



FINAL

2006 Groundwater Sampling Report

**McCormick and Baxter Superfund Site
Stockton, California**

**Prepared for
US Environmental Protection Agency – Region IX**

**Prepared by
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1.0 Introduction

The purpose of this report is to summarize results of groundwater sampling conducted in April and May 2006 at the McCormick and Baxter Superfund Site (the site) in Stockton, California. A remedial investigation (RI) of the site was completed in 1998. It determined that groundwater beneath the site is contaminated with wood preservative chemicals (ICF Kaiser 1998). The site has been divided into two operable units: 1) upland soil and groundwater, and 2) sediment and surface water in Old Mormon Slough. Remedial investigations and feasibility studies have been previously prepared for both operable units, with the selection of remedies documented in the site's Record of Decision (USEPA 1999). A groundwater remedy based on pump-and-treat technologies was selected as an interim approach, pending identification and development of permanent remedies for the site. More recently, a Thermal Treatment Technology Conceptual Design (USACE 2001b) evaluated costs associated with subsurface remediation using thermal technologies and provided updated costs for a pump-and-treat remedy. The US Environmental Protection Agency – Region IX (EPA) is currently evaluating monitored natural attenuation as a remedial alternative.

The human health risk assessment identified pentachlorophenol (PCP), a subset of polycyclic aromatic hydrocarbons (PAHs), dioxins/furans, and arsenic as contaminants of concern at the site (ICF Kaiser 1998). Naphthalene and PCP were singled out as indicator chemicals for the extent of dissolved-phase contamination in groundwater. Dissolved-phase contamination extent was investigated and discussed in the RI report, the 1999 and 2000 Non-Aqueous Phase Liquid (NAPL) Field Investigation Reports (USACE 2000 and 2001a), and the Sampling and Analysis Plan for Groundwater Monitoring (USACE 2001c). A detailed update of the Conceptual Site Model was provided in the 2003 Groundwater Sampling Report (USACE 2004a), which also documented the installation and sampling of six additional wells at the site (on- and off-property).

Monitoring of groundwater has been conducted at the site since 1998 in order to:

- Monitor NAPL migration
- Monitor the extent of dissolved-phase groundwater contamination originating from the site
- Characterize evidence of, or potential for, natural attenuation of dissolved-phase contaminants
- Monitor groundwater gradients and flow directions.

This report was prepared for the EPA by the U.S. Army Corps of Engineers (USACE) - Seattle District. This report is organized as follows:

- Section 1.0 — Introduction
- Section 2.0 — Site description and background
- Section 3.0 — Summary of 2006 field activities and laboratory work
- Section 4.0 — Presentation of groundwater elevation data and chemistry data
- Section 5.0 — Summary and conclusions, with updates to the conceptual site model and recommendations for future sampling

- Section 6.0 — References

Daily Chemical Quality Control Reports are included as Appendix A. Field documentation is included in Appendix B. Pump intake depths, screen intervals, and well depths are included in Appendix C. Static water level measurements from May 2006 and water elevations for the period April 2005 to May 2006 are included in Appendix D. Chain of custody records are included in Appendix E. Data quality summary reports are included in Appendix F. Data summary tables are included in Appendix G. A comparison of results to preliminary cleanup levels (cleanup levels) is included in Appendix H.

2.0 Site Description and Background

The McCormick and Baxter Superfund site occupies approximately 32 acres in a predominantly industrial area near the Port of Stockton and the junction of Interstate 5 and State Highway 4 (Figure 2-1). The northern boundary of the site is formed by Old Mormon Slough, which connects to the Stockton Deepwater Channel on the San Joaquin River. Other site boundaries include Washington Street to the south, Interstate 5 to the east, and an industrial facility located at the Port of Stockton Turning Basin to the west. An eight-acre parcel in the southeastern portion of the site is owned by the Union Pacific Railroad (UPRR). The UPRR property boundaries, shown in Figure 2-1, have been approximated from parcel maps.

The McCormick and Baxter Creosoting Company operated at 1214 West Washington Street in Stockton, California, from 1942 until 1991. Various wood preservation processes were used at the site during its operational history. The treated wood products were used primarily by power utilities, railroads, and the construction industry. Preservatives included creosote, PCP, arsenic, copper, chromium, and zinc. Solvents or carriers for these preservatives included petroleum-based fuels, such as kerosene and diesel, butane, and ether.

Most treatment processes consisted of pressure impregnation of the preservative solutions in retorts. Pressure-treated wood was removed from the retorts and allowed to dry in various wood storage areas throughout the site. The primary facility areas identified as principal sources of contamination at the site include the Main Processing Area (MPA), Oily Waste Ponds Area, Cellon Process Area, and PCP Mixing Shed/Butt Tank Area (Figure 2-2).

The former processing areas and tank farm at the site are paved. The rest of the site is unpaved, with limited vegetative cover. Railroad tracks are located on many areas of the site. Most of the former structures have been removed. An office building, two storage sheds, a storm water collection system lift station, remnants (i.e., foundation and building, not a tank) of a gas station, wooden tower, and a building near the tower are the only remaining above ground structures. Underground sump-like basement foundations and associated piping for the former pressure treatment units remain in the central portion of the site. Entry to the site is controlled by a perimeter fence and 24-hour security service.

The site is located on the margin of the Sacramento River–San Joaquin River Delta in the Great Valley geomorphic province of California. The site terrain has low relief, with elevations ranging from 8 to 15 feet above mean sea level. Surface water bodies in the vicinity of the site include Old Mormon Slough, New Mormon Slough, the Stockton Deepwater Channel, and the San Joaquin River. Old and New Mormon Sloughs are tidally influenced and experience a maximum tidal range of approximately 3 feet. Stockton Channel, the Port of Stockton Turning Basin, and Old Mormon Slough are areas of net sediment deposition, and all but the inner portion of Old Mormon Slough are periodically dredged to maintain depths appropriate for ship traffic. Old Mormon Slough is approximately 2,500 feet long and 160 feet wide. Except for the dredged portions, the slough is approximately 10 feet deep.

2.1 Hydrogeology

The subsurface at the site is characterized by a complex series of bedload channel (sand) deposits and overbank (silt) deposits. The dominant soil type, comprising an average of 78 percent of subsurface soils, is silt. Sand zones exist as layers of highly variable lateral continuity. These sand zones range up to 30 feet thick. Laterally continuous sand units are usually at least 10 feet thick.

2.1.1 Hydrostratigraphy

For water supply purposes, the subsurface in the Stockton area has been divided into a shallow and a deep aquifer. The shallow aquifer extends to a depth of 200 feet below ground surface (bgs; approximately -190 feet elevation). The deep aquifer encompasses depths from 200 feet bgs to at least 1,000 feet bgs. The shallow aquifer and the uppermost portion of the deep aquifer have been further subdivided into zones A through E by past investigators at the site. Groundwater in the shallow aquifer occurs primarily in sand layers and lenses of fine- to coarse-grained sand of variable continuity. The E-zone aquifer sediments are predominantly sandy gravels and gravelly sands that are apparently widespread.

The approximate elevations of the aquifer zones and their soil characteristics are given in the table below. In general, aquifer zones are identified by spikes in the relative abundance of sand. Below an elevation of -200 feet, data are sparse, and determining relative abundance of fine and coarse material is more difficult.

Aquifer Zone	Elevation (Feet NAVD88)	Sand Abundance	
		Range	Average
A	-15 to -45	33 to 52%	40%
B	-50 to -75	16 to 26%	21%
C	-115 to -135	25 to 38%	29%
D	-145 to -165	21 to 37%	27%
E	<-225	n.d.	n.d.

Note:

NAD88 – North American Datum of 1988

n.d. – not determined (insufficient data)

As can be seen from the soil characteristics of the aquifer zones, even in aquifer zones the dominant soil type is silt or clay. It therefore becomes very difficult to establish lateral continuity of permeable zones.

The simplified division into five hydrogeological aquifer zones used by previous site investigators (including USACE) does not convey the complexity of aquifer zone inter-connections. For example, the abundance of sandy zones beneath the former Cellon Process Area suggests that permeable units are probably connected vertically and horizontally by complex, interfingering pathways to an elevation of -75 feet, effectively connecting the A- and B-zones in this area. This vertical pathway has perhaps enhanced migration of NAPL and dissolved-phase contaminants into deeper, laterally extensive sand units. Beneath many portions of the site to an elevation of -100 feet, the interbedding of permeable and less permeable

materials obscures the identification of aquifers and aquitards. However, underlying the B-zone is a fairly extensive silt or clay aquitard at least 10 feet thick.

One consequence of hydrogeologic complexity is that elevations of well screens within a particular designated aquifer zone are not always consistent across the site. Wells screened within a given aquifer zone may or may not be connected by continuous sand channel deposits within that aquifer zone. Sand units at a given elevation may have some lateral continuity across the site, but silt deposits can separate sands at equal elevation. The aquifer zone conceptualization is best viewed as a general characterization of the site as a whole and not as a rigid framework applicable to all locations within the site.

Tidal effects have not been observed in the A-zone (ICF Kaiser 1998), suggesting that there is little direct hydraulic communication between Old Mormon Slough and the surficial aquifer. Tidal responses of up to 0.3 feet were reported for deeper wells, but these responses in deeper sand units are likely due to tidal loading of the deeper confined sands (ICF Kaiser 1998).

2.1.2 Groundwater Flow

The horizontal component of groundwater flow at the site has been predominantly east-southeast for the A- through D-zones and east-northeast in the E-zone, although evidence is starting to suggest that flow patterns are more variable than previously thought (see Section 4.1 and Appendices D and I). An east-northeast E-zone flow direction is consistent with historical regional groundwater data (DWR 1967; ICF Kaiser 1998) that show a large groundwater cone of depression due to groundwater extraction centered over the central portion of the city of Stockton. The deep aquifer supplied industrial water to the Newark-Sierra Paper Corporation (NSPC), located approximately 1,500 feet southeast of the site, but the plant closed in 2003 and the wells are not in operation currently. Although the two NSPC wells extracted 400,000 to 500,000 gallons per day, influence was not apparent in E-zone groundwater levels on site.

The southeasterly flow of groundwater within zones A through D suggests that groundwater recharge of the upper aquifer is from the northwest and/or local pumping of the upper aquifer is occurring to the southeast. The Stockton Deepwater Channel is north of the site, and the main channel of the San Joaquin River is west of the site. These are likely groundwater recharge sources for the upper aquifer. There are no known local users of shallow groundwater near the site that could account for the southeasterly groundwater gradient.

Typical horizontal velocities of groundwater in the A-, B-, C-, D- and E-zone sand units are 0.2, 0.1, 0.05, 0.02, and 0.3 foot/day, respectively. The observed vertical gradient of flow has been downward between all aquifer zones, with isolated exceptions. Calculated vertical groundwater flow velocities (0.0008-0.0014 ft/day) are considerably less than horizontal groundwater velocities. Therefore, the predominant direction of groundwater flow and dissolved-phase contaminant transport is horizontal within sand zones.

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3.0 Field and Analytical Methods

This round consisted of sample collection from 49 of the nearly 100 monitoring wells at the site (Figure 3-1). The USACE sampling team conducted groundwater sampling activities between 24 April and 4 May 2006.

Sample collection and analysis methods as documented in the Sampling and Analysis Plan (USACE 2001c) and the Sampling and Analysis Plan Addendum (USACE 2004b) were followed. Field methods, analytical methods, and data quality are summarized in this section. Field documentation, including purge log forms, test kit results, the safety acknowledgement form, and field notes are included in Appendix B.

3.1 Field Methods

3.1.1 Purging and Sampling Equipment

The 46 monitoring wells purged and sampled during this round contained dedicated Well Wizard[®] bladder pumps constructed of stainless steel and Teflon[™] (Model T1200M). Three of the 49 monitoring wells (SW-61A, SW-182A, and SW-187A – all micro-wells) could not be fitted with bladder pumps and were purged and sampled using a portable Masterflex[®] 12-volt peristaltic pump, disposable silicone pump tubing, and dedicated polyethylene tubing.

The dedicated Well Wizard[®] bladder pump systems consist of an outer stainless steel casing with an internal Teflon[™] bladder and check ball-valves at the bladder discharge and inlet ends. Teflon-lined polyethylene twin bonded tubing with a 0.375-inch outside diameter discharge tube and a 0.25-inch outside diameter airline was connected from the down-well pump to a well cap assembly near or above ground surface. The system pumping rate was regulated with a MicroPurge[®] basics[™] MP10 controller unit. The drive source for the pump system was a QED Model 3020 electric air compressor, which was connected to a 12-volt car battery for power.

The following 49 wells were purged and sampled during this round:

- **A-zone:** A-4, A-6, A-7, DSW-7A, OFS-1A, OFS-3A, OFS-4A1, OFS-4A2, OFS-5A, OS-4A, SW-61A, SW-182A, SW-187A
- **B-zone:** DSW-1B, DSW-3B, DSW-5B, DSW-7B, OFS-3B, OS-4B, MW-9B, MW-10B
- **C-zone:** DSW-1C, DSW-2C, DSW-3C, MW-8C, DSW-6C, DSW-7C, OFS-4C, OFS-5C, ONS-1C, ONS-2C, OS-1C, OS-4C
- **D-zone:** DSW-1D, DSW-4D, OFS-1D, OFS-4D, ONS-1D, ONS-2D, OS-5D, MW-7D
- **E-zone:** DSW-2E, MW-3E, MW-4E, OFS-4E, OFS-5E, OS-1E, MW-5E, MW-6E

Pump intake depths, screen intervals, and well bottom depths are presented in Appendix C.

3.1.2 Decontamination Procedures

Since bladder pumps or peristaltic tubing was dedicated to each well, only flow cells, flow cell probes, turbidity vials, and measuring cups required daily decontamination. Standard

decontamination procedures included washing equipment in a phosphate-free soap and tap water solution then a tap water rinse, followed by two additional distilled water spray rinses. The equipment was then allowed to air dry.

3.1.3 Groundwater Purging Methods

All groundwater purging and sampling was performed in accordance with the Seattle District's low-flow groundwater standard operating procedure (USACE 2001d). Data generated during purging were recorded on the MicroPurge/Low-Flow Sampling Log forms (Appendix B). All field team members adhered to and conducted all work under worker protection level "D", comprised of work clothing, steel-toed boots, Nitrile gloves, safety glasses, sunscreen, sun hats and/or hardhats.

The depth to groundwater was measured and recorded prior to and during micropurge and low-flow groundwater sampling activities at each monitoring well.

For the 46 wells fitted with dedicated Teflon™ bladder pumps, an air compressor unit was connected to a QED Well Wizard pump controller equipped with an adjustable pressure regulator to control flow rates. For the three micro-wells purged and sampled using a portable peristaltic pump, groundwater was drawn up and out of the 1/4-inch dedicated discharge tubing placed in the well, and through a short length of silicone tubing being massaged by the pump paddle wheel. The spinning paddle wheel induced a vacuum within the discharge tubing, thus drawing water out of the well and through the tubing. The pump flow rate was controlled using an electronic rheostat control.

The pump flow rates were adjusted to maximize withdrawal rates without causing excessive drawdown in the well. Purging flow rates ranged from 0.14 to 0.36 liters/minute at all 49 monitoring wells. During micropurge activities at each well, water quality indicator parameters were recorded every two minutes until stabilization was achieved, as described below.

A MicroPurge® basics™ MP20 flow cell was connected to each pump's discharge line and was used to measure stabilization parameters [pH, specific conductivity, temperature, dissolved oxygen (DO), and oxidation-reduction potential (ORP)]. A HF Scientific Model DRT-15CE turbidity meter was used to measure the turbidity of the groundwater. Groundwater was captured in a vial directly from the pump tubing discharge at regular intervals to measure turbidity during purging.

Low-flow purging continued until three consecutive measurements of the stabilization parameters met control limits and drawdown was confirmed to be less than 0.3 feet over the three measurement periods. Stabilization control limits are as follows:

Stabilization Parameter	Control Limit
pH	+/- 0.2 units
Specific Conductivity	+/- 0.020 mS/cm
Temperature	+/- 0.2 °C
DO	+/- 0.2 mg/l
ORP	+/- 25 mV

Purge water turbidity was also monitored and recorded, but it was not used as a stabilization parameter. Turbidity is a general indicator of water quality but not an indicator of water chemistry, and therefore is not an indicator of a change in groundwater chemistry.

3.1.4 Groundwater Sample Collection Methods

Prior to sample collection, the samplers donned clean, Nitrile protective gloves and splash protection glasses. Environmental Sampling Supply located in Oakland, California, supplied pre-cleaned sampling containers with preservatives added as appropriate. All sample containers were kept in pre-iced shipping coolers prior to and during sample collection.

All sample containers were filled immediately following purging by disconnecting the flow-through cell from the system and capturing groundwater directly from the discharge end of the sample tubing. The pump was not turned off between purging and sampling. Groundwater samples requiring field filtration (samples analyzed for dissolved metals) were passed through in-line 0.45 micron pore size disposable filters.

All sample containers were carefully filled at a low-flow rate to minimize agitation and aeration of the samples. Containers for dissolved gases (40 ml VOA vials) were immediately sealed and visually inspected to verify that no headspace was present (i.e., no bubbles). During sample collection, physical observations were recorded in the field notes.

Unusual observations during Round 12 groundwater purging and sampling are as follows:

- A distinct naphthalene-like odor was detected in DSW-3B, DSW-5B, MW-9B (slight) DSW-1C, DSW-7C, ONS-1C, DSW-4D, OS-5D, MW-7D, OS-1E, MW-4E, and MW-6E.
- A distinct creosote-like odor was detected in DSW-1B, ONS-2C, DSW-6C, DSW-3C, DSW-1D, ONS-1D, and OFS-4E.
- Sulfurous odors were detected in wells OFS-3A, MW-10B, OS-4C, OFS-4C, and OFS-5C. According to field notes, sulfur-like odors were only noted during purging at well DSW-7A during Round 11 last year.
- Brown purge water coloration was observed at wells OS-4A, DSW-7B, and OS-1C.
- Light grey to grey purge water coloration was observed at water pumped from wells OFS-1A, OFS-3A, and OFS-3B.
- Light orange purge water coloration was observed at well OFS-5A and OFS-4D.
- Microbubbles were observed during purging at wells OFS-4A2, OFS-5A, DSW-5B, DSW-2C, DSW-7C, DSW-4D, OFS-1D, OS-5D, OFS-5E, and MW-5E.
- Well OFS-3A – the vault was flooded by rain water and had to be bailed out prior to

sample collection.

- Well OS1E vault was filled with soil and had to be cleaned out.
- Wells DSW-3B and DSW-3C were sampled on 28 April 2006 (a Friday), and samples shipped to Region 9 lab for Saturday analysis. These samples were mis-directed by FedEx and arrived a full 72 hours after sample shipment. Since some of the holding times were missed, and all samples arrived at 12°C, well DSW-3B was re-sampled on 2 May 2006, and well DSW-3C was re-sampled on 3 May 2006. Only the later analytical results should be qualified as useable data.

Trip blanks consisting of de-ionized water in 40 ml vials accompanied each cooler containing samples for Methane, Ethane, Ethene analysis. The trip blanks were sent blind to the laboratory for their designated chemical analysis. Temperature control blanks used to measure the temperature of the cooler upon receipt at the laboratory were submitted daily with each cooler.

Since collected groundwater samples were relatively warm, all filled sample containers were placed into an ice water bath (in the McCormick and Baxter field office) for a minimum of 45 minutes to lower the sample water temperature to within range of the shipping preservation temperature of 4° C. After pre-cooling, sample labels describing specific project, location, analysis, team members, preservative, sampling date, and collection time were placed on each sample container. The samples were then packaged and prepared for shipment.

At the conclusion of sampling at each well, surface equipment—consisting of the pump controller, portable pump, flow cell, and air supply lines—was disconnected or removed from the well. The protective well covers were either bolted back into place or padlocked.

3.1.5 Sample Shipping and Chain of Custody Methods

Samples to be analyzed for SVOC and Low Level PCP were collected within 2½ days due to having three sampling team members collecting samples in the field. These samples were shipped daily via the FedEx station at the Stockton Airport to the EPA Region 9 Laboratory in Richmond, California. Sample shipment information was phoned in daily to the EPA Region 9 sample coordinator, Mary O'Donnell, and emailed to the Region 9 RSCC email address (r9rsc@epa.gov). Chain of custody tracking report forms were generated for these samples using Forms II Lite (ver. 5.1) software.

Natural attenuation analysis sampling (SVOC, Low Level PCP, Total and Dissolved Manganese, Common Anions, Methane, Ethane, Ethene, and Total Organic Carbon) was completed in approximately 5½ days. With the exception of total and dissolved manganese samples, all of these were shipped daily to the EPA Region 9 laboratory. Sample shipment information was phoned in daily to the EPA Region 9 sample coordinator, Mary O'Donnell, and emailed to the Region 9 RSCC email address (r9rsc@epa.gov). Chain of custody tracking report forms were generated for these samples using Forms II Lite (ver. 5.1) software.

Total and dissolved manganese samples were sent daily via FedEx station at the Stockton Airport to the Bonner Analytical Testing Company (Contract Laboratory Program (CLP) laboratory). Sample shipment information was emailed to David Garey, the CLP Coordinator

for EPA Regions 7 and 9, each day samples were shipped to the CLP laboratory. Chain of custody tracking report forms were generated for all samples using Forms II Lite (ver. 5.1) software as required by the CLP. Copies of the chain of custody records are included in Appendix E.

3.1.6 Water Level Measurement Methods

Water levels were measured as a stabilization parameter during purging. Additionally, the static water levels in all monitoring wells were measured after sampling was completed to monitor groundwater gradients and flow directions (Appendix D). Interpretations from Round 12 groundwater level monitoring are provided in Section 4.1.

Water levels were measured in each well during low-flow purging to monitor and control drawdown. If a water level drawdown of more than 0.3 feet is observed, the pumping rate would be lowered to counteract the drawdown. Controlling drawdown through static water level measurements can minimize the mixing of stagnant casing water with formation water. The static water level readings during purging were recorded on the MicroPurge/Low Flow Sampling log sheets included in Appendix B. Round 12 observations indicate only minor drawdown at well MW-8C with no other problems noted with the exception of well MW-7D. At well MW-7D, over 1.0 foot of drawdown was measured by the field sampling team until they could reduce the pump flow rate to correct the dropping water level.

The USACE field sampling team used a portable Slope Indicator water level meter for static water level measurements in each well during purging, and for static water level measurements in all wells at the completion of the sampling round. The portable Slope Indicator Company water level meter, which consisted of a 0.375-inch diameter stainless steel sensor, was lowered until an audible and visual signal was produced, indicating contact with water. A narrow 0.25-inch diameter electrical cable line, which was used to lower and raise the sensor probe, was permanently marked in feet and tenths with markings every 0.01 feet for measurement. Readings were measured (to the nearest 0.01 feet) from top of the well casing.

3.1.7 Equipment Calibration

Prior to commencing the daily field sampling, water quality parameter measurement probes were checked for calibration according to specific protocols in the vendor's instruction manuals and the Seattle District's low-flow standard operating procedures. Calibration procedures involved testing each individual probe element with a NIST standard (or water vapor in the case of dissolved oxygen calibration) to ensure the probes had not drifted out of the calibration range. Only the turbidity meter calibration could be adjusted to the standard. The pH, temperature, conductivity, dissolved oxygen, and ORP probes could only be tested to see if they held calibration. All field probes passed the daily calibration protocols without incident during the Round 12 sampling event.

3.1.8 Disposition of Investigative Derived Waste

Daily collected purge water and decontamination water were containerized in spill-proof five gallon water storage jugs. The water was then transferred to and discharged onto a concrete lined pit located within the former pole wash area and allowed to evaporate, per established standard operating procedures. All spent personal protective equipment was packaged in plastic garbage bags and disposed in the site's solid waste bin.

3.2 Analytical Methods

Groundwater samples were analyzed using field test kits as well as conventional techniques at fixed-based laboratories.

3.2.1 Field Analysis

In addition to parameters used to confirm stabilization during purging, additional parameters (dissolved oxygen, carbon dioxide, and total and ferrous iron) were measured using Hach® and CHEMets® field test kits to assist in an evaluation of natural attenuation processes. A summary of the field testing program is given in Table 3-2. Results from Hach® and CHEMets® field tests are presented in Appendix B.

3.2.2 Fixed Laboratory Analysis

Samples were collected by USACE and analyzed by the EPA Region 9 Laboratory of Richmond, CA, and Bonner Analytical Testing Company of Hattiesburg, MS. Groundwater samples, field duplicates, matrix spikes/matrix spike duplicates, and trip blanks were submitted to the laboratories for analysis. Samples were analyzed for the following parameters:

- Semivolatile organic compounds by USEPA Method SW8270C,
- Polynuclear aromatic hydrocarbons by USEPA Method SW8270C – Modified for select ion monitoring (SIM),
- Pentachlorophenol by USEPA Method SW8270C – Modified,
- Methane, ethene, and ethane by Kampbell, D.H. et. al., [1989] (RSK 175),
- Total and dissolved manganese by USEPA Contract Laboratory Program Statement of Work ILM05.3,
- Anions by USEPA Method 300.0, and
- Total organic carbon by USEPA-NERL Method 415.1.

Not all samples were analyzed for each parameter. A summary of the fixed laboratory program is given in Table 3-3.

3.3 Data Quality Summary

This section summarizes the quality assurance/quality control (QA/QC) review of the analytical results for groundwater samples collected during the April – May 2006 sampling event.

The desk-top data review was performed in accordance with criteria set-forth in the project-specific Sampling and Analysis Plan (SAP) (USACE 2001c). The data were validated in accordance with USEPA CLP National Functional Guidelines for Organic Data Review, EPA-540/R-99/008, October 1999 and USEPA CLP National Functional Guidelines for Inorganic Data Review, EPA-540-R-04-004, October 2004. It should be noted the desk-top data review did not include an evaluation of sample collection procedures or field sampler's notes.

All samples collected were subject to a QA/QC review of representativeness, accuracy, precision, comparability, sensitivity, and completeness including:

- Chain-of-custody, holding time, and preservation
- Instrument calibrations
- Instrument tuning
- QC Blanks (Method, Calibration, and Trip)
- Surrogate recoveries
- Internal standards
- Matrix spikes
- Blank spikes (or Laboratory Control Samples)
- Field duplicate samples
- Compound identification
- Reporting limits

Qualifiers that may be assigned to data include:

- U - The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
- J - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
- UJ - The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
- R - The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.
- D – Sample result reported from a secondary dilution.

Qualification modifies the usefulness of the individual values to which they are assigned. Estimated values are still usable. Sample results requiring qualification based on this review are

summarized in Table 2, Summary of Qualified Data of the individual desk-top review reports (Appendix F). Results were evaluated to determine how well the sampling and analysis process met the project data quality objectives. Overall, project data quality objectives were met and the data, as qualified, are acceptable for project uses, except where rejected. Data quality issues that affect the uncertainty associated with specific data sets are presented below.

3.3.1 Representativeness

Data representativeness is the degree to which data accurately and precisely represent the system under study. It is a function of sampling site selection, sampling methods, and analytical techniques specified in the sampling program. It is evaluated qualitatively through review of sample collection and handling methods and quantitatively through the analysis of blanks.

Chain-of-Custody

Samples were submitted to the laboratory under chain-of-custody procedures established in the SAP. Discrepancies to chain-of-custody or preservation procedures and associated qualifiers are summarized below.

SVOCs, PAHs, PCP, RSK-175, Anions, and TOC: The cooler temperatures associated with samples DSW3B12, DSW3C12 (plus field duplicate 5DSW10C12), and 7MW812 (RSK-175 only) (collected on April 28, 2006) were above the QC limits of $4 \pm 2^\circ\text{C}$, which ranged from 7°C to 12°C . The samples were recollected (except for the trip blank) on May 2 and 3, 2006, with cooler temperatures within QC limits. The laboratory analyzed the samples from each collection date, with comparable results. Even though the elevated cooler temperatures did not appear to have a significant impact on the initial analysis data, it was still deemed less usable, thus, it was rejected. The recollected data are considered more usable, except for the PAH analysis of sample DSW3C12, where the method blank exhibited contamination for phenanthrene, fluorene, and pyrene. As a result, the initial analysis data for sample DSW3C12 is considered more usable, since PAHs are not expected to significantly degrade due to elevated cooler temperature, therefore, no qualification of the data was necessary.

Manganese by CLP SOW ILM05.3: The cooler temperatures associated with groundwater samples DSW3B12, DSW3C12 (plus field duplicate 5DSW10C12) (all collected on April 28, 2006) and all samples collected from May 1 to 4, 2006, were above the QC limits of $4^\circ\text{C} \pm 2^\circ\text{C}$, which ranged from at 6.5°C to 16.5°C . The total and dissolved manganese results for all affected samples were qualified as estimated and flagged "J" or "UJ".

For sample A612, the time of collection on the chain-of-custody form (i.e., 08:42) did not match the sample container (i.e., 08:24). No qualification was necessary.

PAHs by 8270 SIM: The date of collection for sample MW7D12 was documented as April 27, 2006 on the chain-of-custody form, and as May 1, 2006, on the sample container. The laboratory reported the date from the sample container in the data package, which is consistent with the other fractions.

Dissolved Gases by RSK-175: The data for trip blank 7MW812, that is associated with the initial analyses of groundwater samples DSW3B12, DSW3C12 (plus field duplicate 5DSW10C12), were rejected and flagged “R”, because the associated groundwater samples were deemed unusable.

Holding Times

All project samples were extracted/analyzed within the technical holding times with the exceptions noted below. These holding time exceedances are not indicative of an ongoing precision problem; therefore, the observed holding time exceedances have not severely affected data usability.

PAHs by 8270 SIM: The laboratory believes that sample MW6E12 was inadvertently not spiked with surrogate compounds, as evident from the zero percent recoveries. The sample was re-extracted, but it was performed 14 days past technical holding time (i.e., 7 days from date of collection). The re-extraction data were not rejected due to the extended holding time because the detected concentrations are at levels similar to the initial analysis, hence, the extended holding time did not significantly jeopardize the representativeness of the data. Instead, the re-extracted data were qualified as estimated and flagged “J” or “UJ”, except for naphthalene because it was reported from the SVOC analysis.

PCP by 8270 Modified: The initial analysis of sample MW6E12 exhibited zero percent surrogate recovery for 2,4,6-tribromophenol, due to a laboratory extraction error (i.e., sample not spiked with surrogate compound). The sample was re-extracted 14 days outside technical holding time (i.e., 7 days from date of collection). The PCP result was qualified as rejected and flagged “R” since no PCP was detected in the sample.

3.3.2 Accuracy

Accuracy is the comparison of a measured value with the true or expected value of the measured quantity. It is an assessment of the bias or systematic error of the entire data collection process. It is evaluated quantitatively through the analysis of blanks, calibration standards, PE samples, and blank, matrix, and surrogate spikes. It also is evaluated by examining instrument calibration and internal standards to determine analytical bias. Sampling accuracy is measured as the percent recovery of spiked compounds, surrogate compounds, and PE sample compounds.

Instrument Calibration

Instrument tuning standards, initial calibrations (ICALs), and continuing calibration verifications (CCVs) were analyzed at the proper frequency and at the appropriate concentrations required by the individual methods. The calibration acceptance criteria were evaluated by assessing the average relative response factor (RRF) and percent relative standard deviation (%RSD) for the ICAL, and the RRF and percent difference (%D) for the CCV. All instrument calibration results were within the method QC limits and EPA data validation criteria for the target compounds of concern except for the following.

SVOCs by 8270C: The %D for benzyl alcohol was greater than 25% in one or more CCVs. Associated results (all non-detect) were qualified as estimated and flagged “UJ”.

Review of Method Blanks

Quality Control blank samples are analyzed to monitor contamination during the course of sample collection, handling, shipping, storage, and analysis. Method, calibration, and trip blanks were analyzed. Compounds of concern were not detected in any of the blanks analyzed during the sampling event, except as noted below.

