Co 208

Kennedy/Jenks Consultants

Engineers & Scientists

622 Folsom Street
San Francisco, California 94107
415-243-2150
FAX 415-896-0999

20 September 2002

Mr. Barney M. Chan
Hazardous Materials Specialist
Environmental Health Service Administration
Alameda County Health Care Services Agency
1131 Harbor Bay Parkway, Suite 250
Alameda, CA 94502-6577

Subject: Work Plan for Soil Remediation and Additional Characterization,
901 Embarcadero, Oakland, California
K/J 000128.00

Dear Mr. Chan:

The enclosed Work Plan for Soil Remediation and Additional Characterization (Work Plan) is submitted by Kennedy/Jenks Consultants on behalf of Praxair, Inc. (Praxair). The Work Plan proposes soil remediation in specific areas and additional subsurface investigation activities at 901 Embarcadero in Oakland (the Site). The Site is owned by the Port of Oakland, and the Work Plan was developed in cooperation with the Port's representatives. The Work Plan focuses on the remediation and additional evaluation of potential impacts to soil and groundwater related to former chemical management areas exterior to the buildings.

Praxair is anxious to proceed with the activities discussed in the Work Plan, and we will appreciate your prompt review. We welcome the opportunity to discuss the Work Plan with you either in a meeting or by telephone. If you have any questions regarding this Work Plan, please call either Nick DiFranco of Praxair at (732) 738-3424 or me at (415) 243-2534.

Very truly yours,

KENNEDY/JENKS CONSULTANTS

Meredith G. Durant

Meredith G. Durant, P.E.
Senior Engineer

Enclosure

cc: Nick DiFranco, Praxair
Doug Herman, Port of Oakland
Leroy Griffin, Oakland Fire Department
John Sibley, Praxair
Jeriann Alexander, Subsurface Consultants
Jonathan Redding, Wendel Rosen Black & Dean

Kennedy/Jenks Consultants

622 Folsom Street
San Francisco, California 94107
415-243-2150
415-896-0999 (Fax)

Work Plan for Soil Remediation and Additional Characterization at 901 Embarcadero, Oakland, California

20 September 2002

Prepared for

Praxair, Inc.
P.O. Box 237
Keasbey, New Jersey 08832

Table of Contents

List of Tables ..... *ii*

List of Figures ..... *ii*

List of Appendices ..... *ii*

Section 1: Introduction and Background **1**

1.1 Site Description 1
1.2 Summary of Site History 1
1.3 Previous Subsurface Investigations and Remediation 2
1.4 Current Status 2
1.5 Soil Remediation Objectives 3

Section 2: Activities Performed Since May 2001 ..... **4**

2.1 Sediment Removal from Storm Drain Drop Inlets 4
2.2 Equipment Removal 4
2.3 Cleaning 5
2.4 Additional Soil Sampling 5

Section 3: Proposed Soil Remediation Activities **6**

3.1 Soil Excavation Areas 6
3.1.1 Vicinity of Boring KB-7 6
3.1.2 Vicinity of Boring KB-13A 6
3.1.3 Vicinity of Boring KB-11 7
3.2 Collection and Analysis of Confirmation Samples 7
3.3 Excavation Backfill 7
3.4 Residuals Management 8
3.5 Field Preparation 8

Section 4: Associated Field Activities **9**

4.1 Removal of Lead-Based Paint from Building 1 Foundation Walls 9
4.2 Sealing of Floor Drains 9
4.3 Exterior Sumps 9

Section 5: Proposed Additional Characterization **10**

5.1 Hydraulic Lift in Eastern Loading Dock of Building 1 10
5.2 Former Oil/Water Separator and Cooling Tower 10
5.3 Former Acetone Drum Storage Area 11
5.4 Vicinity of Boring KB-13 11
5.5 Reconnaissance Groundwater Sampling 12
5.6 Data Evaluation 12

Table of Contents (cont'd)

Section 6: Report Preparation 13

References 14

List of Tables

1 Mercury Concentrations in Soil Samples Near Boring KB-11
2 Sampling and Analysis Plan

List of Figures

1 Site Location Map
2 Soil and Groundwater Sampling Locations (May 2001)
3 Locations of Soil Samples in Vicinity of KB-11 (June 2002)
4 Proposed Soil Excavation Areas
5 Proposed Sampling Locations

List of Appendices

A Analytical Data Report and Chain of Custody Form – June 2002 Soil Samples
B Surface and Shallow Soil Sampling – Standard Operating Guidelines
C Typical Hydraulic Push/Drive Sampling Procedures – Standard Operating Guidelines

Section 1: Introduction and Background

This Work Plan for Site Closure (Work Plan) is submitted to the Alameda County Health Care Services Agency (County) by Praxair, Inc. The Work Plan was prepared by Kennedy/Jenks Consultants to describe the activities planned to complete soil investigation and remediation activities at 901 Embarcadero in Oakland, California (the Site). The location of the Site is shown on Figure 1. This Work Plan focuses on areas exterior to the buildings.

1.1 Site Description

The Site is located within an industrial area of Oakland that was historically and is currently used for mixed commercial, industrial manufacturing, warehousing and shipping. The Site is located in an area of level topography with an elevation of approximately 10 feet above mean sea level. The Site is located adjacent to the south side of the Embarcadero, a major surface street/truck route. Immediately north of the Embarcadero is US Highway 880 and the Union Pacific railroad tracks. The estuary (Inner Harbor) between Oakland and Alameda Island is approximately 300 feet south of the Site.

The Site is approximately 7.7 acres in size. Ground level at the Site is somewhat elevated relative to surrounding roadways. Based both upon the observed elevation differences and review of Sanborn Maps, fill material was used to create the Site. The Site is owned by the Port of Oakland (the Port).

Praxair is the successor to the former Liquid Carbonic Corporation, which in approximately 1954-1955, entered into a 50-year lease of the Site with the Port. In 1998, Praxair subleased the Site to Alliance Gas Products, a subsidiary of International Gas & Cryogenics. Alliance Gas Products relocated in early March 2002, and the Site is currently vacant.

1.2 Summary of Site History

Review of aerial photos and Sanborn maps indicate the eastern portion of the Site was occupied by two industrial structures (Atlas Gas Engine Machine Shop and Interlocking Stone & Gilro Machine Company) and a railroad spur in the early portion of the 1900s. The Site was vacant for a time, until the mid-1950s, when the existing Building 1 was constructed for use by Liquid Carbonic.

Liquid Carbonic initially used the Site for the manufacture of liquid and solid carbon dioxide (dry ice). Gaseous carbon dioxide was generated through the combustion of natural gas. Various processes were employed to collect and purify the carbon dioxide gas and compressors were utilized to create liquid carbon dioxide and dry ice.

In the early 1970s, an alternate local source of gaseous carbon dioxide made its onsite generation no longer economical. The carbon dioxide gas generating equipment was removed from the Site. The facility was converted to produce acetylene gas, which was generated at the Site until early 2002. The production of acetylene gas resulted in the generation of lime (calcium hydroxide) as a coproduct. The available information indicates that the lime slurry generated at the Site was accumulated in onsite holding tanks and belowgrade sumps until the lime slurry

was removed by a third party for reuse. Other activities at the Site included packaging and distribution of industrial gases such as carbon dioxide, nitrogen, oxygen and argon.

1.3 Previous Subsurface Investigations and Remediation

Four underground storage tanks (USTs), including two diesel USTs, one gasoline UST and one acetone UST were removed from the Site during 1989 and 1990. Diesel- and gasoline-contaminated soils were encountered at the diesel dispenser and gasoline tank excavations, respectively. No acetone-contaminated soils were encountered at the former acetone tank. Groundwater samples collected from the excavation beneath the gasoline tank indicated the presence of hydrocarbons in water. After installation and monitoring of three groundwater monitoring wells in 1995 and 1996 at the Site, the Alameda County Department of Environmental Health allowed the groundwater monitoring to be discontinued and the wells were decommissioned by pressure grouting (Golden Gate Tank Removal 1997).

Data from these monitoring wells indicate that the total dissolved solids concentrations in groundwater at the Site exceed 3,000 mg/l, and thus groundwater at the Site is not considered suitable by the state of California for domestic or municipal water supply purposes.

Based upon visual observations of Alliance's operations at the Site in 2000, and in response to requests from the Port and the County, Praxair agreed to perform additional subsurface investigation activities at the Site. The proposed activities were described in the Subsurface Characterization Work Plan (Kennedy/Jenks 2001a) which was approved by the County, subject to several conditions, in a letter to Praxair dated 11 April 2001 (ACHCSA 2001).

Soil and reconnaissance groundwater sampling activities were performed at the Site in May 2001, and the analytical results and findings were submitted to the County in the Subsurface Characterization Report (Kennedy/Jenks 2001b). The May 2001 sampling locations are shown on Figure 2. On the basis of the available information regarding historical production activities at the Site, and data from the May 2001 sampling activities, semi-volatile organic compounds and polychlorinated biphenyls are not considered chemicals of interest at the Site. Metals are chemicals of interest in soils at two locations of the Site: elevated concentrations of metals were detected in the shallow soil sample collected from Boring KB-7 and elevated concentrations of mercury were found in shallow soil samples collected in the vicinity of Boring KB-11. Total extractable petroleum hydrocarbons (TEPH) is a chemical of interest in groundwater in the vicinity of Boring KB-13, TEPH may also be a chemical of interest in soils at several locations at the Site.

A response to the Subsurface Characterization Report has not been received from the County. Because Praxair intends to address certain environmental issues prior to returning the Site to the Port, remediation activities and additional investigation activities are proposed in specific locations of the Site based upon the recommendations included in the Subsurface Characterization Report.

1.4 Current Status

Alliance Gas Products removed its operations from the Site in early 2002. Some process equipment, including several aboveground bulk liquid storage tanks, four aboveground

lime/water decant tanks, the acetylene generation equipment, a small cooling tower and cylinder filling piping, remained at the Site. In June 2002, Praxair removed remaining process equipment and piping from the Site. The buildings and basic utility lines (water, electrical, gas) currently remain at the Site.

The Port and Praxair are currently negotiating the termination of Praxair's lease of the Site. Although specific plans for redevelopment have not been prepared, the Port has indicated that the Site and surrounding parcels are slated for redevelopment with future uses including residential and commercial.

1.5 Soil Remediation Objectives

The Port leased the Site to Liquid Carbonic for industrial use. As successor to Liquid Carbonic, Praxair intends to remediate soil in certain portions of the Site to levels consistent with industrial use of the Site.

Analytical results from confirmation samples will be compared with background levels (for metals) and with Risk Based Screening Levels (RBSLs) for industrial/commercial land use issued by the San Francisco Bay Regional Water Quality Control Board (RWQCB 2001) and the City of Oakland (City of Oakland 2000). Background concentrations for metals are set forth in the City of Oakland Survey of Background Metal Concentration Studies. Site-specific assessment of background metals concentrations can also be made based upon the 16 shallow soil samples collected from the Site and analyzed for metals in May 2001.

This Work Plan addresses concerns in locations exterior to the buildings. Praxair and the Port are conducting negotiations regarding disposition of the buildings and associated underground utilities. Once these negotiations are concluded, the approach for evaluating soils beneath the buildings can be identified.

Section 2: Activities Performed Since May 2001

Subsequent to the collection of soil and reconnaissance groundwater samples from several locations at the Site in May 2001, Praxair has performed some additional activities that are relevant to remediation of the Site. These activities are summarized below.

2.1 Sediment Removal from Storm Drain Drop Inlets

At the request of the Port, and in response to the analytical results from sediment sample SS-1 collected from the bottom of storm drain drop inlet #1, Foss Environmental (Foss) was retained to flush sediment from the drop inlets and from the drain lines. After evaluation of the drain lines, Foss concluded that four of the drop inlets in the center portion of the Site are individually connected to a single storm water discharge line. This storm water discharge line is believed to be the cooling water discharge line installed in the 1950s. The end of this discharge line is visible to the east of the railroad trestle extending along the rip-rap shoreline south of the Site. There was no manhole to provide access to the discharge line between the Site and the shoreline, and the discharge line was leaking water where it was exposed in the rip-rap embankment upstream of the end of the line. Because there was no means of preventing the discharge of flushing water to the estuary, Foss did not flush sediment down the discharge line. Instead, Foss removed sediment that was present in each of the four drop inlets, and that could be accessed within the pipeline in the vicinity of the drop inlets. The sediment was removed by jetting with high-pressure water, shoveling and vacuuming. The cleaning of the storm drain drop inlets was performed in December 2001.

