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An employee owned company

July 30,1997
File No. 10-1682-09/604

Mr. Sum Arigala
California Regional Water Quality Control Board
San Francisco Bay Region
2101 Webster Street, Suite 500
Oakland, California 94612

SUBJECT: Report of Implementation of Passive Groundwater Remediation, and Semi-Annual Groundwater Monitoring Report; Industrial Asphalt Facility, 52 El Charro Road, Pleasanton, California

Dear Mr. Arigala:

Kleinfelder, Inc. (Kleinfelder) is pleased to present this report of implementation of passive groundwater remediation and semi-annual groundwater monitoring report on behalf of Industrial Asphalt for the above-referenced site (Plate 1) . The site is located on a portion (approximately 5 acres) of the 177 acre parcel owned by the Jamieson Company.

SITE INVESTIGATION AND REMEDIATION HISTORY

Industrial Asphalt is an asphalt manufacturing facility that has occupied the subject site since 1963. Industrial Asphalt maintained six underground storage tanks (USTs) for storage of asphalt, and two USTs storing diesel fuel at the site. Diesel product purchased in 1983 and 1984 was used as a burner fuel in the asphalt batch plant. In 1985, a leaking fuel pipe serving the diesel USTs was identified and repaired. Upon removal of two diesel tanks in February 1987, diesel product was observed in the bottom of the excavation. This product was sampled and analyzed for total petroleum hydrocarbons quantified as diesel (TPH-d) and polychlorinated biphenyls (PCBs). The product was found to contain 340,000 milligrams per kilogram (mg/kg) of TPH-d, and 12 mg/kg of PCBs (Arochlor 1260). At that time, approximately 5,000 gallons of a mixture of diesel and water was pumped from the excavation and transported off-site for Class I disposal. In addition, two asphalt tanks were excavated and removed.

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Remedial Investigation Activities

In March 1987, Kleinfelder drilled seven soil borings around the UST area. Based on soil sample analytical results from the seven borings, three monitoring wells (MW-1, MW-2, and MW-3) were installed in June 1987. Free product was observed in monitoring wells MW-1 and MW-2 shortly after installation. Free product was not observed in monitoring well MW-3. A sample of free product was collected from monitoring well MW-2 in August 1987, analyzed and found to contain 18 mg/kg of PCBs.

In September 1987, the remaining four asphalt USTs were removed, and contaminated soil and backfill material were excavated. Excavated soils were sampled and found to contain from 1,500 to 150,000 mg/kg of TPH-d. Closure samples representative of remaining soils in the excavation were collected (five sidewall samples and seven samples from the excavation floor) were analyzed for TPH-d, with reported concentrations ranging from non-detect to 26 mg/kg.

Soil gas surveys were conducted at the site in October 1987 and June 1988 to aid in plume definition. Information from the first survey was used to identify the locations of five additional groundwater monitoring wells at the site (MW-4 through MW-8). These wells were installed in March 1988. Soil gas samples in the second survey were analyzed for carbon dioxide; methane; benzene (B); toluene (T); xylenes (X); and total hydrocarbons (C4 to C9 carbon range). Carbon dioxide concentrations in soil gas samples ranged from 56,000 micrograms per liter (ug/L) to 210,000 ug/L. These concentrations, significantly higher than ambient air, suggest that unassisted biological activity was occurring.

In July 1989, two groundwater monitoring wells (MW-9 and MW-10) and one observation well (MW-11) were installed, and a staff gauge was installed in the gravel pit north of the site.

In November 1989, the Alameda County Department of Environmental Health (ACDEH) issued a letter to Industrial Asphalt requiring additional work at the site. In response to the ACDEH letter, Kleinfelder developed and submitted a Remedial Investigation/Remedial Action Workplan to the ACDEH in January 1990. As part of this work, fourteen soil borings (SB-1 through SB-10 and MW-13 through 16) were installed in three separate field events at the site. One of the fourteen borings (MW-13) was completed as an extraction well and later designated as extraction well EW-11. Three borings (MW-14 through MW 16) were completed as monitoring wells. Monitoring well MW-11 also was abandoned as part of these field activities.

At boring SB-1 adjacent to the previous UST excavation, free product was encountered during drilling at a depth of 15 feet. In July 1990, approximately 1,000 cubic yards of soil were excavated in the vicinity of SB-1. Impacted soils were recycled onsite in the asphalt plants.

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During the 1990 RI work, a soil sample collected from boring SB-4 at 61 feet below grade (which had contained 340 mg/kg of TPH-d and 0.11 mg/kg of PCBs) was analyzed for polynuclear aromatic hydrocarbons by EPA Method 8270. No PAHs were detected in the sample.

The remedial investigation report summarizing the above work was submitted to ACDEH in December 1990. The RI Report also contained results of aquifer testing performed at the site; a well canvas identifying the location, use, screen interval, and distance of wells from the Industrial Asphalt site; and a baseline health risk assessment.

In January 1991 another 1,000 cubic yards of impacted soil were excavated from an area west of the July 1990 excavation. (This excavation was a follow-up activity from the July 1990 excavation, at which time some impacted soil was not accessible.) Soil was recycled in the asphalt batch process on-site; the excavation was backfilled with clean fill and finished at the surface with asphalt concrete.

In February 1991, ACDEH stipulated that groundwater cleanup should achieve "MCLs (maximum contaminant levels for drinking water) and below levels that could result in a one-in-a-million cancer risk." A feasibility study (FS) for soil and groundwater remediation was submitted to the ACDEH in August 1991. The selected remedy involved (1) extraction wells to pump groundwater; (2) Granular activated carbon to treat extracted groundwater; (3) Discharging treated groundwater to the surface water impoundment north of the facility; and (4) Recycling spent carbon through the onsite asphalt batch manufacturing process.

In May 1992, ten new groundwater extraction wells were installed (EW-1 through EW-10) at the site in support of groundwater remediation. Well and boring locations are shown on Plate 2.

Groundwater Monitoring Program History

Following installation of the first three monitoring wells in June 1987, a monthly groundwater monitoring program was instituted at the site. Depth-to-water, free product thicknesses (as appropriate), groundwater sampling and analysis (for TPH-d and PCBs) were conducted.

Analyses for BTEX (aromatic volatile organic compounds or VOCs) were requested by ACDEH in 1989. Kleinfelder included BTEX analyses in the July/August 1989 groundwater analyses. No BTEX constituents were detected in any groundwater samples, thus BTEX analyses were discontinued. Beginning in July 1990, the groundwater monitoring frequency was reduced to every two months.

Beginning in 1991, the groundwater monitoring frequency was reduced to occur quarterly. At that time, quarterly groundwater samples were analyzed for TPH-d, TPH-o (motor oil), Oil and Grease (O&G), Total Hydrocarbons (TH), and PCBs.

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Beginning with the October 1996 sampling event, the revised groundwater monitoring program depicted in Table 1 has been instituted. Selected monitoring wells at the site are on a semi-annual monitoring frequency, and the majority of monitoring wells are on an annual frequency. The groundwater monitoring program now involves analysis for TPH-d and TPH-o in all groundwater samples, and PCBs in selected monitoring well samples.

The RWQCB, in their June 26, 1996 letter authorizing the revised monitoring program, stated that, "Polynuclear Aromatic Hydrocarbons (PAHs) have not been included in the proposed groundwater monitoring program. Either provide a rationale for not doing so or include PAH analysis in the monitoring program." Kleinfelder included PAH analyses in the October 1996 monitoring event, to address this RWQCB request.

Groundwater Remediation System History

A groundwater remediation system was constructed by Pacific Mechanical Corporation (the low bidder in a competitive bidding process) in 1994. The system consisted of a total of eleven groundwater extraction wells pumping to an oil-water separator, a bag filter, ultraviolet sterilizer, and activated carbon. Please refer to Plate 3 for a layout of the former groundwater remediation system at the site. Treated water was discharged to Industrial Asphalt's recharge pond north of the facility (pond R4) under Industrial Asphalt's Waste Discharge Requirements (WDR) Order Number 93-037, issued by the RWQCB on April 26, 1993.

Kleinfelder started the groundwater remediation system on July 13, 1994. Within three months, extensive biofouling was observed in the oil-water separator, bag filters, and carbon vessels that cause excessive pressure drop and limited treatment system efficiency. Kleinfelder requested in a letter dated November 16, 1994 to introduce chlorine in tablet form into the oil-water separator to prevent the biofouling. The RWQCB authorized chlorine addition in January 1995. The system operated for approximately two years, with limited effectiveness. In the first six months of operation, approximately 16 pounds of hydrocarbons were extracted. In the proceeding eighteen months, only about 5 pounds of hydrocarbons were extracted. Please refer to Plate 4 for a graphical depiction of pounds removed and gallons extracted since start-up.

Kleinfelder submitted a letter report to the RWQCB dated May 21, 1996, requesting authorization to shut down the groundwater remediation system at the site. In that report, we also requested authorization to install oxygen releasing socks (after system shutdown) to enhance passive bioremediation processes in groundwater at the site. The RWQCB approved of the system shutdown and passive bioremediation enhancement in a letter dated June 26, 1996. Following receipt of authorization, Industrial Asphalt turned off the groundwater remediation system on July 19, 1996.

In the 24 months of operation, the groundwater remediation system extracted a total of 7,107,800 gallons of groundwater. This water was treated and discharged in 100% compliance with the WDR issued for the site.

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IMPLEMENTATION OF PASSIVE BIOREMEDIATION

Hydrocarbon degrading bacteria are commonly present in soils and groundwater at virtually all hydrocarbon-impacted sites. Kleinfelder believes that natural biological processes are active in groundwater and capillary fringe soils (near the soil/water interface) at the Industrial Asphalt site. This opinion is based on the following observations:

- In the soil gas survey conducted in June 1988 carbon dioxide, the primary bi-product in bacterial degradation of petroleum hydrocarbons, was detected at concentrations significantly higher than ambient conditions; and
- Biofouling was observed in the oil-water separator, bag filters, and carbon vessels shortly after start-up of the groundwater remediation system.

Based on these observations, and on hydrocarbon mass removal rates observed from the groundwater remediation system, Kleinfelder recommended a passive bioremediation approach for the site. Kleinfelder and Industrial Asphalt representatives met with Mr. Sum Arigala of the RWQCB on June 25, 1996 to discuss implementation of the passive bioremediation approach and changes to the site's groundwater monitoring program. In that meeting, Industrial Asphalt agreed to add extraction well EW-8 to the list of passive remediation wells, and to add monitoring wells MW-10 and MW-15 to the list of monitoring wells sampled twice per year (instead of annually). These additions were documented in a letter from the RWQCB to Industrial Asphalt dated June 26, 1996.

In September 1996, groundwater extraction pumps and piping were removed from the well vaults at the passive remediation wells (wells EW-2, EW-3, EW-4, EW-5, EW-8, EW-10, and EW-11) in preparation for sock installation. On September 26 and 27, 15 foot lengths of 4-inch diameter socks containing Oxygen Release Compound (ORC®) were installed in each of the seven passive remediation wells. Please refer to Appendix A for literature describing the ORC® product.

ORC® socks were installed according to manufacturer instructions. Socks are suspended in each well with manufacturer-provided nylon ropes, tied to a 1-inch schedule 40 galvanized steel bar on the top of the casing of each extraction well. PVC slip caps were slotted to allow them to slip over the steel suspension bar, and installed over each well casing.

Approximately one week and four weeks following installation of the ORC® socks (October 3 and 21, 1996), dissolved oxygen (DO) levels were measured in groundwater in surrounding monitoring wells at 5, 15, and 25 feet below static water level (SWL).

DO results for both events are presented in Table 2. DO levels on October 3, 1996 ranged from 1.20 to 7.45 mg/L; DO levels on October 21, 1996 ranged from 1.63 to 7.80 mg/L. A DO concentration of 2.0 mg/L generally represents the amount of oxygen

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necessary to initiate and/or maintain bioremediation of soluble hydrocarbons in groundwater. DO readings exceeding 2.0 mg/L were observed in all wells tested, except for wells MW-1 and MW-2.

DO levels were also recorded on April 29, 1997. DO readings ranged from 0.10 to 5.30 mg/L.

SEMI-ANNUAL GROUNDWATER MONITORING RESULTS

Introduction

Semi-annual groundwater monitoring was performed in October 1996 and April 1997.

Water Level Monitoring Data

Groundwater surface elevations were measured in all accessible monitoring wells on October 3, October 21, 1996, and April 29, 1997. These measurements are summarized in Table 3. Water levels in the eleven groundwater extraction wells were not measured. Overall groundwater surface elevations in monitoring wells at the site declined an average of about 12 feet from March 18, 1996 to October 3, 1996. The overall groundwater surface elevation increased an average of about 4 feet from October 3, 1996 to April 29, 1997.

On October 3, 1996 and October 21, 1996, the groundwater gradient beneath the site was nearly flat on the west side of the site; groundwater flow direction on the east side of the site was to the northeast with an average gradient of 0.02 to 0.025 feet per foot (ft/ft) (Plates 5 and 6). The groundwater remediation system had been shut down for approximately 2 1/2 months prior to these observations. On April 29,1997, the groundwater gradient beneath the site was relatively flat on the west side. The groundwater flow direction on the east side was to the northeast with a gradient of approximately 0.01 ft/ft (Plate 7).

Groundwater Monitoring Analytical Results - October 1996

The October 1996 groundwater monitoring event represented the first event under the revised monitoring program (Table 1). Under this program, groundwater samples are collected from monitoring wells MW-1, MW-2, MW-3, MW-8, MW-10, and MW-15 twice per year (in September/October and March/April); and all accessible monitoring wells are sampled annually (in March/April). All samples are analyzed for TPH-d and TPH-o. Samples from monitoring wells MW-1, MW-2, MW-3, and MW-8 also are to be analyzed for PCBs. Dissolved oxygen concentrations are measured in all accessible monitoring wells in each monitoring event.

Groundwater monitoring wells MW-1, MW-2, MW-10, and MW-15 were purged with a submersible pump, and sampled with disposable bailers on October 7, 1996. Please refer

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to Appendix B for purge logs. Monitoring well MW-3 was dry, therefore it was not sampled. Monitoring well MW-8 was not accessible at the time of sampling, due to site constraints.

Groundwater samples collected from the site were analyzed by American Environmental Network (AEN) laboratories, a State-certified analytical laboratory. The samples were analyzed for TPH-d and TPH-o using a modified EPA Test Method 8015 (extraction), for PCBs (except samples from well MW-15) using EPA Test Method 8080, and for PAHs (this event only) by EPA Method 8270. Analytical data are summarized on Table 3. Complete analytical laboratory reports for the October 1996 sampling event along with chain of custody records are included in Appendix C.

Black flecks or a tar-like sheen of immeasurable thickness were observed in purged water and samples collected from monitoring wells MW-1 and MW-2. In January 1996, monitoring well MW-2 was not sampled because of similar observations. Since that time, Kleinfelder has proceeded with purging and sampling in these source area wells if no *measurable* free product is present *after* purging.

Detectable concentrations of PCBs were found in samples from monitoring well MW-1 (0.6 µg/L), and MW-2 (1.2 µg/L) during the October 1996 sampling round. Petroleum hydrocarbons were detected in all samples collected this event. Note that only those wells expected to contain elevated hydrocarbon concentrations were selected for monitoring on a semi-annual basis (i.e., twice yearly).

Duplicate samples were collected from well MW-15 in October 1996, and labeled as sample numbers KMW-15 and KMW-51. Analytical results for these samples appeared to be in agreement with each other indicating acceptable levels of field and laboratory precision.

Groundwater Monitoring Analytical Results - April 1997

Groundwater monitoring wells MW-1, MW-2, MW-5, MW-6, MW-7, MW-8, MW-14, MW-15, and MW-16 were purged with a submersible pump, and sampled with disposable bailers on April 29 and April 30, 1997. In addition, off-site water supply well 14A2 was sampled from a tap on April 29, 1997. Please refer to Appendix B for purge logs. Monitoring well MW-3 was noted as "Dry" at the time of sampling, therefore it was not sampled. Monitoring wells MW-4, MW-9 and MW-10 were not accessible at the time of sampling due to site constraints.

Groundwater samples collected from the site were analyzed by American Environmental Network (AEN) laboratories, a State-certified analytical laboratory. All the samples were analyzed for TPH-d and TPH-o using modified EPA Test Method 8015 (extraction). Monitoring wells MW-1, MW-2 and MW-8 were also analyzed for PCBs using EPA Test Method 8080. Analytical data are summarized on Table 3. Complete analytical

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laboratory reports for the April 1997 sampling event along with chain of custody records are included in Appendix C.

While purging MW-1 and MW-2 a petroleum odor was noticed and a slight sheen was observed in the purge water. In addition, MW-2 had black spots in the purge water.

Detectable concentrations of PCBs were found in monitoring well MW-1 (0.2 µg/L), and MW-2 (0.2 µg/L) during the April 1997 sampling round. The analytical laboratory was instructed to achieve a reporting limit of 0.1 µg/L, significantly lower that the standard reporting limit of 0.5 µg/L. Petroleum hydrocarbons were detected in monitoring wells MW-1, MW-2, MW-6, MW-8, and MW-16.

Duplicate samples were collected from well MW-8 in April 1997, and labeled as sample numbers MW-8 and MW-18. Analytical results for these samples appeared to be in agreement with each other indicating acceptable levels of field and laboratory precision.

SUMMARY OF GROUNDWATER MONITORING DATA

A review of the data from the October 1996 and April 1997 sampling events at the Industrial Asphalt site indicates the following:

- The groundwater surface elevation beneath the site declined an average of about 12 feet since March 1996. On October 3 and October 21, 1996, groundwater flow was nearly flat on the west side of the site, with a north-northeast flow gradient of 0.02 ft/ft on the east side. The groundwater surface elevation increased an average of about 4 feet from October 3, 1996 to April 29, 1997. On April 29,1997, the groundwater gradient beneath the site was relatively flat on the west side. The groundwater flow direction on the east side was to the northeast with a gradient of approximately 0.01 ft/ft.

- Concentrations of diesel and oil range petroleum hydrocarbons above 1.0 mg/l continue to persist in samples from monitoring wells MW-1 and MW-2. Black flecks observed in purge water and samples from these wells appear to be heavy range petroleum hydrocarbons, causing the elevated TPH-d and TPH-o concentrations in these samples.

- PCBs were detected in samples from wells MW-1 and MW-2 at concentrations of 0.6 and 1.2 µg/L respectively for the October 1996 sampling. These PCB concentrations are higher than those seen in the last two years from these wells, but are within the range observed historically. These detections also correlate well with the diesel and oil detections in these same samples. Concentrations of PCBs in samples from MW-1 and MW-2 decreased to 0.2 µg/L in both wells in the April 1997 sampling event.

- Concentrations of TPH-d and TPH-o in samples from monitoring well MW-15 from the October 1996 sampling event were consistent with recent monitoring events. In the April 1997 sampling event, concentrations of TPH-d and TPH-o were not detected above the laboratory reporting limits.

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- In October 1996, concentrations of TPH-d and TPH-o in samples from monitoring well MW-10 were the lowest observed in the last three years.

- PAHs were not detected in any groundwater samples collected during the October 1996 event.

RECOMMENDATIONS

Based on the above, Kleinfelder recommends continued monitoring under the semi-annual schedule. We recommend that PAH analyses no longer be performed in groundwater at the site in light of the non-detect results observed in monitoring well samples.

LIMITATIONS

This report was prepared in general accordance with the accepted standard of practice which exists in Northern California at the time the investigation was performed. It should be recognized that definition and evaluation of environmental conditions is a difficult and inexact art. Judgements leading to conclusions and recommendations are generally made with an incomplete knowledge of the conditions present. More extensive studies, including additional environmental investigations, can tend to reduce the inherent uncertainties associated with such studies. If the Client wishes to reduce the uncertainty beyond the level associated with this study, Kleinfelder should be notified for additional consultation.

Our firm has prepared this report for the Client's exclusive use for this particular project and in accordance with generally accepted engineering practices within the area at the time of our investigation. No other representations, expressed or implied, and no warranty or guarantee is included or intended.

This report may be used only by the Client and only for the purposes stated, within a reasonable time from its issuance. Land use, site conditions (both onsite and offsite) or other factors may change over time, and additional work may be required with the passage of time. Any party other than the Client who wishes to use this report shall notify Kleinfelder of such intended use. Based on the intended use of the report, Kleinfelder may require that additional work be performed and that an updated report be issued. Non-compliance with any of these requirements by the Client or anyone else will release Kleinfelder from any liability resulting from the use of this report by any unauthorized party.

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We trust that the content of this correspondence adequately addresses the needs of the RWQCB. If you have any questions or comments concerning this request, please do not hesitate to call us at 510-484-1700.

Sincerely,

KLEINFELDER, INC.

Daniel S. Carroll, P.E.
Project Manager

Paul A. Baginski, C.E.
Regional Environmental Manager

DSC:PAB:sh

cc: Mr. Michael Munn - Industrial Asphalt
Mr. Don Atkinson-Adams - Alameda County Department of Environmental Health
Ms. Loretta Barsamian - RWQCB, San Francisco Bay Region
Mr. Craig Mayfield - Alameda County Flood Control and Water Conservation District, Zone 7

Enclosures

Plate 1	Site Vicinity Map
Plate 2	Site Plan
Plate 3	Cumulative Organics Removal
Plate 4	Former Groundwater Treatment System Layout
Plate 5	Groundwater Surface Contours, October 3, 1996
Plate 6	Groundwater Surface Contours, October 21, 1996
Table 1	Revised Groundwater Monitoring Program
Table 2	Dissolved Oxygen Measurements
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Table 4	Summary of Analytical Results, Last 4 Quarters
Appendix A	Oxygen Release Compound Product Literature
Appendix B	Purge Logs, October 1996 Groundwater Monitoring Event
Appendix C	Analytical Results, October 1996 Groundwater Monitoring Event

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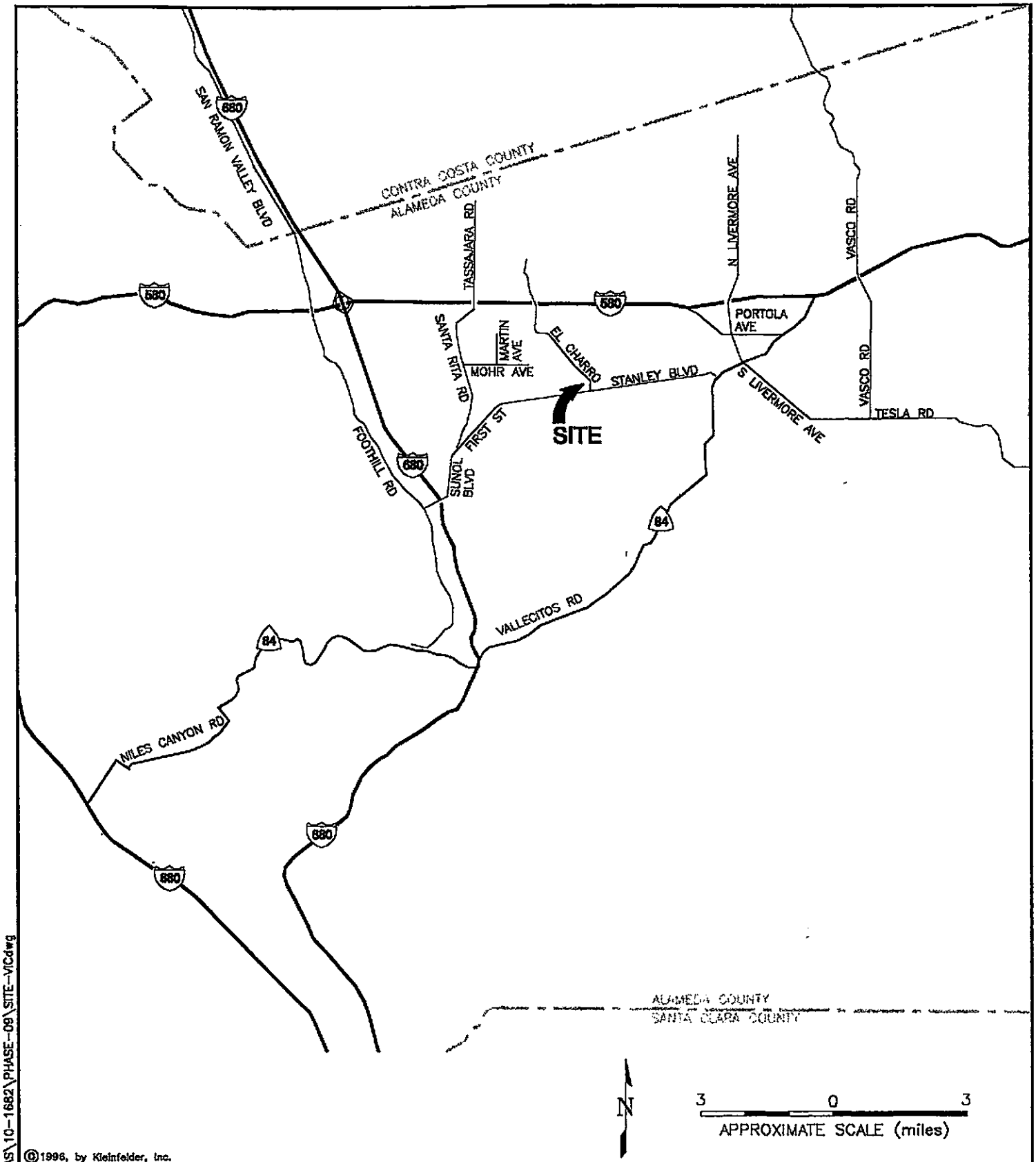
PLATES



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DRAFTED BY: L. Sue	DATE: 10-21-96
CHECKED BY: D. Carroll	DATE: 10-21-96

SITE VICINITY MAP

INDUSTRIAL ASPHALT
52 EL CHARRO ROAD
PLEASANTON, CALIFORNIA

PROJECT NO. 10-168209-603

PLATE 1

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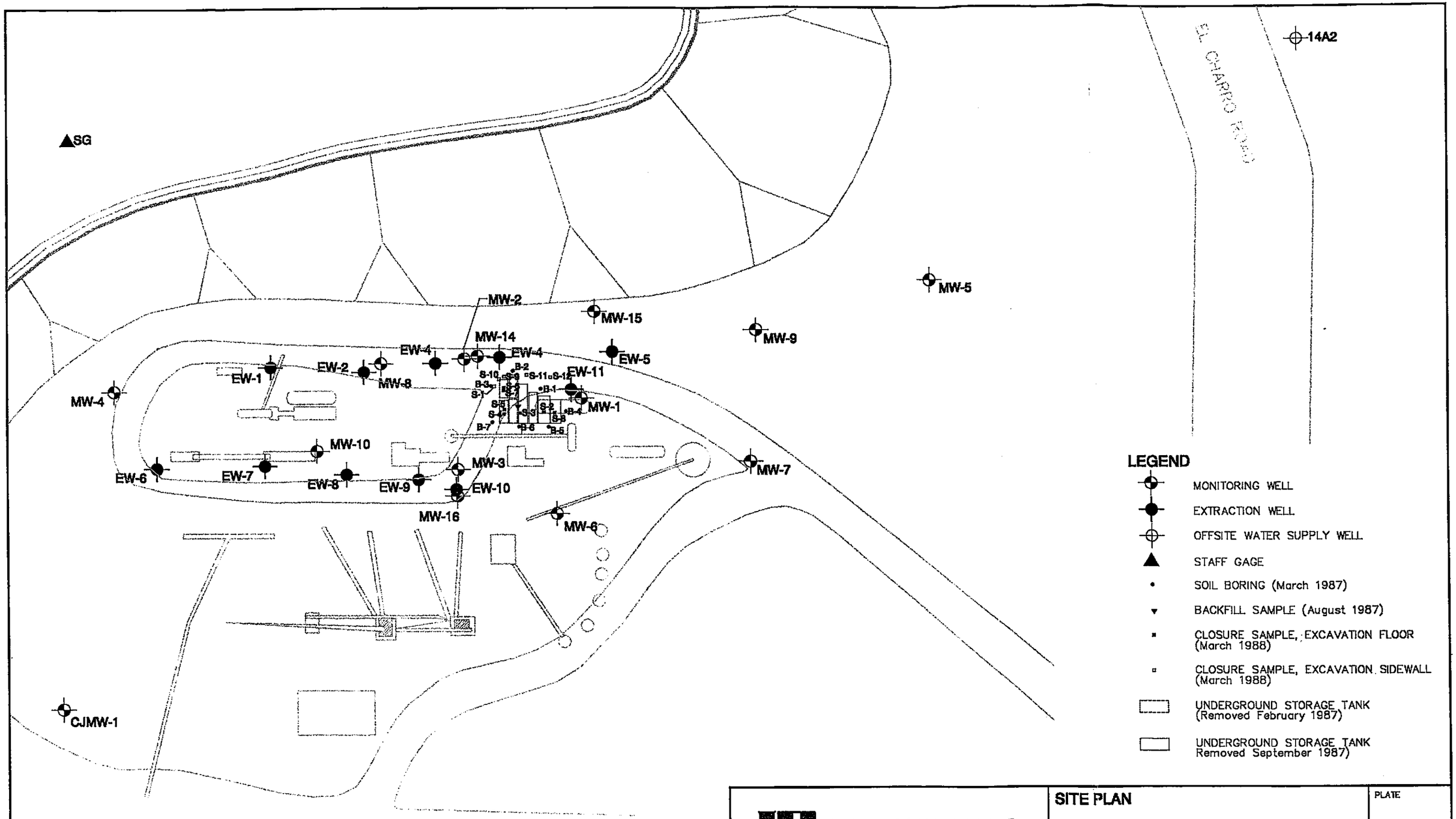

LEGEND

- MONITORING WELL
- EXTRACTION WELL
- OFFSITE WATER SUPPLY WELL
- STAFF GAGE
- SOIL BORING (March 1987)
- BACKFILL SAMPLE (August 1987)
- CLOSURE SAMPLE, EXCAVATION FLOOR (March 1988)
- CLOSURE SAMPLE, EXCAVATION SIDEWALL (March 1988)
- UNDERGROUND STORAGE TANK (Removed February 1987)
- UNDERGROUND STORAGE TANK Removed September 1987)

BASE MAP SOURCE:
Wells surveyed by Associated Proffessions, Inc.
Site details from 1987 photo (No. HAP-753), Pacific Aerial Surveys.

