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June 18, 1997

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Mr. Kayode Kadara
U.S. Postal Service FSO
850 Cherry Avenue
San Bruno, California 94099-4120

Request for Site Closure
United States Postal Service - GMF/VMF
1675 7th Street
Oakland, California

Dear Mr. Kadara:

This letter presents the U.S. Postal Services' (USPS) request for site closure at the USPS facility, 1675 7th Street, Oakland, California, (Site; Plate 1). Work was conducted on behalf of the USPS by Harding Lawson Associates (HLA) and in accordance with a request from the Alameda County Department of Environmental Health (ACDEH) to perform a well search, chemical data compilation, and a risk assessment to evaluate and assess whether site closure is justifiable.

BACKGROUND

In November 1991, Geo/Resources Consultants, Inc. (GRC), observed the removal of two 10,000-gallon diesel underground storage tanks (USTs), one 5,000-gallon gasoline UST, one 750-gallon waste oil UST, and associated product piping from the site. Plate 2 presents the former locations of the USTs. Ten soil samples were collected from the four tank excavations by R. S. Eagan Company (EAGAN) and analyzed for the respective contents of each tank. Laboratory analytical results indicate that elevated levels of total petroleum hydrocarbons as gasoline (TPHg), diesel (TPHd) and benzene, toluene, ethylbenzene and xylenes (BTEX) were present in samples collected from below the tanks and the product piping. TPHg, TPHd and BTEX were detected at maximum concentrations of 2,500, 130, and 170 milligrams per kilogram (mg/kg) respectively (GRC, 1993).

In June 1992, an additional 10,000 gallon diesel UST was removed from an area near the northwest corner of the main facility (Plate 2). Soil and groundwater samples were subsequently collected from the excavation. Results of soil samples collected from the excavation sidewalls did not detect petroleum hydrocarbons above their respective detection limits. TPHd, benzene, and xylenes were detected in groundwater samples collected from the excavation at concentrations of 72,000, 3.8 and 12 micrograms per liter ($\mu\text{g/l}$) respectively. The ACDEH subsequently requested that a groundwater investigation be conducted at the site based on the elevated concentrations of petroleum hydrocarbons detected in soil during the tank removal. Additionally, the ACDEH indicated that remaining soil contamination in the area of the two former 10,000-gallon diesel USTs and piping be further evaluated (GRC, 1992).



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It is HLA's understanding, that in summer 1992, the remaining impacted soil in the vicinity of the two former diesel USTs was removed from the site and that the results of the investigation were presented in *Supplemental Observation Letter, Underground Storage Tank (UST) Program, U.S. Postal Service Vehicle Maintenance Facility, Oakland, California* dated September 17, 1992.

In September 1993, GRC performed a subsurface investigation which included the drilling of nine soil borings, conversion of five of the borings to groundwater monitoring wells (MW-1 through MW-5) and collection of soil and groundwater samples. Results of this investigation were presented in *Subsurface Site Investigation, United States Postal Service General Mail Facility/Vehicle Maintenance Facility, 1675 7th Street, Oakland, California*, dated October 1993 (GRC, 1993). Soil samples collected from the borings indicated that petroleum hydrocarbons were detected in borings installed in the vicinity of the former gasoline UST (boring MW-2), former fuel dispensing island (boring MW-4) and the former 10,000 gallon diesel USTs (boring B-8). Sample analytical results are summarized as follows:

- TPHg was detected in borings MW-4 and B-8 at concentrations of 53 and 180 mg/kg respectively
- TPHd was detected in borings MW-4 and B-8 at concentrations of 2,400 and 84 mg/kg respectively
- Benzene was detected in borings MW-2 and B-8 at concentrations of 0.04 and 0.15 mg/kg respectively
- Toluene was detected in boring B-8 at a concentration of 0.35 mg/kg
- Ethylbenzene was detected in boring B-8 at a concentration of 2.1mg/kg
- Xylenes were detected in borings MW-4 and B-8 at concentrations of 0.087 and 13 mg/kg respectively.

No other petroleum hydrocarbon constituents were detected in soil samples collected from the borings. Table 1 presents soil sample results from the investigation.

Groundwater samples were also collected from the monitoring wells; TPHd was detected in well MW-4 at a concentration of 580 µg/l. Petroleum hydrocarbons were not detected in any of the other groundwater samples during the subsurface investigation. Table 2 presents groundwater sample results from the investigation and includes subsequent results of the quarterly monitoring program.

Quarterly groundwater monitoring at the site was initiated in January 1994. In January 1995, in response to the construction of Interstate 880 in the vicinity of the site, the ACDEH approved the abandonment of well MW-5. Well MW-5, located up-gradient of the release area, had been non-detect for petroleum hydrocarbon constituents since its installation. HLA took over the monitoring program in February 1995. In March 1996, after the completion of one year of monitoring by HLA, the ACDEH approved the discontinuation of the analysis of TPHg and BTEX in wells MW-1 through MW-3 and also reduced the sampling frequency to biannual. The last monitoring event was performed in November 1996. Petroleum hydrocarbon constituents continued to be detected in wells MW-1, MW-3, and MW-4 with the highest concentrations continuing to present in well MW-4.

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During November 1996, TPHg, TPHd, benzene and ethylbenzene were detected in well MW-4 at concentrations of 600, 13,000, 0.78 and, 0.94 $\mu\text{g/l}$ respectively. Table 2 presents historical results of the groundwater monitoring program at the site.

Site Hydrogeology

The subsurface investigations performed by GRC at the site indicate that the site is underlain by medium dense to dense silty sand, clayey sand, and sand to 21 feet below ground surface (bgs), the maximum depth explored at the site. Review of the boring logs indicate that groundwater was encountered in borings at a depth of approximately 9 to 11 feet bgs and stabilized at depths between approximately 3.6 and 5.0 feet during the 1993 subsurface investigation. Subsequent monitoring events indicate that depth to groundwater at the site has decreased to depths between 9.5 and 11 feet bgs. Groundwater flow at the site has consistently been to the southwest.

WELL SEARCH

As requested by the ACDEH, a well search of registered wells within a 1,000 foot radius of the site was performed by HLA. HLA reviewed Department of Water Resources files and the well database of the Alameda County Water Resources District (ACWRD) to conduct the survey. According to DWR files and the ACWRD database no water production/supply wells are located within a 1,000 foot radius of the site; however, there are 11 monitoring wells within the 1,000 foot radius of the site. The closest monitoring wells are approximately 500 feet northwest of the site at 1755 7th Street. Based on these findings, there do not appear to be any current exposure points or health risks associated with groundwater supply wells.

