100 Pine Street, 10th Floor
San Francisco, CA 94111
(415) 434-9400 • FAX (415) 434-1365

GEOMATRIX

11 June 1997
Project 2611.01

Ms. Amy Leech
Alameda County Health Care Services Agency
1131 Harbor Bay Parkway
Alameda, California 94502

Subject: Groundwater Investigation Results and Evaluation of Closure Criteria
Clark's Home And Garden
23040 Clawiter Road
Hayward, California

Dear Ms. Leech,

At the request of Mr. Chester Clark, Geomatrix Consultants, Inc. (Geomatrix), is submitting this report of investigation and evaluation of closure criteria for the Clark's Home and Garden Property (the "Site"; Figure 1). The primary objective of this work was to further assess petroleum-affected groundwater. The investigation was performed on 19 February 1997 in accordance with the June 1996 Geomatrix "Groundwater Screening Results and Scope of Work for Additional Groundwater Investigation" (Results and Scope of Work)[1] as modified by the Alameda County Health Care Services Agency (ACHCSA) letter dated 31 July 1996. ACHCSA subsequently requested assessing the potential presence of polynuclear aromatic hydrocarbons (PNAs), which are constituents of potential toxicological concern that are commonly associated with petroleum hydrocarbons. This letter report presents site background, objectives of this investigation, field and laboratory methods, results of the investigation, and comparison of the results to the criteria for low-risk sites presented in a California Regional Water Quality Control Board, San Francisco Bay Region (RWQCB) 5 January 1996 letter[2]. Based on the comparison to RWQCB guidance, we will likely recommend that this site be closed by ACHCSA, pending results of a well records review.

PREVIOUS INVESTIGATIONS

On 4 November 1988, one 3000-gallon unleaded gasoline underground storage tank (UST) and one 1000-gallon diesel UST, both located north of the main office building at the site (Figure 2), were removed. Kaprealian Engineering, Inc. (KEI), of Benicia, California, removed the tanks and observed no holes or leaks in the gasoline tank, but did observe several small pin-size holes in the diesel tank. KEI collected four soil samples (two beneath each

[1] Geomatrix Consultants, Inc., 1996, Groundwater Screening Results and Scope of Work for Additional Groundwater Investigation, June.

[2] California Regional Water Quality Control Board, San Francisco Bay Region RWQCB, January 1996, Supplemental Instructions to State Water Board December 8, 1995 Interim Guidance on Required Cleanup at Low Risk Fuel Sites, 5 January.

tank) for laboratory chemical analysis between depths of 10 and 13 feet below ground surface (bgs; samples A-1, A-2, B-1, B-2). Because results from samples collected beneath the former diesel tank indicated the presence of petroleum hydrocarbons in soil, KEI excavated soil to a depth of 18 feet bgs (approximate depth to groundwater) beneath this tank on 19 December 1988 and collected one sidewall soil sample (SW-1) at a depth of 17.2 feet bgs. This sample also contained measurable petroleum hydrocarbons. The locations of the previous soil samples are shown on Figure 2 and results are summarized in Table 1.

On 1 August 1991, Terratech installed a monitoring well (MW-1, Figure 2) approximately 5 feet west of the western edge of the former UST excavation. One soil sample was collected from the capillary fringe at 15 feet bgs. The analytical results (Table 1) indicated the presence of petroleum hydrocarbons, however no benzene or toluene were detected in this sample. Subsequently, groundwater monitoring has been performed at the site since August 1991. Historical depth to water measurements (DTWs) in MW-1 have ranged from 12.83 to 17.92 feet below the top of casing. Table 2 presents the historical groundwater analytical data from monitoring well MW-1. These data show a general decrease in concentrations of total petroleum hydrocarbons quantified as diesel (TPHd), gasoline (TPHg), and benzene, toluene, ethylbenzene, and xylenes (BTEX).

On 22 November 1995, in accordance with a request by ACHCSA, Geomatrix conducted a field investigation to identify the lateral extent of groundwater impact by the former USTs. Four borings (B1 through B4, Figure 2) were drilled on-site to collect grab groundwater samples. Analytical results for these samples are summarized in Table 3. Samples analyzed for TPHd and TPH quantified as motor oil (TPHmo) were cleaned up with silica gel to remove polar biogenic material resulting from intrinsic bioremediation that may cause positive interference with analyses. In the downgradient borings (B-1 and B-4), elevated concentrations of TPHg, TPHd, and TPHmo were detected in groundwater samples [up to 11, 270 and 3.3 milligrams per liter (mg/l), respectively]. BTEX were detected at concentrations up to 18, 18, 150, and 81 micrograms per liter (µg/l), respectively. As indicated in the Geomatrix June 1996 Results and Scope of Work, the TPHd detections do not likely represent dissolved constituents in groundwater because concentrations greatly exceed the reported solubility of diesel fuel no. 2 (1-6 mg/l)[3,4]. It is likely that detections were elevated because the grab groundwater samples, which were highly turbid, contained non-dissolved petroleum hydrocarbons bound to sediment in the sample or non-dissolved separate phase material that

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[3] Shiu, W.Y., Bobra, M., Bobra, A.M., Maijanen, A., Sumito, L., and Mackay D., 1990. The Water Solubility of Crude Oils and Petroleum Products, Oil and Chemical Pollution, 7, p. 57-94.

[4] Fizgerald, J., 1996, Issues Paper: Implementation of VPH/EPH Approach, Public Comment Draft, Massachusetts Department of Environmental Protection Bureau of Waste Site Cleanup, May.

was carried into the borehole during the drilling process. These potential sources of interference with TPHd analyses have been recognized and described in literature[5].

SCOPE OF WORK AND OBJECTIVES

Based on the results of the November 1995 investigation, Geomatrix proposed additional investigation to assess groundwater quality downgradient from the former UST area. The scope of work performed by Geomatrix and the objectives of the work are summarized as follows:

- A groundwater sample was collected from on-site monitoring well MW-1 to confirm that groundwater near the former USTs is minimally impacted by petroleum hydrocarbons. Samples were analyzed for TPHd, TPHg, and BTEX. TPHd analysis was performed following silica gel cleanup, which removes soluble polar biogenic material. Such non-petroleum material may have caused positive interference with previous TPHd analyses on samples collected from this monitoring well.

- A grab groundwater sample was collected from two borings (B-5 and B-6, Figure 2) drilled near B-1 and B-4 to better assess dissolved petroleum hydrocarbons in groundwater downgradient of the former USTs. An attempt was made to avoid incorporating residual material from capillary fringe sediments in the sample. Samples were collected and analyzed for TPHg, TPHd (following silica gel cleanup), and BTEX constituents. In addition to the conventional TPHd analysis, a second set of samples was collected and analyzed following laboratory filtration with 0.7-micron glass fiber filter. Filtration removes non-dissolved petroleum hydrocarbons that adhere to sediment in the sample.

- Two off-site borings were drilled on the west side of Clawiter Road (B-7 and B-8, Figure 2) to better establish the extent of residual hydrocarbons in the capillary fringe. Grab groundwater samples also were collected from each boring to further confirm the extent of dissolved petroleum hydrocarbons in groundwater. Samples were analyzed for TPHg, TPHd (following silica gel cleanup), and BTEX. Because residual petroleum hydrocarbons were encountered in the capillary fringe, a second set of samples were analyzed for TPHd following laboratory filtration.

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[5] Zemo, D.A. and Synowiec, K.A., 1995, TPH detections in Groundwater: Identification and Elimination of Positive Interferences, in Proceedings of the 1995 Petroleum Hydrocarbons and Organic Chemicals in Groundwater Prevention, Detection, and Remediation.

- At the request of ACHCSA, a sample of petroleum-affected soil was collected to assess the potential presence of PNAs, which are constituents of potential toxicological concern that are commonly associated with petroleum hydrocarbons.

FIELD ANALYTICAL METHODS

The following sections describe methods used to drill borings and install temporary wells, collect soil and groundwater samples, and perform sample analysis.

Drilling and Temporary Well Installation

Before beginning subsurface work, the following activities were performed: a site-specific health and safety plan was prepared by Geomatrix; a drilling permit from the Alameda County Flood Control and Water Conservation District - Zone 7 (ACFCWCD) was obtained; boring locations were marked by Geomatrix and cleared for underground utilities by Cruz Brothers of Milpitas, California; and Underground Service Alert was notified at least 48 hours before fieldwork began.

Four shallow soil borings (B-5 through B-8) were advanced on 19 February 1997 at the locations shown on Figure 2. The four borings were advanced to a depth of 22 feet bgs to allow for the collection of grab groundwater samples. Borings were drilled by Precision Sampling Incorporated of San Rafael, California, a California licensed drilling contractor, under the observation of Geomatrix. Each boring was advanced using a direct-push technology (DPT), which utilizes a hydraulic hammer to advance a 2.4-inch-diameter drive casing containing a 3-foot-long core barrel lined with stainless steel liners. Soil cores were logged by a Geomatrix geologist in accordance with the Unified Soil Classification System as described in the American Society of Testing and Materials Standard D 2488-90[6] and a lithologic log was prepared for each boring. Lithologic information is presented in the boring logs included as Attachment A.

Temporary wells were installed in the borings to allow for the collection of grab groundwater samples. The temporary wells were constructed of 1-inch-diameter PVC pipe consisting of 10 feet of 0.01-inch-slot well screen at the base, attached to 15 feet of blank PVC casing. After the installation of the temporary well in each boring, the drive casing was retracted to just below the top of saturated sediments (about 14 feet bgs in B-5 and 17.5 feet bgs in B-6, B-7, and B-8) to reduce the potential for residual non-dissolved petroleum hydrocarbons in the capillary fringe from entering the casing. After groundwater samples were collected, the

[6] American Society of Testing and Materials (ASTM), 1990, Standard Practice for Description and Identification of Soils (Visual-Manual Procedure), ASTM Standard D 2488-90.

borings were destroyed by backfilling the borehole with neat Portland™ cement, using the temporary PVC well as tremie.

Between each boring, all downhole equipment was steam cleaned and the rinsate was contained in a 55-gallon drum. Soil cuttings were contained in two 5-gallon buckets with lids. These containers were labeled and are stored temporarily at the site pending disposal.

Soil and Groundwater Sampling

A soil sample was collected at 13 feet bgs from boring B-5 for laboratory chemical analysis. The sample was collected in a 6-inch-long stainless steel liner during drilling. After the sample was retrieved, the ends of the stainless steel liner were immediately covered with Teflon™ sheets, capped, and sealed with silicone tape. The sample was then labeled, placed in an ice-cooled chest, and delivered to the analytical laboratory under Geomatrix chain-of-custody procedures.

Groundwater samples were collected from temporary wells installed in the four borings and from monitoring well MW-1. Groundwater was collected using a new 0.5-inch disposable bailer at each sampling location and dispensing the water with a bottom-emptying device (stopcock) into sample bottles. Samples for TPHg and BTEX analysis were collected in 40-milliliter vials and samples for TPHd analysis were collected in 1-liter amber glass bottles; sample bottles contained hydrochloric acid preservative. A duplicate sample, designated B-9, was collected from the temporary well in boring B-7. An equipment blank sample, designated EB-1, was collected by pouring deionized water through a cleaned bailer and transferring the sample into appropriate sample containers. The samples were labeled, placed in an ice-cooled chest, and delivered to the analytical laboratory under Geomatrix chain-of-custody procedures.

Laboratory Analyses

Soil and groundwater samples were submitted to Friedman and Bruya, located in Seattle, Washington, a California Department of Health Services certified laboratory. The soil sample was analyzed for PNAs using U.S. Environmental Protection Agency (EPA) Method 8270. The groundwater samples were analyzed for TPHg and TPHd using EPA Method 8015M; and BTEX and methyl tertiary-butyl ether (MtBE) using EPA Method 8020. Before TPHd analysis, all samples were cleaned with silica gel (following guidance in EPA Method 3630M) to remove polar biogenic material that could cause positive interferences. Additionally, to remove sediment that could contain adsorbed, non-dissolved petroleum hydrocarbons, a second sample from each boring was first passed through a 0.7-micron glass fiber filter before TPHd analysis. It should be noted that the analytical laboratory reported product in the sample from borings B-5 and B-6. Copies of the laboratory analytical reports, chromatograms, and chain-of-custody documentation are included as Attachment B.

RESULTS OF FIELD INVESTIGATION

The following sections describe results of this investigation, including hydrogeologic conditions encountered, soil conditions, and shallow groundwater conditions.

Hydrogeologic Conditions

The site stratigraphy and the occurrence and movement of groundwater have been presented previously in the Geomatrix June 1996 Results and Scope of Work and are updated herein based on results of this investigation. The site is underlain by about one foot of coarse-grained fill and a mixture of coarse- and fine-grained sediments to a depth of about 13 to 16 feet bgs. Below these mixed sediments, predominantly fine-grained sediments (lean clay or silt) with relatively small amounts of sand were encountered. Groundwater was measured approximately 12.83 feet bgs in monitoring well MW-1 on 19 February 1997; historical data indicate that depth to groundwater previously has been 14 to 18 feet bgs. Based on information from nearby sites presented in the Geomatrix June 1996 Results and Scope of Work, groundwater flows west, towards San Francisco Bay, which is 2 miles distant.

Soil Conditions

Residual petroleum was noted in soil starting at depths between 13 and 16 feet bgs in all four borings drilled during this investigation. As described above, a sample of affected soil from this interval was collected from boring B-5 and analyzed for PNAs. No PNAs were detected above the laboratory reporting limit in the sample suggesting that PNAs are not present at significant concentrations in affected soil at the site.

Groundwater Conditions

The analytical results for the four grab groundwater samples collected during this investigation are shown in Table 4 and the results for the sample collected from MW-1 are shown along with historical analytical data from this well in Table 2. In summary, TPHd, TPHg, and BTEX were detected in all the samples; MtBE was not detected in any of the samples.

The results for the sample collected from monitoring well MW-1 in February 1997 are generally consistent with historical results for samples collected from this well (Table 2). However, the results for the TPHd analysis following silica gel cleanup (0.43 mg/l) is considerably lower than previous results for samples that were not cleaned up with silica gel (1.3 to 13.0 mg/l). These data indicate that previous TPHd analyses were interfered with by soluble polar biogenic material likely resulting from in situ biodegradation. That residual petroleum hydrocarbons in the vicinity of the former USTs have undergone biodegradation is further indicated by: (1) the low concentration of BTEX constituents detected in historical groundwater samples from MW-1; and (2) the results of a hydrocarbon fingerprint

characterization that was performed on a groundwater sample from MW-1, as documented in the Geomatrix June 1996 Results and Scope of Work. It should be noted that silica gel cleanup was not performed in conjunction with the TPHg analyses because the cleanup procedures may cause volatilzation of the low-boiling components of petroleum hydrocarbons; therefore, the TPHg quantification may include biogenic material and/or petroleum hydrocarbons.

As described above, grab groundwater samples collected for TPHd analysis were cleaned up with silica gel to remove interferences caused by polar biogenic material. A sample split from each boring also was filtered by the laboratory to remove non-dissolved petroleum that may be adhered to sediment present in samples. The TPHd analytical results for the unfiltered samples ranged from 2.1 mg/l (B-7) to 1100 mg/l (B-6). The TPHd analytical results for the filtered samples ranged from 0.36 to 0.55 mg/l for samples B-5F, B-7F, and B-8F; the result for sample B-6F, which contained a layer of product, was 180 mg/l TPHd. The results from B-5F, B-7F, and B-8F are similar to the results for the sample from MW-1 and likely represent dissolved concentrations of extractable TPH in groundwater. However, the results for the sample from B-6F greatly exceeds the typical solubility of diesel and indicates that separate-phase was present in the sample (as reported by the laboratory), even after filtering. It should be noted that the results for unfiltered samples from borings B-5 and B-6 are similar to results from unfiltered grab groundwater samples previously collected in this area (B-1 and B-4), indicating that sediment in the earlier samples likely caused positive interference in the analyses. The aggregate data indicate that dissolved TPHd in groundwater does not likely exceed about 0.5 mg/l.

In the grab groundwater samples, TPHg ranged from 3.4 to 8.6 mg/l and BTEX concentrations were relatively low (e.g., benzene ranged from 2 to 4 micrograms per liter [µg/l]; Table 4). As described above, the TPHg quantification may include biogenic materials or non-dissolved petroleum, but such interferences cannot be removed without potential loss of volatiles from the samples.

In the equipment blank sample (EB-1) BTEX, TPHg, MtBE, and TPHd (unfiltered) were not detected. However, the TPHd analytical result for the filtered sample (EB-1F) was 5 mg/l. Reanalysis of this sample confirmed the presence of TPHd (0.17 mg/l). Based on our review of the data, it appears that the sample container for EB-1F was (1) inadvertently mislabelled in the field (i.e., the sample was actually groundwater from one of the borings) or (2) came into contact with petroleum-affected material in the field. Because no petroleum constituents were detected in the remaining equipment blank samples, we believe that the detection in EB-1F was an isolated occurrence.

COMPARISON TO RWQCB LOW-RISK CRITERIA AND EVALUATION OF CLOSURE CRITERIA

This section discusses the results of the investigation within the context of recent RWQCB guidance pertaining to management of petroleum hydrocarbon sites. In a 5 January 1996 letter from RWQCB to San Francisco Bay Area Agencies Overseeing UST Cleanup, RWQCB provides supplemental instructions and a fact sheet with questions and answers pertaining to SWRCB 8 December 1995 interim guidance on required cleanup at low risk fuel sites. The interim guidance is based on a Lawrence Livermore National Laboratory (LLNL) 16 October 1995 Report[7].

Although the analytical data show that shallow site groundwater contains dissolved petroleum hydrocarbons, the concentrations are sufficiently low so that we believe that it is appropriate to compare the site data against the RWQCB's six criteria that define a "low risk groundwater case." Toluene, ethylbenzene, and xylenes were detected at concentrations well below their Maximum Contaminant Levels (MCLs; 1000, 680, and 1750 µg/l, respectively). However, benzene has been detected slightly above the MCL of 1 µg/l in most samples. The six criteria for "low risk groundwater cases" are presented below and data collected during this investigation are discussed as they pertain to the criteria.

1. **The leak has been stopped and ongoing sources, including free product, removed or remediated.**

   The RWQCB supplemental instructions state that "Free product or soil which contains sufficient mobile constituents (leachate, vapors, or gravity flow) to degrade groundwater quality above water quality objectives or result in a significant threat to human health or the environment should be considered a source. For old releases, the absence of current groundwater impact is often a good indication that residual concentrations present in the soil are not a source of pollution." The fact sheet further defines what is considered a "source" and states, "Oil and grease, degraded crude oil, and degraded diesel may not be soluble enough to be considered a significant source and often do not degrade water quality or present a significant risk to human health or the environment."

