REMEDIAL ALTERNATIVE EVALUATION AND PROPOSED SITE SPECIFIC CLEANUP OBJECTIVES REPORT

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Alameda County
Environmental Health

FOR

FORMER USA GASOLINE STATION NO. 57
10700 MACARTHUR BOULEVARD
OAKLAND, CALIFORNIA

Prepared for

MOLLER INVESTMENT GROUP, INC

AUGUST 12, 2009

Prepared by

STRATUS
ENVIRONMENTAL, INC.

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Project No. 2007-0057-01

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August 12, 2009
Project No. 2007-0057-01

Mr. Jerry Wickham
Alameda County Health Care Services Agency
1131 Harbor Bay Parkway, Suite 250
Alameda, California 94502

Subject: Remedial Alternatives Evaluation and Proposed Site Specific Cleanup Objectives Report, Former USA Station No. 57, 10700 MacArthur Boulevard, Oakland, California

Dear Mr. Wickham:

On behalf of Moller Investment Group, Inc. (MIGI), Stratus Environmental, Inc. (Stratus) is attaching a report entitled *Remedial Alternatives Evaluation and Proposed Site Specific Cleanup Objectives*, for Former USA Station No. 57, located at 10700 MacArthur Boulevard, Oakland, California. This report was prepared pursuant to a request by Alameda County Health Care Services Agency (ACHCSA) personnel, in a letter dated February 13, 2009. The report summarizes historical environmental activities at the site implemented to characterize and remediate previously documented petroleum hydrocarbon impact to the subsurface, responds to questions posed in the ACHCSA February 2009 correspondence, and discusses a proposed plan to re-develop the property at the location of the former service station as a grocery store. The document also includes a health risk assessment report prepared by a toxicology consultant retained on behalf of MIGI. The risk assessment report was used to develop site specific cleanup goals for the property, as requested by ACHCSA in the February 2009 letter.

Following your initial review of the attached document, Stratus and MIGI, and likely several other parties (including the property owner and their environmental consultant), would like to meet with ACHCSA to discuss issues pertinent to the site's environmental case. We feel that it would not be prudent to propose a corrective action approach until ACHSA personnel, MIGI, and the property owner agree on the appropriate soil and groundwater cleanup levels for the site. The property owner is generally agreeable to the strategy presented, and we expect to receive a letter supporting the site specific cleanup goals presented in the attached report. We feel that it would be most productive to conduct this meeting prior to ACHCSA's issuance of a formal response letter to the attached report.

If you have any questions or comments regarding the report, or the site in general, please contact me at (530) 676-2062.

Sincerely,

STRATUS ENVIRONMENTAL, INC.

Scott Bittinger

Scott G. Bittinger, P.G.
Project Manager

cc: Mr. Charles Miller, Moller Investment Group, Inc.
Mr. John Jay, Jay-Phares Corporation
Mr. Peter McIntyre, AEI Consultants, Inc.

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August 12, 2009

Mr. Jerry Wickham
Alameda County Health Care Services Agency
1131 Harbor Bay Parkway, Suite 250
Alameda, CA 94502-6577

Re: Remedial Alternatives Evaluation and
Proposed Site Specific Cleanup Objectives Report
Former USA Station No. 57
10700 Macarthur Boulevard
Oakland, California

Dear Mr. Wickham:

The data and information presented in this report were prepared under the supervision of the undersigned.

Sincerely,

STRATUS ENVIRONMENTAL, INC.

Scott Bittinger

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Mr. John Jay, Jay-Phares Corporation
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1.0 INTRODUCTION AND EXECUTIVE SUMMARY

Stratus Environmental, Inc. (Stratus), on behalf of Moller Investment Group, Inc. (MIGI, formerly USA Gasoline Corporation [USA]), has prepared the following *Remedial Alternatives Evaluation and Proposed Site Specific Cleanup Objectives Report* for the property formerly occupied by USA Service Station No. 57, located at 10700 Macarthur Boulevard, Oakland, California (see Figure 1 and Figure 2). This document was prepared pursuant to a request by Alameda County Health Care Services Agency (ACHCSA), in a letter dated February 13, 2009.

The site is located in a vacant portion of the Foothill Square shopping center, near the intersection of 108th Avenue and Foothill Boulevard, in southeast Oakland. The owner of the subject property (Jay-Phares Corporation) intends to redevelop the area formerly occupied by USA Station 57 in the near future. Based on a recent discussion with Jay-Phares Corporation, construction of a grocery store in the area formerly occupied by USA Station 57 is proposed.

Petroleum hydrocarbon impact to the subsurface was discovered during a subsurface investigation completed in 1987. The underground storage tanks (USTs) and associated fuel delivery system were removed from the subject property in 1994, and the service station was closed and demolished at this time. At the time of UST removal, impacted soil surrounding the former UST cavity (estimated at 775 cubic yards) was excavated and removed from the property, resulting in the removal of an estimated 327.2 pounds of total petroleum hydrocarbons as gasoline (TPHG) from the site.

The geology beneath the site predominately consists of fine grained soils (silt/clay mixtures) situated above an undulatory bedrock surface. Clayey sand, silty sand, and clayey gravel soils appear to be interbedded within the fine grained soils. The soil horizon thicknesses above bedrock, encountered during historical subsurface investigations, are variable, ranging from at least 10 feet to more than 44 feet below ground surface (bgs). The soil/bedrock interface appears to generally dip towards the north, at an apparent angle of approximately 25 degrees from horizontal.

A groundwater monitoring program was initiated at the site in 1995. Groundwater levels beneath the site have fluctuated significantly during this time, ranging from approximately 5 to 24.5 feet bgs; the historically low depth to groundwater measurement was recorded during a recent (first quarter 2009) monitoring event. A convergent groundwater flow direction, towards the former fuel dispenser portion of the site, appears to be predominately present, with north-northeast groundwater flow generally present beneath the southern portion of the site and south-southeast groundwater flow largely observed beneath the northern portion of the site.

Historical groundwater analytical data from the site indicate the presence of TPHG/gasoline range organics (GRO), total petroleum hydrocarbons as diesel/diesel range organics (TPHD/DRO), benzene, toluene, ethylbenzene, and xylenes (BTEX compounds), methyl tertiary butyl ether (MTBE), tertiary butyl alcohol (TBA), di-isopropyl ether (DIPE), and

1,2-dichloroethane (1,2-DCA). At the time of a recent well sampling event (first quarter 2009), GRO, benzene, and MTBE were detected at maximum concentrations of 11,000 micrograms per liter (µg/L), 5,400 µg/L, and 660 µg/L, respectively. The petroleum hydrocarbon plume appears to be relatively stable and decreasing. There is no known water supply well usage in the immediate site vicinity, and groundwater impact originating from USA Station 57 appears unlikely to threaten potential sensitive receptors based on available site data.

Between July 2004 and November 2007, intermittent dual phase extraction (DPE), and DPE/air sparging (AS) were used at the site as interim remedial action measures. These remediation efforts resulted in removal of an estimated 797 pounds of TPHG from the site in the vapor phase. Combined DPE/AS remediation resulted in higher petroleum hydrocarbon mass extraction rates than DPE alone.

The remedial alternatives evaluation presented in this document discusses the technical viability, anticipated limitations, and estimated costs associated with 7 remedial approaches/technologies that could be used to mitigate petroleum hydrocarbon impact beneath the subject property. Costs associated with implementing a monitored natural attenuation approach for the site, which would involve completing periodic monitoring of groundwater until contaminant concentrations degraded to cleanup goals, or for a fixed period of time, are also presented.

In the February 13, 2009 letter, ACHCSA personnel directed that site specific cleanup goals be developed for the subject property. In order to complete this task, Stratus retained a toxicology consultant to complete a modified Cal/EPA Preliminary Endangerment Assessment (PEA) Health Risk Assessment (HRA) and utilized the Risk Based Corrective Action (RBCA) model to develop site specific target cleanup levels (SSTLs) and clean-up factors (CRFs) for soil and groundwater contaminants identified beneath the site. SSTLs were developed for both commercial and residential receptors. The commercial receptors considered are adult/children shoppers and adult workers; the residential receptors considered are adults/children living above impacted soil and groundwater. For these two types of receptors, three exposure scenarios were evaluated. These include the exposure of the receptors to impacted soil (dermal, inhalation), groundwater (inhalation of vapors emanating from impacted groundwater,) and ingestion of impacted groundwater.

Results of the HRA indicated that Cal/EPA cancer risks for maximum and 95% upper confidence limit (UCL) soil concentrations for the two soil carcinogens on-site (benzene and ethylbenzene) by oral, dermal and inhalation routes for the child/adult shopper and for the adult worker were at or below the 1.0E-06 (one in a million) level of acceptable risk. In addition, hazard indices under the 1.0 threshold were calculated using both the maximum and 95% UCL soil concentrations for soil for both shoppers and workers. Using RBCA software, risks to both commercial and residential receptors to soil were also calculated. Although slightly higher than the Cal/EPA soil risks, all risks and hazards by RBCA modeling were also below their respective acceptable levels. Nearly all of the soil samples collected at the site contained concentrations of contaminants below the residential and commercial SSTLs. However the highest historical concentrations of benzene (9.6 milligrams per kilogram [mg/Kg], 13 feet bgs) and xylenes (440 mg/Kg, 3.5 feet bgs) exceed the residential and commercial SSTLs. DPE remediation could potentially have reduced the maximum benzene and xylene concentrations in soil beneath the site to levels below the SSTLs; however this has not been assessed.

Results of the HRA indicated that RBCA cancer risks for 95% UCL groundwater concentrations for all chemicals by inhalation of vapor emanating from groundwater for both commercial and residential receptors were at or below the 1.0E-06 level of acceptable risk. In addition, hazard indices were under the 1.0 threshold for this scenario. Using first quarter 2009 groundwater analytical data, GRO concentrations in groundwater are currently above the SSTLs of the residential and commercial scenarios, and benzene concentrations in groundwater are currently above the SSTL of the residential scenario, under the inhalation of vapors emanating from impacted groundwater exposure pathway. Trend lines for graphically depicted historical GRO, benzene, and MTBE concentrations indicate that although concentrations at select wells may periodically be above SSTLs, long term average groundwater concentrations meet SSTLs.

In the February 13, 2009 letter, ACHCSA personnel requested that a Draft Corrective Action Plan (CAP) be prepared for the site. Prior to selecting the most appropriate site management approach or remedial alternative, we believe that it is imperative that regulatory approval of site specific cleanup requirements be established, given the importance of this decision. Pending a review of this document by ACHCSA personnel, and an agreement upon site specific cleanup levels for the subject property, the Draft CAP will promptly be prepared and submitted.

2.0 SITE DESCRIPTION

2.1 Subject Site and Vicinity

The subject property is located in a mixed residential and commercial neighborhood in southeast Oakland. The property is bounded to the northeast by Foothill Boulevard, and to the southeast by 108th Avenue, and is situated approximately 500 feet west-southwest of Interstate 580. The site occupies a relatively small portion of the Foothill Square shopping center. This portion of the subject property formerly occupied by USA Station 57 is currently undeveloped. Areas adjacent to the site (to the southwest and northwest) are used as parking for the shopping center. A residential neighborhood is located south of the Foothill Square shopping center.

The site is situated approximately 80 feet above sea level, immediately west of the Oakland/San Leandro Hills and approximately 4 miles northeast of San Francisco Bay. The property is located on the eastern portion of the East Bay Plain. Topography at the site is relatively flat, with the ground surface typically sloping west-southwest towards San Francisco Bay. The Oakland/San Leandro Hills rise sharply out of the East Bay Plain east of the site and Interstate 580.

The former service station configuration included three 12,000-gallon gasoline and one 8,000-gallon diesel USTs and three dispenser islands. The station was closed, and the USTs, dispensers, and associated product piping were removed in July 1994. The approximate location of the USTs and fuel dispensers are included on Figures 2 and 3.

The Jay-Phares Corporation intends to redevelop the Foothill Square shopping center, including the area formerly occupied by USA Station 57, in the near future. The current property redevelopment plan includes construction of a grocery store at the location of former USA Station 57. A map depicting the tentative redevelopment plan for the property, including the location of the grocery store, is attached as Figure 2A.

3.0 SUBSURFACE CONDITIONS

Information pertaining to the subsurface conditions at the site are discussed in the following subsections of this document. Geologic logs prepared during historical subsurface investigations at the property, by Stratus and other consultants representing USA/MIGI, were used to prepare this discussion and are presented in Appendix A. Soil boring and well installation details are summarized on a table included in Appendix A.

3.1 Geologic Conditions

The following description of the site geologic conditions was prepared predominately based on available soil boring logs prepared by Stratus and previous consultants representing USA. A geologic cross section illustrating interpreted geologic relationships is presented as Figure 4. The surface trace of this cross section is included on Figure 3.

The geology beneath the site predominately consists of fine grained soils (silt/clay mixtures) situated above an undulatory bedrock surface. Clayey sand, silty sand, and clayey gravel soils appear to be interbedded within the fine grained soils. The soil horizon thicknesses above bedrock, encountered during historical subsurface investigations, are variable, ranging from at least 10 feet to more than 44 feet bgs. Based on available information, sedimentary bedrock (siltstone/sandstone or similar) appears to be present beneath the soil strata. The upper portion of the bedrock appears to be significantly weathered, allowing penetration by hollow stem auger drilling equipment and California split-spoon sampling equipment. The soil/bedrock interface appears to generally dip towards the north, at an apparent angle of approximately 25 degrees from horizontal.

3.2 Hydrogeologic Conditions

Depth to groundwater has ranged from approximately 5 to 24.5 feet bgs in the site monitoring wells between 1995 and 2009. Recent depth to groundwater measurements in the site monitoring wells are near historically low levels. Historical depth to groundwater measurements, and groundwater elevations, are included on a table presented in Appendix B. A groundwater elevation contour map depicting groundwater flow at the time of the first quarter 2009 monitoring event is presented as Figure 5.

In a letter dated February 13, 2009, ACHCSA commented on their interpretations of the hydrogeologic conditions at the site, which were based on groundwater elevations, and requested that Stratus perform some additional hydrogeologic analyses of site conditions. Specifically, ACHCSA requested an evaluation of, and comments on, 1) the selection of wells to be appropriately used to approximate groundwater flow beneath the site (i.e. long-screen/bedrock penetrating monitoring wells versus shallower-screened/non bedrock penetrating extraction wells) and 2) the presence/nature of a vertical hydraulic gradient beneath the site and an evaluation as to whether select wells at the site, with relatively long screening intervals situated across both the soil horizons and the uppermost bedrock interface, could potentially function as conduits for vertical contaminant migration at the site.

In order to address ACHCSA's first issue regarding the validity of using data from the long-screen/bedrock penetrating monitoring wells versus using the data from shallower-screened/non bedrock penetrating extraction wells, Stratus evaluated and graphed the historic groundwater elevations in all site wells relative to both the overall length/total depth of the well and to the length of the well screen that penetrates underlying bedrock. A graph was prepared in which wells were grouped (by color) according to their overall well screen intervals (Graph A, included in Appendix B). From this graph, it appears that water levels in some similarly-screened wells may be affected by some variable other than total screen depth (in particular MW-7). A second graph was prepared in which wells were grouped (again by color) according to the length of the well screen that penetrates underlying bedrock (Graph B, also included in Appendix B). From this graph, it is evident that the amount of screen placed within the bedrock appears to be correlative to the height of the water table observed in each well (i.e. the more screen placed within the bedrock, the lower the hydraulic head pressure). Based on this data, it appears most technically appropriate to estimate shallow groundwater flow direction and gradient using those wells not screened into (and affected by) the bedrock beneath the site (EX-1, EX-2, EX-3, EX-4, MW-4, and MW-5).

Stratus has prepared a series of groundwater elevation contour maps for seven of the quarterly events conducted since the extraction wells were installed. For each of these seven quarterly monitoring events, 3 sets of groundwater elevation contour maps have been prepared. The first group (Figures 1A through 7A in Appendix B) illustrate groundwater flow direction using data collected from the extraction wells only (EX-1 through EX-4). The second group (Figures 1B through 7B in Appendix B) include data collected from extraction wells EX-1 through EX-4, and the 2 monitoring wells that were constructed with long screen intervals, but apparently don't extend into the underlying bedrock (MW-4 and MW-5). The third group (Figures 1C through 7C in Appendix B) use data from the monitoring wells with screening intervals extending into the underlying bedrock (S-1, S-2, MW-3, MW-7, and MW-8).

Although groundwater flow direction beneath the site is variable, the groundwater elevation contour maps presented in Appendix B (Figures 2A/B/C through 7A/B/C) predominately illustrate a convergent groundwater flow direction towards the area near the former fuel dispenser islands and well EX-4. It appears that north and northeast groundwater flow is predominately observed in the southern part of the site, and south and southeast groundwater flow is predominately observed in the northern part of the site. The apparent convergent groundwater flow conditions observed much of the time beneath the site may partially explain the limited lateral transport of contaminants away from the former UST/fuel dispenser area (discussed in section 3.3).

Given ACHCSA's concern regarding the interpretation of groundwater flow direction from groundwater elevation measurements collected from the existing well network, it appears prudent to present several groundwater flow direction maps in future semi-annual monitoring reports prepared for the site (site switched from quarterly to semi-annual monitoring in July 2009). Stratus will implement this change to future reporting of interpreted groundwater flow beneath the site.

To address ACHCSA's second issue regarding the presence/nature of a vertical hydraulic gradient beneath the site and whether select wells at the site, with relatively long screening intervals situated across both the soil horizons and the uppermost bedrock interface, could potentially function as conduits for vertical contaminant migration at the site, Stratus evaluated historic groundwater elevations in wells pairs EX-2/MW-3, EX-1/S-1, and EX-4/MW-7. The current well network was not designed for the purpose of studying vertical hydraulic gradients, however Stratus has selected these well groupings, due to the relative close proximity of these shallow/long screened interval wells to each other, in order to provide the most practically possible comparison using the available historical data to address ACHCSA personnel's concern regarding potential vertical downward hydraulic gradients.

Results of this evaluation indicate that there are significant head differences in those wells screened above bedrock compared to those screened into bedrock (partially or fully). At well pairs EX-2/MW-3 and EX-1/S-1 (where the majority of both deeper wells are set into bedrock), the hydraulic head differences average approximately –4.2 and –5.8 feet, respectively (over 14 quarters between 2005 and 2009). At well pair EX-4/MW-7 (approximately 7 feet of MW-7 well screen is set into bedrock), an average head elevation difference of only –1.3 feet is measured. In the February 13, 2009 letter, ACHCSA states that these differences in groundwater elevations could indicate the presence of a downward vertical hydraulic gradient. Stratus disagrees with this statement and instead contends that the differences in head elevations observed in the wells may be attributed to the averaging of head pressure in the shallow soil horizons with head pressure in the upper portions of the bedrock, and not be reflective of a true vertical component of flow. The presence of long-screened monitoring wells does not enable upward or downward flow in the absence of a mechanism driving that flow; therefore, Stratus contends it is unlikely that the wells are acting as conduits.

Although many of the site monitoring wells extend into the upper portion of the bedrock beneath the property, Stratus does not believe that the wells are functioning as a vertical conduit between shallow groundwater and a separate aquifer within the regional bedrock. Given that the monitoring wells beneath the property were drilled using the hollow stem auger method, which is typically unable to penetrate competent bedrock, the lower portion of the monitoring wells are almost certainly screened within weathered, decomposed bedrock, which is unlikely to have significant hydrologic separation from the shallow groundwater observed beneath the property. Low groundwater recharge rates observed during historical well sampling events, in both the monitoring and extraction wells, suggest similar water bearing properties at all well locations and depths.

Based on the distribution of dissolved petroleum hydrocarbon contaminants in groundwater, discussed in section 3.3, it appears that groundwater flow beneath the property is resulting in minimal transport of contaminants away from the former UST and fuel dispenser areas. Based on our understanding of the site geology and hydrogeology, there does not appear to be an aquifer, laterally continuous soil interval of substantial permeability, or definitive vertical flow component that would enable significant lateral or vertical movement of petroleum hydrocarbons.

3.3 Extent of Petroleum Hydrocarbon Impact

Extent of Petroleum Hydrocarbon Impact in Soil

Stratus has prepared four soil iso-concentration contour maps depicting the approximate extent of TPHG impact to soil at depths of surface grade to 7 feet bgs (Figure 6), 7 to 12 feet bgs (Figure 7), 12 to 17 feet bgs (Figure 8), and 17 to 22 feet bgs (Figure 9). These figures include soil analytical data collected from compliance sampling during site demolition and excavation, and results of samples collected during subsurface investigation (drilling) activities. Subsequent to collection of the analytical data used to generate these figures, DPE/AS remediation (discussed in section 4.2) has been completed at the site, which would almost certainly have resulted in contaminant concentration reductions and a redistribution of contaminants within the subsurface. Despite these remedial efforts and expectant reduction/redistribution of the contaminant mass concentrations, it is our opinion that these figures are useful for illustrative purposes to describe the extent of the petroleum hydrocarbon impact remaining at the site. TPHD, BTEX, and MTBE have also been reported in soil samples collected at the site. Historical analytical results for soil samples collected at the site are presented in Appendix C.

Petroleum hydrocarbon impact to the shallow subsurface (above 7 feet bgs) appears to primarily be located near the former fuel pump islands, in the northern portion of the site. The highest concentrations of petroleum hydrocarbons in the fuel pump island area appear to be present immediately below surface grade, with concentrations generally decreasing with depth in this area. Maximum TPHG concentrations of 4,500 mg/Kg (beneath product line trench sample location PI-2 at 3.5 feet bgs) were historically reported. Excavation work to the south of the fuel dispenser island area (discussed in section 4.1) should have removed the majority of the shallow petroleum hydrocarbon impact in this portion of the site (the approximate lateral limits of excavation are included on Figures 6 through 9).

The lateral extent of petroleum hydrocarbon impact to soil appears to encompass a larger area from 7 to 12 feet bgs relative to that observed from surface grade to 7 feet bgs (see Figures 6 and 7), possibly due to 'smear zone' influence with the upper portion of the water table at times of high groundwater levels beneath the site. The highest concentration of TPHG and benzene in soil between 7 and 12 feet bgs, following excavation work, was detected at the southern limits of the excavation, at concentrations of 130 mg/Kg and 0.33 mg/Kg, respectively. TPHG was also detected in samples collected near the former diesel UST and southern fuel pump island at concentrations of 80 mg/Kg (boring AS-1) and 100 mg/Kg (sample TC2-5). Benzene and MTBE concentrations at this depth appear to be low.

The extent of petroleum hydrocarbon impact to soil appears to encompass the largest lateral area between approximately 12 and 17 feet bgs (see Figure 8). Three samples collected at this depth, at scattered locations across the site, contained TPHG concentrations between 500 mg/Kg and 540 mg/Kg. Soil samples collected at this depth should be within the 'smear zone' and affected by fluctuations in groundwater levels beneath the site. Re-adsorption of contaminants into backfill soil placed within the excavation may have occurred based on data obtained at boring EX-1; however limited samples within the excavation backfill have been collected.

Select soil samples collected between 17 feet bgs and 25 feet bgs also appear to be within the 'smear zone', with a similar lateral contaminant distribution as soils between 12 and 17 feet bgs (see Figures 8 and 9). Samples collected from portions of the site at this depth interval appear to be situated immediately above the soil/bedrock interface. The highest concentrations of TPHG in this depth interval were reported near the southern and northern corners of the former UST pit (620 mg/Kg and 600 mg/Kg, respectively). Benzene concentrations in soil at this depth also appear to be low (0.67 mg/Kg maximum concentration at boring AS-2 [21 feet bgs]).

Extent of Petroleum Hydrocarbon Impact in Groundwater

GRO, TPHD, BTEX, MTBE, TBA, DIPE, and 1,2-DCA have historically been reported in groundwater samples beneath the site. Historical groundwater analytical results are included in Appendix B. Stratus has prepared annual average GRO and benzene iso-concentration contour maps using analytical data collected from the site monitoring wells in 1998 (see Figures 10 and 11), and GRO, benzene, and MTBE iso-concentration contour maps using 2003 monitoring well analytical results (see Figures 12 through 14). GRO, benzene, and MTBE concentrations reported for samples collected during the first quarter 2009 well sampling event are summarized on Figure 15. Iso-concentration contour maps depicting the interpreted lateral extent of GRO, benzene, and MTBE impact to the subsurface, using first quarter 2009 analytical data, are presented as Figures 16, 17, and 18, respectively.

Figures 10 through 18 illustrate that petroleum hydrocarbon and MTBE impact to groundwater appears to remain in the area immediately surrounding the former USTs and fuel dispenser islands, with minimal lateral transport of contaminants away from these areas. A comparison of the iso-concentration contour maps prepared using annual average 1998, annual average 2003, and first quarter 2009 analytical data suggests that the plume of impacted groundwater beneath the property is relatively stable and decreasing. The plume of impacted groundwater is not known to have migrated offsite and appears adequately characterized at this time. Historical-long term groundwater trends are further discussed in section 6.1, and illustrated for select wells in Figures 20 through 34.

The highest petroleum hydrocarbon concentrations appear situated in the southern portion of the site, near the former UST complex. At the time of the most recent sampling event, the highest concentrations of GRO and benzene were detected in samples collected from well EX-2, at concentrations of 11,000 µg/L and 5,400 µg/L, respectively. The highest concentration of MTBE at the time of the first quarter 2009 well sampling event was detected in well MW-3 (650 µg/L).

4.0 HISTORICAL REMEDIAL ACTIVITIES

4.1 Soil Overexcavation

Approximately 775 cubic yards of soil were reported excavated at the time of UST removal in 1994. Using the arithmetic mean of concentrations reported from samples collected from the soil stockpile generated during the excavation, an estimated 327.2 pounds of TPHG, 41.3 pounds of TPHD, and 0.15 pounds of benzene were removed from the subsurface via excavation. A table summarizing petroleum hydrocarbon mass removal computations is provided in Appendix D.

4.2 Intermittent DPE and DPE/AS Remediation Events

In 2003, USA/MIGI was informed by the Jay-Phares Group that the property was being marketed actively for redevelopment. Potential development plans were provided to Stratus in June-July 2003. These plans included a proposal to lower surface grade by approximately 6 feet. Discussions and meetings were held between USA/MIGI, Jay-Phares, AEI Consultants (who represents Jay-Phares), ACHCSA, and Stratus, during the third and fourth quarter 2003, to identify the most viable remedial technology to mitigate petroleum hydrocarbon impact to the subsurface prior to redevelopment. Based on site geology, hydrogeology, and extent of impact, DPE was identified as an implementablel, and likely viable, remedial alternative (although cost intensive) for the subject site. Therefore, with approval from ACHCSA, Stratus conducted petroleum hydrocarbon mass reduction events using DPE and DPE/AS technology, intermittently between July 2004 and November 2007. The objective of the mass removal events was to reduce concentrations of petroleum hydrocarbons in the subsurface, with an understanding that any remaining petroleum hydrocarbon impacted soil encountered during lowering of surface grade at the subject property would be removed and disposed of offsite during the anticipated property redevelopment activity.

The first three DPE events were completed using wells S-1, S-2, and MW-3 for extraction, with MW-7 also used for extraction during the third DPE event. Subsequent DPE and DPE/AS events were completed using wells EX-1 through EX-4 for extraction. Table 1 presents a summary of the DPE remediation events. Additional data tables summarizing information collected during the DPE and DPE/AS events are presented in Appendix E.

The first DPE event was conducted between July 6 and 25, 2004, using a 400 cubic feet per minute (cfm) DPE system. During the first DPE event, individual well DPE tests using wells S-1, S-2, and MW-3, and a combined DPE test using all three wells, were conducted to evaluate the technical viability of using DPE to mitigate the subsurface petroleum hydrocarbon impact. During the combined DPE test, an average applied vacuum of 22.66 inches mercury ("Hg) (or 308.18 inches water column ["WC]) resulted in an average soil vapor extraction rate of 86 cfm and an average groundwater extraction rate of 0.55 gallons per minute (gpm). Approximately 13.35 pounds of GRO were extracted in vapor and aqueous phases during this DPE event. Based on the findings of this test and analytical results of subsequent quarterly monitoring, Stratus proposed (letter dated October 15, 2004) to conduct quarterly DPE events as an interim remedial measure to reduce the subsurface petroleum hydrocarbon mass (prior to redevelopment). In a letter dated May 9, 2005, ACHCSA approved the proposal for conducting intermittent DPE events. The results of this DPE event indicated that relatively low hydraulic and air flow permeabilities are present in the subsurface, with low flow rates induced by the DPE system. Draw-down and induced vacuum data were collected from select observation wells to establish radius of influence (ROI) for vapor and groundwater extraction

A second DPE petroleum hydrocarbon mass removal event was conducted at the site between June 6, 2005, and July 1, 2005, using a 400 cfm DPE system. During this DPE event, an applied vacuum in the range of 23 to 25 "Hg produced soil vapor flow rates in the range of 23 to 39.4 cfm, and an average groundwater extraction rate of 1.12 gpm. A total of 34,340 gallons of extracted groundwater were treated using the carbon vessels and discharged to the sanitary sewer. Approximately 6.449 pounds and 0.082 pounds of GRO were extracted in vapor and aqueous phases, respectively, during this DPE event.

A third DPE petroleum hydrocarbon mass removal event was conducted at the site between August 29, 2005, and September 16, 2005, using a 200 cfm DPE system. During this DPE event, an applied vacuum in the range of 16 to 18 "Hg produced soil vapor flow rates in the range of 37.3 to 62.5 cfm, and an average groundwater extraction rate of 2.45 gpm. A total of 54,730 gallons of extracted groundwater were treated using the carbon vessels and discharged to the sanitary sewer. GRO was not reported in any of the influent soil vapor samples collected during this DPE event. Approximately 0.014 pounds of GRO were extracted in aqueous phase during this DPE event.

Based on information collected from the first three mass removal events, Stratus proposed and installed strategically located extraction wells in known areas of petroleum hydrocarbon impact. Wells EX-1 through EX-4 were installed in October 2005, and screened shallower in the subsurface (entire screening interval above bedrock) than the previous monitoring wells used for extraction.

A fourth DPE petroleum hydrocarbon mass removal event was conducted at the site between February 20, 2006, and March 24, 2006, using the newly installed extraction wells EX-1 through EX-4. During this DPE event, an applied vacuum in the range of 18.5 to 23 "Hg produced influent soil vapor flow rates in the range of 22.4 to 50.6 cfm, and an average groundwater extraction rate of 0.40 gpm. A total of 13,340 gallons of extracted groundwater were treated using the carbon vessels and discharged to the sanitary sewer. Approximately 25.83 pounds of GRO were extracted in vapor and aqueous phases during this DPE event.

A fifth DPE petroleum hydrocarbon mass removal event was conducted at the site between May 1, 2006, and May 25, 2006. An applied vacuum in the range of 20 to 24.5 "Hg produced influent soil vapor flow rates in the range of 21.9 to 56.2 cfm, and an average groundwater extraction rate of 0.30 gpm. A total of 7,400 gallons of extracted groundwater were treated using the carbon vessels and discharged to the sanitary sewer. Based on influent soil vapor flow rates and concentrations, approximately 5.43 pounds of GRO were extracted in vapor phase and 0.027 pounds of GRO were removed from the subsurface in aqueous phase during this DPE event.

A sixth DPE petroleum hydrocarbon mass removal event was conducted at the site between July 17, 2006, and August 10, 2006. An applied vacuum in the range of 16 to 18 "Hg produced influent soil vapor flow rates in the range of 70.7 to 114.8 cfm, and an average groundwater extraction rate of 0.06 gpm. A total of 1,900 gallons of extracted groundwater were treated using the carbon vessels and discharged to the sanitary sewer. Based on influent soil vapor flow rates and concentrations, approximately 47.63 pounds of GRO were extracted in vapor phase and 0.0072 pounds of GRO were removed from the subsurface in aqueous phase during the sixth DPE event.

In order to improve performance of future mass extraction events, Stratus proposed to complete AS in conjunction with DPE (Work Plan dated June 13, 2007); ACHCSA approved the scope of work proposed in this Work Plan (letter dated July 25, 2007). Two air sparge wells (AS-1 and AS-2) were subsequently installed on the property.

The DPE-AS event was conducted between September 4 and November 14, 2007, for 779.50 hours (approximately 32.48 days). The DPE-AS system was unable to operate continuously due to frequent malfunctions of the propane generator used to power the control panel of the DPE system. A 2-hp Quincy blower, rated at 9.6 cfm, was used to inject air into the subsurface through recently installed wells AS-1 and AS-2 at approximately 150 to 200 percent of the static head pressure observed at wells AS-1 and AS-2 at the beginning of the remediation event. An applied vacuum in the range of 8.0 to 15.0 "Hg produced influent soil vapor flow rates in the range of 93.3 to 132.6 cfm and an average groundwater extraction rate of 0.08 gpm. GRO and benzene concentrations in the influent air samples ranged from 540 milligrams per cubic meter (mg/m^3) to 1,800 mg/m^3 and 0.75 mg/m^3 to 3.4 mg/m^3, respectively. GRO, benzene, and MTBE concentrations in the influent water samples ranged from 51 µg/L to 470 µg/L, 9.2 µg/L to 140 µg/L, and 3.8 µg/L to 230 µg/L, respectively. An estimated 698.8 pounds of GRO were removed in the vapor phase during the DPE/AS remediation event. Given these findings, combined DPE and AS was significantly more effective than DPE alone in removing petroleum hydrocarbon mass from the subsurface.

Although the total mass removed during the seven mass removal events was low (particularly for groundwater), DPE appears to have reduced concentrations of GRO and benzene in wells S-1, S-2, EX-1, EX-2, and MW-3. It appears that along with DPE events, other factors such as fluctuating groundwater elevations and naturally occurring processes like biodegradation and attenuation may have also contributed to the observed reduction in petroleum hydrocarbon concentrations.

4.3 iSOC™ Oxygen Injection Groundwater Remediation

An iSOC™ oxygen injection system operated at the site between January 22, 2006 and September 4, 2007, in order to supplement aerobic degradation of petroleum hydrocarbons in groundwater between intermittent DPE events. The iSOC™ oxygen injection system is a bioremediation technology that produces high levels of dissolved oxygen for in-situ biodegradation of petroleum hydrocarbon constituents. The iSOC™ system consists of individual injection units (1.62 inches in diameter and approximately 15 inches in length) made of stainless steel, and an industrial grade oxygen cylinder. The individual injections units contain a micro-flow controller that regulates the flow based on the static head and pressure setting at the oxygen cylinder. The injection units also contain micro-porous hollow fibers, which provide a significant mass transfer area and create an ultra saturation zone when oxygen gas pressure is maintained lower than the static groundwater pressure. Each individual injection unit is placed in a monitoring well and connected to a 250 cubic centimeter (cc) oxygen cylinder using a single run ¼-inch diameter tubing. Between January 11, 2006 and December 18, 2006, the individual injection units were placed in wells S-1, S-2, and MW-3. In December 2006, the iSOC™ units were moved from wells S-1 and MW-3 to wells EX-1 and EX-2. The operation of the oxygen injection system at the site was discontinued on September 4, 2007, prior to initiation of the DPE-AS event.

5.0 POTENTIAL EXPOSURE PATHWAYS, SENSITIVE RECEPTORS, AND RISK ASSESSMENT

An exposure pathway model for the site is presented in Figure 19. The primary source of exposure appears to be spills and leaks related to historical gasoline station operations at the site. Secondary sources for exposure appear to include residual hydrocarbons in subsurface soils and dissolved hydrocarbons in the groundwater. Potential exposure pathways associated with the secondary sources include volatilization to outdoor air, and the potential for dermal contact and ingestion related to subsurface construction activities at the site. Given the depth to groundwater beneath the site, exposure to hydrocarbons dissolved in the groundwater, through volatilization, contact, or ingestion, appears unlikely.

5.1 Potential On-site Exposure Pathways

A primary pathway of exposure to the petroleum hydrocarbons beneath the site has not been identified, given the current property usage. Secondary exposure to the impact also appears limited at this time. Exposure to residual hydrocarbons in the soil might come through inhalation of compounds volatilized to outdoor air. The ground surface of the site is mostly paved with concrete and asphalt. These paving materials are not impervious to soil vapors, but the potential exposure risk associated with volatilization of petroleum hydrocarbon vapors to outdoor air is unlikely to represent an exposure risk. Normal surface air movement (wind, etc.) is likely to dilute and remove impacted soil vapors from the site before concentrations reach risk levels.

Construction workers involved in excavation within the area of impacted soil could be exposed through dermal contact, accidental ingestion, or inhalation of volatilized hydrocarbons during excavation work. It is our understanding, based on conversations with, and information provided by, Jay Phares Corporation, that lowering surface grade up to 5 feet in the site vicinity is likely. Additional excavation into the subsurface might also be necessary in order to implement construction activities. If petroleum hydrocarbon impact to shallow soil remains at the time that any excavation at the site is completed, the work should be performed by personnel trained in handling hazardous materials. These workers should take precautions to properly check, and if necessary, ventilate excavations in the impacted areas. Likewise, these workers should take proper measures to monitor air quality, utilize breathing respirators where appropriate, wear the proper clothing while working at the site, and wash prior to eating or drinking. If properly trained workers are utilized, and proper care and attention are given to safety precautions and hygiene, the risk of exposure to construction workers should be reduced.

Dissolved petroleum hydrocarbons are present in groundwater beneath the site. Given the current depth to groundwater (up to 24.5 feet bgs), there appears to be little risk of on-site exposure to the dissolved petroleum hydrocarbons beneath the site.

5.2 Potential Off-site Receptors-Water Supply Wells

A water supply well survey was completed on behalf of USA/MIGI in 1998. A table summarizing information obtained during this well survey, and a map depicting well locations obtained from this survey, are presented in Appendix F. The nearest water supply well identified in the well survey was installed approximately 1,000-feet southwest of the site, at 2455 109th Avenue. Given the distance of the water supply wells identified in the well survey for the site, and that hydrocarbon-related contaminants originating from USA Station 57 are not known to have migrated offsite, there appears to be little risk of the groundwater plume affecting groundwater sensitive receptors in the site vicinity.

5.3 Human Health Risk Assessment and Cleanup Goals

At the request of ACHCSA personnel, in the February 13, 2009 letter, site specific cleanup goals have been developed for the subject site. In order to complete this task, Stratus retained a toxicology consultant (Skinner Associates [Skinner] of Creston, California) to complete this work. Using available analytical data collected during historical site environmental activities, Skinner conducted a modified PEA-HRA and utilized the RBCA model (version 2.51) to develop SSTLs and CRFs for soil and groundwater contaminants identified beneath the site. A copy of the Skinner report is presented in Appendix G.

SSTLs were developed by Skinner for both commercial and residential receptors. The commercial receptors considered are adult/children shoppers and adult workers; the residential receptors considered are adults/children living above impacted soil and groundwater. For these two types of receptors, three exposure scenarios were evaluated. These include the exposure of the receptors to impacted soil (dermal, inhalation), groundwater (inhalation of vapors emanating from impacted groundwater), and ingestion of impacted groundwater. SSTLs are summarized in Table 2. All soil and groundwater analytical data collected at the site was used to develop mean, standard deviation, and 95% UCL values (see tables 1a through 1g of the Skinner Document). Both maximum contaminant concentration values and 95% UCL values were used to calculate risk and hazard levels.

Following collection of a majority of the soil samples used to evaluate contaminant concentrations in soil during historical site investigations, DPE and DPE/AS remediation was completed. Therefore, the soil analytical data used by Skinner to complete the HRA almost certainly overestimates current contaminant concentrations. In addition, although groundwater beneath the site may be considered by a regulatory agency as a potential drinking water source (and for this reason was considered herein), the property and surrounding neighborhood receive municipal water from an alternate source and it would be very unlikely to utilize groundwater beneath the site as a future water supply. Further, the City of Oakland does not have "any plans to develop local ground-water resources for drinking water purposes, because of existing or potential saltwater intrusion, contamination, or poor or limited quantity"[1].

Results of the HRA indicated that Cal/EPA cancer risks for maximum and 95% UCL soil concentrations for the two soil carcinogens on-site (benzene and ethylbenzene) by oral, dermal, and inhalation routes for the child/adult shopper and for the adult worker were at or below the 1.0E-06 (one in a million) level of acceptable risk. In addition, hazard indices under the 1.0 threshold were calculated using both the maximum and 95% UCL soil concentrations for soil for both shoppers and workers. Using RBCA software, risks to both commercial and residential receptors to soil were also calculated. Although slightly higher than the Cal/EPA soil risks, all risks and hazards by RBCA modeling were also below their respective acceptable levels.

Results of the HRA indicated that RBCA cancer risks for 95% UCL groundwater concentrations for all chemicals by inhalation of vapor emanating from groundwater for the both commercial and residential receptors were at or below the 1.0E-06 level of acceptable risk. In addition, hazard indices were under the 1.0 threshold for this scenario. Risks for residential ingestion of groundwater generated a combined risk of 4.87E-04 and a hazard index of 5.27. Risks for commercial groundwater ingestion generated a combined risk of 1.2E-04 and a hazard index of 1.94. Risk and hazard indices for ingestion of groundwater under commercial and residential scenarios are above the acceptable thresholds.

Nearly all of the soil samples collected at the site contained concentrations of contaminants below the residential and commercial SSTLs presented in Table 2. However, the maximum historical concentrations of benzene (9.6 mg/Kg) and total xylenes (440 mg/Kg) reported for soil samples at the site exceed the SSTLs for soil under the residential and commercial scenario.

With the assumption that the only groundwater exposure risk comes from inhalation of vapors originating from the contaminanted groundwater, GRO and benzene concentrations in select areas of the site remain above select SSTLs, based on first quarter 2009 groundwater analytical data. Concentrations of GRO currently exceed the residential and commercial SSTLs at wells EX-2 and S-2, and concentrations of benzene exceed the residential SSTL at well EX-2. Under the groundwater ingestion scenario, and also using first quarter 2009 groundwater analytical data, concentrations of dissolved ethylbenzene, toluene, and xylenes are below the residential and commercial SSTLs, and concentrations of MTBE are below the commercial SSTL.

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[1] *East Bay Plain Groundwater Basin Beneficial Use Evaluation Report* (San Francisco Bay-RWQCB, June 1999),

6.0 REMEDIAL ALTERNATIVES EVALUATION

Based on our understanding of the site geology and hydrogeology, the extent of petroleum hydrocarbons and fuel oxygenate/additive impact to the subsurface, identified potential sensitive receptors to the fuel contamination, the current property use, and expected redevelopment of the site, Stratus has selected the following project management strategies/remedial approaches for discussion, analysis, and comparison. Table 3 presents a summary of the costs associated with each potential alternative/management approach, and assumptions used in considering each potential remedial technology.

- No Action/Monitored Natural Attenuation.
- Combined DPE and AS Remediation.
- Excavation of impacted soil, transport of excavated soil offsite to a Class 2 landfill, backfill of excavation cavity with mixture of gypsum into clean backfilled soil.
- Excavation of impacted soil, onsite nutrient/surfactant treatment (land farming) of soil, and subsequent backfill of treated soil.
- Excavation of impacted soil, onsite incineration of soil, and subsequent backfill of treated soil, with mixture of gypsum into backfilled soil.
- Electrical resistance heating (ERH) with vapor recovery.
- Enhanced aerobic bioremediation of groundwater by injection of ORC Advanced® Oxygen Release Compound using the direct push method and offsite disposal of impacted soil encountered during anticipated future re-grading of the property.
- In-situ chemical oxidation (ISCO) using ozone injection.

The following assumptions were used in evaluating potential remedial approaches for the subject site:

- The site is currently a vacant portion of a shopping center, though redevelopment of the entire property, including construction of a grocery store over the area formerly occupied by USA Station 57, is anticipated in the near future.
- The property owner would allow each of the possible remedial approaches to be implemented, despite any reasonable inconveniences associated with the work.
- Underground utility lines located near the site (electric, natural gas, water, sewer) could be removed and re-routed to meet current property uses, if necessary.

- Adequate electrical power could be obtained for operation of DPE, soil incineration, and ERH remediation equipment.

- Onsite treatment of soil (via land farming or incineration) is possible, given the relatively large size of the subject property.

- An air discharge permit for a DPE system, or an onsite soil incinerator, could be obtained from the Bay Area Air Quality Management District (BAAQMD).

- East Bay Municipal Utility District (EBMUD) would approve a sewer discharge permit application for the property, which would be needed to allow for disposal of treated wastewater generated during DPE.

6.1 No Action/Monitored Natural Attenuation

This management technique does not involve any active remedial action other than periodic groundwater monitoring. Natural attenuation is a process in which the indigenous microorganisms, under natural physical and chemical conditions, reduce/degrade the petroleum hydrocarbon concentrations. The natural attenuation rates for any given site are greatly influenced by the amount/type of naturally occurring microorganisms and dissolved oxygen (for aerobic conditions), or manganese, sulfate, iron, etc. (for anaerobic conditions), and temperature. In addition, the natural attenuation rates can also be limited by the subsurface petroleum hydrocarbon concentrations (electron donor).

Under the current property use scenario, completing no additional remedial efforts might be a reasonable site management strategy, pending regulatory approval, given the historical soil and groundwater concentrations, SSTLs, and that no known beneficial groundwater use is foreseen in the near future. Since the site is currently a vacant lot primarily covered with soil and concrete, no vapor exposure or groundwater sensitive receptors to the dissolved petroleum hydrocarbons have been identified, and the plume appears stable, decreasing, and situated within primarily fine grained (i.e. low permeability) soil, in-place management of the impacted soil and groundwater would potentially be acceptable.

Stratus has prepared graphs depicting GRO, benzene, and MTBE concentrations at five wells (S-1, S-2, MW-3, EX-1, and EX-2) using historical groundwater analytical data for samples collected from these wells (see Figures 20 through 34). These figures include first order decay equation contaminant concentration trend lines. In 14 of the 15 graphs, contaminant concentrations at the respective well are shown to decrease with time. In each of the graphs, the contaminant concentration trend line depicts GRO, benzene, and MTBE concentrations at levels currently below residential and commercial SSTLs for these contaminants. This appears generally consistent with the results of recent well sampling events, although GRO and benzene concentrations at select wells are intermittently above the SSTLs during individual well sampling events.

If no action/monitored natural attenuation was to be implemented, Stratus anticipates that the site would qualify for placement under a semi-annual groundwater monitoring program, based on our understanding of the site conditions and recently adopted State Water Resources Control Board (SWRCB) Resolution No. 2009-0042. Although long term average groundwater concentration trends indicate that groundwater conditions at the site generally meet SSTLs, for the purposes of this estimate, we anticipate that 10 years of semi-annual groundwater monitoring would be necessary under the no action/monitored natural attenuation scenario. Stratus anticipates that approximately $124,000.00 would be necessary to complete 10 years of semi-annual groundwater monitoring and reporting, and complete destruction of the existing site wells following the monitoring period. These costs would need to be adjusted if the current well network was removed to allow for property re-development, and replacement monitoring wells installed at a later date.

6.2 Dual Phase Extraction and Air Sparge System

DPE involves the simultaneous extraction of soil vapors and groundwater from the subsurface. A DPE system will address removal of the adsorbed phase hydrocarbons in the soil above and below the water table, as well as the hydrocarbons dissolved in groundwater. Relatively high vacuums (20 to 23 "Hg) are applied to a stinger (1 to 1 ¼ inch diameter) placed in the extraction well, using a liquid ring blower to extract soil vapors and groundwater. Once the soil vapor and groundwater are removed from the subsurface, they are separated in the air/water separator of the DPE system. The hydrocarbon-laden vapors and groundwater are then channeled to separate treatment systems. The soil vapors are typically treated with thermal or catalytic oxidizers, and the groundwater is treated using granular activated carbon (GAC) vessels prior to discharge.

Historical remediation efforts at the site indicate that DPE was significantly more effective when completed in conjunction with AS. Sparging of air into the shallow saturated zone appears to have improved air flow rates in the subsurface, and resulted in improved extraction of petroleum hydrocarbon-laden soil vapors versus DPE alone. If a full scale remediation system were installed, additional AS and extraction wells should be installed, in order to expand the area of treatment within the subsurface.

DPE and AS appears to be a technically viable remedial alternative at the site, particularly to meet commercial SSTLs in a localized area, based on data collected during the September to November 2007 intermittent remedial event. During this period of time, an estimated mass of nearly 700 pounds of TPHG were removed from the subsurface in the vapor phase (approximately 32.5 days of operational uptime).

Construction of a DPE and AS system would likely be feasible under the current property use scenario. An adequate power supply appears to be available nearby, although substantial time may be required for PG&E to implement the necessary utility service connections. Discharge of treated groundwater at the site should not be problematic, as EBMUD previously approved a permit for sewer discharge at the site. A BAAQMD permit would also need to be secured for discharge of vapors from the DPE system. If the DPE and AS remedial approach were implemented, redevelopment of the site could potentially be delayed, as several years would likely be necessary for this technology to reduce contaminant concentrations to closure levels.

Implementation of DPE requires significant capital investment, utility, and operation/ maintenance costs. Stratus estimates that construction of a DPE and AS system, operation of the system for approximately 2.5 years, followed by one year of post-remediation groundwater monitoring, would require approximately $652,000.00 to complete.

6.3 Overexcavation of Soil with Offsite Disposal, Backfilling of Excavation with Clean Soil mixed with Gypsum

Under this alternative, an excavation would be completed in order to physically remove contaminated soil from the subsurface. The impacted soil would then be transported to a Class 2 landfill, available locally in Richmond, Livermore, and Milpitas, for disposal. If the excavation was implemented at times of seasonally low groundwater levels, such as summer or fall, soil could be removed to near the bedrock interface prior to encountering groundwater. Once the excavation was completed, gypsum (calcium sulfate, $CaSO_4 \cdot 2H_2O$) would be mixed into the soil, at approximately 5 percent volume, and the soil/gypsum mixture would be backfilled into the excavation cavity. Following backfilling, the gypsum would provide a source of sulfate that should enhance in-situ remediation of remaining hydrocarbons (predominately dissolved phase) within the subsurface.

Excavation of soil is a technically viable alternative, since no structures are located in the immediate vicinity of the site. Unimpacted shallow soil (clean overburden and soil around the perimeter of the excavation) would likely need to be removed in some areas in order to access hydrocarbon impacted areas. Based on the known extent of impact to soil, Stratus estimates that an area of approximately 11,240 square feet (excluding the area of the 1994 excavation) would need to be excavated at the site (see map depicting lateral limits of assumed excavation in Appendix H). If the average depth of the impacted area of excavation was 20 feet, a soil volume of approximately 8,326 cubic yards would need to be removed from the site (soil volume does not include expansion volume after removal from subsurface). In order to access the deeper areas of impact, de-watering of the excavation cavity would possibly be necessary.

In order to complete this excavation, several underground utility lines would likely need to be removed or re-routed prior to beginning work. A map showing the locations of underground utility lines in the site vicinity is included in Appendix H. A majority of the site monitoring and remediation wells would also need to be destroyed prior to beginning work. It is possible that petroleum hydrocarbon laden soil vapors emanating from the soil excavation, or stockpiles of the excavated soil, could become a nuisance to the public.

The majority of the costs associated with implementation of this scope of work would involve transportation and disposal costs for the soil, and transportation and procurement costs for clean soil. Given our understanding of the property owner's intention of lowering grade approximately 4 to 5 feet in the area surrounding the site, it might be possible to backfill the excavation cavity with clean soil generated by property re-grading, which would significantly lower backfilling costs. However, in order to do this, the excavation cavity would likely need to be left open for a significant period of time until regrading could proceed; if this were the case, a fencing enclosure would need to be erected around the perimeter of the excavation cavity as a public safety measure until backfilling could occur.

Once the excavation backfilling was completed, a replacement groundwater monitoring well network would likely need to be installed, and a post remediation groundwater monitoring program implemented. Stratus estimates that destroying the current well network, removal of select underground utility lines, implementation of the excavation, backfilling the excavation cavity, well replacement, and one year of post-remediation groundwater monitoring would require approximately $895,000.00 to complete.

6.4 Overexcavation of Soil, Onsite Treatment (Land Farming) of Soil

Under this remedial alternative, an excavation surrounding the area of petroleum hydrocarbon impact would initially be completed in order to allow for access of heavy equipment to the impacted soil. Impacted soil would be excavated from within the larger excavation perimeter, from surface grade to the deepest accessible area of impact, or the soil/bedrock interface, in order to expose the contaminant mass within the subsurface. Treatment of soil using a bioremediation technique (placement of a nutrient/surfactant mixture) would be used to mitigate the soil impact within the boundaries of the larger excavation. Once all of the accessed soil had been treated; verification soil sampling would be implemented in order to evaluate the effectiveness of the bioremediation. The excavation cavity would be leveled off once treatment of soil was completed.

Implementation of this remedial alternative would result in removal of a relatively large quantity of soil. Unimpacted shallow soil (clean overburden and soil around the perimeter of the excavation) would need to be removed in some areas in order to access hydrocarbon impacted areas. Based on the known extent of impact to soil, Stratus estimates that an area of approximately 11,240 square feet (excluding the area of the 1994 excavation) would need to be excavated at the site (see map depicting lateral limits of assumed excavation in Appendix H); this area does not include the soil that would need to be excavated around the perimeter of the impact. Based on our estimate that the average depth of the impacted area of excavation is 20 feet, a soil volume of approximately 8,326 cubic yards would need to be bioremediated (soil volume does not include expansion volume after removal from subsurface). In order to access the deeper areas of impact, de-watering of the excavation cavity would possibly be necessary.

In order to complete this excavation, several underground utility lines would likely need to be removed or re-routed prior to beginning work. A map showing the locations of underground utility lines in the site vicinity is included in Appendix H. A majority of the site monitoring and remediation wells would also need to be destroyed prior to beginning work. Excavation at the property for bioremediation appears possible given the large size of the subject property, however the work would likely result in a significant inconvenience to the facility given the large area of excavation. It is possible that petroleum hydrocarbon laden soil vapors emanating from the soil excavation, or soil stockpiles, could become a nuisance to the public.

An advantage of this remedial approach is that remediation of most of the site impact should occur in a relatively rapid period of time. Stratus would retain a subcontractor (possibly Texas EnviroChem, Inc. of Houston, Texas) to complete the excavation and apply the nutrient/surfactant mixture. A proposal prepared by Texas EnviroChem, Inc. to complete the work activities, and information regarding the nutrient/surfactant material (TX Chem HE-1000^{TM}), is presented in Appendix I. Once confirmation soil sampling verifies successful completion of bioremediation, the excavation cavity would be closed. Re-installation of groundwater monitoring wells would probably be necessary to complete post-remediation groundwater monitoring and sampling.

Stratus estimates that destroying the current well network, removal of select underground utility lines, implementation of the excavation, soil treatment, backfilling of the excavation cavity, well replacement, and one year of post-remediation groundwater monitoring would require approximately $826,000.00 to complete.

6.5 Overexcavation of Soil, Onsite Treatment (Incineration) of Soil, Backfill of Excavated Soil Mixed with Gypsum

Under this remedial alternative, soil would be excavated from surface grade to the deepest accessible area of impact, or the soil/bedrock interface, in order to physically remove most of the contaminant mass from the subsurface. The excavated soil would be temporarily stockpiled, and subsequently incinerated to remove petroleum hydrocarbons from the soil. Once incineration was complete, gypsum would be mixed into the soil, at approximately 5 percent volume, and the soil/gypsum mixture would be backfilled into the excavation cavity. Following backfilling, the gypsum would provide a source of sulfate that should enhance in-situ remediation of remaining hydrocarbons (predominately dissolved phase) within the subsurface.

Implementation of this remedial alternative would result in removal of a relatively large quantity of soil. Unimpacted shallow soil (clean overburden) would likely need to be removed in some areas in order to access areas where hydrocarbons are situated deeper within the subsurface. Based on the known extent of impact to soil, Stratus estimates that an area of approximately 11,240 square feet (excluding the area of the 1994 excavation) would need to be excavated at the site (see map in Appendix H). Based on our estimate that the average depth of the excavation is 20 feet, a soil volume of approximately 8,326 cubic yards would need to be removed and incinerated (soil volume does not include expansion volume after removal from subsurface). In order to access the deeper areas of impact, de-watering of the excavation cavity would probably be necessary.

In order to complete this excavation, several underground utility lines would likely need to be removed or re-routed prior to beginning of work (see Appendix H for location). A majority of the site monitoring and remediation wells would also need to be destroyed prior to beginning work. Implementation of this remedial alternative would require the property owner to provide a relatively large staging area for placement and remediation of soil. However, we anticipate that less area would be needed for stockpiling of soil and placement of the incineration equipment under this scenario than under the bioremediation (land farming) alternative discussed above. It is possible that petroleum hydrocarbon laden soil vapors emanating from the soil excavation, or soil stockpiles, could become a nuisance to the public. Noise associated with operation of the incineration equipment could also be a nuisance. A permit to operate the soil incineration equipment would need to be secured from the BAAQMD.

Excavation, incineration, and backfilling of soil appears to be a technically viable remedial alternative, that in our opinion would be likely to result in a reduction in contaminant concentrations to near closure levels. If this work were implemented, Stratus would retain the services of a subcontractor (possibly Nevada Thermal Services, LLC [NTS] of Sparks, Nevada) in order to complete the incineration work. An advantage of this remedial approach is that remediation would be completed in a very short period of time. Once incineration of the soil was completed, gypsum would be mixed into the soil and the excavation cavity would be backfilled to surface grade. Re-installation of groundwater monitoring wells would probably be necessary to complete post-remediation groundwater monitoring and sampling.

A cost estimate provided by NTS to complete thermal remediation of soil is provided in Appendix J. NTS estimates that the excavation would generate 12,500 tons of soil (at a density of approximately 111 pounds per cubic foot, based on an excavation volume of 8,326 cubic yards). NTS indicated that their thermal remediation equipment is capable of incinerating 10 tons of soil per hour, or 240 tons of soil per day, if operated on a continuous basis. Based on this soil treatment capacity, a minimum of 52 days would be necessary for NTS to incinerate soil excavated from the site. The NTS estimate included in Appendix J estimates that soil can be incinerated onsite for a cost of approximately $85.24 per ton; although this price appears to be underestimated (see comments in Appendix J), incineration of soil at a cost of approximately $90.00 to $95.00 per ton appears realistic.

Stratus estimates that destroying the current well network, removal of select underground utility lines, implementation of the excavation, incineration of the soil, backfilling the excavation cavity, well replacement, and one year of post-remediation groundwater monitoring would require approximately $1,320,000.00 to complete. Given this estimated cost, this remedial approach is not likely to be the most cost effective technology for the site.

6.6 Electrical Resistance Heating with Vapor Recovery

ERH is an in-situ remedial technology that remediates soil and groundwater by heating the subsurface across the area of remediation. During heating (using alternating current electricity), residual and dissolved phase hydrocarbons are volatilized into steam and vapors, with subsequent recovery and abatement. Information regarding ERH, and a proposal developed by a potential subcontractor (Thermal Remediation Services, Inc. [TRS]) to complete ERH at the site, are attached in Appendix K.

ERH would likely be a very effective remedial approach at the site. Contaminants could be recovered from soil, groundwater, and the soil bedrock interface by heating of the subsurface, followed by contaminant volatilization. Remediation would be completed in a relatively short period of time (likely within a year). Under the current property use scenario, sufficient room is available for placement of the ERH equipment at the site.

In order to implement ERH at the site, TRS recommends installation of 68 electrode/vapor recovery wells, in a grid pattern with spacings of 17 feet between the wells. The wells would heat the subsurface to a depth of 30 feet bgs in order to complete recovery (using soil vapor extraction [SVE]) of contaminants under this scenario. Prior to beginning work, a power supply would need to be obtained from PG&E and an air discharge permit (for the vapor recovery system) would need to be secured from BAAQMD. Groundwater condensate generated during vapor recovery would need to be recovered, treated onsite using granular activated carbon, and discharged to the sewer under the EBMUD permit for the site, or hauled offsite for disposal.

Prior to beginning ERH, all of the current site wells would need to be destroyed in order to avoid damage during thermal heating. Once remediation work was completed, monitoring wells would need to be replaced to allow for post-remediation groundwater sampling.

Although ERH would very likely be an effective remedial approach for the site, this technology does not appear to be cost effective. In order to destroy the current well network, complete ERH, re-install a replacement monitoring well network, and complete one year of post-remediation groundwater monitoring, Stratus estimates that $2,321,000.00 would be required to manage the site to closure using ERH technology.

6.7 Enhanced Aerobic Bioremediation of Dissolved Contaminants Using Injection of ORC Advanced®

Using this remedial approach, ORC Advanced® would be injected into the subsurface, across the area of the site with documented groundwater impact, in order to reduce contaminant concentrations in the groundwater. The purpose of injecting this product into the subsurface would be to stimulate aerobic bioremediation of the petroleum hydrocarbon contaminants in-situ by raising dissolved oxygen concentrations in groundwater. Information regarding ORC Advanced®, provided by the manufacturer (Regenesis, Inc.), is provided in Appendix L. Remediation of contaminants would occur over a period of up to 12 months, based on product information provided by Regenesis, Inc.

Stratus has prepared a figure which includes the approximate extent of GRO, benzene, and MTBE impact to groundwater, using analytical results for samples collected during the first quarter 2009. Proposed injection soil boring locations, situated at 10-foot spaced intervals, are shown to overlay the areas with petroleum hydrocarbon impact. Given the known extent of petroleum hydrocarbon impact to groundwater, Stratus estimates that approximately 138 injection borings, situated about 10-feet from one another, would be needed in order to treat the subsurface with ORC Advanced® (see figure in Appendix L). Stratus estimates that ORC Advanced® would be injected between depths of approximately 10 and approximately 25 to 28 feet bgs.

A disadvantage of this remedial approach would be that the remedial technology has not been evaluated for effectiveness at the site. Several post-remediation groundwater sampling events would be needed to evaluate performance of the technology, given the length of time (up to 12 months) that dissolved oxygen concentrations in the subsurface would be expected to be elevated. The construction schedule for the property might necessitate destruction of the existing well network prior to completion of the 12-month enhanced bio-remediation schedule, which would inhibit our understanding regarding the effectiveness of the remediation efforts.

A potential disadvantage of using injection of ORC Advanced® could involve delivery of the product to all areas of impact within the saturated zone, given the soil types (predominately fine grained soil of low permeability) encountered within the subsurface. It appears possible that remediation of contaminants would be more effective in the immediate proximity of the injection points, with less effective contaminant concentration reduction in areas located away from the injection points. However, the relatively close spacing of the borings (10-feet on-center) should reduce this effect. Also, the relatively long period of time that enhanced bioremediation would occur (time release up to one year) would likely allow sufficient time for oxygen levels across the injection area to become more uniform.

Another disadvantage of this alternative would be that since soil beneath the property would not be remediated, groundwater would be exposed to residual petroleum hydrocarbons situated fixed within the soil. These petroleum hydrocarbons would be expected to continue de-sorbing over time, providing an ongoing source of impact to groundwater, and potentially necessitating re-application of ORC Advanced® at a later date.

In order to complete remediation of groundwater using enhanced in-situ bioremediation by injection of ORC Advanced® during a single product application event, and completion of post-remediation groundwater monitoring, would require an estimated $224,000.00.

6.8 In-Situ Chemical Oxidation using Ozone Injection

ISCO involves injection of oxidants such as ozone, hydrogen peroxide, potassium permanganate, dissolved oxygen, etc., into the subsurface using specially designed wells or regular groundwater monitoring wells. These oxidants break down the petroleum hydrocarbons to carbon dioxide and water. Some of the unreacted or residual oxidant breaks down to oxygen, resulting in dissolved oxygen, which aids in bioremediation of petroleum hydrocarbons. The performance of these chemical oxidation technologies varies from site to site depending on site geology, hydrogeology, and the nature and concentration of contaminants of concern. Of the above-mentioned oxidants, based on our experience and published literature, ozone injection appears to be the most effective in-situ remedial measure in mitigating the petroleum hydrocarbon impact to groundwater. The effectiveness of ISCO is dependent on the delivery of oxidants to impacted areas, which in turn is dependent on the subsurface lithology.

A disadvantage of this remedial approach would be that the remedial technology has not been evaluated for effectiveness at the site. A bench scale test and pilot test would need to be completed before designing a full-scale system. Completion of the bench scale test and pilot test would involve significant expenditure and several months (approximately 4 months for all tasks) to complete.

If bench scale and pilot testing confirmed that ISCO using ozone injection was a viable alternative for the site, Stratus anticipates that a relatively large number of ozone injection wells would need to be installed in order to enable delivery of the oxidant to all areas of impact within the saturated zone, given the soil types (predominately fine grained soil of low permeability) encountered within the subsurface. It appears possible that remediation of contaminants would be more effective in the immediate proximity of the injection wells, with less effective contaminant concentration reduction in areas located away from the injection wells. Depending on the number of wells needed to cover the area of impact, more than one ozone injection machine might be necessary in order to complete remediation at the site (we anticipate that two would be needed).

An advantage of using ozone injection would be that the injection equipment electrical requirement is single phase and 30 amps, which would be cost effective to operate, require minimal installation costs, and is relatively easy to obtain (relative to the power requirement for a DPE/AS system or soil incineration equipment). Although the electrical costs for the system would be low, analytical costs for collecting samples to evaluate the performance of the ozone injection system, and potentially maintain compliance with a Waste Discharge Permit (if required by the RWQCB), would likely be high. Costs for implementing ozone injection would be substantially reduced if tubing and piping connecting the ozone generating machine to the injection wells could be placed above ground; in order to do this, a secured fence enclosure would need to be erected around the injection well network.

A disadvantage of using the ozone injection remedial approach would be that at times of relatively low groundwater levels, the saturated interval situated within the soil stratum and above the site bedrock would be very thin, and potentially non-existent in areas of the property. The effectiveness of ozone injection would be expected to be significantly reduced at times of low groundwater levels, as the absence of groundwater would inhibit propagation of ozone/dissolved oxygen away from the injection well.

Ozone injection would likely require several years in order to mitigate groundwater at the site. Once ozone injection was completed, a period of post-remediation groundwater monitoring would be appropriate at the site. In order to complete remediation of groundwater using ISCO for a period of two years, and completion of post-remediation groundwater monitoring, Stratus estimates that approximately $538,000.00 would be necessary.

6.9 Discussion

Selection of the appropriate remedial approach or management strategy for the subject site is dependent upon ACHCSA's acceptance of the site specific cleanup goals presented in this report. We believe that it would not be prudent to select a preferred remedial alternative for the property at this time given that ACHCSA personnel have not reviewed the content of this document. It is our opinion that a proper evaluation of the necessary remedial approach can only be completed once the cleanup goals for the property have been firmly established and accepted by the agency(ies) who will oversee cleanup activities and eventually allow the environmental case at the property to move to closure once the accepted levels have been reached. In addition, a thorough and confirmed understanding of the proposed development plans for the site is necessarby to establish acceptable alternatives and time available to complete remediation. Pending a review of this document, and an agreement regarding site specific cleanup goals for the property, Stratus intends to prepare and submit the Draft CAP requested by ACHCSA on behalf of MIGI.

7.0 LIMITATIONS

This report was prepared in general accordance with accepted standards of care which existed at the time this work was performed. No other warranty, expressed or implied, is made. Conclusions and recommendations are based on field observations and data obtained from this work and previous investigations. It should be recognized that definition and evaluation of geologic conditions is a difficult and somewhat inexact science. Judgments leading to conclusions and recommendations are generally made with incomplete knowledge of the subsurface conditions present. More extensive studies may be performed to reduce uncertainties, such as additional subsurface assessment, risk-based corrective action analysis, or fate and transport modeling. This report is solely for the use and information of our client unless otherwise noted.

Table 1
Remediation Events Summary
Former USA Service Station No. 57
10700 MacArthur Boulevard
Oakland, California

Remed. Event No.	Event Dates	No. of Days	Event Type	Wells Used[1]	Soil Vapor			Groundwater			GRO Mass Removed, lbs		Highest		DTW Range, feet bgs	Comments
					Avg. Ext Rate, cfm	Total Extracted, cu.ft	GRO Concn. Range, mg/m^3	Avg. Ext Rate, gpm	Total Extracted, gallons	GRO Concn. Range, µg/L	Vapor	G.Water	Induced Vac[2], "WC	Draw-down[2], feet bgs		
1	07/06/04 to 07/25/04	19	DPE - individual wells & combined	S-1, S-2, & MW-3	87.28	2,396,726	<12 to 660	0.41	35,600	<50 to 2,200	13.34	0.015	1.3 @ S-1 (50' from nearest test well)	1.97 @ MW-8 (50' from nearest test well)	~ 11.5 to 21.5	Pilot test and mass removal event
2	06/06/05 to 07/01/05	25	DPE-combined	S-1, S-2, & MW-3	30.90	958,333	<15 to 160	1.12	34,340	<50 to 590	6.45	0.082	0.02 @ MW-6 (110' from nearest test well)	2.27 @ MW-8 (50' from nearest test well)	~ 6 to 16	Mass removal event
3	08/29/05 to 09/16/05	19	DPE-combined	S-1, S-2, MW-3, & MW-7	46.80	1,012,338	<15	2.45	54,730	<50 to 67	<0.5	0.014	0.00	2.33 @ MW-8 (50' from nearest test well)	~8.5 to 19	Mass removal event
4	02/20/06 to 03/24/06	32	DPE-combined	EX-1, EX-2, EX-3, & EX-4	33.04	1,321,116	98 to 690	0.40	13,340	130 to 3,800	25.68	0.157	3.15 @ MW-8 (60' from nearest test well)	1.88 @MW-6 (75' from nearest test well)	~2 to 11 (EX wells) & ~11 to 16.5 (obs wells)	Mass removal event. EX-1 to EX-4 are test wells. S-1,S-2,MW-3,MW-4,MW-6,MW-7,&MW-8 are obceration (Obs) wells
5	05/01/06 to 05/25/06	25	DPE-combined	EX-1, EX-2, EX-3, & EX-4	36.79	956,010	37 to 180	0.30	7,400	110 to 990	5.43	0.027	0.01 @ MW-8 (60' from nearest test well)	2.11 @ MW-3	~2 to 8 (EX-wells) & ~8 to 12 (Obs wells)	Mass removal event. EX-1 to EX-4 are test wells. S-1,S-2,MW-3,MW-4,MW-6,MW-7,&MW-8 are obseration (Obs) wells
6	07/17/06 to 08/10/06	24	DPE-combined	EX-1, EX-2, EX-3, & EX-4	96.05	3,326,861	80 to 370	0.06	1,990	150 to 900	47.63	0.007	0.00	1.85 @ MW-3 (15' from nearest test well)	~10 to 14.5(Obs wells)	Mass removal event. EX-1 to EX-4 are test wells. S-1,S-2,MW-3,MW-4,MW-6,MW-7,&MW-8 are obseration (Obs) wells
7	09/04/07 to 11/14/07	70	DPE-combined with Air Sparging	EX-1, EX-2, EX-3, EX-4, AS-1 & AS-2	111.31	5,205,946	77 to 1,800	0.03	1,570	51 to 470	693.83	0.002	--	4.14 @ MW-8 (60' from nearest test well)	~10 to 13 (EX-wells) & ~15 to 24 (Obs wells)	Mass removal event. EX-1 to EX-4 are test wells. S-1,S-2,MW-3,MW-4,MW-6,MW-7,&MW-8 are obseration (Obs) wells. Air sparging at AS-1 & AS-2
				Total	NA	15,177,330	NA	NA	148,970	NA	792.35	0.305	NA	NA	NA	

Notes:

Remed. - Remediation
No. - Number
DPE- Dual phase extraction
Avg - Average

Ext - Extraction
cfm - cubic feet per minute
cu. Ft - cubic feet
Concn. - Concentration

mg/m3 - milligrams per cubic meter
gpm - gallons per minute
µg/L - micrograms per litre
GRO - Gasoline range organics

lbs - Pounds
G.Water - Groundwater water
"wc - Inches water column
bgs - Below ground surface

EX-wells - Extraction wells
Obs wells - Observation wells
NA - Not applicable

[1] Wells S-1 & S-2 are screened from 20 to 40 feet bgs, well MW-3 is screened from 24 to 44 feet bgs, well MW-7 is screened from 10 to 40 feet bgs, wells EX-1 to EX-4 are screened from 6 to 25 feet bgs, and wells AS-1 & AS-2 are screened from 17.5 to 20 feet bgs.

[2] Highest induced vacuum and drawdown measurements are at observation wells (non-extracting wells)

TABLE 2

SITE SPECIFIC TARGET LEVELS (SSTLs) - RBCA
Former USA Station No. 57
10700 MacArthur Boulevard, Oakland, California

Chemical	**Commercial**		**Residential**		**Groundwater Ingestion**	
	Soil (mg/Kg)	**Groundwater[1] (mg/L)**	**Soil (mg/Kg)**	**Groundwater[1] (mg/L)**	**Residential (mg/L)**	**Commercial (mg/L)**
Benzene	9.5E+00	1.40E+01	2.3E+00	3.40E+00	1.20E-02	5.20E-02
Ethyl benzene	>3.7E+02	>1.7E+02	>3.7E+02	>1.7E+02	3.70E+00	1.02E+01
Xylenes (mixed isomers)	2.3E+02	1.0E+02	6.5E+01	3.00E+01	7.30E+00	2.00E+01
Toluene	>8E+02	>5.3E+02	>8E+02	>5.3E+02	2.90E+00	8.20E+00
TPH - Aliph >C06-C08	>2E+02	>5.4E+00	>2.6E+02	>5.4E+00	2.20E+00	>5.4E+00
TPH - Aliph >C16-C21	NT	NC	NT	NT	>2.5E-06	>2.5E-06
DCA 1,2	ND	4.0E+00	ND	9.80E-01	7.40E-03	3.10E-02
MTBE	ND	1.1E+03	ND	2.70E+02	3.70E-01	1.00E+00

NOTES:

[1] Assumes groundwater is not used for drinking but vapors emanating from groundwater will be inhaled.

ND = Not Detected
NA = Not Available
NT = No Toxicity Data
NC = Not Carginogenic

Table 3
Remedial Alternatives Evaluation Summary
Former USA Service Station No. 57
10700 MacArthur Boulevard, Oakland, California

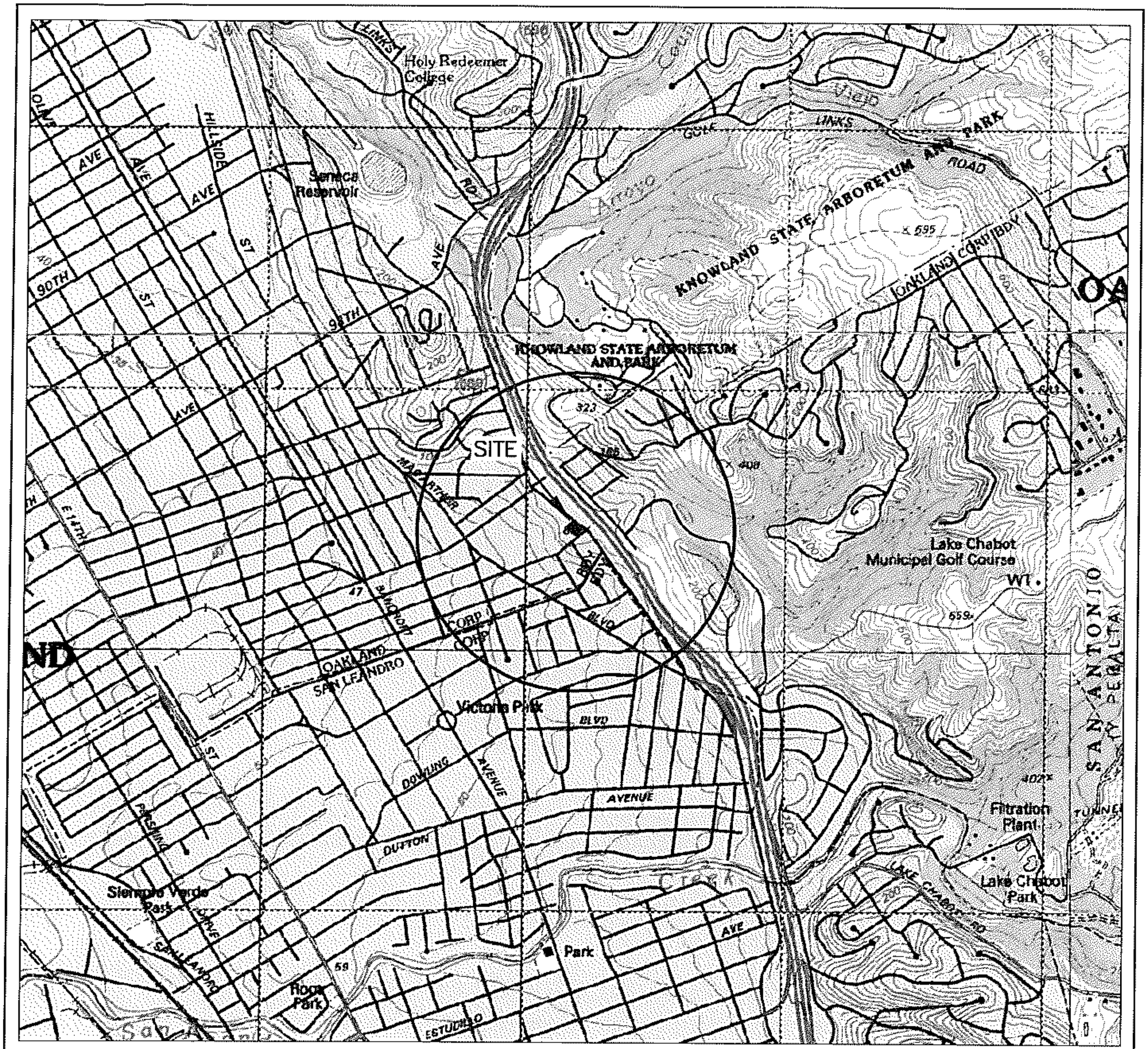
Remedial Alternative	Assumptions	Cost	
No Action/Natural Attenuation (Monitoring Only)	Concentration of petroleum hydrocarbons and MTBE will attenuate over time (in the next 10 years). No additional wells need to be installed/replaced. Subsequent to reaching the cleanup goals, all the monitoring/remediation wells will be abandoned.	1. Monitoring Cost (10 years, semi-annual sampling & reporting) 2. Well destruction Costs **Total**	$100,000.00 $24,000.00 **$124,000.00**
Dual Phase Extraction (DPE) and Air Sparging (AS) Using 200 cfm thermal oxidizer w/ 15-hp liquid ring blower and two 1,000 lb carbon vessels. Discharge groundwater to sewer. Air sparging will be conducted using a 5-hp oilless compressor	Adequate power is available to operate a 3-phase, 140-amp DPE system. A transformer upgrade is not required. EBMUD will re-issue permit allowing disposal of treated water to sewer system. Cost of utilities is based on 200 cfm thermal oxidizer with 15-hp liquid ring pump. Air discharge permit can be obtained. Additional 3 extraction wells and 6 air sparge wells will have to be installed. Life cycle operation and maintenance costs are for 2.5 years wherein two visits will be conducted every month to check system operation, optimize system performance, and collect compliance verification air samples. Costs for two carbon changeouts per year are also included in the life cycle costs. Based on our experience at similar sites, PG&E (gas and electric) costs are estimated at $7,000 per month and sewer disposal fees are estimated at $800 per month. Monitoring cost is for 3.5 years with semi-annual sampling and reporting.	1. Design & Permitting 2. Well Installation 3. Equipment and construction 4. Life Cycle (O & M - 2.5 years) 5. O&M Laboratory Cost (2.5-years) 6. Utility Cost (2.5 years) 7. Monitoring Cost (3.5 years) 8. Well Destruction Cost **Total**	$25,000.00 $30,000.00 $195,000.00 $65,000.00 $38,000.00 $234,000.00 $35,000.00 $30,000.00 **$652,000.00**
Excavation of soil, transport of soil for offsite disposal, backfill cavity with clean soil / gypsum mixture	The excavation area is approximately 11,240 square feet and the average depth of the excavation is 20 feet. All of the extraction and air sparge wells, and several of the monitoring wells, would be destroyed to facilitate excavation. Alameda County Health Department/RWQCB would allow backfilling of soil/gysum mixture. Addition of gypsum (calcium sulfate) would be effective in mitigating remaining groundwater contaminant concentrations. A local landfill (likely Richmond, but possibly Milpitas or Livermore) would accept the waste soil. Disposal of soil will cost approximately $15 per ton, with 12,500 tons of soil generated. Six wells will be re-installed upon completion of excavation to allow for post-remediation monitoring. Groundwater monitoring is conducted on a quarterly basis for only one year subsequent to the excavation/backfilling remediation efforts.	1. Design & Permitting 2. Destruction of current wells 3. Soil Excavation 4. Transport & Disposal of Soil 5. Soil/Gypsum Backfill and Compactio 6. Monitoring well re-installation 7. Monitoring cost (1-year quarterly) 8. Well Destruction Cost **Total**	$8,000.00 $20,000.00 $60,000.00 $525,000.00 $225,000.00 $20,000.00 $20,000.00 $17,000.00 **$895,000.00**

Table 3
Remedial Alternatives Evaluation Summary
Former USA Service Station No. 57
10700 MacArthur Boulevard, Oakland, California

Remedial Alternative	Assumptions	Cost	
Excavation of soil, onsite soil treatment (land farming), backfill of treated soil	Alameda County Health Department/CRWQCB would allow for placement of nutrient/surfactant mixture (likely TX Chem HE-1000), and backfilling of soil into the subsurface after treatment. Excavation area is approximately 11,240 square feet and the average depth of the excavation is 20 feet. All of the site remediation and monitoring wells located in the area of will be abandoned and 6 wells will be re-installed upon completion of excavation. Groundwater monitoring is conducted on a quarterly basis for only one year subsequent to the excavation/backfilling remediation efforts.	1. Design and permitting 2. Destruction of current wells 3. Excavation, treatment, and backfilling of soil with de-watering 4. Monitoring well re-installation 5. Monitoring cost (1-year quarterly) 6. Well Destruction Cost **Total**	$20,000.00 $24,000.00 $725,000.00 $20,000.00 $20,000.00 $17,000.00 **$826,000.00**
Excavation of soil, onsite soil treatment (incineration), backfill of soil mixed with gypsum	An air discharge permit could be obtained for incineration equipment. Alameda County Health Department/RWQCB would allow backfilling of soil/gysum mixture after treatment. Addition of gypsum (calcium sulfate) would be effective in mitigating remaining groundwater contaminant concentrations. Adequate temporary power could be obtained to operate the incineration equipment. A municipal water supply with a capacity of approximately 20 to 30 gallons per minute could be obtained for operation of the incineration equipment. Electricity and water costs included in thermal treatment proposal costs provided by subcontractor. All of the extraction and air sparge wells, and several of the monitoring wells, would be destroyed to facilitate excavation. The excavation area is approximately 11,240 square feet and the average depth of the excavation is 20 feet (12,500 tons of soil estimated for treatment). Six wells will be re-installed upon completion of excavation to allow for post-remediation monitoring. Groundwater monitoring is conducted on a quarterly basis for only one year subsequent to the excavation/backfilling remediation efforts.	1. Design and permitting 2. Destruction of current wells 3. Excavation of soil with de-watering 4. Thermal treatment of soil 5. Backfill of soil/gypsum mixture 6. Monitoring well re-installation 7. Monitoring cost (1-year quarterly) 8. Well Destruction Cost **Total**	$9,000.00 $24,000.00 $40,000.00 $1,150,000.00 $40,000.00 $20,000.00 $20,000.00 $17,000.00 **$1,320,000.00**
Electrical Resistance Heating (ERH) with vapor recovery	Adequate electrical power could be obtained. A transformer upgrade is not required. Air discharge permit could be obtained. EBMUD will re-issue permit to allow discharge of treated water (condensate) to sewer system (alternatively, groundwater could be hauled offsite). ERH costs include design, installation, SVE system with an abatement device, and removal of electrodes.	1. Destruction of current wells 2. ERH (including all tasks) 3. Monitoring well re-installation 4. Monitoring cost (1-year quarterly) 5. Well Destruction Cost **Total**	$24,000.00 $2,240,000.00 $20,000.00 $20,000.00 $17,000.00 **$2,321,000.00**

Table 3
Remedial Alternatives Evaluation Summary
Former USA Service Station No. 57
10700 MacArthur Boulevard, Oakland, California

Remedial Alternative	Assumptions	Cost	
Enhanced Bioremediation of groundwater using injection of ORC Advanced	Alameda County Health Department/RWQCB would allow injection of ORC Advanced into the subsurface. Estimated that 11,000 pounds of ORC Advanced would be injected through 138 boreholes located at 10' spacings (80 pounds per borehole). Assume 1-time application only (re-application at a later time not considered in costs). Groundwater monitoring is conducted on a quarterly basis for only one year subsequent to the remediation efforts.	1. Procurement and injection of ORC Advanced	$180,000.00
		2. Monitoring cost (1-year quarterly)	$20,000.00
		3. Destruction of current wells	$24,000.00
		Total	$224,000.00
In-Situ Chemical Oxidation (ISCO) using ozone injection	Assume 40 ozone injection wells needed and 2 ozone injection machines will be necessary to pulse inject ozone through these wells. The power requirement for the ozone injection system is single phase and 60 amp. Above ground piping/tubing can be connected from the ozone injection system to the ozone injection wells. Monitoring cost is for 3 years with semi-annual sampling and reporting.	1. Work Plan and bench scale test	$12,000.00
		2. Ozone well installation & pilot test	$60,000.00
		3. Installation/procurement of full scale system and wells	$250,000.00
		4. Life Cycle (O & M - 2 years)	$38,000.00
		5. O&M Laboratory Cost (2-years)	$64,000.00
		6. Utility Costs (2-years)	$4,000.00
		7. Monitoring cost (3-year semi-annual)	$30,000.00
		8. Well Destruction Cost	$80,000.00
		Total	$538,000.00



GENERAL NOTES:
BASE MAP FROM U.S.G.S.
OAKLAND, CA
7.5 MINUTE TOPOGRAPHIC
PHOTOREVISED 1980

North

QUADRANGLE LOCATION

0 2000 FT

SCALE 1:24,000

USA57IQuarterly JMP REV August 13, 2007 USA 57 Site Location Map

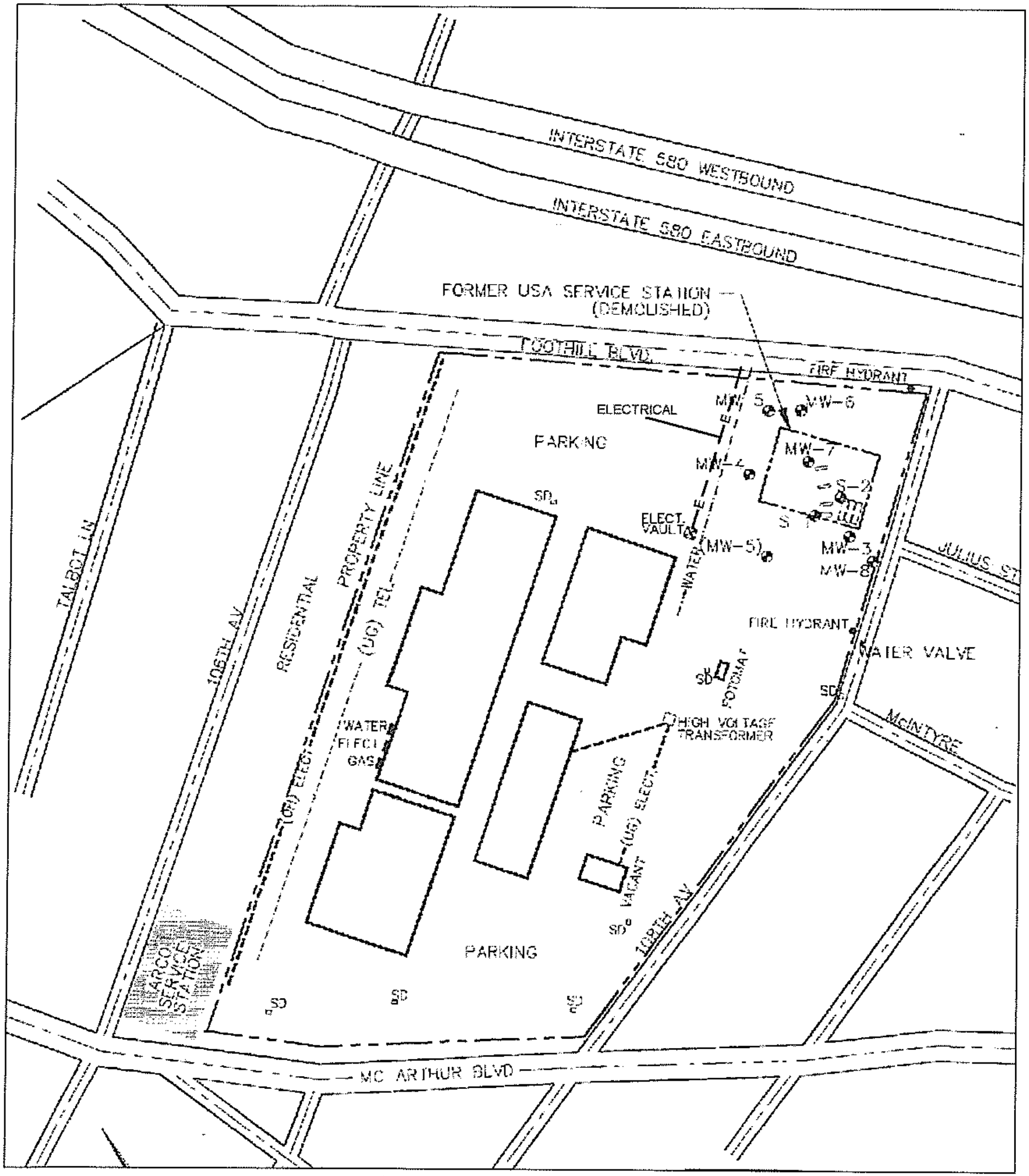
STRATUS
ENVIRONMENTAL, INC.

FORMER USA SERVICE STATION NO. 57
10700 MACARTHUR BOULEVARD
OAKLAND, CALIFORNIA

SITE LOCATION MAP

FIGURE
1

PROJECT NO.
2007-0057-01



NOTES:
1. LOCATIONS OF UTILITIES BASED ON SURVEY PERFORMED BY OTHERS
2. BUILDING LOCATIONS AND PROPERTY BOUNDARIES APPROXIMATE
3. ADDITIONAL UNDERGROUND UTILITY LIKELY EXIST ON PROPERTY, HOWEVER AVAILABLE INFORMATION PROVIDED ON THIS FIGURE FOR REFERENCE PURPOSES.

0 200 FT

APPROXIMATE SCALE

BASED ON DRAWING FROM GHH ENGINEERING, INC. DATED 1/19/01

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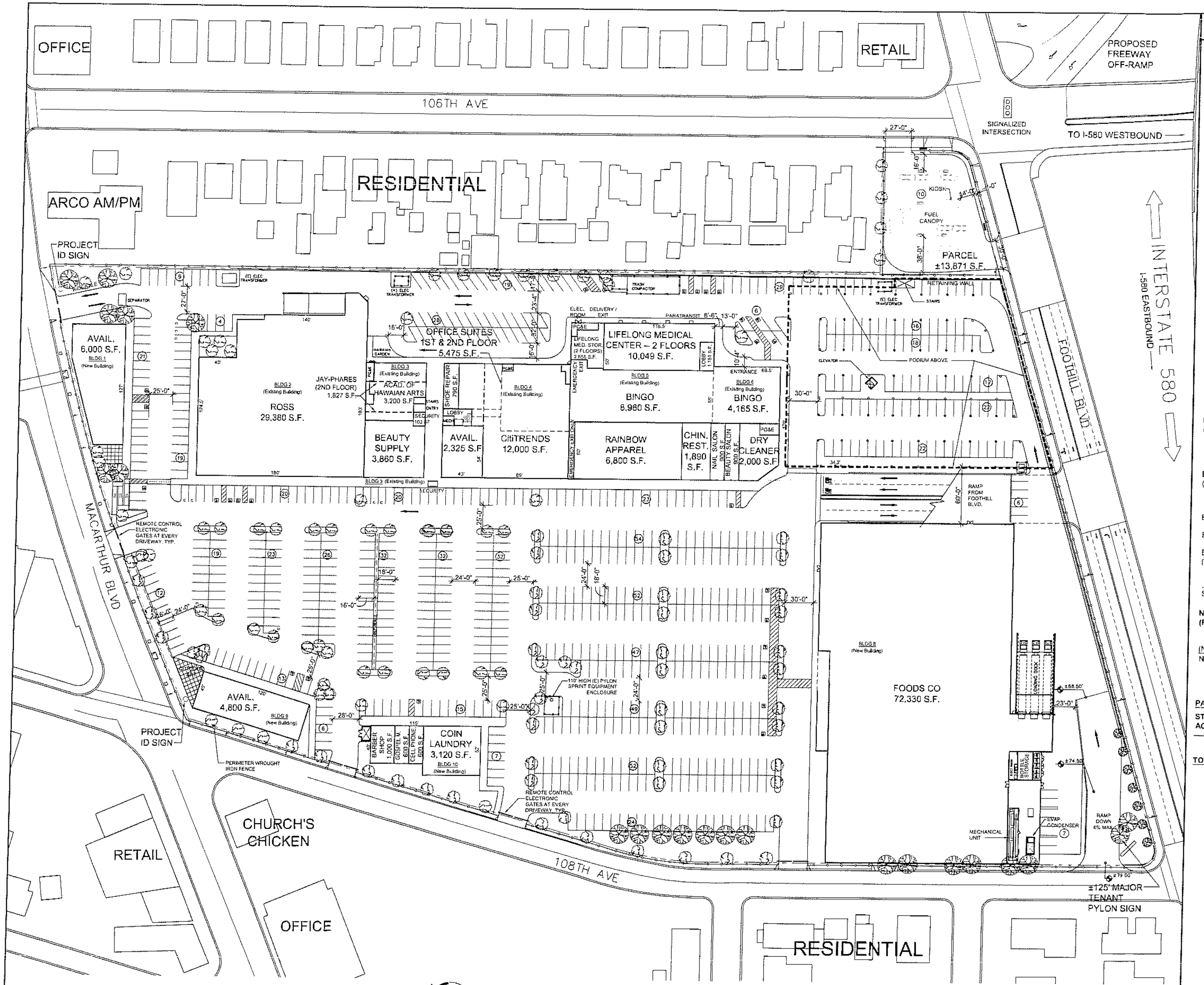
FORMER USA SERVICE STATION NO. 57
10700 MacARTHUR BOULEVARD
OAKLAND, CALIFORNIA

SITE VICINITY MAP

FIGURE
2

PROJECT NO.
2007-0057-01



SITE PLAN @ GRADE
SCALE: 1" = 40'-0"

SITE DATA

APNs: 47-5589-1 47-5589-1-5
47-5589-1-4 47-5589-1-6

ZONING: C-30 (DISTRICT THOROUGHFARE COMMERCIAL)

TOTAL SITE AREA:	602,945 S.F. (±13,841 ACRES)
(-) UPPER LEVEL PARCEL	13,871 S.F. (±0.318) ACRES)
LOWER LEVEL COMMERCIAL PARCEL	589,074 S.P. (±13.523 ACRES)

COMMERCIAL BUILDING AREA

BUILDING 1 -- AVAILABLE (6,000 S.F.)		6,000 S.F.
BUILDING 2 – ROSS		29,380 S.F.
BUILDING 3 – ACADEMY OF HAWAIIAN ARTS (8,990 S.F.)		3,200 S.F.
	BEAUTY SUPPLY	3,860 S.F.
	JAY-PHARES CORPORATION (2ND FLOOR)	1,827 S.F.
	SECURITY	103 S.F.
BUILDING 4 -- OFFICE SUITES (20,605 S.F.)		5,475 S.F.
	SHOE REPAIR	790 S.P.
	CITI TRENDS	12,000 S.F.
	AVAILABLE	2,325 S.F.
BUILDING 5 – LIFELONG MEDICAL CENTER (31,785 S.F.)		10,049 S.F.
	LOBBY	1,151 S.F.
	LIFELONG MEDICAL ADDITION	2,655 S.F.
	PG&E	250 S.F.
	BINGO	8,960 S.F.
	RAINBOW APPAREL	6,800 S.F.
	NAIL SALON	900 S.F.
	CHINESE RESTAURANT	1,890 S.F.
BUILDING 6 – BINGO (8,205 S.F.)		4,165 S.F.
	NAIL SALON	900 S.F.
	BEAUTY SALON	900 S.F.
	DRY CLEANER	2,000 S.F.
	PG&E	240 S.F.
BUILDING 7 – NORTH PODIUM (20,772 SF)		
	DAVITA HEMODIALYSIS	9,504 S.F.
	HEADSTART - 1ST FLOOR	7,776 S.F.
	HEADSTART - 2ND FLOOR	3,492 S.F.
BUILDING 8 – FOODS CO		72,330 S.F.
BUILDING 9 –FINANCIAL/RETAIL AVAILABLE		4,800 S.F.
BUILDING 10 – CELL PHONE (5,320 S.F.)		600 S.F.
	GOSPEL MUSIC	600 S.F.
	BARBERSHOP	1,000 S.P.
	COIN LAUNDRY	3,120 S.F.
SUBTOTAL =		208,142 S.F.
NET COMMERCIAL BUILDING AREA (F.A.R.)		**208,142 S.F. (34.5%)**

(N) BUILDING AREA – PODIUM

NORTH PODIUM	±49,050 S.F.

PARKING PROVIDED – TOTAL:

STANDARD & COMPACT	800
ACCESSIBLE (4%)	33
	833 SPACES
TOTAL PROJECT PARKING RATIO:	**4.00/1,000 S.F.**

ARC Inc.
ARCHITECTS
560 First Street, Suite B-201
Benicia CA 94510
Tel: (707) 745-0502
arc@arcincarchitects.com

FOOTHILL SQUARE
MACARTHUR BLVD
OAKLAND, CA

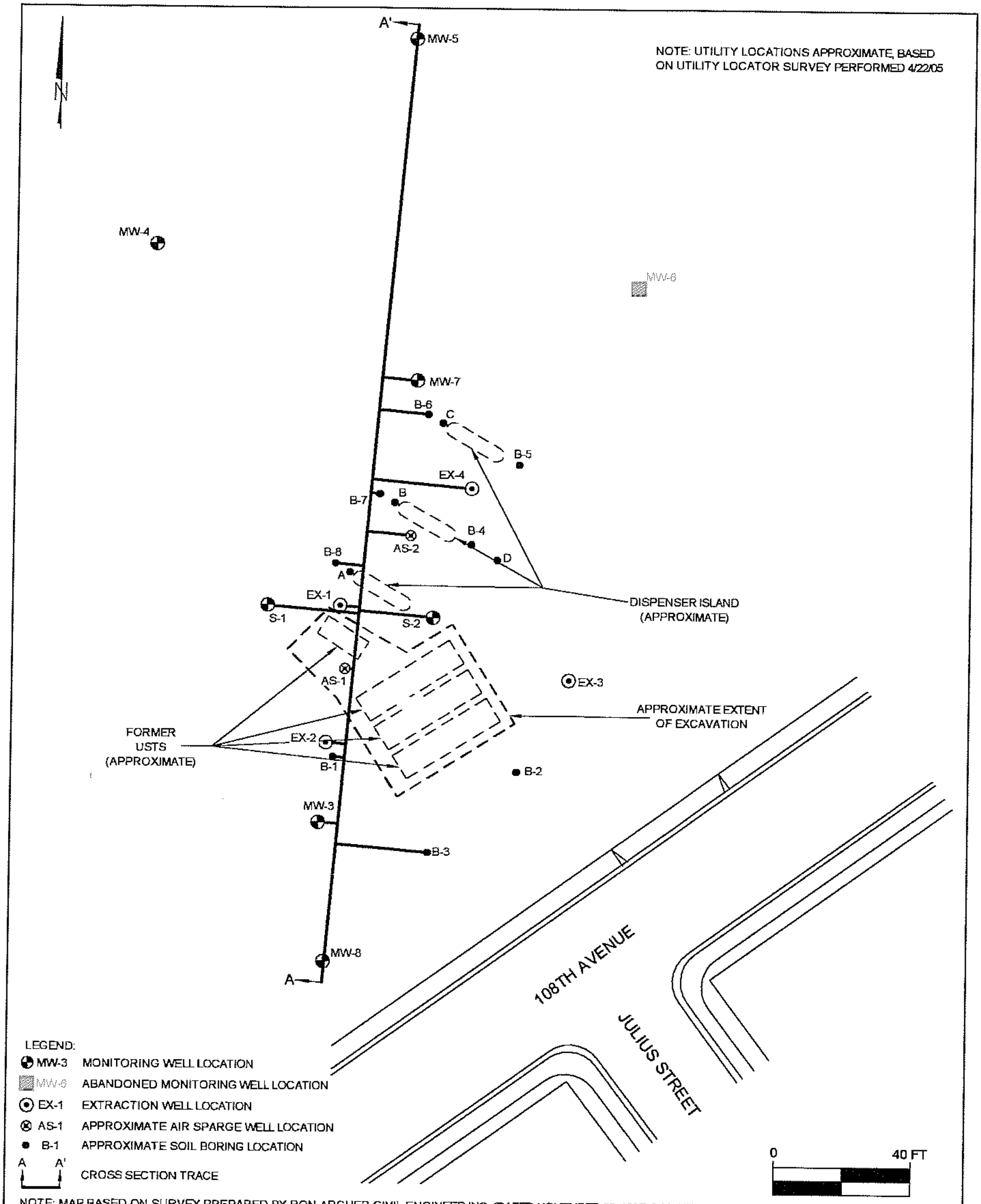
MACARTHUR BOULEVARD ASSOCIATES
10700 MACARTHUR BLVD., SUITE 200
OAKLAND, CA 94605
P: (510)562-9500 F: (510)562-9505
johnjay@jayphares.com

DATE:	5-13-09
REV. NO.	REV. DATE
1	5-14-09

PRELIMINARY LEASING PLAN

JOB NO.: JP003

Figure 2A



NOTE: MAP BASED ON SURVEY PREPARED BY RON ARCHER CIVIL ENGINEER INC. (DATED NOVEMBER 22, 1995) & MORROW SURVEYING (2005) AND DRAWINGS PREPARED BY ALTON GEOSCIENCE, WESTERN GEO-ENGINEERS, AND GHH ENGINEERING.

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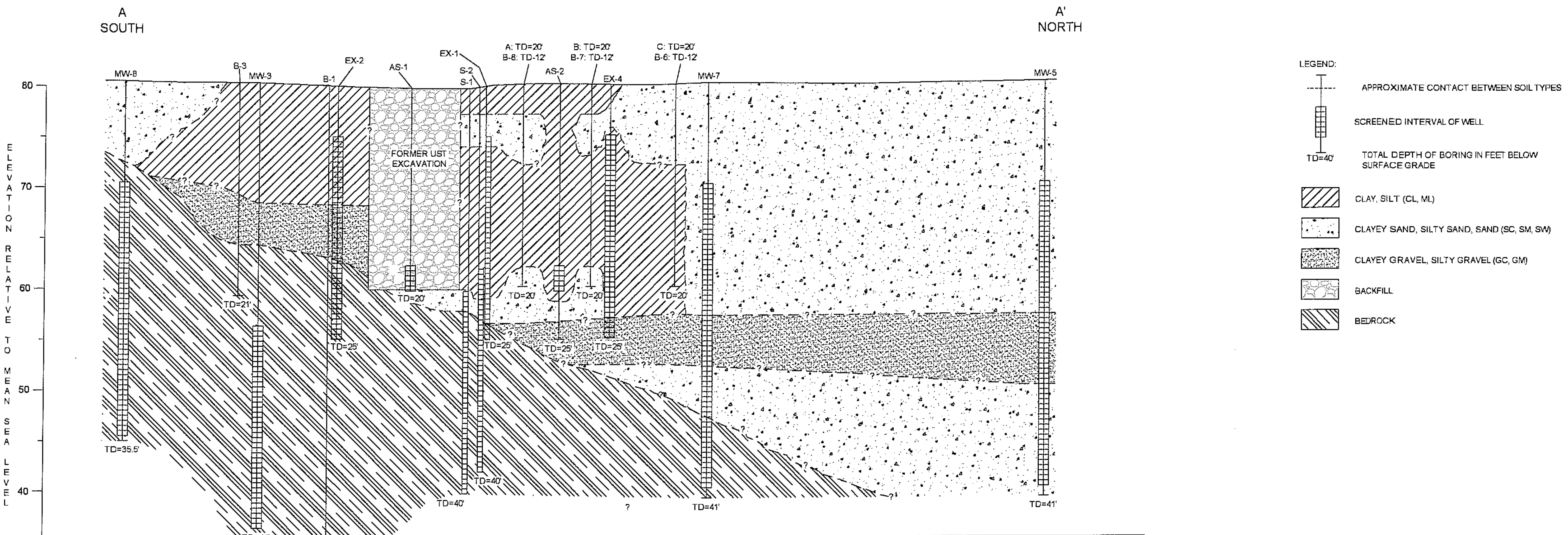
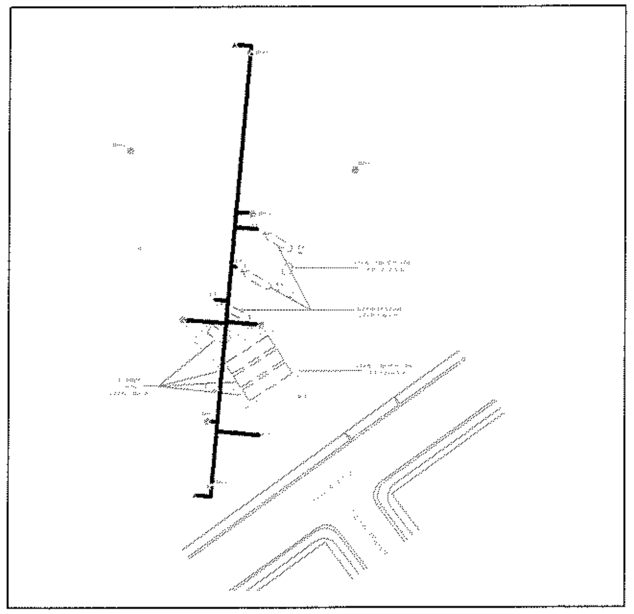
OAKLAND, CALIFORNIA

SITE PLAN

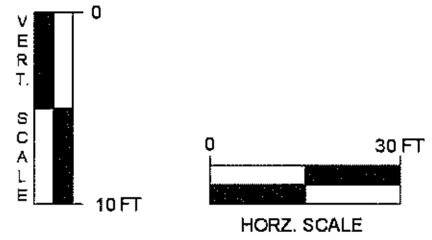
FIGURE
3

PROJECT NO.
2007-0057-01





SITE PLAN



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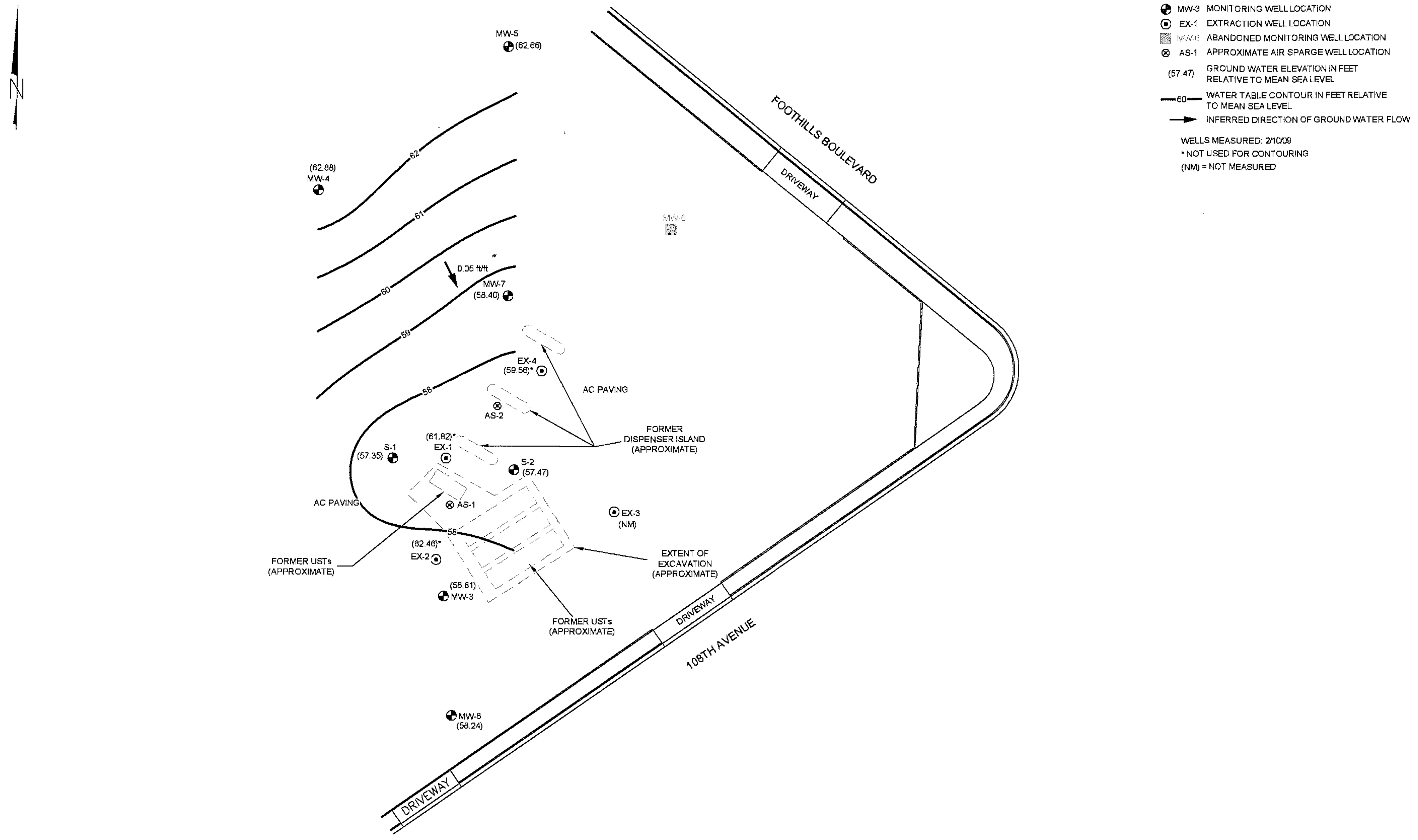
OAKLAND, CALIFORNIA

GEOLOGIC CROSS SECTION A-A'

FIGURE
4

PROJECT NO.
2007-0057-01

USA57SCM JMP REV May 6, 2009 USA 57 CrossAA2009



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ENVIRONMENTAL, INC.

0 40 FT
SCALE

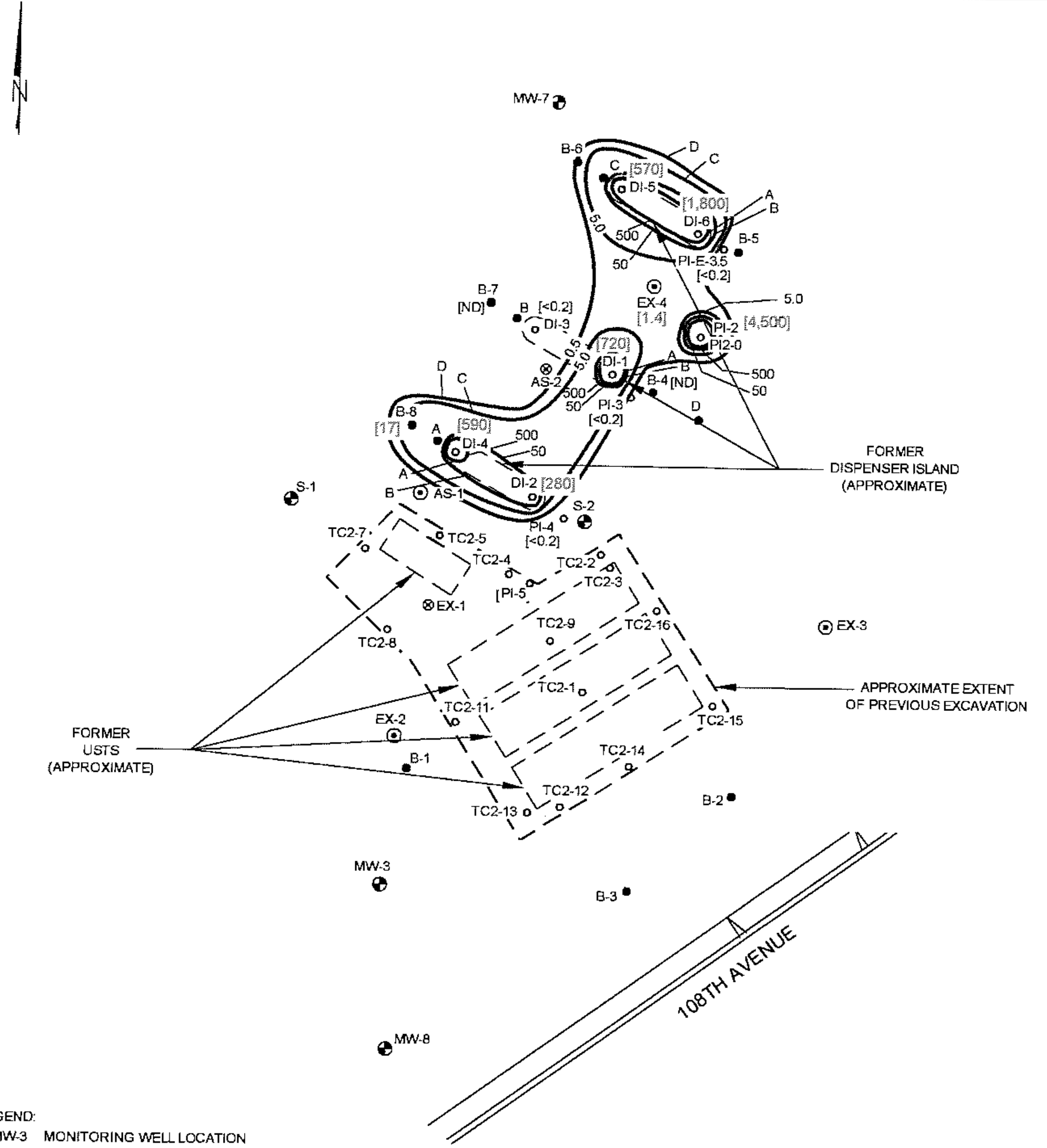
FORMER USA SERVICE STATION NO. 57
10700 MACARTHUR BOULEVARD
OAKLAND, CALIFORNIA

GROUNDWATER ELEVATION CONTOUR MAP
1st QUARTER 2009

FIGURE
5

PROJECT NO.
2007-0057-01

USA57SCM JMP REV April 15, 2009 USA 57 1Q09



LEGEND:

● MW-3	MONITORING WELL LOCATION
⊙ EX-1	EXTRACTION WELL LOCATION
⊗ AS-1	APPROXIMATE AIR SPARGE WELL LOCATION
● B-1	APPROXIMATE SOIL BORING LOCATION
○ D1-4	APPROXIMATE SOIL SAMPLE LOCATION
[<0.2]	TOTAL PETROLEUM HYDROCARBONS AS GASOLINE IN mg/Kg
ND	NOT DETECTED (LABORATORY REPORTING LIMITS NOT AVAILABLE)
NA	NOT ANALYZED FOR THIS CONSTITUENT

SOIL SAMPLES COLLECTED BETWEEN 7/94 AND 3/95 & 10/05 AND 8/07
NOT ALL EXCAVATION SAMPLE LOCATIONS SHOWN; ONLY THOSE SAMPLES
COLLECTED AT THE FURTHEST EXTENT OF EXCAVATION

NOTE: DPE REMEDIATION LIKELY RESULTED IN REDISTRIBUTION OF TPHG FOLLOWING SAMPLE COLLECTION

0 60 FT
SCALE

NOTE: MAP BASED ON SURVEY PREPARED BY RON ARCHER CIVIL ENGINEER INC. (DATED NOVEMBER 22, 1995) & MORROW SURVEYING (2005), AND DRAWINGS PREPARED BY ALTON GEOSCIENCE, WESTERN GEO-ENGINEERS, & GHH ENGINEERING.

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FORMER USA SERVICE STATION NO. 57
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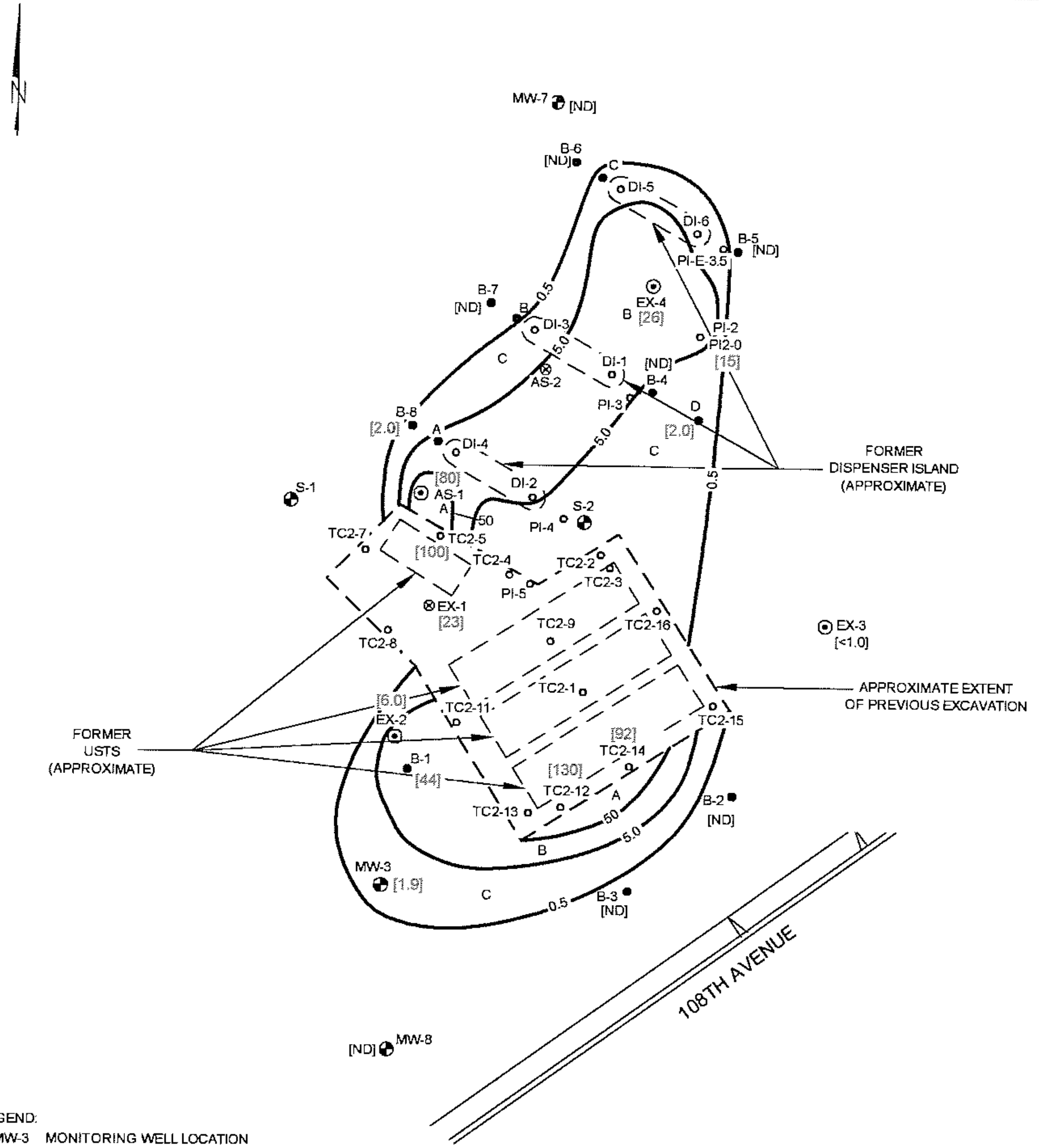
OAKLAND, CALIFORNIA

TPHG IN SOIL ISO-CONCENTRATION
CONTOUR MAP (0 - 7' bgs)

FIGURE
6

PROJECT NO.
2007-0057-01

USA57ASCM JMP REV April 15, 2009 USA 57 Soil Analytical



LEGEND:

MW-3	MONITORING WELL LOCATION
EX-1	EXTRACTION WELL LOCATION
AS-1	APPROXIMATE AIR SPARGE WELL LOCATION
● B-1	APPROXIMATE SOIL BORING LOCATION
○ D1-4	APPROXIMATE SOIL SAMPLE LOCATION
[44]	TOTAL PETROLEUM HYDROCARBONS AS GASOLINE IN mg/Kg
ND	NOT DETECTED (LABORATORY REPORTING LIMITS NOT AVAILABLE) - ASSUMED <0.50
NA	NOT ANALYZED FOR THIS CONSTITUENT

SOIL SAMPLES COLLECTED BETWEEN 7/94 AND 11/95 & 10/05 AND 8/07
NOT ALL EXCAVATION SAMPLE LOCATIONS SHOWN; ONLY THOSE SAMPLES COLLECTED AT THE FURTHEST EXTENT OF EXCAVATION

NOTE: DPE REMEDIATION LIKELY RESULTED IN REDISTRIBUTION OF TPHG FOLLOWING SAMPLE COLLECTION

NOTE: MAP BASED ON SURVEY PREPARED BY RON ARCHER CIVIL ENGINEER INC. (DATED NOVEMBER 22, 1995) & MORROW SURVEYING (2005), AND DRAWINGS PREPARED BY ALTON GEOSCIENCE, WESTERN GEO-ENGINEERS, & GHH ENGINEERING.

0 60 FT
SCALE

USA 57 Soil Analytical
REV April 15, 2009
JMP
USA57ASCM

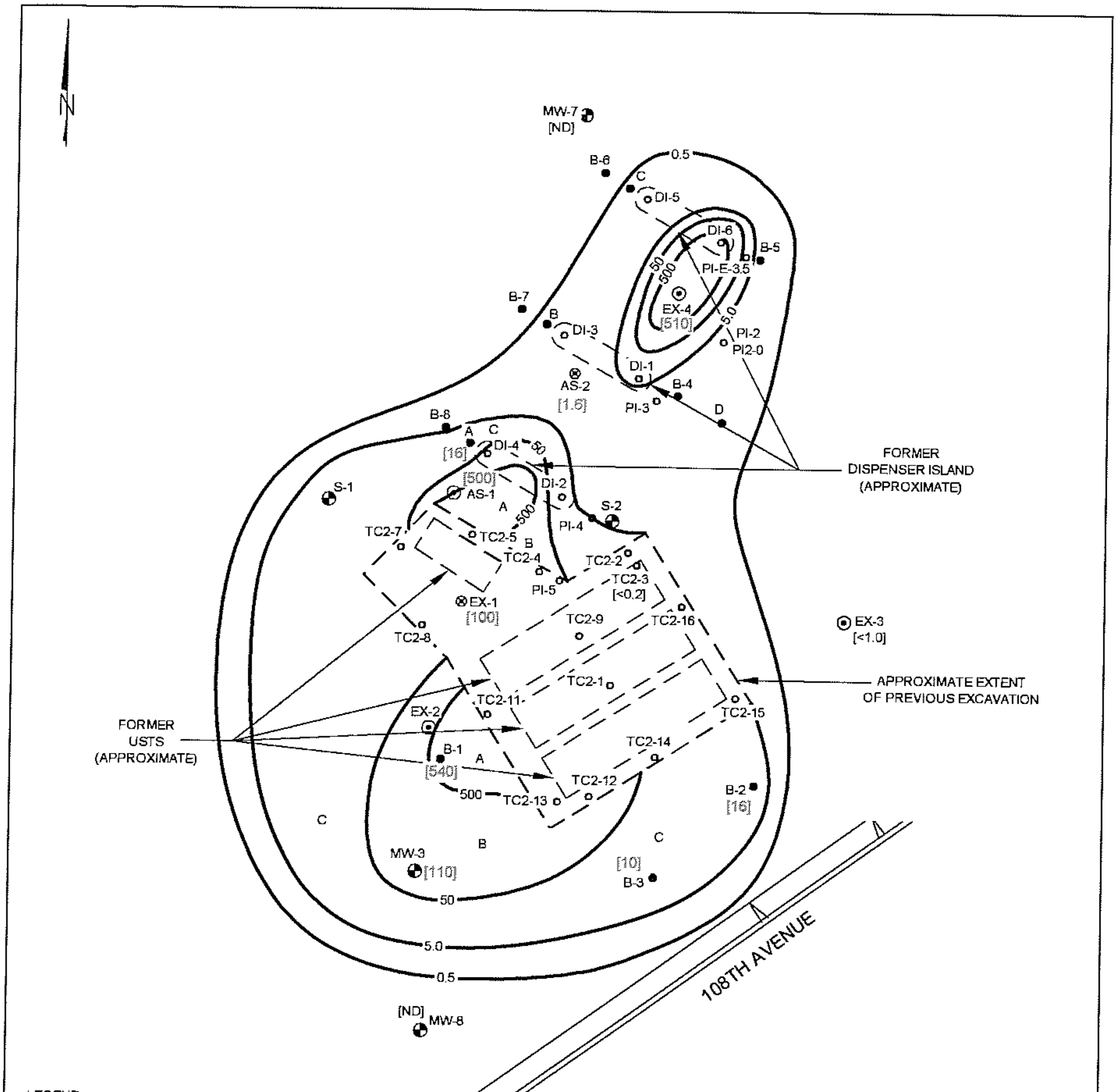
STRATUS
ENVIRONMENTAL, INC.

FORMER USA SERVICE STATION NO. 57
10700 MACARTHUR BOULEVARD
OAKLAND, CALIFORNIA

TPHG IN SOIL ISO-CONCENTRATION CONTOUR MAP (7' - 12' bgs)

FIGURE
7

PROJECT NO.
2007-0057-01



LEGEND:

● MW-3	MONITORING WELL LOCATION
⊙ EX-1	EXTRACTION WELL LOCATION
⊗ AS-1	APPROXIMATE AIR SPARGE WELL LOCATION
● B-1	APPROXIMATE SOIL BORING LOCATION
○ D1-4	APPROXIMATE SOIL SAMPLE LOCATION
[<0.2]	TOTAL PETROLEUM HYDROCARBONS AS GASOLINE IN mg/Kg
ND	NOT DETECTED (LABORATORY REPORTING LIMITS NOT AVAILABLE)
NA	NOT ANALYZED FOR THIS CONSTITUENT

SOIL SAMPLES COLLECTED BETWEEN 7/94 AND 11/95 & 10/05 AND 8/07
NOT ALL EXCAVATION SAMPLE LOCATIONS SHOWN; ONLY THOSE SAMPLES
COLLECTED AT THE FURTHEST EXTENT OF EXCAVATION

NOTE: DPE REMEDIATION LIKELY RESULTED IN REDISTRIBUTION OF TPHG FOLLOWING SAMPLE COLLECTION

NOTE: MAP BASED ON SURVEY PREPARED BY RON ARCHER CIVIL ENGINEER INC. (DATED NOVEMBER 22, 1995) & MORROW SURVEYING (2005), AND DRAWINGS PREPARED BY ALTON GEOSCIENCE, WESTERN GEO-ENGINEERS, & GHH ENGINEERING.

0 60 FT
SCALE

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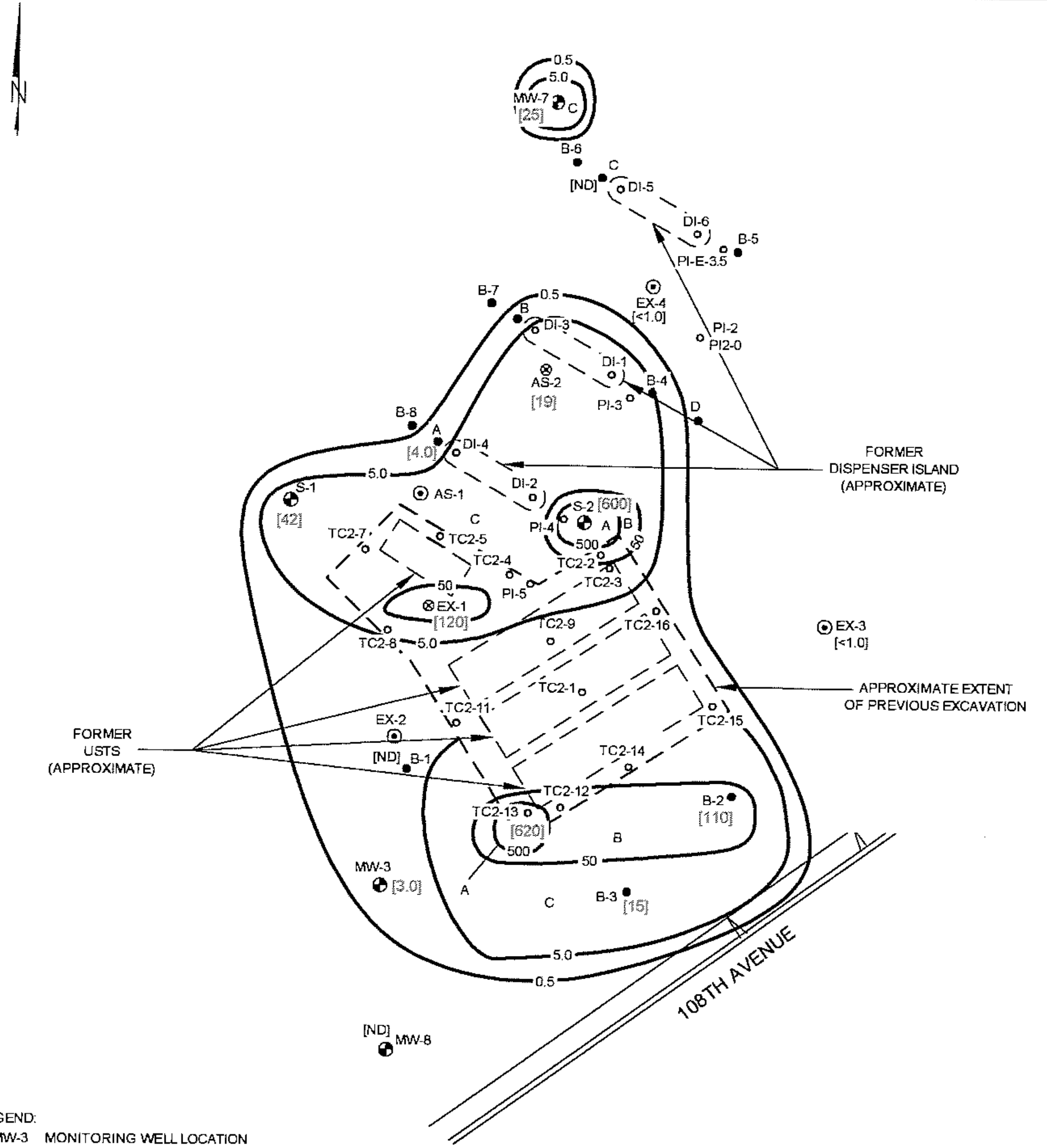
OAKLAND, CALIFORNIA

TPHG IN SOIL ISO-CONCENTRATION
CONTOUR MAP (12' - 17' bgs)

FIGURE
8

PROJECT NO.
2007-0057-01



LEGEND:

⊕	MW-3	MONITORING WELL LOCATION
⊙	EX-1	EXTRACTION WELL LOCATION
⊗	AS-1	APPROXIMATE AIR SPARGE WELL LOCATION
●	B-1	APPROXIMATE SOIL BORING LOCATION
○	D1-4	APPROXIMATE SOIL SAMPLE LOCATION
	[3.0]	TOTAL PETROLEUM HYDROCARBONS AS GASOLINE IN mg/Kg
	ND	NOT DETECTED (LABORATORY REPORTING LIMITS NOT AVAILABLE)
	NA	NOT ANALYZED FOR THIS CONSTITUENT

SOIL SAMPLES COLLECTED BETWEEN 7/94 AND 11/95 & 10/05 AND 8/07
NOT ALL EXCAVATION SAMPLE LOCATIONS SHOWN; ONLY THOSE SAMPLES
COLLECTED AT THE FURTHEST EXTENT OF EXCAVATION

NOTE: DPE REMEDIATION LIKELY RESULTED IN REDISTRIBUTION OF TPHG FOLLOWING SAMPLE COLLECTION

0 60 FT

SCALE

NOTE: MAP BASED ON SURVEY PREPARED BY RON ARCHER CIVIL ENGINEER INC. (DATED NOVEMBER 22, 1995) & MORROW SURVEYING (2005), AND DRAWINGS PREPARED BY ALTON GEOSCIENCE, WESTERN GEO-ENGINEERS, & GHH ENGINEERING.

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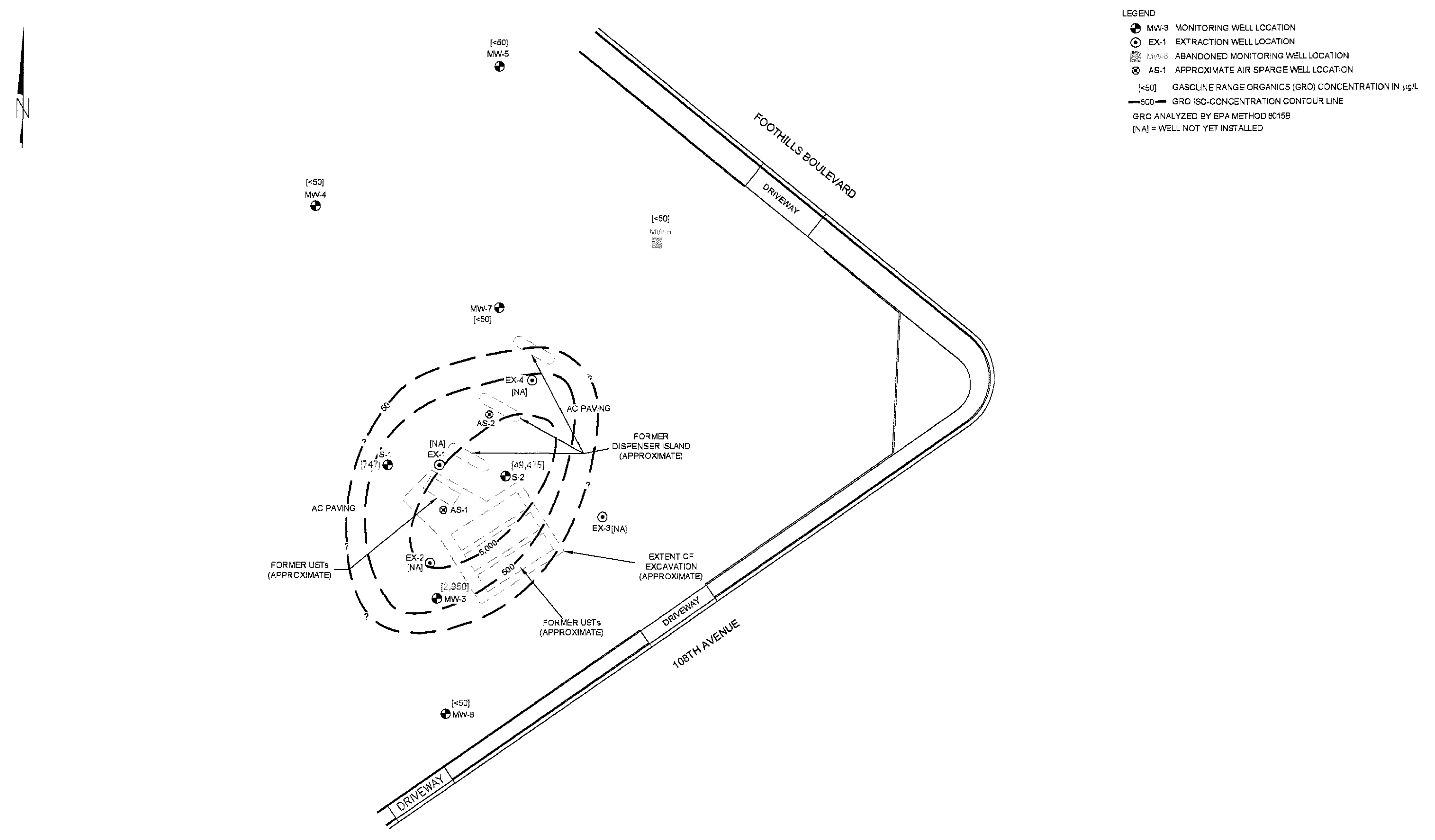
OAKLAND, CALIFORNIA

TPHG IN SOIL ISO-CONCENTRATION
CONTOUR MAP, (17' - 25' bgs)

FIGURE
9

PROJECT NO.
2007-0057-01



USA57ISCM JMP REV April 15, 2009 USA 57 1Q09

STRATUS
ENVIRONMENTAL, INC.

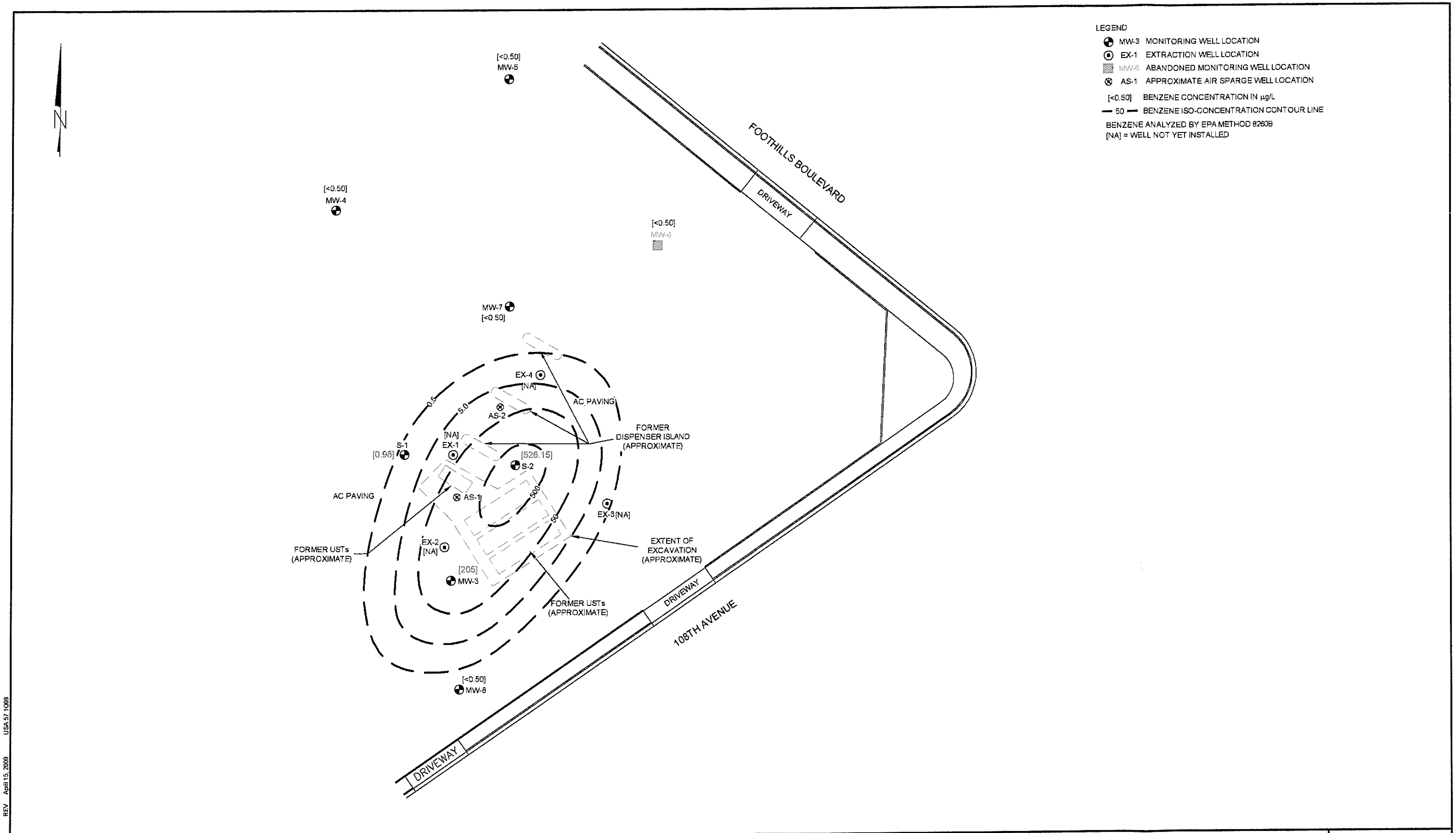
0 40 FT
SCALE

FORMER USA SERVICE STATION NO. 57
10700 MACARTHUR BOULEVARD
OAKLAND, CALIFORNIA

ANNUAL AVERAGE GRO IN GROUNDWATER
ISO-CONCENTRATION CONTOUR MAP, 1998

FIGURE
10

PROJECT NO.
2007-0057-01



USA57\SCM JMP REV April 15, 2009 USA 57 1009

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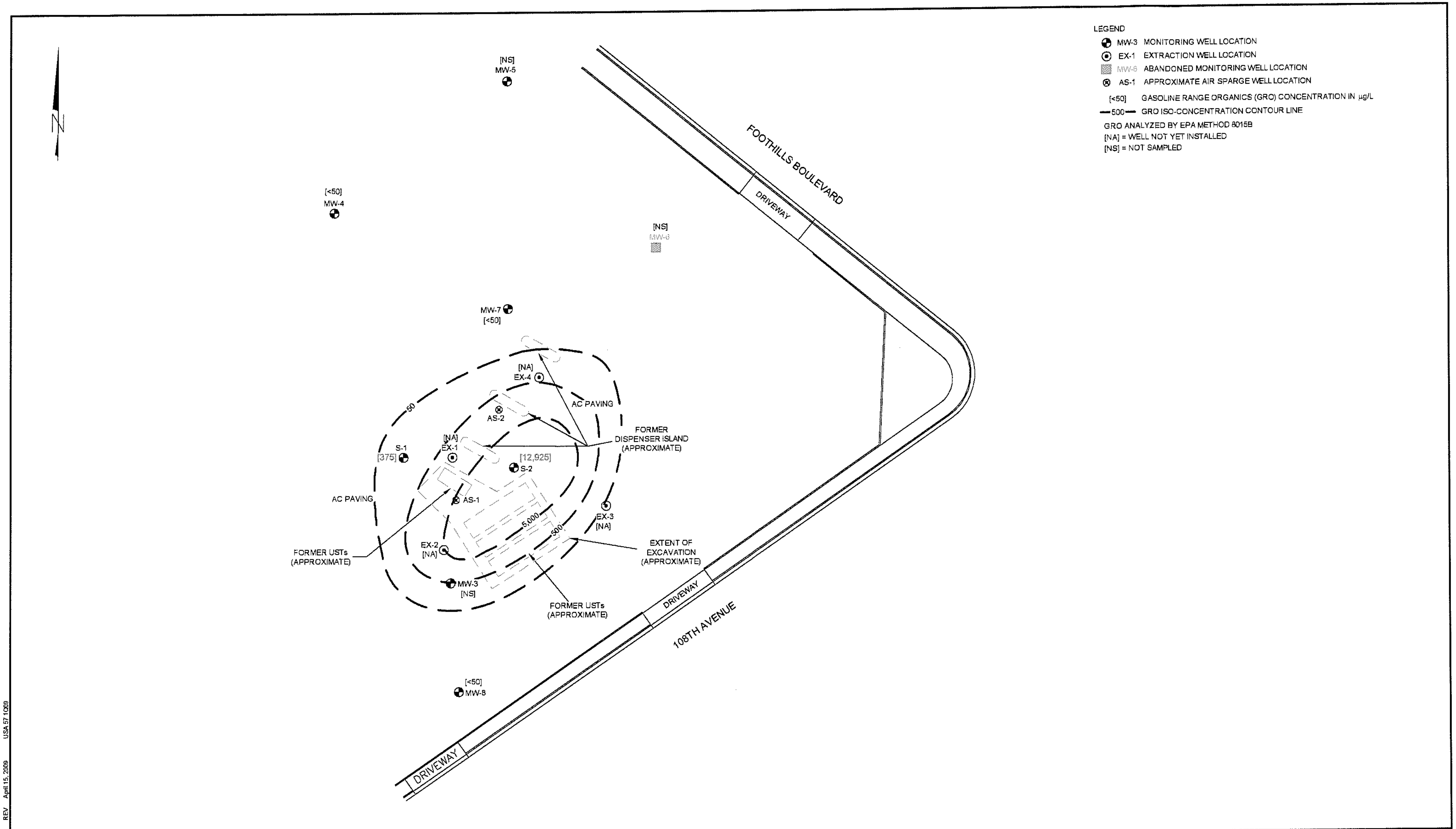
ANNUAL AVERAGE BENZENE IN GROUNDWATER
ISO-CONCENTRATION CONTOUR MAP, 1998

FIGURE
11

PROJECT NO.
2007-0057-01



STRATUS
ENVIRONMENTAL, INC.

0 40 FT
SCALE

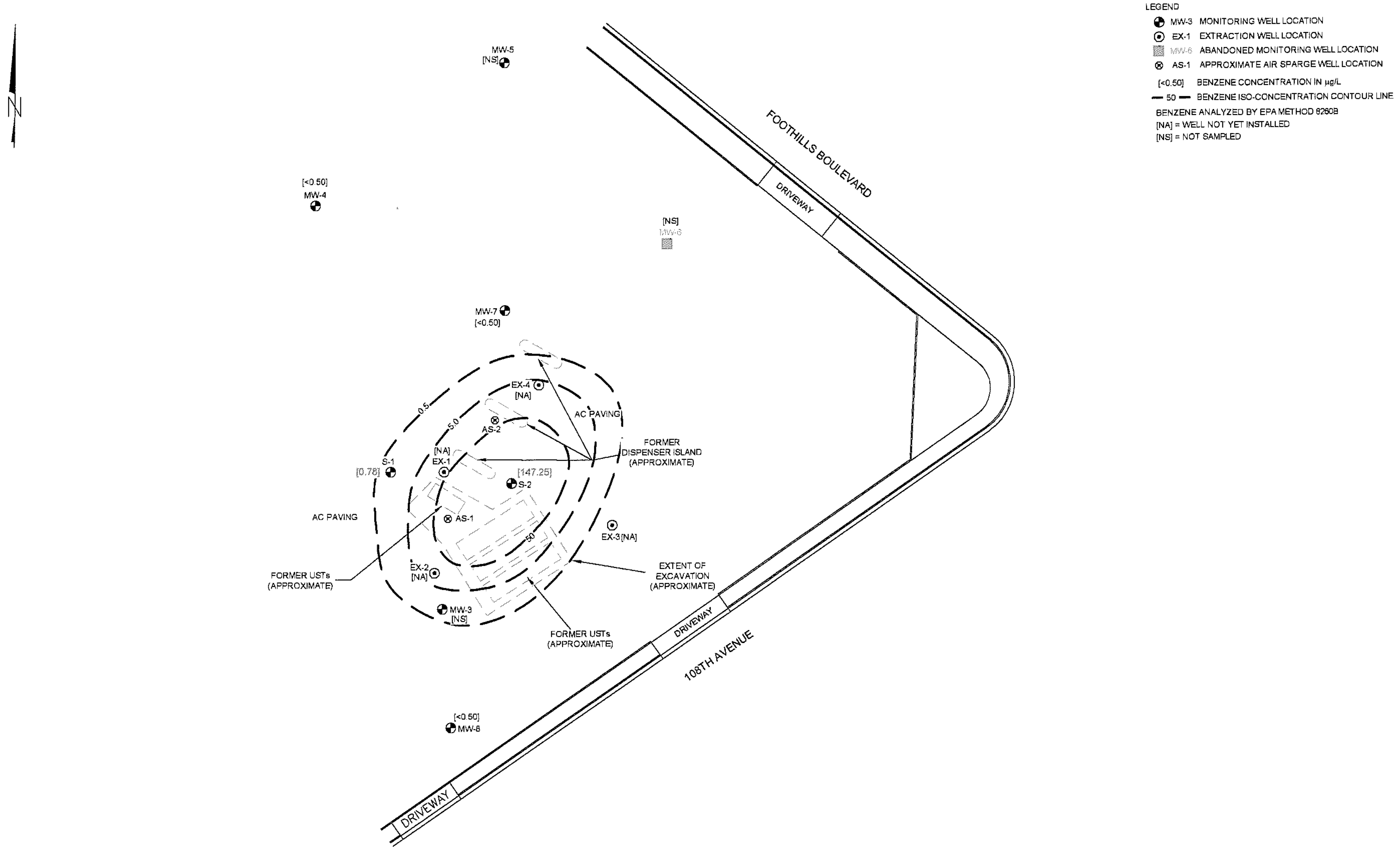
FORMER USA SERVICE STATION NO. 57
10700 MACARTHUR BOULEVARD
OAKLAND, CALIFORNIA

ANNUAL AVERAGE GRO IN GROUNDWATER
ISO-CONCENTRATION CONTOUR MAP, 2003

FIGURE
12

PROJECT NO.
2007-0057-01

USA571SCM JMP REV April 15, 2009 USA 57 1Q09



USA57\SCM JMP REV April 15, 2009 USA 57 1O09

STRATUS
ENVIRONMENTAL, INC.

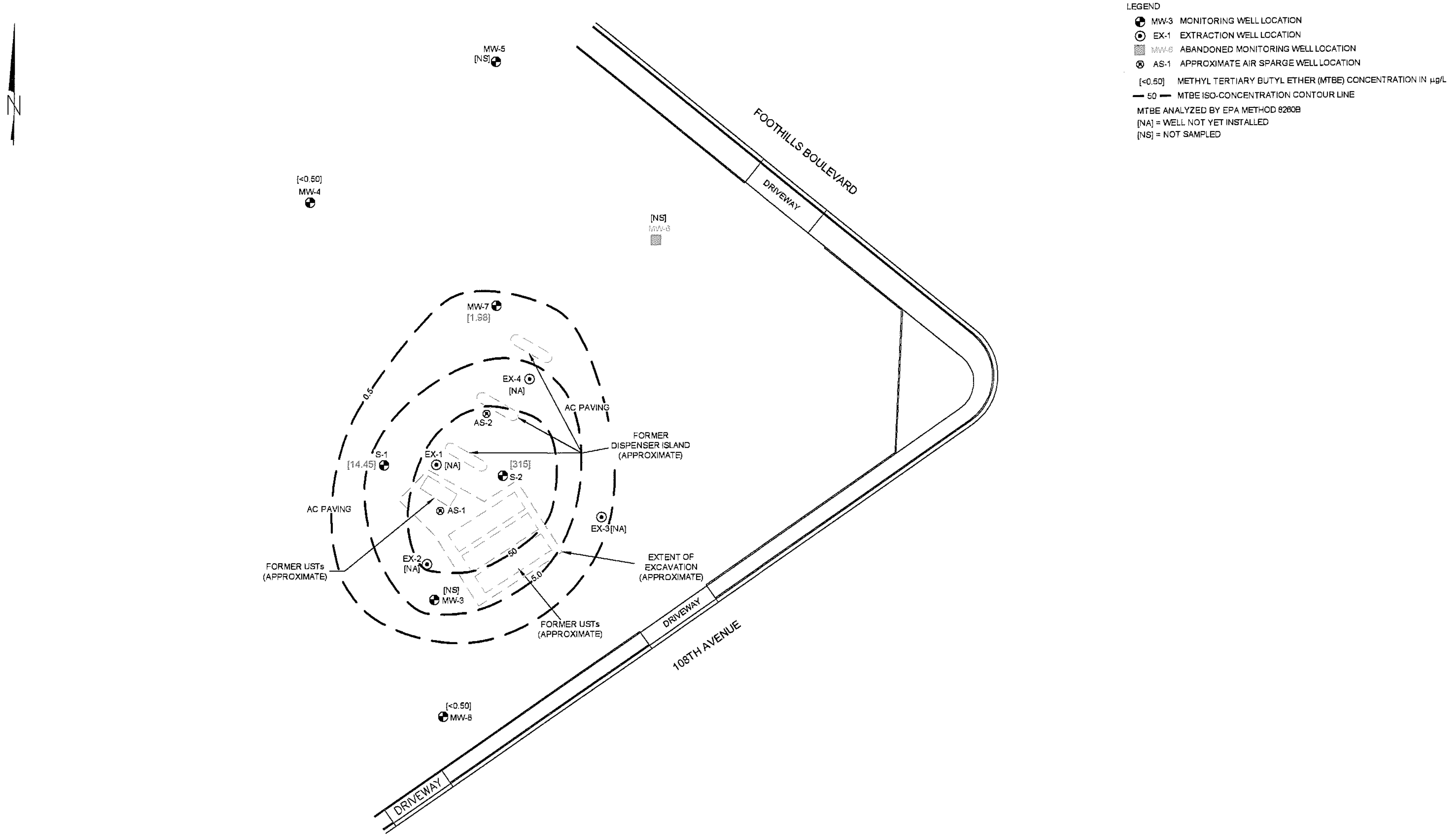
0 40 FT
SCALE

FORMER USA SERVICE STATION NO. 57
10700 MACARTHUR BOULEVARD
OAKLAND, CALIFORNIA

ANNUAL AVERAGE BENZENE IN GROUNDWATER
ISO-CONCENTRATION CONTOUR MAP, 2003

FIGURE
13

PROJECT NO.
2007-0057-01



STRATUS
ENVIRONMENTAL, INC.

