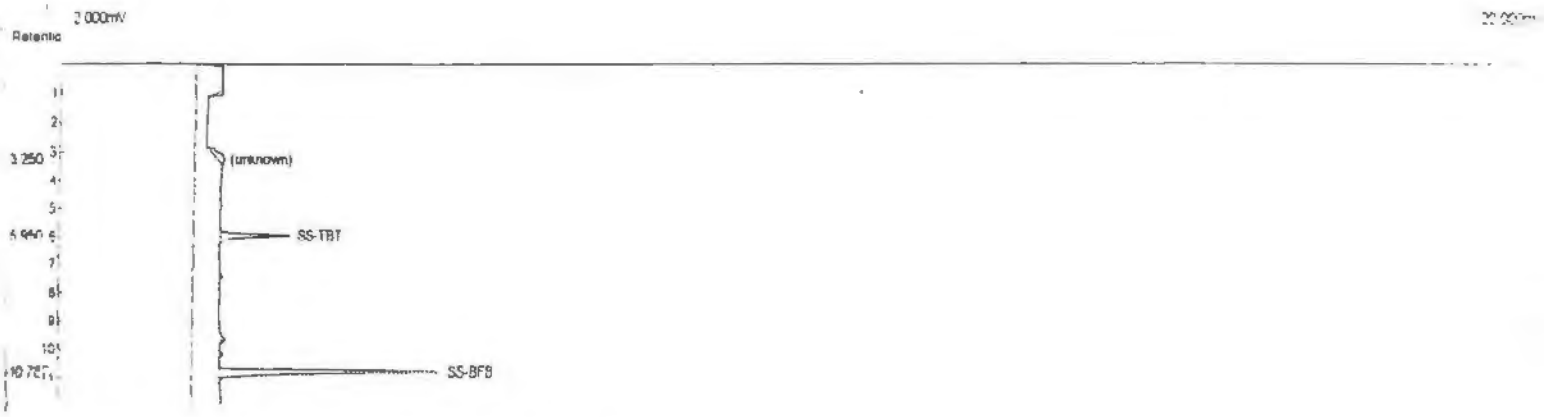
Component	Retention	Area	External	Internal	Units
Benzene	4.183	23.130	13.93	13.9337	ppm
SS-TBT	5.400	13.934	10.56	10.5561	ppb
Toluene	7.033	24.841	15.33	15.3340	ppm
Ethylbenzene	9.300	18.067	15.44	15.4423	ppm
M&P-Xylene	9.466	60.394	33.55	33.5519	ppm
O-Xylene	10.016	22.872	16.62	16.6176	ppm
SS-BFB	10.683	45.676	11.20	11.1951	ppb
		208.914	116.83	116.8307	

Lab name: On Site Labs Inc
Analysis date: 03/05/2002 17:03:13
Method: EPA 8021 mod.
Lab ID: GC-2
Description: PID - Ch. 1
Column: Rtx-5,30m,5.0um,0.53mm
Carrier: N2
Data file: 0305pt15.chr ()
Sample: et-in matrix spike duplicat
Operator: MAP



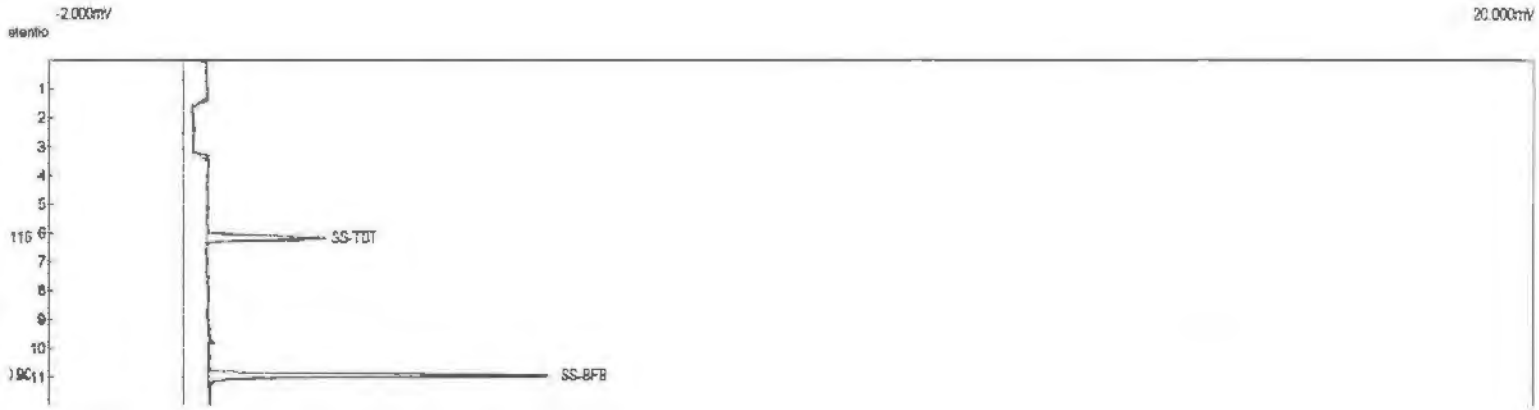
Component	Retention	Area	External	Internal	Units
enzene	5.100	21.360	12.87	12.8675	ppm
S-TGT	6.116	14.578	11.04	11.0439	ppb
oluene	7.500	21.674	13.32	13.3173	ppm
hylbenzene	9.516	15.946	13.63	13.6286	ppm
&P-Xylene	9.666	54.464	30.27	30.2689	ppm
Xylene	10.166	20.957	15.41	15.4092	ppm
S-BFB	10.783	43.618	10.74	10.7397	ppb
		192.716	107.28	107.2751	

Lab name: On Site Labs Inc
Analysis date: 03/05/2002 12:13:24
Method: EPA 8021 mod.
Lab ID: GC-2
Description: PID - Ch. 1
Column: Rtx-5,30m,5.0um,0.53mm
Carrier: N2
Data file: 0305pt3.chr ()
Sample: METHOD BLANK
Operator: MAP



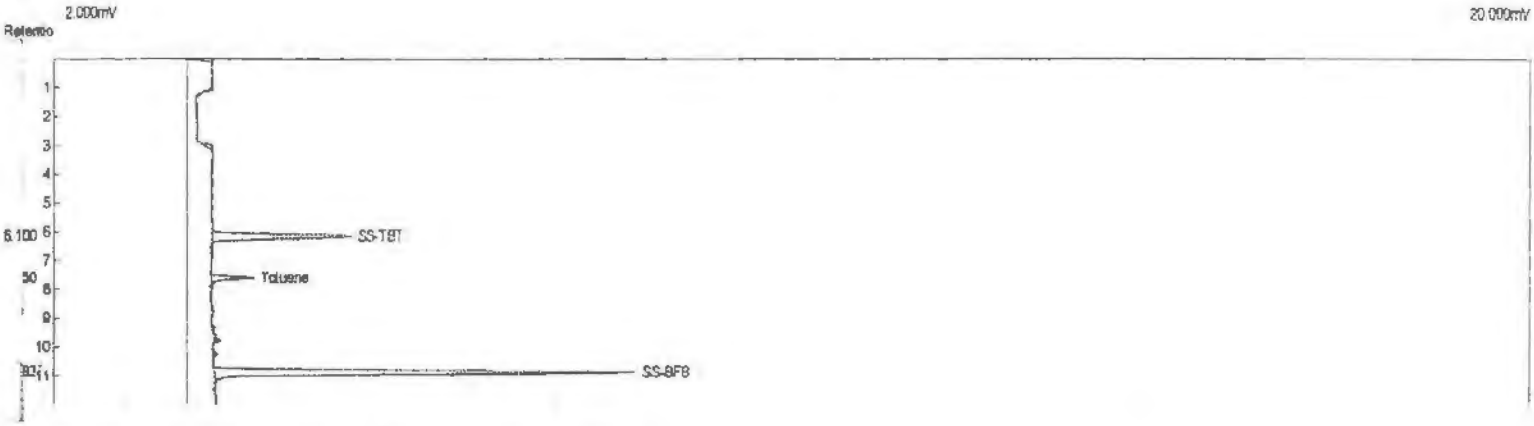
Component	Retention	Area	External	Internal	Units
SS-TBT	5.950	9.166	6.96	6.9591	ppb
SS-BFB	10.783	24.204	5.93	5.9324	ppb
		33.390	12.89	12.8914	

Lab name: On Site Labs Inc
Analysis date: 03/05/2002 13:06:00
Method: EPA 8021 mod.
Lab ID: GC-2
Description: PID - Ch. 1
Column: Rtx-5,30m,5.0um,0.53mm
Carrier: N2
Data file: 0305pt4.chr ()
Sample: ILA014/0304CH2M
Operator: MAP



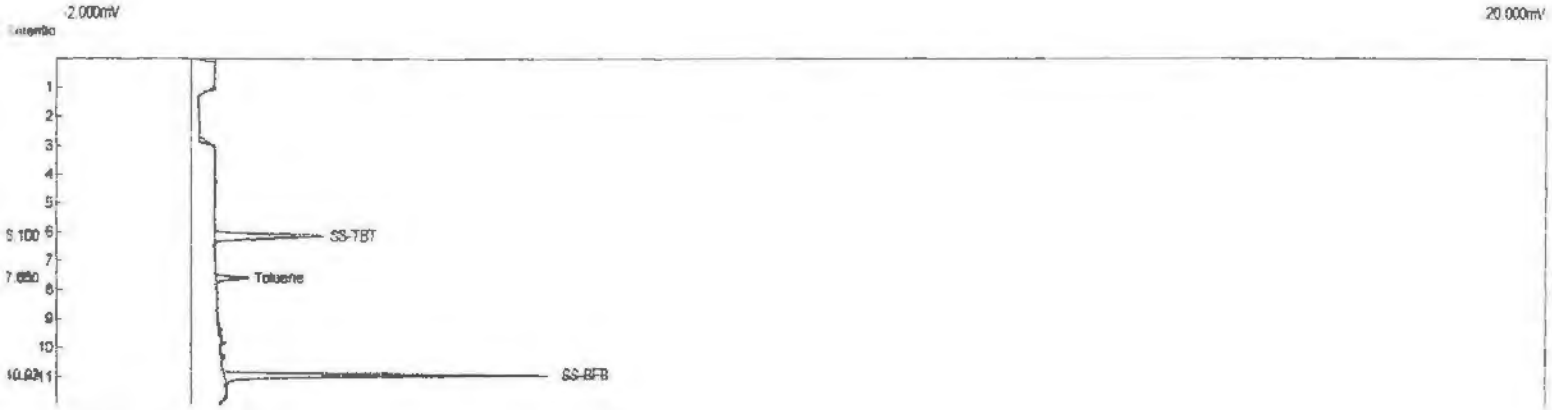
Component	Retention	Area	External	Internal	Units
S-TBT	6.116	14.756	11.18	11.1788	ppb
S-BFB	10.900	39.221	9.61	9.6130	ppb
		53.977	20.79	20.7918	

Analysis date: 03/05/2002 13:21:36
Method: EPA 8021 mod.
Lab ID: GC-2
Description: PID - Ch. 1
Column: Rtx-5,30m,5.0um,0.53mm
Carrier: N2
a file: 0305pt5.chr ()
ample: ILA015TB2/0304CH2M
Operator: MAP



Component	Retention	Area	External	Internal	Units
S-TBT	6.100	18.220	13.80	13.8030	ppb
Toluene	7.550	4.977	3.07	3.0722	ppm
SS-BFB	10.833	46.518	11.40	11.4015	ppb
		69.715	28.28	28.2767	

Analysis date: 03/05/2002 13:56:43
Method: EPA 8021 mod.
Lab ID: GC-2
Description: PID - Ch. 1
Column: Rtx-5,30m,5.0um,0.53mm
Carrier: N2
Data file: 0305pt6.CHR ()
Sample: ILA016EB2/0304CH2M
Operator: MAP



Component	Retention	Area	External	Internal	Units
SS-TBT	6.100	13.910	10.54	10.5379	ppb
Toluene	7.550	3.776	2.33	2.3309	ppm
SS-BFB	10.933	35.566	8.72	8.7172	ppb
		53.252	21.59	21.5859	

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 #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

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

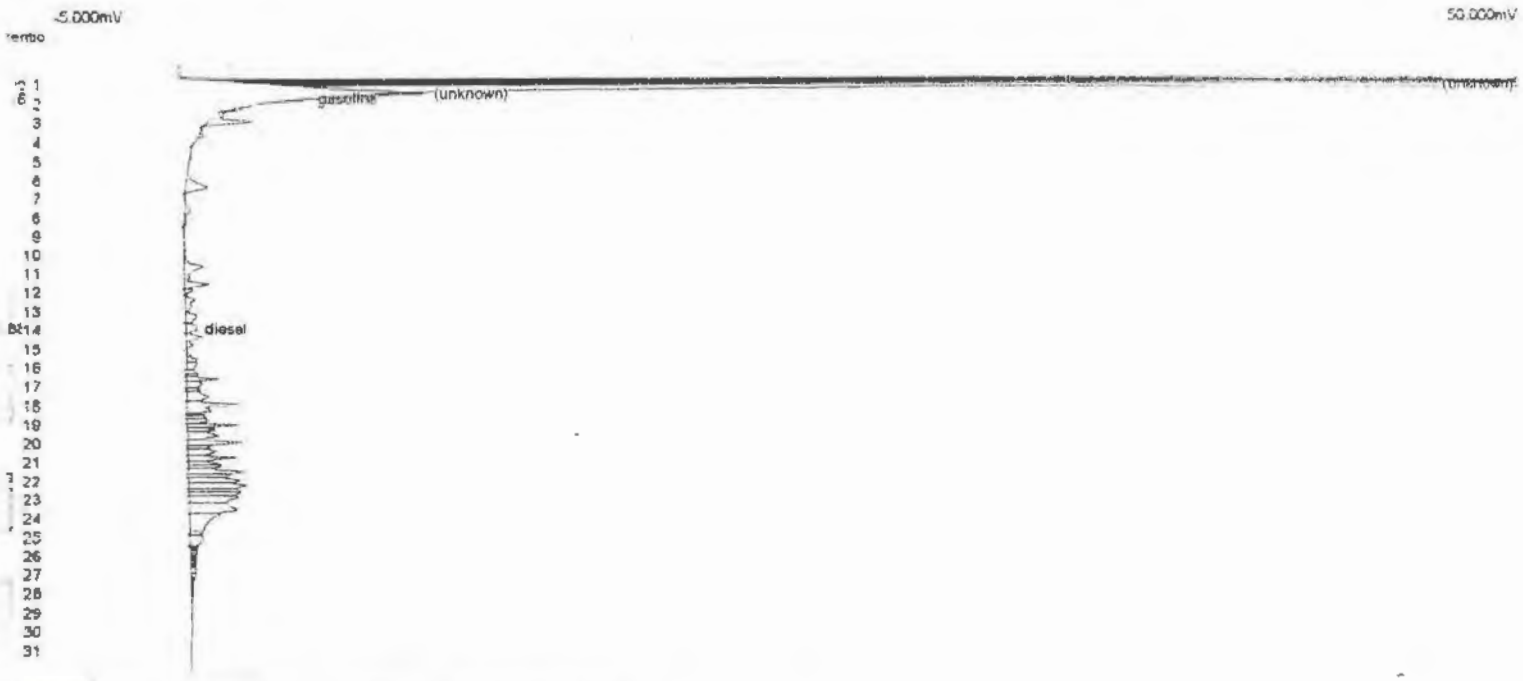
ANALYSES PERFORMED BY MARCO A PEDRAZA
DATA REVIEWED BY KEVIN SHELBURNE

ON SITE LABS, INC
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: 03/12/2002 11:42:58
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
gasoline	2.833	46.401	45.31	
diesel	10.033	260.198	93.73	ppm
		306.600	139.05	

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

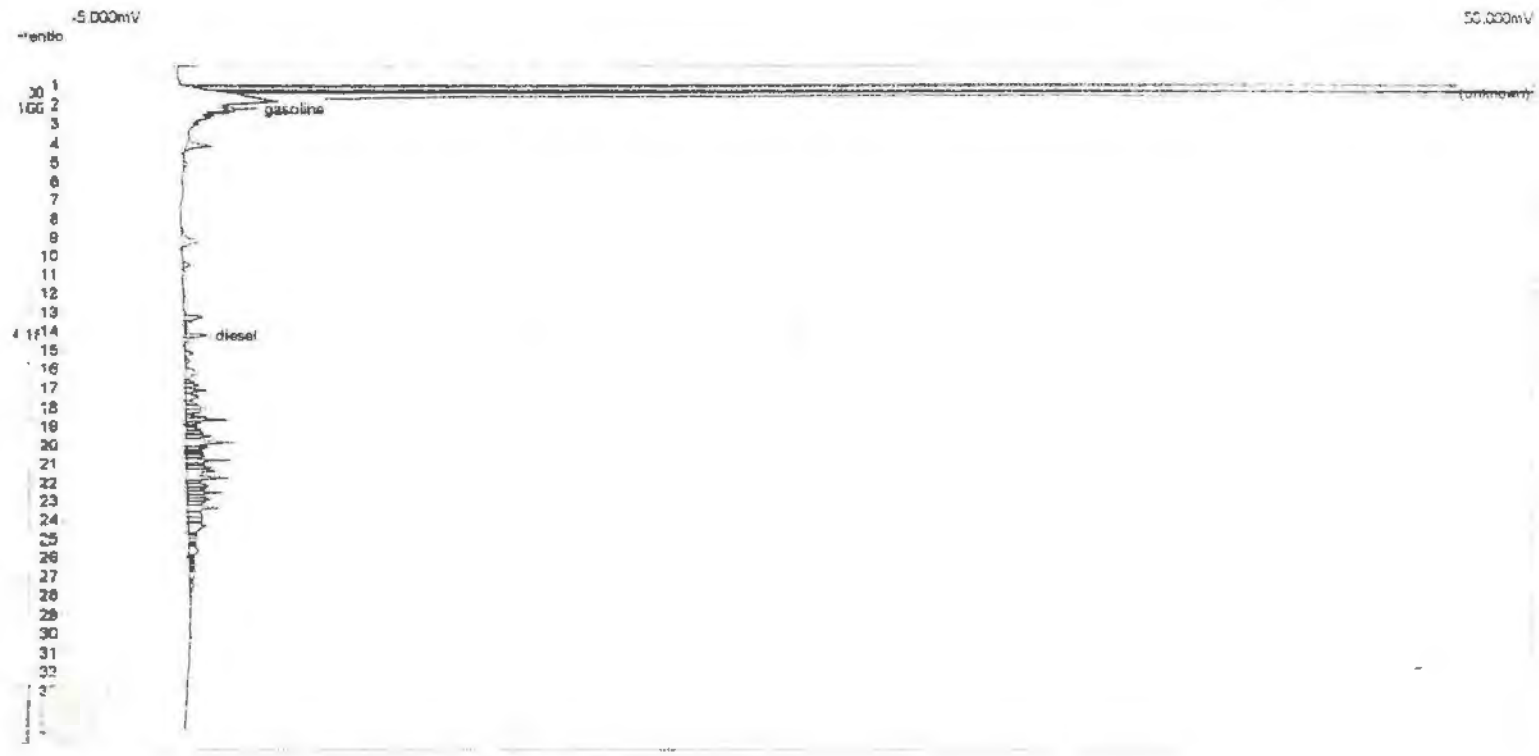


nent	Retention	Area	External	Units
asoline	1.716	131,436	90.77	
iesel	13.883	590.769	199.85	ppm
		722.205	290.62	

Lab name: On Site Labs Inc
nalysis 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

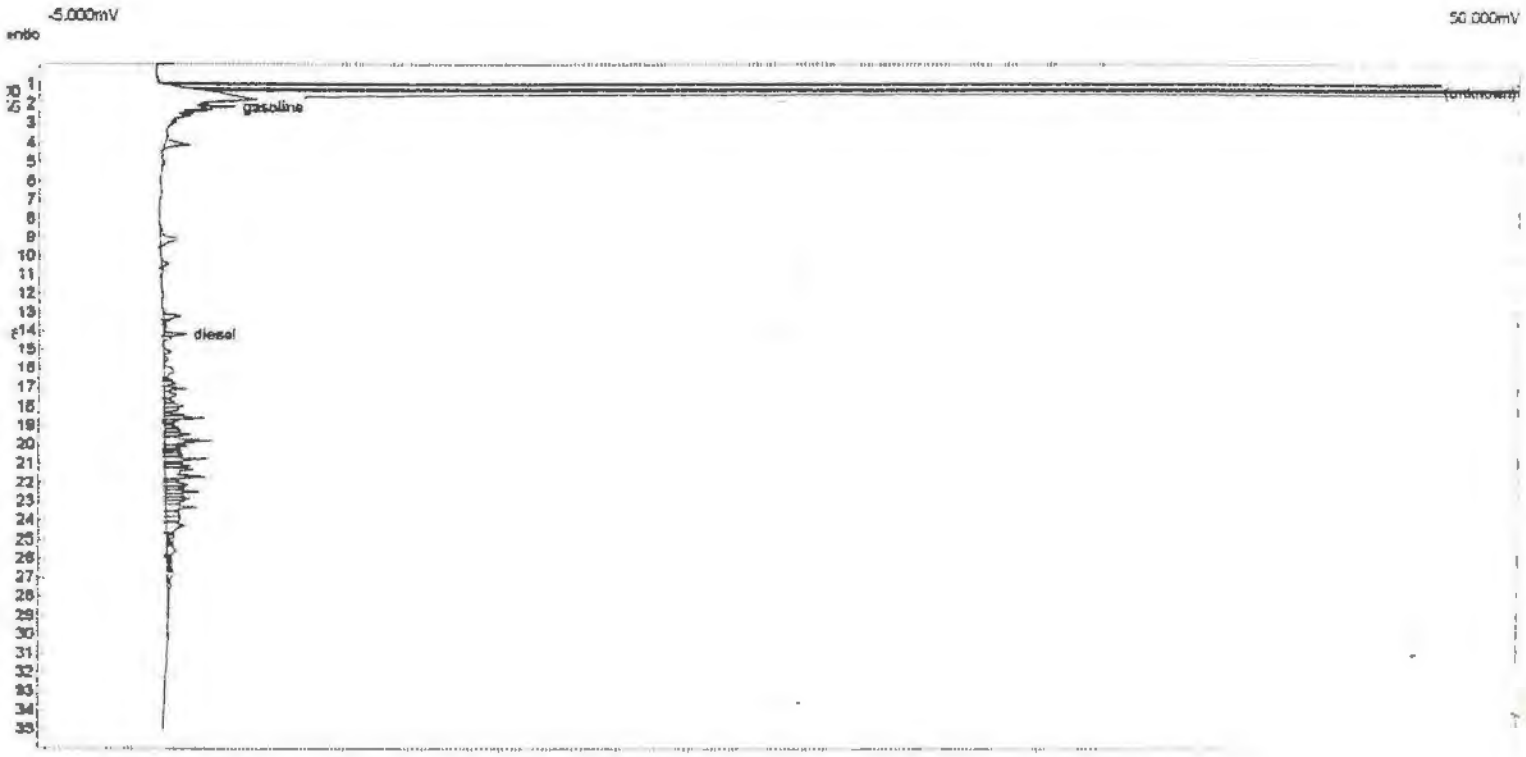
Component	Retention	Area	External	Units
soline	1.916	116.589	95.25	
esel	13.116	508.650	209.84	ppm
		625.239	305.09	

Lab name: On Site Labs Inc
nalysis 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
er: N2
ile: 0312fb18.CHR ()
nple: 50/100 ppm G/D CLOSE
Operator: MAP



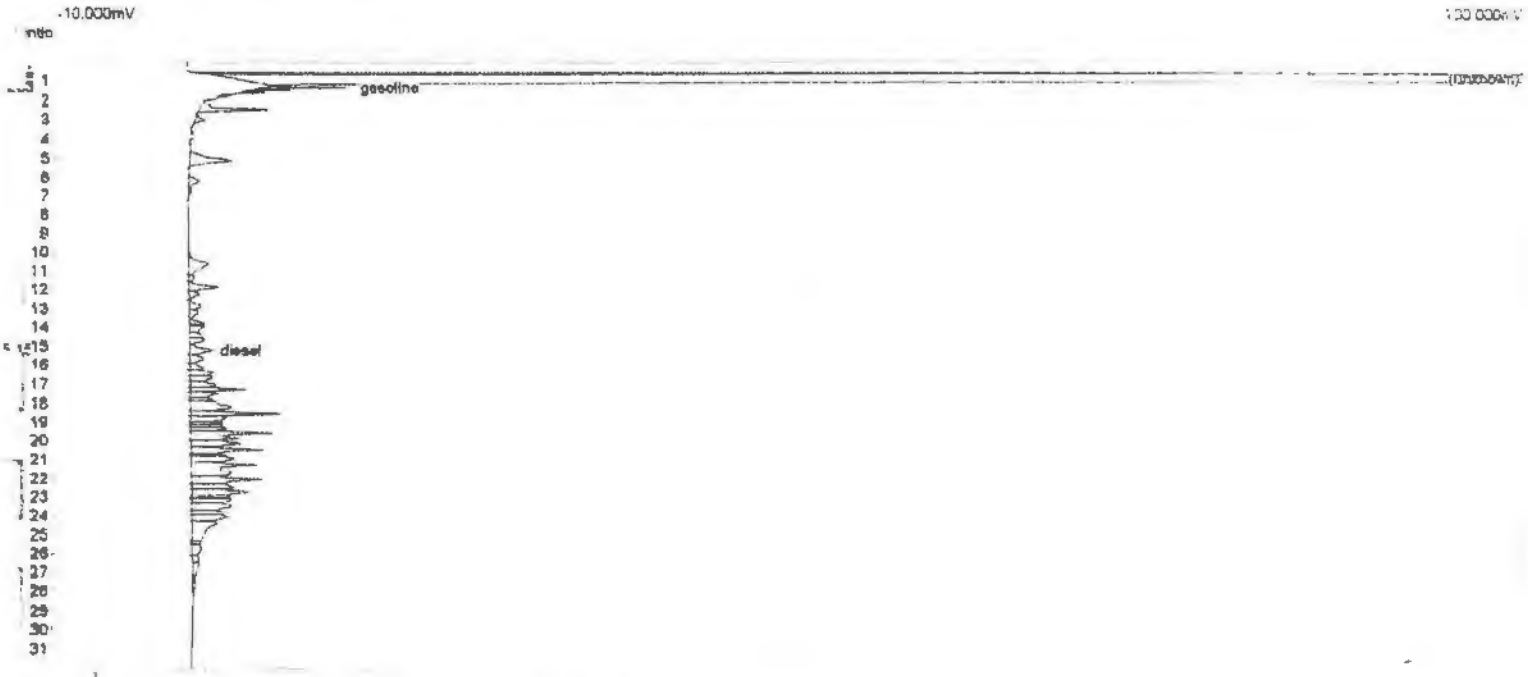
Component	Retention	Area	External	Units
soline	2.166	48.162	47.03	
diesel	14.183	276.055	99.44	ppm
		324.217	146.48	

Lab name: On Site Labs Inc
nalysis date: 03/12/2002 16:39:55
Method: EPA 8015B mod.
Lab ID: GC - 5
Description: FID2 - Ch. 2
Column: XTI-5, 30m, 0.53mm, 1.5um
Carrier: N2
Data file: 0312fb16.CHR ()
Sample: 50/100 ppm G/D CLOSE
Operator: MAP



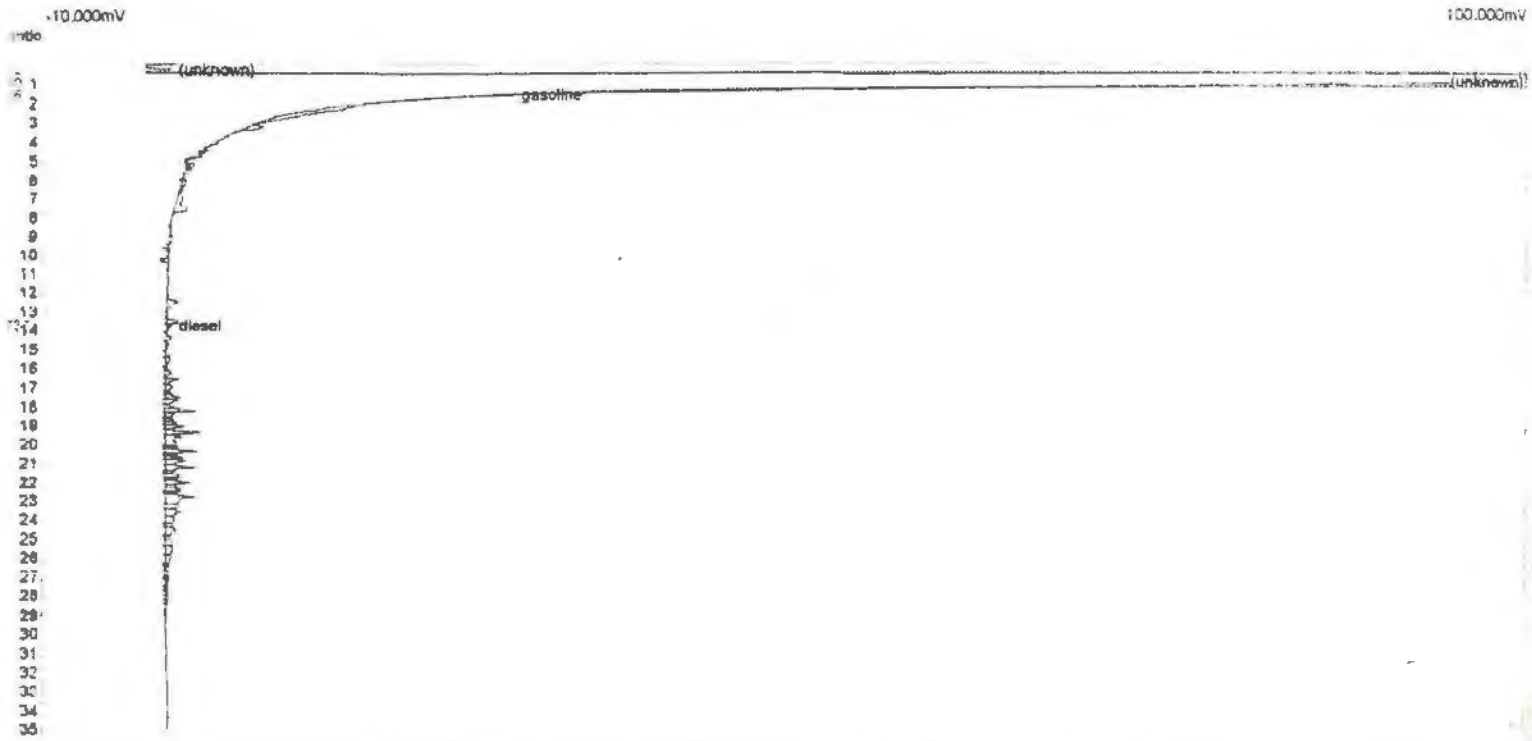
Component	Retention	Area	External	Units
soline	2.166	48.162	47.03	
sel	14.183	276.055	99.44	ppm
		324.217	146.48	

Lab name: On Site Labs Inc
alysis date: 03/12/2002 18:39:55
Method: EPA 8015B mod.
Lab ID: GC - 5
Description: FID 3 - Ch. 3
Column: XTI-5, 30m, 0.53mm, 1.5um
er: N2
file: 0312fc16.CHR ()
nple: 200/400 ppm G/D CLOSE
Operator: MAP



