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INDEPENDENT REMEDIAL ACTION REPORT

AT

**FORMER TEXACO FACILITY 63-232-0037
8701 GREENWOOD AVENUE
SEATTLE, WASHINGTON**

**ECOLOGY TCP IDENTIFICATION NO. 2868
ERI JOB 31001T.R01
January 5, 1996**

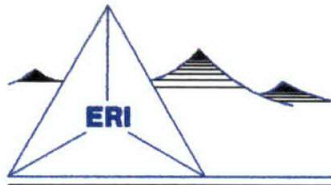
Prepared for

**TEXACO ENVIRONMENTAL SERVICES
3400 188TH STREET SW, SUITE 630
LYNNWOOD, WASHINGTON 98037**

Prepared by

ENVIRONMENTAL RESOLUTIONS, INC.





ENVIRONMENTAL RESOLUTIONS, INC.

INDEPENDENT REMEDIAL ACTION REPORT

FOR

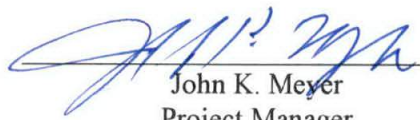
FORMER TEXACO FACILITY 63-232-0037
8701 GREENWOOD AVENUE
SEATTLE, WASHINGTON


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January 5, 1996

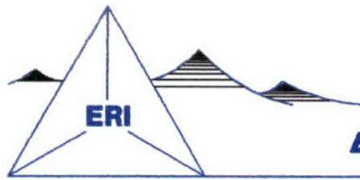
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OTHER _____ CW	<input checked="" type="checkbox"/>
INSPECTOR (INIT.) <i>RN</i> DATE <i>2/29/96</i>	

IRAP

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ENVIRONMENTAL RESOLUTIONS, INC.

INDEPENDENT REMEDIAL ACTION REPORT

For

**Former Texaco Facility 63-232-0037
8701 Greenwood Avenue
Seattle, Washington**

INTRODUCTION

Texaco Environmental Services (TES) retained Environmental Resolutions, Inc. (ERI) to prepare this Independent Remedial Action Program (IRAP) report summarizing results of assessment and remediation activities conducted at former Texaco facility 63-232-0037, located at 8701 Greenwood Avenue, in Seattle, Washington. This IRAP report summarizes the results of previous assessment, monitoring, and remediation activities conducted since 1991 and concludes with a recommendation that this document be submitted to the Washington State Department of Ecology for review under the Independent Remedial Action Program. Based on results of previous investigations, we recommend the report be submitted with a request for a no further action determination concerning soil at the site, with an interim no further action determination concerning groundwater. A final no further action determination for groundwater would be granted based on results of fourth quarter 1995 and first quarter 1996 groundwater sampling events demonstrating compliance with Model Toxics Control Act cleanup standards.

BACKGROUND

The site is located on the northwest corner at the intersection of Greenwood Avenue North and North 87th Street in Seattle, Washington, at an elevation of approximately 260 feet (80 meters) above mean sea level (National Geodetic Vertical Datum [NGVD] 1929). The site location is shown on Plate P-1. Commercial properties are present to the north, east, and south. Residential properties are present across the alley to the west. The nearest surface water body is Green Lake approximately one mile to the southeast. The site is currently vacant with no above-ground structures.

In June 1995, the property was sold. There are currently plans to develop the site as a commercial retail facility. Drawings provided by the new owner indicate that the proposed new building will be built on pilings and will cover most or all of the southern portion of the site. The remaining portion of the site will be a paved parking area. The proposed building and parking area are shown on the attached drawing supplied by the new owner.

SITE HISTORY

The following summarizes the site history and results of previous assessment and remediation activities conducted since 1991. A detailed chronology of previous investigations and a list of references are included in Appendix A.

According to information obtained from TES, prior to 1946 the site contained a small service station and wood-framed house. The underground storage tanks (USTs) appear to have been located at the southeastern portion of the property. Additional information concerning the types, number, and sizes of the tanks is not available. In 1946 Texaco leased the property, razed the service station building and house, and constructed a full service gasoline station with one pump island and two service bays. The USTs reportedly consisted of one 4,000-, one 3,500-, and one 2,000-gallon fuel storage tank and one 550-gallon waste oil UST, located in the southern and eastern portion of the site. Plate P-2 is a site plan showing prior tank locations.

Texaco purchased the site in 1967 and constructed a new service station including a new building with two service bays and two pump islands. The USTs were replaced with two 10,000-gallon gasoline, one 550-gallon waste oil, and one 1,000-gallon heating oil UST. A single 4,000-gallon gasoline UST was added in 1971. All tanks were reportedly located at the southeastern portion of the property and constructed of single-walled steel. Figures provided by TES show a tank pit dewatering well and pump next to the UST basin. Details concerning well construction are not known. No additional information on UST removal and replacement is available.

In 1986, the USTs were removed and replaced with three 10,000-gallon gasoline and one 10,000-gallon diesel UST. All USTs were reportedly constructed of single-walled fiberglass. The new tanks and product piping were placed in approximately the same locations as the previous facilities. No additional information on UST removal or excavation is available.

During March 1991, TES drilled seven borings and installed five groundwater monitoring wells (AGW-1 through AGW-5) near the pump islands and USTs (Plate P-2). Soil samples collected near the heating and gasoline USTs reportedly contained total petroleum hydrocarbon (TPH) concentrations exceeding Model Toxics Control Act (MTCA)¹ Method A Cleanup Levels. Confined groundwater was encountered immediately beneath a silt and peat layer present between approximately 8 and 15 feet below ground surface (bgs). AGW-3 was abandoned because of flowing conditions. Groundwater samples collected from AGW-4 and AGW-5 contained concentrations of total xylenes and benzene, respectively, exceeding MTCA Method A Cleanup Levels. Groundwater samples collected from AGW-1, AGW-2, and AGW-3 contained concentrations of benzene, toluene, ethylbenzene, and total xylenes (BTEX), and halogenated volatile organic compounds (HVOCs) below MTCA Method A Cleanup Levels. Depth to water measurements ranged between 0.5 and 3 feet below the tops of the casings, and suggested a groundwater gradient directed toward the southwest. Historic depth to water measurements and groundwater laboratory results are shown on the tables prepared by EMCON and provided in Appendix A.

Beginning in May 1991, groundwater samples were collected from the four monitoring wells on a quarterly basis. Seven quarterly sampling events were conducted between May 1991 and June 1993. Groundwater samples collected from AGW-1 and AGW-2 located near the gasoline USTs, and AGW-4 located at the downgradient portion of the property near the station building, generally contained concentrations of total petroleum hydrocarbons and gasoline (TPH-G), and BTEX exceeding MTCA Method A Cleanup Levels. Groundwater samples collected from AGW-1 and AGW-2 generally contained

¹Chapter 173-340 WAC, The Model Toxics Control Act Cleanup Regulation, Method A Cleanup Levels. Amended December 1993.

the highest concentrations. During July 1991, a release was reported in the vicinity of the unleaded tank turbine. This event appears to correlate with an increase in dissolved hydrocarbon concentrations detected during the August 1991 sampling event. Except for the first two sampling events, groundwater samples collected from AGW-5 contained analyte concentration below MTCA Method A Cleanup Levels. Depth to water measurements generally suggested a groundwater gradient directed toward the south and west.

In January 1994, the gasoline, diesel, heating oil, and waste oil USTs were decommissioned and removed along with the product piping and pump islands. The building was also razed and the hoists removed. During subsequent excavation activities, two approximately 1,250-gallon concrete sumps were discovered. One of the sumps was removed, and the other left in place to avoid disturbing the underlying peat and silt confining layer. During excavation activities, monitoring well AGW-4 was abandoned and removed to allow excavation of additional hydrocarbon-impacted soil.

Soil samples were collected from separate excavations near the former USTs, hoists, and sumps following removal of the USTs and related piping. Approximately 680 cubic yards of impacted soil were removed from the areas of the former waste oil UST, hoists, and dispenser islands, and transported off-site for treatment. Because of the confined groundwater conditions at the site, additional excavation was not conducted to avoid disturbing the confining peat and silt layer.

Following removal of impacted soil, confirmation soil samples were collected at the limits of excavation. All of the approximately 29 soil samples collected from the sidewalls of the gasoline and diesel, heating oil, pump island, and hoist excavations following removal of hydrocarbon-impacted soil contained analyte concentrations below MTCA Method A Cleanup Levels.

Approximately 23 confirmation soil samples were collected from the limits of the waste oil and sump excavation following removal of impacted soil. Twelve of the 23 samples contained concentrations of TPH-G, total petroleum hydrocarbons as diesel (TPH-D), as oil (TPH-O), and BTEX below MTCA Method A Cleanup Levels. Eleven confirmation soil samples collected from the sidewalls and peat at the bottom of the waste oil and sump area at the completion of excavation contained TPH-G, TPH-D, or TPH-O concentrations exceeding MTCA Method A Cleanup Levels. Two of the eleven samples contained benzene concentrations of 0.73 and 4.3 parts per million (ppm), exceeding the MTCA Method A Cleanup Level of 0.5 ppm. However, the laboratory noted that seven of the eleven samples showed non-TPH responses due to the peat matrix. The remaining four samples showed patterns consistent with TPH responses. *The laboratory also noted the relatively low percent solids in the soil samples causing the concentrations reported on a dry weight basis to show much higher responses compared to samples reported on an as received basis. Locations of soil samples collected at the final limits of excavation that contained analyte concentrations exceeding MTCA Method A Cleanup Levels are shown on Plate P-3. Laboratory results recalculated on both a dry weight and as received basis are shown. A figure and table prepared by EMCON showing the soil sample locations and laboratory results are included in Appendix A. Laboratory reports are provided with chromatograms in Appendix B.

One soil sample (WO-NW-2), collected near the former waste oil UST was additionally analyzed for eight Resource Conservation and Recovery Act (RCRA) metals, HVOCs, and polychlorinated biphenyls (PCBs). Metals concentrations were below MTCA Method A Cleanup Levels; HVOCs and PCBs were not detected. A laboratory report for the metals, HVOC, and PCB analyses is included in Appendix B.

On March 11, 1994, two additional groundwater monitoring wells (AGW-6 and AGW-7) were installed near the former location of AGW-4 and near the former pump islands. Soil samples collected above the peat and silt confining layer contained concentrations of TPH-D and TPH-O exceeding MTCA Method A Cleanup Levels.* However, the laboratory report again noted that the chromatograms did not match the typical analyte fingerprints due to the peat matrix.

Groundwater samples were again collected during March and November 1994. Groundwater samples collected from AGW-1, AGW-2, and AGW-6 contained benzene and total xylenes concentrations exceeding MTCA Method A Cleanup Levels; the TPH-G concentration in the sample collected from AGW-1 also exceeded the MTCA Method A Cleanup Level. Groundwater samples collected from AGW-5 and AGW-7 contained analyte concentrations below the method reporting limits (MRLs). Depth to water measurements again indicated a groundwater gradient directed to the southwest.

Between March and December 1994, a combined air sparging/vapor extraction system was installed in the former gasoline and diesel UST excavation. The system was operated by introducing air into the saturated zone to volatilize dissolved hydrocarbons and increase the rate of natural biodegradation. Water levels within the former excavation were controlled by pumping treated groundwater from the system into the sanitary sewer using the adjacent dewatering well and pump. The groundwater treatment system was operated between December 2, 1994, and June 27, 1995, recovering approximately 45.5 pounds of volatile hydrocarbons. The groundwater recovery system removed and discharged approximately 649,600 gallons of groundwater during this period.

Groundwater samples were collected from the five on-site wells during quarterly groundwater sampling events conducted in February, June, and September 1995. Laboratory results indicated a general decline in dissolved concentrations from earlier levels (Tables 1 and 2). Laboratory results from the most recent groundwater sampling event indicate that analyte concentrations were below MTCA Method A Cleanup Levels in every sample.

DISCUSSION

Soil

Information from previous well installation and groundwater sampling investigations indicates the site is underlain from the surface to approximately 8 feet bgs by gravel, sand, and silt. A layer of peat and silt underlies the upper unit extending to approximately 15 feet bgs. Below the peat and silt layer are saturated sands and gravelly sands. The peat and silt layer appears to act as a confining layer separating the saturated and unsaturated materials. The former gasoline and diesel UST basin appears to have been excavated through the peat and silt confining layer allowing groundwater to accumulate in the tank basin. A dewatering well and pump have historically been used to influence the water level in the gasoline and diesel UST basin.

Laboratory results of soil samples collected following UST removal and excavation activities in January 1994 indicate that soil above the peat and silt confining layer has been impacted by diesel- and oil-range hydrocarbons in the area of the former waste oil UST and sumps. Approximately 680 cubic yards of impacted soil were excavated and removed. Additional excavation was not conducted to avoid disturbing the peat and silt confining layer. All 29 soil samples collected following excavation near the former gasoline, diesel, and heating oil USTs, hoists, and dispenser islands contained TPH-G, TPH-D, TPH-O, and BTEX concentrations below MTCA Method A Cleanup Levels.

Twelve of the 23 confirmation soil samples collected at the limits of the waste oil and sump excavation following removal of impacted soil contained TPH-G, TPH-D, TPH-O, and BTEX concentrations below MTCA Method A Cleanup Levels. The remaining eleven soil samples collected near the former waste oil and sump area following excavation contained reported analyte concentrations exceeding MTCA Method A Cleanup Levels (Plate P-3). However, the laboratory noted that seven of the eleven samples showed non-TPH responses due to the peat matrix. This suggests that much of the concentrations reported as diesel and oil probably result from natural properties of the peat and do not represent petroleum hydrocarbons. The remaining four samples showed patterns consistent TPH responses. Chromatograms for the eleven samples are included in Appendix B. In addition, the laboratory noted relatively low percent solids in the peat samples causing the concentrations reported on a dry weight basis to show much higher responses compared to samples reported on an as received basis. Six of the eleven soil samples contained analyte concentrations below MTCA Method A Cleanup Levels when calculated on an as received basis. Appendix B contains a laboratory report showing TPH concentrations recalculated on an as received basis.

Construction plans and drawings provided by the new owner indicate a building and paved parking area covering the property including areas of remaining impacted soil. Areas of remaining impacted soil and the location of the proposed building and parking areas are shown on Plate P-4.

Groundwater

Depth to water measurements collected since 1991 indicate groundwater depths ranging between approximately 0 and 6 feet bgs with a gradient consistently directed toward the south and west. AGW-3 was abandoned immediately after installation because of flowing conditions. Groundwater appears to be confined beneath a silt and peat confining layer present between approximately 8 and 15 feet bgs.

Gasoline-range hydrocarbons appear to have impacted groundwater. Concentrations of TPH-G and BTEX have historically exceeded MTCA Method A Cleanup Levels. Groundwater samples collected from AGW-1 and AGW-2 located near the gasoline USTs have historically contained the highest dissolved hydrocarbon concentrations. Groundwater sampling results suggest that these concentration result from a release from the unleaded turbine in July 1991. Concentrations of TPH-G and BTEX have decreased since that time, falling sharply following soil excavation and treatment system operation conducted in 1994 and 1995. Hydrocarbon concentrations were below MTCA Method A Cleanup Levels in every groundwater sample collected during the last sampling event conducted in September 1995. During the prior sampling event conducted in June 1995, only the benzene concentration in the sample collected from AGW-1 (5.3 ppb) slightly exceeded the MTCA Method A Cleanup Level of 5 ppb.

Diesel- and oil-range hydrocarbons do not appear to have impacted groundwater.

CONCLUSIONS

Diesel- and Oil-Range Hydrocarbons

Soil impacted with diesel- and oil-range hydrocarbons appears to remain above the peat and silt confining layer in the area of the former waste oil UST and sumps at the southwestern portion of the site. However, laboratory results indicate that much of the concentrations reported as diesel and oil result from matrix interference associated with the peat, and probably do not represent petroleum hydrocarbons. Additional excavation of hydrocarbon-impacted soil would likely disturb the underlying peat and silt confining layer. It appears that the proposed new building and paved parking will cover remaining areas of impacted soil, providing institutional controls to ensure protection of human health and the environment.

Diesel- and oil-range hydrocarbons do not appear to have impacted groundwater.

Gasoline-Range Hydrocarbons

Historic groundwater sample laboratory results indicate that groundwater near AGW-1 and AGW-2 has been impacted by gasoline-range hydrocarbons. During July 1991, a leak was reported in the vicinity of the unleaded tank turbine. This event appears to correlate with an increase in dissolved hydrocarbon concentrations detected during the August 1991 sampling event. Concentrations of TPH-G and BTEX have decreased since that time, falling sharply following recent excavation and treatment system operation. Hydrocarbon concentrations were below MTCA Method A Cleanup Levels in every groundwater sample collected during the last sampling event conducted in September 1995. Concentrations were below MTCA Method A Cleanup Levels in all but one sample collected during the prior sampling event conducted in June 1995 (5.3 ppb in AGW-1). This suggests recent remedial activities have been effective in reducing dissolved hydrocarbon concentrations.

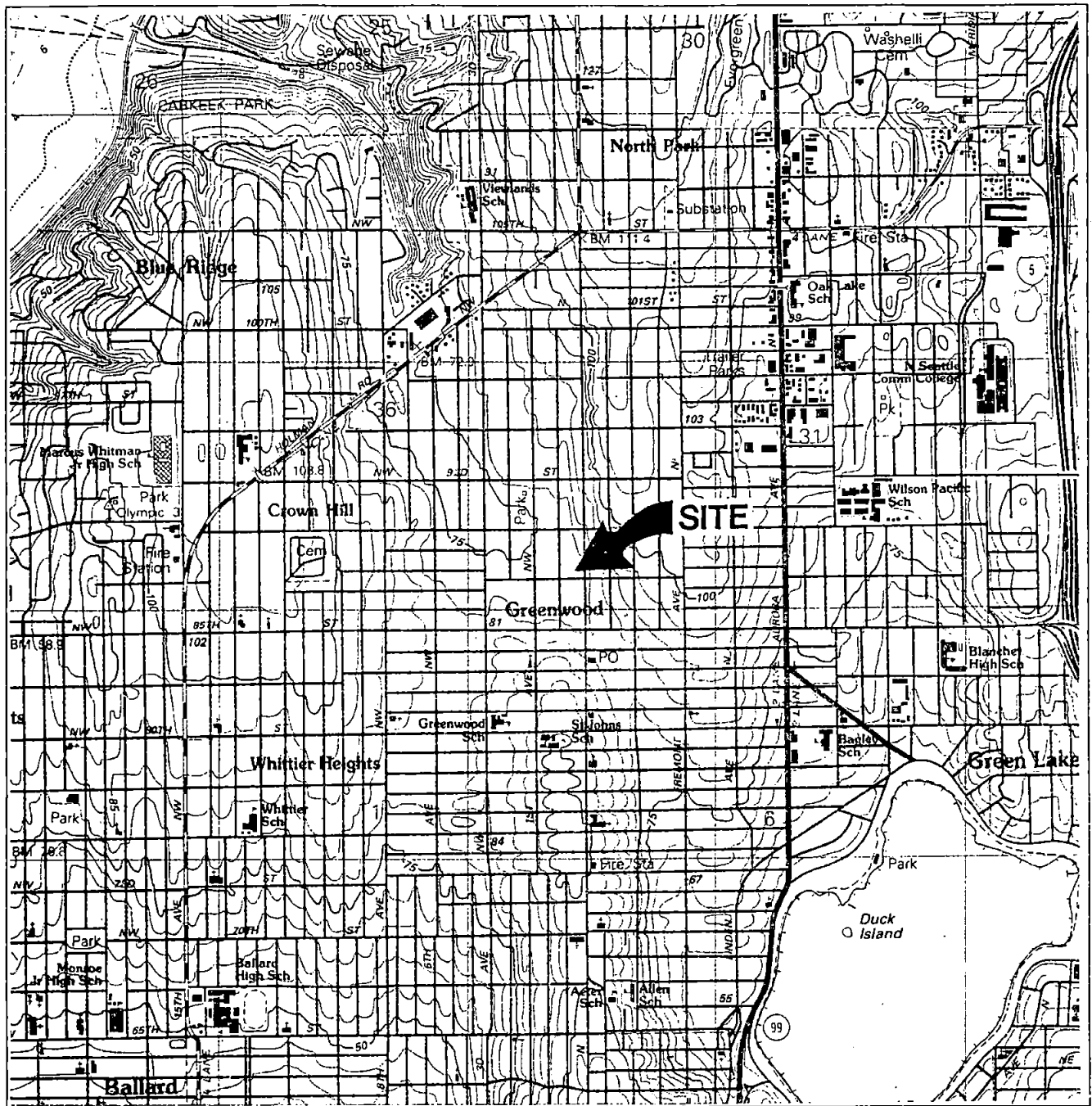
Recent trends in laboratory results suggest that groundwater samples collected during the fourth quarter 1995 and first quarter 1996 groundwater sampling events, will likely contain analyte concentrations below MTCA Method A Cleanup Levels.

