ERM WEST

Terranext
9838 Old Placerville Road, Suite 100 Sacramento, CA 95827-3559

ENVIRONMENTAL PROTECTION
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(916) 682-0449

Project No. 05100535

Ms. Jennifer Eberle
Alameda County Health Care Services Agency
Department of Environmental Health
Division of Hazardous Materials
1131 Harbor Bay Parkway
Alameda, California 94502

STID 1824

(510)946-0455
J Ackerman

Re: Request for Site Closure
Southern Pacific Transportation Company
1399 Wood Street – Oakland, California

Dear Ms. Eberle: Larry Seto

Terranext, on behalf of Union Pacific Railroad Company (UPRR), formerly Southern Pacific Transportation Company, is requesting closure for the railroad property located at 1399 Wood Street, Oakland, California (Figure 1, Attachment A). The following paragraphs summarize site investigation and monitoring results to date and then evaluate the 1399 Wood Street site in terms of the proposed criteria for a low risk ground water site. Results of recent ground water grab sampling, not previously published, are included.

SUMMARY OF SITE INVESTIGATION AND GROUND WATER MONITORING

Underground Storage Tank Removal

In September 1989, Canonie Environmental Services Corporation (Canonie) removed a fuel dispensing island with associated piping and three underground storage tanks (USTs) (identified in Canonie's report as Tank 1/2, Tank 3, and Tank 4) from the 1399 Wood Street site. The three USTs were a 12,000-gallon split-compartment diesel-gasoline tank (Tank 1/2), a 7,300-gallon diesel tank (Tank 3), and a 550-gallon waste oil tank (Tank 4). The location of the UST excavations are shown on Figure 2 in Attachment A. The procedures and results of the tank removal program were presented in a Canonie report dated December 18, 1989 (*Final Site Report, Underground Storage Tank Removal, Southern Pacific Transportation Company, Oakland, California*).

Canonie personnel collected a total of five soil samples from the sidewall/floor of the three tank excavations and one soil sample from beneath the former fuel dispenser location. These soil samples were analyzed for total extractable petroleum hydrocarbons (TEPH), total

volatile petroleum hydrocarbons (TVPH), and benzene, toluene, ethylbenzene, and xylenes (BTEX). The single sample collected from the Tank 4 excavation was also analyzed for oil and grease, polychlorinated biphenyls (PCBs), volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), and the metals cadmium (Cd), chromium (Cr), lead (Pb), and zinc (Zn). Oil and grease, VOCs, and cadmium were not detected in the sample analyzed from the Tank 4 excavation. Maximum concentrations of analytes detected in soil samples are listed below:

Analyte	Maximum Concentration (mg/kg)	Location
TEPH	6,500	Tank 1/2 excavation
TVPH	360	Tank 1/2 excavation
Benzene	6.7	Tank 1/2 excavation
Toluene	31	Tank 1/2 excavation
Ethylbenzene	40	Tank 1/2 excavation
Xylenes	230	Tank 1/2 excavation
PCBs	37	Tank 4 excavation
Chromium	36	Tank 4 excavation
Lead	9.9	Tank 4 excavation
Zinc	56	Tank 4 excavation
SVOCs	0.99*	Tank 4 excavation

* bis(2-ethylhexyl)phthalate was the only SVOC detected.

Canonie personnel did not observe free product on the water surface in any of the tank excavations. Two ground water grab samples were collected from the Tank 1/2 excavation and one sample from the Tank 3 excavation. One sample from the Tank 1/2 excavation was analyzed for TEPH, TVPH, and BTEX while the other sample was analyzed only for PCBs. TVPH, benzene, and PCBs were not detected. The reported concentrations of TEPH, toluene, ethylbenzene, and xylenes were 330 mg/kg, 2.7 mg/kg, 1.1 mg/kg, and 5.1 mg/kg. The single sample from the Tank 3 excavation was analyzed for TEPH and BTEX. The only analyte detected was total xylenes at a concentration of 0.0013 mg/kg.

Preliminary Soil Investigation

The Alameda County Health Care Services Agency - Department of Environmental Health, Division of Hazardous Materials (Alameda County) required further investigation of the site. In October ~~1992~~, Terranext [then Industrial Compliance (IC)] performed a preliminary soil investigation in which 11 soil borings (A1 through A11) were drilled and sampled. The procedures and results of this work were detailed in IC's report dated January 17, 1994 (*Preliminary Soil Investigation Report, Southern Pacific Transportation Company, 1399 Wood Street, Oakland, California*).

The soil borings were advanced to depths ranging from 5.5 feet below ground surface (bgs) to 14 feet bgs. Ground water was encountered at from 5 feet to 8 feet bgs. The location of the 11 soil borings is shown on Figure 2 in Attachment A. Analytical results from soil samples collected from these borings (boring A-11 was not sampled) are presented in Table 1 in Attachment B. Soil samples selected for analysis were collected from depths ranging from 2 feet bgs to 6 feet bgs. As documented by the tabularized data, total petroleum hydrocarbons in the gasoline range (TPH-G) were detected in soil samples from three borings, two near the former location of Tanks 1/2 and 4 and one near the fuel dispensing island. Total petroleum hydrocarbons in the diesel range (TPH-D) were identified in soil samples from four borings, two near the former location of Tanks 1/2 and 4 and two near the former location of Tank 3. BTEX components were detected in soil samples from the same three borings in which TPH-G was detected. PCBs were not detected in the single sample analyzed from the boring (A-9) near the former location of Tank 4.

Soil Remediation and Ground Water Investigation

In June of 1994, IC conducted soil remediation and performed a ground water investigation. The procedures and results of remediation and site investigation activities were presented in IC's report dated August 29, 1994 (*Soil Remediation and Ground Water Investigation Report, Southern Pacific Transportation Company, 1399 Wood Street, Oakland, California*).

A total of approximately 1,200 cubic yards (cy) of petroleum hydrocarbon impacted soil was removed from two areas of the site. These areas, designated Excavation A and Excavation B are shown on Figure 2 in Attachment A. Approximately 150 cy of impacted soil was removed from Excavation A; approximately 1,050 cy of impacted soil was removed from Excavation B.

Prior to initiation of the soil cleanup task, remedial goals of 100 mg/kg TPH and 4.6 mg/kg benzene were negotiated with Alameda County. Following excavation of all visually

impacted soil, confirmation samples were collected from excavation floor and sidewall areas. These samples were analyzed and the results compared to the site soil remedial goals. Analytical results from soil confirmation samples are presented in Table 2 (Excavation A) and Table 3 (Excavation B) in Attachment B.

TPH-G and BTEX compounds were not detected in any of the seven soil confirmation samples collected from Excavation A. TPH-D was detected at a concentration of 2 mg/kg in two of the seven samples.

TPH-D was not detected in any of the 20 soil confirmation samples collected from Excavation B. One or more BTEX compounds were detected in 10 of the samples. The highest reported concentration of benzene was 3.4 mg/kg, approximately 1 mg/kg less than the remedial goal of 4.6 mg/kg. One soil confirmation sample from the floor and three soil confirmation samples from the sidewall of Excavation B had reported TPH-G concentrations in excess of the remedial goal of 100 mg/kg for TPH. The sample from the excavation floor (sample B-(S-5) in Table 3) had a reported concentration of TPH-G of 550 mg/kg. A minor amount of additional excavation was conducted in the area of this sample. The three sidewall samples exceeding the TPH remedial goal were collected from a depth of 3.5 feet bgs along a 25-foot section of sidewall in the northeast corner of the excavation. Reported concentrations of TPH-G in these three samples were 1,800 mg/kg, 3,600 mg/kg, and 13,000 mg/kg. The soil represented by these three samples was left in place as Excavation B could not be extended beyond the property boundary.

After conclusion of the soil remediation activities, a ground water investigation was initiated. Three monitoring wells were installed (MW-1, MW-2, and MW-3) at the locations shown on Figure 2 in Attachment A. The wells were all completed to a total depth of approximately 14 feet bgs and with 10 feet of screen. Static water level in all wells was at about 6 feet bgs as during previous phases of site investigation. Monitoring well MW-1 was located adjacent to and in the assumed downgradient direction from the former location of Tank 3. Monitoring well MW-2 was placed in an assumed upgradient location. Monitoring well MW-3 was located adjacent to and in the assumed downgradient direction from the location of the former dispenser island.

Following well development, initial sampling of the new monitoring wells occurred on June 29, 1994. Quarterly ground water monitoring was continued through the fourth quarter of 1995 (last sampled on January 3, 1996), for a total of seven monitoring events. The analytical results for all monitoring events are summarized in Table 2 in Attachment B. During the period of ground water monitoring, TPH-G and benzene have been detected consistently in ground water samples from MW-3 at concentrations ranging from 0.11 mg/L

to 0.47 mg/L and 0.7 micrograms per liter (μg/L) to 5.1 μg/L. TPH-D has been detected sporadically in ground water samples from MW-1 at concentrations ranging from 0.097 mg/L to 0.16 mg/L. Free product has never been observed on the water surface in any of the three site monitoring wells.

The apparent direction of ground water flow during the period of monitoring has been predominantly to the east-northeast. The calculated hydraulic gradient has ranged from 0.004 to 0.024. Ground water elevation contour maps for all monitoring events are included in Attachment C.

Ground Water Grab Sampling

As a result of negotiations for closure of the 1399 Wood Street site, Alameda County approved a workplan submitted by Terranext in a letter dated March 6, 1996. The workplan proposed the installation of two temporary monitoring wells downgradient (to the northeast as defined by ground water monitoring results) of the former UST locations. The temporary monitoring wells were installed, sampled and abandoned on April 4, 1996. GWS-1 was installed off site and downgradient of the former location of Tanks 1/2 and 4. GWS-2 was installed downgradient of the former location of Tank 3. Locations of these temporary monitoring wells are shown on Figure 2 in Attachment A.

The well borings were advanced utilizing a CME-75 truck-mounted hollow-stem auger drill rig. Drive samples for lithologic characterization were taken using a 2-inch diameter by 18-inch long split-spoon sampler. Lithology was characterized using the Unified Soil Classification System. Soil encountered in the GWS-1 boring consisted of asphalt (6 inches thick) and baserock to a depth of 2.5 feet bgs. Fill material consisting of silty sand with wood fragments occurred from 2.5 feet bgs to 7 feet bgs. Native clayey sand and silty sand was encountered from 7 feet bgs to the total boring depth of 11 feet bgs. The lithology encountered in the boring for GWS-2 consisted of asphalt (6 inches thick) and baserock to a depth of 1.5 feet bgs. Fill, consisting of silty sand and sandy clay with granular debris, was encountered from 1.5 feet bgs to 6.5 feet bgs. Native sand mixtures with silt or clay occurred from 6.5 feet bgs to the total boring depth of 9 feet bgs. Boring logs for GWS-1 and GWS-2 are included as Attachment D.

The temporary monitoring wells were constructed within the hollow-stem augers using 2-inch, Schedule 40 polyvinyl chloride (PVC) casing. Five feet of slotted well screen (0.020 inch machine cut) was installed from 1 to 2 feet above the bottom of the boring to 1 to 2 feet above the apparent static water level at the time of drilling. The remaining portion of each well, to approximately 2 feet above land surface, was constructed of blank casing. An

artificial filter pack consisting of Lonestar #3 sand was placed from the bottom of the borings to approximately 1 foot above the top of screen. A bentonite seal, consisting of 3/8-inch bentonite pellets, was placed above the filter pack and hydrated. This temporary seal extended approximately to land surface. General features of well construction are shown on the well construction logs included as Attachment D.

Typical for temporary monitoring well installations, the wells were not developed prior to sampling and the elevation of the wells was not surveyed. Within a few hours of completion, each well was purged a minimum of three casing volumes by hand bailing. Temperature, pH, and electrical conductivity were monitored during purging. The wells were then sampled using a disposable bailer. Free product was not observed on the water surface or in the bailer during sampling of either of the temporary monitoring wells. Immediately following sampling, the temporary monitoring wells were abandoned. Abandonment consisted of pulling the PVC blank casing and screen, drilling out the filter pack material, and then filling the borehole from bottom to land surface with a cement/bentonite grout.

The ground water sample collected from GWS-1 was analyzed for TPH-G by EPA Method 8015 modified. The ground water sample collected from GWS-2 was analyzed for TPH-D by EPA Method 8015 modified in three separate runs: one sample split was analyzed according to the standard Method 8015 modified protocol; one split was analyzed after filtration through a 0.45 micron filter; one split was analyzed after the sample was processed through silica gel using EPA Method 3630. Samples from GWS-1 and GWS-2 were also analyzed for BTEX by EPA Method 8020. Analytical results are summarized in Table 1, Attachment B. Analytical laboratory reports are included as Attachment E.

Petroleum hydrocarbons quantified in the gasoline range were detected in the ground water sample from GWS-1 at a concentration of 0.22 mg/L. Petroleum hydrocarbons quantified in the diesel range were detected in the unfiltered, the filtered, and the silica gel processed ground water sample splits from GWS-2 at concentrations of 1.2 mg/L, 0.98 mg/L, and 0.99 mg/L. None of the above results exhibited a chromatographic pattern that matched the laboratory's gasoline or diesel fuel standard. This suggests that the petroleum hydrocarbons detected in the two ground water grab samples are degraded or weathered fuel hydrocarbons.

Benzene and toluene were detected in the ground water sample from GWS-1 at concentrations of 3.9 μg/L and 0.53 μg/L. BTEX compounds were not detected in the ground water sample from GWS-2.

EVALUATION OF 1399 WOOD STREET SITE AS A LOW RISK GROUND WATER CASE

In late 1995, Lawrence Livermore National Laboratory (LLNL) presented a series of two reports to the State Water Resources Control Board (SWRCB) regarding the effectiveness of the leaking underground fuel tank (LUFT) cleanup program. The LLNL report entitled: *California Leaking Underground Fuel Tank (LUFT) Historical Case Analyses*, dated November 16, 1995, documented the results of the LUFT program, and the LLNL report entitled: *Recommendations to Improve the Cleanup Process for California's Leaking Underground Fuel Tanks*, dated October 16, 1995, presented recommendations to make the LUFT program more effective. Among the findings of these studies, the LLNL group determined that the impact of the LUFTs to the environment was not as severe as once thought, and at the majority of sites, passive bioremediation was as effective as active ground water remediation. The LLNL group also recommended adopting a "risk-based" system in determining site closure.

Based on the results of these two reports, the SWRCB recommended changes to the policies which direct local agencies in overseeing the cleanup of LUFT sites. In a letter dated December 8, 1995, the SWRCB recommended that the oversight agencies proceed aggressively to close low risk soil sites and low risk ground water sites where monitoring has demonstrated a stable plume.

Pursuant to the SWRCB letter, the California Regional Water Quality Control Board, San Francisco Bay Region (Regional Board) defined six criteria for low risk soil and ground water sites in a memorandum dated January 5, 1996 and entitled: *Regional Board Supplemental Instructions to State Water Board, December 8, 1995, Interim Guidance on Required Cleanup at Low Risk Fuel Sites*. The following paragraphs evaluate the 1399 Wood Street site in terms of the six criteria proposed by the Regional Board as necessary to characterize a site as a low risk ground water case. The six criteria are numbered and appear in boldface italic.

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

> Potential ongoing sources have been removed and no free product has been encountered at the site. Three USTs and a fuel dispensing island with associated piping were removed from the site between September 15 and 18, 1989.

Soil remediation goals established for the site were 100 mg/kg TPH and 4.6 mg/kg benzene. A total of 1,200 cy of petroleum hydrocarbon impacted soil was removed from the excavations surrounding the former UST locations between May 31 and June 6, 1994. Analytical results from soil confirmation samples collected from the sidewalls and floors of the excavated areas indicate that all but a small area of petroleum hydrocarbon impacted soil has been removed from the site. TPH-G and BTEX compounds were not detected in any of the seven soil confirmation samples collected from Excavation A. TPH-D was reported at a concentration of 2 mg/kg in two of the seven samples. Reported concentration of TPH and benzene in the 20 soil confirmation samples collected from Excavation B were all less than the established remedial goals with the exception of a single floor sample in the middle of the excavation (additional excavation occurred here) and three samples collected from 3.5 feet bgs along a 25-foot section of the northeast sidewall at the property boundary. Soil in this sidewall area, which was left in place, had reported concentrations of TPH-G of 1,800 mg/kg, 3,600 mg/kg, and 13,000 mg/kg. Reported concentration of benzene in these three samples was 0.4 mg/kg, 3.4 mg/kg, and <1 mg/kg.

Free product was not encountered in any of the soil borings previously drilled on the site. Free product has not been present in any of the monitoring wells over the seven quarters of ground water monitoring. Free product was not encountered in the recent borings drilled for ground water grab sampling.

2. ***The site has been adequately characterized.***

Soil and ground water conditions at the site have been characterized during previous investigation, remediation, and monitoring activities. Soil conditions have been characterized using analytical data from soil samples collected during UST removal in September 1988, from soil samples collected from borings installed during the preliminary soil investigation in October 1992, and from post-excavation soil confirmation samples collected in June 1994. These data indicate that hydrocarbon-affected soil was limited to the vicinity of former Tank 3 and the area surrounding Tank 1/2, Tank 4, and the fuel dispensing island. These data also indicate that all soil with petroleum hydrocarbon concentrations in excess of site remedial goals was removed from Excavation A, and substantially removed from Excavation B during the June 1994 remediation activities. Site characterization data indicate that the only remaining petroleum impacted soil occurs in the northwest corner of Excavation B.

Ground water conditions have been characterized using analytical data from quarterly sampling of the three ground water monitoring wells on site. Quarterly monitoring was initiated in the second quarter of 1994 and continued through the fourth quarter of 1995 (a total of seven monitoring events). In addition ground water conditions have also been characterized utilizing the two temporary monitoring wells installed, sampled, and abandoned on April 4, 1996.

3. ***The dissolved hydrocarbon plume is not migrating.***

Available site data suggest that petroleum hydrocarbon impact to site ground water is localized and that impacted ground water is not migrating any significant distance downgradient of the site. Petroleum hydrocarbons in the diesel range have been detected in ground water samples from adjacent to (MW-1) and immediately downgradient (GWS-2) of the former location of Tank 3 (diesel). Petroleum hydrocarbons in the diesel range have not been detected in ground water samples from either of the two ground water monitoring sites further downgradient of the former Tank 3 location, i.e. MW-3 and GWS-1. The lack of detectable concentrations of TPH-D in ground water samples from MW-3 suggests that impacted ground water has not migrated as far as 100 feet downgradient from the former location of Tank 3.

Petroleum hydrocarbons in the gasoline range have been detected in ground water samples from adjacent to (MW-3) and immediately downgradient (GWS-1) of the former dispenser island and the former locations of Tank 1/2 (gasoline/diesel) and Tank 4 (waste oil). Benzene, toluene and xylenes have been detected in ground water samples from MW-3; benzene and toluene were detected in the single ground water sample from GWS-1. Although there are no further downgradient ground water monitoring points, it is logical to assume that impacted ground water from the dispenser island/Tank 1 and 2/Tank 4 source area has also migrated less than 100 feet downgradient given the limited distance between the two areas and a consequent assumption of similar hydrogeologic conditions.

Although a crossgradient monitoring point, the fact that reported concentrations of TPH-G and BTEX components in ground water samples from MW-3 have not increased over the period of monitoring suggests that the plume of hydrocarbon impacted ground water from the former dispenser island/Tank 1 and 2/Tank 4 source area is stable. This conclusion is further

supported by the fact that the concentrations of TPH-G, benzene and toluene reported in the ground water sample from GWS-1 (downgradient) are within the range of concentrations detected for the same compounds over the entire period of monitoring of MW-3.

The similarity of reported concentrations of petroleum hydrocarbon compounds in ground water samples from MW-3 and GWS-1 also suggests that the small volume of petroleum hydrocarbon impacted soil left in place in the northeast corner of Excavation B is not an active or significant source area for petroleum hydrocarbon impact to ground water. This conclusion is based on the fact that MW-3 is upgradient of the area of impacted soil while GWS-1 is downgradient.

Site conditions also serve to limit the potential migration of hydrocarbon impacted ground water. The horizontal hydraulic gradient for shallow ground water beneath the site is relatively low (0.003 to 0.024) and shallow subsurface deposits are relatively fine grained, typically clays, silts, and silty to clayey fine grained sands. The conclusion that these conditions serve to limit migration of impacted ground water is supported by data from other nearby sites in West Oakland with similar hydrogeologic conditions, where migration of dissolved constituents in ground water has been shown to be very limited.[1,2]

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

Petroleum hydrocarbon impact to water supply wells or other sensitive receptors is very unlikely. Shallow ground water in West Oakland is not used for municipal or domestic purposes. A well survey from the Alameda County Public Works Agency indicates that there are no drinking water supply wells within a 1/4-mile radius of the site. Furthermore, Alameda County requires a minimum 50-foot sanitary seal for municipal and industrial water supply wells and a 20-foot sanitary seal for domestic and irrigation wells. Wells so constructed would not be affected by the shallow ground water at the site which typically occurs at from 2 feet to 7 feet bgs. The only other potential

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[1] Geomatrix Consultants, Inc., 1995, *Remedial Investigation and Baseline Risk Assessment Report*, Former Bobo's Junkyard Operable Unit, 1401 Third Street, Oakland, California, 22 November.