SCREENING HUMAN HEALTH RISK ASSESSMENT

This section presents a screening human health risk assessment (SHHRA) that was conducted to evaluate possible impacts on human health from petroleum hydrocarbons detected in subsurface soil and groundwater at the USPS site. As requested by the Alameda County Department of Environmental Health, the risk assessment is conducted on the basis of Tier 1 of the Risk-Based Corrective Action (RBCA) approach developed by the American Society of Testing and Materials in *Standard Guide for Risk-Based Corrective Action Applied at Petroleum Release Sites (ASTM, 1995)*. RBCA is not a risk assessment *per se*, but a 3-tiered, risk-based site investigation that may or may not include a quantitative risk assessment. Tiers 1 and 2 are screening steps in which chemical concentrations detected at the site are compared to risk-based screening levels, Tier 1 Risk Based Screening Levels (RBSLs) being the least site-specific, but most conservative (i.e., lowest) and health-protective. If maximum detected soil and/or groundwater concentrations are lower than Tier 1 screening levels, the site is considered unlikely to pose a human health risk.

Data Evaluation

Analytical data for subsurface soil and groundwater are summarized in Tables 1 and 2. Soil data used for the SHHRA were obtained by GRC in 1993. Twenty-five soil samples at depths ranging from 2.5 to 11.5 feet below ground surface (bgs) were collected from nine soil borings. Samples were analyzed for TPHd, TPHg, and BTEX, which were detected in only 3 samples. Polycyclic aromatic hydrocarbons (PAHs) were not analyzed. Analytes were detected in soil at monitoring well MW-4 at 3 to 3.5 feet below ground surface (bgs) (i.e., TPHd, TPHg, and xylenes at 2,400, 53, and 0.087 mg/kg, respectively), the location adjacent to a former diesel fuel dispensing island where analytes were also detected in groundwater, and at 6 to 9.5 feet bgs at boring B-8 (i.e., BTEX at concentrations ranging from 0.15 mg/kg for benzene to 13 mg/kg for xylenes, and TPHd and TPHg at 84 and 180 mg/kg, respectively), which is adjacent to a fuel line and two former UST locations. The maximum BTEX concentrations, which were detected at 6 to 6.5 feet bgs at boring B-8, are provided in Table 1. Due to natural attenuation processes such as volatilization to ambient air and biodegradation by naturally occurring soil organisms, concentrations of these compounds in soil, especially the volatile BTEX, are likely to have substantially decreased since 1993, when soil sampling was conducted. Therefore, it is conservative (i.e., health-protective) to evaluate the concentration data collected in 1993.

In ASTM guidance, the volatile fraction of TPH is evaluated as detected BTEX compounds and the PAH naphthalene. The non-volatile fraction, represented by the PAH benzo(a)pyrene, was not evaluated due to a lack of analytical data. Although PAHs were not analyzed in soil at the site, these constituents are not expected to be of concern on the basis of their relatively low concentrations in diesel.

Groundwater Risk Evaluation

TPH and BTEX data used in the SHHRA were obtained by GRC and HLA. In quarterly groundwater monitoring conducted from September 1993 through November 1996, TPH was detected in 4 of 5 monitoring wells and BTEX were not detected, except at monitoring well MW-3 and MW-4. In the November 1996 monitoring event, benzene and ethylbenzene were detected at MW-4; the concentrations evaluated in the SHHRA are averages of paired duplicate results (Table 2). As shown in Table 3, the maximum detected concentrations of benzene and ethylbenzene were below federal and State Maximum Contaminant Levels (MCLs). On the basis of this result, chemicals detected in groundwater are considered unlikely to pose a human health threat and groundwater is unlikely to require remediation. Therefore, groundwater was not further evaluated in this SHHRA.

Tier 1 RBCA Evaluation of Soil

Tier 1 of the ASTM-RBCA method is conservative and, while not as site-specific as Tier 2, is adapted to likely exposure conditions at the site. In Tier 1, maximum detected concentrations of indicator chemicals detected in soil at the site are compared to RBSLs. RBSLs are health-based chemical concentrations in soil, at and below which adverse noncancer health effects or a significant incremental cancer risk are not expected to occur in exposed human receptors. Depending on the routes by which receptors could be exposed to a chemical, RBSLs may correspond to one or more exposure pathways such as soil ingestion, dermal contact with soil, and inhalation exposure to vapors migrating from soil.

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The USPS site is located in a predominantly commercial and industrial area. The site, which is currently in use as a vehicle maintenance facility, is paved and occupied by one building and a fuel dispensing island. Site use is not anticipated to change and residential development is unlikely. Although there are no known plans for construction at the site at present, future construction is a possibility. Therefore, both commercial and construction worker receptors were considered to be potentially exposed to chemicals in soil at the site and were evaluated in the SHHRA. Both receptors are considered "commercial" in the ASTM-RBCA approach, and commercial RBSLs apply to both.

Potential complete exposure pathways for these receptors were identified by considering potential environmental fate and transport of the chemicals in soil, and routes by which receptors could be exposed. BTEX, having relatively high vapor pressures and Henry constants, may volatilize through the soil column to ambient air, where they are dispersed as vapors.

Receptors at the site may be exposed to BTEX by inhaling vapors in air. It was conservatively assumed that future construction could place a structure at the location of maximum BTEX concentrations (i.e. soil boring B-8). The receptors were, therefore, assumed to be exposed to vapors in both indoor and outdoor air. Because the site is paved, receptors can only contact chemicals in soil under a construction scenario. Therefore, construction workers were also evaluated for direct exposure to soil.

To summarize, the following receptors and exposure pathways were identified for evaluation in the Tier 1 RBCA assessment:

- Commercial workers - inhalation of vapors migrating from soil to indoor air
- Commercial workers - inhalation of vapors migrating from soil to outdoor air
- Construction (i.e., commercial) workers - direct exposure to soil via ingestion and dermal contact.

Receptors were assumed to be exposed to vapor concentrations associated with the maximum soil concentration. This is highly conservative given that people are expected to move around a site, incurring exposure to only average concentrations over time.

For the Tier 1 analysis, conservative, ASTM default parameter values for soil (e.g., soil density and porosity, and area and depth of contaminants), air dispersion (e.g., wind speed and building volume), and exposure assumptions (e.g., soil ingestion rate, inhalation rate, and duration and frequency of exposure) were utilized. On the basis of State guidance, RBSLs for benzene were multiplied by 0.29 to account for the lower, more conservative cancer potency factor developed for benzene by Cal/EPA as compared to the EPA slope factor used by ASTM (*SFBRWQCB, 1996*).

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RBSLs for the selected receptor and pathways were compiled in Table 4. For benzene, the only carcinogen detected in soil at the site, RBSLs were compiled for the 10^{-5} risk level (i.e., one additional cancer case per 100,000 exposed people), which is generally considered "acceptable" for commercial worker receptors within California. In addition, EPA Region IX Preliminary Remediation Goals (PRGs) were compiled for the purposes of comparison. PRGs are conservative, risk-based soil concentrations developed for multipathway exposure to chemicals in soil (i.e., ingestion, dermal contact, and vapor inhalation). They are developed using generally the same toxicity values and conservative exposure assumptions as ASTM RBSLs.