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DRAFTED BY: L. Sue DATE: 10-21-96

CHECKED BY: D. Carroll DATE: 11-1-96

SITE PLAN

INDUSTRIAL ASPHALT
52 EL CHARRO ROAD
PLEASANTON, CALIFORNIA

PROJECT NO. 10-168209-603

PLATE 2

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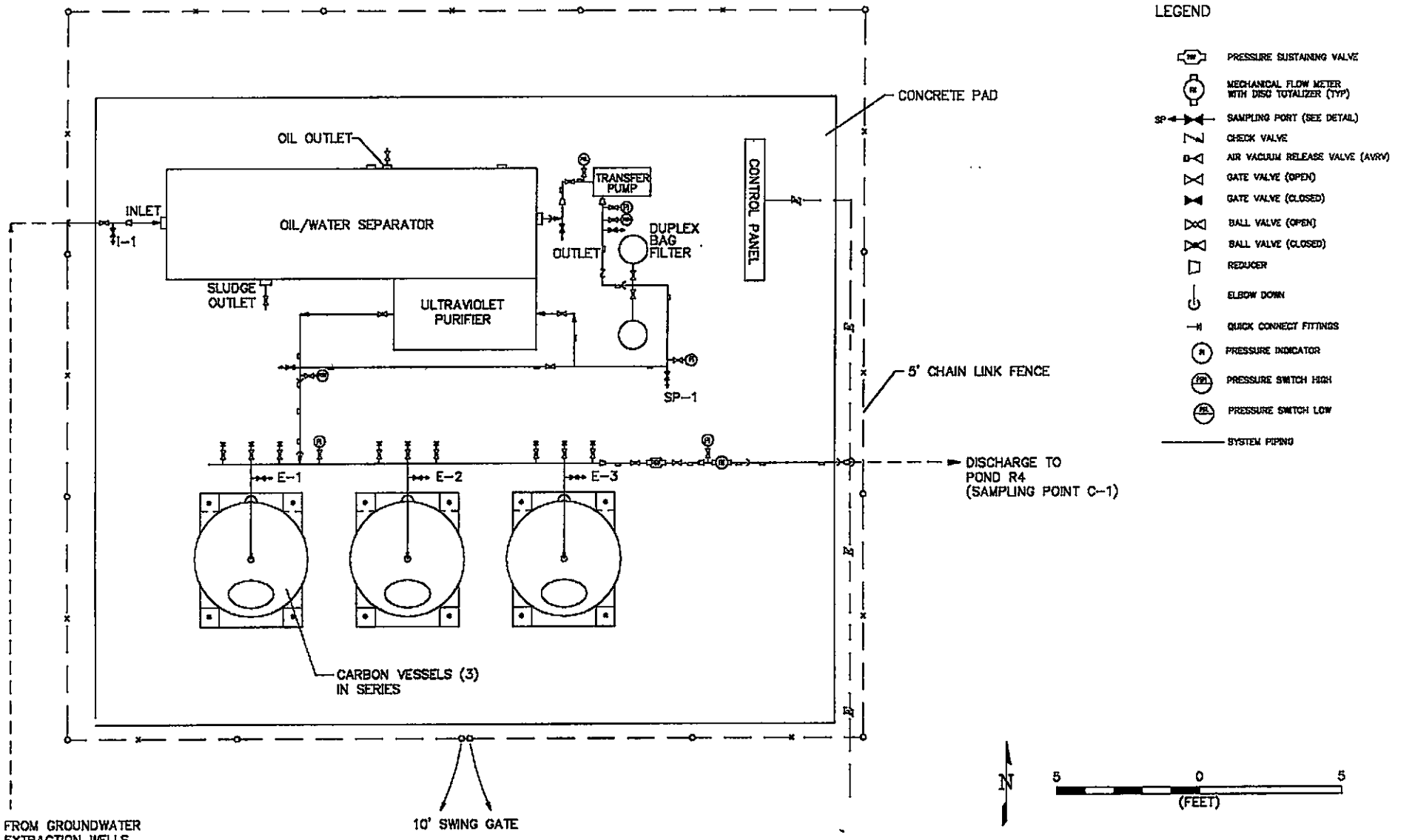

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DRAFTED BY: L. Sue	DATE: 10-21-96
CHECKED BY: D. Carroll	DATE: 11-12-96

FORMER GROUNDWATER TREATMENT SYSTEM LAYOUT

INDUSTRIAL ASPHALT
52 EL CHARRO ROAD
PLEASANTON, CALIFORNIA

PROJECT NO. 10-168209-603

PLATE 3

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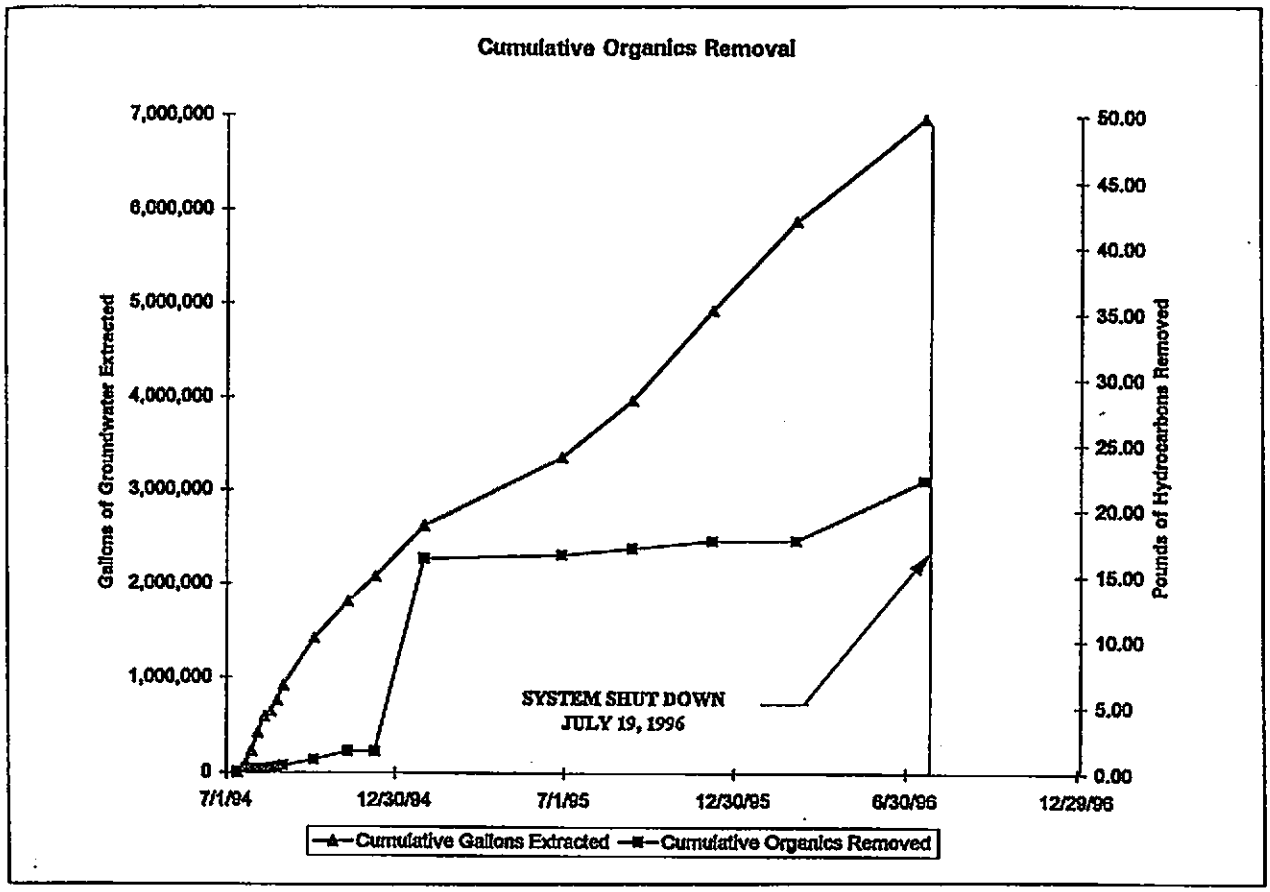

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DRAFTED BY: S.T. Davis	DATE: 7-15-96	CUMULATIVE ORGANICS REMOVED
CHECKED BY: D. Carroll	DATE: 7-15-96	INDUSTRIAL ASPHALT 52 EL CHARRO ROAD PLEASANTON, CALIFORNIA
		PROJECT NO. 10-168209-603

PLATE 4

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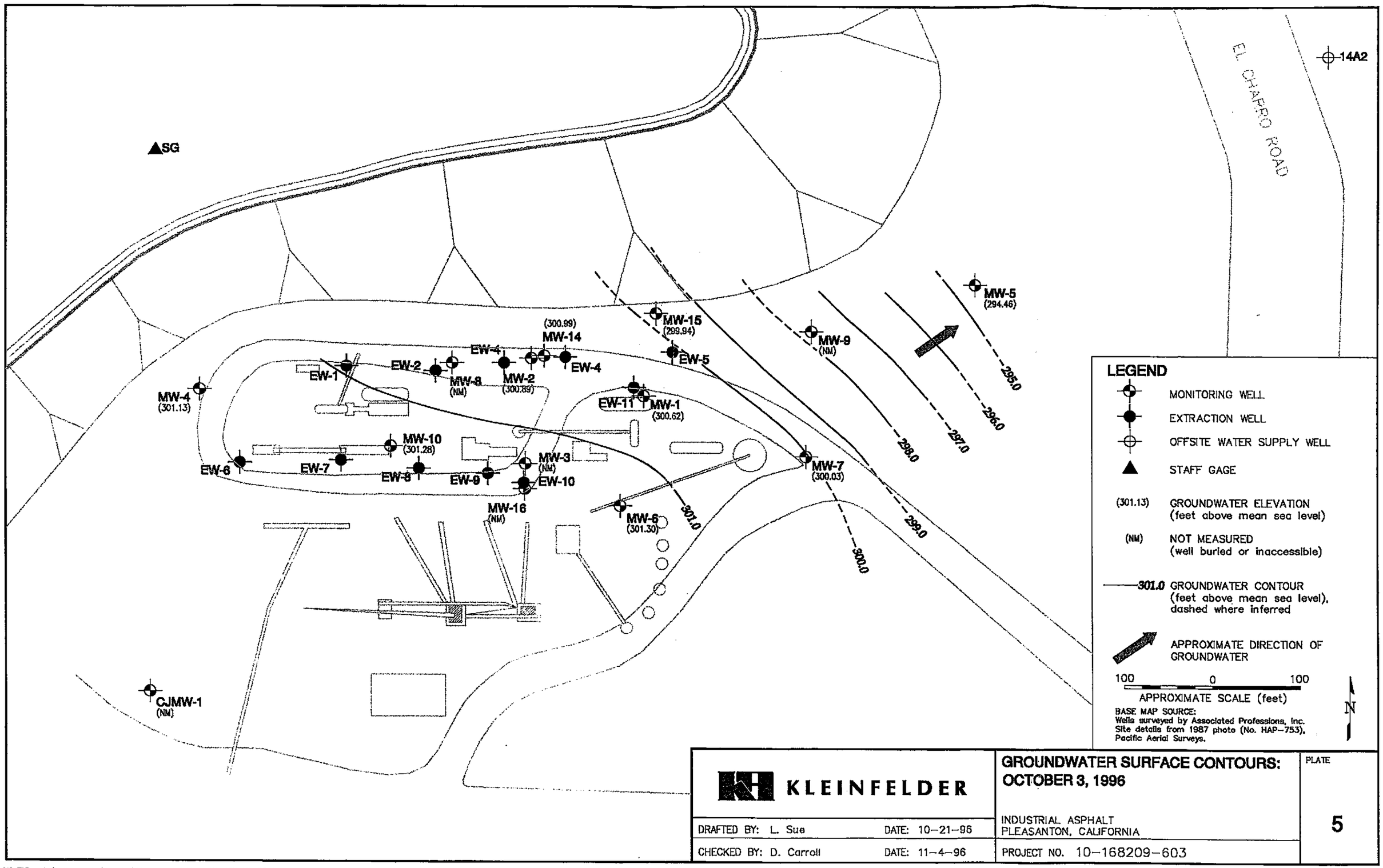

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DRAFTED BY: L. Sue	DATE: 10-21-96
CHECKED BY: D. Carroll	DATE: 11-4-96

GROUNDWATER SURFACE CONTOURS: OCTOBER 3, 1996

INDUSTRIAL ASPHALT
PLEASANTON, CALIFORNIA

PROJECT NO. 10-168209-603

PLATE 5

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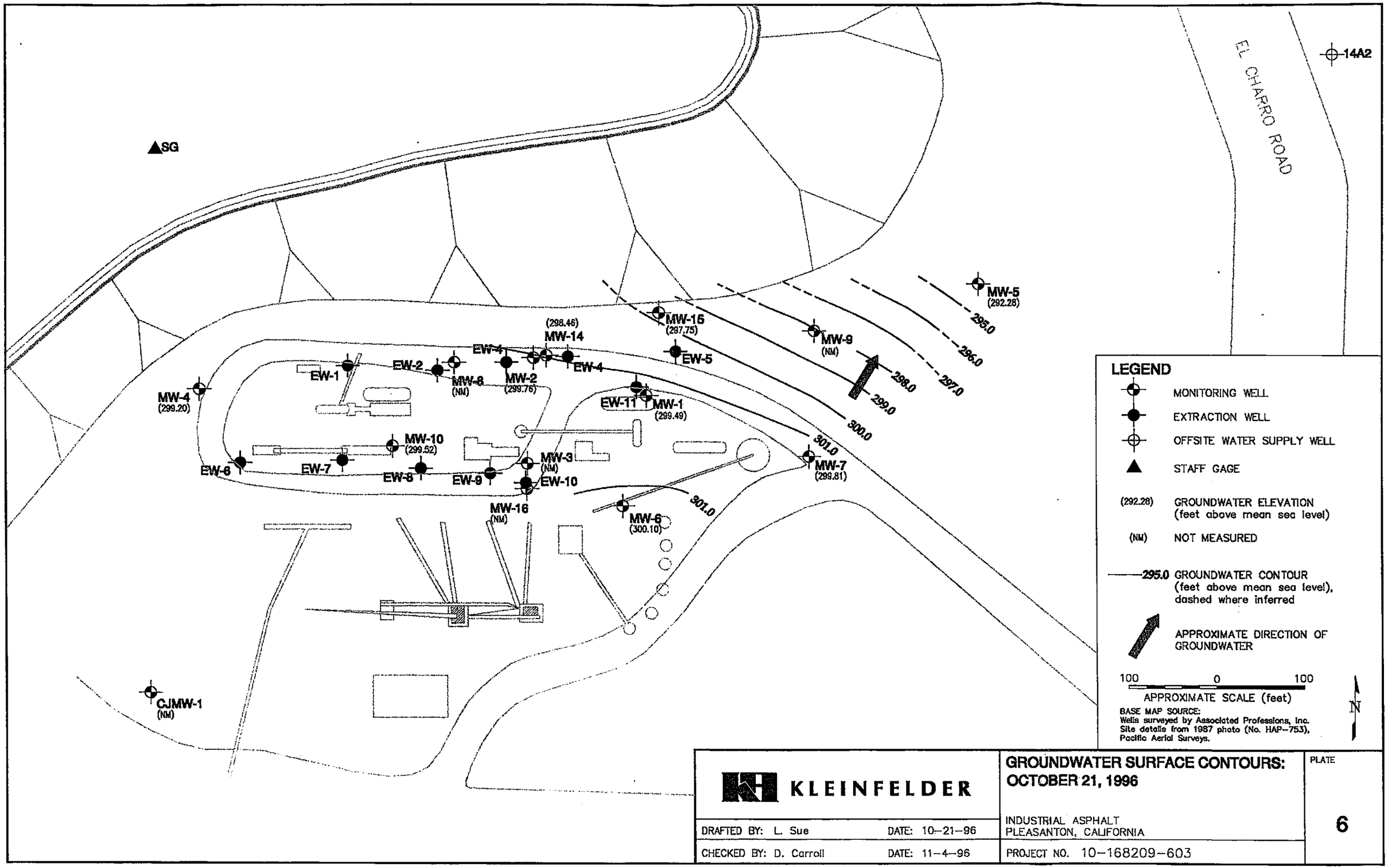

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DRAFTED BY: L. Sue	DATE: 10-21-96
CHECKED BY: D. Carroll	DATE: 11-4-96

GROUNDWATER SURFACE CONTOURS: OCTOBER 21, 1996

INDUSTRIAL ASPHALT
PLEASANTON, CALIFORNIA

PROJECT NO. 10-168209-603

PLATE 6

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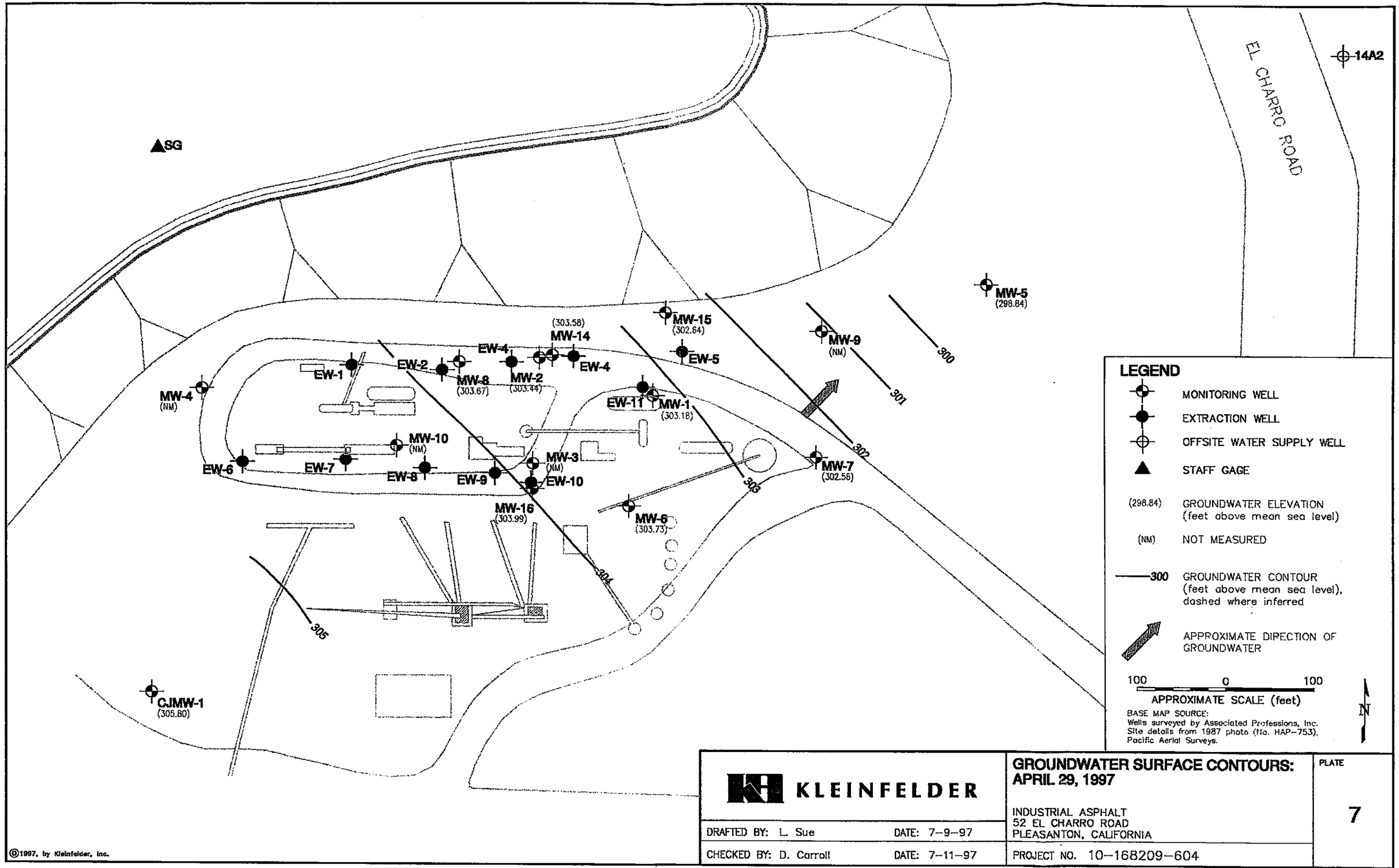

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GROUNDWATER SURFACE CONTOURS: APRIL 29, 1997

INDUSTRIAL ASPHALT
52 EL CHARRO ROAD
PLEASANTON, CALIFORNIA

PLATE 7

DRAFTED BY: L. Sue	DATE: 7-9-97
CHECKED BY: D. Carroll	DATE: 7-11-97
PROJECT NO. 10-168209-604	

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TABLES

TABLE 1
REVISED GROUNDWATER MONITORING PROGRAM
INDUSTRIAL ASPHALT, 52 EL CHARRO ROAD, PLEASANTON CALIFORNIA

Monitoring Well Number	Sampling Frequency	Analyses			
		TPH-diesel (EPA Method 8015)	TPH-motor oil (EPA Method 8015)	Dissolved Oxygen	PCBs (EPA Method 8080)
MW-1	Semi-Annual	X	X	X	X
MW-2	Semi-Annual	X	X	X	X
MW-3	Semi-Annual	X	X	X	X
MW-4	Annual	X	X	X	
MW-5	Annual	X	X	X	
MW-6	Annual	X	X	X	
MW-7	Annual	X	X	X	
MW-8	Semi-Annual	X	X	X	X
MW-9	Annual	X	X	X	
MW-10	Semi-Annual	X	X	X	
MW-11	Annual	X	X	X	
MW-12	Annual	X	X	X	
MW-13	Annual	X	X	X	
MW-14	Annual	X	X	X	
MW-15	Semi-Annual	X	X	X	
MW-16	Annual	X	X	X	
14A2	Annual	X	X	X	

NOTES:

1. Revised monitoring program approved by SFBRWQCB by letter dated June 26, 1996.
2. TPH - Total Petroleum Hydrocarbons quantified against indicated standard.
3. PCBs - Polychlorinated Biphenyls
4. PAHs were analyzed one time, in the October 1996 monitoring event. PAH analyses are not recommended for inclusion in the groundwater monitoring program.

TABLE 2
DISSOLVED OXYGEN MEASUREMENTS
INDUSTRIAL ASPHALT, 52 EL CHARRO ROAD, PLEASANTON, CALIFORNIA

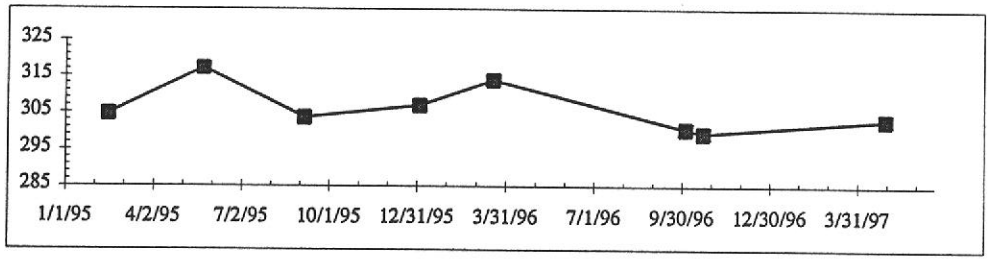
Monitoring Well	Measurement Date	Dissolved Oxygen Reading (mg/L) at Indicated Depth Below SWL		
		5'	15'	25'
MW-1	10/3/96	1.60	NM	NM
	10/21/96	1.95	NM	NM
	4/29/97	0.20	0.10	NM
MW-2	10/7/96	1.20	0.70	NM
	10/21/96	1.63	NM	NM
	4/29/97	0.2	0.1	NM
MW-3	10/3/96	NM	NM	NM
	10/21/96	NM	NM	NM
	4/29/97	NM	NM	NM
MW-4	10/3/96	7.45	7.50	6.20
	10/4/96	7.80	7.72	NM
	4/29/97	NM	NM	NM
MW-5	10/3/96	5.60	4.80	3.20
	10/21/96	6.03	5.93	NM
	4/29/97	2.15	1.80	1.40
MW-6	10/3/96	3.95	3.85	3.70
	10/21/96	4.05	4.02	3.90
	4/29/97	1.80	2.00	0.20
MW-7	10/3/96	2.00	1.90	1.70
	10/21/96	2.10	2.00	1.90
	4/29/97	0.40	0.20	0.19
MW-8	10/3/96	Not Accessible		
	10/21/96	Not Accessible		
	4/29/97	0.30	0.30	0.20
MW-9	10/3/96	Not Accessible		
	10/21/96	Not Accessible		
	4/29/97	Not Accessible		
MW-10	10/3/96	3.40	3.20	2.50
	10/21/96	3.50	3.60	3.00
	4/29/97		Not Accessible	
MW-14	10/3/96	4.50	4.55	4.45
	10/21/96	4.62	4.68	4.00
	4/29/97	2.30	2.10	0.80
MW-15	10/3/96	4.50	1.00	0.75
	10/21/96	3.47	1.10	0.82
	4/29/97	2.10	1.80	0.20
MW-16	10/3/96	Not Accessible		
	10/21/96	Not Accessible		
	4/29/97	3.20	3.40	1.80
MW-14A2	10/3/96	7.30	NM	NM
	10/21/96	NM	NM	NM
	4/29/97	5.30	NM	NM

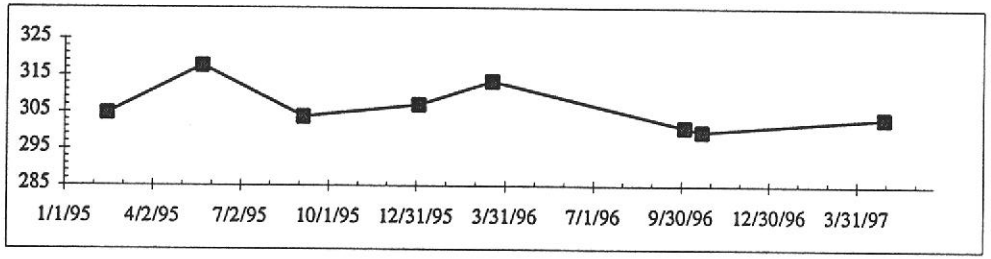
Notes:

1. Dissolved oxygen (D.O.) readings measured in-situ using a YS1 55 D.O. meter with 150 foot lead
2. Temperatures also recorded at time of D.O. measurements, ranging from 16.8 to 18.3 degrees C.
3. SWL = static water level
4. NM = Not measured

TABLE 3
SUMMARY OF GROUND WATER ELEVATIONS
INDUSTRIAL ASPHALT, 52 EL CHARRO ROAD, PLEASANTON, CALIFORNIA

Well Number	Date	Product Thickness (ft)	Depth to Water (ft)	Elevation (ft, MSL)	Trend
MW-1	2/14/95	SHEEN	74.77	304.64	
MP Elev.	5/23/95	SHEEN	62.24	317.17	
379.41	9/5/95	SHEEN	75.73	303.68	
Well Depth	1/3/96	SHEEN	72.43	306.98	
88	3/18/96	SHEEN	65.44	313.97	
	10/3/96	SHEEN	78.79	300.62	
	10/21/96	NM	79.92	299.49	
	4/29/97	SHEEN	76.23	303.18	
MW-2	2/14/95	SHEEN	75.16	304.64	
MP Elev.	5/23/95	SHEEN	62.15	317.65	
379.80	9/5/95	SHEEN	75.99	303.81	
Well Depth	1/3/96	SHEEN	72.76	307.04	
90	3/18/96	SHEEN	66.40	313.40	
	10/3/96	SHEEN	78.91	300.89	
	10/21/96	NM	80.04	299.76	
	4/29/97	SHEEN	76.36	303.44	
MW-3	2/14/95	SHEEN	73.73	304.81	
MP Elev.	5/23/95	SHEEN	60.14	318.40	
378.54	9/5/95	NA	74.55	303.99	
Well Depth	1/3/96	SHEEN	71.37	307.17	
90	3/18/96	SHEEN	64.96	313.58	
	10/3/96	DRY			
	10/21/96	NM			
	4/29/97	DRY			





