Phase III RCRA Facility Investigation Groundwater Report
450 East Grand Avenue
South San Francisco, CA

August 14, 2005

Prepared For:

Cherokee San Francisco & Grand Avenue, L.L.C.

Prepared By:

EnviroAssets, Inc.
2450 Washington Ave., Suite 270
San Leandro, CA 94577

Phase III RCRA Facility Investigation Groundwater Report
450 East Grand Avenue
South San Francisco, CA

August 14, 2005

Prepared For:

Cherokee San Francisco & Grand Avenue, L.L.C.

Prepared By:

EnviroAssets, Inc.
2450 Washington Ave., Suite 270
San Leandro, CA 94577

Original Signed By

Michael Harrison, P.E.
Principal

TABLE OF CONTENTS

FIGURES

TABLES

APPENDICES

1.0 INTRODUCTION

This RCRA Facility Investigation (RFI) Groundwater Report ("Report") has been prepared by EnviroAssets, Inc. (EnviroAssets) on behalf of Cherokee San Francisco & Grand Avenue, L.L.C. (Cherokee) for the property at 450 E. Grand Avenue, South San Francisco, California (Property). The Property location is shown on Figure 1. The Document has been prepared in accordance with Corrective Action Consent Agreement ("CACA") P2-00/01-008 under the Department of Toxic Substances Control ("DTSC") Voluntary Cleanup Program. This Document is part of the cooperative approach between Cherokee and DTSC to achieve cleanup and closure of the Property such that the Property is protective of human health and the environment.

The Property stretches over approximately 27 acres, and is located on the shores of San Francisco Bay in South San Francisco, California, at the east end of East Grand Avenue approximately one mile east of Highway 101. Comprised of property sold by the South San Francisco Land and Improvement Company and salt marsh and tidelands sold by the State Board of Tideland Commissioners in the 1890's, the Property was the site of manufacturing activities for over 100 years, beginning with the Steiger Terra Cotta Pottery Works (circa 1894) and W.P. Fuller (circa 1898). Manufacturing activities at the site underwent significant changes over the years, and included production of ceramic products, white lead, plate glass, pigment and colorant-pastes, rubber paint, red lead, enamel paint, varnish, resins, and more recently, latex paint products, as described in more detail in the following sections. Currently, industrial operations have ended at the Property, and it is under development by its current owner Slough SSF, LLC (Slough) for use as biotech office and laboratory space.

As an original "interim status" facility, a designation granted to facilities in operation before passage of the Recourse Conservation and Recovery Act (RCRA) in 1976, the Property has undergone a series of environmental investigations and Corrective Actions stretching over multiple decades. Under the United States Environmental Protection Agency (USEPA), investigation of the intermediate and deeper groundwater was completed, soil and shallow groundwater issues were separated, and soil Corrective Actions were Completed with Controls in 2000. At that "sensible transition point" (EPA, September 18, 2000), the DTSC assumed lead agency status in order to regulate maintenance of the soil Corrective Action controls and completion of the shallow groundwater Corrective Actions. As lead agency, the DTSC has overseen the RCRA Facility Groundwater Investigation (RFI) including sampling of existing monitoring wells, installation of additional monitoring wells, and discrete shallow groundwater sampling designed to address potential data gaps. This Report has been prepared under CACA P2-00/01-008 to summarize the decades long environmental program at the Property, document the shallow groundwater investigations that indicate the site-specific media cleanup objectives have been met, and document that the shallow groundwater at the property does not require any additional action or measures to ensure the remedy remains protective of human health and the environment. Therefore, the shallow groundwater investigation results at the Property indicate that the Property is suitable for a Corrective Action Complete Without Controls determination.

2.0 PROPERTY BACKGROUND

This section presents the Property's historical and environmental setting. Both the commercial and environmental aspects of the Property history are discussed.

2.1 Property Description

The Property is located in South San Francisco, California, at the east end of East Grand Avenue approximately one mile east of Highway 101, and within the area described as the "Shoreline Manufacturing Zone" in the *East of 101 Area Plan* ("Plan") prepared by the City of South San Francisco (Figure 1). According to the Plan, the land uses for this area include heavy industrial, manufacturing, and mixed use commercial, and include no permanent residential uses except for live-aboards in the local marinas. The Property is located on Point San Bruno, and is bordered by the San Francisco Bay ("Bay") to the east, the former San Bruno Channel to the south, by an air-freight forwarding company to the west, and by Genentech and the former Marine Magnesium facility to the North and Northwest.

Since Congress passed RCRA in 1976, the facility has been operating under “interim status” permit designation. Interim status was granted to facilities in operation before passage of RCRA, a measure that gave the U.S. Environmental Protection Agency authority to control hazardous waste.

The Property consists of 27-acres of both native strata and imported fill materials, and is comprised of property sold by the South San Francisco Land and Improvement Company and salt marsh and tidelands sold by the State Board of Tideland Commissioners in the 1890's. The tidelands portions of the Property were filled in stages during the early portion of the twentieth century. Manufacturing activities have occurred at the Property for over 100 years, beginning with the Steiger Terra Cotta Pottery Works (circa 1894) and W.P. Fuller (circa 1898). Manufacturing activities at the site have undergone significant changes over the years and have included production of ceramic products, white lead, plate glass, pigment and colorant-pastes, rubber paint, red lead, enamel paint, varnish, and resins, and more recently, latex paint products, as described in more detail in the following sections. Currently, all industrial activities at the Property have ceased, and it is under development as combined office and laboratory space by its current owner Slough SSF, LLC. Figure 2 presents historical sampling locations along with the locations of existing groundwater monitoring wells. The Master Site Plan for the Property is included as Figure 3.

2.1.1 Ownership History

Paint manufacturing began at the Property in 1898 under the ownership of W.P. Fuller. In 1927, W.P. Fuller acquired the Steiger Terra Cotta Pottery Works on a 10.5 acre parcel at the western portion of the Property. In 1968, The O’Brien Corporation purchased the Property. ICI Glidden then purchased a 7-acre portion on the southwestern portion of the Property from The O’Brien Corporation. The entire 27-acre parcel (including the 7-acre ICI Glidden portion) was purchased by Cherokee (effective June 30, 1999). The entire property was then purchased by Slough, the current and sole owner of the Property, on December 11, 2000.

2.1.2 Operational History

The following operational history was inferred from historical maps, aerial photographs, and Sanborn maps of the property.

1898 to 1907
During this period the Property consisted of approximately 11-acres. Activities on the Property included:

- White lead works;
- Plate glass production;
- Pigment and colorant-paste production;
- Rubber paint works; and
- Southern and eastern property fill activities.

1907 to 1913
During this period, the Property had increased to 17.5 acres through filling. Activities on the Property expanded to include:

- Red lead works;
- Linseed oil refining;
- A machine shop;
- A varnish department; and
- Southern and eastern property fill activities.

A storm sewer system was also installed during this period.

1913 to 1927
During this period, W.P. Fuller purchased the neighboring Steiger Terra Cotta Pottery Works to expand the Property to approximately 27 acres. During this time period, significant improvements were made at the Property including:

- A paint manufacturing building;
- A varnish manufacturing plant and packaging area;
- A breakwater was constructed near the wharves along the southern property boundary;
- A new storage tank farm in the northern portion of the property (9 aboveground tanks);
- Expansion of the storm sewer system; and
- Southern and eastern property fill activities.

1927 to 1938
During this period, Property expansions include:

- Increased number of aboveground tanks in the northern tank farm from 9 to 27; and
- Construction of a drum storage area and a parking garage.

1938 to 1947
During this period, minor improvements were made at the Property including:

- A new manufacturing building was constructed;
- A new tank farm with 23 aboveground storage tanks was completed on the southwestern portion of the property; and
- Five new drains were added to the stormwater system.

1947 to 1968
During this period, changes at the Property included:

- A solvent still installed in the southeast portion of the site;
- A new laboratory facility (completed in 1956)
- The parking garages were demolished; and
- The San Bruno Channel immediately south of the Property was filled.

1968 to 1999
The O'Brien Corporation purchased the Property in 1968 and began the series of changes and modernizations that led to the current Property layout. A list of only the most significant changes and projects is presented below

- Lead works removed (1969)
- Wharves removed (1970)
- Storm sewer discharge to Bay eliminated by retrofitting the storm sewers into the sanitary sewer system (1968-1973)
- Spill control and countermeasure plan
- The manufacture of paint products shifted from solvent-enamel based paints to water-based (latex) paints.
- A new warehouse was constructed (1972)
- A washwater waste treatment system and three small surface impoundments (ponds) were installed (1976)
- A washwater waste treatment system and the ponds were removed (1985-86); and
- The breakwater was removed (1992-1993)

1999 to present
Cherokee purchased the Property in June 1999 and implemented an aggressive environmental program, including:

- Closure of the former waste surface impoundments at the Property was achieved (1999).
- Eastern property corrective measures were conducted (2000).
- Soil closure was awarded by the EPA (September 18, 2000).
- Deed Restrictions (Administrative Controls) were executed (October 4, 2000).
- A CACA was completed with the DTSC (March 29, 2001).
- Phase III RFI Groundwater Investigations were conducted.

2000 to present

Slough purchased the Property in December 2000. Under its ownership, all industrial activities ceased, and the Property was prepared for development as a combined office and laboratory space catering to the biotech industry.

- All manufacturing activities ceased and the final tenant, ICI Paints, terminated its occupancy in mid 2002.
- All historical structures on the Property were demolished to make way for development.
- Development of the "Britannia East Grand" biotech campus began and is currently under way (Figure 3).

2.1.3 Regulatory History

As discussed previously, the Property has harbored industrial activities for over 100 years. Consequently, the regulatory history for the Property is long and complex. The Administrative Record Index compiled by the EPA in September 1998 includes (EPA, 1998) of documents. Therefore, this section presents only permitted facilities and the most significant regulatory developments.

The O'Brien Corporation applied for a RCRA Interim Status permit and was granted RCRA interim Part B status in November 1980. The RCRA regulated units at the Property included three surface impoundments, one storage area, and two storage tanks. DTSC approved the former hazardous waste storage surface impoundment closure on August 25, 1999, officially closing all hazardous waste management units at the Property.

During the early 1920s, W.P. Fuller built a varnish manufacturing plant on the Property. The varnish process consisted of diluting natural resins and oils, such as linseed oil, with various thinners and driers. Trace amounts of residual solvent vapors not recondensed or captured in fume scrubbers, were combusted in a "fume incinerator". The fume incinerator was a component of the plant's natural gas boiler system that provided heat to the plant. The emissions from the fume incinerator were permitted under the Clean Air Act from the State of California Department of Industrial Relations and discharged to the atmosphere. The permit was later transferred to the San Francisco Bay Area Air Quality Management District ("BAAQMD"). The use of this system was discontinued in 1988.

In December 1987, DTSC conducted a RCRA Facility Assessment (RFA) to identify solid waste management units ("SWMUs"). They reported 31 areas of concern associated with past operations at the Property. EPA issued a RCRA 3008(h) Administrative Order ("Order") in March 1989 based upon the results of the RFA. In response, The O'Brien Corporation prepared a *Site Assessment Report*, in 1990 that led to a renegotiation of the Order. The amended order, issued by the EPA in April 1991, included seven areas of concern to be further investigated with potential corrective action. The seven areas of concern were included in the Order were:

1. The former solvent still area;
2. The former tank farm area (northern property)
3. The eastern property;
4. The area around MW-21;

5. The former USTs;
6. The breakwater; and
7. The warehouse area.

These areas were later generalized to the five areas shown on Figure 4. The amended order required The O'Brien Corporation to remove the breakwater which was placed on the southern property for erosion control during the ownership of W.P. Fuller & Company, to conduct a risk assessment of the area surrounding the current warehouse, and to investigate the remaining areas under a RCRA Facility Investigation (RFI).

The key aspects of the Order have been satisfied during performance of the following activities:

- The breakwater was removed in April 1992 and a Corrective Measures Implementation Report was submitted to the EPA (April 1993).
- Several phases of RFI were completed including the *Final Phase II RCRA Facility Investigation*, Harza 1996.
- Based on the results of the RFI activities, the EPA issued a *Statement of Basis for Soil Remediation at the O'Brien Corporation's facility* in July 1999. No significant comments were received and a *Final Decision and Response to Comments* was issued by the EPA on April 26, 2000.
- Corrective measures including additional investigation, soil removal, and low-permeability cap construction were conducted during the summer of 2000.
- The EPA approved the Phase II RFI (with conditions) and Corrective Measures for soil on September 18, 2000. The conditions required further investigation and review of shallow groundwater conditions. The approval letter also requests DTSC to assume the role as lead agency for the continuing shallow groundwater investigation.
- Cherokee and DTSC cooperatively accomplished Deed Restrictions for the property on October 4, 2000 (Appendix A). A voluntary Corrective Action Consent Agreement (P2-00/01-008) was then completed on March 29, 2001. The CACA incorporates the conditions included in the EPA approval of the RFI and soil corrective measures.
- A revised Phase III RFI/Current Conditions shallow groundwater monitoring workplan was submitted to the DTSC on February 15, 2002. The DTSC approved the Workplan on June 26, 2002.
- Shallow groundwater monitoring and discrete sampling activities were conducted with regulatory oversight from the first quarter of 1998 through 2004.

2.1.4 Waste Generation

A variety of wastes have been generated at the Property during its long and varied industrial history including: oils (including whale and fish oils), petroleum hydrocarbons, inorganics including lead and zinc, resin additives, and solvents. All industrial activities at the Property have now ceased, and waste generation activities are governed by the Soil Management Plan required by the executed Deed Restriction.

2.1.5 Waste Management

As discussed previously, no regulated waste management units currently exist at the Property. Specific details regarding historical waste management units are provided in the *Site Assessment Report*, prepared by The O'Brien Corporation in 1990 (O'Brien, 1990).

2.1.6 Spills and Discharge History

In February 1982, a leak is reported to have occurred from underground piping in the northern tank farm while toluene was being unloaded. The leaking pipes were reportedly located in a sloped earthen area immediately above the pump house. Following discovery of the leak, the soils were removed and aerated and the subsurface piping was replaced with above ground piping. In 1988 the entire tank farm was removed from the O'Brien Property. Groundwater monitoring for volatile and semivolatile organic compounds was performed through 1989 in wells installed within the tank farm and spill area. Detections occurred only in 1983 test results. Additional information on this spill is provided in Section 5.2.4.

2.1.7 Chronology of Critical Events

The following section presents major events in the Property history.

- In 1898, manufacturing activities began under the ownership of W.P. Fuller.
- From approximately 1900 through the 1920's, the southern and eastern portions of the property were expanded with artificial fill. Although the sources of the fill are unclear, fill materials are believed to have derived from demolition debris from the 1906 San Francisco earthquake, the Steiger Terra Cotta Pottery Works, and other industrial sources. These assumptions were corroborated when large quantities of pottery, glass shards, and other industrial type fill materials were encountered during soil corrective measures in 2000.
- 1927, W.P. Fuller acquired the Steiger Terra Cotta Pottery Works on a 10.5 acre parcel at the western portion of the Property.
- The O'Brien Corporation purchased the Property in 1968 and initiated major changes in manufacturing activities.
- The facility was granted RCRA interim Part B status in November 1980
- Removal and closure of the breakwater was completed in 1992 and 1993.
- Removal of former surface impoundments in 1985 and 1986 and initiation of 7-years of post-closure monitoring.
- A groundwater monitoring workplan was submitted to the EPA in September 1997 and was approved in October 1997. Groundwater monitoring has been ongoing since the first quarter of 1998.
- The Property was purchased by Cherokee on June 30, 1999.
- Approval of former hazardous waste storage surface impoundment closure was issued by the DTSC on August 25, 1999.
- *Final Remedy Selection* for Corrective Measures was issued by the EPA on April 26, 2000.

- Correction Action and RFI approval and lead agency change request issued by EPA in September 18, 2000.
- Deed restrictions for the property were finalized on October 4, 2000.
- The Property was purchased by Slough Estates on December 11, 2000.
- A revised Phase III RCRA Facility Investigation Workplan/Current Conditions Report was issued on February 15, 2002, and approved by the DTSC on June 26, 2002.
- A *Revised Workplan for Additional Groundwater Investigation* was submitted to the DTSC on June 10, 2003, and approved on June 13, 2003.
- An *Additional Groundwater Investigation Summary Report* was submitted to the DTSC on November 7, 2003, and approved on May 28, 2004.
- A *Semiannual Groundwater Monitoring Summary And Request For Termination of Groundwater Monitoring Program* report was submitted to the DTSC on March 17, 2005. The DTSC provided verbal approval of monitoring termination during the May 6, 2005, Meet-and-Confer meeting.

3.0 ENVIRONMENTAL SETTING

The following sections present the environmental setting on and around the Property.

3.1 Location/Land Use

The property location, land use, zoning, and surrounding area are discussed in Section 2.1, Property Description. The population with access to the Property is limited to industrial and construction workers. No residential areas exist in the Point San Bruno area, east of Highway 101 ("101").

3.2 Local Ecology

The Property is currently under development as an office park. Consequently, there are few vegetated areas except for hillside or shoreline buffer zones. Based upon the California Wildlife Habitat Relationships System habitat classification scheme, if left uncontrolled, the Property would revert to that of disturbed, Non-Native Annual Grassland/Coastal Prairie (Grassland) with typical Non-Native Grassland species. Throughout the Shoreline Manufacturing Zone, Non-Native Grassland vegetation consists of annual grasses and herbs, which grow primarily during the winter and spring months and are dominated by non-native annual species. Common and characteristic species include wild oats (*Avena barbata*), softchess brome (*Bromus mollis*), fillaree (*Erodium* spp.), barley (*Hordeum* spp.), and wild rye (*Lolium multiflorum*). Non-Native Grassland intergrades with ruderal vegetation throughout the study area. Ruderal vegetation is a common component in Non-Native Annual Grasslands and consists of annual and perennial herbs and grasses that occupy currently and previously disturbed sites. Ruderal vegetation often occurs on vacant lots and along roadsides subject to continuous disturbance from maintenance activities. These disturbed areas are dominated by common, invasive and weedy plant species, including yellow star thistle (*Centaurea solstitialis*), pampus grass (*Cortaderia selloana*), bristly ox-tongue (*Picris echioides*), and anise (*Foeniculum vulgare*). In some less frequently disturbed sites, coyote bush (*Baccharis pilularis*), a common component of coastal scrub, has begun to colonize the area.

The Property is bordered immediately to the south by the former San Bruno Channel. The San Bruno Channel was filled between 1963 and 1978 with industrial fill of unknown origins. The area serves as a drainage canal that channels runoff from a large city storm sewer outfall to the Bay. The San Bruno Channel area is approximately one acre in size, extends from San Francisco Bay westward forming a narrow drainage within the former San Bruno Channel. A portion of the site is intertidal. The soils of the site consist mainly of fill ranging in size from riprap to fine grain materials. According to a site survey performed by H.T. Harvey & Associates in 2000, the site is mostly vegetated by tidal salt marsh plants. The dominant plant species include cordgrass (*Spartina foliosa*), saltgrass (*Distichlis spicata*), alkali bulrush (*Scirpus robustus*) and pickleweed (*Salicornia virginica*). Some non-native annual grasses and sweet fennel dominate the slopes immediately adjacent to the wetlands in the center of the former San Bruno Channel.

The Property is bordered immediately to the east by mudflats and subtidal open water bounding the western shore of San Francisco Bay. The mudflats are "relatively steep and have reduced tidal flow" (JSA 1995). The intertidal area is vegetated by saltgrass (*Distichlis spicata*), saltbush (*Atriplex*), and non-native annuals in its upper margin, with cordgrass (*Spartina foliosa*) extending towards the subtidal zone.

3.3 Topography and Surface Drainage

The Property topography ranges from approximately 76-feet above mean sea level on the bedrock outcrop in the northern portion of the Property, to sea level along the southeastern portion of the Property. Surface water flow is towards the Bay on the east and southeast and towards the former San Bruno Channel to the south. The pre-development topography of the Property is shown on Figure 5. In 1997 and 1998, The O'Brien Corporation retained stormwater in a bermed area in the southeastern portion of the Property for sampling prior to discharge to The Bay. Following the 1997-1998 stormwater monitoring, The O'Brien Corporation was granted a Notice of Termination from the Regional Water Quality Control Board. Currently, the topography of the Property is in flux as significant changes required by the development plan are implemented. Stormwater activities are now governed by the developer's Storm Water Pollution Prevention Plan and are outside of the scope of this document.

3.4 Climate

Climatology at the Property has been previously evaluated in detail by the MARK Group as part of the Hydrogeological Assessment Report/Report of Waste Discharge (12/21/1987). The conclusions of that evaluation are presented in the following sections. Data evaluated by the MARK Group include minimum, mean, mean maximum 100-year, and probable annual precipitation; 24-hour precipitation from a 100-year event, and a probable maximum precipitation event; and mean annual and monthly evaporation at the Property.

3.4.1 Precipitation

Data for mean annual precipitation was collected by the MARK Group (MARK Group, 12/21/1987) from climatological data compiled by the National Weather Service Forecast Office for the San Francisco International Airport, The Oakland International Airport, and the San Francisco Federal Building Weather Station. These stations are located 1.9, 9.2, and 9.0 miles from the site, respectively. Based on the evaluation, the mean annual precipitation at the Property was estimated to be 19.15 inches. The 100-year, 24-hour precipitation event, and probable maximum 24-hour precipitation event were estimated at 5.71 inches and 15.56 inches, respectively.

3.4.2 Evaporation

The MARK Group estimated the mean annual evaporation at the Property from measured evaporation data from the Burlingame Climatological Station located 4.5 miles southwest of the site. The annual evaporation data, based on 23 years of record, ranged from 39.17 to 68.38 inches, with a mean value of 35.56 inches. The greatest evaporation was measured in May

through September and the least evaporation in November through February. Using a correction factor for Class A pan evaporation rates, the mean annual evaporation from the water surfaces at the Property was estimated to be 42.95 inches.

Comparison of estimated mean annual precipitation and evaporation at the Property indicates that the water surfaces near the Property could have a maximum net loss of about 23.6 inches per year (MARK Group, 12/21/1987).

3.4.3 Wind Direction and Velocity

Rose diagrams for wind direction, velocity, and frequency of occurrence for San Francisco International Airport, published by the National Oceanographic and Atmospheric Administration were evaluated by the MARK Group for the years 1985 and 1986. Results of the evaluation indicate the predominance of northwesterly winds at speeds of 3 to 10 miles per hour. Wind speeds were reportedly greatest in the late spring and summer months.