The sludge and materials used in decontamination were placed in six 55-gallon drums, and approximately 1500 gallons of wastewater was accumulated in a Baker tank. The drums were transported to Crosby & Overton for management as hazardous waste, and the liquid was removed by a vacuum truck and transported to Seaport Environmental in Redwood City for management as non-hazardous waste.

2.2 Equipment Removal

During June 2002, Praxair removed gas production and processing equipment that remained at the Site following the departure of Alliance Gas. The production equipment removed from the Site by Praxair included:

- Aboveground bulk liquid (nitrogen, carbon dioxide, argon and oxygen) storage tanks and associated piping and packaging systems.
- Acetylene generation, purification and cylinder filling equipment.
- Paint booth and associated storage sheds.
- Four aboveground tanks used to decant lime and water.
- Cooling tower located immediately west of Building 1.
- Gas cylinder filling racks and equipment.
- Compressors.

In addition, Praxair removed the aboveground portion of the former maintenance shed in the eastern side of the Site and the hydraulic lift (dock elevator) beneath the loading dock on the east side of Building 1.

2.3 Cleaning

During removal of the gas packaging equipment and lime management systems in June 2002, Praxair cleaned various items that remain at the Site including:

- The walls and floor of the acetylene generator room.
- Three below ground sumps most recently used for the accumulation of cooling water and lime.
- Floors and hydrostatic test pits within Building 1.
- Trench drains within Building 1 and Building 2.

The cleaning of concrete surfaces and removal of process equipment is described in more detail in the *Report on Hazardous Materials Closure Activities* (Kennedy/Jenks 2002). Do we have?

2.4 Additional Soil Sampling

The concentration of mercury detected in the surface soil sample collected from Boring KB-11 exceeded the RBSL identified by the San Francisco Bay Regional Water Quality Control Board for residential land use. The RBSL for residential land use scenarios is 4.7 mg/kg of mercury and for industrial/commercial land use scenarios is 10 mg/kg (RWQCB 2001). The City of Oakland Tier 1 RBSLs for surficial soil are 4.7 mg/kg and 30 mg/kg for residential and commercial/industrial land uses, respectively (City of Oakland 2000). The concentration of mercury in the surface soil sample from Boring KB-11 was also elevated relative to mercury concentrations detected in other soil samples collected from the Site.

Kennedy/Jenks collected additional shallow soil samples during a site visit associated with Praxair's process closure activities. Soil samples were collected with the objective of further characterizing the lateral and vertical extent of elevated levels of mercury in soil in the vicinity of Boring KB-11 where mercury had previously been detected at a concentration of 5.6 mg/kg in a shallow soil sample collected from a depth interval less than 6 inches below ground surface (bgs).

A total of seven additional samples were collected from four locations in June 2002 and submitted to STL San Francisco for analysis of total mercury. Soil samples were collected at a maximum depth of 1.5 feet bgs. The analytical results are summarized in Table 1. The sample locations and analytical results are shown on Figure 3. Analytical data reports for these additional soil samples are included in Appendix A.

As shown in Figure 3, the samples were collected from an area of packed dirt that is bounded to the east and south by concrete pavement. None of the mercury concentrations detected in these soil samples exceed the RBSL for commercial/industrial land use.

Section 3: Proposed Soil Remediation Activities

3.1 Soil Excavation Areas

On the basis of the analytical results from soil samples collected in May 2001 and June 2002, Praxair proposes to remediate shallow soil in three areas of the Site by excavating chemically-impacted soil. The excavated soil will be replaced with clean import fill material.

3.1.1 Vicinity of Boring KB-7

Boring KB-7 was advanced in May 2001 near the south wall of Building 2, outside of the former acetylene generator room. The soil sample collected from the upper six inches of soil contained elevated concentrations of several metals and also contained 2,500 mg/kg of total petroleum hydrocarbons (TPH). However, the soil sample collected from a depth interval of 3 to 3.5 feet bgs in the same boring contained less than 1 mg/kg of TPH and the metals concentrations were significantly lower than those in the more shallow sample.

At this time, it is anticipated that an area measuring approximately 20 feet by 20 feet will be excavated to a depth of approximately 2 feet bgs in the vicinity of Boring KB-7. The proposed excavation area is shown on Figure 4.

One confirmation sample will be obtained from each of the four sides and from two locations in the floor of the excavation. The confirmation samples will be submitted for analysis of metals using EPA Method 6010, TPH using EPA Method 8015 modified and pH using EPA Method 9045. If concentrations of metals and TPH in the confirmation samples are less than RBSLs or estimated background metals concentrations, the excavated area will be backfilled with clean import fill and compacted.

3.1.2 Vicinity of Boring KB-13A

Borings KB-13 and KB-13A were advanced near the former dust bin and paint storage area immediately north of Building 1. At the time that Boring KB-13 was advanced, access to areas immediately adjacent to the north wall of Building 1 was restricted by storage sheds, equipment and overhead piping systems. Therefore, soil and groundwater samples were collected from Boring KB-13 and a surface soil sample was collected from Boring KB-13A.

At this time it is anticipated that surface soil within an area measuring approximately 20 feet by 10 feet will be excavated to a depth of approximately 6 inches bgs in the vicinity of Boring KB-13A. The proposed excavation area is shown on Figure 4. The excavation will be performed to address shallow soils in an area between the building and adjacent concrete-paved areas. The concrete surfaces in this area will not be removed during the soil excavation.

In this area, shallow soils will be removed as a precaution to remove chemical residues that may be present in surface soils associated with the dust collection activities performed in this area by Alliance Gas. Post-excavation confirmation soil samples will be collected from several locations in this area.

Additional shallow soil samples may be collected and analyzed for TEPH and/or metals prior to the start of excavation activities in order to better characterize the area to be excavated.

3.1.3 Vicinity of Boring KB-11

Concentrations of mercury in shallow soils in the vicinity of Boring KB-11 do not exceed RBSLs for commercial/industrial land use, However, because some of the mercury concentrations appear elevated relative to Site-specific background concentrations, and because mercury was present at low concentrations in the "monkey dust" used in the nearby acetylene purification process, Praxair proposes to remove surface soils in this area. Praxair intends to excavate shallow soil containing mercury from an area measuring as much as 45 feet long and 20 feet wide. Soil will be excavated to a maximum depth of approximately 2 feet bgs.

One confirmation sample will be collected from each of the four sides and from two locations in the floor of the excavation. The confirmation samples will be submitted for analysis of mercury using EPA Method 7471. If mercury concentrations in the confirmation samples are less than residential RBSLs, the excavated area will be backfilled with clean import fill material. The soil samples will also be analyzed for pH using EPA Method 9045.

Additional shallow soil samples may be collected and analyzed for mercury prior to the start of excavation activities in order to better delineate the area to be excavated.

3.2 Collection and Analysis of Confirmation Samples

The anticipated confirmation samples and analytical methods are presented in Table 2. Soil samples will be collected in accordance with the procedures set forth in Appendix B.

At this time, it is anticipated that the samples will be submitted to STL San Francisco in Pleasanton, California. STL San Francisco is a state-certified analytical laboratory. Following collection, samples will be preserved in the containers prepared and provided by the analytical laboratory. The samples will be labeled and placed in a chilled container. The samples will be submitted in the chilled container to the analytical laboratory under chain-of-custody procedures. It is anticipated that the analytical laboratory will observe its customary internal QA/QC procedures during analysis of the samples.

Samples will be analyzed for acetone using EPA Method 8260. Samples will be analyzed for total extractable petroleum hydrocarbons using a silica gel cleanup and EPA Method 8015 modified. CAM 17 metals will be analyzed using EPA Series 6000 Methods, with mercury analyzed using EPA Method 7471.

3.3 Excavation Backfill

Excavated areas will be backfilled with clean import fill. As described above, the maximum planned excavation depth is 2 feet. If an excavation is deepened and groundwater is encountered within the excavation, clean crushed rock will be placed in the excavation to a depth above the water table. A geotextile filter fabric will then be placed on top of the crushed rock and import fill will be placed above the filter fabric.

3.4 Residuals Management

Soil from each of the three excavated areas will be placed in separate stockpiles. The excavated soil will be stockpiled on concrete or asphalt pavement and covered with plastic sheeting. A 4-point composite sample will be collected from each stockpile and submitted for analysis of chemicals of interest in the respective location. Depending upon the analytical results from the composite samples, the soil stockpiles will be disposed of at an appropriately permitted offsite landfill.

However, removal and backfilling of the fours sumps will be most cost-effectively performed during removal of the building foundations and concrete aprons. At this time, the schedule for these activities has not been determined. The sumps are currently covered with chain-link fence panels placed horizontally to reduce trip and fall hazards. In addition, to reduce the entrance of rainwater into the sumps, Praxair has secured plastic sheeting to the fence panels.

3.5 Field Preparation

Praxair will retain a qualified environmental remediation contractor to perform the soil excavation activities. On behalf of Praxair, Kennedy/Jenks will provide oversight and collect confirmation samples during the soil excavation activities.

Both the environmental remediation contractor selected by Praxair and Kennedy/Jenks will prepare Health and Safety Plans to address their respective activities at the Site.

Prior to performing subsurface excavation and sampling activities, a search for underground utilities and other subsurface obstructions will be performed by a private utility location subcontractor. Underground Service Alert will also be notified prior to initiating subsurface excavation or sampling activities.

Section 4: Associated Field Activities

4.1 Removal of Lead-Based Paint from Building 1 Foundation Walls

The exterior of the concrete foundation walls of Building 1 are painted blue. In some areas of the foundation walls, the paint is loose and peeling. Two samples of the peeling blue paint were collected and analyzed for lead in May 2002. The samples contained 1,100 and 2,000 mg/kg of lead, respectively.

At this time, Praxair intends to have the loose paint removed. Paint that is firmly affixed to the concrete surface will not be removed. The removed paint will be collected, placed in a container and properly disposed of at an offsite facility.

4.2 Sealing of Floor Drains

To prevent any future inadvertent discharge to the drain systems, floor drains inside Buildings 1 and 2 will be sealed with concrete where the drain line penetrates the concrete floor. Similarly, openings in the scale pits will be sealed or plugged to prevent inadvertent release to the subsurface soils.

4.3 Exterior Sumps

There are four belowground concrete sumps at the Site. Two sumps located north of Building 2 were used for management of lime and water. A smaller sump located outside the north wall of Building 2 was used to collect cylinder cooling water from Building 2. Although Praxair removed the cooling tower structure in June 2002, the cooling water reservoir sump remains to the west of Building 1. It is anticipated that all four sumps will be demolished and backfilled prior to the site redevelopment.

Section 5: Proposed Additional Characterization

In additional to the soil excavation activities described in the preceding section, Praxair intends to collect additional samples in several areas of the Site. These areas include:

- Adjacent to the former hydraulic elevator/lift
- Adjacent to the cooling tower
- Former acetone drum storage area
- Vicinity of Boring KB-13

These proposed additional samples are summarized in Table 2. Additional information on the rationale and analytical methods for each of the locations is presented below. The general procedures for collection of soil and reconnaissance groundwater samples are presented in Appendix C.

5.1 Hydraulic Lift in Eastern Loading Dock of Building 1

Soil Boring KB-4 was advanced approximately 3 feet east of the loading dock in May 2001. The surface soil sample collected from Boring KB-4 contained 25 mg/kg of TEPH, and the soil sample collected from 3.5 feet bgs in this boring did not contain TEPH at concentrations exceeding analytical reporting limits. In June 2002, Praxair removed the lift cylinder and the hydraulic fluid it contained. The lift cylinder was found to be encased in concrete, with additional concrete below the lift cylinder, and there was no visual evidence of a hydraulic fluid release either to the concrete or to the surrounding soils. The bottom of the cylinder was approximately 5 feet bgs. Confirmation soil samples were not collected during removal of the lift cylinder.

