October 16, 2000

Oct 17 8 05 AM '00

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SEI No. 001134-R

RE: Site Investigation Report for the Olde Windsor Apartments in Windsor, Vermont

Dear Sue:

Please find enclosed Stone Environmental Inc.'s Site Investigation Report for the Olde Windsor Apartments in Windsor, Vermont. I have sent a copy of this report to Mike Smith at the State of Vermont DEC. Please review this document and call me with questions.

Sincerely yours,

STONE ENVIRONMENTAL, INC.

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SITE INVESTIGATION REPORT
Olde Windsor Apartments
Windsor, Vermont

SEI PROJECT # 00-1134

Prepared for:

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EXECUTIVE SUMMARY

During the summer of 2000 Stone Environmental performed a site investigation at the Olde Windsor Apartments in Windsor, Vermont. The investigation was intended to assess the following issues: the condition and contents of a 20,000 gallon underground storage tank (UST); the relationship between contamination located at the tank and an area beside a brook approximately 350 feet away; the distribution of the contamination (fuel oil and pentachlorophenol) in three dimensions and; the hydrogeology of the site and how it may affect contaminant transport. The UST reportedly experienced at least two catastrophic failures, resulting in the overland flow of fuel to the Mill Brook which is located 350 feet away.

The first part of this investigation consisted of non-aqueous phase liquid (NAPL) sampling and analysis and a tank investigation. Although NAPL was not present in the UST, samples were collected in several areas between the UST and the bank of Mill Brook where the overland flow was anticipated to have reached. Two and a half feet of NAPL was present in MW-11at the time of this investigation; this well was reported to have only sheens present in the past. Analyses of the NAPL samples indicate that the contamination found in MW-11 (located near the UST area) appears to be of the same nature (#2 fuel oil) as the contamination found in a sample collected beside Mill Brook. Analytical results also suggest that there are two distinct classes of petroleum contamination (#2 fuel oil and a heavier #4 or #6 oil) present in the area immediately north of Mill Brook. Also, the presence of several biomarking compounds (i.e. prystane and phytane) in these samples indicates that this contamination does not contain a significant amount of kerosene. An inspection of the tank's interior determined that no residual fuel was present and the tank was still structurally intact. After notifying the State of Vermont Site Management Section of these findings, it was decided to close the tank in place by completely filling it with a cement slurry.

The second part of the investigation consisted of soil coring, logging and sampling at 13 locations along with on-site analyses of 50 samples for total petroleum hydrocarbons (TPH) and 30 samples for pentachlorophenol (PCP). The results of the soil coring program indicate the following in regards to contaminant distribution: 1) the TPH contamination is present as a narrow band of non-aqueous phase liquid (NAPL) within a layer of fine silts and sands; 2) the fine silt and sands are below what appears to be buried construction material (i.e. wood, bricks and coal) and is therefore believed to be the ground surface at the time(s) of the fuel release; 3) the width of the TPH contamination is fairly narrow (less than 50 feet) in the area where the spill is believed to have originated, becoming approximately 150 feet wide in the area beside Mill Brook; 4) a region of relatively uncontaminated soil exists between the two zones (UST area and the bank of Mill Brook) of heavily contaminated soils and; 5) the extent of pentachlorophenol contamination is limited to the southern portion where this fuel spill most probably came in contact with the wastes associated with a former wood-dipping operation.

The second phase of this investigation involved the installation of monitoring wells at seven locations throughout this site and the installation and sampling of three mini-piezometers in Mill Brook. The monitoring well measurements show a relatively flat water table within the central portion of the investigated area that is believed to be a hydraulic divide. This divide appears to be at the center of a radial flow regime with groundwater leaving the site in three general directions: 1) to the north towards Lake Runnemede; 2) to the east towards the Connecticut River and; 3) to the south towards Mill Brook. Sensitive receptors at this site include Mill Brook and Lake Runnemede which, is within a water supply wellhead protection area. Existing residential water supply wells are all outside a ½ mile radius from this site are therefore not considered to be receptors for this contamination. Water levels and analysis of the groundwater at the three mini-piezometers indicate

the brook is being recharged by groundwater from the surrounding area and that semi-volatile organic contamination (above the laboratory's detection limit) is not reaching Mill Brook.
As a result of this investigation, it has been determined that a significant amount of NAPL contamination remains at this site however, several factors appear to inhibit the contamination from migrating very far from where it was originally deposited. These factors include: 1) apparently low solubility of the NAPL constituents (semi-volatile organic compounds) contaminants: 2) the relatively low hydraulic conductivity of the silts and fine sands in the contaminated area; 2) a high degree of sorption to the soils as indicated by the contaminant's soil/water partitioning coefficients and; 3) the low flux of groundwater through this area. More data regarding the quantity of volatile organic compounds in the NAPL contamination and the potential for these compounds to adversely affect the surrounding groundwater needs to be assessed. Previous investigations (The Johnson Company, 1998) indicate that a significant quantity of dissolved phase contamination is present in the soil beside Mill Brook where NAPL is known to exist. Since this investigation did not specifically look for volatile organic compounds (VOCs, such as benzene, toluene, ethylbenzene and xylene), it would be prudent to sample the groundwater as it exits the site on the northern, eastern and southern boundaries. Without these data, recommendations regarding remedial requirements and/or strategies can not be made. Also, the NAPL present in MW-11 should be removed periodically and disposed of properly.

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1.0 INTRODUCTION

This report has been prepared by Stone Environmental on behalf of Housing Vermont Inc. The purpose of this report is to document the investigation into the nature and extent of subsurface contamination associated with a fuel release from an underground storage tank (UST). Stone Environmental undertook the in-field portion of the investigation between August 14th and August 18th, 2000. The investigation was conducted in accordance with the Work Plan for a Subsurface Investigation at the Olde Windsor Apartments in Windsor, Vermont., dated June 8th, 2000.

1.1 Background and Objectives

An Environmental Site Assessment (ESA) report, submitted by Strategic Analytical Systems (August 12, 1994), indicated that two underground storage tanks (UST) were used to store #6 fuel for the former Windsor State Prison boiler heating system. Currently, and as a result of the tank exploration investigation portion of this most recent work, it is believed that only one 20,000 gallon tank was used for #6 fuel storage. The tank was reported to have experienced at least one catastrophic release of its contents sometime in the 1970's and 1960's, resulting in the overland flow of fuel which, purportedly reached Mill Brook approximately 1/8 mile away. It is not clear whether the release was from the tank or from the associated piping.

In 1976 the property was sold by the State of Vermont to Peabody Construction and renovated into residential apartments. Windsor Housing Associates purchased the property in1978 and then sold the property to Windsor Village Housing Limited Partnership in1994.

Two separate investigations, prompted by a real estate transfer and the presence of a "sheen" in a nearby monitoring well (MW-11), have shown no soil or groundwater contamination which was in excess of the State of Vermont's action levels. Subsequent to these investigations, the Windsor School property has undergone extensive investigations and remedial measures. The Windsor School property was also formerly part of the Windsor State Prison complex. The investigations on the Windsor School property were associated with contamination by a combination of kerosene, pentachlorphenol (PCP) and dioxins which are attributed to a wood treatment process undertaken at the prison. During the investigative and remedial work, several zones to the southwest of the two USTs were determined to be heavily contaminated with a heavily weathered fuel oil and/or kerosene in various parts of the site. The presence of fuel oil within an area that was reportedly contaminated as a result of the catastrophic failures of the boiler facility's UST(s), prompted the Sites Management Section (SMS) to request further investigation into this problem.

In the spring of 2000 Housing Vermont Inc. hired SEI to perform an investigation at this site. The main objectives of this work were to determine the following: 1) the contents and condition of UST(s) located at the former prison boiler facility; 2) whether the boiler facility's UST(s) was the source of contamination found in other

parts of the site and; 3) the nature, extent and potential impact of this contamination.

1.2 Previous Work

In August of 1994 Strategic Analytical Systems (SAS) performed a Phase I Environmental assessment of the Olde Windsor Apartments property. SAS reported that, based on physical evidence and interviews, two abandoned USTs were located on site and a catastrophic release of fuel oil had occurred sometime before 1980. The following February, SAS advanced five soil borings in the immediate vicinity of the two tanks and found no contamination to be present.

In 1997, Peabody Properties, in response to a request by the State of Vermont Waste Management Division, hired SEI to perform an initial site investigation. This work was prompted by the observation of a sheen in MW-11, which is located to the southwest of the two USTs. As part of this investigation, SEI installed two monitoring wells (to the south and southwest of the USTs) and several borings. A sheen was observed in one well, however no Total Petroleum Hydrocarbon (TPH) above 0.5 ppm was present in the groundwater sample from this well. All other explorations were determined to be free of contamination. It is worth noting that PCP was not a target compound for these analyses. The ground water flow direction, during the 1997 investigation, was determined to be northwesterly. The SEI report concluded that the contamination found in MW-11 most likely did not emanate from the two USTs. However, a review of the locations of these explorations and the groundwater flow direction does not conclusively rule out the two USTs as the source of the contamination in MW-11.

During the final stage of implementation of a Corrective Action Plan for the dioxin contaminated soils on the eastern portion of the Windsor School property, performed by The Johnson Company in the Fall of 1997, several drums were encountered by an excavation crew in the area shown on Figure 1. Non aqueous phase liquid (NAPL) was present in the drums and the soils and wood chip debris around the drums also contained NAPL. Analysis of soil and water samples from the excavation was conducted by Eastern Analytical, Incorporated. The NAPL contamination was classified as "weathered fuel oil, with a possible lubricating oil component". It was also determined that no PCP contamination was present in either the soils or the groundwater at levels above the laboratory's detection limits of 100 ug/Kg and 2 ug/L, respectively.

As part of a Supplemental Site Investigation (SSI), performed by The Johnson Company in the Fall of 1998 to determine the PCP, dioxin and petroleum compound distribution across the Windsor School property, a zone of NAPL (see Figure 1) was found approximately 250 feet south of the two USTs. The NAPL was present at approximately 5'-6' below ground surface. The eastern and western extents of the NAPL were determined in the southern portion of the site however, the extent of contamination in the northern portion of the site was not. PCP and dioxin were determined to be present at concentrations above 100 ug/kg (ppb) and 100 ng/kg (ppt), respectively, at locations where the NAPL was found. Stream sediment sample analyses indicated that PCP, dioxin, several PAHs and VOCs had reached the brook bottom sediment, however all compounds were well below

acceptable limits except for the dioxin, which exceeded the 13 ppt remedial action threshold in two locations.

1.3 Site Location and Sensitive Receptors

The general location of the site is depicted on Figure 1. A defunct boiler building resides on the northern most section of this site. The building's western side is now open and reveals several large rooms with approximately 20 foot ceilings that contain remnants of the boiler system. A bottom floor is partially covered with fill soils, 4 feet of the top of two doors accessing this floor can be seen from the eastern side of the building. These doors were welded shut and thus not opened during this investigation. The structure is built into a steep embankment (approximately 30 feet high) which lies between the high school playing field and the Olde Windsor Apartment complex. The playing field is level and terminates to the south at a wire fence. Between the fence and Mill Brook is a wooded area, which is fairly level to the point where it drops off precipitously to the brook.

The two potential receptors at this site are Lake Runnemede to the north and Mill Brook to the south. A search of the State of Vermont Water Supply Division's records indicate that residential water, in the vicinity of this site, is supplied by the Town of Windsor's public water supply system. The primary well for the public water supply system is located on the northwest side of Lake Runnemede, approximately ½ mile away. This investigation determined that no semi-volatile organic compounds (SVOC) were reaching the groundwater below Mill Brook at levels above the laboratory's detection limit. A previous investigation (The Johnson Company [JCO], 1998) indicates that the sediments below Mill Brook do contain significant quantities of SVOC contamination however, due to the low solubility and strong sorption characteristics of these SVOCs, it is apparent that these compounds are not adversely impacting the surrounding groundwater. The JCO investigation also determined that a significant quantity of dissolved phase volatile organic compounds (VOC) exist in the soil where NAPL is present however, of the 12 sediment samples collected along Mill Brook, only one sample contained a small amount of VOC contamination (total BTEX = 1,521 ug/kg). Considering that only a small amount contamination is present within 50 feet of a NAPL source area, it is unlikely that this contamination could adversely affect the waters of Lake Runnemede and more importantly, the town's water supply. Also, for these same reasons, it appears that the potential for this contamination to present a vapor phase contamination problem in the residential basements along Main Street is low. A better understanding of the extent and magnitude of VOC contamination in the northern portions of this site is needed to better address the threat to receptors in the north.

2.0 FIELD PROGRAM

2.1 NAPL Sampling and Tank Investigation

Objective:

The objectives for this part of the field program were to:

1) Collect and analyze NAPL samples to determine whether the UST is the source of NAPL contamination found in other areas of the site and to;
2) Determine the condition and contents of an abandoned UST.

Methods:

NAPL samples were collected from a monitoring well (MW-11) located approximately 150 feet southwest of the UST area and two areas located beside Mill Brook. Several efforts to sample the tanks and the area immediately around the boiler building for NAPL were unsuccessful due to limited access and hand auguring limitations (refusal). The locations of these samples (NS-1a and NS1-b) are shown in Figure 2. The sample from MW-11 was obtained using a bailer and the samples from the Mill Brook area (NS-2 and NS-3) were collected using a hand auger. A total of 17 hand auger attempts were required to collect samples NS-2 and NS-3. We were unable to collect a sample in the area of NS-4. Fill material, consisting of bricks, rocks and wood, caused repeated refusals at approximately 2-4 feet below ground surface. Although not specified in the work plan for this work, a sample of water, collected from the same auger bucket interval (approximately 4 feet below ground surface) as the NS-2 soil sample, was obtained to assess the partioning characteristics of the NAPL in this sample. The samples were analyzed by Endyne Laboratory using a modified EPA Method 8015 (GC/FID) for fuel class indentification (i.e. kerosene, #2 or #6 heating fuel). Documentation regarding specific requirements of this analytical methodology are enclosed in Appendix 1. The results of these analyses were reviewed by a third party chemist who specializes in the field of fuel class identification. A complete listing of these analytical results and the chemist's review of the data are supplied in Appendix 1.

Access to the tank was achieved using a backhoe. Efforts to dig in the area east of the rank were thwarted by the presence of a thick, steel reinforced, concrete surface. Instead, the area located directly over the center of tank was excavated to gain access to the main opening in the tank. Precision Industrial Maintenance (PIM) was contracted to enter the tank and assess its contents and condition. Once accessed, the tank was flushed with ambient air to ensure that permissible levels of oxygen were present upon entry. The tank was then checked for flammable gasses and oxygen concentration prior to entry. All necessary rescue and monitoring equipment were used throughout the time in which the PIM technician was in the tank. Photographs of this tank investigation are supplied in Appendix 4.

At the end of this tank investigation, Carroll Concrete of Newport, New Hampshire was contracted to deliver approximately 30 yards of cement directly into the tank. The excavation hole was then backfilled with native material and finished off to grade using concrete.

Results:

The results of the sample analyses and conclusions regarding the fuel class indentification of the samples are shown in Table 1 below. A review of the data by the third party chemist indicates that the NAPL in MW-11 is very similar to the NAPL found in NS-3 located beside Mill Brook and that a second fuel class was determined to exist at the NS-2 sample location. This report is presented in Appendix 1. The report also states that the prystane and phytane, present as dominating resolvable compounds in all of the sample results, effectively rules out the presence of kerosene in these samples. Because prystane and phytane are

considerably more resistant to processes of biological degradation than the other NAPL constituents, the ratio between the two compounds can be used as an indicator of the source material (crude oil) from which the material was derived. Samples with similar prystane/phytane ratios (i.e. MW-11 and NS-3) can therefore be used to link the samples to the same source material. This however, does not rule out the chance that two independent fuels, with coincident prystane/phytane ratios, were used at this site. Although, the fuel classification of the MW-11 and NS-3 samples indicates a fuel lighter in fraction than the anticipated #6 fuel, the connection between the two samples, combined with the numerous reports of a spill occurring across this area, suggests that the NAPL located by Mill Brook originated at the tanks. In spite of the fact that the boiler facility release was reportedly of #6 fuel, the product in the subsurface more closely resembles a #2 fuel oil.

The several attempts to collect a NAPL sample in the area immediately south and west (NS-1a and NS1b) of the boiler building were all unsuccessful. At NS-1a, the hand auger effort was terminated at approximately four feet due to construction debris (i.e. glass and brick). A similar result was encountered at the NS-1b location however, the presence of two feet of fine sand prior to refusal suggested that there was no NAPL present at this location and the refusal was due to the bedrock surface.

As indicated by the disparate results of NS-2, water and NS-2 soil samples, an insignificant amount of mass is present in the surrounding groundwater due to the apparently low water solubility of the NAPL constituents. These data suggest that although there is a significant amount of NAPL present, the impact to the groundwater is minimal. A more in-depth discussion of the solubility of these compounds is provided in Section 3.2 below.

TABLE 1
NAPL Sampling Results
TPH, mg/kg

Sample ID	TPH Concentration, mg/kg	Pristane/Phytane Ratio	Fuel Classification
MW-11, NAPL	689,000	2.1	Heavily weathered mid-range petroleum distillate – diesel fuel #2
NS-2, Soil	20,400	0.85	Moderate to heavily weathered heavy range fuel oil such as diesel #4 or diesel #6
NS-2, Water	*<60	NA	NA
NS-3, Soil	51,600	2.4	Heavily weathered mid-range petroleum distillate – diesel fuel #2

NOTE: NS-2 samples collected in saturated soil approximately four feet below ground surface. NS-3 collected in damp soils at approximately 5 feet below ground surface.
* This result is reported as mg/L.

At the start of the tank investigation it was believed that two abandoned USTs were present in the area due east of the boiler building. Upon closer inspection of the premises and an interview with the former boiler room manager (Smokey Powers), it was determined that only one 20,000 gallon tank was used to supply the boiler heating system. According to Mr. Powers, the tank had catastrophically failed sometime in the early 1970s and efforts were made to repair the tank. The tank was pressure tested with water only to find more leaks were present. The tank was then cleaned to remove all residual oil and subsequently filled with sand. At this point the prison brought in an above ground storage tank to store the fuel oil. What this tank investigation found is consistent with what Smokey Powers reports: the tanks were partially filled and the bottom sands were devoid of oily deposits. Because the sand was delivered through two relatively small opening (one in the middle and one on the southern end of the tank) the sand did not completely fill the tanks and was present as sloping mounds beneath each of the fill holes. The headspace of the two sand samples was tested as a qualitative measure to ensure that no volatile contamination was present in this tank.

Although it is unlikely, the presence of another tank located to the east of the 20,000 gallon tank should not be ruled out since there have been reports of a second tank being present.

2.2 Soil Coring and Sampling

Objective:

The objectives for the soil coring and sampling were to:
1) Determine the distribution of TPH and PCP contamination in three dimensions and to;
2) identify any preferential flow pathways that may exist within the hydrogeology of this site.

Methods:

The soil coring program consisted of the collection and analyses of bulk soil samples at a total of 13 locations. The locations of these soil cores are shown on Figure 2. Soil cores were collected using the EnviroCore system which collected continuous soil cores in three foot increments.

Samples were collected from the cores by slicing the butyrate core liner in a longitudinal fashion and inserting a small stainless steel spoon to remove a subcore of the soil. This subcore was then extruded directly into pre-weighed 40 milliliter sample bottles containing analytical grade hexane for the TPH analyses. Samples for PCP by immunoassay were collected into 100-milliliter clear glass jars. The core liner was then logged for stratigraphy.

Upon completion of coring at each location, the core holes were grouted to the surface using a bentonite grout pumped into the hole under pressure while the casing was withdrawn from the hole. Prior to starting the next hole, all downhole equipment was decontaminated using a steam cleaner.

Results:

A summary of the soil coring phase of this work can be found in Table 2 below. These 13 cores were comprised of 168 linear feet with an average depth per hole of 13 feet. As can be seen in Table 2, the highest concentration of TPH contamination is found in the area north of MW-11 (along transect #1 and SC-13) at an elevation of approximately 339 feet. PCP contamination was found in only two samples (SC08-3.8 and SC09-4) along transect #2. The TPH contamination found in SC-8 may not be associated with the contamination found near MW-11 for the following three reasons: 1) the chromatographic pattern of this sample's contamination is significantly different than the contamination found in transect #1 samples; 2) the presence of PCP in a sample from this core and the absence of PCP in cores along transect #1 and; 3) this contamination was found three feet above the contamination found in transect #1. A detailed discussion of the relevance of this data to the site is furnished in Section 3.2 below. Boring logs for the soil coring are provided in Appendix 2.

TABLE 2
Soil Coring Data

Soil Core ID	Total Depth, ft	Maximum TPH Concentration, ug/kg	Elevation of Maximum TPH Concentration	Geologic Unit Containing Maximum TPH Concentration
STC01	10.7	2000 U	NA	NA
STC02	24.0	8855	339	Silty fine sand – wood present
STC03	12.5	2951	339	Medium sand – Wood present
STC04	13.2	2000 U	NA	NA
STC05	2.3	2000 U	NA	NA
STC06	9.0	2000 U	NA	NA
STC07	15.0	2000 U	NA	NA
STC08	12.0	1294 J	342	Silty fine sand – wood and brick present
STL09	15.0	2000 U	NA	NA
STC10	12.0	2000 U	NA	NA
STC11	12.0	2000 U	NA	NA
STC12	9.6	2000 U	NA	NA
STC13	21.0	55269	339	Fine sandy silt – brick and coal present

Total Depth = 168 feet

* Note:

2.3 Piezometer Installation and Water Level Measurements

Objective:

The purpose of this phase was to provide a network of monitoring wells, which are located to:

1) Define the direction and magnitude of the hydraulic gradient in three dimensions for assessing transport;

3) Identify any groundwater divide that may exist at this site.

Methods:

At the end of the soil coring program, nine piezometers were installed at seven locations, two of which contained a deep and shallow piezometer. The wells were installed using a modified version of the Envirocore tool. The modification involved a special drive shoe and a sacrificial knockout tip which are specifically designed for well installations. Upon driving the Envirocore casing to the desired depth, a 0.75" inside diameter (I.D.) pre-sandpacked well was lowered into the casing. Well screens consist of 0.75 inch I.D. PVC inner screen with a 1.75 inch outer diameter (O.D.) PVC outer screen, both with a 0.01 slot size. The casing was then pulled up to allow the sacrificial tip to fall off, the monitoring well to drop through the bottom of the drive shoe and the surrounding soil to collapse around the piezometer. The well screens for all the wells are three feet long. Two previously installed wells (MW-13 and MW16) were found in the northern portion of this site and were used to compliment this new well network. A complete listing of the screened intervals for the new and previously installed wells is shown on Table 3 below. A full round of water level measurements was performed on September 5, 2000.

TABLE 3
Piezometer Data

Piezometer I.D.	Screen Length, ft	Screened Interval Below Ground Surface, ft
Installed Prior to Summer 2000		
MW-13	10	NA
MW-16	10	30-40
Installed Summer 2000		
PZ-1s	3	4-7
PZ-1d	3	8-11
PZ-2	3	6-9
PZ-3	3	7-10
PZ-4	3	7-10
PZ-5s	3	7-10
PZ-5d	3	10-13
PZ-6	3	6-9
PZ-7	3	10-13

NA = Data not available at the time of this report.

Results:

As indicated in Figure 3, the water table in the central portion of this site (playing field) is characterized by a very slight hydraulic gradient and appears to represent a high point in the water table of this area. From this high point the groundwater appears to flow in a radial fashion towards the following three receiving bodies of water: 1) Lake Runnemede in the northeast with a hydraulic gradient of 1.7×10^{-2} (between PZ-5 and MW-13); 2) Mill Brook to the southwest (based on the mini-piezometer results) and; 3) the Connecticut River to the east with a hydraulic gradient of 2.1×10^{-2} (between PZ-6 and PZ-7). Since the flat region of this site is topographically (as shown in Figure 1) located above these three bodies of water, it is likely that this would contribute to the radial flow regime of this site. The results of this portion of the work are discussed in greater detail in Section 3.1 below.

2.4 Mini-piezometer Installation and Sampling

Objective:

The objective for the mini-piezometers was to determine whether groundwater traveling off this site and entering (discharging) into Mill Brook which is approximately 350 feet away from the UST area.

Methods:

Each of the three mini-piezomenters were constructed of three foot lengths of 5/8" I.D. clear polyethylene tubing with the bottom 0.5 feet drill slotted with 1/8" holes. The tubes were driven within an outer black steel rod to a depth of 1.5 feet below the stream bed. At the target depth, the outer rod was removed and the remaining polyethylene tube was fastened to a ¼" steel rod to ensure that the top end of the tube remained out of the water. After a two day equilibration time, measurements of the difference between the level of water inside the tube and the height of the stream surrounding the tube were recorded. The locations of these three mini-piezometers are shown on Figure 2.

The mini-piezometers were sampled using a slow purge (low stress) sampling method and each sample was analyzed for semi-volatile contaminants (including PCP) by EPA Method 8270. The Endyne Laboratory analytical results for these samples are provided in Appendix 1.

Results:

The mini-piezometers installed in the stream indicated that the stream was receiving groundwater. Mini-piezometer #2 (MP-1) showed a much stronger upward component (1.5 inches above the stream) than MP-2 which read approximately 0.2 inches above the height of the stream. MP-3 was installed too close to the stream bank and as a result of a decreased stream elevation at the time of this sampling, the mini-piezometer was not in contact with the stream water and thus was not able to be read. However, the bottom of MP-3 was sufficiently deep to allow for the groundwater sample to be collected.

All three mini-piezometer groundwater sample results were free of semi-volatile compounds above the laboratory detection limits (ranging from 2ug/L for Anthracene to 50 ug/L for 4,6-dinitro-2-methylphenol).

2.4 Analytical Program

2.4.1 On-Site TPH and PCP Soil Analyses by Direct Inject GC and Immunoassay

Objective:

The purpose of the on-site analyses was to:

1) provide near real time analytical results which helped to guide the investigation with respect to items such as sampling depth requirements (i.e. determining where the drilling may end in a given hole) and sampling frequency and;

2) Accommodate a large number of samples for analysis to offer a cost effective program.

Method:

All soil samples were analyzed on-site in SEI's Mobile Laboratory for TPH and PCP using direct inject gas chromatography and immunoassay methods, respectively.

A site-specific NAPL calibration standard, acquired from MW-11, was used to prepare standards for the quntitation of TPH. Originally, methanol was selected as the solvent for preparing (diluting) calibration standards and as the preservative and extraction fluid for the soil samples. However, unsuccessful efforts to dissolve the NAPL into the methanol indicated that the NAPL was too insoluble in methanol for use as either of the intended purposes. Instead, reagent grade hexane was used as the solvent for the calibration standard preparation and field preservation/extraction of the soil samples. A three-point linear regression calibration curve, ranging from 1000 mg/kg to 10,000 mg/kg, was used to quantitate all of the soil samples. QA/QC protocols, involving duplicate runs and calibration checks were performed for every batch of ten samples.

An immunoassay method (RaPID Assay) was used to determine the PCP concentrations in a select number of soil samples. This method has been validated by the EPA as method number SW-846 4010 for the determination of PCP in soils. Approximately 30 of the soil samples were analyzed for TPH were analyzed for PCP. The samples were analyzed in two groups on two different days. QA/QC protocols, involving duplicate runs and calibration checks were performed for every batch of fifteen samples.

Results:

Over the course of three field days and 13 soil cores the SEI laboratory analyzed a total of 50 soil samples for TPH and 30 soil samples for PCP. A complete listing of the results can be found in Appendix 3. A listing of the soil samples that contained either TPH or PCP detections is shown in Table 4.

TABLE 4
TPH and PCP Detections

Sample I.D.	TPH Concentration, mg/kg	PCP Concentration, ug/kg
C2 - 11.4	6,219	<10
C2 – 12.9	8,855	<10
C3 – 7.5	2,951	<10
C8 – 3.8	1,294 J	23
C9 – 4.0	<2000	65
C13 - 16	55,269	<10

J = estimated value below the detection limit.

2.4 Site Survey

Objective:
The site survey was performed to locate all investigation points accurately with respect to each other and other pertinent features of the site.

Methodology:
The survey was performed by Bruno Associates of Springfield, Vermont using industry practices.

Results:
All maps and figures associated with this report, with the exception of Figure 1, are based on the survey data generated by Bruno Associates. The survey data does include several features from previous investigations and remedial efforts that are relevant to this work.

3.0 DATA INTERPRETATION AND CONCEPTUAL MODEL

3.1 Site Hydrogeology

In general, the site is comprised of the following three hydrostratigraphic units from top to bottom: 1) topsoil and construction debris; 2) fine silts and sands and; 3) coarse gravel. There appears to be a relatively weak horizontal hydraulic gradient over the central portion of this site. Data collected from the piezometer clusters suggest there is no vertical component to the hydraulic gradient however, due to these wells not being properly sealed with bentonite grout, this finding is questionable at this time. As shown on Figure 3, the central area is believed to represent a hydraulic divide between three discharge points. To the north the water flows north towards Lake Runnemede and to the south the water discharges to Mill Brook. The eastern component to the hydraulic gradient is probably caused by the Connecticut River, which is approximately one half of a mile away.

The site has reportedly undergone several construction projects, resulting in dramatic changes to the natural topography of this site. This effect is most prevalent in the area west of the boiler building where a gravel road now exists. In this area the topography was raised as much as 16 feet, as evidenced by the presence of construction debris (i.e. wood, bricks and coal) and NAPL at 16 feet BGS. The soil that is believed to be non-native varies widely from course to fine sand and contains varying amounts of construction debris.

A finer silt and sand unit is present throughout much of this site just below the fill soils. Most of the TPH contamination found as part of this study is within this unit, suggesting that this unit is near the original ground surface at the time of the oil release. A coarse sand and gravel unit was found in most of the cores (other cores did not go deep enough) at elevations between 336 and 338 feet.

In the central part of the site the water table appears to be at or just above the surface of the coarse sand and gravel unit within the upper silts and sands. This may suggest that the local flow system is either confined or semi-confined. Also, the nearly flat water table in the central area of this site may be the result of the very coarse material which, tends to reduce the horizontal component of the hydraulic gradient.

3.2 Contaminant Solubility and Mobility

The semi-volatile constituents of fuel related NAPLs, such as the five polycyclic aromatic hydrocarbons (PAH) compounds listed in Table 5 below, are known have extremely low water solubility values and high soil/water portioning coefficients, especially in comparison to the volatile compounds also contained in the NAPL mixtures. The following table is a list of literature derived solubility values and calculated soil-water partitioning coefficients (K_d) for a select number of volatile and semi-volatile compounds. A total organic carbon (TOC) value of 0.3% was used for the K_d calculations. This value represents the more conservative (lower) value of the two values obtained from the TOC analyses of SC08-5 (0.5%) and the SC13-19 (0.3%) samples. Both samples were analyzed using the EPA Method 415.1 for TOC. Given this data, one can see why the volatile compounds are more of a concern than the SVOCs in regards to their higher potential for off site migration.

TABLE 5
Solubility and Soil-Water Partitioning Coefficients

Compound Name	*Kd, L/kg	**Solubility mg/L
Semi-Volatile Compounds		
Flouranthrene	39.5	0.22
Anthracene	52.1	0.06
Flourene	27.9	1.82
Naphthalene	4.3	31.4
Benzo(a)pyrene	2028	0.0015
Volatile Organic Compounds		
Benzene	0.32	1789
Toluene	0.80	517
Ethylbenzene	1.72	168

* $K_d = K_{oc} \times F_{oc}$ - K_{oc} values obtained from Environmental Organic Chemistry, Wiley Interscience, 1993.
** Solubility values obtained from Environmental Organic Chemistry, Wiley Interscience, 1993.

3.3 Contaminant Distribution

3.3.1 Total Petroleum Hydrocarbon and Pentachlorophenol Distribution

TPH contamination exists over a large portion of the site. The highest degree of contamination is located in the areas of MW-11 and Mill Brook where NAPL contamination is known to exist. Prior to this investigation only sheens of oil in MW-11 were reported to exist however, at the time of this study approximately 2.5 feet of black NAPL was present. The TPH contamination found in the soil cores along transect #1 and SC13 was present as a thick, oily liquid. A previous investigation, performed by The Johnson Company in 1998, determined that a narrow band of NAPL contamination was present in the wooded area beside Mill Brook at approximately five feet BGS.

This contamination starts in an area just west of the boiler building and terminates at a point very close to the bank of Mill Brook. The source zone of this contamination was not found during this work. However, assuming that this contamination originated at the boiler building, the northern extent of the contamination is probably not far from SC13. The horizontal extent of the contamination is shown is Figure 4. The width of this contamination is greatest in the wooded area beside the brook (approximately 175 feet) and becomes less wide in the area of Transect #1 (approximately 60 feet). The contamination is present as a relatively thin band of NAPL within a fine sand and silt layer. In soil core #13, where multiple samples were collected within a small vertical distance, the band was found to be no more than 1.6 feet thick. Dissolved phase contamination above and below this NAPL contamination was not found at levels above the 2,000 mg/kg detection limit however, a previous investigation (JCO 1998) determined that a significant amount of dissolved phase contamination (i.e. BTEX compounds) was present above and below the NAPL zone. It is worth noting that trends in the TPH values of these grossly contaminated soils across this site are not reliable due to the different analytical methods used during these separate investigations. Specifically, JCO TPH values for the Mill Brook area samples are based on a fresh kerosene calibration standard while the SEI TPH values for the northern contamination are based on a site derived (MW-11) NAPL calibration curve.

Based on historical reports of a fuel release and the results of the NAPL fingerprinting results, it is believed that the NAPL contamination found in the area in and around MW-11 is directly associated with the contamination beside Mill Brook. However, the area between these two areas (along transect #2) appears to be significantly less contaminated; only one sample (SC08 at 3.8 feet BGS) contained a measurable amount of TPH contamination (1,294 mg/kg, estimated value below the 2,000 mg/kg detection limit). Also, as mentioned above in Section 2.2, the contamination found in this sample appears to be of a different nature than that of the MW-11 contamination. Considering that this site has experienced many changes to its landscape and the number of different practices that have taken place over the last 50 years, there are many plausible scenarios that might explain why this area is less contaminated and why there appears to be more than one type of contamination. One likely scenario is this: at the time of the spill this area along transect #2 may have experienced a more thorough cleanup and recovery effort than that of other areas, only to be subsequently contaminated by some other

process (possibly another spill) which involved a different class of petroleum hydrocarbons.

It appears that there is no PCP contamination in the area along transect #1 and SC13. Previous analyses of MW-11 groundwater has shown no PCP contamination in this well. PCP contamination was only found in two samples along transect #2: SC09-4 and SC08-3.8 at 23 ug/kg and 65 ug/kg, respectively. It appears that the major zones of PCP contamination, as delineated in JCO 1998 report and in excess of 100 ug/kg, are limited to several fairly localized areas of the site. These two samples are located on the northern edge of the largest PCP contamination zone which, encompasses the area beside Mill Brook.