RECOMMENDATIONS

ERI recommends that a copy of this report be submitted to Ecology for review under the Independent Remedial Action Program. Based on available information, we recommend that TES request Ecology to issue the following determinations:

- No further action concerning hydrocarbon-impacted soil at the site based on the location, type, and concentration of contaminants, and hydrogeologic constraints imposed by the silt and peat confining layer. Construction drawings and plans indicate that the proposed commercial retail development for the site will likely provide institutional controls to ensure protection of human health and the environment.

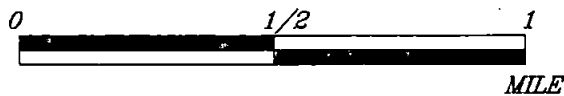
- An interim no further action determination concerning groundwater at the site contingent upon results of additional groundwater sampling events. Recent laboratory results suggest that fourth quarter 1995 and first quarter 1996 groundwater sample laboratory results will confirm that hydrocarbon concentrations in groundwater are in compliance with Model Toxics Control Act cleanup standards. A final no further action determination for groundwater would be issued once laboratory results demonstrate compliance with these cleanup standards.



31001SVM



APPROXIMATE SCALE



Source: U.S.G.S. 7.5 x 15 minute
topographic quadrangle map
Seattle, North 1983



SITE VICINITY MAP

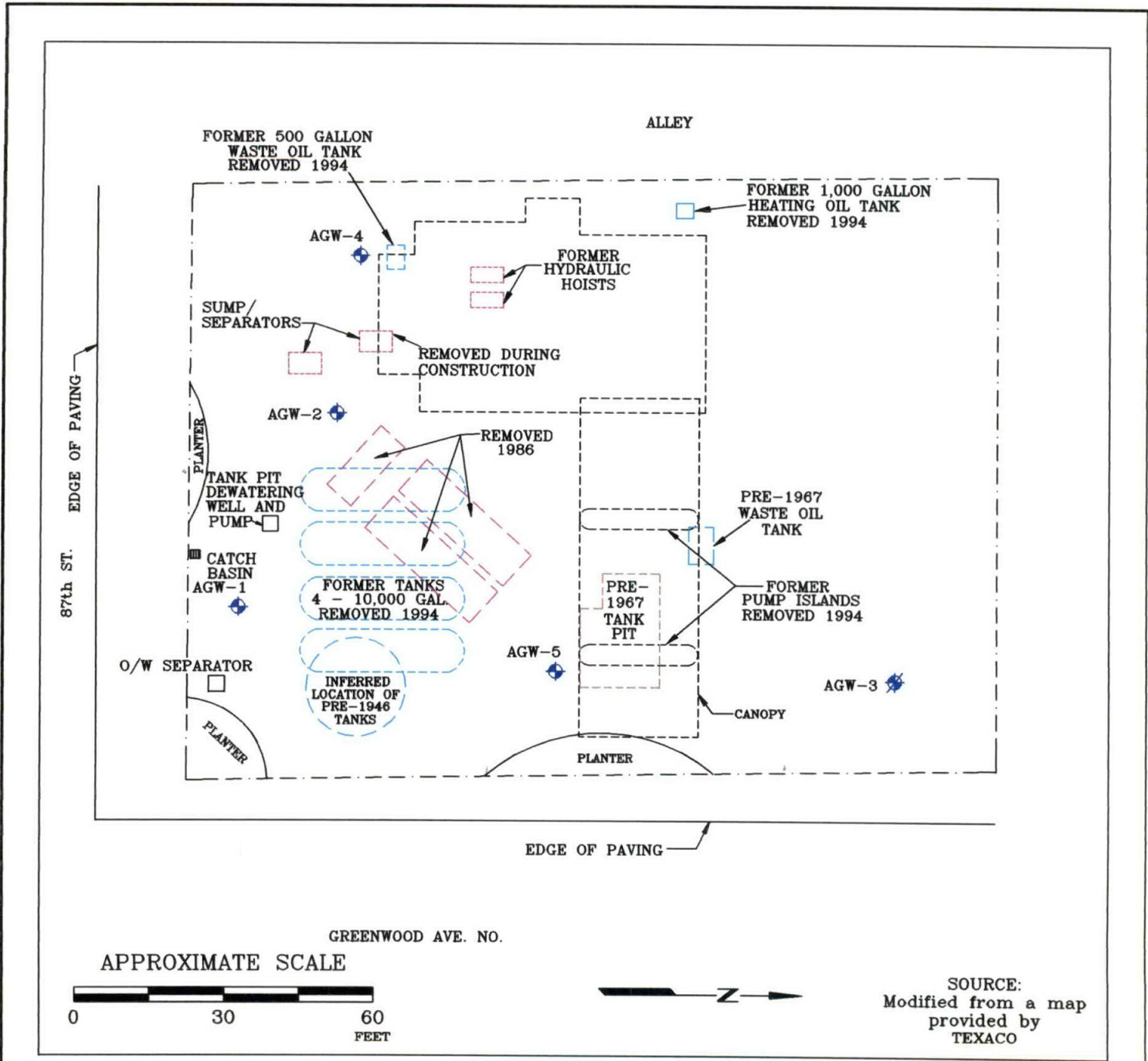
FORMER TEXACO FACILITY 63-232-0037
8701 Greenwood Avenue North
Seattle, Washington

PROJECT

3100

PLATE

P-1



FN 31001002

EXPLANATION

- ◆ AGW-5 Groundwater Monitoring Well
- ◆ AGW-3 Decommissioned Groundwater Monitoring Well



GENERALIZED SITE PLAN

FORMER TEXACO FACILITY 63-232-0037
 8701 Greenwood Avenue North
 Seattle, Washington

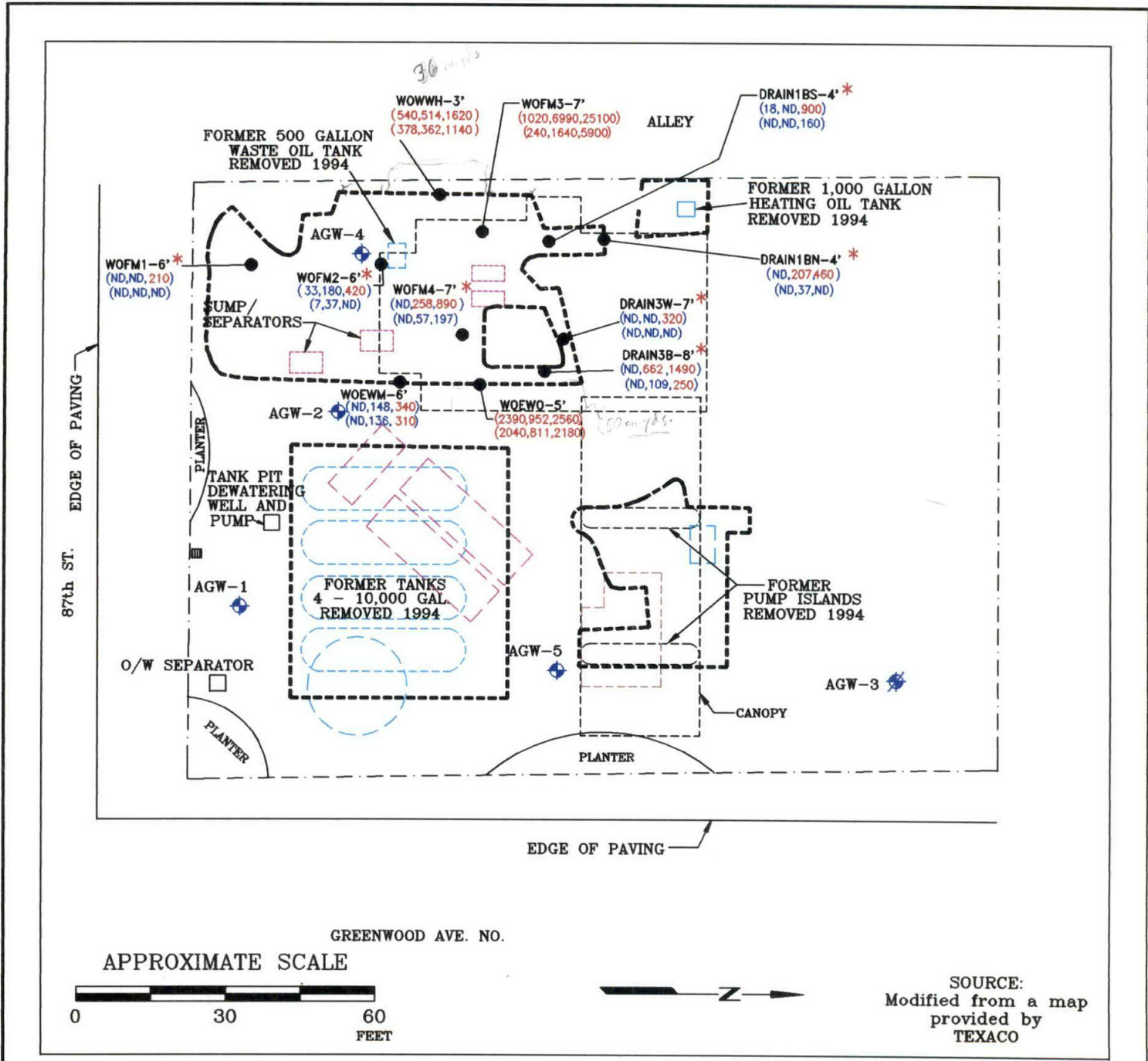
PROJECT NO.

3100

PLATE

P-2

DATE: 12/29/96



FN 31001002

EXPLANATION

- ◆ AGW-5 Groundwater Monitoring Well
- ◆ AGW-3 Decommissioned Groundwater Monitoring Well
- Soil Sample Location - Remaining Following Excavation
- Soil Sample Names (Numbers Signifies Depth Below Grade in Feet)
- Upper Limit of Excavation

Numbers in Red Exceed MTCA Method A Cleanup Levels

Dry Weight (ND,148,340)
As Received (ND,136,310)

TPH-0 Concentration
TPH-D Concentration
TPH-G Concentration

* Non-TPH response due to peat matrix



SOIL SAMPLE ANALYSES MAP

FORMER TEXACO FACILITY 63-232-0037
8701 Greenwood Avenue North
Seattle, Washington

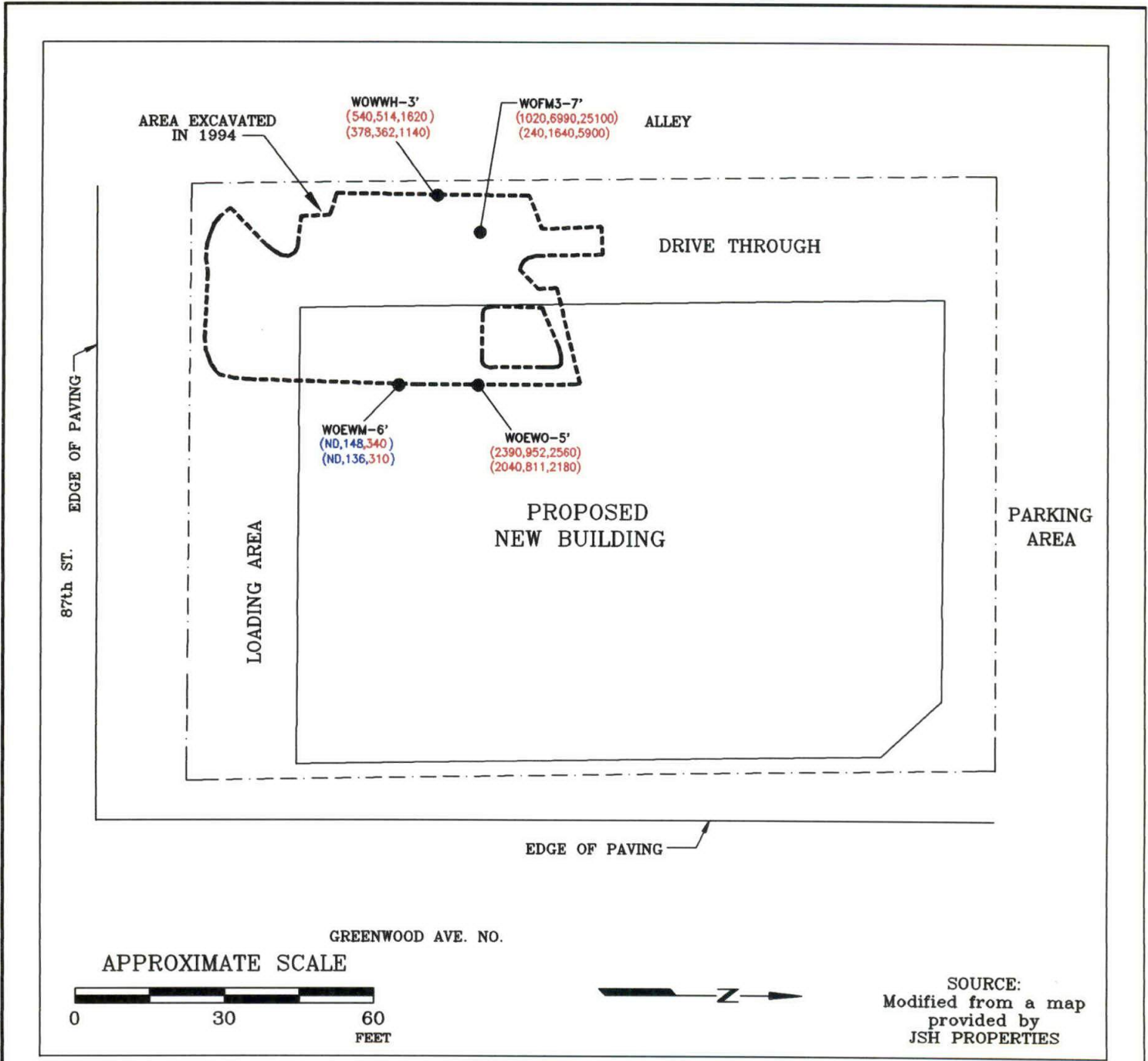
PROJECT NO.

3100

PLATE

P-3

DATE: 12/29/95



FN 31001003

EXPLANATION

- Soil Sample with Hydrocarbon Concentration exceeding MTCA Method A cleanup levels
- WOFM3-7' Soil Sample Names (Numbers Signifies Depth Below Grade in Feet)
- Upper Limit of Excavation

- Numbers in Red Exceed MTCA Method A Cleanup Levels
- Dry Weight (ND,148,340)
- As Received (ND,136,310)
- TPH-O Concentration
- TPH-D Concentration
- TPH-G Concentration



PROPOSED NEW CONSTRUCTION
 FORMER TEXACO FACILITY 63-232-0037
 8701 Greenwood Avenue North
 Seattle, Washington

PROJECT NO.
3100
PLATE
P-4
 DATE: 12/29/96

APPENDIX A

CHRONOLOGY, REFERENCES, FIGURE, AND TABLES

APPENDIX A

CHRONOLOGY

During March 1991, TES drilled seven borings and installed five groundwater monitoring wells near the pump islands and USTs. Monitoring well locations are shown on Plate P-2. Soil samples collected near the heating and gasoline USTs reportedly contained total petroleum hydrocarbon (TPH) concentrations exceeding Model Toxics Control Act (MTCA)¹ Method A Cleanup Levels. Confined groundwater was encountered immediately beneath a silt and peat layer present between approximately 8 and 15 feet below ground surface (bgs). Groundwater samples were collected from the five wells on April 3, 1991. Following groundwater sample collection, AGW-3 was abandoned because of flowing conditions. Groundwater samples collected from AGW-4 and AGW-5 contained concentrations of total xylenes and benzene, respectively, exceeding MTCA Method A Cleanup Levels. Remaining groundwater samples contained analyte concentrations below MTCA Method A Cleanup Levels. Depth to water measurements ranged between 0.5 and 3 feet below the tops of the casings, and suggested a groundwater gradient directed toward the southwest. Results of the investigation are presented in the *TES Report on Initial Site Assessment* dated July 18, 1991. Historic groundwater laboratory results and depth to water measurements are presented in Tables T-1 and T-2.

Groundwater samples were again collected from the four remaining wells (AGW-1, AGW-2, AGW-4, and AGW-5) on May 15, and August 15, 1991. Groundwater samples collected from AGW-1, AGW-4, and AGW-5 during both the May and August 1991 contained benzene concentrations exceeding the MTCA Method A Cleanup Level; the sample collected from AGW-1 also contained concentrations of toluene, ethylbenzene, and total xylenes exceeding MTCA Method A Cleanup Levels. Groundwater samples collected from AGW-4 and AGW-5 in May contained concentrations of total xylenes and toluene, respectively, exceeding MTCA Method A Cleanup Levels. Groundwater samples collected from AGW-1, AGW-2, and AGW-4 during August 1991 contained concentrations of total petroleum hydrocarbons as gasoline (TPH-G) exceeding the MTCA Method A Cleanup Level; the groundwater sample collected from AGW-2 also contained concentrations of benzene, toluene, and total xylenes exceeding MTCA Method A Cleanup Levels. The TPH-G concentrations detected during the August 1991 sampling event appeared to be related to a leak in the vicinity of the unleaded tank turbine in July 1991. The groundwater sample collected from AGW-4 also contained a concentration of total petroleum hydrocarbons as diesel (TPH-D) exceeding the MTCA Method A Cleanup Level. Depth to water measurements suggested a groundwater gradient directed toward the southwest. Results of the investigation are presented in the *TES Quarterly Update Report* dated November 15, 1991.

