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Alameda County
Environmental Health

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March 12, 2011

Ms. Barbara Jakub
Alameda County Environmental Health Services
1131 Harbor Bay Parkway, Suite 250
Alameda, CA 94502

Re: Fuel Leak Case No: RO0000133

Enclosed please find the *Site Investigation Report* dated February 1, 2012 , the *Natural Attenuation Analysis* dated February 1, 2012, the *Human Health Risk Assessment* dated February 1, 2012, and the *2011 Second Semi-Annual Monitoring Report* dated February 1, 2012. These reports were prepared by Taber Consultants of West Sacramento, California.

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

Sincerely,

Paulette Satterley

Paulette Satterley

NATURAL ATTENUATION ANALYSIS

Former City of Paris Cleaners
3516 Adeline Street
Oakland, California 94608

USTCF Claim #002192

Prepared For:

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Taber Project # 2011-0107

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1.0 INTRODUCTION

On behalf of the Ms. Paulette Satterley, Taber Consultants has prepared this *Natural Attenuation Analysis (*NAA) for submittal to the San Francisco Bay Regional Water Quality Control Board (SFBRWQCB) and Alameda County Health Care Services Agency (ACHSA). The scope of work conducted during this project complies with existing SFBRWQCB and ACHSA directive letters.

The investigation was requested by the ACEHD in a letter dated March 10, 2009. Taber Consultants prepared the following work plans and work plan addenda to address the ACEHD request:

- *Additional Site Investigation Work Plan* dated January 22, 2010;
- *Additional Site Investigation Work Plan Addendum* dated September 13, 2010; and
- Two work plan revision letters dated January 7, 2011 and February 2, 2011.

The workplan and workplan addenda were approved by Ms. Barbara Jakub of the ACEHD in a letter dated October 29, 2010 and email dated March 10, 2011.

1.1 Purpose

The objective of the NAA is to provide evidence that natural attenuation of petroleum hydrocarbons is occurring at the site and to provide projections on when water quality objectives will be met through natural attenuation processes presently operating at the site.

1.2 Site Location and Description

The site is the location of the former City of Paris Cleaners, a former dry cleaning, laundry and dyeing operation located at Alameda County Assessor's Parcel Number (APN) 05-478-23. The property is currently owned by Mrs. Debra Runyon. The facility operated as City of Paris Cleaners and Dyers for about 40 years until the 1960's, but cleaning materials and tanks were not completely removed from the site until 1992. The site buildings remained vacant for a number of years following the closure of the dry cleaning operation, and then the owner converted them to residential and light commercial use.

The site lies at the southeastern corner of the intersection of 35th Street and Adeline Street at approximately 30 feet above mean sea level (amsl) in the northwest portion of the City of Oakland, California (Figure 1 and 2). The site buildings currently house on-site living quarters and City of Paris Studios, a workshop for art, art restoration, collectibles and hobbies. Mrs. Runyon acquired the site in July 2000.

1.3 Chronological Site History and Previous Subsurface Investigations

In 1987, Frank Champion, the owner at that time, applied for permits to remove underground storage tanks (USTs) at the site. Mr. Champion applied for five permits, obtaining permission to remove two 1000-gallon tanks, a 500-gallon tank, a 250-gallon tank and a 150-gallon tank. The USTs were used to store Stoddard Solvent, the dry cleaning solvent used during operation of the dry cleaning facility until the 1960s when the facility was closed.

On October 4, 1990, Semco Company of San Mateo excavated and reported removing one 750-gallon and two 1,000-gallon underground tanks used to store Stoddard Solvent. Six soil samples were collected in conjunction with the UST removal. The samples were collected at depths between 6.5 and 14 feet below ground surface (bgs) at the six locations in the tank excavation. The soil samples were analyzed for total petroleum hydrocarbons as gasoline (TPH-G) and benzene, toluene, ethyl-benzene and xylenes (BTEX), and the results indicated that TPH-G was detected at concentrations ranging from 1 to 1000 milligrams per kilogram (mg/kg); toluene was detected in one sample at 54 micrograms per kilogram (ug/kg); ethyl-benzene was detected in one sample at 400 ug/kg; and xylenes were detected in six samples ranging from 9 to 19,000 ug/kg. Although the TPH was detected in the TPH-G range, the analytical report by Superior Analytical Laboratory, Inc. San Francisco, notes that the TPH could be weathered gasoline or diesel (total petroleum hydrocarbons as diesel, TPH-D).

On July 31 and August 1 and 2, 1991, Uriah Inc. (Uriah) of Livermore, California) performed a soil vapor survey at the site using a photo-ionization detector (PID) (a Photovac TIP I) to screen soil for the presence of organic vapors. The purpose was to identify the approximate boundaries of soil impacted by Stoddard Solvent. Soil vapor samples were collected from nine locations in the area of the former tanks at depths of 3, 6, 9 and/or 12 feet bgs. The soil vapor samples were screened using the PID. PID readings were observed in all of the samples. Due to structures, sidewalks and other site features, the full extent of impacted soil was not defined from the limited soil vapor survey. PID readings ranged from 5 to 110 parts per million (ppm).

On August 30, 1991, Uriah contracted with W.A. Craig to excavate soil from the eastern portion of the tank pit. Approximately 44 cubic yards of Stoddard Solvent-impacted soil were excavated and placed in a treatment cell constructed on site for bioremediation. During excavating, Uriah discovered a 250-gallon UST containing less than 50 gallons of unknown liquid. The UST location is shown on Figure 2. The tank liquid and a soil sample from 7 feet bgs (one foot below the bottom of the 250-gallon UST) were analyzed for TPH-D and BTEX. The liquid sample contained 130 milligrams per liter (mg/l) TPH-D, 6 micrograms per liter (ug/l) ethyl-benzene, and 32 ug/l xylenes. The soil sample contained 130 mg/kg TPH-D, 420 ug/kg toluene, 270 ug/kg ethyl-benzene, and 1,500 ug/kg xylenes. The UST was transported offsite on October 31, 1991 under manifest to Erickson, Inc., in Richmond, California for recycling. An additional 15 cubic yards of impacted soil was excavated from the tank pit on January 27, 1992 and added to the bioremediation cell. No additional soil was excavated due to safety concerns regarding building foundation integrity. Characterization soil samples were collected from the north, east, south and

west excavation sidewalls at depths of 9, 9, 7 and 9 feet bgs, respectively. Concentrations of TPH-SS in the samples were 14, 140, 9.8, and 47 mg/kg, respectively.

On March 31, 1992, composite samples of soil from the bioremediation cell were analyzed for total petroleum hydrocarbons as stoddard solvent (TPH-SS). The bioremediation reduced hydrocarbons to concentrations acceptable by ACEHD. ACEHD approved use of the bioremediated soil as onsite backfill. W. A. Craig backfilled the tank pit with bioremediated soil and clean fill on April 21, 1992.

On October 29 and 30, 1992, Uriah supervised installation of ground water monitoring wells at the site. Soils Exploration Services of Vacaville, California, installed three 30-foot monitoring wells (MW-1, MW-2 and MW-3). The well locations are shown on Figure 2. Soil samples were collected at 5 and 10 feet bgs and analyzed for TPH-SS, TPH-D and BTEX. No TPH-SS was detected at or above the laboratory reporting limit in samples from 5 feet bgs, however soil samples from MW-1, MW-2 and MW-3 had TPH-SS concentrations of 210, 17 and 30 mg/kg, respectively. No TPH-D was detected at or above the laboratory reporting limit. Benzene was detected in the 5- and 10-foot samples from MW-1 at concentrations of 0.3 and 1.1 ug/kg, and in the 5- and 10-foot samples from MW-3 at concentrations of 2.5 and 26 ug/kg Toluene, ethylbenzene and total xylenes were detected in the samples from MW-1, 2 and 3 at concentrations between 12 and 550 ug/kg.

The initial groundwater samples from MW-1, MW-2 and MW-3 were collected on November 18, 1992 and analyzed for TPH-SS, TPH-D, TPH-G, MTBE, and BTEX. TPH-SS concentrations were 1,800 ug/l in MW-1, 630 ug/l in MW-2 and 11,000 ug/l in MW-3. No TPH-D, TPH-G, MTBE and BTEX were detected at or above the laboratory reporting limits. The results are included in Table 1.

On March 19, 1998, Dugan Associates (Dugan) of San Jose, California advanced six soil borings (EB-1 through EB-6) to a depth of approximately 18 feet bgs to assess the Stoddard Solvent release. Soil boring EB-1 was advanced on-site to the northwest of the former UST locations. Borings EB-2 through EB-6were advanced offsite on the north side of 35th Street in the direction projected at the time to be downgradient of the site. At each soil boring, soil samples were collected at 5, 10 and 15 feet bgs and a grab groundwater sample at 18 feet bgs. The samples were analyzed for TPH-SS, BTEX and MTBE. TPH-SS was detected in the groundwater samples from EB-1 and EB-5 at concentration of 270,000 ug/l and 780 ug/l, respectively.. The groundwater sample from EB-1 had concentrations of toluene, ethyl-benzene and xylenes at 93 ug/l, 66 ug/l, and 1700 ug/l, respectively. GThe groundwater sample from EB-5 had 2 ug/l xylenes. No other analytes were detected in EB-1 and EB-5 at or above the laboratory reporting limits. No analytes were detected in groundwater samples from EB-2, EB-3 and EB-4. The 10-foot and 15-foot soil samples from EB-1 had TPH-SS concentrations of 310 and 340 mg/kg , respectively, and trace amounts of total xylenes and toluene. No analytes were detected in the soil samples from EB-2 through EB-5. The boring locations are shown on Figure 2. The analytical results are included in Table 1.

In September, 1999, ACEHD issued a directive letter requesting that Dugan analyze groundwater samples for semi-volatile organic compounds (SVOCs) and volatile organic

compounds (VOCs). The purpose was to assess for solvents commonly associated with dry cleaning operations other than the Stoddard Solvent already identified at the site. In December 1999, the quarterly groundwater samples from the three monitoring wells (MW-1, MW-2 and MW-3) were additionally analyzed for SVOCs using EPA Method 8270 and VOCs using EPA Method 8010. In the February 5, 2000, *Groundwater Monitoring Report – Fourth Quarter 1999* Dugan reported that only a low concentration of 1,1-dichloroethane (1,1-DCA) was detected MW-1, low concentrations of 1,1-DCA and naphthalene were detected in MW-2 and low concentrations of 1,2-dichlorobenzene (1,2-DCB), 1,1-DCA, 2-methylnaphthalene and naphthalene were detected in MW-3.. No other SVOCs or VOCs were detected in the samples. The results are included in Table 2. At that time Dugan defined a north-trending groundwater gradient at 0.003 ft./ft.

In their September 1999 letter, the ACEHD also noted that according to a database search they believed a 97-foot industrial well had been drilled at the site. The well was identified and is located approximately 16 feet southeast of MW-3. The well is now referred to as well W-IND (Figure 2).

In March 2002, in compliance with an ACEHD directive letter, Well Test, Inc. (formerly Dugan and Associates) redeveloped the three monitoring wells (by purging 10 well-volumes) and sampled the three wells pursuant to quarterly monitoring responsibilities. Well W-IND was also included in the sampling event. The analytical results of the sampling indicated up to 11,000 µg/l of TPH-SS in the sample from MW-1, no BTEX at or above laboratory reporting limits, up to 31 µg/l MTBE in the sample from MW-3, 0.61 µg/l DCB in the sample from MW-1, and 130 ug/l Naphthalene in MW-1. Well Test, Inc. reported a groundwater gradient of 0.14 ft/ft to the southeast.

Taber Consultants, formerly Western Resource Management (WRM), assumed environmental consulting responsibilities for the site commencing in June 2007. Taber performed groundwater monitoring at the site for the first and second semiannual periods of 2009. In response to a query by ACEHD, Taber submitted a well completion report request to the California Department of Water Resources, in which undated well boring logs for a well at the City of Paris Cleaners, at 3516 Adeline Street, indicated a 97-foot industrial well on the site. Taber also found well drilling information for another industrial well drilled in 1927 for the "City of Paris Cleaners," drilled to 295 feet. The location of this well is unknown, and the original log has no address. It appears that the California Department of Water Resources contacted the owner during efforts to identify existing wells in Oakland. A handwritten note on the well log is mostly illegible but possibly states "Owner says he never had this well, only the 97' ".

On July 28, 2009, ACEHD advised Responsible Parties that The California State Water Resources Control Board (SWRCB) had approved Resolution No. 2009-0042, which reduced quarterly groundwater monitoring requirements to semiannual or less frequent monitoring at all sites. In 2009, the monitoring frequency at the site was reduced to semiannual, during the first and third quarters.

In August 2009 Taber Consultants evaluated using the HydraSleeve® no-purge groundwater sampling method for the four site wells. With verbal authorization from

Barbara Jakub of ACEHD, on March 17, 2010, Taber Consultants implemented ongoing use of the HydraSleeve® sampling method at the site.

The analytical program for the groundwater samples collected from the wells includes TPH-SS, TPH-G, BTEX and MTBE. Reports summarizing monitoring results have previously been submitted to the ACEHD The groundwater monitoring results are summarized in Table 1.

In April and May, 2011, Taber Consultants performed activities to characterize the TPH-SS distribution in soil, vapor and groundwater. During the investigation, Taber Consultants investigated the well construction and performed hydrogeology investigations to characterize subsurface geology and groundwater distribution at the site as well as natural attenuation parameters. Taber Consultants reported site investigation findings in the *Site Investigation Report* (SIR) and assessment of risk in the *Human Health Risk Assessment* (HHRA), with both reports dated February 1, 2012

2.0 SITE CONDITIONS

A description of the site setting and subsurface conditions is presented in the following report sections.

2.1 Site Soils

Soil boring logs, provided in Appendix A, indicate soil types consistent with unconsolidated alluvial deposits including intercalated mixtures of clays, silts, sands and gravels.

Based on the Natural Resource Conservation Service (NRCS) Soil Survey for the west Alameda County area, near surface (to 5-foot depth) soils in the site vicinity are described as Urban Land-Clear Lake complex with linear slopes. The typical profile is clay. The soils have slow permeability due to talf (bog or wetlands) landform geomorphology, typical of a Bay Mud environment, derived from low coastal plain consisting of an essentially flat (e.g. 0-1 % slopes) and broad area dominated by closed depressions and a non-integrated or poorly integrated drainage system. Precipitation tends to pond locally and lateral transport is slow both above and below ground, which favors the accumulation of soil organic matter and retention of fine earth sediments (NRCS, 2003).

2.2 Groundwater

As noted in the *Site Investigation Report*, two groundwater zones are present at the site. The shallow groundwater zone ranges between approximately 12 and 17 feet bgs. The deeper groundwater zone ranges between 26 and 36 feet bgs. Both zones vary in thickness across the site. The shallower groundwater zone is composed of sands and gravels containing appreciable fines. The deeper groundwater zone is composed of sands and gravels with fines, however fines content is much reduced in comparison to the shallow groundwater zone. During the 2011 site investigation groundwater elevations in both zones appeared to be under the influence of confining layers that produced artesian flow in the borings. The soil boring map from the 2011 site investigation is included as Figure 3.

Historical measurements for site wells indicate that depth to groundwater typically ranges from about 6 to 14 feet below top of casing (BTOC) in the monitoring wells. Groundwater flow magnitude and direction in the vicinity of the monitoring wells has been difficult to quantify due to the probable influence of artesian flow in the monitoring wells. Historically, differences in groundwater elevation of 2 feet or more have been measured over a lateral distance of less than 100 feet, occasionally producing apparent steep gradients to the east or northeast, counter to the westerly groundwater gradient that would be expected in close proximity to the San Francisco Bay. The historical groundwater hydrographs from monitoring wells MW-1, MW-2 and MW-3 from June 1992 through March 2011 are depicted in Figure 4. Differences in orientation of apparent groundwater flow are not constant, but do not appear to have predictable periodicity. Groundwater elevations from the most recent monitoring event are presented on Figure 4.

2.3 Zimmerman Residence Underground Storage Tank and Groundwater Plume

A source of TPH-G has been identified at the Zimmerman property adjacent to the City of Paris Cleaners at 3442 Adeline Street. The Zimmerman Residence is located approximately 60 feet to the southwest of the former City of Paris Cleaners site at 3442 Adeline Street in Oakland. The property includes a residential building and a warehouse and spans the distance from Adeline Street to Chestnut Street to the east.

On February 22, 2000, one 3,750-gallon UST was removed from the warehouse adjacent to Chestnut Street, approximately 180 feet to the south east of the monitoring wells at the City of Paris site. Site investigations were conducted at the site in June 2006, October 2007, December 2007 and May 2008.

Soil and groundwater samples from the Zimmerman residence site contained TPH-G, TPH-D and BTEX. Maximum concentrations reported in groundwater samples from soil borings were 120,000 µg/L TPH-G (S-4), 12,000 TPH-D (SB-14), 10,000 µg/L benzene (SB-11), 930 µg/L toluene (pit water), 3,500 µg/L ethyl-benzene (S-4), and 7,900 µg/L xylenes (SB-11), respectively. Grab groundwater samples taken in May 2008 had concentrations of 740 µg/l TPH-G in soil boring SB-27 (east of the industrial well W-IND at the site), 3,600 µg/l TPH-G in soil boring SB-25 (on the southeast corner of the site), and 2,300 µg/l TPH-G in soil boring SB-26 (south the monitoring wells at the site). Included in Appendix B are Figure 5 and Table 2 from AEI Consultants July 31, 2009, *Groundwater Monitoring Well Installation Report*.

At the Zimmerman site, approximately 1100 tons of impacted soil were removed in March 2009 from the warehouse interior adjacent to Chestnut Street. During soil removal, AEI observed free product. In March 2009, AEI Consultants injected hydrogen peroxide into the permeable bridge they had installed in the backfill area to treat the free product and to mitigate plume migration from the source. An injection well was installed in the tank excavation area at the Zimmerman residence in May 2009 to aerate impacted groundwater.

2.4 Source Area and Constituents of Concern

In October 1990 Semco Company of San Mateo excavated and reported removing one 750-gallon and two 1,000-gallon underground tanks used to store Stoddard Solvent. An additional 250-gallon tank was removed in October 1991.

Groundwater sample concentrations from March 23, 2011 for MW-1 in the source area are below the California Primary Maximum Contaminant Levels (MCLs) for ethyl benzene, xylenes, and MTBE (Table 3). The concentrations compare to the California-used USEPA Superfund Provisional limits for TPH-SS, TPH-G and BTEX as follows:

Description	TPH-SS	TPH-G[a]	Benzene	Ethylbenzene	Xylenes	MtBE
MW-1 (µg/l)	8800	8100	<10	<10	<10	<5
CA Primary MCL (µg/l) or Region 2 Environmental Screening Levels (µg/l) *	100*	100*	1	300	1750	13

[a]Degraded Stoddard Solvent, as reported in the *Site Investigation Report*.

Benzene concentrations in groundwater at the site have on rare occasions exceeded 1 ug/l, however the most recent groundwater monitoring analytical data do not report detection limits within the range required to compare to the California MCL. As a result, Taber Consultants notes that concentrations of benzene from the 2011 site investigation grab groundwater samples at GP-10, which were less than 1 ug/L which is the laboratory reporting limit for benzene. Historical groundwater monitoring data are presented in Table 4.

Based on soil analytical results from soil samples collected in 1991 and 2011, the majority of the remaining TPH-SS-impacted soil appears to be in the courtyard of the residence, in the vicinity of monitoring well MW-1 and GeoProbe® boring GP-10. Analytical soils data from the 2011 site investigation are presented in Table 5.

Groundwater monitoring and site investigation data indicate that the source area and groundwater plume center of mass is near the former Stoddard Solvent tank area in the courtyard of the residence (Table 4 and Table 6). The constituent of concern (COCs) is TPH-SS. Although the groundwater monitoring and site investigation report TPH-G in soil and groundwater samples, laboratory reports have consistently noted that peaks in the TPH-G chromatograms are non-typical. In chromatograms of TPH-G standards, the lighter gasoline constituents elute much earlier than the bulk of organic moieties (chemical species) present in the site samples. The shape of the chromatograms and location of peaks containing TPH-G compounds are similar in shape and have similar moiety elution times to the chromatograms containing TPH-SS. Similarly, TPH-G detections in soil and groundwater samples tend to coincide with locations where TPH-SS has been detected in soil and/or groundwater. Given that there is no history of TPH-G tanks at the site and the age of the TPH-SS plume, Taber Consultants believes that the analytical results for TPH-G detected at the site is, in actuality, weathered TPH-SS.

While BTEX and MtBE have been detected historically at the site, since 2007 concentrations of these COCs have been below laboratory detection limits, which may in part be a result of the dilution rates used by the laboratory. Over the monitoring data period, plume concentrations have not shown consistent decline with time in monitoring well MW-1, however since June 2009 TPH-SS and TPH-G have declined in monitoring wells MW-2 and MW-3. The most recent monitoring event groundwater analytical results are presented on Figure 6.

2.5 Remedial Activities Summary

In 1991, approximately 59 cubic yards of impacted soil were over-excavated during UST removal activities and placed in a cell for on-site. The on-site bioremediated soil was reused as tank excavation fill on the site. No additional soils were excavated at the time due to safety concerns regarding building foundation integrity.

No further remedial activities have taken place at the site since 1991.

3.0 NATURAL ATTENUATION ANALYSIS

Remediation by natural attenuation (NA) is the reduction in mass or concentration of a compound in groundwater over time or distance from a source due to naturally occurring physical, chemical, and biological processes. NA may be selected as a sole remediation approach where immediate threats to human health and the environment do not exist or have been mitigated. NA may also represent a secondary remediation tool to supplement active groundwater remediation methods.

NA processes include biodegradation, dispersion, dilution, sorption, and volatilization. Of these, biodegradation typically accounts for the majority of mass removal and associated declines in constituent of concern (COC) concentrations. Biodegradation reactions involve a carbon (energy) source, metabolizing microbes, electron acceptors, and metabolic by-products. For sites impacted by petroleum hydrocarbons, the petroleum hydrocarbon constituents serve as the carbon source. The ultimate products of biodegradation reactions are carbon dioxide, water, and a reduced electron-acceptor component.

Catabolic reactions which occur under aerobic conditions represent the most effective NA reaction. Under aerobic conditions, oxygen serves as the electron acceptor and carbon dioxide and water are the by-products. Reduction reactions which occur under anaerobic conditions are less effective in degrading petroleum hydrocarbons, but can still result in a steady decline in COC concentrations. A summary of typical aerobic and anaerobic reactions listed in order of effectiveness is provided below.

Type of Microbial Respiration	Electron Acceptor	Metabolic By-Product	Approximate Redox Potential (mV)[1]
Aerobic (Oxidation)	Oxygen (O_2)	Carbon Dioxide (CO_2)	+810
Anaerobic (Reduction)	Nitrate (NO_3^-)	Nitrogen (N_2)	+745
	Manganese (Mn^{4+}) (insoluble)	Manganese (Mn^{2+}) (soluble)	+525
	Ferric Iron (Fe^{3+}) (insoluble)	Ferrous Iron (Fe^{2+}) (soluble)	-45
	Sulfate (SO_4^{2-})	Hydrogen Sulfide (H_2S)	-220
	Carbon Dioxide (CO_2)	Methane (CH_4)	-245

[1]Approximate reduction of inorganic substances by hydrogen at pH=7 and 25°C.

At many sites, natural aerobic processes (oxygen) are responsible for less than 10% of hydrocarbon biodegradation. Of the anaerobic processes, manganese may not be present in sufficient quantities to be a significant electron acceptor. In addition, soil bacteria show an enzymatic preference for Mn^{4+}, so Fe^{3+} reduction will not begin until Mn^{4+}

is depleted. On the other hand, because of its general abundance, sulfate reduction is often the largest contributor to hydrocarbon degradation. It is noted that reduction-oxidation processes in groundwater systems tend to segregate into discrete zones dominated by one terminal electron-accepting process (TEAP), although often not exclusively.

According to ASTM E1943-98 (2004) *Standard Guide for Remediation of Ground Water by Natural Attenuation at Petroleum Release Sites*, a primary line of evidence for remediation by NA is provided by observed reductions in plume geometry or reductions in COC concentrations in groundwater with time. Secondary lines of evidence are provided by geochemical indicators of NA processes including levels of dissolved oxygen, oxidation-reduction potential, pH, temperature, nitrate, sulfate, manganese, ferrous iron, and methane. In addition, attenuation rates calculated based on groundwater monitoring results can contribute to a secondary line of evidence. Finally, additional optional lines of evidence can be provided via microbial information and constituent transport and attenuation models.

3.1 Primary Line Of Evidence

Historical groundwater monitoring results do not provide strong evidence that natural attenuation processes are effectively degrading COCs in site groundwater in the source area, i.e. monitoring wells MW-1, MW-2 and MW-3. As reported in Table 2, COC concentrations in site monitoring wells have not shown a steady pattern of decline over time. The data are ambiguous however, due to possible mingling of the Zimmerman residence plume with the plume at the site. Cumulative groundwater analytical results through the second quarter of 2010 are provided in Table 2. In addition, TPH-SS and TPH-G concentration versus time graphs are provided in Figures 7 through 9 for wells MW-1, MW-2, and MW-3.

Further from the source area, however, the May 4, 1998, Dugan Associates *Soil and Grab Groundwater Sampling Report* grab groundwater samples had increased TPH-SS concentrations in comparison with recent grab groundwater samples from similar locations. West of the present location of monitoring well MW-1, the concentration of TPH-SS was 270,000 ug/l from soil boring EB-1; during the May 2011 site investigation, grab groundwater samples from the shallow groundwater zone between 10 and 20 feet bgs had a maximum concentration of 1000 ug/l TPH-SS in GeoProbe® boring GP-10. Further north, Dugan Associates took a grab groundwater sample at 18 feet bgs from soil boring EB-5 that had a concentration of TPH-SS of 780 ug/l TPH-SS; the grab groundwater sample from GeoProbe® boring GP-4 had a shallow groundwater zone concentration of 150 ug/l TPH-SS.

3.2 Secondary Line Of Evidence

Taber Consultants collected groundwater samples from site monitoring wells, the industrial well and GeoProbe® borings GP-1, GP-2, GP-5, GP-3, GP-4, GP-8, GP-9, and GP-11 during the 2011 site investigation to evaluate subsurface conditions related to NA processes. Both shallow and deeper groundwater zones in GP-3, GP-4, GP-8 and GP-9 were sampled for NA parameters in order to characterize each groundwater zone with respect to NA processes. Each Groundwater sample was analyzed for carbon dioxide, phosphorus, Total Kjeldahl Nitrogen (TKN), sulfide, methane, ethane, alkalinity as calcium carbonate, manganese, ferrous iron, sulfate, and nitrate, by Sparger Technology, Inc. in Rancho Cordova, CA. The following parameters were measured in the field: temperature, pH, dissolved oxygen, oxidation reduction potential, and conductivity. Analytical results for natural attenuation parameters in groundwater and field measurements are provided in Table 7. The complete laboratory reports are provided in Appendix C.

Temperate and pH are at levels favorable to NA reactions.

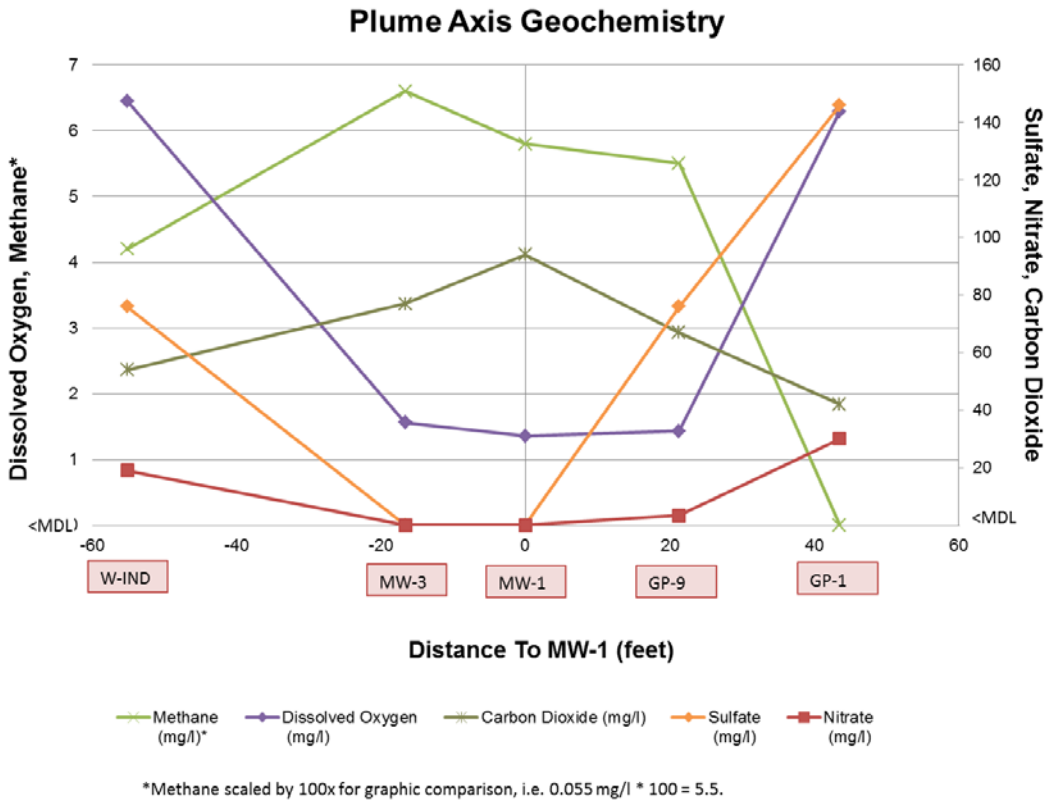
Dissolved oxygen concentrations were lower within the monitoring wells and soil boring groundwater samples in which petroleum hydrocarbons were detected than in soil boring groundwater samples where no petroleum hydrocarbons were detected, which is typical of sites undergoing anaerobic biodegradation. Dissolved oxygen was present in both shallow and deeper groundwater zones outside of the immediate plume area, ranging from 3.18 mg/l to 8.70 mg/l in grab groundwater samples. Within the plume, however, dissolved oxygen was depleted, with concentrations of 0.33 mg/l and 0.24 mg/l in GP-8 and GP-9 in the shallow groundwater zone, and 0.99 in the deeper groundwater zone in GP-8.

Oxidation reduction potential (ORP) across the site favored anaerobic reduction, varying from 75.1 mV to -202.7 mV (GP-5 ORP was -281.5, but was approximately 300 feet east of the source area at the site). Generally, ORP increased away from the source area.

Alkalinity is an indicator of microbial respiration due to release of organic acids by microbes which dissolves carbonate minerals or increased dissolved carbon dioxide forming dissolved bicarbonate. In the source area, microbial populations would increase due to the presence of a food source. Alkalinity also serves to buffer groundwater pH from becoming more acidic due to release of organic acids by microorganisms.

The aforementioned metabolic by-products were detected at elevated concentrations in groundwater sampled from within the plume as compared to groundwater from wells located upgradient and cross-gradient of the former tank area.

The following chart microbial kinetics chart shows that microbial kinetics within the plume are rapid at the site, with anaerobic electron acceptors oxygen, nitrate and sulfate being depleted and anaerobic by-products methane and carbon dioxide being elevated within the source area:



3.3 Additional Lines Of Evidence

Additional lines of evidence for NA processes at the site can include modeling or other analysis that provide additional perspective regarding processes at the site. Taber Consultants used an EPA-recommended modeling tool that incorporates capacity with site data to predict migration and degradation. The chromatograms also provide evidence that natural processes are weathering the TPH-SS at the site.

3.3.1 Bioscreen-AT

Taber Consultants completed a supplementary analysis of NA processes at the site using *Bioscreen-AT Natural Attenuation Decision Support System, Version 1.43* (Bioscreen-AT) Bioscreen-AT is a screening-level model developed for and distributed by the EPA that simulates remediation through natural attenuation of dissolved hydrocarbons at petroleum fuel release sites. Bioscreen-AT is an enhancement of the standard Excel based Bioscreen program. In Bioscreen-AT a second solution method can be chosen as an alternative to the Domenico solution. The alternative method is an exact three-dimensional analytical solution for solute transport within a semi-infinite aquifer. This solution, unlike the Domenico solution, is exact and avoids the introduction of numerical error into the solution.

Input parameter values for the Bioscreen-AT model to simulate the migration of TPH-SS were based on laboratory results from soil samples taken to evaluate soil parameters (Table 8), geochemical data obtained from site groundwater samples during the site investigation and historical site conditions. Parameters such as hydraulic conductivity and hydraulic gradient were selected to present a conservative estimate of plume fate and transport. The following parameter values were used in the model:

- hydraulic conductivity of 5.2E-03 centimeters per second (cm/s) based on the K value at GeoProbe® boring GP-10;
- effective porosity of 0.15, the average value in the shallow groundwater zone;
- average soil density (1.5 kg/L);
- average fraction organic content (2.5%)
- hydraulic gradient of 0.02 ft/ft based as a reasonable gradient for the site conditions;
- based on the distribution of TPH-SS in grab groundwater samples, a plume length of 100 feet and a plume width of 60 feet was simulated;
- the distribution coefficient was conservatively simulated as 100 l/kg, by reason that laboratory analysis of grab groundwater samples indicate that more mobile species such as benzene are minimal at the site; therefore an average of distribution coefficients for BTEX compounds would provide a reasonable estimation of a petroleum hydrocarbon mixture;
- a first-order degradation coefficient of 1.13 years was calculated from MW-3 using groundwater monitoring data from June 2007 until March 2011, during which time concentrations of TPH-SS steadily declined;
- delta oxygen observed was 8.46 mg/l;
- delta nitrate observed was 12.57 mg/l;
- ferrous iron was not observed at the site, which could be a result of reactions with sulfide or sorption into the aquifer matrix, therefore the recommended Bioscreen AT concentration of 16.6 mg/l was used;
- delta sulfate observed was 178.18 mg/l;
- the maximum methane concentration observed at the site was 0.064 mg/l.

Results from the Bioscreen AT program indicate that benzene and TPH-SS impacts to groundwater are not likely to migrate beyond the immediate vicinity of the site. Bioscreen AT input data and selected output charts are provided on Figures 10 through 21 for 5-, 10- and 50-year simulations, first assuming no degradation, and then 1st order decay. If there was no COC degradation, the size of the plume for TPH-SS would expand further. However, applying the degradation rates recently observed at MW-3 in the 1st order degradation simulations, Figures 13, 17 and 21 indicate decreasing plume dimensions over time. The charts demonstrate that biodegradation reactions are likely to result in significant reductions in COC concentrations and mass in site groundwater within a relatively short time frame of five years. In summary, the Bioscreen AT model provides a line of evidence that NA processes are now remediating the residual concentration of TPH-SS in site groundwater. The Bioscreen manual is included as Appendix D.

3.3.2 Chromatography Analysis

The chromatograms for TPH-G and TPH-SS analysis of soil samples in GP-8 and GP-12 illustrate of the weathered nature of the petroleum hydrocarbons across the site and the progress of NA processes at the site. Analysis of the chromatograms reveal that while TPH-G range hydrocarbons are quantifiable at the site, the material is actually likely to be weathered TPH-SS.

Soil samples GP-8-16.5 and GP-12-16.5 had peaks within TPH-G range and were quantified at 5.3 mg/kg and 690 mg/kg, respectively. Analysis of the chromatograms in comparison to the TPH-G standard, however, shows that neither sample has a typical chromatogram for TPH-G, with the bulk of the curve eluting after 4 minutes, forming a hump with stunted peaks indicating weathering of more volatile compounds.

Quantification for TPH-SS in soil samples GP-8-16.5 and GP-12-16.5, however, had concentrations of 30 mg/kg and <10 mg/kg. The shape and curve of the chromatogram peaks, however, are composed of corresponding peaks eluting at corresponding times, and the individual peaks of both chromatograms are reduced in magnitude compared to the TPH-SS standard chromatogram. The standard, GP-8-16.5 and GP-12-16.5 TPH-G chromatograms and the standard, GP-8-16.5 and GP-12-16.5 TPH-SS chromatograms are attached as Appendix E. The chromatograms are marked to show the relative locations of the peaks of the standard to the peaks of the sample chromatograms.

3.3.3 Weathering of TPH-SS

An additional indicator of NA at the site is that concentrations of weathered TPH-SS are elevated relative to TPH-SS. The relative proportion of TPH-SS to weathered TPH-SS is approximately 1:2 in 2011 site investigation grab groundwater samples from GP-4, GP-8, GP-9, GP-10. Concentrations of TPH-SS in grab groundwater samples obtained in the plume periphery are below laboratory reporting limits (<50 mg/kg), while concentrations of weathered TPH-SS from plume boundaries samples are low (~150 mg/kg). As the more bioavailable and easily weathered TPH-SS is degraded, increasingly recalcitrant compounds are left. These compounds are likely to degrade more slowly as less-readily degraded and less mobile compounds become the predominant chemical species at the site.

4.0 REFERENCES

AEI Consultants, *Groundwater Monitoring Well Installation Report*, July 31, 2009.

AEI Consultants, *Interim Source Removal Report*, August 31, 2009.

ASTM International, *ASTM E 1943 – 98, Standard Guide for Remediation of Ground Water by Natural Attenuation at Petroleum Release Sites*, reapproved 2004.

Bioscreen Natural Attenuation Decision Support System, *User's Manual Version 1.3*, National Risk Management Research Laboratory, August 1996.

Dugan Associates, *Soil and Grab Groundwater Sampling Report*, May 4, 1998.

Map Unit Description: Urban Land-Clear Lake Complex–Alameda County, California, Western Part, Natural Resources Conservation Service, Soil Maps Version 2, July 27, 2010, Soil Data Version 6, July 27, 2010.

5.0 SCHEDULE OF UPCOMING ACTIVITIES

On behalf of Ms. Paulette Satterley, Taber Consultants was directed by the ACHCSA to perform further site characterization and site investigation. Taber Consultants has completed field activities at the site including soil borings, natural attenuation analysis sampling, vapor sampling and preferential pathway determination. Results of these investigative activities will provide the basis for the *Site Conceptual Model* (SCM).

In August, 2011, Taber Consultants collected monitoring data for the Second Semi-Annual Groundwater Monitoring Report for 2011. Taber Consultants will compile that monitoring data with historical data to further evaluate trends at the site.

6.0 CONCLUSIONS AND RECOMMENDATIONS

Concentrations of TPH-SS in MW-1, MW-2 and MW-3 groundwater samples exceed the general TPH taste and odor threshold of 100 ug/L for middle distillates as defined by the San Francisco Bay Regional Water Quality Control Board. Historically, the concentration of TPH-SS has also exceeded the groundwater nuisance and odor concerns screening level of 5,000 ug/L for TPH.

However, the NA analysis above indicates that the TPH-SS plume at the site is shrinking, leaving low-mobility, more recalcitrant weathered TPH-SS in its place. Currently, electron acceptors oxygen, nitrate and sulfate are depleted in groundwater samples containing TPH-SS relative to groundwater samples where TPH-SS is not present (outside the TPH-SS plume). Presence of higher concentrations of electron acceptors outside the plume suggest that the TPH-SS plume will not migrate further due to NA capacity of groundwater near the plume.

Proximity of the Zimmerman Residence plume to the site, upgradient to the east and cross gradient to the south, could have affected availability of electron acceptors in the source area. Remediation at the Zimmerman Residence, including H2O2 injection and air sparging, may have reduced the impact of that plume on electron acceptors at the City of Paris. However, these effects would be recent and difficult to quantify in the near-term. Continued decreases in TPH-SS concentrations over in the wells at City of Paris would provide a positive indication that NA processes have improved at the site.

A sensitive receptor survey, the results of which were included in the *Site Investigation Report* (SIR) dated February 1, 2011 found no domestic wells, irrigation wells or public water supply wells located within a one-mile radius of the site, therefore exposure to impacted groundwater is not considered a complete exposure pathway. The *Human Health Risk Assessment* dated February 1, 2011, found that risks at the site to human health were below the target values for cancer risk and hazard quotient.

Taber Consultants recommends a *Problem Assessment Report* (PAR) to identify what, if any, additional site investigation and/or remedial strategies are required and feasible at the site. If the site is suitable for a low risk closure, site closure and site restoration activities including well abandonment of the monitoring wells and the industrial well would be appropriate.

7.0 REPORT DISTRIBUTION

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1131 Harbor Parkway, Suite 250
Alameda CA, 94502

Ms. Cherie McCaulou
San Francisco Bay Regional Water Quality Control Board
1515 Clay St., Suite 1400
Oakland, CA 94612

8.0 REMARKS AND SIGNATURE

The interpretations and/or conclusions contained in this report represent our professional opinions and are based in part on information supplied by the client. These opinions are based on currently available information and were developed in accordance with currently accepted geologic, hydrogeologic, and engineering practices in Alameda County, California in 2012. Other than this, no warranty is implied or intended.

This report has been prepared solely for the use of Ms. Paulette Satterley. Any reliance on this report by third parties shall be at such parties' sole risk. The work described herein was performed under the direct supervision of the professional geologist, registered with the State of California, whose signature appears below.

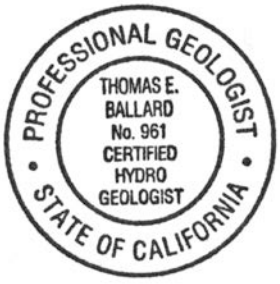
We appreciate the opportunity to provide you with geologic, engineering and environmental consulting services and trust this report meets your needs. If you have any questions or concerns, please call us at (916) 371-1690.

Sincerely,

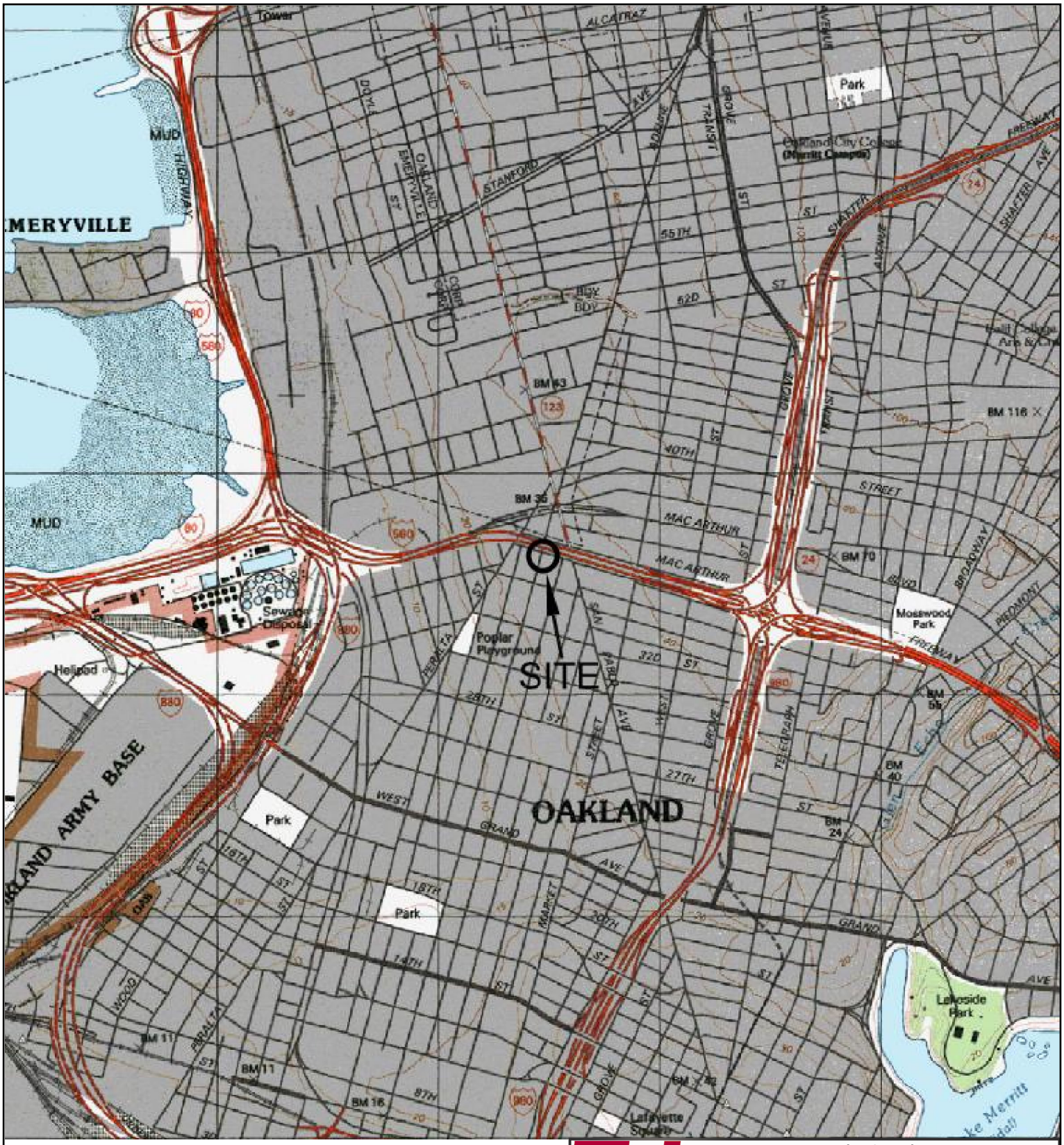
Taber Consultants

Ellen Pyatt, MSc.

Thomas E. Ballard, P.G. 7299, C.H.G. 961
Principal, Senior Hydrogeologist



FIGURES



Scale: 1:24,000

Source:
USGS West Oakland Quadrangle Topographic Map Report, 7.5 Minute Series (topgraphic), dated 1993

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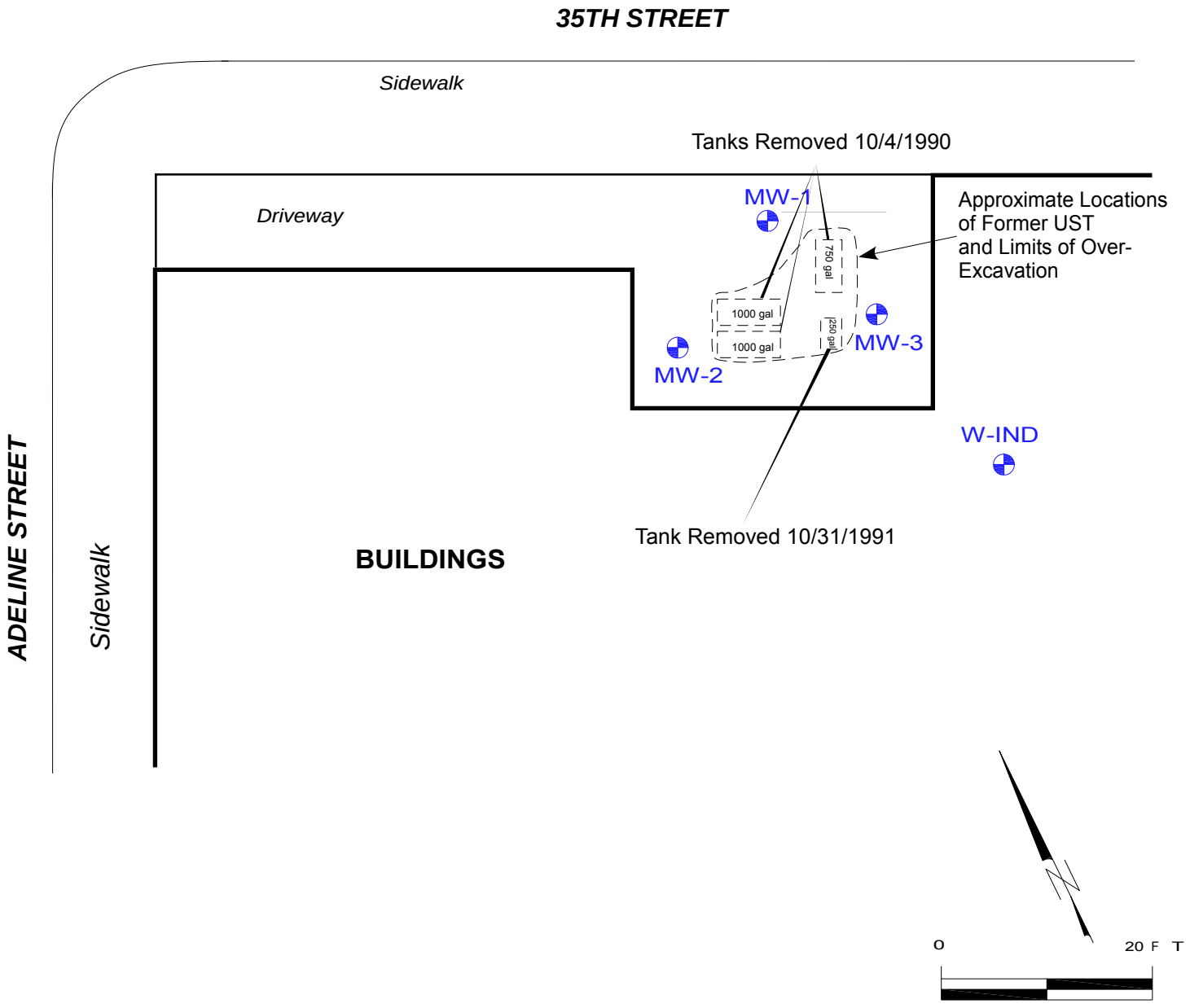
Former City of Paris Cleaners

3516 Adeline Street
Oakland, California

Vicinity Map

2011-0107	November 2011	Figure 1



LEGEND

- MW-2 GROUNDWATER MONITORING WELL
- W-IND INDUSTRIAL WELL
- 250 gal APPROXIMATE UNDERGROUND STORAGE TANK LOCATIONS

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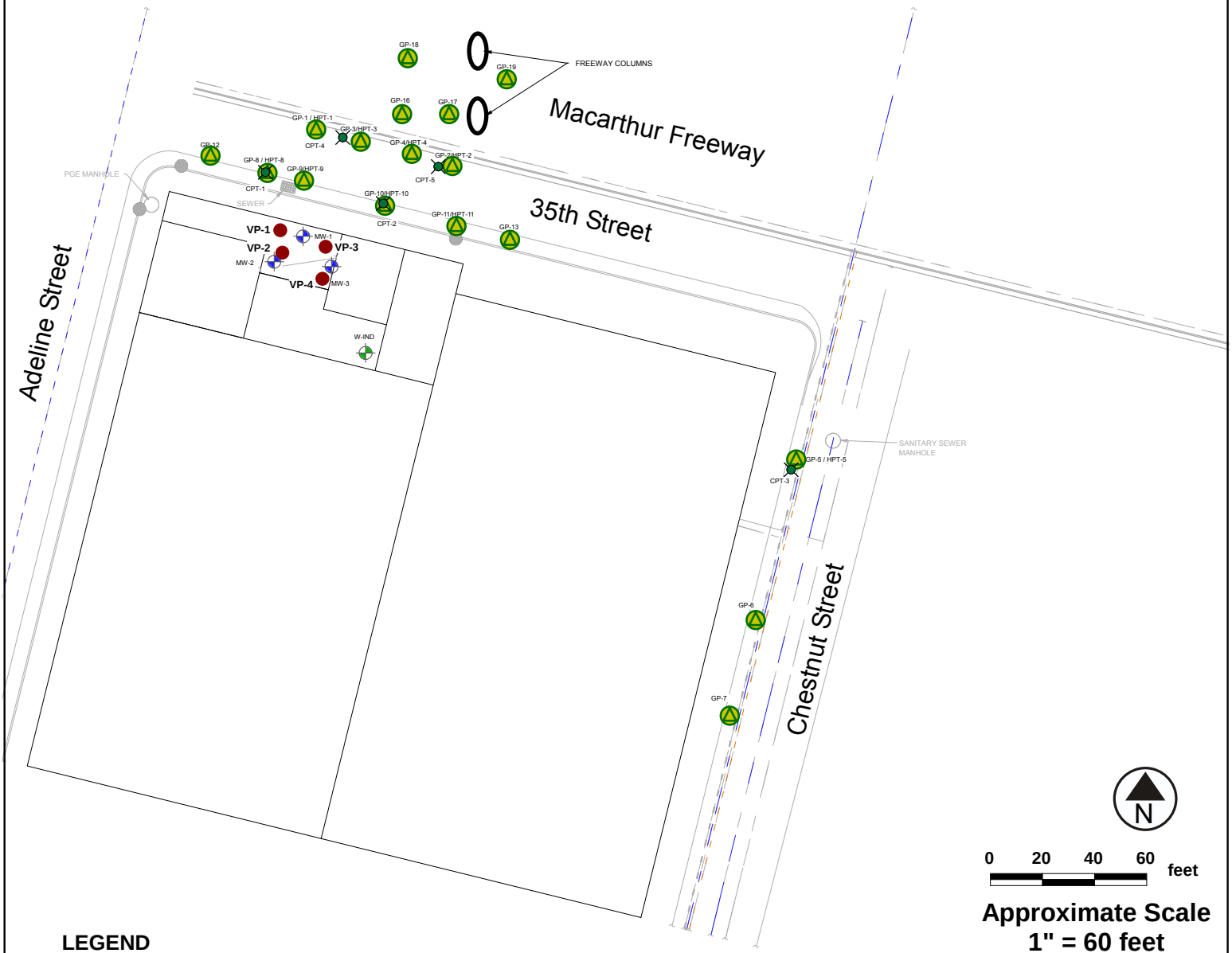
Site Map

051074	June 2011	Figure 2



Approximate Scale
1" = 60 feet

LEGEND

- MW-3 GROUNDWATER MONITORING WELL
- W-IND INDUSTRIAL WELL
- CPT-3 CONE PENETROMETER TEST BORING
- GP-3/HPT-3 GEOPROBE/HYDRAULIC PROFILING TOOL BORING
- SOIL VAPOR SAMPLING POINTS
- WATER/SEWER UNDERGROUND CONDUIT
- PG&E UNDERGROUND CONDUIT
- UNKNOWN UNDERGROUND CONDUIT (LOCATOR)
- UTILITY ACCESS COVER

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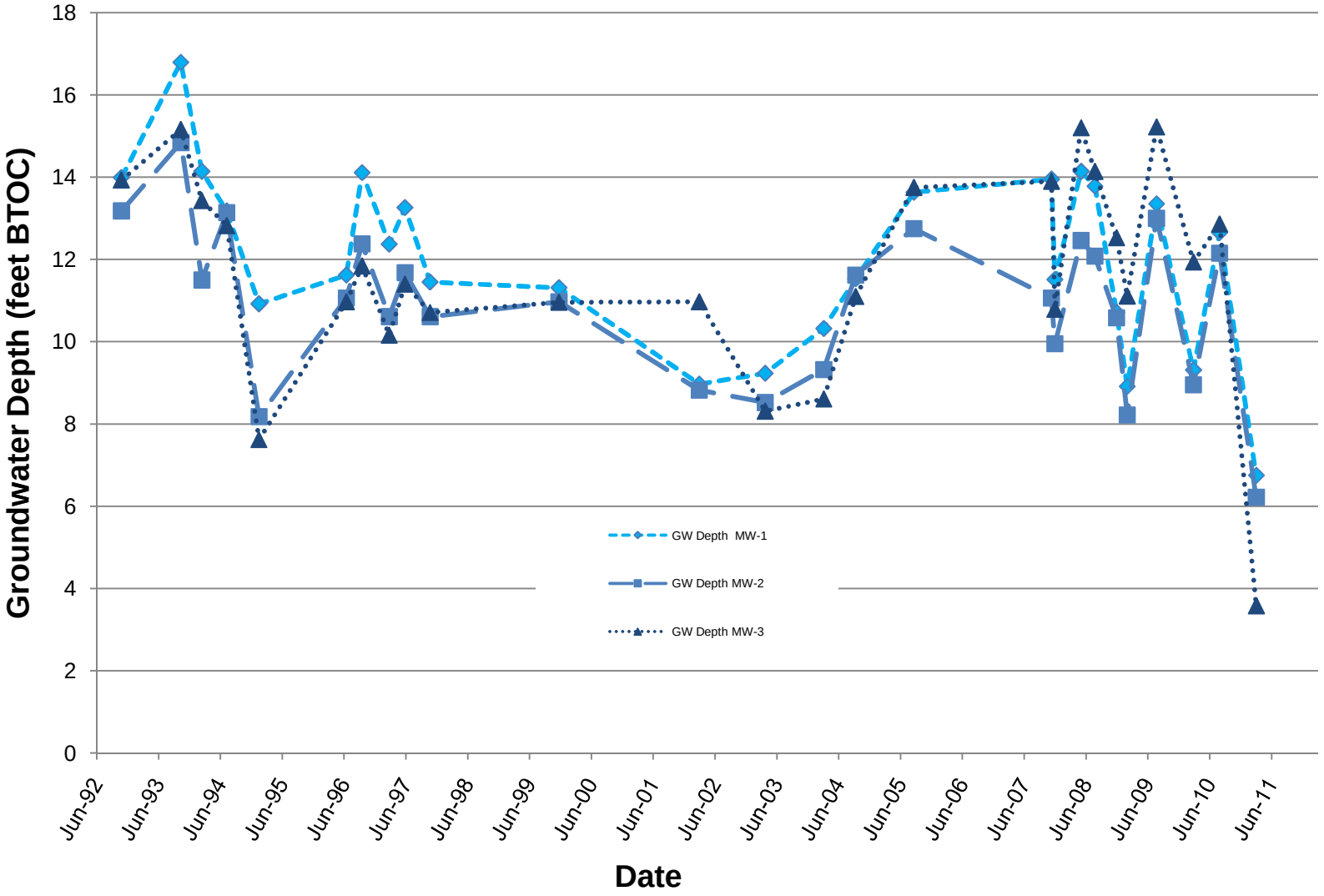
CITY OF PARIS

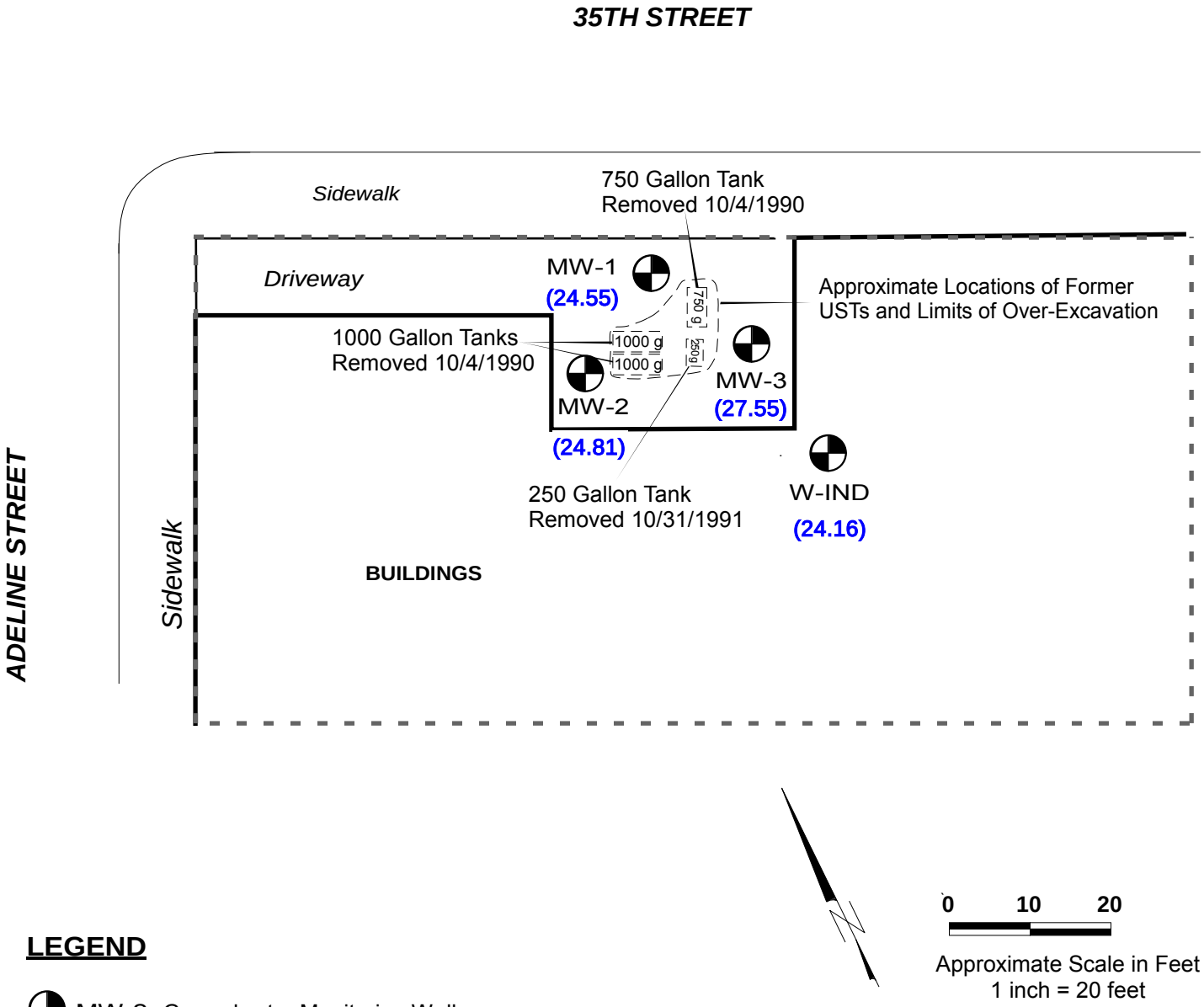
3516 Adeline Street
Oakland, CA

Soil Boring Map

051074	June 2011	Figure 3

Figure 4. Groundwater Hydrograph MW-1, MW-2 and MW-3





0 10 20

Approximate Scale in Feet
1 inch = 20 feet

LEGEND

- MW-2 Groundwater Monitoring Well
- W-IND Industrial Well
- [750 g] Approximate Locations Former Underground Storage Tanks
- Approximate Site Boundary (Assessor's Parcel Number 5-478-23)
- (27.55) Groundwater Elevation (feet Above Mean Sea Level)

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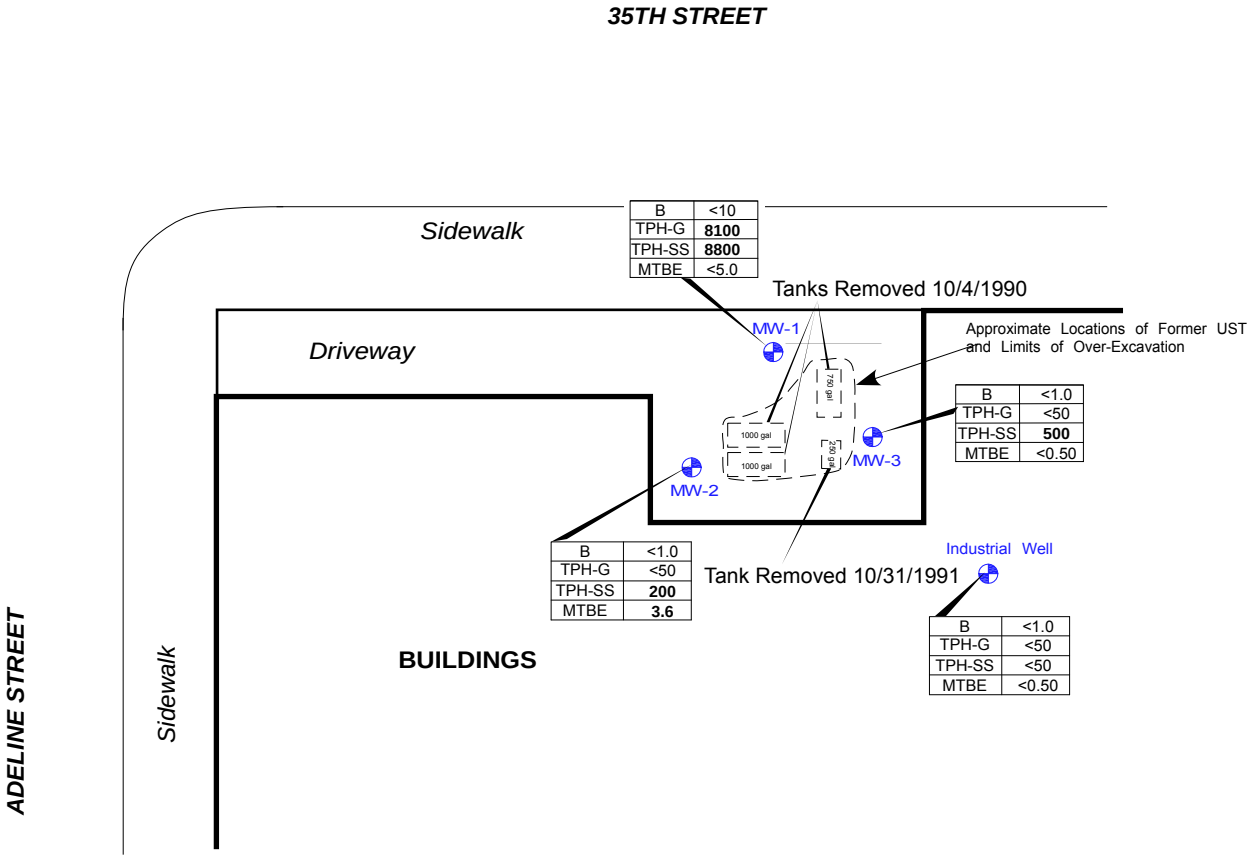
March 23, 2011 Groundwater Elevations

051074	July 2011	Figure 5



0 20 FT

APPROX. SCALE

LEGEND

MW-1 GROUNDWATER MONITORING WELL

250 gal APPROXIMATE UNDERGROUND STORAGE TANK LOCATIONS

B	<0.50
TPH-SS	<50
TPH-G	<50
MTBE	1.2

BENZENE CONCENTRATION IN MICROGRAMS PER LITER (ug/L)

TOTAL PETROLEUM HYDROCARBONS AS STODDARD SOLVENT IN ug/L

TOTAL PETROLEUM HYDROCARBONS AS GASOLINE IN ug/L

METHYL TERTIARY BUTYL ETHER IN ug/L

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Groundwater Analytical Concentrations

