June 6, 2008

Mr. Jerry Wickham
Hazardous Materials Specialist
Alameda County Environmental Health
1131 Harbor Bay parkway, Suite 250
Alameda, CA 94502-6577

Subject: Fuel Leak Case No. RO0000092 and Geotracker Global ID T0600100065 Work Plan for Additional Site Investigation–AB&I Foundry, 7825 San Leandro Street, Oakland, California 94621

Dear Mr Wickham:

AB&I respectfully submits the attached Work Plan for Additional Site Investigation for the AB&I Foundry Site located at 7825 San Leandro Street, Oakland, California.

I declare, under penalty of perjury, that the information and/or recommendations contained in the attached document is true and correct to the best of my knowledge.

Sincerely,

AB&I

Dave Robinson
Environmental Manager

Attachment: Work Plan for Additional Site Investigation - AB&I Foundry, 7825 San Leandro Street, Oakland, California

WORK PLAN FOR

ADDITIONAL SITE INVESTIGATION

AB&I Foundry
7825 San Leandro Street
Oakland, California

01-ABI-001

Prepared For:

AB&I
7825 San Leandro Street
Oakland, California

Prepared By:

SGI environmental THE SOURCE GROUP, INC.
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June 6, 2008

Prepared By:

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Principal Geologist

Reviewed By:

Jon R. Philipp, P.G., C.HG.
Senior Hydrogeologist

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CERTIFICATION

All hydrogeologic and geologic information, conclusions, and recommendations in this document regarding the AB&I Foundry Site have been prepared under the supervision of and reviewed by the certified professional whose signature appears below.

Jon Philipp, P.G., C.HG.
Senior Hydrogeologist
The Source Group, Inc.
California Professional Geologist No. 7945

6/9/08
Date

1.0 INTRODUCTION

This document presents a Supplemental Site Investigation Work Plan (Work Plan) for the AB&I Foundry (AB&I), located at 7825 San Leandro Street, in Oakland, California (the Site, Figure 1). This Work Plan was prepared in response to comments provided by Alameda County Environmental Health (ACEH) in their letter dated March 27, 2008. The ACEH letter was prepared in response to the The Source Group, Inc. (SGI) report titled, *Site Investigation Report*, dated February 14, 2008 (Site Investigation Report) and requests a work plan from AB&I to address further characterization of the Site (ACEH, 2008). SGI prepared this Work Plan on behalf of AB&I for submittal to the ACEH.

2.0 BACKGROUND

2.1 Site Description

The Site is located at 7825 San Leandro Street, east of the intersection with 77th Avenue, in a light industrial area of Oakland (Figures 1 and 2). The Site is bound by commercial/industrial properties to the north, south, east, and west. Union Pacific Railroad tracks are located immediately adjacent to the western edge of the Site. Elmhurst Creek is located at the southeast corner of the Site (Figure 2). San Leandro Bay is located approximately one mile west of the Site.

2.2 Site History and Operations

AB&I has been operating at its present location since at least 1930 (BSK, 1993). Business activities include the manufacture of cast pipe and fittings. The facility accepts scrap iron and steel, which it stockpiles on-site, for use during manufacturing activities. The Site encompasses an area of approximately 11.8 acres. Previously, seven underground storage tanks (USTs) have been located on-site.

A water supply well is located along southwest perimeter of the Site. Information provided by AB&I indicates that the well is currently used in conjunction with East Bay Municipal Utility District (EBMUD) water as a source of process (cooling) water associated with plant operations.

2.3 Hydrogeological Setting

The Site is located near the San Francisco Bay within an area identified as the East Bay Plain. The East Bay Plain is situated on the east side of the San Francisco Bay depression. The alluvial sediments of the East Bay Plain consist of a mixture of gravel, sand and clay deposited by coalescing alluvial fans. In the vicinity of the Site, fluvial and near shore deposits have been mapped (Helley et. al., 1979). The fluvial deposits are described as unconsolidated, moderately sorted, fine sand and silt, with clayey silt and occasional thin beds of coarse sand (Muir, 1993). The near-shore deposits are described as a well-sorted, fine to medium grained sand and silt, with lenses of sandy clay and clay. Regional groundwater flow in the vicinity of the Site is interpreted to be towards the west - southwest toward San Leandro Bay.

Although groundwater in the East Bay Plain is generally considered a potential future source of drinking water, there are no permitted drinking water wells within the Site vicinity (SFRWQCB, 1999), nor is the shallow groundwater in this area likely to be used as a public drinking water source in the foreseeable future.

Soils encountered in the unsaturated and saturated zones beneath the Site are predominantly gravelly clay (fill) and silty clay with an interfingered lens of poorly sorted sand and gravel to the maximum depth explored (30 feet below ground surface [bgs]). Shallow groundwater has been observed to occur at the Site at a depth of approximately 4 to 9 feet bgs and flows toward the northwest.

Lithologic conditions reported for the Oakland Truck Stop site located immediately adjacent to and east of the Site indicates that sediments underlying that site generally include silty clay to a depth of approximately 16 feet bgs, sediments from 16 feet bgs to 40 feet bgs consist of more permeable soil such as silty sand, sandy silt or gravelly sand and sediments from 40 feet bgs to the total depth explored of 50 feet bgs consist of a low permeability silty clay (ASE, 2007).

2.4 Previous Investigations

Various investigations have been conducted at the Site since 1991. Four of the investigations consisted of UST closure reports that were written as part of UST removals conducted at the Site between August 1991 and June 1992. In addition to the four USTs removed in the early 1990s, the three 10,000-gallon USTs were removed in 1982/1983. The USTs removed included:

- Three 10,000-gallon USTs used for storing gasoline (removed 1982/1983);
- 8,000-gallon UST used for storing unleaded gasoline (removed 8/8/91);
- 550-gallon UST used for storing regular, leaded gasoline (removed 8/26/91);
- 8,000-gallon UST initially used for storing mineral spirits and later for storing 1,1,1-trichloroethane (removed 10/4/91); and
- 12,000-gallon UST used for storing diesel fuel (removed 6/3/92).

All of the tank removals, with the exception of the three former 10,000-gallon gasoline USTs were accompanied by a UST closure report. Information on the history of the three 10,000-gallon gasoline USTs was obtained from a review of historical aerial photographs from 1969, 1975, 1977, and 1983 obtained from Pacific Aerial Surveys, located in Oakland, California and from discussions with Mr. Dave Robinson (AB&I's Environmental Manager).

Previous investigations conducted at the Site suggested that the three 10,000-gallon gasoline USTs were located within the building footprint of the Finished Goods Storage Area warehouse (Figure 2). A review of the aerial photographs and discussions with Mr. Dave Robinson indicate that the three 10,000-gallon USTs were not located within the Finished Goods Storage Area footprint but were located adjacent to, and northeast of the Finished Goods Storage Area (Figure 2).

Information on the remaining USTs was obtained from closure reports prepared following their removal.

In general, analytical results for the soil and groundwater samples collected from locations adjacent to the USTs during their removal reportedly showed detectable concentrations of total petroleum hydrocarbons as gasoline (TPHg), as diesel (TPHd), 1,1-dichloroethane (1,1-DCA), chloroethane, and 1,1,1 trichloroethane (1,1,1-TCA). Affected soil at each former tank location was excavated until confirmation samples indicated the chemicals of concern were at relatively low concentrations based on photoionization detector (PID) screening results, or to where an obstruction made further excavation impracticable and/or hazardous.

In 1993, BSK installed four groundwater monitoring wells (MW-1 through MW-4) to comply with a request by the ACEH for a preliminary assessment of the areas surrounding each of the removed USTs (Figure 2). Between 1993 and 1997, sampling results indicated the presence of petroleum hydrocarbons and chlorinated volatile organic compounds (chlorinated VOCs) in groundwater in the vicinity of the former USTs.

On July 14, 2006, groundwater samples were collected from each of the existing monitoring wells (MW-1, MW-3, and MW-4) and submitted for chemical analysis for polyaromatic hydrocarbons (PAHs) using EPA Method 8270C, TPHg and TPHd using EPA Method 8015M as well as benzene, toluene, ethylbenzene and xylenes (BTEX) using EPA Method 8020. The three samples were also analyzed for VOCs, including fuel oxygenates using EPA Method 8260B. Well MW-2 was found to be damaged beyond repair, and therefore was not sampled.

In August 2006, monitoring well MW-2 was destroyed and replaced with well MW-2R (BSK, 2007). In addition, five new groundwater monitoring wells (MW-5 through MW-9) were also installed.

Results of the July/August 2006 sampling event indicated that five of the nine wells had concentrations of at least one compound that exceeded their respective U.S. Environmental Protection Agency (USEPA) maximum contaminant level (MCL) or California Regional Water Quality Control Board – San Francisco Bay Region (CRWQCB-SF) Environmental Screening Levels for groundwater that is a current or potential source of drinking water (ESLs; BSK, 2007).

In October/November 2007, SGI conducted an investigation on the Site to further characterize the extent of petroleum hydrocarbon and chlorinated VOC-affected soil and groundwater associated with former USTs at the Site. TPHg, TPHd, BTEX, methyl tert butyl ether (MTBE), tributyl alcohol (TBA), and chlorinated VOCs were detected in groundwater underlying the Site. Of the constituents detected, only vinyl chloride and 1,1-dichloroethane (1,1-DCA) exceeded their respective ESLs for groundwater that is not a current or potential source of drinking water. A review of historical groundwater data indicated that chlorinated VOC concentrations were stabilized or declining for certain compounds. As a result, SGI concluded that the Site was a low-risk release site and recommended that quarterly monitoring of all nine monitoring wells continue to confirm that concentrations are steady or declining (SGI 2008a).

In February 2008, groundwater samples were collected as part of the quarterly monitoring program required for the Site. Nine wells (MW-1 through MW-9) were sampled as part of the monitoring event. Generally, concentrations of TPHg, TPHd, BTEX, and chlorinated VOCs reported during the sampling event were consistent with those reported during the August 2006 and October 2007 sampling events with the exception of increased concentrations of chlorinated VOCs in well MW-8. SGI concluded that the increased concentrations of chlorinated VOCs reported in samples collected from well MW-8 may be a result of rising water levels since August 2006 (SGI 2008b).

On March 27, 2008, ACEH issued a letter to AB&I requesting a work plan to include:

- Preparation of a conceptual site model that evaluates the potential sources, contaminant migration pathways, and potential receptors for the petroleum hydrocarbons and VOCs within the area of and downgradient of the former 8,000 gallon mineral spirits/1,1,1-TCA UST;
- Preparation of a conceptual site model that evaluates the potential sources, contaminant migration pathways, and potential receptors for the petroleum hydrocarbons within the area of and downgradient of the former three 10,000-Gallon USTs dispenser island area;
- Conducting further investigation to define the vertical extent of contamination in the area of the former three 10,000-Gallon USTs, former 550 gallon gasoline UST, and former 8,000 gallon mineral spirits/1,1,1-TCA UST;
- Evaluation of the potential for vapor intrusion to the office building located adjacent to the former 550 gallon gasoline UST Area;
- Evaluation of possible reasons for the discrepancy between soil gas and groundwater sample results in the vicinity of monitoring well MW-8; and
- Submittal of sampling results for VOCs and petroleum hydrocarbons in groundwater from the on-site water supply well.

3.0 PROJECT OBJECTIVES AND SCOPE OF WORK

3.1 Project Objectives

The objective of this investigation is to fill in data gaps associated with previous investigations conducted at the Site and to further delineate the extent of petroleum hydrocarbon and VOC contamination in groundwater underlying the Site. The investigation will address concerns outlined by ACEH in their letter to AB&I, dated March 27, 2008 (ACEH, 2008). Specifically, the concerns outlined by the ACEH and noted by SGI that will be addressed during this investigation include:

Conceptual Site Model - Former Mineral Spirits/1,1,1-TCA UST Area

ACEH has requested that AB&I prepare a conceptual site model that evaluates the potential sources, contaminant migration pathways, and potential receptors for the petroleum hydrocarbons and VOCs within the area of and downgradient of the former mineral spirits/1,1,1-TCA UST. This information is outlined schematically in a conceptual site model (CSM) shown on Figure 3 and described below.