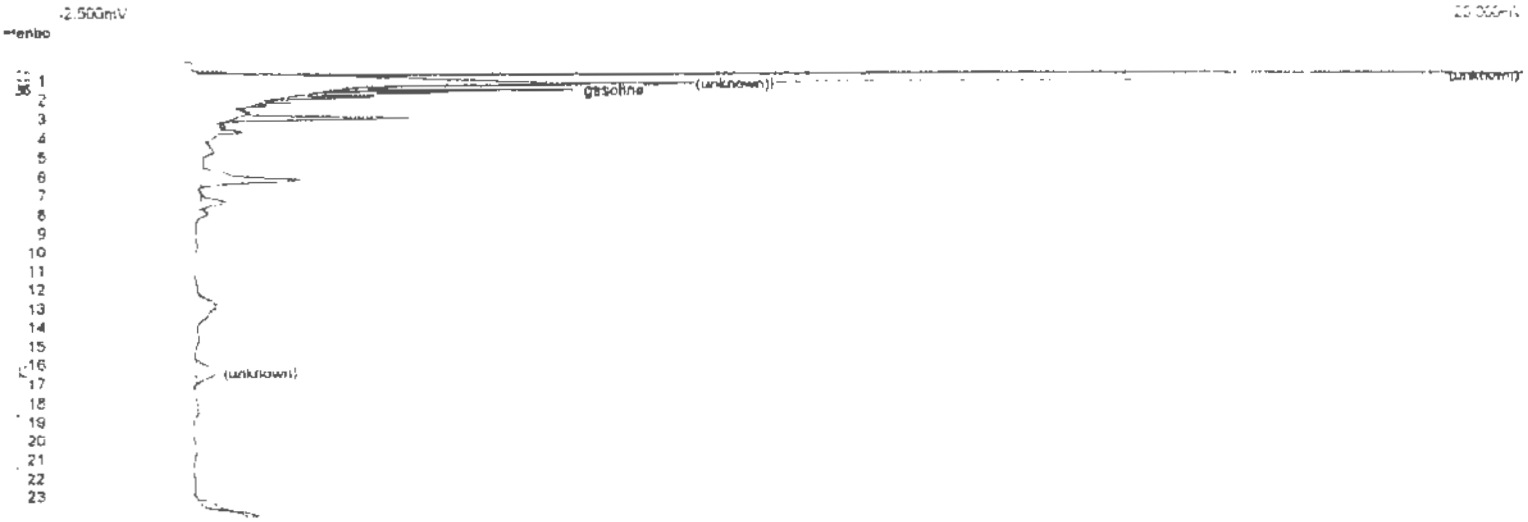
onent	Retention	Area	External	Units
gasoline	1.283	264.803	182.87	
sel	15.150	1322.143	447.27	ppm
		1586.946	630.15	

Lab name: On Site Labs Inc
alysis 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
soline	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 16:13:16
Method: EPA 8015B mod.
Lab ID: GC - 5
Description: FID 3 - Ch. 3
Column: XTI-5, 30m, 0.53mm, 1.5um
ier. N2
ile: 0312fc12.CHR ()
ple CA-S-80matrix spike
Operator. MAP

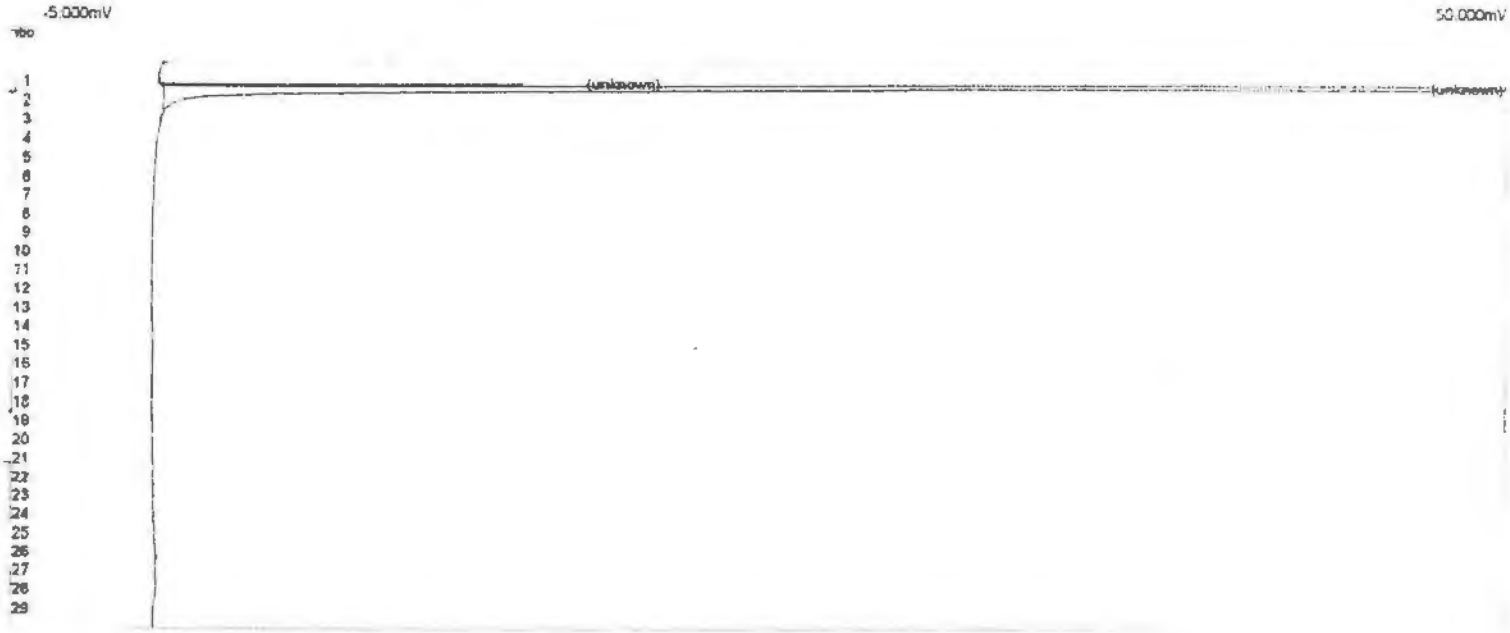


Component	Retention	Area	External	Units
soline	1.466	141 900	98.00	
		141.900	98.00	

Lab name: On Site Labs Inc
Analysis date: 03/12/2002 16:13:18
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 dupli
Operator: MAP

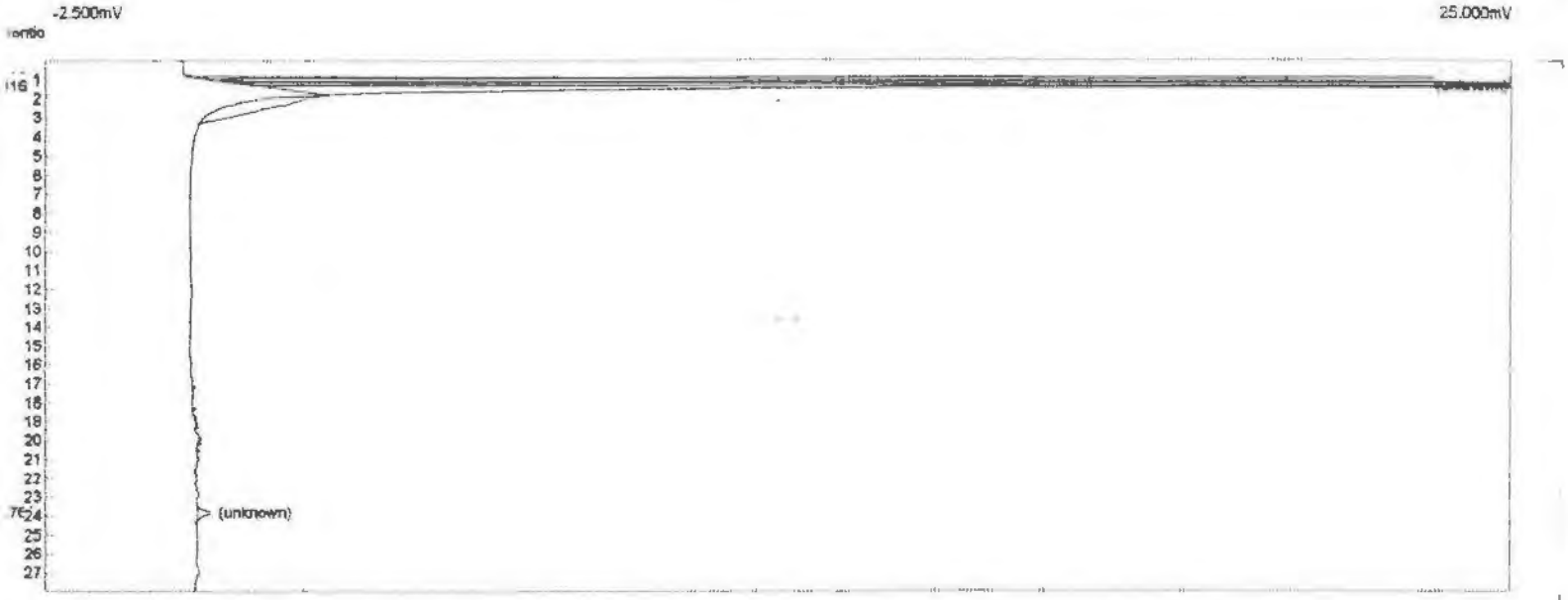
Component	Retention	Area	External	Units
Gasoline	2.066	117.382	95.90	
		117.382	95.90	

Lab name: On Site Labs Inc
alysis 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
C[illegible]: N2
[illegible]e: 0312fb4.CHR ()
Sample: METHOD BLANK
Operator: MAP



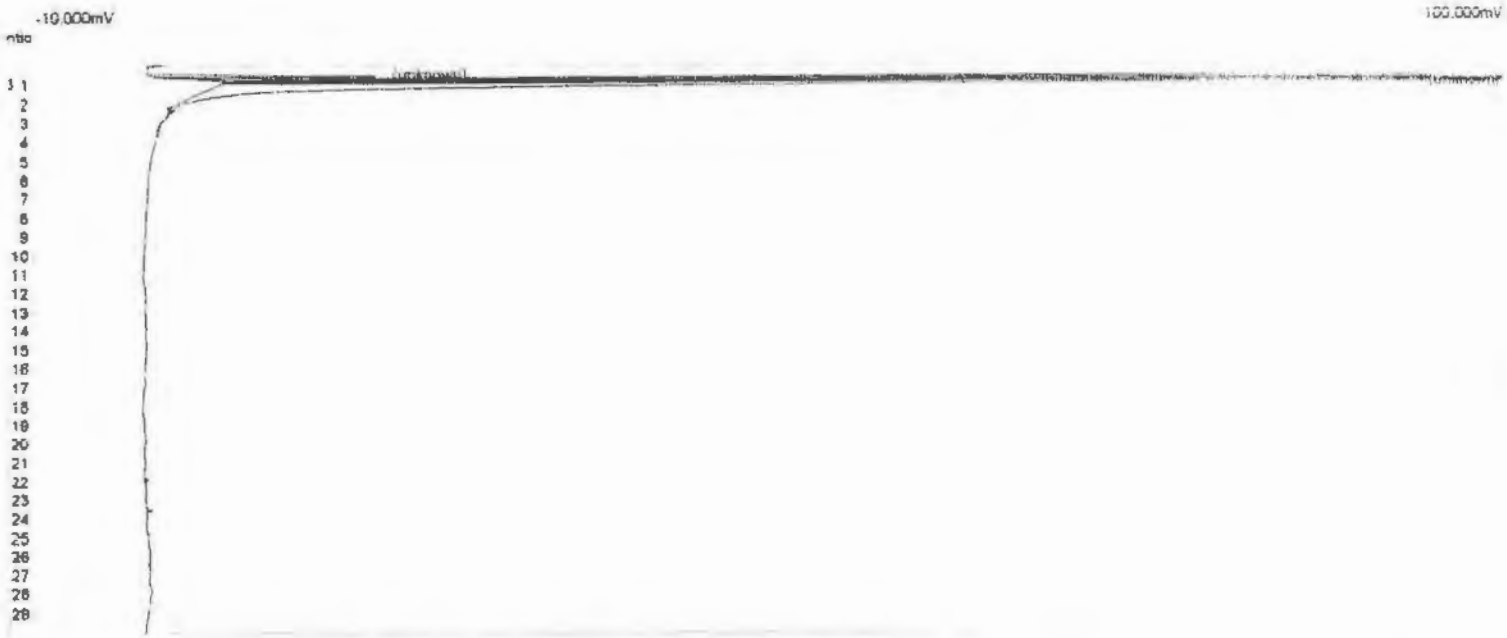
Com[illegible]nent	Retention	Area	External	Units
		0.000	0.00	

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



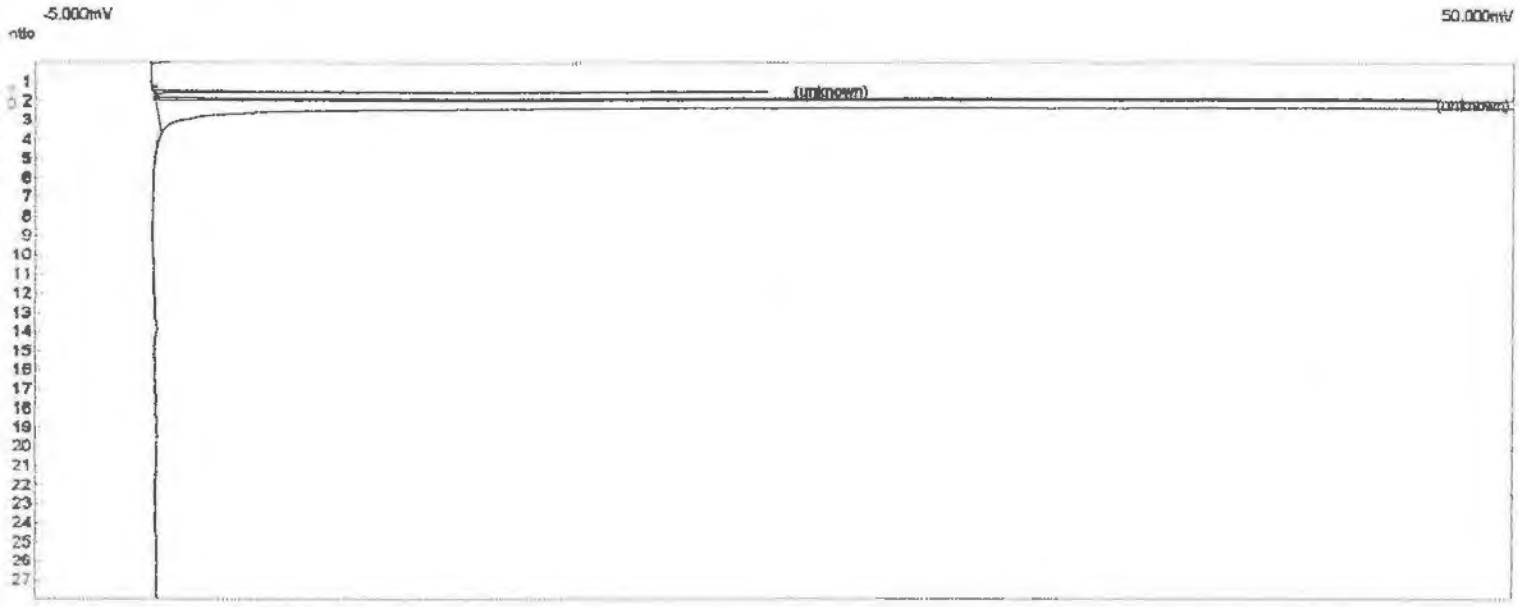
Component	Retention	Area	External	Units
		0.000	0.00	

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[illegible]: N2
D[illegible]e: 0312fd4.CHR ()
S[illegible]le: METHOD BLANK
Operator: MAP



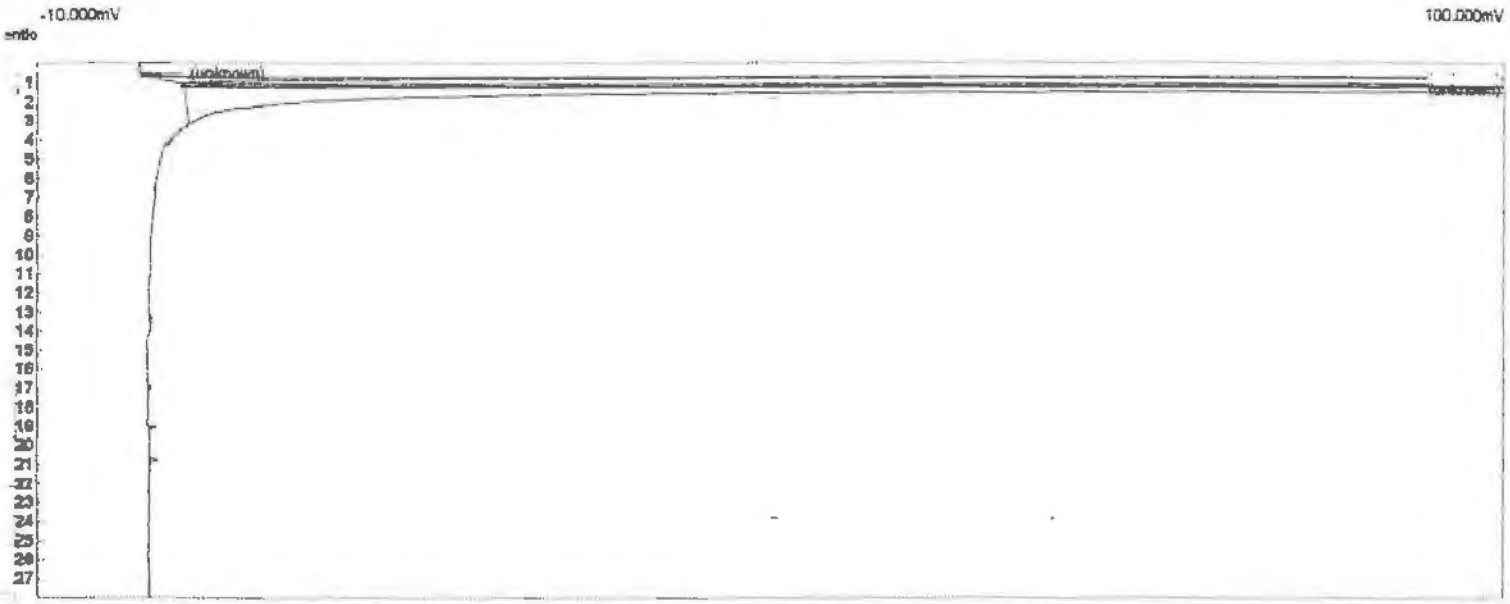
Com[illegible]nent	Retention	Area	External	Units
		0.000	0.00	

Analysis 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



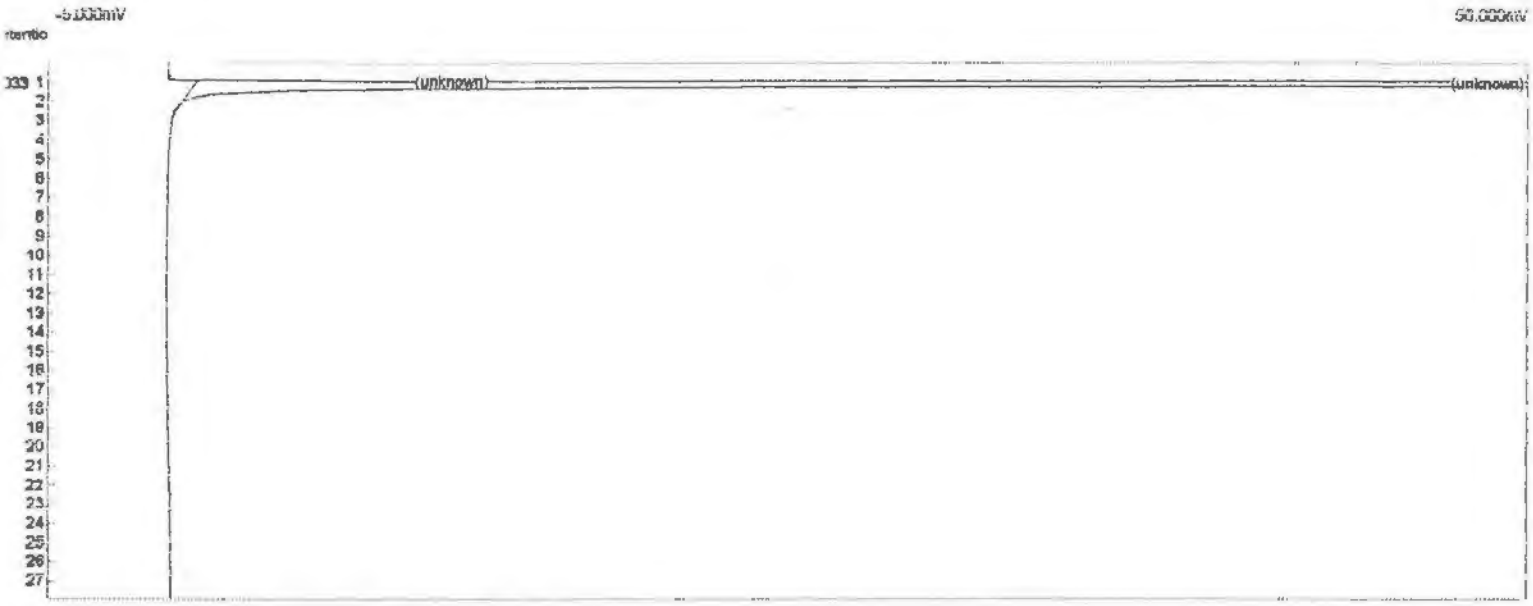
Component	Retention	Area	External	Units
		0.000	0.00	

Lab name: On Site Labs Inc
ılysis date: 03/12/2002 17:06:30
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: 0312fd13.CHR ()
[illegible]ie: JLA021/0311CH2M
Op[illegible]ator: MAP



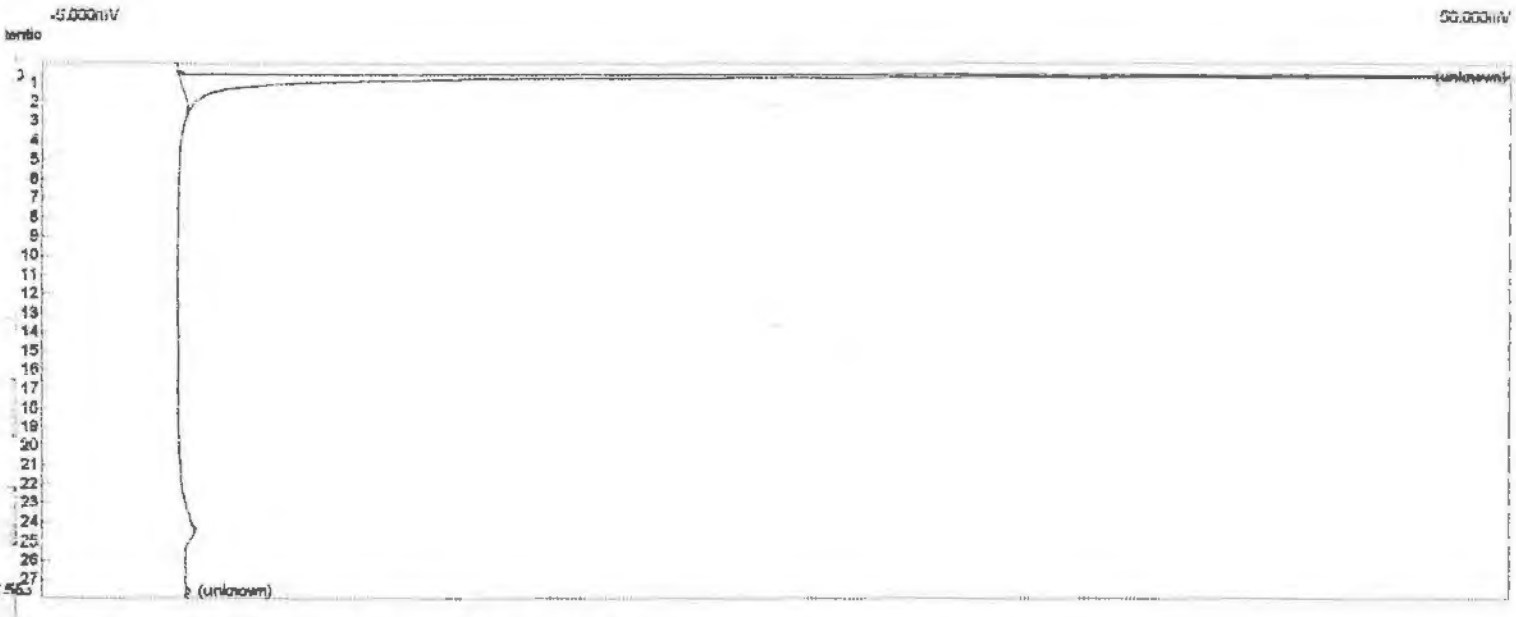
Component	Retention	Area	External	Units
		0.000	0.00	

Analysis 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



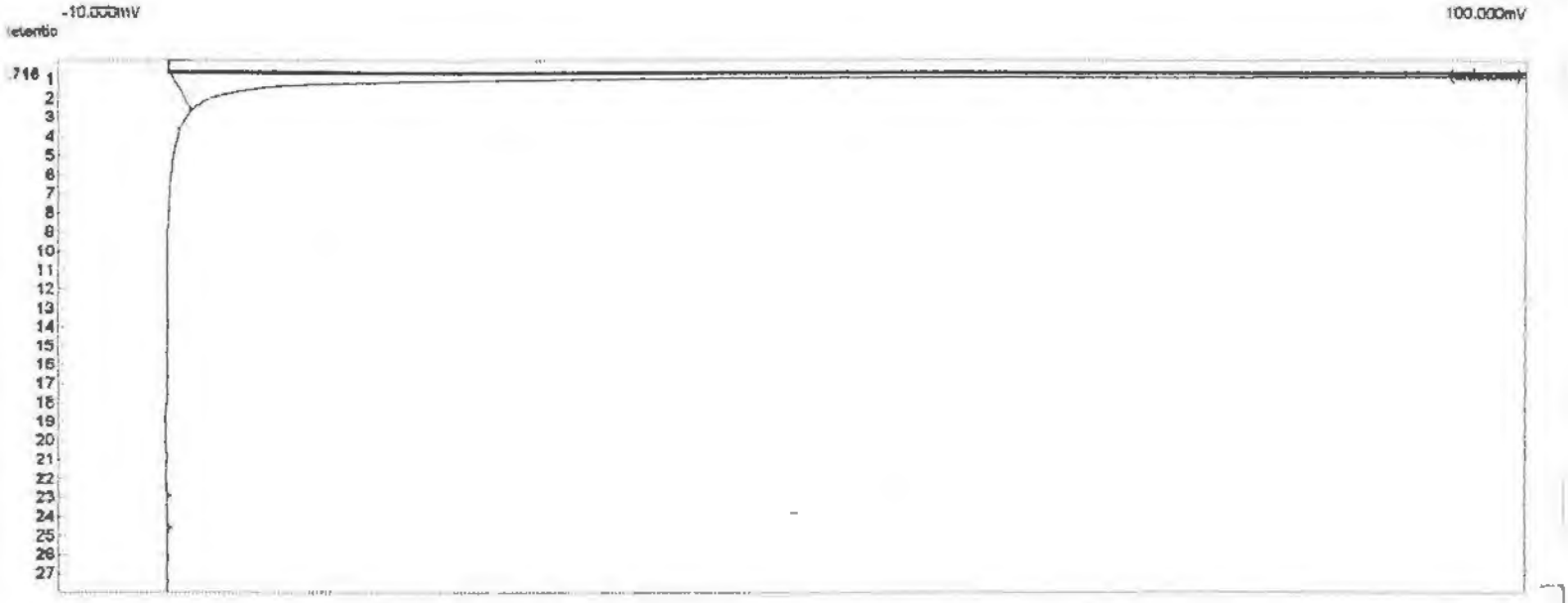
Component	Retention	Area	External	Units
		0.000	0.00	

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
Carrier: N2
D[illegible]e: 0312fc14.CHR ()
[illegible]le: JLA023/0311CH2M
Operator: MAP



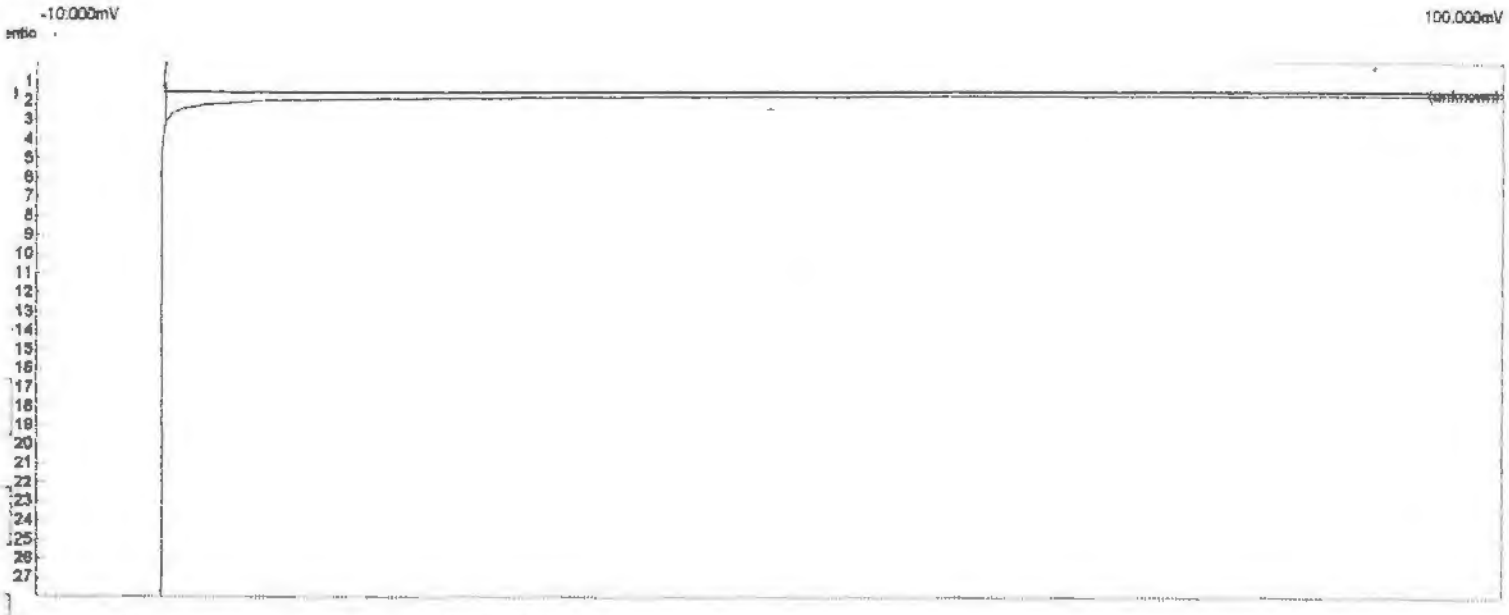
Component	Retention	Area	External	Units
		0.000	0.00	