   The former USTs and petroleum-affected soil were removed from the site in 1988. Although residual petroleum hydrocarbons were observed in the vadose zone soil during subsequent investigations, these petroleum hydrocarbons do not appear to be a significant source of chemicals to groundwater. This conclusion is supported by the

[7] Lawrence Livermore National Laboratory, 1995, Recommendations to improve the cleanup process for California's Leaking Underground Fuel Tanks (LUFTs), Livermore, California, 16 October.

findings of the hydrocarbon fingerprint characterization (Geomatrix June 1996 Results and Scope of Work), which indicated that these petroleum hydrocarbons are a very heavily degraded gasoline or diesel fuel; such petroleum hydrocarbon would not likely have sufficient soluble material to be a source of constituents to groundwater. This conclusion also is supported by the findings from investigation(s) indicating that shallow groundwater at the site does not appear to be significantly impacted by the soluble petroleum hydrocarbons (e.g., BTEX), even near the former source (i.e., MW-1; see discussion of criterion 3 below).

2. The site has been adequately characterized.

The November 1995 and February 1997 investigations have adequately characterized the distribution of petroleum hydrocarbons in soil and groundwater on-site and immediately downgradient of the site to the extent necessary to assess whether they impact groundwater (discussed under criterion 3 below) or if they pose a threat to human health, the environment, or other sensitive nearby receptors (discussed under criteria 4, 5, and 6 below).

3. The dissolved hydrocarbon plume is not migrating.

As described above, toluene, ethylbenzene, and xylenes have been detected in groundwater at concentrations well below their respective MCLs and benzene has been detected slightly above the MCL of 1 µg/l in samples collected immediately downgradient of the site (2 to 4 µg/l). There are no water quality objectives for aggregate TPH measurements; however, data collected during this investigation show that concentrations of dissolved extractable TPH (i.e., TPHd) are relatively low (0.5 mg/l or less). Historical data from MW-1 show that BTEX and TPH concentrations in groundwater generally have decreased during the last six years (Table 2), indicating that the benzene drinking water MCL will likely be achieved via natural attenuation. Furthermore, data collected during this investigation indicate that the dissolved plume is not migrating because concentrations of dissolved constituents in groundwater samples collected immediately downgradient of the site (e.g., approximately 50 to 100 feet downgradient of the former tank location) were very low (Table 3). Plume stability is indicated by the fact that similar low concentrations of benzene were detected in samples from both sides of Clawiter Road. These findings are consistent with those of the Lawrence Livermore National Laboratory (1995), which indicate that biodegradation will stabilize a plume within 250 feet of the source in most cases. In summary, the aggregate site groundwater data indicate that benzene, the only constituent detected at concentrations above the drinking water MCL, has not migrated significantly beyond the site and is decreasing in concentration due to natural attenuation.

gradient not confirmed
no data from adjoining site

4. No water wells, deeper drinking water aquifers, surface water, or other sensitive receptors are likely to be impacted.

Water wells, deeper drinking water aquifers, surface water or other sensitive receptors are not likely to be impacted. Based on information from Alameda County Zone 7 Water Agency, the nearest water supply well is a domestic well located west of the site at 23145 Clawiter Road. Because this well is 130 feet deep, it is not likely to be screened in shallow water-bearing units and, therefore, is not likely to be affected by the low concentrations of constituents detected in shallow groundwater at and near the site. Geomatrix proposes to obtain additional information about this well (details on location and well construction) to verify this conclusion. Based on U.S. Geological Survey topographic maps, the nearest surface water bodies are more than one mile from the Site. Because there is not a significant impact to shallow groundwater at the site, it is extremely unlikely that potential deeper drinking water aquifers or surface water bodies will be impacted.

5. The site presents no significant risk to human health.

The site does not present a significant risk to human health because: (1) petroleum-affected soil and groundwater occur at depths where human exposure is unlikely (13 to 16 feet bgs); and (2) concentrations of potential constituents of concern in soil are sufficiently low so as not to present a human health risk. Petroleum-affected soil was excavated to a depth of 13 to 18 feet beneath the former USTs. Downgradient of the USTs petroleum-affected soil was observed only in the capillary fringe (13 to 16 feet bgs). Human exposure to soil at these depths is considered to be unlikely. Even if exposure to petroleum-affected soil was to occur, concentrations of potential constituents that may present a human health risk are generally below levels of potential concern. As stated earlier, PNAs were not detected in a sample of affected soil collected during this investigation. Concentrations of BTEX detected in samples collected below the former USTs are equal to or below EPA Region IX Industrial Preliminary Remediation Goals (PRGs; Table 7)[8].

[8] U.S. Environmental Protection Agency, 1996, Region 9 Preliminary Remediation Goals (PRGs) 1996, 1 August.

6. The site presents no significant risk to the environment.

The site currently is an active commercial facility located in an urban environment. Sensitive environmental receptors are not likely to be present in this setting. Even if sensitive environmental receptors are present, petroleum-affected soil and groundwater occur at a depth where exposure would not occur.

Based on these findings, we believe that the site meets the RWQCB definition of a "low risk groundwater case." The management strategy recommended by RWQCB in the supplemental instructions is that monitoring should be performed for a minimum of one year to determine if site conditions are remaining stable or improving over time. As described above, such monitoring has been performed at the site for six years. The monitoring data indicate that conditions are improving over time and water quality objectives will be met via natural attenuation. To confirm that the fourth criterion above is met (no likely impact to drinking water wells), Geomatrix proposes to obtain details about locations and construction of the domestic well located at 23145 Clawiter Road. If this information confirms that the well is not likely to be impacted by low concentrations of constituents (e.g., benzene) detected in shallow groundwater at the site, Geomatrix will recommend that ACHCSA close this case with no further action required.

Please call any of the undersigned if you have questions regarding this letter report.

Sincerely,

GEOMATRIX CONSULTANTS, INC.

Ross A. Steenson, R.G.
Project Geologist

Gary R. Foote, R.G.
Senior Geologist

Tom Graf, P.E.
Principal Engineer

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Attachments: Table 1 - Summary of Historical Soil Analytical Results
Table 2 - Summary of Historical Groundwater Analytical Results From Monitoring Well MW-1
Table 3 - Summary of Grab Groundwater Analytical Results From 22 November 1995 Investigation
Table 4 - Summary of Grab Groundwater Analytical Results From 19 February 1997 Investigation
Figure 1 - Site Location Map
Figure 2 - Site Plan
A - Well Logs
B - Laboratory Analytical Reports and Chain-of-Custody Documentation

TABLES

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TABLE 1

SUMMARY OF HISTORICAL SOIL ANALYTICAL RESULTS[1]

Clark's Home and Garden
23040 Clawiter Road
Hayward, California

Concentrations in milligrams per kilograms (mg/kg)

Sample Name	Date	Depth (feet bgs[2])	TPH as Diesel	TPH as Gasoline	Benzene	Toluene	Ethyl-Benzene	Total Xylenes
A1	11/4/88	13	---[3]	5.1	<0.05	<0.01	<0.1	<0.1
A2	11/4/88	13	---	<1.0	<0.05	<0.1	<0.1	<0.1
B1	11/4/88	10	24,000	2700	0.43	33	61	350
B2	11/4/88	10	23,000	3500	0.57	46	63	350
SW-1	12/19/88	17.2	1100	670	1.1	23	67	15
DH-1	8/1/91	5.5	29	9.9	BTEX detected between 0.0027 and 0.3 mg/log			
MW-1	8/1/91	5.5	ND[4]	ND	ND	ND	ND	ND
MW-1	8/1/91	10.5	ND	ND	ND	ND	ND	ND
MW-1	8/1/91	15.0	350	6700	ND	ND	6.6	27
EPA Region IX Industrial PRG[5]			NA[6]	NA	1.4	880	230	320

Notes:

1. Soil samples analyzed by Sequoia Analytical of Redwood City, California, for total petroleum hydrocarbons (TPH) as diesel and gasoline using modified Environmental Protection Agency (EPA) Method 8015, and for benzene, toluene, ethylbenzene, and xylenes using EPA Method 8020.
2. feet bgs = feet below ground surface.
3. --- indicates not analyzed for that compound.
4. ND = not detected at or above reporting limit; reporting limit not available.
5. PRG = Preliminary Remediation Goal.
6. NA = No PRG established.

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TABLE 2

SUMMARY OF HISTORICAL GROUNDWATER ANALYTICAL RESULTS[1] FOR MONITORING WELL MW-1

Clark's Home and Garden
23040 Clawiter Road Site
Hayward, California

Concentrations in micrograms per liter (µg/l) unless otherwise noted.

Date	TPH as Diesel (mg/l)[2]	TPH as Gasoline (mg/l)	Benzene	Toluene	Ethyl-Benzene	Total Xylenes
8/7/91	7.1	5.9	45	<25	130	520
9/5/91	2.8[3]	47.0	<50	<50	230	660
10/15/91	13.0	24.0	<50	<50	<50	390
1/7/92	9.0[3]	23.0[4]	<50	<50	270	800
4/8/92	3.5[3]	8.1	19	<5	350	210
7/7/92	6.3	7.0	<5	<5	190	170
11/23/93	1.6	2.4	1.5	3.7	41	24
1/31/94	1.9	3.9	1.9	4.2	56	49
4/11/94	3.0	2.2	1.2	4.6	11	11
7/27/94	4.4[5]	6.2	<1	<1	50	74
10/31/94	1.8	1.7	2.1	4.9	20	42
10/9/95	1.3	0.87	<0.5	<0.5	12	10.4
1/17/96	1.8	1.8	10[6]	<5[6]	16	19.8
4/25/96	1.5	1.7	11	5.7	26	25
2/19/97[7]	0.43[8]	2.8	9	6	33	50

Notes:

1. Samples analyzed for total petroleum hydrocarbons (TPH) as diesel and gasoline using modified Environmental Protection Agency (EPA) Method 8015, and for benzene, toluene, ethylbenzene, and xylenes using EPA Method 8020.
2. mg/l = milligrams per liter.
3. Laboratory notes that TPH detected as diesel due to both diesel and a petroleum hydrocarbon lighter than diesel.
4. Laboratory notes that TPH as gasoline does not appear to have a typical gasoline pattern.
5. Laboratory reports quantitation in the kerosene range, diesel range not reported due to overlap of hydrocarbon ranges.
6. Sample analyzed for volatile organic compounds using EPA Method 8240.
7. Sample also analyzed for MtBE using EPA Method 8020. MtBE was not detected above the analytical reporting limit of 0.5 µg/l
8. Sample analyzed following silica gel cleanup.

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TABLE 3

SUMMARY OF GRAB GROUNDWATER ANALYTICAL RESULTS
22 NOVEMBER 1995 INVESTIGATION[1]

Clark's Home and Garden
23040 Clawiter Road
Hayward, California

Concentrations in micrograms per liter (µg/l) unless otherwise indicated.

Sample Name	Date	TPH[2] as Gasoline[3] (mg/l)[4]	TPH as Diesel[3] (mg/l)	TPH as Motor Oil[3] (mg/l)	Benzene[5] µg/L	Toluene[5]	Ethyl-benzene[5]	Total Xylenes[5]
B-1	11/22/95	9.2	51.0	0.84	18	15	80	8
B-2/B-12[6]	11/22/95	2.5/1.2	0.75/0.22	<0.2/<0.2	<0.5/<0.5	<0.5/<0.5	7.1/8.3	<0.5/<0.5
B-3	11/22/95	<0.05	<0.05	<0.2	<0.5	<0.5	<0.5	0.6
B-4	11/22/95	11.0	270.0	3.3	<1[7]	18	150	81

Notes:

1. Analyses conducted by Friedman & Bruya, Inc., of Seattle, Washington.
2. TPH = total petroleum hydrocarbon.
3. TPH as gasoline, diesel, and motor oil analyzed using modified EPA Method 8015 (silica gel cleanup performed on extractions prior to analysis for TPH as diesel and motor oil).
4. mg/l = milligrams per liter.
5. Benzene, toluene, ethylbenzene, and total xylenes analyzed using EPA Method 8020.
6. Duplicate sample result.
7. Sample was diluted by the laboratory and detection limit raised due to dilution.

GEOMATRIX

TABLE 4

SUMMARY OF GRAB GROUNDWATER ANALYTICAL RESULTS
19 FEBRUARY 1997 INVESTIGATION[1]

Clark's Home and Garden
23040 Clawiter Road
Hayward, California

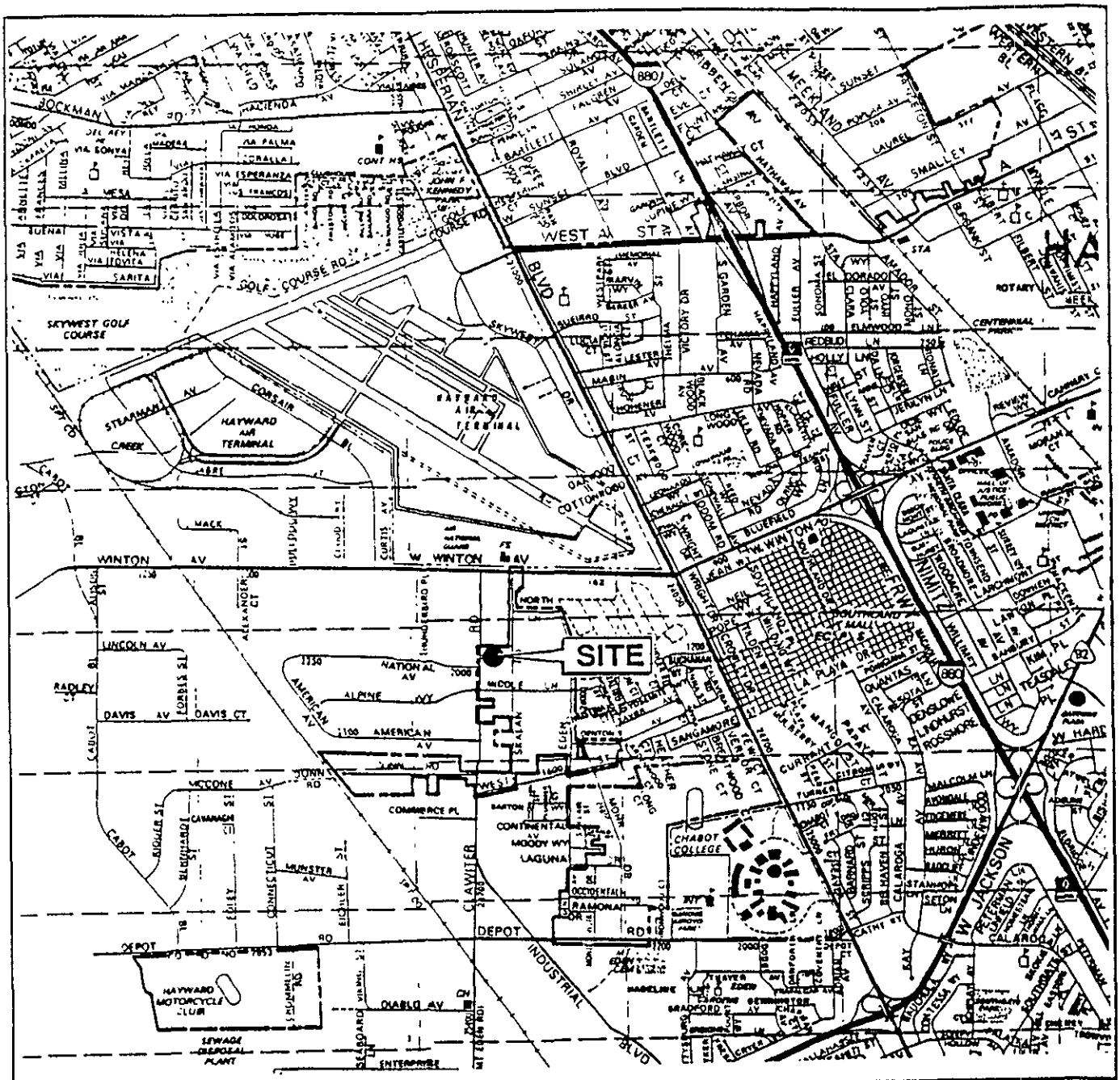
Concentrations in micrograms per liter (µg/l) unless otherwise noted.

Sample Name	Sample Date	TPH as Diesel[2] (mg/l)	TPH as Gasoline (mg/l)	Benzene	Toluene	Ethylbenzene	Total Xylenes	MTBE
B-5	2/19/97	25[3]	4.7	2	5	37	9	<2[4]
B-5F[5]	2/19/97	0.55[3]	---[6]	---	---	---	---	---
B-6	2/19/97	1100[7]	8.6	4	13	90	10	<2[4]
B-6F[5]	2/19/97	180[7]	---	---	---	---	---	---
B-7	2/19/97	12[7]	3.4	2	5	3	8	<0.5
B-7 dup	2/19/97	2.1[7]	3.5	1.9	5.3	<0.5	11	<0.5
B-7F[5]	2/19/97	0.4[7,8]	---	---	---	---	---	---
B-8	2/19/97	7.6	6.3	4	8	10	16	<2[4]
B-8F[5]	2/19/97	0.36[7,8]	---	---	---	---	---	---
EB-1	2/19/97	<0.05	<0.05	<0.5	<0.05	<0.5	<0.5	<0.5
EB-1F[5]	2/19/97	5/0.17[9]	---	---	---	---	---	---

Notes:

1. Grab groundwater samples analyzed by Friedman & Bruya, Inc., of Seattle, Washington, for total petroleum hydrocarbons (TPH) as diesel and gasoline using modified Environmental Protection Agency (EPA) Method 8015; and for benzene, toluene, ethylbenzene, total xylenes, and methyl tertiary butyl ether (MTBE) using EPA Method 8020.
2. Grab groundwater sample extracts were passed through a silica gel column prior to TPH as diesel analysis.
3. Laboratory notes the pattern of peaks in the chromatogram is not indicative of diesel #2.
4. Detections limits raised due to dilution.
5. The sample was filtered with a 0.7-micron glass fiber filter.
6. --- indicates not analyzed.
7. Laboratory notes the pattern of peaks present is indicative of a mixture of petroleum products, a portion of which is indicative of diesel.
8. The sample was extracted after hold time had expired.
9. This sampe was re-analyzed to confirm results.

