RESULTS OF THE HYDROGEOLOGIC INVESTIGATION CONDUCTED AT THE MARKETPLACE/NIELSEN PROPERTIES THE MARTIN GROUP

SEPTEMBER 11, 1989

McLaren

3 wells
No tubes

September 11, 1989

Mr. Walter Kaczmarek
The Martin Group
6475 Christie Avenue, Suite 500
Emeryville, California 94608

Dear Mr. Kaczmarek:

RESULTS OF THE HYDROGEOLOGIC INVESTIGATION CONDUCTED AT THE MARKETPLACE/NIELSEN PROPERTIES, THE MARTIN GROUP

Enclosed herewith are the "Results of the Hydrogeologic Investigation Conducted at the Marketplace/Nielsen Properties". The results indicate that:

1. Metal levels are not substantially elevated in groundwater. X

2. Floating petroleum product was observed in Well W-5 and during the construction of Well W-15. This liquid substance is distinctly different in appearance from the asphalt-like-material previously reported in site soils in isolated locations and is believed to be of different origin.

3. Total dissolved solids and electrical conductivity are above levels considered suitable for drinking water. The groundwater at the Marketplace/Nielsen site is not extracted for any beneficial use.) Ho

These observations support the conclusions that:

1. There is no potential for human exposure via drinking water ingestion to chemicals measured in groundwater.

2. There is not significant hazard to aquatic life in the San Francisco Bay from migration of chemicals in groundwater.

980 Atlantic Avenue, Suite 100, Alameda, CA 94501 415.521.5200 FAX 415.521.1547

If you have any questions, please do not hesitate to call.

Sincerely,

Patrick Sheehan, PhD.
Supervising Toxicologist
ChemRisk

Julie S. Menack, RG
Supervising Geologist
McLaren

Enclosure

0824CDJ2

1. There is evidence of retail centers in/near the A 23,24
2. RWQCB requires non degradation policy — Site will need continual monitoring after some remedial work.
3. Need some surety, precaution statement for future UG work & disposal

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EXECUTIVE SUMMARY

In April, 1989, the Alameda County Department of Environmental Health (DEH) requested further characterization of current groundwater conditions at the Martin Group's Marketplace/Nielsen site (Figure 1). This investigation performed on behalf of the Martin Group was conducted to determine the extent of chemicals in groundwater on the Marketplace/ Nielsen site and to assess whether chemicals may be migrating from the site.

This investigation was conducted as proposed in McLaren Environmental Engineering's "Data Review and Work Plan to Conduct Further Groundwater Characterization at the Marketplace/Nielsen Properties" (Work Plan), August 9, 1989, and involved: 1) the construction of three groundwater monitor wells, 2) the sampling and analysis of groundwater from five existing wells and the three new wells, 3) surveying well and water table elevations, 4) review of agency files regarding adjacent sites, and 5) the interpretation of site geology, hydrogeology, and the distribution of chemicals in groundwater.

Based on data collected from both new and existing monitor wells, the following conclusions can be drawn regarding groundwater flow and chemical migration beneath the Marketplace/Nielsen site. Recommendations for further work are included under separate cover.

Groundwater Flow

- The predominant direction of groundwater flow across the site is to the southwest.
- The water yield for wells varies from very poor to fairly good yield due to localized variations in site geology.
- Wells now exist on the upgradient and downgradient portions of the site.

Chemical Distribution in Groundwater

- Elevated concentrations of metals are in general, not detected in groundwater across the site. There is no correlation between elevated concentrations of metals in soils and the level of metals in soils and the level of metals in groundwater.
- Naphthalene, a PNA compound, was detected in one upgradient well, Well W-8. No PNAs were detected in downgradient wells.
- Three inches of floating petroleum product was observed in upgradient Well W-5.
- A minor amount of floating product was observed in Well W-10 and was removed when the well was bailed dry.

- The upgradient and lateral extent of the floating product and occurrence has not been determined.

- Total petroleum hydrocarbons were observed for the first time in Well W-7 and were not observed in Well W-8 where they had been previously detected.

- Total dissolved solids (TDS) and electrical conductivity are above levels considered suitable for drinking water supply.

- The potential for upgradient contamination from other sites exists.

Potential Threat to Humans and Aquatic Life

- There is no potential for human exposure via drinking water ingestion to chemicals measured in groundwater.

- There is no significant hazard from the semi-volatile organic compounds or metals to the aquatic life of San Francisco Bay.

The results indicate that although there is floating product in wells W-5 and W-10, hydrocarbons have not as yet moved off-site. The results also indicate that the source of hydrocarbons could potentially be east of the site.

The fuel oil source has been identified as the asphalt refinery and associated tanks and lines that were in existence at the site between the early 1900s until the tanks were removed in 1965. The active source of petroleum hydrocarbons to the soil or groundwater was therefore mitigated when the refinery was dismantled and tanks removed.

The upgradient and downgradient extent of the floating product must be defined in groundwater to satisfy the RWQCB. McLaren recommends installation of an additional well downgradient of Well W-5 to determine the downgradient on-site extent and installation of an upgradient well (potentially on the Southern Pacific Railroad property) to determine the upgradient extent of floating product.

INTRODUCTION

SITE HISTORY

Marketplace Site

The northeast corner of the Marketplace site was occupied by the Paraffine Company in 1884. This company was involved in research and development of bituminous and petroleum-based products and may have also been involved in the refining of asphalt and kerosene. In 1902, the Paraffine Company began to manufacture roofing materials and refine asphalt for use in paints. The asphalt refinery was located in what is now the northeastern corner of the Marketplace property and southern portion of the Nielsen property and was dismantled prior to 1965. Asphalt was refined by removing the light hydrocarbon fractions from crude oil by a distillation process in the refinery area. The volatile fraction obtained during refining was pumped to the powerhouse and used as fuel. The resulting refined asphalt was then pumped to the roofing building where it was used to saturate the roofing felt material. The light fractions were used to fuel a powerhouse located on-site.

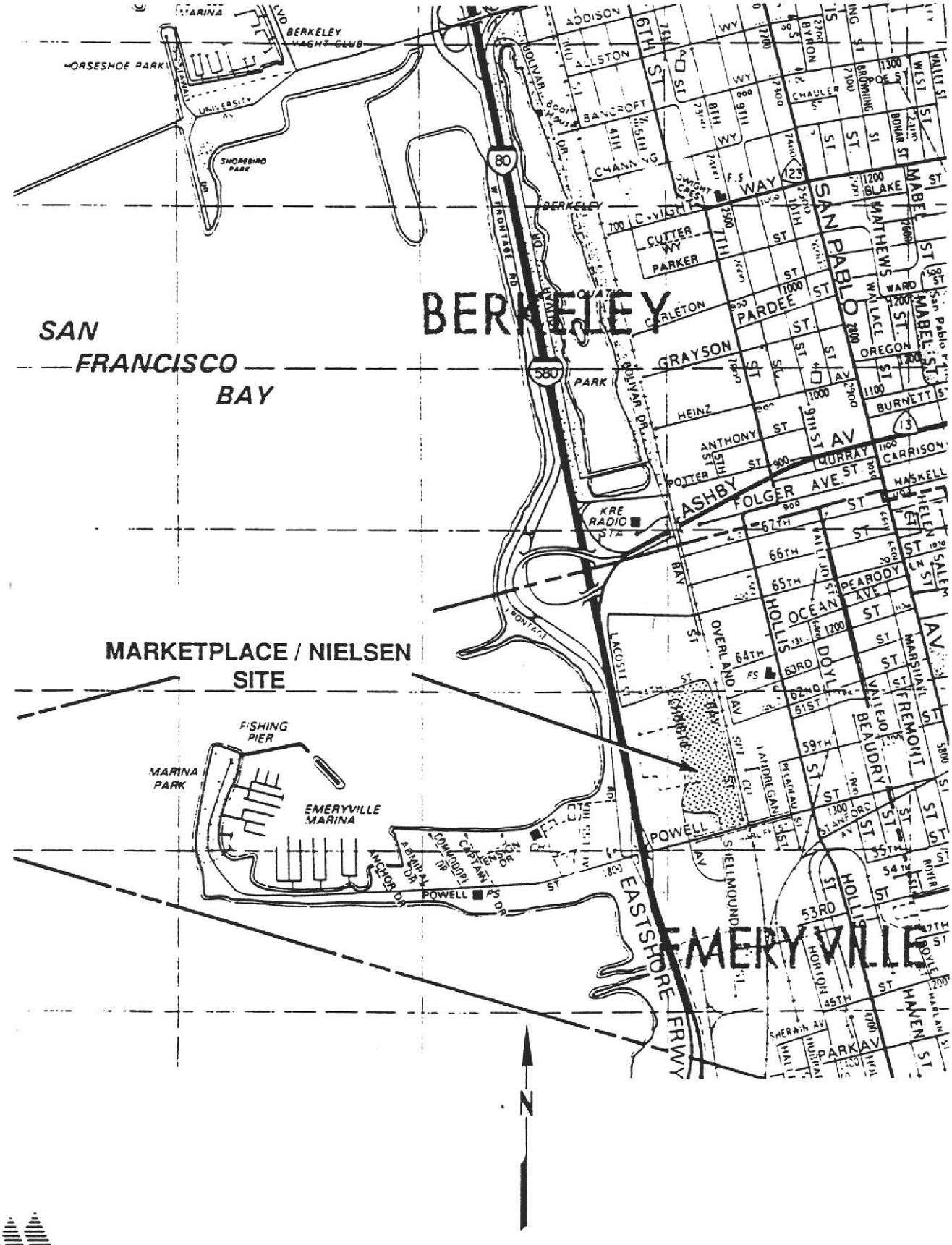
In 1920, the Paraffine Company changed its name to PABCO. In 1929, PABCO began manufacturing paints. By 1930, most of what is now the Marketplace property was covered with buildings. The two existing Marketplace buildings were used for storage and paint manufacturing. Paint mediums included linseed, oil, and synthetic toluene. Paint pigments included titanium oxide, lead, zinc oxide, zinc chromate, magnesium silicate, and barium sulfate. Three underground tank farms, each of which contained three to six concrete tanks were located immediately east of the Marketplace building. These tanks were used to store solvents used in paint manufacturing. A fourth tank farm containing four underground concrete tanks was located on the eastern property boundary immediately southeast of the former asphalt refinery and were used to store crude asphalt. When excavated, these tanks were found to contain asphaltic residue. A concrete tank was located in the extreme southeastern corner of the site.

In 1957, PABCO was purchased by Fiberboard Corporation. In 1964, Fiberboard began to divest its industries and by 1974, all structures except those currently existing were demolished. In 1975, the site was graded and construction of the existing Marketplace parcel lot was completed.

Nielsen Site

Early development of the former Nielsen Freight Lines site occurred contemporaneously with development of the Marketplace site. Between 1935 and 1937, the portion of the Nielsen site north of 63rd Street was filled.

FIGURE 1
SITE LOCATION MAP



The Nielsen site was part of the manufacturing operation at the Marketplace site, making roofing products and paint; at that time there were four large above ground storage tanks, a building, and a storage yard on the Nielsen property.

The Nielsen site was developed as a trucking facility in the 1960's. Several diesel, gasoline, and waste oil underground tanks were installed in the 1960's and solvents and degreasers were stored on the ground surface. Storage at the Nielsen site included, a 10,000-gallon gasoline storage tank and fueling manifold, a 10,000-gallon diesel tank and fueling manifold, a 500-gallon waste oil tank, a 500-gallon lube oil tank, and an antifreeze and motor oil drum storage area.

PREVIOUS GROUNDWATER INVESTIGATIONS

Marketplace Site

An environmental assessment of the Marketplace property was performed in 1982 by Woodward Clyde Associates (WCC, 1982). This investigation included drilling soil borings at 15 locations and the installation of four groundwater monitoring wells. The results of this investigation indicated the presence of a tarry substance in soils adjacent to the north end of the Marketplace building and east of the northern part of the building. Further investigation by Woodward Clyde (WCC, 1987) indicated that "black floating fluid" was encountered in Well W-5. The fluid was at that time characterized as "floating product". Later investigations by Earth Metrics (Earth Metrics, 1988) and Aqua Terra Technologies (ATT, 1988) characterized the material as a "hardened 'tar' like substance" or an "asphalt like material". The WCC report also indicated fuel weight hydrocarbons in the shallow fill and PNAs in groundwater in Well W-8, and tar paper materials in other subsurface locations including adjacent to Well W-7. The maximum depth of the asphaltic substance in soil was determined to be up to 7 feet as a result of additional soil borings by Earth Metrics in 1988 (Earth Metrics, 1988).

Nielsen Site

An environmental assessment of the Nielsen property was performed in 1987 by Woodward Clyde Associates (WCC, 1987) in conjunction with closure activities for on-site underground tanks, piping, and manifolds. During excavation activities, all soils containing greater than 100 ppm of fuel was removed and aerated on site in accordance with Bay Area Air Quality Management District guidelines. A total of eight groundwater monitoring wells were installed during these activities to determine the potential impact of these tanks and chemical use areas on groundwater. The wells were installed either upgradient or downgradient of chemical use areas.

EXTENT OF PRIOR GROUNDWATER SAMPLING AND ANALYSIS

Chemical analyses performed on all wells at the Marketplace/Nielsen site are summarized in Table 1. This table indicates the dates each well was sampled, the report in which the data was first presented, analytical method, and analytical laboratory.

Because these were separate properties with different use histories, a variety of chemical analyses were performed. Groundwater from all four wells at the Marketplace site had been sampled for priority pollutant metals. However, groundwater from only two wells, W-4 and W-12, had been analyzed for organic constituents. The groundwater in Well W-12 was analyzed for volatile organic compounds according to EPA Method 624 in 1982 (WCC, 1982), and groundwater in Wells W-4 and W-12 was analyzed for total semi-volatile organic compounds according to EPA Method 9020 in 1988 (Earth Metrics, 1988).

More complete data had been collected from the wells at the Nielsen site. These wells were all sampled when installed for priority pollutant metals and volatile organic compounds according to EPA Method 624. At the same time, groundwater from specific wells was analyzed for general minerals (wastewater), oil and grease according to EPA Method 418.1, total petroleum hydrocarbons according to EPA Method 8015, semi-volatile organic compounds according to EPA Method 625, halogenated volatile organic compounds according to EPA Method 601, or ethylene glycol by GC/FID. Additionally, groundwater from all Nielsen wells was analyzed for pH and specific conductivity during development (WCC, 1987).

REGIONAL HYDROGEOLOGY

The Marketplace and Nielsen properties (Figures 1 and 2) lie to the west of the Hayward fault on the Berkeley Alluvial Plain of the East Bay Plain Area. Uplift of bedrock on the eastern side of the fault occurred approximately 1 million years ago and resulted in the formation of the East Bay Hills to the east. The soils beneath the Emeryville area were deposited by streams as alluvium eroded from the hills and as tidal flat and tidal channel deposits of San Francisco Bay (Alameda Flood Control and Water Conservation District [ACFC and WCD], 1988). These native soils are referred to as the "Older Alluvium" and the "Bay Mud".

The Older Alluvium is a laterally continuous deposit comprised of layers of poorly consolidated clay, silt, sand, and gravel that directly overlie bedrock. The top of the Older Alluvium is approximately 20 to 25 feet below grade in the Emeryville area (ACFC and WCD, 1988). Groundwater within the Older Alluvium is semi-confined. Based on the variable composition and thickness of individual deposits within the Older Alluvium, hydraulic conductivities and yields of wells are highly variable and range from tens of gallons per minute (gpm) to over a thousand gpm (ACFC and WCD, 1988). This deposit is the major groundwater reservoir in

SUMMARY OF ANALYSES PERFORMED ON GROUNDWATER SAMPLES
FROM MARKETPLACE AND NIELSEN SITES

Well No.	Date	Report(g)	Lab Name	Metals	General Minerals	Semi-volatile Organics EPA 625	Total Semi-volatile Organics EPA 9020	Volatile Organics EPA 624	Halogenated Volatile Organics EPA 601	Ethylene Glycol GC/FID	Oil & Grease EPA 418.1	TPH EPA 8015
MARKETPLACE												
W-4(a)	1/20/81	WCC 1982	B&C(d)	X								
	12/1/87	EM 1988	FF(e)	X			X					
	8/14/89	This report	MC(h,i)	X		X						
W-5(a,b)	1/20/81	WCC 1982	B&C	X								
W-10(a)	1/20/81	WCC 1982	B&C	X								
	4/17/87	WCC 1987						X	X			
	8/17/89	This report	AAL(j,i)	X		X						
W-12(c)	1/20/81	WCC 1982	B&C	X				X				
	1/27/82	WCC 1982	B&C					X				
	12/1/87	EM 1988	FF	X			X					
W-13(k)	8/14/89	This report	MC(h,i)	X		X						
W-14(k)	8/14/89	This report	MC(h,i)	X		X						
W-15(k)	8/14/89	This report	MC(h,i)	X		X						
NIELSEN PROPERTY												
W-1(a)	4/14/87	WCC 1987	B&C	X	F(f)			X	X	X	X	X
		EM 1988	No Lab Data									
	8/14/89	This report	MC(h,i)	X		X						
W-2(c)	4/14/87	WCC 1987	B&C	X	F			X	X		X	X
		EM 1988	No Lab Data									X
W-3(c)	4/14/87	WCC 1987	B&C	X	X,F	X		X	X			
W-4(c)	4/14/87	WCC 1987	B&C	X	F			X	X		X	X
	12/1/87	EM 1988	ANAMETRIX			X		X				
W-5A(c)	4/16/87	WCC 1987	B&C	X	F			X				X
W-6A(c)	4/16/87	WCC 1987	B&C	X	F			X				X
		EM 1988	No Lab Data									X
W-7(a)	4/16/87	WCC 1987	B&C	X	X,F	X		X				
	8/14/89	This report	MC(h,i)	X		X						
W-8(a)	4/17/87	WCC 1987	B&C	X	F	X		X	X			
	8/14/89	This report	MC(h,i)	X		X						

(a) Existing well.
(b) Groundwater samples cannot be presently collected from this well as it is filled with asphaltic material.
(c) Well no longer exists.
(d) Brown and Caldwell Analytical Laboratory.
(e) Fireman's Fund Analytical Laboratory.
(f) "F" indicates that partial field tests were performed including pH and/or specific conductance.
(g) Refer to References for complete report name.
(h) McLaren Environmental Engineering Laboratory.
(i) Electrical conductivity, pH, TDS, and chloride analyses were also performed.
(j) Anlab Analytical Laboratory.
(k) New monitor well installed by McLaren Engineering.

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the East Bay Plain Area (ACFC and WCD, 1988). Groundwater within this deposit flows towards San Francisco Bay to the west (Earth Metrics, Inc., 1988).

Where present, the Bay Mud overlies the Older Alluvium. This unit is laterally continuous throughout the western portion of the Berkeley Alluvial Plan and ranges in thickness from less than 1 foot in inland areas to as much as 50 feet under the San Francisco Bay. In the Emeryville area, the Bay Mud occurs at approximately 5 to 10 feet below grade and is approximately 5 feet thick (ACFC and WCD, 1988). The Bay Mud is relatively impermeable and serves as a hydraulic barrier separating the Older Alluvium from overlying artificial "fill" material (described below). Groundwater within this deposit also flows towards San Francisco Bay to the west (Earth Metrics, Inc., 1987).

Artificial fill material overlies the native Bay Mud and Older Alluvium deposits over approximately one-third of the land area of Emeryville. The fill was imported and deposited in order to extend the shoreline of Emeryville (Earth Metrics, 1987). The thickness of the fill material ranges from approximately 1 to 15 feet. The composition of the fill material is highly variable. Clays, silts, sands, and gravels occur in varying thicknesses throughout the fill material. In addition, boring logs indicate the presence of construction debris (e.g., concrete blocks, wood, glass, plastic, tar paper, and metal) within the fill material.

The water table occurs within the artificial fill and is encountered at depths of 5 to 10 feet. The depth to the water table within the fill at certain locations in this area may vary in response to San Francisco Bay tides. At certain locations, there may be perched water zones within the fill due to the presence of impermeable layers of limited aerial extent. Groundwater in this material is unconfined and also flows to the southwest towards San Francisco Bay. Topographic control results in southwesterly groundwater flow in some portions of Emeryville.

HYDROGEOLOGIC INVESTIGATION

Previous soil and groundwater investigations at the Marketplace/Nielsen site were conducted between 1981 and 1987. These investigations indicated the presence of various organic compounds and metals in both soils and groundwater beneath the site. The results of these investigations are summarized in detail in McLaren's data review and work plan. The purpose of the current investigation is to: 1) further define the extent of chemicals in the groundwater and 2) characterize current groundwater conditions at the site. To accomplish these goals, three new groundwater monitor wells were constructed and groundwater from these and five existing wells was sampled and analyzed for: 1) semi-volatile organic compounds (SOCs), including a library search, using EPA Method 625, 2) priority pollutant metals (200 series) using various 7000 series EPA Methods, 3) total dissolved solids (TDS) and pH using EPA Method 9045, and 4) specific conductivity using EPA Method 9050. Volatile organic chemicals (VOCs) were not analyzed for because previous analyses indicated that VOCs are present in low concentrations. Petroleum hydrocarbons were not specifically analyzed for because wells previously sampled did not contain detectable concentrations of these constituents. However, the library search associated with the SOC analysis identified the concentration of C9 to C35 hydrocarbons.

CONSTRUCTION AND DEVELOPMENT OF GROUNDWATER MONITOR WELLS

Three additional groundwater monitor wells (Wells W-13, W-14, and W-15) were constructed to aid in further characterizing groundwater conditions at the site. Figure 2 is a site plan showing the locations of these wells in addition to pre-existing and abandoned groundwater monitor wells. Wells W-13 and W-14 were constructed in order to provide groundwater data on downgradient or western side of the site. Well W-15 was constructed to sample groundwater upgradient entering the site. Well W-15 was constructed in the vicinity of W-5, which cannot be sampled because it contains what appeared to be free petroleum product (product), previously described as an asphaltic material. W-15 was purposely screened through a deeper zone than W-5 in order to determine the quality of groundwater at this location.

Drilling logs showing construction details and soil lithology are given in Appendix A. Construction details for both the existing and new wells are summarized in Table 2. A detailed description of the construction and development of the new monitor wells is given below.

The boreholes for each of the new wells are 8 inches in diameter and were drilled using a hollow-stem auger rig. All drilling equipment was steam-cleaned prior to the drilling of each boring. The boreholes for the downgradient Wells W-13 and W-14 were drilled to a total depth of 11 feet. The borehole for Well W-15 was drilled to a depth of 23 feet. To prevent cross-contamination of soil zones in Well W-15 a steel conductor casing was placed to a depth of 8 feet prior to drilling to the bottom depth.