3.4 Refined Conceptual Model

Although there are several modifications to be made based on the results of this most recent investigation, this refined conceptual model is very similar to that of the June 8, 2000 work plan. A large release(s) of fuel oil occurred sometime during the 1960s and/or 1970s. The rate and duration of this fuel release was reportedly large enough to allow for overland flow of the oil and discharge into Mill Brook, approximately 350 feet to the south. In conjunction with this release, several other practices and events occurring at this site probably contributed additional contamination to the site.

The current topography in the area just south of the USTs and Mill Brook is quite flat. However, based on a visual inspection of the 1962 orthophotos, there does appear to be several naturally formed drainage cuts which indicate a slope in the direction of the river. In several areas of this site where the fuel may have traveled overland, the ground surface is believed to have been filled in and leveled. This last point is supported through reports by Dufresne and Henry (1998) and several former employees of the Windsor Prison. Also in support of this point, are the results of this investigation's soil coring program (and the JCO 1998 report), which indicates fill soils and debris to depths well below (between 2 and 16 feet) the current ground surface.

In contrast to the original conceptual model, the fuel class identification portion of this work indicates that at least one of the fuel releases involved a lighter fuel class such as a #2 or diesel rather than the expected #6 fuel. Also, an interpretation of the analytical data indicates that kerosene is not present in MW-11 and in the two areas of the site where NAPL samples were collected. This last fact strongly suggests that the kerosene contamination, derived as part of the former wood dipping operation did not contribute to the contamination located in the northern section of this site.

Data regarding the corrective actions for the release from the USTs are sparse. Different areas of the site most probably underwent varying degrees of recovery and cleanup efforts. For example, the area along transect #2 appears to be much cleaner than the areas to the north and south, suggesting that the contamination was moved (possibly bulldozed) south or north to where significant quantities already existed. Undulations in the topography at the time of the spill may also account for the varying amounts of contamination found. Depositions by John Malter acting as a consultant to the Department of Corrections, and Kenneth Cram, an employee of the Prison, state that a levee was constructed in an effort to prevent the flow of fuel from entering the river. The location and/or evidence of this levee

have not been determined however, it seems likely that the area beside Mill Brook that now contains massive NAPL contamination is the area where the levee existed. A significant quantity of the oil was likely to have infiltrated the ground surface, especially behind a dike where the effect of the ponding of the oil would be to increase the hydraulic head, which drives the downward flow of oil. Also, a report indicates that the free standing pools of fuel were burned as part of the corrective action measures.

Subsequent to the fuel spill(s) and cleanup efforts, it is likely that a major razing effort, reported to have taken place soon after the prison was sold to Peabody Inc., caused several more hazardous waste releases to occur. For example, the 5 crushed 55-gallon drums located between 2 and 4 feet below the present ground surface (found during a remedial effort in 1998) are probably the product of this razing. Oil, described as "weathered fuel oil with a lubricating oil component" was found in the drum excavation. The contamination found during this investigation at 4 feet BGS along transect #2 is also described as a heavily weathered fuel oil in the #6 fuel class range. It seems likely that there are areas of this site where various NAPLs from different sources (i.e., wood treatment, boiler USTs and automotive repair) have commingled.

Transport of this NAPL contamination was probably largely due to overland flow followed by some subsequent subsurface flow of NAPL. This subsurface flow would have included some spreading due to capillary forces. The oil would then have followed the topography of any perching layers and/or the water table or capillary fringe. A groundwater divide, located in the central portion of this site, is apparently causing a radial flow regime with groundwater leaving the site towards three points of discharge: Mill Brook (south); Lake Rnnemede (north) and; the Connecticut River (east). Shortly after the release, the more volatile fraction of the oils began to dissolve into groundwater and to volatilize into the soil gas and the atmosphere. Again, the groundwater divide would affect the dissolved fraction, carrying solutes radially in the direction of the hydraulic gradient towards the three points of discharge. The lighter end hydrocarbons while more mobile in the subsurface are also more susceptible to biodegradation. At this site the following petroleum products are believed to be present: #2, #4 and #6 heating oil, diesel fuel and a lubricating oil. Each of these fuel classes contains a unique range of aliphatic hydrocarbons which determine its viscosity, solubility, volatility, sorption characteristics and ease of biodegradation. All these factors will contribute to how well each of these fuel classes naturally attenuate in a given hydrogeological setting. Given the age of these sources and the fact that no fuel related products or PCP contamination has been found to have adversely impact Mill Brook, it is likely that the natural attenuation processes are effectively mitigating the impact of this contamination to the Mill Brook and Lake Runnemede.

4.0 RECOMMEDATIONS

4.1 Groundwater Sampling North of The UST Area

To be sure that a significant quantity of VOCs are not partitioning from the NAPL into the groundwater and subsequently flowing off site, groundwater samples should be collected at several locations along the northern edge of this property. Although previous data (JCO, 1998 report) suggest that insignificant quantities of VOC contamination is reaching Mill Brook, the eastern extent of the VOC

contamination is not well understood and therefore groundwater sampling efforts are recommended in the area between this site and the football field to the east. The samples could be collected using temporary well points, driven to the water table by a direct push drill rig.

4.2 Boiler Room Investigation

Since this investigation was not able to enter the bottom floor of the boiler facility, it is advised to further investigate the condition and contents of this room. At this time SEI is not sure whether this floor is merely a crawl space or a full floor. The released oil may have been deposited into this floor and if so, may still be contributing oil to the site (i.e. MW-11).

4.3 Recommendations for Remedial Solutions

SEI recommends that this site does not require any remedial efforts in regards to the fuel contamination associated with the boiler building UST and other fuel wastes. This recommendation assumes that the results of the groundwater sampling in the northern section of this property indicate that significant quantities of VOC contamination are not leaving this site. The data collected to date, especially those included in the JCO, 1998 report, indicate that even in the presence of grossly contaminated soils, groundwater and sediments (located as little as 50 feet directly down gradient of these soils) appear not to be adversely affected by this contamination.

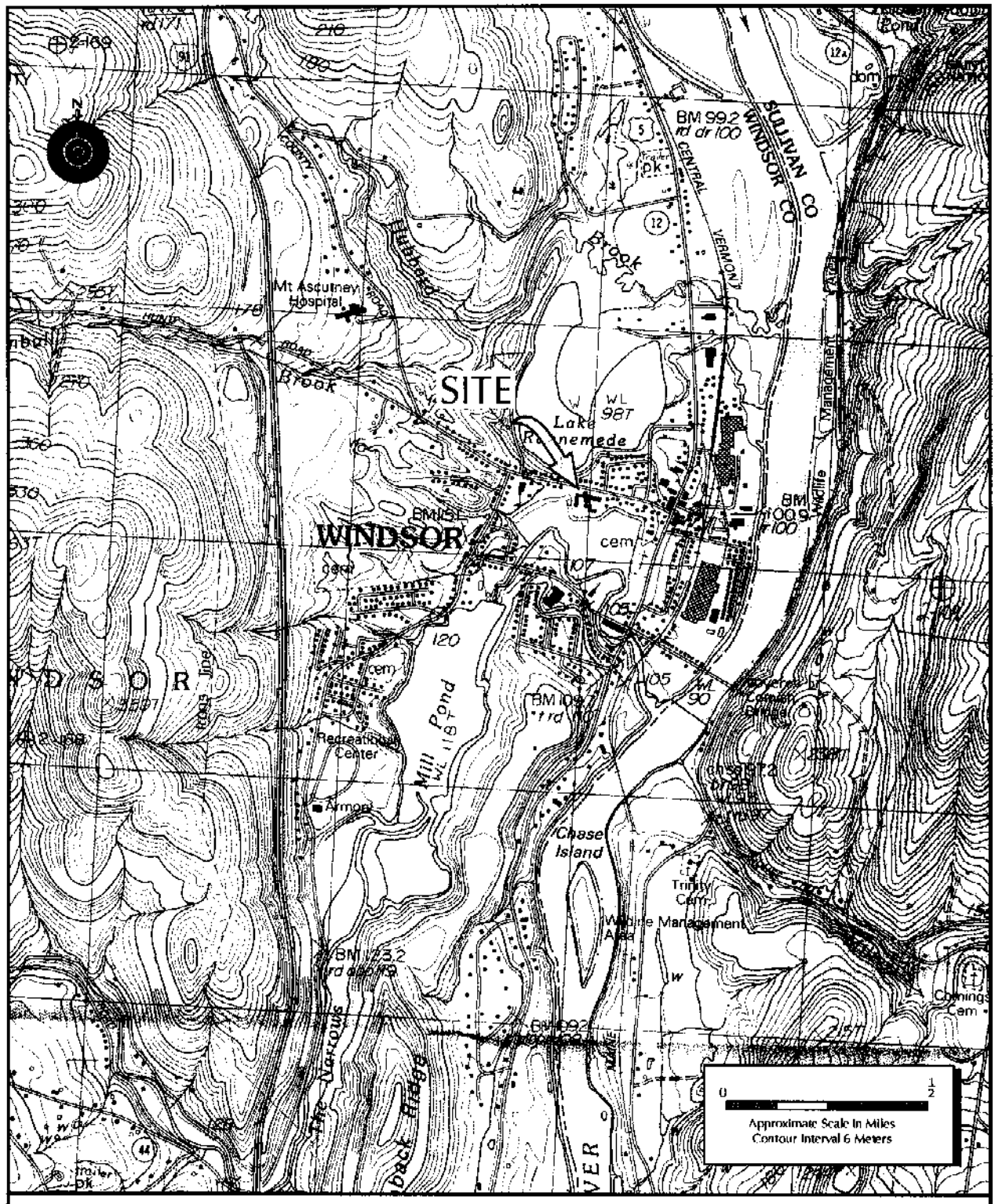

FIGURE 1: Site Location Map
Olde Windsor Apartments, Windsor, Vermont

Source: Source: Mt. Ascutney, VT - New Hampshire, 7.5 Minute Series, 1:25,000, 1984
o:\proj oo\1134-r-windsor village\report\figures\location.cdr
10-13-00 jms

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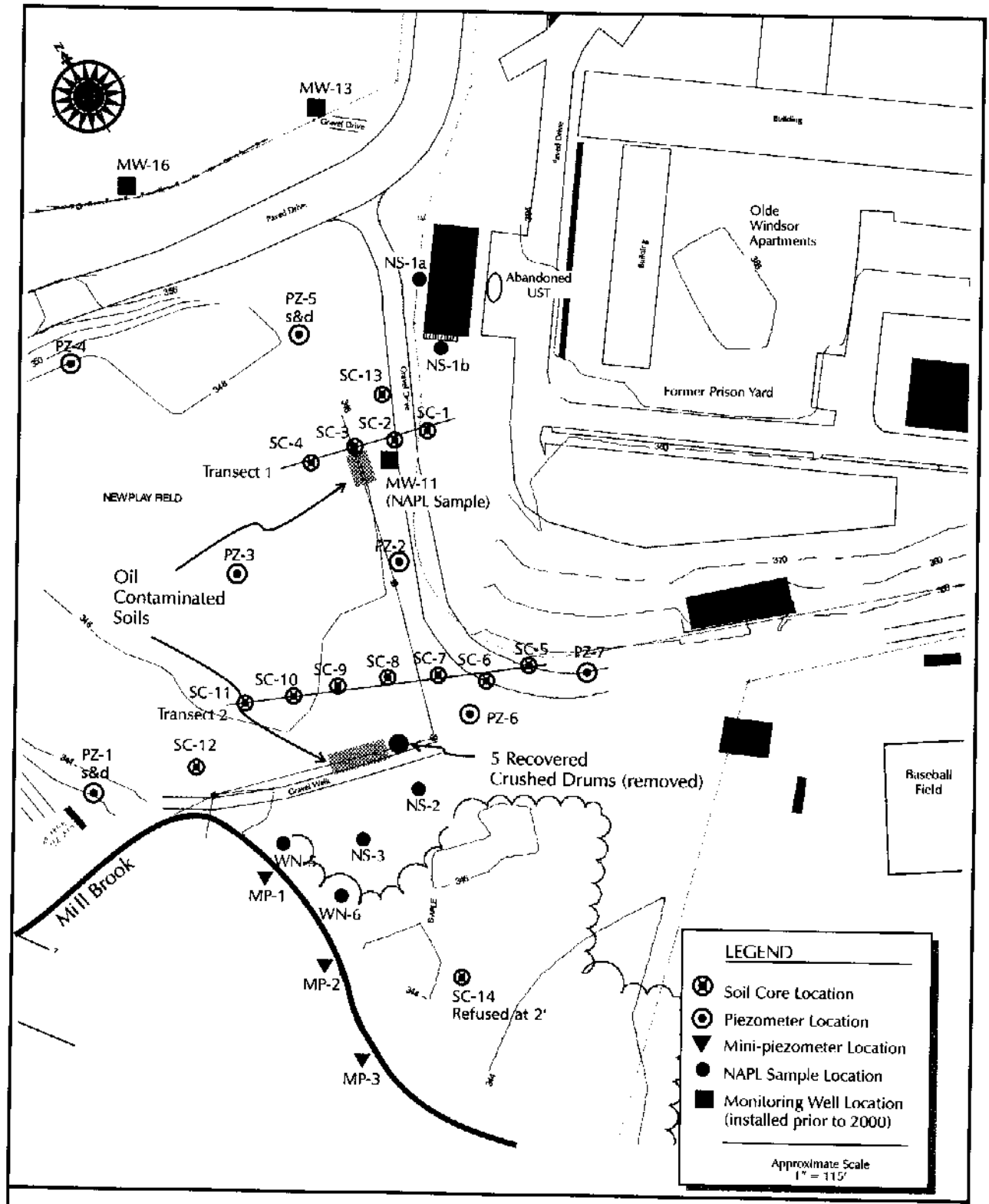

FIGURE 2: Site Investigation Sampling Points - Summer 2000
Olde Windsor Apartments, Windsor, Vermont

Source: The Johnson Company, Montpelier, Vermont, SSI & CAFI Report, 1998
o:\proj-oo\1134-r-windsor village\report\figures\fig2-samp points-2000.cdr
int:05 1-00 rev:10-13-00 jms/mr

STONE ENVIRONMENTAL INC

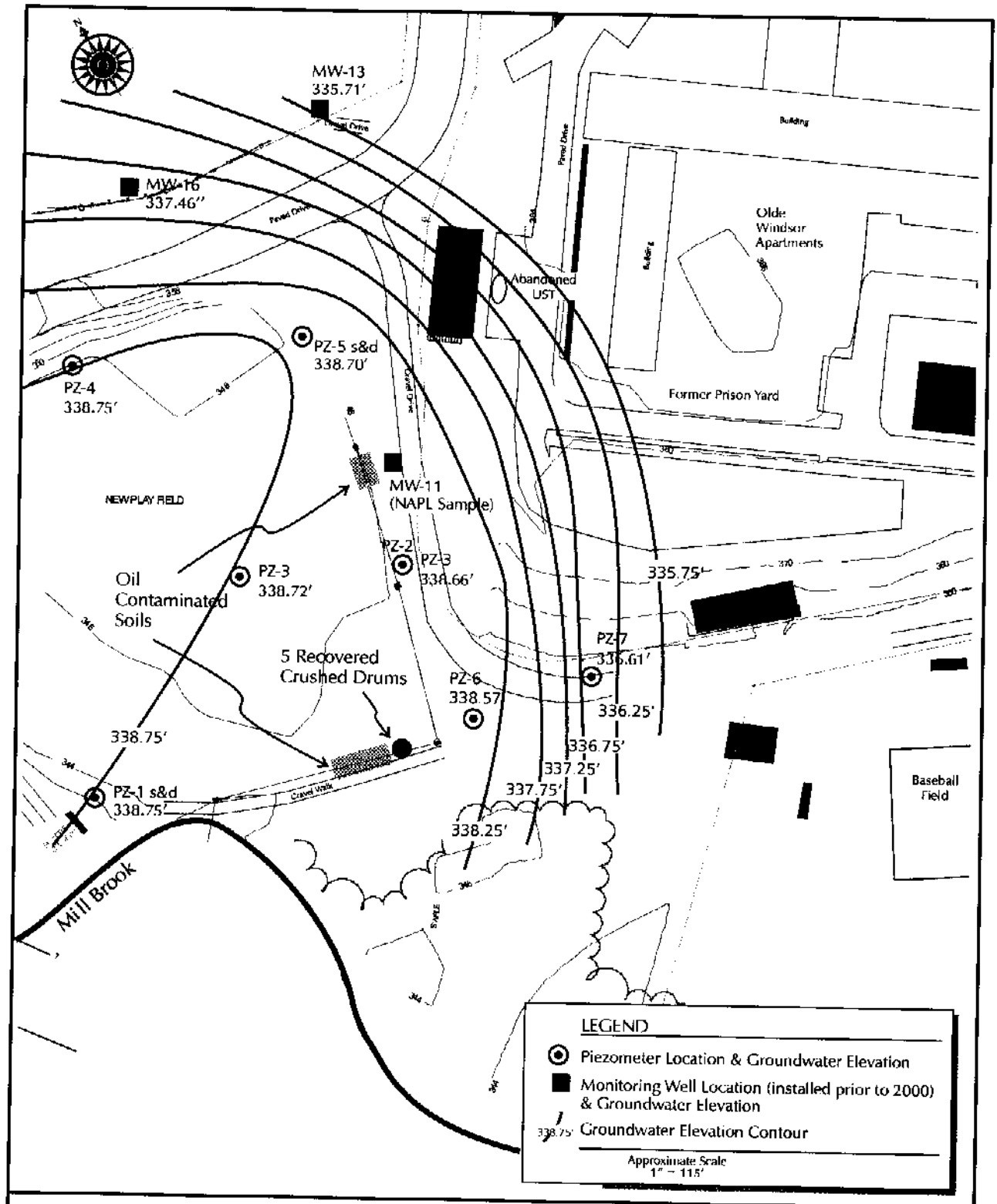

FIGURE 3: GroundWater Elevation Contour Map - September 5, 2000
Olde Windsor Apartments, Windsor, Vermont

Source: The Johnson Company, Montpelier, Vermont, SSI & CAFI Report, 1998
o:\proj-oo\1134-r-windsor village\report\figures\gwcontours.cdr
10-13-00 jms/mr

STONE ENVIRONMENTAL INC

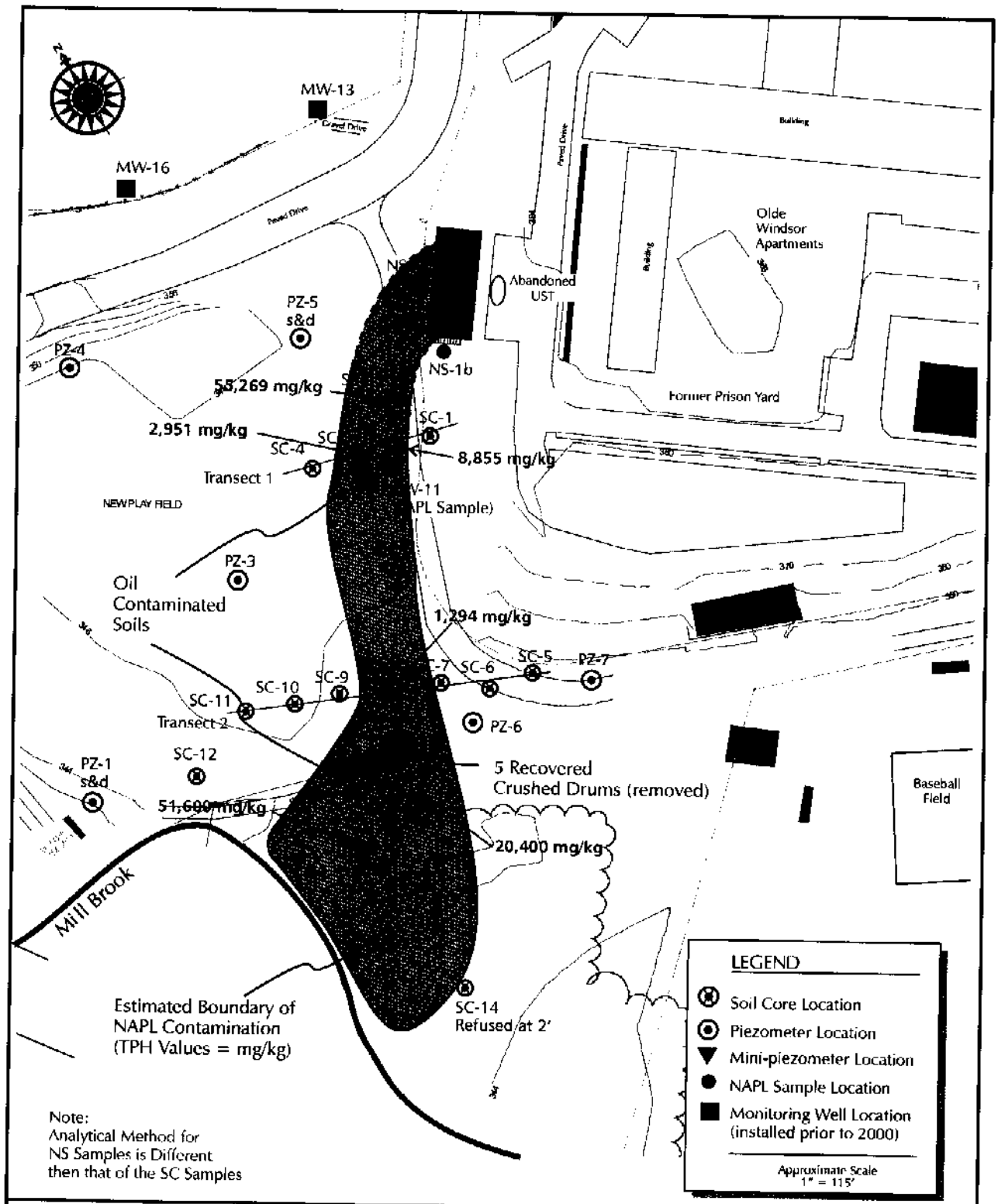

FIGURE 4: Aerial Extent of NAPL Contamination
Olde Windsor Apartments, Windsor, Vermont

Source: The Johnson Company, Montpelier, Vermont, SSI & CAP Report, 1998
o:\proj-oo\1134-r-windsor village\report\figures\fig4-plume.cdr
int:05-1-00 rev:10-13-00 jms/mr

STONE ENVIRONMENTAL INC

APPENDIX I

Analytical Results And Methodology

DRAFT

Memorandum

To: Mike Rossi/Stone Environmental **Date:** October 10, 2000

From: Eric L. Butler, Ph.D.

Subject: Interpretation of Petroleum Hydrocarbon Analyses of Samples from the Windsor Site

This memorandum summarizes my interpretation of the analysis of three samples from the Olde Windsor Apartments site, in Windsor, Vermont. The samples, NS-2 and NS-3, two soil samples, and MW-11, a fugitive product (non-aqueous phase liquid [NAPL]) sample, were analyzed for total petroleum hydrocarbons (TPH) by Endyne, Inc. of Williston VT, applying a TPH 8015 DRO method (DRO means diesel range organics). The laboratory quantified the TPH, quantified pristane and phytane, and their gas chromatographic analysis encompassed straight chain alkanes from C8-C36, inclusive.

I base my interpretation on the information in the data package from the laboratory which I have assumed to be correct and on my professional experience in the field of petroleum hydrocarbon composition and analysis. I also reviewed the Work Plan, of June 8, 2000, prepared by Stone Environmental for this project along with a transmittal letter from Mr. Rossi to me dated July 27, 2000, which accompanied the Work Plan and the data package.

NS-3 and MW-11

- these samples are very similar to each other in composition with regard to TPH DRO analysis
- they can be characterized as containing a moderate to heavily weathered mid-range petroleum distillate product such as diesel fuel #2
- there is not much, if any, kerosene in these samples based on pristane and phytane being the dominant resolvable components (as opposed to lighter isoprenoid compounds)
- the pristane/phytane ratio of these two samples is similar as well (2.4 and 2.1); this ratio is often diagnostic of source crudes because the ratio is reflected in the produced products and remains stable even through fairly extensive weathering

NS-2

- this sample can be characterized as containing a moderate to heavily weathered heavy range fuel oil such as diesel #4 or diesel #6

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- the hydrocarbon matter extends into a much heavier range than for the other two samples, and the average molecular weight is greater in this sample

- the pristane/phytane ratio in this sample is 0.85, quite dissimilar to the other two samples (in calculating this ratio I adjusted the reported area of 5090 for phytane by subtracting 500, to correct for the poor integration by the data system; the reported area for C18 in this sample was used to judge the magnitude of the correction - without the adjustment the ratio would have been 0.75)

June 21, 2000

Page 1 of 1

FAX

To: Harry Locker
Endyne Laboratory Inc.

STONE ENVIRONMENTAL

Fax: (802) 879-7103

From: Michael Rossi
Direct Phone: (802) 229-2194
E-Mail: mrossi@stone-env.com

58 East State Street
Montpelier, Vermont
05602 USA

Phone / 802. 229.4541
Fax / 802. 229.5417

SEI No. 1128
Re: Fingerprinting Methodology for Windsor NAPL Samples

Hello Harry:

I am writing here to formalize the analytical methodology for the fingerprinting work that we have been discussing over the past few months. We anticipate collecting non-aqueous phase liquid (NAPL) samples for these analyses however, if this is not possible, soil samples containing high concentrations of residual NAPL will be used. The samples may contain one or more of the following fuel classes: #6 heating fuel; #2 heating fuel and; kerosene. The method requested for these analyses is essentially EPA's Method 8015 with the exception of quantifying for the individual prystane/C17 and phytane/C18 ratios as well as hopane (C30). The cost and availability for the hopane standard are being researched. Currently, I can not find anyone in the U.S. who sells Hopane, so the costs to get the material in a timely manner may be prohibitive to these analyses.

As a matter of Quality Control/Quality Assurance, the following criteria should be achieved through out these analyses:

- a check to demonstrate that mass discrimination is not occurring in the given analytical system – the response ratio of C28 to C20 must be at least 0.85.
- Method blank per analytical batch – no detections above one-half the reporting limit.
- Solvent blank every five samples – no detections above one-half the reporting limit.
- If a concentration step is required, a surrogate (OTP, or other suitable compound) spike will be quantitated and should fall within 70-130% of the spiked concentration.

We expect to have a total of six samples and will be delivering them to you sometime in the next few weeks. I will call at least two days prior to delivery and expect these analyses to be performed within seven days of delivery. Also, these results will be reviewed by Eric Butler of Gradient Corporation for fuel identification; therefore Eric will need Endyne's chromatograms for those fuel classes mentioned above. As we discussed, the price per analyses is estimated at $150 per sample; with additional costs to be determined based upon my Hopane research. Please give me a call as soon as possible to go over any questions or concerns regarding this work.

Thanks again, Mike

Original sent by: [_] Regular Mail [_] Overnight Delivery [_] 2nd Day Delivery [_] This fax is the only form of delivery

ENDYNE, INC.

Laboratory Services

160 James Brown Drive
Williston, Vermont 05495
(802) 879-4333
FAX 879-7103

REPORT OF LABORATORY ANALYSIS

CLIENT. Stone Environmental, Inc.
PROJECT NAME: 96-330
DATE REPORTED: July 18, 2000
DATE SAMPLED: June 23, 2000

ORDER ID: 8141
REF. #: 157,675-157,678

Enclosed please find the results of the analyses performed for the samples referenced on the attached chain of custody record.

Chain of custody indicated sample preservation upon arrival at the laboratory.

All samples were prepared and analyzed by requirements outlined in the referenced methods and within the specified holding times.

All instrumentation was calibrated with the appropriate frequency and verified by the requirements outlined in the referenced methods.

Blank contamination was not observed at levels affecting the analytical results.

Analytical method precision and accuracy was monitored by laboratory control standards which included matrix spike, duplicate and quality control analyses. These standards were determined to be within established laboratory method acceptance limits.

Reviewed by,

Harry B. Locker, Ph.D.
Laboratory Director

Enclosures

ENDYNE, INC.

Laboratory Services

160 James Brown Drive
Williston, Vermont 05495
(802) 879-4333
FAX 879-7103

LABORATORY REPORT

SPECIAL REPORT

CLIENT: Stone Environmental, Inc.
PROJECT NAME: 96-330
REPORT DATE: July 18, 2000
SAMPLER: MR
DATE SAMPLED: June 23, 2000
DATE RECEIVED: June 25, 2000

ORDER ID: 8141
ANALYSIS DATE: July 12, 2000
SITE: NS-2 Soil
REF.#:157,675
TIME SAMPLED: NI

PARAMETER	RESULT	UNIT
TPH 8015 DRO	20,400.	mg/kg
C17/Pristane	0.14	Area Ratio
C18/Phytane	0.08	Area Ratio

ENDYNE, INC.

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LABORATORY REPORT

SPECIAL REPORT

CLIENT: Stone Environmental, Inc.
PROJECT NAME: 96-330
REPORT DATE: July 18, 2000
SAMPLER: MR
DATE SAMPLED: June 23, 2000
DATE RECEIVED: June 25, 2000

ORDER ID: 8141
ANALYSIS DATE: July 12, 2000
SITE: NS-2 Water
REF.#: 157,676
TIME SAMPLED: NI

PARAMETER	RESULT	UNIT
TPH 8015 DRO	< 60.0	mg/L
C17/Pristane	ND	Area Ratio
C18/Phytane	ND	Area Ratio

Notes:

* ND indicates Not Determined

ENDYNE, INC.

Laboratory Services

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Williston, Vermont 05495
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LABORATORY REPORT

SPECIAL REPORT

CLIENT: Stone Environmental, Inc.
PROJECT NAME: 96-330
REPORT DATE: July 18, 2000
SAMPLER: MR
DATE SAMPLED: June 23, 2000
DATE RECEIVED: June 25, 2000

ORDER ID: 8141
ANALYSIS DATE: July 12, 2000
SITE: NS-3
REF.#: 157,677
TIME SAMPLED: NI

PARAMETER	RESULT	UNIT
TPH 8015 DRO	51,600.	mg/kg
C17/Pristane	0.13	Area Ratio
C18/Phytane	0.09	Area Ratio

ENDYNE, INC.