SHRRA Results

As shown in Table 4, the Tier 1 RBSL for volatilization to enclosed spaces (i.e., indoor air) was exceeded by the maximum detected concentration of benzene. No other RBSLs (i.e., those for outdoor air exposure and direct soil exposure), and no PRGs, were exceeded. These results are not considered to imply that exposure to benzene vapors in indoor air at the site could be associated with human health risks. The Tier 1 RBCA evaluation is very conservative; as discussed above, almost all parameters used to develop RBSLs are default, not site-specific. The use of site-specific values for soil, surface, and building parameters to model benzene volatilization would result in higher RBSLs. The following factors make it unlikely that benzene in soil at the site poses a health risk:

- Tier 1 RBSLs are compared to maximum concentrations only, which assumes that receptors stay at one place onsite for 250 days per year over a 25-year exposure duration
- Benzene concentrations in soil are likely to have substantially reduced since sampling was conducted in 1993, as discussed above
- No structure is currently located over the location of maximum detected concentration, and there are no plans to construct such a structure in the future; exposure to benzene vapors in indoor air is, therefore, unlikely to occur
- EPA Region IX PRGs, which are conservative values that are developed to evaluate the vapor inhalation pathway (in addition to others), were not exceeded for benzene.

SUMMARY

Review of available GRC reports indicate that the majority of impacted soil associated with the UST and dispenser island releases has been removed. Results of boring soil samples indicate petroleum hydrocarbons were only present in three borings located in the vicinity of the former gasoline UST, former fuel dispensing island, and the former 10,000 gallon diesel USTs. Review of quarterly groundwater monitoring results indicate that the maximum detected concentrations of benzene and ethylbenzene (only detected in well MW-4) were below federal and state MCLs; and therefore unlikely to pose a human threat and groundwater is unlikely to require remediation.

and MW-3, 11-14-95

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REFERENCES

American Society of Testing and Materials (ASTM), 1995. *Standard Guide for Risk-Based Corrective Action Applied at Petroleum Release Sites*. E1739-95.

Department of Toxic Substances Control, Office of the Science Advisor 1992. *Supplemental Guidance for Human Health Multimedia Risk Assessment of Hazardous Waste Sites and Permitted Facilities*. July.

California Environmental Protection Agency (Cal/EPA), 1994a. *California Cancer Potency Factors: Update*. Office of Environmental Health Hazard Assessment. November 1.

Geo/Resources Consultants, Inc. (GRC), 1992. *Construction Observation of UST Activities, United States Postal Service, Oakland, Main Post Office, 1675 7th Street, Oakland, California*. April 23.

_____, 1993. *Subsurface Investigation, United States Postal Service General Mail Facility/Vehicle Maintenance Facility, 1675 7th Street., Oakland, California*. October 29.

California Environmental Protection Agency (Cal/EPA), 1994. *Summary of California Drinking Water Standards*. Department of Health Services. November 10.

San Francisco Bay Regional Water Quality Control Board (SFBRWQCB), 1996. *Regional Board Supplemental Instructions to State Water Board December 8, 1995, Interim Guidance on Required Cleanup at Low-Risk Fuel Sites*. Memorandum. January 5.

U.S. Environmental Protection Agency (EPA), 1996a. *Soil Screening Guidance: Technical Background Document*. PB96-963502. May.

_____, 1996b. *Region 9 Preliminary Remediation Goals (PRGs), 1996*. August 1.

_____, 1996c. *Federal Drinking Water Standards and Health Advisories Table*. Region IX. December.

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On the basis of the results of the well search indicating that only monitoring wells are present within a 1,000 foot radius of the site and the screening human health risk assessment indicating that BTEX in soil at the site are not considered to pose a human health risk, it is HLA's recommendation that no risk-based remediation be completed and case closure be granted.

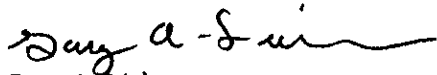
If you should have any questions please call Gary Lieberman at (415) 884-3158 or Rose Wood at (415) 884-3135.

Yours very truly,

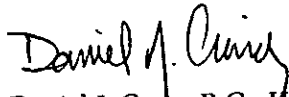
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GAL/RW/DJC:mh/MH49102.LTR-USPS

Attachments: Table 1 - Summary of Analytical Results of Soil Samples
Table 2 - Summary of Analytical Results of Groundwater Samples
Table 3 - Comparison of Groundwater Concentrations to MCLs
Table 4 - Comparison of Soil Concentrations to Screening Concentrations
Plate 1 - Vicinity Map
Plate 2 - Site Plan

**Table 1. Summary of Analytical Test Results of Soil Samples
United States Postal Service - GMF/VMF
Oakland, California**

Sample I.D.#	Sample Depth (feet)	TPHd (mg/kg)	TPHg (mg/kg)	Benzene (mg/kg)	Toluene (mg/kg)	Ethylbenzene (mg/kg)	Total Xylenes (mg/kg)
MW-1	5.0	<10	<1.0	<0.003	<0.003	<0.003	<0.003
MW-1	8.0	<10	<1.0	<0.003	<0.003	<0.003	<0.003
MW-2	2.5 - 3.0	<10	<1.0	0.040	<0.003	<0.003	<0.003
MW-2	7.0 - 7.5	<10	<1.0	<0.003	<0.003	<0.003	<0.003
MW-2	8.5 - 9.0	<10	<1.0	<0.003	<0.003	<0.003	<0.003
MW-3	3.0 - 3.5	<10	<1.0	<0.003	<0.003	<0.003	<0.003
MW-3	7.0 - 7.5	<10	<1.0	<0.003	<0.003	<0.003	<0.003
MW-3	9.0 - 9.5	<10	<1.0	<0.003	<0.003	<0.003	<0.003
MW-4	3.0 - 3.5	2400	53	<0.15	<0.15	<0.15	0.087
MW-4	7.0 - 7.5	<10	<1.0	<0.003	<0.003	<0.003	<0.003
MW-4	9.0 - 9.5	<10	<1.0	<0.003	<0.003	<0.003	<0.003
MW-5	3.0	<10	<1.0	<0.003	<0.003	<0.003	<0.003
MW-5	6.5	<10	<1.0	<0.003	<0.003	<0.003	<0.003
MW-5	9.0	<10	<1.0	<0.003	<0.003	<0.003	<0.003
B-6	3.0 - 3.5	<10	<1.0	<0.003	<0.003	<0.003	<0.003
B-6	7.0 - 7.5	<10	<1.0	<0.003	<0.003	<0.003	<0.003
B-6	11.0 - 11.5	<10	<1.0	<0.003	<0.003	<0.003	<0.003
B-7	4.5 - 5.0	<10	<1.0	<0.003	<0.003	<0.003	<0.003
B-7	5.0 - 5.5	<10	<1.0	<0.003	<0.003	<0.003	<0.003
B-7	10.0 - 10.5	<10	<1.0	<0.003	<0.003	<0.003	<0.003
B-7	13.5 - 14.0	<10	<1.0	<0.003	<0.003	<0.003	<0.003
B-8	6.0 - 6.5	84	180	0.15	0.35	2.1	13
B-8	9.0 - 9.5	<10	<1.0	<0.003	<0.003	<0.003	0.12
B-8	9.0 - 9.5	<10	<1.0	<0.003	<0.003	<0.003	<0.003
B-9	10.5 - 11.0	<10	<1.0	<0.003	<0.003	<0.003	<0.003

TPHd Total petroleum hydrocarbons as diesel.
 TPHg Total petroleum hydrocarbons as gasoline.
 mg/kg Milligrams per kilogram.

