USACE CONTRACT NO. DACW33-94-D-0002
TASK ORDER NO. 020
TOTAL ENVIRONMENTAL RESTORATION CONTRACT

FINAL
PILOT-SCALE TREATABILITY STUDY REPORT FOR THE CHROMIUM AND VOC GROUNDWATER OPERABLE UNIT (OU) 2 EE/CA STRATFORD ARMY ENGINE PLANT Stratford, Connecticut

October 2000

Prepared for

U.S. Army Corps of Engineers
New England District
Concord, Massachusetts

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THE CHROMIUM AND VOC GROUNDWATER OPERABLE UNIT (OU) 2 EE/CA
STRATFORD ARMY ENGINE PLANT
Stratford, Connecticut

Prepared for:

U.S. Army Corps of Engineers
New England District
Concord, Massachusetts

Prepared by:

Foster Wheeler Environmental Corporation
Boston, Massachusetts

and

Harding Lawson Associates
Portland, Maine

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1.0 PROJECT DESCRIPTION

Foster Wheeler Environmental Corporation (Foster Wheeler) and Harding Lawson Associates (HLA) have been contracted through the U.S. Army Corps of Engineers (USACE) – New England District (NAE) to complete a Non-time Critical Removal Action (NCRA) for source areas in Operable Unit (OU) 2, the site-wide groundwater OU at the Stratford Army Engine Plant (SAEP). This NCRA is being completed under Task Order No. 020 of Contract No. DACW33-94-D-0002.

The objectives of this Task Order are to: 1) complete additional field activities necessary to provide further characterization of subsurface conditions at SAEP, 2) summarize the results of previous field activities in a Pre-design Investigation Report (Foster Wheeler/HLA, 2000), 3) conduct bench-scale and pilot-scale treatability testing to determine the effectiveness of particular in-situ technologies at reducing the levels of contamination in groundwater at the site, and 4) document the decision process for selection of a removal action for OU 2 in an Engineering Evaluation/Cost Analysis (EE/CA) and Removal Action Memorandum (RAM).

Figure 1-1 shows the site location. A site description, history, and summary of previous investigations for OU 2 at SAEP, and description of the Chromium Hot Spot and trichloroethene (TCE) (volatile organic compound [VOC] Hot Spot #1) contamination areas can be found in the OU 2 Pre-design Investigation Report (Foster Wheeler/HLA, 2000). This Pilot Test Report presents the results of two pilot-scale treatability studies conducted to investigate the effectiveness of in-situ treatment technologies at reducing concentrations of hexavalent chromium (Cr[VI]) and VOCs, primarily TCE, in groundwater hot-spot areas at SAEP. Information obtained during operation of the pilot-scale systems will aid in cost estimation and design of full-scale systems for treatment of the hot-spot areas. The selected technologies are proposed possible solutions to address hot-spot contamination only and are not intended to fully remediate site groundwater.

The pilot tests were conducted in accordance with the methods described in the Pilot-Scale Treatability Study Work Plan for the Chromium and VOC Groundwater OU 2 EE/CA (Foster Wheeler/HLA, 1999). The work plan was developed based on the results of bench-scale treatability testing and in accordance with the U.S. Environmental Protection Agency's (USEPA's) Guide for Conducting Treatability Studies (USEPA, 1992).

Two treatment technologies were investigated in separate test areas during pilot-scale testing at SAEP. The in-situ Cr(VI) reduction test investigated the ability of ferrous sulfate ($FeSO_4$) to reduce concentrations of Cr(VI) in the Chromium Hot Spot. The in-situ chemical oxidation test investigated how well potassium permanganate ($KMnO_4$) reduces concentrations of VOCs, primarily TCE at VOC Hot Spot #1. Tests were conducted in two phases. Phase 2 was added after the Phase 1 results indicated additional treatment was required to properly evaluate technologies.

The in-situ Cr(VI) reduction pilot-scale test was completed in a 30-foot by 30-foot area near the Cr(VI) hot-spot area (Figure 1-2). In the presence of ferrous iron (Fe[II]), Cr(VI) can be reduced to the less toxic trivalent form through the following reaction:

$$HCrO_4^- + 3Fe(II) + 7H^+ \rightarrow Cr(III) + 3Fe(III) + 4H_2O$$

In general, three Fe(II) ions each donate a single electron to the chromium ion to reduce it to trivalent chromium (Cr(III)). A $FeSO_4$ solution is capable of providing Fe(II) to facilitate the reaction, which generally runs to completion in less than 5 minutes. The Cr(III) will precipitate with ferric iron (Fe[III]) in an insoluble precipitate (Palmer and Puls, 1994).

The in-situ chemical oxidation pilot-scale test was completed near the TCE hot-spot area (VOC Hot Spot #1) within the former Chromium Plating Facility (see Figure 1-2). The test was completed in a 30-foot by 30-foot area using $KMnO_4$ to oxidize VOC contamination (consisting primarily of TCE). $KMnO_4$ can oxidize chlorinated VOCs (e.g., TCE) through the following reaction:

$$2MnO_4^- + C_2HCl_3 \rightarrow 2CO_2 + 2MnO_2 + 3Cl^- + H^+$$

This report presents pilot test results in accordance with the USEPA's Guide for Conducting Treatability Studies (USEPA, 1992). Section 2.0 of this report presents the primary conclusions and recommendations reached from the pilot test. Section 3.0 presents a summary of the pilot test work approach including deviations from the Work Plan (Foster Wheeler/HLA, 1999). Section 4.0 presents the pilot test results and an evaluation of the results. Appendices A and B contain figures and tables respectively, as referenced in this report.

2.0 CONCLUSIONS AND RECOMMENDATIONS

This section presents the primary conclusions and recommendations developed from the pilot test. Specific results and discussions that contributed to these conclusions and recommendations are presented in Section 4.0.

2.1 CONCLUSIONS

Based on the pilot test results and their interpretation, the following conclusions were reached:

- During the test, TCE concentrations were significantly reduced by a combination of flushing and oxidation. TCE is effectively oxidized by $KMnO_4$ in groundwater to concentrations below the Connecticut Department of Environmental Protection (CTDEP) Remediation Standard Regulation (RSR) Surface Water Protection Criteria (SWPC) for TCE of 2.34 milligrams per liter (mg/L); however, local variations in subsurface conditions, and extraction rates less than design, led to greater travel times to effectively distribute the $KMnO_4$. A higher mass of $KMnO_4$ was required than predicted based on TCE concentrations in soil and groundwater. The need for higher mass may be a result of local variations in TCE concentration and natural organic matter found in the soil, and larger treatment lobes created by extraction rates that were less than design.
- During the test Cr(VI) was removed by a combination of flushing and oxidation. Cr(VI) was effectively reduced to concentrations at least two orders of magnitude lower than at the start of the test. The CTDEP RSR SWPC (0.11 mg/L) for hexavalent chromium was not achieved throughout the treatment areas. This may be due to fouling of the subsurface with iron, which inhibited further delivery of Fe(II) to some areas. Modifications to the delivery of chemical may be able to overcome this issue. Longer travel times and higher $FeSO_4$ doses were required than predicted based on aquifer properties and measured concentrations of Cr(VI) in soil and groundwater. Test results indicate that significant Cr(VI) removal by flushing only is also possible.
- For both $KMnO_4$ and $FeSO_4$, injection at higher concentrations over a shorter period of time appeared to achieve faster, and more effective, treatment than lower concentrations injected over a longer period of time. The result may be a combination of the effect of higher reagent concentrations, and a greater amount of acid to maintain a low pH in the aquifer.
- Oxidation of TCE by $KMnO_4$ in the former TCE area oxidized some Cr(III) to Cr(VI).
- Treatment of the Cr(VI) area with $FeSO_4$ showed an advantage over flushing only at maintaining low Cr(VI) concentrations over the long-term.
- Effective long-term treatment of the TCE was observed in some areas of the TCE treatment area; however, other areas showed indications of rebounding TCE concentrations due to residual TCE contamination in soil.

2.2 RECOMMENDATIONS

Based on pilot test results, the conclusions presented in the previous subsection, and observations during the test, the following recommendations are made regarding the implementation of the pilot test in-situ treatments at a full scale:

- An observational approach should be used that implements treatment in two or more stages; this would allow adjustments to be made in the second or latter phases based on observations made during earlier phases. Due to local variations in site conditions, the information currently available for the site is not adequate to design a system to completely treat the areas in one phase. A phased, observational implementation should be able to address these local hydraulic and chemical variations.
- For the TCE area, $KMnO_4$ should be left in place for an extended period of time to allow for diffusion and treatment of TCE in low-permeability areas. In addition, numerous injection phases of $KMnO_4$ may be necessary to effectively treat residual TCE that appears to be present in soil based on the observed rebounding TCE concentrations following the test.
- In areas where TCE and Cr(VI) contamination overlap, TCE oxidation should precede Cr(VI) reduction. This is necessary to leave the site in reducing conditions at the conclusion of the treatment so that chromium will remain in the trivalent form.
- Depending on logistics, consideration should be given to injection of $KMnO_4$ and $FeSO_4$ in wells at a tighter spacing without groundwater extraction during the design phase. Groundwater extraction serves to promote chemical movement and distribution in the subsurface; however, local zones of high permeability may prevent this method from treating all areas within the desired treatment area. Maintenance and operation of extraction wells also proved to be labor intensive during the pilot test and may present a greater expense than installing more injection wells. Extraction at the completion of the test could be used to remove residual chemicals.
- For Cr(VI) reduction, a pre-conditioning of the aquifer should be conducted by injecting acid into the groundwater to depress the pH of groundwater around the injection well prior to injection of $FeSO_4$. This will prevent potential fouling from oxidation and precipitation of iron in the immediate vicinity of the injection well. In addition, implementation of an extraction and treatment phase and a flushing phase should be considered to remove a significant mass of CR(VI) prior to addition of the reduction reagents. This approach would remove the Cr(VI) mass that is easily extracted and reduce the mass of reagents required.
- $KMnO_4$ and $FeSO_4$ should be injected at high concentrations to maximize effectiveness. For estimation purposes, assume a 15:1 mole/mole ratio for treatment of TCE by $KMnO_4$ and a 30:1 mole/mole ratio for treatment of Cr(VI) by $FeSO_4$. Actual mass of chemical delivered should be based on observational results during implementation.

3.0 TREATABILITY STUDY WORK APPROACH

This section provides a summary of the pilot-scale treatability testing work approach. It includes a description of the test objectives, test design and procedures, equipment and materials, sampling and analysis, and deviations from the Work Plan. Additional detail on the work approach can be found in the Pilot-Scale Treatability Study Work Plan for the Chromium and VOC Groundwater OU 2 EE/CA (Foster Wheeler/HLA, 1999).

3.1 PILOT-SCALE TREATABILITY STUDY OBJECTIVES

As part of the Pilot-scale Treatability Study Work Plan, Foster Wheeler/HLA conducted a data gap analysis in accordance with the USEPA guidance on conducting treatability studies. The data gaps identified included:

- Information regarding reasonable reduction levels for contaminants in-situ with SAEP's specific site conditions is not available;
- Information on the effectiveness of $FeSO_4$ at reducing Cr(VI) in-situ at SAEP is lacking;
- Information on the effectiveness of $KMnO_4$ at oxidizing TCE in-situ at SAEP is lacking;
- Details regarding the ability of an injection/extraction system to maintain hydraulic control in a proposed test area is not available;
- Cost and design information necessary for a full-scale design and cost estimate of these in-situ systems is not available.

Based on these identified data gaps and a review of applicable or relevant and appropriate requirements, Foster Wheeler/HLA developed the following test objectives:

- Determine what treatment levels can reasonably be achieved using the in-situ treatment technologies.
- Determine if $FeSO_4$ can reduce Cr(VI) concentrations to meet the CTDEP RSR SWPC of 0.11 mg/L.
- Determine if $KMnO_4$ can reduce TCE concentrations to meet the CTDEP RSR SWPC of 2.34 mg/L.
- Demonstrate the effectiveness of the pumping system at maintaining hydraulic control in the pilot test areas.

- Develop the necessary information for full-scale system costing and design.

3.2 EXPERIMENTAL DESIGN AND PROCEDURES

This subsection summarizes the experimental design and the procedures established for conducting the pilot test. Additional detail on the design and procedures can be found in the Treatability Study Work Plan (Foster Wheeler/HLA, 1999).

3.2.1 Groundwater Flow Evaluation and Hydraulic Control

Hydraulic control of fluids to be injected and recovered during the pilot test was evaluated using a groundwater flow evaluation, which is presented in the Pilot Test Work Plan (Foster Wheeler/HLA, 1999). The purpose of the groundwater flow evaluation was to evaluate the potential for loss of containment and provide information on likely flow pathways and travel times for the fluids injected and captured by the extraction well. The pattern of wells for the flow evaluation was four injection points equally spaced along a 30-foot diameter circle with the extraction well at the center (Figure 3-1). Screen lengths of all wells were 10 feet, and screens were placed at the same depth, from approximately 27 to 37 feet below ground surface (bgs) in the chromium area and approximately 25 to 35 feet bgs in the TCE area. All injection wells and piezometers were 1 inch in diameter. The extraction wells were 4 inches in diameter. A summary of the actual installed depths for the pilot tests is presented in Table 3-1.

The flow evaluation suggested that a pilot test extraction flow rate of 5 gallons per minute (gpm) should provide a reasonable travel time for injected fluids for the planned 10-day operation period. Travel times along the major routes of flow were predicted to be from about 1.5 to 5 days, allowing several pore flushes over the test period for these pathways. An injection rate (total of 4 gpm) slightly lower than the extraction rate provided for a greater assurance of containment.

3.2.2 In-situ Cr(VI) Reduction

The general scheme of treatment in the Cr(VI) area was to inject a $FeSO_4$ solution in four wells on a circular perimeter around a single extraction well. The rationale for well placement and flow rates was established by the groundwater flow evaluation. Adequate amounts of $FeSO_4$ to treat the estimated mass of Cr(VI) in soil and groundwater determined during pre-test sampling were to be injected over a 10-day period of operation. Based on the bench-scale treatability test results, six moles (two times the stoichiometric relationship) of $FeSO_4$ are required for each mole of Cr(VI) estimated to be present within the treatment area. In addition, the injection solution was adjusted to a pH of approximately 2.5 using sulfuric acid to prevent injection well plugging.

The groundwater flow evaluation demonstrated that the proposed injection and extraction system would establish four individual lobes of $FeSO_4$ migrating from the injection wells (one from each well) to the extraction well. The pilot-scale test was designed take advantage of this injection pattern by injecting a different concentration of $FeSO_4$ in each well to evaluate the effect of $FeSO_4$ dose at the pilot scale. One injection well (IW-99-05) did not receive any $FeSO_4$ to evaluate the effect of flushing only. The other three injection wells (IW-99-06, IW-99-07, and IW-99-08) were to receive three, six, and nine moles of $FeSO_4$ per mole of Cr(VI), respectively. The actual amount of $FeSO_4$ injected was higher than originally planned as described in Subsection 3.6.2. Concentrations of $FeSO_4$ varied between piezometers, and were increased during the test as described in Subsection 3.3.

Soil and groundwater were sampled and analyzed before the test to estimate the mass of Cr(VI) in the test area and required mass of $FeSO_4$. In-situ groundwater and extracted groundwater were sampled and analyzed during and after the test to evaluate changes in the concentration of Cr(VI) within the pilot test treatment area. Observation piezometers were installed at several points within the treatment area, both on and off the main radii defined by lines from the injection wells to the extraction well (see Figure 3-1). Sampling and analysis during the test monitored for the movement of the $FeSO_4$ front as it progressed to the extraction well. Piezometers were monitored for several chemical parameters, as described in Subsection 3.4, to detect the $FeS0_4$ front.

Sampling and analysis following the injection phases was conducted to monitor for potential rebounding Cr(VI) concentrations. As discussed in Subsection 3.1, one objective of the NCRA is to reduce groundwater concentrations below CTDEP RSR SWPC. A key measure of success of the treatment will be the ability to meet, and maintain these concentrations. If insufficient chemical is injected, or if inadequate delivery of the chemical to low-permeability zones occurs, groundwater concentrations are expected to slowly increase from the initial reductions achieved. Therefore, groundwater monitoring was conducted for six months following injection to look for such rebounding groundwater concentrations.

3.2.3 In-situ Chemical Oxidation

The general scheme of treatment for in-situ oxidation was identical to the in-situ chromium reduction, with the exception that $KMnO_4$ replaces $FeSO_4$ as the injected chemical. Enough $KMnO_4$ to treat the estimated mass of TCE was to be injected over the 10-day period of operation. Based on the bench-scale treatability test results 2 moles (2 times the stoichiometric relationship) of $KMnO_4$ are required for each mole of TCE estimated to be present within the treatment area.

The TCE pilot-scale test also took advantage of the four-lobe injection pattern by injecting a different concentration of $KMnO_4$ in each injection well to evaluate the effect of various $KMnO_4$ dosages at the pilot scale (see Figure 3-1). To evaluate the effect of flushing only, one injection well (IW-99-04) did not receive any $KMnO_4$. Based on the

bench-scale treatability test results, the other three injection wells (IW-99-02, IW-99-02, and IW-99-01) were to receive 1, 1.5, and 2.5 moles of $KMnO_4$ per mole of TCE respectively. The actual mass of $KMnO_4$ injected exceeded these amounts as described in Subsection 3.6.2. In addition, all KMnO4 injection solutions were adjusted to a pH below 5.0 to prevent injection well plugging. Concentrations of $KMnO_4$ varied between injection wells, and were increased during the test.

Soil and groundwater were sampled and analyzed before the test to estimate the mass of TCE and required mass of $KMnO_4$. In-situ groundwater and extracted groundwater were sampled and analyzed during and after the test to evaluate changes in the concentration of TCE within the pilot test treatment area. Monitoring for movement of the chemical front through the treatment area and for potential rebounding groundwater concentrations, as described for the Cr(VI) test area, are also part of the test design for the TCE area.

3.3 EQUIPMENT AND MATERIALS

The in-situ chromium reduction and in-situ TCE oxidation pilot systems generally consisted of two systems at each area: the injection system and the extraction and organic pre-treatment system. The major equipment and materials for each of these components were as follows:

The injection system at each area (chromium and TCE) generally consisted of the following:

- chemical make-up tank with mixer and three metering pumps;
- clean water supply;
- flow distribution panel with a flow meter, chemical injector, and control valve for each well; and
- tubing between the various process units.

A general process flow diagram for the injection system is included in Figure 3-2. The concentrations of $FeSO_4$ and $KMnO_4$ in the chemical make-up tanks were 52 grams per liter (g/L) and 10 g/L, respectively. Concentrations were increased twice during the test to 180 g/L and 36 g/L, respectively. Concentrations of $FeSO_4$ injected ranged from 11 g/L to 35 g/L. Concentrations of $KMnO_4$ injected ranged from 1.3 g/L to 3.8 g/L.

The injected concentration was obtained by setting the metering pumps to inject different volumes of solution into the individual injection streams. Metering pumps were initially set to the desired milliliter per minute injection rate. Periodically, the metering pump injection rates were checked to verify calibration. Calibration checks were performed infrequently during the initial part of the Phase 1 test due to the high frequency of sample collection. As the sampling frequency decreased, and more time was available, calibration checks frequencies were made daily.

The extraction system for hydraulic control at each area consisted of a single submersible pump in the central extraction well, which discharged extracted groundwater via flexible pipe through two activated carbon units, placed in series, for removal of VOC contamination. Treated water was discharged to a holding tank to await sampling and analysis. After demonstration of VOC removal (concentration of total VOCs less than 100 mg/L), water was discharged by gravity to the Chemical Waste Treatment Plant (CWTP) sump at Building 63 for chromium removal. A process flow diagram for the extraction and pre-treatment system is included in Figure 3-3.

3.4 SAMPLING AND ANALYSIS

Sampling and analysis was conducted to monitor the treatment area for hydraulic control, movement of the $FeSO_4$ and $KMnO_4$ fronts, reduction in contaminant concentrations in groundwater within the treatment area, and rebound in groundwater contaminant concentrations after the test. During the test samples, were analyzed using an on-site gas chromatograph (GC) and Hach™ test kits for VOCs, total chromium, Cr(VI), Fe[II], and manganese (Mn). Approximately 10 percent of on-site analyses were duplicated by off-site confirmation analyses. Table 3-2 presents the sampling locations, type, frequency, and rationale for collection of samples in the chromium pilot test area. Table 3-3 presents the sample analysis methods for each sample type in the chromium pilot test area. Table 3-4 presents the sampling locations, type, frequency, and rationale for collection of samples in the TCE pilot test area. Table 3-5 presents the sample analysis methods for each sample type in the TCE pilot test area.

3.5 DATA MANAGEMENT

Both qualitative and quantitative data were collected during the completion of pilot-scale treatability studies. Data was collected during well and piezometer installation, during system operation, and following system shutdown.

Data collected during the pilot-scale treatability studies is presented in data tables in this report. In addition, analytical data has been entered into the SAEP Microsoft Access Geographic Information System database. All off-site data has been validated using level II validation procedures. Off-site data and a data quality summary report for all on-site generated data are attached to this report (Appendix C and D).

3.6 DEVIATIONS FROM THE WORK PLAN

The following subsections describe the major deviations from the work plan.

3.6.1 Test Duration

The Pilot Test Work Plan called for 10 days of chemical injection. During the initial 10 days of operation from November 30 through December 10, 1999 (TCE area) and December 1 through December 11, 1999 (chrome area), travel times between injection wells and the extraction wells were longer than anticipated. At the conclusion of the 10 days, complete treatment of the pilot test areas had not been achieved (i.e., high concentrations of TCE and Cr(VI) remained). Therefore, the test was run during an additional 14-day period from January 19 through February 1, 2000 (both areas). The 10-day test period in December 1999 is referred to as Phase 1, and the 14-day test period in January 2000 is referred to as Phase 2.

3.6.2 Mass of $KMnO_4$ and $FeSO_4$ Injected

The Pilot Test Work Plan called for injection of 0, 1, 1.5, and 2.5 moles of $KMnO_4$ per mole TCE in the four different injection wells. Similarly injection of 0, 3, 6, and 9 moles of $FeSO_4$ per mole of Cr(VI) was planned for the chromium area injection wells. The masses of TCE and Cr(VI) present in the treatment areas were calculated based on analytical results from soil samples and groundwater samples collected prior to the test. Table 3-6 presents the calculation of the mass in each area based on this data. The estimated mass of TCE per lobe in the TCE area at the start of the test was 4.3 kilograms (kg). The estimated mass of total organic carbon (TOC) per lobe in the TCE area at the start of the test was 73 kg. The estimated mass of Cr(VI) per lobe in the chromium area at the start of the test was 2.7 kg. It should be noted that these are average values for each test area. Variation between and within lobes could be substantial. The actual mass injected into each lobe is estimated and presented in Table 3-7 and varied from zero to 83 kg of $KMnO_4$ n the TCE area, and zero to 575 kg of $FeSO_4$ in the chrome area.

3.6.3 Maintenance of Injection and Extraction Flow Rates

Maintenance of extraction and injection flow rates exactly as described in the Work Plan was not achieved. There were two problems encountered that caused deviations from the flow rates described in the Work Plan. Upon start up of the Phase 1 test, the rotameters installed on the extraction well lines quickly and repeatedly clogged with silt, such that the float in the rotameter would no longer move with changes in flow rate. Flow rates for the system were set by cleaning the rotameter, setting the flow control valve, and then leaving the system at that setting. After seven days of operation it was found that flow rates were 1-2 gpm less than the desired 5 gpm. From that point on, flow rates were periodically verified by one-minute volume measurements at the discharge point. Rotameters on the injection system did not have this problem.

The other problem encountered with maintaining flow rates was caused by well fouling. Both injection and extraction wells experienced some fouling as a result of precipitation of inorganics. Fouling of injection wells resulted in backup of the injection solution, but

no prolonged reduction in injection flow rate. Fouling of extraction wells resulted in decreased rates of extraction. Both injection and extraction well fouling was treated by the addition of sulfuric acid to the well. Acid had the effect of dissolving the precipitates causing the fouling and restoring the desired performance. Fouling of extraction well EW-99-03 became especially extreme during the Phase 2 test, and this well required repeated treatment with sulfuric acid.

4.0 RESULTS AND DISCUSSION

This section presents the results of the Cr(VI) reduction and TCE oxidation pilot tests in tabular and graphical form and provides an evaluation of the results.