Lab name: On Site Labs Inc
Analysis 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



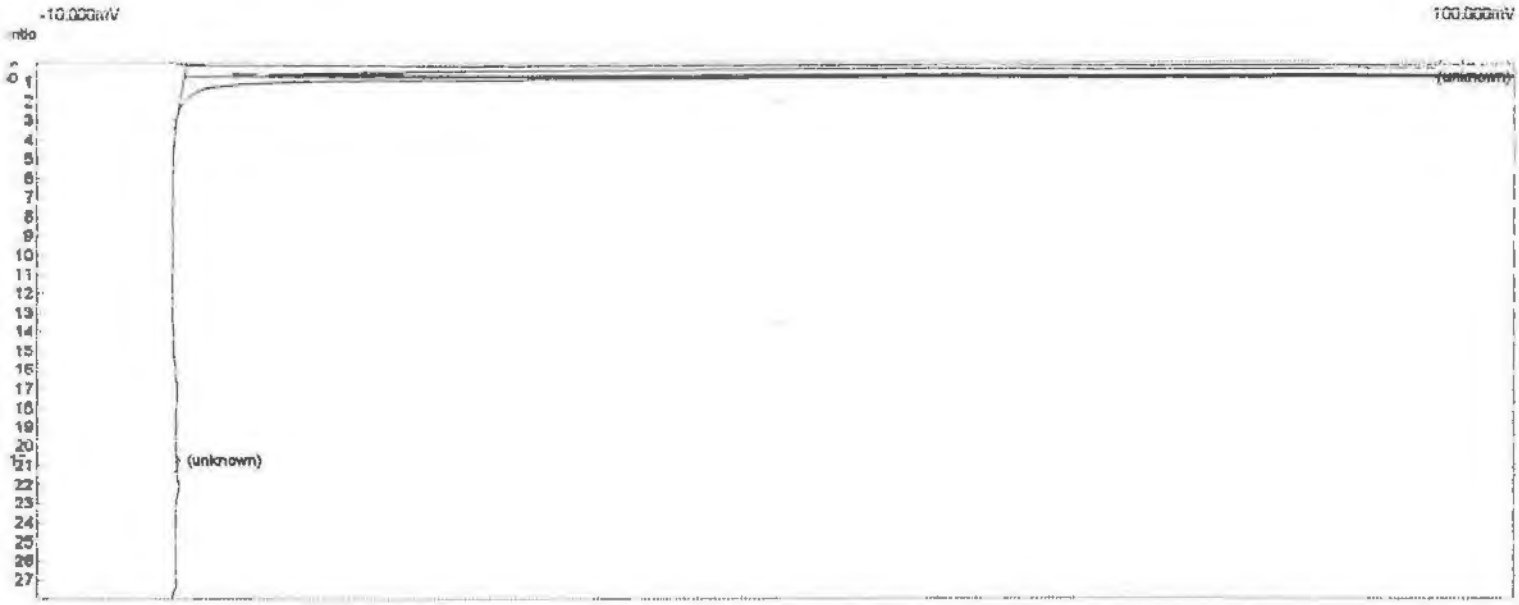
Component	Retention	Area	External	Units
		0.000	0.00	

Lab name: On Site Labs inc
alysis date: 03/12/2002 16:09:42
Method: EPA 6015B mod.
Lab ID: GC - 5
Description: FID2 - Ch. 2
Column: XTI-5, 30m, 0.53mm, 1.5um
Carrier: N2
D[illegible]: 0312fb15.CHR ()
[illegible]e: ILA017/0311CH2M
Operator: MAP



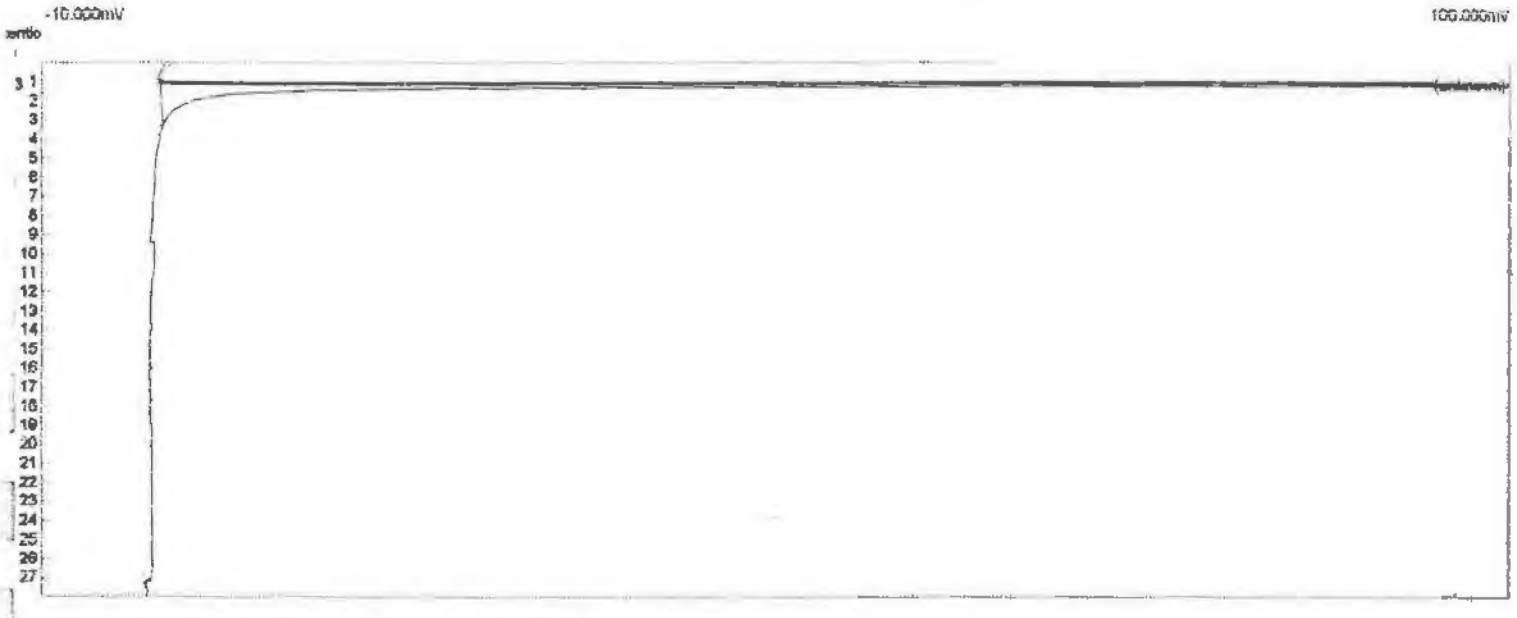
Component	Retention	Area	External	Units
		0.000	0.00	

Lab name: On Site Labs Inc
alysis date: 03/12/2002 18:09:42
Method: EPA 8015B mod.
Lab ID: GC - 5
Description: FID 3 - Ch. 3
Column: XTI-5, 30m, 0.53mm, 1.5um
Carrier: N2
Data file: 0312fc15.CHR ()
Sample: ILA018/0311CH2M
Operator: MAP



Component	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
C[illegible]er: N2
F[illegible]e: 0312fd15.CHR ()
[illegible]le: ILA019/0311CH2M
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

			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

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)

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

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

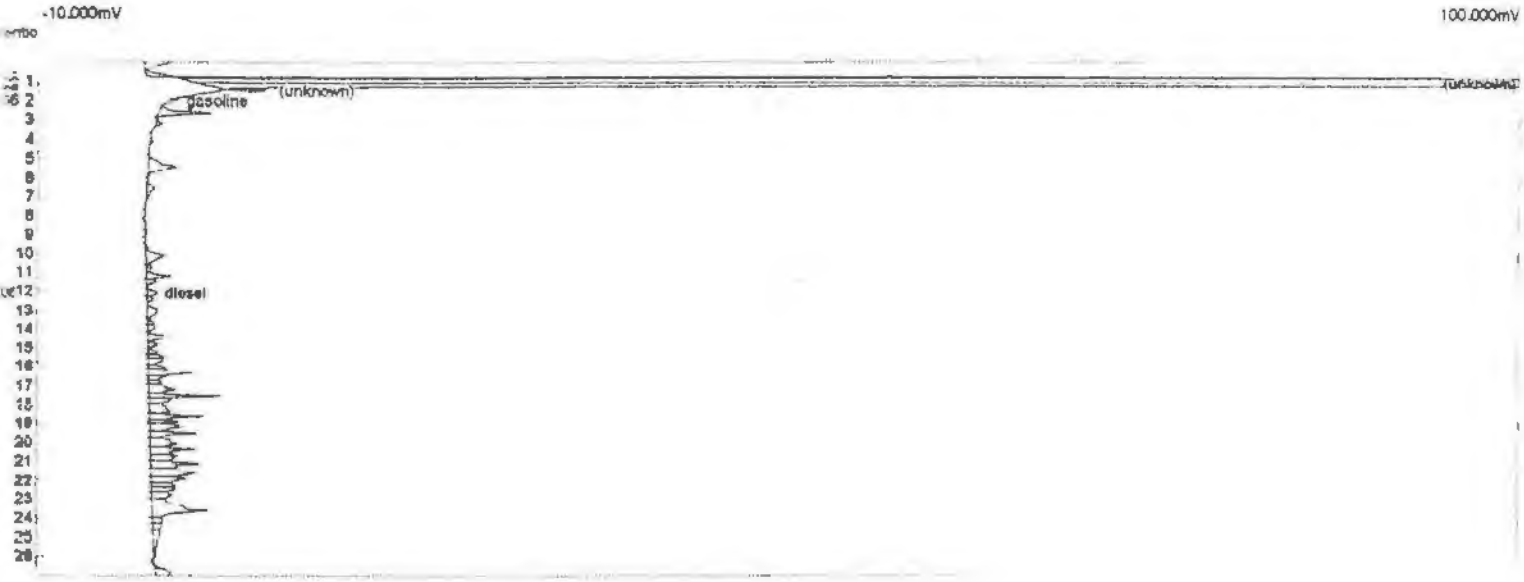
COMPOUND	SPK CON (ppm)	MS CONC (ppm)	%REC MS	MSD CONC (ppm)	%REC MSD	RPD	ACCEPTABLE RPD	ACCEPTABLE RECOVERY
TPH-GASOLINE	200	194	97%	179	90%	8%	15%	81% - 126%
TPH-DIESEL	400	437	109%	444	111%	2%	15%	74% - 131%

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

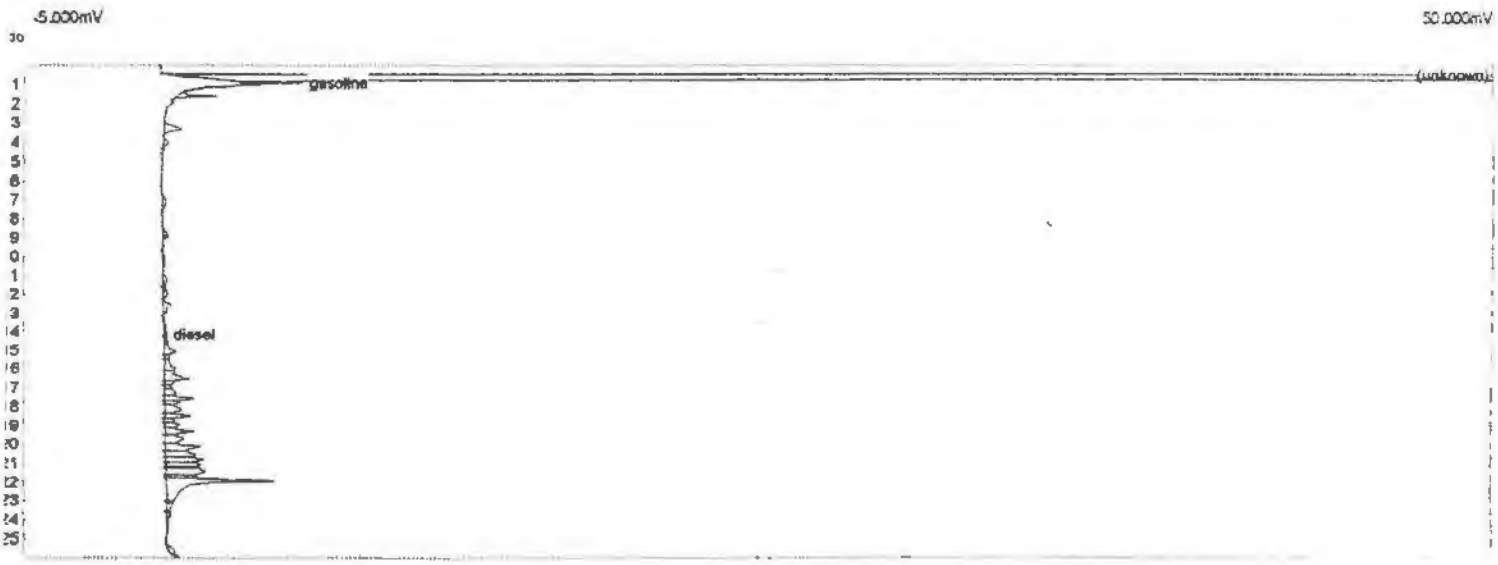
ON SITE LABS, INC
PMB 627, HC 01 BOX 29030, CAGUAS, P.R. 00725
TELEPHONE (787) 720-0329 FAX 789-3858

Lab name: On Site Labs Inc
Analysis date: 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



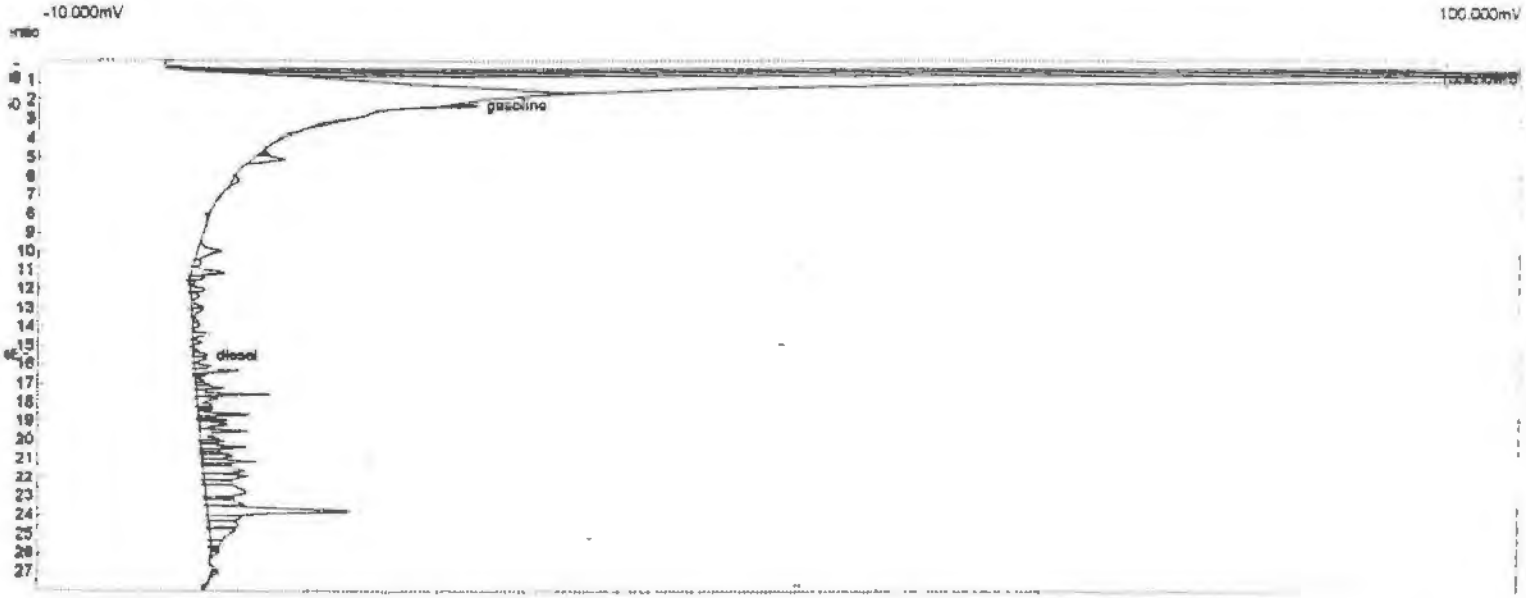
Component	Retention	Area	External	Units
soline	1.966	210.681	205.74	
sel	12.066	1040.886	374.96	ppm
		1251.567	580.70	

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



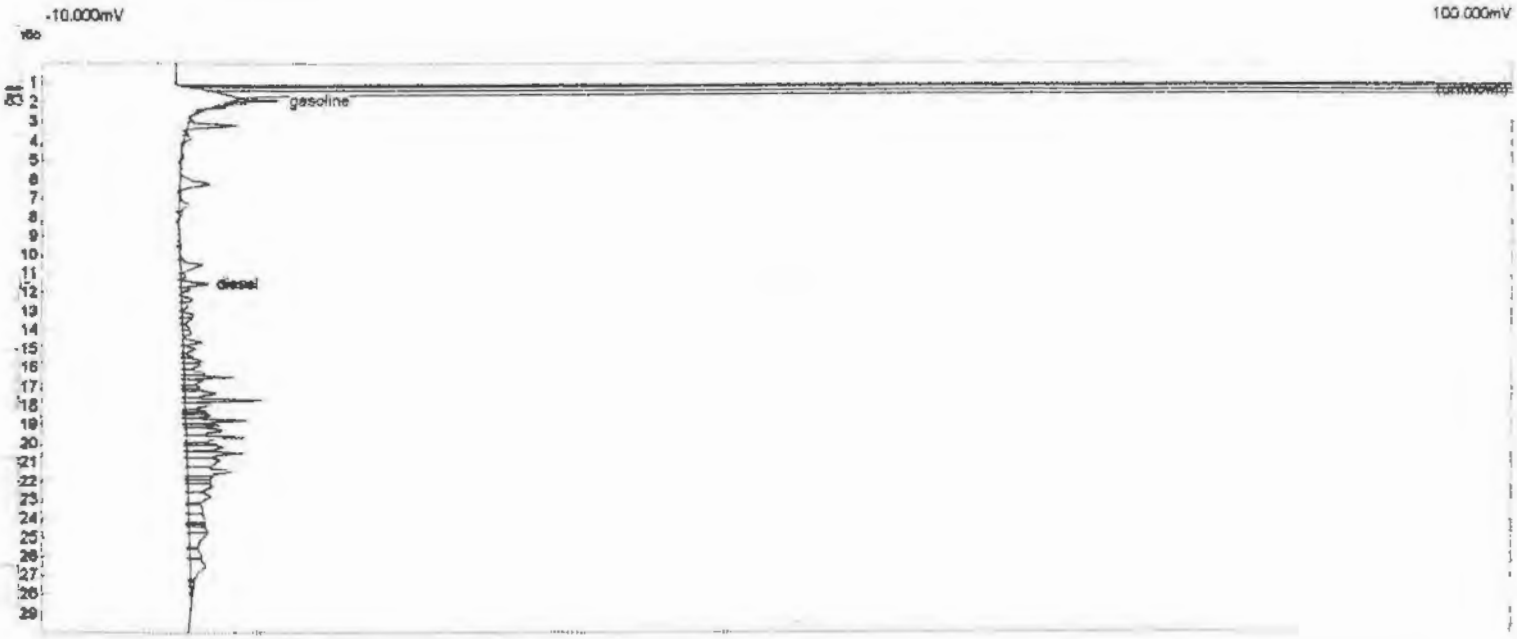
Component	Retention	Area	External	Units
oline	0.883	63.328	43.73	
sel	14.133	327.451	110.78	ppm
l		390.779	154.51	

Lab name: On Site Labs Inc
alysis 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



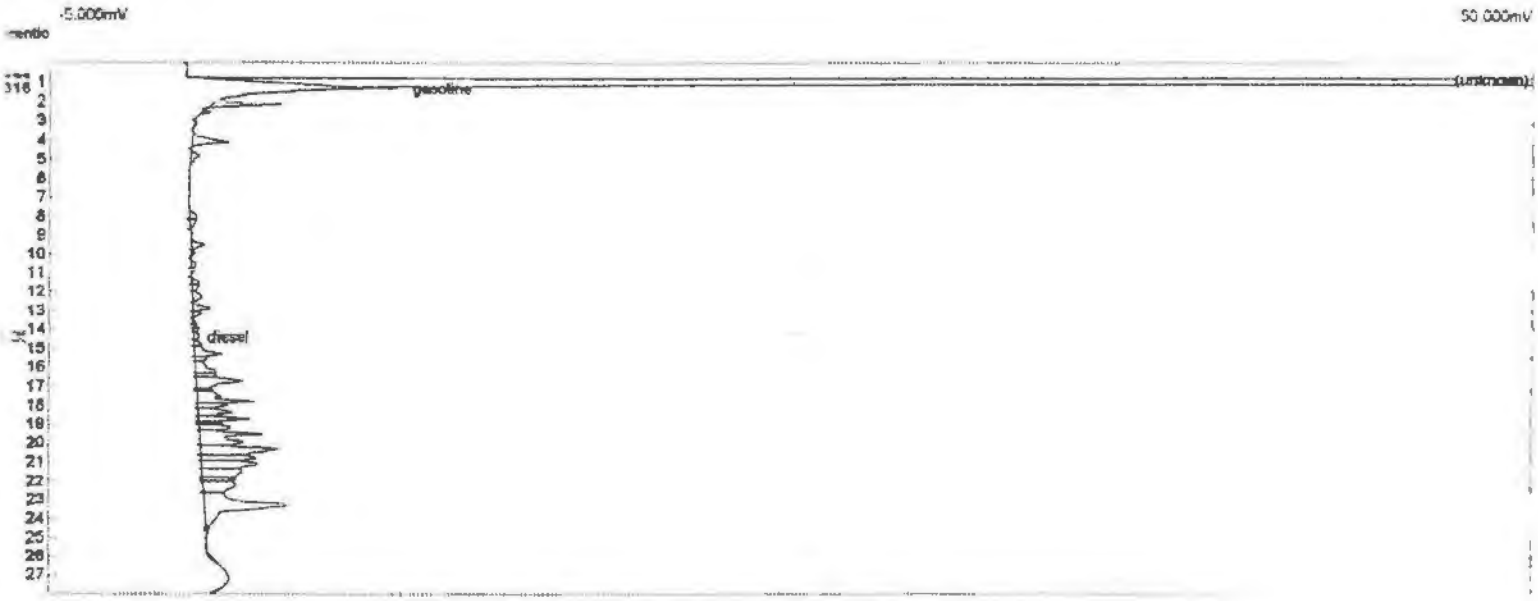
Component	Retention	Area	External	Units
soline	2.250	260.332	212.69	
sel	15.483	1067.232	440.28	ppm
		1327.564	652.97	

Lab name: On Site Labs Inc
alysis date: 03/18/2002 18:46:09
Method: EPA 8015B mod.
Lab ID: GC - 5
Description: FID2 - Ch. 2
Column: XTI-5, 30m, 0.53mm, 1.5um
r: N2
ile: 0318fb17.CHR ()
mple: 200/400 ppm G/D close
Operator: MAP



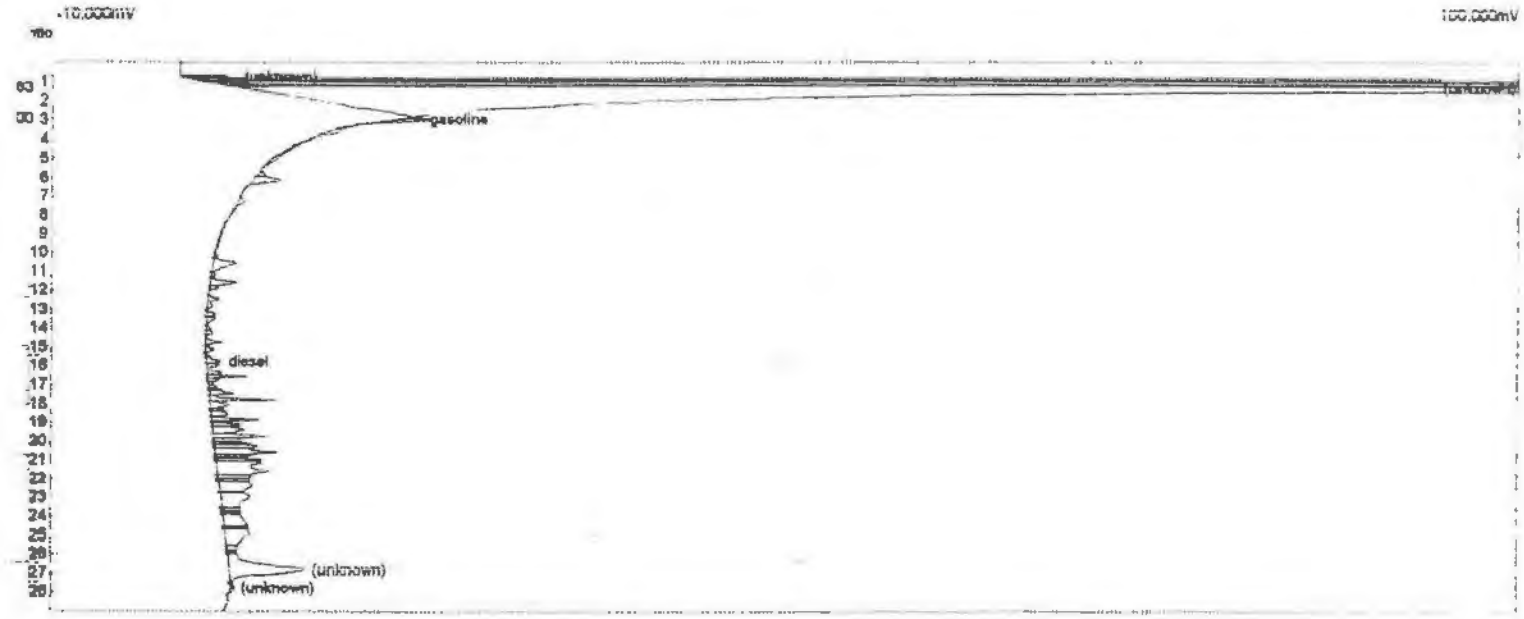
Co nent	Retention	Area	External	Units
	1.883	210.391	205.46	
iesel	11.516	1218.967	439.11	ppm
		1429.359	644.57	

Lab name: On Site Labs Inc
Analysis 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



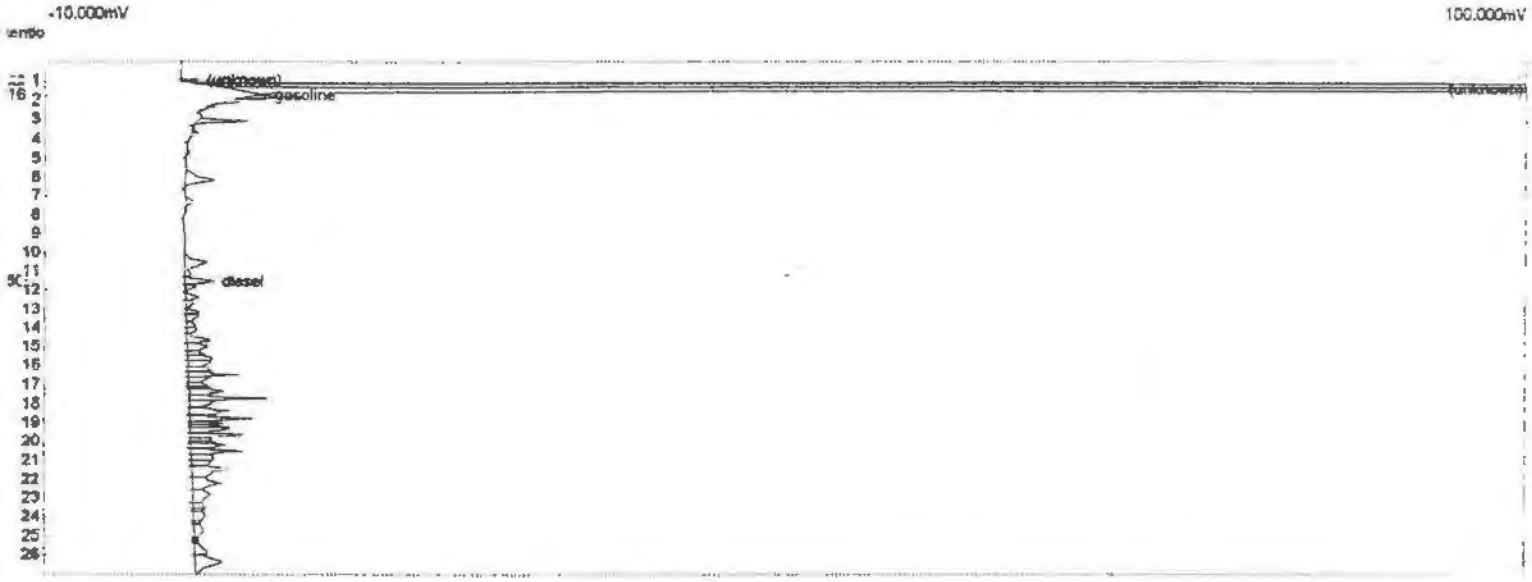
Component	Retention	Area	External	Units
gasoline	1.316	138.731	95.81	
diesel	14.350	614.201	207.80	ppm
		752.991	303.61	

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
le: 0318fd17.CHR ()
Sample: 200/400 ppm G/D close
Operator: MAP



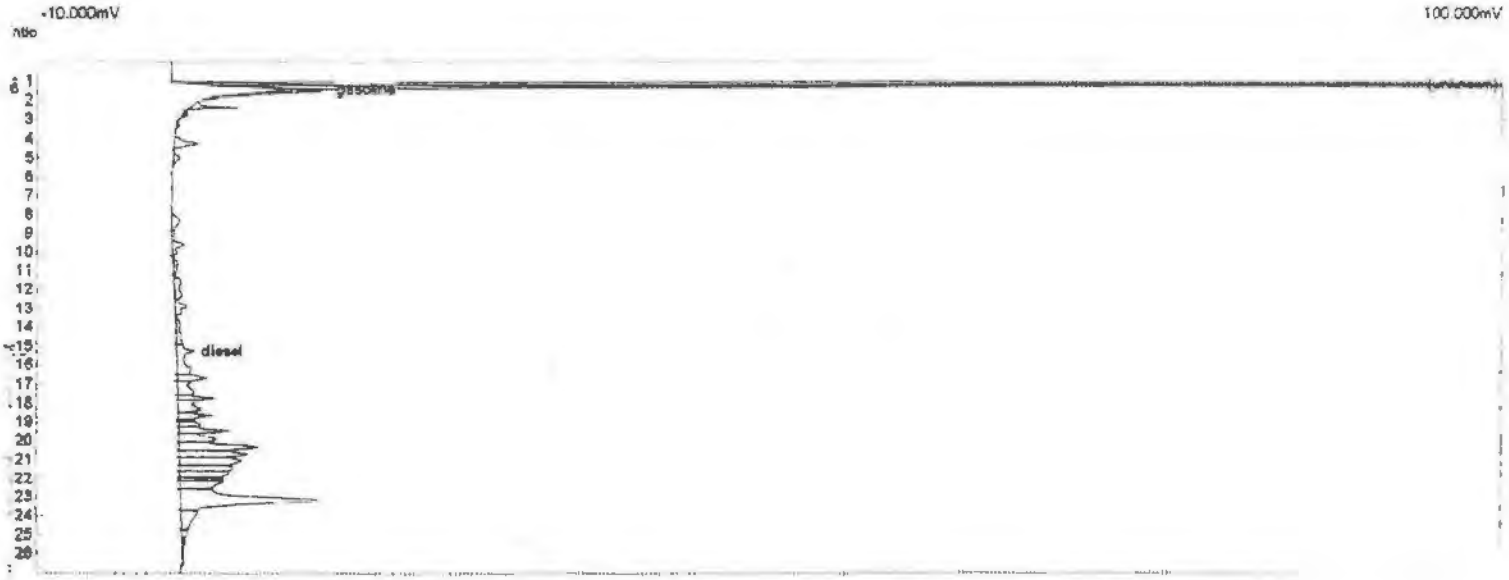
Component	Retention	Area	External	Units
o	2.900	258.564	211.24	
esel	15.750	1051.809	433.91	ppm
		1310.372	645.16	