Laboratory Services

160 James Brown Drive
Williston, Vermont 05495
(802) 879-4333
FAX 879-7103

LABORATORY REPORT

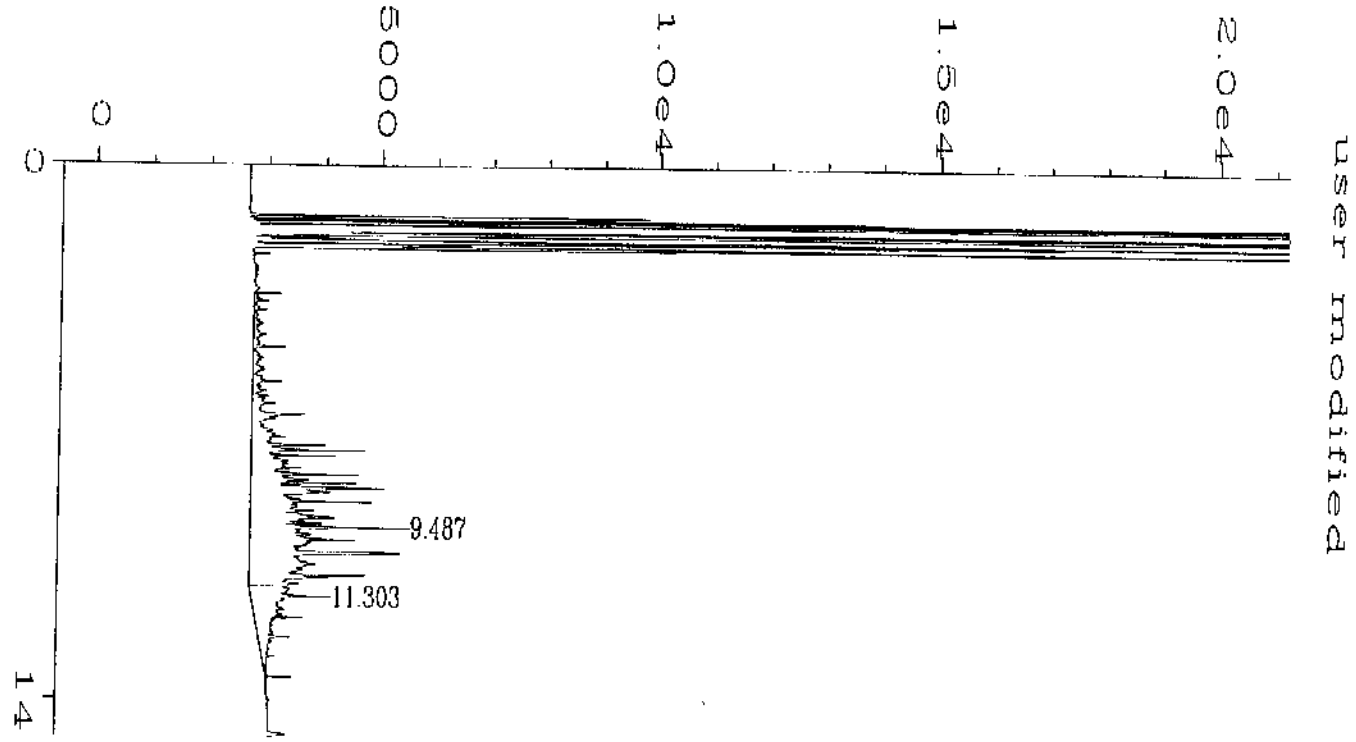
SPECIAL REPORT

CLIENT: Stone Environmental, Inc.
PROJECT NAME: 96-330
REPORT DATE: July 18, 2000
SAMPLER: MR
DATE SAMPLED: June 23, 2000
DATE RECEIVED: June 25, 2000

ORDER ID: 8141
ANALYSIS DATE: July 12, 2000
SITE: MW 11
REF.#: 157,678
TIME SAMPLED: NI

PARAMETER	RESULT	UNIT
TPH 8015 DRO	689,000.	mg/kg
C17/Pristane	0.01	Area Ratio
C18/Phytane	0.07	Area Ratio

ANALYSIS DATE	CYC #	Sample # / Standard I.D.	Inject. Vol.	Conc. Vol.	Initial Vol.	Vial Date	Acquisition Method	Analyst	Notes
07-03-00	06	100ppm Hydrocarb Window	2.0uL			04-29-00	HYDR3	JD	C28:C20 = 1.02
07-03-00	08	Hexane Blank	2.0uL			07-03-00	TPHLN3	JD	No Hydrocarbons Detected
07-03-00	16	157676 100%	2.0uL	2.00ml	30.4ml	06-30-00	TPH2-3	JD	Sample response < 60.0 mg/L
07-03-00	17	Hexane Blank	2.0uL			07-03-00	TPHLN3	JD	No Hydrocarbons Detected
07-03-00	19	100ppm Hydrocarb Window	2.0uL			04-29-00	HYDR3	JD	C28:C20 = 1.15
07-12-00	17	Hexane Blk	2.0uL			07-12-00	TPH2-3	JD	No Hydrocarbons Detected
07-12-00	18	30ppm C17/C18	2.0uL			07-10-00	PRIST3	JD	1 Pt Calibration / RT for C17:Prist & C18:Phyt
07-12-00	19	100ppm Hydro Win	2.0uL			07-12-00	HYDR3	JD	C28:C20 = 0.91
07-12-00	20	2000ppm #2 Fuel 7/12	2.0uL			07-12-00	TPHLN3	JD	Line Check: 94% Recovery
07-12-00	21	Hexane Blk	2.0uL			07-12-00	TPH2-3	JD	No Hydrocarbons Detected
07-12-00	22	Soil Blk	2.0uL	5.00ml	10.0g	07-10-00	PRIST3	JD	No Hydrocarbons Detected
07-12-00	23	Soil QC	2.0uL	5.00ml	10.0g	07-10-00	PRIST3	JD	~125% Recovery C17:Prist & C18:Phyt
07-12-00	24	157675 1-5	2.0uL	5.00ml	5.11g	07-10-00	TPH2-3	JD	TPH Value = 20,400. Mg/Kg
07-12-00	25	Hexane Blk	2.0uL			07-12-00	TPH3-3	JD	No Hydrocarbons Detected
07-12-00	26	157676 #2 100%	2.0uL	1.00ml	0.0240g	07-10-00	TPH2-3	JD	NOT USED -- SEE ABOVE RUNS
07-12-00	27	Hexane Blk	2.0uL			07-12-00	TPH3-3	JD	No Hydrocarbons Detected
07-12-00	28	157677 1-20	2.0uL	5.00ml	6.02g	07-10-00	TPH2-3	JD	TPH Value = 51,600. Mg/Kg
07-12-00	29	Hexane Blk	2.0uL			07-12-00	TPH3-3	JD	No Hydrocarbons Detected
07-12-00	30	157678 1-20	2.0uL	4.00ml	0.2007g	07-10-00	TPH2-3	JD	TPH Value = 689,000. Mg/Kg
07-12-00	31	Hexane Blk	2.0uL			07-12-00	TPH2-3	JD	No Hydrocarbons Detected
07-12-00	33	100ppm Hydro Win	2.0uL			07-12-00	HYDR3	JD	C28:C20 = 0.95 / Fuel ID Standard
07-12-00	37	4000ppm #2 Fuel 7/12	2.0uL			07-12-00	TPHLN3	JD	Line Standard
07-12-00	38	5000ppm #2 Fuel 7/12	2.0uL			07-12-00	TPHLN3	JD	Line Standard / Fuel ID Standard
07-12-00	39	5000ppm #6 Fuel	2.0uL			07-12-00	TPH2-3	JD	Fuel ID Standard
07-12-00	40	5000ppm Kerosene	2.0uL			07-12-00	TPH2-3	JD	Fuel ID Standard
07-12-00	41	1000ppm #2 Fuel 7/12	2.0uL			07-12-00	TPHLN3	JD	Line Standard
07-12-00	43	2000ppm #2 Fuel 7/12	2.0uL			07-12-00	TPHLN3	JD	Line Check: 101% Recovery



Calibrated report not possible because no calibration table exists

Area Percent Report

Data File Name : C:\HPCHEM\1\DATA\FID\07120041.D
Operator : Jake Derivan
Instrument : 608-FID
Sample Name : 1000ppm TPH 7/12
Run Time Bar Code:
Acquired on : 13 Jul 00 09:28 AM
Report Created on: 13 Jul 00 09:47 AM

Page Number : 1
Vial Number : 4
Injection Number : 1
Sequence Line : 1
Instrument Method: TPHLN3.MTH
Analysis Method : TPHTPH.MTH

Sig. 1 in C:\HPCHEM\1\DATA\FID\07120041.D

Pk#	Ret Time	Area	Height	Type	Width	Area %
1	9.487	244362	2839	MM	1.435	84.7371
2	11.303	44015	1427	MM	0.514	15.2629

Total area = 288377

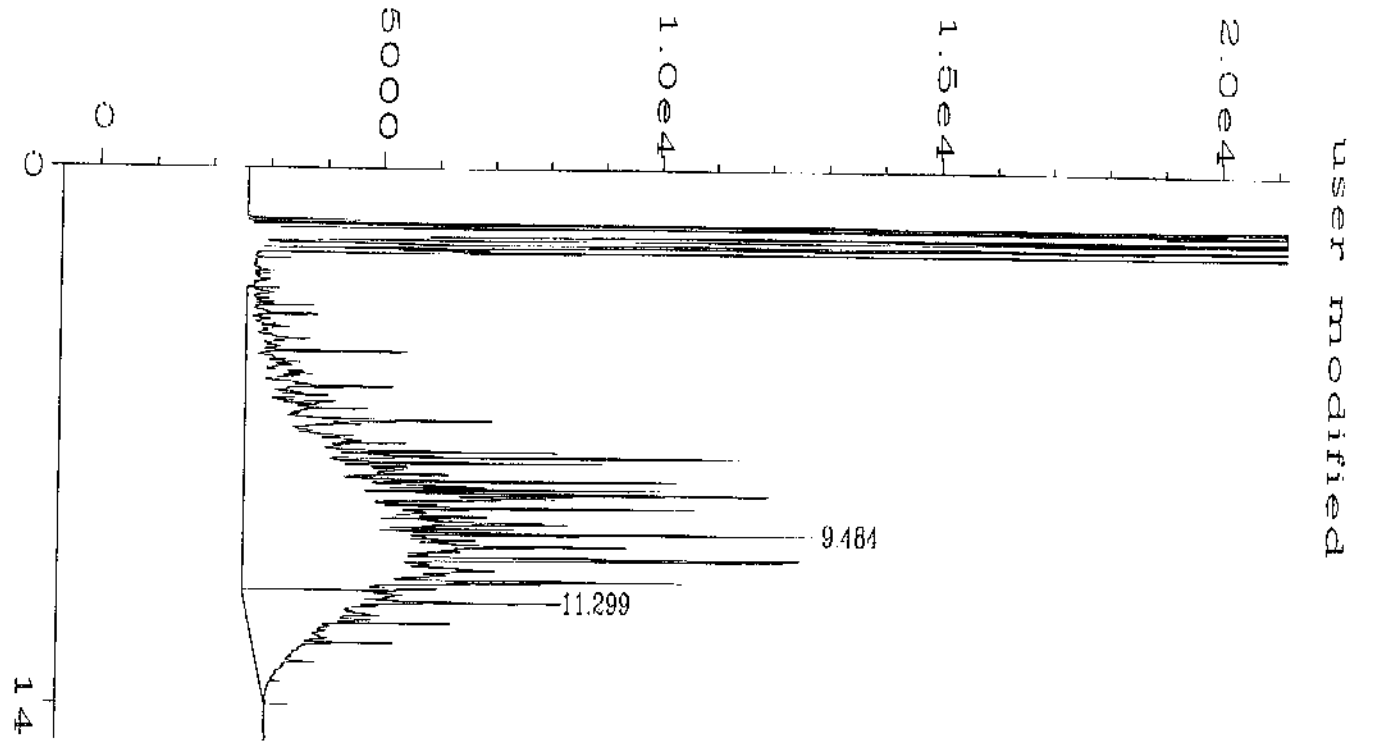
User Modified

Line Standard Packet:

Corr: 0.999931735

Slope: 307.8405

Intcp: -8118.5



Calibrated report not possible because no calibration table exists

Area Percent Report

Data File Name : C:\HPCHEM\1\DATA\FID\07120037.D
Operator : Jake Derivan
Instrument : 608-FID
Sample Name : 4000ppm TPH 7/12
Run Time Bar Code:
Acquired on : 13 Jul 00 04:24 AM
Report Created on: 13 Jul 00 09:10 AM

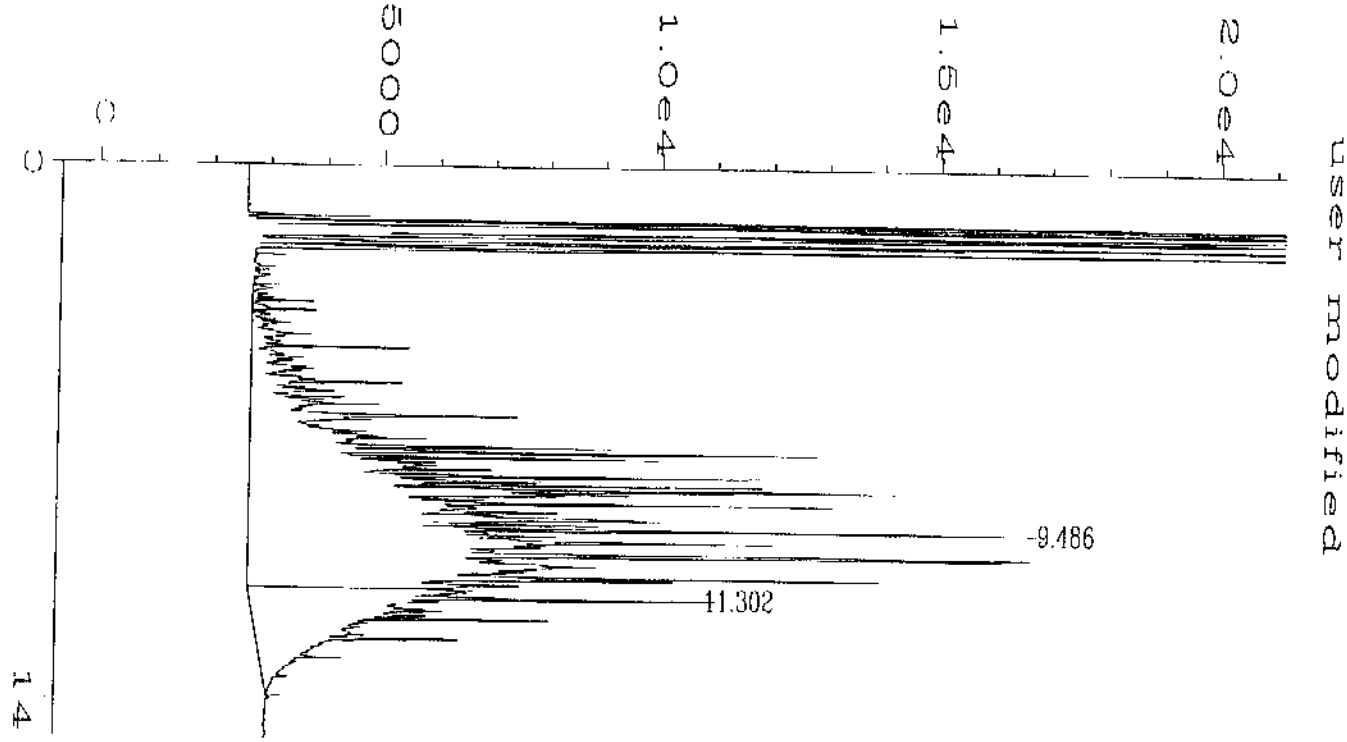
Page Number : 1
Vial Number : 7
Injection Number : 1
Sequence Line : 20
Instrument Method: TPHLN3.MTH
Analysis Method : TPHTPH.MTH

Sig. 1 in C:\HPCHEM\1\DATA\FID\07120037.D

Pk#	Ret Time	Area	Height	Type	Width	Area %
1	9.484	1027182	10573	MM	1.619	83.6446
2	11.299	200849	5691	MM	0.588	16.3554

Total area = 1228031

User Modified



Calibrated report not possible because no calibration table exists

Area Percent Report

Data File Name : C:\HPCHEM\1\DATA\FID\07120038.D
Operator : Jake Derivan
Instrument : 608-FID
Sample Name : 5000ppm TPH 7/12
Run Time Bar Code:
Acquired on : 13 Jul 00 04:45 AM
Report Created on: 13 Jul 00 09:05 AM

Page Number : 1
Vial Number : 8
Injection Number : 1
Sequence Line : 20
Instrument Method: TPHLN3.MTH
Analysis Method : TPHTPH.MTH

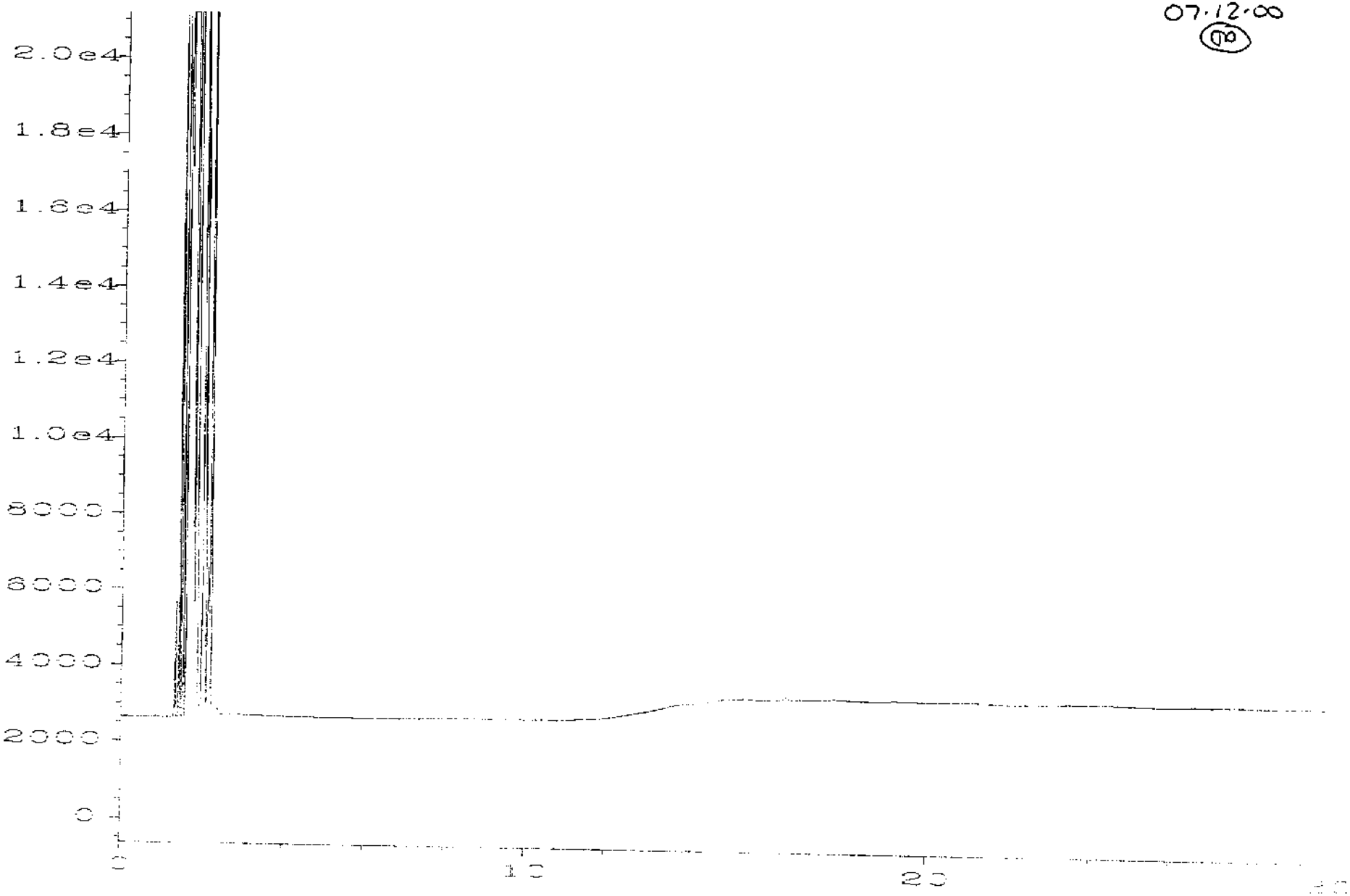
Sig. 1 in C:\HPCHEM\1\DATA\FID\07120038.D

Pk#	Ret Time	Area	Height	Type	Width	Area %
1	9.486	1257331	14230	MM	1.473	82.2041
2	11.302	272192	8421	MM	0.539	17.7959

Total area = 1529523

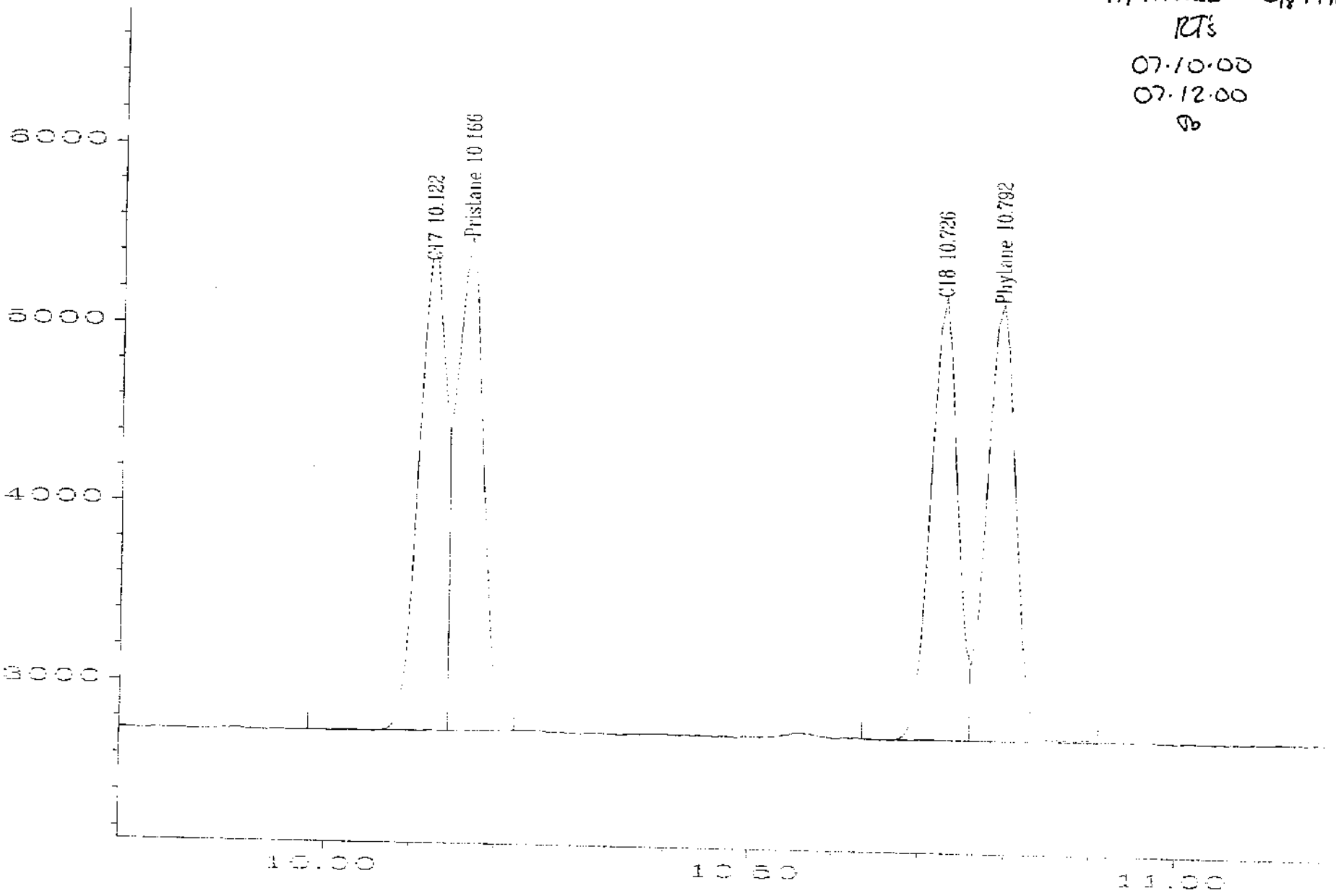
User Modified

Hexane Blank
07.12.00
07.12.00
(98)

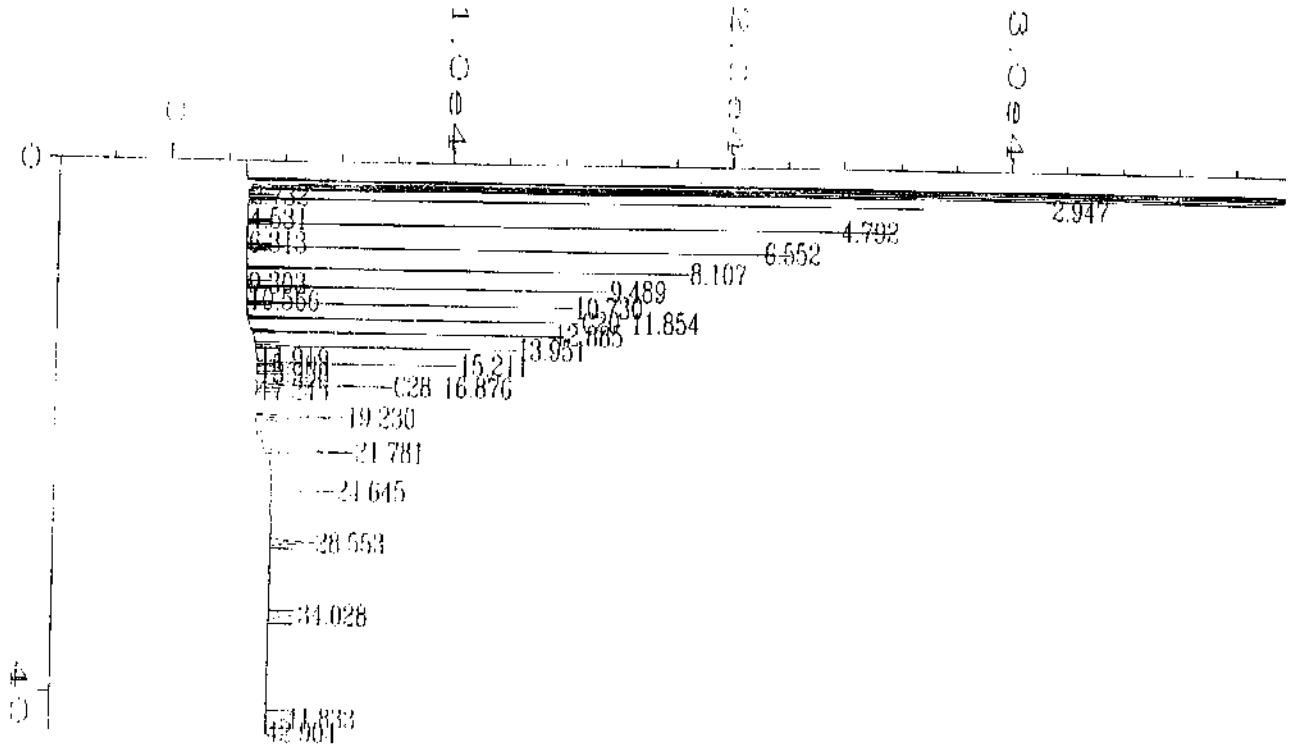


Sig 1 in C:\HPCHEM\1\DATA\FID\07120019.D

TPH DRO
8015
C_{17}/Pristane & C_{18}/Phytane
RT's
07.10.00
07.12.00
DO



Sig. 1 in C:\HPCHEM\1\DATA\FID\07120018.D



External Standard Report

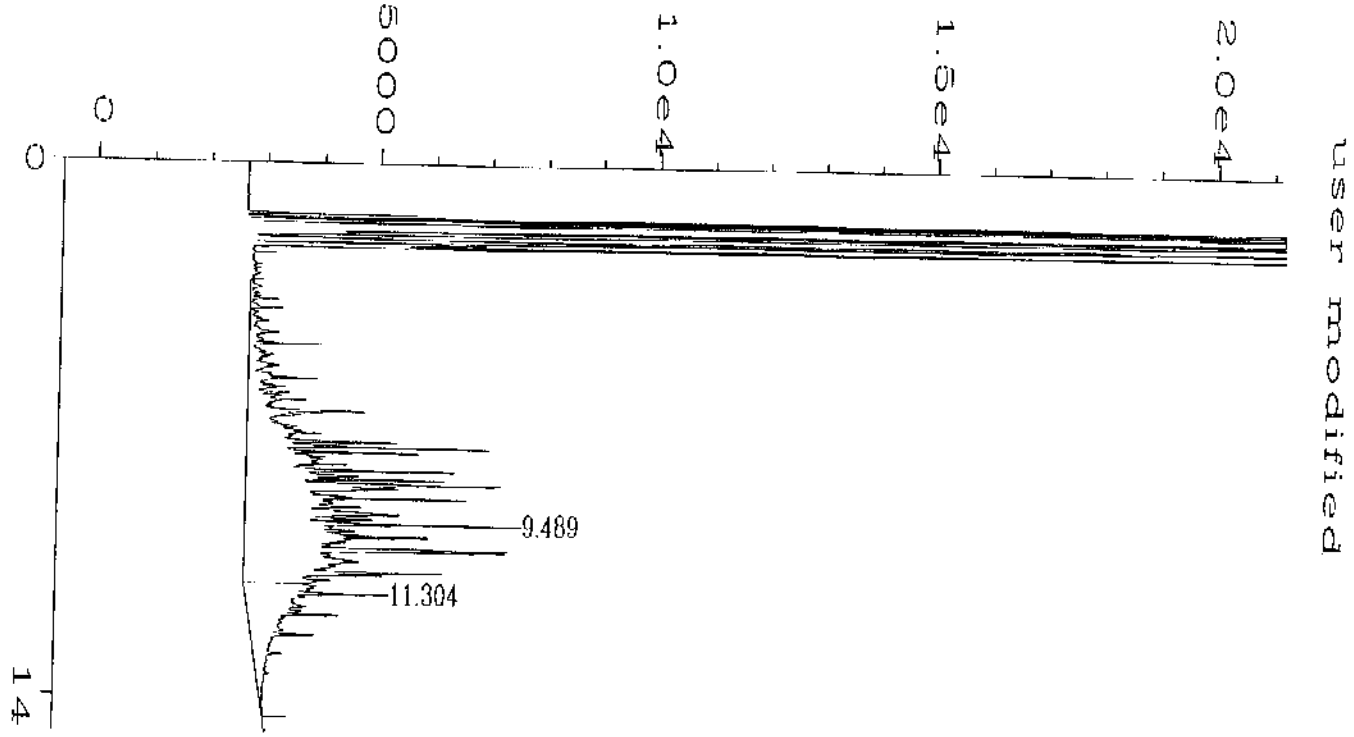
Data File Name	: C:\HPCHEM\1\DATA\FID\07120019.D		
Operator	: Jake Derivan	Page Number	: 1
Instrument	: 608-FID	Vial Number	: 2
Sample Name	: 100ppm Hydro Win (1)	Injection Number	: 1
Run Time Bar Code:		Sequence Line	: 4
Acquired on	: 12 Jul 00 07:30 PM	Instrument Method	: HYDR3.MTH
Report Created on	: 13 Jul 00 08:59 AM	Analysis Method	: C20&C28.MTH
Last Recalib on	: 04 NOV 99 07:53 AM	Sample Amount	: 0
Multiplier	: 1	ISTD Amount	:

Fig. 1 in C:\HPCHEM\1\DATA\FID\07120019.D

Ret Time	Area	Type	Width	Ref#	ng/ul	Name
11.854	26257	BB	0.035	1	0.000	C20
16.876	23985	BB	0.078	1	0.000	C28

Calibration table contains at least one peak with amt = 0

$C_{28} : C_{20} = 0.9135$



alibrated report not possible because no calibration table exists

Area Percent Report

Data File Name : C:\HPCHEM\1\DATA\FID\07120020.D
Operator : Jake Derivan
Instrument : 608-FID
Sample Name : 2000ppm TPH 7/12 (6b)
Run Time Bar Code:
Acquired on : 12 Jul 00 08:19 PM
Report Created on: 13 Jul 00 09:13 AM

Page Number : 1
Vial Number : 15
Injection Number : 1
Sequence Line : 5
Instrument Method: TPHLN3.MTH
Analysis Method : TPHTPH.MTH

Sig. 1 in C:\HPCHEM\1\DATA\FID\07120020.D

Pk#	Ret Time	Area	Height	Type	Width	Area %
1	9.489	479730	4986	MM	1.604	84.1412
2	11.304	90418	2573	MM	0.586	15.8588

Total area = 570148

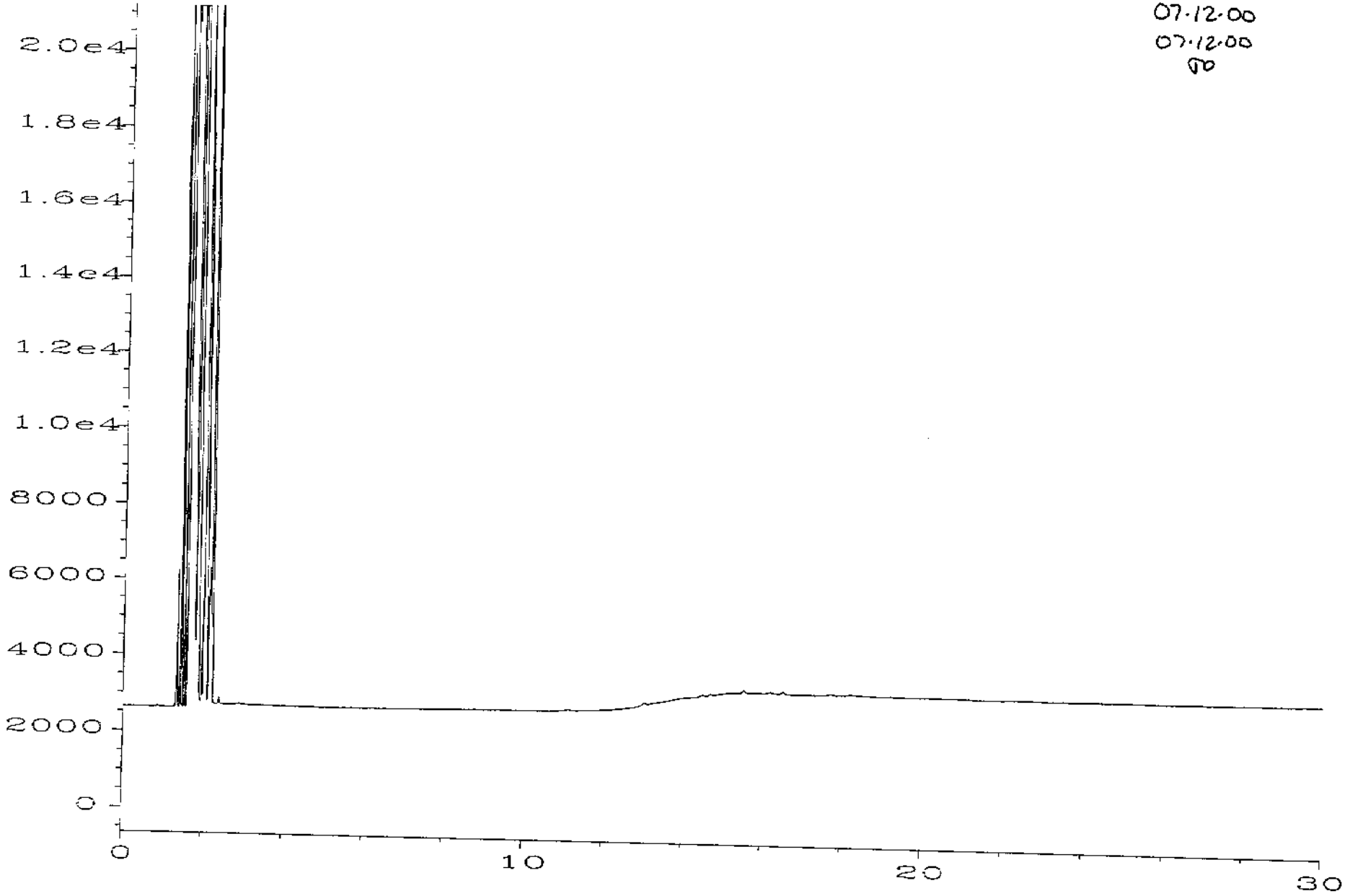
User Modified

TPH Line Check: Result: 1878.4614 mg/mL

Target: 2000 mg/mL

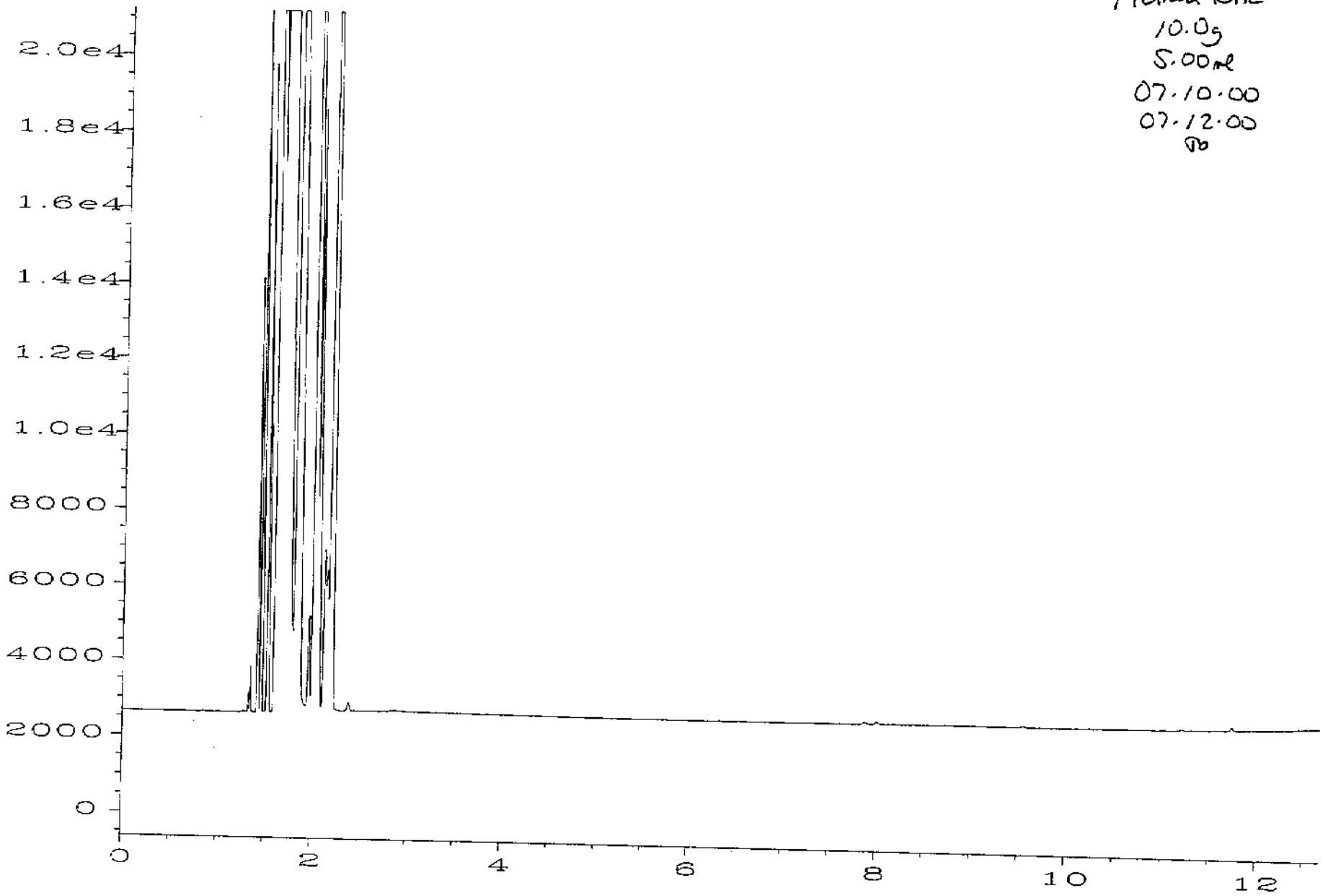
% Rec: 94%

TPH DRO
3015
Hexane Blank
07-12-00
07-12-00
GO

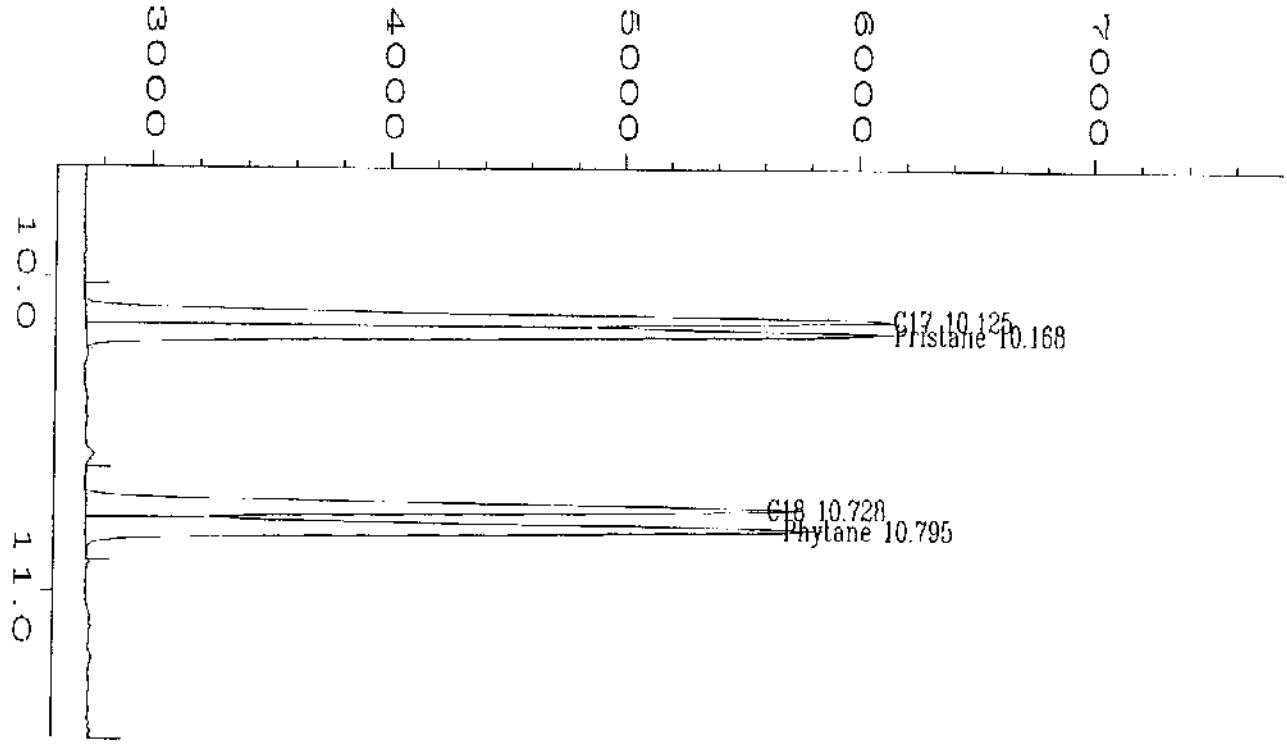


Sig. 1 in C:\HPCHEM\1\DATA\FID\07120021.D

TPH Ord
8015
Method BLK
10.0g
5.00ml
07.10.00
07.12.00
RD



Sig. 1 in C:\HPCHEM\1\DATA\FID\07120022.D



External Standard Report

ata File Name : C:\HPCHEM\1\DATA\FID\07120023.D
Operator : Jake Derivan
Instrument : 608-FID
ample Name : Soil QC
Run Time Bar Code:
Acquired on : 12 Jul 00 09:35 PM
eport Created on: 13 Jul 00 09:41 AM
ast Recalib on : 13 Jul 00 09:40 AM
Multiplier : 1