[2] Geomatrix Consultants, Inc., 1996, *Draft Remedial Investigation and Baseline Risk Assessment Report*, I-880 Realignment Corridor, West Oakland and Desert Rail Yards, Oakland, California, 29 February.

receptor(s) for the low concentrations of selected petroleum hydrocarbon compounds in site ground water are aquatic organisms in the Oakland Inner Harbor, located approximately 7,000 feet (1.3 miles) south of the site, or the Oakland Outer Harbor, located approximately 3,500 feet (0.7 miles) northwest of the site. Given that the predominant direction of ground water flow is to the east-northeast and that dissolved petroleum hydrocarbons in site ground water do not appear to have migrated even 100 feet downgradient, it is very unlikely that these receptors will be impacted.

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

Available data suggests that the site does not present a significant risk to human health. All but a very small volume of petroleum hydrocarbon affected soil has been removed from the site. The remaining petroleum hydrocarbon affected soil is at a depth of about 3.5 feet bgs and occurs under an existing paved area where casual contact is unlikely except under a controlled excavation scenario. It is also very unlikely that humans will contact petroleum hydrocarbon affected ground water as site ground water is not used for industrial or drinking water supply.

In the following paragraphs, risk to human health posed by residual petroleum hydrocarbons in site soil and ground water are evaluated based on concentrations of BTEX, primarily benzene, and not on concentration of TPH. Risk-based concentrations have not been developed for TPH and methodologies to evaluate risk due to TPH, while available, are not commonly used in California.

Soil

Comparison of site soil and ground water data to United States Environmental Protection Agency (USEPA) and State of California health-risk-based standards further supports a conclusion of no significant risk. Maximum detected concentrations of BTEX in soil confirmation samples from Excavation A and Excavation B are compared to USEPA Region IX preliminary soil remediation goals below.

Chemical	Maximum Detected Concentration (mg/kg)		Region IX Preliminary Remediation Goal* (PRG) (mg/kg)
	Excavation A	Excavation B	Industrial
Benzene	<0.005	3.4	3.2
Toluene	<0.005	8.8	2,800
Ethylbenzene	<0.005	51	690
Xylenes	<0.005	100	990

* USEPA Region IX Preliminary Remediation Goals, August 6, 1996.

Currently, the site and the surrounding area is zoned by the City of Oakland for light industry. The railroad has plans to sell the parcel of land, which includes the site, in the future. There are no plans or intentions on the part of the railroad to change the use of the site prior to the sale. The land will be sold for light industrial use and it is assumed that the site and the immediately surrounding area will remain in light industrial use for the foreseeable future. The nearest residences to the site are located approximately 400 feet to the southeast. The nearest residences in the downgradient direction (east-northeast) are located approximately 600 feet from the site boundary.

Maximum detected concentrations of toluene, ethylbenzene, and xylenes are one to three orders of magnitude below preliminary remediation goals for industrial soil. The highest concentration of benzene detected in soil remaining at the site is approximately equal to the industrial PRG - 3.4 mg/kg (site) vs. 3.2 mg/kg (PRG). As discussed above, the residual impacted soil in question occurs at a depth of about 3.5 feet bgs and is under pavement and not accessible to site workers except under a controlled excavation scenario. Current and anticipated future use of the site is light industrial.

Risk management

Ground Water

A comparison of the maximum detected concentrations of BTEX in samples of site ground water to State of California Department of Health Services maximum contaminant levels (MCLs) is presented below.

Chemical	Maximum Detected Concentration (μg/L)	California MCLs* (μg/L)
Benzene	5.1	1
Toluene	4.5	150
Ethylbenzene	ND	700
Xylenes	3.6	1,750

* California Regional Water Quality Control Board - Central Valley Region, July 1995, *A Compilation of Water Quality Goals*.

The maximum concentration of benzene reported in site ground water samples exceeds the current MCL. This is not a significant factor as the area of impacted ground water is very localized. There is no indication that impacted ground water is migrating downgradient and shallow ground water in the area is not used for domestic or industrial purposes.

It is noted that the maximum benzene concentration listed above is not representative of overall site ground water conditions. The value represents a single reported concentration from a ground water sample collected from monitoring well MW-3 in December of 1994. With respect to ground water samples collected from MW-3, the average reported concentration of benzene over the period of monitoring (seven events) is approximately 2 μg/L. The average reported concentration of benzene in all site ground water samples is about 1.2 μg/L.

Risk-Based Corrective Action Tier 1 Evaluation

The preceding qualitative assessment of site data and comparison of site data to existing risk-based standards indicate that the site presents no significant risk to human health. A risk-based corrective action (RBCA) Tier 1 evaluation has been performed to more fully evaluate risk to human health. The RBCA method was recently developed to assess the potential risk posed to human health and the environment at sites having had a release of petroleum hydrocarbons. The RBCA method was developed by the American Society for Testing and Materials (ASTM) and published in November 1995 as *Standard Guide for Risk-Based Corrective Action Applied at Petroleum Release Sites*, ASTM Designation E 1739-5, (ASTM Guide). The RBCA method is currently being implemented at many federal, state and local agencies. It is

assumed for this discussion that the reader has some familiarity and basic experience with the RBCA method.

The following evaluation does not include discussion of Site Assessment and Site Classification steps of the method. The material covered in these steps have been addressed in the preceding sections of this document and in previous investigation reports. The present evaluation only compares maximum reported concentrations of selected chemical constituents in site soil and ground water to a set of conservative risk-based screening levels (RBSLs). The purpose of the evaluation is to assess the risk posed by existing site conditions.

Site data establishes four chemicals of concern (COCs) for site soil, benzene, toluene, ethylbenzene, and xylenes, and three COCs for site ground water, benzene, toluene, and xylenes. COCs for this evaluation are any constituent having been detected at or above the laboratory method reporting limit and for which health risk information is available.

Four potential exposure pathways were evaluated, leaching to ground water from all soils and ground water ingestion, ground water volatilization to indoor air and ground water volatilization to outdoor air. The other potential soil pathways such as direct ingestion and dermal contact and inhalation of particulates were not evaluated because the volume of residual impacted soil is considered to be very small and the soil occurs under pavement. It is likely that this soil will only be penetrated during a controlled excavation with the knowledge that petroleum hydrocarbon impacted soil may be present.

The RBSLs used are based on a commercial/industrial receptor (rather than residential), a risk factor of 1×10^{-6} for benzene, and hazard quotients of 1 for ethylbenzene, toluene, and xylenes. Parameters used to calculate the RBSLs were standard default values except for selected site specific values based primarily on depth to ground water:

Surficial soil	top 1 foot
Capillary zone thickness	0.4 foot
Vadose zone thickness	5 feet
Depth to ground water	5 feet
Depth to top of affected soil	1 foot
Thickness of affected soil	4 feet

Output tables from the RBCA Tier 1 evaluation process are included in Attachment F. A summary of the results is shown below.

Chemical	Maximum Detected Soil Concentration (mg/kg)	RBSL for Soil Leaching to Ground Water (mg/kg)
Benzene	3.4	0.058
Ethylbenzene	51	130
Toluene	8.8	360
Xylenes	100	>RES

what about soil to Indoor?

Chemical	Maximum Detected Ground Water Concentration (mg/L)	RBSL for Ground Water Ingestion (mg/L)	RBSL for Ground Water Volatilization to Indoor Air (mg/L)	RBSL for Ground Water Volatilization to Outdoor Air (mg/L)
Benzene	0.0051	0.0099	0.014	48
Ethylbenzene	ND	10	>SOL	>SOL
Toluene	0.0045	20	170	>SOL
Xylenes	0.0036	>SOL	>SOL	>SOL

ND Not detected at a reporting limit of 0.5 μg/L.

>RES The risk level of 1 x 10^{-5} is not exceeded for compound at any concentration.

>SOL The risk level of 1 x 10^{-5} is not exceeded by solubility of compound.

The RBCA Tier 1 evaluation indicates that the maximum reported concentration of all COCs, for the exposure pathways evaluated, are less than calculated RBSLs with the single exception of benzene in soil leaching to ground water. The maximum reported concentration of benzene in soil remaining on site is 3.4 mg/kg while the calculated RBSL value is 0.058 mg/kg. While the methodology suggests a risk associated with potential leaching of benzene into ground water, the maximum reported concentration of benzene in site ground water does not exceed the calculated RBSL for

ingestion of site ground water. Further, as stated previously, site ground water is not used for industrial or domestic purposes.

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

The site presents no significant risk to the environment because it is located in a heavily developed area of West Oakland and there is little open land and no known wetlands, sensitive habitats, or sensitive receptors in the site vicinity. An Environmental Impact Statement/Report (EIS/EIR) has been prepared by the U.S. Department of Transportation (U.S. DOT) and California Department of Transportation (Caltrans) for the I-880 reconstruction project.[3] The 1399 Wood Street site is included in the area of the reconstruction project. According to the EIS/EIR, the nearest area designated as wetlands is more than one-half mile northeast of the site and the nearest other sensitive habitat is the Emeryville Crescent, a tidal salt marsh located more than 1 mile north of the site. Although the general direction of flow of the shallow ground water from the site is to the east-northeast, the stable plume conditions indicate that these sensitive habitats will not be impacted.

CONCLUSIONS AND REQUEST FOR CLOSURE

UPRR believes the information and data summarized in this letter report justify characterization of the 1399 Wood Street site as a low risk ground water case and request that Alameda County close the case investigation. Although the Regional Board Interim Guidance does not give explicit guidelines for closure of low risk ground water cases, the Fact Sheet attached to the Interim Guidance discusses closure of sites where monitoring is being performed and no active remediation is anticipated. The fact sheet basically states that closure of such sites would be appropriate as soon as there were sufficient data to support conclusions that the source had been removed, the plume had stabilized, and that natural attenuation or bioremediation would achieve appropriate water quality objectives (if any) in a reasonable time frame.

Clearly there are sufficient data from the 1399 Wood Street site to support the conclusion that the source has been effectively removed as discussed under Criterion 1. Available data indicates that the small volume of petroleum hydrocarbon impacted soil left in place in the

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[3] U.S. Department of Transportation and California Department of Transportation, 1991, *Final Environmental Impact Statement/Report*, September.

northeast corner of Excavation B is not an active or significant source area for petroleum hydrocarbon impact to ground water. There also are sufficient monitoring data to conclude that plumes of impacted ground water associated with the former Tank 3 and the former dispenser island/Tank 1 and 2/Tank 4 source areas are both small (migration less than 100 feet downgradient) and stable (Criterion 3). Finally, site conditions are such and there are sufficient data available to support a conclusion that the site presents no significant risk to human health or the environment and that there is no need to implement active remediation (Criteria 4, 5 and 6). Based on the findings of the LLNL reports, the recommendations of the SWRCB, and review of site specific data, it is reasonable to conclude that passive bioremediation will act to reduce residual concentrations of petroleum hydrocarbons in site soil and ground water.

If you have any questions regarding this summary of site conditions and monitoring results and the request for closure, please contact the undersigned at (916) 369-8971 or Mr. Norm Siler of UPRR at (402) 271-4327.

Sincerely,

TERRANEXT

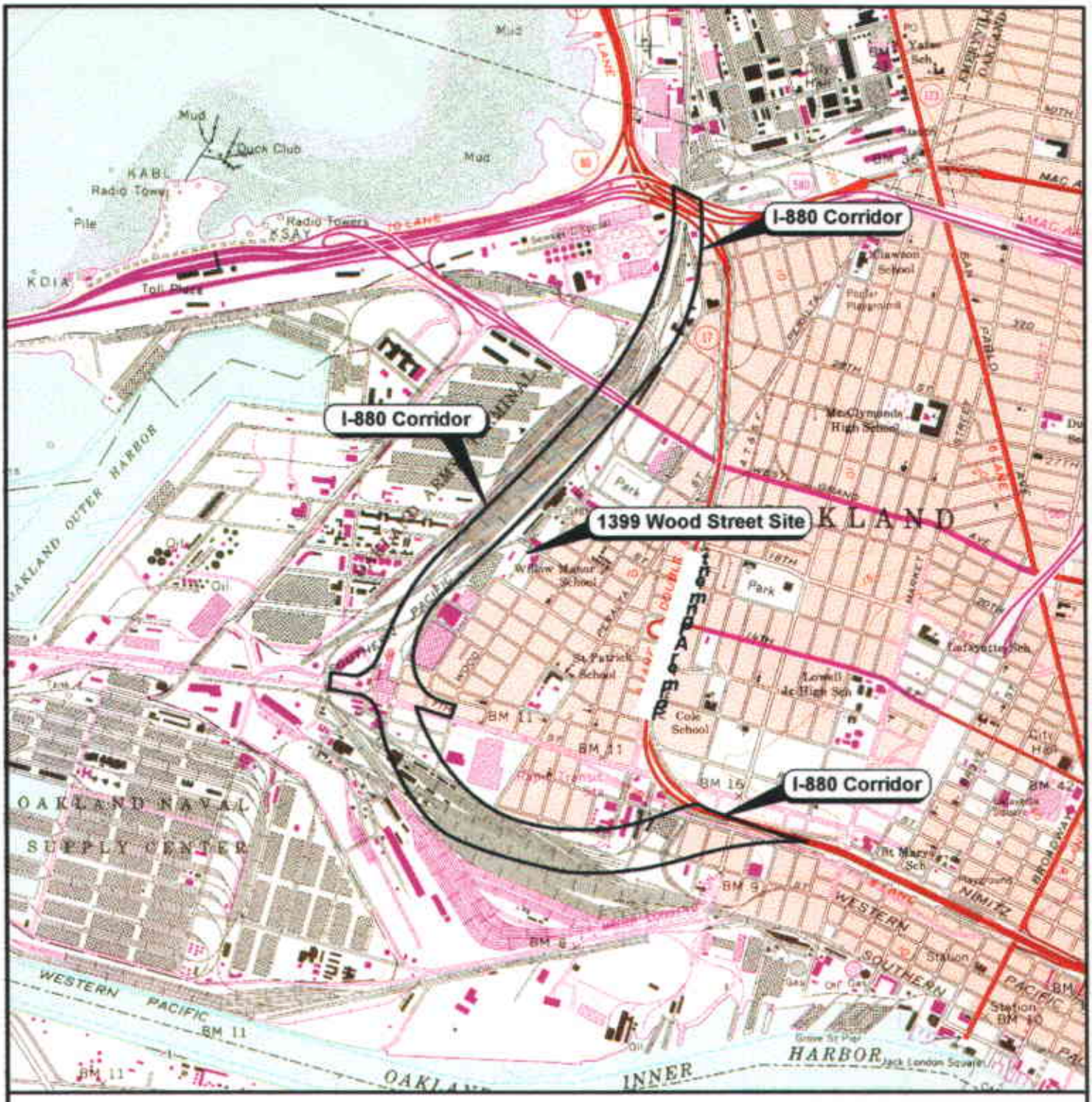
James B. Ackerman, R.G.
Project Geologist

Carl Taylor
Project Manager

JBA/CT/dao

Attachments

cc: Mr. Norm Siler, Union Pacific Railroad Company (with attachments)
Mr. John Moe, Union Pacific Railroad Company (with attachments)



1/2 0 1 MILE

APPROXIMATE SCALE (MILES)

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

APPROXIMATE SCALE (FEET)

N

Reference:
U.S.G.S. 7.5 Minute Series (Topographic)
Oakland West Quadrangle
California
Dated: 1959, revised: 1980

Project No.: 05100535	Figure No.: 1
Scale: As Above	Page No.: -
File No.: SITEMAP	Drawn By: Patti Decker
Date: 10/15/96	Approved By: Richard Bateman

TerraNext

SITE LOCATION MAP

SOUTHERN PACIFIC TRANSPORTATION COMPANY
1399 WOOD STREET
OAKLAND, CALIFORNIA

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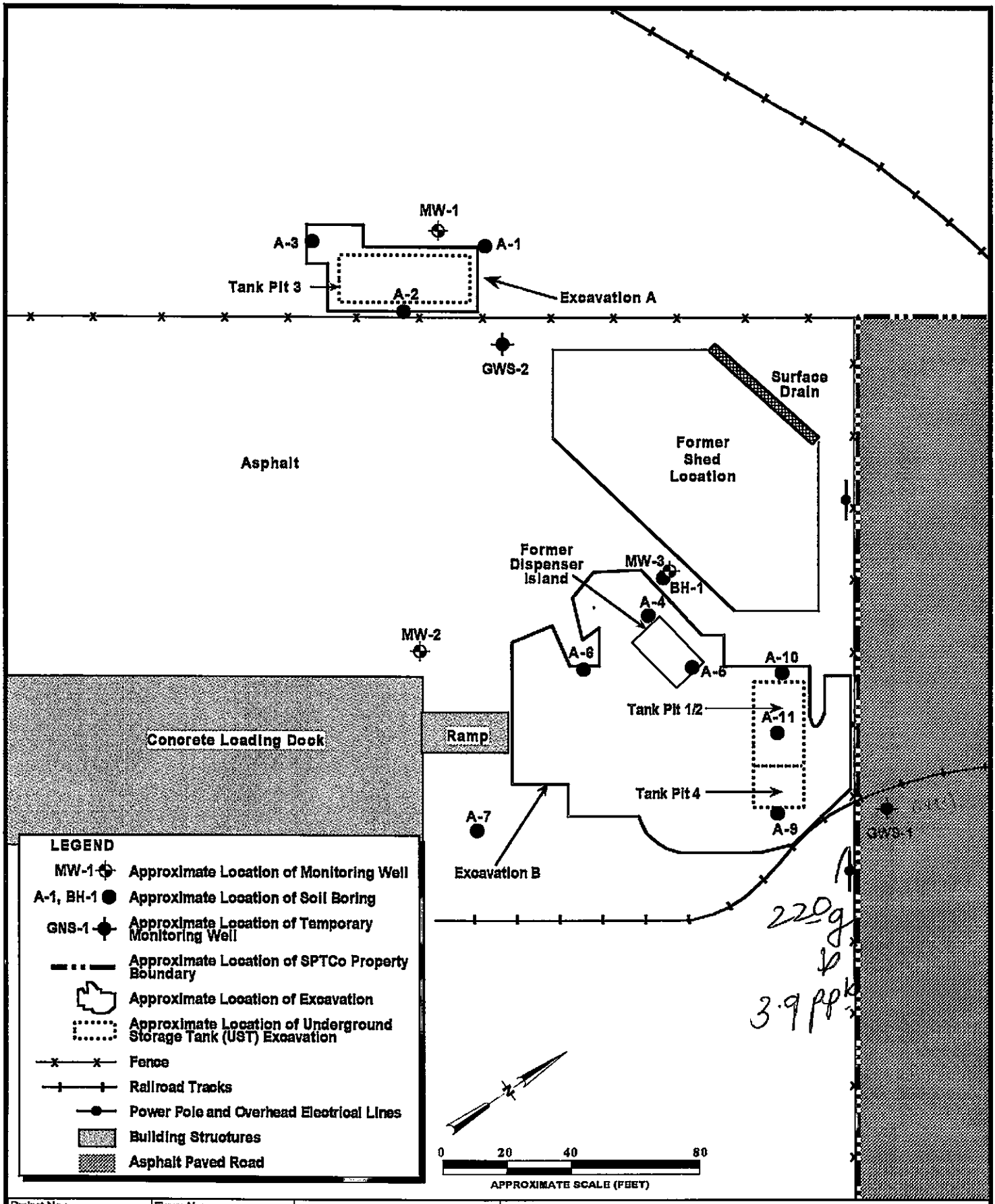


Project No.: 05100636	Figure No: 2
Scale: 1" = 40'	Page No.:
File No.: D5000637	Drawn By: Janelle Hurtado
Date: 09/20/96	Approved By: Dick Bateman

TerraNext

LOCATION OF SOIL BORINGS AND MONITORING WELLS

SOUTHERN PACIFIC TRANSPORTATION COMPANY
1399 WOOD STREET
OAKLAND, CALIFORNIA

ATTACHMENT B

SUMMARY OF SOIL AND GROUND WATER ANALYTICAL RESULTS

TABLE 1
ANALYTICAL RESULTS
SOIL BORING SOIL SAMPLES

Soil Boring Number[a]	Date Collected	Sample Depth (feet)	TPH[b] (mg/kg)		Volatile Organic Compounds[c] (mg/kg)				PCBs[d] (mg/kg)
			Gasoline	Diesel	Benzene	Toluene	Ethylbenzene	Total Xylenes	
A-1	10-22-92	2-2.5	<0.5	<0.5	<0.005	<0.01	<0.005	<0.005	NA
	10-22-92	5-5.5	<0.5	1.4	<0.005	<0.01	<0.005	<0.005	NA
A-2	10-22-92	4-4.5	<0.5	<0.5	<0.005	<0.01	<0.005	<0.005	NA
	10-22-92	5.5-6	<0.5	<0.5	<0.005	<0.01	<0.005	<0.005	NA
A-3	10-22-92	5.5-6	<0.5	0.7	<0.005	<0.01	<0.005	<0.005	NA
A-4	10-22-92	5-5.5	<0.5	<0.5	<0.005	<0.01	<0.005	<0.005	NA
A-5	10-22-92	3.5-4	5,000[e]	<50[f]	3.9	6.9	28	150	NA
	10-22-92	5-5.5	11	<0.5	0.62	0.1	0.49	1.3	NA
A-6	10-22-92	5-5.5	<0.5	<0.5	<0.005	<0.01	<0.005	<0.005	NA
A-7	10-23-92	5-5.5	<0.5	<0.5	<0.005	<0.01	<0.005	<0.005	NA
A-8	10-23-92	5-5.5	<0.5	<0.5	<0.005	<0.01	<0.005	<0.005	NA
A-9	10-23-92	5-5.5	9.0[e]	19	0.016	<0.01	0.050	0.22	<0.1[f]
A-10	10-23-92	2.5-3	<0.5	<0.5	<0.005	<0.01	<0.005	<0.005	NA
	10-23-92	4.5-5	1.5[e]	4.3	<0.005	<0.01	0.008	0.029	NA

a See Figure 4 for approximate boring locations.

b Total petroleum hydrocarbons (TPH) analyzed by EPA Method 8260 Modified.

c Analyzed by EPA Method 8260 Modified.

d Polychlorinated biphenyls (PCBs) analyzed by EPA Method 8080.

e TPH in this sample identified as weathered gasoline.

f High concentration of some analytes caused the sample to be run diluted resulting in raised method detection limits for analytes.

mg/kg Milligrams per kilogram, approximately equal to parts per million (ppm).