FIGURE 2
SITE PLAN SHOWING
LOCATION OF GROUNDWATER
MONITOR WELLS AND TRACES
OF GEOLOGIC CROSS-SECTION

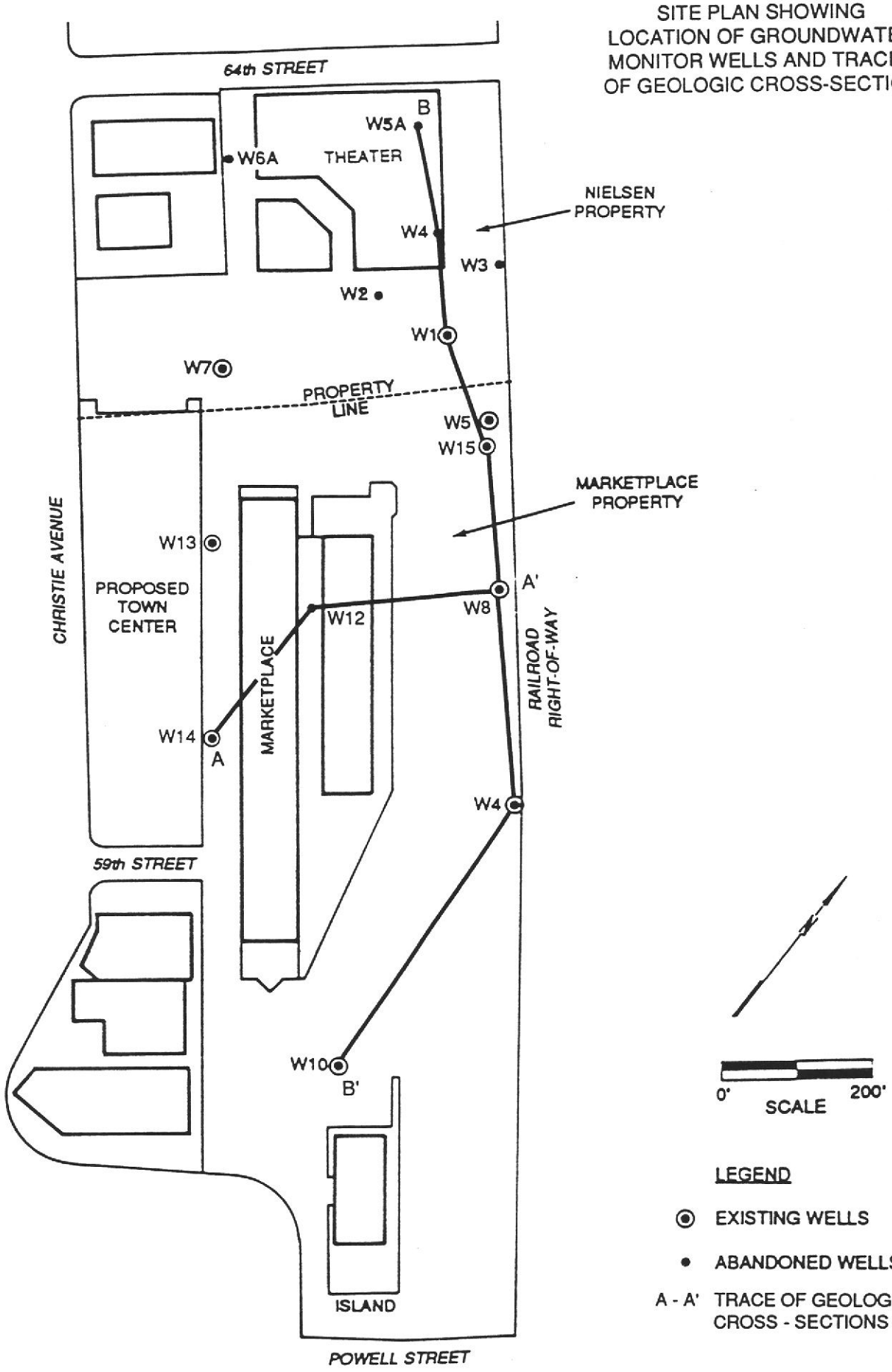

TABLE 2
GROUNDWATER MONITOR WELL CONSTRUCTION DETAILS
WATER TABLE DEPTHS AND ELEVATIONS AT THE
MARKETPLACE AND NIELSEN PROPERTIES

Well Description and Date of Completion	Depth of Boring (feet)	Borehole Diameter (inches)	Depth of Casing (feet)	Screened Interval (feet)	Top of Casing (feet)	Approximate Water Surface Elevations (feet)	Depth to Groundwater
Marketplace Property							
W-4 (8-4-81)	12.5	6	12.5	3-12.5	10.45	7.95[C]	2.55C
						8.65[G]	
					9.96[E]	6.01[F]	
W-5 (7-30-81)	14	6	14	3-14	12.15	9.65[C]	2.50[C]
						9.28[G]	
							11.41[E]
W-10 (8-4-81)	6.75	6	7.87	7.87	7.56	5.06[C]	2.50C
						4.96[G]	
					7.14[E]	3.56[F]	3.58[F]
W-12[B] (1-14-82)	12	6	12	3-12	10.35	6.0[C]	4.35C
						5.80[G]	
W-13 (8-9-89)	11	8	10	5-10	8.15[E]	3.51[F]	4.64[F]
W-14 (8-9-89)	11	8	10	5-10	7.97[E]	2.95[F]	5.02[F]
W-15 (8-9,10-89)	23	8	20	10-20	11.51[E]	8.08[F]	3.43[F]

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TABLE 2
GROUNDWATER MONITOR WELL CONSTRUCTION DETAILS
WATER TABLE DEPTHS AND ELEVATIONS AT THE
MARKETPLACE AND NIELSEN PROPERTIES
(continued)

Well Description and Date of Completion	Depth of Boring (feet)	Borehole Diameter (inches)	Depth of Casing (feet)	Screened Interval (feet)	Top of Casing (feet)	Water Surface Elevations (feet)	Depth to Groundwater
Nielsen Property							
W-1 (4-13-87)	13	8	13	3-13	11.47[E]	6.08[D] 5.87[F]	6[D] 5.60[F]
W-2[B] (4-15-87)	13.5	8	13.5	3.5-11.5	---	5.75[D]	5[D]
W-3[B] (4-14-87)	13.5	8	13.5	3.5-13.5	---	6.17[D]	6[D]
W-4[B] (4-14-87)	13	8	12.5	12.5	---	---	5.5[D]
W-5A[B] (4-9-87)	11.5	8	11	3.5-11	---	5.90[D]	6.5[D]
W-6A[B] (4-13-87)	14	8	14	3.5-13.5	---	8.80[D]	3.5[D]
W-7 (4-16-87)	12.5	8	12.5	2-12	9.05[E]	6.88[D] 5.46[F]	3[D] 3.59[F]
W-8 (4-17-87)	13	8	13	3-13	10.43[E]	6.88[D,F] 6.84[F]	5.5[D] 3.59[F]

A Unexplained discrepancy between depth of boring and existence of monitor well.
B Inaccessible or abandonment (Earth Metrics, 1987).
C Measurement taken January 18, 1982.
D Measurement taken May 6, 1987.
E Measurement taken August 18, 1989.
F Measurement taken August 20, 1989.
G Measurement taken March 27 and 28, 1985 (WCC, 1985).

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Soil samples for geologic characterization were continuously collected during drilling using an 18-inch long California Modified Split-Spoon sampler. Samples were collected by driving the sampler ahead of the auger bit using a 140-pound drop hammer. The soil samples were classified using the United States Department of Agriculture and the Unified Soil Classification Systems.

All of the new monitor wells were constructed of 2-inch I.D. PVC casing and 0.01-inch machine slotted PVC screen. The filter pack for these wells consists of 12/20 mesh silica sand and extends one foot above the screened interval of these new wells. A sanitary seal composed of neat cement was placed in the remaining annular space between the casing and the borehole. All of the new and existing wells were equipped with watertight locking caps. Like the existing wells, the new wells are equipped with vault boxes covered by traffic-rated lids.

The screen slot width used for the new wells was selected because the water in existing wells with 0.20 inch slots was turbid. This turbidity is probably the result of fine-grained sediments passing through the larger screen and sand pack of these wells. It is hoped that the finer sand pack and screen slot size will prevent this from occurring in the new wells.

The new wells were developed using a centrifugal pump to remove 10 casing volumes of water. All soils and fluids generated during drilling and well development were collected in 55-gallon drums. These drums are presently stored at the site, and the contents will be tested and disposed of.

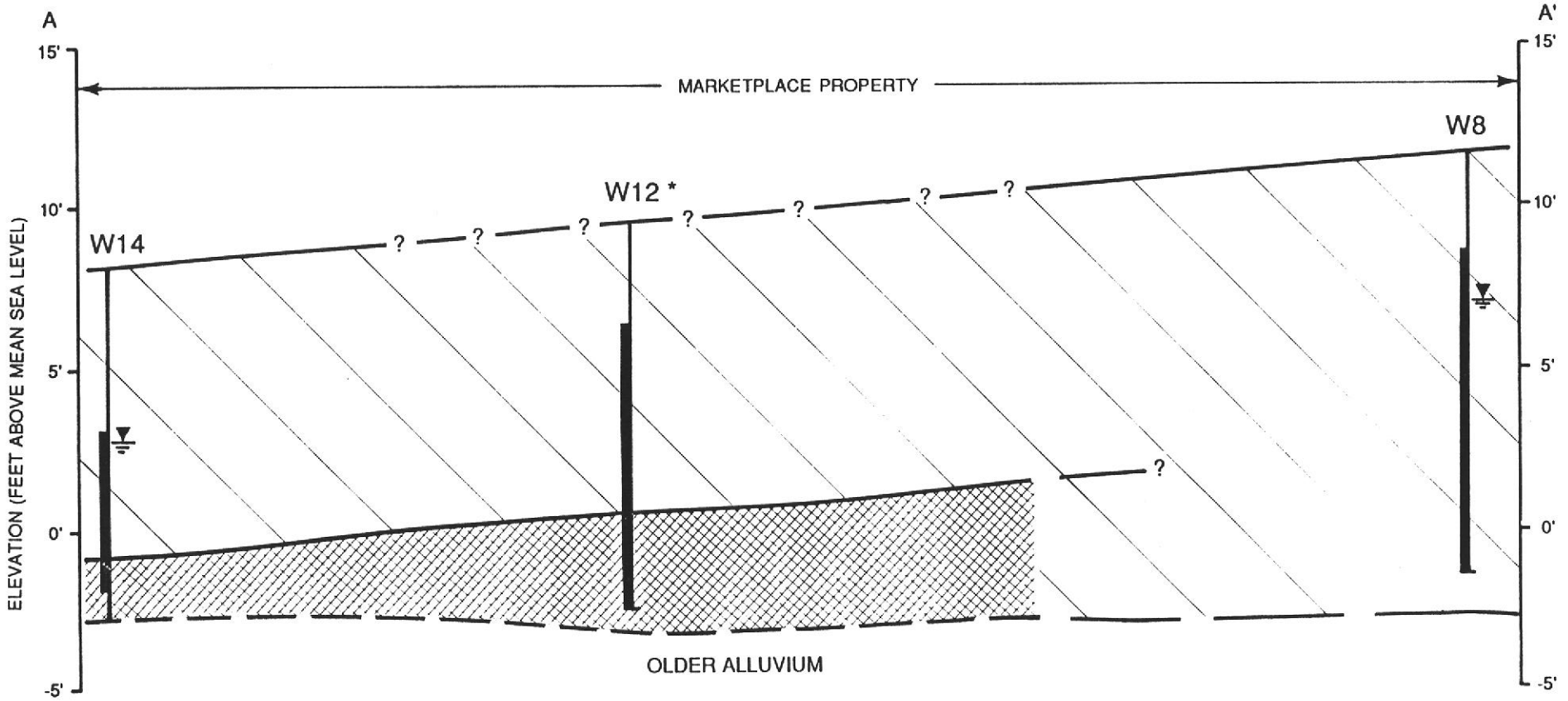
All wells, with the exception of Well W-10, were sampled using a peristaltic pump. A minimum of three casing volumes of water was removed from each well prior to sampling. Well W-10 was sampled using a disposable hand bailer because the first casing volume of water removed from this well contained product. Subsequent casing volumes of water removed from this well and the sample collected were free of product. Because Well W-10 was very slow to recharge, only one casing volume was removed prior to sampling. All wells recharged moderately quickly with the exception of Wells W-10 and W-14.

SITE GEOLOGY

In order to characterize the site geology, drilling logs from selected borings and data from a site topographic survey were used to construct geologic cross-sections (Figures 3 and 4). Cross-section A-A' (Figure 3) trends southwest to northeast and cross-section B-B' (Figure 4) trends approximately northwest to southeast.

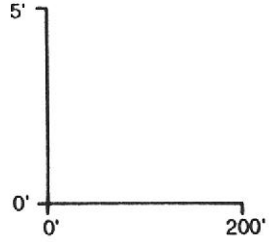
The cross-sections show that the Marketplace/Nielsen site is underlain by, in order of increasing depth below grade, artificial fill, the "Bay Mud", and the "Older Alluvium". Groundwater elevations are also shown on the cross-sections.

FIGURE 3
GEOLOGIC CROSS-SECTION A - A'



LEGEND

- ARTIFICIAL FILL
- BAY MUD
- WATER LEVEL 8/20/89
- ABANDONED MONITOR WELL
- SCREENED INTERVAL — MONITOR WELL



HORIZONTAL SCALE: 1" = 200'
VERTICAL SCALE: 1" = 5'
VERTICAL EXAGGERATION: 40 X

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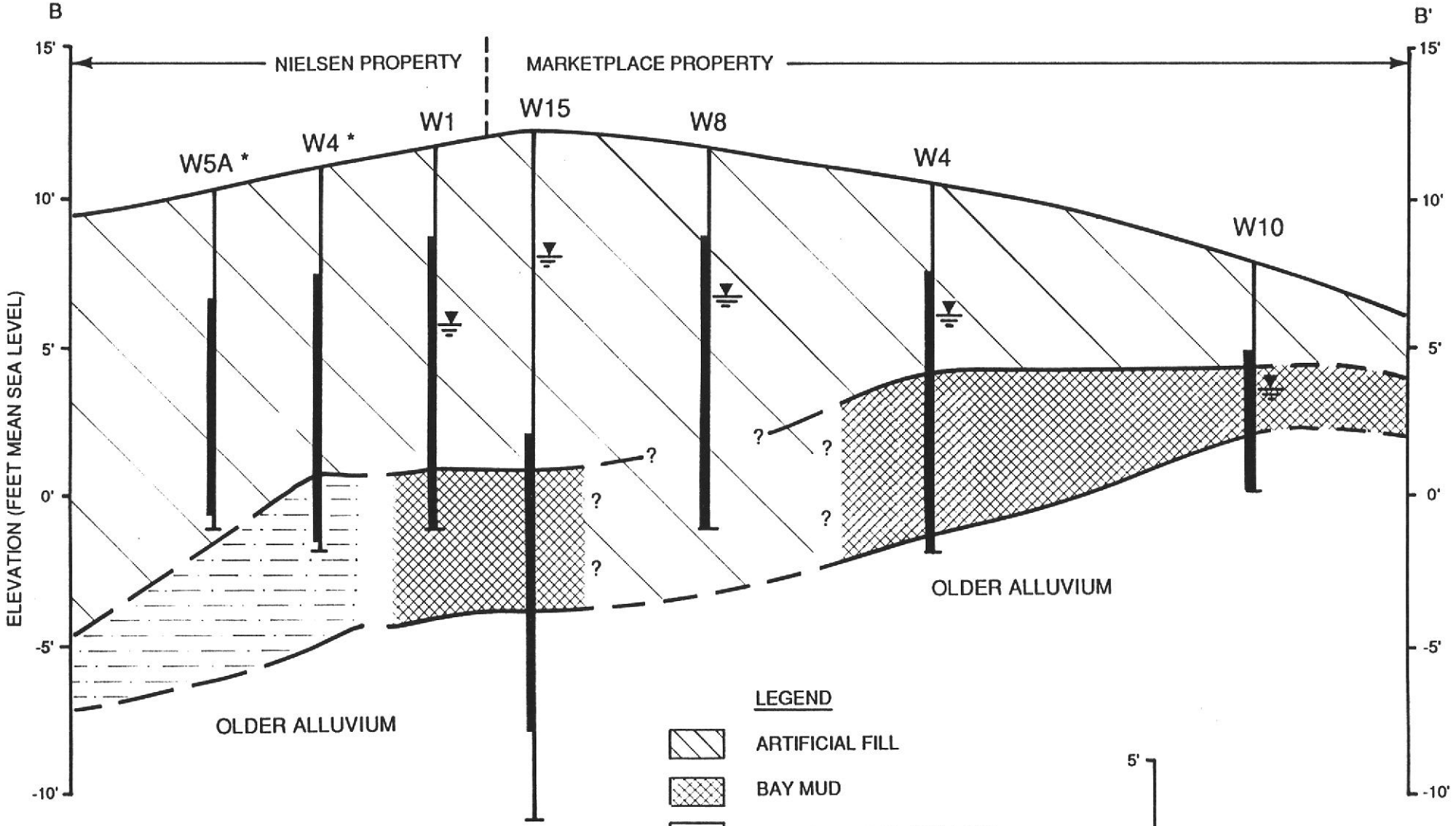
FIGURE 4
GEOLOGIC CROSS-SECTION B - B'



HORIZONTAL SCALE: 1" = 200'
VERTICAL SCALE: 1" = 5'
VERTICAL EXAGGERATION: 40 X

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The artificial fill is an unconsolidated, relatively uncompacted material comprised of gravels, sands, silts, and clays and also contains wood, brick, metal, plastic, glass, and tar paper construction debris. It has been imported and deposited since the late 1800s in order to extend the shoreline of Emeryville (Earth Metrics, 1988). It is thickest (approximately 15 feet) in the northwestern portion of the site and in the vicinity of monitor Well W-8. Both of these areas were cut by tidal channels and/or tidal pools in the mid-1800s (WCC, 1982). The artificial fill is thinnest (approximately three feet thick) beneath the southeastern portion of the site in the vicinity of Well W-10, and may be the reason for low well yield in this well.

Underlying the artificial fill under most of the site is an unconsolidated silty clay deposited by the San Francisco Bay called the Bay Mud. Where it occurs, the Bay Mud is approximately 2 to 5 feet thick. It is absent in areas where the tidal channels/pools once existed.

Underlying the Bay Mud and tidal channel/pool deposits is the Older Alluvium. This unit is unconsolidated and is comprised of materials that were eroded from the East Bay Hills and subsequently deposited by streams. This unit is highly variable in composition. It consists of gravels, sands, silts, and clays of varying thicknesses.

The recent drilling log from monitor Well W-15 indicates that product seeped into the borehole at the water table at 3 feet below grade. This is most likely the product that is three inches thick in Well W-5. This product seep was intentionally sealed from the well screen in Well W-15 by cement, so that a valid groundwater sample could be collected from that location. Although the product seep was sealed from Well W-15, a hydrocarbon substance was also observed within worm burrows at depths ranging from 9 to 24 feet below grade. Product was also observed when bailing Well W-10; it coated the bailer when the well was first bailed dry and did not enter the well again. Field observations from other wells installed at the Nielsen and Marketplace sites, including those installed by McLaren do not reveal evidence of this product at other locations.

SITE HYDROGEOLOGY

Groundwater elevations for all existing monitor wells, with the exception of Well W-5, were determined on August 20, 1989. The groundwater elevation in Well W-5 was not determined because this well contained product, previously reported as too thick to sample. Groundwater surface elevations with respect to mean sea level (MSL) and depths below grade are listed in Table 2.

The cross-sections show that groundwater is encountered between 3 and 6 feet below grade and that its upper boundary occurs within the artificial fill throughout most of the site. Groundwater within the artificial fill is unconfined; that is, its upper boundary is the local water table. The cross-sections also show that the water table approximates the surface topography; this is characteristic of unconfined, unconsolidated groundwater systems.

The water table occurs within the Bay Mud in Well W-10. Field observations indicate that this well was repeatedly bailed dry (was slow to recharge) during groundwater sampling. This is because the Bay Mud and the underlying materials through which W-10 is screened do not readily transmit groundwater. Because of its low hydraulic conductivity, the Bay Mud serves as a barrier impeding the exchange of groundwater between the overlying artificial fill and the underlying Older Alluvium.

Figure 5 is a water table elevation contour map and shows groundwater flow directions across the site. Groundwater flows perpendicular to these contours from areas of high water table elevation to areas of low water table elevation. The figure shows that the predominant direction of groundwater flow is towards the southwest. The slope of the water table, and hence the groundwater flow direction, roughly corresponds to the topography throughout the site.

A groundwater high point occurs in the vicinity of monitor Well W-15. The elevation of the product in monitor Well W-5 appears to be approximately at the same level as the groundwater in Well W-15 indicating that groundwater and product in this localized area may be locally perched within the fill. Because the groundwater elevation in Well W-15 and product elevation in Well W-5 may be indicative of different groundwater conditions, this data was not used to indicate the general groundwater flow direction across the site (Figure 5). It may be necessary to resurvey these wells to determine if these elevations are accurate.

Figure 5 shows that the slope of the water table or the hydraulic gradient is variable in both direction and magnitude. The variable magnitude of the hydraulic gradient indicates that the monitor wells are screened through vertical sections having different hydraulic conductivities. The curvature and broader spacing of the contours between Wells W-1 and W-13 is apparently due to the higher conductivity of the former tidal channel at that location. Groundwater preferentially enters the buried channel because it is composed of more permeable materials. The estimated hydraulic gradient adjacent to the tidal channels is estimated to be approximately 0.005 (approximately 25 feet per mile). The hydraulic gradient in the southern portion of the site is estimated to be approximately 0.009 (approximately 50 feet per mile).

SITE GROUNDWATER CONDITIONS

Groundwater conditions at the site have been monitored since 1981. A listing of analyses performed since 1981 was presented on Table 1.

Semi-volatile Organic Compounds and Hydrocarbons

Figure 6 shows the distribution of semi-volatile organic compounds (SOCs) and hydrocarbons in groundwater beneath the site. Table 3 lists the SOC concentrations detected at the site since 1981.

FIGURE 5
GROUNDWATER SURFACE ELEVATIONS AND FLOW DIRECTIONS WITHIN THE ARTIFICIAL FILL

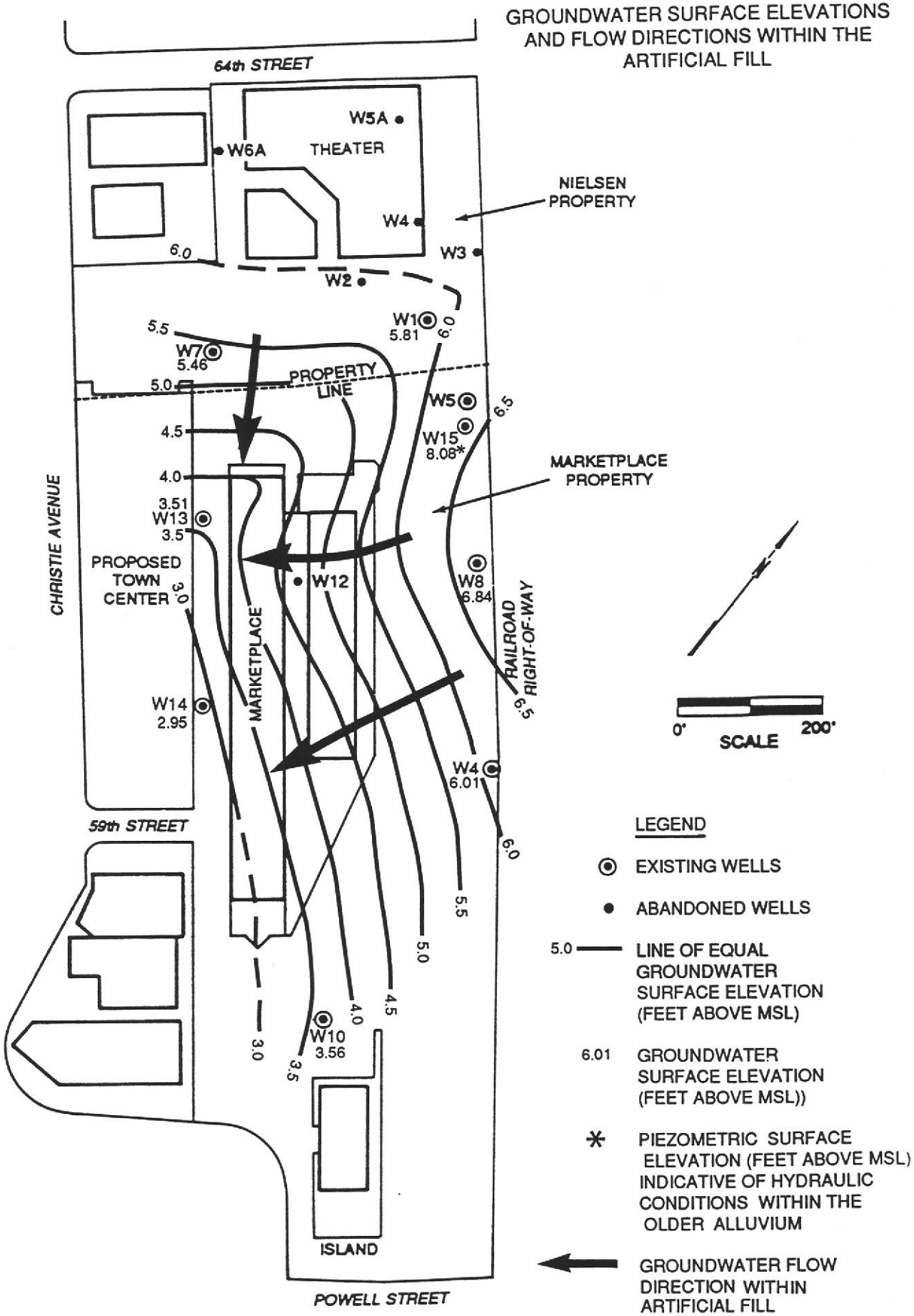

FIGURE 6
DISTRIBUTION OF SEMIVOLATIVE ORGANIC COMPOUNDS WITHIN THE ARTIFICIAL FILL

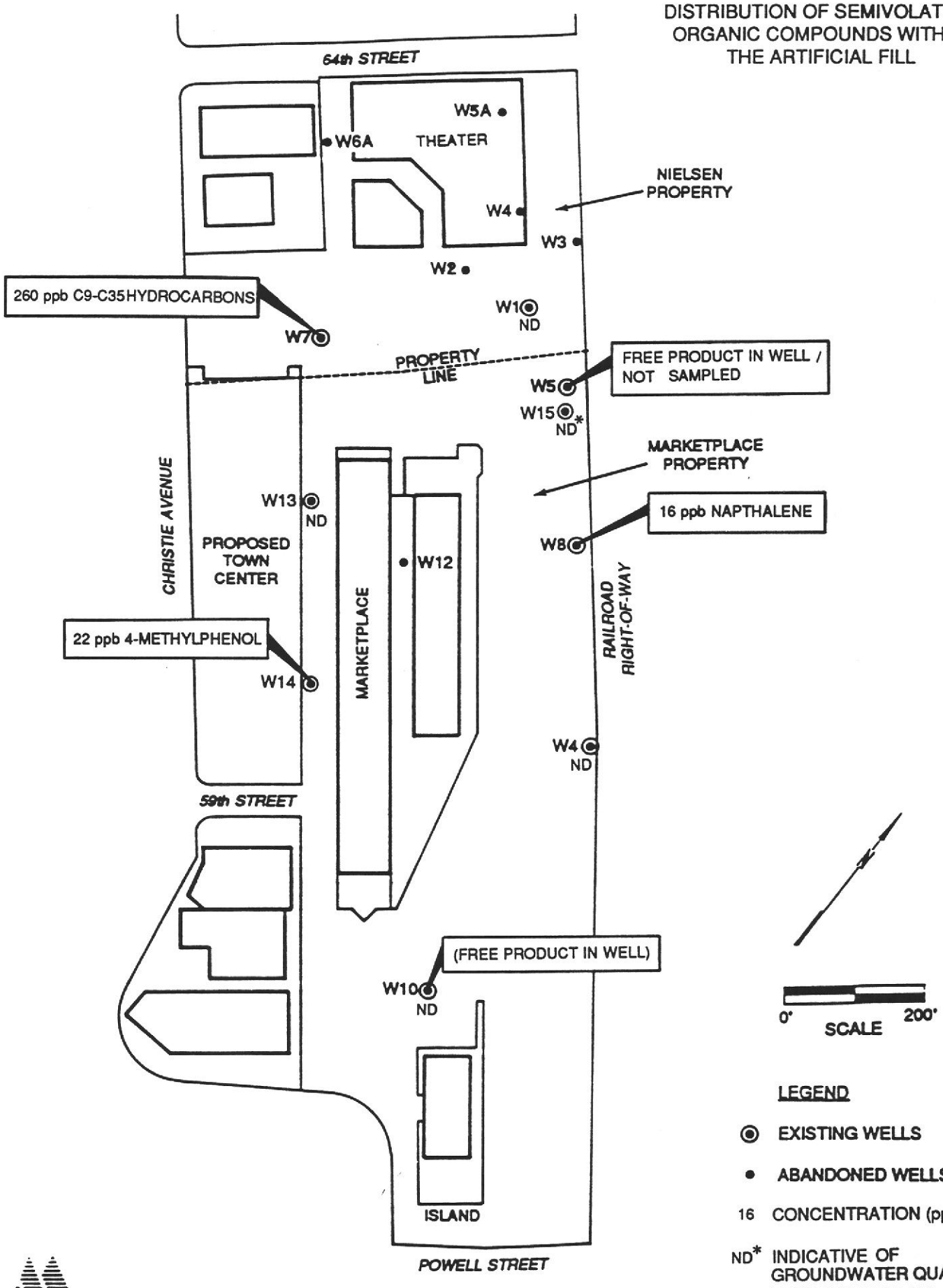

TABLE 3. SEMIVOLATILE ORGANICS IN GROUNDWATER SAMPLES FROM MARKETPLACE AND NIELSEN PROPERTIES (PPB).