3.5 Surface Water Hydrology

A detailed analysis of surface water systems within one mile of the Property was performed by the MARK Group in 1987, using a combination of aerial photograph review and field reconnaissance (MARK Group, 12/21/1987). Off-site water bodies identified during their review consist of The Bay, which borders the site on the east, and marginal wetlands (the Former San Bruno Channel) bordering the site on the south. As discussed previously, the former San Bruno Channel was filled from 1963 to 1978 and now serves as a drainage channel for a large South San Francisco storm sewer outfall. The only on-site surface water feature identified during the MARK Group study was the spring located on the hillside at the north side of the Property. The apparent source for this spring was considered to be a water reservoir at the top of the hill to the northwest of the Property. A holding tank on this hill provides water storage for the City of South San Francisco. The spring flow rate was previously estimated at approximately ½ to 1-gallon per minute, without visible seasonal change.

The hillside that borders the north side of the Property has a drainage area of less than 0.6 square miles (MARK Group, 12/21/1987). The Federal Emergency Management Agency Flood Insurance Rate Map for 1981 classifies the site as "Zone C", indicating only minimal potential for flooding. The nearest mapped area of potential 100-year flood hazard is along the Colma Creek drainage, located over one mile west of the Property.

3.6 Hydrogeology

The following sections present a cursory discussion of the hydrogeology at the Property. A more comprehensive discussion of the hydrogeology at the Property is provided in Section 8 of the Hydrogeological Assessment Report, Report of Waste Discharge (MARK Group, 12/21/1987) and Section 2 of the Phase II RFI.

3.6.1 Site Hydrogeology

Previous site investigations (MARK Group, 12/21/1987, November 1989) have identified three distinct hydrostratigraphic units, or hydrogeologic zones. Based on review of the previous work, these units have been adopted for this report. The following discussion of water-bearing units at the site is based primarily on the previous investigations. The three hydrostratigraphic units have been identified on the basis of differences in general stratigraphy, differences in potentiometric levels, and in response to tidal influence. The two uppermost zones occur within the artificial fill, and the Bay Mud and Colluvial Deposits. The third water-bearing zone is the Franciscan Complex bedrock. Figure 6 presents the approximate locations of the surface expressions of the interfaces between the three primary units. Each zone is described in the following sections. Site cross sections prepared by Harza (1996) are included as Figures 7-10 (the cross section location lines are shown on Figure 2).

3.6.1.1 Fill Material

A large portion of the Property was artificially filled with material from unknown sources from 1900 through the 1920's. Although the sources of the fill are unclear, fill materials are believed to have derived from demolition debris from the 1906 San Francisco earthquake, the Steiger Terra Cotta Pottery Works, and other industrial sources. These assumptions were corroborated when large quantities of pottery, glass shards, and other industrial type fill materials were encountered during soil corrective measures in 2000. Figure 11 presents the historical shoreline of the South San Francisco region in 1895. Figure 12 presents locations and approximate dates of filling activities.

The uppermost water-bearing zone occurs within the 10 to 15 feet of artificial fill present over the southern half of the site. The fill zone consists primarily of a heterogeneous mix of silty clays, with sand and gravel in varying proportions. Groundwater in the zone appears to be unconfined. The fill zone is separated from the underlying Bay Mud/Colluvium zone by the relatively impermeable Bay Mud silty clay. This separation is reflected in local differences in water quality, potentiometric level, and reported degree of tidal influence. As observed during excavation of impacted materials during Corrective Measures conducted in 2000, the fill contact with underlying sediments can undulate several feet within very limited areas. The Fill Material zone pinches out along the northern half of the site, and terminates at the bay margin on the east, but may extend across portions of the drainage channel bordering the Property on the south.

The hydraulic conductivity of the fill has been previously evaluated using both slug tests and pump tests on a number of wells (MARK Group, 12/21/1987, November 1989). The reported values ranged from about 9.9×10^{-5} to 9.8×10^{-3} centimeters per second (cm/sec). The large variation in calculated hydraulic conductivity values probably reflects the heterogeneity of the fill material. The average value of hydraulic conductivity of the fill is reported at 2.9×10^{-4} cm/sec determined by pump testing and 1.3×10^{-3} cm/sec determined by slug testing.

3.6.1.2 Bay Mud/Colluvium

Continuous sampling in several soil borings revealed the presence of sand interbeds near the base of the Bay Mud and within the underlying colluvium (MARK Group, 12/21/1987). Observation wells installed by the MARK Group showed relative differences in potentiometric levels between this zone and the overlying fill, indicating the presence of a distinct hydrostratigraphic zone. In addition, measured tidal responses reported by the MARK Group also provided evidence that the Bay Mud/Colluvium appeared to be hydrologically isolated from the overlying fill, but in probable hydraulic contact with the low permeability bedrock zone below.

The Bay Mud/Colluvium zone pinches out where the bedrock surfaces toward the northern half of the Property, but appears to extend laterally to the east, south, and west. This unit may be as much as 70 feet thick beneath the southern portion of the Property. The average hydraulic conductivity reported by the MARK Group (November 1989) for the Bay Mud is less than 2.0 x 10^{-8} cm/sec, and 3.9 x 10^{-4} cm/sec for colluvium.

3.6.1.3 Bedrock

Five wells (three monitoring and two observation) have been screened within the sandstone and shale zones of the Franciscan Complex at the site. Measured variations in groundwater flow pattern and potentiometric surface indicate that the bedrock zone forms a distinct hydrostratigraphic unit (MARK Group, 12/21/1987, November 1989). The bedrock is present at the surface in the northern half of the Property, and is present at depths of over 150 feet in the southern half of the Property. Reported hydraulic conductivity of the bedrock is approximately 1.7 x 10^{-6} cm/sec (MARK Group, November 1989).

3.6.1.3.1 Groundwater Flow

Groundwater levels were measured quarterly in monitoring wells completed in the fill and groundwater flow direction was determined prior to interior well destruction activities conducted in October 2002. Well construction details are provided in Table 12. Following demolition of interior wells, conducted to remove monitoring wells from areas of the property slated for imminent development, the shallow groundwater monitoring network was no longer suitable for determination of groundwater flow direction. A contour of water levels taken from the shallow (fill) aquifer during second quarter 2001 groundwater monitoring is presented on Figure 13. As indicated by the overlain groundwater flow direction arrows, groundwater flow in the shallow aquifer at the Property is similar to the ground surface topology and trends towards The Bay and the former San Bruno Channel at an approximate gradient of 0.009 ft/ft. Groundwater has been observed within the shallow subsurface at depths ranging from four to 12 feet below ground surface (bgs), which varies seasonally. During the Corrective Measures, completed during the low groundwater conditions of the Bay Area's 2000 dry season, the groundwater was observed to be perched on the undulating clay layer underlying the fill materials. The undulating clay layer supporting the perched groundwater was observed at depths ranging from approximately 6 to 7 feet bgs in Excavations 2 and 3, and approximately 11 to 12 feet bgs in Excavation 4 (Figure 2).

Groundwater levels were measured in wells completed in the Bay Mud/Colluvium and Bedrock by Harza on March 18, 1994. Elevation contours and flow lines derived by Harza for the Bay Mud/Colluvium and Bedrock in March of 1994 are shown on Figures 14 and 15, respectively. Whereas water level elevations changed somewhat between measurement dates, the general groundwater flow patterns depicted for each hydrostratigraphic zone remained consistent for the measurement dates.

Groundwater flow direction in the Bay Mud/Colluvium is toward the southeast during both the March and April measurements. This flow pattern clearly indicates that the Bay Mud/Colluvium is a distinct and separate hydro stratigraphic unit. The measured hydraulic gradients range from 0.007 ft/ft on April 8 to 0.010 on March 18. 1994.

The potentiometric surfaces for the Bedrock zone appear to reflect the bedrock topographic surface depicted by the subsurface cross sections (Figures 7 through 10). The groundwater flow contours appear to reflect the swale area on the western portion of the site as well as the associated ridge present in the central portion of the site. The hydraulic gradient measured through the western swale area is 0.026 ft/ft.

4.0 INVESTIGATION SUMMARY

Significant environmental investigations have occurred at the Property since the early 1980's. As discussed previously, the administrative record for the Property is currently over 95 pages (EPA, 1998). Therefore, brief descriptions of the most significant previous investigations presented in the following sections are not inclusive of all work conducted at the Property.

4.1 Ecology Protection Systems, 1982-1983

In 1982, Ecology Protection Systems (EPS) installed four groundwater monitoring wells (W -1 to W-4), collected five surface soil samples, and installed eight soil borings to obtain soil and ground water samples for a preliminary investigation of site conditions. Three wells were installed in the southeastern corner of the property to evaluate water quality in the former impoundment area and one well was placed on the northern property in the vicinity of the former underground tank area (by former pump house). In general, the investigation indicated the presence of elevated levels of lead in the area of the former ponds and the presence of volatile organic compounds (VOCs) in the northern area. However, the investigation did not indicate the presence of VOCs in ground water near the ponds. Results of the EPS investigation are presented in the January 1983 report, *Soil Contamination Investigation.* The approximate locations of monitoring wells W-3 and W-4 (not shown on Figure 2) are approximately 50 feet west of W-2 and in the area of W-7, respectively.

4.2 Woodward Clyde Consultants, 1983-1987

Between 1983 and 1987, Woodward Clyde Consultants (WCC) performed several site characterization studies that included the installation of eight ground water monitoring wells (W-2. 6, and 7, and MW -11 through 15) and drilling several exploratory borings for soil sample collection.

The wells were installed to evaluate possible potentiometric differences at the site related to different subsurface geologic units, and to provide additional ground water quality data in the former impoundment area. The WCC studies concluded that groundwater in the vicinity of the former ponds was not significantly impacted by VOCs or lead, and that the elevated levels of lead in the soil were immobile and would not pose a significant threat to public health or the environment. Groundwater monitoring was performed at the site from July 1984 through May 1982.

Results of the WCC investigations are presented in reports titled, *Soil and Groundwater Quality Assessment* (August 1983); *Soil and Groundwater Quality Assessment Report, Addendum No. 1* (January 1984); *Soil and Groundwater Quality Assessment Report, Addendum No.2* (April1984); and *Water Quality Assessment Report* (July 1985).

In addition to the assessment investigations described above, the impoundments were closed in 1982. Details of the closure are contained in the November 1987 report, *Closure Report -Solar Evaporation Ponds -Impoundment Closure Area.*

4.3 The Mark Group, 1987-1990

At the request of the California Regional Water Quality Control Board (RWQCB), the *Hydrogeologic Assessment Report/Report Of Waste Discharge* (MARK Group, 12/21/1987) was performed to further refine the site hydrogeology and investigate specific areas of potential environmental concern. During this investigation, four monitoring wells (MW -18 through 21) and 10 piezometers (PM -1 through PM 4A and PM-6 through PM-11) were installed and a variety of field tests were performed to evaluate hydrogeologic properties and chemical quality characteristics of the site. This investigation helped define three stratigraphic, water-bearing zones; established on-site areas of tidal influence; and provided a more detailed evaluation of the distribution of chemical constituents in soil and groundwater.

Several other investigations were performed by The Mark Group (MARK Group) to additionally address specific areas of concern at the Property. The investigations are outlined in reports: *Pond Closure Certification Report* (April, 1987); *Breakwater Investigation* (December, 1987); *San Bruno Channel Fill Investigation* (March, 1989); ISD Post-Closure Monitoring Report (November, 1989); and *Addendum to Hydrogeological Assessment Report* (November 1989). MARK investigations concluded with issuance of their *Site Assessment Report* (February 1990), which contains a detailed summary of all previous investigations at the site.

4.4 EPA-RCRA Facility Assessment, 1987

In December 1987, EPA contractors conducted a RCRA Facility Assessment (RFA) that resulted in the issuance of a RCRA 3008(h) Order in March 1989 (amended in April 1991). Additional details regarding this document are presented in Section 2.1.3, Regulatory History.

4.5 EMCON Associates, 1992

In 1992, EMCON Associates performed an RCRA facility investigation at the Property in compliance with a revised unilateral order issued by the U.S. EPA. The purpose of the RFI was to determine the nature and extent of potential releases of hazardous constituents at five potential source areas at the site. The investigation included chemical analysis of soil and groundwater samples collected from nine exploratory borings. The results of the study, as presented in EMCON's *RCRA F acility Investigation* (September 1992), have helped to define the spatial distribution of chemical constituents at the Former Solvent Still Area, the Former Underground Tank Area 4&5, the Former Tank Farm Area, the Eastern Property, and the MW-21 Area.

4.6 EMCON Associates, 1992

In March 1992, EMCON Associates supervised the removal of the Former Breakwater and surrounding soils. This removal action was part of an Administrative Order. Soil samples were collected (S-l through S-l 0) and analyzed for a variety of chemical compounds. Based on these data it was determined that the contaminated material had been adequately removed. Please note that the locations of these soil samples are not plotted on any of the figures included in this report.

4.7 Ratech Resources, 1993

In May 1993, Ratech Resources conducted an evaluation to determine the data needs for completion of a human health risk assessment and an ecological evaluation. This work entailed reviewing historical soil, sediment, and ground water quality, tabulating this information, identifying the relationship of these data with SWMUs and AOCs, and determining what additional data would be necessary for the completion of the risk assessment and ecological evaluation included in this report.

The results of this work are presented in Ratech Resource's May 28, 1993 document. *Data Needs Letter For A Risk Assessment/Ecological Evaluation*. Please note all soil and ground water quality data used during the Phase II RFI was generated by Harza or was obtained from Ratech Resource's May 1993 document

4.8 Henshaw Associates, Inc. (1997-2001)

In response to a requirement of the administrative order, Henshaw performed discrete sampling of eastern property shallow groundwater on March 10 and 11, 1998, collecting six samples at approximate 70 foot intervals along the eastern property boundary with direct push techniques. Elevated levels of volatile and semivolatile organic chemicals and selected metals were identified in samples collected along the eastern property boundary in areas that were excavated during the 2000 Corrective Measures. The results of the eastern property discrete sampling were included in a letter report submitted to the EPA on June 5, 1998 along with the results of first quarter 1998 groundwater monitoring.

Henshaw conducted shallow groundwater monitoring at the Property from the first quarter of 1998 through the third quarter of 2001. In October 2000, Cherokee voluntarily installed and sampled three additional monitoring wells along the eastern property boundary. These wells, MW-30, -31, and -32, were sampled quarterly from their installation through the end of 2002, for VOCs, SVOCs, PPM, and TEPH. DTSC approved termination of monitoring from these wells in 2003.

During the 1997-1998 wet seasons, Henshaw conducted routine site inspections and sampling of stormwater runoff on the undeveloped portion of the Property. Based upon the Annual Stormwater Report containing the monitoring results, the RWQCB granted a "Notice of Termination of general permit stormwater requirements".

In 1999, Henshaw initiated discussion with the DTSC in order to finalize closure of the former surface impoundments at the Property. Based upon these discussions, the DTSC approved the closure plan for the surface impoundments on August 25, 1999.

In October 2000, Henshaw submitted a Corrective Measures Workplan for the former San Bruno Channel. As most of the former San Bruno Channel property is owned by the Haskins Brothers, this workplan was completed as a joint project. The Bay Conservation Development Commission requested that an alternative corrective measures strategy be developed.

In 2000, Henshaw conducted Corrective Measures at the Property on behalf of Cherokee, and under the oversight of the EPA. The soil Corrective Measures (CMs) completed at the Property were designed to protect human health and the environment by minimizing exposure to and removing contaminated soils that that have been impacted at the Property. During implementation of the CMs, impacted soils were removed from the Eastern and former Solvent Still Areas and replaced with clean fill (Figure 2). The Property's existing low permeability cap was extended to areas of impacted soils adjacent to the existing warehouse and paved area (Figure 2). Additionally, deed restrictions (administrative controls, Appendix A) were implemented to limit future use of the property to commercial or industrial purposes and mandate soil management and low-permeability cap maintenance practices.

During excavation activities, confirmatory samples were collected to ascertain if CM completion criteria (PRGs) were met. Based upon these samples, approximately 16,300 tons of impacted soils with concentrations of contaminants of concern above EPA approved media cleanup standards were removed from approximately 0.9 acres of the Property. Excavated soils were disposed of as characteristic RCRA waste or California Hazardous waste, as appropriate.

Two low permeability caps, 4,740 and 45,765 square feet in area, were constructed in the areas shown on Figure 2 in order to "eliminate exposure to contaminated soil" (EPA, 2000). The low permeability caps were constructed above grade to minimize the disturbance of impacted soils. Following review of the *Corrective Measures Completion Report* (Henshaw, September 11, 2000), the EPA issued a "No Further Action" letter for soil at the property on September 18, 2000 (Appendix B). The no further action letter was designed to facilitate transition of the lead regulatory agency from EPA to DTSC at a "sensible transition point". In keeping with the recent Corrective Measures, the historical data available for the property, and previous determinations that intermediate and deeper aquifers were not impacted by industrial activities at the site, the No Further Action letter required implementation of a deed restriction and compliance point shallow groundwater monitoring plan. Consequently, subsequent shallow groundwater investigation was designed to investigate whether chemicals of concern are migrating through groundwater movement from the Property as dissolved phase migrants. In order to provide a conservative look at the migration of inorganic constituents, five (5) micron filters were used to remove entrained sediment from groundwater samples, rather than the industry standard 0.45 micron filters. Filters with the relative large five micron filter size openings were requested by the EPA so that potential colloidal metals transport (defined as migration of sorbed chemicals on soil particles below five micron in size) could be included in monitoring data.

Cherokee and DTSC cooperatively accomplished Deed Restrictions for the property on October 4, 2000 (Appendix A). A voluntary Corrective Action Consent Agreement (P2-00/01-008) was then completed on March 29, 2001, at which time the DTSC assumed lead regulatory status for the project. The CACA incorporates the conditions included in the EPA approval of the Phase II RFI and soil Corrective Measures. In July 2001, Henshaw prepared a *Phase III Facility Investigation Workplan/Current Conditions Report* on behalf of Cherokee and in accordance with the new CACA. Additionally, a letter clarifying the division of responsibilities between Cherokee and Slough, the new property owner, was provided to the DTSC in November 2001 (Appendix C).

4.9 Geomatrix (2001-present)

Geomatrix conducted an investigation of groundwater quality along the southern boundary of the 450 East Grand Avenue property on behalf of Slough during March 2001. The work included advancing CPT data and collecting grab groundwater samples at six locations along the southern (downgradient) property boundary. Samples were analyzed for TPH, VOCs, and metals. In general, sample results were unremarkable. However, elevated concentrations of TPH were noted next to the former AST farm. Geomatrix presented the findings of this investigation in a letter report titled *Additional Groundwater Analytical Results,* May 18, 2001. Laboratory analytical reports (LARs) from this investigation are included in Appendix D, and summary tables are provided in Appendix E. Geomatrix continues to serve as Sloughs' primary environmental consultant as the soil management plan required by Property deed restrictions is implemented throughout the development period, and administrative controls are maintained by Slough.

4.10 The Source Group (2002)

In May 2002, The Source Group performed investigation of the former AST farm vicinity on behalf of ICI paints, the former operator of the paint manufacturing facility at the Property. These activities followed the decommissioning of the AST farm in early 2002, and were conducted at the direction of the San Mateo County Environmental Health Department. In all, seven soil borings were advanced and six groundwater samples were collected. Review of these sampling results indicated that areas of hydrocarbons and naphthalene existed in groundwater beneath the Former AST Farm area. The Source Group presented the findings of this investigation in the *Soil And Groundwater Sampling Report,* May 23, 2002. LARs from this investigation are included in Appendix D, and summary tables are provided in Appendix E.

4.11 EnviroAssets, Inc. (2001-present)

EnviroAssets assumed groundwater monitoring duties on behalf of Cherokee in September 2001. From September 2001 through June 2002, shallow groundwater monitoring wells MW-11, MW-21, MW-21, MW-30, MW-31, MW-32, PM-09, and PM-14 were monitored on a quarterly basis. Following the June 2002 monitoring event, the DTSC approved terminating monitoring of wells MW-11, MW-21, MW-21, 32, PM-09, and PM-14. Per DTSC request, monitoring of groundwater quality in wells MW-30, MW-31, and MW-32 was continued for two additional quarters.

On July 2 and 3, 2002 monitoring wells W-7, MW-18 and MW-19 were abandoned under San Mateo County Health Services (SMCHS) permit numbers MW-184-02 and MW-185-02. On October 7 and 8, 2002 monitoring wells PM-2, PM-3, PM-10, PM-12, PM-13, MW-12, MW-13, MW-14, MW-15, MW-20 and W-5 were destroyed under San Mateo County Health Services (SMCHS) permit numbers MW-296-02 and MW-297-02. These wells, abandoned with the concurrence of DTSC, were not included as part of the shallow groundwater monitoring program and were located in areas of the property slated for imminent development.

In November 2002, EnviroAssets initiated investigation of the former aboveground storage tank (AST) farm in the southwestern portion of the Property. This work was conducted at the behest of the DTSC in response to data collected by Slough's consultant Geomatrix in March 2001 that suggested free product existed in shallow groundwater beneath the former AST farm. EnviroAssets performed field observation and head-space screening of soil during removal of the concrete slab beneath the former AST farm, followed by excavation of four test pits to the depth of the first encountered groundwater in order to directly observe subsurface conditions at the former AST farm. Although no significant free product was observed, oily sheen and organic matter were observed on the surface of the water in three of the test pits, and a naphthalene like odor was noted. Results of this screening investigation were presented in *Screening Summary for Former Southwestern Above Ground Storage Tank Farm* (EnviroAssets, December 20, 2002).

On July 26, 2002, EnviroAssets submitted a *Groundwater Quality and Appropriate Groundwater Standards Evaluation.* Based upon this report and subsequent correspondence, concentration based ecological screening values (ESVs) for surface water were approved by the DTSC as a "mechanism to evaluate groundwater quality" (DTSC, May 28, 2004). Specifically, per DTSC (December 20, 2002):

> *The primary source of toxicity screening values for surface waters in California is 40 CFR 131(2000). The appropriate screening values for this site are the criterion continuous concentrations (CCCs) water quality standards. Where marine CCCs are not available for certain chemicals, alternative standards may be used.*

The decision to use ecological screening values for surface water as site-specific media cleanup objectives for evaluation of shallow groundwater quality at the Property is based upon the following key elements:

- The executed Deed Restrictions for the property that include prohibitions on beneficial use of groundwater beneath the property; and
- The absence of chemicals of concern in groundwater at concentrations that present a significant threat to human health.

The DTSC also agreed that a 10-fold adjustment of surface water standards due to dilution and mixing within the tidal front is consistent with Regional Water Quality Control Board orders for sites proximate to San Francisco Bay, and is an appropriate approach for this project (DTSC,

March 17, 2003). A detailed discussion regarding ecological screening values is presented in Section 6.4.

Positively detected chemicals and selected water quality standards are provided in Tables 1, 2, and 3, grouped by chemical family (inorganics, VOCs, and SVOCs respectively).