EMCON Northwest, Inc. (EMCON), conducted quarterly groundwater sampling activities on November 21, 1991, and March 6, 1992. Groundwater samples collected from AGW-1 and AGW-2 during both sampling events contained concentrations of benzene, toluene, ethylbenzene, and total xylenes (BTEX), and TPH-G exceeding MTCA Method A Cleanup Levels; the groundwater sample collected from AGW-2 also contained concentrations of TPH as oil (TPH-O) exceeding the MTCA Method A Cleanup Level. The sample collected from AGW-4 during the November 1991 sampling event contained concentrations of TPH-G, TPH-O, benzene, toluene, and total xylenes exceeding MTCA Method A Cleanup Levels, samples collected from AGW-4 during March 1992 contained benzene and toluene concentrations exceeding MTCA Method A Cleanup Levels. Groundwater samples collected from AGW-5 contained analyte concentrations below MTCA Method A Cleanup Levels. Depth to water measurements again suggested a groundwater gradient directed toward the southwest. Results of the investigation are presented in the

EMCON *Quarterly Ground Water Sampling Report* dated May 7, 1992. * (This document does not appear on Ecology's list of files.)

EMCON collected groundwater samples from the site on November 6, 1992. Groundwater samples collected from AGW-1 and AGW-2 contained concentrations of TPH-G and BTEX exceeding MTCA Method A Cleanup Levels. The sample collected from AGW-4 contained a benzene concentration exceeding the MTCA Method A Cleanup Level. Analyte concentrations in the groundwater sample collected from AGW-5 were below the MRL. Depth to water measurements again suggested a groundwater gradient directed toward the southwest. Results of the investigation are presented in the EMCON *Quarterly Groundwater Sampling Report* dated December 4, 1992.

EMCON again conducted quarterly groundwater sampling activities on March 26, 1993. Groundwater samples collected from AGW-1 and AGW-2 contained concentrations of benzene, ethylbenzene, total xylenes and TPH-G exceeding MTCA Method A Cleanup Levels. The sample collected from AGW-4 contained concentrations of benzene, ethylbenzene, and total xylenes exceeding MTCA Method A Cleanup Levels. No analytes were detected in the groundwater sample collected from AGW-5. Depth to water measurements suggested a groundwater gradient directed toward the west and south. Results of the investigation are presented in the EMCON *Quarterly Groundwater Sampling Report* dated July 1, 1993. * (This document does not appear on Ecology's list of files.)

EMCON conducted quarterly groundwater sampling activities on June 9, 1993. Groundwater samples collected from AGW-1 and AGW-2 again contained concentrations of benzene, ethylbenzene, total xylenes, and TPH-G exceeding MTCA Method A Cleanup Levels. The sample collected from AGW-4 contained concentrations of BTEX, TPH-G, and TPH-D exceeding MTCA Method A Cleanup Levels. No analytes were detected in the groundwater sample collected from AGW-5. Depth to water measurements suggested a groundwater gradient directed toward the west and south. Results of the investigation are presented in the EMCON Groundwater Sampling Report dated September 23, 1993.

In January 1994, the gasoline, diesel, heating oil, and waste oil USTs were decommissioned and removed along with the product piping and pump islands. The building was also razed and the hoists removed. During subsequent excavation activities, two approximately 1,250-gallon concrete sumps were discovered. One of the sumps was removed, and the other left in place to avoid disturbing the underlying peat and silt confining layer. During excavation activities, monitoring well AGW-4 was abandoned and removed to allow excavation of additional hydrocarbon-impacted soil. Well abandonment activities were supervised by a licensed well driller.

Soil samples were collected from separate excavations near the former USTs, hoists, and sumps following removal of the USTs and related piping. Following receipt of laboratory results, additional excavation activities were conducted to remove hydrocarbon-impacted soil. Approximately 680 cubic yards of impacted soil were removed and transported off-site for treatment. Confirmation soil samples were then collected from the limits of the excavations. Soil samples collected from the sidewalls of the gasoline and diesel, heating oil, pump island, and hoist excavations following removal of hydrocarbon-impacted soil contained analyte concentrations below MTCA Method A Cleanup Levels. Eleven soil samples collected from the eastern sidewall and peat at the bottom of the waste oil and sump area at the completion of excavation contained TPH-G, TPH-D, or TPH-O concentrations exceeding MTCA Method A Cleanup Levels. Two of these soil samples also contained benzene concentrations of 0.73 and 4.3 parts per million (ppm), slightly exceeding the MTCA Method A Cleanup Level of 0.5 ppm. Additional excavation was not conducted in this area to avoid disturbing the confining peat and silt layer. The laboratory report noted

that many of the samples showed non-TPH responses due to the peat matrix. The laboratory also noted the relatively low percent solids in the soil samples causing the concentrations reported on a dry weight basis to show much higher responses compared to samples reported on an as received basis. Laboratory results recalculated on an as received basis are included in Appendix A along with chromatograms.

One sample (WO-NW-2) collected near the former waste oil UST was analyzed for halogenated volatile organic compounds (HVOCs), polychlorinated biphenyls (PCBs), and eight Resource Conservation and Recovery Act (RCRA) metals. Metals concentrations were below MTCA Method A Cleanup Levels; HVOCs and PCBs were not detected. Locations of soil samples collected at the final limits of excavation that contained analyte concentrations exceeding MTCA Method A Cleanup Levels are shown on Plate P-3.

On March 11, 1994, two additional groundwater monitoring wells (AGW-6 and AGW-7) were installed at the site. AGW-6 was installed near the southwest corner of the site downgradient from former monitoring well AGW-4 that was removed during excavation. Monitoring well AGW-7 was installed to evaluate the condition of groundwater near the former pump islands. Soil samples collected above the peat and silt confining layer approximately 5.5 to 7 feet bgs contained concentrations of TPH-D and TPH-O exceeding MTCA Method A Cleanup Levels. However, the laboratory report noted that the samples contained components that eluted in the diesel- and oil-ranges, but the chromatograms did not match the typical analyte fingerprints.

Groundwater samples were collected from the two new and three existing wells on March 17, 1994. Groundwater samples collected from AGW-1, AGW-2, and AGW-6 contained benzene and total xylenes concentrations exceeding MTCA Method A Cleanup Levels; the TPH-G concentration in the sample collected from AGW-1 also exceeded the MTCA Method A Cleanup Level. Groundwater samples collected from AGW-5 and AGW-7 contained analyte concentrations below The MRLs. Depth to water measurements again indicated a groundwater gradient directed to the southwest.

Following excavation activities, a combined air sparging/vapor extraction system was installed in the former gasoline and diesel UST excavation. The treatment system was constructed by installing separate air sparging and vapor extraction lines within the former UST basin, and backfilling with pea gravel. Piping was then connected to blowers within an above-ground treatment enclosure. The system was operated by introducing air into the saturated zone via the air sparging piping to volatilize dissolved hydrocarbons and increase the rate of natural biodegradation. Volatile hydrocarbons were then recovered by the vapor extraction piping and discharged to the atmosphere under a permit from the Puget Sound Air Pollution Control Agency (PSAPCA). During operation, water levels within the former excavation were controlled by pumping groundwater from the system into the sanitary sewer using the adjacent dewatering well and pump under an authorization from the King County Department of Metropolitan Services (Metro). Details of tank removal, excavation, well installation, and remediation system installation activities are presented in the EMCON *Underground Storage Tank Decommissioning* report dated September 9, 1994.

EMCON collected groundwater samples from the five on-site wells on November 10, 1994. Groundwater samples collected from AGW-2 and AGW-6 contained benzene and total xylenes concentrations exceeding MTCA Method A Cleanup Levels. Groundwater samples collected from remaining wells contained analyte concentrations below MTCA Method A Cleanup Levels; concentrations in samples collected from AGW-5 and AGW-7 were below the MRLs. Depth to water measurements again indicated a groundwater gradient directed to the southwest. Details of the investigation are presented in the EMCON *1994 Progress Report* dated August 8, 1995.

EMCON collected groundwater samples from the five on-site wells on February 24, 1995. Groundwater samples collected from AGW-5 and AGW-6, and the duplicate sample collected from AGW-1, contained benzene concentrations exceeding the MTCA Method A Cleanup Level. The sample collected from AGW-6 also contained a concentration of total xylenes exceeding the MTCA Method A Cleanup Level. This is the first time since August 1991 that analyte concentrations exceeded MTCA Method A Cleanup Levels in groundwater samples collected from AGW-5. No analytes were detected in the sample collected from AGW-7. Depth to water measurements suggested a groundwater gradient directed toward the south. Details of the investigation are presented in the EMCON *Groundwater Sampling Report* dated June 13, 1995.

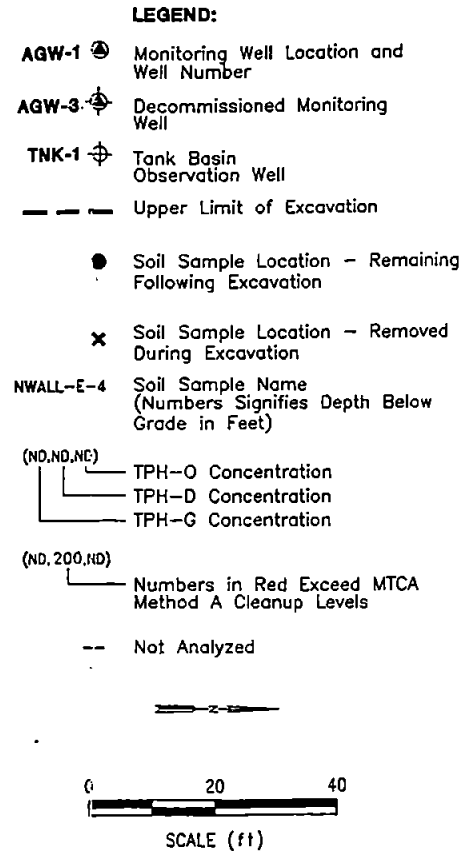
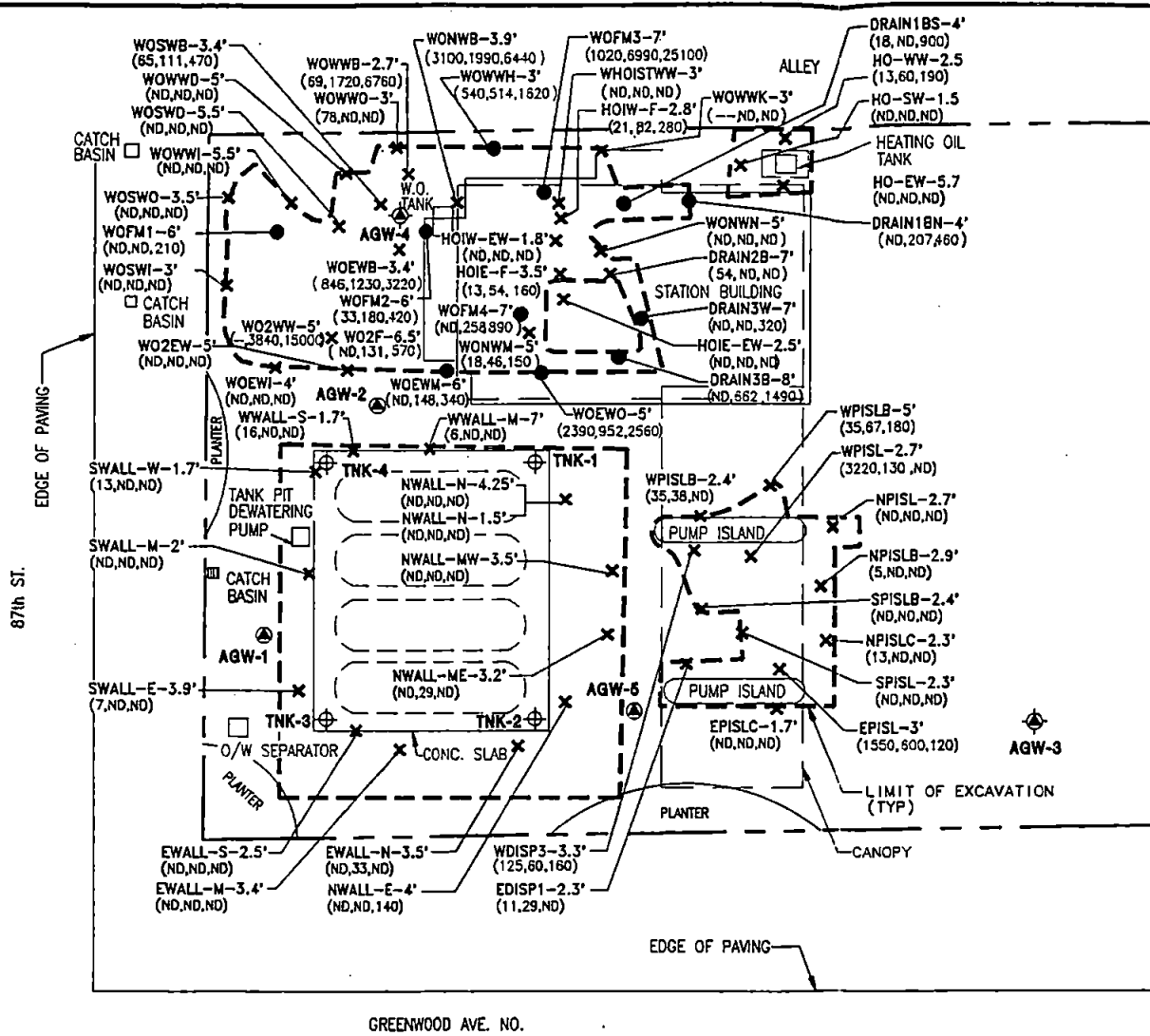
The next groundwater sampling event was conducted by EMCON on June 28, 1995. The groundwater sample collected from AGW-1 contained 5.3 parts per billion (ppb) benzene, slightly exceeding the MTCA Method A Cleanup Level of 5 ppb. No other analyte concentration exceeded the MTCA Method A Cleanup Level in any groundwater sample analyzed. Analyte concentrations were below the MRLs in samples collected from AGW-5 and AGW-7. Depth to water measurements suggested a gradient directed toward the south. Results of the investigation are presented in the EMCON *Groundwater Sampling Report* dated August 8, 1995.

EMCON again collected groundwater samples on September 11, 1995. Groundwater samples collected from all five monitoring wells contained analyte concentrations below MTCA Method A Cleanup Levels; samples collected from AGW-2, AGW-5, and AGW-7 contained analyte concentrations below the MRLs. Depth to water measurements suggested a groundwater gradient generally directed toward the south. Details of the investigation are presented in the EMCON *Groundwater Sampling Report* dated November 9, 1995.

The groundwater treatment system was operated between December 2, 1994, and June 27, 1995, recovering approximately 45.5 pounds of volatile hydrocarbons. The groundwater recovery system removed and discharged approximately 649,600 gallons of groundwater during this period. Details of the remediation system installation and operation are presented in the EMCON *1994 Progress Report* dated August 8, 1995, and *Remediation Status Report* dated November 10, 1995.

REFERENCES

- Texaco Environmental Services Inc., Report on Initial Site Assessment dated July 18, 1991.
- Texaco Environmental Services, Quarterly Update Report, August - October, 1991 dated November 15, 1991.
- EMCON Northwest, Inc., Quarterly Ground Water Sampling Report dated May 7, 1992.
- EMCON Northwest, Inc., Quarterly Ground Water Sampling Report dated December 4, 1992.
- EMCON Northwest, Inc., Groundwater Sampling Report dated July 1, 1993.
- EMCON Northwest, Inc., Groundwater Sampling Report dated September 23, 1993.
- EMCON Northwest, Inc., Underground Storage Tank Decommissioning report dated September 9, 1994.
- EMCON, Groundwater Sampling Report dated June 13, 1995.
- EMCON, Groundwater Sampling Report dated August 8, 1995.
- EMCON, 1994 Progress Report dated August 8, 1995.
- EMCON, Groundwater Sampling Report dated November 9, 1995.
- EMCON, Remediation Status Report dated November 10, 1995.



DATE 9-94
 DWN. MLP
 REV. _____
 APPR. _____
 PROJECT NO. 0368-013.10

Figure 3
 8701 GREENWOOD AVENUE NORTH
 SEATTLE, WASHINGTON
 SOIL SAMPLE LOCATIONS AND
 LABORATORY RESULTS

Table 1

Groundwater Monitoring Data
 Texaco Service Station 63-232-0037
 8701 Greenwood Avenue North
 Seattle, Washington

Well Number	Screened Interval (ft bgs)	Top of Casing Elevation (ft)	Date	Depth to Water (ft)	Depth to Product (ft)	Groundwater Elevation (ft)	Groundwater Elevation Change Since Last Measurement (ft)
AGW-1	4.5 - 19.5	47.36	04/03/91	3.18	None	44.18	—
			05/15/91	—	None	—	—
			08/15/91	0.62	None	46.74	+2.56
			11/21/91	0.70	None	46.88	+0.14
			03/06/92	0.47	None	46.89	+0.01
			11/06/92	0.46	None	46.90	+0.01
			03/26/93	0.49	None	46.87	-0.03
			06/09/93	0.42	None	46.94	+0.07
			03/17/94	1.99	None	45.37	-1.57
			11/10/94	1.21	None	46.15	+0.78
			02/24/95	6.90	None	40.46	-5.69
			06/28/95	5.93	None	41.43	+0.97
			9/11/95	2.31	None	45.05	+3.62
AGW-2	4.5 - 19.0	47.59	04/03/91	3.43	None	44.16	—
			05/15/91	—	None	—	—
			08/15/91	1.65	None	45.94	+1.78
			11/21/91	1.30	None	46.29	+0.35
			03/06/92	1.14	None	46.45	+0.16
			11/06/92	1.18	None	46.41	-0.04
			03/26/93	1.18	None	46.41	0.00

Table 1

Groundwater Monitoring Data
 Texaco Service Station 63-232-0037
 8701 Greenwood Avenue North
 Seattle, Washington

Well Number	Screened Interval (ft bgs)	Top of Casing Elevation (ft)	Date	Depth to Water (ft)	Depth to Product (ft)	Groundwater Elevation (ft)	Groundwater Elevation Change Since Last Measurement (ft)
AGW-2 (continued)		47.64*	06/09/93	1.06	None	46.53	+0.12
			03/17/94	2.18	None	45.46	-0.07
			11/10/94	1.57	None	46.07	+0.61
			02/24/95	5.84	None	41.80	-4.27
			06/28/95	5.41	None	42.23	+0.43
			09/11/95	2.12	None	45.52	+3.29
AGW-3 Well Decommissioned	4.5 - 19.0	49.10	03/29/91	—	None	49.10	—
AGW-4 Well Decommissioned	4.5 - 19.5	47.97	04/03/91	4.61	None	43.36	—
			05/15/91	—	None	—	—
			08/15/91	2.76	None	45.21	+1.85
			11/21/91	2.45	None	45.52	+0.31
			03/06/92	2.45	None	45.52	0.00
			11/06/92	3.21	None	44.79	-0.76
			03/26/93	3.03	None	44.94	+0.18
06/09/93	2.66	None	45.31	+0.37			
AGW-5	4.5 - 19.5	49.47	04/03/91	2.78	None	46.69	—
			05/15/91	—	None	—	—
			08/15/91	1.53	None	47.94	+1.25
			11/21/91	2.40	None	47.07	-0.87

Table 1

**Groundwater Monitoring Data
Texaco Service Station 63-232-0037
8701 Greenwood Avenue North
Seattle, Washington**

Well Number	Screened Interval (ft bgs)	Top of Casing Elevation (ft)	Date	Depth to Water (ft)	Depth to Product (ft)	Groundwater Elevation (ft)	Groundwater Elevation Change Since Last Measurement (ft)
AGW-5 (continued)		49.11*	03/06/92	1.45	None	48.02	+0.95
			11/06/92	2.27	None	47.20	-0.82
			03/26/93	2.05	None	47.42	+0.22
			06/09/93	1.95	None	47.52	+0.10
			03/17/94	1.65*	None	47.46	-0.06
			11/10/94	3.52	None	45.59	-1.87
			02/24/95	3.79	None	45.32	-0.27
			06/28/95	3.61	None	45.50	+0.18
AGW-6	14.0 - 24.0	46.17*	09/11/95	3.62	None	45.49	-0.01
			03/17/94	.51	None	45.66	—
			11/10/94	1.58	None	44.59	-1.07
			02/24/95	2.62	None	43.55	-1.04
			06/28/95	3.97	None	42.20	-1.35
AGW-7	16.0 - 26.0	48.70	09/11/95	1.70	None	44.47	+2.27
			03/17/94	.05	None	48.65	—
			11/10/94	0.00	None	48.70	+0.05
			02/24/95	1.64	None	47.06	-1.64
			06/28/95	1.26	None	47.44	+0.38
			09/11/95	0.00	None	NM	NM

NOTE: * = resurveyed March 16, 1994.
 NM = not measurable due to flowing conditions.