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



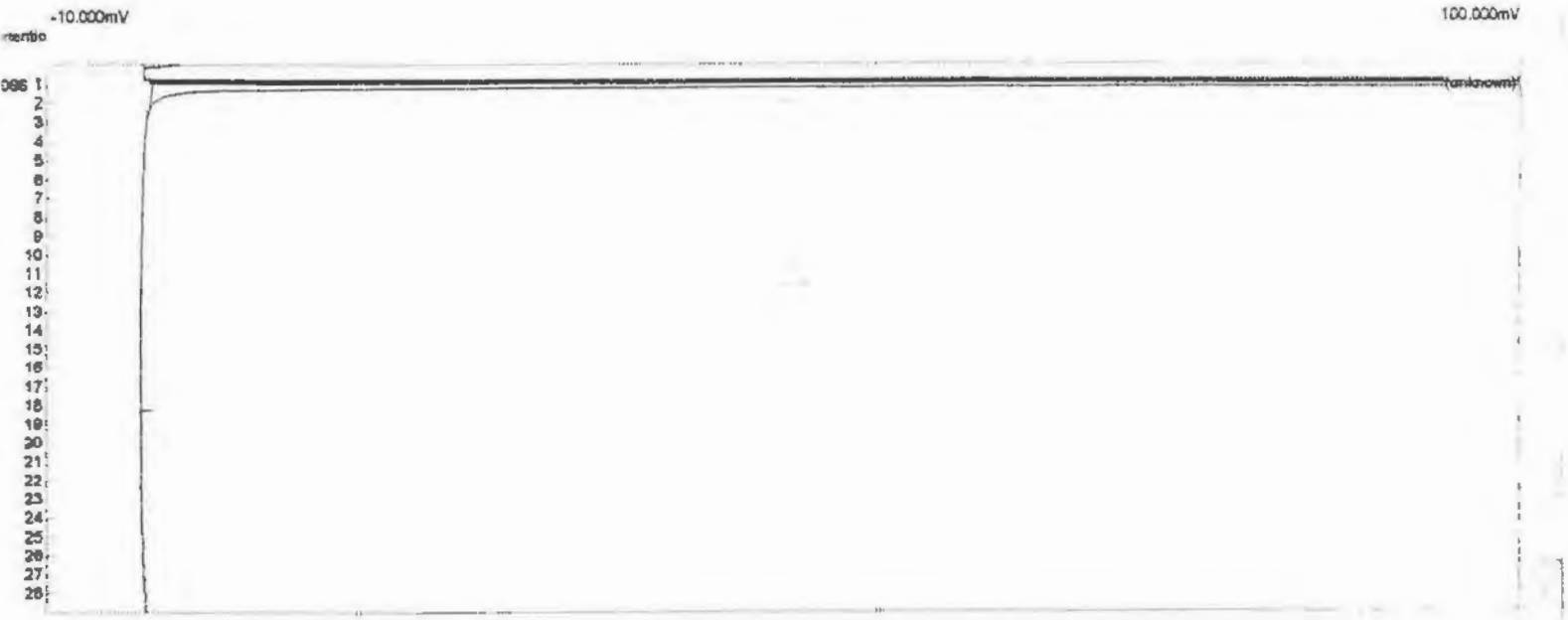
Component	Retention	Area	External	Units
soline	1.716	198.609	193.95	
sel	11.500	1214.061	437.34	ppm
		1412.670	631.30	

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
C r: N2
D e: 0318fc16.CHR ()
Sample: HLA03matrix spike duplicat
Operator: MAP



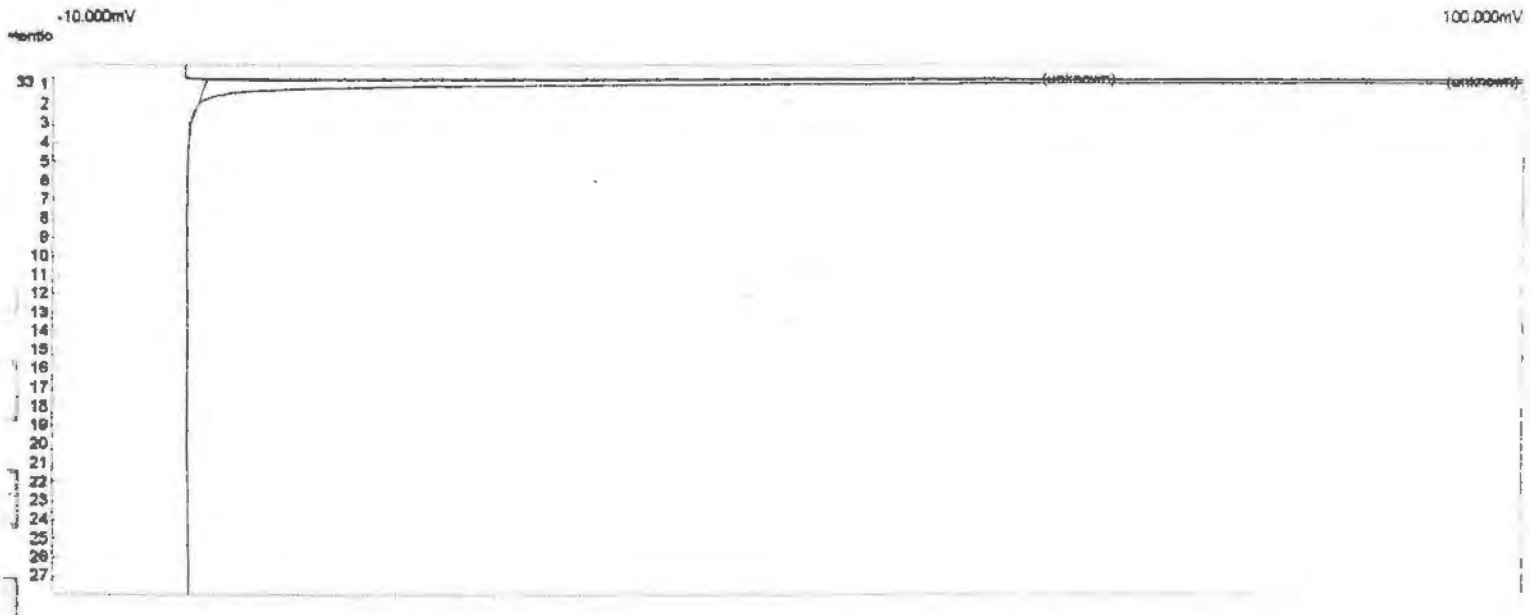
Component	Retention	Area	External	Units
isolin	1.416	258.561	178.56	
se	15.233	1313.525	444.36	ppm
		1572.086	622.92	

Lab name: On Site Labs Inc
Analysis 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



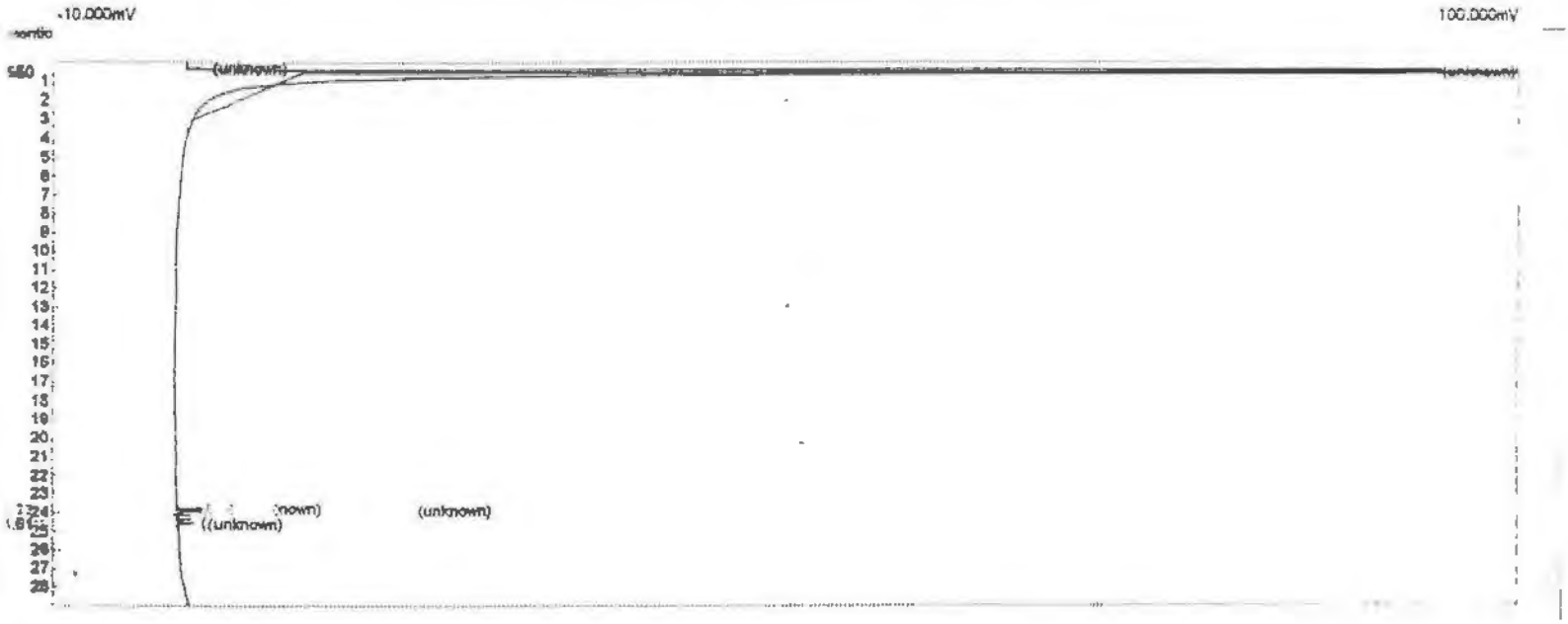
Component	Retention	Area	External	Units
		0.000	0.00	

Lab name: On Site Labs Inc
nalysis 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
file: 0318fc8.CHR ()
ple: method blank
Operator: MAP



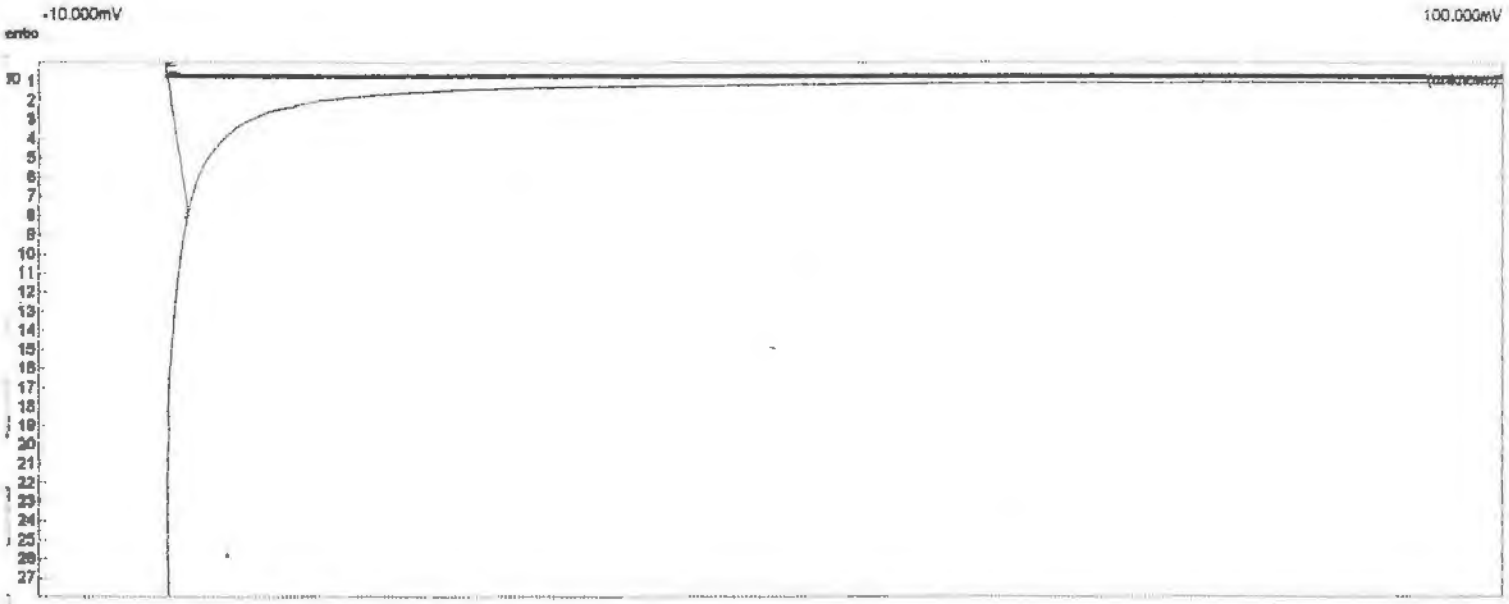
Component	Retention	Area	External	Units
		0.000	0.00	

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



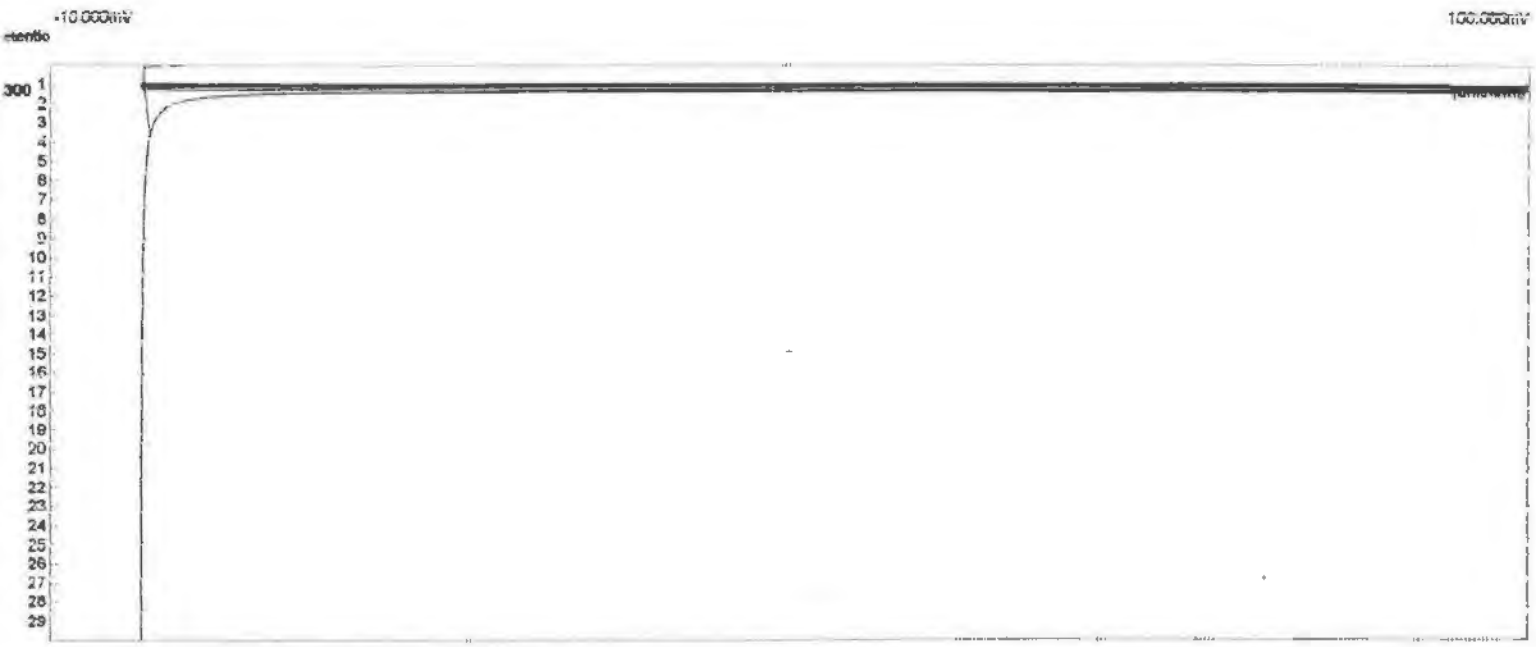
Component	Retention	Area	External	Units
		0.000	0.00	

Lab name: On Site Labs Inc
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]e: 0318FD13.chr ()
[illegible]le: HLA031/0311CH2M
O[illegible]ator: MAP



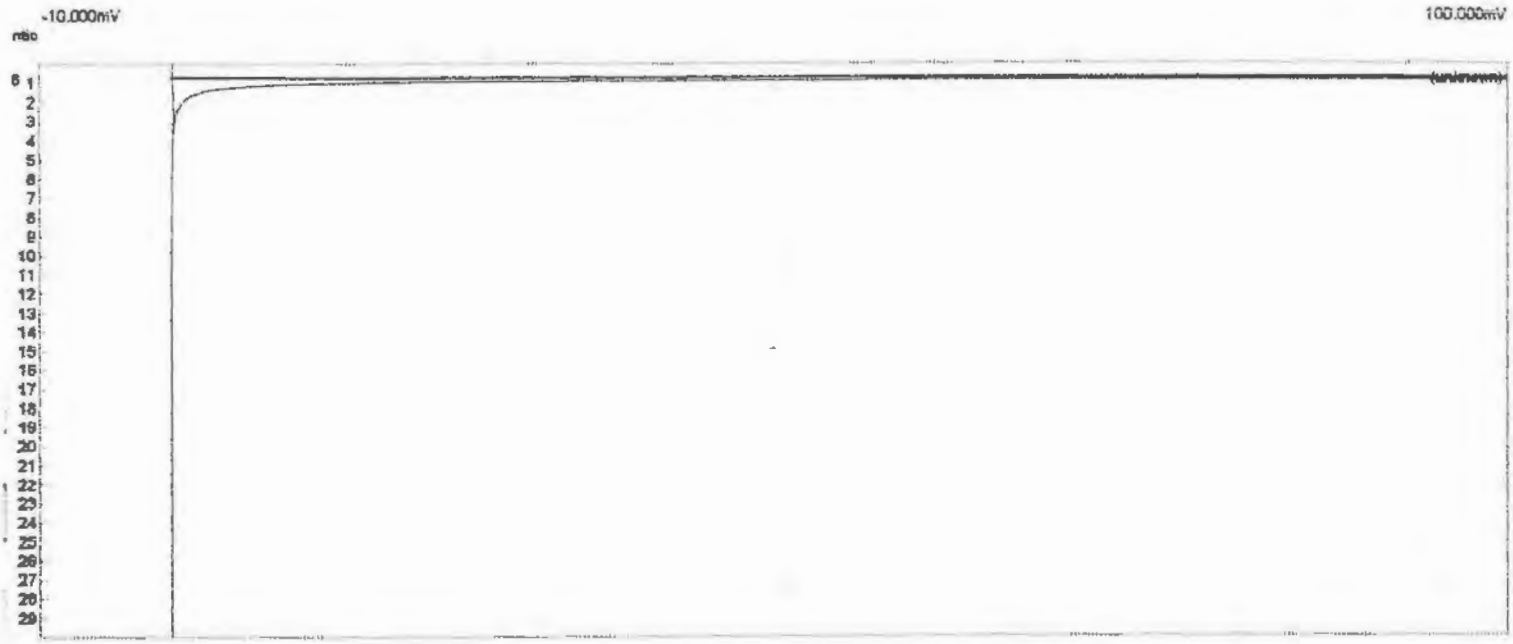
Component	Retention	Area	External	Units
		0.000	0.00	

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



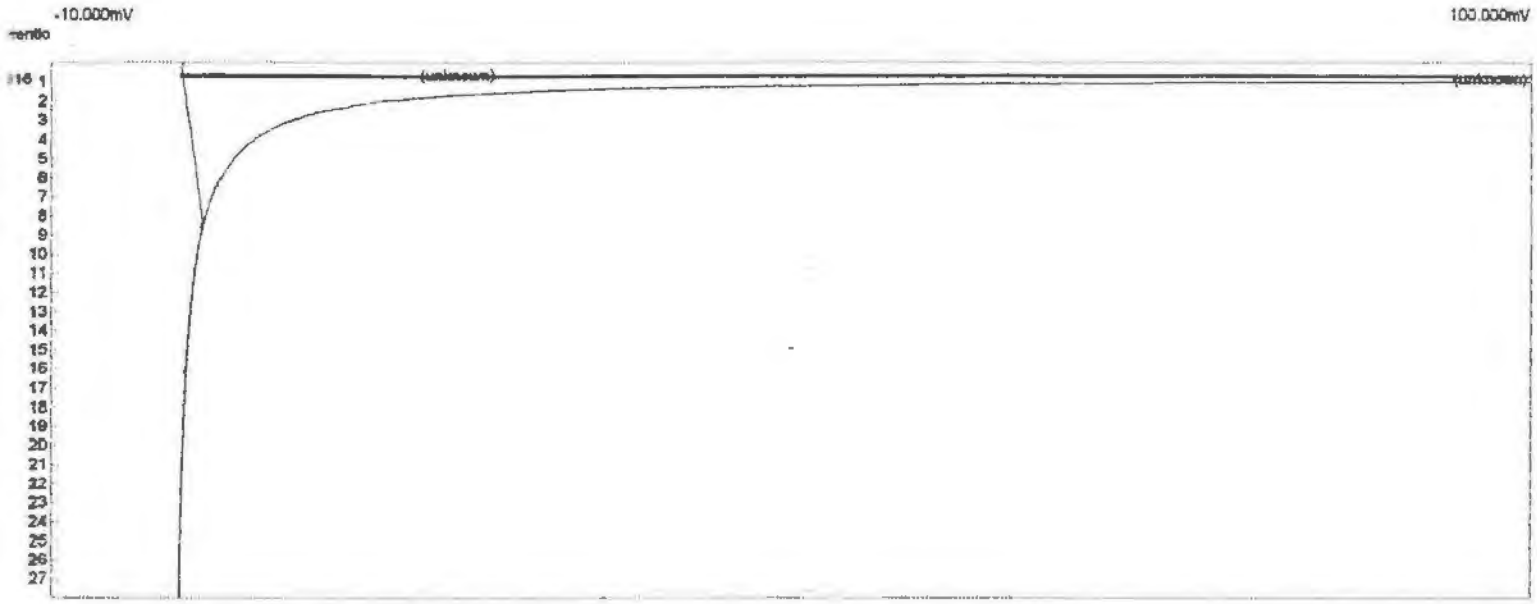
Component	Retention	Area	External	Units
		0.000	0.00	

Lab name: On Site Labs Inc
alysis 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[illegible]: 0318FC14.chr ()
S[illegible]e: JLA025/0311CH2M
Operator: 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: 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 #0210311CH2M
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

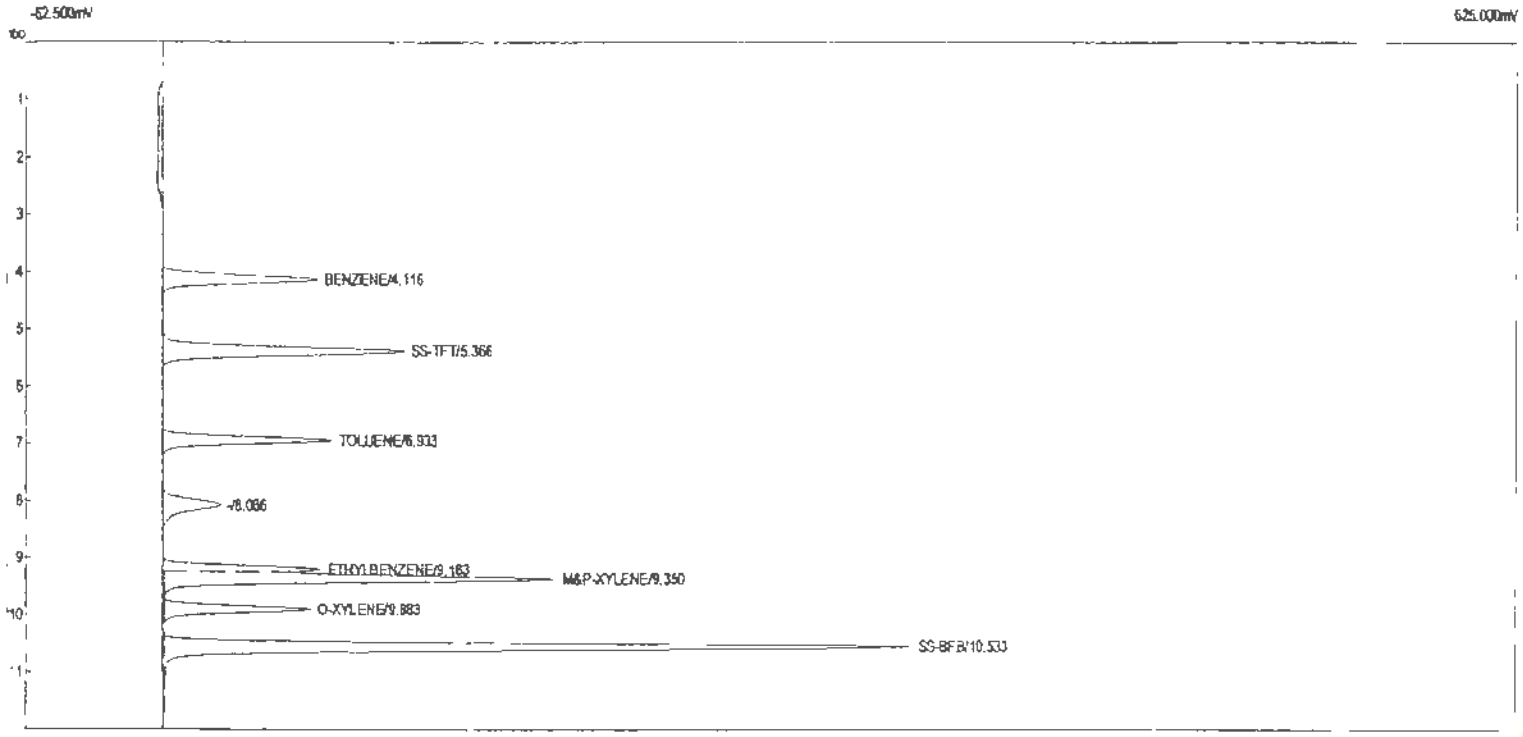
OSL Project #02I0311CH2M

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

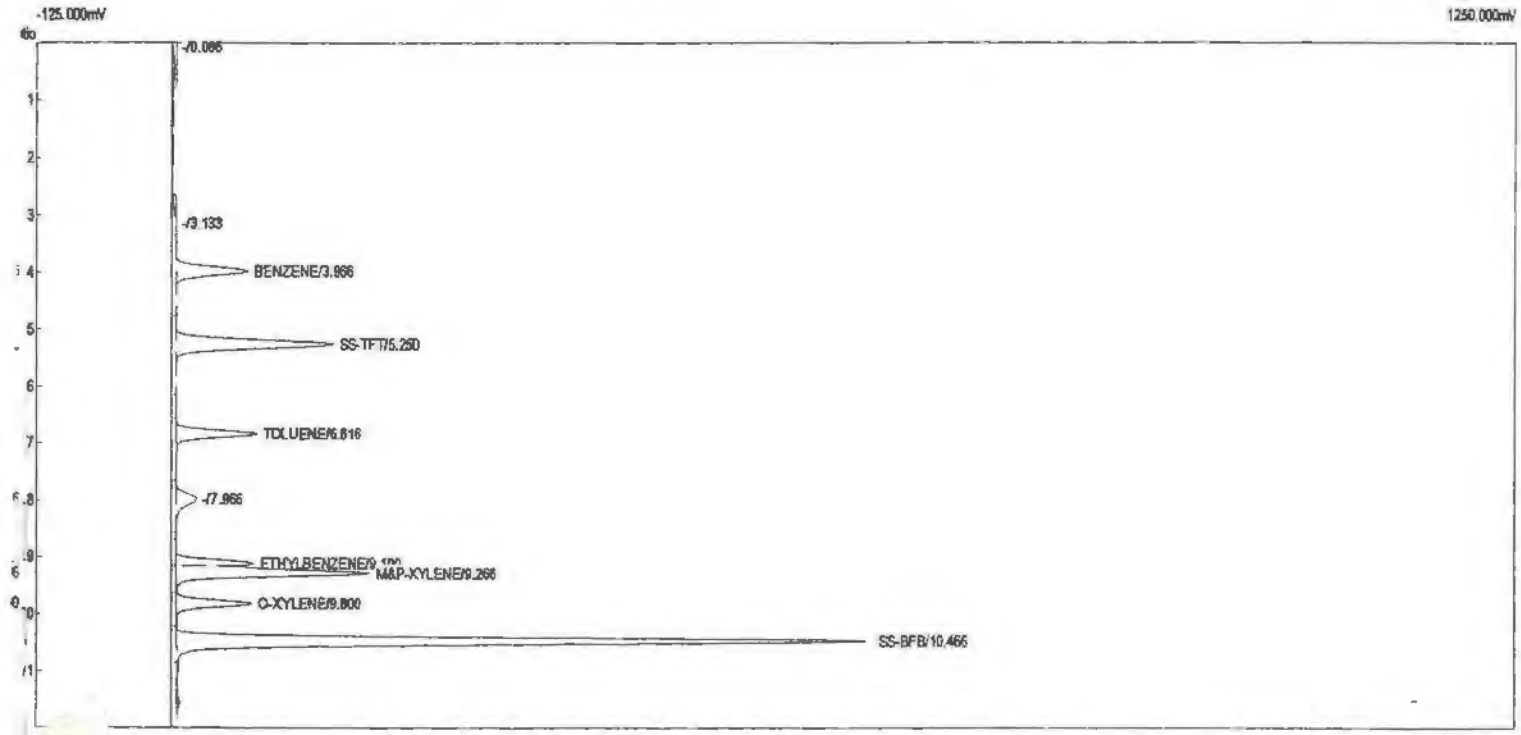
"ND" INDICATES ANALYTE NOT DETECTED AT OR ABOVE THE LISTED DETECTION LIMIT
DUP. = LABORATORY DUPLICATE
µg/L = MICROGRAMS PER LITER
ANALYSES PERFORMED BY: MARCO A. PEDRAZA
DATA REVIEWED BY: KEVIN SHELBURNE

alysis 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



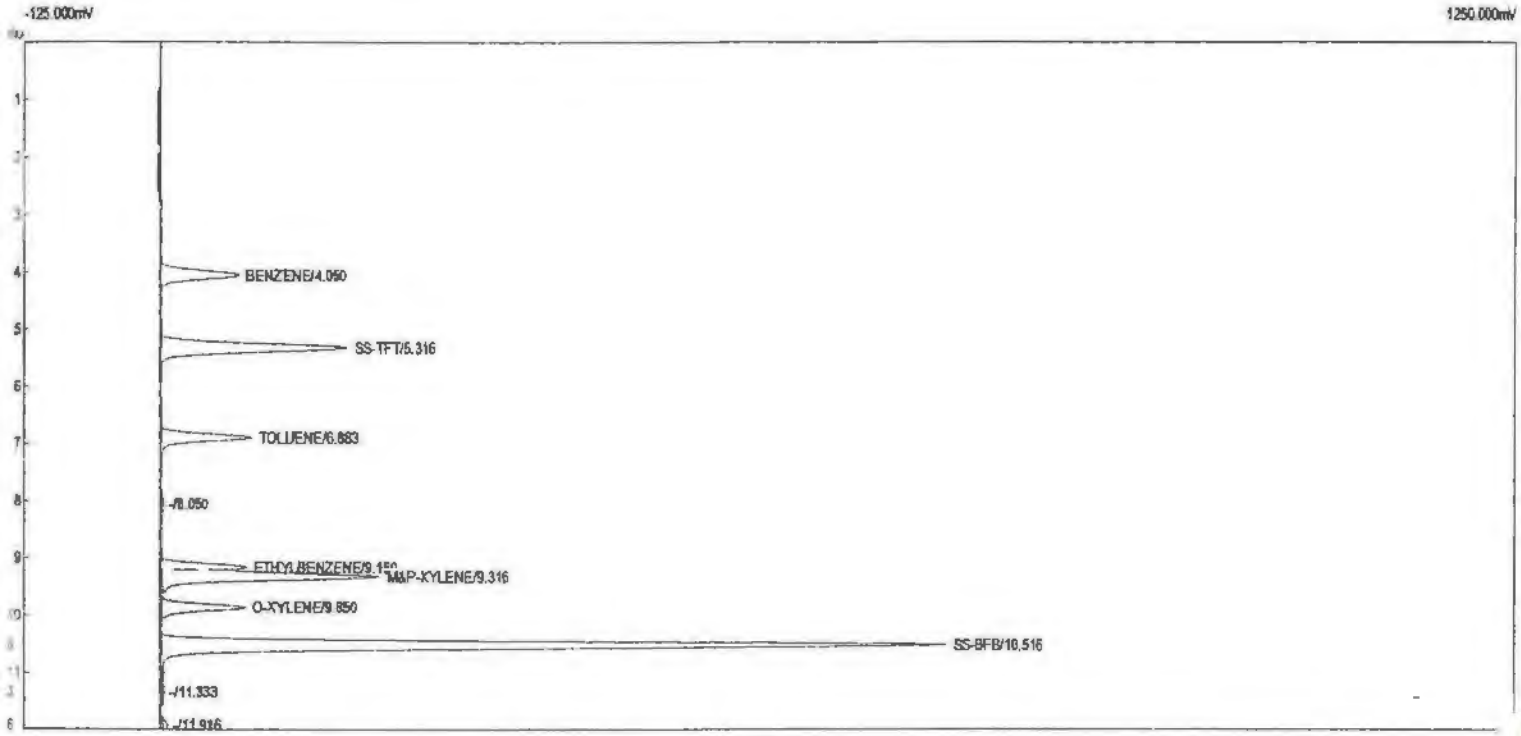
Component	Retention	Height	Area	External	Internal	Units
NZENE	4.116	71.676	727.064	8.48	8.4759	ppb
-TFT	5.366	111.960	1188.597	13.29	13.2923	ppb
LUENE	6.933	78.680	689.170	8.47	8.4737	ppb
HYLBENZENE	9.183	72.818	467.283	7.10	7.0972	ppb
P-XYLENE	9.350	181.067	1614.985	16.40	16.4024	ppb
YLENE	9.883	67.820	566.881	7.75	7.7453	ppb
-BFB	10.533	345.781	2848.708	12.49	12.4943	ppb
			8102.687	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
Da[illegible]e: 0318P22.CHR ()
[illegible]s: 8 ppb BTEX CLOSE STD
C[illegible]or: MAP