Page Number : 1
Vial Number : 17
Injection Number : 1
Sequence Line : 7
Instrument Method: PRIST3.MTH
Analysis Method : C17PRIST.MTH
Sample Amount : 0
ISTD Amount :

ig. 1 in C:\HPCHEM\1\DATA\FID\07120023.D

Ret Time	Area	Type	Width	Ref#	ng/ul	Name
10.125	7342	BV	0.032	1	37.537	C17
10.168	7554	VV	0.034	1	37.541	Pristane
10.728	6699	PV	0.035	1	37.335	C18
10.795	7162	VB	0.036	1	37.349	Phytane

Target: 15 mg/kg

C17: $\frac{37.537\,\mu g}{ml} \times \frac{5.00\,ml}{10.0\,g} = 18.7685\,\mu g/g$ %Rec: 125%

Pristane: $\frac{37.541\,\mu g}{ml} \times \frac{5.00\,ml}{10.0\,g} = 18.7705\,\mu g/g$ %Rec: 125%

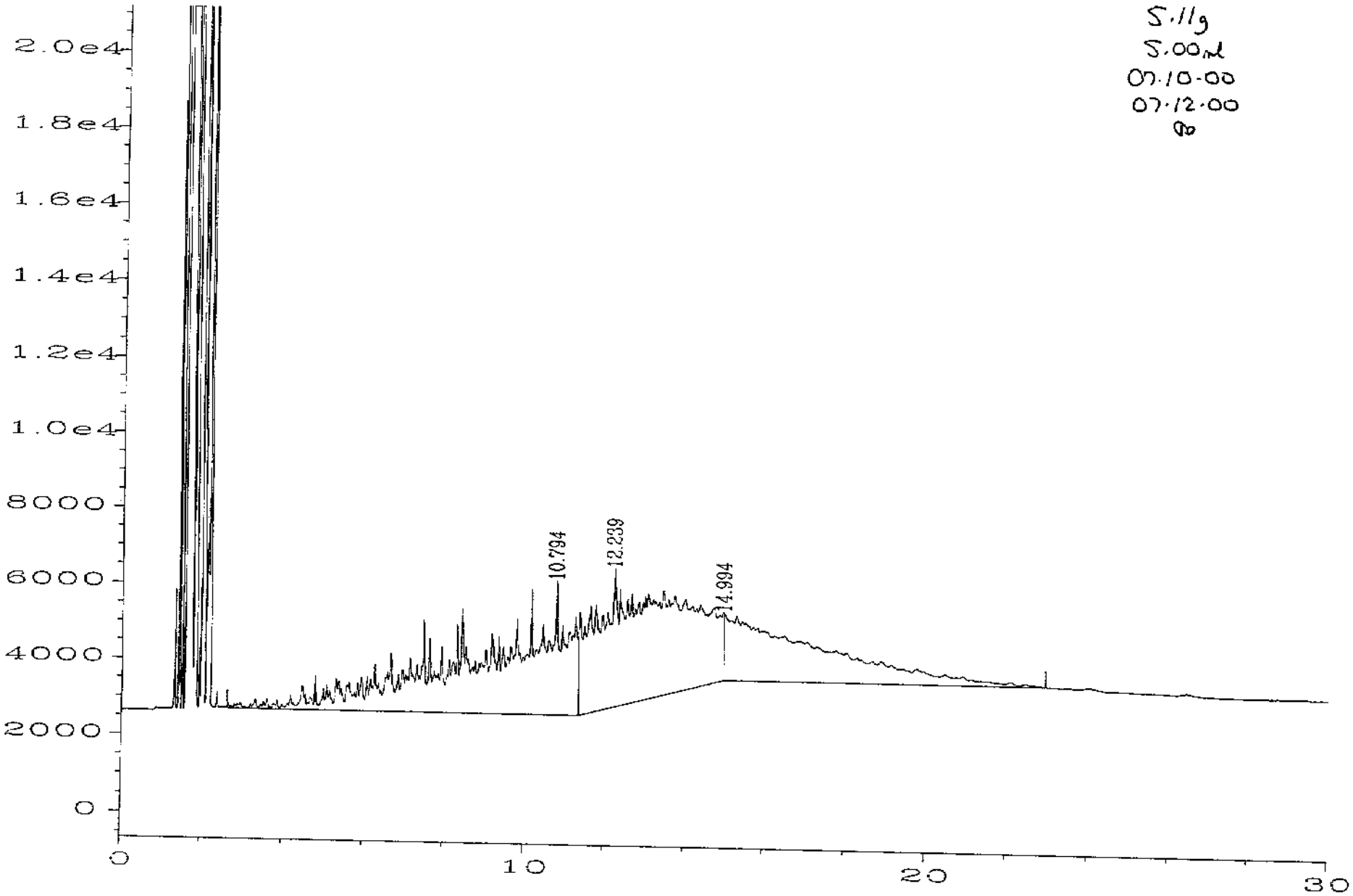
C18: $\frac{37.335\,\mu g}{ml} \times \frac{5.00\,ml}{10.0\,g} = 18.6675\,\mu g/g$ %Rec: 124%

Phytane: $\frac{37.349\,\mu g}{ml} \times \frac{5.00\,ml}{10.0\,g} = 18.6745\,\mu g/g$ %Rec: 124%

TPH Diesel
8015
Method QC
10.0 g
5.00 ml
07.10.00
07.12.00
dp

TPH DRO
8015
157675 1-5 dilution
5.11g
5.00ml
07.10.00
07.12.00
90

user modified



Sig. 1 in C:\HPCHEM\1\DATA\FID\07120024.D

Calibrated report not possible because no calibration table exists

Area Percent Report

Data File Name : C:\HPCHEM\1\DATA\FID\07120024.D
Operator : Jake Derivan
Instrument : 608-FID
Sample Name : 157675 1-5
Run Time Bar Code:
Acquired on : 12 Jul 00 09:54 PM
Report Created on: 13 Jul 00 09:34 AM

Page Number : 1
Vial Number : 9
Injection Number : 1
Sequence Line : 8
Instrument Method: TPH2-3.MTH
Analysis Method : TPHTPH.MTH

Sig. 1 in C:\HPCHEM\1\DATA\FID\07120024.D

Pk#	Ret Time	Area	Height	Type	Width	Area %
1	10.794	482227	3550	MM	2.264	37.8805
2	12.239	498777	3671	MM	2.264	39.1806
3	14.994	292016	1793	MM	1.902	22.9388

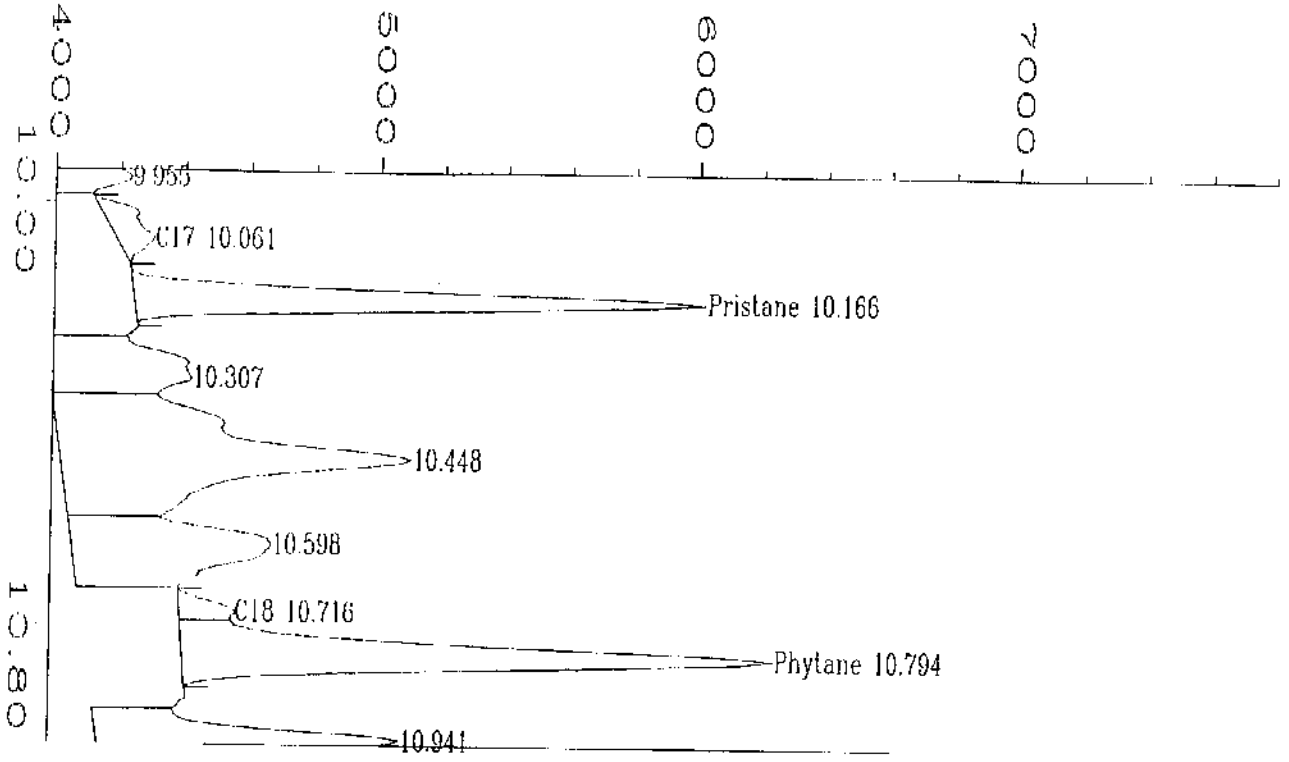
Total area = 1273020

User Modified

$$\frac{4161.6957\ mg}{mL} \times \frac{5.00\ mL}{5.11\ g} = 4072.1093\ mg/kg \times 5$$

$$= 20360.5465\ mg/kg$$

TPH DRO
8015
157675 1-5 SL
5.11g
5.00mL
07.10.00
07.12.00
8



External Standard Report

Data File Name : C:\HPCHEM\1\DATA\FID\07120024.D
Operator : Jake Derivan
Instrument : 608-FID
Sample Name : 157675 1-5 (TD)
Run Time Bar Code:
Acquired on : 12 Jul 00 09:54 PM
Report Created on: 13 Jul 00 12:14 PM
Last Recalib on : 13 Jul 00 09:40 AM
Multiplier : 1

Page Number : 1
Vial Number : 9
Injection Number : 1
Sequence Line : 8
Instrument Method: TPH2-3.MTH
Analysis Method : C17PRIST.MTH
Sample Amount : 0
ISTD Amount :

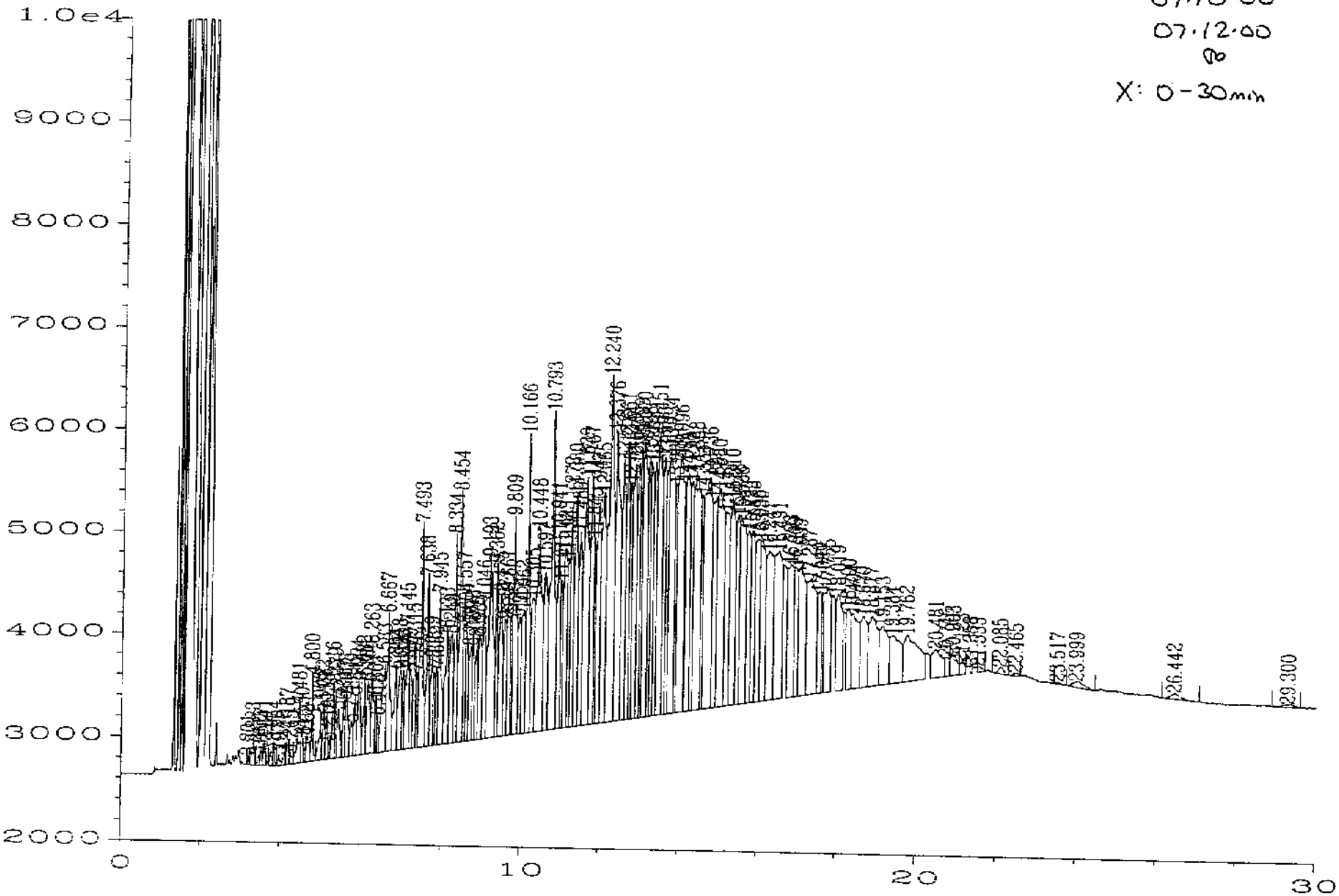
Sig. 1 in C:\HPCHEM\1\DATA\FID\07120024.D

Ret Time	Area	Type	Width	Ref#	ng/ul	Name
10.061	527	MM	0.071	1	2.694	C17
10.166	3832	MM	0.035	1	19.048	Pristane
10.716	392	MM	0.037	1	2.187	C18
10.794	5090	MM	0.046	1	26.548	Phytane

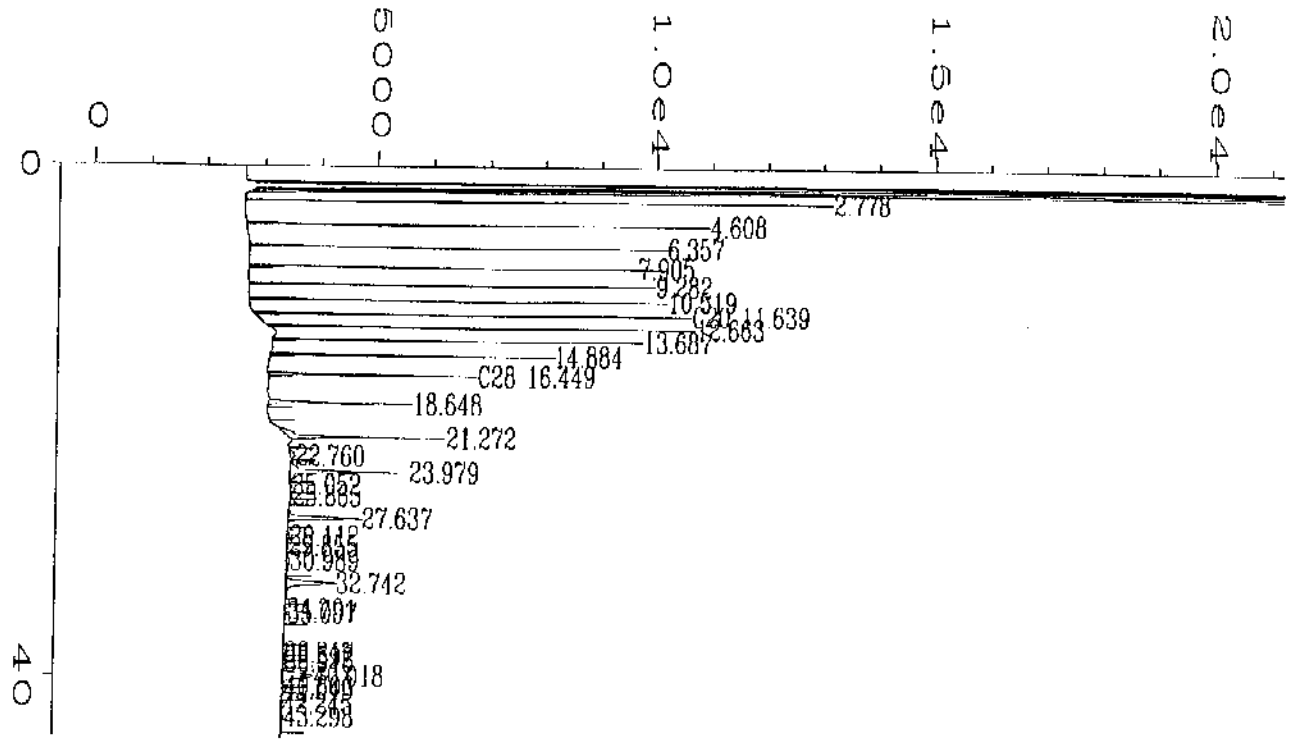
User Modified

C_{17}/Pristane & C_{18}/Phytane area counts

157675
For Fuel ID
07.10.00
07.12.00
8
X: 0-30min



Sig. 1 in C:\HPCHEM\1\DATA\FID\07120024.D



External Standard Report

ata File Name	: C:\HPCHEM\1\DATA\FID\07030006.D		
Operator	: Jake Derivan	Page Number	: 1
Instrument	: 608-FID	Vial Number	: 2
ample Name	: Hydrocarbon Win	Injection Number	: 1
.un Time Bar Code:		Sequence Line	: 1
Acquired on	: 03 Jul 00 03:06 PM	Instrument Method	: HYDR3.MTH
eport Created on	: 01 Aug 00 09:49 AM	Analysis Method	: C20&C28.MTH
ast Recalib on	: 04 NOV 99 07:53 AM	Sample Amount	: 0
Multiplier	: 1	ISTD Amount	:

ig. 1 in C:\HPCHEM\1\DATA\FID\07030006.D

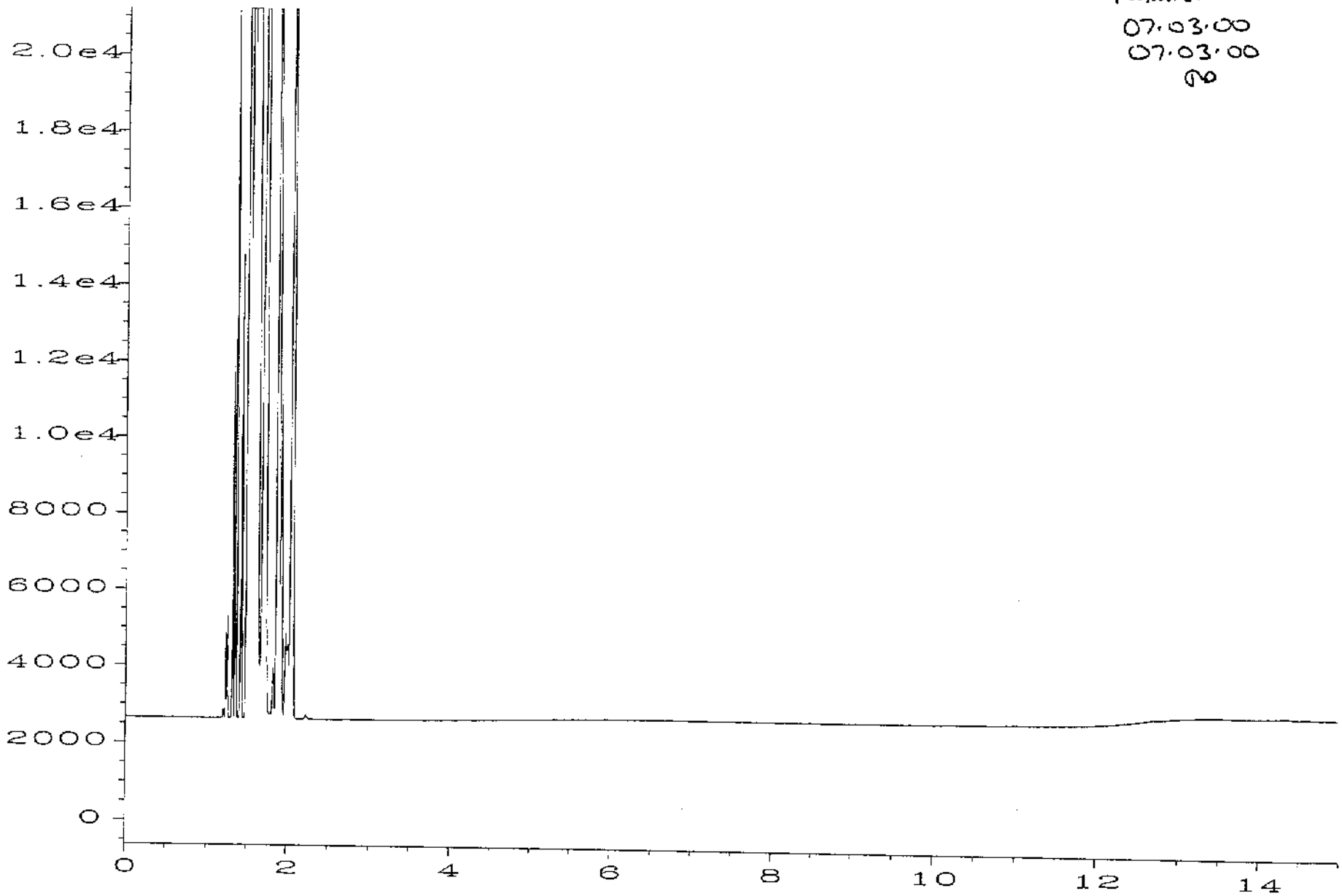
Ret Time	Area	Type	Width	Ref#	ng/ul	Name
11.639	17442	BB	0.035	1	0.000	C20
16.449	17732	BB	0.074	1	0.000	C28

Calibration table contains at least one peak with amt = 0

C28:C20 = 1.02

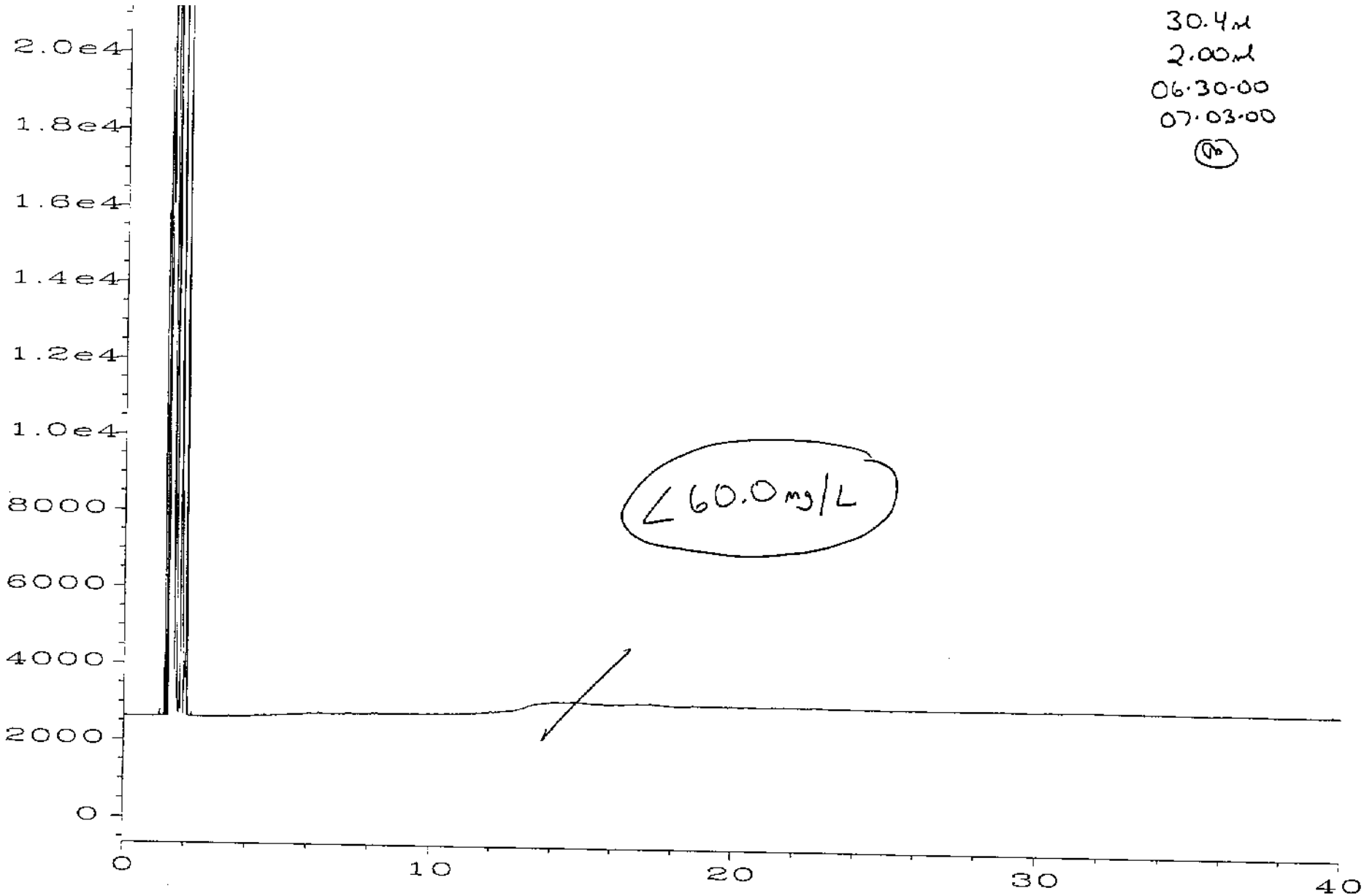
157676 Data Packet

TPH DRO
8015
Hexane Blk
07.03.00
07.03.00
no



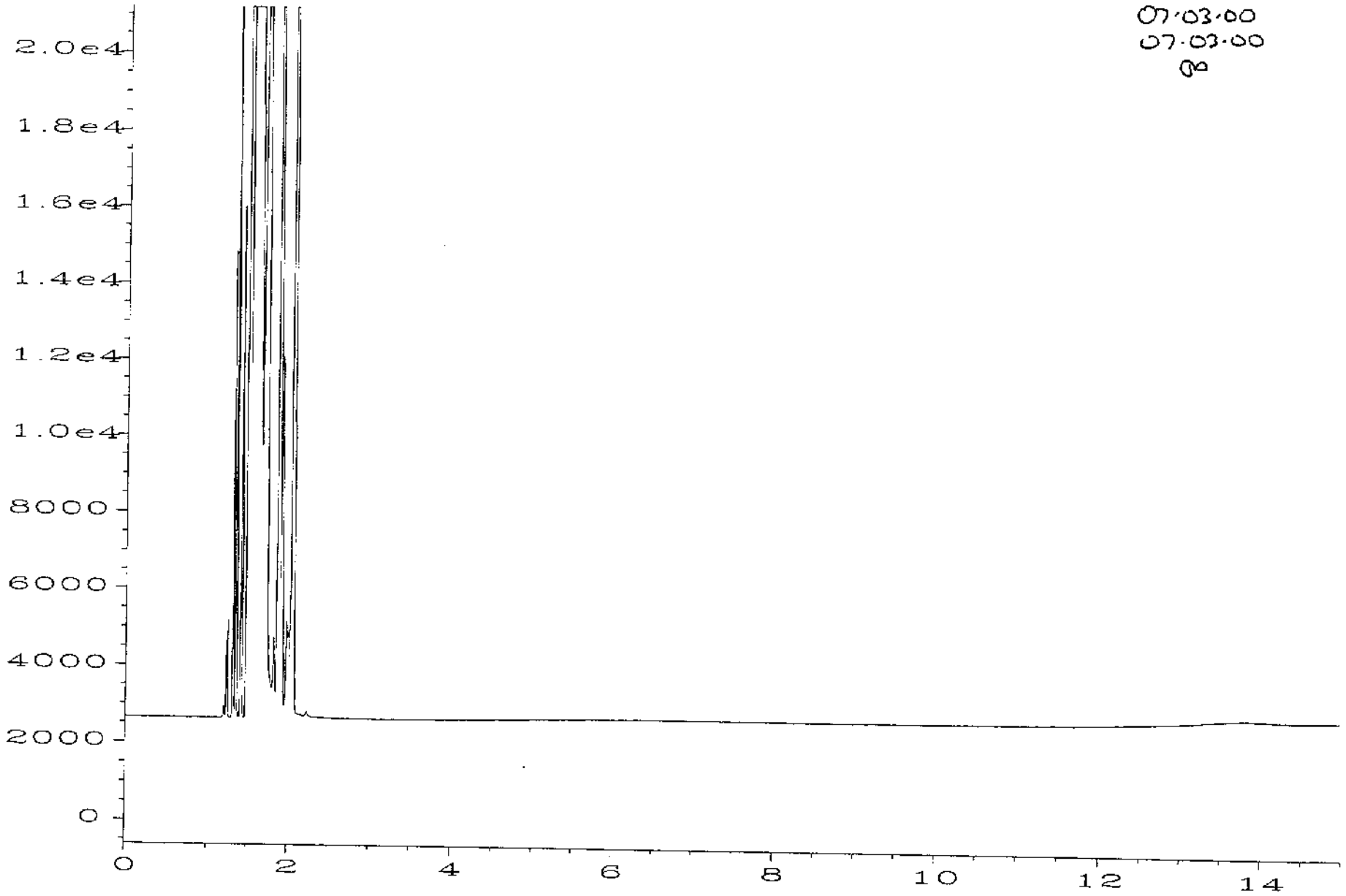
Sig. 1 in C:\HPCHEM\1\DATA\FID\07030008.D

TPH DRO
8015
157676 100%
30.4 mL
2.00 mL
06-30-00
07-03-00
(DO)