Well No.	Date	Analytical Method	Total Semivolatile Organic Compounds	Other 625 Compounds	Acena-phthene	Benzo (a) Anthracene	Benzo (b) Fluoranthene	Benzo (k) Fluoranthene	Chrysene	Fluorene
Marketplace										
W-4	12/1/87	9020	97	NA	NA	NA	NA	NA	NA	NA
	8/14/89	625	NA	ND	<10	<10	<10	<10	<10	<10
W-10	8/17/89	625	NA	ND	<10	<10	<10	<10	<10	<10
W-12	12/1/87	9020	89	NA	NA	NA	NA	NA	NA	NA
W-13	8/14/89	625	NA	ND	<10	<10	<10	<10	<10	<10
W-14	8/14/89	625	NA	ND	<10	<10	<10	<10	<10	<10
W-15	8/14/89	625	NA	ND	<10	<10	<10	<10	<10	<10
Nielsen										
W-1	8/14/89	625	NA	ND	<10	<10	<10	<10	<10	<10
W-3	4/14/87	625	NA	ND	<2	<2	<2	<2	<2	<2
W-4	12/1/87	625	NA	ND	<2	<2	<2	<2	<2	<2
W-7	4/16/87	625	NA	ND	<2	<2	<2	<2	<2	<2
	8/14/89	625	NA	ND	<10	<10	<10	<10	<10	<10
W-8	4/17/87	625	NA	ND	4	2	1	1	2	9
	8/14/89	625	NA	ND	<10	<10	<10	<10	<10	<10

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TABLE 3. SEMIVOLATILE ORGANICS IN GROUNDWATER SAMPLES FROM MARKETPLACE AND NIELSEN PROPERTIES (PPB).
CONTINUED ...

Well No.	Date	Analytical Method	Fluoranthene	Naphthalene	Phenanthrene	Pyrene	4-Methyl Phenol
Marketplace							
W-4	12/1/87	9020	NA	NA	NA	NA	NA
	8/14/89	625	<10	<10	<10	<10	<10
W-10	8/17/89	625	<10	<10	<10	<10	<10
W-12	12/1/87	9020	NA	NA	NA	NA	NA
W-13	8/14/89	625	<10	<10	<10	<10	<10
W-14	8/14/89	625	<10	<10	<10	<10	22
W-15	8/14/89	625	<10	<10	<10	<10	<10
Nielsen							
W-1	8/14/89	625	<10	<10	<10	<10	<10
W-3	4/14/87	625	<2	<2	<2	<2	4
W-4	12/1/87	625	<2	<2	<2	<2	<2
W-7	4/16/87	625	<2	<2	<2	<2	NA
	8/14/89	625	<10	<10	<10	<10	<10
W-8	4/17/87	625	4	30	5	5	NA
	8/14/89	625	<10	16	<10	<10	<10

TABLE 3. SEMIVOLATILE ORGANICS IN GROUNDWATER SAMPLES FROM MARKETPLACE AND NIELSEN PROPERTIES (PPB).
CONTINUED ...

Well No.	Date	Analytical Method	C1-Naphthalene	C2-Naphthalene	C2-Phenanthrene	C3-Benzene	C9-C35 Hydrocarbons	Butanoic Acid
Marketplace								
W-4	12/1/87	9020	NA	NA	NA	NA	NA	NA
	8/14/89	625	NA	NA	NA	NA	NA	NA
W-10	8/17/89	625	NA	NA	NA	NA	NA	NA
W-12	12/1/87	9020	NA	NA	NA	NA	NA	NA
W-13	8/14/89	625	NA	NA	NA	NA	NA	NA
W-14	8/14/89	625	NA	NA	NA	NA	NA	NA
W-15	8/14/89	625	NA	NA	NA	NA	NA	NA
Nielsen								
W-1	8/14/89	625	NA	NA	NA	NA	NA	NA
W-3	4/14/87	625	<2	<2	<2	<2	<2	NA
W-4	12/1/87	625	NA	NA	NA	NA	NA	NA
W-7	4/16/87	625	<2	<2	<2	<2	<2	400
	8/14/89	625	NA	NA	NA	NA	260	NA
W-8	4/17/87	625	50	40	NA	60	10000	<1
	8/14/89	625	NA	NA	NA	NA	NA	NA

TABLE 3. SEMIVOLATILE ORGANICS IN GROUNDWATER SAMPLES FROM MARKETPLACE AND NIELSEN PROPERTIES (PPB).
CONTINUED ...

Well No.	Date	Analytical Method	Hexanoic Acid	Pentanoic Acid	Propanoic Acid
Marketplace					
W-4	12/1/87	9020	NA	NA	NA
	8/14/89	625	NA	NA	NA
W-10	8/17/89	625	NA	NA	NA
W-12	12/1/87	9020	NA	NA	NA
W-13	8/14/89	625	NA	NA	NA
W-14	8/14/89	625	NA	NA	NA
W-15	8/14/89	625	NA	NA	NA
Nielsen					
W-1	8/14/89	625	NA	NA	NA
W-3	4/14/87	625	NA	NA	NA
W-4	12/1/87	625	NA	NA	NA
W-7	4/16/87	625	300	200	1000
	8/14/89	625	NA	NA	NA
W-8	4/17/87	625	<1	<1	<1
	8/14/89	625	NA	NA	NA

Three inches of floating product was observed in Well W-5. Product was also observed in Well W-10 when it was first bailed. In samples collected for this investigation, SOCs were detected in Wells W-7, W-8, and W-14. A library search was performed to determine whether heavy fuel weight hydrocarbons (C9 to C35 chain hydrocarbons) occur in groundwater. The search indicated that these hydrocarbons occur in Well W-7 at 260 parts per billion (ppb). Hydrocarbons were not previously detected in this well (WCC, 1987) although organic acids and other unknown SOCs were detected. The WCC report attributed these compounds to buried tar paper fill material at that location. Naphthalene was detected in Well W-8 at 16 ppb. Naphthalene along with other polynuclear aromatic compounds (PNAs) and 10,000 ppb C9 to C35 hydrocarbons were detected in this well when previously sampled in 1987. Analytical results for Well W-14 indicated 22 ppb of 4-methylphenol.

There are no specific primary (drinking water) or secondary (industrial use) MCLs (maximum contaminant levels) or SALs (State Action Levels) for either naphthalene or 4-methlyphenol. However, according to the RWQCB (RWQCB, 1988) an investigation is required where hydrocarbons have impacted groundwater.

Metals

Groundwater was sampled and analyzed for the presence of antimony, arsenic, beryllium, cadmium, chromium, copper, lead, mercury, nickel, selenium, silver, thallium, and zinc. Arsenic, chromium, copper, lead, nickel and zinc were the only metals detected. Detection limits are shown on the laboratory data sheets compiled in Appendix D. Arsenic was detected in all of the monitor wells. Chromium and lead were detected only in Well W-7. Table 4 lists the concentrations of various metals detected in groundwater beneath the site since 1981 and shows that in general, metal concentrations in groundwater have decreased.

Figure 7 shows the distribution of arsenic in groundwater beneath the site. The distribution is roughly symmetrical about a line trending in the direction of regional groundwater flow (southwest). Because the highest concentrations were detected in upgradient Wells W-1 and W-8, the source may be located off-site. The State primary MCL for arsenic is 50 ppb (CCR, Title 22, Section 22-64435). The maximum concentration of arsenic detected was 100 ppb (0.1 ppm), slightly above the MCL.

Chromium was detected at a concentration of 30 ppb (0.03 ppm) in Well W-7. This is below the State primary MCL for chromium (IV) of 50 ppb (CCR, Title 26, Section 22-64435). Standards for chromium (III) have not been established.

Copper was detected at 20 ppb (0.02 ppm) and lead was detected at a concentration of 80 ppb (0.08 ppm) in Well W-7. The lead concentration is above the State primary MCL of 50 ppb (CCR, Title 26, Section 22-64435).

FIGURE 7
DISTRIBUTION OF ARSENIC
IN GROUNDWATER

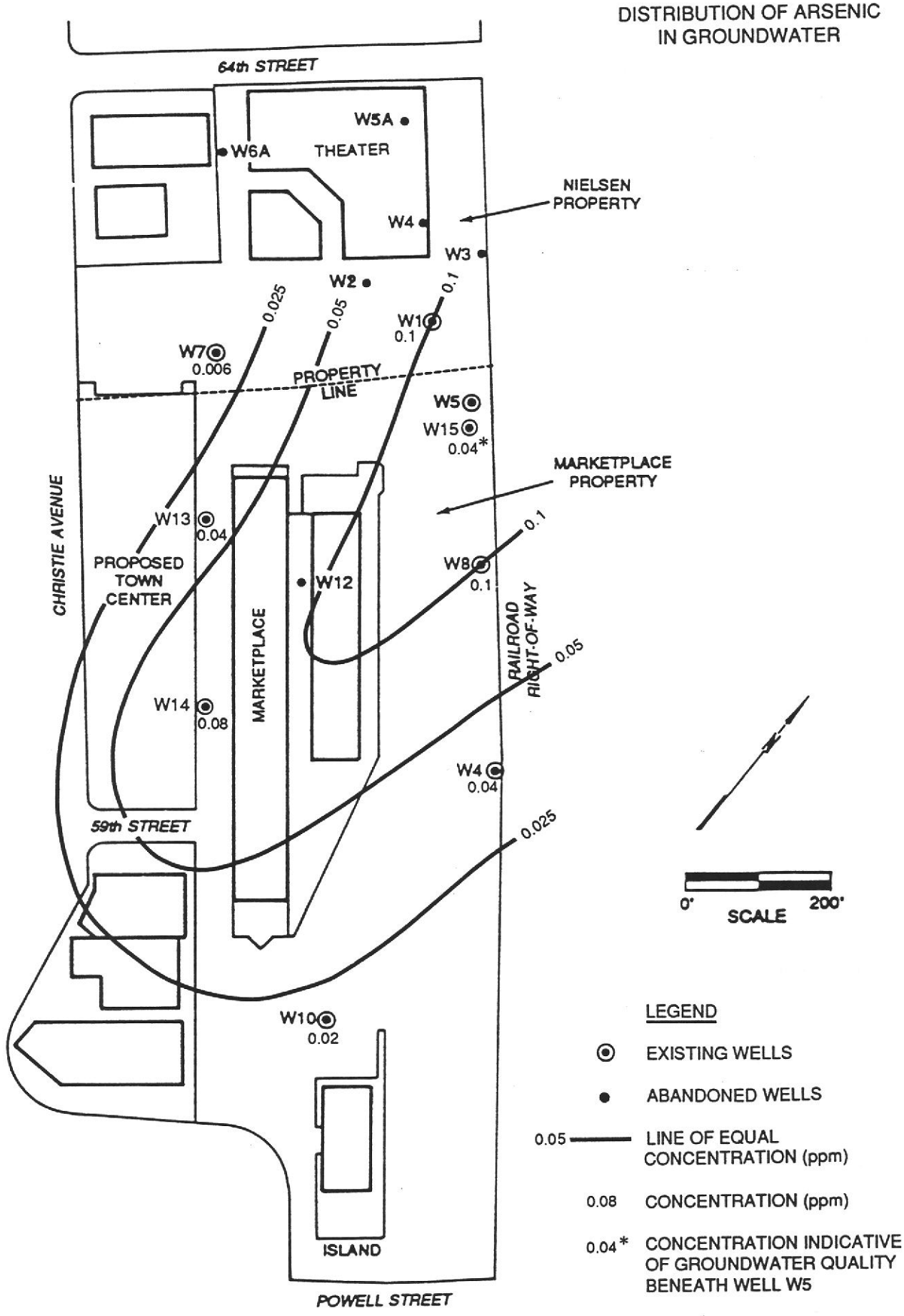


TABLE 4. CONCENTRATIONS OF METALS IN GROUNDWATER SAMPLES FROM WELLS ON MARKETPLACE AND NIELSEN PROPERTIES (PPM).

Well No.	Date	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper
Marketplace									
W-4	1/20/81	NA	<0.0005	NA	NA	<0.01	<0.01	<0.01	<0.01
	12/1/87	<0.5	<0.2	0.5	<0.01	<0.005	0.06	0.06	3.88
	8/14/89	<0.5	0.04	NA	<0.05	<0.01	<0.02	NA	<0.02
W-5	1/20/81	NA	<0.0005	NA	NA	<0.01	<0.01	<0.01	<0.01
W-10	1/20/81	NA	<0.0005	NA	NA	<0.01	<0.01	<0.01	0.02
	8/17/89	<0.5	0.02	NA	<0.05	<0.01	<0.02	NA	<0.02
W-12	1/20/81	NA	<0.0005	NA	NA	<0.01	<0.01	<0.01	<0.01
	12/1/87	<0.5	<0.2	26.8	<0.01	<0.058	0.7	0.12	127.5
W-13	8/14/89	<0.5	0.04	NA	<0.05	<0.01	<0.02	NA	<0.02
W-14	8/14/89	<0.5	0.08	NA	<0.05	<0.01	<0.02	NA	<0.02
W-15	8/14/89	<0.5	0.04	NA	<0.05	<0.01	<0.02	NA	<0.02
Nielsen									
W-1	4/14/87	NA	NA	NA	NA	NA	0.05	NA	NA
	8/14/89	<0.5	0.1	NA	<0.05	<0.01	<0.02	NA	<0.02
W-2	4/14/87	<0.1	0.006	NA	<0.1	<0.1	<0.02	<0.050	<0.02
W-3	4/14/87	<0.1	0.002	NA	<0.1	<0.1	<0.02	<0.050	<0.02
W-4	4/14/87	NA	NA	NA	NA	NA	0.11	NA	NA
W-5A	4/16/87	NA	NA	NA	NA	NA	<0.02	NA	NA
W-6A	4/16/87	NA	NA	NA	NA	NA	0.02	NA	NA
W-7	4/16/87	<0.1	0.016	NA	<0.1	<0.1	0.08	<0.05	0.16
	8/14/89	<0.5	0.006	NA	<0.05	<0.01	0.03	NA	0.02
W-8	4/17/87	NA	NA	NA	NA	NA	<0.02	NA	NA
	8/14/89	<0.5	0.1	NA	<0.05	<0.01	<0.02	NA	<0.02

TABLE 4. CONCENTRATIONS OF METALS IN GROUNDWATER SAMPLES FROM WELLS ON MARKETPLACE AND NIELSEN PROPERTIES (PPM).
CONTINUED ...

Well No.	Date	Lead	Manganese	Mercury	Molybdenum	Nickel	Selenium	Silver
Marketplace								
W-4	1/20/81	0.003	NA	NA	NA	<0.01	NA	NA
	12/1/87	<0.05	9.05	<0.05	0.15	<0.05	<0.2	<0.2
	8/14/89	<0.05	NA	<0.002	NA	<0.02	<0.001	<0.05
W-5	1/20/81	<0.001	NA	NA	NA	<0.01	NA	NA
W-10	1/20/81	0.004	NA	NA	NA	<0.01	NA	NA
	8/17/89	<0.05	NA	<0.002	NA	0.02	<0.001	<0.05
W-12	1/20/81	<0.001	NA	NA	NA	<0.01	NA	NA
	12/1/87	2.9	6.83	<0.05	0.15	0.53	<0.2	<0.2
W-13	8/14/89	<0.05	NA	<0.002	NA	<0.02	<0.001	<0.05
W-14	8/14/89	<0.05	NA	<0.002	NA	0.02	<0.001	<0.05
W-15	8/14/89	<0.05	NA	<0.002	NA	<0.02	<0.001	<0.05
Nielsen								
W-1	4/14/87	0.004	NA	NA	NA	< 0.05	NA	NA
	8/14/89	<0.05	NA	<0.002	NA	<0.02	<0.001	<0.05
W-2	4/14/87	<0.001	NA	0.0003	NA	< 0.05	<0.001	<0.01
W-3	4/14/87	<0.001	NA	0.0002	NA	< 0.05	<0.001	<0.01
W-4	4/14/87	0.002	NA	NA	NA	0.15	NA	NA
W-5A	4/16/87	<0.1	NA	NA	NA	< 0.05	NA	NA
W-6A	4/16/87	0.1	NA	NA	NA	< 0.05	NA	NA
W-7	4/16/87	0.7	NA	0.0017	NA	0.2	<0.001	<0.01
	8/14/89	0.08	NA	<0.002	NA	0.07	<0.001	<0.05
W-8	4/17/87	<0.1	NA	NA	NA	< 0.05	NA	NA
	8/14/89	<0.05	NA	<0.002	NA	<0.02	<0.001	<0.05

TABLE 4. CONCENTRATIONS OF METALS IN GROUNDWATER SAMPLES FROM WELLS ON MARKETPLACE AND NIELSEN PROPERTIES (PPM). CONTINUED ...

Well No.	Date	Tin	Thallium
Marketplace			
W-4	1/20/81	NA	NA
	12/1/87	<0.1	<0.5
	8/14/89	NA	<1.0
W-5	1/20/81	NA	NA
W-10	1/20/81	NA	NA
	8/17/89	NA	<1.0
W-12	1/20/81	NA	NA
	12/1/87	<0.1	<0.5
W-13	8/14/89	NA	<1.0
W-14	8/14/89	NA	<1.0
W-15	8/14/89	NA	<1.0
Nielsen			
W-1	4/14/87	NA	NA
	8/14/89	NA	<1.0
W-2	4/14/87	NA	0.1
W-3	4/14/87	NA	<0.1
W-4	4/14/87	NA	NA
W-5A	4/16/87	NA	NA
W-6A	4/16/87	NA	NA
W-7	4/16/87	NA	0.1
	8/14/89	NA	<1.0
W-8	4/17/87	NA	NA
	8/14/89	NA	<1.0

Nickel was detected at a concentration of 70 ppb (0.07 ppm) in Well W-7, 20 ppb (0.02 ppm) in Well W-10, and 20 ppb (0.02 ppm) in Well W-14.

Zinc was detected at a concentration of 40 ppb (0.04 ppm) in Well W-1, 90 ppb (0.09 ppm) in Well W-7, and 60 ppb (0.06 ppm) in Well W-14. These concentrations are below the State secondary MCL of 5000 ppb (CCR, Title 22, Section 22-64435).

Previous investigations of site soil conditions indicate that metals, specifically zinc and lead are distributed in soils beneath the Nielsen site below California State Hazardous Waste Criteria (Woodward Clyde, 1987) and that lead, copper, zinc, and mercury occur in the soil in the southernmost portion of the site in the vicinity of Well W-10 above California State Criteria for hazardous waste (Total Threshold Limit Concentrations or TTLCs). The low levels of these metals in groundwater samples taken from Well W-10 implies that the soil has not adversely affected the groundwater in the southernmost portion of the site. In general, the areas where metals are detected in groundwater do not correlate with the areas where metals have been detected in the soil.

Chloride

Figure 8 shows the current distribution of chloride in groundwater beneath the site. Chloride is expected to occur in site groundwater because the water levels occur at former Bay levels. The figure indicates that there are two areas of relatively high concentrations of chloride beneath the site aligned with groundwater flow. The State secondary MCL for chloride is 250,000 ppb (250 ppm) (CCR, Title 26, Section 22-64435). Figure 8 shows that this level is exceeded throughout a substantial portion of the site. Table 5 lists the chloride concentrations detected at the site since 1981.

Specific Conductivity

Figure 9 shows the specific conductivity of groundwater beneath the site. The figure indicates that there are two areas of relatively high specific conductivity. These areas are roughly symmetrical about lines trending in the direction of local groundwater flow (south near W-7 and southwest in the southern portion of the site) similar to the occurrence of chloride. The State secondary MCL for specific conductivity is 900 uS/cm (CCR, Title 26, Section 22-64435). Figure 9 shows that this level is exceeded throughout a substantial portion of the site. According to the California Regional Water Quality Control Board (RWQCB), surface water or groundwater which has a specific conductivity greater than 5000 uS/cm is not suitable for municipal or domestic water supply. Table 5 lists the specific conductivities registered at the site since 1981.