FIGURES

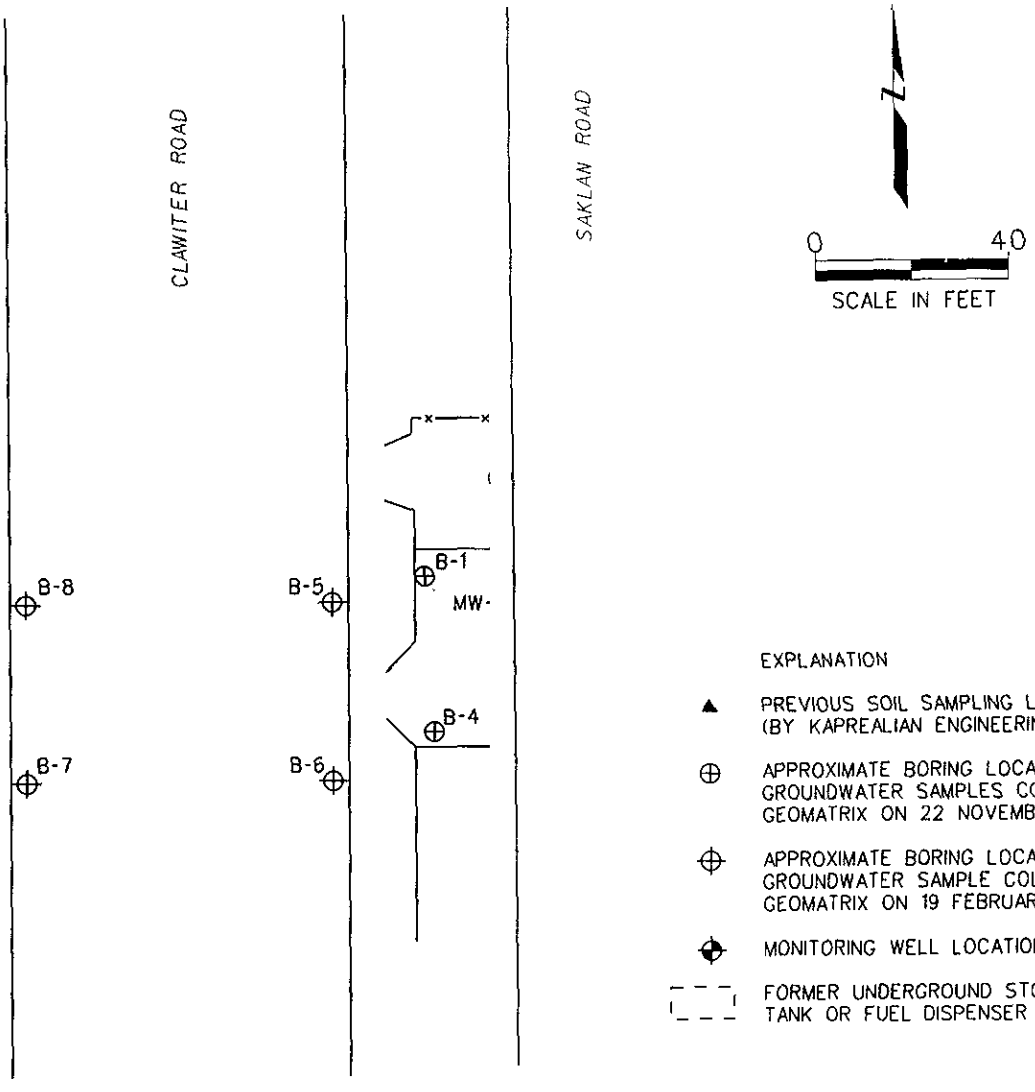


GEOMATRIX

SITE LOCATION MAP
Clark's Home and Garden
23040 Clawiter Road
Hayward, California

Figure
1

Project No.
2611



EXPLANATION

- ▲ PREVIOUS SOIL SAMPLING LOCATION (BY KAPREALIAN ENGINEERING, INC.)
- ⊕ APPROXIMATE BORING LOCATION OF GRAB GROUNDWATER SAMPLES COLLECTED BY GEOMATRIX ON 22 NOVEMBER 1995
- ⊕ APPROXIMATE BORING LOCATION OF GRAB GROUNDWATER SAMPLE COLLECTED BY GEOMATRIX ON 19 FEBRUARY 1997
- ⊕ MONITORING WELL LOCATION
- FORMER UNDERGROUND STORAGE TANK OR FUEL DISPENSER LOCATION

06-MAR-1997 12:12 kuber
r:\2000-2900s\2611\fig_02.dgn bw ctb
\\PRINTSRV\SF4MV2B MAP_4mv.pen
CHECKED: _____

SITE PLAN WITH RECENT AND HISTORICAL SOIL AND GROUNDWATER SAMPLING LOCATIONS

Clark's Home and Garden
23040 Clawiter Road
Hayward, California

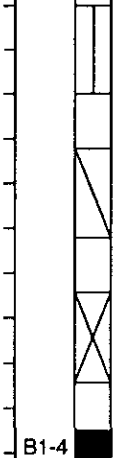
GEOMATRIX	Project No. 2611	Figure 2

GEOMATRIX

ATTACHMENT A

PROJECT: CLARK'S HOME AND GARDEN Hayward, California		**Boring Log Explanation**	
BORING LOCATION:		ELEVATION AND DATUM:	
DRILLING CONTRACTOR:		DATE STARTED:	DATE FINISHED:
DRILLING METHOD:		TOTAL DEPTH:	MEASURING POINT:
DRILLING EQUIPMENT:		DEPTH TO WATER: FIRST	COMPL.
SAMPLING METHOD:		LOGGED BY:	
HAMMER WEIGHT:	DROP:	RESPONSIBLE PROFESSIONAL:	REG. NO.

DEPTH (feet)	SAMPLES: Sample No.	SAMPLES: Sample	SAMPLES: Blows/ Foot	OVM Reading (ppm)	DESCRIPTION NAME (USCS Symbol): color, moist, % by weight., plast., consistency, structure, cementation, react. w/HCl. geo inter Surface Elevation	REMARKS



Notes

1. Soil descriptions are in accordance with the USCS as set forth by ASTM D2488-90 "Standard Practice for Description and Identification of Soils (Visual-Manual Procedure)."
2. Soil color described according to Munsell Color Chart.
3. Dashed lines separating soil strata represent inferred boundaries between sampled intervals that may be abrupt or gradual transitions. Solid lines represent approximate boundaries observed within sample intervals.
4. OVM = organic vapor meter, reading in parts per million.
5. Odor, if noted, is subjective and not necessarily indicative of specific compounds or concentrations

Interval of recovered soil core collected with split-barrel sampler

Interval of recovered soil core collected with split-spoon drive sampler

Interval of no recovery

Sample collected for chemical analysis and sample identification

B-1 (3/97)

PROJECT: CLARK'S HOME AND GARDEN
Hayward, California

Log of Boring No. B-5

BORING LOCATION: East side of Clawiter Boulevard	ELEVATION AND DATUM: Feet below ground surface (BGS)
DRILLING CONTRACTOR: Precision Sampling, Inc.	DATE STARTED: 2/19/97 / DATE FINISHED: 2/19/97
DRILLING METHOD: Direct Push Technology	TOTAL DEPTH: 22 feet / MEASURING POINT: ---
DRILLING EQUIPMENT: XD-1	DEPTH TO WATER: FIRST --- / COMPL. ---
SAMPLING METHOD: 3-foot x 2.5-inch continuous Envirocore	LOGGED BY: N. Taylor
HAMMER WEIGHT: --- / DROP: ---	RESPONSIBLE PROFESSIONAL: R. Steenson / REG. NO. RG 6592

DEPTH (feet)	SAMPLES: Sample No.	SAMPLES: Sample	SAMPLES: Blows/ Foot	OVM Reading (ppm)	DESCRIPTION (NAME (USCS Symbol). color, moist, % by weight., plast., consistency, structure, cementation, react. w/HCl. geo. inter.)	REMARKS
					Surface Elevation: ---	
					Asphalt	
					Baserock	
1–2				4.4	CLAYEY SAND with GRAVEL (SC) Dark brown (10YR 3/3), moist, 50% fine to coarse sand, 25% low to medium plasticity fines, 25% subangular gravel	
3–5						
6				4.4	SILTY GRAVEL with SAND (GM) Very pale brown (10YR 8/3), moist, 70% subrounded poorly-graded gravel, 15% low plasticity fines, 15% fine sand	
7–9						
10				4.6		
11					CLAYEY SAND (SC) Olive brown (2.5Y 4/4), moist, 70% fine sand, 30% medium plasticity fines	
12	B5-13			1.9		
13					LEAN CLAY (CL) Light olive brown (2.5Y 4/3), wet, 95% low plasticity fines, 5% fine sand	Odor
14				1.8	Zone of red mottling Color change to dark greenish gray (5GY 4/1)	
15						

B-1 (12/95)

Project No. 2611.01 | **Geomatrix Consultants** | Figure A-2

2611 001

PROJECT: CLARK'S HOME AND GARDEN
Hayward, California

Log of Boring No. B-5 (cont.)

DEPTH (feet)	SAMPLES: Sample No.	SAMPLES: Sample	SAMPLES: Blows/Foot	OVM Reading (ppm)	DESCRIPTION: NAME (USCS Symbol), color, moist, % by weight., plast., consistency, structure, cementation, react. w/HCl, geo. inter	REMARKS
16				300	LEAN CLAY (CL) (continued)	Drive casing retracted to 14 feet BGS. One-inch-diameter PVC temporary well installed with 0.01-inch slot well screen from 12 to 22 feet BGS for collection of grab groundwater sample B-5.
17				170		
18					2-inch sand layer, wet	
19					1-inch sand layer, wet Color change to dark greenish gray (5GY 3/1)	
20				81		Boring destroyed by backfilling the borehole through the casing with cement grout and then removing the casing.
21				46		
22					Bottom of boring at 22.0 feet.	
23						
24						
25						
26						
27						
28						
29						
30						
31						
32						
33						

PROJECT: CLARK'S HOME AND GARDEN
Hayward, California

Log of Boring No. B-6

BORING LOCATION: East side of Clawiter Boulevard on grass strip	ELEVATION AND DATUM: Feet below ground surface (BGS)
DRILLING CONTRACTOR:	DATE STARTED: 2/19/97 / DATE FINISHED: 2/19/97
DRILLING METHOD: Direct Push Technology	TOTAL DEPTH: 22 feet / MEASURING POINT: ---
DRILLING EQUIPMENT: XD-1	DEPTH TO WATER: FIRST --- / COMPL. ---
SAMPLING METHOD: 3-foot x 2.5-inch continuous Envirocore	LOGGED BY: N. Taylor
HAMMER WEIGHT: --- / DROP: ---	RESPONSIBLE PROFESSIONAL: R. Steenson / REG. NO. RG 6592

DEPTH (feet)	SAMPLES: Sample No.	SAMPLES: Sample	SAMPLES: Blows/Foot	OVM Reading (ppm)	DESCRIPTION	REMARKS
					Surface Elevation: ---	
0					1 foot organic material (landscaping)	
1					LEAN CLAY (CL) Black (10YR 2/1), moist, 90% medium plasticity fines, 10% fine sand, trace plant material	
2						
2.5					Color change to very dark grayish brown (10YR 3/2)	
3						
4					Color change to brown (10YR 4/3)	
5				1.8	CLAYEY SAND (SC) Brown (10YR 5/3), moist, 70% fine sand, 30% low to medium plasticity fines	
6						
7					SANDY LEAN CLAY (CL) Brown (10YR 5/3), moist, 70% low to medium plasticity fines, 30% fine sand	
8						
9						
10					CLAYEY SAND (SC) Brown (10YR 5/3), moist, 60% fine sand, 40% low to medium plasticity fines	
11				0.9		
12						
13					Wet	
14						
15						

B-1 (12/95)

Project No. 2611.01	**Geomatrix Consultants**	Figure A-3

2611.003

PROJECT: CLARK'S HOME AND GARDEN
Hayward, California

Log of Boring No. B-6 (cont.)

DEPTH (feet)	SAMPLES: Sample No.	SAMPLES: Sample	SAMPLES: Blows/Foot	OVM Reading (ppm)	DESCRIPTION: NAME (USCS Symbol): color, moist, % by weight , plast , consistency, structure, cementation, react w/HCl. geo. inter.	REMARKS
16				3.9	CLAYEY SAND (SC) (continued)	
					WELL-GRADED SAND Brown (10YR 4/3), wet, 80% fine to medium sand, 20% nonplastic fines	Odor
17					LEAN CLAY (CL) Dark greenish gray (10Y 4/1), moist to wet, 95% fines, 5% fine sand, medium plasticity	
				226		Drive casing retracted to 17 feet BGS. One-inch-diameter PVC temporary well installed with 0.01-inch slot well screen from 12 to 22 feet BGS for collection of grab groundwater sample B-6.
18					2-inch lens of sand, wet	
19					2-inch lens of sand, wet	
					Color change to dark greenish gray (10Y 3/1)	
20						
21						
22					Bottom of boring at 22.0 feet.	Boring destroyed by backfilling the borehole through the casing with cement grout and then removing the casing.
23						
24						
25						
26						
27						
28						
29						
30						
31						
32						
33						

B-2 (12/95)

PROJECT: CLARK'S HOME AND GARDEN
Hayward, California

Log of Boring No. B-7

BORING LOCATION: West side of Clawiter Boulevard	ELEVATION AND DATUM: Feet below ground surface (BGS)
DRILLING CONTRACTOR: Precision Sampling, Inc.	DATE STARTED: 2/19/97 / DATE FINISHED: 2/19/97
DRILLING METHOD: Direct Push Technology	TOTAL DEPTH: 22 feet / MEASURING POINT: ---
DRILLING EQUIPMENT: XD-1	DEPTH TO WATER: FIRST --- / COMPL. ---
SAMPLING METHOD: 3-foot x 2.5-inch continuous Envirocore	LOGGED BY: N. Taylor
HAMMER WEIGHT: --- / DROP: ---	RESPONSIBLE PROFESSIONAL: R. Steenson / REG. NO. RG 6592

DEPTH (feet)	SAMPLES: Sample No.	SAMPLES: Sample	SAMPLES: Blows/Foot	OVM Reading (ppm)	DESCRIPTION: NAME (USCS Symbol): color, moist, % by weight, plast., consistency, structure, cementation, react. w/HCl. geo. inter.	REMARKS
					Surface Elevation: ---	
					Asphalt	
					Baserock	
1–2					CLAYEY SAND with GRAVEL (SC) Dark brown (10YR 3/3), moist, 50% fine to medium sand, 25% low to medium plasticity fines, 25% subangular gravel	
3–4						
5–6						
7					Lens of silty sand (SM), brown (10YR 5/3), slightly moist, 80% fine to medium sand, 20% nonplastic fines	
8–9						
10					LEAN CLAY with SAND (CL) Brown (10YR 5/3), moist, 80% low to medium plasticity fines, 10-20% fine sand, hard	
11					SILTY SAND (SM) Brown (10YR 5/3), moist, 80% fine to medium sand, 20% non to low plastic fines	
12					Wet	
13					WELL-GRADED GRAVEL with SAND and SILT (GW-GM) Brown (10YR 5/3), wet, 60% subrounded gravel, 30% fine to medium sand, 10% low plasticity fines	
14–15					SILTY SAND (SM) Brown (10YR 5/3), wet, 80% fine sand, 20% non to low plastic fines	

B-1 (12/95)

PROJECT: CLARK'S HOME AND GARDEN
Hayward, California

Log of Boring No. B-7 (cont.)

DEPTH (feet)	SAMPLES: Sample No.	SAMPLES: Sample	SAMPLES: Blows/Foot	OVM Reading (ppm)	DESCRIPTION: NAME (USCS Symbol): color, moist, % by weight., plast., consistency, structure, cementation, react. w/HCl geo. inter.	REMARKS
16					LEAN CLAY (CL) Brown (10YR 5/3), 80% medium plasticity fines, 20% fine sand, soft	
					Decrease in sand to 5%	
17					Color change to dark greenish gray (10YR 4/1), medium hard	Odor
					2-inch sand layer	Drive casing retracted to 17 feet BGS. One-inch-diameter PVC temporary well installed with 0.01-inch slot well screen from 12 to 22 feet BGS for collection of grab groundwater sample B-7.
18					2-inch sand layer	
19					Color change to dark greenish gray (10Y 3/1)	
20						
21						
22					Bottom of boring at 22.0 feet.	Boring destroyed by backfilling the borehole through the casing with cement grout and then removing the casing.
23						
24						
25						
26						
27						
28						
29						
30						
31						
32						
33						

B-2 (12/95)

PROJECT: CLARK'S HOME AND GARDEN
Hayward, California

Log of Boring No. B-8

BORING LOCATION: West side of Clawiter Boulevard	ELEVATION AND DATUM: Feet below ground surface (BGS)
DRILLING CONTRACTOR: Precision Sampling, Inc.	DATE STARTED: 2/19/97 / DATE FINISHED: 2/19/97
DRILLING METHOD: Direct Push Technology	TOTAL DEPTH: 22 feet / MEASURING POINT: ---
DRILLING EQUIPMENT: XD-1	DEPTH TO WATER: FIRST 12.5 feet / COMPL. ---
SAMPLING METHOD: 3-foot x 2.5-inch continuous Envirocore	LOGGED BY: N. Taylor
HAMMER WEIGHT: --- / DROP: ---	RESPONSIBLE PROFESSIONAL: R. Steenson / REG. NO. RG 6592

DEPTH (feet)	SAMPLES: Sample No.	SAMPLES: Sample	SAMPLES: Blows/Foot	OVM Reading (ppm)	DESCRIPTION (NAME (USCS Symbol): color, moist, % by weight., plast., consistency, structure, cementation, react w/HCl geo inter.)	REMARKS
					Surface Elevation: ---	
					Asphalt	
					Baserock	
1					CLAYEY SAND with GRAVEL (SC) Dark brown (10YR 3/3), slightly moist, 50% fine to coarse sand, 25% low to medium plasticity fines, 25% subangular gravel	
2						
3						
4						
5						
6					SANDY LEAN CLAY (CL) Brown (10YR 5/3), moist, 70% low to medium plasticity fines, 30% fine sand, hard, root fragments	
7						
8						
9				1.1	SILT with SAND (ML) Yellowish brown (10YR 5/4), moist, 80% nonplasticity fines, 20% fine sand	
10						
11					SILTY SAND (SM) Yellowish brown (10YR 5/4), moist, 80% fine to medium sand, 20% non to low plastic fines	
12					LEAN CLAY (CL) Yellowish brown (10YR 5/4), wet, 80% low to medium plasticity fines, 20% fine sand ATD ▽	
13					SILTY SAND (SM) Yellowish brown (10YR 5/4), wet, 80% fine to medium sand, 20% non to low plastic fines	
14				1.1	LEAN CLAY (CL) Yellowish brown (10YR 5/4), wet, 95% medium plasticity fines, 5% fine sand, soft	
15						

B-1 (12/95)

PROJECT: CLARK'S HOME AND GARDEN
Hayward, California

Log of Boring No. B-8 (cont.)