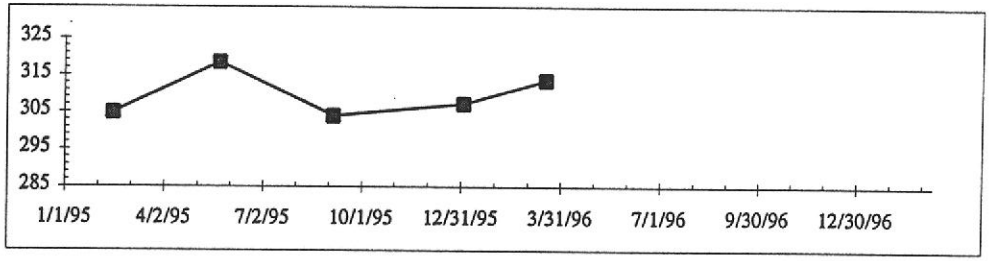
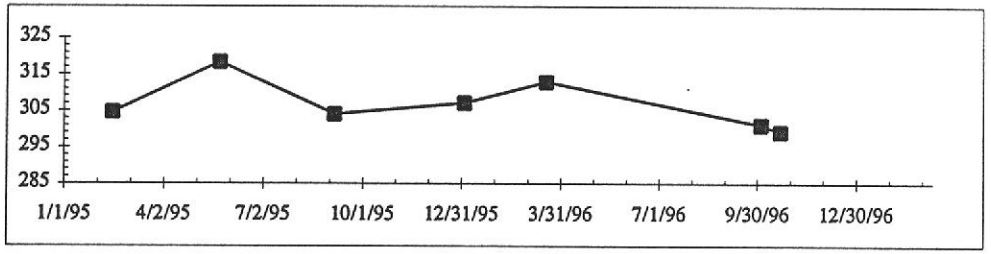
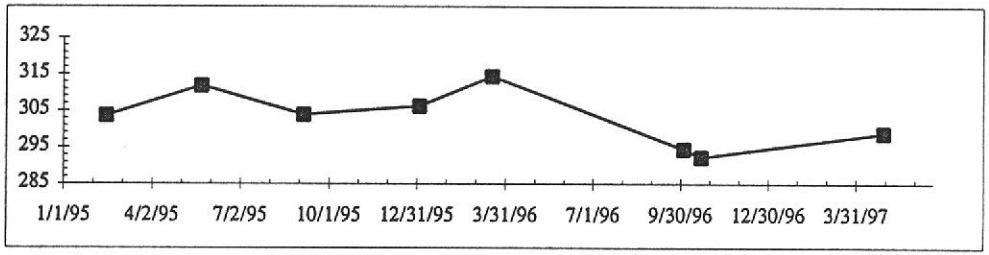


TABLE 3
SUMMARY OF GROUND WATER ELEVATIONS
INDUSTRIAL ASPHALT, 52 EL CHARRO ROAD, PLEASANTON, CALIFORNIA

Well Number	Date	Product Thickness (ft)	Depth to Water (ft)	Elevation (ft, MSL)	Trend
MW-4	2/14/95	NE	71.71	304.55	
MP Elev.	5/23/95	NE	57.90	318.36	
376.26	9/5/95	NE	72.25	304.01	
Well Depth	1/3/96	NE	69.15	307.11	
95	3/18/96	NE	63.34	312.92	
	10/3/96	NE	75.13	301.13	
	10/21/96	NM	77.06	299.20	
	4/29/97	NM			
MW-5	2/14/95	NE	78.91	303.64	
MP Elev.	5/23/95	NE	70.72	311.83	
382.55	9/5/95	NE	78.67	303.88	
Well Depth	1/3/96	NE	76.30	306.25	
110	3/18/96	NE	68.14	314.41	
	10/3/96	NE	88.09	294.46	
	10/21/96	NM	90.27	292.28	
	4/29/97	NE	83.71	298.84	
MW-6	2/14/95	NE	74.19	304.96	
MP Elev.	5/23/95	NE	60.80	318.35	
379.15	9/5/95	NE	75.21	303.94	
Well Depth	1/3/96	NE	71.88	307.27	
109	3/18/96	NE	65.29	313.86	
	10/3/96	NE	77.85	301.30	
	10/21/96	NM	79.05	300.10	
	4/29/97	NE	75.42	303.73	





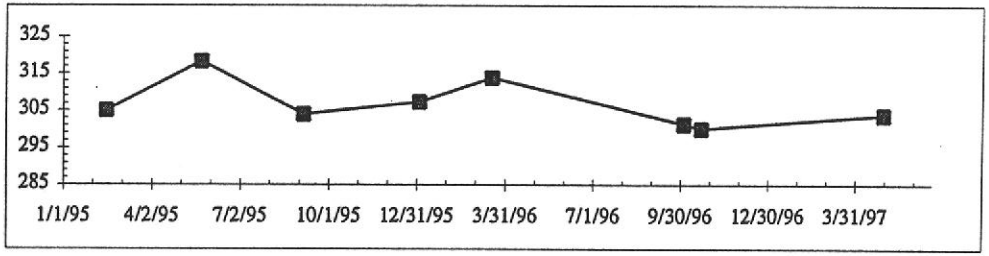
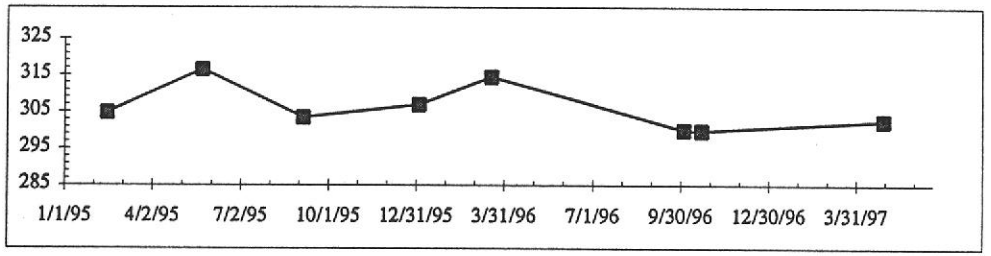
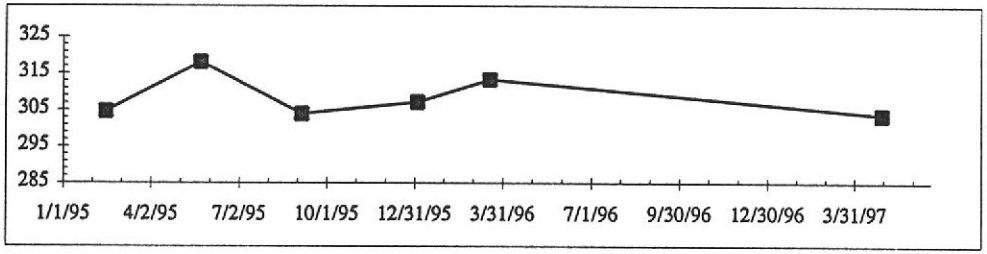


TABLE 3
SUMMARY OF GROUND WATER ELEVATIONS
INDUSTRIAL ASPHALT, 52 EL CHARRO ROAD, PLEASANTON, CALIFORNIA

Well Number	Date	Product Thickness (ft)	Depth to Water (ft)	Elevation (ft, MSL)	Trend
MW-7	2/14/95	NE	74.20	304.74	
MP Elev.	5/23/95	NE	62.41	316.53	
378.94	9/5/95	NE	75.48	303.46	
Well Depth	1/3/96	NE	71.99	306.95	
109	3/18/96	NE	64.43	314.51	
	10/3/96	NE	78.91	300.03	
	10/21/96	NM	79.13	299.81	
	4/29/97	NE	76.38	302.56	
MW-8	2/14/95	ODOR	73.87	304.69	
MP Elev.	5/23/95	ODOR	60.48	318.08	
378.56	9/5/95	ODOR	74.59	303.97	
Well Depth	1/3/96	NE	71.39	307.17	
109	3/18/96	NE	65.25	313.31	
	10/3/96	NA	Buried		
	10/21/96	NA	Buried		
	4/29/97	NE	74.89	303.67	
MW-9	2/14/95	NA	Flooded		
MP Elev.	5/23/95	NA	Buried		
377.40	9/5/95	NA	Buried		
Well Depth	1/3/96	NA	Buried		
108	3/18/96	NA	Buried		
	10/3/96	NA	Buried		
	10/21/96	NM	Buried		
	4/29/97	NM	Buried		





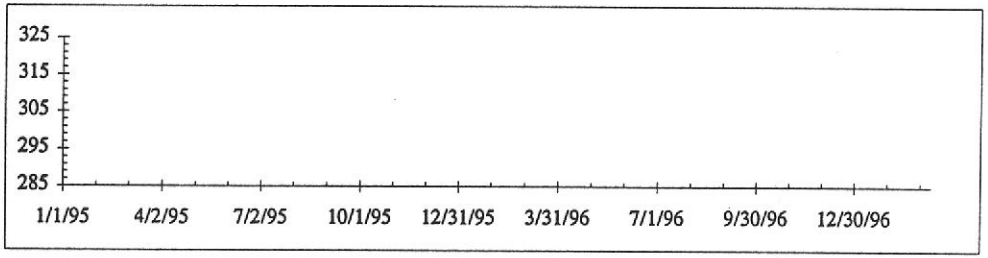


TABLE 3
SUMMARY OF GROUND WATER ELEVATIONS
INDUSTRIAL ASPHALT, 52 EL CHARRO ROAD, PLEASANTON, CALIFORNIA

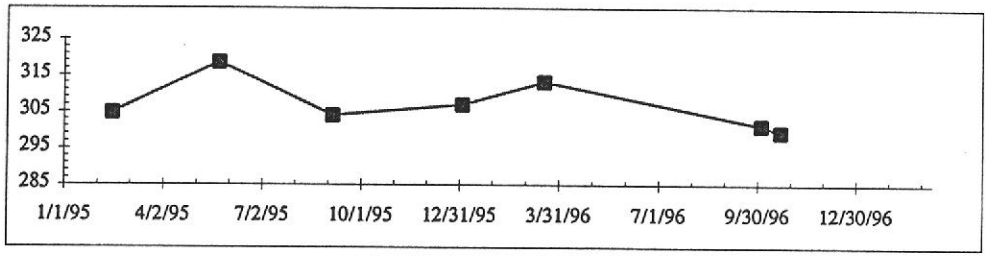
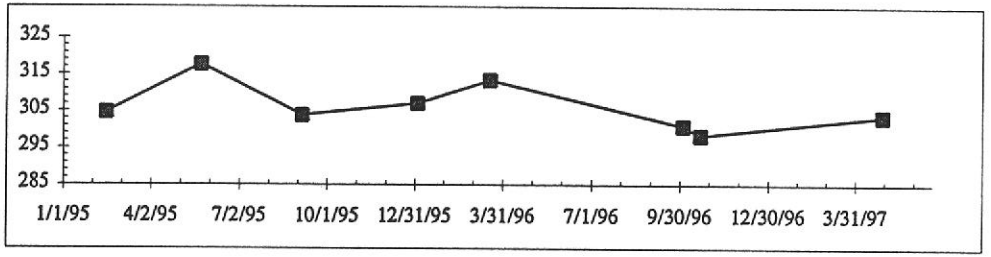
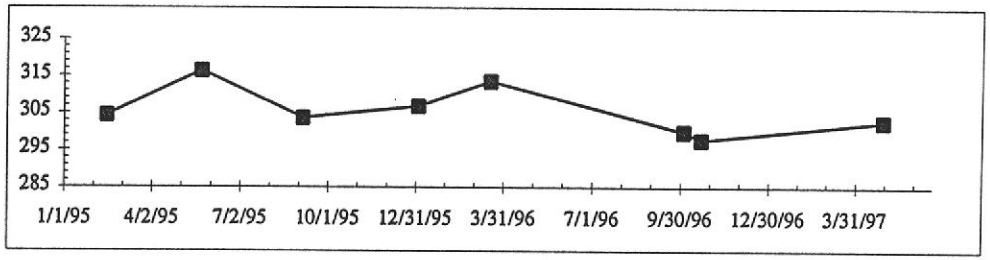
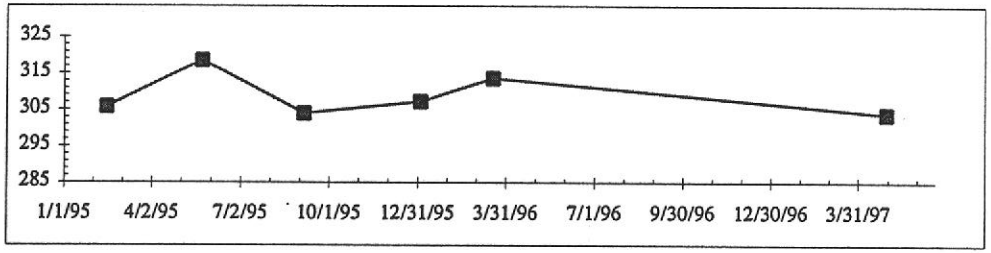
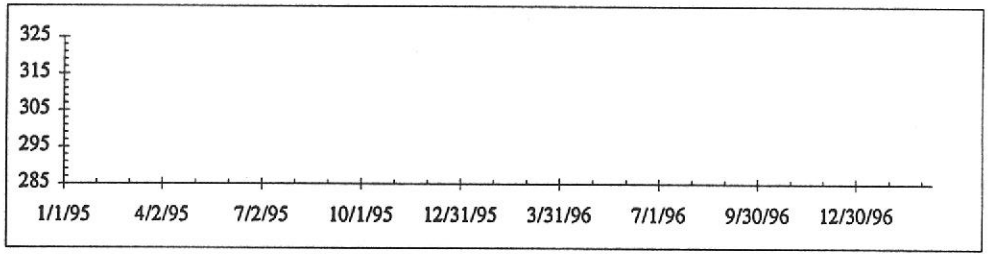
Well Number	Date	Product Thickness (ft)	Depth to Water (ft)	Elevation (ft, MSL)	Trend
MW-10	2/14/95	NE	73.32	304.72	
MP Elev.	5/23/95	NE	59.45	318.59	
378.04	9/5/95	NE	74.01	304.03	
Well Depth	1/3/96	NE	71.03	307.01	
111	3/18/96	NE	64.82	313.22	
	10/3/96	NE	76.76	301.28	
	10/21/96	NM	78.52	299.52	
	4/29/97		Buried		
MW-14	2/14/95	NE	75.48	304.61	
MP Elev.	5/23/95	NE	62.36	317.73	
380.09	9/5/95	NE	76.22	303.87	
Well Depth	1/3/96	NE	72.97	307.12	
114.5	3/18/96	NE	66.71	313.38	
	10/3/96	NE	79.10	300.99	
	10/21/96	NM	81.63	298.46	
	4/29/97	NE	76.51	303.58	
MW-15	2/14/95	NE	73.83	304.29	
MP Elev.	5/23/95	NE	61.77	316.35	
378.12	9/5/95	NE	74.55	303.57	
Well Depth	1/3/96	NE	71.35	306.77	
117	3/18/96	NE	64.61	313.51	
	10/3/96	NE	78.18	299.94	
	10/21/96	NM	80.37	297.75	
	4/29/97	NE	75.48	302.64	

TABLE 3
SUMMARY OF GROUND WATER ELEVATIONS
INDUSTRIAL ASPHALT, 52 EL CHARRO ROAD, PLEASANTON, CALIFORNIA

Well Number	Date	Product Thickness (ft)	Depth to Water (ft)	Elevation (ft, MSL)	Trend
MW-16	2/14/95	NE	73.83	305.82	
MP Elev.	5/23/95	NE	61.16	318.49	
379.65	9/5/95	NE	75.71	303.94	
Well Depth	1/3/96	NE	72.42	307.23	
110	3/18/96	NE	66.06	313.59	
	10/3/96	NA	Buried		
	10/21/96	NA	Buried		
	4/29/97	NE	75.88	303.77	
STAFF	2/14/95	NE	Above Staff Gage		
GAGE	5/23/95	NE	Above Staff Gage		
MP Elev.	9/5/95	NA	Not Measured		
300.00	1/3/96	NA	Not Measured		
	3/18/96	NE	Above Staff Gage		
	10/3/96	NA	Not Measured		
	10/21/96	NA	Not Measured		
	4/29/97	NA	Not Measured		
CJMW-1	2/14/95	NE	77.23	305.52	
MP Elev.	5/23/95	NE	60.31	322.44	
382.75	9/5/95	NA	Not Measured		
Well Depth	1/3/96	NA	Not Measured		
NA	3/18/96	NE	70.10	312.65	
	10/3/96	NA	Not Measured		
	10/21/96	NA	Not Measured		
	4/29/97	NA	76.95	305.80	





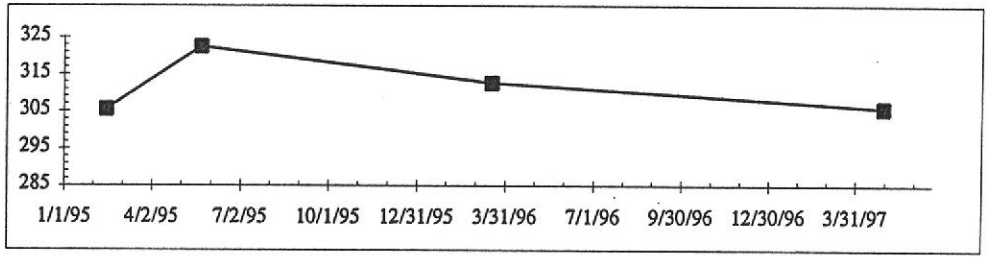


TABLE 3
SUMMARY OF GROUND WATER ELEVATIONS
INDUSTRIAL ASPHALT, 52 EL CHARRO ROAD, PLEASANTON, CALIFORNIA

Well Number	Date	Product Thickness (ft)	Depth to Water (ft)	Elevation (ft, MSL)	Trend

NOTES:
MP Elev. Measuring Point Elevation refers to Top of Casing, Mean Sea Level (USGS Datum)
Depth to Water in feet below Top of Casing
NA Not Applicable
NE Not Encountered
NM Not measured, reading not recorded

TABLE 4
SUMMARY OF ANALYTICAL RESULTS, LAST FOUR QUARTERS
INDUSTRIAL ASPHALT, 52 EL CHARRO ROAD, PLEASANTON CALIFORNIA

Well Number	Sample Date	Sample Number	TPH as Diesel[1] (mg/L)	TPH as Oil[1] (mg/L)	Total Oil & Grease[2] (mg/L)	Total Hydrocarbons[3] (mg/L)	PAHs (µg/L)	PCBs[4] (µg/L)
MW-1								
	May-95	2975	0.73	0.2	1	0.6	NA	0.1
	Sep-95	83445	4.4	3.8	19	13	NA	<0.5
	Jan-96	3168	9.2	7	2	2	NA	0.6
	Mar-96	3128	0.17	<0.2	3.1	2.2	NA	<0.1
	Oct-96	KMW-1	19	12	NA	NA	<100	0.6
	Apr-97	MW-1	2.7	3.1	NA	NA	NA	0.2
MW-2								
	May-95	2973	0.75	<0.2	<0.5	<0.5	NA	0.4
	(duplicate)	2980	0.68	<0.2	<0.5	<0.5	NA	<0.1
	Sep-95	83446	2.4	1	16	14	NA	<0.5
	Jan-96	Not sampled, free product encountered in well. See field notes.						
	Mar-96	3125	4.5	3.4	6.7	5.4	NA	0.1
	(duplicate)	3126	2.1	1.3	5.6	4.3	NA	0.1
	Oct-96	KMW-2	49	30	NA	NA	<100	1.2
	Apr-97	MW-2	5.8	3.3	NA	NA	NA	0.2
MW-3								
	May-95	2974	2.5	0.8	3	2	NA	0.1
	Sep-95	NT	NT	NT	NT	NT	NT	NT
	Jan-96	Not sampled, free product encountered in well. See field notes.						
	Mar-96	3127	0.71	0.7	1.5	1.3	NA	0.2
	Oct-96	Not sampled, well dry. See field notes.						
	Apr-97	Not sampled, well dry. See field notes.						
MW-4								
	May-95	2964	<0.05	<0.5	<0.5	<0.5	NA	<0.1
	Sep-95	83456	<0.05	<0.2	<0.5	<0.5	NA	<0.5
	Jan-96	3175	<0.05	<0.2	0.5	<0.5	NA	<0.1
	Mar-96	3133	<0.05	0.7	0.9	<0.5	NA	<0.1
	Oct-96	Not sampled. On annual sampling frequency.						
	Apr-97	Not sampled. Well not accessible at time of sampling.						

TABLE 4
SUMMARY OF ANALYTICAL RESULTS, LAST FOUR QUARTERS
INDUSTRIAL ASPHALT, 52 EL CHARRO ROAD, PLEASANTON CALIFORNIA

Well Number	Sample Date	Sample Number	TPH as Diesel[1] (mg/L)	TPH as Oil[1] (mg/L)	Total Oil & Grease[2] (mg/L)	Total Hydrocarbons[3] (mg/L)	PAHs (µg/L)	PCBs[4] (µg/L)
MW-5								
	May-95	2963	<0.05	<0.5	<0.5	<0.5	NA	<0.1
	Sep-95	83457	<0.05	<0.2	<0.5	<0.5	NA	<0.5
	Jan-96	3174	<0.05	<0.2	<0.5	<0.5	NA	<0.1
	Mar-96	3133	<0.05	<0.2	<0.5	<0.5	NA	<0.1
	Oct-96	Not sampled. On annual sampling frequency.						
	Apr-97	MW-5	<0.05	<0.2	NA	NA	NA	NA
MW-6								
	May-95	2965	<0.05	<0.5	<0.5	<0.5	NA	<0.1
	Sep-95	83455	<0.05	<0.2	<0.5	<0.5	NA	<0.5
	Jan-96	3173	<0.05	<0.2	<0.5	<0.5	NA	<0.1
	Mar-96	3138	<0.05	<0.2	<0.5	<0.5	NA	<0.1
	Oct-96	Not sampled. On annual sampling frequency.						
	Apr-97	MW-6	0.1	<0.2	NA	NA	NA	NA
MW-7								
	May-95	2967	<0.05	<0.05	<0.5	<0.5	NA	<0.1
	Sep-95	83454	0.2	0.4	<0.5	<0.5	NA	<0.5
	Jan-96	3172	<0.05	<0.2	<0.5	<0.5	NA	<0.1
	Mar-96	3137	<0.05	<0.2	<0.5	<0.5	NA	<0.1
	Oct-96	Not sampled. On annual sampling frequency.						
	Apr-97	MW-7	<0.05	<0.2	NA	NA	NA	NA
MW-8								
	May 1995	2970	0.3	<0.5	<0.5	<0.5	NA	<0.1
	(duplicate)	652381	0.4	<0.5	<0.5	<0.5	NA	<0.1
	Sept.1995	83448	0.3	<0.2	<0.5	<0.5	NA	<0.5
	(duplicate)	83447	0.3	<0.2	<0.5	<0.5	NA	<0.5
	Jan. 1996	3167	0.9	1	<0.5	<0.5	NA	<0.1
	(duplicate)	3166	0.65	0.4	1	<0.5	NA	<0.1
	Mar. 1996	3132	1.3	0.9	1.5	0.5	NA	<0.1
	(duplicate)	3131	1.2	0.7	0.8	<0.5	NA	<0.1
	Oct-96	Not sampled. Well not accessible at time of sampling.						
	Apr-97	MW-8	0.41	<0.2	NA	NA	NA	<0.1
	(duplicate)	MW-18	0.35	<0.2	NA	NA	NA	<0.1

TABLE 4
SUMMARY OF ANALYTICAL RESULTS, LAST FOUR QUARTERS
INDUSTRIAL ASPHALT, 52 EL CHARRO ROAD, PLEASANTON CALIFORNIA

Well Number	Sample Date	Sample Number	TPH as Diesel[1] (mg/L)	TPH as Oil[1] (mg/L)	Total Oil & Grease[2] (mg/L)	Total Hydrocarbons[3] (mg/L)	PAHs (µg/L)	PCBs[4] (µg/L)
MW-9								
	May-95	NT	NT	NT	NT	NT	NT	NT
	Sep-95	NT	NT	NT	NT	NT	NT	NT
	Jan-96	NT	NT	NT	NT	NT	NT	NT
	Mar-96	NT	NT	NT	NT	NT	NT	NT
	Oct-96	Not sampled. Inaccessible indefinitely.						
MW-10								
	May-95	2972	2.4	0.5	2	0.9	NA	<0.1
	Sep-95	83452	<0.05	1	1	<0.5	NA	<0.5
	Jan-96	3164	0.1	0.2	2	0.9	NA	<0.1
	Mar-96	3129	1.9	0.8	1.4	0.7	NA	<0.1
	Oct-96	KMW-10	0.08	<0.2	NA	NA	<10	<0.1
	Apr-97	Not sampled. Well not accessible at time of sampling.						
MW-14								
	May-95	2968	<0.05	<0.5	<0.5	<0.5	NA	<0.1
	Sep-95	83449	<0.05	<0.2	1	<0.5	NA	<0.5
	Jan-96	3171	<0.05	<0.2	<0.5	<0.5	NA	<0.1
	Mar-96	3136	<0.05	<0.2	<0.5	<0.5	NA	<0.1
	Oct-96	Not sampled. On annual sampling frequency.						
	Apr-97	MW-14	<0.05	<0.2	NA	NA	NA	NA
MW-15								
	May-95	2971	0.1	<0.5	<0.5	<0.5	NA	<0.1
	Sep-95	83451	0.3	0.4	2	<0.5	NA	<0.5
	Jan-96	3165	0.1	0.3	<0.5	<0.5	NA	<0.1
	Mar-96	3134	0.14	ND	<0.5	<0.5	NA	<0.1
	Oct-96	KMW-15	0.11	<0.2	NA	NA	<10	NA
	(duplicate)	KMW-51	0.1	<0.2	NA	NA	<10	NA
	Apr-97	MW-15	<0.05	<0.2	NA	NA	NA	NA

TABLE 4
SUMMARY OF ANALYTICAL RESULTS, LAST FOUR QUARTERS
INDUSTRIAL ASPHALT, 52 EL CHARRO ROAD, PLEASANTON CALIFORNIA

Well Number	Sample Date	Sample Number	TPH as Diesel[1] (mg/L)	TPH as Oil[1] (mg/L)	Total Oil & Grease[2] (mg/L)	Total Hydrocarbons[3] (mg/L)	PAHs (µg/L)	PCBs[4] (µg/L)
MW-16								
	May-95	2969	<0.05	<0.5	<0.5	<0.5	NA	<0.1
	Sep-95	83450	0.06	<0.2	<0.5	<0.5	NA	<0.5
	Jan-96	3170	<0.05	0.3	<0.5	<0.5	NA	<0.1
	Mar-96	3135	<0.05	0.9	0.7	<0.5	NA	<0.1
	Oct-96	Not sampled. On annual sampling frequency.						
	Apr-97	MW-16	<0.05	0.4	NA	NA	NA	NA
14A2[5]								
	May-95	2966	<0.05	<0.5	<0.5	<0.5	NA	<0.1
	Sep-95	83453	<0.05	<0.2	<0.5	<0.5	NA	<0.5
	Jan-96	3169	<0.05	<0.2	<0.5	<0.5	NA	<0.1
	Mar-96	3130	<0.05	<0.2	<0.5	<0.5	NA	<0.1
	Oct-96	Not sampled. On annual sampling frequency.						
	Apr-97	14A2	<0.05	<0.2	NA	NA	NA	NA
Drinking Water Standard[6]			—	—	—	—		0.5

NOTES FOR TABLE 4

1. Sample analysis via SM 3510 GCFID.
2. Sample analysis via SM 5520C.
3. Sample analysis via SM 5520F.
4. Polychlorinated Biphenyl compounds. Sample analysis via EPA Test Method 8080.
5. Jamieson Well sampled via a tap.
6. California Department of Health Services Drinking Water Standards, Primary Maximum Contaminant Levels (MCL); secondary MCLs listed in parentheses. Source: Water Quality Goals, California Regional Water Quality Control Board, February 1991.

TPH Total Petroleum Hydrocarbons.
<0.1 Not Detected at or above the indicated laboratory reporting limit.
NT Not Tested (ie., well not sampled)
NA Sample not analyzed for that constituent
PCBs Polychlorinated Biphenyls. Only Arochlor 1260 was detected.
PAHs Polynuclear Aromatic Hydrocarbons by EPA 8270

APPENDIX A

REGENESIS

BIOREMEDIATION PRODUCTS

Oxygen Release Compound (ORC®)

ORC releases oxygen slowly to enhance bioremediation.

Oxygen Release Compound (ORC®)

Bioremediation—A Natural Process

Bioremediation is a process by which microorganisms degrade hazardous substances. For example, common bacteria can metabolically transform toxic petroleum products into carbon dioxide and water. Aerobic bioremediation requires oxygen, as well as moisture and commonly occurring nutrients.

There are several advantages to implementing a bioremediation system as compared to other technologies. Other remediation methods may simply transfer the contaminants to another medium which requires additional clean up. Excavation and transportation of the contaminant is often required. Bioremediation degrades contaminants on-site and can be more cost effective than other treatment technologies. The EPA actively promotes bioremediation as it is an ecologically sound, natural process.