As noted previously, the hydraulic lift has been removed, and there is no current usage of the loading dock. Soil samples are proposed for collection in two locations near the former hydraulic dock lift in the eastern loading dock of Building 1. Borings will be advanced at locations as close as possible to the location of the former lift with the intent of collecting soil samples from a depth of at least 5 feet bgs. The soil samples will be analyzed for TEPH using EPA Method 8015 modified, with a silica gel cleanup step.

If groundwater is encountered in the soil borings, reconnaissance groundwater samples will be collected from each boring and analyzed for TEPH using EPA Method 8015 and a silica gel cleanup step.

5.2 Former Oil/Water Separator and Cooling Tower

Site construction drawings from the 1950s refer to an oil/water separator exterior to the west wall of Building 1. However, the location of the oil/water separator is not shown on the drawings. Installation of an oil/water separator would have been consistent with activities and processes associated with the production and packaging of liquid and solid carbon dioxide. However, following removal of the dry ice production operations, an oil/water separator would not have been necessary.

At this time, there is no indication of an oil/water separator in the concrete-paved area between Building 1 and Building 2. The cooling tower reservoir is unusually deep (the floor of the reservoir is 5 feet bgs), and the tower itself was supported by steel beams that spanned the reservoir. After assessing possible locations for an oil/water separator and considering the configuration of the cooling tower recently removed from exterior to the west wall of Building 1, the conclusion of Praxair personnel familiar with this type of facility operation is that the oil/water separator was converted for use as the cooling tower reservoir.

Based upon this hypothesis, soil borings will be advanced adjacent to the north and south sides of the cooling tower reservoir and soil samples will be collected to assess the potential presence of TEPH in soil. Soil samples will be collected at depth of approximately 5 feet bgs in each of the two borings. The samples will be submitted for analysis of TEPH using EPA Method 8015 modified, with a silica gel cleanup step. If groundwater is encountered in either of the soil borings, a reconnaissance groundwater sample will be collected and analyzed for TEPH.

5.3 Former Acetone Drum Storage Area

While Alliance Gas was operating at the Site, 55-gallon drums of acetone were stored north of Building 2 in secondary containment system outside of a storage shed. The acetone was added to the acetylene cylinders to absorb the acetylene gas. Alliance Gas removed the acetone drums from the Site, and Praxair removed the storage shed. To assess the potential release of acetone to surface soils, two shallow soil borings are proposed in the area of the former containment system. It is anticipated that two soil samples will be collected from each boring at depths of 6 inches and approximately 3 feet bgs. The samples will be submitted for analysis of acetone using EPA Method 8260.

5.4 Vicinity of Boring KB-13

Boring KB-13, located an estimated 20 feet north of the north wall of Building 1, was advanced to groundwater in May 2001. The initial intent was to sample groundwater in the immediate vicinity of the paint storage and dust bin areas located adjacent to the north wall of Building 1. However, access to the north wall of Building 1 was limited in May 2001, and the drill rig (needed to advance the boring to groundwater) was set up at the location of Boring KB-13. The groundwater sample collected from Boring KB-13 in May 2001 contained 6,200 mg/l of TPH as diesel (TPHd).

At this time, additional sampling of groundwater in the vicinity of Boring KB-13 is proposed to characterize the extent of groundwater impacted by TPHd. Six borings will be advanced to allow the collection of reconnaissance groundwater samples. The borings will be advanced at six locations in the vicinity of Boring KB-13 and the north wall of Building 1. Reconnaissance groundwater samples will be collected and submitted for analysis of TEPH using a silica gel cleanup step and EPA Method 8015. Groundwater samples from two of these locations will also be collected and analyzed for dissolved metals.

5.5 Reconnaissance Groundwater Sampling

During the subsurface characterization activities in May 2001, reconnaissance groundwater samples were collected from 11 locations at the Site. Groundwater samples from four locations were analyzed for total metals. In order to address potential concerns regarding concentrations of dissolved metals, Praxair proposes to advance three borings to allow the collection of additional reconnaissance groundwater samples. The samples will be filtered in the field and submitted for analysis of dissolved metals.

As shown on Figure 5, the reconnaissance groundwater samples will be collected for analysis of dissolved metals from the vicinity of the previous Borings KB-10, KB-15 and KB-23.

5.6 Data Evaluation

Analytical results from the soil and groundwater samples will be evaluated and compared with RBSLs and background values. If analytical results in a specific area exceed RBSLs or background levels, Praxair will take appropriate action. Although difficult to specifically predict and plan in advance of obtain the data, these actions may include additional excavation or assessment of the risk associated with the residual concentrations.

Section 6: Report Preparation

Following completion of the excavation and soil sampling activities and evaluation of the resulting data, Kennedy/Jenks, on behalf of Praxair, will prepare and submit a report to the County and the Port. The report will include the following:

- Site map showing the locations of the excavated areas and soil samples.
- Description of the field activities.
- Summary tables of analytical results.
- Data evaluation.
- Summary of the findings.
- Laboratory analytical data reports and chain of custody forms.
- Documentation regarding residuals management.
- Recommendations for additional activities, as needed and appropriate.

References

Alameda County Health Care Services Agency 2001. Letter from Barney Chan to Nick DiFranco of Praxair, Inc. 11 April 2001.

Golden Gate Tank Removal 1997. Letter from Mr. John Carver PE to Ms. Cordelia Clark, Liquid Carbonic, Re: Completion of Well Abandonments dated 22 January 1997.

Kennedy/Jenks 2001a. *Subsurface Characterization Work Plan for 901 Embarcadero Road, Oakland, California*. 9 February 2001.

Kennedy/Jenks 2001b. *Subsurface Characterization at 901 Embarcadero, Oakland, California.* 15 October 2001.

Kennedy/Jenks 2002. *Report on Hazardous Materials Closure Activities, 901 Embarcadero, Oakland, California.* 17 September 2002.

City of Oakland 2000. Oakland Urban Land Redevelopment Program: Guidance Document. City of Oakland Public Works Agency. Oakland Urban Land Redevelopment Program, 1 January 2000.

City of Oakland. Survey of Background Metal Concentration Studies from www.oaklandpw.com/ulrprogram.

RWQCB 2001. Application of Risk-Based Screening Levels and Decision Making to Sites with Impacted Soil and Groundwater. California Regional Water Quality Control Board, San Francisco Bay Region. Interim Final – December 2001.

Tables

Table 1: Mercury Concentrations in Soil Samples Near Boring KB-11

Soil Sample Location	Sample Depth (ft bgs)[a]	Date Collected	Mercury Concentration (mg/kg)[b][c]
RBSL–Resid[d]			4.7
RBSL–Comm/Ind[d]			10
KB-11	0.0-0.5	05/18/01	5.6
KB-11A	1.0-1.5	06/06/02	0.37
KB-24	0.0-0.5	06/06/02	8.3
KB-24	1.0-1.5	06/06/02	0.11
KB-25	0.0-0.5	06/06/02	0.86
KB-25A	0.5	06/06/02	1.2
KB-26	0.0-0.5	06/06/02	2.8
KB-26	1.0-1.5	06/06/02	4.6

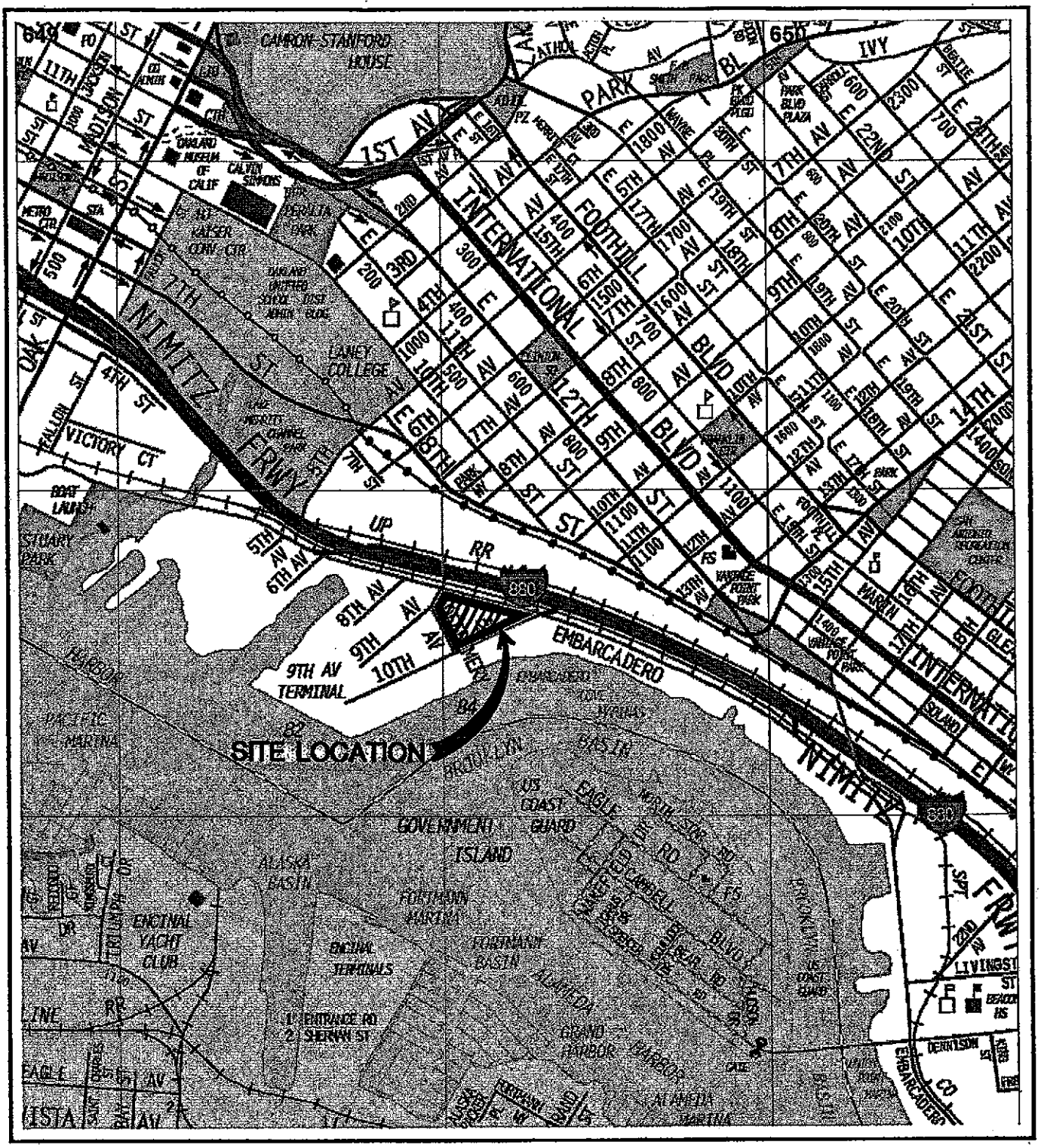
(a) ft bgs = Feet below ground surface
(b) mg/kg = Milligrams per kilogram
(c) Samples analyzed by STL San Francisco using EPA Method 7471A.
(d) RBSL = Risk Based Screening Levels for Surface Soil from Application of Risk-Based Screening Levels and Decision Making to Sites with Impacted Soil and Groundwater (RWQCB 2001). Groundwater IS NOT a current or potential source of drinking water. Values presented for residential and commercial/industrial land use scenarios.

Table 2: Sampling and Analysis Plan

Location	Purpose	Sampled Media	Expected Number[a]	TEPH[b]	Metals[c]	Mercury[d]	pH[e]	Acetone[f]
Vicinity of KB-7	Post-excavation confirmation	Soil	4 – sides 2 – floor	X	X		X	
Vicinity of KB-11	Post-excavation confirmation	Soil	4 – sides 2 – floor			X	X	
Vicinity of KB-13	Post-excavation confirmation	Soil	6	X	X			
Near Former Hydraulic Lift	Post-removal confirmation	Soil	2	X				
Cooling Tower Outside Building 1	Characterization	Soil	2	X				
Vicinity Former Acetone Drums	Characterization	Soil	4					X
Vicinity of KB-13	Additional characterization	Soil & Groundwater	6	X	2-X[g]			
Various	Additional characterization	Groundwater	3		X[g]			

(a) Actual number of samples may vary depending upon conditions encountered.
(b) Samples analyzed for total extractable petroleum hydrocarbons using silica gel cleanup and EPA Method 8015 modified.
(c) Samples analyzed for 17 CAM metals using EPA Method 6010.
(d) Samples analyzed for mercury using EPA Method 7471A.
(e) Samples analyzed for pH using EPA Method 9045.
(f) Samples analyzed for acetone using EPA Method 8260.
(g) Samples will be filtered prior to analysis for dissolved metals.