0 40 FT
SCALE

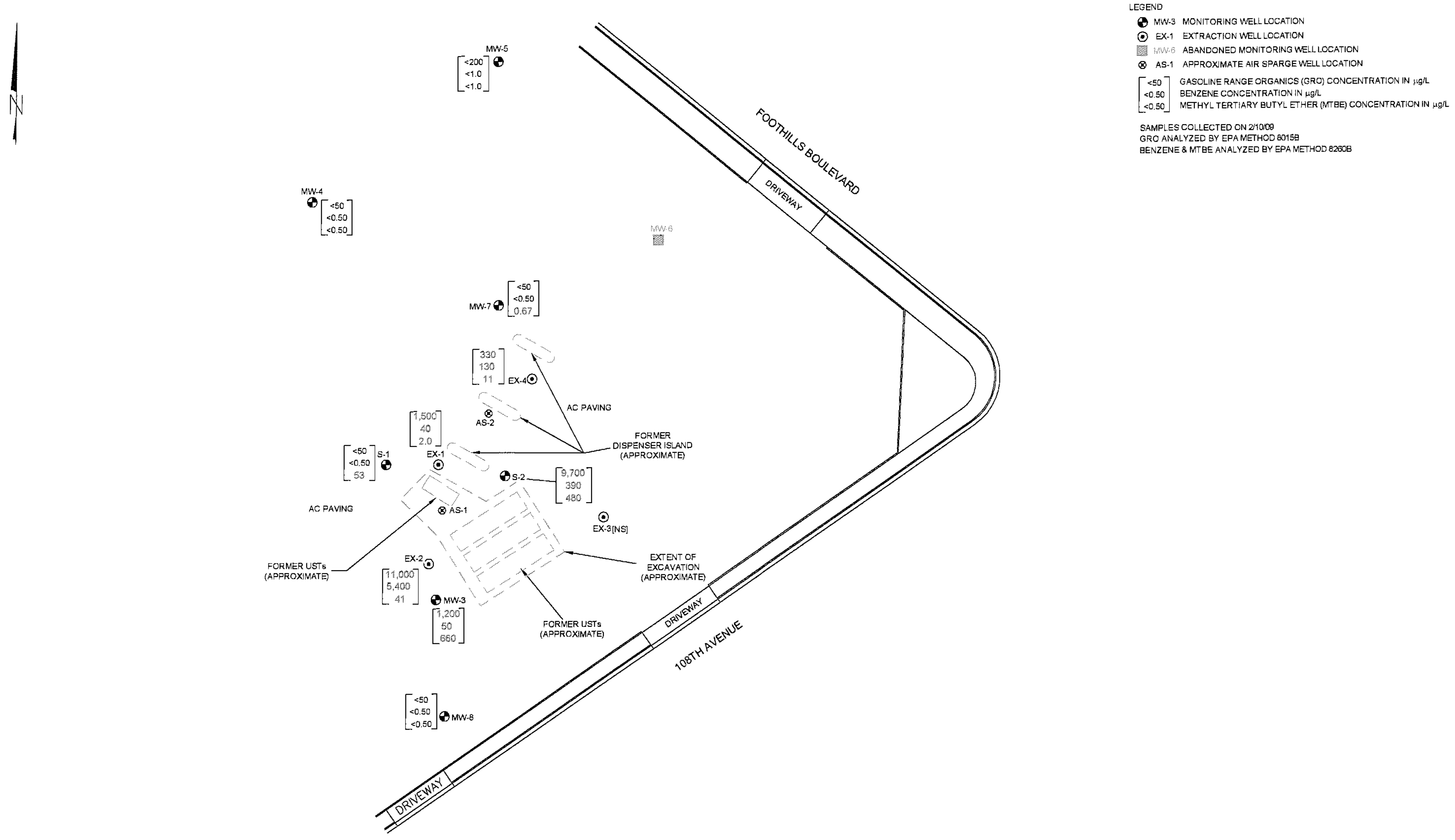
FORMER USA SERVICE STATION NO. 57
10700 MACARTHUR BOULEVARD
OAKLAND, CALIFORNIA

ANNUAL AVERAGE MTBE IN GROUNDWATER
ISO-CONCENTRATION CONTOUR MAP, 2003

FIGURE
14

PROJECT NO.
2007-0057-01

USA57USCM JMP REV April 15, 2009 USA 57 1Q09



USA57\SCM JMP REV April 15, 2009 USA 57 1Q09

STRATUS
ENVIRONMENTAL, INC.

0 40 FT
SCALE

FORMER USA SERVICE STATION NO. 57
10700 MACARTHUR BOULEVARD
OAKLAND, CALIFORNIA

GROUNDWATER ANALYTICAL SUMMARY
1st QUARTER 2009

FIGURE
15
PROJECT NO.
2007-0057-01

LEGEND

● MW-3 MONITORING WELL LOCATION

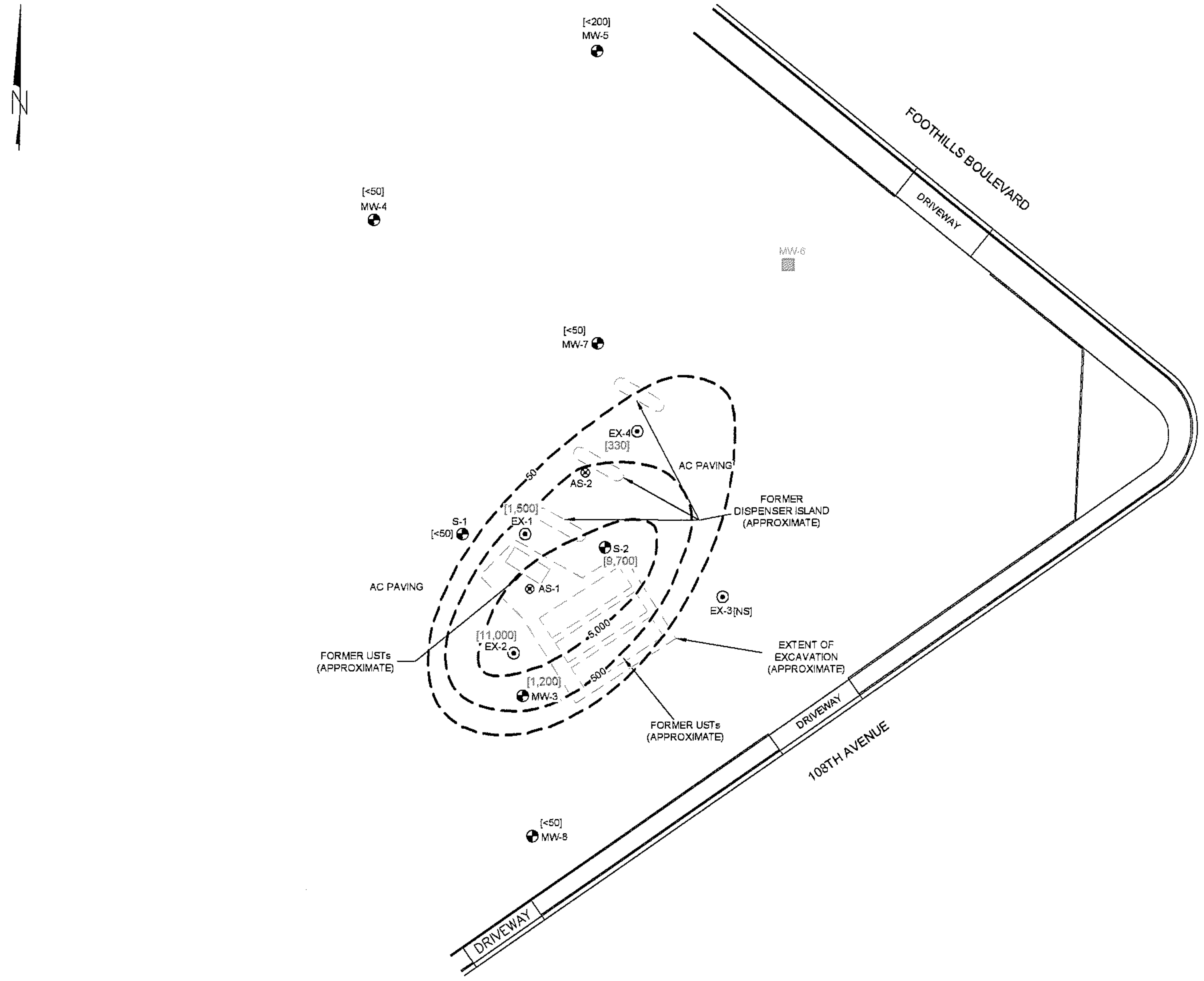
⊙ EX-1 EXTRACTION WELL LOCATION

▨ MW-6 ABANDONED MONITORING WELL LOCATION

⊗ AS-1 APPROXIMATE AIR SPARGE WELL LOCATION

[<50] GASOLINE RANGE ORGANICS (GRO) CONCENTRATION IN µg/L

SAMPLES COLLECTED ON 2/10/09
GRO ANALYZED BY EPA METHOD 8015B



USA57 1Q09 April 15, 2009 REV JMP USA571SCM

STRATUS
ENVIRONMENTAL, INC.

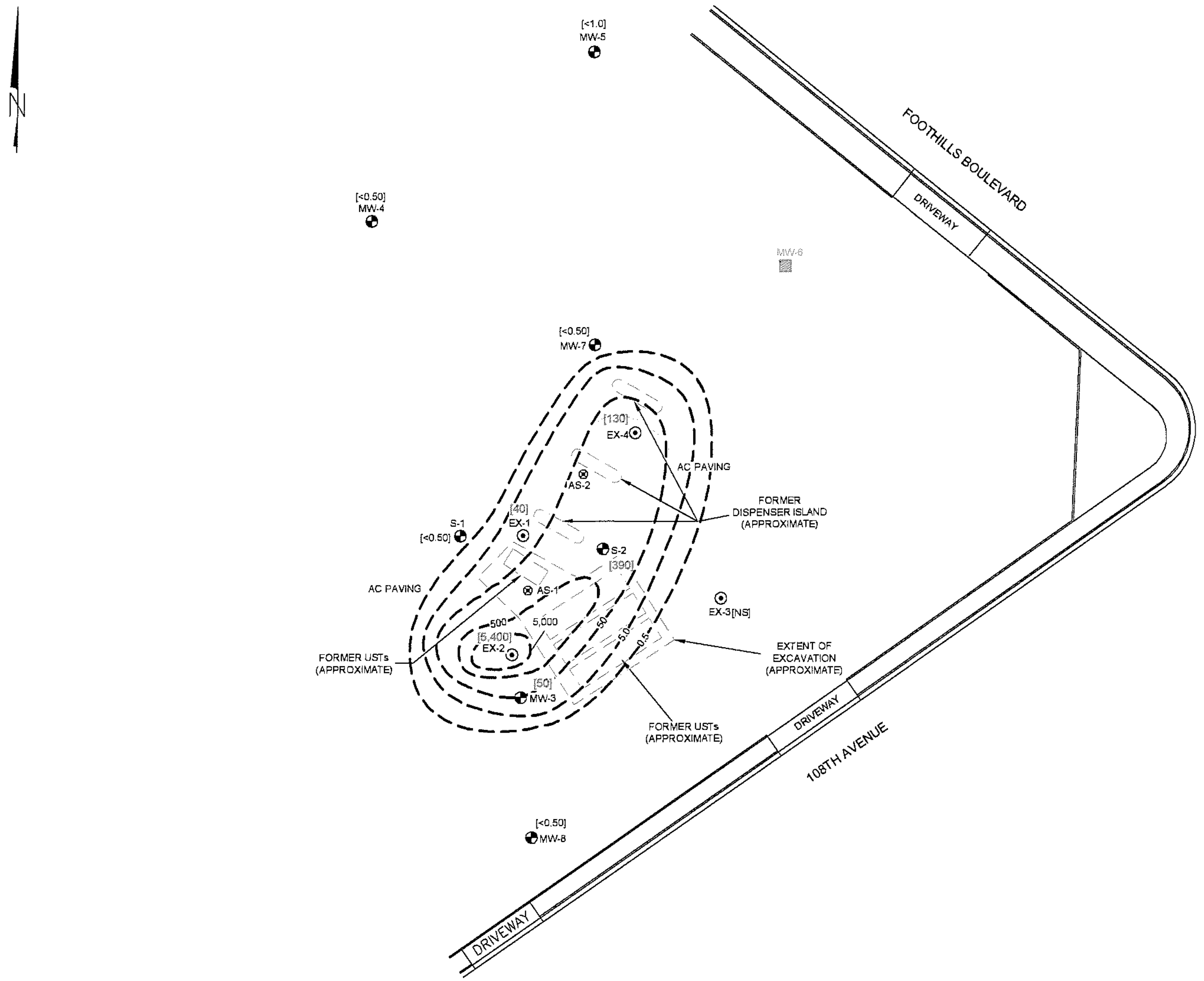
0 40 FT
SCALE

FORMER USA SERVICE STATION NO. 57
10700 MACARTHUR BOULEVARD
OAKLAND, CALIFORNIA

GRO IN GROUNDWATER
ISO-CONCENTRATION CONTOUR MAP
1st QUARTER 2009

FIGURE
16

PROJECT NO.
2007-0057-01



LEGEND

- ◉ MW-3 MONITORING WELL LOCATION
- ⊙ EX-1 EXTRACTION WELL LOCATION
- ▨ MW-6 ABANDONED MONITORING WELL LOCATION
- ⊗ AS-1 APPROXIMATE AIR SPARGE WELL LOCATION

[<0.50] BENZENE CONCENTRATION IN µg/L

SAMPLES COLLECTED ON 2/10/09
BENZENE ANALYZED BY EPA METHOD 8260B

USA57SCM JMP REV April 15, 2009 USA 57 1Q09

STRATUS
ENVIRONMENTAL, INC.

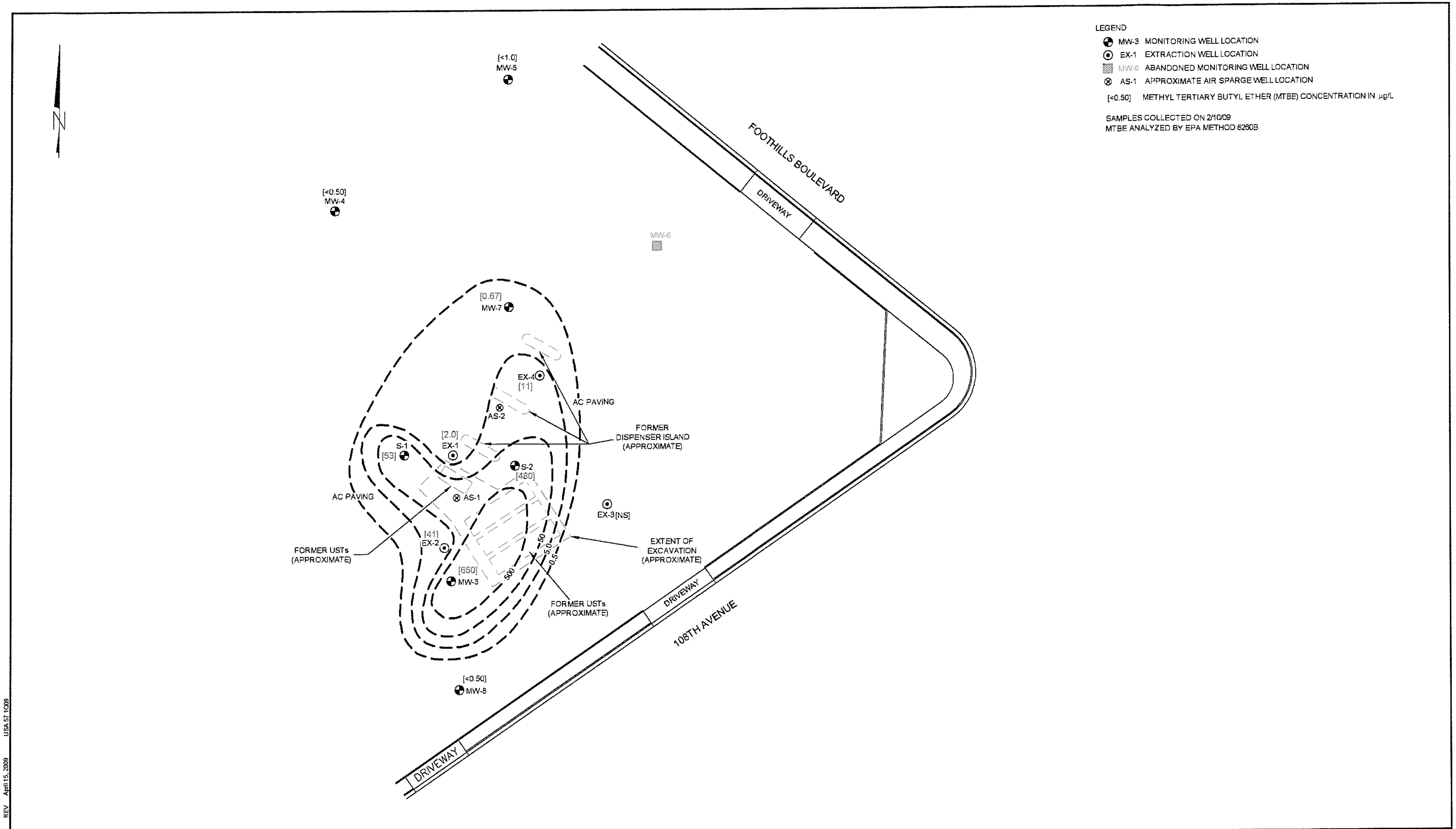
0 40 FT
SCALE

FORMER USA SERVICE STATION NO. 57
10700 MACARTHUR BOULEVARD
OAKLAND, CALIFORNIA

BENZENE IN GROUNDWATER
ISO-CONCENTRATION CONTOUR MAP
1st QUARTER 2009

FIGURE
17

PROJECT NO.
2007-0057-01



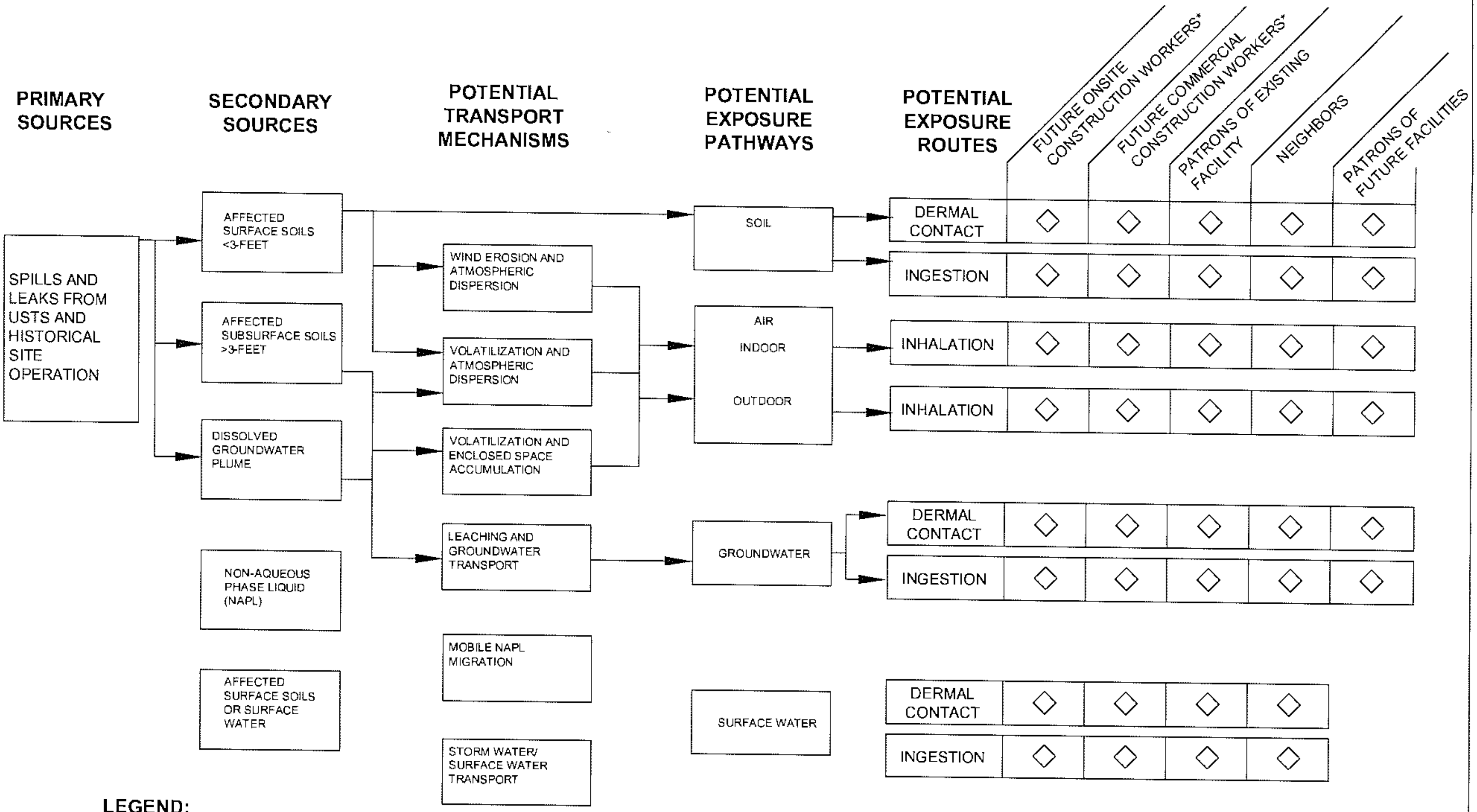
USA57.SCM JMP REV April 15, 2009 USA 57 1Q09

STRATUS
ENVIRONMENTAL, INC.

0 40 FT
SCALE

FORMER USA SERVICE STATION NO. 57
10700 MACARTHUR BOULEVARD
OAKLAND, CALIFORNIA
MTBE IN GROUNDWATER
ISO-CONCENTRATION CONTOUR MAP
1st QUARTER 2009

FIGURE
18
PROJECT NO.
2007-0057-01



POTENTIAL EXPOSURE PATHWAYS	POTENTIAL EXPOSURE ROUTES	FUTURE ONSITE CONSTRUCTION WORKERS*	FUTURE COMMERCIAL CONSTRUCTION WORKERS*	PATRONS OF EXISTING FACILITY	NEIGHBORS	PATRONS OF FUTURE FACILITIES
SOIL	DERMAL CONTACT	◇	◇	◇	◇	◇
	INGESTION	◇	◇	◇	◇	◇
AIR INDOOR	INHALATION	◇	◇	◇	◇	◇
OUTDOOR	INHALATION	◇	◇	◇	◇	◇
GROUNDWATER	DERMAL CONTACT	◇	◇	◇	◇	◇
	INGESTION	◇	◇	◇	◇	◇
SURFACE WATER	DERMAL CONTACT	◇	◇	◇	◇	
	INGESTION	◇	◇	◇	◇	

LEGEND:

◆ COMPLETE PATHWAY

◇ INCOMPLETE PATHWAY

* ASSUMES WORKERS ARE APPRISED OF THE POTENTIAL HAZARDS. CONSTRUCTION WORKERS AT SITE ASSUMEO TO BE PROPERLY TRAINED IN WORKING WITH AND HANDLING GASOLINE IMPACTED SOIL. ASSUMES BUILDINGS PROPERLY DESIGNED TO PROHIBIT VAPOR INTRUSION.

FIGURE 19
POTENTIAL EXPOSURE PATHWAY MODEL

FORMER USA SERVICE STATION NO. 57
10700 MACARTHUR BOULEVARD
OAKLAND, CALIFORNIA

PROJECT NO. 2007-0057-01	DRAWN BY JMP 4/20/05
FILE NO. USA 57	PREPARED BY S.B.
REVISION NO.	REVIEWED BY

STRATUS ENVIRONMENTAL, INC.

Figure 20

Former USA Service Station No. 57
10700 McArthur Boulevard
Oakland, California

GRO Concentrations in Groundwater, Well S-1, 1995 to 2009

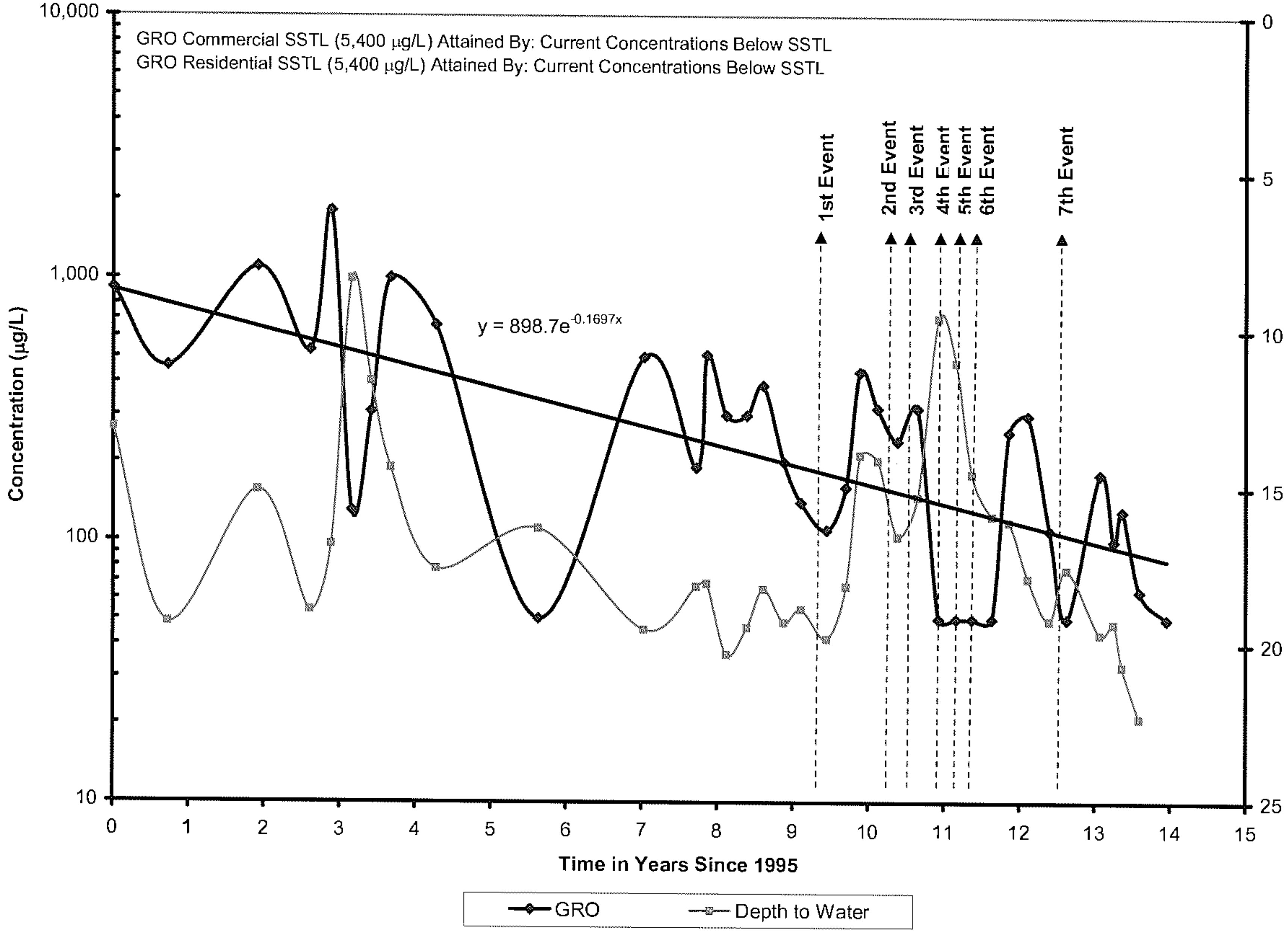


Figure 21

Former USA Service Station No. 57
10700 McArthur Boulevard
Oakland, California

Benzene Concentrations in Groundwater, Well S-1, 1995 to 2009

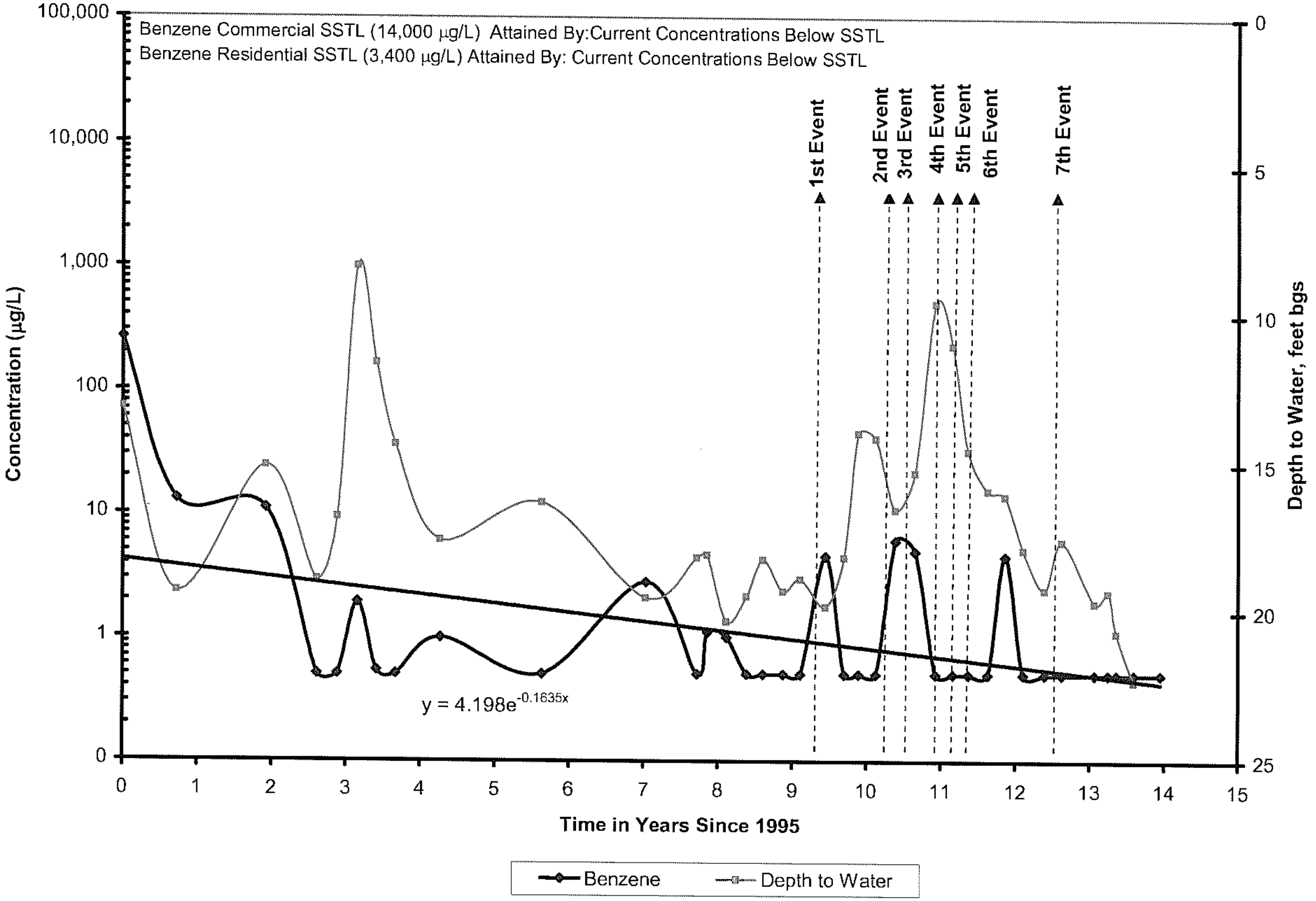


Figure 22

Former USA Service Station No. 57
10700 McArthur Boulevard
Oakland, California
MTBE Concentrations in Groundwater, Well S-1, 1995 to 2009

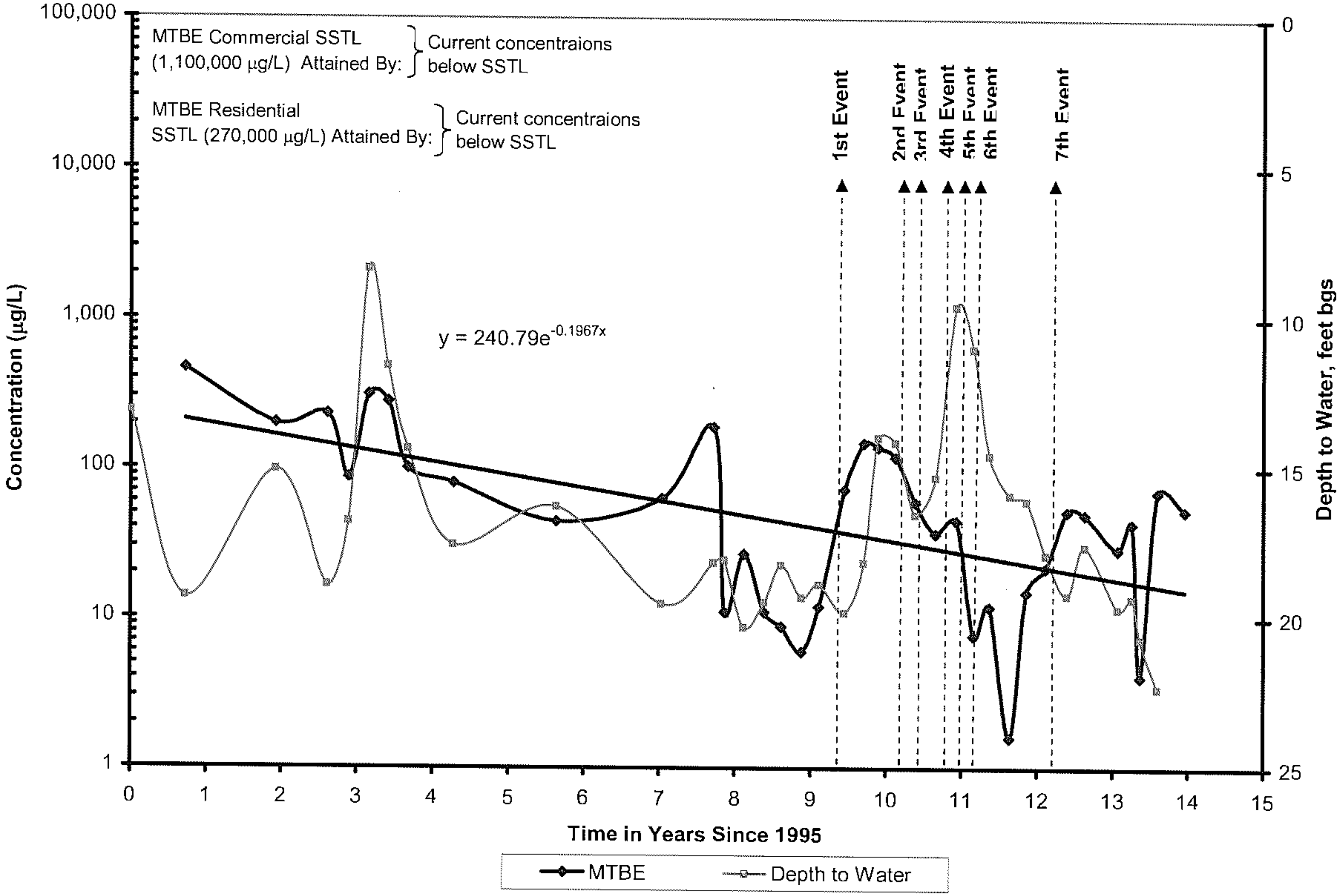


Figure 23

Former USA Service Station No. 57
10700 McArthur Boulevard
Oakland, California

GRO Concentrations in Groundwater, Well S-2, 1995 to 2009

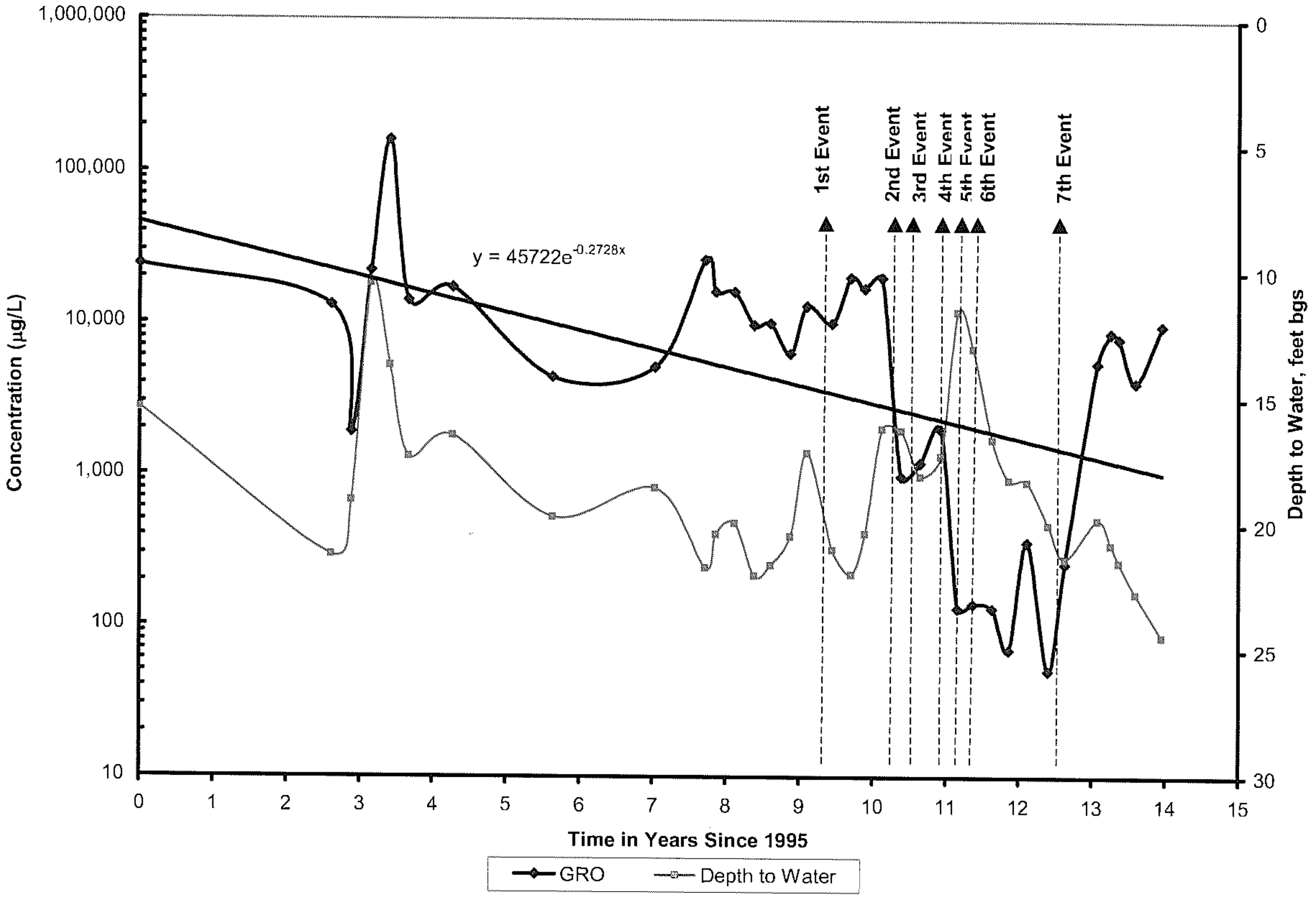


Figure 24

Former USA Service Station No. 57
10700 McArthur Boulevard
Oakland, California

Benzene Concentrations in Groundwater, Well S-2, 1995 to 2009

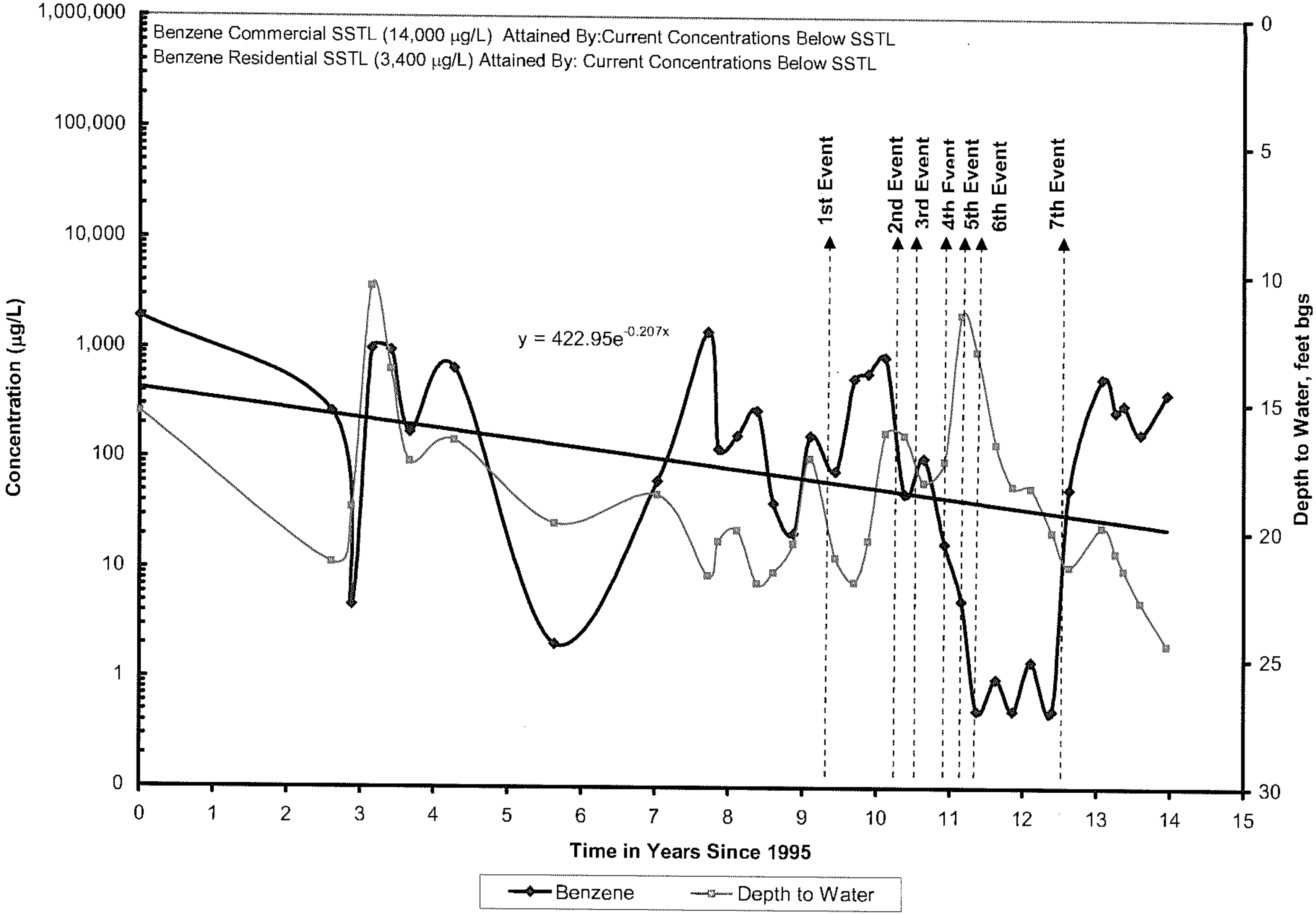


Figure 25
Former USA Service Station No. 57
10700 McArthur Boulevard
Oakland, California
MTBE Concentrations in Groundwater, Well S-2, 1995 to 2009

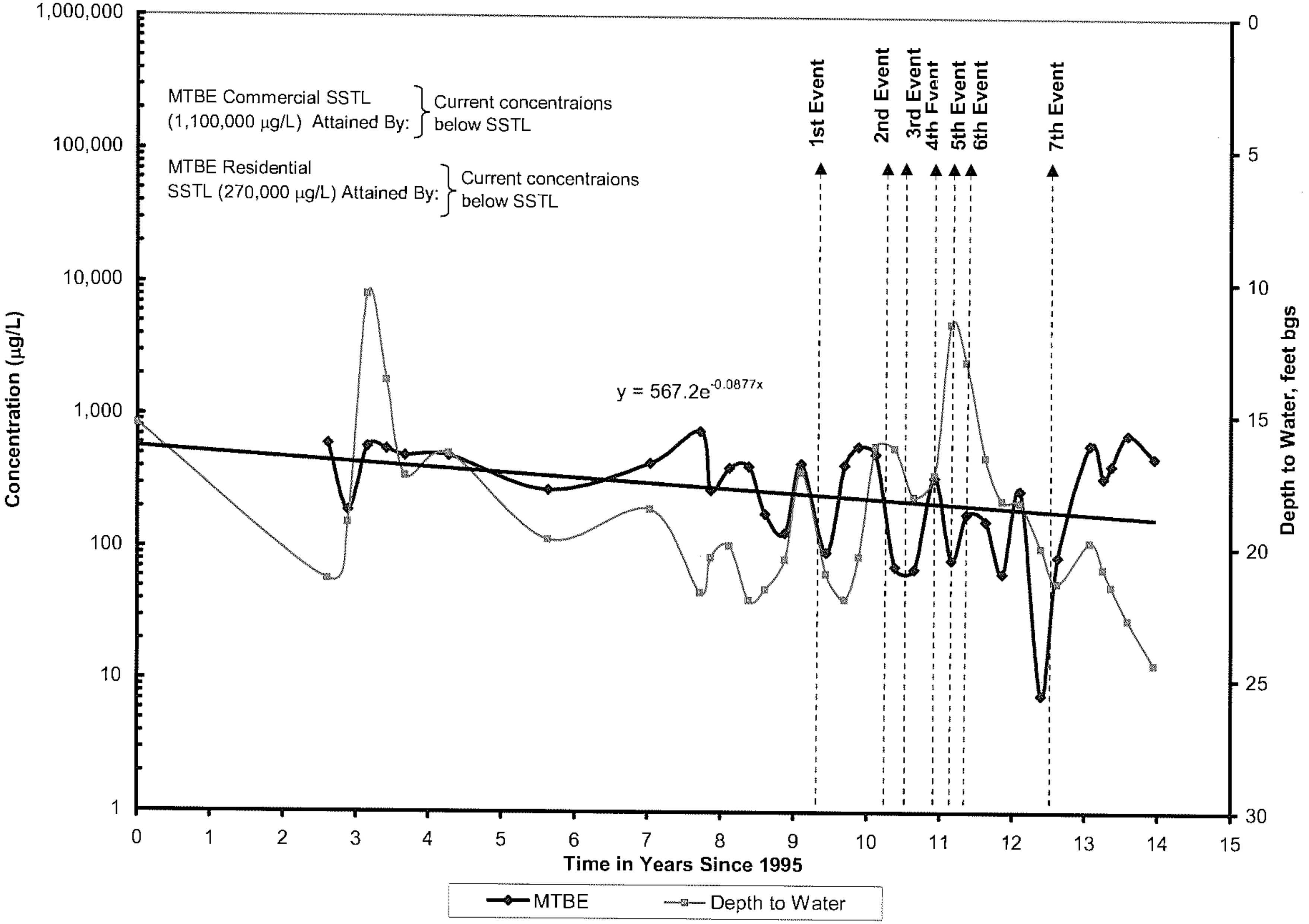


Figure 26

Former USA Service Station No. 57
10700 McArthur Boulevard
Oakland, California

GRO Concentrations in Groundwater, Well MW-3, 1995 to 2009

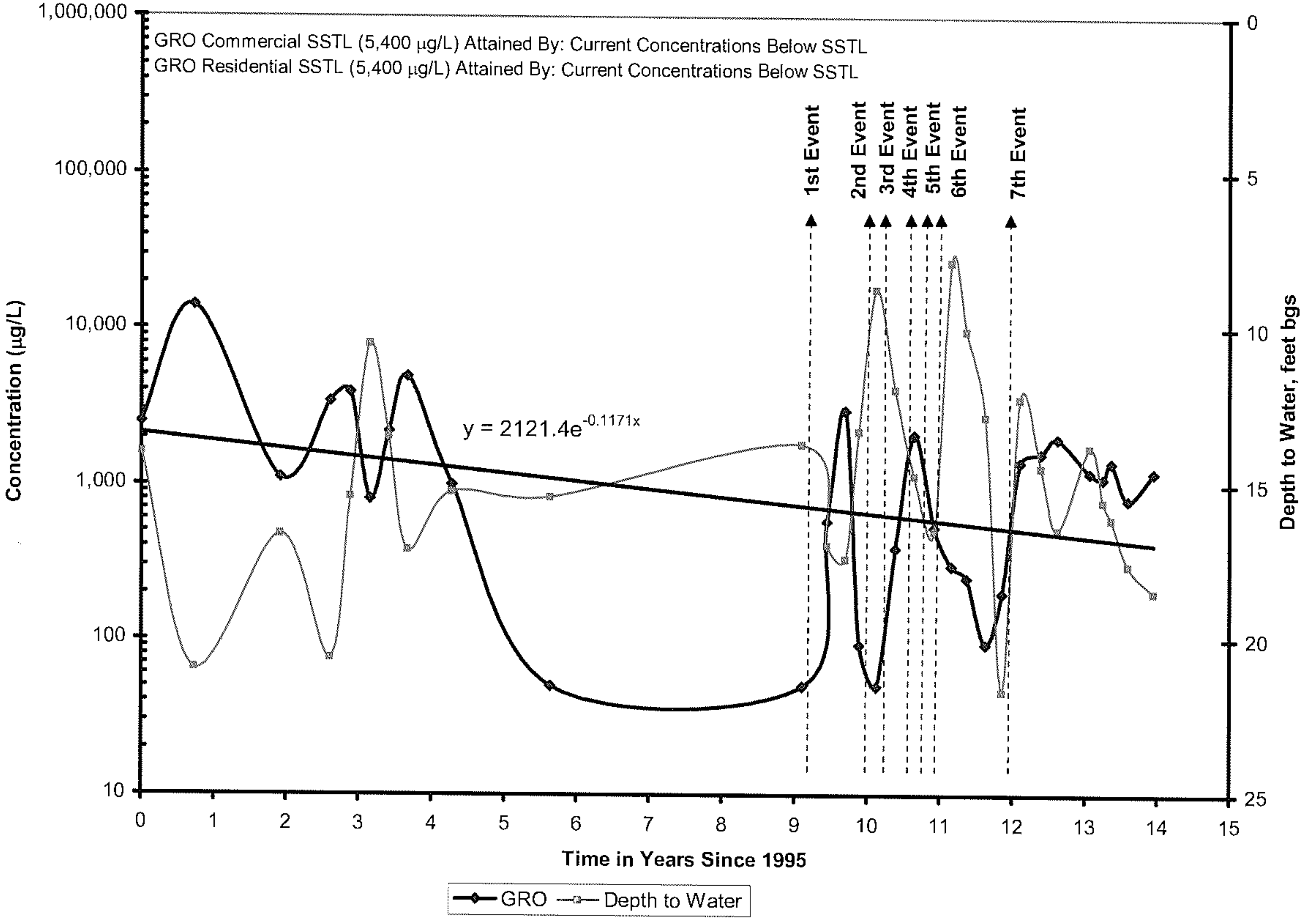


Figure 27

Former USA Service Station No. 57
10700 McArthur Boulevard
Oakland, California

Benzene Concentrations in Groundwater, Well MW-3, 1995 to 2009

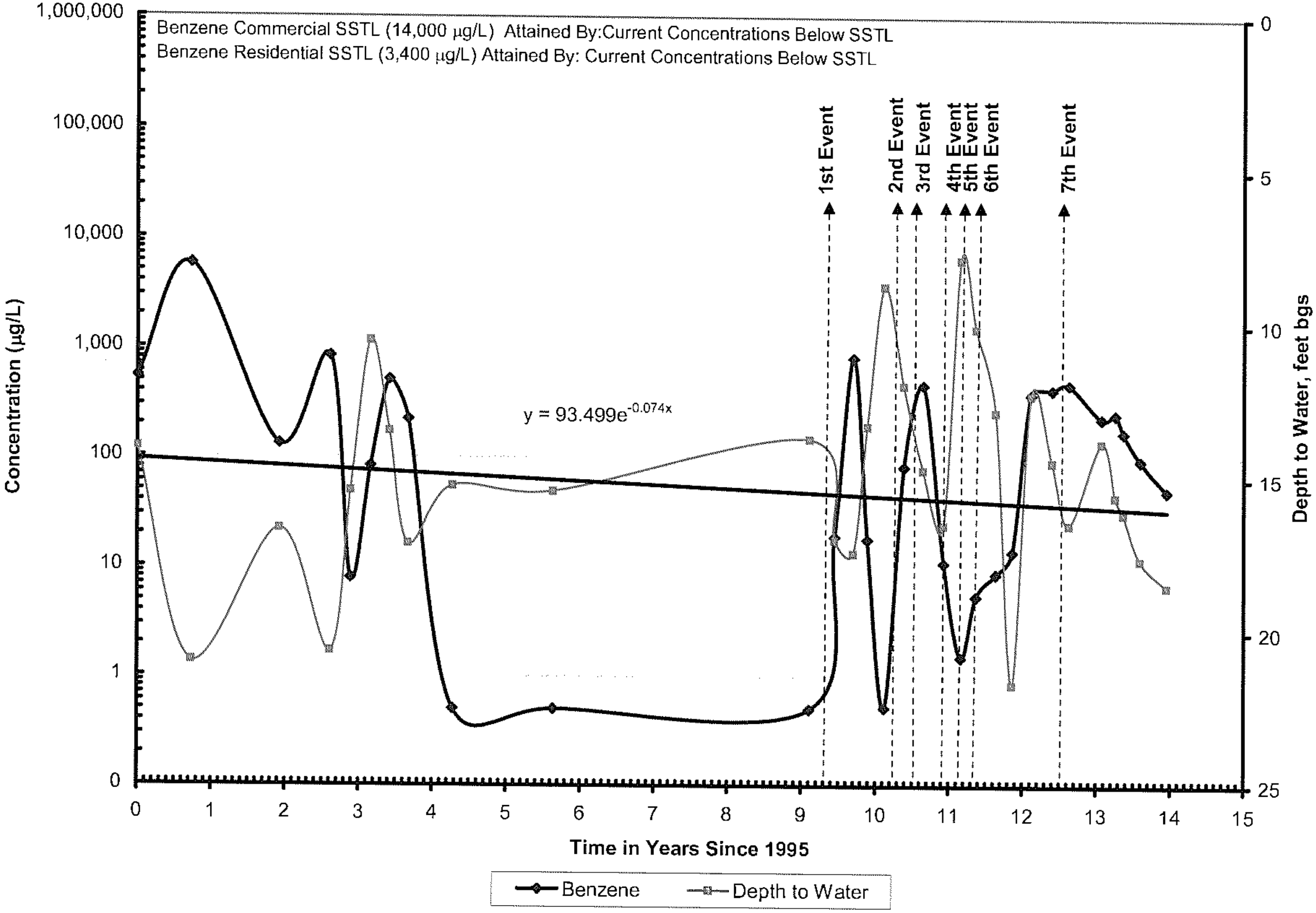


Figure 28

Former USA Service Station No. 57
10700 McArthur Boulevard
Oakland, California

MTBE Concentrations in Groundwater, Well MW-3, 1995 to 2009

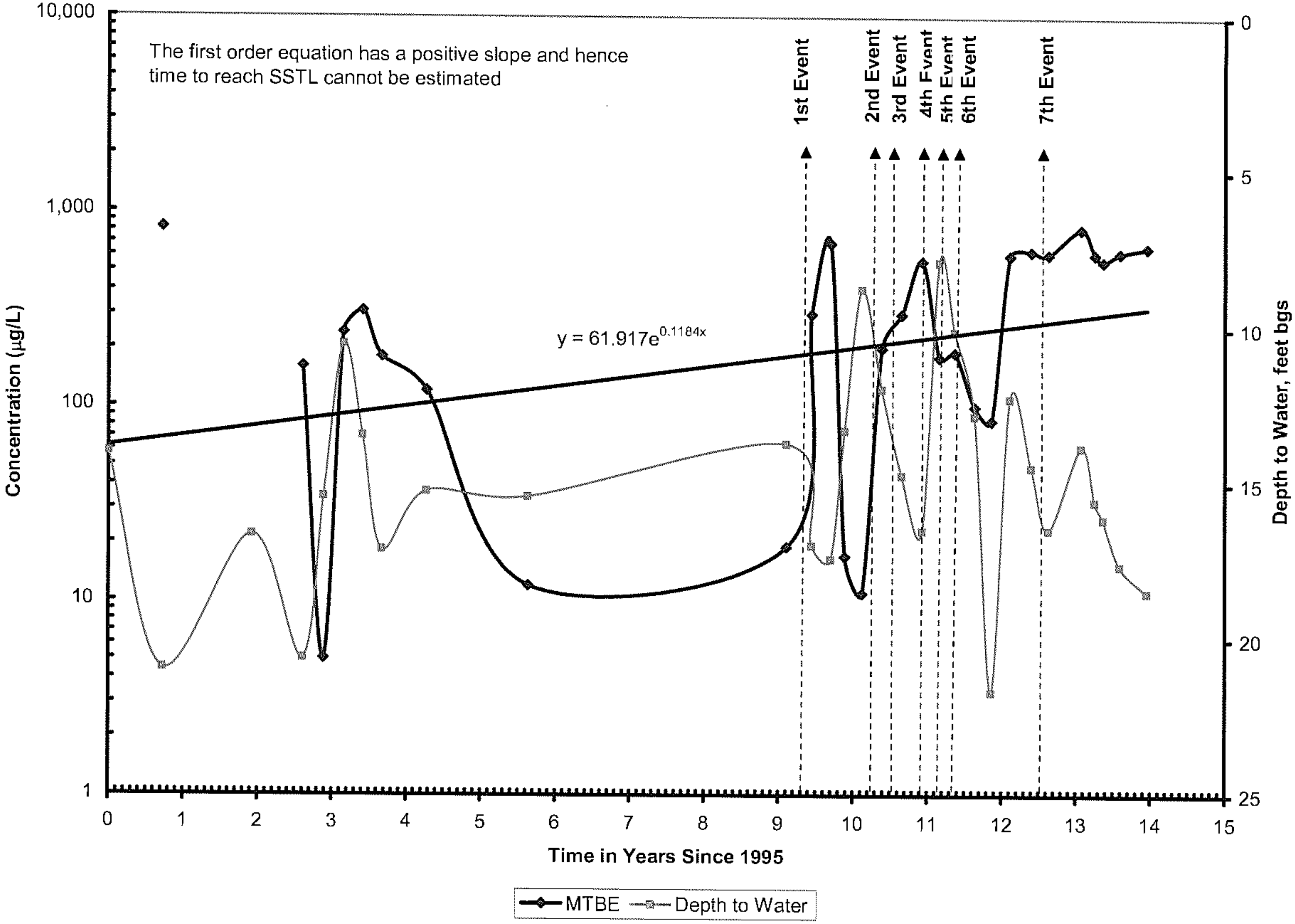


Figure 29

Former USA Service Station No. 57
10700 McArthur Boulevard
Oakland, California

GRO Concentrations in Groundwater, Well EX-1, 2005 to 2009

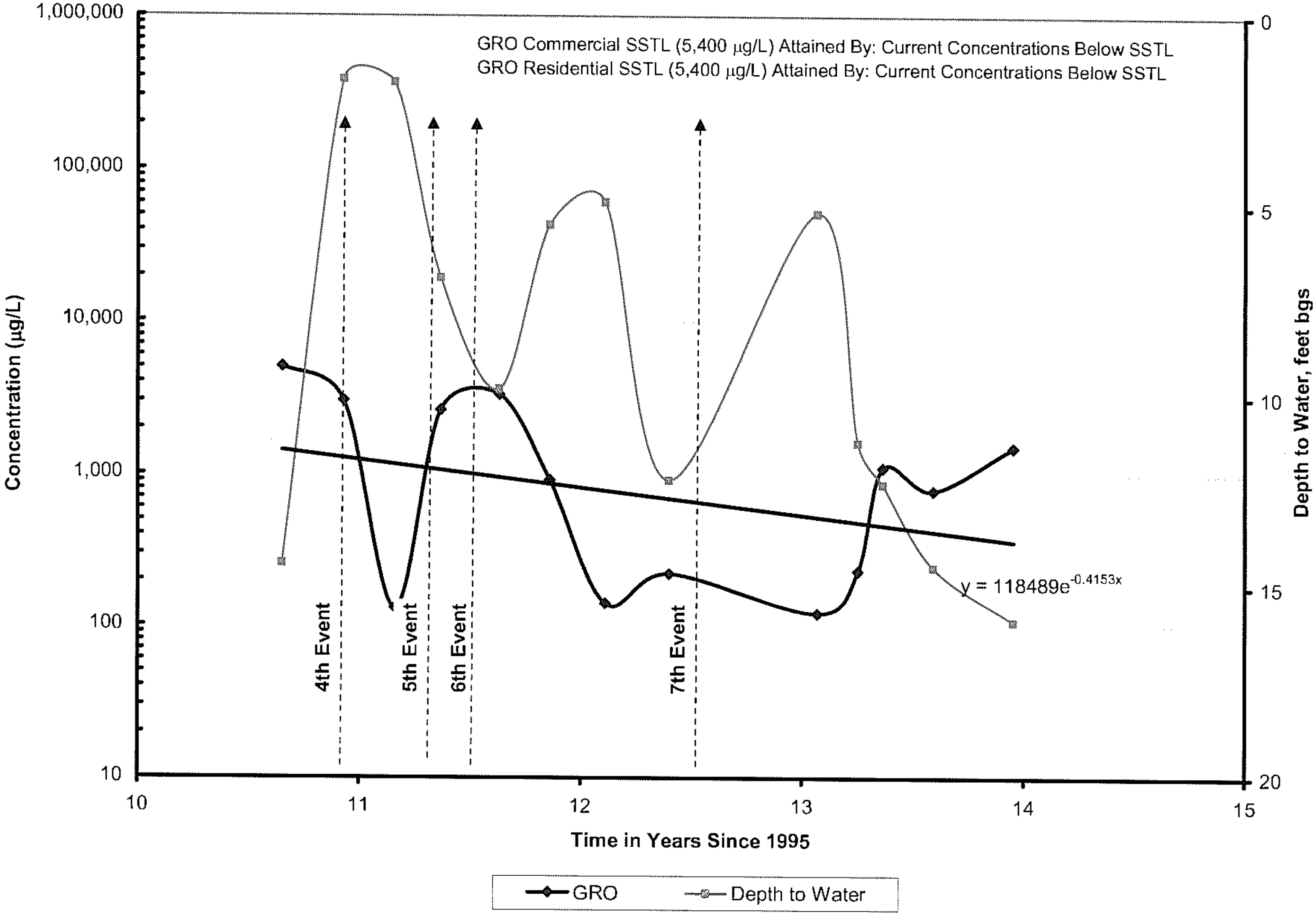


Figure 30

Former USA Service Station No. 57
10700 McArthur Boulevard
Oakland, California

Benzene Concentrations in Groundwater, Well EX-1, 2005 to 2009

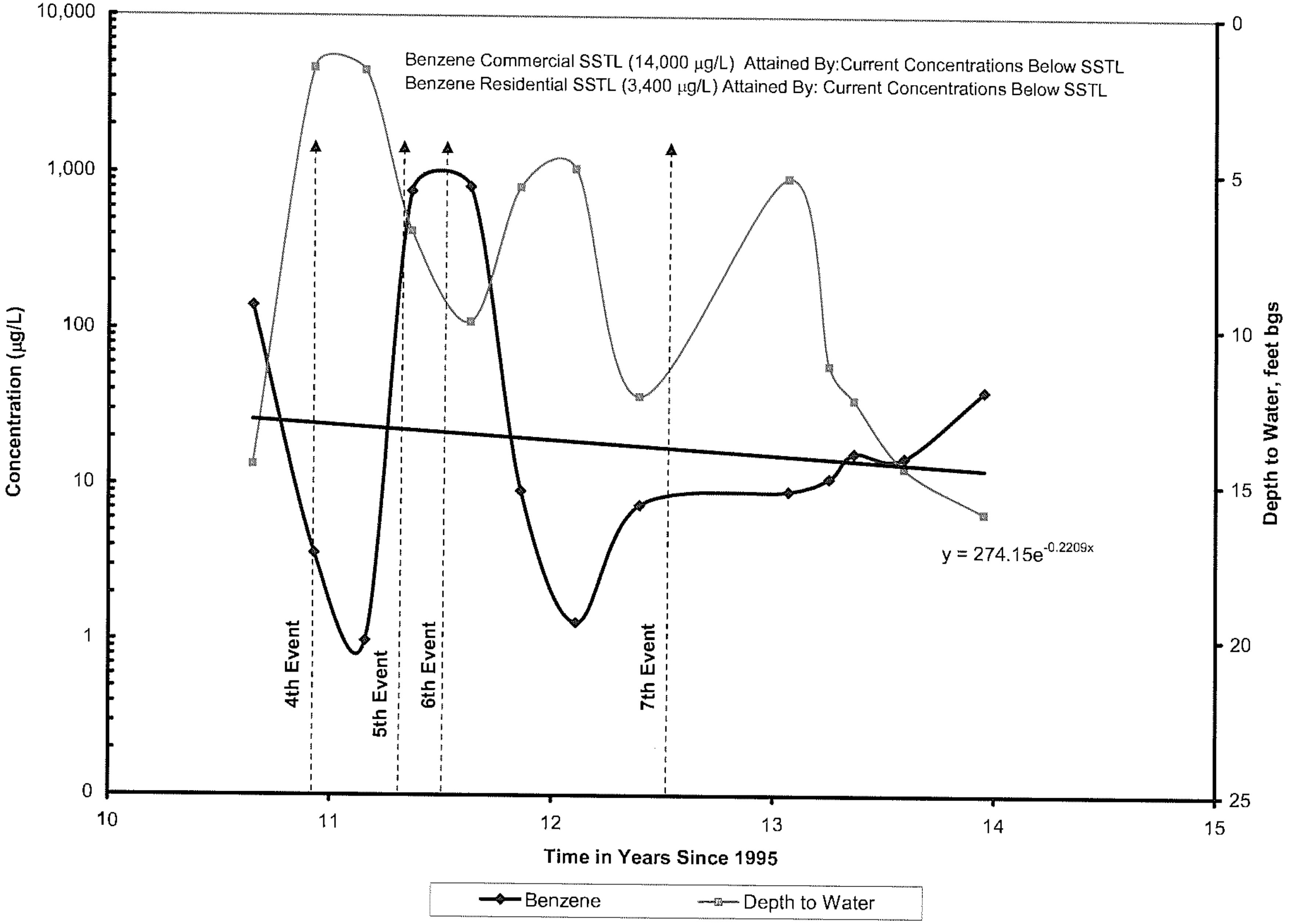


Figure 31

Former USA Service Station No. 57
10700 McArthur Boulevard
Oakland, California

MTBE Concentrations in Groundwater, Well EX-1, 2005 to 2009

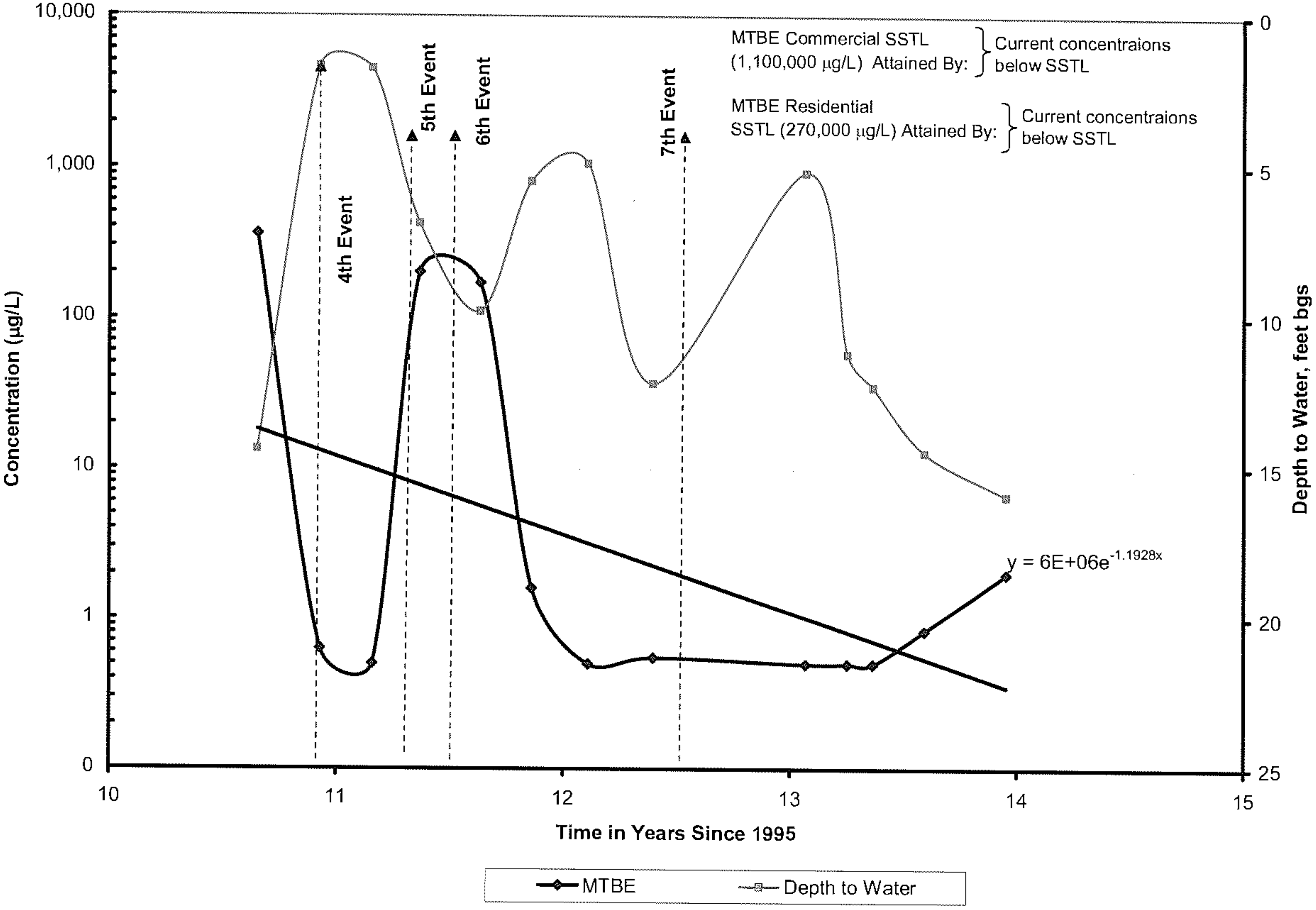


Figure 32

Former USA Service Station No. 57
10700 McArthur Boulevard
Oakland, California

GRO Concentrations in Groundwater, Well EX-2, 2005 to 2009

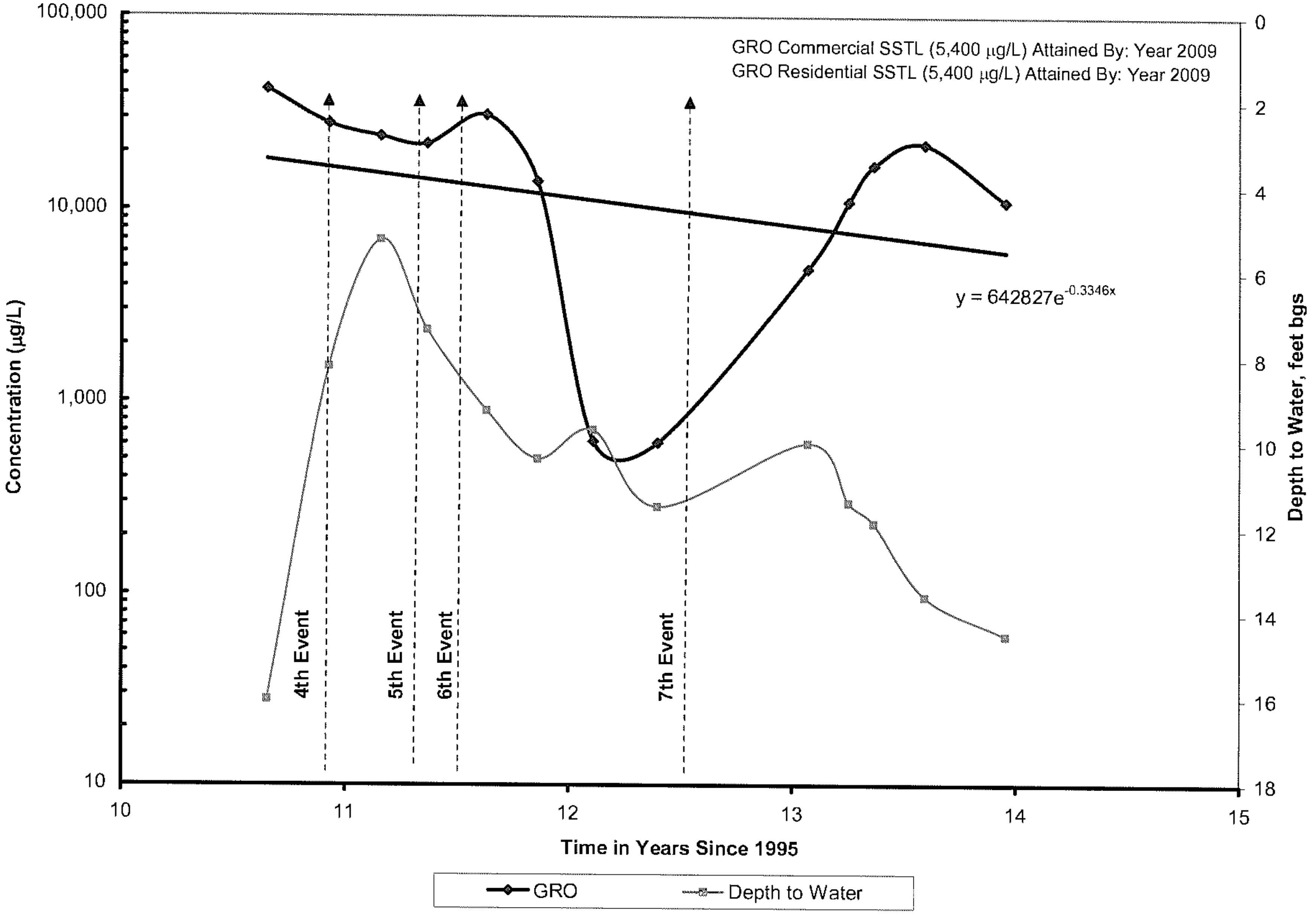


Figure 33

Former USA Service Station No. 57
10700 McArthur Boulevard
Oakland, California

Benzene Concentrations in Groundwater, Well EX-2, 2005 to 2009

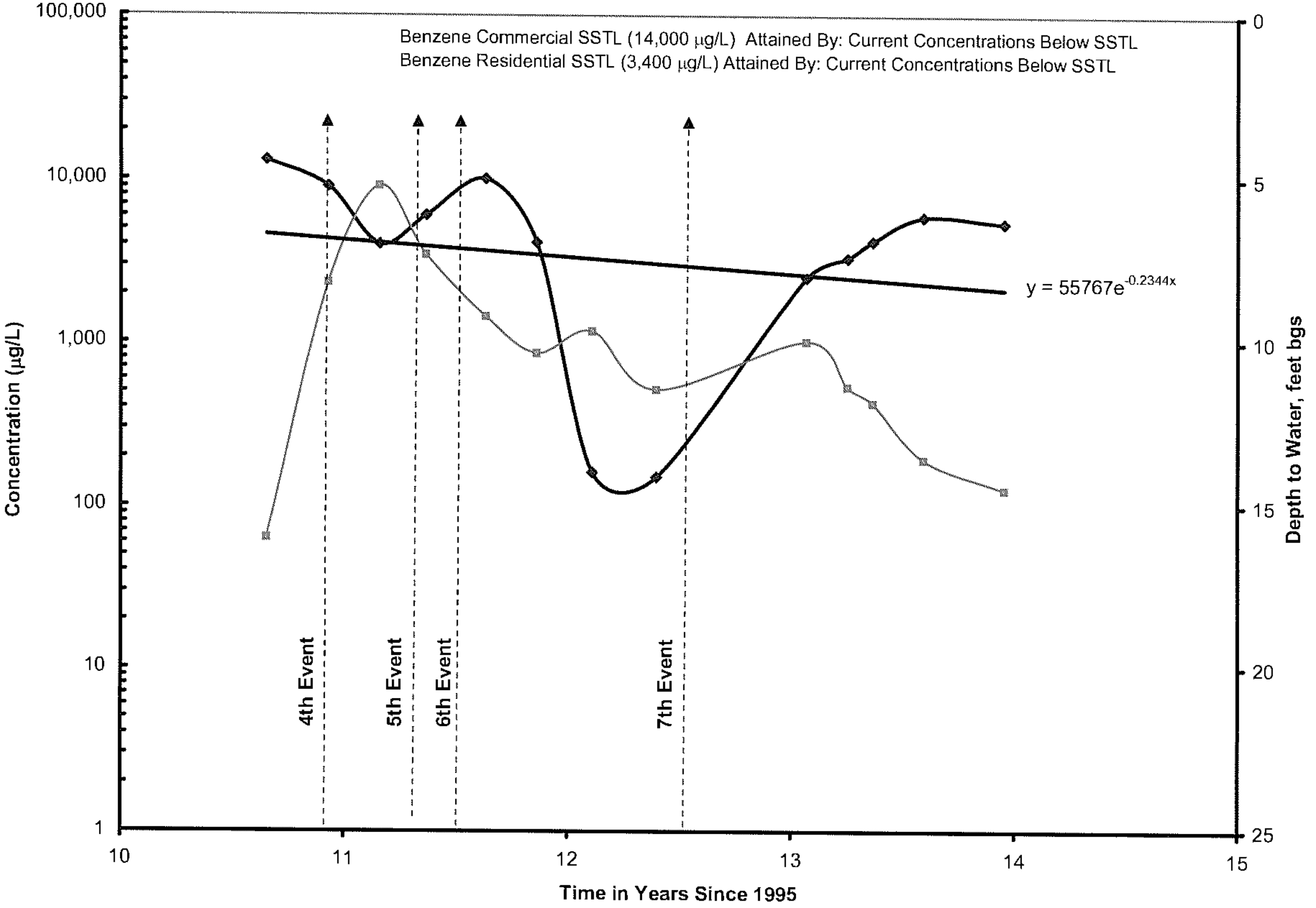
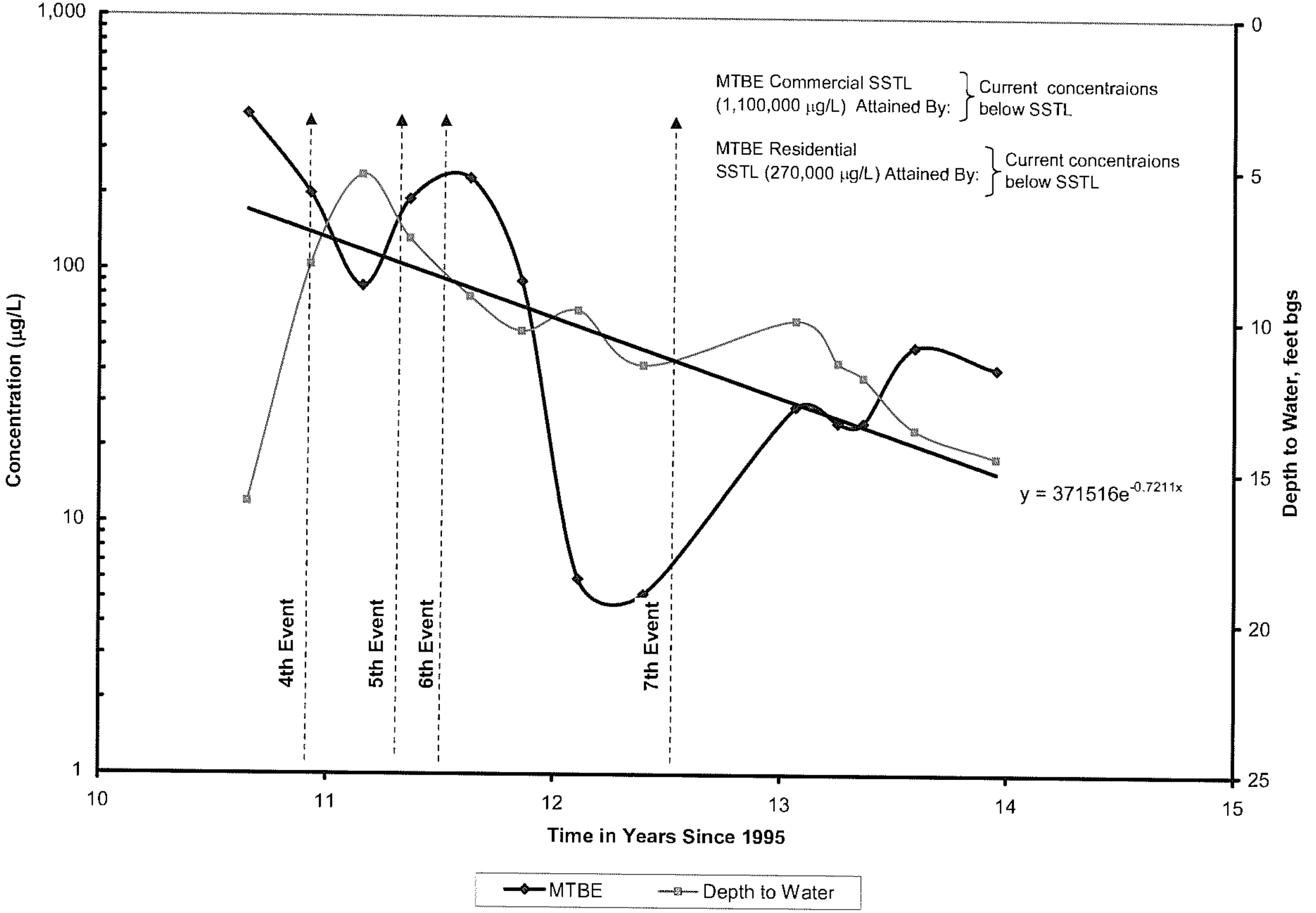


Figure 34

Former USA Service Station No. 57
10700 McArthur Boulevard
Oakland, California

MTBE Concentrations in Groundwater, Well EX-2, 2005 to 2009



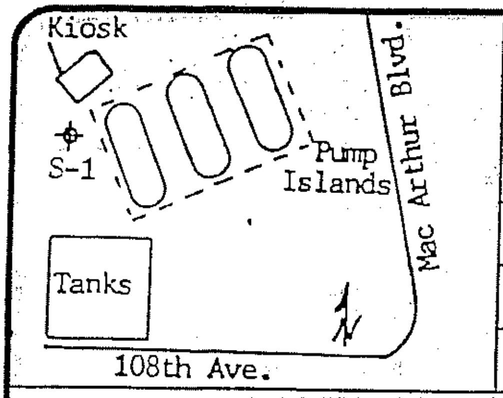
APPENDIX A

SOIL BORING LOGS, WELL DETAILS, AND DRILLING AND WELL CONSTRUCTION SUMMARY TABLE

TABLE 1
DRILLING AND WELL CONSTRUCTION SUMMARY
Former USA Station #57
10700 MacArthur Boulevard
Oakland, California

ID	Date	Boring Dia. (inches)	Boring Depth (feet bgs)	Casing Diameter (inches)	Casing Depth (feet bgs)	Slot Size (inches)	Screen Interval (feet bgs)
Monitoring Wells							
S-1	2/12/87	8	40	3	40	0.02	20 to 40
S-2	2/12/87	8	40	3	40	0.02	20 to 40
MW-3	2/28/95	10	44	4	44	0.02	24 to 44
MW-4	11/20/95	10	40.5	4	40.5	0.02	10 to 40.5
MW-5	11/20/95	10	41	4	40	0.02	10 to 40
MW-6	11/20/95	10	40.5	4	40.5	0.02	10 to 40.5
MW-7	11/21/95	10	41	4	40	0.02	10 to 40
MW-8	11/21/95	10	35.5	4	35	0.02	10 to 35
Extraction Wells							
EX-1	10/6/05	10	25	4	25	0.02	5 to 25
EX-2	10/7/05	10	25	4	25	0.02	5 to 25
EX-3	10/6/05	10	25	4	25	0.02	5 to 25
EX-4	10/6/05	10	25	4	25	0.02	5 to 25
Air Sparge Wells							
AS-1	8/23/07	8	20	1	20	0.02	17.5 to 20
AS-2	8/23/07	8	25	1	20	0.02	17.5 to 20
Soil Borings							
A	2/12/87	8	20				
B	2/12/87	6	20				
C	2/12/87	6	20				
D	2/12/87	6	20				
B-1	2/28/95	8	46				
B-2	3/1/95	8	31				
B-3	3/1/95	8	21				
B-4	3/2/95	8	12				
B-5	3/2/95	8	12				
B-6	3/2/95	8	12				
B-7	3/2/95	8	12				
B-8	3/2/95	8	12				

JOB NO. 100-22.01



SHELL OIL COMPANY -- WELL LOG

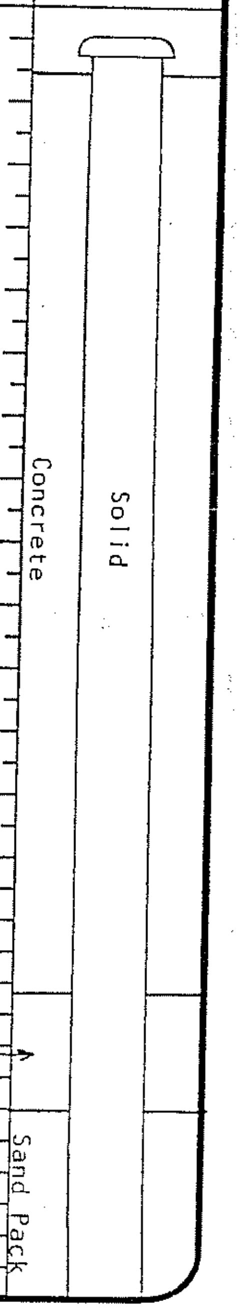
PAGE 1 OF 2

WELL NUMBER ▶ S-1
LOCATION ▶ Oakland
DATE ▶ 2/12/87
WEATHER ▶ Cool, rain
LOGGED BY ▶ DM
DRILLED BY ▶ Bayland: Ed, Curt
DRILLING METHOD ▶ HSA
SAMPLING METHOD ▶ Cal. Mod.
GRAVEL PACK ▶ CA
SEAL ▶ Bentonite & concrete

CASING ▶ TYPE Schedule 40 PVC DIAMETER 3" LENGTH 20' HOLE DIA 8"
SCREEN ▶ TYPE Schedule 40 PVC SLOT .020" DIAMETER 3" LENGTH 20' TOTAL DEPTH 40'

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	HNU (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS
						0			Concrete
						1			(CL) olive-brown silty clay
						2			
						3			
Dp			M		ND	4	■	P	(minor sand; no odor)
						5	■		(gravelly at 5')
						6			
						7			
						8			
Dp	MS	VD				9	■	8	(SC) dark yellowish-brown clayey sand; trace find gravel; no odor
					ND	10	■	25 45	
						1			
						2			
						3			
						4 ▼	■	15	
Dp	MS	VD			38	5	■	30 50	(very silty, slight odor)
						6			
						7			
						8			
Dp	MS	VD			102	9	■	6 15	(very fine grained; moderate to strong odor)

WELL COMPLETION



PACIFIC ENVIRONMENTAL GROUP, INC.

JOB NO. 100-22.01

SHELL OIL COMPANY -- WELL LOG

PAGE 2 **OF** 2

LOCATION MAP

See page 1 for details.

ELEVATION ▶

WELL NUMBER ▶ S-1

LOCATION ▶ Oakland

DATE ▶

WEATHER ▶

LOGGED BY ▶

DRILLED BY ▶

DRILLING METHOD ▶

SAMPLING METHOD ▶

GRAVEL PACK ▶

SEAL ▶

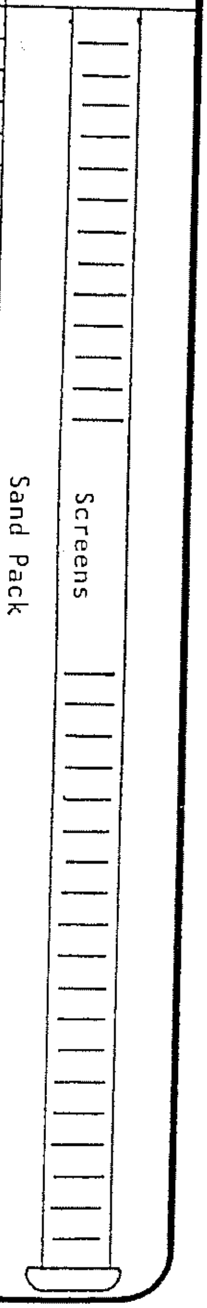
CASING ▶ **TYPE** **DIAMETER** **LENGTH** **HOLE DIA**

SCREEN ▶ **TYPE** **SLOT** **DIAMETER** **LENGTH** **TOTAL DEPTH**

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	(H-NU) (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS
						2o	■	15 25	(SC) continued
						2			(harder drilling)
Dr-Dp	PS	VD			ND	4	■	50	yellowish-brown silty sandstone; deeply weathered; fractured; trace clay; no odor
Dp		Hd			1	9	■	30 50	yellowish-brown claystone; no odor
						3o			
Dp		Hd			ND	4	■	30 50	(very closely fractured; deeply weathered; no odor to very slight odor)
						8 ▽			
Wt	PS	VD				9	■	50	dark grayish-brown silty sandstone; fractured

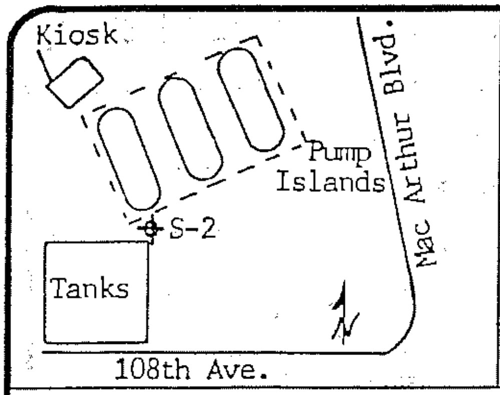
Total Depth = 40'

WELL COMPLETION



PACIFIC ENVIRONMENTAL GROUP, INC.

JOB NO. 100-22.01



SHELL OIL COMPANY -- WELL LOG

PAGE 1 OF 2

WELL NUMBER ▶ S-2

LOCATION ▶ Oakland

DATE ▶ 2/12/87

WEATHER ▶ cool, rainy

LOGGED BY ▶ DM

DRILLED BY ▶ Bayland: Ed, Curt

DRILLING METHOD ▶ HSA

SAMPLING METHOD ▶ Cal. Mod.

GRAVEL PACK ▶ CA

SEAL ▶ bentonite & concrete

CASING ▶ **TYPE** Schedule 40 PVC **DIAMETER** 3" **LENGTH** 20'

HOLE DIA 8"

SCREEN ▶ **TYPE** Schedule 40 PVC **SLOT** .020" **DIAMETER** 3" **LENGTH** 20'

TOTAL DEPTH 40'

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	HNU (PPM)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS	WELL COMPLETION
						0			concrete	Concrete Solid
						1			(CL) gray silty clay; no odor	
Dp	WS				ND	4 5	■	P	(SM) dark yellowish-brown silty sand; very fine-grained; no odor	
Dp		Hd	L		4.4	9 10	■	11 22 30	(CL) dark yellowish-brown sandy clay; very silty; moderate odor	
Dp		VSt	L		127	4 5	■	P	(CL-ML) dark grayish-brown silty clay to clayey silt; no odor	
						6 ▼				Bentonite
Dp	PS					8 9	■		(SC) dark yellowish-brown clayey sand; some gravel; silty; very fine-grained; no odor	Sand Pack

PACIFIC ENVIRONMENTAL GROUP, INC. **JOB NO.** 100-22.01

SHELL OIL COMPANY -- WELL LOG

PAGE 2 **OF** 2

LOCATION MAP

See page 1 for details.

ELEVATION ▶

WELL NUMBER ▶ S-2

LOCATION ▶ Oakland

DATE ▶

WEATHER ▶

LOGGED BY ▶

DRILLED BY ▶

DRILLING METHOD ▶

SAMPLING METHOD ▶

GRAVEL PACK ▶

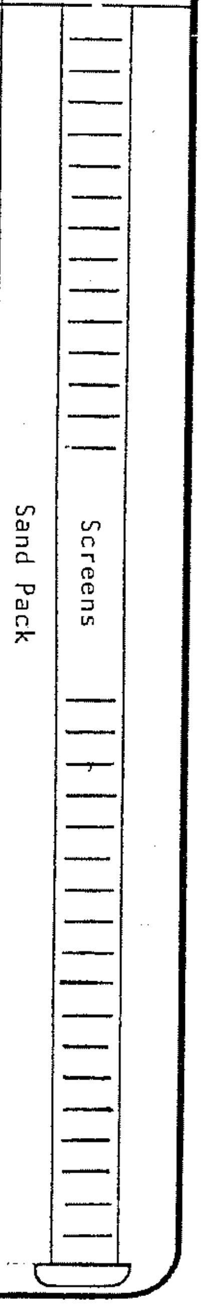
SEAL ▶

CASING ▶ **TYPE** **DIAMETER** **LENGTH** **HOLE DIA**

SCREEN ▶ **TYPE** **SLOT** **DIAMETER** **LENGTH** **TOTAL DEPTH**

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	(H-Nu) (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS
						2o			(SC) continued
						1			
						2			
						3			
						4	■	P	
Dp	P				152	5			dark yellowish brown to dark grayish-brown sandstone; fractured; weathered; no odor
						6			
						7			
						8			
						9			
Dp	P	VD				30	■	P	(very closely fractured; very strong odor)
						1	▽		
						2			
						3			
Wt		VD				4	■	P	(fractured; moderate odor)
						5			
						6			
						7			
						8			
Wt		VD				9	■	P	(fractured; weathered; no odor) total depth = 40'

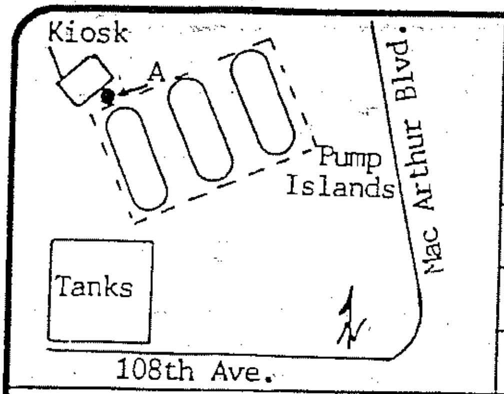
WELL COMPLETION



JOB NO. 100-22.01

SHELL OIL COMPANY -- WELL LOG

PAGE 1 OF 1



WELL NUMBER ▶ Boring A		**LOCATION** ▶ Oakland	
DATE ▶ 2/12/87		**WEATHER** ▶ cool, rainy	
LOGGED BY ▶ DM		**DRILLED BY** ▶ Bayland: Ed, Curt	
DRILLING METHOD ▶ HSA		**SAMPLING METHOD** ▶ Cal. Mod.	
GRAVEL PACK ▶ n/a		**SEAL** ▶ concrete	

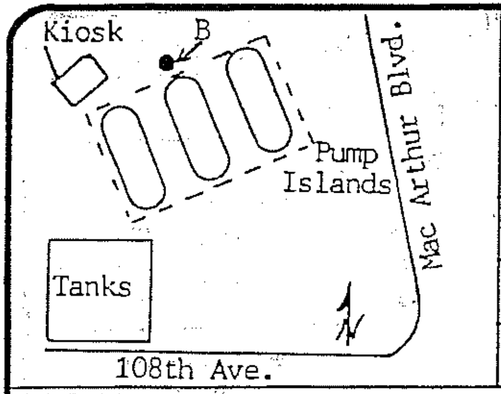
CASING ▶ **TYPE** n/a **DIAMETER** n/a **LENGTH** **HOLE DIA** 8"

SCREEN ▶ **TYPE** n/a **SLOT** n/a **DIAMETER** n/a **LENGTH** **TOTAL DEPTH** 20'

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	H-NU (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS	WELL COMPLETION
						0			concrete	concrete
									asphalt	
						1			(CL) olive silty clay; brown mottling	
Dp	PS				ND	4	■	P	(SC) olive-gray clayey sand; little gravel; no odor	
Dp		Hd	L		ND	9	■	8 18 20	(CL) dark yellowish-brown sandy clay; some silt; trace fine gravel; no odor	
Dp		Hd	L		8.3	4	■	12 20 30	(increasing sand and fine gravel; slight odor)	
						9			(SC) dark yellowish-brown clayey sand; some gravel; no odor	
Dp					4.6				total depth = 20'; no water encountered	

PACIFIC ENVIRONMENTAL GROUP, INC.

JOB NO. 100-22.01



SHELL OIL COMPANY -- WELL LOG

PAGE 1 OF 1

WELL NUMBER ▶ Boring B

LOCATION ▶ Oakland

DATE ▶ 2/12/87

WEATHER ▶ cool, cloudy

LOGGED BY ▶ DM

DRILLED BY ▶ Bayland: Ed, Curt

DRILLING METHOD ▶ CFA

SAMPLING METHOD ▶ Cal. Mod.

GRAVEL PACK ▶ n/a

SEAL ▶ concrete

CASING ▶ **TYPE** n/a **DIAMETER** n/a **LENGTH**

HOLE DIA 6"

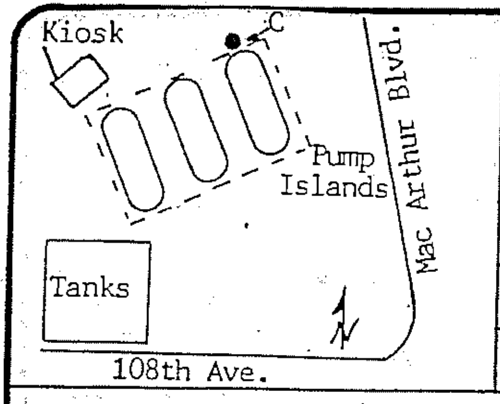
SCREEN ▶ **TYPE** n/a **SLOT** n/a **DIAMETER** n/a **LENGTH**

TOTAL DEPTH 20'

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	H-NU (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS	WELL COMPLETION
						0			concrete; odor in base rock	concrete
Dp-Mst						1			(CL) yellowish-brown silty clay; trace fine sand; no odor	
Dp	MS				ND	4	■	P	(SM) dark yellowish-brown silty sand; fine to medium grained; no odor (gravelly at 5')	
Dp		Hd	L		ND	9	■	8 20 20	(CL) dark yellowish-brown sandy clay; some silt; no odor	
Dp		Hd	L		ND	4	■	10 20 25	(very silty; no odor)	
						8			(SC) dark yellowish-brown clayey sand; some grave; silty; no odor	
Dp	PS	VD			<1	9	■	10 25 30	total depth = 20'; no water encountered	

PACIFIC ENVIRONMENTAL GROUP, INC.

JOB NO. 100-22.01



SHELL OIL COMPANY -- WELL LOG

PAGE 1 OF 1

WELL NUMBER ▶ Boring C

LOCATION ▶ Oakland

DATE ▶ 2/12/87

WEATHER ▶ cool, rainy

LOGGED BY ▶ DM

DRILLED BY ▶ Bayland: Ed, Curt

DRILLING METHOD ▶ CFA

SAMPLING METHOD ▶ Cal. Mod.

GRAVEL PACK ▶ n/a

SEAL ▶ concrete

CASING ▶ **TYPE** n/a **DIAMETER** n/a **LENGTH**

HOLE DIA 6"

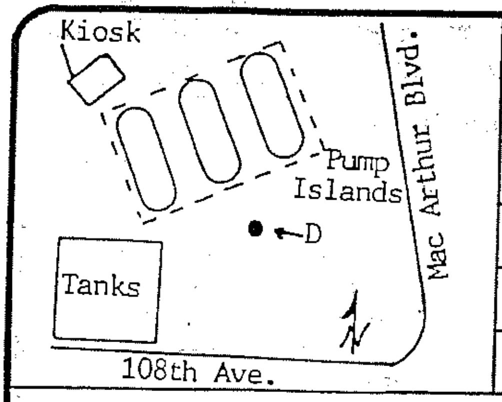
SCREEN ▶ **TYPE** n/a **SLOT** n/a **DIAMETER** n/a **LENGTH**

TOTAL DEPTH 20'

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	H-NU (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS	WELL COMPLETION
						0			concrete	concrete
Dp						1			(SM-ML) dark yellowish-brown silty sand to sandy silt	
						2				
						3				
Dp	MS				ND	4	■	P	(fine to medium grained; no odor)	
						5				
						6				
						7				
						8			(CL) dark yellowish-brown sandy clay; some silt; trace gravel; no odor	
Dp		Hd			ND	9	■	10 18 23		
						10				
						1				
						2				
						3				
Dp		Hd			<1	4	■	10 18 25	(very silty; no odor)	
						5				
						6				
						7				
						8				
Dp		Hd			14.2	9	■	10 18 20	(dark grayish-brown; slight odor) total depth = 20'; no water encountered	

PACIFIC ENVIRONMENTAL GROUP, INC.

JOB NO. 100-22.01



SHELL OIL COMPANY -- WELL LOG

PAGE 1 OF 1

WELL NUMBER ▶ Boring D

LOCATION ▶ Oakland

DATE ▶ 2/12/87

WEATHER ▶ cold, rainy

LOGGED BY ▶ DM

DRILLED BY ▶ Bayland: Ed, Curt

DRILLING METHOD ▶ CFA

SAMPLING METHOD ▶ Cal. Mod.

GRAVEL PACK ▶ n/a

SEAL ▶ concrete

CASING ▶ **TYPE** n/a **DIAMETER** **LENGTH**

HOLE DIA 6"

SCREEN ▶ **TYPE** **SLOT** **DIAMETER** **LENGTH**

TOTAL DEPTH 20'

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	HNU (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS	WELL COMPLETION
						0			concrete	concrete
Dp-Mst						1			(CL) yellowish-brown silty clay; trace sand	
						2				
						3			?	
						4		P	(SW) dark grayish-brown sand	
						5				
						6				
						7				
Wt	PS				18.2	8				
Dp		Stf	L			9		P	(no odor)	
						10			(GC-SC) dark grayish-brown clayey gravel to sand; very silty; no odor	
						1				
						2				
						3				
Dp		Stf	L		ND	4		P	(CL) yellowish-brown silty clay; very silty; some very fine sand	
						5				
						6				
						7				
						8				
		VSt				9		P	total depth = 20'; no water encountered	

PROJECT NO.: 41-0034
LOCATION: USA Gas #57
10700 MacArthur Boulevard
Oakland, California

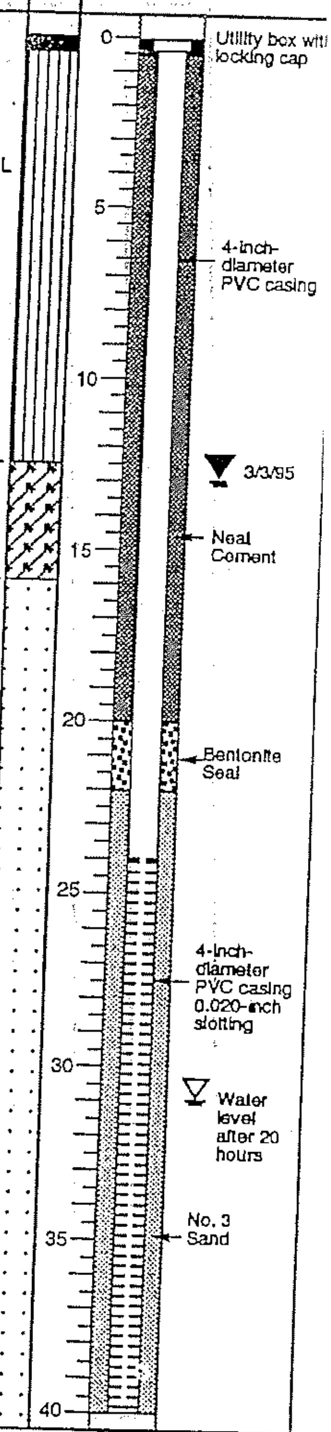
DATE DRILLED: 2/28/95
LOGGED BY: A. Le May
APPROVED BY: M. Katen, RG
DRILLING CO.: Bayland Drilling

DRILLING METHOD: 10-inch diameter Hollow-Stem Auger
SAMPLER TYPE: California Modified Split-Spoon
TOTAL DEPTH: 44.0 feet DEPTH TO WATER:

BLOWS PER 6 INCHES	CGI (ppm)	TPH-G (ppm)	SAMPLE	DEPTH (feet below grade)	DESCRIPTION	USCS
				0	Hand-augered to 5 feet. 4 inches of Asphalt.	
7,8,10	115	ND			CLAYEY SILT: yellowish brown, soft, damp, very fine-grained.	ML
				5		
5,7,8	20	1.9		10	Olive, moist.	
—	10% LEL	240			GRAVELLY SAND: yellowish brown, damp, well graded, with clay.	GC
13,24,50 for 4"	2% LEL	110		15		
5 for 5"	500				SANDSTONE: brownish yellow, very friable, dry, fine-grained with silt.	
—	50				SILTSTONE: dark yellowish brown, very friable, dry, with sand.	
11,22,50 for 4"	100	3.0		20		
50 for 6"	10	ND			Soft, interbedded with fractured, very hard, damp sandstone.	
50 for 6"	25			25		
—	20				Dry.	
15,17,19	50	ND				
				30		
—	0				Damp.	
—	15					
				35		
—	15				With increased clay content in siltstone, mottled dark green and yellowish brown.	
	0				Moist.	
50 for 6"	100	ND				
				40		

LITHOLOGY

WELL CONSTRUCTION DETAIL



ALTON GEOSCIENCE
Livermore, California

LOG OF EXPLORATORY BORING

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PAGE 1 OF 2

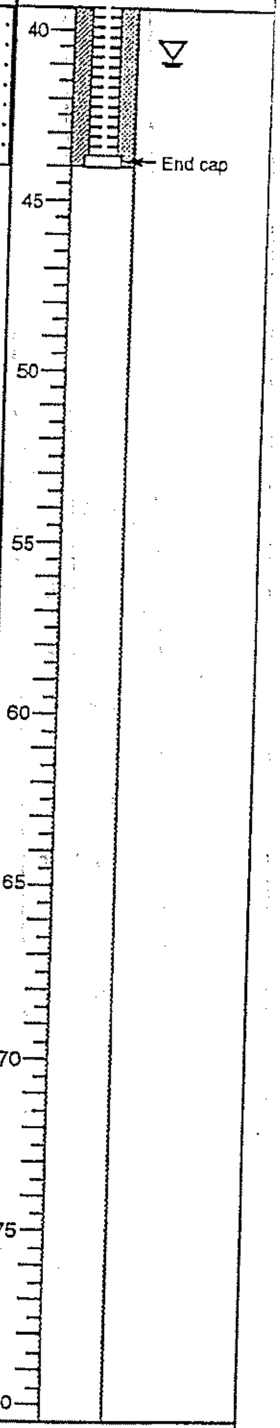
PROJECT NO.: 41-0034
LOCATION: USA Gas #57
10700 MacArthur Boulevard
Oakland, California

DATE DRILLED: 2/28/95
LOGGED BY: A. Le May
APPROVED BY: M. Katen, RG
DRILLING CO.: Bayland Drilling

DRILLING METHOD: 10-inch diameter Hollow-Stem Auger
SAMPLER TYPE: California Modified Split-Spoon
TOTAL DEPTH: 44.0 feet DEPTH TO WATER:

BLOWS PER 6 INCHES	CGI (ppm)	TPH-G (ppm)	SAMPLE	DEPTH (feet below grade)	DESCRIPTION	USCS	LITHOLOGY
				40			
				45			
				50			
				55			
				60			
				65			
				70			
				75			
				80			

WELL CONSTRUCTION DETAIL



ALTON GEOSCIENCE
Livermore, California

LOG OF EXPLORATORY BORING

MW-3

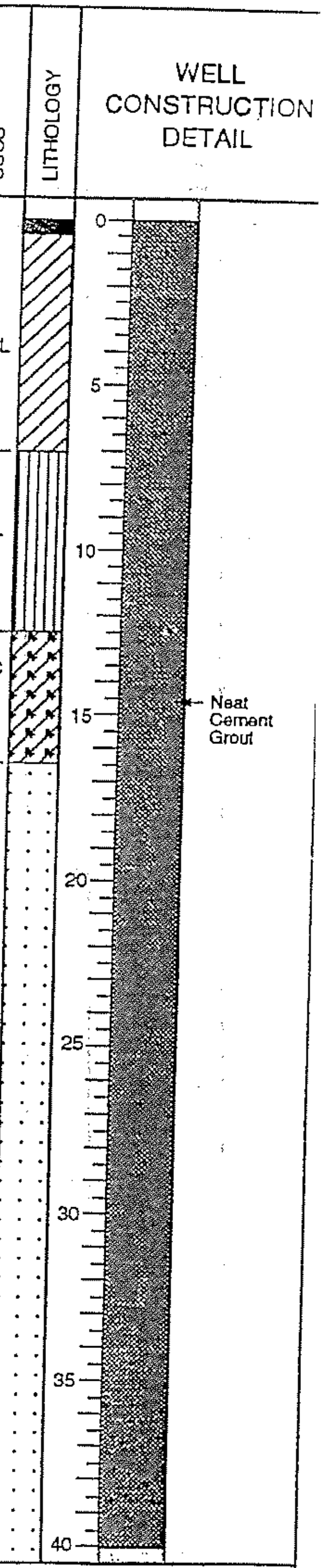
PAGE 2 OF 2

PROJECT NO.: 41-0034
LOCATION: USA Gas #57
10700 MacArthur Boulevard
Oakland, California

DATE DRILLED: 2/28/95
LOGGED BY: A. Le May
APPROVED BY: M. Katen, RG
DRILLING CO.: Bayland Drilling

DRILLING METHOD: 8-inch diameter Hollow-Stem Auger
SAMPLER TYPE: California Modified Split-Spoon
TOTAL DEPTH: 46.0 feet DEPTH TO WATER: 44.0 feet

BLOWS PER 6 INCHES	CGI (ppm)	TPH-G (ppm)	SAMPLE	DEPTH (feet below grade)	DESCRIPTION	USCS
				0	Hand-augered to 4 feet. 6 inches of Concrete.	
7,11,8	0	ND		5	SILTY CLAY: dark gray brown, soft, damp.	CL
6,7,11	75	44		10	CLAYEY SILT: dark yellowish brown, soft, damp, few small pebbles.	ML
6,11,15	70% LEL	540		15	GRAVELLY SAND: mottled dark yellow brown and green, loose, damp, with clay.	GC
					From approximately 17 feet to bottom of hole: Interbedded sandstone and siltstone.	
21,37,42	350	ND		20	SANDSTONE: light olive brown, very fractured and friable with calcium carbonate infill in fractures. SILTY CLAY (weathered bedrock): dark grayish brown, soft, damp at 10 feet.	
47 for 12"	5% LEL	3.9		25	Light olive brown, wet, with gravel. SANDSTONE: light olive brown, very fractured and friable with calcium carbonate infill in fractures.	
15,29,26	5% LEL	ND		30	SILTY CLAY (weathered bedrock): light olive brown, soft, wet, with gravel. GRAVELLY SAND (weathered bedrock): dark yellowish brown, loose, moist.	
12,15,19	175	ND		35	Interbedded with silty clay.	
41,27,35	175	ND		40		



ALTON GEOSCIENCE
Livermore, California

LOG OF EXPLORATORY BORING

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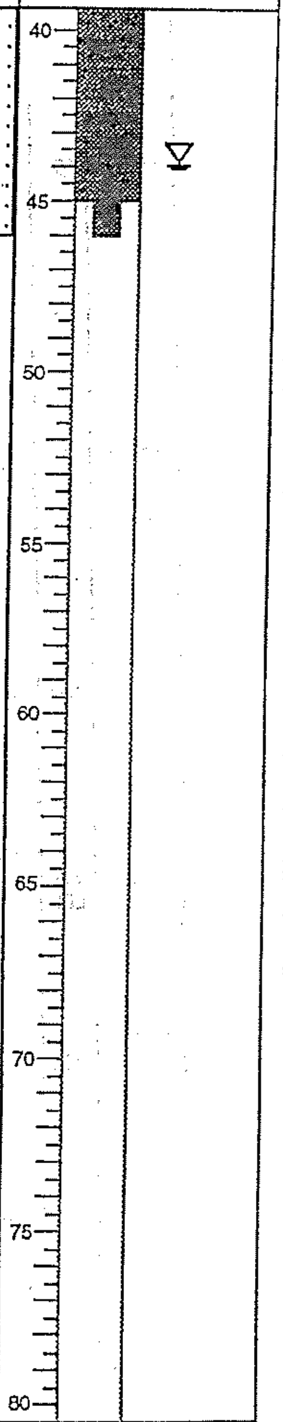
PROJECT NO.: 41-0034
LOCATION: USA Gas #57
10700 MacArthur Boulevard
Oakland, California

DATE DRILLED: 2/28/95
LOGGED BY: A. Le May
APPROVED BY: M. Katen, RG
DRILLING CO.: Bayland Drilling

DRILLING METHOD: 8-inch diameter Hollow-Stem Auger
SAMPLER TYPE: California Modified Split-Spoon
TOTAL DEPTH: 46.0 feet DEPTH TO WATER: 44.0 feet

BLOWS PER 6 INCHES	CGI (ppm)	TPH-G (ppm)	SAMPLE	DEPTH (feet below grade)	DESCRIPTION	USCS	LITHOLOGY
			☒	40			
27,30 41 for 4"	40	4		45	GRAVELLY CLAY (weathered bedrock): dark yellowish brown, saturated, well graded, with sand and pebbles to 1/4 inch.		
				50		ML	
				55			
				60			
				65			
				70			
				75			
				80			

WELL CONSTRUCTION DETAIL



ALTON GEOSCIENCE
Livermore, California

LOG OF EXPLORATORY BORING

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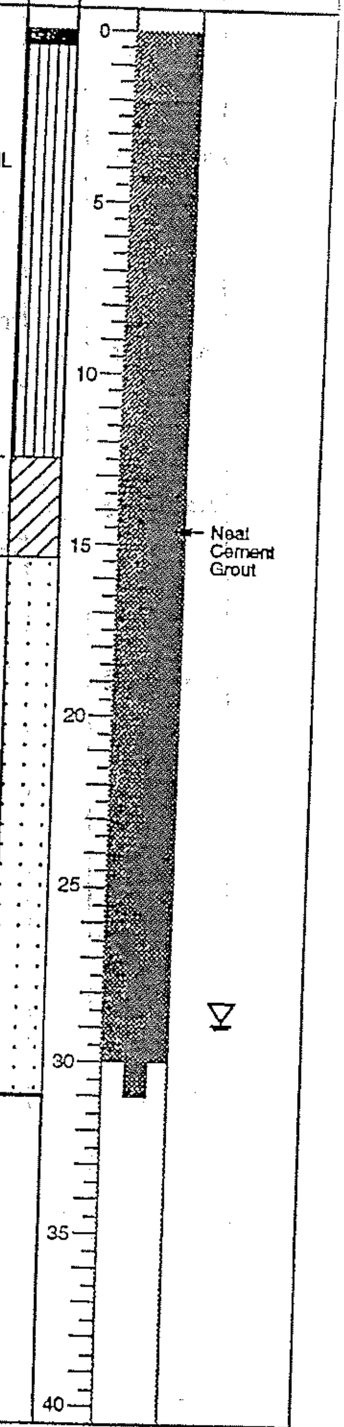
PAGE 2 OF 2

PROJECT NO.: 41-0034
LOCATION: USA Gas #57
10700 MacArthur Boulevard
Oakland, California

DATE DRILLED: 3/1/95
LOGGED BY: A. Le May
APPROVED BY: M. Katen, RG
DRILLING CO.: Bayland Drilling

DRILLING METHOD: 8-inch diameter Hollow-Stem Auger
SAMPLER TYPE: California Modified Split-Spoon
TOTAL DEPTH: 31.0 feet DEPTH TO WATER: 29.0 feet

BLOWS PER 6 INCHES	CGI (ppm)	TPH-G (ppm)	SAMPLE	DEPTH (feet below grade)	DESCRIPTION	USCS
				0	Hand-augered to 5 feet. 4 inches of Asphalt.	
11,12,17	60	ND	☒	5	CLAYEY SILT: dark yellowish brown, soft, damp, fine-grained, low plasticity.	ML
11,16,21	80	ND	☐	10	At approximately 10 feet depth includes small pebbles and mottled dark brown and green.	
21,27,31	5% LEL	16	☐	15	SANDY CLAY: dark yellowish brown, damp, fine-grained.	CL
					SANDSTONE: brownish yellow, fractured, damp, fine-grained, with clay.	
8,10,16	325	110	☐	20	SANDY CLAY (weathered bedrock): dark yellowish brown, damp, fine-grained. SANDSTONE: brownish yellow, fractured, fine-grained, with green staining.	
8,11,17	60 150% LEL	240	☐	25	Interbedded with sandy clay. SANDY CLAY (weathered bedrock) to 25 feet, then fractured sandstone.	
6,11,13	LEL off scale		☐	30	GRAVELLY SAND (weathered bedrock): very dark greyish brown, loose, saturated, well graded.	
				35		
				40		



ALTON GEOSCIENCE
Livermore, California

LOG OF EXPLORATORY BORING

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PAGE 1 OF 1

41-0034/B-1 03/17/95

PROJECT NO.: 41-0034
LOCATION: USA Gas #57
10700 MacArthur Boulevard
Oakland, California

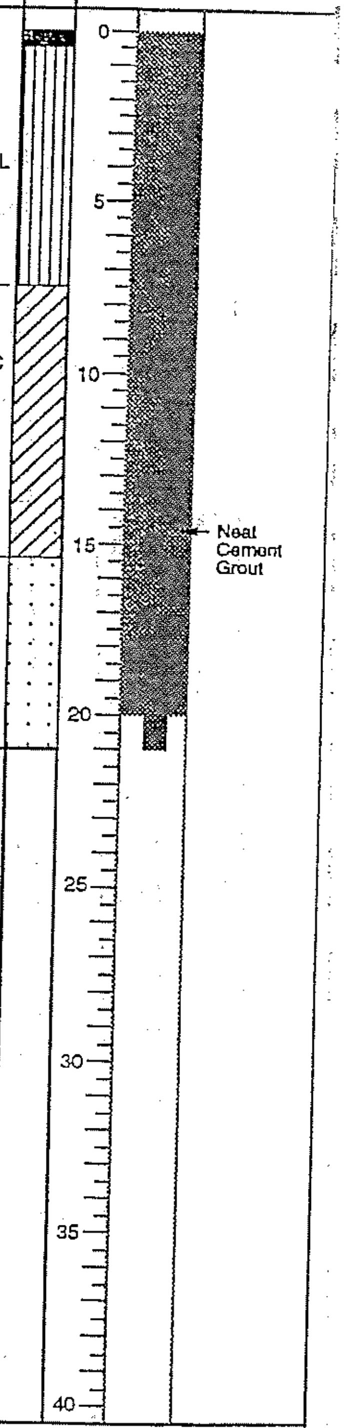
DATE DRILLED: 3/1/95
LOGGED BY: A. Le May
APPROVED BY: M. Katen, RG
DRILLING CO.: Bayland Drilling

DRILLING METHOD: 8-inch diameter Hollow-Stem Auger
SAMPLER TYPE: California Modified Split-Spoon
TOTAL DEPTH: 21.0 feet DEPTH TO WATER:

BLOWS PER 6 INCHES	CGI (ppm)	TPH-G (ppm)	SAMPLE	DEPTH (feet below grade)	DESCRIPTION	USCS
				0	Hand-augered to 5 feet. 4 Inches Asphalt.	
5,7,10	0		☒	5	CLAYEY SILT: brown, soft, damp, fine-grained, with sand and occasional pebbles.	ML
8,10,8	5	ND	☐	10	SANDY CLAY: very dark grayish brown, soft, damp, with small pebbles and a moderate amount of silt.	SC
28,39,43	15	10	☒	15	SANDSTONE: light yellowish brown, friable, very fractured, contains 3-inch thick layer of sandy clay at 15 feet.	
27,46,23	30	15	☐	20	Interbedded with gravelly clay. GRAVELLY CLAY (weathered bedrock): dark olive brown, moderately soft, with large pebbles to 0.5-inch diameter.	
				25		
				30		
				35		
				40		

LITHOLOGY

WELL CONSTRUCTION DETAIL



ALTON GEOSCIENCE
Livermore, California

LOG OF EXPLORATORY BORING

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PAGE 1 OF 1

41-0034/B-3 03/21/95

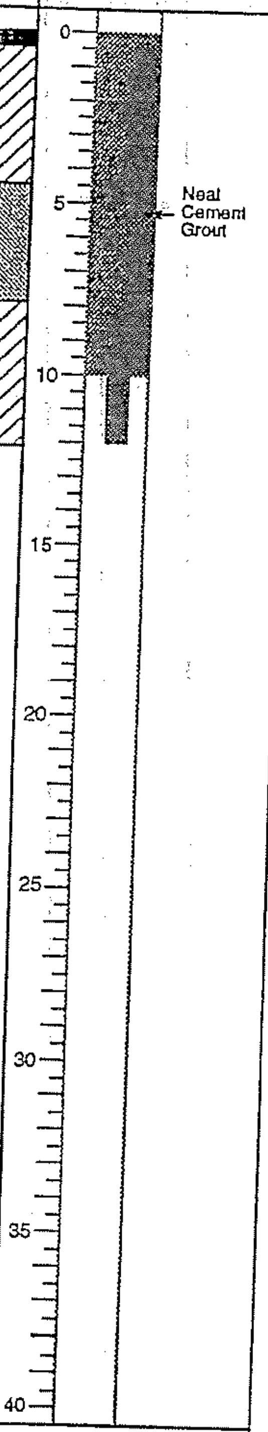
PROJECT NO.: 41-0034
LOCATION: USA Gas #57
10700 MacArthur Boulevard
Oakland, California

DATE DRILLED: 3/2/95
LOGGED BY: A. Le May
APPROVED BY: M. Katen, RG
DRILLING CO.: Bayland Drilling

DRILLING METHOD: 8-inch diameter Hollow-Stem Auger
SAMPLER TYPE: California Modified Split-Spoon
TOTAL DEPTH: 12.0 feet DEPTH TO WATER:

BLOWS PER 6 INCHES	CGI (ppm)	TPH-G (ppm)	SAMPLE	DEPTH (feet below grade)	DESCRIPTION	USCS	LITHOLOGY
				0	Hand-augered to 4 feet. 6 inches Concrete		
5,7,13	5	ND			SANDY CLAY: olive brown, soft, saturated from surface, with small amount of pebbles.	CL	▨
7,7,8	15	ND		5	SAND: dark yellowish brown, loose, saturated, medium- to coarse-grained sand, poorly graded.	SP	
6,15,15	15	ND		10	SANDY CLAY: olive brown, medium soft, moist, with small amount of pebbles.	CL	▨

WELL CONSTRUCTION DETAIL



ALTON GEOSCIENCE
Livermore, California

LOG OF EXPLORATORY BORING

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PAGE 1 OF 1

41-0034/B-4 03/21/95

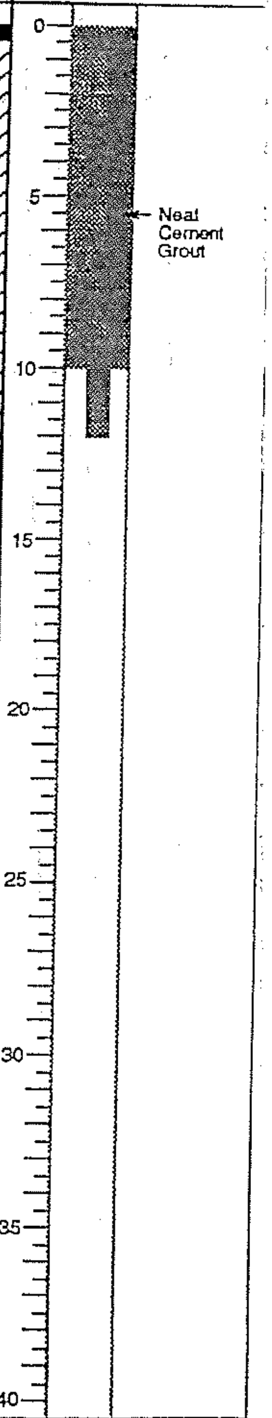
PROJECT NO.: 41-0034
LOCATION: USA Gas #57
10700 MacArthur Boulevard
Oakland, California

DATE DRILLED: 3/2/95
LOGGED BY: A. Le May
APPROVED BY: M. Katen, RG
DRILLING CO.: Bayland Drilling

DRILLING METHOD: 8-inch diameter Hollow-Stem Auger
SAMPLER TYPE: California Modified Split-Spoon
TOTAL DEPTH: 12.0 feet DEPTH TO WATER:

BLOWS PER 6 INCHES	CGI (ppm)	TPH-G (ppm)	SAMPLE	DEPTH (feet below grade)	DESCRIPTION	USCS
				0	Hand-augered to 4 feet. 6 inches Concrete.	
—	0		☒			
					SANDY CLAY: olive brown, very soft, damp, with small pebbles.	CL
5,7,14	10	ND		5	Moist, with silt.	
				10		
15,16,21	15	ND				
				15		
				20		
				25		
				30		
				35		
				40		

WELL CONSTRUCTION DETAIL



ALTON GEOSCIENCE
Livermore, California

LOG OF EXPLORATORY BORING

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PAGE 1 OF 1

PROJECT NO.: 41-0034
LOCATION: USA Gas #57
10700 MacArthur Boulevard
Oakland, California

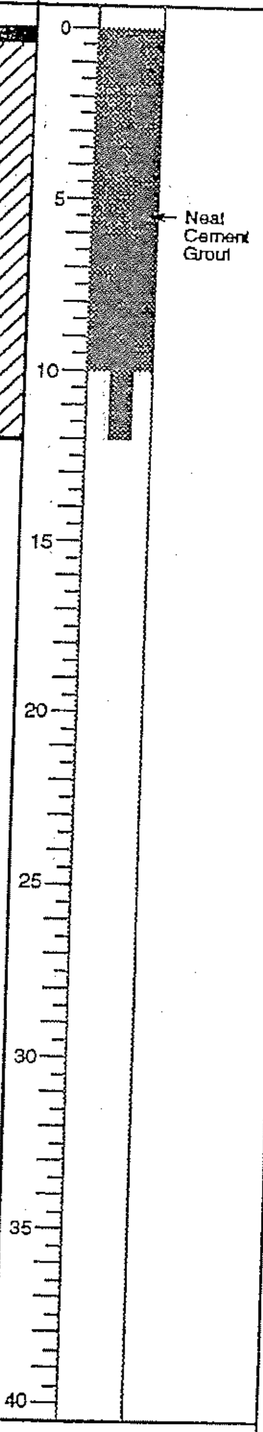
DATE DRILLED: 3/2/95
LOGGED BY: A. Le May
APPROVED BY: M. Katen, RG
DRILLING CO.: Bayland Drilling

DRILLING METHOD: 8-inch diameter Hollow-Stem Auger
SAMPLER TYPE: California Modified Split-Spoon
TOTAL DEPTH: 12.0 feet DEPTH TO WATER:

BLOWS PER 6 INCHES	CGI (ppm)	TPH-G (ppm)	SAMPLE	DEPTH (feet below grade)	DESCRIPTION	USCS
				0	Hand-augered to 4 feet. 6 Inches of Concrete.	
2,2,5	130 60	33			SANDY CLAY: green olive gray, very soft, damp, with silt and occasional pebbles.	CL
2,7,11	10	2.6		5	Olive gray.	
2,13,21	10	ND		10	SILTY CLAY: dark brown, soft, with occasional larger pebbles.	
				15		
				20		
				25		
				30		
				35		
				40		

LITHOLOGY

WELL CONSTRUCTION DETAIL



ALTON GEOSCIENCE
Livermore, California

LOG OF EXPLORATORY BORING

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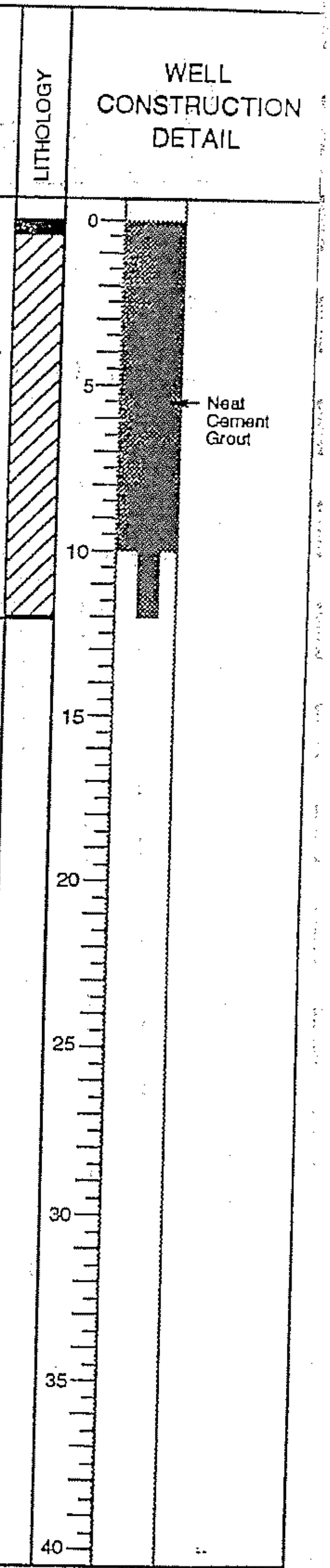
41-0034/B-6 03/21/95

PROJECT NO.: 41-0034
LOCATION: USA Gas #57
10700 MacArthur Boulevard
Oakland, California

DATE DRILLED: 3/2/95
LOGGED BY: A. Le May
APPROVED BY: M. Katen, RG
DRILLING CO.: Bayland Drilling

DRILLING METHOD: 8-inch diameter Hollow-Stem Auger
SAMPLER TYPE: California Modified Split-Spoon
TOTAL DEPTH: 12.0 feet DEPTH TO WATER:

BLOWS PER 6 INCHES	CGI (ppm)	TPH-G (ppm)	SAMPLE	DEPTH (feet below grade)	DESCRIPTION	USCS
				0	Hand-augered to 5 feet. 6 inches Concrete.	
2,2,5	130	ND			SANDY CLAY: dark olive gray, very soft, damp, with silt and occasional pebbles.	
	60					CL
2,7,11	10	ND		5	At 4.5 feet depth, dark brown, harder, increased silt content.	
2,13,21	10	ND		10	Dark olive gray, medium hard, damp, with silt. At 11.5 feet depth, dark brown, hard.	
				15		
				20		
				25		
				30		
				35		
				40		



ALTON GEOSCIENCE
Livermore, California

LOG OF EXPLORATORY BORING

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PROJECT NO.: 41-0034
LOCATION: USA Gas #57
10700 MacArthur Boulevard
Oakland, California

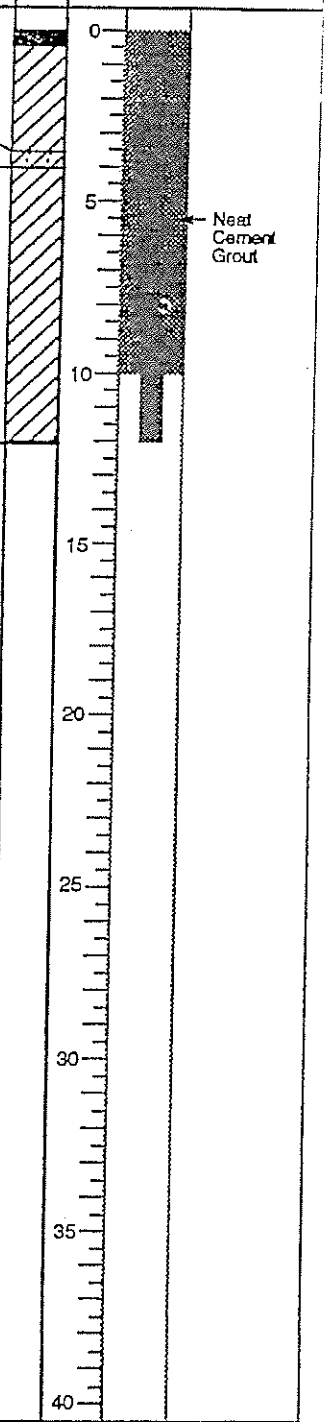
DATE DRILLED: 3/2/95
LOGGED BY: A. Le May
APPROVED BY: M. Katen, RG
DRILLING CO.: Bayland Drilling

DRILLING METHOD: 8-inch diameter Hollow-Stem Auger
SAMPLER TYPE: California Modified Split-Spoon
TOTAL DEPTH: 12.0 feet DEPTH TO WATER:

BLOWS PER 6 INCHES	CGI (ppm)	TPH-G (ppm)	SAMPLE	DEPTH (feet below grade)	DESCRIPTION	USCS
				0	Hand-augered to 4 feet. 6 inches Concrete.	
					SANDY CLAY: dark olive gray, very soft, damp.	CL
4,4,7	90	17			CLAYEY SAND: dark olive gray, very soft, damp, with some small gravel pebbles.	SC
2,3,5	95	ND		5	GRAVELLY CLAY: dark olive gray, very soft, saturated.	CL
17,23,22	25	2.0		10	SILTY CLAY: dark yellowish brown, hard, damp, with rare small pebbles, with sand.	
				15		
				20		
				25		
				30		
				35		
				40		

LITHOLOGY

WELL CONSTRUCTION DETAIL



ALTON GEOSCIENCE
Livermore, California

LOG OF EXPLORATORY BORING

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PAGE 1 OF 1

PROJECT NO.: 41-0034
LOCATION: USA Gas #57
10700 MacArthur Boulevard
Oakland, California

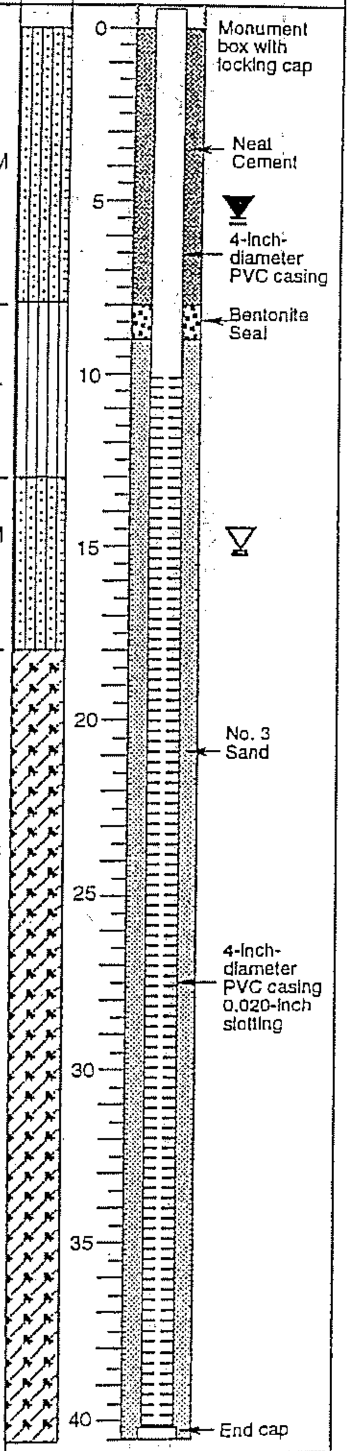
DATE DRILLED: 11/20/95
LOGGED BY: A. Le May
APPROVED BY: M. Katen, RG
DRILLING CO.: V & W Drilling

DRILLING METHOD: 10-inch diameter Hollow-Stem Auger
SAMPLER TYPE: California Modified Split-Spoon
TOTAL DEPTH: 40.5 feet DEPTH TO WATER: 15.0 feet

BLOWS PER 6 INCHES	PID(ppm)	TPH-G (ppm)	SAMPLE	DEPTH (feet below grade)	DESCRIPTION	USCS
				0	Hand-augered to 5 feet.	
9,14,15	—			5	SILTY SAND: dark yellowish brown, medium dense, damp, poorly graded.	SM
8,11,14	0	ND		10	SANDY SILT: dark yellowish brown, stiff, damp, with clay.	ML
18,21,34	5			15	SILTY SAND: dark yellowish brown, medium dense, moist, with clay, contains carbonate pebbles up to 0.13-inch diameter.	SM
18,31,34	0			20	SILTY SAND and GRAVEL Mixture: dark yellowish brown, medium dense, wet, with clay.	GC
14,24,36	0			25	SILTY CLAYEY SAND and GRAVEL Mixture: strong brown, dense, damp, with pebbles to 0.5-inch diameter.	
12,16,23	0			30		
9,22,31	0			35	Medium dense.	
30,50	0			40	Increased silt content.	

LITHOLOGY

WELL CONSTRUCTION DETAIL



ALTON GEOSCIENCE
Livermore, California

LOG OF EXPLORATORY BORING

MW-4
PAGE 1 OF 1

PROJECT NO.: 41-0034
LOCATION: USA Gas #57
10700 MacArthur Boulevard
Oakland, California

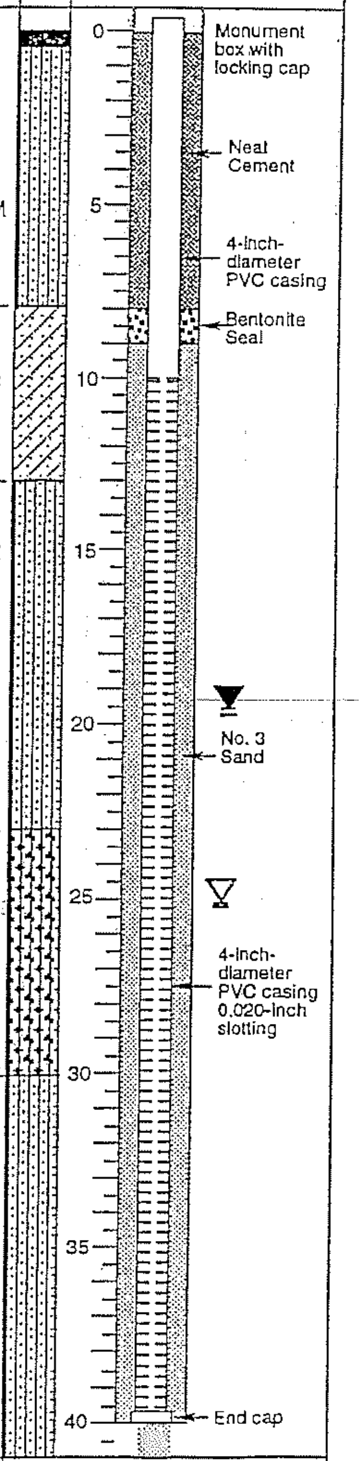
DATE DRILLED: 11/20/95
LOGGED BY: A. Le May
APPROVED BY: M. Katen, RG
DRILLING CO.: V & W Drilling

DRILLING METHOD: 10-inch diameter Hollow-Stem Auger
SAMPLER TYPE: California Modified Split-Spoon
TOTAL DEPTH: 41.0 feet DEPTH TO WATER: 25.0 feet

BLOWS PER 6 INCHES	PID(ppm)	TPH-G (ppm)	DEPTH (feet below grade)	DESCRIPTION	USCS
			0	Hand-augered to 5 feet. 4 inches Asphalt.	
7,18,21	0		5	SILTY SAND: yellowish brown, medium dense, damp, fine-grained, poorly graded.	SM
10,14,19	0	ND	10	CLAYEY SAND: dark yellowish brown, medium dense, damp, poorly graded, with occasional pebbles to 0.5-inch diameter.	SC
16,23,24	0	ND	15	SILTY SAND: dark yellowish brown, medium dense, damp, with gravel and some clay.	SM
12,18,24	0		20		
6,9,16	—		25	No recovery, sampler saturated, gravel lense?	GM
				SILTY CLAYEY SANDY GRAVEL: dark yellowish brown, loose, saturated, poorly graded.	
10,15,24	0		30	SILTY SAND: dark yellowish brown, medium dense, damp, with gravel and some clay.	SM
5,12,21	0		35	With lenses up to 4 inches of more gravel-rich, saturated.	
10,21,32			40		

LITHOLOGY

WELL CONSTRUCTION DETAIL



ALTON GEOSCIENCE
Livermore, California

LOG OF EXPLORATORY BORING

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PAGE 1 OF 1

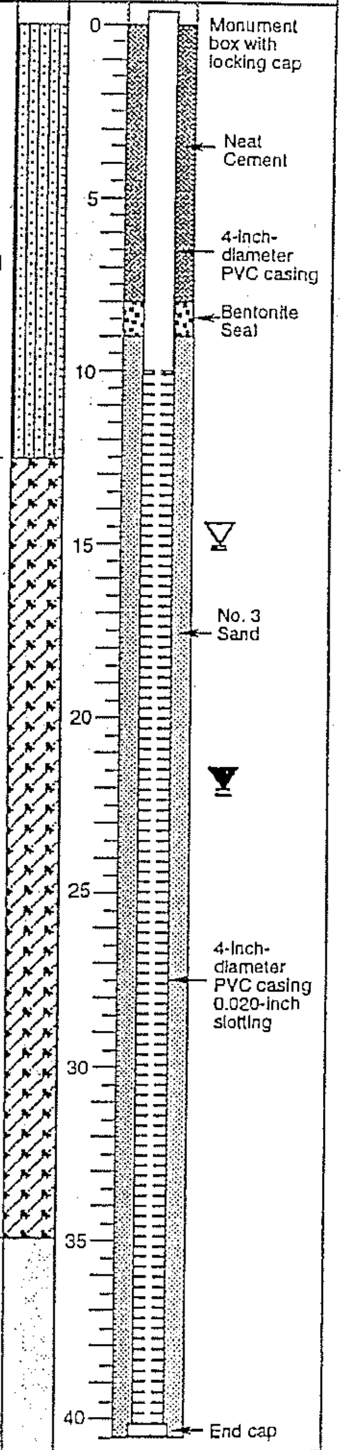
PROJECT NO.: 41-0034
LOCATION: USA Gas #57
10700 MacArthur Boulevard
Oakland, California

DATE DRILLED: 11/20/95
LOGGED BY: A. Le May
APPROVED BY: M. Katen, RG
DRILLING CO.: V & W Drilling

DRILLING METHOD: 10-inch diameter Hollow-Stem Auger
SAMPLER TYPE: California Modified Split-Spoon
TOTAL DEPTH: 40.5 feet DEPTH TO WATER: 15.0 feet

BLOWS PER 6 INCHES	PID(ppm)	TPH-G (ppm)	DEPTH (feet below grade)	DESCRIPTION	USCS
			0	Hand-augered to 5 feet.	
10,16,21	—		5	SILTY SAND for 2 inches: brown, dry, then SILTY SAND: dark yellowish brown, medium dense, damp with some clay.	SM
13,25,30	0	ND	10	With gravel.	
9,18,28	0		15	SILTY SAND and GRAVEL Mixture: moist, with clay.	
18,21,24	0		20	Wet.	
9,14,19	0		25	Gravel-rich lenses up to 4-inch thick.	GC
6,11,16	—		30	Saturated, poor recovery.	
12,50 for 4"			35	As above for 6 inches, damp. SILTY SANDSTONE BEDROCK: dark yellowish brown, dry, fractured and friable.	
12,17,17	0		40	CLAYEY GRAVEL BEDROCK Interbedded: brown, loose, saturated, includes fractured bedrock pebbles.	

LITHOLOGY / WELL CONSTRUCTION DETAIL



ALTON GEOSCIENCE
Livermore, California

LOG OF EXPLORATORY BORING

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PAGE 1 OF 1

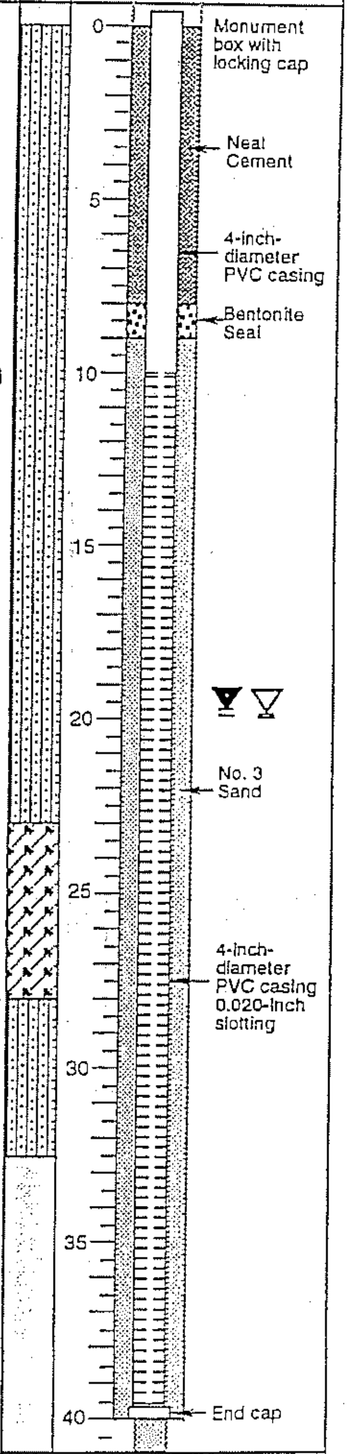
PROJECT NO.: 41-0034
LOCATION: USA Gas #57
10700 MacArthur Boulevard
Oakland, California

DATE DRILLED: 11/21/95
LOGGED BY: A. Le May
APPROVED BY: M. Katen, RG
DRILLING CO.: V & W Drilling

DRILLING METHOD: 10-inch diameter Hollow-Stem Auger
SAMPLER TYPE: California Modified Split-Spoon
TOTAL DEPTH: 41.0 feet DEPTH TO WATER: 20.0 feet

BLOWS PER 6 INCHES	PID(ppm)	TPH-G (ppm)	SAMPLE	DEPTH (feet below grade)	DESCRIPTION	USCS
				0	Hand-augered to 5 feet.	
6,11,19	0			5	SILTY SAND: dark yellowish brown, medium dense, damp, fine-grained, poorly graded.	
9,15,22	0	ND		10	With clay and carbonate pebbles to 0.5-inch diameter.	SM
8,15,23	0	ND		15		
10,13,20	>2,500	25		20	Slight greenish color.	
14,19,22	>2,500			25	CLAYEY SANDY and GRAVEL Mixture: yellowish brown, medium dense, damp, pebbles to 0.13-inch diameter.	GC
17,31,32	0			30	SILTY SAND: dark yellowish brown, dense, damp, with gravel and clay.	SM
23,50	0			35	SILTY SANDSTONE BEDROCK; light olive brown, very fractured, moist, very friable, with clay.	
13,2232	0			40	With claystone interbeds, saturated.	

LITHOLOGY / WELL CONSTRUCTION DETAIL



ALTON GEOSCIENCE
Livermore, California

LOG OF EXPLORATORY BORING

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PAGE 1 OF 1

41-0034/MW-7 01/05/96

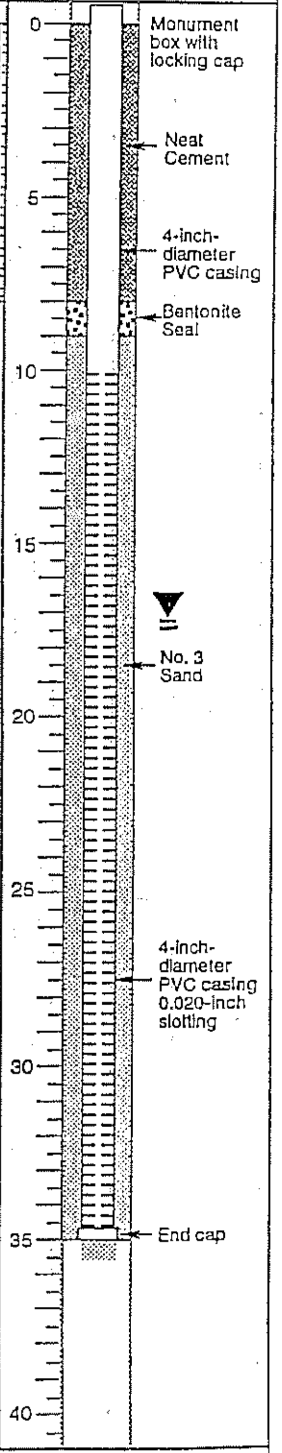
PROJECT NO.: 41-0034
LOCATION: USA Gas #57
10700 MacArthur Boulevard
Oakland, California

DATE DRILLED: 11/21/95
LOGGED BY: A. Le May
APPROVED BY: M. Katen, RG
DRILLING CO.: V & W Drilling

DRILLING METHOD: 10-inch diameter Hollow-Stem Auger
SAMPLER TYPE: California Modified Split-Spoon
TOTAL DEPTH: 35.5 feet DEPTH TO WATER: N/A

BLOWS PER 6 INCHES	PID(ppm)	TPH-G (ppm)	DEPTH (feet below grade)	DESCRIPTION	USCS
			0	Hand-augered to 5 feet.	
10,14,24	—		5	SILTY SAND: dark yellowish brown, medium dense, damp, with gravel and clay.	SM
50 for 3"	0	ND	10	SILTY SANDSTONE BEDROCK: yellowish brown, friable, fractured, dry, very dense	
50 for 5"	—	ND	15		
50 for 5"	—	ND	20		
50 for 6"	—		25		
25,32,50	0		30	As above including 6 inches of strong brown claystone and sand.	
28,50 for 6"	0		35		
			40		

WELL CONSTRUCTION DETAIL



ALTON GEOSCIENCE
Livermore, California

LOG OF EXPLORATORY BORING

MW-8
PAGE 1 OF 1

SOIL BORING LOG **Boring No.** EX-1 **Sheet** 1 **of** 2

Client: Former USA 57
Date: 10/6/2005
Address: 10700 MacArthur Blvd
Oakland, CA
Drilling Company: Woodward Drilling Co.
rig type: Mobil B-61
Drilling Foreman: Amador
Project No.: 2007-0057-01
Method: HSA
hole diam.: 10"
Logged By: Justin Crose

Well Pack:
sand: 4.5 ft. to 25 ft.
bent.: 3.5 ft. to 4.5 ft.
grout: 0.5 ft. to 3.5 ft.

Well Construction:
casing: PVC
screen: 5 to 25 ft.
casing diam.: 4"
screen slot: 0.02"

Sample Type	Sample No.	Blow Count	Sample Time	Sample Recov.	Well Construct.	Depth Scale	LITHO COLUMN	Descriptions of Materials and Conditions	PID (PPM)
						1		Concrete	
						2	CL	CLAY, olive brown 2.5Y 4/3, 10-15% fine sand, moist	0
						3			
						4			
						5			
S	EX-1-6	3 3 10	16:13	60		6	SC	CLAYEY SAND (5'-5.2'), brown 10YR 4/3, 75% fine sand, 25% clayey fines, moist	0
						7	CL	CLAY, dark grayish brown 2.5Y 4/3, 5-10% fine to medium sand, trace black MnO2, moist, stiff	
						8			
						9			
						10			
S	EX-1-11	7 7 10	16:28	70		11	CL	CLAY, olive brown 2.5Y to dark grayish brown 2.5Y, moist	39
						12			
						13			
						14			
						15			
S	EX-1-16	4 5 20	16:38	60		16	CL	CLAY, dark grayish brown 2.5Y 4/2 with spots of greenish gray GLEY 1 & dark yellowish brown 10YR 4/6, 5% fine to coarse sand, moist, very stiff	>1000
						17			
						18			
						19			
						20			

Comments: Drilled to 25 feet bgs

STRATUS
ENVIRONMENTAL, INC.

SOIL BORING LOG **Boring No. EX-1** **Sheet 2 of 2**

Client Former USA 57
Address 10700 MacArthur Blvd
Oakland, CA
Project No. 2007-0057-01
Logged By: Justin Crose

Date 10/6/2005
Drilling Company Woodward Drilling Co. rig type: Mobil B-61
Drilling Foreman Amador
Method HSA hole diam.: 10"

Sample		Blow	Sample		Well Construc	Depth	LITHO	Descriptions of Materials	PID
Type	No.	Count	Time	Recov.	t.	Scale	COLUMN	and Conditions	(PPM)
S	EX-1-21	7 19 22	16:56	90		21	CL	CLAY, light olive brown 2.5Y 5/6 to olive yellow 2.5Y, 10-15% fine to CLAY, dark grayish brown to very dark grayish brown 2.5Y with spots of greenish gray GLEY 1 & orange FeO2 stains, trace gravel, moist, hard	>1000
						22			
						23			
						24			
						25			
		50(4)	17:18	25		26	CL	CLAY to Mudstone, clay - dark yellowish brown 10YR to brownish yellow 10YR, mudstone - brown 10YR, 5-15% fine sand to fine gravel 4/3	527
						27			
						28			
						29			
						30			
						31			
						32			
						33			
						34			
						35			
						36			
						37			
						38			
						39			
						40			

STRATUS
ENVIRONMENTAL, INC.

WELL DETAILS

PROJECT NUMBER: 2007-0057-01

PROJECT NAME: USA 57

LOCATION: 10700 MacArthur Blvd, Oakland, California

WELL PERMIT NO.: W2005-0944

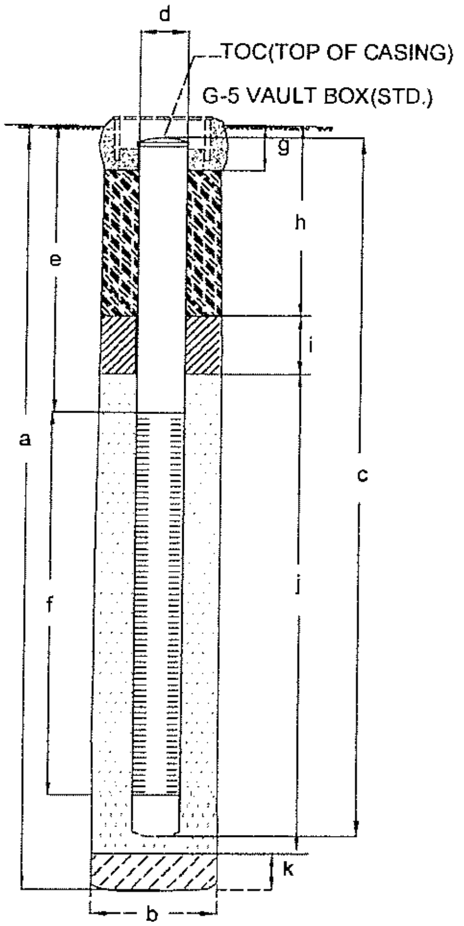
BORING/WELL NO.: EX-1

TOP OF CASING ELEV.: 77.72'

GROUND SURFACE ELEV.: 78.04'

DATUM: NAD 83

INSTALLATION DATE: October 6, 2005



▨ BENTONITE

▩ CEMENT

▦ CONCRETE

░ SAND

☰ PERFORATION

NOT TO SCALE

EXPLORATORY BORING

a. TOTAL DEPTH 25 ft.

b. DIAMETER 10 in.

DRILLING METHOD Hollow stem auger

WELL CONSTRUCTION

c. TOTAL CASING LENGTH 25 ft.

MATERIAL Schedule 40 PVC

d. DIAMETER 4 in.

e. DEPTH TO TOP PERFORATIONS 5 ft.

f. PERFORATED

INTERVAL FROM 5 TO 25 ft.

PERFORATION TYPE Slotted Screen

PERFORATION SIZE 0.02 in.

g. SURFACE SEAL 0 to 1.0 ft.

SEAL MATERIAL Concrete

h. BACKFILL 1.0 to 3.5 ft.

BACKFILL MATERIAL Neat Cement

i. SEAL 3.5 to 4.5 ft.

SEAL MATERIAL Bentonite

j. FILTER PACK 4.5 to 25 ft.

FILTER PACK MATERIAL #3 Sand

k. BOTTOM SEAL

SEAL MATERIAL N/A

PREPARED BY ______________ DATE ________

REVIEWED BY ______________ DATE ________

SOIL BORING LOG **Boring No.** EX-2 **Sheet** 1 **of** 2

Client: Former USA 57
Date: 10/7/2005
Address: 10700 MacArthur Blvd
Oakland, CA
Drilling Company: Woodward Drilling Co.
rig type: Mobil B-61
Drilling Foreman: Amador
Project No.: 2007-0057-01
Method: HSA
hole diam.: 10"
Logged By: Justin Crose

Well Pack: sand: 4.5 ft. to 25 ft.
bent.: 3.5 ft. to 4.5 ft.
grout: 1 ft. to 3.5 ft.
Well Construction: casing: PVC
screen: 5 to 25 ft.
casing diam.: 4"
screen slot: 0.02"

Sample		Blow	Sample		Well	Depth		Descriptions of Materials	PID
Type	No.	Count	Time	Recov.	Construct.	Scale	LITHO COLUMN	and Conditions	(PPM)
						1		Concrete	
						2	CL	CLAY, yellowish brown 10YR 5/4 to brown 10YR 4/3, trace black MnO2, moist	7
						3			
						4			
						5			
S	EX-2-6	4 8 22	8:38	70		6	CL	CLAY, yellowish brown 10YR 5/4 to brown 10YR 4/3, trace black MnO2, trace caliche, moist, hard	0
						7			
						8			
						9			
						10			
S	EX-2-11	10 12 28	8:45	80		11	CL	CLAY, very dark brown 7.5YR to olive gray 5Y 5/2 with orange FeO2 stains, trace gravel, moist, hard	0
						12			
						13			
						14			
						15			
		50(3)	8:57	20		16	CL	CLAY, light olive brown 2.5Y 5/6, trace caliche, 5-10% fine to coarse sand, trace gravel, dry, hard	466
						17			
						18			
						19			
						20			

Comments: Drilled to 25 feet bgs

STRATUS
ENVIRONMENTAL, INC.