051074	March 23, 2011	Figure 6

Figure 7. MW-1 TPH-SS,TPH-G, and Groundwater Depth

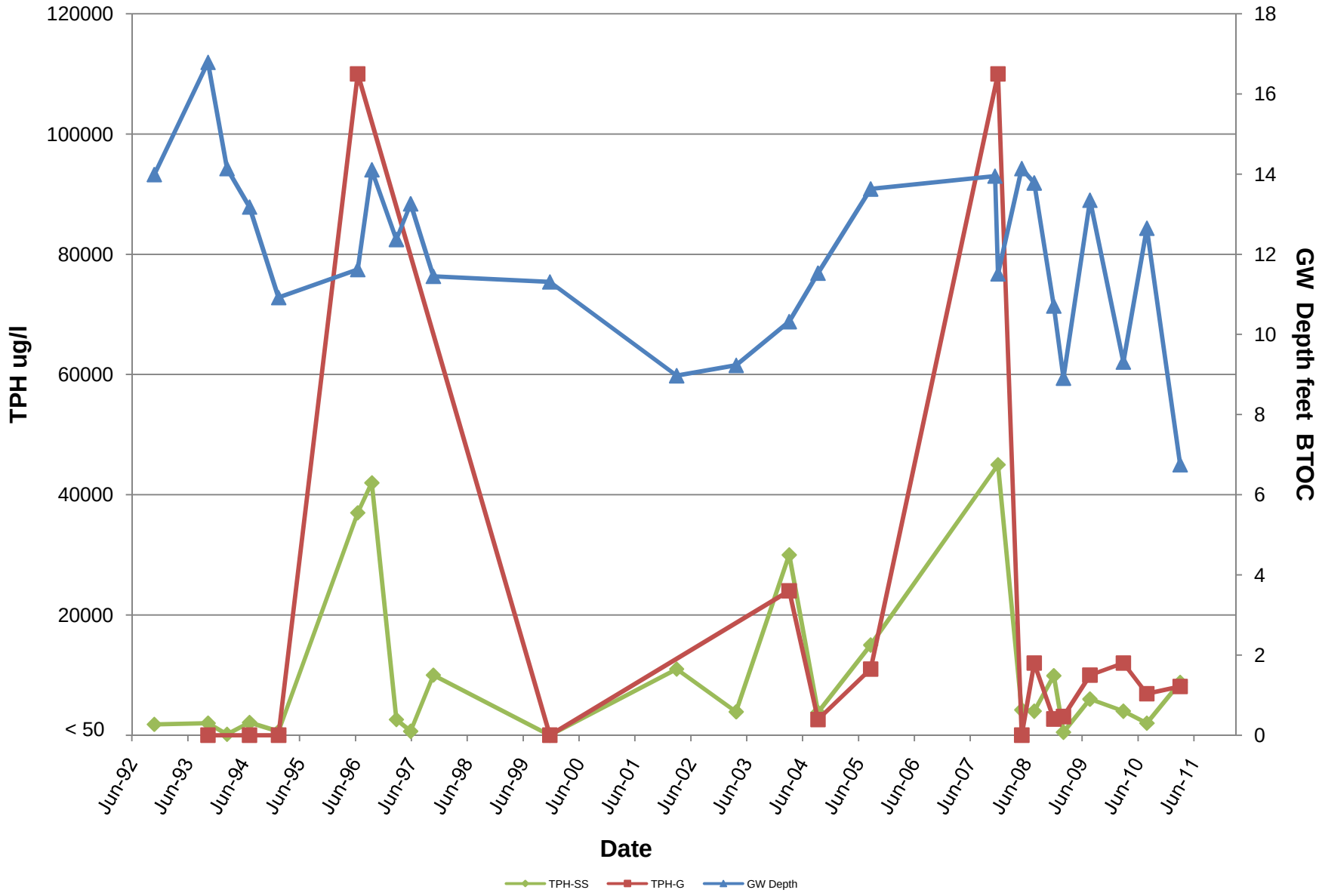


Figure 8. MW-2 TPH-SS, TPH-G, and Groundwater Depth

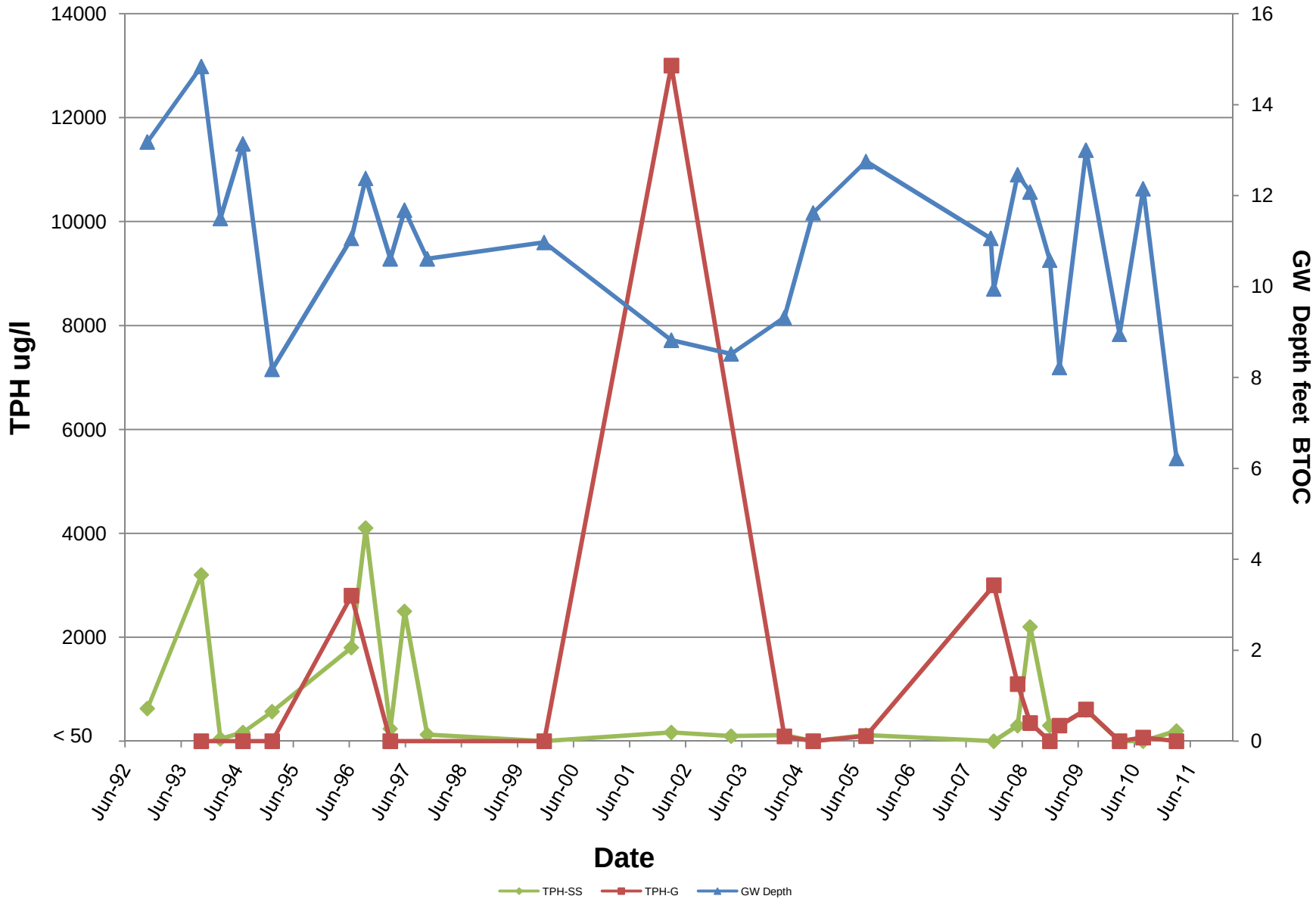


Figure 9. MW-3 TPH-SS, TPH-G, and Groundwater Depth

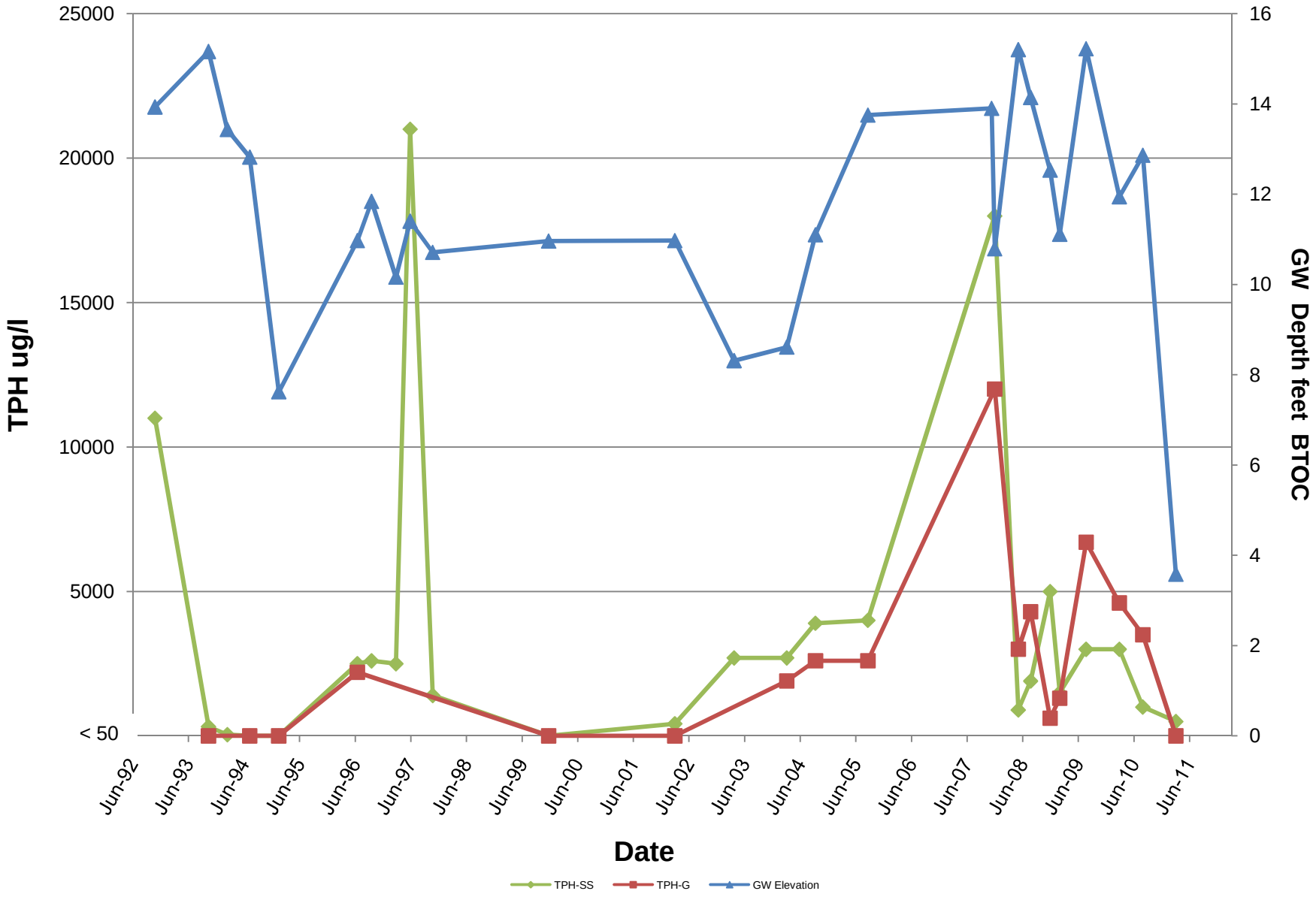


Figure 10. BioScreen AT Input Screen

5-Year Simulation, Koc = 100

BIOSCREEN-AT Natural Attenuation Decision Support System

S.S. Papadopulos & Associates, Inc. — *Version 1.43* — *M.Karanovic (Jul 2007)*

Data Input Instructions:

115 → 1. Enter value directly....or

↑ or

0.02 → 2. Calculate by filling in grey cells below. (To restore formulas, hit button below).

Variable* → Data used directly in model.

20 → Value calculated by model. (Don't enter any data).

1. HYDROGEOLOGY

Seepage Velocity*	Vs	717.354	(ft/yr)
or		↑ or	
Hydraulic Conductivity	K	5.2E-03	(cm/sec)
Hydraulic Gradient	i	0.02	(ft/ft)
Porosity	n	0.15	(-)

2. DISPERSION

Longitudinal Dispersivity*	alpha x	7.061	(ft)
Transverse Dispersivity*	alpha y	0.706	(ft)
Vertical Dispersivity*	alpha z	0.000	(ft)
or		↑ or	
Estimated Plume Length	Lp	100	(ft)

3. ADSORPTION

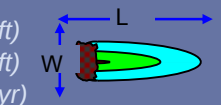
Retardation Factor*	R	2501.0	(-)
or		↑ or	
Soil Bulk Density	rho	1.5	(kg/l)
Partition Coefficient	Koc	100	(L/kg)
FractionOrganicCarbon	foc	2.5E+0	(-)

4. BIODEGRADATION

1st Order Decay Coeff*	lambda	6.1E-1	(per yr)
or		↑ or	
Solute Half-Life	t-half	1.13	(year)
or Instantaneous Reaction Model			
Delta Oxygen*	DO	8.46	(mg/L)
Delta Nitrate*	NO3	12.57	(mg/L)
Observed Ferrous Iron*	Fe2+	16.6	(mg/L)
Delta Sulfate*	SO4	178.18	(mg/L)
Observed Methane*	CH4	0.064	(mg/L)

5. GENERAL

Modeled Area Length*	100	(ft)
Modeled Area Width*	60	(ft)
Simulation Time*	5.00	(yr)

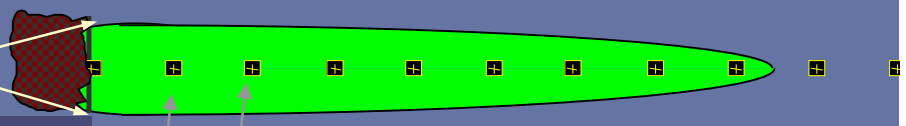


6. SOURCE DATA

Source Thickness: 10 (ft)

Source	
Width (ft)	Conc.(mg/L)
60	8.8

☐ Exponentialy Decaying Conc.



View of Plume Looking Down

Observed Centerline Concentrations at Monitoring Wells
If No Data Leave Blank or Enter "0"

7. FIELD DATA FOR COMPARISON

Dist. from Source (ft)	Concentration (mg/L)
0	8.8
10	
20	1.0
30	
40	
50	
60	.15
70	.0
80	
90	.0
100	

8. CHOOSE TYPE OF OUTPUT TO SEE:

RUN | **RUN**

View | **View Plume**

View BIOSCREEN

Recalculate This Sheet

Paste Example Dataset

Paste Dataset from BIOSCREEN

Restore Formulas for Vs,

Figure 11. BioScreen AT Plume Centerline TPH-SS 5-Year Simulation, Koc = 100

DISSOLVED HYDROCARBON CONCENTRATIONS IN PLUME (mg/L at Z=0)

Distance from Source (ft)

	0	10	20	30	40	50	60	70	80	90	100
No Degradation	8.800	0.451	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1st Order Decay	8.800	0.048	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Field Data from Site	8.800		1.000				0.150				

# of TimeSteps 20 | Displayed Time=5 years | Return to Input | View Plume Output

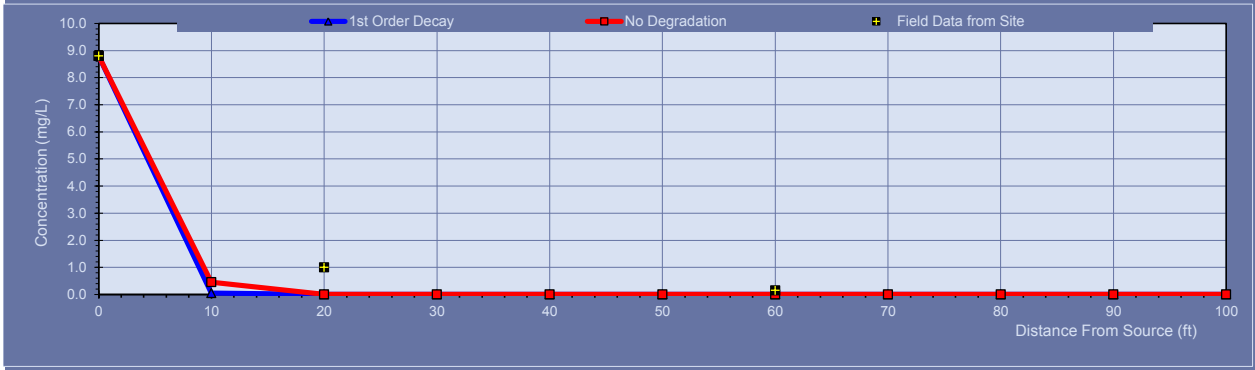


Figure 12. BioScreen AT Plume Contours TPH-SS
5-Year Simulation, No Degradation, Koc = 100

DISSOLVED HYDROCARBON CONCENTRATIONS IN PLUME (mg/L at Z=0)

Transverse distance (ft) / *Distance from Source (ft)*

	0	10	20	30	40	50	60	70	80	90	100
30	8.800	0.024	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
15	8.800	0.048	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0	8.800	0.048	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
-15	8.800	0.048	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
-30	8.800	0.024	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Model to Display:

Show 'No

Show Contour

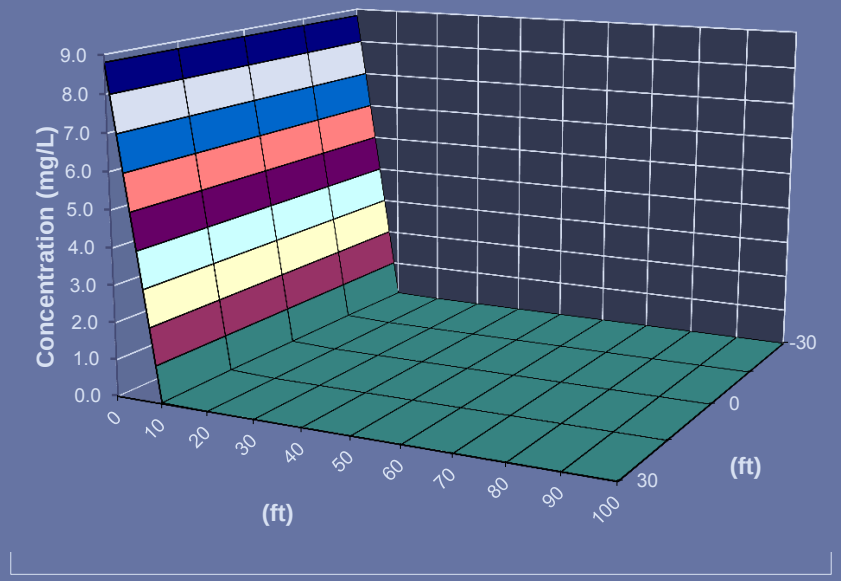
View Centerline

# of TimeSteps: 20

Displayed Time=5 years

Displayed Model: 1st order Decay

Return to Input



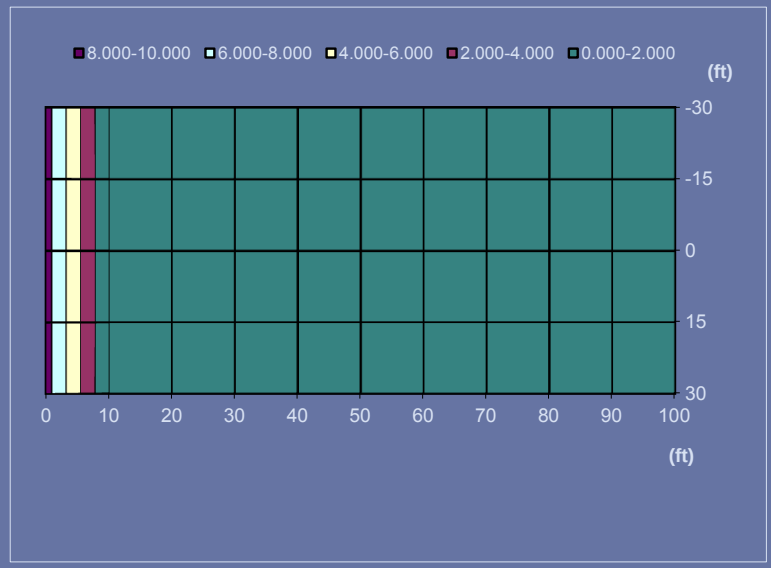


Figure 13. BioScreen AT Plume Contours TPH-SS

5-Year Simulation, First Order Degradation, Koc = 100

DISSOLVED HYDROCARBON CONCENTRATIONS IN PLUME (mg/L at Z=0)

Transverse distance (ft) / *Distance from Source (ft)*

	0	10	20	30	40	50	60	70	80	90	100
30	8.800	0.226	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
15	8.800	0.451	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0	8.800	0.451	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
-15	8.800	0.451	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
-30	8.800	0.226	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Model to Display:

Show '1st order

Show Contour

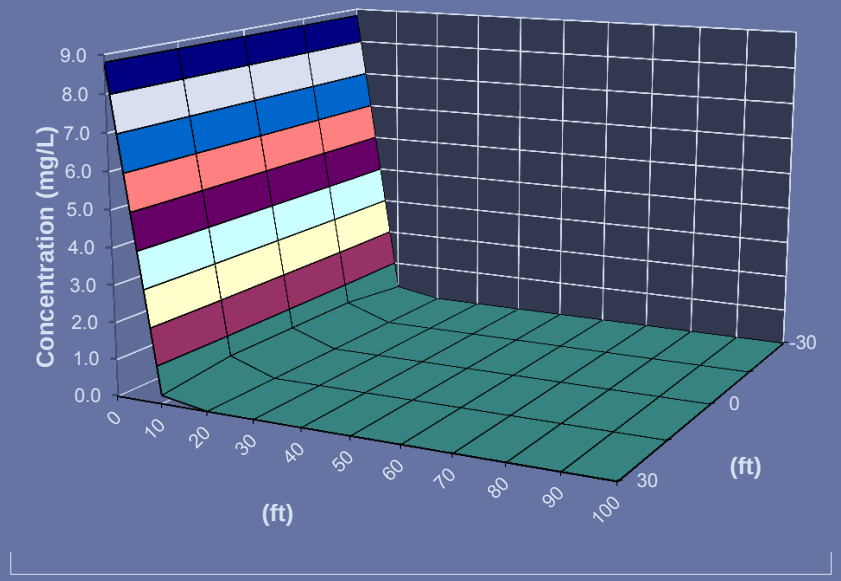
View Centerline

Return to Input

# of TimeSteps: 20

Displayed Time=5 years

Displayed Model: No Degradation



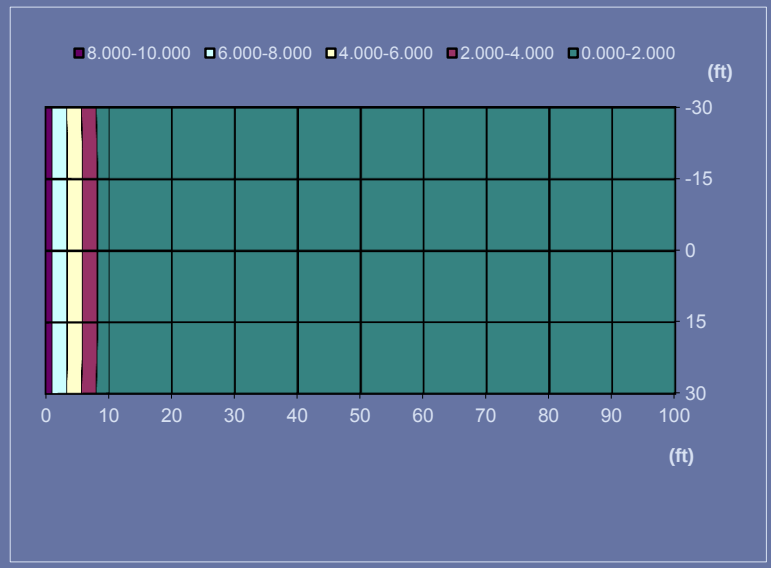


Figure 14. BioScreen AT Input Screen
10-Year Simulation, Koc = 100

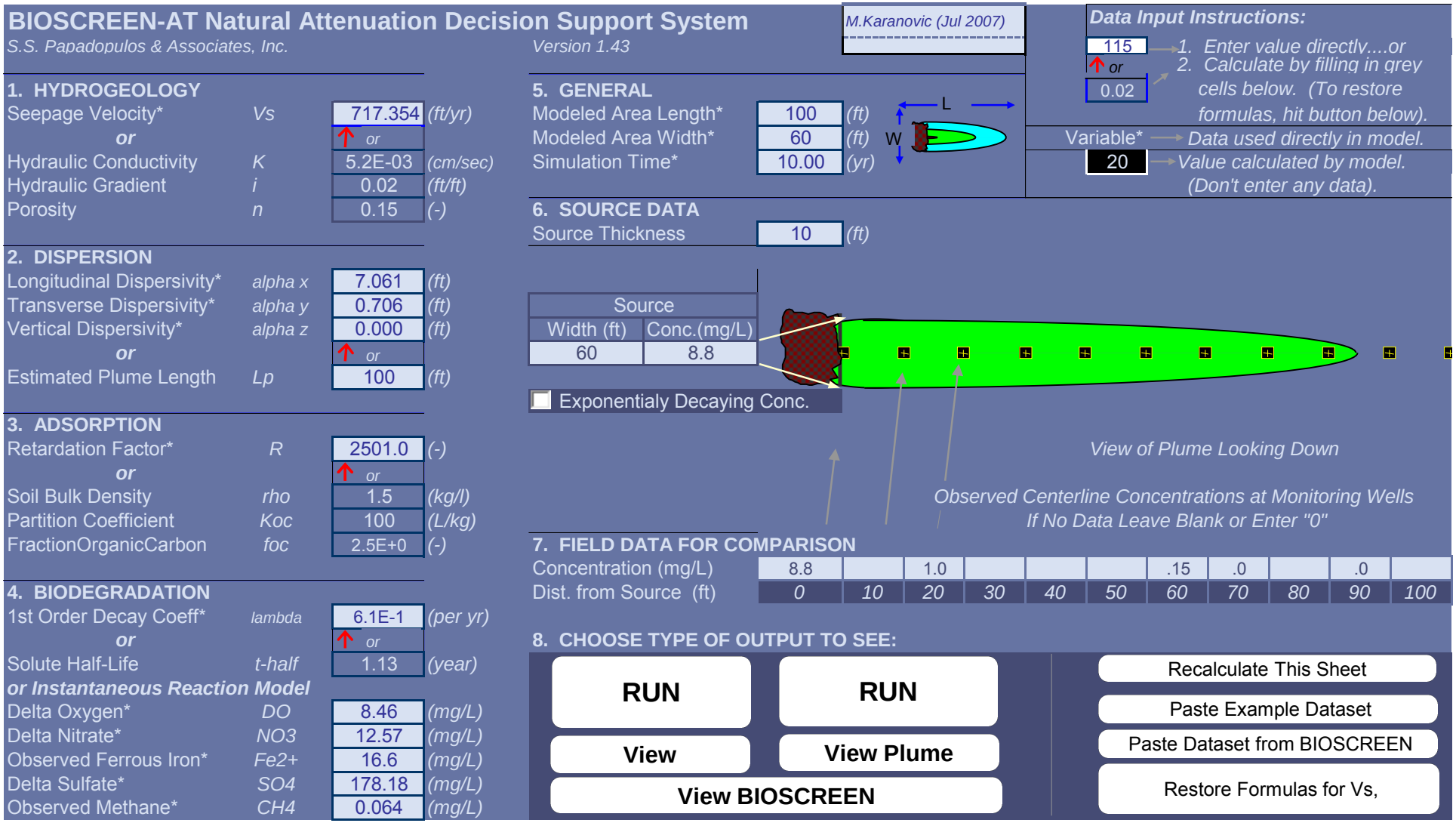


Figure 15. BioScreen AT Plume Centerline TPH-SS 10-Year Simulation, Koc = 100

DISSOLVED HYDROCARBON CONCENTRATIONS IN PLUME (mg/L at Z=0)

	Distance from Source (ft)										
	0	10	20	30	40	50	60	70	80	90	100
No Degradation	8.800	1.938	0.056	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1st Order Decay	8.800	0.069	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Field Data from Site	8.800		1.000				0.150				

# of TimeSteps: 20

Displayed Time=10 years

Return to Input | View Plume Output

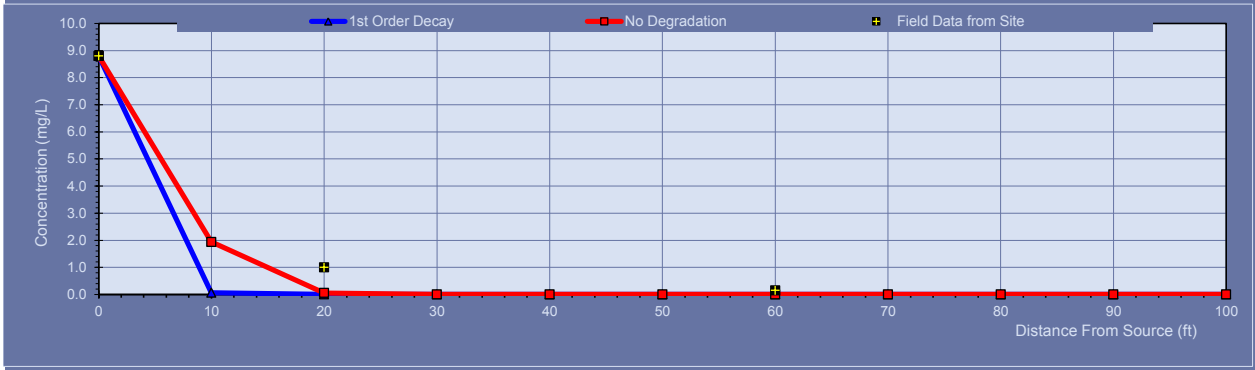


Figure 16. BioScreen AT Plume Contours TPH-SS

10-Year Simulation, No Degradation Koc = 100

DISSOLVED HYDROCARBON CONCENTRATIONS IN PLUME (mg/L at Z=0)

Transverse distance (ft) / *Distance from Source (ft)*

	0	10	20	30	40	50	60	70	80	90	100
30	8.800	0.969	0.028	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
15	8.800	1.938	0.056	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0	8.800	1.938	0.056	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
-15	8.800	1.938	0.056	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
-30	8.800	0.969	0.028	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Model to Display:

Show '1st order

Show Contour

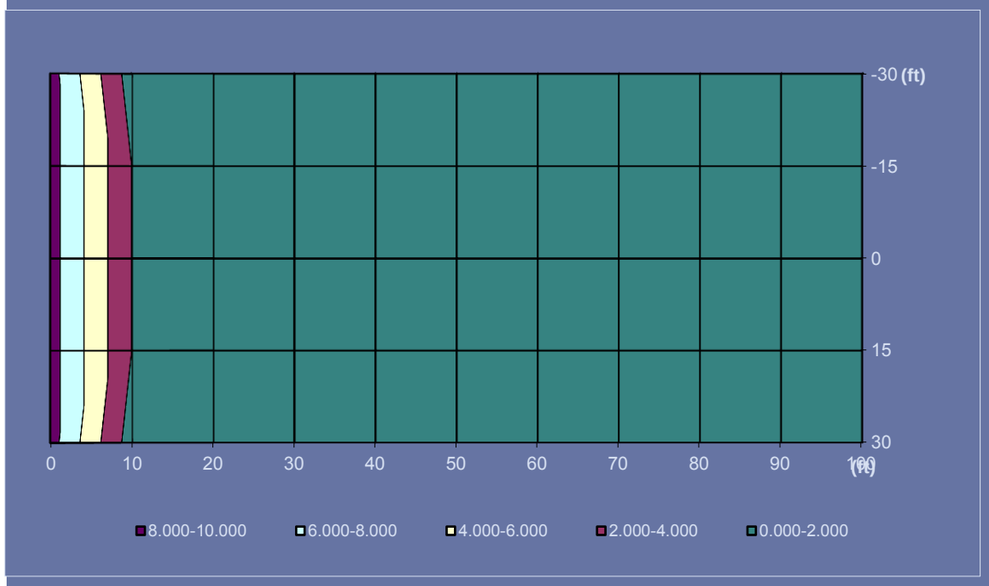
View Centerline

Return to Input

# of TimeSteps: 20

Displayed Time=10.00 years

Displayed Model: No Degradation



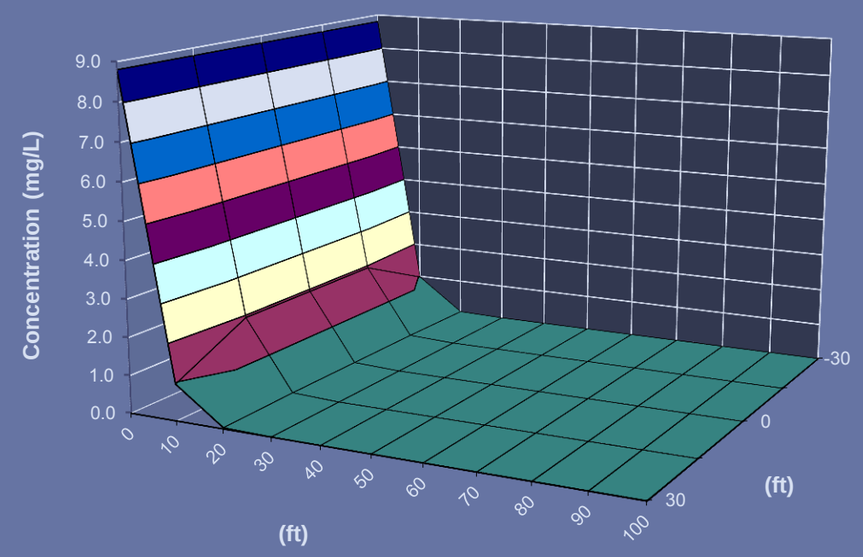


Figure 17. BioScreen AT Plume Contours TPH-SS
10-Year Simulation, First Order Degradation, Koc = 100

DISSOLVED HYDROCARBON CONCENTRATIONS IN PLUME (mg/L at Z=0)

Transverse distance (ft) / *Distance from Source (ft)*

	0	10	20	30	40	50	60	70	80	90	100
30	8.800	0.034	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
15	8.800	0.069	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0	8.800	0.069	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
-15	8.800	0.069	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
-30	8.800	0.034	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Model to Display:

Show 'No

Show Contour

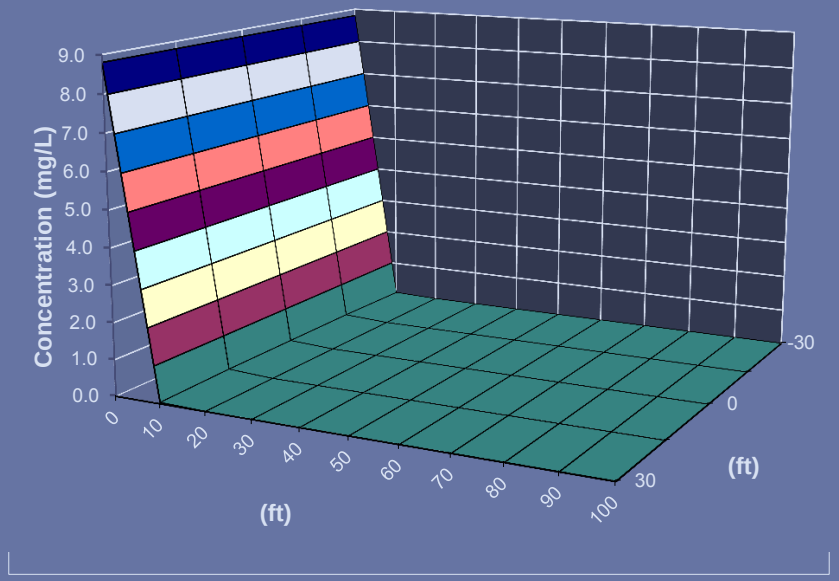
View Centerline

# of TimeSteps: 20

Displayed Time=10 years

Displayed Model: 1st order Decay

Return to Input



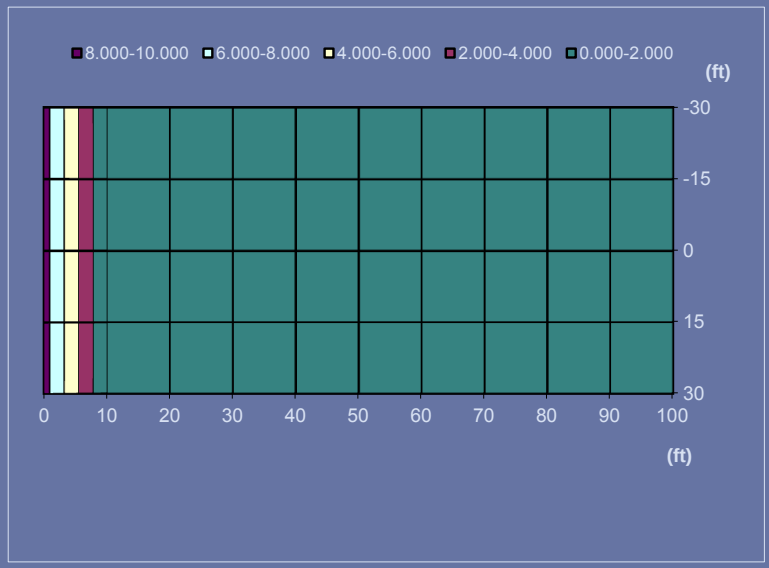


Figure 18. BioScreen AT Input Screen

50-Year Simulation, Koc = 100

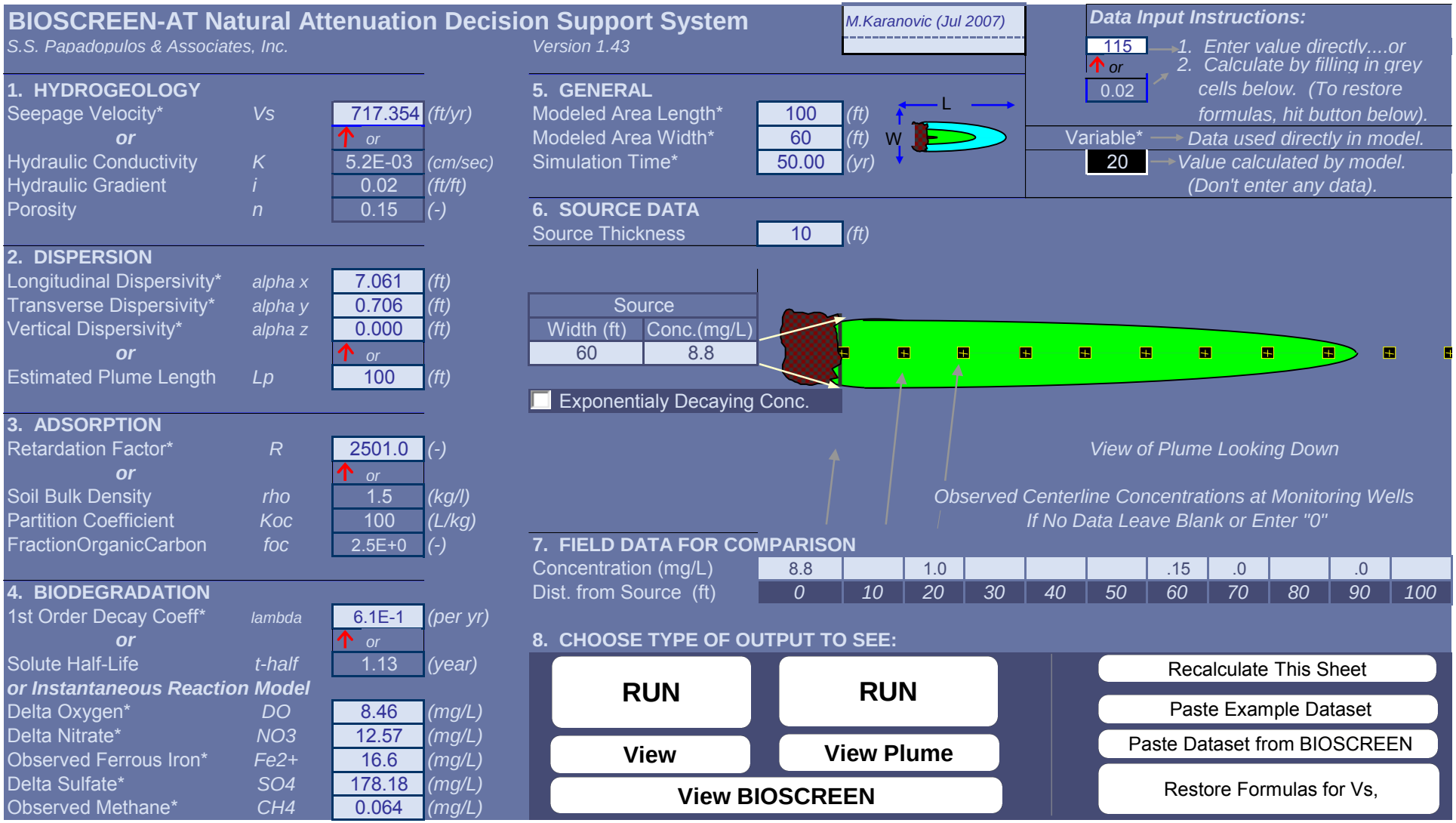


Figure 19. BioScreen AT Plume Centerline TPH-SS 50-Year Simulation, Koc = 100

	0	10	20	30	40	50	60	70	80	90	100
No Degradation	8.800	7.036	4.222	1.759	0.485	0.086	0.010	0.001	0.000	0.000	0.000
1st Order Decay	8.800	0.070	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Field Data from Site	8.800		1.000				0.150				

# of TimeSteps 20 | Displayed Time=50 years | Return to Input | View Plume Output

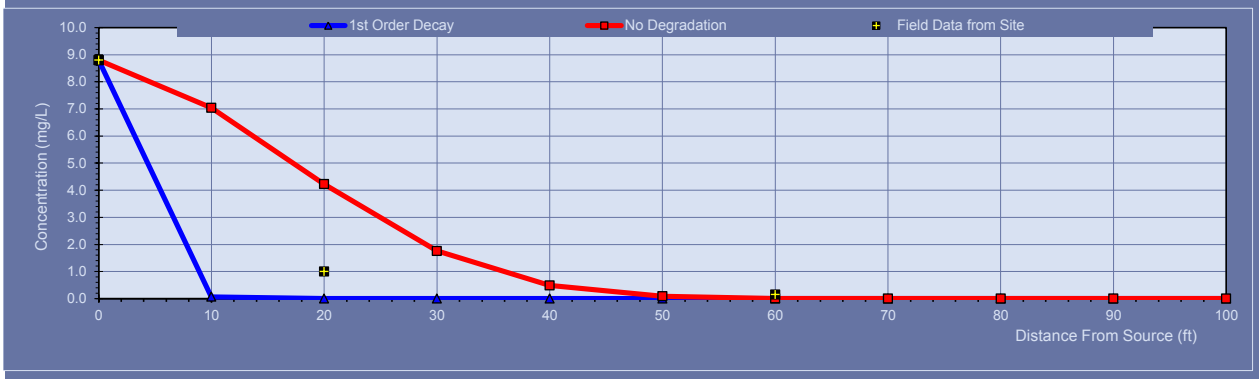


Figure 20. BioScreen AT Plume Contours TPH-SS
50-Year Simulation, No Degradation, Koc = 100

DISSOLVED HYDROCARBON CONCENTRATIONS IN PLUME (mg/L at Z=0)

Transverse distance (ft) / *Distance from Source (ft)*

	0	10	20	30	40	50	60	70	80	90	100
30	8.800	3.518	2.111	0.879	0.242	0.043	0.005	0.000	0.000	0.000	0.000
15	8.800	7.036	4.222	1.758	0.485	0.086	0.010	0.001	0.000	0.000	0.000
0	8.800	7.036	4.222	1.759	0.485	0.086	0.010	0.001	0.000	0.000	0.000
-15	8.800	7.036	4.222	1.758	0.485	0.086	0.010	0.001	0.000	0.000	0.000
-30	8.800	3.518	2.111	0.879	0.242	0.043	0.005	0.000	0.000	0.000	0.000

Model to Display:

Show '1st order

Show Contour

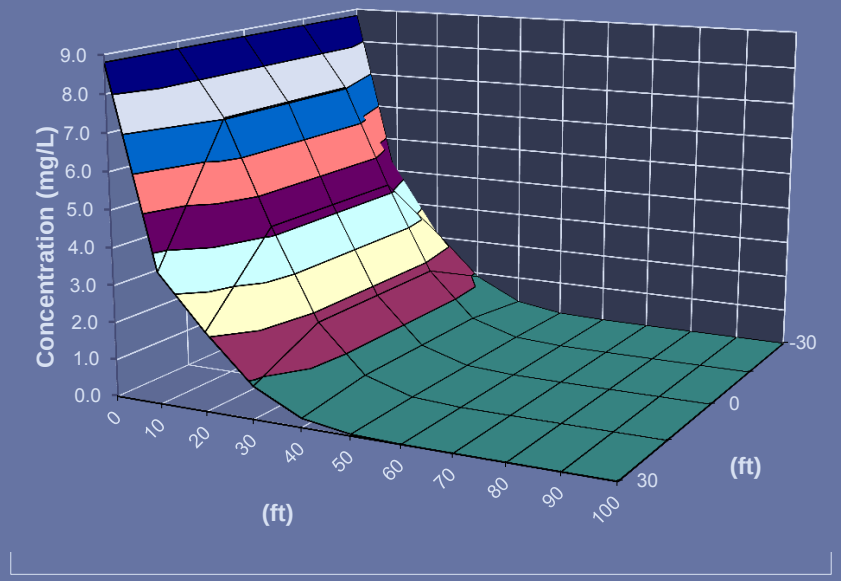
View Centerline

Return to Input

# of TimeSteps: 20

Displayed Time=50 years

Displayed Model: No Degradation



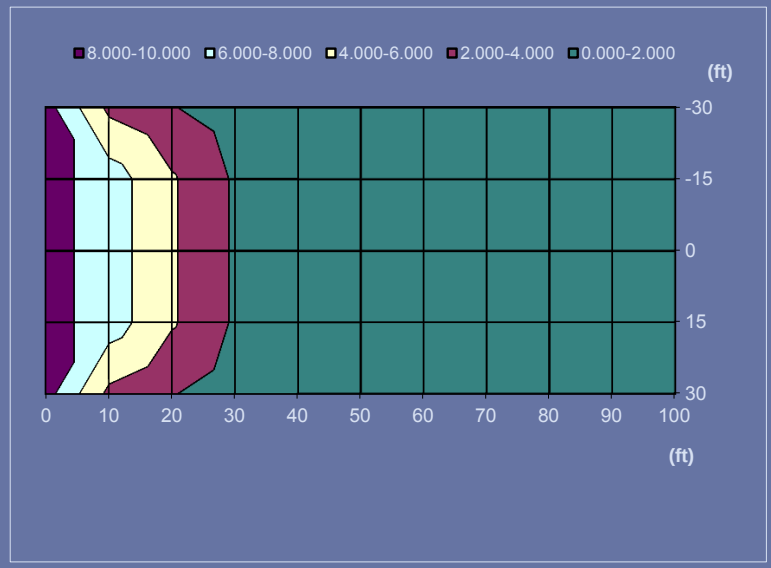


Figure 21. BioScreen AT Plume Contours TPH-SS
50-Year Simulation, First Order Degradation, Koc = 100

DISSOLVED HYDROCARBON CONCENTRATIONS IN PLUME (mg/L at Z=0)

Transverse distance (ft) — *Distance from Source (ft)*

	0	10	20	30	40	50	60	70	80	90	100
30	8.800	0.035	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
15	8.800	0.070	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0	8.800	0.070	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
-15	8.800	0.070	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
-30	8.800	0.035	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Model to Display:

Show 'No

Show Contour

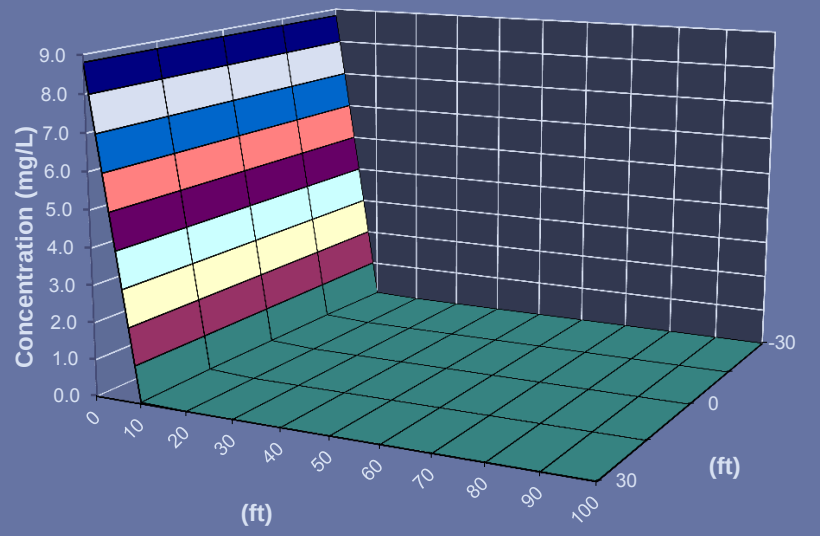
View Centerline

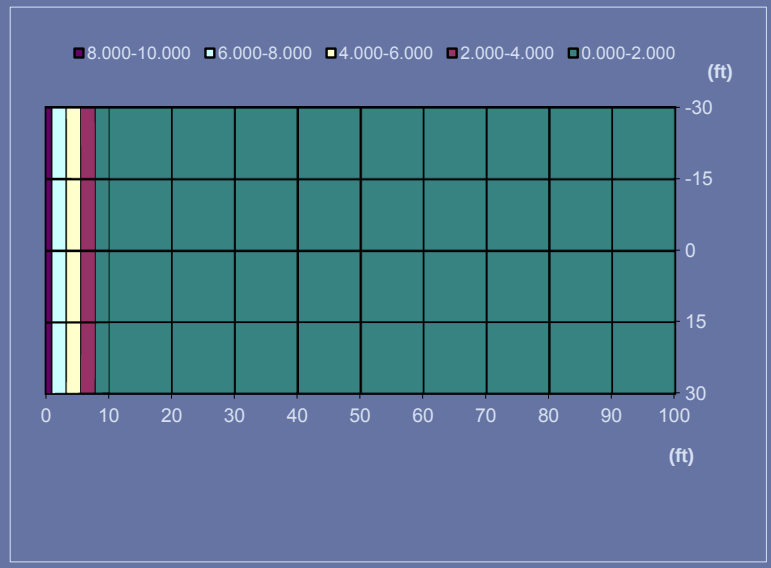
# of TimeSteps: 20

Displayed Time=50 years

Displayed Model: 1st order Decay

Return to Input





TABLES

TABLE 1
SOIL SAMPLE ANALYTICAL RESULTS
HISTORICAL INVESTIGATION SUMMARY
City of Paris Cleaners
3516 Adeline Street, Oakland, California 94608

Analytical Summary

Location ID	Date	Comments	TPH-SS	TPH-D	TPH-G	Benzene	Toluene	Ethyl benzene	Xylenes	MTBE
			mg/kg					ug/kg		
TE-1	10/4/1990	750 g tank	--		**290**	<150	<150	**400**	**5100**	--
TE-2	10/4/1990	750 g tank	--		**560**	<150	<150	<150	**11000**	--
TE-3	10/4/1990	1000 g tank	--		**370**	<150	<150	<150	**4700**	--
TE-4	10/4/1990	1000 g tank	--		**1**	<3	<3	<3	**9**	--
TE-5	10/4/1990	1000 g tank	--		**170**	<30	**54**	<30	**2100**	--
TE-6	10/4/1990	1000 g tank	--		**1000**	<150	<150	<150	**19000**	--
N1-9	1/17/1992	Pit Excavation Boundaries	**14**		**15**	<5.0	<5.0	<5.0	<5.0	--
E1-7	1/17/1992	Pit Excavation Boundaries	**9.8**		**110**	<5.0	<5.0	<5.0	**410**	--
S1-9	1/17/1992	Pit Excavation Boundaries	**140**		<10	<5.0	<5.0	<5.0	<5.0	--
W1-9	1/17/1992	Pit Excavation Boundaries	**47**		**55**	<5.0	**22**	<5.0	**16**	--
CPCS-1	10/31/1992	250-Gallon Tank, Soil	--		**130**	<76	**420**	**270**	**1500**	
CPCS-1	10/31/1992	250-Gallon Tank Water	--		**130**	<3	<3	**6**	**32**	
E1-4	3/31/1992	Bioremediation Mound	**4.2**		<10	<5	**5**	<5	<5	--
W1-4	3/31/1992	Bioremediation Mound	**7.3**		<10	<5	<5	<5	<5	--
MW-1-5	10/29/1992	Monitoring Well Installation	<10	<10	--	**0.3**	**12**	<0.2	<0.6	--
MW-1-10	10/29/1992	Monitoring Well Installation	**210**	<10	--	**1.1**	**21**	**12**	<0.6	--
MW-2-5	10/30/1992	Monitoring Well Installation	<10	<10	--	<0.2	**63**	**130**	**210**	--
MW-2-10	10/30/1992	Monitoring Well Installation	**17**	<10	--	<0.2	**120**	<0.2	**360**	--
MW-3-5	10/30/1992	Monitoring Well Installation	<10	<10	--	**2.5**	**120**	**47**	**160**	--
MW-3-10	10/30/1992	Monitoring Well Installation	**30**	<10	--	**26**	**550**	<0.2	<0.6	--
EB1-05	3/19/1998	e,j,h,i	ND		--	ND	ND	ND	ND	ND
EB1-10	3/19/1998	c	**310**		--	ND<0.02	**0.1**	ND<0.02	**1.8**	ND<0.40
EB1-15	3/19/1998	c	**340**		--	ND<0.01	ND<0.04	ND<0.01	**1.6**	ND<0.2
EB2-05	3/19/1998		<1		--	<5	<5	<5	<5	<50
EB2-10	3/19/1998		<1		--	<5	<5	<5	<5	<50
EB2-15	3/19/1998		<1		--	<5	<5	<5	<5	<50
EB3-05	3/19/1998		<1		--	<5	<5	<5	<5	<50
EB3-10	3/19/1998		<1		--	<5	<5	<5	<5	<50
EB3-15	3/19/1998		<1		--	<5	<5	<5	<5	<50
EB4-05	3/19/1998		<1		--	<5	<5	<5	<5	<50
EB4-10	3/19/1998		<1		--	<5	<5	<5	<5	<50

TABLE 1
SOIL SAMPLE ANALYTICAL RESULTS
HISTORICAL INVESTIGATION SUMMARY
City of Paris Cleaners
3516 Adeline Street, Oakland, California 94608

Analytical Summary										
Location ID	Date	Comments	TPH-SS	TPH-D	TPH-G	Benzene	Toluene	Ethyl benzene	Xylenes	MTBE
			mg/kg			ug/kg				
EB4-15	3/19/1998		<1		--	<5	<5	<5	<5	<50
EB5-05	3/19/1998		<1		--	<5	<5	<5	<5	<50
EB5-10	3/19/1998		<1		--	<5	<5	<5	<5	<50
EB5-15	3/19/1998		<1		--	<5	<5	<5	<5	<50
EB6-05	3/19/1998		<1		--	<5	<5	<5	<5	<50
EB6-10	3/19/1998		<1		--	<5	<5	<5	<5	<50
EB6-15	3/19/1998		<1		--	<5	<5	<5	<5	<50

Explanation:
TPH-SS = Total petroleum hydrocarbons as Stoddard Solvent, analyzed by EPA Method 8015B.
TPH-D = Total petroleum hydrocarbons as diesel, analyzed by 8015B.
TPH-G = Total petroleum hydrocarbons as gasoline, analyzed by EPA Method 8260B.

Benzene, toluene, ethylbenzene, and total xylenes analyzed by EPA Method 8260B.
MTBE = Methyl tertiary-butyl ether, analyzed by EPA Method 8260B.
PID - Photo Ionization Detector in parts per million volume.

NA = Data not available
<n = Below laboratory detection limit of n ppm.
-- = not analyzed

TABLE 2
SOIL VAPOR SURVEY
HISTORICAL INVESTIGATION SUMMARY
City of Paris Cleaners
3516 Adeline Street, Oakland, California 94608

Location ID	Date	PID
		ppmv
A-1-3	7/31/1991 - 8/2/1991	ND
A-1-6	7/31/1991 - 8/2/1991	**16**
A-1-9	7/31/1991 - 8/2/1991	**20**
A-1-12	7/31/1991 - 8/2/1991	**12**
A-2-3	7/31/1991 - 8/2/1991	ND
A-2-6	7/31/1991 - 8/2/1991	**49**
A-2-9	7/31/1991 - 8/2/1991	ND
A-2-12	7/31/1991 - 8/2/1991	ND
A-3-3	7/31/1991 - 8/2/1991	
A-3-6	7/31/1991 - 8/2/1991	**24**
A-3-9	7/31/1991 - 8/2/1991	**7**
A-3-12	7/31/1991 - 8/2/1991	**6**
A-4-3	7/31/1991 - 8/2/1991	ND
A-4-6	7/31/1991 - 8/2/1991	**44**
A-4-9	7/31/1991 - 8/2/1991	**5**
A-4-12	7/31/1991 - 8/2/1991	**30**
A-5-3	7/31/1991 - 8/2/1991	ND
A-5-6	7/31/1991 - 8/2/1991	**21**
A-5-9	7/31/1991 - 8/2/1991	**28**
A-5-12	7/31/1991 - 8/2/1991	**26**
A-6-3	7/31/1991 - 8/2/1991	ND
A-6-6	7/31/1991 - 8/2/1991	**14**
A-6-9	7/31/1991 - 8/2/1991	**110**
A-6-12	7/31/1991 - 8/2/1991	**22**
A-7-3	7/31/1991 - 8/2/1991	ND
A-7-6	7/31/1991 - 8/2/1991	**17**
A-7-9	7/31/1991 - 8/2/1991	**13**
A-7-12	7/31/1991 - 8/2/1991	**15.5**
A-8-3	7/31/1991 - 8/2/1991	ND
A-8-6	7/31/1991 - 8/2/1991	**18**
A-8-9	7/31/1991 - 8/2/1991	**13**
A-8-12	7/31/1991 - 8/2/1991	**15.5**
A-9-3	7/31/1991 - 8/2/1991	ND
A-9-6	7/31/1991 - 8/2/1991	**10**
A-9-9	7/31/1991 - 8/2/1991	**13**
A-9-12	7/31/1991 - 8/2/1991	ND

PID - Photo Ionization Detector in parts per million volume.

NA = Data not available
<n = Below laboratory detection limit of n ppm.
-- = not analyzed

TABLE 3
GROUNDWATER ELEVATION AND ANALYTICAL RESULTS
March 23, 2011
City of Paris Cleaners
3516 Adeline Street, Oakland, California 94608

		Elevation Summary			Analytical Summary						
Well ID	Date	Top of Casing Elevation (feet amsl)	Depth to Water (feet BTOC)	Groundwater Elevation (feet amsl)	TPH-SS	TPH-G	Benzene	Toluene (ug/l)	Ethyl benzene	Xylenes	MTBE
MW-1	03/23/11	31.30	6.75	24.55	**8800**	**8100**	<10	<10	<10	<10	<5
MW-2	03/23/11	31.03	6.22	24.81	**200**	<50	<1.0	<1.0	<1.0	<1.0	**3.6**
MW-3[a]	03/23/11	31.13	3.58	27.55	**500**	<50	<1.0	<1.0	<1.0	<1.0	<0.50
W-IND	03/23/11	32.48	8.32	24.16	<50	<50	<1.0	<1.0	<1.0	<1.0	<0.50

Explanation:

TPH-G = Total petroleum hydrocarbons as gasoline, analyzed by EPA Method 8015B.
TPH-SS = Total petroleum hydrocarbons as stoddard solvent, analyzed by the 8015B.
Benzene, toluene, ethylbenzene, and total xylenes analyzed by EPA Method 8260B.
MTBE = Methyl tertiary-butyl ether, analyzed by EPA Method 8260B.

amsl = Above mean sea level.
BTOC = Below top of casing.

ug/l = Micrograms per liter.
<1.0 = Not detected at or above indicated laboratory reporting limit.

On March 17, 2010, Taber Consultants implemented the HydraSleeve® no purge protocol for all wells.
On March 23, 2011, Taber Consultants resurveyed top of casing elevations for all wells.

MW-3[a] During the 3/23/11 monitoring event, Taber Consultants replaced a damaged well cap. Please see report for discussion.