DEPTH (feet)	SAMPLES: Sample No.	SAMPLES: Sample	SAMPLES: Blows/Foot	OVM Reading (ppm)	DESCRIPTION: NAME (USCS Symbol): color, moist, % by weight., plast., consistency, structure, cementation, react. w/HCl, geo inter.	REMARKS
16					CLAY (CL) (continued) *2-inch lens of well-graded sand*	No odor
17					Color change to dark greenish gray (10Y 4/1), medium hard, odor	Odor
18				93	2-inch lens of well-graded sand *2-inch lens of well-graded sand*	Drive casing retracted to 17 feet BGS. One-inch-diameter PVC temporary well installed with 0.01-inch slot well screen from 12 to 22 feet BGS for collection of grab groundwater sample B-8.
19				35	Color change to dark greenish gray (5GY 3/1)	
20						
21						
22					Bottom of boring at 22.0 feet.	Boring destroyed by backfilling the borehole through the casing with cement grout and then removing the casing.
23						
24						
25						
26						
27						
28						
29						
30						
31						
32						
33						

B-2 (12/95)

GEOMATRIX

ATTACHMENT B

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Beth M. Albertson, M.S.
Bradley T. Benson
Kelley D. Wilt

3012 16th Avenue West
Seattle, WA 98119-2029
TEL: (206) 285-8282
FAX: (206) 283-5044

March 12, 1997

Ross Steenson, Project Manager
Geomatrix Consultants, Inc.
100 Pine Street, Suite 1000
San Francisco, CA 94111-5112

Dear Mr. Steenson:

Included are the results from the testing of material submitted on February 20, 1997 from your 2611.01 project. Samples B-6, B-6F, B-7, B-8, B-9, EB-1F, and MW-1 contain non-water soluble petroleum, a portion of which is indicative of diesel. This may be due to a sheen on the sample or material adsorbed to particulate matter in the sample.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Charlene Jensen

Charlene Jensen
Chemist

keh
Enclosures
c: Nathaniel Taylor, Geomatrix
GMC0312R.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: March 12, 1997
Date Received: February 20, 1997
Project: 2611.01
Date Samples Extracted: February 20, 1997
Date Extracts Analyzed: February 25, 1997

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES, MTBE, AND GASOLINE USING EPA METHODS 8020 AND 8015
Samples Processed Using Method 5030
Results Reported as µg/L (ppb)

Sample #	Benzene	Toluene	Ethyl Benzene	Total Xylenes	MTBE	Gasoline	Surrogate % Recovery
B-5	2	5	37	9	<2 c	4,700	101
B-6	4	13	90	10	<2 c	8,600	102
B-7	2	5	3	8	<0.5	3,400	105
B-8	4	8	10	16	<2 c	6,300	99
B-9 B-7 Dupl.	1.9	5.3	<0.5	11	<0.5	3,500	110
EB-1 Equipment Blank	<0.5	<0.5	<0.5	<0.5	<0.5	<50	101
MW-1	9	6	33	50	<0.5	2,800	102
Method Blank	<0.5	<0.5	<0.5	<0.5	<0.5	<50	100

c - The sample was diluted due to high levels of material. Detection limits are raised due to dilution.

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: March 12, 1997
Date Received: February 20, 1997
Project: 2611.01
Date Samples Extracted: February 20, 1997
Date Extracts Analyzed: February 22, 1997

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL BY GC/FID (Modified 8015)
Samples Passed Through a Silica Gel Column Prior to Analysis
Samples Processed Using Method 3510
Results Reported as µg/L (ppb)

Sample ID	Diesel	Surrogate (% Recovery)
B-5	25,000 b	112
B-5F	550 b,f	104
B-6	1,100,000 a	d
B-6F	180,000 a,f	110
B-7	12,000 a	99
B-8	7,600 a	94
B-9 B-7 Dupl.	2,100 a	100
EB-1 } Equipment blank	<50	110
EB-1F } Equipment blank	5,000 a,f	111
MW-1	430 a	112
Method Blank	<50	80

a - The pattern of peaks present is indicative of a mixture of petroleum products, a portion of which is indicative of diesel. The result may not be representative of the level of material dissolved in the water.

b - The pattern of peaks present is not indicative of diesel #2. The result may not be representative of the level of material dissolved in the water.

d - The sample was diluted. Surrogate recoveries are not meaningful.

f - Sample was filtered with a 0.7 micron glass fiber filter.

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: March 12, 1997
Date Received: February 20, 1997
Project: 2611.01
Date Samples Extracted: March 5, 1997
Date Extracts Analyzed: March 7, 1997

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL BY GC/FID (Modified 8015)
Samples Processed Using Method 3510
Sample Extracts Passed Through a Silica Gel Column Prior to Analysis
Results Reported as µg/L (ppb)

Sample ID	Diesel	Surrogate (% Recovery)
B-7	400 b,f,g	100
B-8	360 b,f,g	94
EB-1F	170 a,f,g	92
Method Blank	<50	87

a - The pattern of peaks present is indicative of a mixture of petroleum products, a portion of which is indicative of diesel. The result may not be representative of the level of material dissolved in the water.

b - The pattern of peaks present is not indicative of diesel #2. The result may not be representative of the level of material dissolved in the water.

f - Sample was filtered with a 0.7 micron glass fiber filter.

g - This sample was reanalyzed. The sample was extracted after hold time had expired.

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Semivolatile Compounds By EPA Method 8270

Client Sample ID:	B-5-13.0	Client:	Geomatrix Consultants, Inc.
Date Received:	02/20/97	Project:	2611.01
Date Extracted:	03/03/97	Lab ID:	76056
Date Analyzed:	03/06/97	Data File:	030606.D
Matrix:	Soil	Instrument:	GCMS#2
Units:	ug/g (ppm)	Operator:	kwilt

Surrogates:	% Recovery	Lower Limit	Upper Limit
Nitrobenzene-d5	80	23	120
2-Fluorobiphenyl	83	30	115
Terphenyl-d14	77	18	137

Compounds:	Concentration ug/g (ppm)
Naphthalene	<0.03
2-Methylnaphthalene	<0.03
Acenaphthylene	<0.03
Acenaphthene	<0.03
Dibenzofuran	<0.03
Fluorene	<0.03
Phenanthrene	<0.03
Anthracene	<0.03
Carbazole	<0.03
Fluoranthene	<0.03
Pyrene	<0.03
Benzo[a]anthracene	<0.03
Chrysene	<0.03
Benzo(a)pyrene	<0.03
Benzo(b)flouranthene	<0.03
Benzo(k)flouranthene	<0.03
Indeno(1,2,3-cd)pyrene	<0.03
Dibenz(a,h)anthracene	<0.03
Benzo(g,h,i)perylene	<0.03

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Semivolatile Compounds By EPA Method 8270

Client Sample ID:	B-5-13.0 Duplicate	Client:	Geomatrix Consultants, Inc.
Date Received:	02/20/97	Project:	2611.01
Date Extracted:	03/03/97	Lab ID:	76056
Date Analyzed:	03/06/97	Data File:	030607.D
Matrix:	Soil	Instrument:	GCMS#2
Units:	ug/g (ppm)	Operator:	kwilt

Surrogates:	% Recovery	Lower Limit	Upper Limit
Nitrobenzene-d5	81	23	120
2-Fluorobiphenyl	83	30	115
Terphenyl-d14	77	18	137

Compounds:	Concentration ug/g (ppm)
Naphthalene	<0.03
2-Methylnaphthalene	<0.03
Acenaphthylene	<0.03
Acenaphthene	<0.03
Dibenzofuran	<0.03
Fluorene	<0.03
Phenanthrene	<0.03
Anthracene	<0.03
Carbazole	<0.03
Fluoranthene	<0.03
Pyrene	<0.03
Benzo[a]anthracene	<0.03
Chrysene	<0.03
Benzo(a)pyrene	<0.03
Benzo(b)flouranthene	<0.03
Benzo(k)flouranthene	<0.03
Indeno(1,2,3-cd)pyrene	<0.03
Dibenz(a,h)anthracene	<0.03
Benzo(g,h,i)perylene	<0.03

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Semivolatile Compounds By EPA Method 8270

Client Sample ID:	Method Blank	Client:	Geomatrix Consultants, Inc.
Date Received:	02/20/97	Project:	2611.01
Date Extracted:	03/03/97	Lab ID:	Method Blank 07-121
Date Analyzed:	03/06/97	Data File:	030603.D
Matrix:	Soil	Instrument:	GCMS#2
Units:	ug/g (ppm)	Operator:	kwilt

Surrogates:	% Recovery	Lower Limit	Upper Limit
Nitrobenzene-d5	86	23	120
2-Fluorobiphenyl	86	30	115
Terphenyl-d14	82	18	137

Compounds:	Concentration ug/g (ppm)
Naphthalene	<0.03
2-Methylnaphthalene	<0.03
Acenaphthylene	<0.03
Acenaphthene	<0.03
Dibenzofuran	<0.03
Fluorene	<0.03
Phenanthrene	<0.03
Anthracene	<0.03
Carbazole	<0.03
Fluoranthene	<0.03
Pyrene	<0.03
Benzo[a]anthracene	<0.03
Chrysene	<0.03
Benzo(a)pyrene	<0.03
Benzo(b)flouranthene	<0.03
Benzo(k)flouranthene	<0.03
Indeno(1,2,3-cd)pyrene	<0.03
Dibenz(a,h)anthracene	<0.03
Benzo(g,h,i)perylene	<0.03

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: March 12, 1997
Date Received: February 20, 1997
Project: 2611.01

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES, MTBE, AND GASOLINE USING EPA METHODS 8020 AND 8015

Laboratory Code: 76041 (Duplicate)

Analyte	Reporting Units	Sample Result	Duplicate Result	Relative Percent Difference	Acceptance Criteria
Benzene	µg/L (ppb)	<0.5	<0.5	nm	0-20
Toluene	µg/L (ppb)	<0.5	<0.5	nm	0-20
Ethylbenzene	µg/L (ppb)	<0.5	<0.5	nm	0-20
Xylenes	µg/L (ppb)	<0.5	<0.5	nm	0-20
MTBE	µg/L (ppb)	<0.5	<0.5	nm	0-20
Gasoline	µg/L (ppb)	<50	<50	nm	0-20

Laboratory Code: Spike Blank

Analyte	Reporting Units	Spike Level	% Recovery MS	% Recovery MSD	Acceptance Criteria	Relative Percent Difference
Benzene	µg/L (ppb)	100	92	91	79-113	1
Toluene	µg/L (ppb)	100	99	96	82-117	3
Ethylbenzene	µg/L (ppb)	100	102	100	82-119	2
Xylenes	µg/L (ppb)	300	105	104	84-120	1
MTBE	µg/L (ppb)	100	99	97	65-135	2
Gasoline	µg/L (ppb)	1000	107	110	80-125	3

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: March 12, 1997
Date Received: February 20, 1997
Project: 2611.01

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL BY GC/FID (MODIFIED 8015)

Samples Passed Through a Silica Gel Column Prior to Analysis

Laboratory Code: Spike Blank

Analyte	Reporting Units	Spike Level	% Recovery MS	% Recovery MSD	Acceptance Criteria	Relative Percent Difference
Diesel	µg/L (ppb)	2500	102	95	62-146	7

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: March 12, 1997
Date Received: February 20, 1997
Project: 2611.01

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL BY GC/FID (MODIFIED 8015) Samples Passed Through a Silica Gel Column Prior to Analysis

Laboratory Code: Spike Blank

Analyte	Reporting Units	Spike Level	% Recovery MS	% Recovery MSD	Acceptance Criteria	Relative Percent Difference
Diesel	µg/L (ppb)	2500	81	74	60-138	9

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: March 12, 1997
Date Received: February 20, 1997
Project: 2611.01

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR SEMIVOLATILES BY EPA METHOD 8270

Laboratory Code: 76056 (Duplicate)

Analyte	Reporting Units	Sample Result	Duplicate Result	Relative Percent Difference	Acceptance Criteria
Phenol	ug/g(ppm)	<0.03	<0.03	nm	0-20
2-Chlorophenol	ug/g(ppm)	<0.03	<0.03	nm	0-20
1,4-Dichlorobenzene	ug/g(ppm)	<0.03	<0.03	nm	0-20
N-Nitroso-di-n-propylamine	ug/g(ppm)	<0.03	<0.03	nm	0-20
1,2,4-Trichlorobenzene	ug/g(ppm)	<0.03	<0.03	nm	0-20
4-Chloro-3-methylphenol	ug/g(ppm)	<0.03	<0.03	nm	0-20
Acenaphthene	ug/g(ppm)	<0.03	<0.03	nm	0-20
2,4-Dinitrotoluene	ug/g(ppm)	<0.03	<0.03	nm	0-20
4-Nitrophenol	ug/g(ppm)	<0.03	<0.03	nm	0-20
Pentachlorophenol	ug/g(ppm)	<0.03	<0.03	nm	0-20
Pyrene	ug/g(ppm)	<0.03	<0.03	nm	0-20

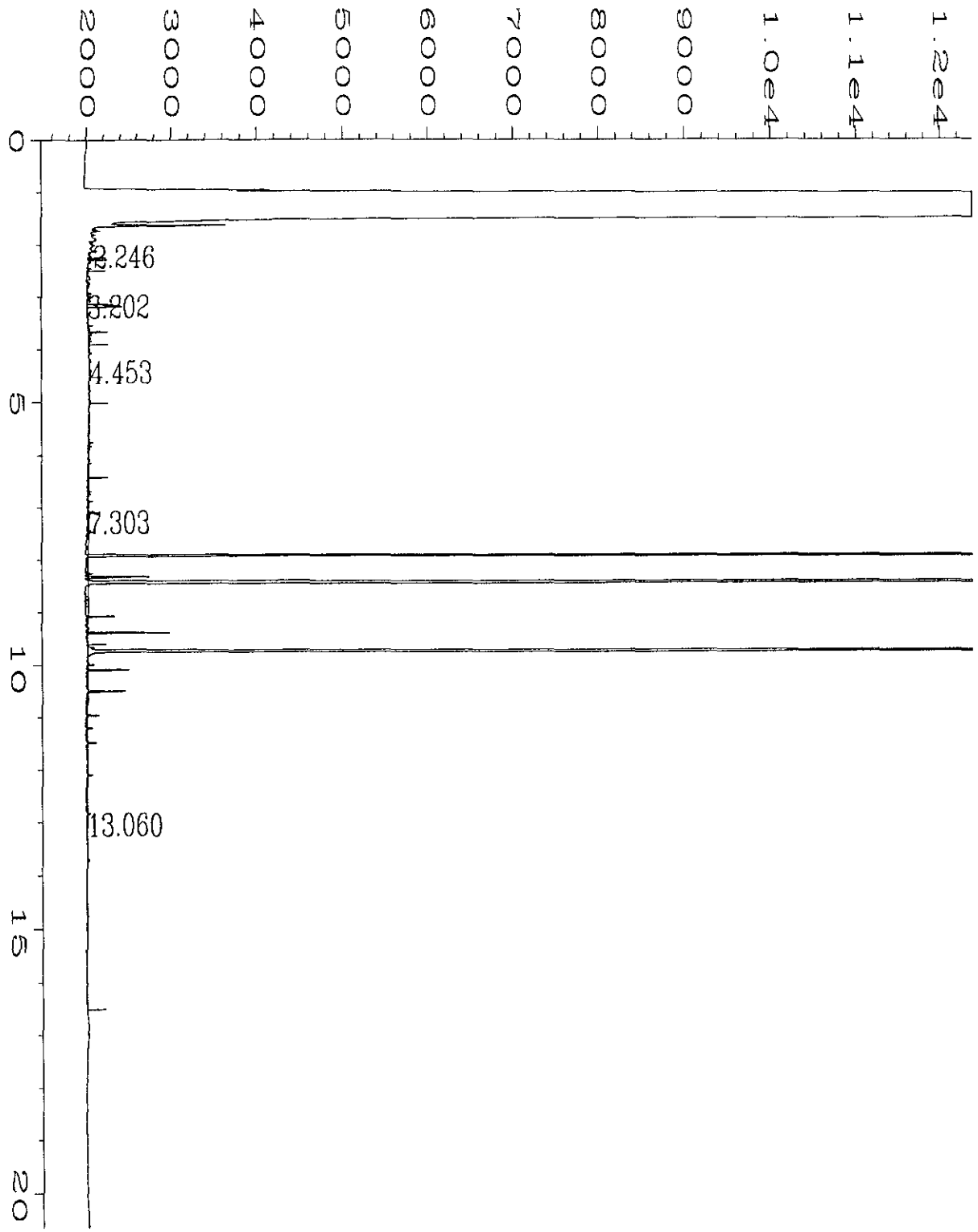
Laboratory Code: 76056 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	% Recovery MS	% Recovery MSD	Soil Acceptance Criteria	Relative Percent Difference
Phenol	ug/g(ppm)	5.0	<0.03	73	73	26-90	0
2-Chlorophenol	ug/g(ppm)	5.0	<0.03	74	72	25-102	3
1,4-Dichlorobenzene	ug/g(ppm)	3.3	<0.03	78	77	28-104	1
N-Nitroso-di-n-propylamine	ug/g(ppm)	3.3	<0.03	80	77	41-126	4
1,2,4-Trichlorobenzene	ug/g(ppm)	3.3	<0.03	77	76	38-107	1
4-Chloro-3-methylphenol	ug/g(ppm)	5.0	<0.03	72	71	26-103	1
Acenaphthene	ug/g(ppm)	3.3	<0.03	79	77	31-137	3
2,4-Dinitrotoluene	ug/g(ppm)	3.3	<0.03	80	75	28-89	6
4-Nitrophenol	ug/g(ppm)	5.0	<0.03	75	72	11-114	4
Pentachlorophenol	ug/g(ppm)	5.0	<0.03	70	72	17-109	3
Pyrene	ug/g(ppm)	3.3	<0.03	79	77	35-142	3

Laboratory Code: Spike Blank

Analyte	Reporting Units	Spike Level	% Recovery MS	% Recovery MSD	Soil Acceptance Criteria	Relative Percent Difference
Phenol	ug/g(ppm)	5.0	77	79	26-90	3
2-Chlorophenol	ug/g(ppm)	5.0	75	81	25-102	8
1,4-Dichlorobenzene	ug/g(ppm)	3.3	81	87	28-104	7
N-Nitroso-di-n-propylamine	ug/g(ppm)	3.3	83	90	41-126	8
1,2,4-Trichlorobenzene	ug/g(ppm)	3.3	81	85	38-107	5
4-Chloro-3-methylphenol	ug/g(ppm)	5.0	71	78	26-103	9
Acenaphthene	ug/g(ppm)	3.3	80	85	31-137	6
2,4-Dinitrotoluene	ug/g(ppm)	3.3	80	88	28-89	10
4-Nitrophenol	ug/g(ppm)	5.0	74	82	11-114	10
Pentachlorophenol	ug/g(ppm)	5.0	80	81	17-109	1
Pyrene	ug/g(ppm)	3.3	81	85	35-142	5