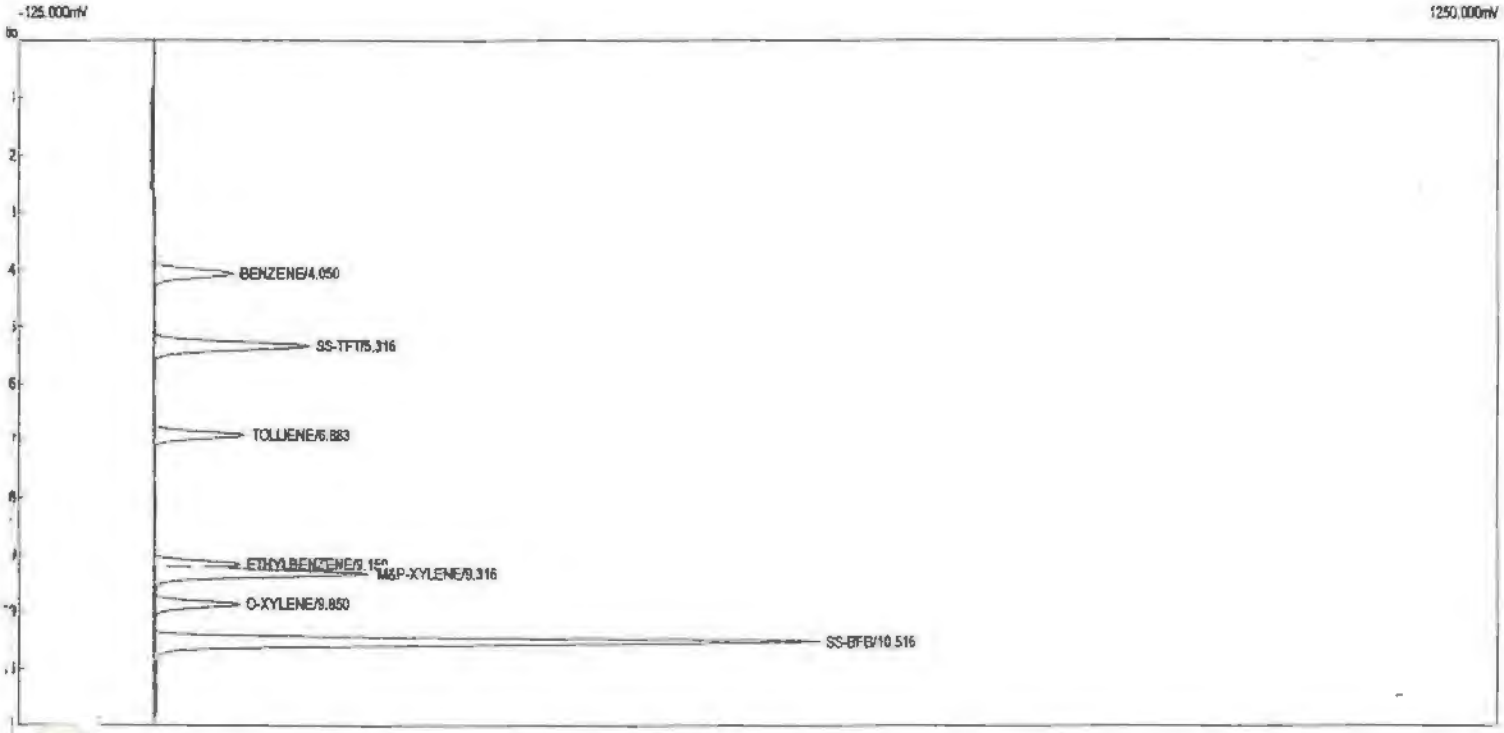
Co[illegible]ent	Retention	Height	Area	External	Internal	Units
ENZENE	3.966	67.088	716.491	8.35	8.3527	ppb
TFT	5.250	146.375	1564.790	17.50	17.4993	ppb
UENE	6.816	75.591	681.207	8.38	8.3758	ppb
HYLBENZENE	9.100	72.519	478.088	7.26	7.2614	ppb
&P-XYLENE	9.266	180.475	1625.490	16.51	16.5091	ppb
YLENE	9.800	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.
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



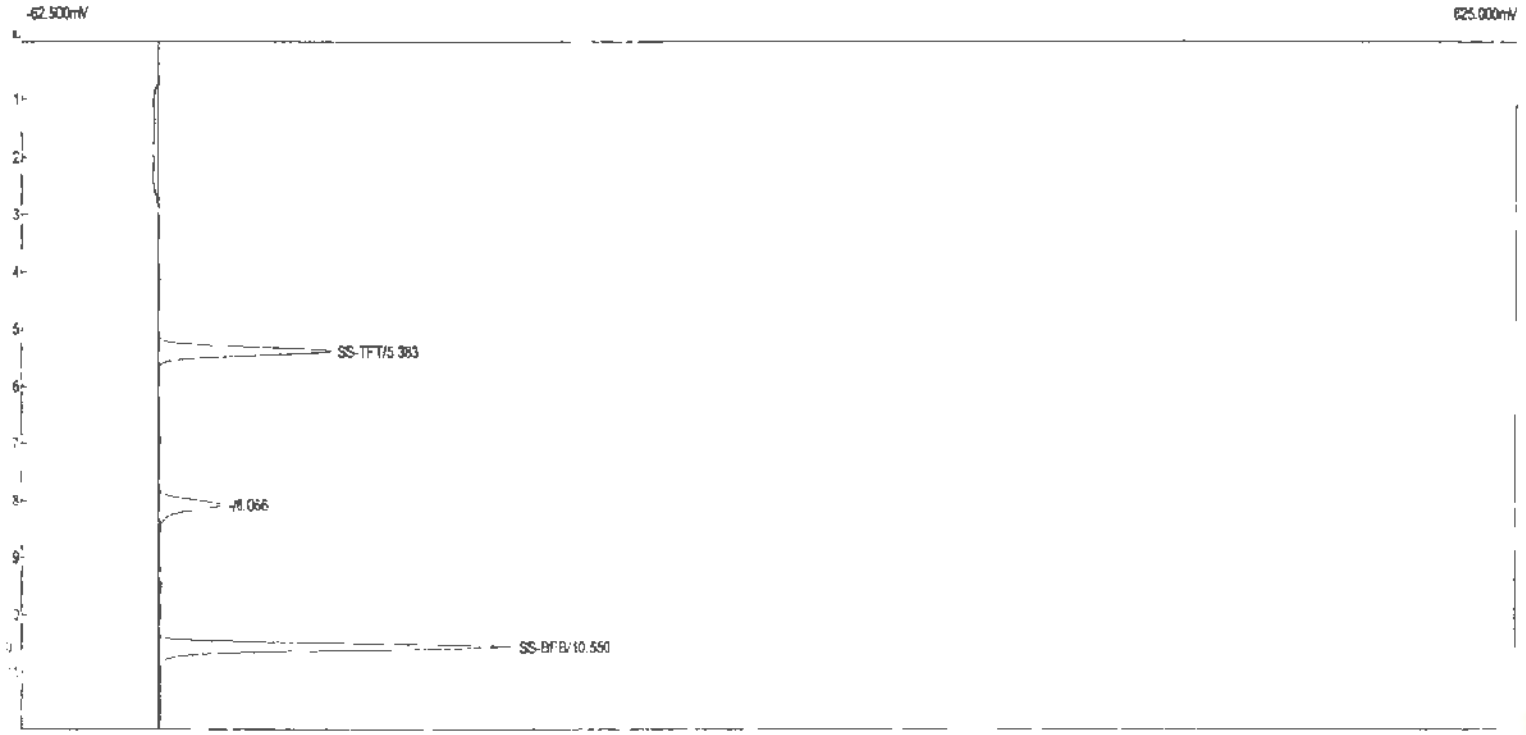
Component	Retention	Height	Area	External	Internal	Units
NZENE	4.050	74.053	799.540	9.32	9.3208	ppb
-TFT	5.316	172.946	1836.926	20.54	20.5427	ppb
LUENE	6.883	85.754	774.375	9.52	9.5214	ppb
HYLBENZENE	9.150	80.379	523.459	7.95	7.9505	ppb
P-XYLENE	9.316	201.816	1857.134	18.86	18.8618	ppb
YLENE	9.850	78.554	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 ()
S : ILA019matrix spike duplica
C or: MAP



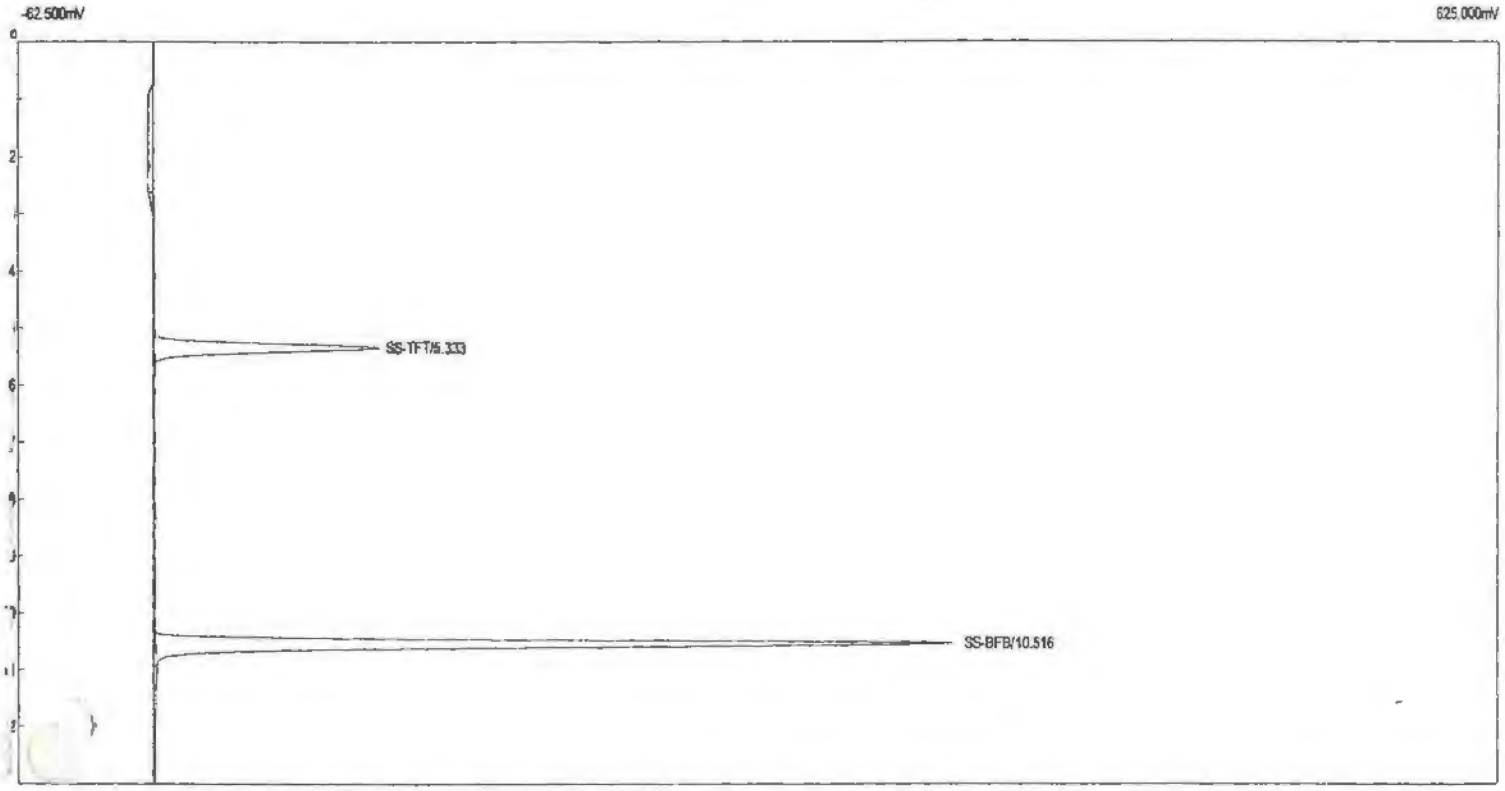
Component	Retention	Height	Area	External	Internal	Units
NZENE	4.050	74.807	801.364	9.34	9.3421	ppb
TFT	5.316	145.040	1533.984	17.15	17.1548	ppb
UENE	6.883	85.370	759.008	9.33	9.3324	ppb
HYLBENZENE	9.150	80.800	528.273	8.02	8.0236	ppb
P-XYLENE	9.316	201.783	1835.918	18.65	18.6463	ppb
YLENE	9.850	79.993	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	

Lab name: On Site Labs Inc.
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



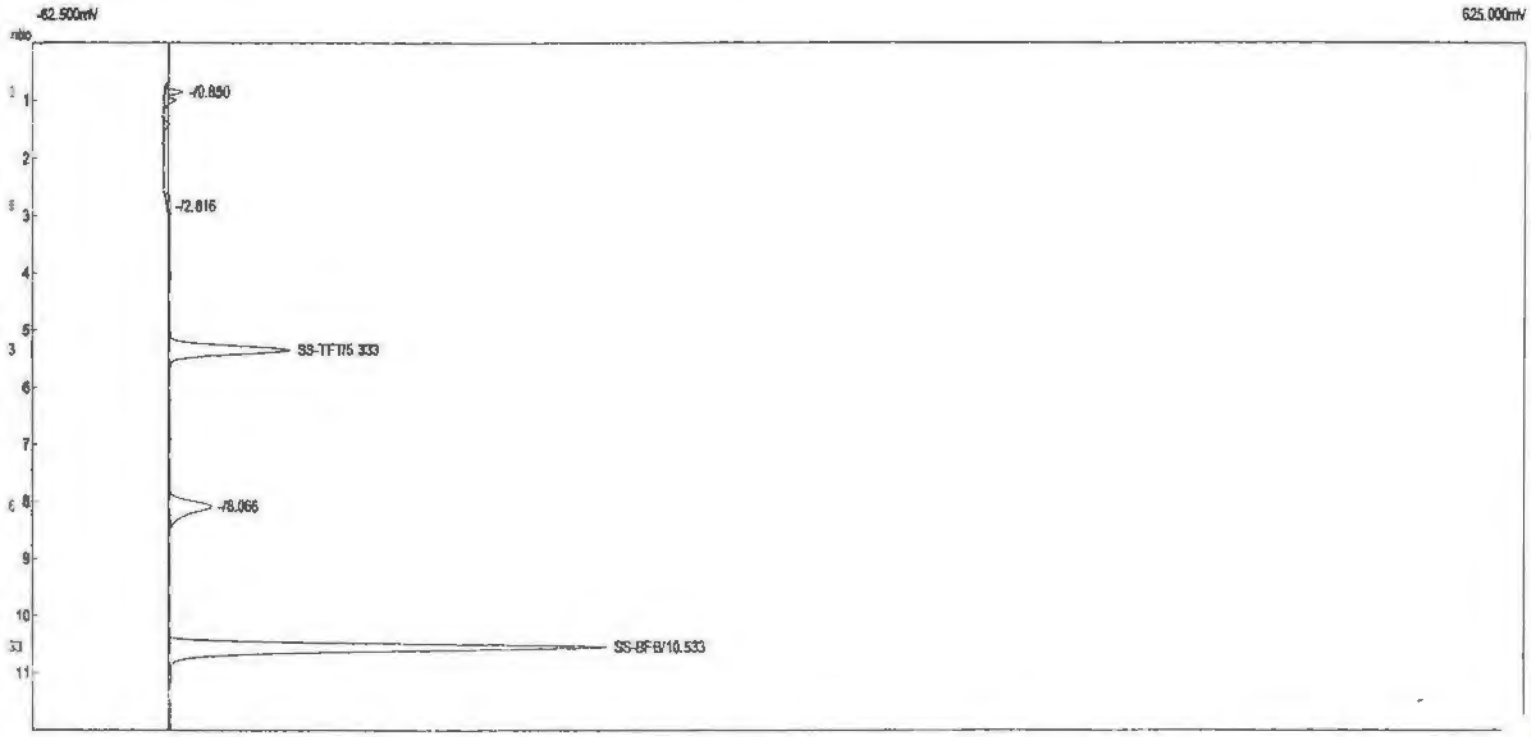
Component	Retention	Height	Area	External	Internal	Units
TFT	5.383	79.558	837.175	9.36	9.3623	ppb
BFB	10.550	163.309	1406.245	6.17	6.1677	ppb
			2243.420	15.53	15.5300	

Lab name: On Site Labs Inc.
lysis date: 03/18/2002 15:48:30
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
Date File: 0318P13.CHR ()
S[illegible] HLA0319/0311CH2M
O[illegible]r: MAP



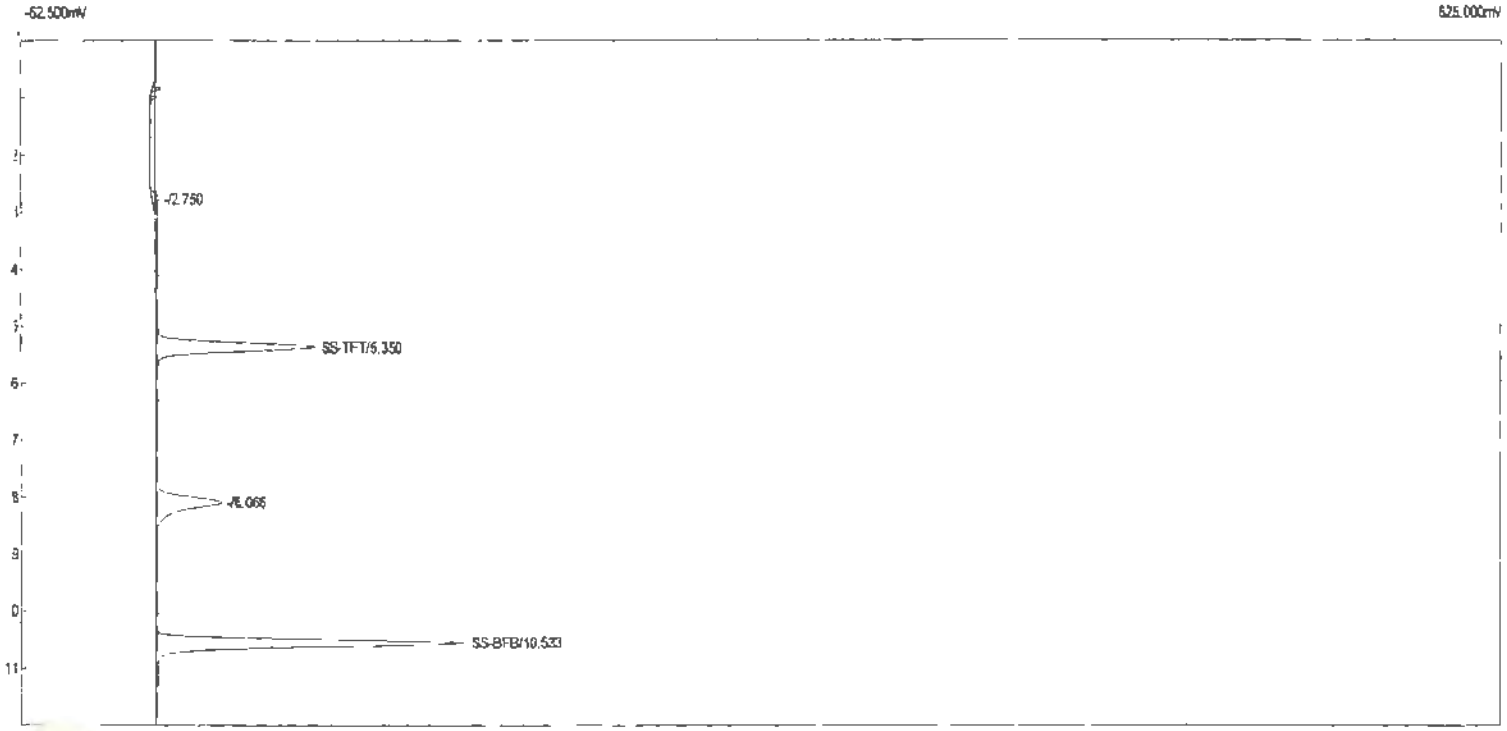
Component	Retention	Height	Area	External	Internal	Units
TFT	5.333	104.844	1105.736	12.37	12.3656	ppb
S-BFB	10.516	373.626	3273.720	14.36	14.3584	ppb
			4379.456	26.72	26.7241	

Lab name: On Site Labs Inc.
nalysis date: 03/18/2002 14:42:18
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: 0318P10.CHR ()
Sample: JLA024/0305CH2M
Operator: MAP 03//



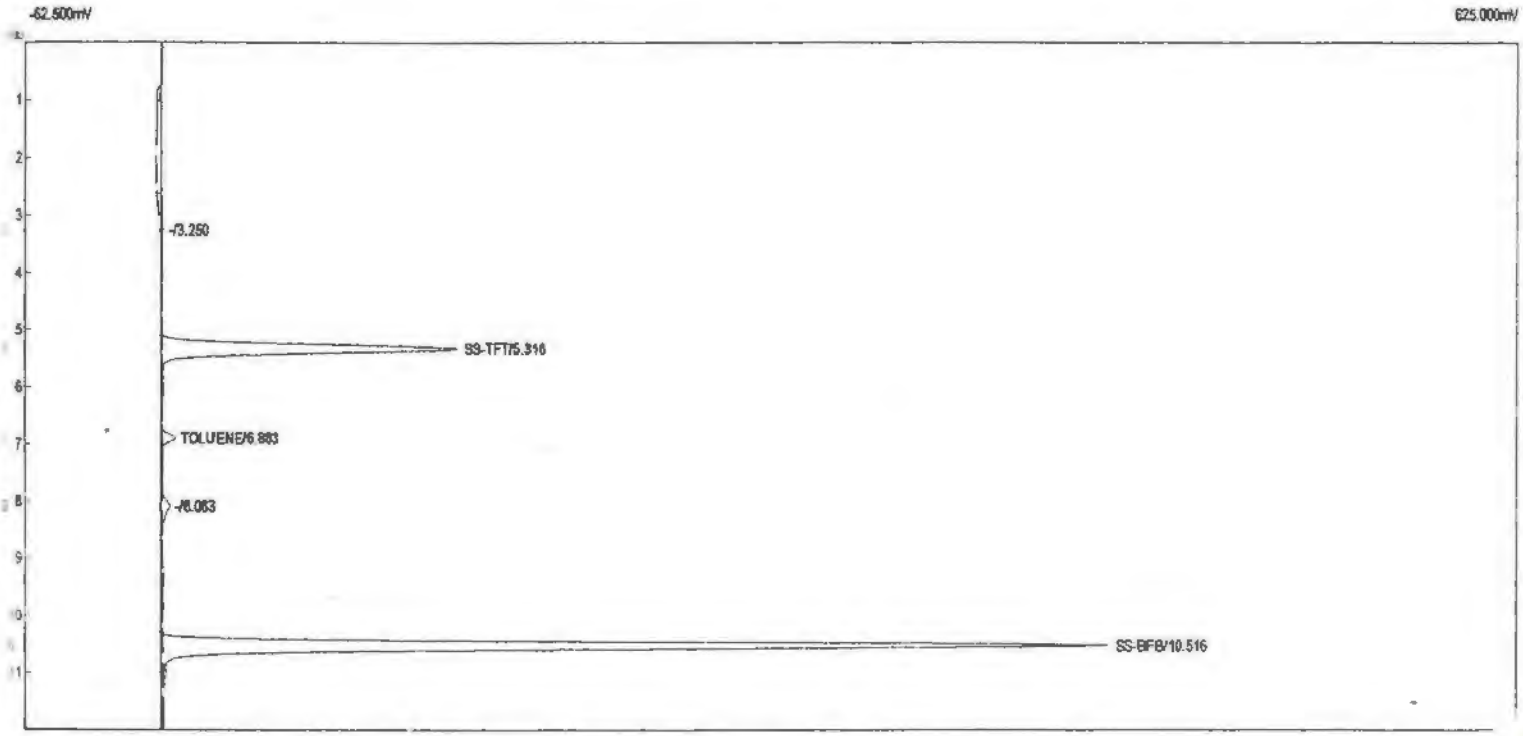
Component	Retention	Height	Area	External	Internal	Units
-TFT	5.333	55.701	596.424	6.67	6.6699	ppb
-BFB	10.533	202.204	1846.796	8.10	8.1000	ppb
			2443.220	14.77	14.7699	

ysis date: 03/18/2002 15:05:56
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
Date 0318P11.CHR ()
S JLA025/0305CH2M
Op MAP



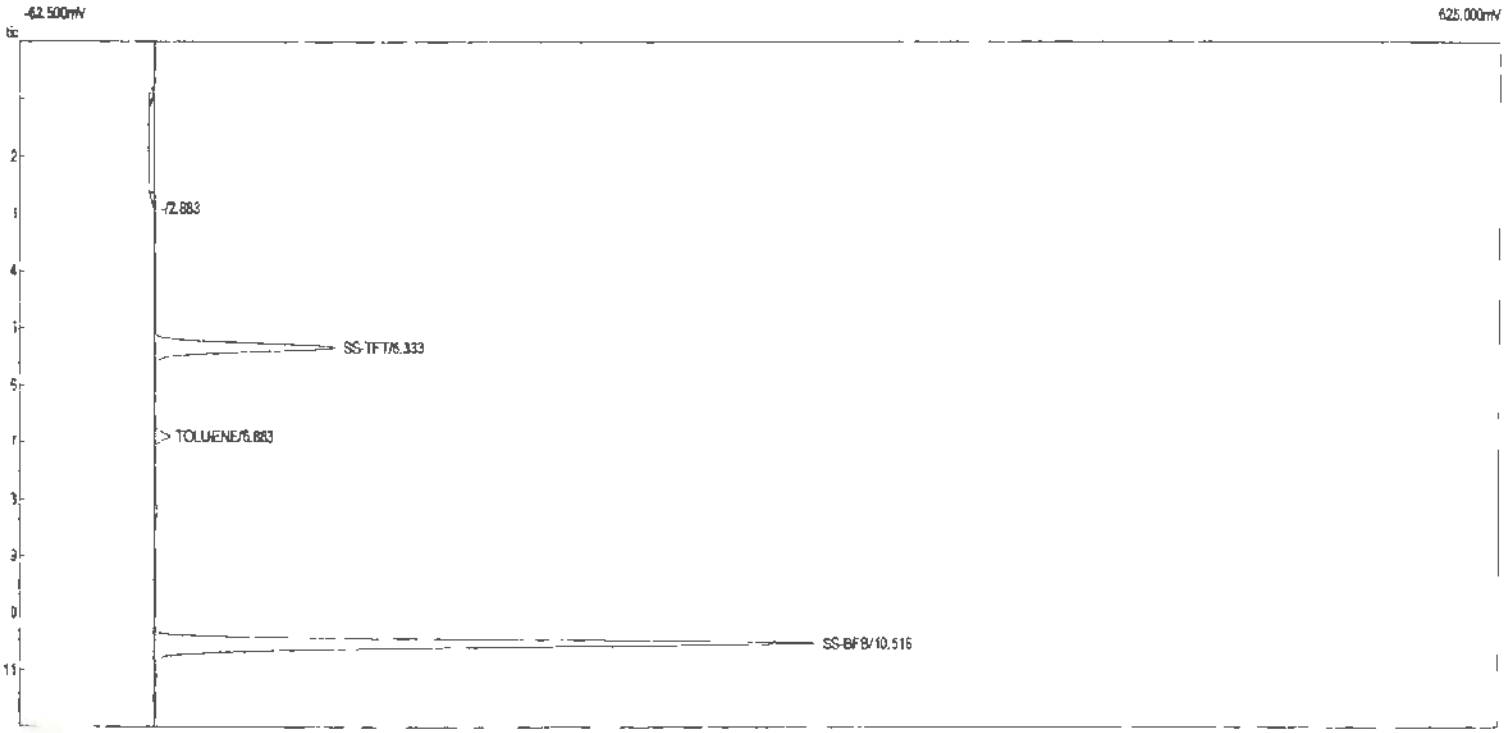
Co ent	Retention	Height	Area	External	Internal	Units
-TFT	5.350	73.717	791.054	8.85	6.8465	ppb
BFB	10.533	143.708	1309.928	5.75	5.7453	ppb
			2100.982	14.59	14.5918	