Potential Sources

The potential source(s) of contaminants released into the environment are interpreted to be leaks associated with the operation of the former mineral spirits/1,1,1-TCA UST. In addition, releases from the former three 10,000-Gallon USTs dispenser island area also appear to be commingling with and have impacted groundwater in the area of the former mineral spirits/1,1,1-TCA UST.

As depicted in the report titled *Site Investigation Report*, prepared by SGI, dated February 14, 2008, a chlorinated VOC plume is shown beginning approximately 100 feet northwest of the former mineral spirits/1,1,1-TCA UST(SGI 2008a). ACEH has requested that current and past activities within the area between the former mineral spirits/1,1,1-TCA UST and plume be reviewed to assess the potential for solvents to have been discharged from locations other than the former mineral spirits/1,1,1-TCA UST.

SGI reviewed available information provided by AB&I to assess the potential for solvents to have been discharged from locations other than the former mineral spirits/1,1,1-TCA UST. The mineral spirits and 1,1,1-TCA stored in the UST were used as a thinner for asphalt coatings on new manufactured pipe. The asphalt coating was applied to the pipe in a dip tank. The exact location of the former dip tank is currently unknown but is believed to have been located in close proximity to the former mineral spirits/1,1,1-TCA UST. No other areas were identified where these solvents were used.

Previous investigations related to the UST removal and subsequent groundwater sampling have identified the presence of 1,1,1-TCA, chloroethane, 1,1-DCA, 1,1-DCE, and vinyl chloride in soil and, or groundwater in the immediate vicinity of the former mineral spirits/1,1,1-TCA UST. Recent groundwater sampling conducted by SGI in October/November 2007 identified the presence of TPHg, BTEX, and

TPHd in groundwater in the immediate vicinity and at least 60 feet downgradient and northwest of the former mineral spirits/1,1,1-TCA UST (soil boring SB-25, Figure 2). No chlorinated VOCs were detected in this area during the October/November 2007 investigation. The absence of chlorinated VOCs and presence of TPHg, BTEX, and TPHd in groundwater suggests that bio-degradation of 1,1,1-TCA and other chlorinated VOCs is occurring via aerobic oxidation related to the presence of elevated concentrations petroleum hydrocarbons in the former mineral spirits/1,1,1-TCA UST source area.

Groundwater located further downgradient of the former mineral spirits/1,1,1-TCA UST source area (underlying the Parking Lot Area) is primarily impacted by chlorinated VOCs with relatively low concentrations of BTEX and TPHd. The highest concentrations of chlorinated VOCs were detected in samples collected along the eastern portion of the parking lot near well MW-8. The source of the chlorinated VOCs in the Parking Lot Area groundwater is interpreted to be associated with releases of 1,1,1-TCA from the mineral spirits/1,1,1-TCA UST.

The migration of TPH and chlorinated VOCs at the Site is interpreted to occur as a result of shallow groundwater flow. However, natural processes such as adsorption, dispersion, and natural degradation are expected to limit the horizontal and vertical extent of TPH and chlorinated VOCs. The primary source of the contaminants, leaks associated with discharges of TPH and chlorinated VOCs from the UST systems, have been terminated. Therefore, the only remaining sources are interpreted to be the affected soil beneath and downgradient of the USTs.

Contaminant Migration Pathways

TPH tends to sorb to soil particles and can be transported from surface soils at the Site via dust generation or in surface water runoff. More volatile organic chemicals detected at the Site (e.g., chlorinated solvents or gasoline-range petroleum hydrocarbons) would not be expected to be present in surface soils, but can migrate downward from shallow soils to deeper soils under the force of gravity. These volatile chemicals could also migrate upward through soil gas into the atmosphere. In addition, these types of chemicals can migrate to underlying groundwater through leaching.

TPH and VOCs detected in groundwater have the potential of migrating through natural groundwater flow processes. Soil encountered at the Site consists of fill underlain by clay with thin interbeds of silt and silty sand. Poor core (sample) recovery was observed in the upper 5 to 15 feet in boreholes SB-34, SB-35, and SB-36 located in the Parking Lot Area. The lack of recovery is interpreted to be related to coarser grained soil (e.g., sand and gravel) present in this area. The presence of coarse grained materials (gravel) in the shallow soil is interpreted to be fill associated with development of the roadway (77th Avenue) and the Parking Lot Area. The presence of finer grained soil (clay) in nearby and adjacent boreholes suggests that the coarse grained soil is laterally discontinuous on-Site, however may be locally continuous under 77th Avenue. The fill may act as a preferential pathway to groundwater flow. It should be noted that water quality results associated with samples collected from borings SB-34, SB-35, and SB-36 were generally non-detect for VOCs.

Potential Receptors and Exposure Pathways

The Site and surrounding areas are currently zoned for commercial/industrial use and they are expected to remain as such in the future. Therefore, the following receptors include:

- Hypothetical Onsite Outdoor Commercial/Industrial Worker Receptor (current and future exposure scenario); and
- Hypothetical Onsite Indoor Commercial/Industrial Worker Receptor (current and future exposure scenario).

The onsite water supply well may also be a receptor in the event that there is a connection between the impacted shallow groundwater and deeper groundwater from which the well produces.

The exposure pathways assumed to be complete and significant for the hypothetical outdoor commercial/industrial worker receptor include:

- Inhalation of vapors in outdoor air volatilizing from the subsurface.
- Ingestion of soil;
- Dermal contact with soil; and
- Inhalation of dusts/vapors in outdoor air generated from soil and groundwater.

The exposure pathways assumed to be complete and significant for the hypothetical indoor commercial/industrial worker receptor include:

- Inhalation of vapors in indoor air volatilizing from the subsurface.

Data Gaps

Fifteen soil samples were collected from the former 8,000-Gallon Mineral Spirits/1,1,1-TCA UST area during the October/November 2007 investigation. Soil samples collected from the former UST area had detectable concentrations of TPHg and TPHd. Soil samples collected in deeper soil (greater than 10 feet bgs) did not report any compounds above the laboratory reporting limits indicating that contamination is confined to the upper 10-feet. Concentrations of TPHg and TPHd detected in soil samples collected from borings located north and east of the excavated were generally low indicating that soils in that area are relatively unimpacted with petroleum hydrocarbons. Concentrations of TPHg and TPHd were greatest in soil samples collected west of the UST area at a depth of 4-feet bgs, corresponding to the tar material observed in this area. Soil data from samples collected within the vicinity of the former UST suggests that excavation activities were effective in removing the majority of the contaminated soil in the area of the former UST. TPH and VOC affected soil in the vicinity of the former mineral spirits/1,1,1-TCA UST has been adequately characterized.

As indicated in section 2.4, ACEH requested that AB&I submit available sampling results for VOCs and petroleum hydrocarbons in groundwater from the on-Site water supply well. AB&I participated in the

Ground-Water Ambient Monitoring and Assessment (GAMA) program currently being implemented by the State Water Resource Control Board in coordination with the U.S. Geological Survey and Lawrence Livermore National Laboratory. Groundwater samples were collected from the on-Site water supply well in June 2007 and analyzed for VOCs and other water quality parameters. The results of the organic analyses identified the presence of low concentrations (<2 micrograms per liter [ug/l]) of tetrachloroethene (PCE), trichloroethene (TCE), and cis-1,2 dichloroethene (cis-1,2 DCE). A copy of the GAMA results is included in Appendix A. There is no available data that indicates that TCE or PCE has been used on the Site. The on-Site water supply well produces water from depths greater than 300 feet bgs. Therefore, the presence of the VOCs in the water supply well groundwater sample is likely related to other regional, off-site sources of contamination.

Additional groundwater data is needed to assess the lateral and vertical extent of TPH and chlorinated VOC affected groundwater in the vicinity of the former UST and well MW-8. Specifically, this data will be used to:

- Assess preferential groundwater flow and contaminant movement;
- Confirm that deeper groundwater has not been impacted by Site activities, and;
- Assess potential impacts to the onsite water supply well.

Conceptual Site Model - Former Three 10,000-Gallon USTs Dispenser Island Area

ACEH has requested that AB&I prepare a conceptual site model that evaluates the potential sources, contaminant migration pathways, and potential receptors for the petroleum hydrocarbons within the area of and downgradient of the former three 10,000-gallon USTs dispenser island area. This information is outlined schematically in a conceptual site model (CSM) shown on Figure 3 and described below.

Potential Sources

The potential source(s) of contaminants released into the environment are interpreted to be leaks associated with the operation of the former three 10,000-gallon USTs and dispenser island area. During the October/November 2007 investigation, five grab groundwater samples were collected from the area of the former three 10,000-gallon USTs. Groundwater underlying and south-southwest of the former USTs is impacted with TPHg, BTEX, and TPHd. The highest concentrations of TPHg, BTEX, and TPHd were reported in samples collected from beneath the storage goods warehouse, which is located south-southwest of the tank area (Figure 2). Higher concentrations of TPHg, BTEX, and TPHd in groundwater samples collected downgradient of the UST area suggest that excavation of the source area during the removal of the USTs was effective in reducing the source of contaminants to groundwater in the immediate vicinity of the USTs. The presence of elevated concentrations of TPHg, BTEX, and TPHd in groundwater underlying the storage goods warehouse is interpreted to be related to residual petroleum hydrocarbons that have migrated via groundwater flow from the former UST area. Review of logs for

borings SB-7, SB-8, and SB-9 further support this conclusion. Petroleum hydrocarbon odors and elevated photo-ionization detector (PID) readings are noted within the saturated zone at each of the three boring locations in contrast to the absence of odors and elevated PID readings noted in the unsaturated zone.

Contaminant Migration Pathways

TPH tends to sorb to soil particles and can be transported from surface soils at the Site via dust generation or in surface water runoff. More volatile organic chemicals detected at the site (e.g., VOCs or gasoline-range petroleum hydrocarbons) would not be expected to be present in surface soils, but can migrate downward from shallow soils to deeper soils under the force of gravity. These volatile chemicals could also migrate upward through soil gas into the atmosphere. In addition, these types of chemicals, can migrate to underlying groundwater through leaching.

TPH and VOCs detected in groundwater have the potential of migrating through natural groundwater flow processes. Soil encountered at the Site consists of fill underlain by clay with thin interbeds of silt and silty sand. A two to three foot thick sandy gravel layer was encountered at approximately 21-feet bgs in borings advanced in the location of the former three 10,000-gallon USTs. The presence of finer grained soil (clay) in nearby and adjacent boreholes suggests that the coarse grained soil may be related to former creek channels which may act as preferential pathways to groundwater flow.

Potential Receptors and Exposure Pathways

The Site and surrounding areas are currently zoned for commercial/industrial use and they are expected to remain as such in the future. Therefore, the following receptors include:

- Hypothetical Onsite Outdoor Commercial/Industrial Worker Receptor (current and future exposure scenario); and
- Hypothetical Onsite Indoor Commercial/Industrial Worker Receptor (current and future exposure scenario).

The exposure pathways assumed to be complete and significant for the hypothetical outdoor commercial/industrial worker receptor include:

- Inhalation of vapors in outdoor air volatilizing from the subsurface.
- Ingestion of soil;
- Dermal contact with soil; and
- Inhalation of dusts/vapors in outdoor air generated from soil and groundwater.

The exposure pathways assumed to be complete and significant for the hypothetical indoor commercial/industrial worker receptor include:

- Inhalation of vapors in indoor air volatilizing from the subsurface.

The onsite water supply well may also be a receptor in the event that there is a connection between the impacted shallow groundwater and deeper groundwater from which the well produces.

Data Gaps

As stated above, groundwater located south-southwest and downgradient of the former USTs is impacted with TPHg, BTEX, and TPHd. Higher concentrations of TPHg, BTEX, and TPHd in samples collected downgradient of the UST area suggest than excavation of the source area during the removal of the USTs was effective in reducing the source of contaminants to groundwater in the immediate vicinity of the USTs. The presence of elevated concentrations of TPHg, BTEX, and TPHd in groundwater underlying the storage goods warehouse is interpreted to be related to residual petroleum hydrocarbons that have migrated via groundwater flow from the former UST area.