FIGURE 8
DISTRIBUTION OF CHLORIDE
IN GROUNDWATER

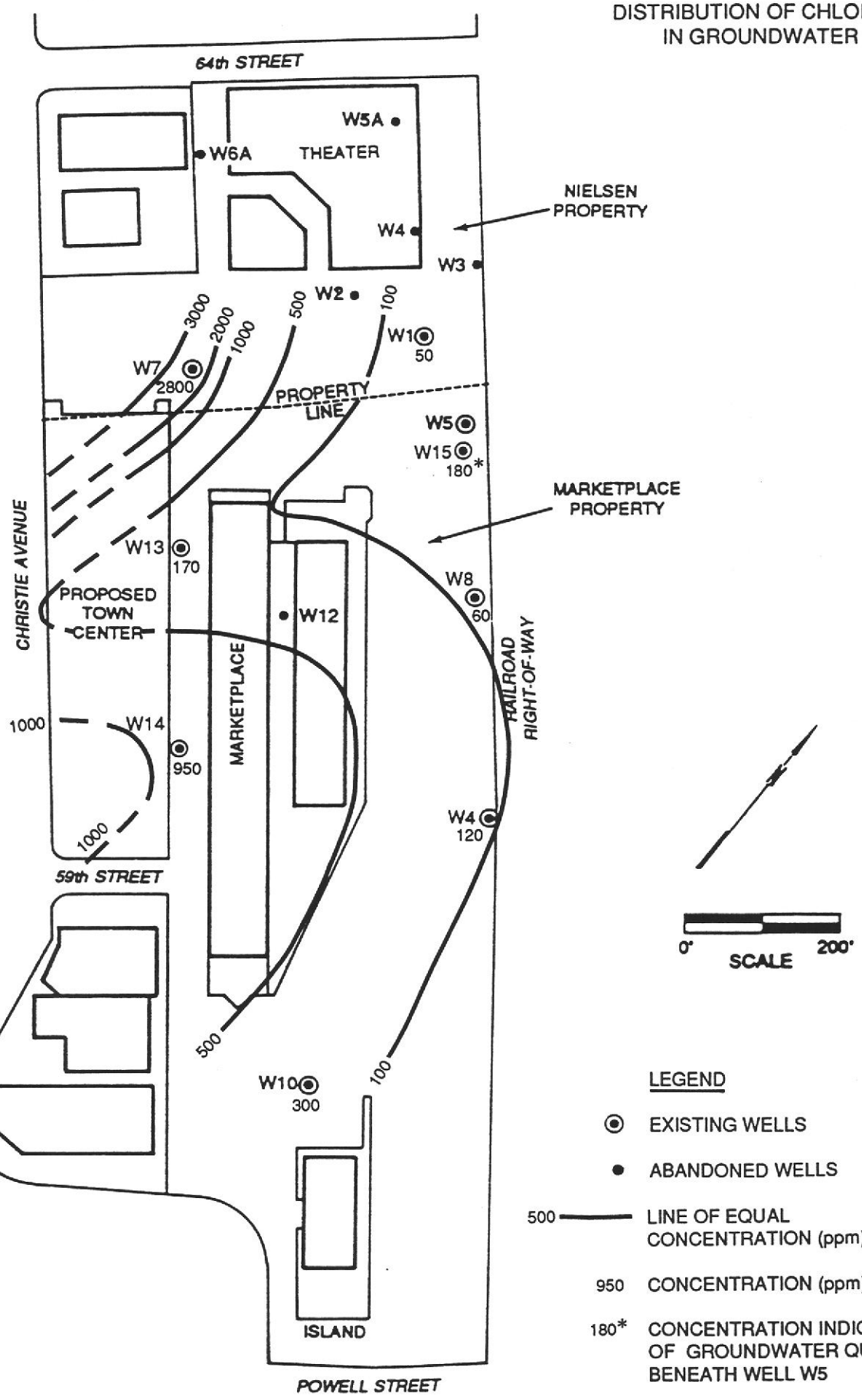


FIGURE 9
SPECIFIC CONDUCTIVITY
OF GROUNDWATER

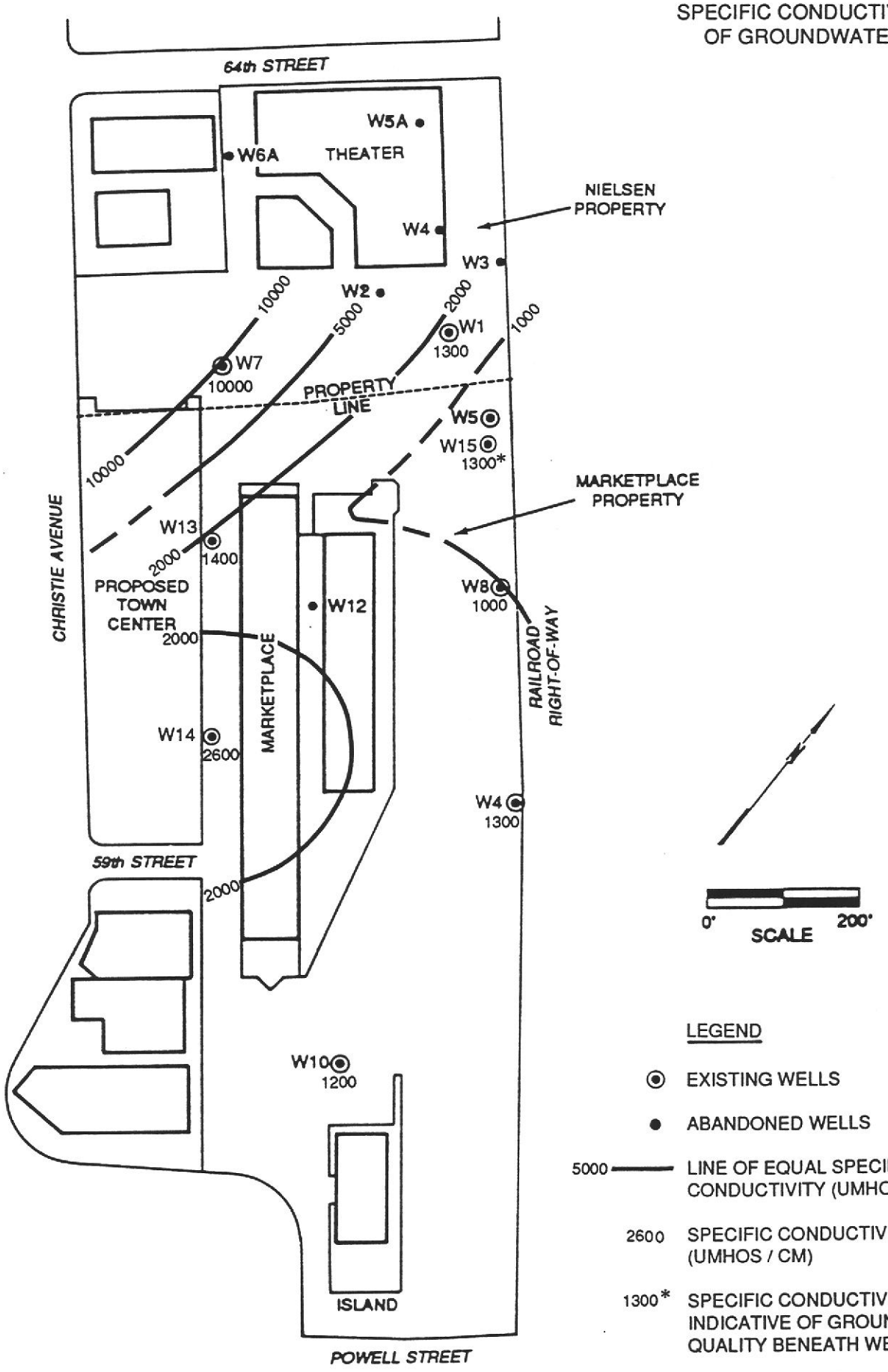


TABLE 5. GENERAL MINERALS ANALYSIS OF GROUNDWATER SAMPLES FROM WELLS AT THE NIELSEN PROPERTY (mg/L).

Well No.	Date	TDS	Turbidity (NTU)	pH	Specific Conductivity (umhos/cm)	Chloride	Carbonate Alk as CaCO3	Bicarbonate Alk as CaCO3	Hydroxide Alk as CaCO3	Total Alkalinity as CaCO3
W-1	4/14/87	NA	NA	6.9*	1600*	NA	NA	NA	NA	NA
	8/14/89	950	NA	7.2	1300	50	NA	NA	NA	NA
W-2	4/14/87	NA	NA	NA	2900*	NA	NA	NA	NA	NA
W-3	4/14/87	NA	NA	6.7*	400*	NA	NA	NA	NA	NA
	4/14/87	370	130	6.7	520	18	<1	210	<1	210
W-4	4/14/87	NA	NA	6.5*	1500*	NA	NA	NA	NA	NA
W-5A	4/9/87	NA	NA	NA	1600*	NA	NA	NA	NA	NA
	4/16/87	NA	NA	7	1840	NA	NA	NA	NA	NA
W-6A	4/13/87	NA	NA	6.6*	4200*	NA	NA	NA	NA	NA
	4/16/87	NA	NA	7.2	5790	NA	NA	NA	NA	NA
W-7	4/16/87	NA	NA	NA	4800*	NA	NA	NA	NA	NA
	4/16/87	3070	300	6.5	6500	1290	<1	1740	<1	1740
	8/14/89	7100	NA	6.7	10000	2800	NA	NA	NA	NA
W-8	4/17/87	NA	NA	6.7*	1100*	NA	NA	NA	NA	NA
	4/17/87	NA	NA	6.4	1300	NA	NA	NA	NA	NA
	8/14/89	850	NA	6.3	1000	60	NA	NA	NA	NA
Marketplace Property										
W-4	8/14/89	830	NA	7	1300	120	NA	NA	NA	NA
W-10	8/17/89	860	NA	11.7	1200	50	NA	NA	NA	NA
W-13	8/14/89	940	NA	7.8	1400	170	NA	NA	NA	NA
W-14	8/14/89	1500	NA	8.3	2600	950	NA	NA	NA	NA
W-15	8/14/89	830	NA	7.3	1300	180	NA	NA	NA	NA

* Field Test Results From Woodward-Clyde, August 1987, Report

TABLE 5. GENERAL MINERALS ANALYSIS OF GROUNDWATER SAMPLES FROM WELLS AT THE NIELSEN PROPERTY (mg/L). CONTINUED ...

Well No.	Date	Manganese	Nitrate (as N)	Nitrite (as N)	Ammonia Nitrogen	Total Kjeldahl Nitrogen	Total Phosphorus (as P)	Potassium	Silica as SiO2	Sodium	Sulfate
W-1	4/14/87	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	8/14/89	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
W-2	4/14/87	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
W-3	4/14/87	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	4/14/87	15	1	<0.01	0.66	0.66	0.71	1.7	50	53	57
W-4	4/14/87	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
W-5A	4/9/87	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	4/16/87	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
W-6A	4/13/87	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	4/16/87	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
W-7	4/16/87	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	4/16/87	68	<0.10	<0.01	51	63	4.7	56	72	800	37
	8/14/89	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
W-8	4/17/87	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	4/17/87	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	8/14/89	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Marketplace Property											
W-4	8/14/89	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
W-10	8/17/89	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
W-13	8/14/89	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
W-14	8/14/89	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
W-15	8/14/89	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

TABLE 5. GENERAL MINERALS ANALYSIS OF GROUNDWATER SAMPLES FROM WELLS AT THE NIELSEN PROPERTY (mg/L). CONTINUED ...

Well No.	Date	Calcium	Fluoride
W-1	4/14/87	NA	NA
	8/14/89	NA	NA
W-2	4/14/87	NA	NA
W-3	4/14/87	NA	NA
	4/14/87	18	0.33
W-4	4/14/87	NA	NA
W-5A	4/9/87	NA	NA
	4/16/87	NA	NA
W-6A	4/13/87	NA	NA
	4/16/87	NA	NA
W-7	4/16/87	NA	NA
	4/16/87	210	1.3
	8/14/89	NA	NA
W-8	4/17/87	NA	NA
	4/17/87	NA	NA
	8/14/89	NA	NA
Marketplace Property			
W-4	8/14/89	NA	NA
W-10	8/17/89	NA	NA
W-13	8/14/89	NA	NA
W-14	8/14/89	NA	NA
W-15	8/14/89	NA	NA

Total Dissolved Solids

Figure 10 shows the distribution of total dissolved solids (TDS) of groundwater beneath the site. The figure indicates that there are two areas of relatively high TDS beneath the site. These areas are roughly symmetrical about lines trending in the direction of local groundwater flow (south near W-7 and southwest in the southern portion of the site) and are the same shape as both the chloride and specific conductivity distributions. This is expected as TDS is directly related to both chloride concentration and specific conductivity. The State secondary MCL for TDS is 500 ppm (CCR, Title 22, Section 22-64435). Figure 10 shows that this level is exceeded throughout the site. According to the California Regional Water Quality Control Board (RWQCB), surface water or groundwater which has TDS in excess of 3000 ppm is not suitable for municipal or domestic water supply. Table 5 lists the specific conductivities registered at the site since 1981.

pH

Groundwater samples, with the exception of the sample taken from W-10, had pH values that are indicative of neutral water. The pH values for all wells are given in Table 2. Well W-10 had a pH value of 11.7 which implies that water within this well is alkaline. The reason for the alkaline pH is not known. It should be noted that material with a pH of 12.5 or greater is classified as hazardous and corrosive by the California Code of Regulations (CCR) Title 26, Section 22-66708. The EPA National Ambient Water Quality Criteria based on taste and odor or human health and welfare for pH is 5 to 9 pH units. Table 5 lists the pH values registered at the site since 1981.

REVIEW OF AGENCY FILES

Various state and federal lists were examined in order to identify other properties where soils and groundwater have been sampled and analyzed in the vicinity of the Marketplace/Nielsen property. The purpose of this review was to determine the status of surrounding area investigations and their potential impact on the Marketplace/Nielsen site. In general, it did not appear that the surrounding sites had much if any impact on the Marketplace/Nielsen site although the potential exists due to localized variation in groundwater flow. However, this review indicates that there are numerous sites in the area and that the general water quality of these sites is poor.

Files available at the Regional Water Quality Control Board (RWQCB) were examined. Table 6 is a listing of sites within approximately 1/2 mile of the subject property. Brief summaries of site conditions are provided in the following sections. The locations of these sites are shown in Figure 11; the numbers on this figure correspond to those in Table 6.

WESTINGHOUSE ELECTRIC COMPANY, 5899 PELADEAU STREET (#1 on map)

This site is listed as an EPA Superfund site in the CERCLIS list. However, the EPA has turned over the case to the RWQCB and is taking no further action. This site is being handled by the RWQCB as a Toxics Case. The western boundary of the site is located approximately 200 yards east of the subject property in an upgradient direction. Soil and groundwater at the site contain polychlorinated biphenyls (PCBs).

A subsurface cutoff wall made of a bentonite-soil slurry was constructed on the northern portion of the Westinghouse site, east of the center of the Marketplace/Nielsen site in 1985. The purpose of this cutoff wall was to fully encapsulate the area where PCBs occur in soil and prevent chemicals from moving off-site. Because this slurry wall extends down into the impermeable Bay Mud, groundwater in the fill above the Bay Mud does not move downgradient towards the Marketplace/Nielsen site.

There are several groundwater monitor wells both within and outside the cutoff wall. The most recent data available (December, 1987) suggest that concentrations in these wells have dropped since April, 1986 and that the downgradient monitor well, which is directly upgradient of the Marketplace/Nielsen site does not contain PCBs at this time. This indicates that the remedial steps taken (excavation of the contaminated soil and construction of the cutoff wall) appear to have been effective.

PETERSON MANUFACTURING COMPANY, 1600 63rd STREET (#2 on map)

This site is being handled by the RWQCB as an Underground Fuel Leak Case and is located less than 1/8 of mile north of the subject property and is now occupied by a new Federal Express terminal. The RWQCB site file indicates that groundwater and soil contain diesel fuel and gasoline.

FIGURE 10
DISTRIBUTION OF TOTAL DISSOLVED SOLIDS IN GROUNDWATER

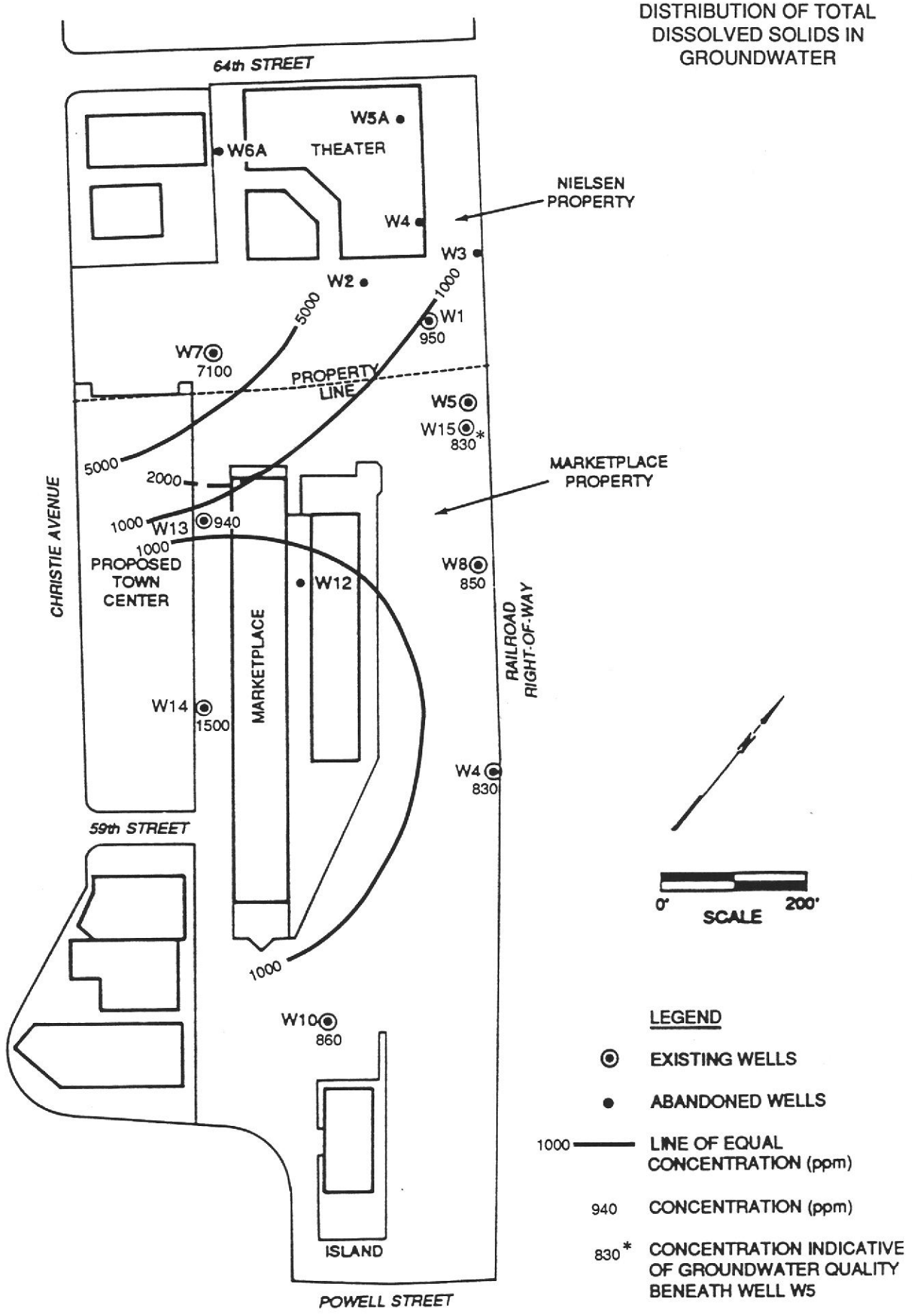
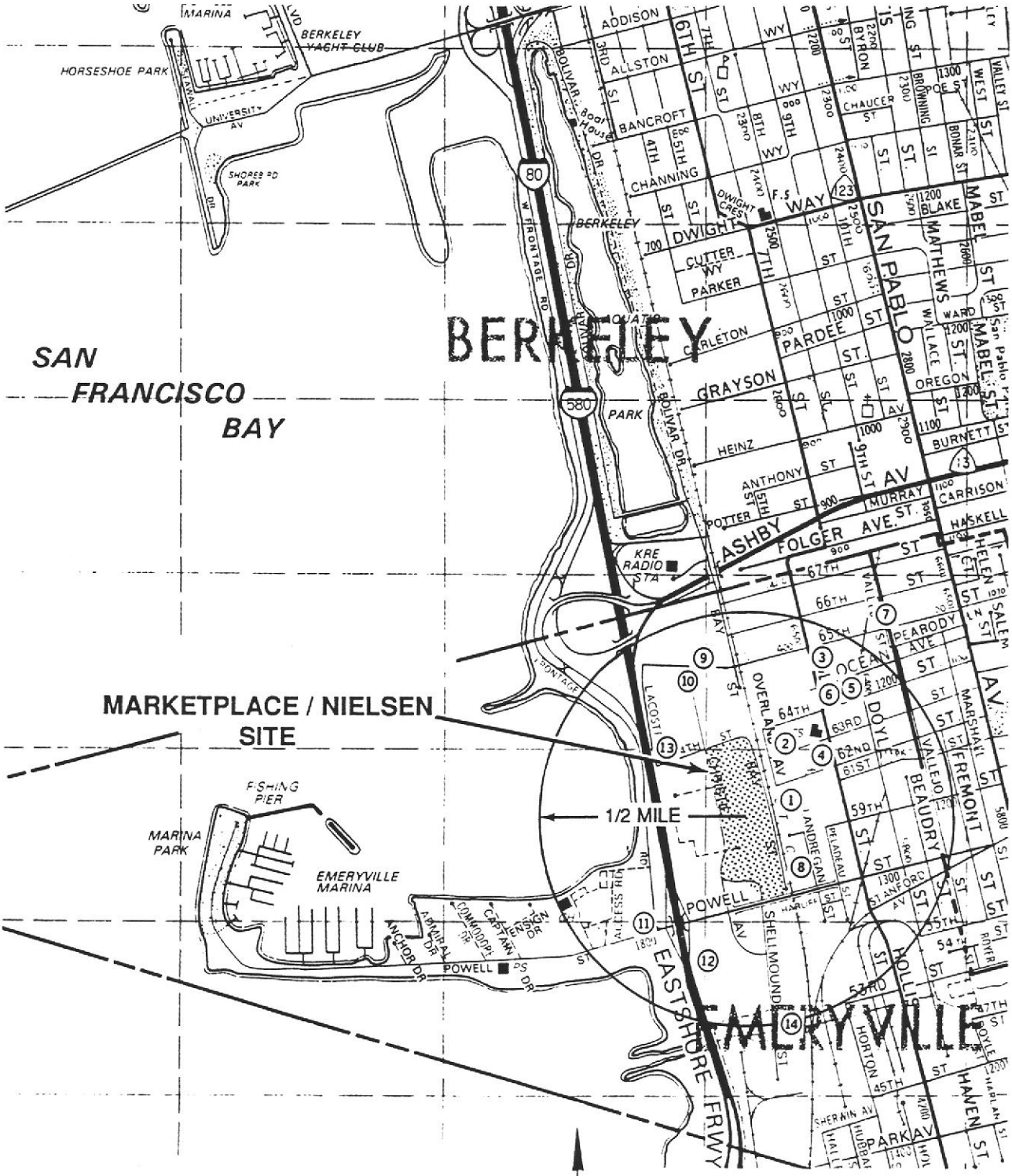


FIGURE 11
OTHER SITES WITH REPORTED
SOIL OR GROUNDWATER
CONTAMINATION



① = SITE NUMBER LISTED IN TABLE 6

1/2 MILE

TABLE 6

SOURCES OF SOIL AND GROUNDWATER CONTAMINATION
IN THE VICINITY OF THE SITE

Map Designation	Site Name	Address	Hydraulic Relation and Impacted Zone
1	Westinghouse Electric Company	5899 Peladeau St.	upgradient
2	Peterson Manufacturing Corporation	1600 63rd St.	upgradient,
3	Henry Horn and Sons, Inc.	1301 65th St.	upgradient
4	Hollis Street Project	6050 Hollis St.	upgradient
5	Getz Construction Company	1351 Ocean Ave.	upgradient
6	HFH Limited	6400 Hollis St.	upgradient
7	Oliver Rubber Company	1200 65th St.	upgradient
8	Chevron Asphalt Plant and Terminal	1520 Powell Ave.	upgradient
9	Benefit Capital Corporation	1650 65th St.	cross gradient
10	Bay Center Project	65th and Christie Ave.	cross gradient
11	Shell Oil Company Service Station	1800 Powell Ave.	downgradient
12	P.I.E. Nationwide Property	5500 Eastshore Freeway	downgradient
13	Garrett Freight Line	64th and Lacoste St.	cross gradient
14	Pfizer Pigments Inc.	4650 Shellmound St.	downgradient

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Diesel fuel (as TPH/Diesel) was detected at a concentration of 17,000 ppm in a groundwater sample taken during March, 1988 from an on-site industrial well which the RWQCB has requested be abandoned. Other on-site wells had lower concentrations of diesel but concentrations were not given. The RWQCB site file contained no information regarding tank removal or remediation of this site.

Groundwater samples collected at the Nielsen site in 1987 and analyzed for a variety of petroleum hydrocarbons (McLaren, 1989) indicate that groundwater from the Peterson site had not impacted the Nielsen site as of that time.

HENRY HORN AND SONS, 1301 65th STREET (#3 on map)

This site is being handled by the RWQCB as an Underground Fuel Leak Case. Henry Horn and Sons leased the property to Oakland Diesel Distributing Corporation in 1981. This corporation uses the site for the sale and repair of engine parts and is located less than a 1/2 of a mile north of the subject property. Gasoline occurs in both groundwater and soil at this site.

A letter report written by Blymer Engineers, Inc. (July 14, 1988) indicates that soil and groundwater at the site contain gasoline at concentrations up to 35,000 and 1,400 ppb (as TPH/G), respectively. Xylene was detected at a concentration of 15 ppb. A hydrocarbon sheen (free product) was observed on the local water table. An underground storage tank which was removed on June 9, 1988 was observed to have two holes in it. As of July, 1988, the extent of the hydrocarbons in the soil and groundwater had not been defined and remediation had not been undertaken at the site. Because this site is upgradient of the subject site, it is possible that TPH in groundwater might reach the subject site.

HOLLIS STREET PROJECT, 6050 HOLLIS STREET (#4 on map)

This site is being handled by the RWQCB as an Underground Fuel Leak Case. The site is a service station located approximately 1/4 of a mile east of the subject property. Petroleum hydrocarbons from an underground storage tank have contaminated soils at this site. Based on regional groundwater flow directions and local topography, the Hollis Street Project Site is located hydraulically upgradient from the subject property.

TPH concentrations in the soil did not exceed 1700 ppm. The leaking tank was removed sometime during 1987 and a single groundwater monitor well was installed immediately downgradient of the tank excavation in February, 1989. Groundwater samples did not contain detectable TPH concentrations. RWQCB files indicate that the Alameda County Department of Environmental Health (DEH) is satisfied with the monitoring plan being performed at the site. This plan involves quarterly groundwater sampling of the monitor well immediately downgradient from the tank excavation.

GETZ CONSTRUCTION COMPANY, 1351 OCEAN AVENUE (#5 on map)

This site is being handled by the RWQCB as an Underground Fuel Leak Case. The site is located less than 1/2 of a mile north of the subject property and is now occupied by Wind River Systems, Inc. Gasoline leaking from a storage tank has reached soil at the site. The tank was removed and soil samples were taken from the tank excavation. Diesel concentrations in the soil did not exceed 930 ppm. There was no indication that groundwater sampling had been done at the site. Based on regional groundwater flow directions and local topography, the Getz Construction Company Site is located hydraulically upgradient from the subject property.