SOIL BORING LOG

Boring No. EX-2

Sheet 2 of 2

Client Former USA 57

Address 10700 MacArthur Blvd
Oakland, CA

Project No. 2007-0057-01

Logged By: Justin Crose

Date 10/7/2005

Drilling Company Woodward Drilling Co. rig type: Mobil B-61

Drilling Foreman Amador

Method HSA hole diam.: 10"

Sample		Blow	Sample		Well Construct.	Depth	LITHO COLUMN	Descriptions of Materials	PID
Type	No.	Count	Time	Recov.		Scale		and Conditions	(PPM)
		50(5)	9:20	25		21	CL	CLAY, light olive brown 2.5Y 5/6 to olive yellow 2.5Y, 10-15% fine to medium sand, trace coarse sand and fine gravel, intermittent cementation, dry, hard	66
						22			
						23			
						24			
						25			
		50(6)	9:40	30		26	CL	CLAY to Mudstone, mudstone - white CaCO3 cementing, clay - olive gray 5Y 5/2 & very dark brown 7.5YR, dry to moist	45
						27			
						28			
						29			
						30			
						31			
						32			
						33			
						34			
						35			
						36			
						37			
						38			
						39			
						40			

STRATUS
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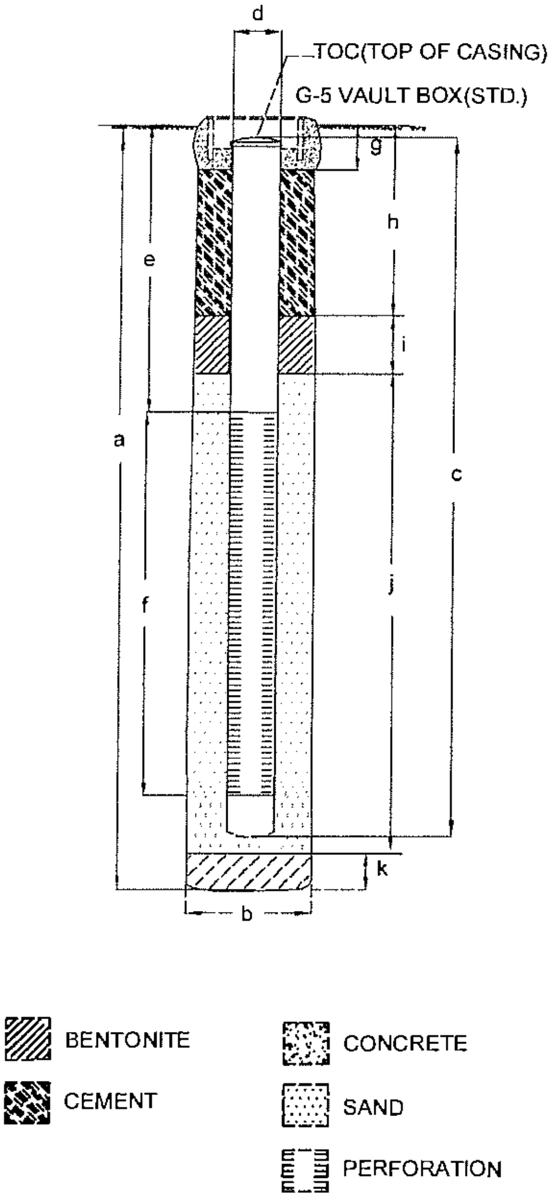
WELL DETAILS

PROJECT NUMBER: 2007-0057-01
PROJECT NAME: USA 57
LOCATION: 10700 MacArthur Blvd, Oakland, California
WELL PERMIT NO.: W2005-0945

BORING/WELL NO.: EX-2
TOP OF CASING ELEV.: 76.96'
GROUND SURFACE ELEV.: 77.24'
DATUM: NAD 83
INSTALLATION DATE: October 7, 2005



NOT TO SCALE

EXPLORATORY BORING

a. TOTAL DEPTH 25 ft.
b. DIAMETER 10 in.
DRILLING METHOD Hollow stem auger

WELL CONSTRUCTION

c. TOTAL CASING LENGTH 25 ft.
MATERIAL Schedule 40 PVC
d. DIAMETER 4 in.
e. DEPTH TO TOP PERFORATIONS 5 ft.
f. PERFORATED
INTERVAL FROM 5 TO 25 ft.
PERFORATION TYPE Slotted Screen
PERFORATION SIZE 0.02 in.
g. SURFACE SEAL 0 to 1.0 ft.
SEAL MATERIAL Concrete
h. BACKFILL 1.0 to 3.5 ft.
BACKFILL MATERIAL Neat Cement
i. SEAL 3.5 to 4.5 ft.
SEAL MATERIAL Bentonite
j. FILTER PACK 4.5 to 25 ft.
FILTER PACK MATERIAL #3 Sand
k. BOTTOM SEAL
SEAL MATERIAL N/A

PREPARED BY ____________ DATE ________

REVIEWED BY ____________ DATE ________

SOIL BORING LOG **Boring No.** EX-3 **Sheet** 1 **of** 2

Client: Former USA 57
Date: 10/6/2005
Address: 10700 MacArthur Blvd
Oakland, CA
Drilling Company: Woodward Drilling Co. rig type: Mobil B-61
Drilling Foreman: Amador
Project No.: 2007-0057-01
Method: HSA hole diam.: 10"
Logged By: Justin Crose

Well Pack: sand: 4.5 ft. to 25 ft.
bent.: 3.5 ft. to 4.5 ft.
grout: 0.5 ft. to 3.5 ft.
Well Construction: casing: PVC screen: 5 to 25 ft.
casing diam.: 4" screen slot: 0.02"

Sample		Blow	Sample		Well Construct.	Depth	LITHO COLUMN	Descriptions of Materials	PID
Type	No.	Count	Time	Recov.		Scale		and Conditions	(PPM)
						1		Asphalt	
						2	CL	CLAY, dark yellowish brown 10YR, trace black MnO2, 5% fine sand, moist	0
						3			
						4			
						5			
S	EX-3-6	4 4 12	12:46	80		6	CL	CLAY, dark yellowish brown 10YR 4/4, trace black MnO2 & caliche, trace fine to coarse sand, moist, very stiff	0
						7			
						8			
						9			
						10			
S	EX-3-11	8 12 17	12:59	70		11	CL	CLAY, olive gray 5Y 4/2 to dark grayish brown 2.5Y 4/2 with orange FeO2 stains, trace fine to coarse sand, very stiff	0
						12			
						13			
						14			
						15			
S	EX-3-15.5	12 50(6)	13:27	40		16	CL	CLAY, greenish gray to dark yellowish brown 10YR to dark grayish brown 2.5Y with orange FeO2 stains, trace fine sand, dry to moist, hard	45
						17			
						18			
						19			
						20			

Comments: Drilled to 25 feet bgs

STRATUS
ENVIRONMENTAL, INC.

SOIL BORING LOG

Boring No. EX-3

Sheet 2 of 2

Client Former USA 57

Address 10700 MacArthur Blvd

Oakland, CA

Project No. 2007-0057-01

Logged By: Justin Crose

Date 10/6/2005

Drilling Company Woodward Drilling Co. rig type: Mobil B-61

Drilling Foreman Amador

Method HSA hole diam.: 10"

Sample		Blow	Sample		Well Construct.	Depth	LITHO	Descriptions of Materials	PID
Type	No.	Count	Time	Recov.		Scale	COLUMN	and Conditions	(PPM)
S	EX-3-20.5	50(6)	13:51	40		21	CL	CLAY, brown 10YR 4/3, 5-15% fine to coarse sand, weakly cemented, dry, hard	
						22			
						23			
						24			
						25			
S	EX-3-25.5	50(6)	14:32	35		26	CL	CLAY to Mudstone, clay - dark yellowish brown 10YR 4/6 to brownish yellow 10YR 6/8, mudstone - brown 4/3, dry, hard	
						27			
						28			
						29			
						30			
						31			
						32			
						33			
						34			
						35			
						36			
						37			
						38			
						39			
						40			

STRATUS
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WELL DETAILS

PROJECT NUMBER: 2007-0057-01

PROJECT NAME: USA 57

LOCATION: 10700 MacArthur Blvd, Oakland, California

WELL PERMIT NO.: W2005-0946

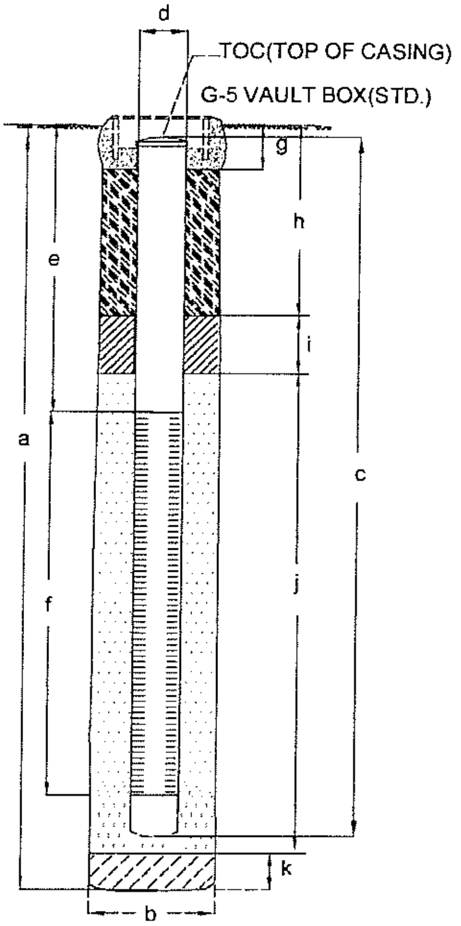
BORING/WELL NO.: EX-3

TOP OF CASING ELEV.: 78.87'

GROUND SURFACE ELEV.: 79.52'

DATUM: NAD 83

INSTALLATION DATE: October 6, 2005



▨ BENTONITE

▩ CEMENT

░ CONCRETE

░ SAND

☰ PERFORATION

NOT TO SCALE

EXPLORATORY BORING

a. TOTAL DEPTH 25 ft.

b. DIAMETER 10 in.

DRILLING METHOD Hollow stem auger

WELL CONSTRUCTION

c. TOTAL CASING LENGTH 25 ft.

MATERIAL Schedule 40 PVC

d. DIAMETER 4 in.

e. DEPTH TO TOP PERFORATIONS 5 ft.

f. PERFORATED

INTERVAL FROM 5 TO 25 ft.

PERFORATION TYPE Slotted Screen

PERFORATION SIZE 0.02 in.

g. SURFACE SEAL 0 to 1.0 ft.

SEAL MATERIAL Concrete

h. BACKFILL 1.0 to 3.5 ft.

BACKFILL MATERIAL Neat Cement

i. SEAL 3.5 to 4.5 ft.

SEAL MATERIAL Bentonite

j. FILTER PACK 4.5 to 25 ft.

FILTER PACK MATERIAL #3 Sand

k. BOTTOM SEAL

SEAL MATERIAL N/A

PREPARED BY ____ DATE ____

REVIEWED BY ____ DATE ____

SOIL BORING LOG

Boring No. EX-4

Sheet 1 of 2

Client: Former USA 57
Date: 10/6/2005
Address: 10700 MacArthur Blvd
Oakland, CA
Drilling Company: Woodward Drilling Co.
rig type: Mobil B-61
Drilling Foreman: Amador
Project No.: 2007-0057-01
Method: HSA
hole diam.: 10"
Logged By: Justin Crose

Well Pack
sand: 4.5 ft. to 25 ft.
bent.: 3.5 ft. to 4.5 ft.
grout: 0.5 ft. to 3.5 ft.

Well Construction
casing: PVC
screen: 5 to 25 ft.
casing diam.: 4"
screen slot: 0.02"

Sample		Blow	Sample		Well Construct.	Depth	LITHO COLUMN	Descriptions of Materials	PID
Type	No.	Count	Time	Recov.		Scale		and Conditions	(PPM)
						1		Drill on dirt	
						2		Top Soil, dry	
						3			
						4	SM	SILTY SAND, 80-85% fine sand, 15-20% silt, moist	231
						5	SW	SAND (3.7' to 5'), 95% fine to coarse sand, trace fine gravel, 5% fines, moist	237
S	EX-4-6	9 12 18	9:06	80		6	CL	CLAY, dark yellowish brown 10YR 4/4, trace black MnO2, trace fine sand to fine gravel, moist, very stiff	231
						7			
						8			
						9			
						10			
S	EX-4-11	8 8 10	9:18	80		11	CL	CLAY, dark grayish brown 2.5Y 4/2, moist, very stiff	>1000
						12			
						13			
						14			
						15			
S	EX-4-16.5	5 15 20	9:48	100		16	CL	CLAY, dark grayish brown 2.5Y 4/2, moist, hard	>1000
						17			
						18			
						19			
						20			

Comments: Drilled to 25 feet bgs

STRATUS
ENVIRONMENTAL, INC.

SOIL BORING LOG Boring No. EX-4 Sheet 2 of 2

Client Former USA 57
Date 10/6/2005
Address 10700 MacArthur Blvd
Oakland, CA
Drilling Company Woodward Drilling Co. rig type: Mobil B-61
Drilling Foreman Amador
Project No. 2007-0057-01
Method HSA hole diam.: 10"
Logged By: Justin Crose

Sample		Blow	Sample		Well Construct.	Depth	LITHO	Descriptions of Materials	PID
Type	No.	Count	Time	Recov.		Scale	COLUMN	and Conditions	(PPM)
S	EX-4-21	19 50(6)	10:06	70		21	CL	CLAY WITH GRAVEL, dark yellowish brown 10YR 4/4 to olive gray 5Y 4/2, 5-25% gravel (lower % towards top of sample), orange FeO2 stains, damp to moist	450
						22			
						23			
						24			
						25			
S	EX-4-25.5	50(6)	10:25	40		26	ML	SILT, light olive brown 2.5Y 5/4 to dark yellowish brown 10YR, weakly cemented, dry, hard	91
						27			
						28			
						29			
						30			
						31			
						32			
						33			
						34			
						35			
						36			
						37			
						38			
						39			
						40			

STRATUS
ENVIRONMENTAL, INC.

WELL DETAILS

PROJECT NUMBER: 2007-0057-01

PROJECT NAME: USA 57

LOCATION: 10700 MacArthur Blvd, Oakland, California

WELL PERMIT NO.: W2005-0947

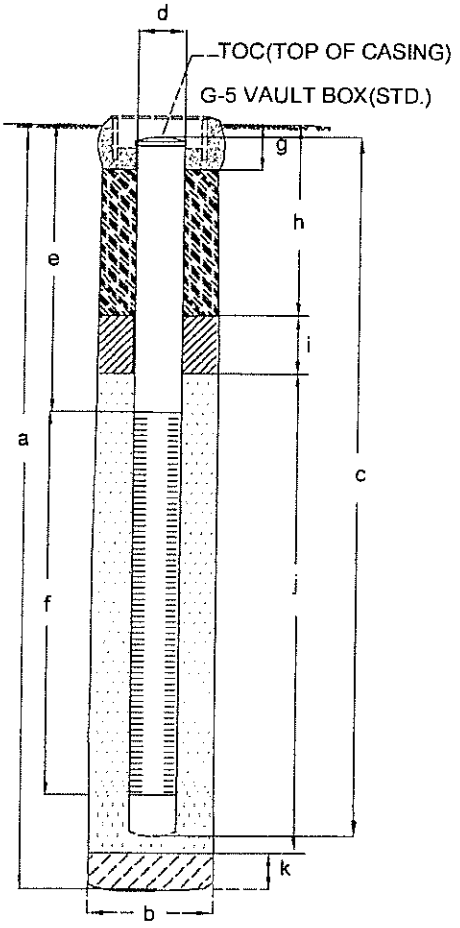
BORING/WELL NO.: EX-4

TOP OF CASING ELEV.: 77.96'

GROUND SURFACE ELEV.: 78.27'

DATUM: NAD 83

INSTALLATION DATE: October 6, 2005



▨ BENTONITE

▩ CEMENT

▦ CONCRETE

░ SAND

☰ PERFORATION

NOT TO SCALE

EXPLORATORY BORING

a. TOTAL DEPTH 25 ft.

b. DIAMETER 10 in.

DRILLING METHOD Hollow stem auger

WELL CONSTRUCTION

c. TOTAL CASING LENGTH 25 ft.

MATERIAL Schedule 40 PVC

d. DIAMETER 4 in.

e. DEPTH TO TOP PERFORATIONS 5 ft.

f. PERFORATED

INTERVAL FROM 5 TO 25 ft.

PERFORATION TYPE Slotted Screen

PERFORATION SIZE 0.02 in.

g. SURFACE SEAL 0 to 1.0 ft.

SEAL MATERIAL Concrete

h. BACKFILL 1.0 to 3.5 ft.

BACKFILL MATERIAL Neat Cement

i. SEAL 3.5 to 4.5 ft.

SEAL MATERIAL Bentonite

j. FILTER PACK 4.5 to 25 ft.

FILTER PACK MATERIAL #3 Sand

k. BOTTOM SEAL

SEAL MATERIAL N/A

PREPARED BY ____________ DATE ________

REVIEWED BY ____________ DATE ________

SOIL BORING LOG **Boring No. AS-1** **Sheet: 1 of 1**

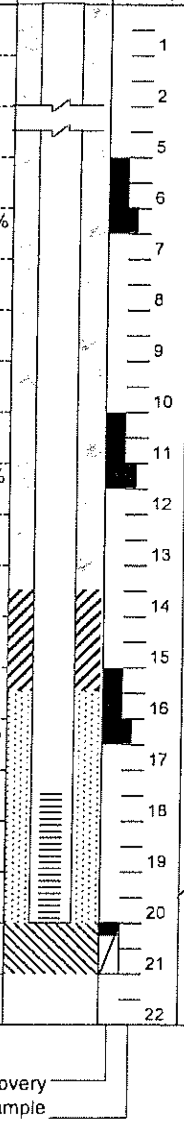
Client: Former USA Station No. 57
Address: 10700 MacArthur Boulevard
Oakland, CA
Project No. 2007-0057-01
Logged By: Allan Dudding

Date: August 23, 2007
Drilling Co. Mitchell Drilling, Environmental rig type: CME-75
Driller: Edward Mitchell, Jr.
Method: Hollow Stem Auger Hole Diameter: 8 inches
Sampler: 2 in. split spoon

Well Pack sand: 15.5 ft. to 20 ft.
bent.: 13.5 ft. to 15.5 ft.
grout: 0 ft. to 13.5 ft.

Well Construction Casing Material: Schedule 40 PVC Screen Interval: 17.5 to 20 ft.
Casing Diameter: 1 in. Screen Slot Size: 0.020 -in.

Depth to GW: ▽ first encountered = NA ▼ Static =



Sample Type	Sample No.	Blow Count	Sample Time	Sample Recov.	Depth Scale	Lithologic Column	Descriptions of Materials and Conditions	PID (PPM)
					1		Installed in approximately 6" of concrete pavement. Borehole cleared with hand auger to 5 feet bgs.	
					2			
					5			
S	AS-1-6'	11 15 17	1352	100%	6	CH	Fat Clay, trace sand, CH, very dark grayish brown (2.5Y 3/2), high plasticity, medium grained sand, moist, very stiff to hard. ~95% clay, trace sand.	4.3
					7			
					8			
					9			
					10			
S	AS-1-11'	11 17 23	1403	100%	11	CL	Lean Clay, trace sand and gravel, CL, dark greenish gray (GLEY1 4/10Y), medium plasticity, fine to medium grained sand, fine grained gravel, moist, hard, hydrocarbon odor. ~95% clay, trace sand and gravel.	235.8
					12			
					13			
					14			
					15			
S	AS-1-16'	8 16 26	1412	100%	16	CL	Lean Clay, trace sand, CL, dark yellowish brown (10YR 4/4), medium plasticity fine to medium grained sand, moist, hard, hydrocarbon odor. ~95% clay, trace sand.	106.5
					17			
					18			
					19			
					20			
Insufficient Recovery		11 50/6"	1428	20%	21	GP	Poorly graded Gravel, GP, light olive brown (2.5Y 5/4), fine to medium grained, dry, dense, no odor, no staining.	13.1
					22			

Comments: Boring advanced to 20 feet bgs, sampled to 21 feet bgs.

STRATUS
ENVIRONMENTAL, INC.

WELL DETAILS

PROJECT NUMBER: 2007-0057-01

PROJECT NAME: Former USA Service Station No. 57

LOCATION: 10700 MacArthur Blvd, Oakland, California

WELL PERMIT NO.: W2007-0903

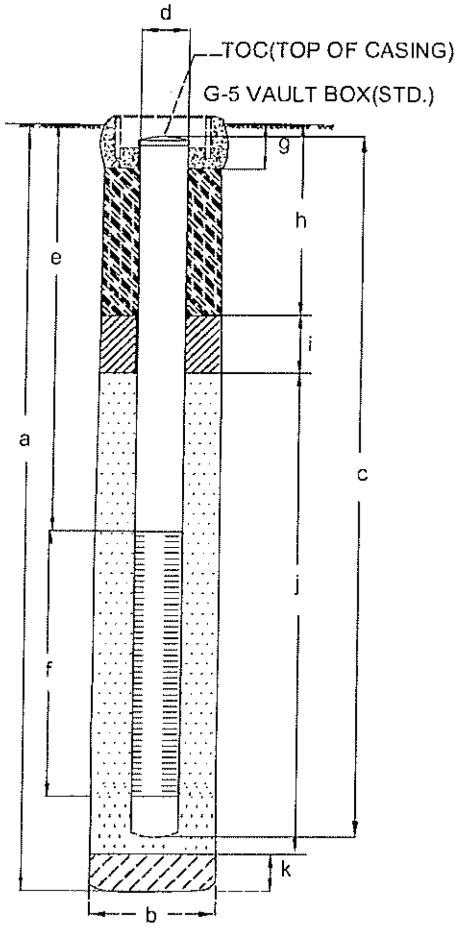
BORING/WELL NO.: AS-1

TOP OF CASING ELEV.:

GROUND SURFACE ELEV.:

DATUM:

INSTALLATION DATE: August 23, 2007



▨ BENTONITE

▩ CEMENT

▦ CONCRETE

░ SAND

☰ PERFORATION

NOT TO SCALE

EXPLORATORY BORING

a. TOTAL DEPTH 20 ft.

b. DIAMETER 8 in.

DRILLING METHOD Hollow Stem Auger

WELL CONSTRUCTION

c. TOTAL CASING LENGTH 20 ft.

MATERIAL Schedule 40 PVC

d. DIAMETER 1 in.

e. DEPTH TO TOP PERFORATIONS 17.5 ft.

f. PERFORATED

INTERVAL FROM 17.5 TO 20 ft.

PERFORATION TYPE Slotted Screen

PERFORATION SIZE 0.02 in.

g. SURFACE SEAL 0 to 1.0 ft.

SEAL MATERIAL Concrete

h. BACKFILL 1.0 to 13.5 ft.

BACKFILL MATERIAL Neat Cement

i. SEAL 13.5 to 15.5 ft.

SEAL MATERIAL Bentonite

j. FILTER PACK 15.5 to 20 ft.

FILTER PACK MATERIAL #3 Sand

k. BOTTOM SEAL

SEAL MATERIAL N/A

PREPARED BY DATE

REVIEWED BY DATE

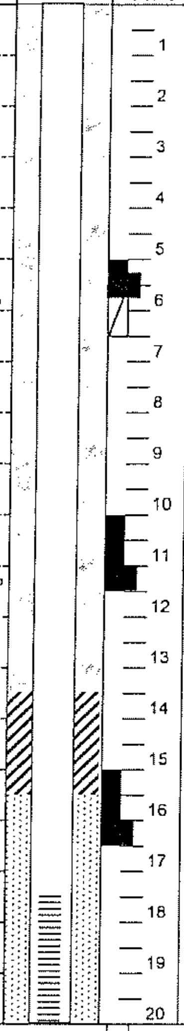
SOIL BORING LOG **Boring No. AS-2** **Sheet: 1 of 2**

Client: Former USA Station No. 57
Date: August 23, 2007
Address: 10700 MacArthur Boulevard
Oakland, CA
Drilling Co.: Mitchell Drilling, Environmental rig type: CME-75
Driller: Edward Mitchell, Jr.
Project No.: 2007-0057-01
Method: Hollow Stem Auger Hole Diameter: 8 inches
Logged By: Allan Dudding
Sampler: 2 in. split spoon

Well Pack sand: 15.5 ft. to 20 ft.
bent.: 13.5 ft. to 15.5 ft.
grout: 0 ft. to 13.5 ft.

Well Construction Casing Material: Schedule 40 PVC Screen Interval: 17.5 to 20 ft.
Casing Diameter: 1 in. Screen Slot Size: 0.020 -in.

Depth to GW: ▽ first encountered = NA ▼ Static =



Sample		Blow Count	Sample		Well Details	Depth Scale	Lithologic Column	Descriptions of Materials and Conditions	PID (PPM)
Type	No.		Time	Recov.					
						1		Well installed on broken asphalt pavement. Borehole cleared using hand auger to 5 feet bgs.	
						2			
						3			
						4			
						5			
S	AS-2-5.5'	8 10 14	1112	50%		6	CL	Silty Clay, CL, dark greenish gray (GLEY1 4/10Y), low plasticity, moist, very stiff, no odor, no staining. 70% clay, 30% silt.	0
						7			
						8			
						9			
						10			
S	AS-2-11'	9 14 19	1118	100%		11	CL	Clay, CL, very dark grayish brown (2.5Y 3/2), medium plasticity, moist, hard, hydrocarbon odor, no staining.	9.8
						12			
						13			
						14			
						15			
S	AS-2-16'	14 20 25	1124	100%		16	CL	Silty Clay, CL, dark yellowish brown (10YR 4/4) with green mottling, low plasticity, moist, hard, no odor. 70% clay, 30% silt.	59.6
						17			
						18			
						19			
						20			

Recovery
Sample

Comments:

STRATUS
ENVIRONMENTAL, INC.

SOIL BORING LOG **Boring No. AS-2** **Sheet: 2 of 2**

Client	Former USA Station No. 57	Date	August 23, 2007
Address	10700 MacArthur Boulevard	Drilling Co.	Mitchell Drilling, Environmental rig type: CME-75
	Oakland, CA	Driller	Edward Mitchell, Jr.
Project No.	2007-0057-01	Method	Hollow Stem Auger Hole Diameter: 8 inches
Logged By:	Allan Dudding	Sampler:	2 in. split spoon

Sample		Blow Count	Sample		Well Details	Depth Scale	Lithologic Column	Descriptions of Materials and Conditions	PID (PPM)
Type	No.		Time	Recov.					
		14 17				21	CL	Clay, trace sand, CL, dark yellowish brown (10YR 4/4), medium plasticity,	125.4
S	AS-2-21'	36	1132	100%				medium grained sand, moist, hard, hydrocarbon odor, no staining. ~95% clay, trace sand.	
						22			
						23			
						24			
						25			
		17 28				26	CL	Clay, trace sand, CL, dark yellowish brown (10YR 4/4), medium plasticity,	412
S	AS-2-26'	50/5"	1151	100%				medium to coarse grained sand, moist, hard, hydrocarbon odor, no staining. ~95% clay, trace sand.	
						27			
						28			
						29			
						30			
						31			
						32			
						33			
						34			
						35			
						36			
						37			
						38			
						39			
						40			

Recovery

Sample

Comments: Boring drilled to 25 feet bgs, sampled to 26.5 feet bgs. Well installed at 20 feet bgs above five feet of bentonite fill.

STRATUS ENVIRONMENTAL, INC.

WELL DETAILS

PROJECT NUMBER: 2007-0057-01

PROJECT NAME: Former USA Service Station No. 57

LOCATION: 10700 MacArthur Blvd, Oakland, California

WELL PERMIT NO.: W2007-0904

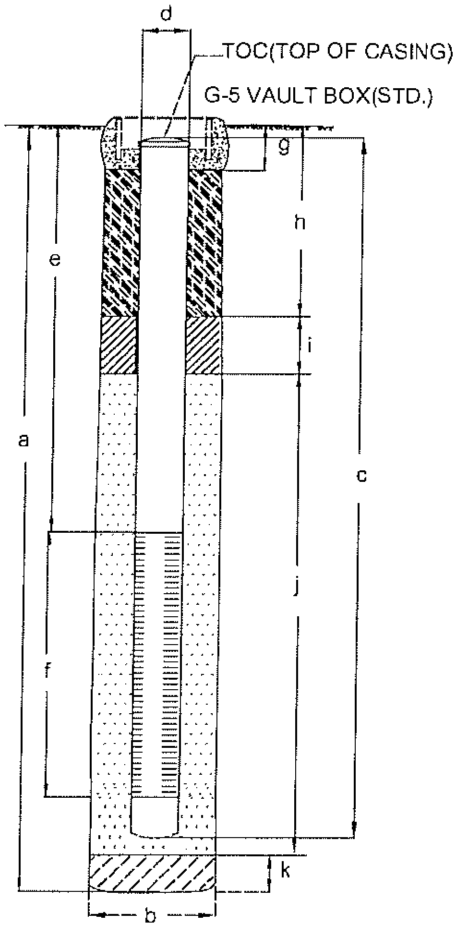
BORING/WELL NO.: AS-2

TOP OF CASING ELEV.:

GROUND SURFACE ELEV.:

DATUM:

INSTALLATION DATE: August 23, 2007



▨ BENTONITE

▩ CEMENT

▒ CONCRETE

░ SAND

☰ PERFORATION

NOT TO SCALE

EXPLORATORY BORING

a. TOTAL DEPTH 25 ft.

b. DIAMETER 8 in.

DRILLING METHOD Hollow Stem Auger

WELL CONSTRUCTION

c. TOTAL CASING LENGTH 20 ft.

MATERIAL Schedule 40 PVC

d. DIAMETER 1 in.

e. DEPTH TO TOP PERFORATIONS 17.5 ft.

f. PERFORATED

INTERVAL FROM 17.5 TO 20 ft.

PERFORATION TYPE Slotted Screen

PERFORATION SIZE 0.02 in.

g. SURFACE SEAL 0 to 1.0 ft.

SEAL MATERIAL Concrete

h. BACKFILL 1.0 to 13.5 ft.

BACKFILL MATERIAL Neat Cement

i. SEAL 13.5 to 15.5 ft.

SEAL MATERIAL Bentonite

j. FILTER PACK 15.5 to 20 ft.

FILTER PACK MATERIAL #3 Sand

k. BOTTOM SEAL 20 to 25 ft.

SEAL MATERIAL Bentonite

PREPARED BY ____________ DATE ________

REVIEWED BY ____________ DATE ________

APPENDIX B

HISTORICAL GROUNDWATER ELEVATION AND ANALYTICAL DATA AND ALTERNATE GROUNDWATER ELEVATION CONTOUR MAPS

TABLE 1
GROUNDWATER ELEVATION AND ANALYTICAL SUMMARY
Former USA Service Station No. 57
10700 MacArthur Blvd., Oakland, California

Well Number	Date Collected	Depth to Water (feet)	Well Elevation (ft msl)	Groundwater Elevation (ft msl)	GRO[5] (µg/L)	TPHD (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)	MTBE (µg/L)
S-1	02/12/87						630	4.4	3.5	37	NA
	03/03/95	13.10	74.74	61.64	910	5,900	260	7.6	16	14	NA
	07/24/95	12.35		62.39	NA	NA	NA	NA	NA	NA	NA
	11/22/95	19.30	78.68	59.38	460	6,100	13	0.69	0.99	1.1	460*
	12/06/95	19.59		59.09	NA	NA	NA	NA	NA	NA	NA
	01/04/96	19.52		59.16	NA	NA	NA	NA	NA	NA	NA
	01/31/97	15.07		63.61	1,100	200	11	6	3	6	200*
	10/10/97	18.90		59.78	530	2,000	<0.5	2.1	<0.5	<2	230*
	01/20/98	16.79		61.89	1,800	200	<0.5	<0.5	1.5	10	87*
	04/28/98	8.37		70.31	130	7,300	1.9	3.2	<0.5	<0.5	310*
	07/31/98	11.61		67.07	310	2,000	0.54	4.6	3.8	0.82	280*
	06/10/99	14.35		64.33	660	150	0.99	<0.5	<0.5	2.4	80*[1]
	10/18/00	17.56		61.12	<50	330	<0.5	0.93	<0.5	<0.5	44
	03/12/02	16.29		62.39	500	<50	2.8	4.8	0.79	4.4	63
	11/19/02	19.53		59.15	190	NA	<0.50	<0.50	<0.50	<0.50	190
	01/09/03	18.14		60.54	510	NA	1.1	<0.50	0.52	<0.50	11
	04/14/03	18.04		60.64	300	NA	<1.0[2]	<1.0[2]	<1.0[2]	<1.0[2]	27
	07/21/03	20.31		58.37	300	NA	<0.50	<0.50	<0.50	<0.50	11
	10/09/03	19.46		59.22	390	NA	<0.50	<0.50	<0.50	<0.50	8.8
	01/15/04	18.21	79.66	61.45	200	NA	<0.50	<0.50	<0.50	<0.50	6.0
	04/08/04	19.29		60.37	140	NA	<0.50	<0.50	<0.50	<0.50	12
	08/10/04	18.86		60.80	110	NA	4.6	<0.50	<0.50	0.51	73
	11/11/04	19.81		59.85	160	NA	<0.50	<0.50	<0.50	<0.50	150
	01/19/05	18.12		61.54	440	NA	<0.50	<0.50	1.4	<0.50	140
	04/14/05	13.94		65.72	320	NA	<0.50	<0.50	<0.50	<0.50	120
	07/19/05	14.11		65.55	240	NA	6.1	<0.50	0.60	<0.50	60
	10/24/05	16.53		63.13	320	NA	5.0	<0.50	1.1	<0.50	37

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S-1	02/02/06	15.27		64.39	<50	NA	<0.50	<0.50	<0.50	<0.50	45
Cont.	04/27/06	9.59		70.07	<50	NA	<0.50	<0.50	<0.50	<0.50	7.7
	07/12/06	11.00		68.66	<50	NA	<0.50	<0.50	<0.50	<0.50	12
	10/17/06	14.54		65.12	<50	NA	<0.50	<0.50	<0.50	<0.50	1.6
	01/08/07	15.87		63.79	260	NA	4.6	<0.50	<0.50	<0.50	15
	04/09/07	16.06		63.60	300	NA	<0.50	<0.50	<0.50	<0.50	22
	04/23/07	16.31		63.35	NA	NA	NA	NA	NA	NA	NA
	07/23/07	17.86		61.80	110	NA	<0.50	<0.50	<0.50	<0.50	52
	10/15/07	19.22		60.44	<50	NA	<0.50	<0.50	<0.50	<0.50	50
	03/24/08	17.58		62.08	180	NA	<0.50	<0.50	<0.50	<0.50	29
	05/30/08	19.66		60.00	<100[2]	NA	<0.50	<0.50	<0.50	<0.50	43
	07/10/08	19.32		60.34	130	NA	<0.50	<0.50	<0.50	<0.50	4.1
	10/01/08	20.67		58.99	64	NA	<0.50	<0.50	<0.50	<0.50	70
	02/10/09	22.31		57.35	<50	NA	<0.50	<0.50	<0.50	<0.50	53

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Well Number	Date Collected	Depth to Water (feet)	Well Elevation (ft msl)	Groundwater Elevation (ft msl)	GRO[5] (µg/L)	TPHD (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)	MTBE (µg/L)
S-2	02/12/87		Sheen				3,400	3,800	1,300	11,000	NA
	03/03/95	15.39	76.86	61.47	24,000	6,000	1,900	440	600	2,500	NA
	07/24/95	14.47		62.39	NA	NA	NA	NA	NA	NA	NA
Sheen	11/22/95	21.52	80.93	59.41	NA	NA	NA	NA	NA	NA	NA
	12/06/95	21.78		59.15	NA	NA	NA	NA	NA	NA	NA
	01/04/96	21.75		59.18	NA	NA	NA	NA	NA	NA	NA
	01/31/97	17.25		63.68	NA	NA	NA	NA	NA	NA	NA
Sheen	10/10/97	21.21		59.72	13,000	<50	260	38	190	280	600*
Sheen	01/20/98	19.07		61.86	1,900	2,300	4.6	6.3	<0.5	4.6	190*
	04/28/98	10.47		70.46	22,000	<100	980	160	320	680	570*
	07/31/98	13.71		67.22	160,000	<50	950	290	550	1,700	550*
	11/02/98	17.31		63.62	14,000	<500	170	70	170	230	490*
	06/10/99	16.48		64.45	17,000	<50	650	230	<25	750	490*[1]
	10/18/00	19.70		61.23	4,400	<50	2	64	5.1	12	270
	03/12/02	18.56		62.37	5,100	660	62	44	52	78	430
	11/19/02	21.70		59.23	26,000	NA	1,400	180	520	340	750
	01/09/03	20.37		60.56	16,000	NA	120	32	76	214	270
	04/14/03	19.93		61.00	16,000	NA	160	76	210	290	400
	07/21/03	22.00		58.93	9,700	NA	270	90	200	277	410
	10/09/03	21.58		59.35	10,000	NA	39	9.2	52	26.5	180
	01/15/04	20.44	81.90	61.46	6,300	NA	21	<2.0 [3]	20	3.1	130
	04/08/04	17.15		64.75	13,000	NA	160	76	170	231	430
	08/10/04	20.98		60.92	10,000	NA	76	13	<5.0[3]	500	92
	11/11/04	21.95		59.95	20,000	NA	530	240	370	1,730	420
	01/19/05	20.33		61.57	17,000	NA	590	150	250	990	580
	04/14/05	16.17		65.73	20,000	NA	830	230	570	1,980	510
	07/19/05	16.25		65.65	970	NA	48	13	16	57	72
	10/24/05	18.07		63.83	1,200	NA	100	13	52	41	69

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Well Number	Date Collected	Depth to Water (feet)	Well Elevation (ft msl)	Groundwater Elevation (ft msl)	GRO[5] (µg/L)	TPHD (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)	MTBE (µg/L)
S-2	02/02/06	17.26		64.64	2,000	NA	17	12	26	108	340
Cont.	04/27/06	11.55		70.35	130	NA	5.1	1.1	2.8	8.8	81
	07/12/06	12.98		68.92	140	NA	<0.50	<0.50	<0.50	0.77	180
	10/17/06	16.59		65.31	130	NA	0.98	<0.50	1.1	2.20	160
	01/08/07	18.21		63.69	69	NA	<0.50	<0.50	<0.50	<0.50	64
	04/09/07	18.29		63.61	360	NA	1.4	1.5	2.2	9.8	270
	07/23/07	20.00		61.90	<50	NA	<0.50	<0.50	<0.50	<0.50	7.7
	10/15/07	21.32		60.58	260	NA	53	0.92	<0.50	1.0	86
	03/24/08	19.78		62.12	5,500	NA	540	20	120	70	600
	05/30/08	20.78		61.12	8,700	NA	270	50	200	386	340
	07/10/08	21.45		60.45	8,000	NA	310	36	150	246	420
	10/01/08	22.71		59.19	4,100	NA	170	3.8	57	8	720
	02/10/09	24.43		57.47	9,700	NA	390	31.0	340	107.5	480

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MW-3	03/03/95	13.99	76.30	62.31	2,500	1,600	540	92	36	200	NA
	07/24/95	13.33		62.97	NA	NA	NA	NA	NA	NA	NA
	11/22/95	20.94	80.32	59.38	14,000	5,400	5,700	230	430	650	820*
	12/06/95	17.48		62.84	NA	NA	NA	NA	NA	NA	NA
	01/04/96	20.01		60.31	NA	NA	NA	NA	NA	NA	NA
	01/31/97	16.63		63.69	1,100	<50	130	8	5	5	NA
	10/10/97	20.62		59.70	3,400	1,100	830	4	100	<10	160*
	01/20/98	15.40		64.92	3,900	550	7.9	4.1	<0.5	3.7	<5.0*
	04/28/98	10.51		69.81	800	1,000	82	5.2	5.7	5.4	240*
	07/31/98	13.46		66.86	2,200	610	510	7.6	16	5.27	310*
	11/02/98	17.11		63.21	4,900	1,600	220	16	13	13.7	180*
	06/10/99	15.24		65.08	1,000	120	<0.5	<0.5	<0.5	1.1	120*[1]
	10/18/00	15.41		64.91	<50	<50	<0.5	<0.5	<0.5	<0.5	12
	04/08/04	13.70		66.62	<50	NA	<0.50	<0.50	<0.50	<0.50	19
	08/10/04	16.96		63.36	580	NA	19	<1.0[3]	<1.0[3]	3.3	300
	11/11/04	17.40		62.92	3,000	NA	810	<5.0[3]	43	<5.0[3]	690
	01/19/05	13.28		67.04	92	NA	18	<0.50	0.77	<0.50	17
	04/14/05	8.73		71.59	<50	NA	0.52	<0.50	<0.50	<0.50	11
	07/19/05	11.94		68.38	390	NA	82	2.3	1.8	9.2	200
	10/24/05	14.70	77.27	62.57	2,100	NA	460	6.9	7.7	11.9	300
	02/02/06	16.48		60.79	530	NA	11	<0.50	1.2	1.1	560
	04/27/06	7.85		69.42	<300[3]	NA	<1.5[3]	<1.5[3]	<1.5[3]	<1.5[3]	180
	07/12/06	10.08		67.19	250	NA	5.5	<1.0[3]	<1.0[3]	<1.0[3]	190
	10/17/06	12.80		64.47	93	NA	8.8	<0.50	<0.50	<0.50	100

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MW-3	01/08/07	21.68		55.59	200	NA	14	<0.50	0.89	0.95	85
Cont.	04/09/07	12.24		65.03	1,400	NA	380	6.6	22	12.5	600
	04/23/07	12.53		64.74	NA	NA	NA	NA	NA	NA	NA
	07/23/07	14.44		62.83	1,600	NA	420	<2.5[3]	27	<2.5[3]	630
	10/15/07	16.45		60.82	2,000	NA	470	2.7	23	<2.5[3]	610
	03/24/08	13.80		63.47	1,200	NA	230	1.9	9.9	1.2	820
	05/30/08	15.54		61.73	1,100	NA	250	<2.5[3]	14	<2.5[3]	610
	07/10/08	16.10		61.17	1,400	NA	170	<1.0	10	2.6	560
	10/01/08	17.60		59.67	800	NA	95	<1.0[3]	1.8	<1.0[3]	620
	02/10/09	18.46		58.81	1,200	NA	50	<1.0[3]	1.8	<1.0[3]	660

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MW-4	11/22/95	14.99	76.42	61.43	<50	200	<0.5	1.5	<0.5	1.7	6.4*
	12/06/95	11.21		65.21	NA	NA	NA	NA	NA	NA	NA
	01/04/96	14.62		61.80	NA	NA	NA	NA	NA	NA	NA
	01/31/97	8.18		68.24	<50	<50	<0.5	2	<0.5	2	11*
	10/10/97	14.14		62.28	<50	<50	<0.5	<0.5	<0.5	<2	<5.0*
	01/20/98	7.05		69.37	<50	<50	<0.5	<0.5	<0.5	<0.5	<5.0*
	04/28/98	5.88		70.54	<50	<50	<0.5	<0.5	<0.5	<0.5	<5.0*
	07/31/98	8.40		68.02	<50	<50	<0.5	<0.5	<0.5	<0.5	<5.0*
	11/02/98	16.08		60.34	NA	NA	NA	NA	NA	NA	NA
	06/10/99	14.81		61.61	NA	NA	NA	NA	NA	NA	NA
	10/18/00	12.71		63.71	<50	<50	<0.5	0.59	0.82	0.53	<5.0*
	03/12/02	8.92		67.50	<50	<50	<0.5	0.61	0.72	2.5	1.8
	11/19/02	13.24		-13.24	<50	NA	<0.50	<0.50	<0.50	<0.50	<0.50
	01/09/03	11.00		-11.00	<50	NA	<0.50	<0.50	<0.50	<0.50	<0.50
	04/14/03	11.03		-11.03	<50	NA	<0.50	<0.50	<0.50	<0.50	<0.50
	07/21/03	13.10		-13.10	<50	NA	<0.50	<0.50	<0.50	<0.50	<0.50
	10/09/03	13.33		-13.33	<50	NA	<0.50	<0.50	<0.50	<0.50	<0.50
	01/15/04	12.14		-12.14	<50	NA	<0.50	<0.50	<0.50	<0.50	<0.50
	04/08/04	10.76		65.66	<50	NA	<0.50	<0.50	<0.50	<0.50	<0.50
	08/10/04	12.62		63.80	<50	NA	<0.50	<0.50	<0.50	<0.50	<0.50
	11/11/04	11.93		64.49	<50	NA	<0.50	<0.50	<0.50	<0.50	<0.50
	01/19/05	10.34		66.08	<50	NA	<0.50	<0.50	<0.50	<0.50	<0.50
	04/14/05	5.66	[4]	NM	<50	NA	<0.50	<0.50	<0.50	<0.50	<0.50
	07/19/05	7.55	[4]	NM	<50	NA	<0.50	<0.50	<0.50	<0.50	<0.50
	10/24/05	10.12	76.26	66.14	<50	NA	<0.50	<0.50	<0.50	<0.50	<0.50

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Former USA Service Station No. 57
10700 MacArthur Blvd., Oakland, California

Well Number	Date Collected	Depth to Water (feet)	Well Elevation (ft msl)	Groundwater Elevation (ft msl)	GRO[5] (µg/L)	TPHD (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)	MTBE (µg/L)
MW-4	02/02/06	6.99		69.27	<50	NA	<0.50	<0.50	<0.50	<0.50	<0.50
Cont.	04/27/06	NM		NM			Well Not Monitored or Sampled - Covered				
	07/12/06	6.05		70.21	<50	NA	<0.50	<0.50	<0.50	<0.50	<0.50
	10/17/06	NM		NM			Well Not Monitored or Sampled - Covered				
	01/08/07	8.82		67.44	<50	NA	<0.50	<0.50	<0.50	<0.50	<0.50
	04/09/07	8.52		67.74	<50	NA	<0.50	<0.50	<0.50	<0.50	<0.50
	07/23/07	10.10		66.16	<50	NA	<0.50	<0.50	<0.50	<0.50	<0.50
	10/15/07	10.90		65.36	<50	NA	<0.50	<0.50	<0.50	<0.50	<0.50
	03/24/08	9.32		66.94	<50	NA	<0.50	<0.50	<0.50	<0.50	<0.50
	05/30/08	10.60		65.66	<50	NA	<0.50	<0.50	<0.50	<0.50	<0.50
	07/10/08	11.31		64.95	<50	NA	<0.50	<0.50	<0.50	<0.50	<0.50
	10/01/08	12.37		63.89	<50	NA	<0.50	<0.50	<0.50	<0.50	<0.50
	02/10/09	13.38		62.88	<50	NA	<0.50	<0.50	<0.50	<0.50	<0.50

TABLE 1
GROUNDWATER ELEVATION AND ANALYTICAL SUMMARY
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Well Number	Date Collected	Depth to Water (feet)	Well Elevation (ft msl)	Groundwater Elevation (ft msl)	GRO[5] (µg/L)	TPHD (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)	MTBE (µg/L)
MW-5	11/22/95	19.56	80.52	60.96	<50	280	<0.5	1.8	<0.5	3	2.2*
	12/06/95	15.84		64.68	NA	NA	NA	NA	NA	NA	NA
	01/04/96	19.36		61.16	NA	NA	NA	NA	NA	NA	NA
	01/31/97	13.31		67.21	80	<50	<0.5	0.6	<0.5	2	6*
	10/10/97	17.80		62.72	<50	<50	<0.5	<0.5	<0.5	<2	<5*
	01/20/98	12.58		67.94	<50	<50	<0.5	<0.5	<0.5	<0.5	<5.0*
	04/28/98	9.45		71.07	<50	<50	<0.5	<0.5	<0.5	<0.5	<5.0*
	07/31/98	7.38		73.14	<50	<50	<0.5	<0.5	<0.5	<0.5	<5.0*
	11/02/98	15.98		64.54	<50	<500	<0.5	<0.5	<0.5	<0.5	<5.0*
	06/10/99	14.60		65.92	NA	NA	NA	NA	NA	NA	NA
	10/18/00	17.77		62.75	<50	<50	<0.5	0.75	<0.5	0.79	28
	03/12/02	15.72		64.80	<50	<50	<0.5	<0.5	<0.5	<0.5	<5.0*
	11/19/02	NM		NM				Well Damaged			
	01/09/03	NM		NM				Well Damaged			
	04/14/03	NM		NM				Well Damaged			
	07/21/03	NM		NM				Well Damaged			
	10/09/03	NM		NM				Well Damaged			
	01/15/04	NM		NM				Well Damaged			
	04/08/04	16.80		63.72	<100	NA	<0.50	<0.50	<0.50	<0.50	<0.50
	08/10/04	18.58		61.94	89	NA	<0.50	<0.50	<0.50	<0.50	<0.50
	11/11/04	NM		NM				Well Damaged			
	01/19/05	NM		NM				Well Damaged			
	04/14/05	10.57	[4]	NM	<50	NA	<0.50	<0.50	<0.50	<0.50	<0.50
	07/19/05	11.77	[4]	NM	<100[2]	NA	<0.50	<0.50	<0.50	<0.50	<0.50
	10/24/05	14.29	80.78	66.49	<50	NA	<0.50	<0.50	<0.50	<0.50	<0.50
	02/02/06	NM		NM		Well Not Monitored or Sampled - Under Soil Pile					
	04/27/06	7.42		73.36	<100[2]	NA	<0.50	<0.50	<0.50	<0.50	<0.50

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Well Number	Date Collected	Depth to Water (feet)	Well Elevation (ft msl)	Groundwater Elevation (ft msl)	GRO[5] (µg/L)	TPHD (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)	MTBE (µg/L)
MW-5	07/12/06	NM		NM	Well Not Monitored or Sampled - Covered						
Cont.	10/17/06	NM		NM	Well Not Monitored or Sampled - Covered						
	01/08/07	NM		NM	Well Not Monitored or Sampled - Covered						
	04/09/07	NM		NM	Well Not Monitored or Sampled - Covered						
	04/23/07	11.90		68.88	<50	NA	<0.50	<0.50	<0.50	<0.50	<0.50
	07/23/07	13.98		66.80	<50	NA	<0.50	<0.50	<0.50	<0.50	<0.50
	10/15/07	14.97		65.81	<50	NA	<0.50	<0.50	<0.50	<0.50	<0.50
	03/24/08	12.77		68.01	<100[2]	NA	<0.50	<0.50	<0.50	<0.50	<0.50
	05/30/08	14.76		66.02	<200[2]	NA	<1.0[2]	<1.0[2]	<1.0[2]	<1.0[2]	<1.0[2]
	07/10/08	15.74		65.04	<100[2]	NA	<0.50	<0.50	<0.50	<0.50	<0.50
	10/01/08	16.90		63.88	<50	NA	<0.50	<0.50	<0.50	<0.50	<0.50
	02/10/09	18.12		62.66	<200[2]	NA	<1.0[2]	<1.0[2]	<1.0[2]	<1.0[2]	<1.0[2]
MW-6	10/15/07	NM		NM	Well Destroyed						
	10/01/08	NM		NM	Well Destroyed						

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Well Number	Date Collected	Depth to Water (feet)	Well Elevation (ft msl)	Groundwater Elevation (ft msl)	GRO[5] (µg/L)	TPHD (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)	MTBE (µg/L)
MW-7	11/22/95	19.38	78.86	59.48	<50	180	<0.5	0.57	<0.5	0.62	0.73*
	12/06/95	19.72		59.14	NA	NA	NA	NA	NA	NA	NA
	01/04/96	19.76		59.10	NA	NA	NA	NA	NA	NA	NA
	01/31/97	15.25		63.61	70	<50	0.7	1	<0.5	<1	8*
	10/10/97	19.03		59.83	<50	<50	<0.5	<0.5	<0.5	<2	15*
	01/20/98	17.11		61.75	<50	<50	<0.5	<0.5	<0.5	<0.5	<5.0*
	04/28/98	8.22		70.64	<50	<50	<0.5	<0.5	<0.5	<0.5	9.3*
	07/31/98	11.53		67.33	<50	<50	<0.5	<0.5	<0.5	<0.5	<5.0*
	11/02/98	15.15		63.71	NA	NA	NA	NA	NA	NA	NA
	06/10/99	14.23		64.63	NA	NA	NA	NA	NA	NA	NA
	10/18/00	17.59		61.27	NA	<50	<0.5	<0.5	<0.5	<0.5	<5.0*
	03/12/02	16.54		62.32	<50	<50	<0.5	<0.5	<0.5	<0.5	2.9
	11/19/02	19.59		-19.59	<50	NA	<0.50	<0.50	<0.50	<0.50	3.8
	01/09/03	18.38		-18.38	<50	NA	<0.50	<0.50	<0.50	<0.50	2.7
	04/14/03	18.17		-18.17	<50	NA	<0.50	<0.50	<0.50	<0.50	<0.50
	07/21/03	20.29		-20.29	<50	NA	<0.50	<0.50	<0.50	<0.50	1.8
	10/09/03	19.48		-19.48	<50	NA	<0.50	<0.50	<0.50	<0.50	2.9
	01/15/04	18.45	79.81	61.36	<50	NA	<0.50	<0.50	<0.50	<0.50	2.6
	04/08/04	17.28		62.53	<50	NA	<0.50	<0.50	<0.50	<0.50	0.81
	08/10/04	18.85		60.96	<50	NA	<0.50	<0.50	<0.50	<0.50	2.1
	11/11/04	19.85		59.96	<50	NA	<0.50	<0.50	<0.50	<0.50	1.0
	01/19/05	19.59		60.22	<50	NA	<0.50	<0.50	<0.50	<0.50	1.5
	04/14/05	14.17		65.64	<50	NA	<0.50	<0.50	<0.50	<0.50	<0.50
	07/19/05	14.16		65.65	<50	NA	<0.50	<0.50	<0.50	<0.50	1.9
	10/24/05	16.65		63.16	<50	NA	<0.50	<0.50	<0.50	<0.50	<0.50

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MW-7	02/02/06	15.39		64.42	<50	NA	<0.50	<0.50	<0.50	<0.50	1.3
Cont.	04/27/06	8.51		71.30	<50	NA	<0.50	<0.50	<0.50	<0.50	<0.50
	07/12/06	9.94		69.87	<50	NA	<0.50	<0.50	<0.50	<0.50	<0.50
	10/17/06	13.46		66.35	<50	NA	<0.50	<0.50	<0.50	<0.50	<0.50
	01/08/07	15.03		64.78	<50	NA	<0.50	<0.50	<0.50	<0.50	0.99
	04/09/07	15.27		64.54	<50	NA	<0.50	<0.50	<0.50	<0.50	0.54
	07/23/07	16.96		62.85	<50	NA	<0.50	<0.50	<0.50	<0.50	1.7
	10/15/07	18.29		61.52	750	NA	<0.50	<0.50	<0.50	<0.50	0.81
	03/24/08	16.72		63.09	<50	NA	<0.50	<0.50	<0.50	<0.50	0.85
	05/30/08	17.81		62.00	<50	NA	<0.50	<0.50	<0.50	<0.50	0.56
	07/10/08	18.48		61.33	<50	NA	<0.50	<0.50	<0.50	<0.50	<0.50
	10/01/08	19.71		60.10	<50	NA	<0.50	<0.50	<0.50	<0.50	0.66
	02/10/09	21.41		58.40	<50	NA	<0.50	<0.50	<0.50	<0.50	0.67

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MW-8	11/22/95	33.33	79.55	46.22	<50	360	<0.5	1.3	<0.5	2.1	2.1*
	12/06/95	17.57		61.98	NA	NA	NA	NA	NA	NA	NA
	01/04/96	20.08		59.47	NA	NA	NA	NA	NA	NA	NA
	01/31/97	18.72		60.83	80	<50	0.6	1	<0.5	1	8*
	10/10/97	20.26		59.29	50	<50	<0.5	<0.5	<0.5	<2	<5*
	01/20/98	15.91		63.64	<50	<50	<0.5	<0.5	<0.5	<0.5	<5.0*
	04/28/98	10.39		69.16	<50	<50	<0.5	<0.5	<0.5	<0.5	<5.0*
	07/31/98	12.93		66.62	<50	<50	<0.5	<0.5	<0.5	<0.5	<5.0*
	11/02/98	16.90		62.65	<50	<500	<0.5	<0.5	<0.5	<0.5	<5.0*
	06/10/99	14.98		64.57	NA	NA	NA	NA	NA	NA	NA
	10/18/00	16.27		63.28	<50	<50	<0.5	<0.5	1.1	6.3	8.6*
	03/12/02	14.56		64.99	<50	<50	<0.5	0.63	0.55	1.7	0.94
	11/19/02	21.14		-21.14	<50	NA	<0.50	<0.50	<0.50	<0.50	<0.50
	01/09/03	17.90		-17.90	<50	NA	<0.50	<0.50	<0.50	<0.50	<0.50
	04/14/03	17.84		-17.84	<50	NA	<0.50	<0.50	<0.50	<0.50	<0.50
	07/21/03	19.79		-19.79	<100[2]	NA	<0.50	<0.50	<0.50	<0.50	<0.50
	10/09/03	21.02		-21.02	<50	NA	<0.50	<0.50	<0.50	<0.50	<0.50
	01/15/04	18.10	80.50	62.40	<50	NA	<0.50	<0.50	<0.50	<0.50	<0.50
	04/08/04	17.51		62.99	<50	NA	<0.50	<0.50	<0.50	<0.50	<0.50
	08/10/04	20.76		59.74	<50	NA	<0.50	<0.50	<0.50	<0.50	<0.50
	11/11/04	21.38		59.12	<50	NA	<0.50	<0.50	<0.50	<0.50	<0.50
	01/19/05	17.20		63.30	<50	NA	<0.50	<0.50	<0.50	<0.50	<0.50
	04/14/05	12.68		67.82	<50	NA	<0.50	<0.50	<0.50	<0.50	<0.50
	07/19/05	15.78		64.72	<50	NA	<0.50	<0.50	<0.50	<0.50	<0.50
	10/24/05	18.68		61.82	<50	NA	<0.50	<0.50	<0.50	<0.50	<0.50

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MW-8	02/02/06	14.57		65.93	<50	NA	<0.50	<0.50	<0.50	<0.50	<0.50
Cont.	04/27/06	10.48		70.02	<100[2]	NA	<0.50	<0.50	<0.50	<0.50	<0.50
	07/12/06	13.08		67.42	<50	NA	<0.50	<0.50	<0.50	<0.50	<0.50
	10/17/06	15.96		64.54	<50	NA	<0.50	<0.50	<0.50	<0.50	<0.50
	01/08/07	16.70		63.80	<50	NA	<0.50	<0.50	<0.50	<0.50	<0.50
	04/09/07	16.25		64.25	<50	NA	<0.50	<0.50	<0.50	<0.50	<0.50
	07/23/07	18.66		61.84	<50	NA	<0.50	<0.50	<0.50	<0.50	<0.50
	10/15/07	20.36		60.14	<50	NA	<0.50	<0.50	<0.50	<0.50	<0.50
	03/24/08	17.81		62.69	<50	NA	<0.50	<0.50	<0.50	<0.50	<0.50
	05/30/08	19.78		60.72	<50	NA	<0.50	<0.50	<0.50	<0.50	<0.50
	07/10/08	20.32		60.18	<50	NA	<0.50	<0.50	<0.50	<0.50	<0.50
	10/01/08	21.81		58.69	<50	NA	<0.50	<0.50	<0.50	<0.50	<0.50
	02/10/09	22.26		58.24	<50	NA	<0.50	<0.50	<0.50	<0.50	<0.50

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EX-1	10/24/05	14.37	77.72	63.35	5,000	NA	140	8.4	20	195	360
	02/02/06	1.68		76.04	3,000	NA	3.6	<0.50	14	55.5	0.63
	04/27/06	1.76		75.96	130	NA	0.98	<0.50	<0.50	2.42	<0.50
	07/12/06	6.88		70.84	2,600	NA	760	15	34	104	200
	10/17/06	9.79		67.93	3,300	NA	810	<5.0[3]	32	68	170
	01/08/07	5.47		72.25	910	NA	9.1	<0.50	2.7	5.9	1.6
	04/09/07	4.88		72.84	140	NA	1.3	<0.50	1.2	0.93	<0.50
	07/23/07	12.17		65.55	220	NA	7.4	<0.50	1.7	<0.50	0.55
	10/15/07	NM		NM				Not Sampled			
	03/24/08	5.17		72.55	120	NA	9.1	<0.50	1.6	0.96	<0.50
	05/30/08	11.18		66.54	230	NA	11	<0.50	2.2	0.54	<0.50
	07/10/08	12.27		65.45	1,100	NA	16	<0.50	4.9	13.5	<0.50
	10/01/08	14.46		63.26	780	NA	15	<0.50	4.3	2.3	0.83
	02/10/09	15.90		61.82	1,500	NA	40	<1.0[3]	11	9.1	2.0
EX-2	10/24/05	16.00	76.96	60.96	42,000	NA	13,000	1,300	1,300	2,580	410
	02/02/06	8.18		68.78	28,000	NA	9,000	1,300	1,100	3,340	200
	04/27/06	5.22		71.74	24,000	NA	4,000	1,800	650	3,900	86
	07/12/06	7.32		69.64	22,000	NA	6,000	1,300	810	3,280	190
	10/17/06	9.22		67.74	31,000	NA	10,000	1,800	1,200	3,400	230
	01/08/07	10.35		66.61	14,000	NA	4,100	440	440	1,140	90
	04/09/07	9.67		67.29	620	NA	160	17	24	58	6.0
	07/23/07	11.46		65.50	610	NA	150	7.5	29	38	5.2
	10/15/07	NM		NM				Not Sampled			
	03/24/08	9.98		66.98	4,900	NA	2,500	210	130	390	29
	05/30/08	11.36		65.60	11,000	NA	3,300	330	380	1,100	<25[3]
	07/10/08	11.85		65.11	17,000	NA	4,200	550	490	1,780	<25[3]
	10/01/08	13.57		63.39	22,000	NA	5,900	510	960	3,400	<50[3]
	02/10/09	14.50		62.46	11,000	NA	5,400	93	310	421	41

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Well Number	Date Collected	Depth to Water (feet)	Well Elevation (ft msl)	Groundwater Elevation (ft msl)	GRO[5] (µg/L)	TPHD (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)	MTBE (µg/L)
EX-3	10/24/05	14.85	78.87	63.02	20,000	NA	220	21	660	3,110	<10[3]
	02/02/06	NM		NM	Well Not Monitored or Sampled - Under Soil Pile						
	04/27/06	NM		NM	Well Not Monitored or Sampled - Covered						
	07/12/06	9.01		68.86	5,700	NA	79	19	120	657	<2.5[3]
	10/17/06	NM		NM	Well Not Monitored or Sampled - Covered						
	01/08/07	12.31		66.56	970	NA	8.3	0.81	19	19.8	<0.50
	04/09/07	10.78		68.09	700	NA	8.9	<0.50	11	6.5	<0.50
	07/23/07	12.82		66.05	1,500	NA	14	<0.50	21	8.9	<0.50
	10/15/07	NM		NM	Not Sampled						
	03/24/08	NM		NM	Well Not Monitored or Sampled - Covered						
	05/30/08	14.10		64.77	280	NA	0.99	<0.50	0.97	1.35	<0.50
	07/10/08	14.86		64.01	340	NA	1.5	<0.50	1.6	<0.50	<0.50
	10/01/08	16.38		62.49	330	NA	1.1	<0.50	<0.50	<0.50	<0.50
	02/10/09	NM		NM	Well Not Monitored or Sampled - Covered						
EX-4	10/24/05	14.93	77.96	63.03	1,900	NA	390	69	8.8	90	11
	02/02/06	NM		NM	Well Not Monitored or Sampled - Under Soil Pile						
	04/27/06	NM		NM	Well Not Monitored or Sampled - Covered						
	07/12/06	7.37		70.59	6,400	NA	1,400	400	120	1,220	35
	10/17/06	NM		NM	Well Not Monitored or Sampled - Covered						
	01/08/07	12.92		65.04	3,500	NA	840	51	22	162	25
	04/09/07	12.43		65.53	4,600	NA	730	78	83	410	6.5
	07/23/07	14.20		63.76	7,200	NA	2,600	180	100	560	29
	10/15/07	NM		NM	Not Sampled						
	03/24/08	12.14		65.82	230	NA	29	<0.50	1.8	5.1	0.61
	05/30/08	14.10		63.86	360	NA	110	<1.0[3]	5.0	2.8	3.2
	07/10/08	15.16		62.80	500	NA	150	<1.0[3]	2.6	6.3	3.0
	10/01/08	16.41		61.55	260	NA	96	<1.0[3]	1.5	<1.0[3]	5.2
	02/10/09	18.40		59.56	330	NA	130	<0.50	2.5	1.2	11

TABLE 1
GROUNDWATER ELEVATION AND ANALYTICAL SUMMARY
Former USA Service Station No. 57
10700 MacArthur Blvd., Oakland, California

Well Number	Date Collected	Depth to Water (feet)	Well Elevation (ft msl)	Groundwater Elevation (ft msl)	GRO[5] (µg/L)	TPHD (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)	MTBE (µg/L)

Note:

* = MTBE analyzed using EPA Method 8020/8021B
MTBE = Methyl tert-butyl ether
TPHD = Total petroleum hydrocarbons as diesel
GRO = Gasoline Range Organics C4-C13
GRO analyzed using EPA Method 8015B and the remaining analytes using EPA Method 8260B

msl = Mean sea level
µg/L = micrograms per liter

NA = Not analyzed
NM = Not measured

[1] Laboratory indicates the chromatogram does not match the diesel hydrocarbon range pattern.
[2] Reporting limits were increased due to sample foaming.
[3] Reporting limits were increased due to high concentrations of target analytes.
[4] Casing elevation invalid - well casing modified (cut) on April 12, 2005.
[5] Reported as total petroleum hydrocarbons as gasoline (TPHG C3-C14+) prior to second quarter 2006.

Monitoring wells surveyed by Morrow Surveying on February 10, 2004, and again on November 29, 2005.

Data prior to November 19, 2002 provided by GHH Engineering.

TABLE 2
GROUNDWATER ANALYTICAL RESULTS FOR OXYGENATES AND ADDITIONAL COMPOUNDS
Former USA Service Station No. 57
10700 MacArthur Blvd., Oakland, California

Well Number	Date Collected	MTBE (µg/L)	TBA (µg/L)	DIPE (µg/L)	ETBE (µg/L)	TAME (µg/L)	1,2-DCA (µg/L)	EDB (µg/L)	Methanol (µg/L)	Ethanol (µg/L)
S-1	11/19/02	190	<10	<1.0	<1.0	<1.0	NA	NA	NA	NA
	01/09/03	11	<5.0	<1.0	<1.0	<1.0	NA	NA	NA	NA
	04/14/03	27	<20[2]	<2.0[2]	<2.0[2]	<2.0[2]	NA	NA	NA	NA
	07/21/03	11	<10[2]	<1.0	<1.0	<1.0	NA	NA	NA	NA
	10/09/03	8.8	6.4	<1.0	<1.0	<1.0	<1.0	<2.0	NA	NA
	01/15/04	6.0	10	<1.0	<1.0	<1.0	<1.0	<2.0	NA	NA
	04/08/04	12	8.5	<1.0	<1.0	<1.0	<1.0	<2.0	<5,000	<5,000
	08/10/04	73	28	<1.0	<1.0	<1.0	16	<2.0	<5,000	<5,000
	11/11/04	150	14	<1.0	<1.0	<1.0	7.3	<2.0	<5,000	<5,000
	01/19/05	140	14	<1.0	<1.0	<1.0	3.8	<2.0	<5,000	<5,000
	04/14/05	120	10	<1.0	<1.0	<1.0	1.4	<2.0	<5,000	<5,000
	07/19/05	60	11	<1.0	<1.0	<1.0	9.6	<2.0	<5,000	<5,000
	10/24/05	37	<10	<1.0	<1.0	<1.0	2.2	<2.0	<5,000	<5,000
	02/02/06	45	<10	<1.0	<1.0	<1.0	1.2	<2.0	<5,000	<5,000
	04/27/06	7.7	<10	<1.0	<1.0	<1.0	<1.0	<2.0	<5,000	<5,000
	07/12/06	12	<10	<1.0	<1.0	<1.0	7.9	<2.0	<5,000	<5,000
	10/17/06	1.6	<10	<1.0	<1.0	<1.0	<1.0	<2.0	<5,000	<5,000
	01/08/07	15	<10	<1.0	<1.0	<1.0	<1.0	<2.0	<5,000	<5,000
	04/09/07	22	<10	<1.0	<1.0	<1.0	<1.0	<2.0	<5,000	<5,000
	07/23/07	52	<10	<1.0	<1.0	<1.0	<1.0	<2.0	NA	NA
	10/15/07	50	<10	<1.0	<1.0	<1.0	1.8	<2.0	NA	NA
	03/24/08	29	<10	<1.0	<1.0	<1.0	<1.0	<2.0	NA	NA
	05/30/08	43	13	<1.0	<1.0	<1.0	<1.0	<4.0[2]	NA	NA
	07/10/08	4.1	<10	<1.0	<1.0	<1.0	<1.0	<2.0	NA	NA
	10/01/08	70	<10	<1.0	<1.0	<1.0	<1.0	<2.0	NA	NA
	02/10/09	53	<10	<1.0	<1.0	<1.0	<1.0	<2.0	NA	NA

TABLE 2
GROUNDWATER ANALYTICAL RESULTS FOR OXYGENATES AND ADDITIONAL COMPOUNDS

Former USA Service Station No. 57
10700 MacArthur Blvd., Oakland, California

Well Number	Date Collected	MTBE (μg/L)	TBA (μg/L)	DIPE (μg/L)	ETBE (μg/L)	TAME (μg/L)	1,2-DCA (μg/L)	EDB (μg/L)	Methanol (μg/L)	Ethanol (μg/L)
S-2	11/19/02	750	<200[1]	<20[1]	<20[1]	<20[1]	NA	NA	NA	NA
	01/09/03	270	<100[1]	<10[1]	<10[1]	<10[1]	NA	NA	NA	NA
	04/14/03	400	95	<5.0[1]	<5.0[1]	<5.0[1]	NA	NA	NA	NA
	07/21/03	410	110	<5.0[1]	<5.0[1]	<5.0[1]	NA	NA	NA	NA
	10/09/03	180	57	<5.0[1]	<5.0[1]	<5.0[1]	<5.0[1]	<20[1]	NA	NA
	01/15/04	130	48	<4.0[1]	<4.0[1]	<4.0[1]	<4.0[1]	<16[1]	NA	NA
	04/08/04	430	130	<5.0[1]	<5.0[1]	<5.0[1]	<5.0[1]	<20[1]	<5,000	<5,000
	08/10/04	92	<100[1]	<10[1]	<10[1]	<10[1]	74	<40[1]	<5,000	<5,000
	11/11/04	420	<200[1]	<20[1]	<20[1]	<20[1]	<20[1]	<80[1]	<5,000	<5,000
	01/19/05	580	200	<5.0[1]	<5.0[1]	<5.0[1]	8.2	<20[1]	<5,000	<5,000
	04/14/05	510	150	<10[1]	<10[1]	<10[1]	<10[1]	<40[1]	<5,000	<5,000
	07/19/05	72	37	<1.0	<1.0	<1.0	38	<2.0	<5,000	<5,000
	10/24/05	69	33	<1.0	<1.0	<1.0	35	<4.0[1]	<5,000	<5,000
	02/02/06	340	150	<1.0	<1.0	<1.0	3.2	<4.0[1]	<5,000	<5,000
	04/27/06	81	<10	<1.0	<1.0	<1.0	1.3	<2.0	<5,000	<5,000
	07/12/06	180	42	<1.0	<1.0	<1.0	5.8	<2.0	<5,000	<5,000
	10/17/06	160	<10	<1.0	<1.0	<1.0	<1.0	<2.0	<5,000	<5,000
	01/08/07	64	<10	<1.0	<1.0	<1.0	2.6	<2.0	<5,000	<5,000
	04/09/07	270	32	<1.0	<1.0	<1.0	1.3	<2.0	<5,000	<5,000
	07/23/07	7.7	<10	<1.0	<1.0	<1.0	<1.0	<2.0	NA	NA
	10/15/07	86	22	<1.0	<1.0	<1.0	3.5	<2.0	NA	NA
	03/24/08	600	180	<5.0[1]	<5.0[1]	<5.0[1]	<5.0[1]	<20[1]	NA	NA
	05/30/08	340	220	<10[1]	<10[1]	<10[1]	<10[1]	<40[1]	NA	NA
	07/10/08	420	150	<10[1]	<10[1]	<10[1]	<10[1]	<40[1]	NA	NA
	10/01/08	720	300	<5.0[1]	<5.0[1]	<5.0[1]	<5.0[1]	<20[1]	NA	NA
	02/10/09	480	140	<5.0[1]	<5.0[1]	<5.0[1]	<5.0[1]	<20[1]	NA	NA

TABLE 2
GROUNDWATER ANALYTICAL RESULTS FOR OXYGENATES AND ADDITIONAL COMPOUNDS

Former USA Service Station No. 57
10700 MacArthur Blvd., Oakland, California

Well Number	Date Collected	MTBE (µg/L)	TBA (µg/L)	DIPE (µg/L)	ETBE (µg/L)	TAME (µg/L)	1,2-DCA (µg/L)	EDB (µg/L)	Methanol (µg/L)	Ethanol (µg/L)
MW-3	04/08/04	19	7.6	<1.0	<1.0	<1.0	<1.0	<2.0	<5,000	<5,000
	08/10/04	300	2,000	2.2	<2.0[1]	<2.0[1]	270	<8.0[1]	<5,000	<5,000
	11/11/04	690	1,400	<10[1]	<10[1]	<10[1]	140	<40[1]	<5,000	<5,000
	01/19/05	17	19	<1.0	<1.0	<1.0	1.4	<2.0	<5,000	<5,000
	04/14/05	11	25	<1.0	<1.0	<1.0	6.2	<2.0	<5,000	<5,000
	07/19/05	200	1,000	<2.0[1]	<2.0[1]	<2.0[1]	240	<8.0[1]	<5,000	<5,000
	10/24/05	300	750	<5.0[1]	<5.0[1]	<5.0[1]	210	<20[1]	<5,000	<5,000
	02/02/06	560	1,300	2.7	<1.0	<1.0	98	<4.0[1]	<5,000	<5,000
	04/27/06	180	330	<3.0[1]	<3.0[1]	<3.0[1]	220	<12[1]	<5,000	<5,000
	07/12/06	190	24	<2.0[1]	<2.0[1]	<2.0[1]	210	<8.0[1]	<5,000	<5,000
	10/17/06	100	50	<1.0	<1.0	<1.0	21	<2.0	<5,000	<5,000
	01/08/07	85	30	<1.0	<1.0	<1.0	22	<2.0	<5,000	<5,000
	04/09/07	600	510	<5.0[1]	<5.0[1]	<5.0[1]	67	<20[1]	<5,000	<5,000
	07/23/07	630	920	<5.0[1]	<5.0[1]	<5.0[1]	99	<20[1]	NA	NA
	10/15/07	610	840	<5.0[1]	<5.0[1]	<5.0[1]	110	<20[1]	NA	NA
	03/24/08	820	840	3.2	<2.0[1]	<2.0[1]	63	<8.0[1]	NA	NA
	05/30/08	610	880	<5.0[1]	<5.0[1]	<5.0[1]	68	<20[1]	NA	NA
	07/10/08	560	570	3.2	<2.0[1]	<2.0[1]	30	<8.0[1]	NA	NA
	10/01/08	620	1,100	3.5	<2.0[1]	<2.0[1]	94	<8.0[1]	NA	NA
	02/10/09	660	820	4.0	<2.0[1]	<2.0[1]	38	<8.0[1]	NA	NA

TABLE 2
GROUNDWATER ANALYTICAL RESULTS
FOR OXYGENATES AND ADDITIONAL COMPOUNDS

Former USA Service Station No. 57
10700 MacArthur Blvd., Oakland, California

Well Number	Date Collected	MTBE (μg/L)	TBA (μg/L)	DIPE (μg/L)	ETBE (μg/L)	TAME (μg/L)	1,2-DCA (μg/L)	EDB (μg/L)	Methanol (μg/L)	Ethanol (μg/L)
MW-4	11/19/02	<0.50	<5.0	<1.0	<1.0	<1.0	NA	NA	NA	NA
	01/09/03	<0.50	<5.0	<1.0	<1.0	<1.0	NA	NA	NA	NA
	04/14/03	<0.50	<5.0	<1.0	<1.0	<1.0	NA	NA	NA	NA
	07/21/03	<0.50	<5.0	<1.0	<1.0	<1.0	NA	NA	NA	NA
	10/09/03	<0.50	<5.0	<1.0	<1.0	<1.0	<1.0	<2.0	NA	NA
	01/15/04	<0.50	7.8	<1.0	<1.0	<1.0	<1.0	<2.0	NA	NA
	04/08/04	<0.50	<10	<1.0	<1.0	<1.0	<1.0	<2.0	<5,000	<5,000
	08/10/04	<0.50	<10	<1.0	<1.0	<1.0	<1.0	<2.0	<5,000	<5,000
	11/11/04	<0.50	<10	<1.0	<1.0	<1.0	<1.0	<2.0	<5,000	<5,000
	01/19/05	<0.50	<10	<1.0	<1.0	<1.0	<1.0	<2.0	<5,000	<5,000
	04/14/05	<0.50	<10	<1.0	<1.0	<1.0	<1.0	<2.0	<5,000	<5,000
	07/19/05	<0.50	<10	<1.0	<1.0	<1.0	<1.0	<2.0	<5,000	<5,000
	10/24/05	<0.50	<10	<1.0	<1.0	<1.0	<1.0	<2.0	<5,000	<5,000
	02/02/06	<0.50	<10	<1.0	<1.0	<1.0	<1.0	<2.0	<5,000	<5,000
	04/27/06				Well Not Monitored or Sampled - Covered					
	07/12/06	<0.50	<10	<1.0	<1.0	<1.0	<1.0	<2.0	<5,000	<5,000
	10/17/06				Well Not Monitored or Sampled - Covered					
	01/08/07	<0.50	<10	<1.0	<1.0	<1.0	<1.0	<2.0	<5,000	<5,000
	04/09/07	<0.50	<10	<1.0	<1.0	<1.0	<1.0	<2.0	<5,000	<5,000
	07/23/07	<0.50	<10	<1.0	<1.0	<1.0	<1.0	<2.0	NA	NA
	10/15/07	<0.50	<10	<1.0	<1.0	<1.0	<1.0	<2.0	NA	NA
	03/24/08	<0.50	<10	<1.0	<1.0	<1.0	<1.0	<2.0	NA	NA
	05/30/08	<0.50	<10	<1.0	<1.0	<1.0	<1.0	<2.0	NA	NA
	07/10/08	<0.50	<10	<1.0	<1.0	<1.0	<1.0	<2.0	NA	NA
	10/01/08	<0.50	<10	<1.0	<1.0	<1.0	<1.0	<2.0	NA	NA
	02/10/09	<0.50	<10	<1.0	<1.0	<1.0	<1.0	<2.0	NA	NA

TABLE 2
GROUNDWATER ANALYTICAL RESULTS
FOR OXYGENATES AND ADDITIONAL COMPOUNDS

Former USA Service Station No. 57
10700 MacArthur Blvd., Oakland, California

Well Number	**Date Collected**	**MTBE (µg/L)**	**TBA (µg/L)**	**DIPE (µg/L)**	**ETBE (µg/L)**	**TAME (µg/L)**	**1,2-DCA (µg/L)**	**EDB (µg/L)**	**Methanol (µg/L)**	**Ethanol (µg/L)**
MW-5	11/19/02					Well Damaged				
	01/09/03					Well Damaged				
	04/14/03					Well Damaged				
	07/21/03					Well Damaged				
	10/09/03					Well Damaged				
	01/15/04					Well Damaged				
	04/08/04	<0.50	<10	<1.0	<1.0	<1.0	<1.0	<4.0[2]	<5,000	<5,000
	08/10/04	<0.50	<10	<1.0	<1.0	<1.0	<1.0	<2.0	<5,000	<5,000
	11/11/04					Well Damaged				
	01/19/05					Well Damaged				
	04/14/05	<0.50	<10	<1.0	<1.0	<1.0	<1.0	<2.0	<5,000	<5,000
	07/19/05	<0.50	<10	<1.0	<1.0	<1.0	<1.0	<4.0[2]	<5,000	<5,000
	10/24/05	<0.50	<10	<1.0	<1.0	<1.0	<1.0	<2.0	<5,000	<5,000
	02/02/06					Well Not Monitored or Sampled - Under Soil Pile				
	04/27/06	<0.50	<10	<1.0	<1.0	<1.0	<1.0	<4.0[2]	<5,000	<5,000
	07/12/06					Well Not Monitored or Sampled - Covered				
	10/17/06					Well Not Monitored or Sampled - Covered				
	01/08/07					Well Not Monitored or Sampled - Covered				
	04/09/07					Well Not Monitored or Sampled - Covered				
	04/23/07	<0.50	<10	<1.0	<1.0	<1.0	<1.0	<2.0	NA	NA
	07/23/07	<0.50	<10	<1.0	<1.0	<1.0	<1.0	<2.0	NA	NA
	10/15/07	<0.50	<10	<1.0	<1.0	<1.0	<1.0	<2.0	NA	NA
	03/24/08	<0.50	<10	<1.0	<1.0	<1.0	<1.0	<4.0[2]	NA	NA
	05/30/08	<1.0[2]	<20[2]	<2.0[2]	<2.0[2]	<2.0[2]	<2.0[2]	<8.0[2]	NA	NA
	07/10/08	<0.50	<10	<1.0	<1.0	<1.0	<1.0	<4.0[2]	NA	NA
	10/01/08	<0.50	<10	<1.0	<1.0	<1.0	<1.0	<2.0	NA	NA
	02/10/09	<1.0[2]	<20[2]	<2.0[2]	<2.0[2]	<2.0[2]	<2.0[2]	<8.0[2]	NA	NA
MW-6	10/15/07					Well Destroyed				
	10/01/08					Well Destroyed				

TABLE 2
GROUNDWATER ANALYTICAL RESULTS FOR OXYGENATES AND ADDITIONAL COMPOUNDS

Former USA Service Station No. 57
10700 MacArthur Blvd., Oakland, California

Well Number	Date Collected	MTBE (µg/L)	TBA (µg/L)	DIPE (µg/L)	ETBE (µg/L)	TAME (µg/L)	1,2-DCA (µg/L)	EDB (µg/L)	Methanol (µg/L)	Ethanol (µg/L)
MW-7	11/19/02	3.8	<5.0	<1.0	<1.0	<1.0	NA	NA	NA	NA
	01/09/03	2.7	<5.0	<1.0	<1.0	<1.0	NA	NA	NA	NA
	04/14/03	<0.50	<5.0	<1.0	<1.0	<1.0	NA	NA	NA	NA
	07/21/03	1.8	<5.0	<1.0	<1.0	<1.0	NA	NA	NA	NA
	10/09/03	2.9	<5.0	<1.0	<1.0	<1.0	<1.0	<2.0	NA	NA
	01/15/04	2.6	7.9	<1.0	<1.0	<1.0	<1.0	<2.0	NA	NA
	04/08/04	0.81	9.0	<1.0	<1.0	<1.0	<1.0	<2.0	<5,000	<5,000
	08/10/04	2.1	<10	<1.0	<1.0	<1.0	<1.0	<2.0	<5,000	<5,000
	11/11/04	1.0	<10	<1.0	<1.0	<1.0	<1.0	<2.0	<5,000	<5,000
	01/19/05	1.5	<10	<1.0	<1.0	<1.0	<1.0	<2.0	<5,000	<5,000
	04/14/05	<0.50	<10	<1.0	<1.0	<1.0	<1.0	<2.0	<5,000	<5,000
	07/19/05	1.9	<10	<1.0	<1.0	<1.0	<1.0	<2.0	<5,000	<5,000
	10/24/05	<0.50	<10	<1.0	<1.0	<1.0	<1.0	<2.0	<5,000	<5,000
	02/02/06	1.3	<10	<1.0	<1.0	<1.0	<1.0	<2.0	<5,000	<5,000
	04/27/06	<0.50	<10	<1.0	<1.0	<1.0	<1.0	<2.0	<5,000	<5,000
	07/12/06	<0.50	<10	<1.0	<1.0	<1.0	<1.0	<2.0	<5,000	<5,000
	10/17/06	<0.50	<10	<1.0	<1.0	<1.0	<1.0	<2.0	<5,000	<5,000
	01/08/07	0.99	<10	<1.0	<1.0	<1.0	<1.0	<2.0	<5,000	<5,000
	04/09/07	0.54	<10	<1.0	<1.0	<1.0	<1.0	<2.0	<5,000	<5,000
	07/23/07	1.7	<10	<1.0	<1.0	<1.0	<1.0	<2.0	NA	NA
	10/15/07	0.81	<10	<1.0	<1.0	<1.0	<1.0	<2.0	NA	NA
	03/24/08	0.85	<10	<1.0	<1.0	<1.0	<1.0	<2.0	NA	NA
	05/30/08	0.56	<10	<1.0	<1.0	<1.0	<1.0	<2.0	NA	NA
	07/10/08	<0.50	<10	<1.0	<1.0	<1.0	<1.0	<2.0	NA	NA
	10/01/08	0.66	<10	<1.0	<1.0	<1.0	<1.0	<2.0	NA	NA
	02/10/09	0.67	<10	<1.0	<1.0	<1.0	<1.0	<2.0	NA	NA

TABLE 2
GROUNDWATER ANALYTICAL RESULTS FOR OXYGENATES AND ADDITIONAL COMPOUNDS

Former USA Service Station No. 57
10700 MacArthur Blvd., Oakland, California

Well Number	Date Collected	MTBE (µg/L)	TBA (µg/L)	DIPE (µg/L)	ETBE (µg/L)	TAME (µg/L)	1,2-DCA (µg/L)	EDB (µg/L)	Methanol (µg/L)	Ethanol (µg/L)
MW-8	11/19/02	<0.50	<5.0	<1.0	<1.0	<1.0	NA	NA	NA	NA
	01/09/03	<0.50	<5.0	<1.0	<1.0	<1.0	NA	NA	NA	NA
	04/14/03	<0.50	<5.0	<1.0	<1.0	<1.0	NA	NA	NA	NA
	07/21/03	<0.50	<10[2]	<1.0	<1.0	<1.0	NA	NA	NA	NA
	10/09/03	<0.50	<5.0	<1.0	<1.0	<1.0	<1.0	<2.0	NA	NA
	01/15/04	<0.50	9.9	<1.0	<1.0	<1.0	<1.0	<2.0	NA	NA
	04/08/04	<0.50	<10	<1.0	<1.0	<1.0	<1.0	<2.0	<5,000	<5,000
	08/10/04	<0.50	<10	<1.0	<1.0	<1.0	<1.0	<2.0	<5,000	<5,000
	11/11/04	<0.50	<10	<1.0	<1.0	<1.0	<1.0	<2.0	<5,000	<5,000
	01/19/05	<0.50	<10	<1.0	<1.0	<1.0	<1.0	<2.0	<5,000	<5,000
	04/14/05	<0.50	<10	<1.0	<1.0	<1.0	<1.0	<2.0	<5,000	<5,000
	07/19/05	<0.50	<10	<1.0	<1.0	<1.0	<1.0	<2.0	<5,000	<5,000
	10/24/05	<0.50	<10	<1.0	<1.0	<1.0	<1.0	<2.0	<5,000	<5,000
	02/02/06	<0.50	<10	<1.0	<1.0	<1.0	<1.0	<2.0	<5,000	<5,000
	04/27/06	<0.50	<10	<1.0	<1.0	<1.0	<1.0	<4.0[2]	<5,000	<5,000
	07/12/06	<0.50	<10	<1.0	<1.0	<1.0	<1.0	<2.0	<5,000	<5,000
	10/17/06	<0.50	<10	<1.0	<1.0	<1.0	<1.0	<2.0	<5,000	<5,000
	01/08/07	<0.50	<10	<1.0	<1.0	<1.0	<1.0	<2.0	<5,000	<5,000
	04/09/07	<0.50	<10	<1.0	<1.0	<1.0	<1.0	<2.0	<5,000	<5,000
	07/23/07	<0.50	<10	<1.0	<1.0	<1.0	<1.0	<2.0	NA	NA
	10/15/07	<0.50	<10	<1.0	<1.0	<1.0	<1.0	<2.0	NA	NA
	03/24/08	<0.50	<10	<1.0	<1.0	<1.0	<1.0	<2.0	NA	NA
	05/30/08	<0.50	<10	<1.0	<1.0	<1.0	<1.0	<2.0	NA	NA
	07/10/08	<0.50	<10	<1.0	<1.0	<1.0	<1.0	<2.0	NA	NA
	10/01/08	<0.50	<10	<1.0	<1.0	<1.0	<1.0	<2.0	NA	NA
	02/10/09	<0.50	<10	<1.0	<1.0	<1.0	<1.0	<2.0	NA	NA

TABLE 2
GROUNDWATER ANALYTICAL RESULTS FOR OXYGENATES AND ADDITIONAL COMPOUNDS
Former USA Service Station No. 57
10700 MacArthur Blvd., Oakland, California

Well Number	Date Collected	MTBE (μg/L)	TBA (μg/L)	DIPE (μg/L)	ETBE (μg/L)	TAME (μg/L)	1,2-DCA (μg/L)	EDB (μg/L)	Methanol (μg/L)	Ethanol (μg/L)
EX-1	10/24/05	360	120	<1.0	<1.0	<1.0	<1.0	<4.0[1]	<5,000	<5,000
	02/02/06	0.63	<10	<1.0	<1.0	<1.0	<1.0	<4.0[1]	<5,000	<5,000
	04/27/06	<0.50	<10	<1.0	<1.0	<1.0	<1.0	<2.0	<5,000	<5,000
	07/12/06	200	110	<10[1]	<10[1]	<10[1]	<10[1]	<40[1]	<5,000	<5,000
	10/17/06	170	<100[1]	<10[1]	<10[1]	<10[1]	30	<40[1]	<5,000	<5,000
	01/08/07	1.6	<10	<1.0	<1.0	<1.0	<1.0	<2.0	<5,000	<5,000
	04/09/07	<0.50	<10	<1.0	<1.0	<1.0	<1.0	<2.0	<5,000	<5,000
	07/23/07	0.55	<10	<1.0	<1.0	<1.0	<1.0	<2.0	NA	NA
	10/15/07	Not Sampled								
	03/24/08	<0.50	<10	<1.0	<1.0	<1.0	<1.0	<2.0	NA	NA
	05/30/08	<0.50	<10	<1.0	<1.0	<1.0	<1.0	<2.0	NA	NA
	07/10/08	<0.50	<10	<1.0	<1.0	<1.0	<1.0	<2.0	NA	NA
	10/01/08	0.83	<10	<1.0	<1.0	<1.0	<1.0	<2.0	NA	NA
	02/16/09	2.0	<20[1]	<2.0[1]	<2.0[1]	<2.0[1]	<2.0[1]	<8.0[1]	NA	NA
EX-2	10/24/05	410	<2,000[1]	<200[1]	<200[1]	<200[1]	<200[1]	<800[1]	<5,000	<5,000
	02/02/06	200	<1,000[1]	<100[1]	<100[1]	<100[1]	<100[1]	<400[1]	<5,000	<5,000
	04/27/06	86	<500[1]	<50[1]	<50[1]	<50[1]	<50[1]	<200[1]	<5,000	<5,000
	07/12/06	190	<500[1]	<50[1]	<50[1]	<50[1]	<50[1]	<200[1]	<5,000	<5,000
	10/17/06	230	<1,000[1]	<100[1]	<100[1]	<100[1]	400	<400[1]	<5,000	<5,000
	01/08/07	90	<400[1]	<40[1]	<40[1]	<40[1]	<40[1]	<160[1]	<5,000	<5,000
	04/09/07	6.0	<20[1]	<2.0[1]	<2.0[1]	<2.0[1]	<2.0[1]	<8.0[1]	<5,000	<5,000
	07/23/07	5.2	<10	<1.0	<1.0	<1.0	<1.0	<4.0[1]	NA	NA
	10/15/07	Not Sampled								
	03/24/08	29	<200[1]	<20[1]	<20[1]	<20[1]	<20[1]	<80[1]	NA	NA
	05/30/08	<25[1]	<500[1]	<50[1]	<50[1]	<50[1]	<50[1]	<200[1]	NA	NA
	07/10/08	<25[1]	<500[1]	<50[1]	<50[1]	<50[1]	<50[1]	<200[1]	NA	NA
	10/01/08	<50[1]	<1,000[1]	<100[1]	<100[1]	<100[1]	<100[1]	<400[1]	NA	NA
	02/10/09	41	<500[1]	<50[1]	<50[1]	<50[1]	<50[1]	<200[1]	NA	NA

TABLE 2
GROUNDWATER ANALYTICAL RESULTS
FOR OXYGENATES AND ADDITIONAL COMPOUNDS
Former USA Service Station No. 57
10700 MacArthur Blvd., Oakland, California

Well Number	Date Collected	MTBE (µg/L)	TBA (µg/L)	DIPE (µg/L)	ETBE (µg/L)	TAME (µg/L)	1,2-DCA (µg/L)	EDB (µg/L)	Methanol (µg/L)	Ethanol (µg/L)
EX-3	10/24/05	<10[1]	<200[1]	<20[1]	<20[1]	<20[1]	<20[1]	<80[1]	<5,000	<5,000
	02/02/06	Well Not Monitored or Sampled - Under Soil Pile								
	04/27/06	Well Not Monitored or Sampled - Covered								
	07/12/06	<2.5[1]	<50[1]	<5.0[1]	<5.0[1]	<5.0[1]	<5.0[1]	<20[1]	<5,000	<5,000
	10/17/06	Well Not Monitored or Sampled - Covered								
	01/08/07	<0.50	12	<1.0	<1.0	<1.0	1.1	<2.0	<5,000	<5,000
	04/09/07	<0.50	<10	<1.0	<1.0	<1.0	<1.0	<2.0	<5,000	<5,000
	07/23/07	<0.50	<10	<1.0	<1.0	<1.0	<1.0	<2.0	NA	NA
	10/15/07	Not Sampled								
	03/24/08	Well Not Monitored or Sampled - Covered								
	05/30/08	<0.50	<10	<1.0	<1.0	<1.0	<1.0	<4.0[2]	NA	NA
	07/10/08	<0.50	<10	<1.0	<1.0	<1.0	<1.0	<4.0[2]	NA	NA
	10/01/08	<0.50	<10	<1.0	<1.0	<1.0	<1.0	<2.0	NA	NA
	02/10/09	Well Not Monitored or Sampled - Covered								
EX-4	10/24/05	11	51	<5.0[1]	<5.0[1]	<5.0[1]	<5.0[1]	<20[1]	<5,000	<5,000
	02/02/06	Well Not Monitored or Sampled - Under Soil Pile								
	04/27/06	Well Not Monitored or Sampled - Covered								
	07/12/06	35	<200[1]	<10[1]	<10[1]	<10[1]	<10[1]	<40[1]	<5,000	<5,000
	10/17/06	Well Not Monitored or Sampled - Covered								
	01/08/07	25	<100[1]	<10[1]	<10[1]	<10[1]	<10[1]	<40[1]	<5,000	<5,000
	04/09/07	6.5	<100[1]	<10[1]	<10[1]	<10[1]	<10[1]	<40[1]	<5,000	<5,000
	07/23/07	29	<200[1]	<20[1]	<20[1]	<20[1]	<20[1]	<80[1]	NA	NA
	10/15/07	Not Sampled								
	03/24/08	0.61	<10	<1.0	<1.0	<1.0	<1.0	<2.0	NA	NA
	05/30/08	3.2	<20[1]	<2.0[1]	<2.0[1]	<2.0[1]	<2.0[1]	<8.0[1]	NA	NA
	07/10/08	3.0	<20[1]	<2.0[1]	<2.0[1]	<2.0[1]	<2.0[1]	<8.0[1]	NA	NA
	10/01/08	5.2	25	<2.0[1]	<2.0[1]	<2.0[1]	<2.0[1]	<8.0[1]	NA	NA
	02/10/09	11	27	<1.0	<1.0	<1.0	2.0	<4.0[1]	NA	NA

TABLE 2
GROUNDWATER ANALYTICAL RESULTS FOR OXYGENATES AND ADDITIONAL COMPOUNDS
Former USA Service Station No. 57
10700 MacArthur Blvd., Oakland, California

Well Number	Date Collected	MTBE (µg/L)	TBA (µg/L)	DIPE (µg/L)	ETBE (µg/L)	TAME (µg/L)	1,2-DCA (µg/L)	EDB (µg/L)	Methanol (µg/L)	Ethanol (µg/L)

Note:

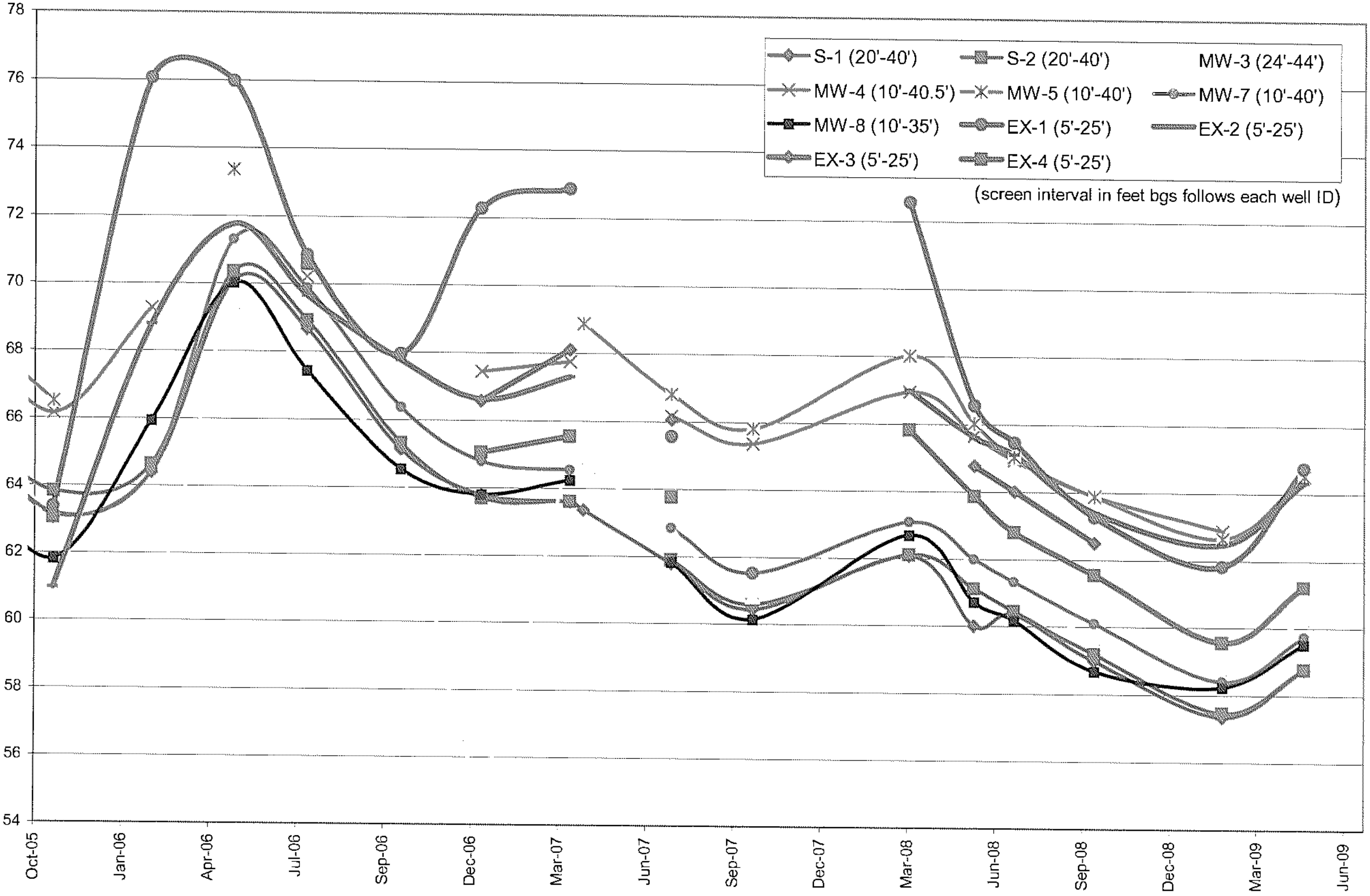
Oxygenates analyzed using EPA Method 8260B
µg/L = micrograms per liter
NA = Not analyzed

[1] Reporting limits were increased due to high concentrations of target analytes
[2] Reporting limits were increased due to sample foaming

MTBE = Methyl tertiary butyl ether
TBA = Tertiary butyl alcohol
DIPE = Di-isopropyl ether
ETBE = Ethyl tertiary butyl ether
TAME = Tertiary amyl methyl ether
1,2-DCA = 1,2-Dichloroethane
EDB = 1,2-Dibromoethane

GRAPH A
Groundwater Elevations Over Time (Wells Grouped by Screen Intervals)

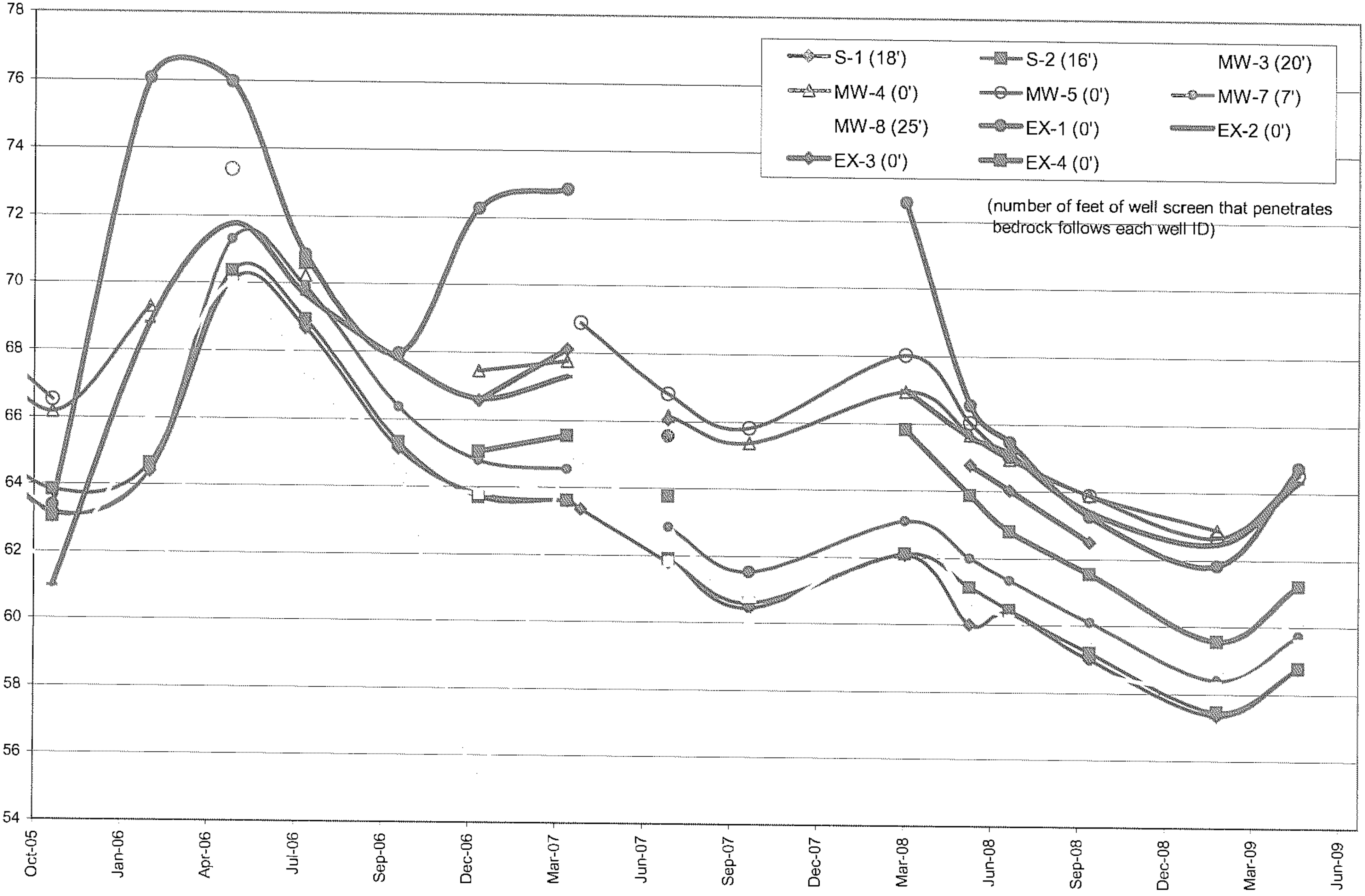
Former USA Station No. 57, 10700 Macarthur Blvd, Oakland, California

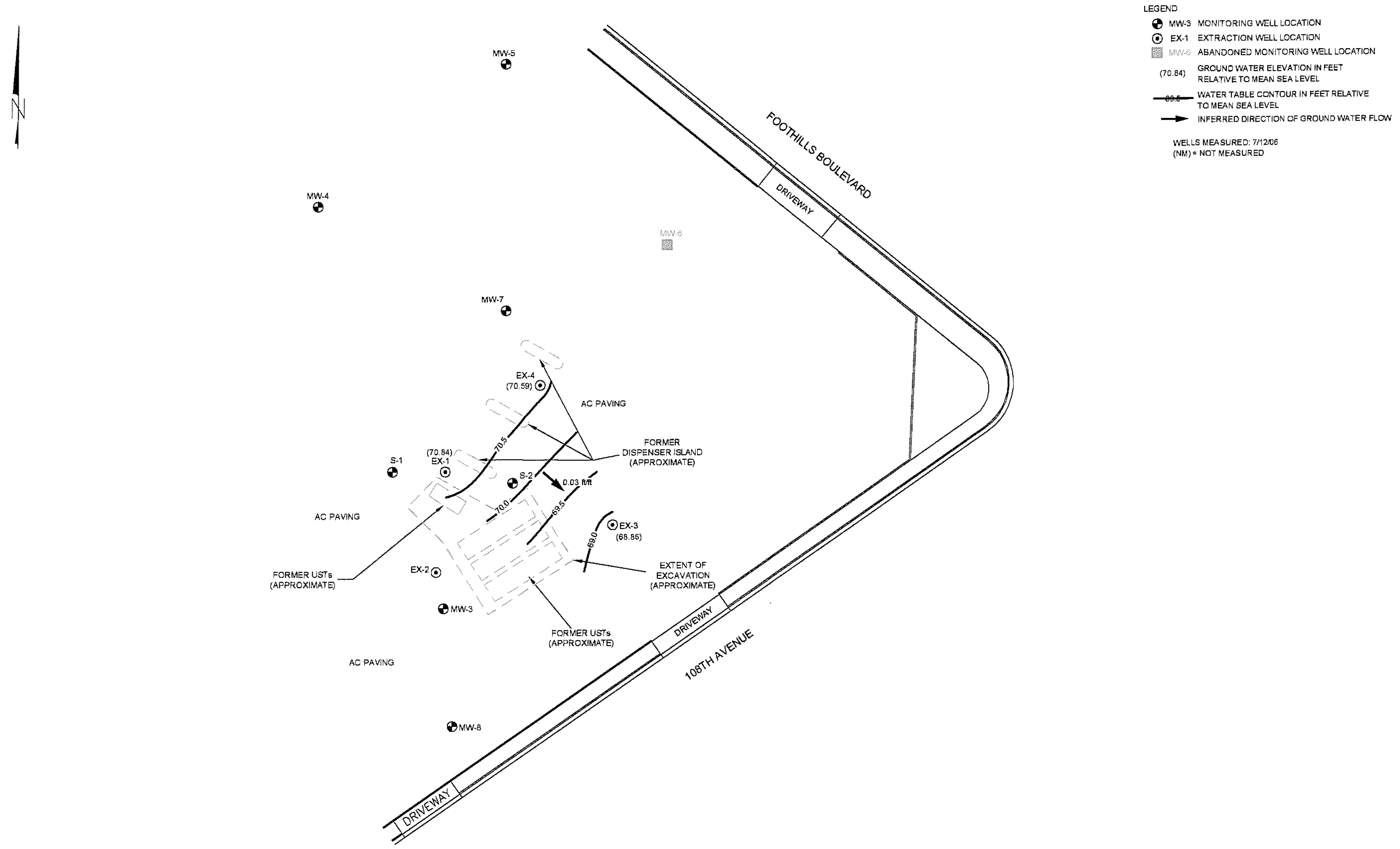


GRAPH B

Groundwater Elevations Over Time (Wells Grouped by Length of Screen Penetrating Bedrock)

Former USA Station No. 57, 10700 Macarthur Blvd, Oakland, California





NOTE: LOCATIONS OF ALL CURRENT AND FORMER SITE FEATURES IS APPROXIMATE

USA\57\SCM JMP REV August 7, 2009 USA 57 QMR GWC

STRATUS
ENVIRONMENTAL, INC.

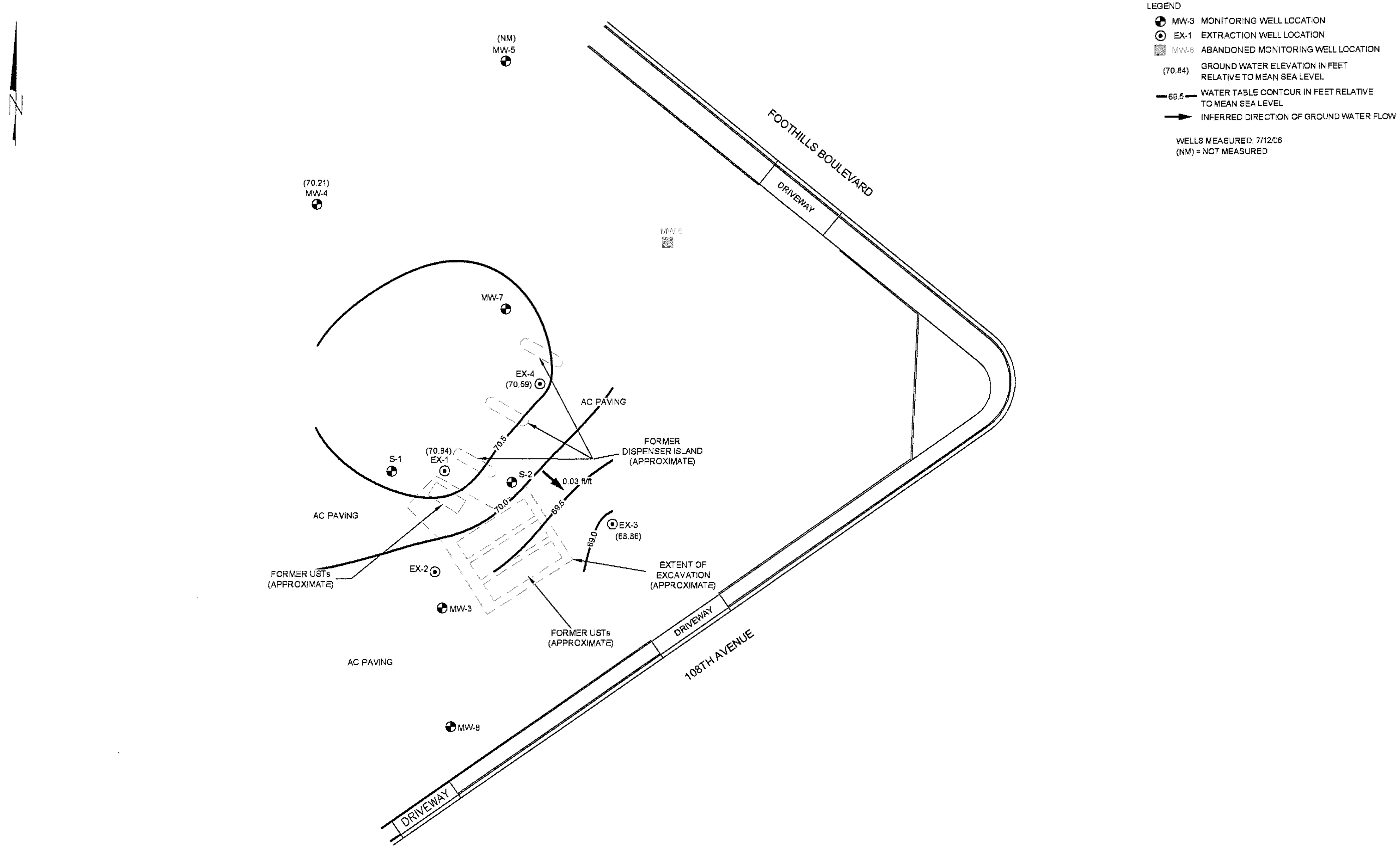
0 40 FT
SCALE

FORMER USA SERVICE STATION NO. 57
10700 MACARTHUR BOULEVARD
OAKLAND, CALIFORNIA

EXTRACTION WELL GROUNDWATER ELEVATION
CONTOUR MAP, 3rd QUARTER 2006

FIGURE
1A

PROJECT NO.
2007-0057-01



NOTE: LOCATIONS OF ALL CURRENT AND FORMER SITE FEATURES IS APPROXIMATE

STRATUS
ENVIRONMENTAL, INC.

0 40 FT
SCALE

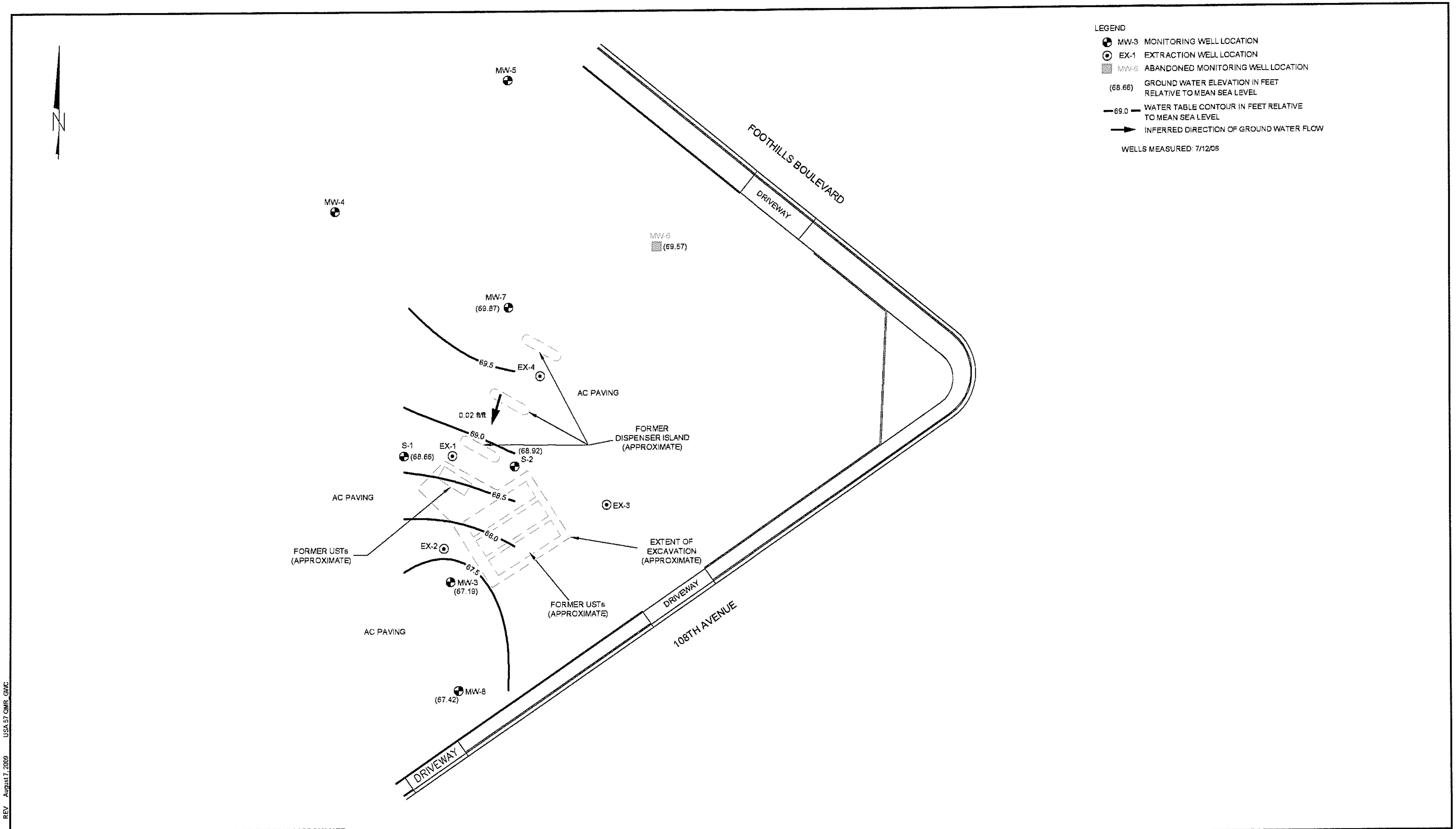
FORMER USA SERVICE STATION NO. 57
10700 MACARTHUR BOULEVARD
OAKLAND, CALIFORNIA

EXTRACTION WELL WITH MW-4 & MW-5
GROUNDWATER ELEVATION CONTOUR MAP
3rd QUARTER 2006

FIGURE
1B

PROJECT NO.
2007-0057-01

USA57SCM JMP REV August 7, 2009 USA 57 OMR GWC



NOTE: LOCATIONS OF ALL CURRENT AND FORMER SITE FEATURES IS APPROXIMATE

USA57\SCM JMP REV August 7, 2009 USA 57 QMR GWC

STRATUS
ENVIRONMENTAL, INC.

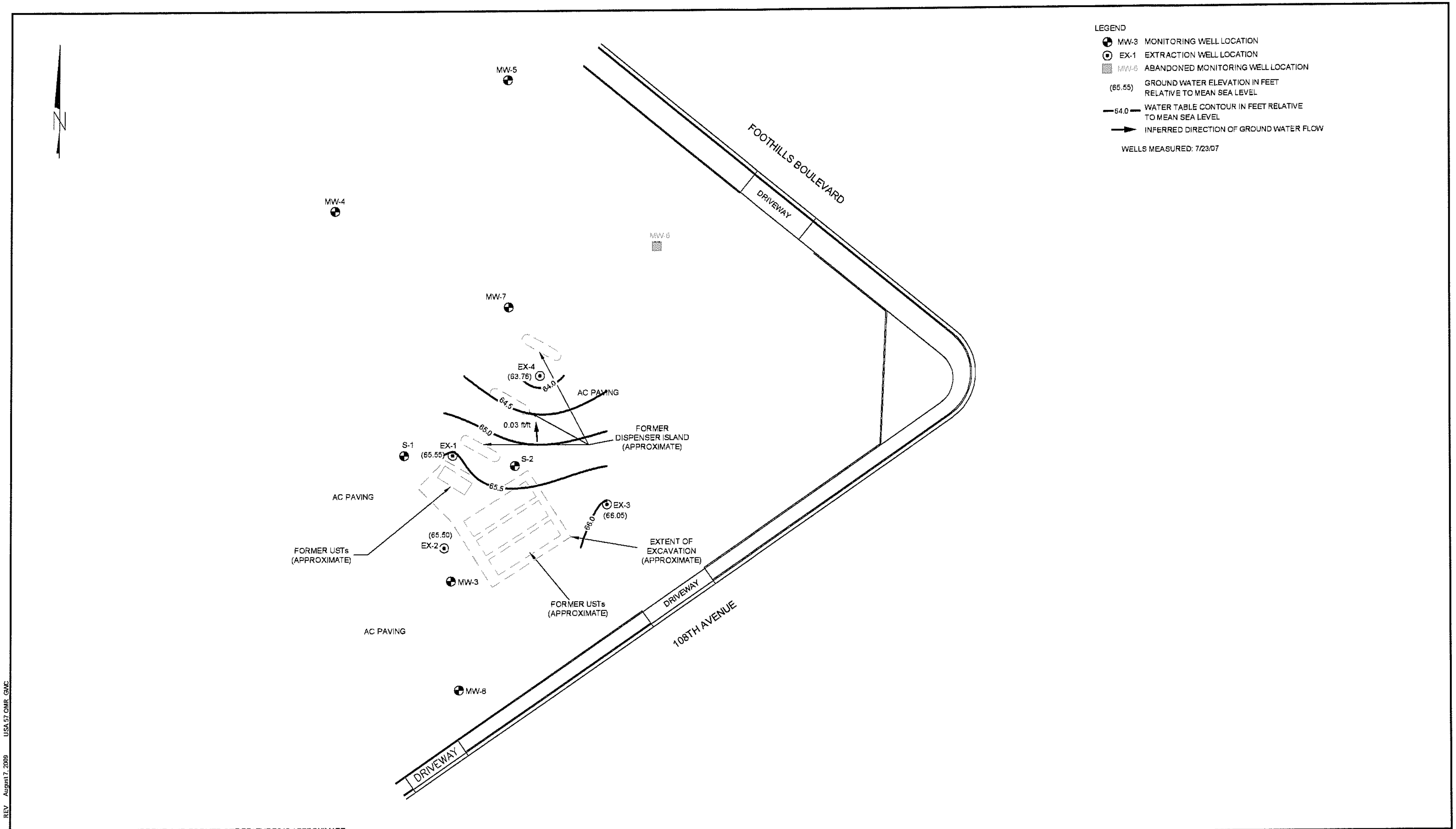
0 40 FT
SCALE

FORMER USA SERVICE STATION NO. 57
10700 MACARTHUR BOULEVARD
OAKLAND, CALIFORNIA

MONITORING WELL (WITHOUT MW-4 & MW-5)
GROUNDWATER ELEVATION CONTOUR MAP
3rd QUARTER 2006

FIGURE
1C

PROJECT NO.
2007-0057-01



NOTE: LOCATIONS OF ALL CURRENT AND FORMER SITE FEATURES IS APPROXIMATE

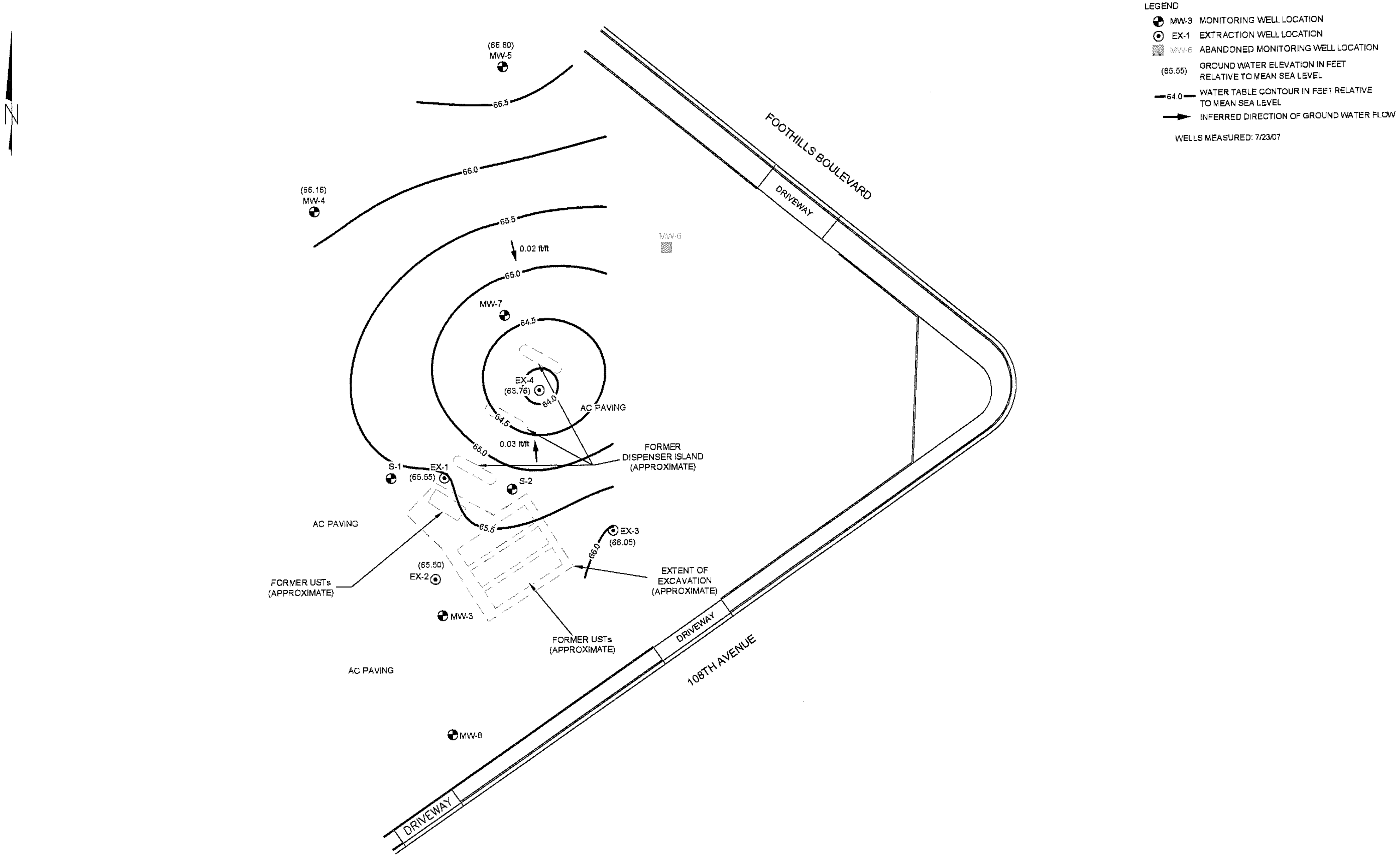
STRATUS
ENVIRONMENTAL, INC.

FORMER USA SERVICE STATION NO. 57
10700 MACARTHUR BOULEVARD
OAKLAND, CALIFORNIA

EXTRACTION WELL GROUNDWATER ELEVATION
CONTOUR MAP, 3rd QUARTER 2007

FIGURE
2A
PROJECT NO.
2007-0057-01

USA57\SCM JMP REV August 7, 2009 USA 57 OMR GWC



USA57\SCM JMP REV August 7, 2009 USA 57 QMR GWC

NOTE: LOCATIONS OF ALL CURRENT AND FORMER SITE FEATURES IS APPROXIMATE

STRATUS
ENVIRONMENTAL, INC.

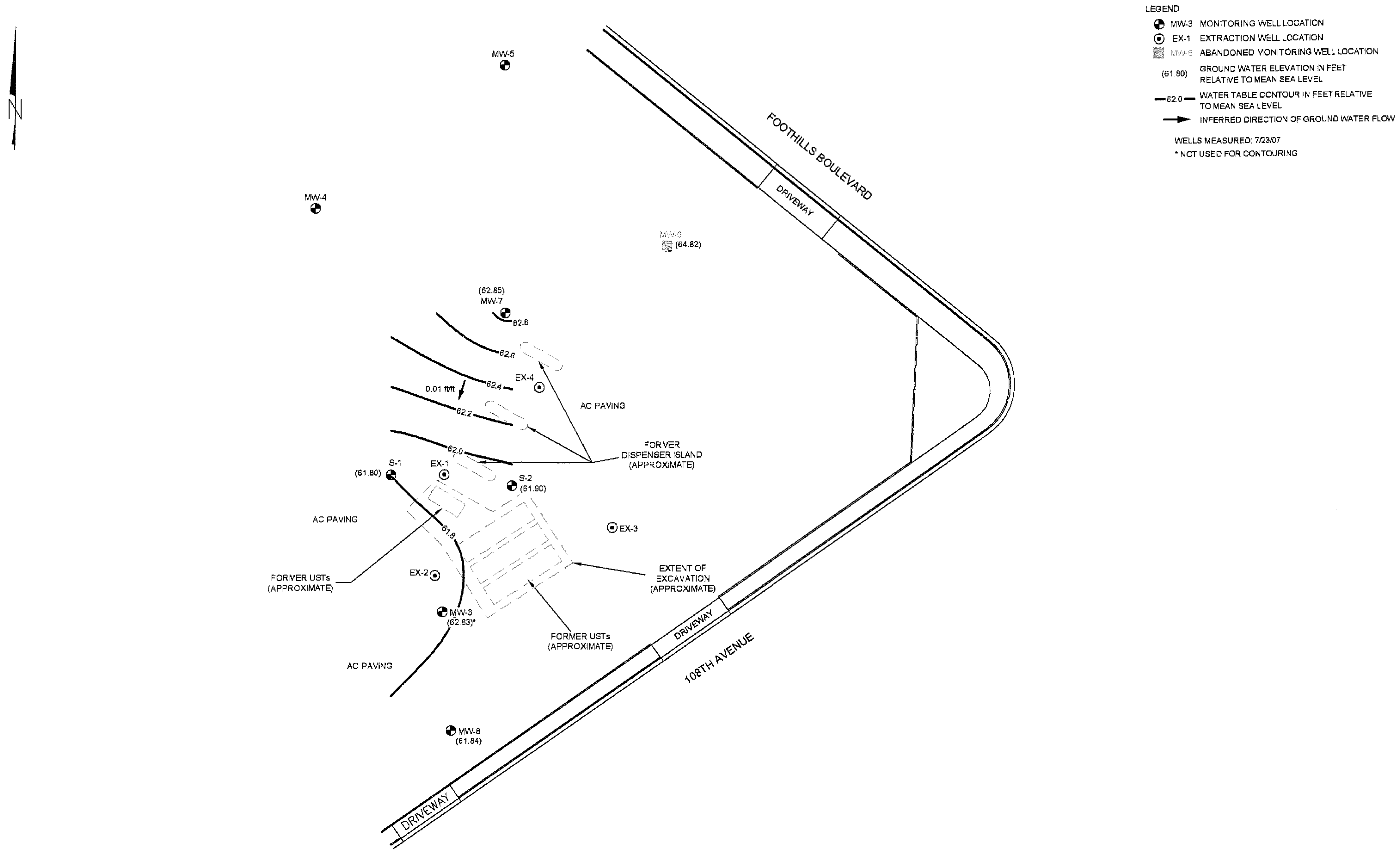
0 40 FT
SCALE

FORMER USA SERVICE STATION NO. 57
10700 MACARTHUR BOULEVARD
OAKLAND, CALIFORNIA

EXTRACTION WELL WITH MW-4 & MW-5
GROUNDWATER ELEVATION CONTOUR MAP
3rd QUARTER 2007

FIGURE
2B

PROJECT NO.
2007-0057-01



NOTE: LOCATIONS OF ALL CURRENT AND FORMER SITE FEATURES IS APPROXIMATE

USA\57\SCM JMP REV August 7, 2009 USA 57 QMR GWC

STRATUS
ENVIRONMENTAL, INC.

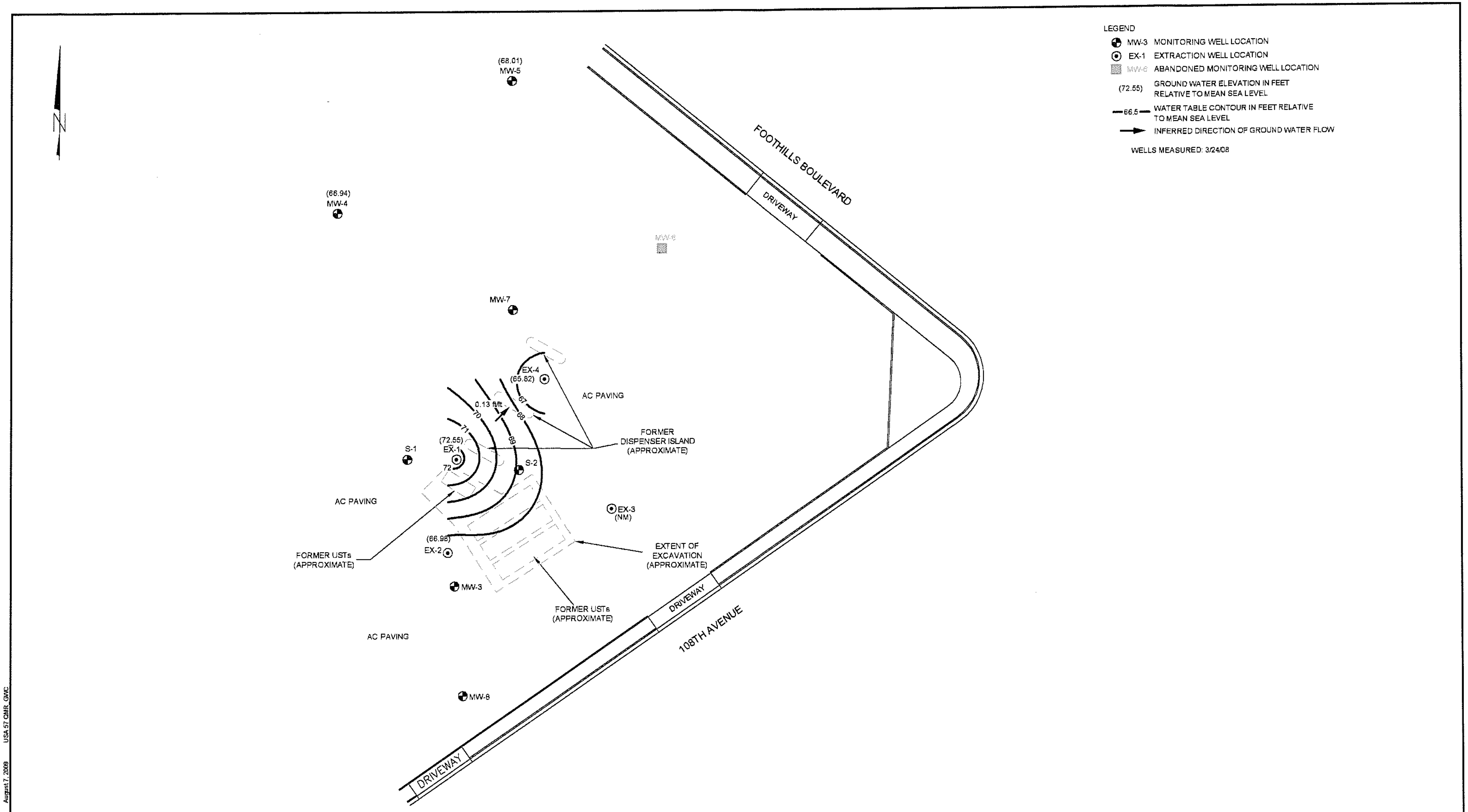
0 40 FT
SCALE

FORMER USA SERVICE STATION NO. 57
10700 MACARTHUR BOULEVARD
OAKLAND, CALIFORNIA

MONITORING WELL (WITHOUT MW-4 & MW-5)
GROUNDWATER ELEVATION CONTOUR MAP
3rd QUARTER 2007

FIGURE
2C

PROJECT NO.
2007-0057-01



NOTE: LOCATIONS OF ALL CURRENT AND FORMER SITE FEATURES IS APPROXIMATE

STRATUS
ENVIRONMENTAL, INC.

0 40 FT
SCALE

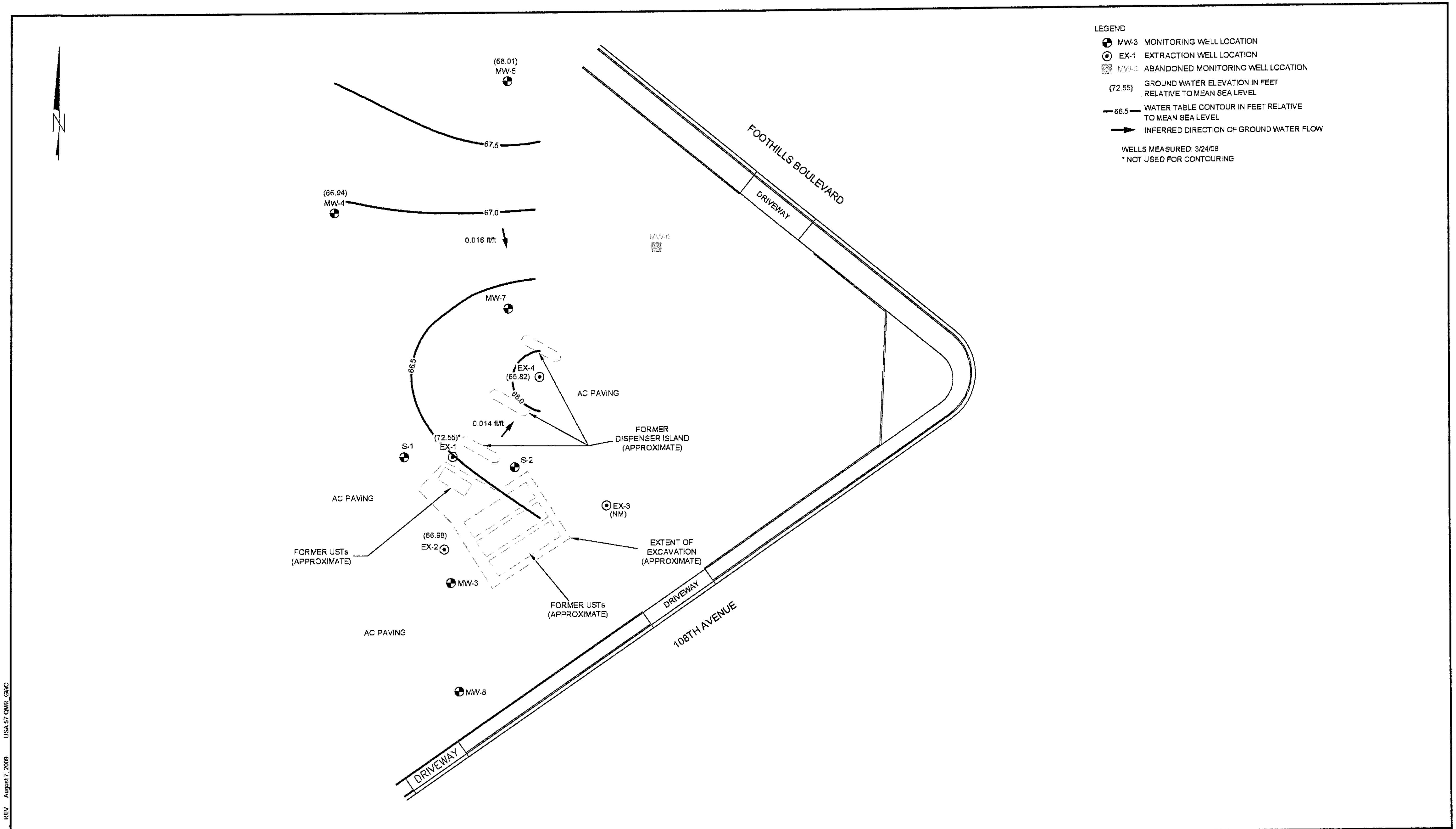
FORMER USA SERVICE STATION NO. 57
10700 MACARTHUR BOULEVARD
OAKLAND, CALIFORNIA

EXTRACTION WELL GROUNDWATER ELEVATION CONTOUR MAP, 1st QUARTER 2008

FIGURE
3A

PROJECT NO.
2007-0057-01

USA57SCM JMP REV August 7, 2009 USA 57 QMR GWC



NOTE: LOCATIONS OF ALL CURRENT AND FORMER SITE FEATURES IS APPROXIMATE

STRATUS
ENVIRONMENTAL, INC.

0 40 FT
SCALE

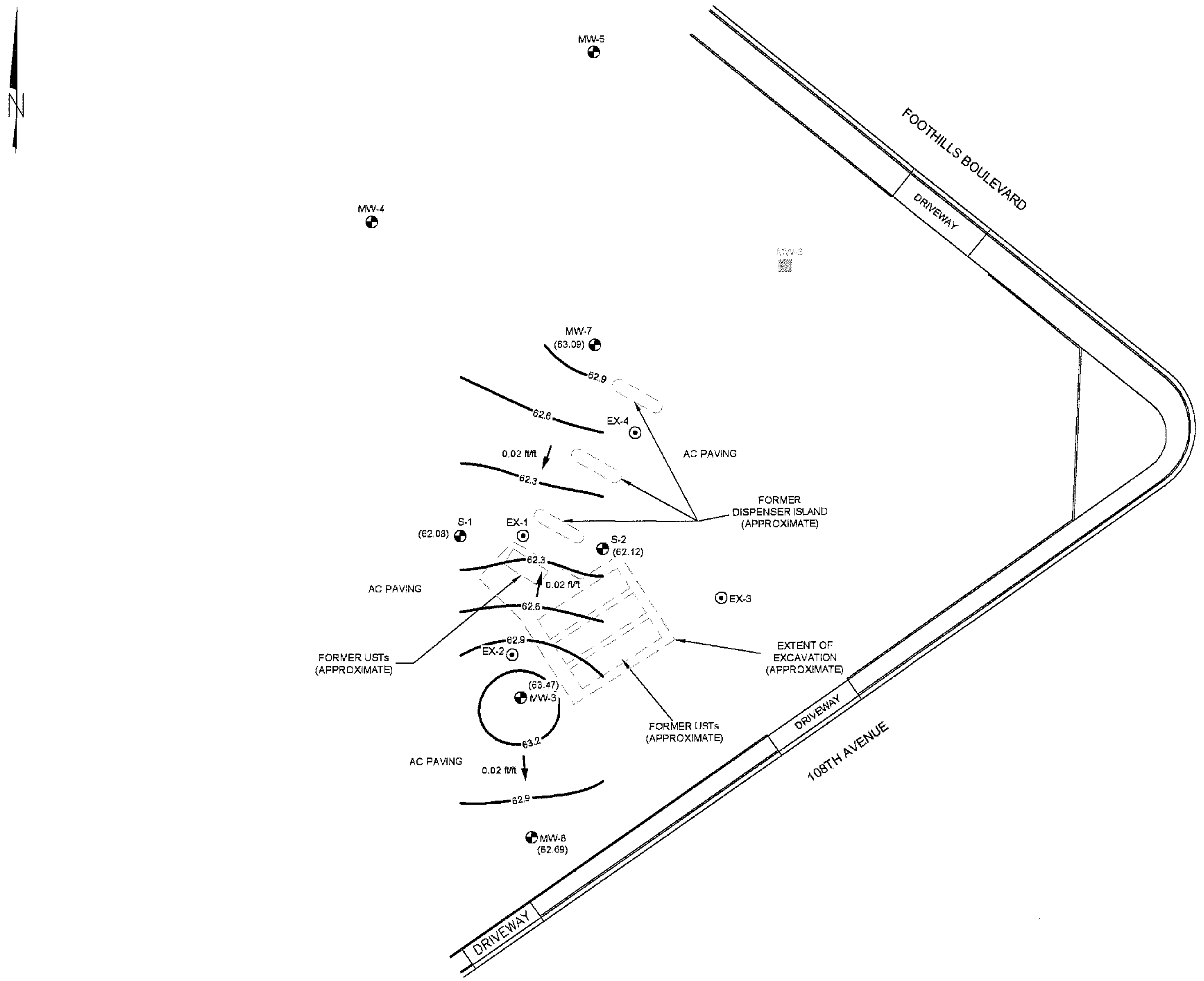
FORMER USA SERVICE STATION NO. 57
10700 MACARTHUR BOULEVARD
OAKLAND, CALIFORNIA

EXTRACTION WELL WITH MW-4 & MW-5
GROUNDWATER ELEVATION CONTOUR MAP
1st QUARTER 2008

FIGURE
3B

PROJECT NO.
2007-0057-01

USA157ASCM JMP REV August 7, 2009 USA 57 OMR GWC



LEGEND

- ● MW-3 MONITORING WELL LOCATION
- ⊙ EX-1 EXTRACTION WELL LOCATION
- ▨ MW-6 ABANDONED MONITORING WELL LOCATION
- (62.08) GROUND WATER ELEVATION IN FEET RELATIVE TO MEAN SEA LEVEL
- —64— WATER TABLE CONTOUR IN FEET RELATIVE TO MEAN SEA LEVEL
- → INFERRED DIRECTION OF GROUND WATER FLOW

WELLS MEASURED: 3/24/08

NOTE: LOCATIONS OF ALL CURRENT AND FORMER SITE FEATURES IS APPROXIMATE

STRATUS
ENVIRONMENTAL, INC.

0 40 FT
SCALE

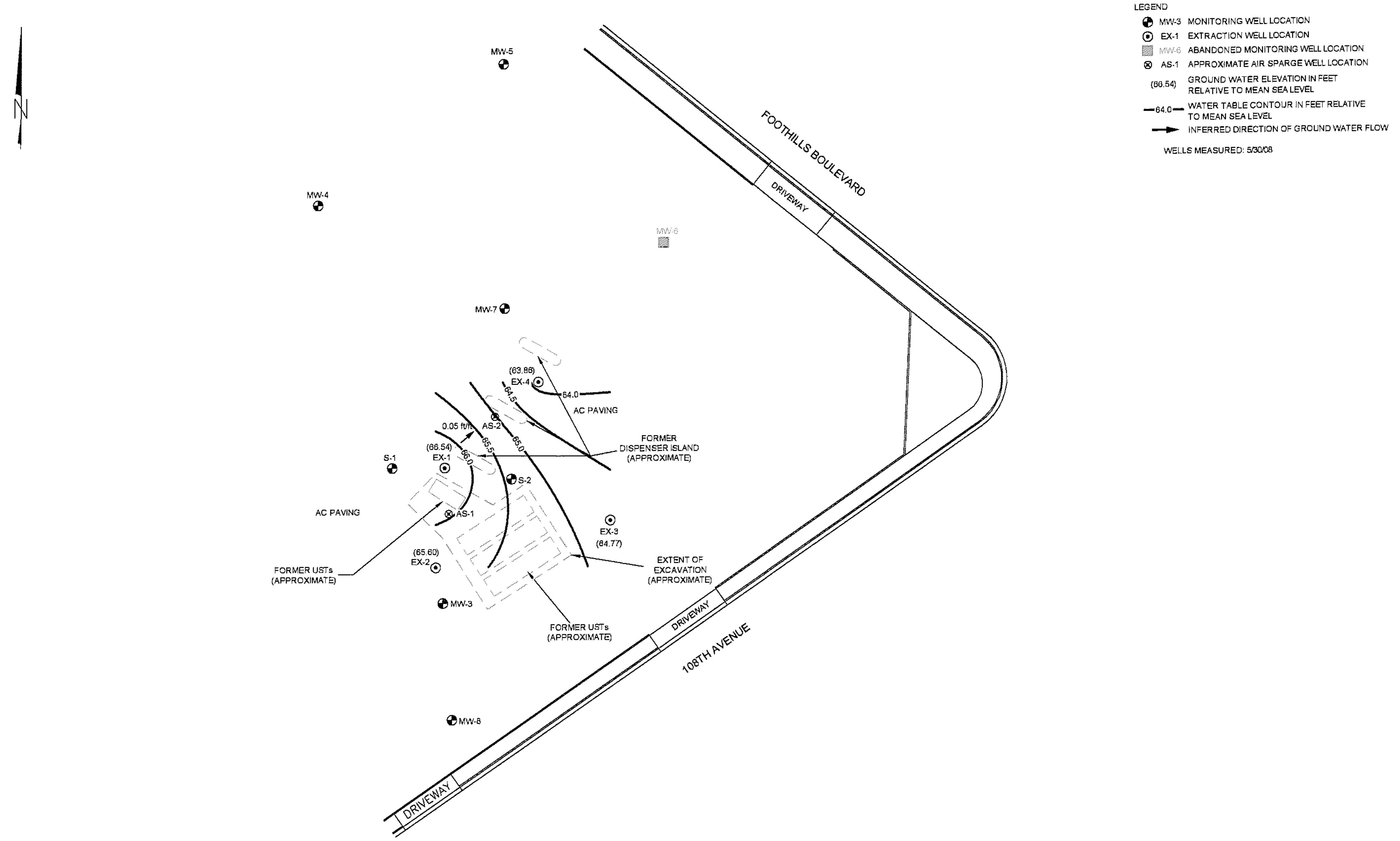
FORMER USA SERVICE STATION NO. 57
10700 MACARTHUR BOULEVARD
OAKLAND, CALIFORNIA

MONITORING WELL (WITHOUT MW-4 & MW-5)
GROUNDWATER ELEVATION CONTOUR MAP
1st QUARTER 2008

FIGURE
3C

PROJECT NO.
2007-0057-01

USA57\SCM JMP REV August 7, 2009 USA 57 QMR_GWC



STRATUS
ENVIRONMENTAL, INC.

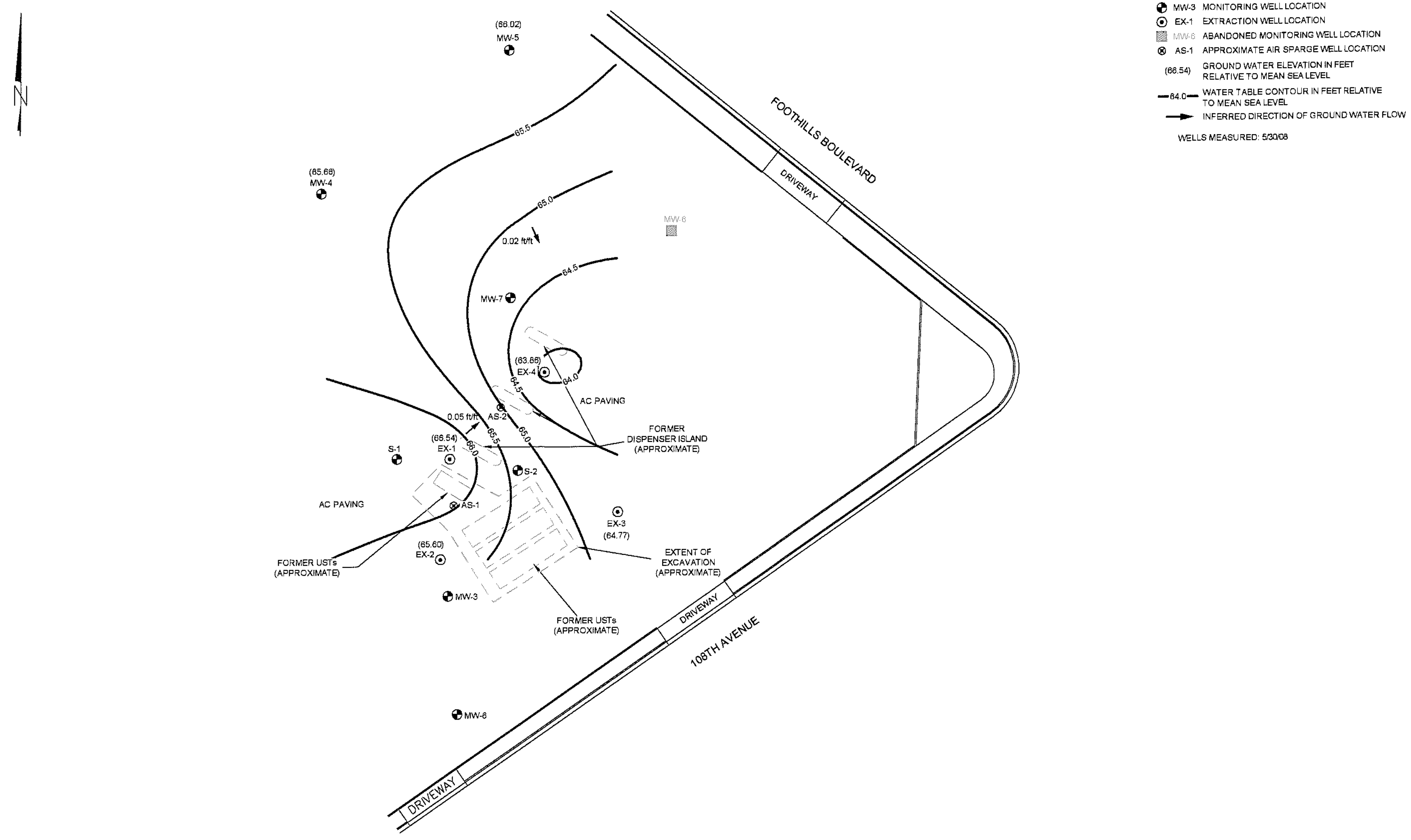
0 40 FT
SCALE

FORMER USA SERVICE STATION NO. 57
10700 MACARTHUR BOULEVARD
OAKLAND, CALIFORNIA

EXTRACTION WELL GROUNDWATER ELEVATION
CONTOUR MAP, 2nd QUARTER 2008

FIGURE
4A
PROJECT NO.
2007-0057-01

USA57ISCM JMP REV April 15, 2009 USA 57 1Q09



0 40 FT

SCALE

STRATUS
ENVIRONMENTAL, INC.

FORMER USA SERVICE STATION NO. 57
10700 MACARTHUR BOULEVARD
OAKLAND, CALIFORNIA

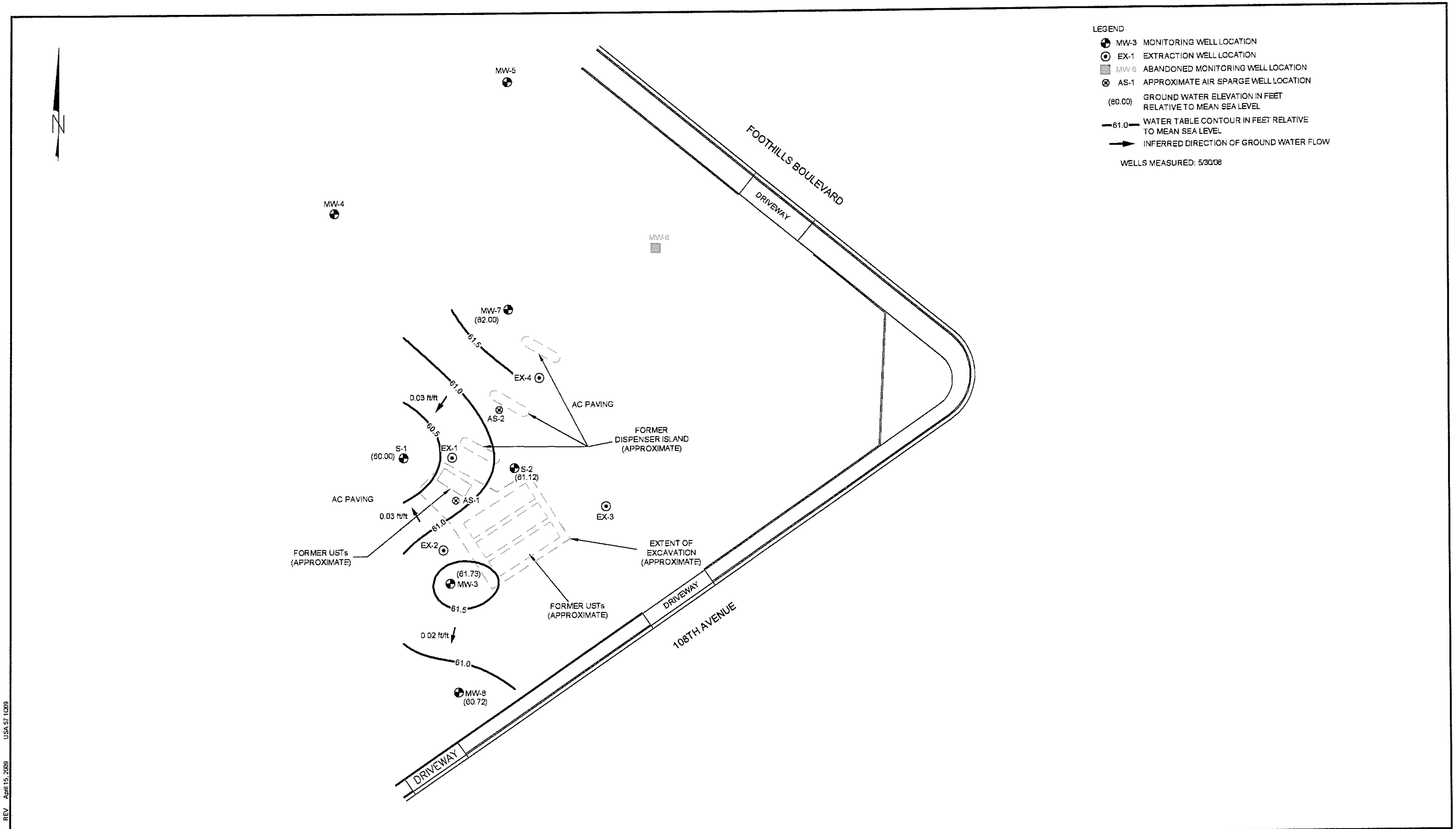
EXTRACTION WELL WITH MW-4 & MW-5
GROUNDWATER ELEVATION
CONTOUR MAP, 2nd QUARTER 2008

FIGURE

4B

PROJECT NO.
2007-0057-01

USA57ISCM JMP REV April 15, 2009 USA 57 1Q09



STRATUS ENVIRONMENTAL, INC.