4.1 TREATMENT RESULTS

Results from on-site analysis of samples throughout the pilot test, plus selected off-site analyses, are presented in Table 4-1. Results for all off-site laboratory analysis of samples are presented in Appendix C. In general, off-site laboratory data have been used for confirmation of on-site analyses during the pilot tests, and evaluation of rebounding concentrations following the tests. All graphs presented in this report rely on data generated on-site to the extent possible, and are only supplemented by off-site data where on-site data was not available. Appendix D presents an evaluation of the on-site data, including appropriate comparisons with off-site laboratory data for confirmation. In general the quality of the on-site data was confirmed. On-site Cr(VI) data generally compared well with the off-site data with a slight bias toward higher results. On-site VOC results, compared well with off-site VOC results except where on-site analysis was performed immediately after collection of the sample. Mn and total chromium results meet the data quality objective for qualitative evaluation of pilot test performance. On-site Mn results appear to be biased low when compared to the off-site results. On-site total chromium results compare well with off-site total chromium results, except at low concentrations.

Figures 4-1 through 4-12 are graphical presentations of data showing reductions in TCE concentrations over time. Figures 4-13 through 4-24 are graphical presentations of the data showing reductions in Cr(VI) concentrations over time. In general these results show decreasing concentrations throughout the pilot test in the treatment zones. Only piezometers PZ-99-07, PZ-99-02B, and PZ-99-10 showed significant contaminant removal during the Phase 1 test period (see Figure 3-1). The remaining piezometers showed significant removal during the Phase 2 test period. The following subsections present additional evaluation and discussions with respect to pilot-scale test results.

4.1.1 Effect of Flushing

Injection well IW-99-04 in the TCE area, and injection well IW-99-05 in the chromium area, received potable water at a rate of 1 gpm each with no chemical addition. The purpose of this injection was to provide a comparison of the effects of treatment to the effects of flushing only. Figures 4-11 and 4-24 present the results for piezometers PZ-99-06 and PZ-99-11 respectively, which represent the monitoring points in the lobes that did not receive any chemical. TCE concentrations in piezometer PZ-99-06 initially appeared to increase during the Phase 1 test, followed by an eventual decrease in concentrations. There was a significant TCE rebound effect observed in piezometer PZ-99-06 between the two phases and generally decreasing concentrations during the Phase 2 test.

4.1.2 Effect of Mass of Chemical Injected

Figures 4-25 and 4-26 show a comparison of TCE and Cr(VI) concentration reductions verses the mass of chemical injected. TCE and Cr(VI) concentrations for individual piezometers were plotted against the estimated mass of reagent injected into the lobe where that piezometer is located. The purpose of these graphs is to evaluate if initial treatment of contaminants occurred at a similar mass of reagent delivered in the different lobes.

For the TCE area (Figure 4-25), piezometers PZ-99-04, PZ-99-05, and PZ-99-07 are located approximately seven feet from their respective injection wells. Treatment at these three piezometers appeared to occur after addition of 42, 30, and 8 kg of $KMnO_4$, respectively. Total mass injected into the lobes for these piezometers was 45, 58, and 83 kg, respectively. This data suggest significant variation in contaminant mass between the different lobes, but also suggests the possibility that injection of $KMnO_4$ at higher concentrations over a short time may achieve better treatment than the equivalent mass of $KMnO_4$ over a longer time period. Alternatively, the results may indicate that the lobes contained a significant variation in initial TCE mass. Piezometer PZ-99-01B required approximately 36 kg of $KMnO_4$ before significant treatment occurred, only slightly more than piezometer PZ-99-05; however, this piezometer is a greater distance from the injection well and had higher initial TCE concentrations.

For the chromium area (Figure 4-26) two piezometers (PZ-99-08 and PZ-99-09) are located from the injection wells. Piezometer PZ-99-02B is located closer to an injection well, although on an indirect path, and piezometer PZ-99-10 is located farther from an injection well. Treatment was initially achieved for piezometer PZ-99-02B after injection of approximately 40 kg of $FeSO_4$, followed by piezometer PZ-99-08 at 60 kg, piezometer PZ-99-10 at 100 kg, and piezometer PZ-99-09 at 330 kg. Total mass injected into the lobes was 228 kg, (PZ-99-08), 334, kg/ (PZ-99-09) and 575 kg (PZ-99-02A/B/C, PZ-99-10). Similar to the TCE area, these results suggest variation between the lobes, with a possible advantage to injection at higher concentrations over a short time period, versus lower concentrations over a longer time period. Another explanation may be that lower pH was maintained in the injection well IW-99-08 lobe than the other lobes due to the higher dosage of chemical, and that this "acidification" improved the performance in this lobe. The advantage of a short time period may be to distribute a large mass of chemical before chemical precipitation occurs, potentially altering the flow paths of injected chemical solutions.

There may be some relationship between mass of reagent delivered and rebounding contaminant concentrations. Rebounding contaminant concentrations are more evident in the flushing lobes; however, differences in rebounding contaminant concentrations between the three other lobes may be due to other factors besides the mass of reagent delivered to the different lobes (e.g., different initial mass and variation in hydrogeology).

Additional discussion of rebounding contaminant concentrations is presented in Subsection 4.6.

4.1.3 Effect of Travel Time from Injection Well

Only one injection lobe in each treatment area contained two piezometers at different distances from the injection well. Comparison of piezometers from different lobes would be biased by the different mass of chemical injected for each lobe. In general results indicate that treatment occurred at the closer piezometer (PZ-99-02B and PZ-99-05) first (see Figure 3-1). This contradicts the groundwater flow evaluation presented in the Pilot Test Work Plan, which predicted piezometers PZ-99-02B and PZ-99-05 would be on a longer flow path than piezometers PZ-99-10 and PZ-99-01B, since piezometers PZ-99-02B and PZ-99-05 are not on the direct line from the injection well to the extraction well.

4.2 INDICATORS OF CHEMICAL FRONT MOVEMENT

Throughout the test several groundwater parameters were monitored as possible indicators of treatment. Temperature, pH, conductivity, turbidity, dissolved oxygen, and oxidation-reduction potential (ORP) were monitored for both treatment areas. The following subsections evaluate the influence of chemical injection on each of these parameters as the test progressed. Figures for piezometers PZ-99-07, PZ-99-06, PZ-99-10, and PZ-99-11 are presented for each of these parameters and compared with the change in TCE and Cr(VI) concentrations, respectively (Figures 4-27 through 4-46). These graphs help demonstrate the arrival of the chemical front at each piezometer. Similar trends occurred in other piezometers for which figures were not prepared. Piezometers PZ-99-07 and PZ-99-10 demonstrate typical trends for piezometers that showed effective treatment. Piezometers PZ-99-06 and PZ-99-11 demonstrate trends for the lobes that did not receive treatment chemical.

4.2.1 Temperature

Figures 4-27 through 4-30 show the changes in temperature observed as the tests progressed. Potable water was used for injection, which is several degrees colder than the background aquifer. In both the TCE and chromium areas the groundwater temperature can be seen to decline during the Phase 1 and Phase 2 treatment periods, with a gradual increase in temperature between the two periods. Temperature acts as an indicator of the replacement of groundwater with water from the injection wells and can be observed for both treated and untreated lobes.

4.2.2 pH

Figures 4-31 through 4-34 show the changes in pH observed as the tests progressed. Both $KMnO_4$ and $FeSO_4$ solutions were mixed at a low pH to minimize fouling of the injection wells. Therefore, a depressed pH is evidence of the chemical front reaching the

piezometer. Decreases in pH are evident for the treated lobes during both the Phase 1 and Phase 2 treatment periods, with a gradual increase in pH between the treatment periods. Although there is variation in pH during the test in the untreated lobes, there is no clear trend in pH values. pH decreases in the untreated lobes were not expected, because these lobes did not receive any acid.

4.2.3 Conductivity

Figures 4-35 through 4-38 show the changes in conductivity observed as the tests progressed. Conductivity is generally an indicator of high dissolved solids. With injection of dissolved $KMnO_4$ and $FeSO_4$ conductivity would be expected to increase. The decreases observed during the Phase 1 test period may be the result of consumption of the injected chemicals by TCE and Cr(VI). As permanganate and Fe(II) react with TCE and Cr(VI) they form MnO_2 and ferric hydroxide ,which typically precipitate out of solution. Also, the potable water used for injection contains less dissolved solids than the aquifer water, which is partially affected by its proximity to the ocean. Therefore, increasing conductivity is seen only after excess $KMnO_4$ or $FeSO_4$ has reached the piezometer.

4.2.4 Dissolved Oxygen

Figures 4-39 through 4-42 show the changes in dissolved oxygen observed as the tests progressed. Limited data is available following the Phase 1 test due to failure of the instrument to properly calibrate for dissolved oxygen. In general, dissolved oxygen concentrations increase for both the TCE and chromium areas during the two test phases. This result is expected for the TCE area; however, it is counter-intuitive for the chromium area where the objective is to establish reducing conditions. Dissolved oxygen is likely from the potable water, which contains higher dissolved oxygen than the groundwater. Under neutral pH conditions, dissolved oxygen in the potable supply water would be rapidly reduced by Fe(II); however, below pH 5 the kinetics of this reaction are very slow, and dissolved oxygen can remain in solution (Snoeyink and Jenkins, 1980).

4.2.5 Oxidation-Reduction Potential

Figures 4-43 through 4-46 show the changes in ORP observed as the tests progressed. ORP was observed to increase during both the $KMnO_4$ and $FeSO_4$ injection. This result was expected for the TCE area, as $KMnO_4$ contributes oxygen to the aquifer; however, increasing ORP in the chromium area was not initially anticipated, as the objective is to produce reducing conditions for chromium.

4.2.6 Mn and Iron

Figures 4-5 through 4-12 show the changes in concentration of total Mn in the TCE area observed as the tests progressed. In the TCE area, Mn was observed to begin increasing

toward the end of the Phase 1 test period, and to increase rapidly during the Phase 2 test period. The increase in Mn concentrations begins to occur shortly after TCE concentrations are reduced to below detection limits.

Figures 4-17 through 4-24 show the changes in concentration of Fe(II) in the chromium area as the tests progressed. Fe(II) is observed to increase rapidly at the end of the Phase 1 test period. It then drops significantly between the two test periods, before increasing again during the Phase 2 test. Fe(II) concentrations decrease again following the Phase 2 test. This result indicates that the pilot test effectively distributes Fe(II), but that the Fe(II) is not persistent in the groundwater. This may be caused by dissolved oxygen slowly oxidizing Fe(II) to Fe(III). At the acidic pH levels present in the subsurface when chemicals are being introduced through the injection wells, the low pH will inhibit the oxygen in the dilution water from oxidizing the Fe(II). When chemical injection stops, the pH will rise, allowing the residual oxygen to slowly oxidize surplus Fe(II).

4.2.7 Color

Color changes were observed during the pilot test in both the TCE and chromium areas that indicated movement of the chemical front. In the TCE area, groundwater samples changed from clear to pale yellow, to light purple, and finally to dark purple. The pale yellow most likely indicates Cr(VI) mobilized in front of the chemical front. The light and dark purple indicated the arrival of $KMnO_4$.

In the chromium area, decreasing concentrations of Cr(VI) were observable through changes from a dark yellow to a pale yellow. When the chemical front reached a piezometer, iron precipitation was evident as high turbidity that settled to form a redish-brown precipitate. The supernate following this precipitation was typically clear.

4.3 HYDRAULIC CONTROL OF INJECTED CHEMICAL

Hydraulic containment for either the pilot scale or a fully implemented hot-spot treatment cell depends ultimately on the overall water balance of the components of flow, (i.e., the injection and extraction rates), and also the natural flow of groundwater through the cross-sectional area of the recycle zone. The extraction rate needs to be slightly in excess of the sum of the other two flows. At an assumed hydraulic conductivity of 15 feet per day (ft/d), a capture zone of about 40 feet in width and 10 feet in height, and a hydraulic gradient of 0.002 ft/ft, the estimated natural flow through the cell is about 0.06 gpm. Total extraction rate should exceed the natural flow through plus the injection rate, at a minimum, if the flow is to be contained. Total extraction rates during the pilot test could not be maintained at the planned 5 gpm (due to fouling of the extraction well), which would have satisfied this criterion. In any further testing or implementation of this technology, extraction well design and maintenance improvements will be effected in order to maintain sufficient excess extraction versus injection rates.

Differences in observed drawdowns at extraction and observation points within the chromium and TCE test cells are likely attributable to local variations in hydraulic conductivity, fouling of well screens (particularly at the Chromium test cell), particulate precipitation within the aquifer matrix after reactions have taken place, and vertical anisotropy. Sharp increases in drawdowns at EW-99-03 appear to be accompanied, in some cases, by substantial increases in turbidity.

Modeling results suggest that there would tend to be some flow of injected reactants outward from the cell. Over longer periods of time, the excess extraction rates produce closed paths for these reactants. However, over a short period of time, some of these reactants would remain in the aquifer. However, due to the high capacity of the aquifer over stoichiometric requirements for conversion of either Cr(VI) or TCE, residual reactants in the aquifer over the duration of a pilot test are likely to have measurable impacts only within a short distance of the treatment cell. Implementation of a long-term hot-spot remedy may conclude with a period of extraction only, or of continued operation with injection of potable water to cleanse the cell prior to shutting off the system. This is more important with residual permanganate, which has the potential of oxidizing chromium back to the hexavalent state under appropriate conditions.

Modeling of the reduced pilot test extraction rates of 3 to 4 gpm was done with the existing groundwater model constructed for the Pilot Test Workplan (FWENC/HLA, 1999). The hydraulic conductivity used in these simulations was 15 ft/d. Model run Strat7 was done with an extraction rate of 3 gpm and injection rate of 4 gpm (1 gpm at each of 4 injection points). Figures 4-47 through 4-50 show the particle paths generated for 14 days, and 1,000 days to show longer-term particle paths and capture zones. Model run Strat8 was done with an extraction rate of 4 gpm, equal to the total injection rate. At the equal rates, the treatment cell over a long time shows only minor loss of injected fluids. The effective area treated over 1,000 days at 4 gpm is greater than at the design injection rate at 5 gpm (i.e., injected chemicals create a wider treatment lobe). This effect may have contributed to the greater mass of reagent required for treatment of the lobe during the pilot test.

Since the model was conducted at steady-state, comparisons with observed drawdowns are meaningful only when the actual pumping system approaches equilibrium. Seasonal trends of rising or falling water table are not included in field observation data for the pilot test. The model suggests an extraction well drawdown range of 2.5 ft (at 3 gpm) to 3.6 ft (at 4 gpm). Further, injection well mounding would be expected to vary from 0.8 to 0.6 feet over this extraction range. Observation piezometers, (e.g., PZ-99-08, PZ-99-09, and PZ-99-11) are close to the hinge point between mounding and drawdown, and showed drawdowns of only 0.1 to 0.3 feet. Similarly, observational piezometer PZ-99-02B would be expected to show close to zero drawdown in the range of pumping applied (0.2 ft mounding to 0.1 ft drawdown). At a distance of 6 feet (such as piezometer PZ-99-10) from the extraction well, expected drawdowns might vary between 0.7 and 1.3 feet. Extraction well drawdowns at the Chromium Area were greater than expected, likely due

to fouling of the screen. At the TCE treatment cell, drawdowns were not as great as expected, which may be due to a locally greater hydraulic conductivity at this location.

4.4 OXIDATION OF CR(III)

Samples collected from extraction well EW-99-02 were analyzed for Cr(VI) throughout the test. The purpose of this analysis was to evaluate whether the $KMnO_4$ was oxidizing Cr(III) bound to the soil. Figure 4-51 shows a graph of Cr(VI) concentrations from extraction well EW-99-02 versus time. There are several fluctuations in the data; however, there is a clear upward trend in Cr(VI) concentrations over time from below detection limits up to 15 mg/L. Samples collected one week after the end of Phase 2 were analyzed for Cr(VI). These samples indicate a range of Cr(VI) concentrations in the TCE area within the 10-foot treatment zone from 0.39 to 15 mg/L. Prior to the test, samples analyzed for Cr(VI) from all of these piezometers were below detection limits.

4.5 EFFECT OF SAMPLE AGE

During the test, HLA observed that oxidation reactions continued to occur in the sample jars collected from the TCE area. Samples that were initially purple when collected, were observed to change to brown and form a brown precipitate that would settle out in the jar. It appeared that $KMnO_4$ was being consumed and solid MnO_2 precipitate was forming. No preservative was used during sample collection. HLA also observed that TCE concentrations in the jars decreased with time. A series of analyses were conducted on a single sample to demonstrate the typical change in concentration over times. Table 4-4 shows the results of these analyses.

From literature and the bench-scale test results, the kinetics for oxidation of TCE by permanganate, and reduction of Cr(VI) by ferrous iron at reduced pH, have been demonstrated to be relatively fast (i.e., less than a couple of hours). Therefore, it would be expected that a sample of groundwater from the soil pore space that contains permanganate or ferrous sulfate would not contain significant TCE or Cr(VI), except in a narrow time frame after the chemical front reaches the well or piezometer. The expectation would be to find residual contaminant or residual reductant/oxidant in a collected sample, but not significant concentrations of both. If the sample does not contain significant concentrations of both, reaction in the sample bottles would be minimal. The fact that significant reactions appeared to be continuing to occur in the bottles indicated that the collected sample contained significant concentrations of both the contaminant and reductant or oxidant. The most plausible explanation for this is that contaminant and oxidant/reductant are pulled into the well during sampling from different screen elevations, and are mixed in the well, initiating the reaction. This suggests a limitation of the pilot test in its capacity to uniformly distribute injectate over the vertical treatment interval. Had a sample preservative been added it would have stabilized the contaminant concentration, but it would have affected the oxidant/reductant concentration. Had a preservative been added, interpretation of the results may have

indicated inadequate mass of oxidant/reductant delivered rather than inadequate distribution.

In general sample age effects were observed to affect the TCE samples when permanganate was present. Sample age effects may have affected Cr(VI) results when ferrous iron was present; however, the relationship in this case was less firmly established. Sample age effects were not generally observed for samples collected from the water flushing lobes.

For consistency, the results reported in the tables and figures represent samples that have been allowed to age several hours before analysis. This allows effective comparison of data from samples analyzed on-site and off-site. Samples from the chromium area generally showed some visual changes with time due to the settling of iron hydroxide precipitates; however, due to the initial suspended iron particles, personnel were not able to observe whether additional iron precipitation was occurring in the bottle which would have indicated additional reactions in the bottle.

4.6 EVALUATION OF REBOUND

For the chromium area there is some indication of rebounding Cr(VI) concentrations, primarily in two wells. Figure 4-52 presents the Cr(VI) concentrations in groundwater during the rebound monitoring period (February through August 2000). Only injection well IW-99-05, extraction well EW-99-03, and piezometers PZ-99-09 and PZ-99-11 have concentrations of Cr(VI) exceeding 1 mg/L in any of the post-test samples. On the last day of the test, February 1, 2000, piezometer PZ-99-11 and extraction well EW-99-03 had concentrations of Cr(VI) above 1 mg/L. Cr(VI) concentrations have risen steadily in piezometer PZ-99-11 since the test was terminated. Cr(VI) concentrations in extraction well EW-99-03 declined immediately following termination of the test, followed by a steady rise in concentration over the rebound monitoring period. Cr(IV) concentrations in injection well IW-99-05 remained steady for approximately two months, followed by a steady rise. Cr(VI) concentrations at piezometer PZ-99-09 rose immediately following termination of the test, and for the first two months following the test, but seemed to stabilize after April, 2000.

Cr(VI) concentrations above 1 mg/L are generally present in the lobe that did not receive ferrous sulfate. This includes injection well IW-99-05, piezometer PZ-99-11, and extraction well EW-99-03. This suggests that ferrous sulfate present in the other lobes is able to more effectively maintain residual chromium as Cr(III) than areas flushed by water only. The only exception to this observation is piezometer PZ-99-09, which shows significant Cr(VI) concentrations (1 to 15 mg/L) following the test. Treatment of this piezometer, however, occurred late in the Phase 2 pilot test, which suggests that adequate mass of ferrous sulfate may not have been delivered to this location.

Assuming a hydraulic conductivity of 15 ft/day, a gradient of 0.002 ft/ft, and a soil porosity of 0.3, natural groundwater velocity towards the treatment cell is estimated at 0.1 ft/day. At this velocity, groundwater from outside the treatment area would be capable of travelling 18 feet during the six months of rebound sampling. However, there is no indication that groundwater concentrations within the pilot test area have rebounded due to inflow from untreated water outside the treatment cell. Such an event would be expected to result in increasing Cr(VI) concentrations in injection wells IW-99-07 and IW-99-08, and piezometer PZ-99-02B, prior to increases at other locations, due to their location on the upgradient side of the treatment area. Because Cr(VI) concentrations have remained low at these locations, there is either little movement of contaminated water into the treatment area, or adequate residual Fe(II) is present to effectively treat Cr(VI) in the water that has entered the treatment area. This observation further supports that the Cr(VI) concentrations observed at the other locations are the result of incomplete treatment in those areas without adequate Fe(II) residual, and are not the result of contaminated water inflow from outside the treatment area.

For the TCE area there are several wells and piezometers that have had increasing concentrations of TCE since termination of the test. Figure 4-53 presents the TCE concentrations at the end of the test and for each of samples collected following the test (February to August). Only injection wells IW-99-01, IW-99-02, and piezometer PZ-99-07, have maintained undetectable TCE concentrations. For the remaining locations, rebounding TCE concentrations have been observed, and initial evaluation of the data indicates it is difficult to determine whether the rebounding concentrations are due to dissolution of residual product in the soil, or to movement of contaminated groundwater from outside the treatment area into the treatment area. In general, rebounding groundwater concentrations are observed on the upgradient side of the treatment area, which would suggest inflow of contaminated groundwater from outside of the treatment area. However, in a few cases there is evidence to suggest dissolution of residual as the source of rebounding concentrations. Specific evaluations for each location are as follows:

- Injection wells IW-99-03 and IW-99-04: Both of these injection wells are located on the upgradient side of the treatment area. Rebounding TCE concentrations at these locations may be due to either inflow from outside the treated area or dissolution of residual TCE in soil.
- Piezometer PZ-99-05: This piezometer is located downgradient from injection well IW-99-03, but has TCE concentrations that are higher than those at injection well IW-99-03. This suggests that rebounding concentrations at this location are more likely due to inadequate residual permanganate and dissolution of residual contamination from the soil.
- Piezometer PZ-99-06: This piezometer was never completely treated during the pilot test, which suggests either inadequate flushing was achieved, or dissolution of residual was occurring during the test.

- Piezometer PZ-99-01B: This piezometer was treated to less than 100 µg/L at termination of the test; however, just one week later concentrations rebounded to 140,000 µg/L. Such a rapid rebound cannot be explained by inflow from outside the treatment area and is believed to be due to dissolution of residual from the soil.
- Extraction well EW-99-02 and piezometer PZ-99-04: Both of these locations initially had low TCE concentrations which remained low for two (PZ-99-04) to five (EW-99-02) months and then began to increase. Increasing concentrations at these locations could be due to inflow of contaminated water from the area around piezometer PZ-99-01B. Due to the close proximity of extraction well EW-99-02 to piezometer PZ-99-01B, and the observation that the TCE concentrations in extraction well EW-99-02 do not increase for nearly five months following termination of the test, it is most likely that this location contained significant residual permanganate and minimal residual soil contamination. It appears that residual permanganate was able to neutralize dissolved TCE moving in from the direction of piezometer PZ-99-01B. However, for piezometer PZ-99-04, this same explanation is not as convincing, since it is located a greater distance from piezometer PZ-99-01B, and rebounding concentrations are observed sooner.

Overall, there is evidence for certain locations in the TCE area that rebounding concentrations are due to dissolution of residual soil contamination. Data from other locations in the TCE area are inconclusive as to the cause of rebounding concentrations. Data for the Cr(VI) area generally support that locations of rebounding concentrations coincide with incomplete treatment, and are not associated with inflow from outside the treatment area.