Additional groundwater data is needed to assess the lateral and vertical extent of TPH and VOC affected groundwater south-southwest of the former USTs and well MW-9. This data is needed to:

- Assess preferential groundwater flow and contaminant movement;
- Confirm that deeper groundwater has not been impacted by Site activities, and;
- Assess potential impacts to the onsite water supply well.

Soil Gas and Indoor Air Evaluation

Soil gas samples were collected from 10 locations during the 2007 investigation. Of the ten samples collected, three of the samples did not report concentrations of any EPA Method 8260 soil gas target list compound above the laboratory reporting limit. Of the seven remaining samples, concentrations of chloroethane, BTEX, and PCE were detected in one or more samples. Benzene was reported in four samples that exceed the ESL for residential land use and two samples exceeded the ESL for commercial land use. No other samples contained concentrations of VOCs that exceeded ESLs for residential or commercial land use. ACEH has requested that additional evaluation be conducted to assess the potential for vapor intrusion to the office building located adjacent to the former 550 gallon gasoline UST area.

During the October/November 2007 investigation, soil gas sample SV-10 collected near well MW-8 contained benzene, toluene, and ethylbenzene at concentrations of 0.21, 0.26, and 0.28 micrograms per liter (µg/l), respectively. No 1,1-DCA, 1,1-DCE, and 1,1,1-TCA were reported in soil gas sample SV-10. Groundwater collected from well MW-8 did not contain benzene, toluene, or ethylbenzene, but did contain 1,1 DCA, 1,1-DCE, and 1,1,1-TCA. Possible reasons for the discrepancy between soil gas and groundwater sample results in the vicinity of monitoring well MW-8 are currently unknown but may

include possible cross contamination associated with the soil gas sampling equipment or containers (e.g., incomplete decontamination).

Data Gaps

As indicated above, benzene was reported in four samples that exceed the ESL for residential land use and two samples exceeded the ESL for commercial land use. Additional soil gas data is needed to assess the potential for vapor intrusion to the office building located adjacent to the former 550 gallon gasoline UST area and to further assess the discrepancy between soil gas and groundwater data in the vicinity of well MW-8.

3.2 Scope of Work

As discussed above, the objective of this investigation is to fill in data gaps associated with previous investigations conducted at the Site and to further delineate the extent of petroleum hydrocarbon and VOC contamination in soil and groundwater underlying the Site. The following tasks will be conducted to meet the project objectives:

1. Pre-field activities including permitting;
2. Soil and groundwater investigation including drilling and sampling 10 soil borings and four soil gas samples; and
3. Preparation of a report presenting the results of the Site investigation including a risk-based evaluation.

3.3 Field Activities

3.3.1 Prefield Activities

An application to advance borings will be prepared and submitted along with appropriate fees to Alameda County Public Works Agency.

A Site visit will be performed to mark the locations of the proposed borings at the Site. Following the Site visit, a subsurface utility locating company will be retained to determine the location of underground utilities in the area of the proposed borings. At least 48 hours prior to the start of sampling activities. Underground Services Alert (USA) will be notified in addition.

3.3.2 Soil Gas Investigation

As indicated previously, ACEH has requested that additional evaluation be conducted to assess the potential for vapor intrusion to the office building located adjacent to the former 550 gallon gasoline UST Area. The layout of the office building is shown in Figure 4. As indicated in Figure 4, the ground floor level

of the building located closest to the former 550 gallon gasoline UST area is used for storage and inventory control. The south facing side of the ground floor is completely open to the outdoors and production area (Figure 4). Other adjacent ground level areas include storage, the employee break room, two offices (human resources [HR] and safety), and the employee locker room. The main office facilities are located on the second floor overlying these areas.

Up to four soil gas locations have been selected on Site including three that will be advanced within the interior of the ground floor of the storage and inventory area located closest to the 550 gallon UST area. The fourth soil gas sample will be installed near well MW-8 to assess the discrepancy between the previous groundwater and soil gas sampling results (Figure 4).

Methodologies used for the soil gas investigation will meet the requirements of the January 2003 Active Soil Gas Investigation Advisory published by the DTSC and Regional Water Quality Control Board (CRWQCB), Los Angeles Region. Soil gas samples will be collected from discrete depths utilizing a hydraulically-driven probe equipped with detachable drive points. Once the drive point reaches the target sample depth, the drive point is retracted to provide a void space where soil gas can accumulate. Prior to sample collection, two to three tubing volumes of air are purged. Soil gas samples are collected through the polyethylene tubing into a syringe, glass bulb wrapped in aluminum foil, or summa^{tm} canister. Soil gas samples are then collected and immediately transferred to an on-site mobile laboratory for analysis. One sub slab soil gas samples will be collected beneath the office building located adjacent to the former 550 gallon gasoline UST area. All other samples will be collected at a depth of approximately 5-feet bgs. Prior to advancing each probe, the sample rods will be cleaned to prevent cross-contamination from previous sampling events.

The sample containers will be labeled with sample-point identification, date and time of collection. Samples will be taken to an on-site mobile laboratory where they will be logged onto the chain-of-custody form and assigned a laboratory identification number. The samples will be analyzed on-site by a California state-certified mobile laboratory where they will be analyzed for VOCs. On site analysis of the samples will enable the field team to collect additional samples, if warranted.

After removing the sample rod from the ground, the borehole will be sealed using cement grout. The interior locations and outside locations beneath the concrete pad and will be capped with concrete at the surface.

3.3.3 Soil Sampling

To address the data gaps outlined in Section 3.1, up to 10 soil borings will be advanced on-site to allow the collection of soil samples for the purpose of lithologic characterization, and delineation of the extent and magnitude of groundwater contamination. Soil samples will be collected using a direct-push technology (DPT) percussion rig equipped with a dual-tube sampling system. Proposed soil boring locations are shown on Figure 5.

Soil samples for lithological characterization will be collected continuously to a maximum depth ranging from the surface to 50-feet bgs in the source (UST) areas to evaluate the vertical extent of impacted groundwater beneath and downgradient of the former USTs. All soil samples will be logged according to Unified Soil Classification System (USCS), including color, moisture content, mottling, and presence of staining or odors. In addition, approximately 20 grams of soil from each sample will be screened in the field for VOCs using an organic vapor monitor (OVM) equipped with a PID.

3.3.4 Grab Groundwater Sampling

As described in section 2.3, available data collected from the SF Truck stop site located immediately adjacent to and east of the Site suggests that permeable sediments may be present between a depth of approximately 30 feet bgs and 40 feet bgs. Previous borings and groundwater monitoring wells have only extended to a maximum depth of 20 feet bgs to 30 feet bgs. Additional, groundwater quality data will be collected to assess the vertical extent of impacted groundwater.

To address the investigation objections outlined in section 3.1, up to 10 grab groundwater samples will be collected to assess the vertical extent of TPH and VOC-impacted groundwater near the east and west perimeter of the Site and UST areas shown in Figure 5. One of the 10 borings will be placed near the water supply well to assess groundwater quality. Deeper high to moderate permeability soils will be targeted for groundwater collection. Sample collection depths will be determined based on the specific information (lithology) at each location.

Grab groundwater samples will be collected using a Hydropunch® sampler (or equivalent sampling method) consisting of an expendable drive point, drive head, protective sheath, and inner stainless-steel screen. A drive rod will be added to the top of the sampler and the entire assembly driven into the subsurface using the percussion of the DPT rig. By adding a series of hollow, hardened-steel drive rods, the sampler will be advanced to the desired depth. Once the desired depth is reached, extension rods will be placed down the center of the drive rods to push out the expendable drive point and to hold the screen in position as the rods are retracted approximately 4 feet. The screen is thus exposed to the aquifer and fills with groundwater. Groundwater samples will be collected by placing a polyethylene tube with a bottom check valve into the screen. The tubing will be gently moved up and down to minimize volatilization, resulting in water flow through the check valve and tubing to the ground surface.

If groundwater flow into the screen is extremely slow, the sampling equipment will be withdrawn and a small diameter temporary polyvinyl chloride (PVC) well screen will be inserted into the borehole. This will allow the DPT rig to move to the next sampling location while enough groundwater to sample enters the temporary well. The groundwater samples will be collected using the polyethylene tube and check valve system described previously. All samples will be analyzed for TPHg and VOCs using EPA Methods 8015M and 8260B, respectively.

All sample locations are approximate and may be modified in the field to accommodate site-specific conditions (e.g. buildings, paved surfaces, and utilities). However, every attempt will be made to select sample locations in a manner that addresses the objectives outlined above.

3.3.5 Decontamination Procedures

Disposable sampling equipment, such as small tools, hoses, and disposable gloves, will be either decontaminated or disposed of after each use. The decontamination procedure will consist of:

- Wash in a phosphate-free soap and water mixture;
- Rinse thoroughly in distilled water following washing; and
- Final rinse using distilled water.

Decontamination procedures will be conducted using three 5-gallon buckets with their respective wash/rinse solutions. Solutions will be replaced when they become cloudy and disposed of via transferal into 55-gallon waste drums.

3.3.6 Investigation-Derived Waste Management

Investigation derived waste (IDW) will be placed in labeled and sealed DOT-approved 55-gallon drums for temporary storage at the Site. IDW is anticipated to consist of soil cuttings, decon water, and purge water. IDW will be properly disposed in accordance with the applicable Federal, State, and local regulations.

4.0 QUALITY ASSURANCE PROCEDURES

Quality assurance is the process for evaluating the completeness, correctness, consistency, and compliance of a data package against a standard. Data is evaluated using quality control (QC) procedures employed in the field and in the laboratory. QC procedures in the field will consist of strict protocols for field sampling and decontamination and the collection of field blanks and blind duplicate samples for laboratory analysis. Laboratory QC procedures will include the analysis of matrix spike and matrix spike duplicates, surrogate spikes, method blanks, and laboratory control samples. A description of each type and the results of the analyses are presented below.

4.1 Field QC Samples

QC samples ensure that the sampling and field measurements activities are in control and generate quality data. QC samples for this project will consist of trip blanks, equipment blanks and duplicates/split samples.

- One trip blank will be collected per shipping container of samples during the course of the investigation. The trip blank will be submitted to the laboratory for VOC analysis. The trip blank will consist of a sample vial that is filled in the laboratory with ASTM Type II reagent grade water, transported to the site, handled like a sample and returned to the laboratory for analysis.
- Equipment blanks will be collected at a frequency of one per day. An equipment blank will be collected by pouring ASTM Type II reagent grade water through or over the purging or sampling device, transferring the water to a sample bottle, and transporting it to the laboratory for analysis.
- Field duplicates will be collected for every 10 samples collected of soil gas and groundwater. Field duplicates will be collected from one sampling location during a single act of sampling.
- Field measurement (organic vapor screening, pH, conductivity, temperature) QC checks will be collected daily. Five percent of all field measurements will be measured in duplicate.

4.2 Laboratory QC Samples

Laboratory QC samples will consist of method blanks, laboratory control samples, matrix spikes, matrix spike supplicate, and surrogate spikes.

- Method blanks will be analyzed at a minimum frequency of one per batch and the concentration of target compounds in the blank must be less than the practical quantitation limit (PQL).
- Laboratory control samples (LCSs) will be analyzed at a minimum frequency of one per batch. Laboratory control samples consist of blank spikes, which are used to determine the accuracy of the analytical procedure by measuring a known concentration of an analyte of interest.

- Surrogate spikes will be performed for all organic standards, samples and blanks. Each organic standard sample matrix spike, matrix spike duplicate, LCS and blank is spiked with surrogate compounds prior to purging or extraction. Surrogate spike recoveries must fall within the limits established by the analytical method and if a surrogate spike recovery is outside of acceptable ranges, then a corrective action will be taken.
- Matrix spike/matrix spike duplicates (MS/MSD) are conducted to evaluate the matrix effect of the sample on the analytical method. The MS/MSD analyses will be performed at a minimum frequently of one per each group of 20 samples of the sample matrix.

5.0 HEALTH AND SAFETY

Measures will be implemented at the Site to protect project personnel and the general public by reducing the risk to health and safety during the Work Plan implementation. A Site-specific HASP establishes procedures to reduce the risk at the Site.