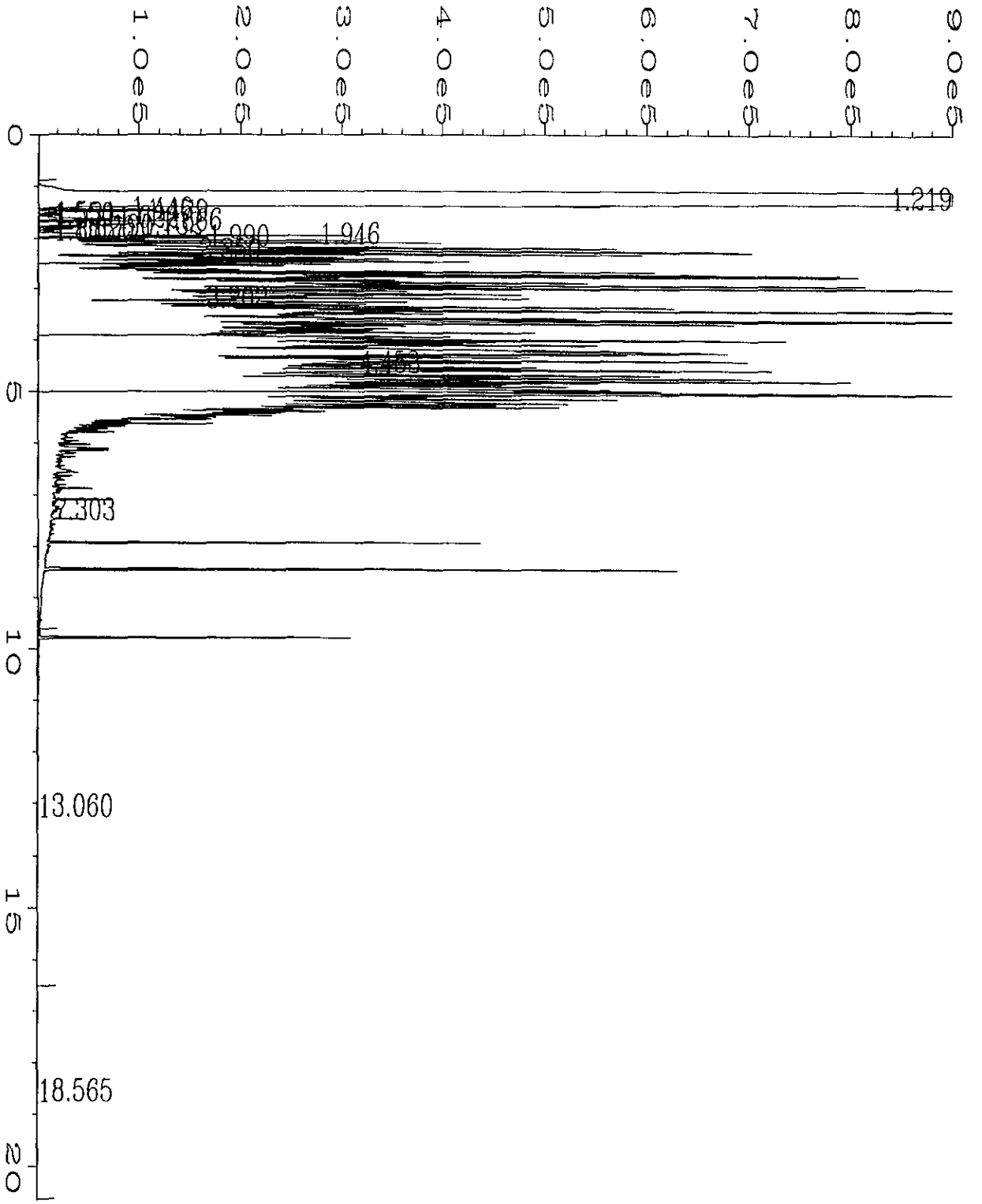
nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.



Data File Name : C:\HPCHEM\4\DATA\02-21-97\035F0601.D
Operator : TRR
Instrument : ANALYZER4
Sample Name : MB 07-107 SIL
Run Time Bar Code:
Acquired on : 21 Feb 97 07:44 PM
Report Created on: 24 Feb 97 10:30 AM

METHOD BLANK

Page Number : 1
Vial Number : 35
Injection Number : 1
Sequence Line : 6
Instrument Method: TPHD.MTH
Analysis Method : TPHD.MTH



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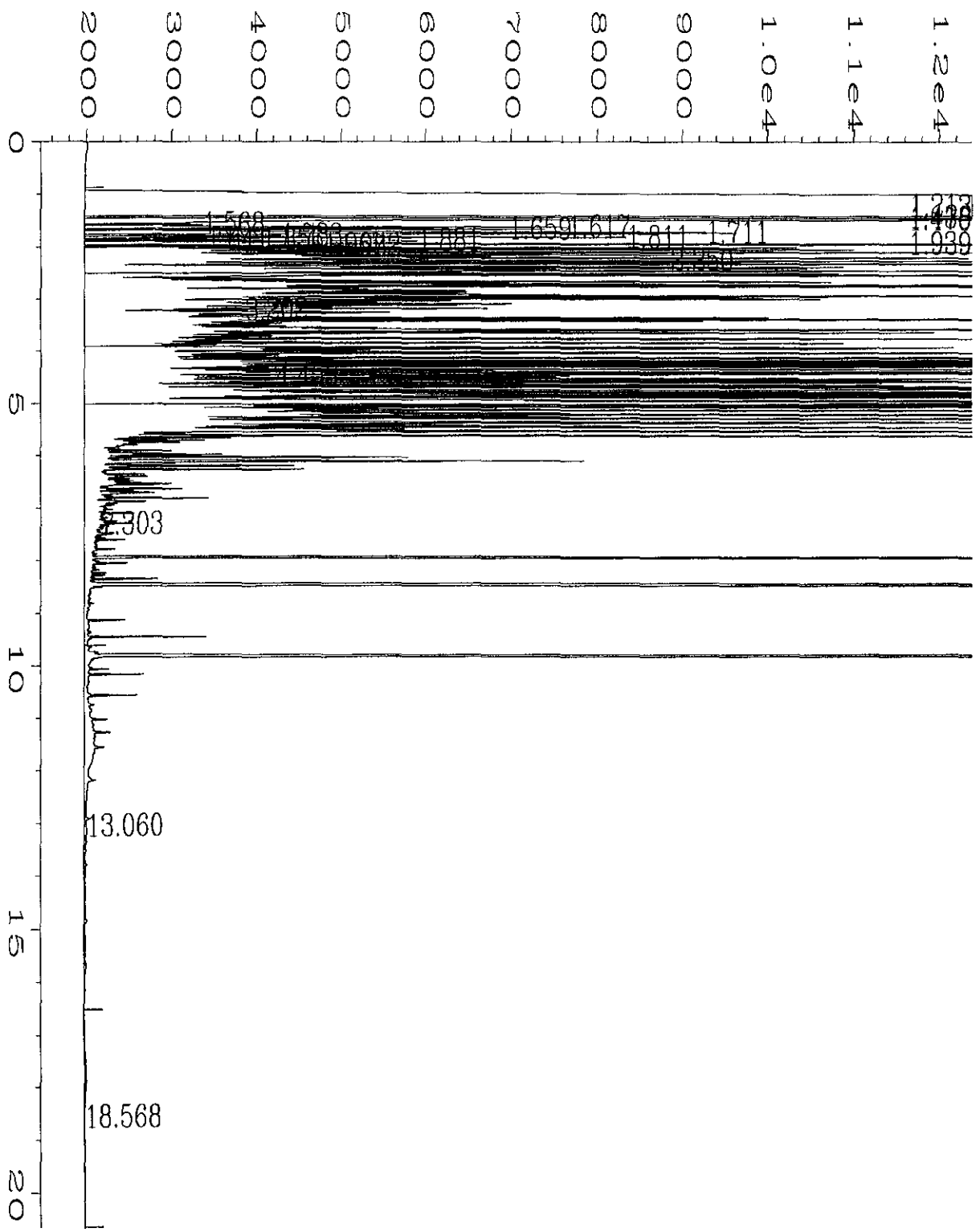
Operator : TRR
Instrument : ANALYZER4
Sample Name : 76015 SIL
Run Time Bar Code:
Acquired on : 21 Feb 97 09:06 PM
Report Created on: 24 Feb 97 10:10 AM

B-5

Page Number : 1
Vial Number : 38
Injection Number : 1
Sequence Line : 6
Instrument Method: TPHD.MTH
Analysis Method : TPHD.MTH



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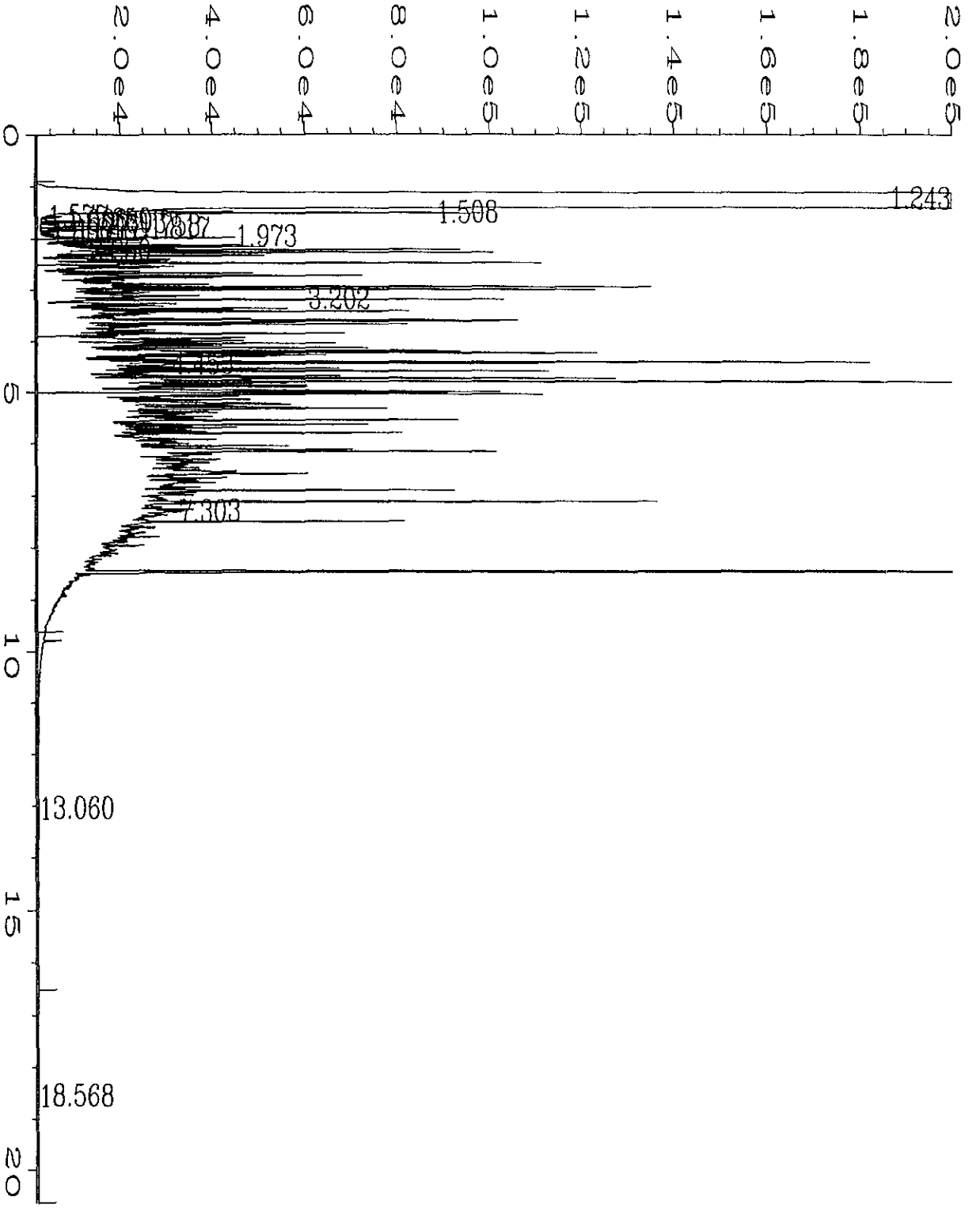
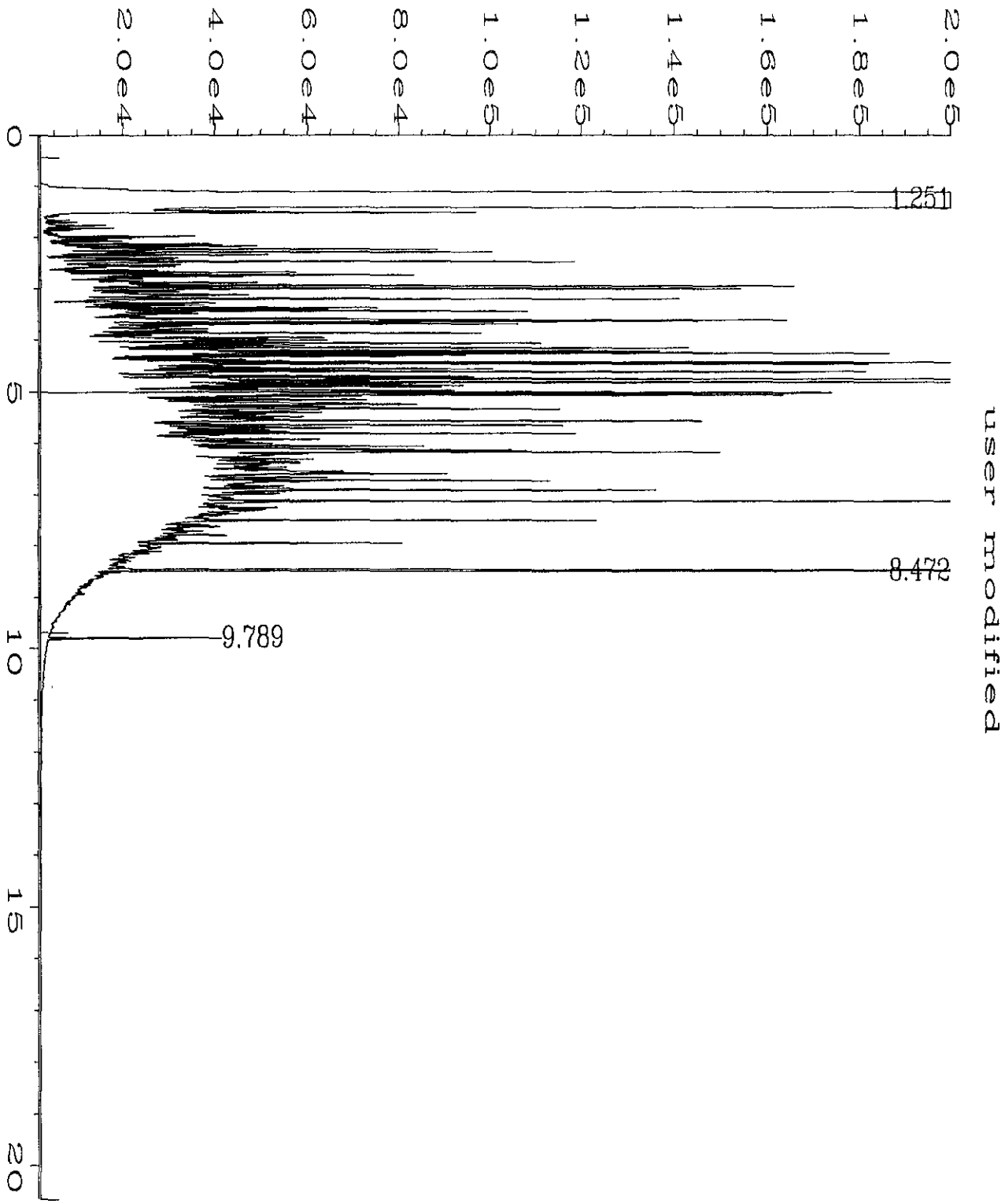
Operator : TRR
Instrument : ANALYZER4
Sample Name : 76017 SIL B-5F
Run Time Bar Code:
Acquired on : 21 Feb 97 09:33 PM
Report Created on: 24 Feb 97 10:13 AM

Page Number : 1
Vial Number : 39
Injection Number : 1
Sequence Line : 6
Instrument Method: TPHD.MTH
Analysis Method : TPHD.MTH