SVOCs by 8270C: The target compound bis(2-ethylhexyl)phthalate was detected in the method blanks associated with SDG Nos. 06115A and 06124C. The affected sample results were qualified as non-detect and flagged “U” at either the reported result or at the quantitation limit (QL).

PAHs by 8270 SIM: Naphthalene, acenaphthene, phenanthrene, flouranthene, and pyrene were detected in the method blanks associated with SDG Nos. 06121B and 06124C. The affected sample results were qualified as non-detect and flagged “U” at the QL.

Dissolved Gases by RSK-175: Methane was detected in trip blanks 7MW612 and 7MW712. Methane results for sample A612 were qualified non-detect and flagged “U” at the QL.

Surrogate Recovery Review

Each SVOC, PAH, PCP, and RSK-175 sample was spiked with surrogates (extraction monitoring compounds) prior to analysis. Surrogate recoveries were within the control limits, with the following exceptions.

SVOCs by 8270C: Samples 5DSW9C12, DSW1C12, and MW4E12 exhibited high base neutral (BN) surrogate recoveries, while sample DSW1C12 exhibited high and low BN surrogate recoveries. The detected results for one or more of the following target compounds were qualified as estimated and flagged “J”: acenaphthene, dibenzofuran, fluorene, phenanthrene, and carbazole.

PCP by 8270 Modified: Several samples exhibited elevated surrogate recoveries, but those target analytes associated with the affected analyses were non-detect. Therefore, no qualification of the data was necessary.

Internal Standard Recovery

Each SVOC, PAH, and PCP sample was spiked with internal standards (IS) prior to analysis. Internal standard recoveries were within the control limits (area count -50% to +100% and retention time within ± 0.50 minute of CCAL). The internal standard recoveries for all samples reviewed were within laboratory control limits, except for the following.

SVOCs by 8270C: The IS percent recovery for naphthalene-d8 was <50% for samples DSW6C12, 5ONS5D12, ONS1C12, DSW5B12, 5DSW9C12, DSW1C12, MW4E12, and MW7D12. Associated detected results were qualified as estimated and flagged with a “J”, non-detected results were flagged “UJ”.

PAHs by 8270 SIM: The IS percent recovery for perylene-d12 was <50% for sample DSW2E12. The IS percent recovery for naphthalene-d8 was <50% for samples OFS4A212 and MW10B12. Associated detected results were qualified as estimated and flagged with a “J”, non-detected results were flagged “UJ”.

Matrix Spike/Matrix Spike Duplicate Review

Matrix spike/matrix spike duplicates (MS/MSDs) were analyzed for SVOC, PAH, PCP, manganese, and RSK-175. The frequency requirement of 5 percent was met. No data require qualification based on MS/MSD percent recoveries.

Laboratory Control Sample (LCS) Review

LCS (or blank spike) analyses were used to assess laboratory accuracy. At least one LCS and/or an LCS Duplicate were analyzed per analytical batch, meeting project frequency requirements. LCS data presented and reviewed for these sample delivery groups are within control limits with the exceptions noted below. Results are random and do not indicate systematic analytical error during the analysis.

SVOCs by 8270C: The percent recoveries for 2-chlorophenol, 1,3-dichlorobenzene, 1,4-dichlorobenzene, 1,2-dichlorobenzene, 2-methylphenol, hexachloroethane, 2-nitrophenol, 1,2,4-trichlorobenzene, and hexachlorocyclopentadiene in the blank spike associated with samples 5ONS5D12, ONS1C12, ONS1D12, MW3E12, and OFS3B12 were below QC limits. Non-detected results in the associated samples were qualified as estimated and flagged “UJ”.

The percent recovery for hexachlorocyclopentadiene in the blank spike associated with samples MW7D12, DSW2E12, MW5E12, DSW7C12, MW6E12, OS1E12, OS1C12, OS4A12, OS5D12, OS4B12, and DSW3B12 was zero percent. Non-detected results in the associated samples were qualified as rejected and flagged “R”.

The percent recoveries for bis(2-chloroethoxy)-methane, 3-nitroaniline, diethylphthalate, 4-nitroaniline, and carbazole in the blank spike associated with samples MW7D12, DSW2E12, MW5E12, DSW7C12, MW6E12, OS1E12, OS1C12, OS4A12, OS5D12, OS4B12, and DSW3B12 were below QC limits. Non-detected results in the associated samples were qualified as estimated and flagged “UJ”, detected results in the associated samples were qualified as estimated and flagged “J”.

PAHs by 8270 SIM: The percent recovery for acenaphthene in the blank spike associated with samples MW3E12 and OFS3B12 was below QC limits. Non-detected results in the associated samples were qualified as estimated and flagged “UJ”.

TOC by 415.1: The percent recovery for TOC in the blank spike associated with samples ONS1C12, ONS1D12, and DSW5B12 was above QC limits. Detected results in these samples were qualified as estimated and flagged “J”.

Performance Evaluation (PE) Sample Review

No PE samples were collected during this sampling event.

3.3.3 Precision

Precision is the mutual agreement among individual measurements of the same property and is a measure of the random error component of the data collection process. The overall precision of the data is the sum of the sampling precision and analytical precision. The sampling precision is measured as the relative percent difference (RPD) between primary and field duplicate results. The analytical precision is measured as the RPD or coefficient of variation between analytical laboratory duplicates and between the MS and MSD analyses.

Field Duplicate Review

One blind field duplicate should be collected and analyzed at a rate of 10% of the field samples and exhibit acceptable precision. The project-specific precision criterion for aqueous samples is a RPD of $\pm 30\%$. The blind field duplicates generally exhibited RPDs $\pm 30\%$ for results at or above the quantitation limits. USEPA National Functional Guidelines do not require data qualification for field duplicate precision.

Laboratory Duplicate Review

One matrix duplicate should be collected and analyzed for inorganic parameters at a rate of 10% of the field samples and exhibit acceptable precision. The project-specific precision criterion for aqueous samples is a RPD of $\pm 20\%$. The matrix duplicates exhibited RPDs $\pm 20\%$ for results at or above the quantitation limits. No qualification was necessary based on duplicate precision results.

3.3.4 Comparability

Comparability is a measure of the confidence with which one data set can be compared to another data set, data from similar studies, reference values (such as background), reference materials, and screening values. Comparability is achieved through the use of standard sampling techniques and EPA-approved analytical methods. Reporting of data in units consistent with other organizations also ensures comparability. The groundwater monitoring data met comparability requirements.

3.3.5 Sensitivity

Sensitivity is the capability of a method or instrument to discriminate between measurement responses representing different levels of a variable of interest. Sensitivity is determined from

the value of the standard deviation at the concentration level of interest. It represents the minimum difference in concentration that can be distinguished between two samples with a high degree of confidence.

SVOCs by 8270C: All reported analytical results were consistent with SAP requirements, except for the following instance. Several samples required secondary dilutions due to linear range exceedances occurring in the undiluted analyses. The laboratory reported only one result for each target compound on the analytical summary form (i.e., Form 1), and did not qualify which results are associated with the secondary dilutions (i.e., flagged “D”). However, after review of the QL, the affected target compounds were identified accordingly. During the desk-top review, a “D” qualifier was added to each target compound result determined from a secondary dilution analysis.

Dissolved Gases by RSK-175: Several samples required secondary dilutions for methane. The affected methane results were flagged “D” (result reported from a secondary dilution) on the analytical summaries.

Anions by 300.0: The nitrite QL were elevated due to matrix interference from high levels of chloride (i.e., >50 mg/L) present in the samples. The nitrite results were qualified as estimated (“UJ”). The chloride results for all samples except 5OFS8A12 and OFS4A112, and nitrate and sulfate for select samples, were flagged “D”, indicating the results were determined from a secondary dilution.

Reporting Limits

For this sampling event, all groundwater samples were analyzed for PAHs – SIM in the event the corresponding full SVOC results were non-detect (“U”). This allows for the lowest possible QL to be achieved, per the project-specific data quality objectives. The following data reduction procedure was performed during the desk-top review in order to obtain one set of PAH results for each sample. The PAH – SIM analyses were generally reported in their entirety, except for instances where the corresponding PAH results from the full SVOC scan were at or above the QL (within the linear range of calibration), whereupon the associated PAH – SIM results were crossed out on the analytical summaries.

3.3.6 Completeness

Completeness for usable data is defined as the percentage of usable data out of the total amount of data generated. Valid data are measurements that are considered acceptable based on the QA/QC review. Completeness for all analyses performed during the April-May 2006 sampling event was 100%, with the exceptions of SVOCs (99.7%), and PCP (97.7%). The project completeness goal of 95 percent has been met for the project to date.

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4.0 Results

Groundwater elevation data for the period April 2005 to May 2006 are included in Appendix D. Chemical analysis results for the 2006 annual sampling event are presented in Tables 4-1 and 4-2. Chemical analysis results for all of the sampling rounds from 1998 through 2006 are included in Appendix G.

4.1 Groundwater Elevation Data and Flow Directions

The following general statements can be made for the five aquifer zones for the April-May 2006 sampling event:

- Groundwater elevations for the B-, C-, D-, and E-zones are, on average, 1.8 ft higher than April-May 2005. The A-zone average groundwater elevation is approximately 1.5 ft higher than a year ago.
- Based on aquifer zone averages, the prevailing vertical gradient is downward.
- In the A-zone, groundwater flows to the southeast and east in a manner consistent with recent historical flow directions (Figure 4-1).
- The B-zone exhibits an easterly to southerly groundwater flow direction, which is typical of the historical dry season pattern (Figure 4-2).
- The C-zone exhibits a northeasterly to northerly groundwater flow direction (Figure 4-3), which, based on monitoring over 2005 and 2006, seems to precede the very disordered potentiometric surface observed during the dry months of June, July, and August.
- Typical of historical patterns, the D-zone potentiometric surface displays flow generally to the south and southeast (Figure 4-4).
- The E-zone is characterized by a fairly uniform north-northeasterly flow direction (Figure 4-5).

Based on gradients determined from the potentiometric surface maps, groundwater velocities have been calculated using the following relationship:

$$v = Ki/n_e,$$

where v is velocity, K is hydraulic conductivity, i is hydraulic gradient, and n_e is effective porosity. Results are presented in the table below, with comparisons to the average gradients and velocities determined during 2005-2006.

Aquifer Zone	May 2006 Gradient	Average Gradient	Hydraulic Conductivity (ft/day)	May 2006 Velocity (ft/day)	Average Velocity (ft/day)
A	0.0030	0.0022	23	0.28	0.20
B	0.0021	0.0014	19	0.16	0.10
C	0.0004	0.0003*	43	0.07	0.05
D	0.0006	0.0005	12	0.03	0.02
E	0.0006	0.0006	136	0.31	0.34

n_e assumed to be 25% for all aquifer zones

* April, May, September, and November used to calculate average gradient

It is worth noting that even in the E-zone, where velocities are greatest, groundwater travels only 4 inches in a day or roughly 120 feet in a year.

4.2 Analytical Results

Groundwater analytical data for sampling conducted during 2006 are summarized in Tables 4-1 and 4-2.

4.2.1 PAH

Due to its high concentration in creosote and its higher solubility relative to other PAH, naphthalene has been used historically to map the maximum extent of PAH dissolved in groundwater. Although data from the 2006 sampling event confirm that naphthalene is not necessarily the most mobile PAH, there are very few instances where a PAH is detected in the absence of naphthalene. However, concentrations of low molecular weight PAH (LPAH), such as acenaphthene, 2-methylnaphthalene and phenanthrene, may exceed that of naphthalene, particularly when naphthalene concentrations are less than 15 micrograms per liter ($\mu\text{g/L}$). High molecular weight PAH (HPAH), such as benzo(a)pyrene, are much more limited in extent, presumably due to their lower solubilities and higher adsorption coefficients.

LPAH

Naphthalene and acenaphthene are present in groundwater in all aquifer zones investigated at the site. The distribution of naphthalene in each zone is shown in Figures 4-6 through 4-10. Acenaphthene distribution is shown for the B-, C-, and D-zones (Figures 4-11 through 4-13), where acenaphthene has a larger dissolved-phase extent than naphthalene. These figures were constructed using data from wells sampled in 2006, but also taking into account historical data from wells in the most heavily contaminated areas of the site. Recent sampling has focused less on areas with high dissolved-phase contamination than on peripheral areas that are more relevant to delineation of extent of contamination. In general, concentrations are greatest where NAPL is known or suspected to exist, and concentrations decrease rapidly within a relatively short distance (hundreds of feet) from source areas.

Naphthalene has been observed sporadically in all three wells at the OFS-5 location (which is across Mormon Slough north of the site) since the 2003 sampling event. These detections are not easily attributable to source areas at the site, based on current knowledge. It is possible that trace concentrations of some PAH represent background levels reflecting many years of industrial activity around Stockton.

Naphthalene was detected in 6 of the 13 A-zone wells sampled (Figure 4-6), with minor changes from 2005. With detection limits below $0.1 \mu\text{g/L}$, it is anticipated that fluctuation above and below that level will be common in wells near the margin of the dissolved-phase plume. Within (or near) the footprint representing known or suspected NAPL source areas, naphthalene was detected in wells A-6 ($2.2 \mu\text{g/L}$) and SW-187A ($2.0 \mu\text{g/L}$). Naphthalene was detected in locations outside of known source areas at the following wells: $0.53 \mu\text{g/L}$ at A-7, $0.28 \mu\text{g/L}$ at OFS-4A2, and estimated at $<0.1 \mu\text{g/L}$ at A-4, DSW-7A, and OFS-5A. Naphthalene was not detected at OFS-

1A, OFS-3A, OFS-4A1, OS-4A, SW-182A, and SW-61A. The detection of naphthalene in SW-182A in 2005 was not repeated this year, and the 2005 result represents the only time naphthalene has been found in this well. Despite the numerous detections at low levels, naphthalene distribution in the A-zone is well constrained as shown by the number of wells situated around, and down-gradient of, NAPL source areas. The only noteworthy occurrence of acenaphthene in the A-zone is at SW-187A, with a detection of 300 µg/L. Of all A-zone wells currently being monitored, the acenaphthene detection at SW-187A is the highest of any PAH.

Naphthalene was detected in five of eight B-zone wells sampled, although with only one exception (well DSW-5B at 2,200 µg/L), the detections were low (Figure 4-7). After an excursion during 2003 to slightly higher concentrations, naphthalene in well DSW-5B has dropped to a level more typical of recent history. In known or suspected source areas, such excursions in dissolved-phase concentrations are not considered statistically significant unless confirmed by successive sampling events. Monitoring well MW-10B, installed during 2003 to define the southern edge of the plume, had naphthalene reported at 0.14 µg/L, whereas OFS-3B, roughly 200 feet further south, had a result of 0.3 µg/L. The other well installed during 2003, MW-9B, contained 1.6 µg/L naphthalene (down from 21 µg/L in 2003). Naphthalene was not detected in the furthest well down-gradient, OS-4B (<0.14 µg/L). Given the low concentrations in wells MW-9B, MW-10B, and OFS-3B, the southern extent of naphthalene is not perfectly defined, but it seems unlikely that it extends much further south or southeast. Lateral extent of naphthalene is reasonably well constrained to the northeast by the absence of detections in well DSW-1B (<0.22 µg/L) and well DSW-7B (<0.05 µg/L).

While distribution of naphthalene is generally well constrained in the B-zone, acenaphthene appears to exhibit greater than expected mobility, demonstrating that the limits of the dissolved-phase PAH plume have not been defined. An acenaphthene concentration of 55 µg/L in well MW-9B implies greater southward migration of the dissolved-phase plume than indicated by naphthalene (Figure 4-11). As with naphthalene, though, concentrations have decreased from a high of 180 µg/L since 2003. Similarly, a detection of acenaphthene at 41 µg/L in well DSW-1B indicates greater extent to the northeast. None of these acenaphthene concentrations exceeds the preliminary groundwater cleanup level of 370 µg/L identified in the Feasibility Study (ICF Kaiser 1999). Concentrations approaching the cleanup level were observed in 2006 at DSW-3B (270 µg/L) and DSW-5B (320 µg/L). Historically, concentrations greater than 370 µg/L have been noted in wells in, or near, NAPL source areas on the property.

Naphthalene was detected in 10 of 12 C-zone wells sampled (Figure 4-8). Concentrations in wells DSW-1C (10,000 µg/L) and ONS-1C (17,000 µg/L) remain at levels suggestive of proximity to a NAPL source. Well MW-8C (1,100 µg/L) decreased from a concentration of 4,200 µg/L in 2005 and is down considerably from 6,400 µg/L in 2004. Naphthalene in well DSW-6C, near the southwestern property boundary, exhibited a marked increase to 3,200 µg/L from 710 µg/L last year and is now above the maximum observed during the last ten years of 2,200 µg/L. Aside from these four wells, all other wells contained less than 1 µg/L naphthalene. Acenaphthene continues to be observed in the down-gradient well OS-1C (2.2 µg/L; Figure 4-12), but concentrations have changed little for at least 10 years.

Naphthalene was detected in seven of eight D-zone wells sampled (Figure 4-9). The concentration of naphthalene in ONS-1D (1,800 µg/L) is slightly lower than concentrations observed over the last three years (2,500-3,000 µg/L). However, along the southeastern property boundary, where well MW-7D was installed, concentrations have decreased to 1,000 µg/L since 2003. Other wells, including DSW-1D (67 µg/L), ONS-2D (2.6 µg/L), OFS-1D (0.036 µg/L), OFS-4D (4.3 µg/L), and OS-5D (<0.44 µg/L), show little change from 2003 and remain at relatively low levels. Concentrations in DSW-4D (560 µg/L) have risen over the last three years from 6 µg/L. Given the high concentrations at well MW-7D, it appears likely that the plume continues off-property for some distance to the southeast of well MW-7D. The presence of acenaphthene in well OS-5D (7.5 µg/L) indicates that some dissolved-phase constituents have migrated further down-gradient (Figure 4-13).

Naphthalene was detected in six of the eight E-zone wells sampled. The E-zone has historically had two loci of contamination: wells MW-4E and OFS-4E. Concentrations of naphthalene in well MW-4E remain high at 12,000 µg/L (Figure 4-10). The other area of contamination, near well OFS-4E, continues to exhibit decreasing naphthalene concentrations. From an historical high of greater than 3,500 µg/L in 1995-1996, naphthalene has remained at or below 1 µg/L for the past three years. The highest acenaphthene concentration detected was 290 µg/L at MW-4E (Table 4-1). Aside from OFS-4E at 12 µg/L, all other detections were below 10 µg/L. Originally considered to be down-gradient of MW-4E based on historical flow directions to the east, wells MW-6E and DSW-2E are likely down-gradient of OFS-4E. A revision in interpretation of E-zone groundwater flow directions means that there is uncertainty about the extent of contamination down-gradient of MW-4E, where there is no monitoring well coverage. This greater than usual uncertainty is reflected in the use of question marks in Figure 4-10.

HPAH

Because reliance on naphthalene as an indicator of PAH presence recently came into question, low-level analytical methods were adopted in 2004 to allow detection of HPAH at or below the EPA's Maximum Contaminant Level (MCL) of 0.2 µg/L for benzo(a)pyrene. Of the HPAH, benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, and dibenzo(a,h)anthracene, were detected. Out of 49 wells sampled, HPAH were found in six wells. See Table 4-1 for HPAH results.

In the A-zone, benzo(a)anthracene was detected in well SW-187A (0.065 µg/L). Chrysene was also detected in this well (estimated at 0.041 µg/L).

The B-zone had a single detection of benzo(a)anthracene at well DSW-1B (estimated at 0.056 µg/L).

HPAH were found in four C-zone wells: benzo(a)anthracene (0.39 µg/L), benzo(b)fluoranthene (estimated at 0.028 µg/L), and chrysene (0.24 µg/L) in ONS-1C; benzo(a)anthracene (estimated at 0.039 µg/L) and chrysene (estimated at 0.041 µg/L) in DSW-6C; benzo(a)anthracene (estimated at 0.031 µg/L) in DSW-1C; and benzo(b)fluoranthene (0.055 µg/L), benzo(k)fluoranthene (0.057 µg/L), chrysene (estimated at 0.056 µg/L), and dibenzo(a,h)anthracene (estimated at 0.027 µg/L) in OFS-5C.

HPAH were not detected in D- or E-zone wells.

4.2.2 PCP

PCP contamination of groundwater is essentially restricted to the A-zone, where it was detected in three out of 12 A-zone wells, compared to one out of 36 wells in the other four aquifer zones. Wells currently monitored that are in, or near, NAPL source areas, continue to exhibit dissolved-phase concentrations well above the MCL of 1 µg/L. Examples include SW-182A at 260 µg/L, A-6 at 760 µg/L, and SW-61A at 32 µg/L (Figure 4-14). Temporal trends are difficult to discern in these wells, because PCP concentrations appear to fluctuate randomly over several hundred µg/L. Wells OFS-1A, OFS-3A, OFS-4A1 and OFS-4A2, located off-property to the south, clearly constrain the limits of southward migration of the PCP plume, while A-7 and DSW-7A serve a similar purpose to the east. Southward migration of PCP is probably limited by groundwater flow directions, which tend to parallel the property boundary.

Aside from the A-zone, PCP was reported in only one other well, ONS-1C in the C-zone, at 2.4 µg/L (Figure 4-15). No detections have been reported in off-property wells.

4.2.3 Biogeochemical Conditions

Biogeochemical parameters can be used as a line of evidence to assess natural attenuation of groundwater contaminants. Sampling and analysis for the various electron acceptors (i.e., dissolved oxygen, nitrate, sulfate) and products of microbial respiration (i.e., Fe II and methane) in select monitoring wells began during the 1999 NAPL investigation. As organic contaminants biodegrade, levels of electron acceptors decline. Zones where electron acceptors are depleted, relative to background, usually represent areas where contaminant degradation is occurring (or has occurred). Up-gradient levels of electron acceptors can be used to estimate the assimilative capacity of an aquifer for removal of organic contaminants. Because of the importance of understanding biogeochemical conditions in assessing current natural attenuation processes, a summary of current conditions is provided below for each groundwater zone in the subsurface.

Dissolved oxygen is essentially depleted in all five groundwater zones. Based on test kit data, the highest DO level was 3.5 mg/L in well MW-7D, but this result is not consistent with historical detections or with the result obtained from the flow-through cell (0.5 mg/L) during purging (Table 4-2). Aside from MW-7D, the highest DO concentration was 1.5 mg/L in OS-4A. The majority of DO levels were less than or equal to 0.5 mg/L, which indicates that aerobic respiration is not a significant process. Fe II and Mn II levels are generally too low for Fe III or Mn IV reduction to be considered significant. The highest Fe II level detected in the 2005 sampling event was 1.2 mg/L at well OS-4B (all others were less than 1 mg/L). The highest Mn IV level detected in 2006 was 390 µg/L at well OS-1C.

Evidence indicates that biodegradation of PAH and PCP under aerobic, manganese-, or iron-reducing conditions will not be significant. Furthermore, it is believed that essentially all of the bioavailable Fe III and Mn IV that was originally present in the contaminated zone of the aquifer

matrix has probably been depleted due to the NAPL (i.e., a continuing source of electron donor), and because of the number of years that the aquifers have been exposed to the contaminants.

Results from sampling and analysis for sulfate, nitrate, and methane in 2006, as well as historical trends for select wells, are shown in Figures 4-16 through 4-26.

A-Zone

The highest concentrations of sulfate are found in the A-zone aquifer, ranging from 40 to 220 mg/L (Figure 4-16). The lowest historical sulfate detection in the A-zone was 24 mg/L (in 1999, but not sampled since) at well DSW-7A (on the down-gradient side of the plume). From the 2006 sampling event, A-zone nitrate concentrations range from 29 mg/L to less than 0.1 mg/L (reporting limit). In some areas near the center of the naphthalene and PCP hot spots, concentrations of sulfate and nitrate are higher than at up-, down- or cross-gradient locations (Figures 4-16 and 4-17). Inhibition of nitrate- and sulfate-reducing bacteria may partially explain these elevated sulfate and nitrate levels. Proximity to NAPL and high PCP levels may be responsible for microbial inhibition. Geochemical data indicate that nitrate- and sulfate-reduction are the dominant microbiological processes in the A-zone. From 1999 to 2006, sulfate levels generally appear to be stable. The only exception is well OS-4A, where sulfate appears to have declined from 200 to 40 mg/L. A sample from well A-6, at the leading edge of the A-zone NAPL contamination, had non-detectible levels of methane (Figure 4-18). Recent sampling for dissolved gases in off-property monitoring wells indicates non-detectible to very low levels of methane.

B-Zone

Nitrate was only detected in one B-zone well during 2006 (an estimated 0.08 mg/L in MW-9B). In wells currently monitored, sulfate concentrations range from a high of 100 mg/L (OS-4B) to non-detect (Figure 4-19). Methane concentrations range from 16,000 to 37 µg/L (Figure 4-20). Thus, sulfate-reduction and methanogenesis appear to be the dominant microbial processes in the B-zone. It appears that methanogenic conditions are present near the south side of the Old Mormon Slough, and that there is some methanogenic activity within the hot spot area of the naphthalene plume. A sulfate-depleted zone extends from suspected NAPL source areas down-gradient to MW-9B.

Based on data going back to 1998, there appears to be an inverse correlation between methane and PCP concentrations in the B-zone (PCP was not detected in wells where methane was greater than 310 µg/L). In wells where high concentrations of methane have been detected, PCP usually appears to be nearly depleted or absent. The data suggest that methanogenic biodegradation of PCP may be occurring, limiting PCP concentrations.

Over the past several years, substantial increases in methane concentrations were observed in two wells (DSW-3B and DSW-5B) that could be compared, while concentrations decreased in one well (MW-9B). Sulfate concentrations appeared to be stable in the wells that could be compared (two of which, DSW-3B and DSW-5B, are consistently less than the reporting limit).

C-Zone

Nitrate and sulfate are essentially depleted in the C-zone. The only exception is the cross-gradient well, OFS-5C, where sulfate was detected at 65 mg/L (Figure 4-21). Except for well OFS-5C, all C-zone wells tested exhibited strongly methanogenic conditions (Figure 4-22). Excluding well OFS-5C (14 µg/L), the lowest methane concentration detected was 2,300 µg/L (OS-1C).

Methane concentrations greater than 200 µg/L are generally considered strong evidence of methanogenic conditions (Wiedemeier and Chappelle, 1998). Some of the highest methane concentrations were detected within the hot spot of the naphthalene plume. In some respects this is surprising since methanogenic biodegradation of PAHs has not been documented in the literature. However, it is possible that other hydrocarbon compounds that were released at the site are supporting the methanogenic population. Methanogenic conditions appear to span both ends of the naphthalene plume, and to prevail all the way across the site, from the furthest up-gradient well (DSW-3C) to one of the most down-gradient wells (OS-1C). Over the past several years, significant increases in methane concentrations were observed in four of the seven wells that could be compared.

D-Zone

Nitrate and sulfate are essentially depleted in the D-zone. The only notable exception is MW-7D (5.9 mg/L sulfate), which appears to be within the hot spot of the naphthalene plume (Figure 4-23).

All D-zone wells currently monitored exhibited strongly methanogenic conditions (Figure 4-24). Historically the lowest levels of methane are found in DSW-2D (25 µg/L in 2001). Excluding DSW-2D, the lowest methane level detected since 1998 was 1,000 µg/L (DSW-1D in 2001). Methanogenic conditions appear to prevail in up-gradient areas, within the naphthalene plume, and far down-gradient from the naphthalene plume. Since 2000, methane levels appear to be nearly stable in five of the six wells that could be compared, and levels in one well (ONS-1D) in the plume area increased.

E-Zone

Nitrate and sulfate (Figure 4-25) are depleted in the E-zone. All E-zone wells tested exhibited strongly methanogenic conditions (Figure 4-26). The lowest methane concentration detected in 2006 was 5,900 µg/L in OS-1E. Methanogenic conditions appear to prevail within, cross-gradient, and down-gradient from the naphthalene plume. There are not any up-gradient wells (i.e., SW side of site for this zone) that have been tested for natural attenuation parameters in the E-zone. Since 2000, a distinct increasing trend is apparent in only one well (DSW-2E), whereas other wells exhibit less distinct and variable trends.

4.3 Comparison of Results to Preliminary Cleanup Levels

Cleanup levels for groundwater have not been established for the site because a final

groundwater remedy has not been selected. In the interim, EPA's MCL are used to determine if groundwater contaminants are at concentrations of concern to human health. When MCL are not available, EPA Region 9 Preliminary Remediation Goals (PRGs) are used instead. Site groundwater data were compared to the values listed in Table 4-3. Results were compiled for each of the five aquifer zones. Data from 2006 were compiled and compared, and then all data from 1998 through 2006 were compiled and compared. Results of this comparison are tabulated in Appendix H for reference purposes only.

5.0 Summary and Conclusions

5.1 Conceptual Site Model Update

Creosote NAPL has penetrated to depths approaching, and possibly into, the E-zone aquifer. In the A-, B-, and C-zones, NAPL has migrated laterally such that it has reached the property boundary to the south and possibly continued off-property. Dissolved-phase plumes emanating from NAPL source areas are fairly limited in areal extent, but data suggest that naphthalene concentrations exceeding preliminary groundwater cleanup levels may extend several hundred feet off-property in the C-zone and D-zone. The generally limited nature of the plumes suggests that naphthalene may have been retarded by natural attenuation processes, either through adsorption or biodegradation. Sulfate, nitrate, and methane groundwater data provide evidence that active biological communities exist that may be contributing to degradation of creosote related contaminants.

Because NAPL migration from release points into soil and groundwater has had the greatest effect in producing current site conditions, it will likely continue to be the most important transport mechanism if not addressed. As long as the adsorptive capacity of the aquifer is not exceeded and electron receptor availability is not limited, natural attenuation processes may prevent the development of a significant dissolved-phase groundwater plume. Evidence from some wells suggests that the dissolved-phase PAH plume is, in fact, retreating in some areas (for example, SW-187A, DSW-1D, OFS-4D, and OFS-4E) or stabilizing in others (DSW-6C and ONS-1D). However, the longevity of conditions promoting natural attenuation is not known.

Under current conditions, there are no known local receptors down-gradient of the site utilizing groundwater as a potable water source. In fact, the City of Stockton has decreased its withdrawals from the deep aquifer to minimize eastward expansion of a saline wedge. Their actions may significantly decrease the risk posed by site-related contamination in groundwater. Utilization of groundwater from aquifers in close proximity to the site, or greatly enhanced down-gradient migration of contaminant plumes, would likely increase risk of exposure to site contaminants.

5.2 Conclusions

This report summarized results of groundwater sampling conducted in April and May 2006 at the McCormick and Baxter Superfund site. This report also updated the conceptual site model based on the 2006 sampling results. Potential data gaps have been noted in several sections of the report, but recommendations to resolve those data gaps are beyond the scope of this report and are covered in a separate preliminary draft management plan (USACE 2006 in progress). The preliminary draft management plan identifies data gaps and provides recommendations for future investigations to support an evaluation of monitored natural attenuation as a remedial alternative for the site. Although the management plan has not been finalized, it is anticipated that groundwater sampling will occur semi-annually for the next two years. Uncertainties about extent of contamination in several aquifer zones are being addressed by installation of additional monitoring wells in the fall of 2006.