TABLE 4
GROUNDWATER ELEVATION AND ANALYTICAL RESULTS
HISTORICAL SUMMARY
City of Paris Cleaners
3516 Adeline Street, Oakland, California 94608

		Elevation Summary			Analytical Summary										
Well ID	Date	Top of Casing Elevation (feet amsl)	Depth to Water (feet BTOC)	Groundwater Elevation (feet amsl)	TPH-SS	TPH-G	Benzene	Toluene	Ethyl benzene	Xylenes (ug/l)	MTBE	1,2-DCB	1,1-DCA	2-Methyl-Naphthalene	Naphthalene
Groundwater Sample Locations															
EB1-18[a]	03/19/98	18' bgs Groundwater Grab Sample			**270000**	--	<5	**93**	**66**	**1700**	<100	--	--	--	--
EB2-18[b]	03/19/98	18' bgs Groundwater Grab Sample			<50	--	<0.5	<0.5	<0.5	<0.5	<5	--	--	--	--
EB3-18[b]	03/19/98	18' bgs Groundwater Grab Sample			<50	--	<0.5	<0.5	<0.5	<0.5	<5	--	--	--	--
EB4-18	03/19/98	18' bgs Groundwater Grab Sample			<50	--	<0.5	<0.5	<0.5	<0.5	<5	--	--	--	--
EB5-18[c]	03/19/98	18' bgs Groundwater Grab Sample			**780**	--	<0.5	<0.5	<0.5	**2**	<5	--	--	--	--
EB6-18	03/19/98	18' bgs Groundwater Grab Sample			<50	--	<0.5	<0.5	<0.5	<0.5	<5	--	--	--	--
MW-1	11/18/92	17.44	13.99	3.45	**1800**	NA	<0.5	<0.5	<0.5	<0.5	NA	--	--	--	--
MW-1	11/4/1993	17.44	16.79	0.65	**2000**	<50	<0.5	<0.5	<0.5	<0.5	NA	--	--	--	--
MW-1	3/8/1994	17.44	14.14	3.3	**150**	NA	**35**	**40**	**72**	**120**	NA	--	--	--	--
MW-1	8/2/1994	17.44	13.18	4.26	**2100**	<50	<0.5	<0.5	<0.5	<0.5	NA	--	--	--	--
MW-1	2/8/1995	17.44	10.92	6.52	**620**	<50	<0.5	<0.5	<0.5	<0.5	NA	--	--	--	--
MW-1**	7/8/1996	17.44	11.62	5.82	**37000**	**110000**	**1.6**	<0.5	<0.5	**74**	**7.9**	--	--	--	--
MW-1	10/9/1996	17.44	14.11	3.33	**42000**	NA	<0.5	**5**	<0.5	<0.5	NA	--	--	--	--
MW-1	3/18/1997	17.44	12.37	5.07	**2600**	NA	<0.5	**1.5**	**1.5**	**9.6**	<6.0	--	--	--	--
MW-1	6/19/1997	17.44	13.26	4.18	**660**	NA	<0.5	<0.5	**1.2**	**0.71**	<5	--	--	--	--
MW-1	11/14/1997	17.44	11.45	5.99	**10000**	NA	<0.5	<0.5	**110**	**1.2**	<5	--	--	--	--
MW-1	12/15/1999	17.44	11.31	6.13	<20	<50	<0.5	<0.5	<0.5	<0.5	NA	<0.5	**0.59**	<0.5	<0.5
MW-1	03/22/02	17.44	8.97	8.47	**11000**	--	--	--	--	--	<5	--	--	--	**130**
MW-1	04/15/03	17.44	9.23	8.21	**3900**	--	<2.5	<2.5	<2.5	**3**	**9**	--	--	--	--
MW-1	03/26/04	17.44	10.32	7.12	**30000**	**24000**	<50	<50	<50	<50	<500	--	--	--	--
MW-1	09/30/04	17.44	11.53	5.91	**3800**	**2600**	<0.5	<0.5	<0.5	**2.7**	<5	--	--	--	--
MW-1	09/09/05	17.44	13.63	3.81	**15000**	**11000**	c	<5	<5	**15**	<50	--	--	--	--
MW-1	11/30/07	17.44	13.95	3.49	--	--	--	--	--	--	--	--	--	--	--
MW-1	12/20/07	17.44	11.51	5.93	**45000**	**110000**	**20**	**50**	**20**	**100**	<5	--	--	--	--
MW-1	05/23/08	17.44	14.14	3.3	**4200**	<500	<1	<1	<1	**20**	<0.50	--	--	--	--
MW-1	08/12/08	17.44	13.78	3.66	**4000**	**12000**	<1	<1	<1	<1	<0.50	--	--	--	--
MW-1	12/18/08	17.44	10.71	6.73	**9900**	**2700**	<1	<1	<1	<1	<0.50	--	--	--	--
MW-1	02/19/09	17.44	8.91	8.53	**500**	**3100**	<10	<10	<10	<10	<5	--	--	--	--
MW-1	08/11/09	17.44	13.35	4.09	**13000**	**7800**	<10	<10	<10	<10	**5.9**	--	--	--	--
MW-1 NP	*08/11/09*	*17.44*	*13.35*	*4.09*	***6000***	***10000***	*<10*	*<10*	*<10*	*<10*	*<5*	--	--	--	--

TABLE 4
GROUNDWATER ELEVATION AND ANALYTICAL RESULTS
HISTORICAL SUMMARY
City of Paris Cleaners
3516 Adeline Street, Oakland, California 94608

		Elevation Summary			Analytical Summary										
Well ID	Date	Top of Casing Elevation (feet amsl)	Depth to Water (feet BTOC)	Groundwater Elevation (feet amsl)	TPH-SS	TPH-G	Benzene	Toluene	Ethyl benzene	Xylenes (ug/l)	MTBE	1,2-DCB	1,1-DCA	2-Methyl-Naphthalene	Naphthalene
MW-1	03/17/10	17.44	9.31	8.13	**4000**	**12000**	<20	<20	<20	**20**	<10	--	--	--	--
MW-1	08/18/10	17.44	12.65	4.79	**2000**	**6900**	<100	<100	<100	<100	<50	--	--	--	--
MW-1	03/23/11	31.30	6.75	24.55	**8800**	**8100**	<10	<10	<10	<10	<5	--	--	--	--
MW-2	11/18/92	17.31	13.18	4.13	**630**	NA	<0.5	<0.5	<0.5	<0.5	NA	--	--	--	--
MW-2	11/04/93	17.31	14.84	2.47	**3200**	<50	<0.5	<0.5	<0.5	<0.5	NA	--	--	--	--
MW-2	03/08/94	17.31	11.5	5.81	**45**	NA	**1.4**	**2**	**11**	**19**	NA	--	--	--	--
MW-2	08/02/94	17.31	13.14	4.17	**170**	<50	<0.5	<0.5	<0.5	<0.5	NA	--	--	--	--
MW-2	02/08/95	17.31	8.18	9.13	**570**	<50	<0.5	<0.5	<0.5	<0.5	NA	--	--	--	--
MW-2**	07/08/96	17.31	11.06	6.25	**1800**	**2800**	<0.5	**2.6**	**15**	**24**	**6.3**	--	--	--	--
MW-2	10/09/96	17.31	12.38	4.93	**4100**	NA	<0.5	**0.57**	<0.5	<0.5	NA	--	--	--	--
MW-2	03/18/97	17.31	10.61	6.7	**240**	<0.5	**0.57**	<0.5	<0.5	**5.3**	NA	--	--	--	--
MW-2	06/19/97	17.31	11.68	5.63	**2500**	NA	<0.5	<0.5	**9.1**	<0.5	<5	--	--	--	--
MW-2	11/14/97	17.31	10.61	6.7	**130**	NA	<0.5	<0.5	**0.9**	**1.2**	<5	--	--	--	--
MW-2	12/15/99	17.31	10.97	6.34	<20	<50	<0.5	<0.5	<0.5	<0.5	NA	<0.5	**0.53**	<0.5	**49**
MW-2	03/22/02	17.31	8.82	8.49	**170**	**13000**	**410**	**1000**	**210**	**1100**	<5	--	--	--	<10
MW-2	04/15/03	17.31	8.52	8.79	**99**	--	<0.5	<0.5	<0.5	**0.76**	**10**	--	--	--	--
MW-2	03/26/04	17.31	9.32	7.99	**120**	**93**	<0.5	<0.5	<0.5	**0.76**	**5.4**	--	--	--	--
MW-2	09/30/04	17.31	11.62	5.69	<50	<50	<0.5	<0.5	<0.5	<0.5	<5	--	--	--	--
MW-2	09/09/05	17.31	12.75	4.56	**120**	**98**	<0.5	<0.5	<0.5	<0.5	<5	--	--	--	--
MW-2	11/30/07	17.31	11.06	6.25	--	--	--	--	--	--	--	--	--	--	--
MW-2	12/20/07	17.31	9.95	7.36	<50	**3000**	<1	**1.6**	<1	**2.4**	**2.9**	--	--	--	--
MW-2	05/23/08	17.31	12.46	4.85	**300**	**1100**	<1	<1	<1	<1	**3.5**	--	--	--	--
MW-2	08/12/08	17.31	12.08	5.23	**2200**	**350**	<1	<1	<1	<1	<0.50	--	--	--	--
MW-2	12/18/08	17.31	10.58	6.73	**300**	<50	<1	<1	<1	<1	**7.3**	--	--	--	--
MW-2	02/19/09	17.31	8.22	9.09	**300**	**300**	<1	<1	<1	<1	**3.4**	--	--	--	--
MW-2	08/11/09	17.31	13.00	4.31	**600**	**610**	<1	<1	<1	<1	**3.8**	--	--	--	--
MW-2	03/17/10	17.31	8.95	8.36	<50	<50	<1	<1	<1	<1	**1.8**	--	--	--	--
MW-2	08/18/10	17.31	12.15	5.16	<50	**70**	<1	<1	<1	<1	**2.4**	--	--	--	--
MW-2	03/23/11	31.03	6.22	24.81	**200**	<50	<1	<1	<1	<1	**3.6**	--	--	--	--
MW-3	11/18/92	17.44	13.93	3.51	**11000**	NA	<0.5	<0.5	<0.5	<0.5	NA	--	--	--	--
MW-3	11/04/93	17.44	15.16	2.28	**320**	<50	<0.5	<0.5	<0.5	<0.5	NA	--	--	--	--
MW-3	03/08/94	17.44	13.43	4.01	**45**	NA	**0.8**	**0.9**	**5**	**10**	NA	--	--	--	--

TABLE 4
GROUNDWATER ELEVATION AND ANALYTICAL RESULTS
HISTORICAL SUMMARY
City of Paris Cleaners
3516 Adeline Street, Oakland, California 94608

		Elevation Summary			Analytical Summary										
Well ID	Date	Top of Casing Elevation (feet amsl)	Depth to Water (feet BTOC)	Groundwater Elevation (feet amsl)	TPH-SS	TPH-G	Benzene	Toluene	Ethyl benzene	Xylenes	MTBE	1,2-DCB	1,1-DCA	2-Methyl-Naphthalene	Naphthalene
										(ug/l)					
MW-3	08/02/94	17.44	12.82	4.62	<20	<50	<0.5	<0.5	<0.5	<0.5	NA	--	--	--	--
MW-3	02/08/95	17.44	7.62	9.82	<20	<50	<0.5	<0.5	<0.5	<0.5	NA	--	--	--	--
MW-3**	07/08/96	17.44	10.97	6.47	**2500**	**2200**	**1**	<0.5	**8.8**	**8**	**10**	--	--	--	--
MW-3	10/09/96	17.44	11.84	5.6	**2600**	NA	<0.5	<0.5	<0.5	<0.5	NA	--	--	--	--
MW-3	03/18/97	17.44	10.16	7.28	**2500**	NA	<0.5	**0.61**	**0.63**	**5.2**	NA	--	--	--	--
MW-3	06/19/97	17.44	11.40	6.04	**21000**	NA	<0.5	<0.5	**11**	<0.5	<5	--	--	--	--
MW-3	11/14/97	17.44	10.71	6.73	**1,400**	NA	<0.5	<0.5	**28**	**28**	<5	--	--	--	--
MW-3	12/15/99	17.44	10.96	6.48	<20	<50	<0.5	<0.5	<0.5	<0.5	NA	**0.87**	**0.57**	**25**	**88**
MW-3	03/22/02	17.44	10.97	6.47	**420**	<50	<0.5	<0.5	<0.5	<0.5	**31**	--	--	--	<50
MW-3	04/15/03	17.44	8.31	9.13	**2700**	--	<0.5	<0.5	<0.5	<0.5	**40**	--	--	--	--
MW-3	03/26/04	17.44	8.61	8.83	**2700**	**1900**	<1.7	<1.7	<1.7	**4.3**	<17	--	--	--	--
MW-3	09/30/04	17.44	11.1	6.34	**3900**	**2600**	<0.5	<0.5	<0.5	**3.2**	<10	--	--	--	--
MW-3	09/09/05	17.44	13.75	3.69	**4000**	**2600**	<0.5	<0.5	**0.57**	**2.7**	**12**	--	--	--	--
MW-3	11/30/07	17.44	13.9	3.54	--	--	--	--	--	--	--	--	--	--	--
MW-3	12/20/07	17.44	10.79	6.65	**18000**	**12000**	<1	**1.6**	**1.1**	**2.4**	**9.2**	--	--	--	--
MW-3	05/23/08	17.44	15.2	2.24	**900**	**3000**	<1	<1	<1	<1	**9.1**	--	--	--	--
MW-3	08/12/08	17.44	14.14	3.3	**1900**	**4300**	<1	<1	<1	<1	**6.5**	--	--	--	--
MW-3	12/18/08	17.44	12.53	4.91	**5000**	**610**	<1	**1**	<1	<1	**20**	--	--	--	--
MW-3	02/19/09	17.44	11.11	6.33	**1500**	**1300**	<1	**1**	<1	<1	**9**	--	--	--	--
MW-3	08/11/09	17.44	15.22	2.22	**1000**	**2200**	<10	<10	<10	<10	**7.3**	--	--	--	--
MW-3 NP	*08/11/09*	*17.44*	*15.22*	*2.22*	***3000***	***6700***	*<10*	*<10*	*<10*	*<10*	*<5*	--	--	--	--
MW-3	03/17/10	17.44	11.94	5.5	**3000**	**4600**	<10	<10	<10	<10	**9.4**	--	--	--	--
MW-3	08/18/10	17.44	12.86	4.58	**1000**	**3500**	<50	<50	<50	<50	<25	--	--	--	--
MW-3[d]	03/23/11	31.13	3.58	27.55	**500**	<50	<1	<1	<1	<1	<0.50	--	--	--	--
W-IND	03/22/02	NA	--	--	<50	**190**	<0.5	<0.5	<0.5	**0.8**	<5	--	--	--	--
W-IND	04/15/03	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
W-IND	03/26/04	NA	--	--	**500**	**200**	<0.5	<0.5	<0.5	<0.5	<5	--	--	--	--
W-IND	09/30/04	NA	--	--	<50	<50	<0.5	<0.5	<0.5	<0.5	<5	--	--	--	--
W-IND	09/09/05	NA	--	--	<50	<50	<0.5	<0.5	<0.5	<0.5	<5	--	--	--	--
W-IND	11/30/07	NA	12.92	--	--	--	--	--	--	--	--	--	--	--	--
W-IND	12/20/07	NA	11.68	--	<50	**500**	<1	**1**	<1	**2.2**	<.50	--	--	--	--
W-IND	05/23/08	NA	12.72	--	**300**	**250**	<1	**3.7**	<1	**2.4**	<0.50	--	--	--	--
W-IND	08/12/08	NA	13.42	--	<50	<50	<1	<1	<1	<1	<0.50	--	--	--	--

TABLE 4
GROUNDWATER ELEVATION AND ANALYTICAL RESULTS
HISTORICAL SUMMARY
City of Paris Cleaners
3516 Adeline Street, Oakland, California 94608

		Elevation Summary			Analytical Summary										
Well ID	Date	Top of Casing Elevation (feet amsl)	Depth to Water (feet BTOC)	Groundwater Elevation (feet amsl)	TPH-SS	TPH-G	Benzene	Toluene	Ethyl benzene	Xylenes	MTBE	1,2-DCB	1,1-DCA	2-Methyl-Naphthalene	Naphthalene
										(ug/l)					
W-IND	12/18/08	NA	12.65	--	<50	<50	<1	<1	<1	<1	**0.7**	--	--	--	--
W-IND	02/19/09	NA	9.74	--	<50	<50	<1	<1	<1	<1	<0.5	--	--	--	--
W-IND	08/11/09	NA	14.13	--	<50	<50	<1	<1	<1	<1	<0.5	--	--	--	--
W-IND	03/17/10	NA	9.78	--	<50	<50	<1	<1	<1	<1	<0.5	--	--	--	--
W-IND	08/18/10	NA	12.84	--	<50	<50	<1	<1	<1	<1	<0.50	--	--	--	--
W-IND	03/23/11	32.48	8.32	24.16	<50	<50	<1	<1	<1	<1	<0.50	--	--	--	--

Explanation:

TPH-G = Total petroleum hydrocarbons as gasoline, analyzed by EPA Method 8015B.
TPH-SS = Total petroleum hydrocarbons as stoddard solvent, analyzed by the 8015B.
Benzene, toluene, ethylbenzene, and total xylenes analyzed by EPA Method 8260B.
MTBE = Methyl tertiary-butyl ether, analyzed by EPA Method 8260B.

amsl = Above mean sea level.
BTOC = Below top of casing.
ug/l - Micrograms per liter.
NA = Data not available

<1 = Not detected at or above indicated laboratory reporting limit.
-- = not analyzed

NP = HydraSleeve® no purge protocol
•• Components found in tbe gasoline range, however they are not characteristic of gasoline components.
On March 17, 2010, Taber Consultants implemented the HydraSleeve® no purge protocol for all wells.
On March During the 3/23/11 monitoring event, Taber Consultants replaced a damaged well cap. See First Semiannual Monitoring Report 2011 for discussion.

EB1-18[a] McCampbell Analytical Inc. laboratory notes: TPH pattern does not appear to be derived from gasoline (Stoddard Solvent?); liquid sample contained more than 5% volume of sediment; lighter than water immiscible sheen is present; and the chromatogram contains no recognizable pattern.

EB1-18[b] McCampbell Analytical Inc. laboratory notes liquid sample contained more than 5% volume of sediment.

EB5-18[c] McCampbell Analytical Inc. laboratory notes TPH pattern does not appear to be derived from gasoline (Stoddard Solvent?) and liquid sample contained more than 5% volume of sediment.

MW-3[d] During the 3/23/11 monitoring event, Taber Consultants replaced a damaged well cap. Please see report for discussion.

TABLE 5

SOIL SAMPLE ANALYTICAL RESULTS

SITE INVESTIGATION

City of Paris Cleaners

3516 Adeline Street, Oakland, California 94608

Boring Identification	Sample Identification	Date	TPH-SS mg/kg	TPH-G mg/kg	TPH-D mg/kg	TPH-FO mg/kg	TPH-MO mg/kg	TPH-K mg/kg	Benzene ug/kg	Toluene ug/kg	Ethyl benzene ug/kg	Xylenes ug/kg	MTBE ug/kg
GP-1	GP-1-17	5/2/2011	<1.0	<0.50	na	na	na	na	<1.0	<1.0	<1.0	<1.0	<0.50
GP-1	GP-1-32.5	5/2/2011	<1.0	<0.50	na	na	na	na	<1.0	<1.0	<1.0	<1.0	<0.50
GP-2	GP-2-17	5/2/2011	<1.0	<0.50	na	na	na	na	<1.0	<1.0	<1.0	<1.0	<0.50
GP-2	GP-2-36	5/2/2011	<1.0	<0.50	na	na	na	na	<1.0	<1.0	<1.0	<1.0	<0.50
GP-3	GP-3-16.5	5/6/2011	<10	<0.50	na	na	<10	na	<1.0	<1.0	<1.0	<1.0	<0.50
GP-4	GP-4-14	5/6/2011	<10	<0.50	na	na	na	na	<1.0	<1.0	<1.0	<1.0	<0.50
GP-4	GP-4-18	5/6/2011	<10	<0.50	na	na	na	na	<1.0	<1.0	<1.0	<1.0	<0.50
GP-4	GP-4-19.5[a]	5/6/2011	<10	**1.8**	na	na	na	na	<1.0	<1.0	<1.0	<1.0	<0.50
GP-5	GP-5-6.5	5/5/2011	<10	<0.50	<1.0	<10	<10	<1.0	<1.0	<1.0	<1.0	<1.0	<0.50
GP-5	GP-5-28	5/5/2011	<10	<0.50	<1.0	<10	<10	<1.0	<1.0	<1.0	<1.0	<1.0	<0.50
GP-6	GP-6-11.5	5/5/2011	<10	<0.50	<1.0	<10	<10	<1.0	<1.0	<1.0	<1.0	<1.0	<0.50
GP-7	GP-7-8	5/6/2011	<10	<0.50	<1.0	<10	<10	<1.0	<1.0	<1.0	<1.0	<1.0	<0.50
GP-7	GP-7-16	5/6/2011	<10	<0.50	<1.0	<10	<10	<1.0	<1.0	<1.0	<1.0	<1.0	<0.50
GP-8	GP-8-16.5[a]	5/12/2011	**30**	**5.3**	<1.0	na	<10	na	<1.0	<1.0	<1.0	<1.0	<0.50
GP-8	GP-8-34	5/12/2011	<10	<0.50	<1.0	na	<10	na	<1.0	<1.0	<1.0	<1.0	<0.50
GP-9	GP-9-16.5[a]	5/12/2011	<10	**3.1**	<1.0	na	<10	na	<1.0	<1.0	<1.0	<1.0	<0.50
GP-9	GP-9-38.5	5/12/2011	<10	<0.50	<1.0	na	<10	na	<1.0	<1.0	<1.0	<1.0	<0.50
GP-10	GP-10-16.5[a]	5/13/2011	<10	**3.3**	na	na	na	na	<1.0	<1.0	<1.0	<1.0	<0.50
GP-10	GP-10-33	5/13/2011	<10	<0.50	na	na	na	na	<1.0	<1.0	<1.0	<1.0	<0.50
GP-11	GP-11-17	5/13/2011	<10	<0.50	na	na	na	na	<1.0	<1.0	<1.0	<1.0	<0.50
GP-11	GP-11-34	5/13/2011	<10	<0.50	na	na	na	na	<1.0	<1.0	<1.0	<1.0	<0.50
GP-11	GP-11-38.5	5/13/2011	<10	<0.50	na	na	na	na	<1.0	<1.0	<1.0	<1.0	<0.50
GP-12	GP-12-16[a]	5/19/2011	<10	**690**	<1.0	na	<10	na	<1,000	<1,000	<1,000	<1,000	<500
GP-12	GP-12-34	5/19/2011	<10	<0.50	<1.0	na	<10	na	<1.0	<1.0	<1.0	<1.0	<0.50
GP-13	GP-13-16.5	5/19/2011	<10	<0.50	<1.0	na	<10	na	<1.0	<1.0	<1.0	<1.0	<0.50
GP-13	GP-13-34	5/19/2011	<10	<0.50	<1.0	na	<10	na	<1.0	<1.0	<1.0	<1.0	<0.50

TABLE 5

SOIL SAMPLE ANALYTICAL RESULTS

SITE INVESTIGATION

City of Paris Cleaners

3516 Adeline Street, Oakland, California 94608

Boring Identification	Sample Identification	Date	TPH-SS mg/kg	TPH-G mg/kg	TPH-D mg/kg	TPH-FO mg/kg	TPH-MO mg/kg	TPH-K mg/kg	Benzene ug/kg	Toluene ug/kg	Ethyl benzene ug/kg	Xylenes ug/kg	MTBE ug/kg
GP-16	GP-16-19[a]	5/17/2011	<10	**20**	<1.0	na	<10	na	<1.0	<1.0	<1.0	**3.0**	<0.50
GP-16	GP-16-38	5/17/2011	<10	<0.50	<1.0	na	<10	na	<1.0	<1.0	<1.0	<1.0	<0.50
GP-17	GP-17-23.5	5/17/2011	<10	<0.50	<1.0	na	<10	na	<1.0	<1.0	<1.0	<1.0	<0.50
GP-17	GP-17-38	5/17/2011	<10	<0.50	<1.0	na	<10	na	<1.0	<1.0	<1.0	<1.0	<0.50
GP-18	GP-18-19	5/17/2011	<10	<0.50	<1.0	na	<10	na	<1.0	<1.0	<1.0	<1.0	<0.50
GP-18	GP-18-38	5/17/2011	<10	<0.50	<1.0	na	<10	na	<1.0	<1.0	<1.0	<1.0	<0.50
GP-19	GP-19-20	5/17/2011	<10	<0.50	<1.0	na	<10	na	<1.0	<1.0	<1.0	<1.0	<0.50
GP-19	GP-19-38	5/17/2011	<10	<0.50	<1.0	na	<10	na	<1.0	<1.0	<1.0	<1.0	<0.50

Explanation:

TPH-SS = Total petroleum hydrocarbons as Stoddard Solvent, analyzed by EPA Method 8015B.

TPH-G = Total petroleum hydrocarbons as gasoline, analyzed by EPA Method 8015B.

TPH-D = Total petroleum hydrocarbons as diesel, analyzed by EPA Method 8015B.

TPH-FO = Total petroleum hydrocarbons as fuel oil, EPA Method 8015B.

TPH-MO = Total petroleum hydrocarbons as motor oil, EPA Method 8015B.

TPH-K = Total petroleum hydrocarbons as kerosene, EPA Method 8015B.

Benzene, toluene, ethylbenzene, and total xylenes analyzed by EPA Method 8260B.

MTBE = Methyl tertiary-butyl ether, analyzed by EPA Method 8260B.

mg/kg = milligrams per kilogram.

ug/kg = micrograms per kilogram.

NA = Not Analyzed.

[a]Non-typical TPH pattern present in gas range.

TABLE 6
GRAB GROUNDWATER SAMPLE ANALYTICAL RESULTS
SITE INVESTIGATION
City of Paris Cleaners
3516 Adeline Street, Oakland, California 94608

Location	Date	TPH-SS ug/l	TPH-G ug/l	Benzene ug/l	Toluene ug/l	Ethyl benzene ug/l	Xylenes ug/l	MTBE ug/l
Shallow Groundwater Zone								
GP-3-15	5/6/2011	<50	<50	<1.0	**2.3**	<1.0	<1.0	<0.50
GP-4-15[a]	5/6/2011	**150**	**310**	<1.0	**2.2**	<1.0	<1.0	<0.50
GP-8-15[a]	5/12/2011	**80**	**160**	<1.0	<1.0	<1.0	<1.0	<0.50
GP-9-15[a]	5/12/2011	**200**	**470**	<1.0	<1.0	<1.0	<1.0	**1.5**
GP-10-15[a]	5/13/2011	**1000**	**2100**	<1.0	<1.0	<1.0	<1.0	<0.50
GP-11-15	5/13/2011	<50	<50	<1.0	<1.0	<1.0	<1.0	**0.6**
GP-16-15[a]	5/17/2011	<50	**130**	<1.0	<1.0	<1.0	**1.1**	<0.50
GP-17-15	5/17/2011	<50	<50	<1.0	<1.0	<1.0	<1.0	<0.50
GP-18-15[a]	5/17/2011	<50	**80**	<1.0	<1.0	<1.0	<1.0	<0.50
GP-19-15	5/19/2011	<50	<50	<1.0	<1.0	<1.0	<1.0	**0.7**
Deep Groundwater Zone								
GP-1	5/2/2011	<50	<50	<1.0	<1.0	<1.0	<1.0	<0.50
GP-2	5/2/2011	<5.0	<50	<1.0	<1.0	<1.0	<1.0	<0.50
GP-3-35	5/6/2011	<50	<50	<1.0	<1.0	<1.0	<1.0	<0.50
GP-4-35	5/6/2011	<50	<50	<1.0	<1.0	<1.0	<1.0	<0.50
GP-5[b]	5/5/2011	<50	<50	<1.0	<1.0	<1.0	<1.0	**10**
GP-8-35[a]	5/12/2011	<50	**140**	<1.0	<1.0	<1.0	<1.0	<0.50
GP-9-35	5/12/2011	<50	<50	<1.0	<1.0	<1.0	<1.0	<0.50
GP-10-35[a]	5/13/2011	**900**	**1600**	<1.0	<1.0	<1.0	<1.0	<0.50
GP-11-35	5/13/2011	<50	<50	<1.0	<1.0	<1.0	<1.0	<0.50
GP-12-35[a]	5/19/2011	<50	**360**	<1.0	<1.0	<1.0	<1.0	**0.5**
GP-13-35	5/19/2011	<50	<50	<1.0	<1.0	<1.0	<1.0	**0.6**
GP-16-35	5/17/2011	<50	<50	<1.0	<1.0	<1.0	<1.0	<0.50
GP-17-35	5/17/2011	<50	<50	<1.0	<1.0	<1.0	<1.0	<0.50
GP-18-35	5/17/2011	<50	<50	<1.0	<1.0	<1.0	<1.0	<0.50
GP-19-35	5/17/2011	<10	<0.50	<1.0	<1.0	<1.0	<1.0	<0.50

Explanation:

TPH-SS = Total petroleum hydrocarbons as Stoddard Solvent, analyzed by EPA Method 8015B.

TPH-G = Total petroleum hydrocarbons as gasoline, analyzed by EPA Method 8015B.

TPH-D = Total petroleum hydrocarbons as diesel, analyzed by EPA Method 8015B.

TPH-F = Total petroleum hydrocarbons as fuel oil, EPA Method 8015B

TPH-K = Total petroleum hydrocarbons as kerosene, EPA Method 8015B.

Benzene, toluene, ethylbenzene, and total xylenes analyzed by EPA Method 8260B.

MTBE = Methyl tertiary-butyl ether, analyzed by EPA Method 8260B.

ug/l = micrograms per liter.

NA = Not Analyzed.

[a]Non-typical TPH pattern present in gas range.

[b]Note: GP-5 was also analyzed for TPH as kerosene and fuel oil which were not detected at or above the laboratory reporting limit of 50 ug/l.

TABLE 5
GROUNDWATER SAMPLE ANALYTICAL RESULTS
NATURAL ATTENUATION ANALYSIS
City of Paris
3516 Adeline St, Oakland, CA 94608

Sample	Sample Date	CO2 (mg/l)	Phosphorus (mg/l)	TKN (mg/l)	Alkalinity as CaCO3 (mg/l)	Sulfate (mg/l)	Nitrate (mg/l)	Ferrous Iron (mg/l)	Ferric Iron (mg/l)	Manganese (II) (mg/l)	Ethane (mg/l)	Ethene (mg/l)	Sulfide (mg/l)	Methane (mg/l)	Dissolved Oxygen (%)	Dissolved Oxygen (mg/l)	ORP (mV)	pH	EC (uS/cm)	Temp (deg C)
Shallow Zone Samples																				
GP-3-15	5/6/2011	**83**	**0.315**	**0.870**	**312**	**185**	**25.0**	<0.025	**1.4**	**6.24**	<0.01	<0.01	<500	**0.035**	99.7	8.7	27.9	6.65	1195	21.06
GP-4-15	5/6/2011	**94**	**0.293**	**1.830**	**379**	**6.82**	<0.050	<0.025	**29.0**	**5.55**	<0.01	<0.01	<500	**0.047**	73.9	6.59	-124.6	7.08	1017	20.34
GP-8-15	5/12/2011	**65**	**0.422**	**0.793**	**517**	**17**	<0.050	<0.025	**9.7**	**3.40**	**0.022**	**0.02**	<500	**0.068**	3.4	0.33	-176.5	7.84	1380	21.40
GP-9-15	5/12/2011	**130**	**0.386**	**1.910**	**400**	**16**	<0.050	<0.025	**6.9**	**1.64**	**0.038**	**0.02**	<500	**0.081**	2.2	0.24	-144.2	7.44	1299	23.20
GP-11-15	5/13/2011	**89**	**0.103**	**0.793**	**220**	**126.0**	**36.0**	<0.025	**3.4**	**1.89**	**0.022**	**0.02**	<500	**0.045**	27.5	3.18	-91.4	7.93	960	22.30
Mixed Zone Samples																				
MW-1	5/12/2011	**94**	**0.938**	**1.720**	**750**	<1.0	<0.050	<0.025	**18.0**	**1.12**	<0.01	<0.01	<500	**0.058**	11.4	1.36	-202.6	7.2	1831	15.40
MW-2	5/12/2011	**64**	**0.115**	**0.265**	**666**	**81**	**130.0**	<0.025	**0.3**	**3.06**	<0.01	<0.01	<500	**0.047**	23.4	2.83	-116.7	5.5	1857	15.90
MW-3	5/12/2011	**77**	**1.260**	**1.780**	**299**	<1.0	<0.050	<0.025	**19.0**	**1.36**	<0.01	<0.01	<500	**0.066**	12.7	1.56	-202.7	7.3	667	15.70
W-IND	5/12/2011	**54**	**9.630**	**0.731**	**350**	**76**	**19.0**	<0.025	**8.0**	**0.69**	<0.01	<0.01	<500	**0.042**	50.6	6.45	18.1	7.04	1077	15.80
Deep Zone Samples																				
GP-1	5/2/011	**42**	**0.362**	**0.230**	**279**	**146**	**30.0**	<0.025	**2.1**	**2.18**	<0.01	<0.01	<500	<0.010	60.2	6.29	75.1	6.14	1069	21.00
GP-2	5/2/011	**65**	**0.341**	**1.300**	**216**	**70**	**35.0**	<0.025	**0.9**	**4.96**	<0.01	<0.01	<500	**0.025**	35.4	3.29	-165.7	6.98	774	22.07
GP-3-35	5/6/2011	**54**	**0.105**	**0.300**	**230**	**86**	**36.0**	<0.025	**5.8**	**4.85**	<0.01	<0.01	<500	<0.010	39.6	3.6	-57.0	6.19	814	20.23
GP-4-35	5/6/2011	**88**	**0.409**	**0.630**	**173**	**71**	**38.0**	<0.025	**0.7**	**6.38**	<0.01	<0.01	<500	**0.064**	42.7	3.86	38.0	7.21	699	18.94
GP-5	5/5/2011	**105**	**0.025**	**0.750**	**330**	**86**	**30.0**	<0.025	**0.1**	**1.83**	**0.024**	<0.01	<500	**0.048**	28.3	2.38	-281.5	8.20	956	23.70
GP-8-35	5/12/2011	**122**	**0.625**	**1.370**	**297**	**96**	**14.0**	<0.025	**9.5**	**5.42**	**0.033**	**0.03**	<500	**0.077**	8.5	0.99	-108.3	6.91	1068	20.90
GP-9-35	5/12/2011	**67**	**0.753**	**0.923**	**242**	**76.0**	**3.4**	<0.025	**8.6**	**9.63**	**0.019**	**0.01**	<500	**0.055**	20.6	1.43	-91.4	6.38	938	20.90
GP-11-35	5/13/2011	**72**	<0.010	**0.458**	**284**	**79.0**	**39.0**	<0.025	**0.3**	**5.10**	**0.022**	**0.02**	<500	**0.055**	19.9	2.21	-107.1	7.56	924	23.90

CO2- Carbon Dioxide completed using EPA Method 4500-C02 C
Phosphorus analyses completed using EPA Method 365.3
TKN - Total Kjeldahl Nitrogen analyses completed using EPA Method 351.2
Alkalinity as Calcium Carbonate analyses completed using EPA method SM 2320B
Sulfate and nitrate analyses completed using EPA method 300.0
Ferrous iron analyses completed using EPA method 6101610/SM 3500
Ferric iron analyses completed using EPA Method 6010A
Manganese analyses completed using EPA method 6010B
Methane, ethane, and ethene analyses completed using EPA Method RSK-175
Sulfide analyses completed using EPA method 376.2/4500-S 2-G

TABLE 8
SOIL SAMPLE ANALYTICAL RESULTS
NATURAL ATTENUATION ANALYSIS
SOIL PROPERTIES
City of Paris
3516 Adeline St, Oakland, CA 94608

Location	Date	Effective Porosity	Porosity	Moisture Percent	Wet Unit Weight	Dry Unit Weight	Bulk Density	Organic Matter	Fraction Organic Carbon	SHC	Hydraulic Conductivity
		%	%	%	pcf	pcf	kg/l	%	%	in/hr	(cm/sec)
GP-1-18	5/2/2011	24.00	65.3	30.5	76.4	58.5	0.94	1.38	0.80	0.063	4.4E-05
GP-2-11	5/2/2011	17.90	56.8	17.8	85.8	72.9	1.17	0.68	0.40	0.29	2.0E-04
GP-3-14.5*	5/6/2011	12.73	38.3	14.4	119.0	104.0	1.67	4.34	2.52	8.42	5.9E-03
GP-5-15**	5/5/2011	28.20	50.9	13.0	93.6	82.8	1.33	5.61	3.26	4.79	3.4E-03
GP-8-14	5/12/2011	3.74	42.7	17.8	113.8	96.6	1.55	3.94	2.29	0.0048	3.4E-06
GP-9-15	5/12/2011	4.69	37.9	17.0	122.5	104.7	1.68	3.78	2.20	0.0015	1.1E-06
GP-10-16	5/13/2011	13.97	37.9	14.6	119.9	104.6	1.68	3.83	2.23	0.019	1.3E-05
GP-11-17	5/13/2011	8.34	24.8	8.7	137.8	126.7	2.03	4.10	2.38	0.0073	5.2E-06

pfc = pounds per cubic foot
kg/l = kilograms per liter
Bulk density converted from dry unit weight, i.e. GP-1-18, 58.5 pcf * 0.453592 kg/l * 1/28.3168 pcf = 0.94
Fraction Organic Carbon (f_{oc})-- Method ASTM F1647 B -- Walkley-Black. Foc = Percent Organic Matter / 1.72, i.e. GP-5-15, 5.61/1.72 = 3.26
SHC = saturated hydraulic conductivity
Hydraulic conductivity in centimeters per second (cm/sec) converted from SHC in inches per hour (in/hr) i.e. GP-1-18, 0.063 in/hor* *2.54 cm/in *1 hour/60 minutes*1 minute/60 seconds = 4.4E-05

*sample not appropriate for conductivity, not collected properly.
**sample outside plume

APPENDIX A.

SOIL BORING LOGS

SOIL BORING LOG

CLIENT: *CHAMPION ESTATE* WELL #: *MW-1*
LOCATION: *3516 ADELINE St., OAKLAND, CA.*
DATE DRILLED: *10/29-30/92* DRILLED BY: *S.E.S.*
DRILLING METHOD: *H.S. Augers* SAMPLE METHOD: *Split Spoon*
LOGGED BY: *ADI CONSTANTINESCU*

Depth Below Surface	Samples Collected INT	Samples Collected Sample No.	SOIL DESCRIPTION Color, Grain size, Texture, Moisture, Consistency, Odor	Unified Soil Classification	Log	Penetration Collected Blows / 18"	Comments
5		MW1-5	SANDY GRAVEL; BROWN; WELL GRADED; LOOSE; DRY; NO HYDROCARBON ODOR.	GW		2, 3, 6	
10		MW1-10	SANDY GRAVEL; GRAY TO BROWN; MEDIUM DENSE; SLIGHTLY MOIST, VAGUE HYDROCARBON ODOR.			4, 5, 8	
15		MW1-15	CLAYEY SAND; GREENISH GRAY; MEDIUM; MEDIUM DENSE; MOIST; VAGUE HYDROCARBON ODOR.			4, 11, 12	
20		MW1-20	CLAYEY SAND; OLIVE GRAY; POORLY GRADED MEDIUM; MEDIUM DENSE; WET; NO HYDROCARBON ODOR.	SC		3, 5, 10	
25			CLAYEY SAND; OLIVE GRAY; POORLY GRADED MEDIUM; MEDIUM DENSE; WATER SATURATED; NO HYDROCARBON ODOR.			3, 7, 6	
30			SANDY CLAY; WITH SOME GRAVEL; LIGHT BROWN; WITH LOW PLASTICITY; STIFF; WATER SATURATED; NO HYDROCARBON ODOR.	CL		4, 8, 14	

SOIL BORING LOG

CLIENT CHAMPION ESTATE WELL # MW-2
LOCATION 3516 ADELINE St., OAKLAND, CA
DATE DRILLED 10/30/92 DRILLED BY S.E.S.
DRILLING METHOD H.S. Augers SAMPLE METHOD Split Spoon
LOGGED BY ADI CONSTANTINESCU

Depth Below Surface	Samples Collected: INT.	Sample No.	SOIL DESCRIPTION: Color, Grain size, Texture, Moisture, Consistency, Odor	Unified Soil Classification	Log	Penetration Collected: Blows / 18"	Comments
5		MW2-5	SANDY GRAVEL: BROWN; WELL GRADED; LOOSE; DRY; NO HYDROCARBON ODOR.	GW		2, 3, 5 2, 4, 5	
10		MW2-10	SANDY GRAVEL: GRAY TO BROWN; MEDIUM DENSE; SLIGHTLY MOIST; VAGUE HYDROCARBON ODOR.			3, 6, 14	
15		MW2-15	CLAYEY SAND: GREENISH GRAY; MEDIUM; MEDIUM DENSE; MOIST; HYDROCARBON ODOR.			4, 12, 12	
20		MW2-20	CLAYEY SAND: OLIVE GRAY; POORLY GRADED; MEDIUM; MEDIUM DENSE; WET; NO HYDROCARBON ODOR.	SC		3, 6, 11 10	
25			CLAYEY SAND: OLIVE GRAY; POORLY GRADED; MEDIUM; MEDIUM DENSE; WATER SATURATED; NO HYDROCARBON ODOR.			4, 7, 5	
30			SANDY CLAY: WITH SOME GRAVEL; LIGHT BROWN; WITH LOW PLASTICITY; STIFF; WATER SATURATED; NO HYDROCARBON ODOR.	CL		3, 9, 15	

SOIL BORING LOG

CLIENT: *CHAMPION ESTATE* WELL #: *MW-3*
LOCATION: *3516 ADELINE St., OAKLAND, CA.*
DATE DRILLED: *10/30/92* DRILLED BY: *S.E.S.*
DRILLING METHOD: *H.S. Augers* SAMPLE METHOD: *Split Spoon*
LOGGED BY: *ADI CONSTANTINESCU*

Depth Below Surface	Samples Collected INT	Samples Collected Sample No.	SOIL DESCRIPTION Color, Grain size, Texture, Moisture, Consistency, Odor	Unified Soil Classification	Log	Penetration Collected Blows / 18"	Comments
5		MW3-5	SANDY GRAVEL; BROWN; WELL GRADED; LOOSE; DRY; NO HYDROCARBON ODOR.	GW		2, 4, 5	
10		MW3-10	SANDY GRAVEL; GRAY TO BROWN; MEDIUM DENSE; SLIGHTLY MOIST, VAGUE HYDROCARBON ODOR.			3, 10, 13	
15		MW3-15	CLAYEY SAND; GREENISH GRAY; MEDIUM; MEDIUM DENSE; MOIST; HYDROCARBON ODOR;			3, 11, 11	
20		MW3-20	CLAYEY SAND; OLIVE GRAY; POORLY GRADED; MEDIUM; MEDIUM DENSE; MOIST; VAGUE HYDROCARBON ODOR.	SC		4, 6, 10	
25			CLAYEY SAND; OLIVE GRAY; POORLY GRADED; MEDIUM; MEDIUM DENSE; WATER SATURATED; NO HYDROCARBON ODOR.			4, 6, 8	
30			SANDY CLAY; WITH SOME GRAVEL; LIGHT BROWN; WITH LOW PLASTICITY; STIFF; WATER SATURATED; NO HYDROCARBON ODOR.	CL		4, 8, 15	

UNIFIED SOIL CLASSIFICATION SYSTEM

MAJOR DIVISION		LTR	DESCRIPTION	MAJOR DIVISION		LTR	DESCRIPTION
COARSE-GRAINED SOILS	GRAVEL AND GRAVELLY SOILS	GW	Well-graded Gravels or Gravel-Sand mixtures, little or no fines.	FINE-GRAINED SOILS	SILTS AND CLAYS LL<50	ML	Inorganic Silts and very fine sands, rock flour, Silty of Clayey fine Sands, or Clayey Silts with slight plasticity.
		GP	Poorly-graded Gravels or Gravel-Sand mixtures, little or no fines			CL	Inorganic Clays of low to medium plasticity, Gravelly Clays, Sandy Clays, Silty Clays, Lean Clays.
		GM	Silty Gravels, Gravel-Sand-Silt mixtures.			OL	Organic Silts and Organic Silt-Clays of low plasticity.
		GC	Clayey Gravel, Gravel-Sand -Clay mixtures.		SILTS AND CLAYS LL>50	MH	Inorganic Silts, micaceous or diatomaceous fine Sandy or Silty Soils, Elastic Silts.
	SAND AND SANDY SOILS	SW	Well-graded Sand or Gravelly Sands, little or no fines.			CH	Inorganic Clays of high plasticity, fat Clays.
		SP	Poorly-graded Sands or Gravelly Sands, little or no fines.			OH	Organic Clays of medium to high plasticity, organic Silts.
		SM	Silty Sands, Sand-Silt mixtures.				
		SC	Clayey Sands, Sand-Clay mixtures.	HIGHLY ORGANIC SOILS		PT	Peat and other highly Organic Soils.

Well Construction Symbols

- Depth through which sampler is driven
- Relatively undisturbed sample retained
- No lab analysis on sample
- Static water level observed in well/boring
- Initial water level observed in well/boring
- S-10 Sample number
- Sand pack (Monterey Sand #3)
- Bentonite
- Neat cement
- Blank PVC
- Machine-slotted PVC

Soil Symbols

- FILL
- CLAY
- SILT
- SAND
- GRAVEL

Note: Blows represent the number of blows of a 140-pound hammer falling 30-inches to drive the sampler through each 6 inch increments of an 18-inch penetration.

Dashed lines separating units on the log represent approximate boundaries only. Actual boundaries may be gradual. Logs represent subsurface conditions at the boring location at the time of drilling only.

DUGAN ASSOCIATES
SAMPLING SERVICES
Subsurface Environmental Sampling
1180 DELMAS AVE. SAN JOSE, CA 95125
Tel. (408) 287-2175
Fax. (408) 287-2176

BORING LOG SYMBOL KEY
Former City of Paris Cleaners
3516 Adeline Street
Oakland, California

FIGURE 3
Job No. 218

Boring Number EB-1 **Client** Former City of Paris Cleaners

Job Number 218 **Drilling Co.** Exploration Geoservices, Inc.

Location 3516 Aleline St., Oakland, CA **Drilling Method** Hollow Stem Auger

Date Drilled 03/19/98 **Sampling Method** 2-in I.D.- split spoon Sampler

Logged By B. Dugan [R.G. #6253] **Well Casing** Backfilled with Bentonite

Recovery	Sample Type	Sample Depth (feet)	Blows per 6 in.	Moisture Content	Product Odor	Depth in Feet	Graphic Log	Soil Description
						0		Cement [Four inches]
						1		Silty Clay (CL), dark brown, damp to moist, low plasticity, stiff; no petroleum odor.
						2		
						3		
						4		
18"	CA	3-1/2 to 5 ft.	5 7 9	DAMP	NO	5		
						6		
						7		Light brown.
						8		
						9		
18"	CA	8-1/2 to 10 ft.	11 12 14	MOIST	YES	10		Gravelly Clay (GC), light brown, moist, low plasticity, stiff, slight petroleum odor.
						11		Silty Clay (CL), greenish-gray, moist, low plasticity, stiff; minor sand, no petroleum odor.
						12		
						13		
						14		Clayey Gravel (GC), greenish-gray, moist, medium dense, no petroleum odor.
18"	CA	13-1/2 to 15 ft.	6 7 8	MOIST	YES	15		
						16		
						17		
18"	CA	17-1/2 to 19 ft.	5 7 7	WET	YES	18		Free groundwater initially encountered at 18 ft bgs.
						19		Total depth Explored 19 ft bgs.
						20		

DUGAN ASSOCIATES
SOIL & GROUNDWATER SAMPLING LIC. RG#6253

LOG FOR BORING EB-1

Figure 4

Boring Number EB-2 **Client** Former City of Paris Cleaners

Job Number 218 **Drilling Co.** Exploration Geoservices, Inc.

Location 3516 Aleline St., Oakland, CA **Drilling Method** Hollow Stem Auger

Date Drilled 03/19/98 **Sampling Method** 2-in I.D.- split spoon Sampler

Logged By B. Dugan [R.G. #6253] **Well Casing** Backfilled with Bentonite

Recovery	Sample Type	Sample Depth (feet)	Blows per 6 in.	Moisture Content	Product Odor	Depth in Feet	Graphic Log	Soil Description
						0		Asphalt [Four inches]
						1		Base Rock; No petroleum odor.
						2		
						3		Silty Clay (CL), dark brown, damp to moist, low plasticity, stiff; no petroleum odor.
						4		
18"	CA	3-1/2 to 5 ft.	5 8 9	DAMP	NO	5		
						6		
						7		Light brown.
						8		
						9		Clayey Gravel (GC), light brown, moist, medium dense, no petroleum odor.
18"	CA	8-1/2 to 10 ft.	13 14 15	MOIST	NO	10		
						11		
						12		
						13		Silty Clay (CL), light gray, moist, low plasticity, stiff; minor sand, no petroleum odor.
						14		Clayey Gravel (GC), dark brown, moist, medium dense, no petroleum odor.
18"	CA	13-1/2 to 15 ft.	5 7 8	MOIST	NO	15		
						16		Silty Clay (CL), light gray, moist, low plasticity, stiff; minor sand, no petroleum odor.
						17		Clayey Gravel (GC), light gray, wet, medium dense, no petroleum odor.
						18		Free groundwater initially encountered at 18 ft bgs.
18"	CA	18-1/2 to 20 ft.	5 6 8	WET	NO	19		
						20		Total depth Explored 20 ft bgs.

DUGAN ASSOCIATES
SOIL & GROUNDWATER SAMPLING LIC. R.G#6253

LOG FOR BORING EB-2 **Figure 5**

Boring Number EB-3 **Client** Former City of Paris Cleaners

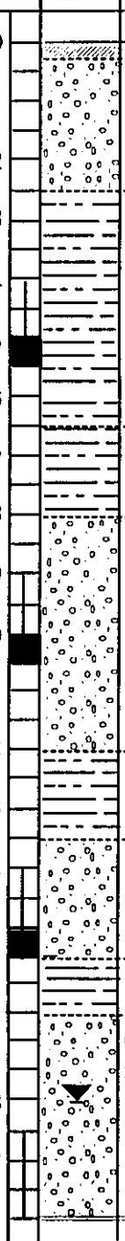
Job Number 218 **Drilling Co.** Exploration Geoservices, Inc.

Location 3516 Aleline St., Oakland, CA **Drilling Method** Hollow Stem Auger

Date Drilled 03/19/98 **Sampling Method** 2-in I.D.- split spoon Sampler

Logged By B. Dugan [R.G. #6253] **Well Casing** Backfilled with Bentonite

Recovery	Sample Type	Sample Depth (feet)	Blows per 6 in.	Moisture Content	Product Odor
18"	CA	3-1/2 to 5 ft.	7 8 9	DAMP	NO
18"	CA	8-1/2 to 10 ft.	8 11 10	MOIST	NO
18"	CA	13-1/2 to 15 ft.	4 5 9	MOIST	NO
18"	CA	18-1/2 to 20 ft.	5 6 8	WET	NO



Soil Description

Asphalt [Four inches]

Base Rock; No petroleum odor.

Silty Clay (CL), dark brown, damp to moist, low plasticity, stiff; no petroleum odor.

Silty Clay (CL), light brown, moist, low plasticity, stiff; no petroleum odor.

Clayey Gravel (GC), dark brown, moist, medium dense, no petroleum odor.

Silty Clay (CL), light gray, moist, low plasticity, stiff; minor sand, no petroleum odor.

Clayey Gravel (GC), dark brown, moist, medium dense, no petroleum odor.

Silty Clay (CL), light gray, moist, low plasticity, stiff; minor sand, no petroleum odor.

Clayey Gravel (GC), light gray, wet, medium dense, no petroleum odor.

Free groundwater initially encountered at 18 ft bgs.

Total depth Explored 20 ft bgs.

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LOG FOR BORING EB-3

Figure 6

Boring Number EB-4 **Client** Former City of Paris Cleaners

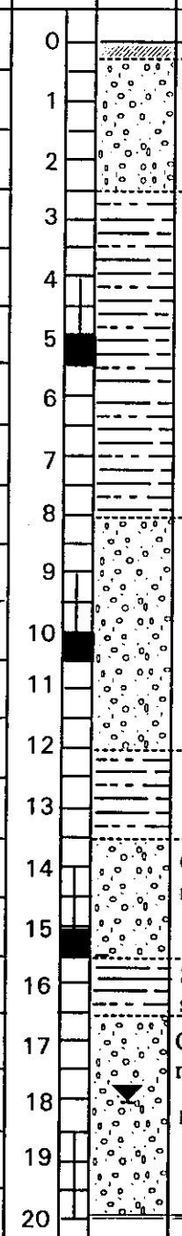
Job Number 218 **Drilling Co.** Exploration Geoservices, Inc.

Location 3516 Aleline St., Oakland, CA **Drilling Method** Hollow Stem Auger

Date Drilled 03/19/98 **Sampling Method** 2-in I.D.- split spoon Sampler

Logged By B. Dugan [R.G. #6253] **Well Casing** Backfilled with Bentonite

Recovery	Sample Type	Sample Depth (feet)	Blows per 6 in.	Moisture Content	Product Odor
18"	CA	3-1/2 to 5 ft.	8 11 12	DAMP	NO
18"	CA	8-1/2 to 10 ft.	8 11 12	MOIST	NO
18"	CA	13-1/2 to 15 ft.	5 7 11	MOIST	NO
18"	CA	18-1/2 to 20 ft.	5 6 8	WET	NO



Soil Description

Asphalt [Four inches]

Base Rock; No petroleum odor.

Silty Clay (CL), dark brown, damp to moist, low plasticity, stiff; no petroleum odor.

Light brown.

Clayey Gravel (GC), light brown, moist, medium dense, no petroleum odor.

Silty Clay (CL), light gray, moist, low plasticity, stiff; minor sand, no petroleum odor.

Clayey Gravel (GC), dark brown, moist, medium dense, no petroleum odor.

Silty Clay (CL), light gray, moist, low plasticity, stiff; minor sand, no petroleum odor.

Clayey Gravel (GC), light gray, wet, medium dense, no petroleum odor.

Free groundwater initially encountered at 18 ft bgs.

Total depth Explored 20 ft bgs.

DUGAN ASSOCIATES
SOIL & GROUNDWATER SAMPLING LIC. RG#6253

LOG FOR BORING EB-4

Figure 7

Boring Number EB-5 **Client** Former City of Paris Cleaners

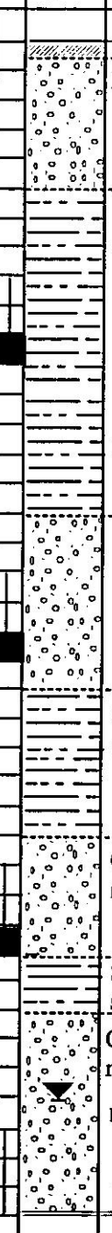
Job Number 218 **Drilling Co.** Exploration Geoservices, Inc.

Location 3516 Aleline St., Oakland, CA **Drilling Method** Hollow Stem Auger

Date Drilled 03/19/98 **Sampling Method** 2-in I.D.- split spoon Sampler

Logged By B. Dugan [R.G. #6253] **Well Casing** Backfilled with Bentonite

Recovery	Sample Type	Sample Depth (feet)	Blows per 6 in.	Moisture Content	Product Odor
18"	CA	3-1/2 to 5 ft.	5 7 9	DAMP	NO
18"	CA	8-1/2 to 10 ft.	11 12 14	MOIST	NO
18"	CA	13-1/2 to 15 ft.	6 7 8	MOIST	NO
18"	CA	18-1/2 to 20 ft.	5 7 7	WET	YES



Soil Description

Asphalt [Four inches]

Base Rock; No petroleum odor.

Silty Clay (CL), dark brown, damp to moist, low plasticity, stiff; no petroleum odor.

Light brown.

Clayey Gravel (GC), light brown, moist, medium dense, no petroleum odor.

Silty Clay (CL), light gray, moist, low plasticity, stiff; minor sand, no petroleum odor.

Clayey Gravel (GC), dark brown, moist, medium dense, no petroleum odor.

Silty Clay (CL), light gray, moist, low plasticity, stiff; minor sand, no petroleum odor.

Clayey Gravel (GC), light gray, wet, medium dense, no petroleum odor.

Free groundwater initially encountered at 18 ft bgs.

Total depth Explored 20 ft bgs.

DUGAN ASSOCIATES
SOIL & GROUNDWATER SAMPLING LIC. RG#6253

LOG FOR BORING EB-5

Figure 8

Boring Number EB-6 **Client** Former City of Paris Cleaners

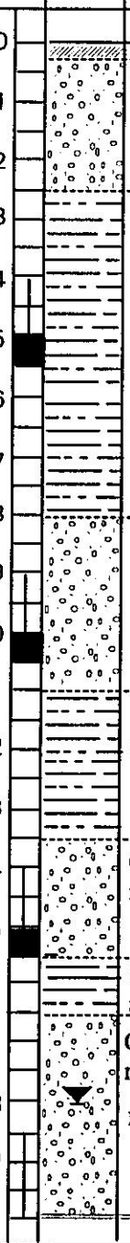
Job Number 218 **Drilling Co.** Exploration Geoservices, Inc.

Location 3516 Aleline St., Oakland, CA **Drilling Method** Hollow Stem Auger

Date Drilled 03/19/98 **Sampling Method** 2-in I.D.- split spoon Sampler

Logged By B. Dugan [R.G. #6253] **Well Casing** Backfilled with Bentonite

Recovery	Sample Type	Sample Depth (feet)	Blows per 6 in.	Moisture Content	Product Odor
18"	CA	3-1/2 to 5 ft.	5 7 9	DAMP	NO
18"	CA	8-1/2 to 10 ft.	10 12 15	MOIST	NO
18"	CA	13-1/2 to 15 ft.	5 7 9	MOIST	NO
18"	CA	18-1/2 to 20 ft.	5 7 8	WET	NO



Soil Description

Asphalt [Four inches]

Base Rock; No petroleum odor.

Silty Clay (CL), dark brown, damp to moist, low plasticity, stiff; no petroleum odor.

Light brown.

Clayey Gravel (GC), light brown, moist, medium dense, no petroleum odor.

Silty Clay (CL), light gray, moist, low plasticity, stiff; minor sand, no petroleum odor.

Clayey Gravel (GC), dark brown, moist, medium dense, no petroleum odor.

Silty Clay (CL), light gray, moist, low plasticity, stiff; minor sand, no petroleum odor.

Clayey Gravel (GC), light gray, wet, medium dense, no petroleum odor.

Free groundwater initially encountered at 18 ft bgs.

Total depth Explored 20 ft bgs.

DUGAN ASSOCIATES
SOIL & GROUNDWATER SAMPLING LIC. RG#6253

LOG FOR BORING EB-6

Figure 9

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BORING NUMBER GP-1

CLIENT Former City of Paris Cleaners
PROJECT NAME
PROJECT NUMBER 051074
PROJECT LOCATION 3516 Adeline Street, Oakland, CA
DATE STARTED 5/2/11 **COMPLETED** 5/2/11
GROUND ELEVATION **HOLE HOLE DIAM.:** 2"
CONTRACTOR ECA
GROUND WATER LEVELS:
METHOD GeoProbe 6600
AT TIME OF DRILLING ---
LOGGED BY ELP **CHECKED BY**
AT END OF DRILLING ---
NOTES
AFTER DRILLING ---

DEPTH (ft)	SAMPLE NUMBER	BLOW COUNTS (N VALUE)	PID (ppm)	GRAPHIC LOG	MATERIAL DESCRIPTION	GROUNDWATER NOTES
0					0.5 Asphalt Sandy, Gravelly Clay (CL) Fill	
					4.0 Clay (CL), dark gray, moist	
5					Mottled gray and brown at 6'	
10					Changing to clay with gravel at 10' 11.5	▽ Shallow zone groundwater first encountered 12 feet bgs
					Clay with Sand (~25%) and Gravel (~10%) (CL), brown with red gray mottling Change to Sandy Clay with Gravel at 12'	
15					16.5	
	GP-1-17				Clayey Gravelly Sand / Sandy Gravel (SC/GC), mottled medium brown-red, wet 18.5	▼ Groundwater measured after completing boring 18.25 feet bgs
20					19.0 Silty Sand (SM), yellow brown, wet Sandy Silt (ML), fine, yellow brown, wet	
					22.0 Clay with Gravel and Sand (CL), yellow brown, moist 23.0	
					Sandy Silt (ML), fine, yellow brown, moist 24.0	
25					Clay with Gravel and Sand (CL), yellow brown, moist	
					Increasing gravel	
30					30.0 Clayey Gravel with Coarse Sand (GC), brown, wet	▽ Deeper zone groundwater first encountered 30 feet bgs
					32.0	
	GP-1-32.5				33.0 Sandy Clayey Silt (ML), brown with red mottles, moist Silty Clay (CL), dark gray, moist	
35						
40					40.0 Bottom of hole at 40.0 feet.	Note: shallow zone groundwater not discreetly sampled for GP-1.

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BORING NUMBER GP-2

CLIENT Former City of Paris Cleaners
PROJECT NAME
PROJECT NUMBER 051074
PROJECT LOCATION 3516 Adeline Street, Oakland, CA
DATE STARTED 5/2/11 **COMPLETED** 5/2/11
GROUND ELEVATION **HOLE HOLE DIAM.:** 2"
CONTRACTOR ECA
GROUND WATER LEVELS:
METHOD GeoProbe 6600
AT TIME OF DRILLING ---
LOGGED BY ELP **CHECKED BY**
AT END OF DRILLING ---
NOTES
AFTER DRILLING ---

DEPTH (ft)	SAMPLE NUMBER	BLOW COUNTS (N VALUE)	PID (ppm)	GRAPHIC LOG	MATERIAL DESCRIPTION	GROUNDWATER NOTES
0					0.5 Concrete / Asphalt Clay (CL), dark gray, moist, fill	
5					5.5 Sand and Gravel (GW), fill 6.5 Sandy, Gravelly Clay (CL), mottled brown, moist, fine-grained	
10					10.0 Clayey and Sandy Gravel (GC/SC), brown, angular to subangular Gravel 2-5 mm	
15	GP-2-11					▼ Groundwater measured after completing boring 13.85 feet bgs
20	GP-2-17				17.0 Clayey Gravel with Silt and Sand (GC), angular to subangular, wet 21.0 Sandy Clay (CL), brown, mottled, moist	▽ Shallow zone groundwater first encountered 17 feet bgs
25						
30						
35					Increasing fines, fine sand 35.0 Clayey Sand (SC), brown, wet, coarse, some coarse sandy rounded Gravel	▽ Deeper zone groundwater first encountered 35 feet bgs
40					40.0 Bottom of hole at 40.0 feet.	Note: shallow zone groundwater not discreetly sampled for GP-2.

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BORING NUMBER GP-3

CLIENT Former City of Paris Cleaners
PROJECT NAME
PROJECT NUMBER 051074
PROJECT LOCATION 3516 Adeline Street, Oakland, CA
DATE STARTED 5/6/11 **COMPLETED** 5/6/11
GROUND ELEVATION **HOLE HOLE DIAM.:** 2"
CONTRACTOR ECA
GROUND WATER LEVELS:
METHOD GeoProbe 6600
AT TIME OF DRILLING ---
LOGGED BY ELP **CHECKED BY**
AT END OF DRILLING ---
NOTES
AFTER DRILLING ---

DEPTH (ft)	SAMPLE NUMBER	BLOW COUNTS (N VALUE)	PID (ppm)	GRAPHIC LOG	MATERIAL DESCRIPTION	GROUNDWATER NOTES
0					0.5 Asphalt	
					Gravelly Clay (CL), fill	
					3.0	
					Gravelly Clay with Coarse Sand (CL), fill, black/dark gray, dry	
5						
					Change to medium gray, moist	
10						
					2" fine angular gravel layer at 12', change to brown silty clay, mottled red/medium gray	
					13.5	
					Sandy Clay / Clayey Sand (CL/SC), brown, moist, grading from coarse to fine sand	
15	GP-3-14.5					
	GP-3-16.5				17.5	
					Sandy Clay (CL), brown and gray mottling, moist	
20						
25						
					27.0	
					Clayey Sand, Sandy Clay (CL/SC), medium brown, moist	
					29.0	
30					Clay with Gravel (CL), trace Sand, moist	
					Increasing sand to ~31', coarse subangular ~2 mm	
					32.5	
					Medium Sand (SM/SC), dark brown, uniform with fines, wet	▽ Deeper zone groundwater first encountered 34 feet bgs
35					34.5	
					35.5 Sandy Clay (CL), dark brown, wet	
					Clayey Sand (SC), medium brown with mottles, wet	Note: shallow zone groundwater not encountered in GP-3; measurement of shallow and deeper zone groundwater not recorded after completing boring.
					37.0	
					Silty Clay (CL), dark gray with gray mottles, moist	
40					40.0	
					Bottom of hole at 40.0 feet.	

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BORING NUMBER GP-4

CLIENT Former City of Paris Cleaners
PROJECT NAME
PROJECT NUMBER 051074
PROJECT LOCATION 3516 Adeline Street, Oakland, CA
DATE STARTED 5/6/11 **COMPLETED** 5/6/11
GROUND ELEVATION **HOLE HOLE DIAM.:** 2"
CONTRACTOR ECA
GROUND WATER LEVELS:
METHOD GeoProbe 6600
AT TIME OF DRILLING ---
LOGGED BY ELP **CHECKED BY**
AT END OF DRILLING ---
NOTES
AFTER DRILLING ---

DEPTH (ft)	SAMPLE NUMBER	BLOW COUNTS (N VALUE)	PID (ppm)	GRAPHIC LOG	MATERIAL DESCRIPTION	GROUNDWATER NOTES
0					0.5 Asphalt Angular Gravel with fines (GW), fill	
					3.5 Clay (CL), dark gray/black, dry, ~5% coarse sand	
5					Color change - medium gray to light gray	
					Trace white inclusions, trace coarse sand	
10					Color change to brown, mottled	▼ Shallow zone groundwater measured after completing boring 10.25 feet bgs
					12.0 Clayey Sand with Gravel (SC), angular, brown with gray mottling	
15	GP-4-14				15.0 Clayey Gravel (GC), subangular with coarse sand, brown, moist	
					17.0 Coarse Sand (SC) with fines, dark brown, moist	
	GP-4-18				19.0	
20	GP-4-19.5				Sandy Clay (CL), dark brown, moist Color change to dark gray, moist, ~30% fine uniform sand Hydrocarbon odor, gray, moist Color change at 22' to brown with vertical gray streaks	
25					Decreasing sand, increasing clay, brown	
					Color change to red/brown mottled with white inclusions	
30						
					32.5 Clayey Sand (SC), dark brown, wet, trace large gravel ~20 mm	▽ Deeper zone groundwater first encountered 34 feet bgs
35						
					37.0 Silty Clay (CL), dark gray with lighter gray mottling, wet	Note: shallow zone groundwater not encountered in GP-4; measurement of deeper zone groundwater not recorded after completing boring.
40					40.0 Bottom of hole at 40.0 feet.	

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BORING NUMBER GP-5

CLIENT Former City of Paris Cleaners
PROJECT NAME
PROJECT NUMBER 051074
PROJECT LOCATION 3516 Adeline Street, Oakland, CA
DATE STARTED 5/5/11 **COMPLETED** 5/5/11
GROUND ELEVATION **HOLE HOLE DIAM.:** 2"
CONTRACTOR ECA
GROUND WATER LEVELS:
METHOD **GeoProbe 6600**
AT TIME OF DRILLING ---
LOGGED BY ELP **CHECKED BY**
AT END OF DRILLING ---
NOTES
AFTER DRILLING ---

DEPTH (ft)	SAMPLE NUMBER	BLOW COUNTS (N VALUE)	PID (ppm)	GRAPHIC LOG	MATERIAL DESCRIPTION	GROUNDWATER NOTES
0					0.5 Asphalt	
					Clay (CL), Fill, dry	
5					5.5	
					Sandy Clay with Gravel (CL), mottled dark and light gray, moist	
	GP-5-6.5				Change to brown, increasing Sand/Gravel	
10					Coarse Sand, change to dark brown	▼ Groundwater measured after completing boring 10.61 feet bgs
15					Increasing Sand, Gravel, staining at ~15' where water increasing	
	GP-5-15				Fill, brick pieces, Clay, dark brown/red with mottles	
					Decreasing gravel, change to brown, ~10% coarse sand	
20					No Gravel	
25			8.6		Increasing Gravel at 25'	
	GP-5-28				28.0 Coarse Sand with Clay (SC), brown, wet	
30						▽ Deeper zone groundwater first encountered 31 feet bgs
					33.0	
					34.0 Gravel (GW), wet	
35					35.0 Coarse Sand (SW), dark brown,wet, trace fines	
					36.0 Subangular fine Gravel (GW), dark brown, trace fines, wet	
					37.0 Medium Sand (SP), gray, wet	
					Clayey Gravel (GC), brown, wet, coarse angular, with coarse Sand	
40					40.0 Bottom of hole at 40.0 feet.	Note: shallow zone groundwater not discreetly sampled for GP-5.

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BORING NUMBER GP-6

CLIENT Former City of Paris Cleaners
PROJECT NAME
PROJECT NUMBER 051074
PROJECT LOCATION 3516 Adeline Street, Oakland, CA
DATE STARTED 5/5/11 **COMPLETED** 5/5/11
GROUND ELEVATION **HOLE HOLE DIAM.:** 2"
CONTRACTOR ECA
GROUND WATER LEVELS:
METHOD **GeoProbe 6600**
AT TIME OF DRILLING ---
LOGGED BY ELP **CHECKED BY**
AT END OF DRILLING ---
NOTES
AFTER DRILLING ---

DEPTH (ft)	SAMPLE NUMBER	BLOW COUNTS (N VALUE)	PID (ppm)	GRAPHIC LOG	MATERIAL DESCRIPTION	GROUNDWATER NOTES
0					0.5 Ashalt	
					Gravelly Clay (CL), dark gray, dry, strong hydrocarbon odor, angular	
5					6.0	
			84.8		Clay (CL), with angular fine Gravel, dark gray	
			4.3			
10			54.3			
	GP-6-11.5				Change to brown	
			54.3		Change to gray-green with red mottling	
			23.7			
15					15.0 Change to Sandy Clay (CL), dark gray, strong hydrocarbon odor	
			1200		16.0 Gravel (GC), dark gray, angular	
			850		Silty Sandy Clay (CL), brown mottled, moist	
			0.5			
			1.7			
20					20.0	
					Bottom of hole at 20.0 feet.	

Note: Groundwater not encountered.

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BORING NUMBER GP-7

CLIENT Former City of Paris Cleaners
PROJECT NAME
PROJECT NUMBER 051074
PROJECT LOCATION 3516 Adeline Street, Oakland, CA
DATE STARTED 5/6/11 **COMPLETED** 5/6/11
GROUND ELEVATION **HOLE HOLE DIAM.:** 2"
CONTRACTOR ECA
GROUND WATER LEVELS:
METHOD GeoProbe 6600
AT TIME OF DRILLING ---
LOGGED BY ELP **CHECKED BY**
AT END OF DRILLING ---
NOTES
AFTER DRILLING ---

DEPTH (ft)	SAMPLE NUMBER	BLOW COUNTS (N VALUE)	PID (ppm)	GRAPHIC LOG	MATERIAL DESCRIPTION	GROUNDWATER NOTES
0					0.5 Asphalt	
					Gravelly Clay (CL), Fill, dark gray, dry, strong hydrocarbon odor	
5					5.0	
					Clay with trace coarse Sand (CL), gray	
			7.1			
					Change to fine Sandy Clay, hydrocarbon odor	
	GP-7-8		243			
10						
			98.7		Change to brown with light gray inclusions	
					11.0 Increasing angular Gravel, increasing Sand	
					Silty Clayey Sand (SC), mottled dark gray, red, light gray, dry	
			62.7			
15						
			7.4			
	GP-7-16		63.9		17.0	
					Sandy Clay with coarse Sand (CL), brown, dry	
			4.2			
			3.2			
20					20.0	
			2.8		Appears wet at end of sampler at 20'	
					Bottom of hole at 20.0 feet.	