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



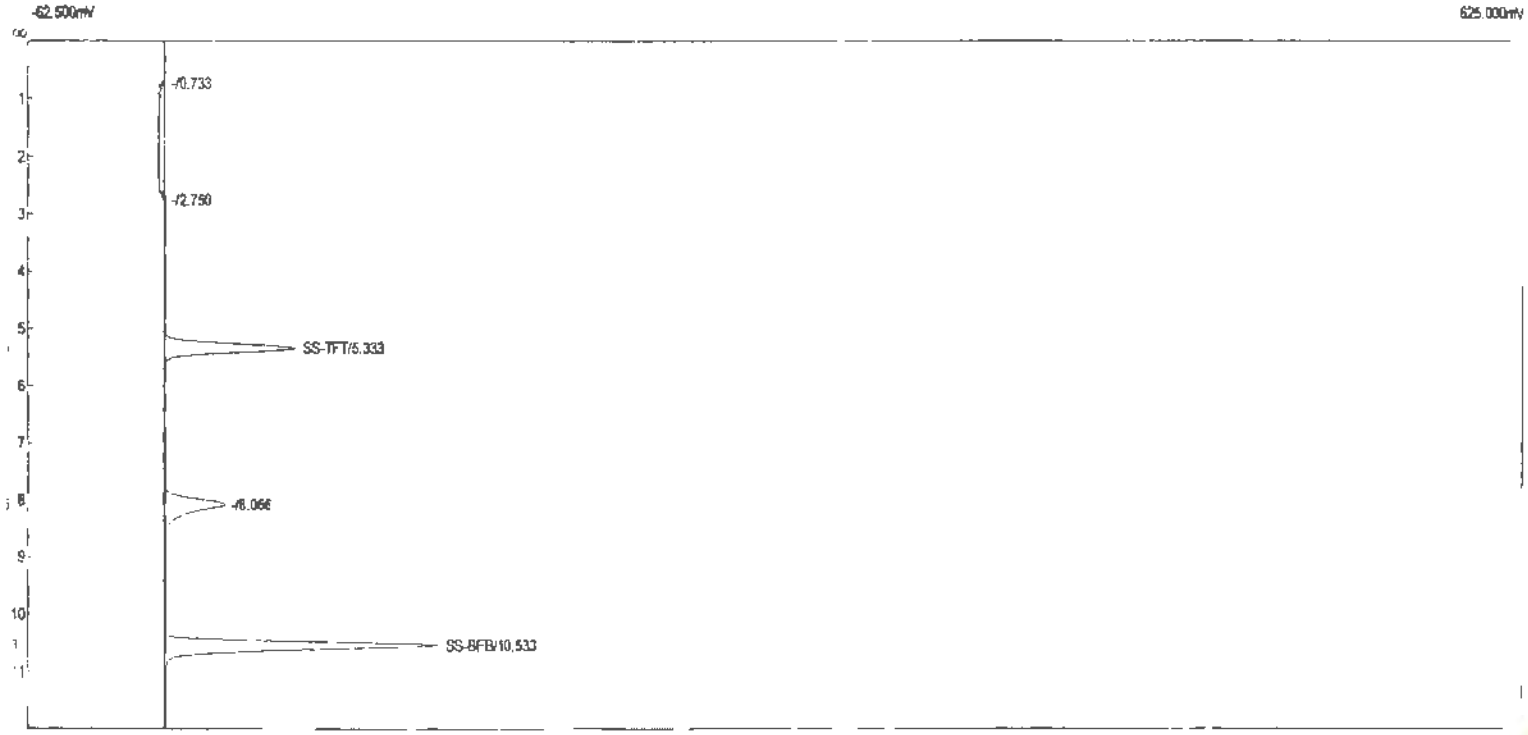
Component	Retention	Height	Area	External	Internal	Units
-TFT	5.316	136.660	1458.655	16.31	16.3124	ppb
OLUENE	6.883	5.946	54.392	0.67	0.6688	ppb
-BFB	10.516	437.579	3754.789	16.47	16.4684	ppb
			5267.836	33.45	33.4496	

Lab name: On Site Labs Inc.
alysis date: 03/18/2002 17:02:34
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
Dat e: 0318P17.CHR ()
S J: JLA026TB3/0305CH2M
C, r: MAP



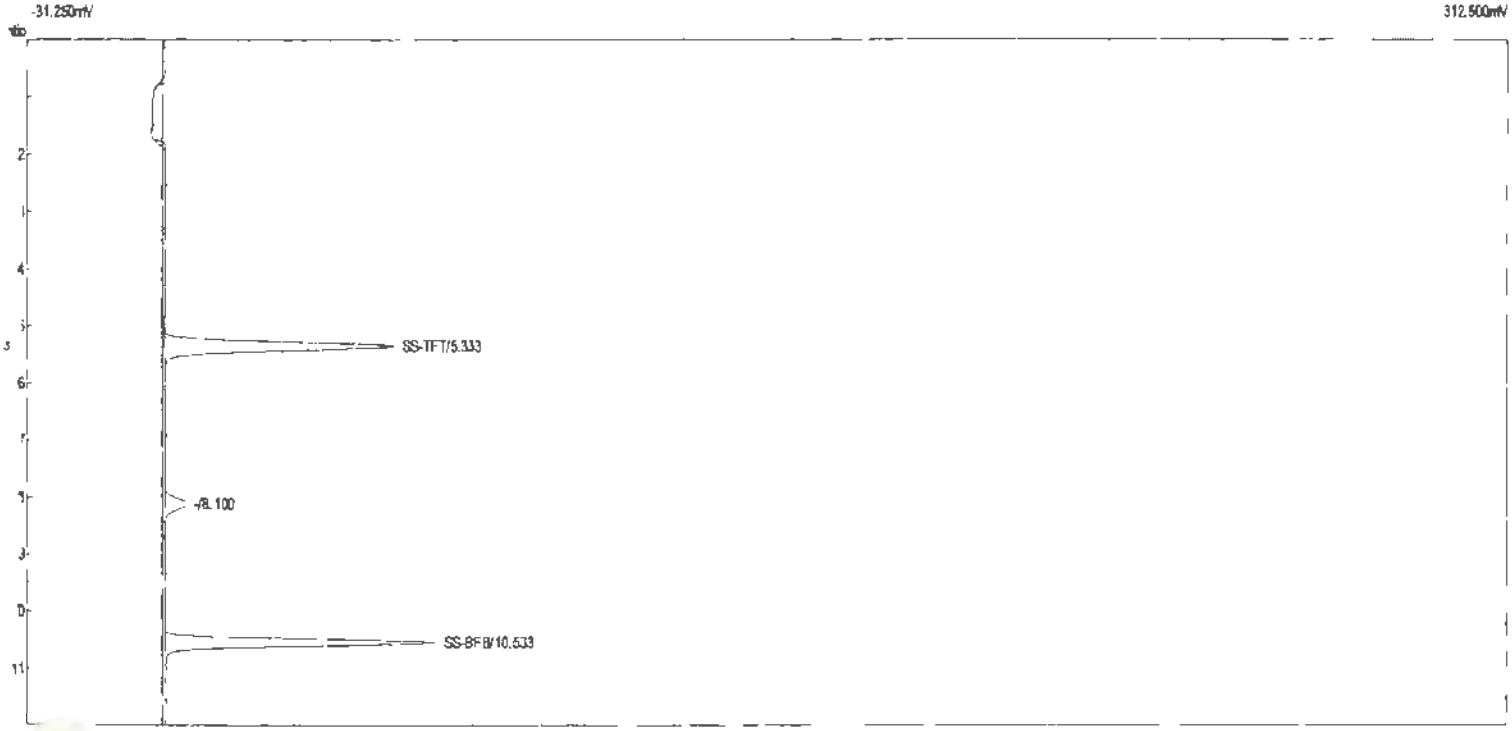
Co ent	Retention	Height	Area	External	Internal	Units
-TFT	5.333	85.165	911.518	10.19	10.1937	ppb
UENE	6.883	7.381	68.152	0.84	0.8380	ppb
BFB	10.516	306.718	2912.570	12.77	12.7744	ppb
			3892.240	23.81	23.8061	

alysis date: 03/18/2002 15:28.14
Method: EPA 8020A mod
Lab ID: GC-3-P&T
Description: PID1-CHANNEL 1
Column: Rtx-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	

Analysis date: 03/18/2002 10:23:14
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: 0318P15.CHR ()
Sample: ILA019/0305CH2M DUP
Operator: MAP



Component	Retention	Height	Area	External	Internal	Units
SS-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

March 22, 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 AND 1970 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:

- 3 water samples analyzed for TPH-gas/diesel by modified EPA test method 8015B.
- 3 water samples analyzed for BTEX by modified EPA test method 8020A.
- 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 #02I0318CH2M-3
DAILY CALIBRATION DATE: 03/21/02

CH2M HILL PROJECT NO. 167722.FI FQ
PROJECT NAME: RRNAS SITES 1970 AND 88

			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%	152.69	0.25	0.6%	145.94	0.24	5.0%
TPH GASOLINE	FID #3 (gc5)	10 - 30,000	0.36	15.0%	201.99	0.34	7.0%	190.41	0.32	12.3%
TPH GASOLINE	FID #4 (gc5)	10 - 30,000	0.31	15.4%	195.21	0.33	6.3%	195.01	0.33	6.2%
TPH DIESEL	FID #2 (gc5)	25 - 20,000	0.69	14.1%	938.75	0.78	12.7%	839.48	0.70	0.8%
TPH DIESEL	FID #3 (gc5)	25 - 20,000	0.74	13.6%	962.29	0.80	8.5%	971.54	0.81	9.6%
TPH DIESEL	FID #4 (gc5)	25 - 20,000	0.61	11.1%	801.13	0.67	10.2%	729.31	0.61	0.3%

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)

OSL Project #02I0318CH2M-3
DATE: 03/21/02

CH2M HILL PROJECT NO. 167722 FI.FQ
PROJECT NAME: RRNAS SITES 1970 AND 88

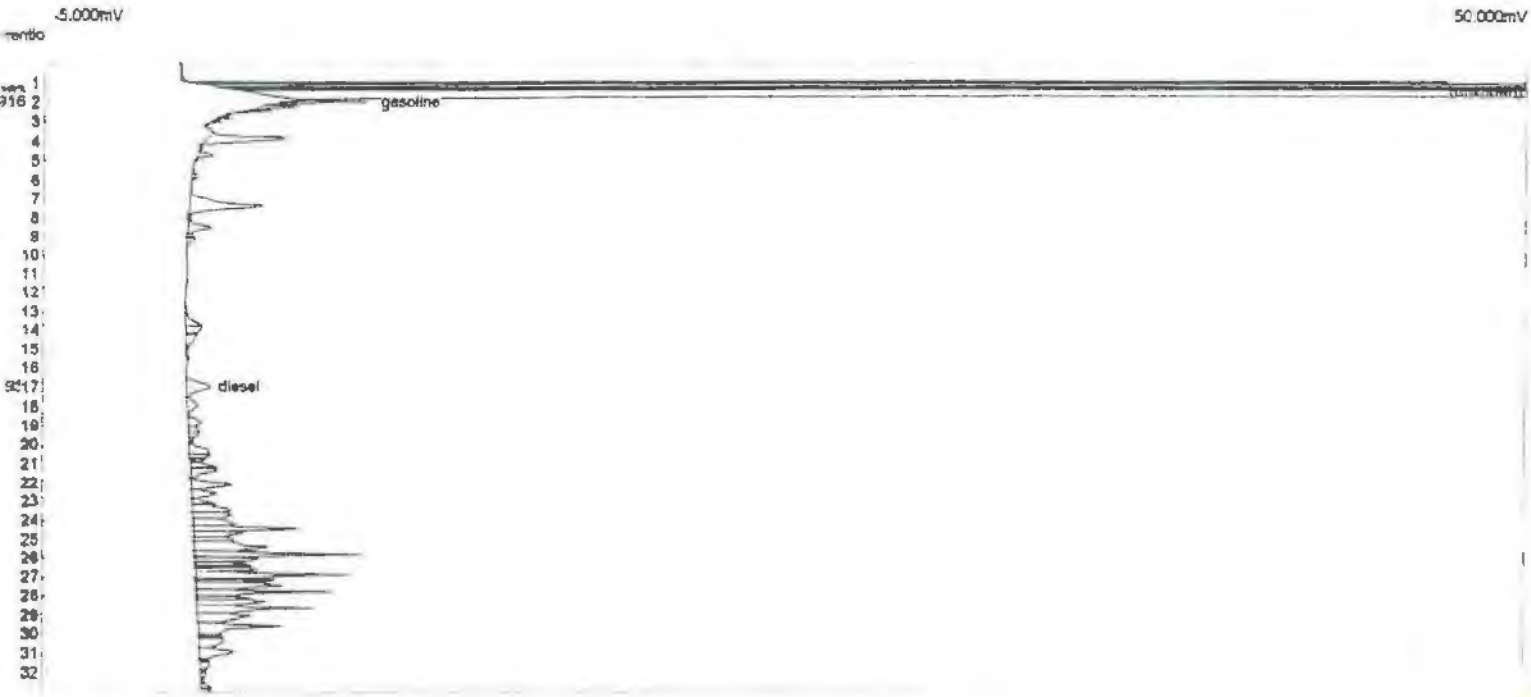
COMPOUND	SPK CON (ppm)	MS CONC (ppm)	%REC MS	MSD CONC (ppm)	%REC MSD	RPD	ACCEPTABLE RPD	ACCEPTABLE RECOVERY
TPH-GASOLINE	200	213	107%	189	94%	12%	15%	81% - 126%
TPH-DIESEL	400	392	98%	370	92%	6%	15%	74% - 131%

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

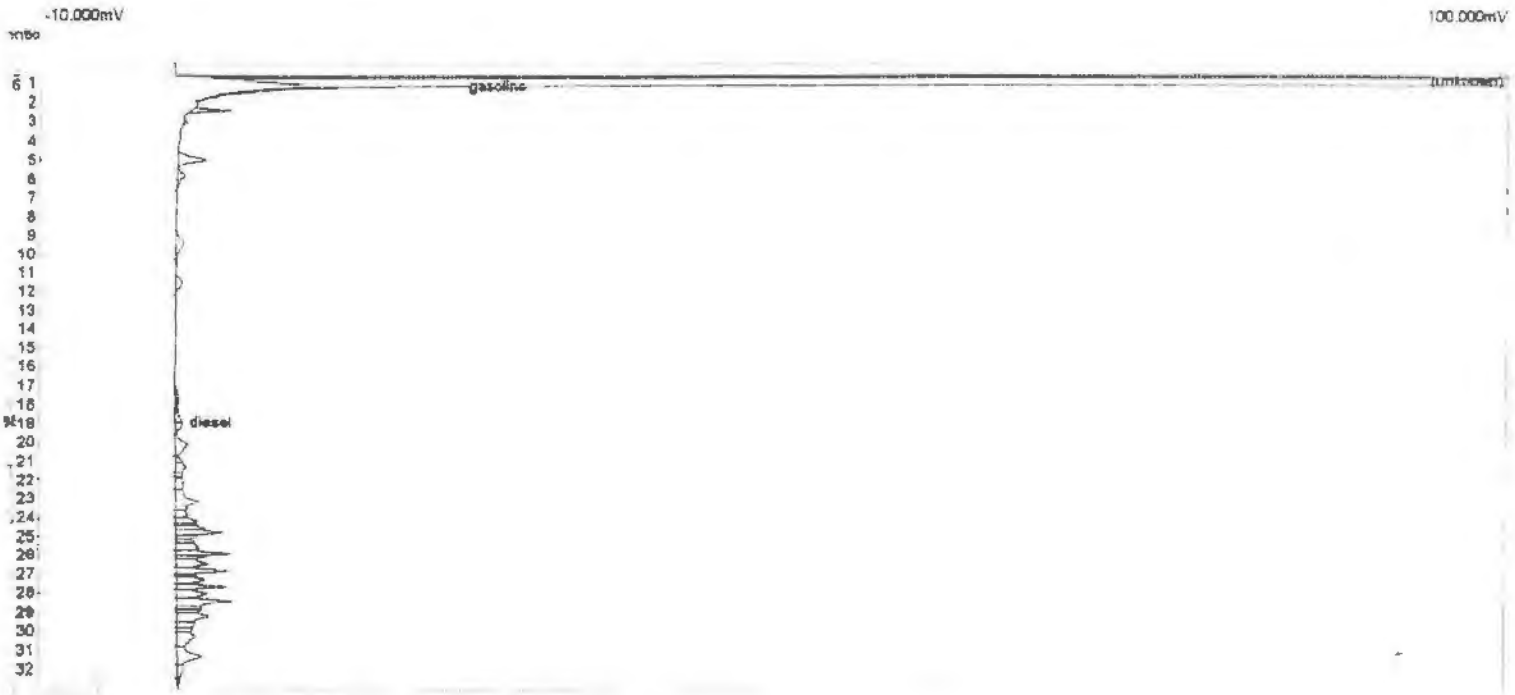
ON SITE LABS, INC
PMB 627, HC-01 BOX 29030, CAGUAS, P.R 00725
TELEPHONE (787) 720-0329 FAX 789-3858

Lab name: On Site Labs Inc
Analysis date: 03/21/2002 11:07:52
Method: EPA 8015B mod.
Lab ID: GC - 5
Description: FID2 - Ch. 2
Column: XTI-5, 30m, 0.53mm, 1.5um
Carrier: N2
Data file: 0318fb17.CHR ()
Sample: 150/300 ppm G/D open
Operator: MAP



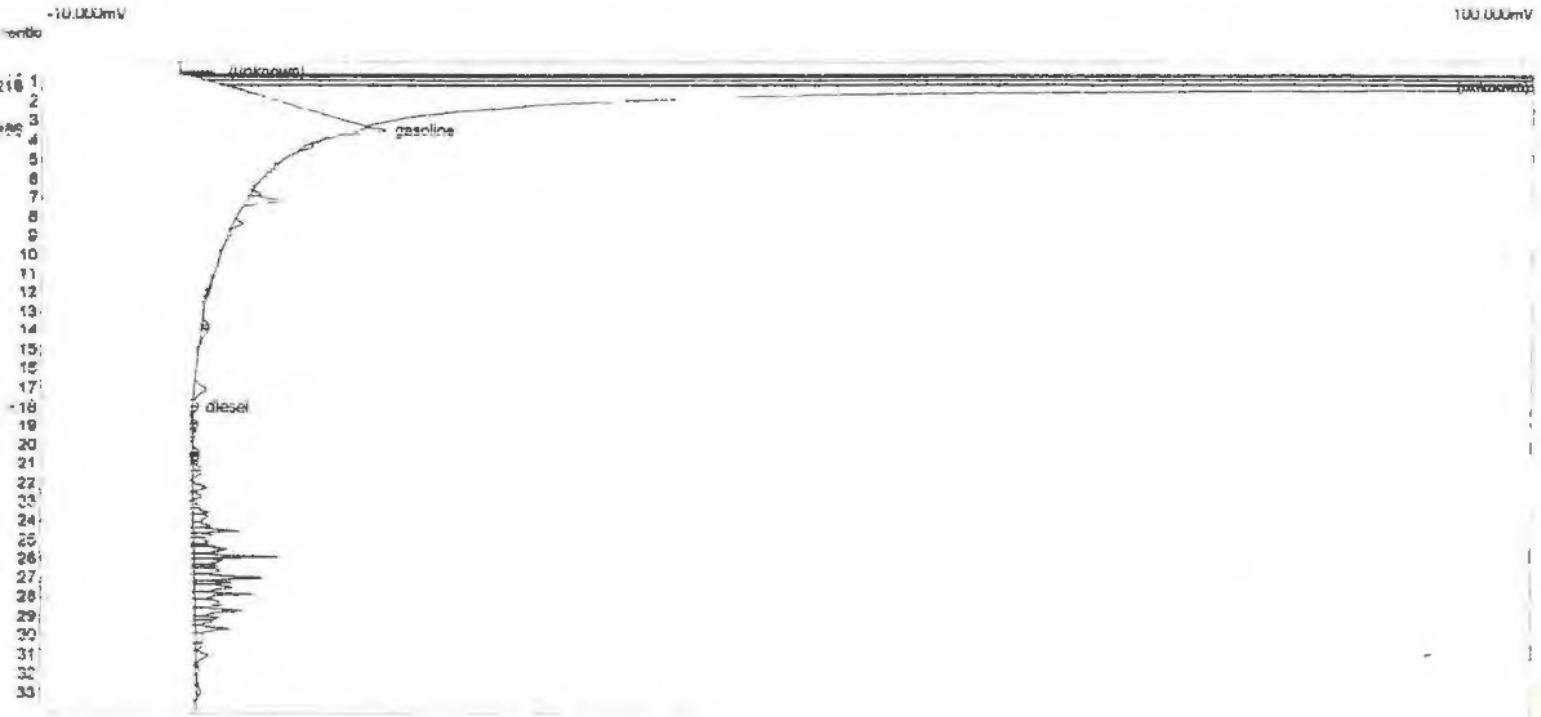
Component	Retention	Area	External	Units
soline	1.916	152.694	149.12	
sel	16.933	938.746	338.16	ppm
		1091.440	487.28	

Lab name: On Site Labs Inc
nalysis date: 03/21/2002 11:07:52
Method: EPA 8015B mod.
Lab ID: GC - 5
Description: FID 3 - Ch. 3
Column: XTI-5, 30m, 0.53mm, 1.5um
C er: N2
le: 0318fc17.CHR ()
ple: 150/300 ppm G/D open
Operator: MAP



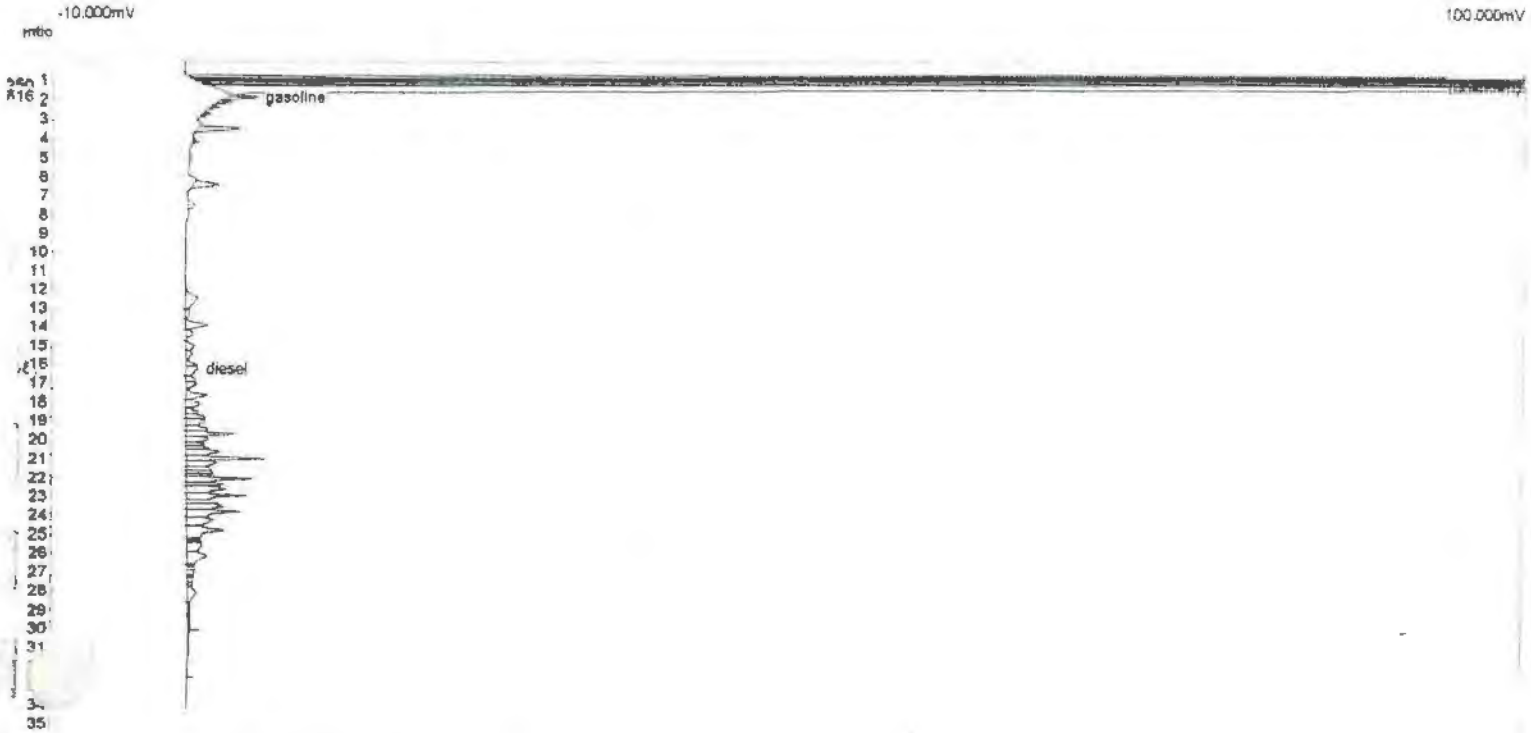
Co nent	Retention	Area	External	Units
soline	1.116	201.989	139.50	
sel	18.883	962.289	325.54	ppm
		1164.278	465.03	

Lab name: On Site Labs Inc
Analysis date: 03/21/2002 11:07:52
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: 0321fd1.CHR ()
Sample: 150/300 ppm G/D open
Operator: MAP



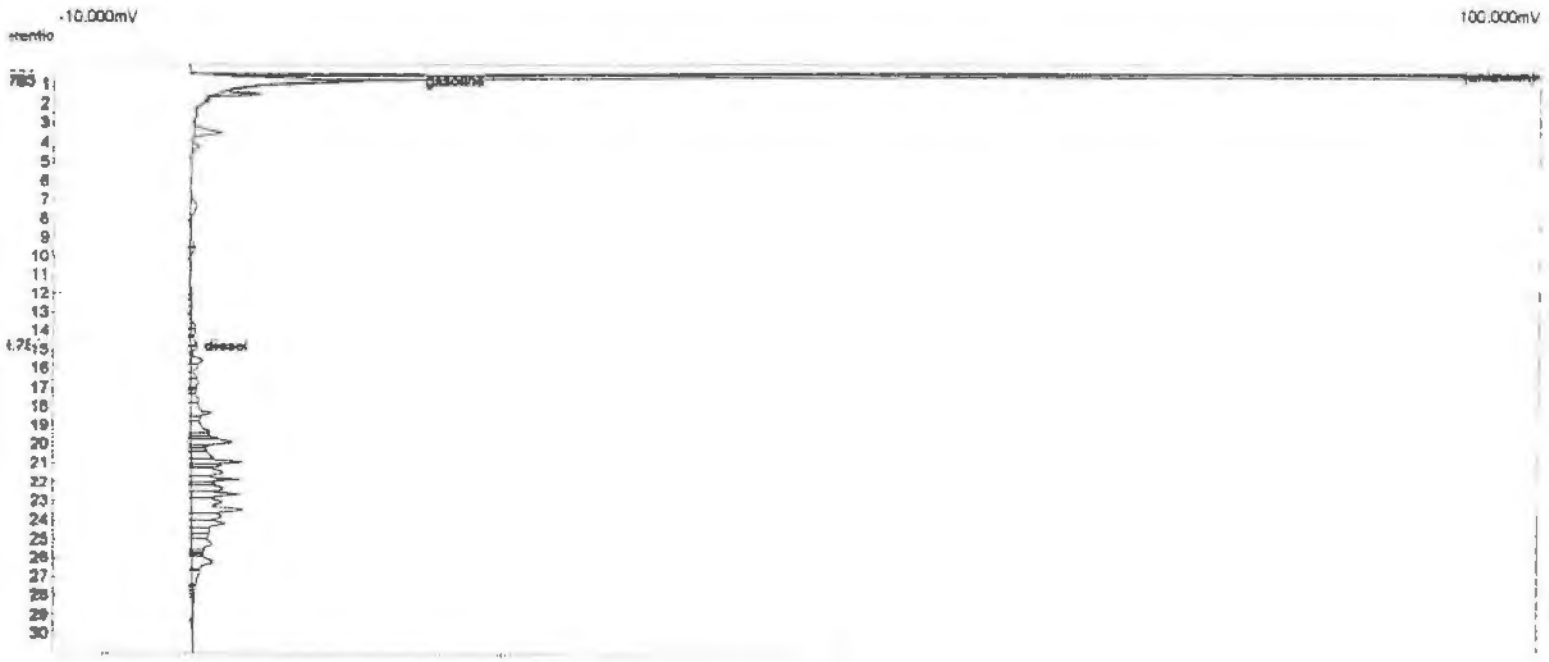
Component	Retention	Area	External	Units
soline	3.466	195.209	159.48	
esel	17.986	801.131	330.50	ppm
		996.341	489.98	

Lab name: On Site Labs Inc
Analysis date: 03/21/2002 15:08:20
Method: EPA 8015B mod.
Lab ID: GC - 5
Description: FID2 - Ch. 2
Column: XTI-5, 30m, 0.53mm, 1.5um
Carrier: N2
Data file: 0321fb8.CHR ()
Sample: 150/300 ppm G/D CLOSE
Operator: MAP