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6.0 References

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TABLES

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Table 3-2 Groundwater Sample Testing - Field Analysis

Location	Redox Potential	pH	Temperature	Specific Conductivity	Dissolved Oxygen		Turbidity	Carbon Dioxide	Total Iron	Ferrous Iron
	Field Meter	Field Meter		Field Meter	Field Meter	CHEMets Test Kit				
A-zone										
A-4	√	√	√	√	√		√			
A-6	√	√	√	√	√	√	√	√	√	√
A-7	√	√	√	√	√		√			
DSW-7A	√	√	√	√	√		√			
OFS-1A	√	√	√	√	√		√			
OFS-3A	√	√	√	√	√		√			
OFS-4A1	√	√	√	√	√	√	√	√	√	√
OFS-4A2	√	√	√	√	√	√	√	√	√	√
OFS-5A	√	√	√	√	√	√	√	√	√	√
OS-4A	√	√	√	√	√	√	√	√	√	√
SW-61A	√	√	√	√	√		√			
SW-182A	√	√	√	√	√		√			
SW-187A	√	√	√	√	√		√			
B-zone										
DSW-1B	√	√	√	√	√		√			
DSW-3B	√	√	√	√	√	√	√	√	√	√
DSW-5B	√	√	√	√	√	√	√	√	√	√
DSW-7B	√	√	√	√	√		√			
OFS-3B	√	√	√	√	√		√			
OS-4B	√	√	√	√	√	√	√	√	√	√
MW-9B	√	√	√	√	√	√	√	√	√	√
MW-10B	√	√	√	√	√	√	√	√	√	√
C-zone										
DSW-1C	√	√	√	√	√	√	√	√	√	√
DSW-2C	√	√	√	√	√		√			
DSW-3C	√	√	√	√	√	√	√	√	√	√
MW-8C	√	√	√	√	√	√	√	√	√	√
DSW-6C	√	√	√	√	√		√			
DSW-7C	√	√	√	√	√	√	√	√	√	√
OFS-4C	√	√	√	√	√		√			
OFS-5C	√	√	√	√	√	√	√	√	√	√
ONS-1C	√	√	√	√	√	√	√	√	√	√
ONS-2C	√	√	√	√	√		√			
OS-1C	√	√	√	√	√	√	√	√	√	√
OS-4C	√	√	√	√	√		√			
D-zone										
DSW-1D	√	√	√	√	√		√			
DSW-4D	√	√	√	√	√	√	√	√	√	√

Location	Redox Potential Field Meter	pH Field Meter	Temperature Field Meter	Specific Conductivity Field Meter	Dissolved Oxygen		Turbidity Field Meter	Carbon Dioxide Hach Test Kit	Total Iron Hach Test Kit	Ferrous Iron Hach Test Kit
					Field Meter	CHEMets Test Kit				
OFS-1D	√	√	√	√	√	√	√	√	√	√
OFS-4D	√	√	√	√	√	√	√	√	√	√
ONS-1D	√	√	√	√	√	√	√	√	√	√
ONS-2D	√	√	√	√	√		√			
OS-5D	√	√	√	√	√	√	√	√	√	√
MW7D	√	√	√	√	√	√	√	√	√	√
E-zone										
DSW-2E	√	√	√	√	√	√	√	√	√	√
MW-3E	√	√	√	√	√		√			
MW-4E	√	√	√	√	√	√	√	√	√	√
OFS-4E	√	√	√	√	√		√			
OFS-5E	√	√	√	√	√	√	√	√	√	√
OS-1E	√	√	√	√	√	√	√	√	√	√
MW-5E	√	√	√	√	√	√	√	√	√	√
MW-6E	√	√	√	√	√	√	√	√	√	√

Table 3-3 Groundwater Sample Testing - Fixed Laboratory Analysis

Location	Sample ID	Sample Type	Analytes					
			SVOC 8270C	PCP GC/MS SIM	Dissolved Gases RSK 175	Total and Dissolved Manganese EPA 200.7	Common Anions EPA 300.0	Total Organic Carbon EPA 415.1
A-zone								
A-4	A411	Primary	√					
A-6	A611	Primary	√		√	√	√	√
	5A211	Duplicate	√					
A-7	A711	Primary	√	√				
DSW-7A	DSW7A11	Primary	√	√				
OFS-1A	OFS1A11	Primary	√	√				
OFS-3A	OFS3A11	Primary	√	√				
OFS-4A1	OFS4A11	Primary	√	√	√	√	√	√
	5OFS8A11	Duplicate			√	√	√	√
OFS-4A2	OFS4A211	Primary	√	√	√	√	√	√
OFS-5A	OFS5A11	Primary	√	√	√	√	√	√
OS-4A	OS4A11	Primary	√	√	√	√	√	√
SW-61A	SW61A11	Primary	√					
SW-182A	SW182A11	Primary	√					
SW-187A	SW187A11	Primary	√					
B-zone								
DSW-1B	DSW1B11	Primary	√	√				
DSW-3B	DSW3B11	Primary	√	√	√	√	√	√
DSW-5B	DSW5B11	Primary	√	√	√	√	√	√
DSW-7B	DSW7B11	Primary	√	√				
	5DSW9B11	Duplicate	X	√				
OFS-3B	OFS3B11	Primary	√	√				
OS-4B	OS4B11	Primary	√	√	√	√	√	√
MW-9B	MW9B11	Primary	√	√	√	√	√	√
MW-10B	MW10B11	Primary	√	√	√	√	√	√
C-zone								
DSW-1C	DSW1C11	Primary	√	√	√	√	√	√
	5DSW9C11	Duplicate	√					
DSW-2C	DSW2C11	Primary	√	√				
DSW-3C	DSW3C11	Primary	√	√	√	√	√	√
	5DSW10C11	Duplicate		√	√	√	√	√
MW-8C	MW8C11	Primary	√	√	√	√	√	√
	5MW11C11	Duplicate	√	√				
DSW-6C	DSW6C11	Primary	√	√				
DSW-7C	DSW7C11	Primary	√	√	√	√	√	√
OFS-4C	OFS4C11	Primary	√	√				
OFS-5C	OFS5C11	Primary	√	√	√	√	√	√

Location	Sample ID	Sample Type	Analytes					
			SVOC 8270C	PCP GC/MS SIM	Dissolved Gases RSK 175	Total and Dissolved Manganese EPA 200.7	Common Anions EPA 300.0	Total Organic Carbon EPA 415.1
ONS-1C	ONS1C11	Primary	√	X	√	√	√	√
	5ONS9C11	Duplicate		√				
ONS-2C	ONS2C11	Primary	√	√				
OS-1C	OS1C11	Primary	√	√	√	√	√	√
OS-4C	OS4C11	Primary	√	√				
D-zone								
DSW-1D	DSW1D11	Primary	√	√				
DSW-4D	DSW4D11	Primary	√	√	√	√	√	√
OFS-1D	OFS1D11	Primary	√	√	√	√	√	√
OFS-4D	OFS4D11	Primary	√	√	√	√	√	√
	5OFS9D11	Duplicate	√		√	√	√	√
ONS-1D	ONS1D011	Primary	√	√	√	√	√	√
	5ONS5D11	Duplicate	√	√				
ONS-2D	ONS2D11	Primary	√	√				
OS-5D	OS5D11	Primary	√	√	√	√	√	√
MW7D	MW7D11	Primary	√	√	√	√	√	√
E-zone								
DSW-2E	DSW2E11	Primary	√	√	√	√	√	√
MW-3E	MW3E11	Primary	√	√				
MW-4E	MW4E11	Primary	√	√	√	√	√	√
OFS-4E	OFS4E11	Primary	√	√				
OFS-5E	OFS5E11	Primary	√	√	√	√	√	√
OS-1E	OS1E11	Primary	√	√	√	√	√	√
MW-5E	MW5E11	Primary	√	√	√	√	√	√
MW-6E	MW6E11	Primary	√	√	√	√	√	√

X – Sample required but not collected (DSW-7B) or broken in transit (ONS-1C)

Table 4-1
McCormick and Baxter Groundwater SVOC Results
April-May 2006

Aquifer Zone Location ID Sample ID Date Sampled Field QC	A A-4 A412 04/24/2006	A A-6 A612 04/27/2006 Parent Sample	A A-6 5A212 04/27/2006 Field Duplicate	A A-7 A712 04/25/2006	A DSW-7A DSW7A12 04/25/2006	A OFS-1A OFS1A12 04/24/2006	A OFS-3A OFS3A12 04/26/2006
SVOCs (µg/L)							
1,2,4-trichlorobenzene	--	1.0 U	1.0 U	--	1.0 U	1.0 U	1.0 UJ
1,2-dichlorobenzene	--	1.0 U	1.0 U	--	1.0 U	1.0 U	1.0 UJ
1,3-dichlorobenzene	--	1.0 U	1.0 U	--	1.0 U	1.0 U	1.0 UJ
1,4-dichlorobenzene	--	1.0 U	1.0 U	--	1.0 U	1.0 U	1.0 UJ
1,4-dioxane	--	1.0 U	1.0 U	--	1.0 U	1.0 U	1.0 U
2,2'-oxybis(1-chloropropane)	--	1.0 U	1.0 U	--	1.0 U	1.0 U	1.0 U
2,4,5-trichlorophenol	--	5.0 U	5.0 U	--	5.0 U	4.8 U	5.0 U
2,4,6-trichlorophenol	--	5.0 U	5.0 U	--	5.0 U	4.8 U	5.0 U
2,4-dichlorophenol	--	5.0 U	5.0 U	--	5.0 U	4.8 U	5.0 U
2,4-dimethylphenol	--	5.0 U	5.0 U	--	5.0 U	4.8 U	5.0 U
2,4-dinitrophenol	--	5.0 U	5.0 U	--	5.0 U	4.8 U	5.0 U
2,4-dinitrotoluene	--	1.0 U	1.0 U	--	1.0 U	1.0 U	1.0 U
2,6-dinitrotoluene	--	1.0 U	1.0 U	--	1.0 U	1.0 U	1.0 U
2-chloronaphthalene	--	1.0 U	1.0 U	--	1.0 U	1.0 U	1.0 U
2-chlorophenol	--	5.0 U	5.0 U	--	5.0 U	4.8 U	5.0 UJ
2-methylnaphthalene	--	1.0 U	1.0 U	--	1.0 U	1.0 U	1.0 U
2-methylphenol	--	5.0 U	5.0 U	--	5.0 U	4.8 U	5.0 UJ
2-nitroaniline	--	5.0 U	5.0 U	--	5.0 U	4.8 U	5.0 U
2-nitrophenol	--	5.0 U	5.0 U	--	5.0 U	4.8 U	5.0 UJ
3 & 4-methylphenol	--	5.0 U	5.0 U	--	5.0 U	4.8 U	5.0 U
3,3'-dichlorobenzidine	--	5.0 U	5.0 U	--	5.0 U	4.8 U	5.0 U
3-nitroaniline	--	5.0 U	5.0 U	--	5.0 U	4.8 U	5.0 U
4,6-dinitro-2-methylphenol	--	5.0 U	5.0 U	--	5.0 U	4.8 U	5.0 U
4-bromophenyl-phenylether	--	1.0 U	1.0 U	--	1.0 U	1.0 U	1.0 U
4-chloro-3-methylphenol	--	5.0 U	5.0 U	--	5.0 U	4.8 U	5.0 U
4-chloroaniline	--	5.0 U	5.0 U	--	5.0 U	4.8 U	5.0 U
4-chlorophenyl-phenylether	--	1.0 U	1.0 U	--	1.0 U	1.0 U	1.0 U
4-nitroaniline	--	5.0 U	5.0 U	--	5.0 U	4.8 U	5.0 U
4-nitrophenol	--	5.0 U	5.0 U	--	5.0 U	4.8 U	5.0 U
acenaphthene	0.05 U	0.270	0.260	0.034 J	0.05 U	0.450	0.026 J
acenaphthylene	0.05 U	0.05	0.046 J	0.05 U	0.05 U	0.05 U	0.05 U
anthracene	0.05 U	0.05 U	0.05 U	0.035 J	0.05 U	0.05 U	0.05 U
benzo(a)anthracene	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
benzo(a)pyrene	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
benzo(b)fluoranthene	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
benzo(g,h,i)perylene	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
benzo(k)fluoranthene	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
benzyl alcohol	--	5.0 U	5.0 U	--	5.0 U	4.8 U	5.0 UJ
bis(2-chloroethoxy)methane	--	1.0 U	1.0 U	--	1.0 U	1.0 U	1.0 U
bis(2-chloroethyl)ether	--	1.0 U	1.0 U	--	1.0 U	1.0 U	1.0 U
bis(2-ethylhexyl)phthalate	--	1.0 U	1.0 U	--	1.0 U	1.0 U	1.0 U
butylbenzylphthalate	--	1.0 U	1.0 U	--	1.0 U	1.0 U	1.0 U
carbazole	--	1.0 U	1.0 U	--	1.0 U	1.0 U	1.0 U
chrysene	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
di-n-butylphthalate	--	1.0 U	1.0 U	--	1.0 U	1.0 U	1.0 U
di-n-octylphthalate	--	1.0 U	1.0 U	--	1.0 U	1.0 U	1.0 U
dibenzo(a,h)anthracene	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
dibenzofuran	--	1.0 U	1.0 U	--	1.0 U	1.0 U	1.0 U
diethylphthalate	--	1.0 U	1.0 U	--	1.0 U	1.0 U	1.0 U
dimethylphthalate	--	1.0 U	1.0 U	--	1.0 U	1.0 U	1.0 U
diphenylamine	--	1.0 U	1.0 U	--	1.0 U	1.0 U	1.0 U
fluoranthene	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
fluorene	0.200	0.100	0.110	0.05 U	0.05 U	0.05 U	0.05 U
hexachlorobenzene	--	1.0 U	1.0 U	--	1.0 U	1.0 U	1.0 U
hexachlorobutadiene	--	1.0 U	1.0 U	--	1.0 U	1.0 U	1.0 UJ
hexachlorocyclopentadiene	--	1.0 U	1.0 U	--	1.0 U	1.0 U	1.0 UJ
hexachloroethane	--	1.0 U	1.0 U	--	1.0 U	1.0 U	1.0 UJ
indeno(1,2,3-cd)pyrene	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
isophorone	--	1.0 U	1.0 U	--	1.0 U	1.0 U	1.0 U
n-nitroso-di-n-propylamine	--	1.0 U	1.0 U	--	1.0 U	1.0 U	1.0 U
naphthalene	0.071	1.7	2.2	0.530	0.027 J	0.05 U	0.140 U
nitrobenzene	--	1.0 U	1.0 U	--	1.0 U	1.0 U	1.0 U
pentachlorophenol	--	760 D	750 D	1.0 U	1.0 U	1.0 U	1.0 U
phenanthrene	0.05 U	0.027 J	1.1	0.05 U	0.05 U	0.05 U	0.05 U
phenol	--	5.0 U	5.0 U	--	5.0 U	4.8 U	5.0 U
pyrene	0.310	0.049 J	0.047 J	0.05 U	0.05 U	0.05 U	0.05 U

notes:
U = the analyte was not detected
D = the diluted value was reported
J = value is estimated
R - data were rejected
-- = compound was not analyzed
SVOCs = Semivolatile Organic
Compounds
µg/L = micrograms per liter

Table 4-1
McCormick and Baxter Groundwater SVOC Results
April-May 2006

Aquifer Zone Location ID Sample ID Date Sampled Field QC	A OFS-4A1 OFS4A112 05/03/2006	A OFS-4A2 OFS4A212 05/03/2006	A OFS-5A OFS5A12 05/04/2006	A OS-4A OS4A12 05/02/2006	A SW-182A SW182A12 04/24/2006	A SW-187A SW187A12 04/24/2006	A SW-61A SW61A12 04/24/2006
SVOCs (µg/L)							
1,2,4-trichlorobenzene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,2-dichlorobenzene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,3-dichlorobenzene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,4-dichlorobenzene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,4-dioxane	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
2,2'-oxybis(1-chloropropane)	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
2,4,5-trichlorophenol	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
2,4,6-trichlorophenol	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
2,4-dichlorophenol	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
2,4-dimethylphenol	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
2,4-dinitrophenol	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
2,4-dinitrotoluene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
2,6-dinitrotoluene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
2-chloronaphthalene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
2-chlorophenol	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
2-methylnaphthalene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	50	1.0 U
2-methylphenol	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
2-nitroaniline	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
2-nitrophenol	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
3 & 4-methylphenol	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
3,3'-dichlorobenzidine	5.0 U	5.0 U	5.0 U	5.0 UR	5.0 U	5.0 U	5.0 U
3-nitroaniline	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
4,6-dinitro-2-methylphenol	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
4-bromophenyl-phenylether	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
4-chloro-3-methylphenol	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
4-chloroaniline	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
4-chlorophenyl-phenylether	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
4-nitroaniline	5.0 U	5.0 U	5.0 U	5.0 UJ	5.0 U	5.0 U	5.0 U
4-nitrophenol	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
acenaphthene	0.05 U	0.100	0.170	0.05 U	0.05 U	300 D	0.057
acenaphthylene	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.91	0.05 U
anthracene	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	16	0.05 U
benzo(a)anthracene	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.065	0.05 U
benzo(a)pyrene	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
benzo(b)fluoranthene	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
benzo(g,h,i)perylene	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
benzo(k)fluoranthene	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
benzyl alcohol	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
bis(2-chloroethoxy)methane	1.0 U	1.0 U	1.0 U	1.0 UJ	1.0 U	1.0 U	1.0 U
bis(2-chloroethyl)ether	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
bis(2-ethylhexyl)phthalate	1.0 U	1.0 U	2.2 U	1.0 U	27	4.4 U	8.0
butylbenzylphthalate	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
carbazole	1.0 U	1.0 U	1.0 U	1.0 UJ	1.0 U	1.0 U	1.0 U
chrysene	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.041 J	0.05 U
di-n-butylphthalate	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
di-n-octylphthalate	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
dibenzo(a,h)anthracene	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
dibenzofuran	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	36	1.0 U
diethylphthalate	1.0 U	1.0 U	1.0 U	1.0 UJ	1.0 U	1.0 U	1.0 U
dimethylphthalate	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
diphenylamine	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
fluoranthene	0.05 U	0.05 U	0.05 U	0.05 U	0.039 J	9.8	0.05 U
fluorene	0.160	0.074	0.061	0.039 J	0.05 U	60	0.05 U
hexachlorobenzene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
hexachlorobutadiene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
hexachlorocyclopentadiene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
hexachloroethane	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
indeno(1,2,3-cd)pyrene	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
isophorone	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
n-nitroso-di-n-propylamine	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
naphthalene	0.05 U	0.280 J	0.036 J	0.059 U	0.05 U	2.0	0.05 U
nitrobenzene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
pentachlorophenol	1.0 U	1.0 U	1.0 U	1.0 U	260 D	5.0 U	32
phenanthrene	0.05 U	0.05 U	0.084	0.05 U	0.05 U	77	0.05 U
phenol	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
pyrene	0.05 U	0.05 U	0.05 U	0.05 U	0.069	4.8	0.05 U

notes:
U = the analyte was not detected
D = the diluted value was reported
J = value is estimated
R - data were rejected
-- = compound was not analyzed
SVOCs = Semivolatile Organic
Compounds
µg/L = micrograms per liter

Table 4-1
McCormick and Baxter Groundwater SVOC Results
April-May 2006

Aquifer Zone Location ID Sample ID Date Sampled Field QC	B DSW-1B DSW1B12 04/26/2006	B DSW-3B DSW3B12 05/02/2006	B DSW-5B DSW5B12 04/27/2006	B DSW-7B DSW7B12 04/25/2006 Parent Sample	B DSW-7B 5DSW9B12 04/25/2006 Field Duplicate	B MW-10B MW10B12 05/04/2006	B MW-9B MW9B12 05/03/2006
SVOCs (µg/L)							
1,2,4-trichlorobenzene	1.1 UJ	1.0 U	1.0 UJ	1.0 U	--	1.0 U	1.0 U
1,2-dichlorobenzene	1.1 UJ	1.0 U	1.0 U	1.0 U	--	1.0 U	1.0 U
1,3-dichlorobenzene	1.1 UJ	1.0 U	1.0 U	1.0 U	--	1.0 U	1.0 U
1,4-dichlorobenzene	1.1 UJ	1.0 U	1.0 U	1.0 U	--	1.0 U	1.0 U
1,4-dioxane	1.1 U	1.0 U	1.0 U	1.0 U	--	1.0 U	1.0 U
2,2'-oxybis(1-chloropropane)	1.1 U	1.0 U	1.0 U	1.0 U	--	1.0 U	1.0 U
2,4,5-trichlorophenol	5.3 U	5.0 U	5.0 U	5.0 U	--	5.0 U	5.0 U
2,4,6-trichlorophenol	5.3 U	5.0 U	5.0 U	5.0 U	--	5.0 U	5.0 U
2,4-dichlorophenol	5.3 U	5.0 U	5.0 UJ	5.0 U	--	5.0 U	5.0 U
2,4-dimethylphenol	5.3 U	5.0 U	4.0 J	5.0 U	--	5.0 U	5.0 U
2,4-dinitrophenol	5.3 U	5.0 U	5.0 U	5.0 U	--	5.0 U	5.0 U
2,4-dinitrotoluene	1.1 U	1.0 U	1.0 U	1.0 U	--	1.0 U	1.0 U
2,6-dinitrotoluene	1.1 U	1.0 U	1.0 U	1.0 U	--	1.0 U	1.0 U
2-chloronaphthalene	1.1 U	1.0 U	1.0 U	1.0 U	--	1.0 U	1.0 U
2-chlorophenol	5.3 UJ	5.0 U	5.0 U	5.0 U	--	5.0 U	5.0 U
2-methylnaphthalene	1.1 U	0.8 J	410 D	1.0 U	--	1.0 U	2.0
2-methylphenol	5.3 UJ	5.0 U	5.0 U	5.0 U	--	5.0 U	2.6 J
2-nitroaniline	5.3 U	5.0 U	5.0 U	5.0 U	--	5.0 U	5.0 U
2-nitrophenol	5.3 UJ	5.0 U	5.0 UJ	5.0 U	--	5.0 U	5.0 U
3 & 4-methylphenol	5.3 U	5.0 U	5.0 U	5.0 U	--	5.0 U	2.7 J
3,3'-dichlorobenzidine	5.3 U	5.0 UR	5.0 U	5.0 U	--	5.0 U	5.0 U
3-nitroaniline	5.3 U	5.0 UJ	5.0 U	5.0 U	--	5.0 U	5.0 U
4,6-dinitro-2-methylphenol	5.3 U	5.0 U	5.0 U	5.0 U	--	5.0 U	5.0 U
4-bromophenyl-phenylether	1.1 U	1.0 U	1.0 U	1.0 U	--	1.0 U	1.0 U
4-chloro-3-methylphenol	5.3 U	5.0 U	5.0 UJ	5.0 U	--	5.0 U	5.0 U
4-chloroaniline	5.3 U	5.0 U	5.0 UJ	5.0 U	--	5.0 U	5.0 U
4-chlorophenyl-phenylether	1.1 U	1.0 U	1.0 U	1.0 U	--	1.0 U	1.0 U
4-nitroaniline	5.3 U	5.0 UJ	5.0 U	5.0 U	--	5.0 U	5.0 U
4-nitrophenol	5.3 U	5.0 U	5.0 U	5.0 U	--	5.0 U	5.0 U
acenaphthene	41	270 D	320 D	0.740	--	23	55
acenaphthylene	0.05 U	1.7	0.860 J	0.05 U	--	0.480	1.0
anthracene	0.150	2.3	11	0.03 J	--	0.400	1.5
benzo(a)anthracene	0.056	0.05 U	0.05 U	0.05 U	--	0.05 U	0.05 U
benzo(a)pyrene	0.05 U	0.05 U	0.05 U	0.05 U	--	0.05 U	0.05 U
benzo(b)fluoranthene	0.05 U	0.05 U	0.05 U	0.05 U	--	0.05 U	0.05 U
benzo(g,h,i)perylene	0.05 U	0.05 U	0.05 U	0.05 U	--	0.05 U	0.05 U
benzo(k)fluoranthene	0.05 U	0.05 U	0.05 U	0.05 U	--	0.05 U	0.05 U
benzyl alcohol	5.3 UJ	5.0 U	5.0 UJ	5.0 U	--	5.0 U	5.0 U
bis(2-chloroethoxy)methane	1.1 U	1.0 UJ	1.0 UJ	1.0 U	--	1.0 U	1.0 U
bis(2-chloroethyl)ether	1.1 U	1.0 U	1.0 U	1.0 U	--	1.0 U	1.0 U
bis(2-ethylhexyl)phthalate	1.1 U	0.9 J	1.0 U	0.7 J	--	2.0 U	1.0 U
butylbenzylphthalate	1.1 U	1.0 U	1.0 U	1.0 U	--	1.0 U	1.0 U
carbazole	1.1 U	1.0 UJ	130 D	1.0 U	--	1.0 U	1.1
chrysene	0.05 U	0.05 U	0.05 U	0.05 U	--	0.05 U	0.05 U
di-n-butylphthalate	1.1 U	1.0 U	1.0 U	1.0 U	--	1.0 U	1.0 U
di-n-octylphthalate	1.1 U	1.0 U	1.0 U	1.0 U	--	1.0 U	1.0 U
dibenzo(a,h)anthracene	0.05 U	0.05 U	0.05 U	0.05 U	--	0.05 U	0.05 U
dibenzofuran	1.1 U	0.6 J	170 D	1.0 U	--	3.7	17
diethylphthalate	1.1 U	1.0 UJ	1.0 U	1.0 U	--	1.0 U	1.0 U
dimethylphthalate	1.1 U	1.0 U	1.0 U	1.0 U	--	1.0 U	1.0 U
diphenylamine	1.1 U	1.0 U	1.0 U	1.0 U	--	1.0 U	1.0 U
fluoranthene	0.062	2.3	1.2	0.05 U	--	0.05 U	0.700
fluorene	0.088	2.8	120 D	0.05 U	--	0.650	11
hexachlorobenzene	1.1 U	1.0 U	1.0 U	1.0 U	--	1.0 U	1.0 U
hexachlorobutadiene	1.1 UJ	1.0 U	1.0 UJ	1.0 U	--	1.0 U	1.0 U
hexachlorocyclopentadiene	1.1 UJ	1.0 U	1.0 U	1.0 U	--	1.0 U	1.0 U
hexachloroethane	1.1 UJ	1.0 U	1.0 U	1.0 U	--	1.0 U	1.0 U
indeno(1,2,3-cd)pyrene	0.05 U	0.05 U	0.05 U	0.05 U	--	0.05 U	0.05 U
isophorone	1.1 U	1.0 U	1.0 UJ	1.0 U	--	1.0 U	1.0 U
n-nitroso-di-n-propylamine	1.1 U	1.0 U	1.0 U	1.0 U	--	1.0 U	1.0 U
naphthalene	0.220 U	1.1 J	2200 D	0.05 U	--	0.140 J	1.6
nitrobenzene	1.1 U	1.0 U	1.0 UJ	1.0 U	--	1.0 U	1.0 U
pentachlorophenol	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
phenanthrene	0.098	12	81 D	0.05 U	--	0.120	16
phenol	5.3 U	5.0 U	5.0 U	5.0 U	--	5.0 U	3.6 J
pyrene	3.1	1.0	0.460	0.05 U	--	0.05 U	0.390

notes:
U = the analyte was not detected
D = the diluted value was reported
J = value is estimated
R - data were rejected
-- = compound was not analyzed
SVOCs = Semivolatile Organic
Compounds
µg/L = micrograms per liter

Table 4-1
McCormick and Baxter Groundwater SVOC Results
April-May 2006

Aquifer Zone Location ID Sample ID Date Sampled Field QC	B OFS-3B OFS3B12 04/26/2006	B OS-4B OS4B12 05/02/2006	C DSW-1C DSW1C12 04/27/2006 Parent Sample	C DSW-1C 5DSW9C12 04/27/2006 Field Duplicate	C DSW-2C DSW2C12 04/25/2006	C DSW-3C DSW3C12 05/03/2006 Parent Sample	C DSW-3C 5DSW10C12 05/03/2006 Field Duplicate
SVOCs (µg/L)							
1,2,4-trichlorobenzene	1.0 UJ	1.0 U	1.0 UJ	1.0 UJ	1.0 U	1.0 U	--
1,2-dichlorobenzene	1.0 UJ	1.0 U	1.0 UJ	1.0 U	1.0 U	1.0 U	--
1,3-dichlorobenzene	1.0 UJ	1.0 U	1.0 UJ	1.0 U	1.0 U	1.0 U	--
1,4-dichlorobenzene	1.0 UJ	1.0 U	1.0 UJ	1.0 U	1.0 U	1.0 U	--
1,4-dioxane	1.0 U	1.0 U	1.0 UJ	1.0 U	1.0 U	1.0 U	--
2,2'-oxybis(1-chloropropane)	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	--
2,4,5-trichlorophenol	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	--
2,4,6-trichlorophenol	5.0 U	5.0 U	5.0 U	5.0 UJ	5.0 U	5.0 U	--
2,4-dichlorophenol	5.0 U	5.0 U	5.0 UJ	5.0 UJ	5.0 U	5.0 U	--
2,4-dimethylphenol	5.0 U	5.0 U	5.0 UJ	14 J	5.0 U	5.0 U	--
2,4-dinitrophenol	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	--
2,4-dinitrotoluene	1.0 U	1.0 U	1.0 UJ	1.0 U	1.0 U	1.0 U	--
2,6-dinitrotoluene	1.0 U	1.0 U	1.0 UJ	1.0 U	1.0 U	1.0 U	--
2-chloronaphthalene	1.0 U	1.0 U	1.0 UJ	1.0 U	1.0 U	1.0 U	--
2-chlorophenol	5.0 UJ	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	--
2-methylnaphthalene	1.0 U	1.0 U	850 D	910 D	1.0 U	1.0 U	--
2-methylphenol	5.0 UJ	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	--
2-nitroaniline	5.0 U	5.0 U	5.0 UJ	5.0 U	5.0 U	5.0 U	--
2-nitrophenol	5.0 UJ	5.0 U	5.0 UJ	5.0 UJ	5.0 U	5.0 U	--
3 & 4-methylphenol	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	--
3,3'-dichlorobenzidine	5.0 U	5.0 UR	5.0 UJ	5.0 U	5.0 U	5.0 U	--
3-nitroaniline	5.0 U	5.0 UJ	5.0 UJ	5.0 U	5.0 U	5.0 U	--
4,6-dinitro-2-methylphenol	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	--
4-bromophenyl-phenylether	1.0 U	1.0 U	1.0 UJ	1.0 U	1.0 U	1.0 U	--
4-chloro-3-methylphenol	5.0 U	5.0 U	5.0 UJ	5.0 UJ	5.0 U	5.0 U	--
4-chloroaniline	5.0 U	5.0 U	5.0 UJ	5.0 UJ	5.0 U	5.0 U	--
4-chlorophenyl-phenylether	1.0 U	1.0 U	1.0 UJ	1.0 U	1.0 U	1.0 U	--
4-nitroaniline	5.0 U	5.0 U	5.0 UJ	5.0 U	5.0 U	5.0 U	--
4-nitrophenol	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	--
acenaphthene	0.025 J	0.05 U	250 DJ	270 DJ	13	8.0	--
acenaphthylene	0.05 U	0.05 U	2.7 J	2.3	0.130	0.05 U	--
anthracene	0.05 U	0.05 U	11 J	8.4	0.05 U	0.05 U	--
benzo(a)anthracene	0.05 U	0.05 U	0.03 J	0.031 J	0.05 U	0.05 U	--
benzo(a)pyrene	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--
benzo(b)fluoranthene	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--
benzo(g,h,i)perylene	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--
benzo(k)fluoranthene	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--
benzyl alcohol	5.0 UJ	5.0 U	5.0 UJ	5.0 UJ	5.0 U	5.0 U	--
bis(2-chloroethoxy)methane	1.0 U	1.0 UJ	1.0 UJ	1.0 UJ	1.0 U	1.0 U	--
bis(2-chloroethyl)ether	1.0 U	1.0 U	1.0 UJ	1.0 U	1.0 U	1.0 U	--
bis(2-ethylhexyl)phthalate	1.0 U	1.0 U	1.0 UJ	1.0	1.0 U	1.0 U	--
butylbenzylphthalate	1.0 U	1.0 U	1.0 UJ	1.0 U	1.0 U	1.0 U	--
carbazole	1.0 U	1.0 UJ	300 DJ	320 DJ	1.0 U	1.0 U	--
chrysene	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--
di-n-butylphthalate	1.0 U	1.0 U	1.0 UJ	1.0 U	1.0 U	1.0 U	--
di-n-octylphthalate	1.0 U	1.0 U	1.0 UJ	1.0 U	1.0 U	1.0 U	--
dibenzo(a,h)anthracene	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--
dibenzofuran	1.0 U	1.0 U	140 DJ	150 DJ	1.0 U	1.0 U	--
diethylphthalate	1.0 U	1.0 UJ	1.0 UJ	1.0 U	1.0 U	1.0 U	--
dimethylphthalate	1.0 U	1.0 U	1.0 UJ	1.0 U	1.0 U	1.0 U	--
diphenylamine	1.0 U	1.0 U	1.0 UJ	1.0 U	1.0 U	1.0 U	--
fluoranthene	0.05 U	0.05 U	5.4 J	4.8	0.05 U	0.063	--
fluorene	0.05 U	0.044 J	110 DJ	120 DJ	0.05 U	0.05 U	--
hexachlorobenzene	1.0 U	1.0 U	1.0 UJ	1.0 U	1.0 U	1.0 U	--
hexachlorobutadiene	1.0 UJ	1.0 U	1.0 UJ	1.0 UJ	1.0 U	1.0 U	--
hexachlorocyclopentadiene	1.0 UJ	1.0 U	1.0 UJ	1.0 UJ	1.0 U	1.0 U	--
hexachloroethane	1.0 UJ	1.0 U	1.0 UJ	1.0 U	1.0 U	1.0 U	--
indeno(1,2,3-cd)pyrene	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--
isophorone	1.0 U	1.0 U	1.0 UJ	1.0 UJ	1.0 U	1.0 U	--
n-nitroso-di-n-propylamine	1.0 U	1.0 U	1.0 UJ	1.0 U	1.0 U	1.0 U	--
naphthalene	0.300	0.140 U	9700 D	10000 D	0.19	0.250	--
nitrobenzene	1.0 U	1.0 U	1.0 UJ	1.0 UJ	1.0 U	1.0 U	--
pentachlorophenol	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	0.9 U	1.0 U
phenanthrene	0.05 U	0.05 U	75 DJ	75 DJ	0.05 U	0.069	--
phenol	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	--
pyrene	0.05 U	0.05 U	3.4 J	3.0	0.05 U	0.120	--

notes:
U = the analyte was not detected
D = the diluted value was reported
J = value is estimated
R - data were rejected
-- = compound was not analyzed
SVOCs = Semivolatile Organic
Compounds
µg/L = micrograms per liter