NA Not analyzed.

< Indicates the analyte was not detected at a concentration at or above the method detection limit as listed.

TABLE 2
ANALYTICAL RESULTS
CONFIRMATION SAMPLES (EXCAVATION A)

Sample Number[a]	Date Collected	Sample Depth[b] (feet bgs)	Total Petroleum Hydrocarbons[c] (mg/kg)		Volatile Organic Compounds[c] (mg/kg)					
			Gasoline	Diesel	Benzene	Toluene	Ethylbenzene	Xylenes	1,2-Dichloroethane	Ethylene Dibromide
A (E-1)	05/31/94	3	<1	<1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
A (E-2)	05/31/94	3	<1	<1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
A (N-1)	05/31/94	3	<1	<1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
A (W-1)	05/31/94	3	<1	2	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
A (W-2)	05/31/94	3	<1	2	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
A (S-1)	05/31/94	3	<1	<1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
A (S-2)	05/31/94	3	<1	<1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005

a See Figure 9 for approximate sample location.

b Sample depth measured in feet below ground surface (bgs).

c Analyzed by EPA Method 8260 Modified.

mg/kg Milligrams per kilogram.

< Indicates the constituent was not detected at a concentration at or above the method practical quantitation limit (PQL) as listed.

TABLE 3
ANALYTICAL RESULTS
CONFIRMATION SAMPLES (EXCAVATION B)

Sample Number[a]	Date Collected	Sample Depth[b] (feet bgs)	Total Petroleum Hydrocarbons[c] (mg/kg)		Volatile Organic Compounds[c] (mg/kg)						PCBs[d]
			Gasoline	Diesel	Benzene	Toluene	Ethylbenzene	Xylenes	1,2-Dichloroethane	Ethylene Dibromide	
B (W-1)	06/01/94	3.5	<1	<1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	NA
B (W-2)	06/02/94	4.0	<1	<1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	NA
B (W-3)	06/02/94	4.5	<1	<1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	NA
B (W-4)	06/02/94	3.5	<1	<1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	NA
B (S-1)	06/02/94	4.0	<1	<1	<0.005	<0.005	<0.005	**0.009**	<0.005	<0.005	NA
B (S-2)	06/03/94	4.0	<1	<1	**0.074**	**0.009**	<0.005	**0.034**	<0.005	<0.005	NA
B (S-3)	06/03/94	4.0	<1	<1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	NA
B (S-4)	06/03/94	4.0	**4**	<1	**0.067**	**0.006**	<0.005	**0.019**	<0.005	<0.005	NA
B (S-5)	06/03/94	4.0	**550**	<50	**0.5**	<0.3	**2.0**	**0.6**	<0.3	<0.3	NA
B (S-6)	06/03/94	4.0	**40**	<20	**0.1**	<0.1	**0.4**	**1.0**	<0.1	<0.1	NA
B (S-7)	06/06/94	3.5	<1	<1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	NA
B (E-1)	06/03/94	4.0	<1	<1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	NA
B (E-2)	06/03/94	3.5	<1	<1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	NA
B (E-3)	06/03/94	3.5	<1	<1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.05
B (E-4)	06/03/94	3.5	<1	<1	**0.011**	<0.005	<0.005	<0.005	<0.005	<0.005	<0.05
B (N-1)	06/01/94	3.5	<1	<1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	NA
B (N-2)	06/03/94	3.5	**1,800**	<50	**0.4**	<0.3	**0.9**	**5.2**	<0.3	<0.3	<0.05
B (N-3)	06/03/94	3.5	**3,600**	<50	**3.4**	**8.8**	**13**	**100**	<0.3	<0.3	<0.1
B (N-4)	06/06/94	3.5	<1	<1	**0.015**	<0.005	<0.005	**0.1**	<0.005	<0.005	<0.05
B (N-5)	06/06/94	3.5	**13,000**	<200	<1	<1	**51**	**3**	<1	<1	<0.05

TABLE 3 (continued)
ANALYTICAL RESULTS
CONFIRMATION SAMPLES (EXCAVATION B)

a	See Figure 13 for approximate sample location.
b	Sample depth measured in feet below ground surface (bgs).
c	Analyzed by EPA Method 8260 Modified.
d	Analyzed by EPA Method 8080.
mg/kg	Milligrams per kilogram
NA	Not analyzed.
<	Indicates the constituent was not detected at a concentration at or above the method practical quantitation limit as listed.

TABLE 4
SUMMARY OF GROUND WATER ANALYTICAL RESULTS

Well Location	Date Sampled	Total Petroleum Hydrocarbons[a] (mg/L)				Volatile Organic Compounds[a] (µg/L)				PCBs (µg/L)	Sodium Chloride (mg/L)	Total Dissolved Solids (mg/L)
		Gasoline	Diesel	Diesel With Filtration	Diesel with Silica Gel Cleanup	Benzene	Toluene	Ethyl-benzene	Xylenes			
EPA Analysis Method		8015M			8015M/3630M	8020				608	6010	160.1
MW-1	06/29/94	<0.05	<0.05	NA	NA	<0.5	<0.5	<0.5	<0.5	<1.0	**40**	**410**
	09/30/94	<0.05	<0.05	NA	NA	<0.5	<0.5	<0.5	<0.5	<0.5	NA	**630**
	12/19/94	<0.05	**0.16**	NA	NA	<0.5	<0.5	<0.5	<0.5	<0.5	**40**	**510**
	03/27/95	<0.05	**0.10**	NA	NA	<0.5	<0.5	<0.5	<0.5	<0.5	**110**	**550**
	06/28/95	NA	**0.13**	NA	NA	NA	NA	NA	NA	NA	NA	NA
	09/27/95	NA	<0.05	NA	NA	NA	NA	NA	NA	NA	NA	NA
	01/03/96	NA	<0.05	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-2	06/29/94	<0.05	<0.05	NA	NA	<0.5	<0.5	<0.5	<0.5	<1.0	**48**	**680**
	09/30/94	<0.05	<0.05	NA	NA	<0.5	<0.5	<0.5	<0.5	<0.5	NA	**670**
	12/19/94	<0.05	<0.05	NA	NA	<0.5	<0.5	<0.5	<0.5	<0.5	**35**	**900**
	03/27/95	<0.05	<0.05	NA	NA	<0.5	<0.5	<0.5	<0.5	<0.5	**38**	**670**
	06/28/95	NS	NS	NA	NA	NS	NS	NS	NS	NS	NS	NS
	09/27/95	NS	NS	NA	NA	NS	NS	NS	NS	NS	NS	NS
	01/03/96	NS	NS	NA	NA	NS	NS	NS	NS	NS	NS	NS
MW-3	06/29/94	**0.11**	<0.05	NA	NA	<0.5	**0.9**	<0.5	**0.8**	<1.0	**60**	**850**
	09/30/94	**0.16**	<0.05	NA	NA	**0.8**	**1.6**	<0.5	**2.3**	<0.5	NA	**880**
	12/19/94	**0.41**	<0.05	NA	NA	**5.1**	**4.5**	<0.5	**3.6**	<0.5	**49**	**1020**
	03/27/95	**0.29**	<0.05	NA	NA	**2.4**	**1.2**	<0.5	**2.8**	<0.5	**38**	**810**
	06/28/95	**0.28**	NA	NA	NA	**1.3**	**1.2**	<0.5	**1.8**	NA	NA	NA
	09/27/95	**0.28**	NA	NA	NA	**0.7**	**1.6**	<0.5	**2.9**	NA	NA	NA
	01/03/96	**0.47**	NA	NA	NA	**3.4**	**1.4**	<0.5	**3.4**	NA	NA	NA

TABLE 4 (continued)
SUMMARY OF GROUND WATER ANALYTICAL RESULTS

Well Location	Date Sampled	Total Petroleum Hydrocarbons[a] (mg/L)				Volatile Organic Compounds[a] (µg/L)				PCBs (µg/L)	Sodium Chloride (mg/L)	Total Dissolved Solids (mg/L)
		Gasoline	Diesel	Diesel With Filtration	Diesel with Silica Gel Cleanup	Benzene	Toluene	Ethyl-benzene	Xylenes			
EPA Analysis Method		8015M			8015M/3630M	8020				608	6010	160.1
GWS-1	04/04/96	**0.22**[b]	NA	NA	NA	**3.9**	**0.53**	<0.5	<0.5	NA	NA	NA
GWS-2	04/04/96	NA	**1.2**[c]	**0.98**[c]	**0.99**[c]	<0.5	<0.5	<0.75	<1.0	NA	NA	NA
Cal DHS MCLs[d]		NE	NE	NE	NE	1	150	700	1,750	0.5	NE	500[e]

a June 29, 1994 samples analyzed by EPA Method 8260 Modified).

b Non-typical chromatographic pattern for gasoline.

c Non-typical chromatographic pattern for diesel.

d California Department of Health Services (DHS) Maximum Contaminant Levels (MCLs) for drinking water (California Regional Water Quality Control Board [Regional Board], July, 1995, Compilation of Water Quality Goals).

e California DHS secondary (recommended) MCL for drinking water (California Regional Board, July, 1995, Compilation of Water Quality Goals).

mg/L Milligrams per liter

µg/L Micrograms per liter

< Symbol indicates constituents not detected above method detection or reporting limits as noted.

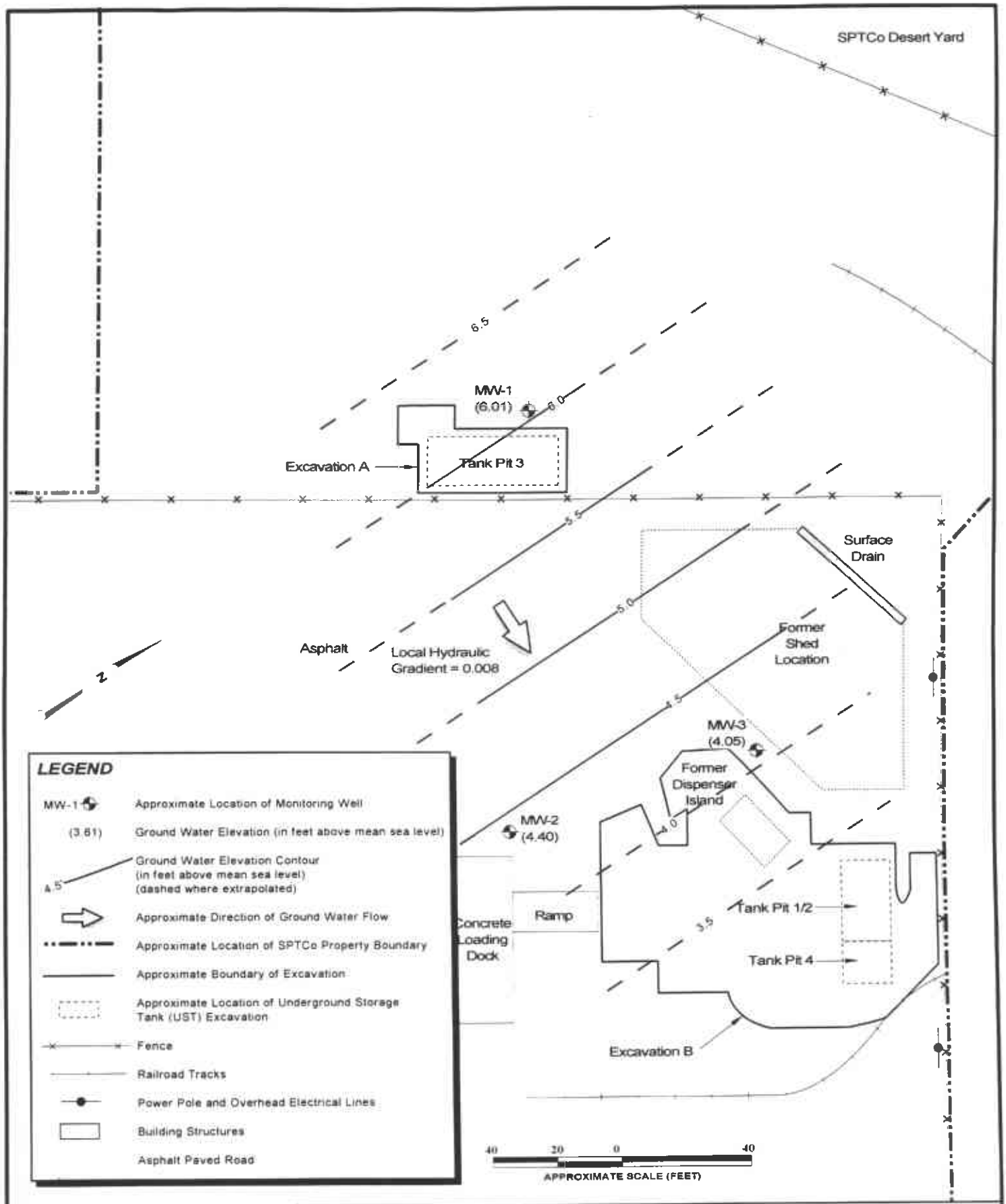
NA Not analyzed.

NE No MCL established.

NS Not sampled.

ATTACHMENT C

GROUND WATER ELEVATION CONTOUR MAPS



Project No.: 05100535	Figure No.: 2
Scale: As Above	Page No.: 5
File No.: q1gw96f02	Drawn By: Patti Decker
Date: 02/19/96	Approved By: Richard Bateman

TerraNext

CONTOUR MAP OF GROUND WATER ELEVATION

JANUARY, 1996
SOUTHERN PACIFIC TRANSPORTATION COMPANY
1399 WOOD STREET
OAKLAND, CALIFORNIA

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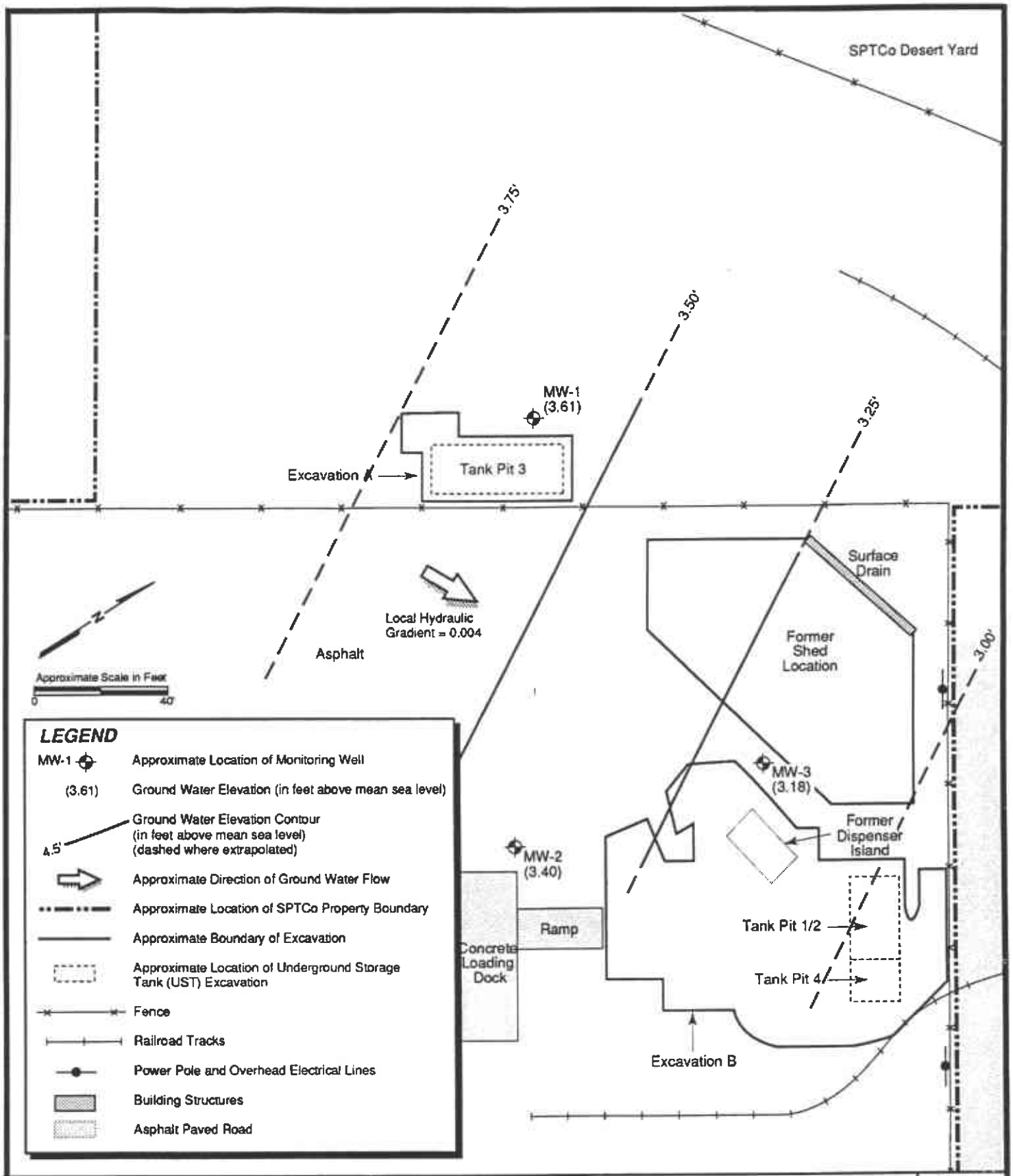


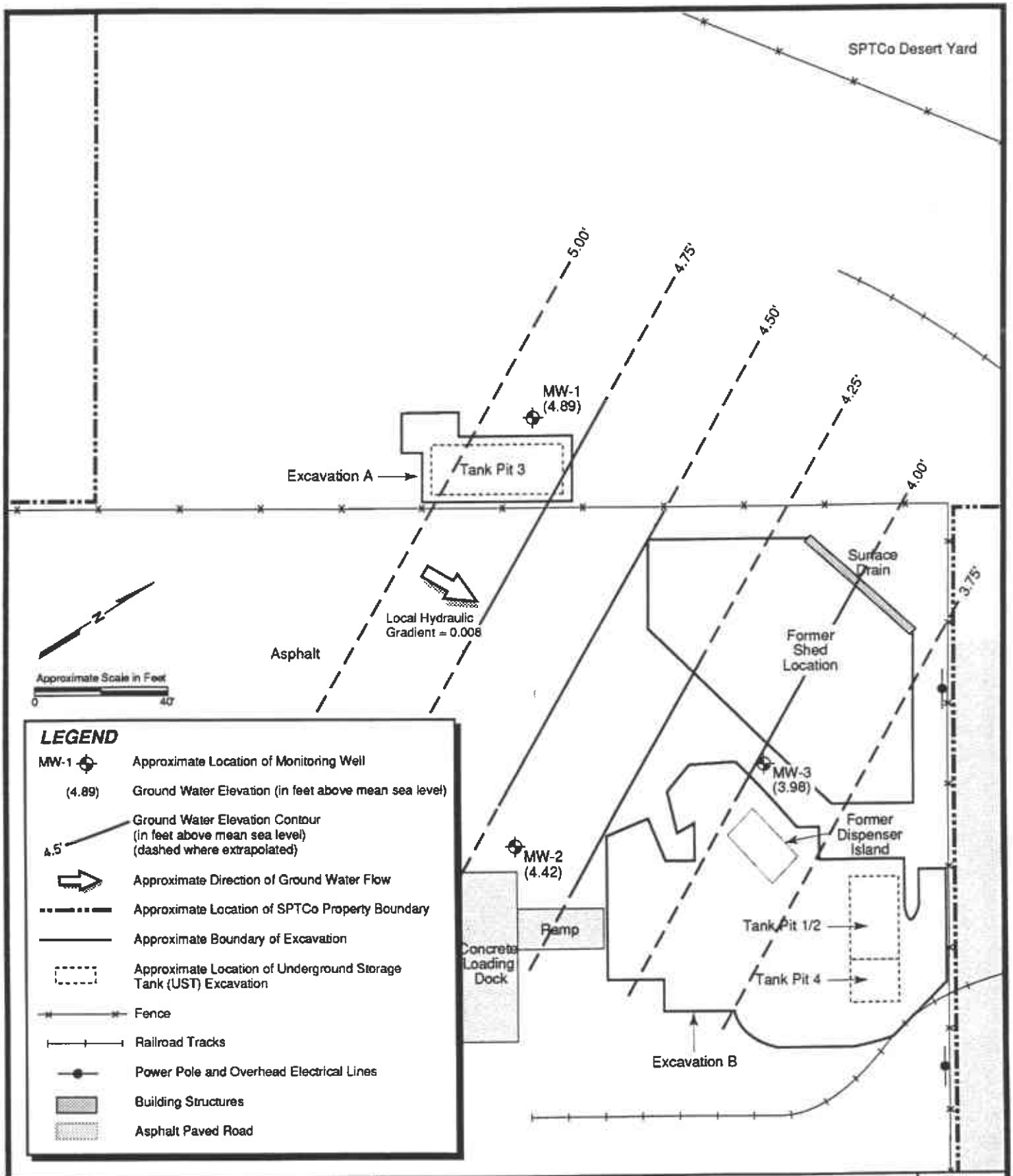
Industrial Compliance
A Subsidiary of SP Environmental Systems, Inc.