**Table 2. Summary of Analytical Results of Groundwater Samples
United States Postal Service - GMF/VMF
1675 7th Street
Oakland, California**

Well Name	Sample Date	Total Petroleum Hydrocarbons as		Benzene µg/l	Toluene µg/l	Ethyl- Benzene µg/l	Xylenes µg/l
		Gasoline µg/l	Diesel µg/l				
MW-1	9/93	< 50	< 50	< 0.5	< 0.5	<0.5	< 0.5
	9/93 (Dup)	< 50	< 50	< 0.5	< 0.5	<0.5	< 0.5
	1/26/94	< 50	< 50	< 0.5	< 0.5	<0.5	< 0.5
	3/94	< 50	< 50	< 0.5	< 0.5	<0.5	< 0.5
	6/94	< 50	73	< 0.5	< 0.5	<0.5	< 0.5
	2/22/95	< 50	600 *	< 0.5	< 0.5	<0.5	< 0.5
	6/6/95	< 50	900 *	< 0.5	< 0.5	<0.5	< 0.5
	8/16/95	< 50	810 *	< 0.5	< 0.5	<0.5	< 0.5
	11/14/95	< 50	590	< 0.5	< 0.5	<0.5	< 0.5
	5/16/96	NA	900	NA	NA	NA	NA
11/15/96	NA	330	NA	NA	NA	NA	
MW-2	9/93	< 50	< 50	< 0.5	< 0.5	<0.5	< 0.5
	1/26/94	< 50	< 50	< 0.5	< 0.5	<0.5	< 0.5
	3/94	< 50	< 50	< 0.5	< 0.5	<0.5	< 0.5
	6/94	< 50	< 50	< 0.5	< 0.5	<0.5	< 0.5
	2/22/95	< 50	280 *	< 0.5	< 0.5	<0.5	< 0.5
	6/6/95	< 50	570 *	< 0.5	< 0.5	<0.5	< 0.5
	8/16/95	< 50	150 *	< 0.5	< 0.5	<0.5	< 0.5
	11/14/95	< 50	<50	< 0.5	< 0.5	<0.5	< 0.5
	5/16/96	NA	320	NA	NA	NA	NA
	11/15/96	NA	< 50	NA	NA	NA	NA
MW-3	9/93	< 50	< 50	< 0.5	< 0.5	<0.5	< 0.5
	1/26/94	< 50	< 50	< 0.5	< 0.5	<0.5	< 0.5
	3/94	< 50	< 50	< 0.5	< 0.5	<0.5	< 0.5
	3/94 (Dup)	< 50	< 50	< 0.5	< 0.5	<0.5	< 0.5
	6/94	Insufficient water - No sample collected					
	2/22/95	50	350 *	< 0.5	< 0.5	<0.5	< 0.5
	6/6/95	< 50	380 **	< 0.5	< 0.5	<0.5	< 0.5
	8/16/95	< 50	440	< 0.5	< 0.5	<0.5	< 0.5
	11/14/95	< 50	200	0.8	< 0.5	<0.5	< 0.5
	5/16/96	NA	1,100	NA	NA	NA	NA
11/15/96	NA	470	NA	NA	NA	NA	

**Table 2. Summary of Analytical Results of Groundwater Samples
United States Postal Service - GMF/VMF
1675 7th Street
Oakland, California**

Well Name	Sample Date	Total Petroleum Hydrocarbons as		Benzene µg/l	Toluene µg/l	Ethyl- Benzene µg/l	Xylenes µg/l
		Gasoline µg/l	Diesel µg/l				
MW-4	9/93	< 50	580	< 0.5	< 0.5	< 0.5	< 0.5
	1/26/94	< 50	850	0.7	< 0.5	< 0.5	< 0.5
	1/26/94	< 50	450	0.8	< 0.5	< 0.5	< 0.5
	3/94	< 50	< 50	< 0.5	< 0.5	< 0.5	< 0.5
	6/94	< 50	250	1.6	< 0.5	< 0.5	< 0.5
	6/94	< 50	260	1.7	< 0.5	< 0.5	< 0.5
	2/22/95	140 ***	1,100 *	1.4	< 0.5	< 0.5	< 0.5
	2/22/95 (Dup)	130 ***	1,000 *	1.1	< 0.5	< 0.5	< 0.5
	6/6/95	1,400 ****	19,000	< 0.5	< 0.5	0.5	< 0.5
	6/6/95 (Dup)	24,000****	23,000	< 0.5	< 0.5	< 0.5	< 0.5
	8/16/95	1,200	3,400	1.2	< 0.5	0.9	< 0.5
	8/16/95 (Dup)	2,000	3,000	1.2	< 0.5	1.0	0.8
	11/14/95	730****	4,200	< 0.5	< 0.5	< 0.5	< 0.5
	11/14/95 (Dup)	950	7,400	< 0.5	< 0.5	< 0.5	< 0.5
	5/16/96	< 50	2,000	< 0.5	< 0.5	< 0.5	< 1.0
	5/16/96 (Dup)	< 50	2,000	< 0.5	< 0.5	< 0.5	< 1.0
	11/15/96	330	8,100	0.78	< 0.5	0.76	< 1.0
11/15/96 (Dup)	600	13,000	0.74	< 0.5	0.94	< 1.0	
MW-5	9/93	< 50	< 50	< 0.5	< 0.5	< 0.5	< 0.5
	1/26/94	< 50	< 50	< 0.5	< 0.5	< 0.5	< 0.5
	3/94	< 50	< 50	< 0.5	< 0.5	< 0.5	< 0.5
	6/94	< 50	< 50	< 0.5	< 0.5	< 0.5	< 0.5

Well Abandoned - January 1995

Notes:

- µg/l Micograms per liter (equivalent to parts per billion)
- < 1.0 Not detected at indicated reporting limit
- * The laboratory interpreted the result as a heavier hydrocarbon than diesel
- ** A non-standard diesel pattern was observed
- *** A non-standard gasoline pattern was observed
- **** The laboratory interpreted the result as a heavier hydrocarbon than gasoline
- Dup Duplicate sample
- NA Not analyzed

Table 3. Comparison of Groundwater Concentrations to MCLs
 United States Postal Service - GMF/VMF
 1675 7th Street
 Oakland, California

Water Screening Concentrations			
Analyte	Maximum Conc. ^a (ug/l)	Federal MCL ^b (ug/l)	State MCL ^b (ug/l)
TPHg	465	NA	NA
TPHd	10,550	NA	NA
Benzene	0.76	5	1
Ethylbenzene	0.85	700	700
Toluene	ND	1000	150
<u>Xylenes</u>	ND	10,000	1750

- MCL Maximum contaminant level.
- ug/l Micrograms per liter.
- TPHg Total petroleum hydrocarbons as gasoline.
- TPHd Total petroleum hydrocarbons as diesel.
- NA Not available.
- ND Not detected.