Figures



BASE MAP: THE THOMAS GUIDE DIGITAL EDITION, 1999 BAY AREA

N

0 500 1000

SCALE IN FEET

Kennedy/Jenks Consultants

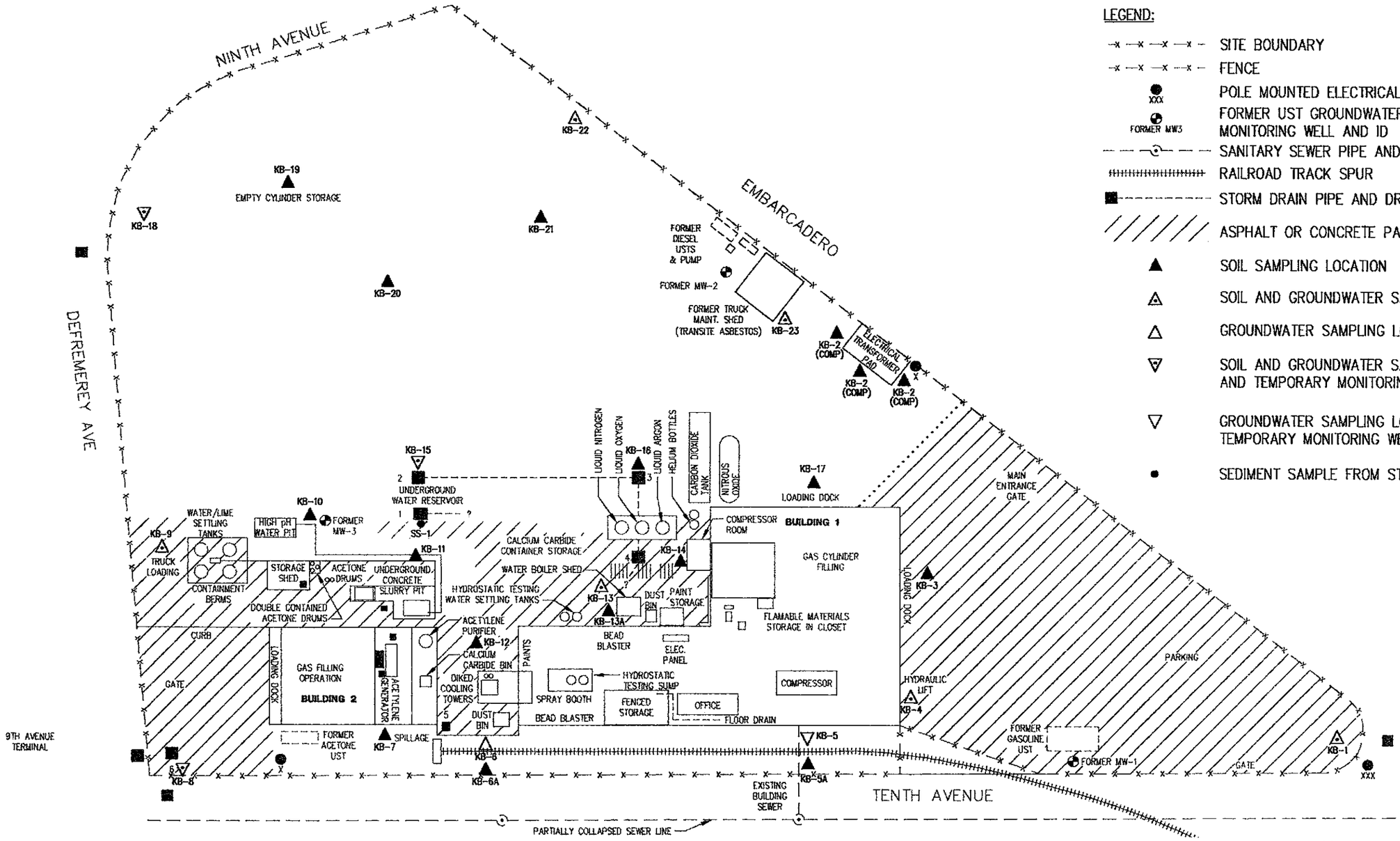
PRAXAIR, INC.
901 EMBARCADERO, OAKLAND, CALIFORNIA

SITE LOCATION MAP

K/J 000128.00
SEPTEMBER 2002

Figure 1

N:\2000.lab\000128.00\Sep02-f1.dwg



LEGEND:

- SITE BOUNDARY
- FENCE
- XXX — POLE MOUNTED ELECTRICAL TRANSFORMER(S)
- FORMER MW3 — FORMER UST GROUNDWATER MONITORING WELL AND ID
- SANITARY SEWER PIPE AND MAINTENANCE HOLE
- RAILROAD TRACK SPUR
- STORM DRAIN PIPE AND DROP INLET
- ASPHALT OR CONCRETE PAVED AREAS
- ▲ SOIL SAMPLING LOCATION
- ◬ SOIL AND GROUNDWATER SAMPLING LOCATION
- △ GROUNDWATER SAMPLING LOCATION
- ▽ SOIL AND GROUNDWATER SAMPLING LOCATION AND TEMPORARY MONITORING WELL
- ▽ GROUNDWATER SAMPLING LOCATION AND TEMPORARY MONITORING WELL
- ● SEDIMENT SAMPLE FROM STORM DRAIN

N

NOT TO SCALE

Kennedy/Jenks Consultants

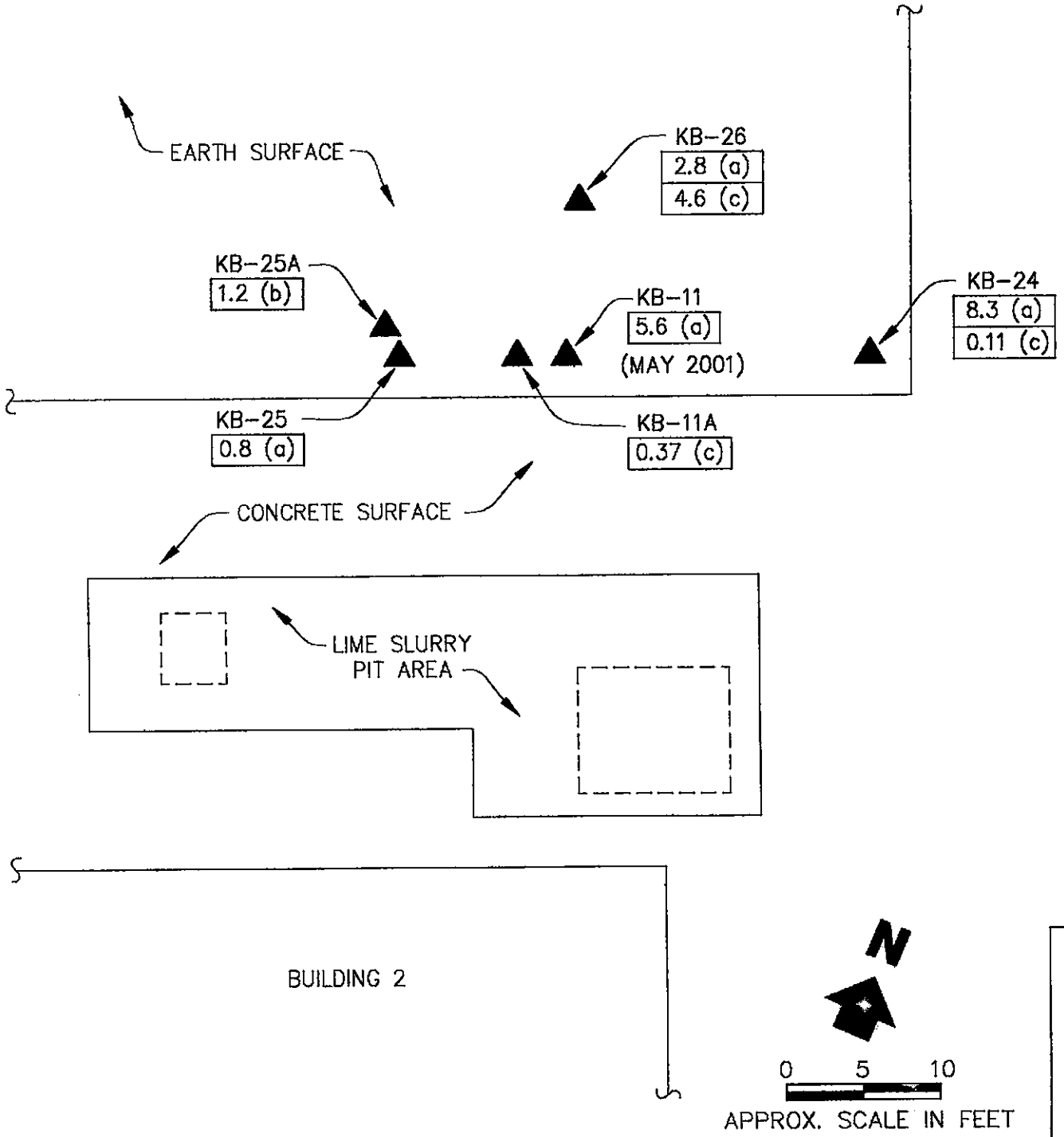
PRAXAIR, INC.
901 EMBARCADERO, OAKLAND, CALIFORNIA

SOIL AND GROUNDWATER SAMPLING LOCATIONS (MAY 2001)

K/J 000128.00
SEPTEMBER 2002

Figure 2

N:\2000.ieb\000128.00\Sep02-f2.dwg



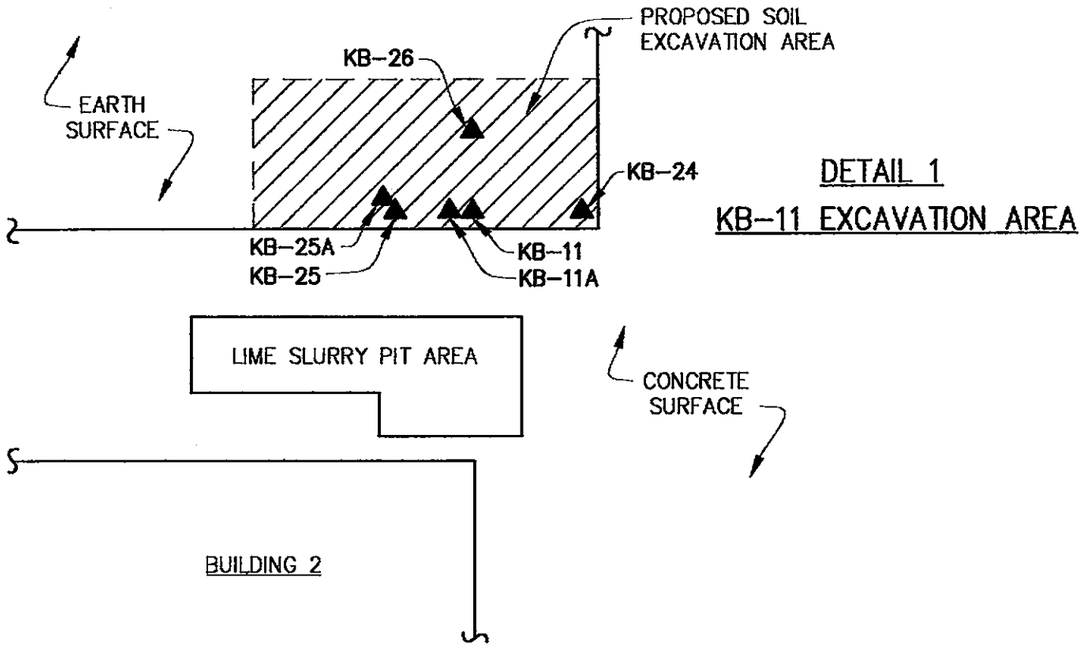
LEGEND

▲ KB-26	SOIL SAMPLE LOCATION
8.3	MERCURY CONCENTRATION IN mg/kg
(a)	SURFACE SAMPLE
(b)	0.5 FEET BELOW GROUND SURFACE
(c)	1-1.5 FEET BELOW GROUND SURFACE