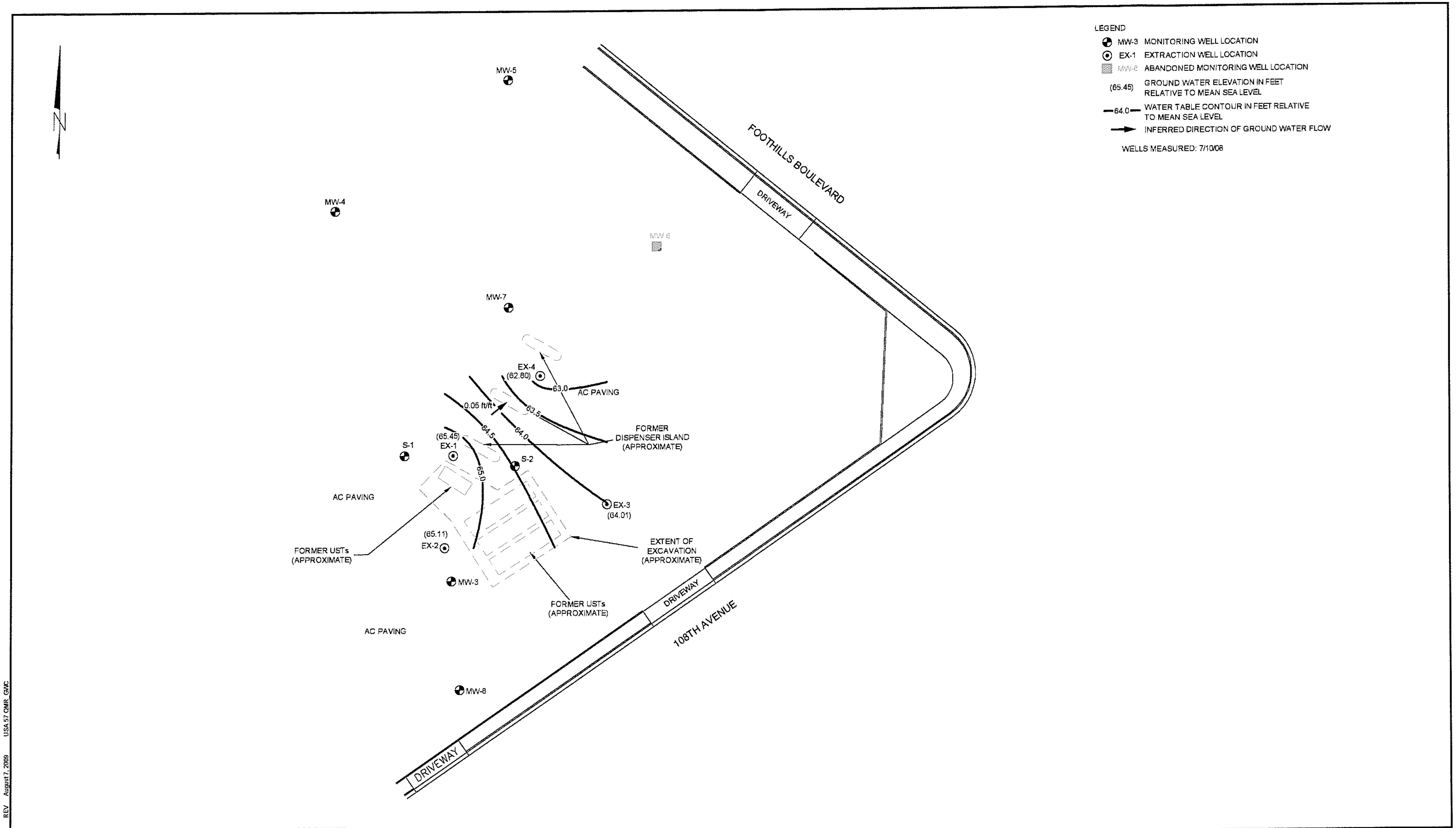
0 40 FT
SCALE

FORMER USA SERVICE STATION NO. 57
10700 MACARTHUR BOULEVARD
OAKLAND, CALIFORNIA
MONITORING WELL (WITHOUT MW-4 & MW-5)
GROUNDWATER ELEVATION CONTOUR MAP
2nd QUARTER 2008

FIGURE
4C

PROJECT NO.
2007-0057-01

USA57ISCM JMP REV April 15, 2009 USA 57 1Q09



NOTE: LOCATIONS OF ALL CURRENT AND FORMER SITE FEATURES IS APPROXIMATE

STRATUS
ENVIRONMENTAL, INC.

0 40 FT
SCALE

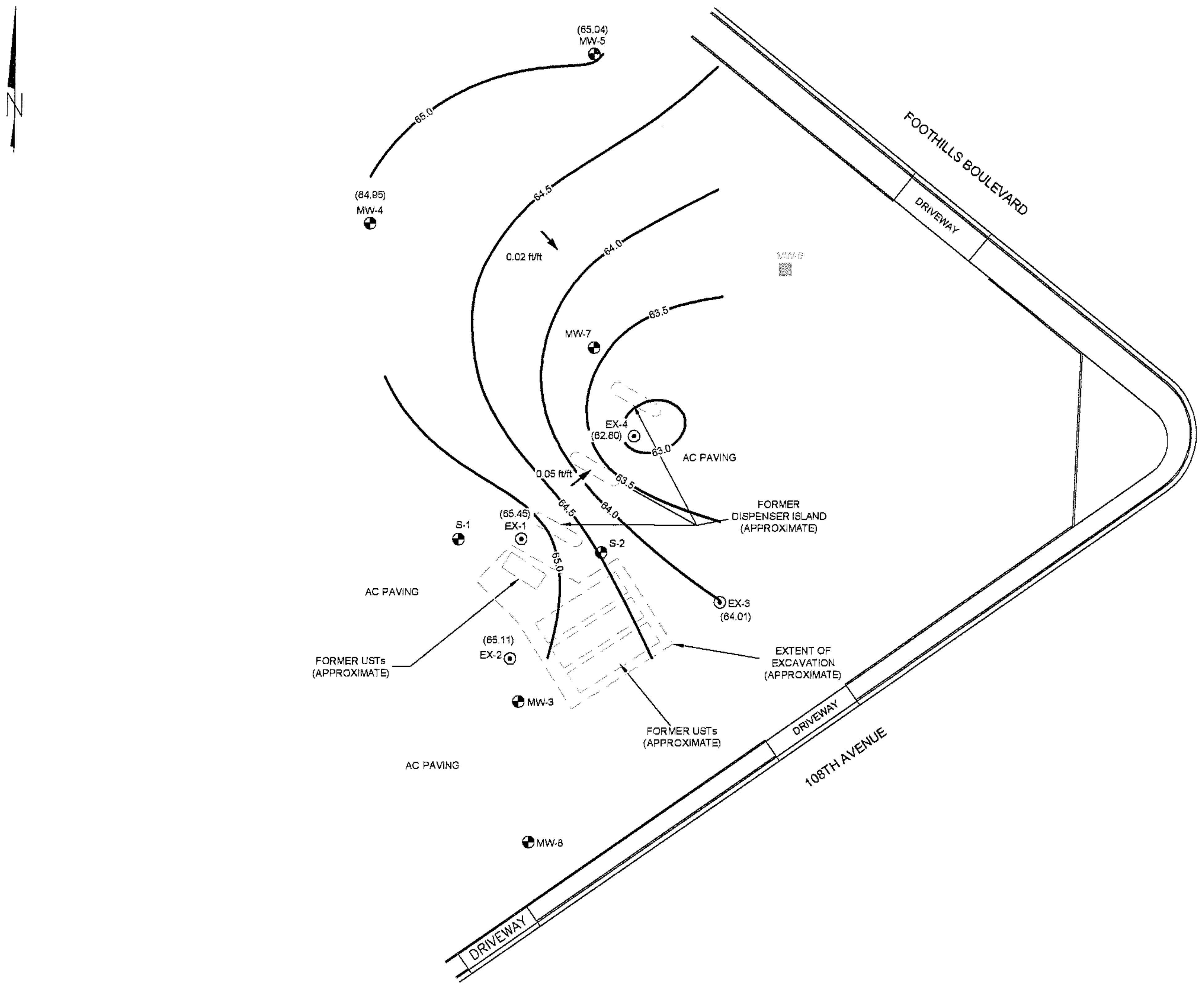
FORMER USA SERVICE STATION NO. 57
10700 MACARTHUR BOULEVARD
OAKLAND, CALIFORNIA

EXTRACTION WELL GROUNDWATER ELEVATION
CONTOUR MAP, 3rd QUARTER 2008

FIGURE
5A

PROJECT NO.
2007-0057-01

USA57SCM JMP REV August 7, 2009 USA 57 OMR GMC



LEGEND

●	MW-3	MONITORING WELL LOCATION
⊙	EX-1	EXTRACTION WELL LOCATION
▨	MW-6	ABANDONED MONITORING WELL LOCATION
	(65.45)	GROUND WATER ELEVATION IN FEET RELATIVE TO MEAN SEA LEVEL
	—64.0—	WATER TABLE CONTOUR IN FEET RELATIVE TO MEAN SEA LEVEL
	→	INFERRED DIRECTION OF GROUND WATER FLOW

WELLS MEASURED: 7/10/08

NOTE: LOCATIONS OF ALL CURRENT AND FORMER SITE FEATURES IS APPROXIMATE

USA57SCM JMP REV August 7, 2009 USA 57 QMR GWC

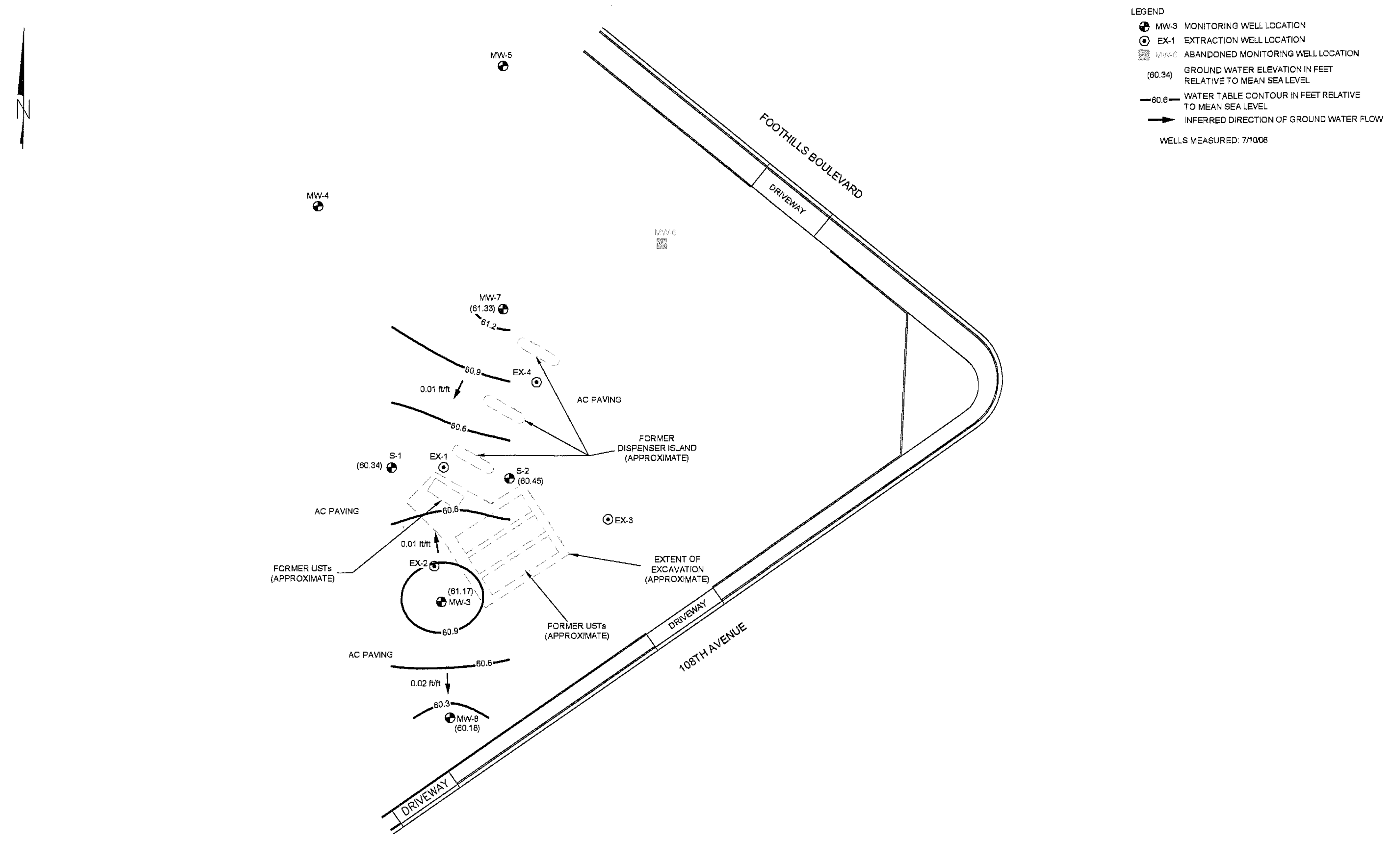
STRATUS
ENVIRONMENTAL, INC.

0 40 FT
SCALE

FORMER USA SERVICE STATION NO. 57
10700 MACARTHUR BOULEVARD
OAKLAND, CALIFORNIA
EXTRACTION WELL WITH MW-4 & MW-5
GROUNDWATER ELEVATION CONTOUR MAP
3rd QUARTER 2008

FIGURE
5B

PROJECT NO.
2007-0057-01



NOTE: LOCATIONS OF ALL CURRENT AND FORMER SITE FEATURES IS APPROXIMATE

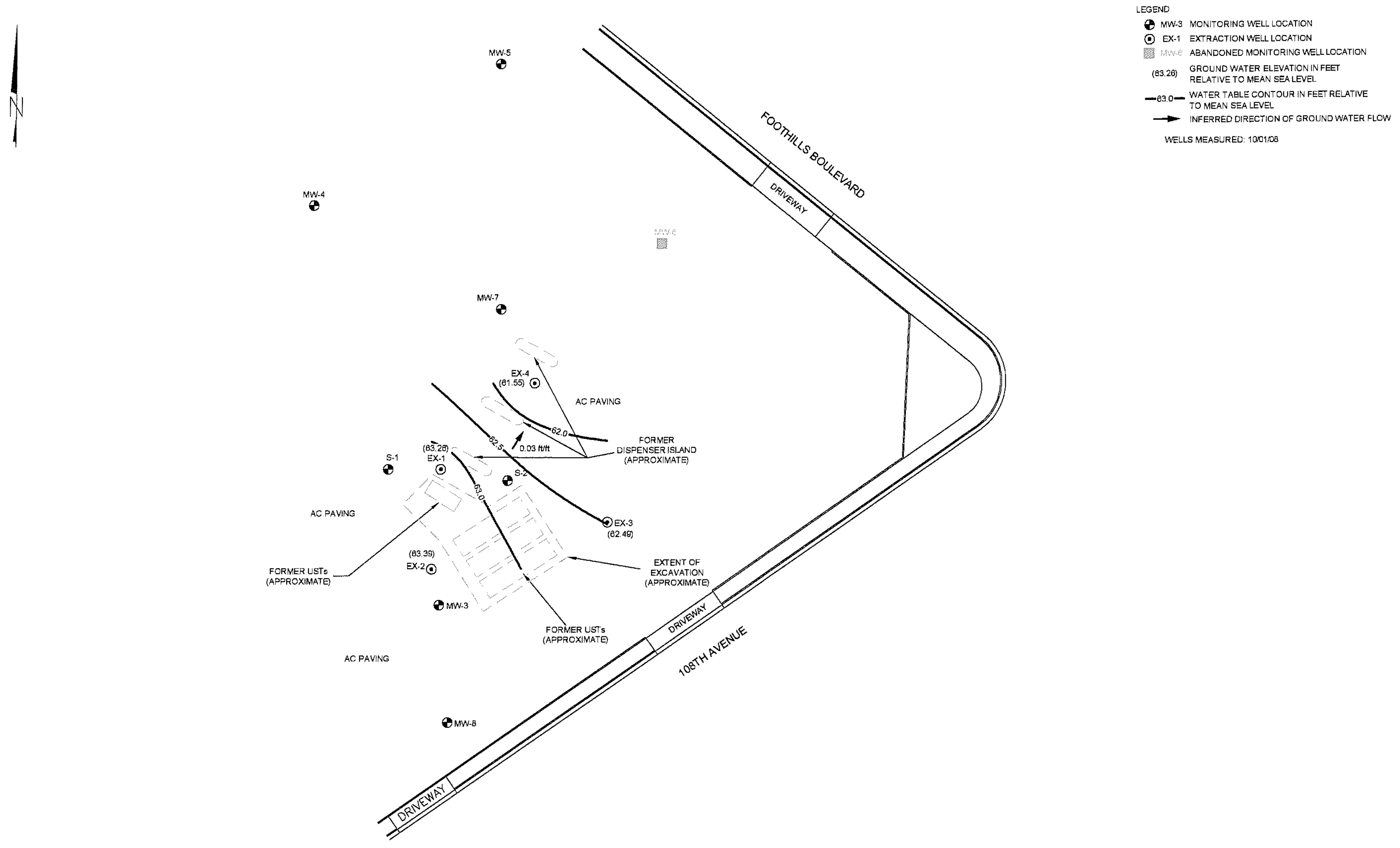
STRATUS
ENVIRONMENTAL, INC.

0 40 FT
SCALE

FORMER USA SERVICE STATION NO. 57
10700 MACARTHUR BOULEVARD
OAKLAND, CALIFORNIA
MONITORING WELL (WITHOUT MW-4 & MW-5)
GROUNDWATER ELEVATION CONTOUR MAP
3rd QUARTER 2008

FIGURE
5C
PROJECT NO.
2007-0057-01

USA57SCM JMP REV August 7, 2009 USA 57 QMR GWC



NOTE: LOCATIONS OF ALL CURRENT AND FORMER SITE FEATURES IS APPROXIMATE

USA57SCM JMP REV August 7, 2009 USA 57 OMR GWC

STRATUS
ENVIRONMENTAL, INC.

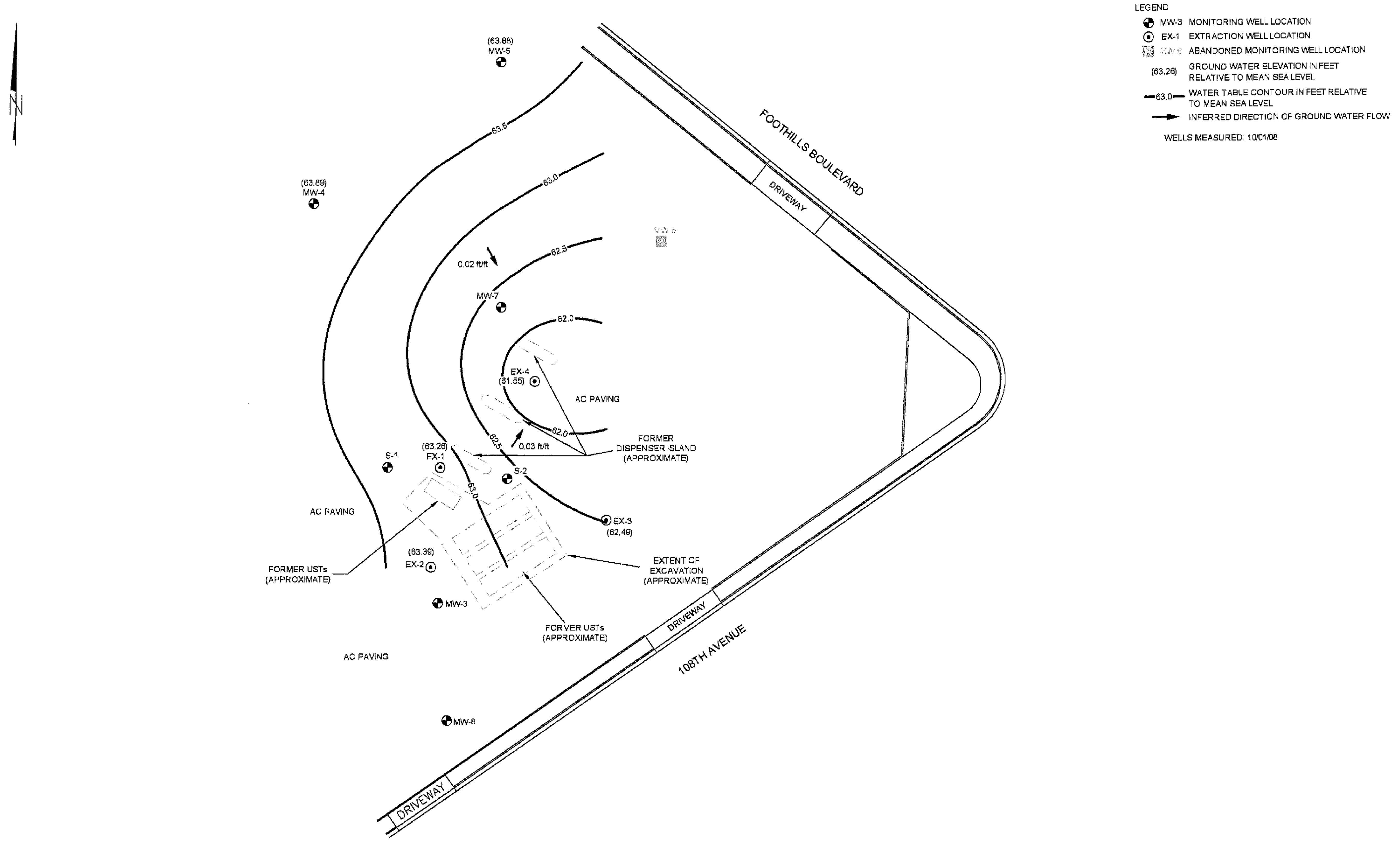
0 40 FT
SCALE

FORMER USA SERVICE STATION NO. 57
10700 MACARTHUR BOULEVARD
OAKLAND, CALIFORNIA

EXTRACTION WELL GROUNDWATER ELEVATION
CONTOUR MAP, 4th QUARTER 2008

FIGURE
6A

PROJECT NO.
2007-0057-01



NOTE: LOCATIONS OF ALL CURRENT AND FORMER SITE FEATURES IS APPROXIMATE

USA57SCM JMP REV August 7, 2009 USA 57 QMR GWC

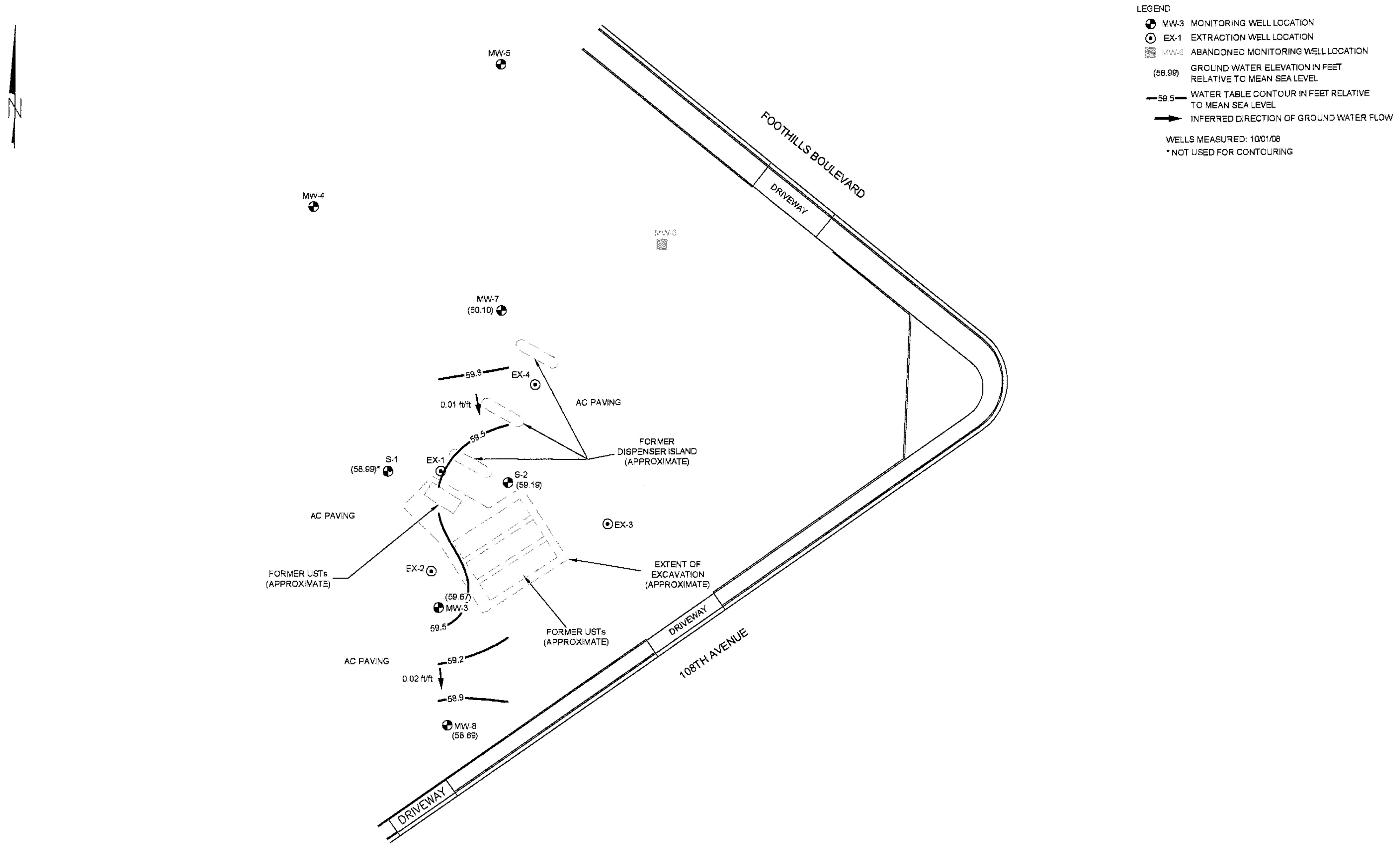
STRATUS
ENVIRONMENTAL, INC.

0 40 FT
SCALE

FORMER USA SERVICE STATION NO. 57
10700 MACARTHUR BOULEVARD
OAKLAND, CALIFORNIA
EXTRACTION WELL WITH MW-4 & MW-5
GROUNDWATER ELEVATION CONTOUR MAP
4th QUARTER 2008

FIGURE
6B

PROJECT NO.
2007-0057-01



NOTE: LOCATIONS OF ALL CURRENT AND FORMER SITE FEATURES IS APPROXIMATE

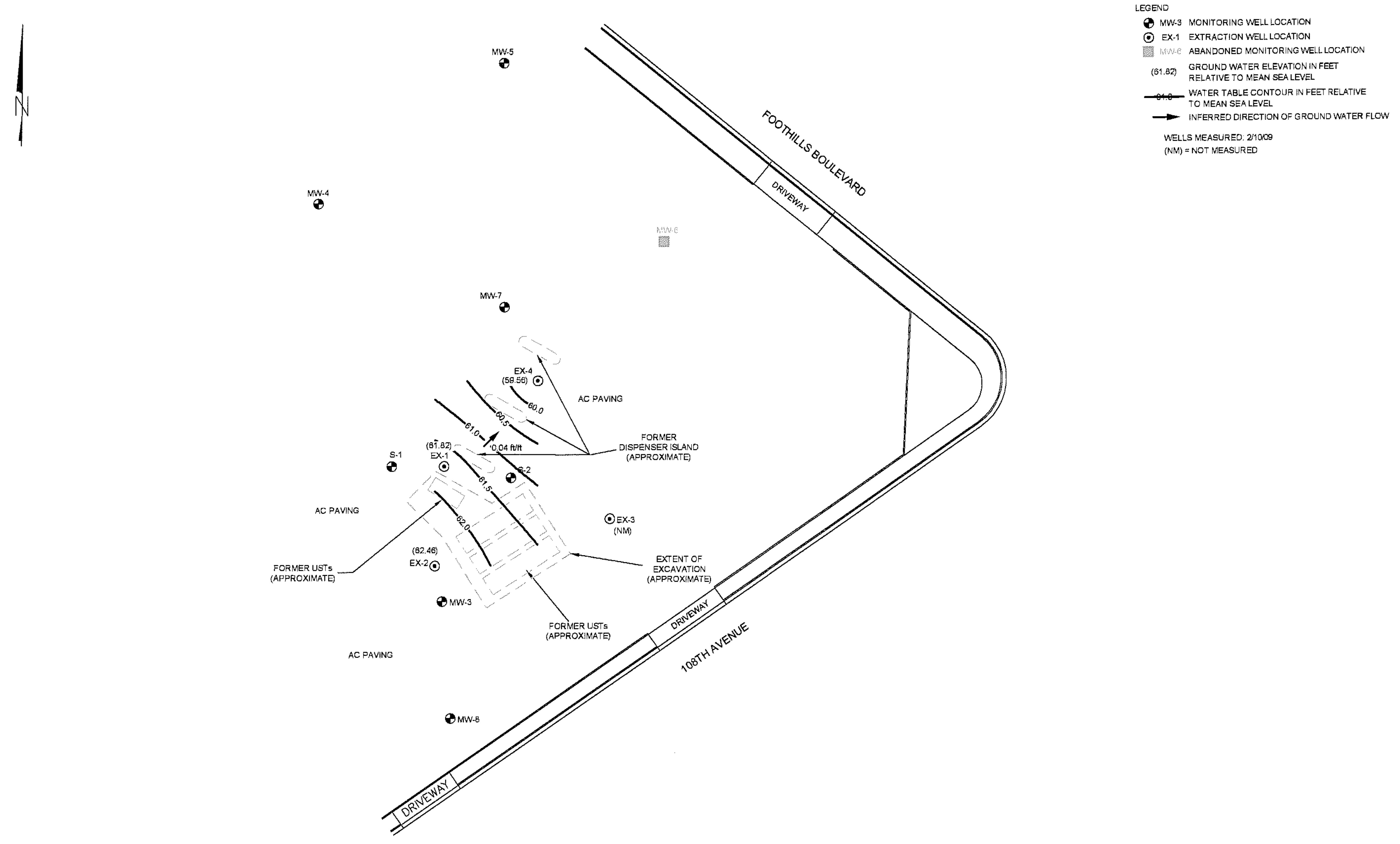
USA57ISCM JMP REV August 7, 2009 USA 57 QMR GWC

STRATUS
ENVIRONMENTAL, INC.

0 40 FT
SCALE

FORMER USA SERVICE STATION NO. 57
10700 MACARTHUR BOULEVARD
OAKLAND, CALIFORNIA
MONITORING WELL (WITHOUT MW-4 & MW-5)
GROUNDWATER ELEVATION CONTOUR MAP
4th QUARTER 2008

FIGURE
6C
PROJECT NO.
2007-0057-01



NOTE: LOCATIONS OF ALL CURRENT AND FORMER SITE FEATURES IS APPROXIMATE

USA57SCM JMP REV August 7, 2009 USA 57 QMR GWC

STRATUS
ENVIRONMENTAL, INC.

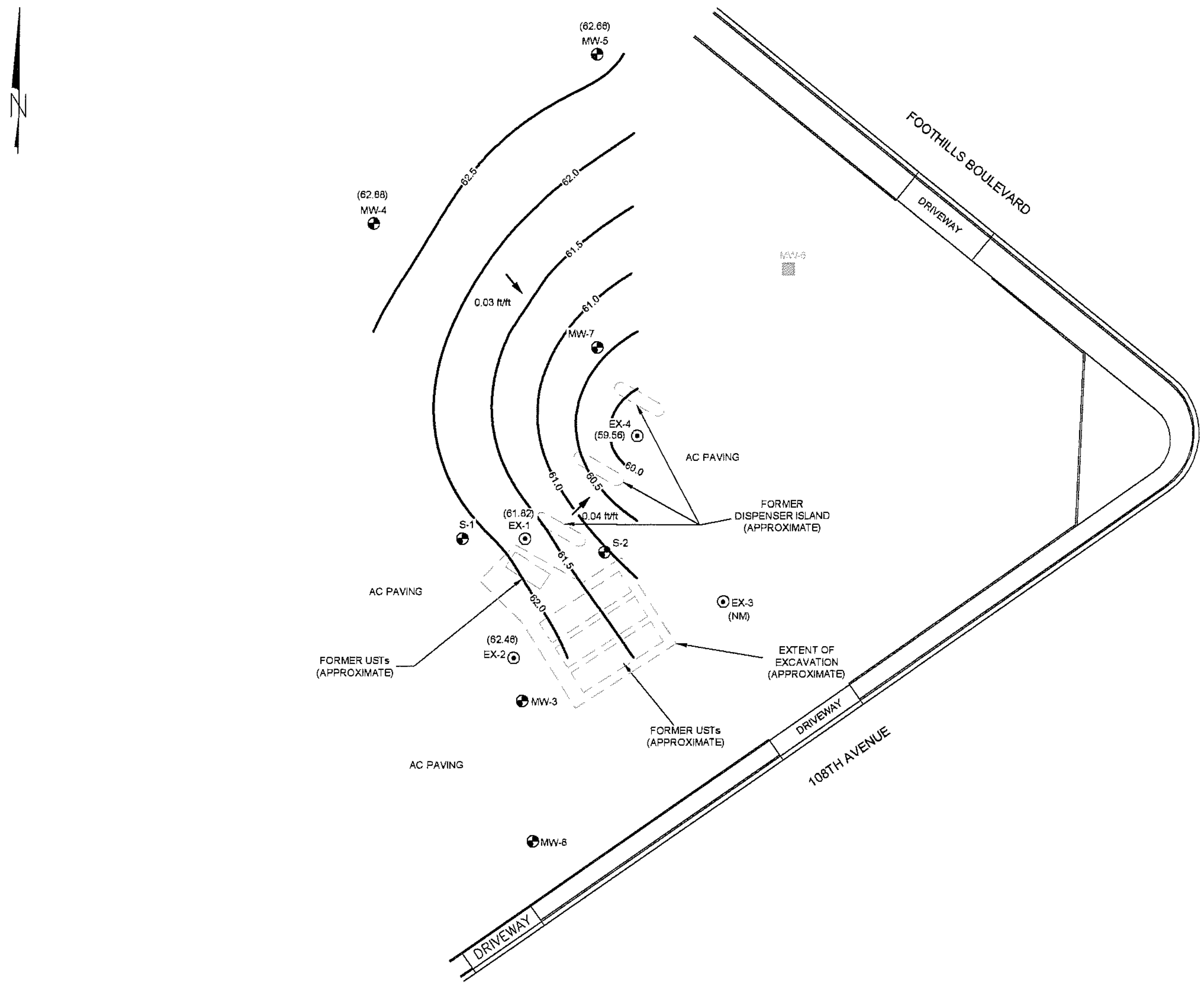
0 40 FT
SCALE

FORMER USA SERVICE STATION NO. 57
10700 MACARTHUR BOULEVARD
OAKLAND, CALIFORNIA

EXTRACTION WELL GROUNDWATER ELEVATION
CONTOUR MAP, 1st QUARTER 2009

FIGURE
7A

PROJECT NO.
2007-0057-01



LEGEND

●	MW-3	MONITORING WELL LOCATION
⊙	EX-1	EXTRACTION WELL LOCATION
▨	MW-6	ABANDONED MONITORING WELL LOCATION
	(61.82)	GROUND WATER ELEVATION IN FEET RELATIVE TO MEAN SEA LEVEL
	—61.0—	WATER TABLE CONTOUR IN FEET RELATIVE TO MEAN SEA LEVEL
	➞	INFERRED DIRECTION OF GROUND WATER FLOW

WELLS MEASURED: 2/10/09
(NM) = NOT MEASURED

NOTE: LOCATIONS OF ALL CURRENT AND FORMER SITE FEATURES IS APPROXIMATE

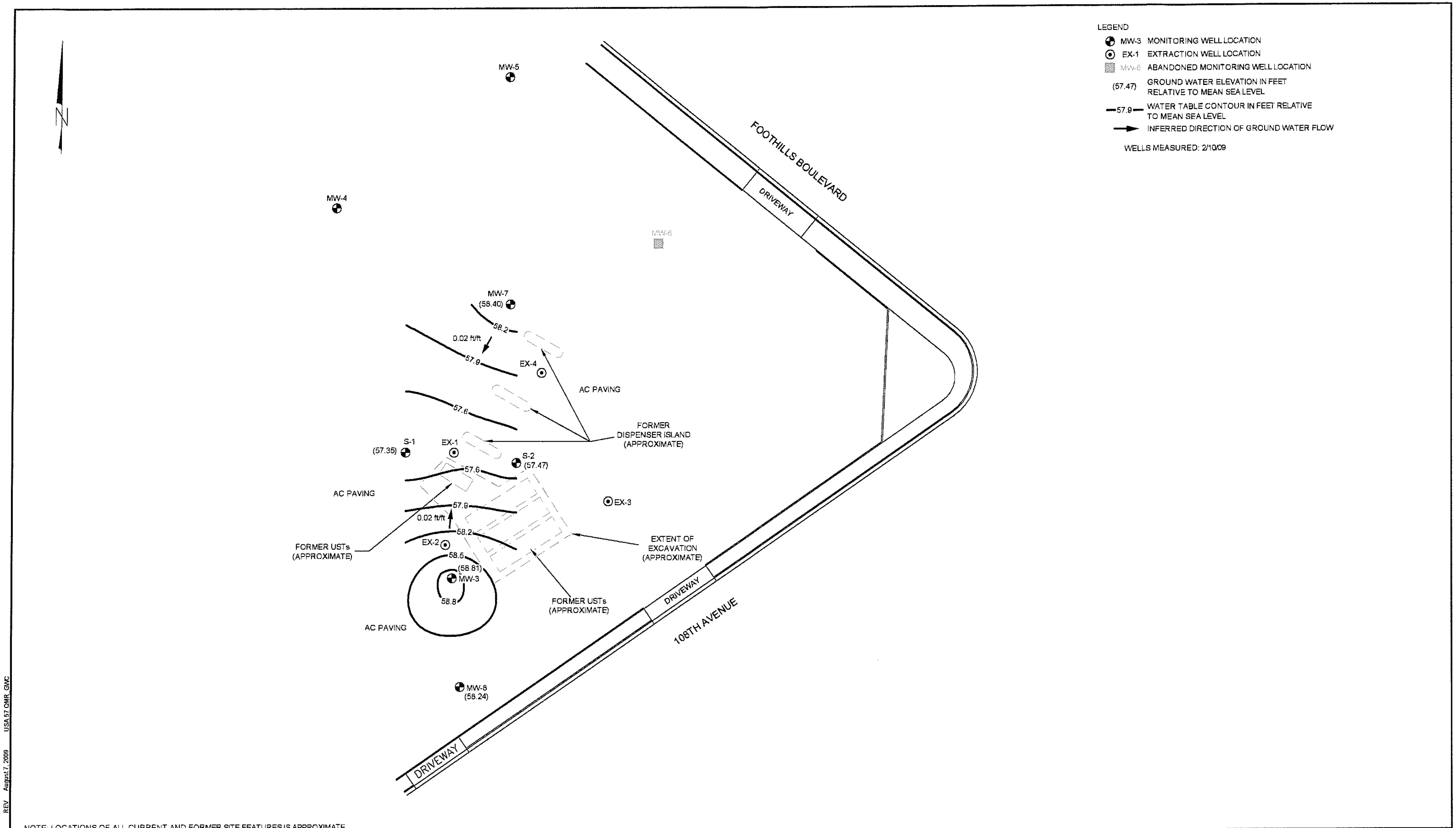
STRATUS
ENVIRONMENTAL, INC.

0 40 FT
SCALE

FORMER USA SERVICE STATION NO. 57
10700 MACARTHUR BOULEVARD
OAKLAND, CALIFORNIA
EXTRACTION WELL WITH MW-4 & MW-5
GROUNDWATER ELEVATION CONTOUR MAP
1st QUARTER 2009

FIGURE
7B
PROJECT NO.
2007-0057-01

USA57SCM JMP REV August 7, 2009 USA 57 QMR GWC



NOTE: LOCATIONS OF ALL CURRENT AND FORMER SITE FEATURES IS APPROXIMATE

USA57SCM JMP REV August 7, 2009 USA 57 QMR GWC

STRATUS
ENVIRONMENTAL, INC.

0 40 FT
SCALE

FORMER USA SERVICE STATION NO. 57
10700 MACARTHUR BOULEVARD
OAKLAND, CALIFORNIA
MONITORING WELL (WITHOUT MW-4 & MW-5)
GROUNDWATER ELEVATION CONTOUR MAP
1st QUARTER 2009

FIGURE
7C
PROJECT NO.
2007-0057-01

APPENDIX C

HISTORICAL SOIL ANALYTICAL DATA

ITAS/Santa Clara to Pacific Environmental Group, Inc.
ATTN: Susan Willhite

February 28, 1987
Page 1 of 2

TABLE OF RESULTS

ND = None Detected

Laboratory Number	Sample Identification		Date Received	Parts per Million (dry soil basis) Total Hydrocarbons
	Project 100-22.01, Oakland			
S7-02-076-01	A	13.5-15'	2/17/87	16.
S7-02-076-02	B	18.5-20'	2/17/87	4.
S7-02-076-03	C	18.5-20'	2/17/87	ND.
S7-02-076-04	D	9-10.5'	2/17/87	2.
S7-02-076-05	S-1	19-20.5'	2/17/87	42.
S7-02-076-06	S-1	19-20.5'	2/17/87	16.
S7-02-076-07	S-2	24-25.5'	2/17/87	600.
S7-02-076-09	Fill Box		2/17/87	410.
			Detection Limit	2.

TABLE 4

SOIL ANALYTICAL DATA
FORMER USA STATION #57
10700 MacARTHUR BOULEVARD
OAKLAND, CALIFORNIA

Well ID	Date	Depth (feet)	TPH G (ppm)	TPH D (ppm)	Benzene (ppm)	Toluene (ppm)	Ethyl-benzene (ppm)	Total Xylene (ppm)
S-1	02/12/87	20.5	42	-	-	-	-	-
		20.5	16	-	-	-	-	-
S-2	02/12/87	24.5	600	-	-	-	-	-
B-1	02/28/95	5.5	ND	-	ND	ND	ND	ND
		9.5	44	-	0.12	ND	0.14	0.4
		13.0	540	55	2.6	10	7.5	48
		20.0	ND	-	0.012	0.016	ND	0.029
		25.0	3.9	-	0.048	0.14	0.062	0.37
		31.0	ND	-	ND	0.011	0.0057	0.045
		35.0	ND	-	0.014	0.018	0.012	0.079
		40.5	ND	ND	ND	ND	ND	ND
B-2	03/01/95	5.0	ND	-	ND	ND	ND	ND
		10.5	ND	-	ND	ND	ND	ND
		16.0	16	-	0.057	0.028	0.029	1.2
		21.0	110	-	0.96	0.41	0.33	1.5
		26.0	240	22	0.76	1.4	0.85	1.9
B-3	03/01/95	11.0	ND	-	ND	ND	ND	ND
		15.5	10	-	0.044	0.11	0.079	0.63
		20.5	15	1.3	0.041	0.37	0.15	1.1
B-4	03/02/95	3.0	ND	-	ND	ND	ND	ND
		6.0	ND	-	ND	ND	ND	ND
		12.0	ND	ND	ND	ND	ND	ND
B-5	03/02/95	5.5	ND	-	ND	ND	ND	ND
		12.0	ND	ND	ND	ND	ND	ND
B-6	03/02/95	4.0	33	5.3	0.093	0.065	0.33	2.0
		5.5	2.6	-	0.062	ND	0.030	0.047
		12.0	ND	-	ND	ND	ND	0.022

TABLE 4 (Continued)

SOIL ANALYTICAL DATA
FORMER USA STATION #57
10700 MacARTHUR BOULEVARD
OAKLAND, CALIFORNIA

Well ID	Date	Depth (feet)	TPH G (ppm)	TPH D (ppm)	Benzene (ppm)	Toluene (ppm)	Ethyl-benzene (ppm)	Total Xylene (ppm)
B-7	03/02/95	3.5	ND	ND	ND	ND	ND	ND
		5.0	ND	-	ND	ND	ND	ND
		12.0	ND	-	ND	ND	ND	ND
B-8	03/02/95	3.0	17	-	0.012	0.021	0.12	0.16
		5.5	ND	ND	0.019	ND	0.050	ND
		12.0	2.0	-	0.042	ND	ND	0.016
MW-3	02/28/95	5.5	ND	-	ND	ND	ND	ND
		11.5	1.9	-	0.026	0.011	0.0061	0.019
		13.5	240	12	0.41	0.64	2.0	5.4
		15.5	110	-	0.37	3.8	1.5	10
		21.5	3.0	-	0.26	0.24	0.059	0.50
		24.5	ND	-	0.030	0.0069	0.0056	0.016
		29.5	ND	-	ND	0.0054	ND	0.0092
		39.5	ND	-	ND	ND	ND	ND
MW-4	11/21/95	10.0	ND	5.0	ND	ND	ND	ND
MW-5	11/21/95	10.0	ND	5.2	ND	ND	ND	ND
		15.0	ND	4.2	ND	ND	ND	ND
MW-6	11/21/95	10.0	ND	4.4	ND	ND	ND	ND
MW-7	11/21/95	10.0	ND	4.7	ND	ND	ND	ND
		15.0	ND	4.3	ND	ND	ND	ND
		20.0	25	8.7	0.071	0.11	0.043	0.1
MW-8	11/21/95	10.0	ND	5.5	ND	ND	ND	ND
		15.0	ND	5.1	ND	ND	ND	ND
		20.0	ND	4.5	ND	ND	ND	ND

TPH G	Total petroleum hydrocarbons in the gasoline range
TPH D	Total petroleum hydrocarbons in the diesel range
ppm	Parts per million
ND	Not detected at the method detection limit
-	Not measured/not analyzed
	Boring locations are presented in Alton Geo Sciences' "Supplementary Site Assessment Report " which are included in Appendix C.

TABLE 5

SOIL ANALYTICAL DATA - TANK REMOVAL
FORMER USA STATION #57
10700 MacARTHUR BOULEVARD
OAKLAND, CALIFORNIA

Sample Location	Sample ID	Date	Depth (feet)	TPH G (ppm)	TPH D (ppm)	Benzene (ppm)	Toluene (ppm)	Ethyl-benzene (ppm)	Total Xylene (ppm)	TTLC Lead (ppm)
Product Trench	PI-E-3.5	07/19/94	3.5	ND(0.2)	ND(1.0)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	7
	PI-2	07/19/94	3.5	4,500	ND(50)	ND(1.0)	6	60	440	4
	PI-3	07/19/94	3.5	ND(0.2)	ND(1.0)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	5
	PI-4	07/19/94	4	ND(0.2)	ND(1.0)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	6
	PI-5	07/19/94	3.5	ND(1.0)	ND(1.0)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	7
	PI2-0	09/19/94	9	15	-	0.02	0.04	0.07	0.19	-
Tank Field	TP1	07/19/94	12.5	-	60	ND(0.005)	0.015	0.007	0.008	-
	TP2	07/19/94	12.5	-	230	ND(1.0)	0.79	2.2	0.7	-
	TP3	07/19/94	13	94	-	0.18	0.25	1	5.9	3
	TP4	07/19/94	13	1400	-	1.9	3.5	12	150	4
	TP5	07/19/94	13	300	-	ND(0.5)	0.74	4.8	20	3
	TP6	07/19/94	13	0.7	-	ND(0.005)	ND(0.005)	0.006	ND(0.005)	3
	TP7	07/19/94	13	ND(0.2)	-	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	3
Tank Cavity	TC-1	08/19/94	16	ND(0.2)	-	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	-
	TC-2	08/19/94	16	93	-	ND(1.0)	0.28	0.63	3.1	-
	TC-3	08/19/94	17.5	2.4	1	0.008	0.02	0.02	0.11	-
	TC-4	08/19/94	15.5	0.7	2	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	-
	TC-5	08/19/94	17	190	-	0.17	0.38	0.99	7.9	-
	TC-6	08/19/94	18	ND(0.2)	-	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	-
	SM-1	08/19/94	19.5	0.4	-	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	-
	TC2-1	09/27/94	417 17	ND(0.2)	-	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	-
	TC2-2	09/27/94	13	13	-	0.06	0.019	0.026	ND(0.005)	-
	TC2-3	09/27/94	16	ND(0.2)	-	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	-
	TC2-4	09/27/94	13	ND(0.2)	-	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	-
	TC2-5	09/27/94	12	100	200	0.13	0.12	0.1	0.26	-
	TC2-7	09/27/94	13	6.3	37	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	-
	TC2-8	09/27/94	13	ND(1.0)	16	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	-
	TC2-9	09/27/94	19	0.4	-	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	-
	TC2-11	09/27/94	13	2200	-	9.6	21	40	260	-
	TC2-12	09/27/94	12	130	-	0.33	0.29	0.66	7.9	-
	TC2-13	09/27/94	20	620	-	1.1	4.9	6.4	66	-
	TC2-14	09/27/94	11	92	-	0.096	0.1	0.17	1.7	-
	TC2-15	09/27/94	17	ND(0.2)	-	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	-
	TC2-16	09/27/94	14	ND(1.0)	-	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	-
(Alton)	TC3-3	10/94	12-13	300	330	-	-	-	-	-
(Alton)	TC3-4	10/94	12-13	510	ND	-	-	-	-	-
(Alton)	TCE-5	10/94	12-13	2400	ND	-	-	-	-	-
(Alton)	TC3-6	10/94	12-13	940	ND	-	-	-	-	-
Dispenser Island	DI-1	09/27/94	3.5	720	-	0.19	2	9	53	-
	DI-2	09/27/94	3.5	280	-	0.12	0.8	4.6	33	-
	DI-3	09/27/94	3	ND(0.2)	-	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	-
	DI-4	09/27/94	3	590	-	0.7	2.5	13	81	-
	DI-5	09/27/94	3.5	570	-	0.1	1.5	2.7	17	-
	DI-6	09/27/94	3.5	1800	-	0.72	5.2	31	180	-

SOIL SAMPLES BY WESTERN GEO-ENGINEERS UNLESS OTHERWISE NOTED

TPH G	Total petroleum hydrocarbons in the gasoline range
TPH D	Total petroleum hydrocarbons in the diesel range
ppm	Parts per million
ND	Not detected at the method detection limit
-	Not measured/not analyzed

WEGE: TABLE 1

USA PETROLEUM CORPORATION
.10700 MACARTHUR BLVD.,
OAKLAND, CALIFORNIA

SOIL SAMPLE LABORATORY RESULTS

SAMPLE LOCATION	SAMPLE ID	DATE SAMPLED	DEPTH SAMPLED IN FEET	SAMPLING COMPANY	LAB	TPH,G ppm	TPH,D ppm	BENZENE ppm	TOLUENE ppm	ETHYL BENZENE ppm	XYLENE ppm	TTLC LEAD ppm	STLC LEAD PPM	PNA's by M8270 ppm	VOL.ORGAN by 8240 ** ppm
P_L TRNCH	PI-E 3.5	07/19/94	3.5	WEGE	AEN	<0.2	<1.0	<.005	<.005	<.005	<.005	7			
P_L TRNCH	PI-2	07/19/94	3.5	WEGE	AEN	4500	<50	<1.0	6	60	440	4			
P_L TRNCH	PI-3	07/19/94	3.5	WEGE	AEN	<0.2	<1.0	<.005	<.005	<.005	<.005	5			
P_L TRNCH	PI-4	07/19/94	4	WEGE	AEN	<0.2	<1.0	<.005	<.005	<.005	<.005	6			
P_L TRNCH	PI-5	07/19/94	3.5	WEGE	AEN	<1.0	<1.0	<.005	<.005	<.005	<.005	7			
TNK FIELD	TP1	07/19/94	12.5	WEGE	AEN		60	<.005	0.015	0.007	0.009				
TNK FIELD	TP2	07/19/94	12.5	WEGE	AEN		230	<1.0	0.79	2.2	0.7			<0.2	
TNK FIELD	TP3	07/19/94	13	WEGE	AEN	94		0.18	0.25	1	5.9	3		* 0.77	ND
TNK FIELD	TP4	07/19/94	13	WEGE	AEN	1400		1.9	3.5	12	150	4			
TNK FIELD	TP5	07/19/94	13	WEGE	AEN	300		<.5	0.74	4.8	20	3			
TNK FIELD	TP6	07/19/94	13	WEGE	AEN	0.7		<.005	<.005	0.006	<.005	3			ND
TNK FIELD	TP7	07/19/94	13	WEGE	AEN	<0.2		<.005	<.005	<.005	<.005	3			
TNK CAVTY	TC-1	06/19/94	16	WEGE	AEN	<0.2		<.005	<.005	<.005	<.005				
TNK CAVTY	TC-2	08/19/94	16	WEGE	AEN	93		<0.01	0.28	0.63	3.1				
TNK CAVTY	TC-3	08/19/94	17.5	WEGE	AEN	2.4	1	0.008	0.02	0.02	0.11				
TNK CAVTY	TC-4	08/19/94	15.5	WEGE	AEN	0.7	2	<.005	<.005	<.005	<.005				
TNK CAVTY	TC-5	06/19/94	17	WEGE	AEN	190		0.17	0.38	0.99	7.9				
TNK CAVTY	TC-6	08/19/94	18	WEGE	AEN	<0.2		<.005	<.005	<.005	<.005				
TNK CAVTY	SM-1	06/18/94	19.5	WEGE	AEN	0.4		<.005	<.005	<.005	<.005				
TNK CAVTY	TC2-1	09/27/94	17	WEGE	AEN	<0.2		<.005	<.005	<.005	<.005				
TNK CAVTY	TC2-2	09/27/94	13	WEGE	AEN	13		0.06	0.019	0.026	<.005				
TNK CAVTY	TC2-3	09/27/94	16	WEGE	AEN	<0.2		<.005	<.005	<.005	<.005				
TNK CAVTY	TC2-4	09/27/94	13	WEGE	AEN	<0.2		<.005	<.005	<.005	<.005				
TNK CAVTY	TC2-5	09/27/94	12	WEGE	AEN	100	200	0.13	0.12	0.1	0.25				
TNK CAVTY	TC2-7	09/27/94	13	WEGE	AEN	6.3	37	<.005	<.005	<.005	<.005				
TNK CAVTY	TC2-8	09/27/94	13	WEGE	AEN	<1.0	16	<.005	<.005	<.005	<.005				
TNK CAVTY	TC2-9	09/27/94	19	WEGE	AEN	0.4		<.005	<.005	<.005	<.005				
TNK CAVTY	TC2-11	09/27/94	13	WEGE	AEN	2200		9.6	21	40	260				
TNK CAVTY	TC2-12	09/27/94	12	WEGE	AEN	130		0.33	0.29	0.66	7.9				
TNK CAVTY	TC2-13	09/27/94	20	WEGE	AEN	620		1.1	4.9	6.4	66				
TNK CAVTY	TC2-14	09/27/94	11	WEGE	AEN	92		0.096	0.1	0.17	1.7				
TNK CAVTY	TC2-15	09/27/94	17	WEGE	AEN	<0.2		<.005	<.005	<.005	<.005				
TNK CAVTY	TC2-16	09/27/94	14	WEGE	AEN	<1.0		<.005	<.005	<.005	<.005				
DISP ISL	DI-1	08/19/94	3.5	WEGE	AEN	720		0.19	2	9	53				
DISP ISL	DI-2	08/19/94	3.5	WEGE	AEN	280		0.12	0.8	4.6	33				
DISP ISL	DI-3	08/19/94	3	WEGE	AEN	<0.2		<.005	<.005	<.005	<.005				

TABLE 2
SOIL ANALYTICAL RESULTS
FORMER USA GASOLINE STATION 57
10700 MACARTHUR BOULEVARD, OAKLAND, CA

Sample ID	Sample Depth (feet bgs)	Date Collected	TPHG (mg/Kg)	Benzene (mg/Kg)	Toluene (mg/Kg)	Ethyl-benzene (mg/Kg)	Total Xylenes (mg/Kg)	MTBE (mg/Kg)	TBA (mg/Kg)	DIPE (mg/Kg)	ETBE (mg/Kg)	TAME (mg/Kg)	1,2-DCA (mg/Kg)
Boring EX-1													
EX-1-11	11	10/6/05	**23**	<0.005	<0.005	<0.005	<0.005	<0.005	<0.50	<0.020	<0.020	<0.020	<0.020
EX-1-16	16	10/6/05	**100**	<0.020*	<0.020*	<0.020*	**0.034**	<0.020*	<2.0*	<0.040*	<0.040*	<0.040*	<0.040*
EX-1-21	21	10/6/05	**120**	**0.018**	<0.010*	**0.34**	**0.79**	**0.033**	<1.0*	<0.020	<0.020	<0.020	<0.020
Boring EX-2													
EX-2-11	11	10/7/05	**6**	<0.005	<0.005	<0.005	**0.0113**	<0.005	<0.50	<0.020	<0.020	<0.020	<0.020
Boring EX-3													
EX-3-11	11	10/6/05	<1.0	<0.005	<0.005	<0.005	<0.005	<0.005	<0.50	<0.020	<0.020	<0.020	<0.020
EX-3-15.5	15.5	10/6/05	<1.0	<0.005	<0.005	<0.005	<0.005	<0.005	<0.50	<0.020	<0.020	<0.020	<0.020
EX-3-20.5	20.5	10/6/05	<1.0	<0.005	<0.005	<0.005	<0.005	<0.005	<0.50	<0.020	<0.020	<0.020	<0.020
Boring EX-4													
EX-4-6	6	10/6/05	**1.4**	**0.020**	<0.005	**0.013**	<0.005	<0.005	<0.50	<0.020	<0.020	<0.020	<0.020
EX-4-11	11	10/6/05	**26**	**0.064**	**0.015**	**0.067**	**0.56**	<0.005	<0.50	<0.020	<0.020	<0.020	<0.020
EX-4-16.5	16.5	10/6/05	**510**	**1.1**	**3.6**	**2.2**	**43**	<0.20*	<20*	<0.40*	<0.40*	<0.40*	<0.40*
EX-4-21	21	10/6/05	<1.0	**0.068**	<0.005	**0.013**	**0.029**	<0.005	<0.50	<0.020	<0.020	<0.020	<0.020
EX-4-25.5	25.5	10/6/05	**18**	<0.005	<0.005	**0.008**	**0.178**	<0.005	<0.50	<0.020	<0.020	<0.020	<0.020

TABLE 2
SOIL ANALYTICAL RESULTS
FORMER USA GASOLINE STATION 57
10700 MACARTHUR BOULEVARD, OAKLAND, CA

Sample ID	Sample Depth (feet bgs)	Date Collected	TPHG (mg/Kg)	Benzene (mg/Kg)	Toluene (mg/Kg)	Ethyl-benzene (mg/Kg)	Total Xylenes (mg/Kg)	MTBE (mg/Kg)	TBA (mg/Kg)	DIPE (mg/Kg)	ETBE (mg/Kg)	TAME (mg/Kg)	1,2-DCA (mg/Kg)

Explanation

TPHG = Total petroleum hydrocarbons as gasoline
BTEX = Benzene, toluene, ethylbenzene, and xylenes
MTBE = Methyl tertiary butyl ether
TBA=Tertiary butyl alcohol
DIPE =Di-isopropyl ether
ETBE = Ethyl tertiary butyl ether
TAME = Tertiary amyl methyl ether
1,2-DCA=1,2-Dichloroethane
bgs = below ground surface
mg/Kg = milligrams per kilogram
* = Reporting limits increased due to high concentrations of target analytes

Analytical Methods

TPHG analyzed using EPA Method SW8015B/DHS LUFT Manual
BTEX, MTBE, TBA, DIPE, ETBE, TAME, and 1,2-DCA analyzed using EPA Method SW8260B

Analytical Laboratory

Alpha Analytical, Inc. (ELAP #2019)

TABLE 2
SOIL ANALYTICAL RESULTS
FORMER USA GASOLINE STATION 57
10700 MACARTHUR BOULEVARD, OAKLAND, CA

Sample ID	Sample Depth (feet bgs)	Date Collected	GRO (mg/Kg)	Benzene (mg/Kg)	Toluene (mg/Kg)	Ethyl-benzene (mg/Kg)	Total Xylenes (mg/Kg)	MTBE (mg/Kg)	TBA (mg/Kg)	DIPE (mg/Kg)	ETBE (mg/Kg)	TAME (mg/Kg)
Boring AS-1												
AS-1-11 Ft.	11	8/23/07	**80**	<0.02*	<0.02*	**0.057**	0.041	<0.02*	<2.0*	<0.04*	<0.04*	<0.04*
AS-1-16 Ft.	16	8/23/07	**500**	<0.2*	<0.2*	**8.8**	**1.72**	<0.2*	<20*	<0.4*	<0.4*	<0.4*
Boring AS-2												
AS-2-16 Ft.	16	8/23/07	**1.6**	**0.0058**	<0.005	<0.005	<0.005	<0.005	<0.50	<0.020	<0.020	<0.020
AS-2-21 Ft.	21	8/23/07	**19**	**0.67**	**0.018**	**0.43**	**1.31**	<0.01*	<1.0*	<0.02*	<0.02*	<0.02*
AS-2-26 Ft.	26	8/23/07	**1.3**	**0.16**	<0.005	**0.029**	**0.031**	<0.005	<0.50	<0.020	<0.020	<0.020

Explanation

GRO = Gasoline range organics
BTEX = Benzene, toluene, ethylbenzene, and xylenes
MTBE = Methyl tertiary butyl ether
TBA=Tertiary butyl alcohol
DIPE =Di-isopropyl ether
ETBE = Ethyl tertiary butyl ether
TAME = Tertiary amyl methyl ether
bgs = below ground surface
mg/Kg = milligrams per kilogram
* = Reporting limits increased due to high concentrations of target analytes

Analytical Methods

GRO analyzed using EPA Method SW8015B/DHS LUFT Manual
BTEX, MTBE, TBA, DIPE, ETBE, and TAME analyzed using EPA Method SW8260B

Analytical Laboratory

Alpha Analytical, Inc. (ELAP #2019)

APPENDIX D

SOIL EXCAVATION MASS REMOVAL CALCULATIONS

Former USA Station No. 57
10700 MacArthur Boulevard
Oakland, California
Mass of TPHG, Benzene, and TPHD in Stockpiled Soil

Basis	**Avg Conc mg/kg**	**Soil Volume cu.ft**	**Soil Density Kg/cu.ft**	**Soil Mass Kg**	**Mass Kg**
TPHG	192.46	20,925.00	36.85	771,086.25	**148.40**
Benzene	0.09	20,925.00	36.85	771,086.25	**0.07**
TPHD	376.40	1,350.00	36.85	49,747.50	**18.72**

Notes:

1. Average concentrations based on data from Western Geo-Sciences (1994).
2. Stockpile for TPHG and benzene assumed to be 775 cubic yards.
3. Stockpile for TPHD assumed to be 50 cubic yards.

APPENDIX E

DUAL PHASE EXTRACTION AND DUAL PHASE EXTRACTION/AIR SPARGE REMEDIATION DATA

TABLE 1
DPE TEST USING WELL S-2
Former USA Station No. 57
10700 MacArthur Boulevard
Oakland, California

Date & Time	TE hh:mm	Appl Vac "Hg	Air Flow cfm	Totalizer Reading gallons	GW Ext Rate gpm	Inf PID ppmv	Oper Temp deg F	Induced Vacuum ("WC) &/or DTW (feet bgs) Data in Observation Wells														
								S-1			MW-3			MW-4		MW-5		MW-7			MW-8	
								Vac	DTW	DD	Vac	DTW	DD	DTW	DD	DTW	DD	Vac	DTW	DD	DTW	DD
7/6/2004 7:00				42,120					18.13			15.70		12.26		18.07			18.19		19.55	
7/6/2004 8:30		Start Up Test using well S-2, DTW =20.26 feet bgs and DPE unit hour meter reading = 839.6																				
7/6/2004 9:00	00:30	25.50	87	42,120	--	2.9	1,450	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
7/6/2004 10:00	01:30	NM	NM	42,120	--	23.0	NM	0.35	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
7/6/2004 11:00	02:30	26.25	88	42,130	0.07	29.0	1,466	1.30	18.38	0.25	0.0	15.70	0.00	12.27	0.01	18.08	0.01	0.0	18.30	0.11	19.58	0.03
7/6/2004 12:00	03:30	26.50	87	42,200	0.33	24.0	1,444	0.50	18.58	0.45	0.0	15.69	-0.01	12.25	-0.01	18.05	-0.02	0.0	18.35	0.16	19.51	-0.04
7/7/2004 6:30	22:00	23.50	86	42,820	0.47	7.1	1,456	0.20	18.65	0.52	0.0	15.70	0.00	12.26	0.00	18.04	-0.03	0.0	18.38	0.19	19.55	0.00
7/7/2004 6:50	22:20	Discontinue Test on S-2																				
Distance to Extraction Well S-2								50			60			135		170		70			100	
Screening Interval		20 - 40 (S-2)						20 - 40			24 - 44			10 - 40.5		10 - 40		10 - 40.5			10 - 35	

Notes:

TE - Time Elapsed, hours: minutes
Appl - Applied
Oper - Operating
Vac - Vacuum
DTW - depth to groundwater
" WC - Inches water column
ppmv - parts per million by volume
Temp - Temperature
deg F - degree Farenheit
Ext. - Extraction

cfm - cubic feet per minute
Inf - Influent
DD - Drawdown
GW Ext - Groundwater Extraction
PID - Photo Ionization Detector
All induced vacuum measured in observation wells were in "WC
gpm - gallons per minute
"Hg - Inches Mercury
bgs - below ground surface
NM - Not measured

TABLE 2
DPE TEST USING WELL S-1

Former USA Station No. 57
10700 MacArthur Boulevard
Oakland, California

Date & Time	TE hh:mm	Appl Vac "Hg	Air Flow cfm	Totalizer Reading gallons	GW Ext Rate gpm	Inf PID ppmv	Oper Temp. deg F	Induced Vacuum ("WC) &/or DTW (feet bgs) Data in Observation Wells														
								S-2			MW-3			MW-4		MW-5		MW-7			MW-8	
								Vac	DTW	DD	Vac	DTW	DD	DTW	DD	DTW	DD	Vac	DTW	DD	DTW	DD
7/7/2004 7:05	Start Up Test using Well S-1																					
7/7/2004 7:05	0.00	NM	NM	42,820	NM	NM	NM	NM	NM		NM	15.70		12.26		18.07			18.38		19.55	
7/7/2004 7:30	00:25	24.00	86	42,890	2.80	1.5	1,459	+7.4	30.08		NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
7/7/2004 8:00	00:55	24.00	87	42,890	--	0.6	1,456	+4.4	25.35	-4.73	0.0	15.70	0.00	12.25	-0.01	18.06	-0.01	0.0	18.38	0.00	19.55	0.00
7/7/2004 9:00	01:55	24.00	87	42,960	0.61	0.0	1,457	+0.2	22.16	-7.92	0.0	15.70	0.00	12.25	-0.01	18.07	0.00	0.0	18.38	0.00	19.55	0.00
7/7/2004 9:05	02:00	Discontinue Test on S-1																				
Distance to Extraction Well S-1								50			60			110		170		80			105	
Screening Interval		20 - 40 (S-1)						20 - 40			24 - 44			10 - 40.5		10 - 40		10 - 40.5			10 - 35	

Notes:

TE - Time Elapsed, hours: minutes
Appl - Applied
Oper - Operating
Vac - Vacuum
DTW - depth to groundwater
" WC - Inches water column
ppmv - parts per million by volume
Temp - Temperature
deg F - degree Farenheit
Ext. - Extraction

cfm - cubic feet per minute
Inf - Influent
DD - Drawdown
GW Ext - Groundwater Extraction
PID - Photo Ionization Detector
All induced vacuum measured in observation wells were in "WC
gpm - gallons per minute
"Hg - Inches Mercury
bgs - below ground surface
NM - Not measured

TABLE 3
DPE TEST USING WELL MW-3
Former USA Station No. 57
10700 MacArthur Boulevard
Oakland, California

Date & Time	TE	Appl Vac	Air Flow	Totalizer Reading	GW Ext Rate	Inf PID	Oper Temp	Induced Vacuum ("WC) &/or DTW (feet bgs) Data in Observation Wells														
								S-1			S-2			MW-4		MW-5		MW-7			MW-8	
	hh:mm	"Hg	cfm	gallons	gpm	ppmv	deg F	Vac	DTW	DD	Vac	DTW	DD	DTW	DD	DTW	DD	Vac	DTW	DD	DTW	DD
7/7/2004 9:25	Start Up Test using Well MW-3																					
7/7/2004 9:25	0.00	NM	NM	42,960	--	NM	NM	NM	NM	--	NM	22.16	--	12.26	--	18.07	--	NM	18.38	--	19.55	NM
7/7/2004 10:00	00:35	24.50	87	42,960	--	0.0	1,450	0.0	NM	--	NM	NM	--	NM	--	NM	--	NM	NM	--	NM	NM
7/7/2004 10:30	01:05	25.50	87	42,960	--	0.0	1,447	0.0	19.38	--	+0.6	21.00	-1.16	12.25	0.00	18.06	-0.01	0.0	18.36	-0.02	19.53	-0.02
7/7/2004 11:30	02:05	26.00	87	42,960	--	0.0	1,456	0.0	19.11	-0.27	+0.2	20.91	-1.25	12.25	0.00	18.06	-0.01	0.0	18.35	-0.03	19.53	-0.02
7/7/2004 11:35	02:10	Discontinue test on MW-3																				
Distance to Extraction Well MW-3								60			60			170		220		120			50	
Screening Interval		24-44 (MW-3)						20 - 40			20 - 40			10 - 40.5		10 - 40		10 - 40.5			10 - 35	

Notes:

TE - Time Elapsed, hours: minutes
Appl - Applied
Oper - Operating
Vac - Vacuum
DTW - depth to groundwater
" WC - Inches water column
ppmv - parts per million by volume
Temp - Temperature
deg F - degree Farenheit
Ext. - Extraction

cfm - cubic feet per minute
Inf - Influent
DD - Drawdown
GW Ext - Groundwater Extraction
PID - Photo Ionization Detector
All induced vacuum measured in observation wells were in "WC
gpm - gallons per minute
"Hg - Inches Mercury
bgs - below ground surface
NM - Not measured

TABLE 4
COMBINED DPE TEST USING WELLS S-1, S-2, AND MW-3

Former USA Station No. 57
10700 MacArthur Boulevard
Oakland, California

Date & Time	TE hh:mm	Appl Vac "Hg	Air Flow cfm	Totalizer Reading gallons	GW Ext Rate gpm	Inf PID ppmv	Oper Temp deg F	MW-4		MW-5		MW-6		MW-7			MW-8		
								DTW	DD	DTW	DD	Vac	DTW	Vac	DTW	DD	Vac	DTW	DD
7/7/2004 11:35	Start Test on S-1, S-2 and MW-3																		
7/7/2004 11:35	0.00	NM	NM	42,960	NM	NM	NM	12.25	--	18.06	--	NM	DRY	NM	18.35	--	NM	19.53	--
7/8/2004 6:15	18:40	22.25	87	44,610	1.47	4.0	1,460	12.25	0.00	18.11	0.05	0.0	DRY	0.0	18.63	0.28	0.0	19.70	0.17
7/9/2004 6:00	42:25	23.00	86	46,960	0.92	2.3	1,440	12.33	0.08	18.18	0.12	0.0	DRY	0.0	18.72	0.37	0.0	20.02	0.49
7/10/2004 6:00	66:25	23.00	86	48,690	0.43	3.5	1,460	12.41	0.16	18.26	0.2	0.0	DRY	0.0	18.78	0.43	0.0	20.32	0.79
7/11/2004 6:00	90:25	21.00	86	50,760	0.38	3.2	1,456	12.41	0.16	18.27	0.21	0.0	DRY	0.0	18.81	0.46	0.0	20.58	1.05
7/12/2004 6:30	114:55	22.50	86	52,780	0.29	3.0	1,453	12.42	0.17	18.32	0.26	0.0	DRY	0.0	18.84	0.49	0.0	20.75	1.22
7/15/2004 6:00	186:25	22.50	86	58,760	0.53	4.0	1,446	12.27	0.02	18.36	0.3	0.0	DRY	0.0	18.90	0.55	0.0	21.17	1.64
7/19/2004 5:45	282:10	23.25	86	66,320	0.45	3.2	1,459	11.67	-0.58	18.23	0.17	0.0	DRY	0.0	18.98	0.63	0.0	21.50	1.97
7/22/2004 5:45	354:10	23.25	86	71,870	0.26	3.0	1,458	12.05	-0.20	18.33	0.27	0.0	DRY	0.0	19.03	0.68	0.0	21.65	2.12
7/25/2004 10:36	431:01			77,720	0.23	**Discontinue DPE Test. DPE unit hour meter reading = 1,297.7**													
Distance to Nearest Extraction Well								110		170		110		70			50		
Screening Interval								10 - 40.5		10 - 40		10 - 40.5		10 - 40.5			10 - 35		

Notes:

TE - Time Elapsed, hours: minutes
Appl - Applied
Oper - Operating
Vac - Vacuum
DTW - depth to groundwater
" WC - Inches water column
ppmv - parts per million by volume
Temp - Temperature
deg F - degree Farenheit
Ext. - Extraction

cfm - cubic feet per minute
Inf - Influent
DD - Drawdown
GW Ext - Groundwater Extraction
PID - Photo Ionization Detector
All induced vacuum measured in observation wells were in "WC
gpm - gallons per minute
"Hg - Inches Mercury
bgs - below ground surface
NM - Not measured

TABLE 5
SOIL VAPOR ANALYTICAL RESULTS
Former USA Station No. 57
10700 MacArthur Boulevard
Oakland, California

Sample Date	Sample Time	Sample ID	Sample Type	TPHG	Benzene	Toluene	Ethyl-benzene	Total Xylenes	MTBE
07/06/04	1030	Eff Air	Air	<12	<0.12	<0.12	<0.12	<0.12	<0.12
07/06/04	1032	Inf Cat Air	Air	**660**	**2.1**	**0.38**	**1.2**	**1.1**	**1.0**
07/07/04	0904	Inf Cat Air S-1	Air	<12	<0.12	<0.12	<0.12	<0.12	**0.29**
07/07/04	1126	Inf Cat Air MW-3	Air	<12	<0.12	<0.12	<0.12	<0.12	**0.13**
07/19/04	0641	Eff Air	Air	<12	<0.12	<0.12	<0.12	<0.12	<0.12
07/19/04	0644	Inf Cat Air	Air	**88**	**0.26**	<0.12	<0.12	**0.19**	**0.25**

All air sample values reported in milligrams per cubic meter (mg/m^3)

TPHG = Total petroleum hydrocarbons as gasoline
BTEX = Benzene, toluene, ethylbenzene, and total xylenes
MTBE = Methyl tertiary butyl ether

Analytical Laboratory
Alpha Analytical, Inc. (ELAP #2019)

Analytical Methods
TPHG analyzed by EPA Method SW8015B/DHS LUFT Manual
BTEX and MTBE analyzed by EPA Method SW8260B

TABLE 6
GROUNDWATER ANALYTICAL RESULTS

Former USA Station No. 57
10700 MacArthur Boulevard
Oakland, California

Sample Date	Sample Time	Sample ID	Sample Type	TPHG	Benzene	Toluene	Ethyl-benzene	Total Xylenes	MTBE	TBA	DIPE	ETBE	TAME	Methanol	Ethanol
07/06/04	1050	S-2	Water	2200	13	1.8	10	26.9	66	170	<1.0	<1.0	<1.0	<5,000	<5,000
07/08/04	0854	Influent	Water	<100[1]	<0.50	<0.50	0.66	4.4	16	NA	NA	NA	NA	NA	NA
07/08/04	0905	GAC Influent	Water	110	<0.50	<0.50	<0.50	1.89	17	NA	NA	NA	NA	NA	NA
07/08/04	1030	Effluent	Water	<50	<0.50	<0.50	<0.50	<0.50	<0.50	NA	NA	NA	NA	NA	NA
07/19/04	0623	Effluent	Water	<50	<0.50	<0.50	<0.50	<0.50	<0.50	<10	<1.0	<1.0	<1.0	NA	NA
07/19/04	0630	Influent	Water	<50	<0.50	<0.50	<0.50	0.52	3.7	56	<1.0	<1.0	<1.0	NA	NA
07/27/04	1118	Effluent	Water	<50	<0.50	<0.50	<0.50	<0.50	<0.50	<10	<1.0	<1.0	<1.0	NA	NA

All water sample values reported in micrograms per liter (µg/L)
TPHG = Total petroleum hydrocarbons as gasoline
BTEX = Benzene, toluene, ethylbenzene, and total xylenes
MTBE = Methyl tertiary butyl ether
TBA = Tertiary butyl alcohol
DIPE = Di-isopropyl ether
ETBE = Ethyl tertiary butyl ether
TAME = Tertiary amyl methyl ether
NA = Not analyzed
[1] Reporting limits were increased due to sample foaming

Analytical Laboratory
Alpha Analytical , Inc. (ELAP #2019)

Analytical Methods
TPHG analyzed by EPA Method SW8015B/DHS LUFT Manual
BTEX, MTBE, TBA, DIPE, ETBE, & TAME analyzed by EPA Method SW8260B
Methanol & Ethanol analyzed by EPA Method SW8260B-DI

TABLE 7
PETROLEUM HYDROCARBON MASS EXTRACTION RATES SUMMARY
Former USA Station No. 57
10700 MacArthur Boulevard
Oakland, California

Date	Test Well ID	Flowrate (cfm)	Influent Concentration (mg/m^3)			Soil Vapor Extraction Rate from Wells (lbs/day)			Cumulative Mass (TPHG) Removed	
									Period[1]	Total
			TPHG	Benzene	MTBE	TPHG	Benzene	MTBE	lbs	lbs
07/06/04	S-2	87.0	660	2.1	1.0	5.16	0.01	0.01	5.16	5.16
07/07/04	S-1	87.0	<12	<0.12	0.29	<0.09	<0.001	0.002	0.01	5.17
07/07/04	MW-3	87.0	<12	<0.12	0.13	<0.09	<0.001	0.001	0.01	5.18
07/19/04	S-1, S-2, MW-3	86.0	88	0.26	0.25	0.68	0.002	0.002	8.16	13.34

Date	Test Well ID	Volume of groundwater extracted[2], gallons	Influent Concentration (µg/L)			Mass Extracted from groundwater (lbs)			Cumulative Mass (TPHG) Removed	
									Period	Total
			TPHG	Benzene	MTBE	TPHG	Benzene	MTBE	lbs	lbs
07/06/04	S-2	80	2,200	13	66	0.001	0.00001	0.00004	0.001	0.001
07/08/04	S-1, S-2, MW-3	2,490	<100	<0.50	16	<0.002	<0.00001	0.0003	0.012	0.014
07/19/04	S-1, S-2, MW-3	21,710	<50	<0.50	4	<0.01	<0.0001	0.001	0.008	0.015

Sample Calculations

Ext. Rate from Wells (vapor) = 40 cu ft x / min 8,400 mg / cu meter lb / 453593 m x 1,440 min / day x cu meter / 35.314 cu ft
= 30.21 lbs/day

Mass removed from groundwater = concentration (µg/L) x gallons extracted x (2.2046 x 10^{-9})(lb/mg) / 0.26418 (gal/L)

[1] For mass estimates between the sampling dates, average mass extraction rate and time elapsed (operational uptime) between the sampling events were used

[2] Volume estimated based on flow totalizer measurements taken on the sampling days

Based on average groundwater extraction rate of 0.63 gpm and the average concentrations, the mass extraction rate for is calculated using:

Mass removed from groundwater (lbs/day) = concentration (µg/L) x average flowrate (gpm) x (2.2046 x 10^{-9})(lb/mg) / 0.26418 (gal/L) * 60 (mins/hr)*24 (hr/day)

TPHG = 0.017 lbs/day
Benzene = 0.0001 lbs/day
MTBE = 0.0002 lbs/day

TABLE 2
DPE EVENT FIELD OBSERVATION SUMMARY
2nd DPE Event - June/July 2005
Former USA Station No. 57
10700 MacArthur Boulevard
Oakland, California

Date	Hour Meter Reading	TE days	Appl Vac "Hg	Air Flow cfm	Totalizer Reading gallons	GW Ext Rate gpm	Inf PID ppmv	Oper Temp deg F	MW-4		MW-5		MW-6			MW-7			MW-8		
									DTW	DD	DTW	DD	Vac	DTW	DD	Vac	DTW	DD	Vac	DTW	DD
06/06/05	Begin June/July 2005 DPE Event, Using Wells S-1, S-2, and MW-3 for Extraction; Hour Meter Reading Prior to Test Start up = 3361.2																				
06/06/05	3361.20	--	24.00	26.6	23,710	--	125.0	1,471	6.65	--	10.91	--	0.00	15.67	--	0.00	14.79	--	0.00	14.08	--
06/07/05	3383.60	0.93	24.00	NM	25,480	1.32	NM	1,443	NM	NM	NM	NM	0.02	NM	NM	0.00	NM	NM	0.00	NM	NM
06/09/05	3416.60	2.31	23.00	27.7	27,160	0.85	6.0	1,473	6.10	-0.55	10.62	-0.29	0.00	14.58	-1.09	0.00	13.58	-1.21	0.00	14.90	0.82
06/14/05	3468.10	4.45	24.00	28.4	31,000	1.24	6.0	1,450	6.35	-0.30	10.80	-0.11	0.00	15.60	-0.07	0.00	13.56	-1.23	0.00	14.81	0.73
06/16/05	3515.00	6.41	25.00	23.0	34,450	1.23	5.0	1,472	6.33	-0.32	10.98	0.07	0.00	15.85	0.18	0.00	13.97	-0.82	0.00	14.98	0.90
06/21/05	3638.20	11.54	25.00	39.4	43,130	1.17	0.0	1,470	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
06/28/05	3804.80	18.48	24.00	39.3	53,540	1.04	NM	1,456	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
07/01/05	3877.30	21.50	24.00	31.9	57,950	1.01	5.0	1,473	6.46	-0.19	11.09	0.18	0.00	15.65	-0.02	0.00	14.18	-0.61	0.00	16.35	2.27
07/01/05	3878.10	21.54	Event End Hr. Meter		58,050		Discontinue DPE Event														
Distance to Nearest Extraction Well									**110**		**170**		**110**			**70**			**50**		
Screening Interval									**10 - 40.5**		**10 - 40**		**10 - 40.5**			**10 - 40.5**			**10 - 35**		

Notes:

TE - Time Elapsed, days
Appl - Applied
Oper - Operating
Vac - Vacuum
DTW - depth to groundwater
" WC - Inches water column
* = time elapsed based on hour meter readings
ppmv - parts per million by volume
Temp - Temperature
deg F - degree Farenheit
Ext. - Extraction

cfm - cubic feet per minute
Inf - Influent
DD - Drawdown
GW Ext - Groundwater Extraction
PID - Photo Ionization Detector
All induced vacuum measured in observation wells were in "WC
gpm - gallons per minute
"Hg - Inches Mercury
bgs - below ground surface
NM - Not measured

TABLE 3
SOIL VAPOR ANALYTICAL RESULTS
2nd DPE Event - June/July 2005
Former USA Station No. 57
10700 MacArthur Boulevard
Oakland, California

Sample Date	Sample Time	Sample ID	TPHG	Benzene	Toluene	Ethyl-benzene	Total Xylenes	MTBE	TBA
06/06/05	11:18	SYS INF Air	**160**	**4.4**	**0.72**	**0.55**	**1.35**	**3.6**	<7.5
06/06/05	11:15	Eff Air	<15	<0.30	<0.30	<0.30	<0.30	<0.30	<7.5
06/28/05	06:16	Inf Air	<15	<0.15	<0.15	<0.15	<0.15	<0.15	NA
07/01/05	05:41	SYS INF AIR*	<50	<0.50	<0.50	<0.50	<1.0	<0.50	<5.0
07/01/05	05:39	EFF AIR*	<50	<0.50	<0.50	<0.50	<1.0	<0.50	<5.0

Notes

All air sample values reported in milligrams per cubic meter (mg/m^3)
TPHG = Total petroleum hydrocarbons as gasoline
BTEX = Benzene, toluene, ethylbenzene, and total xylenes
MTBE = Methyl tertiary butyl ether
TBA = Tertiary butyl alcohol
ETBE = Ethyl tertiary butyl ether
TAME = Tertiary amyl methyl ether
DIPE = Di-isopropyl ether
DIPE, ETBE, and TAME were reported below laboratory reporting limits in all samples.
NA = Not Analyzed

Analytical Laboratory

Alpha Analytical, Inc. (Alpha [ELAP #2019])
* = Analyzed by Severn Trent Laboratories (STL [ELAP #2496])

Analytical Methods

TPHG analyzed by EPA Method SW8015B/DHS LUFT Manual (Alpha) & by 8260B (STL)
BTEX, MTBE, TBA, DIPE, TAME, and ETBE analyzed by EPA Method SW8260B

TABLE 4
GROUNDWATER ANALYTICAL RESULTS
2nd DPE Event - June/July 2005
Former USA Station No. 57
10700 MacArthur Boulevard
Oakland, California

Sample Date	Sample Time	Sample ID	TPHG	Benzene	Toluene	Ethyl-benzene	Total Xylenes	MTBE	TBA	DIPE	ETBE	TAME
06/06/05	11:34	Influent	**590**	**11**	**3.8**	**6.1**	**33**	**62**	**140**	<1.0	<1.0	<1.0
06/07/05	09:41	MID (Fluent)	<50	<0.50	<0.50	<0.50	<0.50	<0.50	<10	<1.0	<1.0	<1.0
06/07/05	09:39	EFF	<50	<0.50	<0.50	<0.50	<0.50	<0.50	<10	<1.0	<1.0	<1.0
06/28/05	06:08	Influent	<50	<0.50	<0.50	<0.50	<0.50	**2.6**	**52**	<1.0	<1.0	<1.0
06/28/05	06:04	Mid GAC	<50	<0.50	<0.50	<0.50	<0.50	<0.50	<10	<1.0	<1.0	<1.0
06/28/05	06:00	Effluent	<50	<0.50	<0.50	<0.50	<0.50	<0.50	<10	<1.0	<1.0	<1.0
07/01/05	05:46	INF	<50	<0.50	<0.50	<0.50	<0.50	**2.2**	**64**	<1.0	<1.0	<1.0
07/01/05	05:54	GAC-1	<50	<0.50	<0.50	<0.50	<0.50	<0.50	<10	<1.0	<1.0	<1.0
07/01/05	05:58	EFF	<50	<0.50	<0.50	<0.50	<0.50	<0.50	<10	<1.0	<1.0	<1.0

All water sample values reported in micrograms per liter (µg/L)
TPHG = Total petroleum hydrocarbons as gasoline
BTEX = Benzene, toluene, ethylbenzene, and total xylenes
MTBE = Methyl tertiary butyl ether
TBA = Tertiary butyl alcohol
DIPE = Di-isopropyl ether
ETBE = Ethyl tertiary butyl ether
TAME = Tertiary amyl methyl ether

Analytical Laboratory
Alpha Analytical , Inc. (ELAP #2019)

Analytical Methods
TPHG analyzed by EPA Method SW8015B/DHS LUFT Manual
BTEX, MTBE, TBA, DIPE, ETBE, & TAME analyzed by
EPA Method SW8260B

TABLE 5
PETROLEUM HYDROCARBON MASS EXTRACTION SUMMARY
2nd DPE Event June/July 2005

Former USA Station No. 57
10700 MacArthur Boulevard
Oakland, California

Date	Time Elapsed (days)	Flowrate (cfm)	Influent Concentration (mg/m^3)			Soil Vapor Extraction Rate from Wells (lbs/day)			Cumulative Mass (TPHG) Removed	
			TPHG	Benzene	MTBE	TPHG	Benzene	MTBE	Period[1] lbs	Total lbs
Petroleum hydrocarbon mass removed during first DPE event conducted during July 2004									13.34	13.34
06/06/05	-	26.6	160	4.4	3.6	0.378	0.010	0.009	0.378	13.718
06/28/05	18.48	39.3	<15	<0.15	<0.15	<0.052	<0.001	<0.001	3.980	17.698
07/01/05	21.54	31.9	<50	<0.50	<0.50	<0.142	<0.001	<0.001	<2.091	19.789

Date		Volume of groundwater extracted[2], gallons	Influent Concentration (µg/L)			Mass Extracted from groundwater (lbs)			Cumulative Mass Removed	
			TPHG	Benzene	MTBE	TPHG	Benzene	MTBE	TPHG lbs	MTBE lbs
Petroleum hydrocarbon mass removed during first DPE event conducted during July 2004									0.015	0.00149
06/06/05	-	56[3]	590	11	62	0.00028	0.00001	0.00003	0.01528	0.00152
06/28/05	18.48	29,830	<50.0	<0.50	2.6	0.07966	0.00143	0.00804	0.09493	0.00956
07/01/05	21.54	4,510	<50.0	<0.50	2.2	<0.00188	<0.00002	0.00009	0.09682	0.00965

Sample Calculations

$$\text{Ext. Rate from Wells (vapor)} = \frac{40\text{ cu ft}}{\text{min}} \times \frac{8{,}400\text{ mg}}{\text{cu meter}} \frac{\text{lb}}{453{,}593\text{ mg}} \times \frac{1{,}440\text{ min}}{\text{day}} \times \frac{\text{cu meter}}{35.314\text{ cu ft}}$$

30.21 lbs/day

Mass removed from groundwater = concentration (µg/L) x gallons extracted x (2.2046 x 10^{-9})(lb/mg) / 0.26418 (gal/L)

[1] For mass estimates between the sampling dates, average mass extraction rate and time elapsed (operational uptime) between the sampling events were used

[2] Volume estimated based on flow totalizer measurements taken on the sampling days

[3] Volume estimated based on average groundwater extraction rate and the time elapsed between the sample collection and start-up

The mass extraction rate is calculated by multiplying the mass extracted per day by the operational uptime for the period.

TABLE 1
DPE EVENT FIELD OBSERVATION SUMMARY
3rd DPE Event - August/September 2005

Former USA Station No. 57
10700 MacArthur Boulevard
Oakland, California

Date	Hour Meter Reading	TE days	Appl Vac "Hg	Air Flow cfm	Totalizer Reading gallons	GW Ext Rate gpm	Inf PID ppmv	Oper Temp deg F	Depth to Water, feet bgs and Induced Vacuum, "WC									
									MW-4		MW-5		MW-6			MW-8		
									DTW	DD	DTW	DD	Vac	DTW	DD	Vac	DTW	DD
8/29/05 5:30	Baseline measurements prior to start of third DPE event								8.71	--	12.90	--	0.00	DRY	--	0.00	16.75	--
8/29/05 7:00	**Begin Third DPE Event, Using Wells S-1, S-2, MW-3, and MW-7 for Extraction; Hour Meter Reading Prior to Test Start up = 435.6. Totalizer reading = 22,580**																	
8/29/05 8:30	437.00	0.06	18.00	48.8	22,740	1.90	5.5	1,458	NM	NM	NM	NM	NM	NM	--	NM	NM	--
8/31/05 5:00	480.70	1.88	18.00	37.3	29,840	2.71	5.5	1,456	8.73	0.02	13.18	0.28	0.00	DRY	--	0.00	17.21	0.46
9/6/05 6:00	619.10	7.65	NM	NM	51,690	2.63	System observed non-functional due to low propane											
9/6/05 9:15	System re-started after propane delivery. Based on hour meter readings for 8/31/5 at 0500 hrs & 9/6/5 at 0600 hrs, the DPE system was likely shutdown on 9/5/05 at 23:14 hrs																	
9/6/05 10:15	620.10	7.69	18.00	62.5	51,850	2.67	16.1	1,447	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
9/9/05 5:00	685.70	10.42	16.00	45.0	61,390	2.42	8.1	1,450	8.99	0.28	13.61	0.71	0.00	DRY	--	0.00	18.68	1.93
9/13/05 5:30	780.20	14.36	16.00	40.4	75,020	2.40	2.0	1,457	9.14	0.43	13.78	0.88	0.00	18.67	-0.33	0.00	19.08	2.33
9/16/05 5:00	796.10	15.02	NM	NM	77,310	2.40	System observed non-functional due to high water level in the knockout tank. Based on hour meter readings between 9/13/05 5:30 and 9/16/05 5:00, the DPE system was likely shutdown on 9/13/05 21:24 hrs. Since the influent concentrations were low, the third DPE event was discontinued.											
Distance to Nearest Extraction Well									**86**		**99**		**70**			**48**		
Screening Interval, feet bgs : S-1=20-40 , S-2=20-40, MW-3=24-44, & MW-7=10-40									**10 - 40.5**		**10 - 40**		**10 - 40.5**			**10 - 35**		

Notes:

TE - Time Elapsed calculated as difference of hour meter readings, days
Appl - Applied
Oper - Operating
Vac - Vacuum
DTW - depth to groundwater
" WC - Inches water column
Ext. - Extraction
GW Ext - Groundwater Extraction
GW Ext Rate = Difference of Totalizer Readings, gallons

cfm - cubic feet per minute
Inf - Influent
DD - Drawdown
bgs - below ground surface
gpm - gallons per minute
"Hg - Inches Mercury

Temp - Temperature
deg F - degree Farenheit
PID - Photo Ionization Detector
ppmv - parts per million by volume
NM - Not measured
-- = Not applicable

[1] Flow rate measured using a digital anemometer at 3" diameter steel pipe;
flow rate = velocity X area of pipe (e.g.: flow rate = 994 feet per minute X 0.05 sq.ft)

TABLE 2
SOIL VAPOR ANALYTICAL RESULTS
3rd DPE Event - August/September 2005

Former USA Station No. 57
10700 MacArthur Boulevard
Oakland, California

Sample Date	Sample Time	Sample ID	TPHG	Benzene	Toluene	Ethyl-benzene	Total Xylenes	MTBE	TBA
08/29/05	09:01	USA57ASYSINF	<15	**0.59**	<0.15	**0.23**	**0.44**	**0.41**	<1.5
08/29/05	09:05	USA57ASYSEFF	<15	<0.15	<0.15	<0.15	<0.15	<0.15	<1.5
09/06/05	10:30	Sys Inf Air	<15	<0.15	<0.15	<0.15	<0.15	<0.15	<7.5
09/13/05	05:45	USA57ASYSINF	<15	**0.19**	<0.15	<0.15	<0.15	<0.15	<7.5

Notes

All air sample values reported in milligrams per cubic meter (mg/m^3)
TPHG = Total petroleum hydrocarbons as gasoline
BTEX = Benzene, toluene, ethylbenzene, and total xylenes
MTBE = Methyl tertiary butyl ether
TBA = Tertiary butyl alcohol
ETBE = Ethyl tertiary butyl ether
TAME = Tertiary amyl methyl ether
DIPE = Di-isopropyl ether

Analytical Laboratory

Alpha Analytical, Inc. (Alpha [ELAP #2019])

Analytical Methods

TPHG analyzed by EPA Method SW8015B/DHS LUFT Manual
BTEX, MTBE, TBA, DIPE, TAME, and ETBE analyzed by EPA Method SW8260B

DIPE, ETBE, and TAME were reported below laboratory reporting limits in all samples (<0.30 mg/m^3).

TABLE 3
GROUNDWATER ANALYTICAL RESULTS
3rd DPE Event - August/September 2005

Former USA Station No. 57
10700 MacArthur Boulevard
Oakland, California

Sample Date	Sample Time	Sample ID	TPHG	Benzene	Toluene	Ethyl-benzene	Total Xylenes	MTBE	TBA	DIPE	ETBE	TAME
08/29/05	09:30	USA57WINF	**55**	**3.3**	**<0.50**	**0.68**	**3.3**	**17**	**160**	<1.0	<1.0	<1.0
08/29/05	09:35	USA57WEFF	<50	<0.50	<0.50	<0.50	<0.50	<0.50	<10	<1.0	<1.0	<1.0
09/06/05	10:36	Inf Water	<50	<0.50	<0.50	<0.50	<0.50	**4.7**	**61**	<1.0	<1.0	<1.0
09/13/05	06:20	USA57WINF	<50	<0.50	<0.50	<0.50	<0.50	**2.6**	**29**	<1.0	<1.0	<1.0
09/13/05	06:22	USA57WGAC1	<50	<0.50	<0.50	<0.50	<0.50	<0.50	<10	<1.0	<1.0	<1.0
09/13/05	06:25	USA57WEFF	<50	<0.50	<0.50	<0.50	<0.50	<0.50	<10	<1.0	<1.0	<1.0
09/16/05	5:32	USA57WINF	**67**	<0.50	<0.50	<0.50	**3.8**	**2.3**	**25**	<1.0	<1.0	<1.0

All water sample values reported in micrograms per liter (µg/L)
TPHG = Total petroleum hydrocarbons as gasoline
BTEX = Benzene, toluene, ethylbenzene, and total xylenes
MTBE = Methyl tertiary butyl ether
TBA = Tertiary butyl alcohol
DIPE = Di-isopropyl ether
ETBE = Ethyl tertiary butyl ether
TAME = Tertiary amyl methyl ether

Analytical Laboratory
Alpha Analytical , Inc. (ELAP #2019)

Analytical Methods
TPHG analyzed by EPA Method SW8015B/DHS LUFT Manual
BTEX, MTBE, TBA, DIPE, ETBE, & TAME analyzed by
EPA Method SW8260B

TABLE 4
PETROLEUM HYDROCARBON MASS EXTRACTION SUMMARY
3rd DPE Event August/September 2005

Former USA Station No. 57
10700 MacArthur Boulevard
Oakland, California

Date	Time Elapsed	Flowrate	Influent Concentration (mg/m^3)			Soil Vapor Extraction Rate (lbs/day)			Cumulative Mass (TPHG) Removed	
	(days)	(cfm)	TPHG	Benzene	MTBE	TPHG	Benzene	MTBE	Period[1] lbs	Total lbs
Petroleum hydrocarbon mass removed during the previous DPE events									19.789	19.789
08/29/05	-	48.8	<15	0.59	0.41	<0.065	0.003	0.002	--	--
09/06/05	7.69	62.5	<15	<0.15	<0.15	<0.083	<0.001	<0.001	<0.570	19.789
09/13/05	6.67	40.4	<15	0.19	<0.15	<0.054	0.001	<0.001	<0.458	19.789

Date	Time Elapsed	Volume of groundwater extracted[2], gallons	Influent Concentration (µg/L)			Mass Extracted from groundwater (lbs)			Cumulative Mass Removed	
	(days)		TPHG	Benzene	MTBE	TPHG	Benzene	MTBE	TPHG lbs	MTBE lbs
Petroleum hydrocarbon mass removed during the previous DPE events									0.09682	0.00965
08/29/05	-	160	55	3.3	17	0.00007	0.000004	0.00002	0.09689	0.00967
09/06/05	7.69	29,110	<50	<0.50	4.7	0.01275	0.00046	0.00264	0.10965	0.01231
09/13/05	6.67	23,170	<50	<0.50	2.6	<0.00967	<0.00010	0.00071	0.10965	0.01231
09/16/05	0.66	2,290	67	<0.50	2.3	0.00112	<0.00001	0.00005	0.11076	0.01231

Sample Calculations

$$\text{Ext. Rate from Wells (vapor)} = \frac{40\ \text{cu ft}}{\text{min}} \times \frac{8{,}400\ \text{mg}}{\text{cu meter}}\ \frac{\text{lb}}{453{,}593\ \text{mg}} \times \frac{1{,}440\ \text{min}}{\text{day}}\ \frac{\times\ \text{cu meter}}{35.314\ \text{cu ft}}$$

30.21 lbs/day

Mass removed from groundwater = concentration (µg/L) x gallons extracted x (2.2046 x 10^{-9})(lb/mg) / 0.26418 (gal/L)

[1] For mass estimates between the sampling dates, average mass extraction rate and time elapsed (operational uptime) between the sampling events were used

[2] Volume estimated based on flow totalizer measurements taken on the sampling days

The mass extraction rate is calculated by multiplying the mass extracted per day by the operational uptime for the period.

TABLE 1
DPE EVENT FIELD OBSERVATION SUMMARY
4th DPE Event - February/March 2006

Former USA Station No. 57
10700 MacArthur Boulevard
Oakland, California

Date	Hour Meter Reading	TE days	Appl Vac "Hg	Air Flow cfm	Totalizer Reading gallons	GW Ext Rate gpm	Inf PID ppmv	Oper Temp deg F	Depth to Water, feet bgs and Induced Vacuum, "WC														
									S-1		S-2		MW-3		MW-6			MW-7			MW-8		
									DTW	DD	DTW	DD	DTW	DD	Vac	DTW	DD	Vac	DTW	DD	Vac	DTW	DD
2/20/06 5:30	**Begin fourth DPE event using wells EX-1, EX-2, EX-3, and EX-4. Hour Meter Reading = 3,086.3. Totalizer reading = 94,450 gallons**																						
2/20/06 5:30	3,086.30	0.00	20.00	40.3	94,450	--	360	1,460	14.47	--	16.61	--	10.79	--	NM	15.70	--	NM	13.74	--	NM	13.82	--
2/24/06 5:15	3,161.30	3.13	System observed non-functional and re-started by resetting power supply. Based on hour meter readings, the DPE system was likely shutdown on 2/23/06 around 0830 hrs																				
2/24/06 5:15	3,161.30	3.13	18.50	50.6	98,740	0.95	150	1,462	14.45	-0.02	16.53	-0.08	11.82	1.03	0.00	15.64	-0.06	0.00	13.65	-0.09	0.00	14.29	0.47
3/3/06 7:00	3,262.40	7.34	23.00	29.0	100,540	0.30	212	1,451	14.20	-0.27	16.30	-0.31	11.55	0.76	0.00	15.10	-0.60	0.10	13.26	-0.48	0.00	14.38	0.56
3/9/06 6:30	3,403.10	13.20	23.00	22.4	103,490	0.35	150	1,470	13.97	-0.50	16.00	-0.61	11.47	0.68	0.00	14.49	-1.21	3.03	13.11	-0.63	3.05	13.69	-0.13
3/16/06 5:30	3,566.70	20.02	23.00	25.5	105,780	0.23	68	1,457	13.61	-0.86	15.60	-1.01	11.15	0.36	0.00	14.15	-1.55	0.00	12.55	-1.19	3.15	13.03	-0.79
3/24/06 5:00	3,752.80	27.77	23.00	30.5	107,790	0.18	35	1,459	13.10	-1.37	14.68	-1.93	10.73	-0.06	0.03	13.82	-1.88	0.05	11.99	-1.75	0.00	12.83	-0.99
3/24/06 5:30	Discontinue fourth DPE event.																						
Average	--	--	**21.75**	**33.04**	--	**0.40**	**162.5**	**1,460**	**13.97**	**-0.60**	**15.95**	**-0.79**	**11.25**	**0.55**	**0.01**	**14.82**	**-1.06**	**0.64**	**13.05**	**-0.83**	**1.24**	**13.67**	**-0.18**
Distance to Nearest Extraction Well, feet									**20**		**27**		**15**		**75**			**33**			**62**		
Screening Interval : EX-1=EX-2=EX-3=EX-4= 5 to 25 feet bgs									**20 - 40**		**20 - 40**		**24 - 44**		**10 - 40.5**			**10 - 40**			**10 - 35**		

Notes:

TE - Time Elapsed calculated as difference of hour meter readings, days
Appl - Applied
Oper - Operating
Vac - Vacuum
DTW - depth to groundwater
" WC - Inches water column
Ext. - Extraction
GW Ext - Groundwater Extraction
GW Ext Rate = Difference of Totalizer Readings, gallons

cfm - cubic feet per minute
Inf - Influent
DD - Drawdown
bgs - below ground surface
gpm - gallons per minute
"Hg - Inches Mercury

Temp - Temperature
deg F - degree Farenheit
PID - Photo Ionization Detector
ppmv - parts per million by volume
NM - Not measured
-- = Not applicable

[1] Flow rate measured using a digital anemometer at 3" diameter steel pipe; flow rate = velocity X area of pipe (e.g.: flow rate = 994 feet per minute X 0.05 sq.ft)

TABLE 2
SOIL VAPOR ANALYTICAL RESULTS
4th DPE Event - February/March 2006
Former USA Station No. 57
10700 MacArthur Boulevard
Oakland, California

Sample Date	Sample Time	Sample ID	TPHG	Benzene	Toluene	Ethyl-benzene	Total Xylenes	MTBE	TBA
02/20/06	07:18	USA57ASysEff	<15	<0.15	<0.15	<0.15	<0.15	<0.15	<7.5
02/20/06	07:20	USA57ASysInf	690	8.3	20	17	107	<0.60	<30
03/03/06	07:25	USA57ASYSINF	480	8.6	7.0	8.8	19.9	0.29	<7.5
03/09/06	06:46	USA57ASysInf	320	2.0	10	11	40.5	<0.30	<15
03/24/06	05:30	USA57ASYSINF	98	0.39	0.50	1.6	7.2	<0.15	<7.5

Notes

All air sample values reported in milligrams per cubic meter (mg/m^3)
TPHG = Total petroleum hydrocarbons as gasoline
BTEX = Benzene, toluene, ethylbenzene, and total xylenes
MTBE = Methyl tertiary butyl ether
TBA = Tertiary butyl alcohol
ETBE = Ethyl tertiary butyl ether
TAME = Tertiary amyl methyl ether
DIPE = Di-isopropyl ether

DIPE, ETBE, and TAME were below laboratory reporting limits in all samples.

Analytical Laboratory

Alpha Analytical, Inc. (Alpha [ELAP #2019])

Analytical Methods

TPHG analyzed by EPA Method SW8015B/DHS LUFT Manual
BTEX, MTBE, TBA, DIPE, TAME, and ETBE analyzed by EPA Method SW8260B

TABLE 3
GROUNDWATER ANALYTICAL RESULTS
4th DPE Event - February/March 2006
Former USA Station No. 57
10700 MacArthur Boulevard
Oakland, California

Sample Date	Sample Time	Sample ID	TPHG	Benzene	Toluene	Ethyl-benzene	Total Xylenes	MTBE	TBA	DIPE	ETBE	TAME
02/20/06	07:28	USA57WINF	**3,800**	**65**	**300**	**71**	**740**	**2.7**	**160**	<5.0[1]	<5.0[1]	<5.0[1]
02/20/06	07:42	USA57WGAC1	<50	<0.50	<0.50	<0.50	<0.50	<0.50	<10	<1.0	<1.0	<1.0
02/20/06	07:39	USA57WEFF	<50	<0.50	<0.50	<0.50	<0.50	<0.50	<10	<1.0	<1.0	<1.0
03/03/06	07:25	USA57WSYSINF	**1,100**	**96**	**20**	**30**	**120**	**10**	**47**	<1.0	<1.0	<1.0
03/09/06	07:24	USA57WINF	**510**	**3.1**	**3.3**	**10**	**65**	**1.1**	**23**	<1.0	<1.0	<1.0
03/09/06	07:26	USA57WEFF	<50	<0.50	<0.50	<0.50	<0.50	<0.50	<10	<1.0	<1.0	<1.0
03/09/06	07:28	USA57GAC1	<50	<0.50	<0.50	<0.50	<0.50	<0.50	<10	<1.0	<1.0	<1.0
03/24/06	05:15	USA57WINF	**130**	**2.7**	**1.9**	**2.8**	**27**	<0.50	**28**	<1.0	<1.0	<1.0
03/24/06	05:20	USA57WEFF	<50	<0.50	<0.50	<0.50	<0.50	<0.50	<10	<1.0	<1.0	<1.0

All water sample values reported in micrograms per liter (μg/L)
TPHG = Total petroleum hydrocarbons as gasoline
BTEX = Benzene, toluene, ethylbenzene, and total xylenes
MTBE = Methyl tertiary butyl ether
TBA = Tertiary butyl alcohol
DIPE = Di-isopropyl etber
ETBE = Ethyl tertiary butyl ether
TAME = Tertiary amyl methyl ether
[1] = Reporting limits were increased due to high concentrations of target analytes

Analytical Laboratory
Alpha Analytical , Inc. (ELAP #2019)

Analytical Methods
TPHG analyzed by EPA Method SW8015B/DHS LUFT Manual
BTEX, MTBE, TBA, DIPE, ETBE, & TAME analyzed by
EPA Method SW8260B

TABLE 4
PETROLEUM HYDROCARBON MASS EXTRACTION SUMMARY
4th DPE Event February/March 2006
Former USA Station No. 57
10700 MacArthur Boulevard
Oakland, California

Date	Time Elapsed (days)	Flowrate (cfm)	Influent Concentration (mg/m^3)			Soil Vapor Extraction Rate (lbs/day)			Cumulative Mass (TPHG) Removed	
			TPHG	Benzene	MTBE	TPHG	Benzene	MTBE	Period[1] lbs	Total lbs
Petroleum hydrocarbon mass removed during the previous DPE events									19.789	19.789
02/20/06	--	40.3	690	8.3	<0.60	2.47	0.03	<0.002	--	--
03/03/06	7.34	29.0	480	8.6	0.29	1.24	0.02	0.001	13.608	33.397
03/09/06	5.86	22.4	320	2.0	<0.30	0.64	0.004	<0.001	5.495	38.892
03/24/06	14.57	30.5	98	0.39	<0.15	0.27	0.001	<0.0004	6.578	45.469

Date	Time Elapsed (days)	Volume of groundwater extracted[2], gallons	Influent Concentration (µg/L)			Mass Extracted from groundwater (lbs)			Cumulative Mass Removed	
			TPHG	Benzene	MTBE	TPHG	Benzene	MTBE	TPHG lbs	MTBE lbs
Petroleum hydrocarbon mass removed during the previous DPE events									0.11076	0.01231
02/20/06	-	48	3,800	65	2.7	0.00152	0.000026	0.000001	0.11228	0.01231
03/03/06	7.34	6,090	1,100	96	10.0	0.12451	0.00409	0.00032	0.23679	0.01263
03/09/06	5.86	2,950	510	3.1	1.1	0.01982	0.00122	0.00014	0.25661	0.01277
03/24/06	14.57	4,300	130	2.7	<0.50	0.01148	0.00010	0.00003	0.26809	0.01280

Sample Calculations

Ext. Rate from Wells (vapor) = $\frac{40.3 \text{ cu ft}}{\text{min}} \times \frac{690 \text{ mg}}{\text{cu meter}} \frac{\text{lb}}{453{,}593 \text{ mg}} \times \frac{1{,}440 \text{ min}}{\text{day}} \times \frac{\text{cu meter}}{35.314 \text{ cu ft}}$

= 2.47 lbs/day

Mass removed from groundwater = concentration (µg/L) x gallons extracted x (2.2046 x 10^{-9})(lb/mg) / 0.26418 (gal/L)

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[1] For mass estimates between the sampling dates, average mass extraction rate and time elapsed (operational uptime) between the sampling events were used

[2] Volume estimated based on flow totalizer measurements taken on the sampling days. For February 20, 2006, the volume of groundwater extracted was estimated based on the average groundwater extraction rate (0.40 gpm) and time elapsed between the start-up and sample collection

TABLE 1
DPE EVENT FIELD OBSERVATION SUMMARY
5th DPE Event - May 2006
Former USA Station No. 57
10700 MacArthur Boulevard
Oakland, California

Date	Hour Meter Reading	TE days	Appl Vac "Hg	Air Flow[1] cfm	Totalizer Reading gallons	GW Ext Rate gpm	Inf PID ppmv	Oper Temp deg F	Depth to Water, feet bgs and Induced Vacuum, "WC														
									S-1		S-2		MW-3		MW-6			MW-7			MW-8		
									DTW	DD	DTW	DD	DTW	DD	Vac	DTW	DD	Vac	DTW	DD	Vac	DTW	DD
5/1/06 9:30	**Begin fifth DPE event using wells EX-1, EX-2, EX-3, and EX-4. Hour Meter Reading = 3,758. Totalizer reading = 107,790 gallons**																						
5/1/06 9:30	3,758.00	0.00	24.50	29.5	107,790	--	12	1,451	9.43	--	11.37	--	7.84	--	0.00	11.00	--	0.00	8.41	--	0.00	11.16	--
5/3/06 5:30	3,826.80	2.87	24.00	21.9	110,790	0.73	15	1,479	9.55	0.12	11.04	-0.33	8.85	1.01	0.00	11.05	0.05	0.00	8.37	-0.04	0.01	11.04	-0.12
5/8/06 6:00	3,923.20	6.88	22.00	26.1	112,920	0.37	17	1,450	9.58	0.15	11.42	0.05	9.51	1.67	0.00	11.08	0.08	0.00	8.35	-0.06	0.00	11.46	0.30
5/16/06 5:30	4,006.80	10.37	Upon arrival the DPE system was observed to be non-operating due to generator malfunction. Based on the hour meter readings, the DPE system was likely shutdown at 17:36 hrs on 5/11/06. The DPE system system was re-started at 5:30 hrs on 5/16/06 after troubleshooting the generator malfunction.																				
5/16/06 5:30	4,006.80	10.37	21.00	56.2	113,780	0.17	50	1,460	9.63	0.20	11.47	0.10	9.95	2.11	0.00	11.28	0.28	0.00	8.43	0.02	0.00	11.86	0.70
5/22/06 5:30	4,150.40	16.35	21.00	38.8	114,830	0.12	43	1,460	9.54	0.11	11.39	0.02	9.85	2.01	0.00	11.10	0.10	0.00	8.39	-0.02	0.00	11.88	0.72
5/25/06 5:30	4,190.20	18.01	Upon arrival the DPE system was observed to be non-operating due to generator malfunction. Based on the hour meter readings, the DPE system was likely shutdown at 21:18 hrs on 5/23/06. The DPE system system was re-started at 5:30 hrs on 5/25/06 after troubleshooting the generator malfunction.																				
5/25/06 5:30	4,190.20	18.01	20.00	48.4	115,090	0.11	20	1,452	NM	--	NM	--	NM	--	NM	NM	--	NM	NM	--	NM	NM	--
5/25/06 6:40	4,191.10	18.05	Discontinue fifth DPE event. Totalizer reading = 115,190 gallons																				
Average	--	--	**22.08**	**36.79**	--	**0.30**	**26.2**	**1459**	**9.55**	**0.15**	**11.34**	**-0.04**	**9.20**	**1.70**	**0.00**	**11.10**	**0.13**	**0.00**	**8.39**	**-0.03**	**0.00**	**11.48**	**0.40**
Distance to Nearest Extraction Well, feet									**20**		**27**		**15**		**75**			**33**			**62**		
Screening Interval : EX-1=EX-2=EX-3=EX-4= 5 to 25 feet bgs									**20 - 40**		**20 - 40**		**24 - 44**		**10 - 40.5**			**10 - 40**			**10 - 35**		

Notes:

TE - Time Elapsed calculated as difference of hour meter readings, days
Appl - Applied
Oper - Operating
Vac - Vacuum
DTW - depth to groundwater
" WC - Inches water column
Ext. - Extraction
GW Ext - Groundwater Extraction
GW Ext Rate = Difference of Totalizer Readings, gallons

cfm - cubic feet per minute
Inf - Influent
DD - Drawdown
bgs - below ground surface
gpm - gallons per minute
"Hg - Inches Mercury

Temp - Temperature
deg F - degree Farenheit
PID - Photo Ionization Detector
ppmv - parts per million by volume
NM - Not measured
-- = Not applicable

[1] Flow rate measured using a digital anemometer at 3" diameter steel pipe;
flow rate = velocity X area of pipe (e.g.: flow rate = 600 feet per minute X 0.05 sq.ft)

TABLE 2
SOIL VAPOR ANALYTICAL RESULTS
5th DPE Event - May 2006

Former USA Station No. 57
10700 MacArthur Boulevard
Oakland, California

Sample Date	Sample Time	Sample ID	TPHG	Benzene	Toluene	Ethyl-benzene	Total Xylenes	MTBE	TBA
05/01/06	10:40	USA57ASysEff	<15	<0.15	<0.15	<0.15	<0.15	<0.15	<7.5
05/01/06	10:45	USA57ASysInf	37	5.4	2.3	0.58	2.25	<0.15	<7.5
05/08/06	06:10	USA57ASYSINF	37	0.31	0.25	0.49	2.73	<0.15	<7.5
05/25/06	06:20	USA57ASysInf	180	1.1	0.22	0.32	0.58	<0.15	<7.5

Notes

All air sample values reported in milligrams per cubic meter (mg/m^3)
TPHG = Total petroleum hydrocarbons as gasoline (Gasoline Range Organics [GRO] C4-C13)
BTEX = Benzene, toluene, ethylbenzene, and total xylenes
MTBE = Methyl tertiary butyl ether
TBA = Tertiary butyl alcohol
ETBE = Ethyl tertiary butyl ether
TAME = Tertiary amyl methyl ether
DIPE = Di-isopropyl ether

Analytical Laboratory

Alpha Analytical, Inc. (Alpha [ELAP #2019])

Analytical Methods

TPHG analyzed by EPA Method SW8015B/DHS LUFT Manual
BTEX, MTBE, TBA, DIPE, TAME, and ETBE analyzed by EPA Method SW8260B

TABLE 3
GROUNDWATER ANALYTICAL RESULTS
5th DPE Event - May 2006

Former USA Station No. 57
10700 MacArthur Boulevard
Oakland, California

Sample Date	Sample Time	Sample ID	TPHG	Benzene	Toluene	Ethyl-benzene	Total Xylenes	MTBE	TBA	DIPE	ETBE	TAME
05/01/06	10:28	USA57WINF	**990**	**170**	**96**	**15**	**205**	**12**	**66**	<2.0[1]	<2.0[1]	<2.0[1]
05/04/06	06:28	USA57WEFF	<50	<0.50	<0.50	<0.50	<0.50	<0.50	<10	<1.0	<1.0	<1.0
05/04/06	06:32	USA57WGAC1	<50	<0.50	<0.50	<0.50	<0.50	<0.50	<10	<1.0	<1.0	<1.0
05/08/06	06:45	USA57WINF	**110**	**0.61**	**<0.50**	**0.66**	**11.1**	**0.61**	**29**	<1.0	<1.0	<1.0
05/25/06	06:35	USA57WInf	**290**	**19**	**2.7**	**3.5**	**22.3**	**20**	**42**	<1.0	<1.0	<1.0
05/25/06	06:39	USA57WMid	<50	<0.50	<0.50	<0.50	<0.50	<0.50	<10	<1.0	<1.0	<1.0

Notes:

All water sample values reported in micrograms per liter (µg/L)
TPHG = Total petroleum hydrocarbons as gasoline (Gasoline Range Organics [GRO] C4-C13)
BTEX = Benzene, toluene, ethylbenzene, and total xylenes
MTBE = Methyl tertiary butyl ether
TBA = Tertiary butyl alcohol
DIPE = Di-isopropyl ether
ETBE = Ethyl tertiary butyl ether
TAME = Tertiary amyl methyl ether

Analytical Laboratory

Alpha Analytical , Inc. (ELAP #2019)

Analytical Methods

TPHG analyzed by EPA Method SW8015B/DHS LUFT Manual
BTEX, MTBE, TBA, DIPE, ETBE, & TAME analyzed by
EPA Method SW8260B

[1] = Reporting limits were increased due to high concentrations of target analytes

TABLE 4
PETROLEUM HYDROCARBON MASS EXTRACTION SUMMARY
5th DPE Event - May 2006

Former USA Station No. 57
10700 MacArthur Boulevard
Oakland, California

Date	Time Elapsed (days)	Flowrate (cfm)	Influent Concentration (mg/m³)			Soil Vapor Extraction Rate (lbs/day)			Cumulative Mass (TPHG) Removed	
			TPHG	Benzene	MTBE	TPHG	Benzene	MTBE	Period[1]	Total
									lbs	lbs
Petroleum hydrocarbon mass removed during the previous DPE events									45.469	45.469
05/01/06	--	29.5	37	5.4	<0.15	0.10	0.01	<0.0004	--	--
05/08/06	6.88	26.1	37	0.31	<0.15	0.09	0.00	<0.0003	0.629	46.098
05/25/06	11.16	48.4	180	1.1	<0.15	0.77	0.005	<0.001	4.801	50.900

Date	Time Elapsed (days)	Volume of groundwater extracted[2], gallons	Influent Concentration (µg/L)			Mass Extracted from groundwater (lbs)			Cumulative Mass Removed	
			TPHG	Benzene	MTBE	TPHG	Benzene	MTBE	TPHG	MTBE
									lbs	lbs
Petroleum hydrocarbon mass removed during the previous DPE events									0.26809	0.01280
05/01/06	-	18	990	170	12	0.00015	0.000026	0.000002	0.26824	0.01280
05/08/06	6.88	5,130	110	0.61	0.61	0.02355	0.00365	0.00027	0.29178	0.01307
05/25/06	11.16	2,270	290	19	20	0.00379	0.00019	0.00020	0.29557	0.01327

Sample Calculations

Ext. Rate from Wells (vapor) =

$$\frac{40.3 \text{ cu ft}}{\text{min}} \times \frac{690 \text{ mg}}{\text{cu meter}} \; \frac{\text{lb}}{453{,}593 \text{ mg}} \times \frac{1{,}440 \text{ min}}{\text{day}} \times \frac{\text{cu meter}}{35.314 \text{ cu ft}}$$

= 2.47 lbs/day

Mass removed from groundwater = concentration (µg/L) x gallons extracted x (2.2046 x 10^{-9})(lb/mg) / 0.26418 (gal/L)

[1] For mass estimates between the sampling dates, average mass extraction rate and time elapsed (operational uptime) between the sampling events were used

[2] Volume estimated based on flow totalizer measurements taken on the sampling days. For May 1, 2006, the volume of groundwater extracted was estimated based on the average groundwater extraction rate (0.30 gpm) and time elapsed between the start-up and sample collection

TABLE 1
DPE EVENT FIELD OBSERVATION SUMMARY
6th DPE Event - July/August 2006
Former USA Station No. 57
10700 MacArthur Boulevard
Oakland, California

Date	Hour Meter Reading	TE days	Appl Vac "Hg	Air Flow[1] cfm	Totalizer Reading gallons	GW Ext Rate gpm	Inf PID ppmv	Oper Temp deg F	Depth to Water, feet bgs and Induced Vacuum, "WC															
									S-1		S-2		MW-3		MW-6			MW-7			MW-8		
									DTW	DD	DTW	DD	DTW	DD	Vac	DTW	DD	Vac	DTW	DD	Vac	DTW	DD
7/17/06 7:00	Begin sixth DPE event using wells EX-1, EX-2, EX-3, and EX-4. Hour Meter Reading = 4,410.7. Totalizer reading = 121,580 gallons																						
7/17/06 7:00	4,410.70	0.00	18.00	113.1	121,580	--	106	1,479	11.00	--	12.98	--	10.08	--	0.00	12.75	--	0.00	9.94	--	0.00	13.08	--
7/17/06 8:30	4,412.10	0.06	18.00	113.4	121,690	1.31	105	1,470	NM	--	NM	--	NM	--	NM	NM	--	NM	NM	--	NM	NM	--
7/21/06 5:00	4,505.10	3.93	18.00	111.5	122,200	0.09	100	1,450	NM	--	NM	--	NM	--	NM	NM	--	NM	NM	--	NM	NM	--
7/25/06 9:45	4,605.60	8.12	16.50	70.7	122,518	0.05	98	1,450	11.53	0.53	13.47	0.49	11.05	0.97	NM	13.13	0.38	NM	10.35	0.41	NM	13.51	0.43
7/27/06 6:00	4,651.40	10.03	17.00	59.9	122,633	0.04	77	1,457	NM	--	NM	--	NM	--	NM	NM	--	NM	NM	--	NM	NM	--
8/3/06 5:00	4,818.10	16.98	16.50	114.8	123,070	0.04	23	1,450	11.95	0.95	13.90	0.92	11.66	1.58	0.00	13.56	0.81	0.00	10.83	0.89	0.00	14.10	1.02
8/10/06 6:45	4,988.00	24.05	17.50	88.9	123,570	0.05	20	1,460	12.25	1.25	14.22	1.24	11.93	1.85	0.00	13.85	1.10	0.00	11.15	1.21	0.00	14.35	1.27
8/10/06 7:00																							
Average	--	--	**17.36**	**96.05**	--	**0.06**	**75.6**	**1,459**															
Distance to Nearest Extraction Well, feet									**20**		**27**		**15**		**75**			**33**			**62**		
Screening Interval : EX-1=EX-2=EX-3=EX-4= 5 to 25 feet bgs									**20 - 40**		**20 - 40**		**24 - 44**		**10 - 40.5**			**10 - 40**			**10 - 35**		

Notes:

TE - Time Elapsed calculated as difference of hour meter readings, days
Appl - Applied
Oper - Operating
Vac - Vacuum
DTW - depth to groundwater
" WC - Inches water column
Ext. - Extraction
GW Ext - Groundwater Extraction
GW Ext Rate = Difference of Totalizer Readings, gallons

cfm - cubic feet per minute
Inf - Influent
DD - Drawdown
bgs - below ground surface
gpm - gallons per minute
"Hg - Inches Mercury

Temp - Temperature
deg F - degree Farenheit
PID - Photo Ionization Detector
ppmv - parts per million by volume
NM - Not measured
-- = Not applicable

[1] Flow rate measured using a digital anemometer at 3" diameter steel pipe;
flow rate = velocity X area of pipe (e.g.: flow rate = 600 feet per minute X 0.05 sq.ft)

TABLE 2
SOIL VAPOR ANALYTICAL RESULTS
6th DPE Event - July/August 2006
Former USA Station No. 57
10700 MacArthur Boulevard
Oakland, California

Sample Date	Sample Time	Sample ID	TPHG	Benzene	Toluene	Ethyl-benzene	Total Xylenes	MTBE	TBA
07/17/06	8:25	USA57ASysEff	<15	<0.15	<0.15	<0.15	<0.15	<0.15	<7.5
07/17/06	8:28	USA57ASysInf	**370**	**3.8**	**0.96**	**1.8**	**3.72**	<0.30	<15
08/03/06	5:42	USA57ASysInf	**80**	<0.15	<0.15	**0.20**	**2.33**	<0.15	<7.5
08/10/06	07:00	USA57ASysInf	**220**	**2.6**	**17**	**5.5**	**27.6**	<0.15	<7.5

Notes

All air sample values reported in milligrams per cubic meter (mg/m^3)

TPHG = Total petroleum hydrocarbons as gasoline (Gasoline Range Organics [GRO] C4-C13)

BTEX = Benzene, toluene, ethylbenzene, and total xylenes

MTBE = Methyl tertiary butyl ether

TBA = Tertiary butyl alcohol

ETBE = Ethyl tertiary butyl ether

TAME = Tertiary amyl methyl ether

DIPE = Di-isopropyl ether

Analytical Laboratory

Alpha Analytical, Inc. (Alpha [ELAP #2019])

Analytical Methods

TPHG analyzed by EPA Method SW8015B/DHS LUFT Manual

BTEX, MTBE, TBA, DIPE, TAME, and ETBE analyzed by EPA Method SW8260B

TABLE 3
GROUNDWATER ANALYTICAL RESULTS
6th DPE Event - July/August 2006
Former USA Station No. 57
10700 MacArthur Boulevard
Oakland, California

Sample Date	Sample Time	Sample ID	TPHG	Benzene	Toluene	Ethyl-benzene	Total Xylenes	MTBE	TBA	DIPE	ETBE	TAME
07/17/06	8:10	USA57WINF	**900**	**170**	**56**	**13**	**130**	**34**	**130**	<5.0[1]	<5.0[1]	<5.0[1]
08/03/06	5:55	USA57WEFF	<50	<0.50	<0.50	<0.50	<0.50	<0.50	<10	<1.0	<1.0	<1.0
08/03/06	5:57	USA57WGAC1	<50	<0.50	<0.50	<0.50	<0.50	<0.50	<10	<1.0	<1.0	<1.0
08/03/06	5:59	USA57WINF	**150**	<0.50	<0.50	<0.50	**17.9**	**0.79**	**18**	<1.0	<1.0	<1.0

Notes:

All water sample values reported in micrograms per liter (μg/L)
TPHG = Total petroleum hydrocarbons as gasoline (Gasoline Range Organics [GRO] C4-C13)
BTEX = Benzene, toluene, ethylbenzene, and total xylenes
MTBE = Methyl tertiary butyl ether
TBA = Tertiary butyl alcohol
DIPE = Di-isopropyl ether
ETBE = Ethyl tertiary butyl ether
TAME = Tertiary amyl methyl ether

Analytical Laboratory

Alpha Analytical , Inc. (ELAP #2019)

Analytical Methods

TPHG analyzed by EPA Method SW8015B/DHS LUFT Manual
BTEX, MTBE, TBA, DIPE, ETBE, & TAME analyzed by
EPA Method SW8260B

[1] = Reporting limits were increased due to high concentrations of target analytes

TABLE 4
PETROLEUM HYDROCARBON AND GROUNDWATER MASS EXTRACTION SUMMARY
6th DPE Event - July/August 2006

Former USA Station No. 57
10700 MacArthur Boulevard
Oakland, California

Date	Time Elapsed (days)	Flowrate (cfm)	Influent Concentration (mg/m^3)			Soil Vapor Extraction Rate (lbs/day)			Cumulative Mass (TPHG) Removed	
			TPHG	Benzene	MTBE	TPHG	Benzene	MTBE	Period[1] lbs	Total lbs
Petroleum hydrocarbon mass removed during the previous DPE events									50.900	50.900
07/17/06	--	113.4	370	3.8	<0.30	3.73	0.04	<0.0030	--	--
08/03/06	16.98	114.8	80	<0.15	<0.15	0.82	<0.002	<0.0015	38.596	89.496
08/10/06	7.07	88.9	220	2.6	<0.15	1.74	0.021	<0.0012	9.032	98.527

Date	Time Elapsed (days)	Volume of groundwater extracted[2], gallons	Influent Concentration (µg/L)			Mass Extracted from groundwater (lbs)			Cumulative Mass Removed	
			TPHG	Benzene	MTBE	TPHG	Benzene	MTBE	TPHG lbs	MTBE lbs
Petroleum hydrocarbon mass removed during the previous DPE events									0.29557	0.01327
07/17/06	-	91.7	900	170	34	0.00069	0.000130	0.000026	0.29626	0.01330
08/03/06	16.98	1,490	150	<0.50	0.79	0.00653	<0.00106	0.00022	0.30279	0.01351

Groundwater extracted to date 186,800 gallons

Sample Calculations

Ext. Rate from Wells (vapor) = $\frac{40.3\ \text{cu ft}}{\text{min}} \times \frac{690\ \text{mg}}{\text{cu meter}}\ \frac{\text{lb}}{453{,}593\ \text{mg}} \times \frac{1{,}440\ \text{min}}{\text{day}} \times \frac{\text{cu meter}}{35.314\ \text{cu ft}}$

= 2.47 lbs/day

Mass removed from groundwater = concentration (µg/L) x gallons extracted x (2.2046 x 10^{-9})(lb/mg) / 0.26418 (gal/L)

[1] For mass estimates between the sampling dates, average mass extraction rate and time elapsed (operational uptime) between the sampling events were used.

[2] Volume estimated based on flow totalizer measurements taken on the sampling days. For July 17, 2006, the volume of groundwater extracted was estimated based on the groundwater extraction rate (1.31 gpm) and time elapsed between the start-up and sample collection .

TABLE 2
DPE-AS EVENT FIELD OBSERVATION SUMMARY
Former USA Station No. 57
10700 MacArthur Boulevard
Oakland, California

Date	Hour Meter Reading	TE (days)	Appl Vac ("Hg)	Air Flow[1] (cfm)	Totalizer Reading (gallons)	GW Ext Rate (gpm)	Inf PID (ppmv)	Oper Temp (deg F)	Depth to Water, feet bgs and Induced Vacuum, "WC									
									S-1		S-2		MW-3		MW-7		MW-8	
									(DTW)	(DD)	(DTW)	(DD)	(DTW)	(DD)	(DTW)	(DD)	(DTW)	(DD)
9/4/07 5:45	NM	NM	NM	NM	NM	NM	NM	NM	18.57	--	20.69	--	15.43	--	17.60	--	19.55	--
9/4/07 9:40	**Begin DPE-AS event using wells EX-1 through EX-4 and AS-1 through AS-2. Hour Meter Reading = 11,489.50. Totalizer Reading = 199,300 gallons**																	
9/4/07 9:40	11,489.50	0.00	15.00	93.3	199,307	--	NM	NM	NM	--	NM	--	NM	--	NM	--	NM	--
9/4/07 10:15	11,490.50	0.04	15.00	98.2	199,320	0.22	230	1,490	NM	--	NM	--	NM	--	NM	--	NM	--
9/4/06 11:15	11,491.40	0.08	14.00	103.1	199,340	0.37	140	1,450	NM	--	NM	--	NM	--	NM	--	NM	--
9/11/07 10:15	11,524.00	1.44	12.00	122.8	199,410	0.04	160	1,450	NM	--	NM	--	NM	--	NM	--	NM	--
9/17/07 5:45	11,592.60	4.30	10.00	122.8	199,550	0.03	139	1,483	NM	--	NM	--	NM	--	NM	--	NM	--
9/18/07 4:15	11,616.70	5.30	NM	NM	199,550	0.00	NM	NM	18.80	0.23	20.94	0.25	16.10	0.67	17.78	0.18	23.69	4.14
9/20/07 5:00	11,640.00	6.27	NM	98.2	199,550	0.00	418	1,538	NM	--	NM	--	NM	--	NM	--	NM	--
9/25/07 9:00	11,668.10	7.44	14.00	103.1	199,630	0.05	400	1,527	NM	--	NM	--	NM	--	NM	--	NM	--
10/2/07 5:00	11,730.00	10.02	NM	NM	NM	--	NM	NM	19.12	0.55	21.33	0.64	16.40	0.97	18.11	0.51	20.24	0.69
10/3/07 5:30	11,762.20	11.36	8.00	132.6	199,690	0.01	1,060	1,480	NM	--	NM	--	NM	--	NM	--	NM	--
10/5/07 5:00	11,808.80	13.30	NM	NM	199,690	--	NM	NM	NM	--	NM	--	NM	--	NM	--	NM	--
10/11/07 7:00	11,862.00	15.52	11.00	122.8	199,770	0.03	90	1,460	NM	--	NM	--	NM	--	NM	--	NM	--
10/15/07 4:50	11,960.30	19.62	NM	NM	199,830	0.01	NM	NM	19.22	0.65	21.32	0.63	16.45	1.02	18.29	0.69	20.36	0.81
10/17/07 8:00	11,972.00	20.10	11.00	103.1	199,830	--	300	1,497	NM	--	NM	--	NM	--	NM	--	NM	--
10/30/07 8:50	12,101.00	25.48	14.50	117.9	199,920	0.01	69	1,450	NM	--	NM	--	NM	--	NM	--	NM	--
11/6/07 7:00	12,108.00	25.77	12.00	117.9	199,990	0.17	347	1,485	NM	--	NM	--	NM	--	NM	--	NM	--
11/14/07 6:00	12,269.00	32.48	NM	NM	NM	--	NM	NM	NM	--	NM	--	NM	--	NM	--	NM	--
11/14/07 20:00	**Discontinue DPE-AS event.**																	
Average	--	--	**12.41**	**111.31**	--	**0.08**	**304.82**	**1,483**										
Distance to Nearest Extraction Well, feet									20		27		15		33		62	
Screening Interval : EX-1=EX-2=EX-3=EX-4= 5 to 25 feet bgs									20 - 40		20 - 40		24 - 44		10 - 40		10 - 35	

TABLE 2
DPE-AS EVENT FIELD OBSERVATION SUMMARY
Former USA Station No. 57
10700 MacArthur Boulevard
Oakland, California

Date	Hour Meter Reading	TE (days)	Appl Vac ("Hg)	Air Flow[1] (cfm)	Totalizer Reading (gallons)	GW Ext Rate (gpm)	Inf PID (ppmv)	Oper Temp (deg F)	Depth to Water, feet bgs and Induced Vacuum, "WC									
									S-1		S-2		MW-3		MW-7		MW-8	
									(DTW)	(DD)	(DTW)	(DD)	(DTW)	(DD)	(DTW)	(DD)	(DTW)	(DD)

Notes:

Appl - Applied

cfm - Cubic feet per minute

DD - Drawdown

deg F - Degree Fahrenheit

DTW - Depth to groundwater

gpm - Gallons per minute

GW Ext Rate = Difference of Totalizer Readings, gallons

"Hg - Inches mercury

Inf - Influent

NM - Not measured

Oper - Operating

PID - Photo ionization detector

ppmv - Parts per million by volume

TE - Time elapsed calculated as difference of hour meter readings, days

Temp - Temperature

Vac - Vacuum

[1] Flow rate measured using a digital anemometer at 3" diameter steel pipe;
flow rate = velocity x area of pipe (e.g. flow rate = 600 feet per minute x 0.05 square feet)

TABLE 3
SOIL VAPOR ANALYTICAL RESULTS
Former USA Station No. 57
10700 MacArthur Boulevard
Oakland, California

Sample Date	Sample Time	Sample ID	GRO (mg/m³)	Benzene (mg/m³)	Toluene (mg/m³)	Ethyl-benzene (mg/m³)	Total Xylenes (mg/m³)	MTBE (mg/m³)	TBA (mg/m³)
09/04/07	11:15	Sys Inf Air 57	**540**	**0.75**	<0.75	**0.97**	<0.75	<0.75	<38
09/04/07	11:20	EFF Air	<15	<0.15	<0.15	<0.15	<0.15	<0.15	<7.5
10/03/07	05:30	0057ASYSINF	**1,800**	**3.4**	**0.96**	**1.2**	**7.5**	<0.75	NA
10/11/07	07:11	USA57 A SYSINF	**730**	**1.2**	**0.45**	<0.30	**1.1**	<0.30	NA
10/11/07	07:00	USA57 A EFF	<15	<0.15	<0.15	<0.15	<0.15	<0.15	NA
11/06/07	07:22	0057 A SYS INF	**1,600**	**2.6**	**1.2**	**0.81**	**2.3**	<0.75	NA
11/06/07	07:20	0057 A SYS EFF	**73**	<0.15	<0.15	<0.15	<0.15	<0.15	NA
11/15/2007 [1]	09:10	0057 A INF	**77**	<0.15	**0.15**	<0.15	**1.16**	<0.15	NA
11/15/2007 [1]	09:05	0057 A EFF	<15	<0.15	<0.15	<0.15	<0.15	<0.15	NA

Notes

[1] Samples analyzed per Bay Area Air Quality Management District (BAAQMD) permit limits
BTEX = Benzene, toluene, ethylbenzene, and total xylenes
GRO = Gasoline Range Organics C4-C13
MTBE = Methyl tertiary butyl ether
NA = Not analyzed
TBA = Tertiary butyl alcohol

Analytical Laboratory

Alpha Analytical, Inc. (Alpha [ELAP #2019])

Analytical Methods

GRO analyzed by EPA Method SW8015B/DHS LUFT Manual
BTEX, MTBE, and TBAanalyzed by EPA Method SW8260B

TABLE 4
GROUNDWATER ANALYTICAL RESULTS
Former USA Station No. 57
10700 MacArthur Boulevard
Oakland, California

Sample Date	Sample Time	Sample ID	GRO (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethyl-benzene (µg/L)	Total Xylenes (µg/L)	MTBE (µg/L)	TBA (µg/L)	DIPE (µg/L)	ETBE (µg/L)	TAME (µg/L)
09/04/07	10:15	INF	**470**	**25**	**2.9**	**10**	**19**	**230**	**120**	<1.0	<1.0	<1.0
10/03/07	5:30	0057WINF	**51**	**9.2**	**0.63**	<0.50	**1.82**	**5.4**	**19**	<1.0	<1.0	<1.0
10/11/07	6:35	USA57 W INF	**120**	**25**	**1.6**	**3.3**	**8.7**	**3.8**	**18**	<1.0	<1.0	<1.0
10/11/07	6:30	USA57 W EFF	<50	<0.50	<0.50	<0.50	<0.50	<0.50	<10	<1.0	<1.0	<1.0
11/06/07	7:35	00057 W INF	**430**	**140**	**33**	**9.6**	**61**	**9.0**	**41**	<2.0[1]	<2.0[1]	<2.0[1]
11/06/07	7:30	00057 W EFF	<50	<0.50	<0.50	<0.50	<0.50	<0.50	<10	<1.0	<1.0	<1.0

Notes:

µg/L - Micrograms per liter
BTEX - Benzene, toluene, ethylbenzene, and total xylenes
DIPE - Di-isopropyl ether
ETBE - Ethyl tertiary butyl ether
GRO - Gasoline range organics C4-C13
MTBE - Methyl tertiary butyl ether
TBA - Tertiary butyl alcohol
TAME - Tertiary amyl methyl ether

Analytical Laboratory

Alpha Analytical , Inc. (ELAP #2019)

Analytical Methods

GRO analyzed by EPA Method SW8015B/DHS LUFT Manual
BTEX, MTBE, TBA, DIPE, ETBE, and TAME analyzed by
EPA Method SW8260B

[1] = Reporting limits were increased due to high concentrations of target analytes

TABLE 5
PETROLEUM HYDROCARBON AND GROUNDWATER MASS EXTRACTION SUMMARY
Former USA Station No. 57
10700 MacArthur Boulevard
Oakland, California

Date	Time Elapsed	Flowrate	Influent Concentration (mg/m^3)			Soil Vapor Extraction Rate (lbs/day)			Cumulative Mass (TPHG) Removed	
	(days)	(cfm)	GRO	Benzene	MTBE	GRO	Benzene	MTBE	Period[1] lbs	Total lbs
Petroleum hydrocarbon mass removed during the previous DPE events									98.527	98.527
09/04/07	0.08	103.1	540	0.75	<0.75	4.95	0.01	<0.0069	4.950	103.477
10/03/07	11.36	132.6	1,800	3.40	<0.75	21.22	0.04	<0.0088	148.618	252.095
10/11/07	15.52	122.8	730	1.2	<0.30	7.97	0.013	<0.0033	226.474	478.569
11/06/07	25.77	117.9	1,600	2.6	<0.75	16.77	0.027	<0.0079	318.733	797.302
11/15/07	NA	NM	77	<0.15	<0.15	--	--	--	--	--

Date	Time Elapsed	Volume of Groundwater Extracted[2]	Influent Concentration (µg/L)			Mass Extracted from Groundwater (lbs)			Cumulative Mass Removed	
	(days)	(gallons)	GRO	Benzene	MTBE	GRO	Benzene	MTBE	GRO lbs	MTBE lbs
Petroleum hydrocarbon mass removed during the previous DPE events									0.30279	0.01351
09/04/07	0.04	20.0	470	25	230	0.00008	0.000004	0.000038	0.30287	0.01355
10/03/07	11.36	390.0	51	9.2	5.4	0.00017	0.00003	0.000018	0.30303	0.01357
10/11/07	15.52	470	120	25	3.8	0.00034	0.0001	0.00002	0.30337	0.01358
11/06/07	25.77	690	430	140	9	0.00158	0.0005	0.00004	0.30495	0.01362

Groundwater extracted to date 187,490 gallons

Sample Calculations

$$\text{Ext. Rate from Wells (vapor)} = \frac{40.3\ \text{cu ft}}{\text{min}} \times \frac{690\ \text{mg}}{\text{cu meter}}\ \frac{\text{lb}}{453{,}593\ \text{mg}} \times \frac{1{,}440\ \text{min}}{\text{day}} \times \frac{\text{cu meter}}{35.314\ \text{cu ft}}$$

$$= 2.47\ \text{lbs/day}$$

Mass removed from groundwater = concentration (µg/L) x gallons extracted x (2.2046×10^{-9})(lb/mg) / 0.26418 (gal/L)

Notes:

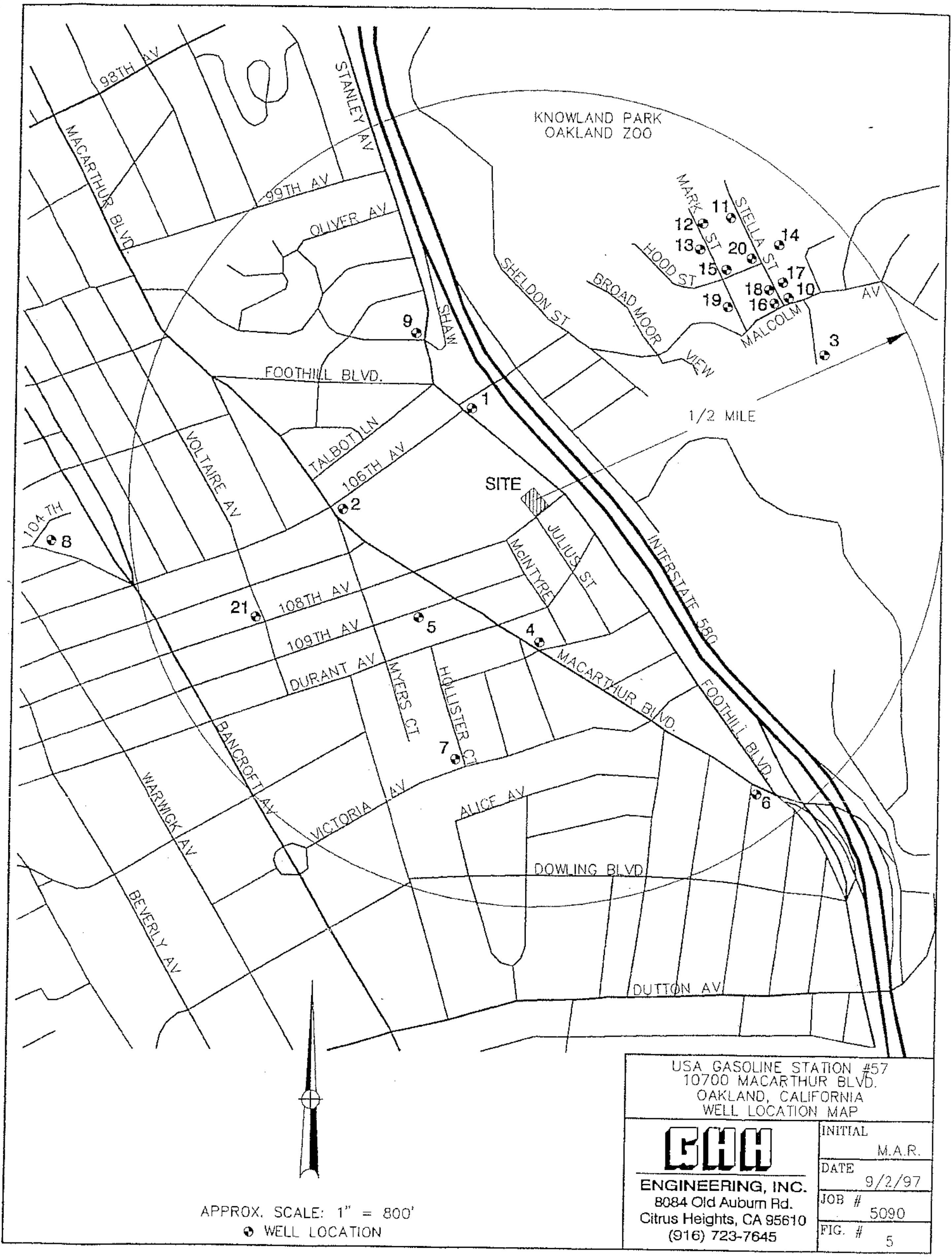
[1] For mass estimates between the sampling dates, average mass extraction rate and time elapsed (operational uptime) between the sampling events were used.

[2] Volume estimated based on flow totalizer measurements taken on the sampling days.

µg/L - Micrograms per liter	lbs - Pounds	TPHG - Total petroleum hydrocarbons
cfm - Cubic feet per meter	mg/m^3 - Milligrams per cubic	
DPE - Dual phase extraction	MTBE - Methuyl tertiary butyl ether	
gal - Gallons	NA - Not analyzed	
GRO - Gasoline range organics	NM - Not monitored	

APPENDIX F

WATER SUPPLY WELL SURVEY DATA



APPROX. SCALE: 1" = 800'

⊕ WELL LOCATION

USA GASOLINE STATION #57
10700 MACARTHUR BLVD.
OAKLAND, CALIFORNIA
WELL LOCATION MAP

GHH
ENGINEERING, INC.
8084 Old Auburn Rd.
Citrus Heights, CA 95610
(916) 723-7645

INITIAL	M.A.R.
DATE	9/2/97
JOB #	5090
FIG. #	5

FIGURE 8

TABLE 1

WELLS WITHIN 1/2-MILE RADIUS
USA STATION #57
OAKLAND, CALIFORNIA

Map ID	Well Use	Owner	Well Address	DWR	Year	Perforated Intervals (feet)
1	MW	Southland	10501 Foothills	2 S 3 W 24 E (3-5)	1987	
2	MW	Arco	10600 MacArthur	2 S 3 W 24 E 11	1992	
3	MW	Sam Kai Kee	106th	2 S 3 W 24 G 1	1951	28-85'
4	MW	Shell		2 S 3 W 24 M		
5	IW	Ms. Kitchen	2544 109th	2 S 3 W 24 M 1		38-55'
6	MW	Unocal	96 MacArthur			Unknown
7	IW	Mr. Brahmse	377 Hollister	2 S 3 W 24 N 1	1971	35-75'
8	CPW	PG&E	Sunnyside 75' SW of 104th	2 S 3 W 23 K 1	1974	120'
9	CPW	PG&E	Shaw & Stanley	2 S 3 W 24 E 2	1976	120'
10	DW	Mr. Freitas	Stella & Malcolm	2 S 3 W 24 B 5	1955	55-123'
11	DW	G. Hower	10700 Stella	2 S 3 W 24 B 2	1951	55'
12	DW	Johnson	10731 Mark	2 S 3 W 24 B 1	1951	102'
13	DW	Sam Kai Kee	Mark	2 S 3 W 24 B 3		100'
14	DW	H. Mathews	10544 Stella	2 S 3 W 24 C 3		42-92'
15	DW	A. Bassigian	Mark & Hood	2 S 3 W 24 B	1958	56-107'
16	DW	C. Bach	Malcolm & Stella	2 S W W 24		100'
17	DW	J. Prentiss	10521 Stella	S 2 3 W 24 C	1951	Unknown
18	DW	R. Trimble	10520 Stella	2 S 3 W 24 C	1951	190'
19	DW	C. Armtront	10550 Stella	2 S 3 W 24 C	1951	Unknown
20	DW	H. Brenneman	10600 Stella	2 S 3 W 24 B 4	1951	98'
21	CPW	PG&E	Voltaire & 108th	2 S S W 23 J 1		105'

MW	Monitoring well
DW	Domestic well
CW	Cathodic protection well
IW	Irrigation well

G:\data\5090\Search.wb1

APPENDIX G

HUMAN HEALTH RISK ASSESSMENT AND CLEANUP LEVELS REPORT PREPARED FOR THE SITE BY SKINNER ASSOCIATES

S/A Skinner Associates

Human Health Risk Assessment and Site Specific Target Levels- Former USA Station # 57 - Oakland, CA.

By:

Clint Skinner, Ph.D., DABT
Skinner Associates
3985 Shooting Star Rd.
Creston, CA. 93432 Clint Skinner

For:

Scott Bittinger
Stratus Environmental, Inc.
3330 Cameron Park Drive, Suite 550
Cameron Park, California 95682

July 17, 2009

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Appendix F: RBCA Report Residential GW Vapor all Chemicals 110
Appendix G: RBCA Report Residential GW All Routes all Chemicals 135
Appendix H: RBCA Report Commercial GW All Routes all Chemicals 160

Executive Summary

Introduction: The following evaluation includes a modified Cal/EPA Preliminary Endangerment Assessment (PEA) Health Risk Assessment (HRA) with proposed Site Specific Target Levels (SSTL) using RBCA software for the Former USA Station # 57 in Oakland, CA. Receptors included shoppers and workers.

Cal/EPA Soil Cancer Risks using Cal/EPA methods and **maximum soil** concentrations for the child/adult shopper were 3.54E-07. For the worker the risks were 1.2E-06 or at the E-6 threshold. Using **95% UCL soil** levels the combined risk for the child/adult shopper was 3.9E-08 or below the risk threshold of E-6. For the worker risks were 1.34E-07 also below the threshold.

Cal/EPA Soil non-cancer hazards using Cal/EPA methods for **maximum soil** concentrations predicted hazard values of 0.4 for the child/adult and 0.014 for the industrial receptor, both under the 1.0 threshold. **95% UCL** soil concentrations predicted hazards of 0.064 for the child and 0.0023for the worker.

RBCA Risks and Hazards - Risks from soil using RBCA and the 95% UCL media values were 1E-6 for commercial and 4.2E-6 for full residential exposure. Soil hazard was 0.28 for commercial and 0.5 for residential exposure. Groundwater risks for vapor intrusion were 4.63E-7 for commercial and 1.9E-6 for residential exposure and hazard was 0.033 for commercial and 0.11 for residential exposure. Risks for commercial groundwater ingestion and vapor generated a combined risk of 1.2E-4 and a hazard of 1.94. Risks for residential groundwater ingestion and vapor intrusion for groundwater generated a combined risk of 4.87E-4 and a hazard of 5.27.

RBCA SSTL Clean-up levels demonstrate that SSTLs for commercial soil and groundwater vapor exposure to all chemicals were not exceeded by present 95% UCL media concentrations and the clean-up levels or CRF were <1.0. The results of residential exposure to soil and groundwater vapor are that SSTLs were not exceeded and the CRF was <1.0. For residential to groundwater by all routes benzene, TPHG and 1,2-DCA exceeded the SSTLs. For commercial groundwater exposure by all routes only benzene exceeded the SSTLs.