HFH LIMITED, 6400 HOLLIS STREET (#6 on map)

This site is being handled by the RWQCB as an Underground Fuel Leak Case. The site is located less than 1/2 of a mile north of the subject property. Soil contaminated by gasoline as the result of a leak in a 2000-gallon underground fuel tank are present at this site. The tank was removed and two soil samples were taken at both ends of the tank excavation. TPH concentrations did not exceed 23 ppm. Because the concentration in the soil was low, no further soil sampling was performed.

Based on regional groundwater flow directions and local topography, the HFH Limited Site is located hydraulically upgradient from the subject property. Because of the low soil concentrations detected, this site is not likely to cause future groundwater contamination at the subject property.

OLIVER RUBBER COMPANY, 1200 65th Street (#7 on map)

This site is being handled by the RWQCB as a leaking underground tank case. The site is located more than 1/2 of a mile north of the subject property. Soil at the site was discovered to contain low levels of PCE (4-6 ppb). Groundwater has not been affected. There is no indication that soils at the site were treated or excavated. Although this site is located hydraulically upgradient of the subject properties, concentrations in the soils are low; therefore, this site is not expected to cause future groundwater contamination.

CHEVRON ASPHALT PLANT AND TERMINAL, 1520 POWELL STREET (#8 on map)

This site is being handled by the RWQCB as a Toxics Case. The site is an abandoned fueling terminal and asphalt testing laboratory. The site is believed to be located immediately east of the railroad tracks within a few hundred yards of the subject property. Groundwater and soil contaminated by chlorinated solvents and cycloalkanes (C_3 through C_8) are present at this site.

RWQCB files indicate that dichloroethene (DCE), trichloroethene (TCE), and vinyl chloride were detected in groundwater at concentrations of up to 1200, 160, and 1500 ppb, respectively. Cycloalkanes were detected at concentrations of up to 3600 ppb. Extensive groundwater monitoring and soil sampling has taken place at the site but the extent of the contamination has yet to be defined.

Chevron retained Western Geologic Resources, Inc. to excavate 7500 cubic yards of soil. Western Geologic Resources, Inc. requested permission from the RWQCB on May 25, 1989 to discharge water from the excavation after treating it. There are no further records regarding the progress of this remediation.

Based on regional groundwater flow directions and the local topography, the Chevron Site is located hydraulically upgradient from the subject property; therefore, it could possibly result in groundwater contamination beneath the southern portion of the subject property.

BENEFIT CAPITAL CORPORATION, 1650 65th STREET (#9 on map)

This site is being handled by the RWQCB as an Underground Fuel Leak Case. The site is located less than 1/2 of a mile northwest of the subject property and is now occupied by the Container Repair Center. A leak in the ancillary piping of an underground gasoline tank resulted in both soil and groundwater contamination. The tank was removed and the soil was excavated in February, 1988. Groundwater contained 33 ppm total fuel hydrocarbons (TFH). Soil contained 6,600 ppm TFH at a depth of ten feet below grade.

The removal of the contaminated soil coupled with the fact that this site is located hydraulically cross gradient from the subject property indicates that this site is not a potential source of groundwater contamination at the subject property.

BAY CENTER PROJECT, 65th AND CHRISTIE AVENUE (#10 on map)

This site is being handled by the RWQCB as a leaking underground storage tank case. The site is located less than 1/2 of a mile northwest of the subject property and is situated on what is now the Emery Bay Business and Apartment Complex. Based on drilling logs, it appears that soils and/or groundwater at this site may have been impacted by industrial activities. This site is located hydraulically cross gradient of the subject property; therefore, it is unlikely that soil conditions at this site would affect conditions at the Marketplace/Nielsen site.

SHELL OIL COMPANY SERVICE STATION, 1800 POWELL STREET (#11 on map)

This site is being handled by the RWQCB as an Underground Fuel Leak Case. The site is a service station located less than 1/2 of a mile west of the

subject property. Groundwater and soil contain petroleum hydrocarbons at this site. A quarterly groundwater monitoring report dated April 14, 1989 indicates that concentrations (as TPHs) in groundwater range from 0.05 to 700 ppm. Benzene was detected at concentrations ranging from 0.0011 to 37.0 ppm. Free product was detected in one monitor well. Hydrocarbon sheens were observed in other monitor wells. RWQCB files give no indication as to whether remedial action is being taken at the site.

Based on regional groundwater flow directions and local topography, this site is located hydraulically downgradient from the subject property; therefore, this site is not likely to result in groundwater contamination at the subject property.

P.I.E. NATIONWIDE PROPERTY, 5500 Eastshore Freeway (#12 on map)

This site is located less than 1/2 of a mile southeast of the subject property. The shopping center on the southeast corner of the Eastshore Freeway and Powell Avenue may occupy all or a portion of this property. Soil and groundwater containing petroleum hydrocarbons (whether hydrocarbons are gas or diesel is not known) has been identified at this site.

A trench has been dug on the western (downgradient) portion of the site in order to capture groundwater. The captured groundwater is being treated with bioreactors located on-site. The treated water is then being discharged into a storm drain.

This site is located downgradient of the subject property; furthermore, neither free product nor dissolved contaminants in groundwater have been detected in wells on the upgradient portion of the site; therefore, this site does not pose a threat to the quality of groundwater beneath the subject property.

GARRETT FREIGHT LINE, 64th STREET AND LACOSTE STREET (#13 on map)

This site is being handled by the RWQCB as an Underground Fuel Leak Case. The site is located approximately 1/4 of a mile west of the subject property and is located on what is now the Emery Bay Business and Apartment complex. Based on regional groundwater flow directions and local topography, the Garrett Freight Line Site is located hydraulically cross-gradient from the subject property.

A RWQCB fuel leak case form dated May 5, 1986 indicates that soil at this site contains both miscellaneous motor fuels and metals; specifically, lead, zinc, and iron. It can be inferred that since lead and zinc have also been detected at the Marketplace/Nielsen site, it is likely that metals occur in soils throughout the area due to former industrial activities.

Hydrocarbon concentrations in the soil are not known. Lead was detected in the soil at concentrations of 50 to 1000 ppm. Zinc concentrations in the soil did not exceed 2500 ppm. Iron was detected in the soil at concentrations ranging from 6,700 to 140,000 ppm. These values could be the result of rusting scrap metal disposed of in the municipal landfill that once existed at the site (Draft Report, Earth Metrics Incorporated, March 14, 1986). It has not been determined if groundwater contains metals at this site.

PFIZER PIGMENTS, INC., 4650 SHELLMOUND STREET (#14 on map)

This site is being handled by the RWQCB as an Underground Fuel Leak Case. The site is a pigment manufacturing plant and is located approximately 1/2 of a mile south of the subject property. Soil contains grease and waste oil as the result of a leak in an underground tank.

The tank was removed and soil samples were taken. Total oil and grease (TOG) concentrations were as high as 53,750 ppm and indicate that product may be present in site soils. The impact on groundwater was minimal and, for the time being, appears to be confined to the area immediately below the tank excavation.

The extent to which soil has been excavated or treated is not known. The DEH ordered Pfizer Pigments to increase their groundwater sampling frequency from semi-annually to quarterly and submit a remedial action plan by June 30, 1989.

Based on regional groundwater flow directions and local topography, this site is located hydraulically down- and cross gradient from the subject property. Because of the hydraulic relation to, and the distance from, the subject property, this site is not likely to impact the subject property.

POTENTIAL THREAT TO HUMANS AND THE AQUATIC LIFE OF THE SAN FRANCISCO BAY

There are significantly lower concentrations of SOCs and metals in the wells than in previous sampling events. The data indicates that naphthalene, 4-methyl phenol, C9 to C35 hydrocarbons, floating product, and selected metals occur in the groundwater below this site. An analysis was conducted to evaluate the risk of human exposure to these chemicals in the groundwater.

HUMAN EXPOSURE TO CHEMICALS IN GROUNDWATER

The unconfined groundwater below the Marketplace/Nielsen Site is not potable and is not extracted for any beneficial use. Established criteria for the determination of potential drinking water resources are provided for by California State Water Resources Control Board Resolution 88-63. This policy states that surface and groundwater resources that exhibit total dissolved solids (TDS) concentrations greater than 3000 mg/L or electrical conductivity greater than 5000 µmhos/cm and that are not reasonably expected by Regional Boards to supply a public water system, are not suitable for municipal or domestic water supply. The TDS concentration in Well W-7, located in an upgradient position on the west-central portion of the site, exceeded 3,000 mg/L during the 1987 and 1989 sampling rounds with concentrations of 3,070 and 7,100 mg/L, respectively. Specific conductivity exceeded 5000 µmhos/cm in Wells W-6A in 1987 and W-7 in 1987 and 1989. These data indicate that the groundwater located under the Marketplace/Nielsen Site is not suitable for drinking water. Therefore, there is no potential for human exposure via drinking water ingestion to the low levels of chemicals measured in the groundwater. Without the potential for exposure no human health threat exists.

EXPOSURES TO AQUATIC LIFE IN THE SAN FRANCISCO BAY

An analysis was conducted to evaluate the potential threat to the San Francisco Bay associated with the migration of chemicals in groundwater from the Marketplace/Nielsen Site to the Bay. The groundwater in the fill zone is unconfined and may flow to the Bay, but is expected to pass through the relatively impermeable and highly organic bay mud before reaching the sediment pore waters of the intertidal zone or the open waters of the Bay proper. A threat to aquatic life could exist if 1) chemicals in the groundwater are shown to migrate off-site to the Bay, and 2) the concentrations of these chemicals once in the Bay waters are sufficient after attenuation and dilution to exceed those levels which cause adverse effects to aquatic organisms. Because of the differences in chemical properties that influence chemical mobility in groundwater, this analysis discusses organic chemicals and metals separately.

Semi-Volatile Organic Compounds

Based on the previous sampling data, volatile organics were not analyzed for in the 1989 sampling event. Naphthalene, 4-methylphenol, and C9 to C35 hydrocarbons are the only semi-volatile organic compounds that were measured above the method detection limit in any of the 1989 groundwater samples (W-7, 260 ppb, W-8, 16 ppb and W-14, 22 ppb, respectively), although free product occurs in Wells W-5 and W-10.

No ambient water quality criteria for the protection of saltwater aquatic life have been established for 4-methylphenol. The concentration for naphthalene is significantly less than the EPA guideline concentration for the protection of saltwater aquatic life, 2.35 ppm. There is insufficient information for the development of water quality criteria for naphthalene, so the guideline concentration is the Lowest Observed Effect Level (LOEL) established during acute toxicity studies for aquatic organisms. The EPA ambient water quality criteria guideline concentration for the protection of saltwater aquatic life for total polynuclear aromatic compounds (PNAs) is 300 ppb, which is significantly greater than the maximum naphthalene concentration in the groundwater. Therefore, the concentration of naphthalene measured in the groundwater at the Marketplace/Nielsen Site poses no significant threat the aquatic life of the San Francisco Bay.

The County of Alameda has identified PNAs as potentially hazardous chemicals associated with asphaltic and heavy petroleum-like materials in contact with the groundwater in the fill near Wells W-5 and W-15. PNAs are very insoluble in water, bind readily to soil, sediment and organic particulate matter and are considered relatively immobile in the soil/groundwater environment (SRC, 1979). As noted above, naphthalene was the only PNA measured above the detection limit of 10 ppm in any of the 1989 groundwater samples. This indicates that the PNAs are immobile and are not migrating into the groundwater from either of these materials, and therefore, pose no significant hazard to the aquatic life of the San Francisco Bay.

Metals

The maximum metal concentrations for Cr, Cu, Ni, Pb, and Zn in the 1989 sample set were measured at Well W-7 (0.03, 0.02, 0.07, 0.08 and 0.09 ppb, respectively). None of these metals were measured at concentrations above the method limit of detection in Well W-13, which is the closest downgradient well. This indicates that metals are not moving through groundwater and/or significant attenuation of the metal concentrations is occurring between Wells W-7 and W-13.

It is very likely that the metal concentrations in the emergent groundwater along the Bay mudflats will be significantly less than the low concentrations measured in the groundwater at the monitoring wells. This is based on the assumption that well concentrations would be diluted by at least a factor of 10 during the transport and emergence process. A dilution factor of 10 is conservative, but appropriate, because the initial contact with benthic organisms will occur in the interstitial waters of the mudflats before the dilution potential of the open water is

realized. Adsorption phenomena can be assumed very conservatively to reduce the concentrations by another factor of 10, resulting in a total attenuation factor of 100. The dominant environmental fate processes reported for these metals are sorption to soil particles (predominantly clays) and particulate organic matter (Pavlov, 1987, Versar, 1979), and a strong affinity for many of these elements to form insoluble complexes with hydrous iron and manganese oxides (Versar, 1979). Based on the low metal concentrations measured in the groundwater and the binding characteristics of the elements, the groundwater underlying the Marketplace/Nielsen site poses no significant threat to the aquatic life of San Francisco Bay due to presence of metal concentrations.

Arsenic in groundwater will be found predominantly in the pentavalent form, because it is readily oxidized (USEPA, 1984) indicating that the As (V) criteria are applicable. On the other hand, Cr is predominantly in the trivalent form (WHO, 1988) which is prone to binding by sediments and precipitation as $Cr(OH_3)$ (Versar, 1979), or co-precipitation with iron oxyhydroxide minerals in the aquatic environment (Rai et. al, 1988).

After accounting for attenuation, those metals that were measured at concentrations above the detection limit, (As, Cr, Cu, Ni, Pb, and Zn) are well below the EPA ambient water quality criteria for the protection of saltwater aquatic life for chronic exposure (Table 7). Three of the elements of interest (Cd, Hg, and Ag) were not measured above the method limit of detection in any of the 1989 samples. If a conservative assumption is made and the attenuation factor is applied to the detection limit concentration, the predicted Bay water concentrations are less than the EPA criteria protecting aquatic life for chronic exposure. For those metals with established California DHS Applied Action Levels, (As, Cd, Cr, Cu, Pb, and Zn) (Table 7) the predicted groundwater concentrations are below the AAL's for saltwater species.

The maximum predicted metal concentrations for Cd, Cu, Ni and Zn are less than or approximately equal to the ambient dissolved metal concentrations reported for various portions of the San Francisco Bay (Table 8). The maximum predicted metal concentrations for Ag, Cr, Hg and Pb were slightly higher than the ambient dissolved concentrations for the San Francisco Bay. The concentrations for Ag and Hg are very conservative as elements were not measured above the detection limit.

Based on the above conservative assumptions the metal concentrations measured in the Marketplace/Nielsen Sites groundwater do not pose a significant threat to the aquatic life of San Francisco Bay.

TABLE 7

AMBIENT WATER QUALITY CRITERIA FOR THE POTECTION OF SALTWATER AQUITIC LIFE

Element	DHS AAL[a] (ppb) Saltwater species		EPA AWQC[b] (ppm) Acute	Chronic
As	22	(v)	2.3319	0.013
		(III)	0.069	0.036
Ag				0.0023[c]
Cd	50		0.043	0.0093
Cr	15	(VI)	1.1	0.05
Cu	6		0.0029	0.0029
Pb	44		0.140	0.0056
Ni			0.075	0.0083
Hg			0.0021	0.000025[c]
Zn	12		0.095	0.086

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[a] California DHS, TSCD, Applied Action Levels Update August 9, 1989.

[b] EPA, 1986. Criteria for Water Quality. EPA 440/5-86-001.

[c] San Francisco RWQCB Basin Plan Objective for marine waters. (Marshack 1988)

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TABLE 8

AMBIENT DISSOLVED METAL CONCENTRATIONS IN THE SAN FRANCISCO BAY

Element	Dissolved Concentration Range ppm	Location
Ag	0.01 to 0.3	Central/north bay
	0.002 to 0.006	South Bay
Cd	0.1 to 0.2	North Bay
Cr	0.13 to 0.19	North Bay
Cu	0.1 to 4.0	Central/North Bay
	4 to 5	South Bay
Hg	0.006 to 0.011	North Bay
Ni	up to 1.0	Central Bay
Pb	0.001 to 0.12	Central/North Bay
	0.02 to 0.09	South Bay
Zn	0.12 to 4.2	Central/North Bay
	0.5 to 7.0	South Bay

Source: Phillips (1989). Phillips, D.J.H. (1988). Monitoring of toxic contaminants in the San Francisco Bay-Delta: A critical review. Aquatic Habitat Institute. Richmond, California pp.212.

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RECOMMENDATIONS

The results indicate that although there is floating product in wells W-5 and W-10, hydrocarbons have not as yet moved off-site. The results also indicate that the source of hydrocarbons could potentially be east of the site.

The San Francisco Bay Region of the California Regional Water Quality Control Board (RWQCB) has prepared guidelines for addressing leaks from underground tanks used for storage of fuels (RWQCB, 1988). The RWQCB guidelines state that a soil/groundwater investigation is required if water samples collected indicate that petroleum has impacted groundwater. If groundwater contamination is discovered and/or floating product is found, a monitoring well should be installed and monitored. A sampling frequency must be established with RWQCB concurrence. Monitoring may include measurement of water and product levels and/or sampling and analysis.

The fuel oil source has been identified as the asphalt refinery and associated tanks and lines that were in existence at the site between the early 1900s until the tanks were removed in 1965. The active source of petroleum hydrocarbons to the soil or groundwater was therefore mitigated when the refinery was dismantled and tanks removed.

The upgradient and downgradient extent of the floating product must be defined in groundwater to satisfy the RWQCB. McLaren recommends installation of an additional well downgradient of Well W-5 to determine the downgradient on-site extent and installation of an upgradient well (potentially on the Southern Pacific Railroad property) to determine the upgradient extent of floating product.

Additionally, McLaren recommends that the free product from Well W-5 be pumped out into a 55-gallon drum. The recovered product from Well W-5 should be characterized through laboratory analysis to determine the grade of oil. Well W-5 should also be monitored on a weekly basis to determine the rate, if any, of free product recurrence. Other on-site wells in which free product or related compounds have been detected (Wells W-7, W-8, and W-10) should be monitored for product using an oil water interface probe. These wells should also be sampled and analyzed to determine the level of petroleum hydrocarbons. A specific proposal will be forwarded under separate cover.

CONCLUSIONS

Based on data collected from both new and existing monitor wells, the following conclusions can be drawn regarding groundwater flow and chemical migration beneath the Marketplace/Nielsen site. Recommendations for further work are included under separate cover.

Groundwater Flow

- The predominant direction of groundwater flow across the site is to the southwest.
- The water yield for wells varies from very poor to fairly good yield due to localized variations in site geology.
- Wells now exist on the upgradient and downgradient portions of the site.

Chemical Distribution in Groundwater

- Elevated concentrations of metals are in general, not detected in groundwater across the site. There is no correlation between elevated concentrations of metals in soils and the level of metals in soils and the level of metals in groundwater.
- Naphthalene, a PNA compound, was detected in one upgradient well, Well W-8. No PNAs were detected in downgradient wells.
- Three inches of floating petroleum product was observed in upgradient Well W-5.
- A minor amount of floating product was observed in Well W-10 and was removed when the well was bailed dry.
- The upgradient and lateral extent of the floating product and occurrence has not been determined.
- Total petroleum hydrocarbons were observed for the first time in Well W-7 and were not observed in Well W-8 where they had been previously detected.
- Total dissolved solids (TDS) and electrical conductivity are above levels considered suitable for drinking water supply.
- The potential for upgradient contamination from other sites exists.

Potential Threat to Humans and Aquatic Life

- There is no potential for human exposure via drinking water ingestion to chemicals measured in groundwater.

- There is no significant hazard from the semi-volatile organic compounds or metals to the aquatic life of San Francisco Bay.

RECOMMENDATIONS

The results indicate that although there is floating product in wells W-5 and W-10, hydrocarbons have not as yet moved off-site. The results also indicate that the source of hydrocarbons could potentially be east of the site.

The San Francisco Bay Region of the California Regional Water Quality Control Board (RWQCB) has prepared guidelines for addressing leaks from underground tanks used for storage of fuels (RWQCB, 1988). The RWQCB guidelines state that a soil/groundwater investigation is required if water samples collected indicate that petroleum has impacted groundwater. If groundwater contamination is discovered and/or floating product is found, a monitoring well should be installed and monitored. A sampling frequency must be established with RWQCB concurrence. Monitoring may include measurement of water and product levels and/or sampling and analysis.

The fuel oil source has been identified as the asphalt refinery and associated tanks and lines that were in existence at the site between the early 1900s until the tanks were removed in 1965. The active source of petroleum hydrocarbons to the soil or groundwater was therefore mitigated when the refinery was dismantled and tanks removed.

The upgradient and downgradient extent of the floating product must be defined in groundwater to satisfy the RWQCB. McLaren recommends installation of an additional well downgradient of Well W-5 to determine the downgradient on-site extent and installation of an upgradient well (potentially on the Southern Pacific Railroad property) to determine the upgradient extent of floating product.

Additionally, McLaren recommends that the free product from Well W-5 be pumped out into a 55-gallon drum. The recovered product from Well W-5 should be characterized through laboratory analysis to determine the grade of oil. Well W-5 should also be monitored on a weekly basis to determine the rate, if any, of free product recurrence. Other on-site wells in which free product or related compounds have been detected (Wells W-7, W-8, and W-10) should be monitored for product using an oil water interface probe. These wells should also be sampled and analyzed to determine the level of petroleum hydrocarbons. A specific proposal will be forwarded under separate cover.

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SOIL DRILLING LOG

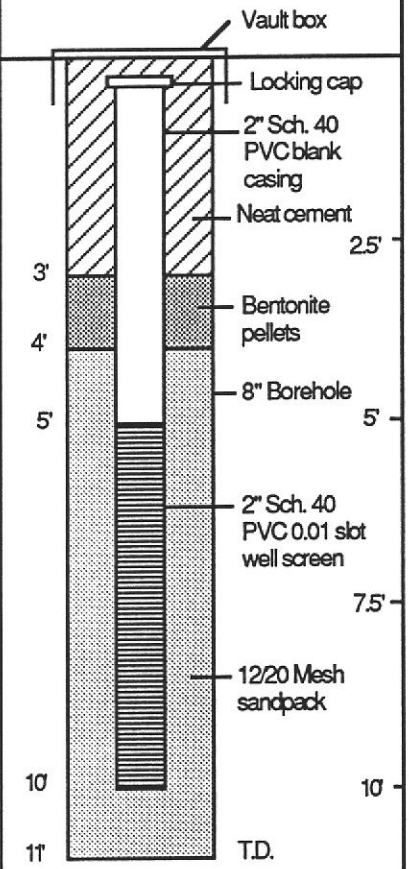
SB/MW # : W-13
D- 2340
Page 1 of 1
Sampler: B. WRIGHT

McLaren Environmental Engineering

PROJECT MARTIN GROUP/MARKETPLACE LOCATION 3' NE OF FENCE, 100' S OF N END OF MARKETPLACE
ELEVATION _____ MONITORING DEVICE 580A OVM
SAMPLING DATE(S) 8-9-89 START 1130 FINISH 1330
SAMPLING METHOD CA MOD. SPLIT SPOON SUBCONTRACTOR & EQUIPMENT ENVIRONMENTAL EXPLORATION, CME-55 HOLLOW STEM AUGER DRILL RIG
MEMO _____

Depth Below Surface(ft.)	Penetration Results: Blows 6"-6"-6"	Penetration Results: BPF	Sampler Depth Interval (ft.)	Sample ID #	OVM reading (ppm)	Soil Description Color, Texture, Moisture, Etc.	Unified Classification	Graphic Log	Sub-Sample
					0	Asphalt Brown (10YR 4/3) gravelly sand, fine grained sand to medium pebble gravel, common brick, fill to 2', moist.	Pb		
2.5'						Greenish gray (5GY 5/1) sand, very fine to medium grained sand, poorly graded, trace pebble gravels and shell fragments, wood at 4'.	SP		
	15-7-7	14	4.0'-5.5'		0				
5'						Greenish gray (5GY 5/1) clayey sand, very fine to medium grained sand, low plasticity, sticky, very moist.	SC		
▽						Light olive brown (2.5Y 5/4) sandy gravel, fine grained sand to medium pebble gravel, well graded, rounded, saturated.	GW		
7.5'	1-1-1	2	7.0'-8.5'		0		SM		
	9-17-21	38	9.0'-10.5'		0	Very dark gray (2.5Y N3/) silty sand, very fine to medium grained sand, dense, soft, sticky, saturated.	OL		
10'							SM		
	7-16-19	35	11.0'-12.5'		0	Very dark gray (2.5Y N3/) clay, medium plasticity, soft, smooth, saturated.	GC		
12.5'						Very dark gray (2.5Y N3/) silty sand, very fine to medium grained sand, dense, medium stiff, common clam shells, moist.			
						Light olive brown (2.5Y 5/4) gravelly clay, coarse grained sand to fine pebble gravel, low plasticity, very stiff, moist.			