Kennedy/Jenks Consultants

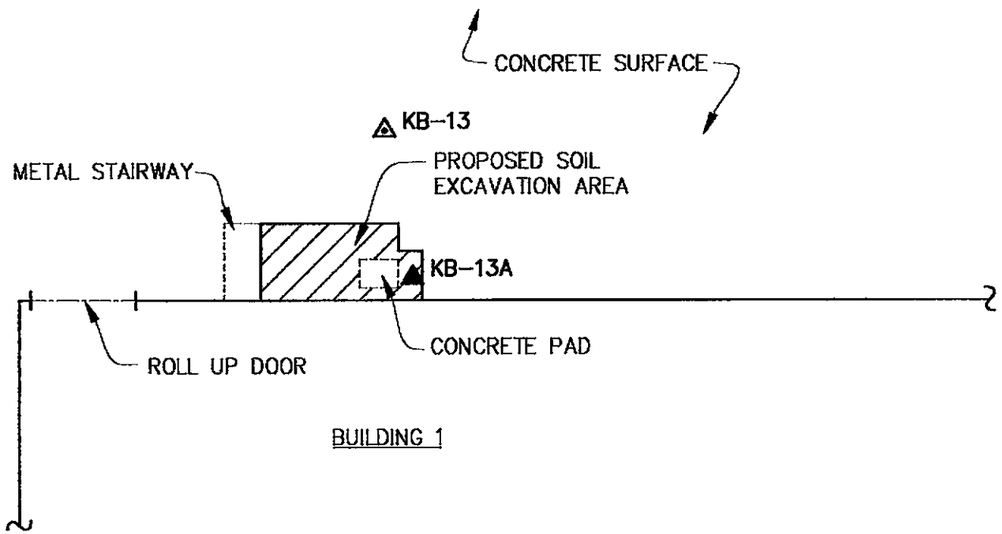
PRAXAIR, INC.
901 EMBARCADERO, OAKLAND, CALIFORNIA
LOCATIONS OF SOIL SAMPLES IN VICINITY OF KB-11 (JUNE 2002)
K/J 000128.00
SEPTEMBER 2002
Figure 3

N:\2000.isb\000128.00\Sep02F3.dwg 8-27-02 10:28:55 AM RoyceO



DETAIL 1

KB-11 EXCAVATION AREA

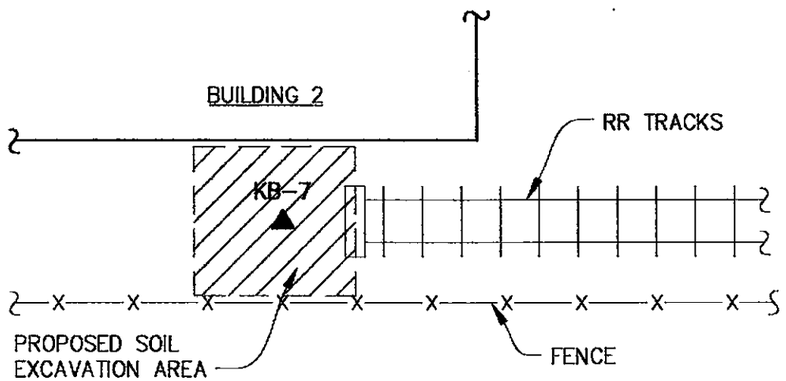


DETAIL 2

KB-13A EXCAVATION AREA

DETAIL 3

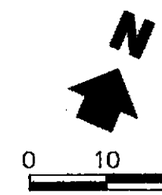
KB-7 EXCAVATION AREA



LEGEND

KB-26 ▲ SOIL BORING

PROPOSED EXCAVATION AREA



APPROX. SCALE IN FEET

SCALE OF EACH DETAIL AREA

Kennedy/Jenks Consultants

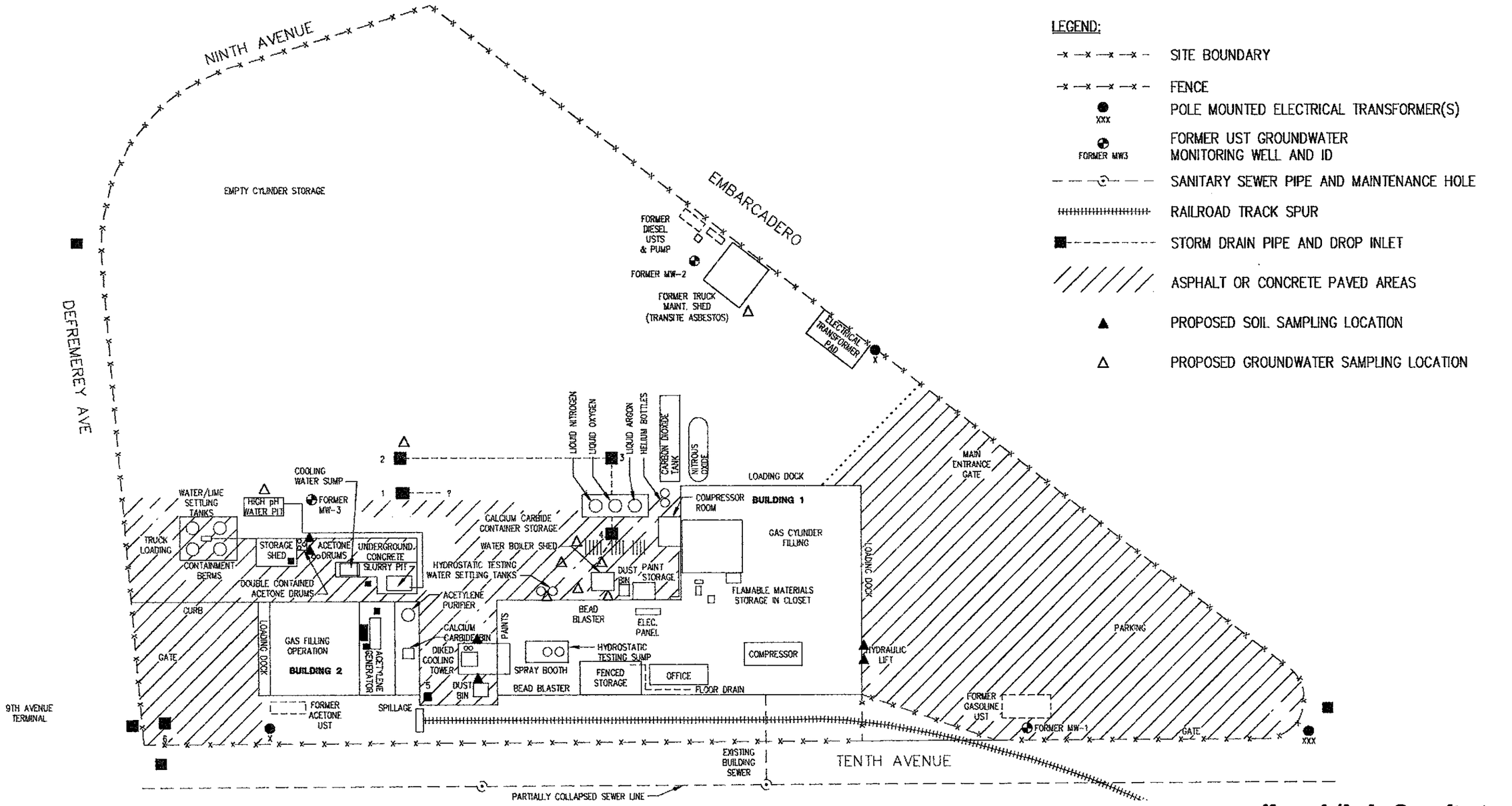
PRAXAIR, INC.
901 EMBARCADERO, OAKLAND, CALIFORNIA

PROPOSED SOIL EXCAVATION AREAS

K/J 000128.00
SEPTEMBER 2002

Figure 4

I:\2000.lab\000128.00\Sep02F4.dwg 8-27-02 04:03:09 PM RoyceO



LEGEND:

- SITE BOUNDARY
- FENCE
- POLE MOUNTED ELECTRICAL TRANSFORMER(S) (XXX)
- FORMER UST GROUNDWATER MONITORING WELL AND ID (FORMER MW3)
- SANITARY SEWER PIPE AND MAINTENANCE HOLE
- RAILROAD TRACK SPUR
- STORM DRAIN PIPE AND DROP INLET
- ASPHALT OR CONCRETE PAVED AREAS
- ▲ PROPOSED SOIL SAMPLING LOCATION
- △ PROPOSED GROUNDWATER SAMPLING LOCATION

N

NOT TO SCALE

Kennedy/Jenks Consultants

PRAXAIR, INC.
901 EMBARCADERO, OAKLAND, CALIFORNIA

PROPOSED SAMPLING LOCATIONS

K/J 000128.00
SEPTEMBER 2002

Figure 5

N:\2000.ieb\000128.00\Sep02F5.dwg

Appendix A

Analytical Data Report and Chain of Custody Form –
June 2002 Soil Samples

Submission #: 2002-06-0095

Date: June 13, 2002

SEVERN TRENT SERVICES

STL San Francisco
1220 Quarry Lane
Pleasanton, CA 94566

Tel 925 484 1919
Fax 925 484 1096
www.stl-inc.com
www.chromalab.com
CA DHS ELAP#2496

Kennedy/Jenks-San Francisco
622 Folsom Street
San Francisco, CA 94107-1366

Attn: Ms. Meredith Durant

RECEIVED
JUN 24 2002
KENNEDY/JENKS CONSULTANTS

Dear Meredith,

Attached is our report for your samples received on Thursday June 6, 2002
This report has been reviewed and approved for release. Reproduction of this report is permitted only in its entirety.

Please note that any unused portion of the samples will be discarded after July 21, 2002 unless you have requested otherwise.
We appreciate the opportunity to be of service to you. If you have any questions, please call me at (925) 484-1919.
You can also contact me via email. My email address is: ssidhu@chromalab.com

Sincerely,

Surinder Sidhu

Surinder Sidhu
Project Manager

Submission #: 2002-06-0095

SEVERN TRENT SERVICES

Dissolved CAM 17 Metals

STL San Francisco
1220 Quarry Lane
Pleasanton, CA 94566

Tel 925 484 1919
Fax 925 484 1096
www.stl-inc.com
www.chromalab.com

CA DHS ELAP#2496

Kennedy/Jenks-San Francisco	✉ 622 Folsom Street San Francisco, CA 94107-1366
Attn: Meredith Durant	Phone: (415) 243-2534 Fax: (415) 896-0999
000128.00	Project:

Samples Reported

Sample ID	Matrix	Date Sampled	Lab #
COOLING TOWER WATER	Water	06/06/2002 08:30	1

Submission #: 2002-06-0095

SEVERN TRENT SERVICES

Dissolved CAM 17 Metals

Kennedy/Jenks-San Francisco

Attn: Meredith Durant

Test Method: 6010B
7470A

Prep Method: 3005A
7470A

STL San Francisco
1220 Quarry Lane
Pleasanton, CA 94566

Tel 925 484 1919
Fax 925 484 1096
www.stl-inc.com
www.chromalab.com

CA DHS ELAP#2496

Sample ID:	**COOLING TOWER WATER**	Lab Sample ID:	2002-06-0095-001
Project:	000128.00	Received:	06/06/2002 17:25
		Extracted:	06/07/2002 04:54
Sampled:	06/06/2002 08:30	QC-Batch:	2002/06/07-01.16 2002/06/07-01.15
Matrix:	Water		