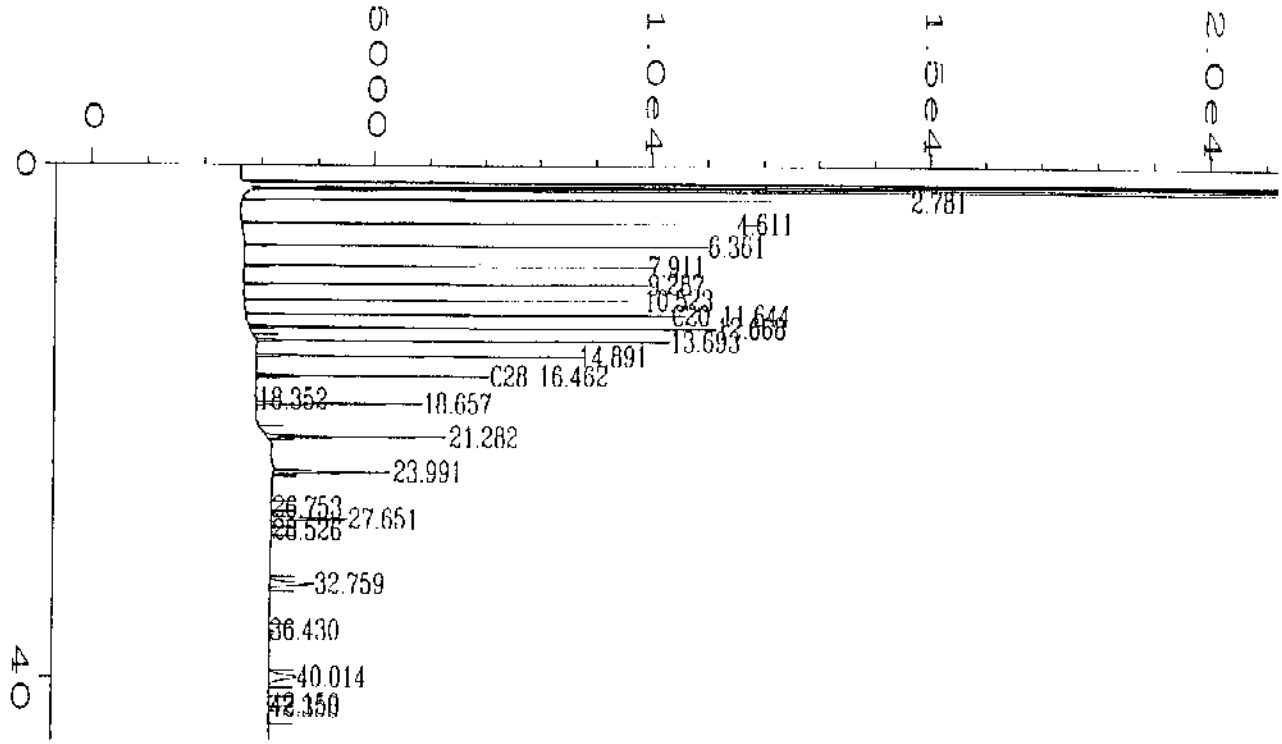


Sig. 1 in C:\HPCHEM\1\DATA\FID\07030016.D

TPH DRO
8015
Hexane Blk
07-03-00
07-03-00
00



Sig. 1 in C:\HPCHEM\1\DATA\FID\070300017.D



External Standard Report

Data File Name : C:\HPCHEM\1\DATA\FID\07030019.D
Operator : Jake Derivan
Instrument : 608-FID
Sample Name : Hydrocarbon Win
Run Time Bar Code:
Acquired on : 03 Jul 00 09:52 PM
Report Created on: 01 Aug 00 09:51 AM
Last Recalib on : 04 NOV 99 07:53 AM
Multiplier : 1

Page Number : 1
Vial Number : 2
Injection Number : 1
Sequence Line : 10
Instrument Method: HYDR3.MTH
Analysis Method : C20&C28.MTH
Sample Amount : 0
ISTD Amount :

Fig. 1 in C:\HPCHEM\1\DATA\FID\07030019.D

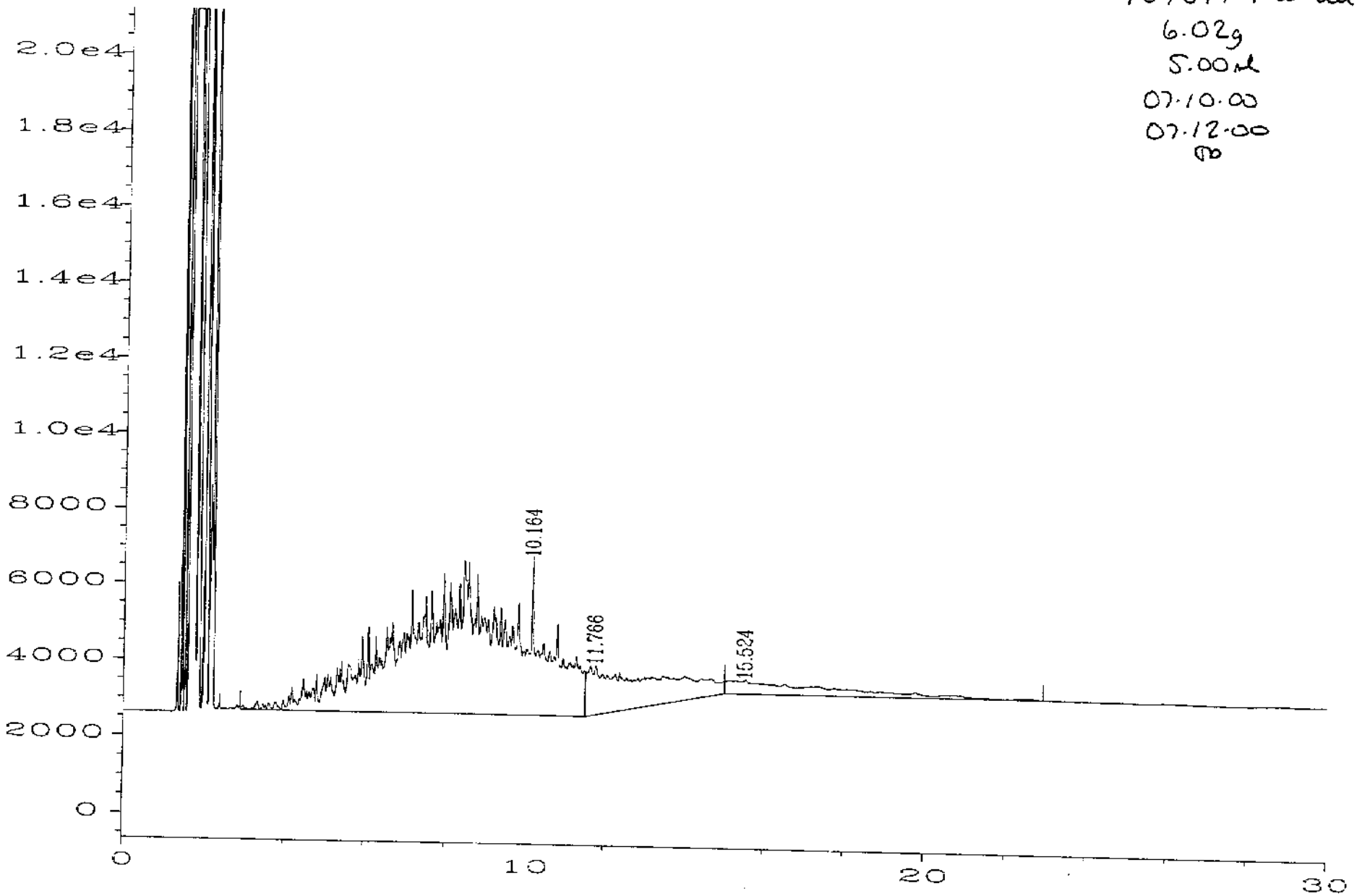
Ret Time	Area	Type	Width	Ref#	ng/ul	Name
11.644	17930	BB	0.035	1	0.000	C20
16.462	20614	BB	0.077	1	0.000	C28

Calibration table contains at least one peak with amt = 0

C28:C20 = 1.15

TPH DRO
8015
157677 1-20 dil
6.02g
5.00ml
07.10.00
07.12.00
RO

user modified



Sig. 1 in C:\HPCHEM\1\DATA\FID\07120028.D

Calibrated report not possible because no calibration table exists

Area Percent Report

Data File Name : C:\HPCHEM\1\DATA\FID\07120028.D
Operator : Jake Derivan
Instrument : 608-FID
Sample Name : 157677 1-20
Run Time Bar Code:
Acquired on : 12 Jul 00 11:57 PM
Report Created on: 13 Jul 00 09:37 AM

Page Number : 1
Vial Number : 11
Injection Number : 1
Sequence Line : 12
Instrument Method: TPH2-3.MTH
Analysis Method : TPHTPH.MTH

Sig. 1 in C:\HPCHEM\1\DATA\FID\07120028.D

Pk#	Ret Time	Area	Height	Type	Width	Area %
1	10.164	729653	4247	MM	2.863	76.9740
2	11.766	149156	1315	MM	1.890	15.7350
3	15.524	69113	389	MM	2.964	7.2910

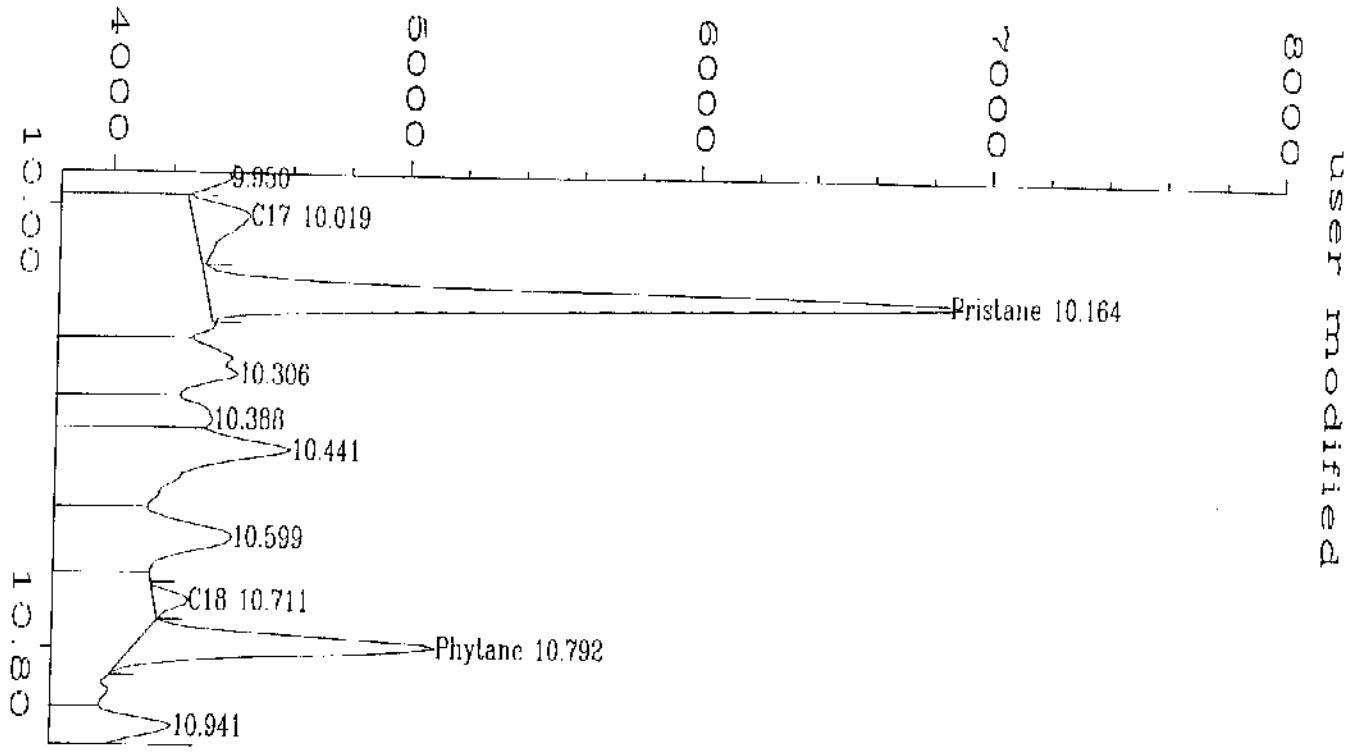
Total area = 947922

User Modified

$$\frac{3105.6358\ mg}{ml} \times \frac{5.00\ ml}{6.02\ g} = 2579.4317\ mg/kg \times 20$$

$$= 51588.6357\ mg/kg$$

TPH 0120
8015
157677 1-20di
6.02g
5.00ml
07.10.00
07.12.00



External Standard Report

ata File Name	: C:\HPCHEM\1\DATA\FID\07120028.D		
Operator	: Jake Derivan	Page Number	: 1
Instrument	: 608-FID	Vial Number	: 11
ample Name	: 157677 1-20	Injection Number	: 1
un Time Bar Code:		Sequence Line	: 12
Acquired on	: 12 Jul 00 11:57 PM	Instrument Method	: TPH2-3.MTH
eport Created on	: 13 Jul 00 10:57 AM	Analysis Method	: C17PRIST.MTH
ast Recalib on	: 13 Jul 00 09:40 AM	Sample Amount	: 0
Multiplier	: 1	ISTD Amount	:

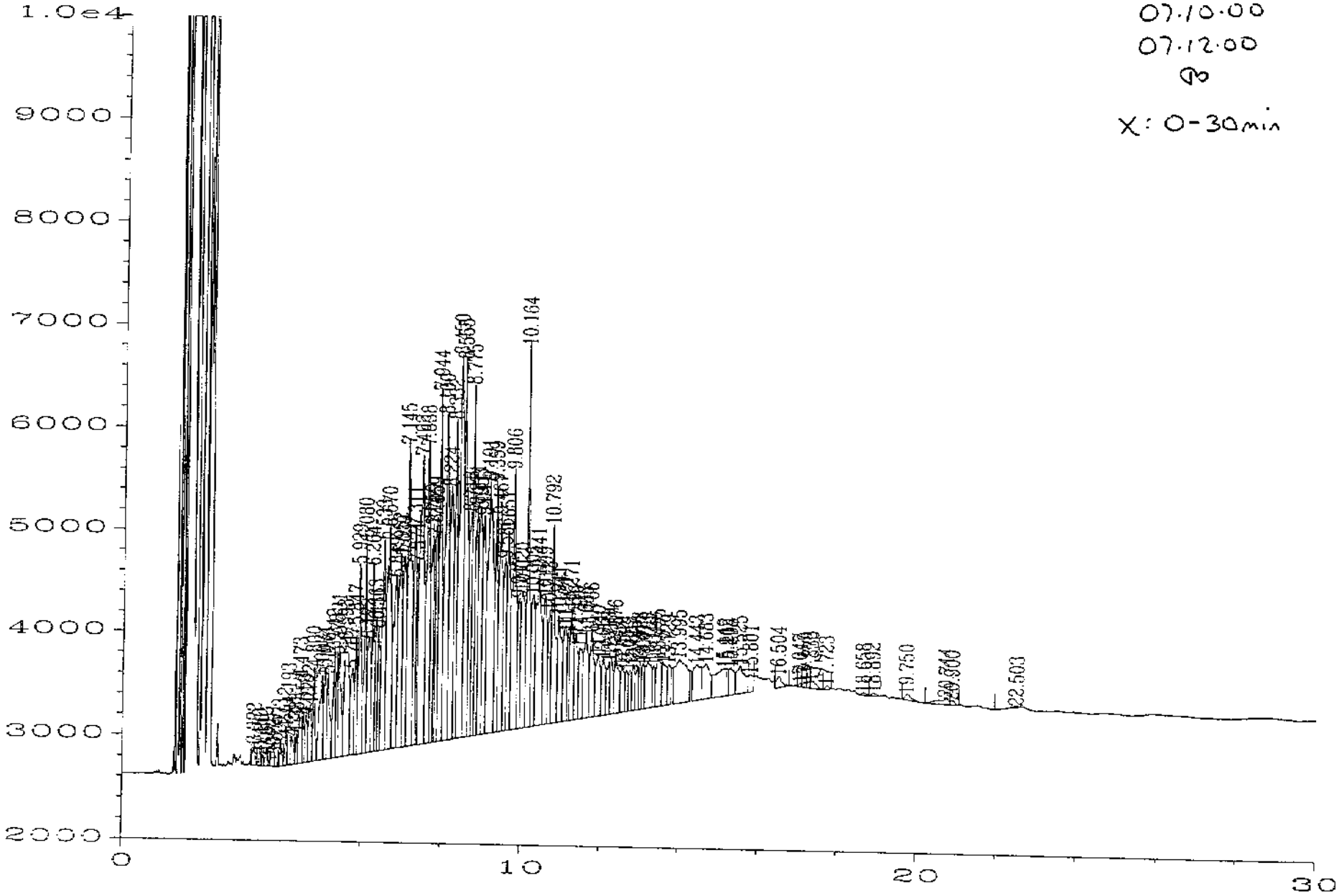
ig. 1 in C:\HPCHEM\1\DATA\FID\07120028.D

ret Time	Area	Type	Width	Ref#	ng/ul	Name
10.019	741	MM	0.062	1	3.788	C17
10.164	5902	MM	0.037	1	29.333	Pristane
10.711	234	MM	0.033	1	1.306	C18
10.792	2477	MM	0.040	1	12.918	Phytane

User Modified

C_{17}/Pristane & C_{18}/Phytane area counts

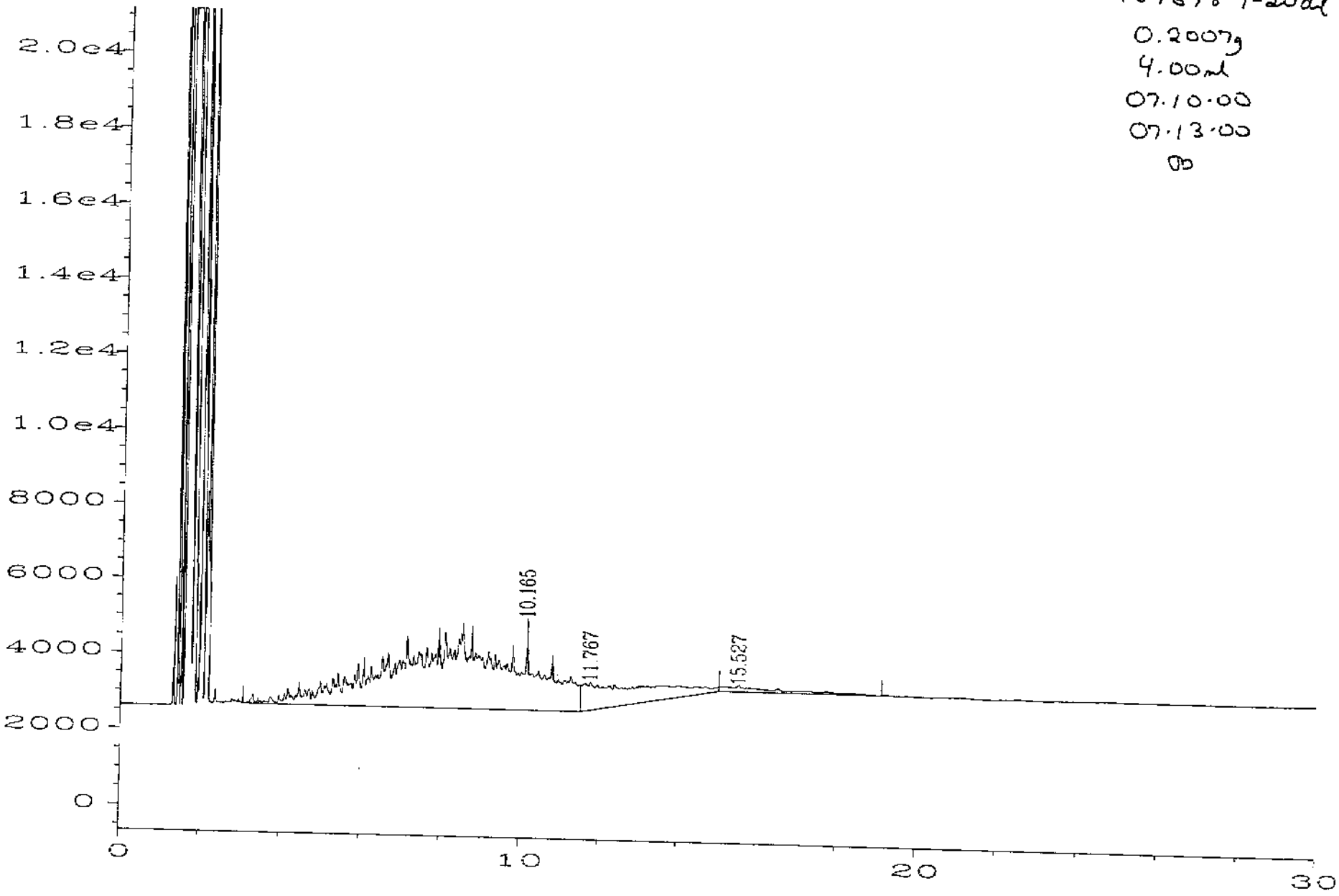
157677
for Fuel ID
07.10.00
07.12.00
90
X: 0-30min



Sig. 1 in C:\HPCHEM\1\DATA\FID\07120028.D

TPH DRO
8015
157678 1-20 dil
0.2007g
4.00ml
07.10.00
07.13.00
DD

user modified



Sig. 1 in C:\HPCHEM\1\DATA\FID\07120030.D

Calibrated report not possible because no calibration table exists

Area Percent Report

Data File Name : C:\HPCHEM\1\DATA\FID\07120030.D
Operator : Jake Derivan
Instrument : 608-FID
Sample Name : 157678 1-20
Run Time Bar Code:
Acquired on : 13 Jul 00 00:58 AM
Report Created on: 13 Jul 00 09:38 AM

Page Number : 1
Vial Number : 12
Injection Number : 1
Sequence Line : 14
Instrument Method: TPH2-3.MTH
Analysis Method : TPHTPH.MTH

Sig. 1 in C:\HPCHEM\1\DATA\FID\07120030.D

Pk#	Ret Time	Area	Height	Type	Width	Area %
1	10.165	426648	2451	MM	2.901	81.4220
2	11.767	81793	759	MM	1.796	15.6094
3	15.527	15555	183	MM	1.419	2.9686

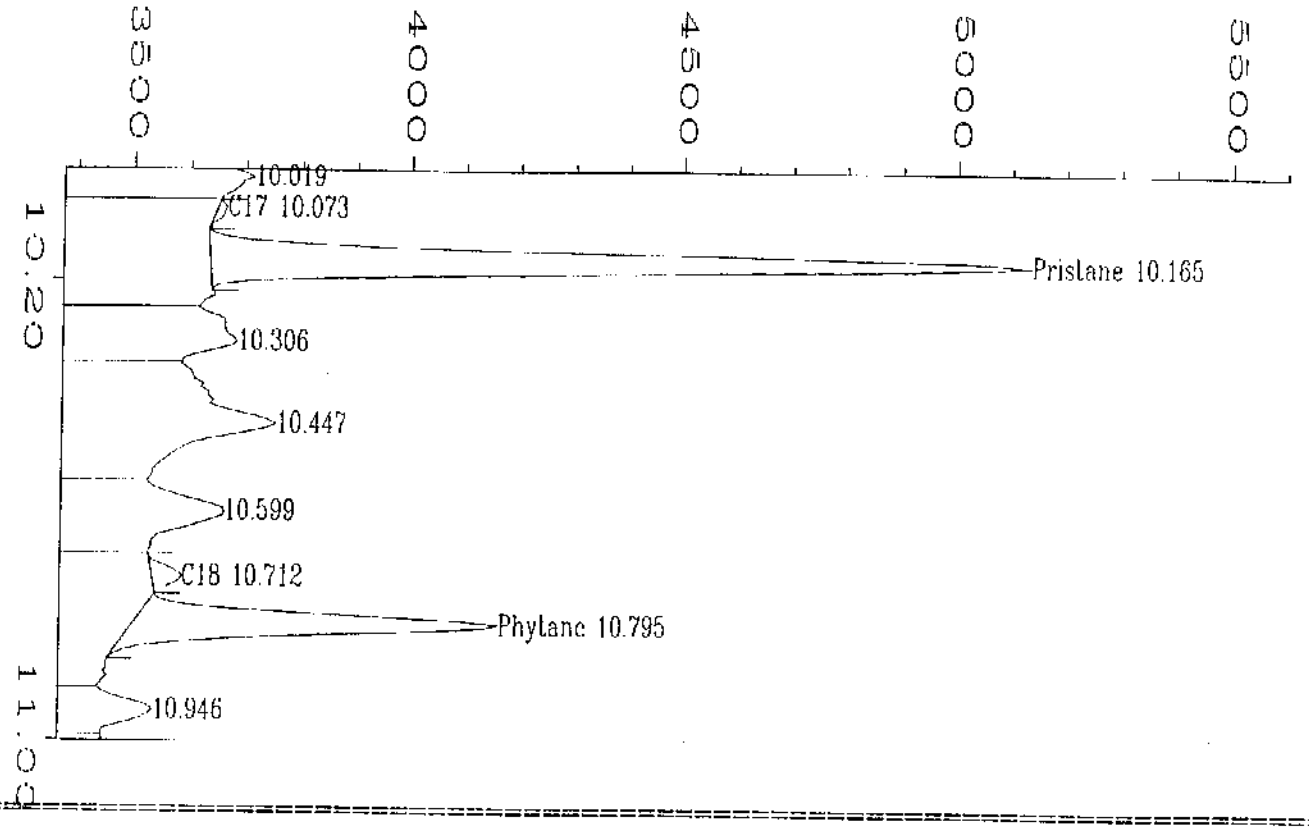
Total area = 523996

User Modified

$$\frac{1728.5396\,\mu g}{ml} \times \frac{4.00\,ml}{0.2007\,g} = 34450.2166\,mg/kg \times 20$$

$$= 689004.3316\,mg/kg$$

TPH DRO
8015
157678 1-20 ml
0.2007g
4.00ml
07.10.00
07.13.00
DB



External Standard Report

Data File Name	: C:\HPCHEM\1\DATA\FID\07120030.D		
Operator	: Jake Derivan	Page Number	: 1
Instrument	: 608-FID	Vial Number	: 12
Sample Name	: 157678 1-20	Injection Number	: 1
Run Time Bar Code:		Sequence Line	: 14
Acquired on	: 13 Jul 00 00:58 AM	Instrument Method	: TPH2-3.MTH
Report Created on	: 13 Jul 00 10:59 AM	Analysis Method	: C17PRIST.MTH
Last Recalib on	: 13 Jul 00 09:40 AM	Sample Amount	: 0
Multiplier	: 1	ISTD Amount	:

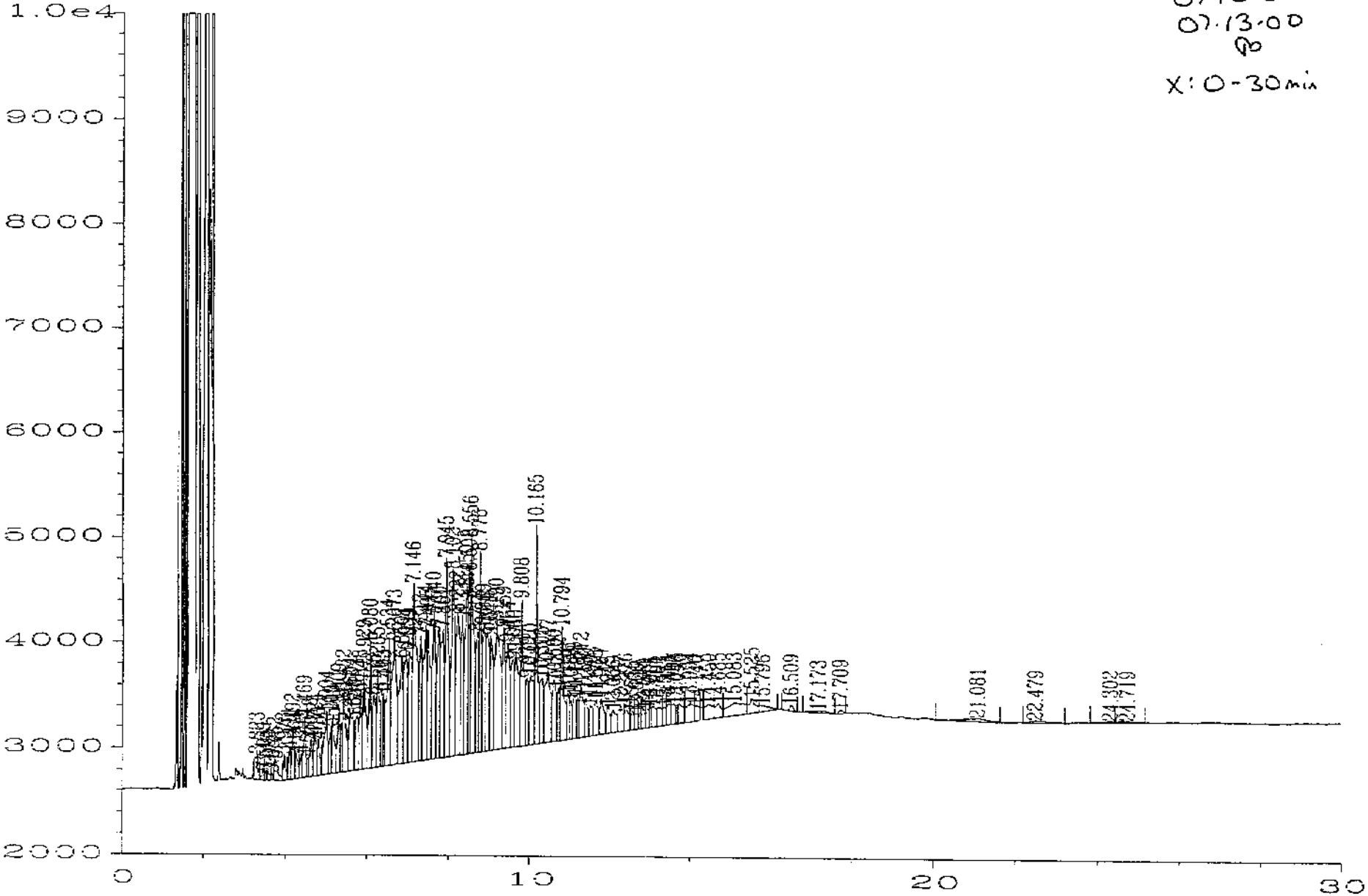
Sig. 1 in C:\HPCHEM\1\DATA\FID\07120030.D

Ret Time	Area	Type	Width	Ref#	ng/ul	Name
10.073	26	MM	0.031	1	0.133	C17
10.165	3382	MM	0.037	1	16.810	Pristane
10.712	107	MM	0.033	1	0.596	C18
10.795	1582	MM	0.040	1	8.250	Phytane

User Modified

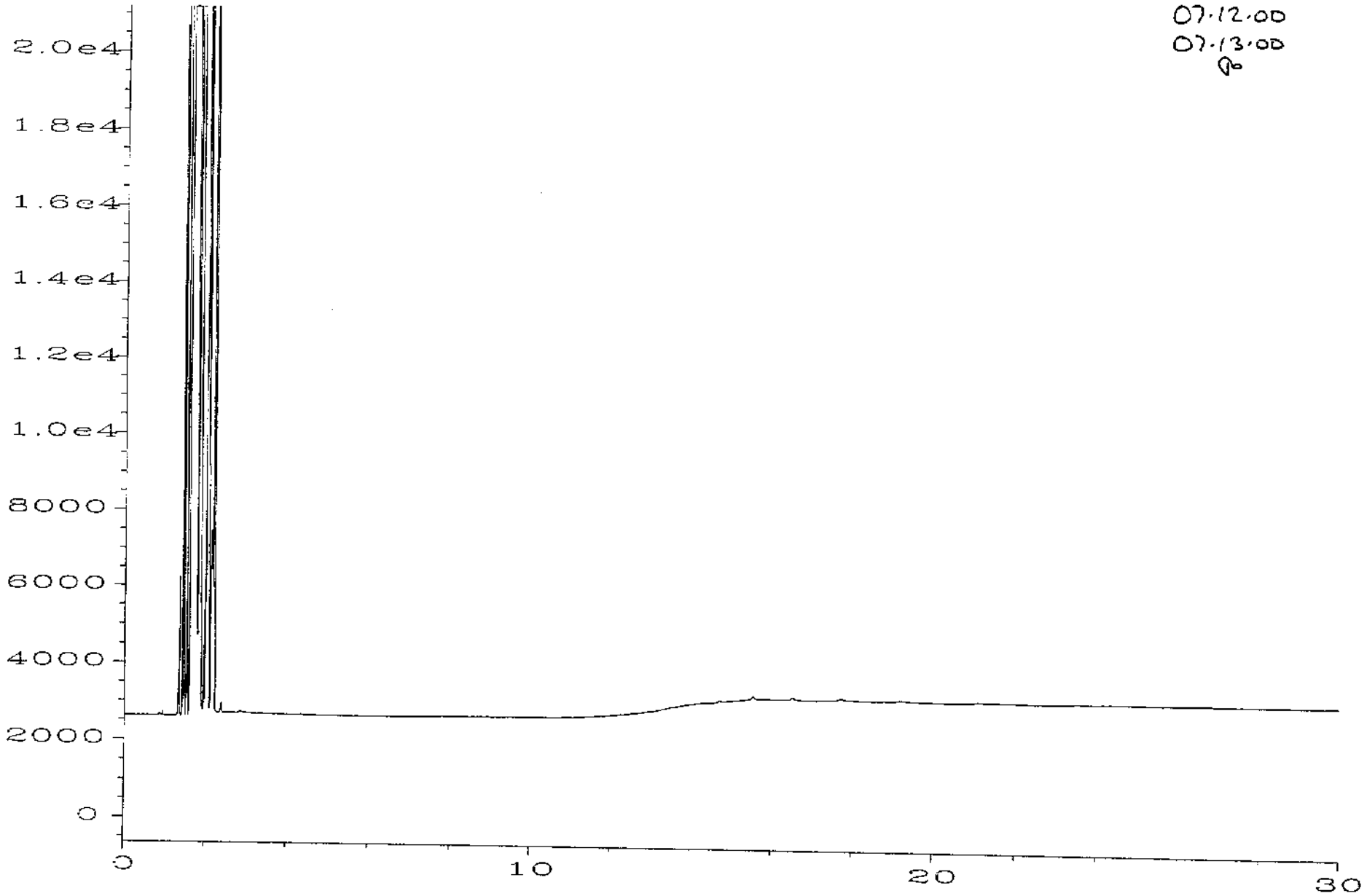
C_{17} / Pristane & C_{18} / Phytane area counts