Blood-lead values (PbB) were predicted using the EPA ALM spreadsheet. For exposure to the **maximum** soil concentration (7 mg/kg), the 95% blood lead for the worker was predicted at 4.3 ug/dL and the probability of the workers' fetus exceeding 10 ug/dL was 0.3%.

Human Health Risk Assessment and Site Specific Target Levels-Former USA Station # 57 - Oakland, CA.

1.0 Introduction and Background

Risks and Clean-up levels were requested by Scott Bittinger of Stratus Environmental, Inc. 3330 Cameron Park Drive, Suite 550 Cameron Park, California 95682 for the former USA Station #57 at 10700 MacArthur Blvd., Oakland CA which is slated to become a grocery store. A Cal/EPA Health Risk Assessment (HRA) was used to define risks and hazards for future workers and patrons with soil exposure. Water risks and hazards and Site Specific Target Levels (SSTL) were calculated using the Risk Based Corrective Action model or RBCA for soil and groundwater modeling.

2.0 PEA Exposure Assessment Methods

2.1 Exposure Assessment

This HRA used the Cal/EPA PEA Guidance (June, 1999) formulas with exposure defaults from Cal/EPA HERD (Human and Ecological Risk Division) Note 1 – (Oct 27 2005). Cal/EPA TCDD cancer slope factors and USEPA Integrated Risk Information System (IRIS) hazard reference doses (RfD) were used to calculate risk and hazard. Target clean-up concentrations as SSTLs and clean-up factors as CRFs [present concentration]/[target concentration] were calculated using the RBCA model 2.51 (2009). Due to the large number of samples and the prominent "hot spots" both maximum and 95% upper confidence level of the mean (**UCL**) media values were evaluated. Receptors included the DTSC child/adult receptor modified for shopping using activity-specific exposure factors (USEPA 1997) and the default adult full-time worker.

2.2 Areas of Exposure

Exposures were evaluated for exposure to all areas of the site as a whole.

2.3 Chemicals of Potential Concern (COPC)

Soil: TPHg, TPHd, benzene, toluene, ethyl benzene, xylenes, lead

H20: Gro, TPHd, benzene, toluene, ethyl benzene, xylenes, MTBE, TBA, 1,2-DCA

2.4 Source Term

Due to the statistical power of the analytical data sets (N=70-80 for soil; N=200 for groundwater), as discussed in PEA manual Jan. 1994 part 2.5.1.4 the 95% upper confidence level of the mean (UCL) may be used "where there is adequate characterization." Also the USEPA (May 1992) Supplemental Guidance to RAGS: Calculating the Concentration Term, states "the 95% upper confidence limit (UCL) of the mean should be used where sufficient test samples are present." The mean concentration best describes exposure to contaminants.

To calculate the mean concentrations for each contaminant, the individual concentrations were added to detection limits for each contaminant that is found on-site.

Distribution of Contaminants

Soil: As seen in the statistics for Table 1A (sampled 1987-1995), the max values are roughly 3-6 times the mean and the standard deviations are roughly twice the mean. BTEX especially demonstrated a ten-fold increase in mean versus max in the B-1 well @ 13 feet. This is normal for soils with "hot spots." For Table 1B (Sampled 1994), the max to mean ratio was similar at 4-5 fold. The standard deviation were slightly tighter but still around twice the mean. The "hot spot" was the tank cavity. Table 1C (Wege Samples 1994) demonstrated up to 10-fold higher max than mean and highs in trench, tank field and tank cavity. Table 1D has 2007 samples of borings overall levels were low and most samples were non-detect but GRO (gas related organics) reached a max of 500 mg/kg in horing AS-1 @ 16 feet.

Groundwater: As seen in the statistics for Table 1f (Sampled 87-09) EX2@16' had 3/6 of the highs (Gro, benzene, et. benzene). The values for these 3 highs were 25X mean for ethyl benzene to 32x for benzene and 230x for Gro. The next 3 highs were found in S-1 and S-2 reaching a value of 58x mean for toluene. For Table 1g (sampled 2002-2009) 3 analytes were over detection limits: MTBE, TBA and 1,2-DCA. The first two analytes had maxima in MW-3 and 1,2-DCA had it in EX-2. MTBE had a high 10x the mean. TBA's high was 30x mean and 1,2-DCA's was 22x mean.

2.5 Analytics Quality Control:

All analytical data was provided by Stratus in Excel spreadsheets or .pdf files by email. These tables were cut/pasted directly into S/A Tables. The only alteration that was made to the analytics spreadsheets in this assessment was to convert "<detection limit" notations to the detection limit values for use in statistical analysis to re-label the tables and add statistics.

2.6 Media, Pathways and Routes:

Conceptual Site Model - Sec Appendix A

2.7 Media, Pathways and Routes:

Conceptual Site Model

Source Term	Routes	Receptors
Soil	oral, dermal, inhalation	child/adult shopper/worker
Groundwater	Inhalation vapor intrusion	full-time store worker

Exposure Assessment Assumptions:

The following scenarios are used in the risk/hazard assessment for soil exposure based on guidance in the Cal/EPA PEA, (June, 1999) as updated by DTSC HERD Note 1 (Oct 27 2005). These defaults are seen in Table 2 and are used in all scenarios except where noted. Groundwater was not evaluated for ingestion or dermal exposure because it is not expected to be potable in the future (Personal Communication with Scott Bittinger of Stratus Env.). Instead, the RBCA model used the Johnson and Ettinger model to evaluate vapor intrusion to buildings which generated risks and hazards and clean-up levels.

Exposure Defaults (Cal/EPA)-Soil:

Child Shopper Portion (PEA B-11-14): Age: 6, body weight: 15 kg, soil ingestion: 200 mg/day, water ingestion: 1L per day, dermal surface area: 2900 cm2, dermal soil adherence factor: 0.2 mg/cm2, inhalation rate: 10 m3/day, exposure frequency: 29 d/yr.*, exposure duration: 6 years, cancer average time: 25550 days: non-cancer average time: EF x ED. Media exposure: soil and water ingestion, dermal exposure and inhalation of vapor and dusts.

Adult Shopper Portion (PEA B-11-14): Age > 6, body weight: 70 kg, soil ingestion: 100 mg/day, water ingestion: 2L/day, dermal surface area: 5700 cm2, dermal soil adherence factor: 0.07 mg/cm2, dermal absorption factors (PEA page A-6), inhalation rate: 20 m3/day, exposure frequency: 35 d/yr.*, exposure duration: 24 years, cancer average time: 25550 days: non-cancer average time: EF x ED. Media exposure: soil and water ingestion, dermal exposure and inhalation of vapor and dusts.

* Maximum shopping time is from USEPA Exposure Factors Handbook (Aug 1997) Tables 15-2 (child) and 15-8 (adult) specific activity factors.

Child/Adult Shopper: Combination of child and adult receptor as performed by PEA reduced equations.

Adult Worker (PEA B-11-14): Age > 6, body weight: 70 kg, soil ingestion: 100 mg/day, water ingestion: 2L/day, dermal surface area: 5700 cm2, dermal adherence factor: 0.2 mg/cm2, dermal absorption factors: PEA page A-6, inhalation rate: 14 m3/day, exposure frequency: 250 d/yr, exposure duration: 25 years, cancer average time: 25550 days, non-cancer average time: EF x ED. Media exposure: soil and water ingestion, dermal exposure and inhalation of vapor and dusts.

3.0 Hazard and Risk Assessment Methods

Risk Assessment Principles: Human exposure to chemicals in the soil and air is estimated using exposure estimates compared to standard measures of health hazard and risk at known levels of exposure. Assessments are dependant on factors which vary according to choice of media values, exposure defaults and risk and hazard values.

3.1 Non-Carcinogenic Effects Methods

Non-cancer hazard was calculated using the equations from PEA Guidance pages B-7-14 in Tables 5a,b. Table 5a presents the Cal/EPA health hazard and risk data based on the maximum concentrations detected at the site. Table 5b presents the health hazard and risk based on the 95% upper confidence levels. The hazard calculations used USEPA Reference Doses (RfD) from Table 4.0 and exposure defaults from Table 2. Hazard values for TPH were provided by
Total Petroleum Hydrocarbon Criteria Working Group (TPHCWG). (1997). Volume 4. In Tables 5a,b hazards for each contaminant are expressed as hazard quotients for exposure by oral, dermal and dust inhalation routes. The summation of hazard quotients for all contaminants generated a combined Hazard Index. **Allowable Hazard:** Any hazard quotient or index greater than 1.0 is considered excessive.

Lead Hazard:

Evaluation of non-cancer hazard for soil-lead used the USEPA ALM spreadsheet from their Lead Website @ http://www.epa.gov/superfund/health/contaminants/lead/products.htm

3.2 Carcinogenic Effects Methods

To evaluate **cancer risk**, the Cal/EPA Cancer Slope Factors were retrieved from the Cal/EPA Office of Environmental Health Hazard Assessment (OEHHA) Toxicity Criteria Data Base (TCDB) at: http://www.oehha.ca.gov/risk/ChemicalDB/cancerpotency.asp

These risk factors were tabulated in Table 4 and were used with PEA formulas (pages B-7-14) in Tables 5a,b for the alternate assessment to calculate risks for the child/adult shopper and with USEPA formulas and defaults for the industrial and construction worker scenarios (Table 2). A combined cancer risk value was tabulated at the bottom of Tables 5a,b for the receptor for all routes, media and all carcinogens.

Allowable Risk – One in a million (10^{-6}) is the point of departure for risk management decisions with some agencies accepting 10 in a million (10^{-5}).

3.3 Risk Based Clean-up Levels – Soil and Groundwater

Site Specific Target Levels (SSTL) and clean-up factors (CRFs) for all soil and groundwater contaminants were calculated using the Risk Based Corrective Action model (RBCA) 2.51 issued in 2009 from GSI Environmental Inc. These soil and groundwater SSTL and CRFs are seen in Table 6. The RBCA assessments used 95% UCL values of all contaminants including for 1) soil TPH, benzene, toluene, et. benzene and xylenes by oral, dermal and inhalation routes including vapor intrusion and 2) groundwater TPH, benzene, et benzene, xylenes, MTBE and 1,2-DCA by inhalation of vapors. The only complete pathway for groundwater exposure is by inhalation of vapors since future workers will not be directly exposed by ingestion or dermal routes. The RBCA model uses standard EPA defaults for exposure assessment and the EPA Johnson & Ettinger model for vapor intrusion modeling. Reports of all exposure and modeling defaults, pathways, soil and groundwater parameters, exposure and risk/hazard calculations, SSTLs and clean-up factors (CRFs) are included in Appendix C-H. The CRF is a ratio of the [present concentration] / [target concentration].

4.0 Uncertainty Assessment

All risk assessments involve the use of assumptions, judgments and imperfect data to varying degrees. Lack of human data often results in use of large uncertainty factors in the final estimates of risk and hazard. There are several categories of uncertainty associated with exposure and risk assessments. Below are some of the factors which contribute to uncertainty in the present risk assessment.

4.1 Uncertainty in Source terms:

1) Use of maximum concentrations is recommended by some agencies to avoid underestimating risk. This practice is likely to overestimate risk/hazard since maximum concentrations are often outliers while receptors are actually exposed to average concentrations, not maxima, as discussed in Cal/EPA PEA manual Jan. 1994 part 2.5.1.4 which states the 95% UCL may be used "where there is adequate characterization." Also the US EPA (May 1992) Supplemental Guidance to RAGS:

Calculating the Concentration Term, states "the 95% upper confidence limit (UCL) of the mean should be used where sufficient test samples are present."

4.2 Uncertainty in Exposure Assessment:

1) Assumption that exposure will continue at initial levels for a 30-year lifetime for residents often overestimates exposure duration and ignores natural decay of the contaminants with time, as discussed by Borgert et al. (1995).

4.3 Uncertainty in Risk Assessment:

1) Limitations in human exposure studies used to derive risk factors can overstate risk and hazard.
2) Use of animal models to generate cancer slope factors requires extrapolation from known high dose in lab studies to unknown human low dose. Low dose risk extrapolation methods (ex. linearized multistage model) usually assume linear dose-response slopes unless another mechanism is known. Actual biological mechanisms, however, often demonstrate log-linear or sigmoidal rate curves. To this overestimation is often added a 95% upper confidence limit on the risk estimate. Use of the most sensitive animal data sets as a policy should be weighed against models with more significance for human exposure.

3) The use of uncertainty factors to extrapolate from animals to humans and normal to sensitive humans and from short-term to chronic exposures and for studies without no effect levels is a key part of the Reference Dose and hazard assessment methodology and can increase risk estimates by 100 to 3000 times.
4) Uncertainty exists in the assumption of additivity of toxic effects such as adding Hazard Quotients or cancer risks with multiple substance exposure. Additivity ignores possible synergisms or antagonisms among chemicals with different mechanisms, which would increase or decrease toxicity beyond additivity.

5.0 Risk and Hazard Assessment Results

Cal/EPA Soil Cancer Risks in Table 5a,b using Cal/EPA methods and **maximum soil** concentrations for the child/adult shopper were 3.54E-07. For the worker the risks were 1.2E-06 or at the E-6 threshold. Using **95% UCL soil** levels the combined risk for the child/adult shopper was 3.9E-08 or below the risk threshold of E-6. For the worker risks were 1.34E-07 also below the threshold.

Cal/EPA Soil non-cancer hazards in Table 5a,b using Cal/EPA methods for **maximum soil** concentrations Table 5a) predicted hazard values of 0.4 for the child/adult and 0.014 for the industrial receptor, both under the 1.0 threshold. **95% UCL** soil concentrations predicted hazards of 0.064 for the child and 0.0023for the worker.

RBCA Risks and Hazards in Table 5c generated risks from soil using RBCA and the 95% UCL media values were 1E-6 for commercial and 4.2E-6 for full residential exposure. Soil hazard was 0.28 for commercial and 0.5 for residential exposure. Groundwater risks for vapor intrusion were 4.63E-7 for commercial and 1.9E-6 for residential exposure and hazard was 0.033 for commercial and 0.11 for residential exposure. Risks for commercial groundwater ingestion and vapor generated a combined risk of 1.2E-4 and a hazard of 1.94. Risks for residential groundwater ingestion and vapor intrusion for groundwater generated a combined risk of 4.87E-4 and a hazard of 5.27.

RBCA SSTL Clean-up levels in Table 6a demonstrate that SSTLs for commercial soil and groundwater vapor exposure to all chemicals were not exceeded by present 95% UCL media concentrations and the clean-up levels or CRF were <1.0 Table 6b shows the results of residential exposure to soil and groundwater vapor where SSTLs were not exceeded and the CRF was <1.0. Table 6c shows residential and commercial exposure to groundwater by all routes. For residential exposure, benzene, TPHG and 1,2-DCA exceeded the SSTLs. For commercial groundwater exposure by all routes only benzene exceeded the SSTLs.

Blood-lead values (PbB) were predicted using the EPA ALM spreadsheet. For exposure to the **maximum** soil concentration (7 mg/kg), the 95% blood lead for the worker was predicted at 4.3 ug/dL and the probability of the workers' fetus exceeding 10 ug/dL was 0.3%.

6.0 Conclusion

Cal/EPA Cancer Risks for maximum soil concentrations for the two soil carcinogens on-site; benzene and ethyl benzene by oral, dermal and inhalation routes was 3.54E-07 for the child/adult shopper and 1.2E-06 for the industrial receptor. The 95% UCL soil combined risk was 3.9E-08 for the child and 1.34E-07 for the worker. The child/adult receptor was under the E-6 risk threshold with both maximum and 95% UCL media values. The industrial receptor was at the E-6 threshold with maximum values and under the threshold with 95% UCL values.

Cal/EPA Hazard values using maximum soil concentrations for all compounds predicted a hazard index of 0.4 for the child and 0.014 for the industrial worker. Using the 95% UCL soil concentrations predicted a hazard index of 0.064 for the child/adult and 0.0023 for the worker. All receptors/media combinations generated hazard indices under the 1.0 threshold.

Soil lead was evaluated with the EPA ALM spreadsheet for exposure to the maximum soil concentration of 7 mg/kg. The 95% confidence limit on the predicted blood lead level for the industrial worker was predicted at 4.3 ug/dL and the probability of the industrial workers' fetus exceeding 10 ug/dL was 0.3%. These predicted blood lead values are below the 10 ug/dL present level of concern.

RBCA Risks and Hazards. The risk for the commercial receptor was 1E-6 and slightly higher than the Cal/EPA industrial receptor (1.34E-07). RBCA residential soil risk was 4.2E-6. RBCA soil hazard was 0.28 for commercial and 0.5 for residential exposure. Groundwater risks for vapor intrusion were 4.63E-7 for commercial and 1.86E-6 for residential exposure and hazard was 0.033 for commercial and 0.11 for residential exposure. Risks for residential ingestion and vapor intrusion for groundwater generated a combined risk of 4.87E-4 and a hazard of 5.27. Risks for commercial groundwater ingestion and vapor generated a combined risk of 1.2E-4 and a hazard of 1.94. Use of groundwater for potable uses is not expected in this area.

RBCA soil and groundwater SSTLs were not exceeded by present 95% UCL soil and groundwater concentrations using all routes for soil and groundwater vapor intrusion. The clean-up factor or CRF was also <1.0 for all chemicals in both media. With ingestion of water the residential receptor exceeded the SSTLs for benzene, TPHG and DCA. For commercial groundwater ingestion and vapor; only benzene exceeded the SSTLs.

Limitations of S/A Risk Assessment: The methods and information used in this assessment are believed to provide accurate and current guidance for risk management decisions without specific warranty. Decisions involving remediation and liability should be made with the aid of the appropriate regulatory authorities together with legal council.

7.0 References

Cal Regional Water Quality Control Board-SF Bay. (May 2008) Background document for the development of Tier 1 Environmental Screening Levels http://www.swrcb.ca.gov/rwqcb2/water_issues/available_documents/ESL_May_2008.pdf

Cal/EPA CHHSL http://www.calepa.ca.gov/brownfields/documents/2005/CHHSLsGuide.pdf

Cal/EPA OEHHA TCDB Cancer Potency site. http://www.oehha.ca.gov/risk/ChemicalDB/cancerpotency.asp

Cal/EPA DTSC Science and Technology Johnson Ettinger Models http://165.235.111.242/AssessingRisk/JE_Models.cfm

Cal/EPA HERD (September 26, 2003) Evaluating Metals as Chemicals of Potential Concern.

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IRIS. Integrated Risk Information Service. USEPA On-line Data Base.

USEPA ALM Spreadsheet (online) ; USEPA Adult Lead Methodology Users Manual (online) http://www.epa.gov/superfund/health/contaminants/lead/products.htm

USEPA PRGS (2009 online) http://epa.gov/region09/superfund/prg/

USEPA (2000) Dermal Assessment . EPA 540/R-99/005

Total Petroleum Hydrocarbon Criteria Working Group (TPHCWG). (1997). Volume 4. Development of Fraction Specific References Doses (RfDs) and Reference Concentrations (RfCs) for Total Petroleum Hydrocarbons (TPH). Amherst Scientific Publishers.

RBCA (2009) Risk Based Corrective Action model version 2.51 from GSI Env. Inc Houston TX 77098

USEPA (Aug, 1997) Exposure Factors Handbook. U.S. Environmental Protection Agency, Office of Health and Environmental Assessment. Washington DC 20460

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TABLES

Table 1a Soil Analytical Data USA Station #57 (87-95) Oakland CA

Well ID	Date	Depth (Feet)	TPH G (ppm)	TPH D (ppm)	Benzene (ppm)	Toluene (ppm)	Ethyl Benzene (ppm)	Total Zylene (ppm)
S-1	2/12/1987	20.5	42					
		20.5	16					
S-2	2/12/1987	24.5	**600**					
B-1	02!28/95	5.5	ND		ND	ND	ND	ND
		9.5	44		0.12	ND	0.14	0.4
		13	540	**55**	**2.6**	**10**	**7.5**	**48**
		20	ND		0.012	0.016	ND	0.029
		25	3.9		0.048	0.14	0.062	0.37
		31	ND		ND	0.01 1	0.0057	0.045
		35	ND		0.014	0.018	0.012	0.079
		40.5	ND	ND	ND	ND	ND	ND
B-2	3/1/1995	5	ND		ND	ND	ND	ND
		10.5	ND		ND	ND	ND	ND
		16	16		0.057	0.028	0.029	1.2
		21	110		0.96	0.41	0.33	1.5
		26	240	22	0.76	1.4	0.85	1.9
B-3	3/1/1995	11	ND		ND	ND	ND	ND
		15.5	10		0.044	0.11	0.079	0.63
		20,5	I S	1.3	0.041	0.37	0.15	1.1
B-4	3/2/1995	3	ND		ND	ND	ND	ND
		6	ND		ND	ND	ND	ND
		12	ND	ND	ND	ND	ND	ND
B-5	3/2/1995	5.5	ND		ND	ND	ND	ND
		12	ND	ND	ND	ND	ND	ND
B-6	03!02/95		33	5.3	0.093	0.065	0.33	2
			2.6		0.062	ND	0.03	0.047
			ND		ND	ND	ND	0.022
B-7	3/2/1995	3.5	ND	ND	ND	ND	11)7	ND
		5	ND	-	ND	ND	ND	ND
		12	ND	-	ND	ND	ND	ND
B-8	3/2/1995	3	17	-	0.012	0.021	0.12	0.16
		5.5	ND	ND	0.019	ND	0.05	ND
	~	12	2	-	0.042	ND	ND	0.016
MW-3	02128/95	5.5	ND	-	ND	ND	ND	ND
		11.5	1.9	-	0.026	0.011	0.0061	0.019
		13.5	240	12	0.41	0.64	2	5.4
		15.5	110	-	0.37	3.8	1.5	10
		21.5	3	-	0.26	0.24	0.059	0.5
		24.5	ND	-	0.03	0.0069	0.0056	0.016
		29.5	ND	-	ND	0.0054	ND	0.0092
		39.5	ND	-	ND	ND	ND	ND
MW-4	11/21/1995	10	ND	5	ND	ND	ND	ND
MW-5	11/21/1995	10	ND	5.2	ND	ND	ND	ND
		15	ND	4.2	ND	ND	ND	ND
MW-6	11!21/95	10	ND	4.4	ND	ND	ND	ND
MW-7	11/21/1995	10	ND	4.7	ND	ND	ND	ND
		15	ND	4.3	ND	ND	ND	ND
		20	25	8.7	0.071	0.11	0.043	0.1
MW-8	11/21/1995	10	ND	5.5	ND	ND	ND	ND
		15	ND	5.1	ND	ND	ND	ND
		20	ND	4.5	ND	ND	ND	ND

Statistics - Test Samples		Depth (Feet)	TPH G (ppm)	TPH D (ppm)	Benzene (ppm)	Toluene (ppm)	Ethyl Benzene (ppm)	Total Xylene (ppm)
Mean		15.4	108.2	9.8	0.3	1.0	0.7	3.2
S.D.		9.4	178.7	13.4	0.6	2.4	1.7	10.0
Max		40.5	600.0	55.0	2.6	10.0	7.5	48.0
N		47.0	19.0	15.0	20.0	18.0	20.0	23.0
T(G-87)		1.6	1.6	1.6	1.6	1.6	1.6	1.6
95% UCL		17.6	173.8	15.4	0.5	1.9	1.3	6.5

NOTES:

TPH G TPH D ppm ND
Total petroleum hydrocarbons in the gasoline range
Total petroleum hydrocarbons in the diesel range
Parts per million
Not detected at the method detection limit
Nol measured not analyzed
Boring locations are presented in Alton Geo Sciences' "Supplementary Site Assessment Report " which are included in Appendix C.

Table 1b Soil Analytical Data USA Station #57 (1994) Oakland CA-Tank Removal

Sample Location	Sample ID	Date	Depth (Feet)	TPH G (ppm)	TPH D (ppm)	Benzene (ppm)	Toluene (ppm)	Ethyl Benzene (ppm)	Total Zylene (ppm)	TTLC Lead (ppm)
Product Trench	PI-E-3.5	7/19/1994	3.5	ND(0.2)	ND(1.0)	ND(0.005)	ND(0.005)	ND(0.005)	ND(O.005)	7
	PI-2	7/19/1994	3.5	4.5	ND(50)	ND(1.0)	6	60	4=40	4
	PI-3	7/19/1994	3.5	ND(0?)	ND(LO)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	5
	PI-4	7/19/1994	4	ND(02)	ND(1.0)	ND(0.005)	ND(0.005)	ND(O.005)	ND(0.005)	6
	PI-5	7/19/1994	3.5	ND(1.0)	ND(1.0)	ND(O.005)	ND(0.005)	ND(O.005)	ND(0.005)	7
	P12-0	9/19/1994	9	15	-	0.02	0.04	0.07	0.19	-
Tank Field	TPI	7/19/1994	12.5	-	60	ND(0.005)	0.015	0.007	0.008	-
	TP2	7/19/1994	12S	-	230	ND(1.0)	0.79	2.2	0.7	-
	TP3	7/19/1994	13	94	-	0.18	0.25	1	5.9	3
	TP4	7/19/1994	13	1400	-	1.9	3.5	12	150	4
	TP5	7/19/1994	13	300	-	ND(0.5)	0.74	4.8	20	3
	TP6	7/19/1994	13	0.7	-	ND(0.005)	ND(0.005)	0.006	ND(0.005)	3
	TP7	7/19/1994	13	ND(0.2)	-	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	3
Tank Cavity	TC-1	8/19/1994	16	ND(0.2)	-	ND(0.005)	ND(0.005)	ND(0.005)	ND(O.005)	-
	TC-2	8/19/1994	16	93	-	ND(1.0)	0.28	0.63	3.1	-
	TC-3	8/19/1994	17.5	2.4	1	0.008	0.02	0.02	0.11	-
	TC-4	8/19/1994	15.5	0.7	2	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	-
	TC-5	8/19/1994	17	190	-	0.17	0.38	0.99	7.9	-
	TC-6	8/19/1994	18	ND(0.2)	-	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	-
	SM-I	8/19/1994	19.5	~	0.4	-	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)
	TC2-1	9/27/1994		417ND(02)	-	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	-
	TC2-2	9/27/1994	13	13	-	0.06	0.019	0.026	ND(0.005)	-
	TC2-3	9/27/1994	16	ND(0.2)	-	ND(0.005)	ND(0.005)	ND(0 005)	ND(0.005)	-
	TC2-4	9/27/1994	13	ND(0.2)	-	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	-
	TC2-5	9/27/1994	12	100	200	0.13	0.12	0.1	0.26	-
	TC2-7	9/27/1994	13	6.3	37	ND(0.005)	ND(O.005)	ND(0.005)	ND(0.005)	-
	TC2-8	9/27/1994	13	ND(1.0)	16	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	-
	TC2-9	9/27/1994	19	0.4	-	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	-
	TC2-11	9/27/1994	13	2200	-	9.6	21	40	260	-
	TC2-12	9/27/1994	12	130	-	0.33	0.29	0.66	7.9	-
	TC2-13	9/27/1994	20	620	-	1.1	4.9	6.4	66	
	TC2-14	9/27/1994	11	92	-	0.096	0.1	0.17	1.7	-
	TC2-15	9/27/1994	17	ND(0.2)	-	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	-
	TC2-16	9/27/1994	14	ND(1.0)	-	ND(0.005)	ND(O.005)	ND(0.005)	ND(0.005)	-
	TC3-3	Oct-94	13	300	330	-	-	-	-	-
	TC3-4	Oct-94	13	510	ND	-	-	-	-	-
	TCE-5	Oct-94	13	2400	ND	-	-	-	-	-
	TC3-6	Oct-94	13	940	ND	-	-	-	-	-
Dispenser Island	DI-1	9/27/1994	3.5	720	-	0.19	2	9	53	-
	DI-2	9/27/1994	3.5	280	-	0.12	0.8	4.6	33	-
	DI-3	9/27/1994	3	ND(0.2)	-	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	-
	DI-4	9/27/1994	3	590	-	0.7	2.5	13	81	-
	DI-5	9/27/1994	3.5	570		0.1	1.5	2.7	17	-
	D1-6	9/27/1994	3.5	1800	-	0.72	5.2	31	180	-

Statistics - Test Samples		Date	Depth (Feet)	TPH G (ppm)	TPH D (ppm)	Benzene (ppm)	Toluene (ppm)	Ethyl Benzene (ppm)	Total Xylene (ppm)	TTLC Lead (ppm)
Mean			11.5	495.3	97.4	1.0	2.4	8.6	46.7	4.5
S.D.			5.3	686.3	123.3	2.4	4.7	15.5	73.3	1.6
Max			20.0	2400.0	330.0	9.6	21.0	60.0	260.0	7.0
N			42.0	27.0	9.0	16.0	21.0	22.0	19.0	10.0
T(G-87)			1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
95% UCL			12.8	706.6	163.2	1.9	4.0	13.9	73.6	5.3

SOIL SAMPLES BY WESTERN GEO-ENGRvEERS UNLESS OTHERWISE NOTED

TPH G TPH D

PPM ND

Total petroleum hydrocarbons in the gasoline range Total petroleum hydrocarbons in the diesel range Pans per million

Not detected at the method detection limit Not measured/not analyzed

Table 1c Soil Analytical Data USA Station #57 (1994) Oakland CA-Wege Samples

Sample Location	Sample ID	Date Sampled	Depth Sampled	TPH G (ppm)	TPH D (ppm)	Benzene (ppm)	Toluene (ppm)	Ethyl Benzene (ppm)	Total Xylene (ppm)	TTLC Lead (ppm)
Trench	PI-E	7/19/1994	3.5	0.2	1	0.005	0.005	0.005	0.005	7
	PI-2		3.5	500	50	1	6	60	440	4
	PI-3		3.5	0.2	1	0.005	0.005	0.005	0.005	5
	PI-4		4	0.2	1	0.005	0.005	0.005	0.005	6
	PI-5		3.5	1	1,0	0.005	0.005	0.005	0.005	7
TANK FIELD	TP-1	7/19/1994	12.5		60	0.005	0.015	0.007	0.009	
	TP-2		12.5		230	1	0.79	2.2	0.7	
	TP-3		13	94		0.18	0.25	1	5.9	3
	TP-4		13	1400		1.9	3.5	12	190	4
	TP-5		13	300		0.5	0.74	4.8	20	3
	TP-6		13	0.7		0.005	,005	0.006	0.005	3
	TP-7		13	0.2		0.005	,005	0.005	0.005	3
TANK CAVITY	TC-1	8/19/1994	16	0.2		0.005	0.005	0.005	0.005	
	TC-2		16	93		0.01	0.28	0.63	3.1	
	TC-3		17.5	2.4	1	0.008	0.02	0.005	0.11	
	TC-4		15.5	0.7	2	. 005	0.005	0.005	0.005	
	TC-5		17	190		0.17	0.38	0.99	7.9	
	TC-6		18	0.2		c.005	0.005	0.005	0.005	
	SM-1		19.5	0.4		0.005	0.005	0.009	0.005	
TANK CAVITY	TC2-1	9/27/1994	17	0.2		0.005	0.005	0.005	0.005	
	TC2-2		13	13		0.06	0.019	0.026	0.005	
	TC2-3		16	0.2		c.005	0.005	c.005	0.005	
	TC2-4		13	0.2		0.005	0.009	0.005	0.005	
	TC2-5		12	100	200	0.13	0.12	0.1	0.25	
	TC2-7		13	6.3	37	,005	,005	0.005	0.005	
	TC2-8		13	1	16	0.005	0.005	0.005	0.005	
	TC2-9		19	0.4		0.005	0.005	0.005	0.005	
	TC2-11		13	2200		9.6	21	40	260	
	TC2-12		12	130		0.33	0.29	0.66	7.9	
	TC2-14		20	620		1.1	4.9	6.4	66	
	TC2-15		11	92		0.096	0.1	0.17	1.7	
	TC2-16		17	0.2		,005	0.005	0.005	0.005	
			14	1		0.005	,005	0.005	0.005	
ISLAND	DI-1	8/19/1994	3.5	720		0.19	2	9	53	
	DI-2		3.5	280		0.12	0.8	1.6	33	
	DI-3		3	0.2		0.005	0.005	0.005	0.005	
Statistics - Test Samples								Ethyl	Total	TTLC
		Date	Depth	TPH G	TPH D	Benzene	Toluene	Benzene	Xylene	Lead
			(Feet)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)
Mean			12.2	198.5	54.5	0.5	1.3	4.1	30.3	4.5
S.D.			5.2	456.3	82.5	1.7	3.9	12.2	88.3	1.6
Max			20.0	2200.0	230.0	9.6	21.0	60.0	440.0	7.0
N			36.0	34.0	11.0	31.0	32.0	34.0	36.0	10.0
T(G-87)			1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
95% UCL			13.6	323.7	94.2	1.0	2.4	7.4	53.8	5.3

Table 1d Soil Analytical Data USA Station #57 (2007) Oakland CA-Boring Samples

Sample ID	Sample Depth (feet bgs)	Date Collected	GRO (mg/Kg)	Benzene (mg/Kg)	Toluene (mg/Kg)	Ethyl benzene (mg/Kg)	Total Xylenes (mg/Kg)	MTBE (mg/Kg)	TBA (mg/Kg)	DIPE (mg/Kg)	ETBE (mg/Kg)	TAME (mg/Kg)
Boring AS-1												
AS-1-11 Ft.	11	8/23/2007	80	_0.02*_	_0.02*_	0.057	0.041	_0.02*_	_2.0*_	_0.04*_	_0.04*_	_0.04*_
AS-1-16 Ft.	16	8/23/2007	500	_0.2*_	_0.2*_	8.8	1.72	_0.2*_	_20*_	_0.4*_	_0.4*_	_0.4*_
Boring AS-2												
AS-2-16 Ft.	16	8/23/2007	1.6	0.0058	_0.005_	_0.005_	_0.005_	_0.005_	_0.5_	_0.02_	_0.02_	_0.02_
AS-2-21 Ft.	21	8/23/2007	19	0.67	0.018	0.43	1.31	_0.01*_	_1.0*_	_0.02*_	_0.02*_	_0.02*_
AS-2-26 Ft.	26	8/23/2007	1.3	0.16	_0.005_	0.029	0.031	_0.005_	_0.5_	_0.02_	_0.02_	_0.02_

Statistics	Depth (Feet)	Date	GRO (mg/Kg)	Benzene (mg/Kg)	Toluene (mg/Kg)	Ethyl benzene (mg/Kg)	Total Xylenes (mg/Kg)	MTBE (mg/Kg)	TBA (mg/Kg)	DIPE (mg/Kg)	ETBE (mg/Kg)	TAME (mg/Kg)
Mean	18.0		120.38	0.28	0.01	1.86	0.62	0.01	0.50	0.02	0.02	0.02
S.D.	5.7		214.66	0.35	0.01	3.88	0.83	0.00	0.00	0.00	0.00	0.00
Max	26.0		500.00	0.67	0.02	8.80	1.72	0.01	0.50	0.02	0.02	0.02
N	5.0		5.00	3.00	3.00	5.00	5.00	2.00	2.00	2.00	2.00	2.00
T(G-87)	1.6		1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60
95% UCL	22.1		273.98	0.60	0.02	4.64	1.21	0.01	0.50	0.02	0.02	0.02

TABLE 1e SOIL ANALYTICAL DATA - COMBINATION OF ALL SOIL TABLES

Statistics - Test Samples		GRO TPH G (ppm)	TPH D (ppm)	Benzene (ppm)	Toluene (ppm)	Ethyl Benzene (ppm)	Total Zylene (ppm)	TTLC Lead (ppm)	DIPE (mg/Kg)	ETBE (mg/Kg)	TAME (mg/Kg)
Mean		268.0	40.9	0.6	1.5	4.3	15.6	4.5	#DIV/0!	#DIV/0!	#DIV/0!
S.D.		512.1	79.0	1.6	3.8	11.6	59.7	1.6	#DIV/0!	#DIV/0!	#DIV/0!
Max		2400.0	330.0	9.6	21.0	60.0	440.0	7.0	0.0	0.0	0.0
N		85.0	48.0	70.0	74.0	81.0	83.0	20.0	0.0	0.0	0.0
T(G-87)		1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
95% UCL		356.9	59.2	0.9	2.2	6.4	26.1	5.1	#DIV/0!	#DIV/0!	#DIV/0!

Table 1f Groundwater Analytical Summary - BTEX- Former USA Gasoline Station 57

Well Number	Date Collected	Depth to Water (feet)	Well Elevation (ft msl)	Groundwater Elevation (ft msl)	GRO[5] (µg/L)	TPHD (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)	MTBE (µg/L)
S-1	02/12/87						630	4.4	3.5	37	NA
	03/03/95	13.10	74.74	61.64	910	5,900	260	7.6	16	14	NA
	07/24/95	12.35		62.39	NA	NA	NA	NA	NA	NA	NA
	11/22/95	19.30	78.68	59.38	460	6,100	13	0.69	0.99	1.1	460*
	12/06/95	19.59		59.09	NA	NA	NA	NA	NA	NA	NA
	01/04/96	19.52		59.16	NA	NA	NA	NA	NA	NA	NA
	01/31/97	15.07		63.61	1,100	200	11	6	3	6	200*
	10/10/97	18.90		59.78	530	2,000	*0.5*	2.1	*0.5*	*2*	230*
	01/20/98	16.79		61.89	1,800	200	*0.5*	*0.5*	1.5	10	87*
	04/28/98	8.37		70.31	130	**7300**	1.9	3.2	*0.5*	*0.5*	310*
	07/31/98	11.61		67.07	310	2,000	0.54	4.6	3.8	0.82	280*
	11/02/98	15.28		63.40	1,000	1,200	*0.5*	9.5	1.6	9.1	100
	06/10/99	14.35		64.33	660	150	0.99	*0.5*	*0.5*	2.4	*80*[1]*
	10/18/00	17.56		61.12	*50*	330	*0.5*	0.93	*0.5*	*0.5*	44
	03/12/02	16.29		62.39	500	*50*	2.8	4.8	0.79	4.4	63
	11/19/02	19.53		59.15	190	NA	*0.5*	*0.5*	*0.5*	*0.5*	190
	01/09/03	18.14		60.54	510	NA	1.1	0.5	0.52	*0.5*	11
	04/14/03	18.04		60.64	300	NA	1.0[2]	1.0[2]	1.0[2]	*1.0[2]*	27
	07/21/03	20.31		58.37	300	NA	*0.5*	*0.5*	*0.5*	*0.5*	11
	10/09/03	19.46		59.22	390	NA	*0.5*	*0.5*	*0.5*	*0.5*	8.8
	01/15/04	18.21	79.66	61.45	200	NA	*0.5*	*0.5*	*0.5*	*0.5*	6.0
	04/08/04	19.29		60.37	140	NA	*0.5*	*0.5*	*0.5*	*0.5*	12
	08/10/04	18.86		60.80	110	NA	4.6	*0.5*	*0.5*	0.51	73
	11/11/04	19.81		59.85	160	NA	*0.5*	*0.5*	*0.5*	*0.5*	150
	01/19/05	18.12		61.54	440	NA	*0.5*	*0.5*	1.4	*0.5*	140
	04/14/05	13.94		65.72	320	NA	*0.5*	*0.5*	*0.5*	*0.5*	120
	07/19/05	14.11		65.55	240	NA	6.1	*0.5*	0.60	*0.5*	60
	10/24/05	16.53		63.13	320	NA	5.0	*0.5*	1.1	*0.5*	37
S-1	02/02/06	15.27		64.39	50	NA	*0.5*	*0.5*	*0.5*	*0.5*	45
Cont.	04/27/06	9.59		70.07	50	NA	*0.5*	*0.5*	*0.5*	*0.5*	7.7
	07/12/06	11.00		68.66	50	NA	*0.5*	*0.5*	*0.5*	*0.5*	12
	10/17/06	14.54		65.12	50	NA	*0.5*	*0.5*	*0.5*	*0.5*	1.6
	01/08/07	15.87		63.79	260	NA	4.6	*0.5*	*0.5*	*0.5*	15
	04/09/07	16.06		63.60	300	NA	0.5	*0.5*	*0.5*	*0.5*	22
	04/23/07	16.31		63.35	NA	NA	NA	NA	*NA*	NA	NA
	07/23/07	17.86		61.80	110	NA	*0.5*	*0.5*	*0.5*	*0.5*	52
	10/15/07	19.22		60.44	50	NA	*0.5*	*0.5*	*0.5*	*0.5*	50
	03/24/08	17.58		62.08	180	NA	*0.5*	*0.5*	*0.5*	*0.5*	29
	05/30/08	19.66		60.00	*100[2]*	NA	*0.5*	*0.5*	*0.5*	*0.5*	43
	07/10/08	19.32		60.34	130	NA	*0.5*	*0.5*	*0.5*	*0.5*	4.1
	10/01/08	20.67		58.99	64	NA	*0.5*	*0.5*	*0.5*	*0.5*	70
	02/10/09	22.31		57.35	*50*	NA	*0.5*	*0.5*	*0.5*	*0.5*	53
S-2	02/12/87		Sheen				3400	3800	1300	11000	NA
	03/03/95	15.39	76.86		24,000	6,000	1,900	440	600	2,500	NA
	07/24/95	14.47			NA	NA	NA	NA	NA	NA	NA
Sheen	11/22/95	21.52	80.93	61.47	NA	NA	NA	NA	NA	NA	NA
	12/06/95	21.78		62.39	NA	NA	NA	NA	NA	NA	NA
	01/04/96	21.75		59.41	NA	NA	NA	NA	NA	NA	NA
	01/31/97	17.25		59.15	NA	NA	NA	NA	NA	NA	NA
Sheen	10/10/97	21.21		59.18	13,000	*50*	260	38	190	280	600*
Sheen	01/20/98	19.07		63.68	1,900	2,300	4.6	6.3	*0.5*	4.6	190*
	04/28/98	10.47		59.72	22,000	*100*	980	160	320	680	570*
	07/31/98	13.71		61.86	160,000	*50*	950	290	550	1,700	550*
	11/02/98	17.31		70.46	14,000	*500*	170	70	170	230	490*
	06/10/99	16.48		67.22	17,000	*50*	650	230	25	750	*490*[1]*
	10/18/00	19.70		63.62	4,400	*50*	2	64	5.1	12	270
	03/12/02	18.56		64.45	5,100	660	62	44	52	78	430
	11/19/02	21.70		61.23	26,000	NA	1,400	180	520	340	750
	01/09/03	20.37		62.37	16,000	NA	120	32	76	214	270
	04/14/03	19.93		59.23	16,000	NA	160	76	210	290	400
	07/21/03	22.00		60.56	9,700	NA	270	90	200	277	410
	10/09/03	21.58		61.00	10,000	NA	39	9.2	52	26.5	180
	01/15/04	20.44	81.90	58.93	6,300	NA	21	*2.0 [3]*	20	3.1	130
	04/08/04	17.15		59.35	13,000	NA	160	76	170	231	430
	08/10/04	20.98		61.46	10,000	NA	76	13	*5.0[3]*	500	92
	11/11/04	21.95		64.75	20,000	NA	530	240	370	1,730	420
	01/19/05	20.33		60.92	17,000	NA	590	150	250	990	580
	04/14/05	16.17		59.95	20,000	NA	830	230	570	1,980	510
	07/19/05	16.25		61.57	970	NA	48	13	16	57	72
	10/24/05	18.07		65.73	1,200	NA	100	13	52	41	69
S-2	02/02/06	17.26		65.65	2,000	NA	17	12	26	108	340

Table 1f Groundwater Analytical Summary - BTEX- Former USA Gasoline Station 57

Well Number	Date Collected	Depth to Water (feet)	Well Elevation (ft msl)	Groundwater Elevation (ft msl)	GRO[5] (µg/L)	TPHD (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)	MTBE (µg/L)
Cont.	04/27/06	11.55		63.83	130	NA	5.1	1.1	2.8	8.8	81
	07/12/06	12.98		64.64	140	NA	*0.5*	*0.5*	*0.5*	0.77	180
	10/17/06	16.59		70.35	130	NA	0.98	0.5	1.1	2.20	160
	01/08/07	18.21		68.92	69	NA	*0.50*	*0.5*	*0.5*	*0.50*	64
	04/09/07	18.29		65.31	360	NA	1.4	1.5	2.2	9.8	270
	07/23/07	20.00		63.69	*50*	NA	*0.50*	*0.5*	*0.5*	*0.50*	7.7
	10/15/07	21.32		63.61	260	NA	53	0.92	0.5	1.0	86
	03/24/08	19.78		61.90	5,500	NA	540	20	120	70	600
	05/30/08	20.78		60.58	8,700	NA	270	*50*	200	386	340
	07/10/08	21.45		62.12	8,000	NA	310	36	150	246	420
	10/01/08	22.71		61.12	4,100	NA	170	3.8	57	8	720
	02/10/09	24.43		60.45	9,700	NA	390	31.0	340	107.5	480
				59.19							
				57.47							
MW-3	03/03/95	13.99	76.30		2,500	1,600	540	92	36	200	NA
	07/24/95	13.33			NA	NA	NA	NA	NA	NA	NA
	11/22/95	20.94	80.32	62.31	14000	5400	5700	230	430	650	**820**
	12/06/95	17.48		62.97	NA	NA	NA	NA	NA	NA	NA
	01/04/96	20.01		59.38	NA	NA	NA	NA	NA	NA	NA
	01/31/97	16.63		62.84	1,100	50	130	8	5	5	NA
	10/10/97	20.62		60.31	3,400	1,100	830	4	100	*10*	160*
	01/20/98	15.40		63.69	3,900	550	7.9	4.1	*0.5*	3.7	*5.0**
	04/28/98	10.51		59.70	800	1,000	82	5.2	5.7	5.4	240*
	07/31/98	13.46		64.92	2,200	610	510	7.6	16	5.27	310*
	11/02/98	17.11		69.81	4,900	1,600	220	16	13	13.7	180*
	06/10/99	15.24		66.86	1,000	120	0.5	*0.5*	*0.5*	1.1	120*[1]
	10/18/00	15.41		63.21	*50*	*50*	0.5	*0.5*	*0.5*	*0.5*	12
	04/08/04	13.70		65.08	*50*	NA	0.5	*0.5*	*0.5*	*0.5*	19
	08/10/04	16.96		64.91	580	NA	19	1.0[3]	1.0[3]	3.3	300
	11/11/04	17.40		66.62	3,000	NA	810	5.0[3]	43	*5.0[3]*	690
	01/19/05	13.28		63.36	92	NA	18	0.5	0.77	*0.5*	17
	04/14/05	8.73		62.92	50	NA	0.52	0.5	0.5	*0.5*	11
	07/19/05	11.94		67.04	390	NA	82	2.3	1.8	9.2	200
	10/24/05	14.70	77.27	71.59	2,100	NA	460	6.9	7.7	11.9	300
	02/02/06	16.48		68.38	530	NA	11	0.5	1.2	1.1	560
	04/27/06	7.85		62.57	*300[3]*	NA	*1.5[3]*	*1.5[3]*	*1.5[3]*	*1.5[3]*	180
	07/12/06	10.08		60.79	250	NA	5.5	*1.0[3]*	*1.0[3]*	*1.0[3]*	190
	10/17/06	12.80		69.42	93	NA	8.8	*0.5*	*0.5*	*0.5*	100
MW-3	01/08/07	21.68		67.19	200	NA	14	*0.5*	0.89	0.95	85
Cont	04/09/07	12.24		64.47	1,400	NA	380	6.6	22	12.5	600
	04/23/07	12.53		55.59	NA	NA	NA	NA	NA	NA	NA
	07/23/07	14.44		65.03	1,600	NA	420	*2.5[3]*	27	*2.5[3]*	630
	10/15/07	16.45		64.74	2,000	NA	470	2.7	23	*2.5[3]*	610
	03/24/08	13.80		62.83	1,200	NA	230	1.9	9.9	1.2	820
	05/30/08	15.54		60.82	1,100	NA	250	*2.5[3]*	14	*2.5[3]*	610
	07/10/08	16.10		63.47	1,400	NA	170	1	10	2.6	560
	10/01/08	17.60		61.73	800	NA	95	*1.0[3]*	1.8	*1.0[3]*	620
	02/10/09	18.46		61.17	1,200	NA	50	*1.0[3]*	1.8	*1.0[3]*	660
				59.67							
				58.81							
MW-4	11/22/95	14.99	76.42		50	200	0.5	1.5	0.5	1.7	6.4*
	12/06/95	11.21			NA	NA	NA	NA	NA	NA	NA
	01/04/96	14.62		61.43	NA	NA	NA	NA	NA	NA	NA
	01/31/97	8.18		65.21	*50*	*50*	*0.5*	2	0.5	2	11*
	10/10/97	14.14		61.80	*50*	*50*	*0.5*	*0.5*	0.5	2	*5.0**
	01/20/98	7.05		68.24	*50*	*50*	*0.5*	*0.5*	*0.5*	*0.5*	*5.0**
	04/28/98	5.88		62.28	*50*	*50*	*0.5*	*0.5*	*0.5*	*0.5*	*5.0**
	07/31/98	8.40		69.37	*50*	*50*	*0.5*	*0.5*	*0.5*	*0.5*	*5.0**
	11/02/98	16.08		70.54	NA	NA	NA	NA	NA	NA	NA
	06/10/99	14.81		68.02	NA	NA	NA	NA	NA	NA	NA
	10/18/00	12.71		60.34	*50*	50	*0.5*	0.59	0.82	0.53	*5.0**
	03/12/02	8.92		61.61	*50*	50	*0.5*	0.61	0.72	2.5	1.8
	11/19/02	13.24		63.71	*50*	NA	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*
	01/09/03	11.00		67.50	*50*	NA	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*
	04/14/03	11.03		-13.24	*50*	NA	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*
	07/21/03	13.10		-11.00	*50*	NA	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*
	10/09/03	13.33		-11.03	*50*	NA	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*
	01/15/04	12.14		-13.10	*50*	NA	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*
	04/08/04	10.76		-13.33	*50*	NA	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*
	08/10/04	12.62		-12.14	*50*	NA	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*
	11/11/04	11.93		65.66	*50*	NA	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*
	01/19/05	10.34		63.80	*50*	NA	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*
	04/14/05	5.66	[4]	64.49	*50*	NA	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*
	07/19/05	7.55	[4]	66.08	*50*	NA	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*
	10/24/05	10.12	76.26	NM	*50*	NA	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*
MW-4	02/02/06	6.99		NM	*50*	NA	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*
Cont	04/27/06	NM		66.14	Well Not Monitored or Sampled - Covered						
	07/12/06	6.05		69.27	*50*	NA	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*
	10/17/06	NM		NM	Well Not Monitored or Sampled - Covered						
	01/08/07	8.82		70.21	*50*	NA	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*
	04/09/07	8.52		NM	*50*	NA	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*
	07/23/07	10.10		67.44	*50*	NA	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*
	10/15/07	10.90		67.74	*50*	NA	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*

Table 1f Groundwater Analytical Summary - BTEX- Former USA Gasoline Station 57

Well Number	Date Collected	Depth to Water (feet)	Well Elevation (ft msl)	Groundwater Elevation (ft msl)	GRO[5] (µg/L)	TPHD (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)	MTBE (µg/L)
	03/24/08	9.32		66.16	50	NA	0.5	0.5	0.5	0.5	0.5
	05/30/08	10.60		65.36	50	NA	0.5	0.5	0.5	0.5	0.5
	07/10/08	11.31		66.94	50	NA	0.5	0.5	0.5	0.5	0.5
	10/01/08	12.37		65.66	50	NA	0.5	0.5	0.5	0.5	0.5
	02/10/09	13.38		64.95	50	NA	0.5	0.5	0.5	0.5	0.5
				63.89							
				62.88							
MW-5	11/22/95	19.56	80.52		50	280	0.5	1.8	0.5	3	2.2*
	12/06/95	15.84			NA	NA	NA	NA	NA	NA	NA
	01/04/96	19.36		60.96	NA	NA	NA	NA	NA	NA	NA
	01/31/97	13.31		64.68	80	50	0.5	0.6	0.5	2	6*
	10/10/97	17.80		61.16	50	50	0.5	0.5	0.5	2	5*
	01/20/98	12.58		67.21	50	50	0.5	0.5	0.5	0.5	5.0*
	04/28/98	9.45		62.72	50	50	0.5	0.5	0.5	0.5	5.0*
	07/31/98	7.38		67.94	50	50	0.5	0.5	0.5	0.5	5.0*
	11/02/98	15.98		71.07	50	500	0.5	0.5	0.5	0.5	5.0*
	06/10/99	14.60		73.14	NA	NA	NA	NA	NA	NA	NA
	10/18/00	17.77		64.54	50	50	0.5	0.75	0.5	0.79	28
	03/12/02	15.72		65.92	50	50	0.5	0.5	0.5	0.5	5.0*
	11/19/02	NM		62.75	Well Damaged						
	01/09/03	NM		64.80	Well Damaged						
	04/14/03	NM		NM	Well Damaged						
	07/21/03	NM		NM	Well Damaged						
	10/09/03	NM		NM	Well Damaged						
	01/15/04	NM		NM	Well Damaged						
	04/08/04	16.80		NM	100	NA	0.5	0.5	0.5	0.5	0.5
	08/10/04	18.58		NM	89	NA	0.5	0.5	0.5	0.5	0.5
	11/11/04	NM		63.72	Well Damaged						
	01/19/05	NM		61.94	Well Damaged						
	04/14/05	10.57	[4]	NM	50	NA	0.5	0.5	0.5	0.5	0.5
	07/19/05	11.77	[4]	NM	100[2]	NA	0.5	0.5	0.5	0.5	0.5
	10/24/05	14.29	80.78	NM	50	NA	0.5	0.5	0.5	0.5	0.5
	02/02/06	NM		NM	Well Not Monitored or Sampled - Under Soil Pile						
	04/27/06	7.42		66.49	100[2]	NA	0.5	0.5	0.5	0.5	0.5
MW-5	07/12/06	NM		NM	Well Not Monitored or Sampled - Covered						
Cont	10/17/06	NM		73.36	Well Not Monitored or Sampled - Covered						
	01/08/07	NM		NM	Well Not Monitored or Sampled - Covered						
	04/09/07	NM		NM	Well Not Monitored or Sampled - Covered						
	04/23/07	11.90		NM	50	NA	0.5	0.5	0.5	0.5	0.5
	07/23/07	13.98		NM	50	NA	0.5	0.5	0.5	0.5	0.5
	10/15/07	14.97		68.88	50	NA	0.5	0.5	0.5	0.5	0.5
	03/24/08	12.77		66.80	100[2]	NA	0.5	0.5	0.5	0.5	0.5
	05/30/08	14.76		65.81	200[2]	NA	1.0[2]	1.0[2]	1.0[2]	1.0[2]	1.0[2]
	07/10/08	15.74		68.01	100[2]	NA	0.5	0.5	0.5	0.5	0.5
	10/01/08	16.90		66.02	50	NA	0.5	0.5	0.5	0.5	0.5
	02/10/09	18.12		65.04	200[2]	NA	1.0[2]	1.0[2]	1.0[2]	1.0[2]	1.0[2]
				63.88							
MW-6	11/22/95	21.73	81.64	62.66	50	140	0.5	1.2	0.5	1.5	5.3*
	12/06/95	18.03			NA	NA	NA	NA	NA	NA	NA
	01/04/96	21.67		59.91	NA	NA	NA	NA	NA	NA	NA
	01/31/97	16.01		63.61	70	50	0.5	2	0.5	1	5*
	10/10/97	20.55		59.97	80	50	0.5	0.5	0.5	2	5*
	01/20/98	15.74		65.63	50	50	0.5	0.5	0.5	0.5	5.0*
	04/28/98	10.78		61.09	50	50	0.5	0.5	0.5	0.5	5.0*
	07/31/98	13.97		65.90	50	50	0.5	0.5	0.5	0.5	5.0*
	11/02/98	17.97		70.86	NA	NA	NA	NA	NA	NA	NA
	06/10/99	16.92		67.67	NA	NA	NA	NA	NA	NA	NA
	10/18/00	NM		63.67	Unable to Locate						
	03/12/02	NM		64.72	Unable to Locate						
	11/19/02	NM		NM	Unable to Locate						
	01/09/03	NM		NM	Unable to Locate						
	04/14/03	NM		NM	Unable to Locate						
	07/21/03	NM		NM	Unable to Locate						
	10/19/03	NM		NM	Unable to Locate						
	01/15/04	NM		NM	Unable to Locate						
	04/08/04	NM		NM	Well Obstructed - Not Sampled						
	08/10/04	NM		NM	Well Obstructed - Not Sampled						
	11/11/04	NM		NM	Well Obstructed - Not Sampled						
	01/19/05	NM		NM	Well Obstructed - Not Sampled						
	04/14/05	15.78		NM	50	NA	0.5	0.5	0.5	0.5	0.5
	07/19/05	NM		NM	Well Obstructed - Not Sampled						
	10/24/05	NM	82.32	65.86	Well Obstructed - Not Sampled						
	02/02/06	15.93		NM	50	NA	0.5	0.5	0.5	0.5	0.5
	04/27/06	11.00		NM	50	NA	0.5	0.5	0.5	0.5	0.5
	07/12/06	12.75		66.39	50	NA	0.5	0.5	0.5	0.5	0.5
	10/17/06	15.95		71.32	50	NA	0.5	0.5	0.5	0.5	0.5
	01/08/07	17.40		69.57	Likely obstructed at 18 ft bgs; contained insufficient water for sampling						
	04/09/07	16.20		66.37	50	NA	0.5	0.5	0.5	0.5	0.5
	07/23/07	17.50		64.92	Likely obstructed at 18 ft bgs; contained insufficient water for sampling						
MW-6	10/15/07	NM		66.12	Well Destroyed						
	10/01/08	NM		64.82	Well Destroyed						
				NM							
				NM							
MW-7	11/22/95	19.38	78.86		50	180	0.5	0.57	0.5	0.62	0.73*
	12/06/95	19.72			NA	NA	NA	NA	NA	NA	NA
	01/04/96	19.76		59.48	NA	NA	NA	NA	NA	NA	NA
	01/31/97	15.25		59.14	70	50	0.7	1	0.5	1	8*
	10/10/97	19.03		59.10	50	50	0.5	0.5	0.5	2	15*
	01/20/98	17.11		63.61	50	50	0.5	0.5	0.5	0.5	5.0*
	04/28/98	8.22		59.83	50	50	0.5	0.5	0.5	0.5	9.3*
	07/31/98	11.53		61.75	50	50	0.5	0.5	0.5	0.5	5.0*

Table 1f Groundwater Analytical Summary - BTEX- Former USA Gasoline Station 57

Well Number	Date Collected	Depth to Water (feet)	Well Elevation (ft msl)	Groundwater Elevation (ft msl)	GRO[5] (µg/L)	TPHD (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)	MTBE (µg/L)
	11/02/98	15.15		70.64	NA	NA	NA	NA	NA	NA	NA
	06/10/99	14.23		67.33	NA	NA	NA	NA	NA	NA	NA
	10/18/00	17.59		63.71	NA	*50*	*0.5*	*0.5*	*0.5*	*0.5*	*5.0**
	03/12/02	16.54		64.63	*50*	*50*	*0.5*	*0.5*	*0.5*	*0.5*	2.9
	11/19/02	19.59		61.27	*50*	NA	*0.5*	*0.5*	*0.5*	*0.5*	3.8
	01/09/03	18.38		62.32	*50*	NA	*0.5*	*0.5*	*0.5*	*0.5*	2.7
	04/14/03	18.17		-19.59	*50*	NA	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*
	07/21/03	20.29		-18.38	*50*	NA	*0.5*	*0.5*	*0.5*	*0.5*	1.8
	10/09/03	19.48		-18.17	*50*	NA	*0.5*	*0.5*	*0.5*	*0.5*	2.9
	01/15/04	18.45	79.81	-20.29	*50*	NA	*0.5*	*0.5*	*0.5*	*0.5*	2.6
	04/08/04	17.28		-19.48	*50*	NA	*0.5*	*0.5*	*0.5*	*0.5*	0.81
	08/10/04	18.85		61.36	*50*	NA	*0.5*	*0.5*	*0.5*	*0.5*	2.1
	11/11/04	19.85		62.53	*50*	NA	*0.5*	*0.5*	*0.5*	*0.5*	1.0
	01/19/05	19.59		60.96	*50*	NA	*0.5*	*0.5*	*0.5*	*0.5*	1.5
	04/14/05	14.17		59.96	*50*	NA	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*
	07/19/05	14.16		60.22	*50*	NA	*0.5*	*0.5*	*0.5*	*0.5*	1.9
	10/24/05	16.65		65.64	*50*	NA	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*
MW-7	02/02/06	15.39		65.65	*50*	NA	*0.5*	*0.5*	*0.5*	*0.5*	1.3
Cont.	04/27/06	8.51		63.16	*50*	NA	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*
	07/12/06	9.94		64.42	*50*	NA	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*
	10/17/06	13.46		71.30	*50*	NA	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*
	01/08/07	15.03		69.87	*50*	NA	*0.5*	*0.5*	*0.5*	*0.5*	0.99
	04/09/07	15.27		66.35	*50*	NA	*0.5*	*0.5*	*0.5*	*0.5*	0.54
	07/23/07	16.96		64.78	*50*	NA	*0.5*	*0.5*	*0.5*	*0.5*	1.7
	10/15/07	18.29		64.54	750	NA	*0.5*	*0.5*	*0.5*	*0.5*	0.81
	03/24/08	16.72		62.85	*50*	NA	*0.5*	*0.5*	*0.5*	*0.5*	0.85
	05/30/08	17.81		61.52	*50*	NA	*0.5*	*0.5*	*0.5*	*0.5*	0.56
	07/10/08	18.48		63.09	*50*	NA	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*
	10/01/08	19.71		62.00	*50*	NA	*0.5*	*0.5*	*0.5*	*0.5*	0.66
	02/10/09	21.41		61.33	*50*	NA	*0.5*	*0.5*	*0.5*	*0.5*	0.67
				60.10							
				58.40							
MW-8	11/22/95	33.33	79.55		*50*	360	*0.5*	1.3	*0.5*	2.1	2.1*
	12/06/95	17.57			NA	NA	NA	NA	NA	NA	NA
	01/04/96	20.08		46.22	NA	NA	NA	NA	NA	NA	NA
	01/31/97	18.72		61.98	80	*50*	0.6	1	0.5	1	8*
	10/10/97	20.26		59.47	*50*	*50*	*0.5*	*0.5*	*0.5*	*2*	*5**
	01/20/98	15.91		60.83	*50*	*50*	*0.5*	*0.5*	*0.5*	*0.5*	*5.0**
	04/28/98	10.39		59.29	*50*	*50*	*0.5*	*0.5*	*0.5*	*0.5*	*5.0**
	07/31/98	12.93		63.64	*50*	*50*	*0.5*	*0.5*	*0.5*	*0.5*	*5.0**
	11/02/98	16.90		69.16	*50*	500	*0.5*	*0.5*	*0.5*	*0.5*	*5.0**
	06/10/99	14.98		66.62	NA	NA	NA	NA	NA	NA	NA
	10/18/00	16.27		62.65	*50*	*50*	0.5	0.5	1.1	6.3	8.6*
	03/12/02	14.56		64.57	*50*	*50*	*0.5*	0.63	0.55	1.7	0.94
	11/19/02	21.14		63.28	*50*	NA	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*
	01/09/03	17.90		64.99	*50*	NA	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*
	04/14/03	17.84		-21.14	*50*	NA	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*
	07/21/03	19.79		-17.90	*100[2]*	NA	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*
	10/09/03	21.02		-17.84	*50*	NA	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*
	01/15/04	18.10	80.50	-19.79	*50*	NA	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*
	04/08/04	17.51		-21.02	*50*	NA	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*
	08/10/04	20.76		62.40	*50*	NA	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*
	11/11/04	21.38		62.99	*50*	NA	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*
	01/19/05	17.20		59.74	*50*	NA	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*
	04/14/05	12.68		59.12	*50*	NA	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*
	07/19/05	15.78		63.30	*50*	NA	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*
	10/24/05	18.68		67.82	*50*	NA	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*
MW-8	02/02/06	14.57		64.72	*50*	NA	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*
Cont.	04/27/06	10.48		61.82	*100[2]*	NA	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*
	07/12/06	13.08		65.93	*50*	NA	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*
	10/17/06	15.96		70.02	*50*	NA	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*
	01/08/07	16.70		67.42	*50*	NA	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*
	04/09/07	16.25		64.54	*50*	NA	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*
	07/23/07	18.66		63.80	*50*	NA	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*
	10/15/07	20.36		64.25	*50*	NA	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*
	03/24/08	17.81		61.84	*50*	NA	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*
	05/30/08	19.78		60.14	*50*	NA	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*
	07/10/08	20.32		62.69	*50*	NA	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*
	10/01/08	21.81		60.72	*50*	NA	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*
	02/10/09	22.26		60.18	*50*	NA	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*
				58.69							
EX-1	10/24/05	14.37	77.72	58.24	5,000	NA	140	8.4	20	195	360
	02/02/06	1.68			3,000	NA	3.6	*0.5*	14	55.5	0.63
	04/27/06	1.76		63.35	130	NA	0.98	*0.5*	*0.5*	2.42	*0.5*
	07/12/06	6.88		76.04	2,600	NA	760	15	34	104	200
	10/17/06	9.79		75.96	3,300	NA	810	5.0[3]	32	68	170
	01/08/07	5.47		70.84	910	NA	9.1	*0.5*	2.7	5.9	1.6
	04/09/07	4.88		67.93	140	NA	1.3	*0.5*	1.2	0.93	*0.5*
	07/23/07	12.17		72.25	220	NA	7.4	*0.5*	1.7	*0.5*	0.55
	10/15/07	NM		72.84	Not Sampled						

Table 1f Groundwater Analytical Summary - BTEX- Former USA Gasoline Station 57

Well Number	Date Collected	Depth to Water (feet)	Well Elevation (ft msl)	Groundwater Elevation (ft msl)	GRO[5] (µg/L)	TPHD (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)	MTBE (µg/L)
	03/24/08	5.17		65 55	120	NA	9.1	*0.5*	1.6	0.96	*0.5*
	05/30/08	11 18		NM	230	NA	11	*0.5*	2 2	0 54	*0.5*
	07/10/08	12.27		72 55	1,100	NA	16	*0.5*	4 9	13 5	*0.5*
	10/01/08	14.46		66 54	780	NA	15	*0.5*	4 3	2 3	0 83
	02/10/09	15.90		65 45	1,500	NA	40	1.0[3]	11	9 1	2.0
				63.26							
EX-2	10/24/05	16.00	76.96	61.82	**42000.00**	NA	**13000.00**	1300.00	**1300.00**	2580.00	410.00
	02/02/06	8.18			28,000	NA	9,000		1,100	3,340	200
	04/27/06	5 22		60.96	24,000	NA	4,000	1,800	650	3,900	86
	07/12/06	7.32		68.78	22,000	NA	6,000	1,300	810	3,280	190
	10/17/06	9.22		71 74	31,000	NA	10,000	1,800	1,200	3,400	230
	01/08/07	10.35		69 64	14,000	NA		440	440	1,140	90
	04/09/07	9.67		67.74	620	NA	160	17	24	58	6 0
	07/23/07	11 46		66.61	610	NA	150	7.5	29	38	5.2
	10/15/07	NM		67.29	Not Sampled						
	03/24/08	9.98		65.50	4,900	NA	2,500	210	130	390	29
	05/30/08	11.36		NM	11,000	NA	3,300	330	380	1,100	*25[3]*
	07/10/08	11.85		66.98	17,000	NA	4,200	550	490	1,780	*25[3]*
	10/01/08	13.57		65.60	22,000	NA	5,900	510	960	3,400	*50[3]*
	02/10/09	14.50		65.11	11,000	NA	5,400	93	310	421	41
				63.39							
EX-3	10/24/05	14.85	78.87	62.46	20,000	NA	220	21	660	3,110	*10[3]*
	02/02/06	NM			Well Not Monitored or Sampled - Under Soil Pile						
	04/27/06	NM		63.02	Well Not Monitored or Sampled - Covered						
	07/12/06	9.01		NM	5,700	NA	79	19	120	657	*2.5[3]*
	10/17/06	NM		NM	Well Not Monitored or Sampled - Covered						
	01/08/07	12.31		68 86	970	NA	8.3	0.81	19	19 8	*0.5*
	04/09/07	10.78		NM	700	NA	8.9	*0.5*	11	6 5	*0.5*
	07/23/07	12 82		66 56	1,500	NA	14	*0.5*	21	8.9	*0.5*
	10/15/07	NM		68.09	Not Sampled						
	03/24/08	NM		66.05	Well Not Monitored or Sampled - Covered						
	05/30/08	14 10		NM	280	NA	0.99	*0 5*	0 97	1.35	*0.5*
	07/10/08	14.86		NM	340	NA	1.5	*0.5*	1.6	*0.5*	*0.5*
	10/01/08	16 38		64.77	330	NA	1.1	*0.5*	*0.5*	*0.5*	*0.5*
	02/10/09	NM		64.01	Well Not Monitored or Sampled - Covered						
				62.49							
EX-4	10/24/05	14.93	77.96	NM	1,900	NA	390	69	8.8	90	11
	02/02/06	NM			Well Not Monitored or Sampled - Under Soil Pile						
	04/27/06	NM		63.03	Well Not Monitored or Sampled - Covered						
	07/12/06	7.37		NM	6,400	NA	1,400	400	120	1,220	35
	10/17/06	NM		NM	Well Not Monitored or Sampled - Covered						
	01/08/07	12.92		70.59	3,500	NA	840	51	22	162	25
	04/09/07	12.43		NM	4,600	NA	730	78	83	410	6 5
	07/23/07	14 20		65 04	7,200	NA	2,600	180	100	560	29
	10/15/07	NM		65.53	Not Sampled						
	03/24/08	12 14		63.76	230		29	0.5	1.8	5.1	0 61
	05/30/08	14.10		NM	360	NA	110	*1.0[3]*	5.0	2 8	3 2
	07/10/08	15.16		65.82	500	NA	150	*1.0[3]*	2 6	6 3	3 0
	10/01/08	16.41		63.86	260	NA	96	*1.0[3]*	1.5	*1.0[3]*	5.2
	02/10/09	18.40		62 80	330	NA	130	0 5	2.5	1 2	11
				61.55							
Statistics	**Date Collected**	**Depth to Water (feet)**	**Well Elevation (ft msl)**	**Groundwater Elevation (ft msl)**	**GRO[5] (µg/L)**	**TPHD (µg/L)**	**Benzene (µg/L)**	**Toluene (µg/L)**	**Ethylbenzene (µg/L)**	**Total Xylenes (µg/L)**	**MTBE (µg/L)**
Mean		**15.3**	**79.0**	**59.8**	**1786.3**	**476.6**	**383.8**	**64.6**	**51.3**	**196.7**	**68.2**
S.D.		**4.3**	**2.0**	**18.3**	**5599.3**	**1545.3**	**1573.1**	**345.7**	**199.3**	**957.8**	**160.5**
Max		**33.3**	**82.3**	**76.0**	**42000.0**	**7300.0**	**13000.0**	**3800.0**	**1300.0**	**11000.0**	**820.0**
N		**315.0**	**22.0**	**309.0**	**187.0**	**47.0**	**213.0**	**207.0**	**217.0**	**207.0**	**136.0**
T(G-87)		**1.6**	**1.6**	**1.6**	**1.6**	**1.6**	**1.6**	**1.6**	**1.6**	**1.6**	**1.6**
95% UCL		**15.7**	**79.7**	**61.5**	**2441.5**	**837.2**	**556.3**	**103.0**	**72.9**	**303.2**	**90.2**

Note:
* MTBE analyzed using EPA Method 8020/8021B
MTBE - Methyl tert-butyl ether
TPHD - Total petroleum hydrocarbons as diesel
GRO - Gasoline Range Organics C4-C13
GRO analyzed using EPA Method 8015B and the remaining analytes using EPA Method 8260B

msl = Mean sea level
µg/L = micrograms per liter
NA - Not analyzed
NM - Not measured
DL *Red Italics*

[1] Laboratory indicates the chromatogram does not match the diesel hydrocarbon range pattern
[2] Reporting limits were increased due to sample foaming.
[3] Reporting limits were increased due to high concentrations of target analytes.
[4] Casing elevation invalid - well casing modified (cut) on April 12, 2005.
[5] Reported as total petroleum hydrocarbons as gasoline (TPHG C3-C14+) prior to second quarter 2006

Monitoring wells surveyed by Morrow Surveying on February 10, 2004, and again on November 29, 2005

Data prior to November 19, 2002 provided by GHH Engineering.

Table 1g GROUNDWATER ANALYTICAL RESULTS FOR OXYGENATES FORMER USA SERVICE STATION No. 57

Well Number	Date Collected	MTBE (μg/L)	TBA (μg/L)	DIPE (μg/L)	ETBE (μg/L)	TAME (μg/L)	1,2-DCA (μg/L)	EDB (μg/L)	Methanol (μg/L)	Ethanol (μg/L)
S-1	11/19/02	190	10	1	1	1	NA	NA	NA	NA
	01/09/03	11	5	1	1	1	NA	NA	NA	NA
	04/14/03	27	20[2]	2.0[2]	2.0[2]	2.0[2]	NA	NA	NA	NA
	07/21/03	11	10[2]	1	1	1	NA	NA	NA	NA
	10/09/03	8.8	6.4	1	1	1	1	2	NA	NA
	01/15/04	6.0	10	1	1	1	1	2	NA	NA
	04/08/04	12	8.5	1	1	1	1	2	5,000	5,000
	08/10/04	73	28	1	1	1	16	2	5,000	5,000
	11/11/04	150	14	1	1	1	7.3	2	5,000	5,000
	01/19/05	140	14	1	1	1	3.8	2	5,000	5,000
	04/14/05	120	10	1	1	1	1.4	2	5,000	5,000
	07/19/05	60	11	1	1	1	9.6	2	5,000	5,000
	10/24/05	37	10	1	1	1	2.2	2	5,000	5,000
	02/02/06	45	10	1	1	1	1.2	2	5,000	5,000
	04/27/06	7.7	10	1	1	1	1	2	5,000	5,000
	07/12/06	12	10	1	1	1	7.9	2	5,000	5,000
	10/17/06	1.6	10	1	1	1	1.0	2	5,000	5,000
	01/08/07	15	10	1	1	1	1.0	2	5,000	5,000
	04/09/07	22	10	1	1	1	1.0	2	5,000	5,000
	07/23/07	52	10	1	1	1	1.0	2	NA	NA
	10/15/07	50	10	1	1	1	1.8	2	NA	NA
	03/24/08	29	10	1	1	1	1	2	NA	NA
	05/30/08	43	13	1	1	1	1	4.0[2]	NA	NA
	07/10/08	4.1	10	1	1	1	1	2	NA	NA
	10/01/08	70	10	1	1	1	1	2	NA	NA
	02/10/09	53	16	1	1	1	1	2	NA	NA
S-2	11/19/02	750	200[1]	20[1]	20[1]	20[1]	NA	NA	NA	NA
	01/09/03	270	100[1]	10[1]	10[1]	10[1]	NA	NA	NA	NA
	04/14/03	400	95	5.0[1]	5.0[1]	5.0[1]	NA	NA	NA	NA
	07/21/03	410	110	5.0[1]	5.0[1]	5.0[1]	NA	NA	NA	NA
	10/09/03	180	57	5.0[1]	5.0[1]	5.0[1]	5.0[1]	20[1]	NA	NA
	01/15/04	130	48	4.0[1]	4.0[1]	4.0[1]	4.0[1]	16[1]	NA	NA
	04/08/04	430	130	5.0[1]	5.0[1]	5.0[1]	5.0[1]	20[1]	5,000	5,000
	08/10/04	92	100[1]	10[1]	10[1]	10[1]	74	40[1]	5,000	5,000
	11/11/04	420	200[1]	20[1]	20[1]	20[1]	20[1]	80[1]	5,000	5,000
	01/19/05	580	200	5.0[1]	5.0[1]	5.0[1]	8.2	20[1]	5,000	5,000
	04/14/05	510	150	10[1]	10[1]	10[1]	10[1]	40[1]	5,000	5,000
	07/19/05	72	37	1	1	1	38	2	5,000	5,000
	10/24/05	69	33	1	1	1	35	4.0[1]	5,000	5,000
	02/02/06	340	150	1	1	1	3.2	4.0[1]	5,000	5,000
	04/27/06	81	10	1	1	1	1.3	2	5,000	5,000
	07/12/06	180	42	1	1	1	5.8	2	5,000	5,000
	10/17/06	160	10	1	1	1	1.0	2	5,000	5,000
	01/08/07	64	10	1	1	1	2.6	2	5,000	5,000
	04/09/07	270	32	1	1	1	1.3	2	5,000	5,000
	07/23/07	7.7	10	1	1	1	1.0	2	NA	NA
	10/15/07	86	22	1	1	1	3.5	2	NA	NA
	03/24/08	600	180	5.0[1]	5.0[1]	5.0[1]	5.0[1]	20[1]	NA	NA
	05/30/08	340	220	10[1]	10[1]	10[1]	10[1]	40[1]	NA	NA
	07/10/08	420	150	10[1]	10[1]	10[1]	10[1]	40[1]	NA	NA
	10/01/08	720	300	5.0[1]	5.0[1]	5.0[1]	5.0[1]	20[1]	NA	NA
	02/10/09	480	140	5.0[1]	5.0[1]	5.0[1]	5.0[1]	20[1]	NA	NA
MW-3	04/08/04	19	7.6	1	1	1	1	2	5,000	5,000
	08/10/04	300	2000.0	2.2	2.0[1]	2.0[1]	270	8.0[1]	5,000	5,000
	11/11/04	690	1,400	10[1]	10[1]	10[1]	140	40[1]	5,000	5,000
	01/19/05	17	19	1	1	1	1.4	2	5,000	5,000
	04/14/05	11	25	1	1	1	6.2	2	5,000	5,000
	07/19/05	200	1,000	2.0[1]	2.0[1]	2.0[1]	240	8.0[1]	5,000	5,000
	10/24/05	300	750	5.0[1]	5.0[1]	5.0[1]	210	20[1]	5,000	5,000
	02/02/06	560	1,300	2.7	1	1	98	4.0[1]	5,000	5,000
	04/27/06	180	330	3.0[1]	3.0[1]	3.0[1]	220	12[1]	5,000	5,000
	07/12/06	190	24	2.0[1]	2.0[1]	2.0[1]	210	8.0[1]	5,000	5,000
	10/17/06	100	50	1	1	1	21	2	5,000	5,000
	01/08/07	85	30	1	1	1	22	2	5,000	5,000
	04/09/07	600	510	5.0[1]	5.0[1]	5.0[1]	67	20[1]	5,000	5,000
	07/23/07	630	920	5.0[1]	5.0[1]	5.0[1]	99	20[1]	NA	NA
	10/15/07	610	840	5.0[1]	5.0[1]	5.0[1]	110	20[1]	NA	NA
	03/24/08	820	840	3.2	2.0[1]	2.0[1]	63	8.0[1]	NA	NA
	05/30/08	610	880	5.0[1]	5.0[1]	5.0[1]	68	20[1]	NA	NA
	07/10/08	560	570	3.2	2.0[1]	2.0[1]	30	8.0[1]	NA	NA
	10/01/08	620	1,100	3.5	2.0[1]	2.0[1]	94	8.0[1]	NA	NA
	02/10/09	660	820	4.0	2.0[1]	2.0[1]	38	8.0[1]	NA	NA
MW-4	11/19/02	0.5	5	1	1	1	NA	NA	NA	NA
	01/09/03	0.5	5	1	1	1	NA	NA	NA	NA
	04/14/03	0.5	5	1	1	1	NA	NA	NA	NA
	07/21/03	0.5	5	1	1	1	NA	NA	NA	NA
	10/09/03	0.5	5	1	1	1	1	2	NA	NA
	01/15/04	0.5	7.8	1	1	1	1	2	NA	NA
	04/08/04	0.5	10.0	1	1	1	1	2	5,000	5,000.0
	08/10/04	0.5	10.0	1	1	1	1	2	5,000	5,000.0
	11/11/04	0.5	10.0	1	1	1	1	2	5,000	5,000.0
	01/19/05	0.5	10.0	1	1	1	1	2	5,000	5,000.0
	04/14/05	0.5	10.0	1	1	1	1	2	5,000	5,000.0
	07/19/05	0.5	10.0	1	1	1	1	2	5,000	5,000.0
	10/24/05	0.5	10.0	1	1	1	1	2	5,000	5,000.0
	02/02/06	0.5	10.0	1	1	1	1	2	5,000	5,000.0
	04/27/06	Well Not Monitored or Sampled - Covered								
	07/12/06	1	10.0	1	1	1	1	2	5,000	5,000
	10/17/06	Well Not Monitored or Sampled - Covered								
	01/08/07	0.5	10	1	1	1	1	2	5,000	5,000
	04/09/07	0.5	10	1	1	1	1	2	5,000	5,000
	07/23/07	0.5	10	1	1	1	1	2	NA	NA
	10/15/07	0.5	10	1	1	1	1	2	NA	NA
	03/24/08	0.5	10	1	1	1	1	2	NA	NA

Table 1g GROUNDWATER ANALYTICAL RESULTS FOR OXYGENATES FORMER USA SERVICE STATION No. 57

Well Number	Date Collected	MTBE (μg/L)	TBA (μg/L)	DIPE (μg/L)	ETBE (μg/L)	TAME (μg/L)	1,2-DCA (μg/L)	EDB (μg/L)	Methanol (μg/L)	Ethanol (μg/L)
	05/30/08	0.5	10	1	1	1	1	2	NA	NA
	07/10/08	0.5	10	1	1	1	1	2	NA	NA
	10/01/08	0.5	10	1	1	1	1	2	NA	NA
	02/10/09	0.5	10	1	1	1	1	2	NA	NA
MW-5	11/19/02	Well Damaged								
	01/09/03	Well Damaged								
	04/14/03	Well Damaged								
	07/21/03	Well Damaged								
	10/09/03	Well Damaged								
	01/15/04	Well Damaged								
	04/08/04	1	10.0	1	1	1	1	4.0[2]	5,000	5,000
	08/10/04	1	10.0	1	1	1	1	2	5,000	5,000
	11/11/04	Well Damaged								
	01/19/05	Well Damaged								
	04/14/05	1	10	1	1	1	1	2	5,000	5,000
	07/19/05	1	10.0	1	1	1	1	4.0[2]	5,000	5,000
	10/24/05	1	10.0	1	1	1	1	2	5,000	5,000
	02/02/06	Well Not Monitored or Sampled - Under Soil Pile								
	04/27/06	1	10.0	1	1	1	1	4.0[2]	5,000	5,000
	07/12/06	Well Not Monitored or Sampled - Covered								
	10/17/06	Well Not Monitored or Sampled - Covered								
	01/08/07	Well Not Monitored or Sampled - Covered								
	04/09/07	Well Not Monitored or Sampled - Covered								
	04/23/07	0.5	10	1	1	1	1	2	NA	NA
	07/23/07	0.5	10	1	1	1	1	2	NA	NA
	10/15/07	0.5	10	1	1	1	1	2	NA	NA
	03/24/08	0.5	10	1	1	1	1	4.0[2]	NA	NA
	05/30/08	1.0[2]	20[2]	2.0[2]	2.0[2]	2.0[2]	2.0[2]	8.0[2]	NA	NA
	07/10/08	0.5	10	1	1	1	1	4.0[2]	NA	NA
	10/01/08	0.5	10	1	1	1	1	2	NA	NA
	02/10/09	1.0[2]	20[2]	2.0[2]	2.0[2]	2.0[2]	2.0[2]	8.0[2]	NA	NA
MW-6	11/19/02	Unable to Locate								
	01/09/03	Unable to Locate								
	04/14/03	Unable to Locate								
	07/21/03	Unable to Locate								
	10/19/03	Unable to Locate								
	01/15/04	Unable to Locate								
	04/08/04	Well Obstructed - Not Sampled								
	08/10/04	Well Obstructed - Not Sampled								
	11/11/04	Well Obstructed - Not Sampled								
	01/19/05	Well Obstructed - Not Sampled								
	04/14/05	1	10	1	1	1	1	2	5,000	5,000
	07/19/05	Well Obstructed - Not Sampled								
	10/24/05	Well Obstructed - Not Sampled								
	02/02/06	1	10	1	1	1	1	2	5,000	5,000
	04/27/06	1	10.0	1	1	1	1	2	5,000	5,000
	07/12/06	1	10.0	1	1	1	1	2	5,000	5,000
	10/17/06	1	10.0	1	1	1	1	2	5,000	5,000
	01/08/07	Likely obstructed at 18 ft bgs; contained insufficient water for sampling								
	04/09/07	1	10.0	1	1	1	1	2	5,000	5,000
	07/23/07	Likely obstructed at 18 ft bgs; contained insufficient water for sampling								
MW-6	10/15/07	Well Destroyed								
	10/01/08	Well Destroyed								
MW-7	11/19/02	**3.8**	5	1	1	1	NA	NA	NA	NA
	01/09/03	**2.7**	5	1	1	1	NA	NA	NA	NA
	04/14/03	0.5	5	1	1	1	NA	NA	NA	NA
	07/21/03	**1.8**	5	1	1	1	NA	NA	NA	NA
	10/09/03	**2.9**	5	1	1	1	1	2	NA	NA
	01/15/04	**2.6**	**7.9**	1	1	1	1	2	NA	NA
	04/08/04	**0.81**	**9.0**	1	1	1	1	2	5,000	5,000
	08/10/04	**2.1**	10.0	1	1	1	1	2	5,000	5,000
	11/11/04	**1.0**	10.0	1	1	1	1	2	5,000	5,000
	01/19/05	**1.5**	10.0	1	1	1	1	2	5,000	5,000
	04/14/05	0.5	10.0	1	1	1	1	2	5,000	5,000
	07/19/05	**1.9**	10.0	1	1	1	1	2	5,000	5,000
	10/24/05	0.50	10.0	1	1	1	1	2	5,000	5,000
	02/02/06	**1.30**	10.0	1	1	1	1	2	5,000	5,000
	04/27/06	0.50	10.0	1	1	1	1	2	5,000	5,000
	07/12/06	0.50	10.0	1	1	1	1	2	5,000	5,000
	10/17/06	0.50	10.0	1	1	1	1	2	5,000	5,000
	01/08/07	**0.99**	10.0	1	1	1	1	2	5,000	5,000
	04/09/07	**0.54**	10.0	1	1	1	1	2	5,000	5,000
	07/23/07	**1.7**	10.0	1	1	1	1	2	NA	NA
	10/15/07	**0.81**	10.0	1	1	1	1	2	NA	NA
	03/24/08	**0.85**	10.0	1	1	1	1	2	NA	NA
	05/30/08	**0.56**	10.0	1	1	1	1	2	NA	NA
	07/10/08	0.50	10.0	1	1	1	1	2	NA	NA
	10/01/08	**0.66**	10.0	1	1	1	1	2	NA	NA
	02/10/09	**0.67**	10	1	1	1	1	2	NA	NA
MW-8	11/19/02	0.50	5	1	1	1	NA	NA	NA	NA
	01/09/03	0.50	5	1	1	1	NA	NA	NA	NA
	04/14/03	0.50	5	1	1	1	NA	NA	NA	NA
	07/21/03	0.50	10[2]	1	1	1	NA	NA	NA	NA
	10/09/03	0.50	5	1	1	1	1	2	NA	NA
	01/15/04	0.50	**9.9**	1	1	1	1	2	NA	NA
	04/08/04	0.50	10.0	1	1	1	1	2	5,000	5,000
	08/10/04	0.50	10.0	1	1	1	1	2	5,000	5,000
	11/11/04	0.50	10.0	1	1	1	1	2	5,000	5,000
	01/19/05	0.50	10.0	1	1	1	1	2	5,000	5,000
	04/14/05	0.50	10.0	1	1	1	1	2	5,000	5,000
	07/19/05	0.50	10.0	1	1	1	1	2	5,000	5,000
	10/24/05	0.50	10.0	1	1	1	1	2	5,000	5,000
	02/02/06	0.50	10.0	1	1	1	1	4.0[2]	5,000	5,000
	04/27/06	0.50	10.0	1	1	1	1	2	5,000	5,000
	07/12/06	0.50	10.0	1	1	1	1	2	5,000	5,000
	10/17/06	0.50	10.0	1	1	1	1	2	5,000	5,000
	01/08/07	0.50	10.0	1	1	1	1	2	5,000	5,000
	04/09/07	0.50	10.0	1	1	1	1	2	5,000	5,000

Table 1g GROUNDWATER ANALYTICAL RESULTS FOR OXYGENATES FORMER USA SERVICE STATION No. 57

Well Number	Date Collected	MTBE (µg/L)	TBA (µg/L)	DIPE (µg/L)	ETBE (µg/L)	TAME (µg/L)	1,2-DCA (µg/L)	EDB (µg/L)	Methanol (µg/L)	Ethanol (µg/L)
	07/23/07	0.50	10.0	1	1	1	1	2	NA	NA
	10/15/07	0.50	10.0	1	1	1	1	2	NA	NA
	03/24/08	0.50	10.0	1	1	1	1	2	NA	NA
	05/30/08	0.50	10.0	1	1	1	1	2	NA	NA
	07/10/08	0.50	10.0	1	1	1	1	2	NA	NA
	10/01/08	0.50	10.0	1	1	1	1	2	NA	NA
	02/10/09	0.50	10	1	1	1	1	2	NA	NA
EX-1	10/24/05	360	120	1	1	1	1	4.0[1]	5,000	5,000
	02/02/06	0.63	10	1	1	1	1	4.0[1]	5,000	5,000
	04/27/06	0.50	10.0	1	1	1	1	2	5,000	5,000
	07/12/06	200	110	10[1]	10[1]	10[1]	10[1]	40[1]	5,000	5,000
	10/17/06	170	100[1]	10[1]	10[1]	10[1]	30	40[1]	5,000	5,000
	01/08/07	1.6	10	1	1	1	1	2	5,000	5,000
	04/09/07	0.5	10	1	1	1	1	2	5,000	5,000
	07/23/07	0.55	10	1	1	1	1	2	NA	NA
	10/15/07	Not Sampled								
	03/24/08	0.50	10	1	1	1	1	2	NA	NA
	05/30/08	0.50	10	1	1	1	1	2	NA	NA
	07/10/08	0.50	10	1	1	1	1	2	NA	NA
	10/01/08	0.83	10	1	1	1	1	2	NA	NA
	02/16/09	2.0	20[1]	2.0[1]	2.0[1]	2.0[1]	2.0[1]	8.0[1]	NA	NA
EX-2	10/24/05	410	2000(1)	200[1]	200[1]	200[1]	200[1]	800[1]	5,000	5,000
	02/02/06	200	1,000[DL]	100[1]	100[1]	100[1]	100[1]	400[1]	5,000	5,000
	04/27/06	86	500[DL]	50[1]	50[1]	50[1]	50[1]	200[1]	5,000	5,000
	07/12/06	190	500[1]	50[1]	50[1]	50[1]	50[1]	200[1]	5,000	5,000
	10/17/06	230	1,000[1]	100[1]	100[1]	100[1]	400	400[1]	5,000	5,000
	01/08/07	90	400[1]	40[1]	40[1]	40[1]	40[1]	160[1]	5,000	5,000
	04/09/07	6.0	20[1]	2.0[1]	2.0[1]	2.0[1]	2.0[1]	8.0[1]	5,000	5,000
	07/23/07	5.2	10.0	1	1	1	1	4.0[1]	NA	NA
	10/15/07	Not Sampled								
	03/24/08	29	200[1]	20[1]	20[1]	20[1]	20[1]	80[1]	NA	NA
	05/30/08	25[1]	500[1]	50[1]	50[1]	50[1]	50[1]	200[1]	NA	NA
	07/10/08	25[1]	500[1]	50[1]	50[1]	50[1]	50[1]	200[1]	NA	NA
	10/01/08	50[1]	1,000[1]	100[1]	100[1]	100[1]	100[1]	400[1]	NA	NA
	02/10/09	41	500[1]	50[1]	50[1]	50[1]	50[1]	200[1]	NA	NA
EX-3	10/24/05	10[1]	200[1]	20[1]	20[1]	20[1]	20[1]	80[1]	5,000	5,000
	02/02/06	Well Not Monitored or Sampled - Under Soil Pile								
	04/27/06	Well Not Monitored or Sampled - Covered								
	07/12/06	2.5[1]	50[1]	5.0[1]	5.0[1]	5.0[1]	5.0[1]	20[1]	5,000	5,000
	10/17/06	Well Not Monitored or Sampled - Covered								
	01/08/07	0.5	12	1	1	1	1.1	2	5,000	5,000
	04/09/07	0.5	10	1	1	1	1	2	5,000	5,000
	07/23/07	0.5	10	1	1	1	1	2	NA	NA
	10/15/07	Not Sampled								
	03/24/08	Well Not Monitored or Sampled - Covered								
	05/30/08	0.5	10	1	1	1	1	4.0[2]	NA	NA
	07/10/08	0.5	10	1	1	1	1	4.0[2]	NA	NA
	10/01/08	0.5	10	1	1	1	1	2	NA	NA
	02/10/09	Well Not Monitored or Sampled - Covered								
EX-4	10/24/05	11	51	5.0[1]	5.0[1]	5.0[1]	5.0[1]	20[1]	5,000	5,000
	02/02/06	Well Not Monitored or Sampled - Under Soil Pile								
	04/27/06	Well Not Monitored or Sampled - Covered								
	07/12/06	35	200[1]	10[1]	10[1]	10[1]	10[1]	40[1]	5,000	5,000
	10/17/06	Well Not Monitored or Sampled - Covered								
	01/08/07	25	100[1]	10[1]	10[1]	10[1]	10[1]	40[1]	5,000	5,000
	04/09/07	6.5	100[1]	10[1]	10[1]	10[1]	10[1]	40[1]	5,000	5,000
	07/23/07	29	200[1]	20[1]	20[1]	20[1]	20[1]	80[1]	NA	NA
	10/15/07	Not Sampled								
	03/24/08	0.61	10	1	1	1	1	2	NA	NA
	05/30/08	3.2	20[1]	2.0[1]	2.0[1]	2.0[1]	2.0[1]	8.0[1]	NA	NA
	07/10/08	3.0	20[1]	2.0[1]	2.0[1]	2.0[1]	2.0[1]	8.0[1]	NA	NA
	10/01/08	5.2	25	2.0[1]	2.0[1]	2.0[1]	2.0[1]	8.0[1]	NA	NA
	02/10/09	11	27	1	1		2.0	4.0[1]	NA	NA
Statistics		MTBE (µg/L)	TBA (µg/L)	DIPE (µg/L)	ETBE (µg/L)	TAME (µg/L)	1,2-DCA (µg/L)	EDB (µg/L)	Methanol (µg/L)	Ethanol (µg/L)
Mean		84.8	94.9	ND	ND	ND	17.7	ND	ND	ND
S.D.		179.2	274.8	ND	ND	ND	54.5	ND	ND	ND
Max		820.0	2000.0	ND	ND	ND	400.0	ND	ND	ND
N		186.0	181.0	ND	ND	ND	157.0	ND	ND	ND
T(G-87)		1.6	1.6	ND	ND	ND	1.6	ND	ND	ND
95% UCL		105.8	127.5	ND	ND	ND	24.7	ND	ND	ND

Note
Oxygenates analyzed using EPA Method 8260B
µg/L = micrograms per liter
NA = Not analyzed
DL = Raised limits
[1] Reporting limits were increased due to high concentrations of target analytes
[2] Reporting limits were increased due to sample foaming

MTBE = Methyl tertiary butyl ether
TBA = Tertiary butyl alcohol
DIPE = Di-isopropyl ether
ETBE = Ethyl tertiary butyl ether
TAME = Tertiary amyl methyl ether
1,2-DCA = 1,2-Dichloroethane
EDB = 1,2-Dibromoethane

TABLE 2 Cal/EPA EXPOSURE ASSESSMENT DEFAULTS a)

RECEPTOR	BW	Soil Injestion	Exposure Frequency	Exposure Duration	Water Consumption	Cancer A. Time (LIFE)a	Non. Cancer A. Time (EF*ED)
ORAL	(kg)	(mg/day)	(day/yr)	(yrs)	(L/day)	(days)	(days)
Child shopper	15	200	29	6	1	25550	174
Adult shopper	70	100	35	24	2	25550	840
Commercial	70	100	250	25	2	25550	6250
Construction	70	330	250	1	2	25550	250
		Surface Area			Adherence Factor		
DERMAL		(cm2)	(day/yr)	(yrs)	(mg/cm2)	(days)	(days)
Child shopper	15	2900	29	6	0.2	25550	174
Adult shopper	70	5700	35	24	0.07	25550	840
Commercial	70	5700	250	25	0.2	25550	6250
Construction	70	5700	250	1	0.8	25550	250
		Inhalation Rate					
INHALATION		(m3/d)	(day/yr)	(yrs)		(days)	(days)
Child shopper	15	10	29	6		25550	174
Adult shopper	70	20	35	24		25550	840
Commercial	70	14	250	25		25550	6250
Construction	70	20	250	1		25550	250

a) Defaults from Cal/EPA Human Health Risk Assessment (HHRA) Note 1 (Oct 27 2005) except EFH (I997) for child/adult exposure frequency

TABLE 3: USA STATION # 57 EXPOSURE POINT AND MEDIA VALUES

	MAX Soil Conc a) (mg/kg)	95% UCL Soil Conc. a) (mg/kg)	Skin Absorb. Factor b) (Proportion)	Air Dust Conc. c) (mg/m3)	MAX Dust Chem Conc. d) (mg/m3)	95% UCL Dust Chem Conc. d) (mg/m3)	MAX Soil Vapor Conc. e) (ug/m3)	95% UCL Soil Vapor Conc. e) (ug/m3)	MAX Water Chem Conc. g) (mg/l)	95% Water Chem Conc. g) (mg/l)
TPH Gas C6-10	2.40E+03	4.37E+02	0.1	0.05	1.20E-04	1.20E-04	NA	NA	4.20E+01	2.44E+00
TPH Diesel C10-22	3.30E+02	7.05E+01	0.1	0.05	1.65E-05	1.65E-05	NA	NA	7.30E+00	8.37E-01
Benzene	9.60E+00	9.76E-01	0.1	0.05	4.80E-07	4.88E-08	NA	NA	1.30E+01	5.56E-01
Toluene	2.10E+01	2.53E+00	0.1	0.05	1.05E-06	1.27E-07	NA	NA	3.80E+00	1.03E-01
Ethyl Benzene	6.00E+01	7.14E+00	0.1	0.05	3.00E-06	3.57E-07	NA	NA	1.30E+00	7.29E-02
Xylene	2.60E+02	3.25E+01	0.1	0.05	1.30E-05	1.62E-06	NA	NA	1.10E+01	3.03E-01
Lead (Pb)	7.00E+00	5.07E+00	0.01	0.05	3.50E-07	2.54E-07	NA	NA	NA	NA
MTBE	ND	ND	0.1	0.05	ND	ND	NA	NA	8.20E-01	9.80E-02
TBA	ND	ND	0.1	0.05	ND	ND	ND	ND	2.00E+00	1.28E-01
1,2-DCA	ND	ND	0.1	0.05	ND	ND	ND	ND	4.00E-01	2.47E-02

NOTES:

a) Exposure point concentrations are from Tables 1a-e

b) Cal EPA PEA dermal absorption and Kp fraction pg A-6 and Table 1 July 1999

c) Cal/EPA PEA July 1999 section 2-30 default respirable dust.

d) Air dust concentration =soil concentration x air dust concentration

e) Soil Vapor maximum concentration from Table 1D

f) Depth below ground surface of maximum vapor sample in feet used in HERD SG Max model

g) See Table 1C

TABLE 4: CAL/EPA RISK AND EPA HAZARD VALUES

SUBSTANCE	CAL Slope Factors a) (mg/kg-day)-1		EPA IUR ug/m3	RfD VALUES b) mg/kg-day	
	Oral	Inhal.	Inhal.	Oral	Inhal.
TPH Gas C5-8 c)	NA	NA	NA	5	18.4
TPH Diesel C9-18 c)	NA	NA	NA	0.1	1
Benzene	1.00E-01	1.00E-01	7.80E-06	4.00E-03	2.00E-02
Toluene	NC	NC	NC	8.00E-02	3.33E+00
Ethyl Benzene	1.10E-02	8.70E-03	8.70E-03	1.00E-01	6.67E-01
Xylene	NC	NC	NC	2.00E+00	NA
MTBE	1.80E-03	9.10E-04	9.10E-04	NA	2.00E+00
TBA	NA	NA	NA	NA	NA
1,2-DCA	7.40E-02	7.20E-02	7.20E-02	2.00E-02	1.60E+00

NOTES:

N/A= Not Available; NC = Not Carcinogen

a) All Cancer Potency Factors from Cal/EPA OEHHA Toxicity Criteria Database.

b) RfDs from EPA IRIS and RAGS part F. RfCs converted to RfD for child (10m3/15 kg) For TPH from DTSC HERD TPH Guidance in Review

c) TPHCWG). (1997)

TABLE 5a: USA STATION # 57 COMMERCIAL CAL/EPA RISK AND HAZARD RESULTS - MAX a)

	Soil Oral/Dermal RISK b)	Soil Inhal RISK b)	Soil Total Risk	Soil Oral/Dermal Hazard b)	Soil Dust Hazard b)	Soil Total Hazard
TPH Gas C6-10						
Child/Adult Shopper	NC	NC	NC	2.82E-02	4.30E-06	2.82E-02
Commercial	NC	NC	NC	9.50E-04	1.30E-06	9.52E-04
TPH Diesel C10-22						
Child/Adult Shopper	NC	NC	NC	1.83E-01	1.09E-05	1.83E-01
Commercial	NC	NC	NC	6.53E-03	3.30E-06	6.54E-03
Benzene						
Child/Adult Shopper	2.09E-07	2.40E-10	2.10E-07	1.33E-01	1.58E-05	1.33E-01
Commercial	7.10E-07	2.35E-09	7.13E-07	4.75E-03	4.80E-06	4.76E-03
Toluene						
Child/Adult Shopper	NC	NC	NC	1.45E-02	2.08E-07	1.45E-02
Commercial	NC	NC	NC	5.20E-04	6.31E-08	5.20E-04
Ethyl Benzene						
Child/Adult Shopper	1.44E-07	1.31E-10	1.44E-07	3.32E-02	2.97E-06	3.32E-02
Commercial	4.88E-07	1.28E-09	4.90E-07	1.19E-03	9.00E-07	1.19E-03
Xylene						
Child/Adult Shopper	NC	NC	NC	7.20E-03	NA	7.20E-03
Commercial	NC	NC	NC	2.57E-04	NA	2.57E-04
Combination	Soil Or/De	Soil Inh	Sum Risk	Soil Or/De	Soil Inh	Sum Haz
Child/Adult Shopper	3.53E-07	3.71E-10	3.54E-07	3.99E-01	3.42E-05	3.99E-01
Commercial	1.20E-06	3.62E-09	1.20E-06	1.42E-02	1.04E-05	1.42E-02

NOTES

NC = Not Carcinogen. NA = Not Available. ND = Not Detected

a) Maximum values from Table 3

b) Cal/EPA Methods B7-B14 and HERD Note 1 except child and adult exposure duration from EPA EFH (Aug 1997)

TABLE 5b: USA STATION # 57 COMMERCIAL CAL/EPA RISK AND HAZARD RESULTS - 95% UCL a)

	Soil		Soil	Soil		Soil
	Oral/Dermal	Soil Inhal	Total	Oral/Dermal	Soil Dust	Total
	RISK b)	RISK b)	Risk	Hazard b)	Hazard b)	Hazard
TPH Gas C6-10						
Child/Adult Shopper	NC	NC	NC	5.13E-03	4.30E-06	5.14E-03
Commercial	NC	NC	NC	1.73E-04	1.30E-06	1.74E-04
TPH Diesel C10-22						
Child/Adult Shopper	NC	NC	NC	3.90E-02	1.09E-05	3.91E-02
Commercial	NC	NC	NC	1.40E-03	3.30E-06	1.40E-03
Benzene						
Child/Adult Shopper	2.13E-08	2.40E-10	2.15E-08	1.35E-02	1.61E-06	1.35E-02
Commercial	7.22E-08	2.35E-09	7.46E-08	4.83E-04	6.59E-07	4.84E-04
Toluene						
Child/Adult Shopper	NC	NC	NC	1.75E-03	2.51E-08	1.75E-03
Commercial	NC	NC	NC	3.16E-05	7.60E-09	3.16E-05
Ethyl Benzene						
Child/Adult Shopper	1.71E-08	1.31E-10	1.73E-08	3.95E-03	3.53E-07	3.95E-03
Commercial	5.81E-08	1.28E-09	5.94E-08	1.41E-04	1.07E-07	1.41E-04
Xylene						
Child/Adult Shopper	NC	NC	NC	8.99E-04	NA	8.99E-04
Commercial	NC	NC	NC	3.22E-05	NA	3.22E-05
Combination	Soil Or/De	Soil Inh	Sum Risk	Soil Or/De	Soil Inh	Sum Haz
Child/Adult Shopper	3.84E-08	3.71E-10	3.88E-08	6.43E-02	1.72E-05	6.43E-02
Commercial	1.30E-07	3.62E-09	1.34E-07	2.26E-03	5.38E-06	2.26E-03

NOTES

NC = Not Carcinogen. NA = Not Available. ND = Not Detected
a) 95% UCL values from Table 3
b) Cal/EPA Methods B7-B14 and HERD Note 1 except child and adult exposure duration from EPA EFH (Aug 1997)

TABLE 5c: USA STATION # 57 RBCA RISK AND HAZARD - 95% UCL a)

	Soil	Soil	Groundwater	Groundwater	Groundwater	Groundwater
	All Routes	All Routes	Vapor	Vapor	Ingest.& Vapor	Ingest.& Vapor
	Risk b)	Hazard b)	Risk b)	Hazard b)	Risk b)	Hazard b)
TPH Gas C6-10						
Residental	NC	4.50E-01	NC	9.50E-02	NC	1.10E+00
Commercial	NC	1.30E-01	NC	2.80E-02	NC	4.00E-01
TPH Diesel C10-22						
Residental	NT	NT	NT	NT	NT	1.20E-02
Commercial	NT	NA	NT	NT	NT	4.10E-03
Benzene						
Residental	4.20E-06	1.60E-02	1.60E-06	6.20E-03	4.50E-04	3.80E+00
Commercial	1.00E-06	4.70E-03	4.00E-07	1.80E-03	1.10E-04	1.40E+00
Toluene						
Residental	NC	1.40E-03	NC	7.70E-05	NC	3.50E-02
Commercial	NC	4.10E-04	NC	2.20E-05	NC	1.30E-02
Ethyl Benzene						
Residental	NC	1.40E-02	NC	2.80E-04	NC	2.00E-02
Commercial	NC	4.20E-03	NC	8.00E-05	NC	7.10E-03
Xylene						
Residental	NC	5.00E-03	NC	1.00E-02	NC	4.20E-02
Commercial	NC	1.40E-01	NC	3.00E-03	NC	1.50E-02
DCA 1,2						
Residental	NC	ND	2.60E-07	9.50E-06	3.40E-05	NT
Commercial	NC	ND	6.20E-08	2.70E-06	8.00E-06	NT
MTBE						
Residental	NC	ND	3.70E-09	1.10E-05	2.60E-06	2.70E-01
Commercial	NC	ND	8.90E-10	3.20E-06	6.20E-07	9.60E-02
Combination	Sum Risk	Sum Haz	Sum Risk	Sum Haz	Sum Risk	Sum Haz
Residental	4.20E-06	4.86E-01	1.86E-06	1.12E-01	4.87E-04	5.27E+00
Commercial	1.00E-06	2.79E-01	4.63E-07	3.29E-02	1.19E-04	1.94E+00

NOTES

NC = Not Carcinogen. NT= No Tox Values NA = Not Available. ND = Not Detected

a) 95% UCL values from Table 3

b) All caclulations made using RBCA version 2.51 GSI Env. (2009) in default mode. Printouts see Appendix.C-H.

Appendix Key: C-Com Soil all Rts & Chems; D-Com GW Vap all Chems; E-Res Soil all Rts & Chems
F-Res GW Vap all Chems G-Res GW all Rts &Chems H-Com GW all Rts & Chems

TABLE 6a: RBCA COMMERCIAL SOIL AND GROUNDWATER VAPOR SSTL AND CRF LEVELS -95% UCL a)

	95% UCL b)	SSTL c)	CRF d)	95% UCL b)	SSTL c)	CRF d)
Chemical / Endpoint	Concent.			Concent.		
	(mg/kg)	[mg/kg] b)		(mg/L)	(mg/L)	
	SOIL	SOIL (e)	SOIL (e)	GW - Vapor f)	GW - Vapor f)	GW - Vapor f)
Benzene	9.76E-01	9.5E+0	<1	5.56E-01	1.4E+1	<1
Ethyl benzene	7.14E+00	>3.7E+2	<1	7.29E-02	>1.7E+2	NA
Xylenes (mixed isomers)	3.25E+01	2.3E+2	<1	3.03E-01	1.0E+2	<1
Toluene	2.53E+00	>8E+2	<1	1.03E-01	>5.3E+2	NA
TPH - Aliph >C06-C08	4.37E+02	>2E+2	<1	2.44E+00	>5.4E+0	NA
TPH - Aliph >C16-C21	7.05E+01	NT	NT	8.37E-01	NC	<1
Dichloroethane, 1,2-	ND	ND	ND	2.50E-02	4.0E+0	NA
MTBE	ND	ND	ND	9.80E-02	1.1E+3	<1

NOTES:

NA = Not Applicable . NT = No Tox Data ND = Not Detected

a) Soil exposure by oral, dermal and inhalation (Appendix. C) . Groundwater exposure by vapor intrusion (App. D).

b) 95% Concentration Values from Table 3.

c) SSTL (Site-Specific-Target-Levels) or clean-up level from RBCA 2.51 - surface soil

d) CRF =portion of target concentration used = (present concentration)/(target concentration or SSTL)

e) Commercial Soil - See Appendix C for RBCA Printout

f) Commercial GW Vapor - See Appendix D for RBCA Printout

TABLE 6b: RBCA RESIDENTIAL SOIL AND GROUNDWATER VAPOR SSTL AND CRF LEVELS -95% UCL a)

	95% UCL b)	SSTL c)	CRF d)	95% UCL b)	SSTL c)	CRF d)
Chemical / Endpoint	Concent.			Concent.		
	(mg/kg)	[mg/kg] b)		(mg/L)	(mg/L)	
	SOIL e)	SOIL e)	SOIL e)	GW - Vapor f)	GW - Vapor f)	GW - Vapor f)
Benzene	9.76E-01	2.3E+0	<1	5.56E-01	3.40E+00	<1
Ethyl benzene	7.14E+00	>3.7e+2	<1	7.29E-02	>1.7e+2	<1
Xylenes (mixed isomers)	3.25E+01	6.5E+1	<1	3.03E-01	3.00E+01	<1
Toluene	2.53E+00	>8E+2	<1	1.03E-01	>5.3E+2	<1
TPH - Aliph >C06-C08	4.37E+02	>2.6e+2	<1	2.44E+00	>5.4E+0	<1
TPH - Aliph >C16-C21	7.05E+01	NT	NT	8.37E-01	NT	NT
DCA 1,2	ND	ND	ND	2.50E-02	9.80E-01	<1
MTBE	ND	ND	ND	9.80E-02	2.70E+02	<1

NOTES:

NA = Not Available. NT = No Tox Data ND = Not Detected

a) Soil exposure by oral, dermal and inhalation (App. E). Groundwater exposure by vapor intrusion (App. F).

b) 95% Concentration Values from Table 3.

c) SSTL (Site-Specific-Target-Levels) or clean-up level from RBCA 2.51

d) CRF =portion of target concentration used = (present concentration)/(target concentration or SSTL)

e) Residential Soil - See Appendix E for RBCA Printout

f) Residential GW Vapor- See Appendix F for RBCA Printout

TABLE 6c: RBCA RESIDENTIAL & COMMERCIAL GW ALL RTS.- SSTL/CRF LEVELS -95% UCL a

Chemical / Endpoint	95% UCL b) GW Concentration (mg/L)	SSTL c) GW - Resident e) (mg/L)	CRF d) GW - Resident e)	SSTL c) GW - Commercial f) (mg/L)	CRF d) GW - Commercial f)
Benzene	5.56E-01	1.20E-02	45.00	5.20E-02	1.1E+1
Ethyl benzene	7.29E-02	3.70E+00	<1	1.02E+01	<1
Xylenes (mixed isomers)	3.03E-01	7.30E+00	<1	2.00E+01	<1
Toluene	1.03E-01	2.90E+00	<1	8.20E+00	<1
TPH - Aliph >C06-C08	2.44E+00	2.2	1.10	>5.4E+0	NA
TPH - Aliph >C16-C21	8.37E-01	>2.5e-6	NT	>2.5E-6	NA
DCA 1,2	2.50E-02	7.40E-03	3.40	3.10E-02	<1
MTBE	9.80E-02	3.70E-01	<1	1.00E+00	<1

NOTES:

NA = Not Available. NT = No Tox Data ND = Not Detected

a) GW exposure by ingestion and vapor intrusion. Residential - App. G. Commercial - App. H.

b) 95% Concentration Values from Table 3.

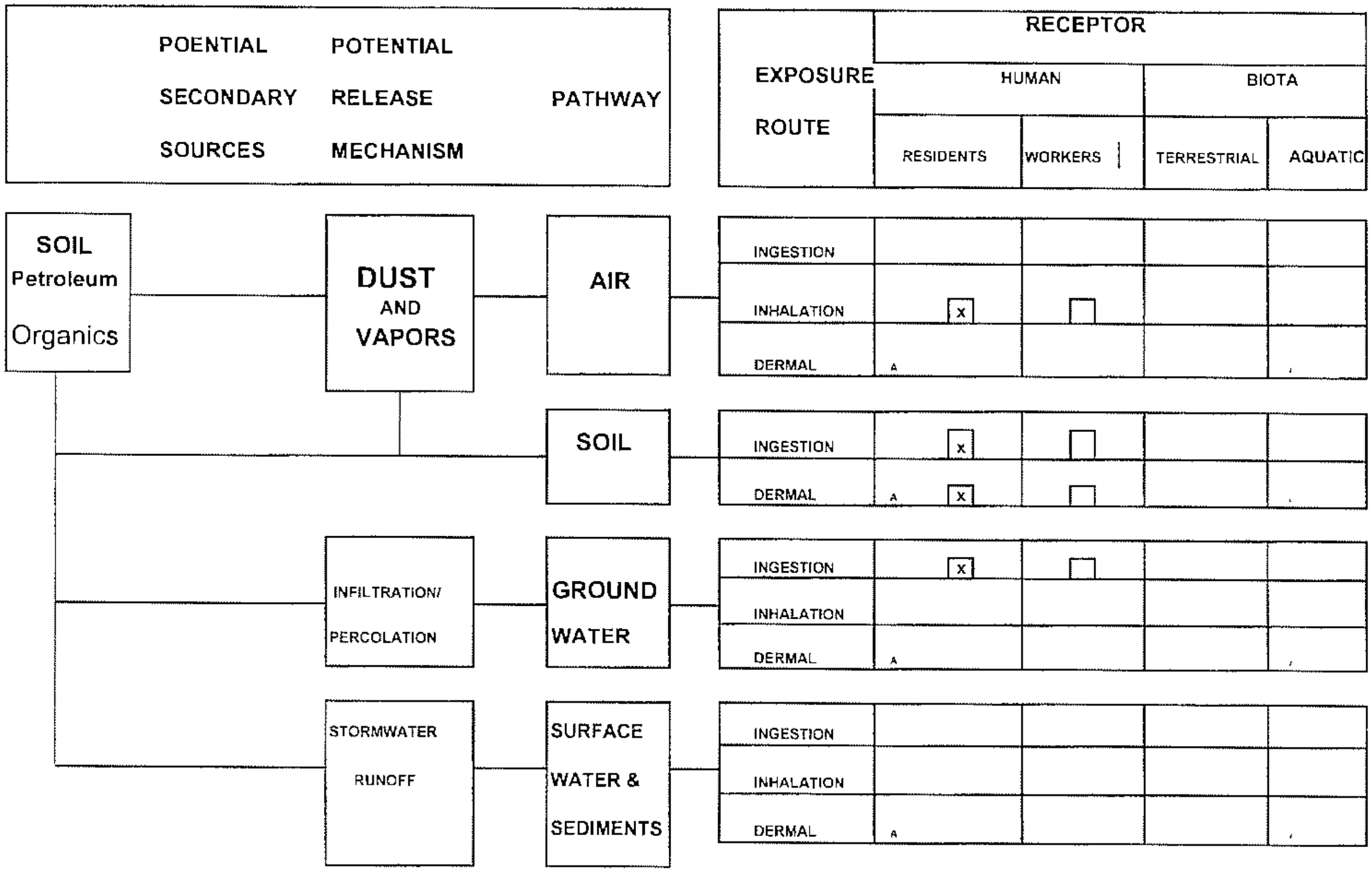
c) SSTL (Site-Specific-Target-Levels) or clean-up level from RBCA 2.51

d) CRF =portion of target amount used = (present concentration)/(SSTL)

e) Residential GW All Routes - See Appendix G for RBCA Printout

f) Commercial GW All Routes- See Appendix H for RBCA Printout

Appendix A: Conceptual Site Model



Modified from Preliminary Endangerment Assessment Guidance Manual. Figure 2.1. DTSC, June 1999	CONCEPTUAL SITE MODEL	DATE: 6/15/09
	PROJECT:Stratus Oakland	***S/A Skinner Associates***

Appendix B: USEPA ALM Results

Calculations of Preliminary Remediation Goals (PRGs)

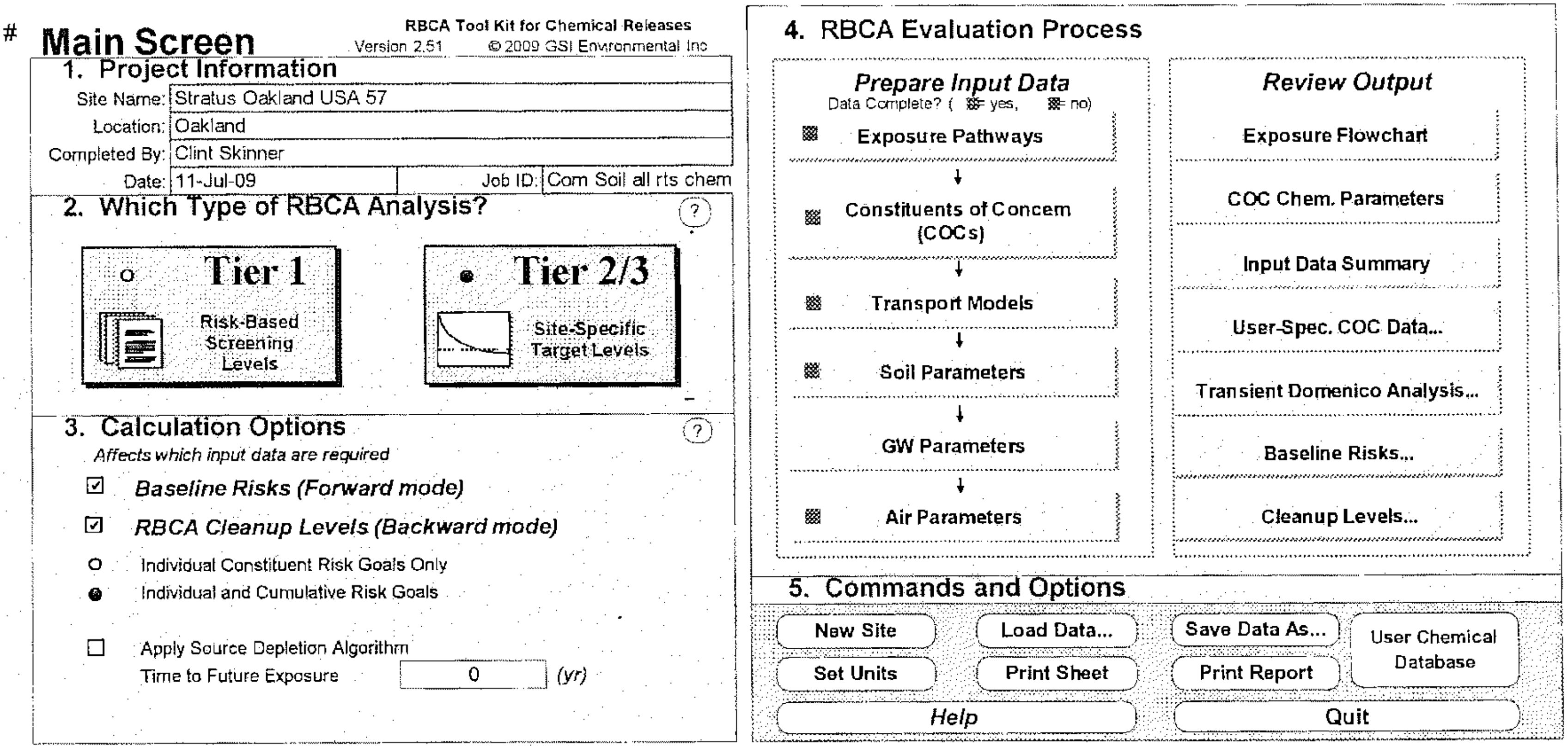
Calculations of Blood Lead Concentrations (PbBs)

U.S. EPA Technical Review Workgroup for Lead, Adult Lead Committee
Version date 05/19/05 EDIT RED CELLS

Exposure Variable	Description of Exposure Variable	Units	Region OR Ethnic GSDi and PbBo Data from NHANES III Analysis							
			All/All	All/White	All/Black	All/Mexican	Northeast/All	Midwest/All	South/All	West/All
PbS	Soil lead concentration	ug/g or ppm	7	7	7	7	7	7	7	7
$R_{fetal/maternal}$	Fetal/maternal PbB ratio	--	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9
BKSF	Biokinetic Slope Factor	ug/dL per ug/day	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
GSD_i	Geometric standard deviation PbB	--	2.1	2.1	2.2	2.3	2.0	2.2	2.1	2.1
PbB_0	Baseline PbB	ug/dL	1.5	1.5	1.8	1.7	2.0	1.5	1.4	1.4
IR_S	Soil ingestion rate (including soil-derived indoor dust)	g/day	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050
IR_{S+D}	Total ingestion rate of outdoor soil and indoor dust	g/day	--	--	--	--	--	--	--	--
W_S	Weighting factor, fraction of IR_{S+D} ingested as outdoor soil	--	--	--	--	--	--	--	--	--
K_{SD}	Mass fraction of soil in dust	--	--	--	--	--	--	--	--	--
$AF_{S, D}$	Absorption fraction (same for soil and dust)	--	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12
$EF_{S, D}$	Exposure frequency (same for soil and dust)	days/yr	219	219	219	219	219	219	219	219
$AT_{S, D}$	Averaging time (same for soil and dust)	days/yr	365	365	365	365	365	365	365	365
PbB_{adult}	**PbB of adult worker, geometric mean**	ug/dL	**1.5**	**1.5**	**1.8**	**1.7**	**2.0**	**1.5**	**1.4**	**1.4**
$PbB_{fetal, 0.95}$	95th percentile PbB among fetuses of adult workers	ug/dL	4.7	4.4	5.7	6.0	5.6	5.0	4.2	4.3
PbB_t	Target PbB level of concern (e g , 10 ug/dL)	ug/dL	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
$P(PbB_{fetal} > PbB_t)$	**Probability that fetal PbB > PbB_t, assuming lognormal distribution**	**%**	**0.4%**	**0.3%**	**0.9%**	**1.2%**	**0.7%**	**0.6%**	**0.2%**	**0.3%**

Source: U.S. EPA (1996). Recommendations of the Technical Review Workgroup for Lead for an Interim Approach to Assessing Risks Associated with Adult Exposures to Lead in Soil

Appendix C: RBCA COMMERCIAL SOIL PRINTOUT



Main Screen

RBCA Tool Kit for Chemical Releases
Version 2.51 © 2009 GSI Environmental Inc

1. Project Information

Site Name: Stratus Oakland USA 57
Location: Oakland
Completed By: Clint Skinner
Date: 11-Jul-09
Job ID: Com Soil all rts chem

2. Which Type of RBCA Analysis?

○ Tier 1 Risk-Based Screening Levels
● Tier 2/3 Site-Specific Target Levels

3. Calculation Options

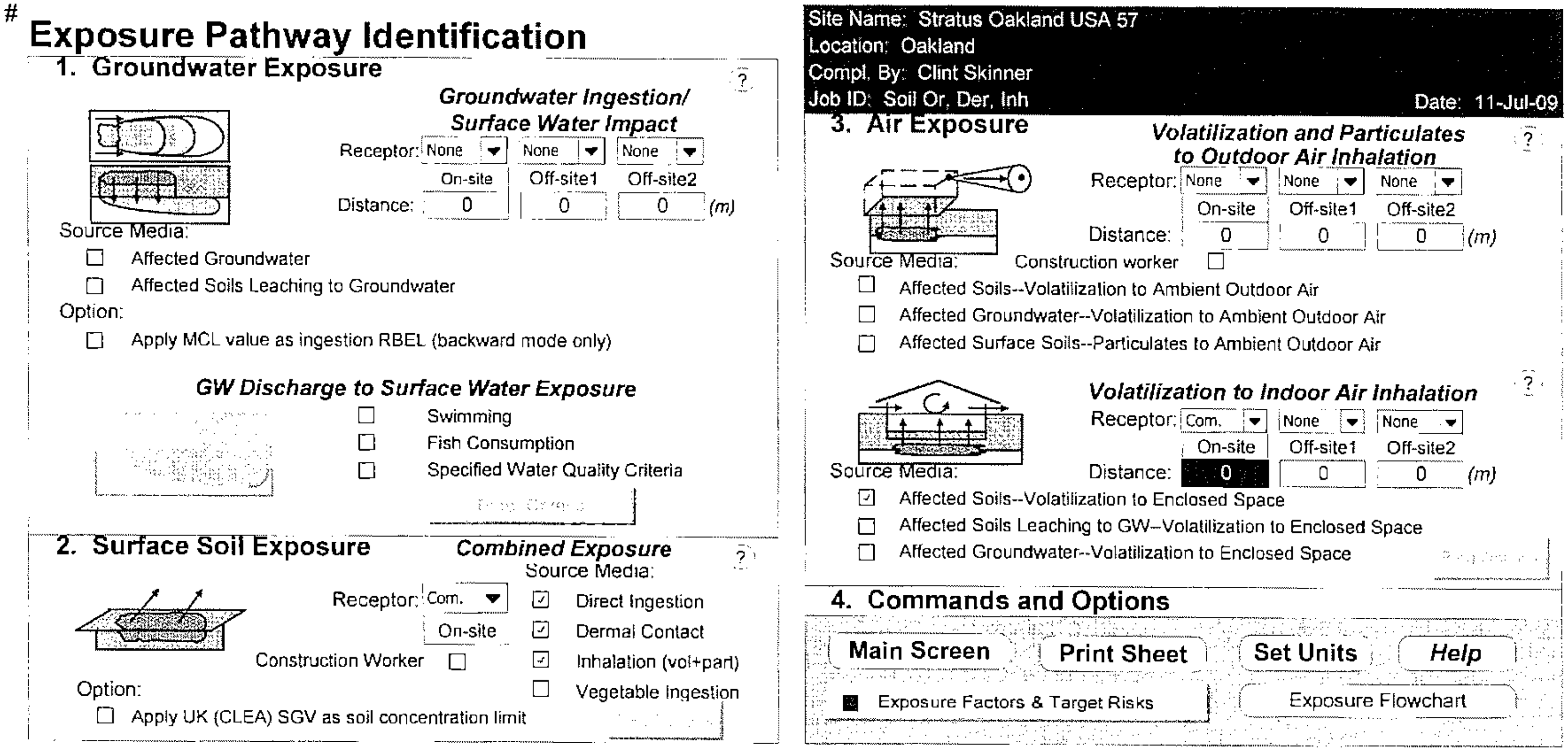
Affects which input data are required

☑ *Baseline Risks (Forward mode)*
☑ *RBCA Cleanup Levels (Backward mode)*
○ Individual Constituent Risk Goals Only
● Individual and Cumulative Risk Goals

☐ Apply Source Depletion Algorithm
Time to Future Exposure 0 (yr)

4. RBCA Evaluation Process

Prepare Input Data
Data Complete? (▨= yes, ▨= no)



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Exposure Pathway Identification

Site Name: Stratus Oakland USA 57
Location: Oakland
Compl. By: Clint Skinner
Job ID: Soil Or, Der, Inh
Date: 11-Jul-09

1. Groundwater Exposure

Groundwater Ingestion/ Surface Water Impact

	On-site	Off-site1	Off-site2	
Receptor:	None	None	None	
Distance:	0	0	0	*(m)*

Source Media:

☐ Affected Groundwater

☐ Affected Soils Leaching to Groundwater

Option:

☐ Apply MCL value as ingestion RBEL (backward mode only)

GW Discharge to Surface Water Exposure

☐ Swimming

☐ Fish Consumption

☐ Specified Water Quality Criteria

2. Surface Soil Exposure

Combined Exposure

Receptor: Com.
On-site

Construction Worker ☐

Source Media:

☑ Direct Ingestion

☑ Dermal Contact

☑ Inhalation (vol+part)

☐ Vegetable Ingestion

Option:

☐ Apply UK (CLEA) SGV as soil concentration limit

3. Air Exposure

Volatilization and Particulates to Outdoor Air Inhalation

	On-site	Off-site1	Off-site2	
Receptor:	None	None	None	
Distance:	0	0	0	*(m)*

Construction worker ☐

Source Media:

☐ Affected Soils--Volatilization to Ambient Outdoor Air

☐ Affected Groundwater--Volatilization to Ambient Outdoor Air

☐ Affected Surface Soils--Particulates to Ambient Outdoor Air

Volatilization to Indoor Air Inhalation

	On-site	Off-site1	Off-site2	
Receptor:	Com.	None	None	
Distance:	0	0	0	*(m)*

Source Media:

☑ Affected Soils--Volatilization to Enclosed Space

☐ Affected Soils Leaching to GW--Volatilization to Enclosed Space

☐ Affected Groundwater--Volatilization to Enclosed Space

4. Commands and Options

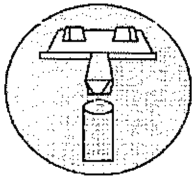
■ Exposure Factors & Target Risks

Exposure Factors and Target Risk Limits

Site Name: Stratus Oakland USA 57
Location: Oakland
Compl. By: Clint Skinner
Job ID: Soil Or, Der, Inh
Date: 11-Jul-09

1. Exposure Parameters

	Residential Receptors			*Commerical Receptors*		*User*
	Child	Adolescent	Adult	Adult	Construc.	*Defined*
Averaging time, carcinogens (yr)	70					-
Averaging time, non-carcinogens (yr)	6	12	30	25	1	-
Body weight (kg)	15	35	70	70	70	-
Exposure duration (yr)	6	12	30	25	1	-
Averaging Time for Vapor Flux (yr)	30			30	30	-
Exposure frequency (d/yr)	350			250	180	-
Dermal exposure freq. (d/yr)	350			250	180	-
Seasonal-avg skin surface area (cm^2/d)	2023	2023	3160	3160	3160	-
Soil dermal adherence factor (mg/cm^2)	0.5	0.5	0.5	0.5	0.5	-
Water ingestion rate (L/d)	1	1	2	1	1	-
Soil ingestion rate (mg/d)	200	200	100	50	100	-
Swimming exposure time (hr/event)	1	3	3			
Swimming event frequency (events/yr)	12	12	12			
Swimming water ingestion rate (L/hr)	0.5	0.5	0.05			
Skin surface area, swimming (cm^2)	3500	8100	23000			
Fish consumption rate (kg/d)	0.025	0.025	0.025			
Vegetable ingestion rate (kg/d)						
Above-ground vegetables	0.002	0.002	0.006			
Below-ground vegetables	0.001	0.001	0.002			
Contaminated fish fraction (-)	1					



2. Age Adjustment for Carcinogens

(residential receptor only)

	Adjustment Factor	
☐ Seasonal skin surface area, soil contact	1022.26	(cm^2-yr/kg)
☑ Water ingestion	1.08571	(mg-yr/L-day)
☐ Soil ingestion	165.714	(mg-yr/kg-day)
☐ Swimming water ingestion	4.56	(L/kg)
☐ Skin surface area, swimming	80640	(cm^2-yr/kg)
☐ Fish consumption	0.02286	(kg-yr/kg-day)
☐ Below-ground vegetable ingestion	0.38	(kg-yr/kg-day)
☐ Above-ground vegetable ingestion	0.88	(kg-yr/kg-day)

3. Non-Carcinogenic Receptor

(residential receptor only)

Adult ▼

4. Target Health Risk Limits

	Individual	Cumulative
Target Cancer Risk (Carcinogens)	1.0E-5	1.0E-5
Target Hazard Quotient/Index (non-Carc.)	1.0E+0	1.0E+0

5. Commands and Options

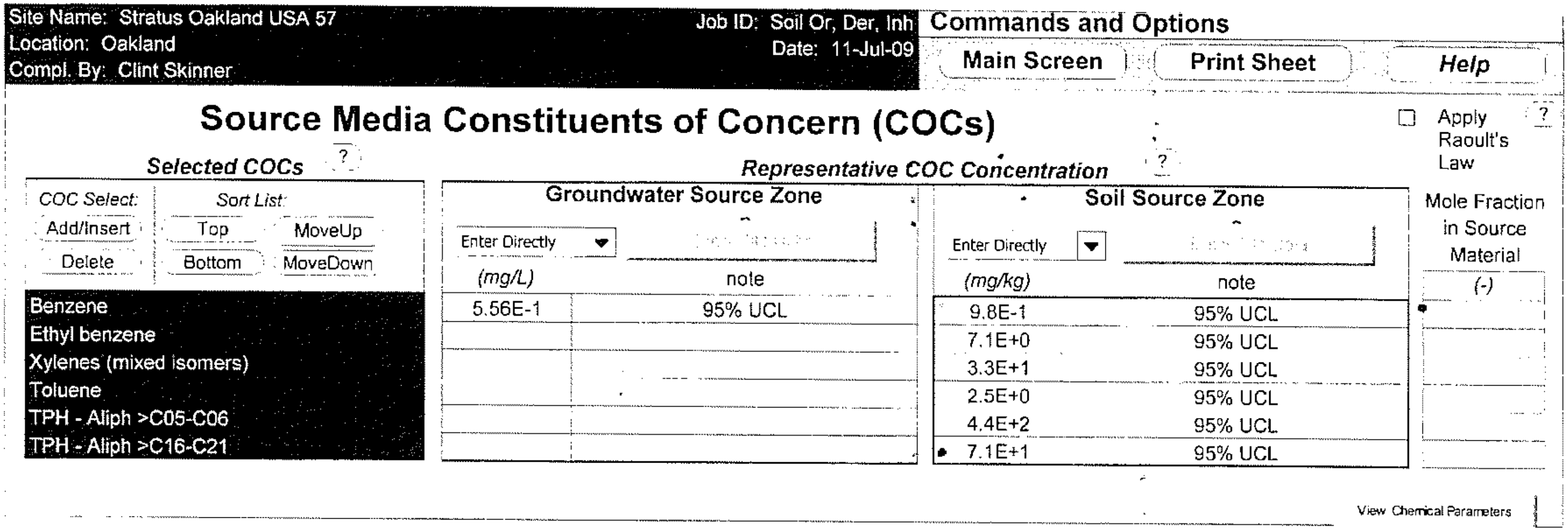
Return to Exposure Pathways

Use/Set Default Values

Print Sheet

Help

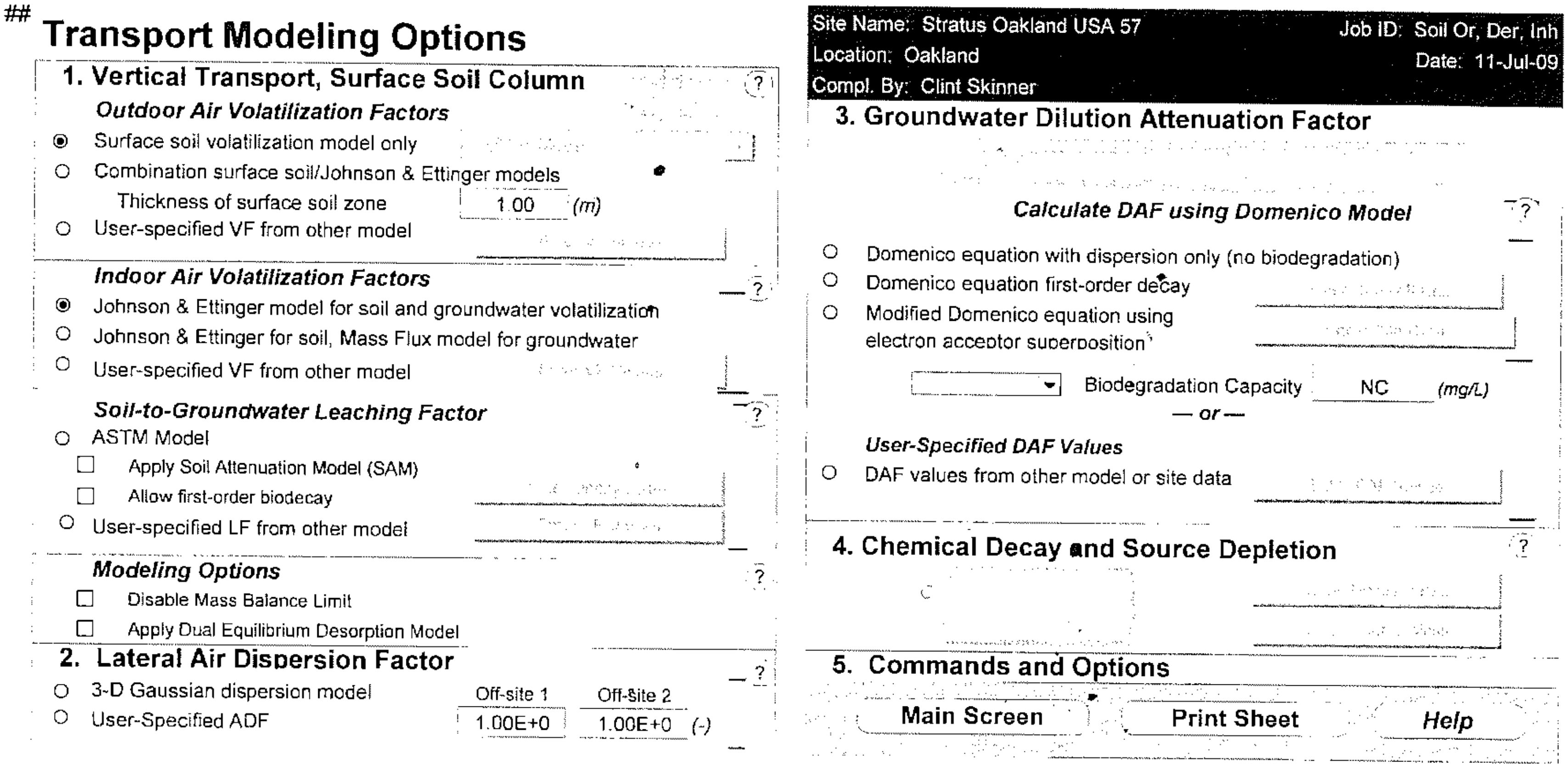
RBCA Tool Kit for Chemical Releases, Version 2.51



Site Name: Stratus Oakland USA 57
Location: Oakland
Compl. By: Clint Skinner
Job ID: Soil Or, Der, Inh
Date: 11-Jul-09

Source Media Constituents of Concern (COCs)

Selected COCs	Representative COC Concentration				Mole Fraction in Source Material
	Groundwater Source Zone		Soil Source Zone		
	(mg/L)	note	(mg/kg)	note	(-)
Benzene	5.56E-1	95% UCL	9.8E-1	95% UCL	
Ethyl benzene			7.1E+0	95% UCL	
Xylenes (mixed isomers)			3.3E+1	95% UCL	
Toluene			2.5E+0	95% UCL	
TPH - Aliph >C05-C06			4.4E+2	95% UCL	
TPH - Aliph >C16-C21			7.1E+1	95% UCL	



Transport Modeling Options

Site Name: Stratus Oakland USA 57
Location: Oakland
Compl. By: Clint Skinner
Job ID: Soil Or, Der, Inh
Date: 11-Jul-09

1. Vertical Transport, Surface Soil Column

Outdoor Air Volatilization Factors

- ● Surface soil volatilization model only
- ○ Combination surface soil/Johnson & Ettinger models
  - Thickness of surface soil zone 1.00 (m)
- ○ User-specified VF from other model

Indoor Air Volatilization Factors

- ● Johnson & Ettinger model for soil and groundwater volatilization
- ○ Johnson & Ettinger for soil, Mass Flux model for groundwater
- ○ User-specified VF from other model

Soil-to-Groundwater Leaching Factor

- ○ ASTM Model
  - ☐ Apply Soil Attenuation Model (SAM)
  - ☐ Allow first-order biodecay
- ○ User-specified LF from other model

Modeling Options

- ☐ Disable Mass Balance Limit
- ☐ Apply Dual Equilibrium Desorption Model

2. Lateral Air Dispersion Factor

		Off-site 1	Off-site 2	
○	3-D Gaussian dispersion model			
○	User-Specified ADF	1.00E+0	1.00E+0	(-)

3. Groundwater Dilution Attenuation Factor

Calculate DAF using Domenico Model

- ○ Domenico equation with dispersion only (no biodegradation)
- ○ Domenico equation first-order decay
- ○ Modified Domenico equation using electron acceptor superposition

Biodegradation Capacity NC (mg/L)

— or —

User-Specified DAF Values

- ○ DAF values from other model or site data

4. Chemical Decay and Source Depletion

5. Commands and Options

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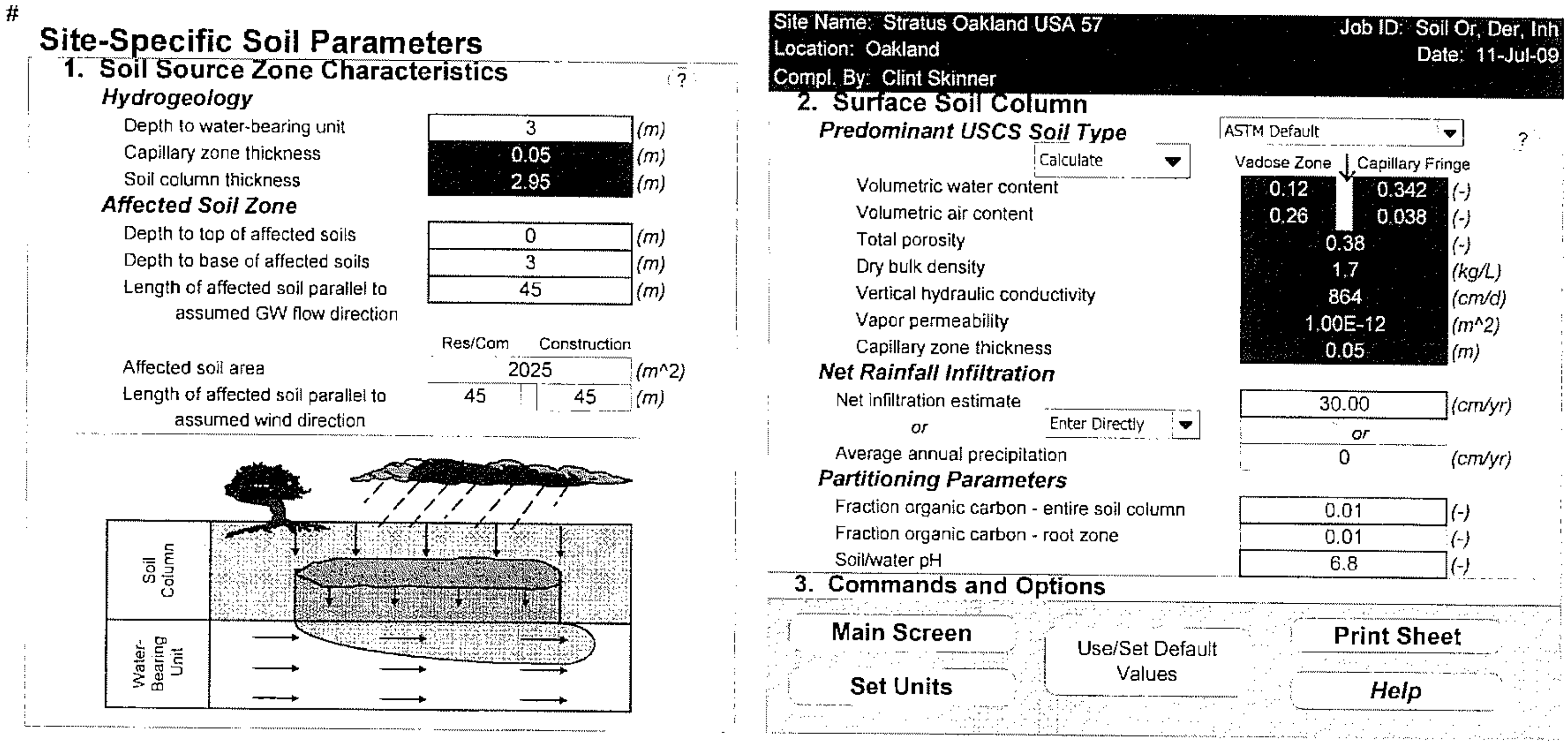

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Site-Specific Soil Parameters

Site Name: Stratus Oakland USA 57
Location: Oakland
Compl. By: Clint Skinner
Job ID: Soil Or, Der, Inh
Date: 11-Jul-09

1. Soil Source Zone Characteristics

Hydrogeology

Depth to water-bearing unit	3	(m)
Capillary zone thickness	0.05	(m)
Soil column thickness	2.95	(m)

Affected Soil Zone

Depth to top of affected soils	0	(m)
Depth to base of affected soils	3	(m)
Length of affected soil parallel to assumed GW flow direction	45	(m)

	Res/Com	Construction	
Affected soil area	2025		(m^2)
Length of affected soil parallel to assumed wind direction	45	45	(m)

2. Surface Soil Column

Predominant USCS Soil Type ASTM Default

Calculate

	Vadose Zone	Capillary Fringe	
Volumetric water content	0.12	0.342	(-)
Volumetric air content	0.26	0.038	(-)
Total porosity	0.38		(-)
Dry bulk density	1.7		(kg/L)
Vertical hydraulic conductivity	864		(cm/d)
Vapor permeability	1.00E-12		(m^2)
Capillary zone thickness	0.05		(m)

Net Rainfall Infiltration

Net infiltration estimate		30.00	(cm/yr)
or	Enter Directly	*or*	
Average annual precipitation		0	(cm/yr)

Partitioning Parameters

Fraction organic carbon - entire soil column	0.01	(-)
Fraction organic carbon - root zone	0.01	(-)
Soil/water pH	6.8	(-)

3. Commands and Options

Site-Specific Air Parameters

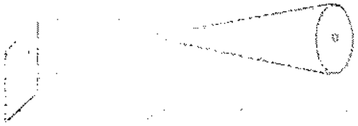
Site Name: Stratus Oakland USA 57
Location: Oakland
Compl. By: Clint Skinner

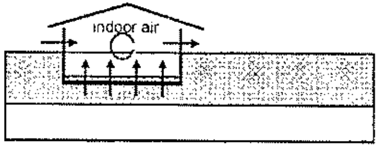
Job ID: Soil Or, Der, Inh
Date: 11-Jul-09

1. Outdoor Air Pathway

User Defined Volatilization Factor Used
User Defined Air Dispersion Factor Used

	Off-site 1	Off-site 2	
Dispersion in Air			?
Distance to offsite air receptor	0	0	(m)
Horizontal dispersivity	0	0	*(m)*
Vertical dispersivity	0	0	*(m)*
Air Source Zone			
Air mixing zone height	2		*(m)*
Ambient air velocity in mixing zone	2.25		*(m/s)*
Inverse mean conc. [Q/C term]	79.25		
Particulate Emissions	*Model: ASTM Model*		
Particulate Emission Factor	6.9E-12		*(kg/m^3)*
or			
Areal particulate emission flux	6.9E-14		*(g/cm^2/s)*
Fraction vegetative cover	0.5		*(-)*
Mean annual air velocity @ 7 m	4.8		
Equivalent 7m air vel. threshold	11.32		*(m/s)*
Windspeed function [F(x) term]	0.223841466		*(-)*





2. Indoor Air Pathway

User Defined Volatilization Factor Used

	Residential	Commercial	
Building volume/area ratio	2	3	*(m)*
Foundation area	70	70	*(m^2)*
Foundation perimeter	49	34	*(m)*
Building air exchange rate	1.4E-4	2.3E-4	*(1/s)*
Depth to bottom of foundation slab	0.15	0.15	*(m)*
Convective air flow through cracks	0.0E+0	0.0E+0	*(m^3/s)*
Foundation thickness	0.15		*(m)*
Foundation crack fraction	0.001		*(-)*
Volumetric water content of cracks	0.12		*(-)*
Volumetric air content of cracks	0.26		*(-)*
Indoor/Outdoor differential pressure	0		*(g/cm/s^2)*
Building Volume	451	451	*(m^3)*
Building Width Perpendicular to GW flow	9.61	9.61	*(m)*
Building Length Parallel to GW flow	9.61	9.61	*(m)*
Saturated Soil Zone Porosity	0.38		*(-)*
Vertical Dispersivity	0.006		*(m)*
Groundwater Seepage Velocity	1.8E+01		*(cm/d)*

?