^a Concentrations are the average of pairs of duplicates obtained from MW-4 on 11/15/96 (Table 2)
^b From: EPA, 1996c; Cal/EPA, 1994.
^c Risk-based screening level (10⁻⁶ risk level for carcinogens). Adjusted for California. From: ASTM, 1995.
^d Selected risk level is not exceeded for all possible dissolved levels.

Table 4. Comparison of Soil Concentrations to Screening Concentrations
 United States Postal Service - GMF/VMF
 1675 7th Street
 Oakland, California

Analyte	Soil Screening Concentrations				
	Maximum Conc. ^a (mg/kg)	EPA Region IX Industrial PRG ^b			
		IX Industrial PRG ^b (mg/kg)	Volatilization to Outdoor Air (mg/kg)	ASTM-RBCA Tier 1 RBSLs ^c - Commercial	
			Volatilization to Indoor Air (mg/kg)	Volatilization to Direct exposure (mg/kg)	
Benzene	0.15	1.4	1.33 ^d	0.03 ^e	29 ^d
Ethylbenzene	2.1	230 ^e	f	1100	11,500
Toluene	0.35	880 ^e	f	54.5	18,700
<u>Xylenes</u>	13	320 ^e	f	f	208,000

mg/kg Milligrams per kilogram.

NA Not available.

 Maximum detected soil concentration exceeds screening concentration.

^a Geo/Resources, 1993.

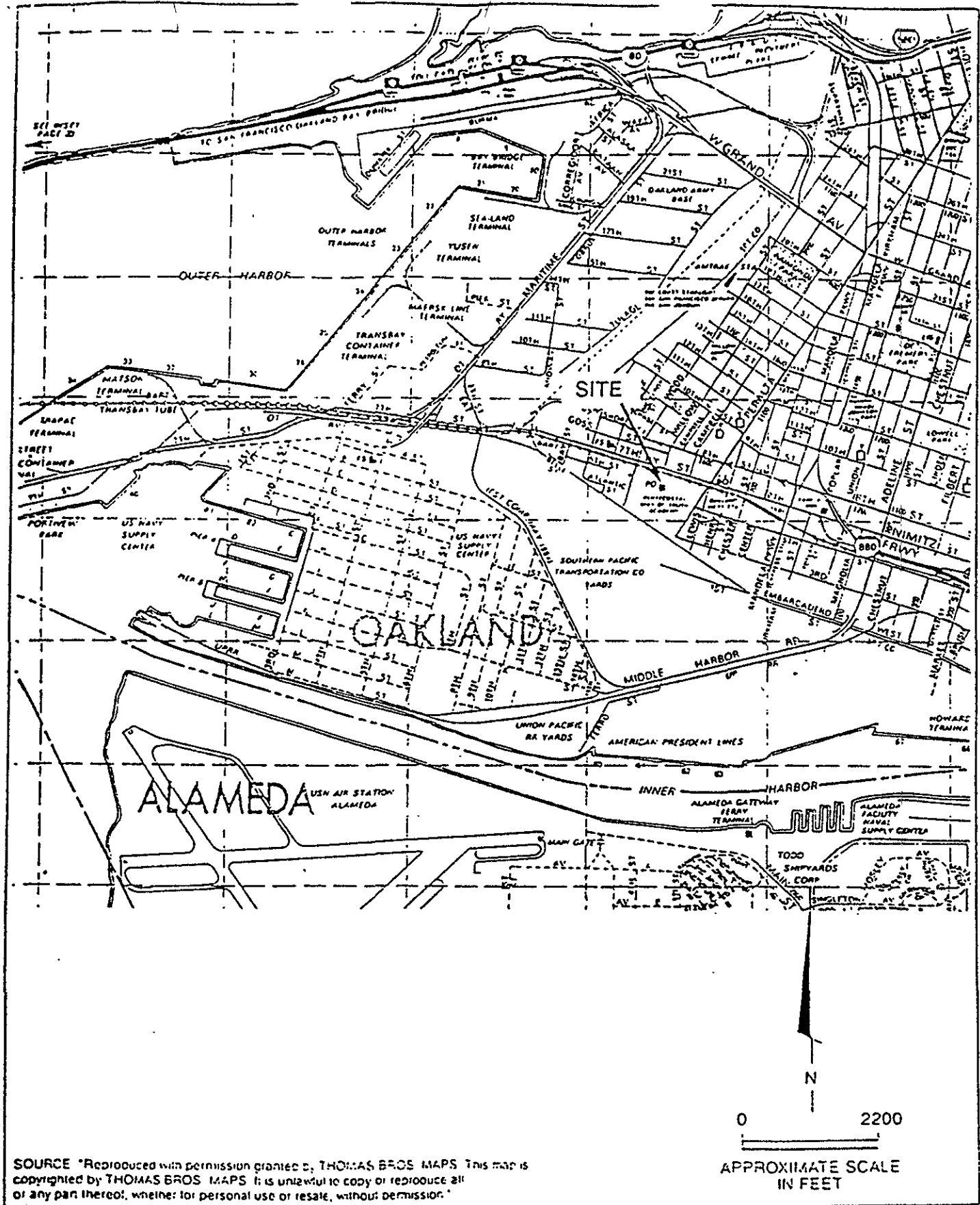
^b Preliminary remediation goals. From: EPA, 1996b.

^c Risk-based screening level. From: ASTM, 1995.

^d Adjusted using California-EPA cancer slope factor and provided for 10⁻⁵ target risk.

^e Saturation concentration.

^f Selected risk level is not exceeded for pure compound present at any concentration.