Following review of the screening summary for the former Southwestern aboveground storage tank farm, the DTSC required installation of two wells in the vicinity of the former AST farm (wells MW-40 and MW-41, installed August 18, 2003), collection of grab groundwater samples from a portion of the eastern property between wells MW-31 and MW-32 (temporary sample points WG-1, WG-2, and WG-3, August 18, 2003), and methyl mercury from well PM-09 (August 21, 2003). EnviroAssets' revised *Work Plan For Additional Groundwater Investigation* (EnviroAssets, June 10, 2003) was approved by the DTSC on June 13, 2003. The *Additional Groundwater Investigation Summary Report* documenting the investigatory activities was submitted to the DTSC on November 7, 2003. Based upon these new data, the DTSC approved termination of monitoring from all but the two newest shallow groundwater monitoring wells, MW-40 and MW-41.

After completing two additional monitoring rounds of groundwater from wells MW-40 and MW-41, EnviroAssets submitted a *Semiannual Groundwater Monitoring Summary and Request For Termination of Groundwater Monitoring Program* on March 17, 2005. The request for termination was approved by the DTSC as concentrations of detected chemicals in samples collected from MW-40 and MW-41 were considerably below approved environmental screening values since the inception of monitoring of water within the wells. With this approval, termination of the shallow groundwater monitoring program was completed. LARs from these investigations are included in Appendix D.

5.0 EXISTING DEGREE AND EXTENT OF IMPACTS

The following sections present a summary of known environmental impacts at the Property. Additional details regarding these impacts can be found in the Phase II RFI and the Corrective Measures Completion Report.

5.1 Soil Impacts

Previous investigations of soil quality at the Property have indicated that Property soils have been impacted with metals in several areas. Additionally, soils in the warehouse area have been impacted with SVOCs. Based upon these results, a Corrective Measures program consisting of soil removal, low permeability cap construction, and administrative controls (Deed Restrictions, Appendix A) were implemented at the Property. Following completion of this program, the EPA issued a no further action letter for soil at the Property on September 18, 2000 (Appendix B). The most significant of these measures include:

- Removal and backfilling of four surface impoundments (1985-1986);
- Removal and backfilling of a breakwater (1992-1993); and
- Eastern and solvent still area Corrective Measures (2000).

Figure 2 presents capped areas added during 2000 Corrective Measures that are included in administrative controls. The attachments to the Deed Restrictions included in Appendix A presents the areas of the Property required to be capped in perpetuity. Media cleanup standards for the Corrective Measures adopted by the U.S. EPA were based on U.S. EPA Region 9 Preliminary Remediation Goals (PRGs) for industrial land use, which "correspond to a one in a million cancer risk, under a conservative set of assumptions" (EPA, 2000). The chemical driving the Corrective Measures was lead, with a corresponding PRG of 1,000 mg/Kg. Soils in unpaved areas were excavated until confirmatory samples were below the PRG. Areas included in the administrative controls may contain concentrations of contaminants of concern at levels significantly above PRGs. Due to the ubiquitous levels of arsenic in Bay Area soils (background concentrations) and the industrial history of the Point San Bruno area, the U.S. EPA adopted a 30 milligram per kilogram (mg/Kg) cleanup standard for arsenic. These standards were deemed appropriate due to the industrial nature of the Property and the surrounding area, the institutional controls included as part of the CMs, and the economic impracticality of creating a pristine environment in an area industrialized since the turn of the century and built on industrial fill.

5.2 Groundwater Impacts

Environmental investigations at the Property have involved sampling of the three aquifer units at the property through discreet sampling and groundwater monitoring well installation and sampling. The following sections are intended to summarize the conditions in groundwater beneath the Property.

As discussed in Section 4.11, shallow groundwater quality data are compared against surface water ecological screening criteria (CCC), or alternative standards where CCC are unavailable.

Please note that the shallow groundwater at the Property is limited by deed restrictions and is not considered for beneficial purposes. During prior investigations completed before final Corrective Measures and Deed Restriction implementation, different criteria were used to screen groundwater quality in the intermediate and deeper aquifer zones.

5.2.1 Fill Material

The following section presents a summary of investigation of the shallow groundwater aquifer unit at the Property.

5.2.1.1 Historical Investigations

During performance of the Phase II RFI, groundwater samples were collected from five monitoring wells (MW –13, MW –21, PM-9, PM-12, and PM-14, Figure 16) and thirteen borings (SWB-3 through SWB-11, TB-3, TB4, EB-32, and EB-35) completed in the Fill Material. The samples were analyzed for total metals, VOCs and SVOCs. Samples collected from MW-21, PM-9, SWB-6, SW-7, SWB-8, SWB-9 and SWB-11 were field filtered and analyzed for dissolved metals. Four groundwater samples (MW-13, MW-21, PM-9, and PM-14) were collected during the April 1994 sampling event and analyzed for dissolved metals. Samples collected from MW-21 and PM-9 were also analyzed for VOCs and SVOCs during the April 1994 sampling event. Samples collected in December 1995 from GeoProbe sampling point EB-32 were analyzed for TPH Extractables and samples collected from EB-35 were analyzed for VOCs and SVOCs. The distribution of metals, VOCs, and SVOCs in the Fill Material water-bearing zone samples collected during performance of the Phase II RFI is shown on figures 17 and 18.

Although the shallow groundwater formation is not considered a source of drinking water, the Phase II RFI compared dissolved metals results against MCLs. Based on these data, dissolved metals did not exceed the MCLs in the Fill Material zone, with the exception of lead in the samples from SWB-7 (0.75 mg/L]) and SWB-8 (0.08 mg/L). Both sample locations are beneath impermeable caps now required by deed restrictions. The only VOCs detected in the Fill Material groundwater were gasoline compounds (benzene, toluene, ethylbenzene, and xylenes [BTEX]). SVOCs (acenaphthene, anthracene, fluoranthene, 2methylnaphthate, and phenantherene) were detected in the MW-21 Area, Former Solvent Still Area, and the Eastern Property. With the exception of SVOCs detected in MW-21, fill soils have been excavated in the areas of positive detections of SVOCs.

Five wells (MW-11, -12, -13, -15, and -15) installed during post-closure monitoring of the former surface impoundments were monitored for lead from January 1988 through November 1995. Dissolved lead concentrations in samples collected from these wells were consistently near or below detection limits. In granting closure of the surface impoundments, DTSC remarked that "based upon the data collected during the closure activities and the seven years of groundwater monitoring, residual lead levels at the site were not found to exceed risk-based levels" (DTSC, August 25, 1999).

5.2.1.2 Recent Investigations

Three wells along the southern property boundary, MW-21, PM-09, and PM-14, were sampled for PPM, VOCs, and SVOCs from March 1998 through June 2002. In October 2001, following completion of Corrective Measures, three wells (MW-30, MW-31, and MW-32) were installed along the eastern property boundary and were sampled on a quarterly basis for PPM, VOCs, SVOCs, and total extractable hydrocarbons from installation through December 2002. Well MW-11, installed south of the former solar evaporation ponds, was added to the monitoring network in March 2001 and monitored for PPM, SVOC, and VOCs through December 2001. Additional samples were collected from MW-11 during two monitoring events for PPM in March and June 2002. Wells MW-40 and MW-41 were installed proximate to the former AST farm. Following installation and development, the shallow monitoring wells were sampled for VOCs (including styrene), SVOCs, dissolved PPM, TEPH, ethylene glycol, and hexavalent chromium. Styrene and ethylene glycol were chosen to represent indicator compounds for latex emulsions. As ethylene glycol and hexavalent chromium were not detected, these analyses were not included when additional sampling of MW-40 and MW-41 was conducted in 2004 for PPM, SVOC, TPH, and VOCs. Table 4 presents a summary of shallow groundwater well monitoring program sampling events.

5.2.1.3 Shallow Groundwater Investigation Statistical Summary

A statistical summary of the groundwater monitoring data collected at the Property is provided in Tables 5, 6, and 7. A list of chemicals of concern (COCs) was developed by including each chemical positively detected in any sample collected from shallow groundwater monitoring wells during the monitoring activities since March 1998. Analytical summary tables are included in Tables 1 through 3, and laboratory analytical reports are included on CD-ROM in Appendix D. The statistical summary tables provide the following information per well for each COC:

- Number Of Analyses;
- Number Of Detections;
- Percent Detections;
- Number Of Detections Above ESVs;
- Minimum;
- Maximum;
- Mean;
- Standard Deviation;
- Median; and
- 95% Upper Confidence Limit (UCL).

The statistics are presented in the following manner:

1) Where a COC was NOT DETECTED in samples collected from individual monitoring wells over the course of the monitoring program:
   a) The minimum and maximums are the minimum and maximum detection limits for the well specific sample set;

b) The average (or mean), standard deviation, and median are calculated with the value of the detection limits;

2) Where a COC was DETECTED in samples collected from individual monitoring wells over the course of the monitoring program:
   a) The provided minimum and maximums include positive detections and calculated values of one half the detection limits for non-detected samples in the well specific sample set;
   b) The average (or mean), standard deviation, and medial are calculated with positive detections and calculated values of one half the detection limits for non-detected samples in the well specific sample set.
3) The UCL assumes a normally distributed sample set and uses the mean and standard deviations calculated as described in bullets 1 and 2.

Please note that dissolved (filtered) concentrations of metals are included in this analysis.

5.2.1.4 Analytical Review

The following sections present a discussion of the statistical information provided in Tables 5, 6, and 7.

5.2.1.4.1 Inorganics (Dissolved)

Shallow groundwater was investigated for the following dissolved phase (filtered) inorganics: antimony, arsenic, beryllium, cadmium, chromium, copper, lead, mercury and methyl mercury, nickel, selenium, silver, thallium, and zinc. No ESVs for antimony, arsenic, beryllium, cadmium, chromium, mercury, selenium, silver, thallium or zinc were exceeded at the Property.

One detection of copper (53 µg/L) in samples collected from MW-31 exceeded the copper ESV of 31 µg/L. This single detection, almost a full order of magnitude greater than the only other positive detection of copper in samples collected from MW-31 (6.0 µg/L), is clearly a statistical outlier and potentially representative of sample contamination.

One exceedence of the ESV for lead (81 µg/L) was noted in a single sample collected from monitoring well PM-09. The sample in question, containing a concentration of 130 µg/L of lead, was collected on June 29, 2000, prior to the soil CMs completed in 2000. Samples collected from well PM-09 following the CMs have not contained lead concentrations over the ESV. Furthermore the mean and UCLs for the 29 samples collected from PM-09 are significantly below the ESV for lead.

Two samples from monitoring well MW-32 contained 110 µg/L of nickel, exceeding the ESV for nickel (82 µg/L). No other concentrations of nickel exceeding the ESV have been observed in samples collected from MW-32. Additionally, the mean nickel concentration for samples collected from MW-32 is 58.46 µg/L; below the ESV for nickel. The UCL for nickel for samples collected from MW-32 of 89.9 µg/L is slightly above the ESV. However, grab samples collected from the vicinity of MW-32 have not contained elevated concentrations of nickel above the ESV. Therefore, given the conservative nature of the ESVs and the relatively low

concentration of nickel in samples collected from MW-32, the exceedences of nickel do not appear to present a threat to human health or the environment.

Results for dissolved inorganic samples collected from the three grab groundwater samples (WG-1, WG-2, and WG-3) collected between MW-31 and MW-32 (summary tables provided in Appendix E) did not exceed any ESVs (of note, no lead was detected).

Dissolved priority pollutant metals were not been detected above ESVs in samples collected from wells MW-40 and MW-41, installed in the former AST farm area.

Concentration versus time data for inorganics that have exceeded ESVs in shallow groundwater samples are presented graphically in figures 19-21.

5.2.1.4.2 Volatile Organic Compounds

No volatile organic compound ESVs were exceeded in shallow groundwater sample analyses at the Property. For the following eight VOCs, no screening levels or ambient water quality criteria have been developed: 2-butanone (MEK), acetone, and p-isopropyltoluene. Based on the lack of regulatory guidance levels, no ESVs are suggested for these compounds. However, concentrations of these chemicals in groundwater samples collected at the Property have rarely exceeded analytical reporting limits. When they have, the detections have been at low levels. Therefore, these low-level detections do not appear to present a threat to human health or the environment.

5.2.1.4.3 Semivolatile Organic Compounds

No semivolatile organic compound ESVs were exceeded in shallow groundwater sample analyses at the Property.

5.2.1.4.4 Petroleum Hydrocarbons

Petroleum hydrocarbons (TPH) have been detected routinely in shallow groundwater samples collected at the property. In each case, these results were qualified by the laboratory as not matching the pattern of the laboratory diesel standard and are consistent with highly degraded hydrocarbons with low associated toxicity. This observation is consistent with the historical nature of the hydrocarbon releases at the property. Furthermore, silica gel cleanup has been demonstrated to significantly reduce the concentration of TPH in samples collected from shallow groundwater at the property. Because the silica gel cleanup serves to remove polar compounds including substances of biological origin including biodegradable animal greases and vegetable oils, this observed reduction supports the conclusion that concentrations of TPH observed in the samples are heavily degraded. Per the DTSC, "TPH, a generic term for complex mixtures of hydrocarbons, cannot be used to predict risk without knowledge of the multitude of compounds within the mixture. Risk is normally evaluated on the basis of the polynuclear aromatic hydrocarbon (PAH) concentration of the TPH" (DTSC, May 28, 2004). PAHs are found within the SVOC family and have not been detected in samples associated with the elevated TPH

concentrations. Therefore, the hydrocarbon detections do not appear to present a threat to human health or the environment.

5.2.2 Bay Mud/Colluvium

This section presents a summary of historical investigations of the Bay Mud/Colluvium water bearing zone. Prior to transitioning the lead agency status to the DTSC and executing the CACA, the EPA approved terminating investigation of this zone.

Groundwater samples were collected from five wells (W-5, PM-2, PM-6, PM-7 and PM-10), and one soil boring (TB-1) completed in the Bay Mud/Colluvium waterbearing zone during performance of the Phase II RFI. The samples from the November 1993 and January 1994 sampling events were analyzed for total metals, VOCs, and SVOCs. Samples collected from PM-2 and PM- 7 were fieldfiltered and analyzed for dissolved metals. Three groundwater samples (W-5, PM-6 and PM-10) were collected during the April 1994 sampling event and analyzed for dissolved metals. The distribution of metals, VOCs, and SVOCs in the Bay Mud/Colluvium groundwater zone is shown on Figures 22 and 23, respectively.

During these sampling activities, dissolved metals were encountered at low levels and no VOCs or SVOCs were detected above the detection limits in the Bay Mud/Colluvium groundwater zone, with the exception of toluene at 7 parts per billion (ppb) in the groundwater sample collected from PM-10, which is well below the MCL for toluene.

5.2.3 Bedrock

This section presents a summary of historical investigations of the Bedrock water bearing zone. Prior to transitioning the lead agency status to the DTSC and executing the CACA, the EPA approved terminating investigation of this zone

Groundwater samples were collected from five wells (W-7, MW-18, MW-19, MW-20, and PM-3) completed in the Bedrock water-bearing zone during the Phase II RFI. Samples collected during the November 1993 sampling event were analyzed for total metals, VOCs, and SVOCs. Samples collected from W-7, MW-19, and PM-3 were field filtered and analyzed for dissolved metals. The distribution of metals, VOCs, and SVOCs in the Bedrock groundwater zone is shown in Figures 24 and 25, respectively.

Based on these data, only low concentrations of metals were observed during the Phase II RFI and no VOCs or SVOCs were reported above detection limits in the Bedrock groundwater zone.

5.2.4 Former Tank Farm Area

This section presents a summary of historical investigations of the Former Tank Farm Area. Prior to transitioning the lead agency status to the DTSC and executing the CACA, the EPA approved terminating investigation of this area.

The former Tank Farm Area was located on bedrock in the northwestern portion of the Property

(Figure 4) prior to 1988. The tank farm was composed of steel tanks constructed on a bermed concrete foundation. A concrete moat and emergency runoff/spill containment tank was included in the spill control measures at the former tank farm. The only spill related to the Tank Farm Area known to have occurred happened on or about February 1982 when toluene being transferred from a rail car or tank truck leaked from underground piping connecting the tanker vehicles to the pump house.

During closure of the tank farm, inspections were conducted by the South San Francisco Fire Department and the San Mateo County Environmental Health Department. After the concrete pad was removed, the inspectors waived soil sampling since there was no evidence of spilled solvent encountered during inspections by visual means and with organic vapor meters. During the course of the closure, 15 cubic yards of soil impacted with tar were removed and disposed of at Casmalia Resources in Santa Barbara, California.

In October 1982, The O'Brien Corporation investigated the toluene leak though soil samples and attempted installation of a well (W-4) in the bedrock underlying the Tank Farm Area. Well W-4 was not completed due to an inability of the drilling rig to penetrate the bedrock. Impacted soils were remediated through aeration and underground pipes were replaced with aboveground piping. Per a request from the RWQCB, The O'Brien Corporation then installed well W-6 in the bedrock proximate to the attempted location for W-4 and downgradient of the Tank Farm Area. Groundwater from well W-6 was sampled in June, November, and December of 1983 with intermittent detections of toluene and ethylbenzene noted. Extremely slow recharge rates, on the order of several months, were noted in well W-6. These observations are in keeping with calculated bedrock hydraulic conductivities of 10^{-6} to 10^{-7} cm/sec. In April 1984, also under the direction of the RWQCB, The O'Brien Corporation installed well W-7 adjacent to well W-6. In accordance with RWQCB direction, the groundwater was tested for benzene, toluene, and ethyl benzene. Samples collected in 1984 were not detected at a limit of three parts per billion. This satisfied the RWQCB until 1987 when The O'Brien Corporation installed well MW-19 downgradient of the former Tank Farm Area. This well was sampled and analyzed for VOC and SVOC in September 1987, January, April, July, and November of 1988. No detections of chemicals of concern were encountered and no further actions were required by the RWQCB or the EPA for the area in question.

6.0 CONCEPTUAL SITE MODEL AND ECOLOGICAL SCOPING ASSESSMENT

As discussed in section 4.11, groundwater quality at the Property is evaluated against ecological screening values for surface water and potential impacts to habitats south and east of the Property through shallow groundwater discharge. This section presents a scoping level biological characterization of habitats, species, and types of communities present or potentially present at the Property in light of potential exposure pathways.

6.1 Conceptual Site Model

As soil closure has been granted at the Property (Appendix B), this section discusses groundwater chemical transport only. Since no separate phase chemicals have been encountered at the Property, chemical migration occurs as dissolved phase transport. The principal mode of dissolved phase transportation is advective movement, which is dependant on the hydraulic gradient of the groundwater. As discussed in Section 3.6.1.3.1, groundwater flow in the shallow aquifer at the Property is similar to the ground surface topology and trends towards The Bay and the former San Bruno Channel where groundwater to surface water interaction undergoes dilution and mechanical mixing within the tidal front. In the absence of a significant gradient, chemical transport occurs through diffusion. Since groundwater encountered in the shallow fill zone has been observed to have a small hydraulic gradient on the order of 0.009 ft/ft, movement of chemicals through the shallow fill aquifer is expected to be slow. As the chemicals of concern at the Property are generally considered to exhibit relatively low mobility, migration of entrained chemicals occurs slowly at the Property.

6.2 Physical Properties of Contaminants

The physical properties of the chemicals of concern relate directly to how chemical migration occurs in the environment. Transport of chemicals entrained (dissolved) in groundwater is moderated by a chemical's ability to dissolve in water, its affinity for organic material in the soil, and chemical specific factors such as density, and molecular weight. Physical properties of the specific chemicals of concern are presented in Table 8. Because TEPH is a mixture of chemicals, it is not included in the Table. Similarly, data is included for the isomers of xylenes rather than the summed "xylenes". The term "chemical retardation" can be used as a general guide for a chemical to move through the subsurface in the dissolved phase. Four types of chemicals of concern have been detected at the Property:

- VOCs
- SVOCs
- PPM
- TEPH

In general, the order of retardation of these chemical families from least to greatest is: VOCs, TEPH, and SVOCs and PPMs (these types have similar retardation rates).

6.3 Pathway Assessment

6.3.1 Groundwater Releases

In 1987, the MARK Group conducted a well search including identification of property owners within a one mile radius of the Property, and review of well records and files at the Department of Water Resources, the San Mateo County Environmental Health Department, and the RWQCB. The only wells identified by the MARK Group were groundwater monitoring wells. No wells that supply potable water for domestic, irrigation, livestock or other agricultural uses were identified during the survey. This is consistent with the commercial and industrial zoning of the East of 101 area of South San Francisco. Additionally, according to piezometric observations in the three groundwater units encountered at the Property, the units all flow towards the Bay or the filled San Bruno Channel immediately to the south of the Property. Therefore, there are no apparent scenarios where groundwater from the Property can impact groundwater wells off the Property.

6.3.2 Surface/Pore Water Releases

As discussed in Section 3.3 and shown on Figure 5, surface water flow is towards the mudflats and Bay on the east and southeast and towards the former San Bruno Channel. Therefore, there is a potential interaction between the mudflats, the Bay, the marginal wetlands of the Former San Bruno Channel, and shallow groundwater at the Property. Consequently, as described in Section 4.11, regulatory standards selected for groundwater evaluation at the property are based upon ecological screening values for surface water. A graphical potential ecological pathway analysis is presented in Figure 26.

6.3.3 Biological Characterization

In 1995, Jenkins, Sanders and Associates (JSA) prepared a *Biological Evaluation Of The Fuller-O'Brien Paint Facility* (JSA, June 29, 1995). Additional site-specific biological assessments of the Property and immediate vicinity include and a field survey and a biological assessment conducted for the South San Francisco Scavenger Company's Environmental Impact Report (ESA, October 28, 1998), and a cursory review by H.T. Harvey & Associates in 2000. Significant portions of the pertinent sections of these reports are excerpted in the following sections.

6.3.3.1 Habitats of Potential Ecological Importance

Based on biological characterization activities conducted at the Property, three habitats were considered of potential ecological importance. They include:

1. The Former San Bruno Channel, a marginal wetland located immediately to the south of the Property;
2. The mudflat on the Bay immediately to the east and southeast; and
3. The upland area that comprises the majority of the Property.

6.3.3.1.1 The Former San Bruno Channel/Marginal Wetland

The Former San Bruno Channel/marginal wetland (Channel) is a low-lying, 2-acre area of artificial fill located immediately south of the Property, occupying the northernmost portion of a larger parcel owned by the Haskins Brothers. The Channel was filled between 1963 and 1978 with industrial fill of unknown origins. The area serves as a drainage canal that channels runoff from a large city storm sewer outfall to the Bay and currently occupies a narrow area (<160 feet wide) between the Property and the South San Francisco Scavengers transfer station to the South on East Jamie Court. The freshwater discharge from the City of South San Francisco storm drain at the westernmost head of the channel adjacent to the southwest corner of the Property, and tidal exchanges at and near the mouth of the channel, create a substantial salinity gradient across the length of the Channel.