Oxygen is often the limiting factor in aerobic bioremediation. Moisture and nutrients, such as phosphorus and nitrogen, are generally present in sufficient quantities. However, oxygen is rapidly consumed by microbes which thrive in an oxygen rich environment. Without adequate oxygen, contaminant degradation will slow and then stop. Thus, additional oxygen is needed to stimulate further microbial growth and activity.

Oxygen Release Compound, ORC

Oxygen Release Compound (ORC) is an innovative technology which enhances bioremediation. ORC is a patented formulation of a very fine, insoluble peroxygen that releases oxygen at a slow, controlled rate when hydrated. Its use has been demonstrated to increase the remediation of hydrocarbon contamination in soil and groundwater.

Features

- Magnesium peroxide compound is activated by moisture
- Patented technology controls and prolongs the release of oxygen
- Moderate pH levels are maintained
- Fine particle size has stable, long shelf life
- No external coating of product is required to control rate of oxygen release
- Pure oxygen source saturates water to higher levels than aeration

Benefits

- Provides a passive, low-cost, long-term oxygen source
- Does not generate harmful residue; environmentally safe
- Is perfect for in-situ remediation where other methods are impractical
- Will not disturb the hydraulics of the contaminated plume
- Does not volatilize pollutants
- Can be used as a redox control agent

ORC Technology

The product releases oxygen when it comes in contact with water as shown by the following equation:

$$MgO_2 + H_2O \rightarrow {}^1/_2O_2 \uparrow + Mg(OH)_2$$

ORC will stop releasing when dry and will again release when rehydrated. The by-products of the reaction are oxygen and magnesium hydroxide (Milk of Magnesia). ORC is environmentally safe to use.

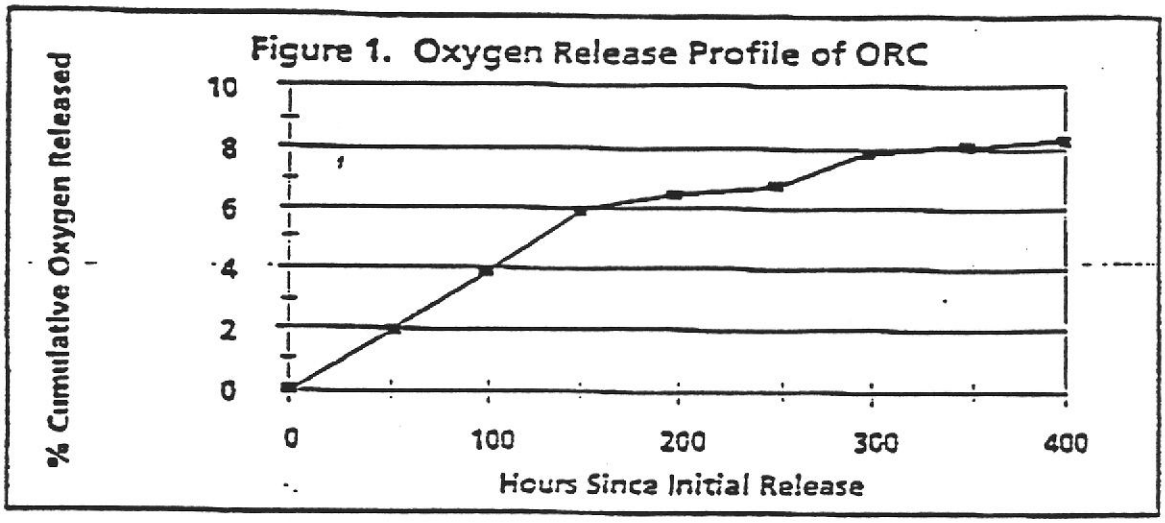


Figure 1 presents a typical release pattern for ORC. In general terms, the product releases up to 10% of the available oxygen in the first several hundred hours, followed by a release of an additional 10% every thousand hours. This translates to a longevity of about one year under static conditions.

ORC Application — The "Oxygen Barrier"

ORC should be considered for contaminated sites whenever aerobic bioremediation is the appropriate treatment technology. For application, ORC powder is mixed in a matrix such as Portland Cement or sand and then lowered into a well or trench in an inert filter sock. After the oxygen dissipates, the socks and spent ORC are removed from the ground and, if necessary, new charges of ORC may be added.

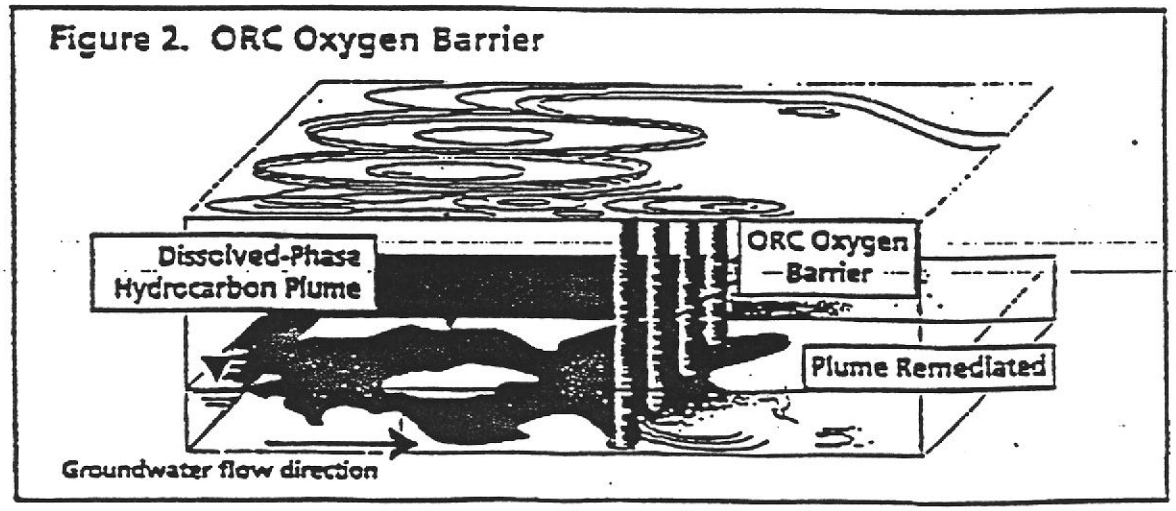
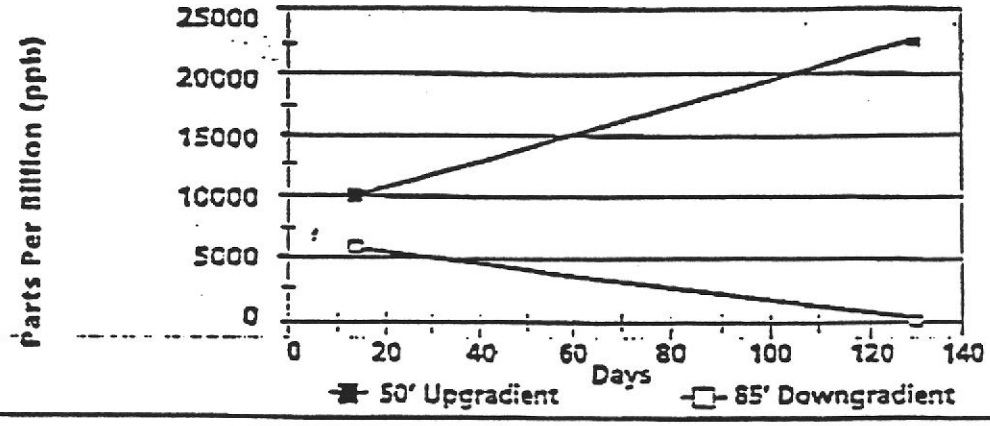


Figure 2 depicts the Oxygen Barrier concept which has been successfully demonstrated to significantly reduce BTEX levels.

Various applications of ORC can meet a wide range of remediation objectives. In ground water applications, ORC can be configured to form an Oxygen Barrier across a contaminated plume. A properly placed row of wells or a trench containing ORC will slowly release oxygen, enhance bioremediation, and cut off the plume in the oxygenated zone (see Figure 2 and 3). The Oxygen Barrier concept was successfully demonstrated at both the University of Waterloo and a site in North Carolina, dramatically remediating BTEX compounds downgradient from the Oxygen Barrier.

Figure 3. Total BTEX — Concentration Over Time



As Figure 3 indicates, while the contaminant source in the North Carolina study continually released increasing levels of BTEX, ORC successfully remediated the contamination downgradient from the "Oxygen Barrier."

Other ORC Applications

► Reduce Risk	Surround highly contaminated area with ORC for fast remediation
► Replace Other Methods	Turn off pump and treat, and use less expensive ORC for final remediation
► Compliment Other Methods	Supplement air sparging with ORC for hard-to-reach contamination
► Treat Soil	Mix ORC into biopiles or use in land farming for faster clean up
► Clean Up Remote Site	May be the best alternative in remote or inclement areas since ORC is a "passive" treatment system
► Control Odor	Successfully demonstrated to control odor in anaerobic impoundments

Please print clearly.

If you would like further information regarding Oxygen Release Compound (ORC®), please call (714) 443-3136 or complete and return this short information card.

A **REGENESIS** representative will contact you to discuss your remediation needs.

Name of Company _____

Name/Title _____

Address _____

City _____ State _____ Zip _____

Phone ( ) _____ Fax ( ) _____

Type of Company: _____

Remediation Needs: _____

ORC—Proven Effectiveness

Studies at several recognized private companies and universities proved that ORC releases oxygen, enhances microbial activity and promotes remediation. Subsequent field applications demonstrated that ORC was effective in promoting bioremediation under "real world" conditions.

- University of Waterloo (published, *Groundwater Monitoring and Remediation*, Winter 1994 edition) — conducted at the widely studied Borden Aquifer in Ontario, Canada. The study indicates that an Oxygen Barrier generated by ORC released significant amounts of dissolved oxygen (D.O.). It concluded that the enhancement of D.O. by ORC led to the biodegradation of at least 4 mg/L each of benzene and toluene.
- North Carolina Site (published, *Proceedings from the Second International Symposium on In Situ and On-Site Bioreclamation*, San Diego, CA, 1993) — study demonstrated that the use of ORC in an Oxygen Barrier dramatically reduced BTEX compounds downgradient from leaking gasoline UST.
- Alaska Site — A study was completed showing the effectiveness of ORC remediation as compared to air sparging. Sparge points fouled in the high iron environment and there was evidence of channeling — a problem common with this technology. ORC was effective in remediation and a full barrier was installed.
- New Mexico Site — The regulatory community showed interest in ORC barriers. From a single test well, remediation occurred downgradient in a wide dispersive pattern. A full barrier proposal was requested.

ORC vs. Other Remediation Technologies

ORC is a safe and effective remediation technology with many application advantages over other chemical oxygen sources, such as hydrogen peroxide and calcium peroxide. Because ORC is formulated to release a constant supply of oxygen over an extended period of time, replenishment is less frequent and more convenient. In addition, ORC's harmless by-products — oxygen and magnesium hydroxide — provide confidence in regulatory approval.

ORC can also provide cost and operational advantages over mechanical oxygen sources. In many circumstances, the cost of implementing an ORC remediation application can be substantially lower than a pump and treat or an air sparging system.

REGENESIS BIOREMEDIATION PRODUCTS
27130 PASEO ESPADA STE A1407
SAN JUAN CAPISTRANO CA 92675-2758

Safety, Storage and Handling

ORC is an oxidizer. ORC should not come into contact with combustible materials. Though the material itself is not flammable, it can release oxygen to feed a fire. In the event of a fire, the area should be flooded with large volumes of water.

Since ORC can be mildly hazardous to human health, certain precautions should be taken when handling the material. Direct contact with the skin and eyes should be avoided, as irritation may occur. Rubber gloves and protective goggles should be worn as a preventative measure. Should contact with skin occur, wash immediately with soap and water. Flush eyes thoroughly and repeatedly for 15 minutes and contact a physician, if necessary.

Inhalation may also cause mild irritation to the lungs, nose, and throat, but should not result in significant, long-term hazard. A proper dust mask or breathing apparatus should be used when the product is handled in the powder form. If inhalation irritation occurs, move to a well ventilated space, or outside to fresh air.

ORC is a very stable compound. Though it is designed to release oxygen when in contact with water, it will remain stable at up to 3% moisture which facilitates storage. Storage areas should remain dry. Avoid areas with high humidity. Store the product away from combustible material. Keep containers closed when not in use.

REGENESIS—The Company

REGENESIS Bioremediation Products was formed to continue the development and marketing of ORC®. Oxygen Release Compound was first sold commercially in 1994 after three years of development. The inventors originally began working on a similar product used to facilitate the growth of plants in oxygen-poor soils. Formulations of ORC, more appropriate to bioremediation applications, were successfully tested in the laboratory and followed by several field demonstrations. The company is now in the commercialization phase, working with clients to meet their specific remediation needs.

The Scientific Advisory Board and the Board of Directors of **REGENESIS** Bioremediation Products are composed of recognized leaders from industry, academia and government.

For further information or technical assistance, please contact

REGENESIS Bioremediation Products
27130A Paseo Espada, Suite 1407
San Juan Capistrano, CA 92675
(714) 443-3136 (Voice) (714) 443-3140 (Fax)

ORC® FILTER SOCK INSTALLATION INSTRUCTIONS

ORC® Filter Socks are used to enhance bioremediation of petroleum hydrocarbons in groundwater. The filter sock contains ORC and an inert carrier matrix. The socks come in one foot sections. They are laced together to span the vertical polluted saturated zone in monitoring type wells. Once the socks are laced together and lowered into the wells, they become hydrated and begin releasing oxygen. The following instructions are vital to proper installation and subsequent removal of the socks.

SAFETY PRECAUTIONS

- ORC is completely non-toxic, but is composed of ultra-fine particles.
- Wear dust masks and goggles to prevent soft tissue irritation.
- Reference the Material Safety Data Sheet for specific technical and physical information.

CONDITION OF SOURCE WELLS

- Test for well deviation and smoothness before ORC installation.
  - For the test, use a 5 foot section of pipe with an outside diameter 1/2 inch smaller than the source well's inside diameter.

KEY REQUIREMENTS FOR INSTALLATION

A) SOCKS MUST BE INSTALLED WITH BLACK GROMMETS ON TOP.
B) Wrap socks as independent units (see page 3, figure 5).
C) A maximum of 20 2-inch socks per section.
D) A maximum of 8 4-inch socks per section.
E) A maximum of 6 6-inch socks per section.
F) Make sure each sock is properly shaped (cylindrical and without bends) to facilitate ease of installation and removal.

HELPFUL HINTS

- ORC matrix hardens into a cement once hydrated.
- Minimize slack between each sock, by periodically pulling up slack while lacing.
- Tie off ORC retrieval lines to the well cap. REGENESIS recommends the use of a 3/8" diameter x 6" long eyebolt.
- The ORC Socks should be wetted to prevent excessive dusting prior to installation.
- Make sure your work area is clean to avoid oil and dirt deposits on the socks.

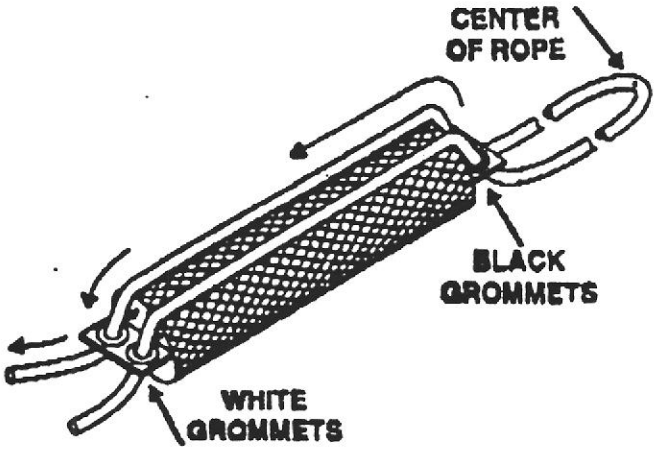
ORC REMOVAL

- ORC Socks will be approximately 20% heavier after water saturation.
- Static friction from screened casing may cause difficulty in removal.
- A winch and stanchion (or comparable equipment) may be necessary to help remove the socks due to increased weight, friction etc.

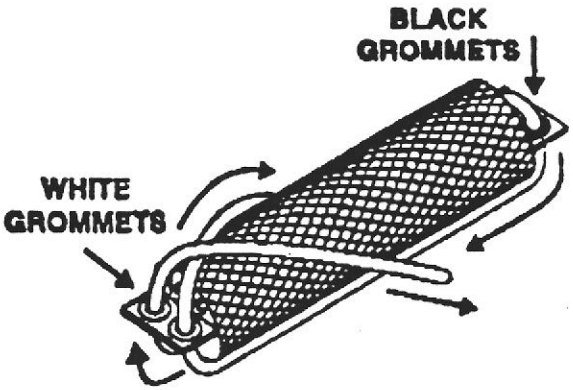
(SEE DETAILED FIGURES INSIDE)

REGENESIS
Bioremediation Products
27130A Paseo Espada - Suite 1407- San Juan Capistrano - CA 92675 - Ph (714) 443-3136 - Fax (714) 443-3140

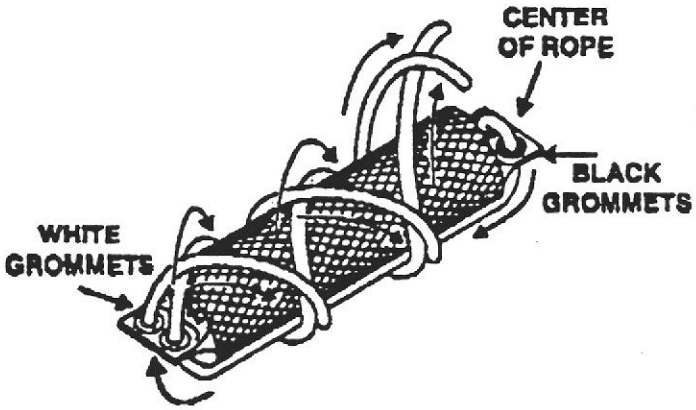
4 INCH AND 6 INCH LACING DIAGRAM



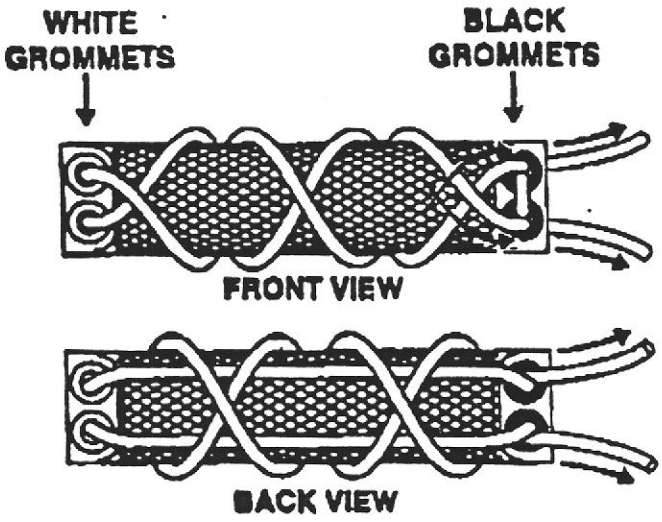
1) Find the center of the rope. Begin lacing the ORC Socks by threading the two ends of the installation rope through the black grommets and then through the white grommets at the bottom of the same side of the bottom sock.



2) Pull the rope through the bottom sock, making sure the center of the rope is between the black grommets. Cross the ropes over each other.

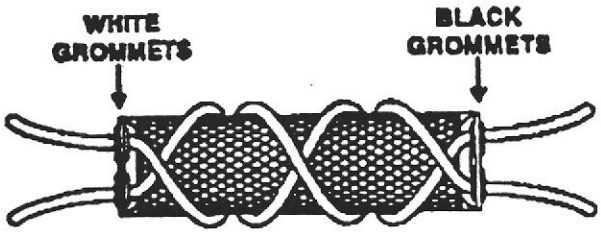


3) Loop the ends of the rope around the back of the sock and cross them. Repeat this step once again, so the rope is wrapped around the sock with two full turns.

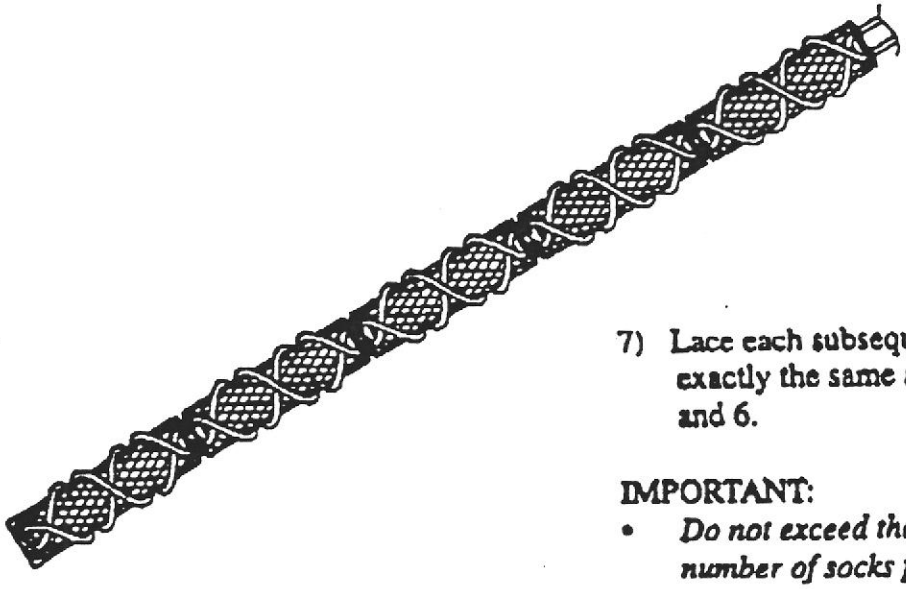


4) Bring the ends of the rope around from the back, cross them, and thread them into the black grommets. The rope ends should be inserted into the black grommets diagonally from the white ones they started from. Threading the black grommets will be tight only on the bottom sock due to the unique lacing pattern.

5) To avoid the ORC Socks slipping past each other, the socks must be laced with the grommet flaps of the bottom sock and second sock butting against each other (as shown).



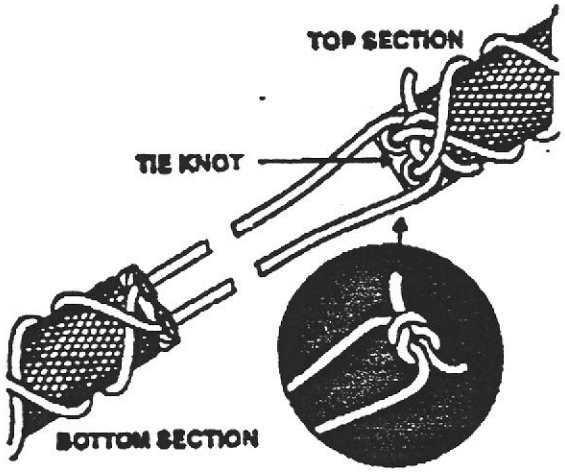
6) The remaining socks on the rope section are laced up according to Figure 6. Make sure that the rope is turned around the sock two full turns, with the grommets of each sock butting up against the next sock as shown in Figure 5.



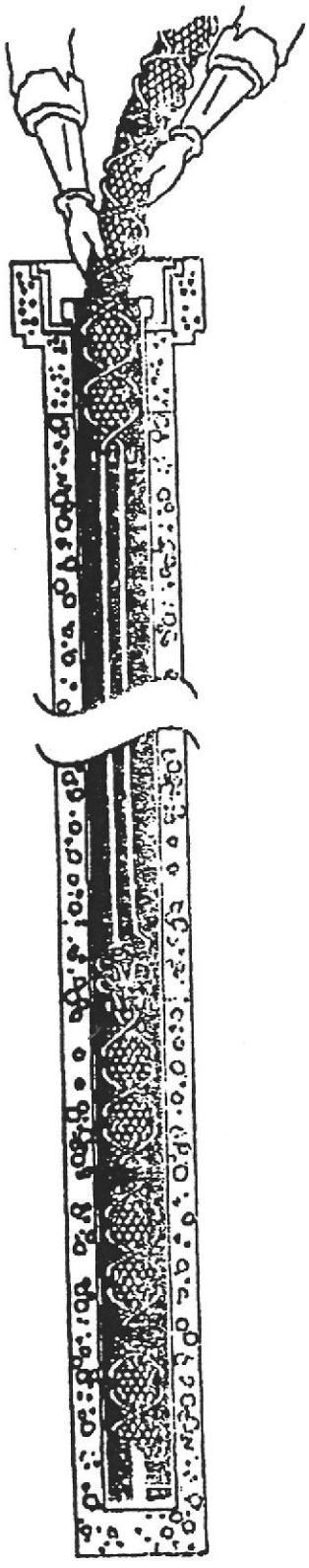
7) Lace each subsequent ORC Sock exactly the same as in Figure 5 and 6.

IMPORTANT:

- *Do not exceed the maximum number of socks per section (see "Key Requirements D & E" on page 1).*
- *Minimize the slack between the socks.*

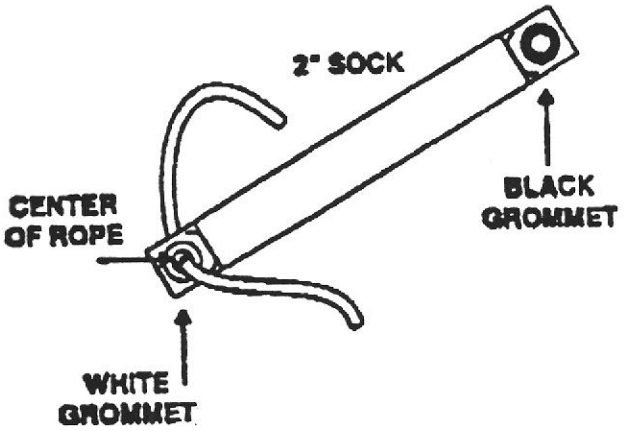


8) If you need to install more ORC Socks than the maximum allowed per well size (see "Key Requirements D & E" on page 1), then multiple sections must be installed. Each section is laced exactly the same, but they should be tied off to each other. Tie the end of the rope from the lower section to the bottom sock of the upper section; this allows each section to be installed and removed independently. (see well diagram)

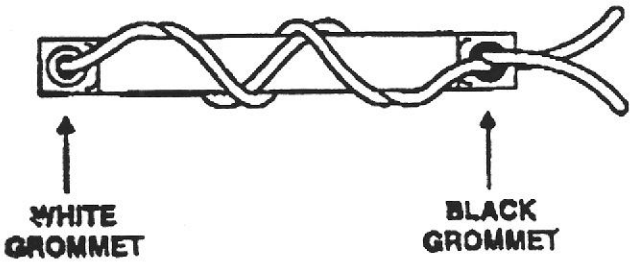


Well Diagram

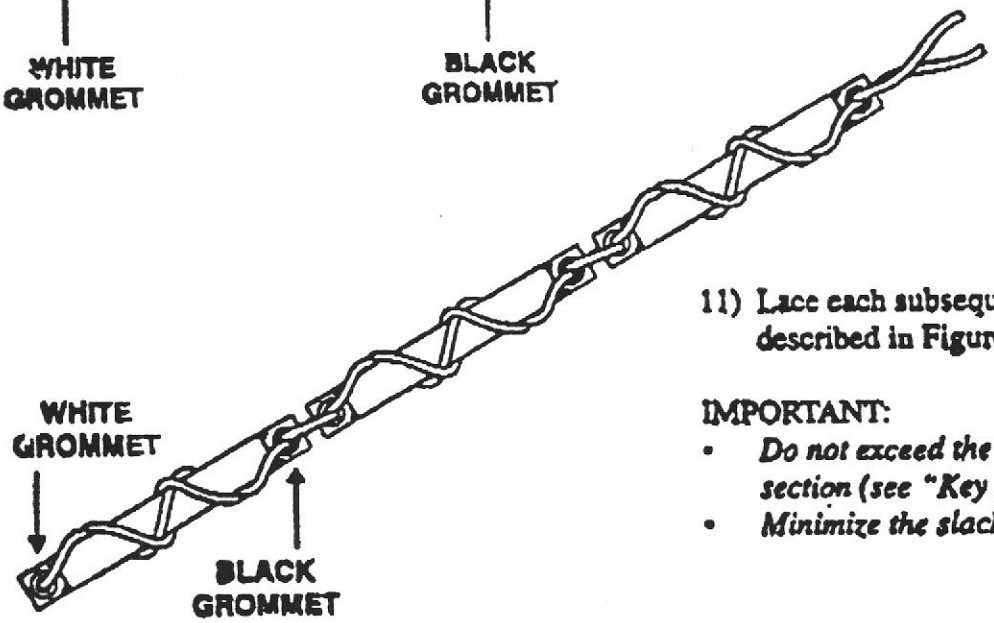
2 INCH LACING DIAGRAM



9) Find the center of the rope. Begin lacing the ORC Socks by threading one end of the installation rope through the white grommet, making sure that the center of the rope is pulled through to the center of the white grommet on the bottom sock.



10) Wrap each end of the installation rope around the sock twice and then cross them through the black grommet.