Table 1

Table 2

Groundwater Laboratory Results
 Texaco Station 63-232-0037
 8701 Greenwood Avenue North
 Seattle, Washington

Monitoring Well	Date	Results of Analyses (µg/L)							
		Ecology Method WTPH-G	Ecology Method WTPH-D (extended)		EPA Method 5030/602				EPA Method 7421
Well Number		TPH-G	TPH-D	TPH-O	Benzene	Toluene	Ethyl-benzene	Total Xylenes	Total Lead
MTCA Method A Cleanup Levels*		1,000	1,000	1,000	5	40	30	20	5
AGW-1	04/03/91	ND	—	—	ND	ND	ND	ND	—
	05/15/91	—	—	—	440	1,000	92	670	—
	08/15/91	361,000	—	—	1,400	7,400	1,000	8,100	ND
	11/21/91	47,000	ND	ND	680	6,400	2,000	13,000	—
	03/06/92	48,000	ND	ND	710	3,200	1,400	8,700	ND
	11/06/92	37,000	—	—	95.1	260	1,400	8,200	ND
	03/26/93	18,400	—	—	42.8	27	397	1,450	ND
	06/09/93	15,000	—	—	35.2	23	415	1,530	ND
	03/17/94	1,960	730	ND	17.8	8	24	104	ND
	11/10/94	ND	840	ND	2.2	ND	ND	2	ND
	*11/10/94	ND	—	—	2.2	ND	ND	2	—
	02/24/95	180	ND	ND	4.8	ND	6	6	ND
	02/24/95	190	—	—	5.3	ND	6	7	—
	06/28/95	60	ND	ND	5.3	ND	2	3	ND
	06/28/95	60	ND	ND	5.3	ND	2	3	ND
	09/11/95	ND	ND	ND	0.7	ND	ND	ND	ND
	09/11/95	ND	—	—	0.8	ND	ND	ND	—

Table 2

Groundwater Laboratory Results
 Texaco Station 63-232-0037
 8701 Greenwood Avenue North
 Seattle, Washington

Monitoring Well		Results of Analyses (µg/L)							
		Ecology Method WTPH-G	Ecology Method WTPH-D (extended)			EPA Method 5030/602			
Well Number	Date	TPH-G	TPH-D	TPH-O	Benzene	Toluene	Ethyl-benzene	Total Xylenes	Total Lead
MTCA Method A Cleanup Levels ^a		1,000	1,000	1,000	5	40	30	20	5
AGW-2	04/03/91	—	—	—	ND	ND	ND	ND	—
	05/15/91	—	—	—	ND	ND	ND	ND	—
	08/15/91	1,030	—	—	250	220	15	86	ND
	11/21/91	7,300	ND	1,200	910	1,300	260	1,200	—
	03/06/92	24,000	ND	1,100	870	3,700	760	4,900	ND
	11/06/92	3,230	—	—	152	98	175	804	ND
	03/26/93	3,390	340	ND	113	33	149	642	ND
	06/09/93	3,270	ND	ND	108	18	164	666	3
	03/17/94	470	270	ND	18.4	ND	17	68	ND
	11/10/94	470	ND	ND	11.5	ND	10	72	ND
	02/24/95	110	ND	ND	2.8	ND	2	14	ND
	06/28/95	60	440	ND	0.6	ND	ND	1	ND
	09/11/95	ND	ND	ND	ND	ND	ND	ND	ND
AGW-3 Well Decommissioned	03/29/91	—	—	—	ND	ND	ND	ND	—
AGW-4	04/03/91	—	—	—	2.6	20	2.7	31	—
	05/15/91	—	—	—	8.4	19	2.4	20	—
	08/15/91	1,200	3,260	—	11	4	1	7	4

Table 2

**Groundwater Laboratory Results
Texaco Station 63-232-0037
8701 Greenwood Avenue North
Seattle, Washington**

Page 3 of 4

Monitoring Well	Date	Results of Analyses (µg/L)							
		Ecology Method WTPH-G	Ecology Method WTPH-D (extended)			EPA Method 5030/602			
Well Number		TPH-G	TPH-D	TPH-O	Benzene	Toluene	Ethyl-benzene	Total Xylenes	Total Lead
MTCA Method A Cleanup Levels ^a		1,000	1,000	1,000	5	40	30	20	5
AGW-4 (continued)	11/21/91	3,500	ND	2,040	660	700	21	133	—
	03/06/92	ND	ND	800	139	182	3	18	ND
	11/06/92	90	—	—	20.9	13	4	17	ND
	03/26/93	999	480	ND	31.8	35	51	246	ND
	06/09/93	1,900	1,060	ND	61.1	64	108	533	ND
	03/17/94	—	—	—	—	—	—	—	—
Well Decommissioned									
AGW-5	04/03/91	—	—	—	30	10	5	7	—
	05/15/91	—	—	—	220	53	3.5	12	—
	08/15/91	—	—	—	9.4	ND	ND	ND	ND
	11/21/91	100	ND	ND	2.5	ND	ND	ND	—
	03/06/92	ND	ND	ND	0.9	ND	ND	ND	ND
	11/06/92	ND	—	—	ND	ND	ND	ND	ND
	03/26/93	ND	—	—	ND	ND	ND	ND	ND
	06/09/93	ND	—	—	ND	ND	ND	ND	ND
	03/17/94	ND	ND	ND	ND	ND	ND	ND	ND
	11/10/94	ND	ND	ND	ND	ND	ND	ND	ND

Table 2

Groundwater Laboratory Results
 Texaco Station 63-232-0037
 8701 Greenwood Avenue North
 Seattle, Washington

Monitoring Well	Date	Results of Analyses (µg/L)							
		Ecology Method WTPH-G	Ecology Method WTPH-D (extended)			EPA Method 5030/602			
Well Number		TPH-G	TPH-D	TPH-O	Benzene	Toluene	Ethyl-benzene	Total Xylenes	Total Lead
MTCA Method A Cleanup Levels ^a		1,000	1,000	1,000	5	40	30	20	5
AGW-5 (continued)	02/24/95	ND	ND	ND	30.6	1	2	ND	ND
	06/28/95	ND	ND	ND	ND	ND	ND	ND	ND
	09/11/95	ND	ND	ND	ND	ND	ND	ND	ND
AGW-6	03/17/94	300	ND	ND	10.6	1	14	56	4
	11/10/94	200	ND	ND	7.4	ND	6	29	ND
	02/24/95	460	ND	ND	8.3	2	8	20	ND
	06/28/95	80	ND	ND	4.7	ND	1	7	ND
	09/11/95	ND	ND	ND	3.2	ND	ND	3	ND
AGW-7	03/17/94	ND	ND	ND	ND	ND	ND	ND	ND
	11/10/94	ND	ND	ND	ND	ND	ND	ND	ND
	02/24/95	ND	ND	ND	ND	ND	ND	ND	ND
	06/28/95	ND	ND	ND	ND	ND	ND	ND	ND
	09/11/95	ND	ND	ND	ND	ND	ND	ND	ND

NOTE: Shaded values equal or exceed MTCA Method A Cleanup Levels.
 ND = not detected at or above method reporting limit.
 µg/L = micrograms per liter; approximates parts per billion.
 — = not analyzed.
 * = results for duplicate sample, designated AGW-8-1194.
 TPH-G = total petroleum hydrocarbons as gasoline.
 TPH-D = total petroleum hydrocarbons as diesel.
 TPH-O = total petroleum hydrocarbons as oil.

^a Chapter 173-340 WAC, "The Model Toxics Control Act Cleanup Regulation; Method A Cleanup Levels." Amended December 1993.

Table 3

Soil Sample Laboratory Results
Texaco Service Station 63-232-0037
8701 Greenwood Avenue North
Seattle, Washington

Page 1 of 5

Sample Number	Depth (feet)	Date Collected	Results of Analyses (ppm)							
			Ecology Method WTPH-G	Ecology Method WTPH-D (extended)			EPA Method 5030/8020			
				TPH-G	TPH-D	TPH-O	Benzene	Toluene	Ethyl-benzene	Total Xylenes
MTCA Method A Cleanup Levels ^a			100.0	200.0	200.0	0.5	40.0	20.0	20.0	
East Hoist Excavation Samples										
hoie-f-3.5	3.5	01/26/94	13	54	160	ND	ND	ND	ND	
hoie-ew-2.5'	2.5	01/26/94	ND	ND	ND	ND	ND	ND	ND	
West Hoist Excavation Samples										
hoiw-f-2.8	2.8	01/26/94	21	82	280*	ND	ND	ND	ND	
hoiw-ew-1.8	1.8	01/26/94	ND	ND	ND	ND	ND	ND	ND	
whoistww-3'	3.0	02/04/94	ND	ND	ND	ND	ND	ND	ND	
Heating Oil Underground Storage Tank Excavation Samples										
ho-ww-2.5	2.5	01/28/94	13	60	190	ND	ND	ND	ND	
ho-sw-1.5	1.5	01/28/94	ND	ND	ND	ND	ND	ND	ND	
ho-ew-5.7	5.7	01/28/94	ND	ND	ND	ND	ND	ND	ND	
Dispenser Island and Piping Excavation Samples										
episl-3'	3.0	01/31/94	1,550*	600*	120	ND	ND	6.1	13.0	
wpisl-2.7'	2.7	01/31/94	3,220*	130	ND	<3.50	ND	42.0*	38.6*	
wdisp3-3.3'	3.3	02/01/94	125*	60	160	ND	ND	ND	0.2	
edisp1-2.3'	2.3	02/01/94	11	29	ND	0.10	ND	ND	0.1	
npisl-2.7'	2.7	02/03/94	ND	ND	ND	ND	ND	ND	0.1	
wpislb-2.4'	2.4	02/03/94	35	38	ND	0.3	0.1	0.7	2.5	
wpislb-5'	5.0	02/03/94	35	67	180	ND	ND	ND	0.2	
npislb-2.9'	2.9	02/04/94	5	ND	ND	ND	ND	ND	ND	
npislc2.3'	2.3	02/04/94	13	ND	ND	ND	ND	ND	ND	

Table 3

Soil Sample Laboratory Results
 Texaco Service Station 63-232-0276
 8701 Greenwood Avenue North
 Seattle, Washington

Sample Number	Depth (feet)	Date Collected	Results of Analyses (ppm)						
			Ecology Method WTPH-G	Ecology Method WTPH-D (extended)		EPA Method 5030/8020			
			TPH-G	TPH-D	TPH-O	Benzene	Toluene	Ethyl-benzene	Total Xylenes
MTCA Method A Cleanup Levels ^a			100.0	200.0	200.0	0.5	40.0	20.0	20.0
Dispenser Island and Piping Excavation Samples (cont.)									
spisl-2.3'	2.3	02/04/94	ND	ND	ND	ND	ND	ND	ND
spislb-2.4'	2.4	02/04/94	ND	ND	ND	ND	ND	ND	ND
epislc-1.7'	1.7	02/04/94	ND	ND	ND	ND	ND	ND	ND
Gasoline Underground Storage Tank Excavation Samples									
swall-m-2	2.0	01/27/94	ND	ND	ND	ND	ND	ND	ND
swall-w-1.7	1.7	01/27/94	13	ND	ND	ND	ND	ND	0.4
swall-e-3.9	3.9	01/27/94	7	ND	ND	ND	ND	ND	ND
ewall-s-2.5	2.5	01/27/94	ND	ND	ND	ND	ND	ND	ND
ewall-m-3.4	3.4	01/27/94	ND	ND	ND	ND	ND	ND	ND
wwall-s-1.7	1.7	01/27/94	16	ND	ND	ND	ND	0.1	0.6
wwall-m-7	7.0	01/27/94	6	ND	ND	ND	ND	ND	0.4
ewall-n-3.5	3.5	01/27/94	ND	33	ND	ND	ND	ND	ND
nwall-n-4.25	4.2	01/27/94	ND	ND	ND	ND	ND	ND	ND
nwall-n-1.5	1.5	01/27/94	ND	ND	ND	ND	ND	ND	ND
nwall-mw-3.5	3.5	01/28/94	ND	ND	ND	ND	ND	ND	ND
nwall-me-3.2	3.2	01/28/93	ND	29	ND	ND	ND	ND	ND
nwall-e-4	4.0	01/28/94	ND	ND	140	ND	ND	ND	ND
Waste Oil Underground Storage Tank Excavation Samples									
wo-nw-2	2.0	01/28/94	ND	80	250*	ND	ND	ND	ND
wo-ew-3.8	3.8	01/28/94	157*	95	220*	ND	ND	0.2	0.2
wo-sw-3.6	3.6	01/28/94	30	468*	1,400*	ND	0.3	1.0	5.8
Waste Oil Underground Storage Tank Excavation Samples									

Table 3

Soil Sample Laboratory Results
 Texaco Service Station 63-232-0276
 8701 Greenwood Avenue North
 Seattle, Washington

Sample Number	Depth (feet)	Date Collected	Results of Analyses (ppm)						
			Ecology Method WTPH-G	Ecology Method WTPH-D (extended)		EPA Method 5030/8020			
			TPH-G	TPH-D	TPH-O	Benzene	Toluene	Ethyl-benzene	Total Xylenes
MTCA Method A Cleanup Levels ^a			100.0	200.0	200.0	0.5	40.0	20.0	20.0
wonwb-3.9'	3.9	02/04/94	3,100*	1,990*	6,440*	1.7*	4.1	14	56*
woswb-3.4'	3.4	02/04/94	65	111	470*	ND	ND	0.2	1.2
woewb-3.4'	3.4	02/04/94	846*	1,230*	3,220*	0.30	ND	4.2	18.6
wowwb-2.7'	2.7	02/04/94	69	1,720*	6,760*	0.22	0.2	0.4	0.6
woswd-5.5'	5.5	02/17/94	ND	ND	ND	ND	ND	ND	ND
wowwd-5'	5.0	02/17/94	ND	ND	ND	ND	ND	ND	ND
wo2ew-5'	5.0	02/23/94	ND	ND	ND	ND	ND	ND	ND
wo2f-6.5'	6.5	02/23/94	ND	131	570 *	ND	ND	ND	ND
wo2ww-5'	5.0	02/23/94	—	3,840*	15,000*	—	—	—	—
wowwh-3'	3.0	02/28/94	540	514	1,620	ND	0.2	0.8	2.6
woswi-3.5'	3.5	03/01/94	ND	ND	ND	ND	ND	ND	ND
woswi-3'	3.0	03/01/94	ND	ND	ND	ND	ND	ND	ND
wowwi-5.5'	5.5	03/01/94	ND	ND	ND	ND	ND	ND	ND
woewi-4'	4.0	03/01/94	ND	ND	ND	ND	ND	ND	0.1
wowwk-3'	3.0	03/02/94	—	ND	ND	—	—	—	—
wonwm-5'	5.0	03/03/94	18	46	150	ND	ND	ND	ND
wonwn-5'	5.0	03/03/94	ND	ND	ND	ND	ND	ND	ND
wowwm-6'	6.0	03/03/94	ND	148	340	ND	ND	ND	ND
wofml-6'	6.0	03/03/94	ND	ND	210	0.5	ND	ND	ND

Table 3

Soil Sample Laboratory Results
Texaco Service Station 63-232-0276
8701 Greenwood Avenue North
Seattle, Washington

Page 4 of 5

Sample Number	Depth (feet)	Date Collected	Results of Analyses (ppm)							
			Ecology Method WTPH-G	Ecology Method WTPH-D (extended)			EPA Method 5030/8020			
			TPH-G	TPH-D	TPH-O	Benzene	Toluene	Ethyl-benzene	Total Xylenes	
MTCA Method A Cleanup Levels ^a			100.0	200.0	200.0	0.5	40.0	20.0	20.0	
Waste Oil Underground Storage Tank Excavation Samples (cont.)										
wofm2-6'	6.0	03/03/94	33	180	420	0.73	7.5	ND	0.9	
wofm3-7'	7.0	03/03/94	1,020	6,990	25,100	4.3	0.7	2.3	17.4	
wofm4-7'	7.0	03/03/94	ND	258	890	ND	ND	ND	ND	
drain1bs-4'	4.0	03/03/94	18	ND	900	ND	ND	ND	ND	
drain1bn-4'	4.0	03/03/94	ND	207	460	ND	ND	ND	ND	
drain2b-7'	7.0	03/03/94	54	ND	ND	0.5	ND	ND	6.5	
drain3b-8'	8.0	03/03/94	ND	662	1,490	ND	ND	ND	ND	
drain3w-7'	7.0	03/03/94	ND	ND	320	0.5	ND	ND	0.9	
wowwo-3'	3.0	03/04/94	78	ND	ND	ND	ND	ND	0.2	
voewo-5'	5.0	03/04/94	2,390	952	2,560	ND	0.3	2.0	11.4	
Stockpile Samples										
ho-sp	NA	02/02/94	ND	98	220	ND	ND	ND	ND	
wo-sp	NA	02/02/94	74	1,180	4,100	ND	ND	ND	0.3	
hoist-sp	NA	02/02/94	2,290	322	740	0.07	1.6	3.4	15.7	
ustsp-1	NA	02/02/94	27	ND	ND	ND	ND	ND	ND	
ustsp-2	NA	02/02/94	ND	ND	ND	ND	ND	ND	ND	
ustsp-3	NA	02/02/94	ND	ND	ND	ND	ND	ND	ND	
coldsp-2	NA	03/04/94	6	42	230	ND	ND	ND	ND	
coldsp-3	NA	03/04/94	685	220	1,100	ND	0.1	0.3	2.5	
hotsp-1	NA	03/04/94	732	3,520	9,480	ND	0.4	0.8	7.3	
Stockpile Samples (cont.)										