157678
for Fuel ID
07-10-00
07-13-00
90
X: 0-30 min

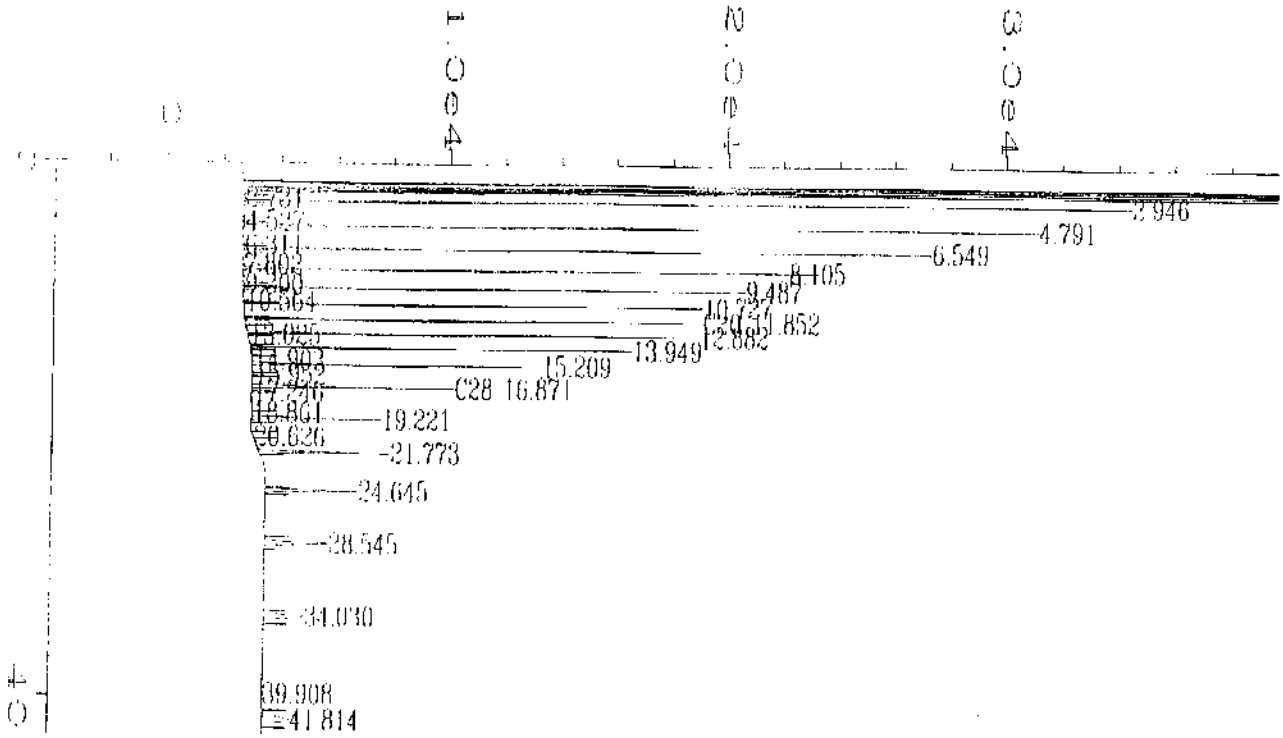


Sig. 1 in C:\HPCHEM\1\DATA\FID\07120030.D

TPH DRO
8015
Hexane Blank
07.12.00
07.13.00
Q



Sig. 1 in C:\HPCHEM\1\DATA\FID\07120031.D



External Standard Report

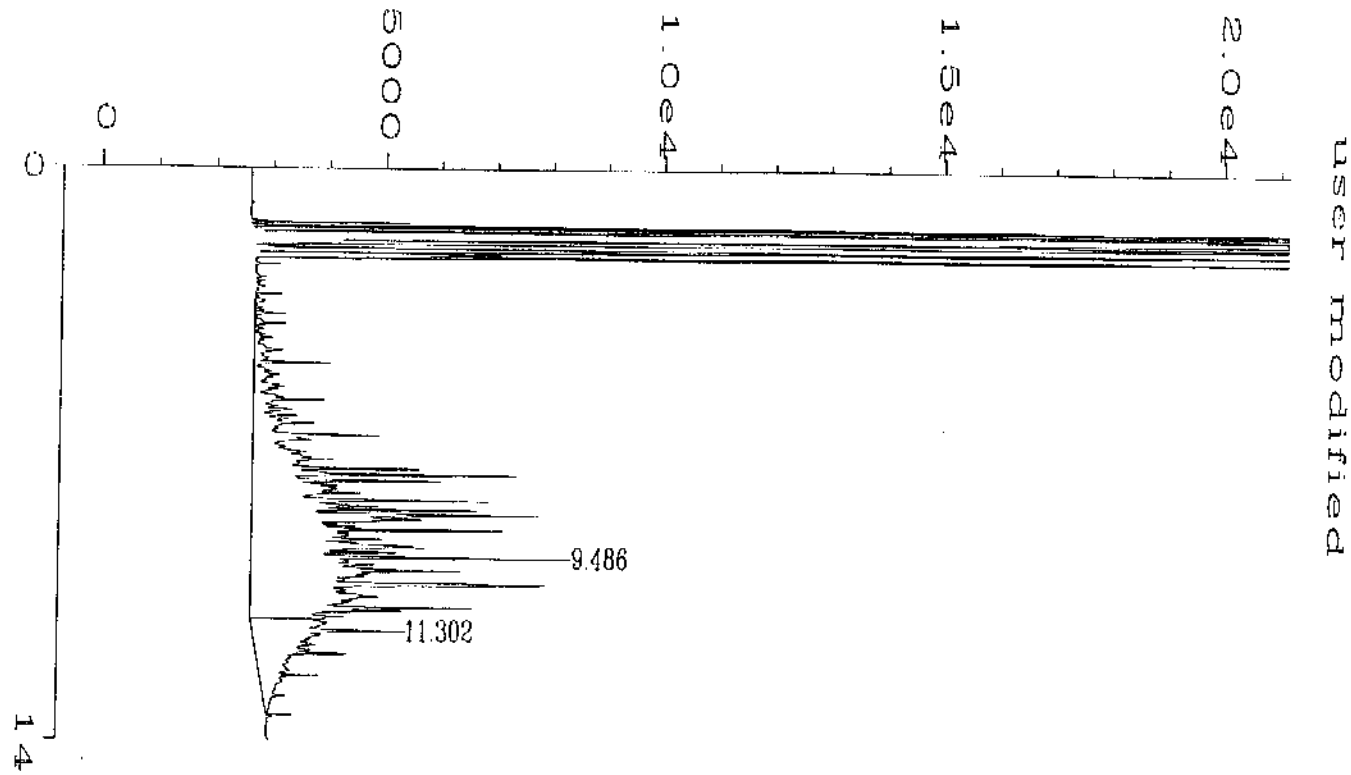
ata File Name	: C:\HPCHEM\1\DATA\FID\07120033.D		
Operator	: Jake Derivan	Page Number	: 1
Instrument	: 608-FID	Vial Number	: 2
ample Name	: 100ppm Hydro Win	Injection Number	: 1
an Time Bar Code:		Sequence Line	: 17
Acquired on	: 13 Jul 00 02:31 AM	Instrument Method	: HYDR3.MTH
Report Created on	: 13 Jul 00 09:00 AM	Analysis Method	: C20&C28.MTH
Last Recalib on	: 04 NOV 99 07:53 AM	Sample Amount	: 0
Multiplier	: 1	ISTD Amount	:

e.g. 1 in C:\HPCHEM\1\DATA\FID\07120033.D

Ret Time	Area	Type	Width	Ref#	ng/ul	Name
11.852	36848	BB	0.035	1	0.000	C20
16.871	35069	BB	0.075	1	0.000	C28

Calibration table contains at least one peak with amt = 0

$C_{28} / C_{20} = 0.9517$



Calibrated report not possible because no calibration table exists

Area Percent Report

Data File Name : C:\HPCHEM\1\DATA\FID\07120043.D
Operator : Jake Derivan
Instrument : 608-FID
Sample Name : 2000ppm TPH 7/12
Run Time Bar Code:
Acquired on : 13 Jul 00 10:17 AM
Report Created on: 13 Jul 00 10:49 AM

Page Number : 1
Vial Number : 5
Injection Number : 1
Sequence Line : 2
Instrument Method: TPHLN3.MTH
Analysis Method : TPHTPH.MTH

Sig. 1 in C:\HPCHEM\1\DATA\FID\07120043.D

Pk#	Ret Time	Area	Height	Type	Width	Area %
1	9.486	524996	5750	MM	1.522	85.9447
2	11.302	85857	2763	MM	0.518	14.0553

Total area = 610853

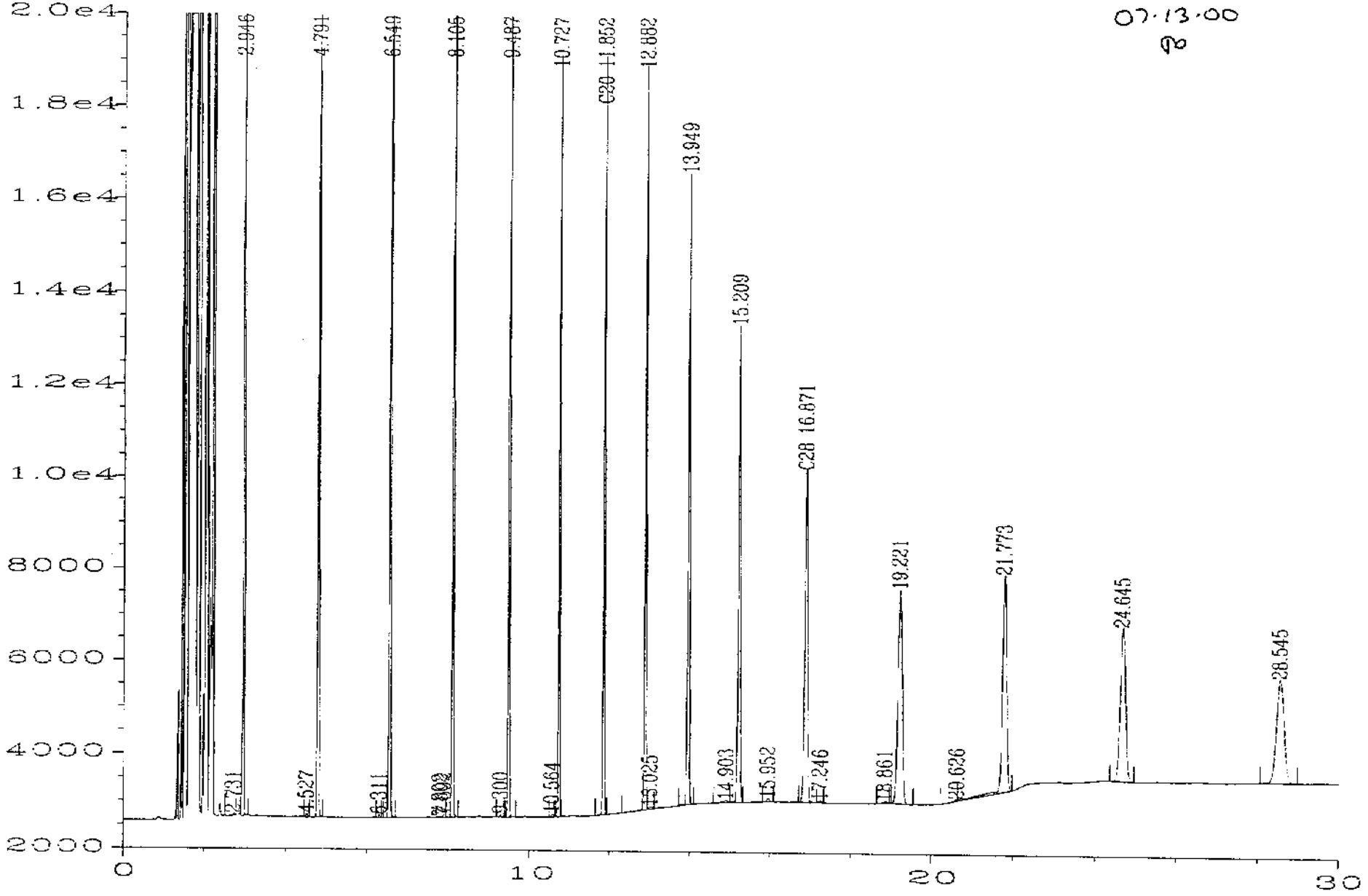
User Modified

Result: 2010.6889 mg/ml

Target: 2000 mg/ml

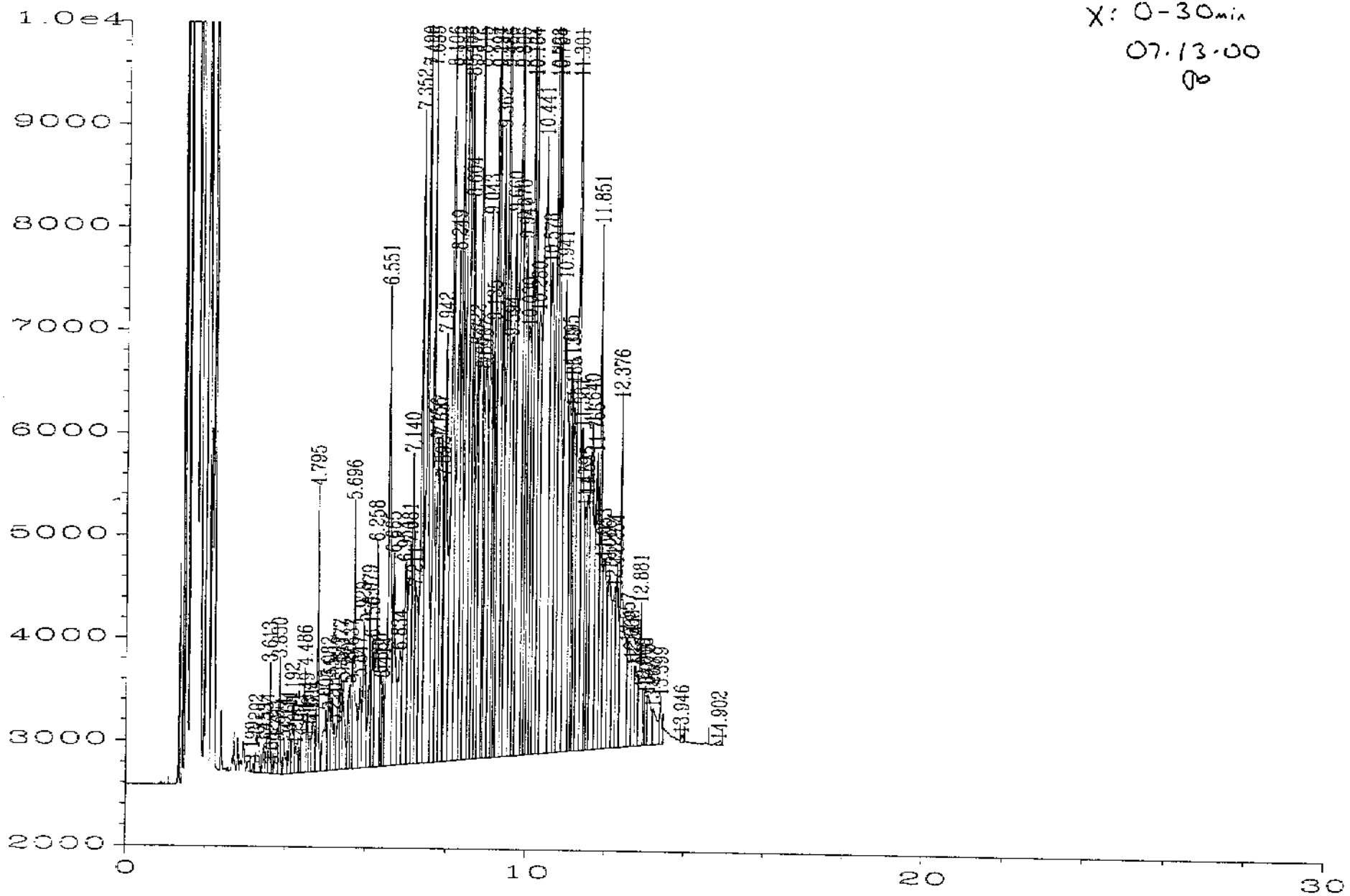
% Rec: 101 %

Hydrocarbon Window
C8 - C36
X: 0 - 30 min
07.13.00
90



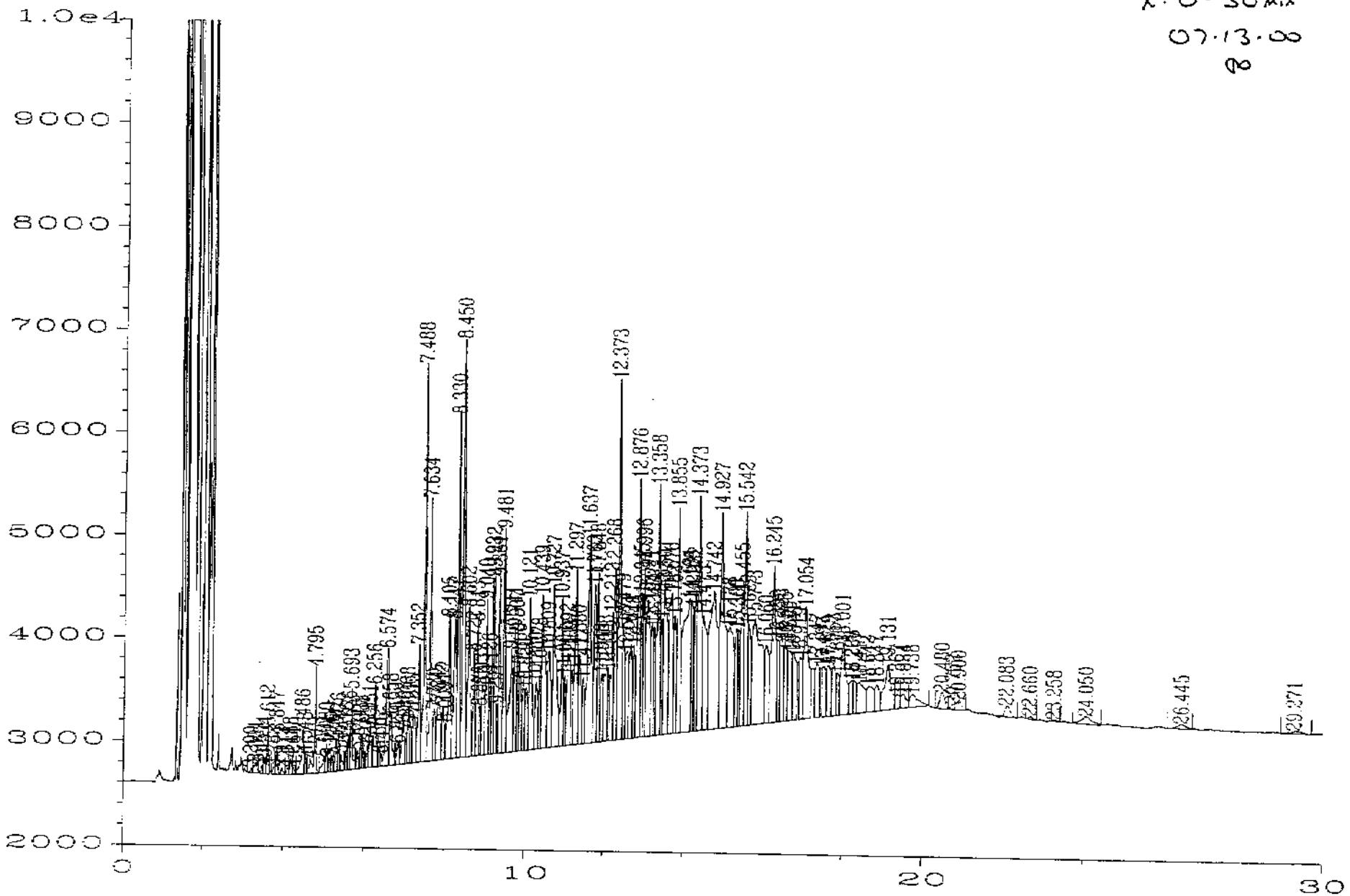
Sig. 1 in C:\HPCHEM\1\DATA\FID\07120033.D

#2 Fuel Oil
Reference Chromatogram
X: 0-30min
07.13.00
Qo



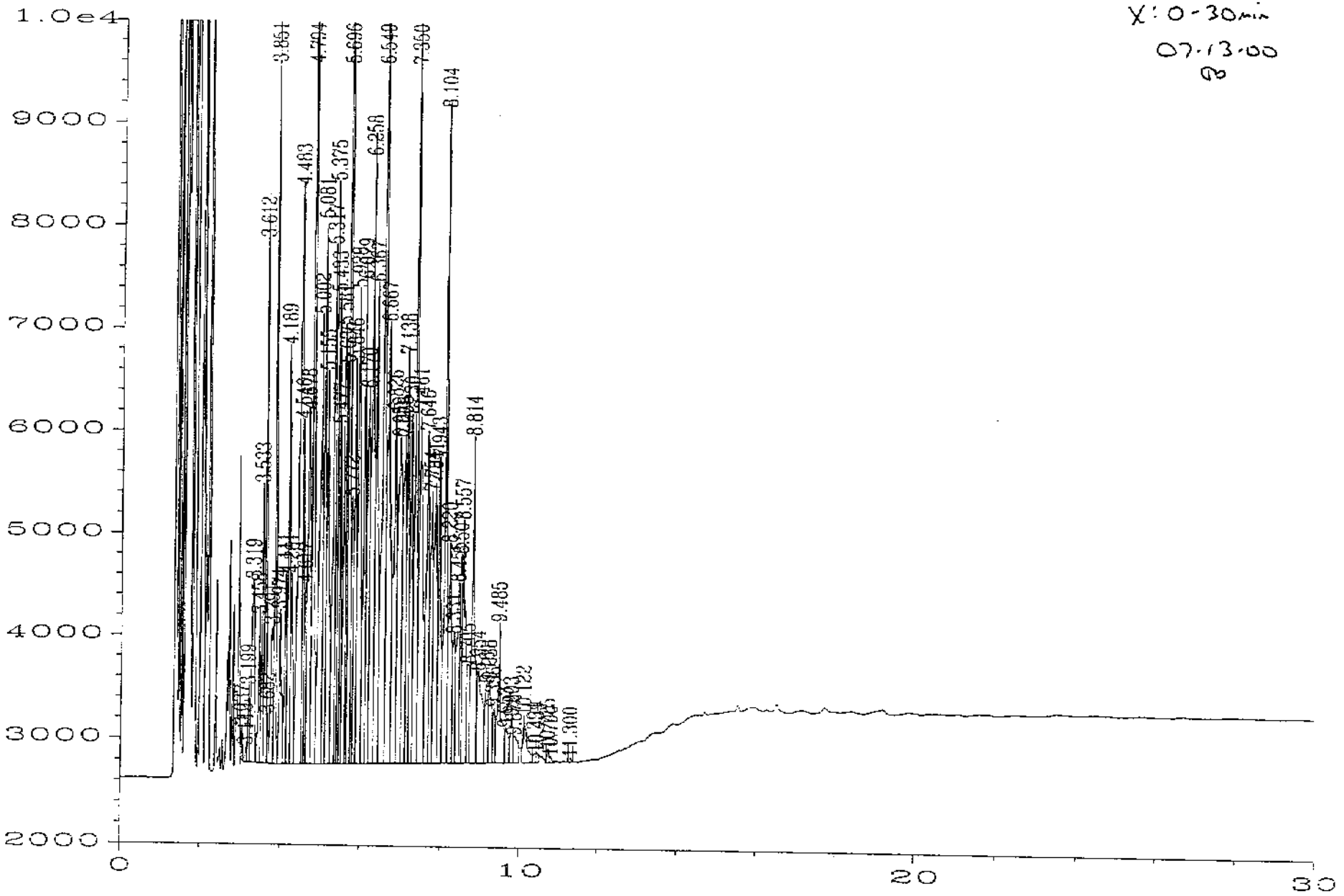
Sig. 1 in C:\HPCHEM\1\DATA\FID\07120038.D

#6 Fuel Oil
Reference Chromatogram
X: 0 - 30 min
07-13-00
R



Sig. 1 in C:\HPCHEM\1\DATA\FID\07120039.D

Kerosene
Reference Chrometogram
X: 0-30min
07-13-00
90



Sig. 1 in C:\HPCHEM\1\DATA\FID\07120040.D

ENDYNE, INC.

Laboratory Services

160 James Brown Drive
Williston, Vermont 05495
(802) 879-4333
FAX 879-7103

LABORATORY REPORT

Stone Environmental, Inc.
58 East State St.
Montpelier, VT 05602
Attn: Mike Rossi

PROJECT: 1134 Windsor VT
ORDER ID: 9004
RECEIVE DATE: August 23, 2000
REPORT DATE: September 12, 2000

Enclosed please find the results of the analyses performed for the samples referenced on the attached chain of custody. Different groups of analyses may be reported under separate cover.

All samples were prepared and analyzed by requirements outlined in the referenced methods and within the specified holding times.

All instrumentation was calibrated with the appropriate frequency and verified by the requirements outlined in the referenced methods.

Blank contamination was not observed at levels affecting the analytical results.

Analytical method precision and accuracy was monitored by laboratory control standards which include matrix spike, duplicate and quality control analyses. These standards were determined to be within established laboratory method acceptance limits, unless otherwise noted.

Reviewed by,

SEP 13 2000

Harry B. Locker, Ph.D.
Laboratory Director

enclosures

ENDYNE, INC.

Laboratory Services

160 James Brown Drive
Williston, Vermont 05495
(802) 879-4333
FAX 879-7103

LABORATORY REPORT

SW 8270C

CLIENT: Stone Environmental, Inc.
PROJECT: 1134 Windsor VT
SITE: MP 1
DATE RECEIVED: August 23, 2000
REPORT DATE: September 12, 2000
ANALYSIS DATE: September 8, 2000

ORDER ID: 9004
REFERENCE NUMBER: 160903
DATE SAMPLED: August 22, 2000
TIME SAMPLED: 2:23 PM
SAMPLER: DC
ANALYST: 917

Parameter	Result ug/L
Acenaphthene	< 2.0
Acenaphthylene	< 2.0
Aniline	< 10.0
Anthracene	< 2.0
Azobenzene	< 5.0
Benzidine	< 10.0
Benzo(a)anthracene	< 2.0
Benzo(b&k)fluoranthene	< 2.0
Benzo(a)pyrene	< 2.0
Benzo(g,h,i)perylene	< 2.0
Bis(2-chloroethyl)ether	< 5.0
Bis(2-chloroethoxy)methane	< 5.0
Bis(2-ethylhexyl)phthalate	< 10.0
Bis(2-chloroisopropyl)ether	< 10.0
4-Bromophenyl phenyl ether	< 2.0
Butyl benzyl phthalate	< 10.0
Carbazole	< 10.0
4-Chloroaniline	< 5.0
1-Chloronaphthalene	< 2.0
2-Chloronaphthalene	< 2.0
4-Chlorophenyl phenyl ether	< 2.0
Chrysene	< 2.0
Dibenzofuran	< 2.0
Dibenzo(a,h)anthracene	< 2.0
Di-n-butylphthalate	< 10.0
1,2-Dichlorobenzene	< 2.0
1,3-Dichlorobenzene	< 2.0
1,4-Dichlorobenzene	< 2.0
3,3'-Dichlorobenzidine	< 5.0
Diethyl phthalate	< 10.0
Dimethyl phthalate	< 10.0
2,4-Dinitrotoluene	< 5.0
2,6-Dinitrotoluene	< 5.0
Di-n-octylphthalate	< 10.0
Fluoranthene	< 2.0
Fluorene	< 2.0
Hexachlorobenzene	< 5.0
Hexachlorobutadiene	< 5.0
Hexachlorocyclopentadiene	< 20.0
Hexachloroethane	< 5.0
Indeno(1,2,3-cd)pyrene	< 2.0
Isophorone	< 2.0

Parameter	Result ug/L
1-Methylnaphthalene	< 2.0
2-Methylnaphthalene	< 2.0
Naphthalene	< 2.0
1-Naphthylamine	< 10.0
2-Naphthylamine	< 10.0
2-Nitroaniline	< 20.0
3-Nitroaniline	< 20.0
4-Nitroaniline	< 20.0
Nitrobenzene	< 5.0
N-Nitroso-di-n-butylamine	< 5.0
N-Nitrosodiphenylamine	< 5.0
N-Nitrosodimethylamine	< 10.0
N-Nitrosodi-n-propylamine	< 10.0
N-Nitrosopiperidine	< 10.0
Phenanthrene	< 2.0
Pyrene	< 2.0
Pyridine	< 10.0
1,2,4-Trichlorobenzene	< 2.0
Benzyl alcohol	< 10.0
4-Chloro-3-methylphenol	< 10.0
2-Chlorophenol	< 5.0
2,4-Dichlorophenol	< 5.0
2,6-Dichlorophenol	< 5.0
2,4-Dimethylphenol	< 5.0
4,6-Dinitro-2-methylphenol	< 50.0
2,4-Dinitrophenol	< 10.0
2-Methylphenol (o-cresol)	< 5.0
3&4-Methylphenol (m&p-cresol)	< 5.0
2-Nitrophenol	< 10.0
4-Nitrophenol	< 10.0
Pentachlorophenol	< 15.0
Phenol	< 5.0
2,4,5-Trichlorophenol	< 10.0
2,4,6-Trichlorophenol	< 10.0
Acid Surrogate 1	34.%
Acid Surrogate 2	26.%
Acid Surrogate 3	66.%
Base/Neutral Surrogate 1	67.%
Base/Neutral Surrogate 2	78.%
Base/Neutral Surrogate 3	125.%
UIP's	0.

ENDYNE, INC.

Laboratory Services

160 James Brown Drive
Williston, Vermont 05495
(802) 879-4333
FAX 879-7103

LABORATORY REPORT

SW 8270C

CLIENT: Stone Environmental, Inc.
PROJECT: 1134 Windsor VT
SITE: MP 2
DATE RECEIVED: August 23, 2000
REPORT DATE: September 12, 2000
ANALYSIS DATE: September 8, 2000

ORDER ID: 9004
REFERENCE NUMBER: 160904
DATE SAMPLED: August 22, 2000
TIME SAMPLED: 1:06 PM
SAMPLER: DC
ANALYST: 917

Parameter	Result ug/L
Acenaphthene	< 2.0
Acenaphthylene	< 2.0
Aniline	< 10.0
Anthracene	< 2.0
Azobenzene	< 5.0
Benzidine	< 10.0
Benzo(a)anthracene	< 2.0
Benzo(b&k)fluoranthene	< 2.0
Benzo(a)pyrene	< 2.0
Benzo(g,h,i)perylene	< 2.0
Bis(2-chloroethyl)ether	< 5.0
Bis(2-chloroethoxy)methane	< 5.0
Bis(2-ethylhexyl)phthalate	< 10.0
Bis(2-chloroisopropyl)ether	< 10.0
4-Bromophenyl phenyl ether	< 2.0
Butyl benzyl phthalate	< 10.0
Carbazole	< 10.0
4-Chloroaniline	< 5.0
1-Chloronaphthalene	< 2.0
2-Chloronaphthalene	< 2.0
4-Chlorophenyl phenyl ether	< 2.0
Chrysene	< 2.0
Dibenzofuran	< 2.0
Dibenzo(a,h)anthracene	< 2.0
Di-n-butylphthalate	< 10.0
1,2-Dichlorobenzene	< 2.0
1,3-Dichlorobenzene	< 2.0
1,4-Dichlorobenzene	< 2.0
3,3'-Dichlorobenzidine	< 5.0
Diethyl phthalate	< 10.0
Dimethyl phthalate	< 10.0
2,4-Dinitrotoluene	< 5.0
2,6-Dinitrotoluene	< 5.0
Di-n-octylphthalate	< 10.0
Fluoranthene	< 2.0
Fluorene	< 2.0
Hexachlorobenzene	< 5.0
Hexachlorobutadiene	< 5.0
Hexachlorocyclopentadiene	< 20.0
Hexachloroethane	< 5.0
Indeno(1,2,3-cd)pyrene	< 2.0
Isophorone	< 2.0

Parameter	Result ug/L
1-Methylnaphthalene	< 2.0
2-Methylnaphthalene	< 2.0
Naphthalene	< 2.0
1-Naphthylamine	< 10.0
2-Naphthylamine	< 10.0
2-Nitroaniline	< 20.0
3-Nitroaniline	< 20.0
4-Nitroaniline	< 20.0
Nitrobenzene	< 5.0
N-Nitroso-di-n-butylamine	< 5.0
N-Nitrosodiphenylamine	< 5.0
N-Nitrosodimethylamine	< 10.0
N-Nitrosodi-n-propylamine	< 10.0
N-Nitrosopiperidine	< 10.0
Phenanthrene	< 2.0
Pyrene	< 2.0
Pyridine	< 10.0
1,2,4-Trichlorobenzene	< 2.0
Benzyl alcohol	< 10.0
4-Chloro-3-methylphenol	< 10.0
2-Chlorophenol	< 5.0
2,4-Dichlorophenol	< 5.0
2,6-Dichlorophenol	< 5.0
2,4-Dimethylphenol	< 5.0
4,6-Dinitro-2-methylphenol	< 50.0
2,4-Dinitrophenol	< 10.0
2-Methylphenol (o-cresol)	< 5.0
3&4-Methylphenol (m&p-cresol)	< 5.0
2-Nitrophenol	< 10.0
4-Nitrophenol	< 10.0
Pentachlorophenol	< 15.0
Phenol	< 5.0
2,4,5-Trichlorophenol	< 10.0
2,4,6-Trichlorophenol	< 10.0
Acid Surrogate 1	38.%
Acid Surrogate 2	26.%
Acid Surrogate 3	58.%
Base/Neutral Surrogate 1	65.%
Base/Neutral Surrogate 2	73.%
Base/Neutral Surrogate 3	126.%
UIP's	0.

ENDYNE, INC.