Vegetation

As presented in Section 3.2, according to a site survey performed by H.T. Harvey & Associates in 2000 the Channel is mostly vegetated by tidal salt marsh plants. The dominant plant species include cordgrass (Spartina foliosa), saltgrass (Distichlis spicata), alkali bulrush (Scirpus robustus) and pickleweed (Salicornia virginica). Some non-native annual grasses and sweet fennel dominate the slopes immediately adjacent to the wetlands in the center of the former San Bruno Channel.

Benthic Invertebrates (JSA, 1995)

The small channel in the marginal wetland should have a relatively natural benthic invertebrate community. Although the wetland has developed in the past [30] years since the filling of the San Bruno Ship Channel, most benthic invertebrates have pelagic larval stages that disperse widely and rapidly colonize new, suitable habitat. Slough habitats characteristically have higher diversity of invertebrates than adjacent marsh plains and mudflats due to longer and more frequent submergence of the channel bottom. Channels with increased tidal flow bring in plankton and other suspended and dissolved nutrients which can support high densities of filter feeders, such as ribbed mussel, *Ischadium dimissum*, and some amphipods, e.g. *Corophium* sp., in addition to the burrowing deposit feeders characteristic of both mudflats and channels. Table 1 [Appendix F] lists representative species likely to occur adjacent to the [Property] because they are among the most common benthic invertebrates known from channels and/or mudflats of natural and restored wetlands in the San Francisco Bay region (Josselyn and Buchholz 1984; Jenkins, Sanders & Associates, unpublished data; Nichols and Pamatmat 1988).

Fishes (JSA, 1995)

The small shallow channel in the marginal wetland should also be used seasonally by the smaller species and individuals of larger species of fishes known to enter similar habitat in wetlands of South San Francisco Bay. Most of these same species also would forage over the mudflats to the east of the [Property] at high tide. Woods (1981) collected nine common species of fish in the tidal sloughs of the Hayward salt marsh restoration. These species and a few others considered common in salt marshes (Miller and Lea, 1972; Jenkins, Sanders & Associates, 1994) are listed in Table 2 [Appendix F]. The small size of the channel and the presumed considerable input of freshwater from the storm drain emptying into the upper end would limit the sizes and

populations of the 13 species listed. Smaller species preferring lower salinity, brackish water, such as mosquitofish, rainwater killifish and juvenile staghorn sculpin, are predicted to be the dominant fishes in this habitat. Juvenile topsmelt (*Atherinops affinis*) characteristically use slough channels as nursery habitat in the spring and summer, moving into deeper water in the fall (Jenkins, Sanders & Associates, 1994). Consequently, topsmelt may be seasonally abundant in the narrow channel. Other numerically dominant species would be the three resident benthic goby species: arrow goby, longjaw mudsucker and yellowfin goby.

Birds (JSA, 1995)

Both observed and predicted avifauna are listed in Table 3 [Appendix F] along with the behavior engaged in at the time of observation and the habitat types they utilized during the surveys. Twelve species were seen during the two-day survey in the Marginal Wetland habitat south of the [Property].

Few birds were observed in the Marginal Wetland habitat at high tide. The tidally influenced part of this wetland was very small with respect to other types of similar habitat throughout San Francisco Bay, which may contribute to the low number seen. However, three species not seen on any other survey did appear at high tide in the marsh: snowy egret, mallard, and belted kingfisher. Overall, relative to the rest of San Francisco Bay, this area is unimportant for waterbirds.

The riparian/freshwater habitat, inland from the brackish marsh, was used extensively by passerines such as white and golden-crowned sparrows, house finches and yellow-rumped warblers. They fed on the seeds of various grasses including *Distichlis* and *Scirpus*.

The south wetlands and riparian habitat surrounding them are a habitat island within a heavily industrial area. They are bounded on the [west, north, and south] by parking lots or buildings, and on the east by San Francisco Bay. Because of habitat isolation and fragmentation in the vicinity of the [Property], many species which otherwise might be able to utilize these areas or which might pass through from more suitable habitat, are most likely absent from the [Channel]. Wildlife corridors, contiguous sections of natural habitat which may be small and linear, are necessary for many species of wildlife to reach and inhabit larger portions of natural habitat in largely urbanized or industrial areas. Because of lack of accessibility or lack of wildlife corridors into the habitat, many avifauna which might otherwise be able to use the habitat in the immediate vicinity of the [Property] do not.

The marginal wetland adjacent to the [Property] has two additional features which make it fairly unsuitable for nesting by birds: small size and linear shape. The small size of the wetland is reflected in the low numbers of birds that utilize it. Nesting birds, whether colonial or solitary, need a buffer zone around their breeding sites, and thus the amount of habitat needed per pair is larger than their actual territory. Many passerine birds both nest and forage on their territories and often defend both the nesting site and their feeding areas; they require a larger distance between themselves and their nearest neighbors than birds that do not both nest and forage on their territories. Additionally, birds often avoid linear habitat types which provide for little or no protection buffer from predators.

Mammals (JSA, 1995)
The marginal wetland should have a low diversity of mammals given its small size and linear configuration, isolation in an urbanized and industrialized area and lack of wildlife corridors. Opossum (*Didelphis virginianus*) and raccoon (*Procyon lotor*), which are well adapted to urbanized areas, appear to be resident on the upland portion of the [Property]. The patches of natural appropriate habitat in Point San Bruno appear to be sufficiently large to support populations of these omnivorous mammals. California ground squirrels (*Spermophilus beecheyi*) and large numbers of their burrows were observed in the fill to the south of the wetland. However ground squirrels rarely, if ever, enter wetlands to forage. The lack of clear wildlife corridors connecting the [Channel] to larger patches of habitat may limit the utilization of this [Channel] by other species of small mammals

Special Status Species (JSA, 1995)
Special status species which might be able to utilize the marginal wetland adjacent to the [Property] would probably not be present because of lack of access combined with the small size and recent creation of the habitat (since filling of the shipping channel, completed in the mid 1970s). As discussed above, the connection of wildlife corridors to the marginal wetland is uncertain.

It is unlikely that the California clapper rail (*Rallus longirostris obsoletus*) and salt marsh harvest mouse (*Reithrodontomys raviventris*) inhabit the area. Rails are reluctant to fly and usually need contiguous habitat in order to emigrate to a new area (J. Takekawa, pers. comm.). Among the many critical factors in adequate habitat for rails is the shape of the channels the rails forage. The rails prefer sharply incised channels which provide a good surface from which to pick clams, amphipods and mussels. The narrow channel south of the [Property] has relatively gradually sloped sides. A larger network of channels than is present at the [Channel] also would be needed in order to support a small population of rails. The fragmentation of marsh habitat around the [Property] may also have an effect on rail reproductive success. Young chicks may not be able to emigrate unless there are large contiguous tracts connecting the new marshes to the few surviving salt marsh areas where they are present (Gill, 1973; Evens and Page, 1983).

The salt marsh harvest mouse does not appear on NDDB printout for the area. It is very unlikely that this small mammal, which is restricted to pickleweed-dominated habitat, would have colonized this recently created salt marsh habitat due to lack of wildlife corridors connecting it to larger natural salt marshes located some distance from the [Property] (Shellhammer et. al., 1982; Shellhammer et. al., 1988). The salt marsh wandering shrew and salt marsh common yellow throat, which did appear on the NDDB printout (Table 4), would also be unlikely inhabitants of the small, recently developed, isolated wetland habitat because of lack of wildlife corridors and limited appropriate habitat as discussed above.

6.3.3.1.2 Mudflat Habitat (JSA, 1995)
The [Property] is immediately adjacent to the San Francisco Bay; the entire eastern boundary of the [Property] is protected by a revetment of concrete pieces and rocks. The mudflat habitat drops off steeply from the revetment due to a long history of dredging and filling in the Vicinity of the [Property].

Benthic Invertebrates

Mudflats with reduced tidal flow and relatively long exposure, such as those east of the [Property], typically support large populations of burrowing organisms and deposit feeders, such as Baltic clam (*Macoma balthica*), burrowing amphipods (e.g. *Grandideriella japonica*) and common polychaetes (*Capitella capitata, Eteone lighti* and *Neanthes succinea*). Table 1 [Appendix F] lists representative species likely to occur adjacent to the [Property] because they are among the most common benthic invertebrates known from mudflats and/or channels of natural and restored wetlands in the San Francisco Bay region (Josselyn and Buchholz, 1984; Jenkins, Sanders & Associates, unpublished data; Nichols and Pamatmat, 1988).

Fishes

Twelve of the 13 species of fishes listed in Table 2 [Appendix F] are considered likely to be resident on or forage over the mudflats to the east of the [Property] at high tide (Miller and Lea, 1972; Jenkins, Sanders & Associates, 1994; Woods, 1981). The mosquito fish is not tolerant of seawater and therefore is not present over mudflats. There are three resident benthic goby species that commonly occur on mudflats in San Francisco Bay: arrow goby, longjaw mudsucker, and yellowfin goby. Northern anchovy (*Engraulis mordax*), topsmelt, shiner surfperch (*Cymatogaster aggregata*) and starry flounder (*Platichthys stellatus*) are expected to congregate in feeding aggregations at high tide over the mudflat. Other species of flatfishes, as well as large mid-water predators, such as striped bass (*Morone saxatilis*), also are reputed to move onto the mudflats to feed at high tides.

Birds

Both observed and predicted avifauna are listed in Table 3 [Appendix F] along with the behavior engaged in at the time of observation and the habitat types they utilized during the surveys. Ten species were seen during the two-day survey on the mudflats east of the [Property]. The mudflats drop off steeply from the rock revetment along the eastern boundary of the [Property] and are not as extensive as others in San Francisco Bay. Compared to other areas in the Bay, few shorebirds utilized the mudflats. The usual common shorebirds such as western sandpiper (*Calidris mauri*), willet (*Catoptrophorus semitalmatus*) and whimbrel (*Numenius phaeopus*) were seen, as were several species of gulls, including western gull (*Larus occidentalis*) and herring gull (*Larus argentatus*). Two snowy plovers (*Charadrius alexandrinus nivosus*), federally listed as a threatened species, were also sighted. The mudflats are an adequate foraging and resting area for these shorebirds, but do not provide any nesting habitat.

Mammals

Two of the larger mammals which appear to be resident on the upland portion of the [Property], opossum and raccoon, are known to forage in the intertidal and would be expected to do so on this site.

Special Status Species

The western snowy plover (*Charadrius alexandrinus nivosus*), a federally listed threatened species, was observed foraging on the upper mudflat on the second day of field observations. This species would only forage in the vicinity of the Site because its breeding habitat of salt pond dikes are not present (Zeiner, et al, 1990).

6.3.3.1.3 Upland Habitat

Section 3.2 presents a summary of the upland ecology prior to the start of development activities and in the vicinity of the Property. However, the Property is currently under development as the "Britannia East Grand" biotech campus by the current owner, Slough. Consequently, very little vegetation, habitat value, or fauna exist on site and it can be considered to have little biological importance. Post-development vegetation on the Property will be landscaped per the Britannia development plan, and is outside the scope of this document. A final soil remedy and administrative controls preventing use of groundwater at the Property have been implemented for the Property. Consequently, the upland portion of the Property is not discussed in more depth within this analysis.

6.4 Ecological Screening Values

As discussed in section 4.11, ecological screening values for surface water have been selected as the appropriate "mechanism to evaluate groundwater quality" at the property (DTSC, May 28, 2004). These rigorously developed ecological screening values provided accessible and conservative comparison values. Specifically:

The primary source of toxicity screening values for surface waters in California is 40 CFR 131(2000). The appropriate screening values for this site are the criterion continuous concentrations (CCCs) water quality standards. Where marine CCCs are not available for certain chemicals, alternative standards may be used (December 20, 2002).

For aquatic life, EPA evaluates many diverse aquatic toxicity studies to determine chronic and acute toxicity taking into account how other factors (such as pH, temperature or hardness) affect toxicity. EPA also, to the extent possible, addresses bioaccumulation or bioconcentration. EPA then uses this toxicity information along with exposure information to determine the guidance criterion. Importantly, EPA subjects such evaluation to peer review and/or public comment (40 CFR Part 131).

The regulations specifically recognize the different effects that chemical exposures have in fresh and saline environments as follows:

Fresh water and salt water (including both estuarine and marine waters) have different chemical compositions, and freshwater and saltwater species often do not inhabit the same water. To provide additional accuracy, criteria are developed for fresh water and for salt water (40 CFR Part 131).

However, for certain chemicals, no saltwater environment standards have been developed. Where that is the case, a process has been completed in order to identify alternative standards. The DTSC provided chemical specific alternative ecological standards in letters dated May 28, 2004 and August 8, 2005 (Appendix B) according to the following methodology:

The ecological screening values for surface waters used in this evaluation were developed by HERD using quantitative structure-activity relationships for the no observed effect concentration (NOEC) for reproduction of Daphnia magna exposed to non-polar organic

compounds (DeWolf et al., 1988) and the 10% effect concentration (EC10, the equivalent of the no effect concentration on populations) of Hyalella azteca exposed to polynuclear aromatic hydrocarbons (PAHs) (Swartz et al., 1995).

Additional research was performed to identify ecological screening values for chemicals without CCCs or guidance values provided by the DTSC. Although the values identified are informal and carry no regulatory authority, they provide an assessment on the state of knowledge specific to the chemicals in question in order to support a qualitative assessment of potential ecological risk. When available, a criterion for protection of saline surface water environments was selected over a freshwater criterion because of the salinity of the San Francisco Bay and the former San Bruno Channel. Regulatory limits reviewed include:

1. California Toxics Rule, Criterion for Continuous Concentration, for saltwater (CTR-CCC-SW);
2. U.S. EPA Criterion for Continuous Concentration for salt water (USEPA-CCC-SW);
3. California Toxics Rule, Human Health (10^{-6} risk for carcinogens), for the consumption of aquatic organisms (CTR-HH)
4. U.S. EPA Ecotox Aquatic Water Quality Criteria for saltwater (Ecotox-SW);
5. U.S. EPA Acute Lowest Observed Effects Level for saltwater (USEPA-ALOEL-SW);
6. U.S. EPA Chronic Lowest Observed Effects Level for saltwater (USEPA-CLOEL-SW);
7. California Toxics Rule, Criterion for Continuous Concentration, for fresh water (CTR-CCC-FW);
8. U.S. EPA Criterion for Continuous Concentration for fresh water (USEPA-CCC-FW);
9. U.S. EPA Ecotox Aquatic Water Quality Criteria for fresh water(Ecotox-FW), and
10. U.S. Department of Energy Preliminary Remediation Goal for Ecological Concerns (DOEPRGs);

In addition, the California Regional Water Quality Control Board (RWQCB) Region 2 Basin Plan (Basin Plan) was reviewed. The Basin Plan made references to some of the water quality criteria limits noted above, as such, the Basin Plan is not referenced as specific ESV.

During the selection process, if multiple guidance levels were available for similar exposure scenarios, the most conservative chemical-specific regulatory guidance level was identified and selected. Therefore, if multiple saline surface water quality guidance level were available, the lowest saline surface water quality guidance level was selected. If no saline surface water quality guidance levels were available, the lowest fresh surface water quality guidance level was selected. Additionally, if a water quality guidance level published as part of the CTR-HH, which addresses potential accumulation of a chemical in an aquatic organisms and its subsequent consumption by humans, was the lesser of other published water quality guidance levels, then the CTR-HH guidance level was selected. The proposed regulatory limits were selected based on the order of preference reflected in the numbering of the above list, and their availability. Of

note, the ECOTOX database included in the review has included the AQUIRE database as a component of the ECOTOX database since 1995.

As noted in Section 4.11, the DTSC has agreed that a groundwater-to-surface water dilution factor of ten (10) times is appropriate for this project (DTSC, March 17, 2003). The following precedents support this dilution factor:

- The San Francisco Bay RWQCB recommendations provide that adjustment of groundwater screening levels with respect to potential dilution may be appropriate on a site-specific basis. In practice, application of groundwater to surface water dilution factors by the RWQCB are "not uncommon, [with] these factors ranging up to 20 with 10 being the most common [1].
- The United States Environmental Protection Agency utilizes a dilution attenuation factor (or DAF) of 20 to derive its Soil Screening Guidance and Preliminary Remediation Goals.
- The Screening Quick Reference Tables (or "Squirt" tables) developed by the National Oceanic and Atmospheric Administration for the Coastal Protection and Restoration Division (CPR Division) of NOAA suggest a 10-fold dilution to account for migration and discharge of groundwater to surface water.

Chemical-specific regulatory guidance levels selected for ESVs for the Property are presented with references to their source in Tables 9, 10 and 11. Consistent with the RWQCB evaluation of appropriate groundwater standards in the San Francisco Bay Area, the established regulatory standards reviewed for appropriateness at the Property are included in the RWQCB *Screening For Environmental Concerns at Sites With Contaminated Soil and Groundwater* (RWQCB, February 2005) document.

A statistical summary of shallow groundwater monitoring data and environmental screening values is discussed in depth in Section 5.2.1.3.

[1] Conversation with Roger Brewer, RWQCB Engineering Geologist, March 7, 2003

7.0 CONCLUSION

The property at 450 East End Avenue in South San Francisco, California, has a long and varied industrial and environmental history. In recent decades, industrial activities at the property waned and then ceased altogether, and environmental investigation of soil, and three water bearing groundwater units was conducted. Under the United States Environmental Protection Agency, investigation of the intermediate and deeper groundwater was completed, soil and shallow groundwater issues were separated, and soil Corrective Actions were Completed with Controls in 2000. At that "sensible transition point" (EPA, September 18, 2000), the DTSC assumed lead agency status in order to regulate maintenance of the soil Corrective Action controls and completion of the shallow groundwater Corrective Actions. As lead agency, the DTSC has overseen RCRA Facility Investigation (RFI) of shallow groundwater including sampling of existing monitoring wells, installation of additional monitoring wells, and discrete shallow groundwater sampling designed to address potential data gaps. Rigorous review of these activities and regulatory guidance have led to the selection of ecological screening values as "the appropriate screening values for this site" (DTSC, December 20, 2002), or site-specific media cleanup objectives.

Evaluation of analytical results from the shallow groundwater investigation conducted at the property and rigorously derived ecological screening values for surface water strongly indicates that the shallow groundwater at the property does not present a risk to human health and the environment. The site-specific media cleanup objectives have been met, and the shallow groundwater at the property does not require any additional action or measures to ensure the remedy remains protective of human health and the environment. Therefore, the shallow groundwater investigation results at the Property indicate that the Property is suitable for a Corrective Action Complete Without Controls determination.

8.0 REFERENCES

Cherokee Environmental Risk Management. November 9, 2001. *Division of Responsibilities*.

Deed Restriction. October 4, 2000. Parcel No. 015-102-270.

Deed Restriction. October 4, 2000. Parcel Nos. 015-101-090 and 015-102-280.

Department of Toxic Substances Control (DTSC). August 25, 1999. *Approval of the Class 3 Modification to the Approved Closure Plan for the Former Hazardous Waste Surface Impoundments at the O'Brien Corporation* (Correspondence).

DTSC. March 29, 2001. *Corrective Action Consent Agreement* ("CACA"), Docket No. HWCA: P2-00/01-008.

DTSC. June 26, 2002. *Review and Conditional Approval of Phase III Resource Conservation and Recovery Act (RCRA) Facility Investigation Workplan*.

DTSC. January 16, 2003. *Review of Groundwater Quality and Appropriate Standards Report* (Correspondence with memorandum attachment from HERD).

DTSC. March 17, 2003. *Response to February 18, 2003 Conference Call Between the Department of Toxic Substances Control (DTSC) and EnviroAssets* (Correspondence).

DTSC. June 13, 2003. *Review and Approval of Revised Workplan for Additional Groundwater Investigation*.

DTSC. May 28, 2004. *Review of Additional Investigation Summary Report* (Correspondence with memorandum attachment from HERD (Human and Ecological Risk Division)).

DTSC. August 8, 2005. Ecological Screening Levels (Correspondence).

Ecology Protection Systems (EPS). January 1983. *Soil Contamination Investigation.*

EMCON Associates. September 1992. *RCRA Facility Investigation*.

EMCON Associates. April 1993. *Bulkhead Remediation Project – The O'Brien Corporation* (Corrective Measures Implementation Report).

EnviroAssets, Inc.. February 15, 2002. *Revised Phase III Facility Investigation Workplan/Current Conditions Report*.

EnviroAssets Inc.. July 26, 2002. *Groundwater Quality and Appropriate Groundwater Standards Evaluation*.

EnviroAssets Inc.. December 20, 2002. *Screening Summary for Former Southwestern Above Ground Storage Tank Farm*.

EnviroAssets Inc.. June 10, 2003. *Revised Workplan for Additional Groundwater Investigation*.

EnviroAssets Inc.. November 7, 2003. *Additional Groundwater Investigation Summary Report*.

EnviroAssets Inc.. March 17, 2005. *Semiannual Groundwater Monitoring Summary And Request For Termination of Groundwater Monitoring Program*.

Environmental Protection Agency (EPA). September 10, 1998. *Administrative Record Index.*

EPA. April 26, 2000. *Final Remedy Selection*.

EPA. September 18, 2000. *Re: Corrective Action at the Former O'Brien Paint Manufacturing Facility* ("No Further Action" Letter).

Environmental Science Associates (ESA). October 28, 1998. *South San Francisco Scavenger Company Materials Recovery Facility and Transfer Station EIR*.

Geomatrix Consultants. May 18, 2001. *Additional Groundwater Analytical Results*.

H.T. Harvey & Associates. July 28, 2000. *Fuller-O'Brien Site Mitigation Concepts (Project # 1810-01)*.

Harza. September 2, 1994. *Soil quality Report for Due Diligence Evaluation of Genentech Property*.

Harza. May 31, 1996. *Final Phase II RCRA Investigation*.

Henshaw Associates, Inc. (Henshaw). June 5, 1998. *Eastern Property and Southern Property Boundary Groundwater Sampling.*

Henshaw. February 24, 2000. *Eastern Property and Southern Property Boundary Groundwater Sampling*.

Henshaw. September 11, 2000. *Corrective Measures Completion Report.*

Henshaw. October 3, 2000. *Former San Bruno Channel Corrective Measures Workplan*.

Jenkins, Sanders & Associates (JSA). June 29, 1995. *Biological Evaluation of the Fuller-O'Brien Paint Facility*.

Ratech Resources. May 28, 1993. *Data Needs Letter For A Risk Assessment/Ecological Evaluation*.

Resource Conservation And Recovery Act (RCRA). March 8, 1989. RCRA 3008(h) Administrative Order ("Order"). USEPA Docket No. RCRA-09-89-0016.