1,1-DCE	1,1-dichloroethene
1,1,1-TCA	1,1,1-trichloroethane
bgs	below ground surface
c1,2-DCE	cis-1,2-dichloroethene
Conc.	concentration
Cond.	conductivity
CERCLA	Comprehensive Response, Compensation, and Liability Act
CTDEP	Connecticut Department of Environmental Protection
CWTP	Chemical Waste Treatment Plant
Cr(III)	trivalent chromium
Cr(total)	total chromium
Cr(VI)	hexavalent chromium
D.O.	dissolved oxygen
EE/CA	Engineering Evaluation/Cost Analysis
EW	extraction well
Fe(II)	ferrous iron
Fe(III)	ferric iron
$FeSO_4$	ferrous sulfate
Foster Wheeler	Foster Wheeler Environmental Corporation
ft	feet
GC	gas chromatograph
gpm	gallons per minute
g/L	grams per liter
HLA	Harding Lawson Associates
IW	injection well
Kg	kilograms
KMnO4	potassium permanganate
mg/L	milligrams per liter
Mn	manganese
MnO_2	manganese dioxide
mS/cm	milliSiemens/centimeter
mV	millivolts
NCRA	Non-time Critical Removal Action
NAE	New England District

NTU	nephelometric turbidity units
ORP	oxidation-reduction potential
OU	Operable Unit
PCE	tetrachloroethene
PZ	piezometer
PVC	polyvinyl chloride
RAM	Removal Action Memorandum
RSR	Remediation Standard Regulation
SAEP	Stratford Army Engine Plant
SWPC	Surface Water Protection Criteria
t1,2-DCE	trans-1,2-dichloroethene
TCE	trichloroethene
Temp.	temperature
TOC	total organic carbon
TOR	top of riser
Turb.	turbidity
µg/L	micrograms per liter
USACE	U.S. Army Corps of Engineers – New England District
USEPA	U.S. Environmental Protection Agency
VOC	volatile organic compound
VC	vinyl chloride

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U.S. Environmental Protection Agency (USEPA), 1993. Guidance on Conducting Non-Time-Critical Removal Actions Under CERCLA. Office of Emergency and Remedial Response. USEPA/540-R-93-057, Washington DC, August 1993.

FIGURES

Figure 4-1
TCE Area - Entire Pilot Test
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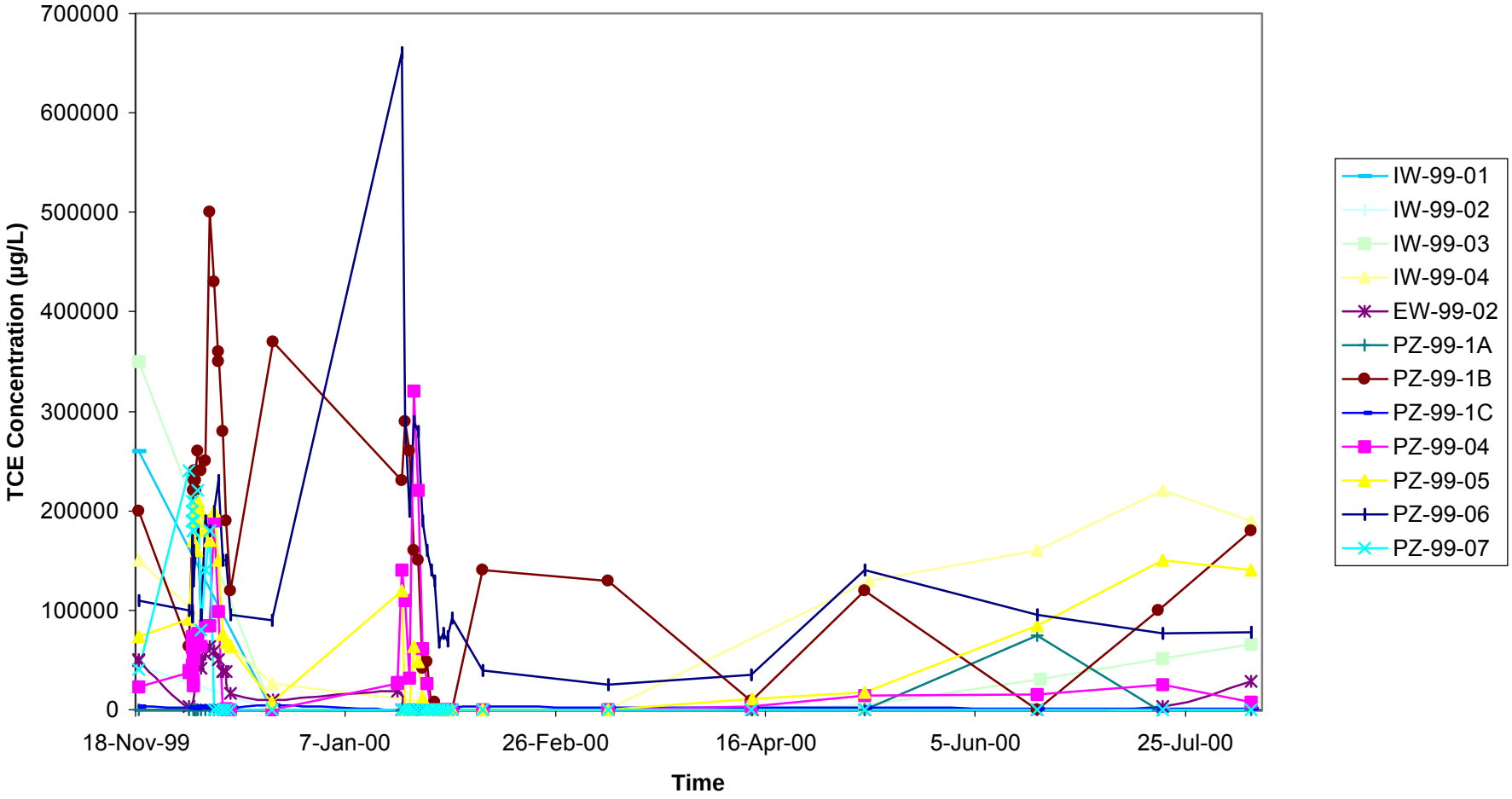

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Figure 4-2
TCE Area - Phase 1
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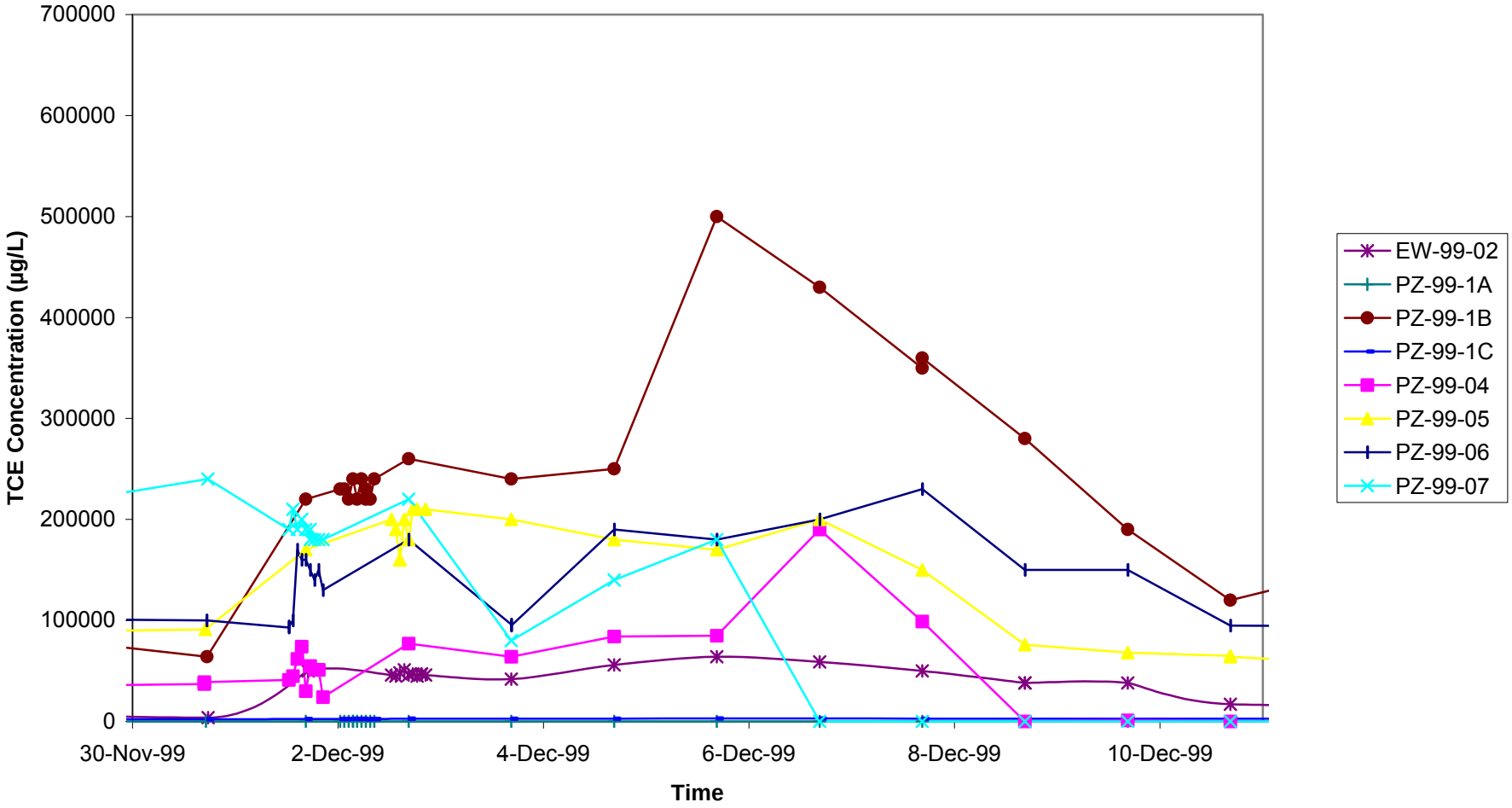

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Figure 4-3
TCE Area - Phase 2
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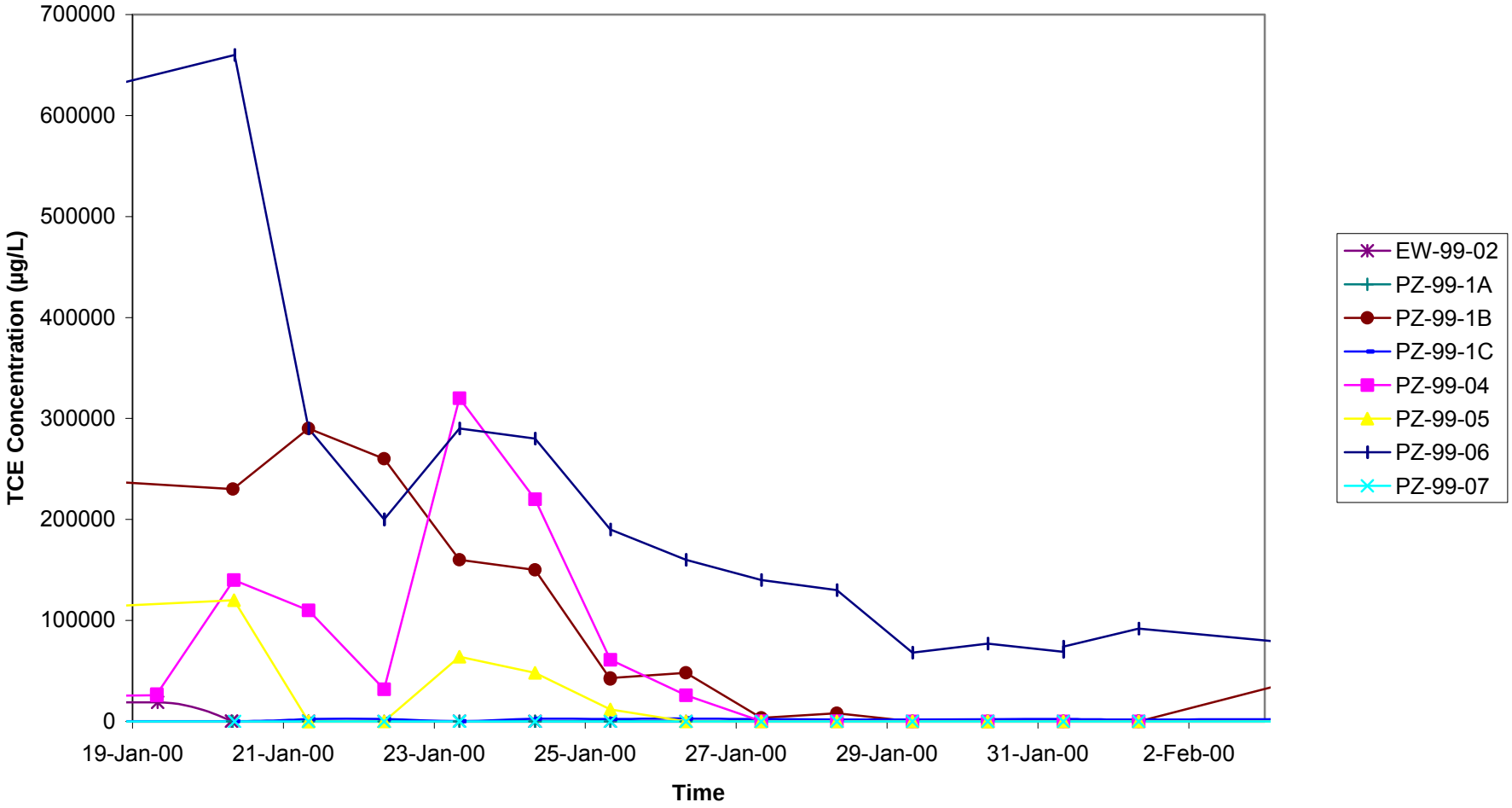

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Figure 4-4
TCE Area - Injection Wells
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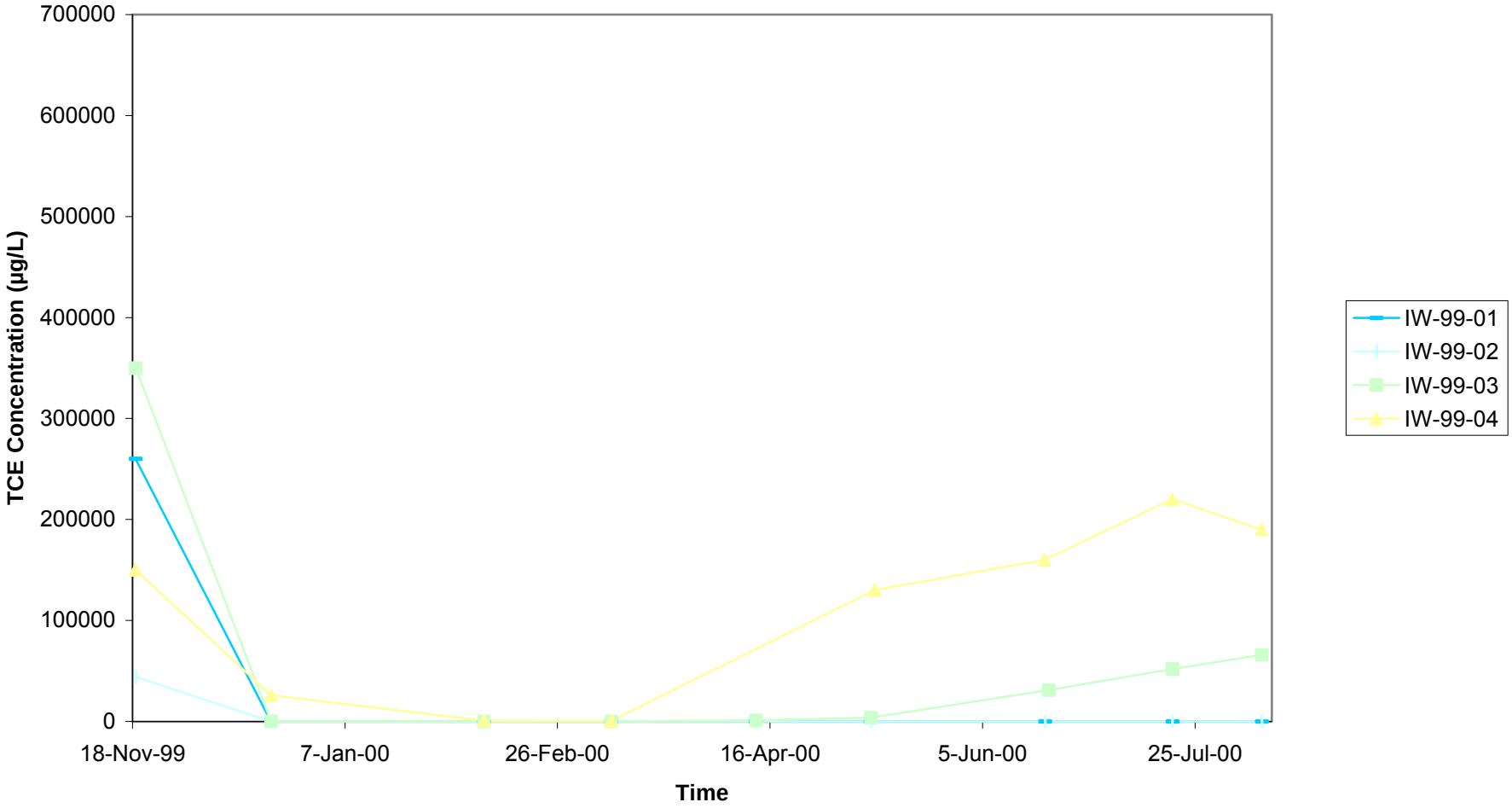

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Figure 4-5
TCE Area - EW-99-02
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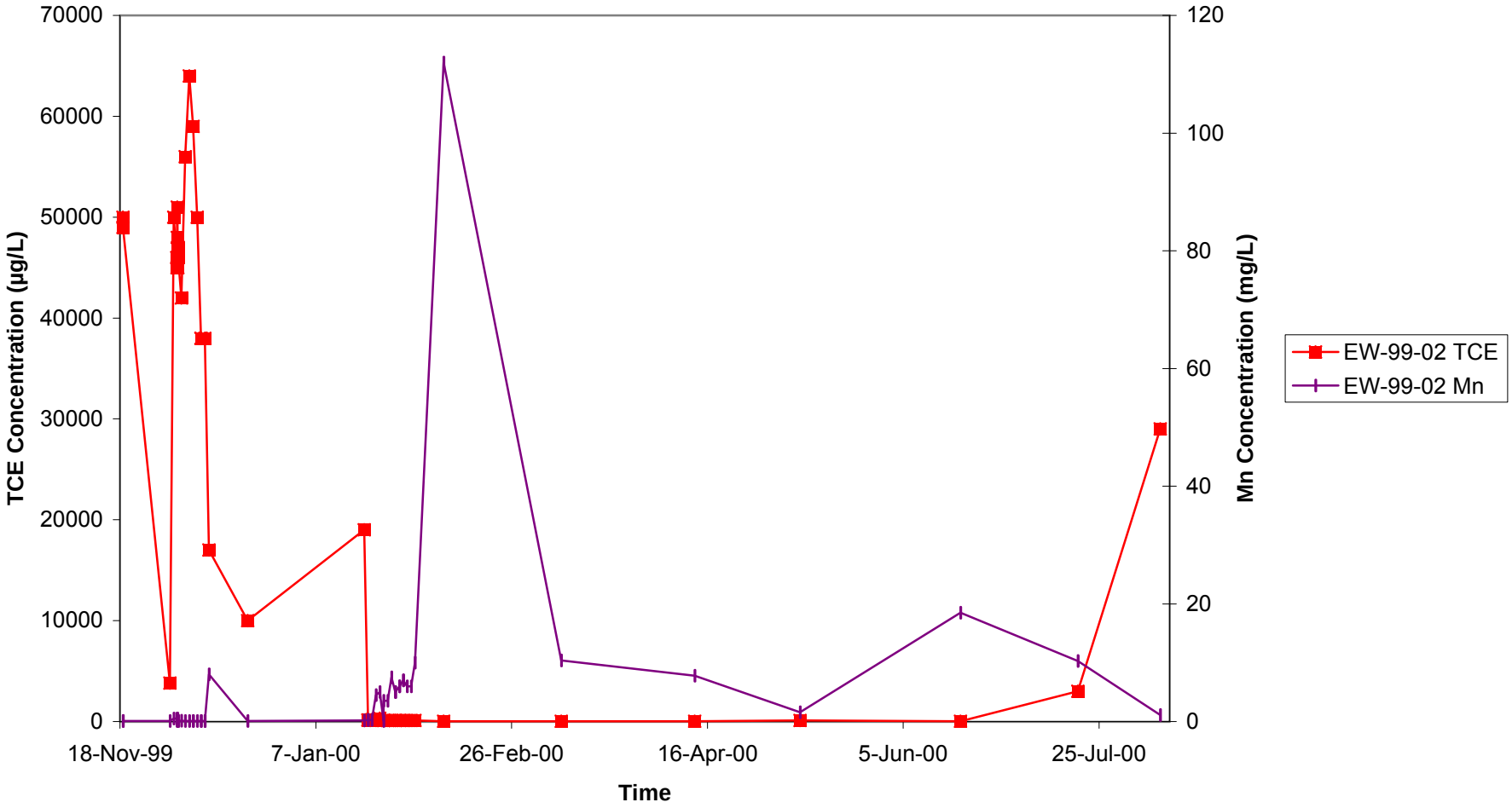

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Figure 4-6
TCE Area - PZ-99-01A
Pilot-Scale Treatability Study Report
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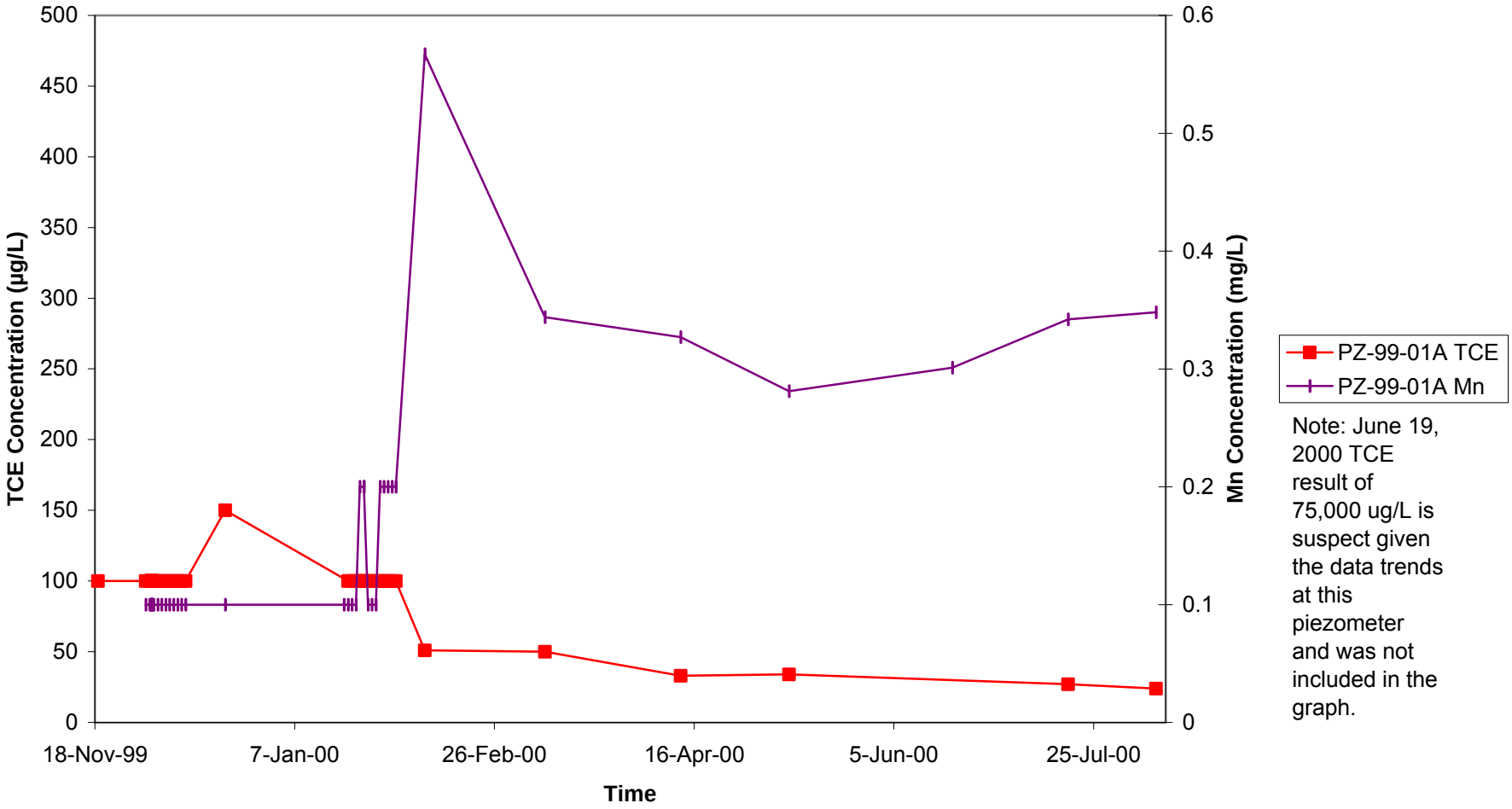

Note: June 19, 2000 TCE result of 75,000 ug/L is suspect given the data trends at this piezometer and was not included in the graph.