Table 4-1
McCormick and Baxter Groundwater SVOC Results
April-May 2006

Aquifer Zone	C	C	C	C	C	C	C	C	C
Location ID	DSW-6C	DSW-7C	MW-8C	MW-8C	OFS-4C	OFS-5C	ONS-1C	ONS-1C	ONS-1C
Sample ID	DSW6C12	DSW7C12	MW8C12	5MW11C12	OFS4C12	OFS5C12	ONS1C12	ONS1C12	5ONS9C12
Date Sampled	04/25/2006	05/01/2006	05/03/2006	05/03/2006	04/25/2006	05/04/2006	04/26/2006	04/26/2006	04/26/2006
Field QC			Parent Sample	Field Duplicate			Parent Sample	Field Duplicate	
SVOCs (µg/L)									
1,2,4-trichlorobenzene	1.0 UJ	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 UJ	--	--
1,2-dichlorobenzene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 UJ	--	--
1,3-dichlorobenzene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 UJ	--	--
1,4-dichlorobenzene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 UJ	--	--
1,4-dioxane	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	--	--
2,2'-oxybis(1-chloropropane)	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	--	--
2,4,5-trichlorophenol	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	--	--
2,4,6-trichlorophenol	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	--	--
2,4-dichlorophenol	5.0 UJ	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 UJ	--	--
2,4-dimethylphenol	8.1 J	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 UJ	--	--
2,4-dinitrophenol	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	--	--
2,4-dinitrotoluene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	--	--
2,6-dinitrotoluene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	--	--
2-chloronaphthalene	1.0 U	1.0	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	--	--
2-chlorophenol	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 UJ	--	--
2-methylnaphthalene	340 D	0.7 J	220 D	270 D	1.0 U	1.0 U	1400 D	--	--
2-methylphenol	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 UJ	--	--
2-nitroaniline	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	--	--
2-nitrophenol	5.0 UJ	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 UJ	--	--
3 & 4-methylphenol	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	8.1	--	--
3,3'-dichlorobenzidine	5.0 U	5.0 UR	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	--	--
3-nitroaniline	5.0 U	5.0 UJ	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	--	--
4,6-dinitro-2-methylphenol	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	--	--
4-bromophenyl-phenylether	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	--	--
4-chloro-3-methylphenol	5.0 UJ	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 UJ	--	--
4-chloroaniline	5.0 UJ	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 UJ	--	--
4-chlorophenyl-phenylether	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	--	--
4-nitroaniline	5.0 U	5.0 UJ	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	--	--
4-nitrophenol	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	--	--
acenaphthene	210 D	140 D	230 D	270 D	3.0	0.360	490 D	--	--
acenaphthylene	4.3	1.1	1.6	1.6	0.05 U	0.05 U	8.5	--	--
anthracene	3.1	0.940	2.6	2.5	0.05 U	0.05 U	23	--	--
benzo(a)anthracene	0.039 J	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.390	--	--
benzo(a)pyrene	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--	--
benzo(b)fluoranthene	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.055	0.028 J	--	--
benzo(g,h,i)perylene	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--	--
benzo(k)fluoranthene	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.057	0.05 U	--	--
benzyl alcohol	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 UJ	--	--
bis(2-chloroethoxy)methane	1.0 UJ	1.0 UJ	1.0 U	1.0 U	1.0 U	1.0 U	1.0 UJ	--	--
bis(2-chloroethyl)ether	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	--	--
bis(2-ethylhexyl)phthalate	1.0 U	1.0 U	1.0 U	1.0 U	0.6 J	2.1 U	1.0 U	--	--
butylbenzylphthalate	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	--	--
carbazole	160 D	0.6 J	130 D	160 D	1.0 U	1.0 U	450 D	--	--
chrysene	0.041 J	0.05 U	0.05 U	0.05 U	0.05 U	0.056 J	0.240	--	--
di-n-butylphthalate	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	--	--
di-n-octylphthalate	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	--	--
dibenzo(a,h)anthracene	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.027 J	0.05 U	--	--
dibenzofuran	76	0.5 J	100 D	120 D	1.0 U	1.0 U	220 D	--	--
diethylphthalate	1.0 U	1.0 UJ	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	--	--
dimethylphthalate	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	--	--
diphenylamine	1.8	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	--	--
fluoranthene	0.980	0.130	0.05 U	0.05 U	0.05 U	0.05 U	18	--	--
fluorene	64	2.5	88 D	100 D	0.032 J	0.05 U	180 D	--	--
hexachlorobenzene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	--	--
hexachlorobutadiene	1.0 UJ	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 UJ	--	--
hexachlorocyclopentadiene	1.0 U	1.0 UJ	1.0 U	1.0 U	1.0 U	1.0 U	1.0 UJ	--	--
hexachloroethane	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 UJ	--	--
indeno(1,2,3-cd)pyrene	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--	--
isophorone	1.0 UJ	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 UJ	--	--
n-nitroso-di-n-propylamine	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	--	--
naphthalene	3200 D	0.320 U	890 D	1100 D	0.081	0.08	17000 D	--	--
nitrobenzene	1.0 UJ	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 UJ	--	--
pentachlorophenol	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	2.4	--	2.1
phenanthrene	26	2.5	36	36	0.05 U	0.05 U	200 D	--	--
phenol	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	71	--	--
pyrene	0.660	0.066	0.05 U	0.05 U	0.05 U	0.05 U	13	--	--

notes:
U = the analyte was not detected
D = the diluted value was reported
J = value is estimated
R - data were rejected
-- = compound was not analyzed
SVOCs = Semivolatile Organic
Compounds
µg/L = micrograms per liter

Table 4-1
McCormick and Baxter Groundwater SVOC Results
April-May 2006

Aquifer Zone Location ID Sample ID Date Sampled Field QC	C ONS-2C ONS2C12 04/24/2006	C OS-1C OS1C12 05/02/2006	C OS-4C OS4C12 04/25/2006	D DSW-1D DSW1D12 04/26/2006	D DSW-4D DSW4D12 04/27/2006	D MW-7D MW7D12 05/01/2006	D OFS-1D OFS1D12 05/04/2006
SVOCs (µg/L)							
1,2,4-trichlorobenzene	1.0 U	1.0 U	1.0 U	1.0 UJ	1.0 U	1.0 UJ	1.0 U
1,2-dichlorobenzene	1.0 U	1.0 U	1.0 U	1.0 UJ	1.0 U	1.0 U	1.0 U
1,3-dichlorobenzene	1.0 U	1.0 U	1.0 U	1.0 UJ	1.0 U	1.0 U	1.0 U
1,4-dichlorobenzene	1.0 U	1.0 U	1.0 U	1.0 UJ	1.0 U	1.0 U	1.0 U
1,4-dioxane	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
2,2'-oxybis(1-chloropropane)	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
2,4,5-trichlorophenol	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
2,4,6-trichlorophenol	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
2,4-dichlorophenol	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 UJ	5.0 U
2,4-dimethylphenol	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	9.5 J	5.0 U
2,4-dinitrophenol	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
2,4-dinitrotoluene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
2,6-dinitrotoluene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
2-chloronaphthalene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
2-chlorophenol	5.0 U	5.0 U	5.0 U	5.0 UJ	5.0 U	5.0 U	5.0 U
2-methylnaphthalene	1.0 U	1.0 U	1.0 U	23	110 D	34 DJ	1.0 U
2-methylphenol	5.0 U	5.0 U	5.0 U	5.0 UJ	5.0 U	5.0 U	5.0 U
2-nitroaniline	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
2-nitrophenol	5.0 U	5.0 U	5.0 U	5.0 UJ	5.0 U	5.0 UJ	5.0 U
3 & 4-methylphenol	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
3,3'-dichlorobenzidine	5.0 U	5.0 UR	5.0 U	5.0 U	5.0 U	5.0 UR	5.0 U
3-nitroaniline	5.0 U	5.0 UJ	5.0 U	5.0 U	5.0 U	5.0 UJ	5.0 U
4,6-dinitro-2-methylphenol	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
4-bromophenyl-phenylether	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
4-chloro-3-methylphenol	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 UJ	5.0 U
4-chloroaniline	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 UJ	5.0 U
4-chlorophenyl-phenylether	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
4-nitroaniline	5.0 U	5.0 UJ	5.0 U	5.0 U	5.0 U	5.0 UJ	5.0 U
4-nitrophenol	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
acenaphthene	3.8	2.2	0.05 U	120 D	69	15	0.029 J
acenaphthylene	0.037 J	0.05 U	0.05 U	0.580	1.4	0.210	0.05 U
anthracene	0.047 U	0.05 U	0.05 U	2.2	1.4	0.370	0.05 U
benzo(a)anthracene	0.047 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
benzo(a)pyrene	0.047 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
benzo(b)fluoranthene	0.047 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
benzo(g,h,i)perylene	0.047 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
benzo(k)fluoranthene	0.047 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
benzyl alcohol	5.0 U	5.0 U	5.0 U	5.0 UJ	5.0 U	5.0 U	5.0 U
bis(2-chloroethoxy)methane	1.0 U	1.0 UJ	1.0 U	1.0 U	1.0 U	1.0 UJ	1.0 U
bis(2-chloroethyl)ether	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
bis(2-ethylhexyl)phthalate	1.0 U	0.8 J	0.5 J	1.0 U	1.0 U	0.5 J	2.1 U
butylbenzylphthalate	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	0.5 J	1.0 U
carbazole	1.0 U	1.0 UJ	1.0 U	19	45	86 DJ	1.0 U
chrysene	0.047 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
di-n-butylphthalate	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
di-n-octylphthalate	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
dibenzo(a,h)anthracene	0.047 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
dibenzofuran	1.0 U	1.0 U	1.0 U	87 D	29	5.2	1.0 U
diethylphthalate	1.0 U	1.0 UJ	1.0 U	1.0 U	1.0 U	1.0 UJ	1.0 U
dimethylphthalate	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
diphenylamine	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
fluoranthene	0.047 U	0.05 U	0.05 U	0.350	0.340	0.05 U	0.05 U
fluorene	0.072	0.05 U	0.05 U	60	23	3.7	0.042 J
hexachlorobenzene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
hexachlorobutadiene	1.0 U	1.0 U	1.0 U	1.0 UJ	1.0 U	1.0 UJ	1.0 U
hexachlorocyclopentadiene	1.0 U	1.0 U	1.0 U	1.0 UJ	1.0 U	1.0 U	1.0 U
hexachloroethane	1.0 U	1.0 U	1.0 U	1.0 UJ	1.0 U	1.0 U	1.0 U
indeno(1,2,3-cd)pyrene	0.047 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
isophorone	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.9 J	1.0 U
n-nitroso-di-n-propylamine	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
naphthalene	0.840	0.240 U	0.046 J	67	560 D	1000 D	0.036 J
nitrobenzene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 UJ	1.0 U
pentachlorophenol	0.9 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
phenanthrene	0.047 U	0.036 J	0.05 U	15	13	1.3	0.05 U
phenol	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	7.6	5.0 U
pyrene	0.047 U	0.05 U	0.05 U	0.260	0.220	0.05 U	0.05 U

notes:
U = the analyte was not detected
D = the diluted value was reported
J = value is estimated
R - data were rejected
-- = compound was not analyzed
SVOCs = Semivolatile Organic
Compounds
µg/L = micrograms per liter

Table 4-1
McCormick and Baxter Groundwater SVOC Results
April-May 2006

Aquifer Zone	D	D	D	D	D	D	E
Location ID	OFS-4D	OFS-4D	ONS-1D	ONS-1D	ONS-2D	OS-5D	DSW-2E
Sample ID	OFS4D12	5OFS9D12	ONS1D12	5ONSSD12	ONS2D12	OS5D12	DSW2E12
Date Sampled	05/03/2006	05/03/2006	04/26/2006	04/26/2006	04/24/2006	05/02/2006	05/01/2006
Field QC	Parent Sample	Field Duplicate	Parent Sample	Field Duplicate			
SVOCs (µg/L)							
1,2,4-trichlorobenzene	1.0 U	1.0 U	1.0 UJ	1.0 UJ	1.0 U	1.0 U	1.0 U
1,2-dichlorobenzene	1.0 U	1.0 U	1.0 UJ	1.0 UJ	1.0 U	1.0 U	1.0 U
1,3-dichlorobenzene	1.0 U	1.0 U	1.0 UJ	1.0 UJ	1.0 U	1.0 U	1.0 U
1,4-dichlorobenzene	1.0 U	1.0 U	1.0 UJ	1.0 UJ	1.0 U	1.0 U	1.0 U
1,4-dioxane	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
2,2'-oxybis(1-chloropropane)	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
2,4,5-trichlorophenol	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
2,4,6-trichlorophenol	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
2,4-dichlorophenol	5.0 U	5.0 U	5.0 UJ	5.0 UJ	5.0 U	5.0 U	5.0 U
2,4-dimethylphenol	5.0 U	5.0 U	5.0 UJ	5.0 UJ	5.0 U	5.0 U	5.0 U
2,4-dinitrophenol	5.0 U	5.0 U	5.0 UJ	5.0 UJ	5.0 U	5.0 U	5.0 U
2,4-dinitrotoluene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
2,6-dinitrotoluene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
2-chloronaphthalene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
2-chlorophenol	5.0 U	5.0 U	5.0 UJ	5.0 UJ	5.0 U	5.0 U	5.0 U
2-methylnaphthalene	1.0 U	0.5 J	160 D	170 D	1.0 U	1.0 U	1.0 U
2-methylphenol	5.0 U	5.0 U	5.0 UJ	5.0 UJ	5.0 U	5.0 U	5.0 U
2-nitroaniline	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
2-nitrophenol	5.0 U	5.0 U	5.0 UJ	5.0 UJ	5.0 U	5.0 U	5.0 U
3 & 4-methylphenol	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
3,3'-dichlorobenzidine	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 UR	5.0 UR
3-nitroaniline	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 UJ	5.0 UJ
4,6-dinitro-2-methylphenol	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
4-bromophenyl-phenylether	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
4-chloro-3-methylphenol	5.0 U	5.0 U	5.0 UJ	5.0 UJ	5.0 U	5.0 U	5.0 U
4-chloroaniline	5.0 U	5.0 U	5.0 UJ	5.0 UJ	5.0 U	5.0 U	5.0 U
4-chlorophenyl-phenylether	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
4-nitroaniline	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 UJ	5.0 UJ
4-nitrophenol	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
acenaphthene	33	31	71 J	69 D	0.260	7.5	1.3
acenaphthylene	2.0	0.480	1.1	1.4	0.05 U	0.310	0.05 U
anthracene	2.6	2.3	1.0	1.2	0.05 U	0.05 U	0.05 U
benzo(a)anthracene	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
benzo(a)pyrene	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 UJ
benzo(b)fluoranthene	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 UJ
benzo(g,h,i)perylene	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 UJ
benzo(k)fluoranthene	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 UJ
benzyl alcohol	5.0 U	5.0 U	5.0 UJ	5.0 UJ	5.0 U	5.0 U	5.0 U
bis(2-chloroethoxy)methane	1.0 U	1.0 U	1.0 UJ	1.0 UJ	1.0 U	1.0 UJ	1.0 UJ
bis(2-chloroethyl)ether	1.0 U	1.0 U	1.0 UJ	1.0 U	1.0 U	1.0 U	1.0 U
bis(2-ethylhexyl)phthalate	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	0.6 J
butylbenzylphthalate	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
carbazole	46	32 J	47 J	69	1.0 U	12 J	1.0 UJ
chrysene	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
di-n-butylphthalate	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
di-n-octylphthalate	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
dibenzo(a,h)anthracene	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 UJ
dibenzofuran	18	17	26 J	5.1	1.0 U	1.5	1.0 U
diethylphthalate	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 UJ	1.0 UJ
dimethylphthalate	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
diphenylamine	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
fluoranthene	0.05 U	0.270	0.062	0.057	0.05 U	0.05 U	0.05 U
fluorene	17	16	24 J	29	0.081	1.5	0.05 U
hexachlorobenzene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
hexachlorobutadiene	1.0 U	1.0 U	1.0 UJ	1.0 UJ	1.0 U	1.0 U	1.0 U
hexachlorocyclopentadiene	1.0 U	1.0 U	1.0 UJ	1.0 UJ	1.0 U	1.0 U	1.0 U
hexachloroethane	1.0 U	1.0 U	1.0 UJ	1.0 UJ	1.0 U	1.0 U	1.0 U
indeno(1,2,3-cd)pyrene	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 UJ
isophorone	1.0 U	1.0 U	1.0 UJ	1.0 UJ	1.0 U	1.0 U	1.0 U
n-nitroso-di-n-propylamine	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
naphthalene	4.2	4.3	1600 D	1800 D	2.6	0.440 U	0.380
nitrobenzene	1.0 U	1.0 U	1.0 UJ	1.0 UJ	1.0 U	1.0 U	1.0 U
pentachlorophenol	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
phenanthrene	27	26	6.9	11	0.069	0.150	0.05 U
phenol	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
pyrene	0.05 U	0.09 U	0.038 J	0.038 J	0.05 U	0.05 U	0.05 U

notes:
 U = the analyte was not detected
 D = the diluted value was reported
 J = value is estimated
 R - data were rejected
 -- = compound was not analyzed
 SVOCs = Semivolatile Organic
 Compounds
 µg/L = micrograms per liter

Table 4-1
McCormick and Baxter Groundwater SVOC Results
April-May 2006

Aquifer Zone Location ID Sample ID Date Sampled Field QC	E MW-3E MW3E12 04/26/2006	E MW-4E MW4E12 04/27/2006	E MW-5E MW5E12 05/01/2006	E MW-6E MW6E12 05/01/2006	E OFS-4E OFS4E12 04/25/2006	E OFS-5E OFS5E12 05/04/2006	E OS-1E OS1E12 05/02/2006
SVOCs (µg/L)							
1,2,4-trichlorobenzene	1.0 UJ	1.1 UJ	1.0 U	1.0 U	1.0 U	1.1 U	1.0 U
1,2-dichlorobenzene	1.0 UJ	1.1 U	1.0 U	1.0 U	1.0 U	1.1 U	1.0 U
1,3-dichlorobenzene	1.0 UJ	1.1 U	1.0 U	1.0 U	1.0 U	1.1 U	1.0 U
1,4-dichlorobenzene	1.0 UJ	1.1 U	1.0 U	1.0 U	1.0 U	1.1 U	1.0 U
1,4-dioxane	1.0 U	1.1 U	1.0 U	1.0 U	1.0 U	1.1 U	1.0 U
2,2'-oxybis(1-chloropropane)	1.0 U	1.1 U	1.0 U	1.0 U	1.0 U	1.1 U	1.0 U
2,4,5-trichlorophenol	4.8 U	5.4 U	5.0 U	5.0 U	5.0 U	5.3 U	5.0 U
2,4,6-trichlorophenol	4.8 U	5.4 U	5.0 U	5.0 U	5.0 U	5.3 U	5.0 U
2,4-dichlorophenol	4.8 U	5.4 UJ	5.0 U	5.0 U	5.0 U	5.3 U	5.0 U
2,4-dimethylphenol	4.8 U	5.4 UJ	5.0 U	5.0 U	5.0 U	5.3 U	5.0 U
2,4-dinitrophenol	4.8 U	5.4 U	5.0 U	5.0 U	5.0 U	5.3 U	5.0 U
2,4-dinitrotoluene	1.0 U	1.1 U	1.0 U	1.0 U	1.0 U	1.1 U	1.0 U
2,6-dinitrotoluene	1.0 U	1.1 U	1.0 U	1.0 U	1.0 U	1.1 U	1.0 U
2-chloronaphthalene	1.0 U	1.1 U	1.0 U	1.0 U	1.0 U	1.1 U	1.0 U
2-chlorophenol	4.8 UJ	5.4 U	5.0 U	5.0 U	5.0 U	5.3 U	5.0 U
2-methylnaphthalene	1.0 U	930	1.0 U	1.0 U	1.0 U	1.1 U	1.0 U
2-methylphenol	4.8 UJ	5.4 U	5.0 U	5.0 U	5.0 U	5.3 U	5.0 U
2-nitroaniline	4.8 U	5.4 U	5.0 U	5.0 U	5.0 U	5.3 U	5.0 U
2-nitrophenol	4.8 UJ	5.4 UJ	5.0 U	5.0 U	5.0 U	5.3 U	5.0 U
3 & 4-methylphenol	4.8 U	5.4 U	5.0 U	5.0 U	5.0 U	5.3 U	5.0 U
3,3'-dichlorobenzidine	4.8 U	5.4 U	5.0 UR	5.0 UR	5.0 U	5.3 U	5.0 UR
3-nitroaniline	4.8 U	5.4 U	5.0 UJ	5.0 UJ	5.0 U	5.3 U	5.0 UJ
4,6-dinitro-2-methylphenol	4.8 U	5.4 U	5.0 U	5.0 U	5.0 U	5.3 U	5.0 U
4-bromophenyl-phenylether	1.0 U	1.1 U	1.0 U	1.0 U	1.0 U	1.1 U	1.0 U
4-chloro-3-methylphenol	4.8 U	5.4 UJ	5.0 U	5.0 U	5.0 U	5.3 U	5.0 U
4-chloroaniline	4.8 U	5.4 UJ	5.0 U	5.0 U	5.0 U	5.3 U	5.0 U
4-chlorophenyl-phenylether	1.0 U	1.1 U	1.0 U	1.0 U	1.0 U	1.1 U	1.0 U
4-nitroaniline	4.8 U	5.4 U	5.0 UJ	5.0 UJ	5.0 U	5.3 U	5.0 UJ
4-nitrophenol	4.8 U	5.4 U	5.0 U	5.0 U	5.0 U	5.3 U	5.0 U
acenaphthene	0.027 J	290 DJ	0.048 U	3.3	12	0.053 U	2.1
acenaphthylene	0.05 U	1.2	0.048 U	0.052 J	0.170	0.053 U	0.05 U
anthracene	0.05 U	0.460	0.048 U	0.05 UJ	0.460	0.053 U	0.05 U
benzo(a)anthracene	0.05 U	0.05 U	0.048 U	0.05 UJ	0.05 U	0.053 U	0.05 U
benzo(a)pyrene	0.05 U	0.05 U	0.048 U	0.05 UJ	0.05 U	0.053 U	0.05 U
benzo(b)fluoranthene	0.05 U	0.05 U	0.048 U	0.05 UJ	0.05 U	0.053 U	0.05 U
benzo(g,h,i)perylene	0.05 U	0.05 U	0.048 U	0.05 UJ	0.05 U	0.053 U	0.05 U
benzo(k)fluoranthene	0.05 U	0.05 U	0.048 U	0.05 UJ	0.05 U	0.053 U	0.05 U
benzyl alcohol	4.8 UJ	5.4 U	5.0 U	5.0 U	5.0 U	5.3 U	5.0 U
bis(2-chloroethoxy)methane	1.0 U	1.1 UJ	1.0 UJ	1.0 UJ	1.0 U	1.1 U	1.0 UJ
bis(2-chloroethyl)ether	1.0 U	1.1 U	1.0 U	1.0 U	1.0 U	1.1 U	1.0 U
bis(2-ethylhexyl)phthalate	1.0 U	1.1 U	0.8 J	1.0 U	1.0 U	2.3 U	1.0 U
butylbenzylphthalate	1.0 U	1.1 U	1.0 U	1.0 U	1.0 U	1.1 U	1.0 U
carbazole	1.0 U	230 DJ	1.0 UJ	1.6 J	14	1.1 U	0.7 J
chrysene	0.05 U	0.05 U	0.048 U	0.05 UJ	0.05 U	0.053 U	0.05 U
di-n-butylphthalate	1.0 U	1.1 U	1.0 U	1.0 U	1.0 U	1.1 U	1.0 U
di-n-octylphthalate	1.0 U	1.1 U	1.0 U	1.0 U	1.0 U	1.1 U	1.0 U
dibenzo(a,h)anthracene	0.05 U	0.05 U	0.048 U	0.05 UJ	0.05 U	0.053 U	0.05 U
dibenzofuran	1.0 U	75	1.0 U	1.0 U	4.9	1.1 U	1.0 U
diethylphthalate	1.0 U	1.1 U	1.0 UJ	1.0 UJ	1.0 U	1.1 U	1.0 UJ
dimethylphthalate	1.0 U	1.1 U	1.0 U	1.0 U	1.0 U	1.1 U	1.0 U
diphenylamine	1.0 U	1.1 U	1.0 U	1.0 U	1.0 U	1.1 U	1.0 U
fluoranthene	0.05 U	0.068	0.048 U	0.05 UJ	0.05 U	0.053 U	0.05 U
fluorene	0.05 U	62	0.048 U	0.710 J	5.2	0.034 J	0.081
hexachlorobenzene	1.0 U	1.1 U	1.0 U	1.0 U	1.0 U	1.1 U	1.0 U
hexachlorobutadiene	1.0 UJ	1.1 UJ	1.0 U	1.0 U	1.0 U	1.1 U	1.0 U
hexachlorocyclopentadiene	1.0 UJ	1.1 U	1.0 U	1.0 U	1.0 U	1.1 U	1.0 U
hexachloroethane	1.0 UJ	1.1 U	1.0 U	1.0 U	1.0 U	1.1 U	1.0 U
indeno(1,2,3-cd)pyrene	0.05 U	0.05 U	0.048 U	0.05 UJ	0.05 U	0.053 U	0.05 U
isophorone	1.0 U	1.1 UJ	1.0 U	1.0 U	1.0 U	1.1 U	1.0 U
n-nitroso-di-n-propylamine	1.0 U	1.1 U	1.0 U	1.0 U	1.0 U	1.1 U	1.0 U
naphthalene	0.660	12000	0.048 U	14	0.300	0.038 J	0.099 U
nitrobenzene	1.0 U	1.1 UJ	1.0 U	1.0 U	1.0 U	1.1 U	1.0 U
pentachlorophenol	1.0 U	1.0 U	1.0 U	5.0 U	1.0 U	1.1 U	1.0 U
phenanthrene	0.05 U	15	0.048 U	0.038 J	4.8	0.053 U	0.05 U
phenol	4.8 U	5.4 U	5.0 U	5.0 U	5.0 U	5.3 U	5.0 U
pyrene	0.05 U	0.031 J	0.048 U	0.05 UJ	0.05 U	0.053 U	0.05 U

notes:
U = the analyte was not detected
D = the diluted value was reported
J = value is estimated
R - data were rejected
-- = compound was not analyzed
SVOCs = Semivolatile Organic
Compounds
µg/L = micrograms per liter

Table 4-2
McCormick and Baxter Groundwater Total and Dissolved Metals, Conventionals, Gases, and Field Data Results
April-May 2006

Aquifer Zone Location ID Sample ID Date Sampled Field QC	A A-6 A612 04/27/2006	A OFS-4A1 OFS4A112 05/03/2006 Parent Sample	A OFS-4A1 5OFS8A12 05/03/2006 Field Duplicate	A OFS-4A2 OFS4A212 05/03/2006	A OFS-5A OFS5A12 05/04/2006
Total Metals (µg/L)					
total manganese	302	71.9 J	68.5 J	173 J	136 J
Dissolved Metals (µg/L)					
dissolved manganese	313	74.9 J	76.5 J	162 J	106 J
Conventionals (mg/L)					
chloride	150 D	41	39	82 D	180 D
nitrate as N	29 D	1.1	0.68	0.1 U	1.4
nitrite as N	0.5 UJ	0.09 J	0.07 J	0.5 UJ	1.1
sulfate	220 D	78 D	76 D	120 D	130 D
total organic carbon	6.6	14	14	2.0	2.7
RSK 175 (µg/L)					
ethane	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U
ethene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
methane	1.2 U	1.2 U	1.2 U	27	0.8 J
Field Data					
Field Meter					
Sp. Cond. (ms/cm)	2.72	0.864	0.864	1.274	1.78
D.O. (mg/L)	0.47	1.06	1.06	0.48	0.78
ORP (Eh) (mV)	117	60	60	-208	-163
pH (Standard Units)	7.04	8.48	8.48	7.63	7.92
Temperature (degrees C)	19.02	20.07	20.07	20.64	20.4
Turbidity (NTU)	1.9	7.1	7.1	2.5	57.1
Test Kits (mg/L)					
DO	0.3	0.9	0.9	0.35	0.5
CO2	230	81	81	59	80
Ferrous Iron	0.1	0	0	0.2	0
Total Iron	0	2.6	2.6	0.6	3.8

notes:

U = the analyte was not detected

D = the diluted value was reported

J = value is estimated

J+ = value is estimated
and biased high

J- = value is estimated
and biased low

-- = compound was not analyzed

µg/L = micrograms per liter

mg/L = milligrams per liter

ms/cm = millisiemens per centimeter

mV = millivolts

ntu = nephelometric turbidity units

Table 4-2
McCormick and Baxter Groundwater Total and Dissolved Metals, Conventionals, Gases, and Field Data Results
April-May 2006