RCRA. April 18, 1991. RCRA 3008(h) Administrative Order ("Order") as amended.

Regional Water Quality Control Board (RWQCB). February 2005. *Screening For Environmental Concerns at Sites With Contaminated Soil and Groundwater*.

San Francisco Estuary Project (SFEP). 1991. *Status and Trends Report on Pollutants in the San Francisco Estuary*.

SFEP. 1992. *State of the Estuary*.

The MARK Group Engineers & Geologists, Inc. (MARK Group). April 1987. *Pond Closure Certification Report.*

MARK Group. December 1987. *Breakwater Investigation.*

MARK Group. December 21, 1987. *Hydrogeological Assessment Report - Report of Waste Discharge - Former Surface Impoundment Area.*

MARK Group. March 1989. *San Bruno Channel Fill Investigation.*

MARK Group. November 1989. *Addendum to Hydrogeological Assessment Report.*

MARK Group. November 1989. ISD Post-Closure Monitoring Report.

MARK Group. February 1990. *Site Assessment Report.*

The Source Group. May 23, 2002. *Soil And Groundwater Sampling Report*

United States Code of Federal Regulations. May 18, 2000. 40 CFR Part 131.

United States Code of Federal Regulations. 1994. 40 CFR Part 136. Appendix B.

Woodward Clyde Consultants (WCC). August 1983. *Soil and Groundwater Quality Assessment.*

WCC. January 1984. *Soil and Groundwater Quality Assessment Report, Addendum No. 1*.

WCC. April 1984. *Soil and Groundwater Quality Assessment Report, Addendum No.2*.

WCC. July 1985. *Water Quality Assessment Report.*

WCC. November 1987. *Closure Report -Solar Evaporation Ponds -Impoundment Closure Area.*

9.0 DISTRIBUTION

Rao Akula
Department of Toxic Substances Control
8800 Cal Center Drive
2nd Floor Permitting
Sacramento, CA 95826
V: (916) 255-6678

Doug Mosteller
Cherokee San Francisco & Grand Avenue, L.L.C.
4600 South Ulster Street, Suite 500
Denver, CO 80237
V: (303) 689-1460

Michelle Rembaum-Fox
Regional Water Quality Control Board - SF Region (RWQCB)
1515 Clay Street, Suite 1400
Oakland, CA 94612
V: (510) 622-2387

Tom Graf
980 Rosewood Dr.
San Mateo, CA 94401
V: (650) 343-4311

FIGURES

TABLES

TABLE 1: INORGANIC MONITORING SUMMARY FOR POSITIVELY DETECTED CHEMICALS

Phase III RFI Groundwater Report
450 East Grand Avenue
South San Francisco, California
(Concentrations presented in µg/L)

Matrix	Sample Location	Field Sample ID	Sample Date	Sample Type	Antimony	Arsenic	Beryllium	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Selenium	Silver	Thallium	Zinc
Environmental Screening Value with 10-fold dilution					5000	360	53	93	1800	31	81	9.4	82	710	9.5	10650	810
W	MW-11	MW11QM101	3/2/2001	PRI	<5	<5	<5	<2	<5	<5	<5	<0.17	<5	<5	<5	<5	<10
W	MW-11	W-MW11-A	5/16/2001	PRI	<5	<5	<5	<2	<5	<5	<5	<0.2	<5	<5	<5	<5	<10
W	MW-11	W-MW11-A	9/6/2001	PRI	5.5	22	<5	<2	<5	<5	<5	<0.2	<5	<5	<5	<5	<10
W	MW-11	W-MW-11-A	12/6/2001	PRI	<5	<5	<5	<2	<5	<5	<5	<0.2	<5	<5	<5	<5	<10
W	MW-11	W-MW-11-A	3/28/2002	PRI	8	15	<5	<2	<5	<5	<5	<0.2	6.4	18	<5	<5	<10
W	MW-11	W-MW-11-A	6/25/2002	PRI	7.3	<5	<5	<2	<5	<5	<5	<0.2	<5	<5	<5	<5	<10
W	MW-21	MW-21F	3/26/1998	PRI	<20	130	<2	<5	<10	<10	<40	<0.2	<10	<10	<5	<50	20
W	MW-21	MW21QM298F	6/30/1998	PRI	<60	160	<2.0	<5.0	<10	<10	<3.0	<0.20	<20	11	<5.0	11	<20
W	MW-21	MW21QM398F	10/2/1998	PRI	41	60	<1	<1	<1	3.2	1.3	<0.2	11	3.4	<1	<1	47
W	MW-21	MW21QM498F	12/16/1998	PRI	52	32	<1	<1	<1	2	<1	<0.2	8.7	3.7	<1	<1	15
W	MW-21	MW21QM199F	3/10/1999	PRI	15.8	74	0.02	0.05	<5	1.8	0.53	<0.2	6.5	<5	0.03	<0.02	28.6
W	MW-21	MW21QM2999(F)	6/30/1999	PRI	18.3	23	<0.04	0.33	<4	2.92	0.72	<0.2	7.58	<2	0.03	<0.04	18.9
W	MW-21	MW21QM399	9/21/1999	PRI	70	<50	<5	<5	<10	<10	<50	<0.5	<20	<50	<20	<50	<20
W	MW-21	MW21QM499	12/29/1999	PRI	80	60	<5	<5	<10	<10	<50	<0.2	<20	<50	<20	<50	30
W	MW-21	MW21QM100F	3/30/2000	PRI	12.7	51	<0.04	0.3	<5	1	7.68	<0.2	7.1	<2	<0.04	<0.04	15
W	MW-21	MW21QM200F	6/29/2000	PRI	<5	<5	<5	<2	<5	<5	<5	<0.2	<5	8.5	<5	<5	<10
W	MW-21	MW21QM300F	9/19/2000	PRI	6.8	57	<5	<2	<5	<5	<5	<0.17	<5	<5	<5	<5	<10
W	MW-21	MW21QM101	3/1/2001	PRI	17	<5	<5	<2	<5	<5	<5	<0.17	<5	<5	<5	<5	<10
W	MW-21	W-MW21-A	5/16/2001	PRI	<5	<5	<5	<2	<5	<5	<5	<0.2	5.9	<5	<5	<5	<10
W	MW-21	W-MW21-A	9/7/2001	PRI	<5	110	<5	<2	<5	<5	<5	<0.2	<5	5.9	<5	11	<10
W	MW-21	W-MW-21-A	12/6/2001	PRI	<5	160	<5	<2	<5	<5	<5	<0.2	<5	<5	<5	<5	<10
W	MW-21	W-MW-21-A	3/28/2002	PRI	13	63	<5	<2	<5	<5	<5	<0.2	<5	19	<5	<5	<10
W	MW-21	W-MW-21-A	6/25/2002	PRI	21	64	<5	<2	<5	<5	<5	<0.2	5.1	<5	<5	<5	<10
W	MW-30	W-MW30-AF	10/10/2000	PRI	5.09	5.62	<4.00	<0.500	<10.0	<10.0	<3.00	<0.200	32.1	<5.00	<1.00	<2.00	157
W	MW-30	MW30QM101	3/1/2001	PRI	<5	<5	<5	<2	<5	<5	<5	<0.17	44	<5	<5	<5	27
W	MW-30	W-MW30-A	5/17/2001	PRI	<5	<5	<5	<2	<5	<5	<5	<0.2	47	<5	<5	<5	15
W	MW-30	W-MW30-A	9/6/2001	PRI	<5	<5	<5	<2	<5	<5	<5	<0.2	44	<5	<5	<5	15
W	MW-30	W-MW-30-A	12/7/2001	PRI	<5	<5	<5	<2	<5	<5	<5	<0.2	46	<5	<5	<5	13
W	MW-30	W-MW-30-A	3/28/2002	PRI	<5	15	<5	<2	<5	<5	<5	<0.2	47	14	<5	<5	11
W	MW-30	W-MW-30-A	6/25/2002	PRI	6.4	<5	<5	<2	<5	<5	<5	<0.2	44	<5	<5	<5	15
W	MW-30	W-MW-30-A	9/27/2002	PRI	<5	17	<5	<2	<5	<5	<5	<0.2	49	10	<5	<5	<10
W	MW-30	W-MW-30-A	12/11/2002	PRI	<5	11	<5	<2	<5	<5	<5	<0.2	44	<5	<5	<5	<10
W	MW-31	W-MW31-AF	10/10/2000	PRI	<5.00	<5.00	<4.00	1.33	<10.0	<10.0	14.6	<0.200	24.1	<5.00	<1.00	<2.00	44.9
W	MW-31	W-MW31-BF	10/10/2000	DUP	<5.00	6.15	<4.00	<0.500	<10.0	<10.0	12.9	<0.200	22.3	<5.00	<1.00	<2.00	37.3

TABLE 1: INORGANIC MONITORING SUMMARY FOR POSITIVELY DETECTED CHEMICALS

Phase III RFI Groundwater Report
450 East Grand Avenue
South San Francisco, California
(Concentrations presented in µg/L)

Matrix	Sample Location	Field Sample ID	Sample Date	Sample Type	Antimony	Arsenic	Beryllium	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Selenium	Silver	Thallium	Zinc
Environmental Screening Value with 10-fold dilution					5000	360	53	93	1800	31	81	9.4	82	710	9.5	10650	810
W	PM-09	HA20QM299(F)	6/30/1999	DUP	0.62	3	0.02	0.2	<4	1.53	34.7	<0.2	5.56	<2	<0.02	<0.02	14.6
W	PM-09	PM09QM299(F)	6/30/1999	PRI	0.77	3	0.03	0.23	<4	2.7	59.6	<0.2	6.26	<2	4.72	<0.02	38.3
W	PM-09	HA20QM399	9/21/1999	DUP	<50	<50	<5	<5	<10	<10	<50	<0.5	<20	<50	<20	<50	<20
W	PM-09	PM09QM399	9/21/1999	PRI	<50	<50	<5	<5	<10	<10	<50	<0.5	<20	<50	<20	<50	<20
W	PM-09	HA20QM499	12/29/1999	DUP	<50	<50	<5	<5	<10	<10	<50	0.3	<20	<50	<20	<50	50
W	PM-09	PM09QM499	12/29/1999	PRI	<50	<50	<5	<5	<10	<10	<50	0.2	<20	<50	<20	<50	210
W	PM-09	HA20QM100F	3/30/2000	DUP	3.4	<2	<0.04	0.2	<5	0.5	2.79	<0.2	3.2	<2	<0.04	<0.04	14
W	PM-09	PM09QM100F	3/30/2000	PRI	0.7	<2	<0.04	0.3	<5	0.8	5.32	<0.2	3.4	<2	<0.04	<0.04	17
W	PM-09	HA2OQM200F	6/29/2000	DUP	<5	<5	<5	<2	<5	5	**130**	<0.2	31	11	<5	<5	150
W	PM-09	PM09QM2-00F	6/29/2000	PRI	<5	<5	<5	<2	<5	<5	<5	<0.2	<5	10	<5	<5	<10
W	PM-09	HA20QM300F	9/19/2000	DUP	<5	<5	<5	<2	14	<5	11	0.53	11	<5	<5	<5	<10
W	PM-09	PM09QM300F	9/19/2000	PRI	<5	12	<5	<2	<5	<5	6.9	0.7	5.2	<5	<5	<5	<10
W	PM-09	HA20QM101	3/2/2001	DUP	<5	<5	<5	<2	<5	<5	14	<0.17	<5	<5	<5	<5	<10
W	PM-09	PM09QM101	3/2/2001	PRI	<5	<5	<5	<2	<5	<5	10	<0.17	<5	<5	<5	<5	<10
W	PM-09	W-PM09-A	5/16/2001	PRI	<5	<5	<5	<2	<5	<5	5.7	<0.2	<5	<5	<5	<5	<10
W	PM-09	W-PM09-B	5/16/2001	DUP	<5	<5	<5	<2	<5	<5	<5	<0.2	<5	<5	<5	<5	<10
W	PM-09	W-PM09-A	9/6/2001	PRI	<5	5.6	<5	<2	<5	<5	<5	<0.2	<5	<5	<5	<5	<10
W	PM-09	W-PM09-B	9/6/2001	DUP	<5	<5	<5	<2	<5	<5	8.1	<0.2	<5	<5	<5	<5	<10
W	PM-09	W-PW-09-A	12/7/2001	PRI	<5	<5	<5	<2	<5	<5	<5	<0.2	<5	<5	<5	<5	<10
W	PM-09	W-PW-09-B	12/7/2001	DUP	<5	<5	<5	<2	<5	<5	<5	<0.2	<5	<5	<5	<5	<10
W	PM-09	W-PM-9-A	3/28/2002	PRI	<5	27	<5	<2	<5	<5	<5	<0.2	<5	23	<5	<5	<10
W	PM-09	W-PM-9-B	3/28/2002	DUP	5.4	31	<5	<2	<5	<5	<5	<0.2	<5	25	<5	<5	<10
W	PM-09	W-PW-09-A	6/25/2002	PRI	5.9	<5	<5	<2	<5	<5	<5	<0.2	<5	<5	<5	<5	<10
W	PM-09	W-PW-09-B	6/25/2002	DUP	<5	<5	<5	<2	<5	<5	<5	<0.2	<5	<5	<5	<5	<10
W	PM-09	W-PM-9-A	8/21/2003	PRI	NA	NA	NA	NA	NA	NA	NA	<0.2	NA	NA	NA	NA	NA
W	PM-09	W-PM-9-B	8/21/2003	DUP	NA	NA	NA	NA	NA	NA	NA	<0.2	NA	NA	NA	NA	NA
W	PM-14	PM 14DF	3/27/1998	DUP	<20	<5	<2	<5	30	<10	<40	<0.2	40	<10	<5	<50	<10
W	PM-14	PM 14F	3/27/1998	PRI	<20	<5	<2	<5	<10	<10	<40	<0.2	20	<10	<5	<50	<10
W	PM-14	PM14QM298F	6/30/1998	PRI	<60	7.2	<2.0	<5.0	<10	<10	<3.0	<0.20	<20	<5.0	<5.0	<5.0	<20
W	PM-14	PM14QM398F	10/2/1998	PRI	<2	2.1	<1	<1	<1	<1	1.7	<0.2	4.5	<2	<1	<1	4.6
W	PM-14	PM14QM498F	12/16/1998	PRI	<2	2.1	<1	<1	<1	1.2	<1	<0.2	3.6	<2	<1	<1	20
W	PM-14	PM14QM199F	3/10/1999	PRI	0.11	<5	<0.02	0.02	<5	0.9	0.22	<0.2	5.2	<5	<0.02	0.04	14.3
W	PM-14	PM14QM299(F)	6/30/1999	PRI	0.29	3	<0.02	0.11	6	2.19	1.07	<0.2	9.74	<2	<0.02	<0.02	22.1
W	PM-14	PM14QM399	9/21/1999	PRI	<50	<50	<5	<5	<10	<10	<50	<0.5	<20	<50	<20	<50	<20

TABLE 2: VOC MONITORING SUMMARY FOR POSITIVELY DETECTED CHEMICALS
Phase III RFI Groundwater Report
450 East Grand Avenue
South San Francisco, California
(Concentrations presented in µg/L)

Matrix	Sample Location	Field Sample ID	Sample Date	Sample Type	1,2,4-Trimethylbenzene	1,2-Dichlorobenzene	1,2-Dichloroethane	1,3,5-Trimethylbenzene	2-Butanone (MEK)	Acetone	Benzene	Carbon disulfide	Chlorobenzene	Chloromethane	Ethylbenzene	Isopropylbenzene	m,p-Xylenes	Naphthalene	n-Butylbenzene	n-Propylbenzene	o-Xylene	p-Isopropyltoluene	sec-Butylbenzene	tert-Butylbenzene	Toluene	Xylenes (total)
Environmental Screening Value with 10-fold dilution					4900	1290	631330	9210	NA	NA	113240	170200	1290	1181150	15050	5330	13430	20720	1150	5090	13430	NA	750	2130	29670	13430
W	MW-11	MW11QM101	3/2/2001	PRI	NA	<0.50	<0.50	NA	<50	<50	<0.50	<1.0	<0.50	<1.0	<0.50	<0.50	NA	<5	NA	NA	NA	NA	NA	NA	<0.50	<1.0
W	MW-11	W-MW11-A	5/16/2001	PRI	<5.0	<0.50	<0.50	<5.0	<50	<50	<0.50	<1.0	<0.50	<1.0	<0.50	<0.50	NA	1.7	NA	NA	NA	NA	NA	NA	<0.50	<1.0
W	MW-11	W-MW11-A	9/6/2001	PRI	<1.0	<1.0	<1.0	<1.0	<50	<50	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0	NA	<1.0	<1.0	<1.0	NA	<1.0	<1.0	<1.0	<1.0	<1.0
W	MW-12	MW-12	3/26/1998	PRI	NA	NA	<5	NA	<100	<100	<5	<10	<5	<10	<5	NA	NA	NA	NA	NA	NA	NA	NA	NA	<5	<10
W	MW-14	MW-14	3/26/1998	PRI	NA	NA	<5	NA	<100	<100	<5	<10	<5	<10	<5	NA	NA	NA	NA	NA	NA	NA	NA	NA	<5	<10
W	MW-21	MW-21	3/26/1998	PRI	NA	NA	<5	NA	<100	<100	<5	<10	<5	<10	<5	NA	NA	NA	NA	NA	NA	NA	NA	NA	<5	<10
W	MW-21	MW21QM298	6/30/1998	PRI	NA	NA	<0.50	NA	<10	<10	<0.50	<0.50	<0.50	<1.0	<0.50	NA	<0.50	NA	NA	NA	<0.50	NA	NA	NA	<0.50	NA
W	MW-21	MW21QM398	10/2/1998	PRI	NA	NA	<0.50	NA	<2.0	<2.0	<0.50	<2.0	<0.50	<0.50	<0.50	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.50	<0.50
W	MW-21	MW21QM498	12/16/1998	PRI	NA	NA	<0.8	NA	<3	<3	<0.8	<0.7	<0.8	<0.6	<0.6	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.8	<2
W	MW-21	MW21QM199	3/10/1999	PRI	<2	<0.5	<0.5	<2	<5	<20	<0.5	<0.5	<0.5	<0.5	<0.5	<2	NA	<2	<2	<2	NA	<2	<2	<2	<0.5	<0.5
W	MW-21	MW21QM299	6/30/1999	PRI	<2	<0.5	<0.5	<2	<2	<2	<0.5	<0.5	<0.5	<0.5	<0.5	<2	NA	<2	<2	<2	NA	<2	<2	<2	<0.5	<0.5
W	MW-21	MW21QM399	9/21/1999	PRI	<2	<0.5	<0.5	<2	<5	<5	<0.5	<0.5	<0.5	<0.5	<0.5	<2	NA	<2	<2	<2	NA	<2	<2	<2	<0.5	<0.5
W	MW-21	MW21QM499	12/29/1999	PRI	<2	<0.5	<0.5	<2	<5	<20	<0.5	<0.5	<0.5	<0.5	<0.5	<2	NA	<2	<2	<2	NA	<2	<2	<2	<0.5	<0.5
W	MW-21	MW21QM100	3/30/2000	PRI	<2	<0.5	<0.5	<2	<20	<20	<0.5	0.5	<0.5	<0.5	<0.5	<2	<0.5	<2	<2	<2	<0.5	<2	<2	<2	<0.5	NA
W	MW-21	MW21QM2-00	6/29/2000	PRI	NA	<0.50	<0.50	NA	<50	<50	<0.50	<1.0	<0.50	<1.0	<0.50	<0.50	NA	<1.0	NA	NA	NA	NA	NA	NA	1.1	2.5
W	MW-21	MW21QM300	9/19/2000	PRI	<1.0	<1.0	<1.0	<1.0	<25	<25	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NA
W	MW-21	MW21QM101	3/1/2001	PRI	NA	<0.50	<0.50	NA	<50	<50	<0.50	<1.0	<0.50	<1.0	<0.50	<0.50	NA	<5	NA	NA	NA	NA	NA	NA	<0.50	<1.0
W	MW-21	W-MW21-A	5/16/2001	PRI	<5.0	<0.50	<0.50	<5.0	<50	<50	<0.50	<1.0	<0.50	<1.0	<0.50	<0.50	NA	<1.0	NA	NA	NA	NA	NA	NA	<0.50	<1.0
W	MW-21	W-MW21-A	9/7/2001	PRI	<1.0	<1.0	<1.0	<1.0	<50	<50	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0	NA	<1.0	<1.0	<1.0	NA	<1.0	<1.0	<1.0	<1.0	<1.0
W	MW-30	W-MW30-A	10/10/2000	PRI	<0.500	<0.500	<0.500	<0.500	<5.00	<10.0	<0.500	<5.00	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	NA
W	MW-30	MW30QM101	3/1/2001	PRI	NA	<0.50	<0.50	NA	<50	<50	<0.50	<1.0	<0.50	<1.0	<0.50	<0.50	NA	<5	NA	NA	NA	NA	NA	NA	<0.50	<1.0
W	MW-30	W-MW30-A	5/17/2001	PRI	<5.0	<0.50	<0.50	<5.0	<50	<50	<0.50	<1.0	<0.50	<1.0	<0.50	<0.50	NA	<1.0	NA	NA	NA	NA	NA	NA	<0.50	<1.0
W	MW-30	W-MW30-A	9/6/2001	PRI	<1.0	<1.0	<1.0	<1.0	<50	<50	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0	NA	<1.0	<1.0	<1.0	NA	<1.0	<1.0	<1.0	<1.0	<1.0
W	MW-30	W-MW-30-A	12/7/2001	PRI	<0.50	<0.50	<0.50	<0.50	<50	<50	<0.50	<5.0	<0.50	<1.0	<0.50	<0.50	NA	<1.0	<1.0	<1.0	NA	<1.0	<1.0	<1.0	<0.50	<1.0
W	MW-30	W-MW-30-A	3/28/2002	PRI	<0.50	<0.50	<0.50	<0.50	<50	<50	<0.50	<5.0	<0.50	<1.0	<0.50	<0.50	NA	<1.0	<1.0	<1.0	NA	<1.0	<1.0	<1.0	<0.50	<1.0
W	MW-30	W-MW-30-A	6/25/2002	PRI	<0.50	<0.50	<0.50	<0.50	<50	<50	<0.50	<5.0	<0.50	<1.0	<0.50	<0.50	NA	<1.0	<1.0	<1.0	NA	<1.0	<1.0	<1.0	<0.50	<1.0
W	MW-30	W-MW-30-A	9/27/2002	PRI	<0.50	<0.50	<0.50	<0.50	<50	<50	<0.50	<5.0	<0.50	<1.0	<0.50	<0.50	NA	<1.0	<1.0	<1.0	NA	<1.0	<1.0	<1.0	<0.50	<1.0
W	MW-30	W-MW-30-A	12/11/2002	PRI	<0.50	<0.50	<0.50	<0.50	<50	<50	<0.50	<5.0	<0.50	<1.0	<0.50	<0.50	NA	<1.0	<1.0	<1.0	NA	<1.0	<1.0	<1.0	<0.50	<1.0
W	MW-31	W-MW31-A	10/10/2000	PRI	<1.00	<1.00	<1.00	<1.00	<10.0	33.4	<1.00	<10.0	<1.00	<1.00	<1.00	3.9	<1.00	6.53	<1.00	2.34	<1.00	<1.00	<1.00	<1.00	<1.00	NA
W	MW-31	W-MW31-B	10/10/2000	DUP	<1.00	<1.00	<1.00	<1.00	<10.0	36.2	<1.00	<10.0	<1.00	<1.00	<1.00	3.67	<1.00	6.46	<1.00	2.26	<1.00	<1.00	<1.00	<1.00	<1.00	NA
W	MW-31	MW31QM101	3/1/2001	PRI	NA	<0.50	<0.50	NA	<50	<50	<0.50	<1.0	<0.50	<1.0	<0.50	5.6	NA	<5	NA	NA	NA	NA	NA	NA	<0.50	<1.0
W	MW-31	W-MW31-A	5/16/2001	PRI	<5.0	<0.50	<0.50	<5.0	<50	<50	<0.50	<1.0	<0.50	1.1	<0.50	4.1	NA	<1.0	NA	NA	NA	NA	NA	NA	<0.50	<1.0
W	MW-31	W-MW31-A	9/6/2001	PRI	<1.0	<1.0	<1.0	<1.0	<50	<50	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0	NA	<1.0	<1.0	1.0	NA	<1.0	<1.0	<1.0	<1.0	<1.0
W	MW-31	W-MW-31-A	12/7/2001	PRI	<0.50	<0.50	<0.50	<0.50	<50	<50	<0.50	<5.0	<0.50	<1.0	<0.50	1.4	NA	<1.0	<1.0	<1.0	NA	<1.0	<1.0	<1.0	<0.50	<1.0
W	MW-31	W-MW-31-A	3/28/2002	PRI	<0.50	<0.50	<0.50	<0.50	<50	<50	<0.50	<5.0	<0.50	<1.0	<0.50	<0.50	NA	<1.0	<1.0	<1.0	NA	<1.0	<1.0	<1.0	<0.50	<1.0
W	MW-31	W-MW-31-A	6/25/2002	PRI	<0.50	<0.50	<0.50	<0.50	<50	<50	<0.50	<5.0	<0.50	<1.0	<0.50	1.5	NA	<1.0	<1.0	2.1	NA	<1.0	<1.0	<1.0	<0.50	<1.0
W	MW-31	W-MW-31-A	9/27/2002	PRI	<0.50	<0.50	<0.50	<0.50	<50	<50	<0.50	<5.0	<0.50	<1.0	<0.50	0.55	NA	<1.0	<1.0	<1.0	NA	<1.0	<1.0	<1.0	<0.50	<1.0
W	MW-31	W-MW-31-B	9/27/2002	DUP	<0.50	<0.50	<0.50	<0.50	<50	<50	<0.50	<5.0	<0.50	<1.0	<0.50	0.56	NA	<1.0	<1.0	<1.0	NA	<1.0	<1.0	<1.0	<0.50	<1.0
W	MW-31	W-MW-31-A	12/11/2002	PRI	<0.50	<0.50	<0.50	<0.50	<50	<50	<0.50	<5.0	<0.50	<1.0	<0.50	<0.50	NA	<1.0	<1.0	<1.0	NA	<1.0	<1.0	<1.0	<0.50	<1.0