Project No.: 05100535	Date: 11/1/95
Drawn By: Patti Decker	Checked By: Richard Bateman

CONTOUR MAP OF GROUND WATER ELEVATION SEPTEMBER, 1995 SOUTHERN PACIFIC TRANSPORTATION COMPANY 1399 WOOD STREET OAKLAND, CALIFORNIA

Figure: 2
Page:
Scale: as shown

Oak-535/Q395GW/F.02 #301

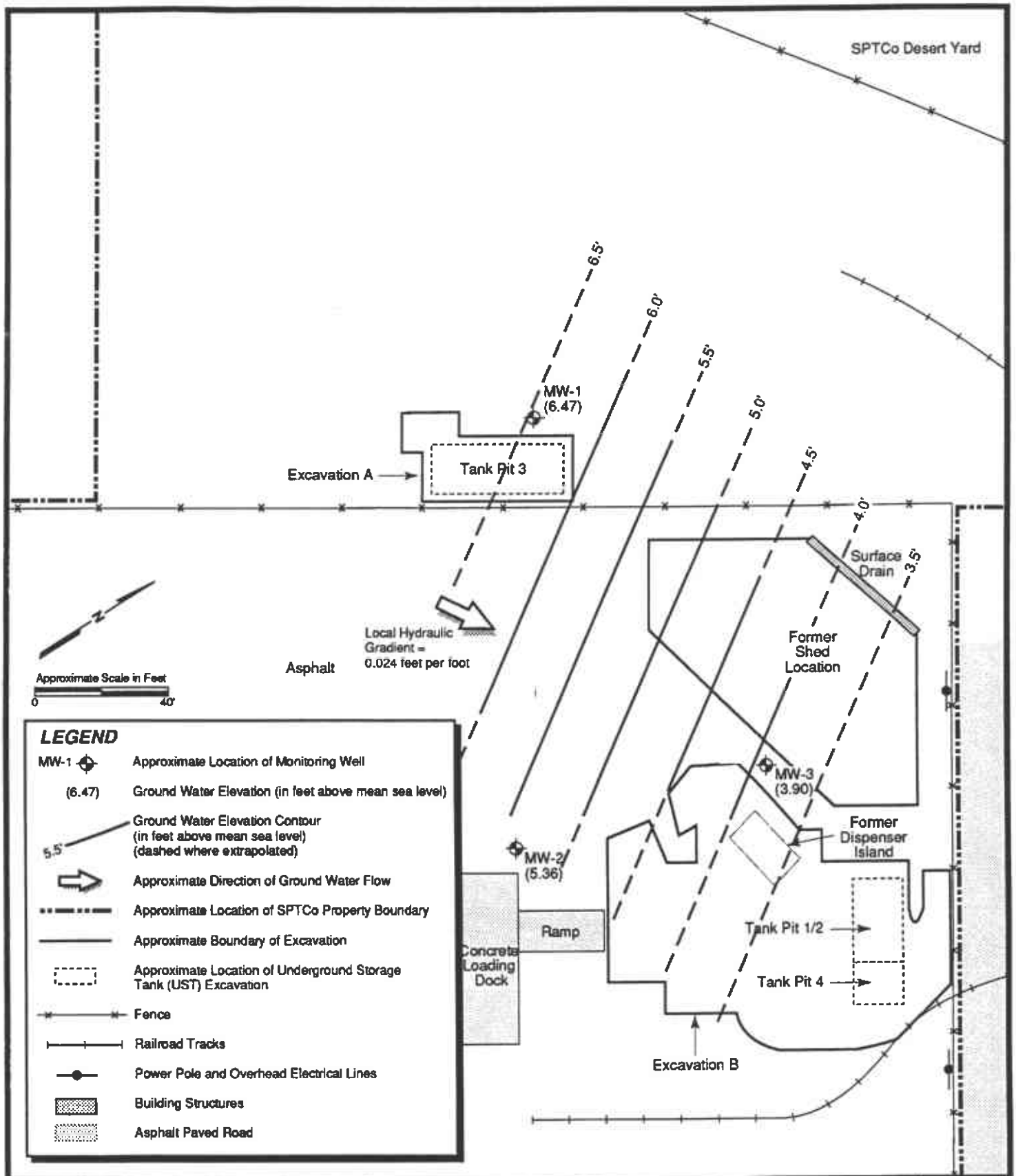


Industrial Compliance
A Subsidiary of SP Environmental Systems, Inc.

CONTOUR MAP OF GROUND WATER ELEVATION JUNE, 1995 SOUTHERN PACIFIC TRANSPORTATION COMPANY 1399 WOOD STREET OAKLAND, CALIFORNIA

Project No.: 05100535	Date: 07/26/95	Figure: 2	
Drawn By: Patti Decker	Checked By: Richard Bateman	Page:	
		Scale: as shown	

Oak-535/Q295GW/F.02 #301



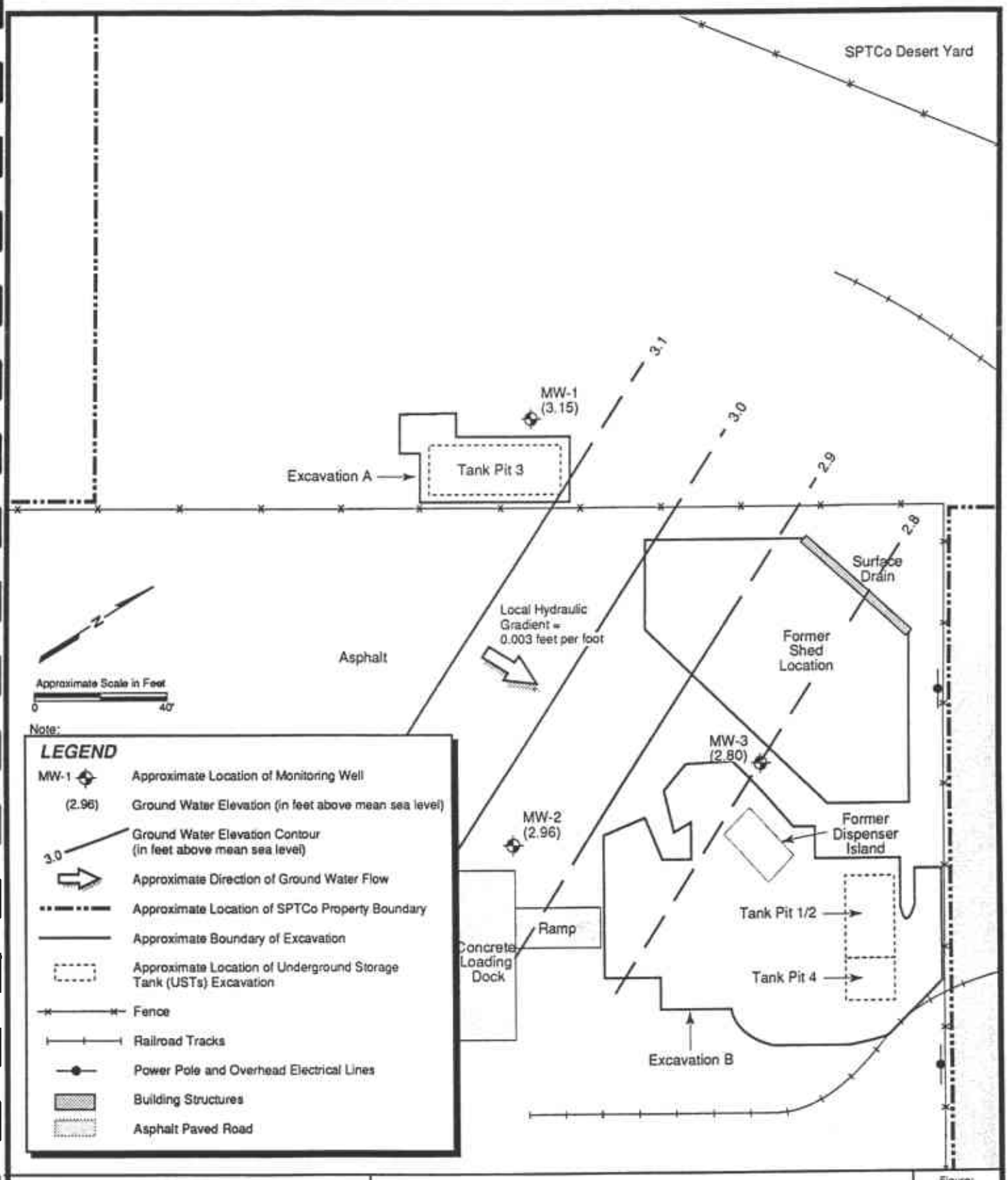
Industrial Compliance
A Subsidiary of SP Environmental Systems, Inc.

CONTOUR MAP OF GROUND WATER ELEVATION MARCH, 1995 SOUTHERN PACIFIC TRANSPORTATION COMPANY 1399 WOOD STREET OAKLAND, CALIFORNIA

Project No.: 05100535	Date: 05/02/95
Drawn By: Patti Decker	Checked By: Richard Bateman

Figure: 3
Page:
Scale: as shown

Oak-535/Q195GW/F.03 #300



Industrial Compliance
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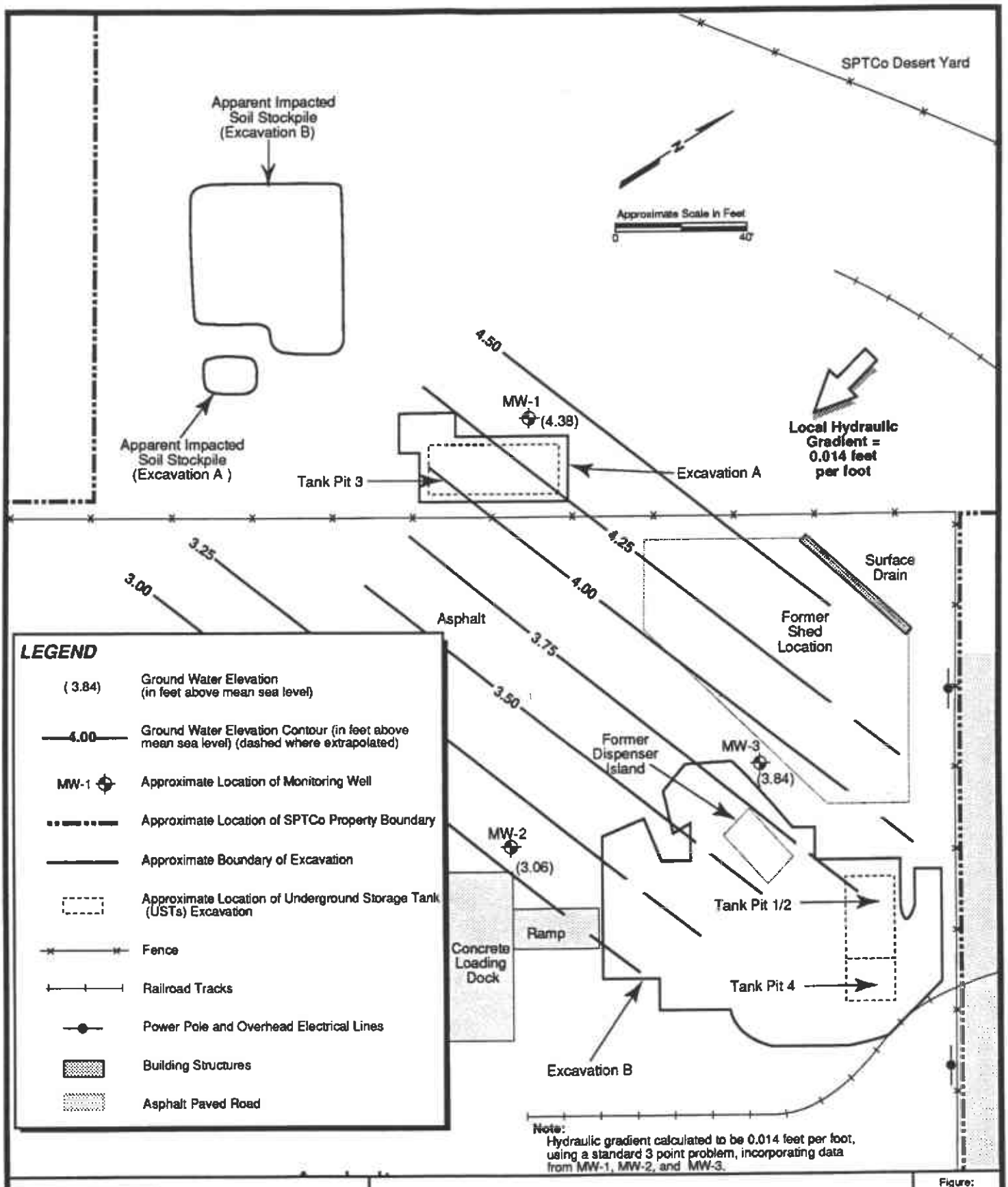
CONTOUR MAP OF GROUND WATER ELEVATIONS SEPTEMBER, 1994 SOUTHERN PACIFIC TRANSPORTATION COMPANY 1399 WOOD STREET OAKLAND, CALIFORNIA

Project No.: 05100535	Date: 01/18/95
Drawn By: Patti Decker	Checked By: James Ackerman

Figure: 4
Page:
Scale: as shown

Oak-535/Q394GW/F.04 #300



Note:
Hydraulic gradient calculated to be 0.014 feet per foot, using a standard 3 point problem, incorporating data from MW-1, MW-2, and MW-3.

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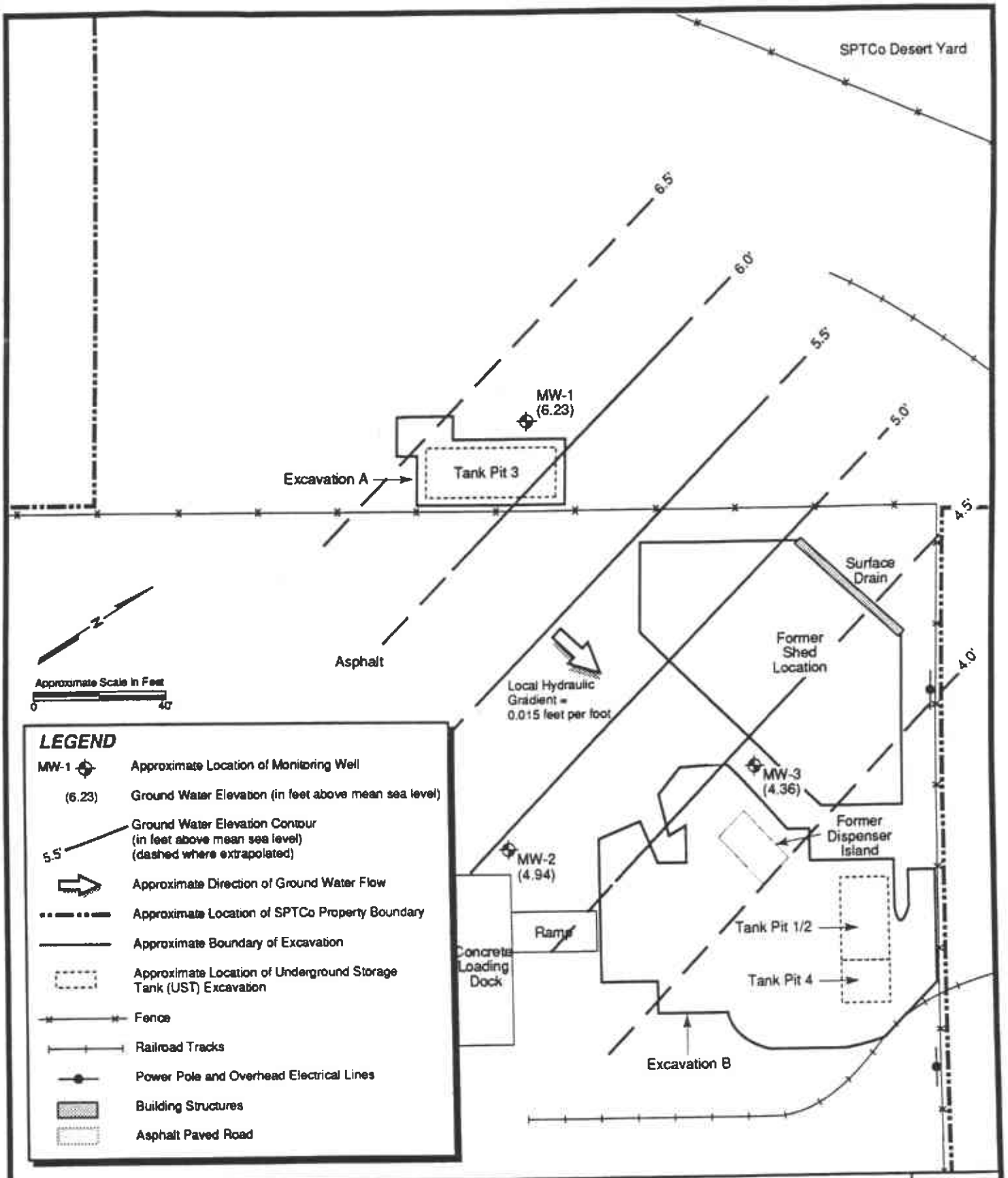
CONTOUR MAP OF GROUND WATER ELEVATIONS WITH HYDRAULIC GRADIENT, JUNE, 1994 SOUTHERN PACIFIC TRANSPORTATION COMPANY 1399 WOOD STREET OAKLAND, CALIFORNIA

Project No.: 05100535	Date: 08/15/94	Figure: 19	
Drawn By: Patti Decker	Checked By: James G. Jensen	Page:	
		Scale: as shown	

Oak-535/SRWP.0894/F.19 #100



Industrial Compliance
A Subsidiary of SP Environmental Systems, Inc.