A Site-specific HASP for the AB&I Foundry was prepared in accordance with federal (29 CFR 1910.120) and State (C.C.R. Title 8, Section 5192) requirements and is included as Appendix A of the Revised Site Investigation Work Plan prepared by SGI, dated August 27, 2007 (SGI 2007).

6.0 REPORTING AND SCHEDULE

6.1 Reporting

A report presenting the results of the site investigation will be prepared and submitted to ACEH upon completion of field activities and laboratory analyses. The report will document the methodologies and results for sample collection and laboratory analyses. The report will present the findings of the Site investigation and interpretations as to the type, magnitude, and extent of contamination, if any. Analytical data will be presented in tabular format and annotated on the appropriate figures. Figures will include a Site location map, Site map showing the sample locations, and a Site map showing annotated contaminant concentrations. The report will contain all pertinent documentation such as permits, boring logs, laboratory reports, survey data, and COC forms. The final report will be reviewed in its entirety and signed by a California State-licensed professional geologist or engineer.

If warranted, the report will present recommendations for further investigative actions. Electronic copies of the report and other data will be submitted to ACEH's ftp site and the State Water Resources Control Board's (SWRCB's) Geotracker web site.

6.2 Schedule

The work proposed in this Work Plan will be conducted according to the following tentative schedule:

Date	Activities
June 6, 2008	Submit Work Plan to ACEH
June 20, 2008	ACEH review and approval of Work Plan
June 23 through June 27, 2008	Pre-field activities/Access Permits
June 30 through July 11, 2008	Field work
July 14 through July 25, 2008	Data Analysis and Report Preparation
July 25, 2008	Report Submittal to ACEH

7.0 REFERENCES

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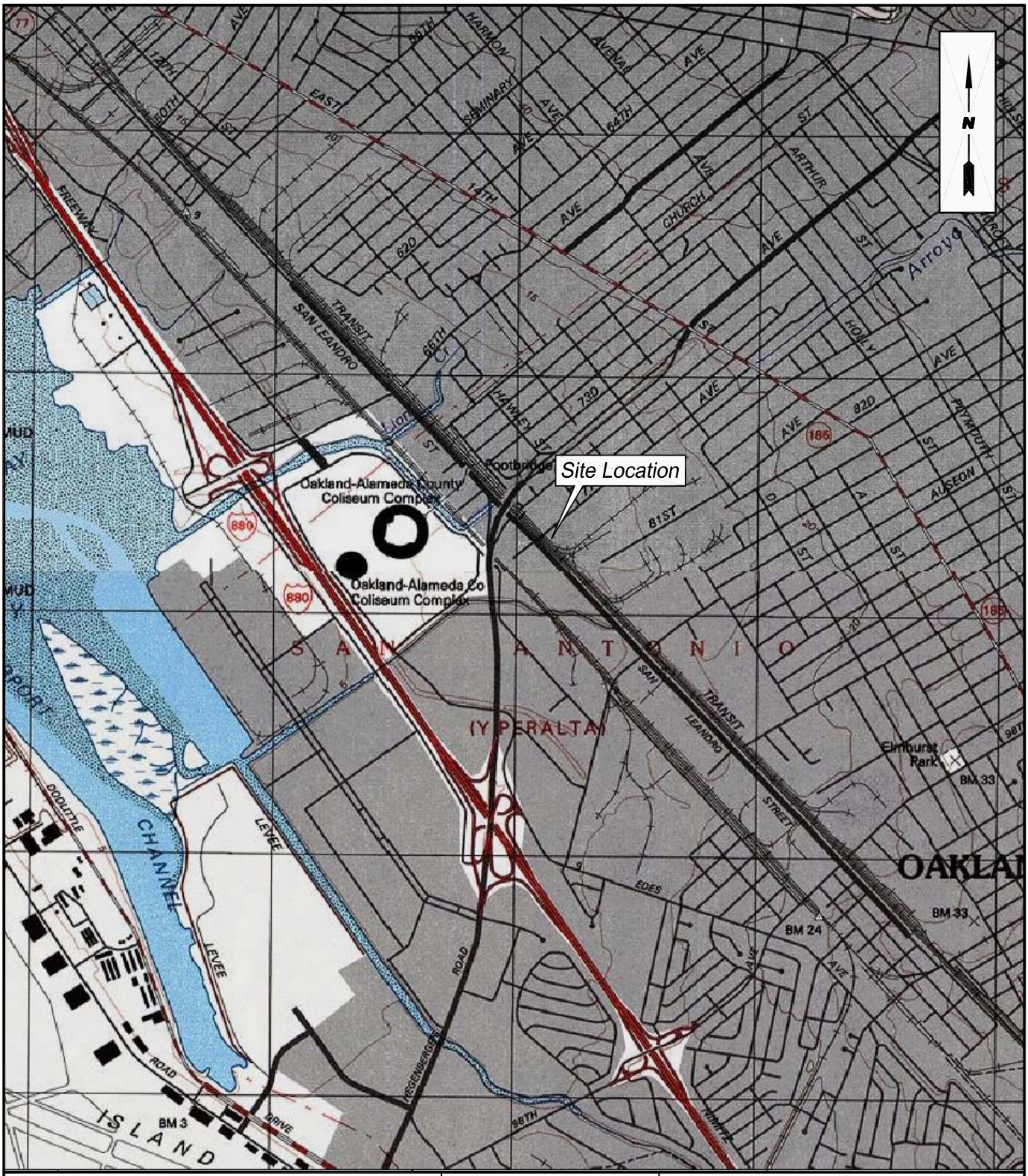
FIGURES



THE SOURCE GROUP, INC.
environmental

3451-C VINCENT ROAD
PLEASANT HILL, CA 94523

SOURCE: U.S.G.S. 7.5' QUAD SHEET
OAKLAND EAST, CALIFORNIA
PHOTOREVISED 1997

SCALE: 0 FEET 2000 SCALE

SITE LOCATION MAP

CLIENT: AB&I FOUNDRY

DATE: 6/27/07

LOCATION: 7825 San Leandro Street
Oakland, California

FIGURE: 1

SAN LEANDRO STREET

Employee Locker Room

Former 550-gallon Gasoline UST

Approximate Limits of Excavation

Former 8,000-gallon Gasoline UST

Former Fuel Dispenser Islands

Former Concrete Pad?

Approximate location of three 10,000-gallon USTs

Former Fuel Dispenser

Finished Goods Storage

Shipping Yard

Pattern Storage

Production Area

Office Building

Former 8,000-gallon Mineral Spirits/1,1,1-TCA UST

Approximate Limits of Excavation

Former Fuel Pump and Piping

HEAVY EQUIPMENT AREA (INACCESSIBLE)

Pipe Finishing

Former 10,000-gallon Diesel UST Area

Approximate Limits of Excavation

SHED

1,000-gallon Diesel AST

SCRAP PILE AREA

Water Supply Well

Elmhurst Creek

N

0 FEET 60

SCALE

Legend

MW-7	Existing Monitoring Well Location (BSK, 1993, 2006)
MW-2	Abandoned Monitoring Well (BSK, 2006)
	Soil Gas Sample Location (SGI, 2007)
	Soil Sample (SGI, 2007)
	Grab Groundwater Sample (SGI, 2007)
	Soil and Grab Groundwater Sample (SGI, 2007)
UST	Underground Storage Tank
1,1,1-TCA	1,1,1-trichloroethane

SITE PLAN

AB&I FOUNDRY
7825 SAN LEANDRO STREET
OAKLAND, CALIFORNIA

THE SOURCE GROUP, INC.
3451-C VINCENT ROAD
PLEASANT HILL, CA 94523

Date: 1/19/08

Figure: 2

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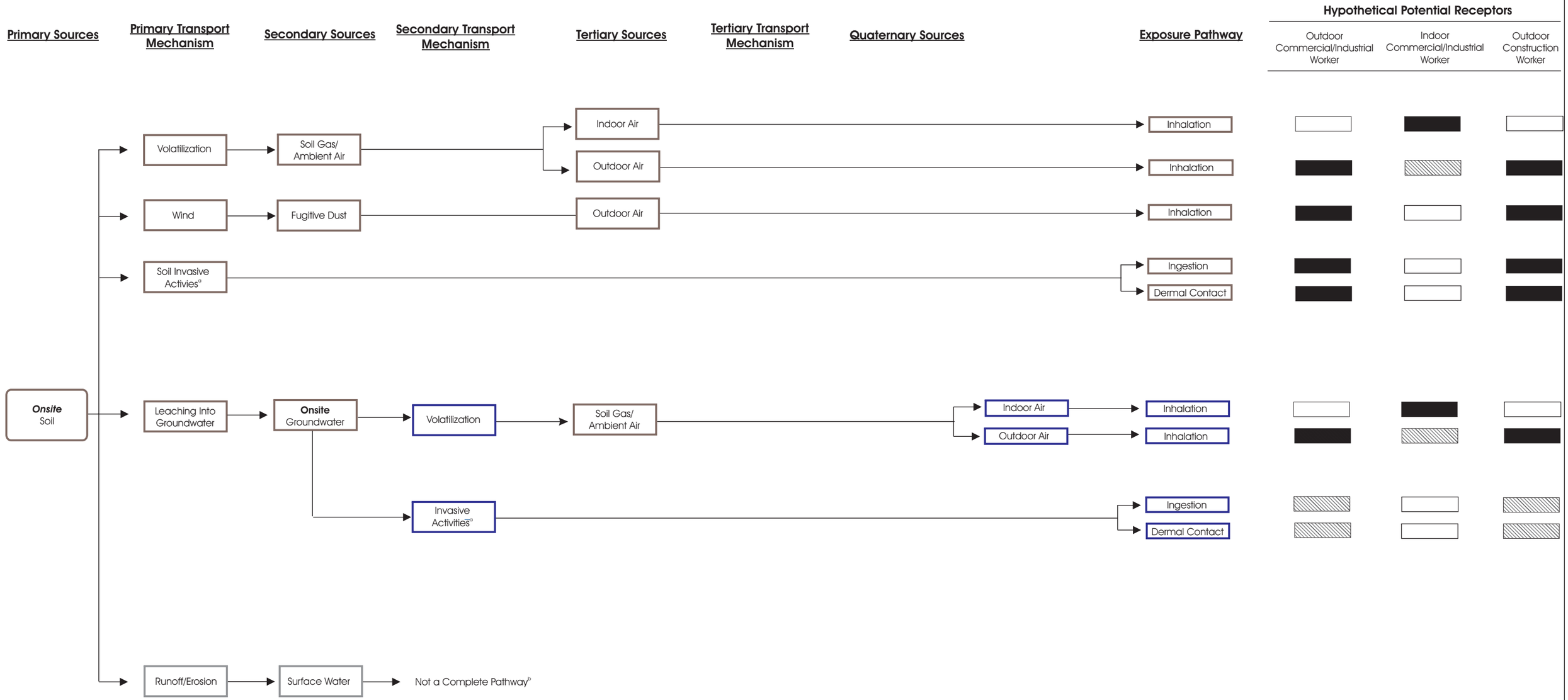

CSM components related to soil.

CSM components related to onsite groundwater.

CSM components related to offsite groundwater.

CSM components related to surface water.

Receptor likely to be exposed via this route, so pathway is considered potentially complete.

Receptor may be exposed via this route, so pathway is considered potentially complete; however, pathway is considered minor.

Pathway is incomplete, no further evaluation required.

[a] Soil invasive activities include construction and development.

[b] Nearest surface water body is upgradient of the Site.