11) Lace each subsequent sock using the same method as described in Figure 2 above.

IMPORTANT:

- *Do not exceed the maximum number of socks per section (see "Key Requirements B" on page 1)*
- *Minimize the slack between socks.*

Please call our technical support personnel with any application questions at (714) 443-3136 between 8:00 a.m. and 5:00 p.m. Pacific Time. Proper installation is critical to effective use of ORC and avoiding problems in the well.

Case Study #1

SINGLE WELL REMEDIATION STUDY - 41 Wells at 16 Sites

Well #	E & C FIRM	INITIAL BTEX (ppb)	PERCENT REDUCTION	WEEKS	INITIAL OXYGEN (ppm)	HIGH READING (ppm)
	ATEC (MI)					
1	Site 1	19980	98%	7	2.7	29
2		54	91%	7	2	29
3		2929	98%	7	2	24
4	Site 2	151	81%	7	4.7	31
5		137	95%	7	0.9	31
6		1	0%	7	2.6	18
7	Site 3	649	96%	7	2.8	19
	Confidential (MI)					
8		492	24%	8	2.6	21
9		3331	94%	8	2	15
10		1287	100%	8	1	17
	Confidential (WY)					
11		5494	100%	8	1.1	7.8
	Enecotech (MI)					
12	Site 1	34960	88%	8	1.8	24
13		406	95%	8	1.2	29
14	Site 2	964	97%	8	0.8	27
15		14		8	6	32
16		10500	100%	8	6	32
17		47600	100%	8	1.8	28
18		6610	100%	8	1.4	24
19		1115	98%	8	7.4	28
20		1136	99%	8	0.6	15
21	Site 3	21	100%	8	0.6	23
22		5800	100%	8	0	33
23		253	100%	8	0	23
24		8030	99%	8	2	22
	ESE (CA)					
25		8810	99%	8	0	26
26		142	89%	8	0.2	18
	Frey (CA)					
27		4130	100%	8	0.2	24
28		1480	100%	8	0.2	13
	Geraghty & Miller (OK)					
29	Site 1	1250	96%	10	0.1	21
30		2276	71%	10	0.1	11
31	Site 2	8980	23%	12	0.8	17
	Parsons (MI)					
32	Site 1	1168	77%	8	2.9	9.3
33		118	86%	8	4	6.5
34		4		8	4	20
35	Site 2	406	98%	8	5	20
36		300	91%	8	5.2	20
37		497	49%	8	6	20
	Parsons (OH)					
38	Site 1	13	39%	8	0.2	25
39		180	95%	8	0.2	20
40	Site 2	127		8	5	8
41		2018	86%	8	0.3	22

Case Study # 2

ORC TECHNICAL BULLETIN # I.2c

Oxygen Release Compound,ORC® New Mexico Field Results

A pilot study was conducted during the months of August through December 1994 at the Shell North Main Site in Belen, New Mexico using an ORC® barrier. The site is a State Lead Site and both the pilot study and the subsequent barrier installation were sponsored by the Underground Storage Tank Bureau of the New Mexico Environment Department.

The purpose of the pilot study was to determine the feasibility of using ORC® to increase the levels of dissolved oxygen (DO) and to remediate a dissolved phase petroleum hydrocarbon plume. The pilot study consisted of the installation and sampling of one 6-inch PVC source well (S-11), 26 downgradient monitoring points, and several existing monitoring wells. The pilot system was monitored to determine changes in DO and BTEX concentrations. The results of the pilot study showed that oxygen was released into the aquifer as verified by substantial increases in the DO concentrations away from the source well, and that remediation occurred at various points in the system as indicated by a decrease in the BTEX concentrations.

As a result of the pilot study, a full scale remediation system using ORC® was installed. The full scale remediation system consists of twenty 6-inch ORC® source wells and 54 monitoring points downgradient of the source wells. The vertical distribution of DO and BTEX was measured with probes located 3, 10, and 17 feet below the water table. A total of 342 ORC® socks were installed on April 3, 1995. The system was monitored to determine changes in DO and BTEX.

The data was analyzed to determine the net effect of adding dissolved oxygen, as generated by ORC®, on the hydrocarbon plume. Technical Bulletin IV.3a presents the details of oxygen barrier formation generated by this data set and also provides the site maps relevant to this discussion. This Technical Bulletin focuses on the total mass ("mass curves") of oxygen and BTEX over 93 days (Figure 1) and examines the fate of the BTEX plume as expressed in concentration contour diagrams over the same time period (Figure 2).

Mass curves are generated by first contouring the areal and vertical distribution of oxygen and BTEX with interpolative techniques such as Kriging. From this, the masses can be averaged in each area bounded by a set of contours and then summed

in the region of interest. This then presents a picture of the changing dynamics of oxygen and BTEX in the entire system over time. As can be seen in Figure 1, the oxygen mass increased to a maximum in first 3-5 days and remained relatively constant for the next thirty days. At this point, the rate of oxygen consumption increased in response to an influx of BTEX through the barrier caused by the excavation of the source upgradient of the barrier (discussed below). Field measurements are indicating the ORC® Filter Socks will have a longevity of about six months under these conditions.

A significant, correlative reduction of the BTEX plume was documented. A series of contour plots illustrate the reduction of the BTEX plume as a result of oxygen migrating from the ORC® barrier. There was clear evidence of enhanced oxygen dispersion into the formation of at least 20 feet downgradient from the monitoring well network, as detailed in Technical Bulletin IV.3a.

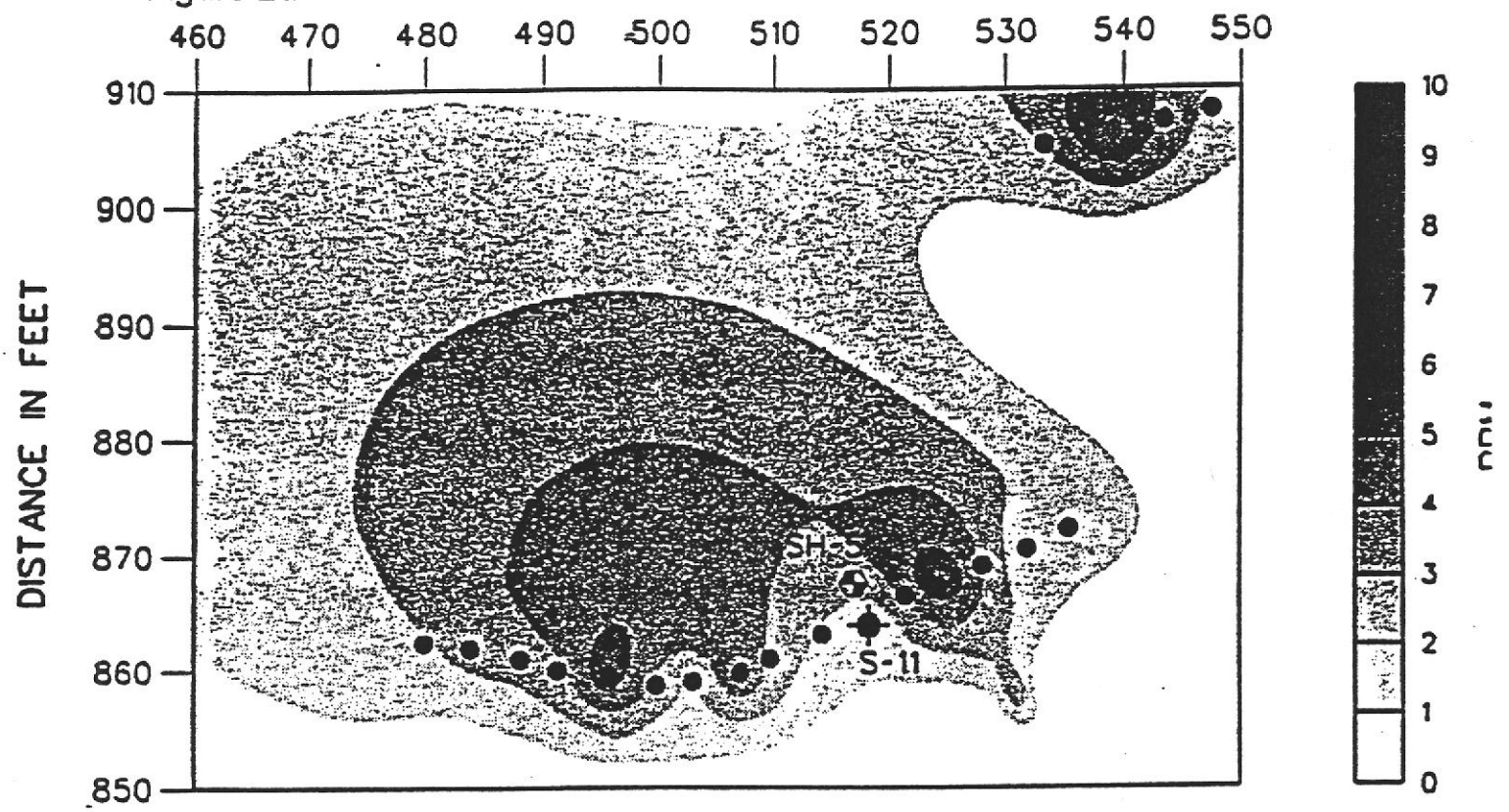
As illustrated, in Figures 2a and 2b, there was a significant reduction in BTEX mass in the treatment zone and at a significant distance away from the barrier. Concentrations of total BTEX in samples from the most downgradient well, 120 feet from the barrier, declined to Non-Detect (ND). Also, at this well, assays of aerobic microbial degraders were two orders of magnitude higher than background indicating the presence of oxygen from the ORC installation was driving bioremediation.

The gasoline spill was in an area approximately 30' X 45' and located at between 50 and 100 feet behind the barrier. Groundwater velocity was 1-2 feet per day. Project timelines dictated that the excavation was to immediately precede barrier placement. This physical activity disturbed the equilibrium of groundwater interaction with sorbed material; rainfall into the open excavation may also have been a factor. The result was that a pulse of increased dissolved phase BTEX was created and carried into the barrier, where it was detected by day 47.

This effect is also seen in the contour plots. The BTEX levels then decreased as further remediation began to bring the situation under control. An increase in the rate of oxygen consumption is noted as a result. Due to the presence of an overhead power line, a 4 well section of Oxygen Barrier was installed in the Northeast corner of the site. Based on the direction of groundwater flow, it was not subject to the pulse of BTEX from the excavated area. Consequently, the area immediately downgradient was remediated.

TOTAL BTEX (PPM) BEFORE ORC INSTALLATION

Figure 2a



TOTAL BTEX (PPM) 93 DAYS AFTER ORC INSTALLATION

Figure 2b

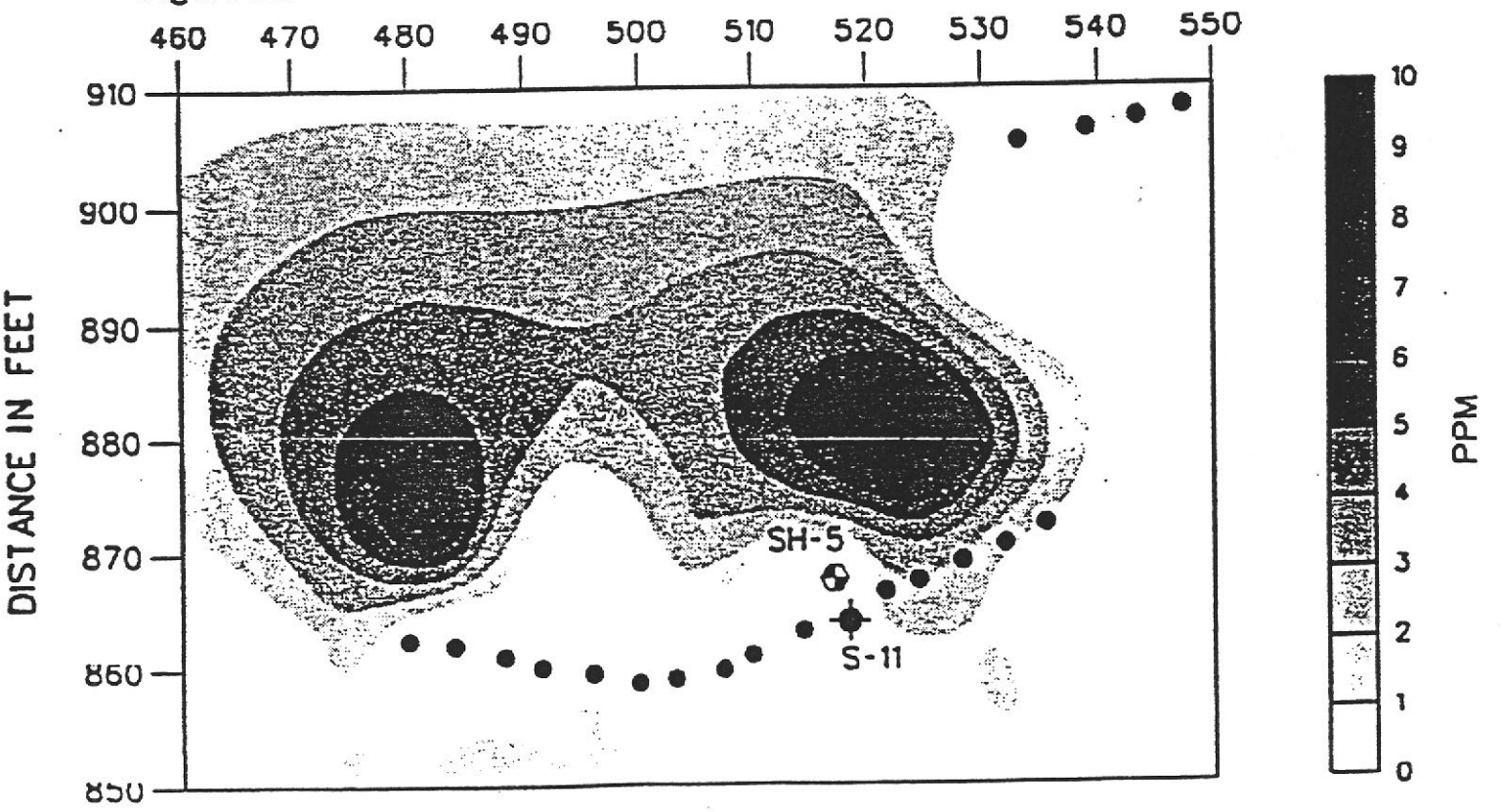
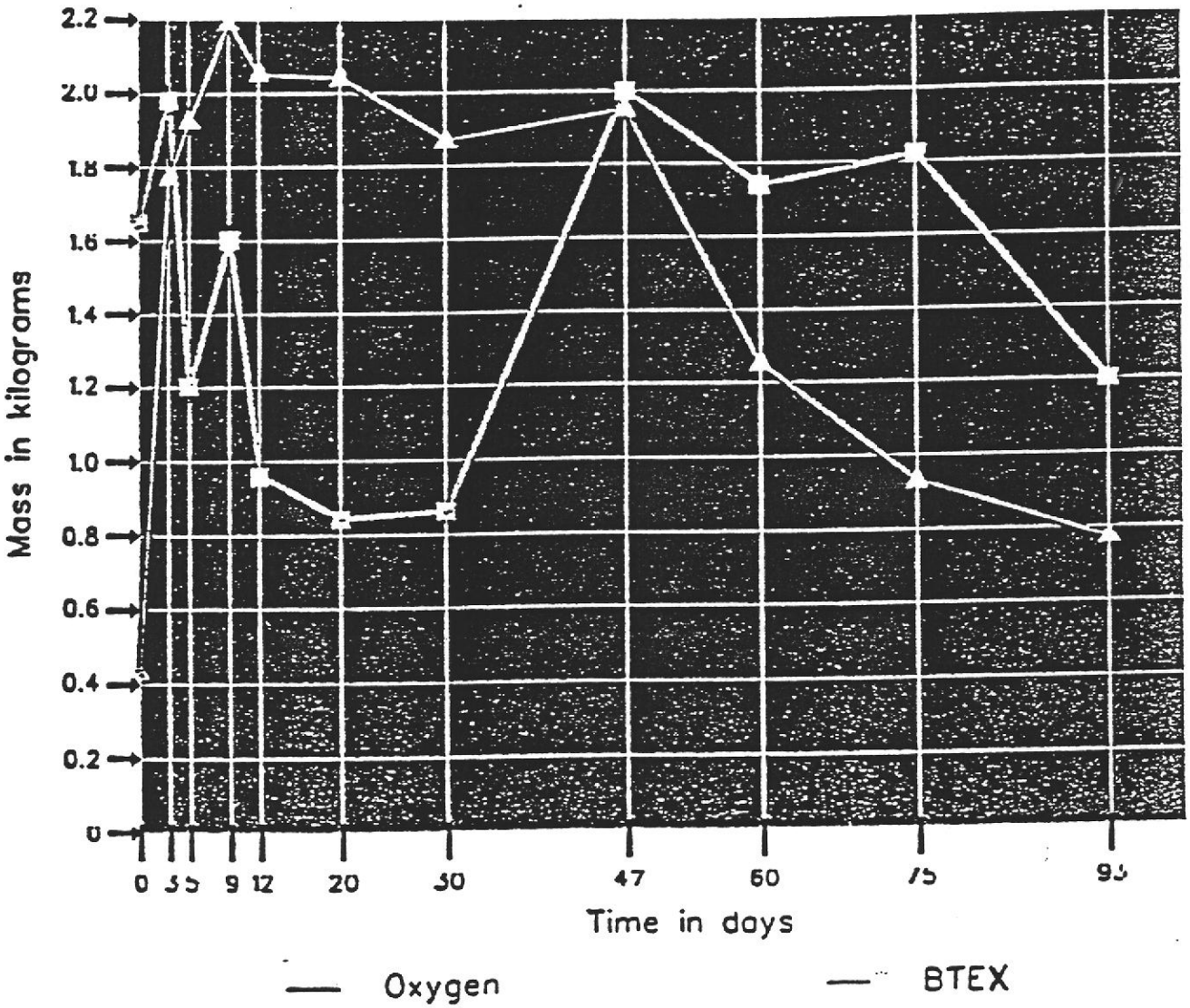


Figure 1


Mass in kilograms
2.2
2.0
1.8
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0
0 3 5 9 12 20 30 47 60 75 93
Time in days
Oxygen
BTEX

APPENDIX B

KA KLEINFELDER

WELL DEVELOPMENT & SAMPLING LOG

WELL NO. MW15

Date: 10/7/96 Weather: CLEAR / WARM Sheet 2 of 6

Project: IND ASPHALT Submitted By: B. DIETZ Date:

Project No.: 10-1682-09 Reviewed By: — Date:

Purpose of Log ☐ Development ☒ Sampling

Equipment & Decontamination

Purging Equipment	Bailer	Disposable Bailer	Suction Pump	(Submersable Pump)	Dedicated Pump	Other:
Sampling Equipment	Bailer	(Disposable Bailer)	Suction Pump	Submersable Pump	Dedicated Pump	Other:

Test Equipment	Water Level	pH	Conductivity	Turbidity
Meter No.		90575	90340	N/A
Calibration Date/Time	NA	10/7/96 @ 1115	10/7/96 @ 1115	

Decontamination Methods	Wash		Rinse I		Rinse II		Rinse III	
	(DI)	Steam	(DI)	Steam	DI	Steam	DI	Steam
TSP	Tap	Hot	Tap	Hot	Tap	Hot	Tap	Hot
Alconox	(Other)	Cool	Other	(Cool)	Other	Cool	Other	Cool
Other: ALCONOX	ALCONOX							
Vol. (gal):	5g		5g					
Source:	BTEX		ALHAMBRA					
Decon. Notes:								

Development / Purge Record

Well Security: (good) fair poor Well Integrity (good) fair poor Locked: (yes) no

Purge Volume (CV) T.D. – DTW × Factor × 1 C.V = ~~40~~ gal

Well Diam.: ☐ 2" ☒ 4" 95' ft. – 78.18 ft. × (2"=0.175 4"=0.663) × 11.15 = ~~444~~ 444 gal 100g

Free Product?: Odor: (no) yes Floating Product: (none) sheen 25.73 film feet thick

								Replicate Goals
Time (24-hr)	1215	1220	1238	1245	1250			
Gallons Purged	0	25	~~220~~ 220	~~330~~ 330	~~440~~ 440			
Surged (minutes)	↑	N/A	2	→	→			(dev. only)
pH	S	7.98	7.52	7.71	7.72			±0.10
Temperature (°C)	T	22°C	20°C	19°C	19°C			±1°C
Cond. (µmhos/cm)	A	780	600	600	600			±10%
Salinity (‰)	R	.01	.01	.01	.01			±10%
Turbidity (NTU's)	T	N/A	→	→	→			<50 NTUs
Color	↓	CLEAR	CLEAR	CLEAR	CLEAR			Colorless
Depth to Water	78.18							±0.01'

Reference Point: (TOC) Other:

Sample Log

Sample #	Time	Quantity	Volume	Type	Preserv.	Filtration	Analysis	Lab
KMW-15	1253	3	1l	AMB	N/A	N/A	TPHd O/C	AEL
							BTEX / PAHs	
KMW51 (DUP)	1255	3	1l	AMB	N/A	N/A		

Misc

Other Observations:

Final Check: VOAs free of bubbles? yes / no / (NA) Well Locked? (yes) / no / NA

KA KLEINFELDER

WELL DEVELOPMENT & SAMPLING LOG

WELL NO. MW-10

Date: 10/7/96 Weather: CLEAR / WARM Sheet 3 of 6

Project: 10-1682-09 Submitted By: B. DIETZ Date:

Project No.: TIA Reviewed By: Date:

Purpose of Log ☐ Development ☒ Sampling

Equipment & Decontamination

Purging Equipment	Bailer	Disposable Bailer	Suction Pump	(Submersable Pump)	Dedicated Pump	Other:
Sampling Equipment	Bailer	(Disposable Bailer)	Suction Pump	Submersable Pump	Dedicated Pump	Other:

Test Equipment	Water Level	pH	Conductivity	Turbidity
Meter No.		90576	90340	N/A
Calibration Date/Time	NA	10/7/1116	10/7/1115	N/A

Decontamination Methods	Wash	Rinse I	Rinse II	Rinse III
	(DI) Steam	(DI) Steam	DI Steam	DI Steam
TSP	Tap Hot	Tap Hot	Tap Hot	Tap Hot
Alconox	Other Cool	Other Cool	Other Cool	Other Cool
Other: ALCONOX	ALCONOX+H2O			
Vol. (gal):	5g	6 g		
Source:	BLD	ALAMBRA		
Decon. Notes:				

Development / Purge Record

Well Security: (good) fair poor Well Integrity: (good) fair poor Locked: (yes) no

Purge Volume (CV) T.D. – DTW × Factor × 1 C.V = 22 gal

Well Diam.: ☐ 2" ☒ 4" 110 ft. – 76.76 ft. × (2"=0.175, 4"=0.663) × 22 = 88 gal

Free Product?: Odor: (no) yes Floating Product: (none) sheen film feet thick

								Replicate Goals
Time (24-hr)	1306	1315	1319	1324	1328			
Gallons Purged	0	22	44	66	88			
Surged (minutes)	↑	N/A						(dev. only)
pH	S	7.85	7.87	7.87	7.87			±0.10
Temperature (°C)	T	23°C	20°C	20°C	20°C			±1°C
Cond. (µmhos/cm)	A	700	650	650	650			±10%
Salinity (‰)	R	.01	.01	.01	.01			±10%
Turbidity (NTU's)	T	N/A	N/A	N/A	N/A			<50 NTUs
Color	↓	CLEAR	CLEAR	CLEAR	CLEAR			Colorless
Depth to Water								±0.01'

Reference Point: (TOC) Other:

Sample Log

Sample #	Time	Quantity	Volume	Type	Preserv.	Filtration	Analysis	Lab
KMW-10	1330	8	1L	AMB	N/A	N/A	PCB/PNA	AEN
							TPHd+OIL	

Misc

Other Observations:

Final Check: VOAs free of bubbles? yes / no / (NA) Well Locked? (yes) / no / NA

KA KLEINFELDER

WELL DEVELOPMENT & SAMPLING LOG

WELL NO. MW-3

Date: 10/7/96 Weather: SUNNY WARM Sheet 5 of 6

Project: I/A Submitted By: B DIETZ Date: /

Project No.: 10-1682-09 Reviewed By: - Date:

Purpose of Log ☐ Development ☑ Sampling

Equipment & Decontamination

Purging Equipment	Bailer	Disposable Bailer	Suction Pump	Submers-able Pump	Dedicated Pump	Other:
Sampling Equipment	Bailer	Disposable Bailer	Suction Pump	Submers-able Pump	Dedicated Pump	Other:

Test Equipment	Water Level	pH	Conductivity	Turbidity
Meter No.				
Calibration Date/Time	NA			

Decontamination Methods	Wash		Rinse I		Rinse II		Rinse III	
TSP	DI	Steam	DI	Steam	DI	Steam	DI	Steam
Alconox	Tap	Hot	Tap	Hot	Tap	Hot	Tap	Hot
Other:	Other	Cool	Other	Cool	Other	Cool	Other	Cool
Vol. (gal):								
Source:								
Decon. Notes:								

Development / Purge Record

Well Security: good fair poor Well Integrity: good fair poor Locked: yes no

Purge Volume (CV) T.D. – DTW × Factor × 1 C.V = gal

Well Diam.: ☐ 2" ☒ 4" 75.4 ft. – 74.8 ft. × 0.66 (2"=0.175, 4"=0.663) × = gal

Free Product?: Odor: no yes Floating Product: none sheen film feet thick

								Replicate Goals
Time (24-hr)								
Gallons Purged	0							(dev. only)
Surged (minutes)	↑							
pH	S							±0.10
Temperature (°C)	T							±1°C
Cond. (µmhos/cm)	A							±10%
Salinity (‰)	R							±10%
Turbidity (NTU's)	T							<50 NTUs
Color	↓							Colorless
Depth to Water								±0.01'

Reference Point: TOC Other:

Sample Log

Sample #	Time	Quantity	Volume	Type	Preserv.	Filtration	Analysis	Lab

Misc

Other Observations: WELL DRY UNABLE TO SAMPLE

Final Check: VOAs free of bubbles? yes / no / NA Well Locked? yes / no / NA

KA KLEINFELDER

WELL DEVELOPMENT & SAMPLING LOG

WELL NO. MW-2

Date: 10/7/96 Weather: SUNNY/WARM Sheet 6 of 6

Project: FIA Submitted By: B. DIETZ Date:

Project No.: 10/1682-09 Reviewed By: Date:

Purpose of Log ☐ Development ☒ Sampling

Equipment & Decontamination

	Bailer	Disposable Bailer	Suction Pump	Submersable Pump	Dedicated Pump	Other:
Purging Equipment				(Submersable Pump)		
Sampling Equipment		(Disposable Bailer)				

Test Equipment	Water Level	pH	Conductivity	Turbidity
Meter No.		90575	90340	N/A
Calibration Date/Time	NA	10/7/96 @1115	10/7/96 @1115	N/A

Decontamination Methods	Wash		Rinse I		Rinse II		Rinse III	
	(DI) Tap	Steam Hot	(DI) Tap	Steam Hot	DI Tap	Steam Hot	DI Tap	Steam Hot
TSP	(Alconox)	Cool	Other	Cool	Other	Cool	Other	Cool
Other: ALCONOX	(Other) DI + ALCONOX							
Vol. (gal):	5g		2g					
Source:	BLD		ALHAMBRA					
Decon. Notes:								

Development / Purge Record

Well Security: good (fair) poor Well Integrity: good (fair) poor Locked: yes (no)

Purge Volume (CV) T.D. − DTW × Factor × 1 C.V = 7.35 gal

Well Diam.: ☐ 2" ☒ 4" 90 ft. − 78.91 ft. × (1"=0.175 4"=0.663) × 7.35 = 29.4 gal

Free Product?: Odor: no (yes)* Floating Product: none (sheen)* film ____ feet thick

								Replicate Goals
Time (24-hr)	1425	1431	1440	1444	1450			
Gallons Purged	0	7	14	22	29.5			
Surged (minutes)	↑	N/A	→	→	→			(dev. only)
pH	S	7.55	7.51	7.56	7.56			±0.10
Temperature (°C)	T	25°C	25°C	22°C	22°C			±1°C
Cond. (µmhos/cm)	A	800	700	700	700			±10%
Salinity (‰)	R	.01‰	.01‰	.01	.01			±10%
Turbidity (NTU's)	T	N/A	→	→	→			<50 NTUs
Color	↓	CLEAR	CLDY	CLDY	CLDY			Colorless
Depth to Water	78.91							±0.01'

Reference Point: (TOC) Other:

Sample Log

Sample #	Time	Quantity	Volume	Type	Preserv.	Filtration	Analysis	Lab
KMW#1	1456	4	1L	AMB	N/A	N/A	TPH-G/BTEX/MTBE	ARI
							PCB	

Misc

Other Observations: STRONG PETROLEUM ODOR. FREE PRODUCT VISIBLE, ALTHOUGH IMMEASURABLE

Final Check: VOAs free of bubbles? (yes) / no / (NA) BD Well Locked? (yes) / no / NA

KA KLEINFELDER

WELL DEVELOPMENT & SAMPLING LOG

WELL NO. MW-1

Date: 10/7/96 Weather: SUNNY/WARM Sheet 4 of 6

Project: I/A Submitted By: B DIETZ Date:

Project No.: 10-1682-09 Reviewed By: Date:

Purpose of Log ☐ Development ☐ Sampling

Equipment & Decontamination

Purging Equipment	Bailer	(Disposable Bailer)	Suction Pump	(Submersable Pump)	Dedicated Pump	Other:
Sampling Equipment	Bailer	(Disposable Bailer)	Suction Pump	Submersable Pump	Dedicated Pump	Other:

Test Equipment	Water Level	pH	Conductivity	Turbidity
Meter No.		90575	90340	N/A
Calibration Date/Time	NA	10/7@1115	10/7@1115	N/A

Decontamination Methods	Wash	Rinse I	Rinse II	Rinse III
	(DI) Steam	(DI) Steam	DI Steam	DI Steam
	Tap Hot	Tap Hot	Tap Hot	Tap Hot
TSP (Alconox) DI	Other Cool	Other Cool	Other Cool	Other Cool
Other: N/A				
Vol. (gal):	DISPOSAL			
Source:	N/A			
Decon. Notes:				

Development / Purge Record

Well Security: (good) fair poor Well Integrity: good (fair) poor Locked: (yes) no

Purge Volume (CV) T.D. 87.4 ft. – DTW 78.79 ft. × Factor (2"=0.175, 4"=0.663) × 1 C.V (1.5) = 1.50 gal

Well Diam.: (2") 4" = 6.0 gal

Free Product?: Odor: no (yes) Floating Product: (none) sheen film feet thick

Time (24-hr)		1334	1338	1339	1343	1352			Replicate Goals
Gallons Purged	0	1.5	3.0	4.5	6.0				
Surged (minutes)	↑	N/A	→	→	→				(dev. only)
pH	S	7.52	7.37	7.39	7.39				±0.10
Temperature (°C)	T	22C	21C	21C	21C				±1°C
Cond. (µmhos/cm)	A	1100	1100	1100	1100				±10%
Salinity (‰)	R	.01	.01	.01	.01				±10%
Turbidity (NTU's)	T	N/A	→	→	→				<50 NTUs
Color	↓	VLDY	→	→	→				Colorless
Depth to Water		78.79							±0.01'

Reference Point: (TOC) Other:

Sample Log

Sample #	Time	Quantity	Volume	Type	Preserv.	Filtration	Analysis	Lab
KMW-1	1405	4	1 L	AMB	N/A	N/A	PNA/PCB	AEN
							TPHd+OIL	

Misc

Other Observations: FREE PRODUCT VISIBLE THROUGHOUT PURGE & IN SAMPLE. OILY DOTS. BAILER LT COATED OF TAR LIKE SUBSTANCE. HOWEVER PRODUCT IS IMMEASURABLE

Final Check: VOAs free of bubbles? yes / no (NA) Well Locked? yes / no / NA

KA KLEINFELDER Dissolved Oxygen (mg/L) @ Depths of 2, 10, 25' below water table.