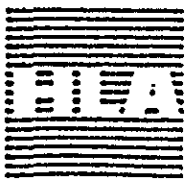


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APPROXIMATE SCALE IN FEET

FIGURE

1



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Engineering and
Environmental Services

Vicinity Map
USPS Oakland GMF/VMF
Oakland, California

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
LFD	30615 002	GAI	3/95	



RECEIVED
FEB 23 1998

February 23, 1998

Larry Seto
Alameda County Dept. Of Environmental Health
1131 Harbor Parkway, Suite 250
Alameda, CA 94502-6577

**Subject: United States Postal Service - GMF/VMF
1675 Seventh Street, Oakland, CA**

Dear Mr. Seto:

Attached please find a copy of the report and cover letter sent to Jennifer Eberle, regarding results of the risk assessment performed for the subject site in June 1997. Based on the analysis performed, the USPS requests closure.

If you should have any questions, please call me at the number listed below, or Mr. Gary Lieberman of Harding Lawson Associates, at 415/884-3158.

Sincerely,

A handwritten signature in black ink, appearing to read "Kayode F. Kadara".

Kayode F. Kadara
Environmental Programs Manager

Attachment

cc. Thomas Bourdon (USPS) w/o attachments
Tom Peacock (Alameda County)



June 23, 1997

Jennifer Eberle
Hazardous Materials Specialist
Alameda County Dept. of Environmental Health
1131 Harbor Parkway, Suite 250
Alameda, CA 94502-6577

Subject: United States Postal Service - GMF/VMF
1675 Seventh Street, Oakland, CA

Dear Ms. Eberle:

The United States Postal Service retained the services of Harding Lawson Associates (HLA) to compile chemical data and perform a risk assessment for the subject site. The analysis indicates that no risk-based remediation is necessary and case closure is recommended. A copy of the report detailing the analysis performed, is enclosed for your review.

If you should have any questions, please call me at the number listed below, or Mr. Gary Lieberman of HLA at 415/884-3158.

Sincerely,

A handwritten signature in black ink, appearing to read "Kayode F. Kadara".

Kayode F. Kadara
Facilities Environmental Specialist

Encl.

cc. Thomas Bourdon, USPS
Gary Lieberman, HLA (w/o attachment)

Harding Lawson Associates

U.S. POSTAL SERVICE
POSTAL SERVICE OFFICE
SAN BRUNO, CA 94099-0300



97 JUN 24 AM 10:45

June 18, 1997

36843 020

Mr. Kayode Kadara
U.S. Postal Service FSO
850 Cherry Avenue
San Bruno, California 94099-4120

Request for Site Closure
United States Postal Service - GMF/VMF
1675 7th Street
Oakland, California

Dear Mr. Kadara:

This letter presents the U.S. Postal Services' (USPS) request for site closure at the USPS facility, 1675 7th Street, Oakland, California, (Site; Plate 1). Work was conducted on behalf of the USPS by Harding Lawson Associates (HLA) and in accordance with a request from the Alameda County Department of Environmental Health (ACDEH) to perform a well search, chemical data compilation, and a risk assessment to evaluate and assess whether site closure is justifiable.

BACKGROUND

In November 1991, Geo/Resources Consultants, Inc. (GRC), observed the removal of two 10,000-gallon diesel underground storage tanks (USTs), one 5,000-gallon gasoline UST, one 750-gallon waste oil UST, and associated product piping from the site. Plate 2 presents the former locations of the USTs. Ten soil samples were collected from the four tank excavations by R. S. Eagan Company (EAGAN) and analyzed for the respective contents of each tank. Laboratory analytical results indicate that elevated levels of total petroleum hydrocarbons as gasoline (TPHg), diesel (TPHd) and benzene, toluene, ethylbenzene and xylenes (BTEX) were present in samples collected from below the tanks and the product piping. TPHg, TPHd and BTEX were detected at maximum concentrations of 2,500, 130, and 170 milligrams per kilogram (mg/kg) respectively (GRC, 1993).

In June 1992, an additional 10,000 gallon diesel UST was removed from an area near the northwest corner of the main facility (Plate 2). Soil and groundwater samples were subsequently collected from the excavation. Results of soil samples collected from the excavation sidewalls did not detect petroleum hydrocarbons above their respective detection limits. TPHd, benzene, and xylenes were detected in groundwater samples collected from the excavation at concentrations of 72,000, 3.8 and 12 micrograms per liter ($\mu\text{g}/\text{l}$) respectively. The ACDEH subsequently requested that a groundwater investigation be conducted at the site based on the elevated concentrations of petroleum hydrocarbons detected in soil during the tank removal. Additionally, the ACDEH indicated that remaining soil contamination in the area of the two former 10,000-gallon diesel USTs and piping be further evaluated (GRC, 1992).



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It is HLA's understanding, that in summer 1992, the remaining impacted soil in the vicinity of the two former diesel USTs was removed from the site and that the results of the investigation were presented in *Supplemental Observation Letter, Underground Storage Tank (UST) Program, U.S. Postal Service Vehicle Maintenance Facility, Oakland, California* dated September 17, 1992.

In September 1993, GRC performed a subsurface investigation which included the drilling of nine soil borings, conversion of five of the borings to groundwater monitoring wells (MW-1 through MW-5) and collection of soil and groundwater samples. Results of this investigation were presented in *Subsurface Site Investigation, United States Postal Service General Mail Facility/Vehicle Maintenance Facility, 1675 7th Street, Oakland, California*, dated October 1993 (GRC, 1993). Soil samples collected from the borings indicated that petroleum hydrocarbons were detected in borings installed in the vicinity of the former gasoline UST (boring MW-2), former fuel dispensing island (boring MW-4) and the former 10,000 gallon diesel USTs (boring B-8). Sample analytical results are summarized as follows:

- TPHg was detected in borings MW-4 and B-8 at concentrations of 53 and 180 mg/kg respectively
- TPHd was detected in borings MW-4 and B-8 at concentrations of 2,400 and 84 mg/kg respectively
- Benzene was detected in borings MW-2 and B-8 at concentrations of 0.04 and 0.15 mg/kg respectively
- Toluene was detected in boring B-8 at a concentration of 0.35 mg/kg
- Ethylbenzene was detected in boring B-8 at a concentration of 2.1mg/kg
- Xylenes were detected in borings MW-4 and B-8 at concentrations of 0.087 and 13 mg/kg respectively.

No other petroleum hydrocarbon constituents were detected in soil samples collected from the borings. Table 1 presents soil sample results from the investigation.

Groundwater samples were also collected from the monitoring wells; TPHd was detected in well MW-4 at a concentration of 580 µg/l. Petroleum hydrocarbons were not detected in any of the other groundwater samples during the subsurface investigation. Table 2 presents groundwater sample results from the investigation and includes subsequent results of the quarterly monitoring program.

Quarterly groundwater monitoring at the site was initiated in January 1994. In January 1995, in response to the construction of Interstate 880 in the vicinity of the site, the ACDEH approved the abandonment of well MW-5. Well MW-5, located up-gradient of the release area, had been non-detect for petroleum hydrocarbon constituents since its installation. HLA took over the monitoring program in February 1995. In March 1996, after the completion of one year of monitoring by HLA, the ACDEH approved the discontinuation of the analysis of TPHg and BTEX in wells MW-1 through MW-3 and also reduced the sampling frequency to biannual. The last monitoring event was performed in November 1996. Petroleum hydrocarbon constituents continued to be detected in wells MW-1, MW-3, and MW-4 with the highest concentrations continuing to present in well MW-4.