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PLEASANT HILL, CA 94523

AB & I Foundry
CALIFORNIA

PROJECT NO.	DATE	DR. BY	APP. BY
01–ABI–001	06/02/08	AK	SD

FIGURE 3
CONCEPTUAL SITE MODEL (CSM)

LEANDRO STREET

Employee Locker Room

Former 550-gallon Gasoline UST

Approximate Limits of Excavation

Former 8,000-gallon Gasoline UST

Former Fuel Dis

SCALE

SB-15

SB-13

SB-12

MW-4

SB-11

SG-8

SB-3

SG-6

SB-14

SB-10

SG-5

SB-1

MW-3

MW-5

Former Fuel Dispenser

SB-9

Grade 0"

-4.5'

Front Entrance

Counters

Locker Area

Water Heaters

Shower Area

Storage Area

Safety Training Area

Scale Room

Vending Machine Room

Janitorial Area

Bathroom

Circular Sink

HR Storage Area

Office Area

Break Room

SG-4

SG-9

SB-8

MW-9

Portion of Building exposed to outdoors and production area

Finishe

Stor

HR (office)

Safety (office)

Electrical Panel Room

Warehouse Shop

SG-3

SB-25

SG-2

SB-24

SG-1

MW-8

SG-10

Former 8,000-gallon Mineral Spirits/1,1,1-TCA UST

SB-22

MW-2

SB-23

Approximate Limits of Excavation

MW-2R

SB-26

Pattern Storage

Office Building (ground level)

Former Fuel Pump and Piping

Production Area

Legend

- MW-8 — Existing Monitoring Well Location (BSK, 1993, 2006)
- MW-2 — Abandoned Monitoring Well (BSK, 2006)
- △ — Soil Gas Sample Location (SGI, 2007)
- ▲ — Proposed Soil Gas Sample Location

N

0 FEET 25

SCALE

Proposed Soil Gas Sample Locations

AB&I FOUNDRY
7825 SAN LEANDRO STREET
OAKLAND, CALIFORNIA

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3451-C VINCENT ROAD
PLEASANT HILL, CA 94523

Date: 1/20/08

Figure: 4

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SAN LEANDRO STREET

Employee Locker Room

Former 550–gallon Gasoline UST

Approximate Limits of Excavation

Former 8,000–gallon Gasoline UST

Former Fuel Dispenser Islands

Former Concrete Pad?

Approximate location of three 10,000–gallon USTs

Former Fuel Dispenser

MW–6

MW–3

MW–5

MW–4

MW–9

Finished Goods Storage

MW–8

Former 8,000–gallon Mineral Spirits/1,1,1–TCA UST

Approximate Limits of Excavation

MW–2

MW–2R

Office Building

Production Area

Former Fuel Pump and Piping

Pattern Storage

Shipping Yard

N

0 FEET 60

SCALE

HEAVY EQUIPMENT AREA (INACCESSIBLE)

Pipe Finishing

Former 10,000–gallon Diesel UST Area

MW–7

Approximate Limits of Excavation

SHED

MW–1

SCRAP PILE AREA

1,000–gallon Diesel AST

Water Supply Well

Elmhurst Creek

Legend

MW–7 Existing Monitoring Well Location (BSK, 1993, 2006)

MW–2 Abandoned Monitoring Well (BSK, 2006)

Proposed Boring Location

UST Underground Storage Tank

1,1,1–TCA 1,1,1–trichloroethane

Proposed Boring Locations

AB&I FOUNDRY
7825 SAN LEANDRO STREET
OAKLAND, CALIFORNIA

THE SOURCE GROUP, INC.
3451–C VINCENT ROAD
PLEASANT HILL, CA 94523

Date: 1/20/08

Figure: 5

All figures.dwg

APPENDIX A

GAMA PROGRAM - ON-SITE WATER SUPPLY SAMPLE RESULTS

Well Owner Report

Detected constituents on the____Fast____schedule

Station ID **374504122112201** ***Gama ID*** **SF-42**

Station Name **002S003W16R001M** ***Sample Date*** **6/19/2007 @ 910**

Owner: **American Brass and Iron Foundry** ***Well Name:*** **AB-I Foundry**

Parameter Code	*Parameter Name*	*Value*	*Units*	*Threshold Value*	*Threshold Type*
00010	Water Temperature	**19.5**	deg Celsius		
00095	Specific Conductance, field	**2090**	µS/cm	900 (1600)	SMCL-CA
00400	pH, field	**7.2**	standard units	6.5 - 8.5	SMCL-US
00300	Dissolved Oxygen	**0.7**	mg/L		
29801	Alkalinity (CaCO3), laboratory	**178**	mg/L		
77093	cis-1,2-Dichloroethylene	**0.19**	µg/L	6	MCL-CA
34475	Tetrachloroethylene (PCE)	**0.21**	µg/L	5	MCL-US
39180	Trichloroethylene (TCE)	**1.46**	µg/L	5	MCL-US
00613	Nitrite, as nitrogen	**0.203**	mg/L	1	MCL-US
00631	Nitrate plus nitrite, as nitrogen	**2.04**	mg/L	10	MCL-US
62854	Total nitrogen (ammonia, nitrite, nitrate, organic nitrogen)	**2.2**	mg/L		
00671	Orthophosphate, as phosphorus	**0.027**	mg/L		
82082	Hydrogen stable isotope ratio of water	**-42.9**	per mil		
82085	Oxygen stable isotope ratio of water	**-6.33**	per mil		

E, estimated value; V, value may be affected by contamination; A, averaged value; M, value rounds to 0 using standard USGS rounding rules.

Preliminary, subject to revision

Well Owner Report

Detected constituents on the_____Fast_____schedule

Station ID **374504122112201** ***Gama ID*** **SF-42**

Station Name **002S003W16R001M** ***Sample Date*** **6/19/2007 @ 910**

Owner: **American Brass and Iron Foundry** ***Well Name:*** **AB-I Foundry**

Parameter Code	*Parameter Name*	*Value*	*Units*	*Threshold Value*	*Threshold Type*
82081	Carbon stable isotope ratio	**-16.64**	per mil		
49933	Carbon-14	**2.24**	percent modern		

E, estimated value; V, value may be affected by contamination; A, averaged value; M, value rounds to 0 using standard USGS rounding rules.

Preliminary, subject to revision

Included on Title 22	Constituent (Common Name)	Primary Use or Source	USGS Parameter Code	CAS Number	Report-ing Level	Threshold Type	Threshold Value	Sampling Schedule	
	Water Quality Indicators (measured in the field)							Fast	Slow
	Temperature (°C)		00010						
💧	Specific Conductance (microsiemens per centimeter)[†]		00095			SMCL-CA[a]	900 (1,600)		
	Dissolved Oxygen (mg/L)		00300						
💧	pH (standard pH units)[†]		00400			SMCL-US	6.5 - 8.5		
💧	Alkalinity (mg/L as calcium carbonate)[†]		29802 (lab 29801)						
	Bicarbonate (mg/L)		63786						
	Carbonate (mg/L)		63788						
💧	Turbidity (nephelometric turbidity units)								

[a]The SMCL-CA for specific conductance has recommended and upper threshold values. The upper value is shown in parentheses.

[†]See Table A Below

	Volatile Organic Compounds (micrograms per liter)[1]							Fast	Slow
	Acetone	Solvent	81552	67-64-1	6	na	na		
	Acrylonitrile	Organic synthesis	34215	107-13-1	0.4	RSD5-US	0.6		
💧	tert-Amyl methyl ether (TAME)	Gasoline oxygenate	50005	994-05-8	0.04	na	na		
	Benzene	Gasoline hydrocarbon	34030	71-43-2	0.016	MCL-CA	1		
	Bromobenzene	Solvent	81555	108-86-1	0.02	na	na		
💧	Bromochloromethane	Fire retardant	77297	74-97-5	0.06	HAL-US	90		
💧	Bromodichloromethane	Disinfection by-product (THM)	32101	75-27-4	0.04	MCL-US	80[2]		
	Bromoform (Tribromomethane)	Disinfection by-product (THM)	32104	75-25-2	0.08	MCL-US	80[2]		
	Bromomethane (Methyl bromide)	Fumigant	34413	74-83-9	0.4	HAL-US	10		
	n-Butylbenzene	Gasoline hydrocarbon	77342	104-51-8	0.14	NL-CA	260		
	sec-Butylbenzene	Gasoline hydrocarbon	77350	135-98-8	0.04	NL-CA	260		
	tert-Butylbenzene	Gasoline hydrocarbon	77353	98-06-6	0.08	NL-CA	260		
💧	Carbon disulfide	Organic synthesis	77041	75-15-0	0.06	NL-CA	160		
💧	Carbon tetrachloride (Tetrachloromethane)	Solvent	32102	56-23-5	0.08	MCL-CA	0.5		
	Chlorobenzene	Solvent	34301	108-90-7	0.02	MCL-CA	70		
💧	Chloroethane	Solvent	34311	75-00-3	0.1	na	na		
	Chloroform (Trichloromethane)	Disinfection by-product (THM)	32106	67-66-3	0.024	MCL-US	80[2]		
	Chloromethane	Refrigerant/organic synthesis	34418	74-87-3	0.1	HAL-US	30		
	3-Chloropropene	Organic synthesis	78109	107-05-1	0.08	na	na		
	2-Chlorotoluene	Solvent	77275	95-49-8	0.04	NL-CA	140		
💧	4-Chlorotoluene	Solvent	77277	106-43-4	0.04	NL-CA	140		
💧	Dibromochloromethane	Disinfection by-product (THM)	32105	124-48-1	0.12	MCL-US	80[2]		
	1,2-Dibromo-3-chloropropane (DBCP)	Fumigant	82625	96-12-8	0.5	MCL-US	0.2		
	1,2-Dibromoethane (EDB)	Fumigant	77651	106-93-4	0.04	MCL-US	0.05		
💧	Dibromomethane	Solvent	30217	74-95-3	0.04	na	na		
	1,2-Dichlorobenzene	Solvent	34536	95-50-1	0.04	MCL-CA	600		
💧	1,3-Dichlorobenzene	Solvent	34566	541-73-1	0.04	HAL-US	600		
	1,4-Dichlorobenzene	Fumigant	34571	106-46-7	0.04	MCL-CA	5		
💧	trans-1,4-Dichloro-2-butene	Organic synthesis	73547	110-57-6	0.6	na	na		
💧	Dichlorodifluoromethane (CFC-12)	Refrigerant	34668	75-71-8	0.14	NL-CA	1000		
💧	1,1-Dichloroethane (1,1-DCA)	Solvent	34496	75-34-3	0.06	MCL-CA	5		
💧	1,2-Dichloroethane (1,2-DCA)	Solvent	32103	107-06-2	0.1	MCL-CA	0.5		
💧	1,1-Dichloroethene (1,1-DCE)	Organic synthesis	34501	75-35-4	0.02	MCL-CA	6		
💧	cis-1,2-Dichloroethene (*cis*-1,2-DCE)	Solvent	77093	156-59-2	0.02	MCL-CA	6		
💧	trans-1,2-Dichloroethene (*trans*-1,2-DCE)	Solvent	34546	156-60-5	0.018	MCL-CA	10		
💧	1,2-Dichloropropane	Fumigant	34541	78-87-5	0.02	MCL-US	5		
💧	1,3-Dichloropropane	Fumigant	77173	142-28-9	0.06	na	na		
	2,2-Dichloropropane	Fumigant	77170	594-20-7	0.06	na	na		
	1,1-Dichloropropene	Organic synthesis	77168	563-58-6	0.04	na	na		
	cis-1,3-Dichloropropene	Fumigant	34704	10061-01-5	0.06	RSD5-US	4[3]		
	trans-1,3-Dichloropropene	Fumigant	34699	10061-02-6	0.1	RSD5-US	4[3]		
	Diethyl ether	Solvent	81576	60-29-7	0.08	na	na		
	Diisopropyl ether (DIPE)	Gasoline oxygenate	81577	108-20-3	0.06	na	na		
💧	Ethylbenzene	Gasoline hydrocarbon	34371	100-41-4	0.02	MCL-CA	300		
	Ethyl *tert*-butyl ether (ETBE)	Gasoline oxygenate	50004	637-92-3	0.04	na	na		
	Ethyl methacrylate	Organic synthesis	73570	97-63-2	0.14	na	na		
	o-Ethyl toluene (1-Ethyl-2-methylbenzene)	Gasoline hydrocarbon	77220	611-14-3	0.04	na	na		
	Hexachlorobutadiene	Organic synthesis	39702	87-68-3	0.1	RSD5-US	9		
	Hexachloroethane	Solvent	34396	67-72-1	0.14	HAL-US	1		
	2-Hexanone (*n*-Butyl methyl ketone)	Solvent	77103	591-78-6	0.4	na	na		
	Iodomethane (Methyl iodide)	Organic synthesis	77424	74-88-4	0.4	na	na		
	Isopropylbenzene	Gasoline hydrocarbon	77223	98-82-8	0.04	NL-CA	770		
	4-Isopropyl-1-methylbenzene	Gasoline hydrocarbon	77356	99-87-6	0.08	na	na		
	Methyl acrylate	Organic synthesis	49991	96-33-3	0.4	na	na		
	Methyl acrylonitrile	Organic synthesis	81593	126-98-7	0.4	na	na		
💧	Methyl *tert*-butyl ether (MTBE)	Gasoline oxygenate	78032	1634-04-4	0.1	MCL-CA	13		
	Methyl isobutyl ketone (MIBK)	Solvent	78133	108-10-1	0.2	NL-CA	120		
	Methylene chloride (Dichloromethane)	Solvent	34423	75-09-2	0.04	MCL-US	5		
	Methyl ethyl ketone (2-Butanone, MEK)	Solvent	81595	78-93-3	1.6	HAL-US	4000		
	Methyl methacrylate	Organic synthesis	81597	80-62-6	0.2	na	na		
	Naphthalene	Gasoline hydrocarbon	34696	91-20-3	0.4	NL-CA	17		
	Perchloroethene (PCE)	Solvent	34475	127-18-4	0.04	MCL-US	5		
💧	n-Propylbenzene	Solvent	77224	103-65-1	0.04	NL-CA	260		
	Styrene	Gasoline hydrocarbon	77128	100-42-5	0.04	MCL-US	100		
💧	1,1,1,2-Tetrachloroethane	Solvent	77562	630-20-6	0.04	HAL-US	70		
	1,1,2,2-Tetrachloroethane	Solvent	34516	79-34-5	0.1	MCL-CA	1		
	Tetrahydrofuran	Solvent	81607	109-99-9	1	na	na		
	1,2,3,4-Tetramethylbenzene	Gasoline hydrocarbon	49999	488-23-3	0.14	na	na		
	1,2,3,5-Tetramethylbenzene	Gasoline hydrocarbon	50000	527-53-7	0.12	na	na		
💧	Toluene	Gasoline hydrocarbon	34010	108-88-3	0.018	MCL-CA	150		
	1,2,3-Trichlorobenzene	Organic synthesis	77613	87-61-6	0.12	na	na		
💧	1,2,4-Trichlorobenzene	Solvent	34551	120-82-1	0.12	MCL-CA	5		
💧	1,1,1-Trichloroethane (TCA)	Solvent	34506	71-55-6	0.04	MCL-CA	200		
💧	1,1,2-Trichloroethane	Solvent	34511	79-00-5	0.04	MCL-CA	5		
💧	Trichloroethene (TCE)	Solvent	39180	79-01-6	0.02	MCL-US	5		
💧	Trichlorofluoromethane (CFC-11)	Refrigerant	34488	75-69-4	0.08	MCL-CA	150		
💧	1,2,3-Trichloropropane (1,2,3-TCP)	Solvent/organic synthesis	77443	96-18-4	0.12	HAL-US	40		
💧	Trichlorotrifluoroethane (CFC-113)	Refrigerant	77652	76-13-1	0.04	MCL-CA	1200		
	1,2,3-Trimethylbenzene	Gasoline hydrocarbon	77221	526-73-8	0.08	na	na		
	1,2,4-Trimethylbenzene	Gasoline hydrocarbon	77222	95-63-6	0.04	NL-CA	330		
	1,3,5-Trimethylbenzene	Organic synthesis	77226	108-67-8	0.04	NL-CA	330		
	Vinyl bromide (Bromoethene)	Fire retardant	50002	593-60-2	0.12	na	na		
💧	Vinyl chloride (Chloroethene)	Organic synthesis	39175	75-01-4	0.08	MCL-CA	0.5		
💧	m- and *p*-Xylene	Gasoline hydrocarbon	85795	108-38-3 / 106-42-3	0.08	MCL-CA	1750		
💧	o-Xylene	Gasoline hydrocarbon	77135	95-47-6	0.04	MCL-CA	1750		