3. Commands and Options

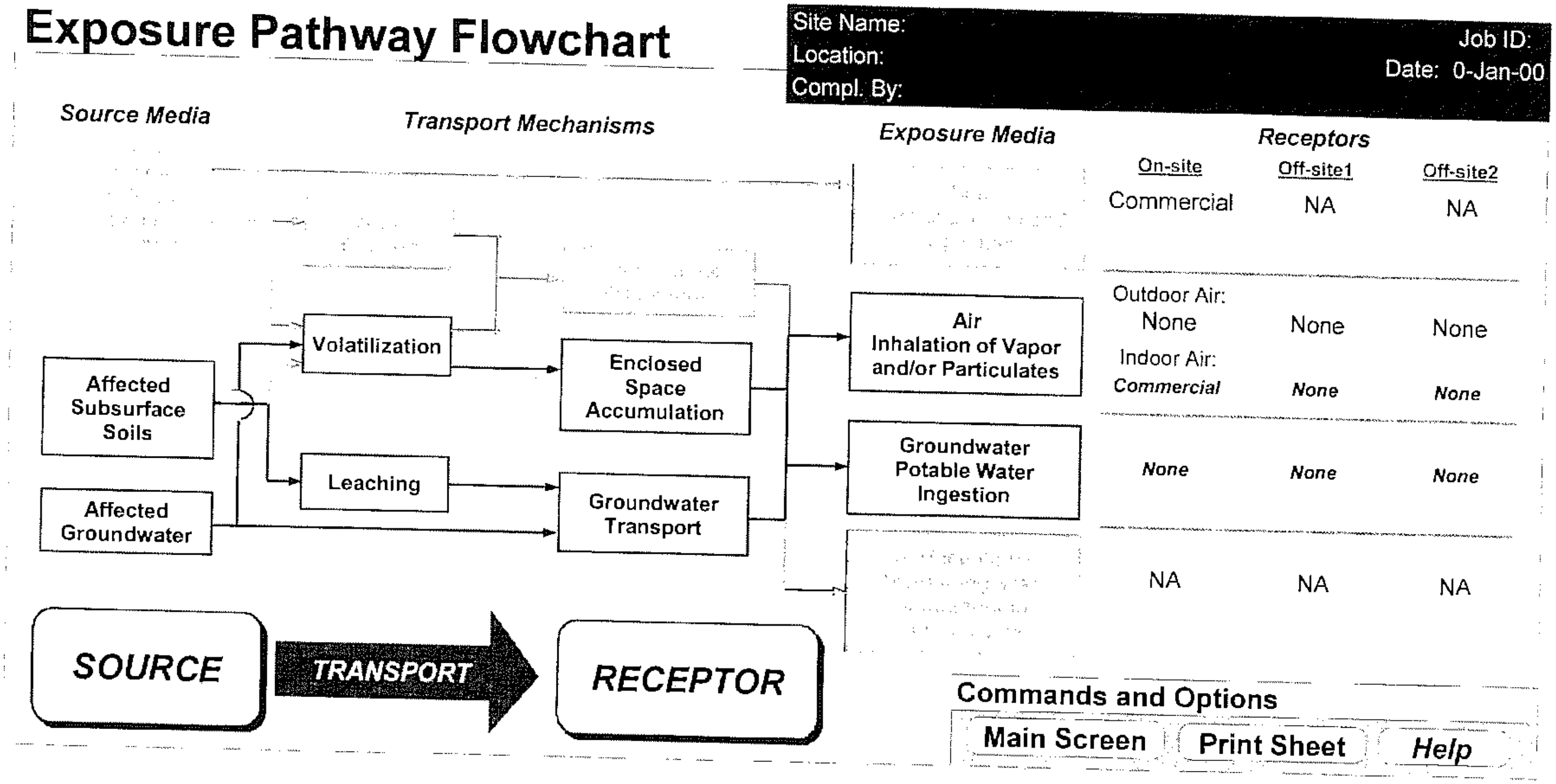
Main Screen

Set Units

Use/Set Default Values

Print Sheet

Help



Exposure Pathway Flowchart

Site Name:
Location:
Compl. By:
Job ID:
Date: 0-Jan-00

Receptors

	On-site	Off-site1	Off-site2
	Commercial	NA	NA
Air Inhalation of Vapor and/or Particulates	Outdoor Air: None	None	None
	Indoor Air: *Commercial*	*None*	*None*
Groundwater Potable Water Ingestion	*None*	*None*	*None*
	NA	NA	NA

RBCA SITE ASSESSMENT | **User-Specified COC Data**

REPRESENTATIVE COC CONCENTRATIONS IN SOURCE MEDIA

CONSTITUENT	**Representative COC Concentration**			
	Groundwater		**Soils (0 - 3 m)**	
	value (mg/L)	note	value (mg/kg)	note
Benzene	5.6E-1	95% UCL	9.8E-1	95% UCL
Ethyl benzene			7.1E+0	95% UCL
Xylenes (mixed isomers)			3.3E+1	95% UCL
Toluene			2.5E+0	95% UCL
TPH - Aliph >C05-C06			4.4E+2	95% UCL
TPH - Aliph >C16-C21			7.1E+1	95% UCL

RBCA SITE ASSESSMENT | **User-Specified COC Data**

REPRESENTATIVE COC CONCENTRATIONS IN SOURCE MEDIA

CONSTITUENT	**Representative COC Concentration**			
	Groundwater		**Soils (0 - 3 m)**	
	value (mg/L)	note	value (mg/kg)	note
Benzene	5.6E-1	95% UCL	9.8E-1	95% UCL
Ethyl benzene			7.1E+0	95% UCL
Xylenes (mixed isomers)			3.3E+1	95% UCL
Toluene			2.5E+0	95% UCL
TPH - Aliph >C05-C06			4.4E+2	95% UCL
TPH - Aliph >C16-C21			7.1E+1	95% UCL

Site Name: Stratus Oakland USA 57
Site Location: Oakland
Completed By: Clint Skinner

Date Completed: 11-Jul-09
Job ID: Com Soil all rts chem

RBCA SITE ASSESSMENT

TIER 2 EXPOSURE CONCENTRATION AND INTAKE CALCULATION

INDOOR AIR EXPOSURE PATHWAYS ■ **(Checked if Pathway is Complete)**

SOILS (0 - 3 m): VAPOR
INTRUSION INTO BUILDINGS

	1) Source Medium	2) NAF Value (L/kg) Receptor	3) Exposure Medium Indoor Air: POE Conc. (mg/m^3) (1) / (2)	4) Exposure Multiplier (EFxED)/(ATx365) (unitless)	5) Average Inhalation Exposure Concentration (mg/m^3) (3) X (4)
		On-site (0 m)	On-site (0 m)	On-site (0 m)	On-site (0 m)
Constituents of Concern	Soil Conc. (mg/kg)	Commercial	Commercial	Commercial	Commercial
Benzene	9.8E-1	5.1E+2	1.9E-3	2.4E-1	4.7E-4
Ethyl benzene	7.1E+0	1.2E+3	6.1E-3	6.8E-1	4.2E-3
Xylenes (mixed isomers)	3.3E+1	1.5E+3	2.1E-2	6.8E-1	1.4E-2
Toluene	2.5E+0	8.4E+2	3.0E-3	6.8E-1	2.1E-3
TPH - Aliph >C05-C06	4.4E+2	1.3E+2	3.4E+0	6.8E-1	2.3E+0
TPH - Aliph >C16-C21	7.1E+1	1.7E+5	4.1E-4	6.8E-1	2.8E-4

* = Chemical with user-specified data

NOTE: AT = Averaging time (days) EF = Exposure frequency (days/yr) ED = Exposure duration (yr) NAF = Natural attenuation factor POE = Point of exposure

Site Name: Stratus Oakland USA 57
Site Location: Oakland
Completed By: Clint Skinner

Date Completed: 11-Jul-09
Job ID: Com Soil all rts chem

RBCA SITE ASSESSMENT

TIER 2 EXPOSURE CONCENTRATION AND INTAKE CALCULATION

INDOOR AIR EXPOSURE PATHWAYS ☐ **(Checked if Pathway is Complete)**

GROUNDWATER: VAPOR INTRUSION INTO BUILDINGS

Exposure Concentration

Constituents of Concern	1) Source Medium	2) NAF Value (m^3/L) Receptor			3) Exposure Medium Indoor Air POE Conc. (mg/m^3) (1) / (2)		
	Groundwater Conc. (mg/L)	On-site (0 m) None	Off-site 1 (0 m) None	Off-site 2 (0 m) None	On-site (0 m) None	Off-site 1 (0 m) None	Off-site 2 (0 m) None
Benzene	5.6E-1						
Ethyl benzene							
Xylenes (mixed isomers)							
Toluene							
TPH - Aliph >C05-C06							
TPH - Aliph >C16-C21							

NOTE: AT = Averaging time (days) EF = Exposure frequency (days/yr) ED = Exposure duration (yr) NAF = Natural attenuation factor POE = Point of exposure

Site Name: Stratus Oakland USA 57
Site Location: Oakland
Completed By: Clint Skinner

Date Completed: 11-Jul-09
Job ID: Com Soil all rts chem

RBCA SITE ASSESSMENT

TIER 2 EXPOSURE CONCENTRATION AND INTAKE CALCULATION

INDOOR AIR EXPOSURE PATHWAYS

GROUNDWATER: VAPOR INTRUSION INTO BUILDINGS

	4) Exposure Multiplier (EFxED)/(ATx365) (unitless)			5) Average Inhalation Exposure Concentration (mg/m^3) (3) X (4)		
Constituents of Concern	On-site (0 m) None	Off-site 1 (0 m) None	Off-site 2 (0 m) None	On-site (0 m) None	Off-site 1 (0 m) None	Off-site 2 (0 m) None
Benzene						
Ethyl benzene						
Xylenes (mixed isomers)						
Toluene						
TPH - Aliph >C05-C06						
TPH - Aliph >C16-C21						

* = Chemical with user-specified data

NOTE: AT = Averaging time (days) EF = Exposure frequency (days/yr) ED = Exposure duration (yr) NAF = Natural attenuation factor POE = Point of exposure

Site Name: Stratus Oakland USA 57
Site Location: Oakland
Completed By: Clint Skinner

Date Completed: 11-Jul-09
Job ID: Com Soil all rts chem

RBCA SITE ASSESSMENT

TIER 2 EXPOSURE CONCENTRATION AND INTAKE CALCULATION

INDOOR AIR EXPOSURE PATHWAYS ☐ **(Checked if Pathway is Complete)**

SOIL LEACHING TO GW- VAPOR INTRUSION INTO BUILDINGS

Exposure Concentration

Constituents of Concern	1) Source Medium	2) NAF Value (m^3/L) Receptor			3) Exposure Medium Indoor Air: POE Conc. (mg/m^3) (1) / (2)		
	Soil Conc. (mg/kg)	On-site (0 m) None	Off-site 1 (0 m) None	Off-site 2 (0 m) None	On-site (0 m) None	Off-site 1 (0 m) None	Off-site 2 (0 m) None
Benzene	9.8E-1						
Ethyl benzene	7.1E+0						
Xylenes (mixed isomers)	3.3E+1						
Toluene	2.5E+0						
TPH - Aliph >C05-C06	4.4E+2						
TPH - Aliph >C16-C21	7.1E+1						

NOTE: AT = Averaging time (days) EF = Exposure frequency (days/yr) ED = Exposure duration (yr) NAF = Natural attenuation factor POE = Point of exposure

Site Name: Stratus Oakland USA 57
Site Location: Oakland
Completed By: Clint Skinner

Date Completed: 11-Jul-09
Job ID: Com Soil all rts chem

TIER 2 EXPOSURE CONCENTRATION AND INTAKE CALCULATION

INDOOR AIR EXPOSURE PATHWAYS

SOIL LEACHING TO GW- VAPOR INTRUSION INTO BUILDINGS

Constituents of Concern	4) Exposure Multiplier (EFxED)/(ATx365) (unitless)			5) Average Inhalation Exposure Concentration (mg/m^3) (3) X (4)		
	On-site (0 m) None	Off-site 1 (0 m) None	Off-site 2 (0 m) None	On-site (0 m) None	Off-site 1 (0 m) None	Off-site 2 (0 m) None
Benzene						
Ethyl benzene						
Xylenes (mixed isomers)						
Toluene						
TPH - Aliph >C05-C06						
TPH - Aliph >C16-C21						

* = Chemical with user-specified data

NOTE: AT = Averaging time (days) EF = Exposure frequency (days/yr) ED = Exposure duration (yr) NAF = Natural attenuation factor POE = Point of exposure

Site Name: Stratus Oakland USA 57
Site Location: Oakland
Completed By: Clint Skinner

Date Completed: 11-Jul-09
Job ID: Com Soil all rts chem

RBCA SITE ASSESSMENT

TIER 2 EXPOSURE CONCENTRATION AND INTAKE CALCULATION

INDOOR AIR EXPOSURE PATHWAYS

MAXIMUM PATHWAY EXPOSURE (mg/m^3)

(Maximum average exposure concentration from soil and groundwater routes.)

Constituents of Concern	On-site (0 m) Commercial	Off-site 1 (0 m) None	Off-site 2 (0 m) None
Benzene	4.7E-4		
Ethyl benzene	4.2E-3		
Xylenes (mixed isomers)	1.4E-2		
Toluene	2.1E-3		
TPH - Aliph >C05-C06	2.3E+0		
TPH - Aliph >C16-C21	2.8E-4		

Site Name: Stratus Oakland USA 57
Site Location: Oakland
Completed By: Clint Skinner

Date Completed: 11-Jul-09
Job ID: Com Soil all rts chem

RBCA SITE ASSESSMENT

TIER 2 PATHWAY RISK CALCULATION

INDOOR AIR EXPOSURE PATHWAYS ☒ **(Checked if Pathway is Complete)**

CARCINOGENIC RISK

Constituents of Concern	(1) Carcinogenic Classification	(2) Maximum Carcinogenic Exposure (mg/m^3)			(3) Inhalation Unit Risk Factor	(4) Individual COC Risk (2) x (3) x 1000		
		On-site (0 m) Commercial	Off-site 1 (0 m) None	Off-site 2 (0 m) None	(µg/m^3)^-1	On-site (0 m) Commercial	Off-site 1 (0 m) None	Off-site 2 (0 m) None
Benzene	TRUE	4.7E-4	-	-	2.2E-6	1.0E-6		
Ethyl benzene	FALSE	-	-	-	-			
Xylenes (mixed isomers)	FALSE	-	-	-	-			
Toluene	FALSE	-	-	-	-			
TPH - Aliph >C05-C06	FALSE	-	-	-	-			
TPH - Aliph >C16-C21	FALSE	-	-	-	-			

Total Pathway Carcinogenic Risk =	**1.0E-6**		

Site Name: Stratus Oakland USA 57
Site Location: Oakland
Completed By: Clint Skinner

Date Completed: 11-Jul-09
Job ID: Com Soil all rts chem

RBCA SITE ASSESSMENT

TIER 2 PATHWAY RISK CALCULATION

INDOOR AIR EXPOSURE PATHWAYS ■ **(Checked if Pathway is Complete)**

TOXIC EFFECTS

	(5) Maximum Toxicant Exposure (mg/m^3)			(6) Inhalation Reference Concentration	(7) Individual COC Hazard Quotient (5) / (6)		
Constituents of Concern	On-site (0 m) Commercial	Off-site 1 (0 m) None	Off-site 2 (0 m) None	(mg/m^3)	On-site (0 m) Commercial	Off-site 1 (0 m) None	Off-site 2 (0 m) None
Benzene	1.3E-3	NC	NC	2.8E-1	4.7E-3		
Ethyl benzene	4.2E-3	NC	NC	1.0E+0	4.2E-3		
Xylenes (mixed isomers)	1.4E-2	NC	NC	1.0E-1	1.4E-1		
Toluene	2.1E-3	NC	NC	5.0E+0	4.1E-4		
TPH - Aliph >C05-C06	2.3E+0	NC	NC	1.8E+1	1.3E-1		
TPH - Aliph >C16-C21	2.8E-4	NC	NC	-			

Total Pathway Hazard Index =	**2.8E-1**		

Site Name: Stratus Oakland USA 57
Site Location: Oakland
Completed By: Clint Skinner

Date Completed: 11-Jul-09
Job ID: Com Soil all rts chem

TIER 2 EXPOSURE CONCENTRATION AND INTAKE CALCULATION

SOIL EXPOSURE PATHWAY ☒ **(Checked if Pathway is Complete)**

SURFACE SOILS: ON SITE INGESTION, DERMAL EXPOSURE

	1) Source/Exposure Medium	2) Exposure Multiplier		3) Average Daily Intake Rate (mg/kg/day) (1) x (2)	
Constituents of Concern	Surface Soil Conc. (mg/kg)	Commercial	Construction Worker	Commercial	Construction Worker
Benzene	9.8E-1	1.7E-7		1.7E-7	-
Ethyl benzene	7.1E+0	4.9E-7		3.5E-6	-
Xylenes (mixed isomers)	3.3E+1	4.9E-7		1.6E-5	-
Toluene	2.5E+0	4.9E-7		1.2E-6	-
TPH - Aliph >C05-C06	4.4E+2	4.9E-7		2.1E-4	-
TPH - Aliph >C16-C21	7.1E+1	3.6E-6		2.5E-4	-

NOTE: RAF = Relative absorption factor (-)
M = Adherence factor (mg/cm^2)
AT = Averaging time (days)
BW = Body weight (kg)
ED = Exposure duration (yrs)
EF = Exposure frequencey (days/yr)
IR = Soil ingestion rate (mg/day)
SA = Skin exposure area (cm^2/day)

Site Name: Stratus Oakland USA 57
Site Location: Oakland
Completed By: Clint Skinner

Date Completed: 11-Jul-09
Job ID: Com Soil all rts chem

TIER 2 PATHWAY RISK CALCULATION

SOIL EXPOSURE PATHWAY ■ **(Checked if Pathway is Complete)**

CARCINOGENIC RISK

Constituents of Concern	(1) Is Carcinogenic	(2) Total Carcinogenic Intake Rate (mg/kg/day)				(3) Slope Factor (mg/kg/day)^-1		(4) Individual COC Risk	
		(a) via Ingestion	(b) via Dermal Contact	(c) via Ingestion	(d) via Dermal Contact	(a) Oral	(b) Dermal	(2a)x(3a) + (2b)x(3b)	(2c)x(3a) + (2d)x(3b)
		Commercial		Construction Worker				Commercial	Construction Worker
Benzene	TRUE	1.7E-7	0.0E+0			5.5E-2	5.5E-2	9.4E-9	-
Ethyl benzene	FALSE					-	-		-
Xylenes (mixed isomers)	FALSE					-	-		-
Toluene	FALSE					-	-		-
TPH - Aliph >C05-C06	FALSE					-	-		-
TPH - Aliph >C16-C21	FALSE					-	-		-

* No dermal slope factor available--oral slope factor used

Total Pathway Carcinogenic Risk = **9.4E-9**

Site Name: Stratus Oakland USA 57
Site Location: Oakland
Completed By: Clint Skinner

Date Completed: 11-Jul-09
Job ID: Com Soil all rls chem

TIER 2 PATHWAY RISK CALCULATION

SOIL EXPOSURE PATHWAY ■ **(Checked if Pathway is Complete)**

TOXIC EFFECTS

	(5) Total Toxicant Intake Rate (mg/kg/day)				(6) Reference Dose (mg/kg-day)		(7) Individual COC Hazard Quotient	
	(a) via Ingestion	(b) via Dermal Contact	(c) via Ingestion	(d) via Dermal Contact	(a) Oral	(b) Dermal	(5a)/(6a) + (5b)/(6b)	(5c)/(6a) + (5d)/(6b)
Constituents of Concern	Commercial		Construction Worker				Commercial	Construction Worker
Benzene	4.8E-7	0.0E+0			4.0E-3	4.0E-3	1.2E-4	
Ethyl benzene	3.5E-6	0.0E+0			1.0E-1	1.0E-1	3.5E-5	
Xylenes (mixed isomers)	1.6E-5	0.0E+0			2.0E-1	2.0E-1	8.0E-5	
Toluene	1.2E-6	0.0E+0			8.0E-2	8.0E-2	1.5E-5	
TPH - Aliph >C05-C06	2.1E-4	0.0E+0			6.0E-2	6.0E-2	3.6E-3	
TPH - Aliph >C16-C21	3.4E-5	2.2E-4			2.0E+0	2.0E+0	1.3E-4	

* No dermal reference dose available--oral reference dose used

Total Pathway Hazard Index = **3.9E-3**

Site Name: Stratus Oakland USA 57
Site Location: Oakland
Completed By: Clint Skinner

Date Completed. 11-Jul-09
Job ID: Com Soil all rts chem

RBCA SITE ASSESSMENT | **Baseline Risk Summary-All Pathways**

Site Name: Stratus Oakland USA 57
Site Location: Oakland

Completed By: Clint Skinner
Date Completed: 11-Jul-09

BASELINE RISK SUMMARY TABLE

EXPOSURE PATHWAY	BASELINE CARCINOGENIC RISK					BASELINE TOXIC EFFECTS				
	Individual COC Risk		Cumulative COC Risk		Risk Limit(s) Exceeded?	Hazard Quotient		Hazard Index		Toxicity Limit(s) Exceeded?
	Maximum Value	Target Risk	Total Value	Target Risk		Maximum Value	Applicable Limit	Total Value	Applicable Limit	
OUTDOOR AIR EXPOSURE PATHWAYS										
☐	NA	NA	NA	NA	☐	NA	NA	NA	NA	☐
INDOOR AIR EXPOSURE PATHWAYS										
■	1.0E-6	1.0E-5	1.0E-6	1.0E-5	☐	1.4E-1	1.0E+0	2.8E-1	1.0E+0	☐
SOIL EXPOSURE PATHWAYS										
■	9.4E-9	1.0E-5	9.4E-9	1.0E-5	☐	3.6E-3	1.0E+0	3.9E-3	1.0E+0	☐
GROUNDWATER EXPOSURE PATHWAYS										
☐	NA	NA	NA	NA	☐	NA	NA	NA	NA	☐
SURFACE WATER EXPOSURE PATHWAYS										
☐	NA	NA	NA	NA	☐	NA	NA	NA	NA	☐
CRITICAL EXPOSURE PATHWAY (Maximum Values From Complete Pathways)										
	1.0E-6	*1.0E-5*	*1.0E-6*	*1.0E-5*	☐	*1.4E-1*	*1.0E+0*	*2.8E-1*	*1.0E+0*	☐
	Indoor Air		*Indoor Air*			*Indoor Air*		*Indoor Air*		

RBCA SITE ASSESSMENT

Site Name: Stratus Oakland USA 57
Site Location: Oakland

Completed By: Clint Skinner
Date Completed: 11-Jul-09

Job ID: Soil Or, Der, Inh

1 OF 1

SURFACE SOIL (0 - 1 m)
SSTL VALUES

Target Risk (Class A & B) 1.0E-5
Target Hazard Quotient 1.0E+0

Groundwater DAF Option

SSTL Results For Complete Exposure Pathways (Checked If Pathway Is Complete)

CONSTITUENTS OF CONCERN		Representative Concentration	☐ Soil Leaching to Groundwater Ingestion / Discharge to Surface Water			☐ Soil Leaching to Groundwater/ Groundwater Volatilization to Indoor Air			■ Soil Vol. to Indoor Air	☐ Soil Volatilization and Surface Soil Particulates to Outdoor Air				■ Direct Contact Pathways: Ingestion, Dermal Contact, Inhalation		Applicable SSTL	SSTL Exceeded ?	Required CRF
CAS No.	Name	(mg/kg)	On-site (0 m) None	Off-site 1 (0 m) None	Off-site 2 (0 m) None	On-site (0 m) None	Off-site 1 (0 m) None	Off-site 2 (0 m) None	On-site (0 m) Commercial	On-site (0 m) None	On-site (0 m) Construction	Off-site 1 (0 m) None	Off-site 2 (0 m) None	On-site (0 m) Commercial	On-site (0 m) Construction	(mg/kg)	"■" if yes	Only if "yes" left
71-43-2	Benzene	9.8E-1							9.5E+0					2.6E+2		9.5E+0	☐	<1
100-41-4	Ethyl benzene	7.1E+0							>3.7E+2					2.0E+5		2.0E+5	☐	<1
1330-20-7	Xylenes (mixed isomers)	3.3E+1							2.3E+2					4.1E+5		2.3E+2	☐	<1
108-88-3	Toluene	2.5E+0							>8.0E+2					1.6E+5		1.6E+5	☐	<1
T-al0506	TPH - Aliph >C05-C06	4.4E+2							>4.7E+2					1.2E+5		1.2E+5	☐	<1
T-al1621	TPH - Aliph >C16-C21	7.1E+1							Tox?					(Inh)Tox?		NC	☐	NA
NA	Total TPH mixture	5.1E+2	NA	NA	NA	NA	NA	NA	NC	NA	NA	NA	NA	1.2E+5	NA	1.2E+5	☐	<1

* = Chemical with user-specified data

">" indicates risk-based target concentration greater than constituent residual saturation value NA = Not applicable NC = Not calculated.

RBCA SITE ASSESSMENT

Site Name: Stratus Oakland USA 57
Site Location. Oakland

Completed By: Clint Skinner
Date Completed 11-Jul-09

Job ID: Soil Or, Der, Inh

SUBSURFACE SOIL (1 - 3 m)
SSTL VALUES

Target Risk (Class A & B) 1 0E-5
Target Hazard Quotient 1.0E+0

Groundwater DAF Option:

SSTL Results For Complete Exposure Pathways (Checked if Pathway is Complete)

CONSTITUENTS OF CONCERN		Representative Concentration	☐ Soil Leaching to Groundwater Ingestion / Discharge to Surface Water			☐ Soil Leaching to Groundwater/ Groundwater Volatilization to Indoor Air			■ Soil Vol. to Indoor Air	☐ Soil Volatilization to Outdoor Air			Applicable SSTL	SSTL Exceeded ?	Required CRF
CAS No.	Name	(mg/kg)	On-site (0 m) None	Off-site 1 (0 m) None	Off-site 2 (0 m) None	On-site (0 m) None	Off-site 1 (0 m) None	Off-site 2 (0 m) None	On-site (0 m) Commercial	On-site (0 m) None	Off-site 1 (0 m) None	Off-site 2 (0 m) None	(mg/kg)	"■" if yes	Only if "yes" left
71-43-2	Benzene	9 8E-1							9.5E+0				9.5E+0	☐	<1
100-41-4	Ethyl benzene	7.1E+0							>3.7E+2				>3.7E+2	☐	
1330-20-7	Xylenes (mixed isomers)	3.3E+1							2.3E+2				2.3E+2	☐	<1
108-88-3	Toluene	2.5E+0							>8.0E+2				>8.0E+2	☐	
T-al0506	TPH - Alph >C05-C06	4.4E+2							>4.7E+2				>4.7E+2	☐	
T-al1621	TPH - Aliph >C16-C21	7.1E+1							Tox?				NC	☐	
NA	Total TPH mixture	5.1E+2	NA	NA	NA	NA	NA	NA	NC	NA	NA	NA	NC	☐	NA

* = Chemical with user-specified data

">" indicates risk-based target concentration greater than constituent residual saturation value NA = Not applicable. NC = Not calculated.

RBCA SITE ASSESSMENT | Cumulative Risk Worksheet

Site Name: Stratus Oakland USA 57
Site Location: Oakland

Completed By: Clint Skinner
Date Completed: 11-Jul-09

Job ID: Soil Or, Der, Inh

CUMULATIVE RISK WORKSHEET

CONSTITUENTS OF CONCERN

CAS No.	Name	Representative Concentration		Proposed CRF		Resultant Target Concentration	
		Soil (mg/kg)	Groundwater (mg/L)	Soil	GW	Soil (mg/kg)	Groundwater (mg/L)
71-43-2	Benzene	9.8E-1		NA	NA	9.8E-1	
100-41-4	Ethyl benzene	7.1E+0		NA	NA	7.1E+0	
1330-20-7	Xylenes (mixed isomers)	3.3E+1		NA	NA	3.3E+1	
108-88-3	Toluene	2.5E+0		NA	NA	2.5E+0	
T-al0506	TPH - Aliph >C05-C06	4.4E+2		NA	NA	4.4E+2	
T-al1621	TPH - Aliph >C16-C21	7.1E+1		NA	NA	7.1E+1	

Cumulative Values:

RBCA SITE ASSESSMENT | Cumulative Risk Worksheet

Site Name. Stratus Oakland USA 57
Site Location Oakland

Completed By Clint Skinner
Date Completed: 11-Jul-09

Job ID: Soil Or, Der, Inh

2 OF 3

CUMULATIVE RISK WORKSHEET

Cumulative Target Risk: 1.0E-5 Target Hazard Index: 1.0E+0

CONSTITUENTS OF CONCERN		ON-SITE RECEPTORS							
		Outdoor Air Exposure: None		Indoor Air Exposure: Commercial		Soil Exposure: Commercial		Groundwater Exposure. None	
		Target Risk: 1.0E-5	Target HQ: 1.0E+0	Target Risk: 1.0E-5	Target HQ: 1.0E+0	Target Risk: 1.0E-5	Target HQ. 1.0E+0	Target Risk. 1.0E-5	Target HQ. 1.0E+0
CAS No.	Name	Carcinogenic Risk	Hazard Quotient	Carcinogenic Risk	Hazard Quotient	Carcinogenic Risk	Hazard Quotient	Carcinogenic Risk	Hazard Quotient
71-43-2	Benzene			1.0E-6	4.7E-3	9.4E-9	1.2E-4		
100-41-4	Ethyl benzene				4.2E-3		3.5E-5		
1330-20-7	Xylenes (mixed isomers)				1.4E-1		8.0E-5		
108-88-3	Toluene				4.1E-4		1.5E-5		
T-al0506	TPH - Aliph >C05-C06				1.3E-1		3.6E-3		
T-al1621	TPH - Aliph >C16-C21						1.3E-4		
	Cumulative Values:	**0.0E+0**	**0.0E+0**	**1.0E-6**	**2.8E-1**	**9.4E-9**	**3.9E-3**	**0.0E+0**	**0.0E+0**

* indicates risk level exceeding target risk

RBCA SITE ASSESSMENT

Cumulative Risk Worksheet

Site Name: Stratus Oakland USA 57
Site Location: Oakland

Completed By: Clint Skinner
Date Completed: 11-Jul-09

Job ID: Soil Or, Der, Inh

CUMULATIVE RISK WORKSHEET

Cumulative Target Risk: 1.0E-5 Target Hazard Index: 1.0E+0

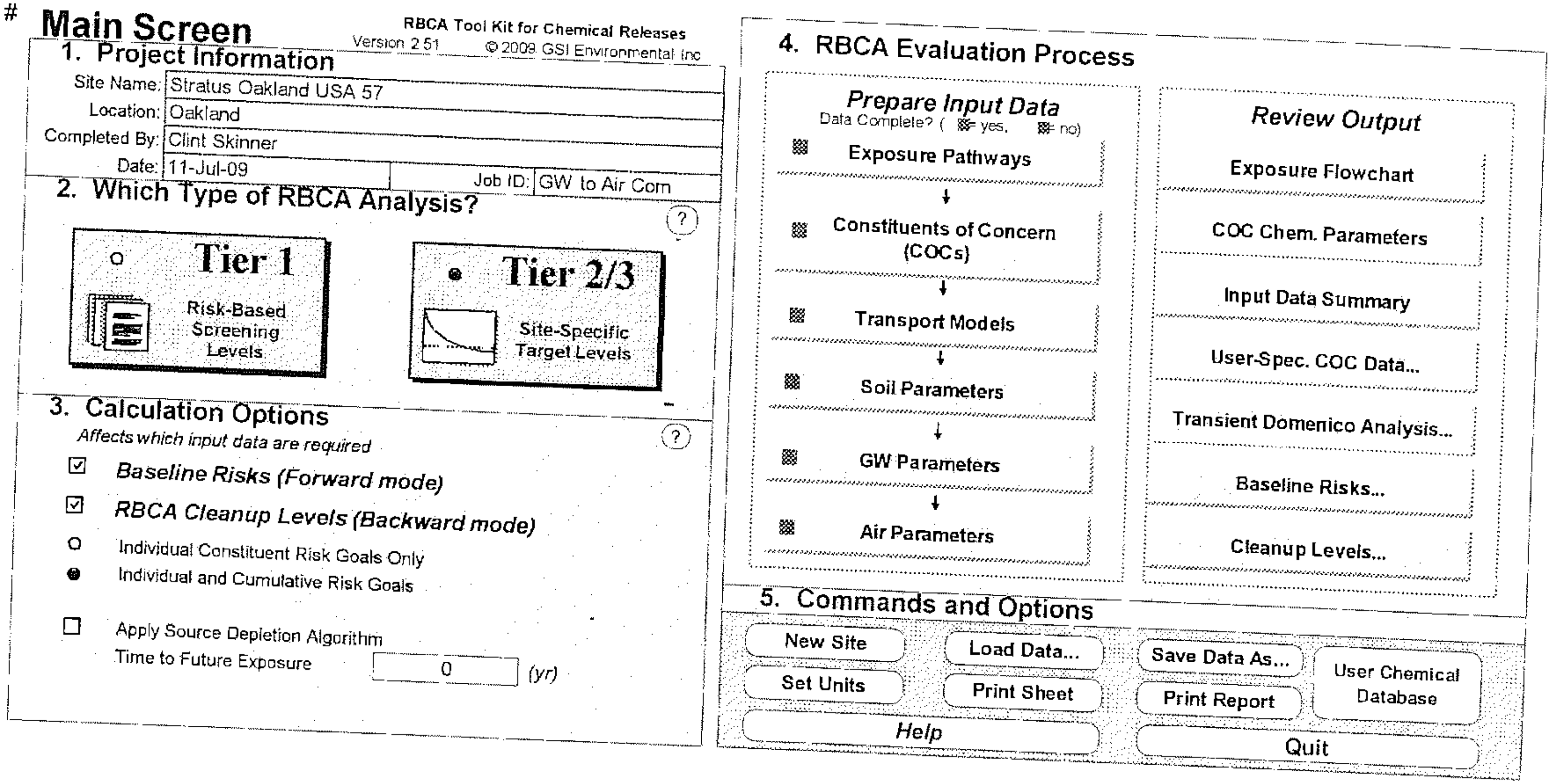
CONSTITUENTS OF CONCERN		OFF-SITE RECEPTORS											
		Outdoor Air Exposure:				Indoor Air Exposure:				Groundwater Exposure:			
		None		None		None		None		None		None	
		Target Risk: 1.0E-5	Target HQ: 1.0E+0	Target Risk: 1.0E-5	Target HQ: 1.0E+0	Target Risk: 1.0E-5	Target HQ: 1.0E+0	Target Risk: 1.0E-5	Target HQ: 1.0E+0	Target Risk: 1.0E-5	Target HQ: 1.0E+0	Target Risk: 1.0E-5	Target HQ: 1.0E+0
CAS No.	Name	Carcinogenic Risk	Hazard Quotient	Carcinogenic Risk	Hazard Quotient	Carcinogenic Risk	Hazard Quotient	Carcinogenic Risk	Hazard Quotient	Carcinogenic Risk	Hazard Quotient	Carcinogenic Risk	Hazard Quotient
71-43-2	Benzene												
100-41-4	Ethyl benzene												
1330-20-7	Xylenes (mixed isomers)												
108-88-3	Toluene												
T-al0506	TPH - Aliph >C05-C06												
T-al1621	TPH - Aliph >C16-C21												
	Cumulative Values:	0.0E+0	0.0E+0	0.0E+0	0.0E+0	0.0E+0	0.0E+0	0.0E+0	0.0E+0	0.0E+0	0.0E+0	0.0E+0	0.0E+0

■ indicates risk level exceeding target risk

indicates risk level exceeding target risk

APPENDIX D: RBCA COMMERCIAL GROUNDWATER PRINTOUT

#



Main Screen

RBCA Tool Kit for Chemical Releases
Version 2.51 © 2009 GSI Environmental Inc

1. Project Information

Site Name: Stratus Oakland USA 57
Location: Oakland
Completed By: Clint Skinner
Date: 11-Jul-09
Job ID: GW to Air Com

2. Which Type of RBCA Analysis?

○ Tier 1 Risk-Based Screening Levels
● Tier 2/3 Site-Specific Target Levels

3. Calculation Options

Affects which input data are required

☑ *Baseline Risks (Forward mode)*
☑ *RBCA Cleanup Levels (Backward mode)*
○ Individual Constituent Risk Goals Only
● Individual and Cumulative Risk Goals

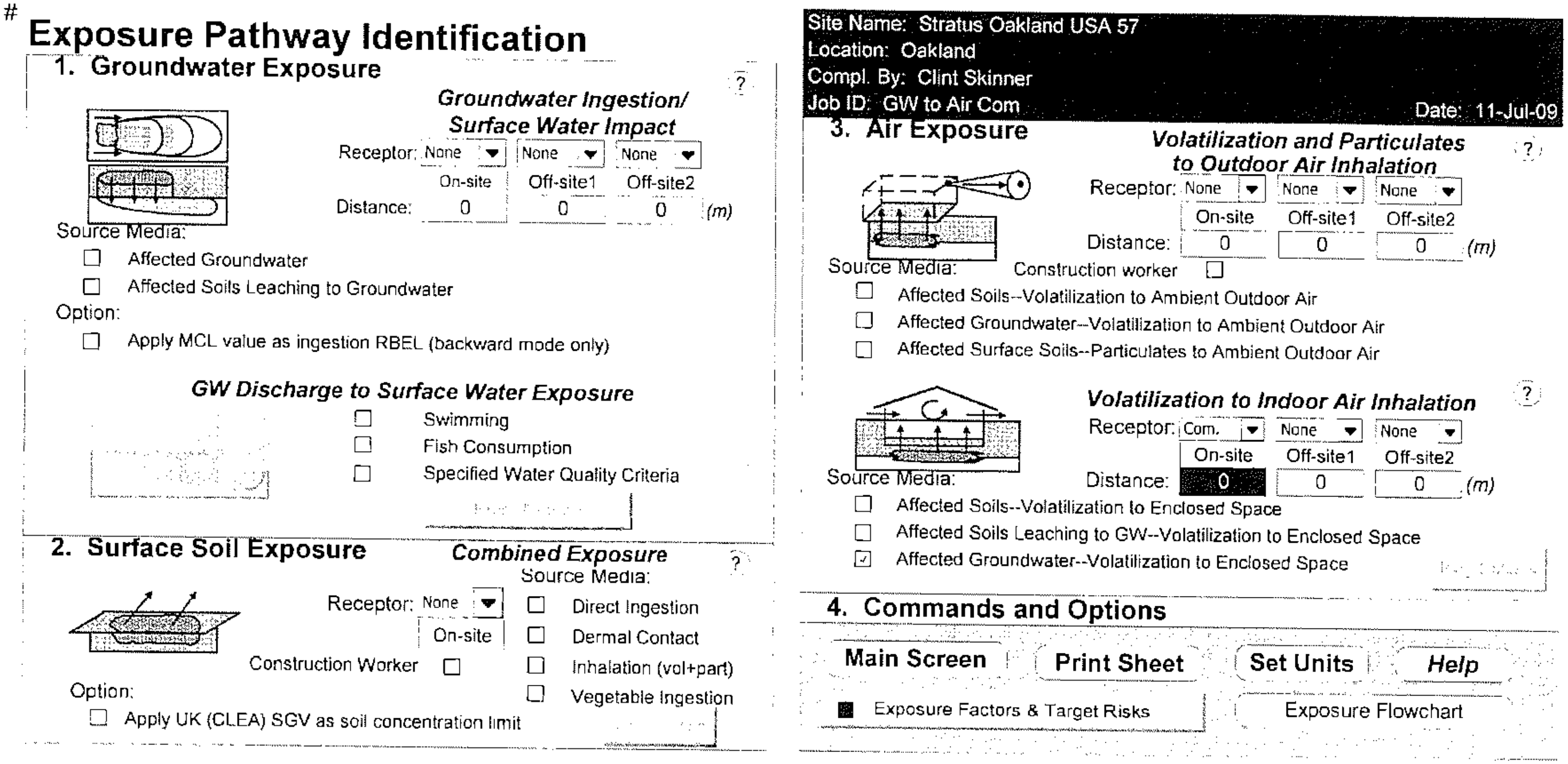
☐ Apply Source Depletion Algorithm
Time to Future Exposure 0 (yr)

4. RBCA Evaluation Process

Prepare Input Data
Data Complete? (▩= yes, ▩= no)

5. Commands and Options

RBCA Tool Kit for Chemical Releases, Version 2.51



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Exposure Pathway Identification

Site Name: Stratus Oakland USA 57
Location: Oakland
Compl. By: Clint Skinner
Job ID: GW to Air Com
Date: 11-Jul-09

1. Groundwater Exposure

Groundwater Ingestion/ Surface Water Impact

	On-site	Off-site1	Off-site2	
Receptor:	None	None	None	
Distance:	0	0	0	(m)

Source Media:
- ☐ Affected Groundwater
- ☐ Affected Soils Leaching to Groundwater

Option:
- ☐ Apply MCL value as ingestion RBEL (backward mode only)

GW Discharge to Surface Water Exposure

- ☐ Swimming
- ☐ Fish Consumption
- ☐ Specified Water Quality Criteria

2. Surface Soil Exposure

Combined Exposure

Receptor: None
On-site
Construction Worker ☐

Source Media:
- ☐ Direct Ingestion
- ☐ Dermal Contact
- ☐ Inhalation (vol+part)
- ☐ Vegetable Ingestion

Option:
- ☐ Apply UK (CLEA) SGV as soil concentration limit

3. Air Exposure

Volatilization and Particulates to Outdoor Air Inhalation

	On-site	Off-site1	Off-site2	
Receptor:	None	None	None	
Distance:	0	0	0	(m)

Construction worker ☐

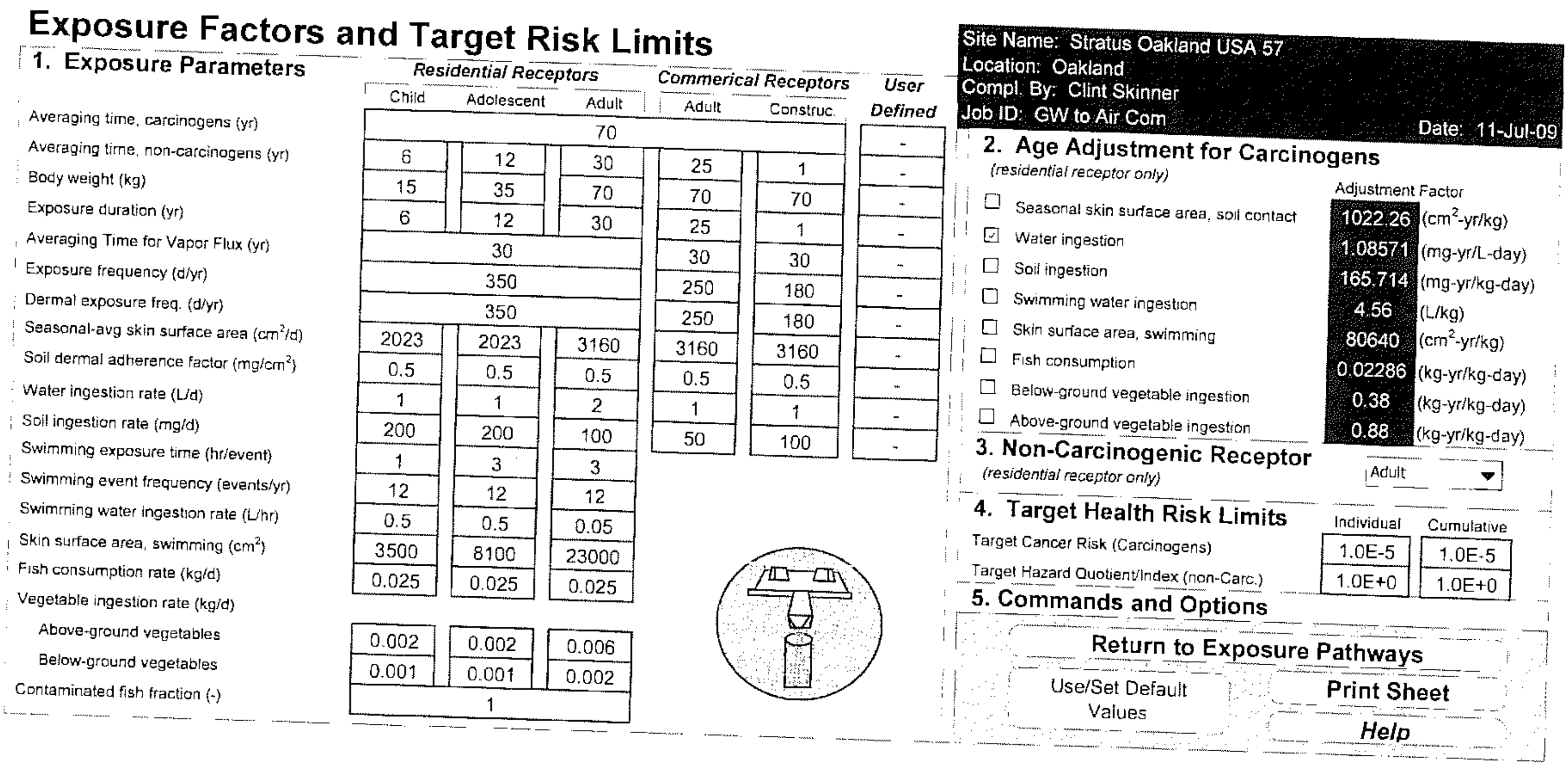
Source Media:
- ☐ Affected Soils--Volatilization to Ambient Outdoor Air
- ☐ Affected Groundwater--Volatilization to Ambient Outdoor Air
- ☐ Affected Surface Soils--Particulates to Ambient Outdoor Air

Volatilization to Indoor Air Inhalation

	On-site	Off-site1	Off-site2	
Receptor:	Com.	None	None	
Distance:	0	0	0	(m)

Source Media:
- ☐ Affected Soils--Volatilization to Enclosed Space
- ☐ Affected Soils Leaching to GW--Volatilization to Enclosed Space
- ☑ Affected Groundwater--Volatilization to Enclosed Space

4. Commands and Options



Exposure Factors and Target Risk Limits

Site Name: Stratus Oakland USA 57
Location: Oakland
Compl. By: Clint Skinner
Job ID: GW to Air Com
Date: 11-Jul-09

1. Exposure Parameters

	Residential Receptors			Commerical Receptors		User
	Child	Adolescent	Adult	Adult	Construc.	Defined
Averaging time, carcinogens (yr)	70					-
Averaging time, non-carcinogens (yr)	6	12	30	25	1	-
Body weight (kg)	15	35	70	70	70	-
Exposure duration (yr)	6	12	30	25	1	-
Averaging Time for Vapor Flux (yr)	30			30	30	-
Exposure frequency (d/yr)	350			250	180	-
Dermal exposure freq. (d/yr)	350			250	180	-
Seasonal-avg skin surface area (cm^2/d)	2023	2023	3160	3160	3160	-
Soil dermal adherence factor (mg/cm^2)	0.5	0.5	0.5	0.5	0.5	-
Water ingestion rate (L/d)	1	1	2	1	1	-
Soil ingestion rate (mg/d)	200	200	100	50	100	-
Swimming exposure time (hr/event)	1	3	3			
Swimming event frequency (events/yr)	12	12	12			
Swimming water ingestion rate (L/hr)	0.5	0.5	0.05			
Skin surface area, swimming (cm^2)	3500	8100	23000			
Fish consumption rate (kg/d)	0.025	0.025	0.025			
Vegetable ingestion rate (kg/d)						
Above-ground vegetables	0.002	0.002	0.006			
Below-ground vegetables	0.001	0.001	0.002			
Contaminated fish fraction (-)	1					

2. Age Adjustment for Carcinogens

(residential receptor only)

	Adjustment Factor	
☐ Seasonal skin surface area, soil contact	1022.26	(cm^2-yr/kg)
☑ Water ingestion	1.08571	(mg-yr/L-day)
☐ Soil ingestion	165.714	(mg-yr/kg-day)
☐ Swimming water ingestion	4.56	(L/kg)
☐ Skin surface area, swimming	80640	(cm^2-yr/kg)
☐ Fish consumption	0.02286	(kg-yr/kg-day)
☐ Below-ground vegetable ingestion	0.38	(kg-yr/kg-day)
☐ Above-ground vegetable ingestion	0.88	(kg-yr/kg-day)

3. Non-Carcinogenic Receptor

(residential receptor only)

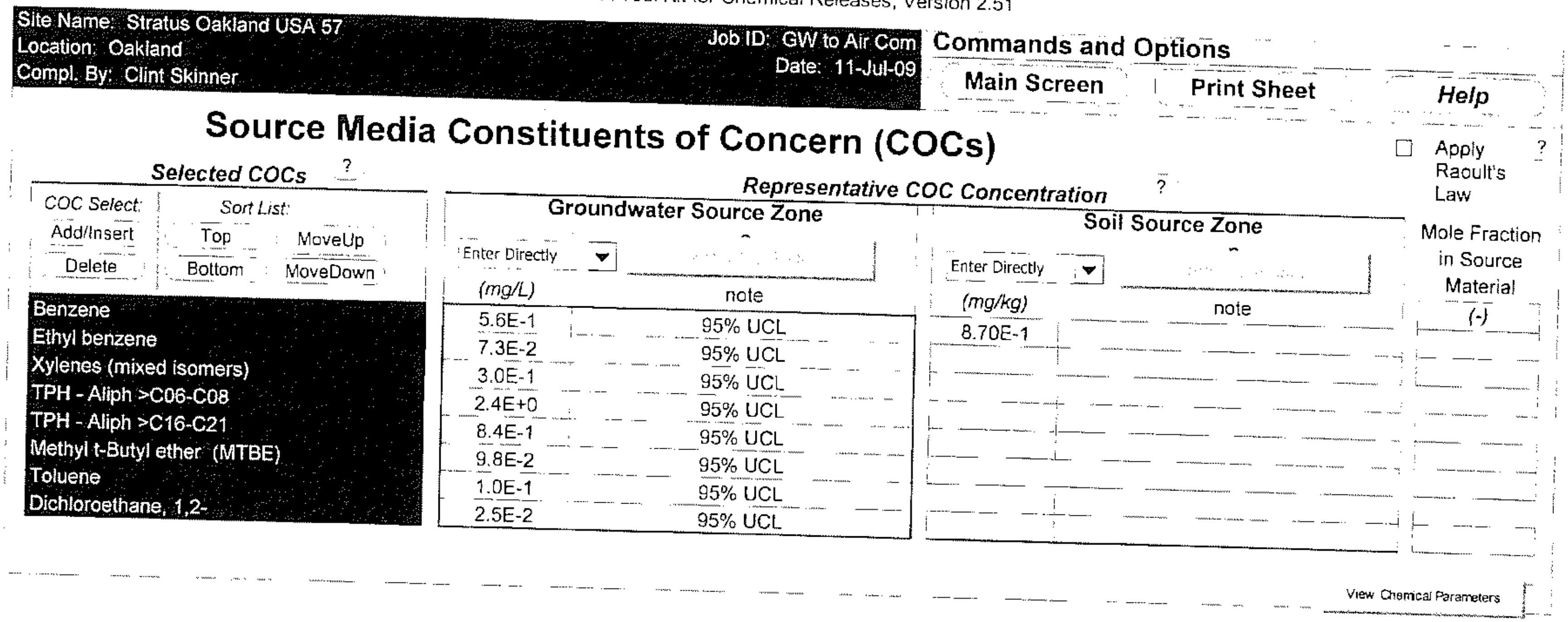
Adult ▼

4. Target Health Risk Limits

	Individual	Cumulative
Target Cancer Risk (Carcinogens)	1.0E-5	1.0E-5
Target Hazard Quotient/Index (non-Carc.)	1.0E+0	1.0E+0

5. Commands and Options

RBCA Tool Kit for Chemical Releases, Version 2.51



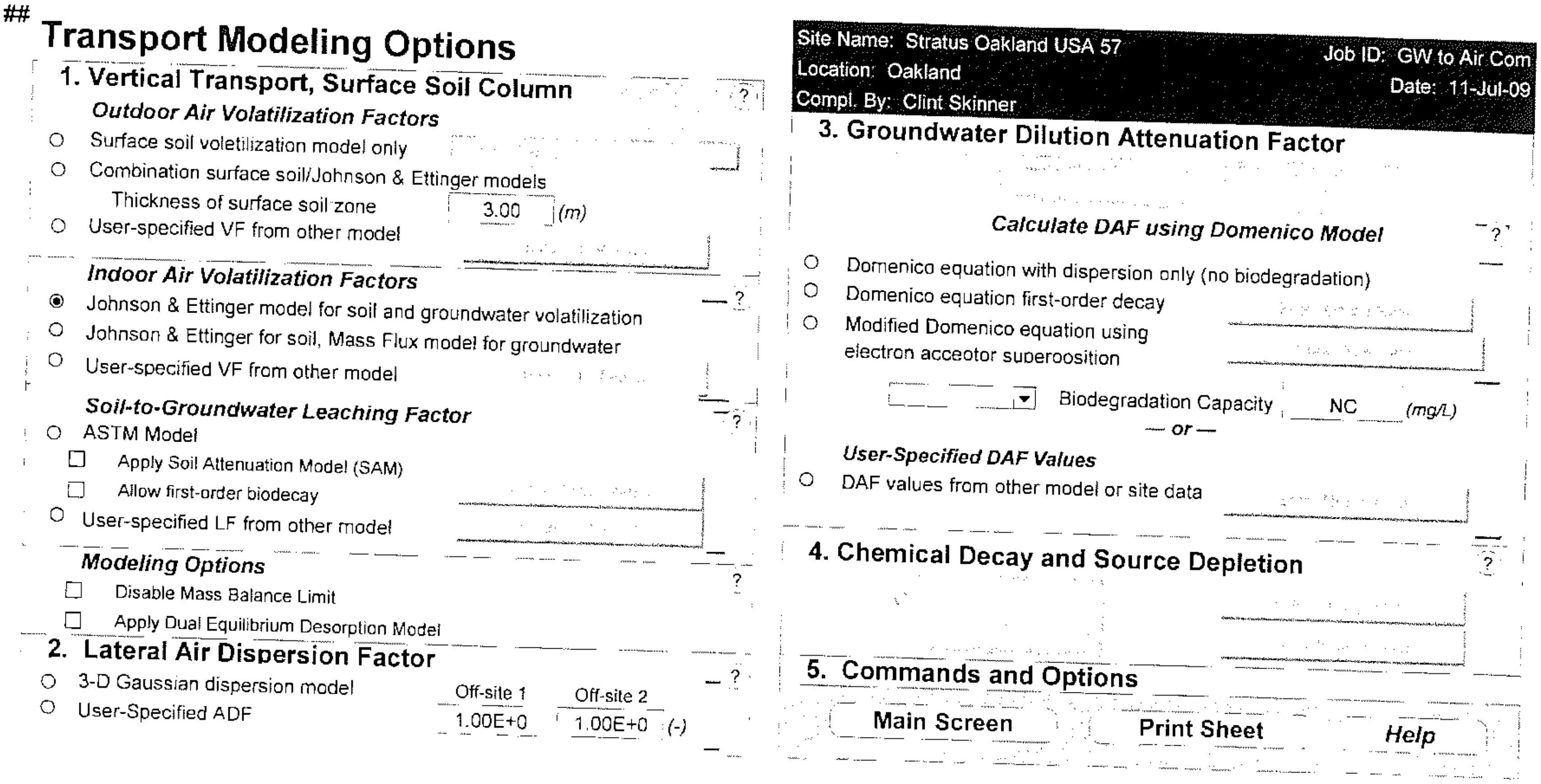
Site Name: Stratus Oakland USA 57
Location: Oakland
Compl. By: Clint Skinner

Job ID: GW to Air Com
Date: 11-Jul-09

Source Media Constituents of Concern (COCs)

☐ Apply Raoult's Law

Selected COCs	Representative COC Concentration: Groundwater Source Zone (mg/L)	note	Soil Source Zone (mg/kg)	note	Mole Fraction in Source Material (-)
Benzene	5.6E-1	95% UCL	8.70E-1		
Ethyl benzene	7.3E-2	95% UCL			
Xylenes (mixed isomers)	3.0E-1	95% UCL			
TPH - Aliph >C06-C08	2.4E+0	95% UCL			
TPH - Aliph >C16-C21	8.4E-1	95% UCL			
Methyl t-Butyl ether (MTBE)	9.8E-2	95% UCL			
Toluene	1.0E-1	95% UCL			
Dichloroethane, 1,2-	2.5E-2	95% UCL			



Transport Modeling Options

Site Name: Stratus Oakland USA 57
Location: Oakland
Compl. By: Clint Skinner
Job ID: GW to Air Com
Date: 11-Jul-09

1. Vertical Transport, Surface Soil Column

Outdoor Air Volatilization Factors

- ○ Surface soil voletilization model only
- ○ Combination surface soil/Johnson & Ettinger models
  - Thickness of surface soil zone 3.00 *(m)*
- ○ User-specified VF from other model

Indoor Air Volatilization Factors

- ● Johnson & Ettinger model for soil and groundwater volatilization
- ○ Johnson & Ettinger for soil, Mass Flux model for groundwater
- ○ User-specified VF from other model

Soil-to-Groundwater Leaching Factor

- ○ ASTM Model
  - ☐ Apply Soil Attenuation Model (SAM)
  - ☐ Allow first-order biodecay
- ○ User-specified LF from other model

Modeling Options

- ☐ Disable Mass Balance Limit
- ☐ Apply Dual Equilibrium Desorption Model

2. Lateral Air Dispersion Factor

- ○ 3-D Gaussian dispersion model
- ○ User-Specified ADF

	Off-site 1	Off-site 2	
	1.00E+0	1.00E+0	(-)

3. Groundwater Dilution Attenuation Factor

Calculate DAF using Domenico Model

- ○ Domenico equation with dispersion only (no biodegradation)
- ○ Domenico equation first-order decay
- ○ Modified Domenico equation using electron acceotor suoeroosition

Biodegradation Capacity NC *(mg/L)*

— *or* —

User-Specified DAF Values

- ○ DAF values from other model or site data

4. Chemical Decay and Source Depletion

5. Commands and Options

Main Screen | Print Sheet | *Help*

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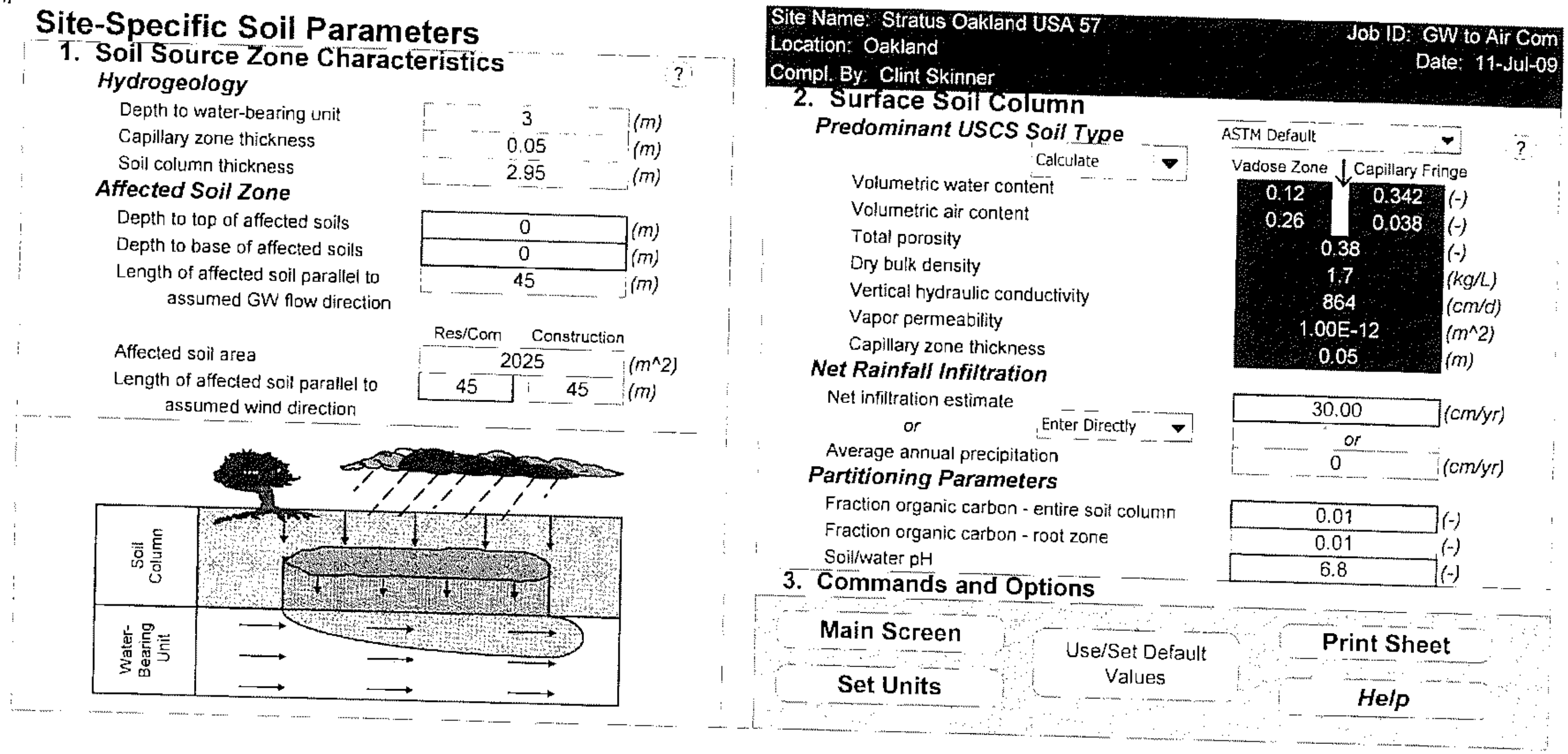


Site-Specific Soil Parameters

Site Name: Stratus Oakland USA 57
Location: Oakland
Compl. By: Clint Skinner
Job ID: GW to Air Com
Date: 11-Jul-09

1. Soil Source Zone Characteristics

Hydrogeology

Depth to water-bearing unit	3	(m)
Capillary zone thickness	0.05	(m)
Soil column thickness	2.95	(m)

Affected Soil Zone

Depth to top of affected soils	0		(m)
Depth to base of affected soils	0		(m)
Length of affected soil parallel to assumed GW flow direction	45		(m)
	Res/Com	Construction	
Affected soil area	2025		(m^2)
Length of affected soil parallel to assumed wind direction	45	45	(m)

2. Surface Soil Column

Predominant USCS Soil Type ASTM Default

Calculate

	Vadose Zone	Capillary Fringe	
Volumetric water content	0.12	0.342	(-)
Volumetric air content	0.26	0.038	(-)
Total porosity	0.38		(-)
Dry bulk density	1.7		(kg/L)
Vertical hydraulic conductivity	864		(cm/d)
Vapor permeability	1.00E-12		(m^2)
Capillary zone thickness	0.05		(m)

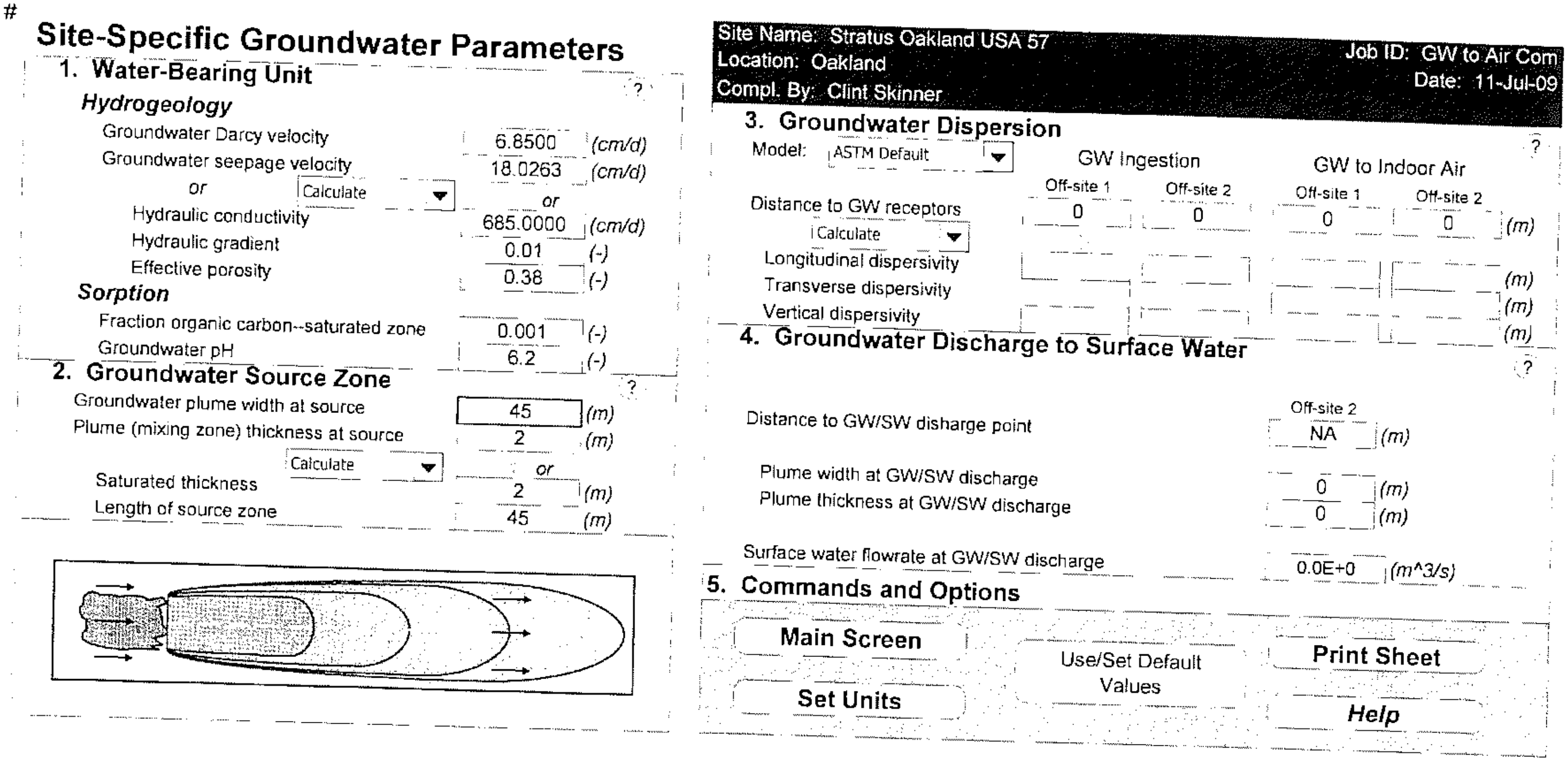
Net Rainfall Infiltration

Net infiltration estimate	30.00	(cm/yr)
or Enter Directly	or	
Average annual precipitation	0	(cm/yr)

Partitioning Parameters

Fraction organic carbon - entire soil column	0.01	(-)
Fraction organic carbon - root zone	0.01	(-)
Soil/water pH	6.8	(-)

3. Commands and Options



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Site-Specific Groundwater Parameters

Site Name: Stratus Oakland USA 57
Location: Oakland
Compl. By: Clint Skinner
Job ID: GW to Air Com
Date: 11-Jul-09

1. Water-Bearing Unit

Hydrogeology

Groundwater Darcy velocity	6.8500	(cm/d)
Groundwater seepage velocity	18.0263	(cm/d)
or Calculate	or	
Hydraulic conductivity	685.0000	(cm/d)
Hydraulic gradient	0.01	(-)
Effective porosity	0.38	(-)

Sorption

Fraction organic carbon--saturated zone	0.001	(-)
Groundwater pH	6.2	(-)

2. Groundwater Source Zone

Groundwater plume width at source	45	(m)
Plume (mixing zone) thickness at source	2	(m)
Calculate	or	
Saturated thickness	2	(m)
Length of source zone	45	(m)

3. Groundwater Dispersion

Model: ASTM Default

	GW Ingestion		GW to Indoor Air		
	Off-site 1	Off-site 2	Off-site 1	Off-site 2	
Distance to GW receptors	0	0	0	0	(m)
Calculate					
Longitudinal dispersivity					(m)
Transverse dispersivity					(m)
Vertical dispersivity					(m)

4. Groundwater Discharge to Surface Water

	Off-site 2	
Distance to GW/SW disharge point	NA	(m)
Plume width at GW/SW discharge	0	(m)
Plume thickness at GW/SW discharge	0	(m)
Surface water flowrate at GW/SW discharge	0.0E+0	(m^3/s)

5. Commands and Options

Site-Specific Air Parameters

Site Name: Stratus Oakland USA 57
Location: Oakland
Compl. By: Clint Skinner
Job ID: GW to Air Com
Date: 11-Jul-09

1. Outdoor Air Pathway

User Defined Volatilization Factor Used
User Defined Air Dispersion Factor Used

	Off-site 1	Off-site 2	
Dispersion in Air			
Distance to offsite air receptor	0	0	(m)
Horizontal dispersivity	0	0	*(m)*
Vertical dispersivity	0	0	*(m)*
Air Source Zone			
Air mixing zone height	2		*(m)*
Ambient air velocity in mixing zone	2.25		*(m/s)*
Inverse mean conc. [O/C term]	79.25		
Particulate Emissions	*Model: ASTM Model*		
Particulate Emission Factor	0		*(kg/m^3)*
or			
Areal particulate emission flux	6.9E-14		*(g/cm^2/s)*
Fraction vegetative cover	0.5		*(-)*
Mean annual air velocity @ 7 m	4.8		
Equivalent 7m air vel. threshold	11.32		*(m/s)*
Windspeed function [F(x) term]	0.223841466		*(-)*

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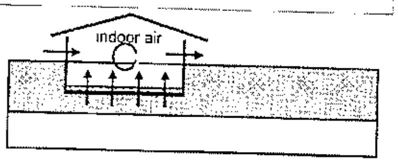

2. Indoor Air Pathway

User Defined Volatilization Factor Used

	Residential	Commercial	
Building volume/area ratio	2	3	*(m)*
Foundation area	70	70	*(m^2)*
Foundation perimeter	49	34	*(m)*
Building air exchange rate	1.4E-4	2.3E-4	*(1/s)*
Depth to bottom of foundation slab	0.15	0.15	*(m)*
Convective air flow through cracks	0.0E+0	0.0E+0	*(m^3/s)*
Foundation thickness	0.15		*(m)*
Foundation crack fraction	0.001		*(-)*
Volumetric water content of cracks	0.12		*(-)*
Volumetric air content of cracks	0.26		*(-)*
Indoor/Outdoor differential pressure	0		*(g/cm/s^2)*
Building Volume	451	451	*(m^3)*
Building Width Perpendicular to GW flow	9.61	9.61	*(m)*
Building Length Parallel to GW flow	9.61	9.61	*(m)*
Saturated Soil Zone Porosity	0.38		*(-)*
Vertical Dispersivity	0.006		*(m)*
Groundwater Seepage Velocity	1.8E+01		*(cm/d)*

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3. Commands and Options

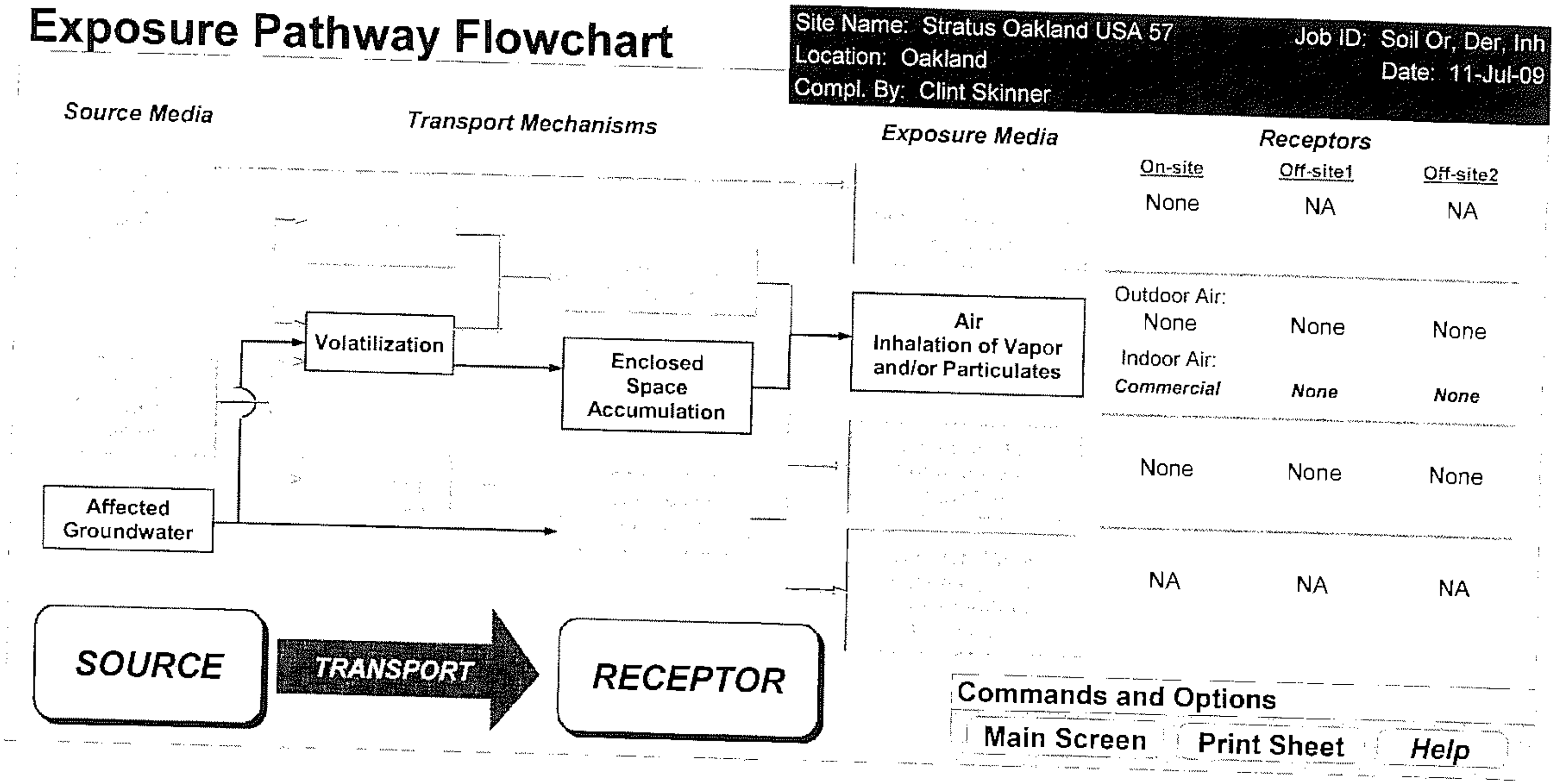
Main Screen

Set Units

Use/Set Default Values

Print Sheet

Help



Exposure Pathway Flowchart

Site Name: Stratus Oakland USA 57
Location: Oakland
Compl. By: Clint Skinner
Job ID: Soil Or, Der, Inh
Date: 11-Jul-09

Exposure Media	On-site	Off-site1	Off-site2
	None	NA	NA
Air Inhalation of Vapor and/or Particulates	Outdoor Air: None	None	None
	Indoor Air: *Commercial*	*None*	*None*
	None	None	None
	NA	NA	NA

RBCA SITE ASSESSMENT

TIER 2 EXPOSURE CONCENTRATION AND INTAKE CALCULATION

INDOOR AIR EXPOSURE PATHWAYS ☐ (Checked if Pathway is Complete)

SOILS : VAPOR
INTRUSION INTO BUILDINGS

Constituents of Concern	1) Source Medium	2) NAF Value (L/kg) Receptor	3) Exposure Medium Indoor Air: POE Conc. (mg/m^3) (1) / (2)	4) Exposure Multiplier (EFxED)/(ATx365) (unitless)	5) Average Inhalation Exposure Concentration (mg/m^3) (3) X (4)
	Soil Conc. (mg/kg)	On-site (0 m) None	On-site (0 m) None	On-site (0 m) None	On-site (0 m) None
Benzene	8.7E-1				
Ethyl benzene					
Xylenes (mixed isomers)					
TPH - Aliph >C06-C08					
TPH - Aliph >C16-C21					
Methyl t-Butyl ether (MTBE)					
Toluene					
Dichloroethane, 1,2-					

* = Chemical with user-specified data

NOTE: AT = Averaging time (days) EF = Exposure frequency (days/yr) ED = Exposure duration (yr) NAF = Natural attenuation factor POE = Point of exposure

Site Name: Stratus Oakland USA 57
Site Location: Oakland
Completed By: Clint Skinner

Date Completed: 11-Jul-09
Job ID: GW to Air Com

RBCA SITE ASSESSMENT

TIER 2 EXPOSURE CONCENTRATION AND INTAKE CALCULATION

INDOOR AIR EXPOSURE PATHWAYS ■ (Checked if Pathway is Complete)

GROUNDWATER: VAPOR INTRUSION INTO BUILDINGS

Exposure Concentration

	1) Source Medium	2) NAF Value (m^3/L) Receptor			3) Exposure Medium Indoor Air: POE Conc. (mg/m^3) (1) / (2)		
Constituents of Concern	Groundwater Conc. (mg/L)	On-site (0 m) Commercial	Off-site 1 (0 m) None	Off-site 2 (0 m) None	On-site (0 m) None	Off-site 1 (0 m) None	Off-site 2 (0 m) None
Benzene	5.6E-1	7.5E+2			7.4E-4		
Ethyl benzene	7.3E-2	6.2E+2			1.2E-4		
Xylenes (mixed isomers)	3.0E-1	7.0E+2			4.3E-4		
TPH - Aliph >C06-C08	2.4E+0	3.4E+0			7.3E-1		
TPH - Aliph >C16-C21	8.4E-1	3.3E-2			2.5E+1		
Methyl t-Butyl ether (MTBE)	9.8E-2	7.0E+3			1.4E-5		
Toluene	1.0E-1	6.4E+2			1.6E-4		
Dichloroethane, 1,2-	2.5E-2	2.6E+3			9.7E-6		

NOTE: AT = Averaging time (days) EF = Exposure frequency (days/yr) ED = Exposure duration (yr) NAF = Natural attenuation factor POE = Point of exposure

Site Name: Stratus Oakland USA 57
Site Location: Oakland
Completed By: Clint Skinner

Date Completed: 11-Jul-09
Job ID: GW to Air Com

RBCA SITE ASSESSMENT

TIER 2 EXPOSURE CONCENTRATION AND INTAKE CALCULATION

INDOOR AIR EXPOSURE PATHWAYS

GROUNDWATER: VAPOR INTRUSION
INTO BUILDINGS

	4) Exposure Multiplier (EFxED)/(ATx365) (unitless)			5) Average Inhalation Exposure Concentration (mg/m^3) (3) X (4)		
Constituents of Concern	On-site (0 m) None	Off-site 1 (0 m) None	Off-site 2 (0 m) None	On-site (0 m) None	Off-site 1 (0 m) None	Off-site 2 (0 m) None
Benzene	2.4E-1			1.8E-4		
Ethyl benzene	6.8E-1			8.0E-5		
Xylenes (mixed isomers)	6.8E-1			3.0E-4		
TPH - Aliph >C06-C08	6.8E-1			5.0E-1		
TPH - Aliph >C16-C21	6.8E-1			1.7E+1		
Methyl t-Butyl ether (MTBE)	2.4E-1			3.4E-6		
Toluene	6.8E-1			1.1E-4		
Dichloroethane, 1,2-	2.4E-1			2.4E-6		

* = Chemical with user-specified data

NOTE: AT = Averaging time (days) EF = Exposure frequency (days/yr) ED = Exposure duration (yr) NAF = Natural attenuation factor POE = Point of exposure

Site Name: Stratus Oakland USA 57
Site Location: Oakland
Completed By: Clint Skinner

Date Completed: 11-Jul-09
Job ID: GW to Air Com

RBCA SITE ASSESSMENT

TIER 2 EXPOSURE CONCENTRATION AND INTAKE CALCULATION

INDOOR AIR EXPOSURE PATHWAYS ☐ (Checked if Pathway is Complete)

SOIL LEACHING TO GW- VAPOR INTRUSION INTO BUILDINGS

Exposure Concentration

	1) Source Medium	2) NAF Value (m^3/L) Receptor			3) Exposure Medium Indoor Air: POE Conc. (mg/m^3) (1) / (2)		
		On-site (0 m)	Off-site 1 (0 m)	Off-site 2 (0 m)	On-site (0 m)	Off-site 1 (0 m)	Off-site 2 (0 m)
Constituents of Concern	Soil Conc. (mg/kg)	None	None	None	None	None	None
Benzene	8.7E-1						
Ethyl benzene							
Xylenes (mixed isomers)							
TPH - Aliph >C06-C08							
TPH - Aliph >C16-C21							
Methyl t-Butyl ether (MTBE)							
Toluene							
Dichloroethane, 1,2-							

NOTE: AT = Averaging time (days) EF = Exposure frequency (days/yr) ED = Exposure duration (yr) NAF = Natural attenuation factor POE = Point of exposure

Site Name: Stratus Oakland USA 57
Site Location: Oakland
Completed By: Clint Skinner

Date Completed: 11-Jul-09
Job ID: GW to Air Com

RBCA SITE ASSESSMENT

TIER 2 EXPOSURE CONCENTRATION AND INTAKE CALCULATION

INDOOR AIR EXPOSURE PATHWAYS

SOIL LEACHING TO GW- VAPOR INTRUSION INTO BUILDINGS

	4) Exposure Multiplier (EFxED)/(ATx365) (unitless)			5) Average Inhalation Exposure Concentration (mg/m^3) (3) X (4)		
	On-site (0 m)	Off-site 1 (0 m)	Off-site 2 (0 m)	On-site (0 m)	Off-site 1 (0 m)	Off-site 2 (0 m)
Constituents of Concern	None	None	None	None	None	None
Benzene						
Ethyl benzene						
Xylenes (mixed isomers)						
TPH - Aliph >C06-C08						
TPH - Aliph >C16-C21						
Methyl t-Butyl ether (MTBE)						
Toluene						
Dichloroethane, 1,2-						

* = Chemical with user-specified data

NOTE: AT = Averaging time (days) EF = Exposure frequency (days/yr) ED = Exposure duration (yr) NAF = Natural attenuation factor POE = Point of exposure

Site Name: Stratus Oakland USA 57
Site Location: Oakland
Completed By: Clint Skinner

Date Completed: 11-Jul-09
Job ID: GW to Air Com

RBCA SITE ASSESSMENT

TIER 2 EXPOSURE CONCENTRATION AND INTAKE CALCULATION

INDOOR AIR EXPOSURE PATHWAYS

MAXIMUM PATHWAY EXPOSURE (mg/m^3)

(Maximum average exposure concentration from soil and groundwater routes.)

Constituents of Concern	On-site (0 m) Commercial	Off-site 1 (0 m) None	Off-site 2 (0 m) None
Benzene	1.8E-4		
Ethyl benzene	8.0E-5		
Xylenes (mixed isomers)	3.0E-4		
TPH - Aliph >C06-C08	5.0E-1		
TPH - Aliph >C16-C21	1.7E+1		
Methyl t-Butyl ether (MTBE)	3.4E-6		
Toluene	1.1E-4		
Dichloroethane, 1,2-	2.4E-6		

Site Name: Stratus Oakland USA 57
Site Location: Oakland
Completed By: Clint Skinner

Date Completed: 11-Jul-09
Job ID: GW to Air Com

RBCA SITE ASSESSMENT

TIER 2 PATHWAY RISK CALCULATION

INDOOR AIR EXPOSURE PATHWAYS ■ **(Checked if Pathway is Complete)**

CARCINOGENIC RISK

	(1) Carcinogenic Classification	(2) Maximum Carcinogenic Exposure (mg/m^3)			(3) Inhalation Unit Risk Factor	(4) Individual COC Risk (2) x (3) x 1000		
Constituents of Concern		On-site (0 m) Commercial	Off-site 1 (0 m) None	Off-site 2 (0 m) None	(µg/m^3)^-1	On-site (0 m) Commercial	Off-site 1 (0 m) None	Off-site 2 (0 m) None
Benzene	TRUE	1.8E-4	-	-	2.2E-6	4.0E-7		
Ethyl benzene	FALSE	-	-	-	-			
Xylenes (mixed isomers)	FALSE	-	-	-	-			
TPH - Aliph >C06-C08	FALSE	-	-	-	-			
TPH - Aliph >C16-C21	FALSE	-	-	-	-			
Methyl t-Butyl ether (MTBE)	TRUE	3.4E-6	-	-	2.6E-7	8.9E-10		
Toluene	FALSE	-	-	-	-			
Dichloroethane, 1,2-	TRUE	2.4E-6	-	-	2.6E-5	6.2E-8		

Total Pathway Carcinogenic Risk = **4.6E-7**

Site Name: Stratus Oakland USA 57
Site Location: Oakland
Completed By: Clint Skinner

Date Completed: 11-Jul-09
Job ID: GW to Air Com

RBCA SITE ASSESSMENT

TIER 2 PATHWAY RISK CALCULATION

INDOOR AIR EXPOSURE PATHWAYS ☒ **(Checked if Pathway is Complete)**

TOXIC EFFECTS

	(5) Maximum Toxicant Exposure (mg/m^3)			(6) Inhalation Reference Concentration	(7) Individual COC Hazard Quotient (5) / (6)		
Constituents of Concern	On-site (0 m) Commercial	Off-site 1 (0 m) None	Off-site 2 (0 m) None	(mg/m^3)	On-site (0 m) Commercial	Off-site 1 (0 m) None	Off-site 2 (0 m) None
Benzene	5.1E-4			2.8E-1	1.8E-3		
Ethyl benzene	8.0E-5			1.0E+0	8.0E-5		
Xylenes (mixed isomers)	3.0E-4			1.0E-1	3.0E-3		
TPH - Aliph >C06-C08	5.0E-1			1.8E+1	2.8E-2		
TPH - Aliph >C16-C21	1.7E+1			-			
Methyl t-Butyl ether (MTBE)	9.6E-6			3.0E+0	3.2E-6		
Toluene	1.1E-4			5.0E+0	2.2E-5		
Dichloroethane, 1,2-	6.7E-6			2.4E+0	2.7E-6		

Total Pathway Hazard Index = 3.2E-2

Site Name: Stratus Oakland USA 57
Site Location: Oakland
Completed By: Clint Skinner

Date Completed: 11-Jul-09
Job ID: GW to Air Com

RBCA SITE ASSESSMENT | **Baseline Risk Summary-All Pathways**

Site Name: Stratus Oakland USA 57
Site Location: Oakland

Completed By: Clint Skinner
Date Completed: 11-Jul-09

BASELINE RISK SUMMARY TABLE

	BASELINE CARCINOGENIC RISK					BASELINE TOXIC EFFECTS				
	Individual COC Risk		Cumulative COC Risk		Risk Limit(s) Exceeded?	Hazard Quotient		Hazard Index		Toxicity Limit(s) Exceeded?
EXPOSURE PATHWAY	Maximum Value	Target Risk	Total Value	Target Risk		Maximum Value	Applicable Limit	Total Value	Applicable Limit	
OUTDOOR AIR EXPOSURE PATHWAYS										
☐	NA	NA	NA	NA	☐	NA	NA	NA	NA	☐
INDOOR AIR EXPOSURE PATHWAYS										
■	4.0E-7	1.0E-5	4.6E-7	1.0E-5	☐	2.8E-2	1.0E+0	3.2E-2	1.0E+0	☐
SOIL EXPOSURE PATHWAYS										
☐	NA	NA	NA	NA	☐	NA	NA	NA	NA	☐
GROUNDWATER EXPOSURE PATHWAYS										
☐	NA	NA	NA	NA	☐	NA	NA	NA	NA	☐
SURFACE WATER EXPOSURE PATHWAYS										
☐	NA	NA	NA	NA	☐	NA	NA	NA	NA	☐
CRITICAL EXPOSURE PATHWAY (Maximum Values From Complete Pathways)										
	4.0E-7	*1.0E-5*	*4.6E-7*	*1.0E-5*	☐	*2.8E-2*	*1.0E+0*	*3.2E-2*	*1.0E+0*	☐
	Indoor Air		*Indoor Air*			*Indoor Air*		*Indoor Air*		

RBCA SITE ASSESSMENT

Site Name: Stratus Oakland USA 57
Site Location: Oakland

Completed By: Clint Skinner
Date Completed: 11-Jul-09

Job ID: GW to Air Com

1 OF 1

GROUNDWATER SSTL VALUES

Target Risk (Class A & B) 1.0E-5
Target Hazard Quotient 1.0E+0

Groundwater DAF Option:

SSTL Results For Complete Exposure Pathways (Checked if Pathway is Complete)

CONSTITUENTS OF CONCERN		Representative Concentration	☐ Groundwater Ingestion / Discharge to Surface Water			■ Groundwater Volatilization to Indoor Air			☐ Groundwater Volatilization to Outdoor Air			Applicable SSTL	SSTL Exceeded ?	Required CRF
CAS No.	Name	(mg/L)	On-site (0 m) None	Off-site 1 (0 m) None	Off-site 2 (0 m) None	On-site (0 m) Commercial	Off-site 1 (0 m) None	Off-site 2 (0 m) None	On-site (0 m) None	Off-site 1 (0 m) None	Off-site 2 (0 m) None	(mg/L)	"■" if yes	Only if "yes" left
71-43-2	Benzene	5.6E-1				1.4E+1						1.4E+1	☐	<1
100-41-4	Ethyl benzene	7.3E-2				>1.7E+2						>1.7E+2	☐	NA
1330-20-7	Xylenes (mixed isomers)	3.0E-1				1.0E+2						1.0E+2	☐	<1
T-al0608	TPH - Aliph >C06-C08	2.4E+0				>5.4E+0						>5.4E+0	☐	NA
T-al1621	TPH - Aliph >C16-C21	8.4E-1				Tox?						NC	☐	NA
1634-04-4	Methyl t-Butyl ether (MTBE)	9.8E-2				1.1E+3						1.1E+3	☐	<1
108-88-3	Toluene	1.0E-1				>5.3E+2						>5.3E+2	☐	NA
107-06-2	Dichloroethane, 1,2-	2.5E-2				4.0E+0						4.0E+0	☐	<1
NA	Total TPH mixture	3.3E+0	NA	NA	NA	NC	NA	NA	NA	NA	NA	NC	☐	NA

* = Chemical with user-specified data

">" indicates risk-based target concentration greater than constituent solubility value   NA = Not applicable.   NC = Not calculated

RBCA SITE ASSESSMENT | Cumulative Risk Worksheet

Site Name Stratus Oakland USA 57
Site Location Oakland
Completed By: Clint Skinner
Date Completed: 11-Jul-09
Job ID: GW to Air Com
1 OF 3

CUMULATIVE RISK WORKSHEET

CONSTITUENTS OF CONCERN		Representative Concentration		Proposed CRF		Resultant Target Concentration	
CAS No.	Name	Soil (mg/kg)	Groundwater (mg/L)	Soil	GW	Soil (mg/kg)	Groundwater (mg/L)
71-43-2	Benzene		5.6E-1	NA	NA		5.6E-1
100-41-4	Ethyl benzene		7.3E-2	NA	NA		7.3E-2
1330-20-7	Xylenes (mixed isomers)		3.0E-1	NA	NA		3.0E-1
T-al0608	TPH - Aliph >C06-C08		2.4E+0	NA	NA		2.4E+0
T-al1621	TPH - Aliph >C16-C21		8.4E-1	NA	NA		8.4E-1
1634-04-4	Methyl t-Butyl ether (MTBE)		9.8E-2	NA	NA		9.8E-2
108-88-3	Toluene		1.0E-1	NA	NA		1.0E-1
107-06-2	Dichloroethane, 1,2-		2.5E-2	NA	NA		2.5E-2

Cumulative Values:

RBCA SITE ASSESSMENT | Cumulative Risk Worksheet

Site Name: Stratus Oakland USA 57
Site Location: Oakland

Completed By: Clint Skinner
Date Completed: 11-Jul-09

Job ID: GW to Air Com

2 OF 3

CUMULATIVE RISK WORKSHEET

Cumulative Target Risk: 1.0E-5 Target Hazard Index: 1.0E+0

ON-SITE RECEPTORS

		Outdoor Air Exposure: None		Indoor Air Exposure: Commercial		Soil Exposure: None		Groundwater Exposure: None	
CONSTITUENTS OF CONCERN		Target Risk: 1.0E-5	Target HQ: 1.0E+0	Target Risk: 1.0E-5	Target HQ: 1.0E+0	Target Risk: 1.0E-5	Target HQ: 1.0E+0	Target Risk: 1.0E-5	Target HQ: 1.0E+0
CAS No.	Name	Carcinogenic Risk	Hazard Quotient	Carcinogenic Risk	Hazard Quotient	Carcinogenic Risk	Hazard Quotient	Carcinogenic Risk	Hazard Quotient
71-43-2	Benzene			4.0E-7	1.8E-3				
100-41-4	Ethyl benzene				8.0E-5				
1330-20-7	Xylenes (mixed isomers)				3.0E-3				
T-al0608	TPH - Aliph >C06-C08				2.8E-2				
T-al1621	TPH - Aliph >C16-C21								
1634-04-4	Methyl t-Butyl ether (MTBE)			8.9E-10	3.2E-6				
108-88-3	Toluene				2.2E-5				
107-06-2	Dichloroethane, 1,2-			6.2E-8	2.7E-6				
	Cumulative Values:	0.0E+0	0.0E+0	4.6E-7	3.2E-2	0.0E+0	0.0E+0	0.0E+0	0.0E+0

■ indicates risk level exceeding target risk

RBCA SITE ASSESSMENT | **Cumulative Risk Worksheet**

Site Name. Stratus Oakland USA 57
Site Location Oakland

Completed By Clint Skinner
Date Completed. 11-Jul-09

Job ID GW to Air Com

CUMULATIVE RISK WORKSHEET

Cumulative Target Risk. 1.0E-5 Target Hazard Index: 1.0E+0

OFF-SITE RECEPTORS

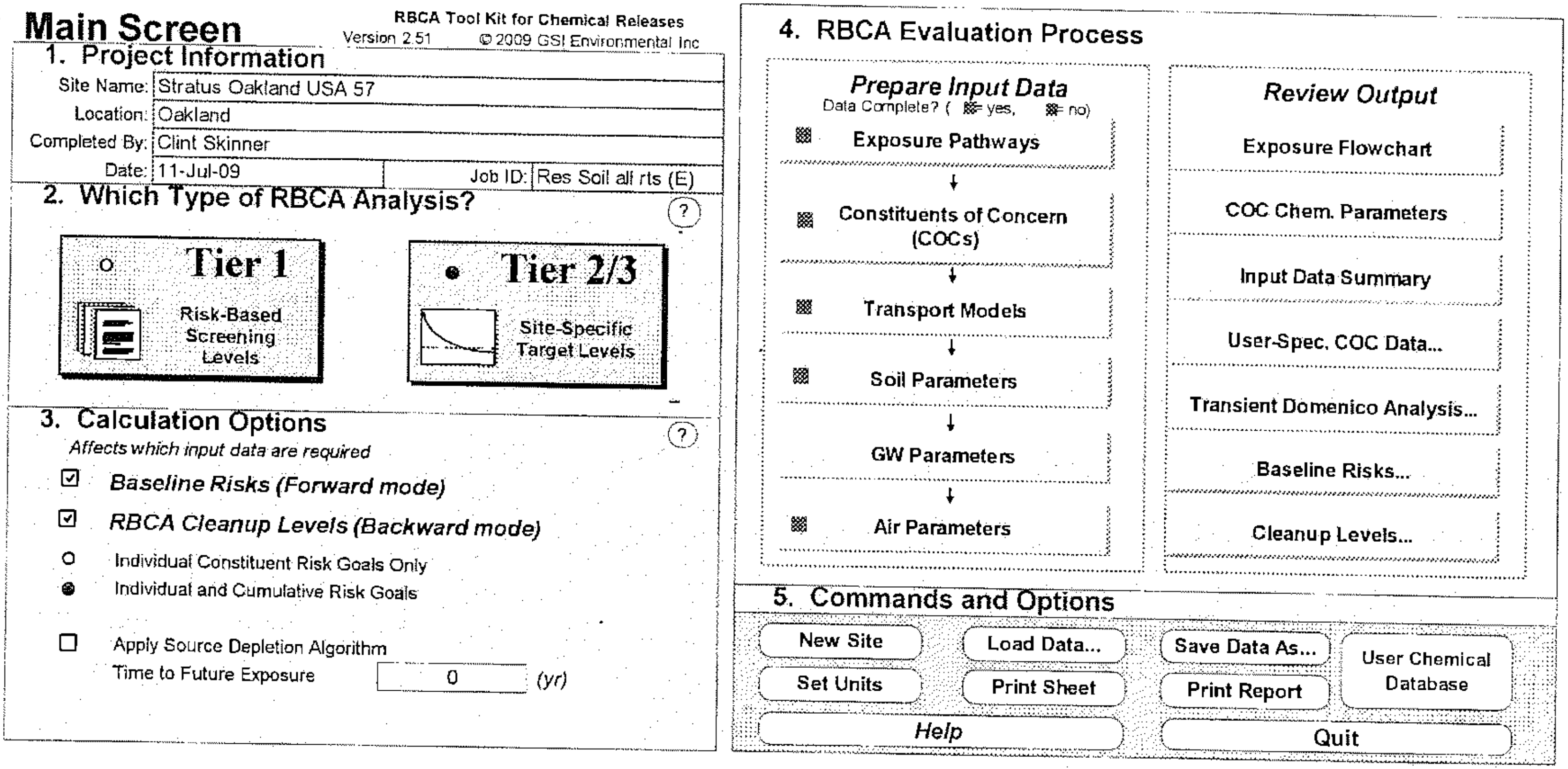
CONSTITUENTS OF CONCERN		Outdoor Air Exposure:				Indoor Air Exposure:				Groundwater Exposure:			
		None		None		None		None		None		None	
		Target Risk: 1.0E-5	Target HQ 1.0E+0	Target Risk 1.0E-5	Target HQ: 1.0E+0	Target Risk: 1.0E-5	Target HQ 1.0E+0	Target Risk. 1.0E-5	Target HQ 1.0E+0	Target Risk: 1.0E-5	Target HQ: 1.0E+0	Target Risk. 1.0E-5	Target HQ 1.0E+0
CAS No.	Name	Carcinogenic Risk	Hazard Quotient	Carcinogenic Risk	Hazard Quotient	Carcinogenic Risk	Hazard Quotient	Carcinogenic Risk	Hazard Quotient	Carcinogenic Risk	Hazard Quotient	Carcinogenic Risk	Hazard Quotient
71-43-2	Benzene												
100-41-4	Ethyl benzene												
1330-20-7	Xylenes (mixed isomers)												
T-al0608	TPH - Aliph >C06-C08												
T-al1621	TPH - Aliph >C16-C21												
1634-04-4	Methyl t-Butyl ether (MTBE)												
108-88-3	Toluene												
107-06-2	Dichloroethane, 1,2-												
	Cumulative Values:	**0.0E+0**	**0.0E+0**	**0.0E+0**	**0.0E+0**	**0.0E+0**	**0.0E+0**	**0.0E+0**	**0.0E+0**	**0.0E+0**	**0.0E+0**	**0.0E+0**	**0.0E+0**

■ indicates risk level exceeding target risk

indicates risk level exceeding target risk

Appendix E: RBCA RESIDENTIAL COMMERCIAL SOIL PRINTOUT

#



Main Screen

RBCA Tool Kit for Chemical Releases
Version 2.51 © 2009 GSI Environmental Inc

1. Project Information

Site Name: Stratus Oakland USA 57
Location: Oakland
Completed By: Clint Skinner
Date: 11-Jul-09
Job ID: Res Soil all rts (E)

2. Which Type of RBCA Analysis?

○ Tier 1 Risk-Based Screening Levels
● Tier 2/3 Site-Specific Target Levels

3. Calculation Options

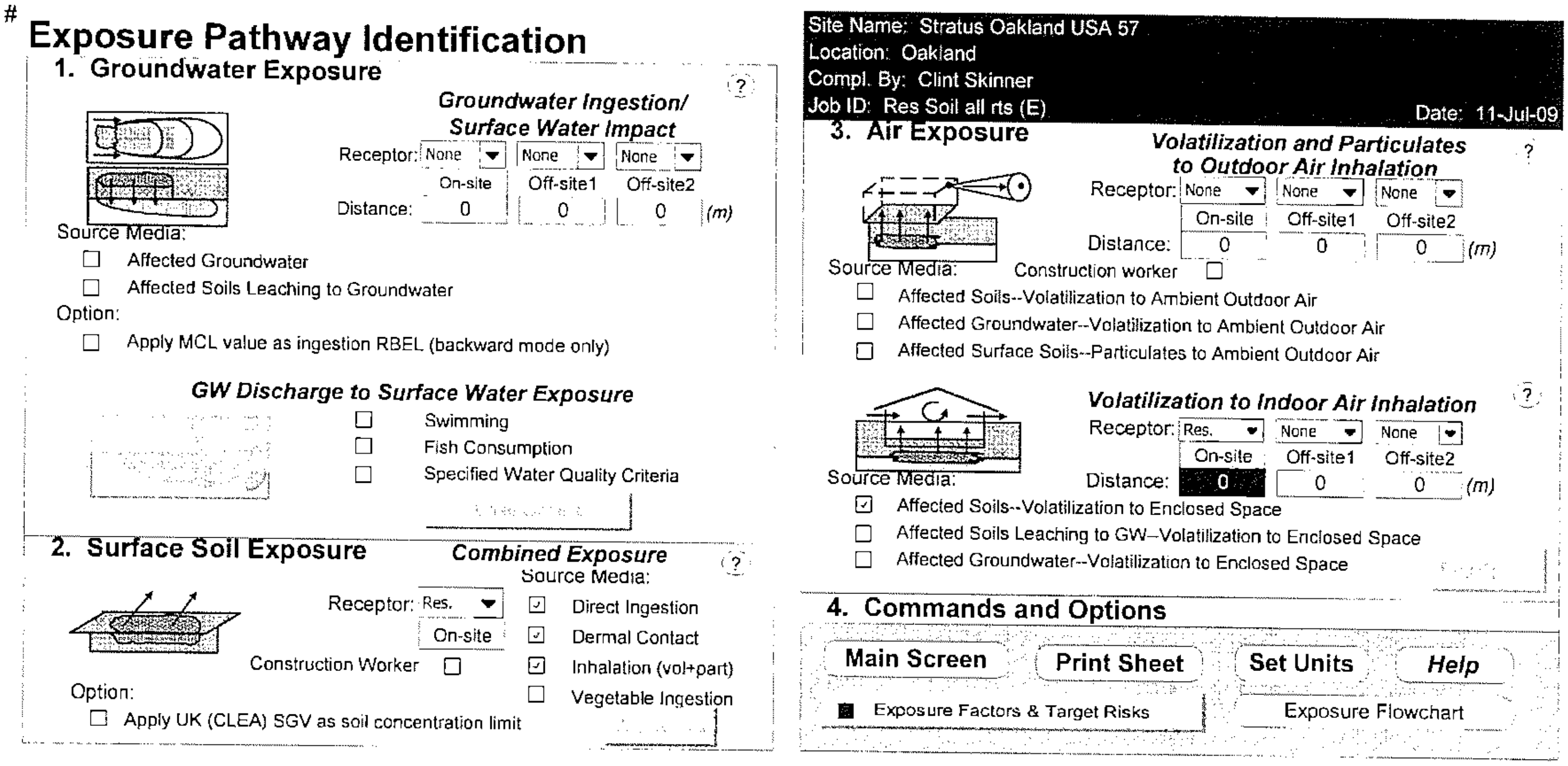
Affects which input data are required

☑ *Baseline Risks (Forward mode)*
☑ *RBCA Cleanup Levels (Backward mode)*
○ Individual Constituent Risk Goals Only
● Individual and Cumulative Risk Goals
☐ Apply Source Depletion Algorithm
Time to Future Exposure 0 *(yr)*

4. RBCA Evaluation Process

Prepare Input Data
Data Complete? (▨= yes, ▨= no)

▨ Exposure Pathways
▨ Constituents of Concern (COCs)
▨ Transport Models
▨ Soil Parameters
GW Parameters
▨ Air Parameters



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Exposure Pathway Identification

Site Name: Stratus Oakland USA 57
Location: Oakland
Compl. By: Clint Skinner
Job ID: Res Soil all rts (E)
Date: 11-Jul-09

1. Groundwater Exposure

Groundwater Ingestion/ Surface Water Impact

	On-site	Off-site1	Off-site2	
Receptor:	None	None	None	
Distance:	0	0	0	(m)

Source Media:
- ☐ Affected Groundwater
- ☐ Affected Soils Leaching to Groundwater

Option:
- ☐ Apply MCL value as ingestion RBEL (backward mode only)

GW Discharge to Surface Water Exposure

- ☐ Swimming
- ☐ Fish Consumption
- ☐ Specified Water Quality Criteria

2. Surface Soil Exposure

Receptor: Res. On-site

Construction Worker ☐

Combined Exposure

Source Media:
- ☑ Direct Ingestion
- ☑ Dermal Contact
- ☑ Inhalation (vol+part)
- ☐ Vegetable Ingestion

Option:
- ☐ Apply UK (CLEA) SGV as soil concentration limit

3. Air Exposure

Volatilization and Particulates to Outdoor Air Inhalation

	On-site	Off-site1	Off-site2	
Receptor:	None	None	None	
Distance:	0	0	0	(m)

Source Media: Construction worker ☐
- ☐ Affected Soils--Volatilization to Ambient Outdoor Air
- ☐ Affected Groundwater--Volatilization to Ambient Outdoor Air
- ☐ Affected Surface Soils--Particulates to Ambient Outdoor Air

Volatilization to Indoor Air Inhalation

	On-site	Off-site1	Off-site2	
Receptor:	Res.	None	None	
Distance:	0	0	0	(m)

Source Media:
- ☑ Affected Soils--Volatilization to Enclosed Space
- ☐ Affected Soils Leaching to GW--Volatilization to Enclosed Space
- ☐ Affected Groundwater--Volatilization to Enclosed Space

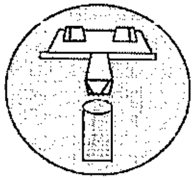
4. Commands and Options

Exposure Factors and Target Risk Limits

Site Name: Stratus Oakland USA 57
Location: Oakland
Compl. By: Clint Skinner
Job ID: Res Soil all rts (E)
Date: 11-Jul-09

1. Exposure Parameters

	Residential Receptors			*Commerical Receptors*		*User Defined*
	Child	Adolescent	Adult	Adult	Construc.	
Averaging time, carcinogens (yr)	70					-
Averaging time, non-carcinogens (yr)	6	12	30	25	1	-
Body weight (kg)	15	35	70	70	70	-
Exposure duration (yr)	6	12	30	25	1	-
Averaging Time for Vapor Flux (yr)	30			30	30	-
Exposure frequency (d/yr)	350			250	180	-
Dermal exposure freq. (d/yr)	350			250	180	-
Seasonal-avg skin surface area (cm^2/d)	2023	2023	3160	3160	3160	-
Soil dermal adherence factor (mg/cm^2)	0.5	0.5	0.5	0.5	0.5	-
Water ingestion rate (L/d)	1	1	2	1	1	-
Soil ingestion rate (mg/d)	200	200	100	50	100	-
Swimming exposure time (hr/event)	1	3	3			
Swimming event frequency (events/yr)	12	12	12			
Swimming water ingestion rate (L/hr)	0.5	0.5	0.05			
Skin surface area, swimming (cm^2)	3500	8100	23000			
Fish consumption rate (kg/d)	0.025	0.025	0.025			
Vegetable ingestion rate (kg/d)						
Above-ground vegetables	0.002	0.002	0.006			
Below-ground vegetables	0.001	0.001	0.002			
Contaminated fish fraction (-)	1					



2. Age Adjustment for Carcinogens

(residential receptor only)

		Adjustment Factor	
☐	Seasonal skin surface area, soil contact	1022.26	(cm^2-yr/kg)
☑	Water ingestion	1.08571	(mg-yr/L-day)
☐	Soil ingestion	165.714	(mg-yr/kg-day)
☐	Swimming water ingestion	4.56	(L/kg)
☐	Skin surface area, swimming	80640	(cm^2-yr/kg)
☐	Fish consumption	0.02286	(kg-yr/kg-day)
☐	Below-ground vegetable ingestion	0.38	(kg-yr/kg-day)
☐	Above-ground vegetable ingestion	0.88	(kg-yr/kg-day)

3. Non-Carcinogenic Receptor

(residential receptor only)

Adult ▼

4. Target Health Risk Limits

	Individual	Cumulative
Target Cancer Risk (Carcinogens)	1.0E-5	1.0E-5
Target Hazard Quotient/Index (non-Carc.)	1.0E+0	1.0E+0

5. Commands and Options

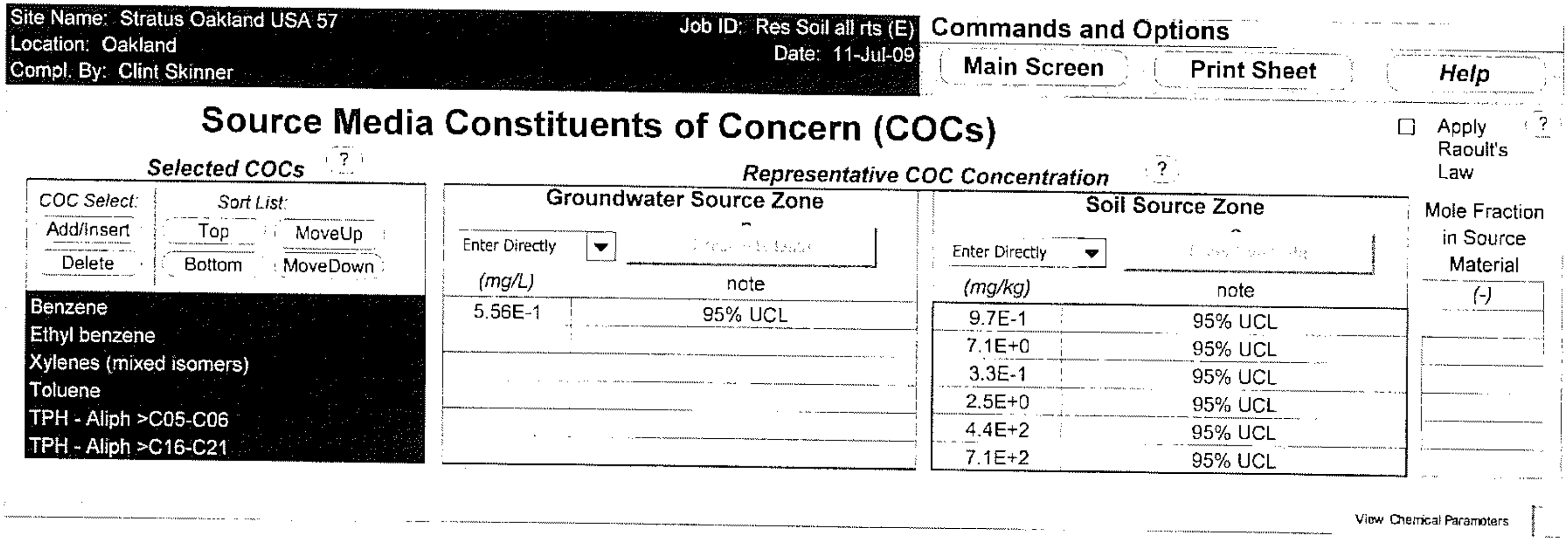
Return to Exposure Pathways

Use/Set Default Values

Print Sheet

Help

RBCA Tool Kit for Chemical Releases, Version 2.51



Site Name: Stratus Oakland USA 57
Location: Oakland
Compl. By: Clint Skinner

Job ID: Res Soil all rts (E)
Date: 11-Jul-09

Source Media Constituents of Concern (COCs)

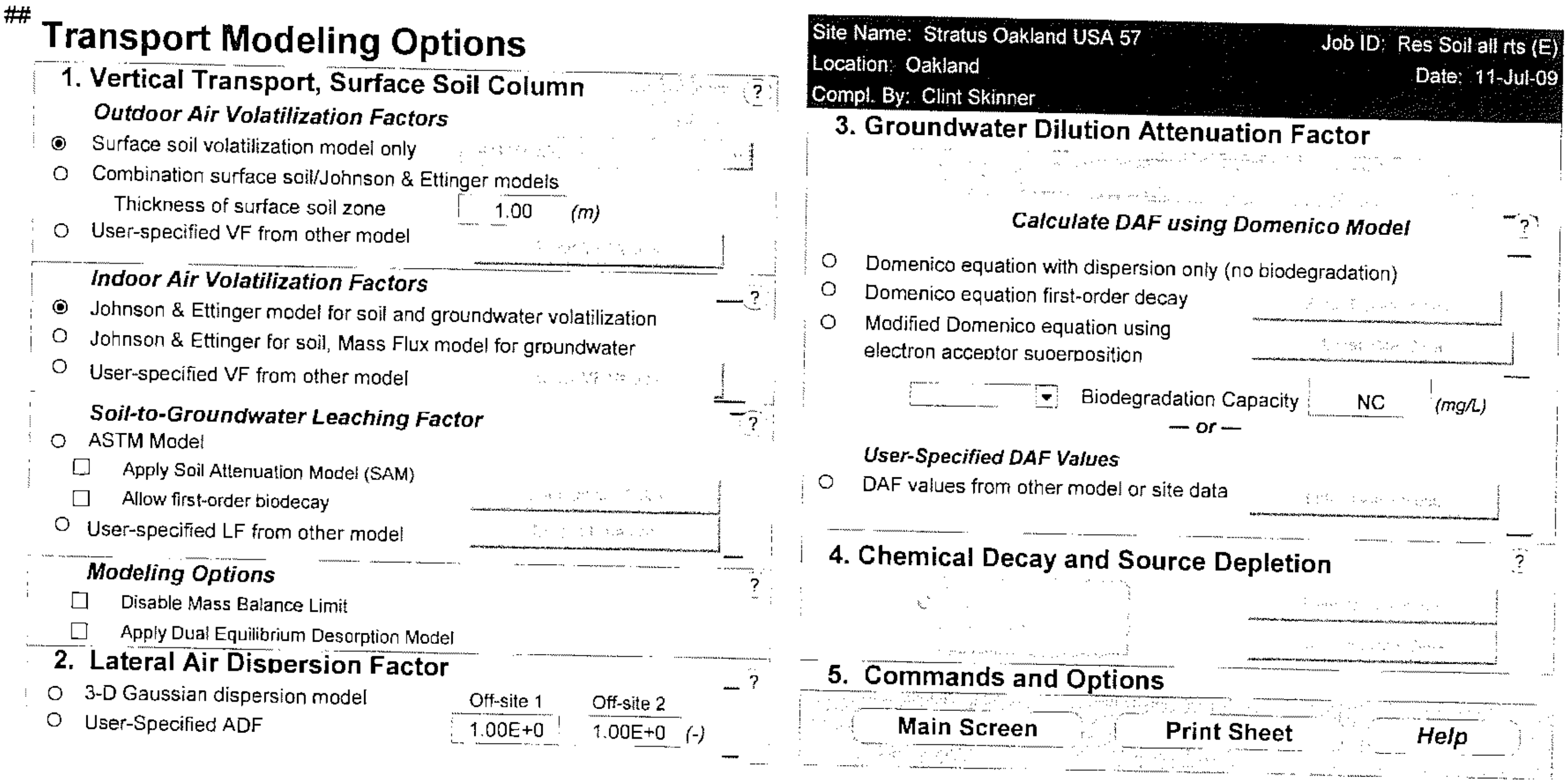
☐ Apply Raoult's Law

Representative COC Concentration

Groundwater Source Zone: Enter Directly

Soil Source Zone: Enter Directly

Selected COCs	Groundwater Source Zone *(mg/L)*	note	Soil Source Zone *(mg/kg)*	note	Mole Fraction in Source Material *(-)*
Benzene	5.56E-1	95% UCL	9.7E-1	95% UCL	
Ethyl benzene			7.1E+0	95% UCL	
Xylenes (mixed isomers)			3.3E-1	95% UCL	
Toluene			2.5E+0	95% UCL	
TPH - Aliph >C05-C06			4.4E+2	95% UCL	
TPH - Aliph >C16-C21			7.1E+2	95% UCL	



Transport Modeling Options

Site Name: Stratus Oakland USA 57
Location: Oakland
Compl. By: Clint Skinner
Job ID: Res Soil all rts (E)
Date: 11-Jul-09

1. Vertical Transport, Surface Soil Column

Outdoor Air Volatilization Factors

● Surface soil volatilization model only
○ Combination surface soil/Johnson & Ettinger models
Thickness of surface soil zone 1.00 (m)
○ User-specified VF from other model

Indoor Air Volatilization Factors

● Johnson & Ettinger model for soil and groundwater volatilization
○ Johnson & Ettinger for soil, Mass Flux model for groundwater
○ User-specified VF from other model

Soil-to-Groundwater Leaching Factor

○ ASTM Model
☐ Apply Soil Attenuation Model (SAM)
☐ Allow first-order biodecay
○ User-specified LF from other model

Modeling Options

☐ Disable Mass Balance Limit
☐ Apply Dual Equilibrium Desorption Model

2. Lateral Air Dispersion Factor

○ 3-D Gaussian dispersion model
○ User-Specified ADF

	Off-site 1	Off-site 2	
	1.00E+0	1.00E+0	(-)

3. Groundwater Dilution Attenuation Factor

Calculate DAF using Domenico Model

○ Domenico equation with dispersion only (no biodegradation)
○ Domenico equation first-order decay
○ Modified Domenico equation using electron acceptor superposition
Biodegradation Capacity NC (mg/L)

— or —

User-Specified DAF Values

○ DAF values from other model or site data

4. Chemical Decay and Source Depletion

5. Commands and Options

#

Site-Specific Soil Parameters

Site Name: Stratus Oakland USA 57
Location: Oakland
Compl. By: Clint Skinner
Job ID: Res Soil all rts (E)
Date: 11-Jul-09

1. Soil Source Zone Characteristics

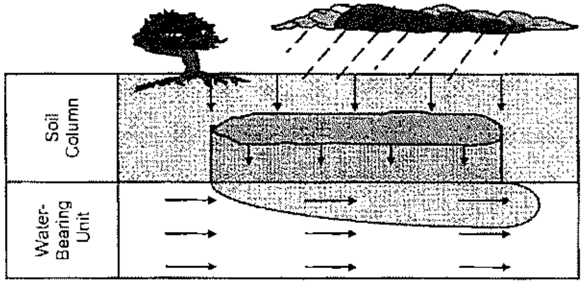
?

Hydrogeology

Depth to water-bearing unit	3	(m)
Capillary zone thickness	0.05	(m)
Soil column thickness	2.95	(m)

Affected Soil Zone

Depth to top of affected soils	0		(m)
Depth to base of affected soils	3		(m)
Length of affected soil parallel to assumed GW flow direction	45		(m)
	Res/Com	Construction	
Affected soil area	2025		(m^2)
Length of affected soil parallel to assumed wind direction	45	45	(m)



2. Surface Soil Column

Predominant USCS Soil Type ASTM Default ▼ ?

Calculate ▼

	Vadose Zone	Capillary Fringe	
Volumetric water content	0.12	0.342	(-)
Volumetric air content	0.26	0.038	(-)
Total porosity	0.38		(-)
Dry bulk density	1.7		(kg/L)
Vertical hydraulic conductivity	864		(cm/d)
Vapor permeability	1.00E-12		(m^2)
Capillary zone thickness	0.05		(m)

Net Rainfall Infiltration

Net infiltration estimate	30.00	(cm/yr)
or Enter Directly ▼	or	
Average annual precipitation	0	(cm/yr)

Partitioning Parameters

Fraction organic carbon - entire soil column	0.01	(-)
Fraction organic carbon - root zone	0.01	(-)
Soil/water pH	6.8	(-)

3. Commands and Options

Main Screen | Use/Set Default Values | **Print Sheet**

Set Units | ***Help***

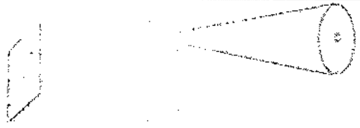
Site-Specific Air Parameters

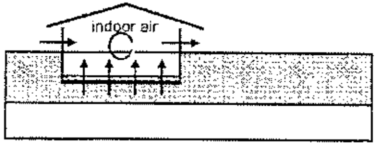
Site Name: Stratus Oakland USA 57
Location: Oakland
Compl. By: Clint Skinner
Job ID: Res Soil all rts (E)
Date: 11-Jul-09

1. Outdoor Air Pathway

User Defined Volatilization Factor Used
User Defined Air Dispersion Factor Used

	Off-site 1	Off-site 2	
Dispersion in Air			
Distance to offsite air receptor	0	0	(m)
Horizontal dispersivity	0	0	*(m)*
Vertical dispersivity	0	0	*(m)*
Air Source Zone			
Air mixing zone height	2		*(m)*
Ambient air velocity in mixing zone	2.25		*(m/s)*
Inverse mean conc. [Q/C term]	79.25		
Particulate Emissions	*Model: ASTM Model*		
Particulate Emission Factor	6.9E-12		*(kg/m^3)*
or			
Areal particulate emission flux	6.9E-14		*(g/cm^2/s)*
Fraction vegetative cover	0.5		*(-)*
Mean annual air velocity @ 7 m	4.8		
Equivalent 7m air vel. threshold	11.32		*(m/s)*
Windspeed function [F(x) term]	0.223841466		*(-)*





2. Indoor Air Pathway

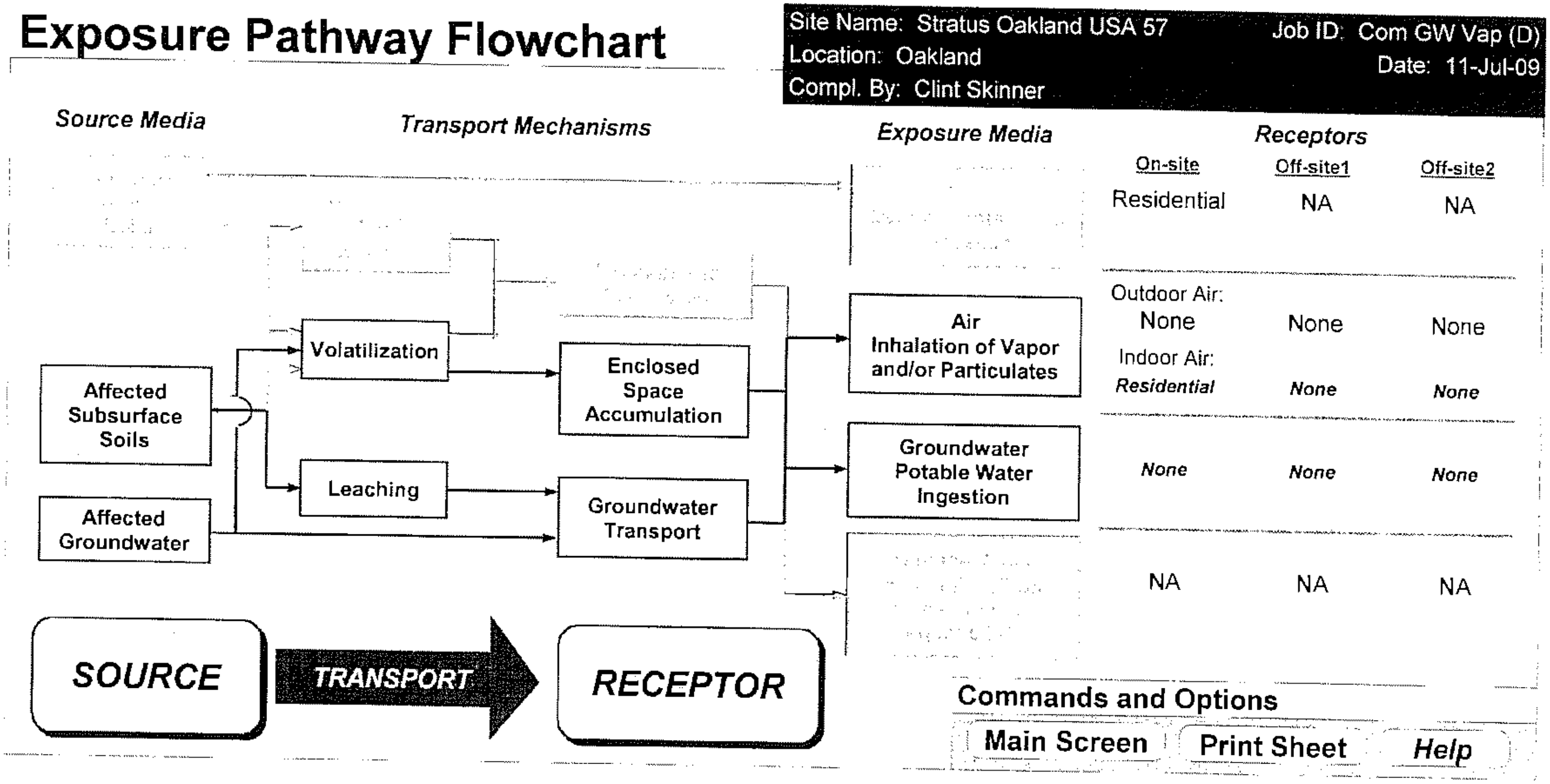
User Defined Volatilization Factor Used

	Residential	Commercial	
Building volume/area ratio	2	3	*(m)*
Foundation area	70	70	*(m^2)*
Foundation perimeter	49	34	*(m)*
Building air exchange rate	1.4E-4	2.3E-4	*(1/s)*
Depth to bottom of foundation slab	0.15	0.15	*(m)*
Convective air flow through cracks	0.0E+0	0.0E+0	*(m^3/s)*
Foundation thickness	0.15		*(m)*
Foundation crack fraction	0.001		*(-)*
Volumetric water content of cracks	0.12		*(-)*
Volumetric air content of cracks	0.26		*(-)*
Indoor/Outdoor differential pressure	0		*(g/cm/s^2)*
Building Volume	451	451	*(m^3)*
Building Width Perpendicular to GW flow	9.61	9.61	*(m)*
Building Length Parallel to GW flow	9.61	9.61	*(m)*
Saturated Soil Zone Porosity	0.38		*(-)*
Vertical Dispersivity	0.006		*(m)*
Groundwater Seepage Velocity	1.8E+01		*(cm/d)*

3. Commands and Options

Main Screen
Use/Set Default Values
Print Sheet
Set Units
Help

RBCA Tool Kit for Chemical Releases, Version 2.51



Exposure Pathway Flowchart

Site Name: Stratus Oakland USA 57
Location: Oakland
Compl. By: Clint Skinner
Job ID: Com GW Vap (D)
Date: 11-Jul-09

Exposure Media	Receptors On-site	Receptors Off-site1	Receptors Off-site2
	Residential	NA	NA
Air Inhalation of Vapor and/or Particulates — Outdoor Air:	None	None	None
Indoor Air:	*Residential*	*None*	*None*
Groundwater Potable Water Ingestion	*None*	*None*	*None*
	NA	NA	NA

RBCA SITE ASSESSMENT | **User-Specified COC Data**

REPRESENTATIVE COC CONCENTRATIONS IN SOURCE MEDIA

CONSTITUENT	Representative COC Concentration			
	Groundwater		Soils (0 - 3 m)	
	value (mg/L)	note	value (mg/kg)	note
Benzene	5.6E-1	95% UCL	9.7E-1	95% UCL
Ethyl benzene			7.1E+0	95% UCL
Xylenes (mixed isomers)			3.3E-1	95% UCL
Toluene			2.5E+0	95% UCL
TPH - Aliph >C05-C06			4.4E+2	95% UCL
TPH - Aliph >C16-C21			7.1E+2	95% UCL

Site Name: Stratus Oakland USA 57
Site Location: Oakland
Completed By: Clint Skinner

Date Completed: 11-Jul-09
Job ID: Res Soil all rts (E)

RBCA SITE ASSESSMENT | **User-Specified COC Data**

REPRESENTATIVE COC CONCENTRATIONS IN SOURCE MEDIA

CONSTITUENT	Representative COC Concentration			
	Groundwater		Soils (0 - 3 m)	
	value (mg/L)	note	value (mg/kg)	note
Benzene	5.6E-1	95% UCL	9.7E-1	95% UCL
Ethyl benzene			7.1E+0	95% UCL
Xylenes (mixed isomers)			3.3E-1	95% UCL
Toluene			2.5E+0	95% UCL
TPH - Aliph >C05-C06			4.4E+2	95% UCL
TPH - Aliph >C16-C21			7.1E+2	95% UCL

Site Name: Stratus Oakland USA 57
Site Location: Oakland
Completed By: Clint Skinner

Date Completed: 11-Jul-09
Job ID: Res Soil all rts (E)

RBCA SITE ASSESSMENT

TIER 2 EXPOSURE CONCENTRATION AND INTAKE CALCULATION

INDOOR AIR EXPOSURE PATHWAYS ■ **(Checked if Pathway is Complete)**

SOILS (0 - 3 m): VAPOR INTRUSION INTO BUILDINGS

	1) Source Medium	2) NAF Value (L/kg) Receptor	3) Exposure Medium Indoor Air: POE Conc. (mg/m^3) (1) / (2)	4) Exposure Multiplier (EFxED)/(ATx365) (unitless)	5) Average Inhalation Exposure Concentration (mg/m^3) (3) X (4)
		On-site (0 m)	On-site (0 m)	On-site (0 m)	On-site (0 m)
Constituents of Concern	Soil Conc. (mg/kg)	Residential	Residential	Residential	Residential
Benzene	9.7E-1	2.1E+2	4.7E-3	4.1E-1	1.9E-3
Ethyl benzene	7.1E+0	4.7E+2	1.5E-2	9.6E-1	1.4E-2
Xylenes (mixed isomers)	3.3E-1	6.3E+2	5.2E-4	9.6E-1	5.0E-4
Toluene	2.5E+0	3.4E+2	7.4E-3	9.6E-1	7.1E-3
TPH - Aliph >C05-C06	4.4E+2	5.2E+1	8.4E+0	9.6E-1	8.1E+0
TPH - Aliph >C16-C21	7.1E+2	6.9E+4	1.0E-2	9.6E-1	9.7E-3

* = Chemical with user-specified data

NOTE: AT = Averaging time (days) EF = Exposure frequency (days/yr) ED = Exposure duration (yr) NAF = Natural attenuation factor POE = Point of exposure

Site Name: Stratus Oakland USA 57
Site Location: Oakland
Completed By: Clint Skinner

Date Completed: 11-Jul-09
Job ID: Res Soil all rts (E)

RBCA SITE ASSESSMENT

TIER 2 EXPOSURE CONCENTRATION AND INTAKE CALCULATION

INDOOR AIR EXPOSURE PATHWAYS ☐ **(Checked if Pathway is Complete)**

GROUNDWATER: VAPOR INTRUSION INTO BUILDINGS

Exposure Concentration

	1) Source Medium	2) NAF Value (m^3/L) Receptor			3) Exposure Medium Indoor Air: POE Conc. (mg/m^3) (1) / (2)		
Constituents of Concern	Groundwater Conc. (mg/L)	On-site (0 m) None	Off-site 1 (0 m) None	Off-site 2 (0 m) None	On-site (0 m) None	Off-site 1 (0 m) None	Off-site 2 (0 m) None
Benzene	5.6E-1						
Ethyl benzene							
Xylenes (mixed isomers)							
Toluene							
TPH - Aliph >C05-C06							
TPH - Aliph >C16-C21							

NOTE: AT = Averaging time (days) EF = Exposure frequency (days/yr) ED = Exposure duration (yr) NAF = Natural attenuation factor POE = Point of exposure

Site Name: Stratus Oakland USA 57
Site Location: Oakland
Completed By: Clint Skinner

Date Completed: 11-Jul-09
Job ID: Res Soil all rts (E)

RBCA SITE ASSESSMENT

TIER 2 EXPOSURE CONCENTRATION AND INTAKE CALCULATION

INDOOR AIR EXPDSURE PATHWAYS

GROUNDWATER: VAPOR INTRUSION INTO BUILDINGS

Constituents of Concern	4) Exposure Multiplier (EFxED)/(ATx365) (unitless)			5) Average Inhalation Exposure Concentration (mg/m^3) (3) X (4)		
	On-site (0 m) None	Off-site 1 (0 m) None	Off-site 2 (0 m) None	On-site (0 m) None	Off-site 1 (0 m) None	Off-site 2 (0 m) None
Benzene						
Ethyl benzene						
Xylenes (mixed isomers)						
Toluene						
TPH - Aliph >C05-C06						
TPH - Aliph >C16-C21						

* = Chemical with user-specified data

NOTE: AT = Averaging time (days) EF = Exposure frequency (days/yr) ED = Exposure duration (yr) NAF = Natural attenuation factor POE = Point of exposure

Site Name: Stratus Oakland USA 57
Site Location: Oakland
Completed By: Clint Skinner

Date Completed: 11-Jul-09
Job ID: Res Soil all rts (E)

RBCA SITE ASSESSMENT

TIER 2 EXPOSURE CONCENTRATION AND INTAKE CALCULATION

INDOOR AIR EXPOSURE PATHWAYS ☐ **(Checked if Pathway is Complete)**

SOIL LEACHING TO GW- VAPOR INTRUSION INTO BUILDINGS

Exposure Concentration

	1) Source Medium	2) NAF Value (m^3/L) Receptor			3) Exposure Medium Indoor Air: POE Conc. (mg/m^3) (1) / (2)		
Constituents of Concern	Soil Conc. (mg/kg)	On-site (0 m) None	Off-site 1 (0 m) None	Off-site 2 (0 m) None	On-site (0 m) None	Off-site 1 (0 m) None	Off-site 2 (0 m) None
Benzene	9.7E-1						
Ethyl benzene	7.1E+0						
Xylenes (mixed isomers)	3.3E-1						
Toluene	2.5E+0						
TPH - Aliph >C05-C06	4.4E+2						
TPH - Aliph >C16-C21	7.1E+2						

NOTE: AT = Averaging time (days) EF = Exposure frequency (days/yr) ED = Exposure duration (yr) NAF = Natural attenuation factor POE = Point of exposure

Site Name: Stratus Oakland USA 57
Site Location: Oakland
Completed By: Clint Skinner

Date Completed: 11-Jul-09
Job ID: Res Soil all rts (E)

RBCA SITE ASSESSMENT

TIER 2 EXPOSURE CONCENTRATION AND INTAKE CALCULATION

INDOOR AIR EXPOSURE PATHWAYS

SOIL LEACHING TO GW- VAPOR INTRUSION INTO BUILDINGS

	4) Exposure Multiplier (EFxED)/(ATx365) (unitless)			5) Average Inhalation Exposure Concentration (mg/m^3) (3) X (4)		
	On-site (0 m)	Off-site 1 (0 m)	Off-site 2 (0 m)	On-site (0 m)	Off-site 1 (0 m)	Off-site 2 (0 m)
Constituents of Concern	None	None	None	None	None	None
Benzene						
Ethyl benzene						
Xylenes (mixed isomers)						
Toluene						
TPH - Aliph >C05-C06						
TPH - Aliph >C16-C21						

* = Chemical with user-specified data

NOTE: AT = Averaging time (days) EF = Exposure frequency (days/yr) ED = Exposure duration (yr) NAF = Natural attenuation factor POE = Point of exposure

Site Name: Stratus Oakland USA 57
Site Location: Oakland
Completed By: Clint Skinner

Date Completed: 11-Jul-09
Job ID: Res Soil all rts (E)

RBCA SITE ASSESSMENT

TIER 2 EXPOSURE CONCENTRATION AND INTAKE CALCULATION

INDOOR AIR EXPOSURE PATHWAYS

MAXIMUM PATHWAY EXPOSURE (mg/m^3)

(Maximum average exposure concentration from soil and groundwater routes.)

Constituents of Concern	On-site (0 m) Residential	Off-site 1 (0 m) None	Off-site 2 (0 m) None
Benzene	1.9E-3		
Ethyl benzene	1.4E-2		
Xylenes (mixed isomers)	5.0E-4		
Toluene	7.1E-3		
TPH - Aliph >C05-C06	8.1E+0		
TPH - Aliph >C16-C21	9.7E-3		

Site Name: Stratus Oakland USA 57
Site Location: Oakland
Completed By: Clint Skinner

Date Completed: 11-Jul-09
Job ID: Res Soil all rts (E)

RBCA SITE ASSESSMENT

TIER 2 PATHWAY RISK CALCULATION

INDOOR AIR EXPOSURE PATHWAYS ☒ **(Checked if Pathway is Complete)**

CARCINOGENIC RISK

Constituents of Concern	(1) Carcinogenic Classification	(2) Maximum Carcinogenic Exposure (mg/m^3)			(3) Inhalation Unit Risk Factor	(4) Individual COC Risk (2) x (3) x 1000		
		On-site (0 m) Residential	Off-site 1 (0 m) None	Off-site 2 (0 m) None	(µg/m^3)^-1	On-site (0 m) Residential	Off-site 1 (0 m) None	Off-site 2 (0 m) None
Benzene	TRUE	1.9E-3	-	-	2.2E-6	4.2E-6		
Ethyl benzene	FALSE	-	-	-	-			
Xylenes (mixed isomers)	FALSE	-	-	-	-			
Toluene	FALSE	-	-	-	-			
TPH - Aliph >C05-C06	FALSE	-	-	-	-			
TPH - Aliph >C16-C21	FALSE	-	-	-	-			

Total Pathway Carcinogenic Risk =	4.2E-6		

Site Name: Stratus Oakland USA 57
Site Location: Oakland
Completed By: Clint Skinner

Date Completed: 11-Jul-09
Job ID: Res Soil all rts (E)

RBCA SITE ASSESSMENT

TIER 2 PATHWAY RISK CALCULATION

INDOOR AIR EXPOSURE PATHWAYS ■ **(Checked if Pathway is Complete)**

TOXIC EFFECTS

	(5) Maximum Toxicant Exposure (mg/m^3)			(6) Inhalation Reference Concentration	(7) Individual COC Hazard Quotient (5) / (6)		
	On-site (0 m) Residential	Off-site 1 (0 m) None	Off-site 2 (0 m) None	(mg/m^3)	On-site (0 m) Residential	Off-site 1 (0 m) None	Off-site 2 (0 m) None
Constituents of Concern							
Benzene	4.5E-3	NC	NC	2.8E-1	1.6E-2		
Ethyl benzene	1.4E-2	NC	NC	1.0E+0	1.4E-2		
Xylenes (mixed isomers)	5.0E-4	NC	NC	1.0E-1	5.0E-3		
Toluene	7.1E-3	NC	NC	5.0E+0	1.4E-3		
TPH - Aliph >C05-C06	8.1E+0	NC	NC	1.8E+1	4.5E-1		
TPH - Aliph >C16-C21	9.7E-3	NC	NC	-			

Total Pathway Hazard Index = **4.9E-1**

Site Name: Stratus Oakland USA 57
Site Location: Oakland
Completed By: Clint Skinner

Date Completed: 11-Jul-09
Job ID: Res Soil all rts (E)

TIER 2 EXPOSURE CONCENTRATION AND INTAKE CALCULATION

SOIL EXPOSURE PATHWAY ■ **(Checked if Pathway is Complete)**

SURFACE SOILS: ON SITE INGESTION, DERMAL EXPOSURE

	1) Source/Exposure Medium	2) Exposure Multiplier		3) Average Daily Intake Rate (mg/kg/day) (1) x (2)	
Constituents of Concern	Surface Soil Conc. (mg/kg)	Residential	Construction Worker	Residential	Construction Worker
Benzene	9.7E-1	5.9E-7		5.7E-7	-
Ethyl benzene	7.1E+0	1.4E-6		9.8E-6	-
Xylenes (mixed isomers)	3.3E-1	1.4E-6		4.5E-7	-
Toluene	2.5E+0	1.4E-6		3.4E-6	-
TPH - Aliph >C05-C06	4.4E+2	1.4E-6		6.0E-4	-
TPH - Aliph >C16-C21	7.1E+2	5.7E-6		4.0E-3	-

NOTE: RAF = Relative absorption factor (-)
M = Adherence factor (mg/cm^2)
AT = Averaging time (days)
BW = Body weight (kg)
ED = Exposure duration (yrs)
EF = Exposure frequencey (days/yr)
IR = Soil ingestion rate (mg/day)
SA = Skin exposure area (cm^2/day)

Site Name: Stratus Oakland USA 57
Site Location: Oakland
Completed By: Clint Skinner

Date Completed: 11-Jul-09
Job ID: Res Soil all rts (E)

TIER 2 PATHWAY RISK CALCULATION

SOIL EXPOSURE PATHWAY ☒ **(Checked if Pathway is Complete)**

CARCINOGENIC RISK

Constituents of Concern	(1) Is Carcinogenic	(2) Total Carcinogenic Intake Rate (mg/kg/day)				(3) Slope Factor (mg/kg/day)^-1		(4) Individual COC Risk	
		(a) via Ingestion	(b) via Dermal Contact	(c) via Ingestion	(d) via Dermal Contact	(a) Oral	(b) Dermal	(2a)x(3a) + (2b)x(3b)	(2c)x(3a) + (2d)x(3b)
		Residential		Construction Worker				Residential	Construction Worker
Benzene	TRUE	5.7E-7	0.0E+0			5.5E-2	5.5E-2	3.1E-8	-
Ethyl benzene	FALSE					-	-		-
Xylenes (mixed isomers)	FALSE					-	-		-
Toluene	FALSE					-	-		-
TPH - Aliph >C05-C06	FALSE					-	-		-
TPH - Aliph >C16-C21	FALSE					-	-		-

* No dermal slope factor available--oral slope factor used.

Total Pathway Carcinogenic Risk = 3.1E-8

Site Name: Stratus Oakland USA 57
Site Location: Oakland
Completed By: Clint Skinner

Date Completed: 11-Jul-09
Job ID: Res Soil all rts (E)

TIER 2 PATHWAY RISK CALCULATION

SOIL EXPOSURE PATHWAY ☒ **(Checked if Pathway is Complete)**

TOXIC EFFECTS

	(5) Total Toxicant Intake Rate (mg/kg/day)				(6) Reference Dose (mg/kg-day)		(7) Individual COC Hazard Quotient	
	(a) via Ingestion	(b) via Dermal Contact	(c) via Ingestion	(d) via Dermal Contact			(5a)/(6a) + (5b)/(6b)	(5c)/(6a) + (5d)/(6b)
Constituents of Concern	Residential		Construction Worker		(a) Oral	(b) Dermal	Residential	Construction Worker
Benzene	1.3E-6	0.0E+0			4.0E-3	4.0E-3	3.3E-4	
Ethyl benzene	9.8E-6	0.0E+0			1.0E-1	1.0E-1	9.8E-5	
Xylenes (mixed isomers)	4.5E-7	0.0E+0			2.0E-1	2.0E-1	2.2E-6	
Toluene	3.4E-6	0.0E+0			8.0E-2	8.0E-2	4.3E-5	
TPH - Aliph >C05-C06	6.0E-4	0.0E+0			6.0E-2	6.0E-2	1.0E-2	
TPH - Aliph >C16-C21	9.7E-4	3.1E-3			2.0E+0	2.0E+0	2.0E-3	

* No dermal reference dose available--oral reference dose used

Total Pathway Hazard Index = **1.2E-2**

Site Name: Stratus Oakland USA 57
Site Location: Oakland
Completed By: Clint Skinner

Date Completed: 11-Jul-09
Job ID: Res Soil all rts (E)

RBCA SITE ASSESSMENT

Baseline Risk Summary-All Pathways

Site Name: Stratus Oakland USA 57
Site Location: Oakland

Completed By: Clint Skinner
Date Completed: 11-Jul-09

1 of 1

BASELINE RISK SUMMARY TABLE

	BASELINE CARCINOGENIC RISK					BASELINE TOXIC EFFECTS				
	Individual COC Risk		Cumulative COC Risk		Risk Limit(s) Exceeded?	Hazard Quotient		Hazard Index		Toxicity Limit(s) Exceeded?
EXPOSURE PATHWAY	Maximum Value	Target Risk	Total Value	Target Risk		Maximum Value	Applicable Limit	Total Value	Applicable Limit	
OUTDOOR AIR EXPOSURE PATHWAYS										
☐	NA	NA	NA	NA	☐	NA	NA	NA	NA	☐
INDOOR AIR EXPOSURE PATHWAYS										
■	4.2E-6	1.0E-5	4.2E-6	1.0E-5	☐	4.5E-1	1.0E+0	4.9E-1	1.0E+0	☐
SOIL EXPOSURE PATHWAYS										
■	3.1E-8	1.0E-5	3.1E-8	1.0E-5	☐	1.0E-2	1.0E+0	1.2E-2	1.0E+0	☐
GROUNDWATER EXPOSURE PATHWAYS										
☐	NA	NA	NA	NA	☐	NA	NA	NA	NA	☐
SURFACE WATER EXPOSURE PATHWAYS										
☐	NA	NA	NA	NA	☐	NA	NA	NA	NA	☐

CRITICAL EXPOSURE PATHWAY (Maximum Values From Complete Pathways)										
	4.2E-6	*1.0E-5*	*4.2E-6*	*1.0E-5*	☐	*4.5E-1*	*1.0E+0*	*4.9E-1*	*1.0E+0*	☐
	Indoor Air		*Indoor Air*			*Indoor Air*		*Indoor Air*		

RBCA SITE ASSESSMENT

Site Name: Stratus Oakland USA 57
Site Location: Oakland

Completed By: Clint Skinner
Date Completed: 11-Jul-09

Job ID: Res Soil al rts (E)

1 OF 1

SURFACE SOIL (0 - 1 m)
SSTL VALUES

Target Risk (Class A & B) 1.0E-5
Target Hazard Quotient 1.0E+0

Groundwater DAF Option

SSTL Results For Complete Exposure Pathways (Checked If Pathway Is Complete)

CONSTITUENTS OF CONCERN		Representative Concentration	☐ Soil Leaching to Groundwater Ingestion / Discharge to Surface Water			☐ Soil Leaching to Groundwater/ Groundwater Volatilization to Indoor Air			■ Soil Vol. to Indoor Air	☐ Soil Volatilization and Surface Soil Particulates to Outdoor Air				■ Direct Contact Pathways: Ingestion, Dermal Contact, Inhalation		Applicable SSTL	SSTL Exceeded ?	Required CRF
CAS No.	Name	(mg/kg)	On-site (0 m) None	Off-site 1 (0 m) None	Off-site 2 (0 m) None	On-site (0 m) None	Off-site 1 (0 m) None	Off-site 2 (0 m) None	On-site (0 m) Residential	On-site (0 m) None	On-site (0 m) Construction	Off-site 1 (0 m) None	Off-site 2 (0 m) None	On-site (0 m) Residential	On-site (0 m) Construction	(mg/kg)	"■" if yes	Only if "yes" left
71-43-2	Benzene	9.7E-1							2.3E+0					1.2E+2		2.3E+0	☐	<1
100-41-4	Ethyl benzene	7.1E+0							>3.7E+2					7.3E+4		7.3E+4	☐	<1
1330-20-7	Xylenes (mixed isomers)	3.3E-1							6.5E+1					1.5E+5		6.5E+1	☐	<1
108-88-3	Toluene	2.5E+0							>8.0E+2					5.8E+4		5.8E+4	☐	<1
T-al0506	TPH - Aliph >C05-C06	4.4E+2							>4.7E+2					4.4E+4		4.4E+4	☐	<1
T-al1621	TPH - Aliph >C16-C21	7.1E+2							Tox?					(Inh)Tox?		NC	☐	NA
NA	Total TPH mixture	1.1E+3	NA	NA	NA	NA	NA	NA	NC	NA	NA	NA	NA	9.0E+4	NA	9.0E+4	☐	<1

* = Chemical with user-specified data

">" indicates risk-based target concentration greater than constituent residual saturation value   NA = Not applicable   NC = Not calculated

RBCA Tool Kit for Chemical Releases, Version 2.51

RBCA SITE ASSESSMENT

Site Name: Stratus Oakland USA 57
Site Location: Oakland

Completed By: Clint Skinner
Date Completed: 11-Jul-09

Job ID: Res Soil all rts (E)

1 OF 1

SUBSURFACE SOIL (1 - 3 m)
SSTL VALUES

Target Risk (Class A & B) 1.0E-5
Target Hazard Quotient 1.0E+0

Groundwater DAF Option:

SSTL Results For Complete Exposure Pathways (Checked if Pathway is Complete)

CONSTITUENTS OF CONCERN		Representative Concentration	☐ Soil Leaching to Groundwater Ingestion / Discharge to Surface Water			☐ Soil Leaching to Groundwater/ Groundwater Volatilization to Indoor Air			■ Soil Vol. to Indoor Air	☐ Soil Volatilization to Outdoor Air			Applicable SSTL	SSTL Exceeded ?	Required CRF
CAS No.	Name	(mg/kg)	On-site (0 m) None	Off-site 1 (0 m) None	Off-site 2 (0 m) None	On-site (0 m) None	Off-site 1 (0 m) None	Off-site 2 (0 m) None	On-site (0 m) Residential	On-site (0 m) None	Off-site 1 (0 m) None	Off-site 2 (0 m) None	(mg/kg)	"■" if yes	Only if "yes" left
71-43-2	Benzene	9.7E-1							2.3E+0				2.3E+0	☐	<1
100-41-4	Ethyl benzene	7.1E+0							>3.7E+2				>3.7E+2	☐	
1330-20-7	Xylenes (mixed isomers)	3.3E-1							6.5E+1				6.5E+1	☐	<1
108-88-3	Toluene	2.5E+0							>8.0E+2				>8.0E+2	☐	
T-al0506	TPH - Aliph >C05-C06	4.4E+2							>4.7E+2				>4.7E+2	☐	
T-al1621	TPH - Aliph >C16-C21	7.1E+2							Tox?				NC	☐	
NA	Total TPH mixture	1.1E+3	NA	NA	NA	NA	NA	NA	NC	NA	NA	NA	NC	☐	NA

* = Chemical with user-specified data

">" indicates risk-based target concentration greater than constituent residual saturation value. NA = Not applicable. NC = Not calculated

RBCA SITE ASSESSMENT | **Cumulative Risk Worksheet**

Site Name. Stratus Oakland USA 57
Site Location. Oakland

Completed By Clint Skinner
Date Completed. 11-Jul-09

Job ID Res Soil all rts (E)

1 OF 3

CUMULATIVE RISK WORKSHEET

CONSTITUENTS OF CONCERN		Representative Concentration		Proposed CRF		Resultant Target Concentration	
CAS No.	Name	Soil (mg/kg)	Groundwater (mg/L)	Soil	GW	Soil (mg/kg)	Groundwater (mg/L)
71-43-2	Benzene	9.7E-1		NA	NA	9.7E-1	
100-41-4	Ethyl benzene	7.1E+0		NA	NA	7.1E+0	
1330-20-7	Xylenes (mixed isomers)	3.3E-1		NA	NA	3.3E-1	
108-88-3	Toluene	2.5E+0		NA	NA	2.5E+0	
T-al0506	TPH - Aliph >C05-C06	4.4E+2		NA	NA	4.4E+2	
T-al1621	TPH - Aliph >C16-C21	7.1E+2		NA	NA	7.1E+2	

Cumulative Values:

RBCA SITE ASSESSMENT | Cumulative Risk Worksheet

Site Name. Stratus Oakland USA 57
Site Locat.on. Oakland
Completed By: Clint Skinner
Date Completed 11-Jul-09
Job ID: Res Soil all rts (E)
2 OF 3

CUMULATIVE RISK WORKSHEET

Cumulative Target Risk: 1 0E-5   Target Hazard Index. 1 0E+0

ON-SITE RECEPTORS

CONSTITUENTS OF CONCERN		Outdoor Air Exposure: None		Indoor Air Exposure: Residential		Soil Exposure: Residential		Groundwater Exposure: None	
		Target Risk: 1.0E-5	Target HQ: 1.0E+0	Target Risk: 1 0E-5	Target HQ 1 0E+0	Target Risk: 1.0E-5	Target HQ: 1.0E+0	Target Risk: 1.0E-5	Target HQ. 1.0E+0
CAS No.	Name	Carcinogenic Risk	Hazard Quotient	Carcinogenic Risk	Hazard Quotient	Carcinogenic Risk	Hazard Quotient	Carcinogenic Risk	Hazard Quotient
71-43-2	Benzene			4.2E-6	1.6E-2	3.1E-8	3.3E-4		
100-41-4	Ethyl benzene				1.4E-2		9.8E-5		
1330-20-7	Xylenes (mixed isomers)				5.0E-3		2.2E-6		
108-88-3	Toluene				1.4E-3		4.3E-5		
T-al0506	TPH - Aliph >C05-C06				4.5E-1		1.0E-2		
T-al1621	TPH - Aliph >C16-C21						2.0E-3		
	Cumulative Values:	**0.0E+0**	**0.0E+0**	**4.2E-6**	**4.9E-1**	**3.1E-8**	**1.2E-2**	**0.0E+0**	**0.0E+0**

■ indicates risk level exceeding target risk

RBCA SITE ASSESSMENT

Cumulative Risk Worksheet

Site Name: Stratus Oakland USA 57
Site Location: Oakland

Completed By: Clint Skinner
Date Completed: 11-Jul-09

Job ID: Res Soil all rts (E)

3 OF 3

CUMULATIVE RISK WORKSHEET

Cumulative Target Risk: 1.0E-5   Target Hazard Index: 1.0E+0

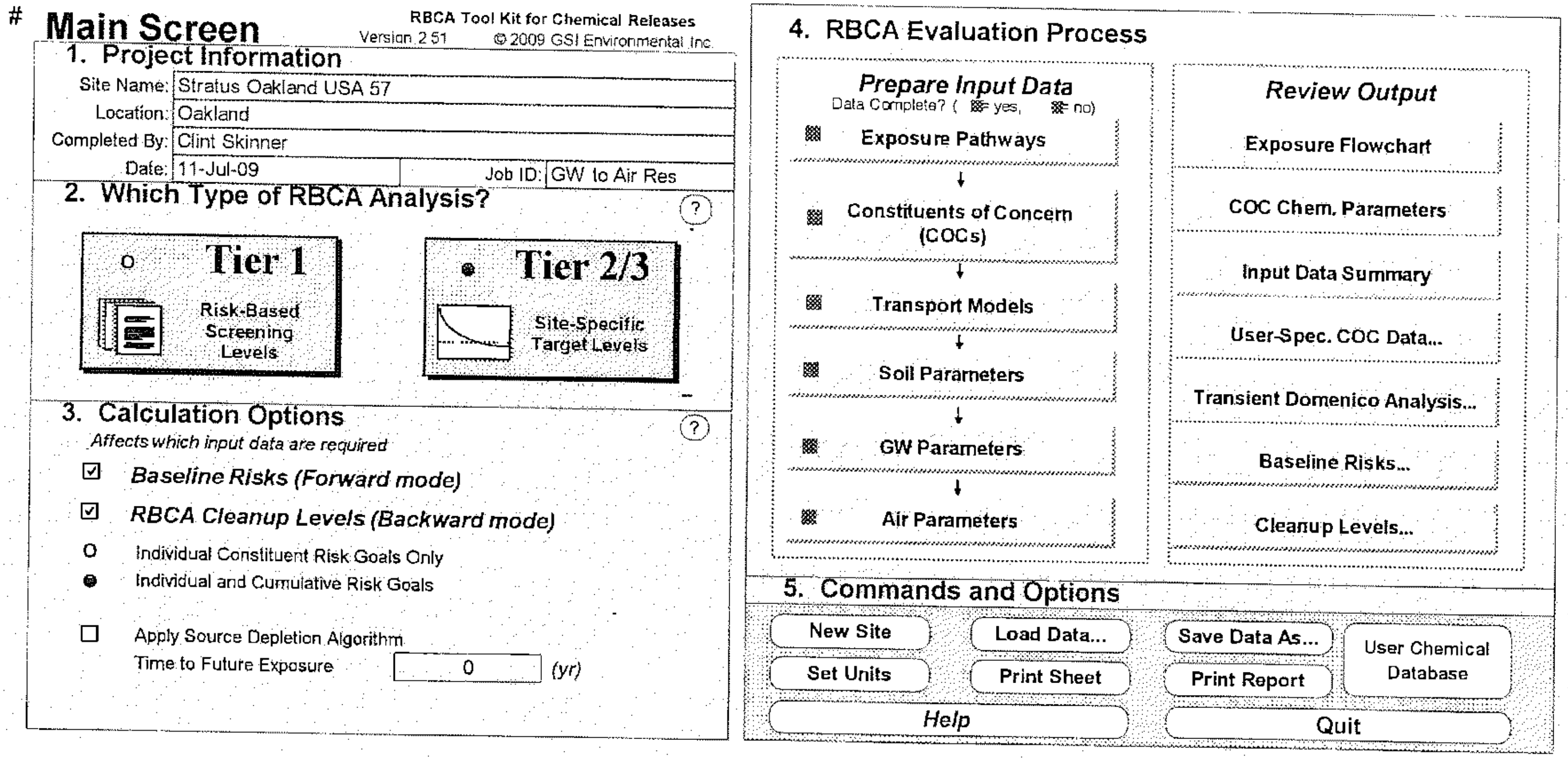
OFF-SITE RECEPTORS

CONSTITUENTS OF CONCERN		Outdoor Air Exposure:				Indoor Air Exposure:				Groundwater Exposure:			
		None		None		None		None		None		None	
		Target Risk: 1.0E-5	Target HQ: 1.0E+0	Target Risk: 1.0E-5	Target HQ: 1.0E+0	Target Risk: 1.0E-5	Target HQ: 1.0E+0	Target Risk: 1.0E-5	Target HQ: 1.0E+0	Target Risk: 1.0E-5	Target HQ: 1.0E+0	Target Risk: 1.0E-5	Target HQ: 1.0E+0
CAS No.	Name	Carcinogenic Risk	Hazard Quotient	Carcinogenic Risk	Hazard Quotient	Carcinogenic Risk	Hazard Quotient	Carcinogenic Risk	Hazard Quotient	Carcinogenic Risk	Hazard Quotient	Carcinogenic Risk	Hazard Quotient
71-43-2	Benzene												
100-41-4	Ethyl benzene												
1330-20-7	Xylenes (mixed isomers)												
108-88-3	Toluene												
T-al0506	TPH - Aliph >C05-C06												
T-al1621	TPH - Aliph >C16-C21												
	Cumulative Values:	0.0E+0	0.0E+0	0.0E+0	0.0E+0	0.0E+0	0.0E+0	0.0E+0	0.0E+0	0.0E+0	0.0E+0	0.0E+0	0.0E+0

■ indicates risk level exceeding target risk

indicates risk level exceeding target risk

APPENDIX F: RBCA RESIDENTIAL GROUNDWATER INHALATION PRINTOUT



\# **Main Screen**

RBCA Tool Kit for Chemical Releases
Version 2.51 © 2009 GSI Environmental Inc.