Laboratory Services

160 James Brown Drive
Williston, Vermont 05495
(802) 879-4333
FAX 879-7103

LABORATORY REPORT

SW 8270C

CLIENT: Stone Environmental, Inc.
PROJECT: 1134 Windsor VT
SITE: MP 3
DATE RECEIVED: August 23, 2000
REPORT DATE: September 12, 2000
ANALYSIS DATE: September 8, 2000

ORDER ID: 9004
REFERENCE NUMBER: 160905
DATE SAMPLED: August 22, 2000
TIME SAMPLED: 3:38 PM
SAMPLER: DC
ANALYST: 917

Parameter	Result ug/L
Acenaphthene	< 2.0
Acenaphthylene	< 2.0
Aniline	< 10.0
Anthracene	< 2.0
Azobenzene	< 5.0
Benzidine	< 10.0
Benzo(a)anthracene	< 2.0
Benzo(b&k)fluoranthene	< 2.0
Benzo(a)pyrene	< 2.0
Benzo(g,h,i)perylene	< 2.0
Bis(2-chloroethyl)ether	< 5.0
Bis(2-chloroethoxy)methane	< 5.0
Bis(2-ethylhexyl)phthalate	< 10.0
Bis(2-chloroisopropyl)ether	< 10.0
4-Bromophenyl phenyl ether	< 2.0
Butyl benzyl phthalate	< 10.0
Carbazole	< 10.0
4-Chloroaniline	< 5.0
1-Chloronaphthalene	< 2.0
2-Chloronaphthalene	< 2.0
4-Chlorophenyl phenyl ether	< 2.0
Chrysene	< 2.0
Dibenzofuran	< 2.0
Dibenzo(a,h)anthracene	< 2.0
Di-n-butylphthalate	< 10.0
1,2-Dichlorobenzene	< 2.0
1,3-Dichlorobenzene	< 2.0
1,4-Dichlorobenzene	< 2.0
3,3'-Dichlorobenzidine	< 5.0
Diethyl phthalate	< 10.0
Dimethyl phthalate	< 10.0
2,4-Dinitrotoluene	< 5.0
2,6-Dinitrotoluene	< 5.0
Di-n-octylphthalate	< 10.0
Fluoranthene	< 2.0
Fluorene	< 2.0
Hexachlorobenzene	< 5.0
Hexachlorobutadiene	< 5.0
Hexachlorocyclopentadiene	< 20.0
Hexachloroethane	< 5.0
Indeno(1,2,3-cd)pyrene	< 2.0
Isophorone	< 2.0

Parameter	Result ug/L
1-Methylnaphthalene	< 2.0
2-Methylnaphthalene	< 2.0
Naphthalene	< 2.0
1-Naphthylamine	< 10.0
2-Naphthylamine	< 10.0
2-Nitroaniline	< 20.0
3-Nitroaniline	< 20.0
4-Nitroaniline	< 20.0
Nitrobenzene	< 5.0
N-Nitroso-di-n-butylamine	< 5.0
N-Nitrosodiphenylamine	< 5.0
N-Nitrosodimethylamine	< 10.0
N-Nitrosodi-n-propylamine	< 10.0
N-Nitrosopiperidine	< 10.0
Phenanthrene	< 2.0
Pyrene	< 2.0
Pyridine	< 10.0
1,2,4-Trichlorobenzene	< 2.0
Benzyl alcohol	< 10.0
4-Chloro-3-methylphenol	< 10.0
2-Chlorophenol	< 5.0
2,4-Dichlorophenol	< 5.0
2,6-Dichlorophenol	< 5.0
2,4-Dimethylphenol	< 5.0
4,6-Dinitro-2-methylphenol	< 50.0
2,4-Dinitrophenol	< 10.0
2-Methylphenol (o-cresol)	< 5.0
3&4-Methylphenol (m&p-cresol)	< 5.0
2-Nitrophenol	< 10.0
4-Nitrophenol	< 10.0
Pentachlorophenol	< 15.0
Phenol	< 5.0
2,4,5-Trichlorophenol	< 10.0
2,4,6-Trichlorophenol	< 10.0
Acid Surrogate 1	39.%
Acid Surrogate 2	30.%
Acid Surrogate 3	62.%
Base/Neutral Surrogate 1	68.%
Base/Neutral Surrogate 2	81.%
Base/Neutral Surrogate 3	124.%
UIP's	0.

SEI-4.2.5 • July 19, 1999

9004 Organic

CHAIN OF CUSTODY RECORD

STONE ENVIRONMENTAL INC

SEI Study # #1134 Project Name/Client Study # Winhall VT

Study Director

Sampling Personnel DJC

SAMPLE INFORMATION

Sample Identification		Date Collected	Type *	Cont.**	Number of Containers	Analysis Requested 8270C
160903 MP1	2:23 [redacted] D.C	8/23/00	W1	2	2	✓
160904 MP2	1:06	8/23/00	W1	2	2	✓
160905 MP3	3:38 [redacted] D.C	8/23/00	W1	2	2	✓
			MPI2 Blank			

Samples Actually Collected 8/22/00

Ship To:

Relinquished By: (Signature)	Date/Time 08/23/00	Received By: (Signature) Cynthia Cucci 8/23/00 10:20	Date/Time
Relinquished By: (Signature)	Date/Time	Received By: (Signature)	Date/Time
Relinquished By: (Signature)	Date/Time	Received By: (Signature)	Date/Time

Special Instructions: * Type of Sample (1) water (2) soil

** Container (1) bag (2) bottle (3) shelby tube (4) other:

Condition of samples when received by lab:

☐ ambient air ☒ ice/ice substitute ☐ frozen

Please remit a completed, signed copy to:

Stone Environmental, Inc.
58 East State Street
Montpelier, Vermont 05602

white copy: original yellow copy: laboratory pink copy: SEI

Page __ of __

Page 5 of 5

ENDYNE, INC.

Laboratory Services

160 James Brown Drive
Williston, Vermont 05495
(802) 879-4333
FAX 879-7103

LABORATORY REPORT

Stone Environmental, Inc.
58 East State St.
Montpelier, VT 05602
Attn: Mike Ross

PROJECT: 1134
ORDER ID: 8911
RECEIVE DATE: August 16, 2000
REPORT DATE: September 12, 2000
SAMPLER: MR

Ref. Number: 160533 | Site: STC08-5 | Date Sampled: August 10, 2000 | Time: 1:00 PM

Parameter	Result	Unit	Method	Analysis Date	Analyst
Total Organic Carbon	5040.	ug/g	EPA 415.1	9/6/00	999

Ref. Number: 160534 | Site: STC13-19' | Date Sampled: August 11, 2000 | Time: 4:03 PM

Parameter	Result	Unit	Method	Analysis Date	Analyst
Total Organic Carbon	3100.	ug/g	EPA 415.1	9/6/00	999

SEP 15 2000

Reviewed by: _____

Note: Analyses performed by subcontracted laboratory.

38071

ENDYNE, INC.

160 James Brown Drive
Williston, Vermont 05495
(802) 879-4333

CHAIN-OF-CUSTODY-RECORD

Project Name: 1134	Reporting Address: 56 E. State St. Montpelier VT 05602	Billing Address: Same
Endyne Order ID: (Lab Use Only) J911 (-O, -I, -S)	Company: SEB Contact Name/Phone #: Mike Ross 802 229 2194	Sampler Name: Phone #:

Ref # (Lab Use Only)	Sample Identification	Matrix	GRAB	COMP	Date/Time	Sample Containers No.	Sample Containers Type/Size	Field Results/Remarks	Analysis Required	Sample Preservation	Rush
160533	~~STC-8-5~~ STC08-5 MDT 8/10/00	Soil	✓		13:00 8/10/00	1	4oz		TOC	None	
				✓							
160534	STC13-19'	Soil	✓		4:28 PM 8/10/00	1	4oz		TOC	None	

Relinquished by:	Date/Time	Received by:	Date/Time	Received by:	Date/Time
[signature]	8/15/00 4:00	[signature]	8/15/00 4:00	Allison Flowers	8/16/00 8:30

New York State Project: Yes ____ No ____

Requested Analyses

1	pH	6	TKN	11	Total Solids	16	Sulfate	21	1664 TPH/FOG	26	8270 PAH
2	Chloride	7	Total P	12	TSS	17	Coliform (Specify)	22	8015 GRO	27	PP13 Metals
3	Ammonia N	8	Total Diss. P	13	TDS	18	COD	23	8015 DRO	28	RCRA8 Metals
4	Nitrite N	9	BOD	14	Turbidity	19	8021B	24	8260/8260B	29	
5	Nitrate N	10	Alkalinity	15	Conductivity	20	8010/8020	25	8270 B/N or Acid	30	
31	Metals (As Is, Total, Diss.) Ag, Al, As, B, Ba, Be, Ca, Cd, Co, Cr, Cu, Fe, Hg, K, Mg, Mn, Mo, Na, Ni, Pb, Sb, Se, Si, Sr, Ti, Tl, V, Zn										
32	TCLP (Specify: volatiles, semi-volatiles, metals, pesticides, herbicides)					33					
34	Other										

(White, Yellow, Pink Copy - Laboratory / Goldenrod Copy - Client)

APPENDIX 2

SEI BORING LOGS

SOIL BORING LOG

Boring ID: STC01

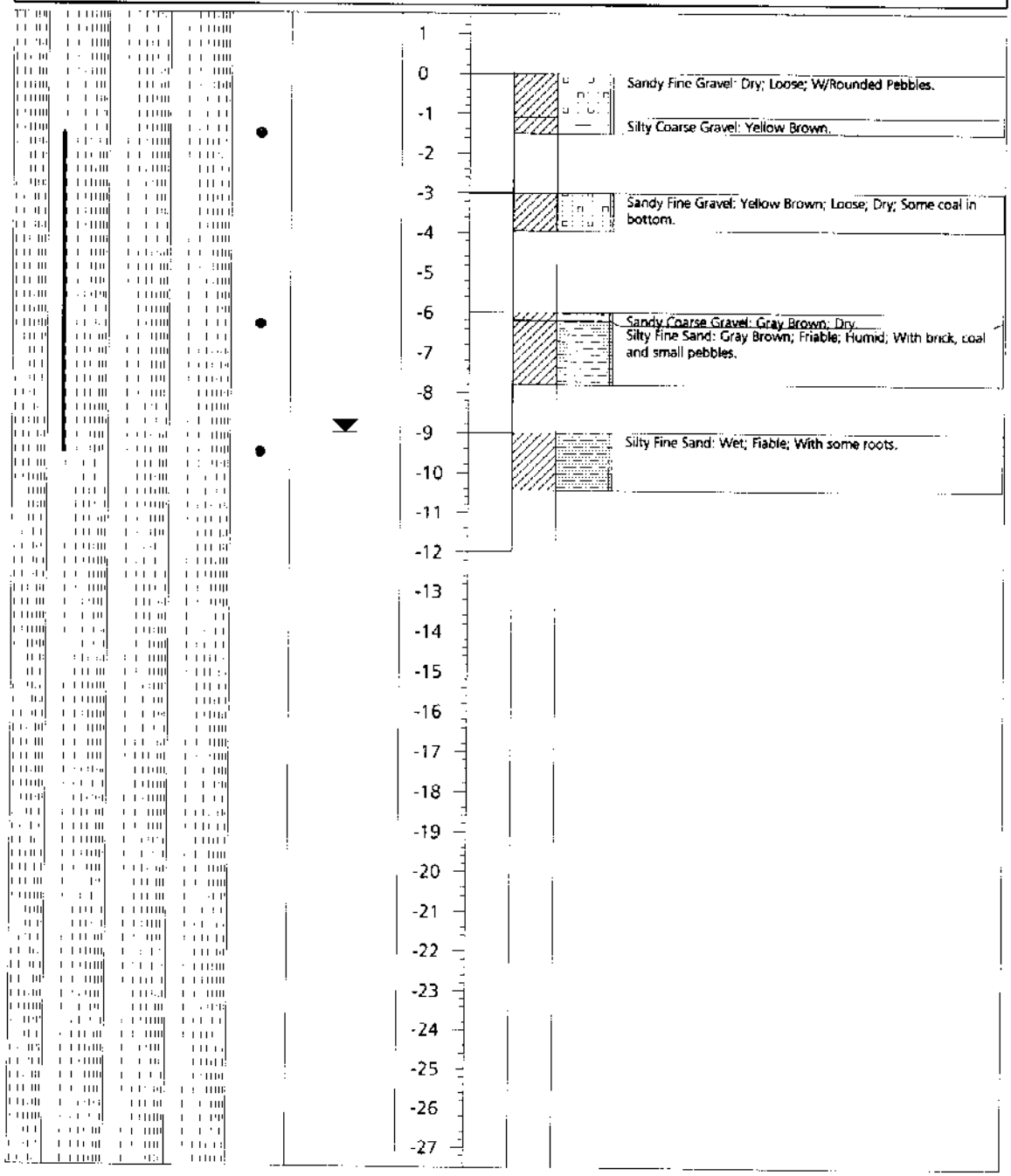
Olde Windsor Apts. - Site Investigation

Source: SEI field notes
8 22-00 djc
n:\proj-00\1134-r~1\STC01.dat

Date Drilled: 8-9-00

Logged by: Seth Pitkin

STONE ENVIRONMENTAL INC



SOIL BORING LOG

Boring ID: STC02

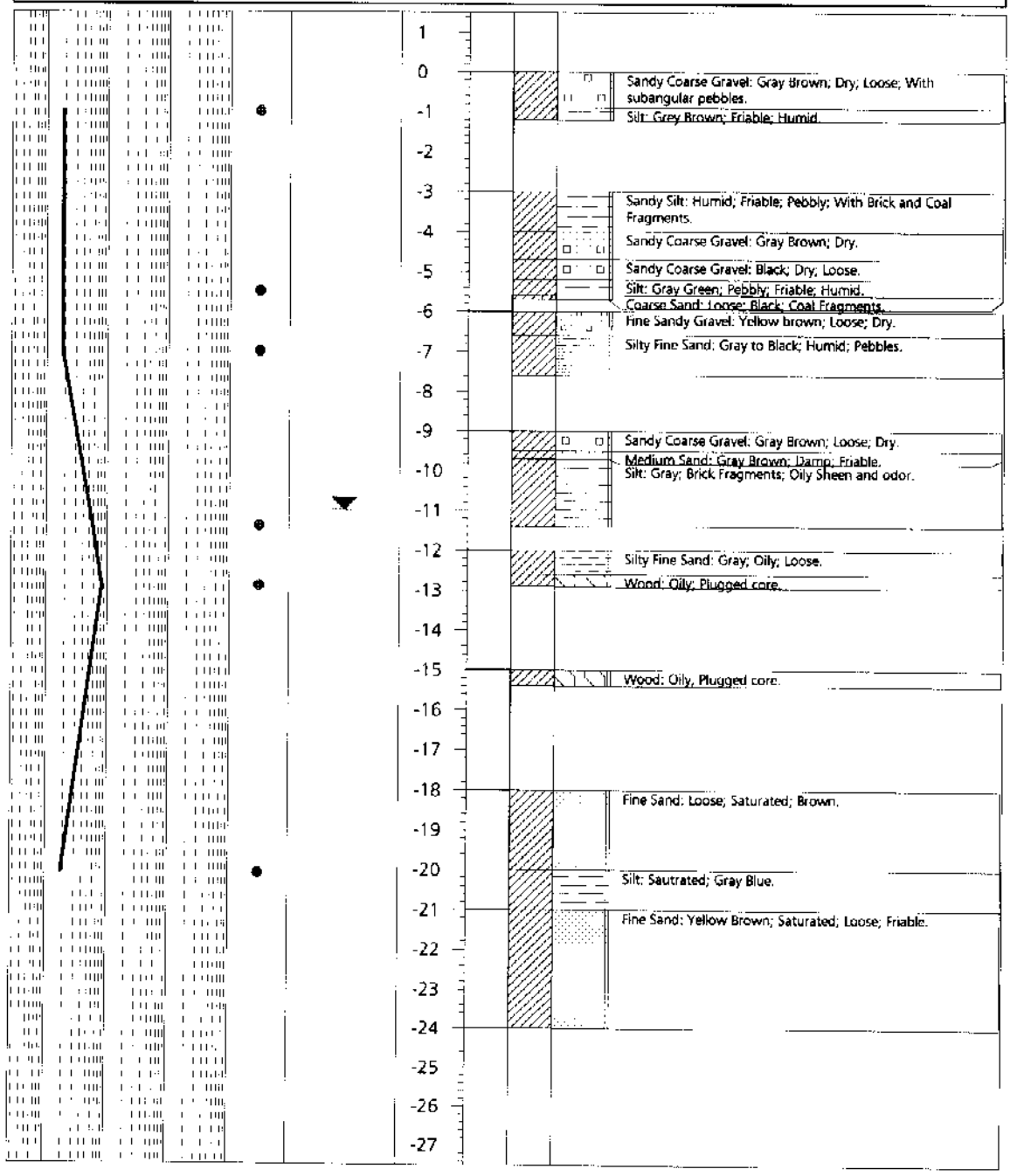
Olde Windsor Apts. - Site Investigation

Date Drilled: 8-8-00

Logged by: Seth Pirkin

Source: SEI field notes
8-22-00 djc
n:\proj-00\1134-r--1\STC02.dat

STONE ENVIRONMENTAL INC



SOIL BORING LOG

Boring ID: STC03

Olde Windsor Apts. - Site Investigation

Date Drilled: 8-8-00

Logged by: Seth Pitkin

STONE ENVIRONMENTAL INC

Source: SEI field notes
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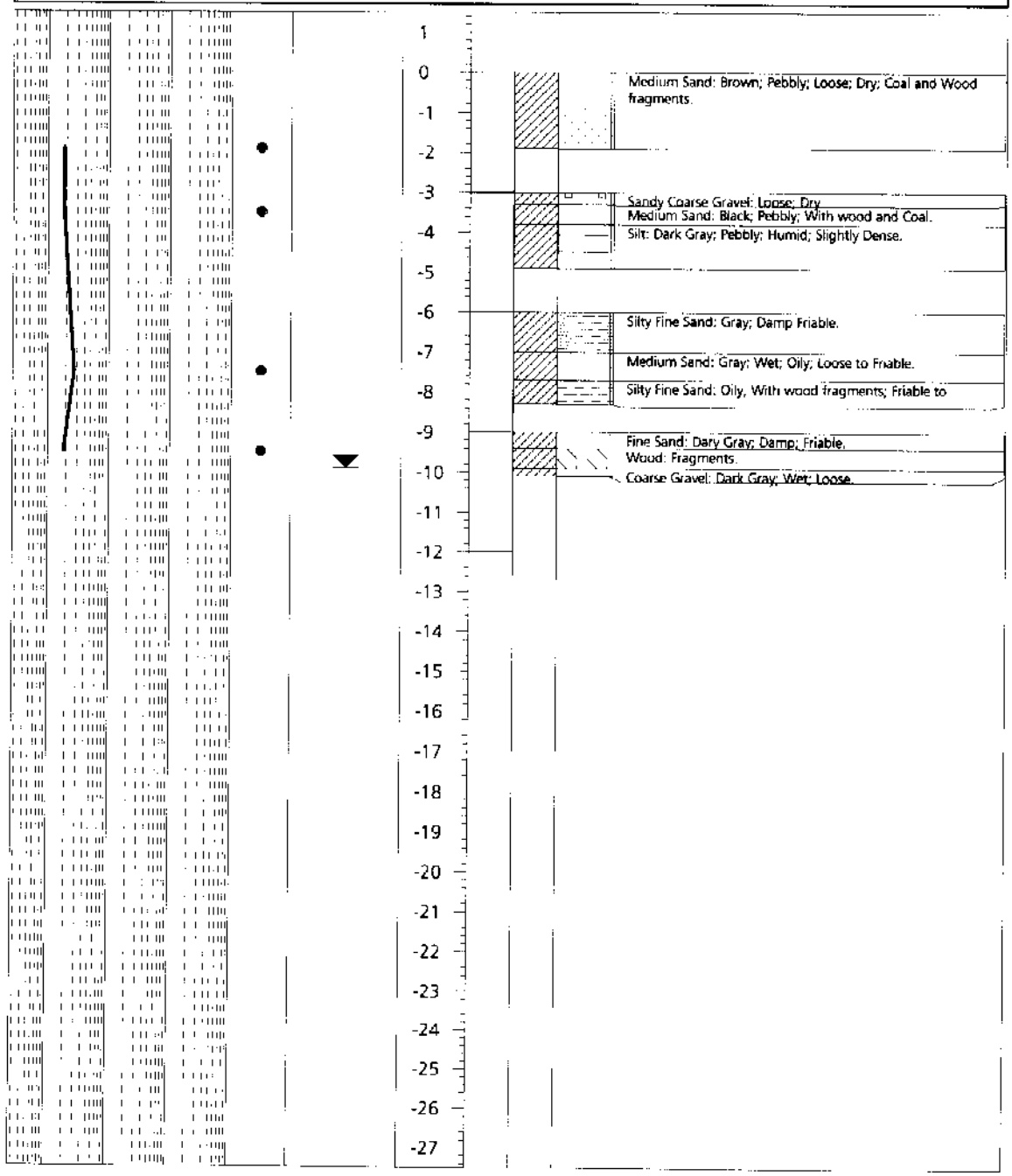

SOIL BORING LOG

Boring ID: STC04

Olde Windsor Apts. - Site Investigation

Source: SEI field notes
8-22-00 djc
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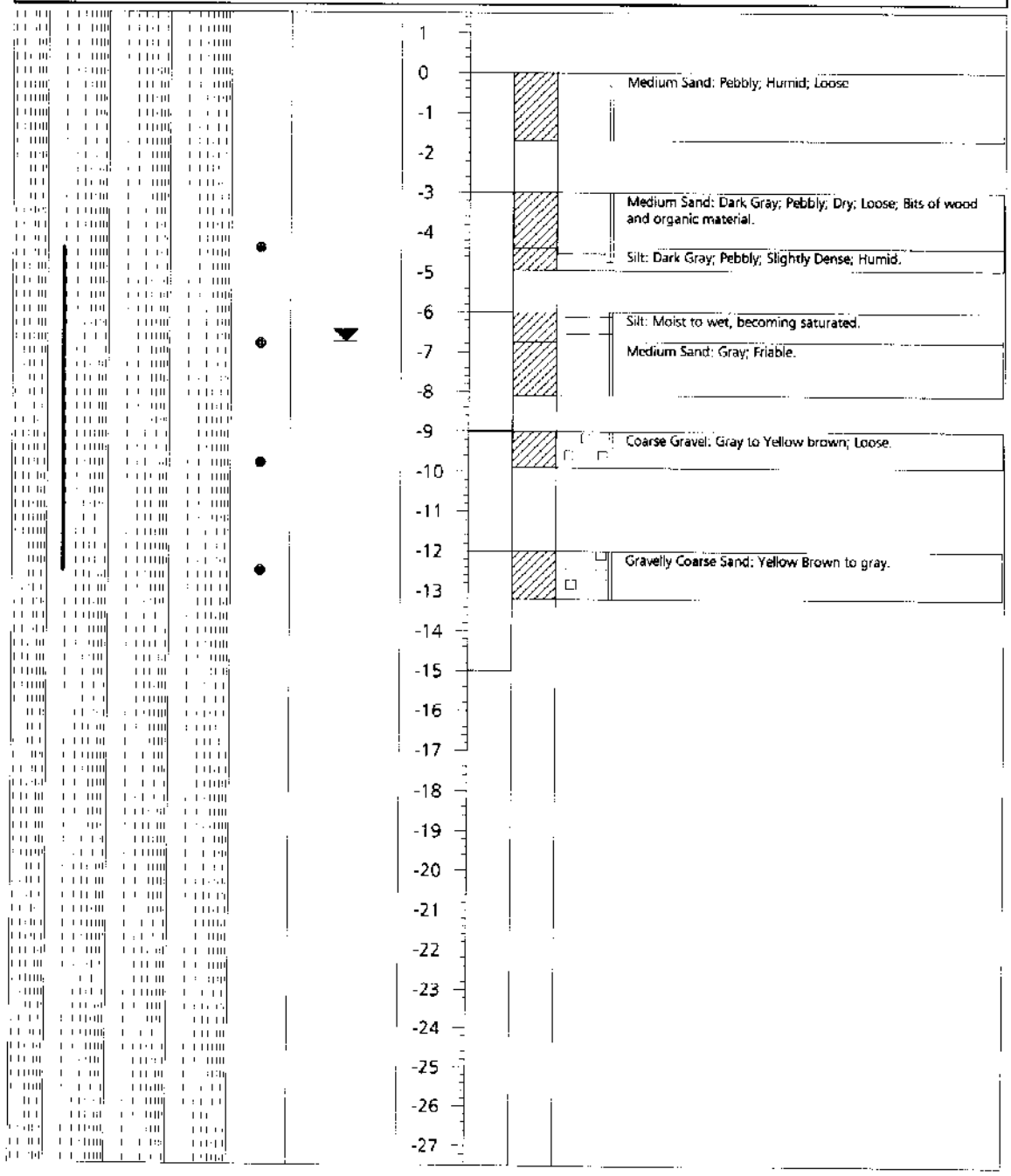
Date Drilled: 8-8-00

Logged by: Seth Pitkin

STONE ENVIRONMENTAL INC



SOIL BORING LOG

Boring ID: STC05

Olde Windsor Apts. - Site Investigation

Date Drilled: 8-8-00

Logged by: Seth Pitkin

Source: SFI field notes
8-22-00 djc
n:\proj-00\1134-r~1\STC05.dat

STONE ENVIRONMENTAL INC

TOTAL BTEX ug/Kg (ND, 10^3, 10^4, 10^5)	SAMPLE DEPTH	APPROX. WATER LEVEL	DEPTH (Feet)	SAMPLE INTERVAL	RECOVERY	GENERAL LITHOLOGY AND COMMENTS (measurements in feet below ground surface based on field notes, and geoscientist interpretation)
			1			
			0			
			-1			Sandy Fine Gravel: Gray; Damp, Loose; Driveway surface.
			-2			Sandy Coarse Gravel: Brown; Dry; Loose.
			-3			Silty Fine Gravel: With Sand, brick and coal fragments; Humid; Friable; Slightly Dense; Refusal at 2.3' BGS.
			-4			
			-5			
			-6			
			-7			
			-8			
			-9			
			-10			
			-11			
			-12			
			-13			
			-14			
			-15			
			-16			
			-17			
			-18			
			-19			
			-20			
			-21			
			-22			
			-23			
			-24			
			-25			
			-26			
			-27			

SOIL BORING LOG

Boring ID: STC06

Olde Windsor Apts. - Site Investigation

Date Drilled: 8-9-00

Logged by: Seth Pitkin

Source: SEI field notes
8-22-00 djc
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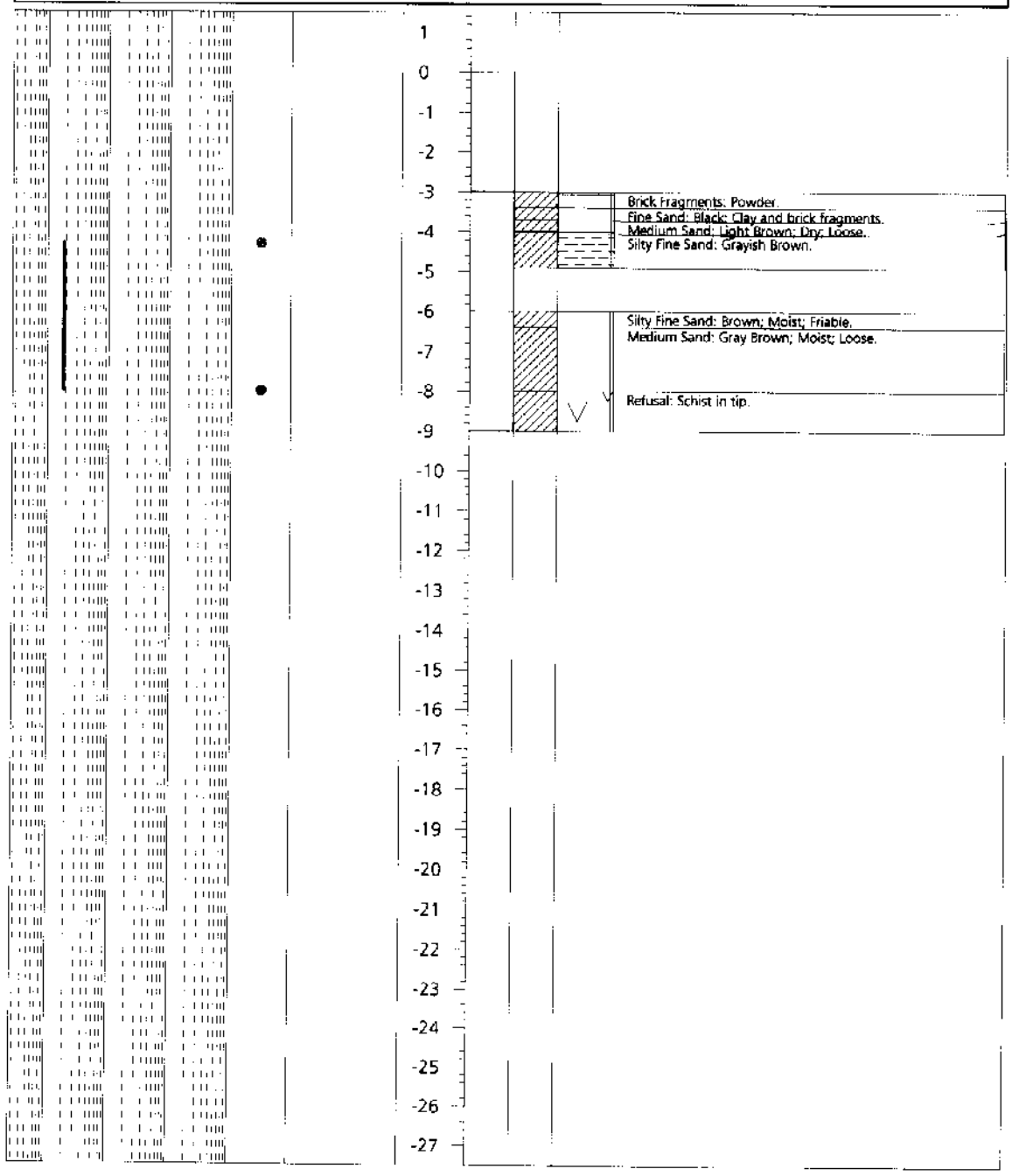
STONE ENVIRONMENTAL INC



SOIL BORING LOG

Boring ID: STC07

Olde Windsor Apts. - Site Investigation

Source: SEI field notes
8-22-00 djc
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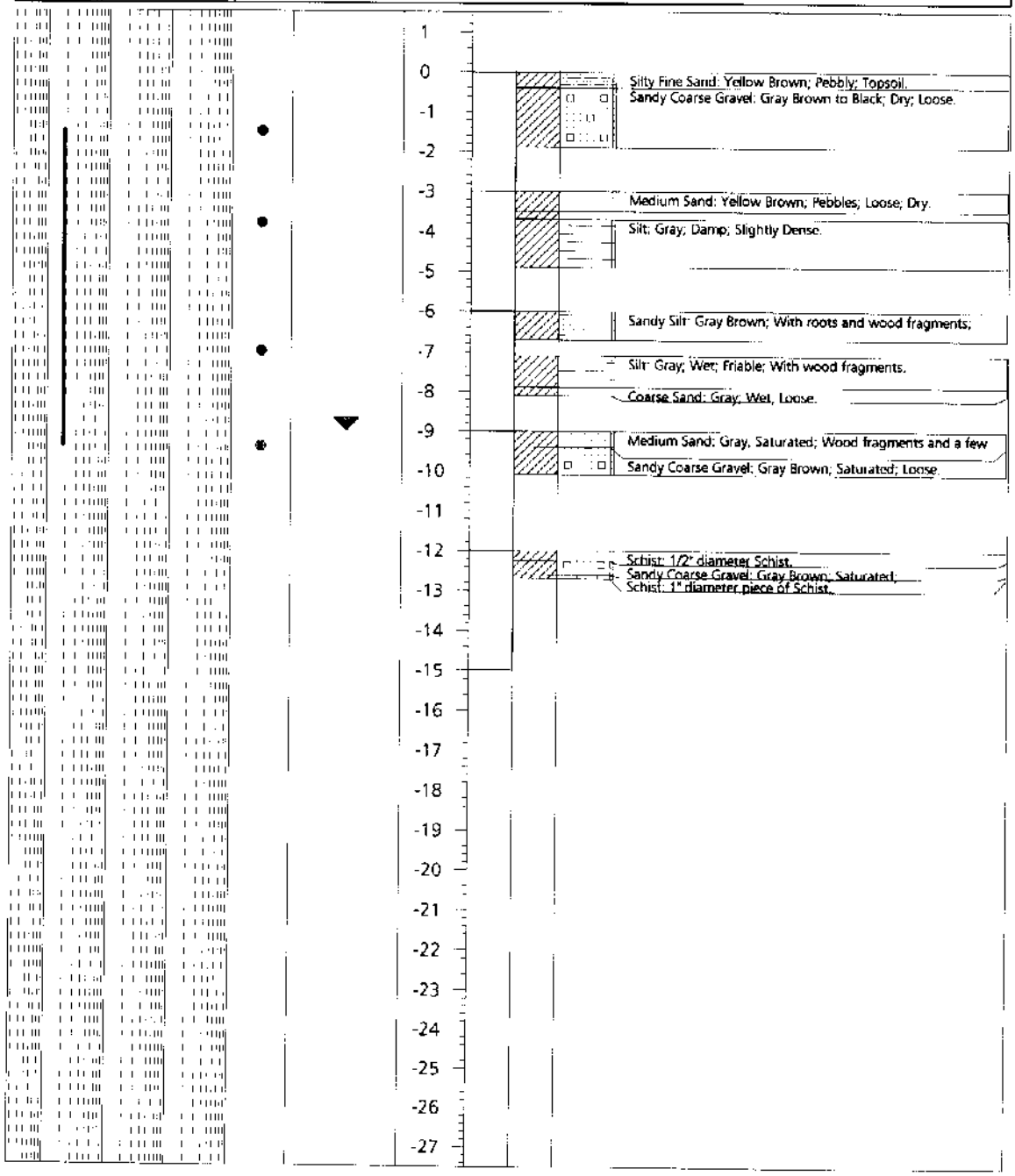
Date Drilled: 8-9-00