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Figure 4-7
TCE Area - PZ-99-01B
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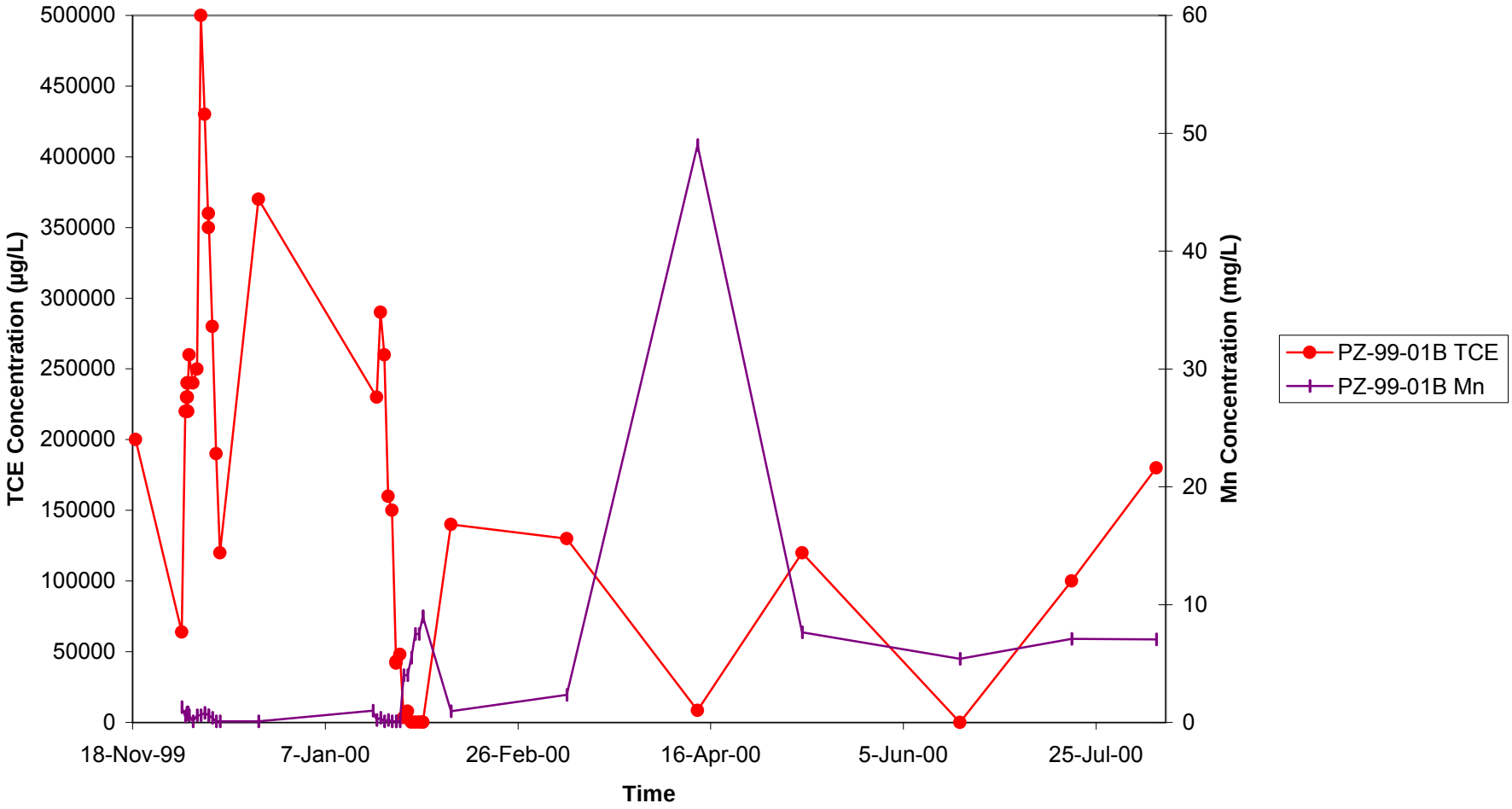

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Figure 4-8
TCE Area - PZ-99-01C
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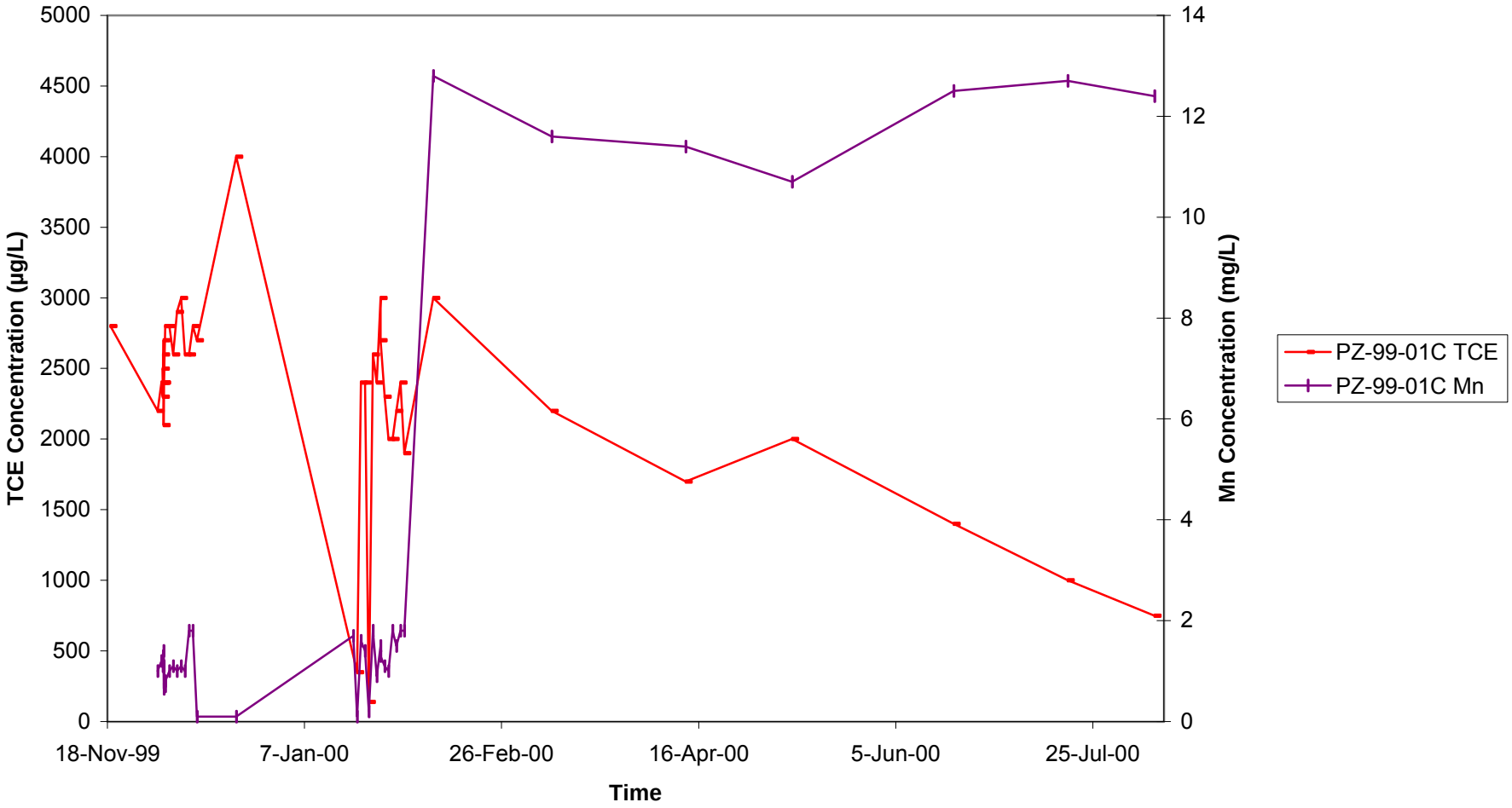

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Figure 4-9
TCE Area - PZ-99-04
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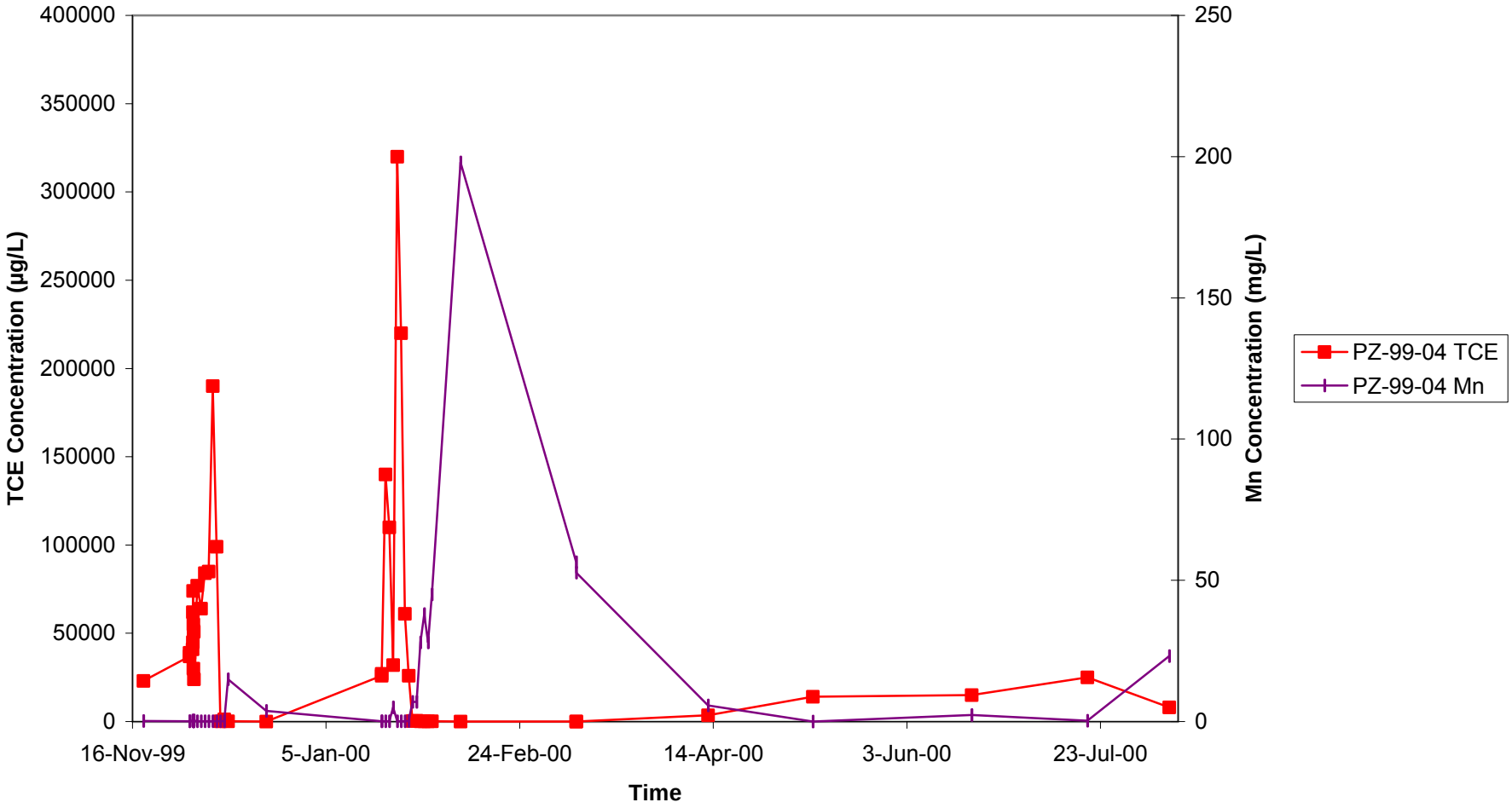

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Figure 4-10
TCE Area - PZ-99-05
Pilot-Scale Treatability Study Report
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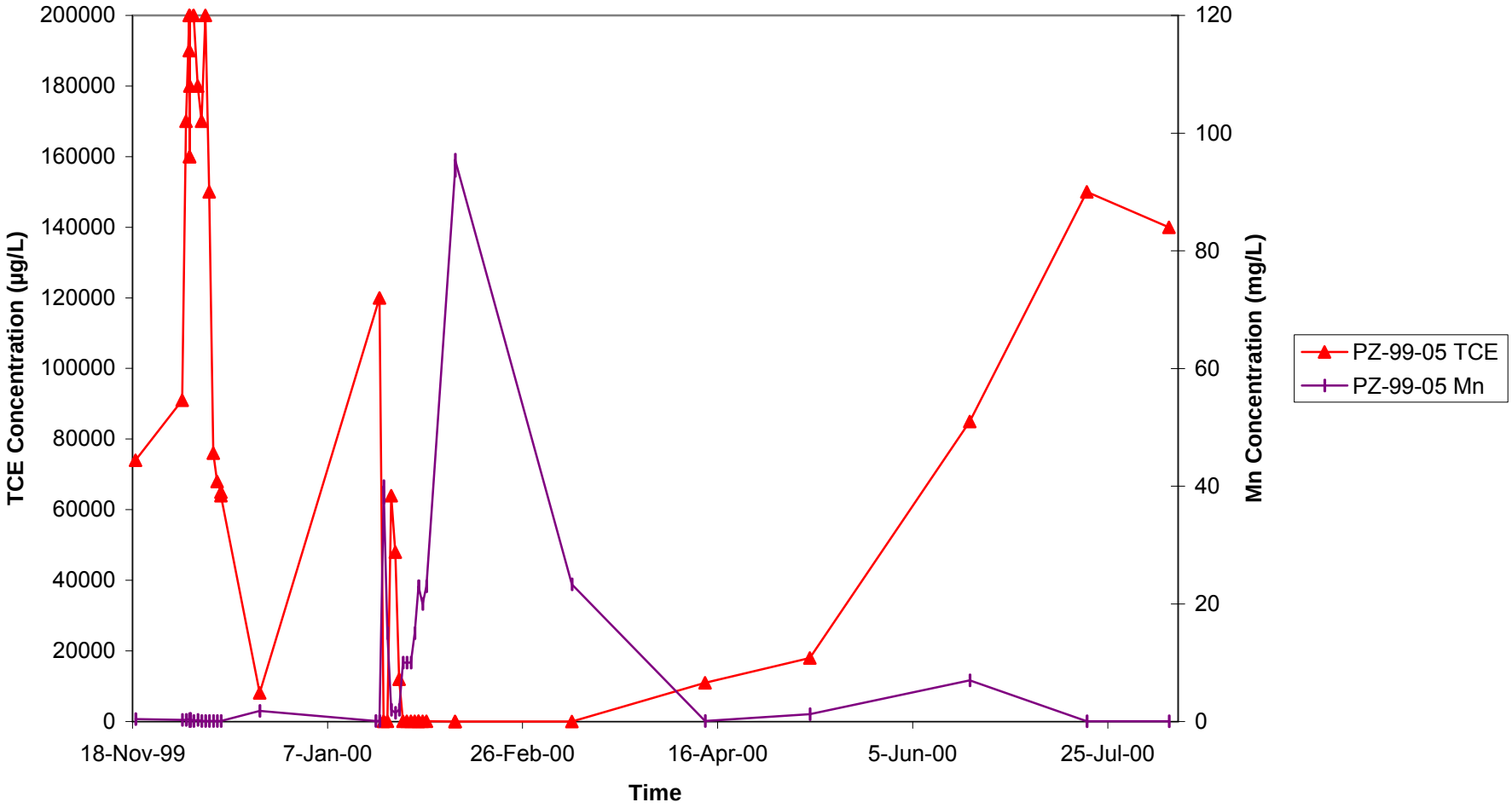

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Figure 4-11
TCE Area - PZ-99-06
Pilot-Scale Treatability Study Report
Stratford Army Engine Report

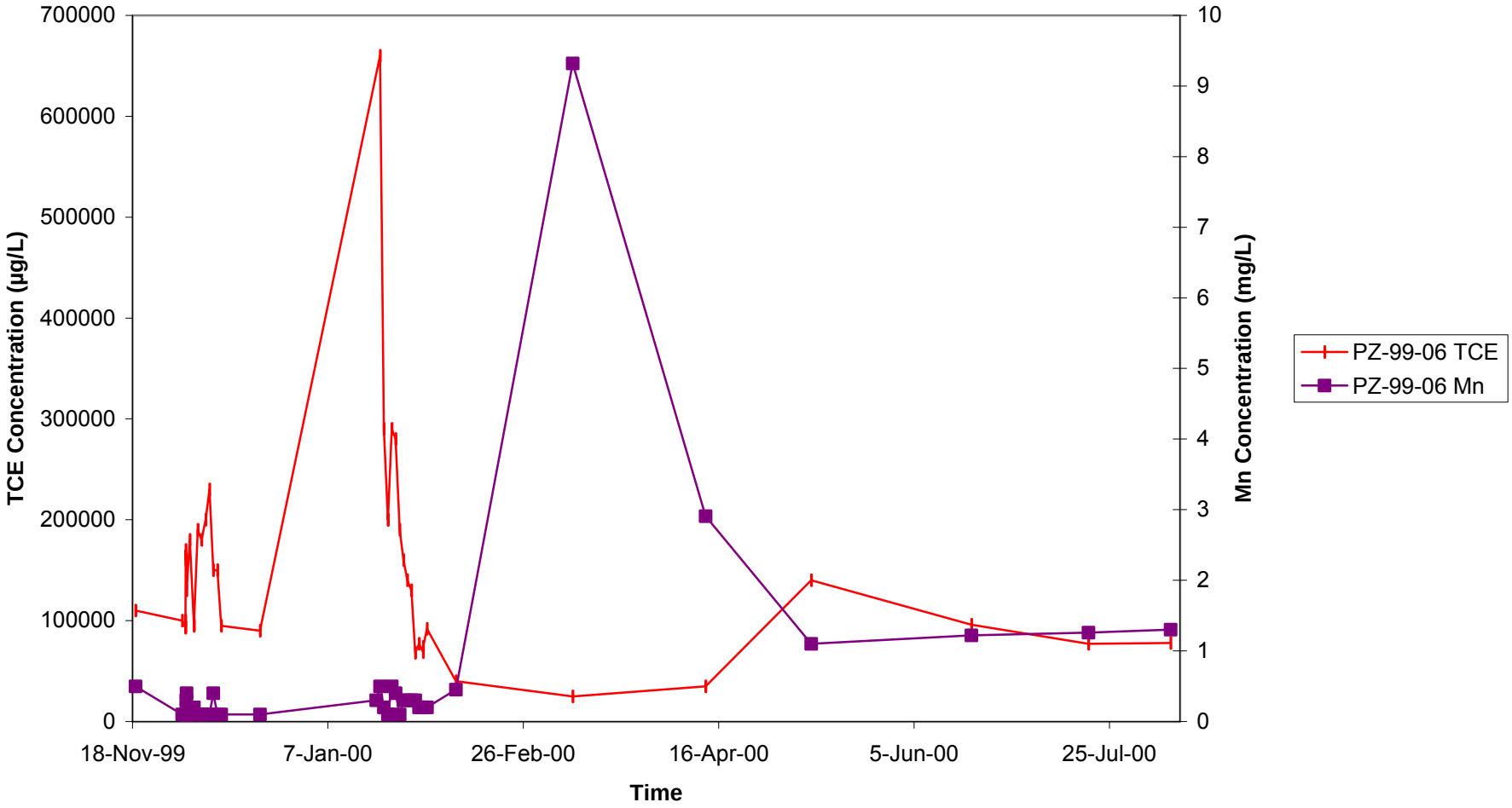

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Figure 4-12
TCE Area - PZ-99-07
Pilot-Scale Treatability Study Report
Stratford Army Engine Plant

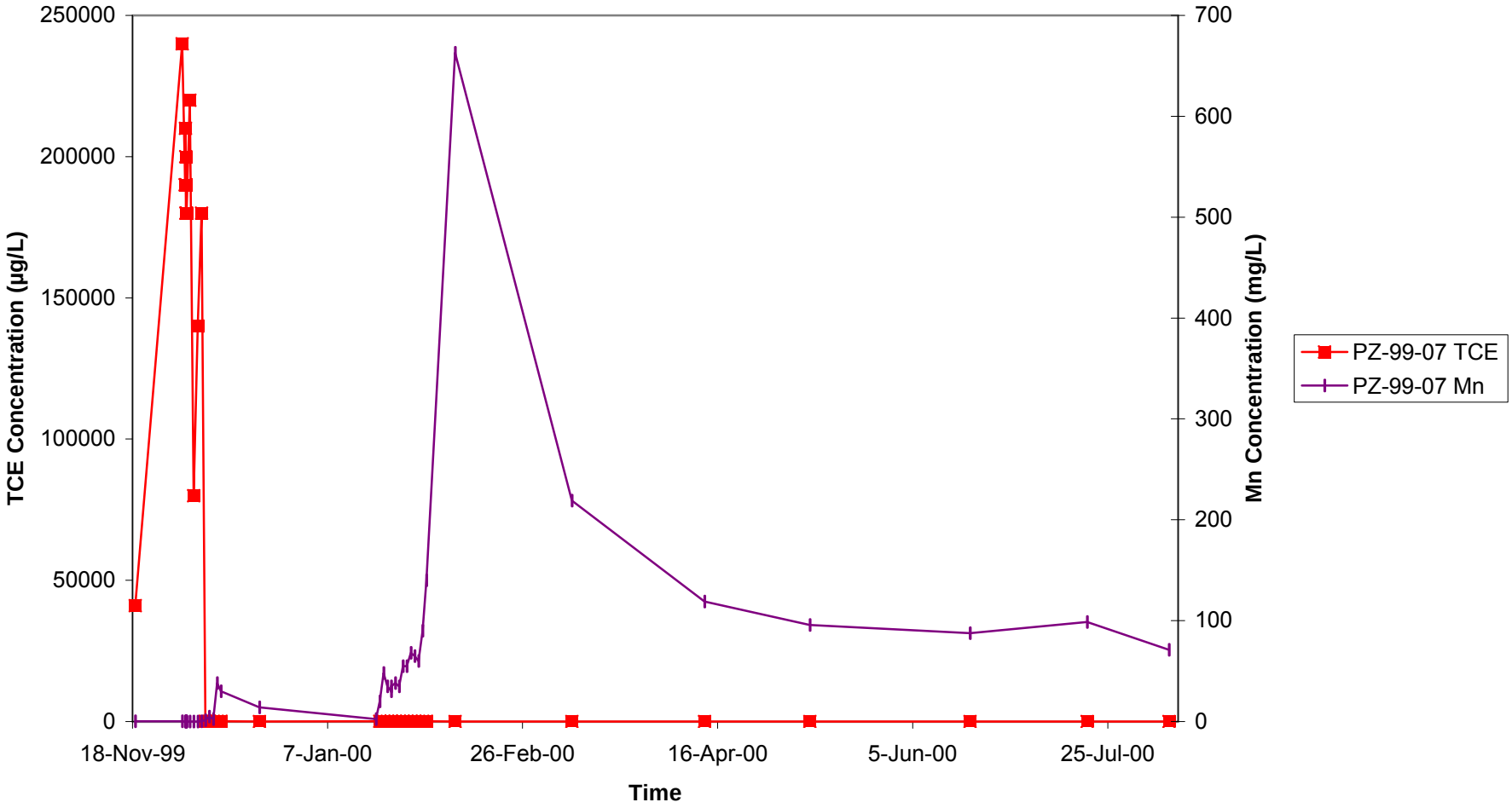

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Figure 4-13
Hexavalent Chrome Area - Entire Pilot Test
Pilot-Scale Treatability Study Report
Stratford Army Engine Plant