Borehole Abandonment/ Well Construction Details



SIGNATURE OF FIELD SUPERVISOR

TITLE

Julie S. Menacke, RG
SIGNATURE OF REVIEWER

Supervising Geologist
TITLE

SOIL DRILLING LOG

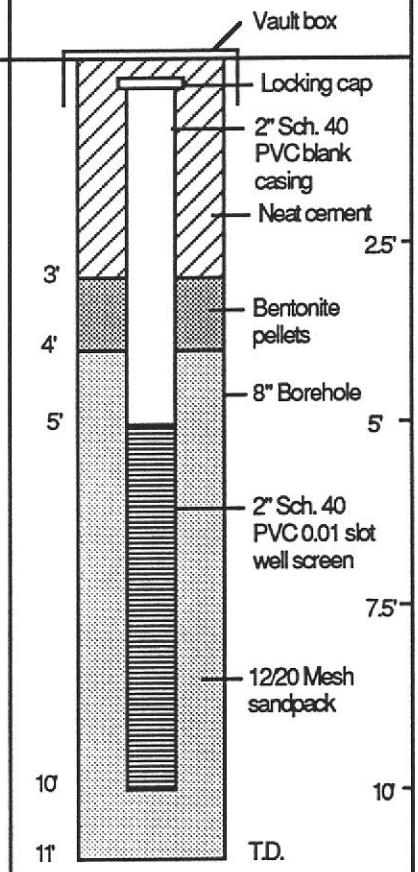
McLaren Environmental Engineering

SB/MW # : W-14
D- 2341
Page 1 of 1
Sampler: B. WRIGHT

PROJECT MARTIN GROUP/MARKETPLACE LOCATION 3' NE OF FENCE, 350' S OF N END OF MARKETPLACE
ELEVATION _____ MONITORING DEVICE 580A OVM
SAMPLING DATE(S) 8-9-89 START 1430 FINISH 1600
SAMPLING METHOD CA MOD. SPLIT SPOON SUBCONTRACTOR & EQUIPMENT ENVIRONMENTAL EXPLORATION, CME-55 HOLLOW STEM AUGER DRILL RIG
MEMO _____

Depth Below Surface(ft.)	Penetration Results: Blows 6"-6"-6"	Penetration Results: BPF	Sampler Depth Interval (ft.)	Sample ID #	OVM reading (ppm)	Soil Description Color, Texture, Moisture, Etc.	Unified Classification	Graphic Log	Sub-Sample
					0	Asphalt Brown (10YR 4/3) gravelly sand, fine grained sand to medium pebble gravel, common brick, loose, moist.	Fb		
2.5'						Gray (5Y 5/1) to light brownish gray (2.5Y 6/2) sand, very fine to coarse grained sand, loose, poorly graded, moist.	SP		
						Light olive brown (2.5Y 5/4) silty clay, high plasticity, stiff, slightly moist.	CL		
5'	5-4-4	8	5.0'-6.5'		0		SM		
						Dark greenish gray (5GY 4/1) silty sand, very fine to medium grained sand, loose, very moist.	SP		
							CL		
	4-7-7	14	7.0'-8.5'		0				
7.5'						Very dark gray (2.5Y N3/) sand, fine to very coarse grained sand, loose, trace pebble gravels and shell fragments, saturated.	SM		
	6-9-9	18	9.0'-10.5'		0				
10'						Greenish gray (5GY 5/1) silty clay, medium plasticity, stiff, slightly moist.	CL		
	5-6-7	13	11.0'-12.5'		0				
						Very dark gray (2.5Y N3/) silty sand, very fine to coarse sand dense, saturated.	CL		
12.5'						Dark gray (2.5Y N4/) silty clay, low plastic, soft, saturated.			
						Light olive brown (2.5Y 5/6) silty clay, medium plasticity, stiff minor fine sand, trace granules, moist.			

Borehole Abandonment/ Well Construction Details



SIGNATURE OF FIELD SUPERVISOR

TITLE

Julie S. Menack
SIGNATURE OF REVIEWER

Supervising Geologist
TITLE

SOIL DRILLING LOG

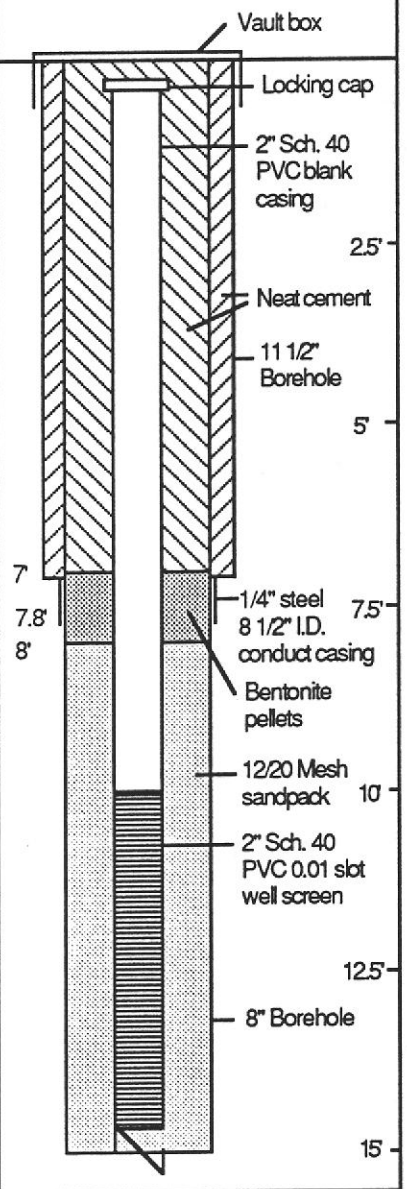
McLaren Environmental Engineering

SB/MW # : W-15
D- 2339
Page 1 of 2
Sampler: B. WRIGHT

PROJECT MARTIN GROUP/MARKETPLACE LOCATION 30' W OF RR RIGHT OF WAY, 50' S OF PROPERTY LINE
ELEVATION _____ MONITORING DEVICE 580A OVM
SAMPLING DATE(S) 8-9/10-89 START 0830 FINISH 1400
SAMPLING METHOD CA MOD. SPLIT SPOON SUBCONTRACTOR & EQUIPMENT ENVIRONMENTAL EXPLORATION, CME-55 HOLLOW STEM AUGER DRILL RIG
MEMO _____

Depth Below Surface(ft.)	Penetration Results: Blows 6"-6"-6"	Penetration Results: BPF	Sampler Depth Interval (ft.)	Sample ID #	OVM reading (ppm)	Soil Description Color, Texture, Moisture, Etc.	Unified Classification	Graphic Log	Sub-Sample
0					1	Asphalt	AC		
						Dark grayish brown (2.5Y 4/2) gravelly sand, roadbase.	Rb		
						Asphalt	AC		
2.5'						Dark greenish gray (5BG 4/1) silty sand, fine to medium grained sand, common brick fill, mild oil odor, moist	Rb		
						Concrete	PCC		
						Black (2.5Y N2/) silty clay, common wood debris, strong oil odor, saturated, product seeped into borehole at 3'	OL		
5'	6-7-15	22	5.0'-6.5'		60-75				
					10-13	Greenish gray (5G 5/1) silty clay, high plasticity, stiff, trace pebble gravel, common burrows at 6', moist	CL		
7.5'									
	7-12-14	26	9.0'-10.5'		20-26	Greenish gray (5GY 5/1) to dark greenish gray (5G 4/1) gravelly clay, coarse sand to medium pebble gravel, low plasticity, stiff, worm burrows filled with tar, oil odor, moist	GC		
10'	7-9-9	18	11.0'-12.5'		10-12				
12.5'	5-6-10	16	13'-14.5'		20-25	Light olive brown (2.5Y 5/6) silty clay, medium plasticity, stiff, minor coarse sand, burrows filled with tar, oil odor, slightly moist.	CL		
15'									

Borehole Abandonment/ Well Construction Details



SIGNATURE OF FIELD SUPERVISOR

TITLE

Julie S. Menack
SIGNATURE OF REVIEWER

Supervising Geologist
TITLE

SOIL DRILLING LOG

McLaren Environmental Engineering

SB/MW # : W-15
D- 2339
Page 2 of 2
Sampler: B. WRIGHT

PROJECT MARTIN GROUP/MARKETPLACE LOCATION 30' W OF RR RIGHT OF WAY, 50' S OF PROPERTY LINE
ELEVATION _____ MONITORING DEVICE 580A OVM
SAMPLING DATE(S) 8-9/10-89 START 0830 FINISH 1400
SAMPLING METHOD CA MOD. SPLIT SPOON SUBCONTRACTOR & EQUIPMENT ENVIRONMENTAL EXPLORATION, CME-55 HOLLOW STEM AUGER DRILL RIG
MEMO _____

Depth Below Surface(ft.)	Penetration Results: Blows 6"-6"-6"	Penetration Results: BPF	Sampler Depth Interval (ft.)	Sample ID #	OVM reading (ppm)	Soil Description Color, Texture, Moisture, Etc.	Unified Classification	Graphic Log	Sub-Sample	Borehole Abandonment/ Well Construction Details
	3-4-6	10	15.0'-16.5'		10-15	Light olive brown (2.5Y 5/6) sandy clay, fine sand, medium plasticity, stiff, tar filled burrows with greenish gray (5BG 5/1) staining, oil odor, slightly moist, moist at 17'.	CL			8" Borehole
	3-6-11	17	17.0'-18.5'		30-50					
17.5'										17.5'
										2" Sch. 40 PVC 0.01 slot well screen
										12/20 Mesh sandpack
20'	4-5-8	13	20.0'-21.5'		64-87	Yellowish brown (10YR 5/4) silty clay, medium plasticity, hard, trace worm burrows, filled with tar, oil odor, slightly moist.	CL			20' 20'
										Bentonite pellets
22.5'										22.5'
										23' T.D.
	6-12-14	16	23.0'-24.5'		5-8	Gray (5Y 5/1) silty clay, medium plastic, hard, minor granules, slightly moist.	CL			
25'										25'

SIGNATURE OF FIELD SUPERVISOR

TITLE

Julie S. Menack
SIGNATURE OF REVIEWER

Supervising Geologist
TITLE

PRIORITY POLLUTANT METALS
(200 SERIES)

Project: Marketplace

Lab Project Number: 2116

Sample Location: W-1

Lab ID Number: 29213

Sample Number: 119605

Date Received: 08/14/89

Date Sampled: 08/09/89

Date Analyzed: 08/14/89

	METAL (SYMBOL)/EPA METHOD	CONCENTRATION ug/ml (ppm)	REPORTING LIMIT ug/ml (ppm)
	Antimony (Sb)/7040	< 0.5	0.5
*	Arsenic (As)/7061	0.1	0.005
	Beryllium (Be)/7090	< 0.05	0.05
	Cadmium (Cd)/7130	< 0.01	0.01
	Chromium (Cr)/7190	< 0.02	0.02
	Copper (Cu)/7210	< 0.09	0.09
	Lead (Pb)/7420	< 0.05	0.05
**	Mercury (Hg)/7470	< 0.002	0.002
	Nickel (Ni)/7520	< 0.2	0.2
*	Selenium (Se)/7741	< 0.001	0.001
	Silver (Ag)/7760	< 0.05	0.05
	Thallium (Tl)/7840	< 1	1.
	Zinc (Zn)/7950	< 0.08	0.08

* Hydride generation method
** Cold vapor method

Comments:

Analyst: F. Ramezanzadeh Reviewed By: S. Azimi-Galloway Date: 08/16/89

Laboratory Director: J. M. Bartell

McLaren

PRIORITY POLLUTANT METALS
(200 SERIES)

Project: Marketplace-Emeryville

Lab Project Number: 2116

Sample Location: Marketplace Emeryville W-4

Lab ID Number: 29225

Sample Number: 119201

Date Received: 08/14/89

Date Sampled: 08/10/89

Date Analyzed: 08/14/89

METAL (SYMBOL)/EPA METHOD	CONCENTRATION ug/ml (ppm)	REPORTING LIMIT ug/ml (ppm)
Antimony (Sb)/7040	< 0.5	0.5
* Arsenic (As)/7061	0.04	0.005
Beryllium (Be)/7090	< 0.05	0.05
Cadmium (Cd)/7130	< 0.01	0.01
Chromium (Cr)/7190	< 0.02	0.02
Copper (Cu)/7210	< 0.09	0.09
Lead (Pb)/7420	< 0.05	0.05
** Mercury (Hg)/7470	< 0.002	0.002
Nickel (Ni)/7520	< 0.2	0.2
* Selenium (Se)/7741	< 0.001	0.001
Silver (Ag)/7760	< 0.05	0.05
Thallium (Tl)/7840	< 1	1.
Zinc (Zn)/7950	< 0.08	0.08

* Hydride generation method
** Cold vapor method

Comments:

Analyst: F. Ramezanzadeh

Reviewed By: S. Azimi-Galloway Date: 08/16/89

Laboratory Director: J. M. Bartell

McLaren

PRIORITY POLLUTANT METALS
(200 SERIES)

Project: Marketplace

Lab Project Number: 2116

Sample Location: W-7

Lab ID Number: 29217

Sample Number: 119601

Date Received: 08/14/89

Date Sampled: 08/09/89

Date Analyzed: 08/14/89

	METAL (SYMBOL)/EPA METHOD	CONCENTRATION ug/ml (ppm)	REPORTING LIMIT ug/ml (ppm)
	Antimony (Sb)/7040	< 0.5	0.5
*	Arsenic (As)/7061	0.006	0.005
	Beryllium (Be)/7090	< 0.05	0.05
	Cadmium (Cd)/7130	< 0.01	0.01
	Chromium (Cr)/7190	0.03	0.02
	Copper (Cu)/7210	< 0.09	0.09
	Lead (Pb)/7420	0.08	0.05
**	Mercury (Hg)/7470	< 0.002	0.002
	Nickel (Ni)/7520	< 0.2	0.2
*	Selenium (Se)/7741	< 0.001	0.001
	Silver (Ag)/7760	< 0.05	0.05
	Thallium (Tl)/7840	< 1	1.
	Zinc (Zn)/7950	0.09	0.08

* Hydride generation method
** Cold vapor method

Comments:

Analyst: F. Ramezanzadeh Reviewed By: S. Azimi-Galloway Date: 08/16/89

Laboratory Director: J. M. Bartell

McLaren

PRIORITY POLLUTANT METALS
(200 SERIES)

Project: Marketplace

Lab Project Number: 2116

Sample Location: W-8

Lab ID Number: 29221

Sample Number: 119609

Date Received: 08/14/89

Date Sampled: 08/09/89

Date Analyzed: 08/14/89

	METAL (SYMBOL)/EPA METHOD	CONCENTRATION ug/ml (ppm)	REPORTING LIMIT ug/ml (ppm)
	Antimony (Sb)/7040	< 0.5	0.5
*	Arsenic (As)/7061	0.1	0.005
	Beryllium (Be)/7090	< 0.05	0.05
	Cadmium (Cd)/7130	< 0.01	0.01
	Chromium (Cr)/7190	< 0.02	0.02
	Copper (Cu)/7210	< 0.09	0.09
	Lead (Pb)/7420	< 0.05	0.05
**	Mercury (Hg)/7470	< 0.002	0.002
	Nickel (Ni)/7520	< 0.2	0.2
*	Selenium (Se)/7741	< 0.001	0.001
	Silver (Ag)/7760	< 0.05	0.05
	Thallium (Tl)/7840	< 1	1.
	Zinc (Zn)/7950	< 0.08	0.08

* Hydride generation method
** Cold vapor method

Comments:

Analyst: F. Ramezanzadeh Reviewed By: S. Azimi-Galloway Date: 08/16/89

Laboratory Director: J. M. Bartell

McLaren

PRIORITY POLLUTANT METALS
(200 SERIES)

Project: Marketplace-Emeryville

Lab Project Number: 2116

Sample Location: Marketplace Emeryville W-13

Lab ID Number: 29233

Sample Number: 119209

Date Received: 08/14/89

Date Sampled: 08/11/89

Date Analyzed: 08/14/89

	METAL (SYMBOL)/EPA METHOD	CONCENTRATION ug/ml (ppm)	REPORTING LIMIT ug/ml (ppm)
	Antimony (Sb)/7040	< 0.5	0.5
*	Arsenic (As)/7061	0.04	0.005
	Beryllium (Be)/7090	< 0.05	0.05
	Cadmium (Cd)/7130	< 0.01	0.01
	Chromium (Cr)/7190	< 0.02	0.02
	Copper (Cu)/7210	< 0.09	0.09
	Lead (Pb)/7420	< 0.05	0.05
**	Mercury (Hg)/7470	< 0.002	0.002
	Nickel (Ni)/7520	< 0.2	0.2
*	Selenium (Se)/7741	< 0.001	0.001
	Silver (Ag)/7760	< 0.05	0.05
	Thallium (Tl)/7840	< 1	1.
	Zinc (Zn)/7950	< 0.08	0.08

* Hydride generation method
** Cold vapor method

Comments:

Analyst: F. Ramezanzadeh Reviewed By: S. Azimi-Galloway Date: 08/16/89

Laboratory Director: J. M. Bartell

McLaren

PRIORITY POLLUTANT METALS
(200 SERIES)

Project: Marketplace-Emeryville

Lab Project Number: 2116

Sample Location: Marketplace Emeryville W-14

Lab ID Number: 29229

Sample Number: 119205

Date Received: 08/14/89

Date Sampled: 08/11/89

Date Analyzed: 08/14/89

	METAL (SYMBOL)/EPA METHOD	CONCENTRATION ug/ml (ppm)	REPORTING LIMIT ug/ml (ppm)
	Antimony (Sb)/7040	< 0.5	0.5
*	Arsenic (As)/7061	0.08	0.005
	Beryllium (Be)/7090	< 0.05	0.05
	Cadmium (Cd)/7130	< 0.01	0.01
	Chromium (Cr)/7190	< 0.02	0.02
	Copper (Cu)/7210	< 0.09	0.09
	Lead (Pb)/7420	< 0.05	0.05
**	Mercury (Hg)/7470	< 0.002	0.002
	Nickel (Ni)/7520	< 0.2	0.2
*	Selenium (Se)/7741	< 0.001	0.001
	Silver (Ag)/7760	< 0.05	0.05
	Thallium (Tl)/7840	< 1	1.
	Zinc (Zn)/7950	< 0.08	0.08

* Hydride generation method
** Cold vapor method

Comments:

Analyst: F. Ramezanzadeh Reviewed By: S. Azimi-Galloway for Date: 08/16/89

Laboratory Director: J. M. Bartell

McLaren

PRIORITY POLLUTANT METALS
(200 SERIES)

Project: Marketplace-Emeryville

Lab Project Number: 2116

Sample Location: Marketplace E-ville W-15

Lab ID Number: 29237

Sample Number: 119213

Date Received: 08/14/89

Date Sampled: 08/11/89

Date Analyzed: 08/14/89

METAL (SYMBOL)/EPA METHOD	CONCENTRATION ug/ml (ppm)	REPORTING LIMIT ug/ml (ppm)
Antimony (Sb)/7040	< 0.5	0.5
* Arsenic (As)/7061	0.04	0.005
Beryllium (Be)/7090	< 0.05	0.05
Cadmium (Cd)/7130	< 0.01	0.01
Chromium (Cr)/7190	< 0.02	0.02
Copper (Cu)/7210	< 0.09	0.09
Lead (Pb)/7420	< 0.05	0.05
** Mercury (Hg)/7470	< 0.002	0.002
Nickel (Ni)/7520	< 0.2	0.2
* Selenium (Se)/7741	< 0.001	0.001
Silver (Ag)/7760	< 0.05	0.05
Thallium (Tl)/7840	< 1	1.
Zinc (Zn)/7950	< 0.08	0.08

* Hydride generation method
** Cold vapor method

Comments:

Analyst: F. Ramezanzadeh Reviewed By: S. Azimi-Galloway Date: 08/16/89

Laboratory Director: J. M. Bartell

McLaren

MARKETPLACE - EMERYVILLE 08/24/89				
Well #	Lab ID	Cu	Ni	Zn
W-1	29213	< 0.02	< 0.02	0.04
W-7	29217	0.02	0.07	0.09
W-8	29221	< 0.02	< 0.02	< 0.04
W-4	29225	< 0.02	< 0.02	< 0.04
W-14	29229	< 0.02	0.02	0.06
W-13	29233	< 0.02	< 0.02	< 0.04
W-15	29237	< 0.02	< 0.02	< 0.04
MW-10	29523	< 0.02	0.02	< 0.04
Detection Limit:		0.02	0.02	0.04

CHLORIDE
EPA METHOD 9252
AND
TOTAL DISSOLVED SOLIDS
AND
pH EPA METHOD 9045

Project: Marketplace

Lab Project Number: 2116

Sample Location: W-1

Lab ID Number: 29215

Sample Number: 119608

Date Received: 08/14/89

Date Sampled: 08/09/89

Date Analyzed: 08/14/89-08/16/89

	CONCENTRATION ug/ml (ppm)	REPORTING LIMIT ug/ml (ppm)
Chloride	50.	0.5
TDS	950.	

pH = 7.2

Comments:

Analyst: F. Ramezanzadeh Reviewed By: S. Azimi-Galloway Date: 08/16/89

Laboratory Director: J. M. Bartell

McLaren

CHLORIDE
EPA METHOD 9252
AND
TOTAL DISSOLVED SOLIDS
AND
pH EPA METHOD 9045

Project: Marketplace-Emeryville

Lab Project Number: 2116

Sample Location: Marketplace Emeryville W-4

Lab ID Number: 29227

Sample Number: 119204

Date Received: 08/14/89

Date Sampled: 08/10/89

Date Analyzed: 08/14/89-08/16/89

	CONCENTRATION ug/ml (ppm)	REPORTING LIMIT ug/ml (ppm)
Chloride	120.	0.5
TDS	830.	
pH = 7.0		

Comments:

Analyst: F. Rameżanzadeh Reviewed By: S. Azimi-Galloway for: Date: 08/16/89

Laboratory Director: J. M. Bartell

McLaren

CHLORIDE
EPA METHOD 9252
AND
TOTAL DISSOLVED SOLIDS
AND
pH EPA METHOD 9045

Project: Marketplace

Lab Project Number: 2116

Sample Location: W-7

Lab ID Number: 29219

Sample: Number: 119604

Date Received: 08/14/89

Date Sampled: 08/09/89

Date Analyzed: 08/14/89-08/16/89

	CONCENTRATION ug/ml (ppm)	REPORTING LIMIT ug/ml (ppm)
Chloride	2800.	0.5
TDS	7100.	

pH = 6.7

Comments:

Analyst: F. Ramezankzadeh

Reviewed By: S. Azimi-Galloway for: Date: 08/16/89

Laboratory Director: J. M. Bartell

McLaren

CHLORIDE (EPA METHOD 9252)
TOTAL DISSOLVED SOLIDS
pH (EPA METHOD 9045)
SPECIFIC CONDUCTIVITY (EPA METHOD 9050)

Project: Marketplace-Emeryville 59802-001

Lab Project Number: 2130

Sample Location: MW-10

Lab ID Number: 29524

Sample: Number: 119615

Date Received: 08/17/89

Date Sampled: 08/16/89

Date Analyzed: 08/20/89

	CONCENTRATION ug/ml (ppm)	REPORTING LIMIT ug/ml (ppm)
Chloride	300.	0.5
TDS	860.	

pH = 11.7

Specific Conductivity = 1200. umho/cm

Comments:

Analyst: F. Ramezanzadeh

Reviewed By: S. Azimi-Galloway

Date: 08/21/89

Laboratory Director: J. M. Bartell

McLaren

CHLORIDE
EPA METHOD 9252
AND
TOTAL DISSOLVED SOLIDS
AND
pH EPA METHOD 9045

Project: Marketplace-Emeryville

Lab Project Number: 2116

Sample Location: Marketplace Emeryville W-14

Lab ID Number: 29231

Sample Number: 119208

Date Received: 08/14/89

Date Sampled: 08/11/89

Date Analyzed: 08/14/89-08/16/89

	CONCENTRATION ug/ml (ppm)	REPORTING LIMIT ug/ml (ppm)
Chloride	950.	0.5
TDS	1500.	

pH = 8.3

Comments:

Analyst: F. Ramezanzadeh Reviewed By: S. Azimi-Galloway Date: 08/16/89

Laboratory Director: J. M. Bartell

McLaren

CHLORIDE
EPA METHOD 9252
AND
TOTAL DISSOLVED SOLIDS
AND
pH EPA METHOD 9045

Project: Marketplace-Emeryville

Lab Project Number: 2116

Sample Location: Marketplace Emeryville W-13

Lab ID Number: 29235

Sample Number: 119212

Date Received: 08/14/89

Date Sampled: 08/11/89

Date Analyzed: 08/14/89-08/16/89

	CONCENTRATION ug/ml (ppm)	REPORTING LIMIT ug/ml (ppm)
Chloride	170.	0.5
TDS	940.	

pH = 7.8

Comments:

Analyst: F. Ramezanzadeh Reviewed By: S. Azimi-Galloway Date: 08/16/89

Laboratory Director: J. M. Bartell

McLaren

CHLORIDE (EPA METHOD 9252)
TOTAL DISSOLVED SOLIDS
pH (EPA METHOD 9045)
SPECIFIC CONDUCTIVITY (EPA METHOD 9050)