Table 3

Soil Sample Laboratory Results
 Texaco Service Station 63-232-0276
 8701 Greenwood Avenue North
 Seattle, Washington

Sample Number	Depth (feet)	Date Collected	Results of Analyses (ppm)						
			Ecology Method WTPH-G	Ecology Method WTPH-D (extended)		EPA Method 5030/8020			
			TPH-G	TPH-D	TPH-O	Benzene	Toluene	Ethyl-benzene	Total Xylenes
MTCA Method A Cleanup Levels ^a			100.0	200.0	200.0	0.5	40.0	20.0	20.0
hotsp-4	NA	03/04/94	507	4,030	6,770	ND	0.2	0.3	3.2
hotsp-5	NA	03/04/94	917	1,000	2,910	ND	0.7	2.2	4.7
spABC	NA	03/08/94	9	104	200	ND	ND	ND	ND
spD	NA	03/08/94	ND	35	ND	ND	ND	ND	ND
Monitoring Well AGW-6 - Soil Boring Samples									
6-5.5'	5.5	03/11/94	ND	413	2,730	0.1	0.3	ND	0.2
6-13'	13.0	03/11/94	ND	ND	140	ND	ND	ND	ND
Monitoring Well AGW-7 - Soil Boring Samples									
7-7'	7.0	03/11/94	5	412	1,870	ND	ND	ND	0.1
7-14.5'	14.5	03/11/94	ND	ND	ND	ND	ND	ND	0.1
NOTE: TPH-G = Total petroleum hydrocarbons as gasoline. TPH-D = Total petroleum hydrocarbons as diesel. TPH-O = Total petroleum hydrocarbons as oil. ppm = Parts per million. NA = Not applicable. ND = Not detected at or above method reporting limit. - = Not analyzed. * = Soil represented by sample subsequently excavated. ** = Results due to the beginning of oil, which elutes in the diesel range. Shaded values exceed MTCA Method A Cleanup Levels.									
^a Chapter 173-340 WAC, <i>The Model Toxics Control Act Cleanup Regulations, Method A Cleanup Levels</i> . Amended February 1991.									

APPENDIX B

LABORATORY REPORTS AND CHROMATOGRAMS



February 4, 1994

Service Request No.: K940595B

John Meyer
EMCON Northwest, Inc.
18912 North Creek Parkway, Suite 210
Bothell, WA 98011

Re: **Texaco Greenwood/Project #0368-013.02/B940064**

Dear John:

Enclosed are the results of the sample(s) submitted to our laboratory on January 28, 1994. Preliminary results were transmitted via facsimile on February 1 and February 2, 1994. For your reference, these analyses have been assigned our service request number K940595.

All analyses were performed consistent with our laboratory's quality assurance program. All results are intended to be considered in their entirety, and Columbia Analytical Services, Inc. (CAS) is not responsible for use of less than the complete report. Results apply only to the samples analyzed.

Please call if you have any questions. My extension is 260.

Respectfully submitted,

Columbia Analytical Services, Inc.

A handwritten signature in cursive script that reads "Janice M. Sedlak". The signature is written in black ink and is positioned above the typed name and title.

Janice M. Sedlak
Project Chemist

JMS/td

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COLUMBIA ANALYTICAL SERVICES, Inc.

Acronyms

ASTM	American Society for Testing and Materials
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
LUFT	Leaking Underground Fuel Tank
MCL	Maximum Contaminant Level is the highest permissible concentration of a substance allowed in drinking water as established by the USEPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
NA	Not Applicable
NAN	Not Analyzed
NC	Not Calculated
NCASI	National Council of the Paper Industry for Air and Stream Improvement
ND	Not Detected at or above the MRL
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: EMCON Northwest, Inc.
 Project: Texaco Greenwood/#0368-013.02
 Sample Matrix: Soil

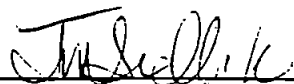
Date Received: 01/28/94
 Date Extracted: 01/31/94
 Work Order No.: K940595B

Halogenated Volatile Organic Compounds
 EPA Methods 5030/8010
 mg/Kg (ppm)
 Dry Weight Basis

Sample Name:	WO-NW-2	Method Blank	Method Blank
Lab Code:	K0595-1	K0595-MB	K0595-MB
Date Analyzed:	02/01/94	01/31/94	02/01/94

Analyte	MRL			
Dichlorodifluoromethane (Freon 12)	0.1	ND	ND	ND
Chloromethane	0.1	ND	ND	ND
Vinyl Chloride	0.05	ND	ND	ND
Bromomethane	0.05	ND	ND	ND
Chloroethane	0.05	ND	ND	ND
Trichlorofluoromethane (Freon 11)	0.05	ND	ND	ND
1,1-Dichloroethene	0.05	ND	ND	ND
Trichlorotrifluoroethane (Freon 113)	0.05	ND	ND	ND
Methylene Chloride	0.2	ND	ND	ND
<i>trans</i> -1,2-Dichloroethene	0.05	ND	ND	ND
<i>cis</i> -1,2-Dichloroethene	0.05	ND	ND	ND
1,1-Dichloroethane	0.05	ND	ND	ND
Chloroform	0.05	ND	ND	ND
1,1,1-Trichloroethane (TCA)	0.05	ND	ND	ND
Carbon Tetrachloride	0.05	ND	ND	ND
1,2-Dichloroethane	0.05	ND	ND	ND
Trichloroethene (TCE)	0.05	ND	ND	ND
1,2-Dichloropropane	0.05	ND	ND	ND
Bromodichloromethane	0.05	ND	ND	ND
2-Chloroethyl Vinyl Ether	0.5	ND	ND	ND
<i>trans</i> -1,3-Dichloropropene	0.05	ND	ND	ND
<i>cis</i> -1,3-Dichloropropene	0.05	ND	ND	ND
1,1,2-Trichloroethane	0.05	ND	ND	ND
Tetrachloroethene (PCE)	0.05	ND	ND	ND
Dibromochloromethane	0.05	ND	ND	ND
Chlorobenzene	0.05	ND	ND	ND
Bromoform	0.05	ND	ND	ND
1,1,2,2-Tetrachloroethane	0.05	ND	ND	ND
1,3-Dichlorobenzene	0.1	ND	ND	ND
1,4-Dichlorobenzene	0.1	ND	ND	ND
1,2-Dichlorobenzene	0.1	ND	ND	ND

Approved by



Date

2/4/94

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: EMCON Northwest
Project: Texaco Greenwood/#0368-013.02
Sample Matrix: Soil

Date Collected: 1/28/94
Date Received: 1/28/94
Date Extracted: 2/1/94
Service Request: K940595B

Polychlorinated Biphenyls (PCBs)
EPA Methods 3550/8080
Units: mg/Kg (ppm)
Dry Weight Basis

Sample Name: WO-NW-2 Method Blank
Lab Code: K0595-01 K0595-MB
Date Analyzed: 2/1/94 2/2/94

Analyte	MRL		
Aroclor 1016	1	ND	ND
Aroclor 1221	1	ND	ND
Aroclor 1232	1	ND	ND
Aroclor 1242	1	ND	ND
Aroclor 1248	1	ND	ND
Aroclor 1254	1	ND	ND
Aroclor 1260	1	ND	ND

Approved By Jim Sellak Date 2/4/94

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: EMCON Northwest
 Project: Texaco Greenwood /# 0368-013.02
 Matrix: Soil

Date Received: 1/28/94
 Work Order No.: K940595B

Duplicate Summary
 Total Metals
 mg/kg (ppm)
 Dry Weight Basis

Sample Name: WO-NW-2
 Lab Code: K059501

Analyte	EPA Method	MRL	Sample Result	Duplicate Sample Result	Average	Relative Percent Difference
Arsenic	7060	1	3	3	3	<1
Barium	6010	1	53	61	57	14
Cadmium	6010	1	ND	ND	ND	-
Chromium	6010	2	21	21	21	<1
Lead	6010	20	25	28	26	12
Mercury	7471	0.2	ND	ND	ND	-
Selenium	7740	1	ND	ND	ND	-
Silver	6010	2	ND	ND	ND	-

Approved: *J. S. Sallah*

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

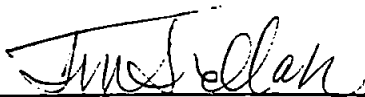
Client: EMCON Northwest
Project: Texaco Greenwood /# 0368-013.02
Matrix: Soil

Date Received: 1/28/94
Work Order No.: K940595B

Matrix Spike Summary
Total Metals
mg/kg (ppm)
Dry Weight Basis

Sample Name: WO-NW-2
Lab Code: K059501

Analyte	MRL	Spike Level	Sample Result	Spiked Sample Result	Percent Recovery	CAS Percent Recovery Acceptance Criteria
Arsenic	1	9	3	11	89	60-130
Barium	1	470	53	537	103	60-130
Cadmium	1	12	ND	10	83	60-130
Chromium	2	47	21	72	109	60-130
Lead	20	120	25	140	96	60-130
Mercury	0.2	0.5	ND	0.5	100	60-130
Selenium	1	2	ND	2	100	60-130
Silver	2	12	ND	11	92	60-130



COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: EMCON Northwest, Inc.
Project: Texaco Greenwood/#0368-013.02
Sample Matrix: Soil

Date Received: 01/28/94
Date Extracted: 01/31/94
Date Analyzed: 01/31/94
Work Order No.: K940595B

Matrix Spike/Duplicate Matrix Spike Summary
 Halogenated Volatile Organic Compounds
 EPA Methods 5030/8010
 mg/Kg (ppm)
 Dry Weight Basis

Sample Name: WO-NW-2
Lab Code: K0595-1

Percent Recovery

Analyte	Spike Level		Sample Result	Spike Result		Percent Recovery		EPA Acceptance Criteria	Relative Percent Difference
	MS	DMS		MS	DMS	MS	DMS		
1,1-Dichloroethene	5	5	ND	5.4	5.3	108	106	28-167	2
Trichloroethene	5	5	ND	5.7	5.5	114	110	35-146	4
Tetrachloroethene	5	5	ND	5.9	5.6	118	112	26-162	5

Approved by _____

Jim Scallato

Date

2/4/94

00007

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: EMCON Northwest, Inc.
Project: Texaco Greenwood/#0368-013.02
Sample Matrix: Water

Date Received: 01/28/94
Date Analyzed: 02/01/94
Work Order No.: K940595B

Surrogate Recovery Summary
Halogenated Volatile Organic Compounds
EPA Methods 5030/8010

Sample Name	Lab Code	Percent Recovery Bromochloromethane	Percent Recovery <i>α,α,α</i> -Trifluorotoluene
System Blank	K0595-MB	86	98
WO-NW-2	K0595-1	76	99
CAS Acceptance Criteria		34-120	78-119

Approved by



Date

2/4/94

00003

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: EMCON Northwest, Inc.
Project: Texaco Greenwood/#0368-013.02
Sample Matrix: Soil

Date Received: 01/28/94
Date Extracted: 01/31/94
Date Analyzed: 01/31/94
Work Order No.: K940595B

Surrogate Recovery Summary
Halogenated Volatile Organic Compounds
EPA Methods 5030/8010

Sample Name	Lab Code	Percent Recovery Bromochloromethane	Percent Recovery α,α,α -Trifluorotoluene
EXT. Method Blank	K0595-MB	83	98
WO-NW-2	K0595-1MS	49	109
WO-NW-2	K0595-1DMS	81	107
CAS Acceptance Criteria		70-130	78-119

Approved by

Jim Sullivan

Date

2/4/94

00005

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: EMCON Northwest
Project: Texaco Greenwood/#0368-013.02
Sample Matrix: Soil

Date Collected: 1/28/94
Date Received: 1/28/94
Date Extracted: 2/1/94
Date Analyzed: 2/1,2/94
Service Request: K940595B

Surrogate Recovery Summary
Polychlorinated Biphenyls (PCBs)
EPA Methods 3550/8080

Sample Name	Lab Code	Percent Recovery Decachlorobiphenyl
WO-NW-2	K0595-01	123
WO-NW-2	K0595-01MS	119
WO-NW-2	K0595-01DMS	118
Lab Control Sample	K0595-LCS	116
Method Blank	K0595-MB	117

CAS Acceptance Limits:

67-138

Approved By Tom Seakate Date 2/4/94

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: EMCON Northwest
Project: Texaco Greenwood/#0368-013.02
Sample Matrix: Soil

Date Collected: 1/28/94
Date Received: 1/28/94
Date Extracted: 2/1/94
Date Analyzed: 2/2/94
Service Request: K940595B

Matrix Spike/Duplicate Matrix Spike Summary
 Polychlorinated Biphenyls (PCBs)
 EPA Methods 3550/8080
 Units: mg/Kg (ppm)
 Dry Weight Basis

Sample Name: WO-NW-2
Lab Code: K0595-01

Percent Recovery

Analyte	Spike Level		Sample Result	Spike Result		Percent Recovery		CAS Acceptance Limits	Relative Percent Difference
	MS	DMS		MS	DMS	MS	DMS		
Aroclor 1242	0.8	0.8	ND	0.7	0.7	88	88	56-127	<1

Approved By *Jim Sedlak* Date 2/4/94



CHAIN OF CUSTODY/LABORATORY ANALYSIS REPORT FORM

DATE 1-28-94 PAGE 2 OF 2

PROJECT NAME Texas Greenwood # 0368-013.02
 PROJECT Greenwood
 COMPANY/ADDRESS EMCON - Bethell
John Meyer, Proj. mgr.
 PHONE 485-5000
 SAMPLERS SIGNATURE Holly Cornes

SAMPLE I.D.	DATE	TIME	LAB I.D.	SAMPLE MATRIX	NUMBER OF CONTAINERS	ANALYSIS REQUEST												REMARKS						
						PETROLEUM HCS			ORGANIC				ORGANIC METALS/INORGANICS											
WO-NW-2	1-23-94	1020	64-4	Soil	1	TPH - HClD	TPH - G	TPH - D	TPH - 418.1	TPH - Other	Halogenated	Volatile Organics	Base/Neu/Acid	Pesticides/PCBS	PAH	TCLP	Metals	Metals Total	Cyanide	pH, Cond Cl, SO ₄	NO ₂ , NO ₃	NH ₃ - N, COD	Total-P TKN, TOC	
WO-EW-3.8		1035	-5		1																			24-hr
WO-SW-3.6		1045	-6		1																			HOLD
HO-WW-2.5		1050	-7		1																			24-hr
HO-SW-1.5		1110	-8		1																			24-hr
HO-EW-5.7		1120	-9		1																			24-hr

RELINQUISHED BY:
Holly Cornes
 Signature
Holly Cornes
 Printed Name
EMCON
 Firm
1-28-94 1530
 Date/Time

RECEIVED BY:
[Signature]
 Signature
[Printed Name]
 Printed Name
[Firm]
 Firm
1-28-94 15:30
 Date/Time

TURNAROUND REQUIREMENTS
 24 hr ___ 48 hr ___ 5 day ___
 ___ Standard (10-15 working days)
 ___ Provide Verbal Preliminary Results
 ___ Provide FAX preliminary Results
 Requested Report Date

REPORT REQUIREMENTS
 ___ I. Routine Report
 ___ II. Report (includes DUP.MAS. MSD, as required, may be charged as samples)
 ___ III. Data Validation Report (includes All Raw Data)
 ___ IV. CLP Deliverable Report

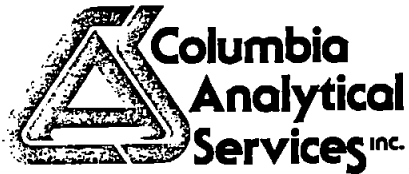
INVOICE INFORMATION:
 P.O.# _____
 Bill To _____

SAMPLE RECEIPT:
 Shipping VIA: _____
 Shipping to: _____
 Condition: _____
 Lab No: K440595B

RELINQUISHED BY:
[Signature]
 Signature
DAVID SEARS
 Printed Name
CAS
 Firm
1-28-94 16:00
 Date/Time

RECEIVED BY:
[Signature]
 Signature
D. STORMS
 Printed Name
CAS
 Firm
1/31/94 1110
 Date/Time

SPECIAL INSTRUCTIONS/COMMENTS:
24-hr rush as marked. HOLD others.
© Compliance cost to TRMI



November 10, 1995

Service Request Nos.: B940121
B940132
B940138

Theresa Geijer
Texaco Environmental Services
3400 188th Street SW
Suite 630
Lynnwood, WA 98037

Re: Texaco #63-232-0037 - Greenwood Avenue Project

Dear Theresa:

Attached are revised results for sample(s) submitted to our laboratory in February of 1994. For your reference, this is regarding the above listed service request numbers.

All analyses were performed consistent with our laboratory's quality assurance program. All results are intended to be considered in their entirety, and CAS is not responsible for use of less than the complete report. Results only apply to samples analyzed.

Please call if you have any questions.

Respectfully submitted,

Columbia Analytical Services, Inc.

A handwritten signature in black ink, appearing to read "Colin B. Elliott".

Colin B. Elliott
Laboratory Manager

CBE/bdr

Page 1 of 11

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Texaco Environmental Services
Project: #63-232-0037
Sample Matrix: Soil

Dates Received: 2/21,16,32/95
Work Order No.: B940121
B940132
B940138

CASE NARRATIVE SUMMARY

All analyses were performed consistent with the quality assurance program of Columbia Analytical Services, Inc.

Samples Drain-1BS-4', -1BN-4', -2B-7', -3B-8', -3W-7', WOFM1-6' and WOFM2-6' show non-TPH responses in both the diesel and oil regions due to the sample matrix (peat or its equivalent). Sample WOFM4-2' also shows lube oil response mixed with the non-TPH matrix response. It is estimated that 40% of the measured oil response in this sample is due to non-TPH components. All other samples ran by Method WTPH-D which had detectable levels of either diesel or oil, show patterns consistent with TPH product responses.

All samples listed above which showed non-TPH matrix responses also have relatively low percent solids. Since the WTPH methods require sample results to be adjusted to a dry weight basis, these samples show much higher results as compared to samples reported on an 'as-received' basis. The results have been recalculated on an 'as received' basis and are included in the following pages.