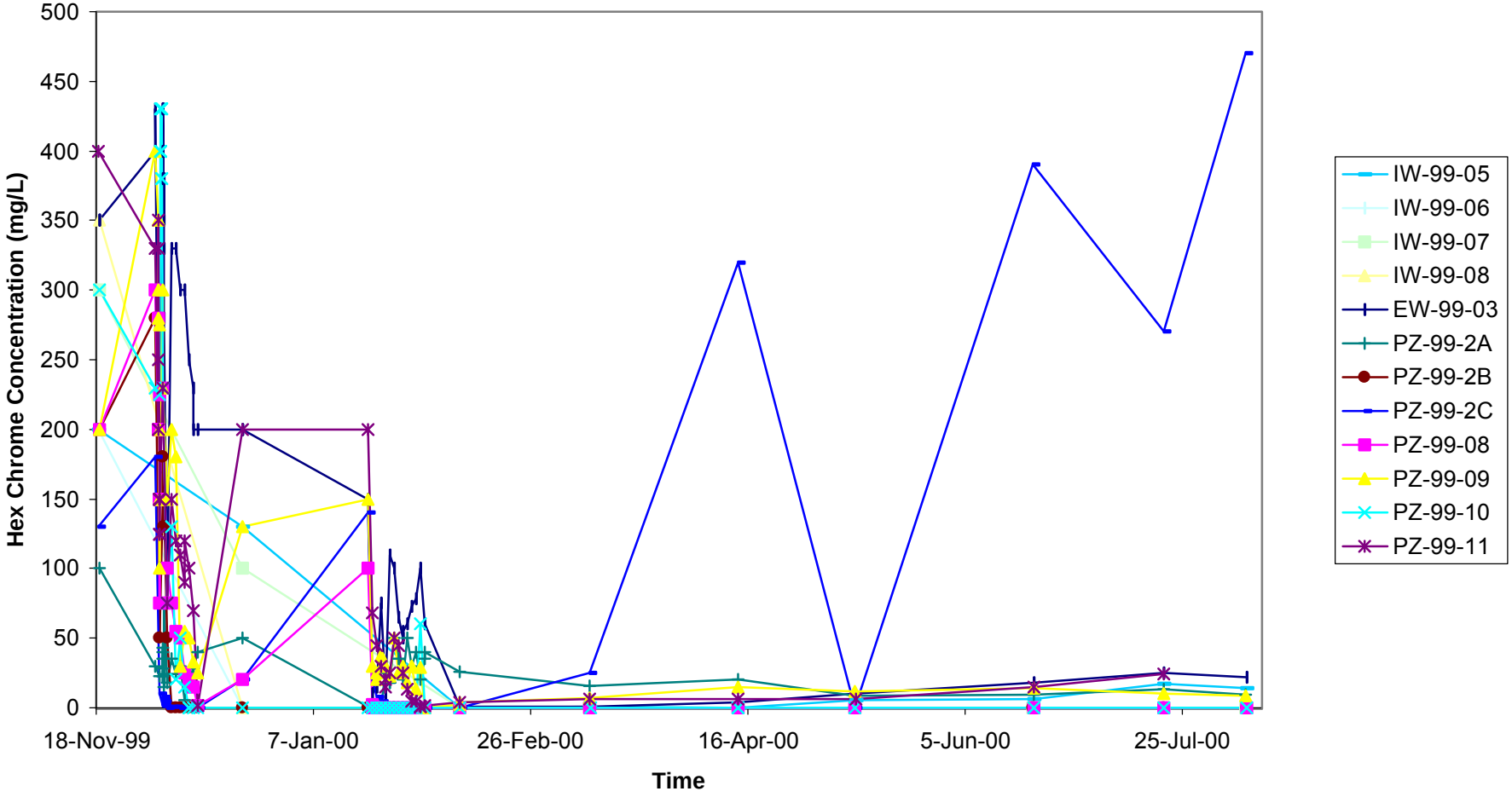

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Figure 4-14
Hexavalent Chrome Area - Phase 1
Pilot-Scale Treatability Study Report
Stratford Army Engine Plant

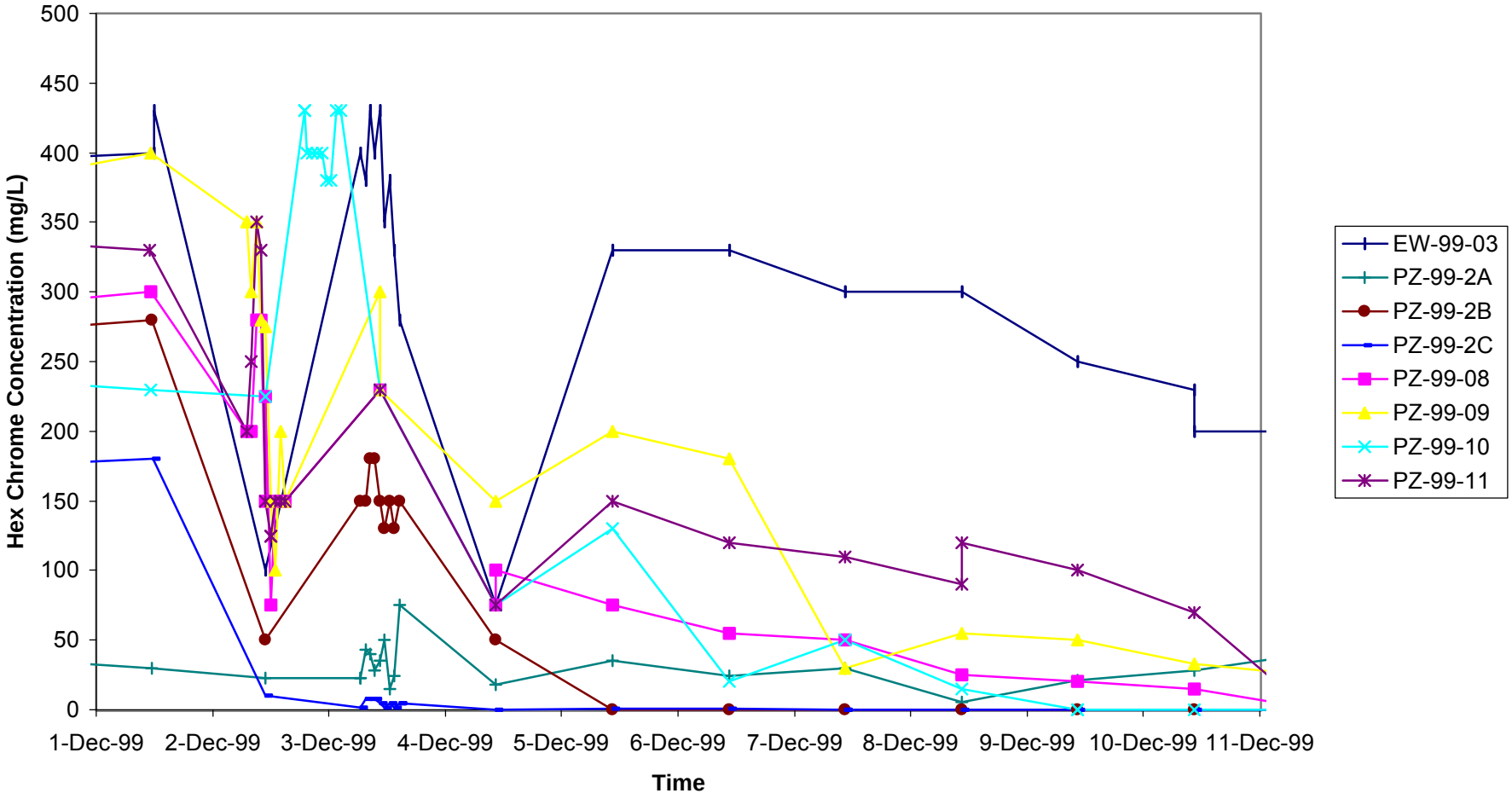

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Figure 4-15
Hexavalent Chrome Area - Phase 2
Pilot-Scale Treatability Study Report
Stratford Army Engine Plant

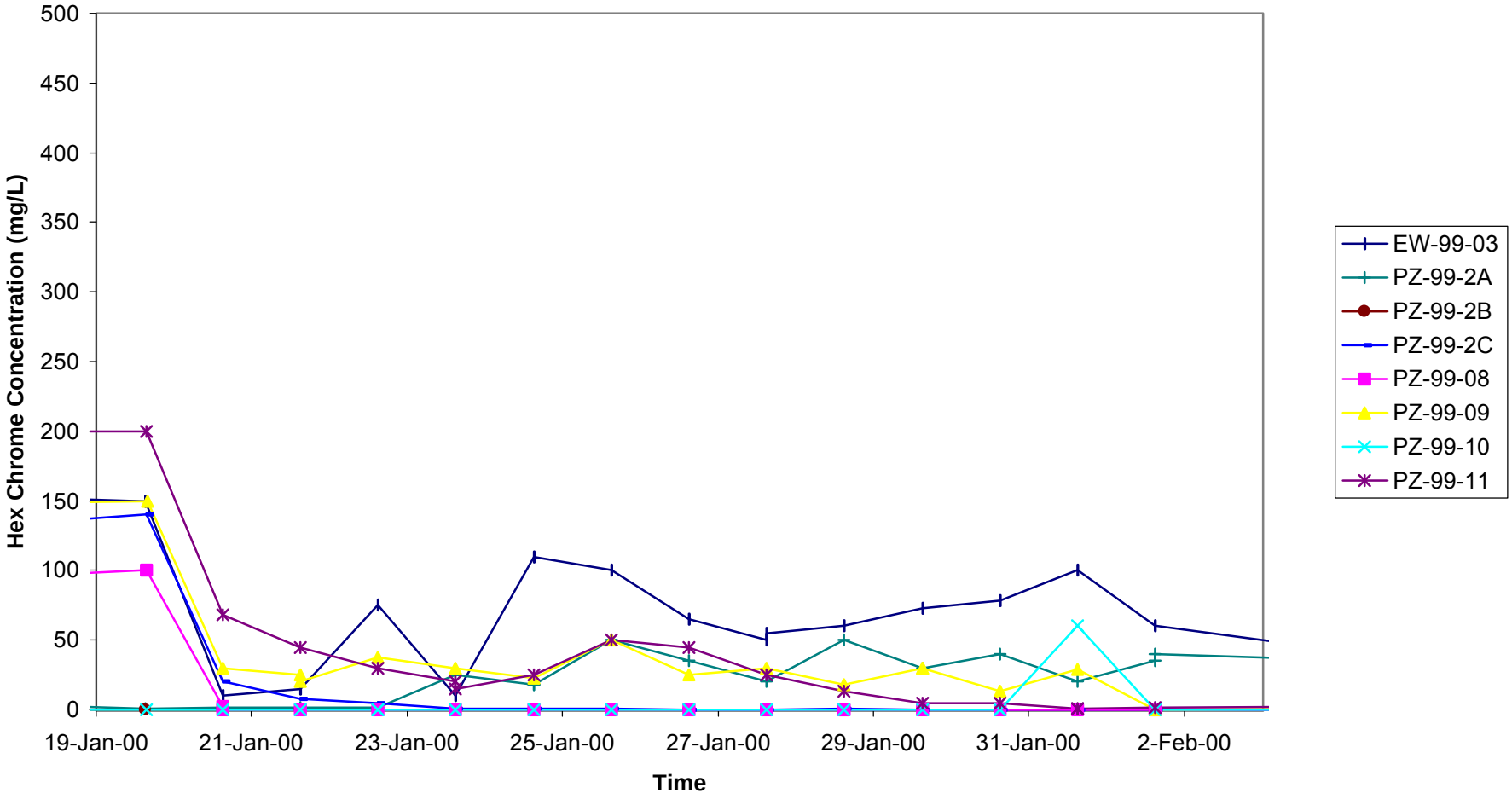

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Figure 4-16
Hexavalent Chrome Area - Injection Wells
Pilot-Scale Treatability Study Report
Stratford Army Engine Plant

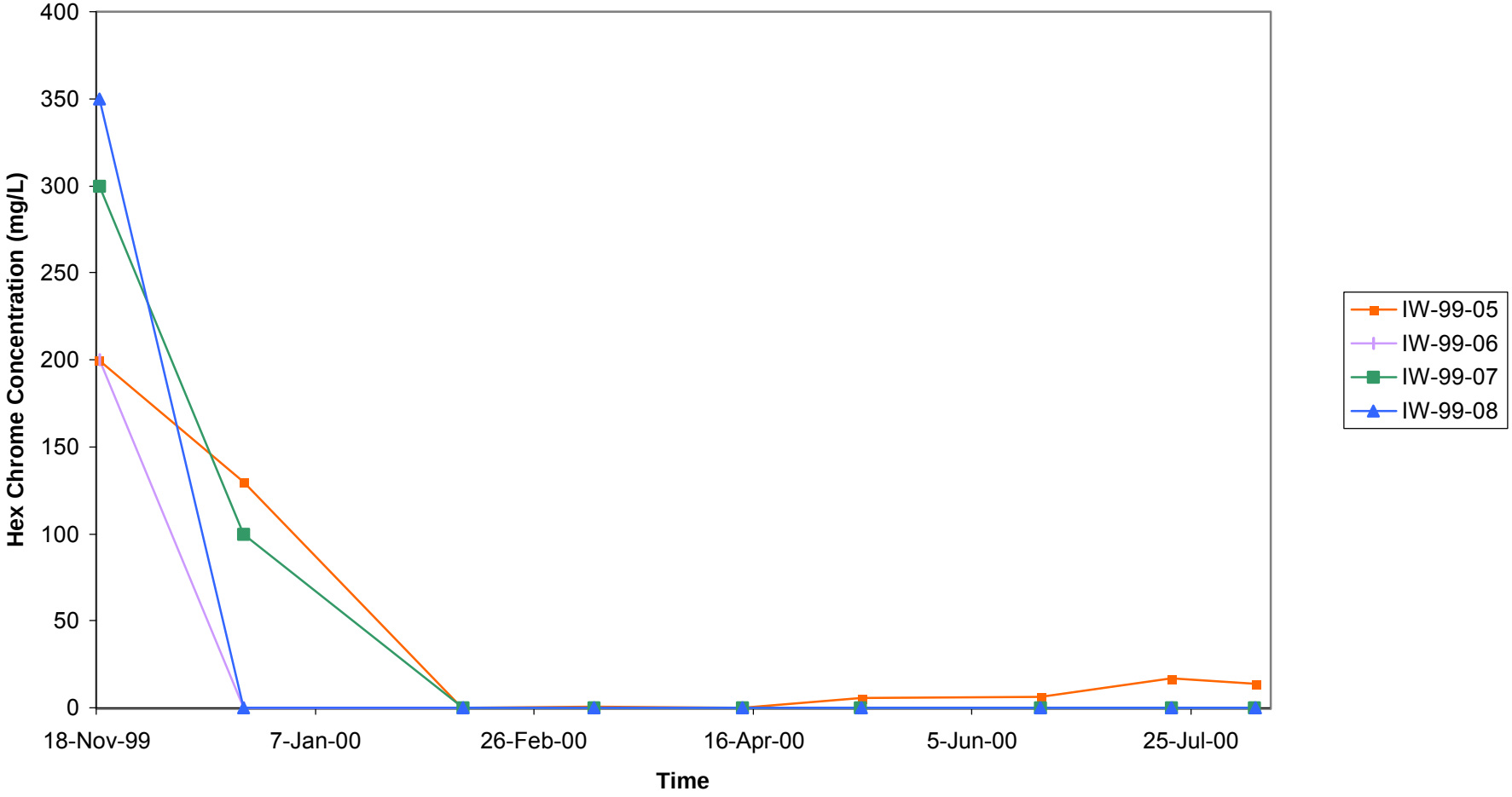

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Figure 4-17
Hexavalent Chrome Area - EW-99-03
Pilot-Scale Treatability Study Report
Stratford Army Engine Plant

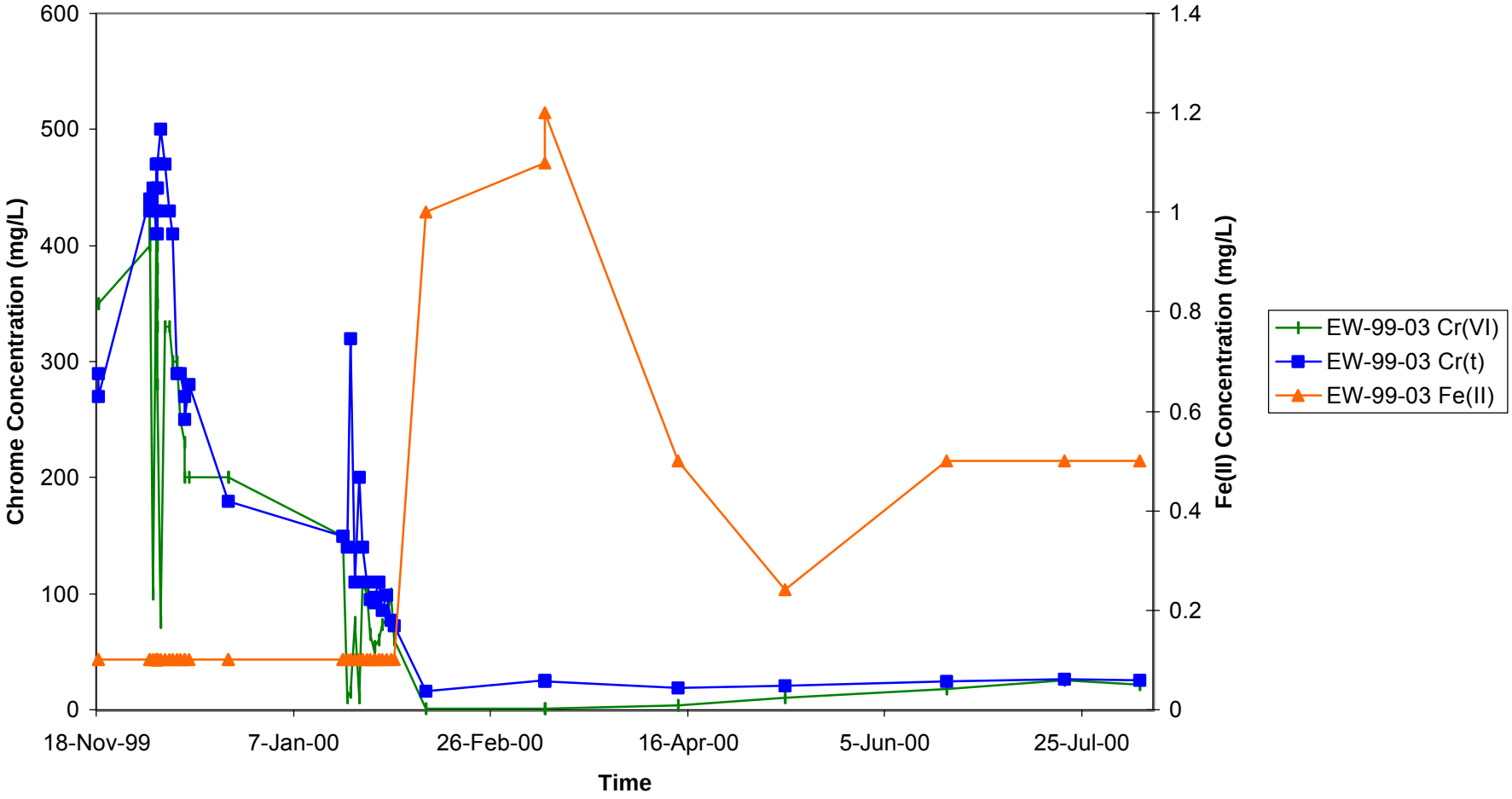

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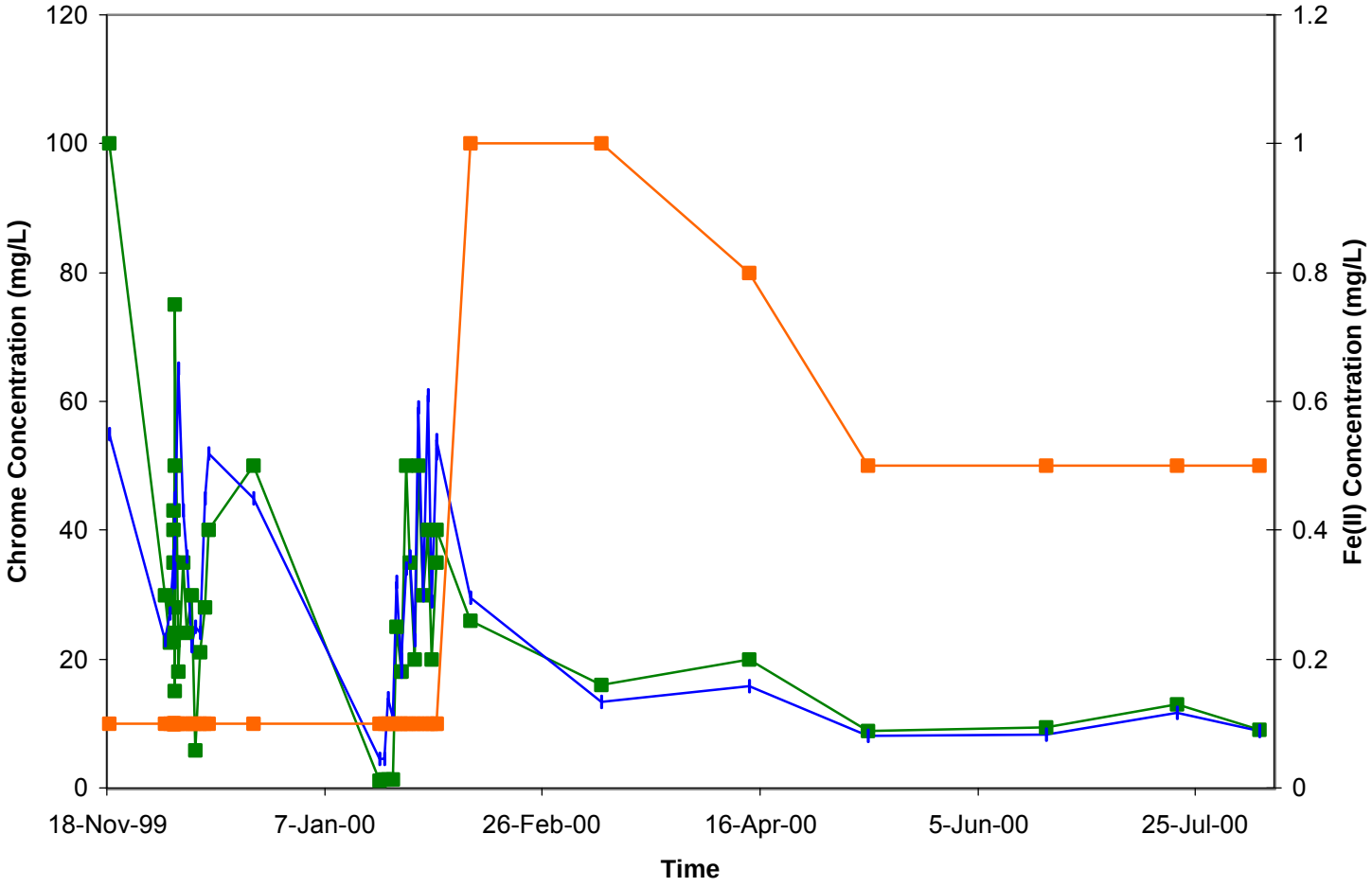
Figure 4-18
Hexavalent Chrome Area - PZ-99-02A
Pilot-Scale Treatability Study Report
Stratford Army Engine Plant



Note: Ferrous iron results shown are all graphed at the detection limit (results were below detection limits) with the exception of the April 13, 2000

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Figure 4-19
Hexavalent Chrome Area - PZ-99-02B
Pilot-Scale Treatability Study Report
Stratford Army Engine Plant