Project: Marketplace-Emeryville 59802-001

Lab Project Number: 2130

Sample Location: MW-10

Lab ID Number: 29524

Sample Number: 119615

Date Received: 08/17/89

Date Sampled: 08/16/89

Date Analyzed: 08/20/89

	CONCENTRATION ug/ml (ppm)	REPORTING LIMIT ug/ml (ppm)
Chloride	300.	0.5
TDS	860.	

pH = 11.7

Specific Conductivity = 1200. umho/cm

Comments:

Analyst: F. Ramezanzadeh

Reviewed By: S. Azimi-Galloway

Date: 08/21/89

Laboratory Director: J. M. Bartell

McLaren

CHLORIDE
EPA METHOD 9252
AND
TOTAL DISSOLVED SOLIDS
AND
pH EPA METHOD 9045

Project: Marketplace-Emeryville

Lab Project Number: 2116

Sample Location: Marketplace E-ville W-15

Lab ID Number: 29239

Sample Number: 119216

Date Received: 08/14/89

Date Sampled: 08/11/89

Date Analyzed: 08/14/89-08/16/89

	CONCENTRATION ug/ml (ppm)	REPORTING LIMIT ug/ml (ppm)
Chloride	180.	0.5
TDS	830.	

pH = 7.3

Comments:

Analyst: F. Ramezanzadeh Reviewed By: S. Azimi-Galloway Date: 08/16/89

Laboratory Director: J. M. Bartell

McLaren

SPECIFIC CONDUCTIVITY
EPA METHOD 9050

Project: Marketplace-Emeryville

Lab Project Number: 2116

Sample Location: Marketplace Emeryville W-4

Lab ID Number: 29228

Sample Number: 119204

Date Received: 08/14/89

Date Sampled: 08/10/89

Date Analyzed: 08/14/89

Specific Conductivity = 1300. umho/cm

Analyst: F. Ramezanzadeh

Reviewed By: S. Azimi-Galloway for: Date: 08/16/89

Laboratory Director: J. M. Bartell

McLaren

SPECIFIC CONDUCTIVITY
EPA METHOD 9050

Project: Marketplace-Emeryville

Lab Project Number: 2116

Sample Location: Marketplace Emeryville W-14

Lab ID Number: 29232

Sample Number: 119208

Date Received: 08/14/89

Date Sampled: 08/11/89

Date Analyzed: 08/14/89

Specific Conductivity = 2600. umho/cm

Analyst: F. Ramezanzadeh

Reviewed By: S. Azimi-Galloway for S. Azimi-Galloway

Date: 08/16/89

Laboratory Director: J. M. Bartell

McLaren

SPECIFIC CONDUCTIVITY
EPA METHOD 9050

Project: Marketplace-Emeryville

Lab Project Number: 2116

Sample Location: Marketplace Emeryville W-13

Lab ID Number: 29236

Sample Number: 119212

Date Received: 08/14/89

Date Sampled: 08/11/89

Date Analyzed: 08/14/89

Specific Conductivity = 1400. umho/cm

Analyst: F. Ramezanzadeh

Reviewed By: S. Azimi-Galloway for Date: 08/16/89

Laboratory Director: J. M. Bartell

McLaren

SPECIFIC CONDUCTIVITY
EPA METHOD 9050

Project: Marketplace-Emeryville	Lab Project Number: 2116
Sample Location: Marketplace Emeryville W-15	Lab ID Number: 29240
Sample Number: 119216	Date Received: 08/14/89
Date Sampled: 08/11/89	Date Analyzed: 08/14/89

Specific Conductivity = 1300. umho/cm

Analyst: F. Ramezanzadeh Reviewed By: S. Azimi-Galloway FOR Date: 08/16/89

Laboratory Director: J. M. Bartell

McLaren

SPECIFIC CONDUCTIVITY
EPA METHOD 9050

Project: Marketplace

Lab Project Number: 2116

Sample Location: W-1

Lab ID Number: 29216

Sample Number: 119608

Date Received: 08/14/89

Date Sampled: 08/09/89

Date Analyzed: 08/14/89

Specific Conductivity = 1300. umho/cm

Analyst: F. Ramezanzadeh Reviewed By: S. Azimi-Galloway for Date: 08/16/89

Laboratory Director: J. M. Bartell

McLaren

SPECIFIC CONDUCTIVITY
EPA METHOD 9050

Project: Marketplace

Lab Project Number: 2116

Sample Location: W-7

Lab ID Number: 29220

Sample Number: 119604

Date Received: 08/14/89

Date Sampled: 08/09/89

Date Analyzed: 08/14/89

Specific Conductivity = 10000. umho/cm

Analyst: F. Rameizanzadeh Reviewed By: S. Azimi-Galloway Date: 08/16/89

Laboratory Director: J. M. Bartell

McLaren

SPECIFIC CONDUCTIVITY
EPA METHOD 9050

Project: Marketplace

Lab Project Number: 2116

Sample Location: W-8

Lab ID Number: 29224

Sample Number: 119612

Date Received: 08/14/89

Date Sampled: 08/09/89

Date Analyzed: 08/14/89

Specific Conductivity = 1000. umho/cm

Analyst: F. Ramezanzadeh Reviewed By: S. Azimi-Galloway Date: 08/16/89

Laboratory Director: J. M. Bartell

McLaren

SEMI-VOLATILE ORGANICS
EPA METHOD 625

Project: Marketplace-Emeryville

Lab Project Number: 2116

Sample Location: Marketplace Emeryville W-13

Lab ID Number: 29234

Sample Number: 119210-11

Date Received: 08/14/89

Date Sampled: 08/11/89

Date Analyzed: 08/16/89

COMPOUND	ANALYTE CONCENTRATION ug/L (ppb)	REPORTING LIMIT ug/L (ppb)
Phenol	< 10	10.
Bis(2-chloroethyl)ether	< 10	10.
2-Chlorophenol	< 10	10.
1,3-Dichlorobenzene	< 10	10.
1,4-Dichlorobenzene	< 10	10.
Benzyl alcohol	< 10	10.
2-Methylphenol	< 10	10.
1,2-Dichlorobenzene	< 10	10.
Bis(2-chloroisopropyl)ether	< 10	10.
4-Methylphenol	< 10	10.
N-Nitrosodi-n-propylamine	< 10	10.
Hexachloroethane	< 10	10.
Nitrobenzene	< 10	10.
Isophorone	< 10	10.
2,4-Dimethylphenol	< 10	10.
1,2,4-Trichlorobenzene	< 10	10.
2-Nitrophenol	< 10	10.
Benzoic acid	< 50	50.
Bis(2-chloroethoxy)methane	< 10	10.
2,4-Dichlorophenol	< 10	10.
Naphthalene	< 10	10.
4-Chloroaniline	< 10	10.
Hexachlorobutadiene	< 10	10.
4-Chloro-3-methlyphenol	< 10	10.
2-Methylnaphthalene	< 10	10.
Hexachlorocyclopentadiene	< 10	10.
2,4,6-Trichlorophenol	< 10	10.
2,4,5-Trichlorophenol	< 50	50.
2-Chloronaphthalene	< 10	10.
3-Nitroaniline	< 50	50.
Dimethylphthalate	< 10	10.
2,6-Dinitrotoluene	< 10	10.
Acenaphthylene	< 10	10.
2-Nitroaniline	< 50	50.

McLaren

Lab ID
Number: 29234

COMPOUND	ANALYTE CONCENTRATION ug/L (ppb)	REPORTING LIMIT ug/L (ppb)
Acenaphthene	< 10	10.
2,4-Dinitrophenol	< 50	50.
4-Nitrophenol	< 50	50.
2,4-Dinitrotoluene	< 10	10.
Dibenzofuran	< 10	10.
Diethylphthalate	< 10	10.
4-Chlorophenyl phenyl ether	< 10	10.
Fluorene	< 10	10.
4-Nitroaniline	< 50	50.
4,6-Dinitro-2-methylphenol	< 50	50.
N-Nitrosodiphenylamine	< 10	10.
4-Bromophenyl phenyl ether	< 10	10.
Hexachlorobenzene	< 10	10.
Pentachlorophenol	< 50	50.
Phenanthrene	< 10	10.
Anthracene	< 10	10.
Butyl benzyl phthalate	< 10	10.
Fluoranthene	< 10	10.
Pyrene	< 10	10.
Di-n-butylphthalate	< 10	10.
3,3'-Dichlorobenzidine	< 20	20.
Benzo(a)anthracene	< 10	10.
Bis(2-ethylhexyl)phthalate	< 10	10.
Chrysene	< 10	10.
Di-n-octylphthalate	< 10	10.
Benzo(b)fluoranthene	< 10	10.
Benzo(k)fluoranthene	< 10	10.
Benzo(a)pyrene	< 10	10.
Indeno(1,2,3-c,d)pyrene	< 10	10.
Dibenz(a,h)anthracene	< 10	10.
Benzo(g,h,i)perylene	< 10	10.

Surrogates	% Recovery
2-Fluorophenol	21
Phenol-d5	27
Nitrobenzene-d5	63
2-Fluorobiphenyl	108
2,4,6-Tribromophenol	52
Terphenyl-d14	82

Comments:

Analyst: R. L. James Reviewed By: J. Wensloff Date: 08/16/89

Laboratory Director: J. M. Bartell

McLaren

SEMI-VOLATILE ORGANICS
EPA METHOD 625

Project: Marketplace

Lab Project Number: 2116

Sample Location: W-7

Lab ID Number: 29218

Sample Number: 119602-603

Date Received: 08/14/89

Date Sampled: 08/09/89

Date Analyzed: 08/15/89

COMPOUND	ANALYTE CONCENTRATION ug/L (ppb)	REPORTING LIMIT ug/L (ppb)
Phenol	< 10	10.
Bis(2-chloroethyl)ether	< 10	10.
2-Chlorophenol	< 10	10.
1,3-Dichlorobenzene	< 10	10.
1,4-Dichlorobenzene	< 10	10.
Benzyl alcohol	< 10	10.
2-Methylphenol	< 10	10.
1,2-Dichlorobenzene	< 10	10.
Bis(2-chloroisopropyl)ether	< 10	10.
4-Methylphenol	< 10	10.
N-Nitrosodi-n-propylamine	< 10	10.
Hexachloroethane	< 10	10.
Nitrobenzene	< 10	10.
Isophorone	< 10	10.
2,4-Dimethylphenol	< 10	10.
1,2,4-Trichlorobenzene	< 10	10.
2-Nitrophenol	< 10	10.
Benzoic acid	< 50	50.
Bis(2-chloroethoxy)methane	< 10	10.
2,4-Dichlorophenol	< 10	10.
Naphthalene	< 10	10.
4-Chloroaniline	< 10	10.
Hexachlorobutadiene	< 10	10.
4-Chloro-3-methlyphenol	< 10	10.
2-Methylnaphthalene	< 10	10.
Hexachlorocyclopentadiene	< 10	10.
2,4,6-Trichlorophenol	< 10	10.
2,4,5-Trichlorophenol	< 50	50.
2-Chloronaphthalene	< 10	10.
3-Nitroaniline	< 50	50.
Dimethylphthalate	< 10	10.
2,6-Dinitrotoluene	< 10	10.
Acenaphthylene	< 10	10.
2-Nitroaniline	< 50	50.

McLaren

Lab ID
Number: 29218

COMPOUND	ANALYTE CONCENTRATION ug/L (ppb)	REPORTING LIMIT ug/L (ppb)
Acenaphthene	< 10	10.
2,4-Dinitrophenol	< 50	50.
4-Nitrophenol	< 50	50.
2,4-Dinitrotoluene	< 10	10.
Dibenzofuran	< 10	10.
Diethylphthalate	< 10	10.
4-Chlorophenyl phenyl ether	< 10	10.
Fluorene	< 10	10.
4-Nitroaniline	< 50	50.
4,6-Dinitro-2-methylphenol	< 50	50.
N-Nitrosodiphenylamine	< 10	10.
4-Bromophenyl phenyl ether	< 10	10.
Hexachlorobenzene	< 10	10.
Pentachlorophenol	< 50	50.
Phenanthrene	< 10	10.
Anthracene	< 10	10.
Butyl benzyl phthalate	< 10	10.
Fluoranthene	< 10	10.
Pyrene	< 10	10.
Di-n-butylphthalate	< 10	10.
3,3'-Dichlorobenzidine	< 20	20.
Benzo(a)anthracene	< 10	10.
Bis(2-ethylhexyl)phthalate	< 10	10.
Chrysene	< 10	10.
Di-n-octylphthalate	< 10	10.
Benzo(b)fluoranthene	< 10	10.
Benzo(k)fluoranthene	< 10	10.
Benzo(a)pyrene	< 10	10.
Indeno(1,2,3-c,d)pyrene	< 10	10.
Dibenz(a,h)anthracene	< 10	10.
Benzo(g,h,i)perylene	< 10	10.

Surrogates	% Recovery
2-Fluorophenol	36
Phenol-d5	34
Nitrobenzene-d5	86
2-Fluorobiphenyl	86
2,4,6-Tribromophenol	2 *
Terphenyl-d14	136

Comments: * Surrogate recovery is below EPA acceptance limits. Due to insufficient amount of sample received by the laboratory, sample could not be re-extracted and reanalyzed.

Analyst: R. L. James Reviewed By: J. Wensloff Date: 08/16/89

Laboratory Director: J. M. Bartell

McLaren

SEMI-VOLATILE ORGANICS
EPA METHOD 625

Project: Marketplace-Emeryville

Lab Project Number: 2116

Sample Location: Marketplace Emeryville W-14

Lab ID Number: 29230

Sample Number: 119206-07

Date Received: 08/14/89

Date Sampled: 08/11/89

Date Analyzed: 08/16/89

COMPOUND	ANALYTE CONCENTRATION ug/L (ppb)	REPORTING LIMIT ug/L (ppb)
Phenol	< 10	10.
Bis(2-chloroethyl)ether	< 10	10.
2-Chlorophenol	< 10	10.
1,3-Dichlorobenzene	< 10	10.
1,4-Dichlorobenzene	< 10	10.
Benzyl alcohol	< 10	10.
2-Methylphenol	< 10	10.
1,2-Dichlorobenzene	< 10	10.
Bis(2-chloroisopropyl)ether	< 10	10.
4-Methylphenol	22.	10.
N-Nitrosodi-n-propylamine	< 10	10.
Hexachloroethane	< 10	10.
Nitrobenzene	< 10	10.
Isophorone	< 10	10.
2,4-Dimethylphenol	< 10	10.
1,2,4-Trichlorobenzene	< 10	10.
2-Nitrophenol	< 10	10.
Benzoic acid	< 50	50.
Bis(2-chloroethoxy)methane	< 10	10.
2,4-Dichlorophenol	< 10	10.
Naphthalene	< 10	10.
4-Chloroaniline	< 10	10.
Hexachlorobutadiene	< 10	10.
4-Chloro-3-methlyphenol	< 10	10.
2-Methylnaphthalene	< 10	10.
Hexachlorocyclopentadiene	< 10	10.
2,4,6-Trichlorophenol	< 10	10.
2,4,5-Trichlorophenol	< 50	50.
2-Chloronaphthalene	< 10	10.
3-Nitroaniline	< 50	50.
Dimethylphthalate	< 10	10.
2,6-Dinitrotoluene	< 10	10.
Acenaphthylene	< 10	10.
2-Nitroaniline	< 50	50.

McLaren

Lab ID
Number: 29230

COMPOUND	ANALYTE CONCENTRATION ug/L (ppb)	REPORTING LIMIT ug/L (ppb)
Acenaphthene	< 10	10.
2,4-Dinitrophenol	< 50	50.
4-Nitrophenol	< 50	50.
2,4-Dinitrotoluene	< 10	10.
Dibenzofuran	< 10	10.
Diethylphthalate	< 10	10.
4-Chlorophenyl phenyl ether	< 10	10.
Fluorene	< 10	10.
4-Nitroaniline	< 50	50.
4,6-Dinitro-2-methylphenol	< 50	50.
N-Nitrosodiphenylamine	< 10	10.
4-Bromophenyl phenyl ether	< 10	10.
Hexachlorobenzene	< 10	10.
Pentachlorophenol	< 50	50.
Phenanthrene	< 10	10.
Anthracene	< 10	10.
Butyl benzyl phthalate	< 10	10.
Fluoranthene	< 10	10.
Pyrene	< 10	10.
Di-n-butylphthalate	< 10	10.
3,3'-Dichlorobenzidine	< 20	20.
Benzo(a)anthracene	< 10	10.
Bis(2-ethylhexyl)phthalate	< 10	10.
Chrysene	< 10	10.
Di-n-octylphthalate	< 10	10.
Benzo(b)fluoranthene	< 10	10.
Benzo(k)fluoranthene	< 10	10.
Benzo(a)pyrene	< 10	10.
Indeno(1,2,3-c,d)pyrene	< 10	10.
Dibenz(a,h)anthracene	< 10	10.
Benzo(g,h,i)perylene	< 10	10.

Surrogates	% Recovery
2-Fluorophenol	22
Phenol-d5	20
Nitrobenzene-d5	59
2-Fluorobiphenyl	90
2,4,6-Tribromophenol	129 *
Terphenyl-d14	124

Comments: * Surrogate recoveries meet EPA/CLP criteria.

Analyst: R. L. James Reviewed By: J. Wensloff Date: 08/16/89

Laboratory Director: J. M. Bartell

McLaren

SEMI-VOLATILE ORGANICS
EPA METHOD 625

Project: Marketplace-Emeryville

Lab Project Number: 2116

Sample Location: Marketplace Emeryville W-4

Lab ID Number: 29226

Sample Number: 119202-03

Date Received: 08/14/89

Date Sampled: 08/10/89

Date Analyzed: 08/16/89

COMPOUND	ANALYTE CONCENTRATION ug/L (ppb)	REPORTING LIMIT ug/L (ppb)
Phenol	< 10	10.
Bis(2-chloroethyl)ether	< 10	10.
2-Chlorophenol	< 10	10.
1,3-Dichlorobenzene	< 10	10.
1,4-Dichlorobenzene	< 10	10.
Benzyl alcohol	< 10	10.
2-Methylphenol	< 10	10.
1,2-Dichlorobenzene	< 10	10.
Bis(2-chloroisopropyl)ether	< 10	10.
4-Methylphenol	< 10	10.
N-Nitrosodi-n-propylamine	< 10	10.
Hexachloroethane	< 10	10.
Nitrobenzene	< 10	10.
Isophorone	< 10	10.
2,4-Dimethylphenol	< 10	10.
1,2,4-Trichlorobenzene	< 10	10.
2-Nitrophenol	< 10	10.
Benzoic acid	< 50	50.
Bis(2-chloroethoxy)methane	< 10	10.
2,4-Dichlorophenol	< 10	10.
Naphthalene	< 10	10.
4-Chloroaniline	< 10	10.
Hexachlorobutadiene	< 10	10.
4-Chloro-3-methlyphenol	< 10	10.
2-Methylnaphthalene	< 10	10.
Hexachlorocyclopentadiene	< 10	10.
2,4,6-Trichlorophenol	< 10	10.
2,4,5-Trichlorophenol	< 50	50.
2-Chloronaphthalene	< 10	10.
3-Nitroaniline	< 50	50.
Dimethylphthalate	< 10	10.
2,6-Dinitrotoluene	< 10	10.
Acenaphthylene	< 10	10.
2-Nitroaniline	< 50	50.

McLaren

Lab ID
Number: 29226

COMPOUND	ANALYTE CONCENTRATION ug/L (ppb)	REPORTING LIMIT ug/L (ppb)
Acenaphthene	< 10	10.
2,4-Dinitrophenol	< 50	50.
4-Nitrophenol	< 50	50.
2,4-Dinitrotoluene	< 10	10.
Dibenzofuran	< 10	10.
Diethylphthalate	< 10	10.
4-Chlorophenyl phenyl ether	< 10	10.
Fluorene	< 10	10.
4-Nitroaniline	< 50	50.
4,6-Dinitro-2-methylphenol	< 50	50.
N-Nitrosodiphenylamine	< 10	10.
4-Bromophenyl phenyl ether	< 10	10.
Hexachlorobenzene	< 10	10.
Pentachlorophenol	< 50	50.
Phenanthrene	< 10	10.
Anthracene	< 10	10.
Butyl benzyl phthalate	< 10	10.
Fluoranthene	< 10	10.
Pyrene	< 10	10.
Di-n-butylphthalate	< 10	10.
3,3'-Dichlorobenzidine	< 20	20.
Benzo(a)anthracene	< 10	10.
Bis(2-ethylhexyl)phthalate	< 10	10.
Chrysene	< 10	10.
Di-n-octylphthalate	< 10	10.
Benzo(b)fluoranthene	< 10	10.
Benzo(k)fluoranthene	< 10	10.
Benzo(a)pyrene	< 10	10.
Indeno(1,2,3-c,d)pyrene	< 10	10.
Dibenz(a,h)anthracene	< 10	10.
Benzo(g,h,i)perylene	< 10	10.

Surrogates	% Recovery
2-Fluorophenol	15 *
Phenol-d5	19
Nitrobenzene-d5	70
2-Fluorobiphenyl	95
2,4,6-Tribromophenol	90
Terphenyl-d14	86

Comments: * Surrogate recoveries meet EPA/CLP criteria.

Analyst: R. L. James Reviewed By: J. Wensloff Date: 08/16/89

Laboratory Director: J. M. Bartell

McLaren

SEMI-VOLATILE ORGANICS
EPA METHOD 625

Project: Marketplace-Emeryville

Lab Project Number: 2116

Sample Location: Marketplace E-ville W-15

Lab ID Number: 29238

Sample Number: 119214-15

Date Received: 08/14/89

Date Sampled: 08/11/89

Date Analyzed: 08/16/89

COMPOUND	ANALYTE CONCENTRATION ug/L (ppb)	REPORTING LIMIT ug/L (ppb)
Phenol	< 10	10.
Bis(2-chloroethyl)ether	< 10	10.
2-Chlorophenol	< 10	10.
1,3-Dichlorobenzene	< 10	10.
1,4-Dichlorobenzene	< 10	10.
Benzyl alcohol	< 10	10.
2-Methylphenol	< 10	10.
1,2-Dichlorobenzene	< 10	10.
Bis(2-chloroisopropyl)ether	< 10	10.
4-Methylphenol	< 10	10.
N-Nitrosodi-n-propylamine	< 10	10.
Hexachloroethane	< 10	10.
Nitrobenzene	< 10	10.
Isophorone	< 10	10.
2,4-Dimethylphenol	< 10	10.
1,2,4-Trichlorobenzene	< 10	10.
2-Nitrophenol	< 10	10.
Benzoic acid	< 50	50.
Bis(2-chloroethoxy)methane	< 10	10.
2,4-Dichlorophenol	< 10	10.
Naphthalene	< 10	10.
4-Chloroaniline	< 10	10.
Hexachlorobutadiene	< 10	10.
4-Chloro-3-methlyphenol	< 10	10.
2-Methylnaphthalene	< 10	10.
Hexachlorocyclopentadiene	< 10	10.
2,4,6-Trichlorophenol	< 10	10.
2,4,5-Trichlorophenol	< 50	50.
2-Chloronaphthalene	< 10	10.
3-Nitroaniline	< 50	50.
Dimethylphthalate	< 10	10.
2,6-Dinitrotoluene	< 10	10.
Acenaphthylene	< 10	10.
2-Nitroaniline	< 50	50.

McLaren

Lab ID
Number: 29238

COMPOUND	ANALYTE CONCENTRATION ug/L (ppb)	REPORTING LIMIT ug/L (ppb)
Acenaphthene	< 10	10.
2,4-Dinitrophenol	< 50	50.
4-Nitrophenol	< 50	50.
2,4-Dinitrotoluene	< 10	10.
Dibenzofuran	< 10	10.
Diethylphthalate	< 10	10.
4-Chlorophenyl phenyl ether	< 10	10.
Fluorene	< 10	10.
4-Nitroaniline	< 50	50.
4,6-Dinitro-2-methylphenol	< 50	50.
N-Nitrosodiphenylamine	< 10	10.
4-Bromophenyl phenyl ether	< 10	10.
Hexachlorobenzene	< 10	10.
Pentachlorophenol	< 50	50.
Phenanthrene	< 10	10.
Anthracene	< 10	10.
Butyl benzyl phthalate	< 10	10.
Fluoranthene	< 10	10.
Pyrene	< 10	10.
Di-n-butylphthalate	< 10	10.
3,3'-Dichlorobenzidine	< 20	20.
Benzo(a)anthracene	< 10	10.
Bis(2-ethylhexyl)phthalate	< 10	10.
Chrysene	< 10	10.
Di-n-octylphthalate	< 10	10.
Benzo(b)fluoranthene	< 10	10.
Benzo(k)fluoranthene	< 10	10.
Benzo(a)pyrene	< 10	10.
Indeno(1,2,3-c,d)pyrene	< 10	10.
Dibenz(a,h)anthracene	< 10	10.
Benzo(g,h,i)perylene	< 10	10.

Surrogates	% Recovery
2-Fluorophenol	20 *
Phenol-d5	28
Nitrobenzene-d5	66
2-Fluorobiphenyl	97
2,4,6-Tribromophenol	15
Terphenyl-d14	106

Comments: * Surrogate recoveries meet EPA/CLP criteria.