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During November 1996, TPHg, TPHd, benzene and ethylbenzene were detected in well MW-4 at concentrations of 600, 13,000, 0.78 and, 0.94 µg/l respectively. Table 2 presents historical results of the groundwater monitoring program at the site.

Site Hydrogeology

The subsurface investigations performed by GRC at the site indicate that the site is underlain by medium dense to dense silty sand, clayey sand, and sand to 21 feet below ground surface (bgs), the maximum depth explored at the site. Review of the boring logs indicate that groundwater was encountered in borings at a depth of approximately 9 to 11 feet bgs and stabilized at depths between approximately 3.6 and 5.0 feet during the 1993 subsurface investigation. Subsequent monitoring events indicate that depth to groundwater at the site has decreased to depths between 9.5 and 11 feet bgs. Groundwater flow at the site has consistently been to the southwest.

WELL SEARCH

As requested by the ACDEH, a well search of registered wells within a 1,000 foot radius of the site was performed by HLA. HLA reviewed Department of Water Resources files and the well database of the Alameda County Water Resources District (ACWRD) to conduct the survey. According to DWR files and the ACWRD database no water production/supply wells are located within a 1,000 foot radius of the site; however, there are 11 monitoring wells within the 1,000 foot radius of the site. The closest monitoring wells are approximately 500 feet northwest of the site at 1755 7th Street. Based on these findings, there do not appear to be any current exposure points or health risks associated with groundwater supply wells.

SCREENING HUMAN HEALTH RISK ASSESSMENT

This section presents a screening human health risk assessment (SHHRA) that was conducted to evaluate possible impacts on human health from petroleum hydrocarbons detected in subsurface soil and groundwater at the USPS site. As requested by the Alameda County Department of Environmental Health, the risk assessment is conducted on the basis of Tier 1 of the Risk-Based Corrective Action (RBCA) approach developed by the American Society of Testing and Materials in *Standard Guide for Risk-Based Corrective Action Applied at Petroleum Release Sites (ASTM, 1995)*. RBCA is not a risk assessment *per se*, but a 3-tiered, risk-based site investigation that may or may not include a quantitative risk assessment. Tiers 1 and 2 are screening steps in which chemical concentrations detected at the site are compared to risk-based screening levels, Tier 1 Risk Based Screening Levels (RBSLs) being the least site-specific, but most conservative (i.e., lowest) and health-protective. If maximum detected soil and/or groundwater concentrations are lower than Tier 1 screening levels, the site is considered unlikely to pose a human health risk.

Data Evaluation

Analytical data for subsurface soil and groundwater are summarized in Tables 1 and 2. Soil data used for the SHHRA were obtained by GRC in 1993. Twenty-five soil samples at depths ranging from 2.5 to 11.5 feet below ground surface (bgs) were collected from nine soil borings. Samples were analyzed for TPHd, TPHg, and BTEX, which were detected in only 3 samples. Polycyclic aromatic hydrocarbons (PAHs) were not analyzed. Analytes were detected in soil at monitoring well MW-4 at 3 to 3.5 feet below ground surface (bgs) (i.e., TPHd, TPHg, and xylenes at 2,400, 53, and 0.087 mg/kg, respectively), the location adjacent to a former diesel fuel dispensing island where analytes were also detected in groundwater, and at 6 to 9.5 feet bgs at boring B-8 (i.e., BTEX at concentrations ranging from 0.15 mg/kg for benzene to 13 mg/kg for xylenes, and TPHd and TPHg at 84 and 180 mg/kg, respectively), which is adjacent to a fuel line and two former UST locations. The maximum BTEX concentrations, which were detected at 6 to 6.5 feet bgs at boring B-8, are provided in Table 1. Due to natural attenuation processes such as volatilization to ambient air and biodegradation by naturally occurring soil organisms, concentrations of these compounds in soil, especially the volatile BTEX, are likely to have substantially decreased since 1993, when soil sampling was conducted. Therefore, it is conservative (i.e., health-protective) to evaluate the concentration data collected in 1993.

In ASTM guidance, the volatile fraction of TPH is evaluated as detected BTEX compounds and the PAH naphthalene. The non-volatile fraction, represented by the PAH benzo(a)pyrene, was not evaluated due to a lack of analytical data. Although PAHs were not analyzed in soil at the site, these constituents are not expected to be of concern on the basis of their relatively low concentrations in diesel.

Groundwater Risk Evaluation

TPH and BTEX data used in the SHHRA were obtained by GRC and HLA. In quarterly groundwater monitoring conducted from September 1993 through November 1996, TPH was detected in 4 of 5 monitoring wells and BTEX were not detected, except at monitoring well MW-3 and MW-4. In the November 1996 monitoring event, benzene and ethylbenzene were detected at MW-4; the concentrations evaluated in the SHHRA are averages of paired duplicate results (Table 2). As shown in Table 3, the maximum detected concentrations of benzene and ethylbenzene were below federal and State Maximum Contaminant Levels (MCLs). On the basis of this result, chemicals detected in groundwater are considered unlikely to pose a human health threat and groundwater is unlikely to require remediation. Therefore, groundwater was not further evaluated in this SHHRA.

Tier 1 RBCA Evaluation of Soil

Tier 1 of the ASTM-RBCA method is conservative and, while not as site-specific as Tier 2, is adapted to likely exposure conditions at the site. In Tier 1, maximum detected concentrations of indicator chemicals detected in soil at the site are compared to RBSLs. RBSLs are health-based chemical concentrations in soil, at and below which adverse noncancer health effects or a significant incremental cancer risk are not expected to occur in exposed human receptors. Depending on the routes by which receptors could be exposed to a chemical, RBSLs may correspond to one or more exposure pathways such as soil ingestion, dermal contact with soil, and inhalation exposure to vapors migrating from soil.

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The USPS site is located in a predominantly commercial and industrial area. The site, which is currently in use as a vehicle maintenance facility, is paved and occupied by one building and a fuel dispensing island. Site use is not anticipated to change and residential development is unlikely. Although there are no known plans for construction at the site at present, future construction is a possibility. Therefore, both commercial and construction worker receptors were considered to be potentially exposed to chemicals in soil at the site and were evaluated in the SHHRA. Both receptors are considered "commercial" in the ASTM-RBCA approach, and commercial RBSLs apply to both.

Potential complete exposure pathways for these receptors were identified by considering potential environmental fate and transport of the chemicals in soil, and routes by which receptors could be exposed. BTEX, having relatively high vapor pressures and Henry constants, may volatilize through the soil column to ambient air, where they are dispersed as vapors.