Note: Groundwater not encountered.

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BORING NUMBER GP-8

CLIENT Former City of Paris Cleaners
PROJECT NAME
PROJECT NUMBER 051074
PROJECT LOCATION 3516 Adeline Street, Oakland, CA
DATE STARTED 5/13/11 **COMPLETED** 5/13/11
GROUND ELEVATION **HOLE HOLE DIAM.:** 2"
CONTRACTOR ECA
GROUND WATER LEVELS:
METHOD GeoProbe 6600
AT TIME OF DRILLING ---
LOGGED BY ELP **CHECKED BY**
AT END OF DRILLING ---
NOTES
AFTER DRILLING ---

DEPTH (ft)	SAMPLE NUMBER	BLOW COUNTS (N VALUE)	PID (ppm)	GRAPHIC LOG	MATERIAL DESCRIPTION	GROUNDWATER NOTES
0					0.5 Concrete	
					Clay (CL), dark grey, with 10% coarse Sand, moist	
5					Change to light brown with trace fine Gravel	
			0.6		9.0 Increasing coarse Sand, light gray with white inclusions	
					Clayey coarse Sand (SC), medium gray / light brown mottled, moist	
10					10.5 Clay with trace fine Sand (CL), dark gray brown mottled, moist	▼ Shallow zone groundwater measured after completing boring 10.68 feet bgs
			1.2			
			8.9		14.0	
15	GP-8-14		18.3		Clayey Sand (SC), dark gray, fine to coarse sand, moist	
			41.5			
	GP-8-16.5				Strong hydrocarbon odor	
			1.7		18.0 Clay with fine Sand (CL), olive gray, moist	
			0.4			
20			1.9			
					Change to brown	
25						
					Change to Silty Clay, medium brown, moist	
			1.2		27.0 Sandy Silt (ML), brown, moist	
					28.5 Gravelly Sandy Clay (CL), brown, fine gravel, coarse sand, moist	
30						
					31.0 Clayey Sand (SC), medium brown, wet, coarse, subangluar	▽ Deeper zone groundwater first encountered 31 feet bgs
			0.4		34.0	
35	GP-8-34				Clay with trace Sand (CL), dark gray, moist	
			0.2		35.5 Clayey Gravel (GC), dark gray, wet	
					37.5 Sandy Clay (CL), dark gray with red mottles, moist	Note: shallow zone groundwater not encountered in GP-8; measurement of deeper zone groundwater not recorded after completing boring.
40			0.1		40.0 Bottom of hole at 40.0 feet.	

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BORING NUMBER GP-9

CLIENT Former City of Paris Cleaners
PROJECT NAME
PROJECT NUMBER 051074
PROJECT LOCATION 3516 Adeline Street, Oakland, CA
DATE STARTED 5/12/11 **COMPLETED** 5/12/11
GROUND ELEVATION **HOLE HOLE DIAM.:** 2"
CONTRACTOR ECA
GROUND WATER LEVELS:
METHOD GeoProbe 6600
AT TIME OF DRILLING ---
LOGGED BY ELP **CHECKED BY**
AT END OF DRILLING ---
NOTES
AFTER DRILLING ---

DEPTH (ft)	SAMPLE NUMBER	BLOW COUNTS (N VALUE)	PID (ppm)	GRAPHIC LOG	MATERIAL DESCRIPTION	GROUNDWATER NOTES
0					0.5 Concrete	
					Clay (CL), dark gray, moist	
5			0.8			
					Change to green with olive green mottling	
			0.1			
10			0.2		9.5 Clayey Gravel (GC), light gray,fine, moist	▼ Shallow zone groundwater measured after completing boring 9.99 feet bgs
			3.7		11.0 Clay with trace Sand (CL), olive gray, moist	
			14.5			
15			38.5		14.5 Change to fine Sandy Clay	▼ Deeper zone groundwater measured after completing boring 15.14 feet bgs
	GP-9-15		425		Clayey Sand (SC), olive and dark gray, coarse, moist	▽ Shallow zone groundwater first encountered 17 feet bgs
	GP-9-16.5					
			5.6		18.0 Change to dark gray, wet, hydrocarbon odor	
20			10.3		Clay with trace Sand (CL), brown with brown mottles, moist	
			7.1			
25			2.1		26.5 Sandy Clayey Gravel (GC), brown , moist	
30						
			1.1		31.5 Change to wet Clay with coarse Gravel and trace fine Sand (CL), light / medium gray mottled, moist, subangular	
35					34.5 Gravel (SW), light brown, ~20 mm, moist	▽ Deeper zone groundwater first encountered 35 feet bgs
			0.6		Coarse to medium Sand with Gravel, dark gray, wet	
			1.0			
			0.7		38.0	
	GP-9-38.5		0.7		Clay (CL), dark gray, wet	
40			0.3		40.0 Bottom of hole at 40.0 feet.	

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BORING NUMBER GP-10

CLIENT Former City of Paris Cleaners
PROJECT NAME
PROJECT NUMBER 051074
PROJECT LOCATION 3516 Adeline Street, Oakland, CA
DATE STARTED 5/12/11 **COMPLETED** 5/12/11
GROUND ELEVATION **HOLE HOLE DIAM.:** 2"
CONTRACTOR ECA
GROUND WATER LEVELS:
METHOD GeoProbe 6600
AT TIME OF DRILLING ---
LOGGED BY ELP **CHECKED BY**
AT END OF DRILLING ---
NOTES
AFTER DRILLING ---

DEPTH (ft)	SAMPLE NUMBER	BLOW COUNTS (N VALUE)	PID (ppm)	GRAPHIC LOG	MATERIAL DESCRIPTION	GROUNDWATER NOTES
0					0.5 Concrete	
					Clay (CL), dark gray, moist	
5					Trace fine sand	
			1.1		Change to medium gray / green Clay with coarse Sand	
10			2.1			
						▼ Deeper zone groundwater measured after completing boring 13.86 feet bgs
15			4.1		14.5 Clayey Sand (SC), dark gray / olive green mottling, moist	
	GP-10-16				Hydrocarbon odor	Shallow zone groundwater measured after completing boring
	GP-10-16.5		13			▽ 17.55 feet bgs
					18.5 Coarse Sand, dark gray, wet, strong hydrocarbon odor	Shallow zone groundwater first encountered 18 feet bgs
20					Clay with trace Sand (CL), blue-gray / green, moist	
			1.3		Change to very hard, brown, dry	
			3		Change to less hard, gray green, moist	
25						
			0.6		26.5	
					27.5 Clayey Gravel (GC), angular	
			0.3		Clay (CL), brown with mottles, moist	
30						
			0.6		31.0	▽ Deeper zone groundwater first encountered 31.5 feet bgs
					32.0 Coarse Sand with Clay (SC), dark brown, wet	
			0.3		Sandy Clay (CL), brown, moist	
	GP-10-33					
35			0.3			
					36.0	
			0.5		Clayey Sand (SC), brown, medium to fine, moist, with trace fine subangular and round Gravel	
					Change to fine Sand	
					38.5	
					Clay with trace fine Sand (CL), dark gray, moist	
40			0.4		40.0	

Bottom of hole at 40.0 feet.

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BORING NUMBER GP-11

CLIENT Former City of Paris Cleaners
PROJECT NAME
PROJECT NUMBER 051074
PROJECT LOCATION 3516 Adeline Street, Oakland, CA
DATE STARTED 5/13/11 **COMPLETED** 5/13/11
GROUND ELEVATION **HOLE HOLE DIAM.:** 2"
CONTRACTOR ECA
GROUND WATER LEVELS:
METHOD GeoProbe 6600
AT TIME OF DRILLING ---
LOGGED BY ELP **CHECKED BY**
AT END OF DRILLING ---
NOTES
AFTER DRILLING ---

DEPTH (ft)	SAMPLE NUMBER	BLOW COUNTS (N VALUE)	PID (ppm)	GRAPHIC LOG	MATERIAL DESCRIPTION	GROUNDWATER NOTES
0					0.5 Concrete	
					Clay (CL), dark gray	
5					Change to greenish gray and brown mottles, white inclusions	
			1.5		Change to brown	
10					12.0	▼ Shallow zone groundwater measured after completing boring 11.85 feet bgs
			0.1		13.0 Clayey Sand (SC), brown, medium/coarse, moist	
					Clayey Gravel (GC), moist, subangular, ~40% fines	▼ Deeper zone groundwater measured after completing boring 14.71 feet bgs
15			0.7			
			0.4		17.0	
	GP-11-17				Sandy Clay (CL), red brown / light brown mottles, moist, fine Sand	
			0.4			
20			0.1			
			0.7			
25			0.3		Change to light gray / brown mottles, trace white inclusions, ~5% coarse angular Gravel	
			0.1			
30						
			0.2		33.0	
	GP-11-34				Sand with Clay (SW/SC), medium to coarse sand, ~10% clay, brown, wet	▽ Deeper zone groundwater first encountered 34 feet bgs
35			0.2		35.0	
					Gravelly Clayey Sand (SC), dark brown, wet, ~30% medium Sand, fine angular Gravel, wet	
			0.8		37.0	
					38.0 Clayey Silt with trace fine Sand (CL), medium brown mottles, moist	
	GP-11-38.5				Clayey Sand (SC), dark brown, fine / medium, wet, ~10% fines	Note: shallow zone groundwater not encountered in GP-11.
40					39.5 40.0	

ENVIRONMENTAL BH CITY OF PARIS SPRING 2011 INVESTIGATION.GPJ LIBRARY.GLB TABER.GDT 6/15/11

(Continued Next Page)

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BORING NUMBER GP-11

CLIENT Former City of Paris Cleaners **PROJECT NAME**

PROJECT NUMBER 051074 **PROJECT LOCATION** 3516 Adeline Street, Oakland, CA

DEPTH (ft)	SAMPLE NUMBER	BLOW COUNTS (N VALUE)	PID (ppm)	GRAPHIC LOG	MATERIAL DESCRIPTION	GROUNDWATER NOTES
					Sandy Clay (CL), dark gray, wet, ~35% Sand	
					Bottom of hole at 40.0 feet.	

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BORING NUMBER GP-12

CLIENT Former City of Paris Cleaners
PROJECT NAME
PROJECT NUMBER 051074
PROJECT LOCATION 3516 Adeline Street, Oakland, CA
DATE STARTED 5/19/11 **COMPLETED** 5/19/11
GROUND ELEVATION **HOLE HOLE DIAM.:** 2"
CONTRACTOR ECA
GROUND WATER LEVELS:
METHOD GeoProbe 6600
AT TIME OF DRILLING ---
LOGGED BY ELP **CHECKED BY**
AT END OF DRILLING ---
NOTES
AFTER DRILLING ---

DEPTH (ft)	SAMPLE NUMBER	BLOW COUNTS (N VALUE)	PID (ppm)	GRAPHIC LOG	MATERIAL DESCRIPTION	GROUNDWATER NOTES
0					0.5 Concrete	
					Clay (CL), olive green, dry	
5						
					7.0	
			2.3		Clayey Sand with Gravel (SC), moist, stained, no hydrocarbon odor, ~15% fine angular Gravel	
10					10.0	
					Clay (CL), olive green and brown, dry, stained, hydrocarbon odor	
			15.4			
					Ttransport appears vertical, cores 75-100% stained to 17', vertical pores stained to 26'	▼ Deeper zone groundwater measured after completing boring 13.91 feet bgs
15			76.7		Increased staining, no brown, moist	
					16.0	
	GP-12-16				Clayey Sitly Gravel (GC), dark gray / green, wet, very strong hydrocarbon odor	▽ Shallow zone groundwater first encountered 17 feet bgs
			2.7		18.0	
					Silty Clay (CL), brown, vertical pores dark grey, wet	
20						
			1.3			
			7.1			
25						
					26.5	
			0.8		Change to brown with brown mottles, moist	
					Clayey Sand with Gravel (SC), medium gray, wet, ~20% Gravel 10-15 mm	
			0.8		28.5	
					Sandy Clay with Gravel (CL), moist	
30					29.5	▽ Deeper zone groundwater first encountered 30 feet bgs
			0.5		Clayey Gravel with Sand (GC), medium brown, wet, coarse Sand, fine subangular Gravel	
					32.0	
			0.4		33.0 Clayey Sand with Gravel (SC), brown, wet	
					34.0 Sandy Clay (CL), brown with brown mottles, moist	
35	GP-12-34		1.9		Clayey Sand (SC), dark gray, wet	
					35.5	
					Sandy Clay (CL), dark gray, moist	
			1.2			
					39.0	Note: shallow zone groundwater could not be sampled in GP-12.
40			0.3		40.0 Clayey Gravel (GM), dark gray, moist, fine subangular Gravel	

Bottom of hole at 40.0 feet.

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BORING NUMBER GP-13

CLIENT Former City of Paris Cleaners
PROJECT NAME
PROJECT NUMBER 051074
PROJECT LOCATION 3516 Adeline Street, Oakland, CA
DATE STARTED 5/19/11 **COMPLETED** 5/19/11
GROUND ELEVATION **HOLE HOLE DIAM.:** 2"
CONTRACTOR ECA
GROUND WATER LEVELS:
METHOD GeoProbe 6600
AT TIME OF DRILLING ---
LOGGED BY ELP **CHECKED BY**
AT END OF DRILLING ---
NOTES
AFTER DRILLING ---

DEPTH (ft)	SAMPLE NUMBER	BLOW COUNTS (N VALUE)	PID (ppm)	GRAPHIC LOG	MATERIAL DESCRIPTION	GROUNDWATER NOTES
0					0.5 Concrete	
					Clay with trace coarse Sand (CL), brown, dry	
5			1.3			
10			5.2		Change to medium brown with red-brown mottles	
					Change to moist	▼ Deeper zone groundwater measured after completing boring 13.45 feet bgs
15			0.3		15.0 Increasing Sand, moist	
					Clayey Sand (SC), medium brown with dark brown mottles, moist	
	GP-13-16.5		1.1		17.0 Sandy Clay (CL), medium brown with medium gray mottles, moist	
20			1.4		Change to medium brown	
			2.4			
25			1.6			
			0.2		28.0	
					Clayey Sand (SC), brown, moist	
30					29.0 Sandy Clay (CL), brown, moist	
			1.0		31.0	
					32.0 Clayey coarse Sand with fine Gravel (SC), brown, moist	
			3.6		Clay (CL), brown with red-brown mottles, moist	
					33.5	
35	GP-13-34		0.8		Silty Sand (SM), brown / medium gray mottles, wet	▽ Deeper zone groundwater first encountered 34 feet bgs
					35.5	
			2.1		Sandy Clay (CL), medium gray with brown mottles, wet 36.5	
					Clayey Sand (SC), brown, fine, wet	
					39.0	Note: shallow zone groundwater could not be sampled in GP-13.
40			2		Sandy Clay (CL), dark gray, moist 40.0	

Bottom of hole at 40.0 feet.

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BORING NUMBER GP-16

CLIENT Former City of Paris Cleaners
PROJECT NAME
PROJECT NUMBER 051074
PROJECT LOCATION 3516 Adeline Street, Oakland, CA
DATE STARTED 5/17/11 **COMPLETED** 5/17/11
GROUND ELEVATION **HOLE HOLE DIAM.:** 2"
CONTRACTOR ECA
GROUND WATER LEVELS:
METHOD GeoProbe 6600
AT TIME OF DRILLING ---
LOGGED BY ELP **CHECKED BY**
AT END OF DRILLING ---
NOTES
AFTER DRILLING ---

DEPTH (ft)	SAMPLE NUMBER	BLOW COUNTS (N VALUE)	PID (ppm)	GRAPHIC LOG	MATERIAL DESCRIPTION	GROUNDWATER NOTES
0					0.5 Asphalt	
					Clay (CL), Fill	
					4.0	
5					Clay (CL), dark brown, dry	
			0			
					Change to light brown	
10					Change to Clay with Gravel, dry, ~20% fine subangular Gravel	
			0		Change to Clay with trace Gravel, moist	
			0		Brown mottles	
15						▼ Shallow zone groundwater measured after completing boring 15.75 feet bgs
			0.3		18.0 Change to Sandy Clay, light brown mottles, moist, ~40% fine Sand	
					19.0 Clayey Sandy Gravel (GC), dark gray, moist, fine, stained, hydrocarbon odor, subangular	
20	GP-16-19		1.7		Sandy Clay (CL), brown, ~40% fine Sand, brown, vertical pores stained, strong hydrocarbon odor	
					Hard Clay with trace Sand, red brown with mottles, moist, stained vertical pores	
			1.4			
25						
			0.3			
			0		Vertical staining, white inclusions	
30						
			0			
			0.1		Brown with black mottling	▼ Deeper zone groundwater measured after completing boring 32.65 feet bgs
			0.1			
35					~40% red mottling, light brown	
			0		Change to light gray	
					Light gray with red-brown mottles	
	GP-16-38					Note: Groundwater not encountered.
40			0.9		40.0 Bottom of hole at 40.0 feet.	

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BORING NUMBER GP-17

CLIENT Former City of Paris Cleaners
PROJECT NAME
PROJECT NUMBER 051074
PROJECT LOCATION 3516 Adeline Street, Oakland, CA
DATE STARTED 5/17/11 **COMPLETED** 5/17/11
GROUND ELEVATION **HOLE HOLE DIAM.:** 2"
CONTRACTOR ECA
GROUND WATER LEVELS:
METHOD GeoProbe 6600
AT TIME OF DRILLING ---
LOGGED BY ELP **CHECKED BY**
AT END OF DRILLING ---
NOTES
AFTER DRILLING ---

DEPTH (ft)	SAMPLE NUMBER	BLOW COUNTS (N VALUE)	PID (ppm)	GRAPHIC LOG	MATERIAL DESCRIPTION	GROUNDWATER NOTES
0					0.5 Asphalt Clay Fill (CL)	
					3.5 Clay with ~10% coarse Sand (CL), dark gray, dry	
5					Change to medium gray	
			0			
10					Trace fine Gravel, subangular, dry	
					Silty Sandy Gravelly Clayey mixture, brown	
					11.5 Clayey Sand (SC), light gray and mottled brown, fine, moist	
			0			▼ Shallow zone groundwater measured after completing boring 13.75 feet bgs
15					Trace subangular fine Gravel	
			0			
					Change to Clayey Sand with Gravel	▼ Deeper zone groundwater measured after completing boring 17.4 feet bgs
			0			
20					19.5 Clay with Sand (CL), brown, damp	
			0			
					Appearance of stained vertical pores to ~25'	
	GP-17-23.5		0.3			
25						
			0.5			
30			0			
			0		34.0 Clayey Sand (SC), dark brown, wet	▽ Deeper zone groundwater first encountered 35 feet bgs
35						
			0			
			0		37.5 0.5' lens of fine Sand with trace fines at 37.0'	
	GP-17-38				Silty Clay (CL), medium gray brown mottles, moist	Note: Shallow groundwater not encountered.
40			0		40.0 Bottom of hole at 40.0 feet.	

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BORING NUMBER GP-18

CLIENT Former City of Paris Cleaners
PROJECT NAME
PROJECT NUMBER 051074
PROJECT LOCATION 3516 Adeline Street, Oakland, CA
DATE STARTED 5/17/11 **COMPLETED** 5/17/11
GROUND ELEVATION **HOLE HOLE DIAM.:** 2"
CONTRACTOR ECA
GROUND WATER LEVELS:
METHOD GeoProbe 6600
AT TIME OF DRILLING ---
LOGGED BY ELP **CHECKED BY**
AT END OF DRILLING ---
NOTES
AFTER DRILLING ---

DEPTH (ft)	SAMPLE NUMBER	BLOW COUNTS (N VALUE)	PID (ppm)	GRAPHIC LOG	MATERIAL DESCRIPTION	GROUNDWATER NOTES
0					0.5 Asphalt	
					Clay with coarse Sand (CL), dark gray, dry	
5					Clay with ~10% mideum sand, medium gray	
			0			
10					Trace fine Gravel, medium gray / brown	
			0			
			0			
15						▼ Shallow zone groundwater measured after completing boring 15.71 feet bgs
			0		18.0	
					19.0 Clayey Sand (SC), trace Gravel, brown with green gray vertical pores, moist, faint hydrocarbon odor	
20	GP-18-19		0.3		Silty Clay (CL), trace Sand, brown with dark gray vertical pores, moist	
			0.4			
25			0			▼ Deeper zone groundwater measured after completing boring 25.23 feet bgs
			0.3		No dark gray vertical pores	
30			0			
			0		~30% Gravel, medium brown, coarse, angular	
					33.5	
35			0		34.5 Clayey Gravel (GC), dark brown, wet	
					Fine Sand with Clay (SC), dark brown, wet	▽ Deeper zone groundwater first encountered 36 feet bgs
			0		36.5	
					Sandy Clay (CL), medium brown, red brown mottles, moist	
	GP-18-38					Note: Shallow groundwater not encountered.
40			0		40.0 Bottom of hole at 40.0 feet.	

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BORING NUMBER GP-19

CLIENT Former City of Paris Cleaners
PROJECT NAME
PROJECT NUMBER 051074
PROJECT LOCATION 3516 Adeline Street, Oakland, CA
DATE STARTED 5/17/11 **COMPLETED** 5/17/11
GROUND ELEVATION **HOLE HOLE DIAM.:** 2"
CONTRACTOR ECA
GROUND WATER LEVELS:
METHOD GeoProbe 6600
AT TIME OF DRILLING ---
LOGGED BY ELP **CHECKED BY**
AT END OF DRILLING ---
NOTES
AFTER DRILLING ---

DEPTH (ft)	SAMPLE NUMBER	BLOW COUNTS (N VALUE)	PID (ppm)	GRAPHIC LOG	MATERIAL DESCRIPTION	GROUNDWATER NOTES
0					0.5 Asphalt	
					Clay (CL), dark brown, dry	
5			0		Change to Clay with trace Sand, dary gray	
					Change to medium gray / brown	
10			0		Change to Gravelly Clay, ~30% fine Gravel	▼ Shallow zone groundwater measured after completing boring 11.35 feet bgs
					Change to Sandy Clay, brown , moist	
15			0.4		16.5 Medium Sand with Clay (SC), trace Gravel, dark brown, moist to wet	
					19.0 Clay (CL), brown, moist	
20	GP-19-20		0			
			0			
25			0			
			0		Trace white inclusions	
			0			
30			0			▼ Deeper zone groundwater measured after completing boring 31.41 feet bgs
			0		Brown, mottles, moist	
35			0		34.5 Sandy Clayey Sand (SC), dark brown, wet	▽ Deeper zone groundwater first encountered 35 feet bgs
			0		37.0 Sandy Clay (CL), dark brown, wet	
40	GP-19-38		0		40.0 Bottom of hole at 40.0 feet.	Note: Shallow groundwater not encountered.

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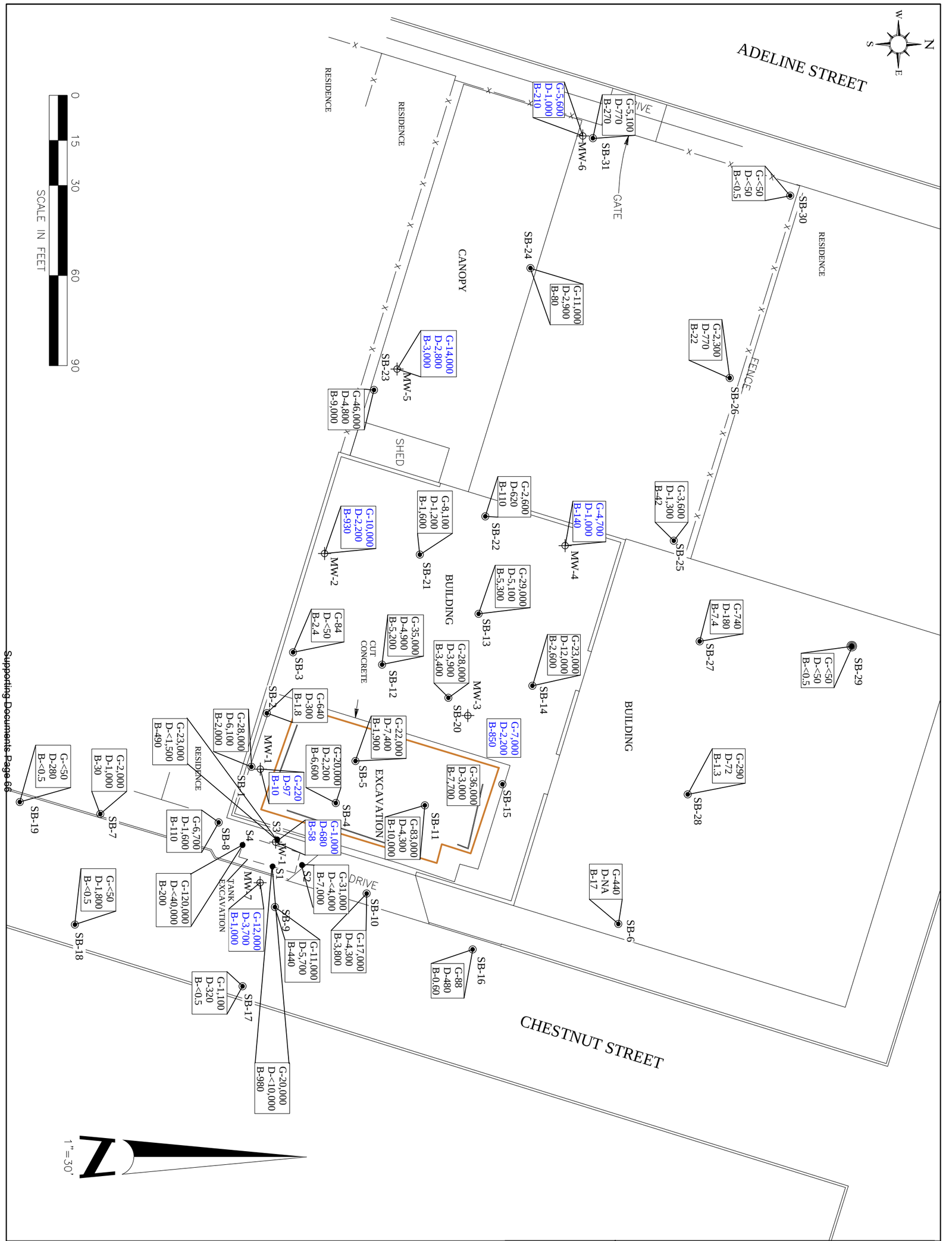
APPENDIX B.

FIGURE 5 AND TABLE 2 FROM AEI CONSULTANTS JULY 31, 2009,

GROUNDWATER MONITORING WELL INSTALLATION REPORT



Supporting Document Page 66

LEGEND

DRAFTED BY RFF

- Soil Boring - 2006
- Soil Boring - 2007
- Monitoring Well
- Former UST
- Source Removal Excavation

G - Total Petroleum Hydrocarbons as Gasoline (µg/L)
D - Total Petroleum Hydrocarbons as Diesel (µg/L)
B - Benzene (µg/L)

G-28,000
D-3,900
B-3,400 — Soil Boring Grab Sample

G-7,000
D-2,200
B-850 — Monitoring Well Data

AEI CONSULTANTS

2500 CAMINO DIABLO, WALNUT CREEK

Groundwater Analytical Data

3442 ADELINE STREET
OAKLAND, CALIFORNIA

FIGURE 5
PROJECT NO. 281939

Table 2: Groundwater Sample Analytical Data
3442 Adeline Street St. Oakland, CA 94608
AEI Project #274761

Sample ID	Date	TPH-g	TPH-d	TPH-mo	MTBE	Benzene	Toluene	E-Benzene	Xylenes	TAME	ETBE	TBA	DIPE	MTBE
		Method 8015			*Method 8021B*					*Method 8260B*				
		µg/L	µg/L		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Pit Water	2/22/2000	34,000	7,400	---	---	3,300	930	400	6,200	---	---	---	---	---
S-1	6/23/06	20,000	<10,000	---	---	980	70	1,500	1,100	---	---	---	---	---
S-2	6/23/06	31,000	<4,000	---	---	7,000	260	920	2,800	---	---	---	---	---
S-3	6/23/06	23,000	<1,500	---	---	490	67	1,200	3,300	---	---	---	---	---
S-4	6/23/06	120,000	<40,000	---	---	200	<15	3,500	2,900	---	---	---	---	---
SB-1	10/1/2007	28,000	6,100	---	<170	2,000	77	1,600	4,100	<25	<25	<250	<25	<25
SB-2	10/1/2007	640	300	---	<5.0	1.8	2.2	1.1	4.9	<0.5	<0.5.	<5.0	<0.5	<0.5
SB-3	10/1/2007	84	<50	---	<5.0	2.4	<0.5	4.2	11	<0.5	<0.5.	<5.0	<0.5	<0.5
SB-4	10/1/2007	20,000	2,200	---	<600	6,600	110	390	430	<17	<17	430	<17	<17
SB-5	10/1/2007	22,000	7,400	---	<250	1,900	86	1,200	2,100	<5.0	<5.0	120	<5.0	<5.0
SB-6	10/1/2007	440	---	---	---	17	<0.5	0.99	2.2	<0.5	<0.5	18	<0.5	2.0
SB-7	10/3/2007	2,000	1,000	---	<25	30	5.1	56	82	<0.5	<0.5.	<5.0	<0.5	6.1
SB-8	10/3/2007	6,700	1,600	---	---	110	6.3	160	140	<0.5	<0.5	12	<0.5	<0.5
SB-9	10/3/2007	11,000	5,700	---	<50	440	14	720	1,000	<1.7	<1.7	37	<1.7	<1.7
SB-10	10/3/2007	17,000	1,700	---	<100	3,800	55	420	830	<10	<10	510	11	<10
SB-11	10/3/2007	83,000	4,300	---	---	10,000	640	2,700	7,900	<25	<25	840	<25	<25
SB-12	12/20/2007	35,000	4,900	---	<450	5,200	110	1,000	1,800	---	---	---	---	---
SB-13	12/20/2007	29,000	5,100	---	<250	5,300	80	1,400	3,900	---	---	---	---	---
SB-14	12/20/2007	23,000	12,000	---	<240	2,600	15	1,500	1,800	---	---	---	---	---

Table 2: Groundwater Sample Analytical Data
3442 Adeline Street St. Oakland, CA 94608
AEI Project #274761

Sample ID	Date	TPH-g	TPH-d	TPH-mo	MTBE	Benzene	Toluene	E-Benzene	Xylenes	TAME	ETBE	TBA	DIPE	MTBE
		Method 8015			*Method 8021B*					*Method 8260B*				
		µg/L	µg/L		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
SB-15	12/20/2007	36,000	3,000	---	<350	7,700	190	1,600	4,700	---	---	---	---	---
SB-16	12/20/2007	88	480	1500	<5.0	0.60	<0.5	<0.5	0.83	---	---	---	---	---
SB-17	12/20/2007	1,100	320	<250	<5.0	<0.5	6.2	<0.5	4.2	---	---	---	---	---
SB-18	12/20/2007	<50	1,800	5,100	<5.0	<0.5	<0.5	<0.5	<0.5	---	---	---	---	---
SB-19	12/20/2007	<50	280	1,400	<5.0	<0.5	<0.5	<0.5	<0.5	---	---	---	---	---
SB-20	12/20/2007	28,000	3,900	---	<160	3,400	22	1,200	930	---	---	---	---	---
SB-21	12/21/2007	8,100	1,200	---	<50	1,600	<5.0	160	84	---	---	---	---	---
SB-22	12/21/2007	2,600	620	---	<10	110	0.90	150	55	---	---	---	---	---
SB-23	5/14/2008	46,000	4,800	---	<450	9,000	40	2,300	5,200	---	---	---	---	---
SB-24	5/14/2008	11,000	2,900	---	<50	80	<5.0	440	290	---	---	---	---	---
SB-25	5/9/2008	3,600	1,300	---	<5.0	42	1.90	65	36	---	---	---	---	---
SB-26	5/14/2008	2,300	770	---	<10	22	2.1	<1.0	2.4	---	---	---	---	---
SB-27	5/14/2008	740	180	---	<5.0	7.4	3.70	<0.5	1.0	---	---	---	---	---
SB-28	5/16/2008	290	72	---	<5.0	1.3	0.93	2.7	4.0	---	---	---	---	---
SB-29	5/16/2008	<50	<50	---	<5.0	<0.5	<0.5	<0.5	<0.5	---	---	---	---	---
SB-30	5/14/2008	<50	<50	---	<5.0	<0.5	<0.5	<0.5	<0.5	---	---	---	---	---
SB-31	5/14/2008	5,100	770	---	<110	270	6.3	79	7	---	---	---	---	---

Table 2: Groundwater Sample Analytical Data
3442 Adeline Street St. Oakland, CA 94608
AEI Project #274761

Sample ID	Date	TPH-g	TPH-d	TPH-mo	MTBE	Benzene	Toluene	E-Benzene	Xylenes	TAME	ETBE	TBA	DIPE	MTBE
		Method 8015			*Method 8021B*					*Method 8260B*				
		µg/L	µg/L		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
MW-1	4/17/2009	220	97	---	<5.0	10	<0.5	3.0	5.4	---	---	---	---	---
MW-2	4/17/2009	7,000	2,200	---	<100	850	19.0	93	470	---	---	---	---	---
MW-3	4/17/2009	10,000	2,200	---	<110	930	5.6	270	920	---	---	---	---	---
MW-4	4/17/2009	4,700	1,200	---	<30	140	2.0	28	18	---	---	---	---	---
MW-5	5/22/2009	14,000	2,800	---	<100	3000	12	340	420	---	---	---	---	---
MW-6	4/17/2009	5,600	1,000	---	<300	210	3.0	180	160	---	---	---	---	---
MW-7	5/22/2009	12,000	3,700	---	<120	1000	37	100	36	---	---	---	---	---
IW-1	5/22/2009	1,200	680	---	<15	58	2.7	2.3	18	---	---	---	---	---
BF-1	3/27/2009	19,000	---	---	<250	890	27	460	1,200	---	---	---	---	---
	6/22/2009	6,700	---	---	<150	840	19	170	150	---	---	---	---	---
ESL		100	100		5.0	1.0	40	30	20	---	---	50,000	---	---

Notes:
µg/L = micrograms per liter
ESL = Environmental Screening Level
TPH-g = total petroleum hydrocarbons as gasoline
TPH-d = total petroleum hydrocarbons as diesel
MTBE = methyl tert-butyl ether
E-Benzene = ethyl benzene
TAME = tert-amyl methyl ether
ETBE = ethyl tert-butyl ether
TBA = tertiary butyl alcohol
DIPE = Di-isopropyl Ether
(1) = Laboratory fllage reasults as "oil range hydrocarbons are significant"

APPENDIX C.

LABORATORY ANALYTICAL REPORTS

Sparger Technology, Inc.
Environmental Laboratories

Analytical Laboratory Division
Mobile Laboratory Division
Scientific Division

Tom Ballard
Taber Consultants
3911 West Capitol Ave.
West Sacramento, CA 95691

Client	Taber Consultants	
Workorder	19850	SIR_CityOfParis
Received	05/03/11	

The samples were received in EPA specified containers. The samples were transported and received under documented chain of custody and stored at four (4) degrees C until analysis was performed.

Sparger Technology, Inc. ID Suffix Keys - These descriptors will follow the Sparger Technology, Inc. ID numbers and help identify the specific sample and clarify the report.

- DUP - Matrix Duplicate
- MS - Matrix Spike
- MSD - Matrix Spike Duplicate
- LCS - Lab Control Sample
- LCSD - Lab Control Sample Duplicate
- RPD - Relative Percent Difference
- QC - Additional Quality Control
- DIL - Results from a diluted sample
- ND - None Detected
- RL - Reporting Limit

Note: In an effort to conserve paper, the results are printed on both sides of the paper.

Ray James
Laboratory Director

3738 Bradview Drive • Sacramento, California 95827 • (916) 369-7688 • FAX (916) 369-7689

Tom Ballard
Taber Consultants
3911 West Capitol Ave.
West Sacramento, CA 95691

Workorder 19850

Enclosed are the results from samples received on May 03, 2011.

The requested analyses are listed below.

SAMPLE	SAMPLE DESCRIPTION	DATE COLLECTED	TEST METHOD
19850001	GP-2, Water	05/02/11	3500-FE B EPA 300.0 EPA 351.2 EPA 376.2 RSK 175 SM 2320B 6010B
19850002	GP-1, Water	05/02/11	3500-FE B EPA 300.0 EPA 351.2 EPA 376.2 RSK 175 SM 2320B 6010B

Test Certificate of Analysis

Client ID Taber Consultants
Workorder # 19850 **Workorder ID** SIR_CityOfParis

Laboratory ID 19850001 **Sampled** 05/02/11
Sample ID GP-2 **Received** 05/03/11
Matrix Water **Reported** 05/19/11

3500 Ferrous Iron

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Ferrous Iron	3500-FE B	05/16/11	05/16/11	ND	0.0250	mg/L	1:1
Ferric Iron	**3500-FE B**	**05/16/11**	**05/16/11**	**0.9**	**0.03**	**mg/L**	**1:1**

Laboratory ID 19850001 **Sampled** 05/02/11
Sample ID GP-2 **Received** 05/03/11
Matrix Water **Reported** 05/19/11

WET CHEMISTRY

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Nitrate	**EPA 300.0**	**05/03/11**	**05/03/11**	**35.0**	**0.050**	**mg/L**	**1:1**
Sulfate	**EPA 300.0**	**05/13/11**	**05/13/11**	**70.0**	**1.0**	**mg/L**	**1:1**
Alkalinity as CaCO3	**SM 2320B**	**05/15/11**	**05/15/11**	**216**	**2.0**	**mg/L**	**1:1**
Total Kjeldahl Nitrogen	**EPA 351.2**	**05/16/11**	**05/17/11**	**1.30**	**0.10**	**mg/L**	**1:1**
Sulfide	EPA 376.2	05/08/11	05/08/11	ND	0.50	mg/L	1:1

Laboratory ID 19850001 **Sampled** 05/02/11
Sample ID GP-2 **Received** 05/03/11
Matrix Water **Reported** 05/19/11

RSK-175

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Methane	**RSK 175**	**05/04/11**	**05/04/11**	**0.025**	**0.010**	**ug/mL**	**1:1**
Ethane	RSK 175	05/04/11	05/04/11	ND	0.010	ug/mL	1:1
Ethene	RSK 175	05/04/11	05/04/11	ND	0.010	ug/mL	1:1
Carbon Dioxide	**RSK 175**	**05/04/11**	**05/04/11**	**65**	**1.0**	**ug/mL**	**1:1**

Laboratory ID 19850001 **Sampled** 05/02/11
Sample ID GP-2 **Received** 05/03/11
Matrix Water **Reported** 05/19/11

6010B METALS

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Manganese	**6010B**	**05/18/11**	**05/19/11**	**4.96**	**0.015**	**mg/L**	**1:1**
Phosphorus	**6010B**	**05/18/11**	**05/19/11**	**0.341**	**0.010**	**mg/L**	**1:1**

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Test Certificate of Analysis

Client ID Taber Consultants
Workorder # 19850 **Workorder ID** SIR_CityOfParis

Laboratory ID 19850002 **Sampled** 05/02/11
Sample ID GP-1 **Received** 05/03/11
Matrix Water **Reported** 05/19/11

3500 Ferrous Iron

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Ferrous Iron	3500-FE B	05/16/11	05/16/11	ND	0.0250	mg/L	1:1
Ferric Iron	**3500-FE B**	**05/16/11**	**05/16/11**	**2.1**	**0.03**	**mg/L**	**1:1**

Laboratory ID 19850002 **Sampled** 05/02/11
Sample ID GP-1 **Received** 05/03/11
Matrix Water **Reported** 05/19/11

WET CHEMISTRY

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Nitrate	**EPA 300.0**	**05/03/11**	**05/03/11**	**30.0**	**0.050**	**mg/L**	**1:1**
Sulfate	**EPA 300.0**	**05/13/11**	**05/13/11**	**146**	**1.0**	**mg/L**	**1:1**
Alkalinity as CaCO3	**SM 2320B**	**05/15/11**	**05/15/11**	**279**	**2.0**	**mg/L**	**1:1**
Total Kjeldahl Nitrogen	**EPA 351.2**	**05/16/11**	**05/17/11**	**0.230**	**0.10**	**mg/L**	**1:1**
Sulfide	EPA 376.2	05/08/11	05/08/11	ND	0.50	mg/L	1:1

Laboratory ID 19850002 **Sampled** 05/02/11
Sample ID GP-1 **Received** 05/03/11
Matrix Water **Reported** 05/19/11

RSK-175

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Methane	RSK 175	05/04/11	05/04/11	ND	0.010	ug/mL	1:1
Ethane	RSK 175	05/04/11	05/04/11	ND	0.010	ug/mL	1:1
Ethene	RSK 175	05/04/11	05/04/11	ND	0.01	ug/mL	1:1
Carbon Dioxide	**RSK 175**	**05/04/11**	**05/04/11**	**42**	**1.0**	**ug/mL**	**1:1**

Laboratory ID 19850002 **Sampled** 05/02/11
Sample ID GP-1 **Received** 05/03/11
Matrix Water **Reported** 05/19/11

6010B METALS

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Manganese	**6010B**	**05/18/11**	**05/19/11**	**2.18**	**0.015**	**mg/L**	**1:1**
Phosphorus	**6010B**	**05/18/11**	**05/19/11**	**0.362**	**0.010**	**mg/L**	**1:1**

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Method Blank Report

Client ID	Taber Consultants	**Sample ID**	MB for HBN 408470 [FEXV/1067]
Laboratory ID	99625	**Matrix**	Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Ferrous Iron	3500-FE B	05/16/11	05/16/11	ND	0.0250	mg/L	1:1

Lab Control Sample Report

Client ID	Taber Consultants	**Sample ID**	LCS for HBN 408470 [FEXV/1067]
Laboratory ID	99626	**Matrix**	Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Ferrous Iron	3500-FE B	05/16/11	05/16/11	1.03	0.0250	mg/L	1:1

Lab Control Sample Duplicate Report

Client ID	Taber Consultants	**Sample ID**	LCSD for HBN 408470 [FEXV/1067
Laboratory ID	99627	**Matrix**	Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Ferrous Iron	3500-FE B	05/16/11	05/16/11	1.03	0.0250	mg/L	1:1

Matrix Spike Report

Client ID	Taber Consultants	**Sample ID**	MS for HBN 408470 [FEXV/1067]
Laboratory ID	99628	**Matrix**	Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Ferrous Iron	3500-FE B	05/16/11	05/16/11	1.08	0.0250	mg/L	1:1

Matrix Spike Duplicate Report

Client ID	Taber Consultants	**Sample ID**	MSD for HBN 408470 [FEXV/1067]
Laboratory ID	99629	**Matrix**	Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Ferrous Iron	3500-FE B	05/16/11	05/16/11	1.03	0.0250	mg/L	1:1

Method Blank Report

Client ID	Taber Consultants	**Sample ID**	MB for HBN 409070 [SULV/1059]
Laboratory ID	99793	**Matrix**	Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Sulfide	EPA 376.2	05/08/11	05/08/11	ND	0.50	mg/L	1:1

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Lab Control Sample Report

Client ID	Taber Consultants	**Sample ID**	LCS for HBN 409070 [SULV/1059]
Laboratory ID	99794	**Matrix**	Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Sulfide	EPA 376.2	05/08/11	05/08/11	ND	0.50	mg/L	1:1

Lab Control Sample Duplicate Report

Client ID	Taber Consultants	**Sample ID**	LCSD for HBN 409070 [SULV/1059
Laboratory ID	99795	**Matrix**	Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Sulfide	EPA 376.2	05/08/11	05/08/11	0.5	0.50	mg/L	1:1

Duplicate Report

Client ID	Taber Consultants	**Sample ID**	DUP for HBN 409070 [SULV/1059]
Laboratory ID	99796	**Matrix**	Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Sulfide	EPA 376.2	05/08/11	05/08/11	ND	0.50	mg/L	1:1

Matrix Spike Report

Client ID	Taber Consultants	**Sample ID**	MS for HBN 409070 [SULV/1059]
Laboratory ID	99797	**Matrix**	Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Sulfide	EPA 376.2	05/08/11	05/08/11	0.5	0.50	mg/L	1:1

Matrix Spike Duplicate Report

Client ID	Taber Consultants	**Sample ID**	MSD for HBN 409070 [SULV/1059]
Laboratory ID	99798	**Matrix**	Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Sulfide	EPA 376.2	05/08/11	05/08/11	0.5	0.50	mg/L	1:1

Method Blank Report

Client ID	Taber Consultants	**Sample ID**	MB for HBN 409076 [TKNV/1050]
Laboratory ID	99805	**Matrix**	Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Total Kjeldahl Nitrogen	EPA 351.2	05/16/11	05/17/11	ND	0.10	mg/L	1:1

Lab Control Sample Report

Client ID Taber Consultants **Sample ID** LCS for HBN 409076 [TKNV/1050]
Laboratory ID 99806 **Matrix** Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Total Kjeldahl Nitrogen	EPA 351.2	05/16/11	05/17/11	10.4	0.10	mg/L	1:1

Lab Control Sample Duplicate Report

Client ID Taber Consultants **Sample ID** LCSD for HBN 409076 [TKNV/1050
Laboratory ID 99807 **Matrix** Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Total Kjeldahl Nitrogen	EPA 351.2	05/16/11	05/17/11	9.65	0.10	mg/L	1:1

Duplicate Report

Client ID Taber Consultants **Sample ID** DUP for HBN 409076 [TKNV/1050]
Laboratory ID 99808 **Matrix** Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Total Kjeldahl Nitrogen	EPA 351.2	05/16/11	05/17/11	1.30	0.10	mg/L	1:1

Matrix Spike Report

Client ID Taber Consultants **Sample ID** MS for HBN 409076 [TKNV/1050]
Laboratory ID 99809 **Matrix** Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Total Kjeldahl Nitrogen	EPA 351.2	05/16/11	05/17/11	10.1	0.10	mg/L	1:1

Matrix Spike Duplicate Report

Client ID Taber Consultants **Sample ID** MSD for HBN 409076 [TKNV/1050]
Laboratory ID 99810 **Matrix** Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Total Kjeldahl Nitrogen	EPA 351.2	05/16/11	05/17/11	10.0	0.10	mg/L	1:1

Method Blank Report

Client ID Taber Consultants **Sample ID** MB for HBN 409086 [ALK/1170]
Laboratory ID 99828 **Matrix** Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Alkalinity as CaCO3	SM 2320B	05/15/11	05/15/11	ND	2.0	mg/L	1:1

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Duplicate Report

Client ID Taber Consultants **Sample ID** GP-2(19850001DUP)
Laboratory ID 99829 **Matrix** Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Alkalinity as CaCO3	SM 2320B	05/15/11	05/15/11	216	2.0	mg/L	1:1

Method Blank Report

Client ID Taber Consultants **Sample ID** MB for HBN 409091 [ICPV/6691]
Laboratory ID 99831 **Matrix** Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Manganese	6010B	05/18/11	05/19/11	ND	0.015	mg/L	1:1
Phosphorus	6010B	05/18/11	05/19/11	ND	0.010	mg/L	1:1

Lab Control Sample Report

Client ID Taber Consultants **Sample ID** LCS for HBN 409091 [ICPV/6691]
Laboratory ID 99832 **Matrix** Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Manganese	6010B	05/18/11	05/19/11	0.193	0.015	mg/L	1:1
Phosphorus	6010B	05/18/11	05/19/11	2.04	0.010	mg/L	1:1

Lab Control Sample Duplicate Report

Client ID Taber Consultants **Sample ID** LCSD for HBN 409091 [ICPV/6691
Laboratory ID 99833 **Matrix** Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Manganese	6010B	05/18/11	05/19/11	0.192	0.015	mg/L	1:1
Phosphorus	6010B	05/18/11	05/19/11	2.04	0.010	mg/L	1:1

Matrix Spike Report

Client ID Taber Consultants **Sample ID** MS for HBN 409091 [ICPV/6691]
Laboratory ID 99834 **Matrix** Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Manganese	6010B	05/18/11	05/19/11	5.01	0.015	mg/L	1:1
Phosphorus	6010B	05/18/11	05/19/11	2.44	0.010	mg/L	1:1

Matrix Spike Duplicate Report

Client ID Taber Consultants **Sample ID** MSD for HBN 409091 [ICPV/6691]
Laboratory ID 99835 **Matrix** Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Manganese	6010B	05/18/11	05/19/11	5.05	0.015	mg/L	1:1
Phosphorus	6010B	05/18/11	05/19/11	2.47	0.010	mg/L	1:1

Duplicate Report

Client ID Taber Consultants **Sample ID** DUP for HBN 409091 [ICPV/6691]
Laboratory ID 99836 **Matrix** Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Manganese	6010B	05/18/11	05/19/11	4.90	0.015	mg/L	1:1
Phosphorus	6010B	05/18/11	05/19/11	0.325	0.010	mg/L	1:1

Method Blank Report

Client ID Taber Consultants **Sample ID** MB for HBN 409100 [IONV/1632]
Laboratory ID 99837 **Matrix** Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Sulfate	EPA 300.0	05/13/11	05/13/11	ND	1.0	mg/L	1:1

Lab Control Sample Report

Client ID Taber Consultants **Sample ID** LCS for HBN 409100 [IONV/1632]
Laboratory ID 99838 **Matrix** Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Sulfate	EPA 300.0	05/13/11	05/13/11	9.81	1.0	mg/L	1:1

Lab Control Sample Duplicate Report

Client ID Taber Consultants **Sample ID** LCSD for HBN 409100 [IONV/1632
Laboratory ID 99839 **Matrix** Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Sulfate	EPA 300.0	05/13/11	05/13/11	9.97	1.0	mg/L	1:1

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Duplicate Report

Client ID Taber Consultants **Sample ID** DUP for HBN 409100 [IONV/1632]
Laboratory ID 99840 **Matrix** Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Sulfate	EPA 300.0	05/13/11	05/13/11	123	1.0	mg/L	1:1

Matrix Spike Report

Client ID Taber Consultants **Sample ID** MS for HBN 409100 [IONV/1632]
Laboratory ID 99841 **Matrix** Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Sulfate	EPA 300.0	05/13/11	05/13/11	131	1.0	mg/L	1:1

Matrix Spike Duplicate Report

Client ID Taber Consultants **Sample ID** MSD for HBN 409100 [IONV/1632]
Laboratory ID 99842 **Matrix** Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Sulfate	EPA 300.0	05/13/11	05/13/11	128	1.0	mg/L	1:1

Method Blank Report

Client ID Taber Consultants **Sample ID** MB for HBN 410270 [SGXV/2747]
Laboratory ID 100004 **Matrix** Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Methane	RSK 175	05/04/11	05/04/11	ND	0.010	ug/mL	1:1
Ethane	RSK 175	05/04/11	05/04/11	ND	0.010	ug/mL	1:1
Ethene	RSK 175	05/04/11	05/04/11	ND	0.01	ug/mL	1:1
Carbon Dioxide	RSK 175	05/04/11	05/04/11	ND	1.0	ug/mL	1:1

Lab Control Sample Report

Client ID Taber Consultants **Sample ID** LCS for HBN 410270 [SGXV/2747]
Laboratory ID 100005 **Matrix** Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Methane	RSK 175	05/04/11	05/04/11	0.45	0.010	ug/mL	1:1
Ethane	RSK 175	05/04/11	05/04/11	0.48	0.010	ug/mL	1:1
Ethene	RSK 175	05/04/11	05/04/11	0.5	0.01	ug/mL	1:1
Carbon Dioxide	RSK 175	05/04/11	05/04/11	192	1.0	ug/mL	1:1

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Lab Control Sample Duplicate Report

Client ID Taber Consultants
Laboratory ID 100006
Sample ID LCSD for HBN 410270 [SGXV/2747
Matrix Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Methane	RSK 175	05/04/11	05/04/11	0.47	0.010	ug/mL	1:1
Ethane	RSK 175	05/04/11	05/04/11	0.46	0.010	ug/mL	1:1
Ethene	RSK 175	05/04/11	05/04/11	0.5	0.01	ug/mL	1:1
Carbon Dioxide	RSK 175	05/04/11	05/04/11	195	1.0	ug/mL	1:1

Duplicate Report

Client ID Taber Consultants
Laboratory ID 100007
Sample ID DUP for HBN 410270 [SGXV/2747]
Matrix Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Methane	RSK 175	05/04/11	05/04/11	0.028	0.010	ug/mL	1:1
Ethane	RSK 175	05/04/11	05/04/11	ND	0.010	ug/mL	1:1
Ethene	RSK 175	05/04/11	05/04/11	ND	0.01	ug/mL	1:1
Carbon Dioxide	RSK 175	05/04/11	05/04/11	62	1.0	ug/mL	1:1

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QC SUMMARY

Client ID	Taber Consultants	**Original**	19850001
QC Batch	SULX 1061	**Sample**	**Duplicate [99796]**
Matrix	Water		

Parameter	**RPD**	**RPD Limits**
Sulfide	00	(20)

Client ID	Taber Consultants	**Original**	19850001
QC Batch	TKNX 1049	**Sample**	**Duplicate [99808]**
Matrix	Water		

Parameter	**RPD**	**RPD Limits**
Total Kjeldahl Nitrogen	0	(30)

Client ID	Taber Consultants	**Original**	19850001
QC Batch	ALK 1170	**Sample**	**Duplicate [99829]**
Matrix	Water		

Parameter	**RPD**	**RPD Limits**
Alkalinity as CaCO3	00	(20)

Client ID	Taber Consultants	**Original**	19850001
QC Batch	ICPP 6710	**Sample**	**Duplicate [99836]**
Matrix	Water		

Parameter	**RPD**	**RPD Limits**
Manganese	1.22	(35)
Phosphorus	4.80	(35)

Client ID	Taber Consultants	**Original**	19883001
QC Batch	ION 1668	**Sample**	**Duplicate [99840]**
Matrix	Water		

Parameter	**RPD**	**RPD Limits**
Sulfate	2.4	(20)

Client ID	Taber Consultants	**Original**	19850001
QC Batch	SGX 2777	**Sample**	**Duplicate [100007]**
Matrix	Water		

Parameter	**RPD**	**RPD Limits**
Methane	11	(20)
Ethane	00	(20)
Ethene	0	(20)
Carbon Dioxide	4.7	(20)

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QC SUMMARY

Client ID	Taber Consultants	**Original**	19850001
QC Batch	FEX 1068	**Samples**	Matrix Spike [99628]
Matrix	Water		Matrix Spike Duplicate [99629]

Parameter	Spike %Recovery	Spike Dup %Recovery	Recovery Limits	RPD	RPD Limits
Ferrous Iron	108	103	(70-125)	4.7	(30 MAX)

Client ID	Taber Consultants	**Original**	19850001
QC Batch	SULX 1061	**Samples**	Matrix Spike [99797]
Matrix	Water		Matrix Spike Duplicate [99798]

Parameter	Spike %Recovery	Spike Dup %Recovery	Recovery Limits	RPD	RPD Limits
Sulfide	90	97	(75-125)	7.5	(20 MAX)

Client ID	Taber Consultants	**Original**	19850001
QC Batch	TKNX 1049	**Samples**	Matrix Spike [99809]
Matrix	Water		Matrix Spike Duplicate [99810]

Parameter	Spike %Recovery	Spike Dup %Recovery	Recovery Limits	RPD	RPD Limits
Total Kjeldahl Nitrogen	88	87	(75-125)	1.1	(30 MAX)

Client ID	Taber Consultants	**Original**	19850001
QC Batch	ICPP 6710	**Samples**	Matrix Spike [99834]
Matrix	Water		Matrix Spike Duplicate [99835]

Parameter	Spike %Recovery	Spike Dup %Recovery	Recovery Limits	RPD	RPD Limits
Manganese	25.0	45.0	(75-125)	57.1	(35 MAX)
Phosphorus	105	106	(75-125)	0.9480	(35 MAX)

Client ID	Taber Consultants	**Original**	19883001
QC Batch	ION 1668	**Samples**	Matrix Spike [99841]
Matrix	Water		Matrix Spike Duplicate [99842]

Parameter	Spike %Recovery	Spike Dup %Recovery	Recovery Limits	RPD	RPD Limits
Sulfate	50	20	(75-125)	86	(20 MAX)

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QC SUMMARY

Client ID	Taber Consultants			**Samples**	Lab Control Sample [99626]	
QC Batch	FEX 1068				Lab Control Sample Duplicate [99627]	
Matrix	Water					
Parameter		**Check %Recovery**	**Check Dup %Recovery**	**Recovery Limits**	**RPD**	**RPD Limits**
Ferrous Iron		103	103	(70-125)	00	(30 MAX)

Client ID	Taber Consultants			**Samples**	Lab Control Sample [99794]	
QC Batch	SULX 1061				Lab Control Sample Duplicate [99795]	
Matrix	Water					
Parameter		**Check %Recovery**	**Check Dup %Recovery**	**Recovery Limits**	**RPD**	**RPD Limits**
Sulfide		90	100	(80-120)	11	(20 MAX)

Client ID	Taber Consultants			**Samples**	Lab Control Sample [99806]	
QC Batch	TKNX 1049				Lab Control Sample Duplicate [99807]	
Matrix	Water					
Parameter		**Check %Recovery**	**Check Dup %Recovery**	**Recovery Limits**	**RPD**	**RPD Limits**
Total Kjeldahl Nitrogen		104	97	(80-120)	7	(20 MAX)

Client ID	Taber Consultants			**Samples**	Lab Control Sample [99832]	
QC Batch	ICPP 6710				Lab Control Sample Duplicate [99833]	
Matrix	Water					
Parameter		**Check %Recovery**	**Check Dup %Recovery**	**Recovery Limits**	**RPD**	**RPD Limits**
Manganese		96.5	96.0	(80-120)	0.5190	(20 MAX)
Phosphorus		102	102	(80-120)	0000	(20 MAX)

Client ID	Taber Consultants			**Samples**	Lab Control Sample [99838]	
QC Batch	ION 1668				Lab Control Sample Duplicate [99839]	
Matrix	Water					
Parameter		**Check %Recovery**	**Check Dup %Recovery**	**Recovery Limits**	**RPD**	**RPD Limits**
Sulfate		98	100	(80-125)	2.0	(20 MAX)

Client ID	Taber Consultants			**Samples**	Lab Control Sample [100005]	
QC Batch	SGX 2777				Lab Control Sample Duplicate [100006]	
Matrix	Water					
Parameter		**Check %Recovery**	**Check Dup %Recovery**	**Recovery Limits**	**RPD**	**RPD Limits**
Methane		90	94	(65-135)	4.3	(20 MAX)
Ethane		96	92	(65-135)	4.3	(20 MAX)
Ethene		104	98	(65-135)	5.9	(20 MAX)

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QC SUMMARY

Client ID	Taber Consultants	**Samples**	Lab Control Sample [100005]
QC Batch	SGX 2777		Lab Control Sample Duplicate [100006]
Matrix	Water		**(continued)**

Parameter	Check %Recovery	Check Dup %Recovery	Recovery Limits	RPD	RPD Limits
Carbon Dioxide	96	98	(65-135)	2.1	(20 MAX)

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Sparger Technology, Inc.
Environmental Laboratories

3738 Bradview Drive
Sacramento, CA 95827
Lab: 916.369.7688
Fax: 916.369.7689

COC # / Lab No. **19850**

Page 1 of 2

Chain-of-Custody Record and Analysis Request

Project Contact (PDF To): **Tom Ballard**	California EDF Report? ☑ Yes ☐ No
Company / Address: **Taber Consultants: 3911 West Capitol Ave.** West Sacramento, CA 95691	Sampling Company Log Code: **WRMC**
	Global ID: **T0600100379**
Phone #: **916-371-1690** Fax #: **916-371-7265**	Deliver all files to: SNess@TaberConsultants.com
Project #: **51074** P.O. #: **3A**	Sampler Signature:
Project Name: **SIR_CityOfParis**	
Project Address: **3514 Adeline St. Oakland, CA**	

TAT: ☐ 12 hr ☐ 24 hr ☐ 48 hr ☐ 72 hr ☒ 1 wk

Sample ID	Field Point Name	Sampling: Date	Sampling: Time	Container: 40 ml VOA	Sleeve	Poly	Glass	Tedlar	Preservative: HCl	HNO_3	None	H_2SO_4	Matrix: Water	Soil	Air	~~Fe2+, Mn2+ (field filtered)~~	Total Fe	NO3- (field filtered)	Gen Chem (P, SO4, alkalinity)	Methane, ethane, ethene, CO2 (RSK-175)	TKN	Sulfide
GP-2	GP-2	5/2	1544	2							X		X							X		
GP-1	GP-1	5/2	1000	2							X		X							X		
GP-1	GP-1	5/2	1000			1					X		X				X					
GP-2	GP-2	5/2	1544			1					X		X			X		X				
GP-2	GP-2	5/2	1544			1					X		X				X					
GP-1	GP-1	5/2	1000			1					X		X					X				
GP-2	GP-2	5/2	1544				1			X			X			X							
GP-2	GP-2	5/2	1544				1			~~X~~	X		X						X			
GP-2	GP-2	5/2	1544				1					X	X							X		
GP-1	GP-1	5/2	1000				1					X	X							X		

	Date	Time		
Relinquished by:	5/3/11	9:00	Received by:	
Relinquished by:	5/3/11	11:30	Received by:	
Relinquished by:	5/3/11		Received by Laboratory:	5/3/11 12:35

Remarks:
please save file(s), PDF's, EDF & XLS name as:
sample date year_month_day_ project name_ WO#

EXAMPLE:
2010_02_10_GMR_CityOfParis_18495

Bill to: Invoice@TaberConsultants.com

For Lab Use Only: Sample Receipt

Temp °C	Initials	Date	Time		

Supporting Documents Page 82

Sparger Technology, Inc.
Environmental Laboratories

3738 Bradview Drive
Sacramento, CA 95827
Lab: 916.369.7688
Fax: 916.369.7689

19850

COC # / Lab No. _____ _____

Page 1 of 1

Chain-of-Custody Record and Analysis Request

Project Contact (PDF To): **Tom Ballard**	California EDF Report? ☑ Yes ☐ No
Company / Address: **Taber Consultants: 3911 West Capitol Ave.**	Sampling Company Log Code: **WRMC**
West Sacramento, CA 95691	Global ID: **T0600100379**
Phone #: **916-371-1690** Fax #: **916-371-7265**	Deliver all files to: SNess@TaberConsultants.com
Project #: **51074** P.O. #: **3A**	Sampler Signature:
Project Name: **SIR_CityOfParis**	
Project Address: **3514 Adeline St. Oakland, CA**	

Sample ID	Field Point Name	Sampling Date	Sampling Time	Container: 40 ml VOA	Container: Sleeve	Container: Poly	Container: Glass	Container: Tedlar	Preservative: HCl	Preservative: HNO_3	Preservative: None	Preservative: $ZnAc/NaOH$	Matrix: Water	Matrix: Soil	Matrix: Air	Analysis Request: ~~Fe2+, Mn2+ (field filtered)~~ Methane	Analysis Request: Total Fe	Analysis Request: NO3- (field filtered)	Analysis Request: Gen Chem (P, SO4, alkalinity)	Analysis Request: Methane, ethane, ethene, CO2 (RSK-175)	Analysis Request: TKN	Analysis Request: Sulfide
GP-2	GP-2	5/2	1544				X					X	X									X
GP-1	GP-1	5/2	1000				X				X		X						X			
GP-1	GP-1	5/2	1000				X					X	X									X
GP-1	GP-1	5/2	1000				X			X			X			X						

TAT: ☐ 12 hr ☐ 24 hr ☐ 48 hr ☐ 72 hr ☐ 1 wk

Relinquished by:	Date	Time	Received by:
	5/3/11	9:25	
	5/3/11	11:20	
	5/3/11	12:30	Received by Laboratory: 5/3/11 12:35 Marshall Rueckert

Remarks:
please save file(s), PDF's, EDF & XLS name as:
sample date year_month_day_ project name_ WO#

EXAMPLE:
2010_02_10_GMR_CityOfParis_18495

Bill to: Invoice@TaberConsultants.com

For Lab Use Only: Sample Receipt

Temp °C	Initials	Date	Time		

Sparger Technology, Inc.
Environmental Laboratories

Analytical Laboratory Division
Mobile Laboratory Division
Scientific Division

Tom Ballard
Taber Consultants
3911 West Capitol Ave.
West Sacramento, CA 95691

Client	Taber Consultants	
Workorder	19863	SIR_CityOfParis
Received	05/06/11	

The samples were received in EPA specified containers. The samples were transported and received under documented chain of custody and stored at four (4) degrees C until analysis was performed.

Sparger Technology, Inc. ID Suffix Keys - These descriptors will follow the Sparger Technology, Inc. ID numbers and help identify the specific sample and clarify the report.

- DUP - Matrix Duplicate
- MS - Matrix Spike
- MSD - Matrix Spike Duplicate
- LCS - Lab Control Sample
- LCSD - Lab Control Sample Duplicate
- RPD - Relative Percent Difference
- QC - Additional Quality Control
- DIL - Results from a diluted sample
- ND - None Detected
- RL - Reporting Limit

Note: In an effort to conserve paper, the results are printed on both sides of the paper.

Ray James
Laboratory Director

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Tom Ballard
Taber Consultants
3911 West Capitol Ave.
West Sacramento, CA 95691

Workorder 19863

Enclosed are the results from samples received on May 06, 2011.

The requested analyses are listed below.