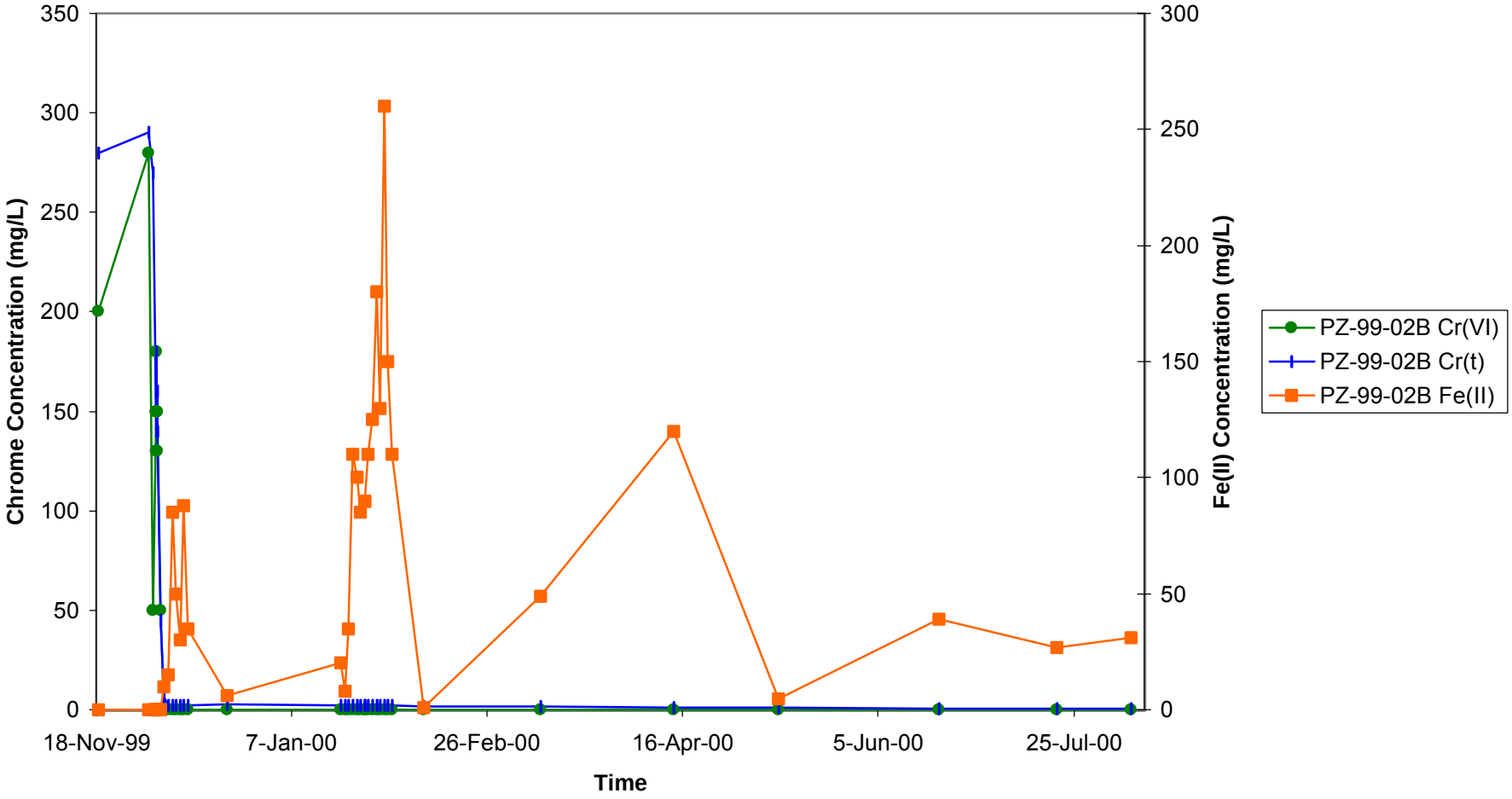

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Figure 4-20
Hexavalent Chrome Area - PZ-99-02C
Pilot-Scale Treatability Study Report
Stratford Army Engine Plant

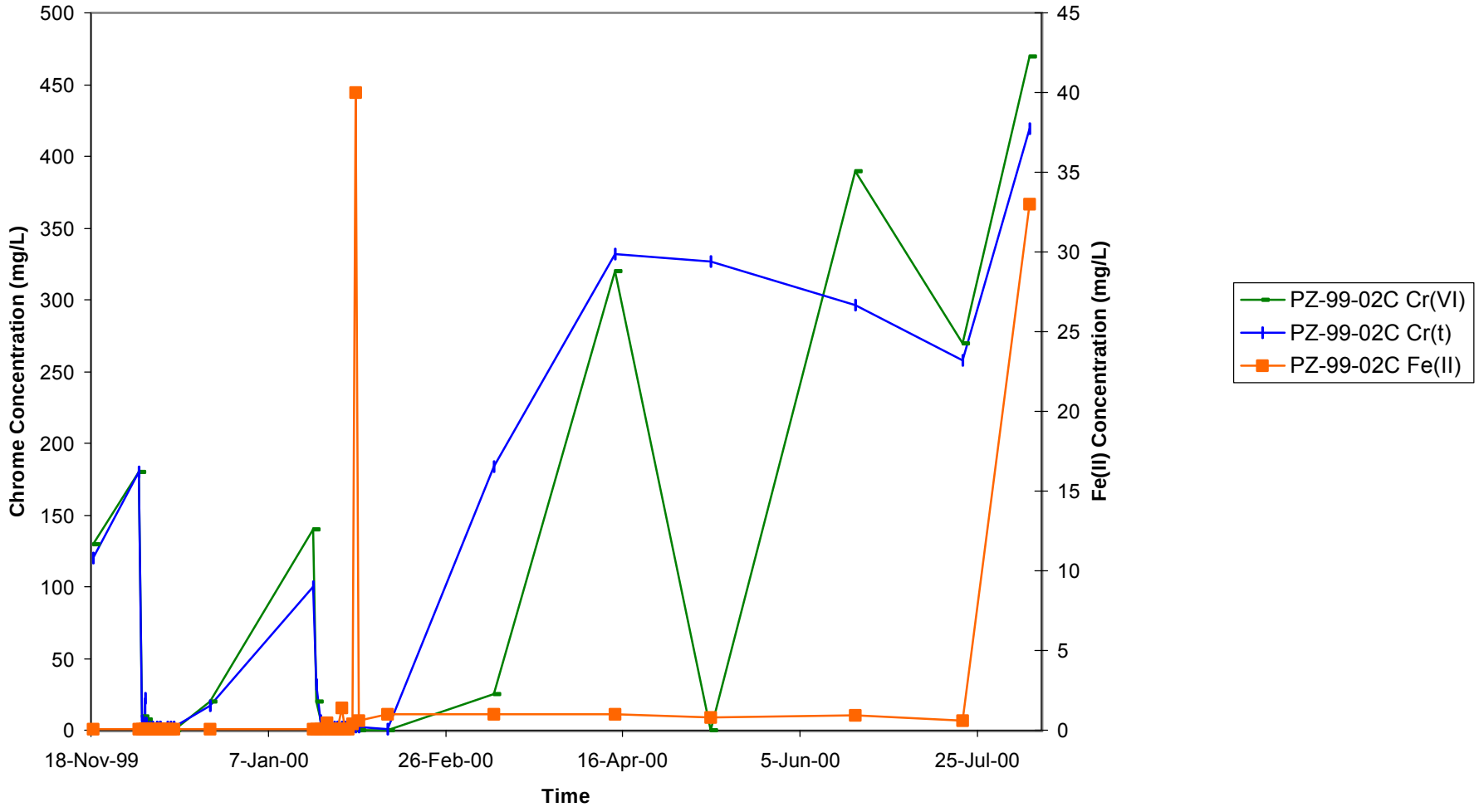

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Figure 4-21
Hexavalent Chrome Area - PZ-99-08
Pilot-Scale Treatability Study Report
Stratford Army Engine Plant

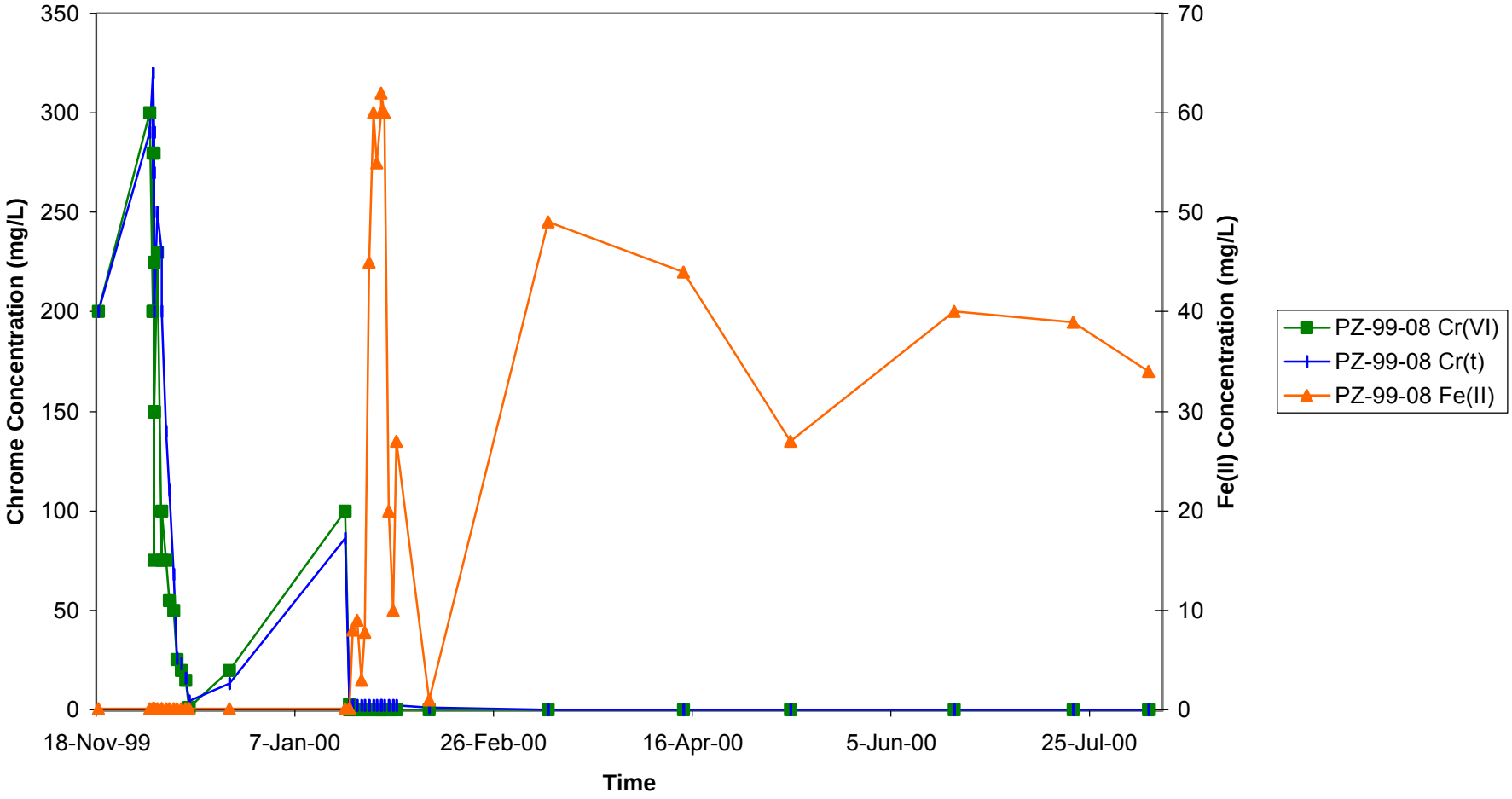

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Figure 4-22
Hexavalent Chrome Area - PZ-99-09
Pilot-Scale Treatability Study Report
Stratford Army Engine Plant

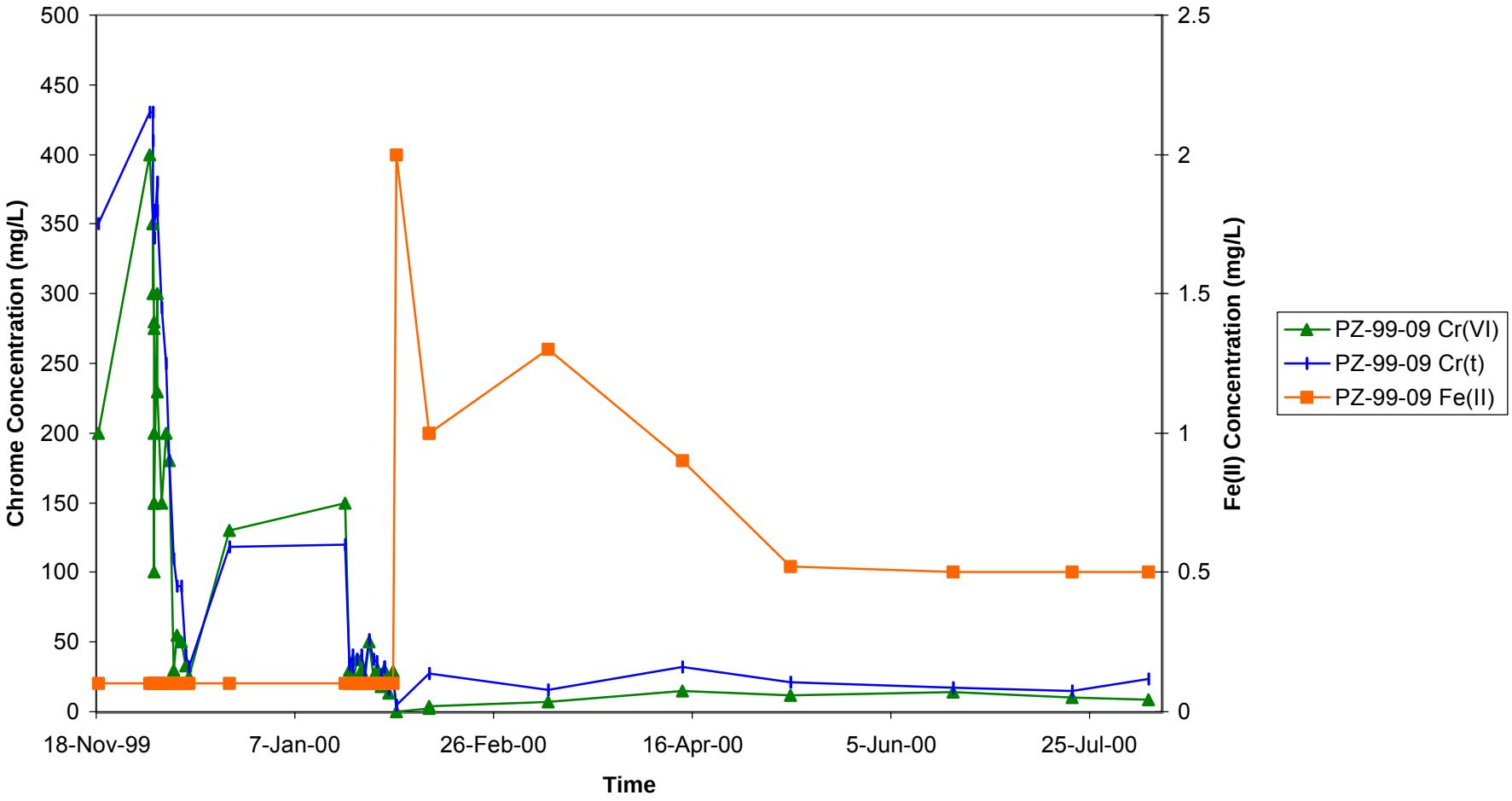

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Figure 4-23
Hexavalent Chrome Area - PZ-99-10
Pilot-Scale Treatability Study Report
Stratford Army Engine Plant

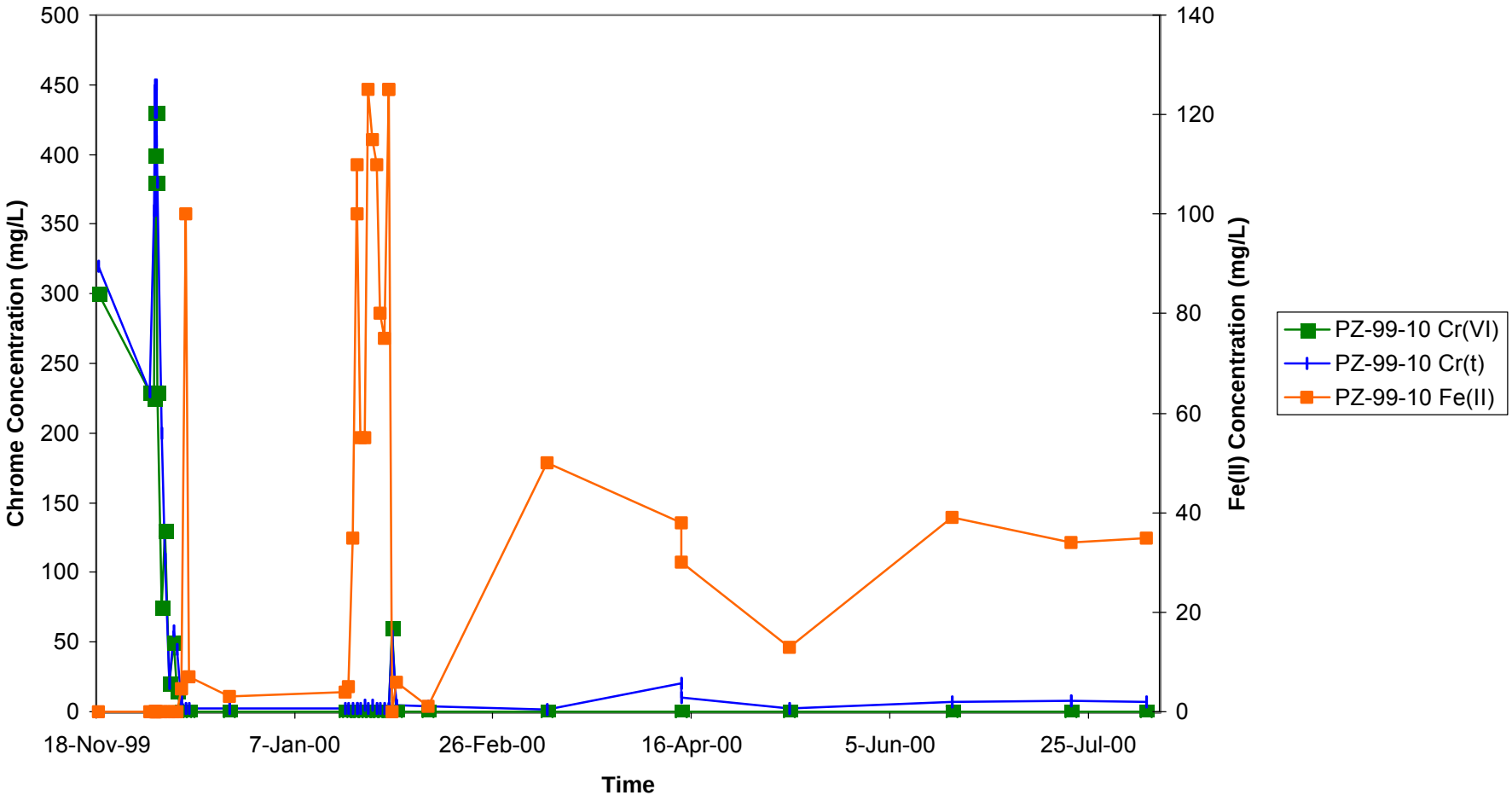

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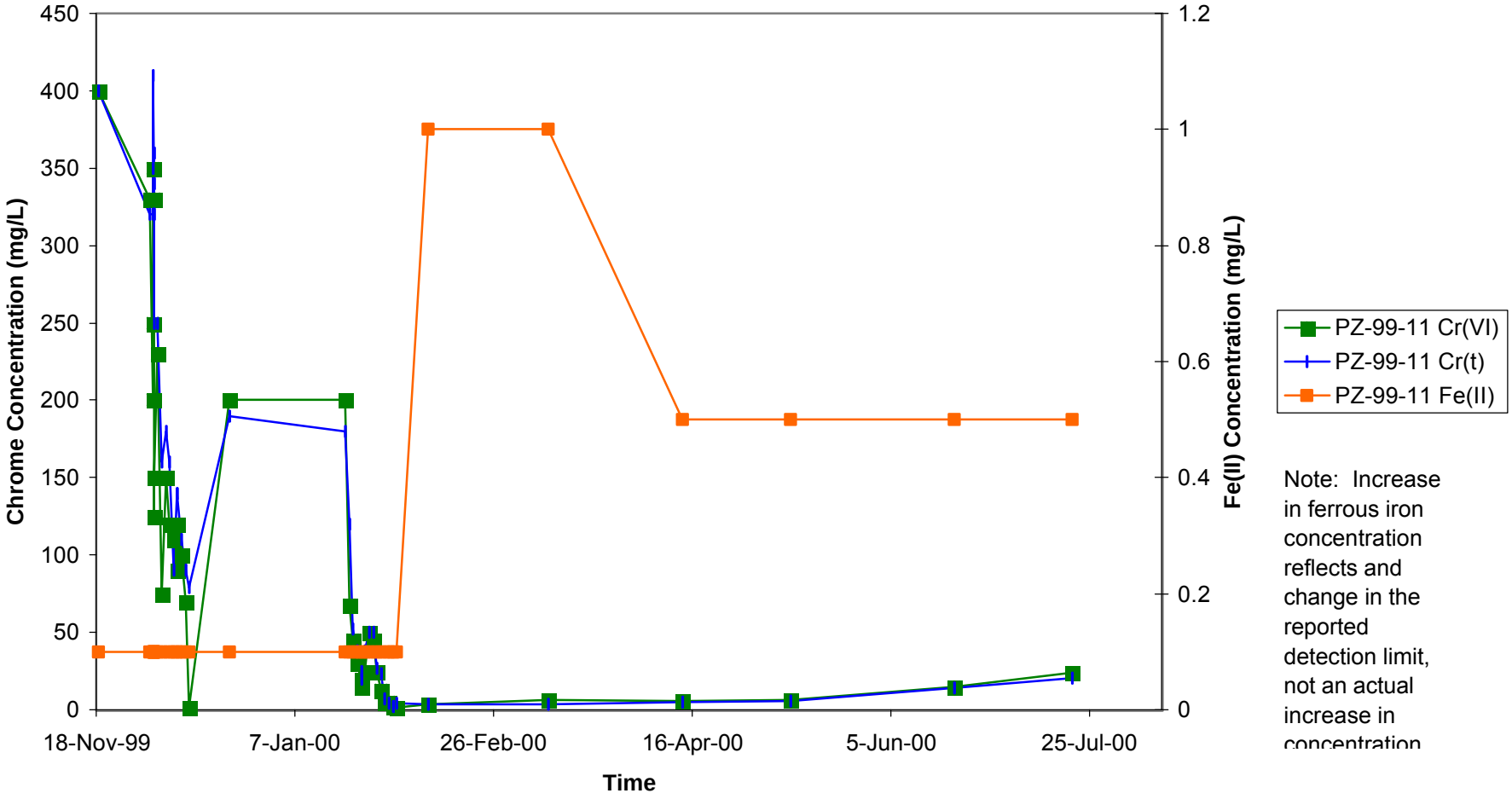
Figure 4-24
Hexavalent Chrome Area - PZ-99-11
Pilot-Scale Treatability Study Report
Stratford Army Engine Plant



Note: Increase in ferrous iron concentration reflects and change in the reported detection limit, not an actual increase in concentration

G:\Projects\TERCS\Projects\DO20\Pilot_Test\Report\Tables and Figures\chromegraphs2.xls

Figure 4-25
TCE Area - Effect of KMnO4 Dose
Pilot-Scale Treatability Study Report
Stratford Army Engine Plant

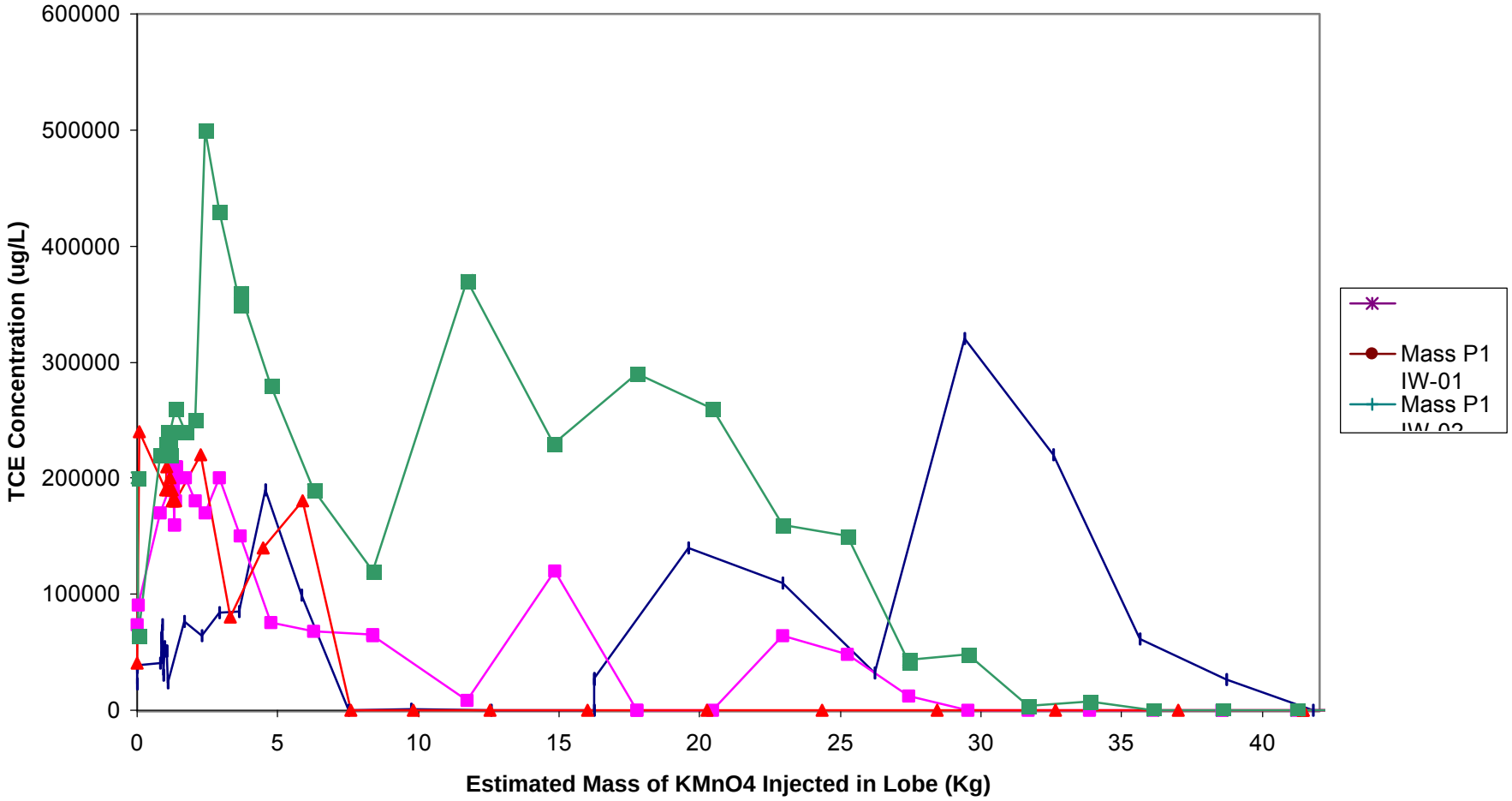


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Figure 4-26
Chrome Area- Effect of FeSO4 Dose
Pilot-Scale Treatability Study Report
Stratford Army Engine Plant