CONTOUR MAP OF GROUND WATER ELEVATION DECEMBER, 1994 SOUTHERN PACIFIC TRANSPORTATION COMPANY 1399 WOOD STREET OAKLAND, CALIFORNIA

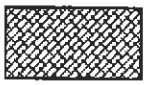
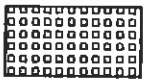
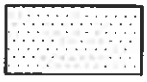
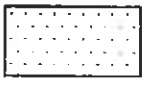
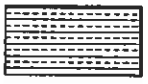
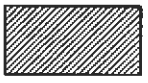
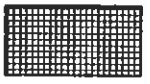
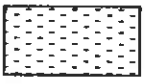
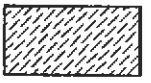
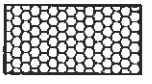
Project No.: 05100535	Date: 02/13/95	Figure: 4	
Drawn By: Patti Decker	Checked By: Richard Bateman	Page:	Scale: as shown

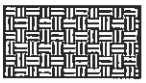
Oak-535/Q494GW/F.04 #300

ATTACHMENT D

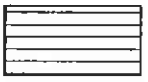
BORING AND WELL CONSTRUCTION LOGS FOR TEMPORARY MONITORING WELLS GWS-1 AND GWS-2

Lithology

	GW	Well graded gravels, gravel and sand mixtures
	GP	Poorly graded gravels or gravel and sand mixtures
	GM	Silty gravels, gravel and silt mixtures
	GC	Clayey gravels, gravel sand clay mixtures
	SW	Well graded sands gravelly sands
	SP	Poorly graded sands or gravelly sands
	SM	Silty sands, sandy silt mixture
	SC	Clayey sands, sand clay mixtures
	ML	Inorganic silts and very fine sands
	CL	Inorganic clays
	OL	Organic silts and organic silty clays
	MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils
	CH	Inorganic clays or high elasticity
	BR	Baserock

	PT Peat and or other highly organic soils

Well Construction

	Bentonite/Cement Grout
	Bentonite Pellets
	Filter Pack
	Screen
	Backfill

	Ground water elevation encountered during time of drilling
	Static ground water elevation
	Screened interval for Hydropunch™ ground water sample
	Sample collected for submittal to an Arizona-Licensed analytical laboratory
	Gradational or approximate contact
	Abrupt contact

All contacts are approximate

NOTES:

<	denotes concentration less than detectable level as listed
NA	Not Available
NM	Not Measured
NE	Not Encountered
ND	Not Detected
NR	Not Recovered
HC	Hydrocarbon
HSA	Hollow Stem Auger
BGS	Below Ground Surface

PROJ.#: 05100535	DATE: 09/20/96
DRAWN BY: JAH	SCALE: NA
DESIGNED BY: -	PAGE #: -
APPROVED BY: Dick Bateman	

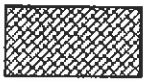
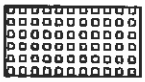
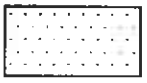
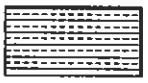
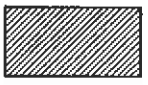
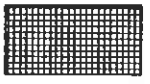
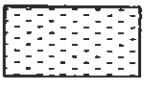
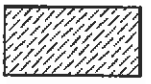
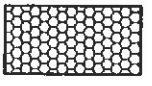
TerraNext

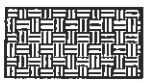
BORING/WELL CONSTRUCTION LOG KEY

SOUTHERN PACIFIC TRANSPORTATON COMPANY
1399 WOOD STREET
OAKLAND, CALIFORNIA

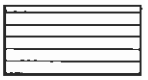
D5000845

Lithology

	GW	Well graded gravels, gravel and sand mixtures
	GP	Poorly graded gravels or gravel and sand mixtures
	GM	Silty gravels, gravel and silt mixtures
	GC	Clayey gravels, gravel sand clay mixtures
	SW	Well graded sands gravelly sands
	SP	Poorly graded sands or gravelly sands
	SM	Silty sands, sandy silt mixture
	SC	Clayey sands, sand clay mixtures
	ML	Inorganic silts and very fine sands
	CL	Inorganic clays
	OL	Organic silts and organic silty clays
	MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils
	CH	Inorganic clays or high elasticity
	BR	Baserock

	PT	Peat and or other highly organic soils

Well Construction

	Bentonite/Cement Grout
	Bentonite Pellets
	Filter Pack
	Screen
	Backfill

	Ground water elevation encountered during time of drilling
	Static ground water elevation
	Screened interval for Hydropunch™ ground water sample
	Sample collected for submittal to an Arizona-Licensed analytical laboratory
	Gradational or approximate contact
	Abrupt contact

All contacts are approximate

NOTES:

<	denotes concentration less than detectable level as listed
NA	Not Available
NM	Not Measured
NE	Not Encountered
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HC	Hydrocarbon
HSA	Hollow Stem Auger
BGS	Below Ground Surface

PROJ.#: 05100535	DATE: 09/20/96
DRAWN BY: JAH	SCALE: NA
DESIGNED BY: -	PAGE #: -
APPROVED BY: Dick Bateman	

TerraNext

BORING/WELL CONSTRUCTION LOG KEY

SOUTHERN PACIFIC TRANSPORTATON COMPANY
1399 WOOD STREET
OAKLAND, CALIFORNIA

D5000845

Logged By:	JAMES ACKERMAN	Boring Diameter:	8.0 INCHES
Drilling Method:	HOLLOW STEM AUGER	Ground Elevation:	~7.6 FEET MSL
Rig Type:	CME-75	Depth to Water:	5.0 FEET BGS
Driller/Company:	JEFF SMITH/WEST HAZMAT	Total Depth:	11.0 FEET

WELL CONSTRUCTION SPECIFICS

Screen Placement	from	9.0	ft.	to	4.0	ft.	Slot Size	0.020 inches	Diameter	2.0 inches	Completion Type:
Blank Casing	from	4.0	ft.	to	+2.0	ft.	Schedule	40	Diameter	2.0 inches	Aboveground ___
Filter Pack	from	11.0	ft.	to	3.0	ft.	Size	#3	Type	Lonestar	At Grade ___
Bentonite Pellets	from	3.0	ft.	to	surface		Type	Hole Plugged	Size	-	Hydrated X
Cement/Bentonite	from	-	ft.	to	-	ft.	Size	-	Percent Bentonite	-	

Sample Number	Recov. Feet	Blows/ 6-inches	Depth Feet	Well Detail	Lithology	USCS Log	Sample Description	FID/PID (ppm)
	NR	Not sampled due to concern of hitting utility line	1–11			AC	6" of asphalt.	
						BR	Baserock to ~2.5'. (From cuttings).	
						SM	From cuttings: dark grayish brown (10y4/2) silty sand (SM), moist, loose, 80% fine/medium subrounded to well rounded sand, 15% silt, 5% clay.	
	20%	6				SM	Very dark gray (5y3/1) silty sand (SM), wet, loose, 80% fine/medium subrounded to well rounded sand, 15% silt, 5% clay, wood fragments.	0.0
		6						
		4						
	100%	5				SC	Olive (5y5/3) mottled olive yellow (5y6/6) clayey sand (SC), moist, loose, 60% fine/ medium rounded to well rounded sand, 40% clay.	46
		5						
		3						
	100%	5				SM	Olive yellow (2.5y6/6) silty sand (SM), moist, loose, 85% fine/medium rounded to well rounded sand, 15% silt (merrit sand?).	30
		7						
		10						
	66%	9				SM	Same as above, + wet.	25
		7						
		12						

PROJ.#: 05100535	DATE: 09/12/96	Terranext	GWS-1 (TEMPORARY)
DRAWN BY: JAH	SCALE: NA		SOUTHERN PACIFIC TRANSPORTATION COMPANY
DESIGNED BY: -	PAGE #: 1 of 1		1399 WOOD STREET
APPROVED BY: Dick Bateman			OAKLAND, CALIFORNIA

D5000841

Logged By:	JAMES ACKERMAN	Boring Diameter:	8.0 INCHES
Drilling Method:	HOLLOW STEM AUGER	Ground Elevation:	~7.6 FEET MSL
Rig Type:	CME-75	Depth to Water:	5.0 FEET BGS
Driller/Company:	JEFF SMITH/WEST HAZMAT	Total Depth:	11.0 FEET

WELL CONSTRUCTION SPECIFICS

Screen Placement	from	9.0	ft.	to	4.0	ft.	Slot Size	0.020 inches	Diameter	2.0 inches	Completion Type:
Blank Casing	from	4.0	ft.	to	+2.0	ft.	Schedule	40	Diameter	2.0 inches	Aboveground __
Filter Pack	from	11.0	ft.	to	3.0	ft.	Size	#3	Type	Lonestar	At Grade __
Bentonite Pellets	from	3.0	ft.	to	surface		Type	Hole Plugged	Size	-	Hydrated X
Cement/Bentonite	from	-	ft.	to	-	ft.	Size	-	Percent Bentonite	-	

Sample Number	Recov. Feet	Blows/ 6-inches	Depth Feet	Well Detail	Lithology	USCS Log	Sample Description	FID/PID (ppm)
	NR	Not sampled due to concern of hitting utility line	1–11			AC	6" of asphalt.	
						BR	Baserock to ~2.5'. (From cuttings).	
						SM	From cuttings: dark grayish brown (10y4/2) silty sand (SM), moist, loose, 80% fine/medium subrounded to well rounded sand, 15% silt, 5% clay.	
	20%	6				SM	Very dark gray (5y3/1) silty sand (SM), wet, loose, 80% fine/medium subrounded to well rounded sand, 15% silt, 5% clay, wood fragments.	0.0
		6						
		4						
	100%	5				SC	Olive (5y5/3) mottled olive yellow (5y6/6) clayey sand (SC), moist, loose, 60% fine/ medium rounded to well rounded sand, 40% clay.	46
		5						
		3						
	100%	5				SM	Olive yellow (2.5y6/6) silty sand (SM), moist, loose, 85% fine/medium rounded to well rounded sand, 15% silt (merrit sand?).	30
		7						
		10						
	66%	9				SM	Same as above, + wet.	25
		7						
		12						

PROJ.#: 05100535	DATE: 09/12/96	TerraNext	GWS-1 (TEMPORARY)
DRAWN BY: JAH	SCALE: NA		SOUTHERN PACIFIC TRANSPORTATION COMPANY
DESIGNED BY: -	PAGE #: 1 of 1		1399 WOOD STREET
APPROVED BY: Dick Bateman			OAKLAND, CALIFORNIA

D5000641

Logged By:	JAMES ACKERMAN	Boring Diameter:	8.0 INCHES
Drilling Method:	HOLLOW STEM AUGER	Ground Elevation:	~8.0 FEET MSL
Rig Type:	CME-75	Depth to Water:	4.5 FEET BGS
Driller/Company:	JEFF SMITH/WEST HAZMAT	Total Depth:	9.0 FEET

WELL CONSTRUCTION SPECIFICS

Screen Placement	from	9.0 ft.	to	3.0 ft.	Slot Size	0.020 inches	Diameter	2.0 inches	Completion Type:
Blank Casing	from	3.0 ft.	to	+2.0 ft.	Schedule	40	Diameter	2.0 inches	Aboveground ___
Filter Pack	from	9.0 ft.	to	2.0 ft.	Size	#3	Type	Lonestar	At Grade ___
Bentonite Pellets	from	2.0 ft.	to	surface	Type	Hole Plugged	Size	-	Hydrated ___
Cement/Bentonite	from	- ft.	to	- ft.	Size	-	Percent Bentonite	-	

Sample Number	Recov. Feet	Blows/ 6-inches	Depth Feet	Well Detail	Lithology	USCS Log	Sample Description	FID/PID (ppm)
	NS	NS	1			AC	6" of asphalt.	
						BR	Baserock to 1.5'.	
	66%	5 7 9	2 3			SM	Black (5y2.5/1) silty sand (SM), moist, loose, 75%, fine/medium rounded to well rounded, sand, 15%, 5% medium rounded gravel, 5% clay shell fragments.	30
	NR	4 7 6	4					
	66%	1 1 1	5 6			CL	Dark gray (5y4/1) sandy clay (CL), wet, very soft, 50% lean clay, 40% medium-coarse sand (from debris), 10% debris including shell and plate fragments.	1.5
	66%	2 2 4	7			SM	Dark gray (5y4/1) silty sand (SM), wet, very loose, 85% fine/medium rounded to well rounded sand, 5% silt.	2.0
	100%	7 22 20	8 9			SP	Dark gray (2.5yn4/0) poorly graded sand (SP), 95% very fine/fine rounded to well rounded sand, 15% silt.	0.0
						SC	Green (close to 5gy6/1) clayey sand (SC), 85% fine/medium rounded to well rounded sand, 15% lean clay.	0.0

PROJ.#: 05100535	DATE: 09/12/96
DRAWN BY: JAH	SCALE: NA
DESIGNED BY: -	PAGE #: 1 of 1
APPROVED BY: Dick Bateman	

TerraNext

GWS-2 (TEMPORARY)

SOUTHERN PACIFIC TRANSPORTATION COMPANY
1399 WOOD STREET
OAKLAND, CALIFORNIA

D5000639

Logged By:	JAMES ACKERMAN	Boring Diameter:	8.0 INCHES
Drilling Method:	HOLLOW STEM AUGER	Ground Elevation:	~8.0 FEET MSL
Rig Type:	CME-75	Depth to Water:	4.5 FEET BGS
Driller/Company:	JEFF SMITH/WEST HAZMAT	Total Depth:	9.0 FEET

WELL CONSTRUCTION SPECIFICS

Screen Placement	from	8.0 ft.	to	3.0 ft.	Slot Size	0.020 inches	Diameter	2.0 inches	Completion Type:
Blank Casing	from	3.0 ft.	to	+2.0 ft.	Schedule	40	Diameter	2.0 inches	Aboveground __
Filter Pack	from	9.0 ft.	to	2.0 ft.	Size	#3	Type	Lonestar	At Grade __
Bentonite Pellets	from	2.0 ft.	to	surface	Type	Hole Plugged	Size	-	Hydrated __
Cement/Bentonite	from	- ft.	to	- ft.	Size	-	Percent Bentonite	-	

Sample Number	Recov. Feet	Blows/ 6-inches	Depth Feet	Well Detail	Lithology	USCS Log	Sample Description	FD/PID (ppm)
	NS	NS	1			AC	6" of asphalt.	
						BR	Baserock to 1.5'.	
	66%	5 7 9	2 3			SM	Black (5y2.5/1) silty sand (SM), moist, loose, 75%, fine/medium rounded to well rounded, sand, 15%, 5% medium rounded gravel, 5% clay shell fragments.	30
	NR	4 7 6	4					
	66%	1 1 1	5 6			CL	Dark gray (5y4/1) sandy clay (CL), wet, very soft, 50% lean clay, 40% medium-coarse sand (from debris), 10% debris including shell and plate fragments.	1.5
	66%	2 2 4	7			SM	Dark gray (5y4/1) silty sand (SM), wet, very loose, 85% fine/medium rounded to well rounded sand, 5% silt.	2.0
	100%	7 22 20	8 9			SP	Dark gray (2.5yn4/0) poorly graded sand (SP), 95% very fine/fine rounded to well rounded sand, 15% silt.	0.0
						SC	Green (close to 5gy6/1) clayey sand (SC), 85% fine/medium rounded to well rounded sand, 15% lean clay.	0.0

PROJ.#: 05100535	DATE: 09/12/96
DRAWN BY: JAH	SCALE: NA
DESIGNED BY: -	PAGE #: 1 of 1
APPROVED BY: Dick Bateman	

Terranext

GWS-2 (TEMPORARY)

SOUTHERN PACIFIC TRANSPORTATION COMPANY
1399 WOOD STREET
OAKLAND, CALIFORNIA

D5000839

ATTACHMENT E

ANALYTICAL LABORATORY REPORTS
GROUND WATER GRAB SAMPLES GWS-1 AND GWS-2

Quanterra Environmental Services

Quanterra Incorporated
880 Riverside Parkway
West Sacramento, California 95605

916 373-5600 Telephone
916 372-1059 Fax

April 24, 1996

QUANTERRA PROJECT NUMBER: 087098
PO/CONTRACT: 05100535

James Ackerman
Terranext
1357 5th Street
Oakland, CA 94607

Dear Mr Ackerman:

This report contains the analytical results for the two aqueous samples which were originally received under chain of custody by Quanterra Environmental Services on 05 April 1996. This sample set is associated with your 1399 Wood St. project.

The case narrative is an integral part of this report.

If you have any questions, please call me at (916)374-4414.

Sincerely,

for

Bonnie McNeill
Project Manager

BM/kbg

Enclosures

Quanterra
Environmental Services

TABLE OF CONTENTS

QUANTERRA PROJECT NUMBER 087098

Quanterra
Environmental Services

CASE NARRATIVE

QUANTERRA PROJECT NUMBER 087098

Total Petroleum Hydrocarbons by GC/FID - Method TPH-Diesel

During the original extraction, the "non-filtered" sample was extracted instead of the "filtered" sample. The "filtered" sample was extracted one day out of holdtime on 12 April 1996.

There were no anomalies associated with this report.

Quanterra
Environmental Services

QUANTERRA'S QUALITY ASSURANCE PROGRAM

Quanterra has implemented an extensive Quality Assurance (QA) program to ensure the production of scientifically sound, legally defensible data of known documentable quality. A key element of this program is Quanterra's Laboratory Control Sample (LCS) system. Controlling lab operations with LCS (as opposed to matrix spike/matrix spike duplicate samples), allows the lab to differentiate between bias as a result of procedural errors versus bias due to matrix effects. The analyst can then identify and implement the appropriate corrective actions at the bench level, without waiting for extensive senior level review or costly and time-consuming sample re-analyses. The LCS program also provides our client with information to assess batch, and overall laboratory performance.

Laboratory Control Samples - (LCS)

Laboratory Control Samples (LCS) are well-characterized, laboratory generated samples used to monitor the laboratory's day-to-day performance of routine analytical methods. The results of the LCS are compared to well-defined laboratory acceptance criteria to determine whether the laboratory system is "in control". Three types of LCS are routinely analyzed: Duplicate Control Samples (DCS), Single Control Samples (SCS), and method blanks. Each of these LCS are described below.

Duplicate Control Samples. A DCS is a well-characterized matrix (blank water, sand, sodium sulfate or celite) which is spiked with certain target parameters and analyzed at approximately 10% of the sample load in order to establish method-specific control limits.

Single Control Samples. An SCS consists of a control matrix that is spiked with surrogate compounds appropriate to the method being used. In cases where no surrogate is available, (e.g. metals or conventional analyses) a single control sample identical to the DCS serves as the control sample. An SCS is prepared for each sample lot. Accuracy is calculated identically to the DCS.

Method Blank Results. A method blank is a laboratory-generated sample which assesses the degree to which laboratory operations and procedures cause false-positive analytical results for your samples.

Quanterra
Environmental Services

SAMPLE DESCRIPTION INFORMATION
for
Terranext

Lab ID	Client ID	Matrix	Sampled Date	Sampled Time	Received Date
087098-0001-SA	GWS-1	AQUEOUS	04 APR 96	11:15	05 APR 96
087098-0002-SA	GWS-2	AQUEOUS	04 APR 96	12:10	05 APR 96

CHAIN-OF-CUSTODY RECORD

P.O. Box 24374 Oakland CA 94623-1374 **No.** 20778

INDUSTRIAL COMPLIANCE • ~~9030 OLD PLACERVILLE ROAD, SUITE 100 • SACRAMENTO, CA 95827-9559~~ 510-238-9540 ~~510-238-9145~~ • Phone ~~916-369-8071~~ • FAX ~~916-369-8370~~

PROJECT NAME	PROJECT LOCATION
1399 Wood St	Oakland CA

PROJ. NO.	PROJECT CONTACT	PROJECT TELEPHONE NO.
05100535	James Ackerman	(510) 238-9540

CLIENT'S REPRESENTATIVE	PROJECT MANAGER/SUPERVISOR
	Carl Taylor

ITEM NO.	SAMPLE NUMBER	DATE	TIME	COMP	GRAB	SAMPLE LOCATION (INCLUDE MATRIX AND POINT OF SAMPLE)	NUMBER OF CONTAINERS	ANALYSIS DESIRED (INDICATE SEPARATE CONTAINERS) TPH-G (8015) / BTEX (8020)	BTEX (8020)	TPH-D (8015)	TPH-D (SILICA GEL STRIP)	TPH-D (FILTRATED)				REMARKS
1	GWS-1	4/4/96	1115		X	GRAB WATER SAMPLE FROM GWS-1 (NEAR TPH-G UST)	3	3								2 NOTE: SAMPLES MAY CONTAIN SILT
2	GWS-2	↓	1210		X	GRAB WATER SAMPLE FROM GWS-2 (NEAR TPH-D UST)	9		3	2	2	2				
3																
4																
5																
6																
7																
8																
9																
10																

TRANSFER NUMBER	ITEM NUMBER	TRANSFERS RELINQUISHED BY	TRANSFERS ACCEPTED BY	DATE	TIME
1	12	James Ackerman	Kari A. Tilly	04/05/96	1050
2					
3					
4					

REMARKS

STANDARD T.A.T.

SAMPLER'S NAME: James Ackerman

SAMPLER'S SIGNATURE: James D. Ackerman

LAB COPY

Quanterra
Environmental
Services

Benzene, Toluene, Ethyl Benzene and Xylenes - Method 8020

Quanterra
Environmental Services

Benzene, Toluene, Ethyl Benzene and Xylenes (BTEX)

Method 8020

Client Name: Terranext
Client ID: GWS-2
Lab ID: 087098-0002-SA
Matrix: AQUEOUS Sampled: 04 APR 96 Received: 05 APR 96
Authorized: 05 APR 96 Prepared: NA Analyzed: 12 APR 96

Parameter	Result	Units	Reporting Limit	
Benzene	ND	ug/L	0.50	
Toluene	ND	ug/L	0.50	
Ethylbenzene	ND	ug/L	0.75	G
Xylenes (total)	ND	ug/L	1.0	

Surrogate	Recovery	
a,a,a-Trifluorotoluene	96	%

Note G : Reporting Limit raised due to matrix interference.