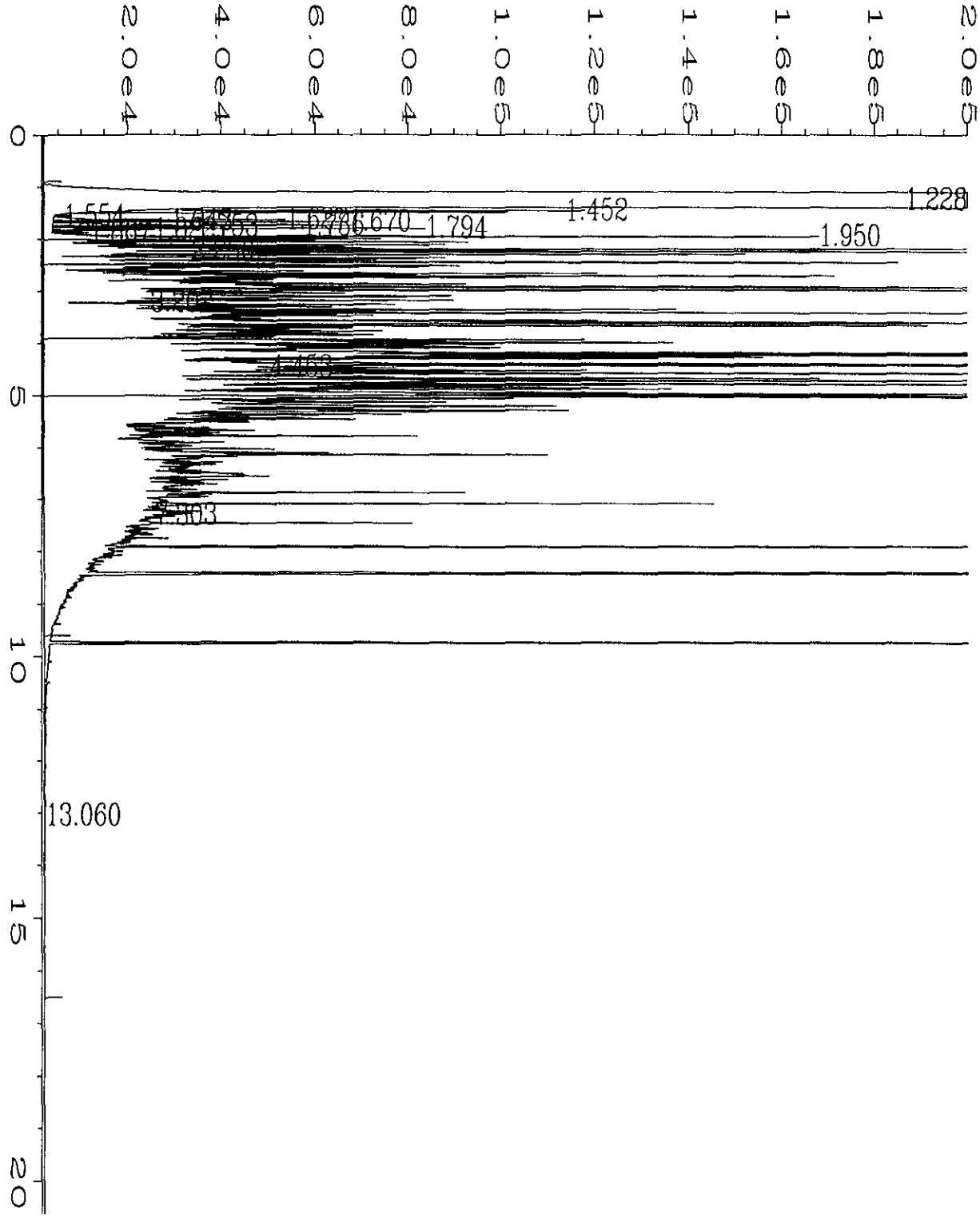
Data File Name : C:\HPCHEM\4\DATA\02-24-97\005F0501.D
Operator : TRR
Instrument : ANALYZER4
Sample Name : ~~76024 1:10~~ 76022 1:100 SS B-6
Run Time Bar Code:
Acquired on : 24 Feb 97 02:13 PM
Report Created on: 24 Feb 97 03:36 PM

Page Number : 1
Vial Number : 5
Injection Number : 1
Sequence Line : 5
Instrument Method: TPHD.MTH
Analysis Method : TPHD.MTH



Data File Name : C:\HPCHEM\4\DATA\02-24-97\004F0501.D
Operator : TRR
Instrument : ANALYZER4
Sample Name : ~~76022 1:100~~ 76024 1:10. B-6F
Run Time Bar Code:
Acquired on : 24 Feb 97 01:45 PM
Report Created on: 24 Feb 97 03:31 PM

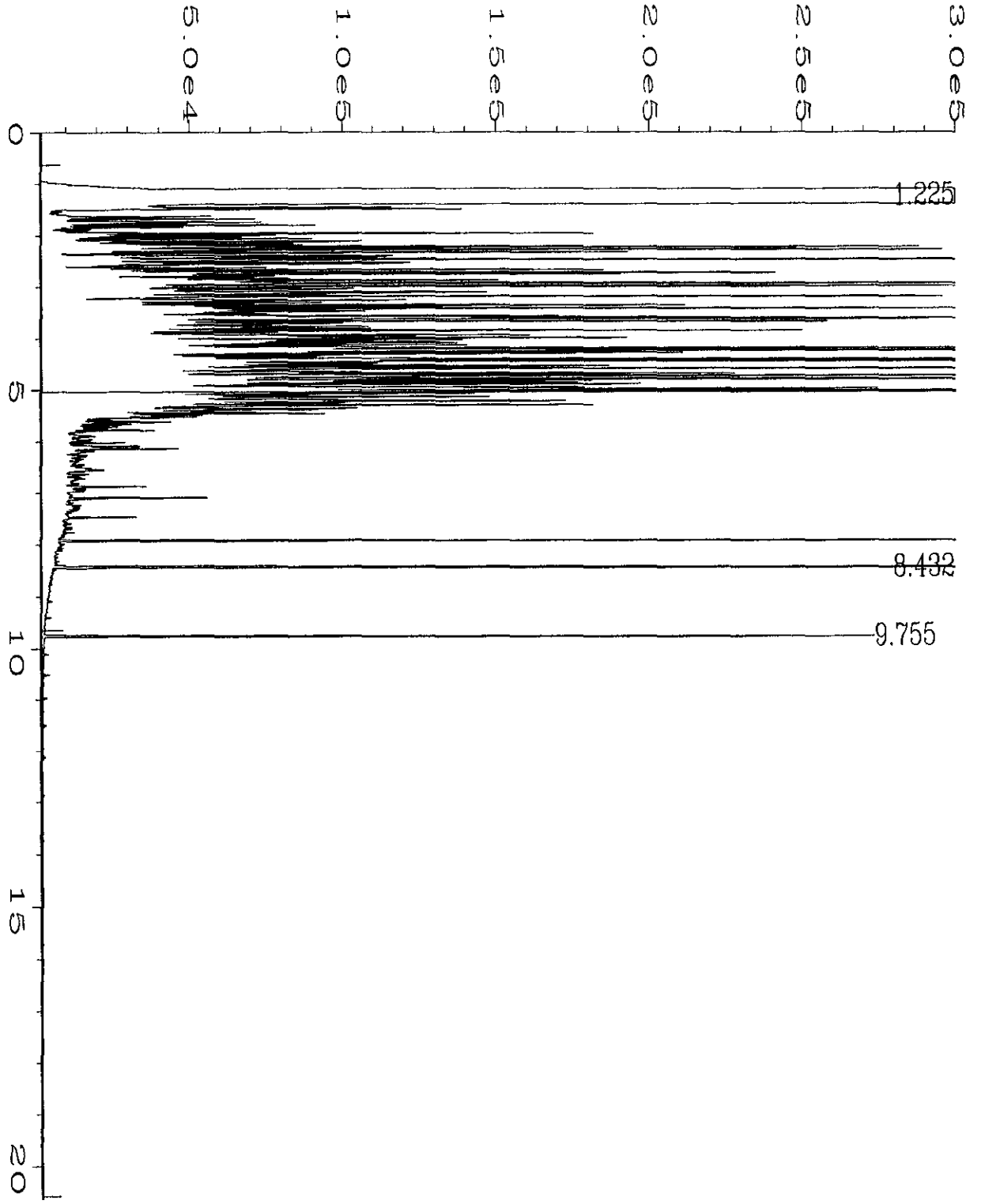
Page Number : 1
Vial Number : 4
Injection Number : 1
Sequence Line : 5
Instrument Method: TPHD.MTH
Analysis Method : TPHD.MTH



Data File Name : C:\HPCHEM\4\DATA\02-21-97\042F0601.D
Operator : TRR
Instrument : ANALYZER4
Sample Name : 76029 SIL
Run Time Bar Code:
Acquired on : 21 Feb 97 10:55 PM
Report Created on: 24 Feb 97 10:28 AM

B-7

Page Number : 1
Vial Number : 42
Injection Number : 1
Sequence Line : 6
Instrument Method: TPHD.MTH
Analysis Method : TPHD.MTH



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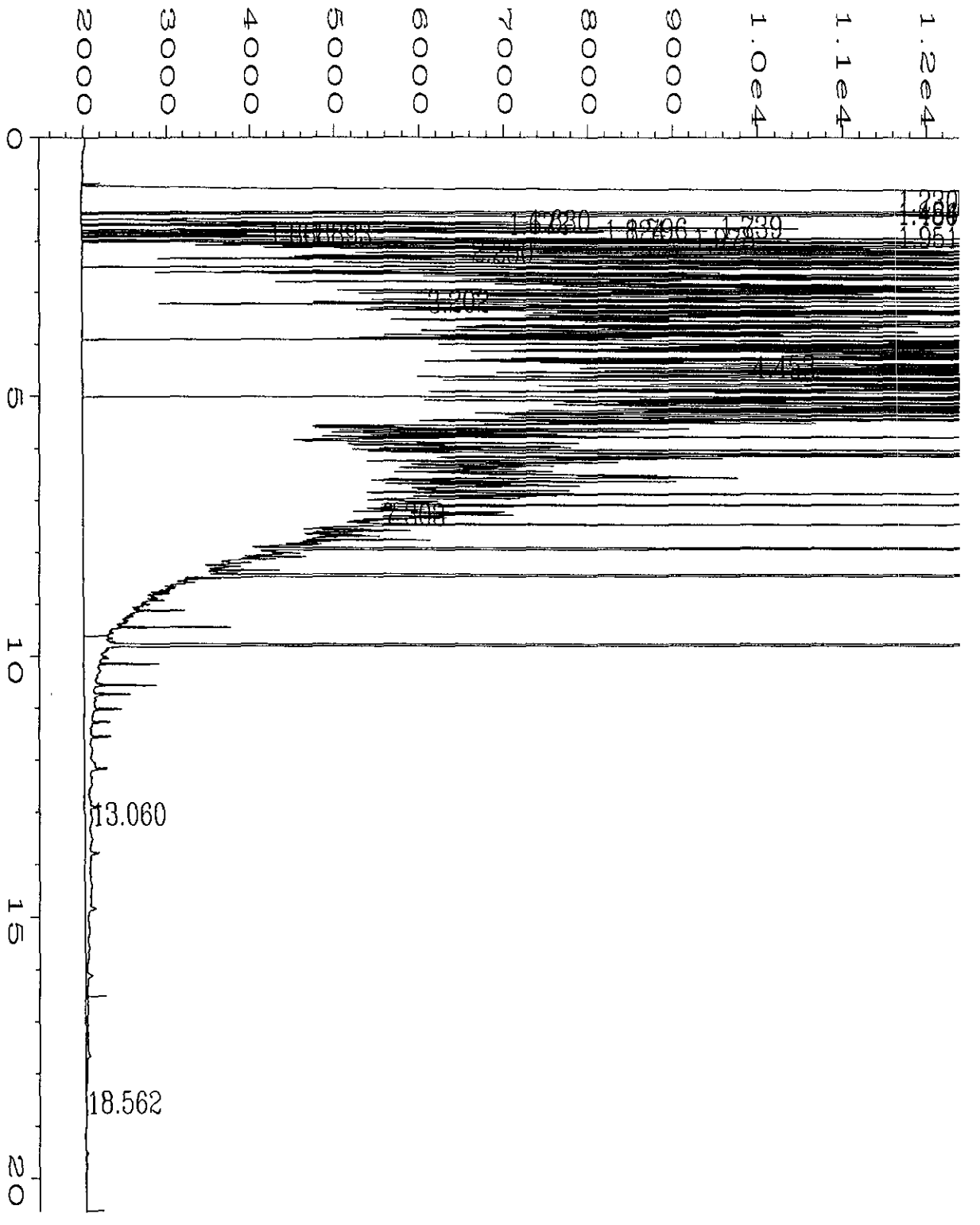
Operator : TRR
Instrument : ANALYZER4
Sample Name : 76034 SIL
Run Time Bar Code:
Acquired on : 21 Feb 97 11:22 PM
Report Created on: 24 Feb 97 10:23 AM

B-8

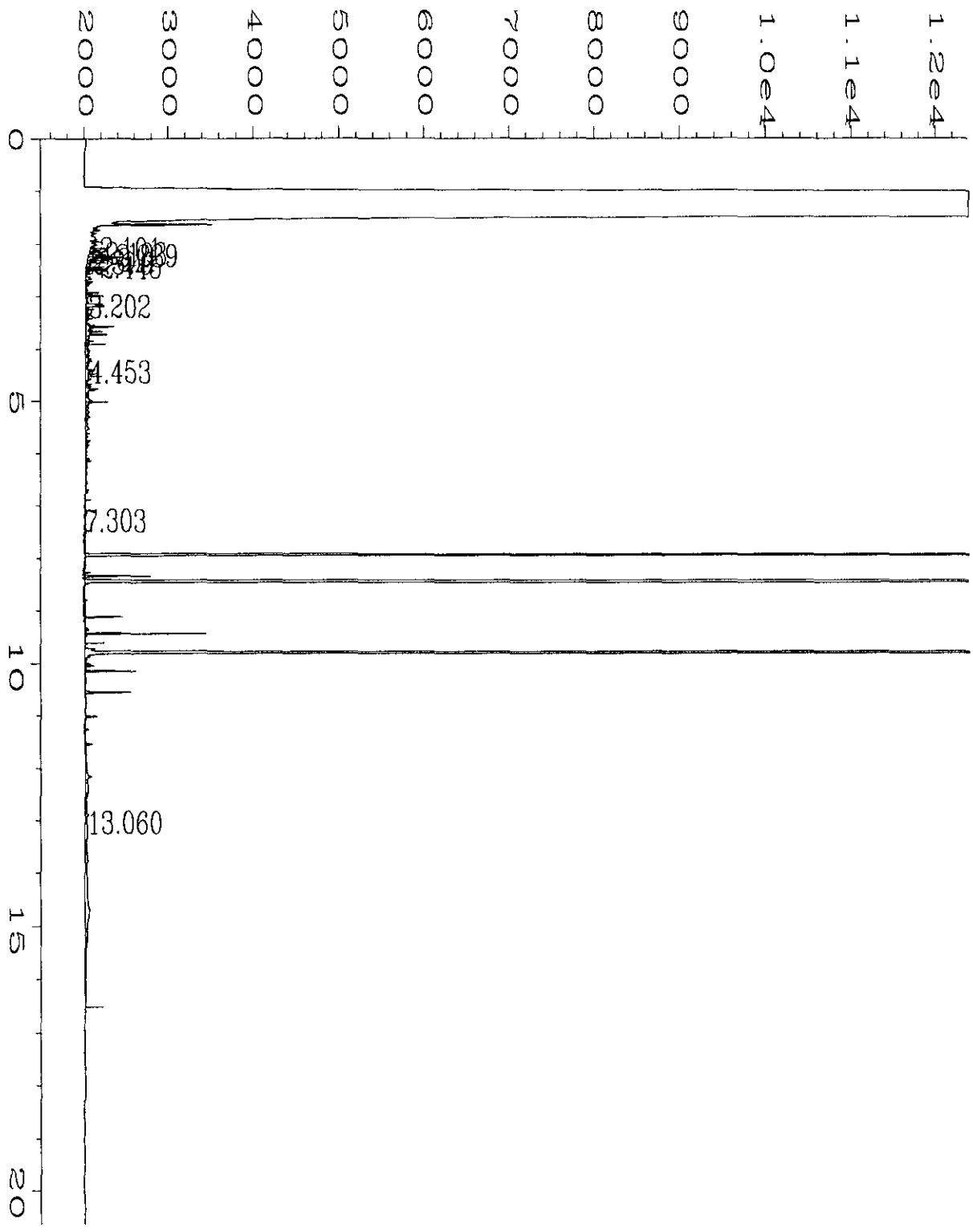
Page Number : 1
Vial Number : 43
Injection Number : 1
Sequence Line : 6
Instrument Method: TPHD.MTH
Analysis Method : TPHD.MTH



Data File Name : C:\HPCHEM\4\DATA\02-21-97\044F0601.D
Operator : TRR
Instrument : ANALYZER4
Sample Name : 76039 SIL
Run Time Bar Code:
Acquired on : 21 Feb 97 11:49 PM
Report Created on: 24 Feb 97 10:24 AM

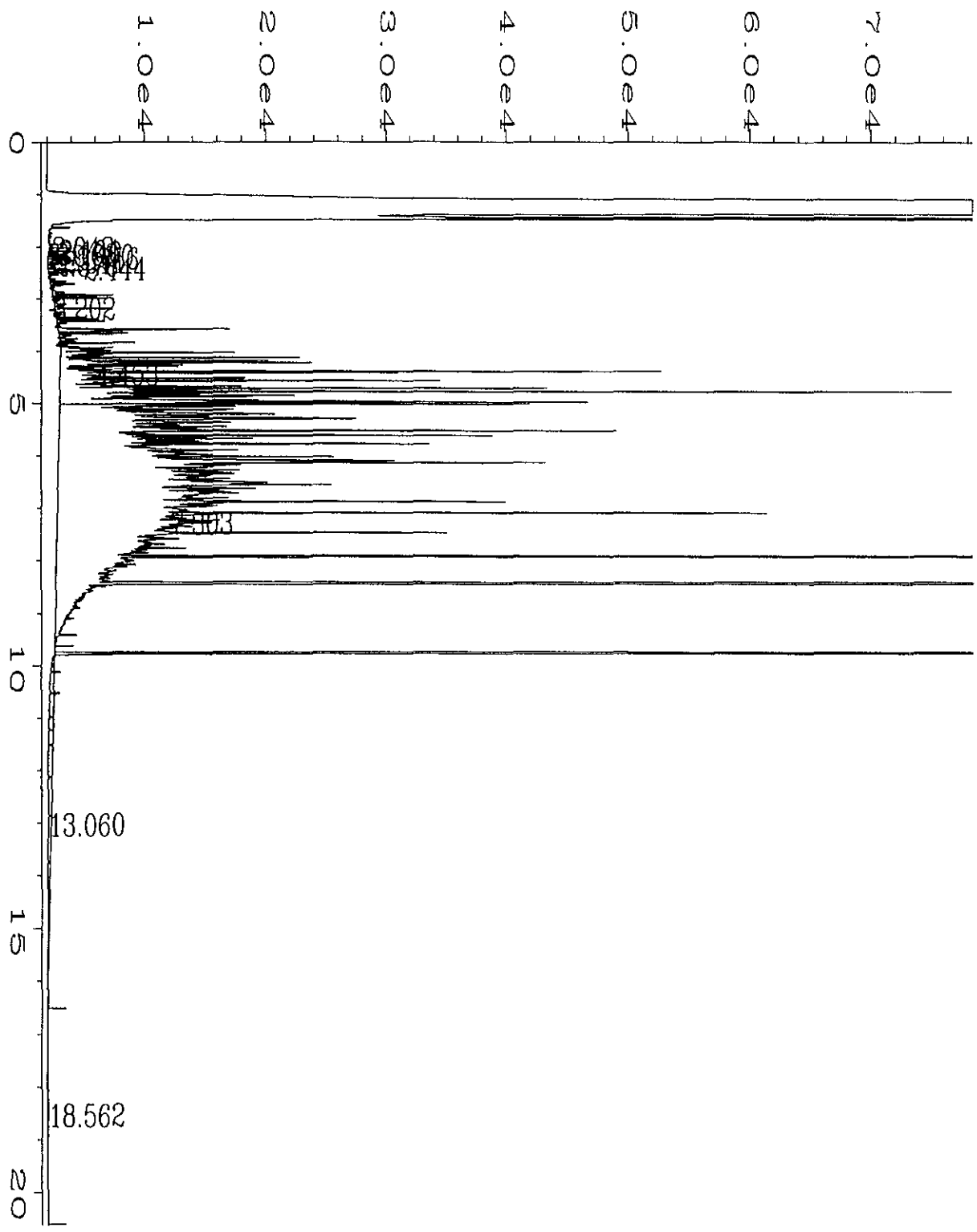
B-9
(B-7 duplicate)