SAMPLE	SAMPLE DESCRIPTION	DATE COLLECTED	TEST METHOD
19863001	GP-5, Water	05/05/11	3500-FE B EPA 300.0 EPA 351.2 EPA 376.2 RSK 175 SM 2320B 6010B

Test Certificate of Analysis

Client ID Taber Consultants
Workorder # 19863 **Workorder ID** SIR_CityOfParis

Laboratory ID 19863001 **Sampled** 05/05/11
Sample ID GP-5 **Received** 05/06/11
Matrix Water **Reported** 05/19/11

3500 Ferrous Iron

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Ferrous Iron	3500-FE B	05/16/11	05/16/11	ND	0.0250	mg/L	1:1
Ferric Iron	**3500-FE B**	**05/16/11**	**05/16/11**	**0.10**	**0.03**	**mg/L**	**1:1**

Laboratory ID 19863001 **Sampled** 05/05/11
Sample ID GP-5 **Received** 05/06/11
Matrix Water **Reported** 05/19/11

WET CHEMISTRY

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Nitrate	**EPA 300.0**	**05/06/11**	**05/06/11**	**30.0**	**0.050**	**mg/L**	**1:1**
Sulfate	**EPA 300.0**	**05/13/11**	**05/13/11**	**86.0**	**1.0**	**mg/L**	**1:1**
Alkalinity as CaCO3	**SM 2320B**	**05/15/11**	**05/15/11**	**330**	**2.0**	**mg/L**	**1:1**
Total Kjeldahl Nitrogen	**EPA 351.2**	**05/16/11**	**05/17/11**	**0.750**	**0.10**	**mg/L**	**1:1**
Sulfide	EPA 376.2	05/08/11	05/08/11	ND	0.50	mg/L	1:1

Laboratory ID 19863001 **Sampled** 05/05/11
Sample ID GP-5 **Received** 05/06/11
Matrix Water **Reported** 05/19/11

RSK-175

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Methane	**RSK 175**	**05/07/11**	**05/07/11**	**0.048**	**0.010**	**ug/mL**	**1:1**
Ethane	**RSK 175**	**05/07/11**	**05/07/11**	**0.024**	**0.010**	**ug/mL**	**1:1**
Ethene	RSK 175	05/07/11	05/07/11	ND	0.010	ug/mL	1:1
Carbon Dioxide	**RSK 175**	**05/07/11**	**05/07/11**	**105**	**1.0**	**ug/mL**	**1:1**

Laboratory ID 19863001 **Sampled** 05/05/11
Sample ID GP-5 **Received** 05/06/11
Matrix Water **Reported** 05/19/11

6010B METALS

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Manganese	**6010B**	**05/18/11**	**05/19/11**	**1.83**	**0.015**	**mg/L**	**1:1**
Phosphorus	**6010B**	**05/18/11**	**05/19/11**	**0.025**	**0.010**	**mg/L**	**1:1**

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Method Blank Report

Client ID	Taber Consultants	**Sample ID**	MB for HBN 408470 [FEXV/1067]
Laboratory ID	99625	**Matrix**	Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Ferrous Iron	3500-FE B	05/16/11	05/16/11	ND	0.0250	mg/L	1:1

Lab Control Sample Report

Client ID	Taber Consultants	**Sample ID**	LCS for HBN 408470 [FEXV/1067]
Laboratory ID	99626	**Matrix**	Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Ferrous Iron	3500-FE B	05/16/11	05/16/11	1.03	0.0250	mg/L	1:1

Lab Control Sample Duplicate Report

Client ID	Taber Consultants	**Sample ID**	LCSD for HBN 408470 [FEXV/1067
Laboratory ID	99627	**Matrix**	Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Ferrous Iron	3500-FE B	05/16/11	05/16/11	1.03	0.0250	mg/L	1:1

Matrix Spike Report

Client ID	Taber Consultants	**Sample ID**	MS for HBN 408470 [FEXV/1067]
Laboratory ID	99628	**Matrix**	Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Ferrous Iron	3500-FE B	05/16/11	05/16/11	1.08	0.0250	mg/L	1:1

Matrix Spike Duplicate Report

Client ID	Taber Consultants	**Sample ID**	MSD for HBN 408470 [FEXV/1067]
Laboratory ID	99629	**Matrix**	Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Ferrous Iron	3500-FE B	05/16/11	05/16/11	1.03	0.0250	mg/L	1:1

Method Blank Report

Client ID	Taber Consultants	**Sample ID**	MB for HBN 409070 [SULV/1059]
Laboratory ID	99793	**Matrix**	Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Sulfide	EPA 376.2	05/08/11	05/08/11	ND	0.50	mg/L	1:1

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Lab Control Sample Report

Client ID Taber Consultants **Sample ID** LCS for HBN 409070 [SULV/1059]
Laboratory ID 99794 **Matrix** Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Sulfide	EPA 376.2	05/08/11	05/08/11	ND	0.50	mg/L	1:1

Lab Control Sample Duplicate Report

Client ID Taber Consultants **Sample ID** LCSD for HBN 409070 [SULV/1059
Laboratory ID 99795 **Matrix** Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Sulfide	EPA 376.2	05/08/11	05/08/11	0.5	0.50	mg/L	1:1

Duplicate Report

Client ID Taber Consultants **Sample ID** DUP for HBN 409070 [SULV/1059]
Laboratory ID 99796 **Matrix** Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Sulfide	EPA 376.2	05/08/11	05/08/11	ND	0.50	mg/L	1:1

Matrix Spike Report

Client ID Taber Consultants **Sample ID** MS for HBN 409070 [SULV/1059]
Laboratory ID 99797 **Matrix** Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Sulfide	EPA 376.2	05/08/11	05/08/11	0.5	0.50	mg/L	1:1

Matrix Spike Duplicate Report

Client ID Taber Consultants **Sample ID** MSD for HBN 409070 [SULV/1059]
Laboratory ID 99798 **Matrix** Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Sulfide	EPA 376.2	05/08/11	05/08/11	0.5	0.50	mg/L	1:1

Method Blank Report

Client ID Taber Consultants **Sample ID** MB for HBN 409076 [TKNV/1050]
Laboratory ID 99805 **Matrix** Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Total Kjeldahl Nitrogen	EPA 351.2	05/16/11	05/17/11	ND	0.10	mg/L	1:1

Lab Control Sample Report

Client ID Taber Consultants **Sample ID** LCS for HBN 409076 [TKNV/1050]
Laboratory ID 99806 **Matrix** Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Total Kjeldahl Nitrogen	EPA 351.2	05/16/11	05/17/11	10.4	0.10	mg/L	1:1

Lab Control Sample Duplicate Report

Client ID Taber Consultants **Sample ID** LCSD for HBN 409076 [TKNV/1050
Laboratory ID 99807 **Matrix** Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Total Kjeldahl Nitrogen	EPA 351.2	05/16/11	05/17/11	9.65	0.10	mg/L	1:1

Duplicate Report

Client ID Taber Consultants **Sample ID** DUP for HBN 409076 [TKNV/1050]
Laboratory ID 99808 **Matrix** Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Total Kjeldahl Nitrogen	EPA 351.2	05/16/11	05/17/11	1.30	0.10	mg/L	1:1

Matrix Spike Report

Client ID Taber Consultants **Sample ID** MS for HBN 409076 [TKNV/1050]
Laboratory ID 99809 **Matrix** Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Total Kjeldahl Nitrogen	EPA 351.2	05/16/11	05/17/11	10.1	0.10	mg/L	1:1

Matrix Spike Duplicate Report

Client ID Taber Consultants **Sample ID** MSD for HBN 409076 [TKNV/1050]
Laboratory ID 99810 **Matrix** Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Total Kjeldahl Nitrogen	EPA 351.2	05/16/11	05/17/11	10.0	0.10	mg/L	1:1

Method Blank Report

Client ID Taber Consultants **Sample ID** MB for HBN 409086 [ALK/1170]
Laboratory ID 99828 **Matrix** Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Alkalinity as CaCO3	SM 2320B	05/15/11	05/15/11	ND	2.0	mg/L	1:1

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Duplicate Report

Client ID Taber Consultants **Sample ID** GP-2(19850001DUP)
Laboratory ID 99829 **Matrix** Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Alkalinity as CaCO3	SM 2320B	05/15/11	05/15/11	216	2.0	mg/L	1:1

Method Blank Report

Client ID Taber Consultants **Sample ID** MB for HBN 409091 [ICPV/6691]
Laboratory ID 99831 **Matrix** Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Manganese	6010B	05/18/11	05/19/11	ND	0.015	mg/L	1:1
Phosphorus	6010B	05/18/11	05/19/11	ND	0.010	mg/L	1:1

Lab Control Sample Report

Client ID Taber Consultants **Sample ID** LCS for HBN 409091 [ICPV/6691]
Laboratory ID 99832 **Matrix** Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Manganese	6010B	05/18/11	05/19/11	0.193	0.015	mg/L	1:1
Phosphorus	6010B	05/18/11	05/19/11	2.04	0.010	mg/L	1:1

Lab Control Sample Duplicate Report

Client ID Taber Consultants **Sample ID** LCSD for HBN 409091 [ICPV/6691
Laboratory ID 99833 **Matrix** Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Manganese	6010B	05/18/11	05/19/11	0.192	0.015	mg/L	1:1
Phosphorus	6010B	05/18/11	05/19/11	2.04	0.010	mg/L	1:1

Matrix Spike Report

Client ID Taber Consultants **Sample ID** MS for HBN 409091 [ICPV/6691]
Laboratory ID 99834 **Matrix** Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Manganese	6010B	05/18/11	05/19/11	5.01	0.015	mg/L	1:1
Phosphorus	6010B	05/18/11	05/19/11	2.44	0.010	mg/L	1:1

Matrix Spike Duplicate Report

Client ID Taber Consultants **Sample ID** MSD for HBN 409091 [ICPV/6691]
Laboratory ID 99835 **Matrix** Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Manganese	6010B	05/18/11	05/19/11	5.05	0.015	mg/L	1:1
Phosphorus	6010B	05/18/11	05/19/11	2.47	0.010	mg/L	1:1

Duplicate Report

Client ID Taber Consultants **Sample ID** DUP for HBN 409091 [ICPV/6691]
Laboratory ID 99836 **Matrix** Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Manganese	6010B	05/18/11	05/19/11	4.90	0.015	mg/L	1:1
Phosphorus	6010B	05/18/11	05/19/11	0.325	0.010	mg/L	1:1

Method Blank Report

Client ID Taber Consultants **Sample ID** MB for HBN 409100 [IONV/1632]
Laboratory ID 99837 **Matrix** Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Sulfate	EPA 300.0	05/13/11	05/13/11	ND	1.0	mg/L	1:1

Lab Control Sample Report

Client ID Taber Consultants **Sample ID** LCS for HBN 409100 [IONV/1632]
Laboratory ID 99838 **Matrix** Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Sulfate	EPA 300.0	05/13/11	05/13/11	9.81	1.0	mg/L	1:1

Lab Control Sample Duplicate Report

Client ID Taber Consultants **Sample ID** LCSD for HBN 409100 [IONV/1632
Laboratory ID 99839 **Matrix** Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Sulfate	EPA 300.0	05/13/11	05/13/11	9.97	1.0	mg/L	1:1

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Duplicate Report

Client ID Taber Consultants **Sample ID** DUP for HBN 409100 [IONV/1632]
Laboratory ID 99840 **Matrix** Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Sulfate	EPA 300.0	05/13/11	05/13/11	123	1.0	mg/L	1:1

Matrix Spike Report

Client ID Taber Consultants **Sample ID** MS for HBN 409100 [IONV/1632]
Laboratory ID 99841 **Matrix** Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Sulfate	EPA 300.0	05/13/11	05/13/11	131	1.0	mg/L	1:1

Matrix Spike Duplicate Report

Client ID Taber Consultants **Sample ID** MSD for HBN 409100 [IONV/1632]
Laboratory ID 99842 **Matrix** Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Sulfate	EPA 300.0	05/13/11	05/13/11	128	1.0	mg/L	1:1

Method Blank Report

Client ID Taber Consultants **Sample ID** MB for HBN 410272 [SGXV/2748]
Laboratory ID 100008 **Matrix** Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Methane	RSK 175	05/07/11	05/07/11	ND	0.010	ug/mL	1:1
Ethane	RSK 175	05/07/11	05/07/11	ND	0.010	ug/mL	1:1
Ethene	RSK 175	05/07/11	05/07/11	ND	0.01	ug/mL	1:1
Carbon Dioxide	RSK 175	05/07/11	05/07/11	ND	1.0	ug/mL	1:1

Lab Control Sample Report

Client ID Taber Consultants **Sample ID** LCS for HBN 410272 [SGXV/2748]
Laboratory ID 100009 **Matrix** Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Methane	RSK 175	05/07/11	05/07/11	0.51	0.010	ug/mL	1:1
Ethane	RSK 175	05/07/11	05/07/11	0.48	0.010	ug/mL	1:1
Ethene	RSK 175	05/07/11	05/07/11	0.4	0.01	ug/mL	1:1
Carbon Dioxide	RSK 175	05/07/11	05/07/11	189	1.0	ug/mL	1:1

Lab Control Sample Duplicate Report

Client ID	Taber Consultants	**Sample ID**	LCSD for HBN 410272 [SGXV/2748
Laboratory ID	100010	**Matrix**	Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Methane	RSK 175	05/07/11	05/07/11	0.49	0.010	ug/mL	1:1
Ethane	RSK 175	05/07/11	05/07/11	0.44	0.010	ug/mL	1:1
Ethene	RSK 175	05/07/11	05/07/11	0.5	0.01	ug/mL	1:1
Carbon Dioxide	RSK 175	05/07/11	05/07/11	195	1.0	ug/mL	1:1

Duplicate Report

Client ID	Taber Consultants	**Sample ID**	DUP for HBN 410272 [SGXV/2748]
Laboratory ID	100011	**Matrix**	Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Methane	RSK 175	05/07/11	05/07/11	0.045	0.010	ug/mL	1:1
Ethane	RSK 175	05/07/11	05/07/11	0.029	0.010	ug/mL	1:1
Ethene	RSK 175	05/07/11	05/07/11	ND	0.01	ug/mL	1:1
Carbon Dioxide	RSK 175	05/07/11	05/07/11	105	1.0	ug/mL	1:1

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QC SUMMARY

Client ID	Taber Consultants	**Original**	19850001		
QC Batch	SULX 1061	**Sample**	**Duplicate [99796]**		
Matrix	Water				**RPD**
Parameter				**RPD**	**Limits**
Sulfide				00	(20)

Client ID	Taber Consultants	**Original**	19850001		
QC Batch	TKNX 1049	**Sample**	**Duplicate [99808]**		
Matrix	Water				**RPD**
Parameter				**RPD**	**Limits**
Total Kjeldahl Nitrogen				0	(30)

Client ID	Taber Consultants	**Original**	19850001		
QC Batch	ALK 1170	**Sample**	**Duplicate [99829]**		
Matrix	Water				**RPD**
Parameter				**RPD**	**Limits**
Alkalinity as CaCO3				00	(20)

Client ID	Taber Consultants	**Original**	19850001		
QC Batch	ICPP 6710	**Sample**	**Duplicate [99836]**		
Matrix	Water				**RPD**
Parameter				**RPD**	**Limits**
Manganese				1.22	(35)
Phosphorus				4.80	(35)

Client ID	Taber Consultants	**Original**	19883001		
QC Batch	ION 1668	**Sample**	**Duplicate [99840]**		
Matrix	Water				**RPD**
Parameter				**RPD**	**Limits**
Sulfate				2.4	(20)

Client ID	Taber Consultants	**Original**	19863001		
QC Batch	SGX 2778	**Sample**	**Duplicate [100011]**		
Matrix	Water				**RPD**
Parameter				**RPD**	**Limits**
Methane				6.5	(20)
Ethane				19	(20)
Ethene				0	(20)
Carbon Dioxide				00	(20)

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QC SUMMARY

Client ID	Taber Consultants	**Original**	19850001
QC Batch	FEX 1068	**Samples**	Matrix Spike [99628]
Matrix	Water		Matrix Spike Duplicate [99629]

Parameter	Spike %Recovery	Spike Dup %Recovery	Recovery Limits	RPD	RPD Limits
Ferrous Iron	108	103	(70-125)	4.7	(30 MAX)

Client ID	Taber Consultants	**Original**	19850001
QC Batch	SULX 1061	**Samples**	Matrix Spike [99797]
Matrix	Water		Matrix Spike Duplicate [99798]

Parameter	Spike %Recovery	Spike Dup %Recovery	Recovery Limits	RPD	RPD Limits
Sulfide	90	97	(75-125)	7.5	(20 MAX)

Client ID	Taber Consultants	**Original**	19850001
QC Batch	TKNX 1049	**Samples**	Matrix Spike [99809]
Matrix	Water		Matrix Spike Duplicate [99810]

Parameter	Spike %Recovery	Spike Dup %Recovery	Recovery Limits	RPD	RPD Limits
Total Kjeldahl Nitrogen	88	87	(75-125)	1.1	(30 MAX)

Client ID	Taber Consultants	**Original**	19850001
QC Batch	ICPP 6710	**Samples**	Matrix Spike [99834]
Matrix	Water		Matrix Spike Duplicate [99835]

Parameter	Spike %Recovery	Spike Dup %Recovery	Recovery Limits	RPD	RPD Limits
Manganese	25.0	45.0	(75-125)	57.1	(35 MAX)
Phosphorus	105	106	(75-125)	0.9480	(35 MAX)

Client ID	Taber Consultants	**Original**	19883001
QC Batch	ION 1668	**Samples**	Matrix Spike [99841]
Matrix	Water		Matrix Spike Duplicate [99842]

Parameter	Spike %Recovery	Spike Dup %Recovery	Recovery Limits	RPD	RPD Limits
Sulfate	50	20	(75-125)	86	(20 MAX)

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QC SUMMARY

Client ID	Taber Consultants			**Samples**	Lab Control Sample [99626]	
QC Batch	FEX 1068				Lab Control Sample Duplicate [99627]	
Matrix	Water					
Parameter		**Check %Recovery**	**Check Dup %Recovery**	**Recovery Limits**	**RPD**	**RPD Limits**
Ferrous Iron		103	103	(70-125)	00	(30 MAX)

Client ID	Taber Consultants			**Samples**	Lab Control Sample [99794]	
QC Batch	SULX 1061				Lab Control Sample Duplicate [99795]	
Matrix	Water					
Parameter		**Check %Recovery**	**Check Dup %Recovery**	**Recovery Limits**	**RPD**	**RPD Limits**
Sulfide		90	100	(80-120)	11	(20 MAX)

Client ID	Taber Consultants			**Samples**	Lab Control Sample [99806]	
QC Batch	TKNX 1049				Lab Control Sample Duplicate [99807]	
Matrix	Water					
Parameter		**Check %Recovery**	**Check Dup %Recovery**	**Recovery Limits**	**RPD**	**RPD Limits**
Total Kjeldahl Nitrogen		104	97	(80-120)	7	(20 MAX)

Client ID	Taber Consultants			**Samples**	Lab Control Sample [99832]	
QC Batch	ICPP 6710				Lab Control Sample Duplicate [99833]	
Matrix	Water					
Parameter		**Check %Recovery**	**Check Dup %Recovery**	**Recovery Limits**	**RPD**	**RPD Limits**
Manganese		96.5	96.0	(80-120)	0.5190	(20 MAX)
Phosphorus		102	102	(80-120)	0000	(20 MAX)

Client ID	Taber Consultants			**Samples**	Lab Control Sample [99838]	
QC Batch	ION 1668				Lab Control Sample Duplicate [99839]	
Matrix	Water					
Parameter		**Check %Recovery**	**Check Dup %Recovery**	**Recovery Limits**	**RPD**	**RPD Limits**
Sulfate		98	100	(80-125)	2.0	(20 MAX)

Client ID	Taber Consultants			**Samples**	Lab Control Sample [100009]	
QC Batch	SGX 2778				Lab Control Sample Duplicate [100010]	
Matrix	Water					
Parameter		**Check %Recovery**	**Check Dup %Recovery**	**Recovery Limits**	**RPD**	**RPD Limits**
Methane		102	98	(65-135)	4.0	(20 MAX)
Ethane		96	88	(65-135)	8.7	(20 MAX)
Ethene		90	96	(65-135)	6.5	(20 MAX)

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QC SUMMARY

Client ID	Taber Consultants	**Samples**	Lab Control Sample [100009]
QC Batch	SGX 2778		Lab Control Sample Duplicate [100010]
Matrix	Water		**(continued)**

Parameter	Check %Recovery	Check Dup %Recovery	Recovery Limits	RPD	RPD Limits
Carbon Dioxide	94	98	(65-135)	4.2	(20 MAX)

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Sparger Technology, Inc.
Environmental Laboratories

3738 Bradview Drive
Sacramento, CA 95827
Lab: 916.369.7688
Fax: 916.369.7689

COC # / Lab No. **19863**

Chain-of-Custody Record and Analysis Request

Project Contact (PDF To): **Tom Ballard**	California EDF Report? ☑ Yes ☐ No
Company / Address: **Taber Consultants: 3911 West Capitol Ave.** West Sacramento, CA 95691	Sampling Company Log Code: **WRMC**
	Global ID: **T0600100379**
Phone #: **916-371-1690** Fax #: **916-371-7265**	Deliver all files to: **SNess@TaberConsultants.com**
Project #: **51074** P.O. #: **3A**	Sampler Signature:
Project Name: **SIR_CityOfParis**	
Project Address: **3514 Adeline St. Oakland, CA**	

Sample ID	Field Point Name	Sampling: Date	Sampling: Time	Container: 40 ml VOA	Container: Sleeve	Container: Poly	Container: Glass	Container: Tedlar	Preservative: HCl	Preservative: HNO_3	Preservative: None	Preservative: Zn Ac / NaOH	Preservative: H_2SO_4	Matrix: Water	Matrix: Soil	Matrix: Air	Analysis Request: Fe2+, Mn2- (field filtered)	Analysis Request: ~~Total Fe~~ Methane, ethane, CO2 (RSK-175)	Analysis Request: NO3- (field filtered)	Analysis Request: Gen Chem (P, SO4, alkalinity)	Analysis Request: Methane, ethane, ethene, CO2 (RSK-175)	Analysis Request: TKN	Analysis Request: Sulfide
GP-5	GP-5	5-5-11	1400	2							X			X							X		
GP-5	GP-5	5-5-11	1400				X													X			
GP-5	GP-5	5-5-11	1400				X					X	X	X								X	X
GP-5	GP-5	5-5-11	1400				X				X			X							X		
GP-5	GP-5	5-5-11	1400				X			X							X	X					
GP-5	GP-5	5-5-11	1400			X					X						X		X				
GP-5	GP-5	5-5-11	1406																X				

Relinquished by:	Date	Time	Received by:
	5-5-11	1730	
Relinquished by:	Date	Time	Received by:
		1457	5/6/11
Relinquished by:	Date	Time	Received by Laboratory:

Remarks:
please save file(s), PDF's, EDF & XLS name as:
sample date year_month_day_ project name_ WO#

EXAMPLE:
2010_02_10_GMR_CityOfParis_18495

Bill to: Invoice@TaberConsultants.com

For Lab Use Only: Sample Receipt

Temp °C	Initials	Date	Time		

Sparger Technology, Inc.
Environmental Laboratories

Analytical Laboratory Division
Mobile Laboratory Division
Scientific Division

Tom Ballard
Taber Consultants
3911 West Capitol Ave.
West Sacramento, CA 95691

Client	Taber Consultants	
Workorder	19864	SIR_CityOfParis
Received	05/07/11	

The samples were received in EPA specified containers. The samples were transported and received under documented chain of custody and stored at four (4) degrees C until analysis was performed.

Sparger Technology, Inc. ID Suffix Keys - These descriptors will follow the Sparger Technology, Inc. ID numbers and help identify the specific sample and clarify the report.

- DUP - Matrix Duplicate
- MS - Matrix Spike
- MSD - Matrix Spike Duplicate
- LCS - Lab Control Sample
- LCSD - Lab Control Sample Duplicate
- RPD - Relative Percent Difference
- QC - Additional Quality Control
- DIL - Results from a diluted sample
- ND - None Detected
- RL - Reporting Limit

Note: In an effort to conserve paper, the results are printed on both sides of the paper.

Ray James
Laboratory Director

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Tom Ballard
Taber Consultants
3911 West Capitol Ave.
West Sacramento, CA 95691

Workorder 19864

Enclosed are the results from samples received on May 07, 2011.

The requested analyses are listed below.

SAMPLE	SAMPLE DESCRIPTION	DATE COLLECTED	TEST METHOD
19864001	GP-3-15, Water	05/06/11	3500-FE B EPA 300.0 EPA 351.2 EPA 376.2 RSK 175 SM 2320B 6010B
19864002	GP-3-35, Water	05/06/11	3500-FE B EPA 300.0 EPA 351.2 EPA 376.2 RSK 175 SM 2320B 6010B
19864003	GP-4-15, Water	05/06/11	3500-FE B EPA 300.0 EPA 351.2 EPA 376.2 RSK 175 SM 2320B 6010B
19864004	GP-4-35, Water	05/06/11	3500-FE B EPA 300.0 EPA 351.2 EPA 376.2 RSK 175 SM 2320B 6010B

Test Certificate of Analysis

Client ID Taber Consultants
Workorder # 19864 **Workorder ID** SIR_CityOfParis

Laboratory ID 19864001 **Sampled** 05/06/11
Sample ID GP-3-15 **Received** 05/07/11
Matrix Water **Reported** 05/19/11

3500 Ferrous Iron

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Ferrous Iron	3500-FE B	05/16/11	05/16/11	ND	0.0250	mg/L	1:1
Ferric Iron	**3500-FE B**	**05/16/11**	**05/16/11**	**1.4**	**0.03**	**mg/L**	**1:1**

Laboratory ID 19864001 **Sampled** 05/06/11
Sample ID GP-3-15 **Received** 05/07/11
Matrix Water **Reported** 05/19/11

WET CHEMISTRY

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Nitrate	**EPA 300.0**	**05/07/11**	**05/07/11**	**25.0**	**0.050**	**mg/L**	**1:1**
Sulfate	**EPA 300.0**	**05/13/11**	**05/13/11**	**185**	**1.0**	**mg/L**	**1:1**
Alkalinity as CaCO3	**SM 2320B**	**05/15/11**	**05/15/11**	**312**	**2.0**	**mg/L**	**1:1**
Total Kjeldahl Nitrogen	**EPA 351.2**	**05/16/11**	**05/17/11**	**0.870**	**0.10**	**mg/L**	**1:1**
Sulfide	EPA 376.2	05/08/11	05/08/11	ND	0.50	mg/L	1:1

Laboratory ID 19864001 **Sampled** 05/06/11
Sample ID GP-3-15 **Received** 05/07/11
Matrix Water **Reported** 05/19/11

RSK-175

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Methane	**RSK 175**	**05/07/11**	**05/07/11**	**0.035**	**0.010**	**ug/mL**	**1:1**
Ethane	RSK 175	05/07/11	05/07/11	ND	0.010	ug/mL	1:1
Ethene	RSK 175	05/07/11	05/07/11	ND	0.010	ug/mL	1:1
Carbon Dioxide	**RSK 175**	**05/07/11**	**05/07/11**	**83**	**1.0**	**ug/mL**	**1:1**

Laboratory ID 19864001 **Sampled** 05/06/11
Sample ID GP-3-15 **Received** 05/07/11
Matrix Water **Reported** 05/19/11

6010B METALS

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Manganese	**6010B**	**05/18/11**	**05/19/11**	**6.24**	**0.015**	**mg/L**	**1:1**
Phosphorus	**6010B**	**05/18/11**	**05/19/11**	**0.315**	**0.010**	**mg/L**	**1:1**

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Test Certificate of Analysis

Client ID Taber Consultants
Workorder # 19864 **Workorder ID** SIR_CityOfParis

Laboratory ID 19864002 **Sampled** 05/06/11
Sample ID GP-3-35 **Received** 05/07/11
Matrix Water **Reported** 05/19/11

3500 Ferrous Iron

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Ferrous Iron	3500-FE B	05/16/11	05/16/11	ND	0.0250	mg/L	1:1
Ferric Iron	**3500-FE B**	**05/16/11**	**05/16/11**	**5.8**	**0.03**	**mg/L**	**1:1**

Laboratory ID 19864002 **Sampled** 05/06/11
Sample ID GP-3-35 **Received** 05/07/11
Matrix Water **Reported** 05/19/11

WET CHEMISTRY

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Nitrate	**EPA 300.0**	**05/07/11**	**05/07/11**	**36.0**	**0.050**	**mg/L**	**1:1**
Sulfate	**EPA 300.0**	**05/13/11**	**05/13/11**	**86.0**	**1.0**	**mg/L**	**1:1**
Alkalinity as CaCO3	**SM 2320B**	**05/15/11**	**05/15/11**	**230**	**2.0**	**mg/L**	**1:1**
Total Kjeldahl Nitrogen	**EPA 351.2**	**05/16/11**	**05/17/11**	**0.300**	**0.10**	**mg/L**	**1:1**
Sulfide	EPA 376.2	05/08/11	05/08/11	ND	0.50	mg/L	1:1

Laboratory ID 19864002 **Sampled** 05/06/11
Sample ID GP-3-35 **Received** 05/07/11
Matrix Water **Reported** 05/19/11

RSK-175

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Methane	RSK 175	05/07/11	05/07/11	ND	0.010	ug/mL	1:1
Ethane	RSK 175	05/07/11	05/07/11	ND	0.010	ug/mL	1:1
Ethene	RSK 175	05/07/11	05/07/11	ND	0.010	ug/mL	1:1
Carbon Dioxide	**RSK 175**	**05/07/11**	**05/07/11**	**54**	**1.0**	**ug/mL**	**1:1**

Laboratory ID 19864002 **Sampled** 05/06/11
Sample ID GP-3-35 **Received** 05/07/11
Matrix Water **Reported** 05/19/11

6010B METALS

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Manganese	**6010B**	**05/18/11**	**05/19/11**	**4.85**	**0.015**	**mg/L**	**1:1**
Phosphorus	**6010B**	**05/18/11**	**05/19/11**	**0.105**	**0.010**	**mg/L**	**1:1**

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Test Certificate of Analysis

Client ID Taber Consultants
Workorder # 19864 **Workorder ID** SIR_CityOfParis

Laboratory ID 19864003 **Sampled** 05/06/11
Sample ID GP-4-15 **Received** 05/07/11
Matrix Water **Reported** 05/19/11

3500 Ferrous Iron

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Ferrous Iron	3500-FE B	05/16/11	05/16/11	ND	0.0250	mg/L	1:1
Ferric Iron	**3500-FE B**	**05/16/11**	**05/16/11**	**29**	**0.03**	**mg/L**	**1:1**

Laboratory ID 19864003 **Sampled** 05/06/11
Sample ID GP-4-15 **Received** 05/07/11
Matrix Water **Reported** 05/19/11

WET CHEMISTRY

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Nitrate	EPA 300.0	05/07/11	05/07/11	ND	0.050	mg/L	1:1
Sulfate	**EPA 300.0**	**05/13/11**	**05/13/11**	**6.82**	**1.0**	**mg/L**	**1:1**
Alkalinity as CaCO3	**SM 2320B**	**05/15/11**	**05/15/11**	**379**	**2.0**	**mg/L**	**1:1**
Total Kjeldahl Nitrogen	**EPA 351.2**	**05/16/11**	**05/17/11**	**1.83**	**0.10**	**mg/L**	**1:1**
Sulfide	EPA 376.2	05/08/11	05/08/11	ND	0.50	mg/L	1:1

Laboratory ID 19864003 **Sampled** 05/06/11
Sample ID GP-4-15 **Received** 05/07/11
Matrix Water **Reported** 05/19/11

RSK-175

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Methane	**RSK 175**	**05/07/11**	**05/07/11**	**0.047**	**0.010**	**ug/mL**	**1:1**
Ethane	RSK 175	05/07/11	05/07/11	ND	0.010	ug/mL	1:1
Ethene	RSK 175	05/07/11	05/07/11	ND	0.010	ug/mL	1:1
Carbon Dioxide	**RSK 175**	**05/07/11**	**05/07/11**	**94**	**1.0**	**ug/mL**	**1:1**

Laboratory ID 19864003 **Sampled** 05/06/11
Sample ID GP-4-15 **Received** 05/07/11
Matrix Water **Reported** 05/19/11

6010B METALS

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Manganese	**6010B**	**05/18/11**	**05/19/11**	**5.55**	**0.015**	**mg/L**	**1:1**
Phosphorus	**6010B**	**05/18/11**	**05/19/11**	**0.293**	**0.010**	**mg/L**	**1:1**

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Test Certificate of Analysis

Client ID Taber Consultants
Workorder # 19864 **Workorder ID** SIR_CityOfParis

Laboratory ID 19864004 **Sampled** 05/06/11
Sample ID GP-4-35 **Received** 05/07/11
Matrix Water **Reported** 05/19/11

3500 Ferrous Iron

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Ferrous Iron	3500-FE B	05/16/11	05/16/11	ND	0.0250	mg/L	1:1
Ferric Iron	**3500-FE B**	**05/16/11**	**05/16/11**	**0.7**	**0.03**	**mg/L**	**1:1**

Laboratory ID 19864004 **Sampled** 05/06/11
Sample ID GP-4-35 **Received** 05/07/11
Matrix Water **Reported** 05/19/11

WET CHEMISTRY

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Nitrate	**EPA 300.0**	**05/07/11**	**05/07/11**	**38.0**	**0.050**	**mg/L**	**1:1**
Sulfate	**EPA 300.0**	**05/13/11**	**05/13/11**	**71.0**	**1.0**	**mg/L**	**1:1**
Alkalinity as CaCO3	**SM 2320B**	**05/15/11**	**05/15/11**	**173**	**2.0**	**mg/L**	**1:1**
Total Kjeldahl Nitrogen	**EPA 351.2**	**05/16/11**	**05/17/11**	**0.630**	**0.10**	**mg/L**	**1:1**
Sulfide	EPA 376.2	05/08/11	05/08/11	ND	0.50	mg/L	1:1

Laboratory ID 19864004 **Sampled** 05/06/11
Sample ID GP-4-35 **Received** 05/07/11
Matrix Water **Reported** 05/19/11

RSK-175

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Methane	**RSK 175**	**05/07/11**	**05/07/11**	**0.064**	**0.010**	**ug/mL**	**1:1**
Ethane	RSK 175	05/07/11	05/07/11	ND	0.010	ug/mL	1:1
Ethene	RSK 175	05/07/11	05/07/11	ND	0.010	ug/mL	1:1
Carbon Dioxide	**RSK 175**	**05/07/11**	**05/07/11**	**88**	**1.0**	**ug/mL**	**1:1**

Laboratory ID 19864004 **Sampled** 05/06/11
Sample ID GP-4-35 **Received** 05/07/11
Matrix Water **Reported** 05/19/11

6010B METALS

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Manganese	**6010B**	**05/18/11**	**05/19/11**	**6.38**	**0.015**	**mg/L**	**1:1**
Phosphorus	**6010B**	**05/18/11**	**05/19/11**	**0.409**	**0.010**	**mg/L**	**1:1**

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Method Blank Report

Client ID	Taber Consultants	**Sample ID**	MB for HBN 408470 [FEXV/1067]
Laboratory ID	99625	**Matrix**	Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Ferrous Iron	3500-FE B	05/16/11	05/16/11	ND	0.0250	mg/L	1:1

Lab Control Sample Report

Client ID	Taber Consultants	**Sample ID**	LCS for HBN 408470 [FEXV/1067]
Laboratory ID	99626	**Matrix**	Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Ferrous Iron	3500-FE B	05/16/11	05/16/11	1.03	0.0250	mg/L	1:1

Lab Control Sample Duplicate Report

Client ID	Taber Consultants	**Sample ID**	LCSD for HBN 408470 [FEXV/1067
Laboratory ID	99627	**Matrix**	Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Ferrous Iron	3500-FE B	05/16/11	05/16/11	1.03	0.0250	mg/L	1:1

Matrix Spike Report

Client ID	Taber Consultants	**Sample ID**	MS for HBN 408470 [FEXV/1067]
Laboratory ID	99628	**Matrix**	Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Ferrous Iron	3500-FE B	05/16/11	05/16/11	1.08	0.0250	mg/L	1:1

Matrix Spike Duplicate Report

Client ID	Taber Consultants	**Sample ID**	MSD for HBN 408470 [FEXV/1067]
Laboratory ID	99629	**Matrix**	Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Ferrous Iron	3500-FE B	05/16/11	05/16/11	1.03	0.0250	mg/L	1:1

Method Blank Report

Client ID	Taber Consultants	**Sample ID**	MB for HBN 409070 [SULV/1059]
Laboratory ID	99793	**Matrix**	Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Sulfide	EPA 376.2	05/08/11	05/08/11	ND	0.50	mg/L	1:1

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Lab Control Sample Report

Client ID Taber Consultants **Sample ID** LCS for HBN 409070 [SULV/1059]
Laboratory ID 99794 **Matrix** Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Sulfide	EPA 376.2	05/08/11	05/08/11	ND	0.50	mg/L	1:1

Lab Control Sample Duplicate Report

Client ID Taber Consultants **Sample ID** LCSD for HBN 409070 [SULV/1059
Laboratory ID 99795 **Matrix** Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Sulfide	EPA 376.2	05/08/11	05/08/11	0.5	0.50	mg/L	1:1

Duplicate Report

Client ID Taber Consultants **Sample ID** DUP for HBN 409070 [SULV/1059]
Laboratory ID 99796 **Matrix** Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Sulfide	EPA 376.2	05/08/11	05/08/11	ND	0.50	mg/L	1:1

Matrix Spike Report

Client ID Taber Consultants **Sample ID** MS for HBN 409070 [SULV/1059]
Laboratory ID 99797 **Matrix** Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Sulfide	EPA 376.2	05/08/11	05/08/11	0.5	0.50	mg/L	1:1

Matrix Spike Duplicate Report

Client ID Taber Consultants **Sample ID** MSD for HBN 409070 [SULV/1059]
Laboratory ID 99798 **Matrix** Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Sulfide	EPA 376.2	05/08/11	05/08/11	0.5	0.50	mg/L	1:1

Method Blank Report

Client ID Taber Consultants **Sample ID** MB for HBN 409076 [TKNV/1050]
Laboratory ID 99805 **Matrix** Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Total Kjeldahl Nitrogen	EPA 351.2	05/16/11	05/17/11	ND	0.10	mg/L	1:1

Lab Control Sample Report

Client ID Taber Consultants **Sample ID** LCS for HBN 409076 [TKNV/1050]
Laboratory ID 99806 **Matrix** Water

Parameter	Method	Prep Date	Analyzed	Result	RL Units	Dilution
Total Kjeldahl Nitrogen	EPA 351.2	05/16/11	05/17/11	10.4	0.10 mg/L	1:1

Lab Control Sample Duplicate Report

Client ID Taber Consultants **Sample ID** LCSD for HBN 409076 [TKNV/1050
Laboratory ID 99807 **Matrix** Water

Parameter	Method	Prep Date	Analyzed	Result	RL Units	Dilution
Total Kjeldahl Nitrogen	EPA 351.2	05/16/11	05/17/11	9.65	0.10 mg/L	1:1

Duplicate Report

Client ID Taber Consultants **Sample ID** DUP for HBN 409076 [TKNV/1050]
Laboratory ID 99808 **Matrix** Water

Parameter	Method	Prep Date	Analyzed	Result	RL Units	Dilution
Total Kjeldahl Nitrogen	EPA 351.2	05/16/11	05/17/11	1.30	0.10 mg/L	1:1

Matrix Spike Report

Client ID Taber Consultants **Sample ID** MS for HBN 409076 [TKNV/1050]
Laboratory ID 99809 **Matrix** Water

Parameter	Method	Prep Date	Analyzed	Result	RL Units	Dilution
Total Kjeldahl Nitrogen	EPA 351.2	05/16/11	05/17/11	10.1	0.10 mg/L	1:1

Matrix Spike Duplicate Report

Client ID Taber Consultants **Sample ID** MSD for HBN 409076 [TKNV/1050]
Laboratory ID 99810 **Matrix** Water

Parameter	Method	Prep Date	Analyzed	Result	RL Units	Dilution
Total Kjeldahl Nitrogen	EPA 351.2	05/16/11	05/17/11	10.0	0.10 mg/L	1:1

Method Blank Report

Client ID Taber Consultants **Sample ID** MB for HBN 409086 [ALK/1170]
Laboratory ID 99828 **Matrix** Water

Parameter	Method	Prep Date	Analyzed	Result	RL Units	Dilution
Alkalinity as CaCO3	SM 2320B	05/15/11	05/15/11	ND	2.0 mg/L	1:1

Duplicate Report

Client ID Taber Consultants **Sample ID** GP-2(19850001DUP)
Laboratory ID 99829 **Matrix** Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Alkalinity as CaCO3	SM 2320B	05/15/11	05/15/11	216	2.0	mg/L	1:1

Method Blank Report

Client ID Taber Consultants **Sample ID** MB for HBN 409091 [ICPV/6691]
Laboratory ID 99831 **Matrix** Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Manganese	6010B	05/18/11	05/19/11	ND	0.015	mg/L	1:1
Phosphorus	6010B	05/18/11	05/19/11	ND	0.010	mg/L	1:1

Lab Control Sample Report

Client ID Taber Consultants **Sample ID** LCS for HBN 409091 [ICPV/6691]
Laboratory ID 99832 **Matrix** Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Manganese	6010B	05/18/11	05/19/11	0.193	0.015	mg/L	1:1
Phosphorus	6010B	05/18/11	05/19/11	2.04	0.010	mg/L	1:1

Lab Control Sample Duplicate Report

Client ID Taber Consultants **Sample ID** LCSD for HBN 409091 [ICPV/6691
Laboratory ID 99833 **Matrix** Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Manganese	6010B	05/18/11	05/19/11	0.192	0.015	mg/L	1:1
Phosphorus	6010B	05/18/11	05/19/11	2.04	0.010	mg/L	1:1

Matrix Spike Report

Client ID Taber Consultants **Sample ID** MS for HBN 409091 [ICPV/6691]
Laboratory ID 99834 **Matrix** Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Manganese	6010B	05/18/11	05/19/11	5.01	0.015	mg/L	1:1
Phosphorus	6010B	05/18/11	05/19/11	2.44	0.010	mg/L	1:1

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Matrix Spike Duplicate Report

Client ID	Taber Consultants	**Sample ID**	MSD for HBN 409091 [ICPV/6691]
Laboratory ID	99835	**Matrix**	Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Manganese	6010B	05/18/11	05/19/11	5.05	0.015	mg/L	1:1
Phosphorus	6010B	05/18/11	05/19/11	2.47	0.010	mg/L	1:1

Duplicate Report

Client ID	Taber Consultants	**Sample ID**	DUP for HBN 409091 [ICPV/6691]
Laboratory ID	99836	**Matrix**	Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Manganese	6010B	05/18/11	05/19/11	4.90	0.015	mg/L	1:1
Phosphorus	6010B	05/18/11	05/19/11	0.325	0.010	mg/L	1:1

Method Blank Report

Client ID	Taber Consultants	**Sample ID**	MB for HBN 409100 [IONV/1632]
Laboratory ID	99837	**Matrix**	Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Sulfate	EPA 300.0	05/13/11	05/13/11	ND	1.0	mg/L	1:1

Lab Control Sample Report

Client ID	Taber Consultants	**Sample ID**	LCS for HBN 409100 [IONV/1632]
Laboratory ID	99838	**Matrix**	Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Sulfate	EPA 300.0	05/13/11	05/13/11	9.81	1.0	mg/L	1:1

Lab Control Sample Duplicate Report

Client ID	Taber Consultants	**Sample ID**	LCSD for HBN 409100 [IONV/1632
Laboratory ID	99839	**Matrix**	Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Sulfate	EPA 300.0	05/13/11	05/13/11	9.97	1.0	mg/L	1:1

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Duplicate Report

Client ID Taber Consultants
Laboratory ID 99840
Sample ID DUP for HBN 409100 [IONV/1632]
Matrix Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Sulfate	EPA 300.0	05/13/11	05/13/11	123	1.0	mg/L	1:1

Matrix Spike Report

Client ID Taber Consultants
Laboratory ID 99841
Sample ID MS for HBN 409100 [IONV/1632]
Matrix Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Sulfate	EPA 300.0	05/13/11	05/13/11	131	1.0	mg/L	1:1

Matrix Spike Duplicate Report

Client ID Taber Consultants
Laboratory ID 99842
Sample ID MSD for HBN 409100 [IONV/1632]
Matrix Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Sulfate	EPA 300.0	05/13/11	05/13/11	128	1.0	mg/L	1:1

Method Blank Report

Client ID Taber Consultants
Laboratory ID 100008
Sample ID MB for HBN 410272 [SGXV/2748]
Matrix Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Methane	RSK 175	05/07/11	05/07/11	ND	0.010	ug/mL	1:1
Ethane	RSK 175	05/07/11	05/07/11	ND	0.010	ug/mL	1:1
Ethene	RSK 175	05/07/11	05/07/11	ND	0.01	ug/mL	1:1
Carbon Dioxide	RSK 175	05/07/11	05/07/11	ND	1.0	ug/mL	1:1

Lab Control Sample Report

Client ID Taber Consultants
Laboratory ID 100009
Sample ID LCS for HBN 410272 [SGXV/2748]
Matrix Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Methane	RSK 175	05/07/11	05/07/11	0.51	0.010	ug/mL	1:1
Ethane	RSK 175	05/07/11	05/07/11	0.48	0.010	ug/mL	1:1
Ethene	RSK 175	05/07/11	05/07/11	0.4	0.01	ug/mL	1:1
Carbon Dioxide	RSK 175	05/07/11	05/07/11	189	1.0	ug/mL	1:1

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Lab Control Sample Duplicate Report

Client ID	Taber Consultants	**Sample ID**	LCSD for HBN 410272 [SGXV/2748
Laboratory ID	100010	**Matrix**	Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Methane	RSK 175	05/07/11	05/07/11	0.49	0.010	ug/mL	1:1
Ethane	RSK 175	05/07/11	05/07/11	0.44	0.010	ug/mL	1:1
Ethene	RSK 175	05/07/11	05/07/11	0.5	0.01	ug/mL	1:1
Carbon Dioxide	RSK 175	05/07/11	05/07/11	195	1.0	ug/mL	1:1

Duplicate Report

Client ID	Taber Consultants	**Sample ID**	DUP for HBN 410272 [SGXV/2748]
Laboratory ID	100011	**Matrix**	Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Methane	RSK 175	05/07/11	05/07/11	0.045	0.010	ug/mL	1:1
Ethane	RSK 175	05/07/11	05/07/11	0.029	0.010	ug/mL	1:1
Ethene	RSK 175	05/07/11	05/07/11	ND	0.01	ug/mL	1:1
Carbon Dioxide	RSK 175	05/07/11	05/07/11	105	1.0	ug/mL	1:1

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QC SUMMARY

Client ID	Taber Consultants	**Original**	19850001		
QC Batch	SULX 1061	**Sample**	**Duplicate [99796]**		
Matrix	Water				**RPD**
Parameter				**RPD**	**Limits**
Sulfide				00	(20)

Client ID	Taber Consultants	**Original**	19850001		
QC Batch	TKNX 1049	**Sample**	**Duplicate [99808]**		
Matrix	Water				**RPD**
Parameter				**RPD**	**Limits**
Total Kjeldahl Nitrogen				0	(30)

Client ID	Taber Consultants	**Original**	19850001		
QC Batch	ALK 1170	**Sample**	**Duplicate [99829]**		
Matrix	Water				**RPD**
Parameter				**RPD**	**Limits**
Alkalinity as CaCO3				00	(20)

Client ID	Taber Consultants	**Original**	19850001		
QC Batch	ICPP 6710	**Sample**	**Duplicate [99836]**		
Matrix	Water				**RPD**
Parameter				**RPD**	**Limits**
Manganese				1.22	(35)
Phosphorus				4.80	(35)

Client ID	Taber Consultants	**Original**	19883001		
QC Batch	ION 1668	**Sample**	**Duplicate [99840]**		
Matrix	Water				**RPD**
Parameter				**RPD**	**Limits**
Sulfate				2.4	(20)

Client ID	Taber Consultants	**Original**	19863001		
QC Batch	SGX 2778	**Sample**	**Duplicate [100011]**		
Matrix	Water				**RPD**
Parameter				**RPD**	**Limits**
Methane				6.5	(20)
Ethane				19	(20)
Ethene				0	(20)
Carbon Dioxide				00	(20)

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QC SUMMARY

Client ID	Taber Consultants	**Original**	19850001
QC Batch	FEX 1068	**Samples**	Matrix Spike [99628]
Matrix	Water		Matrix Spike Duplicate [99629]

Parameter	Spike %Recovery	Spike Dup %Recovery	Recovery Limits	RPD	RPD Limits
Ferrous Iron	108	103	(70-125)	4.7	(30 MAX)

Client ID	Taber Consultants	**Original**	19850001
QC Batch	SULX 1061	**Samples**	Matrix Spike [99797]
Matrix	Water		Matrix Spike Duplicate [99798]

Parameter	Spike %Recovery	Spike Dup %Recovery	Recovery Limits	RPD	RPD Limits
Sulfide	90	97	(75-125)	7.5	(20 MAX)

Client ID	Taber Consultants	**Original**	19850001
QC Batch	TKNX 1049	**Samples**	Matrix Spike [99809]
Matrix	Water		Matrix Spike Duplicate [99810]

Parameter	Spike %Recovery	Spike Dup %Recovery	Recovery Limits	RPD	RPD Limits
Total Kjeldahl Nitrogen	88	87	(75-125)	1.1	(30 MAX)

Client ID	Taber Consultants	**Original**	19850001
QC Batch	ICPP 6710	**Samples**	Matrix Spike [99834]
Matrix	Water		Matrix Spike Duplicate [99835]

Parameter	Spike %Recovery	Spike Dup %Recovery	Recovery Limits	RPD	RPD Limits
Manganese	25.0	45.0	(75-125)	57.1	(35 MAX)
Phosphorus	105	106	(75-125)	0.9480	(35 MAX)

Client ID	Taber Consultants	**Original**	19883001
QC Batch	ION 1668	**Samples**	Matrix Spike [99841]
Matrix	Water		Matrix Spike Duplicate [99842]

Parameter	Spike %Recovery	Spike Dup %Recovery	Recovery Limits	RPD	RPD Limits
Sulfate	50	20	(75-125)	86	(20 MAX)

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QC SUMMARY

Client ID	Taber Consultants			**Samples**	Lab Control Sample [99626]	
QC Batch	FEX 1068				Lab Control Sample Duplicate [99627]	
Matrix	Water					
Parameter		**Check %Recovery**	**Check Dup %Recovery**	**Recovery Limits**	**RPD**	**RPD Limits**
Ferrous Iron		103	103	(70-125)	00	(30 MAX)

Client ID	Taber Consultants			**Samples**	Lab Control Sample [99794]	
QC Batch	SULX 1061				Lab Control Sample Duplicate [99795]	
Matrix	Water					
Parameter		**Check %Recovery**	**Check Dup %Recovery**	**Recovery Limits**	**RPD**	**RPD Limits**
Sulfide		90	100	(80-120)	11	(20 MAX)

Client ID	Taber Consultants			**Samples**	Lab Control Sample [99806]	
QC Batch	TKNX 1049				Lab Control Sample Duplicate [99807]	
Matrix	Water					
Parameter		**Check %Recovery**	**Check Dup %Recovery**	**Recovery Limits**	**RPD**	**RPD Limits**
Total Kjeldahl Nitrogen		104	97	(80-120)	7	(20 MAX)

Client ID	Taber Consultants			**Samples**	Lab Control Sample [99832]	
QC Batch	ICPP 6710				Lab Control Sample Duplicate [99833]	
Matrix	Water					
Parameter		**Check %Recovery**	**Check Dup %Recovery**	**Recovery Limits**	**RPD**	**RPD Limits**
Manganese		96.5	96.0	(80-120)	0.5190	(20 MAX)
Phosphorus		102	102	(80-120)	0000	(20 MAX)

Client ID	Taber Consultants			**Samples**	Lab Control Sample [99838]	
QC Batch	ION 1668				Lab Control Sample Duplicate [99839]	
Matrix	Water					
Parameter		**Check %Recovery**	**Check Dup %Recovery**	**Recovery Limits**	**RPD**	**RPD Limits**
Sulfate		98	100	(80-125)	2.0	(20 MAX)

Client ID	Taber Consultants			**Samples**	Lab Control Sample [100009]	
QC Batch	SGX 2778				Lab Control Sample Duplicate [100010]	
Matrix	Water					
Parameter		**Check %Recovery**	**Check Dup %Recovery**	**Recovery Limits**	**RPD**	**RPD Limits**
Methane		102	98	(65-135)	4.0	(20 MAX)
Ethane		96	88	(65-135)	8.7	(20 MAX)
Ethene		90	96	(65-135)	6.5	(20 MAX)

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QC SUMMARY

Client ID	Taber Consultants	**Samples**	Lab Control Sample [100009]
QC Batch	SGX 2778		Lab Control Sample Duplicate [100010]
Matrix	Water		**(continued)**

Parameter	Check %Recovery	Check Dup %Recovery	Recovery Limits	RPD	RPD Limits
Carbon Dioxide	94	98	(65-135)	4.2	(20 MAX)

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COC # / Lab No. **19864**

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Chain-of-Custody Record and Analysis Request

Project Contact (PDF To): **Tom Ballard**	California EDF Report? ☑ Yes ☐ No
Company / Address: **Taber Consultants: 3911 West Capitol Ave.** West Sacramento, CA 95691	Sampling Company Log Code: **WRMC**
	Global ID: **T0600100379**
Phone #: **916-371-1690** Fax #: **916-371-7265**	Deliver all files to: SNess@TaberConsultants.com
Project #: **51074** P.O. #: **3A**	Sampler Signature: [signature]
Project Name: **SIR_CityOfParis**	
Project Address: **3514 Adeline St.** **Oakland, CA**	

TAT: ☐ 12 hr ☐ 24 hr ☐ 48 hr ☐ 72 hr ☐ 1 wk

Sample ID	Field Point Name	Date	Time	40 ml VOA	Sleeve	Poly	Glass	Tedlar	HCl	HNO_3	None	Water	Soil	Air	Fe2+, Mn2- (field filtered)	~~Total Fe~~ Metals	NO3- (field filtered)	Gen Chem (P, SO4, alkalinity)	Methane, ethane, ethene, CO2 (RSK-175)	TKN	Sulfide
6P-3-15	GP-3	5-6-11	1230			X					X				X						
6P-3-35	GP-3		1500			X					X				X						
GP-4-15	GP-4		1000			X					X				X						
GP-4-35	GP-4		1045			X					X				X						
GP-3-15	GP-3		1230			X					X						X				
GP-3-35	GP-3		1500			X					X						X				
GP-4-15	GP-4		1000			X					X						X				
GP-4-35	GP-4		1045			X					X						X				
GP-3-15	GP-3		1230				X			X						X					
GP-3-35	GP-3		1500				X			X						X					

Relinquished by:	Date	Time	Received by:
[signature]	5-7-11	1100	[signature] 5-7-11
Relinquished by:	Date	Time	Received by:
Relinquished by:	Date	Time	Received by Laboratory:

Remarks:
please save file(s), PDF's, EDF & XLS name as:
sample date year_month_day_ project name_ WO#

EXAMPLE:
2010_02_10_GMR_CityOfParis_18495

Bill to: Invoice@TaberConsultants.com

For Lab Use Only: Sample Receipt

Temp °C	Initials	Date	Time		

Supporting Documents Page 116

Sparger Technology, Inc.
Environmental Laboratories

3738 Bradview Drive
Sacramento, CA 95827
Lab: 916.369.7688
Fax: 916.369.7689

COC # / Lab No. 19864

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Chain-of-Custody Record and Analysis Request

Project Contact (PDF To): **Tom Ballard**	California EDF Report? ☑ Yes ☐ No
Company / Address: **Taber Consultants: 3911 West Capitol Ave.**	Sampling Company Log Code: **WRMC**
West Sacramento, CA 95691	Global ID: **T0600100379**
Phone #: **916-371-1690** Fax #: **916-371-7265**	Deliver all files to: SNess@TaberConsultants.com
Project #: **51074** P.O. #: **3A**	
Project Name: **SIR_CityOfParis**	Sampler Signature:
Project Address: **3514 Adeline St. Oakland, CA**	

Sample ID	Field Point Name	Sampling: Date	Sampling: Time	Container: 40 ml VOA	Container: Sleeve	Container: Poly	Container: Glass	Container: Tedlar	Container:	Preservative: HCl	Preservative: HNO_3	Preservative: None	Preservative: Zn Ac/NaOH	Matrix: Water	Matrix: Soil	Matrix: Air	Analysis Request: Fe2+, Mn2- (field filtered)	Analysis Request: ~~Total Fe~~ Fe+S	Analysis Request: NO3- (field filtered)	Analysis Request: Gen Chem (P, SO4, alkalinity)	Analysis Request: Methane, ethane, ethene, CO2 (RSK-175)	Analysis Request: TKN	Analysis Request: Sulfide
GP-4-15	GP-4	5/6/11	1000				X				X												
GP-4-35	GP-4		1045				X				X							X					
GP-3-15	GP-3		1230				X						X										X
GP-3-35	GP-3		1500				X						X										X
GP-4-15	GP-4		1000				X						X										X
GP-4-35	GP-4		1045				X						X										X
GP-3-15	GP-3		1230				X				X									X			
GP-3-35	GP-3		1500				X				X									X			
GP-4-15	GP-4		1000				X				X									X			
GP-4-35	GP-4	—	1645				X				X									X			

Relinquished by:	Date	Time 1100	Received by: C Gmil 5-7-11
Relinquished by:	Date	Time	Received by:
Relinquished by:	Date	Time	Received by Laboratory:

Remarks:
please save file(s), PDF's, EDF & XLS name as:
sample date year_month_day_ project name_ WO#

EXAMPLE:
2010_02_10_GMR_CityOfParis_18495

Bill to: Invoice@TaberConsultants.com

For Lab Use Only: Sample Receipt

Temp °C	Initials	Date	Time		

TAT: ☐ 12 hr ☐ 24 hr ☐ 48 hr ☐ 72 hr ☐ 1 wk

Supporting Documents Page 117

Sparger Technology, Inc.
Environmental Laboratories

3738 Bradview Drive
Sacramento, CA 95827
Lab: 916.369.7688
Fax: 916.369.7689

COC # / Lab No. 19864

Page 3 of 3

Chain-of-Custody Record and Analysis Request

Project Contact (PDF To): **Tom Ballard**	California EDF Report? ☑ Yes ☐ No
Company / Address: **Taber Consultants: 3911 West Capitol Ave.**	Sampling Company Log Code: **WRMC**
West Sacramento, CA 95691	Global ID: **T0600100379**
Phone #: **916-371-1690** Fax #: **916-371-7265**	Deliver all files to: SNess@TaberConsultants.com
Project #: **51074** P.O. #: **3A**	
Project Name: **SIR_CityOfParis**	Sampler Signature:
Project Address: **3514 Adeline St. Oakland, CA**	

TAT: ☐ 12 hr ☐ 24 hr ☐ 48 hr ☐ 72 hr ☐ 1 wk

Sample ID	Field Point Name	Sampling: Date	Sampling: Time	Container: 40 ml VOA	Container: Sleeve	Container: Poly	Container: Glass	Container: Tedlar	Container:	Preservative: HCl	Preservative: HNO_3	Preservative: None	Preservative: H_2SO_4	Matrix: Water	Matrix: Soil	Matrix: Air	Analysis Request: Fe2+, Mn2- (field filtered)	Analysis Request: Total Fe	Analysis Request: NO3- (field filtered)	Analysis Request: Gen Chem (P, SO4, alkalinity)	Analysis Request: Methane, ethane, ethene, CO2 (RSK-175)	Analysis Request: TKN	Analysis Request: Sulfide
GP-3-15	GP-3	5/6/11	1230				X						X	X								X	
GP-3-35	GP-3	〃	1500				X						X	X								X	
GP-4-15	GP-4	〃	1000				X						X	X								X	
GP-4-35	GP-4	〃	1045				X						X	X								X	
GP-3-15	GP-3	〃	1230	2								X		X							X		
GP-3-35	GP-3	〃	1500	2								X		X							X		
GP-4-15	GP-4	〃	1000	2								X		X							X		
GP-4-35	GP-4	〃	1045	2								X		X							X		

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Relinquished by:	Date: 5-7-11	Time: 1102	Received by: 5-7-11
Relinquished by:	Date:	Time:	Received by:
Relinquished by:	Date:	Time:	Received by Laboratory:

Remarks:
please save file(s), PDF's, EDF & XLS name as:
sample date year_month_day_ project name_ WO#

EXAMPLE:
2010_02_10_GMR_CityOfParis_18495

Bill to: Invoice@TaberConsultants.com

For Lab Use Only: Sample Receipt

Temp °C	Initials	Date	Time		

Sparger Technology, Inc.
Environmental Laboratories

Analytical Laboratory Division
Mobile Laboratory Division
Scientific Division

Tom Ballard
Taber Consultants
3911 West Capitol Ave.
West Sacramento, CA 95691

Client	Taber Consultants	
Workorder	19877	SIR_CityOfParis
Received	05/13/11	

The samples were received in EPA specified containers. The samples were transported and received under documented chain of custody and stored at four (4) degrees C until analysis was performed.

Sparger Technology, Inc. ID Suffix Keys - These descriptors will follow the Sparger Technology, Inc. ID numbers and help identify the specific sample and clarify the report.

- DUP - Matrix Duplicate
- MS - Matrix Spike
- MSD - Matrix Spike Duplicate
- LCS - Lab Control Sample
- LCSD - Lab Control Sample Duplicate
- RPD - Relative Percent Difference
- QC - Additional Quality Control
- DIL - Results from a diluted sample
- ND - None Detected
- RL - Reporting Limit

Note: In an effort to conserve paper, the results are printed on both sides of the paper.

Ray James
Laboratory Director

3738 Bradview Drive • Sacramento, California 95827 • (916) 369-7688 • FAX (916) 369-7689

Tom Ballard
Taber Consultants
3911 West Capitol Ave.
West Sacramento, CA 95691

Workorder 19877

Enclosed are the results from samples received on May 13, 2011.

The requested analyses are listed below.