[b]The MCL-US, and MCL-CA thresholds for trihalomethanes are the sum of chloroform, bromoform, bromodichloromethane, and dibromochloromethane

[c]The RSD5 threshold for 1,3-dichloropropene is the sum of its isomers (cis and trans).

[d]The MCL-CA threshold for xylenes is the sum of all xylenes.

[†]See Table A Below

Included on Title 22	Constituent (Common Name)	Primary Use or Source	USGS Parameter Code	CAS Number	Report-ing Level	Threshold Type	Threshold Value	Sampling Schedule	
	Pesticides and Pesticide Degradates (micrograms per liter)[1]							Fast	Slow
	Acetochlor	Herbicide	49260	34256-82-1	0.006	na	na		
💧	Alachlor	Herbicide	46342	15972-60-8	0.005	MCL-US	2		
💧	Atrazine	Herbicide	39632	1912-24-9	0.007	MCL-CA	1		
	Azinphos-methyl	Insecticide	82686	86-50-0	0.08	na	na		
	Azinphos-methyl-oxon	Insecticide degradate	61635	961-22-8	0.042	na	na		
	Benfluralin	Herbicide	82673	1861-40-1	0.01	na	na		
	Carbaryl	Insecticide	82680	63-25-2	0.06	RSD5-US	400		
	2-Chloro-2,6-diethylacetanilide	Herbicide degradate	61618	6967-29-9	0.0065	na	na		
	4-Chloro-2-methylphenol	Herbicide degradate	61633	1570-64-5	0.005	na	na		
	Chlorpyrifos	Insecticide	38933	2921-88-2	0.005	HAL-US	2		
	Chlorpyrofos, oxygen analog	Insecticide degradate	61636	5598-15-2	0.0562	na	na		
	Cyfluthrin	Insecticide	61585	68359-37-5	0.053	na	na		
	Cypermethrin	Insecticide	61586	52315-07-8	0.046	na	na		
	Dacthal (DCPA)	Herbicide	82682	1861-32-1	0.003	HAL-US	70		
	Deethylatrazine (2-Chloro-4-isopropylamino-6-amino-s -triazine)	Herbicide degradate	04040	6190-65-4	0.014	na	na		
	Desulfinylfipronil	Insecticide degradate	62170	na	0.012	na	na		
	Desulfinylfipronil amide	Insecticide degradate	62169	na	0.029	na	na		
	Diazinon	Insecticide	39572	333-41-5	0.005	HAL-US	1		
	Diazinon, oxon	Insecticide degradate	61638	962-58-3	0.006	na	na		
	3,4-Dichloroaniline	Herbicide degradate	61625	95-76-1	0.0045	na	na		
	Dichlorvos	Insecticide	38775	62-73-7	0.013	na	na		
	Dicrotophos	Insecticide	38454	141-66-2	0.0843	na	na		
	Dieldrin	Insecticide	39381	60-57-1	0.009	RSD5-US	0.02		
	2,6-Diethylaniline	Herbicide degradate	82660	579-66-8	0.006	na	na		
	Dimethoate	Insecticide	82662	60-51-5	0.0061	na	na		
	Ethion	Insecticide	82346	563-12-2	0.016	na	na		
	Ethion monoxon	Insecticide degradate	61644	17356-42-2	0.021	na	na		
	2-Ethyl-6-methylaniline	Herbicide degradate	61620	24549-06-2	0.01	na	na		
	Fenamiphos	Insecticide	61591	22224-92-6	0.029	HAL-US	0.7		
	Fenamiphos sulfone	Insecticide degradate	61645	31972-44-8	0.053	na	na		
	Fenamiphos sulfoxide	Insecticide degradate	61646	31972-43-7	0.040	na	na		
	Fipronil	Insecticide	62166	120068-37-3	0.016	na	na		
	Fipronil sulfide	Insecticide degradate	62167	120067-83-6	0.013	na	na		
	Fipronil sulfone	Insecticide degradate	62168	120068-36-2	0.024	na	na		
	Fonofos	Insecticide	04095	944-22-9	0.006	HAL-US	10		
	Hexazinone	Herbicide	04025	51235-04-2	0.026	HAL-US	400		
	Iprodione	Fungicide	61593	36734-19-7	0.026	na	na		
	Isofenphos	Insecticide	61594	25311-71-1	0.011	na	na		
	Malaoxon	Insecticide degradate	61652	1634-78-2	0.039	na	na		
	Malathion	Insecticide	39532	121-75-5	0.016	HAL-US	100		
	Metalaxyl	Fungicide	61596	57837-19-1	0.0069	na	na		
	Methidathion	Insecticide	61598	950-37-8	0.0087	na	na		
	Metolachlor	Herbicide	39415	51218-45-2	0.01	HAL-US	700		
	Metribuzin	Herbicide	82630	21087-64-9	0.012	HAL-US	70		
	Myclobutanil	Fungicide	61599	88671-89-0	0.033	na	na		
	1-Naphthol	Insecticide degradate	49295	90-15-3	0.0882	na	na		
	Paraoxon-methyl	Insecticide degradate	61664	950-35-6	0.019	na	na		
	Parathion-methyl	Insecticide	82667	298-00-0	0.008	HAL-US	1		
	Pendimethalin	Herbicide	82683	40487-42-1	0.02	na	na		
	cis-Permethrin	Insecticide	82687	54774-45-7	0.01	na	na		
	Phorate	Insecticide	82664	298-02-2	0.02	na	na		
	Phorate oxon	Insecticide degradate	61666	2600-69-3	0.027	na	na		
	Phosmet	Insecticide	61601	732-11-6	0.0079	na	na		
	Phosmet oxon	Insecticide degradate	61668	3735-33-9	0.0511	na	na		
	Prometon	Herbicide	04037	1610-18-0	0.01	HAL-US	100		
	Prometryn	Herbicide	04036	7287-19-6	0.0059	na	na		
	Pronamide (Propyzamide)	Herbicide	82676	23950-58-5	0.004	RSD5-US	20		
💧	Simazine	Herbicide	04035	122-34-9	0.006	MCL-US	4		
	Tebuthiuron	Herbicide	82670	34014-18-1	0.016	HAL-US	500		
	Terbufos	Insecticide	82675	13071-79-9	0.012	HAL-US	0.4		
	Terbufos oxon sulfone	Insecticide degradate	61674	56070-15-6	0.045	na	na		
	Terbuthylazine	Herbicide	04022	5915-41-3	0.0083	na	na		
	Tribufos	Herbicide	61610	78-48-8	0.035	na	na		
	Trifluralin	Herbicide	82661	1582-09-8	0.009	HAL-US	10		