Compound	Result	Rep.Limit	Units	Dilution	Analyzed	Flag
Antimony	0.033	0.0050	mg/L	1.00	06/07/2002 13:44	
Arsenic	0.032	0.0050	mg/L	1.00	06/07/2002 13:44	
Barium	0.15	0.0050	mg/L	1.00	06/07/2002 13:44	
Beryllium	ND	0.0050	mg/L	1.00	06/07/2002 13:44	
Cadmium	0.18	0.0020	mg/L	1.00	06/07/2002 13:44	
Chromium	0.84	0.0050	mg/L	1.00	06/07/2002 13:44	
Cobalt	0.059	0.0050	mg/L	1.00	06/07/2002 13:44	
Copper	1.6	0.0050	mg/L	1.00	06/07/2002 13:44	
Lead	0.042	0.0050	mg/L	1.00	06/07/2002 13:44	
Molybdenum	1.0	0.0050	mg/L	1.00	06/07/2002 13:44	
Nickel	0.47	0.0050	mg/L	1.00	06/07/2002 13:44	
Selenium	0.011	0.0050	mg/L	1.00	06/07/2002 13:44	
Silver	ND	0.0050	mg/L	1.00	06/07/2002 13:44	
Thallium	ND	0.0050	mg/L	1.00	06/07/2002 13:44	
Vanadium	0.0080	0.0050	mg/L	1.00	06/07/2002 13:44	
Zinc	33	0.010	mg/L	1.00	06/07/2002 13:44	
Mercury	ND	0.00020	mg/L	1.00	06/07/2002 13:23	

Submission #: 2002-06-0095

SEVERN TRENT SERVICES

STL San Francisco
1220 Quarry Lane
Pleasanton, CA 94566

Tel 925 484 1919
Fax 925 484 1096
www.stl-inc.com
www.chromalab.com

CA DHS ELAP#2496

Dissolved CAM 17 Metals

Batch QC report

Test Method: 7470A Prep Method: 7470A

Method Blank	**Water**	**QC Batch # 2002/06/07-01.16**
MB: 2002/06/07-01.16-011		Date Extracted: 06/07/2002 08:54

Compound	Result	Rep.Limit	Unit	Analyzed	Flag
Mercury	ND	0.0002	mg/L	06/07/2002 13:13	

Submission #: 2002-06-0095

SEVERN TRENT SERVICES

STL San Francisco
1220 Quarry Lane
Pleasanton, CA 94566

Tel 925 484 1919
Fax 925 484 1096
www.stl-inc.com
www.chromalab.com

CA DHS ELAP#2496

Dissolved CAM 17 Metals

Batch QC report

Test Method: 6010B Prep Method: 3005A

Method Blank **Water** **QC Batch # 2002/06/07-01.15**

MB: 2002/06/07-01.15-011 Date Extracted: 06/07/2002 04:54

Compound	Result	Rep.Limit	Unit	Analyzed	Flag
Antimony	ND	0.0050	mg/L	06/07/2002 07:33	
Arsenic	ND	0.0050	mg/L	06/07/2002 07:33	
Barium	ND	0.0050	mg/L	06/07/2002 07:33	
Beryllium	ND	0.0050	mg/L	06/07/2002 07:33	
Cadmium	ND	0.0020	mg/L	06/07/2002 07:33	
Chromium	ND	0.0050	mg/L	06/07/2002 07:33	
Cobalt	ND	0.0050	mg/L	06/07/2002 07:33	
Copper	ND	0.0050	mg/L	06/07/2002 07:33	
Lead	ND	0.0050	mg/L	06/07/2002 07:33	
Molybdenum	ND	0.0050	mg/L	06/07/2002 07:33	
Nickel	ND	0.0050	mg/L	06/07/2002 07:33	
Selenium	ND	0.0050	mg/L	06/07/2002 07:33	
Silver	ND	0.0050	mg/L	06/07/2002 07:33	
Thallium	ND	0.0050	mg/L	06/07/2002 07:33	
Vanadium	ND	0.0050	mg/L	06/07/2002 07:33	
Zinc	ND	0.010	mg/L	06/07/2002 07:33	

Submission #: 2002-06-0095

SEVERN TRENT SERVICES

STL San Francisco
1220 Quarry Lane
Pleasanton, CA 94566

Tel 925 484 1919
Fax 925 484 1096
www.stl-inc.com
www.chromalab.com

CA DHS ELAP#2496

Dissolved CAM 17 Metals

Batch QC report

Test Method: 7470A Prep Method: 7470A

Laboratory Control Spike (LCS/LCSD) **Water** **QC Batch # 2002/06/07-01.16**

LCS: 2002/06/07-01.16-012 Extracted: 06/07/2002 08:54 Analyzed: 06/07/2002 13:14

LCSD: 2002/06/07-01.16-013 Extracted: 06/07/2002 08:54 Analyzed: 06/07/2002 13:15

Compound	Conc. [mg/L]		Exp.Conc. [mg/L]		Recovery		RPD	Ctrl.Limits [%]		Flags	
	LCS	LCSD	LCS	LCSD	LCS	LCSD	[%]	Recover	RPD	LCS	LCSD
Mercury	0.0223	0.0212	0.0200	0.0200	111.5	106.0	5.1	85-115	20		

Submission #: 2002-06-0095

SEVERN TRENT SERVICES

STL San Francisco
1220 Quarry Lane
Pleasanton, CA 94566

Tel 925 484 1919
Fax 925 484 1096
www.stl-inc.com
www.chromalab.com

CA DHS ELAP#2496

Dissolved CAM 17 Metals

Batch QC report

Test Method: 6010B Prep Method: 3005A

Laboratory Control Spike (LCS/LCSD) **Water** **QC Batch # 2002/06/07-01.15**

LCS: 2002/06/07-01.15-012 Extracted: 06/07/2002 04:54 Analyzed: 06/07/2002 07:37

LCSD: 2002/06/07-01.15-013 Extracted: 06/07/2002 04:54 Analyzed: 06/07/2002 07:41

Compound	Conc. [mg/L]		Exp.Conc. [mg/L]		Recovery		RPD	Ctrl.Limits [%]		Flags	
	LCS	LCSD	LCS	LCSD	LCS	LCSD	[%]	Recover	RPD	LCS	LCSD
Antimony	0.480	0.501	0.500	0.500	96.0	100.2	4.3	80-120	20		
Arsenic	0.426	0.446	0.500	0.500	85.2	89.2	4.6	80-120	20		
Barium	0.495	0.508	0.500	0.500	99.0	101.6	2.6	80-120	20		
Beryllium	0.498	0.512	0.500	0.500	99.6	102.4	2.8	80-120	20		
Cadmium	0.504	0.519	0.500	0.500	100.8	103.8	2.9	80-120	20		
Chromium	0.494	0.510	0.500	0.500	98.8	102.0	3.2	80-120	20		
Cobalt	0.488	0.501	0.500	0.500	97.6	100.2	2.6	80-120	20		
Copper	0.484	0.496	0.500	0.500	96.8	99.2	2.4	80-120	20		
Lead	0.493	0.518	0.500	0.500	98.6	103.6	4.9	80-120	20		
Molybdenum	0.489	0.506	0.500	0.500	97.8	101.2	3.4	80-120	20		
Nickel	0.491	0.505	0.500	0.500	98.2	101.0	2.8	80-120	20		
Selenium	0.482	0.506	0.500	0.500	96.4	101.2	4.9	80-120	20		
Silver	0.486	0.501	0.500	0.500	97.2	100.2	3.0	80-120	20		
Thallium	0.490	0.508	0.500	0.500	98.0	101.6	3.6	80-120	20		
Vanadium	0.501	0.516	0.500	0.500	100.2	103.2	2.9	80-120	20		
Zinc	0.511	0.527	0.500	0.500	102.2	105.4	3.1	80-120	20		

Submission #: 2002-06-0095

SEVERN TRENT SERVICES

Hexavalent Chromium

STL San Francisco
1220 Quarry Lane
Pleasanton, CA 94566

Tel 925 484 1919
Fax 925 484 1096
www.stl-inc.com
www.chromalab.com

CA DHS ELAP#2496

Kennedy/Jenks-San Francisco	✉ 622 Folsom Street San Francisco, CA 94107-1366
Attn: Meredith Durant	Phone: (415) 243-2534 Fax: (415) 896-0999
000128.00	Project:

Samples Reported

Sample ID	Matrix	Date Sampled	Lab #
COOLING TOWER WATER	Water	06/06/2002 08:30	1
COOLING TOWER-SLUDGE	Soil	06/06/2002 08:40	2
COOLING TOWER-FIN MAT`L	Solid	06/06/2002 08:45	3

Submission #: 2002-06-0095

SEVERN TRENT SERVICES

Hexavalent Chromium

Kennedy/Jenks-San Francisco
Attn: Meredith Durant

Test Method: 7196A
Prep Method: 7196A water
7196A soil

STL San Francisco
1220 Quarry Lane
Pleasanton, CA 94566

Tel 925 484 1919
Fax 925 484 1096
www.stl-inc.com
www.chromalab.com

CA DHS ELAP#2496

Sample ID:	**COOLING TOWER WATER**	Lab Sample ID:	2002-06-0095-001
Project:	000128.00	Received:	06/06/2002 17:25
		Extracted:	06/06/2002 19:00
Sampled:	06/06/2002 08:30	QC-Batch:	2002/06/06-02.31
Matrix:	Water		

Compound	Result	Rep.Limit	Units	Dilution	Analyzed	Flag
Chromium (Hexavalent)	0.010	0.010	mg/L	1.00	06/06/2002 19:00	

Submission #: 2002-06-0095

SEVERN TRENT SERVICES

Hexavalent Chromium

Kennedy/Jenks-San Francisco
Attn: Meredith Durant

Test Method: 7196A
Prep Method: 7196A water
7196A soil

STL San Francisco
1220 Quarry Lane
Pleasanton, CA 94566

Tel 925 484 1919
Fax 925 484 1096
www.stl-inc.com
www.chromalab.com

CA DHS ELAP#2496

Sample ID:	**COOLING TOWER-SLUDGE**	Lab Sample ID:	2002-06-0095-002
Project:	000128.00	Received:	06/06/2002 17:25
		Extracted:	06/07/2002 15:35
Sampled:	06/06/2002 08:40	QC-Batch:	2002/06/07-01.31
Matrix:	Soil		

Compound	Result	Rep.Limit	Units	Dilution	Analyzed	Flag
Chromium (Hexavalent)	ND	0.20	mg/Kg	1.00	06/07/2002 15:35	

Submission #: 2002-06-0095

SEVERN TRENT SERVICES

Hexavalent Chromium

Kennedy/Jenks-San Francisco
Attn: Meredith Durant

Test Method: 7196A
Prep Method: 7196A water
7196A soil

STL San Francisco
1220 Quarry Lane
Pleasanton, CA 94566

Tel 925 484 1919
Fax 925 484 1096
www.stl-inc.com
www.chromalab.com

CA DHS ELAP#2496

Sample ID:	**COOLING TOWER-FIN MAT`L**	Lab Sample ID:	2002-06-0095-003
Project:	000128.00	Received:	06/06/2002 17:25
		Extracted:	06/07/2002 15:35
Sampled:	06/06/2002 08:45	QC-Batch:	2002/06/07-01.31
Matrix:	Solid		

Compound	Result	Rep.Limit	Units	Dilution	Analyzed	Flag
Chromium (Hexavalent)	1.4	0.20	mg/Kg	1.00	06/07/2002 15:35	

Submission #: 2002-06-0095

SEVERN TRENT SERVICES

STL San Francisco
1220 Quarry Lane
Pleasanton, CA 94566

Tel 925 484 1919
Fax 925 484 1096
www.stl-inc.com
www.chromalab.com

CA DHS ELAP#2496

Hexavalent Chromium

Batch QC report

Test Method: 7196A

Prep Method: 7196A
water

Method Blank **Water** **QC Batch # 2002/06/06-02.31**

MB: 2002/06/06-02.31-001 Date Extracted: 06/06/2002 19:00

Compound	Result	Rep.Limit	Unit	Analyzed	Flag
Chromium (Hexavalent)	ND	0.01	mg/L	06/06/2002 19:00	

Submission #: 2002-06-0095

SEVERN TRENT SERVICES

STL San Francisco
1220 Quarry Lane
Pleasanton, CA 94566

Tel 925 484 1919
Fax 925 484 1096
www.stl-inc.com
www.chromalab.com

CA DHS ELAP#2496

Hexavalent Chromium

Batch QC report

Test Method: 7196A

Prep Method: 7196A soil

Method Blank	**Soil**	**QC Batch # 2002/06/07-01.31**
MB: 2002/06/07-01.31-001		Date Extracted: 06/07/2002 15:35