SAMPLE	SAMPLE DESCRIPTION	DATE COLLECTED	TEST METHOD
19877001	MW-3, Water	05/12/11	3500-FE B EPA 300.0 EPA 351.2 EPA 376.2 RSK 175 SM 2320B 6010B
19877002	MW-1, Water	05/12/11	3500-FE B EPA 300.0 EPA 351.2 EPA 376.2 RSK 175 SM 2320B 6010B
19877003	GP-8-35, Water	05/12/11	3500-FE B EPA 300.0 EPA 351.2 EPA 376.2 RSK 175 SM 2320B 6010B
19877004	GP-9-15, Water	05/12/11	3500-FE B EPA 300.0 EPA 351.2 EPA 376.2 RSK 175 SM 2320B 6010B
19877005	MW-2, Water	05/12/11	3500-FE B EPA 300.0 EPA 351.2 EPA 376.2 RSK 175 SM 2320B 6010B

Workorder 19877

SAMPLE	SAMPLE DESCRIPTION	DATE COLLECTED	TEST METHOD
19877006	GP-8-15, Water	05/12/11	3500-FE B EPA 300.0 EPA 351.2 EPA 376.2 RSK 175 SM 2320B 6010B
19877007	W-IND, Water	05/12/11	3500-FE B EPA 300.0 EPA 351.2 EPA 376.2 RSK 175 SM 2320B 6010B
19877008	GP-9-35, Water	05/12/11	3500-FE B EPA 300.0 EPA 351.2 EPA 376.2 RSK 175 SM 2320B 6010B

Test Certificate of Analysis

Client ID Taber Consultants
Workorder # 19877 **Workorder ID** SIR_CityOfParis

Laboratory ID 19877001 **Sampled** 05/12/11
Sample ID MW-3 **Received** 05/13/11
Matrix Water **Reported** 05/19/11

3500 Ferrous Iron

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Ferrous Iron	3500-FE B	05/16/11	05/16/11	ND	0.0250	mg/L	1:1
Ferric Iron	**3500-FE B**	**05/16/11**	**05/16/11**	**19**	**0.03**	**mg/L**	**1:1**

Laboratory ID 19877001 **Sampled** 05/12/11
Sample ID MW-3 **Received** 05/13/11
Matrix Water **Reported** 05/19/11

WET CHEMISTRY

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Nitrate	EPA 300.0	05/13/11	05/13/11	ND	0.050	mg/L	1:1
Sulfate	EPA 300.0	05/13/11	05/13/11	ND	1.0	mg/L	1:1
Alkalinity as CaCO3	**SM 2320B**	**05/15/11**	**05/15/11**	**299**	**2.0**	**mg/L**	**1:1**
Total Kjeldahl Nitrogen	**EPA 351.2**	**05/16/11**	**05/17/11**	**1.78**	**0.10**	**mg/L**	**1:1**
Sulfide	EPA 376.2	05/14/11	05/14/11	ND	0.50	mg/L	1:1

Laboratory ID 19877001 **Sampled** 05/12/11
Sample ID MW-3 **Received** 05/13/11
Matrix Water **Reported** 05/19/11

RSK-175

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Methane	**RSK 175**	**05/14/11**	**05/14/11**	**0.066**	**0.010**	**ug/mL**	**1:1**
Ethane	RSK 175	05/14/11	05/14/11	ND	0.010	ug/mL	1:1
Ethene	RSK 175	05/14/11	05/14/11	ND	0.010	ug/mL	1:1
Carbon Dioxide	**RSK 175**	**05/14/11**	**05/14/11**	**77**	**1.0**	**ug/mL**	**1:1**

Laboratory ID 19877001 **Sampled** 05/12/11
Sample ID MW-3 **Received** 05/13/11
Matrix Water **Reported** 05/19/11

6010B METALS

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Manganese	**6010B**	**05/18/11**	**05/19/11**	**1.36**	**0.015**	**mg/L**	**1:1**
Phosphorus	**6010B**	**05/18/11**	**05/19/11**	**1.26**	**0.010**	**mg/L**	**1:1**

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Test Certificate of Analysis

Client ID Taber Consultants
Workorder # 19877 **Workorder ID** SIR_CityOfParis

Laboratory ID 19877002 **Sampled** 05/12/11
Sample ID MW-1 **Received** 05/13/11
Matrix Water **Reported** 05/19/11

3500 Ferrous Iron

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Ferrous Iron	3500-FE B	05/16/11	05/16/11	ND	0.0250	mg/L	1:1
Ferric Iron	**3500-FE B**	**05/16/11**	**05/16/11**	**18**	**0.03**	**mg/L**	**1:1**

Laboratory ID 19877002 **Sampled** 05/12/11
Sample ID MW-1 **Received** 05/13/11
Matrix Water **Reported** 05/19/11

WET CHEMISTRY

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Nitrate	EPA 300.0	05/13/11	05/13/11	ND	0.050	mg/L	1:1
Sulfate	EPA 300.0	05/13/11	05/13/11	ND	1.0	mg/L	1:1
Alkalinity as CaCO3	**SM 2320B**	**05/15/11**	**05/15/11**	**750**	**2.0**	**mg/L**	**1:1**
Total Kjeldahl Nitrogen	**EPA 351.2**	**05/16/11**	**05/17/11**	**1.72**	**0.10**	**mg/L**	**1:1**
Sulfide	EPA 376.2	05/14/11	05/14/11	ND	0.50	mg/L	1:1

Laboratory ID 19877002 **Sampled** 05/12/11
Sample ID MW-1 **Received** 05/13/11
Matrix Water **Reported** 05/19/11

RSK-175

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Methane	**RSK 175**	**05/14/11**	**05/14/11**	**0.058**	**0.010**	**ug/mL**	**1:1**
Ethane	RSK 175	05/14/11	05/14/11	ND	0.010	ug/mL	1:1
Ethene	RSK 175	05/14/11	05/14/11	ND	0.010	ug/mL	1:1
Carbon Dioxide	**RSK 175**	**05/14/11**	**05/14/11**	**94**	**1.0**	**ug/mL**	**1:1**

Laboratory ID 19877002 **Sampled** 05/12/11
Sample ID MW-1 **Received** 05/13/11
Matrix Water **Reported** 05/19/11

6010B METALS

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Manganese	**6010B**	**05/18/11**	**05/19/11**	**1.12**	**0.015**	**mg/L**	**1:1**
Phosphorus	**6010B**	**05/18/11**	**05/19/11**	**0.938**	**0.010**	**mg/L**	**1:1**

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Test Certificate of Analysis

Client ID Taber Consultants
Workorder # 19877 **Workorder ID** SIR_CityOfParis

Laboratory ID 19877003 **Sampled** 05/12/11
Sample ID GP-8-35 **Received** 05/13/11
Matrix Water **Reported** 05/19/11

3500 Ferrous Iron

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Ferrous Iron	3500-FE B	05/16/11	05/16/11	ND	0.0250	mg/L	1:1
Ferric Iron	**3500-FE B**	**05/16/11**	**05/16/11**	**9.5**	**0.03**	**mg/L**	**1:1**

Laboratory ID 19877003 **Sampled** 05/12/11
Sample ID GP-8-35 **Received** 05/13/11
Matrix Water **Reported** 05/19/11

WET CHEMISTRY

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Nitrate	**EPA 300.0**	**05/13/11**	**05/13/11**	**14.0**	**0.050**	**mg/L**	**1:1**
Sulfate	**EPA 300.0**	**05/13/11**	**05/13/11**	**96.0**	**1.0**	**mg/L**	**1:1**
Alkalinity as CaCO3	**SM 2320B**	**05/15/11**	**05/15/11**	**297**	**2.0**	**mg/L**	**1:1**
Total Kjeldahl Nitrogen	**EPA 351.2**	**05/16/11**	**05/17/11**	**1.37**	**0.10**	**mg/L**	**1:1**
Sulfide	EPA 376.2	05/14/11	05/14/11	ND	0.50	mg/L	1:1

Laboratory ID 19877003 **Sampled** 05/12/11
Sample ID GP-8-35 **Received** 05/13/11
Matrix Water **Reported** 05/19/11

RSK-175

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Methane	**RSK 175**	**05/14/11**	**05/14/11**	**0.077**	**0.010**	**ug/mL**	**1:1**
Ethane	**RSK 175**	**05/14/11**	**05/14/11**	**0.033**	**0.010**	**ug/mL**	**1:1**
Ethene	**RSK 175**	**05/14/11**	**05/14/11**	**0.030**	**0.010**	**ug/mL**	**1:1**
Carbon Dioxide	**RSK 175**	**05/14/11**	**05/14/11**	**122**	**1.0**	**ug/mL**	**1:1**

Laboratory ID 19877003 **Sampled** 05/12/11
Sample ID GP-8-35 **Received** 05/13/11
Matrix Water **Reported** 05/19/11

6010B METALS

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Manganese	**6010B**	**05/18/11**	**05/19/11**	**5.42**	**0.015**	**mg/L**	**1:1**
Phosphorus	**6010B**	**05/18/11**	**05/19/11**	**0.625**	**0.010**	**mg/L**	**1:1**

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Test Certificate of Analysis

Client ID Taber Consultants
Workorder # 19877 **Workorder ID** SIR_CityOfParis

Laboratory ID 19877004 **Sampled** 05/12/11
Sample ID GP-9-15 **Received** 05/13/11
Matrix Water **Reported** 05/19/11

3500 Ferrous Iron

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Ferrous Iron	3500-FE B	05/16/11	05/16/11	ND	0.0250	mg/L	1:1
Ferric Iron	**3500-FE B**	**05/16/11**	**05/16/11**	**6.9**	**0.03**	**mg/L**	**1:1**

Laboratory ID 19877004 **Sampled** 05/12/11
Sample ID GP-9-15 **Received** 05/13/11
Matrix Water **Reported** 05/19/11

WET CHEMISTRY

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Nitrate	EPA 300.0	05/13/11	05/13/11	ND	0.050	mg/L	1:1
Sulfate	**EPA 300.0**	**05/13/11**	**05/13/11**	**16.0**	**1.0**	**mg/L**	**1:1**
Alkalinity as CaCO3	**SM 2320B**	**05/15/11**	**05/15/11**	**400**	**2.0**	**mg/L**	**1:1**
Total Kjeldahl Nitrogen	**EPA 351.2**	**05/16/11**	**05/17/11**	**1.91**	**0.10**	**mg/L**	**1:1**
Sulfide	EPA 376.2	05/14/11	05/14/11	ND	0.50	mg/L	1:1

Laboratory ID 19877004 **Sampled** 05/12/11
Sample ID GP-9-15 **Received** 05/13/11
Matrix Water **Reported** 05/19/11

RSK-175

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Methane	**RSK 175**	**05/14/11**	**05/14/11**	**0.081**	**0.010**	**ug/mL**	**1:1**
Ethane	**RSK 175**	**05/14/11**	**05/14/11**	**0.038**	**0.010**	**ug/mL**	**1:1**
Ethene	**RSK 175**	**05/14/11**	**05/14/11**	**0.020**	**0.010**	**ug/mL**	**1:1**
Carbon Dioxide	**RSK 175**	**05/14/11**	**05/14/11**	**130**	**1.0**	**ug/mL**	**1:1**

Laboratory ID 19877004 **Sampled** 05/12/11
Sample ID GP-9-15 **Received** 05/13/11
Matrix Water **Reported** 05/19/11

6010B METALS

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Manganese	**6010B**	**05/18/11**	**05/19/11**	**1.64**	**0.015**	**mg/L**	**1:1**
Phosphorus	**6010B**	**05/18/11**	**05/19/11**	**0.386**	**0.010**	**mg/L**	**1:1**

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Test Certificate of Analysis

Client ID Taber Consultants
Workorder # 19877 **Workorder ID** SIR_CityOfParis

Laboratory ID 19877005 **Sampled** 05/12/11
Sample ID MW-2 **Received** 05/13/11
Matrix Water **Reported** 05/19/11

3500 Ferrous Iron

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Ferrous Iron	3500-FE B	05/16/11	05/16/11	ND	0.0250	mg/L	1:1
Ferric Iron	**3500-FE B**	**05/16/11**	**05/16/11**	**0.3**	**0.03**	**mg/L**	**1:1**

Laboratory ID 19877005 **Sampled** 05/12/11
Sample ID MW-2 **Received** 05/13/11
Matrix Water **Reported** 05/19/11

WET CHEMISTRY

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Nitrate	**EPA 300.0**	**05/13/11**	**05/13/11**	**130**	**0.050**	**mg/L**	**1:1**
Sulfate	**EPA 300.0**	**05/13/11**	**05/13/11**	**81.0**	**1.0**	**mg/L**	**1:1**
Alkalinity as CaCO3	**SM 2320B**	**05/15/11**	**05/15/11**	**666**	**2.0**	**mg/L**	**1:1**
Total Kjeldahl Nitrogen	**EPA 351.2**	**05/16/11**	**05/17/11**	**0.265**	**0.10**	**mg/L**	**1:1**
Sulfide	EPA 376.2	05/14/11	05/14/11	ND	0.50	mg/L	1:1

Laboratory ID 19877005 **Sampled** 05/12/11
Sample ID MW-2 **Received** 05/13/11
Matrix Water **Reported** 05/19/11

RSK-175

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Methane	**RSK 175**	**05/14/11**	**05/14/11**	**0.047**	**0.010**	**ug/mL**	**1:1**
Ethane	RSK 175	05/14/11	05/14/11	ND	0.010	ug/mL	1:1
Ethene	RSK 175	05/14/11	05/14/11	ND	0.010	ug/mL	1:1
Carbon Dioxide	**RSK 175**	**05/14/11**	**05/14/11**	**64**	**1.0**	**ug/mL**	**1:1**

Laboratory ID 19877005 **Sampled** 05/12/11
Sample ID MW-2 **Received** 05/13/11
Matrix Water **Reported** 05/19/11

6010B METALS

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Manganese	**6010B**	**05/18/11**	**05/19/11**	**3.06**	**0.015**	**mg/L**	**1:1**
Phosphorus	**6010B**	**05/18/11**	**05/19/11**	**0.115**	**0.010**	**mg/L**	**1:1**

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Test Certificate of Analysis

Client ID Taber Consultants
Workorder # 19877 **Workorder ID** SIR_CityOfParis

Laboratory ID 19877006 **Sampled** 05/12/11
Sample ID GP-8-15 **Received** 05/13/11
Matrix Water **Reported** 05/19/11

3500 Ferrous Iron

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Ferrous Iron	3500-FE B	05/16/11	05/16/11	ND	0.0250	mg/L	1:1
Ferric Iron	**3500-FE B**	**05/16/11**	**05/16/11**	**9.7**	**0.03**	**mg/L**	**1:1**

Laboratory ID 19877006 **Sampled** 05/12/11
Sample ID GP-8-15 **Received** 05/13/11
Matrix Water **Reported** 05/19/11

WET CHEMISTRY

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Nitrate	EPA 300.0	05/13/11	05/13/11	ND	0.050	mg/L	1:1
Sulfate	**EPA 300.0**	**05/13/11**	**05/13/11**	**17.0**	**1.0**	**mg/L**	**1:1**
Alkalinity as CaCO3	**SM 2320B**	**05/15/11**	**05/15/11**	**517**	**2.0**	**mg/L**	**1:1**
Total Kjeldahl Nitrogen	**EPA 351.2**	**05/16/11**	**05/17/11**	**0.793**	**0.10**	**mg/L**	**1:1**
Sulfide	EPA 376.2	05/14/11	05/14/11	ND	0.50	mg/L	1:1

Laboratory ID 19877006 **Sampled** 05/12/11
Sample ID GP-8-15 **Received** 05/13/11
Matrix Water **Reported** 05/19/11

RSK-175

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Methane	**RSK 175**	**05/14/11**	**05/14/11**	**0.068**	**0.010**	**ug/mL**	**1:1**
Ethane	**RSK 175**	**05/14/11**	**05/14/11**	**0.022**	**0.010**	**ug/mL**	**1:1**
Ethene	**RSK 175**	**05/14/11**	**05/14/11**	**0.020**	**0.010**	**ug/mL**	**1:1**
Carbon Dioxide	**RSK 175**	**05/14/11**	**05/14/11**	**65**	**1.0**	**ug/mL**	**1:1**

Laboratory ID 19877006 **Sampled** 05/12/11
Sample ID GP-8-15 **Received** 05/13/11
Matrix Water **Reported** 05/19/11

6010B METALS

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Manganese	**6010B**	**05/18/11**	**05/19/11**	**3.40**	**0.015**	**mg/L**	**1:1**
Phosphorus	**6010B**	**05/18/11**	**05/19/11**	**0.422**	**0.010**	**mg/L**	**1:1**

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Test Certificate of Analysis

Client ID Taber Consultants
Workorder # 19877 **Workorder ID** SIR_CityOfParis

Laboratory ID 19877007 **Sampled** 05/12/11
Sample ID W-IND **Received** 05/13/11
Matrix Water **Reported** 05/19/11

3500 Ferrous Iron

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Ferrous Iron	3500-FE B	05/16/11	05/16/11	ND	0.0250	mg/L	1:1
Ferric Iron	**3500-FE B**	**05/16/11**	**05/16/11**	**8.0**	**0.03**	**mg/L**	**1:1**

Laboratory ID 19877007 **Sampled** 05/12/11
Sample ID W-IND **Received** 05/13/11
Matrix Water **Reported** 05/19/11

WET CHEMISTRY

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Nitrate	**EPA 300.0**	**05/13/11**	**05/13/11**	**19.0**	**0.050**	**mg/L**	**1:1**
Sulfate	**EPA 300.0**	**05/13/11**	**05/13/11**	**76.0**	**1.0**	**mg/L**	**1:1**
Alkalinity as CaCO3	**SM 2320B**	**05/15/11**	**05/15/11**	**350**	**2.0**	**mg/L**	**1:1**
Total Kjeldahl Nitrogen	**EPA 351.2**	**05/16/11**	**05/17/11**	**0.731**	**0.10**	**mg/L**	**1:1**
Sulfide	EPA 376.2	05/14/11	05/14/11	ND	0.50	mg/L	1:1

Laboratory ID 19877007 **Sampled** 05/12/11
Sample ID W-IND **Received** 05/13/11
Matrix Water **Reported** 05/19/11

RSK-175

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Methane	**RSK 175**	**05/14/11**	**05/14/11**	**0.042**	**0.010**	**ug/mL**	**1:1**
Ethane	RSK 175	05/14/11	05/14/11	ND	0.010	ug/mL	1:1
Ethene	RSK 175	05/14/11	05/14/11	ND	0.010	ug/mL	1:1
Carbon Dioxide	**RSK 175**	**05/14/11**	**05/14/11**	**54**	**1.0**	**ug/mL**	**1:1**

Laboratory ID 19877007 **Sampled** 05/12/11
Sample ID W-IND **Received** 05/13/11
Matrix Water **Reported** 05/19/11

6010B METALS

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Manganese	**6010B**	**05/18/11**	**05/19/11**	**0.689**	**0.015**	**mg/L**	**1:1**
Phosphorus	**6010B**	**05/18/11**	**05/19/11**	**9.63**	**0.010**	**mg/L**	**1:1**

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Test Certificate of Analysis

Client ID Taber Consultants
Workorder # 19877 **Workorder ID** SIR_CityOfParis

Laboratory ID 19877008 **Sampled** 05/12/11
Sample ID GP-9-35 **Received** 05/13/11
Matrix Water **Reported** 05/19/11

3500 Ferrous Iron

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Ferrous Iron	3500-FE B	05/16/11	05/16/11	ND	0.0250	mg/L	1:1
Ferric Iron	**3500-FE B**	**05/16/11**	**05/16/11**	**8.6**	**0.03**	**mg/L**	**1:1**

Laboratory ID 19877008 **Sampled** 05/12/11
Sample ID GP-9-35 **Received** 05/13/11
Matrix Water **Reported** 05/19/11

WET CHEMISTRY

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Nitrate	**EPA 300.0**	**05/13/11**	**05/13/11**	**3.43**	**0.050**	**mg/L**	**1:1**
Sulfate	**EPA 300.0**	**05/13/11**	**05/13/11**	**76.0**	**1.0**	**mg/L**	**1:1**
Alkalinity as CaCO3	**SM 2320B**	**05/15/11**	**05/15/11**	**242**	**2.0**	**mg/L**	**1:1**
Total Kjeldahl Nitrogen	**EPA 351.2**	**05/16/11**	**05/17/11**	**0.923**	**0.10**	**mg/L**	**1:1**
Sulfide	EPA 376.2	05/14/11	05/14/11	ND	0.50	mg/L	1:1

Laboratory ID 19877008 **Sampled** 05/12/11
Sample ID GP-9-35 **Received** 05/13/11
Matrix Water **Reported** 05/19/11

RSK-175

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Methane	**RSK 175**	**05/14/11**	**05/14/11**	**0.055**	**0.010**	**ug/mL**	**1:1**
Ethane	**RSK 175**	**05/14/11**	**05/14/11**	**0.019**	**0.010**	**ug/mL**	**1:1**
Ethene	**RSK 175**	**05/14/11**	**05/14/11**	**0.010**	**0.010**	**ug/mL**	**1:1**
Carbon Dioxide	**RSK 175**	**05/14/11**	**05/14/11**	**67**	**1.0**	**ug/mL**	**1:1**

Laboratory ID 19877008 **Sampled** 05/12/11
Sample ID GP-9-35 **Received** 05/13/11
Matrix Water **Reported** 05/19/11

6010B METALS

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Manganese	**6010B**	**05/18/11**	**05/19/11**	**9.63**	**0.015**	**mg/L**	**1:1**
Phosphorus	**6010B**	**05/18/11**	**05/19/11**	**0.753**	**0.010**	**mg/L**	**1:1**

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Method Blank Report

Client ID	Taber Consultants	**Sample ID**	MB for HBN 408470 [FEXV/1067]
Laboratory ID	99625	**Matrix**	Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Ferrous Iron	3500-FE B	05/16/11	05/16/11	ND	0.0250	mg/L	1:1

Lab Control Sample Report

Client ID	Taber Consultants	**Sample ID**	LCS for HBN 408470 [FEXV/1067]
Laboratory ID	99626	**Matrix**	Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Ferrous Iron	3500-FE B	05/16/11	05/16/11	1.03	0.0250	mg/L	1:1

Lab Control Sample Duplicate Report

Client ID	Taber Consultants	**Sample ID**	LCSD for HBN 408470 [FEXV/1067
Laboratory ID	99627	**Matrix**	Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Ferrous Iron	3500-FE B	05/16/11	05/16/11	1.03	0.0250	mg/L	1:1

Matrix Spike Report

Client ID	Taber Consultants	**Sample ID**	MS for HBN 408470 [FEXV/1067]
Laboratory ID	99628	**Matrix**	Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Ferrous Iron	3500-FE B	05/16/11	05/16/11	1.08	0.0250	mg/L	1:1

Matrix Spike Duplicate Report

Client ID	Taber Consultants	**Sample ID**	MSD for HBN 408470 [FEXV/1067]
Laboratory ID	99629	**Matrix**	Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Ferrous Iron	3500-FE B	05/16/11	05/16/11	1.03	0.0250	mg/L	1:1

Method Blank Report

Client ID	Taber Consultants	**Sample ID**	MB for HBN 409073 [SULV/1060]
Laboratory ID	99799	**Matrix**	Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Sulfide	EPA 376.2	05/14/11	05/14/11	ND	0.50	mg/L	1:1

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Lab Control Sample Report

Client ID Taber Consultants **Sample ID** LCS for HBN 409073 [SULV/1060]
Laboratory ID 99800 **Matrix** Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Sulfide	EPA 376.2	05/14/11	05/14/11	0.5	0.50	mg/L	1:1

Lab Control Sample Duplicate Report

Client ID Taber Consultants **Sample ID** LCSD for HBN 409073 [SULV/1060
Laboratory ID 99801 **Matrix** Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Sulfide	EPA 376.2	05/14/11	05/14/11	0.5	0.50	mg/L	1:1

Duplicate Report

Client ID Taber Consultants **Sample ID** DUP for HBN 409073 [SULV/1060]
Laboratory ID 99802 **Matrix** Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Sulfide	EPA 376.2	05/14/11	05/14/11	ND	0.50	mg/L	1:1

Matrix Spike Report

Client ID Taber Consultants **Sample ID** MS for HBN 409073 [SULV/1060]
Laboratory ID 99803 **Matrix** Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Sulfide	EPA 376.2	05/14/11	05/14/11	0.5	0.50	mg/L	1:1

Matrix Spike Duplicate Report

Client ID Taber Consultants **Sample ID** MSD for HBN 409073 [SULV/1060]
Laboratory ID 99804 **Matrix** Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Sulfide	EPA 376.2	05/14/11	05/14/11	0.5	0.50	mg/L	1:1

Method Blank Report

Client ID Taber Consultants **Sample ID** MB for HBN 409076 [TKNV/1050]
Laboratory ID 99805 **Matrix** Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Total Kjeldahl Nitrogen	EPA 351.2	05/16/11	05/17/11	ND	0.10	mg/L	1:1

Lab Control Sample Report

Client ID Taber Consultants **Sample ID** LCS for HBN 409076 [TKNV/1050]
Laboratory ID 99806 **Matrix** Water

Parameter	Method	Prep Date	Analyzed	Result	RL Units	Dilution
Total Kjeldahl Nitrogen	EPA 351.2	05/16/11	05/17/11	10.4	0.10 mg/L	1:1

Lab Control Sample Duplicate Report

Client ID Taber Consultants **Sample ID** LCSD for HBN 409076 [TKNV/1050
Laboratory ID 99807 **Matrix** Water

Parameter	Method	Prep Date	Analyzed	Result	RL Units	Dilution
Total Kjeldahl Nitrogen	EPA 351.2	05/16/11	05/17/11	9.65	0.10 mg/L	1:1

Duplicate Report

Client ID Taber Consultants **Sample ID** DUP for HBN 409076 [TKNV/1050]
Laboratory ID 99808 **Matrix** Water

Parameter	Method	Prep Date	Analyzed	Result	RL Units	Dilution
Total Kjeldahl Nitrogen	EPA 351.2	05/16/11	05/17/11	1.30	0.10 mg/L	1:1

Matrix Spike Report

Client ID Taber Consultants **Sample ID** MS for HBN 409076 [TKNV/1050]
Laboratory ID 99809 **Matrix** Water

Parameter	Method	Prep Date	Analyzed	Result	RL Units	Dilution
Total Kjeldahl Nitrogen	EPA 351.2	05/16/11	05/17/11	10.1	0.10 mg/L	1:1

Matrix Spike Duplicate Report

Client ID Taber Consultants **Sample ID** MSD for HBN 409076 [TKNV/1050]
Laboratory ID 99810 **Matrix** Water

Parameter	Method	Prep Date	Analyzed	Result	RL Units	Dilution
Total Kjeldahl Nitrogen	EPA 351.2	05/16/11	05/17/11	10.0	0.10 mg/L	1:1

Method Blank Report

Client ID Taber Consultants **Sample ID** MB for HBN 409086 [ALK/1170]
Laboratory ID 99828 **Matrix** Water

Parameter	Method	Prep Date	Analyzed	Result	RL Units	Dilution
Alkalinity as CaCO3	SM 2320B	05/15/11	05/15/11	ND	2.0 mg/L	1:1

Duplicate Report

Client ID Taber Consultants **Sample ID** GP-2(19850001DUP)
Laboratory ID 99829 **Matrix** Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Alkalinity as CaCO3	SM 2320B	05/15/11	05/15/11	216	2.0	mg/L	1:1

Method Blank Report

Client ID Taber Consultants **Sample ID** MB for HBN 409091 [ICPV/6691]
Laboratory ID 99831 **Matrix** Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Manganese	6010B	05/18/11	05/19/11	ND	0.015	mg/L	1:1
Phosphorus	6010B	05/18/11	05/19/11	ND	0.010	mg/L	1:1

Lab Control Sample Report

Client ID Taber Consultants **Sample ID** LCS for HBN 409091 [ICPV/6691]
Laboratory ID 99832 **Matrix** Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Manganese	6010B	05/18/11	05/19/11	0.193	0.015	mg/L	1:1
Phosphorus	6010B	05/18/11	05/19/11	2.04	0.010	mg/L	1:1

Lab Control Sample Duplicate Report

Client ID Taber Consultants **Sample ID** LCSD for HBN 409091 [ICPV/6691
Laboratory ID 99833 **Matrix** Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Manganese	6010B	05/18/11	05/19/11	0.192	0.015	mg/L	1:1
Phosphorus	6010B	05/18/11	05/19/11	2.04	0.010	mg/L	1:1

Matrix Spike Report

Client ID Taber Consultants **Sample ID** MS for HBN 409091 [ICPV/6691]
Laboratory ID 99834 **Matrix** Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Manganese	6010B	05/18/11	05/19/11	5.01	0.015	mg/L	1:1
Phosphorus	6010B	05/18/11	05/19/11	2.44	0.010	mg/L	1:1

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Matrix Spike Duplicate Report

Client ID Taber Consultants **Sample ID** MSD for HBN 409091 [ICPV/6691]
Laboratory ID 99835 **Matrix** Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Manganese	6010B	05/18/11	05/19/11	5.05	0.015	mg/L	1:1
Phosphorus	6010B	05/18/11	05/19/11	2.47	0.010	mg/L	1:1

Duplicate Report

Client ID Taber Consultants **Sample ID** DUP for HBN 409091 [ICPV/6691]
Laboratory ID 99836 **Matrix** Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Manganese	6010B	05/18/11	05/19/11	4.90	0.015	mg/L	1:1
Phosphorus	6010B	05/18/11	05/19/11	0.325	0.010	mg/L	1:1

Method Blank Report

Client ID Taber Consultants **Sample ID** MB for HBN 409100 [IONV/1632]
Laboratory ID 99837 **Matrix** Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Sulfate	EPA 300.0	05/13/11	05/13/11	ND	1.0	mg/L	1:1

Lab Control Sample Report

Client ID Taber Consultants **Sample ID** LCS for HBN 409100 [IONV/1632]
Laboratory ID 99838 **Matrix** Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Sulfate	EPA 300.0	05/13/11	05/13/11	9.81	1.0	mg/L	1:1

Lab Control Sample Duplicate Report

Client ID Taber Consultants **Sample ID** LCSD for HBN 409100 [IONV/1632
Laboratory ID 99839 **Matrix** Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Sulfate	EPA 300.0	05/13/11	05/13/11	9.97	1.0	mg/L	1:1

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Duplicate Report

Client ID Taber Consultants **Sample ID** DUP for HBN 409100 [IONV/1632]
Laboratory ID 99840 **Matrix** Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Sulfate	EPA 300.0	05/13/11	05/13/11	123	1.0	mg/L	1:1

Matrix Spike Report

Client ID Taber Consultants **Sample ID** MS for HBN 409100 [IONV/1632]
Laboratory ID 99841 **Matrix** Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Sulfate	EPA 300.0	05/13/11	05/13/11	131	1.0	mg/L	1:1

Matrix Spike Duplicate Report

Client ID Taber Consultants **Sample ID** MSD for HBN 409100 [IONV/1632]
Laboratory ID 99842 **Matrix** Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Sulfate	EPA 300.0	05/13/11	05/13/11	128	1.0	mg/L	1:1

Method Blank Report

Client ID Taber Consultants **Sample ID** MB for HBN 410274 [SGXV/2749]
Laboratory ID 100012 **Matrix** Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Methane	RSK 175	05/14/11	05/14/11	ND	0.010	ug/mL	1:1
Ethane	RSK 175	05/14/11	05/14/11	ND	0.010	ug/mL	1:1
Ethene	RSK 175	05/14/11	05/14/11	ND	0.01	ug/mL	1:1
Carbon Dioxide	RSK 175	05/14/11	05/14/11	ND	1.0	ug/mL	1:1

Lab Control Sample Report

Client ID Taber Consultants **Sample ID** LCS for HBN 410274 [SGXV/2749]
Laboratory ID 100013 **Matrix** Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Methane	RSK 175	05/14/11	05/14/11	0.48	0.010	ug/mL	1:1
Ethane	RSK 175	05/14/11	05/14/11	0.43	0.010	ug/mL	1:1
Ethene	RSK 175	05/14/11	05/14/11	0.5	0.01	ug/mL	1:1
Carbon Dioxide	RSK 175	05/14/11	05/14/11	191	1.0	ug/mL	1:1

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Lab Control Sample Duplicate Report

Client ID	Taber Consultants	**Sample ID**	LCSD for HBN 410274 [SGXV/2749
Laboratory ID	100014	**Matrix**	Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Methane	RSK 175	05/14/11	05/14/11	0.45	0.010	ug/mL	1:1
Ethane	RSK 175	05/14/11	05/14/11	0.42	0.010	ug/mL	1:1
Ethene	RSK 175	05/14/11	05/14/11	0.5	0.01	ug/mL	1:1
Carbon Dioxide	RSK 175	05/14/11	05/14/11	197	1.0	ug/mL	1:1

Duplicate Report

Client ID	Taber Consultants	**Sample ID**	DUP for HBN 410274 [SGXV/2749]
Laboratory ID	100015	**Matrix**	Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Methane	RSK 175	05/14/11	05/14/11	0.060	0.010	ug/mL	1:1
Ethane	RSK 175	05/14/11	05/14/11	ND	0.010	ug/mL	1:1
Ethene	RSK 175	05/14/11	05/14/11	ND	0.01	ug/mL	1:1
Carbon Dioxide	RSK 175	05/14/11	05/14/11	72	1.0	ug/mL	1:1

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QC SUMMARY

Client ID	Taber Consultants	**Original**	19877001		
QC Batch	SULX 1062	**Sample**	**Duplicate [99802]**		
Matrix	Water				**RPD**
Parameter				**RPD**	**Limits**
Sulfide				00	(20)

Client ID	Taber Consultants	**Original**	19850001		
QC Batch	TKNX 1049	**Sample**	**Duplicate [99808]**		
Matrix	Water				**RPD**
Parameter				**RPD**	**Limits**
Total Kjeldahl Nitrogen				0	(30)

Client ID	Taber Consultants	**Original**	19850001		
QC Batch	ALK 1170	**Sample**	**Duplicate [99829]**		
Matrix	Water				**RPD**
Parameter				**RPD**	**Limits**
Alkalinity as CaCO3				00	(20)

Client ID	Taber Consultants	**Original**	19850001		
QC Batch	ICPP 6710	**Sample**	**Duplicate [99836]**		
Matrix	Water				**RPD**
Parameter				**RPD**	**Limits**
Manganese				1.22	(35)
Phosphorus				4.80	(35)

Client ID	Taber Consultants	**Original**	19883001		
QC Batch	ION 1668	**Sample**	**Duplicate [99840]**		
Matrix	Water				**RPD**
Parameter				**RPD**	**Limits**
Sulfate				2.4	(20)

Client ID	Taber Consultants	**Original**	19877001		
QC Batch	SGX 2779	**Sample**	**Duplicate [100015]**		
Matrix	Water				**RPD**
Parameter				**RPD**	**Limits**
Methane				9.5	(20)
Ethane				00	(20)
Ethene				0	(20)
Carbon Dioxide				6.7	(20)

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QC SUMMARY

Client ID	Taber Consultants	**Original**	19850001
QC Batch	FEX 1068	**Samples**	Matrix Spike [99628]
Matrix	Water		Matrix Spike Duplicate [99629]

Parameter	Spike %Recovery	Spike Dup %Recovery	Recovery Limits	RPD	RPD Limits
Ferrous Iron	108	103	(70-125)	4.7	(30 MAX)

Client ID	Taber Consultants	**Original**	19877001
QC Batch	SULX 1062	**Samples**	Matrix Spike [99803]
Matrix	Water		Matrix Spike Duplicate [99804]

Parameter	Spike %Recovery	Spike Dup %Recovery	Recovery Limits	RPD	RPD Limits
Sulfide	99	97	(75-125)	2.0	(20 MAX)

Client ID	Taber Consultants	**Original**	19850001
QC Batch	TKNX 1049	**Samples**	Matrix Spike [99809]
Matrix	Water		Matrix Spike Duplicate [99810]

Parameter	Spike %Recovery	Spike Dup %Recovery	Recovery Limits	RPD	RPD Limits
Total Kjeldahl Nitrogen	88	87	(75-125)	1.1	(30 MAX)

Client ID	Taber Consultants	**Original**	19850001
QC Batch	ICPP 6710	**Samples**	Matrix Spike [99834]
Matrix	Water		Matrix Spike Duplicate [99835]

Parameter	Spike %Recovery	Spike Dup %Recovery	Recovery Limits	RPD	RPD Limits
Manganese	25.0	45.0	(75-125)	57.1	(35 MAX)
Phosphorus	105	106	(75-125)	0.9480	(35 MAX)

Client ID	Taber Consultants	**Original**	19883001
QC Batch	ION 1668	**Samples**	Matrix Spike [99841]
Matrix	Water		Matrix Spike Duplicate [99842]

Parameter	Spike %Recovery	Spike Dup %Recovery	Recovery Limits	RPD	RPD Limits
Sulfate	50	20	(75-125)	86	(20 MAX)

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QC SUMMARY

Client ID	Taber Consultants			**Samples**	Lab Control Sample [99626]	
QC Batch	FEX 1068				Lab Control Sample Duplicate [99627]	
Matrix	Water					
Parameter		**Check %Recovery**	**Check Dup %Recovery**	**Recovery Limits**	**RPD**	**RPD Limits**
Ferrous Iron		103	103	(70-125)	00	(30 MAX)

Client ID	Taber Consultants			**Samples**	Lab Control Sample [99800]	
QC Batch	SULX 1062				Lab Control Sample Duplicate [99801]	
Matrix	Water					
Parameter		**Check %Recovery**	**Check Dup %Recovery**	**Recovery Limits**	**RPD**	**RPD Limits**
Sulfide		100	103	(80-120)	3.0	(20 MAX)

Client ID	Taber Consultants			**Samples**	Lab Control Sample [99806]	
QC Batch	TKNX 1049				Lab Control Sample Duplicate [99807]	
Matrix	Water					
Parameter		**Check %Recovery**	**Check Dup %Recovery**	**Recovery Limits**	**RPD**	**RPD Limits**
Total Kjeldahl Nitrogen		104	97	(80-120)	7	(20 MAX)

Client ID	Taber Consultants			**Samples**	Lab Control Sample [99832]	
QC Batch	ICPP 6710				Lab Control Sample Duplicate [99833]	
Matrix	Water					
Parameter		**Check %Recovery**	**Check Dup %Recovery**	**Recovery Limits**	**RPD**	**RPD Limits**
Manganese		96.5	96.0	(80-120)	0.5190	(20 MAX)
Phosphorus		102	102	(80-120)	0000	(20 MAX)

Client ID	Taber Consultants			**Samples**	Lab Control Sample [99838]	
QC Batch	ION 1668				Lab Control Sample Duplicate [99839]	
Matrix	Water					
Parameter		**Check %Recovery**	**Check Dup %Recovery**	**Recovery Limits**	**RPD**	**RPD Limits**
Sulfate		98	100	(80-125)	2.0	(20 MAX)

Client ID	Taber Consultants			**Samples**	Lab Control Sample [100013]	
QC Batch	SGX 2779				Lab Control Sample Duplicate [100014]	
Matrix	Water					
Parameter		**Check %Recovery**	**Check Dup %Recovery**	**Recovery Limits**	**RPD**	**RPD Limits**
Methane		96	90	(65-135)	6.5	(20 MAX)
Ethane		86	84	(65-135)	2.4	(20 MAX)
Ethene		92	98	(65-135)	6.3	(20 MAX)

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QC SUMMARY

Client ID Taber Consultants
QC Batch SGX 2779
Matrix Water

Samples Lab Control Sample [100013]
Lab Control Sample Duplicate [100014]
(continued)

Parameter	Check %Recovery	Check Dup %Recovery	Recovery Limits	RPD	RPD Limits
Carbon Dioxide	96	98	(65-135)	2.1	(20 MAX)

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Lab: 916.369.7688
Fax: 916.369.7689

COC # / Lab No. 19877 B

Page 1 of 1 (1 of 5, 2 of 7)

Chain-of-Custody Record and Analysis Request

Project Contact (PDF To): **Tom Ballard**	California EDF Report? ☑ Yes ☐ No
Company / Address: **Taber Consultants: 3911 West Capitol Ave.**	Sampling Company Log Code: **WRMC**
West Sacramento, CA 95691	Global ID: **T0600100379**
Phone #: **916-371-1690** / Fax #: **916-371-7265**	Deliver all files to: **SNess@TaberConsultants.com**
Project #: **51074** / P.O. #: **3A**	Sampler Signature:
Project Name: **SIR_CityOfParis**	
Project Address: **3514 Adeline St. Oakland, CA**	

Sample ID	Field Point Name	Sampling: Date	Sampling: Time	Container: 40 ml VOA	Sleeve	Poly	Glass	Tedlar	Preservative: HCl	HNO_3	None	H_2SO_4	NaOH	Matrix: Water	Soil	Air	Fe^{2+}, Mn^{2+} (field filtered)	Metals (Total Fe)	NO_3^- (field filtered)	Sulfide	TKN	General Chemistry (sulfate, phosphorus, alkalinity)	Methane, CO_2, ethane, ethene (RSK 175)	TAT: 1 wk
MW-3	MW-3	5/12/11	1400				1			X				X				X						x
MW-3	MW-3						1					X		X							X			x
MW-3	MW-3						1						X	X						X				x
MW-1	MW-1		1430			1					X			X			X							x
						1					X			X					X					
							1				X			X								X	X	
							1			X				X				X						
							1					X		X							X			
MW-1							1						X	X						X				

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Remarks:
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sample date year_month_day_ project name_ WO#

EXAMPLE:
2010_02_10_SIR_CityOfParis_18495

Bill to: Invoice@TaberConsultants.com

For Lab Use Only: Sample Receipt

Temp °C	Initials	Date	Time		

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Lab: 916.369.7688
Fax: 916.369.7689

COC # / Lab No. 198773

Chain-of-Custody Record and Analysis Request

Project Contact (PDF To): **Tom Ballard**	California EDF Report? ☑ Yes ☐ No
Company / Address: **Taber Consultants: 3911 West Capitol Ave.**	Sampling Company Log Code: **WRMC**
West Sacramento, CA 95691	Global ID: **T0600100379**
Phone #: **916-371-1690** Fax #: **916-371-7265**	Deliver all files to: SNess@TaberConsultants.com
Project #: **51074** P.O. #: **3A**	Sampler Signature:
Project Name: **SIR_CityOfParis**	
Project Address: **3514 Adeline St. Oakland, CA**	

TAT: ☐ 12 hr ☐ 24 hr ☐ 48 hr ☐ 72 hr ☑ 1 wk

Sample ID	Field Point Name	Sampling: Date	Sampling: Time	Container: 40 ml VOA	Container: Sleeve	Container: Poly	Container: Glass	Container: Tedlar	Preservative: HCl	Preservative: HNO_3	Preservative: None	Preservative: H_2SO_4 / acid/NaOH	Matrix: Water	Matrix: Soil	Matrix: Air	Analysis Request: Fe^{2+}, Mn^{2+} (field filtered)	Analysis Request: Metals (Total Fe)	Analysis Request: NO_3 (field filtered)	Analysis Request: Sulfide	Analysis Request: TKN	Analysis Request: General Chemistry (sulfate, phosphorus, alkalinity)	Analysis Request: Methane, CO_2, ethane, ethene (RSK 175)	TAT: 1 wk
GP-8-35	GP-8	5/12/11	1315			1					X		X			X							x
						1					X							X					x
	GP-8						1				X										X	X	x
	GP-8						1			X							X						x
	GP-8						1					X								X			
GP-8-35	GP-8						1						X						X				
GP-8-35	GP-8	5/12/11	1315				1				X							X					
MW-3	MW-3		1400			1					X					X							
MW-3						1					X							X					
MW-3							1				X										X	X	

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sample date year_month_day_ project name_ WO#

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COC # / Lab No. 19877

Page 3 of 5 ~~4 of 7~~ ~~1 of 1~~

Chain-of-Custody Record and Analysis Request

Project Contact (PDF To): **Tom Ballard**	California EDF Report? ☑ Yes ☐ No
Company / Address: **Taber Consultants: 3911 West Capitol Ave.**	Sampling Company Log Code: **WRMC**
West Sacramento, CA 95691	Global ID: **T0600100379**
Phone #: **916-371-1690** Fax #: **916-371-7265**	Deliver all files to: SNess@TaberConsultants.com
Project #: **51074** P.O. #: **3A**	Sampler Signature:
Project Name: **SIR_CityOfParis**	
Project Address: **3514 Adeline St. Oakland, CA**	

Sample ID	Field Point Name	Sampling: Date	Sampling: Time	Container: 40 ml VOA	Container: Sleeve	Container: Poly	Container: Glass	Container: Tedlar	Container:	Preservative: HCl	Preservative: HNO_3	Preservative: None	Preservative: H_2SO_4	Preservative: ZnAc/NaOH	Matrix: Water	Matrix: Soil	Matrix: Air	Analysis Request: Fe^{2+}, Mn^{2+} (field filtered)	Analysis Request: Metals (Total Fe)	Analysis Request: NO_3^- (field filtered)	Analysis Request: Sulfide	Analysis Request: TKN	Analysis Request: General Chemistry (sulfate, phosphorus, alkalinity)	Analysis Request: Methane, CO_2, ethane, ethene (RSK 175)	TAT: 1 wk
GP-9-15	GP-9	5/12/11	11:00			1						X			X			X							x
GP-9-15	GP-9		11:00			1						X			X				X						x
MW-2	MW-2		10:15				1						X		X						X				x
MW-2	MW-2		10:15				1				X				X				X						x
GP-8-15	GP-8		13:00			1						X			X			X							
GP-8-15			13:00			1						X			X				X						
GP-8-15			13:00				1					X			X						X	X			
GP-8-15			13:00				1							X	X					X					
GP-8-15			13:00				1						X		X						X				
GP-8-15			13:00				1				X				X				X						

TAT: ☐ 12 hr ☐ 24 hr ☐ 48 hr ☐ 72 hr ☑ 1 wk

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	5/13/11	3:40 p.m.	
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sample date year_month_day_ project name_ WO#

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COC # / Lab No. 19877

Page 4 of 5 of 7

Chain-of-Custody Record and Analysis Request

Project Contact (PDF To): **Tom Ballard**	California EDF Report? ☑ Yes ☐ No
Company / Address: **Taber Consultants: 3911 West Capitol Ave.**	Sampling Company Log Code: **WRMC**
West Sacramento, CA 95691	Global ID: **T0600100379**
Phone #: **916-371-1690** Fax #: **916-371-7265**	Deliver all files to: SNess@TaberConsultants.com
Project #: **51074** P.O. #: **3A**	Sampler Signature:
Project Name: **SIR_CityOfParis**	
Project Address: **3514 Adeline St. Oakland, CA**	

Sample ID	Field Point Name	Sampling Date	Sampling Time	Container: 40 ml VOA	Sleeve	Poly	Glass	Tedlar	Preservative: HCl	HNO_3	None	H_2SO_4	$Zn Ac/NaOH$	Matrix: Water	Soil	Air	Analysis Request: Fe2+, Mn2+ (field filtered)	Total Fe Metals	NO3- (field filtered)	Gen Chem (P, SO4, alkalinity)	Methane, ethane, ethene, CO2 (RSK-175)	TKN	Sulfide
W-IND	W-IND	5/12	0930			1					X			X			X						
						1					X			X					X				
							1				X			X						X	X		
							1						X	X								X	
							1					X		X								X	
W-IND							1			X				X				X					
MW-2	MW-2		1015			1					X			X			X						
						1					X			X					X				
							1				X									X	X		
							1						X									X	

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TAT: ☐ 12 hr ☐ 24 hr ☐ 48 hr ☐ 72 hr ☐ 1 wk

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N/A

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Environmental Laboratories

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COC # / Lab No. 19817

5 of 5 (6 of 7)

Page 1 of 1

Chain-of-Custody Record and Analysis Request

Project Contact (PDF To): **Tom Ballard**	California EDF Report? ☑ Yes ☐ No
Company / Address: **Taber Consultants: 3911 West Capitol Ave.**	Sampling Company Log Code: **WRMC**
West Sacramento, CA 95691	Global ID: **T0600100379**
Phone #: **916-371-1690** Fax #: **916-371-7265**	Deliver all files to: SNess@TaberConsultants.com
Project #: **51074** P.O. #: **3A**	Sampler Signature:
Project Name: **SIR_CityOfParis**	
Project Address: **3514 Adeline St. Oakland, CA**	

Sample ID	Field Point Name	Sampling: Date	Sampling: Time	Container: 40 ml VOA	Sleeve	Poly	Glass	Tedlar	Preservative: HCl	HNO_3	None	H_2SO_4	ZnAc/NaOH	Matrix: Water	Soil	Air	Fe^{2+}, Mn^{2+} (field filtered)	Metals (Total Fe)	NO_3^- (field filtered)	Sulfide	TKN	General Chemistry (sulfate, phosphorus, alkalinity)	Methane, CO_2, ethane, ethene (RSK 175)	TAT
GP-9-35	GP-9	5/12	1030			1					X			X			X							x
GP-9-35			1030			1					X			X					X					x
GP-9-35			1030				1			X				X				X						x
GP-9-35			1030				1					X		X							X			x
GP-9-35			1030				1						X	X						X				
GP-9-35			1030				1				X			X								X	X	
GP-9-15			1100				1				X			X								X	X	
GP-9-15			1100				1					X		X							X			
GP-9-15			1100				1						X	X						X				
GP-9-15			1100				1			X				X				X						

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sample date year_month_day_ project name_ WO#

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Sparger Technology, Inc.
Environmental Laboratories

Analytical Laboratory Division
Mobile Laboratory Division
Scientific Division

Tom Ballard
Taber Consultants
3911 West Capitol Ave.
West Sacramento, CA 95691

Client	Taber Consultants	
Workorder	19883	SIR_CityOfParis
Received	05/13/11	

The samples were received in EPA specified containers. The samples were transported and received under documented chain of custody and stored at four (4) degrees C until analysis was performed.

Sparger Technology, Inc. ID Suffix Keys - These descriptors will follow the Sparger Technology, Inc. ID numbers and help identify the specific sample and clarify the report.

- DUP - Matrix Duplicate
- MS - Matrix Spike
- MSD - Matrix Spike Duplicate
- LCS - Lab Control Sample
- LCSD - Lab Control Sample Duplicate
- RPD - Relative Percent Difference
- QC - Additional Quality Control
- DIL - Results from a diluted sample
- ND - None Detected
- RL - Reporting Limit

Note: In an effort to conserve paper, the results are printed on both sides of the paper.

Ray James
Laboratory Director

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Tom Ballard
Taber Consultants
3911 West Capitol Ave.
West Sacramento, CA 95691

Workorder 19883

Enclosed are the results from samples received on May 13, 2011.

The requested analyses are listed below.

SAMPLE	SAMPLE DESCRIPTION	DATE COLLECTED	TEST METHOD
19883001	GP-11-15, Water	05/13/11	3500-FE B EPA 300.0 EPA 351.2 EPA 376.2 RSK 175 SM 2320B 6010B
19883002	GP-11-35, Water	05/13/11	3500-FE B EPA 300.0 EPA 351.2 EPA 376.2 RSK 175 SM 2320B 6010B

Test Certificate of Analysis

Client ID Taber Consultants
Workorder # 19883 **Workorder ID** SIR_CityOfParis

Laboratory ID 19883001 **Sampled** 05/13/11
Sample ID GP-11-15 **Received** 05/13/11
Matrix Water **Reported** 05/19/11

3500 Ferrous Iron

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Ferrous Iron	3500-FE B	05/16/11	05/16/11	ND	0.0250	mg/L	1:1
Ferric Iron	**3500-FE B**	**05/16/11**	**05/16/11**	**3.4**	**0.03**	**mg/L**	**1:1**

Laboratory ID 19883001 **Sampled** 05/13/11
Sample ID GP-11-15 **Received** 05/13/11
Matrix Water **Reported** 05/19/11

WET CHEMISTRY

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Nitrate	**EPA 300.0**	**05/13/11**	**05/13/11**	**36.0**	**0.050**	**mg/L**	**1:1**
Sulfate	**EPA 300.0**	**05/13/11**	**05/13/11**	**126**	**1.0**	**mg/L**	**1:1**
Alkalinity as CaCO3	**SM 2320B**	**05/15/11**	**05/15/11**	**220**	**2.0**	**mg/L**	**1:1**
Total Kjeldahl Nitrogen	**EPA 351.2**	**05/16/11**	**05/17/11**	**0.793**	**0.10**	**mg/L**	**1:1**
Sulfide	EPA 376.2	05/14/11	05/14/11	ND	0.50	mg/L	1:1

Laboratory ID 19883001 **Sampled** 05/13/11
Sample ID GP-11-15 **Received** 05/13/11
Matrix Water **Reported** 05/19/11

RSK-175

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Methane	**RSK 175**	**05/14/11**	**05/14/11**	**0.045**	**0.010**	**ug/mL**	**1:1**
Ethane	**RSK 175**	**05/14/11**	**05/14/11**	**0.022**	**0.010**	**ug/mL**	**1:1**
Ethene	**RSK 175**	**05/14/11**	**05/14/11**	**0.020**	**0.010**	**ug/mL**	**1:1**
Carbon Dioxide	**RSK 175**	**05/14/11**	**05/14/11**	**89**	**1.0**	**ug/mL**	**1:1**

Laboratory ID 19883001 **Sampled** 05/13/11
Sample ID GP-11-15 **Received** 05/13/11
Matrix Water **Reported** 05/19/11

6010B METALS

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Manganese	**6010B**	**05/18/11**	**05/19/11**	**1.89**	**0.015**	**mg/L**	**1:1**
Phosphorus	**6010B**	**05/18/11**	**05/19/11**	**0.103**	**0.010**	**mg/L**	**1:1**

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Test Certificate of Analysis

Client ID Taber Consultants
Workorder # 19883 **Workorder ID** SIR_CityOfParis

Laboratory ID 19883002 **Sampled** 05/13/11
Sample ID GP-11-35 **Received** 05/13/11
Matrix Water **Reported** 05/19/11

3500 Ferrous Iron

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Ferrous Iron	3500-FE B	05/16/11	05/16/11	ND	0.0250	mg/L	1:1
Ferric Iron	**3500-FE B**	**05/16/11**	**05/16/11**	**0.3**	**0.03**	**mg/L**	**1:1**

Laboratory ID 19883002 **Sampled** 05/13/11
Sample ID GP-11-35 **Received** 05/13/11
Matrix Water **Reported** 05/19/11

WET CHEMISTRY

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Nitrate	**EPA 300.0**	**05/13/11**	**05/13/11**	**39.0**	**0.050**	**mg/L**	**1:1**
Sulfate	**EPA 300.0**	**05/13/11**	**05/13/11**	**79.0**	**1.0**	**mg/L**	**1:1**
Alkalinity as CaCO3	**SM 2320B**	**05/15/11**	**05/15/11**	**284**	**2.0**	**mg/L**	**1:1**
Total Kjeldahl Nitrogen	**EPA 351.2**	**05/16/11**	**05/17/11**	**0.458**	**0.10**	**mg/L**	**1:1**
Sulfide	EPA 376.2	05/14/11	05/14/11	ND	0.50	mg/L	1:1

Laboratory ID 19883002 **Sampled** 05/13/11
Sample ID GP-11-35 **Received** 05/13/11
Matrix Water **Reported** 05/19/11

RSK-175

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Methane	**RSK 175**	**05/14/11**	**05/14/11**	**0.055**	**0.010**	**ug/mL**	**1:1**
Ethane	**RSK 175**	**05/14/11**	**05/14/11**	**0.022**	**0.010**	**ug/mL**	**1:1**
Ethene	**RSK 175**	**05/14/11**	**05/14/11**	**0.020**	**0.010**	**ug/mL**	**1:1**
Carbon Dioxide	**RSK 175**	**05/14/11**	**05/14/11**	**72**	**1.0**	**ug/mL**	**1:1**

Laboratory ID 19883002 **Sampled** 05/13/11
Sample ID GP-11-35 **Received** 05/13/11
Matrix Water **Reported** 05/19/11

6010B METALS

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Manganese	**6010B**	**05/18/11**	**05/19/11**	**5.10**	**0.015**	**mg/L**	**1:1**
Phosphorus	6010B	05/18/11	05/19/11	ND	0.010	mg/L	1:1

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Method Blank Report

Client ID Taber Consultants **Sample ID** MB for HBN 409073 [SULV/1060]
Laboratory ID 99799 **Matrix** Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Sulfide	EPA 376.2	05/14/11	05/14/11	ND	0.50	mg/L	1:1

Lab Control Sample Report

Client ID Taber Consultants **Sample ID** LCS for HBN 409073 [SULV/1060]
Laboratory ID 99800 **Matrix** Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Sulfide	EPA 376.2	05/14/11	05/14/11	0.5	0.50	mg/L	1:1

Lab Control Sample Duplicate Report

Client ID Taber Consultants **Sample ID** LCSD for HBN 409073 [SULV/1060
Laboratory ID 99801 **Matrix** Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Sulfide	EPA 376.2	05/14/11	05/14/11	0.5	0.50	mg/L	1:1

Duplicate Report

Client ID Taber Consultants **Sample ID** DUP for HBN 409073 [SULV/1060]
Laboratory ID 99802 **Matrix** Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Sulfide	EPA 376.2	05/14/11	05/14/11	ND	0.50	mg/L	1:1

Matrix Spike Report

Client ID Taber Consultants **Sample ID** MS for HBN 409073 [SULV/1060]
Laboratory ID 99803 **Matrix** Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Sulfide	EPA 376.2	05/14/11	05/14/11	0.5	0.50	mg/L	1:1

Matrix Spike Duplicate Report

Client ID Taber Consultants **Sample ID** MSD for HBN 409073 [SULV/1060]
Laboratory ID 99804 **Matrix** Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Sulfide	EPA 376.2	05/14/11	05/14/11	0.5	0.50	mg/L	1:1

Method Blank Report

Client ID Taber Consultants **Sample ID** MB for HBN 409076 [TKNV/1050]
Laboratory ID 99805 **Matrix** Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Total Kjeldahl Nitrogen	EPA 351.2	05/16/11	05/17/11	ND	0.10	mg/L	1:1

Lab Control Sample Report

Client ID Taber Consultants **Sample ID** LCS for HBN 409076 [TKNV/1050]
Laboratory ID 99806 **Matrix** Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Total Kjeldahl Nitrogen	EPA 351.2	05/16/11	05/17/11	10.4	0.10	mg/L	1:1

Lab Control Sample Duplicate Report

Client ID Taber Consultants **Sample ID** LCSD for HBN 409076 [TKNV/1050
Laboratory ID 99807 **Matrix** Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Total Kjeldahl Nitrogen	EPA 351.2	05/16/11	05/17/11	9.65	0.10	mg/L	1:1

Duplicate Report

Client ID Taber Consultants **Sample ID** DUP for HBN 409076 [TKNV/1050]
Laboratory ID 99808 **Matrix** Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Total Kjeldahl Nitrogen	EPA 351.2	05/16/11	05/17/11	1.30	0.10	mg/L	1:1

Matrix Spike Report

Client ID Taber Consultants **Sample ID** MS for HBN 409076 [TKNV/1050]
Laboratory ID 99809 **Matrix** Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Total Kjeldahl Nitrogen	EPA 351.2	05/16/11	05/17/11	10.1	0.10	mg/L	1:1

Matrix Spike Duplicate Report

Client ID Taber Consultants **Sample ID** MSD for HBN 409076 [TKNV/1050]
Laboratory ID 99810 **Matrix** Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Total Kjeldahl Nitrogen	EPA 351.2	05/16/11	05/17/11	10.0	0.10	mg/L	1:1

Method Blank Report

Client ID	Taber Consultants	**Sample ID**	MB for HBN 409082 [FEXV/1069]
Laboratory ID	99823	**Matrix**	Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Ferrous Iron	3500-FE B	05/16/11	05/16/11	ND	0.0250	mg/L	1:1

Lab Control Sample Report

Client ID	Taber Consultants	**Sample ID**	LCS for HBN 409082 [FEXV/1069]
Laboratory ID	99824	**Matrix**	Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Ferrous Iron	3500-FE B	05/16/11	05/16/11	1.03	0.0250	mg/L	1:1

Lab Control Sample Duplicate Report

Client ID	Taber Consultants	**Sample ID**	LCSD for HBN 409082 [FEXV/1069
Laboratory ID	99825	**Matrix**	Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Ferrous Iron	3500-FE B	05/16/11	05/16/11	1.03	0.0250	mg/L	1:1

Matrix Spike Report

Client ID	Taber Consultants	**Sample ID**	MS for HBN 409082 [FEXV/1069]
Laboratory ID	99826	**Matrix**	Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Ferrous Iron	3500-FE B	05/16/11	05/16/11	1.08	0.0250	mg/L	1:1

Matrix Spike Duplicate Report

Client ID	Taber Consultants	**Sample ID**	MSD for HBN 409082 [FEXV/1069]
Laboratory ID	99827	**Matrix**	Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Ferrous Iron	3500-FE B	05/16/11	05/16/11	1.03	0.0250	mg/L	1:1

Method Blank Report

Client ID	Taber Consultants	**Sample ID**	MB for HBN 409086 [ALK/1170]
Laboratory ID	99828	**Matrix**	Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Alkalinity as CaCO3	SM 2320B	05/15/11	05/15/11	ND	2.0	mg/L	1:1

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Duplicate Report

Client ID Taber Consultants **Sample ID** GP-2(19850001DUP)
Laboratory ID 99829 **Matrix** Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Alkalinity as CaCO3	SM 2320B	05/15/11	05/15/11	216	2.0	mg/L	1:1

Method Blank Report

Client ID Taber Consultants **Sample ID** MB for HBN 409091 [ICPV/6691]
Laboratory ID 99831 **Matrix** Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Manganese	6010B	05/18/11	05/19/11	ND	0.015	mg/L	1:1
Phosphorus	6010B	05/18/11	05/19/11	ND	0.010	mg/L	1:1

Lab Control Sample Report

Client ID Taber Consultants **Sample ID** LCS for HBN 409091 [ICPV/6691]
Laboratory ID 99832 **Matrix** Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Manganese	6010B	05/18/11	05/19/11	0.193	0.015	mg/L	1:1
Phosphorus	6010B	05/18/11	05/19/11	2.04	0.010	mg/L	1:1

Lab Control Sample Duplicate Report

Client ID Taber Consultants **Sample ID** LCSD for HBN 409091 [ICPV/6691
Laboratory ID 99833 **Matrix** Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Manganese	6010B	05/18/11	05/19/11	0.192	0.015	mg/L	1:1
Phosphorus	6010B	05/18/11	05/19/11	2.04	0.010	mg/L	1:1

Matrix Spike Report

Client ID Taber Consultants **Sample ID** MS for HBN 409091 [ICPV/6691]
Laboratory ID 99834 **Matrix** Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Manganese	6010B	05/18/11	05/19/11	5.01	0.015	mg/L	1:1
Phosphorus	6010B	05/18/11	05/19/11	2.44	0.010	mg/L	1:1

Matrix Spike Duplicate Report

Client ID Taber Consultants **Sample ID** MSD for HBN 409091 [ICPV/6691]
Laboratory ID 99835 **Matrix** Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Manganese	6010B	05/18/11	05/19/11	5.05	0.015	mg/L	1:1
Phosphorus	6010B	05/18/11	05/19/11	2.47	0.010	mg/L	1:1

Duplicate Report

Client ID Taber Consultants **Sample ID** DUP for HBN 409091 [ICPV/6691]
Laboratory ID 99836 **Matrix** Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Manganese	6010B	05/18/11	05/19/11	4.90	0.015	mg/L	1:1
Phosphorus	6010B	05/18/11	05/19/11	0.325	0.010	mg/L	1:1

Method Blank Report

Client ID Taber Consultants **Sample ID** MB for HBN 409100 [IONV/1632]
Laboratory ID 99837 **Matrix** Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Sulfate	EPA 300.0	05/13/11	05/13/11	ND	1.0	mg/L	1:1

Lab Control Sample Report

Client ID Taber Consultants **Sample ID** LCS for HBN 409100 [IONV/1632]
Laboratory ID 99838 **Matrix** Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Sulfate	EPA 300.0	05/13/11	05/13/11	9.81	1.0	mg/L	1:1

Lab Control Sample Duplicate Report

Client ID Taber Consultants **Sample ID** LCSD for HBN 409100 [IONV/1632
Laboratory ID 99839 **Matrix** Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Sulfate	EPA 300.0	05/13/11	05/13/11	9.97	1.0	mg/L	1:1

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Duplicate Report

Client ID Taber Consultants
Laboratory ID 99840
Sample ID DUP for HBN 409100 [IONV/1632]
Matrix Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Sulfate	EPA 300.0	05/13/11	05/13/11	123	1.0	mg/L	1:1

Matrix Spike Report

Client ID Taber Consultants
Laboratory ID 99841
Sample ID MS for HBN 409100 [IONV/1632]
Matrix Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Sulfate	EPA 300.0	05/13/11	05/13/11	131	1.0	mg/L	1:1

Matrix Spike Duplicate Report

Client ID Taber Consultants
Laboratory ID 99842
Sample ID MSD for HBN 409100 [IONV/1632]
Matrix Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Sulfate	EPA 300.0	05/13/11	05/13/11	128	1.0	mg/L	1:1

Method Blank Report

Client ID Taber Consultants
Laboratory ID 100012
Sample ID MB for HBN 410274 [SGXV/2749]
Matrix Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Methane	RSK 175	05/14/11	05/14/11	ND	0.010	ug/mL	1:1
Ethane	RSK 175	05/14/11	05/14/11	ND	0.010	ug/mL	1:1
Ethene	RSK 175	05/14/11	05/14/11	ND	0.01	ug/mL	1:1
Carbon Dioxide	RSK 175	05/14/11	05/14/11	ND	1.0	ug/mL	1:1

Lab Control Sample Report

Client ID Taber Consultants
Laboratory ID 100013
Sample ID LCS for HBN 410274 [SGXV/2749]
Matrix Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Methane	RSK 175	05/14/11	05/14/11	0.48	0.010	ug/mL	1:1
Ethane	RSK 175	05/14/11	05/14/11	0.43	0.010	ug/mL	1:1
Ethene	RSK 175	05/14/11	05/14/11	0.5	0.01	ug/mL	1:1
Carbon Dioxide	RSK 175	05/14/11	05/14/11	191	1.0	ug/mL	1:1

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Lab Control Sample Duplicate Report

Client ID Taber Consultants
Laboratory ID 100014
Sample ID LCSD for HBN 410274 [SGXV/2749
Matrix Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Methane	RSK 175	05/14/11	05/14/11	0.45	0.010	ug/mL	1:1
Ethane	RSK 175	05/14/11	05/14/11	0.42	0.010	ug/mL	1:1
Ethene	RSK 175	05/14/11	05/14/11	0.5	0.01	ug/mL	1:1
Carbon Dioxide	RSK 175	05/14/11	05/14/11	197	1.0	ug/mL	1:1

Duplicate Report

Client ID Taber Consultants
Laboratory ID 100015
Sample ID DUP for HBN 410274 [SGXV/2749]
Matrix Water

Parameter	Method	Prep Date	Analyzed	Result	RL	Units	Dilution
Methane	RSK 175	05/14/11	05/14/11	0.060	0.010	ug/mL	1:1
Ethane	RSK 175	05/14/11	05/14/11	ND	0.010	ug/mL	1:1
Ethene	RSK 175	05/14/11	05/14/11	ND	0.01	ug/mL	1:1
Carbon Dioxide	RSK 175	05/14/11	05/14/11	72	1.0	ug/mL	1:1

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QC SUMMARY

Client ID	Taber Consultants	**Original**	19877001		
QC Batch	SULX 1062	**Sample**	**Duplicate [99802]**		
Matrix	Water				**RPD**
Parameter				**RPD**	**Limits**
Sulfide				00	(20)

Client ID	Taber Consultants	**Original**	19850001		
QC Batch	TKNX 1049	**Sample**	**Duplicate [99808]**		
Matrix	Water				**RPD**
Parameter				**RPD**	**Limits**
Total Kjeldahl Nitrogen				0	(30)

Client ID	Taber Consultants	**Original**	19850001		
QC Batch	ALK 1170	**Sample**	**Duplicate [99829]**		
Matrix	Water				**RPD**
Parameter				**RPD**	**Limits**
Alkalinity as CaCO3				00	(20)

Client ID	Taber Consultants	**Original**	19850001		
QC Batch	ICPP 6710	**Sample**	**Duplicate [99836]**		
Matrix	Water				**RPD**
Parameter				**RPD**	**Limits**
Manganese				1.22	(35)
Phosphorus				4.80	(35)

Client ID	Taber Consultants	**Original**	19883001		
QC Batch	ION 1668	**Sample**	**Duplicate [99840]**		
Matrix	Water				**RPD**
Parameter				**RPD**	**Limits**
Sulfate				2.4	(20)

Client ID	Taber Consultants	**Original**	19877001		
QC Batch	SGX 2779	**Sample**	**Duplicate [100015]**		
Matrix	Water				**RPD**
Parameter				**RPD**	**Limits**
Methane				9.5	(20)
Ethane				00	(20)
Ethene				0	(20)
Carbon Dioxide				6.7	(20)

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QC SUMMARY

Client ID	Taber Consultants	**Original**	19877001
QC Batch	SULX 1062	**Samples**	Matrix Spike [99803]
Matrix	Water		Matrix Spike Duplicate [99804]

Parameter	Spike %Recovery	Spike Dup %Recovery	Recovery Limits	RPD	RPD Limits
Sulfide	99	97	(75-125)	2.0	(20 MAX)

Client ID	Taber Consultants	**Original**	19850001
QC Batch	TKNX 1049	**Samples**	Matrix Spike [99809]
Matrix	Water		Matrix Spike Duplicate [99810]

Parameter	Spike %Recovery	Spike Dup %Recovery	Recovery Limits	RPD	RPD Limits
Total Kjeldahl Nitrogen	88	87	(75-125)	1.1	(30 MAX)

Client ID	Taber Consultants	**Original**	19883001
QC Batch	FEX 1069	**Samples**	Matrix Spike [99826]
Matrix	Water		Matrix Spike Duplicate [99827]

Parameter	Spike %Recovery	Spike Dup %Recovery	Recovery Limits	RPD	RPD Limits
Ferrous Iron	108	103	(70-125)	4.7	(30 MAX)

Client ID	Taber Consultants	**Original**	19850001
QC Batch	ICPP 6710	**Samples**	Matrix Spike [99834]
Matrix	Water		Matrix Spike Duplicate [99835]

Parameter	Spike %Recovery	Spike Dup %Recovery	Recovery Limits	RPD	RPD Limits
Manganese	25.0	45.0	(75-125)	57.1	(35 MAX)
Phosphorus	105	106	(75-125)	0.9480	(35 MAX)

Client ID	Taber Consultants	**Original**	19883001
QC Batch	ION 1668	**Samples**	Matrix Spike [99841]
Matrix	Water		Matrix Spike Duplicate [99842]

Parameter	Spike %Recovery	Spike Dup %Recovery	Recovery Limits	RPD	RPD Limits
Sulfate	50	20	(75-125)	86	(20 MAX)