ND = Not detected
NA = Not applicable

Reported By: Jennifer Bavetta Approved By: Patricia Trinidad

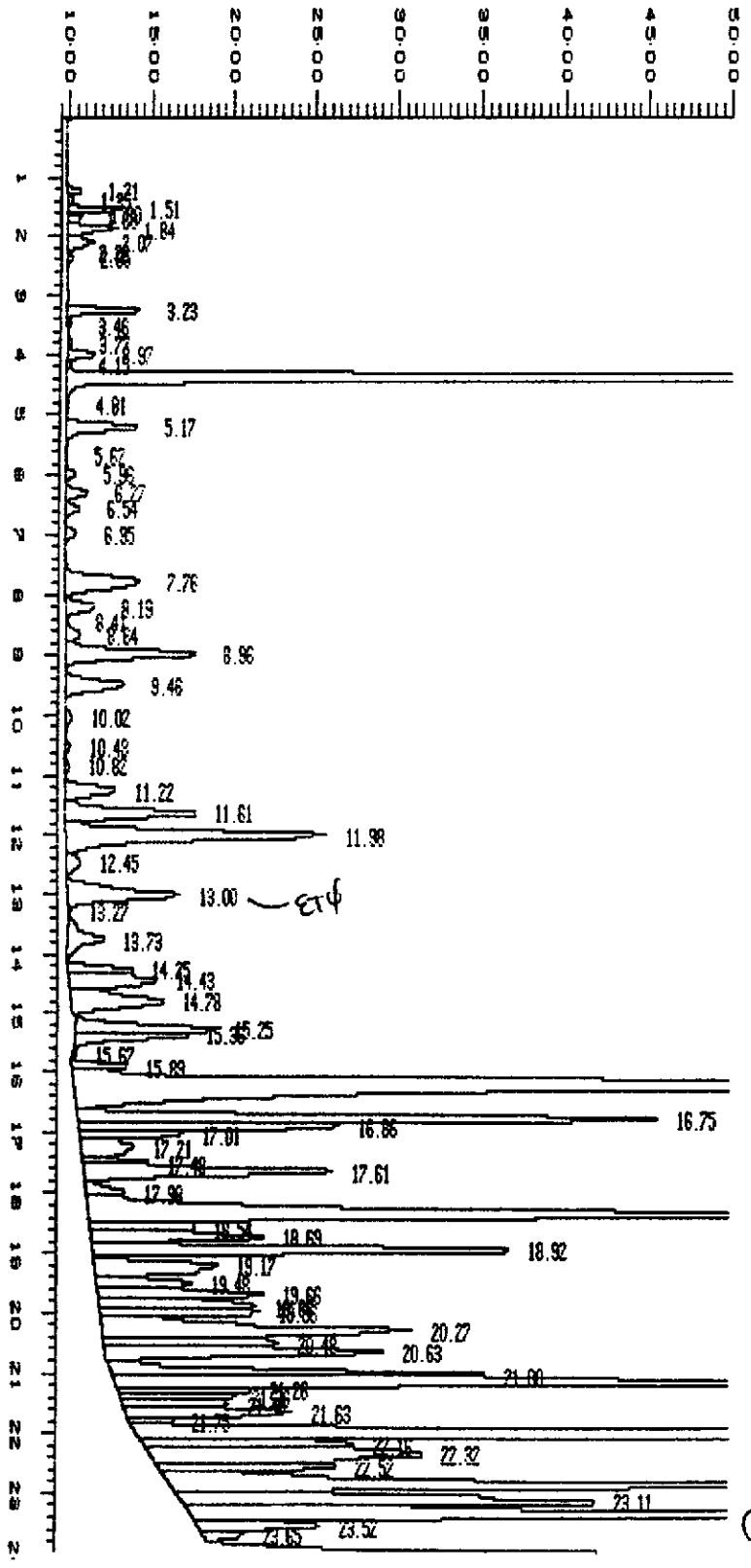
The cover letter is an integral part of this report.
Rev 230787

GUANTERRA - SACRAMENTO CHROMATOGRAPHY

[APR_VOA] 9 1112APR960827,10,1

87098-2 1:1 t=sa. Amount : 1.000.

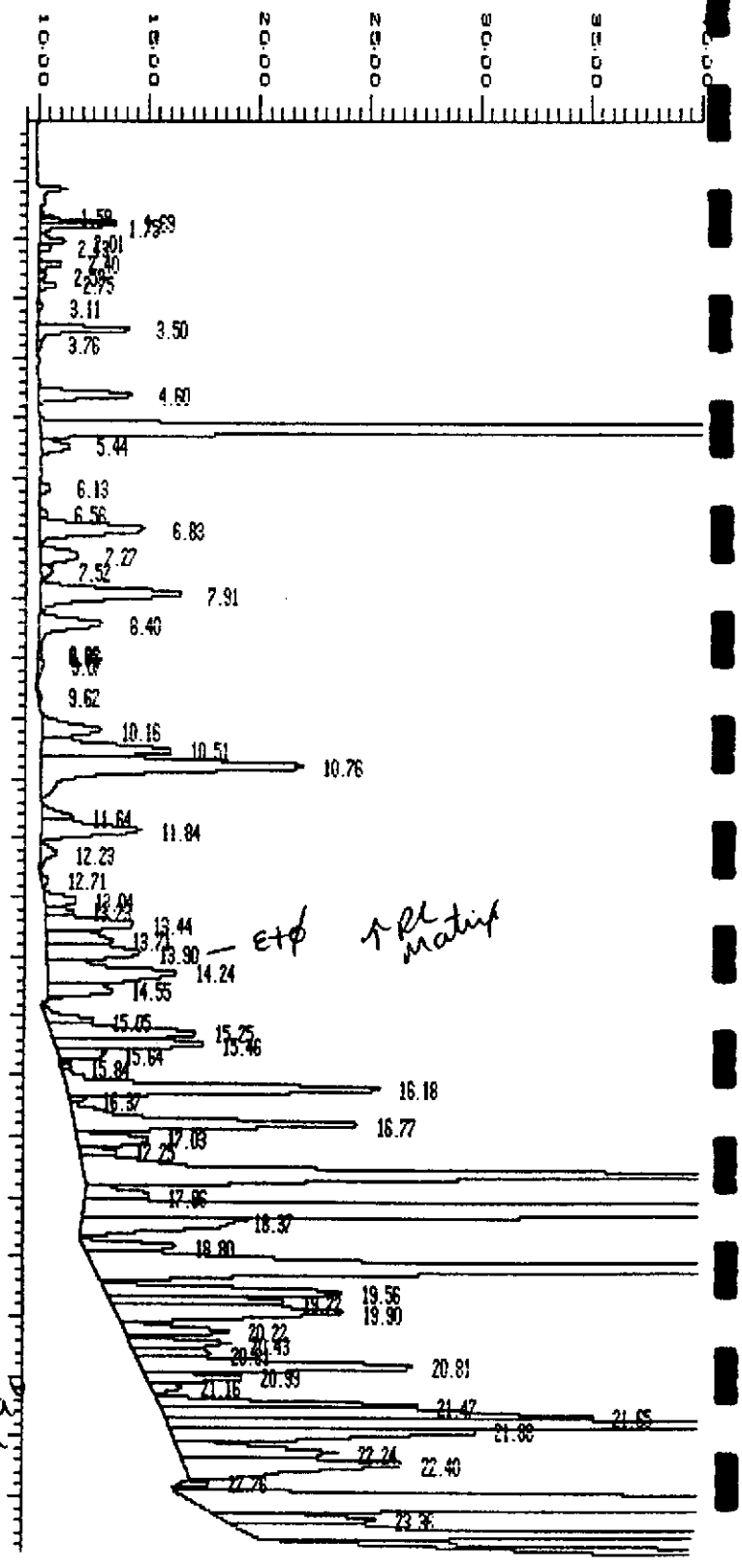
Acquired on 12-APR-1996 at 14:38
Reported on 12-APR-1996 at 15:03
Box 1 (of 1)



[APR_VOA] 10 1112APR960827,10,1

87098-2 1:1 t=sa. Amount : 1.000.

Acquired on 12-APR-1996 at 14:38
Reported on 12-APR-1996 at 15:03
Box 1 (of 1)



Quanterra
Environmental Services

QC LOT ASSIGNMENT REPORT - MS QC
Volatile Organics by GC

Laboratory Sample Number	QC Matrix	QC Category	QC Lot Number (DCS)	QC Run Number (SCS/BLANK/LCS)	MS QC Run Number (SA,MS,SD,DU)
087098-0002-SA	AQUEOUS	602-A	12 APR 96-111	12 APR 96-11A	12 APR 96-11A

Quanterra
Environmental Services

METHOD BLANK REPORT
Volatile Organics by GC

Analyte	Result	Units	Reporting Limit
Test: 8020-BTX-A			
Matrix: AQUEOUS			
QC Lot: 12 APR 96-111 QC Run: 12 APR 96-11A			
Benzene	ND	ug/L	0.50
Toluene	ND	ug/L	0.50
Ethylbenzene	ND	ug/L	0.50
Xylenes (total)	ND	ug/L	1.0

Quanterra
Environmental Services

SINGLE CONTROL SAMPLE REPORT
Volatile Organics by GC

Analyte	Concentration Spiked	Measured	Accuracy(%) SCS	Limits
Category: 602-A				
Matrix: AQUEOUS				
QC Lot: 12 APR 96-111 QC Run: 12 APR 96-11A				
Concentration Units: ug/L				
a,a,a-Trifluorotoluene	20.0	20.0	100	78-126

Calculations are performed before rounding to avoid round-off errors in calculated results.

Quanterra
Environmental Services

LABORATORY CONTROL SAMPLE REPORT
Volatile Organics by GC
Project: 087098

Category: 602-A Aromatic Volatile Organics
Test: 8020-BTX-A
Matrix: AQUEOUS
QC Lot: 12 APR 96-111 QC Run: 12 APR 96-11A
Concentration Units: ug/L

Analyte	Concentration Spiked	Measured	Accuracy(%) LCS	Limits
Benzene	10.0	9.35	94	75-122
Toluene	10.0	9.70	97	76-117
Ethylbenzene	10.0	10.3	103	77-120
Xylenes (total)	30.0	28.7	96	72-128
1,3-Dichlorobenzene	10.0	9.41	94	74-123

ND = Not Detected

Calculations are performed before rounding to avoid round-off errors in calculated results.

Quanterra
Environmental Services

MATRIX SPIKE/MATRIX SPIKE DUPLICATE QC REPORT
Volatile Organics by GC
Project: 087098

Category: 602-A Aromatic Volatile Organics
Test: 8020-BTX-A Method: 8020
Matrix: AQUEOUS
Sample: 087066-0001
QC Run: 12 APR 96-11A
Units: ug/L

Analyte	Sample Result	MS Result	MSD Result	Spiked MS/MSD	%Recovery MS	%Recovery MSD	Control Limits	%RPD	RPD Limit
Benzene	ND	9.5	9.4	10	95	94	39-150	1.7	50
Toluene	ND	9.7	9.5	10	97	95	46-148	1.4	25
Ethylbenzene	ND	10	11	10	103	106	32-160	3.3	35
Xylenes (total)	ND	30	29	30	98	96	65-135	2.9	35
1,3-Dichlorobenzene	ND	9.5	9.4	10	95	94	50-141	0.49	35

ND = Not Detected

Calculations are performed before rounding to avoid round-off errors in calculated results.

Quanterra
Environmental
Services

Total Petroleum Hydrocarbons (Gasoline) - Method P/T-GBX-TRIREGIONAL

Quanterra
Environmental Services

Total Petroleum Hydrocarbons (Gasoline) and BTEX

Method P/T-GBX-TRIREGIONAL

Client Name: Terranext
Client ID: GWS-1
Lab ID: 087098-0001-SA
Matrix: AQUEOUS Sampled: 04 APR 96 Received: 05 APR 96
Authorized: 05 APR 96 Prepared: NA Analyzed: 12 APR 96

Parameter	Result	Units	Reporting Limit	
Benzene	3.9	ug/L	0.50	
Toluene	0.53	ug/L	0.50	
Ethylbenzene	ND	ug/L	0.50	
Xylenes (total)	ND	ug/L	0.50	
Gasoline	ND	ug/L	50	
Hydrocarbon mixture	220	ug/L	50	1

Surrogate	Recovery	
4-Bromofluorobenzene	108	%
a,a,a-Trifluorotoluene	96	%

Note 1 : The peak pattern present in this sample in the range of n-C7 to approximately n-C11 is atypical of a hydrocarbon. The area of quantitation comes primarily from 3 highly resolved peaks which contribute approximately 90% to the result reported. Quantitation is based upon a gasoline reference in the range of n-C7 to n-C12.

ND = Not detected
NA = Not applicable

Reported By: Kyle Stephens Approved By: Patricia Trinidad

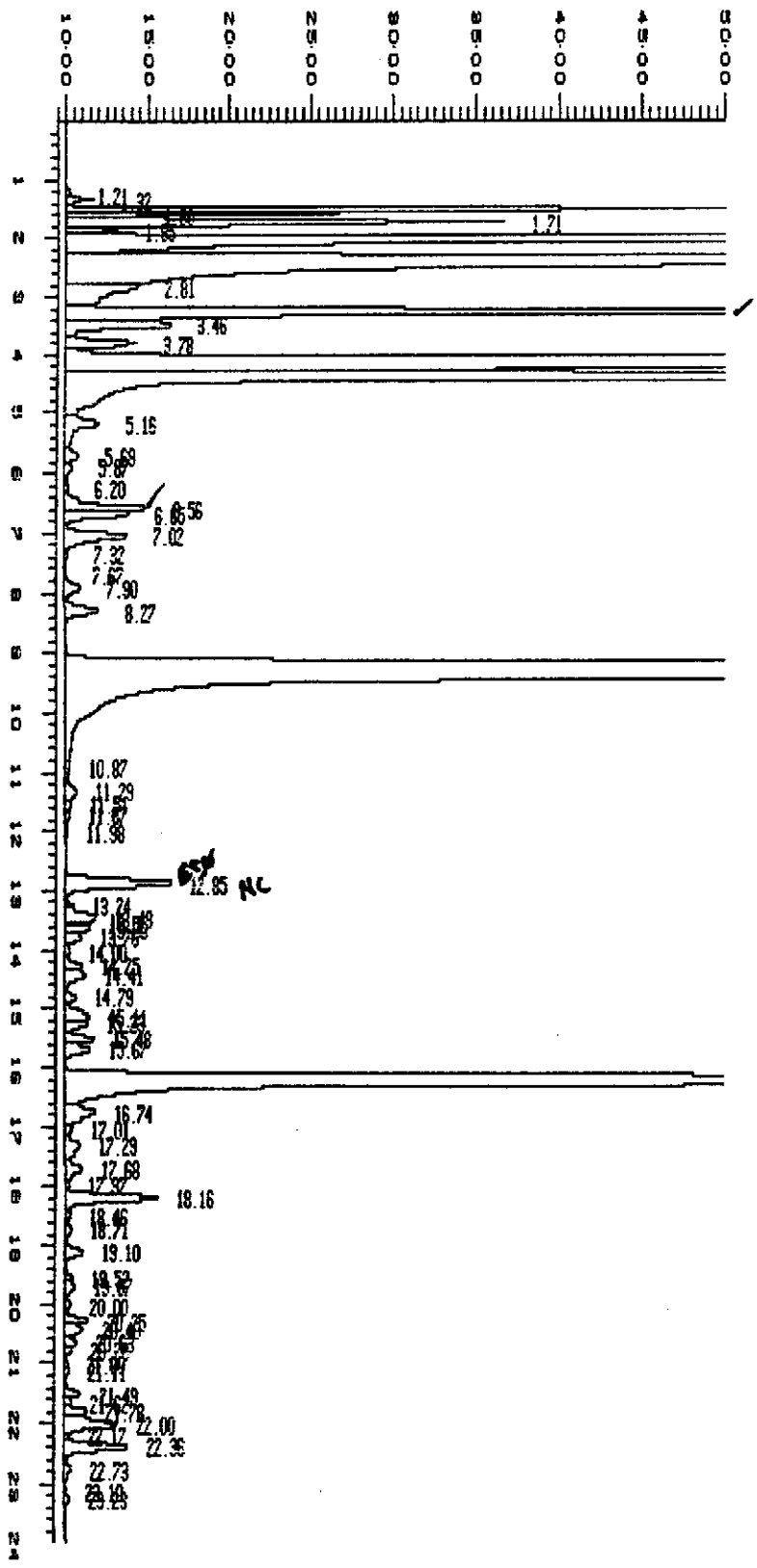
The cover letter is an integral part of this report.
Rev 230787

QUANTERRA - SACRAMENTO CHROMATOGRAPHY

[APR_VOA] 9 1112APR960827.7,1

87038-1 1:1 T=SA. Amount : 1.000.

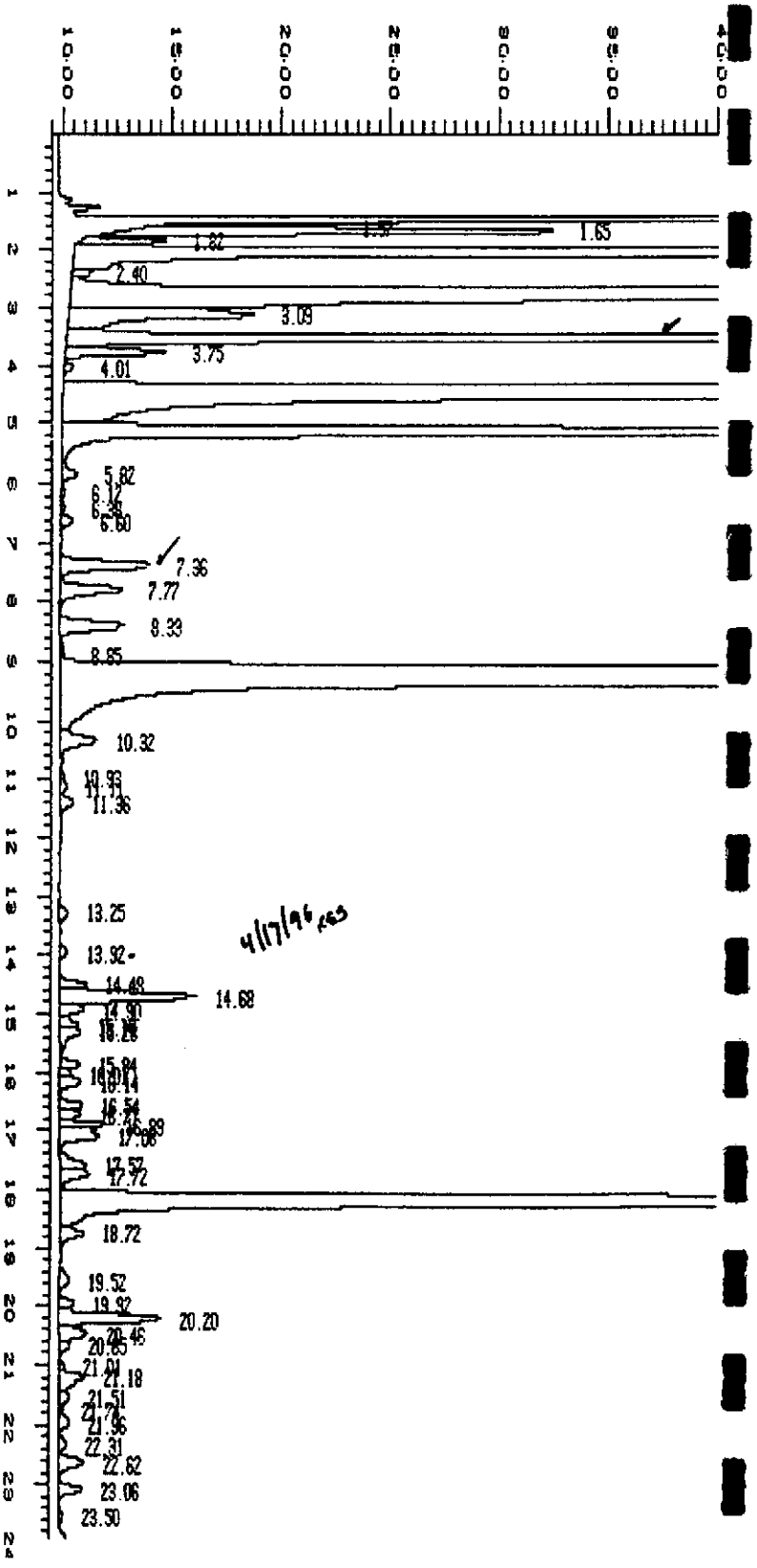
Acquired on 12-APR-1996 at 12:47
Reported on 12-APR-1996 at 13:12
Box 1 (of 1)



[APR_VOA] 10 1112APR960827.7,1

87038-1 1:1 T=SA. Amount : 1.000.

Acquired on 12-APR-1996 at 12:47
Reported on 12-APR-1996 at 13:12
Box 1 (of 1)



Quanterra
Environmental Services

QC LOT ASSIGNMENT REPORT - MS QC
Volatile Organics by GC

Laboratory Sample Number	QC Matrix	QC Category	QC Lot Number (DCS)	QC Run Number (SCS/BLANK/LCS)	MS QC Run Number (SA,MS,SD,DU)
087098-0001-SA	AQUEOUS	TPH-BTEX-A	10 APR 96-141	12 APR 96-11A	10 APR 96-14B

Quanterra
Environmental Services

METHOD BLANK REPORT
Volatile Organics by GC

Test: TPH-GBX-TR-SPE-A
Matrix: AQUEOUS
QC Lot: 10 APR 96-141 QC Run: 12 APR 96-11A

Analyte	Result	Units	Reporting Limit
Benzene	ND	ug/L	0.50
Toluene	ND	ug/L	0.50
Ethylbenzene	ND	ug/L	0.50
Xylenes (total)	ND	ug/L	0.50
Gasoline	ND	ug/L	50
Hydrocarbon mixture	ND	ug/L	50

Quanterra
Environmental Services

SINGLE CONTROL SAMPLE REPORT
Volatile Organics by GC

Analyte	Concentration Spiked	Measured	Accuracy(%) SCS	Limits
Category: TPH-BTEX-A				
Matrix: AQUEOUS				
QC Lot: 10 APR 96-141 QC Run: 12 APR 96-11A				
Concentration Units: ug/L				
4-Bromofluorobenzene	20.0	19.1	96	70-130

Calculations are performed before rounding to avoid round-off errors in calculated results.

Quanterra
Environmental Services

LABORATORY CONTROL SAMPLE REPORT
Volatile Organics by GC
Project: 087098

Category: TPH-BTEX-A TPH and BTEX (Gasoline)
Test: TPH-GBX-TR-SPE-A
Matrix: AQUEOUS
QC Lot: 10 APR 96-141 QC Run: 12 APR 96-11A
Concentration Units: ug/L

Analyte	Concentration Spiked	Measured	Accuracy(%) LCS	Limits
Benzene	10.0	9.35	94	79-121
Toluene	10.0	9.70	97	76-120
Gasoline	1000	1030	103	80-117

ND = Not Detected

Calculations are performed before rounding to avoid round-off errors in calculated results.