TABLE 2: VOC MONITORING SUMMARY FOR POSITIVELY DETECTED CHEMICALS
Phase III RFI Groundwater Report
450 East Grand Avenue
South San Francisco, California
(Concentrations presented in µg/L)

Matrix	Sample Location	Field Sample ID	Sample Date	Sample Type	1,2,4-Trimethylbenzene	1,2-Dichlorobenzene	1,2-Dichloroethane	1,3,5-Trimethylbenzene	2-Butanone (MEK)	Acetone	Benzene	Carbon disulfide	Chlorobenzene	Chloromethane	Ethylbenzene	Isopropylbenzene	m,p-Xylenes	Naphthalene	n-Butylbenzene	n-Propylbenzene	o-Xylene	p-Isopropyltoluene	sec-Butylbenzene	tert-Butylbenzene	Toluene	Xylenes (total)
Environmental Screening Value with 10-fold dilution					4900	1290	631330	9210	NA	NA	113240	170200	1290	1181150	15050	5330	13430	20720	1150	5090	13430	NA	750	2130	29670	13430
W	PM-09	HA20QM300	9/19/2000	DUP	<1.0	1.8	<1.0	<1.0	<25	<25	11	<5.0	1.7	<1.0	<1.0	3.0	10	<1.0	2.4	2.0	1.1	<1.0	1.5	1.2	<1.0	NA
W	PM-09	PM09QM300	9/19/2000	PRI	1.0	1.7	<1.0	<1.0	<25	<25	8.8	<5.0	1.6	<1.0	<1.0	2.3	8.7	1.1	2.2	1.6	1.4	<1.0	1.4	1.2	1.0	NA
W	PM-09	HA20QM101	3/2/2001	DUP	NA	1.3	<0.50	NA	<50	<50	4.0	<1.0	<0.50	<1.0	<0.50	1.8	NA	<5	NA	NA	NA	NA	NA	NA	<0.50	6.2
W	PM-09	PM09QM101	3/2/2001	PRI	NA	0.98	<0.50	NA	<50	<50	3.0	<1.0	<0.50	<1.0	<0.50	1.5	NA	<5	NA	NA	NA	NA	NA	NA	<0.50	5.0
W	PM-09	W-PM09-A	5/16/2001	PRI	<5.0	1.3	<0.50	<5.0	<50	<50	4.7	<1.0	1.9	1.5	<0.50	1.9	NA	<1.0	NA	NA	NA	NA	NA	NA	<0.50	6.8
W	PM-09	W-PM09-B	5/16/2001	DUP	<5.0	1.2	<0.50	<5.0	<50	<50	5.4	<1.0	1.8	<1.0	<0.50	2.2	NA	<1.0	NA	NA	NA	NA	NA	NA	<0.50	6.6
W	PM-09	W-PM09-A	9/6/2001	PRI	<1.0	1.1	<1.0	<1.0	<50	<50	1.8	<5.0	2.2	1.1	<1.0	1.2	NA	1.3	2.2	<1.0	NA	<1.0	<1.0	1.4	<1.0	4.1
W	PM-09	W-PM09-B	9/6/2001	DUP	<1.0	1.3	<1.0	<1.0	<50	<50	2.9	<5.0	2.2	<1.0	<1.0	1.9	NA	<1.0	2.3	1.2	NA	<1.0	<1.0	1.7	<1.0	6.3
W	PM-09	W-PW-09-A	12/7/2001	PRI	0.59	<0.50	<0.50	<0.50	<50	<50	3.7	<5.0	2.8	<1.0	<0.50	2.4	NA	<1.0	1.2	1.3	NA	<1.0	1.9	2.0	<0.50	10
W	PM-09	W-PW-09-B	12/7/2001	DUP	<0.50	<0.50	<0.50	<0.50	<50	<50	3.7	<5.0	2.8	<1.0	<0.50	2.1	NA	<1.0	1.2	1.2	NA	<1.0	1.7	1.8	<0.50	9.7
W	PM-09	W-PM-9-A	3/28/2002	PRI	<0.50	0.59	<0.50	<0.50	<50	<50	4.1	<5.0	0.97	<1.0	<0.50	1.2	NA	<1.0	1.4	<1.0	NA	2.7	<1.0	<1.0	<0.50	6.2
W	PM-09	W-PM-9-B	3/28/2002	DUP	<0.50	0.60	<0.50	<0.50	<50	<50	4.0	<5.0	1.1	<1.0	<0.50	1.6	NA	<1.0	1.6	<1.0	NA	2.9	<1.0	<1.0	<0.50	5.0
W	PM-09	W-PW-09-A	6/25/2002	PRI	<0.50	1.2	<0.50	<0.50	<50	<50	4.4	<5.0	1.9	<1.0	<0.50	1.5	NA	<1.0	1.6	<1.0	NA	<1.0	<1.0	1.4	<0.50	8.5
W	PM-09	W-PW-09-B	6/25/2002	DUP	<0.50	1.2	<0.50	<0.50	<50	<50	4.0	<5.0	1.8	<1.0	<0.50	1.3	NA	<1.0	1.7	<1.0	NA	<1.0	<1.0	1.3	<0.50	7.6
W	PM-14	PM 14	3/27/1998	PRI	NA	<5	<5	NA	<100	<100	<5	<10	<5	<10	<5	NA	NA	NA	NA	NA	NA	NA	NA	NA	<5	<10
W	PM-14	PM 14D	3/27/1998	DUP	NA	<5	<5	NA	<100	<100	<5	<10	<5	<10	<5	NA	NA	NA	NA	NA	NA	NA	NA	NA	<5	<10
W	PM-14	PM14QM298	6/30/1998	PRI	NA	NA	<0.50	NA	<10	<10	<0.50	<0.50	<0.50	<1.0	<0.50	NA	<0.50	NA	NA	NA	<0.50	NA	NA	NA	<0.50	NA
W	PM-14	PM14QM398	10/2/1998	PRI	NA	NA	<0.50	NA	<2.0	<2.0	<0.50	<2.0	<0.50	<0.50	<0.50	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.50	<0.50
W	PM-14	PM14QM498	12/16/1998	PRI	NA	NA	<0.8	NA	<3	<3	<0.8	<0.7	<0.8	<0.6	<0.6	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.8	<2
W	PM-14	PM14QM199	3/10/1999	PRI	<2	<0.5	<0.5	<2	<5	<20	<0.5	<0.5	<0.5	<0.5	<0.5	<2	NA	<2	<2	<2	NA	<2	<2	<2	<0.5	<0.5
W	PM-14	PM14QM299	6/30/1999	PRI	<2	<0.5	<0.5	<2	<2	<2	<0.5	<0.5	<0.5	<0.5	<0.5	<2	NA	<2	<2	<2	NA	<2	<2	<2	<0.5	<0.5
W	PM-14	PM14QM399	9/21/1999	PRI	<2	<0.5	<0.5	<2	<5	<5	<0.5	<0.5	<0.5	<0.5	<0.5	<2	NA	<2	<2	<2	NA	<2	<2	<2	<0.5	<0.5
W	PM-14	PM14QM499	12/29/1999	PRI	<2	<0.5	<0.5	<2	<5	<20	<0.5	<0.5	<0.5	<0.5	<0.5	<2	NA	<2	<2	<2	NA	<2	<2	<2	<0.5	<0.5
W	PM-14	PM14QM100	3/30/2000	PRI	<2	<0.5	<0.5	<2	<5	<20	<0.5	<0.5	<0.5	<0.5	<0.5	<2	NA	<2	<2	<2	NA	<2	<2	<2	<0.5	<0.5
W	PM-14	PM14QM2-00	6/29/2000	PRI	NA	<0.50	<0.50	NA	<50	<50	<0.50	<1.0	<0.50	<1.0	<0.50	<0.50	NA	<1.0	NA	NA	NA	NA	NA	NA	<0.50	<1.0
W	PM-14	PM14QM300	9/19/2000	PRI	<1.0	<1.0	<1.0	<1.0	<25	<25	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NA
W	PM-14	PM14QM101	3/2/2001	PRI	NA	<0.50	<0.50	NA	<50	<50	<0.50	<1.0	<0.50	<1.0	<0.50	<0.50	NA	<5	NA	NA	NA	NA	NA	NA	<0.50	<1.0
W	PM-14	W-PM14-A	5/16/2001	PRI	<5.0	<0.50	<0.50	<5.0	<50	<50	<0.50	<1.0	<0.50	<1.0	<0.50	<0.50	NA	<1.0	NA	NA	NA	NA	NA	NA	<0.50	<1.0
W	PM-14	W-PM14-A	9/6/2001	PRI	<1.0	<1.0	<1.0	<1.0	<50	<50	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0	NA	<1.0	<1.0	<1.0	NA	<1.0	<1.0	<1.0	<1.0	<1.0

Note:
NA Not available
µg/L Microgram per liter or part per billion

TABLE 3: SVOC MONITORING SUMMARY FOR POSITIVELY DETECTED CHEMICALS

Phase III RFI Groundwater Report
450 East Grand Avenue
South San Francisco, California
(Concentrations presented in µg/L)

Matrix	Sample Location	Field Sample ID	Sample Date	Sample Type	2-Methylnaphthalene	4-Methylphenol	Acenaphthene	Benzoic acid	Fluorene	Isophorone	Naphthalene	Phenol
Ecological Screening Value with 10-fold dilution					4680	247020	3030	320250	2260	534000	20720	628400
W	MW-11	MW11QM101	3/2/2001	PRI	<2.3	<2.3	4.9	<11	<5.6	<2.3	<2.3	<2.3
W	MW-11	W-MW11-A	5/16/2001	PRI	<2.6	<2.6	4.4	<13	<2.6	<2.6	<2.6	<2.6
W	MW-11	W-MW11-A	9/6/2001	PRI	<2.0	<2.0	<2.0	<10	<2.0	<2.0	<2.0	<2.0
W	MW-12	MW-12	3/26/1998	PRI	<10	<10	<10	<50	<10	<10	<10	<10
W	MW-14	MW-14	3/26/1998	PRI	<10	<10	<10	<50	<10	<10	<10	<10
W	MW-21	MW-21	3/26/1998	PRI	<10	<10	<10	<50	<10	<10	<10	<10
W	MW-21	MW21QM298	6/30/1998	PRI	<9.4	NA	<9.4	<47	<9.4	26	<9.4	<9.4
W	MW-21	MW21QM398	10/2/1998	PRI	<10	<10	<10	<50	<10	<10	<10	<10
W	MW-21	MW21QM498	12/16/1998	PRI	<10	<10	<10	<50	<10	<10	<10	<10
W	MW-21	MW21QM199	3/10/1999	PRI	<5	NA	<5	<50	<5	30	<5	<5
W	MW-21	MW21QM299	6/30/1999	PRI	<5	NA	<5	<50	<5	<5	<5	<5
W	MW-21	MW21QM399	9/21/1999	PRI	<5	NA	<5	<50	<5	7	<5	<5
W	MW-21	MW21QM499	12/29/1999	PRI	<5	NA	<5	<50	<5	<5	<5	<5
W	MW-21	MW21QM100	3/30/2000	PRI	<5	NA	<5	<50	<5	7	<5	<5
W	MW-21	MW21QM2-00	6/29/2000	PRI	<2.0	<2.0	<2.0	<10	<5.0	18	<2.0	<2.0
W	MW-21	MW21QM300	9/19/2000	PRI	<2.0	<2.0	<2.0	<10	<5.0	2.5	<2.0	<2.0
W	MW-21	MW21QM101	3/1/2001	PRI	<2.0	<2.0	<2.0	<10	<5.0	<2.0	<2.0	<2.0
W	MW-21	W-MW21-A	5/16/2001	PRI	<2.3	<2.3	<2.3	<11	<2.3	<2.3	<2.3	<2.3
W	MW-21	W-MW21-A	9/7/2001	PRI	<2.0	<2.0	<2.0	<10	<2.0	<2.0	<2.0	<2.0
W	MW-30	W-MW30-A	10/10/2000	PRI	<10.0	<10.0	<10.0	<50.0	<10.0	<10.0	<10.0	<10.0
W	MW-30	MW30QM101	3/1/2001	PRI	<2.0	<2.0	<2.0	<10	<5.0	<2.0	<2.0	<2.0
W	MW-30	W-MW30-A	5/17/2001	PRI	<2.5	<2.5	<2.5	<13	<2.5	<2.5	<2.5	<2.5
W	MW-30	W-MW30-A	9/6/2001	PRI	<2.0	<2.0	<2.0	<10	<2.0	<2.0	<2.0	<2.0
W	MW-30	W-MW-30-A	12/7/2001	PRI	<2.9	<2.9	<2.9	<14	<2.9	<2.9	<2.9	<2.9
W	MW-30	W-MW-30-A	3/28/2002	PRI	<2.0	<2.0	<2.0	<10	<2.0	<2.0	<2.0	<2.0
W	MW-30	W-MW-30-A	6/25/2002	PRI	<2.0	<2.0	<2.0	<10	<2.0	<2.0	<2.0	<2.0
W	MW-30	W-MW-30-A	9/27/2002	PRI	<2.0	<2.0	<2.0	<10	<2.0	<2.0	<2.0	<2.0
W	MW-30	W-MW-30-A	12/11/2002	PRI	<2.0	<2.0	<2.0	<10	<2.0	<2.0	<2.0	<2.0
W	MW-31	W-MW31-A	10/10/2000	PRI	<20.0	<20.0	<20.0	<100	<20.0	<20.0	<20.0	<20.0
W	MW-31	W-MW31-B	10/10/2000	DUP	<20.0	<20.0	<20.0	<100	<20.0	<20.0	<20.0	<20.0
W	MW-31	MW31QM101	3/1/2001	PRI	<2.0	<2.0	<2.0	<10	<5.0	<2.0	<2.0	<2.0
W	MW-31	W-MW31-A	5/16/2001	PRI	<2.0	<2.0	<2.0	<10	<2.0	<2.0	<2.0	<2.0
W	MW-31	W-MW31-A	9/6/2001	PRI	<2.0	<2.0	<2.0	<10	<2.0	<2.0	<2.0	<2.0
W	MW-31	W-MW-31-A	12/7/2001	PRI	<2.0	<2.0	<2.0	<10	<2.0	<2.0	<2.0	<2.0
W	MW-31	W-MW-31-A	3/28/2002	PRI	<2.0	<2.0	<2.0	<10	<2.0	<2.0	<2.0	<2.0
W	MW-31	W-MW-31-B	3/28/2002	DUP	<2.3	<2.3	<2.3	<12	<2.3	<2.3	<2.3	<2.3
W	MW-31	W-MW-31-A	6/25/2002	PRI	<2.0	<2.0	<2.0	<10	<2.0	<2.0	<2.0	<2.0
W	MW-31	W-MW-31-A	9/27/2002	PRI	<2.0	<2.0	<2.0	<10	<2.0	<2.0	<2.0	<2.0
W	MW-31	W-MW-31-B	9/27/2002	DUP	<2.0	<2.0	<2.0	<10	<2.0	<2.0	<2.0	<2.0
W	MW-31	W-MW-31-A	12/11/2002	PRI	<2.0	<2.0	<2.0	<10	<2.0	<2.0	<2.0	<2.0
W	MW-31	W-MW-31-B	12/11/2002	DUP	<2.0	<2.0	<2.0	<10	<2.0	<2.0	<2.0	<2.0
W	MW-32	W-MW32-A	10/10/2000	PRI	<10.0	<10.0	<10.0	<50.0	<10.0	<10.0	<10.0	<10.0

TABLE 3: SVOC MONITORING SUMMARY FOR POSITIVELY DETECTED CHEMICALS
Phase III RFI Groundwater Report
450 East Grand Avenue
South San Francisco, California
(Concentrations presented in µg/L)

Matrix	Sample Location	Field Sample ID	Sample Date	Sample Type	2-Methylnaphthalene	4-Methylphenol	Acenaphthene	Benzoic acid	Fluorene	Isophorone	Naphthalene	Phenol
Ecological Screening Value with 10-fold dilution					4680	247020	3030	320250	2260	534000	20720	628400
W	PM-09	W-PM09-A	9/6/2001	PRI	6.6	<2.0	<2.0	<10	<2.0	<2.0	<2.0	<2.0
W	PM-09	W-PM09-B	9/6/2001	DUP	7.0	<2.0	<2.0	<10	<2.0	<2.0	<2.0	<2.0
W	PM-14	PM 14	3/27/1998	PRI	<10	<10	<10	<50	<10	<10	<10	<10
W	PM-14	PM 14D	3/27/1998	DUP	<10	<10	<10	<50	<10	<10	<10	<10
W	PM-14	PM14QM298	6/30/1998	PRI	<9.4	NA	<9.4	<47	<9.4	<9.4	<9.4	<9.4
W	PM-14	PM14QM398	10/2/1998	PRI	<10	<10	<10	<50	<10	<10	<10	<10
W	PM-14	PM14QM498	12/16/1998	PRI	<10	<10	<10	<50	<10	<10	<10	<10
W	PM-14	PM14QM199	3/10/1999	PRI	<5	NA	<5	<50	<5	<5	<5	<5
W	PM-14	PM14QM299	6/30/1999	PRI	<5	NA	<5	<50	<5	<5	<5	<5
W	PM-14	PM14QM399	9/21/1999	PRI	<5	NA	<5	<50	<5	<5	<5	<5
W	PM-14	PM14QM499	12/29/1999	PRI	<5	NA	<5	<50	<5	<5	<5	<5
W	PM-14	PM14QM100	3/30/2000	PRI	<5	NA	<5	<50	<5	<5	<5	<5
W	PM-14	PM14QM2-00	6/29/2000	PRI	<2.0	<2.0	<2.0	<10	<5.0	<2.0	<2.0	<2.0
W	PM-14	PM14QM300	9/19/2000	PRI	<2.0	<2.0	<2.0	<10	<5.0	<2.0	<2.0	<2.0
W	PM-14	PM14QM101	3/2/2001	PRI	<2.0	<2.0	<2.0	<10	<5.0	<2.0	<2.0	<2.0
W	PM-14	W-PM14-A	5/16/2001	PRI	<2.5	<2.5	<2.5	<13	<2.5	<2.5	<2.5	<2.5
W	PM-14	W-PM14-A	9/6/2001	PRI	<2.0	<2.0	<2.0	<10	<2.0	<2.0	<2.0	<2.0

Note:
NA Not available
µg/L Microgram per liter or part per billion

TABLE 4: SUMMARY OF MONITORING PROGRAM SAMPLING EVENTS

Phase III RFI Groundwater Report
450 East Grand Avenue
South San Francisco, California

Sample Location	Sample Date	INORG	SVOC	TPH	VOC
MW-11	3/2/2001	X	X		X
MW-11	5/16/2001	X	X		X
MW-11	9/6/2001	X	X		X
MW-11	12/6/2001	X			
MW-11	3/28/2002	X			
MW-11	6/25/2002	X			
MW-12	3/26/1998		X		X
MW-14	3/26/1998		X		X
MW-21	3/26/1998	X	X		X
MW-21	6/30/1998	X	X		X
MW-21	10/2/1998	X	X		X
MW-21	12/16/1998	X	X		X
MW-21	3/10/1999	X	X		X
MW-21	6/30/1999	X	X		X
MW-21	9/21/1999	X	X		X
MW-21	12/29/1999	X	X		X
MW-21	12/30/1999				
MW-21	3/30/2000	X	X		X
MW-21	6/28/2000				
MW-21	6/29/2000	X	X		X
MW-21	9/19/2000	X	X		X
MW-21	3/1/2001	X	X		X
MW-21	5/16/2001	X	X		X
MW-21	9/6/2001				
MW-21	9/7/2001	X	X	X	X
MW-21	12/6/2001	X			
MW-21	3/28/2002	X			
MW-21	6/25/2002	X			
MW-30	10/10/2000	X	X	X	X
MW-30	3/1/2001	X	X	X	X
MW-30	5/16/2001				
MW-30	5/17/2001	X	X	X	X
MW-30	9/6/2001	X	X	X	X
MW-30	12/6/2001				
MW-30	12/7/2001	X	X	X	X
MW-30	3/28/2002	X	X	X	X
MW-30	6/25/2002	X	X	X	X

TABLE 4: SUMMARY OF MONITORING PROGRAM SAMPLING EVENTS

Phase III RFI Groundwater Report
450 East Grand Avenue
South San Francisco, California

Sample Location	Sample Date	INORG	SVOC	TPH	VOC
PM-09	3/30/2000	X	X		X
PM-09	6/28/2000				
PM-09	6/29/2000	X	X		X
PM-09	9/19/2000	X	X		X
PM-09	3/2/2001	X	X		X
PM-09	5/16/2001	X	X		X
PM-09	9/6/2001	X	X		X
PM-09	12/6/2001				
PM-09	12/7/2001	X			X
PM-09	3/28/2002	X			X
PM-09	6/25/2002	X			X
PM-09	8/21/2003	X			
PM-14	3/27/1998	X	X		X
PM-14	6/30/1998	X	X		X
PM-14	9/30/1998				
PM-14	10/2/1998	X	X		X
PM-14	12/16/1998	X	X		X
PM-14	3/10/1999	X	X		X
PM-14	6/30/1999	X	X		X
PM-14	9/21/1999	X	X		X
PM-14	12/29/1999	X	X		X
PM-14	12/30/1999				
PM-14	3/30/2000	X	X		X
PM-14	6/28/2000				
PM-14	6/29/2000	X	X		X
PM-14	9/19/2000	X	X		X
PM-14	3/2/2001	X	X		X
PM-14	5/16/2001	X	X		X
PM-14	9/6/2001	X	X	X	X
PM-14	12/6/2001	X			
PM-14	3/28/2002	X			
PM-14	6/25/2002	X			

Note:

* Following installation and development, additional analyses of shallow monitoring wells samples for ethylene glycol, chosen along with styrene to represent "indicator compounds for latex emulsions", and hexavalent chromium was conducted.