Page Number : 1
Vial Number : 44
Injection Number : 1
Sequence Line : 6
Instrument Method: TPHD.MTH
Analysis Method : TPHD.MTH



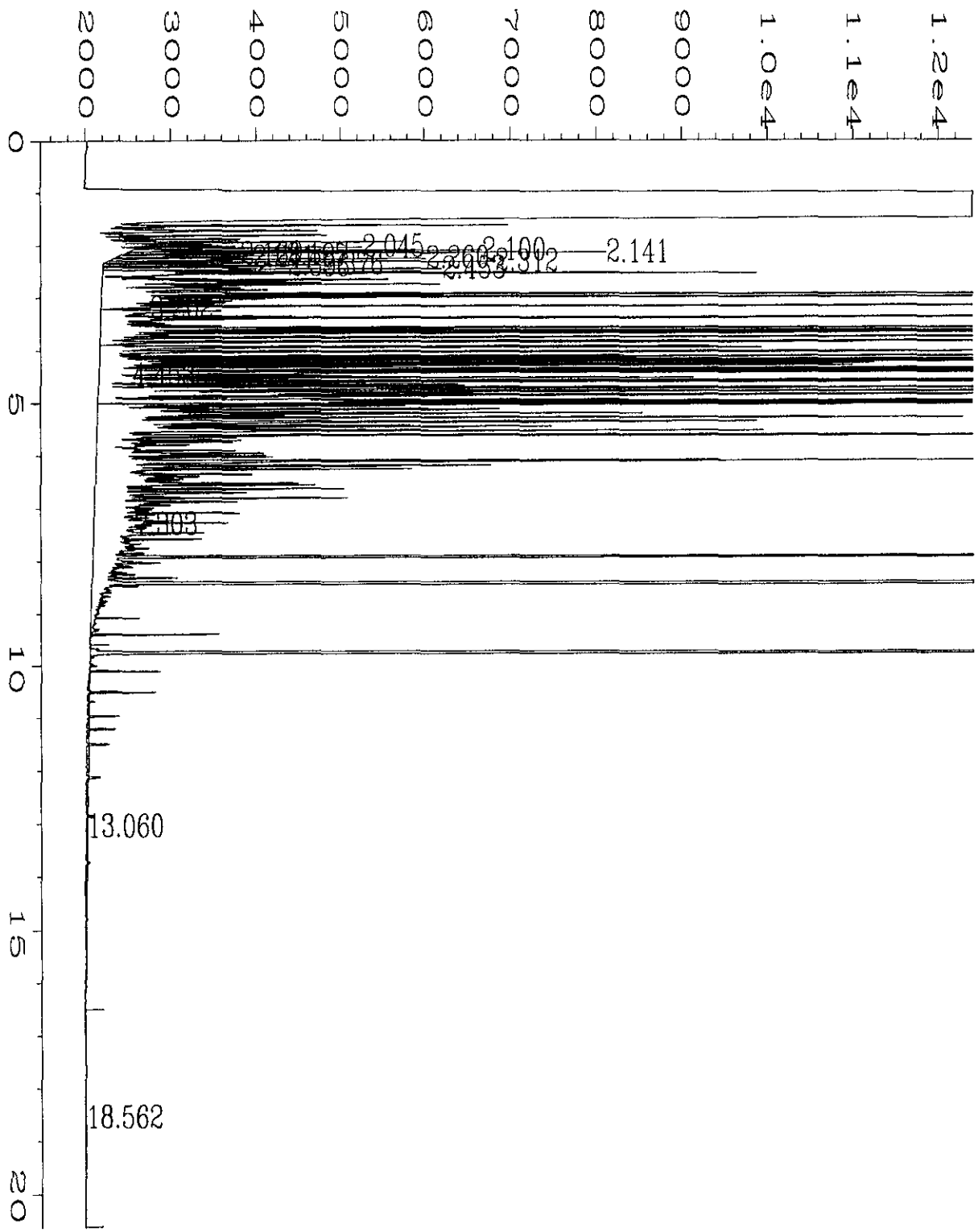
Data File Name : C:\HPCHEM\4\DATA\02-21-97\045F0601.D
Operator : TRR
Instrument : ANALYZER4
Sample Name : 76044 SIL EB-1
Run Time Bar Code:
Acquired on : 22 Feb 97 00:16 AM
Report Created on: 24 Feb 97 10:30 AM

Page Number : 1
Vial Number : 45
Injection Number : 1
Sequence Line : 6
Instrument Method: TPHD.MTH
Analysis Method : TPHD.MTH



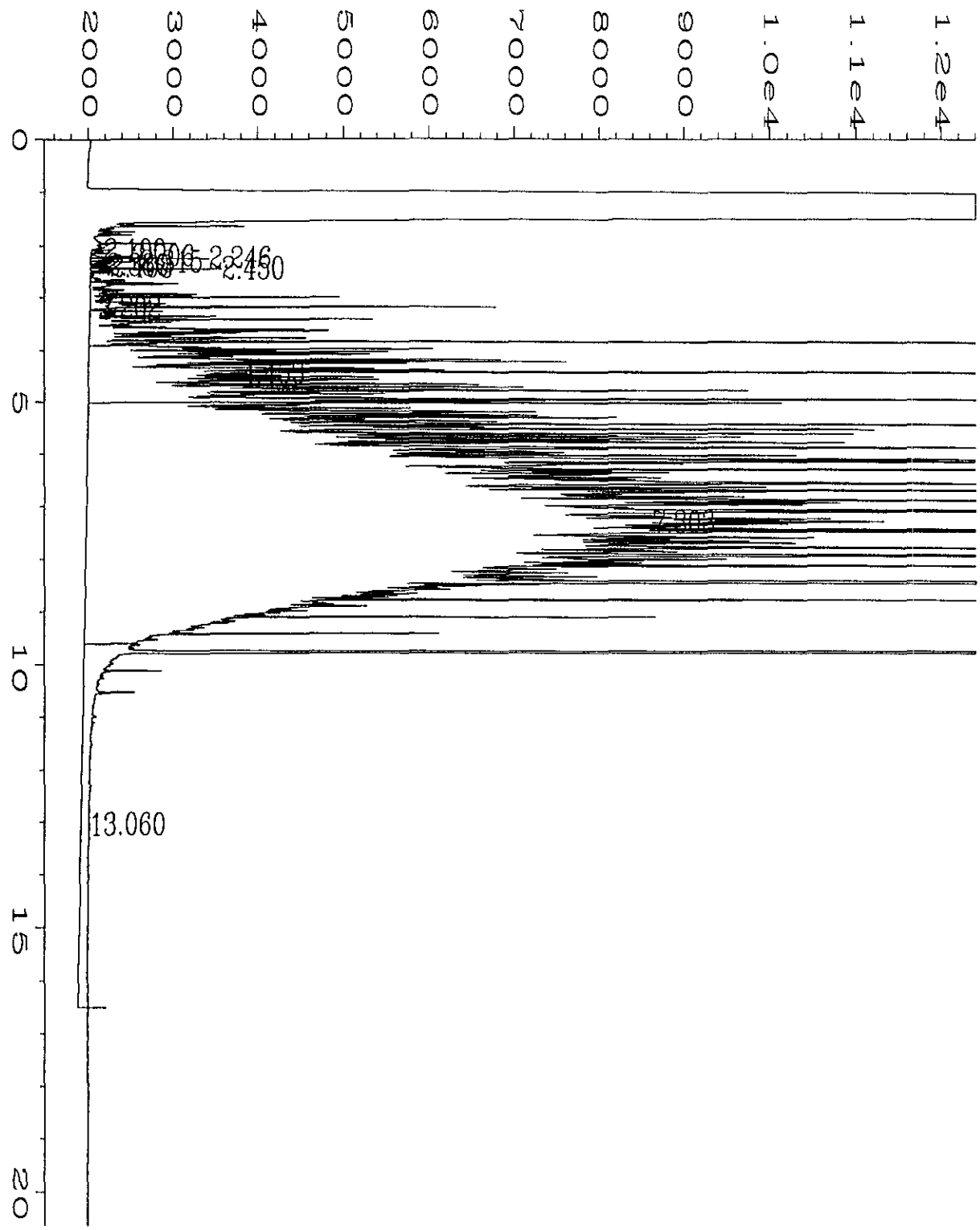
Data File Name : C:\HPCHEM\4\DATA\02-21-97\046F0601.D
Operator : TRR
Instrument : ANALYZER4
Sample Name : 76046 SIL EB-IF
Run Time Bar Code:
Acquired on : 22 Feb 97 00:43 AM
Report Created on: 03 Mar 97 08:07 AM

Page Number : 1
Vial Number : 46
Injection Number : 1
Sequence Line : 6
Instrument Method: TPHD.MTH
Analysis Method : TPHD.MTH



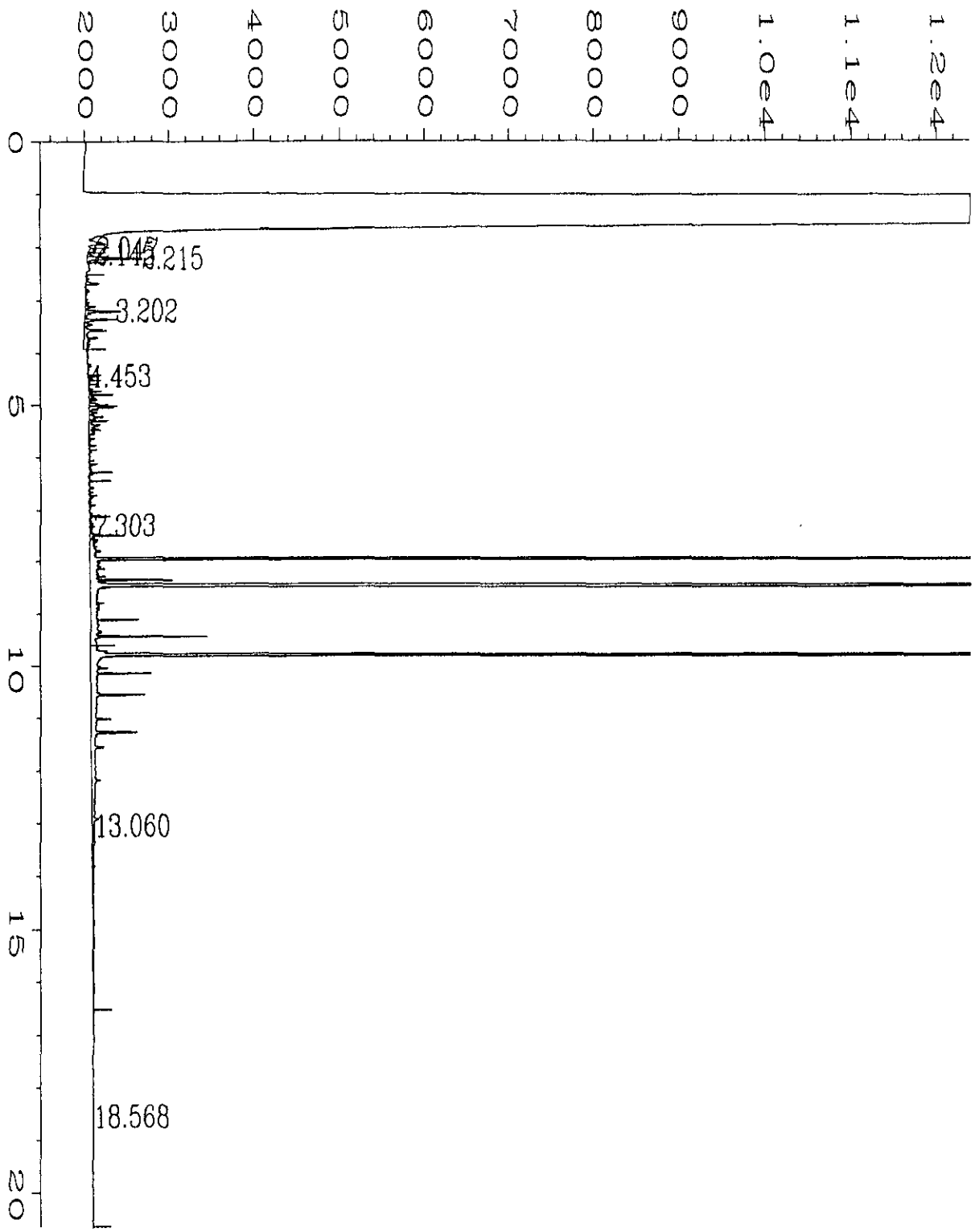
Data File Name : C:\HPCHEM\4\DATA\02-21-97\047F0601.D
Operator : TRR
Instrument : ANALYZER4
Sample Name : 76053 SIL MW-1
Run Time Bar Code:
Acquired on : 22 Feb 97 01:10 AM
Report Created on: 24 Feb 97 10:27 AM

Page Number : 1
Vial Number : 47
Injection Number : 1
Sequence Line : 6
Instrument Method: TPHD.MTH
Analysis Method : TPHD.MTH



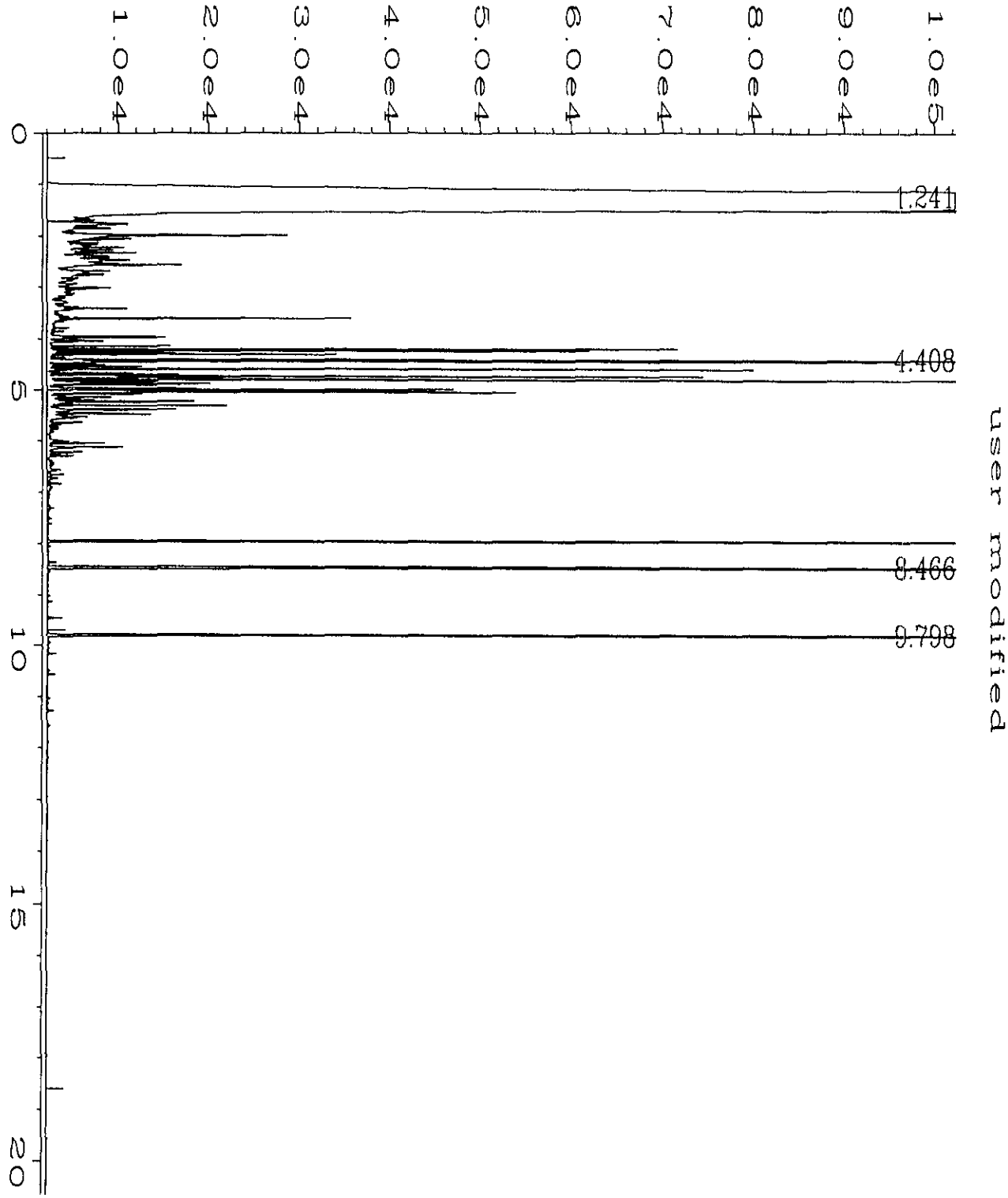
Data File Name : C:\HPCHEM\4\DATA\02-21-97\048F0801.D
Operator : TRR
Instrument : ANALYZER4
Sample Name : 500 PPM WADF STANDARD
Run Time Bar Code:
Acquired on : 22 Feb 97 02:04 AM
Report Created on: 24 Feb 97 10:31 AM

Page Number : 1
Vial Number : 48
Injection Number : 1
Sequence Line : 8
Instrument Method: TPHD.MTH
Analysis Method : TPHD.MTH



Data File Name : C:\HPCHEM\4\DATA\03-05-97\012F2001.D
Operator : TRR
Instrument : ANALYZER4
Sample Name : 07-125 MM MB SIL METHOD BLANK
Run Time Bar Code:
Acquired on : 06 Mar 97 10:57 PM
Report Created on: 07 Mar 97 07:51 AM