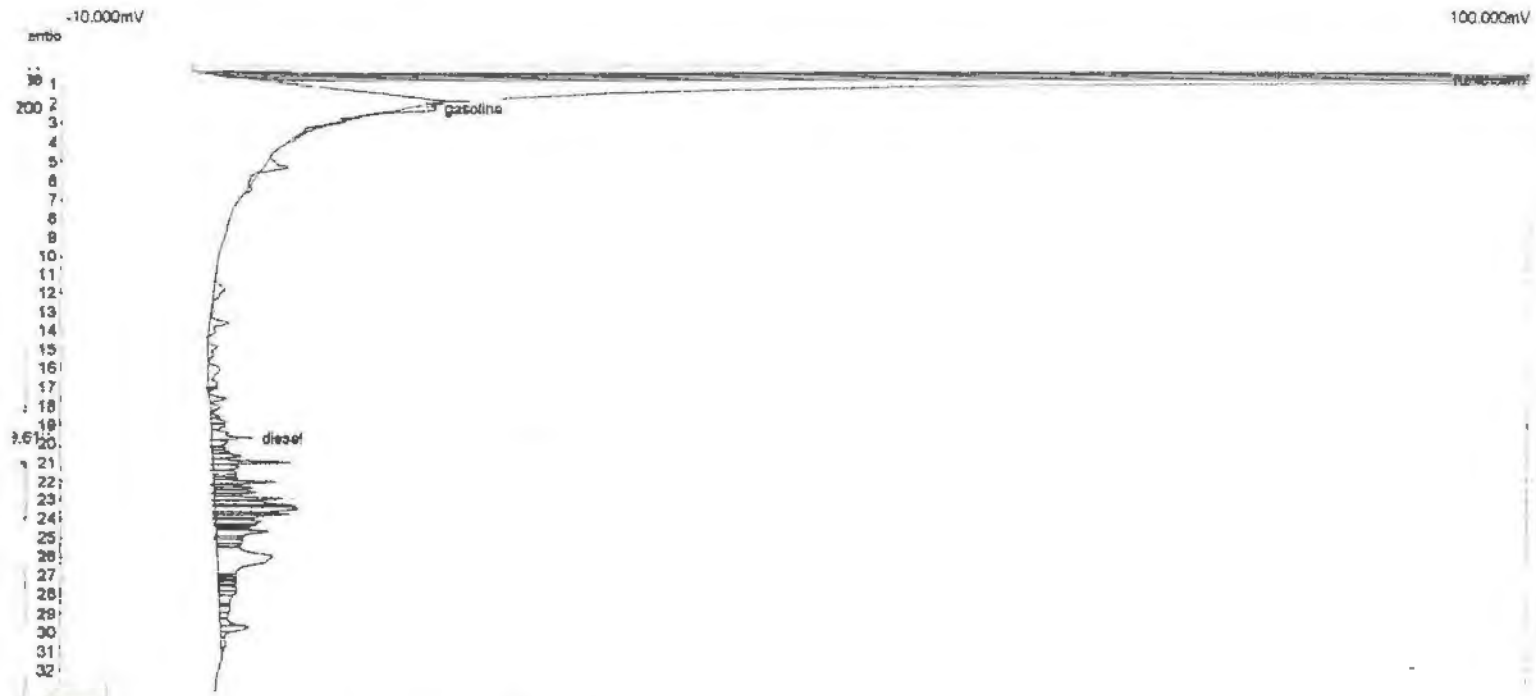
Component	Retention	Area	External	Units
gasoline	1.816	145.940	142.52	
diesel	16.183	839.476	302.40	ppm
		985.417	444.92	

Lab name: On Site Labs Inc
Analysis date: 03/21/2002 15:08:20
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: 0321fc8.CHR 0
Sample: 150/300 ppm G/D CLOSE
Operator: MAP



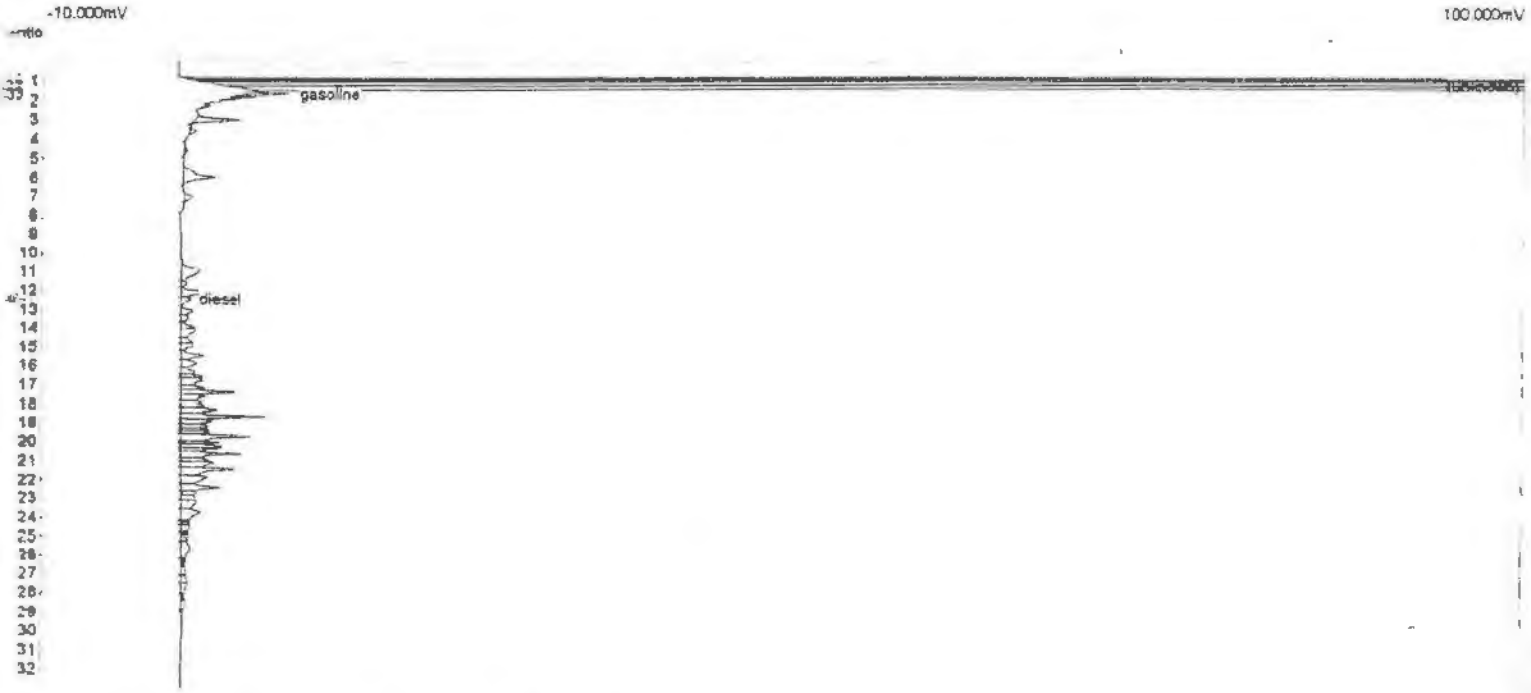
Component	Retention	Area	External	Units
asoline	0.783	190.411	131.50	
iesel	14.750	971.542	328.67	ppm
		1161.953	460.17	

Lab name: On Site Labs Inc
ıalysis date: 03/21/2002 15:08:20
Method: EPA 8015B mod.
Lab ID: GC - 5
Description: FID 4 - Ch. 4
Column: XTI-5, 30m, 0.53mm, 1.5um
ier: N2
ile: 0321fd8.CHR ()
ıple: 150/300 ppm G/D CLOSE
Operator: MAP



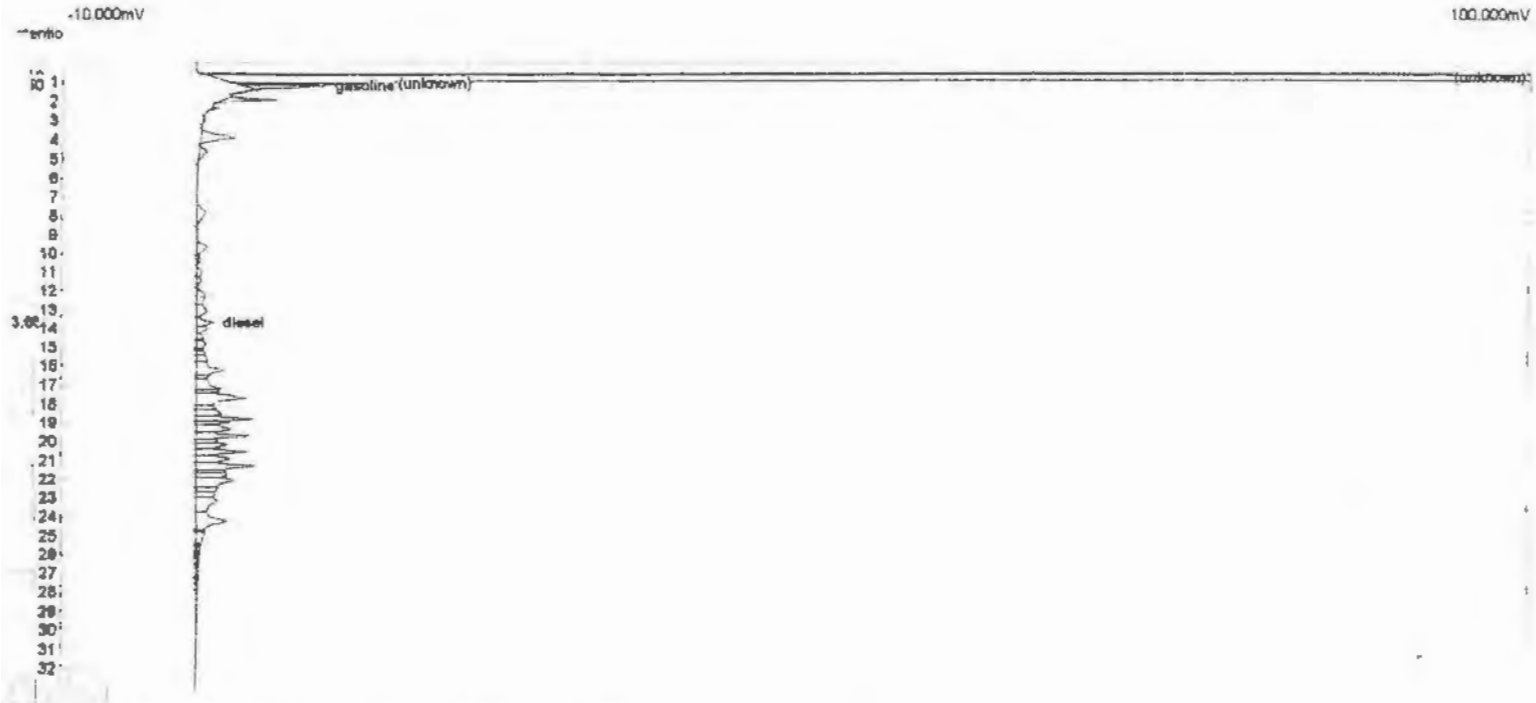
C onent	Retention	Area	External	Units
·soline	2.200	195.013	159.32	
ɜsel	19.616	729.306	300.87	ppm
		924.319	460.19	

Lab name: On Site Labs Inc
Analysis date: 03/21/2002 12:02:46
Method: EPA 8015B mod.
Lab ID: GC - 5
Description: FID2 - Ch. 2
Column: XTI-5, 30m, 0.53mm, 1.5um
Carrier: N2
Data file: 0321fb2.CHR ()
Sample: blank matrix spike
Operator: MAP



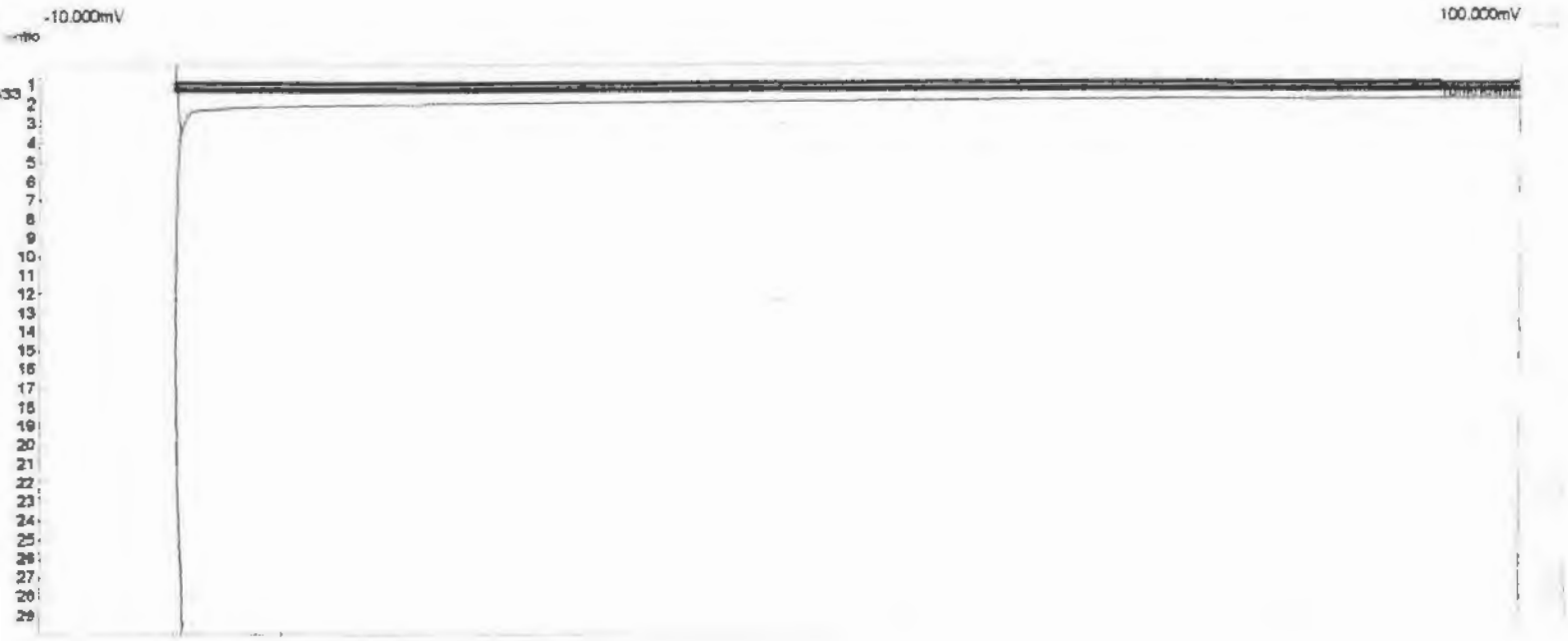
Component	Retention	Area	External	Units
soline	1.633	218.396	213.28	
sel	12.466	1089.296	392.40	ppm
		1307.691	605.67	

Lab name: On Site Labs Inc
nalysis date: 03/21/2002 12:02:46
Method: EPA 8015B mod.
Lab ID: GC - 5
Description: FID 3 - Ch. 3
Column: XTI-5, 30m, 0.53mm, 1.5um
rier: N2
file: 0321fc2.CHR ()
nple: blank matrix spike duplicat
Operator: MAP



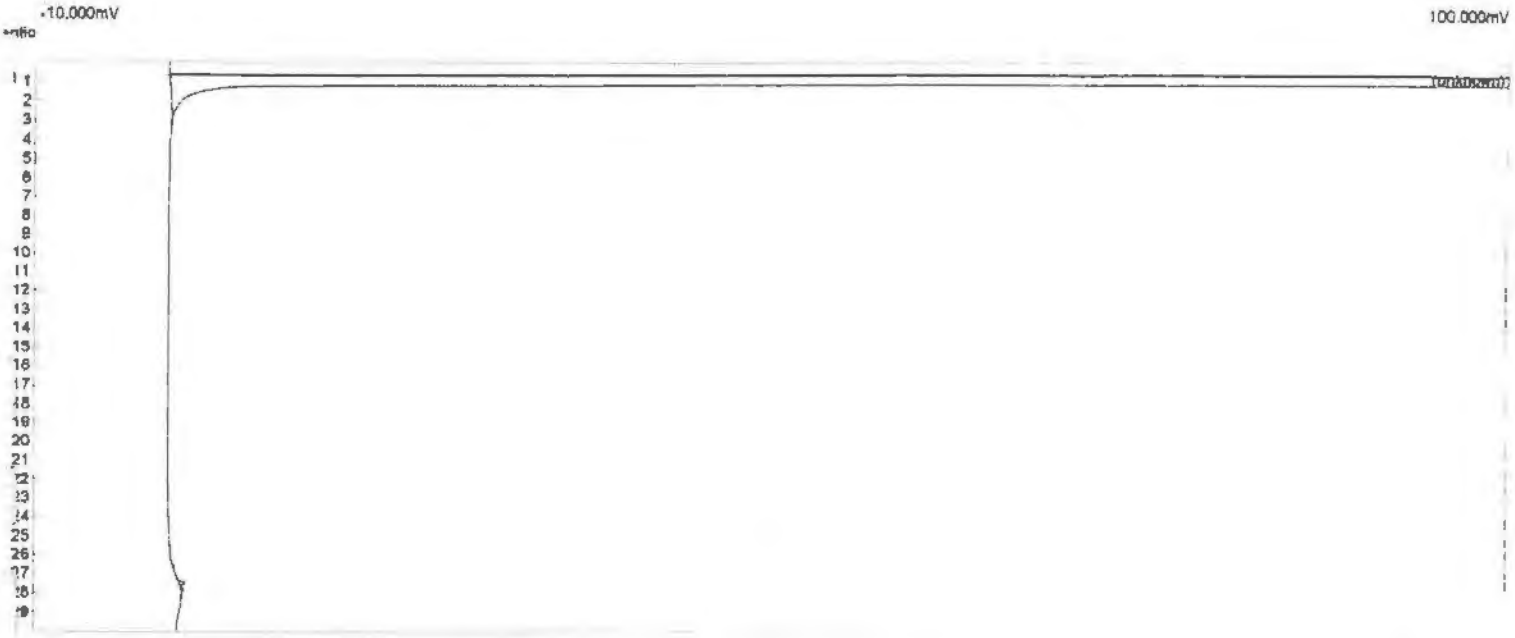
onent	Retention	Area	External	Units
asoline	1.150	273.542	188.91	
sel	13.650	1093.666	369.98	ppm
		1367.208	558.89	

Lab name: On Site Labs inc
Analysis date: 03/21/2002 12:45:13
Method: EPA 8015B mod.
Lab ID: GC - 5
Description: FID2 - Ch. 2
Column: XTI-5, 30m, 0.53mm, 1.5um
Carrier: N2
Data file: 0321fb3.CHR ()
Sample: METHOD BLANK
Operator: MAP



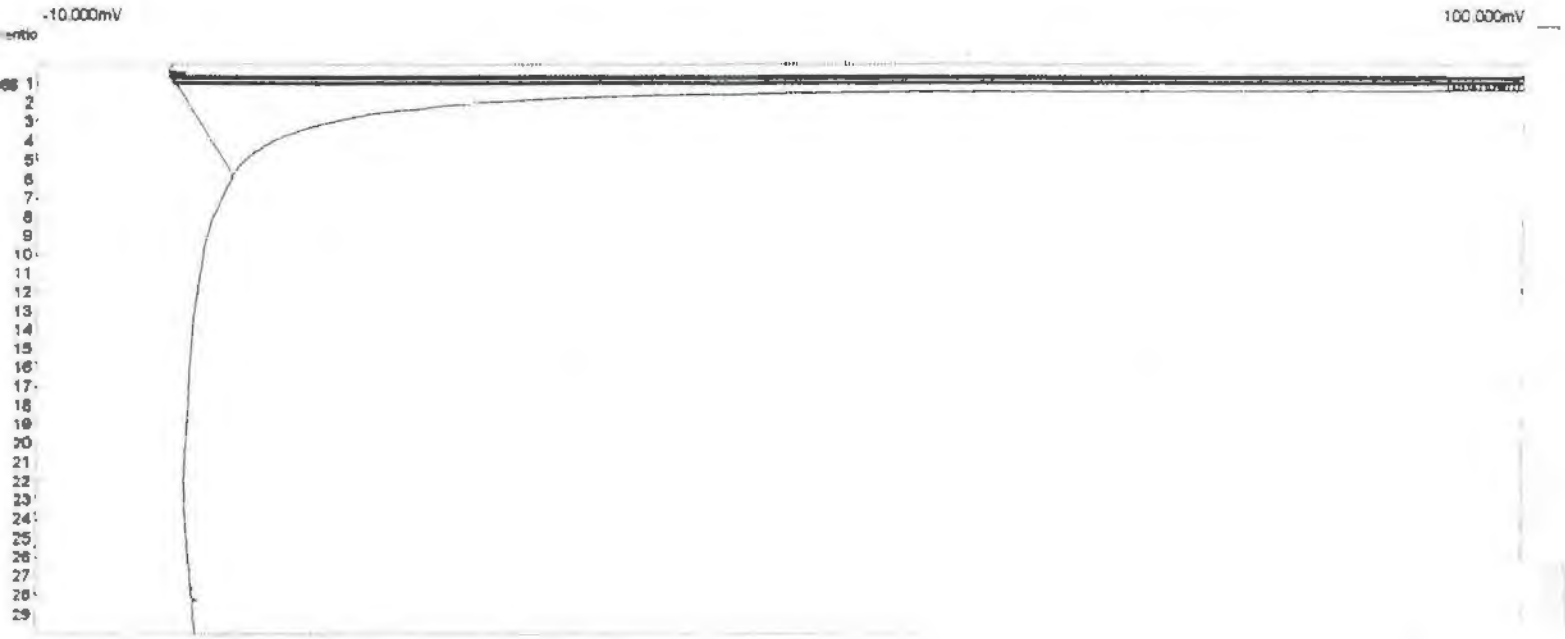
Component	Retention	Area	External	Units
		0.000	0.00	

Lab name: On Site Labs Inc
alysis date: 03/21/2002 12:45:13
Method: EPA 8015B mod.
Lab ID: GC - 5
Description: FID 3 - Ch. 3
Column: XTI-5, 30m, 0.53mm, 1.5um
C[illegible]er: N2
[illegible]e: 0321fc3.CHR ()
[illegible]ple: METHOD BLANK
Operator: MAP



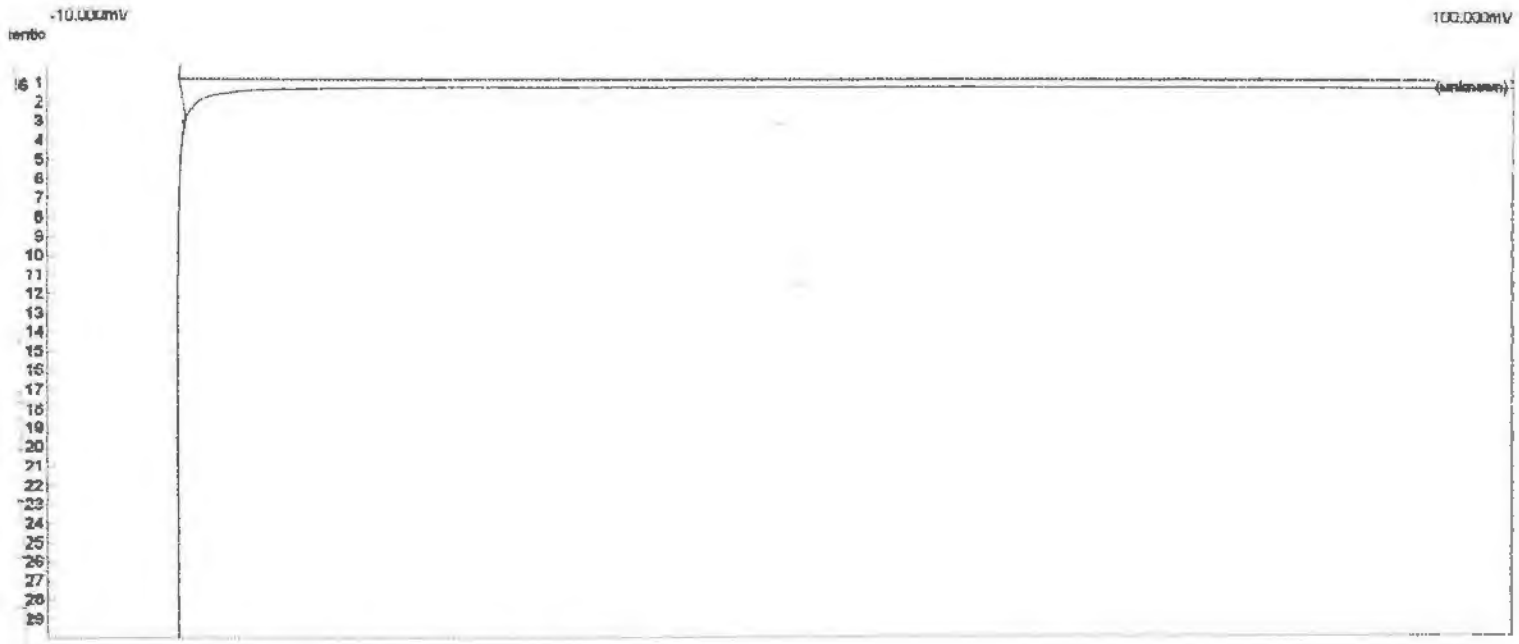
Component	Retention	Area	External	Units
		0.000	0.00	

Lab name: On Site Labs Inc
Analysis date: 03/21/2002 12:45:13
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: 0321fd3.CHR ()
Sample: METHOD BLANK
Operator: MAP



Component	Retention	Area	External	Units
		0.000	0.00	

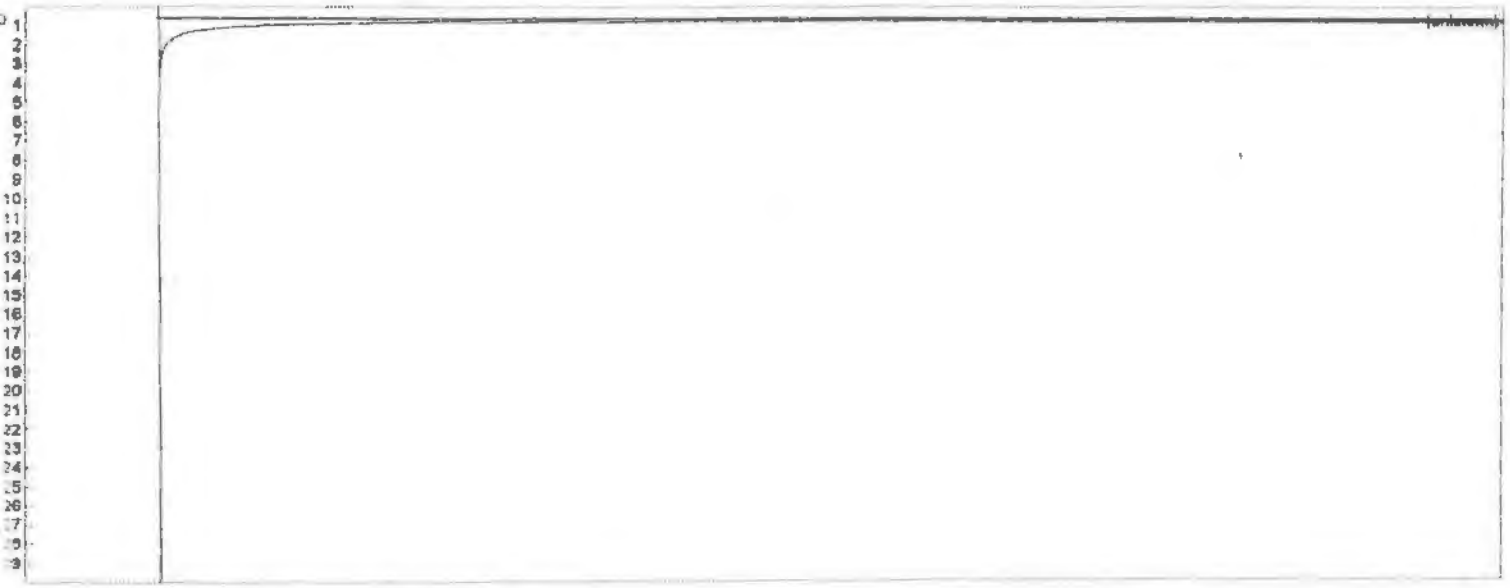
Lab name: On Site Labs Inc
nalysis date: 03/21/2002 13:21:35
Method: EPA 8015B mod.
Lab ID: GC - 5
Description: FID2 - Ch. 2
Column: XTI-5, 30m, 0.53mm, 1.5um
Carrier: N2
Data file: 0321fb4.CHR ()
Sample: ILA029/0318CH2M-3
Operator: MAP



Component	Retention	Area	External	Units
		0.000	0.00	

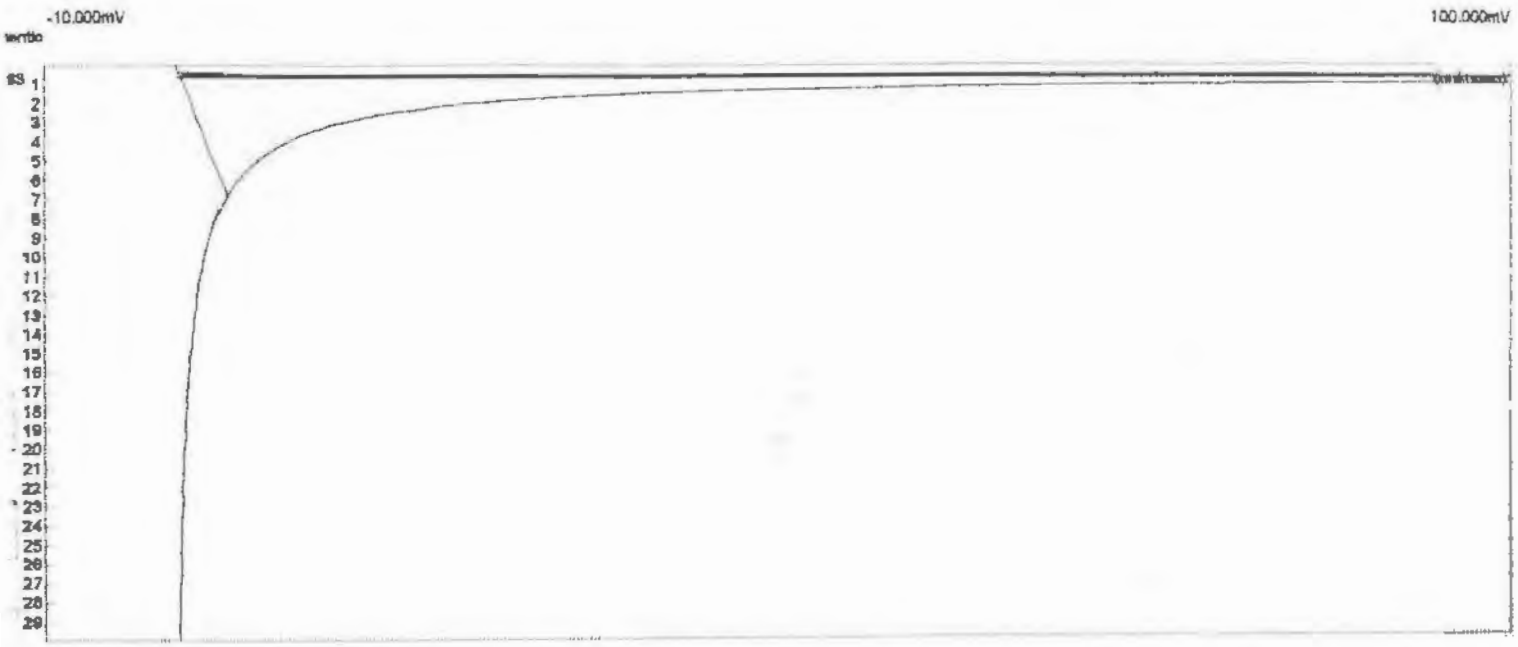
alysis date: 03/21/2002 13:21:35
Method: EPA 8015B mod.
Lab ID: GC - 5
Description: FID 3 - Ch. 3
Column: XTI-5, 30m, 0.53mm, 1.5um
Carrier: N2
Data file: 0321fc4.CHR ()
Sample: ILA030/0318CH2M-3
Operator: MAP