Compound	Result	Rep.Limit	Unit	Analyzed	Flag
Chromium (Hexavalent)	ND	0.2	mg/Kg	06/07/2002 15:35	

SEVERN TRENT SERVICES

STL San Francisco
1220 Quarry Lane
Pleasanton, CA 94566

Tel 925 484 1919
Fax 925 484 1096
www.stl-inc.com
www.chromalab.com

CA DHS ELAP#2496

Hexavalent Chromium

Batch QC report

Test Method: 7196A Prep Method: 7196A water

Laboratory Control Spike (LCS/LCSD) Water QC Batch # 2002/06/06-02.31

LCS: 2002/06/06-02.31-002 Extracted: 06/06/2002 19:00 Analyzed: 06/06/2002 19:00

LCSD: 2002/06/06-02.31-003 Extracted: 06/06/2002 19:00 Analyzed: 06/06/2002 19:00

Compound	Conc. [mg/L]		Exp.Conc. [mg/L]		Recovery		RPD	Ctrl.Limits [%]		Flags	
	LCS	LCSD	LCS	LCSD	LCS	LCSD	[%]	Recover	RPD	LCS	LCSD
Chromium (Hexavalent)	0.200	0.200	0.200	0.200	100.0	100.0	0.0	80-120	20		

Submission #: 2002-06-0095

SEVERN TRENT SERVICES

STL San Francisco
1220 Quarry Lane
Pleasanton, CA 94566

Tel 925 484 1919
Fax 925 484 1096
www.stl-inc.com
www.chromalab.com

CA DHS ELAP#2496

Hexavalent Chromium

Batch QC report

Test Method: 7196A Prep Method: 7196A soil

Laboratory Control Spike (LCS/LCSD) **Soil** **QC Batch # 2002/06/07-01.31**

LCS: 2002/06/07-01.31-002 Extracted: 06/07/2002 15:35 Analyzed: 06/07/2002 15:35

LCSD: 2002/06/07-01.31-003 Extracted: 06/07/2002 15:35 Analyzed: 06/07/2002 15:35

Compound	Conc. [mg/Kg]		Exp.Conc. [mg/Kg]		Recovery		RPD	Ctrl.Limits [%]		Flags	
	LCS	LCSD	LCS	LCSD	LCS	LCSD	[%]	Recover	RPD	LCS	LCSD
Chromium (Hexavalent)	1.90	1.90	2.00	2.00	95.0	95.0	0.0	80-120	20		

Submission #: 2002-06-0095

SEVERN TRENT SERVICES

Metals

STL San Francisco
1220 Quarry Lane
Pleasanton, CA 94566

Tel 925 484 1919
Fax 925 484 1096
www.stl-inc.com
www.chromalab.com

CA DHS ELAP#2496

Kennedy/Jenks-San Francisco	✉ 622 Folsom Street San Francisco, CA 94107-1366
Attn: Meredith Durant	Phone: (415) 243-2534 Fax: (415) 896-0999
000128.00	Project:

Samples Reported

Sample ID	Matrix	Date Sampled	Lab #
KB-11A-1/1.5	Soil	06/06/2002 09:10	4
KB-24-0/0.5	Soil	06/06/2002 09:20	5
KB-24-1/1.5	Soil	06/06/2002 09:25	6
KB-25-0/0.5	Soil	06/06/2002 09:35	7
KB-25A-0.5	Soil	06/06/2002 09:55	8
KB-26-0/0.5	Soil	06/06/2002 10:05	9
KB-26-1/1.5	Soil	06/06/2002 10:15	10

Submission #: 2002-06-0095

SEVERN TRENT SERVICES

Metals

Kennedy/Jenks-San Francisco
Attn: Meredith Durant

Test Method: 7471A
Prep Method: 7471A

STL San Francisco
1220 Quarry Lane
Pleasanton, CA 94566

Tel 925 484 1919
Fax 925 484 1096
www.stl-inc.com
www.chromalab.com

CA DHS ELAP#2496

Sample ID:	**KB-11A-1/1.5**	Lab Sample ID:	2002-06-0095-004
Project:	000128.00	Received:	06/06/2002 17:25
		Extracted:	06/10/2002 08:45
Sampled:	06/06/2002 09:10	QC-Batch:	2002/06/10-01.16
Matrix:	Soil		

Compound	Result	Rep.Limit	Units	Dilution	Analyzed	Flag
Mercury	0.37	0.050	mg/Kg	1.00	06/12/2002 14:10	

Submission #: 2002-06-0095

SEVERN TRENT SERVICES

Metals

Kennedy/Jenks-San Francisco
Attn: Meredith Durant

Test Method: 7471A
Prep Method: 7471A

STL San Francisco
1220 Quarry Lane
Pleasanton, CA 94566

Tel 925 484 1919
Fax 925 484 1096
www.stl-inc.com
www.chromalab.com

CA DHS ELAP#2496

Sample ID:	**KB-24-0/0.5**	Lab Sample ID:	2002-06-0095-005
Project:	000128.00	Received:	06/06/2002 17:25
		Extracted:	06/10/2002 08:45
Sampled:	06/06/2002 09:20	QC-Batch:	2002/06/10-01.16
Matrix:	Soil		

Compound	Result	Rep.Limit	Units	Dilution	Analyzed	Flag
Mercury	8.3	5.0	mg/Kg	100.00	06/12/2002 15:25	

Submission #: 2002-06-0095

SEVERN TRENT SERVICES

Metals

Kennedy/Jenks-San Francisco
Attn: Meredith Durant

Test Method: 7471A
Prep Method: 7471A

STL San Francisco
1220 Quarry Lane
Pleasanton, CA 94566

Tel 925 484 1919
Fax 925 484 1096
www.stl-inc.com
www.chromalab.com

CA DHS ELAP#2496

Sample ID: **KB-24-1/1.5**
Project: 000128.00

Sampled: 06/06/2002 09:25
Matrix: Soil

Lab Sample ID: 2002-06-0095-006
Received: 06/06/2002 17:25
Extracted: 06/10/2002 08:45
QC-Batch: 2002/06/10-01.16

Compound	Result	Rep.Limit	Units	Dilution	Analyzed	Flag
Mercury	0.11	0.050	mg/Kg	1.00	06/12/2002 14:15	

Submission #: 2002-06-0095

SEVERN TRENT SERVICES

Metals

Kennedy/Jenks-San Francisco
Attn: Meredith Durant

Test Method: 7471A
Prep Method: 7471A

STL San Francisco
1220 Quarry Lane
Pleasanton, CA 94566

Tel 925 484 1919
Fax 925 484 1096
www.stl-inc.com
www.chromalab.com

CA DHS ELAP#2496

Sample ID:	**KB-25-0/0.5**	Lab Sample ID:	2002-06-0095-007
Project:	000128.00	Received:	06/06/2002 17:25
		Extracted:	06/10/2002 08:45
Sampled:	06/06/2002 09:35	QC-Batch:	2002/06/10-01.16
Matrix:	Soil		

Compound	Result	Rep.Limit	Units	Dilution	Analyzed	Flag
Mercury	0.86	0.050	mg/Kg	1.00	06/12/2002 14:16	

Submission #: 2002-06-0095

SEVERN TRENT SERVICES

Metals

Kennedy/Jenks-San Francisco
Attn: Meredith Durant

Test Method: 7471A
Prep Method: 7471A

STL San Francisco
1220 Quarry Lane
Pleasanton, CA 94566

Tel 925 484 1919
Fax 925 484 1096
www.stl-inc.com
www.chromalab.com

CA DHS ELAP#2496

Sample ID:	**KB-25A-0.5**	Lab Sample ID:	2002-06-0095-008
Project:	000128.00	Received:	06/06/2002 17:25
		Extracted:	06/10/2002 08:45
Sampled:	06/06/2002 09:55	QC-Batch:	2002/06/10-01.16
Matrix:	Soil		

Compound	Result	Rep.Limit	Units	Dilution	Analyzed	Flag
Mercury	1.2	0.050	mg/Kg	1.00	06/12/2002 14:17	

Submission #: 2002-06-0095

SEVERN TRENT SERVICES

Metals

Kennedy/Jenks-San Francisco
Attn: Meredith Durant

Test Method: 7471A
Prep Method: 7471A

STL San Francisco
1220 Quarry Lane
Pleasanton, CA 94566

Tel 925 484 1919
Fax 925 484 1096
www.stl-inc.com
www.chromalab.com

CA DHS ELAP#2496

Sample ID:	**KB-26-0/0.5**	Lab Sample ID:	2002-06-0095-009
Project:	000128.00	Received:	06/06/2002 17:25
		Extracted:	06/10/2002 08:45
Sampled:	06/06/2002 10:05	QC-Batch:	2002/06/10-01.16
Matrix:	Soil		

Compound	Result	Rep.Limit	Units	Dilution	Analyzed	Flag
Mercury	2.8	0.50	mg/Kg	10.00	06/12/2002 15:26	

Submission #: 2002-06-0095

SEVERN TRENT SERVICES

Metals

Kennedy/Jenks-San Francisco
Attn: Meredith Durant

Test Method: 7471A
Prep Method: 7471A

STL San Francisco
1220 Quarry Lane
Pleasanton, CA 94566

Tel 925 484 1919
Fax 925 484 1096
www.stl-inc.com
www.chromalab.com

CA DHS ELAP#2496

Sample ID:	**KB-26-1/1.5**	Lab Sample ID:	2002-06-0095-010
Project:	000128.00	Received:	06/06/2002 17:25
		Extracted:	06/10/2002 08:45
Sampled:	06/06/2002 10:15	QC-Batch:	2002/06/10-01.16
Matrix:	Soil		

Compound	Result	Rep.Limit	Units	Dilution	Analyzed	Flag
Mercury	4.6	0.50	mg/Kg	10.00	06/12/2002 15:27	

Submission #: 2002-06-0095

SEVERN TRENT SERVICES

STL San Francisco
1220 Quarry Lane
Pleasanton, CA 94566

Tel 925 484 1919
Fax 925 484 1096
www.stl-inc.com
www.chromalab.com

CA DHS ELAP#2496

Metals

Batch QC report

Test Method: 7471A Prep Method: 7471A

Method Blank **Soil** **QC Batch # 2002/06/10-01.16**

MB: 2002/06/10-01.16-054 Date Extracted: 06/10/2002 08:45

Compound	Result	Rep.Limit	Unit	Analyzed	Flag
Mercury	ND	0.050	mg/Kg	06/12/2002 14:06	

Submission #: 2002-06-0095

SEVERN TRENT SERVICES

STL San Francisco
1220 Quarry Lane
Pleasanton, CA 94566

Tel 925 484 1919
Fax 925 484 1096
www.stl-inc.com
www.chromalab.com

CA DHS ELAP#2496

Metals

Batch QC report

Test Method: 7471A Prep Method: 7471A

Laboratory Control Spike (LCS/LCSD) **Soil** **QC Batch # 2002/06/10-01.16**

LCS: 2002/06/10-01.16-055 Extracted: 06/10/2002 08:45 Analyzed: 06/12/2002 14:08

LCSD: 2002/06/10-01.16-056 Extracted: 06/10/2002 08:45 Analyzed: 06/12/2002 14:09

Compound	Conc. [mg/Kg]		Exp.Conc. [mg/Kg]		Recovery		RPD	Ctrl.Limits [%]		Flags	
	LCS	LCSD	LCS	LCSD	LCS	LCSD	[%]	Recover	RPD	LCS	LCSD
Mercury	0.523	0.526	0.500	0.500	104.6	105.2	0.6	85-115	20		

Sample Chain-of-Custody/Analysis Request 2002-06-0095 Kennedy/Jenks Consultants

Possible Hazards: Analytes

Client: Proxim | Report to: Meredith Durant

Site: 909 Embarcadero | Company: K/J

Project No.: 000128.00 | Address: 122 Folsom St

Sampler Name: M. McLeod

Telephone: 415-243-2508 | Fax: 415-896-0999

Lab Destination: STL San Fran

Address: ~~1999~~ Quarry Ln 1220 Pleasanton

Telephone: 925-484-1919

Carrier/Way Bill No.: N/A

(1) Lab ID No.	(1) Client ID No.	Collection Date	Collection Time	(2) Type	Depth	(3) Comp.	(4) Pres.	Turn-around	(5) Analyses Requested: CAM 17 metals	Cr +6	Hg	Comment/Conditions (container type, container number, etc.)
	Cooling Tower Water	6/6	0830	W	n/a	No	HCl to pH<2	24 HR	X	X		Hold extra bottles
	cooling Tower -Sludge	"	0840	S	"	Y	4°C	"		X		Composite before analysis
	Cooling Tower - Fin Mat'l	"	0845	Solid	"	N	"	"		X		
	KB-11A - 1/1.5	"	0910	S	1/1.5	No	"	STD			X	
	KB-24 - 0/0.5	"	0920	"	0/0.5	"	"	"			X	
	KB-24 - 1/1.5	"	0925	"	1/1.5	"	"	"			X	
	KB-25 - 0/0.5	"	0935	"	0/0.5	"	"	"			X	
	KB-25A - 0.5	"	0955	"	0.5	"	"	"			X	
	KB-26 - 0/0.5	"	1005	"	0/0.5	"	"	"			X	
	KB-26 - 1/1.5	"	1015	"	1/1.5	"	"	"			X	
	Cooling Tower - Water - A	"	1025	"	n/a	"	"					HOLD

RUSH

(1) Write only one sample number in each space.
(2) Specify type of sample(s): Water (W), Solid (S), or indicate type.
(3) Mark each sample which should be composited in Laboratory as follows: Place an "A" in box for each sample that should be composited into one sample; use sequential letter for additional groups.
(4) Preservation of sample.
(5) Write each analysis requested across top. Place an "X" in appropriate column to indicate type of analysis needed for each sample.