Aquifer Zone Location ID Sample ID Date Sampled Field QC	A OS-4A OS4A12 05/02/2006	B DSW-3B DSW3B12 05/02/2006	B DSW-5B DSW5B12 04/27/2006	B MW-10B MW10B12 05/04/2006	B MW-9B MW9B12 05/03/2006
Total Metals (µg/L)					
total manganese	45.5 J	240 J	210	7.1 J	45.5 J
Dissolved Metals (µg/L)					
dissolved manganese	13.8 J	237 J	226	6.2 J	12.3 J
Conventionals (mg/L)					
chloride	66 D	130 D	290 D	170 D	210 D
nitrate as N	3.1	0.1 U	0.1 U	0.1 U	0.08 J
nitrite as N	0.5 UJ	0.5 UJ	1.0 UJ	0.5 UJ	0.16
sulfate	40	0.5 U	0.5 U	23	17
total organic carbon	2.0 U	3.8	6.1 J+	3.1	13
RSK 175 (µg/L)					
ethane	1.1 U	11 U	11 U	1.1	11 U
ethene	1.0 U	10 U	10 U	1.0 U	10 U
methane	0.6 J	16000 D	8500 D	42	1900
Field Data					
Field Meter					
Sp. Cond. (ms/cm)	0.655	1.104	1.53	1.023	1.05
D.O. (mg/L)	1.43	0.41	1.56	1.3	0.32
ORP (Eh) (mV)	-54	-197	-222	-279	-253
pH (Standard Units)	7.68	7.91	8	9.06	10.67
Temperature (degrees C)	19.26	18.68	21.72	21.72	21.98
Turbidity (NTU)	20.5	1.3	13.1	2.3	14.5
Test Kits (mg/L)					
DO	1.5	0.7	0.6	0.25	0.15
CO2	121	55	40	31.5	0
Ferrous Iron	0	0.3	0.9	0	0
Total Iron	2.2	0.4	3.6	0.4	1.8

notes:

- U = the analyte was not detected
- D = the diluted value was reported
- J = value is estimated
- J+ = value is estimated
and biased high
- J- = value is estimated
and biased low
- = compound was not analyzed
- µg/L = micrograms per liter
- mg/L = milligrams per liter
- ms/cm = millisiemens per centimeter
- mV = millivolts
- ntu = nephelometric turbidity units

Table 4-2
McCormick and Baxter Groundwater Total and Dissolved Metals, Conventionals, Gases, and Field Data Results
April-May 2006

Aquifer Zone Location ID Sample ID Date Sampled Field QC	B OS-4B OS4B12 05/02/2006	C DSW-1C DSW1C12 04/27/2006	C DSW-3C DSW3C12 05/03/2006 Parent Sample	C DSW-3C 5DSW10C12 05/03/2006 Field Duplicate	C DSW-7C DSW7C12 05/01/2006
Total Metals (µg/L)					
total manganese	83.3 J	125	381 J	349 J	68.1 J
Dissolved Metals (µg/L)					
dissolved manganese	85.4 J	126	142 J	141 J	81.5 J
Conventionals (mg/L)					
chloride	220 D	320 D	120 D	120 D	240 D
nitrate as N	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
nitrite as N	0.5 UJ	1.0 UJ	0.5 UJ	0.5 UJ	1.0 UJ
sulfate	100 D	0.5 U	0.5 U	0.5 U	0.5 U
total organic carbon	1.4 J	9.3	2.0	2.6	4.3
RSK 175 (µg/L)					
ethane	1.1 U	11 U	11 U	11 U	11 U
ethene	1.0 U	10 U	10 U	10 U	10 U
methane	37	14000 D	11000 D	12000 D	7000 D
Field Data					
Field Meter					
Sp. Cond. (ms/cm)	1.283	1.48	0.929	0.929	0.73
D.O. (mg/L)	0.43	0.23	0.7	0.7	0.73
ORP (Eh) (mV)	-244	-229	-248	-248	-196
pH (Standard Units)	8.21	8.88	8.27	8.27	8.52
Temperature (degrees C)	19.85	20.25	18.56	18.56	20.62
Turbidity (NTU)	9.2	16.5	36.9	36.9	5.6
Test Kits (mg/L)					
DO	0.5	0.3	0.4	0.4	0.7
CO2	208	15	30	30	29.7
Ferrous Iron	0.4	0	0.2	0.2	0.3
Total Iron	0.9	2	4.8	4.8	1.1

notes:

U = the analyte was not detected

D = the diluted value was reported

J = value is estimated

J+ = value is estimated
and biased high

J- = value is estimated
and biased low

-- = compound was not analyzed

µg/L = micrograms per liter

mg/L = milligrams per liter

ms/cm = millisiemens per centimeter

mV = millivolts

ntu = nephelometric turbidity units

Table 4-2
McCormick and Baxter Groundwater Total and Dissolved Metals, Conventionals, Gases, and Field Data Results
April-May 2006

Aquifer Zone Location ID Sample ID Date Sampled Field QC	C MW-8C MW8C12 05/03/2006	C OFS-5C OFS5C12 05/04/2006	C ONS-1C ONS1C12 04/26/2006	C OS-1C OS1C12 05/02/2006	D DSW-4D DSW4D12 04/27/2006
Total Metals (µg/L)					
total manganese	219 J	70.8 J	207	403 J	108
Dissolved Metals (µg/L)					
dissolved manganese	210 J	33.8 J	203	390 J	114
Conventionals (mg/L)					
chloride	270 D	210 D	210 D	610 D	290 D
nitrate as N	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
nitrite as N	1.0 UJ	0.5 UJ	1.0 UJ	2.0 UJ	1.0 UJ
sulfate	0.5 U	65 D	0.5 U	0.5 U	0.43 J
total organic carbon	7.2	2.2	14 J+	1.9 J	1.9 J
RSK 175 (µg/L)					
ethane	11 U	1.1 U	11 U	11 U	11 U
ethene	10 U	1.0 U	10 U	10 U	10 U
methane	13000 D	14	22000 D	2300 D	16000 D
Field Data					
Field Meter					
Sp. Cond. (ms/cm)	0	1.125	1.11	2.17	1.25
D.O. (mg/L)	0.34	0.51	1.13	0.36	0.44
ORP (Eh) (mV)	-244	-281	70	-231	-182
pH (Standard Units)	8.27	8.79	8.06	8.04	8.86
Temperature (degrees C)	22.33	20.96	22.31	20.54	20.16
Turbidity (NTU)	2.1	52	0.7	42	--
Test Kits (mg/L)					
DO	0.4	0.4	0.5	0.15	0.5
CO2	47	66	27	292	15
Ferrous Iron	0	0.4	0	0.6	0.1
Total Iron	0.8	4.2	0.3	2	1

notes:

- U = the analyte was not detected
- D = the diluted value was reported
- J = value is estimated
- J+ = value is estimated
and biased high
- J- = value is estimated
and biased low
- = compound was not analyzed
- µg/L = micrograms per liter
- mg/L = milligrams per liter
- ms/cm = millisiemens per centimeter
- mV = millivolts
- ntu = nephelometric turbidity units

Table 4-2
McCormick and Baxter Groundwater Total and Dissolved Metals, Conventionals, Gases, and Field Data Results
April-May 2006

Aquifer Zone Location ID Sample ID Date Sampled Field QC	D MW-7D MW7D12 05/01/2006	D OFS-1D OFS1D12 05/04/2006	D OFS-4D OFS4D12 05/03/2006 Parent Sample	D OFS-4D 5OFS9D12 05/03/2006 Field Duplicate	D ONS-1D ONS1D12 04/26/2006
Total Metals (µg/L)					
total manganese	13.0 J	197 J	253 J	247 J	267
Dissolved Metals (µg/L)					
dissolved manganese	15.0 UJ	195 J	251 J	248 J	261
Conventionals (mg/L)					
chloride	310 D	340 D	260 D	260 D	280 D
nitrate as N	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
nitrite as N	1.0 UJ	1.0 UJ	1.0 UJ	1.0 UJ	1.0 UJ
sulfate	5.9	1.4	0.5 U	0.5 U	0.5 U
total organic carbon	8.9	1.5 J	2.7	2.7	2.2 J+
RSK 175 (µg/L)					
ethane	11 U	11 U	11 U	11 U	11 U
ethene	10 U	10 U	10 U	10 U	10 U
methane	2700 D	10000 D	4100 D	3900 D	13000 D
Field Data					
Field Meter					
Sp. Cond. (ms/cm)	1.85	1.343	1.156	1.156	1.223
D.O. (mg/L)	0.5	0.72	0.45	0.45	0.32
ORP (Eh) (mV)	-224	-265	-266	-266	-228
pH (Standard Units)	11.56	8.2	8.28	8.28	8.64
Temperature (degrees C)	23.86	20.65	21.11	21.11	21.44
Turbidity (NTU)	4.2	2.8	1.1	1.1	0.9
Test Kits (mg/L)					
DO	3.5	0.2	0.2	0.2	1
CO2	0	37	35	35	17
Ferrous Iron	0	0	0	0	0.1
Total Iron	0.5	0.3	0.5	0.5	0.25

notes:

U = the analyte was not detected

D = the diluted value was reported

J = value is estimated

J+ = value is estimated
and biased high

J- = value is estimated
and biased low

-- = compound was not analyzed

µg/L = micrograms per liter

mg/L = milligrams per liter

ms/cm = millisiemens per centimeter

mV = millivolts

ntu = nephelometric turbidity units

Table 4-2
McCormick and Baxter Groundwater Total and Dissolved Metals, Conventionals, Gases, and Field Data Results
April-May 2006

Aquifer Zone Location ID Sample ID Date Sampled Field QC	D OS-5D OS5D12 05/02/2006	E DSW-2E DSW2E12 05/01/2006	E MW-4E MW4E12 04/27/2006	E MW-5E MW5E12 05/01/2006	E MW-6E MW6E12 05/01/2006
Total Metals (µg/L)					
total manganese	373 J	112 J	2000	193 J	180 J
Dissolved Metals (µg/L)					
dissolved manganese	367 J	113 J	271	193 J	180 J
Conventionals (mg/L)					
chloride	380 D	250 D	310 D	270 D	280 D
nitrate as N	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
nitrite as N	1.0 UJ	1.0 UJ	1.0 UJ	1.0 UJ	1.0 UJ
sulfate	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
total organic carbon	1.2 J	1.0 J	5.9	2.0 U	2.0 U
RSK 175 (µg/L)					
ethane	11 U	11 U	11 U	11 U	11 U
ethene	10 U	10 U	10 U	10 U	10 U
methane	9100 D	8000 D	14000 D	11000 D	12000 D
Field Data					
Field Meter					
Sp. Cond. (ms/cm)	1.5	1.08	1.299	1.117	0.64
D.O. (mg/L)	0.5	1.02	0.14	0.52	0.33
ORP (Eh) (mV)	-112	-171	-233	-218	-234
pH (Standard Units)	7.69	8.88	9.08	8.23	8.94
Temperature (degrees C)	22.53	20.92	21.32	20.04	19.93
Turbidity (NTU)	1	1.9	73.2	1.7	1.8
Test Kits (mg/L)					
DO	0.5	1	0.3	0.5	0.35
CO2	28	28.6	10.5	30.8	16
Ferrous Iron	0.8	0.8	0.6	0	0.1
Total Iron	0.9	1	> 10	0	0.6

notes:

U = the analyte was not detected

D = the diluted value was reported

J = value is estimated

J+ = value is estimated
and biased high

J- = value is estimated
and biased low

-- = compound was not analyzed

µg/L = micrograms per liter

mg/L = milligrams per liter

ms/cm = millisiemens per centimeter

mV = millivolts

ntu = nephelometric turbidity units

Table 4-2
McCormick and Baxter Groundwater Total and Dissolved Metals, Conventionals, Gases, and Field Data Results
April-May 2006

Aquifer Zone Location ID Sample ID Date Sampled Field QC	E OFS-5E OFS5E12 05/04/2006	E OS-1E OS1E12 05/02/2006
Total Metals (µg/L)		
total manganese	116 J	261 J
Dissolved Metals (µg/L)		
dissolved manganese	113 J	260 J
Conventionals (mg/L)		
chloride	170 D	300 D
nitrate as N	0.1 U	0.1 U
nitrite as N	0.5 UJ	1.0 UJ
sulfate	0.5 U	0.5 U
total organic carbon	2.0 U	1.5 J
RSK 175 (µg/L)		
ethane	11 U	11 U
ethene	10 U	10 U
methane	9100 D	5900 D
Field Data		
Field Meter		
Sp. Cond. (ms/cm)	0.804	1.308
D.O. (mg/L)	0.57	0.52
ORP (Eh) (mV)	-213	-190
pH (Standard Units)	8.39	8.1
Temperature (degrees C)	20.19	20.41
Turbidity (NTU)	1	12.5
Test Kits (mg/L)		
DO	0.6	0.25
CO2	26	71
Ferrous Iron	0	0.4
Total Iron	0.1	1

notes:

- U = the analyte was not detected
- D = the diluted value was reported
- J = value is estimated
- J+ = value is estimated
and biased high
- J- = value is estimated
and biased low
- = compound was not analyzed
- µg/L = micrograms per liter
- mg/L = milligrams per liter
- ms/cm = millisiemens per centimeter
- mV = millivolts
- ntu = nephelometric turbidity units

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Table 4-3 Preliminary Cleanup Levels

Indicator Chemical	Federal Maximum Contaminant Level/Maximum Contaminant Level Goal ^a	State Maximum Contaminant Level	State Water Resources Control Board Resolution 92-49	Other
Carcinogenic PAHs: ^b Benzo(a)pyrene Benzo(b)fluoranthene Benzo(k)fluoranthene Indeno(1,2,3-cd)pyrene Dibenzo(a,h)anthracene Chrysene Benzo(a)anthracene	0.2	---	Background - MCL	0.2 ^c
Non-Carcinogenic PAHs: -Acenaphthene	---	---	Background – WQO	370 ^d
-Naphthalene	---	---	Background - WQO	6.2 ^e
Pentachlorophenol	1.0	---	Background - MCL	1 ^c
2,3,7,8-TCDD	0.00003	---	Background - MCL	0.00003 ^c
Arsenic	10	50	Background - MCL	50 ^c (18.1) ^f (30.0) ^f (43.3) ^f

^a Non-zero Maximum Contaminant Level Goal

^b Based on Relative Potency Values for benzo(a)pyrene

^c Water Quality Control Plan for Central Valley Basin, Water Quality Objectives (WQO) for Groundwater

^d Based on Reference Dose

^e Region 9 Preliminary Remediation Goal (PRG) for tap water (1 x 10⁻⁶ risk)

^f Reference concentration from site background wells for aquifer zones A, C and E

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FIGURES

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U.S. ARMY CORPS OF ENGINEERS SEATTLE DISTRICT		
McCormick and Baxter Superfund Site 2006 Groundwater Sampling Report		
Site Location		
STOCKTON	Figure 2-1	CALIFORNIA



Oily Waste Ponds

Cellon Process Area

Main Processing Area

PCP Mixing Shed/
Butt Tank Area

0 Feet 500



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McCormick and Baxter
Superfund Site
2006 Groundwater Sampling Report

Principal Source Areas

STOCKTON

Figure 2-2

CALIFORNIA



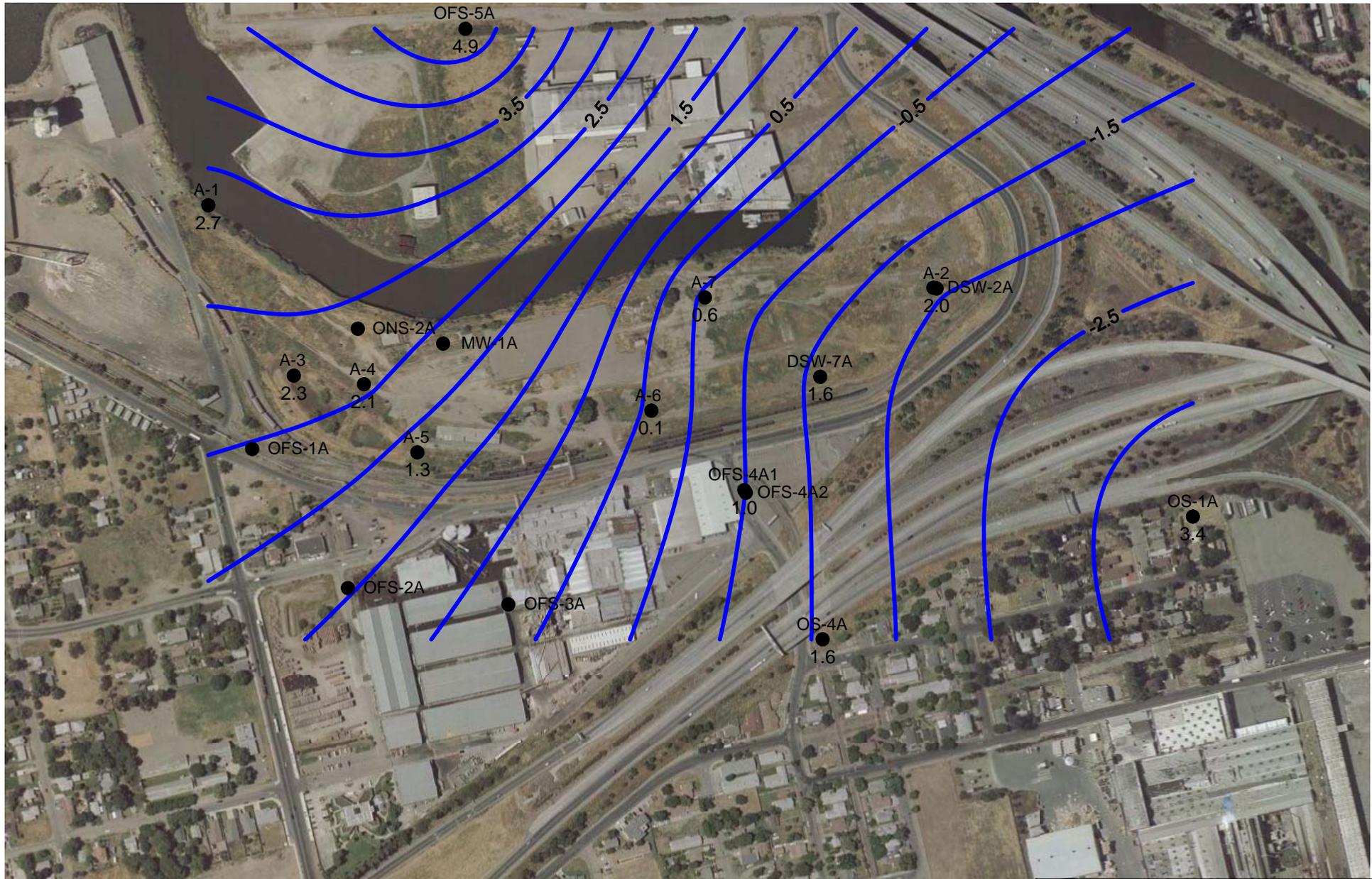
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U.S. ARMY CORPS OF ENGINEERS
SEATTLE DISTRICT

McCormick and Baxter
Superfund Site
2006 Groundwater Sampling Report

Monitoring Well Locations



LEGEND

- 9.5 Groundwater Contour
- MW-9B Monitoring Well with Groundwater Elevation -9.49

Notes:

1. Contouring accomplished using the kriging method in Surfer ver. 8. Pronounced curvature of contours at wells near the edge of the contoured area is an artifact of contouring software.
2. Contour interval = 0.5 ft for A-zone and 0.25 ft for B- through E-zones.

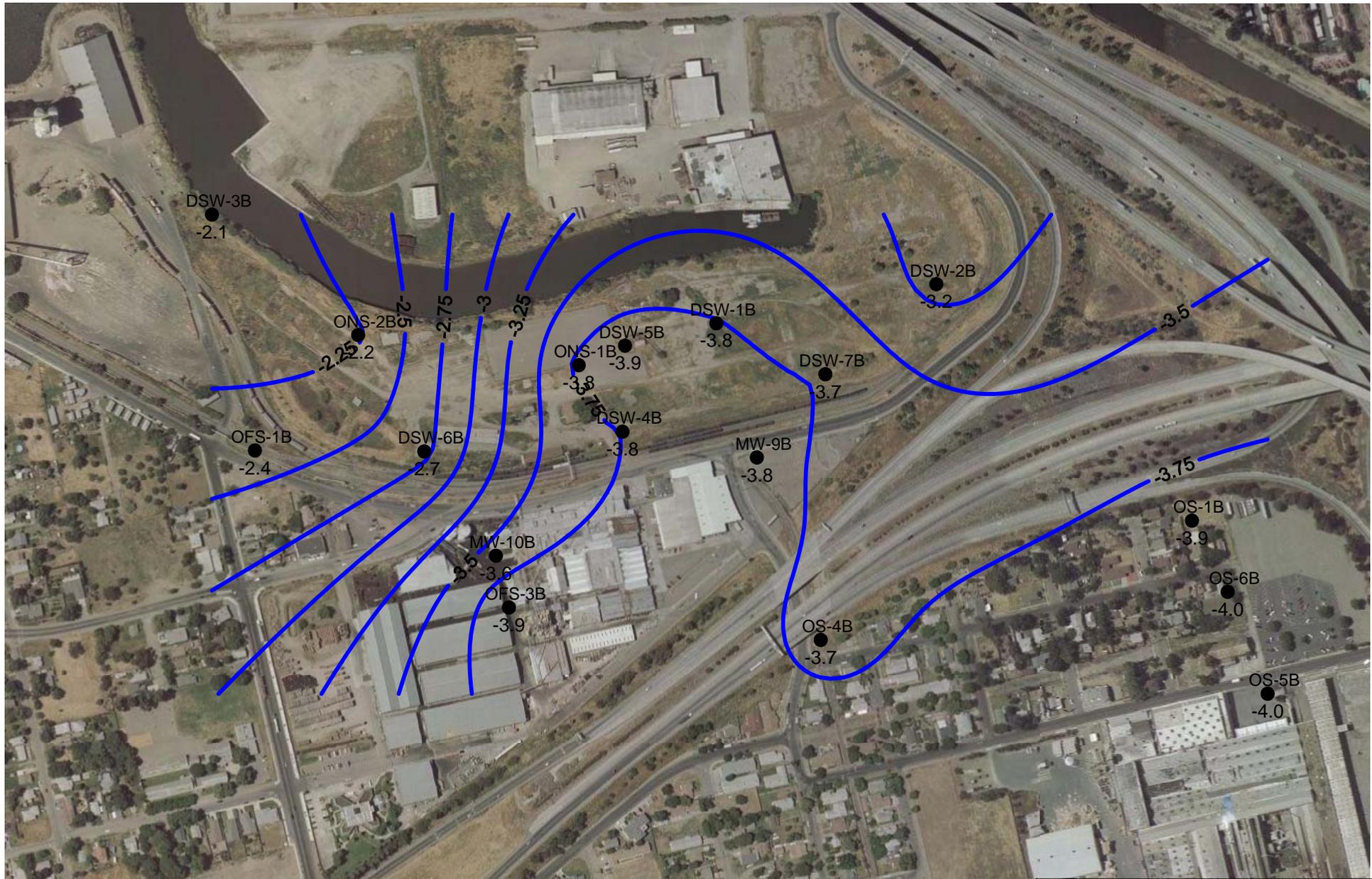
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SEATTLE DISTRICT

McCormick and Baxter
Superfund Site
2006 Groundwater Sampling Report

A-Zone
Potentiometric Surface Map



LEGEND

- 9.5 Groundwater Contour
- MW-9B
-9.49 Monitoring Well with Groundwater Elevation

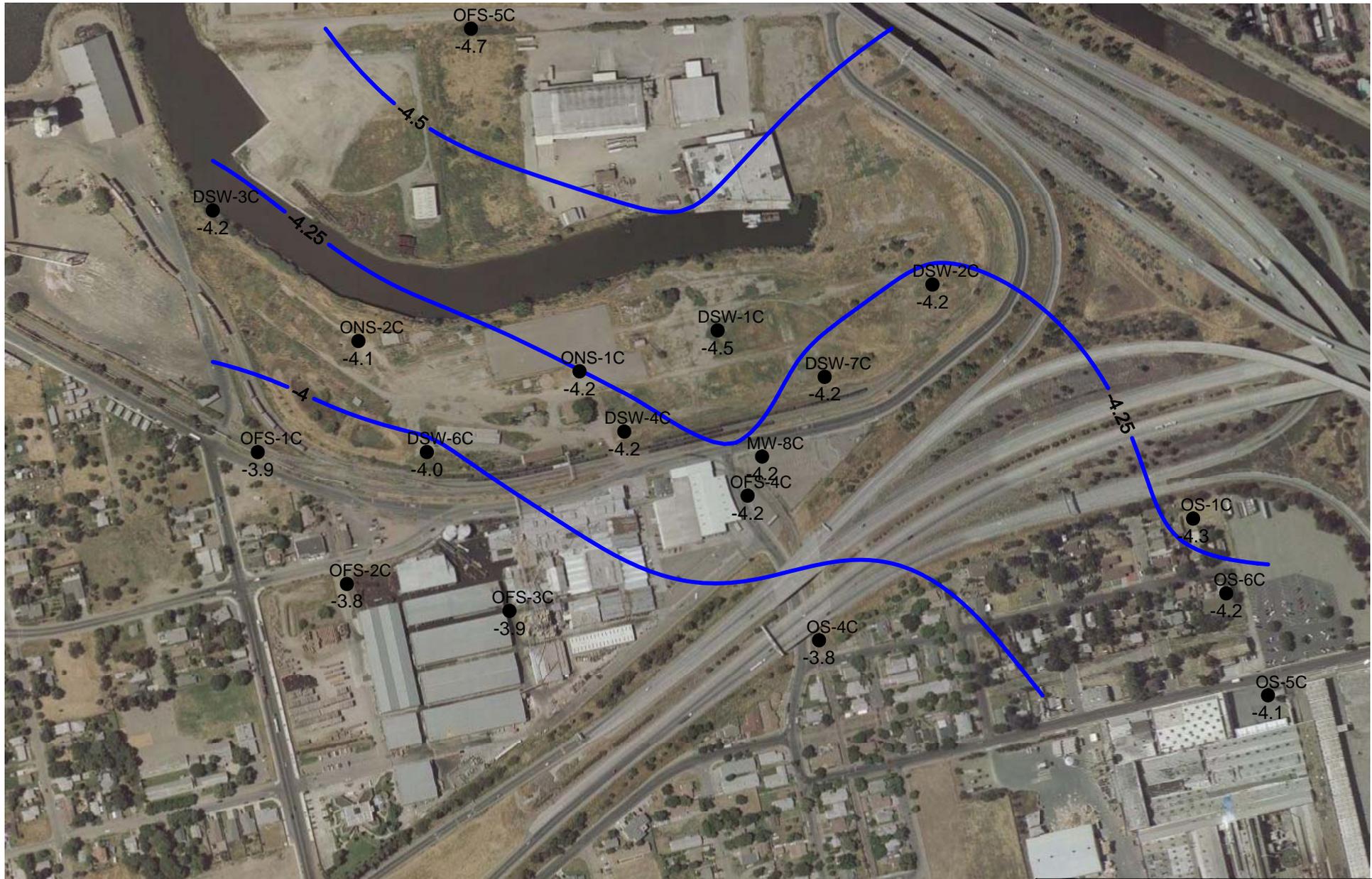
Notes:
 1. Contouring accomplished using the kriging method in Surfer ver. 8. Pronounced curvature of contours at wells near the edge of the contoured area is an artifact of contouring software.
 2. Contour interval = 0.5 ft for A-zone and 0.25 ft for B- through E-zones.



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McCormick and Baxter
Superfund Site
2006 Groundwater Sampling Report
B-Zone

Potentiometric Surface Map



LEGEND

-  Groundwater Contour
-  Monitoring Well with Groundwater Elevation

Notes:

1. Contouring accomplished using the kriging method in Surfer ver. 8. Pronounced curvature of contours at wells near the edge of the contoured area is an artifact of contouring software.
2. Contour interval = 0.5 ft for A-zone and 0.25 ft for B- through E-zones.

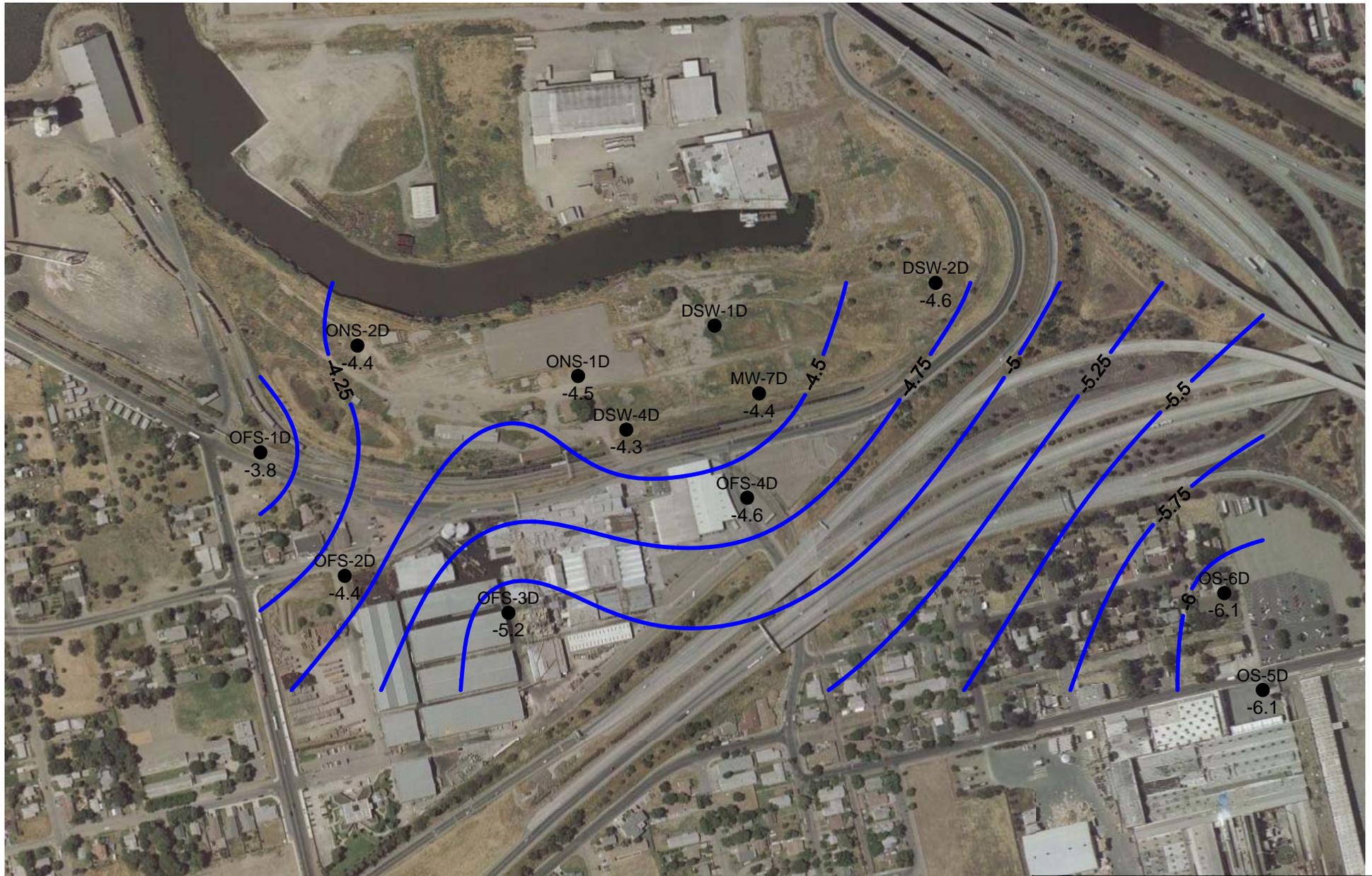
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McCormick and Baxter
Superfund Site
2006 Groundwater Sampling Report
C-Zone

Potentiometric Surface Map



LEGEND

-  -9.5 Groundwater Contour
-  MW-9B Monitoring Well with Groundwater Elevation -9.49

Notes:

1. Contouring accomplished using the kriging method in Surfer ver. 8. Pronounced curvature of contours at wells near the edge of the contoured area is an artifact of contouring software.
2. Contour interval = 0.5 ft for A-zone and 0.25 ft for B- through E-zones.