Analyst: R. L. James Reviewed By: J. Wensloff Date: 08/10/89

Laboratory Director: J. M. Bartell

SEMI-VOLATILE ORGANICS
EPA METHOD 625

Project: Marketplace

Lab Project Number: 2116

Sample Location: W-1

Lab ID Number: 29214

Sample Number: 119606-607

Date Received: 08/14/89

Date Sampled: 08/09/89

Date Analyzed: 08/15/89

COMPOUND	ANALYTE CONCENTRATION ug/L (ppb)	REPORTING LIMIT ug/L (ppb)
Phenol	< 10	10.
Bis(2-chloroethyl)ether	< 10	10.
2-Chlorophenol	< 10	10.
1,3-Dichlorobenzene	< 10	10.
1,4-Dichlorobenzene	< 10	10.
Benzyl alcohol	< 10	10.
2-Methylphenol	< 10	10.
1,2-Dichlorobenzene	< 10	10.
Bis(2-chloroisopropyl)ether	< 10	10.
4-Methylphenol	< 10	10.
N-Nitrosodi-n-propylamine	< 10	10.
Hexachloroethane	< 10	10.
Nitrobenzene	< 10	10.
Isophorone	< 10	10.
2,4-Dimethylphenol	< 10	10.
1,2,4-Trichlorobenzene	< 10	10.
2-Nitrophenol	< 10	10.
Benzoic acid	< 50	50.
Bis(2-chloroethoxy)methane	< 10	10.
2,4-Dichlorophenol	< 10	10.
Naphthalene	< 10	10.
4-Chloroaniline	< 10	10.
Hexachlorobutadiene	< 10	10.
4-Chloro-3-methlyphenol	< 10	10.
2-Methylnaphthalene	< 10	10.
Hexachlorocyclopentadiene	< 10	10.
2,4,6-Trichlorophenol	< 10	10.
2,4,5-Trichlorophenol	< 50	50.
2-Chloronaphthalene	< 10	10.
3-Nitroaniline	< 50	50.
Dimethylphthalate	< 10	10.
2,6-Dinitrotoluene	< 10	10.
Acenaphthylene	< 10	10.
2-Nitroaniline	< 50	50.

Lab ID
Number: 29214

COMPOUND	ANALYTE CONCENTRATION ug/L (ppb)	REPORTING LIMIT ug/L (ppb)
Acenaphthene	< 10	10.
2,4-Dinitrophenol	< 50	50.
4-Nitrophenol	< 50	50.
2,4-Dinitrotoluene	< 10	10.
Dibenzofuran	< 10	10.
Diethylphthalate	< 10	10.
4-Chlorophenyl phenyl ether	< 10	10.
Fluorene	< 10	10.
4-Nitroaniline	< 50	50.
4,6-Dinitro-2-methylphenol	< 50	50.
N-Nitrosodiphenylamine	< 10	10.
4-Bromophenyl phenyl ether	< 10	10.
Hexachlorobenzene	< 10	10.
Pentachlorophenol	< 50	50.
Phenanthrene	< 10	10.
Anthracene	< 10	10.
Butyl benzyl phthalate	< 10	10.
Fluoranthene	< 10	10.
Pyrene	< 10	10.
Di-n-butylphthalate	< 10	10.
3,3'-Dichlorobenzidine	< 20	20.
Benzo(a)anthracene	< 10	10.
Bis(2-ethylhexyl)phthalate	< 10	10.
Chrysene	< 10	10.
Di-n-octylphthalate	< 10	10.
Benzo(b)fluoranthene	< 10	10.
Benzo(k)fluoranthene	< 10	10.
Benzo(a)pyrene	< 10	10.
Indeno(1,2,3-c,d)pyrene	< 10	10.
Dibenz(a,h)anthracene	< 10	10.
Benzo(g,h,i)perylene	< 10	10.

Surrogates	% Recovery
2-Fluorophenol	15 *
Phenol-d5	16
Nitrobenzene-d5	85
2-Fluorobiphenyl	107
2,4,6-Tribromophenol	59
Terphenyl-d14	85

Comments: * Surrogate recoveries meet EPA/CLP criteria.

Analyst: R. L. James Reviewed By: J. Wensloff Date: 08/16/89

Laboratory Director: J. M. Bartell

McLaren

SEMI-VOLATILE ORGANICS
EPA METHOD 625

Project: Marketplace

Lab Project Number: 2116

Sample Location: W-8

Lab ID Number: 29222

Sample Number: 119612

Date Received: 08/14/89

Date Sampled: 08/09/89

Date Analyzed: 08/16/89

COMPOUND	ANALYTE CONCENTRATION ug/L (ppb)	REPORTING LIMIT ug/L (ppb)
Phenol	< 10	10.
Bis(2-chloroethyl)ether	< 10	10.
2-Chlorophenol	< 10	10.
1,3-Dichlorobenzene	< 10	10.
1,4-Dichlorobenzene	< 10	10.
Benzyl alcohol	< 10	10.
2-Methylphenol	< 10	10.
1,2-Dichlorobenzene	< 10	10.
Bis(2-chloroisopropyl)ether	< 10	10.
4-Methylphenol	< 10	10.
N-Nitrosodi-n-propylamine	< 10	10.
Hexachloroethane	< 10	10.
Nitrobenzene	< 10	10.
Isophorone	< 10	10.
2,4-Dimethylphenol	< 10	10.
1,2,4-Trichlorobenzene	< 10	10.
2-Nitrophenol	< 10	10.
Benzoic acid	< 50	50.
Bis(2-chloroethoxy)methane	< 10	10.
2,4-Dichlorophenol	< 10	10.
Naphthalene	16.	10.
4-Chloroaniline	< 10	10.
Hexachlorobutadiene	< 10	10.
4-Chloro-3-methlyphenol	< 10	10.
2-Methylnaphthalene	< 10	10.
Hexachlorocyclopentadiene	< 10	10.
2,4,6-Trichlorophenol	< 10	10.
2,4,5-Trichlorophenol	< 50	50.
2-Chloronaphthalene	< 10	10.
3-Nitroaniline	< 50	50.
Dimethylphthalate	< 10	10.
2,6-Dinitrotoluene	< 10	10.
Acenaphthylene	< 10	10.
2-Nitroaniline	< 50	50.

McLaren

Lab ID
Number: 29222

COMPOUND	ANALYTE CONCENTRATION ug/L (ppb)	REPORTING LIMIT ug/L (ppb)
Acenaphthene	< 10	10.
2,4-Dinitrophenol	< 50	50.
4-Nitrophenol	< 50	50.
2,4-Dinitrotoluene	< 10	10.
Dibenzofuran	< 10	10.
Diethylphthalate	< 10	10.
4-Chlorophenyl phenyl ether	< 10	10.
Fluorene	< 10	10.
4-Nitroaniline	< 50	50.
4,6-Dinitro-2-methylphenol	< 50	50.
N-Nitrosodiphenylamine	< 10	10.
4-Bromophenyl phenyl ether	< 10	10.
Hexachlorobenzene	< 10	10.
Pentachlorophenol	< 50	50.
Phenanthrene	< 10	10.
Anthracene	< 10	10.
Butyl benzyl phthalate	< 10	10.
Fluoranthene	< 10	10.
Pyrene	< 10	10.
Di-n-butylphthalate	< 10	10.
3,3'-Dichlorobenzidine	< 20	20.
Benzo(a)anthracene	< 10	10.
Bis(2-ethylhexyl)phthalate	< 10	10.
Chrysene	< 10	10.
Di-n-octylphthalate	< 10	10.
Benzo(b)fluoranthene	< 10	10.
Benzo(k)fluoranthene	< 10	10.
Benzo(a)pyrene	< 10	10.
Indeno(1,2,3-c,d)pyrene	< 10	10.
Dibenz(a,h)anthracene	< 10	10.
Benzo(g,h,i)perylene	< 10	10.

Surrogates	% Recovery
2-Fluorophenol	22
Phenol-d5	21
Nitrobenzene-d5	113
2-Fluorobiphenyl	187 *
2,4,6-Tribromophenol	110
Terphenyl-d14	222 *

Comments: * Surrogate recovery is above EPA acceptance limits. Due to insufficient amount of sample received by the laboratory, sample could not be re-extracted and reanalyzed.

Analyst: R. L. James Reviewed By: J. Wensloff Date: 08/16/89

Laboratory Director: J. M. Bartell

McLaren

Anlab
ANALYTICAL LABORATORY
A DIVISION OF DEWANTE & STOWELL

1914 S STREET, SACRAMENTO, CALIFORNIA 95814 • 916-447-2946

Base/Neutral Extractable Organic Priority Pollutants
EPA #625

Client: MCLAREN ANALYTICAL LABORATORY
Attn: Shakoora Azimi
Page: 2

Sample Description: 119614
MW-10
Report Date: 08/18/89
Anlab ID# 122608-1
Units: ug/l

Date Sample Collected: Unknown
Date Received @ Lab: 08/17/89
Date Analysis Completed: 08/17/89

Laboratory Project # 2130

Storet	Compound	Concentration	MDL
34611	2,4-Dinitrotoluene	<10	10
34626	2,6-Dinitrotoluene	<10	10
34596	Di-n-octylphthalate	<10	10
34376	Fluoranthene	<10	10
34381	Fluorene	<10	10
39700	Hexachlorobenzene	<10	10
34391	Hexachlorbutadiene	<10	10
34396	Hexachloroethane	<10	10
34403	Indeno (1,2,3-cd) pyrene	<10	10
34408	Isophorone	<10	10
34696	Naphthalene	<10	10
34447	Nitrobenzene	<10	10
34428	N-nitrosodi-n-propylamine	<10	10
34461	Phenanthrene	<10	10
34469	Pyrene	<10	10
34551	1,2,4-Trichlorobenzene	<10	10

OTHER DETECTABLE PRIORITY POLLUTANTS		Concentration	MDL
39120	Benzidine	<100	100
34386	Hexachlorocyclopentadiene	<10	10
34438	N-nitrosodimethylamine	<10	10
34433	N-nitrosodiphenylamine	<10	10

n/a = not analyzed

Data Certified Init. KG
Report Approved Init. TK

Anlab
ANALYTICAL LABORATORY
A DIVISION OF DEWANTE & STOWELL

1914 S STREET, SACRAMENTO, CALIFORNIA 95814 • 916-447-2946

Base/Neutral Extractable Organic Priority Pollutants EPA #625

Client: MCLAREN ANALYTICAL LABORATORY
Attn: Shakoora Azimi
Page: 1

Sample Description: 119614 MW-10
Report Date: 08/18/89
Anlab ID# 122608-1
Units: ug/l

Date Sample Collected: Unknown
Date Received @ Lab: 08/17/89
Date Analysis Completed: 08/17/89

Laboratory Project # 2130

Storet	Compound	Concentration	MDL
34205	Acenaphthene.....	<10	10
34200	Acenaphthylene.....	<10	10
34220	Anthracene.....	<10	10
34526	Benzo (a) anthracene.....	<10	10
34230	Benzo (b) fluoranthene.....	<10	10
34242	Benzo (k) fluoranthene.....	<10	10
34247	Benzo (a) pyrene.....	<10	10
34521	Benzo (ghi) perylene.....	<10	10
34292	Benzyl butyl phthalate.....	<10	10
34273	Bis (2-chloroethyl) ether.....	<10	10
34278	Bis (2-chloroethoxy) methane.....	<10	10
39100	Bis (2-ethylhexyl) phthalate.....	<10	10
34283	Bis (2-chloroisopropyl) ether....	<10	10
34636	4-Bromophenyl phenyl ether.....	<10	10
34581	2-Chloronaphthalene.....	<10	10
34641	4-Chlorophenyl phenyl ether.....	<10	10
34320	Chrysene.....	<10	10
34556	Dibenzo (a,h) anthracene.....	<10	10
39110	Di-n-butylphthalate.....	<10	10
34566	1,3-Dichlorobenzene.....	<10	10
34536	1,2-Dichlorobenzene.....	<10	10
34571	1,4-Dichlorobenzene.....	<10	10
34631	3,3'-Dichlorobenzidine.....	<100	100
34336	Diethyl phthalate.....	<10	10
34341	Dimethyl phthalate.....	<10	10

Data Certified Init. KTorrey Report Approved Init. Tom Kling

Anlab
ANALYTICAL LABORATORY
A DIVISION OF DEWANTE & STOWELL

1914 S STREET, SACRAMENTO, CALIFORNIA 95814 • 916-447-2946

Acid Extractable Organic Priority Pollutants
EPA #625

Client: MCLAREN ANALYTICAL LABORATORY
Attn: Shakoora Azimi
Page: 3

Sample Description: 119614
MW-10
Report Date: 08/18/89
Anlab ID# 122608-1
Units: ug/l

Date Sample Collected: Unknown
Date Received @ Lab: 08/17/89
Date Analysis Completed: 08/17/89

Laboratory Project # 2130

Storet	Compound	Concentration	MDL
34452	4-Chloro-3-methylphenol	<10	10
34586	2-Chlorophenol	<10	10
34601	2,4-Dichlorophenol	<10	10
34606	2,4-Dimethylphenol	<10	10
34616	2,4-Dinitrophenol	<10	10
34657	2-Methyl-4,6-dinitrophenol	<10	10
34591	2-Nitrophenol	<10	10
34646	4-Nitrophenol	<10	10
39032	Pentachlorophenol	<10	10
34694	Phenol	<10	10
34621	2,4,6-Trichlorophenol	<10	10

NA = not analyzed

Data Certified Init. KT Report Approved Init. TK

cc: Julie Menack
McLaren
980 Atlantic Avenue, Suite 100
Alameda, CA 94501

MARKETPLACE - EMERYVILLE

SEMI-VOLATILE HYDROCARBONS

ESTIMATED CURVE
HC C9-C35

LAB ID #	WELL ID #	ESTIMATED CURVE HC C9-C35
29218	MW 7	260 µg/l
29214	MW 1	ND @ 50 µg/l
29222	MW 8	ND @ 50 µg/l
29234	MW 13	ND @ 50 µg/l
29330	MW 14	ND @ 50 µg/l
29238	MW 15	ND @ 50 µg/l
29226	MW 4	ND @ 50 µg/l

Calculations are based on measuring the height of hydrocarbon pattern relative to the peak height of an internal standard. This gives only an estimated concentration. Values cannot be reported below 50 µg/l due to possible carryover from MW 7.

Calculation:

$$\mu g/l = \frac{(Px)(Is)(Vt)}{(Pis)(Rf)(Vo)(V.)}$$

Px = pk. ht. sample
Pis = pk. ht. Is
Is = Is conc in ng(40)
Vt = Vol. tot. extract (1000 µl)
Rf = Assume 1
Vo = Vol Wate Ext. (1000 ml)
Vi = Vol injected (1 µl)

LP 2111

PO 41541 004442

CHAIN OF CUSTODY RECORD

Sampler: Jeff Huckendubler Date Shipped: Aug 10, 1989 Carrier: Fed Ex

Telephone: 415 521 5200 Airbill Number: _____ Cooler: _____

SHIP TO:
McLaren Analytical Laboratory
11101 White Rock Road
Rancho Cordova, CA 95670
(916) 638-3696

4 EHR TAT 4E41

SEND RESULTS TO:
Client Name: Julie Monack
Company: McLaren
Address: Alameda
Phone: 415 521 5200

PROJECT NAME: Marketplace **PROJECT #:** _____

LABORATORY PROJECT (LP) #: _____ **P.O. #:** _____

Relinquished by: (Signature) Jeff Huckendubler Received by: (Signature) Farida Sirjani Date: Aug 10/89 Time: 9:30 am

Relinquished by: (Signature) Farida Sirjani Received by: (Signature) Date: Aug 11/89 Time: 16:00

Relinquished by: (Signature) Received at lab by: (Signature) Date: Time:

ANALYSIS REQUEST

Sample ID Number	Sample Description	Date/Time	Analysis Requested	T.A.T.	Type of Container	Number of Containers	Lab ID
119605	W-1	8-9 (15:45)	Metals	2	1l Amb	1	
9606→607	"	"	625	"	"	2	
119608	"	"	pH, TDS, Cl⁻, Conduc.	"	"	1	
119601	W-7	8-9 (14:45)	Metals	"	"	1	
9602→603	"	"	625	"	"	2	
119604	"	"	pH, TDS, Cl⁻, Conduc	"	"	1	
119609	W-8	8-9 (16:35)	Metals	"	"	1	
9610→611	"	"	625	"	"	2	
119612	"	"	pH, TDS, Cl⁻, Conduc	"	"	1	

Special Instructions/Comments:

Sample Condition Upon Receipt:

SAMPLES RECEIVED IN GOOD CONDITION

Expected Analytical Turn-Around Times:

1 = Immediate Attention: 24 hours
2 = Rush: 48 hours
3 = Standard: 1 week
4 = Standard: 2 weeks

Laboratory Disposition:
Storage Refrigerator ID 11-20
Storage Freezer ID _____

Secured: Yes ___ No ___

LP 2116

McLaren Analytical Laboratory

PB 1 OF 4 № 209751

Chain of Custody Record

RESULTS: ATTN: JULIE MENACK

PERISTALTIC

48 HR TAT

PROJECT DESIGNATION: MARKETPLACE EMERYVILLE SAMPLES TAKEN BY:* BRAD WEBB 2922

AREA	SAMPLE LOCATION	DATE	TIME	SAMPLE TYPE: WATER COMP	SAMPLE TYPE: WATER GRAB	SAMPLE TYPE: SOIL	SAMPLE NO.	TYPE CONTAINER(S)	ANALYSIS REQUIRED
MARKETPLACE EMERYVILLE	W-4	8-10-89	1510		X		119201	1 L. amber	METALS (PPM)
			1511		X		119202		625 29226
			1512		X		119203		↓
			1513		X		119204		pH, conductivity, TDS 28
									29227/28

FIELD DISPOSITION:

IMMEDIATE DELIVERY ☐

STORAGE ☒ REFRIGERATOR ☒ ID ALAMEDA SHOP SECURED ☐ YES

ON ICE FREEZER ☐ ID _____ ☐ NO

RELINQUISHED BY:*	RECEIVED BY:*	DATE/TIME
Brad Webb W. Webb.	Fariba Sirjani	8/11/89 1640
RELINQUISHED BY:*	RECEIVED BY:*	DATE/TIME
Fariba Sirjani	Fed Ex	8/11/89 1500
RECEIVED FOR LABORATORY BY:*	Agnes Benton	DATE/TIME 8-14-89 11:0[illegible]

METHOD OF SHIPMENT:

ICE → FED EX → MAL

LABORATORY DISPOSITION:

IMMEDIATE ANALYSIS ☐ STORAGE ☐ REFRIGERATOR ☐ ID _____ SECURED

FREEZER ☐ ID _____ ☐ ☐

CABINET ☐ ID _____ YES NO

* PRINT NAME AFTER SIGNATURE

SAMPLES RECEIVED IN GOOD CONDITION

McLaren Environmental Engineering

11101 White Rock Road, Rancho Cordova, CA 95670 (916) 638-3696

SP 2116

McLaren Analytical Laboratory

PG 2 OF 4 Nº 209739

Chain of Custody Record

PERISTALTIC

RESULTS TO JULIE MEWACK (ALAMEDA)

48H TAT

PROJECT DESIGNATION MARKETPLACE - EMERYVILLE SAMPLES TAKEN BY:* BRAD WEBB

AREA	SAMPLE LOCATION	DATE	TIME	SAMPLE TYPE: WATER COMP	SAMPLE TYPE: WATER GRAB	SAMPLE TYPE: SOIL	SAMPLE NO.	TYPE CONTAINER(S)	ANALYSIS REQUIRED 2922
MARKETPLACE EMERYVILLE	W-14	8-11-89	12:42		X		119205	1 L amber	METALS (APM)
			12:44		X		119206		625 29230
			12:46		X		119207		29231/32
			12:48		X		119208		pH, conductivity, TDS, Cl⊖
	W-13		1141		X		119209	1 L amber	METALS 29233
			11:43		X		119210		625 29234
			11:45		X		119211		↓ 36
			11:47		X		119212		pH, conductivity, TDS, Cl⊖ 29235/36

FIELD DISPOSITION:

IMMEDIATE DELIVERY ☐

STORAGE ☒ REFRIGERATOR ☐ ID _____ SECURED ☐ YES

ON ICE FREEZER ☐ ID _____ ☐ NO

RELINQUISHED BY:*	RECEIVED BY:*	DATE/TIME
Brad Webb		8/11/89 16:10
RELINQUISHED BY:*	RECEIVED BY:*	DATE/TIME
RECEIVED FOR LABORATORY BY:*		DATE/TIME

METHOD OF SHIPMENT:

ICE → FED EX → MAZ

LABORATORY DISPOSITION:

IMMEDIATE ANALYSIS ☐ STORAGE ☐ REFRIGERATOR ☐ ID _____ SECURED

FREEZER ☐ ID _____ ☐ ☐

CABINET ☐ ID _____ YES NO

* PRINT NAME AFTER SIGNATURE

SAMPLES RECEIVED IN GOOD CONDITION

McLaren Environmental Engineering

11101 White Rock Road, Rancho Cordova, CA 95670 (916) 638-3696

LP2116

McLaren Analytical Laboratory

PG 30F4 № 209753

Chain of Custody Record

(A)=PERISTALTIC (W-15)
(B)=BAILER (WA 10) - BIN

RESULTS TO: JULIE MENACK (ALAMEDA)

4 DAY TAT

PROJECT DESIGNATION: MARKET PLACE - EMERYVILLE SAMPLES TAKEN BY: BRAD WEBB

AREA	SAMPLE LOCATION	DATE	TIME	SAMPLE TYPE: WATER COMP	SAMPLE TYPE: WATER GRAB	SAMPLE TYPE: SOIL	SAMPLE NO.	TYPE CONTAINER(S)	ANALYSIS REQUIRED
MARKET PLACE EMERYVILLE	W-15	8-14-89			X		119213	1 L amber	METALS (AA's) 29238
	↓	↓			L		119214	↓	6,25 ↓
					L		119215		↓ 40
					L		119216	↓	pH, conductivity, TDS, CR 29239/40

FIELD DISPOSITION:

IMMEDIATE DELIVERY ☐

STORAGE ☒ REFRIGERATOR ☐ ID _____ SECURED ☐ YES

FREEZER ☐ ID _____ ☐ NO

RELINQUISHED BY:*	RECEIVED BY:*	DATE/TIME
[signature]		8/14/89
RELINQUISHED BY:*	RECEIVED BY:*	DATE/TIME
RECEIVED FOR LABORATORY BY:* Agnes Burton		DATE/TIME 8-14-89 11:00

METHOD OF SHIPMENT:

LABORATORY DISPOSITION:

IMMEDIATE ANALYSIS ☐ STORAGE ☐ REFRIGERATOR ☐ ID _____ SECURED

FREEZER ☐ ID _____ ☐ ☐

CABINET ☐ ID _____ YES NO

* PRINT NAME AFTER SIGNATURE

SAMPLES RECEIVED IN GOOD CONDITION

McLaren Environmental Engineering
11101 White Rock Road, Rancho Cordova, CA 95670 (916) 638-3696

004432

CHAIN OF CUSTODY RECORD

McLaren

Sampler: Jim Van de Water Date Shipped: 8/16/99 Carrier:

Telephone: 415 521-5200 Airbill Number: 203 0982 003 Cooler:

SHIP TO:
McLaren Analytical Laboratory
11101 White Rock Road
Rancho Cordova, CA 95670
(916) 638-3696

SEND RESULTS TO:
Client Name: Jim Van Der Water or Julie Mena
Company: McLaren
Address: Alameda
Phone: (415) 521-5200 x 363

PROJECT NAME: Marketplace - Emeryville **PROJECT #:** 59802-001

LABORATORY PROJECT (LP) #: 2130 **P.O. #:**

Relinquished by: (Signature) Jim Van de Water Received by: (Signature) Date: 8/16/99 Time:

Relinquished by: (Signature) Received by: (Signature) Date: Time:

Relinquished by: (Signature) Received at lab by: (Signature) Olga E Burton Date: 8-17-99 Time: 10:00

ANALYSIS REQUEST

Sample ID Number	Sample Description	Date/Time	Analysis Requested	T.A.T.	Type of Container	Number of Containers	Lab ID
119613	MW-10	16:45	metals (ppm)		1 liter amber	1	29523
119614*	"	"	625		"	1	~~29524~~
119616	"	"	625 spare		"	1	~~29526~~ (29524) ~~29526~~
119615	"	"	pH TDS conductivity Cl⁻		1 liter plastic		
			2 - 625 ANALYSIS SENT TO ANOTHER LAB. EQUIPMENT DOWN 8-17-99				

Special Instructions/Comments: * sample 119614 sent out sample 119616 was archived at McLaren Labs 8/17/99

Note TAT, if possible by Friday PM. If not is there a way to ~~get~~ it by Saturday

Sample Condition Upon Receipt:

Expected Analytical Turn-Around Times:

1 = Immediate Attention: 24 hours
2 = Rush: 48 hours
3 = Standard: 1 week
4 = Standard: 2 weeks

Laboratory Disposition: 4
Storage Refrigerator ID
Storage Freezer ID

Secured: Yes / No