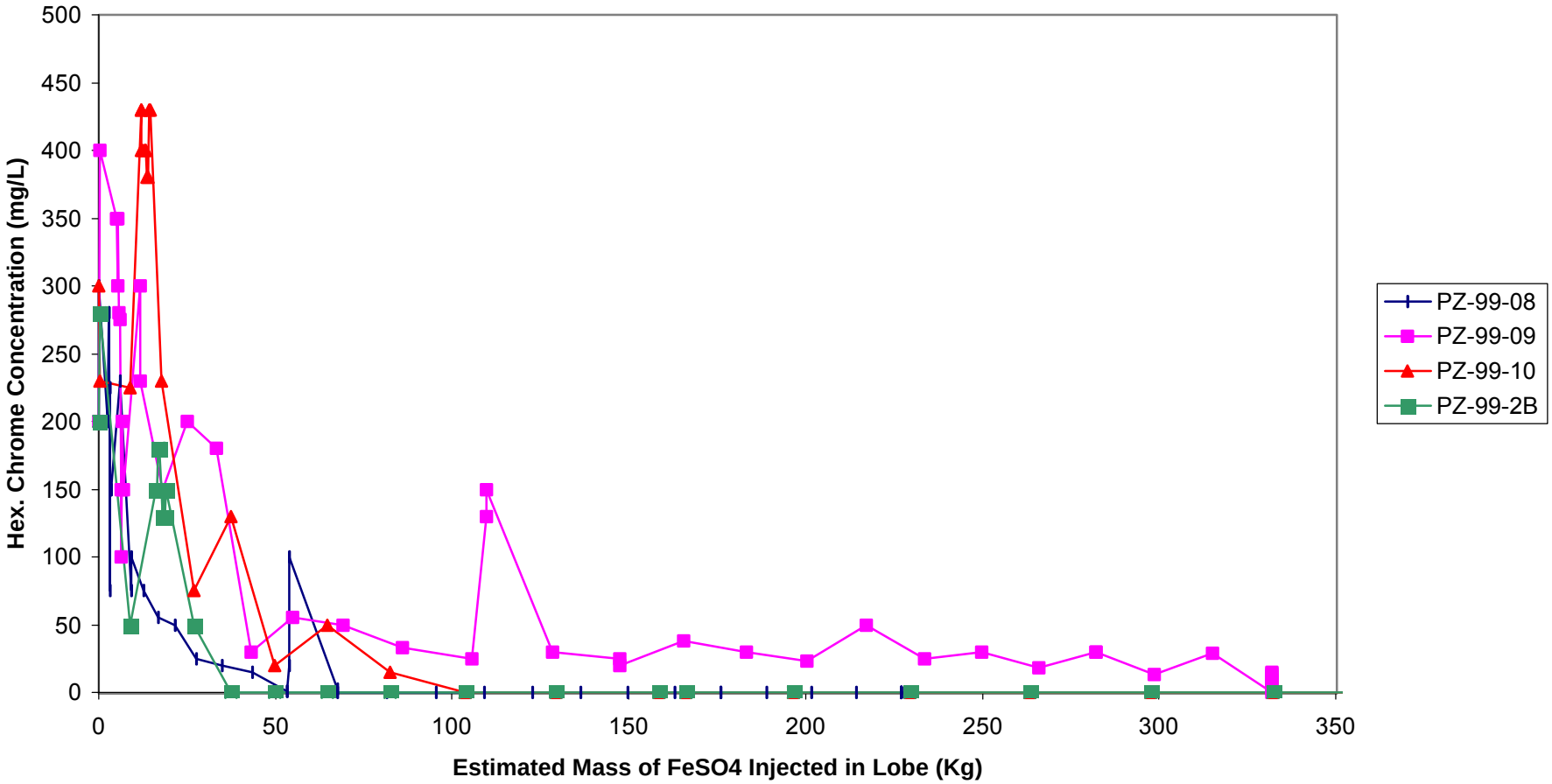

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Figure 4-27
TCE Area - PZ-99-07 TCE/Temperature
Pilot-Scale Treatability Study Report
Stratford Army Engine Plant

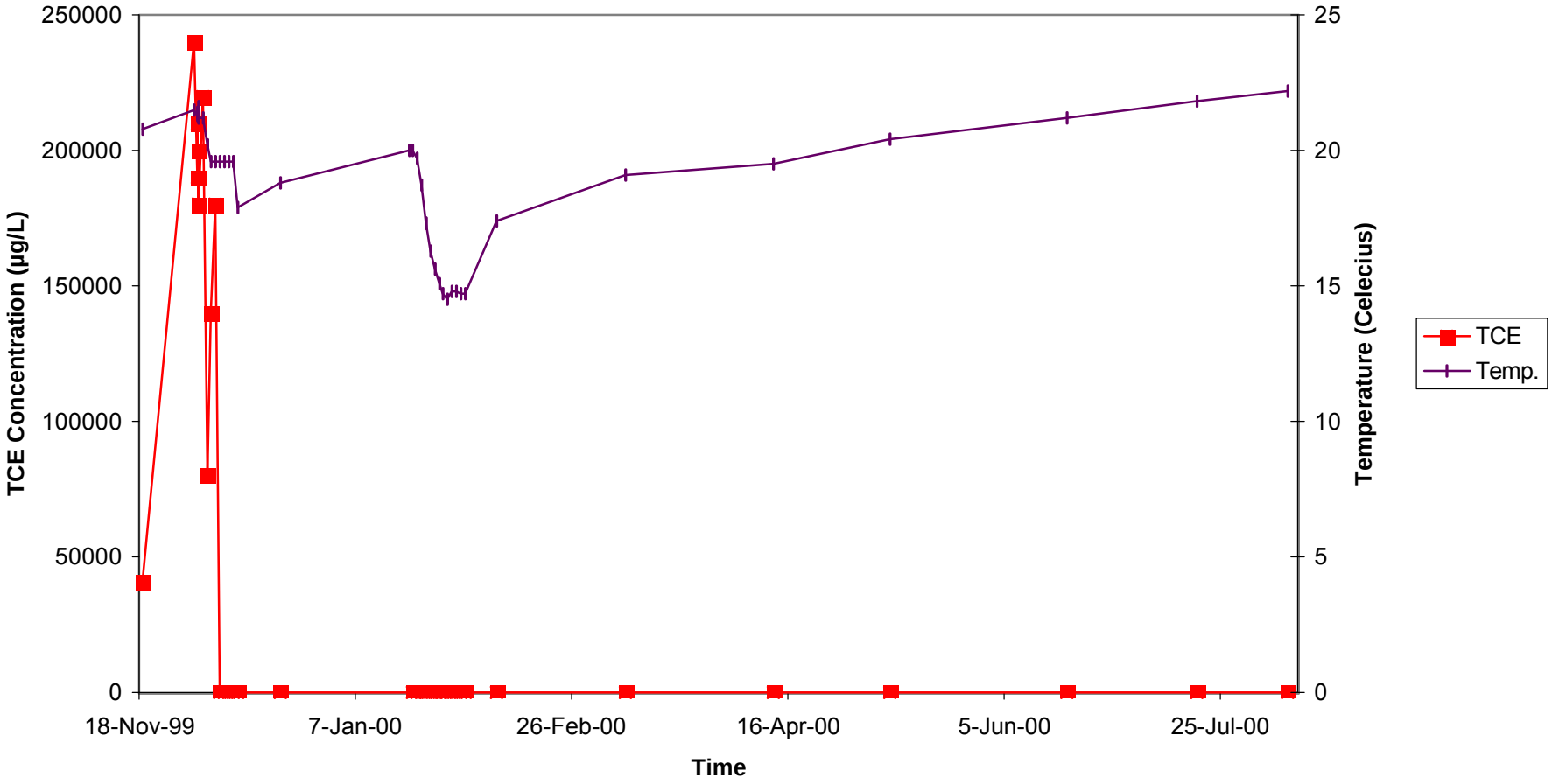

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Figure 4-28
TCE Area - PZ-99-06 TCE/Temperature
Pilot-Scale Treatability Study Report
Stratford Army Engine Plant

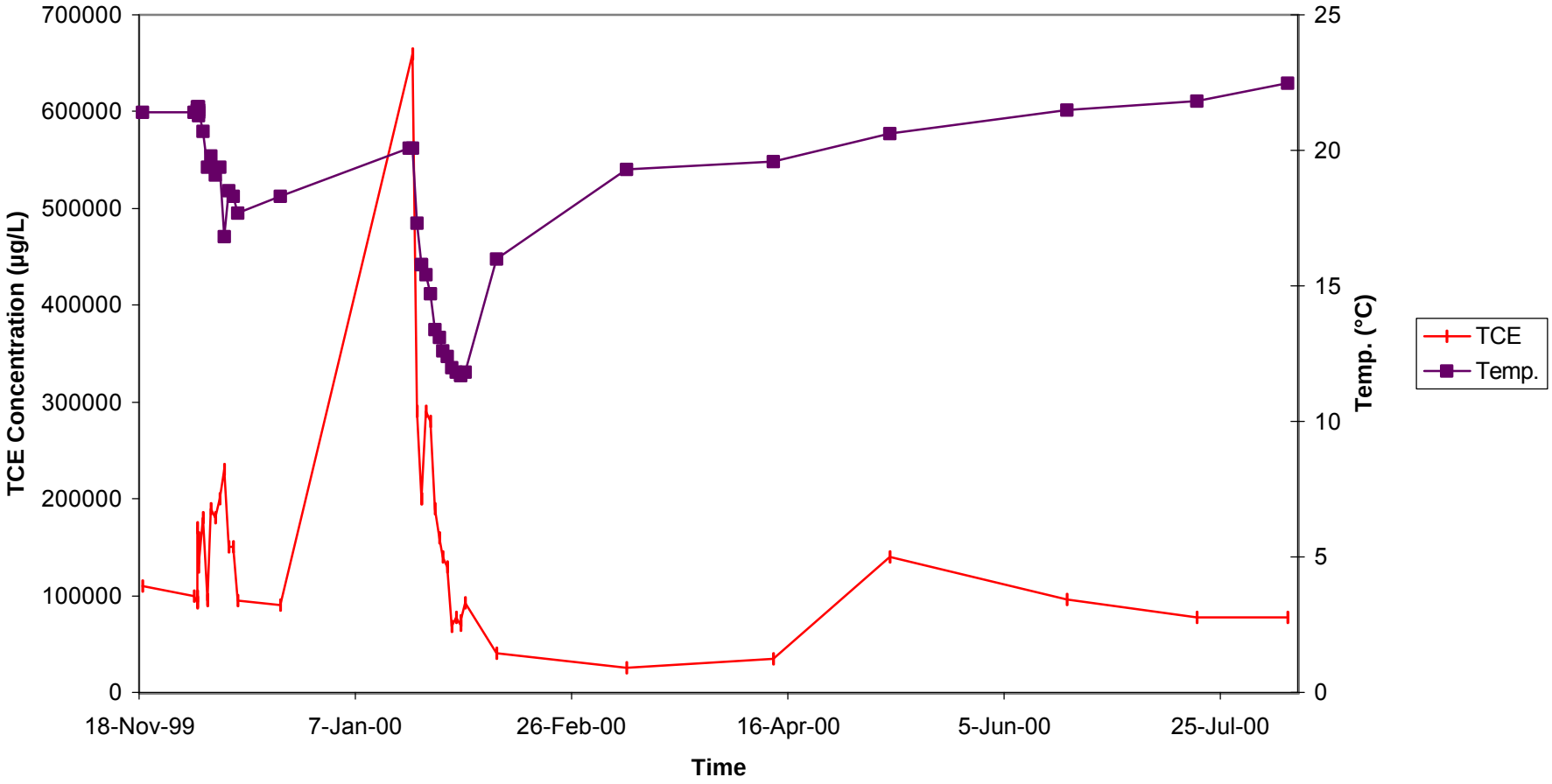

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Figure 4-29
Hexavalent Chrome Area - PZ-99-10 Cr(VI)/Temperature
Pilot-Scale Treatability Study Report
Stratford Army Engine Plant

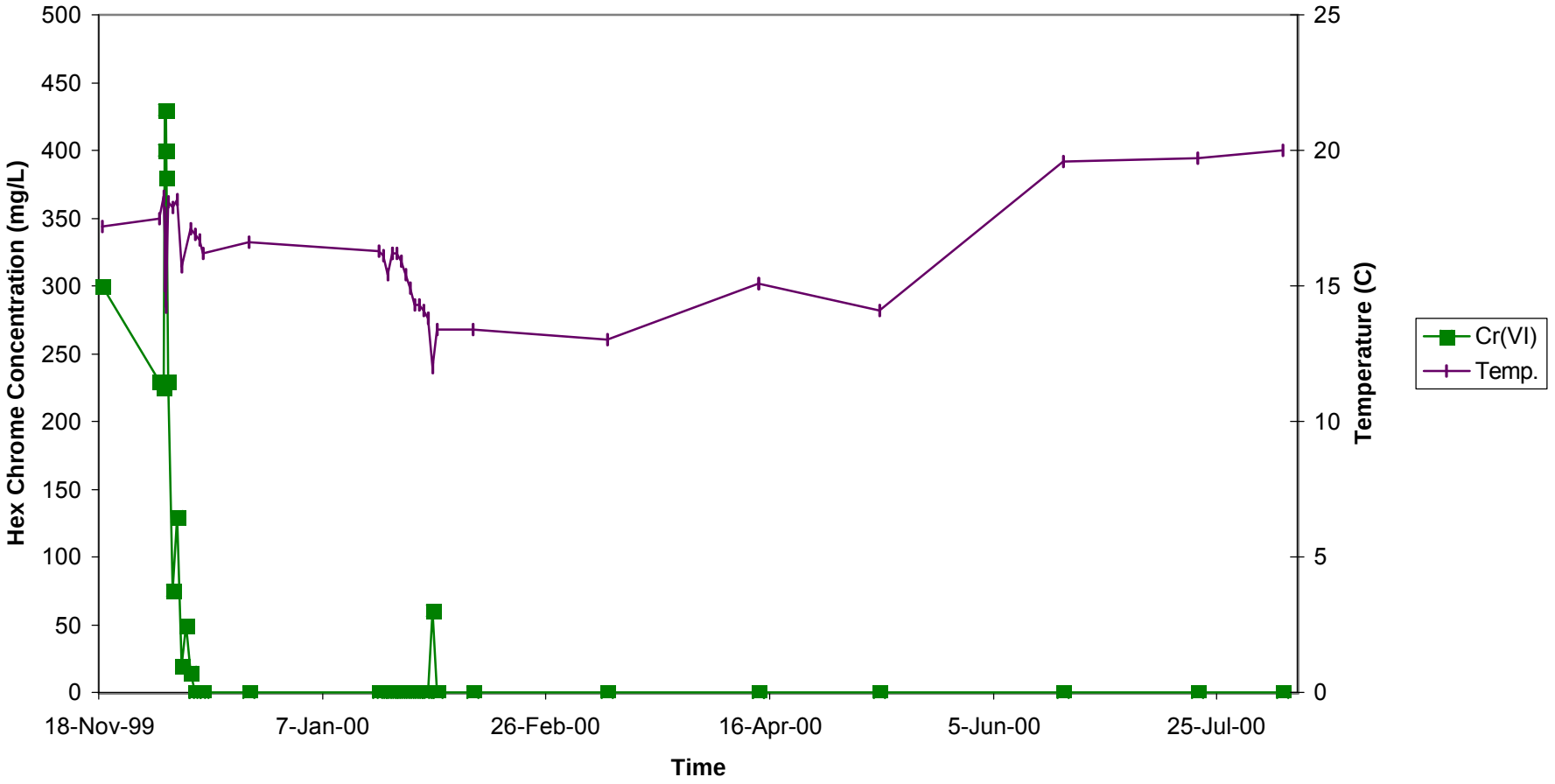

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Figure 4-30
Hexavalent Chrome Area - PZ-99-11 Cr(VI)/Temperature
Pilot-Scale Treatability Study Report
Stratford Army Engine Plant

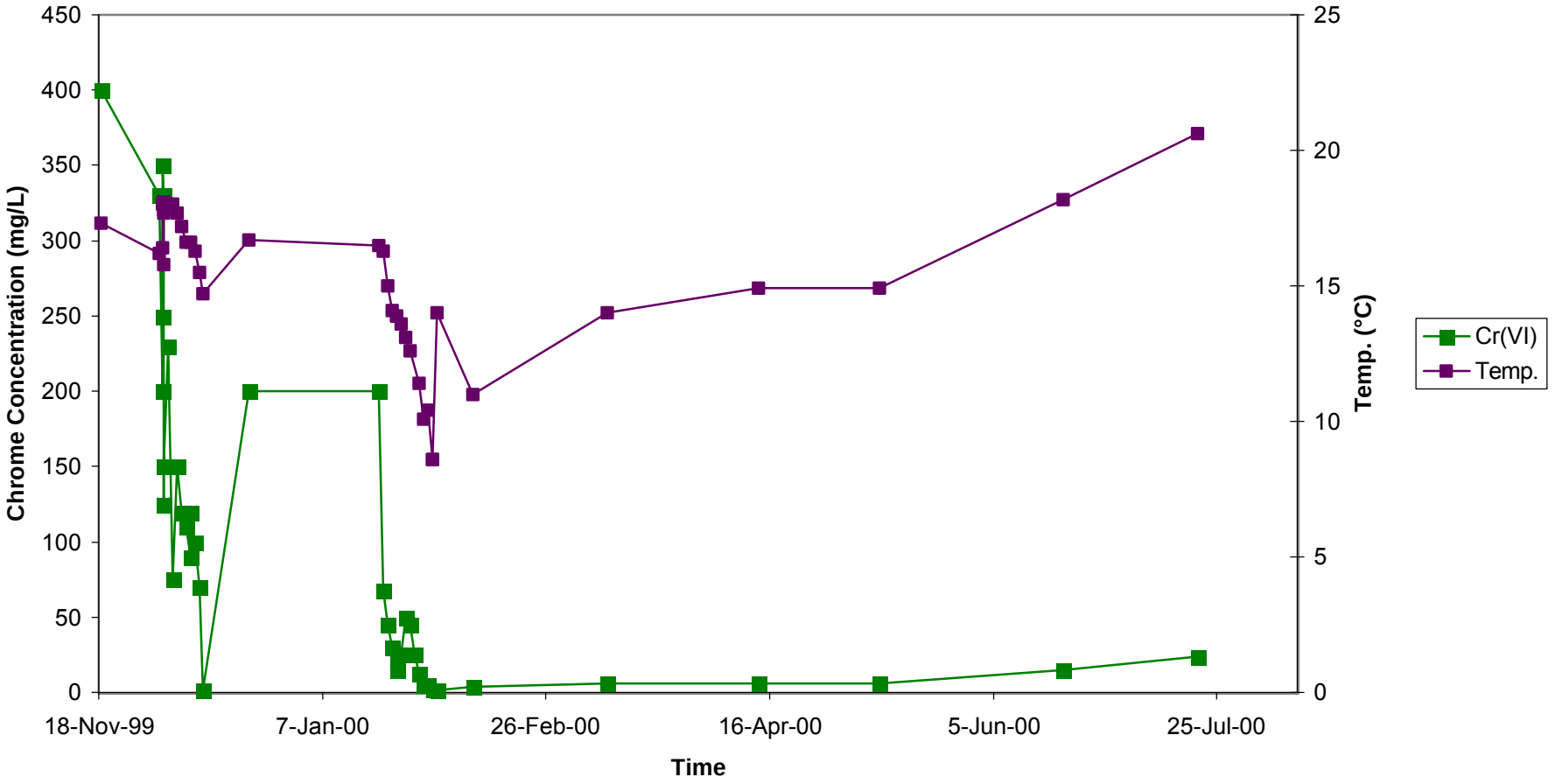

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Figure 4-31
TCE Area - PZ-99-07 TCE/pH
Pilot-Scale Treatability Study Report
Stratford Army Engine Plant

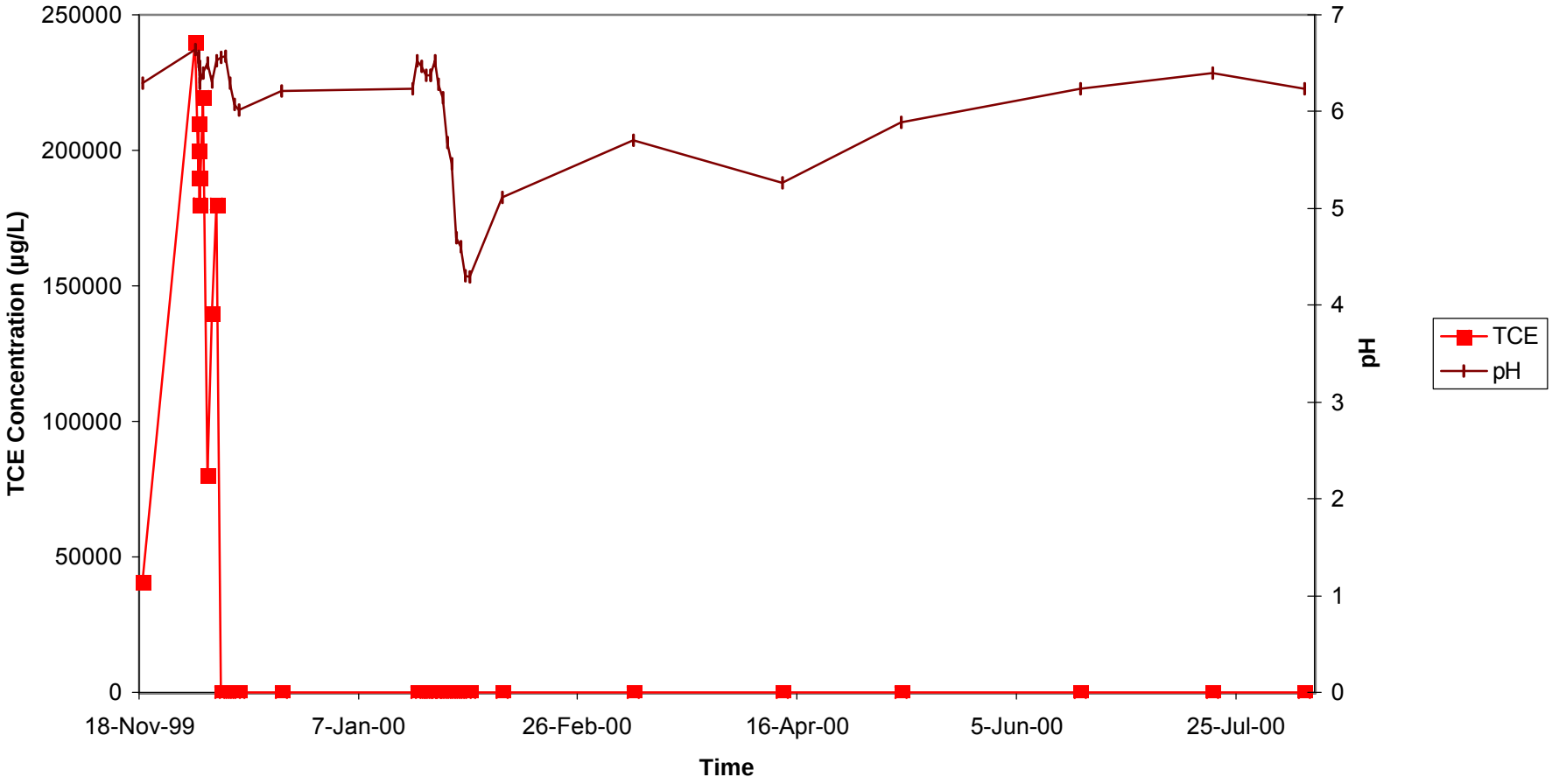

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Figure 4-32
TCE Area - PZ-99-06 TCE/pH
Pilot-Scale Treatability Study Report
Stratford Army Engine Plant