Quanterra
Environmental Services

MATRIX SPIKE/MATRIX SPIKE DUPLICATE QC REPORT
Volatile Organics by GC
Project: 087098

Category: TPH-BTEX-A TPH and BTEX (Gasoline)
Test: TPH-GBX-TR-SPE-A Method: P/T-GBX-TRIREGIONAL
Matrix: AQUEOUS
Sample: 087066-0001
QC Run: 10 APR 96-14B
Units: ug/L

Analyte	Sample Result	MS Result	MSD Result	Spiked MS/MSD	%Recovery MS	%Recovery MSD	Control Limits	%RPD	RPD Limit
	---------- Concentration ----------								
Benzene	ND	9.51	9.35	10.0	95	94	79-121	1.7	10
Toluene	ND	9.67	9.53	10.0	97	95	76-120	1.4	10
Gasoline	ND	989	1020	1000	99	102	80-117	3.5	10

ND = Not Detected

Calculations are performed before rounding to avoid round-off errors in calculated results.

Quanterra
Environmental
Services

Total Petroleum Hydrocarbons by GC/FID - Method TPH-D-TRIREGIONAL

Quanterra
Environmental Services

Total Petroleum Hydrocarbons by GC/FID (Triregional)

Method TPH-D-TRIREGIONAL

Client Name: Terranext
Client ID: GWS-2
Lab ID: 087098-0002-SA
Matrix: AQUEOUS Sampled: 04 APR 96 Received: 05 APR 96
Authorized: 05 APR 96 Prepared: 09 APR 96 Analyzed: 19 APR 96

Parameter	Result	Units	Reporting Limit	
Diesel Fuel	ND	ug/L	50	
Hydrocarbon mixture	1200	ug/L	50	1
Surrogate	**Recovery**			
o-Terphenyl	96	%		

Note 1 : The hydrocarbon pattern present in this sample represents an unknown mixture atypical of diesel fuel in the range of n-C8 to n-C34. Quantitation is based upon a diesel reference between n-C10 and n-C24 only.

ND = Not detected
NA = Not applicable

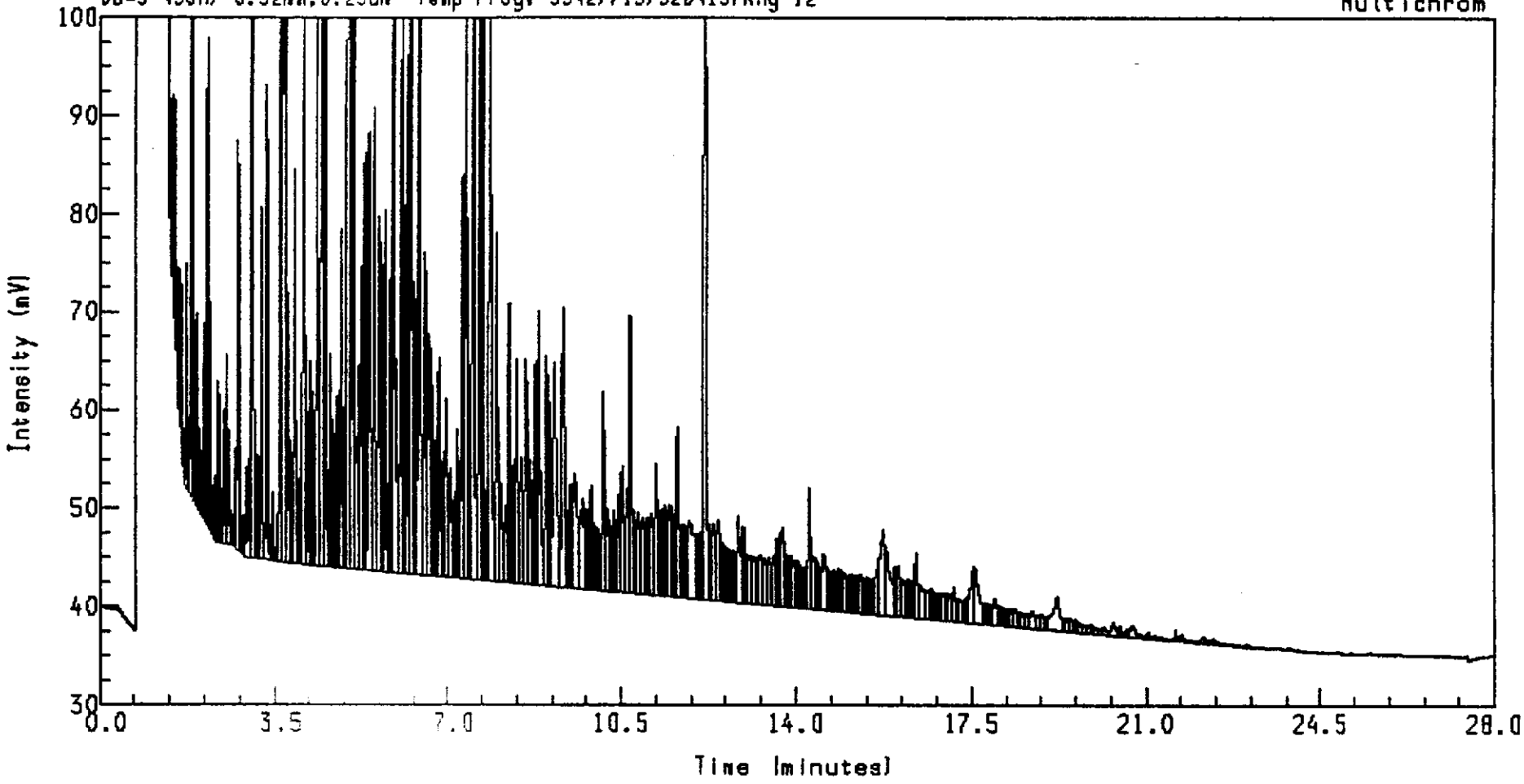
Reported By: Marcia Reed Approved By: Karla Buechler

The cover letter is an integral part of this report.
Rev 230787

QUANTERRA - SACRAMENTO CHROMATOGRAPHY

Analysis Name : [APR_SV] 91 31_18APR961147,33,1.
B7D9B-2 (TR) 1.002/3 T=SA Amount : 1.000
DB-5 (30M) 0.32mm,0.25um Temp Prog: 55(2)/15/320(15)Rng 12

Multichrom



Instrument : GC #3
Channel Title : Varian 3300 FID
Line ID :
Acquired on 19-APR-1996 at 06:26
Reported on 19-APR-1996 at 06:54

Method : GC31
Calibration : 17APR_TR
Run Sequence : GC31

Quanterra
Environmental Services

QC LOT ASSIGNMENT REPORT
Hydrocarbon Work Cell

Laboratory Sample Number	QC Matrix	QC Category	QC Lot Number (DCS)	QC Run Number (SCS/BLANK)
087098-0002-SA	AQUEOUS	TPHD-SPE-A	09 APR 96-11A	09 APR 96-11A

Quanterra
Environmental Services

METHOD BLANK REPORT
Hydrocarbon Work Cell

Analyte	Result	Units	Reporting Limit
Test: TPH-D-TR-SPE-A			
Matrix: AQUEOUS			
QC Lot: 09 APR 96-11A QC Run: 09 APR 96-11A			
Diesel Fuel	ND	ug/L	50
Hydrocarbon mixture	ND	ug/L	50

Quanterra
Environmental Services

SINGLE CONTROL SAMPLE REPORT
Hydrocarbon Work Cell

Analyte	Concentration Spiked	Measured	Accuracy(%) SCS	Limits
Category: TPHD-SPE-A				
Matrix: AQUEOUS				
QC Lot: 09 APR 96-11A QC Run: 09 APR 96-11A				
Concentration Units: ug/L				
o-Terphenyl	40	40	99	50-150

Calculations are performed before rounding to avoid round-off errors in calculated results.

Quanterra
Environmental Services

DUPLICATE CONTROL SAMPLE REPORT
Hydrocarbon Work Cell

Analyte	Concentration Spiked	Measured DCS1	Measured DCS2	Measured AVG	Accuracy Average(%) DCS	Accuracy Average(%) Limits	Precision (RPD) DCS	Precision (RPD) Limit
Category: TPHD-SPE-A Matrix: AQUEOUS QC Lot: 09 APR 96-11A Concentration Units: ug/L								
Diesel Fuel	300	222	261	242	81	56-122	16	26.0

Calculations are performed before rounding to avoid round-off errors in calculated results.

Quanterra
Environmental
Services

Total Petroleum Hydrocarbons by GC/FID - Method Diesel(TR)/Silica Gel clnup

Quanterra
Environmental Services

Total Petroleum Hydrocarbons by GC/FID (Triregional)

Method TPH-Diesel(TR)/Silica Gel Clnup

Client Name: Terranext
Client ID: GWS-2
Lab ID: 087098-0002-SA
Matrix: AQUEOUS Sampled: 04 APR 96 Received: 05 APR 96
Authorized: 05 APR 96 Prepared: 11 APR 96 Analyzed: 19 APR 96

Parameter	Result	Units	Reporting Limit	
Diesel Fuel	ND	ug/L	50	
Hydrocarbon mixture	990	ug/L	50	1
Surrogate	**Recovery**			
o-Terphenyl	103	%		

Note 1 : The hydrocarbon pattern present in this sample represents an unknown mixture atypical of diesel fuel in the range of n-C8 to n-C21. Quantitation is based on a diesel reference between n-C10 and n-C24 only.

ND = Not detected
NA = Not applicable

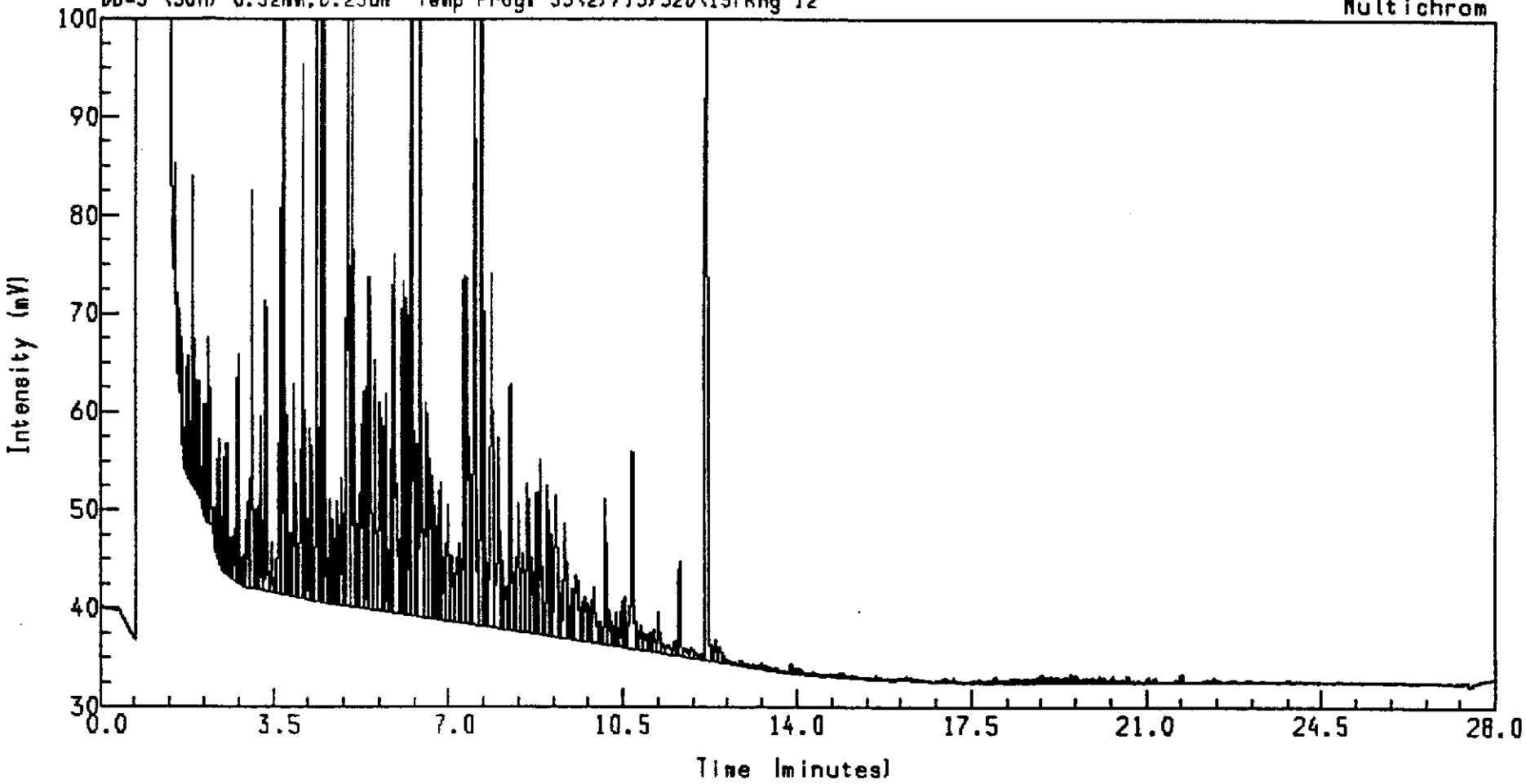
Reported By: Marcia Reed Approved By: Karla Buechler

The cover letter is an integral part of this report.
Rev 230787

QUANTERRA - SACRAMENTO CHROMATOGRAPHY

Analysis Name : [APR_SV] 91 31_19APR961133.16.1.
B7D9B-2 (SILI D.474/2.5 T=SA Amount : 1.000
DB-5 (30M) 0.32mm,0.25um Temp Prog: 55(2)/15/320(15) Rng 12

Multichrom



Instrument : GC #31
Channel Title : Varian 3300 FID
Line ID :
Acquired on 19-APR-1996 at 21:22
Reported on 19-APR-1996 at 21:50

Method : GC31
Calibration : 17APR_XX
Run Sequence : GC31

Quanterra
Environmental Services

QC LOT ASSIGNMENT REPORT
Hydrocarbon Work Cell

Laboratory Sample Number	QC Matrix	QC Category	QC Lot Number (DCS)	QC Run Number (SCS/BLANK)
087098-0002-SA	AQUEOUS	TPHD-SPE-A	11 APR 96-11B	11 APR 96-11B

Quanterra
Environmental Services

METHOD BLANK REPORT
Hydrocarbon Work Cell

Analyte	Result	Units	Reporting Limit
Test: TPH-D-TR-SPE-SIL-A			
Matrix: AQUEOUS			
QC Lot: 11 APR 96-11B QC Run: 11 APR 96-11B			
Diesel Fuel	ND	ug/L	50
Hydrocarbon mixture	ND	ug/L	50

Quanterra
Environmental Services

SINGLE CONTROL SAMPLE REPORT
Hydrocarbon Work Cell

Analyte	Concentration Spiked	Measured	Accuracy(%) SCS	Limits
Category: TPHD-SPE-A Matrix: AQUEOUS QC Lot: 11 APR 96-11B QC Run: 11 APR 96-11B Concentration Units: ug/L				
o-Terphenyl	60	61	101	50-150

Calculations are performed before rounding to avoid round-off errors in calculated results.

Quanterra
Environmental Services

DUPLICATE CONTROL SAMPLE REPORT
Hydrocarbon Work Cell

Analyte	Concentration Spiked	Measured DCS1	Measured DCS2	Measured AVG	Accuracy Average(%) DCS	Accuracy Limits	Precision (RPD) DCS	Precision Limit
Category: TPHD-SPE-A Matrix: AQUEOUS QC Lot: 11 APR 96-11B Concentration Units: ug/L								
Diesel Fuel	450	401	409	405	90	56-122	1.9	26.0

Calculations are performed before rounding to avoid round-off errors in calculated results.

Quanterra
Environmental
Services

Total Petroleum Hydrocarbons by GC/FID - Method TPH-Diesel(TR)/Filtered

Quanterra
Environmental Services

Total Petroleum Hydrocarbons by GC/FID (Triregional)

Method TPH-Diesel(TR)/Filtered

Client Name: Terranext
Client ID: GWS-2
Lab ID: 087098-0002-SA
Matrix: AQUEOUS Sampled: 04 APR 96 Received: 05 APR 96
Authorized: 05 APR 96 Prepared: 12 APR 96 Analyzed: 20 APR 96

Parameter	Result	Units	Reporting Limit	
Diesel Fuel	ND	ug/L	50	
Hydrocarbon mixture	980	ug/L	50	1
Surrogate	**Recovery**			
o-Terphenyl	121	%		

Note 1 : The hydrocarbon pattern present in this sample represents an unknown mixture atypical of diesel fuel in the range of n-C8 to n-C34. Quantitation is based on a diesel reference between n-C10 and n-C24 only.

ND = Not detected
NA = Not applicable

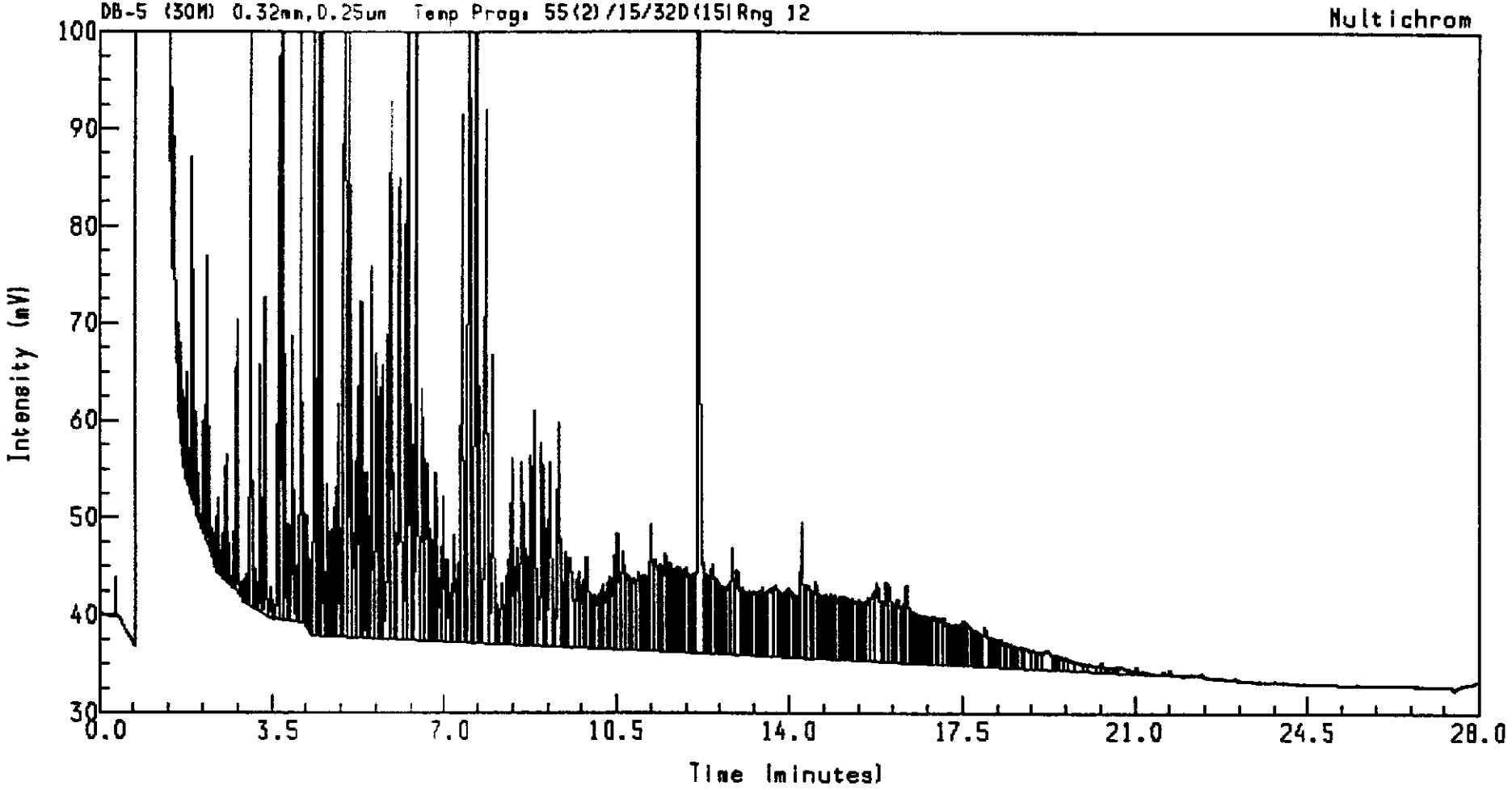
Reported By: Marcia Reed Approved By: Karla Buechler

The cover letter is an integral part of this report.
Rev 230787

QUANTERRA - SACRAMENTO CHROMATOGRAPHY

Analysis Name : [APR_SV] 91 31_19APR961133.21.1.
B7D9B-2 (FILI 0.976/3 T=SA Amount : 1.000
DB-5 (30M) 0.32mm,0.25um Temp Prog: 55(2)/15/320(15)Rng 12

Multichrom



Instrument : GC #31
Channel Title : Varian 3300 FID
Line ID :
Acquired on 20-APR-1996 at 00:16
Reported on 20-APR-1996 at 00:45

Method : GC31
Calibration : 17APR_XX
Run Sequence : GC31

Quanterra
Environmental Services

QC LOT ASSIGNMENT REPORT
Hydrocarbon Work Cell

Laboratory Sample Number	QC Matrix	QC Category	QC Lot Number (DCS)	QC Run Number (SCS/BLANK)
087098-0002-SA	AQUEOUS	TPHD-SPE-A	12 APR 96-11A	12 APR 96-11A

Quanterra
Environmental Services

METHOD BLANK REPORT
Hydrocarbon Work Cell

Analyte	Result	Units	Reporting Limit
Test: TPH-D-TR-SPE-FIL-A			
Matrix: AQUEOUS			
QC Lot: 12 APR 96-11A QC Run: 12 APR 96-11A			
Diesel Fuel	ND	ug/L	50
Hydrocarbon mixture	ND	ug/L	50

Quanterra
Environmental Services

SINGLE CONTROL SAMPLE REPORT
Hydrocarbon Work Cell

Analyte	Concentration Spiked	Measured	Accuracy(%) SCS	Limits
Category: TPHD-SPE-A Matrix: AQUEOUS QC Lot: 12 APR 96-11A QC Run: 12 APR 96-11A Concentration Units: ug/L				
o-Terphenyl	40	41	102	50-150

Calculations are performed before rounding to avoid round-off errors in calculated results.