[1]See Table A Below

Included on Title 22	Constituent (Common Name)	Primary Use or Source	USGS Parameter Code	CAS Number	Report-ing Level	Threshold Type	Threshold Value	Sampling Schedule	
	Potential Wastewater indicators (micrograms per liter)[1]							Fast	Slow
	Acetophenone	Fragrance in detergent and tobacco, flavor in beverages	62064	98-86-2	0.1	na	na		
	Acetyl hexamethyl tetrahydro naphthalene (AHTN)	Musk fragrance	62065	21145-77-7	0.5	na	na		
	Anthracene	Wood preservative, tar, diesel, crude oil, combustion product	34221	120-12-7	0.08	na	na		
	9,10-Anthraquinone	Manufactured dye/textiles, seed treatment, bird repellant	62066	84-65-1	0.16	na	na		
💧	Benzo[a]pyrene	Cancer research, combustion product	34248	50-32-8	0.12	MCL-US	0.2		
	Benzophenone	Fixative for perfumes and soaps	62067	119-61-9	0.18	na	na		
	Bisphenol A	Manufactured polycarbonate resins, antioxidant, flame retardant	62069	80-05-7	0.4	na	na		
	Bromacil †	Herbicide, greater than 80 percent noncrop usage on grass/brush	04029	314-40-9	0.04	HAL-US	70		
	Bromoform (tribromomethane)†	Byproduct waste water treatment, military/explosives	34288	75-25-2	0.08	MCL-US	80		
	3-*tert*-Butyl-4-hydroxy anisole (BHA)	Antioxidant, general preservative	32059	25013-16-5	0.6	na	na		
	Caffeine †	Beverages	50305	58-08-2	0.1	na	na		
	Camphor	Flavor, odorant, ointments	62070	76-22-2	0.1	na	na		
	Carbaryl †	Insecticide, crop and garden uses	82680	63-25-2	1	RSD5-US	400		
	Carbazole	Insecticide, manuf. dyes, explosives, and lubricants	62071	86-74-8	0.08	na	na		
	Chlorpyrifos †	Insecticide, domestic pest and termite control	38933	2921-88-2	0.12	HAL-US	2		
	Cholesterol	Fecal indicator, plant sterol	62072	57-88-5	1.4	na	na		
	3-*beta*-Coprostanol	Carnivore fecal indicator	62057	360-68-9	1.6	na	na		
	Cotinine †	Primary nicotine metabolite	62005	486-56-6	0.4	na	na		
	p-Cresol	Wood preservative	62084	106-44-5	0.18	na	na		
	4-Cumylphenol	Nonionic detergent metabolite	62060	599-64-4	0.14	na	na		
	Diazinon †	Insecticide, greater than 40 percent nonagricultural usage, ants, flies	39572	333-41-5	0.08	HAL-US	1		
	N,N-diethyl-*meta*-toluamide (DEET)	Insecticide, urban uses, mosquito repellent	62082	134-62-3	0.2	na	na		
	1,4-Dichlorobenzene †	Moth repellant, fumigant, deodorant	34572	106-46-7	0.08	MCL-CA	5		
	2,6-Dimethylnaphthalene	Diesel/kerosene (trace in gasoline)	62055	581-42-0	0.2	na	na		
	4-Nonylphenol diethoxylates (Diethoxynonylphenol)	Nonionic detergent metabolite	62083	n/a	5	na	na		
	4-Octylphenol diethoxylates (Diethoxyoctylphenol)	Nonionic detergent metabolite	61705	n/a	1	na	na		
	4-Octylphenol monoethoxylates (Ethoxyoctylphenol)	Nonionic detergent metabolite	61706	n/a	1	na	na		
	Fluoranthene	Component of coal tar and asphalt	34377	206-44-0	0.08	na	na		
	Hexahydrohexamethylcyclopentabenzopyran (HHCB)	Musk fragrance	62075	1222-05-5	0.5	na	na		
	Indole	Pesticide ingredient, fragrance in coffee	62076	120-72-9	0.14	na	na		
	Isoborneol	Fragrance in perfumery, in disinfectants	62077	124-76-5	0.06	na	na		
	Isophorone	Solvent for lacquer, plastic, oil, silicon, resin	34409	78-59-1	0.14	HAL-US	100		
	Isopropylbenzene †	Manufactured phenol/acetone, fuels and paint thinner	62078	98-82-8	0.1	NL-CA	770		
	Isoquinoline	Flavors and fragrances	62079	119-65-3	0.4	na	na		
	d-Limonene	Fungicide, antimicrobial, antiviral, fragrance in aerosols	62073	5989-27-5	0.14	na	na		
	Menthol	Cigarettes, cough drops, liniment, mouthwash	62080	89-78-1	0.2	na	na		
	Metalaxyl	Herbicide, fungicide, mildew, blight, pathogens, golf/turf	50339	57837-19-1	0.08	na	na		
	3-Methyl-1(H)-indole (Skatole)	Fragrance, stench in feces and coal tar	62058	83-34-1	0.08	na	na		
	5-Methyl-1H-benzotriazole	Antioxidant in antifreeze and deicers	62063	136-85-6	1.8	na	na		
	1-Methylnaphthalene	Gasoline, diesel fuel, or crude oil	62054	90-12-0	0.1	na	na		
	2-Methylnaphthalene	Gasoline, diesel fuel, or crude oil	62056	91-57-6	0.08	na	na		
	Methyl salicylate	Liniment, food, beverage, UV-absorbing lotion	62081	119-36-8	0.18	na	na		
	Metolachlor †	Herbicide, indicator of agricultural drainage	39415	51218-45-2	0.08	HAL-US	700		
	Naphthalene †	Fumigant, moth repellent, major component of gasoline	34443	91-20-3	0.1	NL-CA	17		
	para-Nonylphenol (total) (4-Nonylphenol)	Nonionic detergent metabolite	62085	84852-15-3	1.8	na	na		
	4-*n*-Octylphenol	Nonionic detergent metabolite	62061	1806-26-4	0.16	na	na		
	4-*tert*-Octylphenol	Nonionic detergent metabolite	62062	140-66-9	0.1	na	na		
💧	Pentachlorophenol	Herbicide, fumigant, wood preservative, termite control	34459	87-86-5	2	MCL-US	1		
	Phenanthrene	Manufactured explosives, tar, diesel, crude oil, combustion product	34462	85-01-8	0.08	na	na		
	Phenol	Disinfectant, product manufacturing, leachate	34466	108-95-2	0.2	HAL-US	2000		
	Prometon †	Herbicide (non-crop only) applied prior to blacktop	04037	1610-18-0	0.18	HAL-US	100		
	Pyrene	Component of coal tar and asphalt	34470	129-00-0	0.08	na	na		
	beta-Sitosterol	Plant sterol	62068	83-46-5	2	na	na		
	beta-Stigmastanol	Plant sterol	62086	19466-47-8	2	na	na		
	Tetrachloroethylene (PCE)†	Solvent, degreaser, veterinary anthelmintic	34476	127-18-4	0.18	MCL-US	5		
	Tributyl phosphate	Antifoaming agent, flame retardant	62089	126-73-8	0.2	na	na		
	Triclosan	Disinfectant, antimicrobial	62090	3380-34-5	0.2	na	na		
	Triethyl citrate (ethyl citrate)	Cosmetics, pharmaceuticals	62091	77-93-0	0.4	na	na		
	Triphenyl phosphate	Plasticizer, resin, wax, finish, roofing paper, flame retardant	62092	115-86-6	0.16	na	na		
	Tri(2-butoxyethyl)phosphate	Flame retardant	62093	78-51-3	0.5	na	na		
	Tri(2-chloroethyl)phosphate	Plasticizer, flame retardant	62087	115-96-8	0.18	na	na		
	Tri(dichlorisopropyl)phosphate	Flame retardant	62088	13674-87-8	0.18	na	na		

†See Table A Below

Included on Title 22	Constituent (Common Name)	Primary Use or Source	USGS Parameter Code	CAS Number	Report-ing Level	Threshold Type	Threshold Value	Sampling Schedule	
	Pesticides and Pesticide Degradates, continued (micrograms per liter)[1]							Fast	Slow
	Acifluorfen	Herbicide	49315	50594-66-6	0.028	na	na		
	Aldicarb	Insecticide	49312	116-06-3	0.04	MCL-US	3		
	Aldicarb sulfone	Insecticide/degradate	49313	1646-88-4	0.018	MCL-US	3		
	Aldicarb sulfoxide	Degradate	49314	1646-87-3	0.022	MCL-US	4		
💧	Atrazine†	Herbicide	39632	1912-24-9	0.008	MCL-CA	1		
	Bendiocarb	Insecticide	50299	22781-23-3	0.020	na	na		
	Benomyl	Fungicide	50300	17804-35-2	0.022	na	na		
	Bensulfuron-methyl	Herbicide	61693	83055-99-6	0.018	na	na		
💧	Bentazon	Herbicide	38711	25057-89-0	0.012	MCL-CA	18		
	Bromacil	Herbicide	04029	314-40-9	0.018	HAL	70		
	Bromoxynil	Herbicide	49311	1689-84-5	0.028	na	na		
	Caffeine†	Beverages	50305	58-08-2	0.018	na	na		
	Carbaryl†	Herbicide	49310	63-25-2	0.018	RSD5-US	400		
💧	Carbofuran†	Herbicide	49309	1563-66-2	0.016	MCL-CA	18		
	Chloramben, methyl ester	Herbicide	61188	7286-84-2	0.024	na	na		
	Chlorimuron-ethyl	Herbicide	50306	90982-32-4	0.032	na	na		
	3-(4-Chlorophenyl)-1-methyl urea	Degradate	61692	5352-88-5	0.036	na	na		
	Clopyralid	Herbicide	49305	1702-17-6	0.024	na	na		
	Cycloate	Herbicide	04031	1134-23-2	0.014	na	na		
💧	2,4-D (2,4-Dichlorophenoxyacetic acid)	Herbicide	39732	94-75-7	0.038	MCL-US	70		
	2,4-D methyl ester (2,4-Dichlorophenoxyacetic acid methyl ester)	Herbicide	50470	1928-38-7	0.016	na	na		
	2,4-DB (4-(2,4-Dichlorophenoxy)butyric acid)	Herbicide	38746	94-82-6	0.020	na	na		
	DCPA (Dacthal) monoacid	Degradate	49304	887-54-7	0.028	na	na		
	Deethylatrazine† (2-Chloro-4-isopropylamino-6-amino-s-triazine)	Degradate	04040	6190-65-4	0.028	na	na		
	Deisopropyl atrazine (2-chloro-6-ethylamino-4-amino-s-triazine)	Degradate	04038	1007-28-9	0.08	na	na		
	Dicamba	Herbicide	38442	1918-00-9	0.036	HAL	4000		
	Dichlorprop	Herbicide	49302	120-36-5	0.028	na	na		
💧	Dinoseb	Herbicide	49301	88-85-7	0.038	MCL-CA	7		
	Diphenamid	Herbicide	04033	957-51-7	0.010	HAL	200		
	Diuron	Herbicide	49300	330-54-1	0.015	RSD5-US	20		
	Fenuron	Herbicide	49297	101-42-8	0.019	na	na		
	Flumetsulam	Herbicide	61694	98967-40-9	0.040	na	na		
	Fluometuron	Herbicide	38811	2164-17-2	0.016	HAL	90		
	Hydroxyatrazine (2-Hydroxy-4-isopropylamino-6-ethylamino-s-triazine)	Degradate	50355	2163-68-0	0.032	na	na		
	3-Hydroxycarbofuran	Degradate	49308	16655-82-6	0.008	na	na		
	Imazaquin	Herbicide	50356	81335-37-7	0.036	na	na		
	Imazethapyr	Herbicide	50407	81335-77-5	0.038	na	na		
	Imidacloprid	Insecticide	61695	138261-41-3	0.020	na	na		
	Linuron	Herbicide	38478	330-55-2	0.014	na	na		
	MCPA (2-Methyl-4-chlorophenoxyacetic acid)	Herbicide	38482	94-74-6	0.030	HAL	30		
	MCPB (4-(2-Methyl-4-chlorophenoxy) butyric acid)	Herbicide	38487	94-81-5	0.010	na	na		
	Metalaxyl†	Fungicide	50359	57837-19-1	0.012	na	na		
	Methiocarb	Insecticide	38501	2032-65-7	0.010	na	na		
	Methomyl	Insecticide	49296	16752-77-5	0.020	HAL	200		
	Metsulfuron methyl	Herbicide	61697	74223-64-6	0.025	na	na		
	Neburon	Herbicide	49294	555-37-3	0.012	na	na		
	Nicosulfuron	Herbicide	50364	111991-09-4	0.04	na	na		
	Norflurazon	Herbicide	49293	27314-13-2	0.020	na	na		
	Oryzalin	Herbicide	49292	19044-88-3	0.012	na	na		
💧	Oxamyl	Insecticide	38866	23135-22-0	0.030	MCL-CA	50		
💧	Picloram	Herbicide	49291	1918-02-01	0.032	MCL-US	500		
	Propham	Herbicide	49236	122-42-9	0.030	HAL	100		
	Propiconazole	Fungicide	50471	60207-90-1	0.010	na	na		
	Propoxur	Insecticide	38538	114-26-1	0.008	na	na		
	Siduron	Herbicide	38548	1982-49-6	0.020	na	na		
	Sulfometuron-methyl	Herbicide	50337	74222-97-2	0.038	na	na		
	Tebuthiuron†	Herbicide	82670	34014-18-1	0.026	HAL	500		
	Terbacil	Herbicide	04032	5902-51-2	0.016	HAL	90		
	Triclopyr	Herbicide	49235	55335-06-3	0.026	na	na		