4.9°C

Sample Relinquished By: Print Name	Signature	Company	Date	Time	Sample Received By: Print Name	Signature	Company	Date	Time
Mike McLeod		K/J	6/6		D. Harrington		STL-SF	6/6/02	1220
G Morrow	G	STL-SF	6/6	1725	D. Harrington	D. Harrington	STL-SF	6/6/02	1725

66733

SEVERN TRENT SERVICES

STL San Francisco

Sample Receipt Checklist

Submission #: 2002-06 - 0095

Checklist completed by: (initials) CR Date: 06/07/02

Courier name: ☒ STL San Francisco ☐ Client _____

Custody seals intact on shipping container/samples	Yes___ No___	Not Present ✓
Chain of custody present?	Yes ✓ No___	
Chain of custody signed when relinquished and received?	Yes ✓ No___	
Chain of custody agrees with sample labels?	Yes ✓ No___	
Samples in proper container/bottle?	Yes ✓ No___	
Sample containers intact?	Yes ✓ No___	
Sufficient sample volume for indicated test?	Yes ✓ No___	
All samples received within holding time?	Yes ✓ No___	
Container/Temp Blank temperature in compliance (4^{o} C ± 2)?	Temp: 4.9 °C	Yes ✓ No___
Water - VOA vials have zero headspace?	No VOA vials submitted ✓	Yes___ No___

(if bubble is present, refer to approximate bubble size and itemize in comments as **S** (small ~O), **M** (medium ~ O) or **L** (large ~ O)

Water - **pH acceptable upon receipt?** ☐ Yes ☐ No

☐ **pH adjusted**– Preservative used: ☐ HNO_3 ☐ HCl ☐ H_2SO_4 ☐ NaOH ☐ ZnOAc

For any item check-listed "No", provided detail of discrepancy in comment section below:

Comments:

Project Management [Routing for instruction of indicated discrepancy(ies)]

Project Manager: (initials) _____ Date: _____/_____/02

Client contacted: ☐ Yes ☐ No

Summary of discussion:

Corrective Action (per PM/Client):

Appendix B

Surface and Shallow Soil Sampling –
Standard Operating Guidelines

Appendix B: Surface and Shallow Soil Sampling – Standard Operating Guidelines

B.1 Introduction

This guideline describes the equipment and procedures that are used by Kennedy/Jenks Consultants personnel for collecting surface and shallow soil samples.

B.2 Equipment

- Stainless steel or plastic scoops
- Hand auger
- Split-spoon drive sampler (2.5-inch or 2.0-inch I.D.) and associated drill rods, wrench and other tools needed to break down equipment
- Slide hammer
- 2.5-inch or 2.0-inch brass liners and sealing materials (plastic end caps, Teflon seals, silicon tape, zip-lock plastic bags)
- Shovel
- Post hole digger
- Pick
- Breaker bar
- Foxboro FID-Organic Vapor Analyzer (OVA)
- HNU PID-Organic Vapor Analyzer
- OVM
- Measuring tape or measuring wheel
- Stakes or spray paint for sampling grid
- Sampler cleaning equipment
  - Steamcleaner (if available)
  - Generator (if available)
  - Stiff-bristle brushes
  - Buckets
  - High priority phosphate-free liquid soap, such as Liquinox
  - Trisodium phosphate (TSD) for use if samples are oily
  - Methanol (if necessary)
  - 0.1N nitric acid (if necessary)
  - Deionized water
  - Potable water
- Insulated sample storage and shipping containers
- Personal protective equipment (as specified in site safety plan)

B.3 Typical Procedure

1. Obtain applicable drilling and well construction permits, prior to mobilization, if necessary.

2. Clear locations for underground utilities and structures by Underground Service Alert (USA) and subcontractors, if necessary.

3. Measure and mark sampling locations prior to initiation of the sampling program, as specified in the sampling and analysis plan. If sampling locations are based on a grid pattern, stakes can be used to define the grid layout.

4. Collect soil samples for chemical analysis by using precleaned scoops or a hand auger, or by driving a split-spoon drive sampler.

5. If overlying soil is to be removed (as specified in the sampling and analysis plan), use shovels, picks, or post-hole diggers, as needed.

6. Collect soil samples for lithologic logging purposes.

7. If applicable, as described in the site safety plan, use an OVA to analyze *in situ* air samples from the breathing zone and other locations as necessary.

8. Have the soils classified in the field in approximate accordance with the visual-manual procedure of the Unified Soil Classification System (ASTM D 2488-90) and the Munsell Color Classification.

9. Prior to each sampling event, wash sampling equipment (scoops, hand auger, split-spoon drive sampler, and brass liners) with high purity phosphate-free soap. Double-rinse it with deionized water and methanol, and/or 0.1N nitric acid, as appropriate.

10. At each sampling interval, collect soil and place it in the appropriate sampling container. Fill the sample container and compact the soil to minimize air space. Minimize handling of the soil, especially if it is being collected for analysis of volatile compounds.

11. If a split-spoon drive sampler is being used, select one brass liner for potential laboratory analysis. Cover the ends of this sample in Teflon sheets, seal it with plastic caps, and wrap it with silicon or Teflon tape. Place a completed sample label on the brass liner.

12. Place the selected samples in appropriate containers and store them at approximately 4 °C.

13. As a field screening procedure (if applicable), for each sampling interval, place soil not selected for chemical analysis in an airtight container (e.g., plastic bag or jar) and allow it to equilibrate. After this, monitor the headspace in the container using either a HNU, OVM or OVA. Record the headspace concentration in the field notes.

14. Complete chain-of-custody forms in the field and transport the selected samples in insulated containers, at an internal temperature of approximately 4°C, to the analytical laboratory.

B.4 Equipment Cleaning

Prior to collection of each soil sample, the sampling equipment should be either steamcleaned or hand washed. If the sampling equipment is hand washed, wash excavation equipment with a brush, in a solution of high purity phosphate-free soap and potable water. Rinse the equipment with potable water and methanol, and/or 0.1N nitric acid, as appropriate. Follow this with double-rinsing using distilled water.

B.5 Investigation-Derived Residuals

If sufficient volumes of soil cuttings and other residuals are generated, contain the material in appropriately labeled containers for subsequent disposition. All soil samples transported to the laboratory must be returned to the client for disposition if required by the laboratory.

Appendix C

Typical Hydraulic Push/Drive Sampling Procedures –
Standard Operating Guidelines

Appendix C: Typical Hydraulic Push/Drive Sampling Procedures Standard Operating Guidelines

C.1 Introduction

This guideline describes the equipment and procedures that are used by Kennedy/Jenks Consultants personnel for collecting soil and reconnaissance groundwater samples with a hydraulic push/drive system.

C.2 Equipment

- Portable, hydraulic push/drive sampling system
- 6-inch long, 1.75-inch O.D. stainless steel or brass liners and liner sealing materials (Teflon sheets, plastic end caps, Ziploc plastic bags)
- Type II Portland cement
- 1-inch O.D. Schedule 40 PVC screen (0.010-inch slot size)
- 1-inch O.D. Schedule 40 PVC blank casing
- 0.75-inch diameter stainless steel or Teflon bailer
- FID or PID organic vapor analyzer
- Water level indicator
- Temperature, specific conductivity and pH meters
- Equipment cleaning materials
  - Steam cleaner
  - Generator
  - Stiff-bristle brushes
  - Buckets
  - High-purity phosphate-free liquid soap
  - Deionized water
  - Rinsate collection system
- Personal protective equipment
- Appropriate groundwater sample containers
- Chain-of-custody forms
- Insulated sample storage container and ice substitute

C.3 Typical Procedures

1. Applicable drilling permits will be obtained prior to mobilization.
2. Sample locations will be cleared for underground utilities.
3. All downhole equipment will be steam cleaned prior to use at each location.
4. Soil borings will be advanced using a portable, hydraulic push/drive sampling system that simultaneously drives two nested, steel sampling rods into the ground to collect continuous soil cores.
5. As the sampling rods are advanced, the soil core will be collected in a 1-7/8-inch diameter, 3-foot long sample barrel, which is attached to the end of the inner rods. After being advanced 3 feet, the inner rods will be removed from the borehole with a hydraulic winch. The sampler (containing new stainless steel liners) and inner rods will then be lowered back into the borehole to the previous depth and the rods are driven another 3 feet. This process will be repeated until the desired depth is reached.
6. The soil samples will be retained for lithologic logging and chemical analyses, if appropriate.
7. The soils will be classified in the field in approximate accordance with the visual-manual procedure of the Unified Soil Classification System (ASTM D-2488-93), and the Munsell Color Classification.
8. If required, soil samples will be collected at selected intervals for laboratory analysis. At these intervals, the ends of one or more of the soil sample liners will be covered with Teflon end sheets and plastic end caps, and labeled. Labels will document the sample designation, type, date and time of collection, collector(s), location, and any additional information.
9. If groundwater samples will not be collected, the soil borings will be grouted to the ground surface with a neat cement grout (Type II Portland cement) using the tremie method.
10. Upon encountering the uppermost groundwater surface during sampling, the sample barrel and inner rods will be removed and the well screen and casing will be installed within the outer drive casing to facilitate collection of a groundwater sample. The drive casing will be pulled up approximately 3 feet to expose the slotted PVC casing. Groundwater samples will then be collected from within the PVC casing with a 0.75-inch diameter Teflon or stainless steel bailer.
11. The depth to groundwater will be measured prior to groundwater sampling.
12. The sample will be drained directly from the bailer into sample containers. The containers will be labeled to document the sample designation, type, date and time of collection, collector(s), location, and any additional information.
13. After collecting the reconnaissance groundwater sample, decant groundwater into a clean container and record the following field parameters/observations:
    a. Temperature (°C)
    b. pH
    c. Specific conductivity (µmhos/cm)
    d. Depth to water
    e. Color
    f. Other observations (odors, free-phase product)

14. After sample collection, the boring will be grouted to ground surface with a neat cement grout (Type II Portland cement) using the tremie method.

C.4 Equipment Cleaning

1. Downhole equipment (rods, sampler) will be steam cleaned prior to each borehole.
2. Sampling equipment (sampler) will be steam cleaned or washed with a brush in a solution of high-purity phosphate-free soap and potable water, then rinsed with potable water followed by double rinsing with deionized water prior to each sampling run.
3. Downhole equipment and vehicles which warrant it, will be steam cleaned prior to leaving site at completion of sampling.

C.5 Investigation-Derived Residuals

Soil cuttings will be placed in labeled 5-gallon DOT-approved pails with bolt-on covers. Decontamination water and groundwater residuals will be contained in labeled 55-gallon DOT-approved drums with bolt-on covers. All residuals generated during sampling activities will be stored at the site.