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QC SUMMARY

Client ID	Taber Consultants			**Samples**	Lab Control Sample [99800]	
QC Batch	SULX 1062				Lab Control Sample Duplicate [99801]	
Matrix	Water					
Parameter		**Check %Recovery**	**Check Dup %Recovery**	**Recovery Limits**	**RPD**	**RPD Limits**
Sulfide		100	103	(80-120)	3.0	(20 MAX)

Client ID	Taber Consultants			**Samples**	Lab Control Sample [99806]	
QC Batch	TKNX 1049				Lab Control Sample Duplicate [99807]	
Matrix	Water					
Parameter		**Check %Recovery**	**Check Dup %Recovery**	**Recovery Limits**	**RPD**	**RPD Limits**
Total Kjeldahl Nitrogen		104	97	(80-120)	7	(20 MAX)

Client ID	Taber Consultants			**Samples**	Lab Control Sample [99824]	
QC Batch	FEX 1069				Lab Control Sample Duplicate [99825]	
Matrix	Water					
Parameter		**Check %Recovery**	**Check Dup %Recovery**	**Recovery Limits**	**RPD**	**RPD Limits**
Ferrous Iron		103	103	(70-125)	00	(30 MAX)

Client ID	Taber Consultants			**Samples**	Lab Control Sample [99832]	
QC Batch	ICPP 6710				Lab Control Sample Duplicate [99833]	
Matrix	Water					
Parameter		**Check %Recovery**	**Check Dup %Recovery**	**Recovery Limits**	**RPD**	**RPD Limits**
Manganese		96.5	96.0	(80-120)	0.5190	(20 MAX)
Phosphorus		102	102	(80-120)	0000	(20 MAX)

Client ID	Taber Consultants			**Samples**	Lab Control Sample [99838]	
QC Batch	ION 1668				Lab Control Sample Duplicate [99839]	
Matrix	Water					
Parameter		**Check %Recovery**	**Check Dup %Recovery**	**Recovery Limits**	**RPD**	**RPD Limits**
Sulfate		98	100	(80-125)	2.0	(20 MAX)

Client ID	Taber Consultants			**Samples**	Lab Control Sample [100013]	
QC Batch	SGX 2779				Lab Control Sample Duplicate [100014]	
Matrix	Water					
Parameter		**Check %Recovery**	**Check Dup %Recovery**	**Recovery Limits**	**RPD**	**RPD Limits**
Methane		96	90	(65-135)	6.5	(20 MAX)
Ethane		86	84	(65-135)	2.4	(20 MAX)
Ethene		92	98	(65-135)	6.3	(20 MAX)

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QC SUMMARY

Client ID	Taber Consultants	**Samples**	Lab Control Sample [100013]
QC Batch	SGX 2779		Lab Control Sample Duplicate [100014]
Matrix	Water		**(continued)**

Parameter	Check %Recovery	Check Dup %Recovery	Recovery Limits	RPD	RPD Limits
Carbon Dioxide	96	98	(65-135)	2.1	(20 MAX)

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Sparger Technology, Inc.
Environmental Laboratories

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Sacramento, CA 95827
Lab: 916.369.7688
Fax: 916.369.7689

COC # / Lab No. **19883**

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Chain-of-Custody Record and Analysis Request

Project Contact (PDF To): **Tom Ballard**	California EDF Report? ☑ Yes ☐ No
Company / Address: **Taber Consultants: 3911 West Capitol Ave.**	Sampling Company Log Code: **WRMC**
West Sacramento, CA 95691	Global ID: **T0600100379**
Phone #: **916-371-1690** Fax #: **916-371-7265**	Deliver all files to: SNess@TaberConsultants.com
Project #: **51074** P.O. #: **3A**	Sampler Signature:
Project Name: **SIR_CityOfParis**	
Project Address: **3514 Adeline St. Oakland, CA**	

Sample ID	Field Point Name	Sampling: Date	Sampling: Time	Container: 40 ml VOA	Container: Sleeve	Container: Poly	Container: Glass	Container: Tedlar	Container:	Preservative: HCl	Preservative: HNO_3	Preservative: None	Preservative: H_2SO_4	Preservative: ZAC/Na_4OH	Matrix: Water	Matrix: Soil	Matrix: Air	Analysis Request: Fe^{2+}, Mn^{2+} (field filtered)	Analysis Request: Metals (Total Fe)	Analysis Request: NO_3^- (field filtered)	Analysis Request: Sulfide	Analysis Request: TKN	Analysis Request: General Chemistry (sulfate, phosphorus, alkalinity)	Analysis Request: Methane, CO_2, ethane, ethene (RSK 175)	TAT: 1 wk
GP-11-15	GP-11	5/13/11	0915				1					X			X								X	X
							1							X	X						X			X
							1						X		X							X		X
							1				X				X				X					X
							1					X			X			X		X				
GP-11-35	GP-11		1045				1					X			X							X	X	
							1							X	X						X			
							1						X		X							X		
							1				X				X				X					
							1					X			X			X		X				

TAT: ☐ 12 hr ☐ 24 hr ☐ 48 hr ☐ 72 hr ☑ 1 wk

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Relinquished by:	Date	Time	Received by:
	5/13/11	1630	
Relinquished by:	Date	Time	Received by:
Relinquished by:	Date	Time	Received by Laboratory:

Remarks:
please save file(s), PDF's, EDF & XLS name as:
sample date year_month_day_ project name_ WO#

EXAMPLE:
2010_02_10_SIR_CityOfParis_18495

Bill to: Invoice@TaberConsultants.com

For Lab Use Only: Sample Receipt

Temp °C	Initials	Date	Time		

19883

19883

Page 1 of 1

Sparger Technology, Inc.
Environmental Laboratories

3738 Bradview Drive
Sacramento, CA 95827
Lab: 916.369.7688
Fax: 916.369.7689

COC # / Lab No. _

Chain-of-Custody Record and Analysis Request

Project Contact (PDF To): **Tom Ballard**	California EDF Report? ☑ Yes ☐ No
Company / Address: **Taber Consultants: 3911 West Capitol Ave.** West Sacramento, CA 95691	Sampling Company Log Code: **WRMC**
	Global ID: **T0600100379**
Phone #: **916-371-1690** Fax #: **916-371-7265**	Deliver all files to: SNess@TaberConsultants.com
Project #: **51074** P.O. #: **3A**	Sampler Signature:
Project Name: **SIR_CityOfParis**	
Project Address: **3514 Adeline St. Oakland, CA**	

Sample ID	Field Point Name	Sampling: Date	Sampling: Time	Container: 40 ml VOA	Container: Sleeve	Container: Poly	Container: Glass	Container: Tedlar	Preservative: HCl	Preservative: HNO_3	Preservative: None	Preservative: H_2SO_4	Preservative: ZAC/NaOH	Matrix: Water	Matrix: Soil	Matrix: Air	Analysis Request: Fe^{2+}, Mn^{2+} (field filtered)	Analysis Request: Metals (Total Fe)	Analysis Request: NO_3^- (field filtered)	Analysis Request: Sulfide	Analysis Request: TKN	Analysis Request: General Chemistry (sulfate, phosphorus, alkalinity)	Analysis Request: Methane, CO_2, ethane, ethene (RSK 175)	TAT: 1 wk	Supporting Documents Page 162
GP-11-15	GP-11	5/13/11	0915				1				X			X								X	X	x	
							1						X	X						X				x	
							1					X		X							X			x	
							1			X				X				X						x	
							1				X			X			X		X						
GP-11-35	GP-11		1045				1				X			X								X	X		
							1						X	X						X					
							1					X		X							X				
							1			X				X				X							
							1				X			X			X		X						

Relinquished by:	Date: 5/13/11	Time: 1630	Received by:
Relinquished by:	Date	Time	Received by:
Relinquished by:	Date	Time	Received by Laboratory:

Remarks:
please save file(s), PDF's, EDF & XLS name as:
sample date year_month_day_ project name_ WO#

EXAMPLE:
2010_02_10_SIR_CityOfParis_18495

Bill to: Invoice@TaberConsultants.com

For Lab Use Only: Sample Receipt

Temp °C	Initials	Date	Time		

19883

Sparger Technology, Inc.
Environmental Laboratories

3738 Bradview Drive
Sacramento, CA 95827
Lab: 916.369.7688
Fax: 916.369.7689

COC # / Lab No. 19883

Page 3 of 3

Chain-of-Custody Record and Analysis Request

Project Contact (PDF To): **Tom Ballard**	California EDF Report? ☑ Yes ☐ No
Company / Address: **Taber Consultants: 3911 West Capitol Ave.** West Sacramento, CA 95691	Sampling Company Log Code: **WRMC**
	Global ID: **T0600100379**
Phone #: **916-371-1690** Fax #: **916-371-7265**	Deliver all files to: SNess@TaberConsultants.com
Project #: **51074** P.O. #: **3A**	Sampler Signature:
Project Name: **SIR_CityOfParis**	
Project Address: **3514 Adeline St. Oakland, CA**	

TAT: ☐ 12 hr ☐ 24 hr ☐ 48 hr ☐ 72 hr ☑ 1 wk

Sample ID	Field Point Name	Sampling: Date	Sampling: Time	Container: 40 ml VOA	Container: Sleeve	Container: Poly	Container: Glass	Container: Tedlar	Preservative: HCl	Preservative: HNO_3	Preservative: None	Preservative: H_2SO_4	Preservative: ZAC/NaOH	Matrix: Water	Matrix: Soil	Matrix: Air	Analysis Request: Fe^{2+}, Mn^{2+} (field filtered)	Analysis Request: Metals (Total Fe)	Analysis Request: NO_3^- (field filtered)	Analysis Request: Sulfide	Analysis Request: TKN	Analysis Request: General Chemistry (sulfate, phosphorus, alkalinity)	Analysis Request: Methane, CO_2, ethane, ethene (RSK 175)	TAT: 1 wk
GP-11-15	GP-11	5/13/11	0915				1				X			X								X	X	x
							1						X	X						X				x
							1					X		X							X			x
							1			X				X				X						x
							1				X			X			X		X					
GP-11-35	GP-11		1045				1				X			X								X	X	
							1						X	X						X				
							1					X		X							X			
							1			X				X				X						
							1				X			X			X		X					

Relinquished by:	Date	Time	Received by:
	5/13/11	1630	
Relinquished by:	Date	Time	Received by:
Relinquished by:	Date	Time	Received by Laboratory:

Remarks:
please save file(s), PDF's, EDF & XLS name as:
sample date year_month_day_ project name_ WO#

EXAMPLE:
2010_02_10_SIR_CityOfParis_18495

Bill to: Invoice@TaberConsultants.com

For Lab Use Only: Sample Receipt

Temp °C	Initials	Date	Time		

Supporting Documents Page 163

APPENDIX D

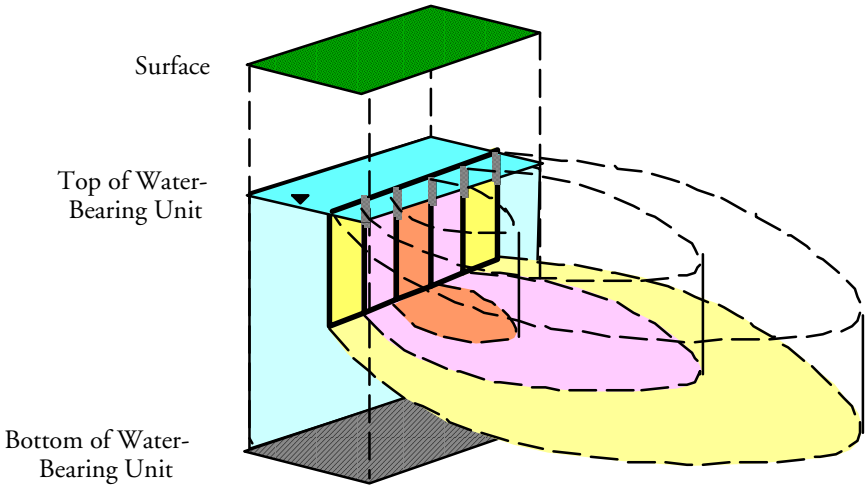
BIOSCREEN MANUAL VERSION 1.3

BIOSCREEN

Natural Attenuation Decision Support System

Version 1.4
July 1997

VERSION 1.4 REVISIONS



by

Charles J. Newell, Ph.D., P.E. and R. Kevin McLeod
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Houston, Texas

James R. Gonzales
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Brooks AFB, San Antonio Texas

INTRODUCTION

BIOSCREEN is an easy-to-use screening model which simulates remediation through natural attenuation (RNA) of dissolved hydrocarbons at petroleum fuel release sites. The software, programmed in the Microsoft® Excel spreadsheet environment and based on the Domenico analytical solute transport model, has the ability to simulate advection, dispersion, adsorption, and aerobic decay as well as anaerobic reactions, which have been shown to be the dominant biodegradation processes at many petroleum release sites. BIOSCREEN includes three different model types:

1) *Solute transport without decay,*

2) *Solute transport with biodegradation modeled as a first-order decay process (simple, lumped-parameter approach),*

3) *Solute transport with biodegradation modeled as an "instantaneous" biodegradation reaction (approach used by BIOPLUME models).*

The model is designed to simulate biodegradation by both aerobic and anaerobic reactions. It was developed for the Air Force Center for Environmental Excellence (AFCEE) Technology Transfer Division at Brooks Air Force Base by Groundwater Services, Inc., Houston, Texas.

Version 1.3 of BIOSCREEN was released in October 1996. Version 1.4 of BIOSCREEN includes a new mass flux calculation feature, a modification to the vertical dispersion term in the Domenico model, a revised description of the Domenico analytical model equation, and a minor change to the input display. This document describes these updates and provides new biodegradation modeling information for BIOSCREEN users. Continue to refer to the existing BIOSCREEN version 1.3 User's Manual as the primary source of information about BIOSCREEN.

NEW MASS FLUX CALCULATION FEATURE IN VERSION 1.4

Version 1.4 of BIOSCREEN includes a new feature to assist users in estimating the mass flux of contaminants entering surface water bodies via groundwater plume discharge. This feature, included on the "Run Array" Output, provides an estimate of the mass flux of contaminants in units of mg/day computed at specific distances away from the source (see Figure 1).

Example Application

Set up BIOSCREEN to simulate the Keesler AFB SWMU 66 plume (Example 1 in the Version 1.3 User's Manual, page 52). Assume that the plume at Keesler AFB discharges into a hypothetical stream located 210 ft away from the source zone as shown in Figure 1 (note that no such stream actually exists at this location). Using BIOSCREEN 1.4 with the Instantaneous Reaction model, calculate the mass flux of contaminants discharging into the stream (see Example 1 in Appendix A).

As shown in the attached Figure 4 (see Example 1 in Appendix A), the computed mass flux of BTEX constituents within the groundwater plume at 224 ft away from the source is 1500 mg/day. Therefore, in order to achieve a target concentration in the stream of < 0.001 mg/L total BTEX, a minimum naturally-occurring flowrate of 1.5 x 10^6 L/day (0.61 cubic feet per second) is required.

Obtaining Streamflow Data

Two types of stream flowrates can be used for estimating exposure concentrations, depending on the nature of the contaminant. For contaminants with *acute* effects on human or aquatic receptors (such as ammonia), a minimum flowrate such as the 2-year 7-day average low flow value may be appropriate. For contaminants with *chronic* effects on human or aquatic receptors (such as the BTEX compounds), a harmonic mean or other form of average flow could be used.

The harmonic mean is defined as:

$$Q_{hm} = \frac{n}{\sum_{i=1}^{i=n} \frac{1}{Q_i}}$$

where Q_i = daily average discharge data
n = number of days with data

Calculation of 10-year 7-day average low flow values is discussed in several hydrology texts, including the *Handbook of Hydrology*, David R. Maidment, ed. McGraw-Hill, 1993. Daily average discharge data are often available through state or local agencies which regulate wastewater treatment discharges. Streamflow data are also available through the U.S. Geological Survey (USGS) for many larger streams (see the USGS World-Wide Web page: http://water.usgs.gov/swr/).

For smaller, ungaged streams, or for locations not near a gaging station, data from an alternative location having similar watershed characteristics (i.e., landuse, land cover, topography, channel type, drainage area, etc.) may be used. For two locations that differ in size of the drainage area, but are otherwise similar, streamflow data from the gaged location may be adjusted by the ratio of drainage areas to provide an estimate of the flow at the ungaged location.

Description of Calculation

The contaminant mass flux is determined using a simple calculation technique. The concentration in each cell of the array is multiplied by: 1) the Darcy velocity, 2) the width associated with each cell in the array, and 3) the thickness of the source zone. The plume mass flux for a particular cross section is then determined by summing the five values in the array for that cross section. The calculation technique is disabled when vertical dispersion is used, as the vertical concentration profile is no longer uniform. In addition, the mass flux calculation should only be used for gaining streams (streams where groundwater discharges into surface water) and should not used for losing streams (streams that recharge groundwater).

The calculation approach is approximate, and other averaging techniques (use of geometric means, etc.) might provide different results. Because the model defines the plume cross section with only 5 points, the computed plume mass flux may appear to be slightly higher for a downgradient point than an upgradient point in some instances. As illustrated in the example, the mass flux estimates are sensitive to the model width, and for best results users should adjust the model width so that the contaminant plume covers most of the calculated array (compare mass flux results from a simulation using a 200 ft model width, Figure 4, to mass flux results from a simulation using a 50 ft model width, Figure 6). Users should assume that the mass flux estimates are probably accurate to ± 50%.

NEW KILOGRAM TO GALLONS CONVERSION FEATURE IN VERSION 1.4

Version 1.4 of BIOSCREEN also includes a new feature to show users how much volume the mass of contaminants displayed in the Array Output screen represents. For example, if BIOSCREEN estimates that the Actual Plume Mass is 7.8 Kg (see Figure 4) , the model will convert this into an effective contaminant volume of 2.4 gallons of organic, using a density value of 0.87 g/mL (representative of the density of a BTEX mixture). The following mass values will be converted to volumes: i) Plume Mass if No Biodegradation, ii) Actual Plume Mass, iii) Plume Mass Removed by Biodegradation, iv) Original Mass in Source (Time = 0 Years), and v) Mass in Source Now (Time = X Years).

To display the data converted into gallons, the user should click the ìSee Gallonsî button in the ìPlume and Source Massesî region of the Array Output screen. A dialog box appears with several common fuel constituents (average BTEX, benzene, toluene, ethylbenzene, and para-xylene) and their densities in g/mL. If an alternative value for constituent densities is available, this number can be entered into the ìDensityî box. When the ìOKî button is pressed, the dialog box disappears and the plume and source mass calculations in Kg are replaced with volume information in gallons. To convert back to mass values, click on the "See Kg" button.

RELATED REFERENCES FOR BIOSCREEN MODELING

Ollila (1996) provides a good comparison of the Domenico model with the instantaneous reaction superposition method against BIOPLUME II. Rifai et al. (1997) summarize the theory and use of AFCEE's BIOPLUME III model. Nevin et al. (1997) describe software for deriving first-order decay coefficients for steady-state plumes from actual site data.

Nevin, J. P., J.A. Connor, C.J. Newell, J.B. Gustafson, K.A. Lyons, 1997. "FATE 5: A Natural Attenuation Calibration Tool for Groundwater Fate and Transport Modeling,", Petroleum Hydrocarbons and Organic Chemicals in Groundwater, NWWA, Houston, Texas, Nov. 1997.

Ollila, P.W., 1996. Evaluating Natural Attenuation With Spreadsheet Analytical Fate and Transport Models. Ground Water Monitoring and Remediation, Vol. XVI, No. 24, pp. 69-75.

Rifai, H.S., C.J. Newell, J.R. Gonzales, S. Dendrou, L. Kennedy, and J. Wilson, 1997. BIOPLUME III Natural Attenuation Decision Support System Version 1.0 User's Manual. Air Force Center for Environmental Excellence, Brooks AFB, Texas (in press).

IMPACT OF NON-BTEX CONSTITUENTS ON BIOSCREEN MODELING

BTEX constituents only comprise a small percentage of the total organic mass in gasoline and JP-4 mixtures. However, the best available information suggests that most JP-4 and gasoline plumes will be dominated by BTEX components, and that only a small fraction of the plumes contain dissolved non-BTEX compounds. This is due to the BTEX compounds having very high solubilities relative to the remaining fraction of organic mass in these fuel mixtures. In other words, most of the non-BTEX constituents of gasoline and JP-4 are relatively insoluble, creating dissolved-phase plumes that are dominated by the BTEX compounds.

The following calculations support this conceptual model of BTEX-dominated plumes from JP-4 and gasoline. For additional supporting data and calculations, see Section 3.3.2 of Weidemeier et al., 1995.

Gasoline composition data presented by Johnson et al. (1990a and 1990b), and JP-4 composition data presented by Stelljes and Watkin (Stelljes and Watkin, 1993; data adapted from Oak Ridge National Laboratory, 1989) were used to determine the effective solubility of these hydrocarbon mixtures in equilibrium with water (effective solubility = mole fraction x pure phase solubility; see Bedient, Rifai, and Newell 1994). The total effective solubility of all the constituents was then compared to the effective solubility of the BTEX constituents. The following tables show this calculation for fresh gasoline, two weathered gasolines, and JP-4:

FRESH GASOLINE
(data from Johnson et al., 1990)

Constituent	Mass Fraction	Mole Fraction	Pure-Phase Solubility (mg/L)	Effective Solubility (mg/L)
Benzene	0.0076	0.0093	1780	17
Toluene	0.055	0.0568	515	29
Ethylbenzene	0.0	0.0	152	0
Xylenes	0.0957	0.0858	198	17
TOTAL BTEX	0.16	0.15	152 - 1780 (range)	63
58 Compounds	0.84	0.85	0.004 - 1230 (range)	30
TOTAL	**1.00**	**1.00**	**-**	**93**

% BTEX = (63 mg/L) ÷ (93 mg/L) = 68 %

WEATHERED GASOLINE # 1
(data from Johnson et al., 1990a)

Constituent	Mass Fraction	Mole Fraction	Pure-Phase Solubility (mg/L)	Effective Solubility (mg/L)
Benzene	0.01	0.0137	1780	24
Toluene	0.1048	0.1216	515	63
Ethylbenzene	0.0	0.0	152	0
Xylenes	0.1239	0.1247	198	25
TOTAL BTEX	0.24	0.26	152 - 1780 (range)	112
58 Compounds	0.76	0.74	0.004 - 1230 (range)	14

TOTAL	**1.00**	**1.00**	**-**	**126**

% BTEX = (112 mg/L) ÷ (126 mg/L) = 89 %

WEATHERED GASOLINE #2
(data from Johnson et al., 1990b)

Constituent	Mass Fraction	Mole Fraction	Pure-Phase Solubility (mg/L)	Effective Solubility (mg/L)
Benzene	0.0021	0.003	1780	5
Toluene	0.0359	0.043	515	22
Ethylbenzene	0.013	0.014	152	2
Xylenes	0.080	0.084	198	15
TOTAL BTEX	0.13	0.14	*152 - 1780 (range)*	44
64 Compounds	0.87	0.86	*0.004 - 1230 (range)*	21
TOTAL	**1.00**	**1.00**	**-**	**65**

% BTEX = (44 mg/L) ÷ (65 mg/L) = 68 %

VIRGIN JP-4
(data from Stelljes and Watkin, 1993; Oak Ridge N. Lab, 1989)

Constituent	Mass Fraction	Mole Fraction	Pure-Phase Solubility (mg/L)	Effective Solubility (mg/L)
Benzene	0.005	0.023	1780	42
Toluene	0.0133	0.053	515	27
Ethylbenzene	0.0037	0.013	152	2
Xylenes	0.0232	0.080	198	16
TOTAL BTEX	0.045 (4.5%)	0.168	152 - 1780 (range)	87
13 Compounds	0.27 (27%)	0.832	0.004 - 1230 (range)	4
TOTAL	**0.315 (31.5)%**	**1.000**	**-**	**91**

% BTEX = (87 mg/L) ÷ (91 mg/L) = 95 %

In each of these four fuel samples, BTEX compounds comprise the majority of the dissolved organic mass in equilibrium with water. The non-BTEX components represent a much smaller portion of the dissolved mass. As expected, the theoretical dissolved-phase concentrations from these samples are much higher than what is typically observed in groundwater samples due to factors such as dilution, the heterogeneous distribution of non-aqueous phase liquids, and the low level of mixing occurring in aquifers (see Bedient, Rifai, and Newell, 1994 for a more complete discussion).

Note that the total effective solubility of weathered gasoline #1 (126 mg/L) is greater than the total effective solubility of the fresh gasoline (93 mg/L). A comparison of the two samples indicates that the fresh gasoline includes a significant mass of light, volatile compounds that have pure-phase solubilities that are much lower than that of the BTEX compounds (e.g., isopentane with a vapor pressure of 0.78 atm and a solubility of 48 mg/L, compared to solubilities of 152 -1780 mg/L for the BTEX compounds). When these light compounds are weathered (probably volatilized), the mole fractions of the BTEX components (the only remaining components with any significant solubility) increase, thereby increasing the total effective solubility of the weathered gasoline. On the other hand, weathered gasoline #2 has a total effective solubility that is significantly lower than fresh gasoline (65 mg/L vs. 93 mg/L), suggesting that this gasoline has weathered to the point where there has been significant removal of both volatile and soluble components from the gasoline.

In their analysis, Stelljes and Watkin (1993) identified only 17 compounds representing 31% by mass of a complete JP-4 mixture. However, a comparison of the relative make-up of the quantified mixture to the reported make-up of JP-4 (also from Stelljes and Watkin, 1993) shows the various classes of organic compounds to be equivalently represented in both mixtures. The quantified mixture appears to be generally representative of the complete JP-4 mixture.

% benzenes, alkylbenzenes in identified compounds:	14% *(note: equals 4.5% of 31.5%)*
% benzenes, alkylbenzenes in complete JP-4 mixture:	18% *(from Stelljes and Watkin, 1993)*
% branched alkanes in all identified compounds:	26%
% branched alkanes in complete JP-4 mixture:	31%
% cycloalkanes in all compounds identified:	7%
% cycloalkanes in complete JP-4 mixture:	16%
% naphthalenes in all compounds identified:	6%

% naphthalenes in complete JP-4 mixture:	3%
% normal alkanes in all compounds identified:	47%
% normal alkanes in complete JP-4 mixture:	32%

Finally, it is important to note that there is considerable variability among different fresh fuels, and even more variation among weathered fuels. Therefore, these results should only be used as a general indicator that the BTEX compounds comprise the majority of the soluble components in plumes originating from JP-4 and gasoline releases. These results should not be used as absolute, universal values for all sites.

With regard to biodegradation modeling, however, it is probably appropriate to assume that BTEX compounds exert the majority (i.e. ~ 70% or greater) of the electron acceptor demand at JP-4 and gasoline sites. To make modeling BTEX using the instantaneous reaction approach more accurate, however, the total concentrations of available electron acceptors can be reduced by some fraction to account for the electron acceptor demand posed by biodegradable non-BTEX organics in groundwater. Two examples of how to account for the impact for non-BTEX components is to multiply all electron acceptor/by-product concentrations used in the model by either i) the ratio of BTEX/TOC concentrations, or ii) the ratio of BTEX/BOD concentrations (if TOC and BOD data are available). If these data are not available, a conservative approach would be to reduce all available electron acceptor/by-product concentrations used in the model by 30% to account for the possible impacts of non-BTEX organics in groundwater.

References for BTEX-Dominated Plumes

Bedient, P. B., H.S. Rifai, and C.J. Newell, Groundwater Contamination: Transport and Remediation, Prentice-Hall, 1994.

Johnson, P.C., M.W. Kemblowski, and J.D. Colthart. 1990a. Quantitative Analysis of Cleanup of Hydrocarbon-Contaminated Soils by In-Situ Soil Venting. Ground Water, Vol. 28, No. 3. May - June, 1990, pp 413-429.

Johnson, P.C., C.C. Stanley, M.W. Kemblowski, D.L. Byers, and J.D. Colthart. 1990b. A Practical Approach to the Design, Operation, and Monitoring of In Site Soil-Venting Systems, Ground Water Monitoring and Remediation, Spring, 1990, pp 159-178.

Oak Ridge National Laboratory, 1989. The Installation Restoration Program Toxicology Guide, DOE Interagency Agreement No. 1891-A076-A1, Volumes III and IV, July, 1989.

Stelljes, M.E., and G.E. Watkin, 1993. "Comparison of Environmental Impacts Posed by Different Hydrocarbon Mixtures: A Need for Site Specific Composition Analysis,", in Hydrocarbon Contaminated Soils and Groundwater, Vol. 3, P.T. Kostecki and E.J. Calabrese, Eds., Lewis Publishers, Boca Raton.

Wiedemeier, T. H., Wilson, J. T., Kampbell, D. H, Miller, R. N., and Hansen, J.E., 1995. "Technical Protocol for Implementing Intrinsic Remediation With Long-Term Monitoring for Natural Attenuation of Fuel

Contamination Dissolved in Groundwater (Revision 0)", Air Force Center for Environmental Excellence, Brooks AFB, Texas, Nov., 1995.

CHANGES FROM BIOSCREEN 1.3

Display of Source Half-Life Values

The input screen for Version 1.4 has been modified to emphasize that BIOSCREEN generates two different source half-lives when a value for "Soluble Mass in Source NAPL, Soil" is entered. As discussed on page 31 of the Version 1.3 User's Manual, two half-lives are reported, one for the Instantaneous Reaction model and one for the No Degradation or First Order Decay models. Version 1.3 of BIOSCREEN presented both half-lives in one black box (black input boxes designate intermediate values calculated by the model). As part of the Version 1.4 modifications, the single box for source half-lives has been replaced with two boxes, one showing the source half-life calculated using the instantaneous reaction model and one showing the source half-life calculated using the No Degradation or First Order Decay models. The change was made to emphasize that two different values are calculated by BIOSCREEN depending on which biodegradation model is employed (see page 31 of the Version 1.3 User's Manual).

Vertical Dispersion Term

As explained in the Version 1.3 User's Manual, BIOSCREEN has been configured so that the default vertical dispersivity is set to zero (see Appendix A.4 in the Version 1.3 User's Manual). In BIOSCREEN 1.3, however, if the user opts to use a non-zero vertical dispersivity estimate, the software may overestimate the effects of vertical dispersion in some cases, as described below.

BIOSCREEN 1.3 was coded so that vertical dispersion is assumed to occur in both directions as the contaminants travel away from the source zone (i.e., downwards and upwards). For source zones located in the middle of a thick aquifer, or in cases where recharge produces a clean zone on top of the plume, this would be an appropriate approach. For source zones located at the top of an aquifer (the case at most petroleum release sites), upward vertical dispersion above the water table does not occur (unless recharge is significant), and therefore the model could overestimate the effects of dispersion. While the vertical dispersion term in the Domenico analytical model expression in the Version 1.3 User's Manual was correct, showing vertical dispersion in only *one* direction (see Appendix A.1), the Version 1.3 model actually simulates vertical dispersion in *both* directions.

In BIOSCREEN 1.4, the default approach of no vertical dispersion is still recommended. The software code has been changed, however, so that there is vertical dispersion is modeled in the downward direction only. (If a user would like to use BIOSCREEN 1.4 with dispersion in both directions, multiply the vertical dispersivity estimate by a factor of 4 and enter the result as the vertical dispersivity. This will have the effect of simulating vertical dispersion occurring in two directions).

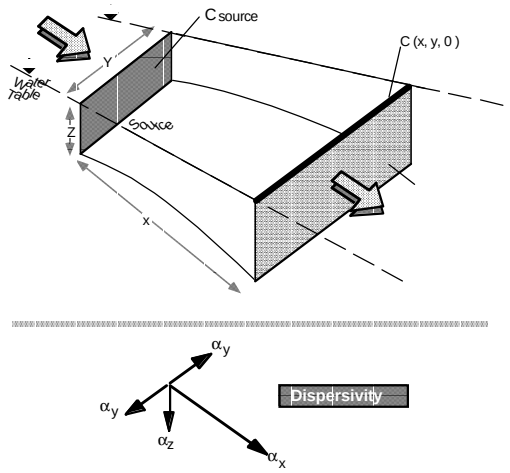
Most users will not notice any effect with this change, as BIOSCREEN's default vertical dispersivity is set near zero corresponding to no vertical dispersion. BIOSCREEN 1.3 only overestimates the effects of vertical dispersion if: 1) the default dispersivity value of zero is

replaced with a non-zero vertical value and 2) the source zone is located at the top of an aquifer that does not have significant recharge.

Appendix A.1 Domenico Analytical Model Equation

The Domenico analytical model expression provided in Appendix A.1 of the BIOSCREEN Version 1.3 User's Manual incorrectly showed how the superposition term was employed, was unclear about the separation of the first order decay model and the instantaneous reaction model, and did not include the source decay term. Revised equation descriptions are provided below and replace the single equation shown on page 41 of the Version 1.3 User's Manual. Note that the equations encoded in the software were not in error and have not been modified (except as described above with regard to vertical dispersion).

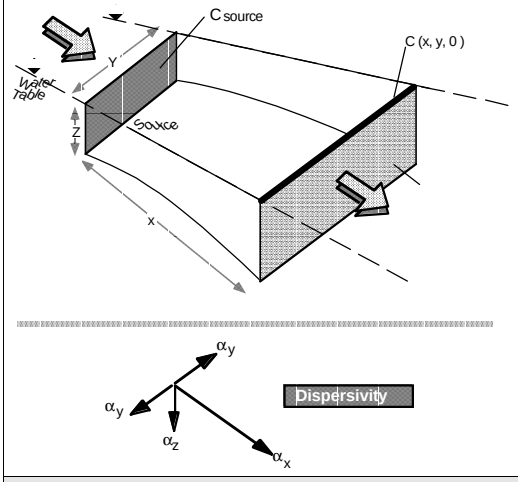
Domenico Model with First Order Decay Algorithm



$$C(x,y,o,t) = C_o \exp\left[-k_s(t - x/v)\right] \frac{1}{8} \exp\left[\frac{x}{\alpha_x 2}\left(1 - (1 + 4\lambda\alpha_x / v)^{1/2}\right)\right] erfc\left[\frac{\left(x - vt(1 + 4\lambda\alpha_x / v)^{1/2}\right)}{2(\alpha_x vt)^{1/2}}\right] \left\{erf\left[\frac{(y + Y/2)}{2(\alpha_y x)^{1/2}}\right] - erf\left[\frac{(y - Y/2)}{2(\alpha_y x)^{1/2}}\right]\right\} \left\{erf\left[\frac{(Z)}{2(\alpha_z x)^{1/2}}\right] - erf\left[\frac{(-Z)}{2(\alpha_z x)^{1/2}}\right]\right\}$$

where: $v = \frac{K \cdot i}{\theta_e R}$

Domenico Model with Instantaneous Reaction Superposition Algorithm



$$C(x,y,o,t) = \left(C_o \exp\left[-k_s(t - x/v)\right] + BC\right) \frac{1}{8} erfc\left[\frac{(x - vt)}{2(\alpha_x vt)^{1/2}}\right] \left\{erf\left[\frac{(y + Y/2)}{2(\alpha_y x)^{1/2}}\right] - erf\left[\frac{(y - Y/2)}{2(\alpha_y x)^{1/2}}\right]\right\} \left\{erf\left[\frac{(Z)}{2(\alpha_z x)^{1/2}}\right] - erf\left[\frac{(-Z)}{2(\alpha_z x)^{1/2}}\right]\right\} - BC$$

where: $v = \frac{K \cdot i}{\theta_e R}$ $BC = \Sigma \frac{C(ea)_n}{UF_n}$

Definitions

BC	Biodegradation capacity (mg/L)
C(x,y,z,t)	Concentration at distance x downstream of source and distance y off centerline of plume at time t (mg/L)
C_s	Concentration in Source Zone (mg/L)
Co	Concentration in Source Zone at t=0 (mg/L)
x	Distance downgradient of source (ft)
y	Distance from centerline of source (ft)
z	Vertical Distance from groundwater surface to measurement point (assumed to be 0; concentration is always assumed to be at top of water table).
$C(ea)_n$	Concentration of electron acceptor (or by-product equivalent) n in groundwater (mg/L)
UF_n	Utilization factor for electron acceptor *n* (i.e., mass ratio of electron acceptor/by-product to hydrocarbon consumed in biodegradation reaction)
α_x	Longitudinal groundwater dispersivity (ft)
α_y	Transverse groundwater dispersivity (ft)
α_z	Vertical groundwater dispersivity (ft)
λ	First-order decay coefficient for dissolved contaminants (yr^{-1})
θ_e	Effective soil porosity
υ	Contaminant velocity in groundwater (ft/yr)
K	Hydraulic conductivity (ft/yr)
R	Constituent retardation factor
i	Hydraulic gradient (ft/ft)
Y	Source width (ft)
Z	Source depth (ft)
t	Time (yr)
k_s	First-order decay term for source concentration (yr^{-1})

ACKNOWLEDGMENTS

BIOSCREEN was developed for the Air Force Center for Environmental Excellence, Brooks AFB, San Antonio, Texas by Groundwater Services, Inc.

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The Air Force Center for Environmental Excellence is distributing BIOSCREEN 1.4 via:

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NRMRL/SPRD
P.O. Box 1198
Ada, Oklahoma 74821-1198

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- **Fax:** (405) 436-8718
- **Bulletin Board:** (405) 436-8506 (14,400 baud-8 bits -1 stop bit -no parity).
- **Internet:** http://www.epa.gov/ada/kerrlab.html (Electronic manuals will be in .pdf format; must download Adobe Acrobat Reader to

Note that first-time users should download:

1) The BIOSCREEN 1.4 software,
2) The BIOSCREEN 1.3 User's Manual, and
3) The BIOSCREEN 1.4 Revisions document.

APPENDIX 1. BIOSCREEN Version 1.4 EXAMPLE

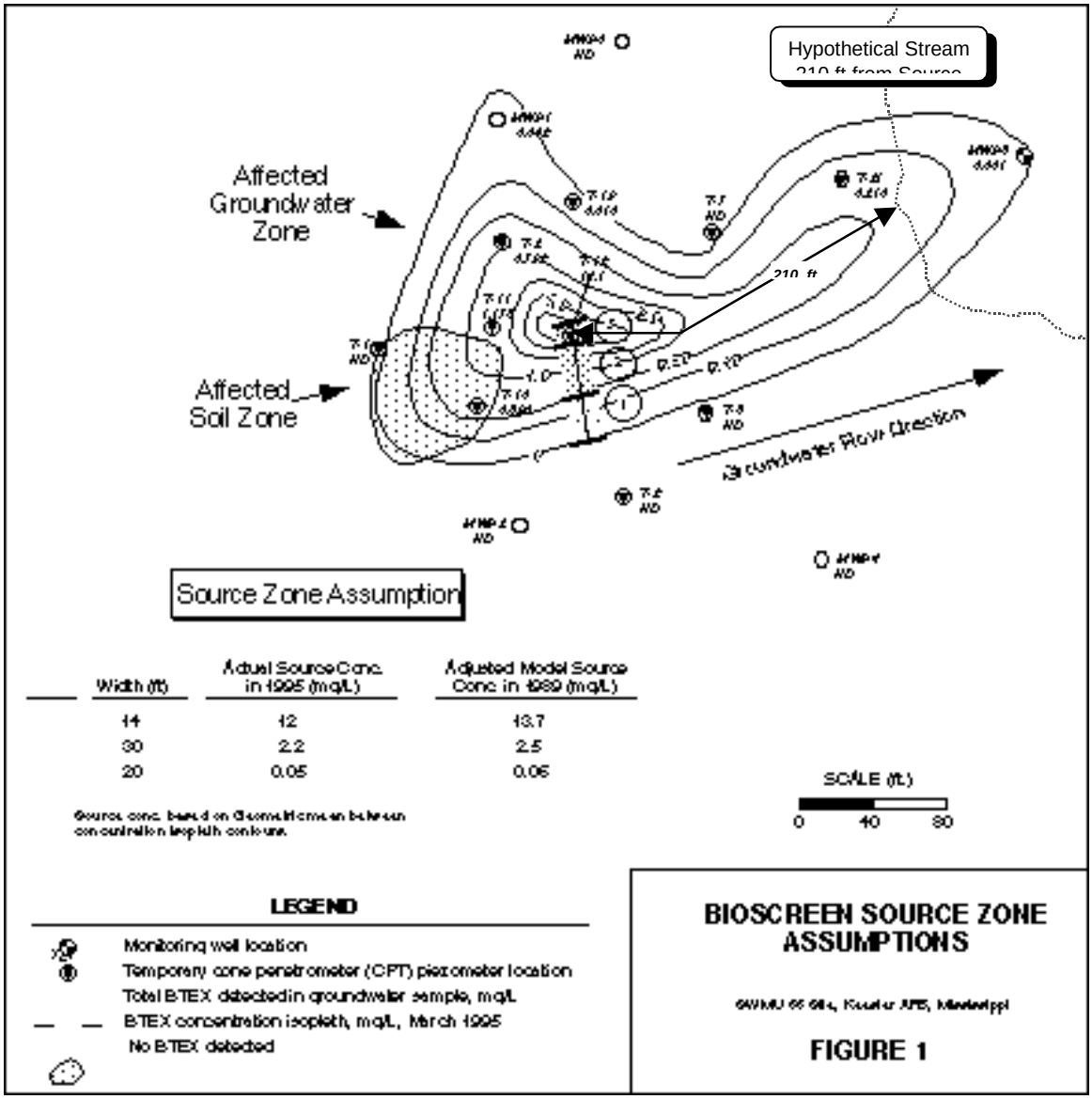
Example 1: SWMU 66, Keesler AFB, Mississippi

- Input Data
- Fig. 1 Source Map
- BIOSCREEN Modeling Summary
- Fig. 2 BIOSCREEN Input Data
- Fig. 3 BIOSCREEN Centerline Output
- Fig. 4 BIOSCREEN Array Output
- Fig. 5 BIOSCREEN Input Data, 50 ft Model Width
- Fig. 4 BIOSCREEN Array Output, 50 ft Model Width

BIOSCREEN EXAMPLE 1

Keesler Air Force Base, SWMU 66, Mississippi

DATA TYPE	Parameter	Value	Source of Data
Hydrogeology	• Hydraulic Conductivity: • Hydraulic Gradient: • Porosity:	1.1 x 10^{-2} (cm/sec) 0.003 (ft/ft) 0.3	• Slug-tests results • Static water level measurements • Estimated
Dispersion	Original: • Longitudinal Dispersivity: • Transverse Dispersivity: • Vertical Dispersivity: After Calibration: • Longitudinal Dispersivity: • Transverse Dispersivity: • Vertical Dispersivity:	 13.3 (ft) 1.3 (ft) 0 (ft) 32.5 (ft) 3.25 (ft) 0 (ft)	 • Based on estimated plume length of 280 ft and Xu/Eckstein relationship • Based on calibration to plume length (Note this is well within the observed range for long. dispersivity; see Fig. A.1 in Appendix A..3. Remember to convert from feet to meters before using the chart).
Adsorption	• Retardation Factor: • Soil Bulk Density ρb: • foc: • Koc:	1.0 1.7 (kg/L) 0.0057% B: 38 T: 135 E: 95 X: 240	• Calculated from R = 1+Koc x foc x ρb/n • Estimated • Lab analysis • Literature - use Koc = 38
Biodegradation	Electron Acceptor: Background Conc. (mg/L): Minimum Conc. (mg/L): Change in Conc. (mg/L): Electron Acceptor: Max. Conc. (mg/L): Avg. Conc. (mg/L):	O2 / NO3 / SO4 2.05 / 0.7 / 26.2 - 0.4 / - 0 / - 3.8 1.65 / 0.7 / 22.4 Fe / CH4 ~~36.1~~ / ~~7.4~~ ~~16.6~~ / ~~6.6~~ Note: Boxed values are BIOSCREEN input values.	• Based on March 1995 groundwater sampling program conducted by Groundwater Services, Inc.
General	• Modeled Area Length: • Modeled Area Width: • Simulation Time:	320 (ft) 200 (ft), 50 (ft) 6 (yrs)	• Based on area of affected groundwater plume • Steady-state flow
Source Data	• Source Thickness: • Source Concentration:	10 (ft) (See Figure 1)	• Based on geologic logs and lumped BTEX monitoring data
Actual Data	Distance From Source (ft): BTEX Conc. (mg/L):	30 / 60 / 180 / 280 5.0 / 1.0 / 0.5 / 0.001	• Based on observed concentrations at site
OUTPUT	Centerline Concentration:	See Figure 3	
	Array Concentration:	See Figure 4, 6	


Hypothetical Stream
Affected Groundwater Zone
Affected Soil Zone
210 ft
Groundwater Flow Direction
Source Zone Assumption
Width (ft)
Actual Source Conc. in 1995 (mg/L)
Adjusted Model Source Conc. in 1989 (mg/L)
14
12
13.7
30
2.2
2.5
20
0.05
0.06
SCALE (ft)
0
40
80
LEGEND
Monitoring well location
Temporary cone penetrometer (CPT) piezometer location
Total BTEX detected in groundwater sample, mg/L
BTEX concentration isopleth, mg/L, March 1995
No BTEX detected
BIOSCREEN SOURCE ZONE ASSUMPTIONS
FIGURE 1

BIOSCREEN Modeling Summary, Keesler Air Force Base, SWMU 66, Mississippi:

- BIOSCREEN was used to try to reproduce the movement of the plume from 1989 (the best guess for when the release occurred) to 1995.
- The soluble mass in soil and NAPL was estimated by integrating BTEX soil concentrations contours mapped as part of the site soil delineation program. An estimated 2000 Kg of BTEX was estimated to be present at the site based on GC/MS analysis of soil samples collected from both the vadose and saturated zone. This value represented a source half-life of 60 years with the instantaneous reaction model (the first value shown in the source half-life box in Figure 2), a relatively long half-life, so the 2000 Kg measured in 1995 was assumed to be representative of 1989 conditions.
- The instantaneous reaction model was used as the primary model to try to reproduce the plume length (~ 280 ft).
- Because a decaying source was used, the source concentration on the input screen (representing concentrations 6 yrs ago) were adjusted so the source concentration on the centerline output screen (representing concentrations now) were equal to 12 mg/L. Because the source decay term is different for the first order decay and instantaneous reaction models, this simulation focused on matching the instantaneous reaction model. The final result was a source concentration of 13.68 mg/L in the center of the source zone (note on the centerline output the source concentration is 12.021 mg/L).
- The initial run of the instantaneous reaction model indicated that the plume was too long. This indicates that there is more mixing of hydrocarbon and electron acceptors at the site than is predicted by the model. Therefore the longitudinal dispersivity was adjusted upwards (more mixing) until BIOSCREEN matched the observed plume length. The final longitudinal dispersivity was 32.5 ft.
- As a check the first-order decay model was used with the BIOSCREEN default value of 2 yrs. This run greatly overestimated the plume length, so the amount of biodegradation was increased by decreasing the solute half-life. A good match of the plume was reached with a solute half-life of 0.15 years. This is within observed ranges reported in the literature (see solute half-life section, page 22).
- As shown in Figure 3, BIOSCREEN matches the observed plume fairly well. The instantaneous model is more accurate near the source while the first order decay model is more accurate near the middle of the plume. Both models reproduce the actual plume length relatively well.

- As shown in Figure 4, the current plume is estimated to contain 7.8 kg of BTEX. BIOSCREEN indicates that the plume under a no-degradation scenario would contain 126.3 kg BTEX. In other words BIOSCREEN indicates that 94% of the BTEX mass that has left the source since 1989 has biodegraded.
- Most of the source mass postulated to be in place in 1989 is still there in 1996 (2000 kg vs. 1837 kg, or 92% left).
- The current plume contains 1.0 ac-ft of contaminated water, with 1.019 acre-ft/yr of water being contaminated as it flows through the source. Because the plume is almost at steady state, 1.019 ac-ft of water become contaminated per year with the same amount being remediated every year due to in-situ biodegradation and other attenuation processes. This indicates that a long-term monitoring approach would probably be more appropriate for this site than active remediation, as the plume is no longer growing in size.

- A hypothetical stream is assumed to be located approximately 210 ft downgradient of the source (note no such stream exists at the actual site). Using an estimated model width of 200 ft (see Figure 2), a mass flux of 1500 mg/day is calculated (see Figure 4) at a distance of 224 ft away from the source (the closest point calculated by BIOSCREEN).

  Users should be aware that the mass flux calculation is sensitive to the model width assigned in Section 6 of the input screen (see Figure 2). A model width of 200 ft was used in the original example so that most of the "no degradation" plume was in the array, allowing calculation of the plume and source masses (see pg. 34-35 of the BIOSCREEN Ver. 1.3 Manual for a more detailed explanation).

For the mass flux calculation, however, a more accurate result will be obtained by selecting a width where most of the plume of interest (in this cased the instantaneous reaction plume) appears across the array. As shown in Figures 5 and 6, a model width of 50 ft was selected so that the instantaneous reaction plume covered most of the BIOSCREEN array. With this width, a mass flux value of 860 mg/day was calculated. This is a more accurate estimate of the mass flux than the 1500 mg/day calculated above.

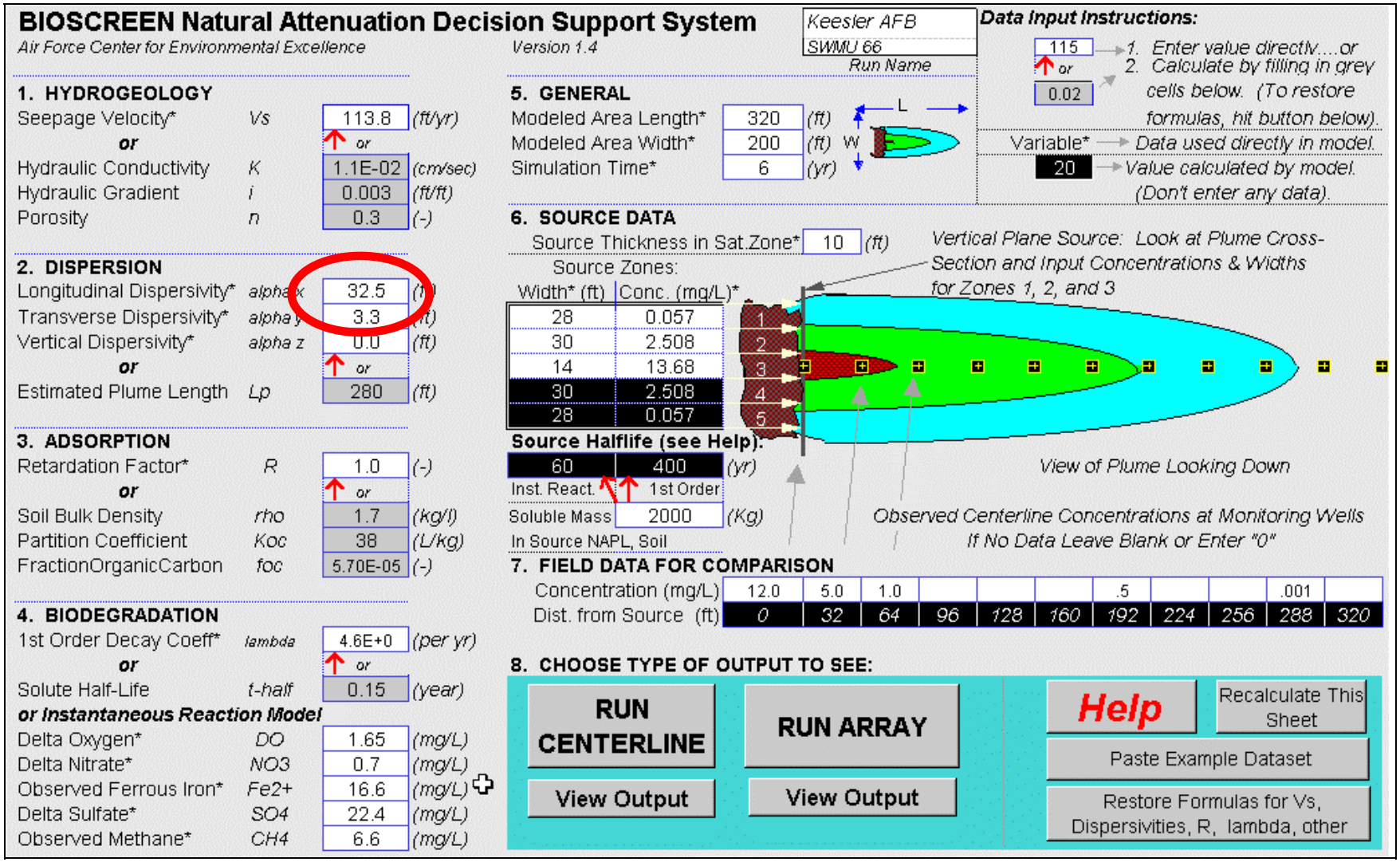
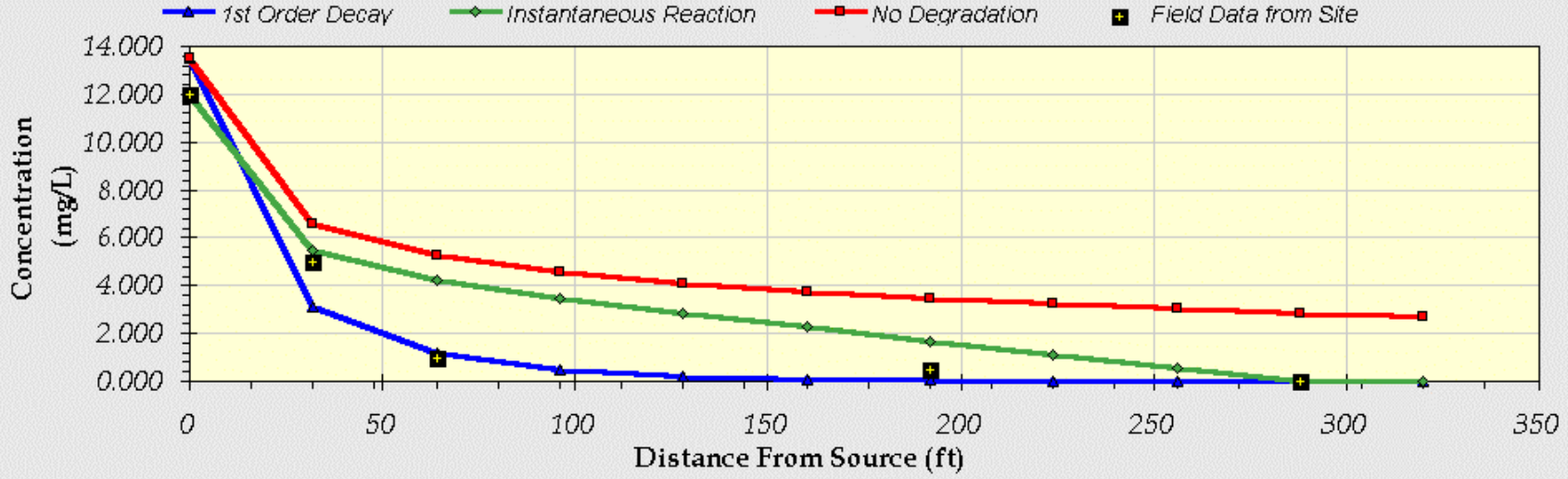


Figure 2. BIOSCREEN Input Screen. Keesler Air Force Base, Mississippi. (Note: longitudinal dispersivity has been changed from the original computed value of 13.3 ft. to 32.5 ft. during calibration.)

DISSOLVED HYDROCARBON CONCENTRATION ALONG PLUME CENTERLINE (mg/L at Z=0)

TYPE OF MODEL	Distance from Source (ft) 0	32	64	96	128	160	192	224	256	288	320
No Degradation	13.544	6.575	5.280	4.581	4.107	3.754	3.474	3.241	3.040	2.861	2.697
1st Order Decay	13.544	3.117	1.186	0.488	0.208	0.090	0.040	0.018	0.008	0.004	0.002
Inst. Reaction	12.021	5.463	4.248	3.500	2.860	2.257	1.678	1.114	0.559	0.004	0.000
Field Data from Site	12.000	5.000	1.000				0.500			0.001	



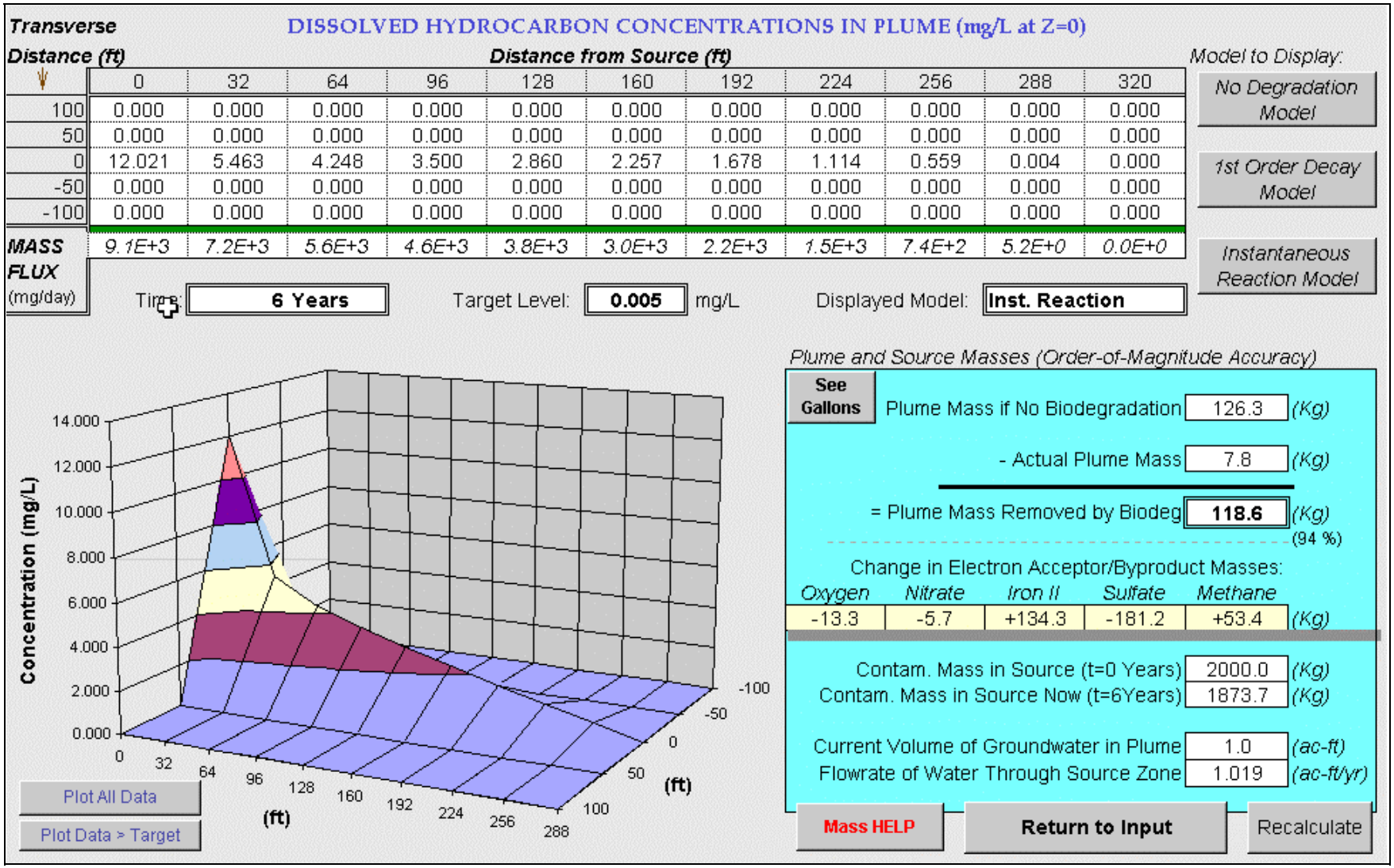
Calculate Animation

Time: 6 Years

Return to Input

Recalculate This Sheet

Figure 3. Centerline Output. Keesler Air Force Base, Mississippi.



Transverse Distance (ft)	0	32	64	96	128	160	192	224	256	288	320
100	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
50	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0	12.021	5.463	4.248	3.500	2.860	2.257	1.678	1.114	0.559	0.004	0.000
-50	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
-100	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
MASS FLUX (mg/day)	9.1E+3	7.2E+3	5.6E+3	4.6E+3	3.8E+3	3.0E+3	2.2E+3	1.5E+3	7.4E+2	5.2E+0	0.0E+0

Figure 4. Array Concentration Output. Keesler Air Force Base, Mississippi.

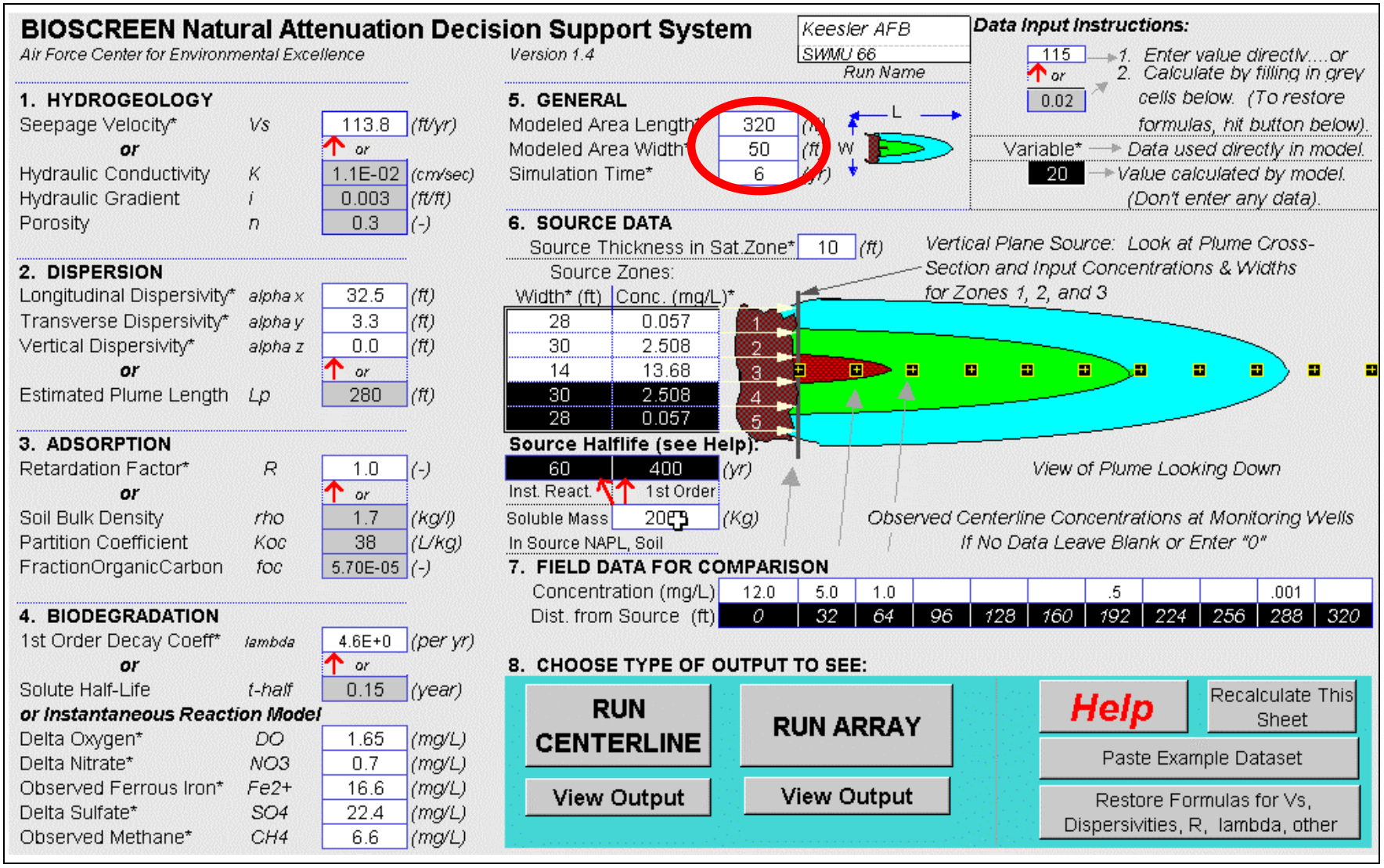
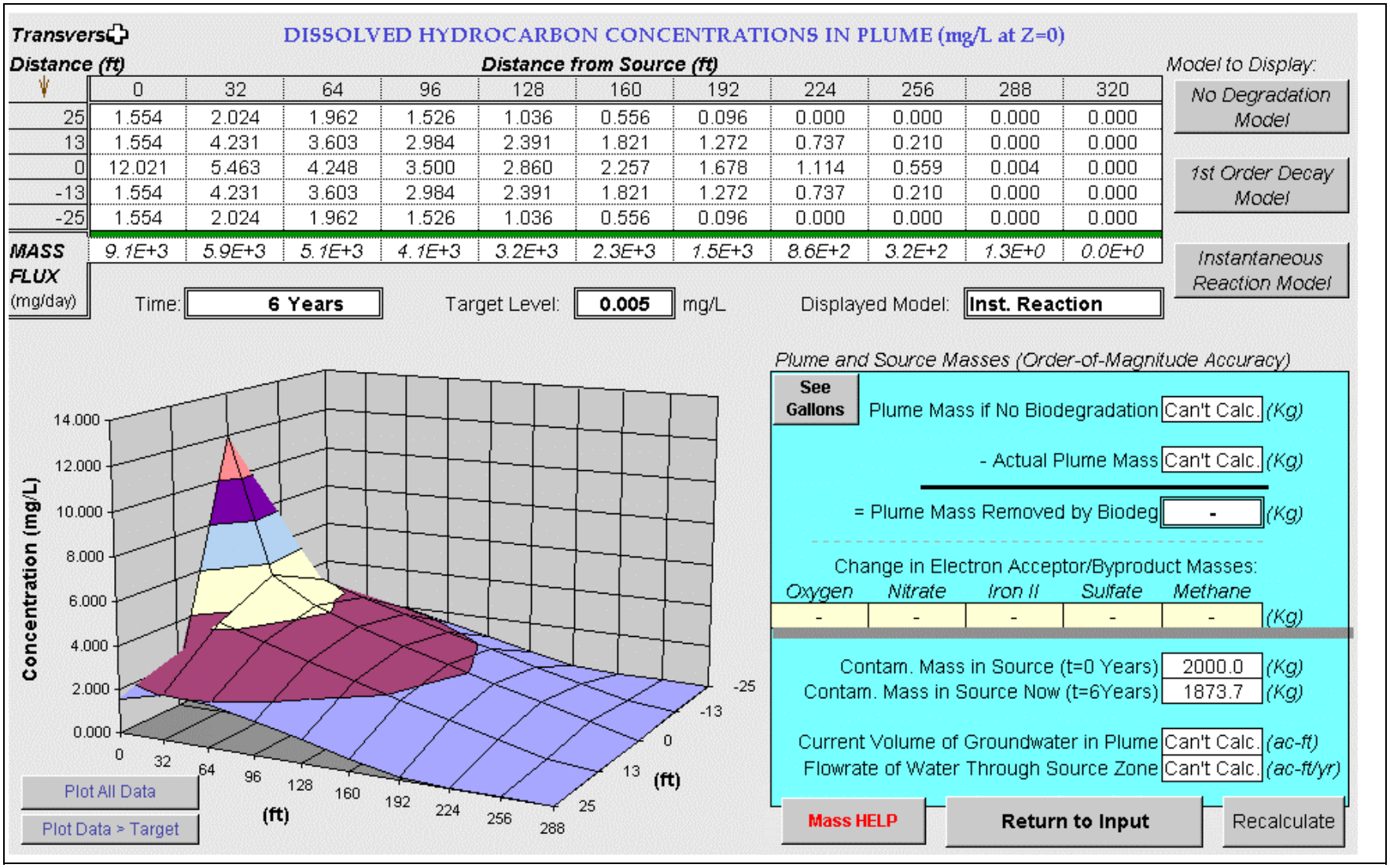


Figure 5. BIOSCREEN Input Screen. Keesler Air Force Base, Mississippi, with 50 ft. modeled area width.