Receptors at the site may be exposed to BTEX by inhaling vapors in air. It was conservatively assumed that future construction could place a structure at the location of maximum BTEX concentrations (i.e. soil boring B-8). The receptors were, therefore, assumed to be exposed to vapors in both indoor and outdoor air. Because the site is paved, receptors can only contact chemicals in soil under a construction scenario. Therefore, construction workers were also evaluated for direct exposure to soil.

To summarize, the following receptors and exposure pathways were identified for evaluation in the Tier 1 RBCA assessment:

- Commercial workers - inhalation of vapors migrating from soil to indoor air
- Commercial workers - inhalation of vapors migrating from soil to outdoor air
- Construction (i.e., commercial) workers - direct exposure to soil via ingestion and dermal contact.

Receptors were assumed to be exposed to vapor concentrations associated with the maximum soil concentration. This is highly conservative given that people are expected to move around a site, incurring exposure to only average concentrations over time.

For the Tier 1 analysis, conservative, ASTM default parameter values for soil (e.g., soil density and porosity, and area and depth of contaminants), air dispersion (e.g., wind speed and building volume), and exposure assumptions (e.g., soil ingestion rate, inhalation rate, and duration and frequency of exposure) were utilized. On the basis of State guidance, RBSLs for benzene were multiplied by 0.29 to account for the lower, more conservative cancer potency factor developed for benzene by Cal/EPA as compared to the EPA slope factor used by ASTM (*SFBRWQCB, 1996*).

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RBSLs for the selected receptor and pathways were compiled in Table 4. For benzene, the only carcinogen detected in soil at the site, RBSLs were compiled for the 10^{-5} risk level (i.e., one additional cancer case per 100,000 exposed people), which is generally considered "acceptable" for commercial worker receptors within California. In addition, EPA Region IX Preliminary Remediation Goals (PRGs) were compiled for the purposes of comparison. PRGs are conservative, risk-based soil concentrations developed for multipathway exposure to chemicals in soil (i.e., ingestion, dermal contact, and vapor inhalation). They are developed using generally the same toxicity values and conservative exposure assumptions as ASTM RBSLs.

SHRRA Results

As shown in Table 4, the Tier 1 RBSL for volatilization to enclosed spaces (i.e., indoor air) was exceeded by the maximum detected concentration of benzene. No other RBSLs (i.e., those for outdoor air exposure and direct soil exposure), and no PRGs, were exceeded. These results are not considered to imply that exposure to benzene vapors in indoor air at the site could be associated with human health risks. The Tier 1 RBCA evaluation is very conservative; as discussed above, almost all parameters used to develop RBSLs are default, not site-specific. The use of site-specific values for soil, surface, and building parameters to model benzene volatilization would result in higher RBSLs. The following factors make it unlikely that benzene in soil at the site poses a health risk:

- Tier 1 RBSLs are compared to maximum concentrations only, which assumes that receptors stay at one place onsite for 250 days per year over a 25-year exposure duration
- Benzene concentrations in soil are likely to have substantially reduced since sampling was conducted in 1993, as discussed above
- No structure is currently located over the location of maximum detected concentration, and there are no plans to construct such a structure in the future; exposure to benzene vapors in indoor air is, therefore, unlikely to occur
- EPA Region IX PRGs, which are conservative values that are developed to evaluate the vapor inhalation pathway (in addition to others), were not exceeded for benzene.

SUMMARY

Review of available GRC reports indicate that the majority of impacted soil associated with the UST and dispenser island releases has been removed. Results of boring soil samples indicate petroleum hydrocarbons were only present in three borings located in the vicinity of the former gasoline UST, former fuel dispensing island, and the former 10,000 gallon diesel USTs. Review of quarterly groundwater monitoring results indicate that the maximum detected concentrations of benzene and ethylbenzene (only detected in well MW-4) were below federal and state MCLs; and therefore unlikely to pose a human threat and groundwater is unlikely to require remediation.

↓
 and MW-3, 11-14-95

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On the basis of the results of the well search indicating that only monitoring wells are present within a 1,000 foot radius of the site and the screening human health risk assessment indicating that BTEX in soil at the site are not considered to pose a human health risk, it is HLA's recommendation that no risk-based remediation be completed and case closure be granted.

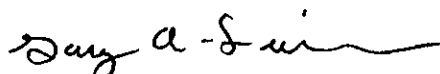
If you should have any questions please call Gary Lieberman at (415) 884-3158 or Rose Wood at (415) 884-3135.

Yours very truly,

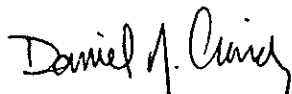
HARDING LAWSON ASSOCIATES



Rose Wood
Project Environmental Scientist



Gary A. Lieberman
Senior Geologist



Daniel J. Craig, R.G., H.G.
Associate Hydrogeologist

GAL/RW/DJC:mh/MH49102.LTR-USPS

Attachments: Table 1 - Summary of Analytical Results of Soil Samples
Table 2 - Summary of Analytical Results of Groundwater Samples
Table 3 - Comparison of Groundwater Concentrations to MCLs
Table 4 - Comparison of Soil Concentrations to Screening Concentrations
Plate 1 - Vicinity Map
Plate 2 - Site Plan

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REFERENCES

American Society of Testing and Materials (ASTM), 1995. *Standard Guide for Risk-Based Corrective Action Applied at Petroleum Release Sites*. E1739-95.

Department of Toxic Substances Control, Office of the Science Advisor 1992. *Supplemental Guidance for Human Health Multimedia Risk Assessment of Hazardous Waste Sites and Permitted Facilities*. July.

California Environmental Protection Agency (Cal/EPA), 1994a. *California Cancer Potency Factors: Update*. Office of Environmental Health Hazard Assessment. November 1.

Geo/Resources Consultants, Inc. (GRC), 1992. *Construction Observation of UST Activities, United States Postal Service, Oakland, Main Post Office, 1675 7th Street, Oakland, California*. April 23.

_____, 1993. *Subsurface Investigation, United States Postal Service General Mail Facility/Vehicle Maintenance Facility, 1675 7th Street., Oakland, California*. October 29.

California Environmental Protection Agency (Cal/EPA), 1994. *Summary of California Drinking Water Standards*. Department of Health Services. November 10.

San Francisco Bay Regional Water Quality Control Board (SFBRWQCB), 1996. *Regional Board Supplemental Instructions to State Water Board December 8, 1995, Interim Guidance on Required Cleanup at Low-Risk Fuel Sites*. Memorandum. January 5.

U.S. Environmental Protection Agency (EPA), 1996a. *Soil Screening Guidance: Technical Background Document*. PB96-963502. May.

_____, 1996b. *Region 9 Preliminary Remediation Goals (PRGs), 1996*. August 1.

_____, 1996c. *Federal Drinking Water Standards and Health Advisories Table*. Region IX. December.