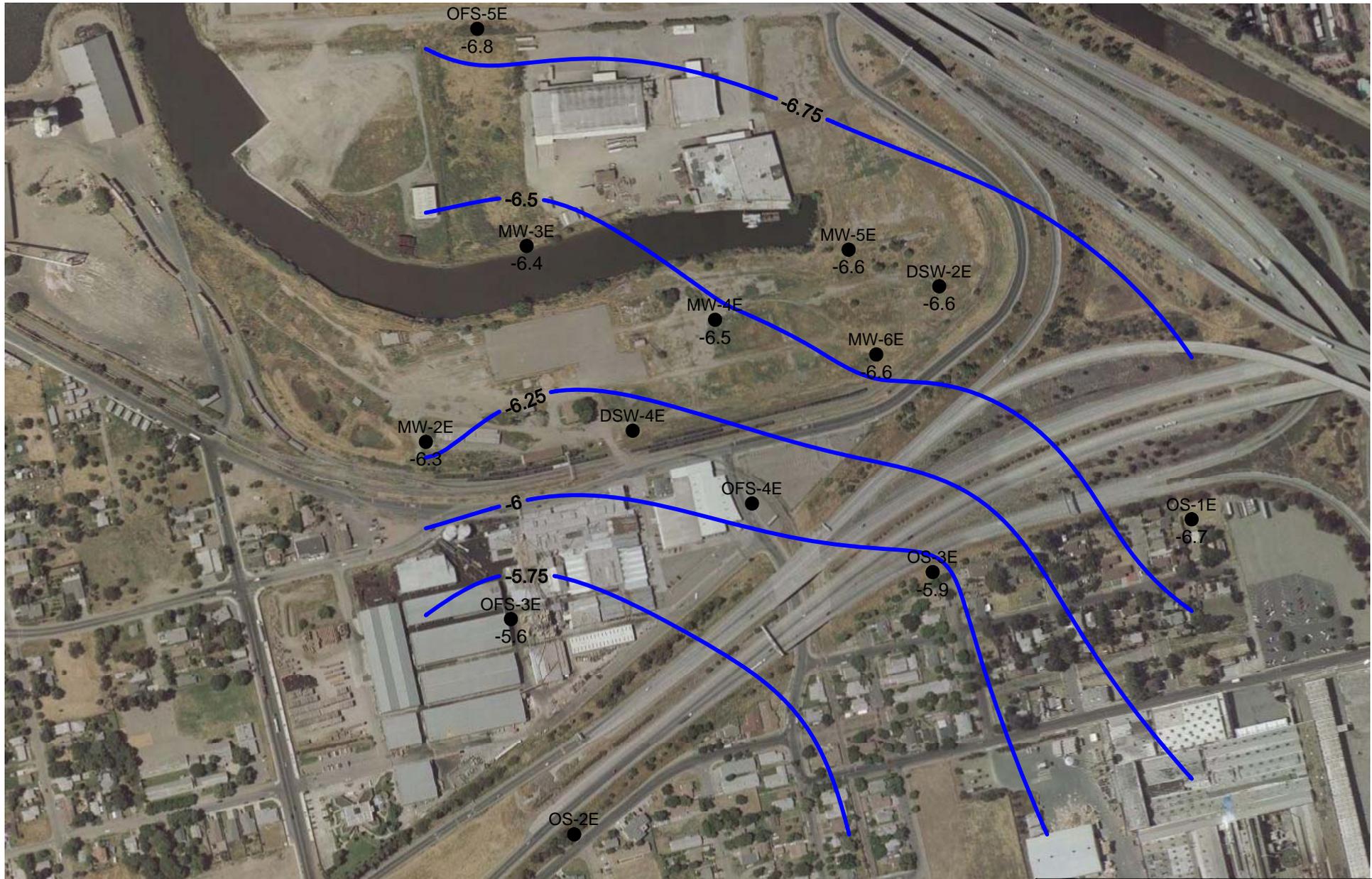
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McCormick and Baxter
Superfund Site
2006 Groundwater Sampling Report

D-Zone
Potentiometric Surface Map



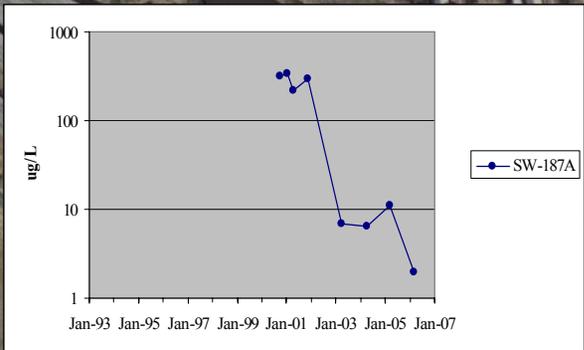
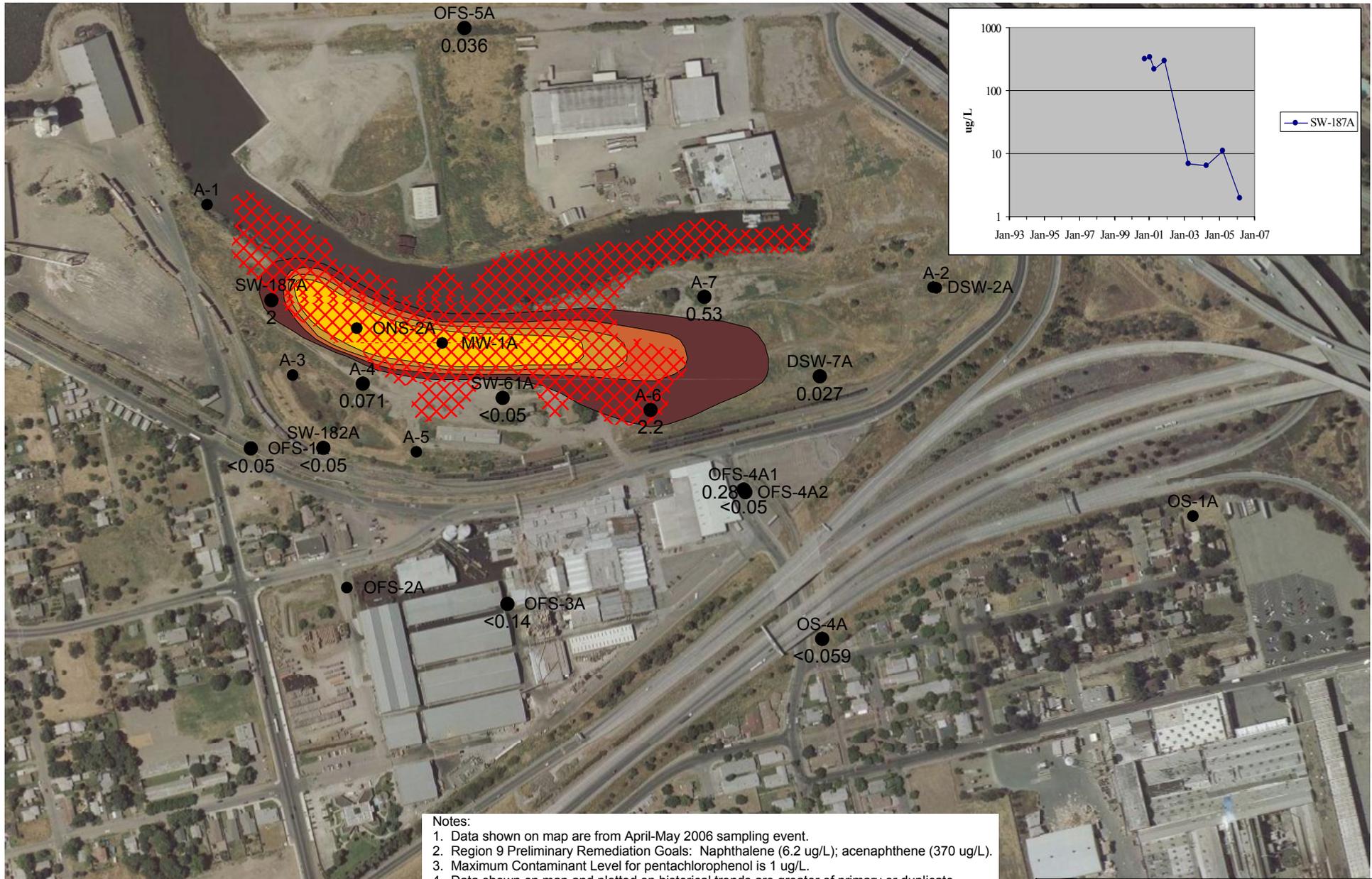
LEGEND

- 9.5 Groundwater Contour
- MW-9B Monitoring Well with Groundwater Elevation -9.49

Notes:
 1. Contouring accomplished using the kriging method in Surfer ver. 8. Pronounced curvature of contours at wells near the edge of the contoured area is an artifact of contouring software.
 2. Contour interval = 0.5 ft for A-zone and 0.25 ft for B- through E-zones.



U.S. ARMY CORPS OF ENGINEERS SEATTLE DISTRICT		
McCormick and Baxter Superfund Site 2006 Groundwater Sampling Report E-Zone Potentiometric Surface Map		
STOCKTON	Figure 4-5	CALIFORNIA



Notes:

1. Data shown on map are from April-May 2006 sampling event.
2. Region 9 Preliminary Remediation Goals: Naphthalene (6.2 ug/L); acenaphthene (370 ug/L).
3. Maximum Contaminant Level for pentachlorophenol is 1 ug/L.
4. Data shown on map and plotted on historical trends are greater of primary or duplicate.
5. Nitrate and sulfate data are in mg/L; all other data are in ug/L.
6. Contaminant concentration isopleths, which are hand-drawn, are inherently speculative, because the monitoring well network provides better definition in some areas than others.
7. For areas that have been shown to be contaminant hot-spots and that are not covered by the current groundwater monitoring program, historical results were taken into account to more accurately portray the groundwater plume.
8. Data qualifiers are not shown.

LEGEND

- 10,000 ug/L
- 1,000 ug/L
- 100 ug/L
- 10 ug/L
- 1 ug/L
- Suspected NAPL Location
- MW-9B Monitoring Well with Concentration 140

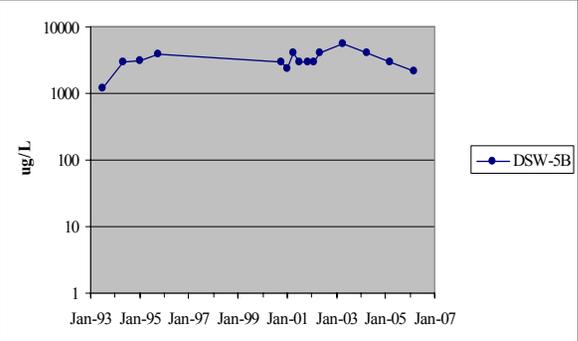
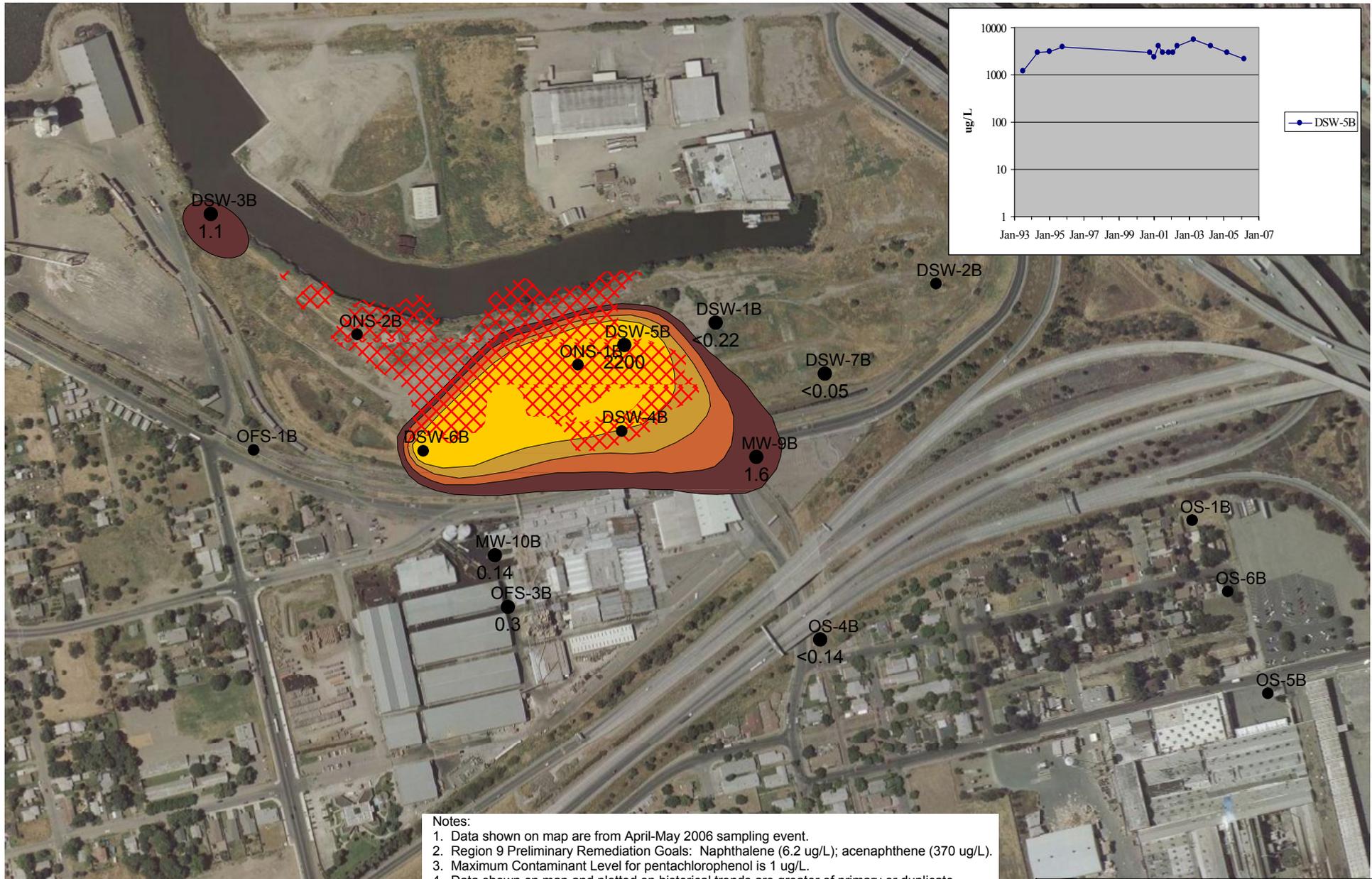
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U.S. ARMY CORPS OF ENGINEERS
SEATTLE DISTRICT

McCormick and Baxter
Superfund Site
2006 Groundwater Sampling Report

A-Zone
Naphthalene



- Notes:
1. Data shown on map are from April-May 2006 sampling event.
 2. Region 9 Preliminary Remediation Goals: Naphthalene (6.2 ug/L); acenaphthene (370 ug/L).
 3. Maximum Contaminant Level for pentachlorophenol is 1 ug/L.
 4. Data shown on map and plotted on historical trends are greater of primary or duplicate.
 5. Nitrate and sulfate data are in mg/L; all other data are in ug/L.
 6. Contaminant concentration isopleths, which are hand-drawn, are inherently speculative, because the monitoring well network provides better definition in some areas than others.
 7. For areas that have been shown to be contaminant hot-spots and that are not covered by the current groundwater monitoring program, historical results were taken into account to more accurately portray the groundwater plume.
 8. Data qualifiers are not shown.

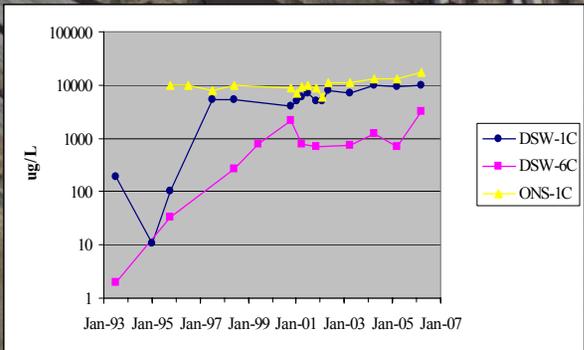
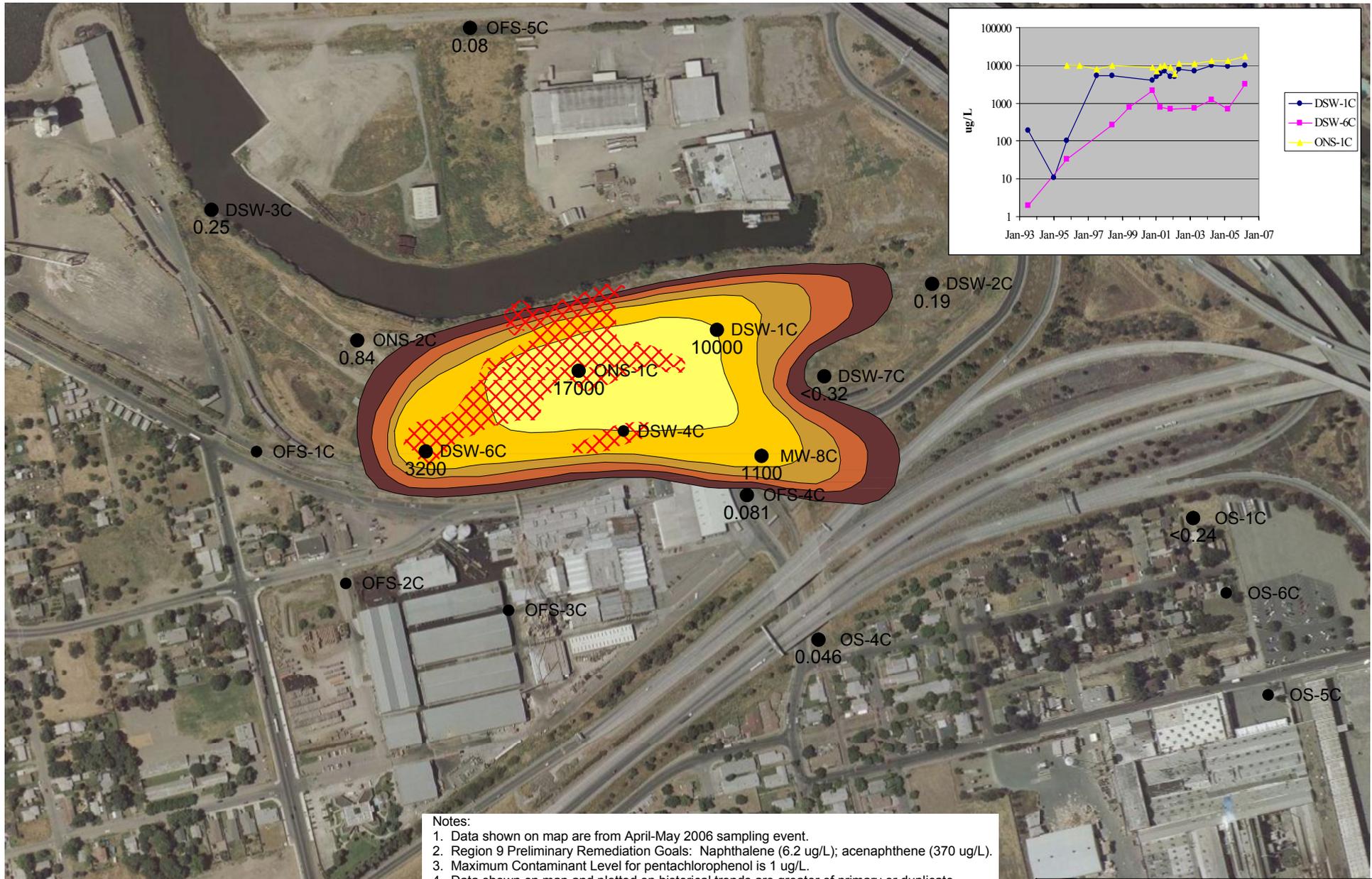
LEGEND

- 10,000 ug/L
- 1,000 ug/L
- 100 ug/L
- 10 ug/L
- 1 ug/L
- Suspected NAPL Location
- MW-9B Monitoring Well with Concentration



U.S. ARMY CORPS OF ENGINEERS
SEATTLE DISTRICT
 McCormick and Baxter
 Superfund Site
 2006 Groundwater Sampling Report
 B-Zone
 Naphthalene

STOCKTON	Figure 4-7	CALIFORNIA
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Notes:

1. Data shown on map are from April-May 2006 sampling event.
2. Region 9 Preliminary Remediation Goals: Naphthalene (6.2 ug/L); acenaphthene (370 ug/L).
3. Maximum Contaminant Level for pentachlorophenol is 1 ug/L.
4. Data shown on map and plotted on historical trends are greater of primary or duplicate.
5. Nitrate and sulfate data are in mg/L; all other data are in ug/L.
6. Contaminant concentration isopleths, which are hand-drawn, are inherently speculative, because the monitoring well network provides better definition in some areas than others.
7. For areas that have been shown to be contaminant hot-spots and that are not covered by the current groundwater monitoring program, historical results were taken into account to more accurately portray the groundwater plume.
8. Data qualifiers are not shown.

LEGEND

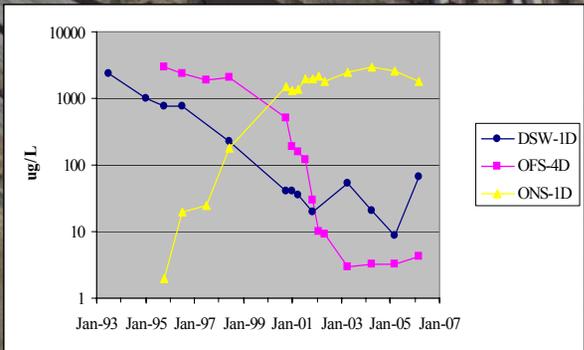
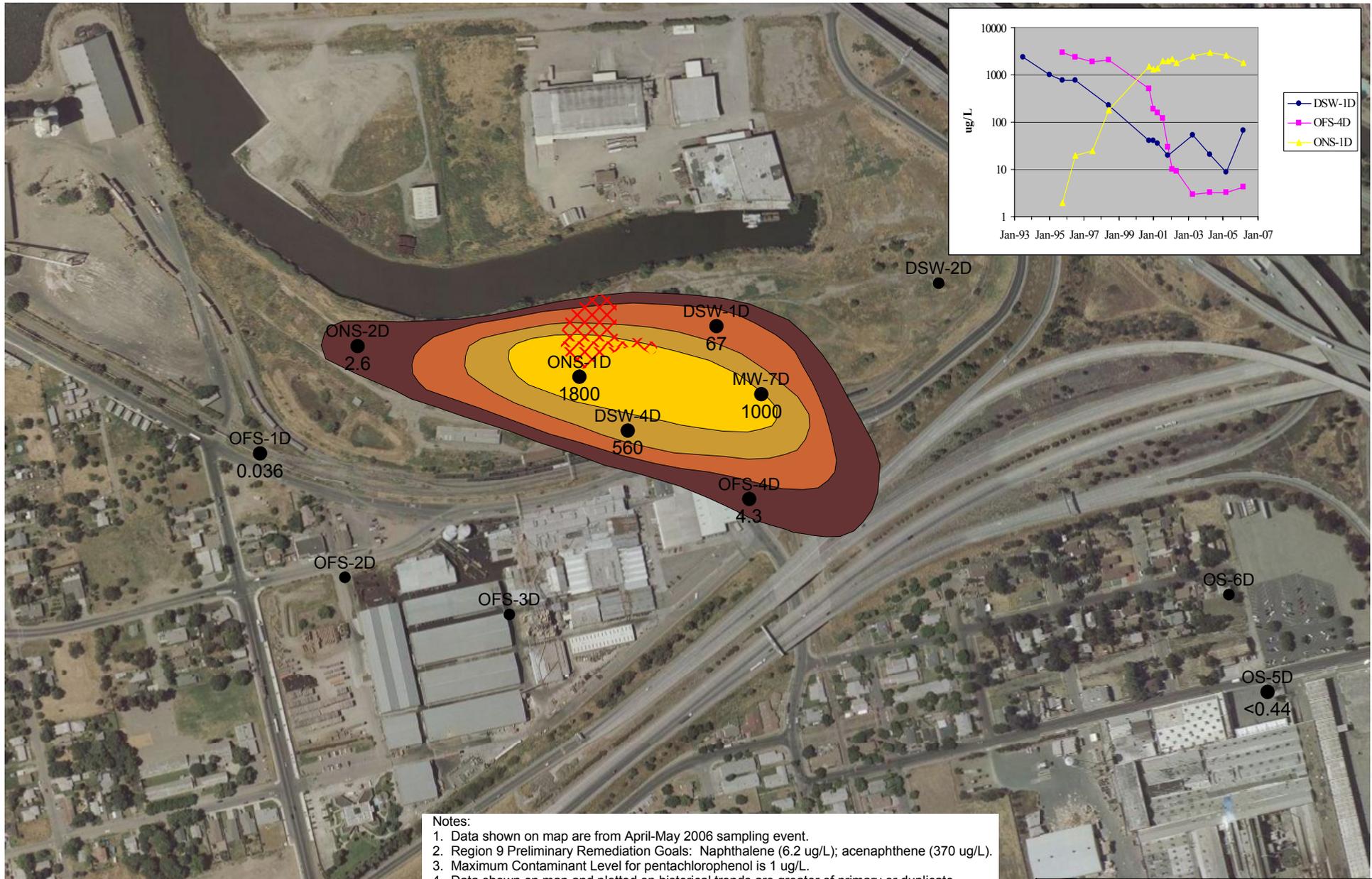
- 10,000 ug/L
- 1,000 ug/L
- 100 ug/L
- 10 ug/L
- 1 ug/L
- Suspected NAPL Location
- MW-9B Monitoring Well with Concentration 140

0 Feet 500



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SEATTLE DISTRICT

McCormick and Baxter
Superfund Site
2006 Groundwater Sampling Report
C-Zone
Naphthalene



Notes:

1. Data shown on map are from April-May 2006 sampling event.
2. Region 9 Preliminary Remediation Goals: Naphthalene (6.2 ug/L); acenaphthene (370 ug/L).
3. Maximum Contaminant Level for pentachlorophenol is 1 ug/L.
4. Data shown on map and plotted on historical trends are greater of primary or duplicate.
5. Nitrate and sulfate data are in mg/L; all other data are in ug/L.
6. Contaminant concentration isopleths, which are hand-drawn, are inherently speculative, because the monitoring well network provides better definition in some areas than others.
7. For areas that have been shown to be contaminant hot-spots and that are not covered by the current groundwater monitoring program, historical results were taken into account to more accurately portray the groundwater plume.
8. Data qualifiers are not shown.

LEGEND

- 10,000 ug/L
- 1,000 ug/L
- 100 ug/L
- 10 ug/L
- 1 ug/L
- Suspected NAPL Location
- MW-9B Monitoring Well with Concentration

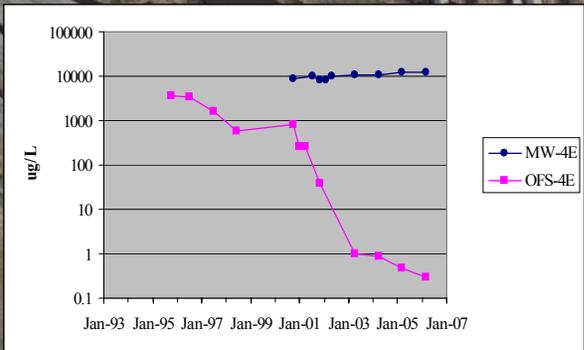
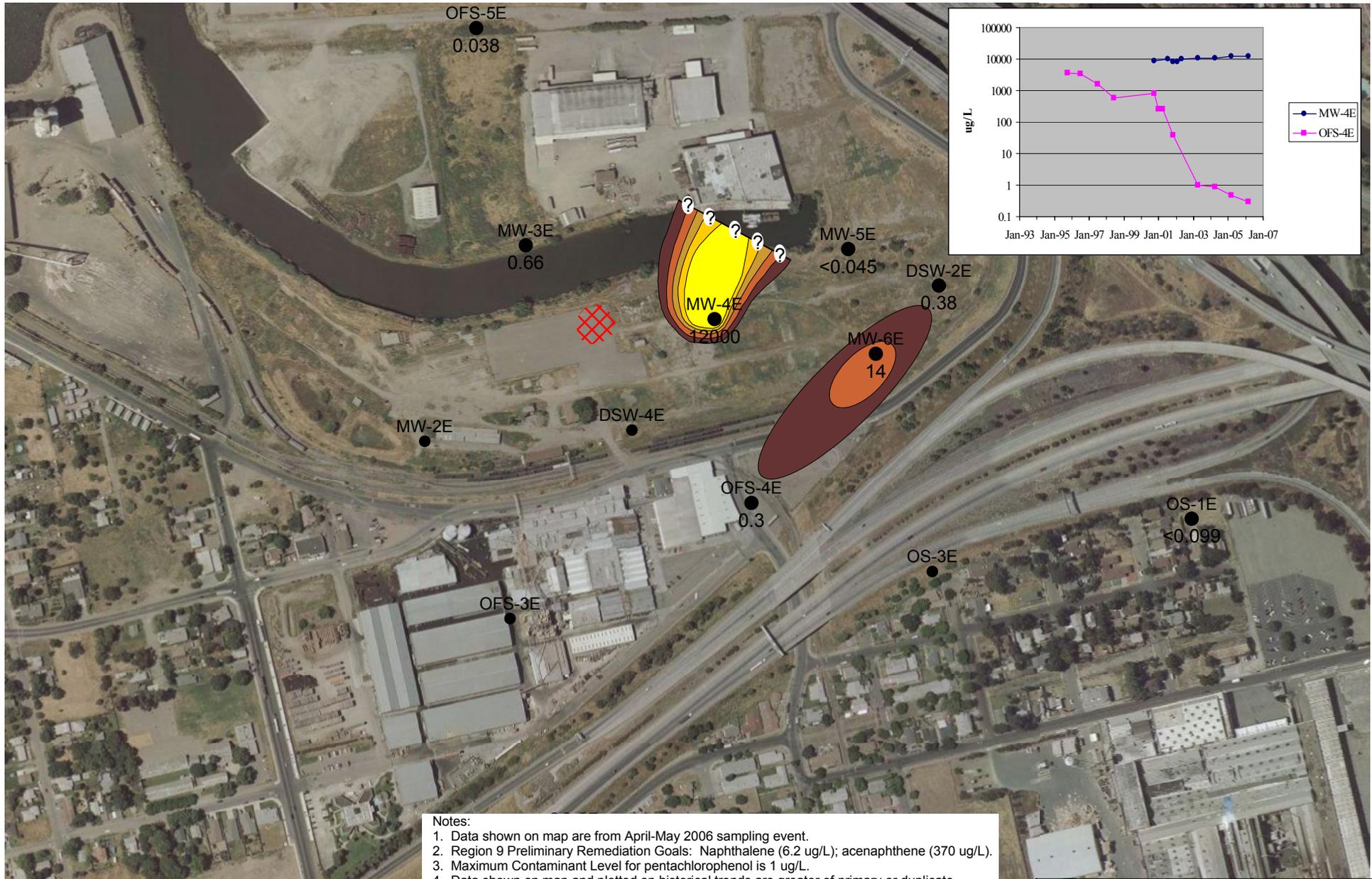
0 Feet 500



U.S. ARMY CORPS OF ENGINEERS
SEATTLE DISTRICT

McCormick and Baxter
Superfund Site
2006 Groundwater Sampling Report

D-Zone
Naphthalene



Notes:

1. Data shown on map are from April-May 2006 sampling event.
2. Region 9 Preliminary Remediation Goals: Naphthalene (6.2 ug/L); acenaphthene (370 ug/L).
3. Maximum Contaminant Level for pentachlorophenol is 1 ug/L.
4. Data shown on map and plotted on historical trends are greater of primary or duplicate.
5. Nitrate and sulfate data are in mg/L; all other data are in ug/L.
6. Contaminant concentration isopleths, which are hand-drawn, are inherently speculative, because the monitoring well network provides better definition in some areas than others.
7. For areas that have been shown to be contaminant hot-spots and that are not covered by the current groundwater monitoring program, historical results were taken into account to more accurately portray the groundwater plume.
8. Data qualifiers are not shown.