1. Project Information

Site Name: Stratus Oakland USA 57
Location: Oakland
Completed By: Clint Skinner
Date: 11-Jul-09
Job ID: GW to Air Res

2. Which Type of RBCA Analysis?

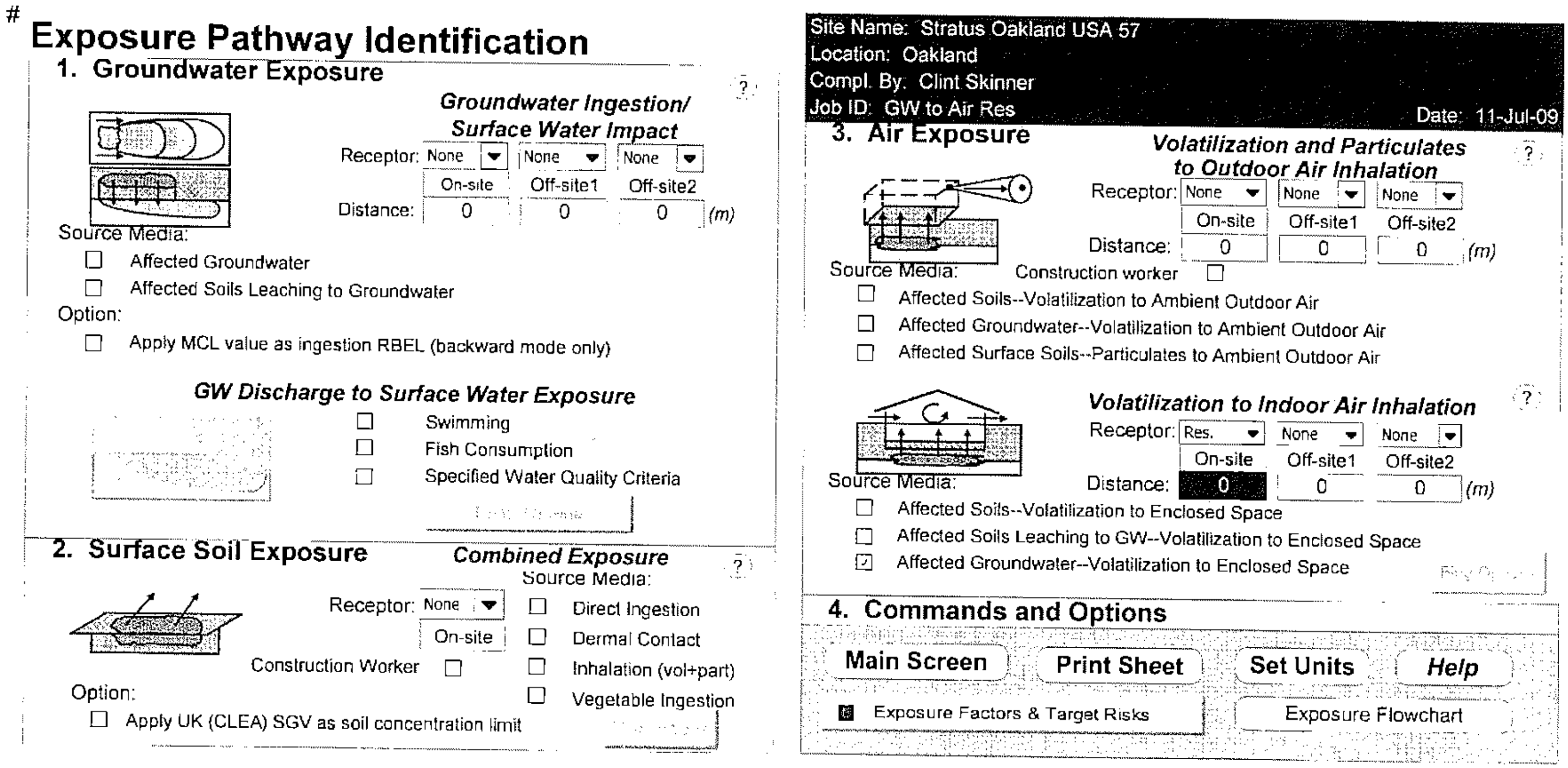
○ Tier 1 Risk-Based Screening Levels
● Tier 2/3 Site-Specific Target Levels

3. Calculation Options

Affects which input data are required

☑ *Baseline Risks (Forward mode)*
☑ *RBCA Cleanup Levels (Backward mode)*
○ Individual Constituent Risk Goals Only
● Individual and Cumulative Risk Goals

☐ Apply Source Depletion Algorithm
Time to Future Exposure 0 (yr)



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Exposure Pathway Identification

Site Name: Stratus Oakland USA 57
Location: Oakland
Compl. By: Clint Skinner
Job ID: GW to Air Res
Date: 11-Jul-09

1. Groundwater Exposure

Groundwater Ingestion/ Surface Water Impact

	On-site	Off-site1	Off-site2	
Receptor:	None	None	None	
Distance:	0	0	0	(m)

Source Media:

☐ Affected Groundwater
☐ Affected Soils Leaching to Groundwater

Option:

☐ Apply MCL value as ingestion RBEL (backward mode only)

GW Discharge to Surface Water Exposure

☐ Swimming
☐ Fish Consumption
☐ Specified Water Quality Criteria

2. Surface Soil Exposure

Combined Exposure

	On-site
Receptor:	None

Construction Worker ☐

Source Media:

☐ Direct Ingestion
☐ Dermal Contact
☐ Inhalation (vol+part)
☐ Vegetable Ingestion

Option:

☐ Apply UK (CLEA) SGV as soil concentration limit

3. Air Exposure

Volatilization and Particulates to Outdoor Air Inhalation

	On-site	Off-site1	Off-site2	
Receptor:	None	None	None	
Distance:	0	0	0	(m)

Construction worker ☐

Source Media:

☐ Affected Soils--Volatilization to Ambient Outdoor Air
☐ Affected Groundwater--Volatilization to Ambient Outdoor Air
☐ Affected Surface Soils--Particulates to Ambient Outdoor Air

Volatilization to Indoor Air Inhalation

	On-site	Off-site1	Off-site2	
Receptor:	Res.	None	None	
Distance:	0	0	0	(m)

Source Media:

☐ Affected Soils--Volatilization to Enclosed Space
☐ Affected Soils Leaching to GW--Volatilization to Enclosed Space
☑ Affected Groundwater--Volatilization to Enclosed Space

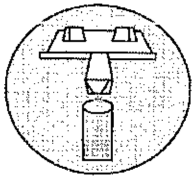
4. Commands and Options

Exposure Factors and Target Risk Limits

Site Name: Stratus Oakland USA 57
Location: Oakland
Compl. By: Clint Skinner
Job ID: GW to Air Res
Date: 11-Jul-09

1. Exposure Parameters

	Residential Receptors			*Commerical Receptors*		*User*
	Child	Adolescent	Adult	Adult	Construc.	*Defined*
Averaging time, carcinogens (yr)	70					-
Averaging time, non-carcinogens (yr)	6	12	30	25	1	-
Body weight (kg)	15	35	70	70	70	-
Exposure duration (yr)	6	12	30	25	1	-
Averaging Time for Vapor Flux (yr)	30			30	30	-
Exposure frequency (d/yr)	350			250	180	-
Dermal exposure freq. (d/yr)	350			250	180	-
Seasonal-avg skin surface area (cm^2/d)	2023	2023	3160	3160	3160	-
Soil dermal adherence factor (mg/cm^2)	0.5	0.5	0.5	0.5	0.5	-
Water ingestion rate (L/d)	1	1	2	1	1	-
Soil ingestion rate (mg/d)	200	200	100	50	100	-
Swimming exposure time (hr/event)	1	3	3			
Swimming event frequency (events/yr)	12	12	12			
Swimming water ingestion rate (L/hr)	0.5	0.5	0.05			
Skin surface area, swimming (cm^2)	3500	8100	23000			
Fish consumption rate (kg/d)	0.025	0.025	0.025			
Vegetable ingestion rate (kg/d)						
Above-ground vegetables	0.002	0.002	0.006			
Below-ground vegetables	0.001	0.001	0.002			
Contaminated fish fraction (-)	1					



2. Age Adjustment for Carcinogens

(residential receptor only)

		Adjustment Factor	
☐	Seasonal skin surface area, soil contact	1022.26	(cm^2-yr/kg)
☑	Water ingestion	1.08571	(mg-yr/L-day)
☐	Soil ingestion	165.714	(mg-yr/kg-day)
☐	Swimming water ingestion	4.56	(L/kg)
☐	Skin surface area, swimming	80640	(cm^2-yr/kg)
☐	Fish consumption	0.02286	(kg-yr/kg-day)
☐	Below-ground vegetable ingestion	0.38	(kg-yr/kg-day)
☐	Above-ground vegetable ingestion	0.88	(kg-yr/kg-day)

3. Non-Carcinogenic Receptor

(residential receptor only)

Adult ▼

4. Target Health Risk Limits

	Individual	Cumulative
Target Cancer Risk (Carcinogens)	1.0E-5	1.0E-5
Target Hazard Quotient/Index (non-Carc.)	1.0E+0	1.0E+0

5. Commands and Options

Return to Exposure Pathways

Use/Set Default Values

Print Sheet

Help

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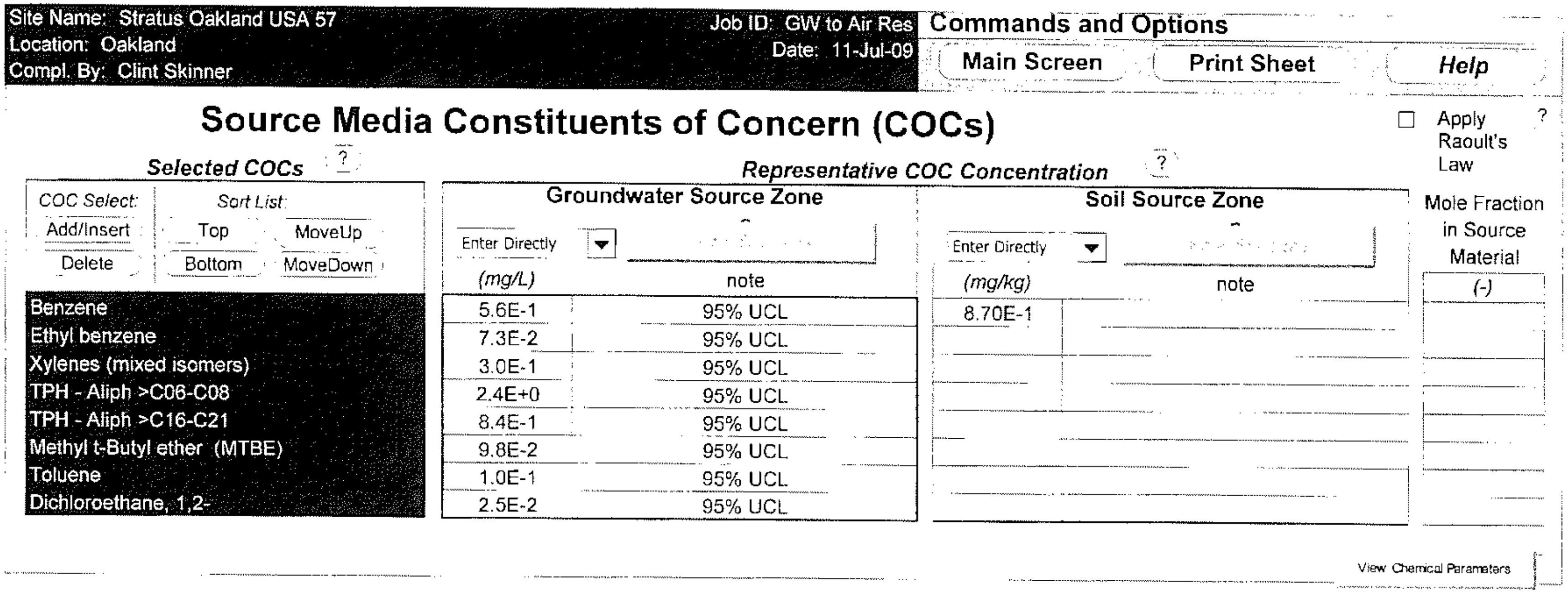

Site Name: Stratus Oakland USA 57
Location: Oakland
Compl. By: Clint Skinner

Job ID: GW to Air Res
Date: 11-Jul-09

Source Media Constituents of Concern (COCs)

☐ Apply Raoult's Law

Selected COCs	Representative COC Concentration				Mole Fraction in Source Material
	Groundwater Source Zone		Soil Source Zone		
	(mg/L)	note	(mg/kg)	note	(-)
Benzene	5.6E-1	95% UCL	8.70E-1		
Ethyl benzene	7.3E-2	95% UCL			
Xylenes (mixed isomers)	3.0E-1	95% UCL			
TPH - Aliph >C06-C08	2.4E+0	95% UCL			
TPH - Aliph >C16-C21	8.4E-1	95% UCL			
Methyl t-Butyl ether (MTBE)	9.8E-2	95% UCL			
Toluene	1.0E-1	95% UCL			
Dichloroethane, 1,2-	2.5E-2	95% UCL			

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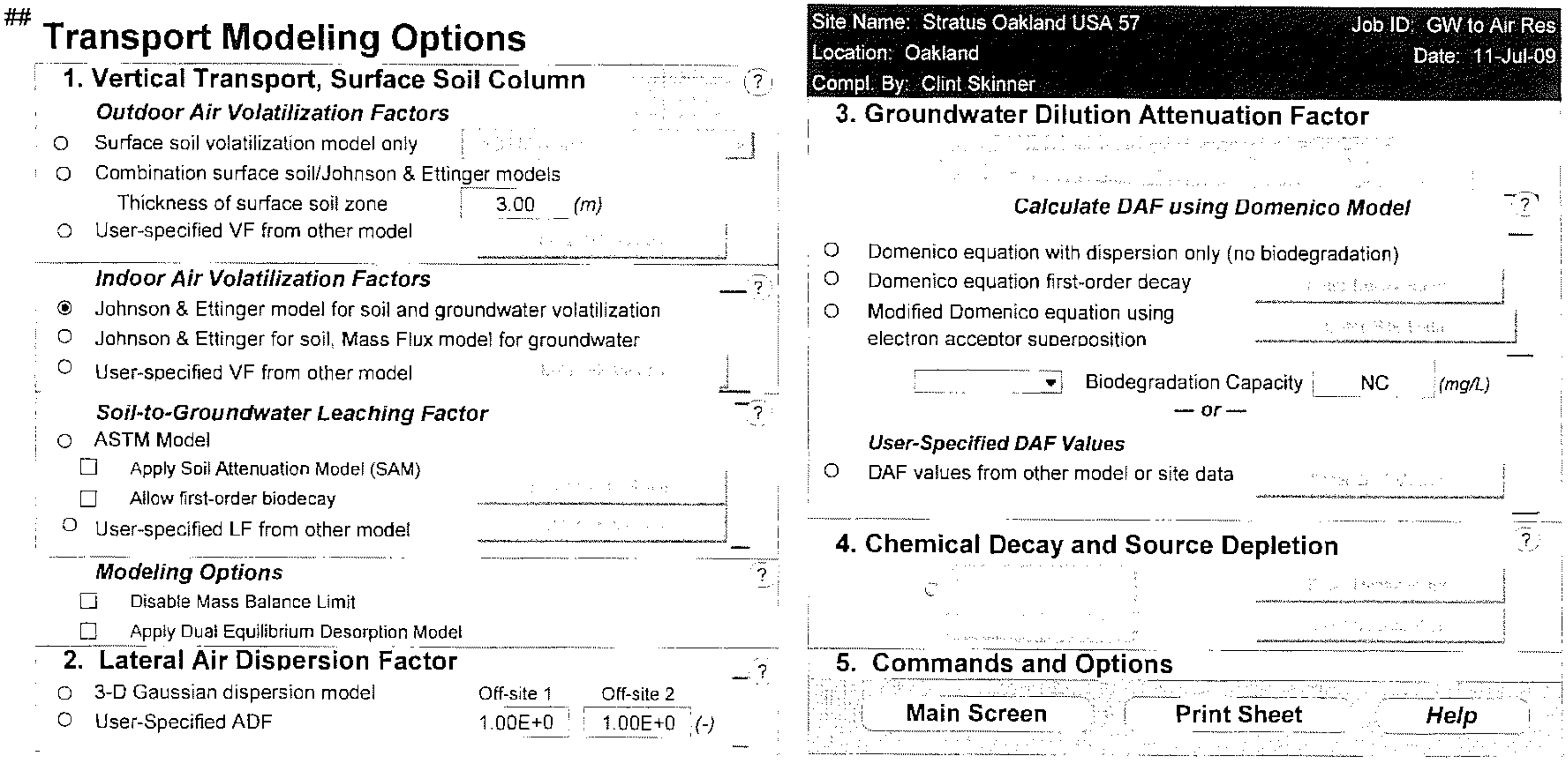


Site Name: Stratus Oakland USA 57
Job ID: GW to Air Res
Location: Oakland
Date: 11-Jul-09
Compl. By: Clint Skinner

Transport Modeling Options

1. Vertical Transport, Surface Soil Column

Outdoor Air Volatilization Factors

○ Surface soil volatilization model only

○ Combination surface soil/Johnson & Ettinger models

Thickness of surface soil zone 3.00 *(m)*

○ User-specified VF from other model

Indoor Air Volatilization Factors

● Johnson & Ettinger model for soil and groundwater volatilization

○ Johnson & Ettinger for soil, Mass Flux model for groundwater

○ User-specified VF from other model

Soil-to-Groundwater Leaching Factor

○ ASTM Model

☐ Apply Soil Attenuation Model (SAM)

☐ Allow first-order biodecay

○ User-specified LF from other model

Modeling Options

☐ Disable Mass Balance Limit

☐ Apply Dual Equilibrium Desorption Model

2. Lateral Air Dispersion Factor

○ 3-D Gaussian dispersion model

○ User-Specified ADF

	Off-site 1	Off-site 2	
User-Specified ADF	1.00E+0	1.00E+0	*(-)*

3. Groundwater Dilution Attenuation Factor

Calculate DAF using Domenico Model

○ Domenico equation with dispersion only (no biodegradation)

○ Domenico equation first-order decay

○ Modified Domenico equation using electron acceptor superposition

Biodegradation Capacity NC *(mg/L)*

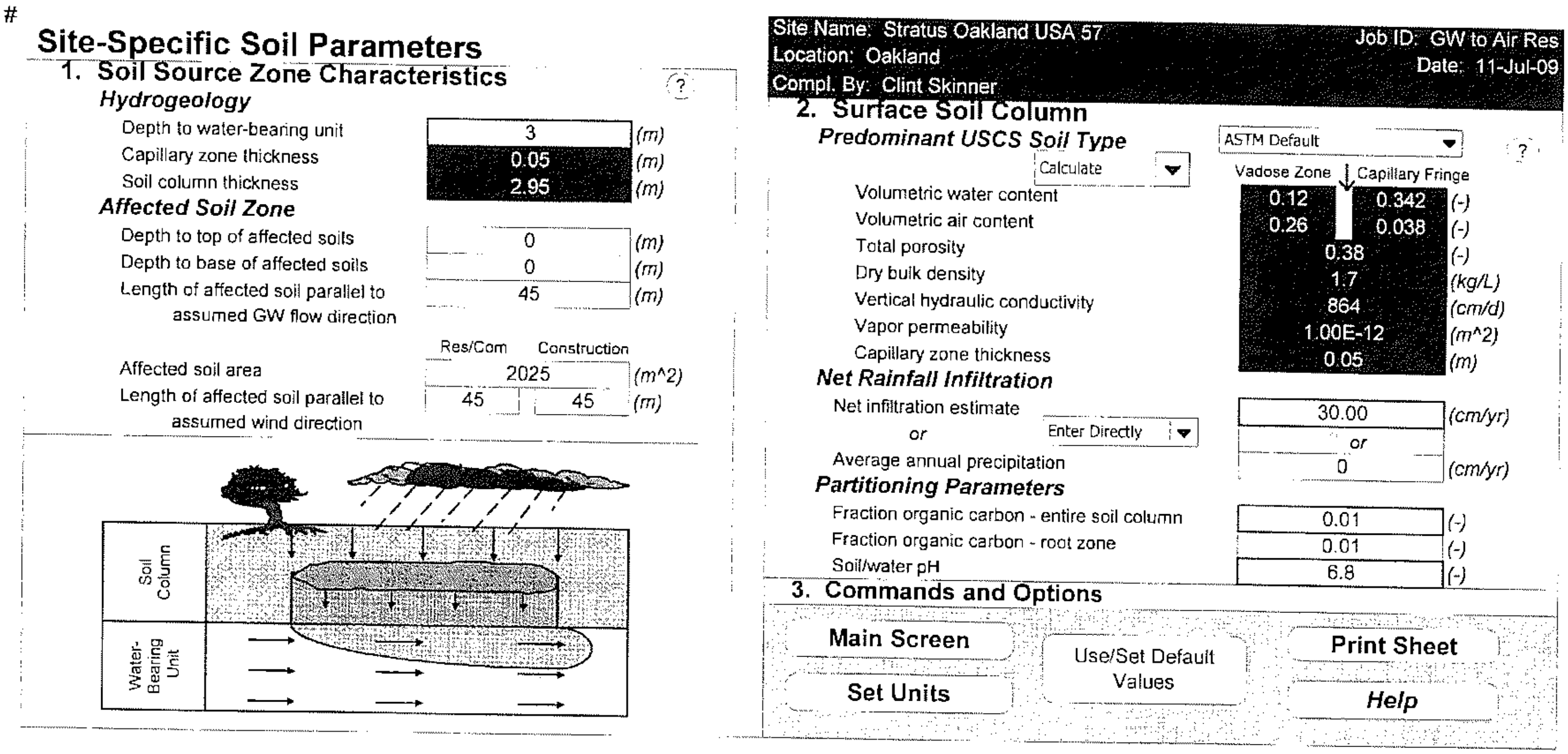
— or —

User-Specified DAF Values

○ DAF values from other model or site data

4. Chemical Decay and Source Depletion

5. Commands and Options



Site-Specific Soil Parameters

Site Name: Stratus Oakland USA 57
Location: Oakland
Compl. By: Clint Skinner
Job ID: GW to Air Res
Date: 11-Jul-09

1. Soil Source Zone Characteristics

Hydrogeology

Depth to water-bearing unit	3	(m)
Capillary zone thickness	0.05	(m)
Soil column thickness	2.95	(m)

Affected Soil Zone

Depth to top of affected soils	0		(m)
Depth to base of affected soils	0		(m)
Length of affected soil parallel to assumed GW flow direction	45		(m)
	Res/Com	Construction	
Affected soil area	2025		(m^2)
Length of affected soil parallel to assumed wind direction	45	45	(m)

2. Surface Soil Column

Predominant USCS Soil Type ASTM Default

Calculate

	Vadose Zone	Capillary Fringe	
Volumetric water content	0.12	0.342	(-)
Volumetric air content	0.26	0.038	(-)
Total porosity	0.38		(-)
Dry bulk density	1.7		(kg/L)
Vertical hydraulic conductivity	864		(cm/d)
Vapor permeability	1.00E-12		(m^2)
Capillary zone thickness	0.05		(m)

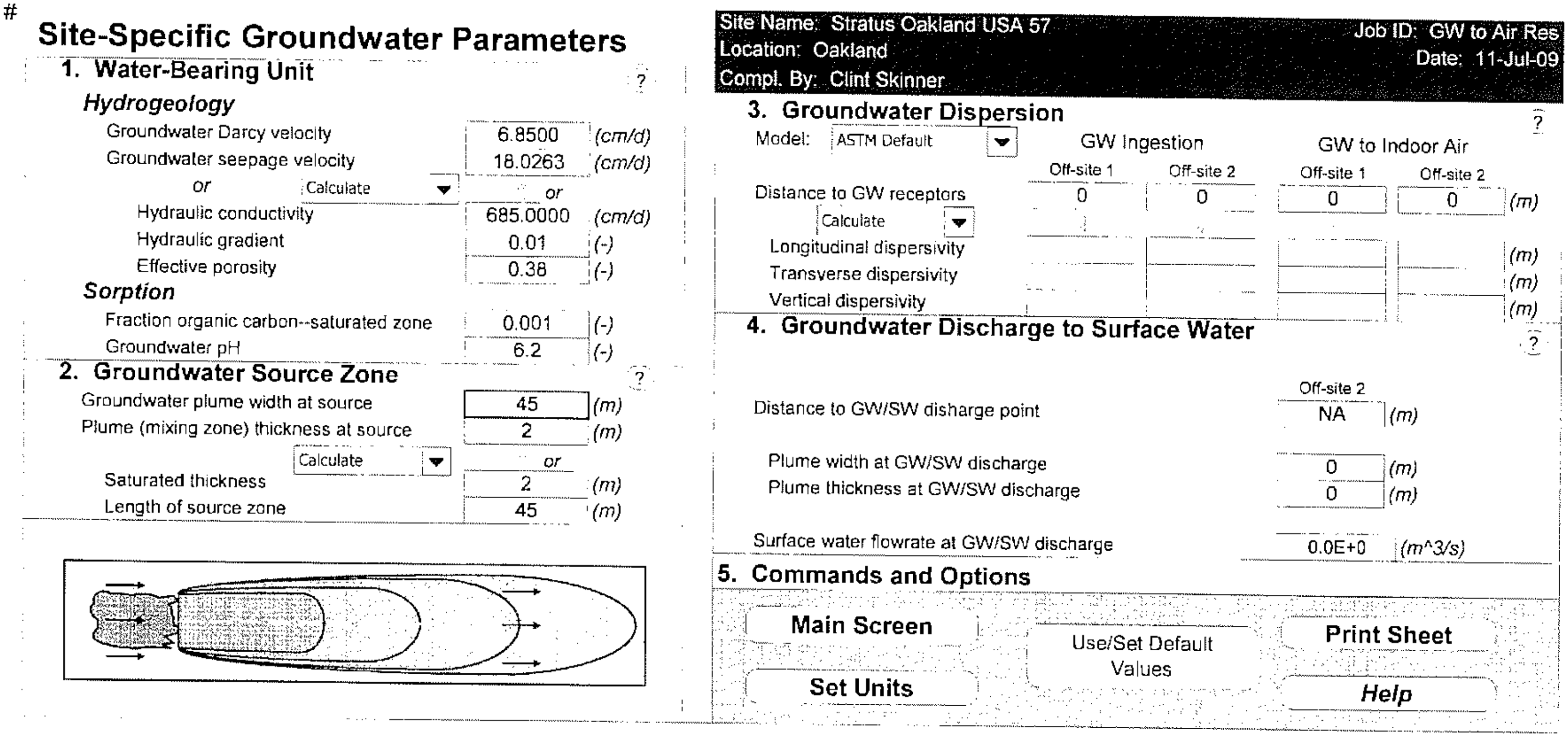
Net Rainfall Infiltration

Net infiltration estimate	30.00	(cm/yr)
or Enter Directly	or	
Average annual precipitation	0	(cm/yr)

Partitioning Parameters

Fraction organic carbon - entire soil column	0.01	(-)
Fraction organic carbon - root zone	0.01	(-)
Soil/water pH	6.8	(-)

3. Commands and Options



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Site Name: Stratus Oakland USA 57
Location: Oakland
Compl. By: Clint Skinner
Job ID: GW to Air Res
Date: 11-Jul-09

Site-Specific Groundwater Parameters

1. Water-Bearing Unit

Hydrogeology

Groundwater Darcy velocity	6.8500	(cm/d)
Groundwater seepage velocity	18.0263	(cm/d)
or Calculate	or	
Hydraulic conductivity	685.0000	(cm/d)
Hydraulic gradient	0.01	(-)
Effective porosity	0.38	(-)

Sorption

Fraction organic carbon--saturated zone	0.001	(-)
Groundwater pH	6.2	(-)

2. Groundwater Source Zone

Groundwater plume width at source	45	(m)
Plume (mixing zone) thickness at source	2	(m)
Calculate	or	
Saturated thickness	2	(m)
Length of source zone	45	(m)

3. Groundwater Dispersion

Model: ASTM Default

	GW Ingestion		GW to Indoor Air		
	Off-site 1	Off-site 2	Off-site 1	Off-site 2	
Distance to GW receptors	0	0	0	0	(m)
Calculate					
Longitudinal dispersivity					(m)
Transverse dispersivity					(m)
Vertical dispersivity					(m)

4. Groundwater Discharge to Surface Water

	Off-site 2	
Distance to GW/SW disharge point	NA	(m)
Plume width at GW/SW discharge	0	(m)
Plume thickness at GW/SW discharge	0	(m)
Surface water flowrate at GW/SW discharge	0.0E+0	(m^3/s)

5. Commands and Options

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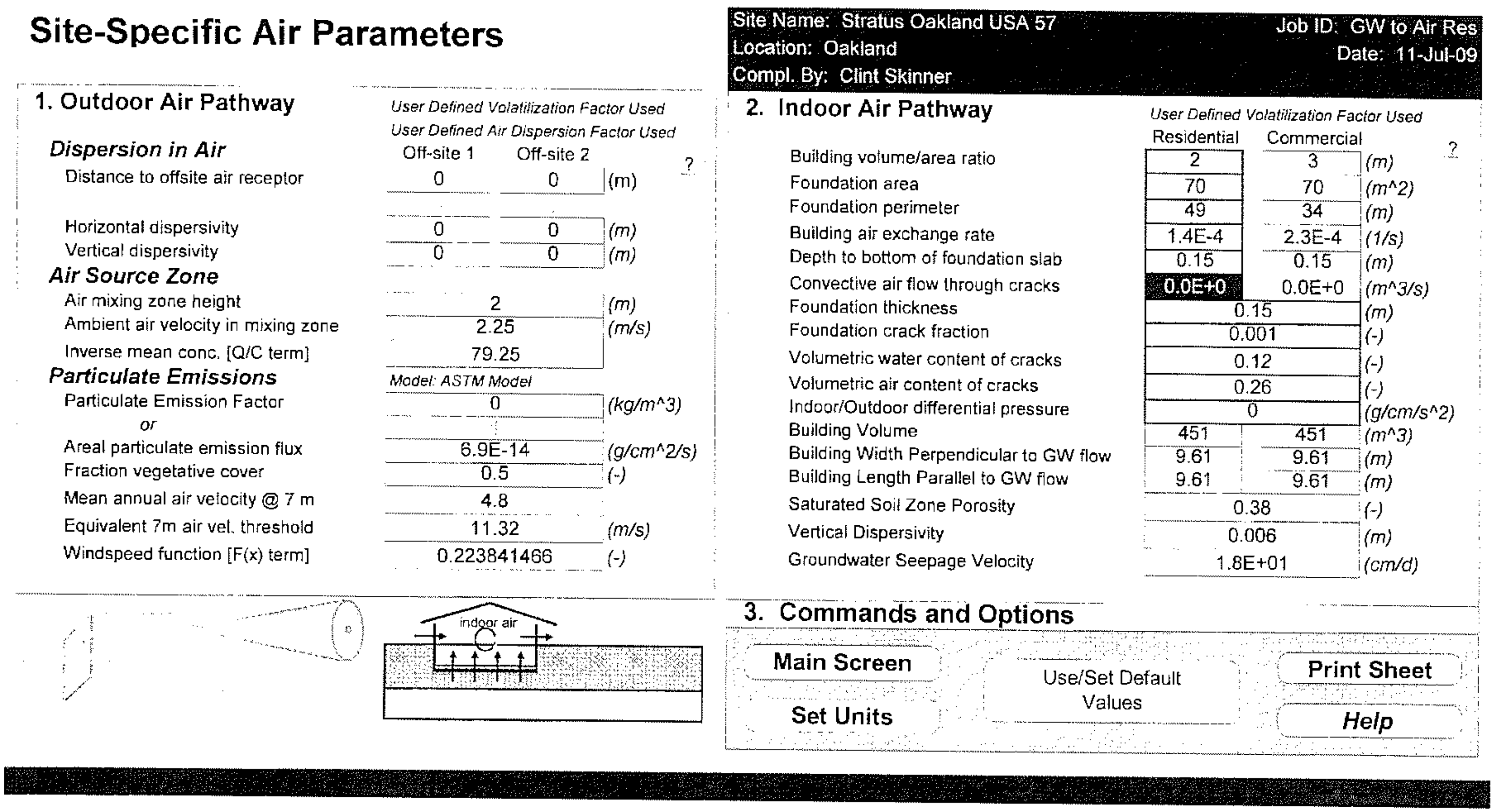


Site-Specific Air Parameters

Site Name: Stratus Oakland USA 57
Location: Oakland
Compl. By: Clint Skinner

Job ID: GW to Air Res
Date: 11-Jul-09

1. Outdoor Air Pathway

User Defined Volatilization Factor Used
User Defined Air Dispersion Factor Used

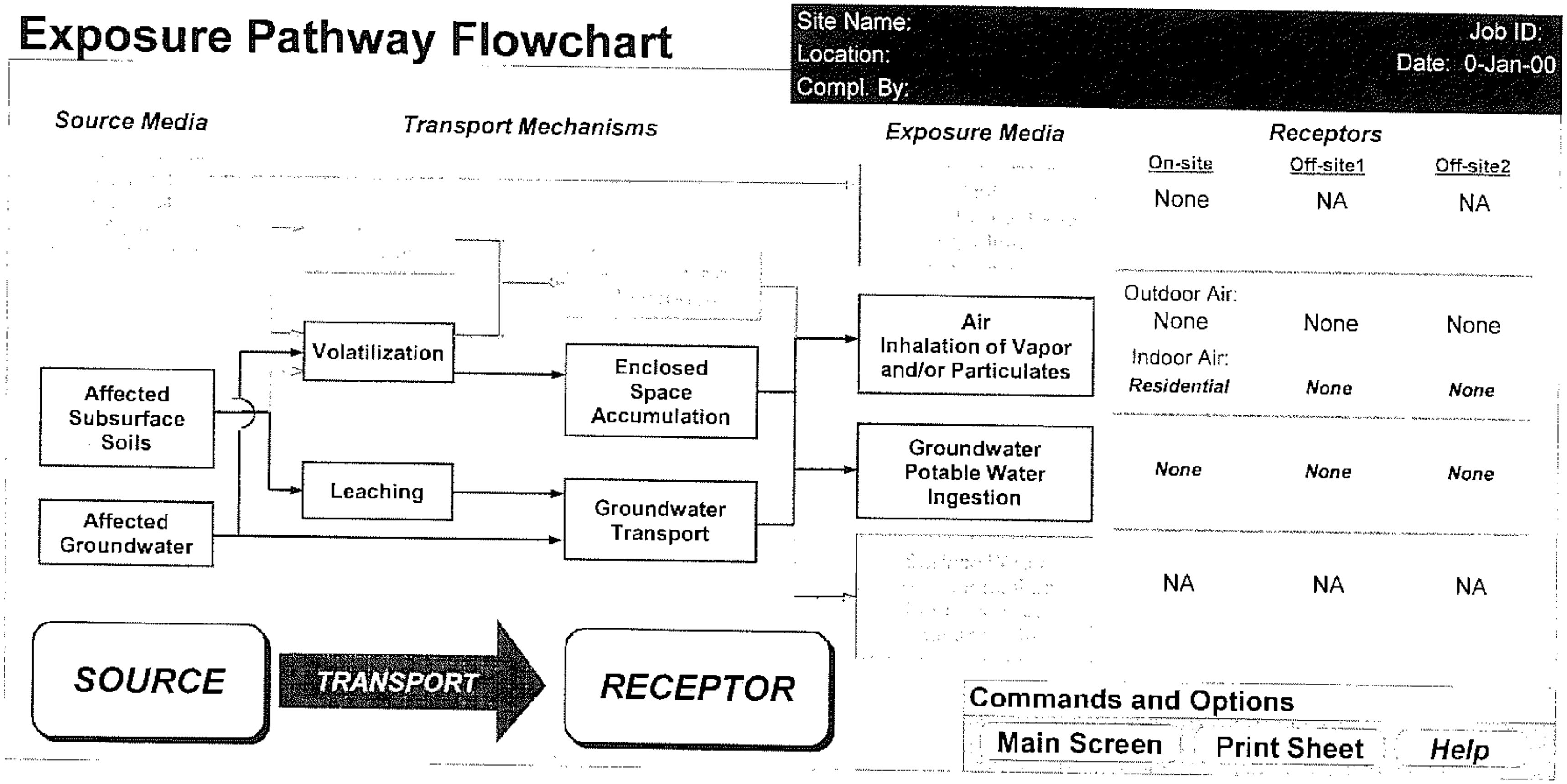
	Off-site 1	Off-site 2	
Dispersion in Air			?
Distance to offsite air receptor	0	0	(m)
Horizontal dispersivity	0	0	*(m)*
Vertical dispersivity	0	0	*(m)*
Air Source Zone			
Air mixing zone height	2		*(m)*
Ambient air velocity in mixing zone	2.25		*(m/s)*
Inverse mean conc. [Q/C term]	79.25		
Particulate Emissions	*Model: ASTM Model*		
Particulate Emission Factor	0		*(kg/m^3)*
or			
Areal particulate emission flux	6.9E-14		*(g/cm^2/s)*
Fraction vegetative cover	0.5		*(-)*
Mean annual air velocity @ 7 m	4.8		
Equivalent 7m air vel. threshold	11.32		*(m/s)*
Windspeed function [F(x) term]	0.223841466		*(-)*

2. Indoor Air Pathway

User Defined Volatilization Factor Used

	Residential	Commercial	?
Building volume/area ratio	2	3	*(m)*
Foundation area	70	70	*(m^2)*
Foundation perimeter	49	34	*(m)*
Building air exchange rate	1.4E-4	2.3E-4	*(1/s)*
Depth to bottom of foundation slab	0.15	0.15	*(m)*
Convective air flow through cracks	0.0E+0	0.0E+0	*(m^3/s)*
Foundation thickness	0.15		*(m)*
Foundation crack fraction	0.001		*(-)*
Volumetric water content of cracks	0.12		*(-)*
Volumetric air content of cracks	0.26		*(-)*
Indoor/Outdoor differential pressure	0		*(g/cm/s^2)*
Building Volume	451	451	*(m^3)*
Building Width Perpendicular to GW flow	9.61	9.61	*(m)*
Building Length Parallel to GW flow	9.61	9.61	*(m)*
Saturated Soil Zone Porosity	0.38		*(-)*
Vertical Dispersivity	0.006		*(m)*
Groundwater Seepage Velocity	1.8E+01		*(cm/d)*

3. Commands and Options



Exposure Pathway Flowchart

Site Name:
Location:
Compl. By:
Job ID:
Date: 0-Jan-00

Exposure Media	Receptors		
	On-site	Off-site1	Off-site2
	None	NA	NA
Air Inhalation of Vapor and/or Particulates	Outdoor Air: None Indoor Air: *Residential*	None *None*	None *None*
Groundwater Potable Water Ingestion	*None*	*None*	*None*
	NA	NA	NA

Commands and Options

RBCA SITE ASSESSMENT | **User-Specified COC Data**

REPRESENTATIVE COC CONCENTRATIONS IN SOURCE MEDIA

CONSTITUENT	Representative COC Concentration			
	Groundwater		Soils (0 - 0 m)	
	value (mg/L)	note	value (mg/kg)	note
Benzene	5.6E-1	95% UCL	8.7E-1	
Ethyl benzene	7.3E-2	95% UCL		
Xylenes (mixed isomers)	3.0E-1	95% UCL		
TPH - Aliph >C06-C08	2.4E+0	95% UCL		
TPH - Aliph >C16-C21	8.4E-1	95% UCL		
Methyl t-Butyl ether (MTBE)	9.8E-2	95% UCL		
Toluene	1.0E-1	95% UCL		
Dichloroethane, 1,2-	2.5E-2	95% UCL		

RBCA SITE ASSESSMENT | **User-Specified COC Data**

REPRESENTATIVE COC CONCENTRATIONS IN SOURCE MEDIA

CONSTITUENT	Representative COC Concentration			
	Groundwater		Soils (0 - 0 m)	
	value (mg/L)	note	value (mg/kg)	note
Benzene	5.6E-1	95% UCL	8.7E-1	
Ethyl benzene	7.3E-2	95% UCL		
Xylenes (mixed isomers)	3.0E-1	95% UCL		
TPH - Aliph >C06-C08	2.4E+0	95% UCL		
TPH - Aliph >C16-C21	8.4E-1	95% UCL		
Methyl t-Butyl ether (MTBE)	9.8E-2	95% UCL		
Toluene	1.0E-1	95% UCL		
Dichloroethane, 1,2-	2.5E-2	95% UCL		

Site Name: Stratus Oakland USA 57
Site Location: Oakland
Completed By: Clint Skinner

Date Completed: 11-Jul-09
Job ID: GW to Air Res

RBCA SITE ASSESSMENT

TIER 2 EXPOSURE CONCENTRATION AND INTAKE CALCULATION

INDOOR AIR EXPOSURE PATHWAYS ☐ **(Checked if Pathway is Complete)**

SOILS : VAPOR
INTRUSION INTO BUILDINGS

Constituents of Concern	1) Source Medium	2) NAF Value (L/kg) Receptor	3) Exposure Medium Indoor Air: POE Conc. (mg/m^3) (1) / (2)	4) Exposure Multiplier (EFxED)/(ATx365) (unitless)	5) Average Inhalation Exposure Concentration (mg/m^3) (3) X (4)
	Soil Conc. (mg/kg)	On-site (0 m) None	On-site (0 m) None	On-site (0 m) None	On-site (0 m) None
Benzene	8.7E-1				
Ethyl benzene					
Xylenes (mixed isomers)					
TPH - Aliph >C06-C08					
TPH - Aliph >C16-C21					
Methyl t-Butyl ether (MTBE)					
Toluene					
Dichloroethane, 1,2-					

* = Chemical with user-specified data

NOTE: AT = Averaging time (days) EF = Exposure frequency (days/yr) ED = Exposure duration (yr) NAF = Natural attenuation factor POE = Point of exposure

Site Name: Stratus Oakland USA 57
Site Location: Oakland
Completed By: Clint Skinner

Date Completed: 11-Jul-09
Job ID: GW to Air Res

RBCA SITE ASSESSMENT

TIER 2 EXPOSURE CONCENTRATION AND INTAKE CALCULATION

INDOOR AIR EXPOSURE PATHWAYS ■ **(Checked if Pathway is Complete)**

GROUNDWATER: VAPOR INTRUSION INTO BUILDINGS

Exposure Concentration

	1) Source Medium	2) NAF Value (m^3/L) Receptor			3) Exposure Medium Indoor Air: POE Conc. (mg/m^3) (1) / (2)		
		On-site (0 m)	Off-site 1 (0 m)	Off-site 2 (0 m)	On-site (0 m)	Off-site 1 (0 m)	Off-site 2 (0 m)
Constituents of Concern	Groundwater Conc. (mg/L)	Residential	None	None	None	None	None
Benzene	5.6E-1	3.1E+2			1.8E-3		
Ethyl benzene	7.3E-2	2.5E+2			2.9E-4		
Xylenes (mixed isomers)	3.0E-1	2.8E+2			1.1E-3		
TPH - Aliph >C06-C08	2.4E+0	1.4E+0			1.8E+0		
TPH - Aliph >C16-C21	8.4E-1	1.3E-2			6.3E+1		
Methyl t-Butyl ether (MTBE)	9.8E-2	2.8E+3			3.5E-5		
Toluene	1.0E-1	2.6E+2			4.0E-4		
Dichloroethane, 1,2-	2.5E-2	1.0E+3			2.4E-5		

NOTE: AT = Averaging time (days) EF = Exposure frequency (days/yr) ED = Exposure duration (yr) NAF = Natural attenuation factor POE = Point of exposure

Site Name: Stratus Oakland USA 57
Site Location: Oakland
Completed By: Clint Skinner

Date Completed: 11-Jul-09
Job ID: GW to Air Res

RBCA SITE ASSESSMENT

TIER 2 EXPOSURE CONCENTRATION AND INTAKE CALCULATION

INDOOR AIR EXPOSURE PATHWAYS

GROUNDWATER: VAPOR INTRUSION
INTO BUILDINGS

	4) Exposure Multiplier (EFxED)/(ATx365) (unitless)			5) Average Inhalation Exposure Concentration (mg/m^3) (3) X (4)		
Constituents of Concern	On-site (0 m) None	Off-site 1 (0 m) None	Off-site 2 (0 m) None	On-site (0 m) None	Off-site 1 (0 m) None	Off-site 2 (0 m) None
Benzene	4.1E-1			7.5E-4		
Ethyl benzene	9.6E-1			2.8E-4		
Xylenes (mixed isomers)	9.6E-1			1.0E-3		
TPH - Aliph >C06-C08	9.6E-1			1.7E+0		
TPH - Aliph >C16-C21	9.6E-1			6.0E+1		
Methyl t-Butyl ether (MTBE)	4.1E-1			1.4E-5		
Toluene	9.6E-1			3.8E-4		
Dichloroethane, 1,2-	4.1E-1			9.8E-6		

* = Chemical with user-specified data

NOTE. AT = Averaging time (days) EF = Exposure frequency (days/yr) ED = Exposure duration (yr) NAF = Natural attenuation factor POE = Point of exposure

Site Name: Stratus Oakland USA 57
Site Location: Oakland
Completed By: Clint Skinner

Date Completed 11-Jul-09
Job ID: GW to Air Res

RBCA SITE ASSESSMENT

TIER 2 EXPOSURE CONCENTRATION AND INTAKE CALCULATION

INDOOR AIR EXPOSURE PATHWAYS ☐ **(Checked if Pathway is Complete)**

SOIL LEACHING TO GW- VAPOR INTRUSION INTO BUILDINGS

Exposure Concentration

	1) Source Medium	2) NAF Value (m^3/L) Receptor			3) Exposure Medium Indoor Air: POE Conc. (mg/m^3) (1) / (2)		
		On-site (0 m)	Off-site 1 (0 m)	Off-site 2 (0 m)	On-site (0 m)	Off-site 1 (0 m)	Off-site 2 (0 m)
Constituents of Concern	Soil Conc. (mg/kg)	None	None	None	None	None	None
Benzene	8.7E-1						
Ethyl benzene							
Xylenes (mixed isomers)							
TPH - Aliph >C06-C08							
TPH - Aliph >C16-C21							
Methyl t-Butyl ether (MTBE)							
Toluene							
Dichloroethane, 1,2-							

NOTE: AT = Averaging time (days) EF = Exposure frequency (days/yr) ED = Exposure duration (yr) NAF = Natural attenuation factor POE = Point of exposure

Site Name: Stratus Oakland USA 57
Site Location: Oakland
Completed By: Clint Skinner

Date Completed: 11-Jul-09
Job ID: GW to Air Res

RBCA SITE ASSESSMENT

TIER 2 EXPOSURE CONCENTRATION AND INTAKE CALCULATION

INDOOR AIR EXPOSURE PATHWAYS

SOIL LEACHING TO GW- VAPOR INTRUSION
INTO BUILDINGS

Constituents of Concern	4) Exposure Multiplier (EFxED)/(ATx365) (unitless)			5) Average Inhalation Exposure Concentration (mg/m^3) (3) X (4)		
	On-site (0 m) None	Off-site 1 (0 m) None	Off-site 2 (0 m) None	On-site (0 m) None	Off-site 1 (0 m) None	Off-site 2 (0 m) None
Benzene						
Ethyl benzene						
Xylenes (mixed isomers)						
TPH - Aliph >C06-C08						
TPH - Aliph >C16-C21						
Methyl t-Butyl ether (MTBE)						
Toluene						
Dichloroethane, 1,2-						

* = Chemical with user-specified data

NOTE: AT = Averaging time (days) EF = Exposure frequency (days/yr) ED = Exposure duration (yr) NAF = Natural attenuation factor POE = Point of exposure

Site Name: Stratus Oakland USA 57
Site Location: Oakland
Completed By: Clint Skinner

Date Completed: 11-Jul-09
Job ID: GW to Air Res

RBCA SITE ASSESSMENT

TIER 2 EXPOSURE CONCENTRATION AND INTAKE CALCULATION

INDOOR AIR EXPOSURE PATHWAYS

MAXIMUM PATHWAY EXPOSURE (mg/m^3)

(Maximum average exposure concentration from soil and groundwater routes.)

Constituents of Concern	On-site (0 m) Residential	Off-site 1 (0 m) None	Off-site 2 (0 m) None
Benzene	7.5E-4		
Ethyl benzene	2.8E-4		
Xylenes (mixed isomers)	1.0E-3		
TPH - Aliph >C06-C08	1.7E+0		
TPH - Aliph >C16-C21	6.0E+1		
Methyl t-Butyl ether (MTBE)	1.4E-5		
Toluene	3.8E-4		
Dichloroethane, 1,2-	9.8E-6		

Site Name: Stratus Oakland USA 57
Site Location: Oakland
Completed By: Clint Skinner

Date Completed: 11-Jul-09
Job ID: GW to Air Res

RBCA SITE ASSESSMENT

TIER 2 PATHWAY RISK CALCULATION

INDOOR AIR EXPOSURE PATHWAYS ■ (Checked if Pathway is Complete)

CARCINOGENIC RISK

Constituents of Concern	(1) Carcinogenic Classification	(2) Maximum Carcinogenic Exposure (mg/m^3) On-site (0 m) Residential	Off-site 1 (0 m) None	Off-site 2 (0 m) None	(3) Inhalation Unit Risk Factor (µg/m^3)^-1	(4) Individual COC Risk (2) x (3) x 1000 On-site (0 m) Residential	Off-site 1 (0 m) None	Off-site 2 (0 m) None
Benzene	TRUE	7.5E-4	-	-	2.2E-6	1.6E-6		
Ethyl benzene	FALSE	-	-	-	-			
Xylenes (mixed isomers)	FALSE	-	-	-	-			
TPH - Aliph >C06-C08	FALSE	-	-	-	-			
TPH - Aliph >C16-C21	FALSE	-	-	-	-			
Methyl t-Butyl ether (MTBE)	TRUE	1.4E-5	-	-	2.6E-7	3.7E-9		
Toluene	FALSE	-	-	-	-			
Dichloroethane, 1,2-	TRUE	9.8E-6	-	-	2.6E-5	2.6E-7		

Total Pathway Carcinogenic Risk =	**1.9E-6**		

Site Name: Stratus Oakland USA 57
Site Location: Oakland
Completed By: Clint Skinner

Date Completed: 11-Jul-09
Job ID: GW to Air Res

RBCA SITE ASSESSMENT

TIER 2 PATHWAY RISK CALCULATION

INDOOR AIR EXPOSURE PATHWAYS ■ **(Checked if Pathway is Complete)**

TOXIC EFFECTS

	(5) Maximum Toxicant Exposure (mg/m^3)			(6) Inhalation Reference Concentration	(7) Individual COC Hazard Quotient (5) / (6)		
	On-site (0 m) Residential	Off-site 1 (0 m) None	Off-site 2 (0 m) None	(mg/m^3)	On-site (0 m) Residential	Off-site 1 (0 m) None	Off-site 2 (0 m) None
Constituents of Concern							
Benzene	1.7E-3			2.8E-1	6.2E-3		
Ethyl benzene	2.8E-4			1.0E+0	2.8E-4		
Xylenes (mixed isomers)	1.0E-3			1.0E-1	1.0E-2		
TPH - Aliph >C06-C08	1.7E+0			1.8E+1	9.5E-2		
TPH - Aliph >C16-C21	6.0E+1			-			
Methyl t-Butyl ether (MTBE)	3.3E-5			3.0E+0	1.1E-5		
Toluene	3.8E-4			5.0E+0	7.7E-5		
Dichloroethane, 1,2-	2.3E-5			2.4E+0	9.5E-6		

Total Pathway Hazard Index =	**1.1E-1**		

Site Name: Stratus Oakland USA 57
Site Location: Oakland
Completed By: Clint Skinner

Date Completed: 11-Jul-09
Job ID: GW to Air Res

RBCA SITE ASSESSMENT

Baseline Risk Summary-All Pathways

Site Name: Stratus Oakland USA 57
Site Location: Oakland

Completed By: Clint Skinner
Date Completed: 11-Jul-09

BASELINE RISK SUMMARY TABLE

	BASELINE CARCINOGENIC RISK					BASELINE TOXIC EFFECTS				
EXPOSURE PATHWAY	Individual COC Risk		Cumulative COC Risk		Risk Limit(s) Exceeded?	Hazard Quotient		Hazard Index		Toxicity Limit(s) Exceeded?
	Maximum Value	Target Risk	Total Value	Target Risk		Maximum Value	Applicable Limit	Total Value	Applicable Limit	
OUTDOOR AIR EXPOSURE PATHWAYS										
☐	NA	NA	NA	NA	☐	NA	NA	NA	NA	☐
INDOOR AIR EXPOSURE PATHWAYS										
■	1.6E-6	1.0E-5	1.9E-6	1.0E-5	☐	9.5E-2	1.0E+0	1.1E-1	1.0E+0	☐
SOIL EXPOSURE PATHWAYS										
☐	NA	NA	NA	NA	☐	NA	NA	NA	NA	☐
GROUNDWATER EXPOSURE PATHWAYS										
☐	NA	NA	NA	NA	☐	NA	NA	NA	NA	☐
SURFACE WATER EXPOSURE PATHWAYS										
☐	NA	NA	NA	NA	☐	NA	NA	NA	NA	☐

CRITICAL EXPOSURE PATHWAY (Maximum Values From Complete Pathways)										
	1.6E-6	*1.0E-5*	*1.9E-6*	*1.0E-5*	☐	*9.5E-2*	*1.0E+0*	*1.1E-1*	*1.0E+0*	☐
	Indoor Air		*Indoor Air*			*Indoor Air*		*Indoor Air*		

RBCA SITE ASSESSMENT

Site Name: Stratus Oakland USA 57
Site Location: Oakland

Completed By: Clint Skinner
Date Completed: 11-Jul-09

Job ID: GW to Air Res

1 OF 1

GROUNDWATER SSTL VALUES

Target Risk (Class A & B) 1.0E-5
Target Hazard Quotient 1.0E+0

Groundwater DAF Option

SSTL Results For Complete Exposure Pathways (Checked if Pathway is Complete)

CONSTITUENTS OF CONCERN		Representative Concentration	☐ Groundwater Ingestion / Discharge to Surface Water			■ Groundwater Volatilization to Indoor Air			☐ Groundwater Volatilization to Outdoor Air			Applicable SSTL	SSTL Exceeded ?	Required CRF
CAS No.	Name	(mg/L)	On-site (0 m) None	Off-site 1 (0 m) None	Off-site 2 (0 m) None	On-site (0 m) Residential	Off-site 1 (0 m) None	Off-site 2 (0 m) None	On-site (0 m) None	Off-site 1 (0 m) None	Off-site 2 (0 m) None	(mg/L)	"■" if yes	Only if "yes" left
71-43-2	Benzene	5.6E-1				3.4E+0						3.4E+0	☐	<1
100-41-4	Ethyl benzene	7.3E-2				>1.7E+2						>1.7E+2	☐	NA
1330-20-7	Xylenes (mixed isomers)	3.0E-1				3.0E+1						3.0E+1	☐	<1
T-al0608	TPH - Aliph >C06-C08	2.4E+0				>5.4E+0						>5.4E+0	☐	NA
T-al1621	TPH - Aliph >C16-C21	8.4E-1				Tox?						NC	☐	NA
1634-04-4	Methyl t-Butyl ether (MTBE)	9.8E-2				2.7E+2						2.7E+2	☐	<1
108-88-3	Toluene	1.0E-1				>5.3E+2						>5.3E+2	☐	NA
107-06-2	Dichloroethane, 1,2-	2.5E-2				9.8E-1						9.8E-1	☐	<1
NA	Total TPH mixture	3.3E+0	NA	NA	NA	NC	NA	NA	NA	NA	NA	NC	☐	NA

* = Chemical with user-specified data

">" indicates risk-based target concentration greater than constituent solubility value. NA = Not applicable. NC = Not calculated

RBCA SITE ASSESSMENT | **Cumulative Risk Worksheet**

Site Name: Stratus Oakland USA 57
Site Location: Oakland
Completed By: Clint Skinner
Date Completed: 11-Jul-09
Job ID: GW to Air Res

1 OF 3

CUMULATIVE RISK WORKSHEET

CONSTITUENTS OF CONCERN		Representative Concentration		Proposed CRF		Resultant Target Concentration	
CAS No.	Name	Soil (mg/kg)	Groundwater (mg/L)	Soil	GW	Soil (mg/kg)	Groundwater (mg/L)
71-43-2	Benzene		5.6E-1	NA	NA		5.6E-1
100-41-4	Ethyl benzene		7.3E-2	NA	NA		7.3E-2
1330-20-7	Xylenes (mixed isomers)		3.0E-1	NA	NA		3.0E-1
T-al0608	TPH - Aliph >C06-C08		2.4E+0	NA	NA		2.4E+0
T-al1621	TPH - Aliph >C16-C21		8.4E-1	NA	NA		8.4E-1
1634-04-4	Methyl t-Butyl ether (MTBE)		9.8E-2	NA	NA		9.8E-2
108-88-3	Toluene		1.0E-1	NA	NA		1.0E-1
107-06-2	Dichloroethane, 1,2-		2.5E-2	NA	NA		2.5E-2

Cumulative Values:

RBCA SITE ASSESSMENT

Cumulative Risk Worksheet

Site Name. Stratus Oakland USA 57
Site Location. Oakland

Completed By: Clint Skinner
Date Completed 11-Jul-09

Job ID: GW to Air Res

2 OF 3

CUMULATIVE RISK WORKSHEET

Cumulative Target Risk: 1 0E-5 Target Hazard Index: 1.0E+0

CONSTITUENTS OF CONCERN		ON-SITE RECEPTORS							
		Outdoor Air Exposure: None		Indoor Air Exposure: Residential		Soil Exposure: None		Groundwater Exposure: None	
		Target Risk: 1 0E-5	Target HQ: 1 0E+0	Target Risk: 1 0E-5	Target HQ: 1 0E+0	Target Risk 1.0E-5	Target HQ: 1.0E+0	Target Risk: 1.0E-5	Target HQ: 1.0E+0
CAS No.	Name	Carcinogenic Risk	Hazard Quotient	Carcinogenic Risk	Hazard Quotient	Carcinogenic Risk	Hazard Quotient	Carcinogenic Risk	Hazard Quotient
71-43-2	Benzene			1.6E-6	6.2E-3				
100-41-4	Ethyl benzene				2.8E-4				
1330-20-7	Xylenes (mixed isomers)				1.0E-2				
T-al0608	TPH - Aliph >C06-C08				9.5E-2				
T-al1621	TPH - Aliph >C16-C21								
1634-04-4	Methyl t-Butyl ether (MTBE)			3.7E-9	1.1E-5				
108-88-3	Toluene				7.7E-5				
107-06-2	Dichloroethane, 1,2-			2.6E-7	9.5E-6				
	Cumulative Values:	0.0E+0	0.0E+0	1.9E-6	1.1E-1	0.0E+0	0.0E+0	0.0E+0	0.0E+0

■ indicates risk level exceeding target risk

RBCA SITE ASSESSMENT | **Cumulative Risk Worksheet**

Site Name: Stratus Oakland USA 57
Site Location: Oakland

Completed By: Clint Skinner
Date Completed: 11-Jul-09

Job ID: GW to Air Res

CUMULATIVE RISK WORKSHEET

Cumulative Target Risk: 1.0E-5 Target Hazard Index: 1.0E+0

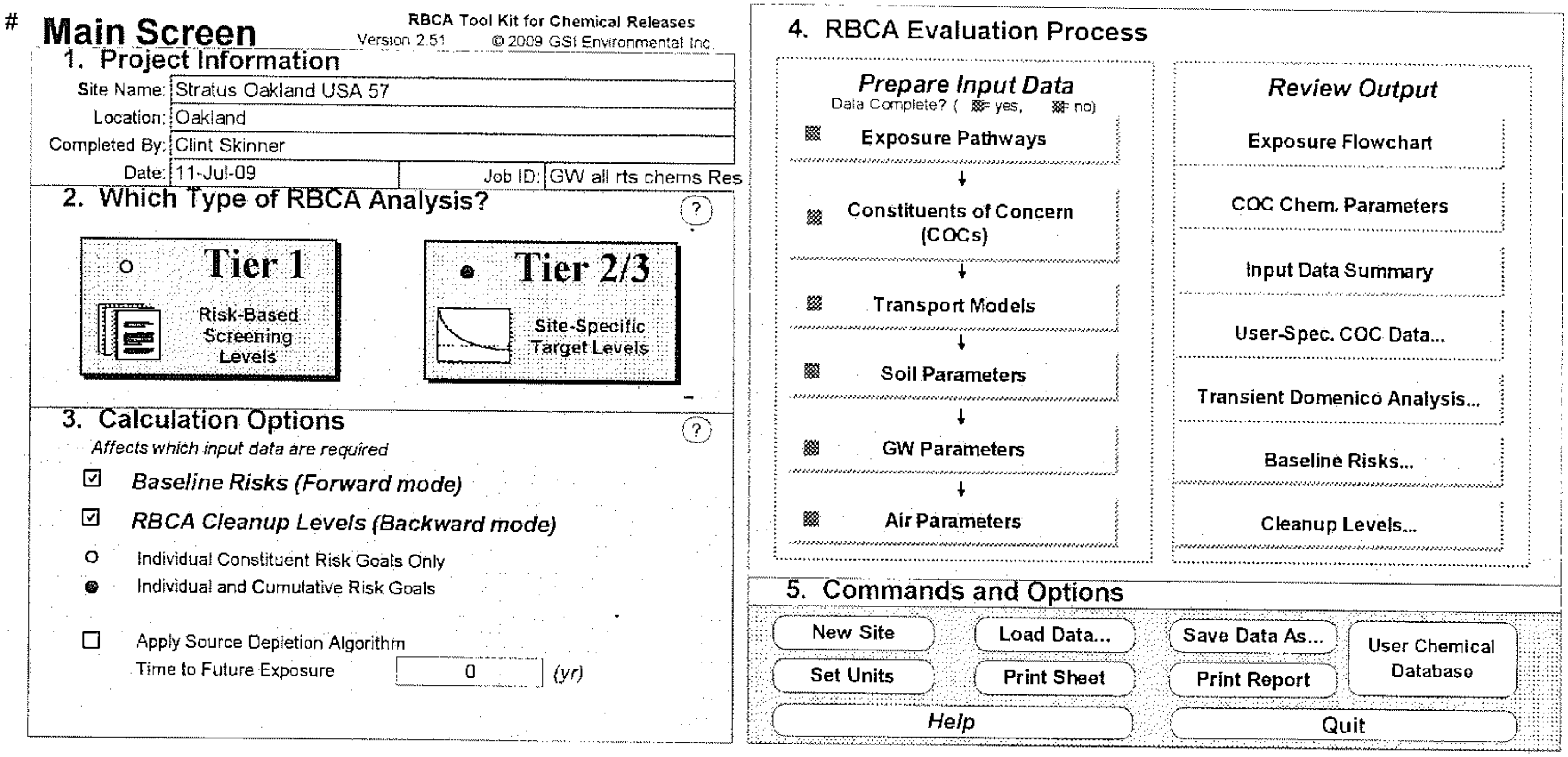
OFF-SITE RECEPTORS

CONSTITUENTS OF CONCERN		Outdoor Air Exposure:				Indoor Air Exposure:				Groundwater Exposure:			
		None		None		None		None		None		None	
		Target Risk: 1.0E-5	Target HQ: 1.0E+0	Target Risk: 1.0E-5	Target HQ: 1.0E+0	Target Risk: 1.0E-5	Target HQ: 1.0E+0	Target Risk: 1.0E-5	Target HQ: 1.0E+0	Target Risk: 1.0E-5	Target HQ: 1.0E+0	Target Risk: 1.0E-5	Target HQ: 1.0E+0
CAS No.	Name	Carcinogenic Risk	Hazard Quotient	Carcinogenic Risk	Hazard Quotient	Carcinogenic Risk	Hazard Quotient	Carcinogenic Risk	Hazard Quotient	Carcinogenic Risk	Hazard Quotient	Carcinogenic Risk	Hazard Quotient
71-43-2	Benzene												
100-41-4	Ethyl benzene												
1330-20-7	Xylenes (mixed isomers)												
T-al0608	TPH - Aliph >C06-C08												
T-al1621	TPH - Aliph >C16-C21												
1634-04-4	Methyl t-Butyl ether (MTBE)												
108-88-3	Toluene												
107-06-2	Dichloroethane, 1,2-												
	Cumulative Values:	0.0E+0	0.0E+0	0.0E+0	0.0E+0	0.0E+0	0.0E+0	0.0E+0	0.0E+0	0.0E+0	0.0E+0	0.0E+0	0.0E+0

■ indicates risk level exceeding target risk

indicates risk level exceeding target risk

APPENDIX G: RBCA RESIDENTIAL GROUNDWATER ALL ROUTES PRINTOUT



Main Screen

RBCA Tool Kit for Chemical Releases
Version 2.51 © 2009 GSI Environmental Inc.

1. Project Information

Site Name: Stratus Oakland USA 57
Location: Oakland
Completed By: Clint Skinner
Date: 11-Jul-09
Job ID: GW all rts chems Res

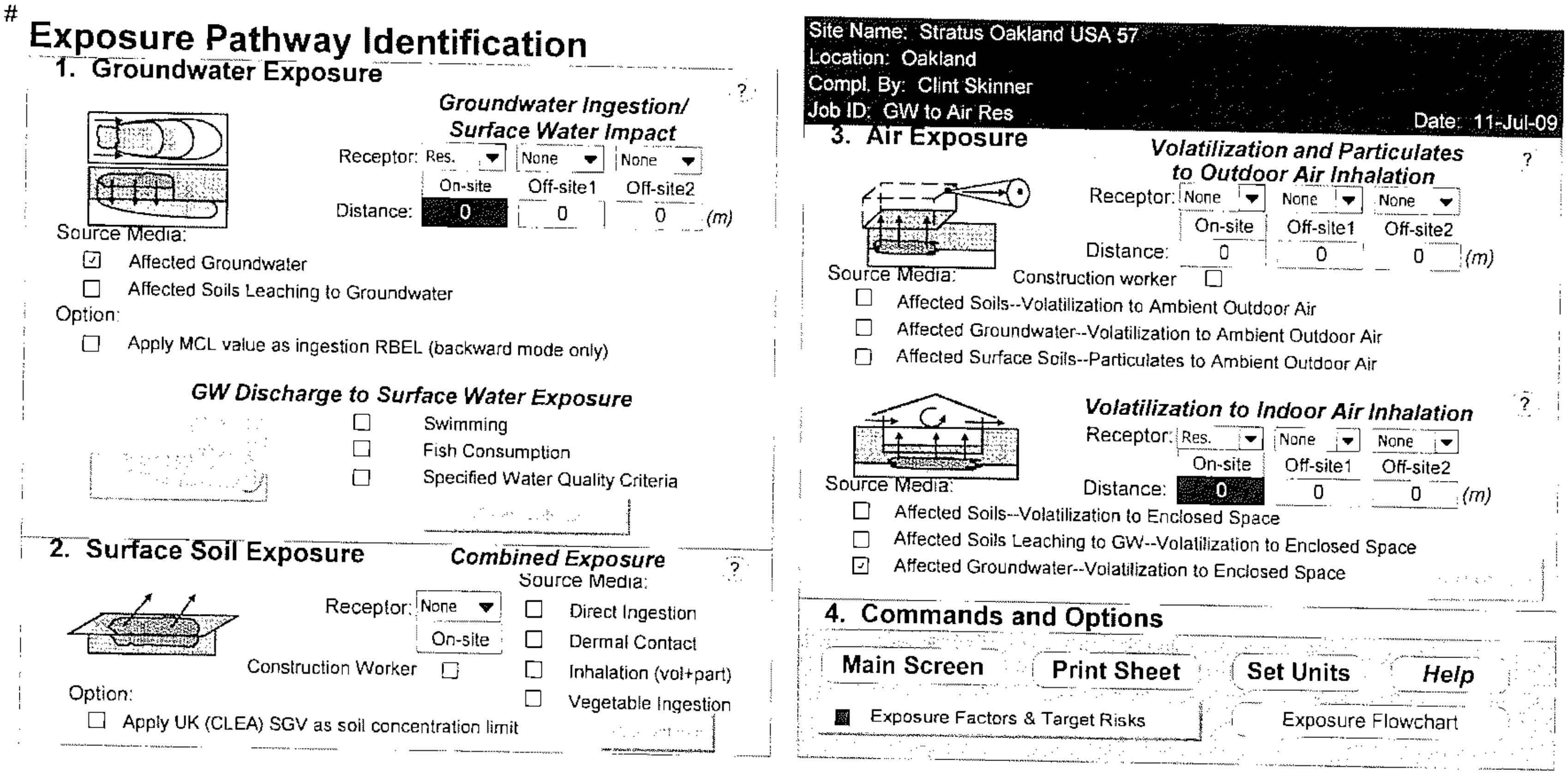
2. Which Type of RBCA Analysis?

○ Tier 1 Risk-Based Screening Levels
● Tier 2/3 Site-Specific Target Levels

3. Calculation Options

Affects which input data are required

☑ *Baseline Risks (Forward mode)*
☑ *RBCA Cleanup Levels (Backward mode)*
○ Individual Constituent Risk Goals Only
● Individual and Cumulative Risk Goals
☐ Apply Source Depletion Algorithm
Time to Future Exposure 0 *(yr)*



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Exposure Pathway Identification

Site Name: Stratus Oakland USA 57
Location: Oakland
Compl. By: Clint Skinner
Job ID: GW to Air Res
Date: 11-Jul-09

1. Groundwater Exposure

Groundwater Ingestion/ Surface Water Impact

	On-site	Off-site1	Off-site2	
Receptor:	Res.	None	None	
Distance:	0	0	0	(m)

Source Media:
- ☑ Affected Groundwater
- ☐ Affected Soils Leaching to Groundwater

Option:
- ☐ Apply MCL value as ingestion RBEL (backward mode only)

GW Discharge to Surface Water Exposure
- ☐ Swimming
- ☐ Fish Consumption
- ☐ Specified Water Quality Criteria

2. Surface Soil Exposure

Receptor: None
On-site
Construction Worker ☐

Option:
- ☐ Apply UK (CLEA) SGV as soil concentration limit

Combined Exposure

Source Media:
- ☐ Direct Ingestion
- ☐ Dermal Contact
- ☐ Inhalation (vol+part)
- ☐ Vegetable Ingestion

3. Air Exposure

Volatilization and Particulates to Outdoor Air Inhalation

	On-site	Off-site1	Off-site2	
Receptor:	None	None	None	
Distance:	0	0	0	(m)

Construction worker ☐

Source Media:
- ☐ Affected Soils--Volatilization to Ambient Outdoor Air
- ☐ Affected Groundwater--Volatilization to Ambient Outdoor Air
- ☐ Affected Surface Soils--Particulates to Ambient Outdoor Air

Volatilization to Indoor Air Inhalation

	On-site	Off-site1	Off-site2	
Receptor:	Res.	None	None	
Distance:	0	0	0	(m)

Source Media:
- ☐ Affected Soils--Volatilization to Enclosed Space
- ☐ Affected Soils Leaching to GW--Volatilization to Enclosed Space
- ☑ Affected Groundwater--Volatilization to Enclosed Space

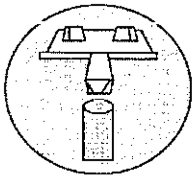
4. Commands and Options

Exposure Factors and Target Risk Limits

Site Name: Stratus Oakland USA 57
Location: Oakland
Compl. By: Clint Skinner
Job ID: GW to Air Res
Date: 11-Jul-09

1. Exposure Parameters

	Residential Receptors			*Commerical Receptors*		*User*
	Child	Adolescent	Adult	Adult	Construc.	*Defined*
Averaging time, carcinogens (yr)	70					-
Averaging time, non-carcinogens (yr)	6	12	30	25	1	-
Body weight (kg)	15	35	70	70	70	-
Exposure duration (yr)	6	12	30	25	1	-
Averaging Time for Vapor Flux (yr)	30			30	30	-
Exposure frequency (d/yr)	350			250	180	-
Dermal exposure freq. (d/yr)	350			250	180	-
Seasonal-avg skin surface area (cm^2/d)	2023	2023	3160	3160	3160	-
Soil dermal adherence factor (mg/cm^2)	0.5	0.5	0.5	0.5	0.5	-
Water ingestion rate (L/d)	1	1	2	1	1	-
Soil ingestion rate (mg/d)	200	200	100	50	100	-
Swimming exposure time (hr/event)	1	3	3			
Swimming event frequency (events/yr)	12	12	12			
Swimming water ingestion rate (L/hr)	0.5	0.5	0.05			
Skin surface area, swimming (cm^2)	3500	8100	23000			
Fish consumption rate (kg/d)	0.025	0.025	0.025			
Vegetable ingestion rate (kg/d)						
Above-ground vegetables	0.002	0.002	0.006			
Below-ground vegetables	0.001	0.001	0.002			
Contaminated fish fraction (-)	1					



2. Age Adjustment for Carcinogens

(residential receptor only)

		Adjustment Factor	
☐	Seasonal skin surface area, soil contact	1022.26	(cm^2-yr/kg)
☑	Water ingestion	1.08571	(mg-yr/L-day)
☐	Soil ingestion	165.714	(mg-yr/kg-day)
☐	Swimming water ingestion	4.56	(L/kg)
☐	Skin surface area, swimming	80640	(cm^2-yr/kg)
☐	Fish consumption	0.02286	(kg-yr/kg-day)
☐	Below-ground vegetable ingestion	0.38	(kg-yr/kg-day)
☐	Above-ground vegetable ingestion	0.88	(kg-yr/kg-day)

3. Non-Carcinogenic Receptor

(residential receptor only)

Adult ▼

4. Target Health Risk Limits

	Individual	Cumulative
Target Cancer Risk (Carcinogens)	1.0E-5	1.0E-5
Target Hazard Quotient/Index (non-Carc.)	1.0E+0	1.0E+0

5. Commands and Options

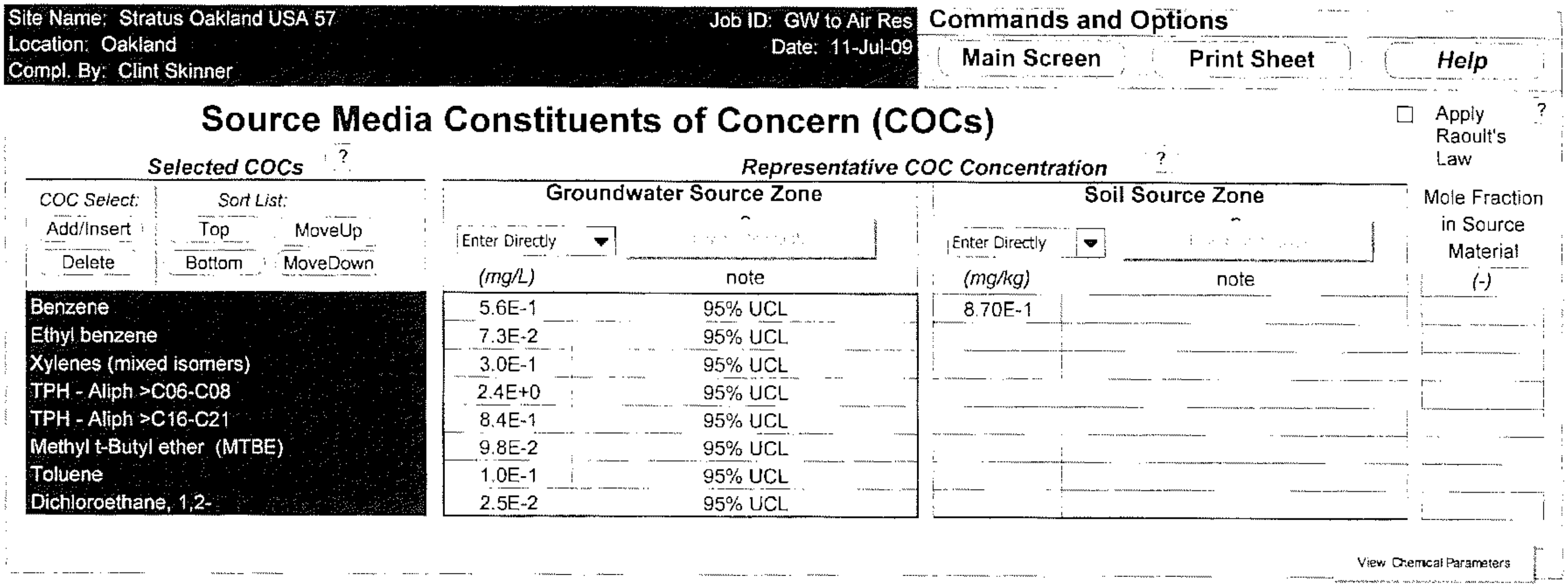
Return to Exposure Pathways

Use/Set Default Values

Print Sheet

Help

RBCA Tool Kit for Chemical Releases, Version 2.51



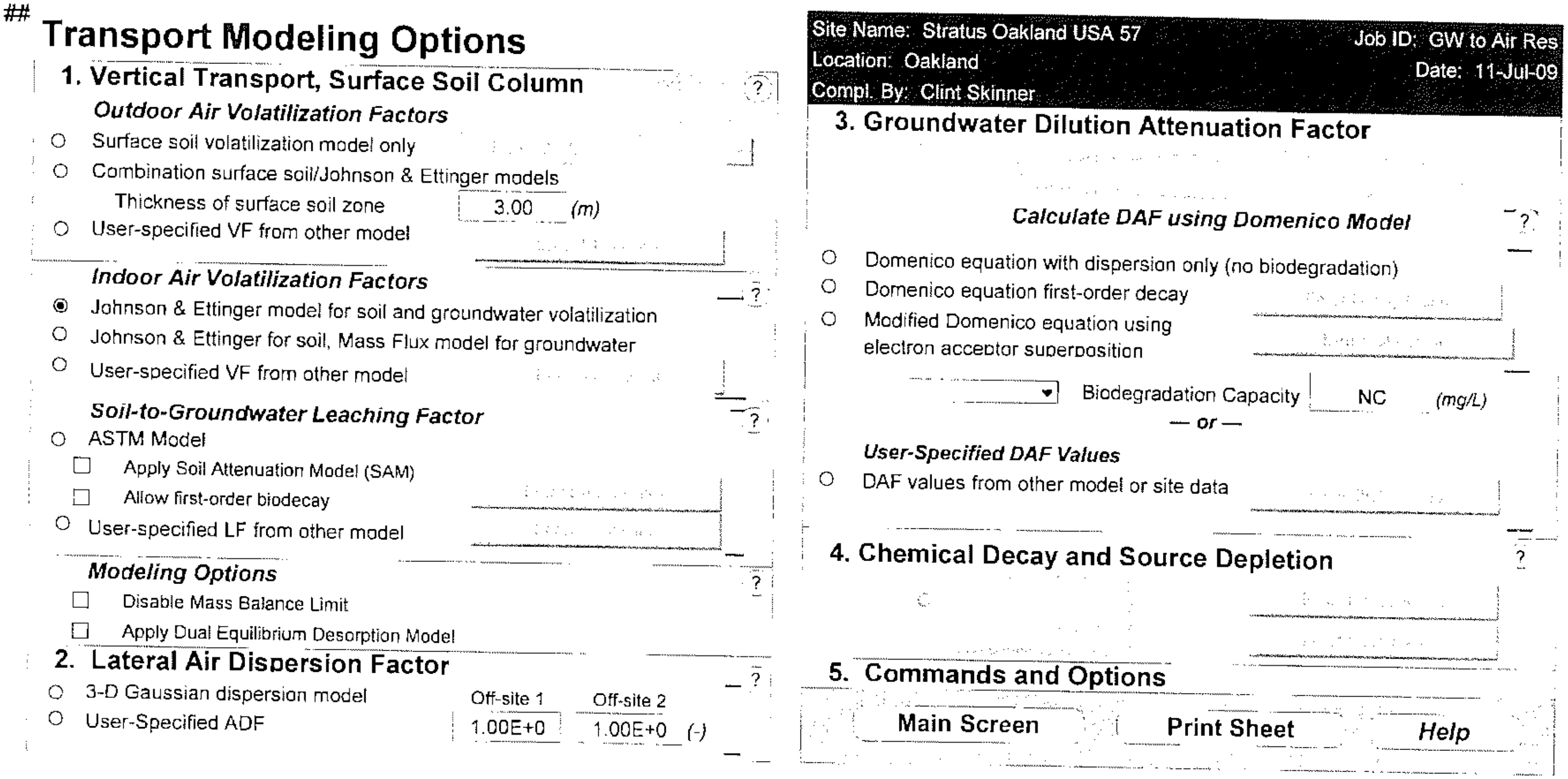
Site Name: Stratus Oakland USA 57
Location: Oakland
Compl. By: Clint Skinner

Job ID: GW to Air Res
Date: 11-Jul-09

Source Media Constituents of Concern (COCs)

☐ Apply Raoult's Law

Selected COCs	Representative COC Concentration				
	Groundwater Source Zone		Soil Source Zone		Mole Fraction in Source Material
	(mg/L)	note	(mg/kg)	note	(-)
Benzene	5.6E-1	95% UCL	8.70E-1		
Ethyl benzene	7.3E-2	95% UCL			
Xylenes (mixed isomers)	3.0E-1	95% UCL			
TPH - Aliph >C06-C08	2.4E+0	95% UCL			
TPH - Aliph >C16-C21	8.4E-1	95% UCL			
Methyl t-Butyl ether (MTBE)	9.8E-2	95% UCL			
Toluene	1.0E-1	95% UCL			
Dichloroethane, 1,2-	2.5E-2	95% UCL			



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Transport Modeling Options

Site Name: Stratus Oakland USA 57
Location: Oakland
Compl. By: Clint Skinner
Job ID: GW to Air Res
Date: 11-Jul-09

1. Vertical Transport, Surface Soil Column

Outdoor Air Volatilization Factors

○ Surface soil volatilization model only
○ Combination surface soil/Johnson & Ettinger models
Thickness of surface soil zone 3.00 *(m)*
○ User-specified VF from other model

Indoor Air Volatilization Factors

● Johnson & Ettinger model for soil and groundwater volatilization
○ Johnson & Ettinger for soil, Mass Flux model for groundwater
○ User-specified VF from other model

Soil-to-Groundwater Leaching Factor

○ ASTM Model
☐ Apply Soil Attenuation Model (SAM)
☐ Allow first-order biodecay
○ User-specified LF from other model

Modeling Options

☐ Disable Mass Balance Limit
☐ Apply Dual Equilibrium Desorption Model

2. Lateral Air Dispersion Factor

○ 3-D Gaussian dispersion model
○ User-Specified ADF

	Off-site 1	Off-site 2	
	1.00E+0	1.00E+0	*(-)*

3. Groundwater Dilution Attenuation Factor

Calculate DAF using Domenico Model

○ Domenico equation with dispersion only (no biodegradation)
○ Domenico equation first-order decay
○ Modified Domenico equation using electron acceptor superposition

Biodegradation Capacity NC *(mg/L)*

— or —

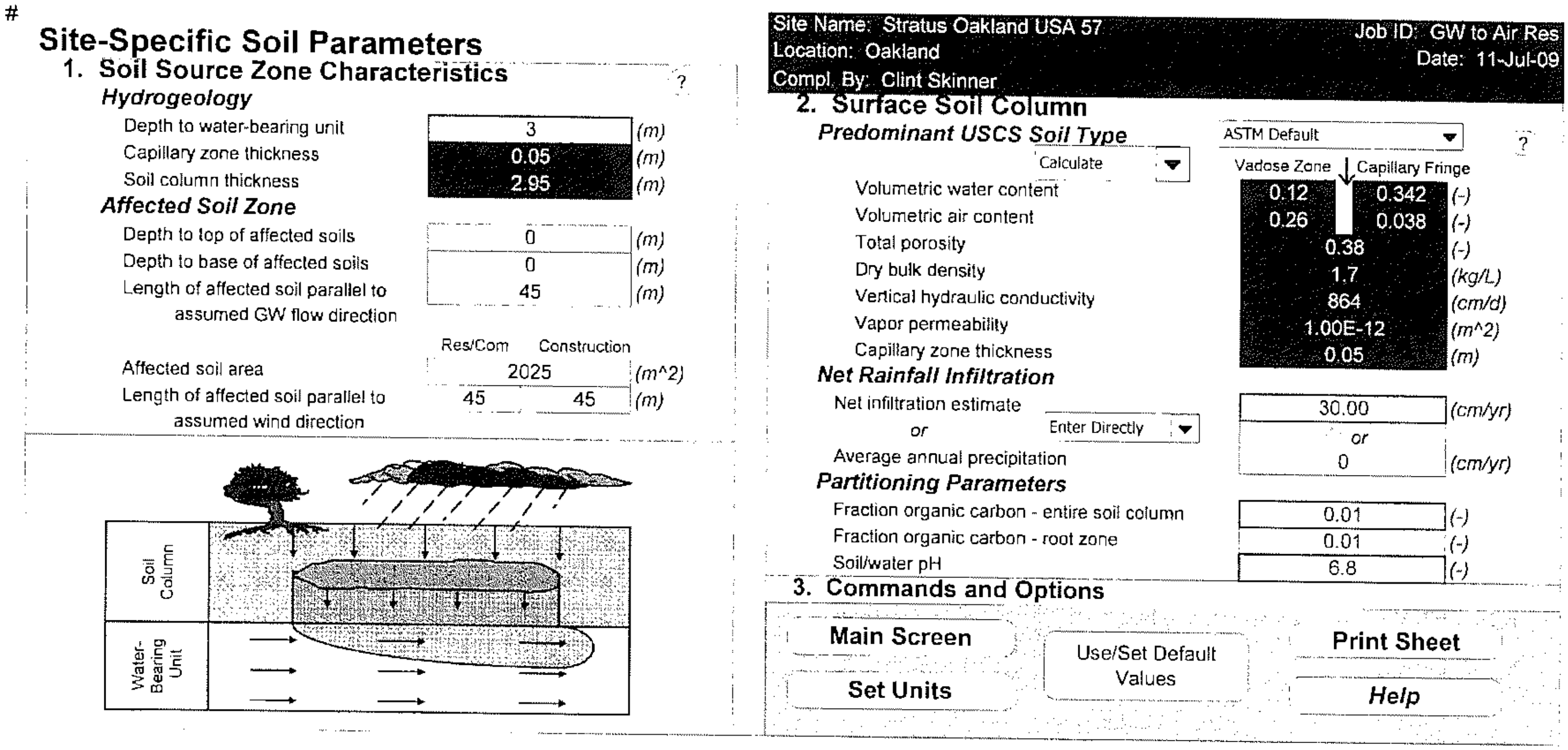
User-Specified DAF Values

○ DAF values from other model or site data

4. Chemical Decay and Source Depletion

5. Commands and Options

RBCA Tool Kit for Chemical Releases, Version 2.51



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Site Name: Stratus Oakland USA 57
Location: Oakland
Compl. By: Clint Skinner

Job ID: GW to Air Res
Date: 11-Jul-09

Site-Specific Soil Parameters

1. Soil Source Zone Characteristics

Hydrogeology

Depth to water-bearing unit	3	*(m)*
Capillary zone thickness	0.05	*(m)*
Soil column thickness	2.95	*(m)*

Affected Soil Zone

Depth to top of affected soils	0		*(m)*
Depth to base of affected soils	0		*(m)*
Length of affected soil parallel to assumed GW flow direction	45		*(m)*
	Res/Com	Construction	
Affected soil area	2025		*(m^2)*
Length of affected soil parallel to assumed wind direction	45	45	*(m)*

2. Surface Soil Column

Predominant USCS Soil Type

ASTM Default ▼

Calculate ▼

	Vadose Zone	Capillary Fringe	
Volumetric water content	0.12	0.342	*(-)*
Volumetric air content	0.26	0.038	*(-)*
Total porosity	0.38		*(-)*
Dry bulk density	1.7		*(kg/L)*
Vertical hydraulic conductivity	864		*(cm/d)*
Vapor permeability	1.00E-12		*(m^2)*
Capillary zone thickness	0.05		*(m)*

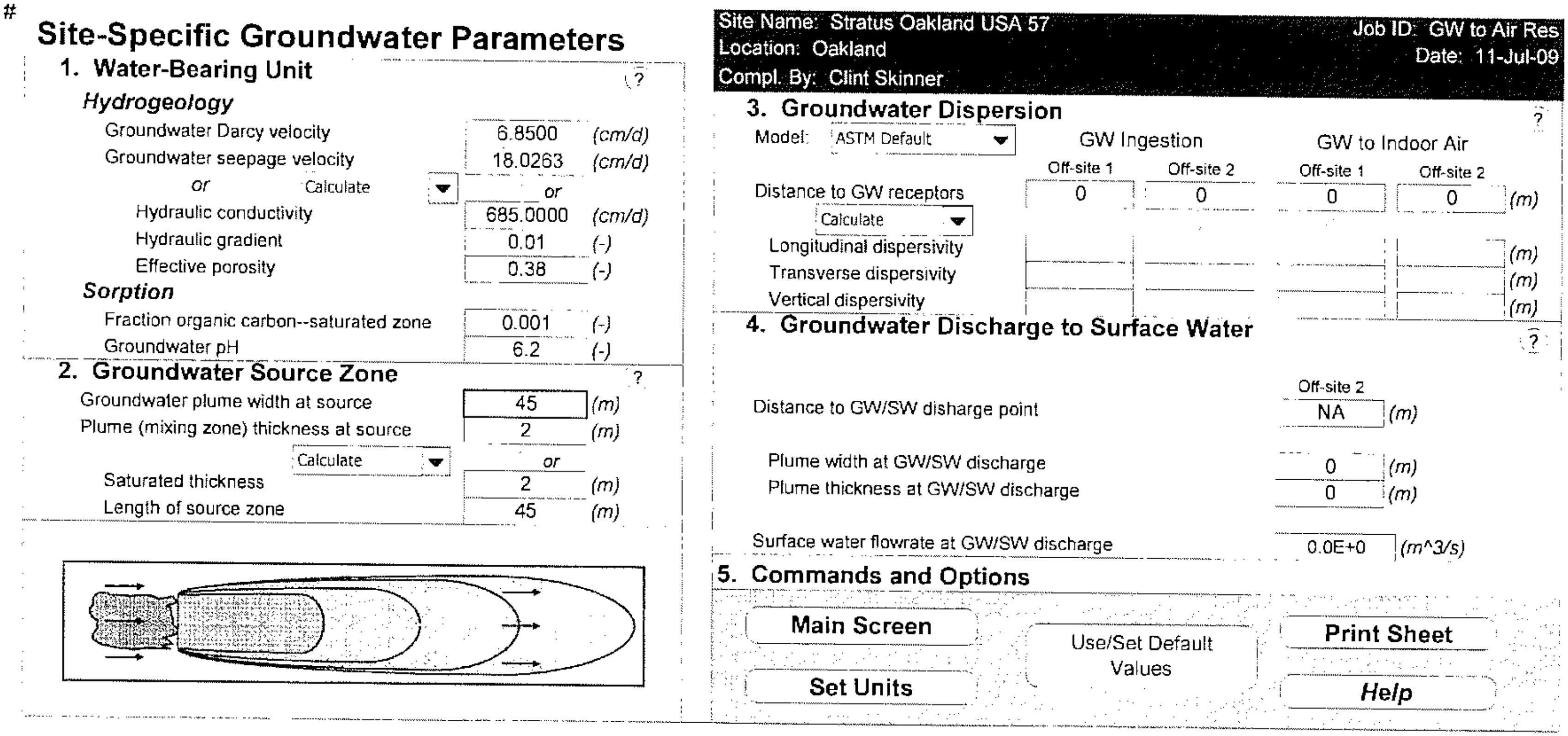
Net Rainfall Infiltration

Net infiltration estimate	30.00	*(cm/yr)*
or Enter Directly ▼	*or*	
Average annual precipitation	0	*(cm/yr)*

Partitioning Parameters

Fraction organic carbon - entire soil column	0.01	*(-)*
Fraction organic carbon - root zone	0.01	*(-)*
Soil/water pH	6.8	*(-)*

3. Commands and Options



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Site-Specific Groundwater Parameters

Site Name: Stratus Oakland USA 57
Location: Oakland
Compl. By: Clint Skinner

Job ID: GW to Air Res
Date: 11-Jul-09

1. Water-Bearing Unit

?

Hydrogeology

Groundwater Darcy velocity	6.8500	(cm/d)
Groundwater seepage velocity	18.0263	(cm/d)
or Calculate	or	
Hydraulic conductivity	685.0000	(cm/d)
Hydraulic gradient	0.01	(-)
Effective porosity	0.38	(-)

Sorption

Fraction organic carbon--saturated zone	0.001	(-)
Groundwater pH	6.2	(-)

2. Groundwater Source Zone

?

Groundwater plume width at source	45	(m)
Plume (mixing zone) thickness at source	2	(m)
Calculate	or	
Saturated thickness	2	(m)
Length of source zone	45	(m)

3. Groundwater Dispersion

?

Model: ASTM Default

	GW Ingestion		GW to Indoor Air		
	Off-site 1	Off-site 2	Off-site 1	Off-site 2	
Distance to GW receptors	0	0	0	0	(m)
Calculate					
Longitudinal dispersivity					(m)
Transverse dispersivity					(m)
Vertical dispersivity					(m)

4. Groundwater Discharge to Surface Water

?

	Off-site 2	
Distance to GW/SW disharge point	NA	(m)
Plume width at GW/SW discharge	0	(m)
Plume thickness at GW/SW discharge	0	(m)
Surface water flowrate at GW/SW discharge	0.0E+0	(m^3/s)

5. Commands and Options

Site-Specific Air Parameters

Site Name: Stratus Oakland USA 57
Location: Oakland
Compl. By: Clint Skinner

Job ID: GW to Air Res
Date: 11-Jul-09

1. Outdoor Air Pathway

User Defined Volatilization Factor Used
User Defined Air Dispersion Factor Used

	Off-site 1	Off-site 2	
Dispersion in Air			
Distance to offsite air receptor	0	0	(m)
Horizontal dispersivity	0	0	*(m)*
Vertical dispersivity	0	0	*(m)*
Air Source Zone			
Air mixing zone height	2		*(m)*
Ambient air velocity in mixing zone	2.25		*(m/s)*
Inverse mean conc. [Q/C term]	79.25		
Particulate Emissions	*Model: ASTM Model*		
Particulate Emission Factor	0		*(kg/m^3)*
or			
Areal particulate emission flux	6.9E-14		*(g/cm^2/s)*
Fraction vegetative cover	0.5		*(-)*
Mean annual air velocity @ 7 m	4.8		
Equivalent 7m air vel. threshold	11.32		*(m/s)*
Windspeed function [F(x) term]	0.223841466		*(-)*

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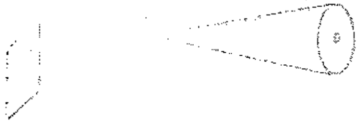
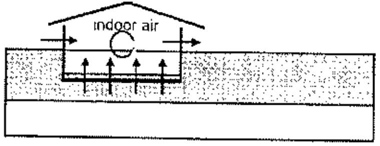




2. Indoor Air Pathway

User Defined Volatilization Factor Used

	Residential	Commercial	
Building volume/area ratio	2	3	*(m)*
Foundation area	70	70	*(m^2)*
Foundation perimeter	49	34	*(m)*
Building air exchange rate	1.4E-4	2.3E-4	*(1/s)*
Depth to bottom of foundation slab	0.15	0.15	*(m)*
Convective air flow through cracks	0.0E+0	0.0E+0	*(m^3/s)*
Foundation thickness	0.15		*(m)*
Foundation crack fraction	0.001		*(-)*
Volumetric water content of cracks	0.12		*(-)*
Volumetric air content of cracks	0.26		*(-)*
Indoor/Outdoor differential pressure	0		*(g/cm/s^2)*
Building Volume	451	451	*(m^3)*
Building Width Perpendicular to GW flow	9.61	9.61	*(m)*
Building Length Parallel to GW flow	9.61	9.61	*(m)*
Saturated Soil Zone Porosity	0.38		*(-)*
Vertical Dispersivity	0.006		*(m)*
Groundwater Seepage Velocity	1.8E+01		*(cm/d)*

?

3. Commands and Options

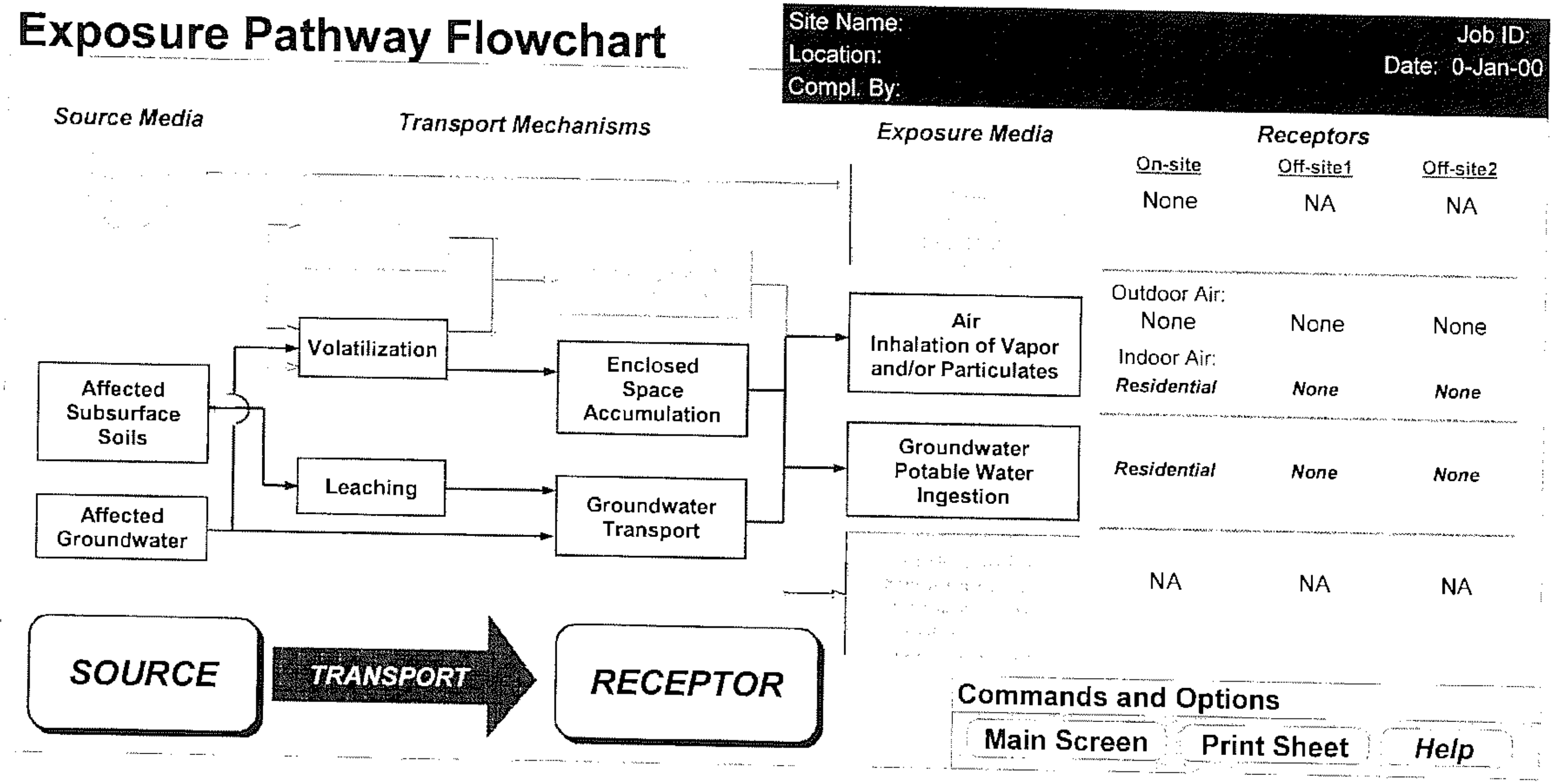
Main Screen

Set Units

Use/Set Default Values

Print Sheet

Help



Exposure Pathway Flowchart

Site Name:
Location:
Compl. By:
Job ID:
Date: 0-Jan-00

Exposure Media	Receptors		
	On-site	Off-site1	Off-site2
	None	NA	NA
Air Inhalation of Vapor and/or Particulates	Outdoor Air: None	None	None
	Indoor Air: *Residential*	*None*	*None*
Groundwater Potable Water Ingestion	*Residential*	*None*	*None*
	NA	NA	NA

RBCA SITE ASSESSMENT

TIER 2 EXPOSURE CONCENTRATION AND INTAKE CALCULATION

INDOOR AIR EXPOSURE PATHWAYS ☐ **(Checked if Pathway is Complete)**

SOILS : VAPOR INTRUSION INTO BUILDINGS

Constituents of Concern	1) Source Medium Soil Conc. (mg/kg)	2) NAF Value (L/kg) Receptor On-site (0 m) None	3) Exposure Medium Indoor Air POE Conc. (mg/m^3) (1) / (2) On-site (0 m) None	4) Exposure Multiplier (EFxED)/(ATx365) (unitless) On-site (0 m) None	5) Average Inhalation Exposure Concentration (mg/m^3) (3) X (4) On-site (0 m) None
Benzene	8.7E-1				
Ethyl benzene					
Xylenes (mixed isomers)					
TPH - Aliph >C06-C08					
TPH - Aliph >C16-C21					
Methyl t-Butyl ether (MTBE)					
Toluene					
Dichloroethane, 1,2-					

* = Chemical with user-specified data

NOTE: AT = Averaging time (days) EF = Exposure frequency (days/yr) ED = Exposure duration (yr) NAF = Natural attenuation factor POE = Point of exposure

Site Name: Stratus Oakland USA 57
Site Location: Oakland
Completed By: Clint Skinner

Date Completed: 11-Jul-09
Job ID: GW to Air Res

RBCA SITE ASSESSMENT

TIER 2 EXPOSURE CONCENTRATION AND INTAKE CALCULATION

INDOOR AIR EXPOSURE PATHWAYS ■ **(Checked if Pathway is Complete)**

GROUNDWATER: VAPOR INTRUSION INTO BUILDINGS

Exposure Concentration

	1) Source Medium	2) NAF Value (m^3/L) Receptor			3) Exposure Medium Indoor Air: POE Conc. (mg/m^3) (1) / (2)		
Constituents of Concern	Groundwater Conc. (mg/L)	On-site (0 m) Residential	Off-site 1 (0 m) None	Off-site 2 (0 m) None	On-site (0 m) None	Off-site 1 (0 m) None	Off-site 2 (0 m) None
Benzene	5.6E-1	3.1E+2			1.8E-3		
Ethyl benzene	7.3E-2	2.5E+2			2.9E-4		
Xylenes (mixed isomers)	3.0E-1	2.8E+2			1.1E-3		
TPH - Aliph >C06-C08	2.4E+0	1.4E+0			1.8E+0		
TPH - Aliph >C16-C21	8.4E-1	1.3E-2			6.3E+1		
Methyl t-Butyl ether (MTBE)	9.8E-2	2.8E+3			3.5E-5		
Toluene	1.0E-1	2.6E+2			4.0E-4		
Dichloroethane, 1,2-	2.5E-2	1.0E+3			2.4E-5		

NOTE: AT = Averaging time (days) EF = Exposure frequency (days/yr) ED = Exposure duration (yr) NAF = Natural attenuation factor POE = Point of exposure

Site Name: Stratus Oakland USA 57
Site Location: Oakland
Completed By: Clint Skinner

Date Completed: 11-Jul-09
Job ID: GW to Air Res

RBCA SITE ASSESSMENT

TIER 2 EXPOSURE CONCENTRATION AND INTAKE CALCULATION

INDOOR AIR EXPOSURE PATHWAYS

GROUNDWATER: VAPOR INTRUSION INTO BUILDINGS

	4) Exposure Multiplier (EFxED)/(ATx365) (unitless)			5) Average Inhalation Exposure Concentration (mg/m^3) (3) X (4)		
	On-site (0 m)	Off-site 1 (0 m)	Off-site 2 (0 m)	On-site (0 m)	Off-site 1 (0 m)	Off-site 2 (0 m)
Constituents of Concern	None	None	None	None	None	None
Benzene	4.1E-1			7.5E-4		
Ethyl benzene	9.6E-1			2.8E-4		
Xylenes (mixed isomers)	9.6E-1			1.0E-3		
TPH - Aliph >C06-C08	9.6E-1			1.7E+0		
TPH - Aliph >C16-C21	9.6E-1			6.0E+1		
Methyl t-Butyl ether (MTBE)	4.1E-1			1.4E-5		
Toluene	9.6E-1			3.8E-4		
Dichloroethane, 1,2-	4.1E-1			9.8E-6		

* = Chemical with user-specified data

NOTE: AT = Averaging time (days) EF = Exposure frequency (days/yr) ED = Exposure duration (yr) NAF = Natural attenuation factor POE = Point of exposure

Site Name: Stratus Oakland USA 57
Site Location: Oakland
Completed By: Clint Skinner

Date Completed: 11-Jul-09
Job ID: GW to Air Res

RBCA SITE ASSESSMENT

TIER 2 EXPOSURE CONCENTRATION AND INTAKE CALCULATION

INDOOR AIR EXPOSURE PATHWAYS ☐ **(Checked if Pathway is Complete)**

SOIL LEACHING TO GW- VAPOR INTRUSION INTO BUILDINGS

Exposure Concentration

	1) Source Medium	2) NAF Value (m^3/L) Receptor			3) Exposure Medium Indoor Air: POE Conc. (mg/m^3) (1) / (2)		
Constituents of Concern	Soil Conc. (mg/kg)	On-site (0 m) None	Off-site 1 (0 m) None	Off-site 2 (0 m) None	On-site (0 m) None	Off-site 1 (0 m) None	Off-site 2 (0 m) None
Benzene	8.7E-1						
Ethyl benzene							
Xylenes (mixed isomers)							
TPH - Aliph >C06-C08							
TPH - Aliph >C16-C21							
Methyl t-Butyl ether (MTBE)							
Toluene							
Dichloroethane, 1,2-							

NOTE: AT = Averaging time (days) EF = Exposure frequency (days/yr) ED = Exposure duration (yr) NAF = Natural attenuation factor POE = Point of exposure

Site Name: Stratus Oakland USA 57
Site Location: Oakland
Completed By Clint Skinner

Date Completed: 11-Jul-09
Job ID: GW to Air Res

RBCA SITE ASSESSMENT

TIER 2 EXPOSURE CONCENTRATION AND INTAKE CALCULATION

INDOOR AIR EXPOSURE PATHWAYS

SOIL LEACHING TO GW- VAPOR INTRUSION INTO BUILDINGS

	4) Exposure Multiplier (EFxED)/(ATx365) (unitless)			5) Average Inhalation Exposure Concentration (mg/m^3) (3) X (4)		
Constituents of Concern	On-site (0 m) None	Off-site 1 (0 m) None	Off-site 2 (0 m) None	On-site (0 m) None	Off-site 1 (0 m) None	Off-site 2 (0 m) None
Benzene	—	—	—	—	—	—
Ethyl benzene	—	—	—	—	—	—
Xylenes (mixed isomers)	—	—	—	—	—	—
TPH - Aliph >C06-C08	—	—	—	—	—	—
TPH - Aliph >C16-C21	—	—	—	—	—	—
Methyl t-Butyl ether (MTBE)	—	—	—	—	—	—
Toluene	—	—	—	—	—	—
Dichloroethane, 1,2-	—	—	—	—	—	—

* = Chemical with user-specified data

NOTE: AT = Averaging time (days) EF = Exposure frequency (days/yr) ED = Exposure duration (yr) NAF = Natural attenuation factor POE = Point of exposure

Site Name: Stratus Oakland USA 57
Site Location: Oakland
Completed By: Clint Skinner

Date Completed: 11-Jul-09
Job ID: GW to Air Res

RBCA SITE ASSESSMENT

TIER 2 EXPOSURE CONCENTRATION AND INTAKE CALCULATION

INDOOR AIR EXPOSURE PATHWAYS

MAXIMUM PATHWAY EXPOSURE (mg/m^3)

(Maximum average exposure concentration from soil and groundwater routes.)

Constituents of Concern	On-site (0 m) Residential	Off-site 1 (0 m) None	Off-site 2 (0 m) None
Benzene	7.5E-4		
Ethyl benzene	2.8E-4		
Xylenes (mixed isomers)	1.0E-3		
TPH - Aliph >C06-C08	1.7E+0		
TPH - Aliph >C16-C21	6.0E+1		
Methyl t-Butyl ether (MTBE)	1.4E-5		
Toluene	3.8E-4		
Dichloroethane, 1,2-	9.8E-6		

Site Name: Stratus Oakland USA 57
Site Location: Oakland
Completed By: Clint Skinner

Date Completed: 11-Jul-09
Job ID: GW to Air Res

RBCA SITE ASSESSMENT

TIER 2 PATHWAY RISK CALCULATION

INDOOR AIR EXPOSURE PATHWAYS ■ **(Checked if Pathway is Complete)**

CARCINOGENIC RISK

	(1) Carcinogenic Classification	(2) Maximum Carcinogenic Exposure (mg/m^3)			(3) Inhalation Unit Risk Factor	(4) Individual COC Risk (2) x (3) x 1000		
		On-site (0 m) Residential	Off-site 1 (0 m) None	Off-site 2 (0 m) None	(µg/m^3)^-1	On-site (0 m) Residential	Off-site 1 (0 m) None	Off-site 2 (0 m) None
Constituents of Concern								
Benzene	TRUE	7.5E-4	-	-	2.2E-6	1.6E-6		
Ethyl benzene	FALSE	-	-	-	-			
Xylenes (mixed isomers)	FALSE	-	-	-	-			
TPH - Aliph >C06-C08	FALSE	-	-	-	-			
TPH - Aliph >C16-C21	FALSE	-	-	-	-			
Methyl t-Butyl ether (MTBE)	TRUE	1.4E-5	-	-	2.6E-7	3.7E-9		
Toluene	FALSE	-	-	-	-			
Dichloroethane, 1,2-	TRUE	9.8E-6	-	-	2.6E-5	2.6E-7		

Total Pathway Carcinogenic Risk = **1.9E-6**

Site Name: Stratus Oakland USA 57
Site Location: Oakland
Completed By: Clint Skinner

Date Completed: 11-Jul-09
Job ID: GW to Air Res

RBCA SITE ASSESSMENT

TIER 2 PATHWAY RISK CALCULATION

INDOOR AIR EXPOSURE PATHWAYS ■ **(Checked if Pathway is Complete)**

TOXIC EFFECTS

	(5) Maximum Toxicant Exposure (mg/m^3)			(6) Inhalation Reference Concentration	(7) Individual COC Hazard Quotient (5) / (6)		
Constituents of Concern	On-site (0 m) Residential	Off-site 1 (0 m) None	Off-site 2 (0 m) None	(mg/m^3)	On-site (0 m) Residential	Off-site 1 (0 m) None	Off-site 2 (0 m) None
Benzene	1.7E-3			2.8E-1	6.2E-3		
Ethyl benzene	2.8E-4			1.0E+0	2.8E-4		
Xylenes (mixed isomers)	1.0E-3			1.0E-1	1.0E-2		
TPH - Aliph >C06-C08	1.7E+0			1.8E+1	9.5E-2		
TPH - Aliph >C16-C21	6.0E+1			-			
Methyl t-Butyl ether (MTBE)	3.3E-5			3.0E+0	1.1E-5		
Toluene	3.8E-4			5.0E+0	7.7E-5		
Dichloroethane, 1,2-	2.3E-5			2.4E+0	9.5E-6		
				Total Pathway Hazard Index =	**1.1E-1**		

Site Name: Stratus Oakland USA 57
Site Location: Oakland
Completed By: Clint Skinner

Date Completed: 11-Jul-09
Job ID: GW to Air Res

RBCA SITE ASSESSMENT

Baseline Risk Summary-All Pathways

Site Name: Stratus Oakland USA 57
Site Location: Oakland

Completed By: Clint Skinner
Date Completed: 11-Jul-09

BASELINE RISK SUMMARY TABLE

	BASELINE CARCINOGENIC RISK					BASELINE TOXIC EFFECTS				
	Individual COC Risk		Cumulative COC Risk		Risk Limit(s) Exceeded?	Hazard Quotient		Hazard Index		Toxicity Limit(s) Exceeded?
EXPOSURE PATHWAY	Maximum Value	Target Risk	Total Value	Target Risk		Maximum Value	Applicable Limit	Total Value	Applicable Limit	
OUTDOOR AIR EXPOSURE PATHWAYS										
☐	NA	NA	NA	NA	☐	NA	NA	NA	NA	☐
INDOOR AIR EXPOSURE PATHWAYS										
■	1.6E-6	1.0E-5	1.9E-6	1.0E-5	☐	9.5E-2	1.0E+0	1.1E-1	1.0E+0	☐
SOIL EXPOSURE PATHWAYS										
☐	NA	NA	NA	NA	☐	NA	NA	NA	NA	☐
GROUNDWATER EXPOSURE PATHWAYS										
■	4.5E-4	1.0E-5	4.9E-4	1.0E-5	■	3.8E+0	1.0E+0	5.3E+0	1.0E+0	■
SURFACE WATER EXPOSURE PATHWAYS										
☐	NA	NA	NA	NA	☐	NA	NA	NA	NA	☐

CRITICAL EXPOSURE PATHWAY (Maximum Values From Complete Pathways)										
	4.5E-4	*1.0E-5*	*4.9E-4*	*1.0E-5*	■	*3.8E+0*	*1.0E+0*	*5.3E+0*	*1.0E+0*	■
	Groundwater		*Groundwater*			*Groundwater*		*Groundwater*		

RBCA SITE ASSESSMENT | **Cumulative Risk Worksheet**

Site Name: Stratus Oakland USA 57
Site Location: Oakland
Completed By: Clint Skinner
Date Completed: 11-Jul-09
Job ID: GW to Air Res

1 OF 3

CUMULATIVE RISK WORKSHEET

CONSTITUENTS OF CONCERN

CAS No.	Name	Representative Concentration		Proposed CRF		Resultant Target Concentration	
		Soil (mg/kg)	Groundwater (mg/L)	Soil	GW	Soil (mg/kg)	Groundwater (mg/L)
71-43-2	Benzene		5.6E-1	NA	NA		5.6E-1
100-41-4	Ethyl benzene		7.3E-2	NA	NA		7.3E-2
1330-20-7	Xylenes (mixed isomers)		3.0E-1	NA	NA		3.0E-1
T-al0608	TPH - Aliph >C06-C08		2.4E+0	NA	NA		2.4E+0
T-al1621	TPH - Aliph >C16-C21		8.4E-1	NA	NA		8.4E-1
1634-04-4	Methyl t-Butyl ether (MTBE)		9.8E-2	NA	NA		9.8E-2
108-88-3	Toluene		1.0E-1	NA	NA		1.0E-1
107-06-2	Dichloroethane, 1,2-		2.5E-2	NA	NA		2.5E-2

Cumulative Values:

RBCA SITE ASSESSMENT | **Cumulative Risk Worksheet**

Site Name: Stratus Oakland USA 57
Site Location: Oakland

Completed By: Clint Skinner
Date Completed: 11-Jul-09

Job ID: GW to Air Res

2 OF 3

CUMULATIVE RISK WORKSHEET

Cumulative Target Risk: 1.0E-5 Target Hazard Index: 1.0E+0

ON-SITE RECEPTORS

CONSTITUENTS OF CONCERN		Outdoor Air Exposure: None		Indoor Air Exposure: Residential		Soil Exposure: None		Groundwater Exposure: Residential	
		Target Risk: 1.0E-5	Target HQ: 1.0E+0	Target Risk: 1.0E-5	Target HQ: 1.0E+0	Target Risk: 1.0E-5	Target HQ: 1.0E+0	Target Risk: 1.0E-5	Target HQ: 1.0E+0
CAS No.	Name	Carcinogenic Risk	Hazard Quotient	Carcinogenic Risk	Hazard Quotient	Carcinogenic Risk	Hazard Quotient	Carcinogenic Risk	Hazard Quotient
71-43-2	Benzene			1.6E-6	6.2E-3			4.5E-4	3.8E+0
100-41-4	Ethyl benzene				2.8E-4				2.0E-2
1330-20-7	Xylenes (mixed isomers)				1.0E-2				4.2E-2
T-al0608	TPH - Aliph >C06-C08				9.5E-2				1.1E+0
T-al1621	TPH - Aliph >C16-C21								1.2E-2
1634-04-4	Methyl t-Butyl ether (MTBE)			3.7E-9	1.1E-5			2.6E-6	2.7E-1
108-88-3	Toluene				7.7E-5				3.5E-2
107-06-2	Dichloroethane, 1,2-			2.6E-7	9.5E-6			3.4E-5	
	Cumulative Values:	0.0E+0	0.0E+0	1.9E-6	1.1E-1	0.0E+0	0.0E+0	4.9E-4 ■	5.3E+0 ■

■ indicates risk level exceeding target risk

RBCA SITE ASSESSMENT

Cumulative Risk Worksheet

Site Name Stratus Oakland USA 67
Site Location. Oakland

Completed By: Clint Skinner
Date Completed 11-Jul-09

Job ID: GW to Air Res

3 OF 3

CUMULATIVE RISK WORKSHEET

Cumulative Target Risk. 1.0E-5   Target Hazard Index 1.0E+0

Groundwater DAF Option: FALSE

Groundwater DAF Option FALSE

OFF-SITE RECEPTORS

CONSTITUENTS OF CONCERN

		Outdoor Air Exposure:				Indoor Air Exposure:				Groundwater Exposure:			
		None		None		None		None		None		None	
		Target Risk: 1.0E-5	Target HQ: 1.0E+0	Target Risk: 1.0E-5	Target HQ: 1.0E+0	Target Risk: 1.0E-5	Target HQ: 1.0E+0	Target Risk: 1.0E-5	Target HQ: 1.0E+0	Target Risk: 1.0E-5	Target HQ: 1.0E+0	Target Risk: 1.0E-5	Target HQ: 1.0E+0
CAS No.	Name	Carcinogenic Risk	Hazard Quotient	Carcinogenic Risk	Hazard Quotient	Carcinogenic Risk	Hazard Quotient	Carcinogenic Risk	Hazard Quotient	Carcinogenic Risk	Hazard Quotient	Carcinogenic Risk	Hazard Quotient
71-43-2	Benzene												
100-41-4	Ethyl benzene												
1330-20-7	Xylenes (mixed isomers)												
T-al0608	TPH - Aliph >C06-C08												
T-al1621	TPH - Aliph >C16-C21												
1634-04-4	Methyl t-Butyl ether (MTBE)												
108-88-3	Toluene												
107-06-2	Dichloroethane, 1,2-												
	Cumulative Values:	**0.0E+0**	**0.0E+0**	**0.0E+0**	**0.0E+0**	**0.0E+0**	**0.0E+0**	**0.0E+0**	**0.0E+0**	**0.0E+0**	**0.0E+0**	**0.0E+0**	**0.0E+0**

■ indicates risk level exceeding target risk

indicates risk level exceeding target risk

RBCA SITE ASSESSMENT

Site Name: Stratus Oakland USA 57
Site Location Oakland

Completed By: Clint Skinner
Date Completed: 11-Jul-09

Job ID: GW to Air Res

GROUNDWATER SSTL VALUES

Target Risk (Class A & B) 1 0E-5
Target Hazard Quotient 1 0E+0

Groundwater DAF Option

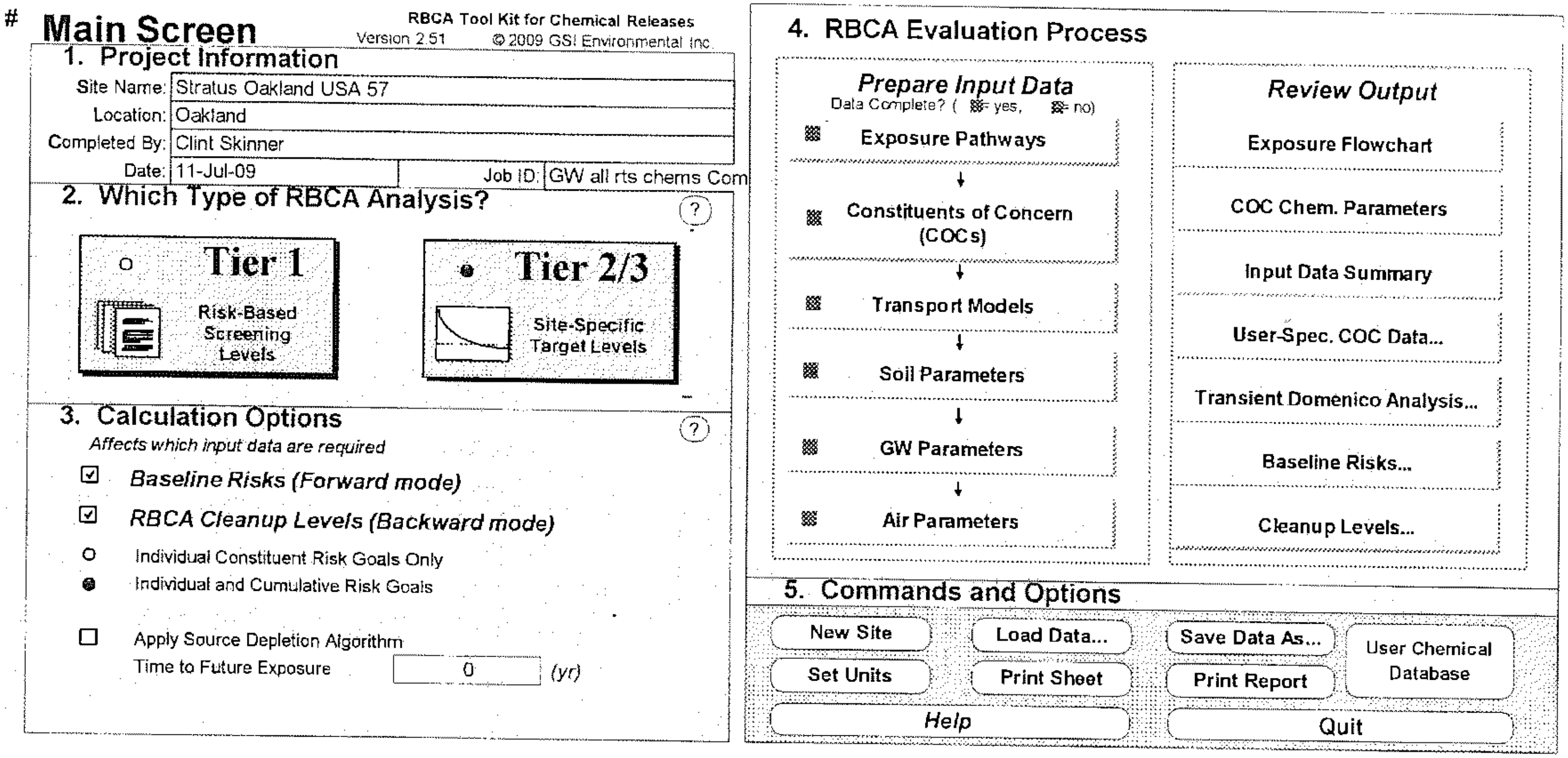
SSTL Results For Complete Exposure Pathways (Checked if Pathway is Complete)

CONSTITUENTS OF CONCERN		Representative Concentration	■ Groundwater Ingestion			■ Groundwater Volatilization to Indoor Air			☐ Groundwater Volatilization to Outdoor Air			Applicable SSTL	SSTL Exceeded ?	Required CRF
CAS No.	Name	(mg/L)	On-site (0 m) Residential	Off-site 1 (0 m) None	Off-site 2 (0 m) None	On-site (0 m) Residential	Off-site 1 (0 m) None	Off-site 2 (0 m) None	On-site (0 m) None	Off-site 1 (0 m) None	Off-site 2 (0 m) None	(mg/L)	"■" if yes	Only if "yes" left
71-43-2	Benzene	5.6E-1	1.2E-2			3 4E+0						1.2E-2	■	4.5E+1
100-41-4	Ethyl benzene	7.3E-2	3.7E+0			>1.7E+2						3.7E+0	☐	<1
1330-20-7	Xylenes (mixed isomers)	3.0E-1	7.3E+0			3.0E+1						7.3E+0	☐	<1
T-al0608	TPH - Aliph >C06-C08	2.4E+0	2 2E+0			>5.4E+0						2.2E+0	■	1.1E+0
T-al1621	TPH - Aliph >C16-C21	8.4E-1	>2.5E-6			Tox?						>2.5E-6	☐	NA
1634-04-4	Methyl t-Butyl ether (MTBE)	9 8E-2	3.7E-1			2.7E+2						3.7E-1	☐	<1
108-88-3	Toluene	1.0E-1	2.9E+0			>5.3E+2						2.9E+0	☐	<1
107-06-2	Dichloroethane, 1,2-	2.5E-2	7.4E-3			9.8E-1						7.4E-3	■	3.4E+0
NA	Total TPH mixture	3.3E+0	2.9E+0	NA	NA	NC	NA	NA	NA	NA	NA	2.9E+0	■	1.1E+0

* = Chemical with user-specified data

">" indicates risk-based target concentration greater than constituent solubility value NA = Not applicable NC = Not calculated

APPENDIX H: RBCA COMMERCIAL GROUNDWATER ALL ROUTES PRINTOUT



Main Screen

RBCA Tool Kit for Chemical Releases
Version 2.51 © 2009 GSI Environmental Inc.

1. Project Information

Site Name: Stratus Oakland USA 57
Location: Oakland
Completed By: Clint Skinner
Date: 11-Jul-09
Job ID: GW all rts chems Com

2. Which Type of RBCA Analysis?

○ Tier 1 — Risk-Based Screening Levels
● Tier 2/3 — Site-Specific Target Levels

3. Calculation Options

Affects which input data are required

☑ *Baseline Risks (Forward mode)*
☑ *RBCA Cleanup Levels (Backward mode)*
○ Individual Constituent Risk Goals Only
● Individual and Cumulative Risk Goals
☐ Apply Source Depletion Algorithm
Time to Future Exposure 0 (yr)

4. RBCA Evaluation Process

Prepare Input Data
Data Complete? (▩= yes, ▩= no)

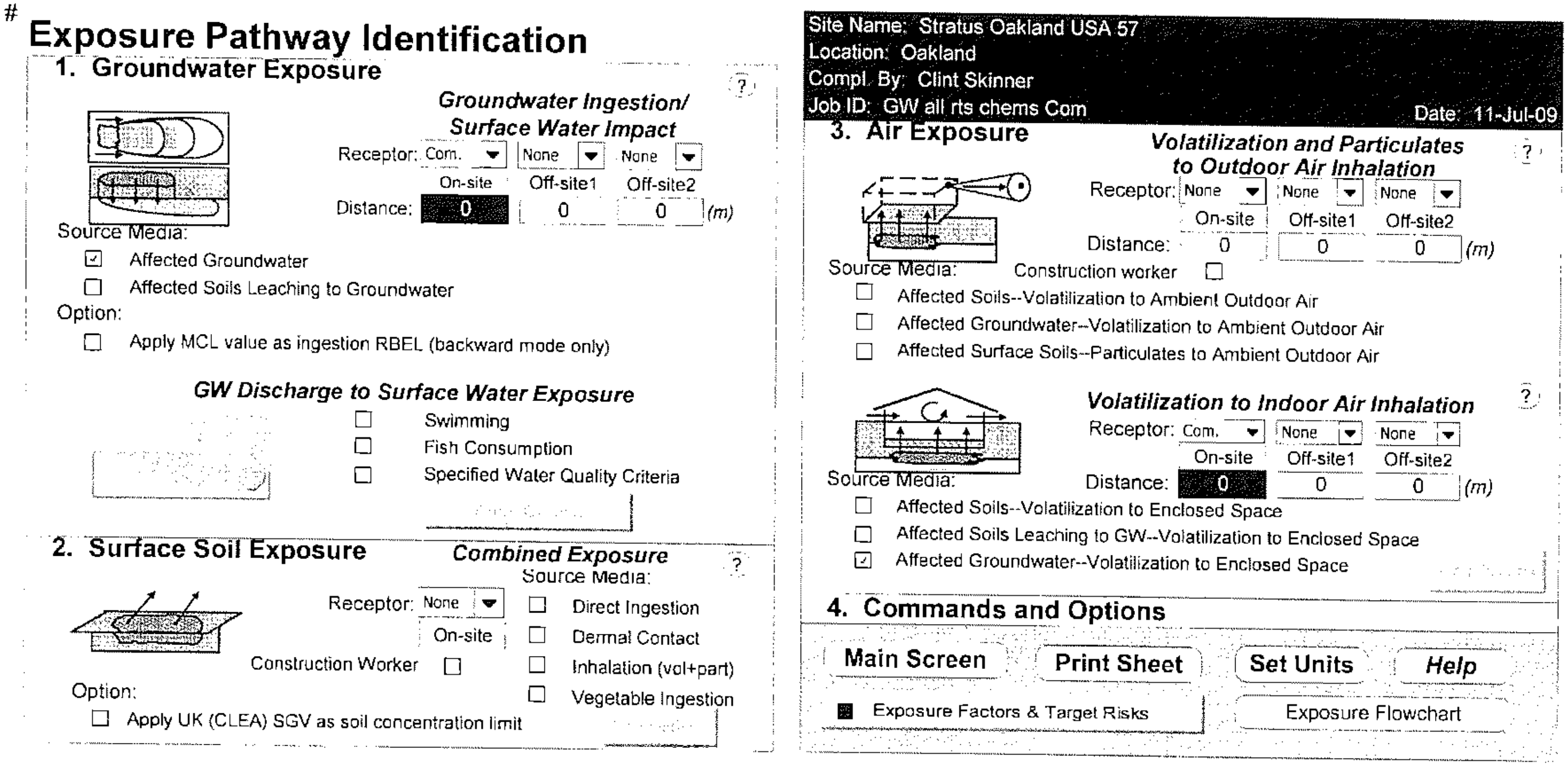
- ▩ Exposure Pathways
- ▩ Constituents of Concern (COCs)
- ▩ Transport Models
- ▩ Soil Parameters
- ▩ GW Parameters
- ▩ Air Parameters

Review Output

- Exposure Flowchart
- COC Chem. Parameters
- Input Data Summary
- User-Spec. COC Data...
- Transient Domenico Analysis...
- Baseline Risks...
- Cleanup Levels...

5. Commands and Options

RBCA Tool Kit for Chemical Releases, Version 2.51



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Exposure Pathway Identification

Site Name: Stratus Oakland USA 57
Location: Oakland
Compl. By: Clint Skinner
Job ID: GW all rts chems Com
Date: 11-Jul-09

1. Groundwater Exposure

Groundwater Ingestion/ Surface Water Impact

	On-site	Off-site1	Off-site2	
Receptor:	Com.	None	None	
Distance:	0	0	0	(m)

Source Media:
- ☑ Affected Groundwater
- ☐ Affected Soils Leaching to Groundwater

Option:
- ☐ Apply MCL value as ingestion RBEL (backward mode only)

GW Discharge to Surface Water Exposure

- ☐ Swimming
- ☐ Fish Consumption
- ☐ Specified Water Quality Criteria

2. Surface Soil Exposure

Combined Exposure

Receptor: None
On-site
Construction Worker ☐

Source Media:
- ☐ Direct Ingestion
- ☐ Dermal Contact
- ☐ Inhalation (vol+part)
- ☐ Vegetable Ingestion

Option:
- ☐ Apply UK (CLEA) SGV as soil concentration limit

3. Air Exposure

Volatilization and Particulates to Outdoor Air Inhalation

	On-site	Off-site1	Off-site2	
Receptor:	None	None	None	
Distance:	0	0	0	(m)

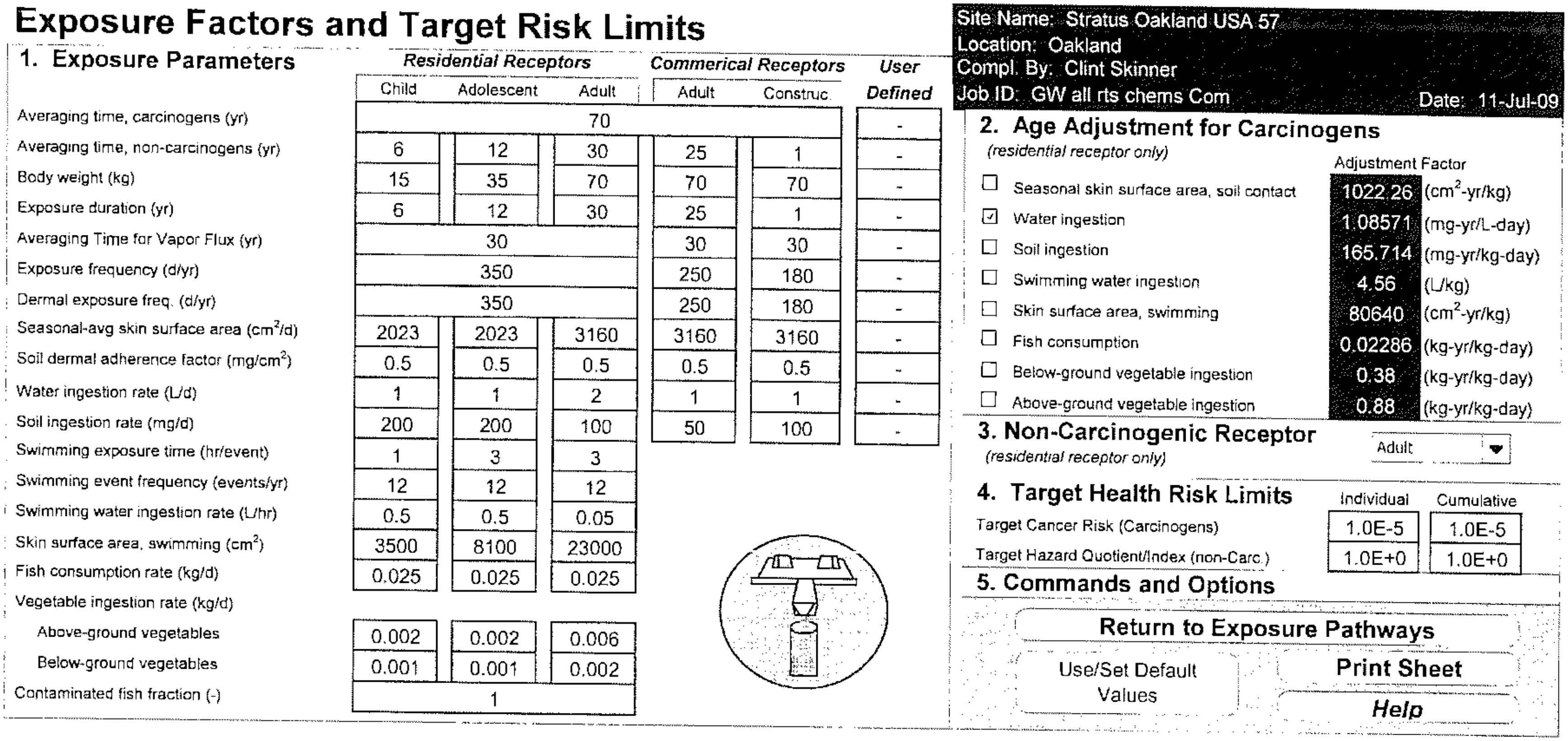
Source Media:
Construction worker ☐
- ☐ Affected Soils--Volatilization to Ambient Outdoor Air
- ☐ Affected Groundwater--Volatilization to Ambient Outdoor Air
- ☐ Affected Surface Soils--Particulates to Ambient Outdoor Air

Volatilization to Indoor Air Inhalation

	On-site	Off-site1	Off-site2	
Receptor:	Com.	None	None	
Distance:	0	0	0	(m)

Source Media:
- ☐ Affected Soils--Volatilization to Enclosed Space
- ☐ Affected Soils Leaching to GW--Volatilization to Enclosed Space
- ☑ Affected Groundwater--Volatilization to Enclosed Space

4. Commands and Options



Exposure Factors and Target Risk Limits

Site Name: Stratus Oakland USA 57
Location: Oakland
Compl. By: Clint Skinner
Job ID: GW all rts chems Com
Date: 11-Jul-09

1. Exposure Parameters

	Residential Receptors			*Commerical Receptors*		*User Defined*
	Child	Adolescent	Adult	Adult	Construc.	
Averaging time, carcinogens (yr)	70					-
Averaging time, non-carcinogens (yr)	6	12	30	25	1	-
Body weight (kg)	15	35	70	70	70	-
Exposure duration (yr)	6	12	30	25	1	-
Averaging Time for Vapor Flux (yr)	30			30	30	-
Exposure frequency (d/yr)	350			250	180	-
Dermal exposure freq. (d/yr)	350			250	180	-
Seasonal-avg skin surface area (cm^2/d)	2023	2023	3160	3160	3160	-
Soil dermal adherence factor (mg/cm^2)	0.5	0.5	0.5	0.5	0.5	-
Water ingestion rate (L/d)	1	1	2	1	1	-
Soil ingestion rate (mg/d)	200	200	100	50	100	-
Swimming exposure time (hr/event)	1	3	3			
Swimming event frequency (events/yr)	12	12	12			
Swimming water ingestion rate (L/hr)	0.5	0.5	0.05			
Skin surface area, swimming (cm^2)	3500	8100	23000			
Fish consumption rate (kg/d)	0.025	0.025	0.025			
Vegetable ingestion rate (kg/d)						
Above-ground vegetables	0.002	0.002	0.006			
Below-ground vegetables	0.001	0.001	0.002			
Contaminated fish fraction (-)	1					

2. Age Adjustment for Carcinogens

(residential receptor only)

	Adjustment Factor	
☐ Seasonal skin surface area, soil contact	1022.26	(cm^2-yr/kg)
☑ Water ingestion	1.08571	(mg-yr/L-day)
☐ Soil ingestion	165.714	(mg-yr/kg-day)
☐ Swimming water ingestion	4.56	(L/kg)
☐ Skin surface area, swimming	80640	(cm^2-yr/kg)
☐ Fish consumption	0.02286	(kg-yr/kg-day)
☐ Below-ground vegetable ingestion	0.38	(kg-yr/kg-day)
☐ Above-ground vegetable ingestion	0.88	(kg-yr/kg-day)

3. Non-Carcinogenic Receptor

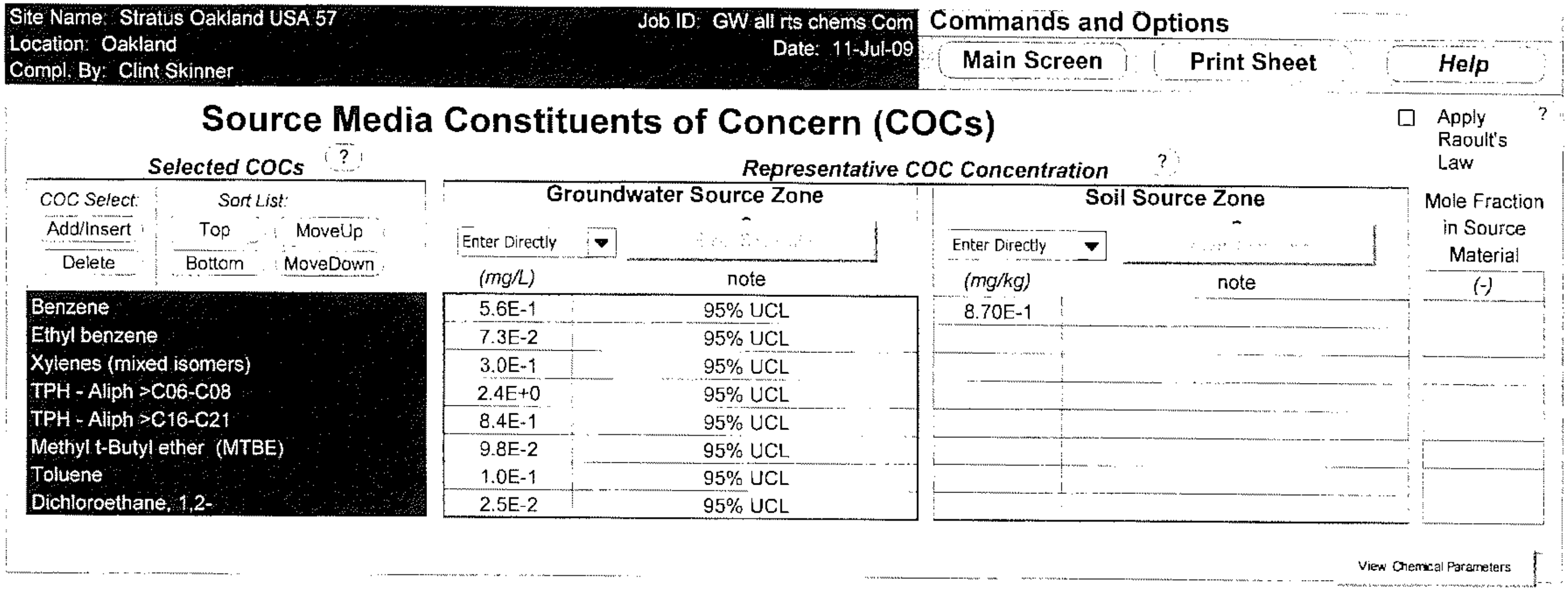
(residential receptor only)

Adult ▼

4. Target Health Risk Limits

	Individual	Cumulative
Target Cancer Risk (Carcinogens)	1.0E-5	1.0E-5
Target Hazard Quotient/Index (non-Carc.)	1.0E+0	1.0E+0

5. Commands and Options



Site Name: Stratus Oakland USA 57
Location: Oakland
Compl. By: Clint Skinner
Job ID: GW all rts chems Com
Date: 11-Jul-09

Source Media Constituents of Concern (COCs)

☐ Apply Raoult's Law

Selected COCs	Representative COC Concentration				
	Groundwater Source Zone		Soil Source Zone		Mole Fraction in Source Material
	(mg/L)	note	(mg/kg)	note	(-)
Benzene	5.6E-1	95% UCL	8.70E-1		
Ethyl benzene	7.3E-2	95% UCL			
Xylenes (mixed isomers)	3.0E-1	95% UCL			
TPH - Aliph >C06-C08	2.4E+0	95% UCL			
TPH - Aliph >C16-C21	8.4E-1	95% UCL			
Methyl t-Butyl ether (MTBE)	9.8E-2	95% UCL			
Toluene	1.0E-1	95% UCL			
Dichloroethane, 1,2-	2.5E-2	95% UCL			

##

Transport Modeling Options

Site Name: Stratus Oakland USA 57
Job ID: GW all rts chems Com
Location: Oakland
Date: 11-Jul-09
Compl. By: Clint Skinner

1. Vertical Transport, Surface Soil Column ?

Outdoor Air Volatilization Factors

○ Surface soil volatilization model only

○ Combination surface soil/Johnson & Ettinger models

Thickness of surface soil zone 3.00 *(m)*

○ User-specified VF from other model

Indoor Air Volatilization Factors ?

● Johnson & Ettinger model for soil and groundwater volatilization

○ Johnson & Ettinger for soil, Mass Flux model for groundwater

○ User-specified VF from other model

Soil-to-Groundwater Leaching Factor ?

○ ASTM Model

☐ Apply Soil Attenuation Model (SAM)

☐ Allow first-order biodecay

○ User-specified LF from other model

Modeling Options ?

☐ Disable Mass Balance Limit

☐ Apply Dual Equilibrium Desorption Model

2. Lateral Air Dispersion Factor ?

	Off-site 1	Off-site 2	
○ 3-D Gaussian dispersion model			
○ User-Specified ADF	1.00E+0	1.00E+0	*(-)*

3. Groundwater Dilution Attenuation Factor

Calculate DAF using Domenico Model ?

○ Domenico equation with dispersion only (no biodegradation)

○ Domenico equation first-order decay

○ Modified Domenico equation using electron acceptor superposition

Biodegradation Capacity NC *(mg/L)*

— *or* —

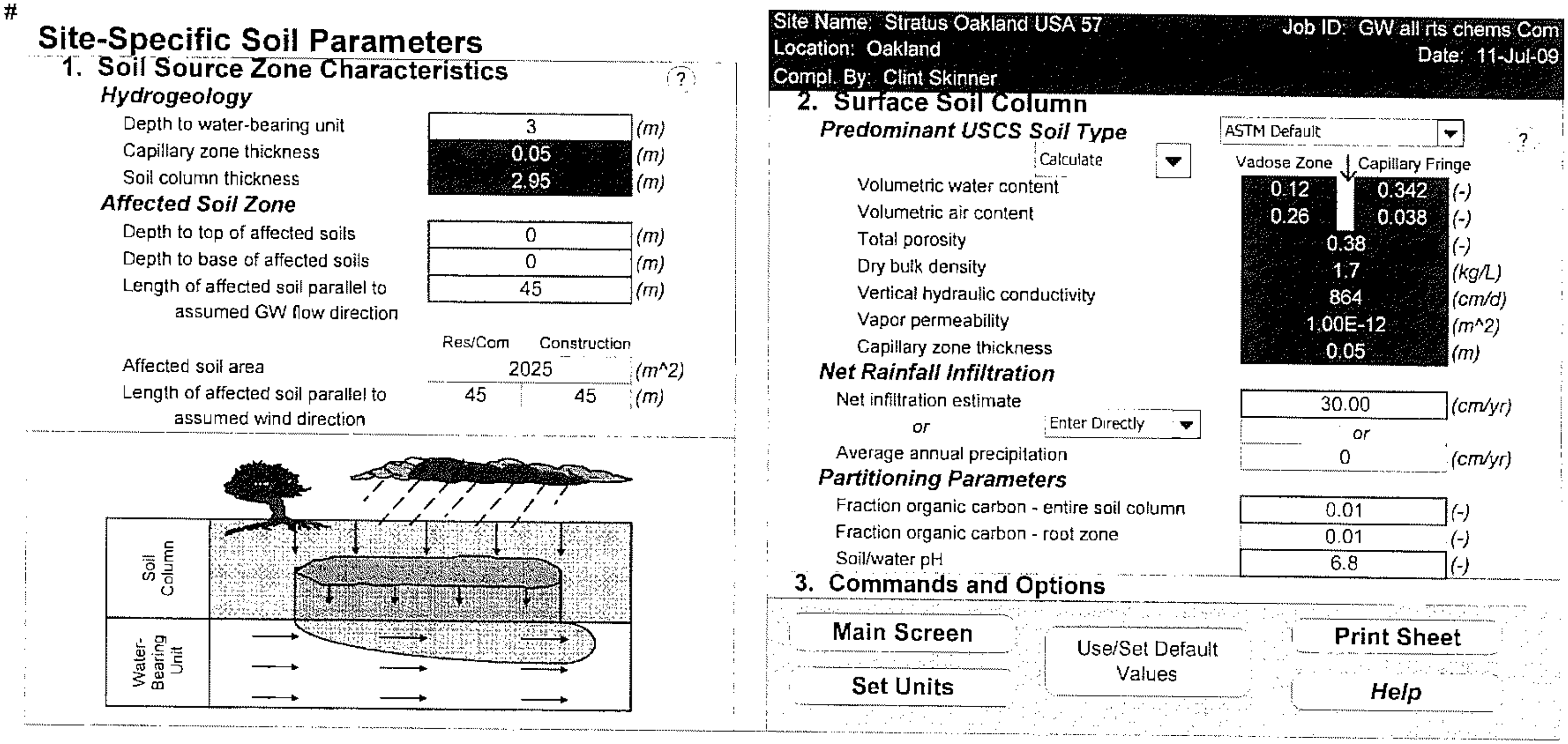
User-Specified DAF Values

○ DAF values from other model or site data

4. Chemical Decay and Source Depletion ?

5. Commands and Options

Main Screen **Print Sheet** ***Help***



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Site Name: Stratus Oakland USA 57
Location: Oakland
Compl. By: Clint Skinner
Job ID: GW all rts chems Com
Date: 11-Jul-09

Site-Specific Soil Parameters

1. Soil Source Zone Characteristics

Hydrogeology

Depth to water-bearing unit	3	(m)
Capillary zone thickness	0.05	(m)
Soil column thickness	2.95	(m)

Affected Soil Zone

Depth to top of affected soils	0		(m)
Depth to base of affected soils	0		(m)
Length of affected soil parallel to assumed GW flow direction	45		(m)
	Res/Com	Construction	
Affected soil area	2025		(m^2)
Length of affected soil parallel to assumed wind direction	45	45	(m)

2. Surface Soil Column

Predominant USCS Soil Type

ASTM Default
Calculate

	Vadose Zone	Capillary Fringe	
Volumetric water content	0.12	0.342	(-)
Volumetric air content	0.26	0.038	(-)
Total porosity	0.38		(-)
Dry bulk density	1.7		(kg/L)
Vertical hydraulic conductivity	864		(cm/d)
Vapor permeability	1.00E-12		(m^2)
Capillary zone thickness	0.05		(m)

Net Rainfall Infiltration

Net infiltration estimate		30.00	(cm/yr)
or	Enter Directly	or	
Average annual precipitation		0	(cm/yr)

Partitioning Parameters

Fraction organic carbon - entire soil column	0.01	(-)
Fraction organic carbon - root zone	0.01	(-)
Soil/water pH	6.8	(-)

3. Commands and Options

#

Site-Specific Groundwater Parameters

Site Name: Stratus Oakland USA 57
Location: Oakland
Compl. By: Clint Skinner

Job ID: GW all rts chems Com
Date: 11-Jul-09

1. Water-Bearing Unit

?

Hydrogeology

Groundwater Darcy velocity	6.9E+0	*(cm/d)*
Groundwater seepage velocity	1.8E+1	*(cm/d)*
or Calculate ▼	↑ *or*	
Hydraulic conductivity	6.9E+2	*(cm/d)*
Hydraulic gradient	0.01	*(-)*
Effective porosity	0.38	*(-)*

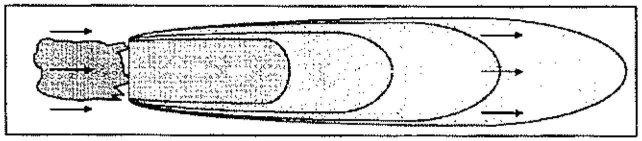
Sorption

Fraction organic carbon--saturated zone	0.001	*(-)*
Groundwater pH	6.2	*(-)*

2. Groundwater Source Zone

?

Groundwater plume width at source	45	*(m)*
Plume (mixing zone) thickness at source	2	*(m)*
Calculate ▼	*or*	
Saturated thickness	2	*(m)*
Length of source zone	45	*(m)*



3. Groundwater Dispersion

?

Model: ASTM Default ▼

	GW Ingestion		GW to Indoor Air		
	Off-site 1	Off-site 2	Off-site 1	Off-site 2	
Distance to GW receptors	0	0	0	0	*(m)*
Calculate ▼	↓	↓	↓	↓	
Longitudinal dispersivity	0	0	0	0	*(m)*
Transverse dispersivity	0	0	0	0	*(m)*
Vertical dispersivity	0	0	0	0	*(m)*

4. Groundwater Discharge to Surface Water

?