TABLE 5: STATISTICAL ANALYSIS OF INORGANICs IN GROUNDWATER
Phase III RFI Groundwater Report
450 East Grand Avenue
South San Francisco, California

		Results in µg/L												
Well Number	Statistic	Antimony	Arsenic	Beryllium	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Selenium	Silver	Thallium	Zinc
Ecological Screening Values with 10-fold dilution		5000	360	53	93	1800	31	81	9.4	82	710	9.5	10650	810
MW-11	Number of Analyses	6	6	6	6	6	6	6	6	6	6	6	6	6
MW-11	Number of Detections	3	2	0	0	0	0	0	0	1	1	0	0	0
MW-11	Percent Detections	50%	33%	0%	0%	0%	0%	0%	0%	17%	17%	0%	0%	0%
MW-11	Number of Detections Above ESL	0	0	0	0	0	0	0	0	0	0	0	0	0
MW-11	Minimum	2.5 (<5)	2.5 (<5)	<5	<2	<5	<5	<5	<0.17	2.5 (<5)	2.5 (<5)	<5	<5	<10
MW-11	Maximum	8	22	<5	<2	<5	<5	<5	<0.2	6.4	18	<5	<5	<10
MW-11	Mean	4.7	7.8	5.0	2.0	5.0	5.0	5.0	0.2	3.2	5.1	5.0	5.0	10.0
MW-11	Standard Deviation	2.6	8.6	0.0	0.0	0.0	0.0	0.0	0.0	1.6	6.3	0.0	0.0	0.0
MW-11	Median	4.0	2.5	5.0	2.0	5.0	5.0	5.0	0.2	2.5	2.5	5.0	5.0	10.0
MW-11	95% UCL	6.8	14.7	N/A	N/A	N/A	N/A	N/A	N/A	4.4	10.1	N/A	N/A	N/A
MW-21	Number of Analyses	17	17	17	17	17	17	17	17	17	17	17	17	17
MW-21	Number of Detections	11	13	1	3	0	5	4	0	7	6	2	2	7
MW-21	Percent Detections	65%	76%	6%	18%	0%	29%	24%	0%	41%	35%	12%	12%	41%
MW-21	Number of Detections Above ESL	0	0	0	0	0	0	0	0	0	0	0	0	0
MW-21	Minimum	2.5 (<5)	2.5 (<5)	0.02	0.05	<1	1	0.5 (<1)	<0.17	2.5 (<5)	1 (<2)	0.02 (<0.04)	0.01 (<0.02)	5 (<10)
MW-21	Maximum	80	160	2.5 (<5)	2.5 (<5)	<10	5 (<10)	25 (<50)	<0.5	11	25 (<50)	10 (<20)	25 (<50)	47
MW-21	Mean	23.4	63.3	1.7	1.2	5.6	3.0	6.0	0.2	6.0	7.3	2.7	6.8	13.8
MW-21	Standard Deviation	23.9	50.5	1.1	0.8	2.8	1.2	8.5	0.1	3.2	8.0	2.9	9.3	12.0
MW-21	Median	15.8	60.0	2.5	1.0	5.0	2.5	2.5	0.2	5.9	3.4	2.5	2.5	10.0
MW-21	95% UCL	34.7	87.3	2.2	1.6	N/A	3.6	10.0	N/A	7.5	11.1	4.1	11.2	19.5
MW-30	Number of Analyses	9	9	9	9	9	9	9	9	9	9	9	9	9
MW-30	Number of Detections	2	4	0	0	0	0	0	0	9	2	0	0	7
MW-30	Percent Detections	22%	44%	0%	0%	0%	0%	0%	0%	100%	22%	0%	0%	78%
MW-30	Number of Detections Above ESL	0	0	0	0	0	0	0	0	0	0	0	0	0
MW-30	Minimum	2.5 (<5)	2.5 (<5)	<4	<0.5	<5	<5	<3	<0.17	32.1	2.5 (<5)	<1	<2	5 (<10)
MW-30	Maximum	6.4	17	<5	<2	<10	<10	<5	<0.2	49	14	<5	<5	157
MW-30	Mean	3.2	6.8	4.9	1.8	5.6	5.6	4.8	0.2	44.1	4.6	4.6	4.7	29.2
MW-30	Standard Deviation	1.5	5.9	0.3	0.5	1.7	1.7	0.7	0.0	4.9	4.3	1.3	1.0	48.4
MW-30	Median	2.5	2.5	5.0	2.0	5.0	5.0	5.0	0.2	44.0	2.5	5.0	5.0	15.0
MW-30	95% UCL	4.2	10.7	N/A	N/A	N/A	N/A	N/A	N/A	47.3	7.4	N/A	N/A	60.8
MW-31	Number of Analyses	12	12	12	12	12	12	12	12	12	12	12	12	12
MW-31	Number of Detections	2	7	0	1	0	2	6	0	12	2	0	0	4
MW-31	Percent Detections	17%	58%	0%	8%	0%	17%	50%	0%	100%	17%	0%	0%	33%
MW-31	Number of Detections Above ESL	0	0	0	0	0	1	0	0	0	0	0	0	0
MW-31	Minimum	2.5 (<5)	2.5 (<5)	<4	0.25 (<0.500)	<5	2.5 (<5)	2.5 (<5)	<0.17	22	2.5 (<5)	<1	<2	5 (<10)
MW-31	Maximum	6.7	32	<5	1.33	<10	53	14.6	<0.2	37	16	<5	<5	44.9
MW-31	Mean	3.1	11.9	4.8	1.0	5.8	7.4	5.9	0.2	26.5	4.4	4.3	4.5	14.9
MW-31	Standard Deviation	1.4	10.2	0.4	0.2	1.9	14.4	4.3	0.0	4.5	4.6	1.6	1.2	16.1
MW-31	Median	2.5	10.1	5.0	1.0	5.0	2.5	3.9	0.2	24.1	2.5	5.0	5.0	5.0
MW-31	95% UCL	3.9	17.7	N/A	1.1	N/A	15.6	8.3	N/A	29.0	7.0	N/A	N/A	24.0

TABLE 5: STATISTICAL ANALYSIS OF INORGANICs IN GROUNDWATER
Phase III RFI Groundwater Report
450 East Grand Avenue
South San Francisco, California

		Results in µg/L												
Well Number	Statistic	Antimony	Arsenic	Beryllium	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Selenium	Silver	Thallium	Zinc
Ecological Screening Values with 10-fold dilution		5000	360	53	93	1800	31	81	9.4	82	710	9.5	10650	810
PM-14	Number of Analyses	18	18	18	18	18	18	18	18	18	18	18	18	18
PM-14	Number of Detections	4	8	0	3	3	4	4	1	13	2	1	2	8
PM-14	Percent Detections	22%	44%	0%	17%	17%	22%	22%	6%	72%	11%	6%	11%	44%
PM-14	Number of Detections Above ESL	0	0	0	0	0	0	0	0	0	0	0	0	0
PM-14	Minimum	0.11	2.1	<0.02	0.02	0.5 (<1)	0.5 (<1)	0.22	0.085 (<0.17)	2.5 (<5)	1 (<2)	0.01 (<0.02)	0.01 (<0.02)	4.6
PM-14	Maximum	30 (<60)	25 (<50)	<5	2.5 (<5)	30	5 (<10)	25 (<50)	1.10	40	25 (<50)	10 (<20)	25 (<50)	380
PM-14	Mean	7.0	6.2	3.2	1.2	4.8	2.9	6.4	0.16	9.3	5.2	2.7	7.1	30.6
PM-14	Standard Deviation	9.6	7.3	2.1	0.9	6.5	1.5	9.0	0.24	8.8	7.4	2.9	10.0	87.5
PM-14	Median	2.5	2.5	5.0	1.0	2.5	2.5	2.5	0.10	6.4	2.5	2.5	2.5	7.5
PM-14	95% UCL	11.4	9.6	N/A	1.6	7.8	3.6	10.6	0.3	13.4	8.6	4.0	11.7	71.0

Notes
<# Not detected below listed detection limit
N/A Not applicable
µg/L Micrograms per liter or part per billion
Highlighted cells call attention to values in excess of ESLs
UCL Upper confidence level

TABLE 6: STATISTICAL ANALYSIS OF VOCs IN GROUNDWATER
Phase III RFI Groundwater Report
450 East Grand Avenue
South San Francisco, California

Well Number	Statistic	Results in µg/L																					
		1,2,4-Trimethylbenzene	1,2-Dichlorobenzene	1,2-Dichloroethane	1,3,5-Trimethylbenzene	2-Butanone (MEK)	Acetone	Benzene	Carbon disulfide	Chlorobenzene	Chloromethane	Ethylbenzene	Isopropylbenzene	m,p-Xylenes	Naphthalene	n-Butylbenzene	n-Propylbenzene	o-Xylene	p-Isopropyltoluene	sec-Butylbenzene	tert-Butylbenzene	Toluene	Xylenes (total)
Environmental Screening Value with 10-fold dilution		4900	1290	631330	9210	N/A	N/A	113240	170200	1290	1181150	15050	5330	13430	20720	1150	5090	13430	N/A	750	2130	29670	13430
MW-11	Number of Analyses	2	3	3	2	3	3	3	3	3	3	3	3	N/A	3	1	1	N/A	1	1	1	3	3
MW-11	Number of Detections	0	0	0	0	0	0	0	0	0	0	0	0	N/A	1	0	0	N/A	0	0	0	0	0
MW-11	Percent Detections	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	N/A	33%	0%	0%	N/A	0%	0%	0%	0%	0%
MW-11	Number of Detections Above ESL	0	0	0	0	N/A	N/A	0	0	0	0	0	0	N/A	0	0	0	N/A	N/A	0	0	0	0
MW-11	Minimum	<1	<0.5	<0.5	<1	<50	<50	<0.5	<1	<0.5	<1	<0.5	<0.5	N/A	0.5 (<1.0)	<1	<1	N/A	<1	<1	<1	<0.5	<1
MW-11	Maximum	<5	<1	<1	<5	<50	<50	<1	<5	<1	<1	<1	<1	N/A	2.5 (<5)	<1	<1	N/A	<1	<1	<1	<1	<1
MW-11	Mean	3.0	0.7	0.7	3.0	50.0	50.0	0.7	2.3	0.7	1.0	0.7	0.7	N/A	1.6	1.0	1.0	N/A	1.0	1.0	1.0	0.7	1.0
MW-11	Standard Deviation	2.8	0.3	0.3	2.8	0.0	0.0	0.3	2.3	0.3	0.0	0.3	0.3	N/A	1.0	N/A	N/A	N/A	N/A	N/A	N/A	0.3	0.0
MW-11	Median	3.0	0.5	0.5	3.0	50.0	50.0	0.5	1.0	0.5	1.0	0.5	0.5	N/A	1.7	1.0	1.0	N/A	1.0	1.0	1.0	0.5	1.0
MW-11	95% UCL	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	2.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
MW-12	Number of Analyses	N/A	N/A	1	N/A	1	1	1	1	1	1	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1	1
MW-12	Number of Detections	N/A	N/A	0	N/A	0	0	0	0	0	0	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0
MW-12	Percent Detections	N/A	N/A	0%	N/A	0%	0%	0%	0%	0%	0%	0%	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0%	0%
MW-12	Number of Detections Above ESL	N/A	N/A	0	N/A	N/A	N/A	0	0	0	0	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0
MW-12	Minimum	N/A	N/A	<5	N/A	<100	<100	<5	<10	<5	<10	<5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	<5	<10
MW-12	Maximum	N/A	N/A	<5	N/A	<100	<100	<5	<10	<5	<10	<5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	<5	<10
MW-12	Mean	N/A	N/A	5.0	N/A	100.0	100.0	5.0	10.0	5.0	10.0	5.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	5.0	10.0
MW-12	Standard Deviation	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
MW-12	Median	N/A	N/A	5.0	N/A	100.0	100.0	5.0	10.0	5.0	10.0	5.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	5.0	10.0
MW-12	95% UCL	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
MW-14	Number of Analyses	N/A	N/A	1	N/A	1	1	1	1	1	1	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1	1
MW-14	Number of Detections	N/A	N/A	0	N/A	0	0	0	0	0	0	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0
MW-14	Percent Detections	N/A	N/A	0%	N/A	0%	0%	0%	0%	0%	0%	0%	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0%	0%
MW-14	Number of Detections Above ESL	N/A	N/A	0	N/A	N/A	N/A	0	0	0	0	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0
MW-14	Minimum	N/A	N/A	<5	N/A	<100	<100	<5	<10	<5	<10	<5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	<5	<10
MW-14	Maximum	N/A	N/A	<5	N/A	<100	<100	<5	<10	<5	<10	<5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	<5	<10
MW-14	Mean	N/A	N/A	5.0	N/A	100.0	100.0	5.0	10.0	5.0	10.0	5.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	5.0	10.0
MW-14	Standard Deviation	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
MW-14	Median	N/A	N/A	5.0	N/A	100.0	100.0	5.0	10.0	5.0	10.0	5.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	5.0	10.0
MW-14	95% UCL	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
MW-21	Number of Analyses	8	10	14	8	14	14	14	14	14	14	14	10	3	10	7	7	3	7	7	7	14	11
MW-21	Number of Detections	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1
MW-21	Percent Detections	0%	0%	0%	0%	0%	0%	0%	7%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	7%	9%
MW-21	Number of Detections Above ESL	0	0	0	0	N/A	N/A	0	0	0	0	0	0	0	0	0	0	0	N/A	0	0	0	0
MW-21	Minimum	<1	<0.5	<0.5	<1	<2	<2	<0.5	0.25 (<0.5)	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<1	<1	<0.5	<1	<1	<1	0.25 (<0.5)	0.25 (<0.5)
MW-21	Maximum	<5	<1	<5	<5	<100	<100	<5	5 (<10)	<5	<10	<5	<2	<1	<5	<2	<2	<1	<2	<2	<2	2.5 (<5)	5 (<10)
MW-21	Mean	2.1	0.6	0.9	2.1	26.9	29.1	0.9	1.0	0.9	1.4	0.9	1.4	0.7	1.9	1.7	1.7	0.7	1.7	1.7	1.7	0.5	1.0
MW-21	Standard Deviation	1.2	0.2	1.2	1.2	29.2	27.9	1.2	1.4	1.2	2.5	1.2	0.7	0.3	1.2	0.5	0.5	0.3	0.5	0.5	0.5	0.6	1.5
MW-21	Median	2.0	0.5	0.5	2.0	15.0	20.0	0.5	0.5	0.5	0.8	0.5	1.5	0.5	2.0	2.0	2.0	0.5	2.0	2.0	2.0	0.3	0.5
MW-21	95% UCL	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.8	1.9
MW-30	Number of Analyses	8	9	9	8	9	9	9	9	9	9	9	9	1	9	7	7	1	7	7	7	9	8
MW-30	Number of Detections	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MW-30	Percent Detections	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
MW-30	Number of Detections Above ESL	0	0	0	0	N/A	N/A	0	0	0	0	0	0	0	0	0	0	0	N/A	0	0	0	0
MW-30	Minimum	<0.5	<0.5	<0.5	<0.5	<5	<10	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1
MW-30	Maximum	<5	<1	<1	<5	<50	<50	<1	<5	<1	<1	<1	<1	<0.5	<5	<1	<1	<0.5	<1	<1	<1	<1	<1
MW-30	Mean	1.1	0.6	0.6	1.1	45.0	45.6	0.6	4.1	0.6	0.9	0.6	0.6	0.5	1.4	0.9	0.9	0.5	0.9	0.9	0.9	0.6	1.0
MW-30	Standard Deviation	1.6	0.2	0.2	1.6	15.0	13.3	0.2	1.8	0.2	0.2	0.2	0.2	N/A	1.4	0.2	0.2	N/A	0.2	0.2	0.2	0.2	0.0
MW-30	Median	0.5	0.5	0.5	0.5	50.0	50.0	0.5	5.0	0.5	1.0	0.5	0.5	0.5	1.0	1.0	1.0	0.5	1.0	1.0	1.0	0.5	1.0
MW-30	95% UCL	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

TABLE 6: STATISTICAL ANALYSIS OF VOCs IN GROUNDWATER
Phase III RFI Groundwater Report
450 East Grand Avenue
South San Francisco, California

Well Number	Statistic	Results in µg/L																					
		1,2,4-Trimethylbenzene	1,2-Dichlorobenzene	1,2-Dichloroethane	1,3,5-Trimethylbenzene	2-Butanone (MEK)	Acetone	Benzene	Carbon disulfide	Chlorobenzene	Chloromethane	Ethylbenzene	Isopropylbenzene	m,p-Xylenes	Naphthalene	n-Butylbenzene	n-Propylbenzene	o-Xylene	p-Isopropyltoluene	sec-Butylbenzene	tert-Butylbenzene	Toluene	Xylenes (total)
Environmental Screening Value with 10-fold dilution		4900	1290	631330	9210	N/A	N/A	113240	170200	1290	1181150	15050	5330	13430	20720	1150	5090	13430	N/A	750	2130	29670	13430
PM-14	Number of Analyses	8	12	15	8	15	15	15	15	15	15	15	10	2	10	7	7	2	7	7	7	15	13
PM-14	Number of Detections	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM-14	Percent Detections	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
PM-14	Number of Detections Above ESL	0	0	0	0	N/A	N/A	0	0	0	0	0	0	0	0	0	0	0	N/A	0	0	0	0
PM-14	Minimum	<1	<0.5	<0.5	<1	<2	<2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<1	<1	<0.5	<1	<1	<1	<0.5	<0.5
PM-14	Maximum	<5	<5	<5	<5	<100	<100	<5	<10	<5	<10	<5	<2	<1	<5	<2	<2	<1	<2	<2	<2	<5	<10
PM-14	Mean	2.1	1.3	1.2	2.1	30.8	33.8	1.2	2.6	1.2	2.0	1.2	1.4	0.8	1.9	1.7	1.7	0.8	1.7	1.7	1.7	1.2	2.2
PM-14	Standard Deviation	1.2	1.7	1.6	1.2	34.4	32.5	1.6	3.4	1.6	3.3	1.6	0.7	0.4	1.2	0.5	0.5	0.4	0.5	0.5	0.5	1.6	3.5
PM-14	Median	2.0	0.5	0.5	2.0	10.0	20.0	0.5	1.0	0.5	1.0	0.5	1.5	0.8	2.0	2.0	2.0	0.8	2.0	2.0	2.0	0.5	1.0
PM-14	95% UCL	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Note
VOC Volatile organic compound
<# Not detected below listed detection limit
N/A Not applicable
µg/L Microgram per liter or part per billion
Highlighted cells call attention to values in excess of PRLs
UCL Upper confidence level

TABLE 7: STATISTICAL ANALYSIS OF SVOCs IN GROUNDWATER
Phase III RFI Groundwater Report
450 East Grand Avenue
South San Francisco, California