LEGEND

- 10,000 ug/L
- 1,000 ug/L
- 100 ug/L
- 10 ug/L
- 1 ug/L
- Suspected NAPL Location
- MW-9B Monitoring Well with Concentration

0 Feet 500



U.S. ARMY CORPS OF ENGINEERS
SEATTLE DISTRICT

McCormick and Baxter
Superfund Site
2006 Groundwater Sampling Report

E-Zone
Naphthalene



Notes:

1. Data shown on map are from April-May 2006 sampling event.
2. Region 9 Preliminary Remediation Goals: Naphthalene (6.2 ug/L); acenaphthene (370 ug/L).
3. Maximum Contaminant Level for pentachlorophenol is 1 ug/L.
4. Data shown on map and plotted on historical trends are greater of primary or duplicate.
5. Nitrate and sulfate data are in mg/L; all other data are in ug/L.
6. Contaminant concentration isopleths, which are hand-drawn, are inherently speculative, because the monitoring well network provides better definition in some areas than others.
7. For areas that have been shown to be contaminant hot-spots and that are not covered by the current groundwater monitoring program, historical results were taken into account to more accurately portray the groundwater plume.
8. Data qualifiers are not shown.

LEGEND

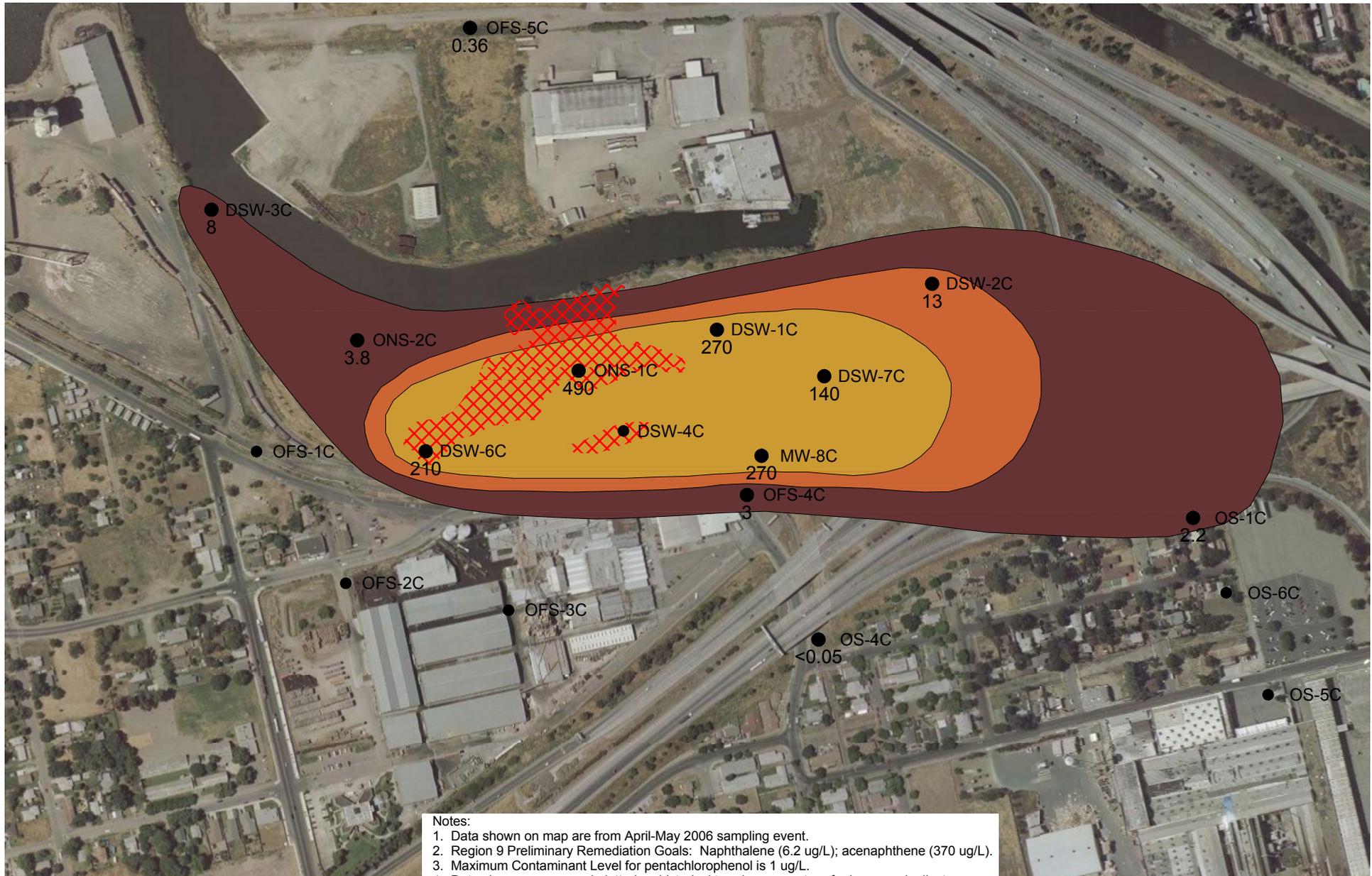
- 10,000 ug/L
- 1,000 ug/L
- 100 ug/L
- 10 ug/L
- 1 ug/L
- Suspected NAPL Location
- MW-9B Monitoring Well with Concentration 140

0 Feet 500



U.S. ARMY CORPS OF ENGINEERS
SEATTLE DISTRICT

McCormick and Baxter
Superfund Site
2006 Groundwater Sampling Report
B-Zone
Acenaphthene



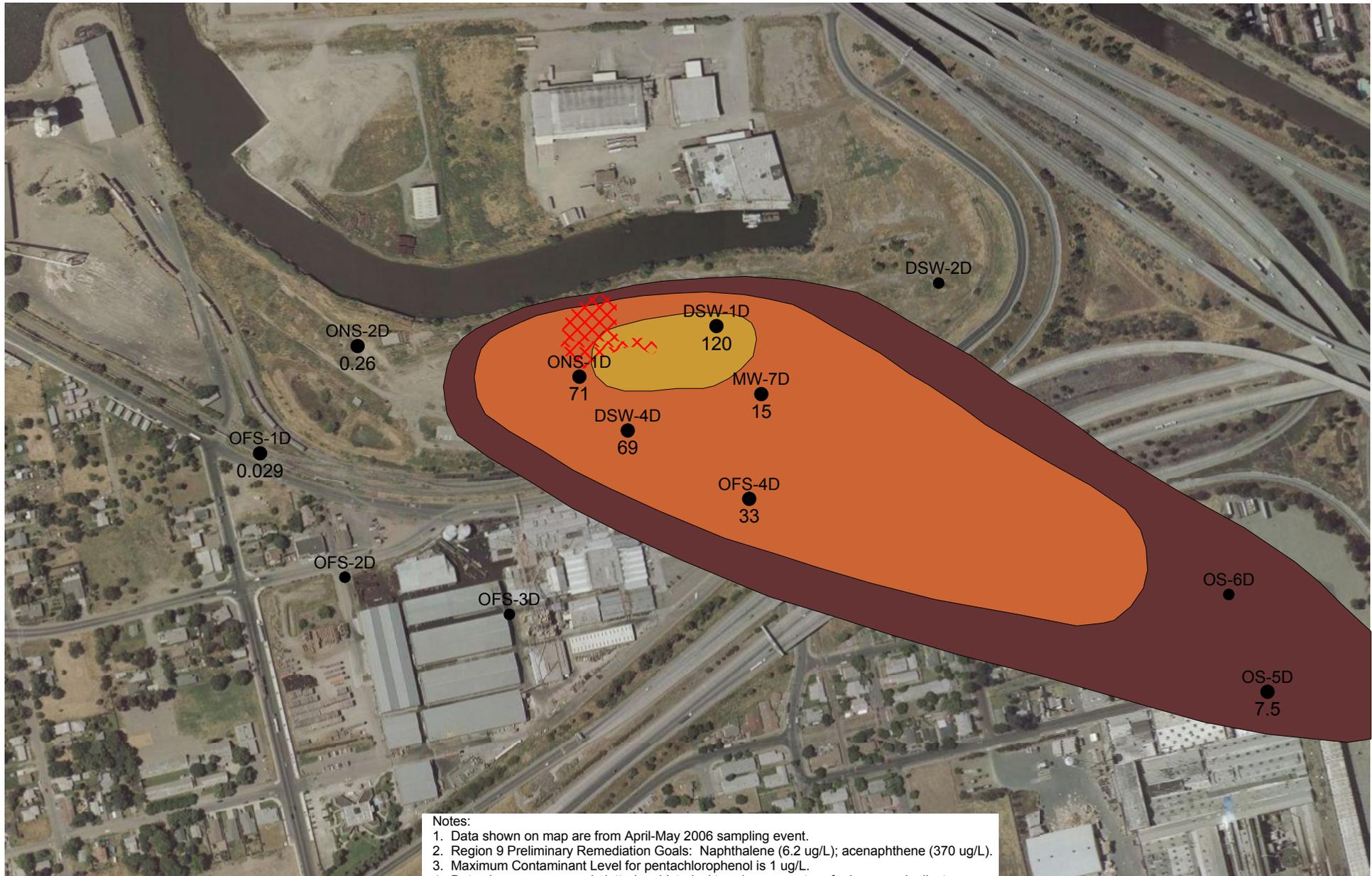
- Notes:
1. Data shown on map are from April-May 2006 sampling event.
 2. Region 9 Preliminary Remediation Goals: Naphthalene (6.2 ug/L); acenaphthene (370 ug/L).
 3. Maximum Contaminant Level for pentachlorophenol is 1 ug/L.
 4. Data shown on map and plotted on historical trends are greater of primary or duplicate.
 5. Nitrate and sulfate data are in mg/L; all other data are in ug/L.
 6. Contaminant concentration isopleths, which are hand-drawn, are inherently speculative, because the monitoring well network provides better definition in some areas than others.
 7. For areas that have been shown to be contaminant hot-spots and that are not covered by the current groundwater monitoring program, historical results were taken into account to more accurately portray the groundwater plume.
 8. Data qualifiers are not shown.

LEGEND

- 10,000 ug/L
- 1,000 ug/L
- 100 ug/L
- 10 ug/L
- 1 ug/L
- Suspected NAPL Location
- MW-9B Monitoring Well with Concentration 140

U.S. ARMY CORPS OF ENGINEERS
SEATTLE DISTRICT
 McCormick and Baxter
 Superfund Site
 2006 Groundwater Sampling Report
 C-Zone
 Acenaphthene

STOCKTON	Figure 4-12	CALIFORNIA
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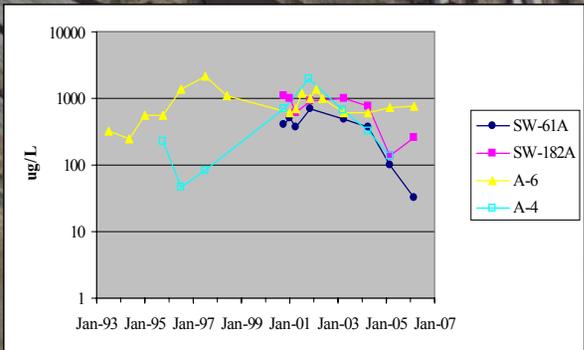
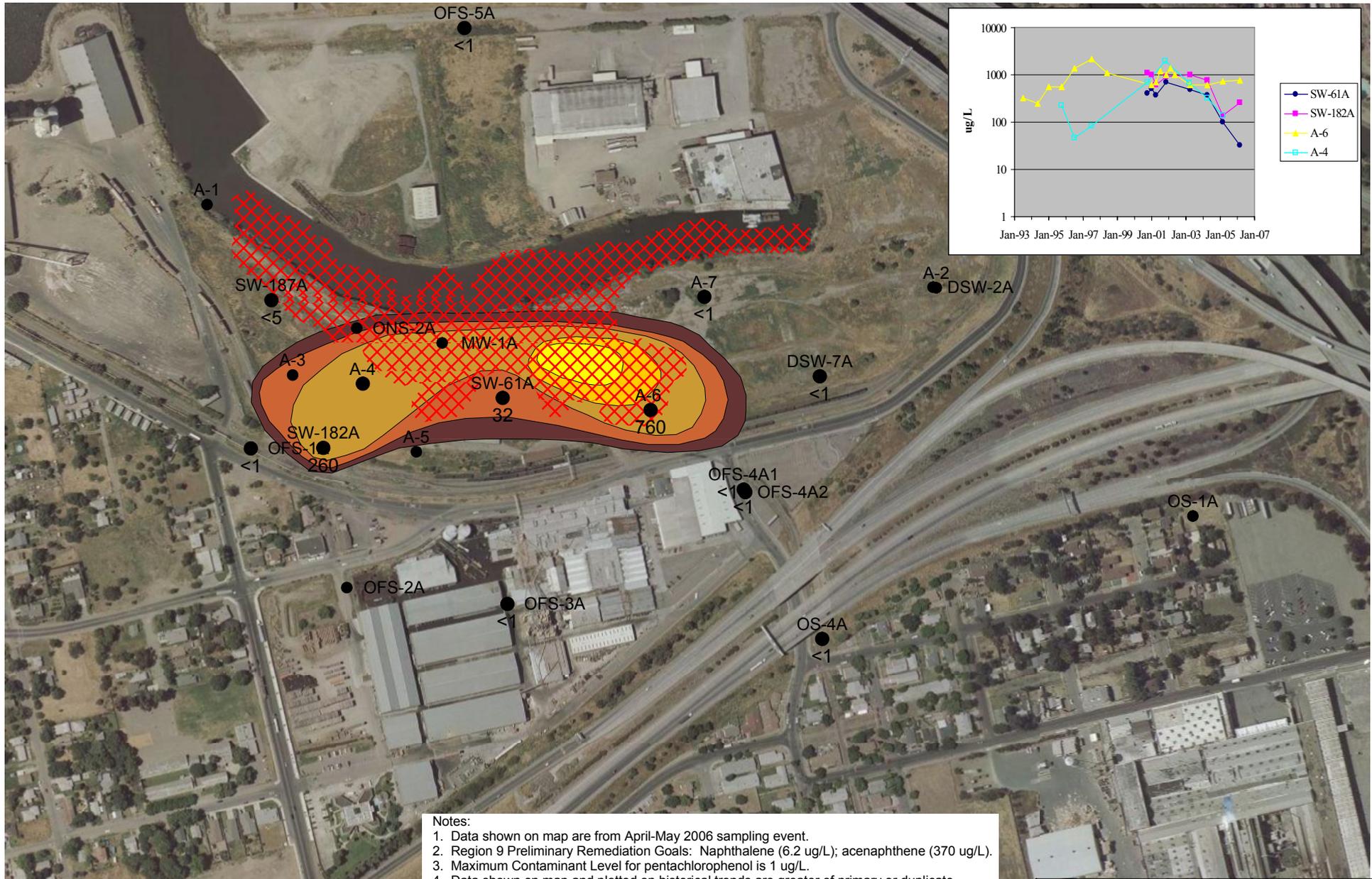
- Notes:
1. Data shown on map are from April-May 2006 sampling event.
 2. Region 9 Preliminary Remediation Goals: Naphthalene (6.2 ug/L); acenaphthene (370 ug/L).
 3. Maximum Contaminant Level for pentachlorophenol is 1 ug/L.
 4. Data shown on map and plotted on historical trends are greater of primary or duplicate.
 5. Nitrate and sulfate data are in mg/L; all other data are in ug/L.
 6. Contaminant concentration isopleths, which are hand-drawn, are inherently speculative, because the monitoring well network provides better definition in some areas than others.
 7. For areas that have been shown to be contaminant hot-spots and that are not covered by the current groundwater monitoring program, historical results were taken into account to more accurately portray the groundwater plume.
 8. Data qualifiers are not shown.

LEGEND

- 10,000 ug/L
- 1,000 ug/L
- 100 ug/L
- 10 ug/L
- 1 ug/L
- Suspected NAPL Location
- MW-9B Monitoring Well with Concentration



U.S. ARMY CORPS OF ENGINEERS SEATTLE DISTRICT		
McCormick and Baxter Superfund Site 2006 Groundwater Sampling Report D-Zone Acenaphthene		
STOCKTON	Figure 4-13	CALIFORNIA



Notes:

1. Data shown on map are from April-May 2006 sampling event.
2. Region 9 Preliminary Remediation Goals: Naphthalene (6.2 ug/L); acenaphthene (370 ug/L).
3. Maximum Contaminant Level for pentachlorophenol is 1 ug/L.
4. Data shown on map and plotted on historical trends are greater of primary or duplicate.
5. Nitrate and sulfate data are in mg/L; all other data are in ug/L.
6. Contaminant concentration isopleths, which are hand-drawn, are inherently speculative, because the monitoring well network provides better definition in some areas than others.
7. For areas that have been shown to be contaminant hot-spots and that are not covered by the current groundwater monitoring program, historical results were taken into account to more accurately portray the groundwater plume.
8. Data qualifiers are not shown.

LEGEND

- 10,000 ug/L
- 1,000 ug/L
- 100 ug/L
- 10 ug/L
- 1 ug/L
- Suspected NAPL Location
- MW-9B Monitoring Well with Concentration

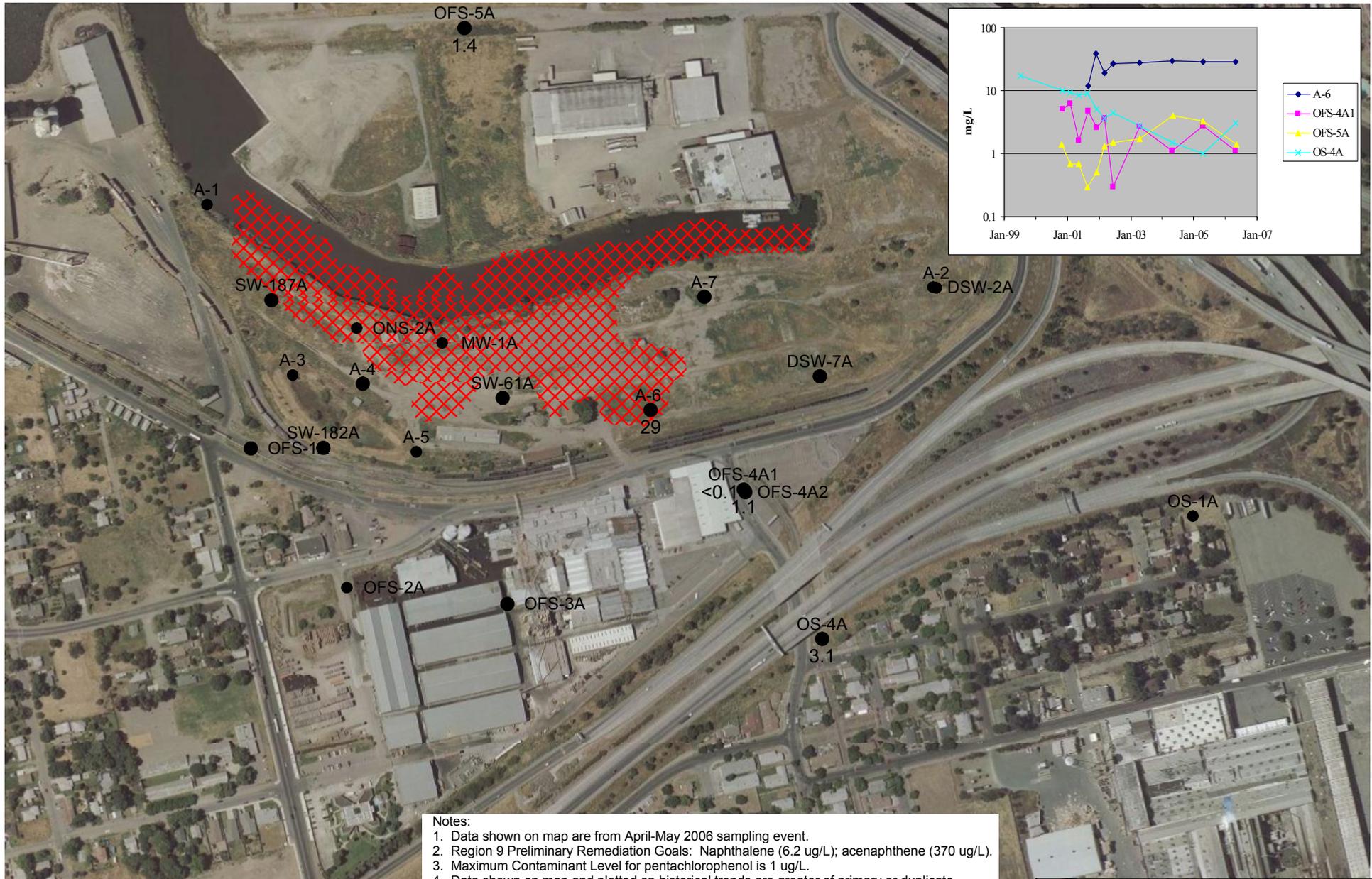
0 Feet 500



U.S. ARMY CORPS OF ENGINEERS
SEATTLE DISTRICT

McCormick and Baxter
Superfund Site
2006 Groundwater Sampling Report

A-Zone
Pentachlorophenol



- Notes:
1. Data shown on map are from April-May 2006 sampling event.
 2. Region 9 Preliminary Remediation Goals: Naphthalene (6.2 ug/L); acenaphthene (370 ug/L).
 3. Maximum Contaminant Level for pentachlorophenol is 1 ug/L.
 4. Data shown on map and plotted on historical trends are greater of primary or duplicate.
 5. Nitrate and sulfate data are in mg/L; all other data are in ug/L.
 6. Contaminant concentration isopleths, which are hand-drawn, are inherently speculative, because the monitoring well network provides better definition in some areas than others.
 7. For areas that have been shown to be contaminant hot-spots and that are not covered by the current groundwater monitoring program, historical results were taken into account to more accurately portray the groundwater plume.
 8. Data qualifiers are not shown.

LEGEND

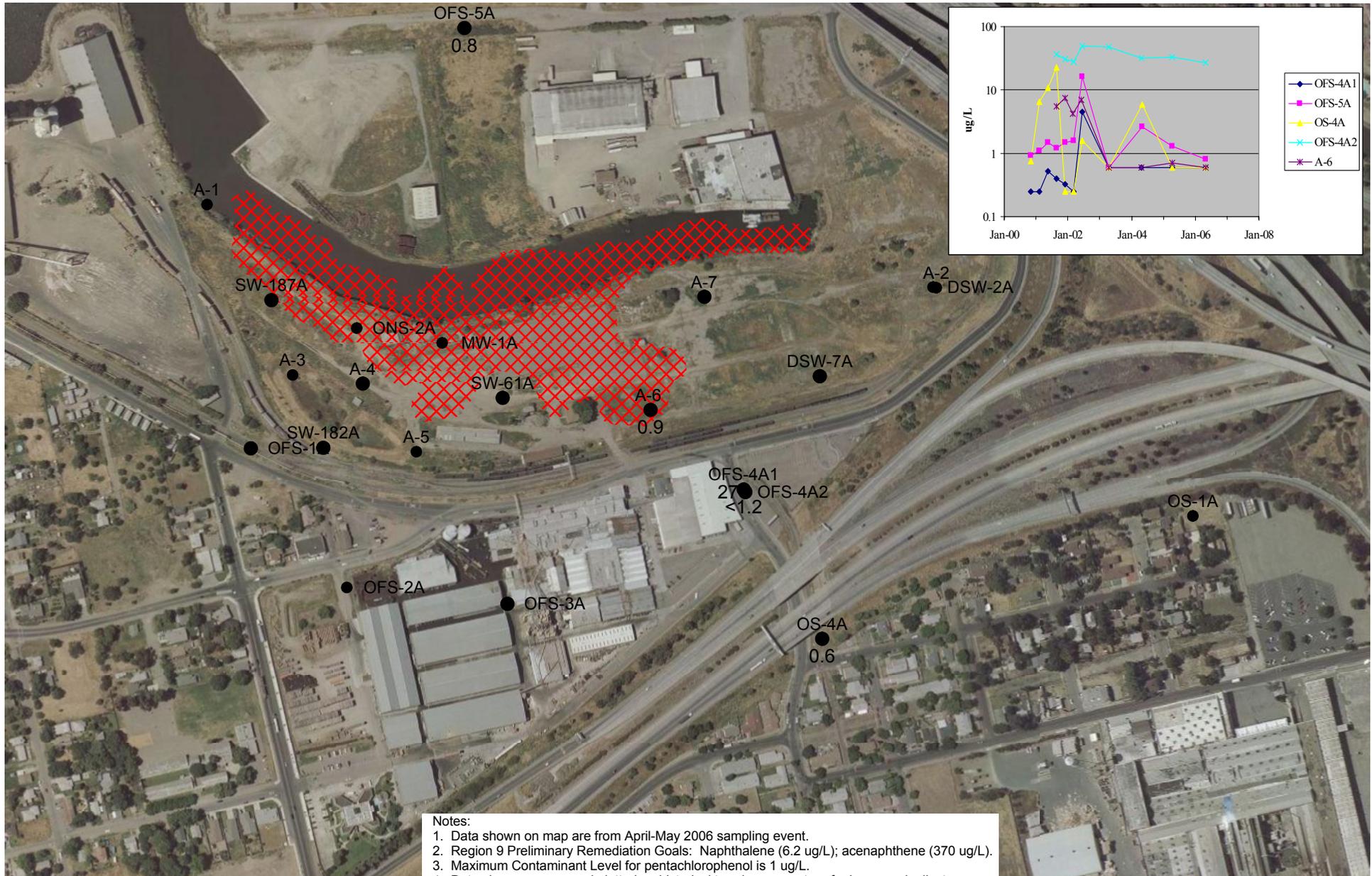
-  Suspected NAPL Location
-  MW-9B Monitoring Well with Concentration 140



U.S. ARMY CORPS OF ENGINEERS
SEATTLE DISTRICT

McCormick and Baxter
Superfund Site
2006 Groundwater Sampling Report

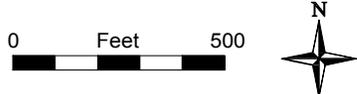
A-Zone
Nitrate



- Notes:
1. Data shown on map are from April-May 2006 sampling event.
 2. Region 9 Preliminary Remediation Goals: Naphthalene (6.2 ug/L); acenaphthene (370 ug/L).
 3. Maximum Contaminant Level for pentachlorophenol is 1 ug/L.
 4. Data shown on map and plotted on historical trends are greater of primary or duplicate.
 5. Nitrate and sulfate data are in mg/L; all other data are in ug/L.
 6. Contaminant concentration isopleths, which are hand-drawn, are inherently speculative, because the monitoring well network provides better definition in some areas than others.
 7. For areas that have been shown to be contaminant hot-spots and that are not covered by the current groundwater monitoring program, historical results were taken into account to more accurately portray the groundwater plume.
 8. Data qualifiers are not shown.

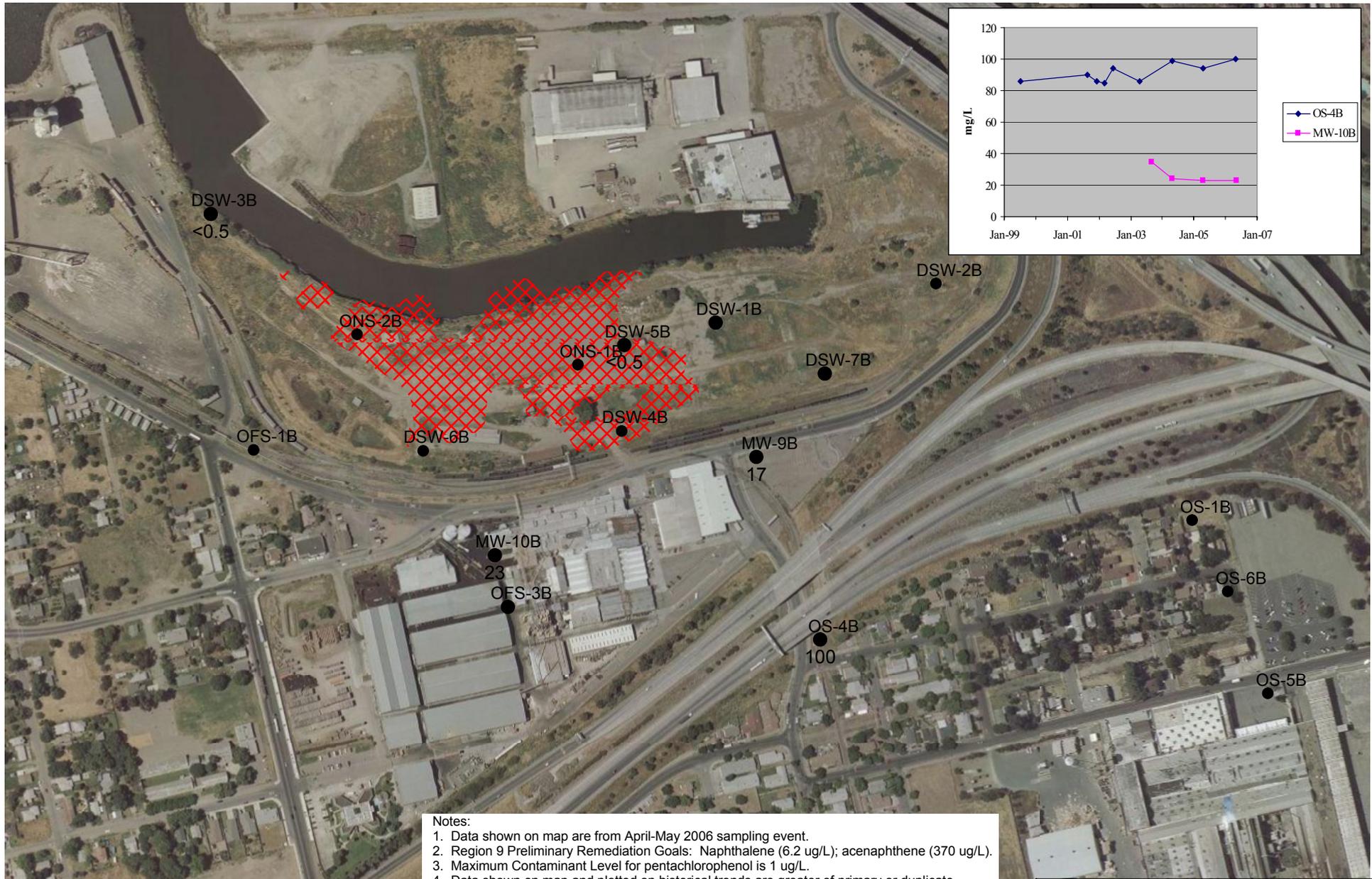
LEGEND

-  Suspected NAPL Location
-  MW-9B 140 Monitoring Well with Concentration



U.S. ARMY CORPS OF ENGINEERS
SEATTLE DISTRICT
 McCormick and Baxter
 Superfund Site
 2006 Groundwater Sampling Report
 A-Zone
 Methane

STOCKTON	Figure 4-18	CALIFORNIA
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- Notes:
1. Data shown on map are from April-May 2006 sampling event.
 2. Region 9 Preliminary Remediation Goals: Naphthalene (6.2 ug/L); acenaphthene (370 ug/L).
 3. Maximum Contaminant Level for pentachlorophenol is 1 ug/L.
 4. Data shown on map and plotted on historical trends are greater of primary or duplicate.
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 7. For areas that have been shown to be contaminant hot-spots and that are not covered by the current groundwater monitoring program, historical results were taken into account to more accurately portray the groundwater plume.
 8. Data qualifiers are not shown.