†See Table A Below

	Pharmaceuticals (micrograms per liter)[1]							Fast	Slow
	Acetaminophen	analgesic	62000	103-90-2	0.024	na	na		
	Albuterol	anti-inflammatory; bronchodilator	62020	18559-94-9	0.0139	na	na		
	Caffeine	stimulant	50305	58-08-2	0.0149	na	na		
	Carbamazapine	anticonvulsant; analgesic; mood stabilizer	62793	298-46-4	0.0179	na	na		
	Codeine	opiod narcotic	62003	76-57-3	0.0223	na	na		
	Cotinine	nicotine metabolite	62005	486-56-6	0.0284	na	na		
	Dehydronifedipine	antianginal metabolite	62004	67035-22-7	0.022	na	na		
	Diltiazem	antianginal; antihypertensive	62008	42399-41-7	0.0179	na	na		
	1,7-Dimethylxanthine	caffeine metabolite	62030	611-59-6	0.0208	na	na		
	Diphenhydramine	antihistamine	62796	58-73-1	0.0229	na	na		
	Fluoxetine	antidepressant	62011	54910-89-3	0.016	na	na		
	Ranitidine	antihistamine	62019	na	0.025	na	na		
	Sulfamethoxazole	antibacterial, antiprotozoal	62021	723-46-6	0.0237	na	na		
	Thiabendazole	anthelmintic	62801	148-79-8	0.025	na	na		
	Trimethoprim	antibacterial	62023	738-70-5	0.0203	na	na		
	Warfarin	anticoagulant	62024	81-81-2	0.00188	na	na		

	Constituent of special interest (micrograms per liter)[2]							Fast	Slow
💧	Perchlorate	Rocket fuel, fireworks, flares, fertilizer	61209	14797-73-0	0.5	NL-CA	6		
	N-Nitrosodimethylamine (NDMA)	Rocket fuel, plasticizer	64176	62-75-9	0.0	NL-CA	0.01		

†See Table A Below

	Nutrients and dissolved organic carbon (mg/L)[1]							Fast	Slow
	Ammonia (as nitrogen)		00608	7664-41-7	0.020	HAL-US	30		
💧	Nitrite (as nitrogen)		00613	14797-65-0	0.002	MCL-US	1		
💧	Nitrate plus nitrite (as nitrogen)		00631	na	0.060	MCL-US	10		
	Total nitrogen (ammonia, nitrite, nitrate, organic nitrogen)		62854	17778-88-0	0.06	na	na		
	Phosphorus, phosphate, orthophosphate (as phosphorus)		00671	14265-44-2	0.006	na	na		

	Major and minor ions (mg/L)[1]							Fast	Slow
	Bromide		71870	24959-67-9	0.02	na	na		
💧	Calcium		00915	7440-70-2	0.02	na	na		
💧	Chloride		00940	16887-00-6	0.12	SMCL-CA	250 (500)[1]		
💧	Fluoride		00950	16984-48-8	0.10	MCL-CA	2		
	Iodide		78165	7553-56-2	0.002	na	na		
💧	Magnesium		00925	7439-95-4	0.014	na	na		
	Potassium		00935	7440-09-7	0.04	na	na		
	Silica		00955	7631-86-9	0.018	na	na		
💧	Sodium		00930	7440-23-5	0.20	na	na		
💧	Sulfate		00945	14808-79-8	0.18	SMCL-CA	250 (500)[1]		
💧	Residue on evaporation (total dissolved solids, TDS)		70300	na	10	SMCL-US	500 (1,000)[1]		

The recommended SMCL-CA thresholds for chloride, sulfate, and TDS are listed with the upper SMCL-CA thresholds in parentheses.

Included on Title 22	Constituent (Common Name)	Primary Use or Source	USGS Parameter Code	CAS Number	Report-ing Level	Threshold Type	Threshold Value	Sampling Schedule	
	Trace Elements (micrograms per liter)[1]							Fast	Slow
💧	Aluminum		01106	7429-90-5	1.6	MCL-CA	1,000		
💧	Antimony		01095	7440-36-0	0.06	MCL-US	6		
💧	Arsenic[†]		01000	7440-38-2	0.12	MCL-US	10		
💧	Barium		01005	7440-39-3	0.08	MCL-CA	1,000		
💧	Beryllium		01010	7440-41-7	0.06	MCL-US	4		
💧	Boron		01020	7440-42-8	8	NL-CA	1,000		
💧	Cadmium		01025	7440-43-9	0.04	MCL-US	5		
💧	Chromium[†]		01030	7440-47-3	0.12	MCL-CA	50		
	Cobalt		01035	7440-48-4	0.04	na	na		
💧	Copper		01040	7440-50-8	0.4	MCL-US	1,300		
💧	Iron[†]		01046	7439-89-6	6	SMCL-CA	300		
	Lead		01049	7439-92-1	0.12	MCL-US	15		
	Lithium		01130	7439-93-2	0.6	na	na		
💧	Manganese		01056	7439-96-5	0.2	SMCL-CA	50		
💧	Molybdenum		01060	7439-98-7	0.12	HAL-US	40		
💧	Nickel		01065	7440-02-0	0.06	MCL-CA	100		
💧	Selenium		01145	7782-49-2	0.08	MCL-US	50		
💧	Silver		01075	7440-22-4	0.10	SMCL-CA	100		
💧	Strontium		01080	7440-24-6	0.4	HAL-US	4,000		
💧	Thallium		01057	7440-28-0	0.04	MCL-US	2		
	Tungsten		01155	7440-33-7	0.06	na	na		
💧	Uranium		22703	7440-61-1	0.04	MCL-US	30		
💧	Vanadium		01085	7440-62-2	0.04	NL-CA	50		
💧	Zinc		01090	7440-66-6	0.6	SMCL-CA	5,000		

[†]See Table A Below

	Trace element species (micrograms per liter)[3]							Fast	Slow
	Arsenic (III)	Natural	99034	22569-72-8	1	na	na		
💧	Arsenic (total)[†]	Natural	01000	7440-38-2	0.5	MCL-US	10		
💧	Chromium (VI), hexavalent	Natural	01032	18540-29-9	1	na	na		
💧	Chromium (total)[†]	Natural	01030	7440-47-3	1	MCL-CA	50		
	Iron (II)	Natural	01047	7439-89-6	2	na	na		
💧	Iron (total)[†]	Natural	01046	7439-89-6	2	SMCL-CA	300		

[†]See Table A Below

	Radioactive constituents*							Fast	Slow
	Radon-222[1]; pCi/L		82303	14859-67-7	*	proposed MCLs-US	300; 4,000		
💧	Tritium[4,7]; pCi/L		07000	10028-17-8	*	MCL-CA	20,000		
💧	Carbon-14[7]; Percent modern carbon		49933	14762-75-5	*	na	na		
	Stable isotope ratios (relative ratios in per mil)							Fast	Slow
	δ^2H of water[9]	Natural	82082	na	2	na	na		
	δ^{18}O of water[9]	Natural	82085	na	0.20	na	na		
	δ^{15}N of nitrate[8]	Natural	82690	na				X	X
	δ^{18}O of nitrate[8]	Natural	63041	na				X	X
	δ^{13}C of dissolved carbonates[9]	Natural	82081	na	0.05	na	na		
	δ^{11}B [4]	Natural		na					X
	Chlorine-37 and bromine-81	Natural		na					X

	Noble gases[5]							Fast	Slow
	Argon (method uncertainty 2%)			7440-37-1	cm^3STP/g	na	na	X	X
	Helium-3 / Helium-4 ratio (method uncertainty .75%)			na / 7440-59-7	atom ratio	na	na	X	X
	Helium-4 (method uncertainty 2%)			7440-59-7	cm^3STP/g	na	na	X	X
	Krypton (method uncertainty 2%)			7439-90-9	cm^3STP/g	na	na	X	X
	Neon (method uncertainty 2%)			7440-01-09	cm^3STP/g	na	na	X	X
💧	Tritium (method uncertainty 1%)[†]			10028-17-8	pCi/L	MCL-CA	20000 (pCi/L)	X	X
	Xenon (method uncertainty 2%)			7440-63-3	cm^3STP/g	na	na	X	X
	[†]See Table A Below								
	Microbial constituents							Fast	Slow
💧	F-specific coliphage[11]	Viral indicator / Intestinal tracts of warm-blooded animals	99335		na	TT-US	99.99 percent killed / inactivated		X
💧	Somatic coliphage[11]	Viral indicator / Fecal contaminated waters	99332		na	TT-US	99.99 percent killed / inactivated		X

[1]USGS National Water Quality Laboratory, Denver, Colorado
[2]Montgomery Watson Harza Laboratory, Monrovia, California
[3]USGS National Research Program Laboratory, Boulder, Colorado
[4]USGS Stable Isotope and Tritium Laboratory, Menlo Park, California
[5]Lawrence Livermore National Laboratory, Livermore, California
[6]Eberline Analytical Services, Richmond, California
[7]University of Arizona, Accelerator Mass Spectrometry Laboratory, Tuscon, Arizona
[8]USGS Stable Isotope Laboratory, Reston, Virginia (USGSSIVA)
[9]University of Waterloo (contract laboratory) (CAN-UWIL)
[10]USGS Reston Chlorofluorocarbon Laboratory
[11]USGS Ohio Water Microbiology Laboratory

Fast	Slow

Cells not color-filled under columns I and J indicate that parameter was not sampled for in the specified sample type (fast, intermediate, slow)

Color-filled cells without an **X** indicate that parameter was sampled for and results are available in Well Owner Report. Absence of the parameter in the Well Owner Report indicates that the parameter was not detected in well.

X	X

Color-filled cells with an **X** indicate that parameter was sampled for, but results are not yet available for Well Owner Report. Absence of the parameter in the Well Owner report is meaningless.

[†]Table A. Constituents analyzed in ground-water samples collected for the San Francisco Bay Groundwater Ambient Monitoring and Assessment (GAMA) study, California, April to June 2007, that appear on multiple analytical schedules, primary constituent classification, and analytical schedules constituent appears on, and preferred analytical schedule.

[Preferred analytical schedules are the methods of analysis with the greatest accuracy and precision out of the ones used for the compound in question. LLNL, Lawrence Livermore

Constituent	Primary constituent classification	Analytical schedules	Preferred analytical schedule
Results from preferred method reported			
Atrazine	Pesticide	2003, 2060	2003
Bromacil	Pesticide	2060, 1433	2060
Bromoform (Tribromomethane)	VOC	2020, 1433	2020
Caffeine	Wastewater indicator	2060, 1433, 2080	2060
Carbaryl	Pesticide	2060, 2003, 1433	2003
Chlorpyrifos	Pesticide	2003, 1433	2003
Deethylatrazine (2-Chloro-4-isopropylamino-6-aminos-t	Pesticide degradate	2003, 2060	2003
Cotinine	Wastewater indicator	1433, 2080	2080
Diazinon	Pesticide	2003, 1433	2003
1,4-Dichlorobenzene	VOC, pesticide	2020, 1433	2020
Isopropylbenzene	VOC	2020, 1433	2020
Metalaxyl	Pesticide	2060, 2003, 1433	2003
Metolachlor	Pesticide	2003, 1433	2003
Naphthalene	VOC	2020, 1433	2020
Prometon	Pesticide	2003, 1433	2003
Tetrachloroethene (PCE)	VOC	2020, 1433	2020
Tebuthiuron	Herbicide	2060, 2003	2003
Results from both methods reported (different USGS parameter codes)			
Alkalinity	Water-quality indicator	1948, field	field
Arsenic, total	Trace element	1948, TML	1948
Chromium, total	Trace element	1948, TML	1948
Iron, total	Trace element	1948, TML	1948
pH	Water-quality indicator	1948, field	field
Specific conductance	Water-quality indicator	1948, field	field
Tritium	Radioactive	LLNL, SITL	both