RECORD OF ~~WATER LEVEL~~ MEASUREMENTS

Date: 4/29 - 4/30/97 Weather: Clear Sheet 1 of 1

Project: Industrial Asphalt Submitted By: LBR Date: 5/1/97

Project No.: 10-1682-09/604 Reviewed By: Date:

Instrument Number: TEMP °C / DO (mg/L

Well Number	Time (opened/measured)	Sensitivity Setting	Measuring Point	Measurement	Replicate Measurements (if requested)		DO	Notes	25' below H2O table	S (locked?)
	(24-hr)	(est. %)	(M.P.)	1	2	3	2	10		
MW-1							17.5/0.2	17.5/0.1		
MW-2							18.1/0.2	18.1/0.1		
~~MW-3~~	Dry									
MW-4	Buried.									
MW-5				83.71			82.71 16.1/2.15	93.71 16.0/1.8	103 ft 16.0/1.4	
MW-6							17.5/1.8	17.3/2.0	17.3/0.2	
MW-7				76.38			78.38 17.1/0.09	86.38 17.1/0.2	101.38 17.0/0.9	
MW-8							17.8/0.3	17.6/0.3	17.5/0.2	
~~MW-9~~										
MW-10	Buried									
~~MW-11~~										
~~MW-12~~										
~~MW-13~~										
MW-14							17.9/2.3	17.6/2.1	17.4/0.8	
MW-15							17.2/2.1	17.2/1.8	17.1/0.7	
MW-16				75.88			77.88 17.5/3.2	85.82 17.2/3.4	100.88 17.2/1.8	
14A2							17.5/5.3			
EW-8										

M.P.: TOC, GS, Cover ring, Other: All Wells Locked – YES / NO

jett b:\WL-FORM.XLS, 6/20/95, DRAFT FINAL

Sampling order: Tap, 4, 5, 6, 7, 14, 16,

KA KLEINFELDER

RECORD OF WATER LEVEL MEASUREMENTS

Date: 4/28/97/4/3/97 Weather: Clear Sheet 1 of 1

Project: Industrial Asphalt Submitted By: KBR Date: 5/1/97

Project No.: Reviewed By: Date:

Instrument Number:

Well Number	Time (opened/measured) (24-hr)	Sensitivity Setting (est. %)	Measuring Point (M.P.)	Measurement 1	Replicate Measurements (if requested) 2	3	Notes			(locked?)	
MW-1	1209/11:15	400	TOC	76.23			Totally submersed in mud				4/29
MW-2	10:59/11:30			76.36							4/28
MW-3	11:30/			Dry	cannot be measured or Sampled.						
MW-4	Buried										
MW-5	12:30/			83.71							
MW-6	12:23/13:32			75.42			covered with Dirt Christy cover broken				
MW-7	12:34/13:28			76.38							
MW-8	10:05/9:00			74.89			buried in mud.				4/29
MW-9	Buried										
MW-10	Buried.										
MW-11	Abandoned										
MW-12	Does not exist										
MW-13	Does not exist.										
MW-14	10:57/16:19			76.51							
MW-15	10:55/9:30			75.48							
MW-16	11:46/8:35			75.88			Pot Dirt in well cap laid down				4/29
14A2	NA										
JMW1	12:27/16:12	"	"	76.95							

M.P.: TOC, GS, Cover ring, Other: All Wells Locked -- YES / NO

jet b:\WL-FORM.XLS, 6/20/95, DRAFT FINAL

sampling order → TOP, 14A2, Buried MW-4, 6, 8, 14, 14R, 15, 1, buried 5, 2, 7 dry

KA KLEINFELDER

WELL DEVELOPMENT & SAMPLING LOG

WELL NO. 14A2

Date: 4-29-97 Weather: Clear Sheet 1 of 1

Project: Industrial Asphalt Submitted By: KBR Date: 5/1/97

Project Number: 10-1682-09 Reviewed By: Date:

Purpose of Log ☐ Development ☒ Sampling

Equipment & Decontamination

Purging Equipment NA	Bailer	Disposable Bailer	Suction Pump	Submers-able Pump	Dedicated Pump	Other:	
Sampling Equipment	Bailer	Disposable Bailer	Suction Pump	2" Submers-able Pump	Dedicated Pump	Other: TAP	

Test Equipment	Water Level	pH	Conductivity	Turbidity
Meter No.		90292	02154	
Calibration Date/Time		NA		

Decontamination Methods	Wash		Rinse I		Rinse II		Rinse III	
TSP	DI	Steam	DI	Steam	DI	Steam	DI	Steam
Alconox	Tap	Hot	Tap	Hot	Tap	Hot	Tap	Hot
Other:	Other	Cold	Other	Cold	Other	Cold	Other	Cold
Vol. (gal):			NA					
Water Source:								
Decon. Notes:								

Development / Purge Record

Well Security: good fair poor Well Integrity: good fair poor Locked: yes no

Purge Volume (CV) T.D. – DTW X Factor 1 C.V. X __ C.V.

Well Diam.: ☐ 2" ☐ 4" ft. – ft. X 2"=0.175 4"=0.663 X

Free Product?: Odor: no yes Floating Product: none sheen film feet thick

Time (24-hr)								Replicate
Gallons Purged	0							Goals
pH	↑		NA					±0.50
Temperature (°C)	S							±10%
Cond. (µmhos/cm)	T							±10%
Salinity (‰)	A							±10%
Turbidity (NTU's)	R							<50 NTUs
Color	T							Colorless
Depth to Water	↓							

Reference Point: TOC Other:

Sample Log

Sample Number	Time	Quantity	Volume	Type	Preserv.	Filtration	Analysis	Lab
14A2	12:35	2	1L	Amber	—	—	TPH-d	
							TPH-mo	A
								E
								N

Misc

Other Observations:

Final Check: VOAs free of bubbles? yes / no / NA Well Locked? yes / no / NA

KA KLEINFELDER

WELL DEVELOPMENT & SAMPLING LOG

WELL NO. MW-1

Date: 4-30-97 Weather: Clear Breezy ≈65°F Sheet 1 of 1

Project: Industrial Asphalt Submitted By: KBR Date: 5/1/97

Project Number: 10-1682-09 Reviewed By: Date:

Purpose of Log ☐ Development ☒ Sampling

Equipment & Decontamination

Purging Equipment	Bailer	Disposable Bailer	Suction Pump	Submersable Pump	Dedicated Pump	Other:
Sampling Equipment	Bailer	Disposable Bailer	Suction Pump	2" Submersable Pump	Dedicated Pump	Other:

Test Equipment	Water Level	pH	Conductivity	Turbidity
Meter No.		90292	02154	
Calibration Date/Time		4-30-97	→	

Decontamination Methods	Wash		Rinse I		Rinse II		Rinse III	
	DI	Steam	DI	Steam	DI	Steam	DI	Steam
TSP	Tap	Hot	Tap	Hot	Tap	Hot	Tap	Hot
Alconox	Other	Cold	Other	Cold	Other	Cold	Other	Cold
Other:			N/A					
Vol. (gal):								
Water Source:								
Decon. Notes:								

Development / Purge Record

Well Security: good fair (poor) Well Integrity: good (fair) poor Locked: yes (no)

Purge Volume (CV) T.D. – DTW X Factor 1 C.V. X ~~3~~ C.V.

Well Diam.: ~~☒~~ 2" ☐ 4" 87.4 ft. – 76.23 ft. X (2"=0.17, 4"=0.66) ~~7.52~~ X ~~22.5~~ 6

Free Product?: Odor: no (yes) Floating Product: none (sheen) ~~& spots~~ film _____ feet thick

Time (24-hr)	13:25	15:30	15:37	15:44				Replicate
Gallons Purged	0	2	4	6				Goals
pH	↑	6.83	6.82	6.91				±0.50
Temperature (°C)	S	18.7	18.5	18.5				±10%
Cond. (µmhos/cm)	T	610	610	610				±10%
Salinity (‰)	A	0.5	0.5	0.5				±10%
Turbidity (NTU's)	R							<50 NTUs
Color	T	Silty	brown →					Colorless
Depth to Water	↓							

Reference Point: TOC Other:

Sample Log

Sample Number	Time	Quantity	Volume	Type	Preserv.	Filtration	Analysis	Lab
MW-1	15:50	2	1L	Amber	—	—	TPH-d	
							TPH-mo	A
		1	1L	Amber	—	—	PCBs	E
								N

Misc

Other Observations: Stiff screw on PVC cap was ~~frozen on~~ cross threaded on. When you try to remove it the stiff fitting below it comes off with it.

Final Check: VOAs free of bubbles? yes / no (NA) Well Locked? yes / no (NA)

KA KLEINFELDER

WELL DEVELOPMENT & SAMPLING LOG

WELL NO. MW-2

Date: 4-30-97 Weather: Clear, Breezy, ~65°F Sheet 1 of 1

Project: Industrial Asphalt Submitted By: KBR Date: 5/1/97

Project Number: 10-1682-09 Reviewed By: Date:

Purpose of Log ☐ Development ☒ Sampling

Equipment & Decontamination

Purging Equipment	Bailer	Disposable Bailer	Suction Pump	(Submersible Pump)	Dedicated Pump	Other:
Sampling Equipment	Bailer	(Disposable Bailer)	Suction Pump	2" Submersible Pump	Dedicated Pump	Other:

Test Equipment	Water Level	pH	Conductivity	Turbidity
Meter No.		90292	02154	
Calibration Date/Time		4-30-97 →		

Decontamination Methods	Wash	Rinse I	Rinse II	Rinse III
	DI (Tap) Other / Steam Hot (Cold)	DI (Tap) Other / Steam Hot (Cold)	DI (Tap) Other / Steam Hot (Cold)	(DI) Tap Other / Steam Hot (Cold)
TSP / Alconox / Other: Liquinox				
Vol. (gal):	2-3	2-3	2-3	1-2
Water Source:	Warehouse →	→	→	Alambra
Decon. Notes:	Hose scrubbed as it was removed...			

Development / Purge Record

Well Security: (good) fair poor Well Integrity: (good) fair poor Locked: (yes) no

Purge Volume (CV) T.D. – DTW X Factor 1 C.V. X 3 C.V.

Well Diam.: ☐ 2" ☒ 4" 90 ft. – 76.36 ft. X (2"=0.175, 4"=0.653) 9 X 27

Free Product?: Odor: no (yes) strong Floating Product: none (sheen) film feet thick

Time (24-hr)	14:07	14:08	14:10	14:12	14:14	14:16	14:17	Replicate
Gallons Purged	0	5	10	15	20	25	27	Goals
pH	↑	6.97	6.92	6.85	6.85	6.85	6.85	±0.50
Temperature (°C)	S	20.0	19.8	19.7	19.7	19.8	19.7	±10%
Cond. (µmhos/cm)	T	700	710	710	710	710	710	±10%
Salinity (‰)	A	0.5	0.5	0.5	0.5	0.5	0.5	±10%
Turbidity (NTU's)	R							<50 NTUs
Color	T	Slightly	cloudy →	→	→	→	→	Colorless
Depth to Water	↓							

Reference Point: TOC Other:

Sample Log

Sample Number	Time	Quantity	Volume	Type	Preserv.	Filtration	Analysis	Lab
MW-2	15:00	2	1L	Amber	—	—	TPH-d	
							TPH-mo	A
		1	1L	Amber	—	—	PCBs	E
							8080	N

Misc

Other Observations: Product like goo on edge of pump housing and on bailer when sampling

Final Check: VOAs free of bubbles? yes / no / (NA) Well Locked? (yes) / no / NA

KA KLEINFELDER

WELL DEVELOPMENT & SAMPLING LOG

WELL NO. MW-5

Date: 4-29-97 Weather: ~~Clear~~ PC / Breezy ~70°F Sheet of

Project: Industrial Asphalt Submitted By: KBR Date: 5/1/97

Project Number: 10-1682-09 Reviewed By: Date:

Purpose of Log ☐ Development ☒ Sampling

Equipment & Decontamination

Purging Equipment	Bailer	Disposable Bailer	Suction Pump	(Submersable Pump)	Dedicated Pump	Other:
Sampling Equipment	Bailer	(Disposable Bailer)	Suction Pump	2" Submersable Pump	Dedicated Pump	Other:

Test Equipment	Water Level	pH	Conductivity	Turbidity
Meter No.		90292	02154	
Calibration Date/Time		4-29-97 →	→	

Decontamination Methods	Wash		Rinse I		Rinse II		Rinse III	
TSP / Alconox / Other: Liquinox	(DI) Tap Other	Steam Hot (Cold)	(DI) Tap Other	Steam Hot (Cold)	(DI) Tap Other	Steam Hot (Cold)	(DI) Tap Other	Steam Hot (Cold)
Vol. (gal):	2-3		2-3		2-3		1-2	
Water Source:	warehouse	→	→	→	→	→	Alambra.	

Decon. Notes: Hose & Scrubber & Rinsed as removed

Development / Purge Record

Well Security: (good) fair poor Well Integrity (good) fair poor Locked: (yes) no

Purge Volume (CV): T.D. 110.4 ft. – DTW 83.71 ft. X Factor (2"=0.17, 4"=0.65) 17.7 X 3 C.V.

Well Diam.: ☐ 2" ☒ 4" X (none) sheen film feet thick

Free Product?: Odor: (no) yes Floating Product:

Time (24-hr)	13:14	13:19	13:21	13:23	13:26	13:28	13:29	Replicate Goals
Gallons Purged	0	10.	20	30.	40	50	53	
pH	↑	6.97	7.02	7.09	7.11	7.11	7.11	±0.50
Temperature (°C)	S	17.1	17.1	17.0	17.0	17.0	17.0	±10%
Cond. (µmhos/cm)	T	550	550	550	530	536	530	±10%
Salinity (‰)	A	0.5	0.5	0.5	0.40	0.40	0.40	±10%
Turbidity (NTU's)	R							<50 NTUs
Color	T	clear	→	→	→	→	→	Colorless
Depth to Water	↓							

Reference Point: TOC Other:

Sample Log

Sample Number	Time	Quantity	Volume	Type	Preserv.	Filtration	Analysis	Lab
MW-5	13:55	2	1L	Amber	—	—	TPH-d	
							TPH-mo	A
								E
								N

Misc

Other Observations:

Final Check: VOAs free of bubbles? yes / no / (NA) Well Locked? (yes) / no / NA

KA KLEINFELDER

WELL DEVELOPMENT & SAMPLING LOG

WELL NO. MW-6

Date: 4-29 30-97 Weather: Clear ~ 60°F Sheet 1 of 1

Project: Industrial Asphalt Submitted By: KBR Date: 5/1/97

Project Number: 10-1682-09 Reviewed By: Date:

Purpose of Log ☐ Development ☒ Sampling

Equipment & Decontamination

Purging Equipment	Bailer	Disposable Bailer	Suction Pump	(Submersable Pump)	Dedicated Pump	Other:
Sampling Equipment	Bailer	(Disposable Bailer)	Suction Pump	2" Submersable Pump	Dedicated Pump	Other:

Test Equipment	Water Level	pH	Conductivity	Turbidity
Meter No.		90292	02154	
Calibration Date/Time		4-30-97	→	

Decontamination Methods	Wash		Rinse I		Rinse II		Rinse III	
	DI	Steam	DI	Steam	DI	Steam	(DI)	Steam
TSP	(Tap)	Hot	(Tap)	Hot	(Tap)	Hot	Tap	Hot
Alconox	Other	(Cold)	Other	(Cold)	Other	(Cold)	Other	(Cold)
Other: Ligunox								
Vol. (gal):	2-3		2-3		2-3		1-2	
Water Source:	Warehouse	→	→	→	→	→	Alambra	

Decon. Notes: Hose scrubbed & Rinsed as it was removed.

Development / Purge Record

Well Security: good fair (poor) Well Integrity: good fair (poor) Locked: yes (no)

Purge Volume (CV)	T.D.	–	DTW	X	Factor	1 C.V.	X	3 C.V.
Well Diam.: ☐ 2" ☒ 4"	106 ft.	–	75.42 ft.	X	2"=0.175 (4"=0.65)	20	X	60

Free Product?: Odor: (no) yes Floating Product: (none) sheen film feet thick

Time (24-hr)	7:25	7:24	7:27	7:29	7:32	7:34	7:37	Replicate Goals
Gallons Purged	0	10	20	30 KP	40	50	60	
pH	↑	6.70	6.87	6.96	6.97	6.98	6.99	±0.50
Temperature (°C)	S	17.0	17.5	17.7	17.8	17.8	17.8	±10%
Cond. (µmhos/cm)	T	620	620	620	620	620	620	±10%
Salinity (‰)	A	0.40	0.40	0.40	0.40	0.40	0.40	±10%
Turbidity (NTU's)	R							<50 NTUs
Color	T	Light brown cloudy	slightly cloudy	Clear	→	→	→	Colorless
Depth to Water	↓							

Reference Point: TOC Other:

Sample Log

Sample Number	Time	Quantity	Volume	Type	Preserv.	Filtration	Analysis	Lab
MW-6	8:00	2	1L	Amber	—	—	TPH-d	
							TPH-mo	A
								E
								N

Misc

Other Observations: Christy box cover broken

Final Check: VOAs free of bubbles? yes / no / (NA) Well Locked? (yes) / no / NA

KA KLEINFELDER

WELL DEVELOPMENT & SAMPLING LOG

WELL NO. MW-7

Date: 4-30-97 Weather: Clear ≈ 65°F Sheet 1 of 1

Project: Industrial Asphalt Submitted By: KBR Date: 5/1/97

Project Number: 10-1682-09 Reviewed By: Date:

Purpose of Log ☐ Development ☒ Sampling

Equipment & Decontamination

Purging Equipment	Bailer	Disposable Bailer	Suction Pump	(Submersable Pump)	Dedicated Pump	Other:
Sampling Equipment	Bailer	(Disposable Bailer)	Suction Pump	2" Submersable Pump	Dedicated Pump	Other:

Test Equipment	Water Level	pH	Conductivity	Turbidity
Meter No.		90292	02154	
Calibration Date/Time		4-30-97	4-30-97	NA

Decontamination Methods	Wash		Rinse I		Rinse II		Rinse III	
	DI	Steam	DI	Steam	DI	Steam	DI	Steam
TSP	(Tap)	Hot	(Tap)	Hot	(Tap)	Hot	(Tap)	Hot
Alconox	Other	(Cold)	Other	(Cold)	Other	(Cold)	Other	(Cold)
Other: Liquinox								
Vol. (gal):	2-3		2-3		2-3		1-2	
Water Source:	Warehouse						Alambra.	
Decon. Notes:	Hose Scrubbed & Rinsed as it was removed.							

Development / Purge Record

Well Security: (good) fair poor Well Integrity: (good) fair poor Locked: yes no

Purge Volume (CV) T.D. 108 ft. – DTW 76.38ft. X Factor (1-0.562) 1 C.V. 21 X 3 C.V. 63

Well Diam.: ☐ 2" ☒ 4" Free Product?: Odor: (no) yes Floating Product: (none) sheen film feet thick

Time (24-hr)	8:24	8:26	8:29	8:31	8:34	8:36	8:39	Replicate Goals
Gallons Purged	0	10	20	30	40	50	63	
pH	↑	7.11	6.91	6.95	6.95	6.95	6.96	±0.50
Temperature (°C)	S	17.4	17.8	18.0	18.0	18.1	18.1	±10%
Cond. (µmhos/cm)	T	610	610	610	600	600	610	±10%
Salinity (‰)	A	0.5	0.5	0.5	0.5	0.5	0.5	±10%
Turbidity (NTU's)	R							<50 NTUs
Color	T	Clear	→	→	→	→	→	Colorless
Depth to Water	↓							

Reference Point: TOC Other:

Sample Log

Sample Number	Time	Quantity	Volume	Type	Preserv.	Filtration	Analysis	Lab
MW-7	9:00	2	1L	Amber	—	—	TPH-d	
							TPH-mo	A
								E
								N

Misc

Other Observations:

Final Check: VOAs free of bubbles? yes / no / (NA) Well Locked? (yes) / no / NA

KA KLEINFELDER

WELL DEVELOPMENT & SAMPLING LOG

WELL NO. MW-8

Date: 4-30-97 Weather: Clear x 68°F

Sheet 1 of 1

Project: Industrial Asphalt Submitted By: KBR

Date: 5/1/97

Project Number: 10-1682-09 Reviewed By:

Date:

Purpose of Log ☐ Development ☒ Sampling

Equipment & Decontamination

Purging Equipment	Bailer	Disposable Bailer	Suction Pump	(Submersable Pump)	Dedicated Pump	Other:
Sampling Equipment	Bailer	(Disposable Bailer)	Suction Pump	2" Submersable Pump	Dedicated Pump	Other:

Test Equipment	Water Level	pH	Conductivity	Turbidity
Meter No.		90292	02154	
Calibration Date/Time		4-30-97		

Decontamination Methods	Wash	Rinse I	Rinse II	Rinse III
	DI (Tap) Other; Steam Hot (Cold)	DI (Tap) Other; Steam Hot (Cold)	DI (Tap) Other; Steam Hot (Cold)	DI (Tap) K-P Other; Steam Hot (Cold)
TSP / Alconox / Other: Liquinox				
Vol. (gal):	2-3	2-3	2-3	1-2
Water Source:	Warehouse			Alhambra.
Decon. Notes:	Hose scrubbed as H was removed.			

Development / Purge Record

Well Security: good (fair) poor Well Integrity: good fair poor Locked: (yes) no

Purge Volume (CV) T.D. – DTW X Factor 1 C.V. X 3 C.V.

Well Diam.: ☐ 2" ~~4"~~ 108 ft. – 74.89 ft. X (1"=0.163 4"=0.653) 22 X 66 feet thick

Free Product?: Odor: no (yes) Floating Product: (none) sheen film

Appeared after 40 gallons

Time (24-hr)		11:36	11:42	11:44	11:48	11:51	11:54	11:58	Replicate Goals
Gallons Purged		0	10	20	30	40	50	66	
pH	↑	7.00	6.92	6.93	6.94	6.94	6.94	±0.50
Temperature (°C)	S	19.8	19.9	19.9	19.9	19.9	19.9	±10%
Cond. (µmhos/cm)	T	650	660	660	660	660	660	±10%
Salinity (‰)	A	0.50	0.50	0.50	0.50	0.50	0.50	±10%
Turbidity (NTU's)	R							<50 NTUs
Color	T	Clear	→	→	→	→	→	Colorless
Depth to Water	↓							

Reference Point: TOC Other:

Sample Log

Sample Number	Time	Quantity	Volume	Type	Preserv.	Filtration	Analysis	Lab
MW-8	12:15	2	1L	Amber	—	—	TPH-d	
		~~4~~	~~1L~~	~~Amber~~	K-P	—	TPH-mo	A
		1	1L	Amber	—	—	PCBs	E
							8080	N
Duplicate Well MW-18	12:30	same	as	above				

Misc

Other Observations: Duplicate sample taken (MW-18)

Final Check: VOAs free of bubbles? yes / no / (NA) Well Locked? (yes) / no / NA

KA KLEINFELDER

WELL DEVELOPMENT & SAMPLING LOG

WELL NO. MW-14

Date: 4-30-97 Weather: Clear ≈65°F Sheet 1 of 1

Project: Industrial Asphalt Submitted By: KBR Date: 5/1/97

Project Number: 10-1682-09 Reviewed By: Date:

Purpose of Log ☐ Development ☒ Sampling

Equipment & Decontamination

Purging Equipment	Bailer	Disposable Bailer	Suction Pump	(Submersable Pump)	Dedicated Pump	Other:
Sampling Equipment	Bailer	(Disposable Bailer)	Suction Pump	2" Submersable Pump	Dedicated Pump	Other:

Test Equipment	Water Level	pH	Conductivity	Turbidity
Meter No.		90292	02154	
Calibration Date/Time		4-30-97 →	→	

Decontamination Methods	Wash		Rinse I		Rinse II		Rinse III	
	DI	Steam	DI	Steam	DI	Steam	(DI)	Steam
TSP	(Tap)	Hot	(Tap)	Hot	(Tap)	Hot	Tap	Hot
Alconox	Other	(Cold)	Other	(Cold)	Other	(Cold)	Other	(Cold)
Other: Liquinox								
Vol. (gal):	2-3		2-3		2-3		1-2	
Water Source:	Warehouse →		→		→		Alambra	
Decon. Notes:	Hose scrubbed & Rinsed while being removed.							

Development / Purge Record

Well Security: (good) fair poor Well Integrity: (good) fair poor Locked: (yes) no

Purge Volume (CV) T.D. 11.4 ft. – DTW 7.51 ft. X Factor (0.66) 1 C.V. 2.5 X 3 C.V. 7.5

Well Diam.: ☐ 2" ☒ 4" Free Product?: Odor: (no) yes Floating Product: (none) sheen film feet thick

	↑ / S / T / A / R / T / ↓							
Time (24-hr)	9:34	9:38	9:42	9:47	9:52	9:57		Replicate Goals
Gallons Purged	0	15	30	45	60	75		
pH		7.34	7.24	7.22	7.23	7.22		±0.50
Temperature (°C)		18.8	19.0	19.1	19.5	19.5		±10%
Cond. (µmhos/cm)		610	610	610	610	610		±10%
Salinity (‰)		0.50	0.50	0.50	0.5	0.5		±10%
Turbidity (NTU's)								<50 NTUs
Color		Slightly cloudy	→	→	→	→		Colorless
Depth to Water								

Reference Point: TOC Other:

Sample Log

Sample Number	Time	Quantity	Volume	Type	Preserv.	Filtration	Analysis	Lab
MW-14	10:15	2	1L	Amber	—	—	TPH-d	
							TPH-mo	A
								E
								N

Misc

Other Observations:

Final Check: VOAs free of bubbles? yes / no / (NA) Well Locked? (yes) / no / NA

KA KLEINFELDER

WELL DEVELOPMENT & SAMPLING LOG

WELL NO. MW-15

Date: 4-30-97 Weather: Clear, Breezy ~65°F Sheet 1 of 1

Project: Industrial Asphalt Submitted By: KBR Date: 5/1/97

Project Number: 10-1682-09 Reviewed By: Date:

Purpose of Log ☐ Development ☒ Sampling

Equipment & Decontamination

Purging Equipment	Bailer	Disposable Bailer	Suction Pump	(Submersable Pump)	Dedicated Pump	Other:
Sampling Equipment	Bailer	(Disposable Bailer)	Suction Pump	2" Submersable Pump	Dedicated Pump	Other:

Test Equipment	Water Level	pH	Conductivity	Turbidity
Meter No.		90292	02154	
Calibration Date/Time		4-30-97 →	→	

Decontamination Methods	Wash	Rinse I	Rinse II	Rinse III
	DI (Tap) Steam Hot Cold Other	DI (Tap) Steam Hot Cold Other	DI (Tap) Steam Hot Cold Other	DI (Tap) Steam Hot Cold Other
TSP / Alconox / Other: Liquinox				
Vol. (gal):	~2-3	2-3	2-3	1-2
Water Source:	warehouse →	→	→	→ Alambra.
Decon. Notes:	Hose scrubbed as it was removed.			