Distance (ft)	0	32	64	96	128	160	192	224	256	288	320
25	1.554	2.024	1.962	1.526	1.036	0.556	0.096	0.000	0.000	0.000	0.000
13	1.554	4.231	3.603	2.984	2.391	1.821	1.272	0.737	0.210	0.000	0.000
0	12.021	5.463	4.248	3.500	2.860	2.257	1.678	1.114	0.559	0.004	0.000
-13	1.554	4.231	3.603	2.984	2.391	1.821	1.272	0.737	0.210	0.000	0.000
-25	1.554	2.024	1.962	1.526	1.036	0.556	0.096	0.000	0.000	0.000	0.000

Figure 6. Array Concentration Output. Keesler Air Force Base, Mississippi, with 50 ft. modeled area width.

APPENDIX A.6 BIOSCREEN EXAMPLES

Example 1: SWMU 66, Keesler AFB, Mississippi

- Input Data
- Fig. 1 Source Map
- BIOSCREEN Modeling Summary
- Fig. 2 BIOSCREEN Input Data
- Fig. 3 BIOSCREEN Centerline Output
- Fig. 4 BIOSCREEN Array Output

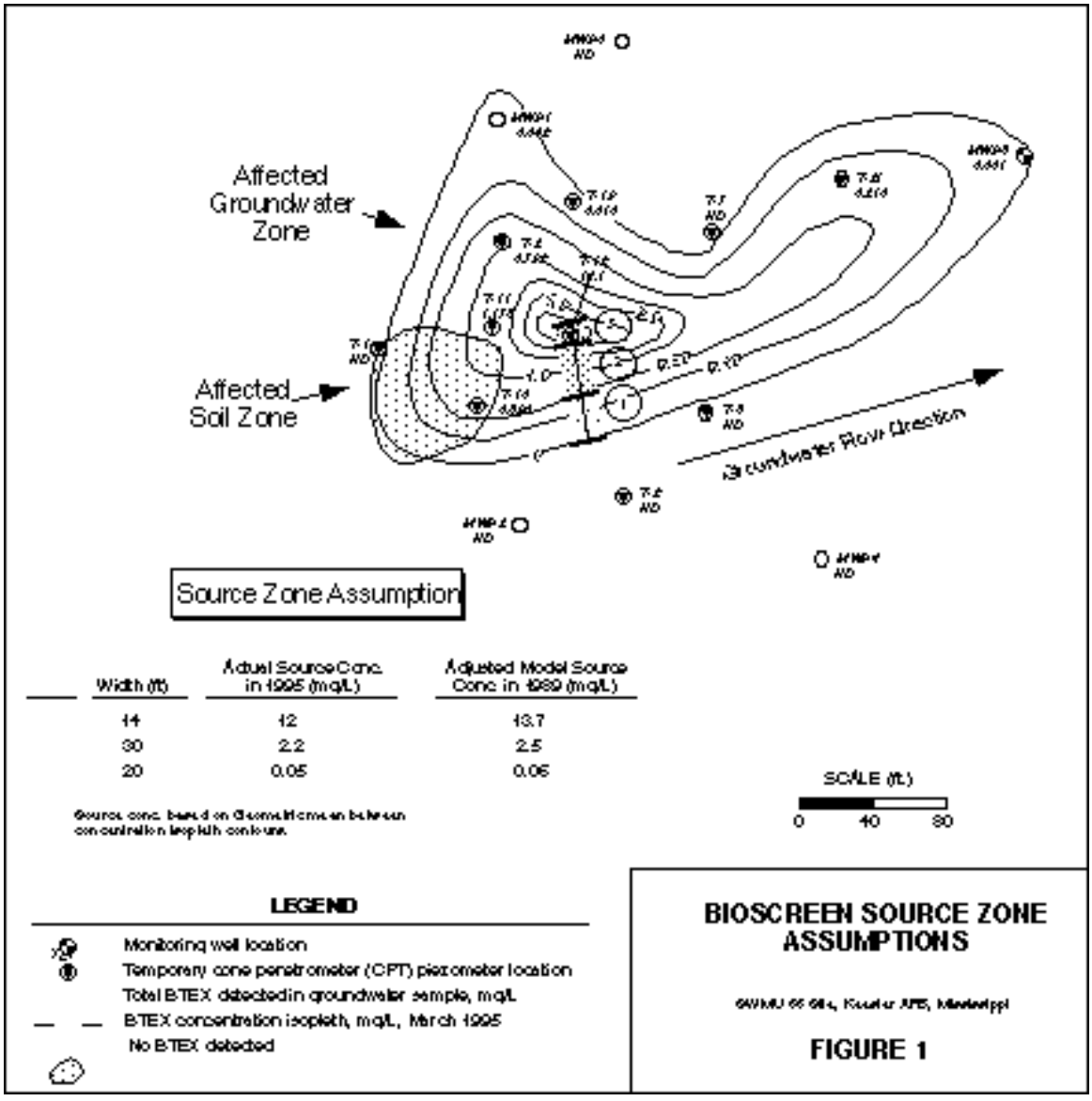
Example 2: UST Site 870, Hill AFB, Utah

- Input Data
- Fig. 5 Source Map
- BIOSCREEN Modeling Summary
- Fig. 6 BIOSCREEN Input Data
- Fig. 7 BIOSCREEN Centerline Output
- Fig. 8 BIOSCREEN Array Output

BIOSCREEN EXAMPLE 1

Keesler Air Force Base, SWMU 66, Mississippi

DATA TYPE	Parameter	Value	Source of Data
Hydrogeology	• Hydraulic Conductivity: • Hydraulic Gradient: • Porosity:	1.1 x 10^{-2} (cm/sec) 0.003 (ft/ft) 0.3	• Slug-tests results • Static water level measurements • Estimated
Dispersion	Original: • Longitudinal Dispersivity: • Transverse Dispersivity: • Vertical Dispersivity: After Calibration: • Longitudinal Dispersivity: • Transverse Dispersivity: • Vertical Dispersivity:	 13.3 (ft) 1.3 (ft) 0 (ft) 32.5 (ft) 3.25 (ft) 0 (ft)	 • Based on estimated plume length of 280 ft and Xu/Eckstein relationship • Based on calibration to plume length (Note this is well within the observed range for long. dispersivity; see Fig. A.1 in Appendix A..3. Remember to convert from feet to meters before using the chart).
Adsorption	• Retardation Factor: • Soil Bulk Density ρb: • foc: • Koc:	1.0 1.7 (kg/L) 0.0057% B: 38 T: 135 E: 95 X: 240	• Calculated from R = 1+Koc x foc x ρb/n • Estimated • Lab analysis • Literature - use Koc = 38
Biodegradation	Electron Acceptor: Background Conc. (mg/L): Minimum Conc. (mg/L): Change in Conc. (mg/L): Electron Acceptor: Max. Conc. (mg/L): Avg. Conc. (mg/L):	O2 NO3 SO4 2.05 0.7 26.2 - 0.4 - 0 - 3.8 1.65 0.7 22.4 Fe CH4 36.1 7.4 16.6 6.6 Note: Boxed values are BIOSCREEN input values.	• Based on March 1995 groundwater sampling program conducted by Groundwater Services, Inc.
General	• Modeled Area Length: • Modeled Area Width: • Simulation Time:	320 (ft) 200 (ft) 6 (yrs)	• Based on area of affected groundwater plume • Steady-state flow
Source Data	• Source Thickness: • Source Concentration:	10 (ft) (See Figure 1)	• Based on geologic logs and lumped BTEX monitoring data
Actual Data	Distance From Source (ft): BTEX Conc. (mg/L):	30 60 180 280 5.0 1.0 0.5 0.001	• Based on observed concentrations at site
OUTPUT	Centerline Concentration:	See Figure 3	
	Array Concentration:	See Figure 4	


Affected Groundwater Zone
Affected Soil Zone
Groundwater Flow Direction
Source Zone Assumption
Width (ft)
Actual Source Conc. in 1995 (mg/L)
Adjusted Model Source Conc. in 1989 (mg/L)
14
12
13.7
30
2.2
2.5
20
0.05
0.06
SCALE (ft.)
0
40
80
LEGEND
Monitoring well location
Temporary cone penetrometer (CPT) piezometer location
Total BTEX detected in groundwater sample, mg/L
BTEX concentration isopleth, mg/L, March 1995
No BTEX detected
BIOSCREEN SOURCE ZONE ASSUMPTIONS
FIGURE 1

BIOSCREEN Modeling Summary, Keesler Air Force Base, SWMU 66, Mississippi:

- BIOSCREEN was used to try to reproduce the movement of the plume from 1989 (the best guess for when the release occurred) to 1995.
- The soluble mass in soil and NAPL was estimated by integrating BTEX soil concentrations contours mapped as part of the site soil delineation program. An estimated 2000 Kg of BTEX was estimated to be present at the site based on GC/MS analysis of soil samples collected from both the vadose and saturated zone. This value represented a source half-life of 60 years with the instantaneous reaction model (the first value shown in the source half-life box in Figure 2), a relatively long half-life, so the 2000 Kg measured in 1995 was assumed to be representative of 1989 conditions.
- The instantaneous reaction model was used as the primary model to try to reproduce the plume length (~ 280 ft).
- Because a decaying source was used, the source concentration on the input screen (representing concentrations 6 yrs ago) were adjusted so the source concentration on the centerline output screen (representing concentrations now) were equal to 12 mg/L. Because the source decay term is different for the first order decay and instantaneous reaction models, this simulation focused on matching the instantaneous reaction model. The final result was a source concentration of 13.68 mg/L in the center of the source zone (note on the centerline output the source concentration is 12.021 mg/L).
- The initial run of the instantaneous reaction model indicated that the plume was too long. This indicates that there is more mixing of hydrocarbon and electron acceptors at the site than is predicted by the model. Therefore the longitudinal dispersivity was adjusted upwards (more mixing) until BIOSCREEN matched the observed plume length. The final longitudinal dispersivity was 32.5 ft.
- As a check the first-order decay model was used with the BIOSCREEN default value of 2 yrs. This run greatly overestimated the plume length, so the amount of biodegradation was increased by decreasing the solute half-life. A good match of the plume was reached with a solute half-life of 0.15 years. This is within observed ranges reported in the literature (see solute half-life section, page 22).
- As shown in Figure 3, BIOSCREEN matches the observed plume fairly well. The instantaneous model is more accurate near the source while the first order decay model is more accurate near the middle of the plume. Both models reproduce the actual plume length relatively well.
- As shown in Figure 4, the current plume is estimated to contain 7.8 kg of BTEX. BIOSCREEN indicates that the plume under a no-degradation scenario would contain 126.3 kg BTEX. In other words BIOSCREEN indicates that 94% of the BTEX mass that has left the source since 1989 has biodegraded.
- Most of the source mass postulated to be in place in 1989 is still there in 1996 (2000 kg vs. 1837 kg, or 92% left).
- The current plume contains 1.0 ac-ft of contaminated water, with 1.019 acre-ft/yr of water being contaminated as it flows through the source. Because the plume is almost at steady state, 1.019 ac-ft of water become contaminated per year with the same amount being remediated every year due to in-situ biodegradation and other attenuation processes. This indicates that a long-term monitoring approach would probably be more appropriate for this site than active remediation, as the plume is no longer growing in size.

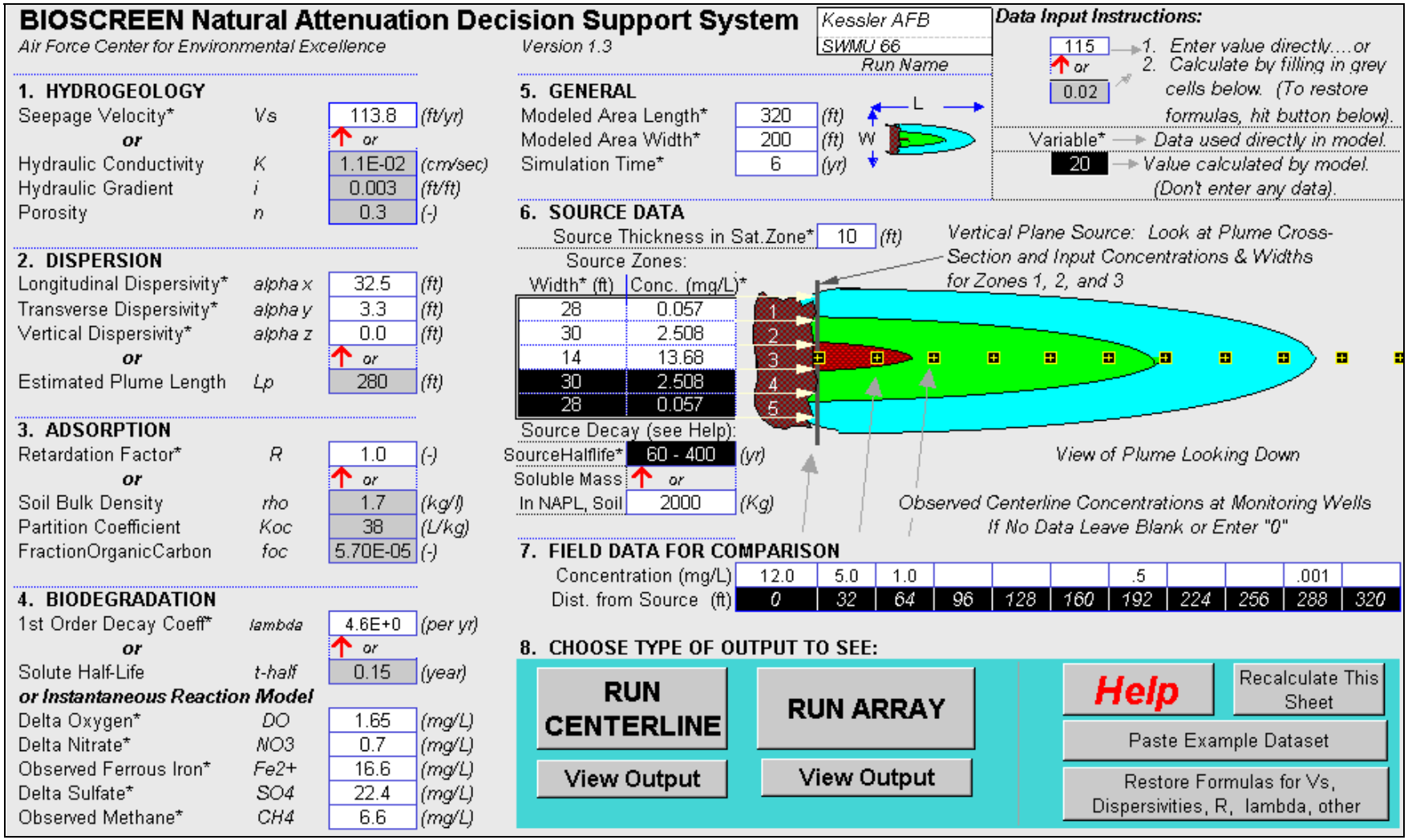
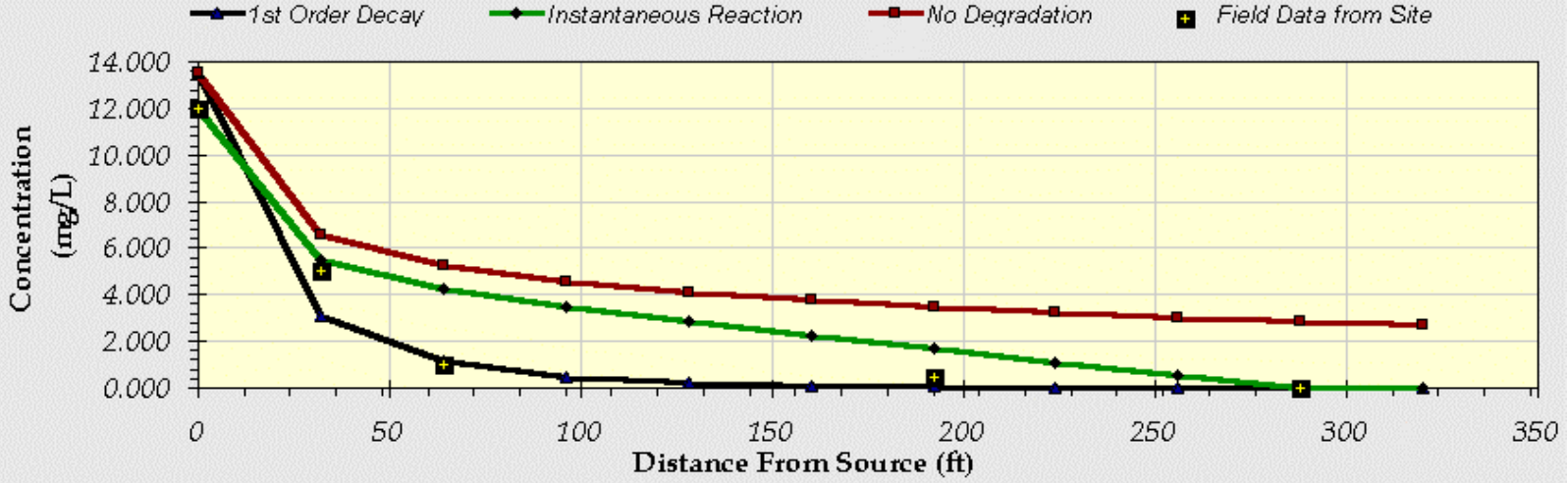


Figure 2. BIOSCREEN Input Screen. Keesler Air Force Base, Mississippi.

DISSOLVED HYDROCARBON CONCENTRATION ALONG PLUME CENTERLINE (mg/L at Z=0)

TYPE OF MODEL	Distance from Source (ft) 0	32	64	96	128	160	192	224	256	288	320
No Degradation	13.544	6.575	5.280	4.581	4.107	3.754	3.474	3.241	3.040	2.861	2.697
1st Order Decay	13.544	3.117	1.186	0.488	0.208	0.090	0.040	0.018	0.008	0.004	0.002
Inst. Reaction	12.021	5.463	4.248	3.500	2.860	2.257	1.678	1.114	0.559	0.004	0.000
Field Data from Site	12.000	5.000	1.000				0.500			0.001	



Calculate Animation

Time: 6 Years

Return to Input

Recalculate This Sheet

Figure 3. Centerline Output. Keesler Air Force Base, Mississippi.

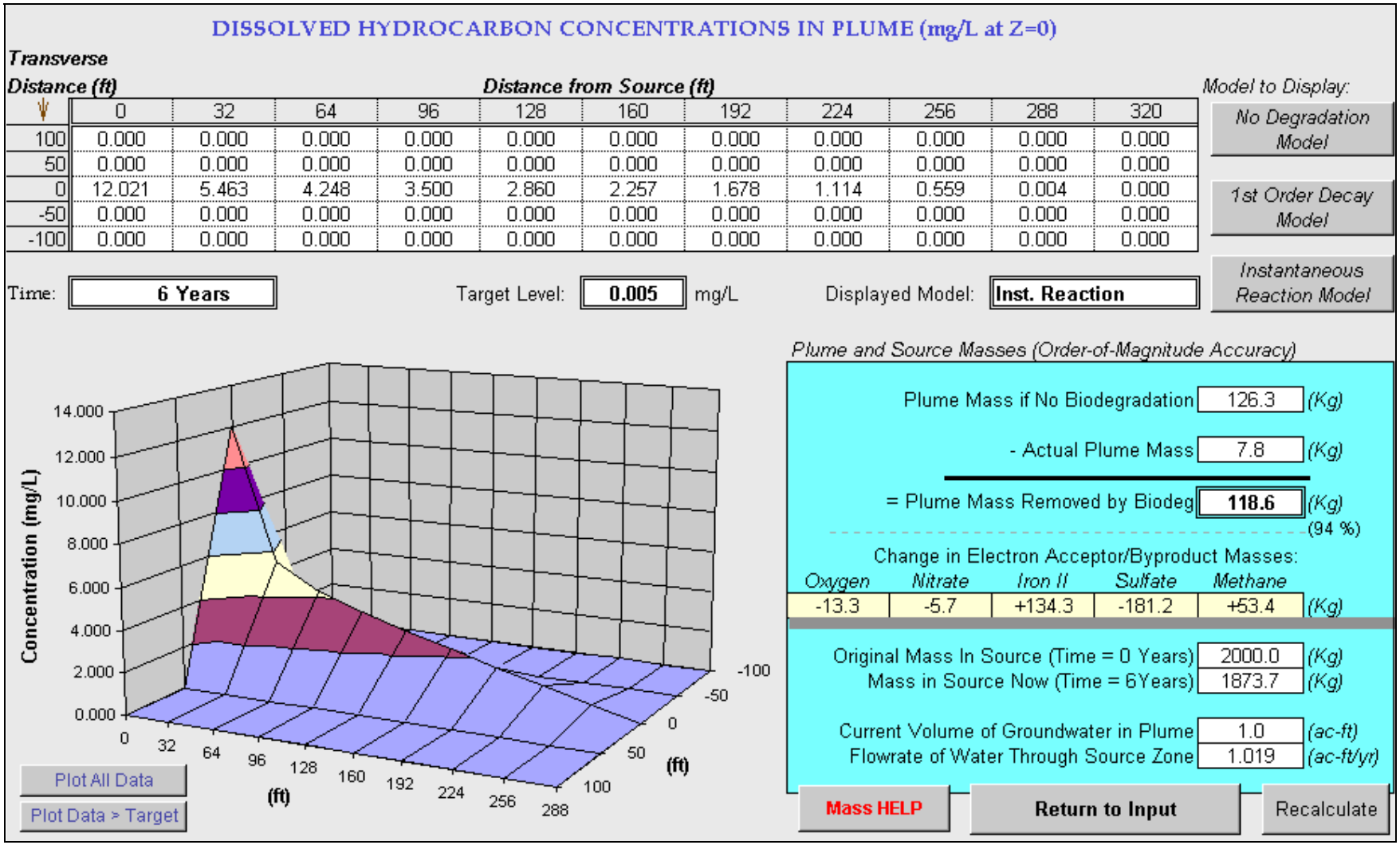
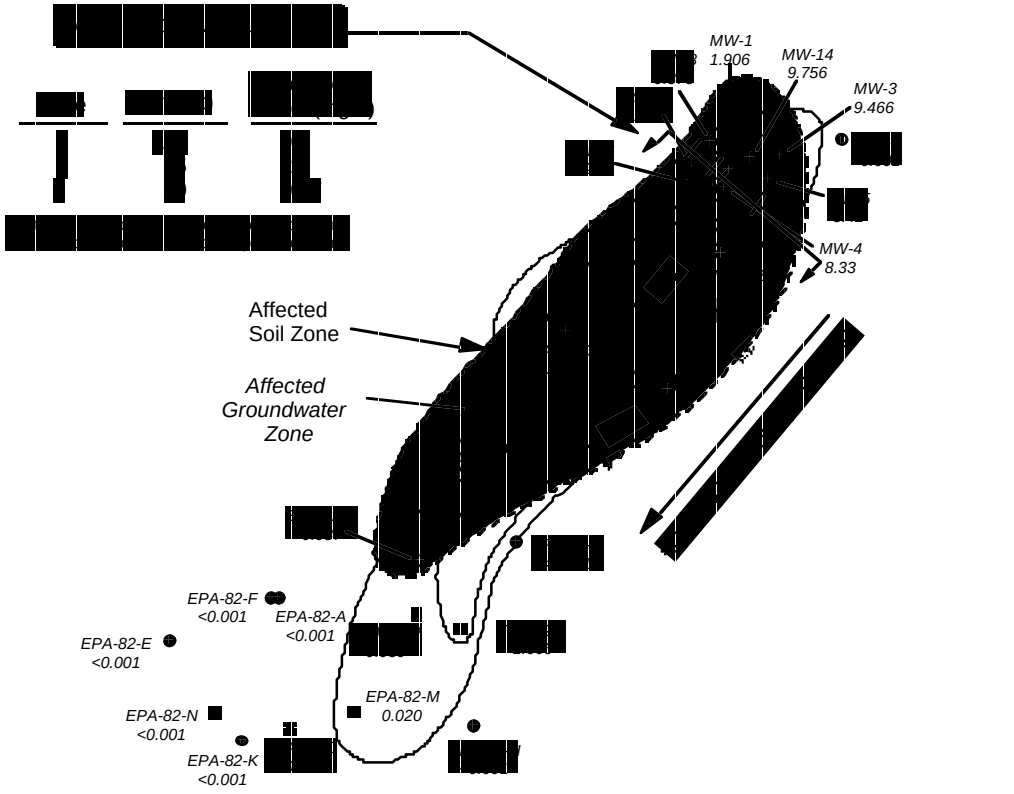


Figure 4. Array Concentration Output. Keesler Air Force Base, Mississippi.

EXAMPLE 2

Hill Air Force Base, UST Site 870, Utah

DATA TYPE	Parameter	Value	Source
Hydrogeology	• Hydraulic Conductivity: • Hydraulic Gradient: • Porosity:	8.05 x 10^{-3} (cm/sec) 0.048 (ft/ft) 0.25	• Slug-tests results • Static water level measurements • Estimated
Dispersion	Original • Longitudinal Dispersivity: • Transverse Dispersivity: • Vertical Dispersivity:	 28.5 (ft) 2.85 (ft) 0 (ft)	• Based on estimated plume length of 1450 ft and Xu's dispersivity formula • Note: No calibration was necessary to match the observed plume length.
Adsorption	• Retardation Factor: • Soil Bulk Density ρb: • foc: • Koc:	1.3 1.7 (kg/L) 0.08% B: 38 T: 135 E: 95 X: 240	• Calculated from R = 1+Koc x foc x ρb/n • Estimated • Lab analysis • Literature - use Koc = 38
Biodegradation	Electron Acceptor: Background Conc. (mg/L): Minimum Conc. (mg/L): Change in Conc. (mg/L): Electron Acceptor: Max. Conc. (mg/L): Avg. Conc. (mg/L):	O2 NO3 SO4 6.0 17.0 100 - 0.22 - 0 - 0 5.78 17.0 100 Fe CH4 50.5 2.04 11.3 0.414 Note: Boxed values are BIOSCREEN input values.	• Based on July 1994 groundwater sampling program conducted by Parsons Engineering Science, Inc.
General	• Modeled Area Length: • Modeled Area Width: • Simulation Time:	1450 (ft) 320 (ft) 5 (yrs)	• Based on area of affected groundwater plume • Steady-state flow
Source Data	• Source Thickness: • Source Concentration:	10 (ft) (See Figure 5)	• Based on geologic logs and lumped BTEX monitoring data
Actual Data	Distance from Source (ft): BTEX Conc. (mg/L):	340 1080 1350 1420 8.0 1.0 0.02 0.005	• Based on observed concentration contour at site (see Figure 5)
OUTPUT	Centerline Concentration:	See Figure 7	
	Array Concentration:	See Figure 8	



LEGEND

- Monitoring well location
- July 1994 Geoprobe sampling location
- BTEX concentration Isopleth, mg/L, July 1994
- Affected Soil Zone

BIOSCREEN SOURCE ZONE ASSUMPTIONS

UST Site 870, Hill AFB, Utah

FIGURE 5

BIOSCREEN Modeling Summary Hill Air Force Base, UST Site 870, Utah:

- BIOSCREEN was used to try to reproduce the movement of the plume.
- An infinite source was assumed to simplify the modeling scenario because no estimates of the source mass were available from soil sampling data. The source was assumed to be in the high concentration zone of the plume area (see Figure 5). Note that the zone of affected soil was quite large; however much of the affected soil zone downgradient of the source was relatively low concentration.

  Two modeling approaches could be applied: 1) assuming the source zone is just downgradient of the affected soil area (near well EPA-82-C) and ignoring the area upgradient of the this point, and 2) modeling most of the plume with source near MW-1. Alternative 1 is theoretically more accurate, as BIOSCREEN cannot account for the contributions from any affected soil zone downgradient of the source. At the case of Hill AFB, however, it was assumed that the contributions from this downgradient affected soil were relatively minor and that the main process of interest was the length of the plume from the high-concentration source zone. Therefore Alternative 2 was modeled, with the note that the middle of the actual plume may actually have higher concentrations than would be expected due to the contaminants in the downgradient affected soil zone.
- The instantaneous reaction model was used as the primary model to try to reproduce the plume length (~ 280 ft) as shown in Figure 7.
- The initial run of the instantaneous reaction model reproduced the existing plume without any need for calibration of dispersivity.
- As a check the first-order decay model was used with the BIOSCREEN default value of 2 yrs. This run greatly overestimated the plume length, so the amount of biodegradation was increased by decreasing the solute half-life. A half-life value of 0.1 years was required to match the plume length, although the match in the middle in the plume was much poorer.
- As shown in Figure 7, BIOSCREEN matches the observed plume fairly well. The instantaneous model is more accurate near the source while the first order decay model is more accurate near the middle of the plume. Both models reproduce the actual plume length relatively well.
- As shown in Figure 8, the model was unable to calculate the mass balances. A quick evaluation shows the reason: with a seepage velocity of 1609 ft/yr and a 5 year simulation time, the undegraded plume should be over 8000 ft long. Because the mass balance is based on a comparison of a complete undegraded plume vs. a degraded plume, a model area length of 8000 ft would be required for BIOSCREEN to complete the mass balance calculation. Therefore two runs would be needed to complete the simulation: 1) a run with a modeled length of 1450 feet to calibrate and evaluate the match to existing data, and 2) a run with a modeled length of 8000 ft to do the mass balance. The results of the second run (change of model area length from 1450 ft to 8000 ft) indicate that over 99% of the mass that has left the source has biodegraded by the time groundwater has traveled 1450 ft.

  Because the plume is no longer moving, a long-term monitoring approach is probably more appropriate for this site than active remediation.

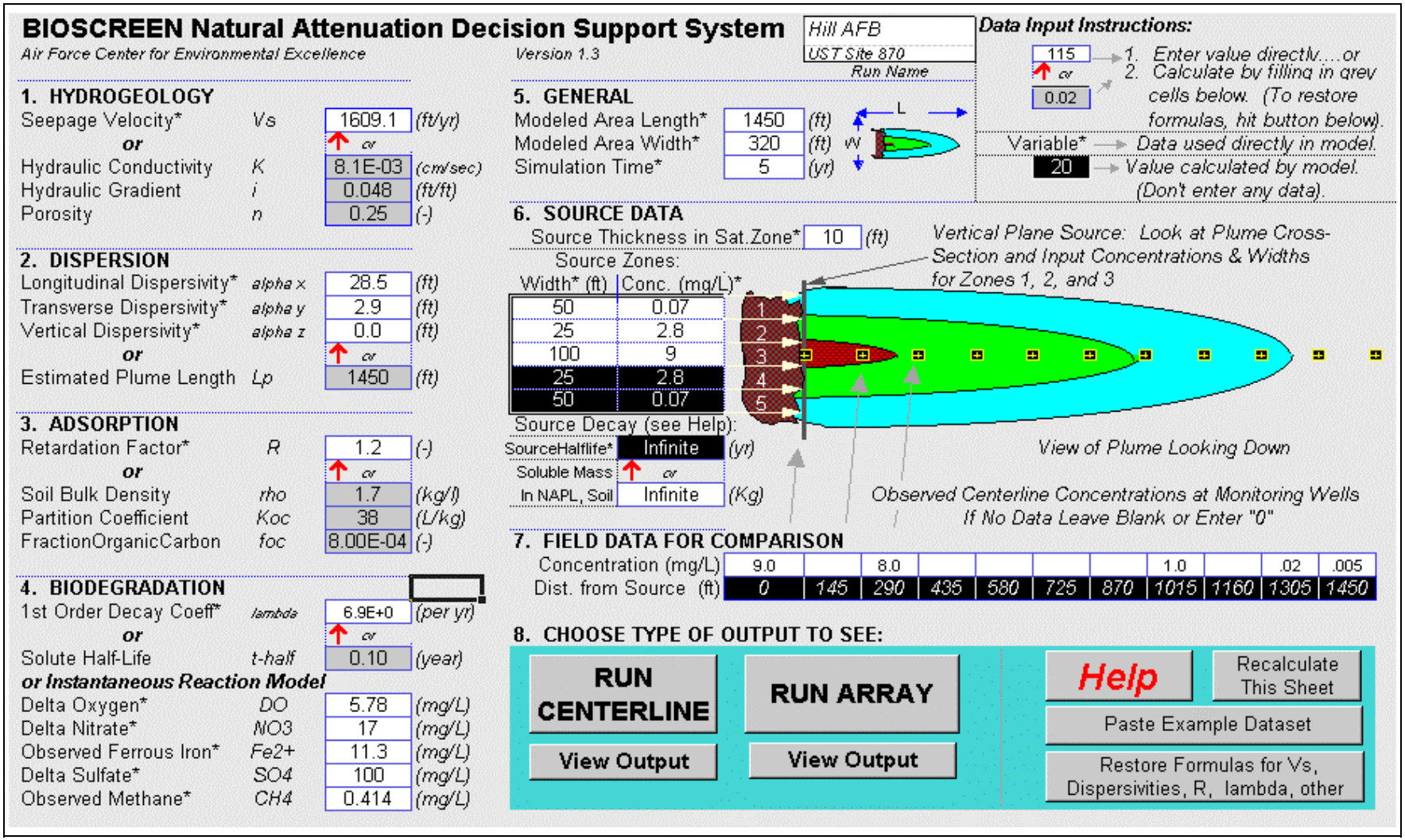


Figure 6. BIOSCREEN Input Screen. Hill Air Force Base, Utah.

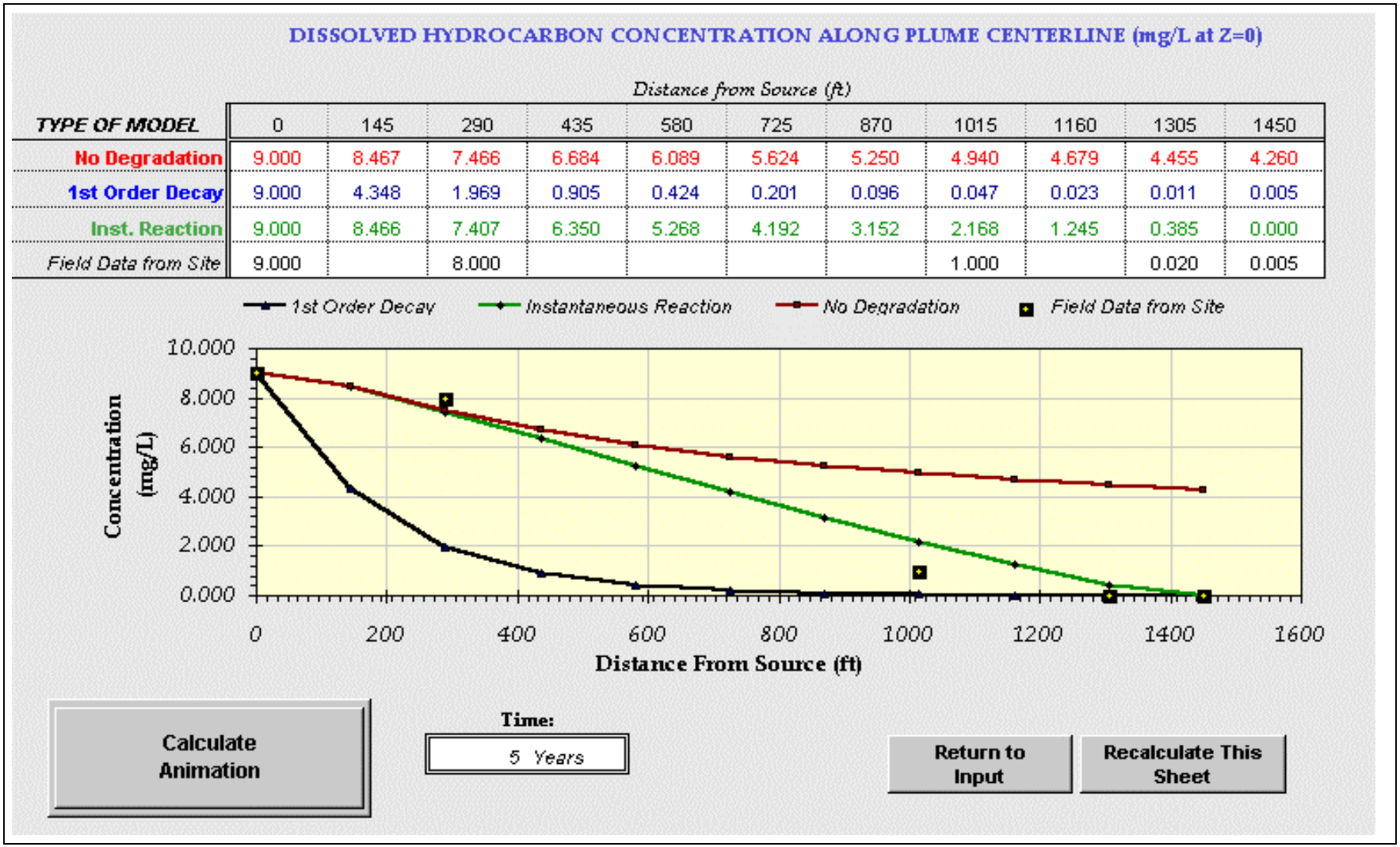


Figure 7. Centerline Output. Hill Air Force Base, Utah.

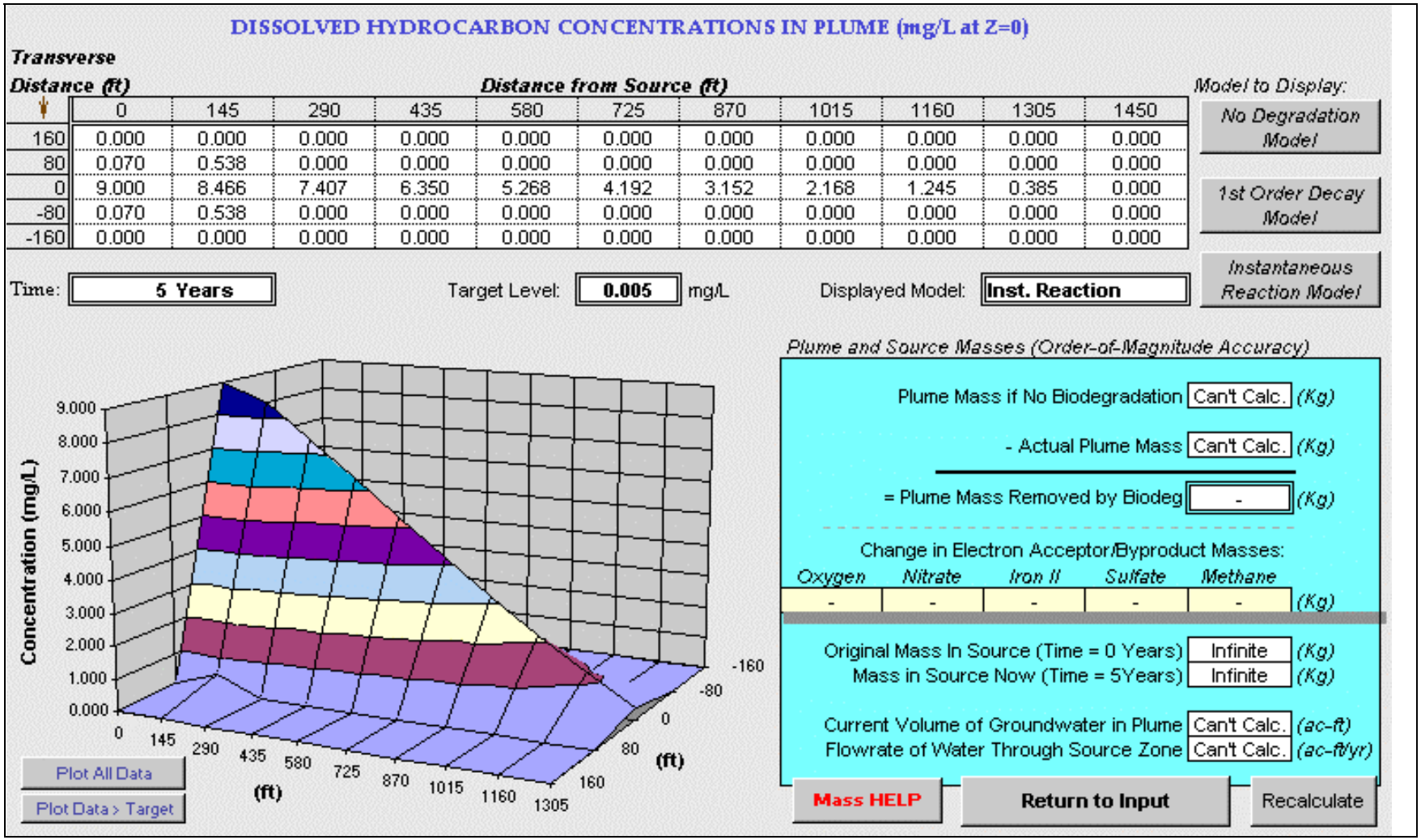


Figure 8. Array Concentration Output. Hill Air Force Base, Utah.

APPENDIX E

SITE INVESTIGATION CHROMATOGRAMS

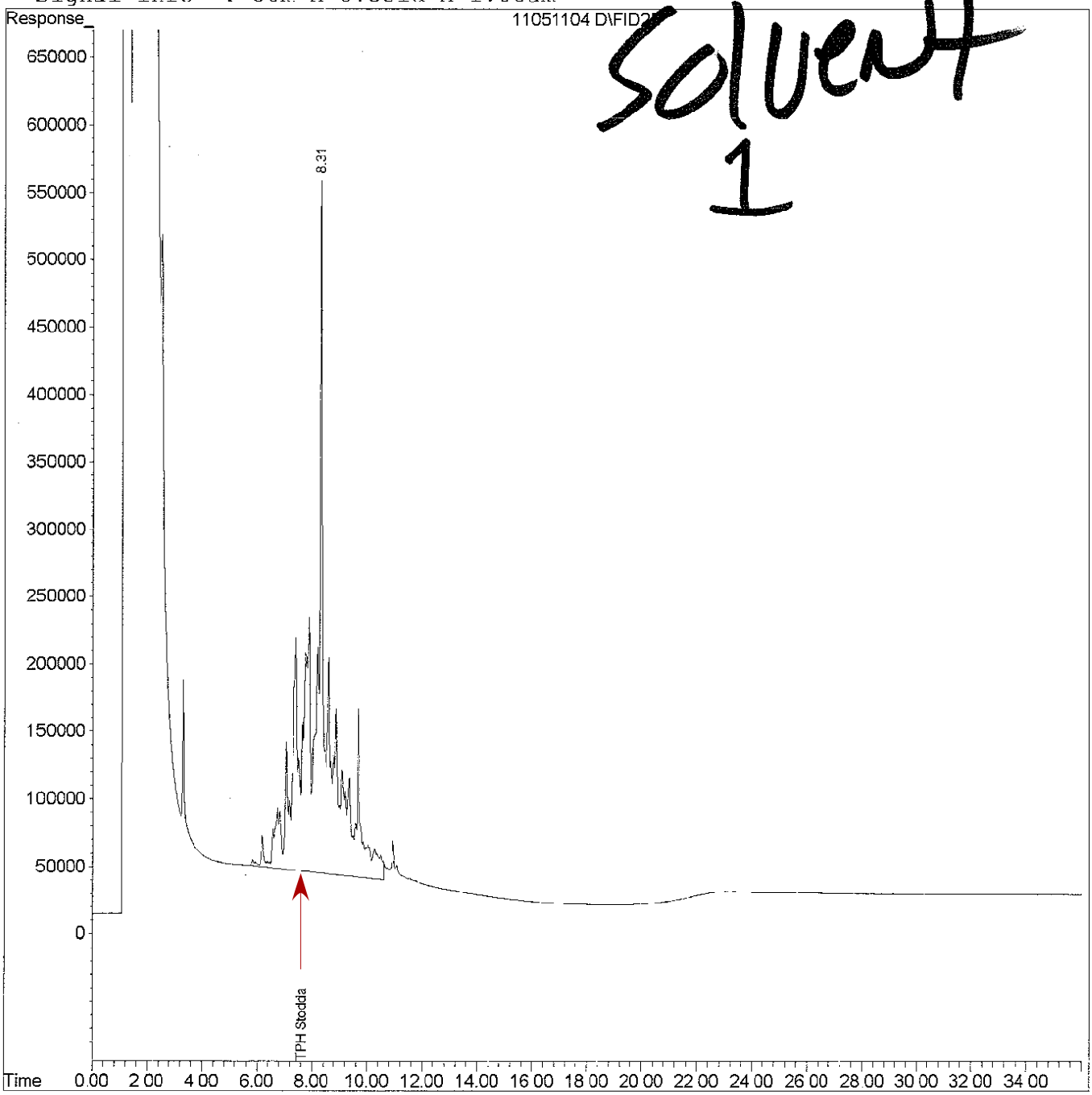
Quantitation Report

Data File : C:\HPCHEM\2\DATA\051111A\11051104.D Vial: 4
Acq On : 11 May 2011 11:22 Operator: R.L. JAMES
Sample : 1000PPM TPH SS STD Inst : HP-FID
Misc : 1000PPM TPH SS STD (2uL) Multiplr: 0.50
IntFile : EVENTS2.E
Quant Time: May 11 14:00 2011 Quant Results File: TPHST1B.RES

Quant Method : C:\HPCHEM\2\METHODS\TPHST1B.M (Chemstation Integrator)
Title : 3500/8015 TPH Stoddard Solvent
Last Update : Wed Jun 11 11:22:01 2008
Response via : Multiple Level Calibration
DataAcq Meth : TPHD1B.M

Volume Inj. : 2uL
Signal Phase : J&W DB-5
Signal Info : 30m X 0.53id X 1.00um

STODDARD SOLVENT 1



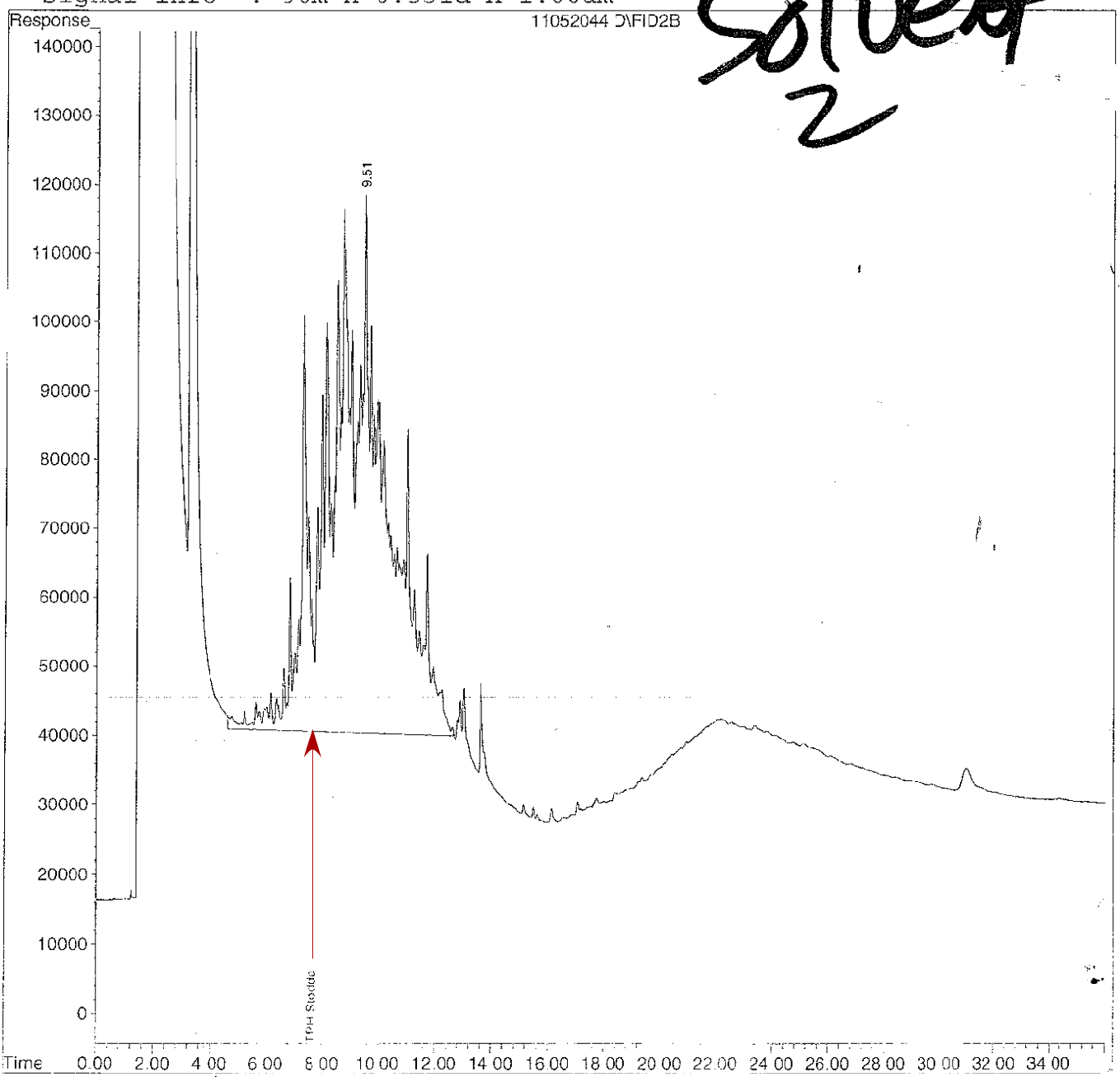
Quantitation Report

Data File : C:\HPCHEM\2\DATA\052011A\11052044.D Vial: 44
Acq On : 24 May 2011 00:15 Operator: R.L. JAMES
Sample : 19868-3; TABER Inst : HP-FID
Misc : GP-8-16.5 (20G/1ML) Multiplr: 0.03
IntFile : EVENTS2.E
Quant Time: May 24 8:24 2011 Quant Results File: TPHST1B.RES

Quant Method : C:\HPCHEM\2\METHODS\TPHST1B.M (Chemstation Integrator)
Title : 3500/8015 TPH Stoddard Solvent
Last Update : Wed Jun 11 11:22:01 2008
Response via : Multiple Level Calibration
DataAcq Meth : TPHD1B.M

Volume Inj. : 2uL
Signal Phase : J&W DB-5
Signal Info : 30m X 0.53id X 1.00um

STODDARD Solvent 2



Quantitation Report

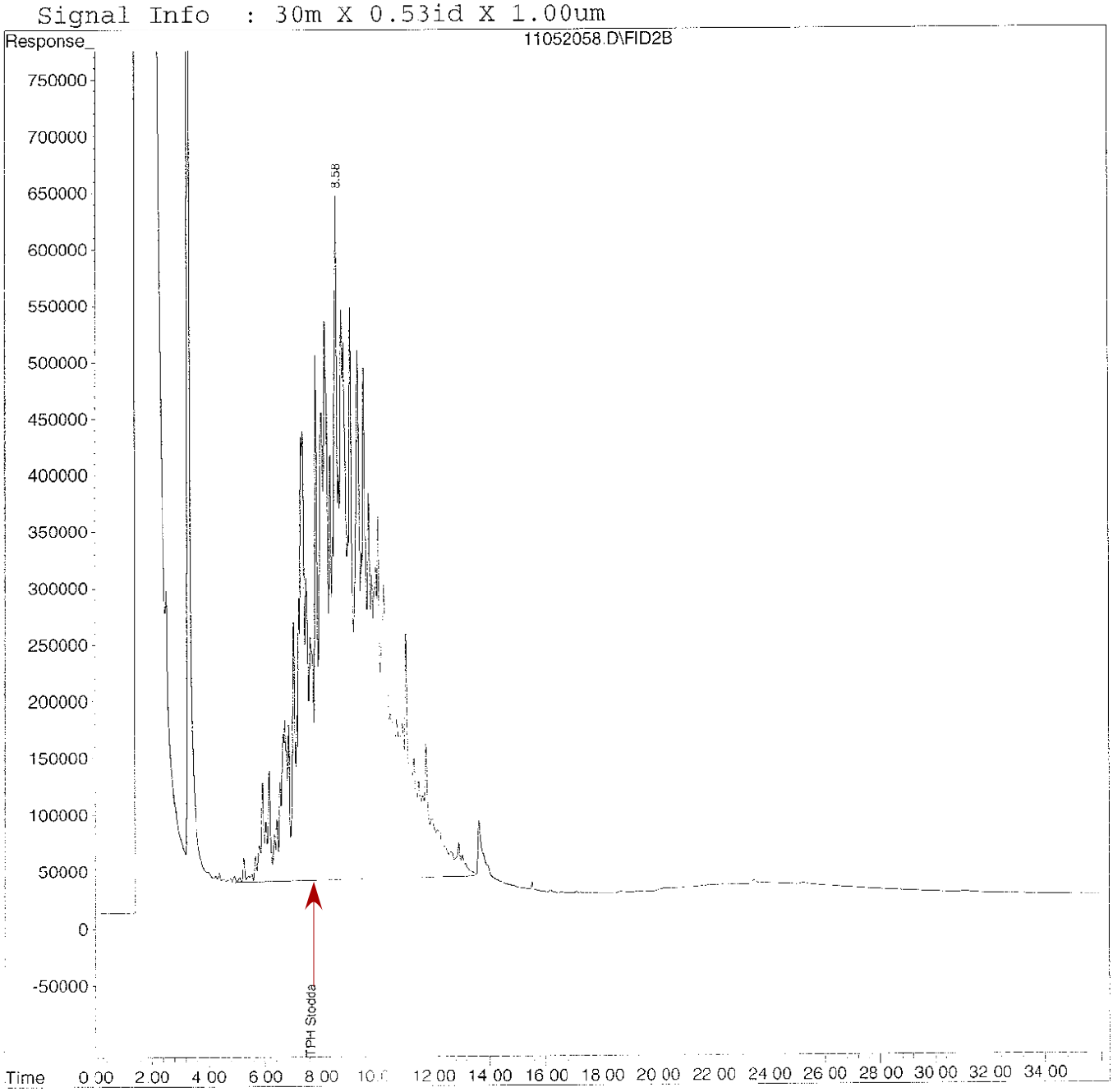
Data File : C:\HPCHEM\2\DATA\052011A\11052058.D
Acq On : 24 May 2011 10:41
Sample : 19882-04; TABER
Misc : GP-12-16 (20G/1ML)
IntFile : EVENTS2.E
Quant Time: May 24 11:24 2011 Quant Results File: TPHST1B.RES

29

Vial: 58
Operator: R.L. JAMES
Inst : HP-FID
Multiplr: 0.03

Quant Method : C:\HPCHEM\2\METHODS\TPHST1B.M (Chemstation Integrator)
Title : 3500/8015 TPH Stoddard Solvent
Last Update : Wed Jun 11 11:22:01 2008
Response via : Multiple Level Calibration
DataAcq Meth : TPHD1B.M

Volume Inj. : 2uL
Signal Phase : J&W DB-5
Signal Info : 30m X 0.53id X 1.00um



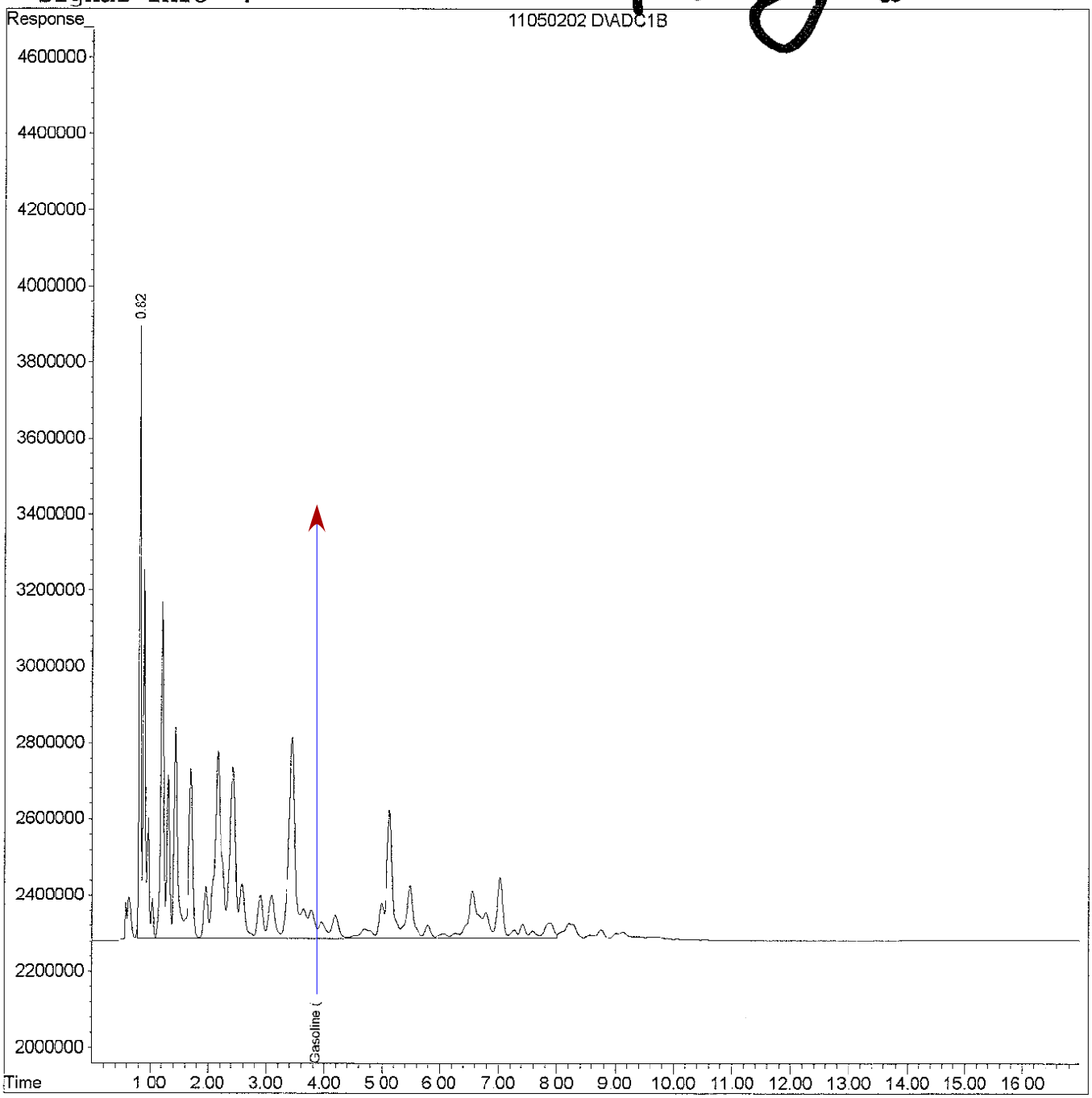
Quantitation Report

Data File : D:\HPCHEM\1\DATA\050211V4\11050202.D Vial: 2
Acq On : 2 May 2011 14:04 Operator: R.L. JAMES
Sample : 1.0PPM TPHgas Inst : VAR-4
Misc : P&T (5ML) Multiplr: 0.20
IntFile : TFT1.E
Quant Time: May 2 14:51 2011 Quant Results File: TPHGV4.RES

Quant Method : C:\HPCHEM\1\METHODS\TPHGV4.M (Chemstation Integrator)
Title : GC TPH Method
Last Update : Thu Apr 07 10:54:15 2011
Response via : Multiple Level Calibration
DataAcq Meth : TPHGV4.M

TPHgas

Volume Inj. : 5ml
Signal Phase :
Signal Info :



Quantitation Report

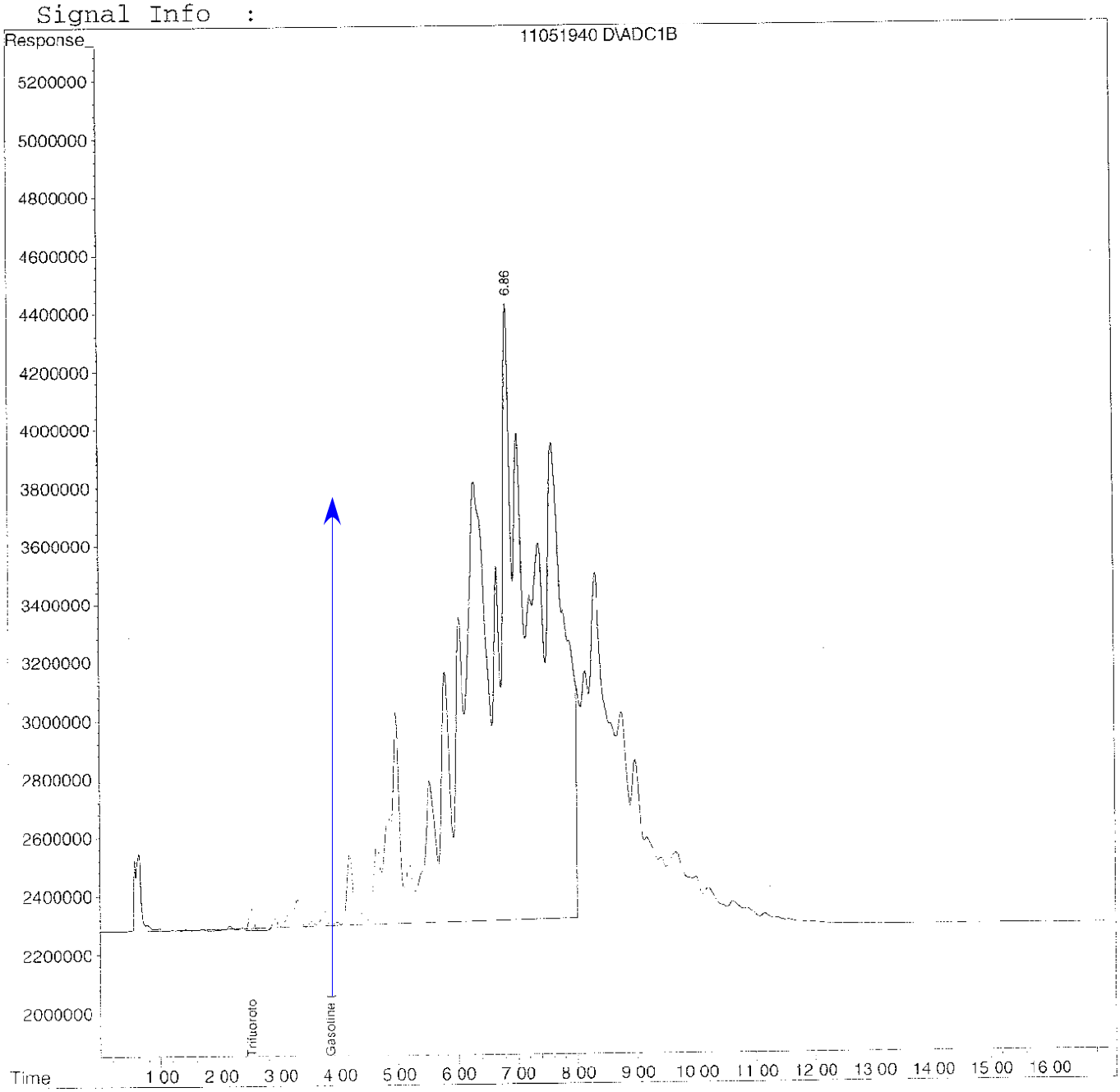
Data File : D:\HPCHEM\1\DATA\051911V4\11051940.D
Acq On : 20 May 2011 14:14
Sample : 19868-03;TABER
Misc : GP-8-16.5-SOIL (5G)
IntFile : TFT1.E
Quant Time: May 20 14:31 2011 Quant Results File: TPHGV4.RES

12

Vial: 9
Operator: R.L. JAMES
Inst : VAR-4
Multiplr: 0.20

Quant Method : C:\HPCHEM\1\METHODS\TPHGV4.M (Chemstation Integrator)
Title : GC TPH Method
Last Update : Tue May 03 08:40:10 2011
Response via : Multiple Level Calibration
DataAcq Meth : TPHGV4.M

Volume Inj. : 5ml
Signal Phase :
Signal Info :



Quantitation Report

Data File : D:\HPCHEM\1\DATA\052311V4\11052311.D
Acq On : 23 May 2011 17:41
Sample : 19882-04;TABER
Misc : GP-12-16-SOIL (4G/10ML) 1:100
IntFile : TFT1.E
Quant Time: May 23 17:58 2011 Quant Results File: TPHGV4.RES

28

Vial: 9
Operator: R.L. JAMES
Inst : VAR-4
Multiplr: 25.00

Quant Method : C:\HPCHEM\1\METHODS\TPHGV4.M (Chemstation Integrator)
Title : GC TPH Method
Last Update : Tue May 03 08:40:10 2011
Response via : Multiple Level Calibration
DataAcq Meth : TPHGV4.M

Volume Inj. : 5ml
Signal Phase :
Signal Info :