Logged by: Seth Pitkin

STONE ENVIRONMENTAL INC



SOIL BORING LOG

Boring ID: STC08

Olde Windsor Apts. - Site Investigation

Date Drilled: 8-9-00

Logged by: Seth Pitkin

Source: SEI field notes
8-22-00 djc
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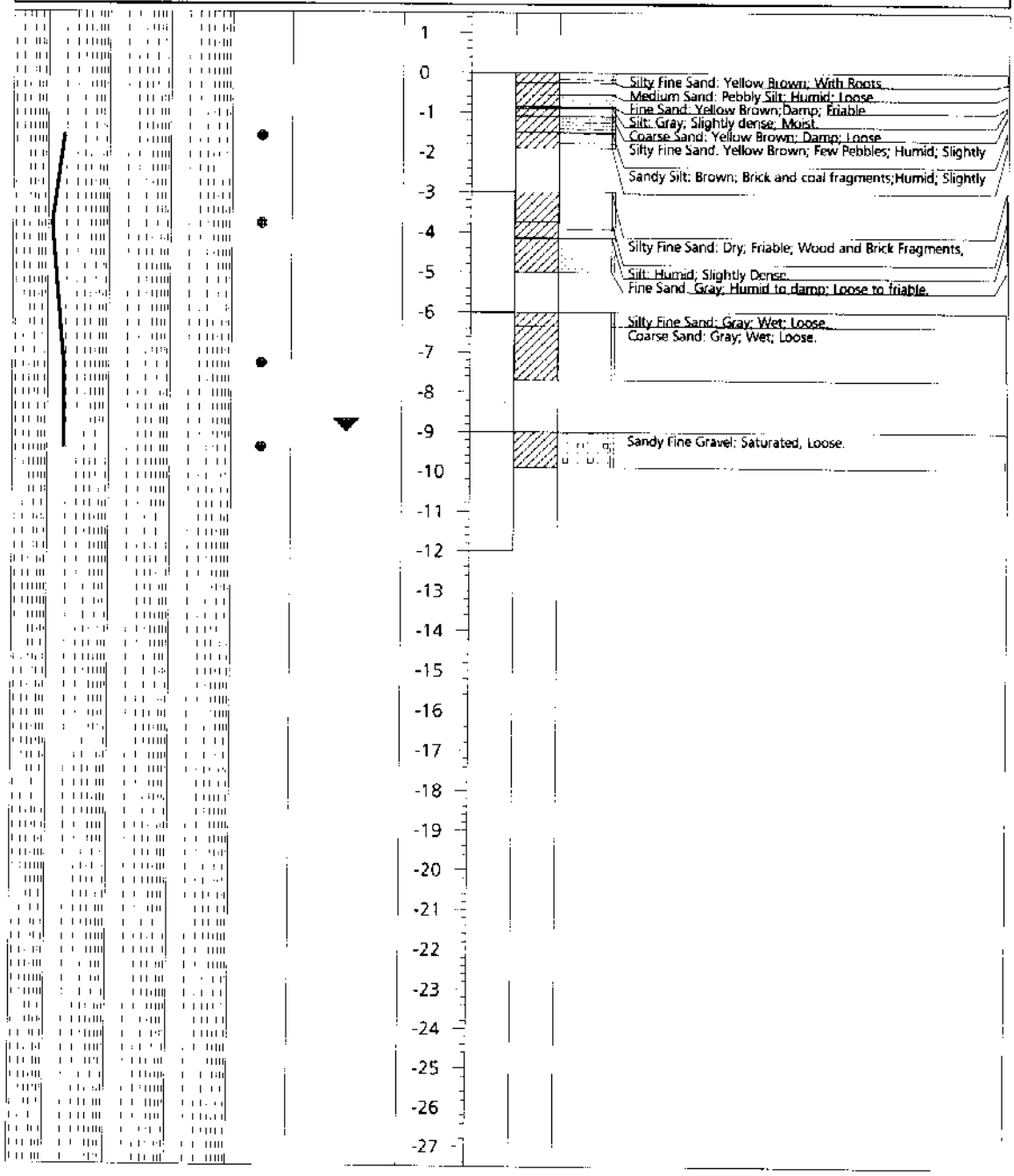
STONE ENVIRONMENTAL INC



SOIL BORING LOG

Boring ID: STC09

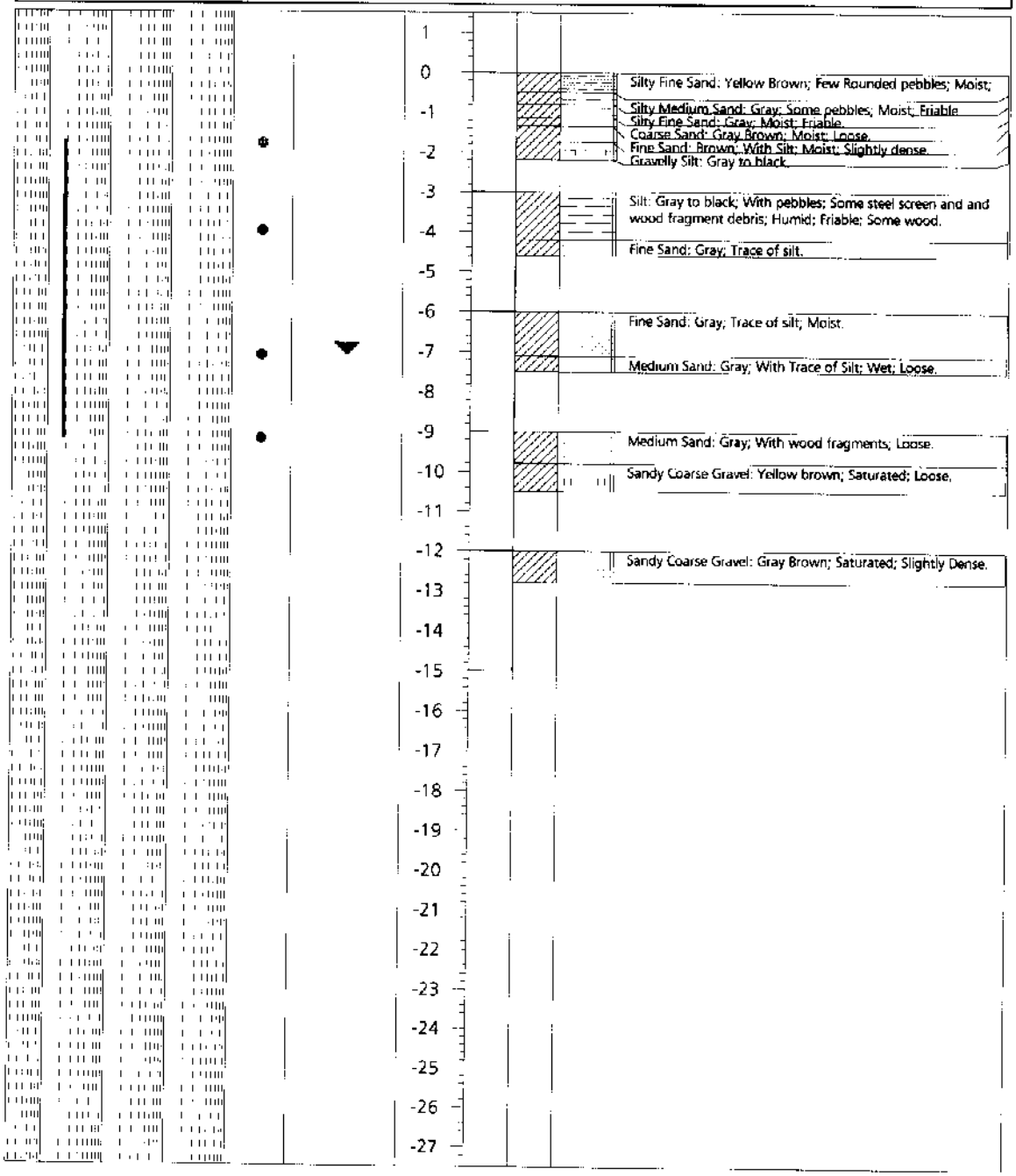
Olde Windsor Apts. - Site Investigation

Source: SEI field notes
8-22-00 djc
n:\proj-00\1134-r--1\STC09.dat

Date Drilled: 8-9-00

Logged by: Seth Pitkin

STONE ENVIRONMENTAL INC



SOIL BORING LOG

Boring ID: STC010

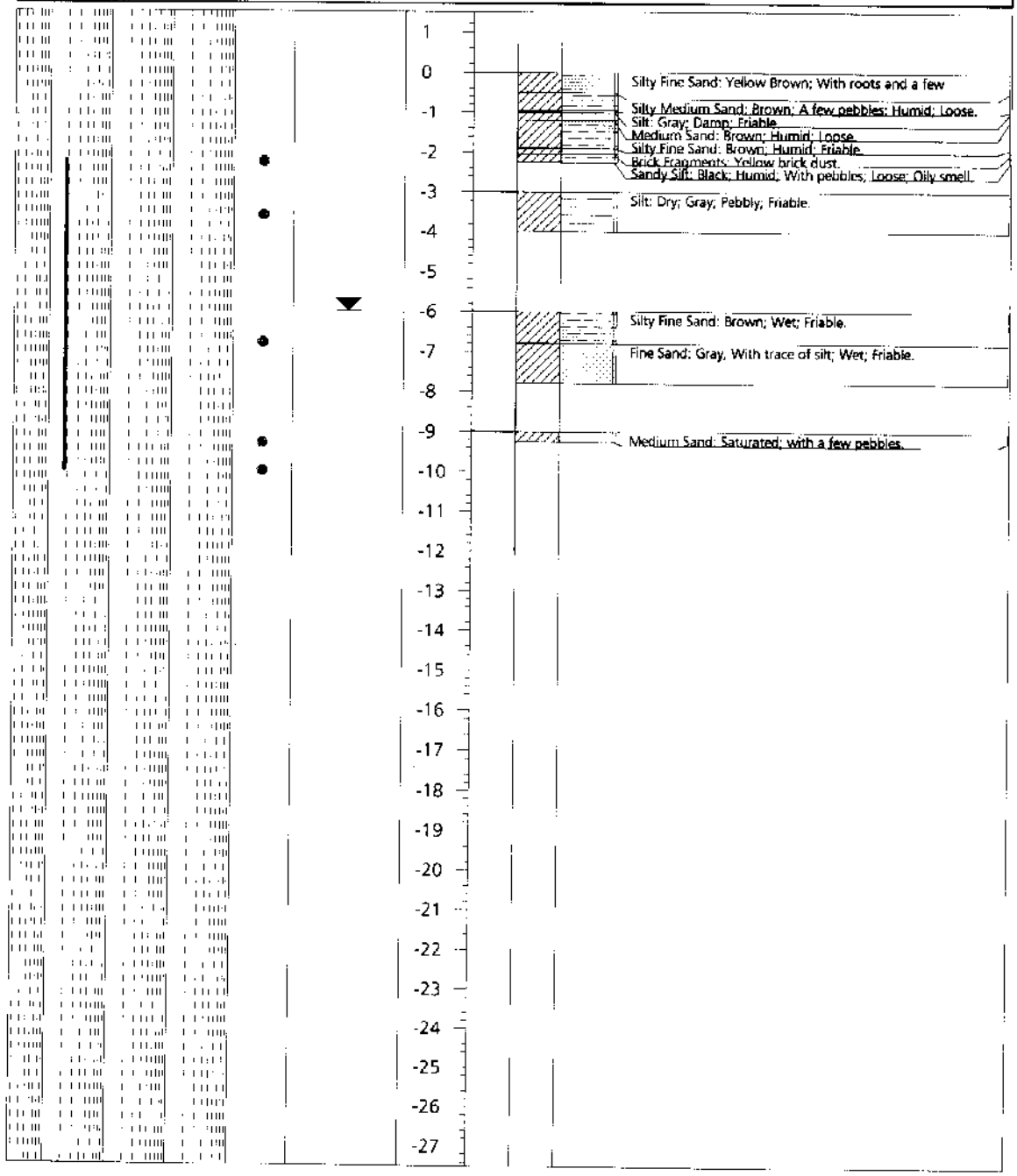
Olde Windsor Apts. - Site Investigation

Date Drilled: 8-9-00

Logged by: Seth Pitkin

Source: SEI field notes
8-22-00 djc
n:\proj-00\1134-r~1\STC010.dat

STONE ENVIRONMENTAL INC



SOIL BORING LOG

Boring ID: STC11

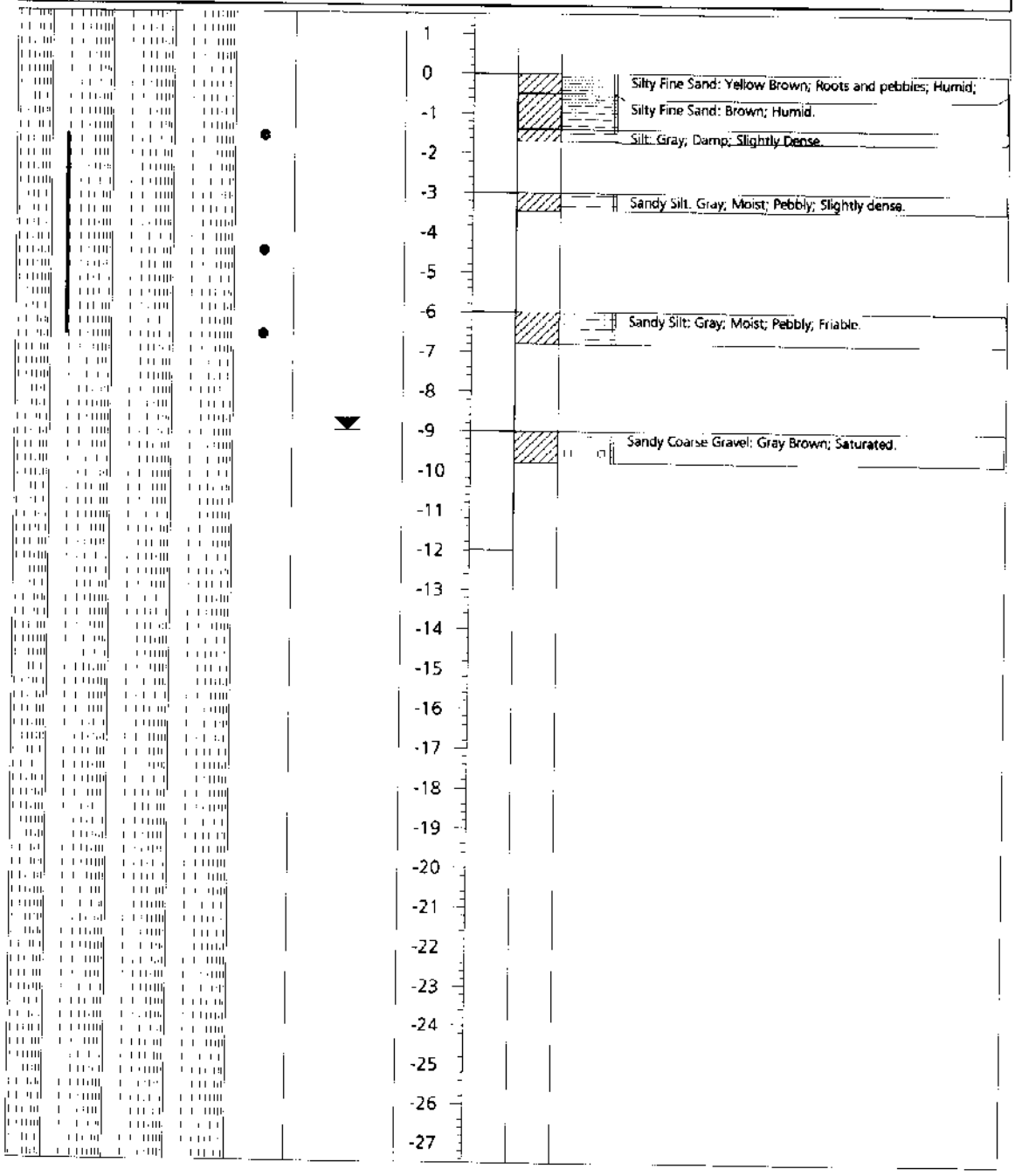
Olde Windsor Apts. - Site Investigation

Date Drilled: 8-9-00

Logged by: Seth Pitkin

Source: SEI field notes
8-22-00 djc
n:\proj-00\1134-r-1\STC11.dat

STONE ENVIRONMENTAL INC



SOIL BORING LOG

Boring ID: STC12

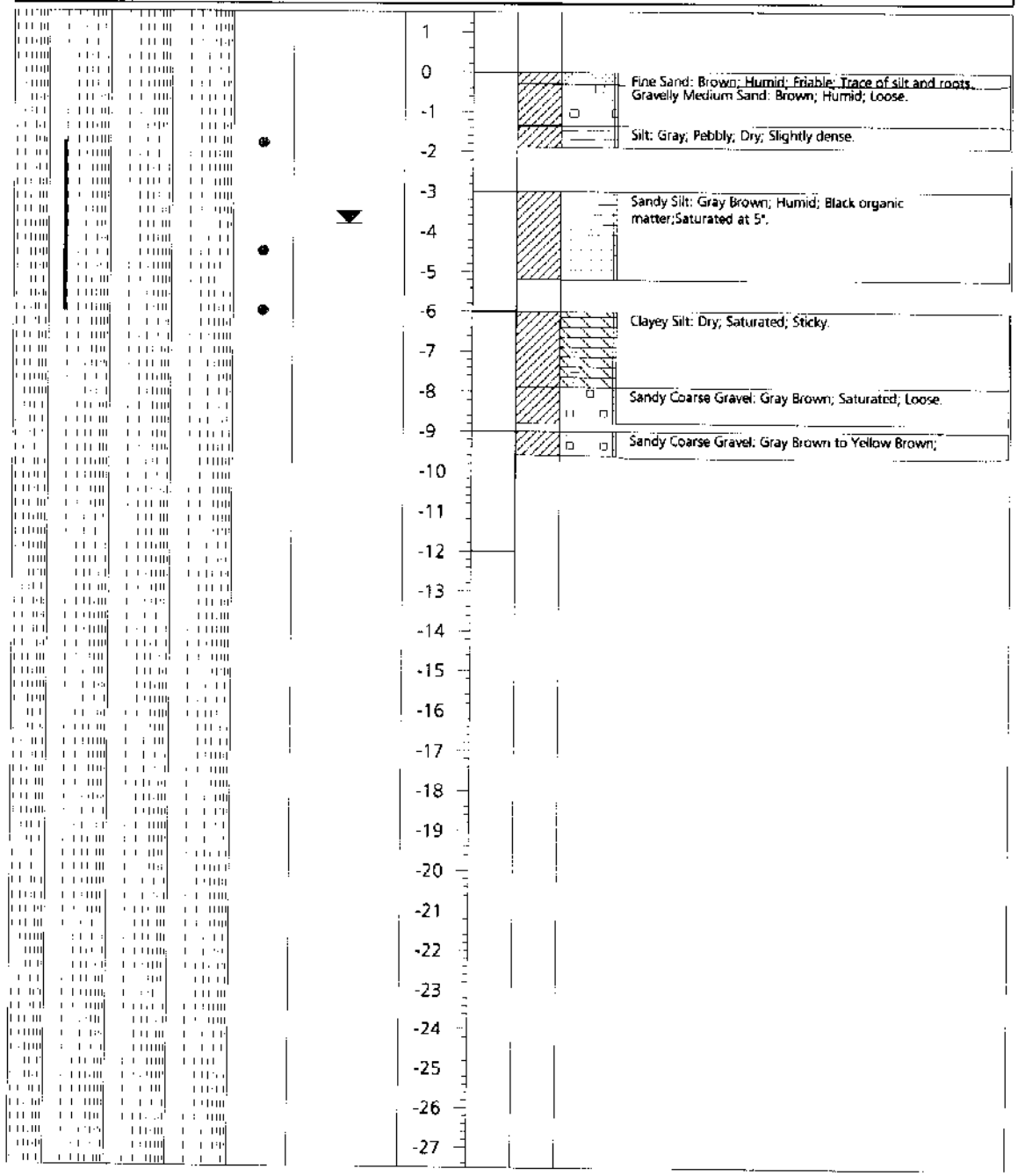
Olde Windsor Apts. - Site Investigation

Source: SEI field notes
8-22-00 djc
n:\proj-00\1134-r~1\STC12.dat

Date Drilled: 8-9-00

Logged by: Seth Pitkin

STONE ENVIRONMENTAL INC



APPENDIX 3

SEI LABOROTORY RESULTS

STONE ENVIRONMENTAL INC.

SPME/GC Laboratory Total Petroleum Hydrocarbon Results

Location: Olde Windsor Apartments

SEI Project #:00-1134

All Samples Collected and Analyzed Between August 8th and 10th of 2000

Soil Core ID	Sample Depth, ft below ground surface	Sample Depth, Elevation	TPH, mg/kg	Q
C1	1.5	350.28	2000	U
C1	6.3	345.48	2000	U
C1	9.5	342.28	2000	U
C2	1	350.84	2000	U
C2	5.5	346.34	2000	U
C2	7	344.84	2000	U
C2	11.4	340.44	*6219*	
C2	12.9	338.94	*8855*	
C2	20.1	331.74	2000	U
C3	1.9	344.72	2000	U
C3	3.5	343.12	2000	U
C3	7.5	339.12	*2951*	
C3	9.5	337.12	2000	U
C4	4.4	343.14	2000	U
C4	6.8	340.74	2000	U
C4	9.8	337.74	2000	U
C4	12.5	335.04	2000	U
C5	1	344.8	2000	U
C6	4.3	342.53	2000	U
C6	8	338.83	2000	U
C7	1.5	343.8	2000	U
C7	3.8	341.5	2000	U
C7	7	338.3	2000	U
C7	9.4	335.9	2000	U
C8	1.6	344.22	2000	U
C8	3.8	342.02	*1294*	J
C8	7.3	338.52	2000	U
C8	9.4	336.42	2000	U

U = Value reported is the laboratory detection limit.

STONE ENVIRONMENTAL INC.

SPME/GC Laboratory Total Petroleum Hydrocarbon Results

Location: Olde Windsor Apartments

SEI Project #:00-1134

All Samples Collected and Analyzed Between August 8th and 10th of 2000

Soil Core ID	Sample Depth, ft below ground surface	Sample Depth, Elevation	TPH, mg/kg	Q
C9	1.8	344	2000	U
C9	4	341.8	2000	U
C9	7.1	338.7	2000	U
C9	9.2	336.6	2000	U
C10	2.25	343.55	2000	U
C10	3.6	342.2	2000	U
C10	6.8	339	2000	U
C10	9.3	336.5	2000	U
C10	10	335.8	2000	U
C11	1.6	344.2	2000	U
C11	4.5	341.3	2000	U
C11	6.6	339.2	2000	U
C12	1.8	343.54	2000	U
C12	4.5	340.84	2000	U
C12	6	339.34	2000	U
C13	6.7	348.37	2000	U
C13	9.8	345.27	2000	U
C13	12.3	342.77	2000	U
C13	13.8	341.27	2000	U
C13	15.3	339.77	2000	U
C13	15.96	339.11	**55269**	
C13	16.9	338.17	2000	U
C13	18.2	336.87	2000	U

U = Value reported is the laboratory detection limit.

STONE ENVIRONMENTAL INC.

Pentachlorophenol by Immunoassay Results

Location: Olde Windsor Apartments

SEI Project #:00-1134

All Samples Collected and Analyzed Between August 8th and 10th of 2000

Soil Core ID	Sample Depth, ft below ground surface	Sample Depth, Elevation	Pentachlorophenol, ug/kg	Q
C1	6.3	345.48	10	U
C1	9.5	342.28	10	U
C2	1	350.84	10	U
C2	11.4	340.44	10	U
C2	12.9	338.94	10	U
C2	15.4	336.44	10	U
C3	1.9	344.72	10	U
C3	7.5	339.12	10	U
C3	9.5	337.12	10	U
C4	6.8	340.74	10	U
C6	4.3	342.53	10	U
C7	3.8	341.5	10	U
C7	9.4	335.9	10	U
C8	3.8	342.02	*23*	U
C9	4	341.8	*65*	U
C9	9.2	336.6	10	U
C10	6.8	339	10	U
C12	6	339.34	10	U
C12	8.5	336.84	10	U
C12	9.5	335.84	10	U
C13	3	348.37	10	U
C13	6.7	348.37	10	U
C13	9.8	345.27	10	U
C13	12.3	342.77	10	U
C13	14	341.07	10	U
C13	15.3	339.77	10	U
C13	15.96	339.11	10	U
C13	18	337.07	10	U
C13	18.9	336.17	10	U
C13	19.3	335.77	10	U

U = Value reported is the method detection limit.

TPH Calibration Data for the Windsor School Site

Cal Standards Prepared by Michael Rossi as described in the SEI Standards Prep Log Book.

Cal Standard derived from a sample of NAPL obtained from MW-11.

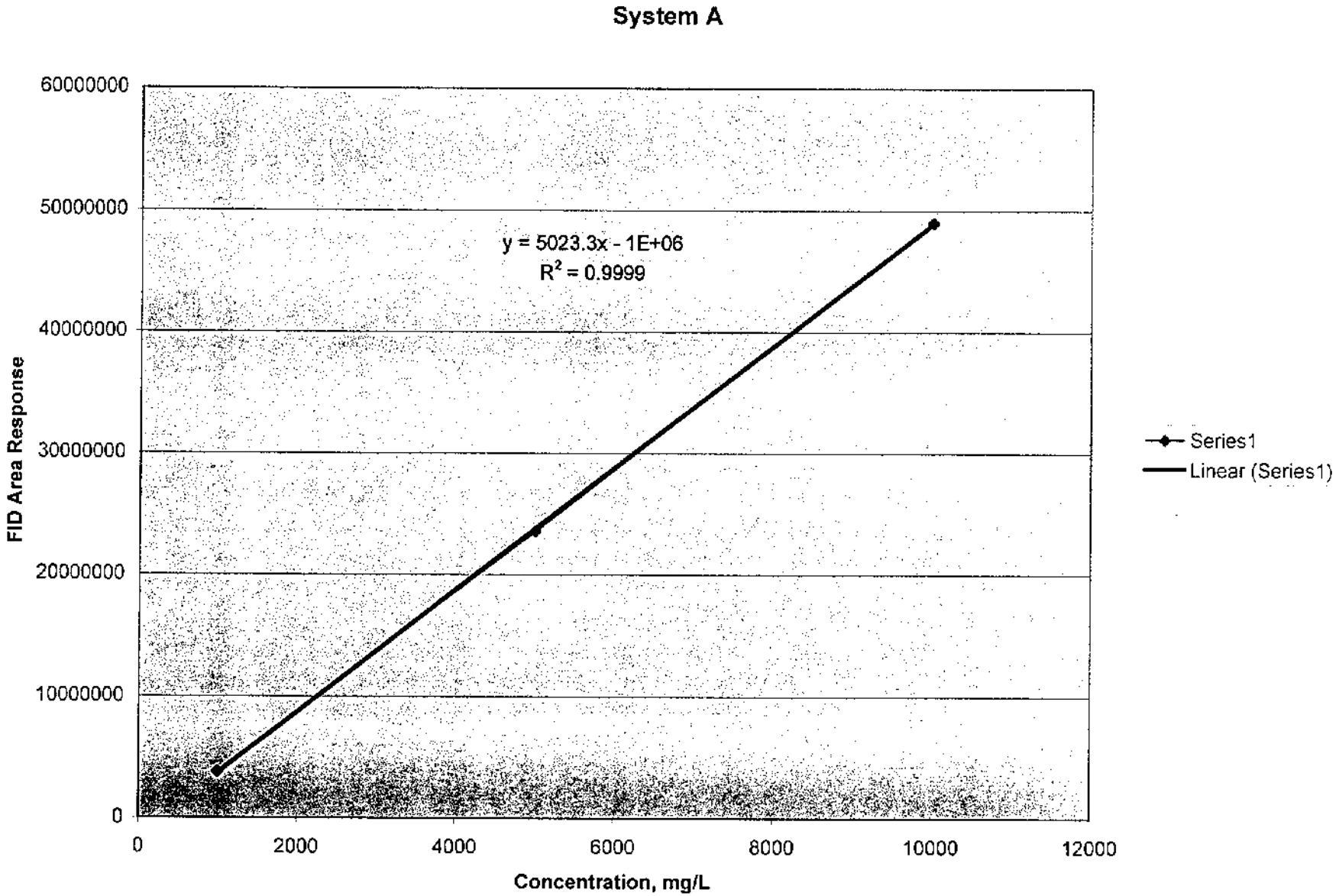
Date: August 8, 2000

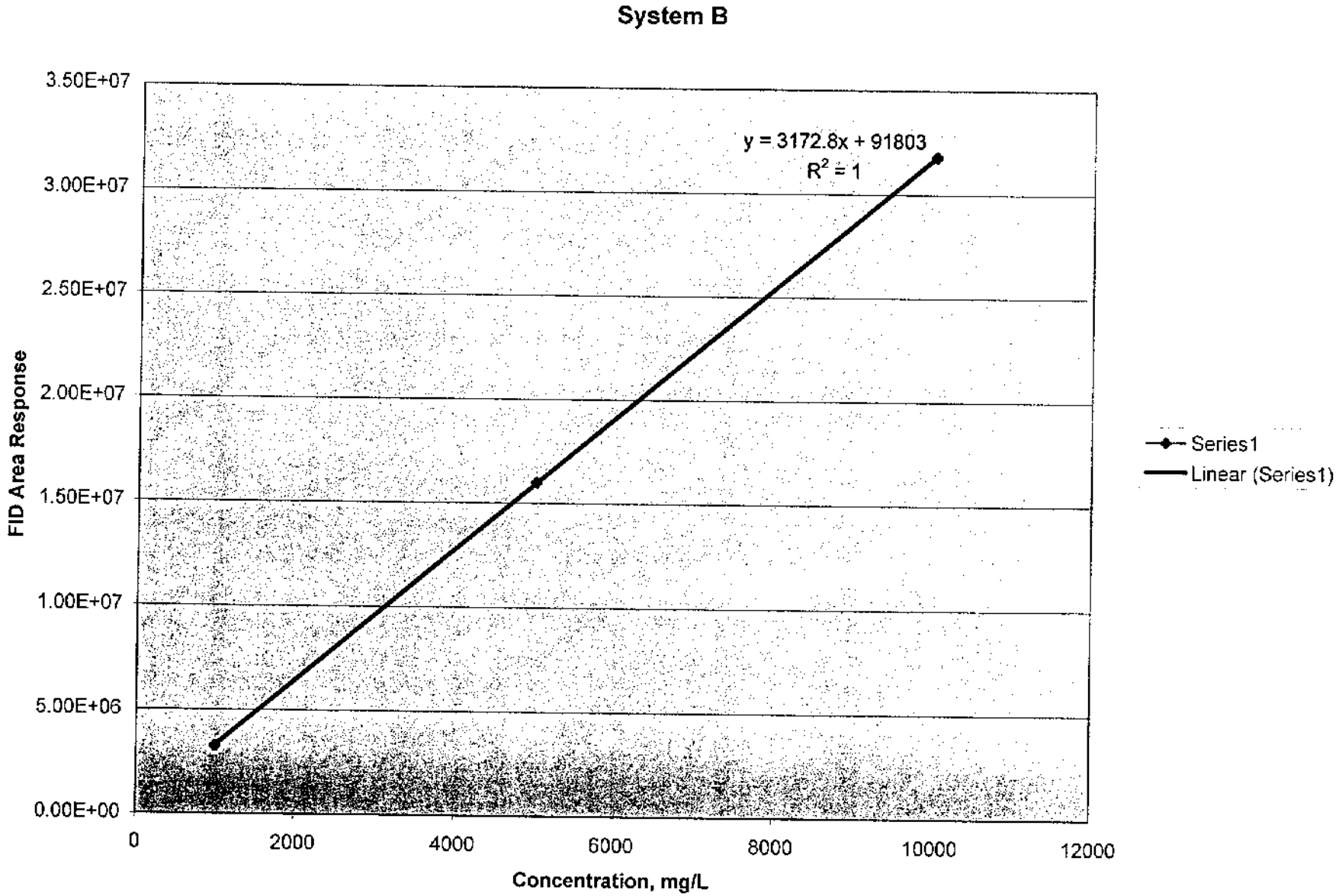
System A
Cal Curve

Conc.	FID Area
1000	3811845
5000	2.36E+07
10000	4.90E+07

System A
Cal Curve

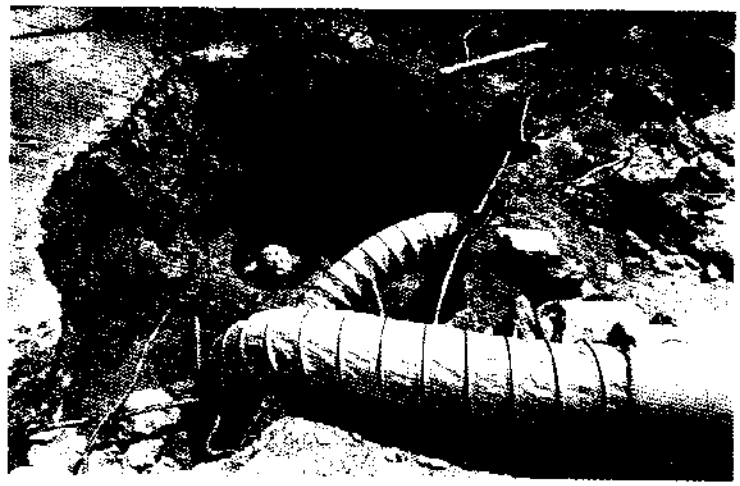
Conc.	FID Area
1000	3.24E+06
5000	1.60E+07
10000	3.18E+07

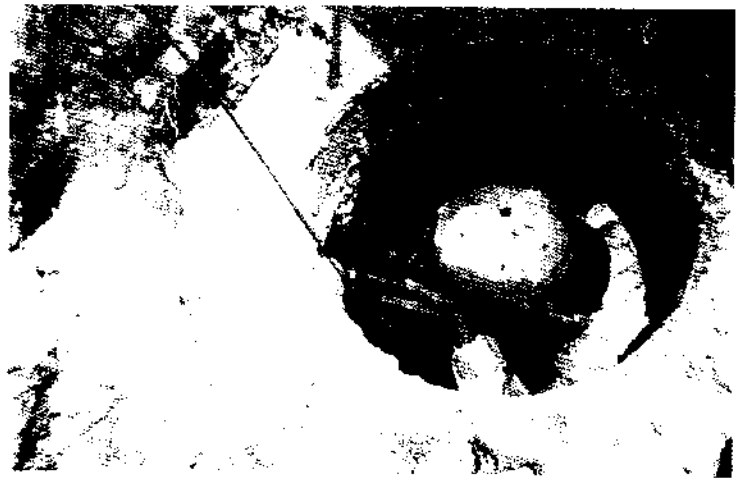

System A
60000000
50000000
40000000
30000000
20000000
10000000
0
FID Area Response
y = 5023.3x - 1E+06
R² = 0.9999
0
2000
4000
6000
8000
10000
12000
Concentration, mg/L
Series1
Linear (Series1)


System B
y = 3172.8x + 91803
R2 = 1
3.50E+07
3.00E+07
2.50E+07
2.00E+07
1.50E+07
1.00E+07
5.00E+06
0.00E+00
FID Area Response
0
2000
4000
6000
8000
10000
12000
Concentration, mg/L
Series1
Linear (Series1)

APPENDIX 4

PHOTOGRAPHS

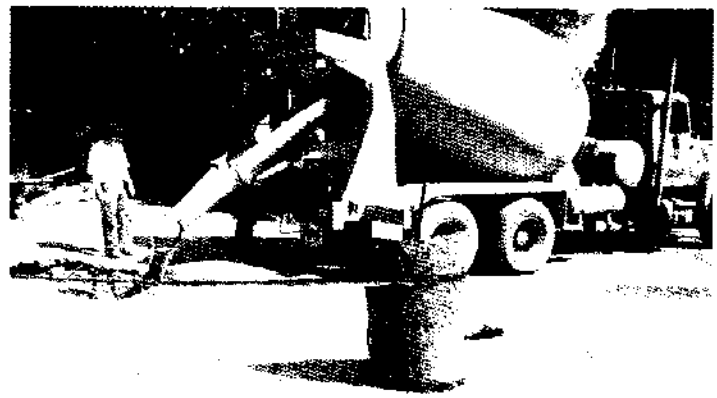




TANK INVESTIGATION
Olde Windsor Apartments, Windsor, Vermont

Source: SEI Field Investigations, 2000
o:\proj-00\1134-r-windsor village\report\figures\tankinvesti.cdr
10 13-00 jms

STONE ENVIRONMENTAL INC



TANK CLOSURE
Olde Windsor Apartments, Windsor, Vermont

Source: SEI Field Investigations, 2000
o:\proj-00\1134-r-windsor village\report\figures\tankfill.cdr
10-13-00 jms

STONE ENVIRONMENTAL INC