Approved by

Ch. Elliott

Date

11/10/95

*WOFM1-6'
4-7*

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Texaco Environmental Services
Project: #63-232-0037
Sample Matrix: Soil

Service Request: B940121
Date Collected: 2/28-3/1/94
Date Received: 3/1/94
Date Extracted: NA
Date Analyzed: 3/1/94

Solids, Total
EPA Method 160.3 Modified
Units: Percent (%)

Sample Name	Lab Code	Result
WOWWH-3'	B94-0121-01	70.5
WOSWI-3.5'	B94-0121-03	86.8
WOSWI-3'	B94-0121-04	84.3
WOWWI-5.5'	B94-0121-05	79.5
WOEWI-4'	B94-0121-07	86.4

Approved By: _____

Carl Elliott

Date: 11/10/95

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Texaco Environmental Services
Project: #63-232-0037
Sample Matrix: Soil

Service Request: B940132
Date Collected: 3/3/94
Date Received: 3/3/94
Date Extracted: NA
Date Analyzed: 3/4/94

Solids, Total
EPA Method 160.3 Modified
Units: Percent (%)

Sample Name	Lab Code	Result
DRAIN 1BS-4'	B940132-01	17.5
DRAIN 1BN-4'	B940132-02	18.0
DRAIN 2B-7'	B940132-03	15.7
DRAIN 3B-8'	B940132-04	16.5
DRAIN 3W-7'	B940132-05	20.0
WONWM-5'	B940132-06	87.0
WOFM1-6'	B940132-07	20.2
WOFM2-6'	B940132-08	20.3
WOFM3-7'	B940132-09	23.5
WOFM4-7'	B940132-10	22.1
WOEWM-6'	B940132-11	92.2
WONWN-5'	B940132-12	88.2

Approved By: _____

John - Elliott

Date: _____

11/10/95

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Texaco Environmental Services
Project: #63-232-0037
Sample Matrix: Soil

Service Request: B940138
Date Collected: 3/4/94
Date Received: 3/4/94
Date Extracted: NA
Date Analyzed: 3/9/94

Solids, Total
EPA Method 160.3 Modified
Units: Percent (%)

Sample Name	Lab Code	Result
WOWWO-3	B940138-01	89.3
WOEWO-5'	B940138-02	85.2
COLDSP-2	B940138-04	88.3
COLDSP-3	B940138-05	85
HOTSP-1	B940138-08	83.4
HOTSP-4	B940138-11	75.7
HOTSP-5	B940138-12	85

Approved By: _____

Ch. Elliott

Date: _____

11/10/95

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Texaco Environmental Services
Project: #63-232-0037
Sample Matrix: Soil

Service Request: B940121
Date Collected: 2/28-3/1/94
Date Received: 3/1/94
Date Extracted: 3/2/94
Date Analyzed: 3/3/94

BTEX and Total Petroleum Hydrocarbons as Gasoline
EPA Methods 5030A/8020 and Washington DOE Method WTPH-G
Units: mg/Kg (ppm)
As Received Basis

Analyte:	Benzene	Toluene	Ethylbenzene	Total Xylenes	TPH as Gasoline
Method Reporting Limit:	0.05	0.1	0.1	0.1	5

Sample Name	Lab Code	Benzene	Toluene	Ethylbenzene	Total Xylenes	TPH as Gasoline
WOWWH-3'	B94-0121-01	ND	0.1	0.6	1.8	378
WOSWI-3.5'	B94-0121-03	ND	ND	ND	ND	ND
WOSWI-3'	B94-0121-04	ND	ND	ND	ND	ND
WOWWI-5.5'	B94-0121-05	ND	ND	ND	ND	ND
WOEWI-4'	B94-0121-07	ND	ND	ND	ND	ND

ND None Detected

Approved By: _____

Col. Elliott

Date: _____

11/20/95

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Texaco Environmental Services
Project: #63-232-0037
Sample Matrix: Soil

Service Request: B940132
Date Collected: 3/3/94
Date Received: 3/3/94
Date Extracted: 3/4,9/94
Date Analyzed: 3/4,11/94

BTEX and Total Petroleum Hydrocarbons as Gasoline
EPA Methods 5030A/8020 and Washington DOE Method WTPH-G
Units: mg/Kg (ppm)
As Received Basis

Analyte:	Benzene	Toluene	Ethylbenzene	Total Xylenes	TPH as Gasoline
Method Reporting Limit:	0.05	0.1	0.1	0.1	5

Sample Name	Lab Code	Benzene	Toluene	Ethylbenzene	Total Xylenes	TPH as Gasoline
DRAIN 1BS-4'	B940132-01	ND	ND	ND	ND	ND
DRAIN 1BN-4'	B940132-02	ND	ND	ND	ND	ND
DRAIN 2B-7'	B940132-03	0.08	ND	ND	1	8
DRAIN 3B-8'	B940132-04	ND	ND	ND	ND	ND
DRAIN 3W-7'	B940132-05	0.1	ND	ND	0.2	ND
WONWM-5'	B940132-06	ND	ND	ND	ND	16
WOFM1-6'	B940132-07	0.1	ND	ND	ND	ND
WOFM2-6'	B940132-08	0.15	1.5	ND	0.2	7
WOFM3-7'	B940132-09	1.01	0.2	0.5	4.1	240
WOFM4-7'	B940132-10	ND	ND	ND	ND	ND
WOEWM-6'	B940132-11	ND	ND	ND	ND	ND
WONWN-5'	B940132-12	ND	ND	ND	ND	ND

ND None Detected

Approved By: _____

Ch. Elliott

Date: _____

11/10/95

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Texaco Environmental Services
Project: #63-232-0037
Sample Matrix: Soil

Service Request: B940138
Date Collected: 3/4/94
Date Received: 3/4/94
Date Extracted: NA
Date Analyzed: 3/9/94

BTEX and Total Petroleum Hydrocarbons as Gasoline
EPA Methods 5030A/8020 and Washington DOE Method WTPH-G
Units: mg/Kg (ppm)
As Received Basis

Analyte:	Benzene	Toluene	Ethylbenzene	Total Xylenes	TPH as Gasoline
Method Reporting Limit:	0.05	0.1	0.1	0.1	5

Sample Name	Lab Code	Benzene	Toluene	Ethylbenzene	Total Xylenes	TPH as Gasoline
WOWWO-3	B940138-01	ND	ND	ND	0.2	70 (a)
WOEWO-5	B940138-02	ND	0.3	1.7	9.7	2040 (a)
COLDSP-2	B940138-04	ND	ND	ND	ND	5
COLDSP-3	B940138-05	ND	0.1	0.3	2.1	582 (a)
HOTSP-1	B940138-08	ND	0.4	0.7	6.1	610 (a)
HOTSP-4	B940138-11	ND	0.2	0.2	2.4	384
HOTSP-5	B940138-12	ND	0.6	1.9	4	780 (a)

a Quantified as gas. The sample contained components that eluted in the gas range, but the chromatogram did not match the typical gas fingerprint.
ND None Detected

Approved By: Colin Elliott Date: 11/10/95

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Texaco Environmental Services
Project: #63-232-0037
Sample Matrix: Soil

Service Request: B940121
Date Collected: 2/28-3/1/94
Date Received: 3/1/94
Date Extracted: 3/2/94
Date Analyzed: 3/2/94

Total Petroleum Hydrocarbons as Diesel and Oil
Washington DOE Method WTPH-D
Units: mg/Kg (ppm)
As Received Basis

Sample Name	Lab Code	Analyte: Method Reporting Limit:	Diesel 25	Oil* 100
WOWWH-3'	B94-0121-01		362 (a)	1140
WOSWI-3.5'	B94-0121-03		ND	ND
WOSWI-3'	B94-0121-04		ND	ND
WOWWI-5.5'	B94-0121-05		ND	ND
WOEWI-4'	B94-0121-07		ND	ND

* Quantified using 30-weight motor oil as a standard.
(a) This result is primarily due to the beginning of oil, which elutes in the diesel region.

Approved By: _____

Col. Elliott

Date: _____

11/10/95

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Texaco Environmental Services
Project: #63-232-0037
Sample Matrix: Soil

Service Request: B940132
Date Collected: 3/3/94
Date Received: 3/3/94
Date Extracted: 3/4,10/94
Date Analyzed: 3/4,17/94

Total Petroleum Hydrocarbons as Diesel and Oil
Washington DOE Method WTPH-D
Units: mg/Kg (ppm)
As Received Basis

Sample Name	Lab Code	Analyte: Method Reporting Limit:	Diesel 25	Oil* 100
DRAIN 1BS-4'	B940132-01 **		ND	160 (a)
DRAIN 1BN-4'	B940132-02 **		37 (b)	ND
DRAIN 2B-7'	B940132-03 **		ND	ND
DRAIN 3B-8'	B940132-04 **		109 (b)	250 (a)
DRAIN 3W-7'	B940132-05 **		ND	ND
WONWM-5'	B940132-06		40 (c)	130
WOFM1-6'	B940132-07 **		ND	ND
WOFM2-6'	B940132-08 **		37 (b)	ND
WOFM3-7'	B940132-09 **		1640 (c)	5900
WOFM4-7'	B940132-10 **		57 (b)	197
WOEWM-6'	B940132-11		136 (c)	310
WONWN-5'	B940132-12		ND	ND

- * Quantified using 30-weight motor oil as a standard.
- a Quantified as oil, but the response does not match typical lube oil.
- b Quantified as diesel, but the response does not match typical diesel.
- c This result is primarily due to the beginning of oil, which elutes in the diesel region.

** With Silica-Gel Cleanup

Approved By: *Car. Ellert* Date: 12/14/95

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Texaco Environmental Services
Project: #63-232-0037
Sample Matrix: Soil

Service Request: B940138
Date Collected: 3/4/94
Date Received: 3/4/94
Date Extracted: 3/10/94
Date Analyzed: 3/15/94

Total Petroleum Hydrocarbons as Diesel and Oil
Washington DOE Method WTPH-D
Units: mg/Kg (ppm)
As Received Basis

Sample Name	Lab Code	Analyte: Method Reporting Limit:	Diesel	Oil*
WOWWO-3	B940138-01		ND	ND
WOWWO-5'	B940138-02		811 (a)	2180
COLDSP-2	B940138-04		37 (a)	200
COLDSP-3	B940138-05		187 (a)	935
HOTSP-1	B940138-08		2940 (a)	7910
HOTSP-4	B940138-11		3050	5120
HOTSP-5	B940138-12		850 (a)	2390

* Quantified using 30-weight motor oil as a standard.

a This result is primarily due to the beginning of oil, which elutes in the diesel region.

Approved By: _____

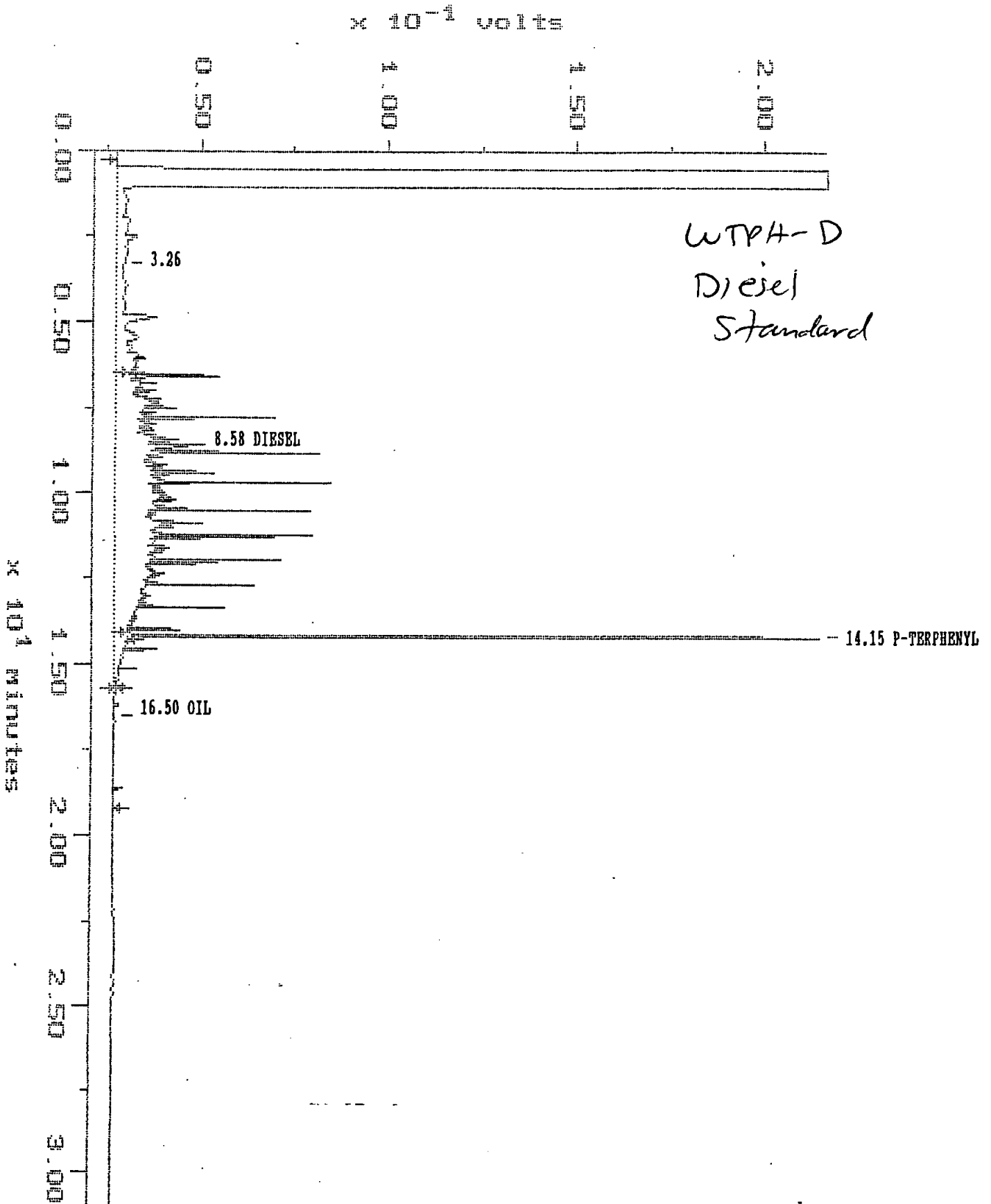


Date: _____

11/2/95

Sample: DIESEL B1-23A Channel: FLAME ID
Acquired: 15-MAR-94 19:30 Method: C:\MAX\DATA1\031594