Development / Purge Record

Well Security: good (fair) poor Well Integrity: good (fair) poor Locked: (yes) no

Purge Volume (CV): T.D. 117 ft. − DTW 75.48 ft. X Factor (2"=0.175, 4"=0.661) 1 C.V. 28 X 3 C.V. 84

Well Diam.: ☐ 2" ☒ 4" Free Product?: Odor: (no) yes Floating Product: (none) sheen film feet thick

Time (24-hr)	13:17	13:21	13:24	13:28	13:31	13:35	1338	Replicate Goals
Gallons Purged	0	14	28	42	56	70	84	
pH	↑	7.19	7.10	7.09	7.08	7.08	7.08	±0.50
Temperature (°C)	S	18.5	18.2	18.0	18.1	18.0	18.0	±10%
Cond. (µmhos/cm)	T	620	640	650	630	630	636	±10%
Salinity (‰)	A	0.5	0.5	0.5	0.5	0.5	0.5	±10%
Turbidity (NTU's)	R							<50 NTUs
Color	T	clear	→	→	→	→	→	Colorless
Depth to Water	↓							

Reference Point: TOC Other:

Sample Log

Sample Number	Time	Quantity	Volume	Type	Preserv.	Filtration	Analysis	Lab
MW-15	13:50	2	1L	Amber	—	—	TPH-d	
							TPH-mo	A
								E
								N

Misc

Other Observations:

Final Check: VOAs free of bubbles? yes / no / (NA) Well Locked? (yes) / no / NA

jett b:\PURGELOG.XLS — General, 6/20/95 DRAFT FINAL

KA KLEINFELDER

WELL DEVELOPMENT & SAMPLING LOG

WELL NO. MW-16

Date: 4-30-97 Weather: Clear ~60°F Sheet 1 of 1

Project: Industrial Asphalt Submitted By: KBR Date: 5/1/97

Project Number: 10-1682-09 Reviewed By: Date:

Purpose of Log ☐ Development ☒ Sampling

Equipment & Decontamination

Purging Equipment	Bailer	Disposable Bailer	Suction Pump	(Submersable Pump)	Dedicated Pump	Other:
Sampling Equipment	Bailer	(Disposable Bailer)	Suction Pump	2" Submersable Pump	Dedicated Pump	Other:

Test Equipment	Water Level	pH	Conductivity	Turbidity
Meter No.		90292	02154	
Calibration Date/Time		4-30-97	4-30-97	

Decontamination Methods	Wash	Rinse I	Rinse II	Rinse III
	DI (Tap) Steam Hot (Cold)	DI (Tap) Steam Hot (Cold)	DI (Tap) Steam Hot (Cold)	(DI) Tap Steam Hot (Cold)
TSP / Alconox / Other: Liquinox	Other	Other	Other	Other
Vol. (gal):	2-3	2-3	2-3	1-2
Water Source:	Warehouse →	→	→	Alambra
Decon. Notes:	Hose scrubbed as it was removed			

Development / Purge Record

Well Security: good fair (poor) Well Integrity: good fair (poor) Locked: yes (no)

Purge Volume (CV) T.D. 109 ft. – DTW 75.88ft. X Factor (2"=0.163 4"=0.653) 1 C.V. 22 X 3 C.V. 66

Well Diam.: ☐ 2" ☒ 4" Free Product?: Odor: no yes Floating Product: none sheen film feet thick

Time (24-hr)	10:38	10:41	10:44	10:46	10:49	10:51	10:55	Replicate Goals
Gallons Purged	0	16	20	30	40	50	66	
pH	↑	7.13	7.09	7.08	7.08	7.08	7.07	±0.50
Temperature (°C)	S	18.9	18.8	18.8	18.9	18.8	18.8	±10%
Cond. (µmhos/cm)	T	660	640	640	640	630	630	±10%
Salinity (‰)	A	0.50	0.40	0.50	0.50	0.50	0.50	±10%
Turbidity (NTU's)	R							<50 NTUs
Color	T	silty (brown)	→	→	→	→	→	Colorless
Depth to Water	↓							

Reference Point: TOC Other:

Sample Log

Sample Number	Time	Quantity	Volume	Type	Preserv.	Filtration	Analysis	Lab
MW-16	11:15	2	1L	Amber	—	—	TPH-d	
							TPH-mo	A
								E
								N

Misc

Other Observations: Christy cover destroyed, christy casing damaged. When taking H2O levels ~1' of dirt was in well (expansion cap shoved down with dirt over it) Put steel water cover over to protect well

Final Check: VOAs free of bubbles? yes / no (NA) Well Locked? yes / (no) NA

APPENDIX C

American Environmental Network

Certificate of Analysis

DOHS Certification: 1172 AIHA Accreditation: 11134

KLEINFELDER, INC.
7133 KOLL CENTER PARKWAY,
SUITE 100
PLEASANTON, CA 94566

ATTN: DAN CARROLL
CLIENT PROJ. ID: 10-1682-09/603
CLIENT PROJ. NAME: INDUST.ASPHALT
C.O.C. NUMBER: 856

REPORT DATE: 10/17/96

DATE(S) SAMPLED: 10/07/96

DATE RECEIVED: 10/07/96

AEN WORK ORDER: 9610089

PROJECT SUMMARY:

On October 7, 1996, this laboratory received 5 water sample(s).

Client requested sample(s) be analyzed for chemical parameters. Results of analysis are summarized on the following page(s). Please see quality control report for a summary of QC data pertaining to this project.

Samples will be stored for 30 days after completion of analysis, then disposed of in accordance with State and Federal regulations. Samples may be archived by prior arrangement.

If you have any questions, please contact Client Services at (510) 930-9090.

Larry Klein
Laboratory Director

KLEINFELDER, INC.

SAMPLE ID: KMW-15
AEN LAB NO: 9610089-01
AEN WORK ORDER: 9610089
CLIENT PROJ. ID: 10-1682-09/603

DATE SAMPLED: 10/07/96
DATE RECEIVED: 10/07/96
REPORT DATE: 10/17/96

ANALYTE	METHOD/ CAS#	RESULT	REPORTING LIMIT	UNITS	DATE ANALYZED
#Extraction for TPH	EPA 3510	-		Extrn Date	10/08/96
TPH as Diesel	GC-FID	0.11 *	0.05	mg/L	10/12/96
TPH as Oil	GC-FID	ND	0.2	mg/L	10/12/96
#Extraction for PNAs	EPA 3520	-		Extrn Date	10/10/96
PNAs by EPA 8270	EPA 8270				
Acenaphthene	83-32-9	ND	10	ug/L	10/11/96
Acenaphthylene	208-96-8	ND	10	ug/L	10/11/96
Anthracene	120-12-7	ND	10	ug/L	10/11/96
Benzo(a)anthracene	56-55-3	ND	10	ug/L	10/11/96
Benzo(b)fluoranthene	205-99-2	ND	10	ug/L	10/11/96
Benzo(k)fluoranthene	207-08-9	ND	10	ug/L	10/11/96
Benzo(g,h,i)perylene	191-24-2	ND	10	ug/L	10/11/96
Benzo(a)pyrene	50-32-8	ND	10	ug/L	10/11/96
Chrysene	218-01-9	ND	10	ug/L	10/11/96
Dibenzo(a,h)anthracene	53-70-3	ND	10	ug/L	10/11/96
Fluoranthene	206-44-0	ND	10	ug/L	10/11/96
Fluorene	86-73-7	ND	10	ug/L	10/11/96
Indeno(1,2,3-cd)pyrene	193-39-5	ND	10	ug/L	10/11/96
Naphthalene	91-20-3	ND	10	ug/L	10/11/96
Phenanthrene	85-01-8	ND	10	ug/L	10/11/96
Pyrene	129-00-0	ND	10	ug/L	10/11/96

ND = Not detected at or above the reporting limit
* = Value at or above reporting limit

KLEINFELDER, INC.

SAMPLE ID: KMW-10
AEN LAB NO: 9610089-02
AEN WORK ORDER: 9610089
CLIENT PROJ. ID: 10-1682-09/603

DATE SAMPLED: 10/07/96
DATE RECEIVED: 10/07/96
REPORT DATE: 10/17/96

ANALYTE	METHOD/ CAS#	RESULT	REPORTING LIMIT	UNITS	DATE ANALYZED
#Extraction for TPH	EPA 3510	-		Extrn Date	10/08/96
TPH as Diesel	GC-FID	0.08 *	0.05	mg/L	10/12/96
TPH as Oil	GC-FID	ND	0.2	mg/L	10/12/96
#Extraction for PCBs	EPA 3510	-		Extrn Date	10/09/96
Polychlorinated Biphenyls	EPA 8080				
Aroclor 1016	12674-11-2	ND	0.1	ug/L	10/10/96
Aroclor 1221	11104-28-2	ND	0.1	ug/L	10/10/96
Aroclor 1232	11141-16-5	ND	0.1	ug/L	10/10/96
Aroclor 1242	53469-21-9	ND	0.1	ug/L	10/10/96
Aroclor 1248	12672-29-6	ND	0.1	ug/L	10/10/96
Aroclor 1254	11097-69-1	ND	0.1	ug/L	10/10/96
Aroclor 1260	11096-82-5	ND	0.1	ug/L	10/10/96
#Extraction for PNAs	EPA 3520	-		Extrn Date	10/10/96
PNAs by EPA 8270	EPA 8270				
Acenaphthene	83-32-9	ND	10	ug/L	10/11/96
Acenaphthylene	208-96-8	ND	10	ug/L	10/11/96
Anthracene	120-12-7	ND	10	ug/L	10/11/96
Benzo(a)anthracene	56-55-3	ND	10	ug/L	10/11/96
Benzo(b)fluoranthene	205-99-2	ND	10	ug/L	10/11/96
Benzo(k)fluoranthene	207-08-9	ND	10	ug/L	10/11/96
Benzo(g,h,i)perylene	191-24-2	ND	10	ug/L	10/11/96
Benzo(a)pyrene	50-32-8	ND	10	ug/L	10/11/96
Chrysene	218-01-9	ND	10	ug/L	10/11/96
Dibenzo(a,h)anthracene	53-70-3	ND	10	ug/L	10/11/96
Fluoranthene	206-44-0	ND	10	ug/L	10/11/96
Fluorene	86-73-7	ND	10	ug/L	10/11/96
Indeno(1,2,3-cd)pyrene	193-39-5	ND	10	ug/L	10/11/96
Naphthalene	91-20-3	ND	10	ug/L	10/11/96
Phenanthrene	85-01-8	ND	10	ug/L	10/11/96
Pyrene	129-00-0	ND	10	ug/L	10/11/96

ND = Not detected at or above the reporting limit
* = Value at or above reporting limit

KLEINFELDER, INC.

SAMPLE ID: KMW-1
AEN LAB NO: 9610089-03
AEN WORK ORDER: 9610089
CLIENT PROJ. ID: 10-1682-09/603

DATE SAMPLED: 10/07/96
DATE RECEIVED: 10/07/96
REPORT DATE: 10/17/96

ANALYTE	METHOD/ CAS#	RESULT	REPORTING LIMIT	UNITS	DATE ANALYZED
#Extraction for TPH	EPA 3510	-		Extrn Date	10/09/96
TPH as Diesel	GC-FID	19 *	0.6	mg/L	10/12/96
TPH as Oil	GC-FID	12 *	2	mg/L	10/12/96
#Extraction for PCBs	EPA 3510	-		Extrn Date	10/09/96
Polychlorinated Biphenyls	EPA 8080				
Aroclor 1016	12674-11-2	ND	0.1	ug/L	10/10/96
Aroclor 1221	11104-28-2	ND	0.1	ug/L	10/10/96
Aroclor 1232	11141-16-5	ND	0.1	ug/L	10/10/96
Aroclor 1242	53469-21-9	ND	0.1	ug/L	10/10/96
Aroclor 1248	12672-29-6	ND	0.1	ug/L	10/10/96
Aroclor 1254	11097-69-1	ND	0.1	ug/L	10/10/96
Aroclor 1260	11096-82-5	0.6 *	0.1	ug/L	10/10/96
#Extraction for PNAs	EPA 3520	-		Extrn Date	10/10/96
PNAs by EPA 8270	EPA 8270				
Acenaphthene	83-32-9	ND	100	ug/L	10/11/96
Acenaphthylene	208-96-8	ND	100	ug/L	10/11/96
Anthracene	120-12-7	ND	100	ug/L	10/11/96
Benzo(a)anthracene	56-55-3	ND	100	ug/L	10/11/96
Benzo(b)fluoranthene	205-99-2	ND	100	ug/L	10/11/96
Benzo(k)fluoranthene	207-08-9	ND	100	ug/L	10/11/96
Benzo(g,h,i)perylene	191-24-2	ND	100	ug/L	10/11/96
Benzo(a)pyrene	50-32-8	ND	100	ug/L	10/11/96
Chrysene	218-01-9	ND	100	ug/L	10/11/96
Dibenzo(a,h)anthracene	53-70-3	ND	100	ug/L	10/11/96
Fluoranthene	206-44-0	ND	100	ug/L	10/11/96
Fluorene	86-73-7	ND	100	ug/L	10/11/96
Indeno(1,2,3-cd)pyrene	193-39-5	ND	100	ug/L	10/11/96
Naphthalene	91-20-3	ND	100	ug/L	10/11/96
Phenanthrene	85-01-8	ND	100	ug/L	10/11/96
Pyrene	129-00-0	ND	100	ug/L	10/11/96

KLEINFELDER, INC.

SAMPLE ID: KMW-1
AEN LAB NO: 9610089-03
AEN WORK ORDER: 9610089
CLIENT PROJ. ID: 10-1682-09/603

DATE SAMPLED: 10/07/96
DATE RECEIVED: 10/07/96
REPORT DATE: 10/17/96

ANALYTE	METHOD/ CAS#	RESULT	REPORTING LIMIT	UNITS	DATE ANALYZED

RLs elevated for EPA 8270 due to high levels of non-target compounds; RLs elevated for diesel/oil due to high levels of target compounds. Sample run dilute.

ND = Not detected at or above the reporting limit
* = Value at or above reporting limit

KLEINFELDER, INC.

SAMPLE ID: KMW-2
AEN LAB NO: 9610089-04
AEN WORK ORDER: 9610089
CLIENT PROJ. ID: 10-1682-09/603

DATE SAMPLED: 10/07/96
DATE RECEIVED: 10/07/96
REPORT DATE: 10/17/96

ANALYTE	METHOD/ CAS#	RESULT	REPORTING LIMIT	UNITS	DATE ANALYZED
#Extraction for TPH	EPA 3510	-		Extrn Date	10/09/96
TPH as Diesel	GC-FID	49 *	0.6	mg/L	10/12/96
TPH as Oil	GC-FID	30 *	2	mg/L	10/12/96
#Extraction for PCBs	EPA 3510	-		Extrn Date	10/09/96
Polychlorinated Biphenyls	EPA 8080				
Aroclor 1016	12674-11-2	ND	0.1	ug/L	10/10/96
Aroclor 1221	11104-28-2	ND	0.1	ug/L	10/10/96
Aroclor 1232	11141-16-5	ND	0.1	ug/L	10/10/96
Aroclor 1242	53469-21-9	ND	0.1	ug/L	10/10/96
Aroclor 1248	12672-29-6	ND	0.1	ug/L	10/10/96
Aroclor 1254	11097-69-1	ND	0.1	ug/L	10/10/96
Aroclor 1260	11096-82-5	1.2 *	0.1	ug/L	10/10/96
#Extraction for PNAs	EPA 3520	-		Extrn Date	10/10/96
PNAs by EPA 8270	EPA 8270				
Acenaphthene	83-32-9	ND	100	ug/L	10/11/96
Acenaphthylene	208-96-8	ND	100	ug/L	10/11/96
Anthracene	120-12-7	ND	100	ug/L	10/11/96
Benzo(a)anthracene	56-55-3	ND	100	ug/L	10/11/96
Benzo(b)fluoranthene	205-99-2	ND	100	ug/L	10/11/96
Benzo(k)fluoranthene	207-08-9	ND	100	ug/L	10/11/96
Benzo(g,h,i)perylene	191-24-2	ND	100	ug/L	10/11/96
Benzo(a)pyrene	50-32-8	ND	100	ug/L	10/11/96
Chrysene	218-01-9	ND	100	ug/L	10/11/96
Dibenzo(a,h)anthracene	53-70-3	ND	100	ug/L	10/11/96
Fluoranthene	206-44-0	ND	100	ug/L	10/11/96
Fluorene	86-73-7	ND	100	ug/L	10/11/96
Indeno(1,2,3-cd)pyrene	193-39-5	ND	100	ug/L	10/11/96
Naphthalene	91-20-3	ND	100	ug/L	10/11/96
Phenanthrene	85-01-8	ND	100	ug/L	10/11/96
Pyrene	129-00-0	ND	100	ug/L	10/11/96

KLEINFELDER, INC.

SAMPLE ID: KMW-2
AEN LAB NO: 9610089-04
AEN WORK ORDER: 9610089
CLIENT PROJ. ID: 10-1682-09/603

DATE SAMPLED: 10/07/96
DATE RECEIVED: 10/07/96
REPORT DATE: 10/17/96

ANALYTE	METHOD/ CAS#	RESULT	REPORTING LIMIT	UNITS	DATE ANALYZED

RLs elevated for EPA 8270 due to high levels of non-target compounds; RLs elevated for diesel/oil due to high levels of target compounds. Sample run dilute.

ND = Not detected at or above the reporting limit
* = Value at or above reporting limit

KLEINFELDER, INC.

SAMPLE ID: KMW-51
AEN LAB NO: 9610089-05
AEN WORK ORDER: 9610089
CLIENT PROJ. ID: 10-1682-09/603

DATE SAMPLED: 10/07/96
DATE RECEIVED: 10/07/96
REPORT DATE: 10/17/96

ANALYTE	METHOD/ CAS#	RESULT	REPORTING LIMIT	UNITS	DATE ANALYZED
#Extraction for TPH	EPA 3510	-		Extrn Date	10/09/96
TPH as Diesel	GC-FID	0.1 *	0.05	mg/L	10/12/96
TPH as Oil	GC-FID	ND	0.2	mg/L	10/12/96
#Extraction for PNAs	EPA 3520	-		Extrn Date	10/10/96
PNAs by EPA 8270	EPA 8270				
Acenaphthene	83-32-9	ND	10	ug/L	10/11/96
Acenaphthylene	208-96-8	ND	10	ug/L	10/11/96
Anthracene	120-12-7	ND	10	ug/L	10/11/96
Benzo(a)anthracene	56-55-3	ND	10	ug/L	10/11/96
Benzo(b)fluoranthene	205-99-2	ND	10	ug/L	10/11/96
Benzo(k)fluoranthene	207-08-9	ND	10	ug/L	10/11/96
Benzo(g,h,i)perylene	191-24-2	ND	10	ug/L	10/11/96
Benzo(a)pyrene	50-32-8	ND	10	ug/L	10/11/96
Chrysene	218-01-9	ND	10	ug/L	10/11/96
Dibenzo(a,h)anthracene	53-70-3	ND	10	ug/L	10/11/96
Fluoranthene	206-44-0	ND	10	ug/L	10/11/96
Fluorene	86-73-7	ND	10	ug/L	10/11/96
Indeno(1,2,3-cd)pyrene	193-39-5	ND	10	ug/L	10/11/96
Naphthalene	91-20-3	ND	10	ug/L	10/11/96
Phenanthrene	85-01-8	ND	10	ug/L	10/11/96
Pyrene	129-00-0	ND	10	ug/L	10/11/96

ND = Not detected at or above the reporting limit
* = Value at or above reporting limit

AEN (CALIFORNIA)
QUALITY CONTROL REPORT

AEN JOB NUMBER: 9610089
CLIENT PROJECT ID: 10-1682-09/603

Quality Control and Project Summary

All laboratory quality control parameters were found to be within established limits.

Definitions

Laboratory Control Sample (LCS)/Method Spikes(s): Control samples of known composition. LCS and Method Spike data are used to validate batch analytical results.

Matrix Spike(s): Aliquot of a sample (aqueous or solid) with added quantities of specific compounds and subjected to the entire analytical procedure. Matrix spike and matrix spike duplicate QC data are advisory.

Method Blank: An analytical control consisting of all reagents, internal standards, and surrogate standards carried through the entire analytical process. Used to monitor laboratory background and reagent contamination.

Not Detected (ND): Not detected at or above the reporting limit.

Relative Percent Difference (RPD): An indication of method precision based on duplicate analyses.

Reporting Limit (RL): The lowest concentration routinely determined during laboratory operations. The RL is generally 1 to 10 times the Method Detection Limit (MDL). Reporting limits are matrix, method, and analyte dependent and take into account any dilutions performed as part of the analysis.

Surrogates: Organic compounds which are similar to analytes of interest in chemical behaviour, but are not found in environmental samples. Surrogates are added to all blanks, calibration and check standards, samples, and spiked samples. Surrogate recovery is monitored as an indication of acceptable sample preparation and instrument performance.

D: Surrogates diluted out.

!: Indicates result outside of established laboratory QC limits.

ANALYSIS: Polychlorinated Biphenyls

MATRIX: Water

METHOD BLANK SAMPLES

SAMPLE TYPE: Blank-Method/Media blank
INSTRUMENT: HP GC FOR 8080PCB
UNITS: ug/L
METHOD:

LAB ID: BLNK-1009-1
PREPARED: 10/09/96
ANALYZED: 10/10/96

INSTR RUN: GC BBW\961010000000/4/
BATCH ID: PCBW100996-1
DILUTION: 1.000000

ANALYTE		RESULT	REF RESULT	REPORTING LIMIT	SPIKE VALUE	RECOVERY (%)	REC LIMITS (%) LOW	REC LIMITS (%) HIGH	RPD (%)	RPD LIMIT (%)
TCMX	(surr)	83.1		0.5	100	83.1	30	131		
Aroclor 1260		ND		0.1						
Aroclor 1016		ND		0.1						
Aroclor 1221		ND		0.1						
Aroclor 1232		ND		0.1						
Aroclor 1242		ND		0.1						
Aroclor 1248		ND		0.1						
Aroclor 1254		ND		0.1						

METHOD SPIKE SAMPLES

SAMPLE TYPE: Laboratory Control Spike
INSTRUMENT: HP GC FOR 8080PCB
UNITS: ug/L
METHOD:

LAB ID: LCSW-1009-1
PREPARED: 10/09/96
ANALYZED: 10/10/96

INSTR RUN: GC BBW\961010000000/5/4
BATCH ID: PCBW100996-1
DILUTION: 1.000000

ANALYTE		RESULT	REF RESULT	REPORTING LIMIT	SPIKE VALUE	RECOVERY (%)	REC LIMITS (%) LOW	REC LIMITS (%) HIGH	RPD (%)	RPD LIMIT (%)
TCMX	(surr)	89.1	83.1	0.5	100	89.1	30	131		
Aroclor 1260		4.47	ND	0.1	4.00	112	53	133		

SAMPLE SURROGATES

SAMPLE TYPE: Sample-Client
INSTRUMENT: HP GC FOR 8080PCB
UNITS: ug/L
METHOD:

LAB ID: 9610089-02B
PREPARED: 10/09/96
ANALYZED: 10/10/96

INSTR RUN: GC BBW\961010000000/1/
BATCH ID: PCBW100996-1
DILUTION: 0.200000

ANALYTE		RESULT	REF RESULT	REPORTING LIMIT	SPIKE VALUE	RECOVERY (%)	REC LIMITS (%) LOW	REC LIMITS (%) HIGH	RPD (%)	RPD LIMIT (%)
TCMX	(surr)	62.7		0.5	100	62.7	30	131		

SAMPLE TYPE: Sample-Client
INSTRUMENT: HP GC FOR 8080PCB
UNITS: ug/L
METHOD:

LAB ID: 9610089-03B
PREPARED: 10/09/96
ANALYZED: 10/10/96

INSTR RUN: GC BBW\961010000000/2/
BATCH ID: PCBW100996-1
DILUTION: 0.200000

ANALYTE		RESULT	REF RESULT	REPORTING LIMIT	SPIKE VALUE	RECOVERY (%)	REC LIMITS (%) LOW	REC LIMITS (%) HIGH	RPD (%)	RPD LIMIT (%)
TCMX	(surr)	55.5		0.5	100	55.5	30	131		

SAMPLE TYPE: Sample-Client
INSTRUMENT: HP GC FOR 8080PCB
UNITS: ug/L
METHOD:

LAB ID: 9610089-04B
PREPARED: 10/09/96
ANALYZED: 10/10/96

INSTR RUN: GC BBW\961010000000/3/
BATCH ID: PCBW100996-1
DILUTION: 0.200000

ANALYTE		RESULT	REF RESULT	REPORTING LIMIT	SPIKE VALUE	RECOVERY (%)	REC LIMITS (%) LOW	REC LIMITS (%) HIGH	RPD (%)	RPD LIMIT (%)
TCMX	(surr)	52.9		0.5	100	52.9	30	131		

ANALYSIS: Semi-Volatile Organics

MATRIX: Water

METHOD BLANK SAMPLES

SAMPLE TYPE: Blank-Method/Media blank
INSTRUMENT: hp mass spec for semi-vols
UNITS: ug/L
METHOD:

LAB ID: BLNK 1010
PREPARED: 10/10/96
ANALYZED: 10/12/96

INSTR RUN: GCMS11\961011000000/10/
BATCH ID: BNAW093096
DILUTION: 1.00

ANALYTE		RESULT	REF RESULT	REPORTING LIMIT	SPIKE VALUE	RECOVERY (%)	REC LIMITS (%) LOW	REC LIMITS (%) HIGH	RPD (%)	RPD LIMIT (%)
2-Fluorophenol	(surr)	54.70			100	54.7	41	104		
Phenol-d5	(surr)	75.00			100	75.0	46	114		
Nitrobenzene-d5	(surr)	80.30			100	80.3	50	112		
2-Fluorobiphenyl	(surr)	91.90			100	91.9	41	111		
2,4,6-Tribromophenol	(surr)	70.20			100	70.2	59	125		
Terphenyl-d14	(surr)	82.20			100	82.2	37	111		
Phenol		ND		10						
2-Chlorophenol		ND		10						
1,4-Dichlorobenzene		ND		10						
N-Nitrosodi-n-propylamine		ND		10						
1,2,4-Trichlorobenzene		ND		10						
4-Chloro-3-methylphenol		ND		10						
Acenaphthene		ND		10						
4-Nitrophenol		ND		50						
2,4-Dinitrotoluene		ND		10						
Pentachlorophenol		ND		50						
Pyrene		ND		10						
Acenaphthylene		ND		10						
Anthracene		ND		10						
Benzidine		ND		50						
Benzoic Acid		ND		50						
Benzo(a)anthracene		ND		10						
Benzo(b)fluoranthene		ND		10						
Benzo(k)fluoranthene		ND		10						
Benzo(g,h,i)perylene		ND		10						
Benzo(a)pyrene		ND		10						
Benzyl Alcohol		ND		20						
Bis(2-chloroethoxy)methane		ND		10						
Bis(2-chloroethyl) Ether		ND		10						
Bis(2-chloroisopropyl) Eth		ND		10						
Bis(2-ethylhexyl) Phthalat		ND		10						
4-Bromophenyl Phenyl Ether		ND		10						
Butylbenzyl Phthalate		ND		10						
4-Chloroaniline		ND		20						
2-Chloronaphthalene		ND		10						
4-Chlorophenyl Phenyl Ethe		ND		10						
Chrysene		ND		10						
Dibenzo(a,h)anthracene		ND		10						
Dibenzofuran		ND		10						
Di-n-butyl Phthalate		ND		10						
1,2-Dichlorobenzene		ND		10						
1,3-Dichlorobenzene		ND		10						
3,3'-Dichlorobenzidine		ND		20						
Diethyl Phthalate		ND		10						
Dimethyl Phthalate		ND		10						
2,6-Dinitrotoluene		ND		10						
Di-n-octyl Phthalate		ND		10						
1,2-Diphenylhydrazine		ND		10						
Fluoranthene		ND		10						
Fluorene		ND		10						
Hexachlorobenzene		ND		10						
Hexachlorobutadiene		ND		10						
Hexachlorocyclopentadiene		ND		10						
Hexachloroethane		ND		10						
Indeno(1,2,3-cd)pyrene		ND		10						
Isophorone		ND		10						
2-Methylnaphthalene		ND		10						
Naphthalene		ND		10						
2-Nitroaniline		ND		50						
3-Nitroaniline		ND		50						
4-Nitroaniline		ND		50						
Nitrobenzene		ND		10						
N-Nitrosodimethylamine		ND		10						
N-Nitrosodiphenylamine		ND		10						