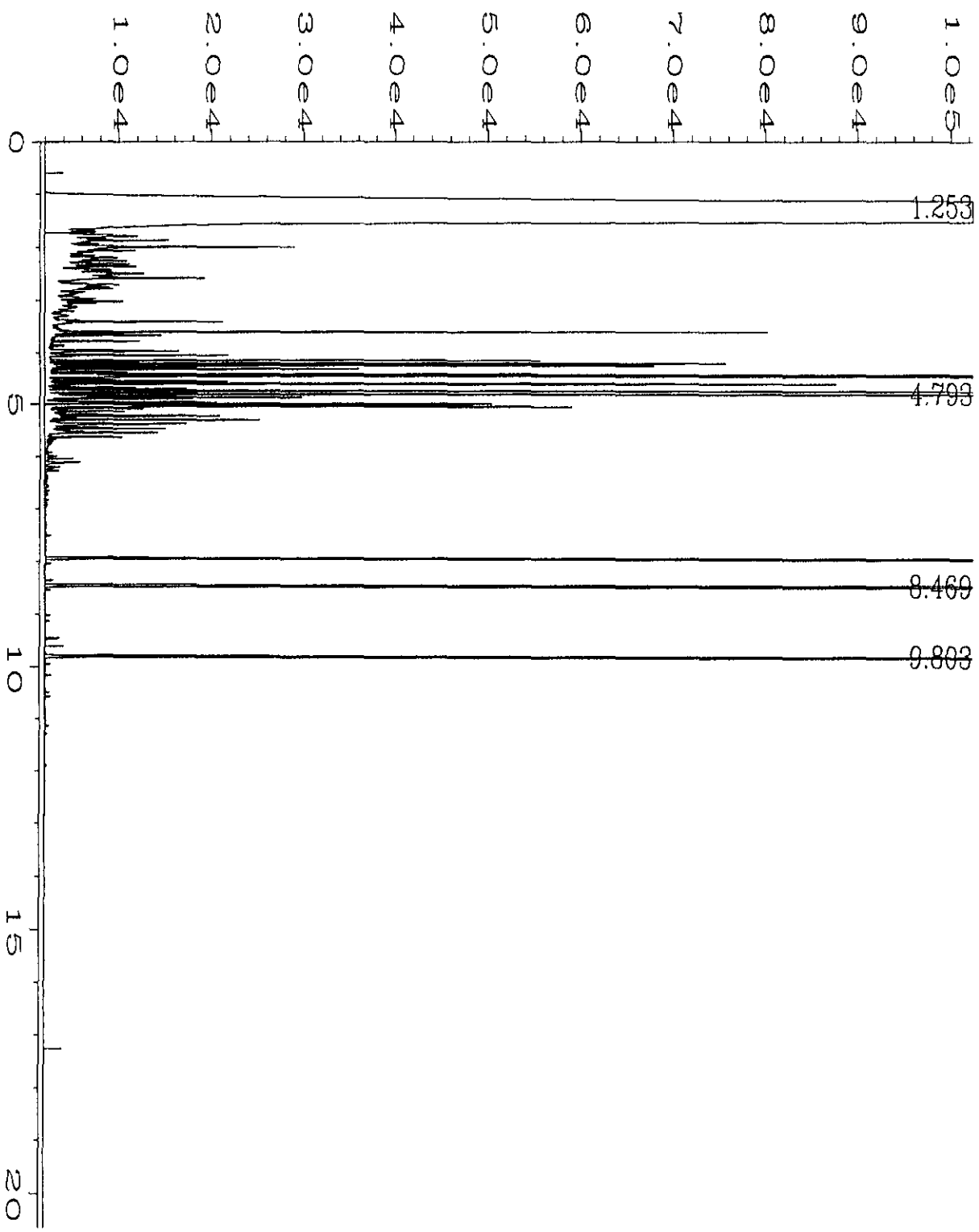
Page Number : 1
Vial Number : 12
Injection Number : 1
Sequence Line : 20
Instrument Method: TPHD.MTH
Analysis Method : TPHD.MTH



Data File Name : C:\HPCHEM\4\DATA\03-05-97\016F2001.D
Operator : TRR
Instrument : ANALYZER4
Sample Name : 76030 SIL
Run Time Bar Code:
Acquired on : 07 Mar 97 00:47 AM
Report Created on: 07 Mar 97 07:48 AM

B-7

Page Number : 1
Vial Number : 16
Injection Number : 1
Sequence Line : 20
Instrument Method: TPHD.MTH
Analysis Method : TPHD.MTH



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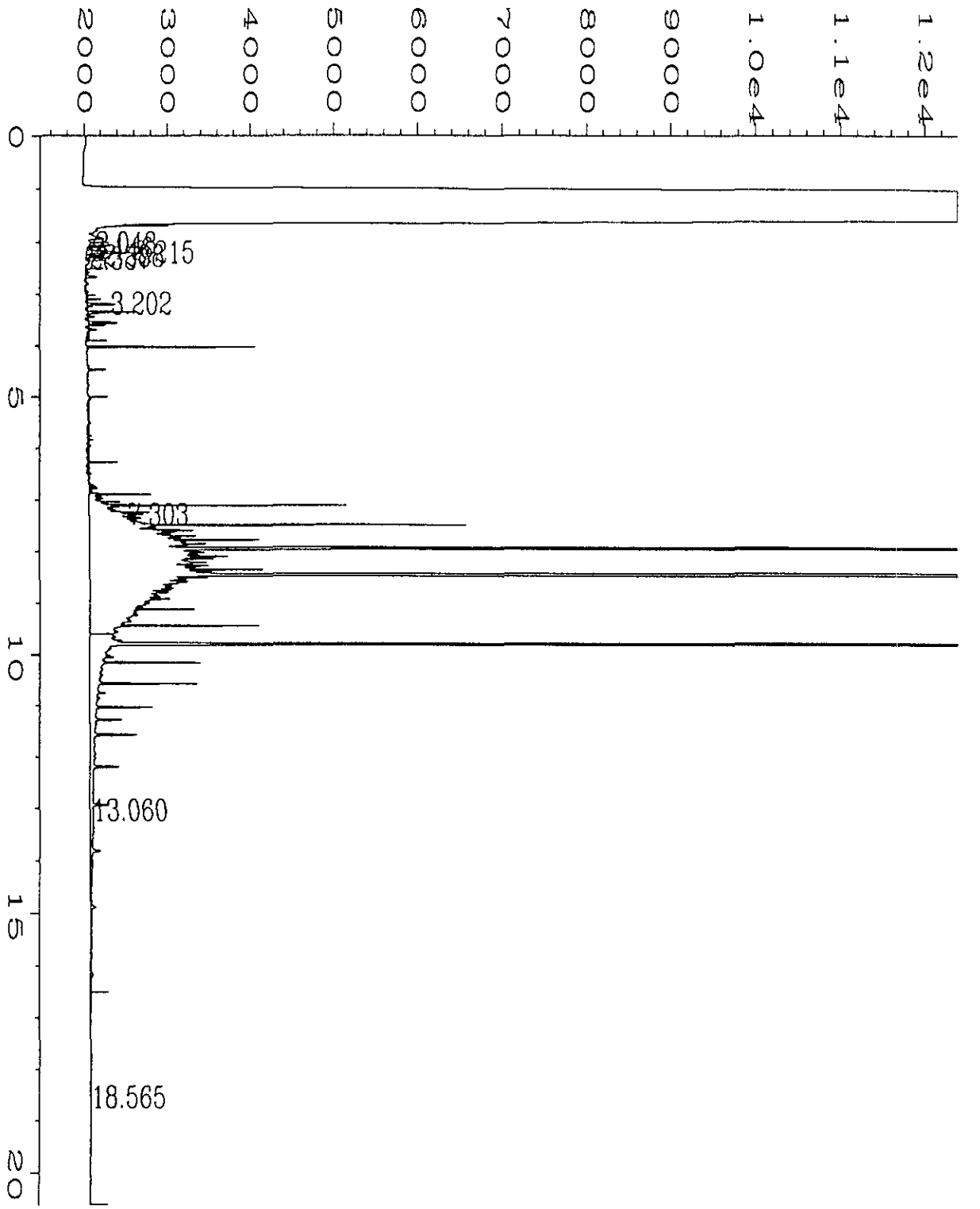
Data File Name : C:\HPCHEM\4\DATA\03-05-97\017F2001.D
Operator : TRR
Instrument : ANALYZER4
Sample Name : 76035 SIL B-B
Run Time Bar Code:
Acquired on : 07 Mar 97 01:14 AM
Report Created on: 07 Mar 97 07:49 AM

Page Number : 1
Vial Number : 17
Injection Number : 1
Sequence Line : 20
Instrument Method: TPHD.MTH
Analysis Method : TPHD.MTH



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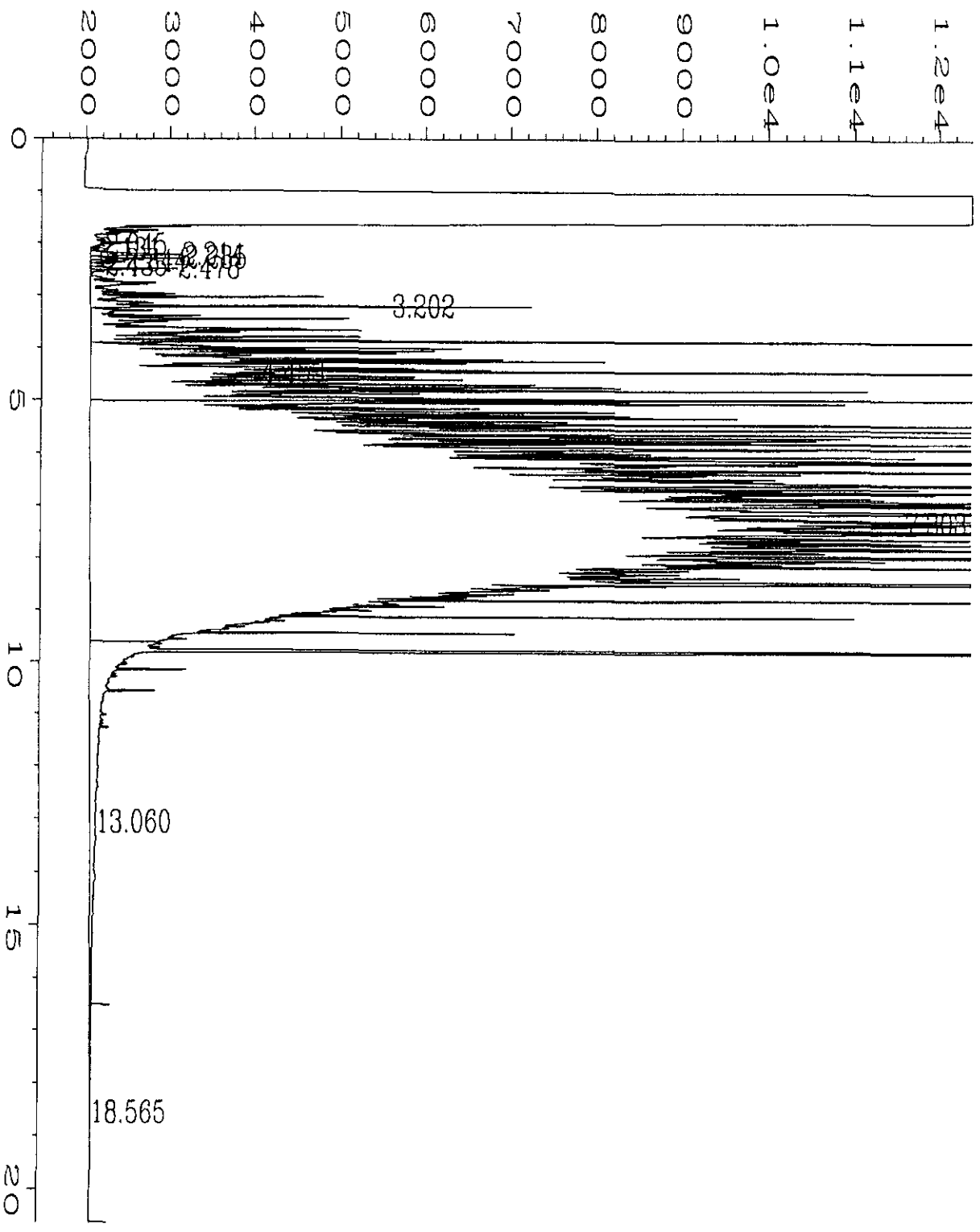
Operator : TRR
Instrument : ANALYZER4
Sample Name : 76047 SIL EB-1F
Run Time Bar Code:
Acquired on : 07 Mar 97 00:19 AM
Report Created on: 07 Mar 97 07:51 AM

Page Number : 1
Vial Number : 15
Injection Number : 1
Sequence Line : 20
Instrument Method: TPHD.MTH
Analysis Method : TPHD.MTH



Data File Name : C:\HPCHEM\4\DATA\03-05-97\034F1901.D
Operator : TRR
Instrument : ANALYZER4
Sample Name : 5-09 500 WADF STANDARD
Run Time Bar Code:
Acquired on : 06 Mar 97 10:30 PM
Report Created on: 07 Mar 97 07:50 AM

Page Number : 1
Vial Number : 34
Injection Number : 1
Sequence Line : 19
Instrument Method: TPHD.MTH
Analysis Method : TPHD.MTH

CHAIN-OF-CUSTODY RECORD

CJ ~~KNF~~ VBI

Nº 10384 2-20-97 10-28

Date 2/19/97

Page 1 of 1

Project No Z611.01

Samplers (Signatures)

Nathaniel A. Taylor

'97

ANALYSES

Date	Time	Sample Number	EPA Method 8010	EPA Method 8020	EPA Method 8020 (BTEX only)	EPA Method 8240	EPA Method 8270	TPH as gasoline	TPH as diesel	Silica Gel	Filter	MtBE	PNAs				HOLD	lab #	Cooled	Soil (S), Water (W) or Vapor (V)	Acidified	Number of containers
2/19	1000	B-5		X				X	X	X		X						76012-16	Y	W	Y	5
	1000	B-5 F							X	X	X							76017-18				2
	1145	B-6		X				X	X	X		X						76019-23				5
	1145	B-6 F							X	X	X							76024-25				2
	1515	B-7		X				X	X	X		X						76026-30				5
	1400	B-8		X				X	X	X		X						76031-35				5
	1600	B-9		X				X	X	X		X						76036-40				5
	1430	EB-1		X				X	X	X		X						76041-45				5
	1430	EB-1 F							X	X	X							76046-47				2
	1630	MW-1		X				X	X	X		X	X				Hold PNA's per Fax 2-20-97 Nat Taylor.	76048-54			Y/N	7
		TB-1															X	76055			Y	1
				NAT				2/19														44

Turnaround time: Standard

Results to: Ross Steenson

Total No of containers: 44

REMARKS

Additional Comments

(1) Clean w/ Silica Gel Prior to all diesel analyses.

(2) Filter w/ 0.7 micron filter

(3) Gas/BTEX/MtBE by EPA 8020.

(4) Diesel by EPA 8015M

(5) PNAs by 8270

(6) Include Chromatograms w/ Results. Fax to Ross Steenson @ 415 + 434-1365

Relinquished by (signature)	Date	Relinquished by (signature)	Date:	Relinquished by (signature)	Date:
Nathaniel A. Taylor	2/19				
Printed Name: NATHANIEL A. TAYLOR	Time: 1900	Printed Name:	Time:	Printed Name	Time
Company: GEOMATRIX		Company		Company	
Received by (signature)	Date 2-20-97	Received by (signature)	Date	Received by (signature)	Date
Printed Name: MANUEL MARTI	Time 8:30 AM	Printed Name	Time	Printed Name	Time
Company: F & BI		Company		Company	

Method of Shipment: FED-EX

Laboratory Comments and Log No:

Re-extract and analyze B-7, B-8 and EB-1F. Clean with silica gel and filter all. Per Ross Steenson phone call 03-04-97.

Geomatrix Consultants
100 Pine Street 10th Floor
San Francisco California 94111
415 434 9400

Form SPT 012 (Revised 12/96)

CHAIN-OF-CUSTODY RECORD

KNT VBI

№ 10385 2-20-97 10:20

Date 2/19/97

Page 1 of 1

Project No 2611.01

Samplers (Signatures)

Nathaniel A. Taylor

'97

Date	Time	Sample Number
2/19	0915	B-5-13.0
	0935	B-5-15.0
	0910	B-5-17.5
↓	1100	B-6-17.0

ANALYSES

EPA Method 8010	EPA Method 8020	EPA Method 8020 (BTEX only)	EPA Method 8240	EPA Method 8270	TPH as gasoline	TPH as diesel		HOLD	DNA analysis requested 2-28-97 per Ross Stenson fax				lab #	Cooled	Soil (S) Water (W) or Vapor (V)	Acidified	Number of containers
								(Y)					76056	Y	S	N	1
								X					76057				1
								X					76058				1
								X					76059	↓	↓	↓	1

MAT 2/19/97

REMARKS

Additional Comments

HOLD ALL SOIL

Turnaround time —

Results to Ross Stenson

Total No. of containers 4

Relinquished by (signature)	Date	Relinquished by (signature)	Date	Relinquished by (signature)	Date
Nathaniel A. Taylor	2/19				
Printed Name	Time	Printed Name	Time	Printed Name	Time
NATHANIEL TAYLOR	1900				
Company		Company		Company	
GEOMATRIX					
Received by (signature)	Date	Received by (signature)	Date	Received by (signature)	Date
	2/20/97				
Printed Name	Time	Printed Name	Time	Printed Name	Time
MANUEL MARTI	8:50 AM				
Company		Company		Company	
F & B J					

Method of Shipment FED-EX

Laboratory Comments and Log No

Geomatrix Consultants
100 Pine Street 10th Floor
San Francisco California 94111
415 434 9400

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Beth M. Albertson, M.S.
Bradley T. Benson
Kelley D. Wilt

3012 16th Avenue West
Seattle, WA 98119-2029
TEL: (206) 285-8282
FAX: (206) 283-5044

March 4, 1997

Ross Steenson, Project Manager
Geomatrix Consultants, Inc.
100 Pine Street, Suite 1000
San Francisco, CA 94111-5112

Dear Mr. Steenson:

In response to your fax this morning, I have prepared a table (shown below) which answers questions 2 and 3.

Sample #	Sample Retained	Sheen	Sediment *
B-5	1, 1L amber	no sheen	yes (1/4 in)
B-5F	1, 1L amber	yes, thin layer	yes (1/4 in)
B-6	1, 1L amber	yes, thick layer	yes (1/4 in)
B-6F	1, 1L amber	yes, thick layer	yes (1/4 in)
B-7	1, 1L amber (not preserved)	no sheen	yes (1/2 in)
B-8	1, 1L amber	no sheen	yes (1 in)
B-9	1, 1L amber	no sheen	yes (1 in)
EB-1	1, 1L amber	no sheen	no
EB-1F	1, 1L amber	no sheen	no
MW-1	3, 1L ambers (2 not preserved)	no sheen	yes (1/4 in)

* Approximate thickness of sediment in remaining 1L ambers is noted.

In response to question 1, we do feel that we achieved a complete cleanup on TPHD samples where silica gel was used. The standard method for silica gel cleanup was employed, and no unusual occurrences were reported.

Please call if you have any further questions or requests.

Sincerely,

FRIEDMAN & BRUYA, INC.

Charlene Jensen

Charlene Jensen
Chemist

keh
GMC0304L.DOC