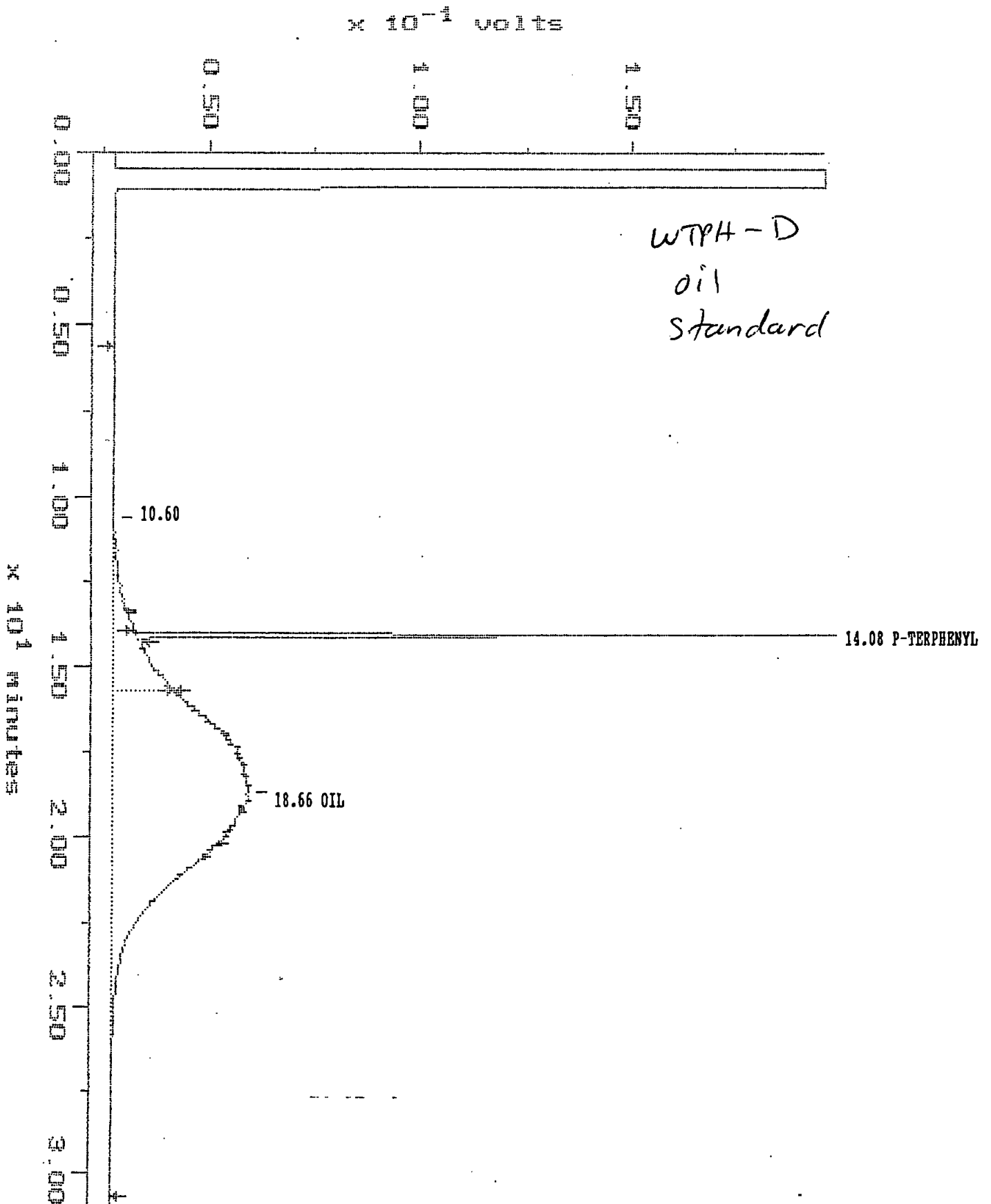
Filename: 0315DIB2
Operator: DC



Sample: OIL B1-22L
Acquired: 15-MAR-94 11:04

Channel: FLAME ID
Method: C:\MAX\DATA1\031594

Filename: 0315OIL1
Operator: DC

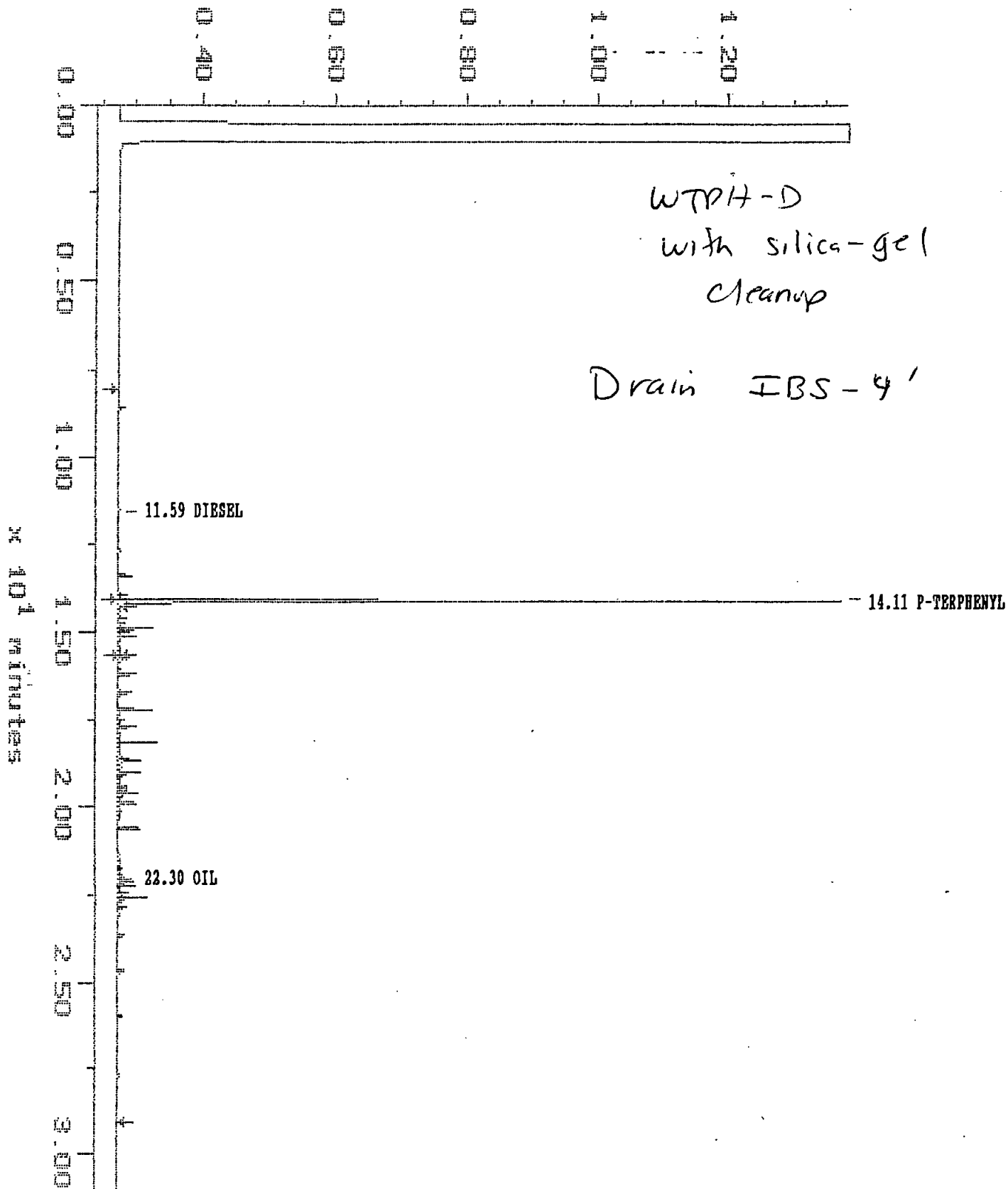


Sample: 132-1 SIL
Acquired: 17-MAR-94 8:02
Dilution: 1 : 10.000

Channel: FLAME ID
Method: C:\MAX\DATA1\031694
Amount: 2.780

Filename: 132-1
Operator: DC

$\times 10^{-1}$ volts

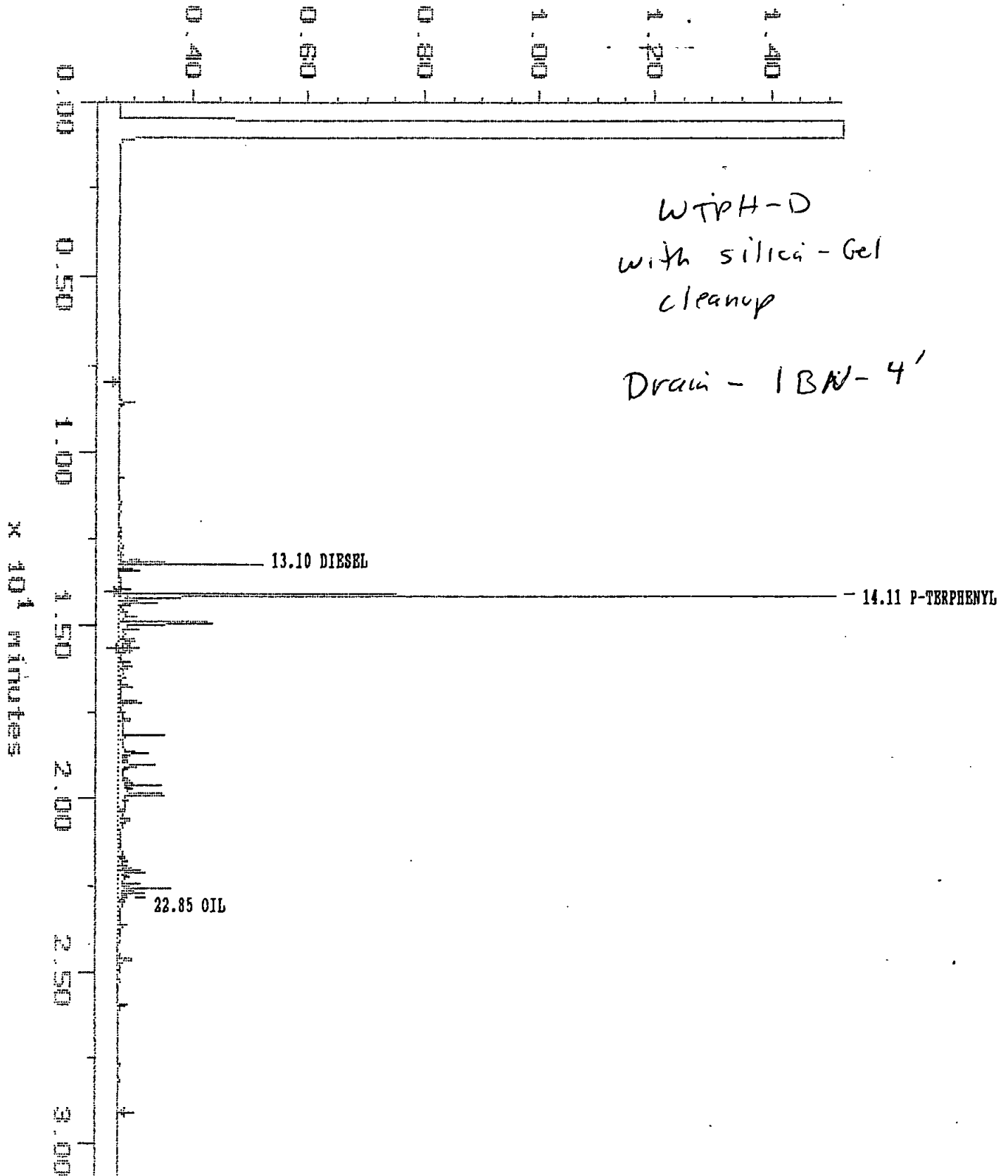


Sample: 132-2 SIL
Acquired: 17-MAR-94 8:42
Dilution: 1 : 10.000

Channel: FLAME ID
Method: C:\MAX\DATA1\031694
Amount: 2.900

Filename: 132-2
Operator: DC

$\times 10^{-1}$ volts



Sample: 132-4 SIL

Channel: FLAME ID

Filename: 132-4

Acquired: 17-MAR-94 10:02

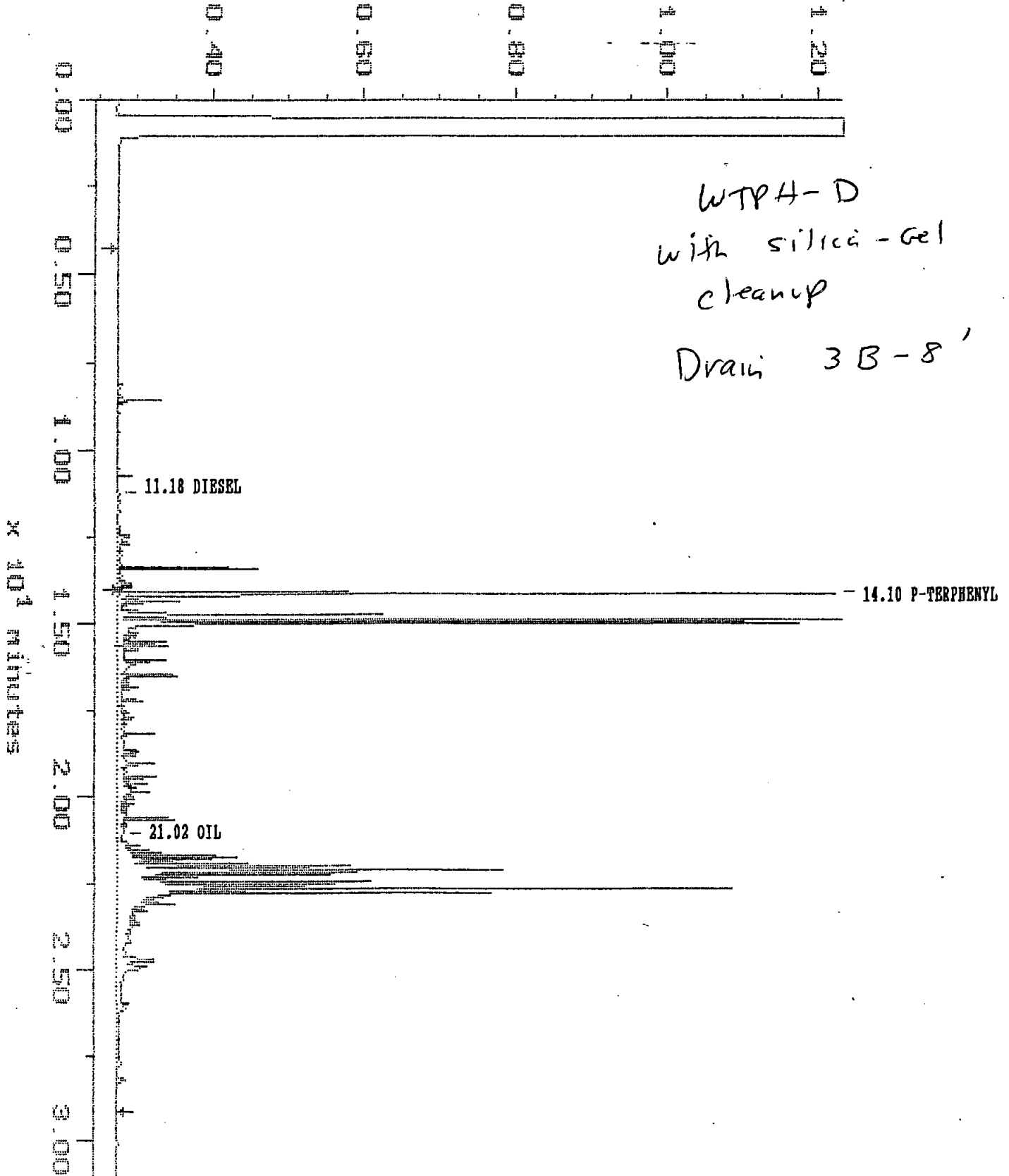
Method: C:\MAX\DATA\031694

Operator: DC

Dilution: 1 : 10.000

Amount: 2.680

$\times 10^{-1}$ volts

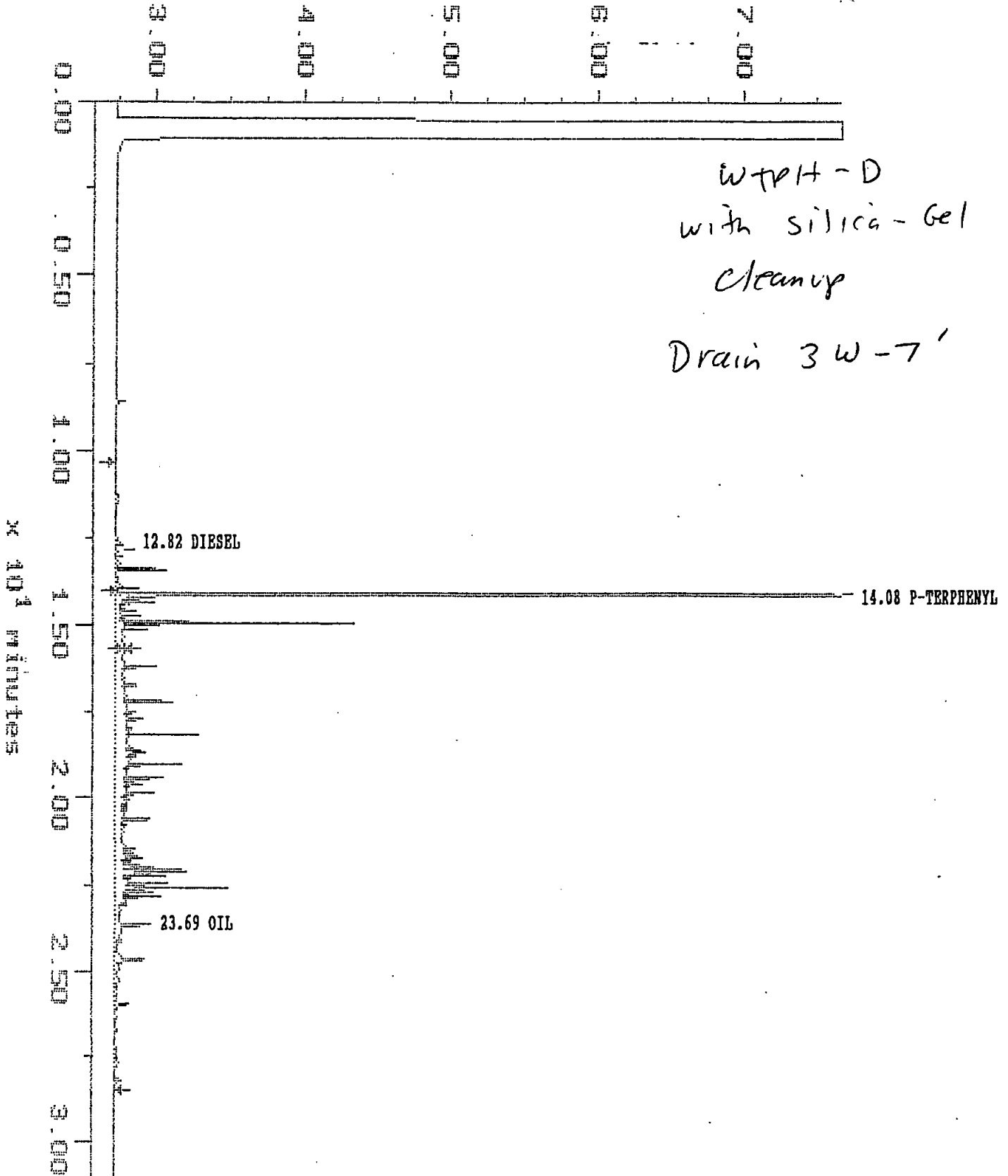


Sample: 132-5 SIL
Acquired: 17-MAR-94 10:42
Dilution: 1 : 10.000

Channel: FLAME ID
Method: C:\MAX\DATA1\031694
Amount: 3.250

Filename: 132-5
Operator: DC

$\times 10^{-2}$ volts



Sample: 132-7 SIL

Channel: FLAME ID

Filename: 132-7

Acquired: 17-MAR-94 11:21

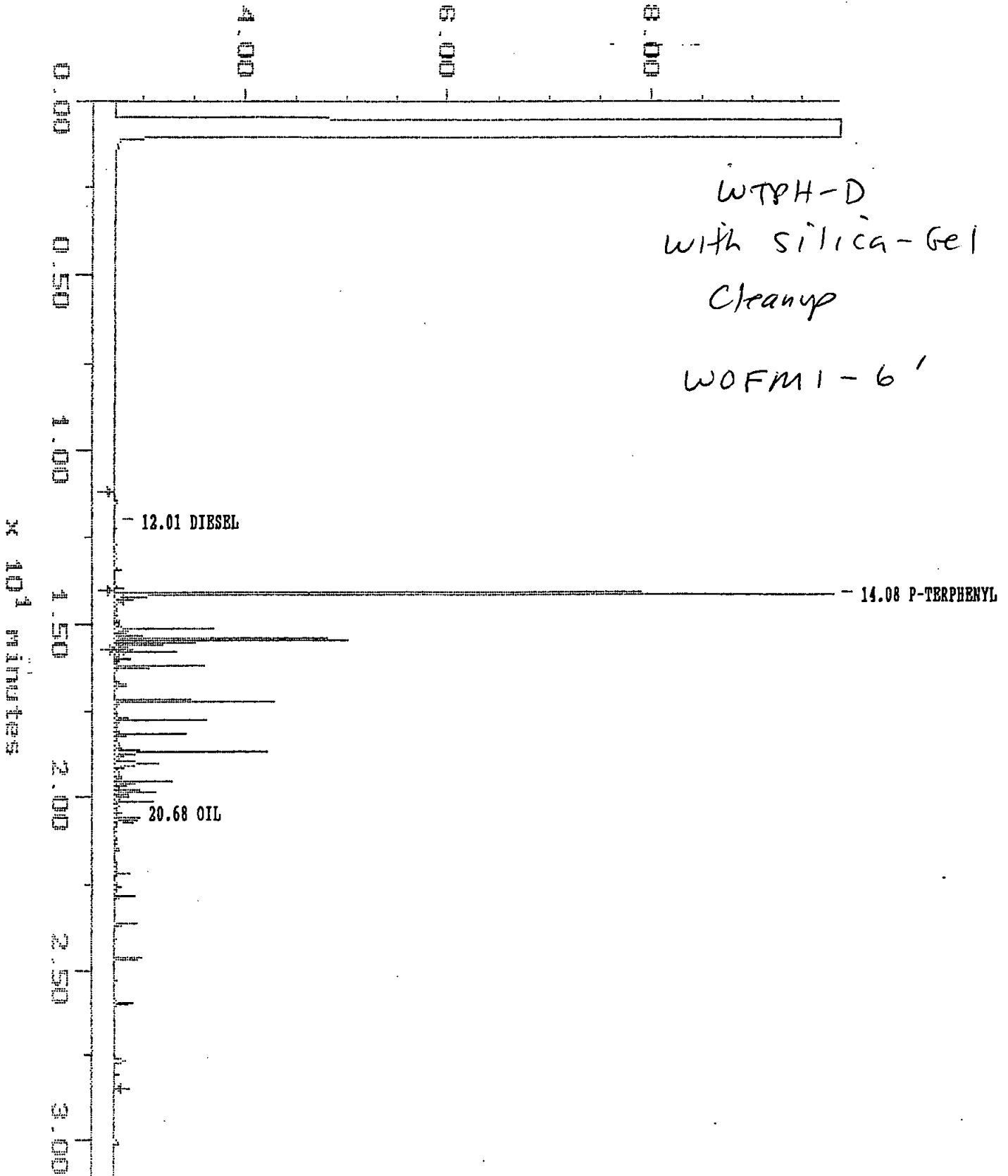
Method: C:\MAX\DATA1\031694

Operator: DC

Dilution: 1 : 10.000

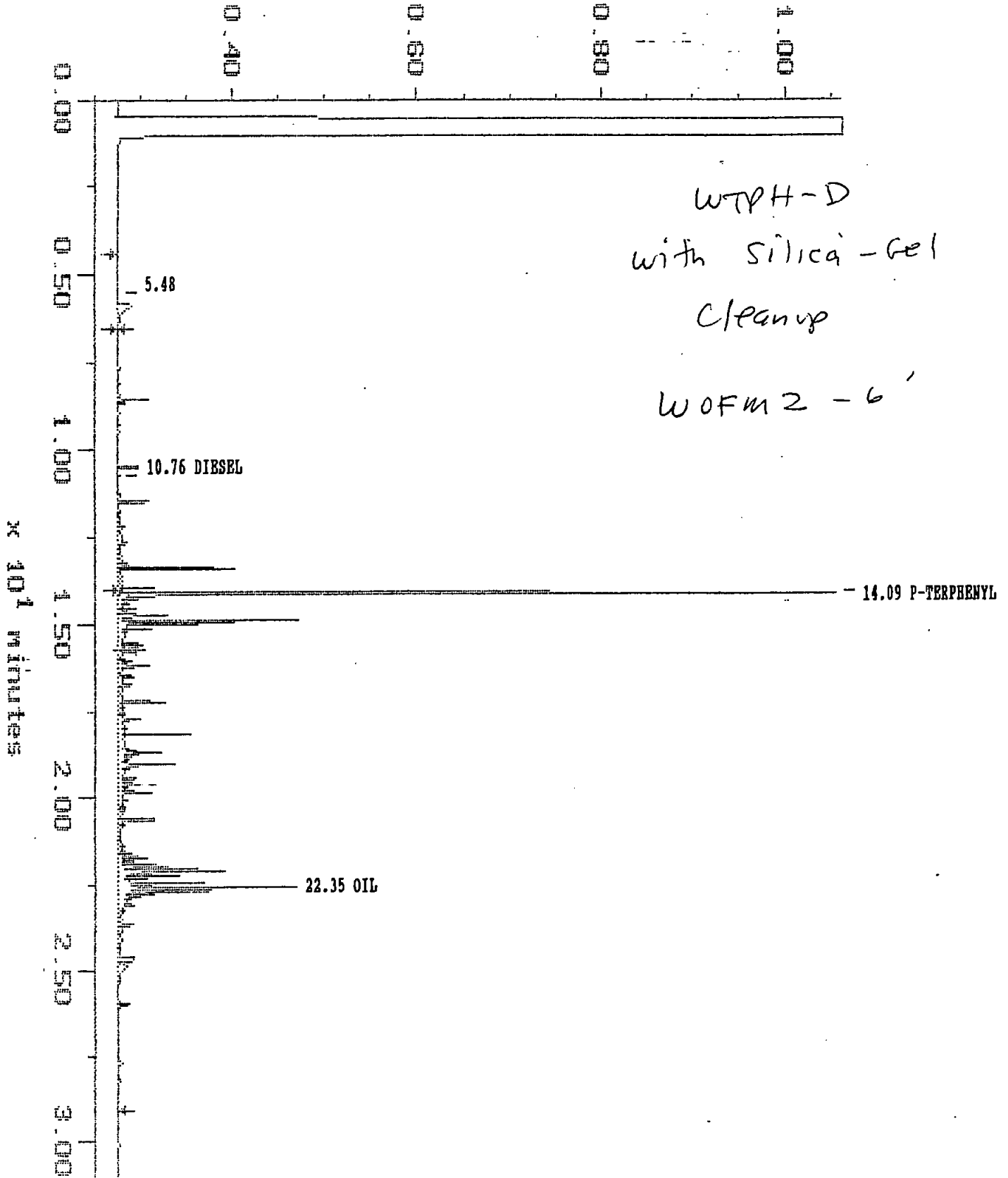
Amount: 3.410

$\times 10^{-2}$ volts



Sample: 132-8 SIL Channel: FLAME ID Filename: 132-8
Acquired: 17-MAR-94 12:01 Method: C:\MAX\DATA\031694 Operator: DC
Dilution: 1 : 10.000 Amount: 3.190