ANALYSIS: Semi-Volatile Organics

MATRIX: Water

METHOD BLANK SAMPLES

SAMPLE TYPE: Blank-Method/Media blank
INSTRUMENT: hp mass spec for semi-vols
UNITS: ug/L
METHOD:

LAB ID: BLNK 1010
PREPARED: 10/10/96
ANALYZED: 10/12/96

INSTR RUN: GCMS11\961011000000/10/
BATCH ID: BNAW093096
DILUTION: 1.00

ANALYTE	RESULT	REF RESULT	REPORTING LIMIT	SPIKE VALUE	RECOVERY (%)	REC LIMITS (%) LOW	REC LIMITS (%) HIGH	RPD (%)	RPD LIMIT (%)
Phenanthrene	ND		10						
2,4-Dichlorophenol	ND		10						
2,4-Dimethylphenol	ND		10						
4,6-Dinitro-2-methylphenol	ND		50						
2,4-Dinitrophenol	ND		50						
2-Methylphenol	ND		10						
4-Methylphenol	ND		10						
2-Nitrophenol	ND		10						
2,4,5-Trichlorophenol	ND		10						
2,4,6-Trichlorophenol	ND		10						

METHOD SPIKE SAMPLES

SAMPLE TYPE: Laboratory Control Spike
INSTRUMENT: hp mass spec for semi-vols
UNITS: ug/L
METHOD:

LAB ID: LCS 1010
PREPARED: 10/10/96
ANALYZED: 10/12/96

INSTR RUN: GCMS11\961011000000/11/10
BATCH ID: BNAW093096
DILUTION: 1.00

ANALYTE		RESULT	REF RESULT	REPORTING LIMIT	SPIKE VALUE	RECOVERY (%)	REC LIMITS (%) LOW	REC LIMITS (%) HIGH	RPD (%)	RPD LIMIT (%)
2-Fluorophenol	(surr)	56.00	54.70		100	56.0	41	104		
Phenol-d5	(surr)	85.60	75.00		100	85.6	46	114		
Nitrobenzene-d5	(surr)	91.40	80.30		100	91.4	50	112		
2-Fluorobiphenyl	(surr)	100.60	91.90		100	101	41	111		
2,4,6-Tribromophenol	(surr)	91.60	70.20		100	91.6	59	125		
Terphenyl-d14	(surr)	95.00	82.20		100	95.0	37	111		
Phenol		115	ND	10	196	58.7	44	126		
2-Chlorophenol		162	ND	10	199	81.4	50	145		
1,4-Dichlorobenzene		152	ND	10	198	76.8	51	132		
N-Nitrosodi-n-propylamine		136	ND	10	183	74.3	52	151		
1,2,4-Trichlorobenzene		178	ND	10	220	80.9	51	128		
4-Chloro-3-methylphenol		153	ND	10	197	77.7	52	149		
Acenaphthene		151	ND	10	186	81.2	58	139		
4-Nitrophenol		107	ND	50	197	54.3	30	152		
2,4-Dinitrotoluene		190	ND	10	254	74.8	60	128		
Pentachlorophenol		131	ND	50	185	70.8	30	160		
Pyrene		154	ND	10	238	64.7	40	130		

SAMPLE SURROGATES

SAMPLE TYPE: Sample-Client
INSTRUMENT: hp mass spec for semi-vols
UNITS: ug/L
METHOD:

LAB ID: 9610089-01B
PREPARED: 10/10/96
ANALYZED: 10/11/96

INSTR RUN: GCMS11\961011000000/1/
BATCH ID: BNAW093096
DILUTION: 1.00

ANALYTE		RESULT	REF RESULT	REPORTING LIMIT	SPIKE VALUE	RECOVERY (%)	REC LIMITS (%) LOW	REC LIMITS (%) HIGH	RPD (%)	RPD LIMIT (%)
2-Fluorophenol	(surr)	102.00			100	102	41	104		
Phenol-d5	(surr)	89.00			100	89.0	46	114		
Nitrobenzene-d5	(surr)	90.20			100	90.2	50	112		
2-Fluorobiphenyl	(surr)	108.50			100	109	41	111		
2,4,6-Tribromophenol	(surr)	91.60			100	91.6	59	125		
Terphenyl-d14	(surr)	97.30			100	97.3	37	111		

ANALYSIS: Semi-Volatile Organics

MATRIX: Water

SAMPLE SURROGATES

SAMPLE TYPE: Sample-Client
INSTRUMENT: hp mass spec for semi-vols
UNITS: ug/L
METHOD:

LAB ID: 9610089-02C
PREPARED: 10/10/96
ANALYZED: 10/11/96

INSTR RUN: GCMS11\961011000000/3/
BATCH ID: BNAW093096
DILUTION: 1.00

ANALYTE		RESULT	REF RESULT	REPORTING LIMIT	SPIKE VALUE	RECOVERY (%)	REC LIMITS (%) LOW	REC LIMITS (%) HIGH	RPD (%)	RPD LIMIT (%)
2-Fluorophenol	(surr)	96.00			100	96.0	41	104		
Phenol-d5	(surr)	76.80			100	76.8	46	114		
Nitrobenzene-d5	(surr)	89.50			100	89.5	50	112		
2-Fluorobiphenyl	(surr)	105.60			100	106	41	111		
2,4,6-Tribromophenol	(surr)	92.20			100	92.2	59	125		
Terphenyl-d14	(surr)	109.40			100	109	37	111		

SAMPLE TYPE: Sample-Client
INSTRUMENT: hp mass spec for semi-vols
UNITS: ug/L
METHOD:

LAB ID: 9610089-03C
PREPARED: 10/10/96
ANALYZED: 10/11/96

INSTR RUN: GCMS11\961011000000/4/
BATCH ID: BNAW093096
DILUTION: 10.0

ANALYTE		RESULT	REF RESULT	REPORTING LIMIT	SPIKE VALUE	RECOVERY (%)	REC LIMITS (%) LOW	REC LIMITS (%) HIGH	RPD (%)	RPD LIMIT (%)
2-Fluorophenol	(surr)	96.90			100	96.9	41	104		
Phenol-d5	(surr)	83.90			100	83.9	46	114		
Nitrobenzene-d5	(surr)	94.40			100	94.4	50	112		
2-Fluorobiphenyl	(surr)	104.30			100	104	41	111		
2,4,6-Tribromophenol	(surr)	93.20			100	93.2	59	125		
Terphenyl-d14	(surr)	103.00			100	103	37	111		

SAMPLE TYPE: Sample-Client
INSTRUMENT: hp mass spec for semi-vols
UNITS: ug/L
METHOD:

LAB ID: 9610089-04C
PREPARED: 10/10/96
ANALYZED: 10/11/96

INSTR RUN: GCMS11\961011000000/5/
BATCH ID: BNAW093096
DILUTION: 10.0

ANALYTE		RESULT	REF RESULT	REPORTING LIMIT	SPIKE VALUE	RECOVERY (%)	REC LIMITS (%) LOW	REC LIMITS (%) HIGH	RPD (%)	RPD LIMIT (%)
2-Fluorophenol	(surr)	100.70			100	101	41	104		
Phenol-d5	(surr)	78.30			100	78.3	46	114		
Nitrobenzene-d5	(surr)	89.60			100	89.6	50	112		
2-Fluorobiphenyl	(surr)	109.20			100	109	41	111		
2,4,6-Tribromophenol	(surr)	93.60			100	93.6	59	125		
Terphenyl-d14	(surr)	110.50			100	111	37	111		

SAMPLE TYPE: Sample-Client
INSTRUMENT: hp mass spec for semi-vols
UNITS: ug/L
METHOD:

LAB ID: 9610089-05B
PREPARED: 10/10/96
ANALYZED: 10/11/96

INSTR RUN: GCMS11\961011000000/2/
BATCH ID: BNAW093096
DILUTION: 1.00

ANALYTE		RESULT	REF RESULT	REPORTING LIMIT	SPIKE VALUE	RECOVERY (%)	REC LIMITS (%) LOW	REC LIMITS (%) HIGH	RPD (%)	RPD LIMIT (%)
2-Fluorophenol	(surr)	96.20			100	96.2	41	104		
Phenol-d5	(surr)	82.40			100	82.4	46	114		
Nitrobenzene-d5	(surr)	88.00			100	88.0	50	112		
2-Fluorobiphenyl	(surr)	99.20			100	99.2	41	111		
2,4,6-Tribromophenol	(surr)	89.80			100	89.8	59	125		
Terphenyl-d14	(surr)	93.10			100	93.1	37	111		

QUALITY CONTROL REPORT

METHOD: EPA 3510 GCFID

AEN JOB NO: 9610089
DATE EXTRACTED: 10/08/96; 10/09/96
INSTRUMENT: C
MATRIX: WATER

Surrogate Standard Recovery Summary

Date Analyzed	Client Id.	Lab Id.	Percent Recovery n-Pentacosane
10/12/96	KMW-15	01	104
10/12/96	KMW-10	02	102
10/12/96	KMW-1	03	87
10/12/96	KMW-2	04	I
10/12/96	KMW-51	05	89
QC Limits:			65-125

I: Interference

DATE EXTRACTED: 10/07/96
DATE ANALYZED: 10/10/96
SAMPLE SPIKED: 9609370-03
INSTRUMENT: C

Matrix Spike Recovery Summary

Analyte	Spike Added (mg/L)	Average Percent Recovery	RPD	QC Limits Percent Recovery	QC Limits RPD
Diesel	4.00	88	1	60-110	15

Daily method blanks for all associated analytical runs showed no contamination at or above the reporting limit.

*** END OF REPORT ***

KLEINFELDER

RISC/G

9610089

PROJ NO	PROJECT NAME
10-1682-09/03	INDUSTRIAL ASPHALT
LP NO (P.O. NO.)	SAMPLERS: (Signature/Number)
	B Dutton 2856

DATE MM DD YY	SAMPLE I.D. TIME HH MM SS	SAMPLE I.D.	NO OF CONTAINERS	ANALYSIS TPHd + OIL	PCB's	PAHs	REMARKS
100796	1253	KMW-15 01A-C	3	X		X	STD T/A
	1330	KMW-10 02A-D	4	X	X	X	
	1406	KMW-1 03A-D	4	X	X	X	
	DRY WELL	~~KMW-3 (UNABLE TO OBTAIN)~~		~~X~~	~~X~~	~~X SD~~	
	1456	KMW-2 04A-D	4	X	X	X	
	1255	KMW-51 05A-C	3	X		X	

Relinquished by: (Signature)	Date/Time	Received by: (Signature)
B Dutton	10/7/96 15:55	Roman C. Jensen
Relinquished by: (Signature)	Date/Time	Received by: (Signature)
Relinquished by: (Signature)	Date/Time	Received for Laboratory by: (Signature)

Remarks

THANKS
AED

Send Results To
D. CARROLL
KLEINFELDER
7133 KOLL CENTER PARKWAY
SUITE 100
PLEASANTON, CA 94566
(510) 484-1700

M-60 White - Sampler Canary - Return Copy To Shipper Pink - Lab Copy

CHAIN OF CUSTODY

№ 856

American Environmental Network

Certificate of Analysis

DOHS Certification: 1172 AIHA Accreditation: 11134

KLEINFELDER, INC.
7133 KOLL CENTER PARKWAY,
SUITE 100
PLEASANTON, CA 94566

ATTN: DAN CAROLL
CLIENT PROJ. ID: 10-1682-09/604
CLIENT PROJ. NAME: INDUST.ASPHALT
C.O.C. NUMBER: 2371
P.O. NUMBER: R4495

REPORT DATE: 05/17/97.

DATE(S) SAMPLED: 04/27/97-04/30/97

DATE RECEIVED: 05/01/97

AEN WORK ORDER: 9705005

PROJECT SUMMARY:

On May 1, 1997, this laboratory received 11 water sample(s).

Client requested sample(s) be analyzed for chemical parameters. Results of analysis are summarized on the following page(s). Please see quality control report for a summary of QC data pertaining to this project.

Samples will be stored for 30 days after completion of analysis, then disposed of in accordance with State and Federal regulations. Samples may be archived by prior arrangement.

If you have any questions, please contact Client Services at (510) 930-9090.

Larry Klein
Laboratory Director

RECEIVED
MAY 20 [illegible]
KLEINFELDER
PLEASANTON, CA

KLEINFELDER, INC.

SAMPLE ID: 14A2
AEN LAB NO: 9705005-01
AEN WORK ORDER: 9705005
CLIENT PROJ. ID: 10-1682-09/604

DATE SAMPLED: 04/27/97
DATE RECEIVED: 05/01/97
REPORT DATE: 05/17/97

ANALYTE	METHOD/ CAS#	RESULT	REPORTING LIMIT	UNITS	DATE ANALYZED
#Extraction for TPH	EPA 3510	-		Extrn Date	05/06/97
TPH as Diesel	GC-FID	ND	0.05	mg/L	05/07/97
TPH as Oil	GC-FID	ND	0.2	mg/L	05/07/97

ND = Not detected at or above the reporting limit
* = Value at or above reporting limit

KLEINFELDER, INC.

SAMPLE ID: MW-5
AEN LAB NO: 9705005-02
AEN WORK ORDER: 9705005
CLIENT PROJ. ID: 10-1682-09/604

DATE SAMPLED: 04/29/97
DATE RECEIVED: 05/01/97
REPORT DATE: 05/17/97

ANALYTE	METHOD/ CAS#	RESULT	REPORTING LIMIT	UNITS	DATE ANALYZED
#Extraction for TPH	EPA 3510	-		Extrn Date	05/06/97
TPH as Diesel	GC-FID	ND	0.05	mg/L	05/07/97
TPH as Oil	GC-FID	ND	0.2	mg/L	05/07/97

ND = Not detected at or above the reporting limit
* = Value at or above reporting limit

KLEINFELDER, INC.

SAMPLE ID: MW-6
AEN LAB NO: 9705005-03
AEN WORK ORDER: 9705005
CLIENT PROJ. ID: 10-1682-09/604

DATE SAMPLED: 04/30/97
DATE RECEIVED: 05/01/97
REPORT DATE: 05/17/97

ANALYTE	METHOD/ CAS#	RESULT	REPORTING LIMIT	UNITS	DATE ANALYZED
#Extraction for TPH	EPA 3510	-		Extrn Date	05/06/97
TPH as Diesel	GC-FID	0.10 *	0.05	mg/L	05/07/97
TPH as Oil	GC-FID	ND	0.2	mg/L	05/07/97

ND = Not detected at or above the reporting limit
* = Value at or above reporting limit

KLEINFELDER, INC.

SAMPLE ID: MW-7
AEN LAB NO: 9705005-04
AEN WORK ORDER: 9705005
CLIENT PROJ. ID: 10-1682-09/604

DATE SAMPLED: 04/30/97
DATE RECEIVED: 05/01/97
REPORT DATE: 05/17/97

ANALYTE	METHOD/ CAS#	RESULT	REPORTING LIMIT	UNITS	DATE ANALYZED
#Extraction for TPH	EPA 3510	-		Extrn Date	05/06/97
TPH as Diesel	GC-FID	ND	0.05	mg/L	05/07/97
TPH as Oil	GC-FID	ND	0.2	mg/L	05/07/97

ND = Not detected at or above the reporting limit
* = Value at or above reporting limit

KLEINFELDER, INC.

SAMPLE ID: MW-14
AEN LAB NO: 9705005-05
AEN WORK ORDER: 9705005
CLIENT PROJ. ID: 10-1682-09/604

DATE SAMPLED: 04/30/97
DATE RECEIVED: 05/01/97
REPORT DATE: 05/17/97

ANALYTE	METHOD/ CAS#	RESULT	REPORTING LIMIT	UNITS	DATE ANALYZED
#Extraction for TPH	EPA 3510	-		Extrn Date	05/06/97
TPH as Diesel	GC-FID	ND	0.05	mg/L	05/07/97
TPH as Oil	GC-FID	ND	0.2	mg/L	05/07/97

ND = Not detected at or above the reporting limit
* = Value at or above reporting limit

KLEINFELDER, INC.

SAMPLE ID: MW-16
AEN LAB NO: 9705005-06
AEN WORK ORDER: 9705005
CLIENT PROJ. ID: 10-1682-09/604

DATE SAMPLED: 04/30/97
DATE RECEIVED: 05/01/97
REPORT DATE: 05/17/97

ANALYTE	METHOD/ CAS#	RESULT	REPORTING LIMIT	UNITS	DATE ANALYZED
#Extraction for TPH	EPA 3510	-		Extrn Date	05/06/97
TPH as Diesel	GC-FID	ND	0.05	mg/L	05/08/97
TPH as Oil	GC-FID	0.4 *	0.2	mg/L	05/08/97

ND = Not detected at or above the reporting limit
* = Value at or above reporting limit

KLEINFELDER, INC.

SAMPLE ID: MW-8
AEN LAB NO: 9705005-07
AEN WORK ORDER: 9705005
CLIENT PROJ. ID: 10-1682-09/604

DATE SAMPLED: 04/30/97
DATE RECEIVED: 05/01/97
REPORT DATE: 05/17/97

ANALYTE	METHOD/ CAS#	RESULT	REPORTING LIMIT	UNITS	DATE ANALYZED
#Extraction for TPH	EPA 3510	-		Extrn Date	05/06/97
TPH as Diesel	GC-FID	0.41 *	0.05	mg/L	05/07/97
TPH as Oil	GC-FID	ND	0.2	mg/L	05/07/97
#Extraction for PCBs	EPA 3510	-		Extrn Date	05/05/97
Polychlorinated Biphenyls	EPA 8080				
Aroclor 1016	12674-11-2	ND	0.1	ug/L	05/10/97
Aroclor 1221	11104-28-2	ND	0.1	ug/L	05/10/97
Aroclor 1232	11141-16-5	ND	0.1	ug/L	05/10/97
Aroclor 1242	53469-21-9	ND	0.1	ug/L	05/10/97
Aroclor 1248	12672-29-6	ND	0.1	ug/L	05/10/97
Aroclor 1254	11097-69-1	ND	0.1	ug/L	05/10/97
Aroclor 1260	11096-82-5	ND	0.1	ug/L	05/10/97

ND = Not detected at or above the reporting limit
* = Value at or above reporting limit

KLEINFELDER, INC.

SAMPLE ID: MW-18
AEN LAB NO: 9705005-08
AEN WORK ORDER: 9705005
CLIENT PROJ. ID: 10-1682-09/604

DATE SAMPLED: 04/30/97
DATE RECEIVED: 05/01/97
REPORT DATE: 05/17/97

ANALYTE	METHOD/ CAS#	RESULT	REPORTING LIMIT	UNITS	DATE ANALYZED
#Extraction for TPH	EPA 3510	-		Extrn Date	05/06/97
TPH as Diesel	GC-FID	0.35 *	0.05	mg/L	05/08/97
TPH as Oil	GC-FID	ND	0.2	mg/L	05/08/97
#Extraction for PCBs	EPA 3510	-		Extrn Date	05/05/97
Polychlorinated Biphenyls	EPA 8080				
Aroclor 1016	12674-11-2	ND	0.1	ug/L	05/10/97
Aroclor 1221	11104-28-2	ND	0.1	ug/L	05/10/97
Aroclor 1232	11141-16-5	ND	0.1	ug/L	05/10/97
Aroclor 1242	53469-21-9	ND	0.1	ug/L	05/10/97
Aroclor 1248	12672-29-6	ND	0.1	ug/L	05/10/97
Aroclor 1254	11097-69-1	ND	0.1	ug/L	05/10/97
Aroclor 1260	11096-82-5	ND	0.1	ug/L	05/10/97

ND = Not detected at or above the reporting limit
* = Value at or above reporting limit

KLEINFELDER, INC.

SAMPLE ID: MW-15
AEN LAB NO: 9705005-09
AEN WORK ORDER: 9705005
CLIENT PROJ. ID: 10-1682-09/604

DATE SAMPLED: 04/30/97
DATE RECEIVED: 05/01/97
REPORT DATE: 05/17/97

ANALYTE	METHOD/ CAS#	RESULT	REPORTING LIMIT	UNITS	DATE ANALYZED
#Extraction for TPH	EPA 3510	-		Extrn Date	05/06/97
TPH as Diesel	GC-FID	ND	0.05	mg/L	05/08/97
TPH as Oil	GC-FID	ND	0.2	mg/L	05/08/97

ND = Not detected at or above the reporting limit
* = Value at or above reporting limit

KLEINFELDER, INC.

SAMPLE ID: MW-2
AEN LAB NO: 9705005-10
AEN WORK ORDER: 9705005
CLIENT PROJ. ID: 10-1682-09/604

DATE SAMPLED: 04/30/97
DATE RECEIVED: 05/01/97
REPORT DATE: 05/17/97

ANALYTE	METHOD/ CAS#	RESULT	REPORTING LIMIT	UNITS	DATE ANALYZED
#Extraction for TPH	EPA 3510	-		Extrn Date	05/06/97
TPH as Diesel	GC-FID	5.8 *	0.05	mg/L	05/08/97
TPH as Oil	GC-FID	3.3 *	0.2	mg/L	05/08/97
#Extraction for PCBs	EPA 3510	-		Extrn Date	05/05/97
Polychlorinated Biphenyls	EPA 8080				
Aroclor 1016	12674-11-2	ND	0.1	ug/L	05/10/97
Aroclor 1221	11104-28-2	ND	0.1	ug/L	05/10/97
Aroclor 1232	11141-16-5	ND	0.1	ug/L	05/10/97
Aroclor 1242	53469-21-9	ND	0.1	ug/L	05/10/97
Aroclor 1248	12672-29-6	ND	0.1	ug/L	05/10/97
Aroclor 1254	11097-69-1	ND	0.1	ug/L	05/10/97
Aroclor 1260	11096-82-5	0.2 *	0.1	ug/L	05/10/97

ND = Not detected at or above the reporting limit
* = Value at or above reporting limit

KLEINFELDER, INC.

SAMPLE ID: MW-1
AEN LAB NO: 9705005-11
AEN WORK ORDER: 9705005
CLIENT PROJ. ID: 10-1682-09/604

DATE SAMPLED: 04/30/97
DATE RECEIVED: 05/01/97
REPORT DATE: 05/17/97

ANALYTE	METHOD/ CAS#	RESULT	REPORTING LIMIT	UNITS	DATE ANALYZED
#Extraction for TPH	EPA 3510	-		Extrn Date	05/06/97
TPH as Diesel	GC-FID	2.7 *	0.05	mg/L	05/08/97
TPH as Oil	GC-FID	3.1 *	0.2	mg/L	05/08/97
#Extraction for PCBs	EPA 3510	-		Extrn Date	05/05/97
Polychlorinated Biphenyls	EPA 8080				
Aroclor 1016	12674-11-2	ND	0.1	ug/L	05/10/97
Aroclor 1221	11104-28-2	ND	0.1	ug/L	05/10/97
Aroclor 1232	11141-16-5	ND	0.1	ug/L	05/10/97
Aroclor 1242	53469-21-9	ND	0.1	ug/L	05/10/97
Aroclor 1248	12672-29-6	ND	0.1	ug/L	05/10/97
Aroclor 1254	11097-69-1	ND	0.1	ug/L	05/10/97
Aroclor 1260	11096-82-5	0.2 *	0.1	ug/L	05/10/97

ND = Not detected at or above the reporting limit
* = Value at or above reporting limit

AEN (CALIFORNIA)
QUALITY CONTROL REPORT

AEN JOB NUMBER: 9705005

CLIENT PROJECT ID: 10-1682-09/604

Quality Control Summary

All laboratory quality control parameters were found to be within established limits.

Definitions

Laboratory Control Sample (LCS)/Method Spike(s): Control samples of known composition. LCS and Method Spike data are used to validate batch analytical results.

Matrix Spike(s): Aliquot of a sample (aqueous or solid) with added quantities of specific compounds and subjected to the entire analytical procedure. Matrix spike and matrix spike duplicate QC data are advisory.

Method Blank: An analytical control consisting of all reagents, internal standards, and surrogate standards carried through the entire analytical process. Used to monitor laboratory background and reagent contamination.

Not Detected (ND): Not detected at or above the reporting limit.

Relative Percent Difference (RPD): An indication of method precision based on duplicate analysis.

Reporting Limit (RL): The lowest concentration routinely determined during laboratory operations. The RL is generally 1 to 10 times the Method Detection Limit (MDL). Reporting limits are matrix, method, and analyte dependent and take into account any dilutions performed as part of the analysis.

Surrogates: Organic compounds which are similar to analytes of interest in chemical behavior, but are not found in environmental samples. Surrogates are added to all blanks, calibration and check standards, samples, and spiked samples. Surrogate recovery is monitored as an indication of acceptable sample preparation and instrumental performance.

D: Surrogates diluted out.

#: Indicates result outside of established laboratory QC limits.

QUALITY CONTROL DATA

METHOD: EPA 3510 GCFID

AEN JOB NO: 9705005
DATE EXTRACTED: 05/06/97
INSTRUMENT: C
MATRIX: WATER

Surrogate Standard Recovery Summary

Date Analyzed	Client Id.	Lab Id.	Percent Recovery n-Pentacosane
05/07/97	14A2	01	90
05/07/97	MW-5	02	90
05/07/97	MW-6	03	93
05/07/97	MW-7	04	94
05/07/97	MW-14	05	91
05/08/97	MW-16	06	94
05/07/97	MW-8	07	95
05/08/97	MW-18	08	88
05/08/97	MW-15	09	92
05/08/97	MW-2	10	118
05/08/97	MW-1	11	89
QC Limits:			65-125

DATE EXTRACTED: 05/05/97
DATE ANALYZED: 05/06/97
SAMPLE SPIKED: 9704278-05
INSTRUMENT: C

Matrix Spike Recovery Summary

Analyte	Spike Added (mg/L)	Percent Recovery	RPD	QC Limits Percent Recovery	QC Limits RPD
Diesel	4.00	86	12	60-110	15

Daily method blanks for all associated analytical runs showed no contamination at or above the reporting limit.

QUALITY CONTROL DATA

METHOD: EPA 8080

AEN JOB NO: 9705005
DATE EXTRACTED: 05/05/97
INSTRUMENT: B
MATRIX: WATER

Surrogate Standard Recovery Summary

Date Analyzed	Client Id.	Lab Id.	Percent Recovery 2,4,5,6-Tetrachloro-meta-xylene
05/10/97	MW-8	07	80
05/10/97	MW-18	08	80
05/10/97	MW-2	10	71
05/10/97	MW-1	11	66
QC Limits:			30-131

DATE EXTRACTED: 05/05/97
DATE ANALYZED: 05/09/97
SAMPLE SPIKED: 9703098-19
INSTRUMENT: B

Matrix Spike Recovery Summary

Analyte	Spike Added (ug/L)	Percent Recovery	RPD	QC Limits Percent Recovery	QC Limits RPD
A1260	8.00	115	1	53-133	16

Daily method blanks for all associated analytical runs showed no contamination at or above the reporting limit.

*** END OF REPORT ***

KLEINFELDER

R-4,5-E 9705005

PROJECT NO.	PROJECT NAME
10-1682-09/604	Industrial Asphalt

L.P. NO. (P.O. NO.)	SAMPLERS: (Signature/Number)
R4495	KBR 3014

RECEIVING LAB: AEN

INSTRUCTIONS/REMARKS: Standard T.A.T

	DATE MM/DD/YY	SAMPLE I.D. TIME HH-MM-SS	SAMPLE I.D.	MATRIX	NO. OF CON-TAINERS	TYPE OF CON-TAINERS	ANALYSIS: TPH-d mod (8015)	RCBs (8080)									
1	4-27-97	12:35	14 AZ	H_2O	12	Amber	X										01AB
2	4-29-97	13:55	MW-5	H_2O	2	Amber	X										02AB
3	4-30-97	8:00	MW-6	H_2O	2	Amber	X										03AB
4		9:00	MW-7	H_2O	2	Amber	X										04AB
5		10:15	MW-14	H_2O	2	Amber	X										05AB
6		11:15	MW-16	H_2O	2	Amber	X										06AB
7		12:15	MW-8	H_2O	3	Amber	X	X									07ABC
8		12:30	MW-18	H_2O	3	Amber	X	X									08ABC
9		13:50	MW-15	H_2O	2	Amber	X										09AB
10		15:00	MW-2	H_2O	3	Amber	X	X									10ABC
11		15:50	MW-1	H_2O	3	Amber	X	X									11ABC
12																	
13																	
14																	
15																	
16																	
17																	
18																	
19																	
20																	

Relinquished by: (Signature)	Date/Time	Received by: (Signature)
KBR	5/1/97 11:10	Rick Gilmore
Rick Gilmore	5-1-97 13:06	Lurena Rodkovich
KBR	5/1/97 11:48	Received for Laboratory by: (Signature)

Instructions/Remarks:

Send Results To:

KLEINFELDER
7133 KOLL CENTER PARKWAY
SUITE 100
PLEASANTON, CA 94566
(510) 484-1700

Attn. Dan Carroll

M-60 White - Sampler Canary - Return Copy To Shipper Pink - Lab Copy

CHAIN OF CUSTODY

No. 2371