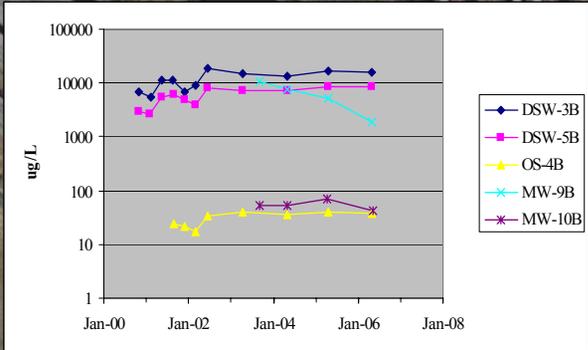
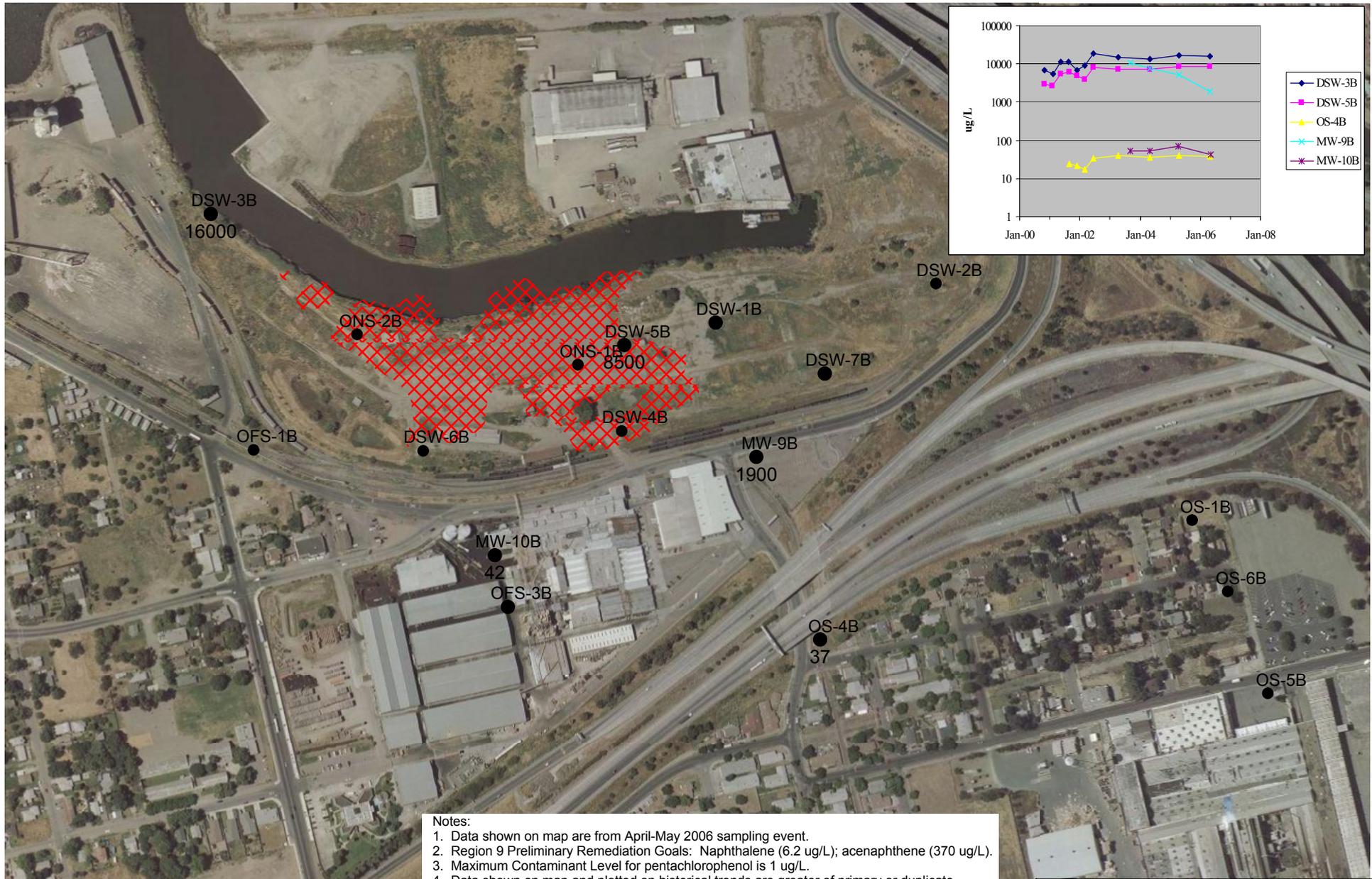
LEGEND

-  Suspected NAPL Location
-  MW-9B
140 Monitoring Well with Concentration



U.S. ARMY CORPS OF ENGINEERS
SEATTLE DISTRICT

McCormick and Baxter
Superfund Site
2006 Groundwater Sampling Report
B-Zone
Sulfate



- Notes:
1. Data shown on map are from April-May 2006 sampling event.
 2. Region 9 Preliminary Remediation Goals: Naphthalene (6.2 ug/L); acenaphthene (370 ug/L).
 3. Maximum Contaminant Level for pentachlorophenol is 1 ug/L.
 4. Data shown on map and plotted on historical trends are greater of primary or duplicate.
 5. Nitrate and sulfate data are in mg/L; all other data are in ug/L.
 6. Contaminant concentration isopleths, which are hand-drawn, are inherently speculative, because the monitoring well network provides better definition in some areas than others.
 7. For areas that have been shown to be contaminant hot-spots and that are not covered by the current groundwater monitoring program, historical results were taken into account to more accurately portray the groundwater plume.
 8. Data qualifiers are not shown.

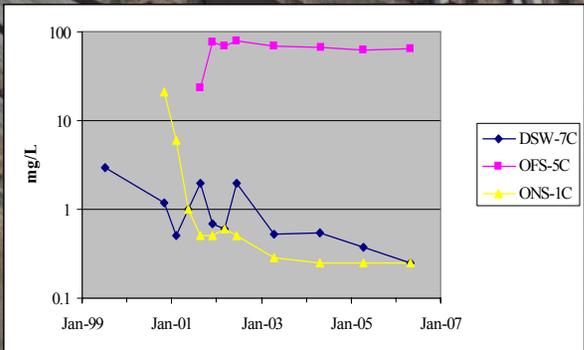
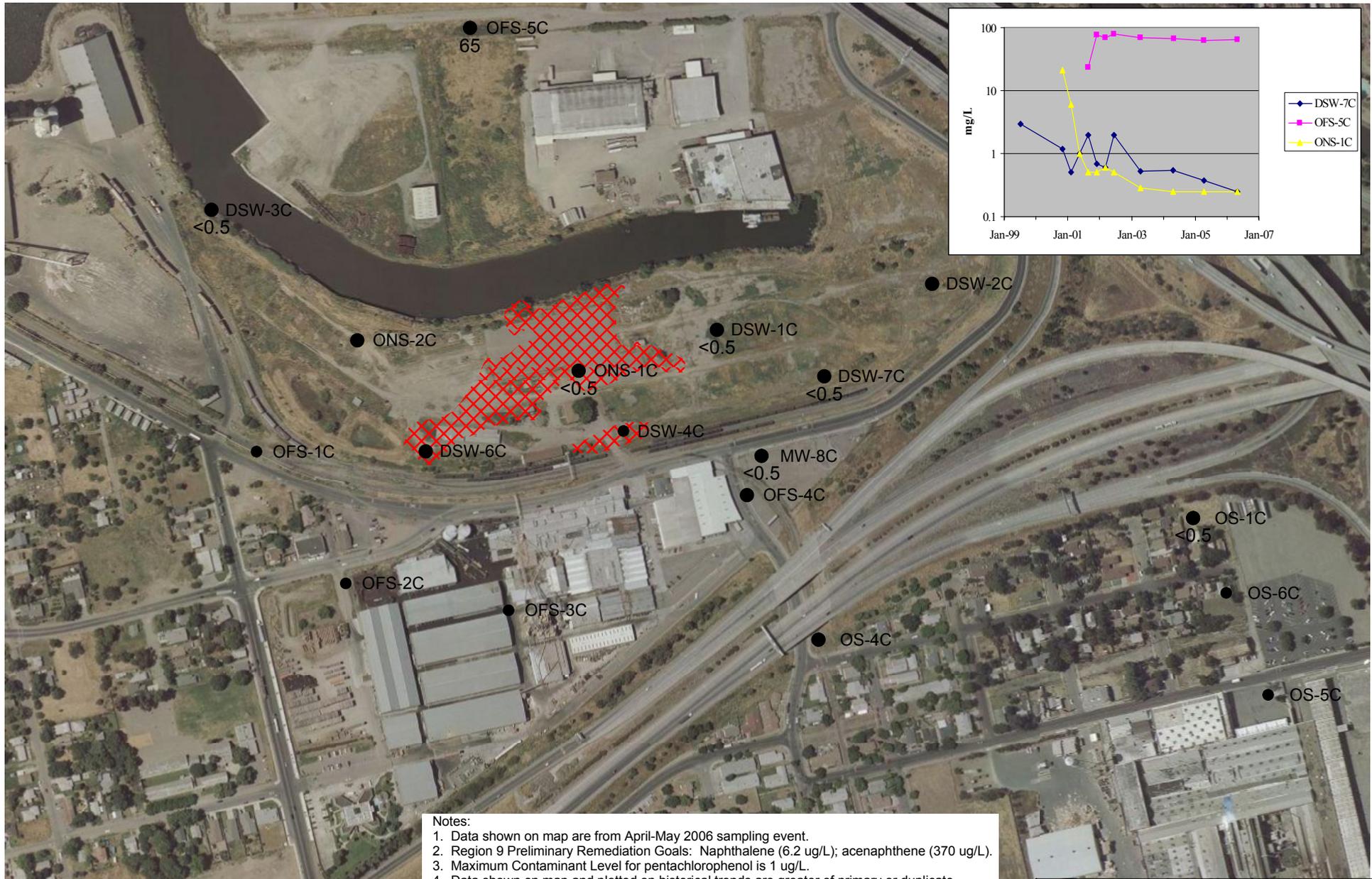
LEGEND

- Suspected NAPL Location
- Monitoring Well with Concentration



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SEATTLE DISTRICT

McCormick and Baxter
Superfund Site
2006 Groundwater Sampling Report
B-Zone
Methane



Notes:

1. Data shown on map are from April-May 2006 sampling event.
2. Region 9 Preliminary Remediation Goals: Naphthalene (6.2 ug/L); acenaphthene (370 ug/L).
3. Maximum Contaminant Level for pentachlorophenol is 1 ug/L.
4. Data shown on map and plotted on historical trends are greater of primary or duplicate.
5. Nitrate and sulfate data are in mg/L; all other data are in ug/L.
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7. For areas that have been shown to be contaminant hot-spots and that are not covered by the current groundwater monitoring program, historical results were taken into account to more accurately portray the groundwater plume.
8. Data qualifiers are not shown.

LEGEND

Suspected NAPL Location

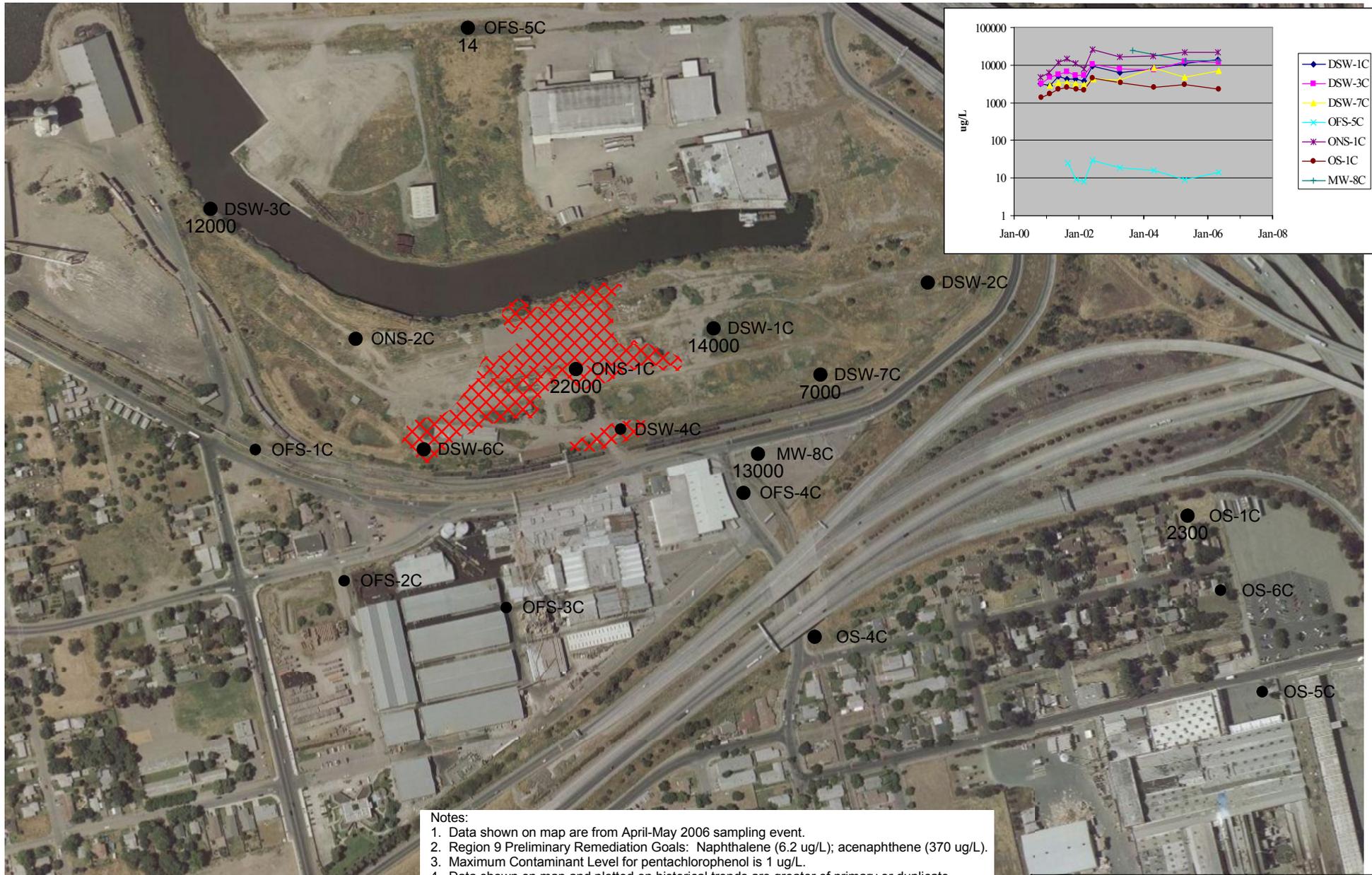
MW-9B
● 140
Monitoring Well with Concentration

0 Feet 500



U.S. ARMY CORPS OF ENGINEERS
SEATTLE DISTRICT

McCormick and Baxter
Superfund Site
2006 Groundwater Sampling Report
C-Zone
Sulfate



- Notes:
1. Data shown on map are from April-May 2006 sampling event.
 2. Region 9 Preliminary Remediation Goals: Naphthalene (6.2 ug/L); acenaphthene (370 ug/L).
 3. Maximum Contaminant Level for pentachlorophenol is 1 ug/L.
 4. Data shown on map and plotted on historical trends are greater of primary or duplicate.
 5. Nitrate and sulfate data are in mg/L; all other data are in ug/L.
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 7. For areas that have been shown to be contaminant hot-spots and that are not covered by the current groundwater monitoring program, historical results were taken into account to more accurately portray the groundwater plume.
 8. Data qualifiers are not shown.

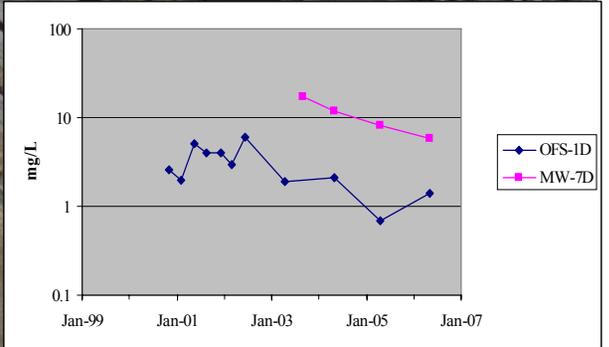
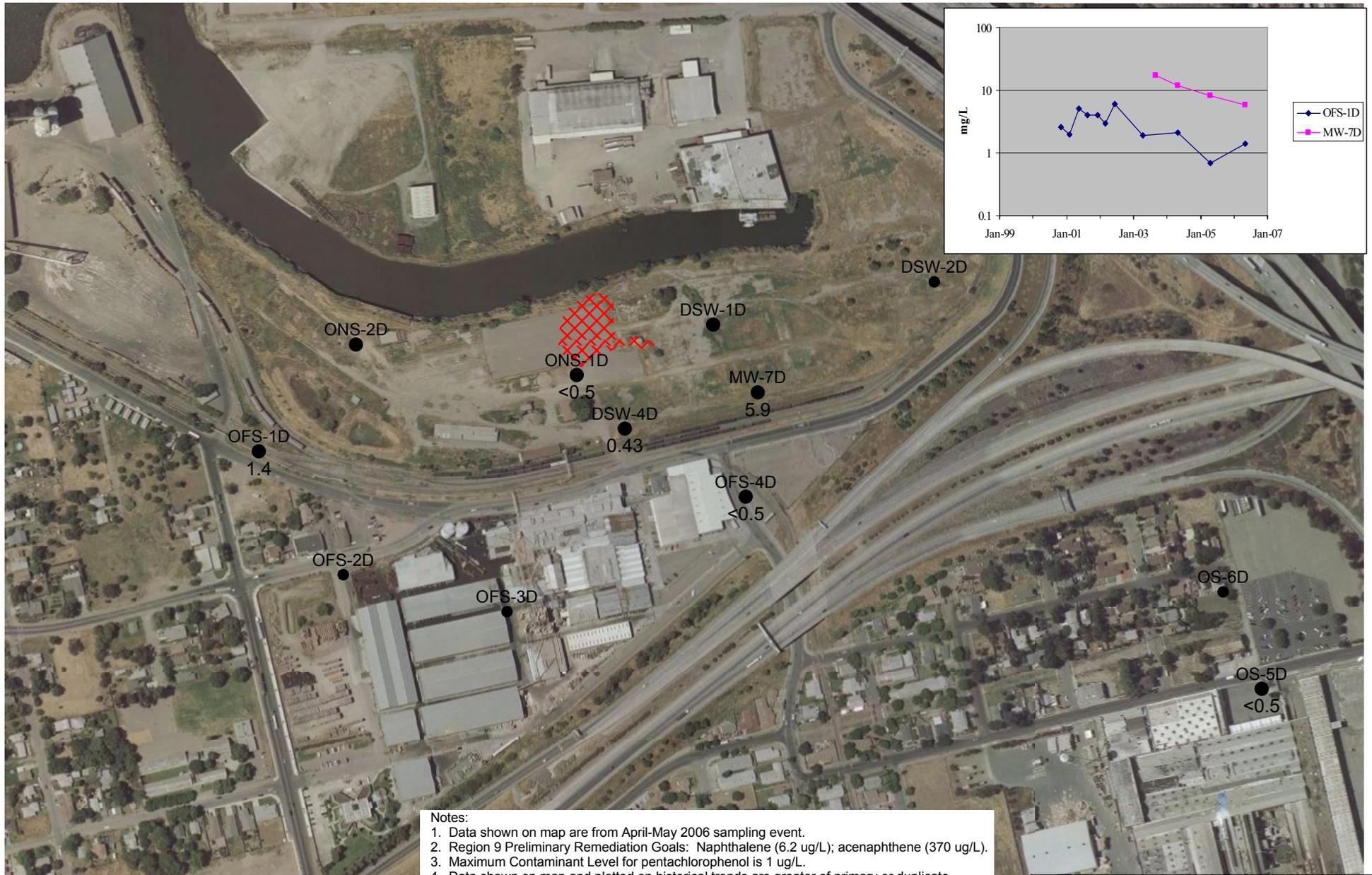
LEGEND

-  Suspected NAPL Location
-  MW-9B Monitoring Well with Concentration 140



U.S. ARMY CORPS OF ENGINEERS
SEATTLE DISTRICT
 McCormick and Baxter
 Superfund Site
 2006 Groundwater Sampling Report
 C-Zone
 Methane

STOCKTON	Figure 4-22	CALIFORNIA
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Notes:

1. Data shown on map are from April-May 2006 sampling event.
2. Region 9 Preliminary Remediation Goals: Naphthalene (6.2 ug/L); acenaphthene (370 ug/L).
3. Maximum Contaminant Level for pentachlorophenol is 1 ug/L.
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8. Data qualifiers are not shown.

LEGEND

Suspected NAPL Location

MW-9B 140 Monitoring Well with Concentration

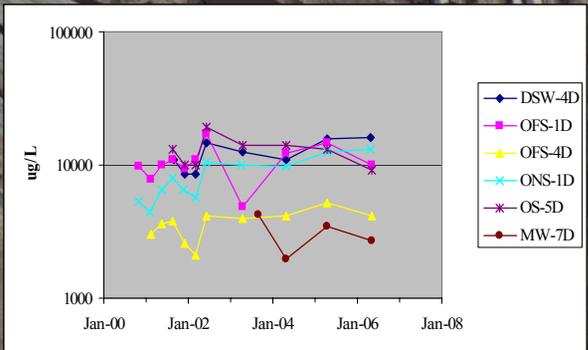
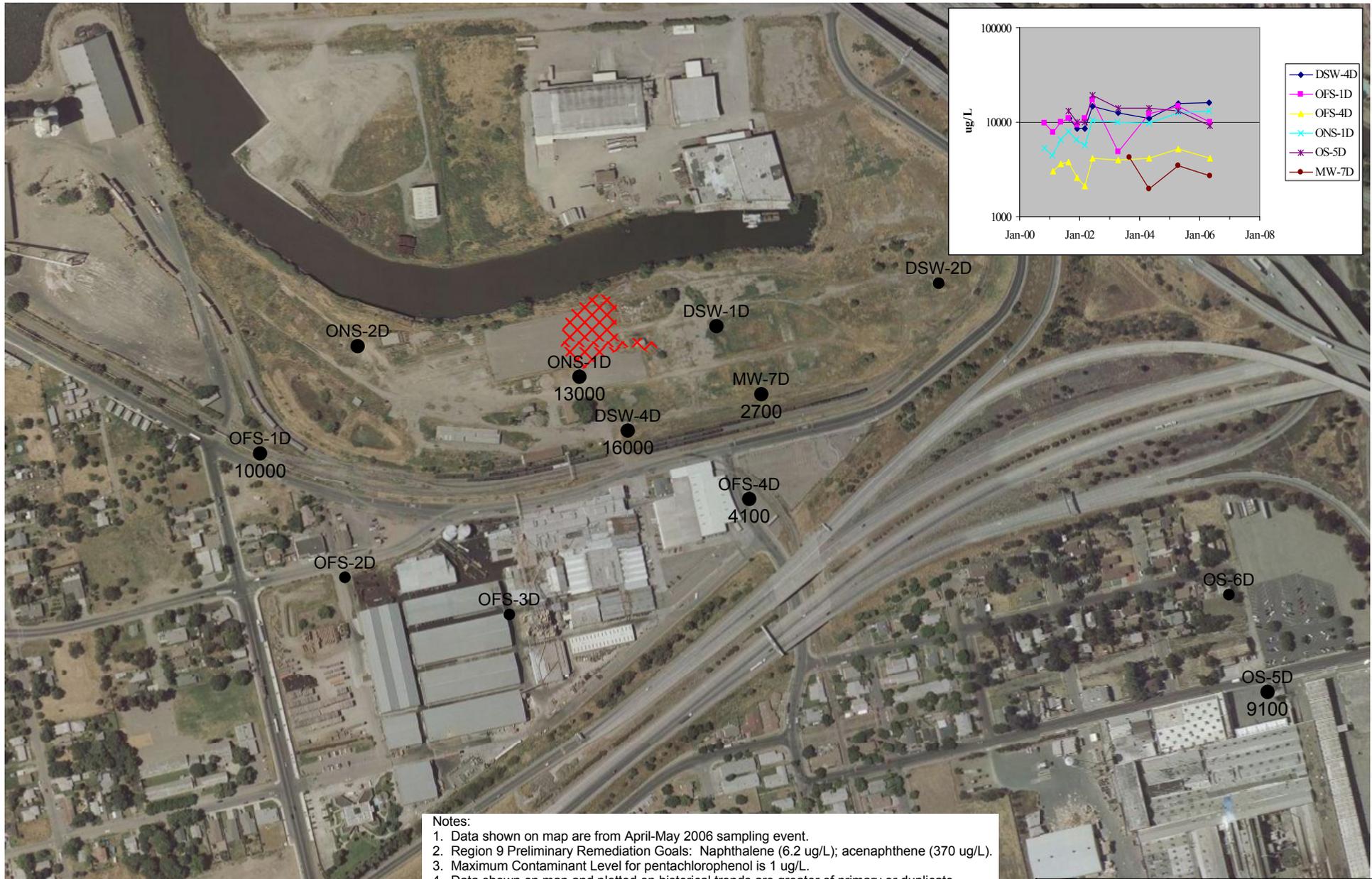
0 Feet 500



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SEATTLE DISTRICT

McCormick and Baxter
Superfund Site
2006 Groundwater Sampling Report

D-Zone
Sulfate



Notes:

1. Data shown on map are from April-May 2006 sampling event.
2. Region 9 Preliminary Remediation Goals: Naphthalene (6.2 ug/L); acenaphthene (370 ug/L).
3. Maximum Contaminant Level for pentachlorophenol is 1 ug/L.
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5. Nitrate and sulfate data are in mg/L; all other data are in ug/L.
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7. For areas that have been shown to be contaminant hot-spots and that are not covered by the current groundwater monitoring program, historical results were taken into account to more accurately portray the groundwater plume.
8. Data qualifiers are not shown.

LEGEND

Suspected NAPL Location

MW-9B
140 Monitoring Well with Concentration

0 Feet 500



U.S. ARMY CORPS OF ENGINEERS
SEATTLE DISTRICT

McCormick and Baxter
Superfund Site
2006 Groundwater Sampling Report

D-Zone
Methane



- Notes:
1. Data shown on map are from April-May 2006 sampling event.
 2. Region 9 Preliminary Remediation Goals: Naphthalene (6.2 ug/L); acenaphthene (370 ug/L).
 3. Maximum Contaminant Level for pentachlorophenol is 1 ug/L.
 4. Data shown on map and plotted on historical trends are greater of primary or duplicate.
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 7. For areas that have been shown to be contaminant hot-spots and that are not covered by the current groundwater monitoring program, historical results were taken into account to more accurately portray the groundwater plume.
 8. Data qualifiers are not shown.

LEGEND

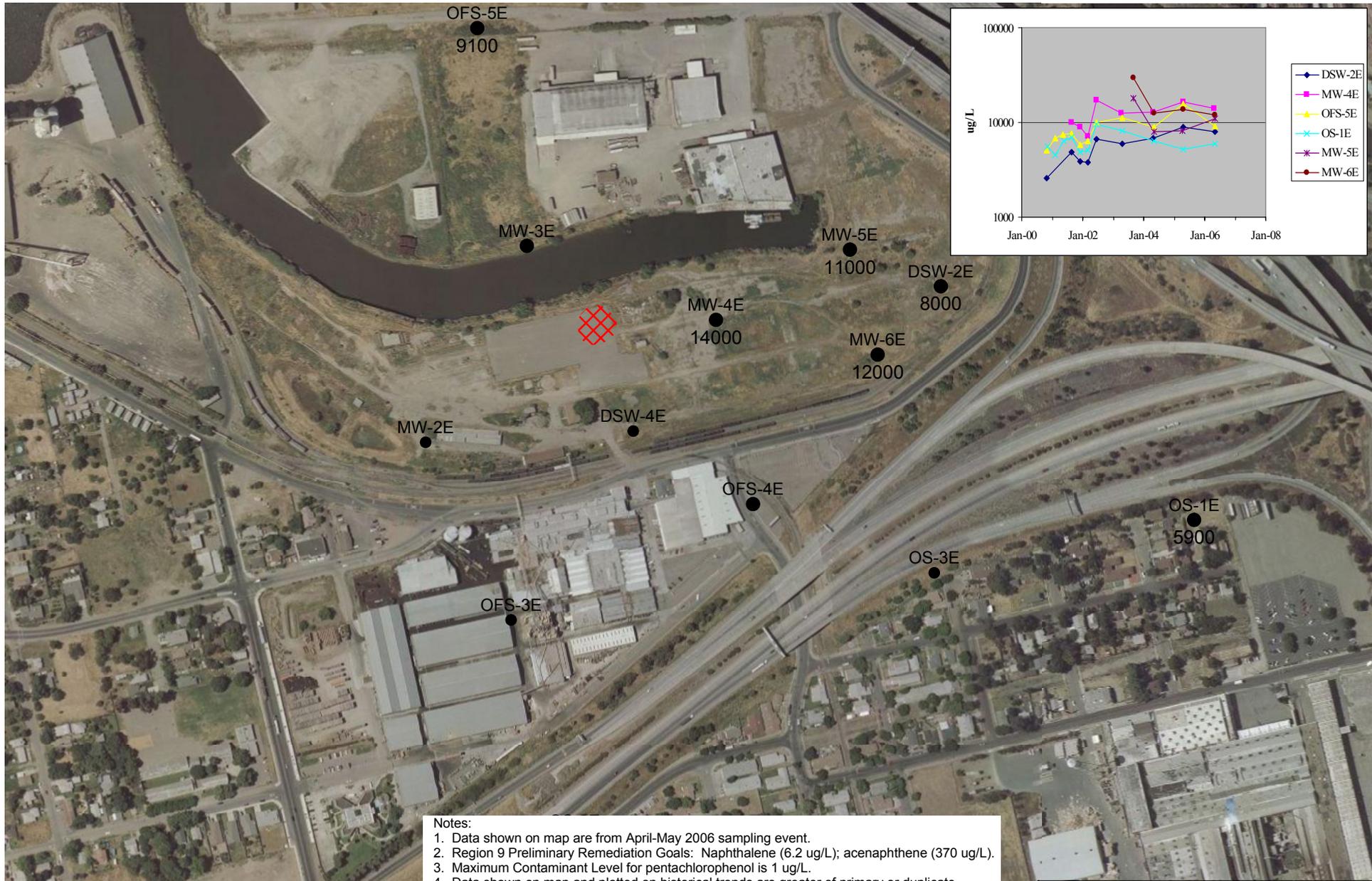
-  Suspected NAPL Location
-  MW-9B
140 Monitoring Well with Concentration



U.S. ARMY CORPS OF ENGINEERS
SEATTLE DISTRICT

McCormick and Baxter
Superfund Site
2006 Groundwater Sampling Report

E-Zone
Sulfate



- Notes:
1. Data shown on map are from April-May 2006 sampling event.
 2. Region 9 Preliminary Remediation Goals: Naphthalene (6.2 ug/L); acenaphthene (370 ug/L).
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 4. Data shown on map and plotted on historical trends are greater of primary or duplicate.
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 7. For areas that have been shown to be contaminant hot-spots and that are not covered by the current groundwater monitoring program, historical results were taken into account to more accurately portray the groundwater plume.
 8. Data qualifiers are not shown.

LEGEND

-  Suspected NAPL Location
-  Monitoring Well with Concentration
- MW-9B 140



U.S. ARMY CORPS OF ENGINEERS
SEATTLE DISTRICT
 McCormick and Baxter
 Superfund Site
 2006 Groundwater Sampling Report
 E-Zone
 Methane

STOCKTON	Figure 4-26	CALIFORNIA
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APPENDICES

(Not reproduced for hard copy. See accompanying CD.)