-10.000mV 100.000mV



omponent	Retention	Area	External	Units
		0.000	0.00	

Lab name: On Site Labs Inc
Analysis date: 03/21/2002 13:21:35
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]file: 0321fd4.CHR ()
[illegible]ile: JLA032/0318CH2M-3
[illegible]tor: MAP



Component	Retention	Area	External	Units
		0.000	0.00	

QA/QC REPORT - CALIBRATION DATA

QSL Project #02I0318CH2M-3
DAILY CALIBRATION DATE: 03/21/02

CH2M HILL PROJECT NO. 167722.FI.FQ
PROJECT NAME: RRNAS SITES 1970 AND 88, 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%	435.45	87.09	1.5%	607.25	86.75	1.1%
TOLUENE	P&T - GC3	0.5 - 75.0	81.33	8.2%	410.30	82.06	0.9%	585.47	83.64	2.8%
ETHYLBENZENE	P&T - GC3	0.5 - 75.0	65.84	13.6%	308.07	61.61	6.4%	463.54	66.22	0.6%
m&p-XYLENES	P&T - GC3	1.0 - 150	98.46	16.8%	983.32	98.33	0.1%	1386.49	99.04	0.6%
o-XYLENES	P&T - GC3	0.5 - 75.0	73.19	17.4%	370.11	74.02	1.1%	532.58	76.08	4.0%

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

QA/QC REPORT - MS/MSD DATA

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

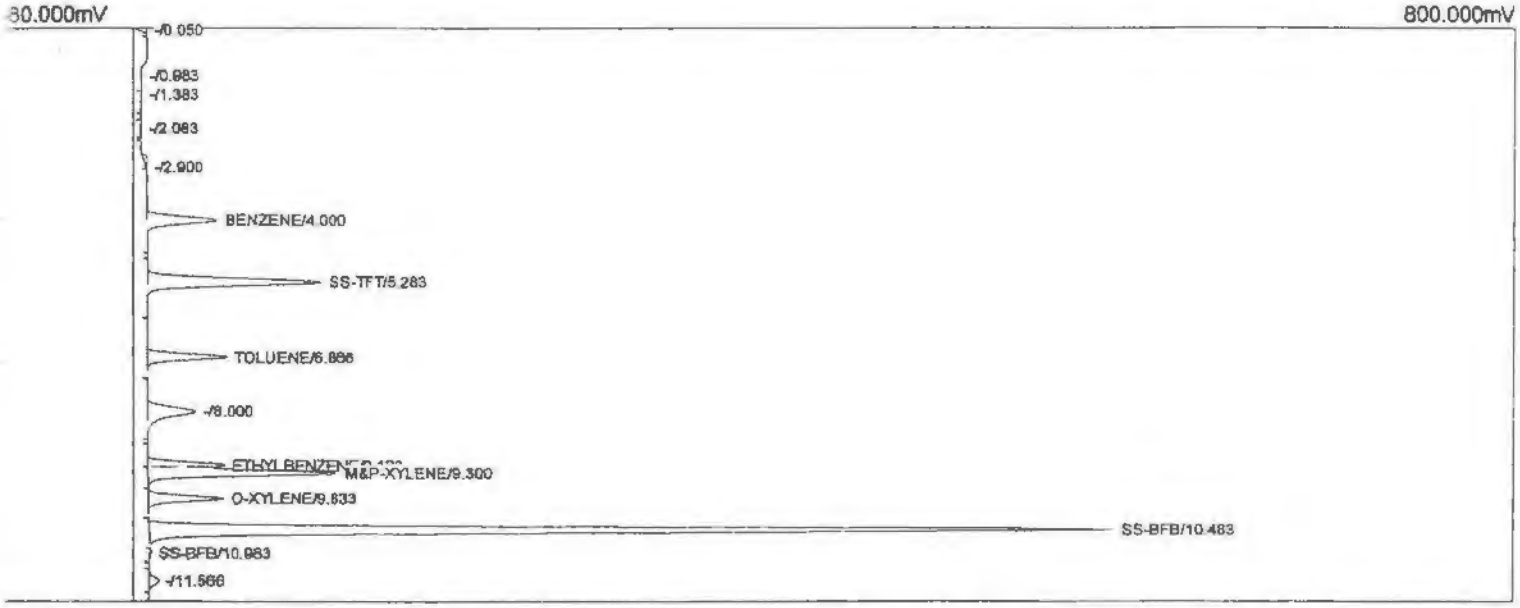
OSL PROJECT #02I0318CH2M-3 | CH2M HILL PROJECT NO 167722.FI FQ
DATE: 03/21/02 | PROJECT NAME: RRNAS SITES 1970 AND 88

COMPOUND	SPK CONC (ppb)	MS CONC (ppb)	%REC MS	MSD CONC (ppb)	%REC MSD	RPD	ACCEPTABLE RPD	ACCEPTABLE RECOVERY
BENZENE	7.0	7.1	102%	6.9	99%	3%	20%	82% - 117%
TOLUENE	7.0	7.3	105%	7.0	100%	5%	20%	87% - 120%
ETHYLBENZENE	7 0	7.0	100%	6 6	94%	6%	20%	83% - 131%
TOTAL XYLENES	21 0	21 1	100%	21 0	100%	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

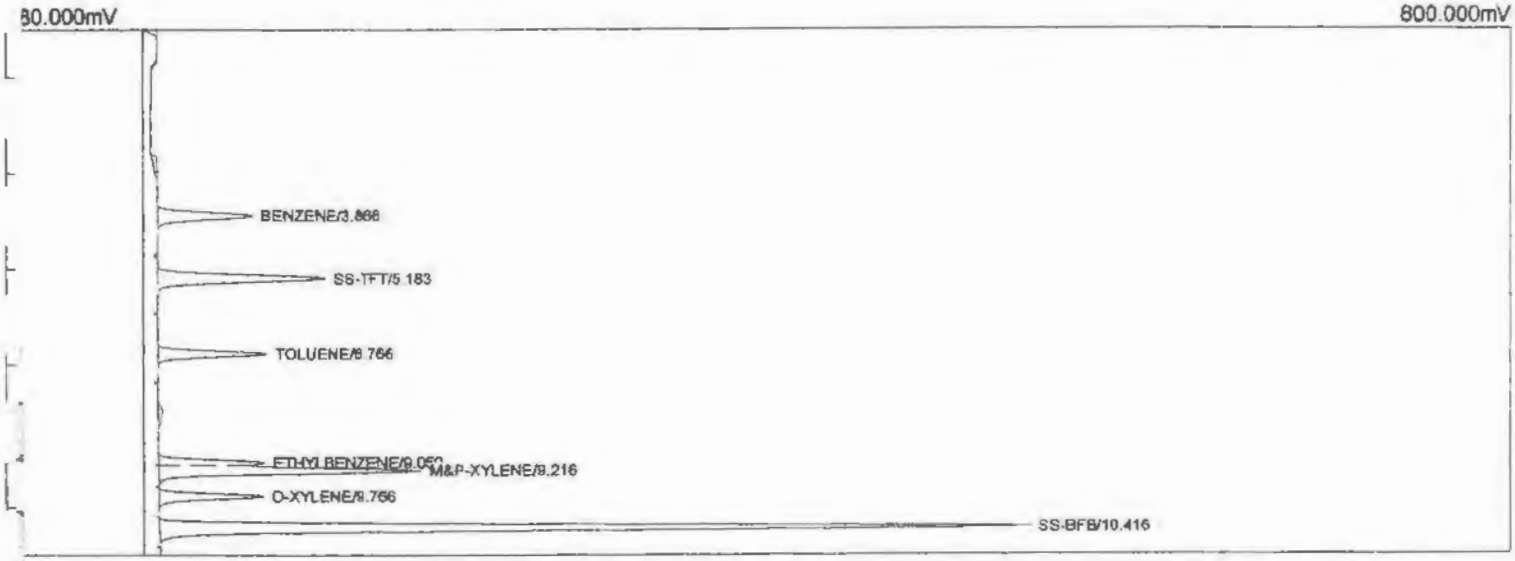
ANALYSES PERFORMED BY MARCO A PEDRAZA
DATA REVIEWED BY KEVIN SHELBURNE

alysis date: 03/21/2002 10:08:11
Method: EPA 8020A mod.
Lab ID: GC-1
Description: PID-CHANNEL 1
Column: Rtx-5 30m, .53mm, 5.0um
Carrier: Nitrogen 1 kg/cm3
Data file: 0213P34.CHR ()
Sample: 5 ppb BTEX OPEN STD
Operator: MAP



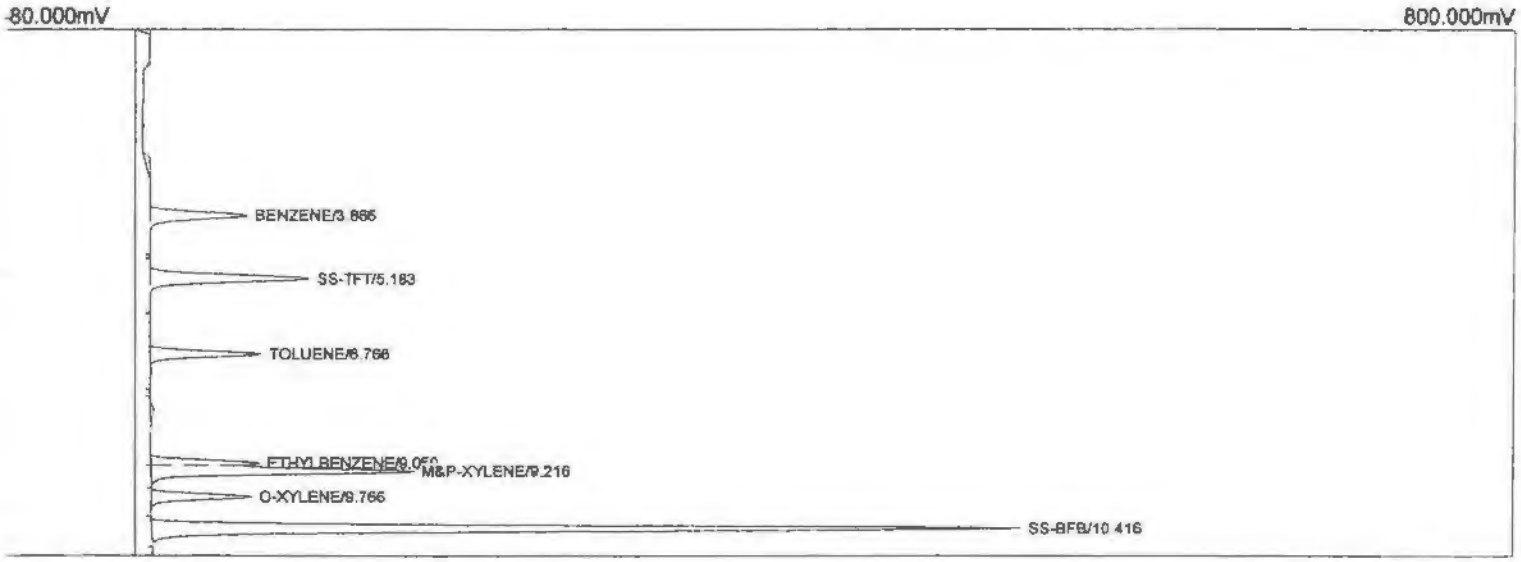
Component	Retention	Area	External	Internal	Units
NZENE	4.000	435.448	5.08	5.0763	ppb
TFT	5.283	1087.754	12.16	12.1645	ppb
LUENE	6.866	410.303	5.04	5.0449	ppb
HYLBENZENE	9.133	308.065	4.68	4.6790	ppb
P-XYLENE	9.300	983.321	9.99	9.9870	ppb
YLENE	9.833	370.108	5.06	5.0568	ppb
BFB	10.483	4485.610	19.67	19.6737	ppb
BFB	10.983	7.084	0.03	0.0311	ppb
		8087.692	61.71	61.7134	

nalysis date: 03/21/2002 14:37:03
Method: EPA 8020A mod.
Lab ID: GC-3-P&T
Description: PID-CHANNEL 1
Column: Rtx-5, 30m,ID.53mm,5um
Carrier: Nitrogen 1 kg/cm3
Data file: C:\PEAKWIN\0321P11.CHR ()
le: 7 ppb BTEX CLOSE STD
tor: MAP



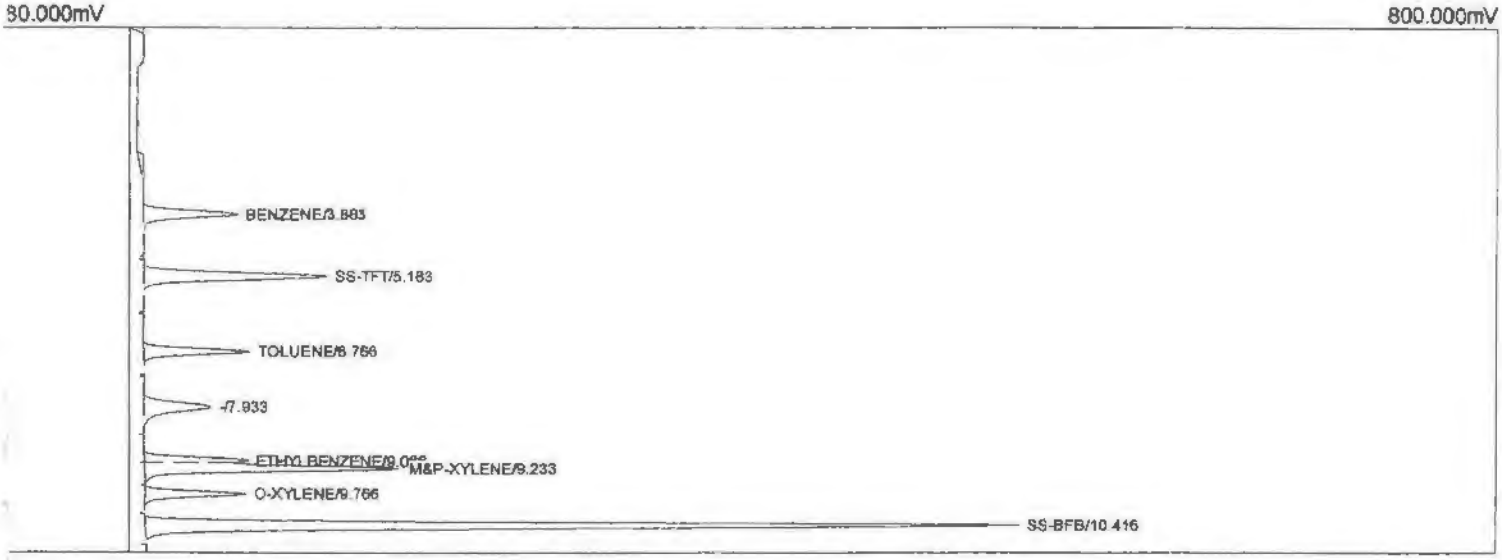
Component	Retention	Area	External	Internal	Units
IZENE	3.866	607.250	7.08	7.0792	ppb
TFT	5.183	1090.307	12.19	12.1931	ppb
OLUENE	6.766	585.474	7.20	7.1987	ppb
THYLBENZENE	9.050	463.541	7.04	7.0404	ppb
NE	9.216	1386.492	14.08	14.0818	ppb
	9.766	532.578	7.28	7.2766	ppb
S-BFB	10.416	4226.782	16.54	16.5385	ppb
		8892.424	73.41	73.4084	

alysis date: 03/21/2002 13:27:02
Method: EPA 8020A mod.
Lab ID: GC-3-P&T
Description: PID-CHANNEL 1
Column: Rtx-5, 30m,ID.53mm,5um
Carrier: Nitrogen 1 kg/cm3
Data file: 0321P9.CHR ()
Sample: JLA032matrix spike
Operator: MAP



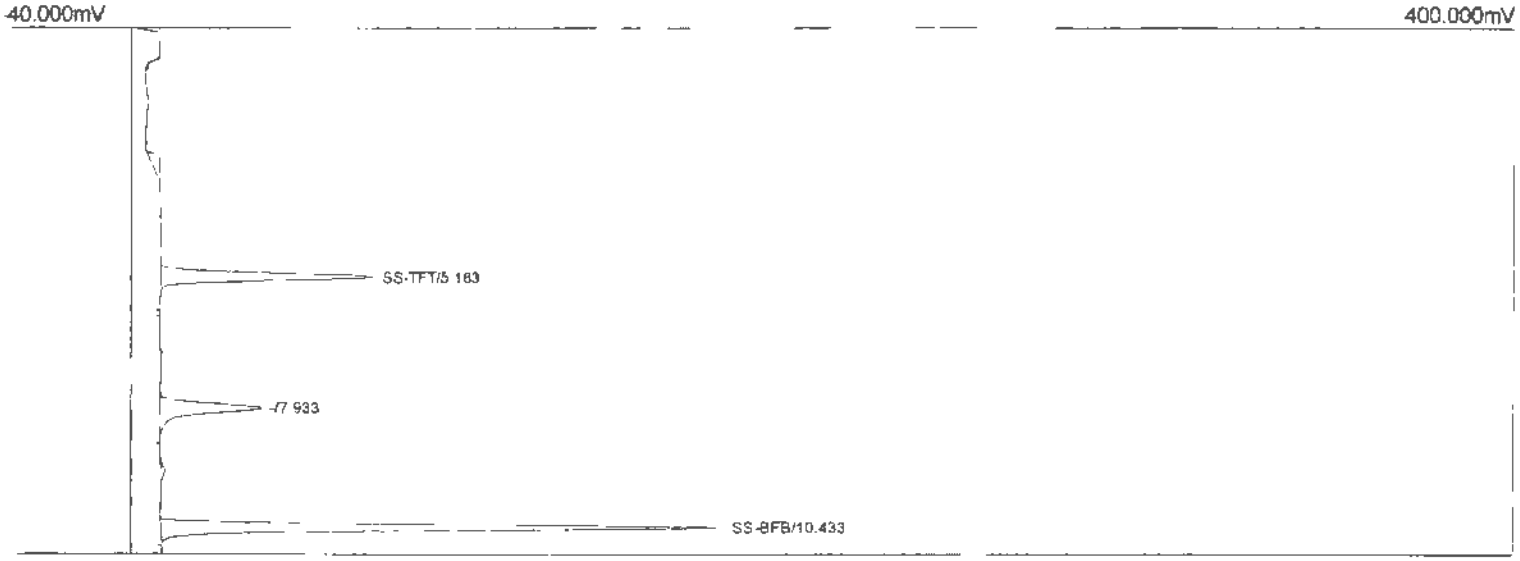
Component	Retention	Area	External	Internal	Units
NZENE	3.866	611.165	7.12	7.1248	ppb
-TFT	5.183	1017.734	11.38	11.3815	ppb
LUENE	6.766	596.074	7.33	7.3291	ppb
HYLBENZENE	9.050	459.167	6.97	6.9740	ppb
P-XYLENE	9.216	1396.044	14.18	14.1788	ppb
YLENE	9.766	505.144	6.90	6.9018	ppb
-BFB	10.416	4233.215	18.57	18.5667	ppb
		8818.543	72.46	72.4567	

Lab name: On Site Labs Inc.
alysis date: 03/21/2002 14:17:33
Method: EPA 8020A mod.
Lab ID: GC-3-P&T
Description: PID-CHANNEL 1
Column: Rbx-5, 30m,ID.53mm,5um
Carrier: Nitrogen 1 kg/cm3
Data file: 0321P10.CHR ()
S: JLA032matrix spike duplica
C: MAP



Component	Retention	Area	External	Internal	Units
IZENE	3.883	594.572	6.93	6.9314	ppb
TFT	5.183	1175.886	13.15	13.1501	ppb
LUENE	6.766	569.652	7.00	7.0042	ppb
HYLB ENE	9.066	433.808	6.59	6.5888	ppb
-X E	9.233	1375.638	13.97	13.9715	ppb
YL	9.766	514.662	7.03	7.0319	ppb
-BFB	10.416	4271.073	18.73	18.7328	ppb
		8935.291	73.41	73.4107	

alysis date: 03/21/2002 10:46:29
Method: EPA 8020A mod.
Lab ID: GC-1
Description: PID-CHANNEL 1
Column: Rtx-5 30m, .53mm, 5.0um
Carrier: Nitrogen 1 kg/cm3
Data file: 0321P2.CHR ()
Sample: METHOD BLANK
Operator: MAP



Component	Retention	Area	External	Internal	Units
TFT	5.183	678.241	7.58	7.5849	ppb
-BFB	10.433	1381.106	6.06	6.0575	ppb
		2059.347	13.64	13.6424	

LABORATORY QA/QC

CH2M HILL PROJECT NO. 167722.FI.FQ

OSL Project #02I0318CH2M-3

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

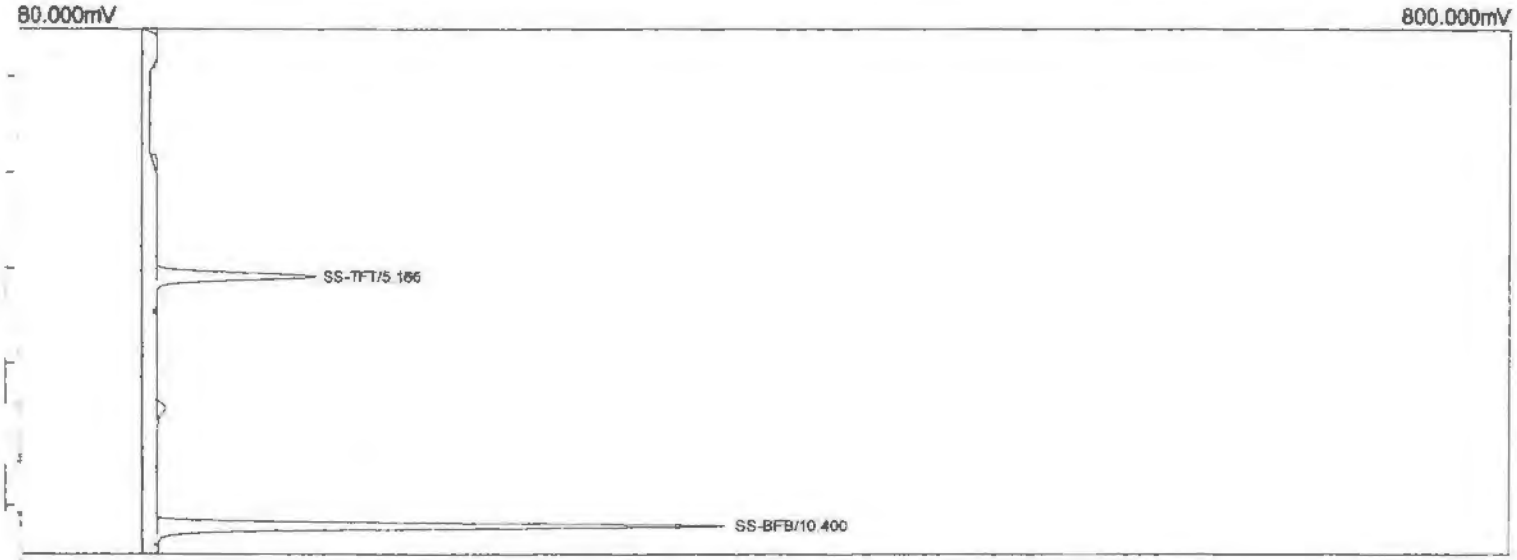
SAMPLE NUMBER	DATE ANALYZED	BENZENE (µg/L)	TOLUENE (µg/L)	ETHYL-BENZENE (µg/L)	TOTAL XYLENES (µg/L)
JLA032	03/21/02	ND	ND	ND	ND
JLA032 DUP	03/21/02	ND	ND	ND	ND
DETECTION LIMIT (µg/L)		1.0	1.0	1.0	3.0

"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

alysis date: 03/21/2002 11:13:49
Method: EPA 8020A mod.
Lab ID: GC-3-P&T
escription: PID-CHANNEL 1
Column: Rtx-5, 30m,ID.53mm,5um
Carrier: Nitrogen 1 kg/cm3
Data file: 0321P3.CHR ()
Sample: ILA029/0318CH2M-3
Operator: MAP

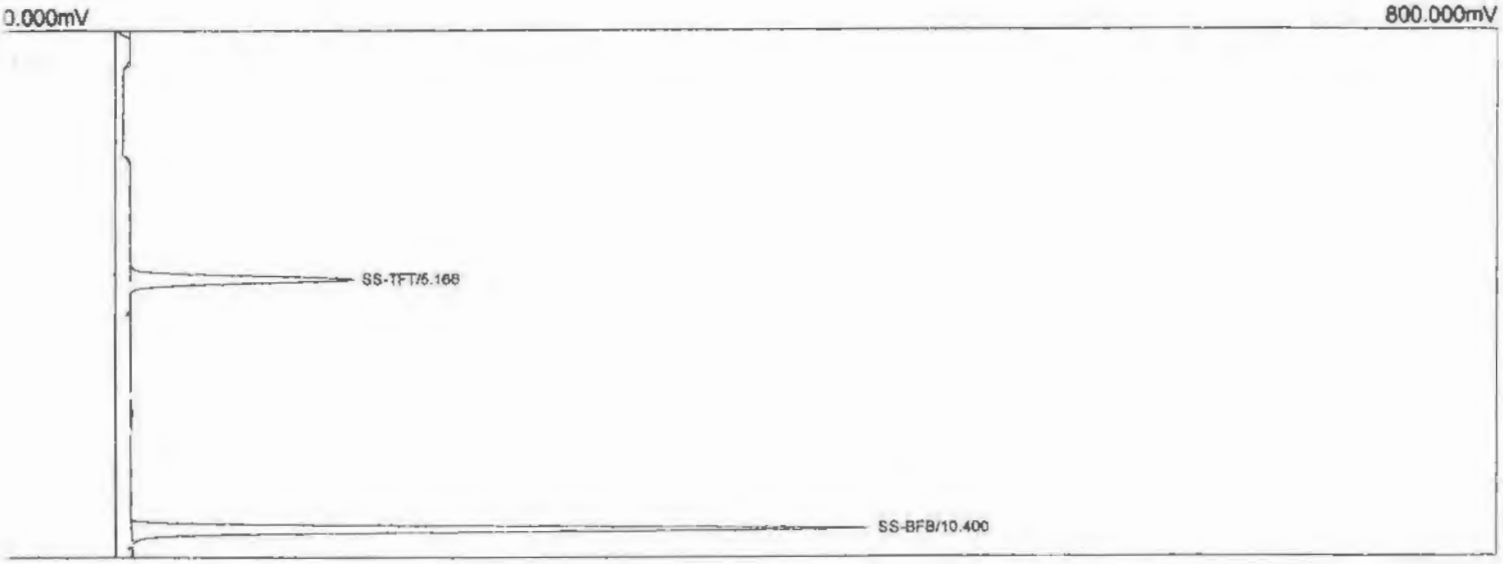
omponent	Retention	Area	External	Internal	Units
FT	5.183	1260.788	14.10	14.0996	ppb
FB	10.400	3056.968	13.41	13.4078	ppb
		4317.756	27.51	27.5074	

nalysis date: 03/21/2002 11:39:43
Method: EPA 8020A mod.
Lab ID: GC-3-P&T
Description: PID-CHANNEL 1
Column: Rtx-5, 30m,ID.53mm,5um
Carrier: Nitrogen 1 kg/cm3
Data file: 0321P4.CHR ()
S e: ILA030/0318CH2M-3
(or: MAP



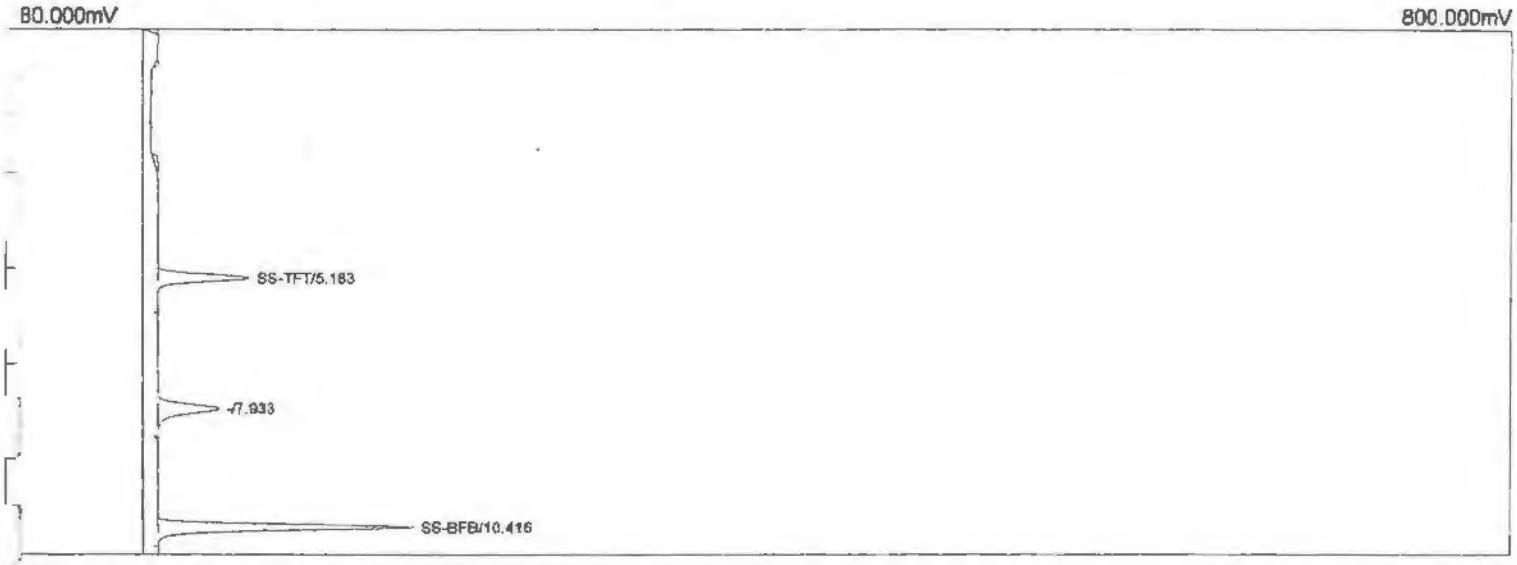
Component	Retention	Area	External	Internal	Units
TFT	5.166	1028.918	11.51	11.5066	ppb
BFB	10.400	2827.221	12.40	12.4001	ppb
		3856.139	23.91	23.9067	

ysis date: 03/21/2002 11:57:54
Method: EPA 8020A mod.
Lab ID: GC-3-P&T
escription: PID-CHANNEL 1
Column: Rtx-5, 30m,ID.53mm,5um
Carrier: Nitrogen 1 kg/cm3
Data file: 0321P5.CHR ()
Sample: JLA032/0318CH2M-3
Operator: MAP



mponent	Retention	Area	External	Internal	Units
T	5.166	1423.546	15.92	15.9198	ppb
B	10.400	3543.362	15.54	15.5411	ppb
		4966.908	31.46	31.4608	

Method: EPA 8020A mod.
Lab ID: GC-3-P&T
Description: PID-CHANNEL 1
Column: Rtx-5, 30m,ID.53mm,5um
Carrier: Nitrogen 1 kg/cm3
Data file: 0321P6.CHR ()
S le: JLA032/0318CH2M-3 DUP
or: MAP



Component	Retention	Area	External	Internal	Units
TFT	5.183	601.646	6.73	6.7283	ppb
BFB	10.416	1348.534	5.91	5.9146	ppb
		1950.180	12.64	12.6429	