x 10⁻⁴ volts



Sample: 132-10 SIL

Channel: FLAME ID

Filename: 132-10

Acquired: 17-MAR-94 13:21

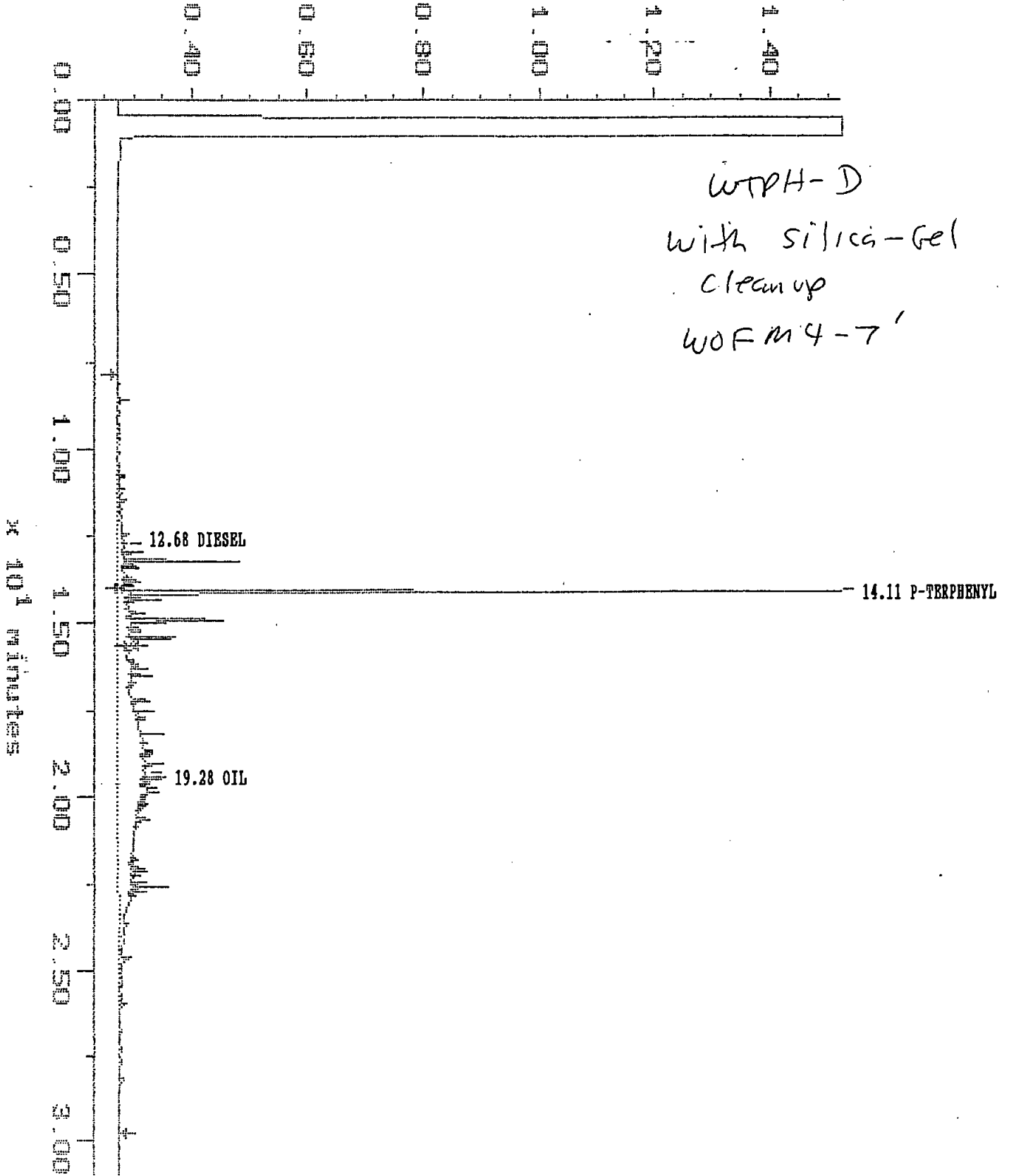
Method: C:\MAX\DATA1\031694

Operator: DC

Dilution: 1 : 10.000

Amount: 3.750

$\times 10^{-4}$ volts

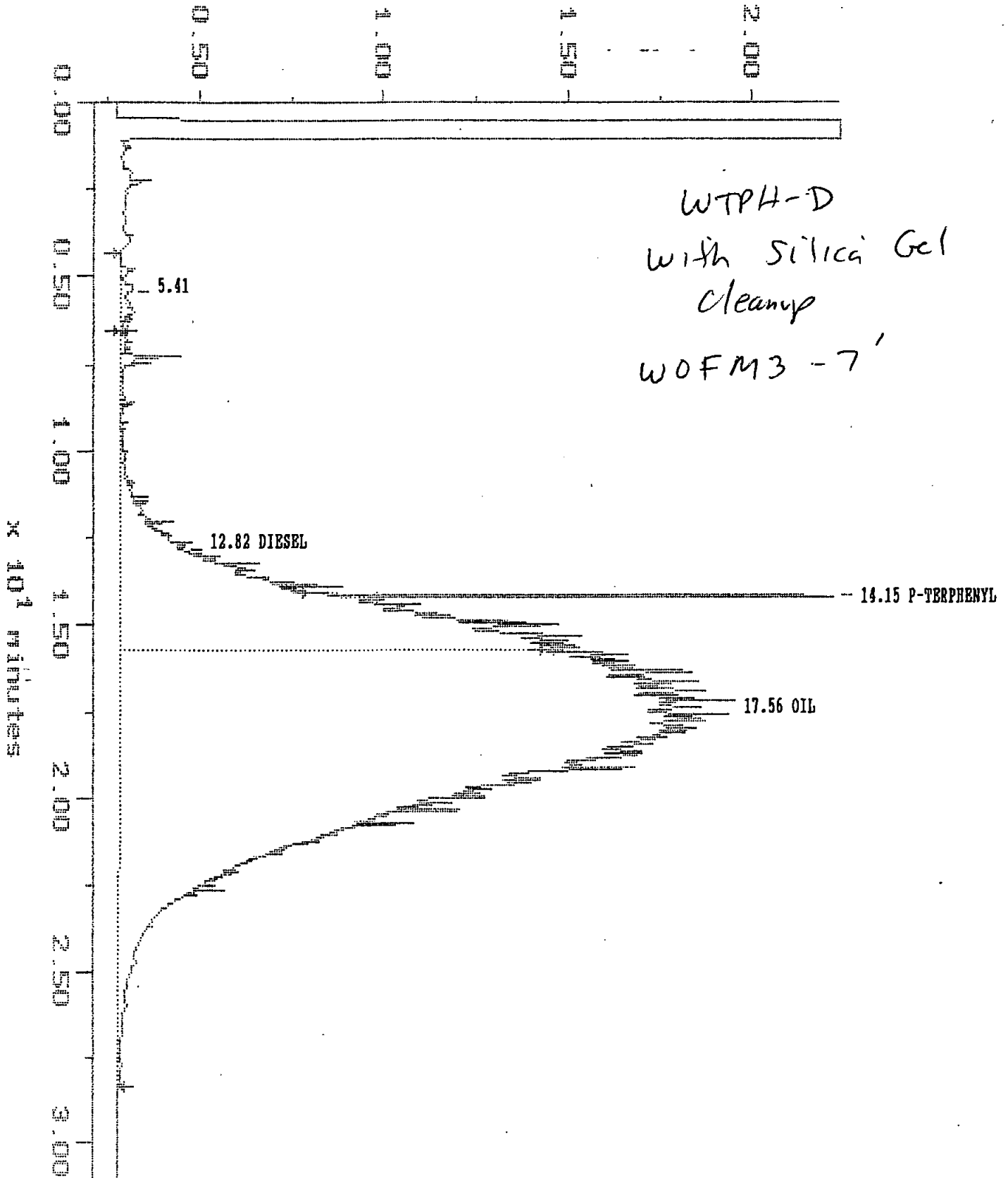


Sample: 132-9 SIL
Acquired: 17-MAR-94 12:41
Dilution: 1 : 10.000

Channel: FLAME ID
Method: C:\MAX\DATA1\031694
Amount: 3.570

Filename: 132-9
Operator: DC

$\times 10^{-4}$ volts

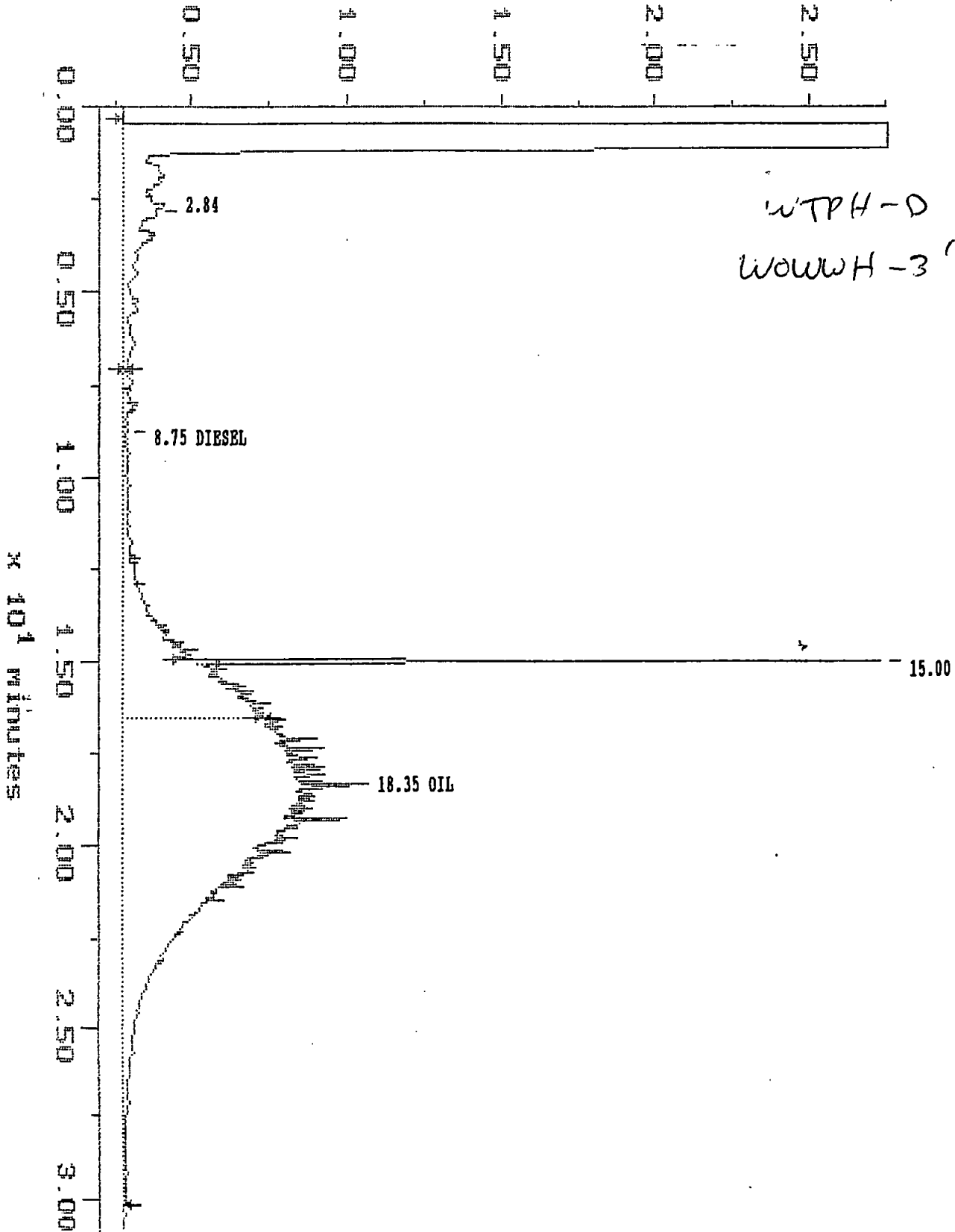


Sample: 121-1
Acquired: 03-MAR-94 10:40
Dilution: 1 : 10.000

Channel: FLAME ID
Method: C:\MAX\DATA1\030394
Amount: 17.700

Filename: 121-1
Operator: DC

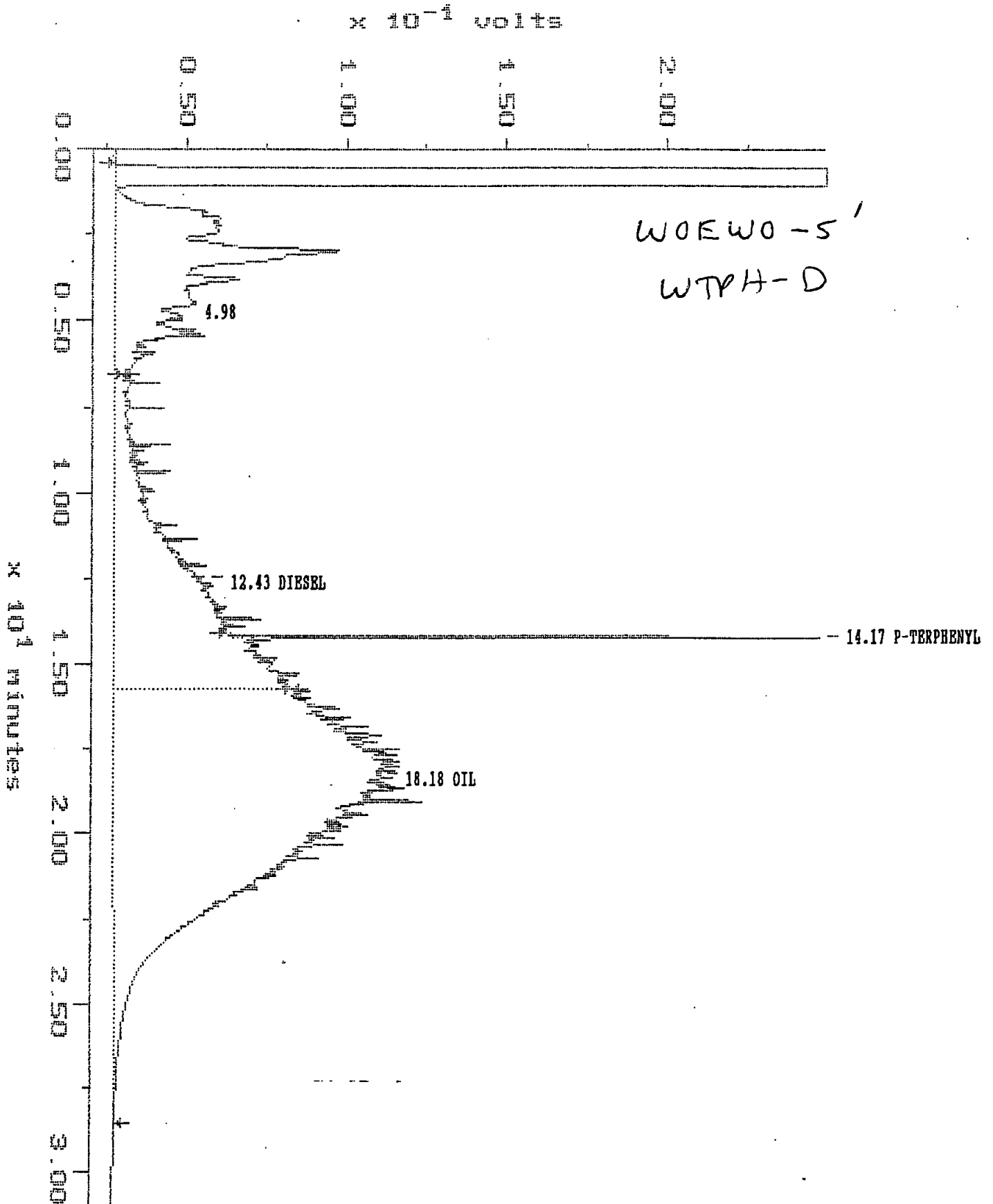
$\times 10^{-4}$ volts



Sample: 138-2
Acquired: 15-MAR-94 15:14
Dilution: 1 : 10.000

Channel: FLAME ID
Method: C:\MAX\DATA1\031594
Amount: 22.470

Filename: 138-2
Operator: DC



Sample: 132-11
Acquired: 04-MAR-94 13:54
Dilution: 1 : 10.000

Channel: FLAME ID
Method: C:\MAX\DATA1\030494

Filename: 132-11
Operator: DC