	Off-site 2	
Distance to GW/SW disharge point	NA	*(m)*
Plume width at GW/SW discharge	0	*(m)*
Plume thickness at GW/SW discharge	0	*(m)*
Surface water flowrate at GW/SW discharge	0	*(m^3/s)*

5. Commands and Options

Main Screen

Set Units

Use/Set Default Values

Print Sheet

Help

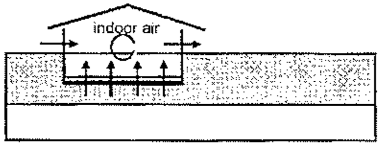
Site-Specific Air Parameters

Site Name: Stratus Oakland USA 57 Job ID: GW all rts chems Com
Location: Oakland Date: 11-Jul-09
Compl. By: Clint Skinner

1. Outdoor Air Pathway

User Defined Volatilization Factor Used
User Defined Air Dispersion Factor Used

	Off-site 1	Off-site 2	
Dispersion in Air			
Distance to offsite air receptor	0	0	(m)
Horizontal dispersivity	0	0	*(m)*
Vertical dispersivity	0	0	*(m)*
Air Source Zone			
Air mixing zone height	2		*(m)*
Ambient air velocity in mixing zone	2.25		*(m/s)*
Inverse mean conc. [Q/C term]	79.25		
Particulate Emissions	*Model: ASTM Model*		
Particulate Emission Factor	0		*(kg/m^3)*
or			
Areal particulate emission flux	6.9E-14		*(g/cm^2/s)*
Fraction vegetative cover	0.5		*(-)*
Mean annual air velocity @ 7 m	4.8		
Equivalent 7m air vel. threshold	11.32		*(m/s)*
Windspeed function [F(x) term]	0.223841466		*(-)*



2. Indoor Air Pathway

User Defined Volatilization Factor Used

	Residential	Commercial	
Building volume/area ratio	2	3	*(m)*
Foundation area	70	70	*(m^2)*
Foundation perimeter	49	34	*(m)*
Building air exchange rate	1.4E-4	2.3E-4	*(1/s)*
Depth to bottom of foundation slab	0.15	0.15	*(m)*
Convective air flow through cracks	0.0E+0	0.0E+0	*(m^3/s)*
Foundation thickness	0.15		*(m)*
Foundation crack fraction	0.001		*(-)*
Volumetric water content of cracks	0.12		*(-)*
Volumetric air content of cracks	0.26		*(-)*
Indoor/Outdoor differential pressure	0		*(g/cm/s^2)*
Building Volume	451	451	*(m^3)*
Building Width Perpendicular to GW flow	9.61	9.61	*(m)*
Building Length Parallel to GW flow	9.61	9.61	*(m)*
Saturated Soil Zone Porosity	0.38		*(-)*
Vertical Dispersivity	0.006		*(m)*
Groundwater Seepage Velocity	1.8E+01		*(cm/d)*

3. Commands and Options

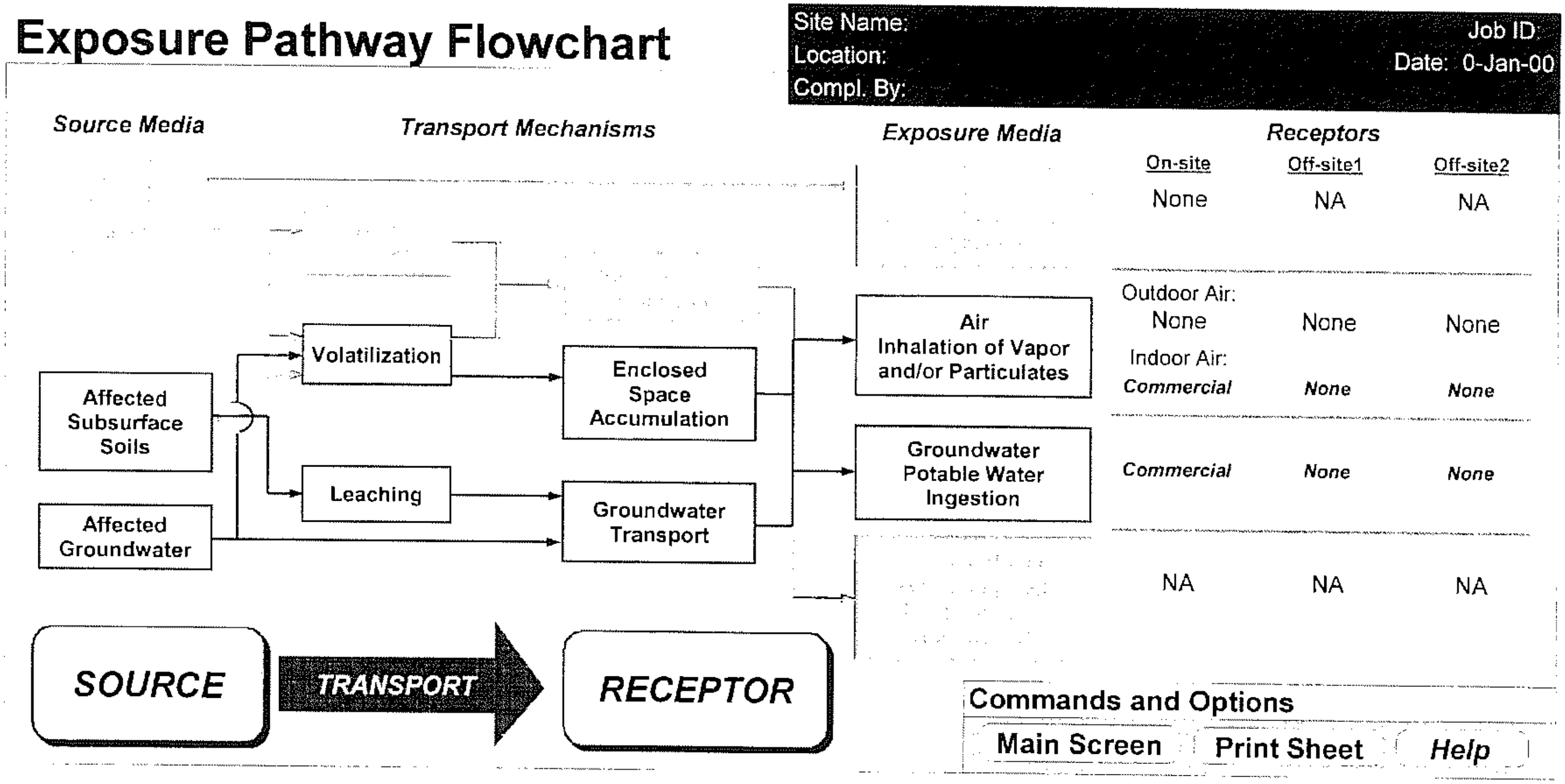
Main Screen

Set Units

Use/Set Default Values

Print Sheet

Help



Exposure Pathway Flowchart

Site Name:
Location:
Compl. By:
Job ID:
Date: 0-Jan-00

Receptors

Exposure Media	On-site	Off-site1	Off-site2
	None	NA	NA
Air Inhalation of Vapor and/or Particulates	Outdoor Air: None	None	None
	Indoor Air: *Commercial*	*None*	*None*
Groundwater Potable Water Ingestion	*Commercial*	*None*	*None*
	NA	NA	NA

RBCA SITE ASSESSMENT | **User-Specified COC Data**

REPRESENTATIVE COC CONCENTRATIONS IN SOURCE MEDIA

CONSTITUENT	**Representative COC Concentration**			
	Groundwater		**Soils (0 - 0 m)**	
	value (mg/L)	note	value (mg/kg)	note
Benzene	5.6E-1	95% UCL	8.7E-1	
Ethyl benzene	7.3E-2	95% UCL		
Xylenes (mixed isomers)	3.0E-1	95% UCL		
TPH - Aliph >C06-C08	2.4E+0	95% UCL		
TPH - Aliph >C16-C21	8.4E-1	95% UCL		
Methyl t-Butyl ether (MTBE)	9.8E-2	95% UCL		
Toluene	1.0E-1	95% UCL		
Dichloroethane, 1,2-	2.5E-2	95% UCL		

RBCA Tool Kit for Chemical Releases, Version 2.51

RBCA SITE ASSESSMENT | **User-Specified COC Data**

REPRESENTATIVE COC CONCENTRATIONS IN SOURCE MEDIA

CONSTITUENT	Representative COC Concentration			
	Groundwater		Soils (0 - 0 m)	
	value (mg/L)	note	value (mg/kg)	note
Benzene	5.6E-1	95% UCL	8.7E-1	
Ethyl benzene	7.3E-2	95% UCL		
Xylenes (mixed isomers)	3.0E-1	95% UCL		
TPH - Aliph >C06-C08	2.4E+0	95% UCL		
TPH - Aliph >C16-C21	8.4E-1	95% UCL		
Methyl t-Butyl ether (MTBE)	9.8E-2	95% UCL		
Toluene	1.0E-1	95% UCL		
Dichloroethane, 1,2-	2.5E-2	95% UCL		

Site Name: Stratus Oakland USA 57
Site Location: Oakland
Completed By: Clint Skinner

Date Completed: 11-Jul-09
Job ID: GW all rts chems Com

RBCA SITE ASSESSMENT

TIER 2 EXPOSURE CONCENTRATION AND INTAKE CALCULATION

INDOOR AIR EXPOSURE PATHWAYS ☐ (Checked if Pathway is Complete)

SOILS : VAPOR INTRUSION INTO BUILDINGS

	1) Source Medium	2) NAF Value (L/kg) Receptor	3) Exposure Medium Indoor Air: POE Conc. (mg/m^3) (1) / (2)	4) Exposure Multiplier (EFxED)/(ATx365) (unitless)	5) Average Inhalation Exposure Concentration (mg/m^3) (3) X (4)
		On-site (0 m)	On-site (0 m)	On-site (0 m)	On-site (0 m)
Constituents of Concern	Soil Conc. (mg/kg)	None	None	None	None
Benzene	8.7E-1				
Ethyl benzene					
Xylenes (mixed isomers)					
TPH - Aliph >C06-C08					
TPH - Aliph >C16-C21					
Methyl t-Butyl ether (MTBE)					
Toluene					
Dichloroethane, 1,2-					

* = Chemical with user-specified data

NOTE: AT = Averaging time (days) EF = Exposure frequency (days/yr) ED = Exposure duration (yr) NAF = Natural attenuation factor POE = Point of exposure

Site Name: Stratus Oakland USA 57
Site Location: Oakland
Completed By: Clint Skinner

Date Completed: 11-Jul-09
Job ID: GW all rts chems Com

RBCA SITE ASSESSMENT

TIER 2 EXPOSURE CONCENTRATION AND INTAKE CALCULATION

INDOOR AIR EXPOSURE PATHWAYS ☒ **(Checked if Pathway is Complete)**

GROUNDWATER: VAPOR INTRUSION INTO BUILDINGS

Exposure Concentration

	1) Source Medium	2) NAF Value (m^3/L) Receptor			3) Exposure Medium Indoor Air: POE Conc. (mg/m^3) (1) / (2)		
Constituents of Concern	Groundwater Conc. (mg/L)	On-site (0 m) Commercial	Off-site 1 (0 m) None	Off-site 2 (0 m) None	On-site (0 m) None	Off-site 1 (0 m) None	Off-site 2 (0 m) None
Benzene	5.6E-1	7.5E+2			7.4E-4		
Ethyl benzene	7.3E-2	6.2E+2			1.2E-4		
Xylenes (mixed isomers)	3.0E-1	7.0E+2			4.3E-4		
TPH - Aliph >C06-C08	2.4E+0	3.4E+0			7.3E-1		
TPH - Aliph >C16-C21	8.4E-1	3.3E-2			2.5E+1		
Methyl t-Butyl ether (MTBE)	9.8E-2	7.0E+3			1.4E-5		
Toluene	1.0E-1	6.4E+2			1.6E-4		
Dichloroethane, 1,2-	2.5E-2	2.6E+3			9.7E-6		

NOTE: AT = Averaging time (days) EF = Exposure frequency (days/yr) ED = Exposure duration (yr) NAF = Natural attenuation factor POE = Point of exposure

Site Name: Stratus Oakland USA 57
Site Location: Oakland
Completed By: Clint Skinner

Date Completed: 11-Jul-09
Job ID: GW all rls chems Com

RBCA SITE ASSESSMENT

TIER 2 EXPOSURE CONCENTRATION AND INTAKE CALCULATION

INDOOR AIR EXPOSURE PATHWAYS

GROUNDWATER: VAPOR INTRUSION INTO BUILDINGS

	4) Exposure Multiplier (EFxED)/(ATx365) (unitless)			5) Average Inhalation Exposure Concentration (mg/m^3) (3) X (4)		
Constituents of Concern	On-site (0 m) None	Off-site 1 (0 m) None	Off-site 2 (0 m) None	On-site (0 m) None	Off-site 1 (0 m) None	Off-site 2 (0 m) None
Benzene	2.4E-1			1.8E-4		
Ethyl benzene	6.8E-1			8.0E-5		
Xylenes (mixed isomers)	6.8E-1			3.0E-4		
TPH - Aliph >C06-C08	6.8E-1			5.0E-1		
TPH - Aliph >C16-C21	6.8E-1			1.7E+1		
Methyl t-Butyl ether (MTBE)	2.4E-1			3.4E-6		
Toluene	6.8E-1			1.1E-4		
Dichloroethane, 1,2-	2.4E-1			2.4E-6		

* = Chemical with user-specified data

NOTE: AT = Averaging time (days) EF = Exposure frequency (days/yr) ED = Exposure duration (yr) NAF = Natural attenuation factor POE = Point of exposure

Site Name: Stratus Oakland USA 57
Site Location: Oakland
Completed By: Clint Skinner

Date Completed: 11-Jul-09
Job ID: GW all rts chems Com

RBCA SITE ASSESSMENT

TIER 2 EXPOSURE CONCENTRATION AND INTAKE CALCULATION

INDOOR AIR EXPOSURE PATHWAYS ☐ **(Checked if Pathway is Complete)**

SOIL LEACHING TO GW- VAPOR INTRUSION INTO BUILDINGS

	Exposure Concentration						
	1) Source Medium	2) NAF Value (m^3/L) Receptor			3) Exposure Medium Indoor Air POE Conc. (mg/m^3) (1) / (2)		
		On-site (0 m) None	Off-site 1 (0 m) None	Off-site 2 (0 m) None	On-site (0 m) None	Off-site 1 (0 m) None	Off-site 2 (0 m) None
Constituents of Concern	Soil Conc. (mg/kg)						
Benzene	8.7E-1						
Ethyl benzene							
Xylenes (mixed isomers)							
TPH - Aliph >C06-C08							
TPH - Aliph >C16-C21							
Methyl t-Butyl ether (MTBE)							
Toluene							
Dichloroethane, 1,2-							

NOTE: AT = Averaging time (days) EF = Exposure frequency (days/yr) ED = Exposure duration (yr) NAF = Natural attenuation factor POE = Point of exposure

Site Name: Stratus Oakland USA 57
Site Location: Oakland
Completed By: Clint Skinner

Date Completed: 11-Jul-09
Job ID: GW all rts chems Com

RBCA SITE ASSESSMENT

TIER 2 EXPOSURE CONCENTRATION AND INTAKE CALCULATION

INDOOR AIR EXPOSURE PATHWAYS

SOIL LEACHING TO GW- VAPOR INTRUSION INTO BUILDINGS

	4) Exposure Multiplier (EFxED)/(ATx365) (unitless)			5) Average Inhalation Exposure Concentration (mg/m^3) (3) X (4)		
	On-site (0 m) None	Off-site 1 (0 m) None	Off-site 2 (0 m) None	On-site (0 m) None	Off-site 1 (0 m) None	Off-site 2 (0 m) None
Constituents of Concern						
Benzene						
Ethyl benzene						
Xylenes (mixed isomers)						
TPH - Aliph >C06-C08						
TPH - Aliph >C16-C21						
Methyl t-Butyl ether (MTBE)						
Toluene						
Dichloroethane, 1,2-						

* = Chemical with user-specified data

NOTE: AT = Averaging time (days) EF = Exposure frequency (days/yr) ED = Exposure duration (yr) NAF = Natural attenuation factor POE = Point of exposure

Site Name: Stratus Oakland USA 57
Site Location: Oakland
Completed By: Clint Skinner

Date Completed: 11-Jul-09
Job ID: GW all rts chems Com

RBCA SITE ASSESSMENT

TIER 2 EXPOSURE CONCENTRATION AND INTAKE CALCULATION

INDOOR AIR EXPOSURE PATHWAYS

MAXIMUM PATHWAY EXPOSURE (mg/m^3)

(Maximum average exposure concentration from soil and groundwater routes.)

Constituents of Concern	On-site (0 m) Commercial	Off-site 1 (0 m) None	Off-site 2 (0 m) None
Benzene	1.8E-4		
Ethyl benzene	8.0E-5		
Xylenes (mixed isomers)	3.0E-4		
TPH - Aliph >C06-C08	5.0E-1		
TPH - Aliph >C16-C21	1.7E+1		
Methyl t-Butyl ether (MTBE)	3.4E-6		
Toluene	1.1E-4		
Dichloroethane, 1,2-	2.4E-6		

Site Name: Stratus Oakland USA 57
Site Location: Oakland
Completed By: Clint Skinner

Date Completed: 11-Jul-09
Job ID: GW all rts chems Com

RBCA SITE ASSESSMENT

TIER 2 PATHWAY RISK CALCULATION

INDOOR AIR EXPOSURE PATHWAYS ☒ **(Checked if Pathway is Complete)**

CARCINOGENIC RISK

	(1) Carcinogenic Classification	(2) Maximum Carcinogenic Exposure (mg/m^3)			(3) Inhalation Unit Risk Factor	(4) Individual COC Risk (2) x (3) x 1000		
		On-site (0 m)	Off-site 1 (0 m)	Off-site 2 (0 m)		On-site (0 m)	Off-site 1 (0 m)	Off-site 2 (0 m)
Constituents of Concern		Commercial	None	None	(µg/m^3)^-1	Commercial	None	None
Benzene	TRUE	1.8E-4	-	-	2.2E-6	4.0E-7		
Ethyl benzene	FALSE	-	-	-	-			
Xylenes (mixed isomers)	FALSE	-	-	-	-			
TPH - Aliph >C06-C08	FALSE	-	-	-	-			
TPH - Aliph >C16-C21	FALSE	-	-	-	-			
Methyl t-Butyl ether (MTBE)	TRUE	3.4E-6	-	-	2.6E-7	8.9E-10		
Toluene	FALSE	-	-	-	-			
Dichloroethane, 1,2-	TRUE	2.4E-6	-	-	2.6E-5	6.2E-8		

Total Pathway Carcinogenic Risk = **4.6E-7**

RBCA SITE ASSESSMENT

TIER 2 PATHWAY RISK CALCULATION

INDOOR AIR EXPOSURE PATHWAYS ☒ **(Checked if Pathway is Complete)**

TOXIC EFFECTS

	(5) Maximum Toxicant Exposure (mg/m^3)			(6) Inhalation Reference Concentration	(7) Individual COC Hazard Quotient (5) / (6)		
	On-site (0 m)	Off-site 1 (0 m)	Off-site 2 (0 m)		On-site (0 m)	Off-site 1 (0 m)	Off-site 2 (0 m)
Constituents of Concern	Commercial	None	None	(mg/m^3)	Commercial	None	None
Benzene	5.1E-4			2.8E-1	1.8E-3		
Ethyl benzene	8.0E-5			1.0E+0	8.0E-5		
Xylenes (mixed isomers)	3.0E-4			1.0E-1	3.0E-3		
TPH - Aliph >C06-C08	5.0E-1			1.8E+1	2.8E-2		
TPH - Aliph >C16-C21	1.7E+1			-			
Methyl t-Butyl ether (MTBE)	9.6E-6			3.0E+0	3.2E-6		
Toluene	1.1E-4			5.0E+0	2.2E-5		
Dichloroethane, 1,2-	6.7E-6			2.4E+0	2.7E-6		

Total Pathway Hazard Index = **3.2E-2**

Site Name: Stratus Oakland USA 57
Site Location: Oakland
Completed By: Clint Skinner

Date Completed: 11-Jul-09
Job ID: GW all rts chems Com

RBCA SITE ASSESSMENT

TIER 2 EXPOSURE CONCENTRATION AND INTAKE CALCULATION

GROUNDWATER EXPOSURE PATHWAYS ☐ **(Checked if Pathway is Complete)**

SOILS : LEACHING TO GROUNDWATER INGESTION

	1) Source Medium	2) NAF Value (L/kg) Receptor			3) Exposure Medium Groundwater: POE Conc. (mg/L) (1)/(2)		
Constituents of Concern	Soil Conc. (mg/kg)	On-site (0 m) Commercial	Off-site 1 (0 m) None	Off-site 2 (0 m) None	On-site (0 m) Commercial	Off-site 1 (0 m) None	Off-site 2 (0 m) None
Benzene	8.7E-1						
Ethyl benzene							
Xylenes (mixed isomers)							
TPH - Aliph >C06-C08							
TPH - Aliph >C16-C21							
Methyl t-Butyl ether (MTBE)							
Toluene							
Dichloroethane, 1,2-							

* = Chemical with user-specified data

NOTE: NAF = Natural attenuation factor POE = Point of exposure

Site Name: Stratus Oakland USA 57
Site Location: Oakland
Completed By: Clint Skinner

Date Completed: 11-Jul-09
Job ID: GW all rts chems Com

RBCA SITE ASSESSMENT

TIER 2 EXPOSURE CONCENTRATION AND INTAKE CALCULATION

GROUNDWATER EXPOSURE PATHWAYS

SOILS : LEACHING TO GROUNDWATER INGESTION (cont'd)

Constituents of Concern	4) Exposure Multiplier (IRxEFxED)/(BWxAT) (L/kg-day)			5) Average Daily Intake Rate (mg/kg/day) (3) x (4)		
	On-site (0 m) Commercial	Off-site 1 (0 m) None	Off-site 2 (0 m) None	On-site (0 m) Commercial	Off-site 1 (0 m) None	Off-site 2 (0 m) None
Benzene						
Ethyl benzene						
Xylenes (mixed isomers)						
TPH - Aliph >C06-C08						
TPH - Aliph >C16-C21						
Methyl t-Butyl ether (MTBE)						
Toluene						
Dichloroethane, 1,2-						

* = Chemical with user-specified data

NOTE:
AT = Averaging time (days)
BW = Body weight (kg)
ED = Exposure duration (yr)
EF = Exposure frequency (days/yr)
IR = Ingestion rate (mg/day)

Site Name: Stratus Oakland USA 57
Site Location: Oakland

Completed By: Clint Skinner
Date Completed: 11-Jul-09

Job ID: GW all rts ch

RBCA SITE ASSESSMENT

TIER 2 EXPOSURE CONCENTRATION AND INTAKE CALCULATION

GROUNDWATER EXPOSURE PATHWAYS ☒ **(Checked if Pathway is Complete)**

GROUNDWATER: INGESTION

	1) Source Medium	2) NAF Value (unitless) Receptor			3) Exposure Medium Groundwater: POE Conc. (mg/L) (1)/(2)		
Constituents of Concern	Groundwater Conc. (mg/L)	On-site (0 m) Commercial	Off-site 1 (0 m) None	Off-site 2 (0 m) None	On-site (0 m) Commercial	Off-site 1 (0 m) None	Off-site 2 (0 m) None
Benzene	5.6E-1	1.0E+0			5.6E-1		
Ethyl benzene	7.3E-2	1.0E+0			7.3E-2		
Xylenes (mixed isomers)	3.0E-1	1.0E+0			3.0E-1		
TPH - Aliph >C06-C08	2.4E+0	1.0E+0			2.4E+0		
TPH - Aliph >C16-C21	8.4E-1	1.0E+0			8.4E-1		
Methyl t-Butyl ether (MTBE)	9.8E-2	1.0E+0			9.8E-2		
Toluene	1.0E-1	1.0E+0			1.0E-1		
Dichloroethane, 1,2-	2.5E-2	1.0E+0			2.5E-2		

NOTE: NAF = Natural attenuation factor POE = Point of exposure

Site Name: Stratus Oakland USA 57
en Site Location: Oakland
Completed By: Clint Skinner

Date Completed: 11-Jul-09
Job ID: GW all rts chems Com

RBCA SITE ASSESSMENT

TIER 2 EXPOSURE CONCENTRATION AND INTAKE CALCULATION

GROUNDWATER EXPOSURE PATHWAYS

GROUNDWATER INGESTION (cont'd)

	4) Exposure Multiplier (IRxEFxED)/(BWxAT) (L/kg/day)			5) Average Daily Intake Rate (mg/kg/day) (3) x (4)		
Constituents of Concern	On-site (0 m) Commercial	Off-site 1 (0 m) None	Off-site 2 (0 m) None	On-site (0 m) Commercial	Off-site 1 (0 m) None	Off-site 2 (0 m) None
Benzene	3.5E-3			1.9E-3		
Ethyl benzene	9.8E-3			7.1E-4		
Xylenes (mixed isomers)	9.8E-3			3.0E-3		
TPH - Aliph >C06-C08	9.8E-3			2.4E-2		
TPH - Aliph >C16-C21	9.8E-3			8.2E-3		
Methyl t-Butyl ether (MTBE)	3.5E-3			3.4E-4		
Toluene	9.8E-3			1.0E-3		
Dichloroethane, 1,2-	3.5E-3			8.7E-5		

* = Chemical with user-specified data

NOTE:
AT = Averaging time (days)
BW = Body weight (kg)
ED = Exposure duration (yr)
EF = Exposure frequency (days/yr)
IR = Ingestion rate (mg/day)

Site Name: Stratus Oakland USA 57
Site Location: Oakland
Completed By: Clint Skinner
Date Completed: 11-Jul-09
Job ID: GW all rts ct

RBCA SITE ASSESSMENT

TIER 2 EXPOSURE CONCENTRATION AND INTAKE CALCULATION

GROUNDWATER EXPOSURE PATHWAYS

MAXIMUM PATHWAY INTAKE (mg/kg/day)
(Maximum intake of active pathways soil leaching & groundwater routes.)

Constituents of Concern	On-site (0 m) Commercial	Off-site 1 (0 m) None	Off-site 2 (0 m) None
Benzene	1.9E-3		
Ethyl benzene	7.1E-4		
Xylenes (mixed isomers)	3.0E-3		
TPH - Aliph >C06-C08	2.4E-2		
TPH - Aliph >C16-C21	8.2E-3		
Methyl t-Butyl ether (MTBE)	3.4E-4		
Toluene	1.0E-3		
Dichloroethane, 1,2-	8.7E-5		

* = Chemical with user-specified data

Site Name: Stratus Oakland USA 57
ıe Site Location: Oakland
Completed By: Clint Skinner

Date Completed: 11-Jul-09
Job ID: GW all rts chems Com

RBCA SITE ASSESSMENT

TIER 2 PATHWAY RISK CALCULATION

GROUNDWATER EXPOSURE PATHWAYS ■ **(Checked if Pathway is Complete)**

CARCINOGENIC RISK

Constituents of Concern	(1) Is Carcinogenic	(2) Maximum Carcinogenic Intake Rate (mg/kg/day)			(3) Oral Slope Factor (mg/kg-day)^-1	(4) Individual COC Risk (2) x (3)		
		On-site (0 m) Commercial	Off-site 1 (0 m) None	Off-site 2 (0 m) None		On-site (0 m) Commercial	Off-site 1 (0 m) None	Off-site 2 (0 m) None
Benzene	TRUE	1.9E-3			5.5E-2	1.1E-4		
Ethyl benzene	FALSE				-			
Xylenes (mixed isomers)	FALSE				-			
TPH - Aliph >C06-C08	FALSE				-			
TPH - Aliph >C16-C21	FALSE				-			
Methyl t-Butyl ether (MTBE)	TRUE	3.4E-4			1.8E-3	6.2E-7		
Toluene	FALSE				-			
Dichloroethane, 1,2-	TRUE	8.7E-5			9.1E-2	8.0E-6		
Total Pathway Carcinogenic Risk =						**1.2E-4**		

Site Name: Stratus Oakland USA 57
Site Location: Oakland
Completed By: Clint Skinner

Date Completed: 11-Jul-09
Job ID: GW all rts chems Com

TIER 2 PATHWAY RISK CALCULATION

GROUNDWATER EXPOSURE PATHWAYS ■ **(Checked if Pathway is Complete)**

TOXIC EFFECTS

	(5) Maximum Toxicant Intake Rate (mg/kg/day)			(6) Oral Reference Dose (mg/kg/day)	(7) Individual COC Hazard Quotient (5) / (6)		
Constituents of Concern	On-site (0 m) Commercial	Off-site 1 (0 m) None	Off-site 2 (0 m) None		On-site (0 m) Commercial	Off-site 1 (0 m) None	Off-site 2 (0 m) None
Benzene	5.4E-3			4.0E-3	1.4E+0		
Ethyl benzene	7.1E-4			1.0E-1	7.1E-3		
Xylenes (mixed isomers)	3.0E-3			2.0E-1	1.5E-2		
TPH - Aliph >C06-C08	2.4E-2			6.0E-2	4.0E-1		
TPH - Aliph >C16-C21	8.2E-3			2.0E+0	4.1E-3		
Methyl t-Butyl ether (MTBE)	9.6E-4			1.0E-2	9.6E-2		
Toluene	1.0E-3			8.0E-2	1.3E-2		
Dichloroethane, 1,2-	Tox?	Tox?	Tox?	-			

Total Pathway Hazard Index =	**1.9E+0**		

Site Name: Stratus Oakland USA 57
Site Location: Oakland
Completed By: Clint Skinner

Date Completed: 11-Jul-09
Job ID: GW all rts chems Com

RBCA Tool Kit for Chemical Releases, Version 2.51

RBCA SITE ASSESSMENT

Baseline Risk Summary-All Pathways

Site Name: Stratus Oakland USA 57
Site Location: Oakland

Completed By: Clint Skinner
Date Completed: 11-Jul-09

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BASELINE RISK SUMMARY TABLE

EXPOSURE PATHWAY	BASELINE CARCINOGENIC RISK					BASELINE TOXIC EFFECTS				
	Individual COC Risk		Cumulative COC Risk		Risk Limit(s) Exceeded?	Hazard Quotient		Hazard Index		Toxicity Limit(s) Exceeded?
	Maximum Value	Target Risk	Total Value	Target Risk		Maximum Value	Applicable Limit	Total Value	Applicable Limit	
OUTDOOR AIR EXPOSURE PATHWAYS										
☐	NA	NA	NA	NA	☐	NA	NA	NA	NA	☐
INDOOR AIR EXPOSURE PATHWAYS										
■	4.0E-7	1.0E-5	4.6E-7	1.0E-5	☐	2.8E-2	1.0E+0	3.2E-2	1.0E+0	☐
SOIL EXPOSURE PATHWAYS										
☐	NA	NA	NA	NA	☐	NA	NA	NA	NA	☐
GROUNDWATER EXPOSURE PATHWAYS										
■	1.1E-4	1.0E-5	1.2E-4	1.0E-5	■	1.4E+0	1.0E+0	1.9E+0	1.0E+0	■
SURFACE WATER EXPOSURE PATHWAYS										
☐	NA	NA	NA	NA	☐	NA	NA	NA	NA	☐

CRITICAL EXPOSURE PATHWAY (Maximum Values From Complete Pathways)										
	1.1E-4	*1.0E-5*	*1.2E-4*	*1.0E-5*	■	*1.4E+0*	*1.0E+0*	*1.9E+0*	*1.0E+0*	■
	Groundwater		*Groundwater*			*Groundwater*		*Groundwater*		

RBCA SITE ASSESSMENT

Site Name Stratus Oakland USA 57
Site Location: Oakland

Completed By: Clint Skinner
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GROUNDWATER SSTL VALUES

Target Risk (Class A & B) 1.0E-5
Target Hazard Quotient 1.0E+0

Groundwater DAF Option

SSTL Results For Complete Exposure Pathways (Checked if Pathway is Complete)

CONSTITUENTS OF CONCERN		**Representative Concentration**	■ Groundwater Ingestion			■ Groundwater Volatilization to Indoor Air			☐ Groundwater Volatilization to Outdoor Air			Applicable SSTL	SSTL Exceeded ?	Required CRF
CAS No.	**Name**	(mg/L)	On-site (0 m) Commercial	Off-site 1 (0 m) None	Off-site 2 (0 m) None	On-site (0 m) Commercial	Off-site 1 (0 m) None	Off-site 2 (0 m) None	On-site (0 m) None	Off-site 1 (0 m) None	Off-site 2 (0 m) None	(mg/L)	"■" if yes	Only if "yes" left
71-43-2	Benzene	5 6E-1	5.2E-2			1.4E+1						5.2E-2	■	1.1E+1
100-41-4	Ethyl benzene	7.3E-2	1.0E+1			>1.7E+2						1.0E+1	☐	<1
1330-20-7	Xylenes (mixed isomers)	3 0E-1	2.0E+1			1.0E+2						2.0E+1	☐	<1
T-al0608	TPH - Aliph >C06-C08	2.4E+0	>5.4E+0			>5.4E+0						>5 4E+0	☐	NA
T-al1621	TPH - Aliph >C16-C21	8.4E-1	>2.5E-6			Tox?						>2.5E-6	☐	NA
1634-04-4	Methyl t-Butyl ether (MTBE)	9.8E-2	1.0E+0			1.1E+3						1.0E+0	☐	<1
108-88-3	Toluene	1.0E-1	8.2E+0			>5.3E+2						8.2E+0	☐	<1
107-06-2	Dichloroethane, 1,2-	2.5E-2	3.1E-2			4.0E+0						3.1E-2	☐	<1
NA	Total TPH mixture	3.3E+0	NC	NA	NA	NC	NA	NA	NA	NA	NA	NC	☐	NA

* = Chemical with user-specified data

">" indicates risk-based target concentration greater than constituent solubility value. NA = Not applicable NC = Not calculated

RBCA SITE ASSESSMENT | Cumulative Risk Worksheet

Site Name: Stratus Oakland USA 57
Site Location Oakland

Completed By: Clint Skinner
Date Completed 11-Jul-09

Job ID GW all rts chems Com

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CUMULATIVE RISK WORKSHEET

CONSTITUENTS OF CONCERN		Representative Concentration		Proposed CRF		Resultant Target Concentration	
CAS No.	Name	Soil (mg/kg)	Groundwater (mg/L)	Soil	GW	Soil (mg/kg)	Groundwater (mg/L)
71-43-2	Benzene		5.6E-1	NA	NA		5.6E-1
100-41-4	Ethyl benzene		7.3E-2	NA	NA		7.3E-2
1330-20-7	Xylenes (mixed isomers)		3 0E-1	NA	NA		3.0E-1
T-al0608	TPH - Aliph >C06-C08		2.4E+0	NA	NA		2.4E+0
T-al1621	TPH - Aliph >C16-C21		8.4E-1	NA	NA		8.4E-1
1634-04-4	Methyl t-Butyl ether (MTBE)		9.8E-2	NA	NA		9.8E-2
108-88-3	Toluene		1.0E-1	NA	NA		1.0E-1
107-06-2	Dichloroethane, 1,2-		2.5E-2	NA	NA		2.5E-2

Cumulative Values:

RBCA SITE ASSESSMENT | Cumulative Risk Worksheet

Site Name: Stratus Oakland USA 57
Site Location Oakland

Completed By: Clint Skinner
Date Completed: 11-Jul-09

Job ID GW all rls chems Com

2 OF 3

CUMULATIVE RISK WORKSHEET

Cumulative Target Risk: 1 0E-5 Target Hazard index 1 0E+0

ON-SITE RECEPTORS

CONSTITUENTS OF CONCERN		Outdoor Air Exposure:		Indoor Air Exposure:		Soil Exposure:		Groundwater Exposure:	
		None		Commercial		None		Commercial	
		Target Risk: 1.0E-5	Target HQ: 1 0E+0	Target Risk: 1 0E-5	Target HQ: 1.0E+0	Target Risk. 1.0E-5	Target HQ 1.0E+0	Target Risk: 1.0E-5	Target HQ 1.0E+0
CAS No.	Name	Carcinogenic Risk	Hazard Quotient	Carcinogenic Risk	Hazard Quotient	Carcinogenic Risk	Hazard Quotient	Carcinogenic Risk	Hazard Quotient
71-43-2	Benzene			4.0E-7	1.8E-3			1.1E-4	1.4E+0
100-41-4	Ethyl benzene				8 0E-5				7.1E-3
1330-20-7	Xylenes (mixed isomers)				3.0E-3				1.5E-2
T-al0608	TPH - Aliph >C06-C08				2.8E-2				4.0E-1
T-al1621	TPH - Aliph >C16-C21								4 1E-3
1634-04-4	Methyl t-Butyl ether (MTBE)			8.9E-10	3.2E-6			6.2E-7	9.6E-2
108-88-3	Toluene				2.2E-5				1.3E-2
107-06-2	Dichloroethane, 1,2-			6 2E-8	2 7E-6			8.0E-6	
	Cumulative Values:	0.0E+0	0.0E+0	4.6E-7	3.2E-2	0.0E+0	0.0E+0	1.2E-4 ■	1.9E+0 ■

■ indicates risk level exceeding target risk

RBCA SITE ASSESSMENT | **Cumulative Risk Worksheet**

Site Name. Stratus Oakland USA 57
Site Location. Oakland

Completed By: Clint Skinner
Date Completed: 11-Jul-09

Job ID GW air rls chems Com
3 OF 3

CUMULATIVE RISK WORKSHEET

Cumulative Target Risk 1.0E-5 Target Hazard Index. 1.0E+0

Groundwater DAF Option. FALSE

Groundwater DAF Option FALSE

OFF-SITE RECEPTORS

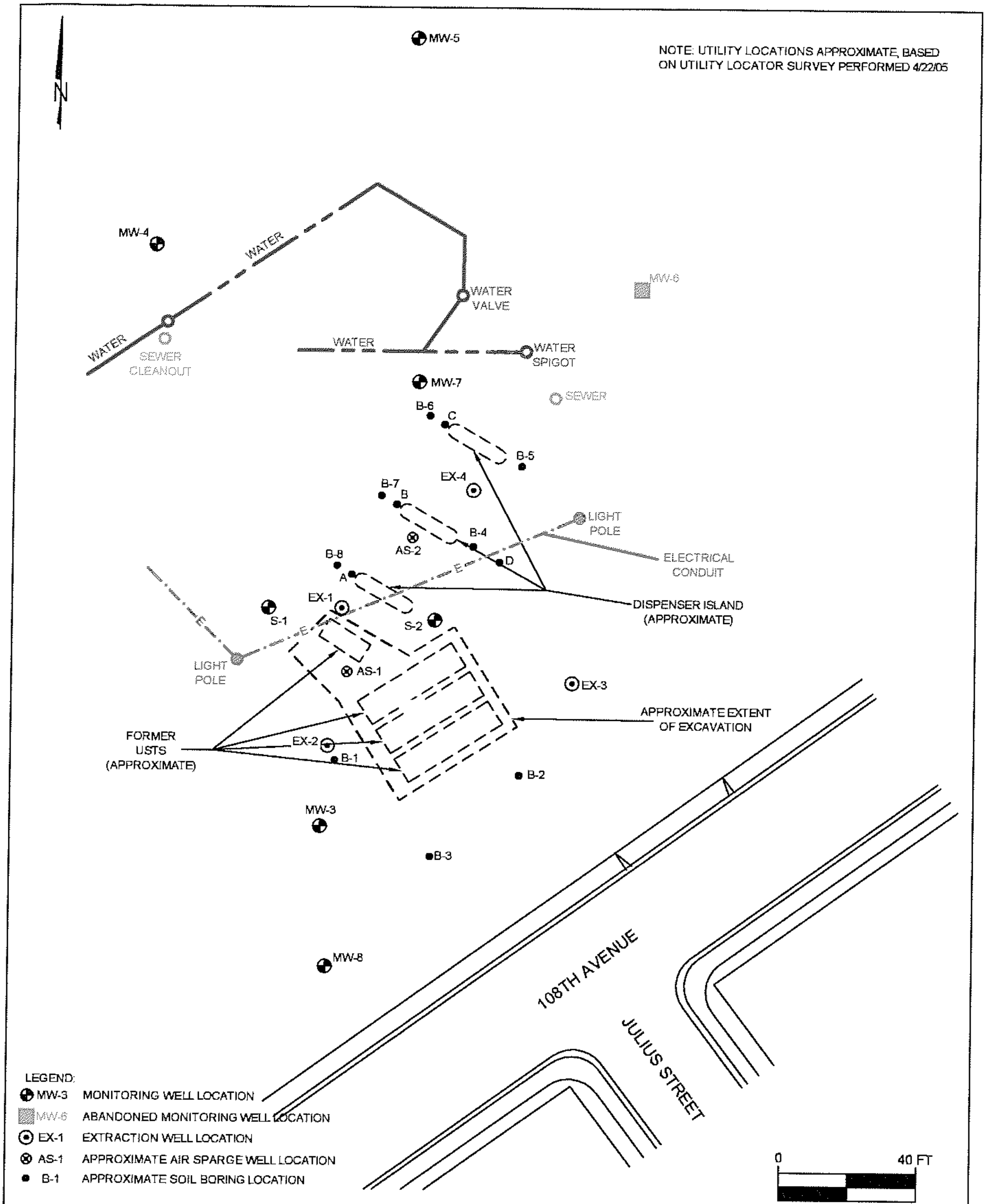
		Outdoor Air Exposure:				Indoor Air Exposure:				Groundwater Exposure:			
		None		None		None		None		None		None	
CONSTITUENTS OF CONCERN		Target Risk. 1.0E-5	Target HQ. 1.0E+0	Target Risk: 1.0E-5	Target HQ: 1.0E+0	Target Risk: 1.0E-5	Target HQ: 1.0E+0	Target Risk 1.0E-5	Target HQ. 1.0E+0	Target Risk 1.0E-5	Target HQ 1.0E+0	Target Risk. 1.0E-5	Target HQ: 1.0E+0
CAS No.	Name	Carcinogenic Risk	Hazard Quotient	Carcinogenic Risk	Hazard Quotient	Carcinogenic Risk	Hazard Quotient	Carcinogenic Risk	Hazard Quotient	Carcinogenic Risk	Hazard Quotient	Carcinogenic Risk	Hazard Quotient
71-43-2	Benzene												
100-41-4	Ethyl benzene												
1330-20-7	Xylenes (mixed isomers)												
T-al0608	TPH - Aliph >C06-C08												
T-al1621	TPH - Aliph >C16-C21												
1634-04-4	Methyl t-Butyl ether (MTBE)												
108-88-3	Toluene												
107-06-2	Dichloroethane, 1,2-												
	Cumulative Values:	**0.0E+0**	**0.0E+0**	**0.0E+0**	**0.0E+0**	**0.0E+0**	**0.0E+0**	**0.0E+0**	**0.0E+0**	**0.0E+0**	**0.0E+0**	**0.0E+0**	**0.0E+0**

■ indicates risk level exceeding target risk

indicates risk level exceeding target risk

APPENDIX H

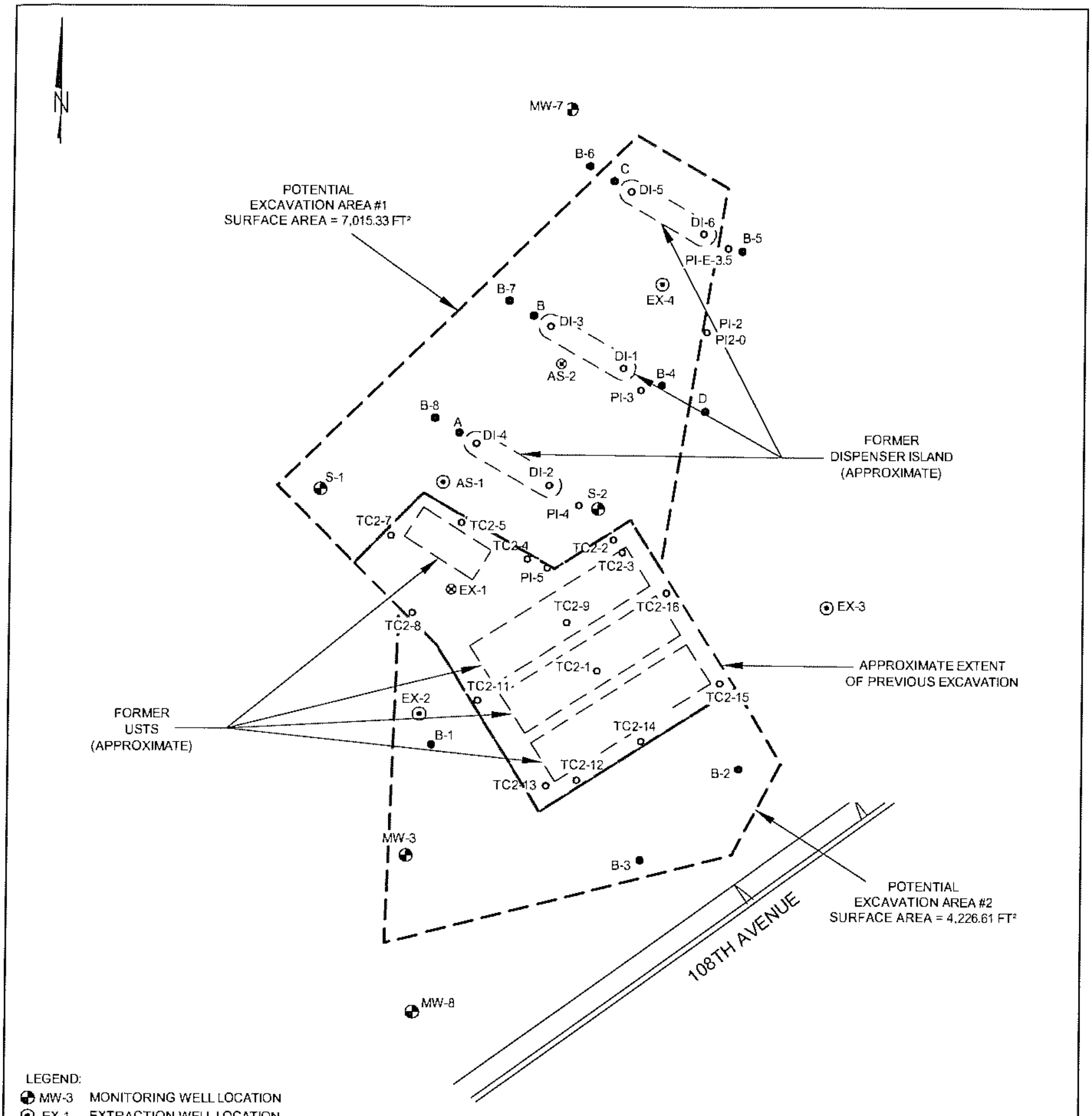
MAPS DEPICTING AREAS OF POTENTIAL SOIL OVEREXCAVATION AND UNDERGROUND UTILITY LOCATIONS NEAR POSSIBLE OVEREXCAVATION



NOTE: UTILITY LOCATIONS APPROXIMATE, BASED ON UTILITY LOCATOR SURVEY PERFORMED 4/22/05

NOTE: MAP BASED ON SURVEY PREPARED BY RON ARCHER CIVIL ENGINEER INC. (DATED NOVEMBER 22, 1995) & MORROW SURVEYING (2005) AND DRAWINGS PREPARED BY ALTON GEOSCIENCE, WESTERN GEO-ENGINEERS, AND GHH ENGINEERING.

STRATUS ENVIRONMENTAL, INC.	FORMER USA SERVICE STATION NO. 57 10700 MACARTHUR BOULEVARD OAKLAND, CALIFORNIA UNDERGROUND UTILITY PLAN	FIGURE PROJECT NO. 2007-0057-01



LEGEND:

⊕	MW-3	MONITORING WELL LOCATION
⊙	EX-1	EXTRACTION WELL LOCATION
⊗	AS-1	APPROXIMATE AIR SPARGE WELL LOCATION
●	B-1	APPROXIMATE SOIL BORING LOCATION
○	D1-4	APPROXIMATE SOIL SAMPLE LOCATION

NOTE: MAP BASED ON SURVEY PREPARED BY RON ARCHER CIVIL ENGINEER INC. (DATED NOVEMBER 22, 1995) & MORROW SURVEYING (2005), AND DRAWINGS PREPARED BY ALTON GEOSCIENCE, WESTERN GEO-ENGINEERS, GHH ENGINEERING.

USA57ISCM JMP REV April 15, 2009 USA 57 Soil Analytical

STRATUS
ENVIRONMENTAL, INC.

FORMER USA SERVICE STATION NO. 57
10700 MACARTHUR BOULEVARD
OAKLAND, CALIFORNIA

SITE PLAN

FIGURE

PROJECT NO.
2007-0057-01

APPENDIX I

PROPOSAL AND NUTRIENT/SURFACTANT PRODUCT INFORMATION PROVIDED BY TEXAS ENVIROCHEM, INC.

Texas EnviroChem, Inc.

PROPOSAL FOR SOIL REMEDIATION
AT
OAKLAND, CALIFORNIA PROPERTY

Stratus Environmental **June 11, 2009**

Attention: Scott Bittenger

Texas EnviroChem, Inc. (TEC) is ready, willing and able to propose a solution for the remediation project located in Oakland, California. We have a unique and effective proven technology that allows a company to bio-remediate a contaminated site insitu. There by keeping the media in place without removing it and exposing the surrounding site to further contamination and opening the client to unnecessary liabilities.

TEC's premier chemical, TX Chem HE-1000™ is a water based synergistic blend of nutrients and surfactants that stimulate the indigenous microbial colonies that already exist in the contaminated soil. In addition the compounds works on surface tension which in turn breaks up the hydrocarbons minute droplets and creates an immediate food source for the microbes.

TX Chem HE-1000 is a proven technology that in most cases reduces TPH (Total Petroleum Hydrocarbons) by as much as 93% in 8 to 24 hours. There are many different applications for HE-1000 but mainly soil remediation, tank degassing / tank cleaning, road spills (hydrocarbons), just to name a few. HE-1000 has undergone a multitude of environmental tests and have met or exceeded each and everyone. They are as follows:

1) USEPA LC-50 - Aquatic Toxicity Test

2) USEPA Dispersant Test

3) USEPA 8260B - Volatiles

4) USEPA 8270C - Semi-Volatiles

5) TX 1005 - TPH

TEC has made application to be added to the USEPA NCP Products list as a surface washing agent and should be listed within the next 90 days.

<u>PLAN OF ACTION</u> –

1) Site evaluation –

- **a) pull background samples prior to startup.**
- **b) estimate quantity of approximate contaminated media.**
- **c) evaluate safety concerns.**
- **d) estimate quantity of chemical needed.**
- **e) estimate what equipment that will needed.**

2) Order chemical -

3) Order equipment –

- **a) trackhoe**
- **b) dozer**
- **c) water truck (60 plus barrels)**
- **d) 2 or 3 inch trash pump (applying chemical to soil) (with suction and discharge hoses)**

4) Personnel –

- **a) 1 supervisor**
- **b) 1 trackhoe operator**
- **c) 1 dozer operator**
- **d) 3 laborers**

5) Job duration –

- **a) approximately – 10 to 14 days (depending on weather)**

COST - 12,500 cu. yds X $49.50 per cubic yard -	**$618,750.00**

PAYMENT TERMS – to be discussed

NOTE: TEC will under certain conditions give a guarantee.

Best regards,

Johnny L. Hunt – President
Texas EnviroChem, Inc.

TxChem HE-1000™
In-Situ Bio-Enhancement Technology

Technical Data

Product Description

TxChem HE-1000™ is a concentrated synergistic blend of synthetic biodegradable, non-toxic, non-flammable surfactants and selected nutrients. When diluted on-site with freshwater, TxChem HE-1000™ is capable of breaking down hydrocarbon masses into microscopic spheres or droplets upon contact by spraying or mixing. These droplets become tightly suspended in solution and remain stable in the rinse and treated media. Noticeable evidence of this action is an immediate change in color of oily soils or pit sludge, as well as the elimination of hydrocarbon odors. TxChem HE-1000™ functions in both fresh and salt water environments.

The addition of fresh soils to the treated media is recommended when treating pits to provide stabilization and a fresh source of bacteria, creating a homogenous mixture of hydrocarbon components throughout the media and increasing surface area exposure to indigenous microbes. Because TxChem HE-1000™ is readily biodegradable and nutrient enriched, it further enhances the biodegradation process by lending other nutrients to the mix. Case histories developed in Ecuador's Amazon basin indicate that indigenous bacteria can rapidly exhaust residual traces of asphaltic type crude after in-situ treatment with TxChem HE-1000™, despite site flooding caused by daily rainfall.

The immediate evidence of mitigation is exhibited in sharp declines in TPH (Total Petroleum Hydrocarbons per EPA Method 418.1) levels in the treated media, regardless of hydrocarbon characteristics or base line TPH levels. Accordingly, one application of TxChem HE-1000™ can achieve results in a fraction of the time and expense normally required for soil excavation, relocation, disposal, incineration, or traditional bioremediation methods. The long term benefit from using TxChem HE-1000™ is that it facilitates biodegradation by *natural means.*

TxChem HE-1000™ is also safe and effective for the use in the removal of petroleum, diesel, or gasoline spills from concrete or asphalt highways, when used by professionals and in accordance with all safety rules. When applied as recommended, TxChem HE-1000™ will encapsulate and tightly suspend microscopic hydrocarbon droplets in the rinse, rendering most volatile materials non-flammable almost instantly and without damage to concrete or asphalt surfaces. While TxChem HE-1000™ is considered environmentally friendly to the most sensitive ecosystems (based on U. S. EPA LC-50 toxicity test on Mysidopsis Bahia shrimp), management of effluent should always comply with federal, state, and local rules and regulations.

Typical Physical & Chemical Characteristics

Physical Appearance	Clear Blue Liquid
Odor	Bland
Specific Gravity	1.02
pH Range	6.0 - 7.0
Boiling Point	212°F
Flash Point	No Flash at Boiling Point
Temperature Limitations	Store in Cool Place
Standard Packaging	55 US Gallon Poly Drums

Suggested Applications for TxChem HE-1000™

Pit Closures

Equipment: Backhoe, trackhoe, or dozer (depending on size of pit) and vacuum truck (skid tanks can be used to mix and contain larger chemical volumes).

Application: Spray or flood contaminated sludge in-situ with chemical solution (1/2 to 2 gallons TxChem He-1000™ neat per cubic yard of contaminated material mixed with 10-20 parts water is recommended), while pulling contaminated berm material into pit and thoroughly mixing to a slurry. Add Fresh soils for stabilization and further reduction in TPH levels.

Surface Hydrocarbon Spills

Equipment: Pressure sprayer (4-5 gpm at 1,200 psi) for smaller spills or vacuum truck (130 bbl capacity with 30 psi discharge pressure) with 2 inch discharge hose and swage or discharge nozzle for larger spills.

Application: Spray chemical solution directly onto hydrocarbon , working from perimeter of spill toward the middle. Mechanically turn soil while spraying to reach contamination at depths below surface. Always prevent run off into ditches, creeks, and waterways. Continue to treat with chemical or rinse with freshwater, until desired results are achieved.

Compressor Stations

Equipment: Pressure Sprayer (4-5gpm at 1,200 psi), garden tiller and hand tools (shovel, rake, etc.).

Application: Starting from the top, spray engine, components, and sump to degrease and clean. Continue to spray contaminated soil or rock around compressor pad, turning or mixing with shovels or tiller if necessary. Repeated treatment may be necessary for desired results.

Pipeline and Flow Line Leaks

Equipment: Backhoe, pressure sprayer (5-7gpm).

Application: Soil should be excavated from around leak and spread on level ground to a depth of 6 to 8 inches deep. Spray excavated soil with chemical solution to effectively reduce TPH levels. Spray pipe line or flow line, walls and bottom of excavated hole, turning soil with hand tools if necessary to reduce flammable vapor levels (always test for vapors before welding on pipe). Fill hole with treaded soils and apply remaining chemical solution if necessary.

Well Head and Tank Farm leaks

Equipment: Pressure sprayer (1,200 psi), garden tiller and hand tools (shovel, rake, etc.)

Application: Remove all free standing oil and water around equipment and tanks. Spray equipment with the TxChem HE-1000™ solution, starting at the top. Spray contaminated soils around or adjacent to equipment or tanks and turn soils with hand tools or tiller to depth of contamination. Treat contaminated soils until visible signs of hydrocarbon are eliminated or until desired TPH levels are achieved. Apply fresh water to treated soils with pressure sprayer as a final soil rinse.

Highway Spills (Petroleum Products)

Equipment: Pressure sprayer (1,200 psi) and vacuum or pump truck for effluent.

Application: Only trained professionals, taking all necessary safety precautions, should contain and/or remove hydrocarbons, or spray residual hydrocarbons on roadway to render volatile material non-flammable. In-situ remediation practices may be employed on hydrocarbon soaked soils, only if permitted by federal, state, and local rules and regulations.

All suggestions and recommendations given above concerning the use of TxChem HE-1000™ are based on tests and data believed to be reliable. Because Texas EnviroChem Inc. cannot control the use of the product by others, no guarantee is either expressed or implied by any such suggestion or recommendation by Texas EnviroChem Inc. nor is any information contained in this leaflet to be construed as a recommendation to infringe any trademark or patent currently valid. Purchaser and user, before using, must determine the suitability of the product for its intended use and user assumes all risk and liability whatsoever in connection therewith. Neither seller nor manufacturer shall be liable, either in tort or in contract for any loss or damage direct or consequential arising out of the use of the product. To the extent any portion of this notice is found to be unenforceable, the remainder shall survive and remain in full force and effect.

Suggested Applications for TxChem He-1000™

Drill Cuttings

Equipment: Wash drum (concrete mixer) with conveyor.

Application: Set up wash drum with conveyor to load drill cuttings (approx 6 to 8 cu yards depending on size of mixer) into drum. Introduce TxChem HE-1000™ solution in to wash cycle and rotate on medium speed for 10 minutes. Switch to high speed for 10-15 minutes. Rinse media and repeat. A large percentage of the wash water can be recaptured and reused once. The clean media can be disposed of on-site or used for road base material. Wash water will bioremediate any hydrocarbons that may exist on the project area. Washed cuttings can then be run through a press to eliminate most of the moisture that exists from the wash cycle. Pressing reduces the potential for damage to the disorption unit if one is being used. The drill cuttings are introduced to the disorption unit for a drying process only. The hydrocarbons have been eliminated in the wash cycle.

Tank Cleaning

Equipment: Heated pressure washer and/or 2-inch discharge pump with fire nozzle.

Application: Initial check with a LEL meter to determine combustible gas and oxygen levels is mandatory prior to tank cleaning startup. The meter readings will determine the safety levels and give a reading to the background levels for reduction of LEL analysis. A heated pressure washer attached to a holding tank containing TxChem HE-1000™ solution will be used to wash the tank's interior. Combustible vapors will also be eliminated at this time. The TxChem He-1000™ solution will suppress any vapors while breaking down the hydrocarbon residue left in the tank. The contaminated media will then be available for disposal in a designated disposal site as non-haz or deposited on the ground (if so allowed) for bio-remediation.

Vapor Suppression/Tank Degassing

Equipment: Pressure washer or discharge pump with fire nozzle

Application: TxChem HE-1000™ will be introduced to contaminated media by way of a pressure washer or discharge pump with fire nozzle (fogging setting). Blanket the media and saturate the air of the surrounding area to suppress the vapors. The effect will be immediate. If deemed necessary, the TxChem HE-1000™ solution can be introduced into the hydrocarbon media for added assurance of vapor suppression.

Soil Remediation

Equipment: Holding tank for TxChem HE-1000™ and water, discharge pump with fire nozzle, trackhoe, backhoe, or dozer.

Application: Analysis will need to be taken to establish background TPH of contaminated soil. The trackhoe/backhoe will begin to work the soil to the designated depth of the contamination and begin a stirring action while the TxChem HE-1000™ solution is being introduced into the soil. The trackhoe/backhoe will turn the soil into slurry and build a retaining wall around the site for protection from cross contamination of surrounding area or bio-cell. An analysis should be taken at 24 and 48 hours after treatment and also again at 7 days after treatment to determine the TPH reduction.

All suggestions and recommendations given above concerning the use of TxChem HE-1000™ are based on tests and data believed to be reliable. Because Texas EnviroChem Inc. cannot control the use of the product by others, no guarantee is either expressed or implied by any such suggestion or recommendation by Texas EnviroChem Inc. nor is any information contained in this leaflet to be construed as a recommendation to infringe any trademark or patent currently valid. Purchaser and user, before using, must determine the suitability of the product for its intended use and user assumes all risk and liability whatsoever in connection therewith. Neither seller nor manufacturer shall be liable, either in tort or in contract for any loss or damage direct or consequential arising out of the use of the product. To the extent any portion of this notice is found to be unenforceable, the remainder shall survive and remain in full force and effect.

TxChem HE-1000™

IN-SITU BIO-ENHANCEMENT PRODUCT

- Creates food source for indigenous microbes in hydrocarbon contamination.
- EPA safe based on U. S. EPA LC-50 for use around sensitive ecosystems.

TxChem HE-1000™ will accelerate the microbial degradation of hydrocarbon waste. TxChem HE-1000™ breaks down hydrocarbons and adds nutrients for microbes. TxChem HE-1000™ will provide an immediate change of color from black to brown and eliminate hydrocarbon odor.

BENEFITS

Reduction of TPH (Total Petroleum Hydrocarbons) in soils, drill cuttings, water, mill scale, and any hydrocarbon contaminated media.

By using TxChem HE-1000™, the hydrocarbon chain is broken down into small, minute particles that becomes a food source for the indigenous microbes.

TxChem HE-1000™ can *reduce* the TPH levels in contaminated media by as much as ***95% within 24-48 hours.***

APPLICATIONS

1. Pit closures
2. Oil Spill
3. Surface Spills
4. Compressor Stations
5. Pipeline and Flow line leaks
6. Well head and tank farm leaks
7. Highway Spills
8. Tank cleaning
9. Drill cuttings
10. Tank/Vapor Suppression
11. Soil remediation

Agitation is key. Greater agitation produces improved results and quicker degradation.

TxChem HE-1000™

Hydrocarbons that TxChem HE-1000™ will bio-degrade:

Crude oil tank bottoms
Crude Oil
Used Oil
Hydraulic Fluids
Benzene
Gasoline
Diesel
Jet Fuel
Bunker Fuels

Contaminated Medias:

Soil
Water
Tanks
Pits
Vapors
Equipment
Roadways
Drill cuttings
Water Treatment Plants
Metals
Wellheads
Refineries
Barges
Ships
Drilling Platforms
Sumps
Mill Scale

All suggestions and recommendations given above concerning the use of TxChem HE-1000™ are based on tests and data believed to be reliable. Because Texas EnviroChem Inc. cannot control the use of the product by others, no guarantee is either expressed or implied by any such suggestion or recommendation by Texas EnviroChem Inc. nor is any information contained in this leaflet to be construed as a recommendation to infringe any trademark or patent currently valid. Purchaser and user, before using, must determine the suitability of the product for its intended use and user assumes all risk and liability whatsoever in connection therewith. Neither seller nor manufacturer shall be liable, either in tort or in contract for any loss or damage direct or consequential arising out of the use of the product. To the extent any portion of this notice is found to be unenforceable, the remainder shall survive and remain in full force and effect.

Material Safety Data Sheet

------ Section 1 • Chemical Product and Company Identification ------

Product Name: **TxChem ACL**

Company:	**Emergency Telephone Numbers:**
Texas EnviroChem, Inc.	24 hrs Chem-Trec 800-424-9300 [within continental US]
11659 Jones RD. PMB 348	
Houston, TX 77070 USA	
Phone 832-247-4984	Revised March 2006

------ Section 2 • Composition, Information on Ingredients ------

Component	**CAS No.**	**OSHA HCS Hazard(s)**
Hydrocarbons, terpene processing by-products	68956-56-9	Flammable Liquid. Skin and eye irritant.

EC Classifications:

Xi	Irritant
R36	Irritating to eyes.
R38	Irritating to skin.
S24	Avoid contact with skin.
S25	Avoid contact with eyes.

------ Section 3 • Hazards Identification ------

Emergency Overview:

Appearance:	Colorless to pale yellow liquid
Odor:	Typical terpene
Risk Summary:	Moderate eye and skin irritant. This substance is flammable and will sustain combustion at temperatures above its flashpoint. Avoid heat, sparks and open flame.

Potential Health Effects:

Inhalation:	Vapors may cause respiratory passage irritation in confined spaces. No known long-term hazards.
Eyes:	Irritating to eyes.
Skin:	Irritating to skin.
Ingestion:	Will be irritating to tissues. May be harmful or fatal if swallowed in sufficient quantity. See Section 11 (Toxicological information) for further information.
Chronic:	Not considered a carcinogen by NTP, IARC, or OSHA. No known chronic indications.

Environmental Hazards:

Similar products are known to have some aquatic toxicity. Also, similar products are known to interfere with water treatment processes. These products are known to readily biodegrade and thus do not pose long-term dangers to the environment.

------ Section 4 • First Aid Measures ------

Inhalation:	Remove person to a ventilated area. See a physician if breathing difficulty persists.
Eyes:	Remove contact lenses. Flush with water for at least 15 minutes. See a physician if irritation persists.
Skin:	Remove contaminated clothing. Wash affected areas with soap and water. See a physician

	if irritation persists.
Ingestion:	Drink lots of water to dilute substance. See a physician.

------ Section 5 • Fire Fighting Measures ------

Flammable Properties:	Flashpoint 42°C (108°F) TCC. Vapors can combust and liquids can burn when temperatures reach or exceed the flashpoint.
Extinguishing Media:	Carbon dioxide, dry chemical, foam.

Fire Fighting Instructions:

Use CO2, foam or dry chemical. Use water as a spray only to lower temperature. This substance floats on water. Treat as an oil fire.

------ Section 6 • Accidental Release Measures ------

Personal Precautions:	See Section 8, Personal Protection.
Environmental Precautions:	Do not discharge into surface waters. May be toxic to aquatic organisms. See Section 3 (Environmental Hazards) and Section 12 (Ecological Information) for further information.

Containment and Cleanup Techniques:

Exercise caution as hard floors coated with this material may be slippery. Small spills may be absorbed by sand or oil-absorbing materials. Large spills should be collected by pumping into closed containers for recovery or disposal. Spills over water will float and may be collected by oil absorbants or by skimming.

------ Section 7 • Handling and Storage ------

Handling:	Wear chemical safety glasses or goggles and chemically resistant gloves. A chemically resistant apron may be used to protect clothing. A respirator may be worn to prevent breathing spray mists or heated fumes.
Storage:	Store in tightly closed metal or glass containers. Containers should be full or blanketed by inert gas. Do not store in plastic. Avoid heat, sparks, and open flames.

------ Section 8 • Exposure Controls, Personal Protection ------

Ventilation:	Mechanical ventillation may be necessary at elevated temperatures to control odor.
Respiratory Protection:	Organic vapor cartridge may be used to prevent irritation from mists and vapors and for odor elimination.
Skin Protection:	Wear chemically resistant rubber gloves and apron (viton, nitrile, and or PVC) to minimize exposure.
Eye Protection:	Wear chemical safety glasses, goggles, or face shield to prevent eye contact.

------ Section 9 • Physical and Chemical Properties ------

Appearance:	Colorless to pale yellow liquid.
Boiling Point:	160°C (320°F).
Flashpoint:	42°C (108°F) TCC.
Odor:	Typical terpene
Oxidizing Properties:	This substance combusts in the presence of strong oxidizers.
pH:	None (not water soluble).
Physical State:	Liquid.
Solubility in water:	less than 0.1%.
Specific Gravity:	0.84 @ 25°C.
Vapor Pressure:	2 mmHg at 20°C.
Vapor Density:	>1 (air = 1.0).

------ Section 10 • Stability and Reactivity ------

Conditions to Avoid:	Excessive temperatures and/or contact with air may cause decomposition or oxidation.
Materials to Avoid:	Avoid contact with strong acids, strong bases, and oxidizing agents. Reacts explosively with iodine pentafluoroethylene.
Decomposition Products:	Incomplete decomposition product may include CO. Ultimate decomposition products are CO_2 and water.

------ Section 11 • Toxicological Information ------

Target Organs: Eyes and skin.
Routes of Entry: Eye and skin contact.
Acute Toxicity: LPR-Mus TD_{LO}: 4800mg/kg/8W-I:ETA.
ORL-Mus TD_{LO}: 67g/kg/39W-I:ETA.
Chronic Toxicity: No known chronic indications.

------ Section 12 • Ecological Information ------

Biodegradability: Not determined. Related chemicals are known to be biodegradable.
Aquatic Toxicity: Marine Pollutant. This substance is immiscible with water. This substance is known to evaporate quickly and biodegrade and should not cause long-term effects.
Bioaccumulation Potential: Not Determined. Related chemicals are known to be non-accumulating in the environment.

------ Section 13 • Disposal Considerations ------

RCRA Hazardous Waste: Classified as a RCRA Hazardous waste (flammability characteristic).
Disposal Methods: Dispose of this material by incineration or recovery at a government-approved disposal facility.

------ Section 14 • Transport Information ------

DOT:
- Proper Shipping Name: Terpene hydrocarbons, n.o.s., 3, UN2319, PG III
- Exceptions: Chemicals, n.o.i. (Not Regulated) - allowable for shipment in non-bulk containers.

IMO: Terpene Hydrocarbons, n.o.s.,3,UN2319,PG III
IATA: Terpene hydrocarbons, n.o.s., 3, UN2319, PGIII.

------ Section 15 • Regulatory Information ------

OSHA – Hazardous by definition of 29CFR1910.1200 for flammability.

CERCLA – (SARA Title III) Hazard Category – Fire hazard.

------ Section 16 • Other Information ------

Hazard Ratings (0 = minimal, 1 = slight, 2 = moderate, 3 = serious, 4 = severe)
HMIS: Health = 2 Flammability = 2 Reactivity = 0
NFPA: Health = 1 Flammability = 2 Reactivity = 0

MATERIAL SAFETY DATA SHEET

24 HOUR EMERGENCY NUMBER: (800) 424-9300 CHEMTREC
REVISED – January 2001

I. PRODUCT IDENTIFICATION:

EnviroChem ACL™
Texas EnviroChem Inc.,
9223 Solon Rd. Bldg. D
Houston, TX 77064

II. PRODUCT INFORMATION:

EnviroChem ACL™
FORM: Liquid
ODOR: Lavender
COLOR: Clear Amber Liquid
FORMULA: Proprietary

III. PHYSICAL AND CHEMICAL DATA:

BOILING POINT: 350°
FREEZING POINT: N/A
SPECIFIC GRAVITY: 0.087
VAPOR PRESSURE (m HG): 4.7
VAPOR DENSITY: 1.0
SOLUBILITY IN H_2O: Negligible

IV. REACTIVITY:

STABILITY: Stable
INCOMPATIBILITY: None
DECOMPOSITION PRODUCTS: N/A

V. FIRE AND EXPLOSION HAZARD DATA:

FLASH POINT: 125-135° F
pH: N/A
EXTINGUISHING MEDIA: Water, Dry Chemical, Foam CO_2
FIRE FIGHTING PROCEDURES: Self contained breathing apparatus and protective clothing.
UNUSUAL FIRE HAZARDS: Avoid heat, sparks, and open flame.

VI. HEALTH HAZARD DATA:

EYE CONTACT:	Wash eye thoroughly for 15 minutes: including upper and lower lids. Seek medical assistance.
SKIN CONTACT:	Irritation possible, wash with soap and water for 15 minutes. If irritation persists, call physician.
INHALATION:	Move to well ventilated area: if breathing difficulties persist after 15 minutes, seek medical assistance.
INGESTION:	If conscious, administer 2 glasses of water. Seed medical assistance. Do not induce vomiting unless directed.
ACUTE:	May irritate eyes, respiratory tract, skin.
CHRONIC:	Prolonged contact with skin may result in dryness due to removal of skin oil.

VII. SPILL & DISPOSAL DATA;

ACCIDENTAL SPILLPROCEDURES: Absorb in inert material & place in DOT approved containers for disposal in accordance with local, state, and federal regulations. Larger spills may be collected and repackaged.
HANDLING AND STORAGE: Keep tightly closed, store in a cool, dry place.

VIII. PROTECTIVE EQUIPMENT TO BE USED:

GLOVES: Rubber
EYE PROTECTION: Goggles recommended
VENTILATION: Recommended
EXHAUST: Mechanical/local
RESPIRATORY PROTECTION: Respirator in confined areas.
OTHER PROTECTIVE EQUIPMENT: As required to avoid skin contact.

IX. TRANSPORT INFORMATION:

The following may not apply to all shipping situations. Consult 49 CFR mode specific/quantity -specific shipping data.
DOT PROPER SHIPPING NAME: Not regulated
DOT IDENTIFICATION: N/A
DOT HAZARD CLASS/DIVISION: Not hazardous
DOT PACKAGING GROUP: N/A
TYPE LABEL REQUIRED: None
**For specific Ltd. Qty. requirement, see DOT regulation 49 CFR*

ATTENTION: To the best of out knowledge, the information contained herein is accurate. However, TECI does not assume any liability for the accuracy or completeness of this information. Final determination of the suitability of any material is the sole responsibility of the user. All materials may present unknown health hazards and should be used with caution. Any product which is not in conformance with this DATA SHEET or which involves using the product in combination with any other process is the sole responsibility of the user.

Complies with OSHA's Hazard Communication Standard 20 CFR 1010.1200

LAFAYETTE AREA LAB
500 AMBASSADOR CAFFERY PKWY
SCOTT, LOUISIANA
ZIP 70583-8544
PHONE: (337) 237-4775

Mysidopsis bahia

48-HOUR ACUTE -STATIC RENEWAL- BIOASSAY REPORT
STD. DISPERSANT TOXICITY TEST

40 CFR, CHAPTER 1, PART 300, DEC 11, 2001

FOR
Texas EnviroChem, Inc.
Sample ID: HE-1000
Sample Collected on: 12/21/01
Sample Received: 12/21/01
Collected by: Texas EnviroChem, Inc.

SPL Identification No.: L1-0201031-01C
Date Reported: January 9, 2002

PREPARED BY:
SPL, Incorporated
500 Ambassador Caffery Parkway
Scott, Louisiana 70583-8544
(337) 237-4775

FOR:
Texas EnviroChem, Inc.
9223 Solon Bldg., D
Houston, TX 77064
Attn: Johnny L. Hunt

TEST SUMMARY:

Test Started: 01/02/02@ 14:10 Test Terminated: 01/04/02@ 13:05
LC50: 118,300 ppm Method Used: TS-K

Analyzed by: T. Gomez, L. Granados, K. Bui, S. Robert, D.Meaux

Sample passes EPA 30,000 ppm toxicity limits

Della Fontenot

Eloy Granados
Manager Biomonitoring Services

Della Fontenot
Bioassay Document Control

Johnny L. Hunt – President
Texas EnviroChem, Inc.

Corporate Seal

information Toxicology international Inc._____

INFO. | OX. IN | ERNATIONAL inc.

3904 Stratum Drive Riverside. CA 92505 USA Ph: (951)352-9959 Fax: (951)785-8539 e-mail:
drgutzar@infotox.com web: wwW-infotox.com

Page 1 of2
Hcf: Z_111504-1
Date: 11-30-2004

Client: Texas EnviroChem, Inc..
9223 Solon Road, Bldg. A
Houston, TX 77064

Toxicologkt: **Dr. Gulzar H. Ahmad, Ph.D., DABT., C[H, ERT., CHMM., CSAC.**
Diplomate American Board of Toxicology
Diplomatc American Board of Industrial Hygiene
EUROTOX Registration in Toxicology
Certification in Safety Assessment of Cosmetics, under the EU Directive
Member; Cosmetic, Toiletry & Fragrance Association (CTFA)
Member; Independent Cosmetic Manufacturers Association (ICMAD)
Member; American Board on Industrial Hygiene (ABIH)
Member; National Art Materials Trade Association (NAMTA)
Member; Society of Cosmetic Chemists (SCC)

Signature-------------- ^

Reference: **LHAMA Review and Certification for tbe**

"Board Surface Cleaner: ***Introduction***

1 reviewed the formulation of the "Cleaner", submitted to me on November 1 5, 2004. The formulation was reviewed according to the US Consumer Product Safety Commission's guideline at 16 CFR 1500.135, using criteria out lined in ASTM D-4236.

In this review the available data, including the relevant data from the National Toxicology Program, International Agencies for Research on Cancer and other sources in the National Library of Medicine data bank were considered to assess the need for **chronic** health hazard warning. The carcinogenicity, reproductive hazard, neurotoxicity, bioavai lability and potential exposures were also considered and in the absence of specific data, a reasonable judgment was made to assure a realistic assessment of the hazard on the ultimate **art material package.**

My review is based only on the submitted formula (Appcndex-1); please advise if there is an alteration to this formula. The validity of this review is dependent upon the validity of the disclosure by both the manufacturers of the components and that of the finished product. Moreover, I used my best professional capabilities in performing this review and if you wish to use this opinion, Info. Tox. International, Inc., any of its employees and/or owners including myself will not be held liable for any injury or damage resulting from the use of this product.

This review will need to be updated every five years or upon reformation or upon our or your learning of new significant safety information. Moreover, in the event of any additional guidance from the CPSC or any applicable regulatory agencies, we will need to comply with that guidance in all respects.

Conclusion.

The amount of the "Cleaner" per container (2 oz) does not contain any material in quantity which is sufficient enough to cause *chronic toxicity* among users when used as intended. Intended for children over 6 years of age. Adult supervision required. The product can be labeled as "CONFORMS TO ASTM D-4236."

*NO'I'K: ASTM D-4236 does not cover **acute health effects.** The product may cause acute health effects such as eye, skin and respiratory tract irritation and/of damage.*

APPENDIX J

SOIL INCINERATION PROPOSAL AND INFORMATION PREPARED BY NEVADA THERMAL SERVICES, L.L.C.

NEVADA THERMAL SERVICES, L.L.C.
2600 E. MUSTANG ROAD · SPARKS, NV 89434 · (775) 342-0807 · FAX (775) 342-0909

May 21, 2009

To: Scott Bittenger, Stratus Environmental

From: Phil Theriault, Nevada Thermal Services

Reference: Oakland, CA
Former Gas Station
Onsite Thermal Treatment Services

Scott, Below is the bid breakdown for the thermal option in Oakland. Please contact me at your convenience if you have any questions or if I can provide anything further at this time.

Thanks for the opportunity to be of service.

Phil

Date:	5/21/09	
Job Name:	Service Station	
Location:	Oakland, CA	
Bid Workup By:	PJT	
Bid Using Plant #	NTS Astec Plant	
Proposal Submitted To:	Stratus ENV	
Quantity Tons:	12500	
Project Schedule Time Frame (months)	2	
	Cost	Per ton
Mobilization	$139,749.43	$11.18
Demobilization	$82,879.43	$6.63
Administrative	$47,407.80	$3.79
Submittals/plant related testing	$9,075.00	$0.73
Permitting/Stack Testing	Not Included	Not Included
Thermal Treatment	$754,637.30	$60.37
Health & Safety	$31,702.00	$2.54
Total	**$1,065,450.96**	**$85.24**
Qualifiers		
Does not account for prevailing wages		
Does not include pad construction costs if required		
Does not include bringing local utilities to pad area	→ Substantial cost	
Does not include permitting or POP Test or CEMs		
Water is included at $5.00/1000 gallons		
Propane is included at .85/gallon		
Does not include soil testing of any kind		

underestimated

We make your soil contamination problems disappear... for good!

APPENDIX K

ELECTRICAL RESISTANCE HEATING PROPOSAL AND INFORMATION PREPARED BY THERMAL REMEDIATION SERVICES, INC.

THERMAL
REMEDIATION
services inc.

Former USA Station Remediation Parameters

"TRS guarantees excellence and remediation certainty. Our word is who we are."
www.thermalrs.com

Electrical Resistance Heating Treatment Area:	17,000 sq. ft
Average Shallow Extent of ERH:	1 ft
Average Deep Extent of ERH:	30 ft
Typical Depth to Groundwater:	17.5 ft
Treatment Volume:	18,300 cu. yd
Assumed Total Organic Carbon Content of Soil:	2.00%
Number of Electrodes:	68
Electrode Boring Diameter (in.):	12-inch o.d.
Average Distance Between Electrodes:	17 ft
Total Depth of Electrodes:	31 ft
Depth to Top of Electrode Conductive Zone:	3 ft
Number of Co-located Vapor Recovery Wells:	68
Number of Temperature Monitoring Points:	8 (7 sensors each)
Is a New Insulating Surface Cap Required?	yes, 100% coverage
Controlling Contaminant:	gasoline
Average Clean-up Percent:	99%
Assumed VOC Mass:	8,900 lb
Vapor Recovery Air Flow Rate:	440 scfm using a 40-hp vapor recovery blower
Condensate Production Rate:	6 gpm
Vapor Treatment Method:	oxidizer
Assumed Activated Carbon Required:	0,000 lb
Power Control Unit (PCU) Capacity:	2000 kW
Average Electrical Heating Power Input:	1122 kW
Total Heating Treatment Time:	115 - 165 days
Design Remediation Energy (kWh):	3,430,000
Assumed Number of Confirmatory Borings:	8 With 6 soil samples per boring.

The above remediation parameters are estimated +/- 20%. Final parameters will be determined during system design.

Budgetary (+/- 20%) Standard Fixed Price for Former USA Station

Thermal Remediation Services Price	Price	Percent	
Design, Work Plans, Permits:	$85,000	4%	
Electrode Materials Mobilization:	$302,000	14%	Payment due before starting field work.
Subsurface Installation:	$146,000	7%	
Surface Installation and Start-up:	$295,000	14%	
Remediation System Operation:	$500,000	23%	
Demobilization and Final Report:	$96,000	4%	
Total TRS Price	**$1,424,000**	65%	Based on payment terms of net 30 days.

Estimated Costs by Others	Cost	Percent	
Drilling and Soil Sampling:	$225,000	10%	assumes $71 per ft
Drill Cuttings and Waste Disposal:	$12,000	1%	assumes $150 per ton
Electrical Utility Connection to PCU:	$30,000	1%	
Electrical Energy Usage:	$465,000	21%	assumes $0.13 per kWh
Carbon Usage, Transportation & Regeneration:	$0	0%	
Water/Condensate Disposal:	$1,000	0%	
Other Operational Costs:	$19,000	1%	includes vapor sampling
Total Estimated Costs by Others	**$752,000**	**35%**	
Total Remediation Cost:	**$2,176,000**	**$119 per cu. yd**	
Go Carbon Neutral (No Net CO_2), Add:	**$9,700**	**0%**	***Ask us how!***

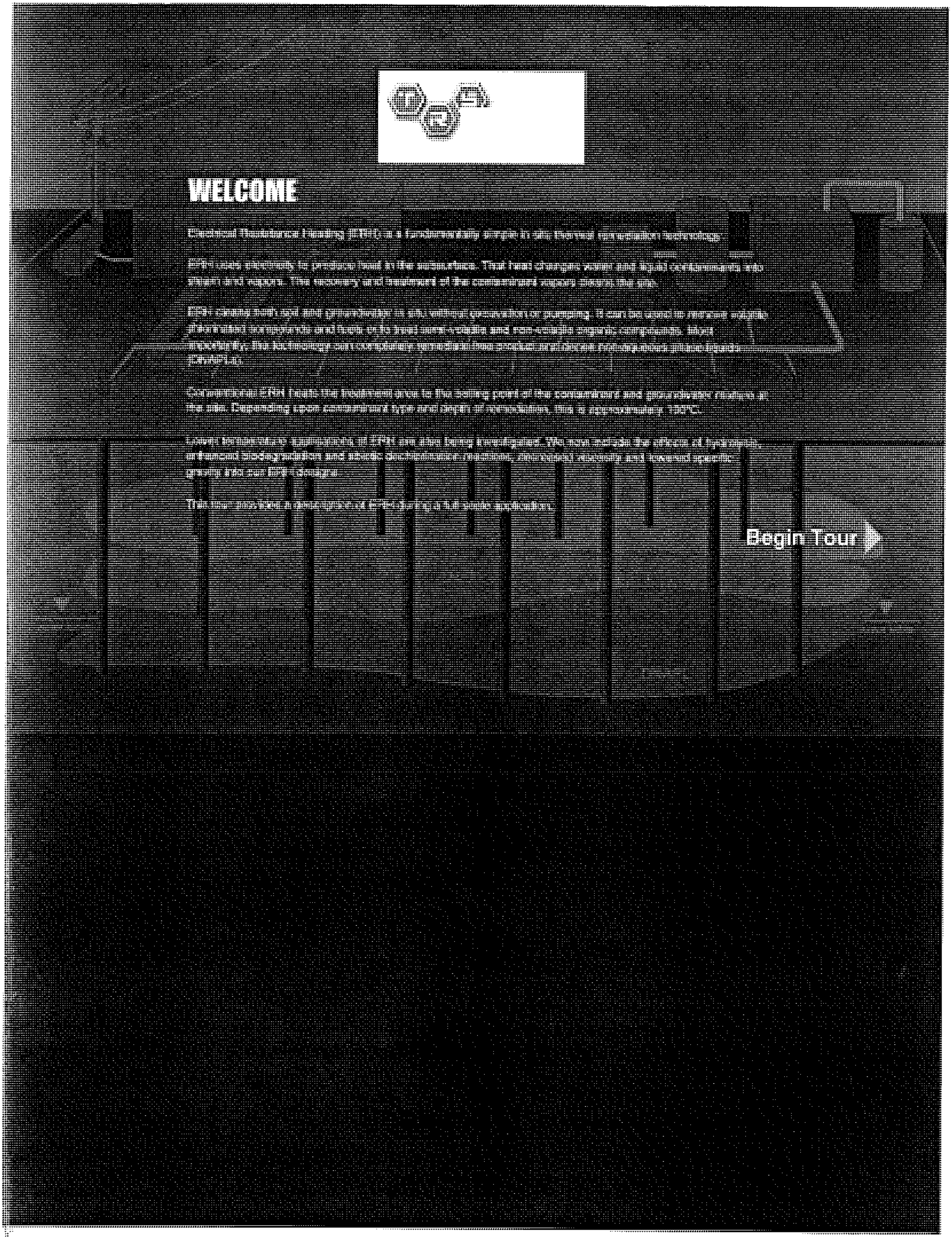
carbon neutral info

"Costs by Others" are conservatively high. TRS recommends using site knowledge or getting quotes.

Prepared for Scott Bittinger, (530) 676 2062, sbittinger@stratusinc.net

Some Included Items for Remediation of Former USA Station

Design, Work Plans, Permits:	TRS Scope	Shared Scope	Scope by Others	Estimated Cost by Others (included above)
Design or "Kick-off" Meeting	☐	■	☐	
Work Plan	☐	■	☐	
Health and Safety Plan	☐	■	☐	
QA/QC Plan	☐	☐	☐	
Sample Analysis Plan	☐	☐	☐	
Air Permit	☐	■	☐	
Sewer Discharge Permit	☐	■	☐	$ additional costs
Building Permit	☐	■	☐	
Regulatory Negotiations and Client Interface	☐	☐	■	difficult for TRS to estimate
Subsurface Installation:				
Pre-installation Building Structural Survey	☐	☐	☐	
Electrode Materials and Well Screen	■	☐	☐	
Drilling Subcontractor for Electrodes	☐	☐	■	$150,080 for 2,108 feet.
Drilling Subcontractor for VR Wells	☐	☐	☐	co-located with electrodes
Drilling Subcontractor for TMPs	☐	☐	■	$8,890 for 256 feet.
Drilling Subcontractor for New MWs	☐	☐	☐	$ - post treatment
Abandonment/Replacement of Existing PVC Wells	☐	☐	■	difficult for TRS to estimate $24,000.00
Concrete Coring	☐	☐	■	$9,420 for 76 cores.
Utility Locator Survey	☐	☐	■	$1,180
Installation (pre-ERH) Soil Sample Analysis	☐	☐	■	$7,200 for 48 samples.
Drill Cutting Disposal	☐	☐	■	$12,450 for 83 tons.
Drill Cutting Disposal Labor	☐	☐	■	$2,750
Forklift or Skid-Steer for Drilling	☐	☐	■	$1,530
Photoionization Detector for Drilling	☐	☐	■	$2,990
Boring Logs and Report	☐	☐	■	$2,610
TRS On-Site Electrode Installation Supervision	■	☐	☐	assumes 33 work days of drilling
Traffic-rated Well Vaults and Installation	☐	☐	☐	
Trenching and Restoration	☐	☐	☐	
New Insulating Surface Cap	■	☐	☐	
Biological Amendment and Addition	☐	☐	☐	
Surface Installation and Start-up:				
Surface Remediation Equipment Mobilization	■	☐	☐	
Crane to Offload/Position Equipment	■	☐	☐	
Perimeter Fence and Security System	■	☐	☐	
Vapor Recovery Piping	■	☐	☐	
Steam Condenser	■	☐	☐	
40 hp VR Blower	■	☐	☐	
Granular Activated Carbon and Regeneration	☐	☐	☐	
600 scfm Fuel Oxidizer	■	☐	☐	
Oil-Water Separator	☐	☐	☐	not required
Equipment Sound Wall	■	☐	☐	
Electrical Utility Connection to PCU	☐	☐	■	$30,000
Telephone Connection to PCU	■	☐	☐	
Garden Hose Connection to Condenser	☐	☐	■	$380
Remediation System Operation:				
ERH Control and Temperature Monitoring	■	☐	☐	
Vapor Sampling and Analysis	☐	☐	■	$4,344 for 32 samples.
Condensate/Discharge Sampling and Analysis	☐	☐	■	$2,022 for 13 samples.
Sampling Labor and Operational Checks	☐	☐	■	$12,022 for 113 hours.
Groundwater Sampling and Analysis	☐	☐	■	difficult for TRS to estimate
Electricity Usage	☐	☐	■	$465,000 for 3,580,000 kWh.
Offset for Carbon Dioxide Emissions	■	☐	☐	
Water/Condensate Disposal	☐	☐	■	$1,000 for 39,600 gallons.
Separate Phase Product Disposal	☐	☐	☐	none expected
				$12,000.00
Demobilization and Final Report:				
Drilling Subcontractor for Confirmatory Borings	☐	☐	■	$8,330 for 240 feet.
Soil Sample Analysis	☐	☐	■	$7,200 for 48 samples.
Well Abandonment	☐	☐	■	$15,600 for 68 wells.
Demobilize Surface Equipment	■	☐	☐	
Final Report	☐	■	☐	too low $60,000.00



WELCOME

Electrical Resistance Heating (ERH) is a fundamentally simple in situ thermal remediation technology.

ERH uses electricity to produce heat in the subsurface. That heat changes water and liquid contaminants into steam and vapors. The recovery and treatment of the contaminant vapors cleans the site.

ERH cleans both soil and groundwater in situ without excavation or pumping. It can be used to remove volatile chlorinated compounds and fuels or to treat semi-volatile and non-volatile organic compounds. Most importantly, the technology can completely remediate free product and dense non-aqueous phase liquids (DNAPLs).

Conventional ERH heats the treatment area to the boiling point of the contaminant and groundwater mixture at the site. Depending upon contaminant type and depth of remediation, this is approximately 100°C.

Lower temperature applications of ERH are also being investigated. We now include the effects of hydrolysis, enhanced biodegradation and abiotic dechlorination reactions, decreased viscosity and lowered specific gravity into our ERH designs.

This tour provides a description of ERH during a full scale application.

TRS ERH Technical Process Tour

①

USING EXISTING SITE POWER

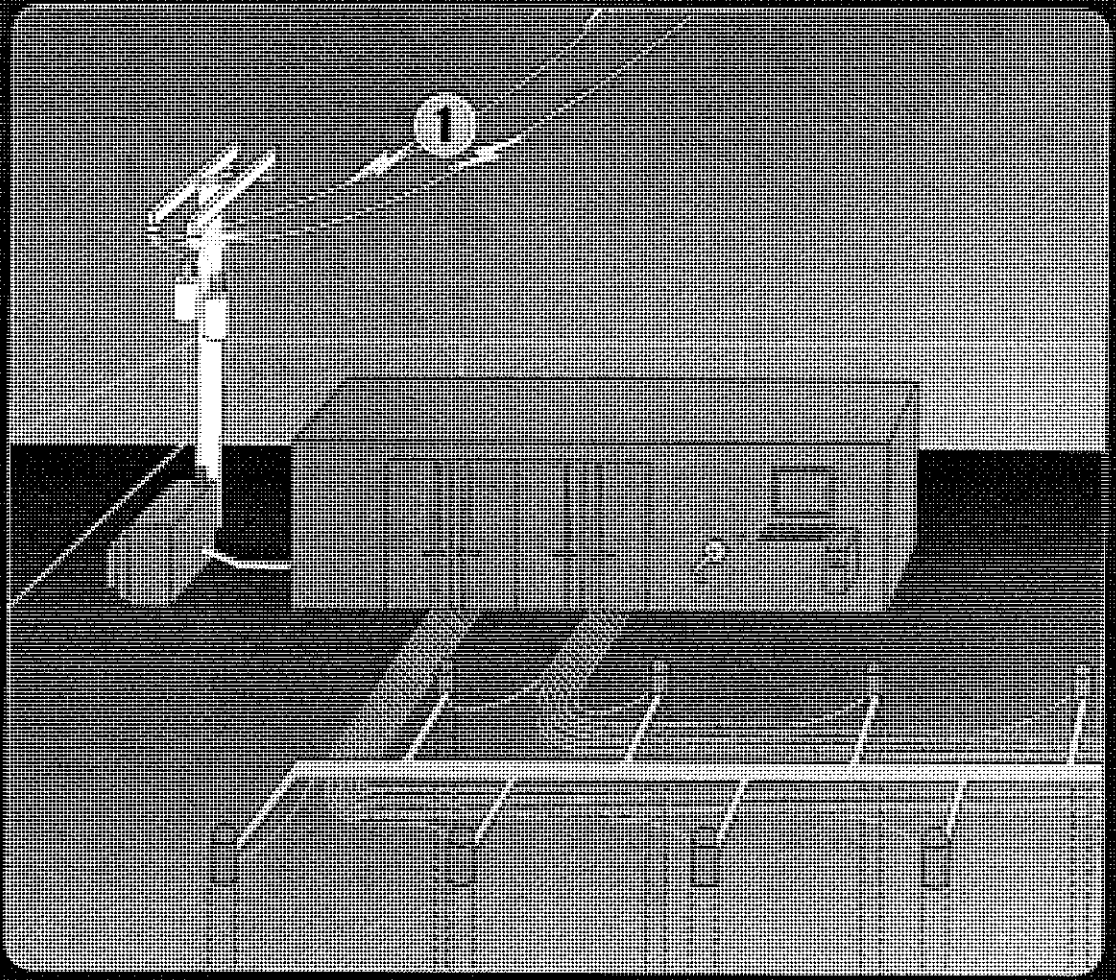
ERH uses 3-phase electricity from the power lines running adjacent to each site. Electrical services at industrial facilities are usually adequate for our needs.

If necessary, TRS will arrange for an upgraded electrical service connected directly to our specialty remediation equipment.

ERH uses alternating current (AC), avoiding the electrolysis problems associated with direct current (DC). ERH will not harm underground utilities or communication lines.

Our ERH Power Control Units (PCUs) use isolation transformers that only allow electricity to flow from one electrode to another. Thus, electricity cannot travel or stray outside of the ERH treatment area.

◀ previous | next ▶



2

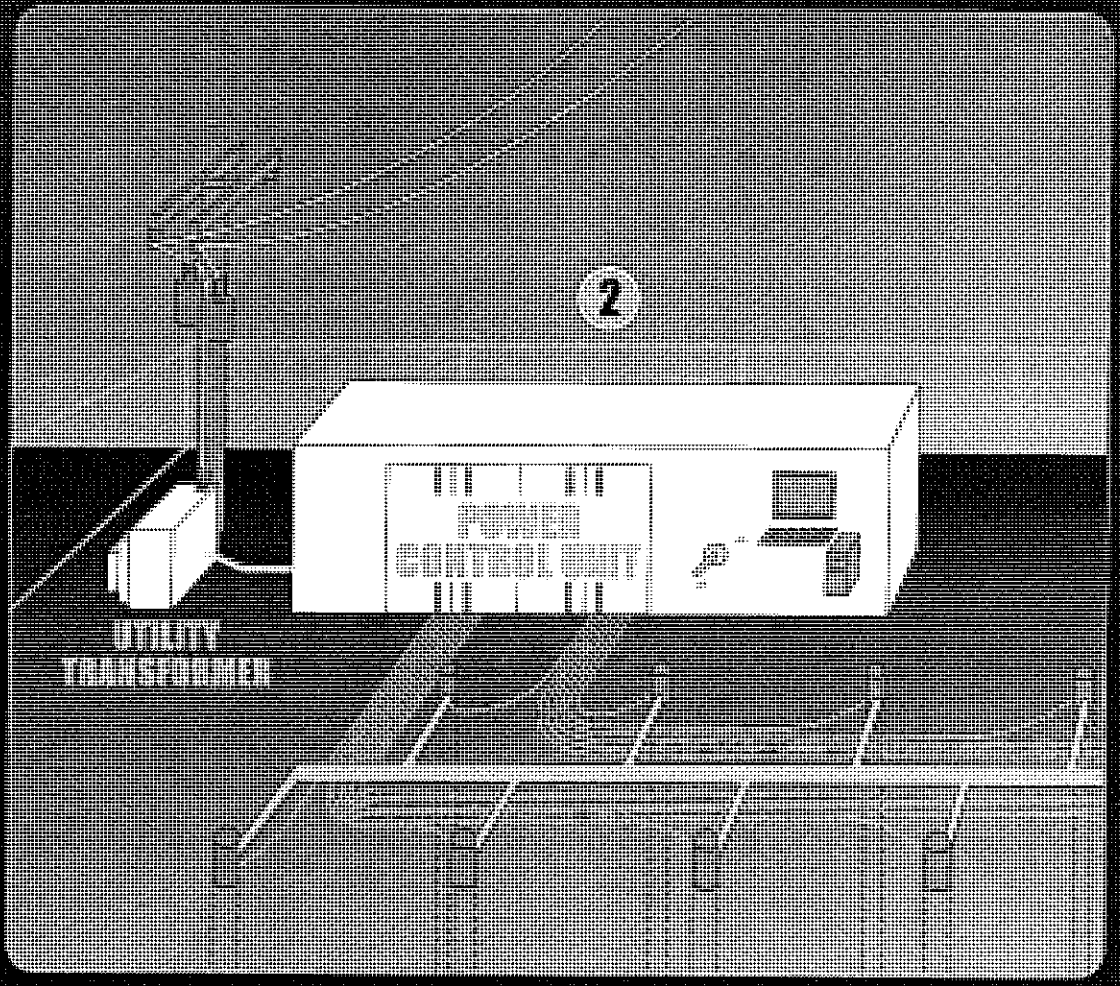
ERH POWER CONTROL UNITS

Inside the PCU, voltage is stepped down for controlled distribution into the subsurface. Electricity is delivered from the PCU to the electrodes using portable power cables.

TRS owns the largest and most diverse fleet of ERH specialty equipment in the world. Our PCUs are sized at 500, 750, 950, 2,000, and 4,000 kilowatts (kW).

The diversity of our equipment fleet allows us to apply ERH at sites ranging from small dry cleaners or gas stations to multi-acre military and major industrial facilities.

Typically, small ERH projects can be completed in 1-3 months and large projects in less than 1-year.



previous | next

TRS ERH Technical Process Tour

3

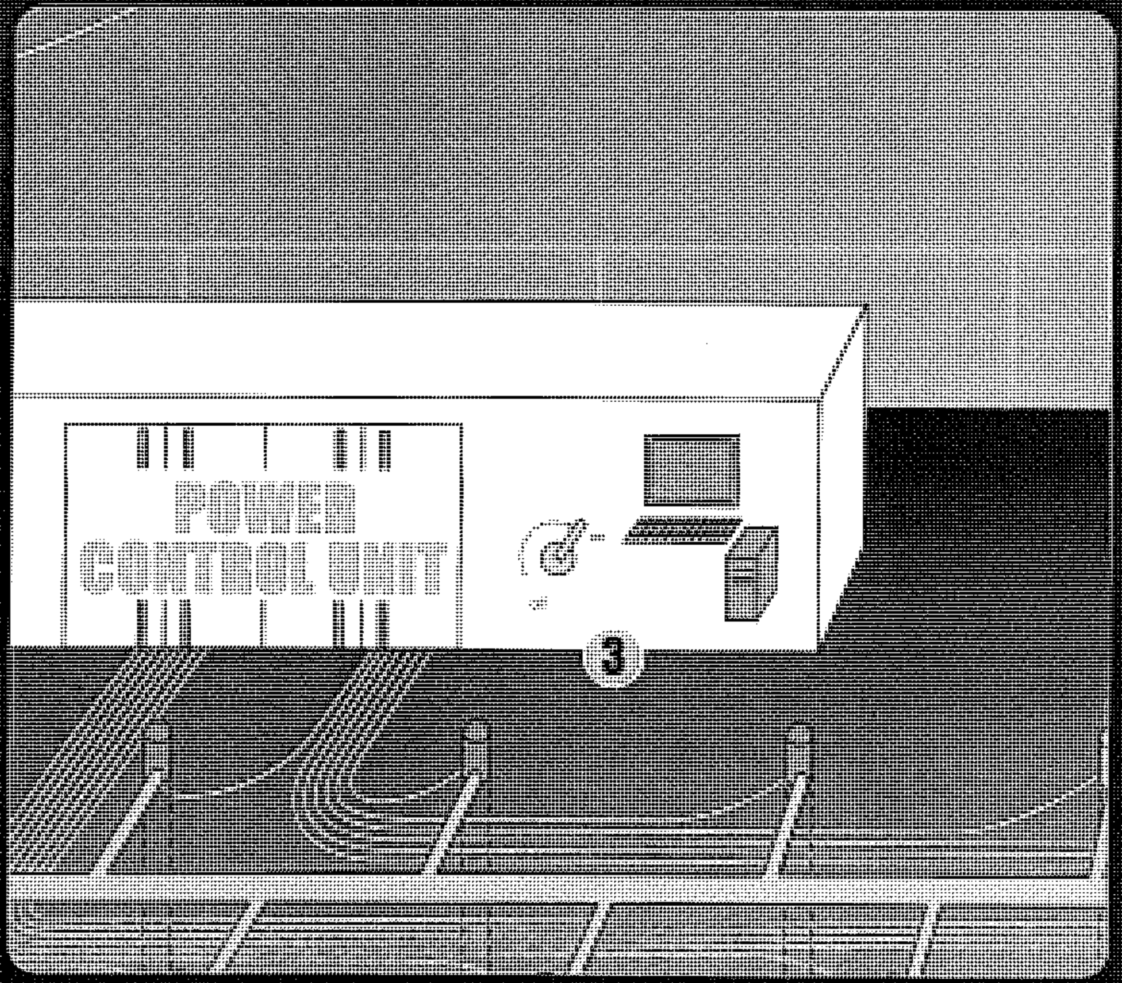
SAFETY

Safety is our primary concern. TRS has a perfect safety record with zero OSHA recordable incidents. Our low EMR rating (0.85) meets the most stringent Federal, state, and private sector requirements.

Our equipment is engineered for safety. The interlocks shut down power application if any part of the remediation system stops operating. Our PCUs also have emergency cutoff switches that instantly de-energize the electrodes.

We typically surround our remediation areas with placarded security fencing and perimeter motion detectors. If unauthorized personnel breach the security perimeter, the ERH system shuts down automatically and TRS is notified immediately.

◀ previous | next ▶



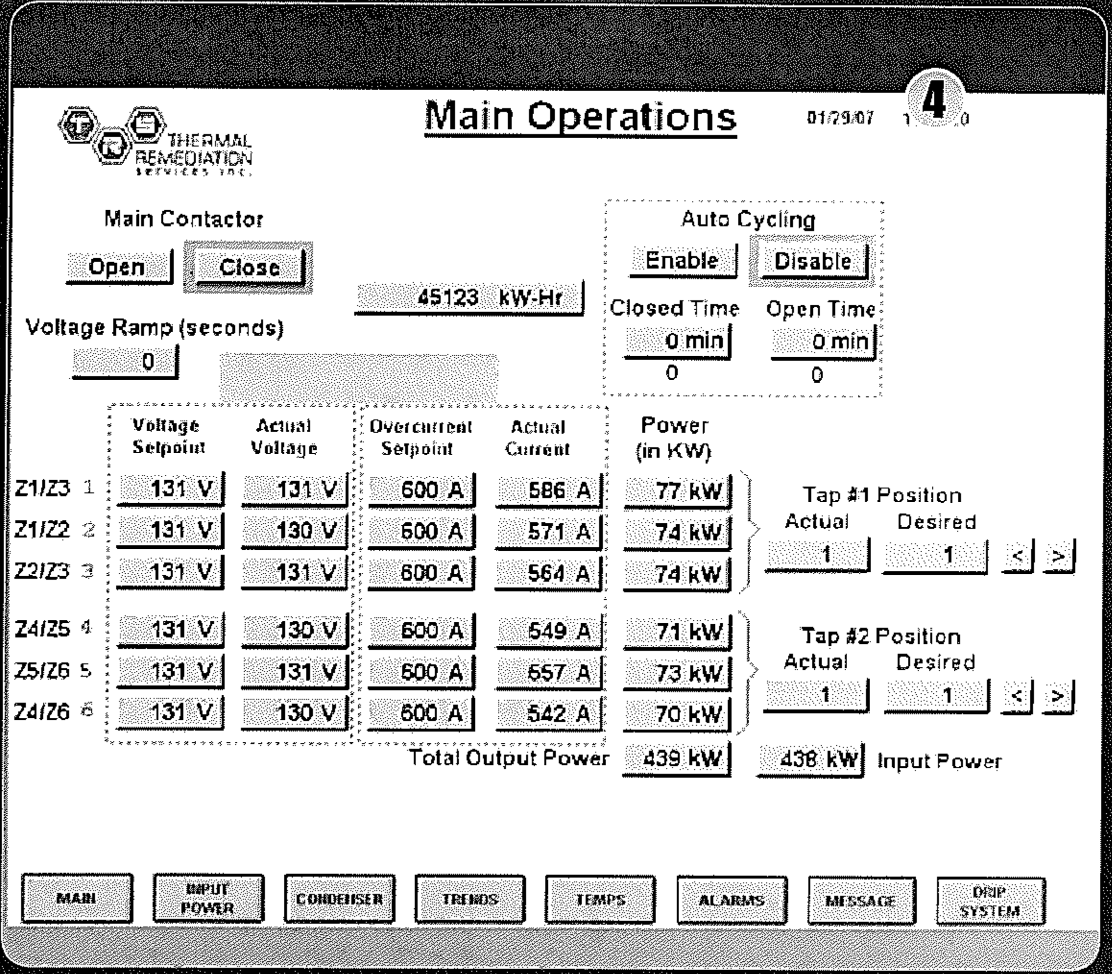
REMOTE OPERATIONS AND MONITORING

Our ERH systems can be remotely monitored and operated through the PCU control computer.

The slide to the right shows a typical PCU Main Operations Screen. The screen displays the electrical power being applied to a site in volts (V), amps (A) and kilowatts (kW).

From the Main Operating Screen, the PCU can be turned on and off and power input into the subsurface can be adjusted. Remote operators can also record subsurface temperature, control drip system operations, and monitor conditions within the condenser and other key remediation system components.

previous | next



Main Operations

01/29/07

Main Contactor: Open / Close

45123 kW-Hr

Voltage Ramp (seconds): 0

Auto Cycling: Enable / Disable

Closed Time: 0 min 0

Open Time: 0 min 0

	Voltage Setpoint	Actual Voltage	Overcurrent Setpoint	Actual Current	Power (in KW)
Z1/Z3 1	131 V	131 V	600 A	586 A	77 kW
Z1/Z2 2	131 V	130 V	600 A	571 A	74 kW
Z2/Z3 3	131 V	131 V	600 A	564 A	74 kW
Z4/Z5 4	131 V	130 V	600 A	549 A	71 kW
Z5/Z6 5	131 V	131 V	600 A	557 A	73 kW
Z4/Z6 6	131 V	130 V	600 A	542 A	70 kW

Total Output Power 439 kW

438 kW Input Power

Tap #1 Position: Actual 1, Desired 1

Tap #2 Position: Actual 1, Desired 1

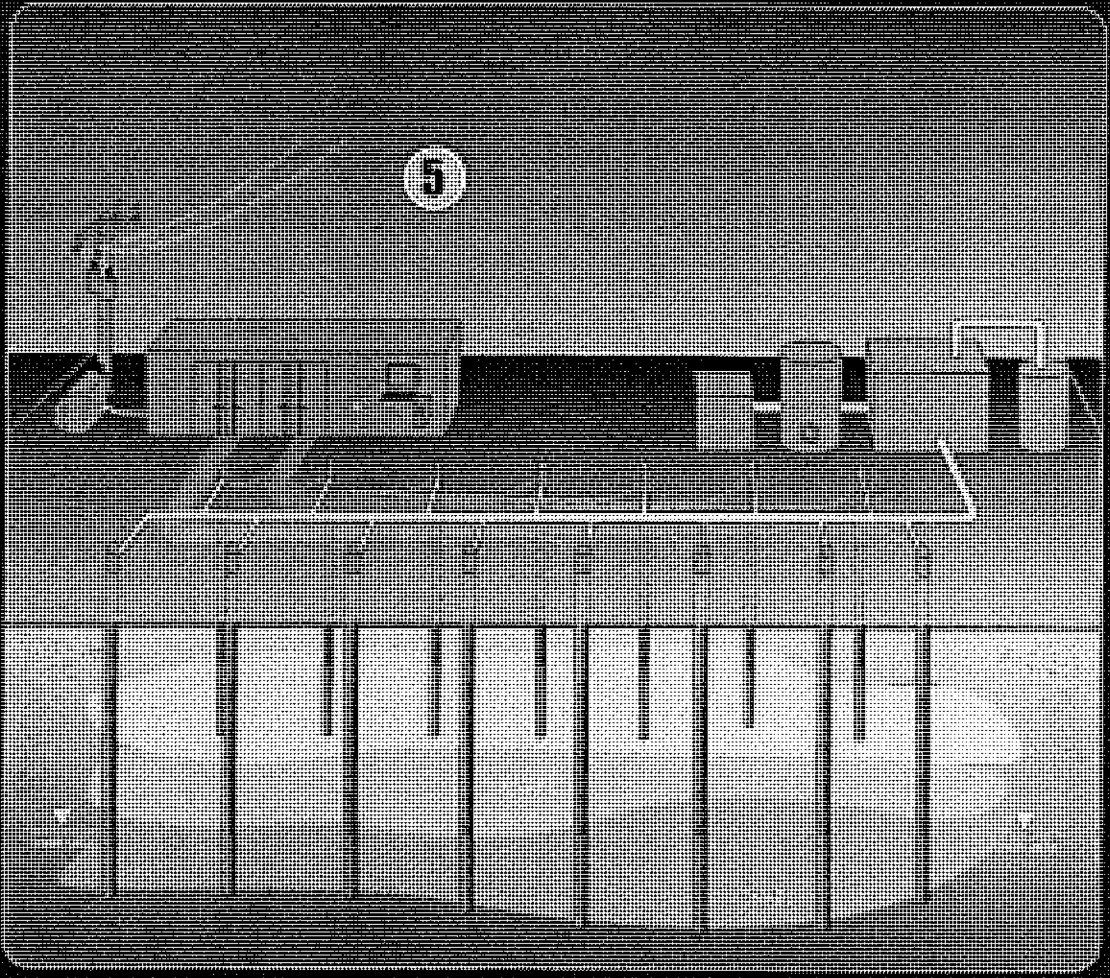
TRS ERH Technical Process Tour

5

ERH ELECTRODE AND VAPOR RECOVERY WELL FIELD

TRS works with our clients to develop ERH design parameters for each site. These parameters include soil and groundwater cleanup goals, remediation time frames, levels of site access desired during the remediation and performance guarantees.

A key design component is the layout of the electrode and vapor recovery (VR) well field. Electrical power is delivered into the subsurface at the electrodes, while steam and contaminant vapors are removed from the VR wells. Often, these two design features are co-located to reduce project costs and improve system efficiency.



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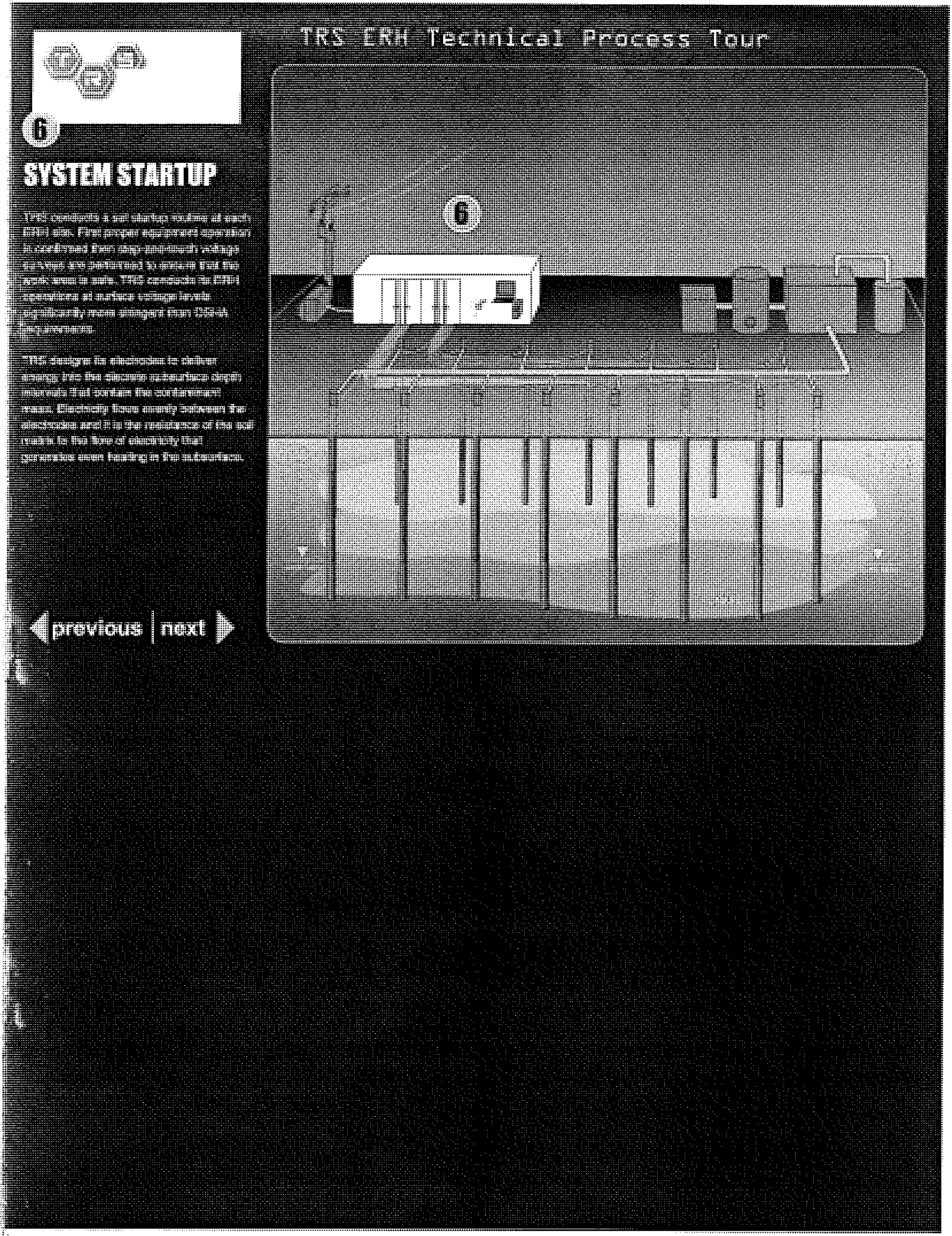


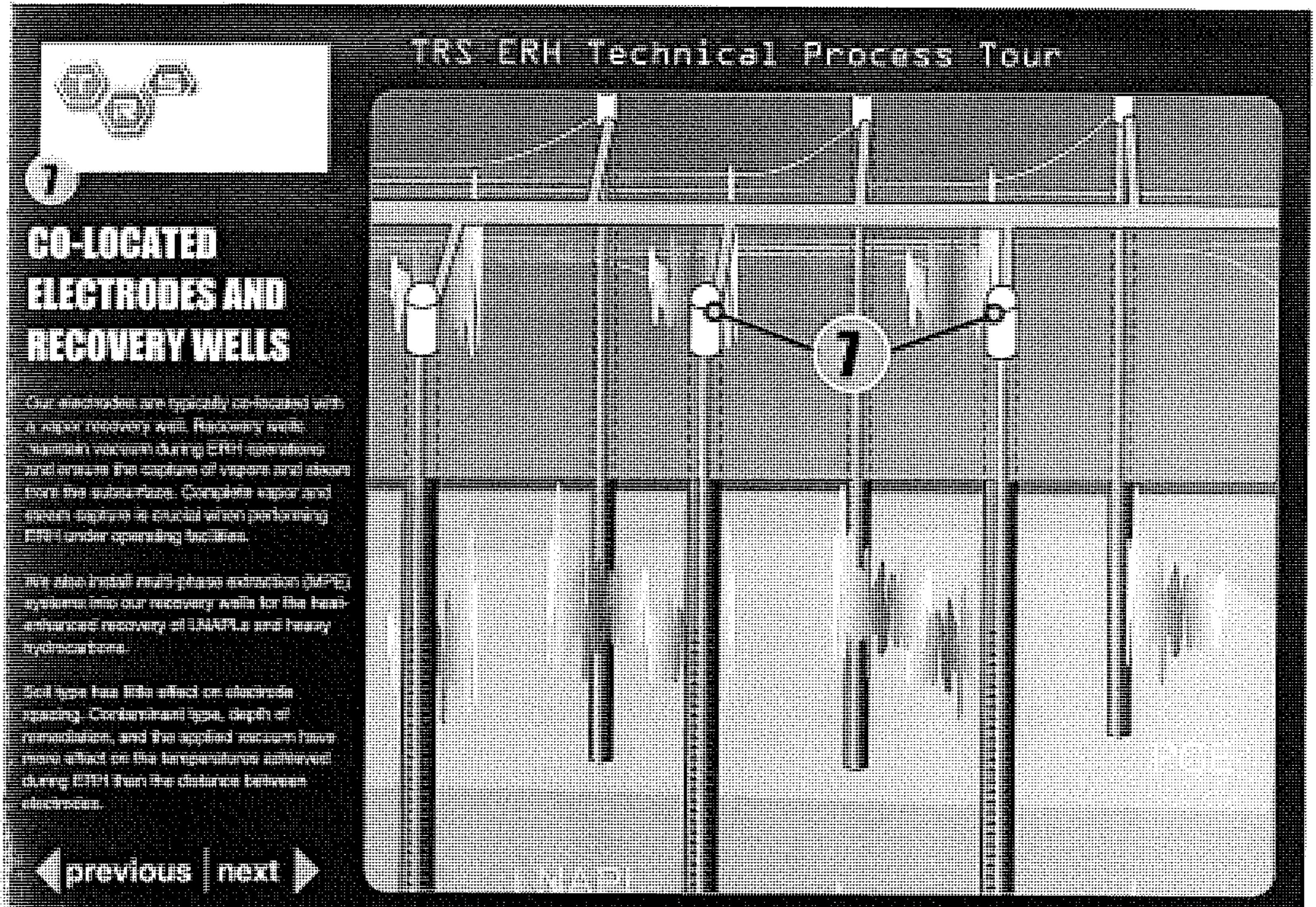
TRS ERH Technical Process Tour

6

SYSTEM STARTUP

TRS conducts a soil startup routine at each ERH site. First proper equipment operation is confirmed then step-and-touch voltage surveys are performed to ensure that the work area is safe. TRS conducts its ERH operations at surface voltage levels significantly more stringent than OSHA requirements.

"TRS designs its electrodes to deliver energy into the discrete subsurface depth intervals that contain the contaminant mass. Electricity flows evenly between the electrodes and it is the resistance of the soil matrix to the flow of electricity that generates even heating in the subsurface.



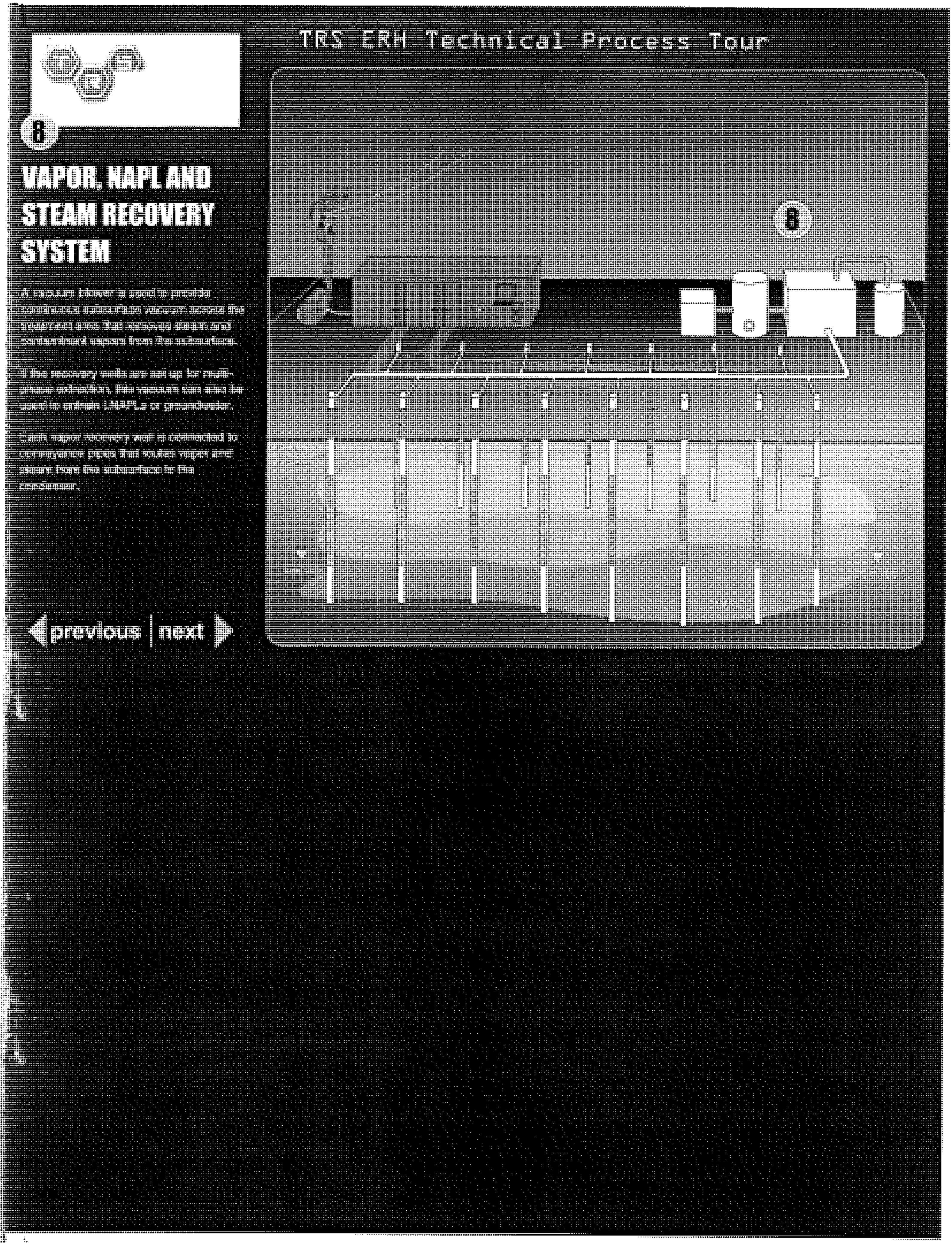
TRS ERH Technical Process Tour

CO-LOCATED ELECTRODES AND RECOVERY WELLS

Our electrodes are typically co-located with a vapor recovery well. Recovery wells maintain vacuum during ERH operations and ensure the capture of vapors and steam from the subsurface. Complete vapor and steam capture is crucial when performing ERH under operating facilities.

We also install multi-phase extraction (MPE) systems into our recovery wells for the heat-enhanced recovery of LNAPLs and heavy hydrocarbons.

Soil type has little effect on electrode spacing. Contaminant type, depth of remediation, and the applied vacuum have more effect on the temperatures achieved during ERH than the distance between electrodes.



TRS ERH Technical Process Tour

VAPOR, NAPL AND STEAM RECOVERY SYSTEM

A vacuum blower is used to provide continuous subsurface vacuum across the treatment area that removes steam and contaminant vapors from the subsurface.

If the recovery wells are set up for multi-phase extraction, this vacuum can also be used to extract LNAPLs or groundwater.

Each vapor recovery well is connected to conveyance pipes that routes vapor and steam from the subsurface to the condenser.

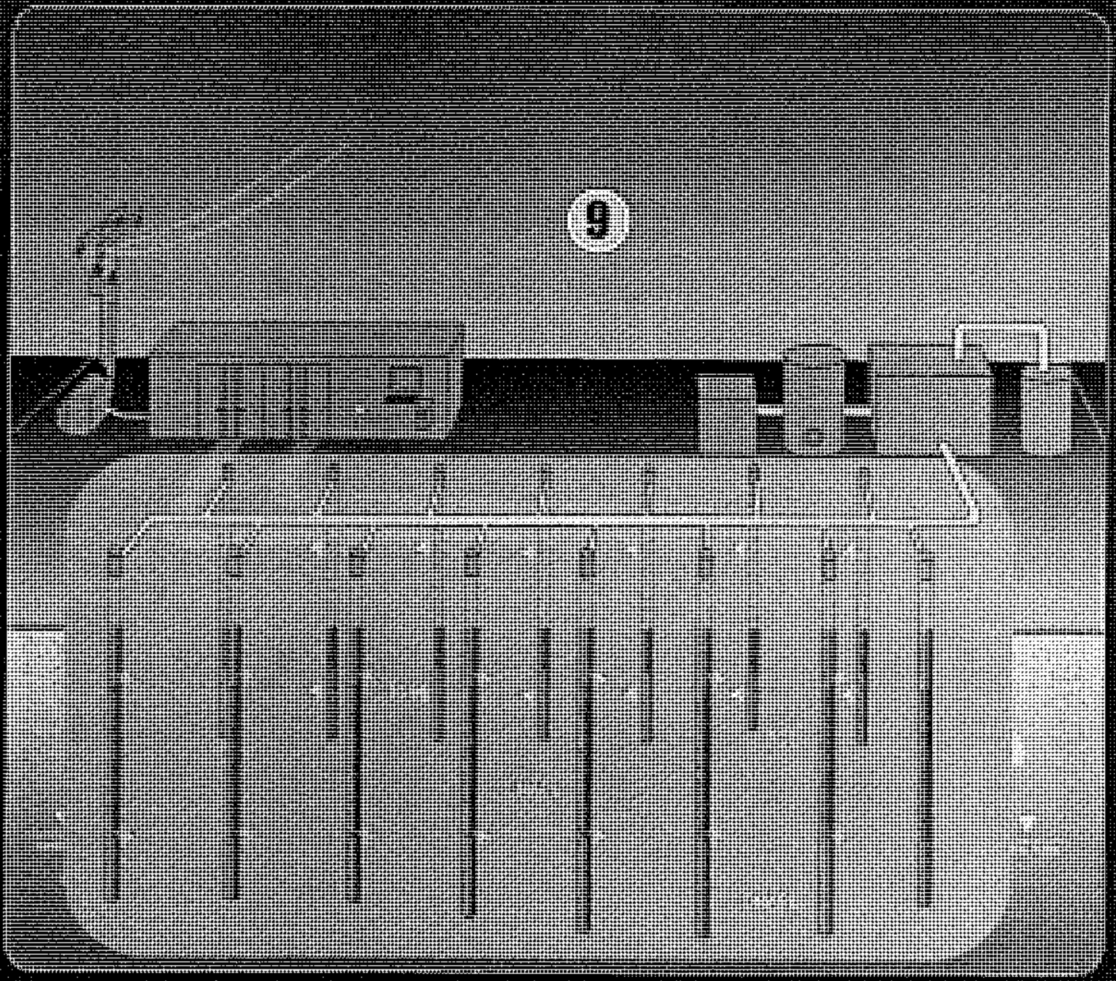
9

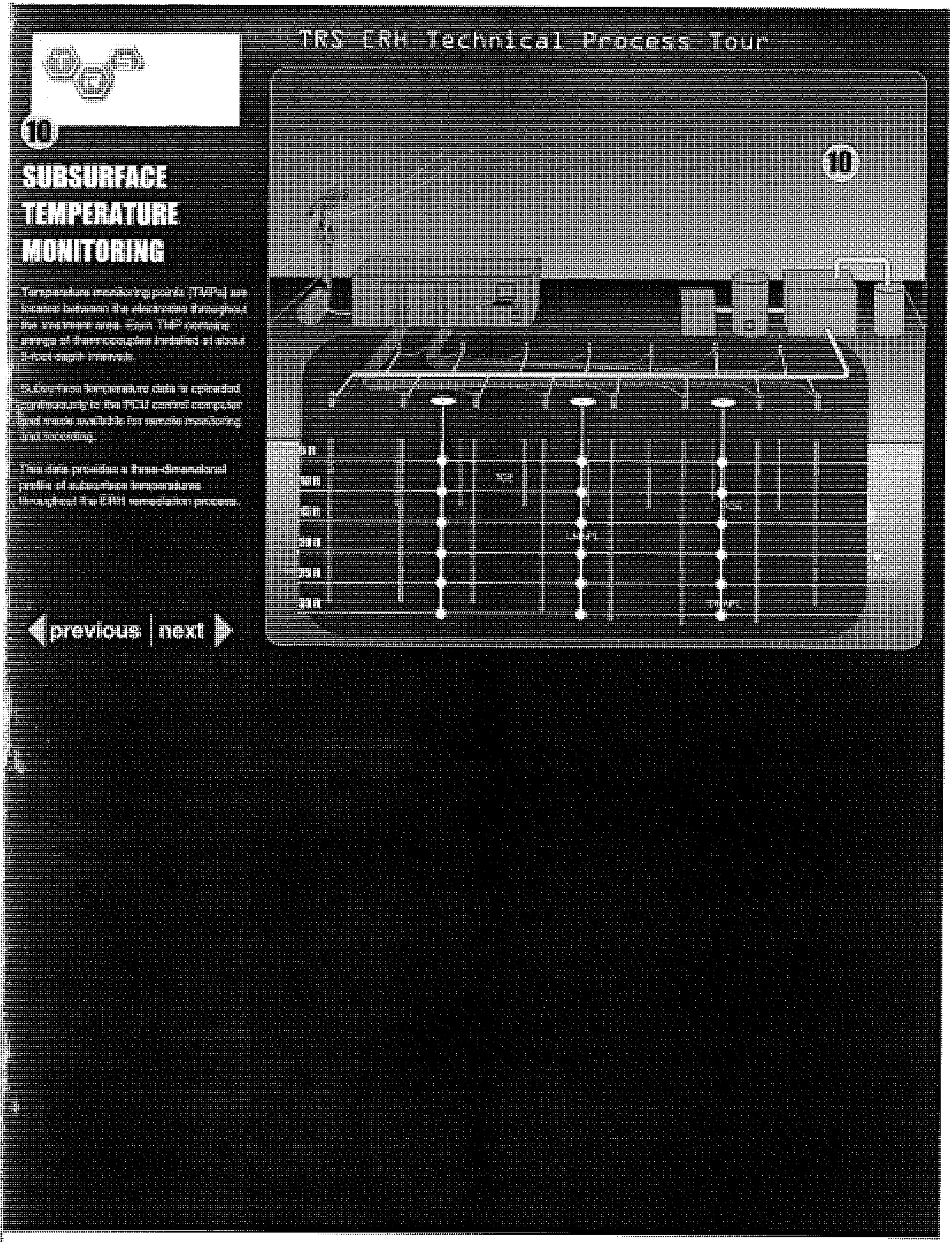
THE HEATING AND CLEANING PROCESS

Lower permeability soil lenses and areas with elevated chloride ion concentrations are more electrically conductive. During ERH, they attract electricity first and heat up slightly quicker than the surrounding formation. These areas also tend to be the most contaminated parts of the site.

During ERH, the combined effects of phase change and steam stripping liberate contaminants from low permeability zones into the surrounding formation where they can be recovered.

By lowering the viscosity and specific gravity of contaminants, ERH enhanced multi-phase extraction (MPE) can be used to remediate heavier hydrocarbons such as gasoline, diesel, jet fuel, oil, creosote and coal tar.





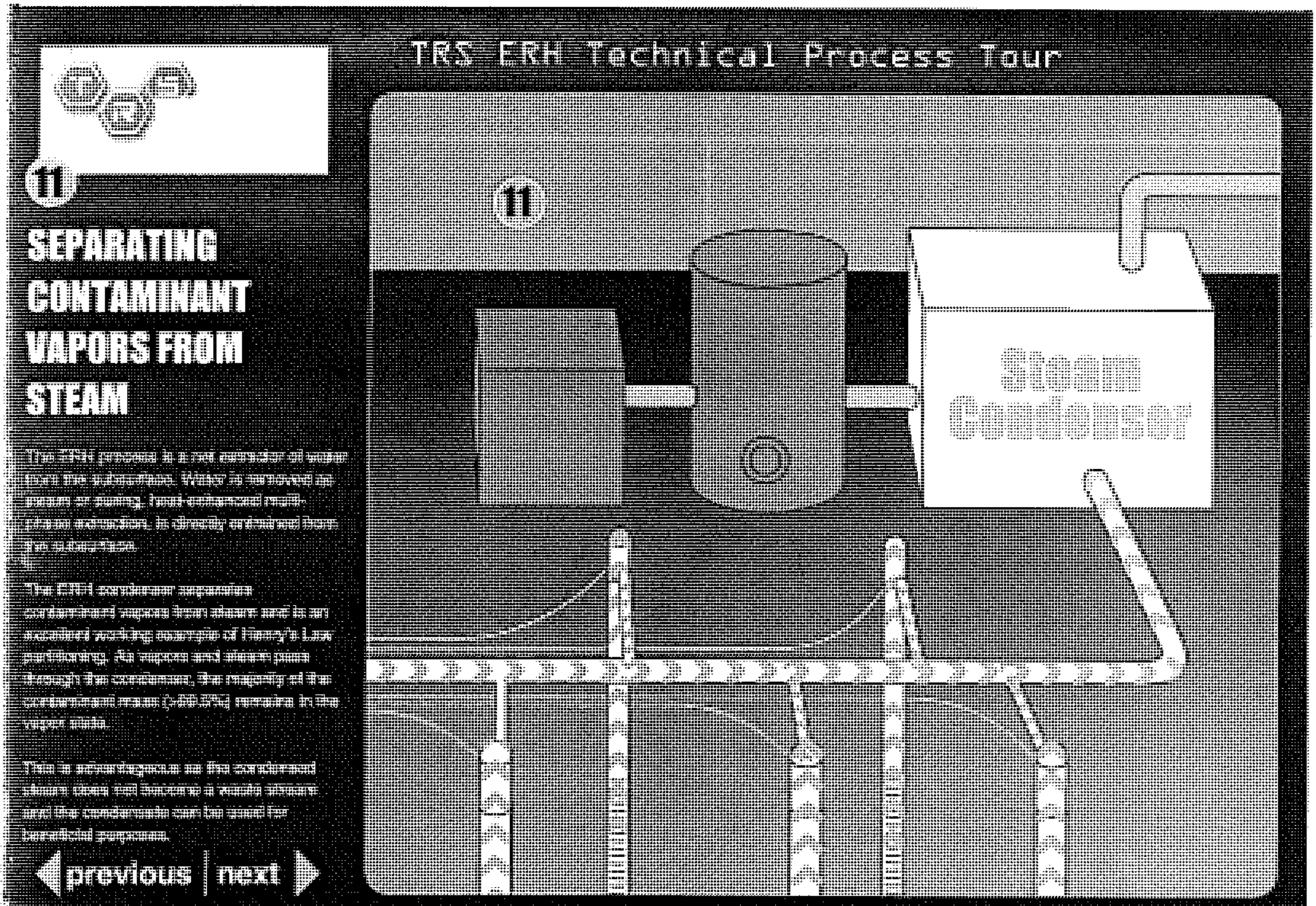
TRS ERH Technical Process Tour

SUBSURFACE TEMPERATURE MONITORING

Temperature monitoring points (TMPs) are located between the electrodes throughout the treatment area. Each TMP contains strings of thermocouples installed at about 5-foot depth intervals.

Subsurface temperature data is uploaded continuously to the PCU control computer and made available for remote monitoring and recording.

This data provides a three-dimensional profile of subsurface temperatures throughout the ERH remediation process.



TRS ERH Technical Process Tour

11

SEPARATING CONTAMINANT VAPORS FROM STEAM

The ERH process is a net extractor of water from the subsurface. Water is removed as steam or during heat-enhanced multi-phase extraction, is directly extracted from the subsurface.

The ERH condenser separates contaminant vapors from steam and is an excellent working example of Henry's Law partitioning. As vapors and steam pass through the condenser, the majority of the contaminant mass (>99.5%) remains in the vapor state.

This is advantageous as the condensed steam does not become a waste stream and the condensate can be used for beneficial purposes.

TRS ERH Technical Process Tour

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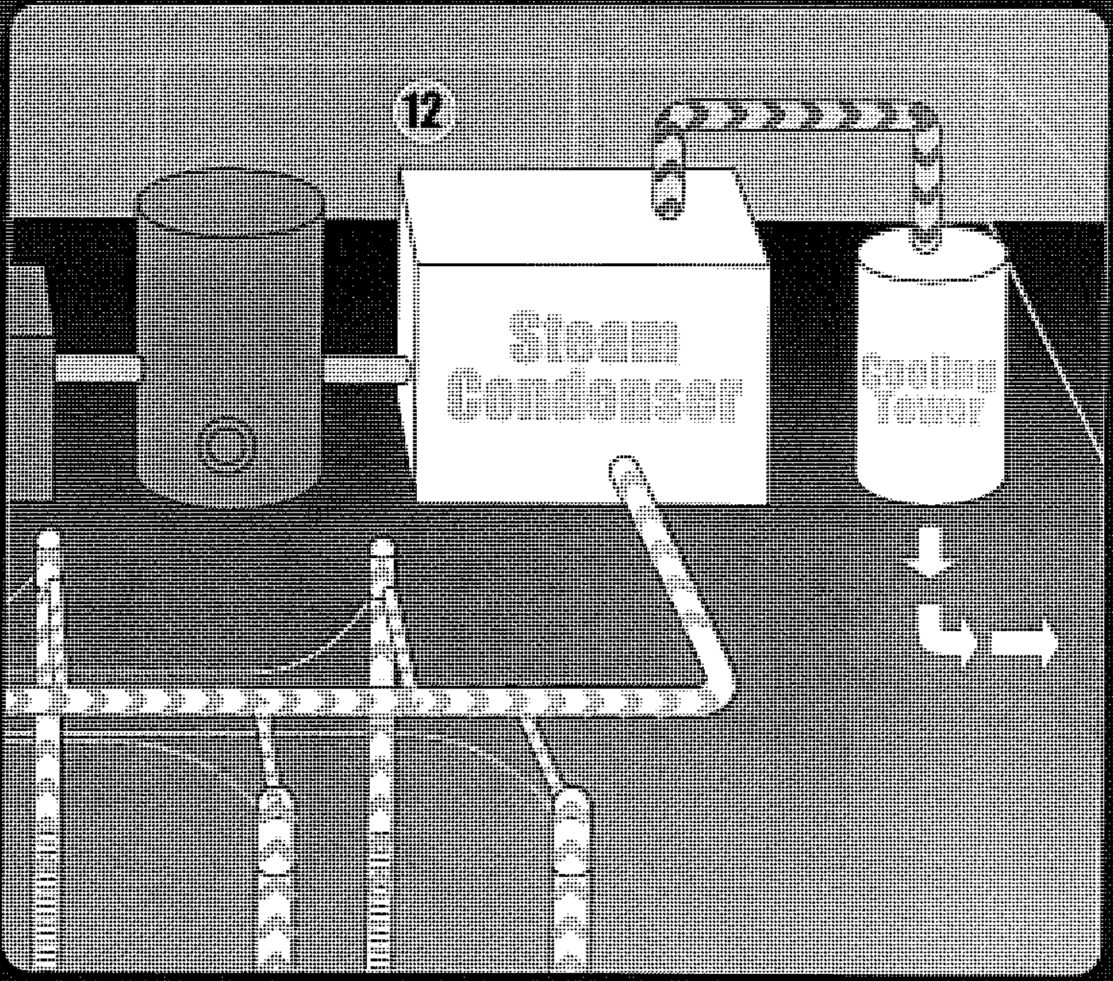
USES OF CONDENSATE

Because the condenser is so efficient, condensate may be used throughout the remediation process. At most sites, all of the condensate generated by ERH is consumed by system operations.

In the condenser, condensate is circulated to the cooling tower as makeup water. It is also used as drip water at the electrodes to maintain moisture content at the soil-electrode interface.

Because the condensate is so clean, if any excess is produced during an ERH remediation it is typically discharged directly to the sewer without further treatment.



TRS ERH Technical Process Tour

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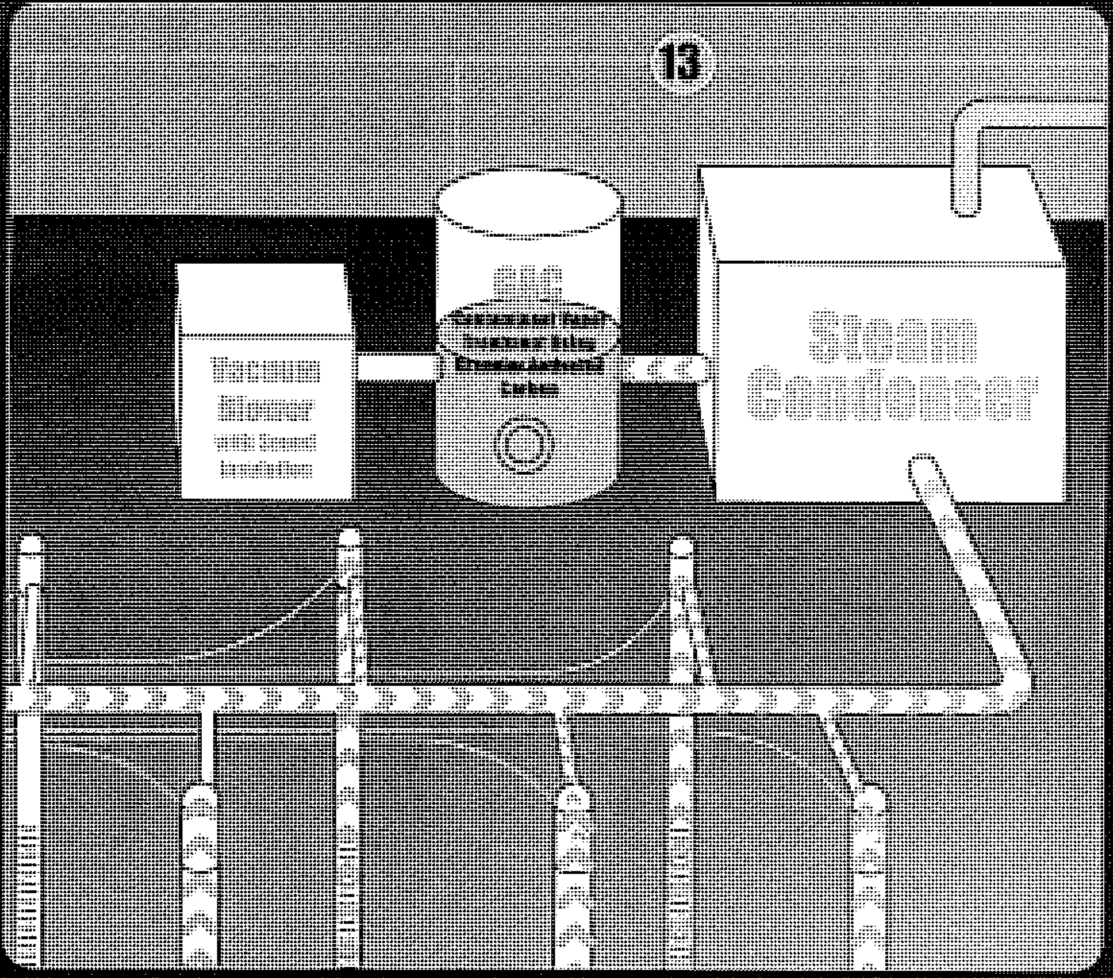
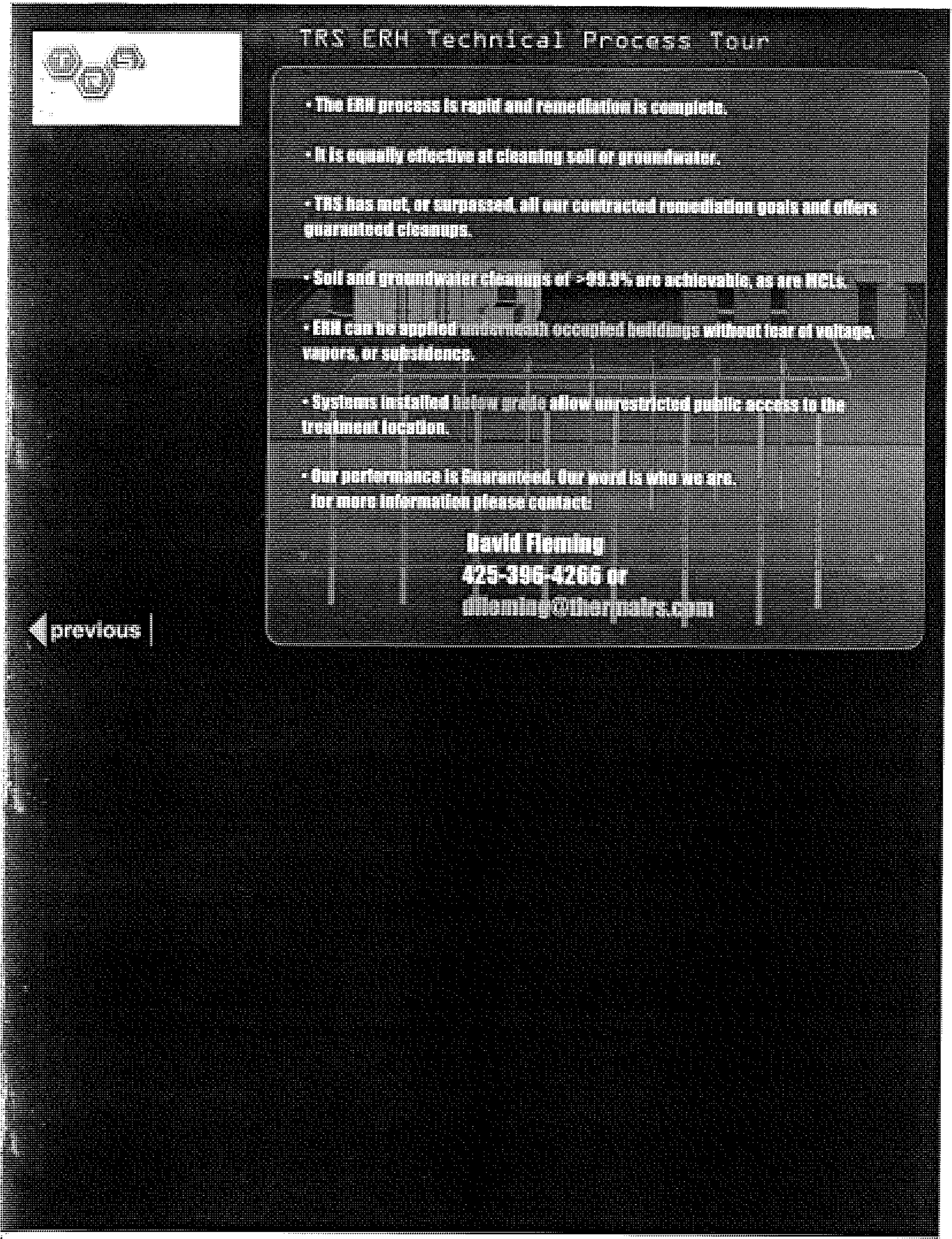
VAPOR TREATMENT

Contaminant vapors are treated prior to discharge to the atmosphere. The most common vapor treatment method is Granular Activated Carbon (GAC).

Thermal or catalytic oxidation can also be used for sites where these treatment methods are appropriate and cost-effective.





TRS ERH Technical Process Tour

- The ERH process is rapid and remediation is complete.

- It is equally effective at cleaning soil or groundwater.

- TRS has met, or surpassed, all our contracted remediation goals and offers guaranteed cleanups.

- Soil and groundwater cleanups of >99.9% are achievable, as are MCLs.

- ERH can be applied underneath occupied buildings without fear of voltage, vapors, or subsidence.

- Systems installed below grade allow unrestricted public access to the treatment location.

- Our performance is Guaranteed. Our word is who we are.

for more information please contact:

David Fleming
425-396-4266 or
dfleming@thermalrs.com

APPENDIX L

ORC ADVANCED® PRODUCT INFORMATION PREPARED BY REGENESIS, INC., PROPOSED SOIL BORING LOCATION MAP, AND DRILLING CONTRACTOR ESTIMATES FOR COMPLETING ORC INJECTION

ORC ADVANCED®
OXYGEN RELEASE
COMPOUND

Highest amount of active oxygen in a controlled-release, oxygen producing compound

PRODUCT OVERVIEW

ORC Advanced® is the state-of-the-art technology for stimulating aerobic bioremediation. It offers unparalleled, maximum oxygen release for periods up to 12 months on a single injection and is specifically designed to minimize oxygen waste while maximizing contaminated site remediation.

ORC Advanced is a formulation of calcium oxyhydroxide which, upon hydration, releases oxygen and forms simple calcium hydroxide and water.

$$CaO(OH)_2 + H_2O \rightarrow \tfrac{1}{2}O_2 + Ca(OH)_2 + H_2O$$

PRODUCT BENEFITS

HIGHEST AVAILABLE OXYGEN CONTENT

More active oxygen (17%) plus Regenesis' patented controlled-release technology (CRT™) saves time and money by increasing degradation rates and improving remediation performance by providing more oxygen on a single injection. It is particularly effective at higher demand sites where oxygen may be limited and scavenged by competing carbon sources.

PATENTED CONTROLLED-RELEASE TECHNOLOGY (CRT™)

Based on the same proven technology employed in the industry standard Oxygen Release Compound (ORC®), CRT allows for an efficient, long-term release of oxygen providing the optimal conditions for sustained aerobic biodegradation. This can save time and money by reducing the potential need for multiple applications. Also, oxygen release "lock-up" is avoided – an unfortunate problem experienced with commodity chemicals.

IN SITU APPLICATION

Remediation with ORC Advanced is typically more cost-effective than *ex situ* treatments. With the use of ORC Advanced there is minimal site disturbance with no above-ground piping or mechanical equipment, no operations and maintenance costs and no hazardous materials handling or disposal.

CRT

DEFINING THE SCIENCE BEHIND CONTROLLED-RELEASE TECHNOLOGY (CRT™)

Early on, Regenesis researchers noted that in order to optimally stimulate the natural attenuation of aerobically degradable contaminants, biologically usable oxygen was best supplied in low but constant concentrations. Big bursts of oxygen are wasteful and simply "bubble off", often generating undesirable foaming and producing unwanted preferential flow paths in the subsurface. Regenesis sought to solve this problem by controlling the rate of oxygen release from solid oxygen sources.

The answer was provided by the development of CRT. The CRT process involves intercalating (embedding) phosphates into the crystal structure of solid peroxygen molecules. This patented feature, now available in the ORC Advanced® formulation, slows the reaction that yields oxygen within the crystal, minimizing "bubble off" which can waste the majority of oxygen available in common solid peroxygen chemicals.

CRT provides "balance" – it slows down the rate of oxygen release while at the same time preventing "lock-up". Commodity solid peroxygen chemicals, when in contact with water, will produce an initial rapid and uncontrolled-release of oxygen. Then, as hydroxides form, a significant portion of the oxygen deeper in the crystal is made unavailable or becomes"locked-up." This undesirable effect is inefficient and costly. CRT prevents lock up and controls the rate of oxygen release, representing the state-of-the-art technology in passive oxygen delivery.

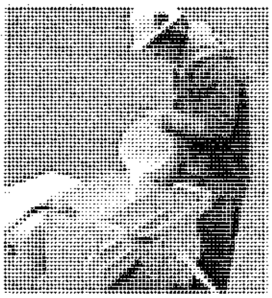
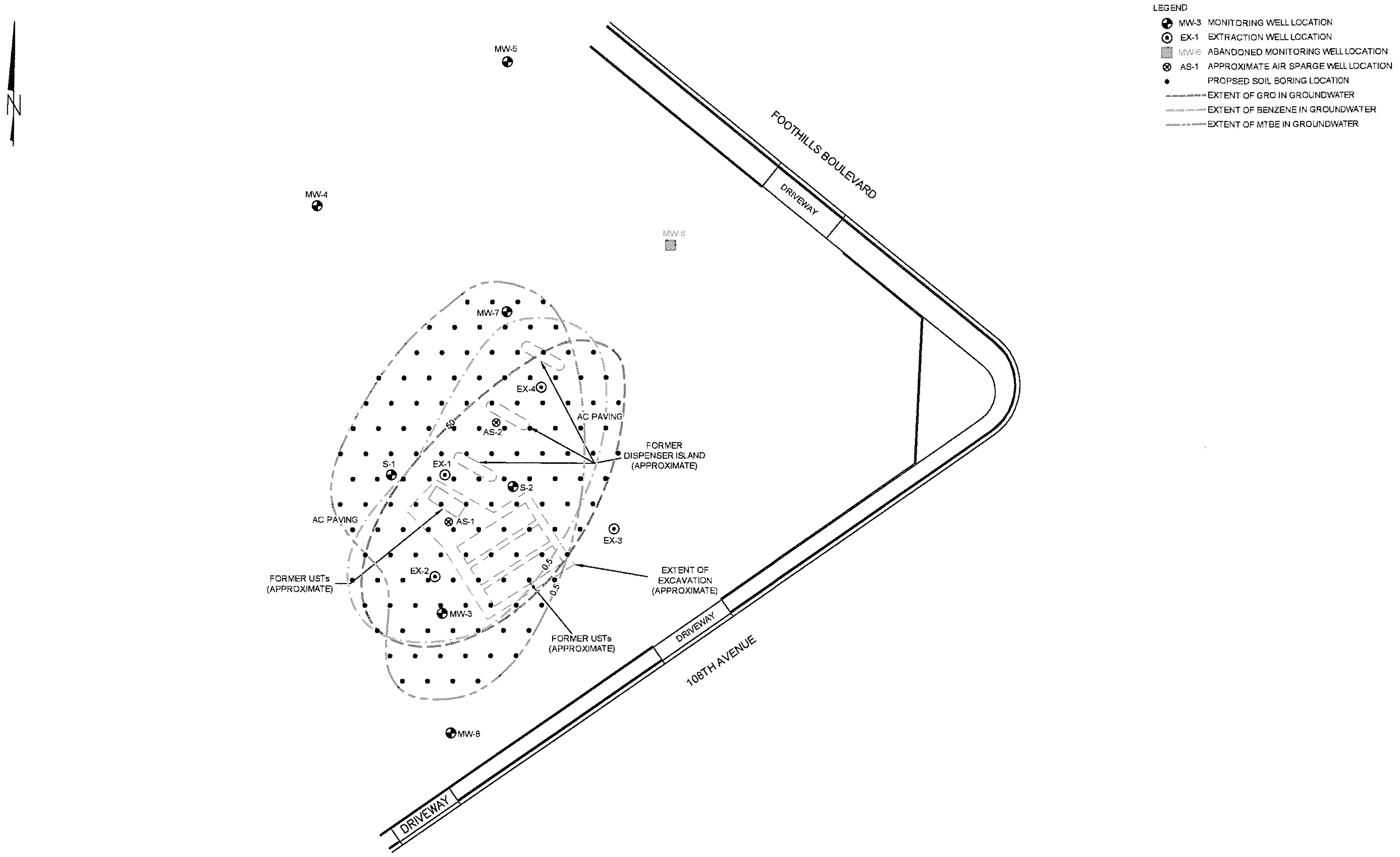


FIGURE 1:
FILLING A PUMP WITH
ORC ADVANCED SLURRY



USA\57\SCM JMP REV April 15, 2009 USA 57 1Q09

STRATUS
ENVIRONMENTAL, INC.

0 40 FT
SCALE

FORMER USA SERVICE STATION NO. 57
10700 MACARTHUR BOULEVARD
OAKLAND, CALIFORNIA

GRO, BENZENE, & MTBE IN GROUNDWATER
ISO-CONCENTRATION CONTOUR MAP
1st QUARTER 2009

FIGURE

PROJECT NO.
2007-0057-01

EN PROB
ENVIRONMENTAL PROBING

FACSIMILE ESTIMATE

sbittinger@stratusinc.net
June 29, 2009

Stratus Environmental Inc.
3330 Cameron Park Drive
Suite 550
Cameron Park, California 95682

Attention: Scott Bittinger

Cost estimate for your ORC Probing Project at Foothill Blvd & 108th Avenue in Oakland, California.

SCOPE OF PROJECT: As per your fax on 6/24/09. 138 probes to 28 feet bgs. Injecting 12000 pounds ORC approximately 3600 gallon mixed with water, which is on site. Grout & patch as needed. No hand augering required.

ESTIMATE

6	10 Hour Days (60 Hours) Probing, Injecting & Grouting (6600 Geoprobe with Two Man Crew)	@$225.00 per hr.	$13,500.00
2	Mob/Demob (two different weeks)	Approx.	960.00
6	Days Additional Man Labor, Grout & Clean etc.		1,100.00
6	Days Per Diem (3 Man Crew)		1,200.00
6	Days (GS-20000 High Pressure Grout Pump & Trailer)		1,200.00
4	Days (HRC Hot Tank & Steam Cleaner)		500.00 minimum
6	500 Gallon Water Tank & Support Truck Over 2 Weeks	@ 300.00 per day	1,800.00
120	Expendable HRC Drive Points	@ 8.75 ea.	1,050.00
85	Concrete Core Bit Usage up to 6” thick	@ 25.00 ea.	If needed
50	Bags Portland Cement Grout	@ 9.50 per bag	475.00
2	Bags Bentonite Chips	@ 10.50 per bag	21.00
	Bags Kwick Set Concrete Patch	@ 9.50 per bag	If needed
	Sales Tax, Markup & Misc.	Approx.	80.00
	TOTAL ESTIMATE		$21,886.00

This estimate might be a little on the high side but should be covered if any delays might arise. I still need a calculation from Regeniss to get an exact figure. Please let me know where we stand with our price.

Sincerely,

Dennis Ott
EnProb Environmental Probing
C-57 License 777007

GREGG

GREGG DRILLING & TESTING, INC.

SPECIALIZING IN ENVIRONMENTAL, GEOTECHNICAL AND IN-SITU TESTING

June 23, 2009

STRATUS Environmental Inc.
Mr. Scott Bittinger
3330 Cameron Park Drive, Suite 550
Cameron Park, CA 95682
530-676-6004
sbittinger@stratusinc.net

SUBJECT: **COST ESTIMATE FOR ORC INJECTION FOR THE PROJECT LOCATED IN OAKLAND, CALIFORNIA**

Dear Mr. Bittinger:

Pursuant to your request, you will find the enclosed cost estimate for the project located in **Oakland, California**. A copy of this proposal is being emailed to you with a hard copy to follow in the mail today.

COST ESTIMATE:

Mob//Daily Travel 18 days at $200.00 per day	$3,600.00
Direct Push/Injection Services (includes rig and support equipment, not materials) to include: Probe and inject 20 pounds of ORC Advanced compound at 138 locations to a depth of 28 feet. No soil sampling STRATUS will provide ORC. 18 days at $3,200.00 per day	$57,600.00
Materials to grout borings (10 feet per boring) 1,380 feet at $2.00 per foot	$2,760.00
TOTAL:	**$63,960.00**

ASSUMPTIONS:

Level D safety protection
Site accessible for equipment
Asphalt or dirt surface
Water is available on site
Daily rate includes up to ten hours per day on-site
Additional time will be billed at rig rate plus $35.00/per man, per hour
STRATUS will provide ORC compound

TERMS and CONDITIONS:

The preceding costs represent our best estimate for the tasks, as we understand them. The cost estimate does not reflect additional charges which would be incurred for standby time or adverse drilling conditions. The cost estimate does not include any taxes that may be charged. The client will be responsible for obtaining the necessary permits and for the clearance of underground utilities. The client will provide copies of USA notices to Gregg Drilling at least 72 hours prior to start of work so that we can use information contained in those notices to also notify USA, as required by law. Gregg Drilling will not be responsible for any damages to underground utilities. Client will be invoiced following completion of the work; all bills are due and payable within 30 days of the date of the invoice. Invoices not paid within 30 days will be subject to a 1.5% per month finance charge.

ACCEPTANCE of PROPOSAL:

Please sign and fax back a copy of this proposal to indicate acceptance of the proposal and conditions.

Accepted by:

Client Name: ______________________________

Signature: ________________________________

Name (printed):____________________________

Title: ____________________________________

Date: ____________________________________

Gregg Drilling & Testing, Inc. would like to thank you for the opportunity to submit a bid on this proposed work and look forward to assisting you on this project. We will be pleased to discuss the details of this work and to provide any further information you may require.

Please feel free to contact me at (925) 313-5800 with any questions you may have.

Sincerely,
GREGG DRILLING & TESTING, INC.

Christopher Pruner

Christopher Pruner/STRATUS SB Oakland 062309
Operations Manger