Quanterra
Environmental Services

DUPLICATE CONTROL SAMPLE REPORT
Hydrocarbon Work Cell

Analyte	Concentration Spiked	Measured DCS1	Measured DCS2	Measured AVG	Accuracy Average(%) DCS	Accuracy Limits	Precision (RPD) DCS	Precision Limit
Category: TPHD-SPE-A Matrix: AQUEOUS QC Lot: 12 APR 96-11A Concentration Units: ug/L								
Diesel Fuel	300	265	296	281	94	56-122	11	26.0

Calculations are performed before rounding to avoid round-off errors in calculated results.

ATTACHMENT F

RBCA TIER 1 SITE ASSESSMENT

RBCA TIER 1/TIER 2 EVALUATION

Output Table 1

Site Name: 1399 Wood Street
Site Location: Oakland, California

Job Identification: 5100535
Date Completed: 1/13/96
Completed By: Glenn Meeth

Software: GSI RBCA Spreadsheet
Version: v 1.0

NOTE: values which differ from Tier 1 default values are shown in bold italics and underlined.

DEFAULT PARAMETERS

Exposure Parameter	Definition (Units)	Residential			Commercial/Industrial	
		Adult	(1-6yrs)	(1-16 yrs)	Chronic	Constrctn
ATc	Averaging time for carcinogens (yr)	70				
ATn	Averaging time for non-carcinogens (yr)	30	6	16	25	1
BW	Body Weight (kg)	70	15	35	70	
ED	Exposure Duration (yr)	30	6	16	25	1
EF	Exposure Frequency (days/yr)	350			250	180
EF.Derm	Exposure Frequency for dermal exposure	350			250	
IRgw	Ingestion Rate of Water (l/day)	2			1	
IRs	Ingestion Rate of Soil (mg/day)	100	200		50	100
IRadj	Adjusted soil ing. rate (mg*yr/kg*d)	1.1E+02			9.4E+01	
IRa.in	Inhalation rate indoor (m^3/day)	15			20	
IRa.out	Inhalation rate outdoor (m^3/day)	20			20	10
SA	Skin surface area (dermal) (cm^2)	5.8E+03		2.0E+03	5.8E+03	5.8E+03
SAadj	Adjusted dermal area (cm^2*yr/kg)	2.1E+03			1.7E+03	
M	Soil to Skin adherence factor	1				
AAFs	Age adjustment on soil ingestion	FALSE			FALSE	
AAFd	Age adjustment on skin surface area	FALSE			FALSE	
tox	Use EPA tox data for air (or PEL based)	TRUE				
gwMCL?	Use MCL as exposure limit in groundwater?	FALSE				

Matrix of Exposed Persons to Complete Exposure Pathways		Residential	Commercial/Industrial	
			Chronic	Constrctn
Groundwater Pathways:				
GW.i	Groundwater Ingestion	FALSE	TRUE	
GW.v	Volatilization to Outdoor Air	FALSE	TRUE	
GW.b	Vapor Intrusion to Buildings	FALSE	TRUE	
Soil Pathways				
S.v	Volatiles from Subsurface Soils	FALSE	FALSE	
SS.v	Volatiles and Particulate Inhalation	FALSE	FALSE	FALSE
SS.d	Direct Ingestion and Dermal Contact	FALSE	FALSE	FALSE
S.l	Leaching to Groundwater from all Soils	FALSE	TRUE	
S.b	Intrusion to Buildings - Subsurface Soils	FALSE	FALSE	

Matrix of Receptor Distance and Location on- or off-site		Residential		Commercial/Industrial	
		Distance	On-Site	Distance	On-Site
GW	Groundwater receptor (cm)		TRUE		TRUE
S	Inhalation receptor (cm)		TRUE		TRUE

Matrix of Target Risks		Individual	Cumulative
TRab	Target Risk (class A&B carcinogens)	1.0E-06	
TRc	Target Risk (class C carcinogens)	1.0E-05	
THQ	Target Hazard Quotient	1.0E+00	
Opt	Calculation Option (1, 2, or 3)	1	
Tier	RBCA Tier	1	

Surface Parameters	Definition (Units)	Residential	Commercial/Industrial Chronic	Commercial/Industrial Construction
t	Exposure duration (yr)	30	25	1
A	Contaminated soil area (cm^2)	2.2E+06		1.0E+06
W	Length of affected soil parallel to wind (cm)	1.5E+03		1.0E+03
W.gw	Length of affected soil parallel to groundwater (c	1.5E+03		
Uair	Ambient air velocity in mixing zone (cm/s)	2.3E+02		
delta	Air mixing zone height (cm)	2.0E+02		
Lss	Definition of surficial soils (cm)	***3.0E+01***		
Pe	Particulate areal emission rate (g/cm^2/s)	2.2E-10		

Groundwater	Definition (Units)	Value
delta.gw	Groundwater mixing zone depth (cm)	2.0E+02
I	Groundwater infiltration rate (cm/yr)	3.0E+01
Ugw	Groundwater Darcy velocity (cm/yr)	2.5E+03
Ugw.tr	Groundwater Transport velocity (cm/yr)	6.6E+03
Ks	Saturated Hydraulic Conductivity(cm/s)	
grad	Groundwater Gradient (cm/cm)	
Sw	Width of groundwater source zone (cm)	
Sd	Depth of groundwater source zone (cm)	
BC	Biodegradation Capacity (mg/L)	
BIO?	Is Bioattenuation Considered	FALSE
phi.eff	Effective Porosity in Water-Bearing Unit	3.8E-01
foc.sat	Fraction organic carbon in water-bearing unit	1.0E-03

Soil	Definition (Units)	Value		
hc	Capillary zone thickness (cm)	***1.5E+01***		
hv	Vadose zone thickness (cm)	***1.4E+02***		
rho	Soil density (g/cm^3)	1.7		
foc	Fraction of organic carbon in vadose zone	0.01		
phi	Soil porosity in vadose zone	0.38		
Lgw	Depth to groundwater (cm)	***1.5E+02***		
Ls	Depth to top of affected soil (cm)	***3.0E+01***		
Lsubs	Thickness of affected subsurface soils (cm)	***1.2E+02***		
pH	Soil/groundwater pH	6.5		
		capillary	vadose	foundation
phi.w	Volumetric water content	0.342	0.12	0.12
phi.a	Volumetric air content	0.038	0.26	0.26

Building	Definition (Units)	Residential	Commercial
Lb	Building volume/area ratio (cm)	2.0E+02	3.0E+02
ER	Building air exchange rate (s^-1)	1.4E-04	2.3E-04
Lcrk	Foundation crack thickness (cm)	1.5E+01	
eta	Foundation crack fraction	0.01	

Dispersive Transport Parameters	Definition (Units)	Residential	Commercial
Groundwater			
ax	Longitudinal dispersion coefficient (cm)		
ay	Transverse dispersion coefficient (cm)		
az	Vertical dispersion coefficient (cm)		
Vapor			
dcy	Transverse dispersion coefficient (cm)		
dcz	Vertical dispersion coefficient (cm)		

RBCA TIER 1/TIER 2 EVALUATION

Output Table 1

Site Name: 1399 Wood Street
Site Location: Oakland, California
Job Identification: 5100535
Date Completed: 1/13/96
Completed By: Glenn Meeth

Software: GSI RBCA Spreadsheet
Version: v 1.0

NOTE: values which differ from Tier 1 default values are shown in bold italics and underlined.

DEFAULT PARAMETERS

Exposure Parameter	Definition (Units)	Residential Adult	Residential (1-6yrs)	Residential (1-16 yrs)	Commercial/Industrial Chronic	Commercial/Industrial Constrctn
ATc	Averaging time for carcinogens (yr)	70				
ATn	Averaging time for non-carcinogens (yr)	30	6	16	25	1
BW	Body Weight (kg)	70	15	35	70	
ED	Exposure Duration (yr)	30	6	16	25	1
EF	Exposure Frequency (days/yr)	350			250	180
EF.Derm	Exposure Frequency for dermal exposure	350			250	
IRgw	Ingestion Rate of Water (l/day)	2			1	
IRs	Ingestion Rate of Soil (mg/day)	100	200		50	100
IRadj	Adjusted soil ing. rate (mg-yr/kg-d)	1.1E+02			9.4E+01	
IRa.in	Inhalation rate indoor (m^3/day)	15			20	
IRa.out	Inhalation rate outdoor (m^3/day)	20			20	10
SA	Skin surface area (dermal) (cm^2)	5.8E+03		2.0E+03	5.8E+03	5.8E+03
SAadj	Adjusted dermal area (cm^2-yr/kg)	2.1E+03			1.7E+03	
M	Soil to Skin adherence factor	1				
AAFs	Age adjustment on soil ingestion	FALSE			FALSE	
AAFd	Age adjustment on skin surface area	FALSE			FALSE	
tox	Use EPA tox data for air (or PEL based)	TRUE				
gwMCL?	Use MCL as exposure limit in groundwater?	FALSE				

Matrix of Exposed Persons to Complete Exposure Pathways		Residential	Commercial/Industrial Chronic	Commercial/Industrial Constrctn
Groundwater Pathways:				
GW.i	Groundwater Ingestion	FALSE	TRUE	
GW.v	Volatilization to Outdoor Air	FALSE	TRUE	
GW.b	Vapor Intrusion to Buildings	FALSE	TRUE	
Soil Pathways				
S.v	Volatiles from Subsurface Soils	FALSE	FALSE	
SS.v	Volatiles and Particulate Inhalation	FALSE	FALSE	FALSE
SS.d	Direct Ingestion and Dermal Contact	FALSE	FALSE	FALSE
S.l	Leaching to Groundwater from all Soils	FALSE	TRUE	
S.b	Intrusion to Buildings - Subsurface Soils	FALSE	FALSE	

Matrix of Receptor Distance and Location on- or off-site		Residential Distance	Residential On-Site	Commercial/Industrial Distance	Commercial/Industrial On-Site
GW	Groundwater receptor (cm)		TRUE		TRUE
S	Inhalation receptor (cm)		TRUE		TRUE

Matrix of Target Risks		Individual	Cumulative
TRab	Target Risk (class A&B carcinogens)	1.0E-06	
TRc	Target Risk (class C carcinogens)	1.0E-05	
THQ	Target Hazard Quotient	1.0E+00	
Opt	Calculation Option (1, 2, or 3)	1	
Tier	RBCA Tier	1	

Surface Parameters	Definition (Units)	Residential	Commercial/Industrial Chronic	Commercial/Industrial Construction
t	Exposure duration (yr)	30	25	1
A	Contaminated soil area (cm^2)	2.2E+06		1.0E+06
W	Length of affected soil parallel to wind (cm)	1.5E+03		1.0E+03
W.gw	Length of affected soil parallel to groundwater (c	1.5E+03		
Uair	Ambient air velocity in mixing zone (cm/s)	2.3E+02		
delta	Air mixing zone height (cm)	2.0E+02		
Lss	Definition of surficial soils (cm)	***3.0E+01***		
Pe	Particulate areal emission rate (g/cm^2/s)	2.2E-10		

Groundwater	Definition (Units)	Value
delta.gw	Groundwater mixing zone depth (cm)	2.0E+02
I	Groundwater infiltration rate (cm/yr)	3.0E+01
Ugw	Groundwater Darcy velocity (cm/yr)	2.5E+03
Ugw.tr	Groundwater Transport velocity (cm/yr)	6.6E+03
Ks	Saturated Hydraulic Conductivity(cm/s)	
grad	Groundwater Gradient (cm/cm)	
Sw	Width of groundwater source zone (cm)	
Sd	Depth of groundwater source zone (cm)	
BC	Biodegradation Capacity (mg/L)	
BIO?	Is Bioattenuation Considered	FALSE
phi.eff	Effective Porosity in Water-Bearing Unit	3.8E-01
foc.sat	Fraction organic carbon in water-bearing unit	1.0E-03

Soil	Definition (Units)	Value	capillary	vadose	foundation
hc	Capillary zone thickness (cm)	***1.5E+01***			
hv	Vadose zone thickness (cm)	***1.4E+02***			
rho	Soil density (g/cm^3)	1.7			
foc	Fraction of organic carbon in vadose zone	0.01			
phi	Soil porosity in vadose zone	0.38			
Lgw	Depth to groundwater (cm)	***1.5E+02***			
Ls	Depth to top of affected soil (cm)	***3.0E+01***			
Lsubs	Thickness of affected subsurface soils (cm)	***1.2E+02***			
pH	Soil/groundwater pH	6.5			
phi.w	Volumetric water content		0.342	0.12	0.12
phi.a	Volumetric air content		0.038	0.26	0.26

Building	Definition (Units)	Residential	Commercial
Lb	Building volume/area ratio (cm)	2.0E+02	3.0E+02
ER	Building air exchange rate (s^-1)	1.4E-04	2.3E-04
Lcrk	Foundation crack thickness (cm)	1.5E+01	
eta	Foundation crack fraction	0.01	

Dispersive Transport Parameters	Definition (Units)	Residential	Commercial
Groundwater			
ax	Longitudinal dispersion coefficient (cm)		
ay	Transverse dispersion coefficient (cm)		
az	Vertical dispersion coefficient (cm)		
Vapor			
dcy	Transverse dispersion coefficient (cm)		
dcz	Vertical dispersion coefficient (cm)		

RBCA SITE ASSESSMENT

Tier 1 Worksheet 6.2

Site Name: 1399 Wood Street
Site Location: Oakland, California

Completed By: Glenn Meeth
Date Completed: 1/13/1996

SUBSURFACE SOIL RBSL VALUES (> 3 FT BGS)

Target Risk (Class A & B) 1.0E-6
Target Risk (Class C) 1.0E-5
Target Hazard Quotient 1.0E+0

☐ MCL exposure limit?
☐ PEL exposure limit?

Calculation Option: 1

RBSL Results For Complete Exposure Pathways ("x" If Complete)

CONSTITUENTS OF CONCERN		Representative Concentration	X Soil Leaching to Groundwater			Soil Volatilization to Indoor Air		Soil Volatilization to Outdoor Air		Applicable RBSL	RBSL Exceeded ?	Required CRF
CAS No.	Name	(mg/kg)	Residential: (on-site)	Commercial: (on-site)	Regulatory(MCL): (on-site)	Residential: (on-site)	Commercial: (on-site)	Residential: (on-site)	Commercial: (on-site)	(mg/kg)	"■" If yes	Only if "yes" left
71-43-2	Benzene	3.4E+0	NA	5.8E-2	NA	NA	NA	NA	NA	5.8E-2	■	5.9E+01
100-41-4	Ethylbenzene	5.1E+1	NA	1.3E+2	NA	NA	NA	NA	NA	1.3E+2	☐	<1
108-88-3	Toluene	8.8E+0	NA	3.6E+2	NA	NA	NA	NA	NA	3.6E+2	☐	<1
1330-20-7	Xylene (mixed isomers)	1.0E+2	NA	>Res	NA	NA	NA	NA	NA	>Res	☐	<1

Software: GSI RBCA Spreadsheet
Version: v 1.0

Serial: G-291-KZX-762

Site Name: 1399 Wood Street
Site Location: Oakland, California

Completed By: Glenn Meeth
Date Completed: 1/13/1996

SUBSURFACE SOIL RBSL VALUES (> 3 FT BGS)

Target Risk (Class A & B) 1.0E-6
Target Risk (Class C) 1.0E-5
Target Hazard Quotient 1.0E+0

☐ MCL exposure limit?
☐ PEL exposure limit?

Calculation Option: 1

RBSL Results For Complete Exposure Pathways ("x" If Complete)

CONSTITUENTS OF CONCERN		Representative Concentration	X Soil Leaching to Groundwater			Soil Volatilization to Indoor Air		Soil Volatilization to Outdoor Air		Applicable RBSL	RBSL Exceeded ?	Required CRF
CAS No.	Name	(mg/kg)	Residential: (on-site)	Commercial: (on-site)	Regulatory(MCL): (on-site)	Residential: (on-site)	Commercial: (on-site)	Residential: (on-site)	Commercial: (on-site)	(mg/kg)	"■" If yes	Only If "yes" left
71-43-2	Benzene	3.4E+0	NA	5.8E-2	NA	NA	NA	NA	NA	5.8E-2	■	5.9E+01
100-41-4	Ethylbenzene	5.1E+1	NA	1.3E+2	NA	NA	NA	NA	NA	1.3E+2	☐	<1
108-88-3	Toluene	8.8E+0	NA	3.6E+2	NA	NA	NA	NA	NA	3.6E+2	☐	<1
1330-20-7	Xylene (mixed isomers)	1.0E+2	NA	>Res	NA	NA	NA	NA	NA	>Res	☐	<1

Software: GSI RBCA Spreadsheet
Version: v 1.0

Serial: G-291-KZX-762

RBCA SITE ASSESSMENT

Tier 1 Worksheet 6.3

Site Name: 1399 Wood Street
Site Location: Oakland, California

Completed By: Glenn Meeth
Date Completed: 1/13/1996

GROUNDWATER RBSL VALUES

Target Risk (Class A & B) 1.0E-6
Target Risk (Class C) 1.0E-5
Target Hazard Quotient 1.0E+0

☐ MCL exposure limit?
☐ PEL exposure limit?

Calculation Option: 1

RBSL Results For Complete Exposure Pathways ("x" If Complete)

CONSTITUENTS OF CONCERN		Representative Concentration	X Groundwater Ingestion			X Groundwater Volatilization to Indoor Air		X Groundwater Volatilization to Outdoor Air		Applicable RBSL	RBSL Exceeded ?	Required CRF
CAS No.	Name	(mg/L)	Residential: (on-site)	Commercial: (on-site)	Regulatory(MCL): (on-site)	Residential: (on-site)	Commercial: (on-site)	Residential (on-site)	Commercial: (on-site)	(mg/L	"■" If yes	Only if "yes" left
71-43-2	Benzene	5.1E-3	NA	9.9E-3	NA	NA	1.4E-1	NA	4.8E+1	9.9E-3	☐	<1
100-41-4	Ethylbenzene	0.0E+0	NA	1.0E+1	NA	NA	>Sol	NA	>Sol	1.0E+1	☐	<1
108-88-3	Toluene	4.5E-3	NA	2.0E+1	NA	NA	1.7E+2	NA	>Sol	2.0E+1	☐	<1
1330-20-7	Xylene (mixed isomers)	3.6E-3	NA	>Sol	NA	NA	>Sol	NA	>Sol	>Sol	☐	<1

Software: GSI RBCA Spreadsheet
Version: v 1.0

Serial: G-291-KZX-762

RBCA SITE ASSESSMENT

Tier 1 Worksheet 6.3

Site Name: 1399 Wood Street
Site Location: Oakland, California

Completed By: Glenn Meeth
Date Completed: 1/13/1996

GROUNDWATER RBSL VALUES

Target Risk (Class A & B) 1.0E-6
Target Risk (Class C) 1.0E-5
Target Hazard Quotient 1.0E+0

☐ MCL exposure limit?
☐ PEL exposure limit?

Calculation Option: 1

RBSL Results For Complete Exposure Pathways ("x" If Complete)

CONSTITUENTS OF CONCERN		Representative Concentration	X Groundwater Ingestion			X Groundwater Volatilization to Indoor Air		X Groundwater Volatilization to Outdoor Air		Applicable RBSL	RBSL Exceeded ?	Required CRF
CAS No.	Name	(mg/L)	Residential: (on-site)	Commercial: (on-site)	Regulatory(MCL): (on-site)	Residential: (on-site)	Commercial: (on-site)	Residential (on-site)	Commercial: (on-site)	(mg/L	"■" If yes	Only if "yes" left
71-43-2	Benzene	5.1E-3	NA	9.9E-3	NA	NA	1.4E-1	NA	4.8E+1	9.9E-3	☐	<1
100-41-4	Ethylbenzene	0.0E+0	NA	1.0E+1	NA	NA	>Sol	NA	>Sol	1.0E+1	☐	<1
108-88-3	Toluene	4.5E-3	NA	2.0E+1	NA	NA	1.7E+2	NA	>Sol	2.0E+1	☐	<1
1330-20-7	Xylene (mixed isomers)	3.6E-3	NA	>Sol	NA	NA	>Sol	NA	>Sol	>Sol	☐	<1

Software: GSI RBCA Spreadsheet
Version: v 1.0

Serial: G-291-KZX-762