Well Number	Statistic	Results in µg/L							
		2-Methylnaphthalene	4-Methylphenol	Acenaphthene	Benzoic acid	Fluorene	Isophorone	Naphthalene	Phenol
Ecological Screening Value with 10-fold dilution		4680	247020	3030	320250	2260	534000	20720	628400
MW-11	Number of Analyses	3	3	3	3	3	3	3	3
MW-11	Number of Detections	0	0	2	0	0	0	0	0
MW-11	Percent Detections	0%	0%	67%	0%	0%	0%	0%	0%
MW-11	Number of Detections Above ESL	0	0	0	0	0	0	0	0
MW-11	Minimum	<2	<2	1 (<2.0)	<10	<2	<2	<2	<2
MW-11	Maximum	<2.6	<2.6	4.9	<13	<5.6	<2.6	<2.6	<2.6
MW-11	Mean	2.3	2.3	3.4	11.3	3.4	2.3	2.3	2.3
MW-11	Standard Deviation	0.3	0.3	2.1	1.5	1.9	0.3	0.3	0.3
MW-11	Median	2.3	2.3	4.4	11.0	2.6	2.3	2.3	2.3
MW-11	95% UCL	N/A	N/A	5.8	N/A	N/A	N/A	N/A	N/A
MW-12	Number of Analyses	1	1	1	1	1	1	1	1
MW-12	Number of Detections	0	0	0	0	0	0	0	0
MW-12	Percent Detections	0%	0%	0%	0%	0%	0%	0%	0%
MW-12	Number of Detections Above ESL	0	0	0	0	0	0	0	0
MW-12	Minimum	<10	<10	<10	<50	<10	<10	<10	<10
MW-12	Maximum	<10	<10	<10	<50	<10	<10	<10	<10
MW-12	Mean	10.0	10.0	10.0	50.0	10.0	10.0	10.0	10.0
MW-12	Standard Deviation	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
MW-12	Median	10.0	10.0	10.0	50.0	10.0	10.0	10.0	10.0
MW-12	95% UCL	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
MW-14	Number of Analyses	1	1	1	1	1	1	1	1
MW-14	Number of Detections	0	0	0	0	0	0	0	0
MW-14	Percent Detections	0%	0%	0%	0%	0%	0%	0%	0%
MW-14	Number of Detections Above ESL	0	0	0	0	0	0	0	0
MW-14	Minimum	<10	<10	<10	<50	<10	<10	<10	<10
MW-14	Maximum	<10	<10	<10	<50	<10	<10	<10	<10
MW-14	Mean	10.0	10.0	10.0	50.0	10.0	10.0	10.0	10.0
MW-14	Standard Deviation	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
MW-14	Median	10.0	10.0	10.0	50.0	10.0	10.0	10.0	10.0
MW-14	95% UCL	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
MW-21	Number of Analyses	14	8	14	14	14	14	14	14
MW-21	Number of Detections	0	0	0	0	0	6	0	0
MW-21	Percent Detections	0%	0%	0%	0%	0%	43%	0%	0%
MW-21	Number of Detections Above ESL	0	0	0	0	0	0	0	0
MW-21	Minimum	<2	<2	<2	<10	<2	1 (<2.0)	<2	<2
MW-21	Maximum	<10	<10	<10	<50	<10	30	<10	<10
MW-21	Mean	5.3	5.0	5.3	35.6	6.0	8.1	5.3	5.3
MW-21	Standard Deviation	3.2	4.1	3.2	19.6	2.7	9.5	3.2	3.2
MW-21	Median	5.0	2.2	5.0	50.0	5.0	5.0	5.0	5.0
MW-21	95% UCL	N/A	N/A	N/A	N/A	N/A	13.1	N/A	N/A

TABLE 7: STATISTICAL ANALYSIS OF SVOCs IN GROUNDWATER
Phase III RFI Groundwater Report
450 East Grand Avenue
South San Francisco, California

Well Number	Statistic	Results in µg/L							
		2-Methylnaphthalene	4-Methylphenol	Acenaphthene	Benzoic acid	Fluorene	Isophorone	Naphthalene	Phenol
Ecological Screening Value with 10-fold dilution		4680	247020	3030	320250	2260	534000	20720	628400
MW-41	Number of Analyses	4	4	4	4	4	4	4	4
MW-41	Number of Detections	4	0	2	0	2	0	4	0
MW-41	Percent Detections	100%	0%	50%	0%	50%	0%	100%	0%
MW-41	Number of Detections Above ESL	0	0	0	0	0	0	0	0
MW-41	Minimum	110	<2	3.7	<10	3.2	<2	77	<2
MW-41	Maximum	410	<20	10 (<20)	<100	10 (<20)	<20	270	<20
MW-41	Mean	222.5	11.0	7.1	55.0	6.9	11.0	135.0	11.0
MW-41	Standard Deviation	130.0	10.4	3.4	52.0	3.7	10.4	90.5	10.4
MW-41	Median	185.0	11.0	7.4	55.0	7.1	11.0	96.5	11.0
MW-41	95% UCL	349.9	N/A	10.4	N/A	10.4	N/A	223.7	N/A
PM-09	Number of Analyses	27	15	27	27	27	27	27	27
PM-09	Number of Detections	13	0	0	0	0	0	0	0
PM-09	Percent Detections	48%	0%	0%	0%	0%	0%	0%	0%
PM-09	Number of Detections Above ESL	0	0	0	0	0	0	0	0
PM-09	Minimum	2.5 (<5)	<2	<2	<10	<2	<2	<2	<2
PM-09	Maximum	8	<10	<10	<50	<10	<10	<10	<10
PM-09	Mean	4.6	4.7	5.2	35.0	5.8	5.2	5.2	5.2
PM-09	Standard Deviation	1.7	3.9	3.1	19.4	2.6	3.1	3.1	3.1
PM-09	Median	4.9	2.0	5.0	50.0	5.0	5.0	5.0	5.0
PM-09	95% UCL	5.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A
PM-14	Number of Analyses	15	9	15	15	15	15	15	15
PM-14	Number of Detections	0	0	0	0	0	0	0	0
PM-14	Percent Detections	0%	0%	0%	0%	0%	0%	0%	0%
PM-14	Number of Detections Above ESL	0	0	0	0	0	0	0	0
PM-14	Minimum	<2	<2	<2	<10	<2	<2	<2	<2
PM-14	Maximum	<10	<10	<10	<50	<10	<10	<10	<10
PM-14	Mean	5.7	5.6	5.7	36.7	6.3	5.7	5.7	5.7
PM-14	Standard Deviation	3.3	4.2	3.3	19.1	2.8	3.3	3.3	3.3
PM-14	Median	5.0	2.5	5.0	50.0	5.0	5.0	5.0	5.0
PM-14	95% UCL	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Note
SVOC Semivolatile organic compound
<# Not detected below listed detection limit
N/A Not applicable
µg/L Microgram per liter or part per billion
UCL Upper confidence level

TABLE 8: PHYSICAL PROPERTIES OF CONTAMINANTS
Phase III RFI Groundwater Report
450 East Grand Avenue
South San Francisco, California

CAS Number	Chemical Name	Diffusivity in Air (Di) (cm2/s)	Diffusivity in Water (Dw) (cm2/s)	Henry's Law Constant (H') (unitless)	Soil-Water Partition Coefficient (Kd) (cm3/g)	Organic Carbon Partition Coef. (Koc) (L/kg)	Permeability constant (Kp) (cm/hr)	Log of Octanol-water Partition Coef. (log Kow)	Molecular Weight (MW)	Water Solubility (S) (mg/L)
Semivolatile Organic Compounds										
91-57-6	2-Methylnaphthalene	4.80E-02	7.84E-06	2.38E-03	NA	2.24E+03	1.50E-01	4.13E+00	1.42E+02	2.46E+01
106-44-5	4-Methylphenol	7.40E-02	1.00E-05	4.09E-05	NA	4.34E+02	9.95E-03	1.94E+00	1.08E+02	2.15E+04
83-32-9	Acenaphthene	4.21E-02	7.69E-06	6.36E-03	NA	7.08E+03	2.50E-01	3.92E+00	1.54E+02	4.24E+00
65-85-0	Benzoic acid	5.36E-02	7.97E-06	1.56E-06	NA	1.45E+01	7.29E-03	1.87E+00	1.22E+02	3.40E+03
86-73-7	Fluorene	3.63E-02	7.88E-06	3.93E-03	NA	1.13E+04	1.71E-01	4.18E+00	1.66E+02	1.89E+00
78-59-1	Isophorone	6.23E-02	6.76E-06	2.72E-04	NA	4.68E+01	4.40E-03	1.70E+00	1.38E+02	1.20E+04
91-20-3	Naphthalene	5.90E-02	7.50E-06	1.80E-02	NA	1.84E+03	6.94E-02	3.30E+00	1.28E+02	3.10E+01
108-95-2	Phenol	8.20E-02	9.10E-06	1.36E-05	NA	2.68E+02	5.53E-03	1.46E+00	9.41E+01	8.28E+04
Volatile Organic Compounds										
95-63-6	1,2,4-Trimethylbenzene	6.44E-02	7.92E-06	2.53E-01	NA	3.72E+03	1.70E-01	3.78E+00	1.20E+02	5.70E+01
95-50-1	1,2-Dichlorobenzene	6.90E-02	7.90E-06	7.79E-02	NA	6.17E+02	6.10E-02	3.38E+00	1.47E+02	1.56E+02
107-06-2	1,2-Dichloroethane	1.04E-01	9.90E-06	4.01E-02	NA	1.74E+01	5.30E-03	1.45E+00	9.90E+01	8.52E+03
108-67-8	1,3,5-Trimethylbenzene	6.02E-02	8.67E-06	3.60E-01	NA	1.62E+03	9.40E-02	3.42E+00	1.20E+02	4.82E+01
78-93-3	2-Butanone (MEK)	8.08E-02	9.80E-06	5.33E-03	NA	1.23E+00	1.10E-03	2.80E-01	7.20E+01	2.23E+05
67-64-1	Acetone	1.24E-01	1.14E-05	1.59E-03	NA	5.75E-01	5.70E-04	-2.40E-01	5.80E+01	1.00E+06
71-43-2	Benzene	8.80E-02	9.80E-06	2.28E-01	NA	5.89E+01	2.10E-02	2.15E+00	7.81E+01	1.75E+03
75-15-0	Carbon disulfide	1.04E-01	1.00E-05	1.24E+00	NA	4.57E+01	2.40E-02	2.16E+00	8.00E+01	1.19E+03
108-90-7	Chlorobenzene	7.30E-02	8.70E-06	1.52E-01	NA	2.19E+02	4.10E-02	2.50E+00	1.13E+02	4.72E+02
74-87-3	Chloromethane	1.26E-01	6.50E-06	3.62E-01	NA	3.50E+01	4.20E-03	1.92E+00	5.05E+01	5.33E+03
100-41-4	Ethylbenzene	7.50E-02	7.80E-06	3.23E-01	NA	3.63E+02	7.40E-02	3.15E+00	1.06E+02	1.69E+02
98-82-8	Isopropylbenzene	6.50E-02	7.10E-06	5.37E-01	NA	2.29E+03	1.10E-01	3.50E+00	1.20E+02	6.13E+01
108-38-3	m-Xylene	7.00E-02	7.80E-06	3.01E-01	NA	4.07E+02	8.00E-02	3.20E+00	1.06E+02	1.61E+02
91-20-3	Naphthalene	5.90E-02	7.50E-06	1.98E-02	NA	2.00E+03	6.90E-02	3.37E+00	1.28E+02	3.10E+01
104-51-8	n-Butylbenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA
103-65-1	n-Propylbenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA
95-47-6	o-Xylene	8.70E-02	1.00E-05	2.13E-01	NA	3.63E+02	8.00E-02	2.95E+00	1.06E+02	1.78E+02
99-87-6	p-Isopropyltoluene	NA	NA	NA	NA	NA	NA	NA	NA	NA
106-42-3	p-Xylene	7.69E-02	8.44E-06	3.14E-01	NA	3.89E+02	8.00E-02	3.15E+00	1.06E+02	1.85E+02
135-98-8	sec-Butylbenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA
98-06-6	tert-Butylbenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA
108-88-3	Toluene	8.70E-02	8.60E-06	2.72E-01	NA	1.82E+02	4.50E-02	2.69E+00	9.21E+01	5.26E+02
1330-20-7	Xylenes (total)	7.14E-02	9.34E-06	2.71E-01	NA	4.43E+02	7.04E-02	3.12E+00	1.06E+02	1.06E+02
Inorganics										
7440-36-0	Antimony	NA	NA	NA	4.50E+01	NA	1.00E-03	NA	NA	3.85E+04
7440-38-2	Arsenic	NA	NA	NA	2.00E+02	NA	1.00E-03	NA	NA	3.02E+04
7440-41-7	Beryllium	NA	NA	NA	7.90E+02	NA	1.00E-03	NA	NA	5.67E+04
7440-43-9	Cadmium	NA	NA	NA	7.50E+01	NA	1.00E-03	NA	NA	2.98E+04
7440-47-3	Chromium	NA	NA	NA	1.80E+06	NA	1.00E-03	NA	NA	1.20E+04
7440-50-8	Copper	NA	NA	NA	4.28E+02	NA	1.00E-03	NA	NA	2.44E+04
7439-92-1	Lead	NA	NA	NA	9.00E+02	NA	1.00E-03	NA	NA	5.00E+04
7439-97-6	Mercury	3.07E-02	6.30E-06	4.67E-01	5.20E+01	5.20E+01	1.00E-03	NA	NA	6.00E-02
7440-02-0	Nickel	NA	NA	NA	6.50E+01	NA	1.00E-03	NA	NA	2.54E+04
7782-49-2	Selenium	NA	NA	NA	3.00E+02	NA	1.00E-03	NA	NA	1.30E+04
7440-22-4	Silver	NA	NA	NA	8.30E+00	NA	1.00E-03	NA	NA	5.57E+04
7440-28-0	Thallium	NA	NA	NA	1.50E+03	NA	1.00E-03	NA	NA	5.00E+04
7440-66-6	Zinc	NA	NA	NA	6.20E+01	NA	1.00E-03	NA	NA	4.32E+04

Note:
NA Not applicable or not available
Data extracted from the Risk Assessment Information System (RAIS) database, Oak Ridge Office, United States Department of Energy

TABLE 9: ECOLOGICAL SCREENING VALUES FOR INORGANICS IN GROUNDWATER

Phase III RFI Groundwater Report
450 East Grand Avenue
South San Francisco, California

COC	ESV	ESV with Dilution	REFERENCE
Antimony	500	5000	USEPA1987
Arsenic	36	360	CTR-CCC-SW
Beryllium	5.3	53	USEPA-CLOEL-FW
Cadmium	9.3	93	CTR-CCC-SW
Chromium	180	1800	CTR-CCC-FW
Copper	3.1	31	CTR-CCC-SW
Lead	8.1	81	CTR-CCC-SW
Mercury	0.94	9.4	USEPA-CCC-SW
Nickel	8.2	82	CTR-CCC-SW
Selenium	71	710	CTR-CCC-SW
Silver	0.95	9.5	CTR-CCC-SW
Thallium	1065	10650	USEPA-ALOEL-SW
Zinc	81	810	CTR-CCC-SW

Notes

Limits presented in micrograms per liter (µg/L) or parts per billion

ESV Ecological Screening Value

COC Chemical of concern

USEPA1987 U.S. EPA. 1987. Quality Criteria for Water—Update #2. EPA 440/5-86-001. Office of Water Regulations and Standards. Washington, D.C. May. (proposed)

CTR-CCC-SW California Toxics Rule, Criterion for Continuous Concentration for saltwater (40 CFR 131)

CTR-CCC-FW California Toxics Rule, Criterion for Continuous Concentration for freshwater (40 CFR 131)

USEPA-CCC-SW U.S. EPA Criterion for Continuous Concentration for saltwater

USEPA-CLOEL-FW U.S. EPA Chronic Lowest Observed Effects Level for freshwater

USEPA-ALOEL-SW U.S. EPA Acute Lowest Observed Effects Level for saltwater

LOEL (Lowest Observable Effect Level) levels were used when no CCC (Criterion Continuous Concentration) levels were present

The corresponding freshwater values were used when no CCC or CLOEL (Chronic LOEL) levels were found for saltwater

No saltwater CCC or CLOEL listed in register for Thallium; Screening level is 50% of Acute LOEL

Proposed CCC for Silver in USEPA1987 document higher than CMC (Critereon Maximum Concentration) in 40 CFR 131 (2000) so 50% of CMC used

TABLE 10: ECOLOGICAL SCREENING VALUES FOR VOCs IN GROUNDWATER

Phase III RFI Groundwater Report
450 East Grand Avenue
South San Francisco, California

VOC	ESV	ESV with dilution factor	REFERENCE
1,2,4-Trimethylbenzene	490	4900	DTSC-5/27/04
1,2-Dichlorobenzene	129	1290	USEPA-CLOEL-SW
1,2-Dichloroethane	63133	631330	DTSC-8/8/05
1,3,5-Trimethylbenzene	921	9210	DTSC-8/8/05
2-Butanone (MEK)	NA	NA	DTSC-8/8/05
Acetone	NA	NA	DTSC-8/8/05
Benzene	11324	113240	DTSC-8/8/05
Bromodichloromethane	31944	319440	DTSC-5/27/04
Carbon disulfide	17020	170200	DTSC-8/8/05
Chlorobenzene	129	1290	USEPA-CLOEL-SW
Chloroform	24927	249270	DTSC-5/27/04
Chloromethane	118115	1181150	DTSC-8/8/05
Ethylbenzene	1505	15050	DTSC-8/8/05
Isopropylbenzene	533	5330	DTSC-5/27/04
m,p-Xylenes	1343	13430	DTSC-5/27/04
Naphthalene	2072	20720	DTSC-5/27/04
n-Butylbenzene	115	1150	DTSC-5/27/04
n-Propylbenzene	509	5090	DTSC-8/8/05
o-Xylene	1343	13430	DTSC-5/27/04
p-Isopropyltoluene	NA	NA	DTSC-5/27/04
sec-Butylbenzene	75	750	DTSC-5/27/04
tert-Butylbenzene	213	2130	DTSC-8/8/05
Toluene	2967	29670	DTSC-5/27/04
Xylenes (total)	1343	13430	DTSC-5/27/04

Notes
Limits presented in micrograms per liter (µg/L) or parts per billion
VOC Volatile organic compound
ESV Ecological Screening Value
NA Not applicable, no published water quality criteria
MEK Methyl ethyl ketone
USEPA-CLOEL-SW U.S. EPA Chronic Lowest Observed Effects Level for saltwater
DTSC-5/27/04 DTSC/HERD memorandum dated May 27, 2004
DTSC-8/8/05 DTSC email dated August 8, 2005

TABLE 11: ECOLOGICAL SCREENING VALUES FOR SVOCs IN GROUNDWATER

Phase III RFI Groundwater Report
450 East Grand Avenue
South San Francisco, California

SVOC	ESV	ESV with dilution factor	REFERENCE
2-Methylnaphthalene	468	4680	DTSC-5/27/04
4-Methylphenol	24702	247020	DTSC-8/8/05
Acenaphthene	303	3030	DTSC-8/8/05
Benzoic acid	32025	320250	DTSC-8/8/05
Butyl benzyl phthalate	121	1210	DTSC-5/27/04
Fluorene	226	2260	DTSC-8/8/05
Isophorone	53400	534000	DTSC-8/8/05
Naphthalene	2072	20720	DTSC-5/27/04
Phenanthrene	37	370	DTSC-5/27/04
Phenol	62840	628400	DTSC-8/8/05

Notes
Limits presented in micrograms per liter (µg/L) or parts per billion
SVOC Semivolatile organic compound
ESV Ecological Screening Value
DTSC-5/27/04 DTSC/HERD memorandum dated May 27, 2004
DTSC-8/8/05 DTSC email dated August 8, 2005

TABLE 12: SHALLOW WELL CONSTRUCTION DETAILS

Phase III RCRA Facility Investigation Groundwater Report
450 East Grand Avenue
South San Francisco, California

Well ID	Installation Date	Drilling Method	Total Depth Well (ft. BGS)	Reference Elevation (ft. MSL)	Top of Screen (ft. BGS)	Bottom of Screen (ft. BGS)	Formation Screened	Slot Type	Slot Size (inches)	Top of Sand Pack (ft. BGS)	Bottom of Sand Pack (ft. BGS)	Borehole Diameter (inches)	Casing Diameter (inch)	Well Casing Type	Installed By
MW-11	1/9/1987	Auger	15.5	10.89	5.5	15.5	Fill Material	Sch. 40 PVC	0.020	4.5	15.5	8	4	Sch. 40 PVC	Woodward-Clyde
MW-12	1/10/1987	Auger	15.5	13.02	5.0	15.0	Fill Material	Sch. 40 PVC	0.020	4.0	15.0	NA	4	Sch. 40 PVC	Woodward-Clyde
MW-13	1/10/1987	Auger	15.0	13.42	5.0	15.0	Fill Material	Sch. 40 PVC	0.020	4.0	15.0	NA	4	Sch. 40 PVC	Woodward-Clyde
MW-14	1/11/1987	Auger	15.0	14.04	5.0	15.0	Fill Material	Sch. 40 PVC	0.020	3.5	15.0	NA	4	Sch. 40 PVC	Woodward-Clyde
MW-15	1/11/1987	Auger	15.0	12.05	5.0	15.0	Fill Material	Sch. 40 PVC	0.020	4.0	15.0	NA	4	Sch. 40 PVC	Woodward-Clyde
MW-21	9/2/1987	Auger	25.0	12.24	13.0	23.0	Fill Material	Sch. 40 PVC	0.007	10.0	25.0	12.0	4	Sch. 40 PVC	Mark Group
MW-30	10/6/2000	Auger	15.0	17.39	8.0	13.0	Fil Material	Sch. 40 PVC	0.010	6.5	15.0	8.0	2	Sch. 40 PVC	Henshaw
MW-31	10/6/2000	Auger	20.0	15.19	8.0	18.0	Fill Material	Sch. 40 PVC	0.010	6.5	20.0	8.0	2	Sch. 40 PVC	Henshaw
MW-32	10/6/2000	Auger	15.5	12.8	8.5	13.5	Fill Material	Sch. 40 PVC	0.010	6.5	15.5	8.0	2	Sch. 40 PVC	Henshaw
MW-40	8/18/2003	Auger	19.0	9.53	7.3	16.3	Fill Material	Sch. 40 PVC	0.010	6.5	19.0	10.0	4	Sch. 40 PVC	EnviroAssets
MW-41	8/18/2003	Auger	19.0	9.69	7.0	16.0	Fill Material	Sch. 40 PVC	0.010	6.5	19.0	10.0	4	Sch. 40 PVC	EnviroAssets
PM-09	8/28/1987	Auger	14.0	10.07	8.0	13.0	Fill Material	Sch. 40 PVC	0.007	5.0	14.0	8.0	2	Sch. 40 PVC	Mark Group
PM-12	12/10/1993	Auger	10.0	13.52	5.0	10.0	Fill Material	Sch. 40 PVC	0.020	4.0	10.0	8.0	2	Sch. 40 PVC	Harza
PM-14	12/10/1993	Auger	12.0	9.35	7.0	12.0	Fill Material	Sch. 40 PVC	0.020	6.0	10.0	8.0	2	Sch. 40 PVC	Harza

Note:
BGS Below ground surface
BMP Below measuring point
MSL Mean sea level
NA Not Available

APPENDIX A DEED RESTRICTIONS

APPENDIX B REGULATORY CORRESPONDENCE

APPENDIX C DIVISION OF RESPONSIBILITIES LETTER

APPENDIX D LABORATORY ANALYTICAL REPORTS

PROVIDED ON CD-ROM

APPENDIX E ANALYTICAL SUMMARY TABLES

APPENDIX F TABLES FROM
BIOLOGICAL EVALUATION OF THE FULLER-O'BRIEN PAINT FACILITY

APPENDIX G BORING AND WELL LOGS