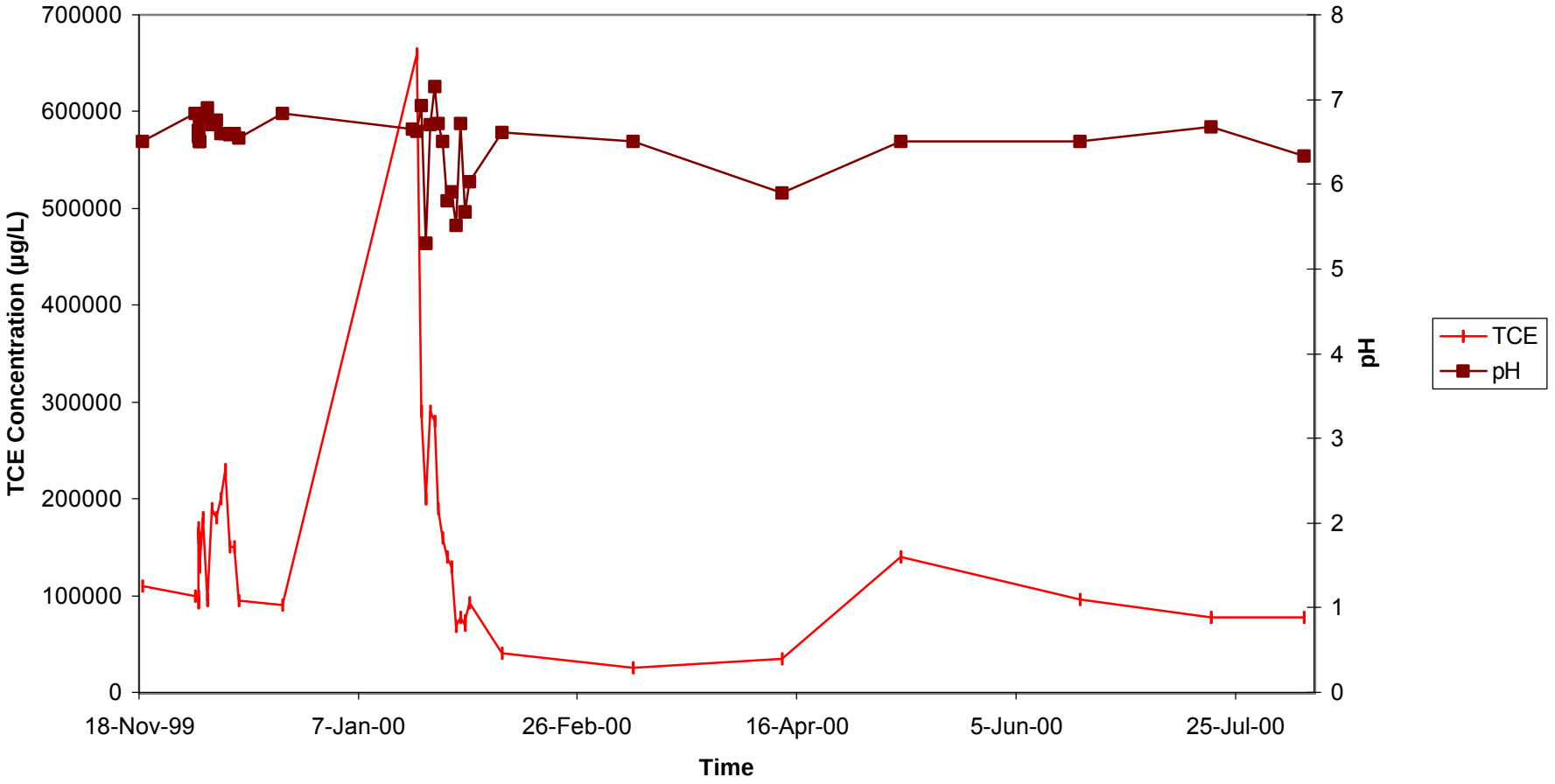

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Figure 4-33
Hexavalent Chrome Area - PZ-99-10 Cr(VI)/pH
Pilot-Scale Treatability Study Report
Stratford Army Engine Plant

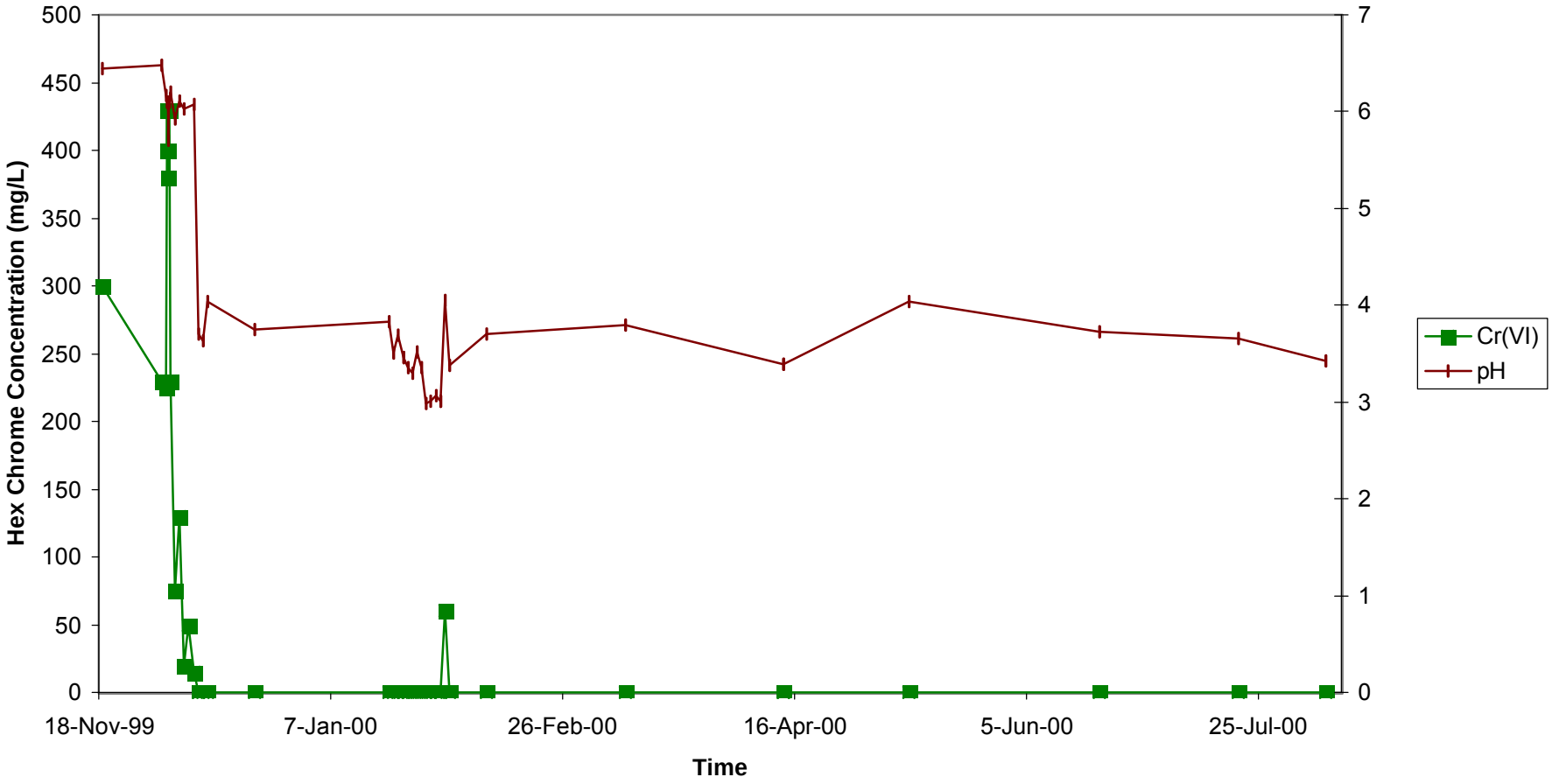

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Figure 4-34
Hexavalent Chrome Area - PZ-99-11 Cr(VI)/pH
Pilot-Scale Treatability Study Report
Stratford Army Engine Plant

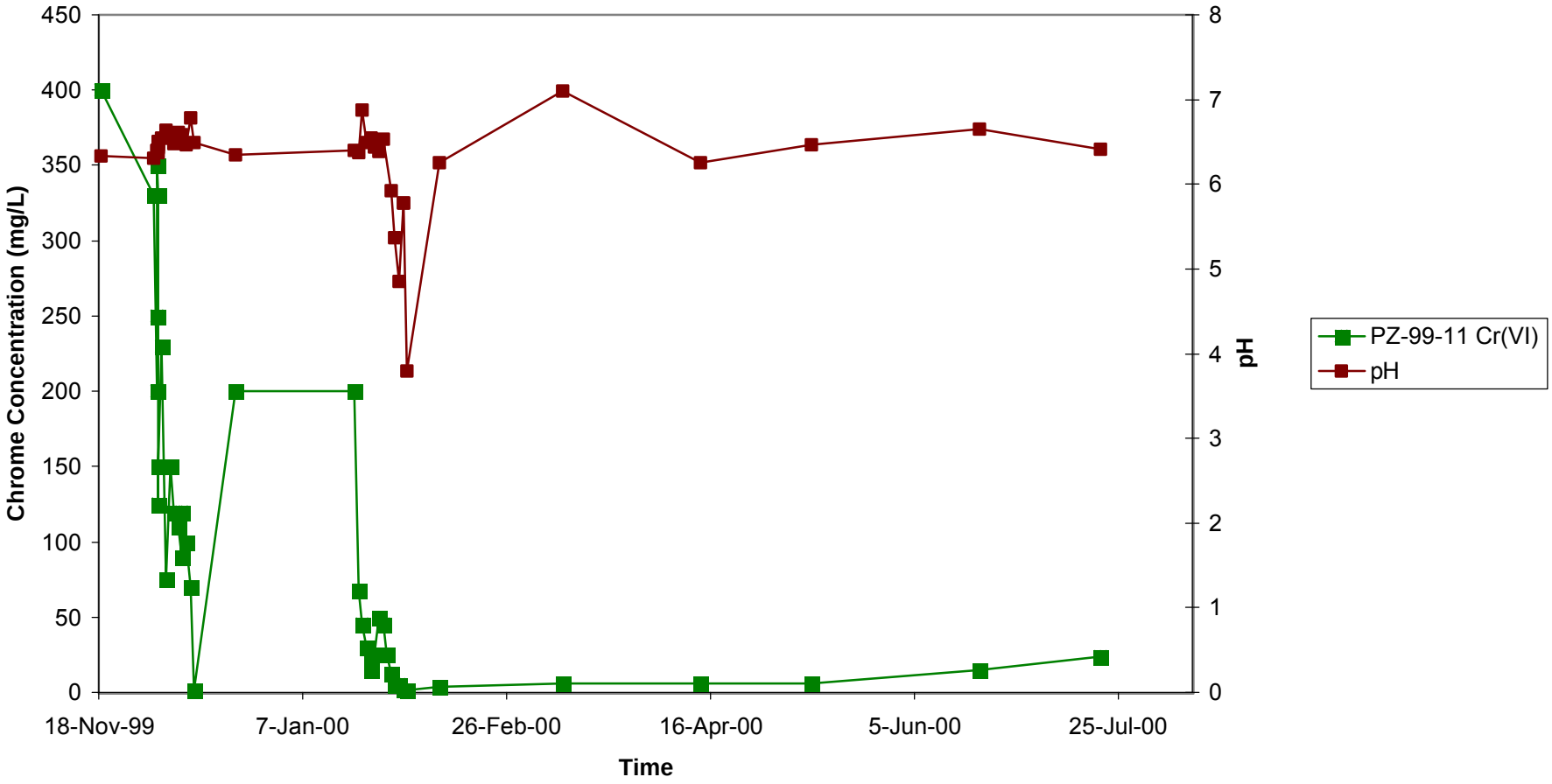

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Figure 4-35
TCE Area - PZ-99-07 TCE/Conductivity
Pilot-Scale Treatability Study Report
Stratford Army Engine Plant

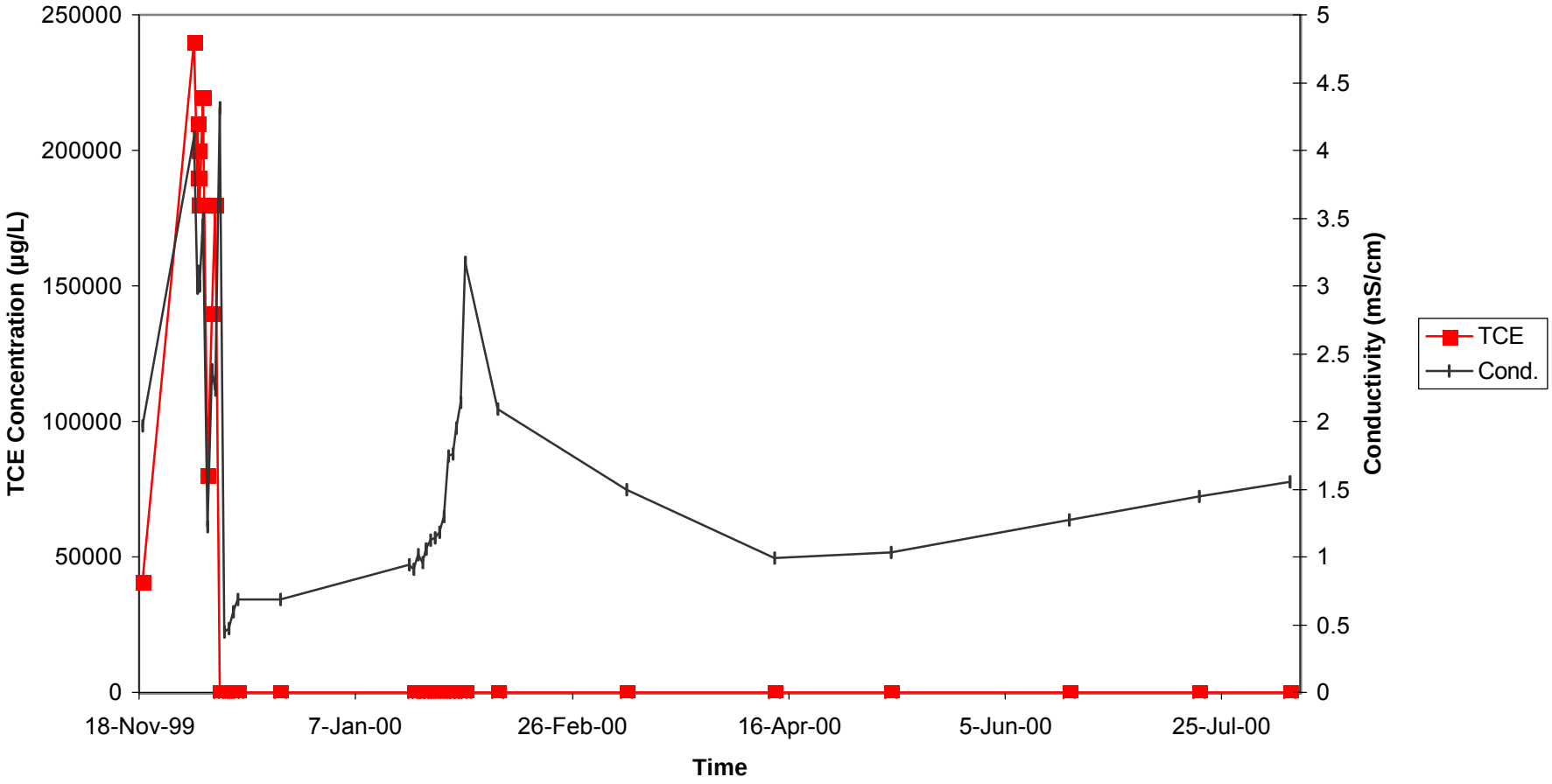

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Figure 4-37
Hexavalent Chrome Area - PZ-99-10 Cr(VI)/Conductivity
Pilot-Scale Treatability Study Report
Stratford Army Engine Plant

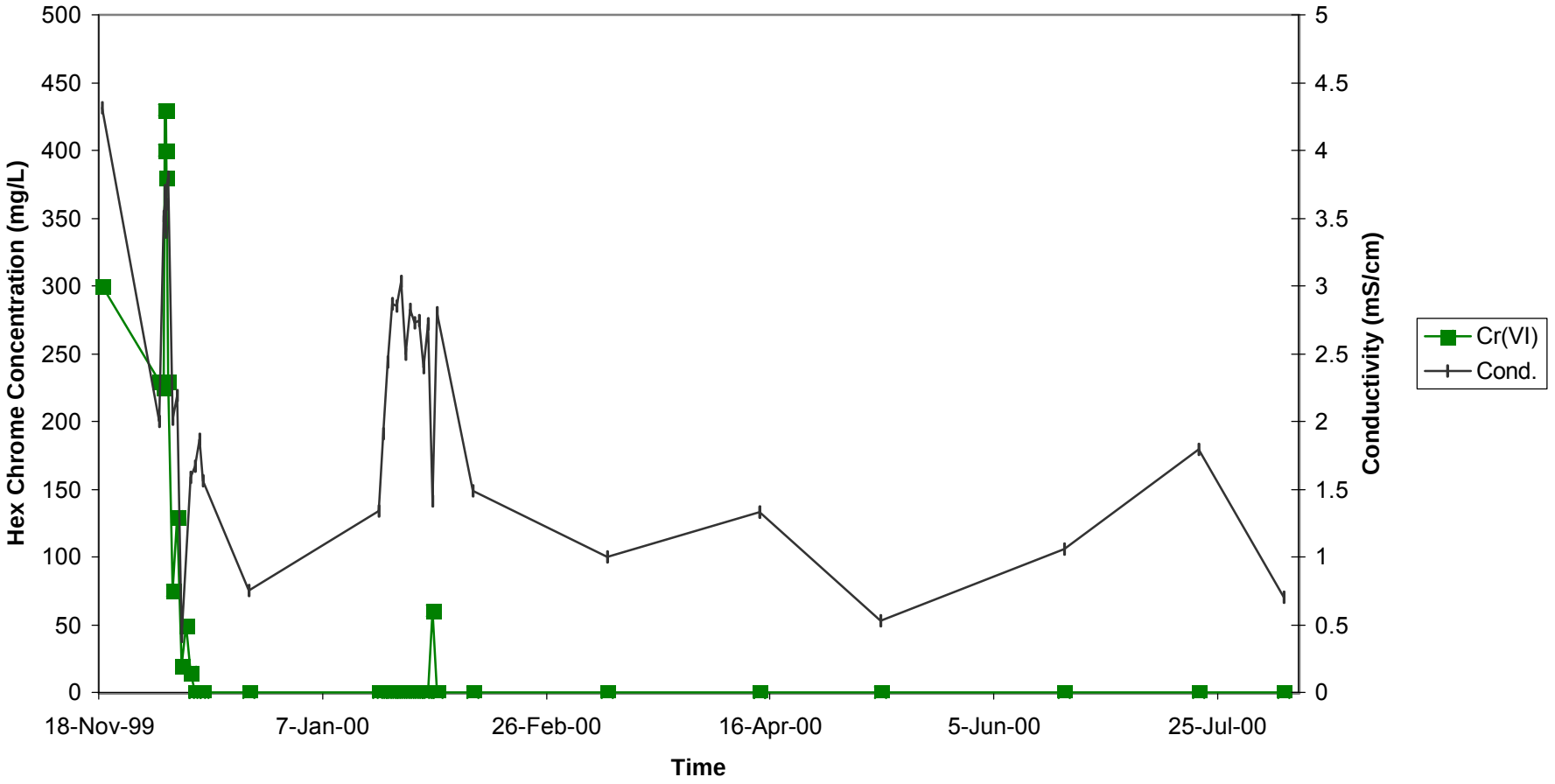

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Figure 4-38
Hexavalent Chrome Area - PZ-99-11 Cr(VI)/Conductivity
Pilot-Scale Treatability Study Report
Stratford Army Engine Plant

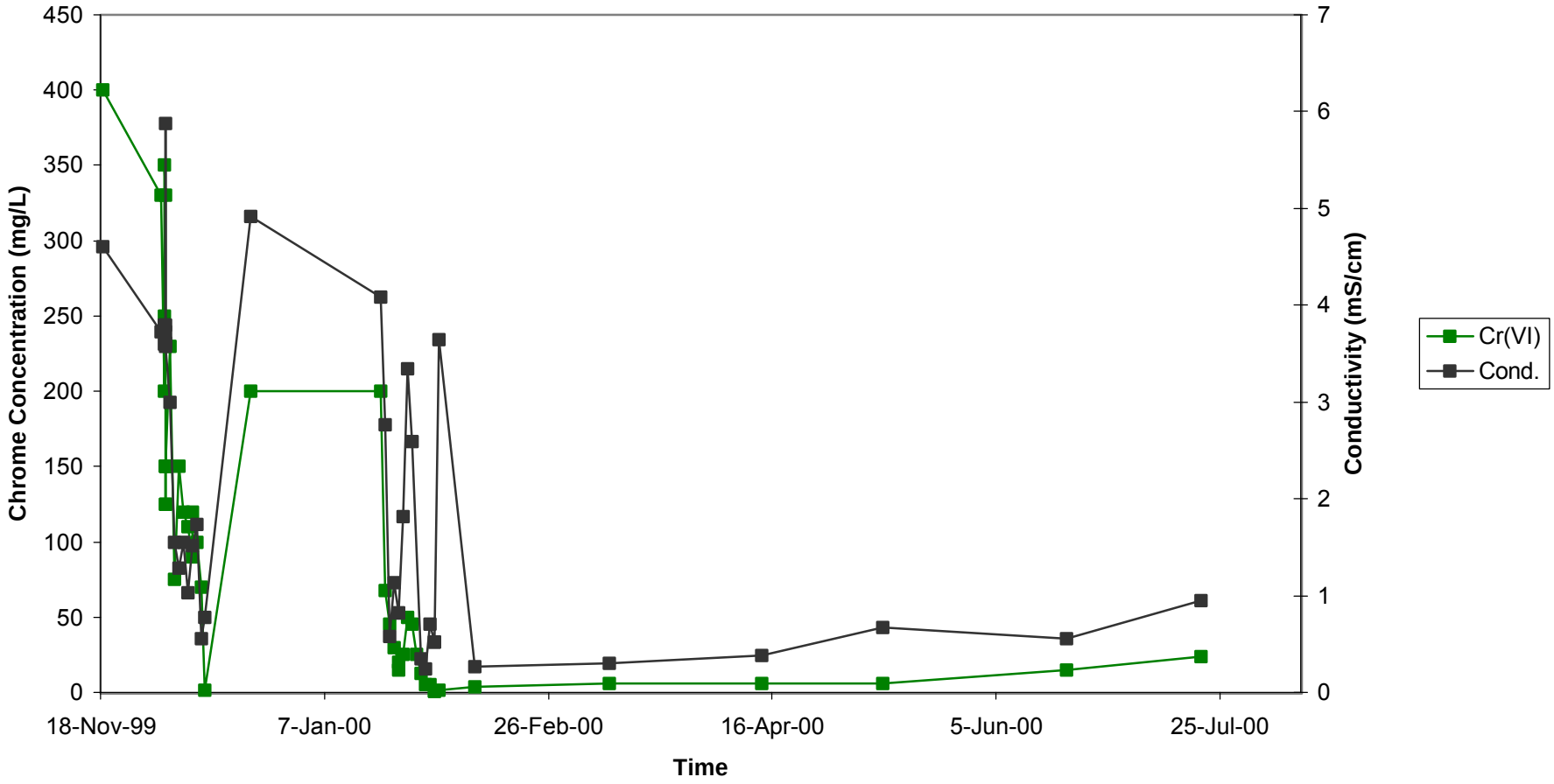

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Figure 4-39
TCE Area - PZ-99-07 TCE/Dissolved Oxygen
Pilot-Scale Treatability Study Report
Stratford Army Engine Plant

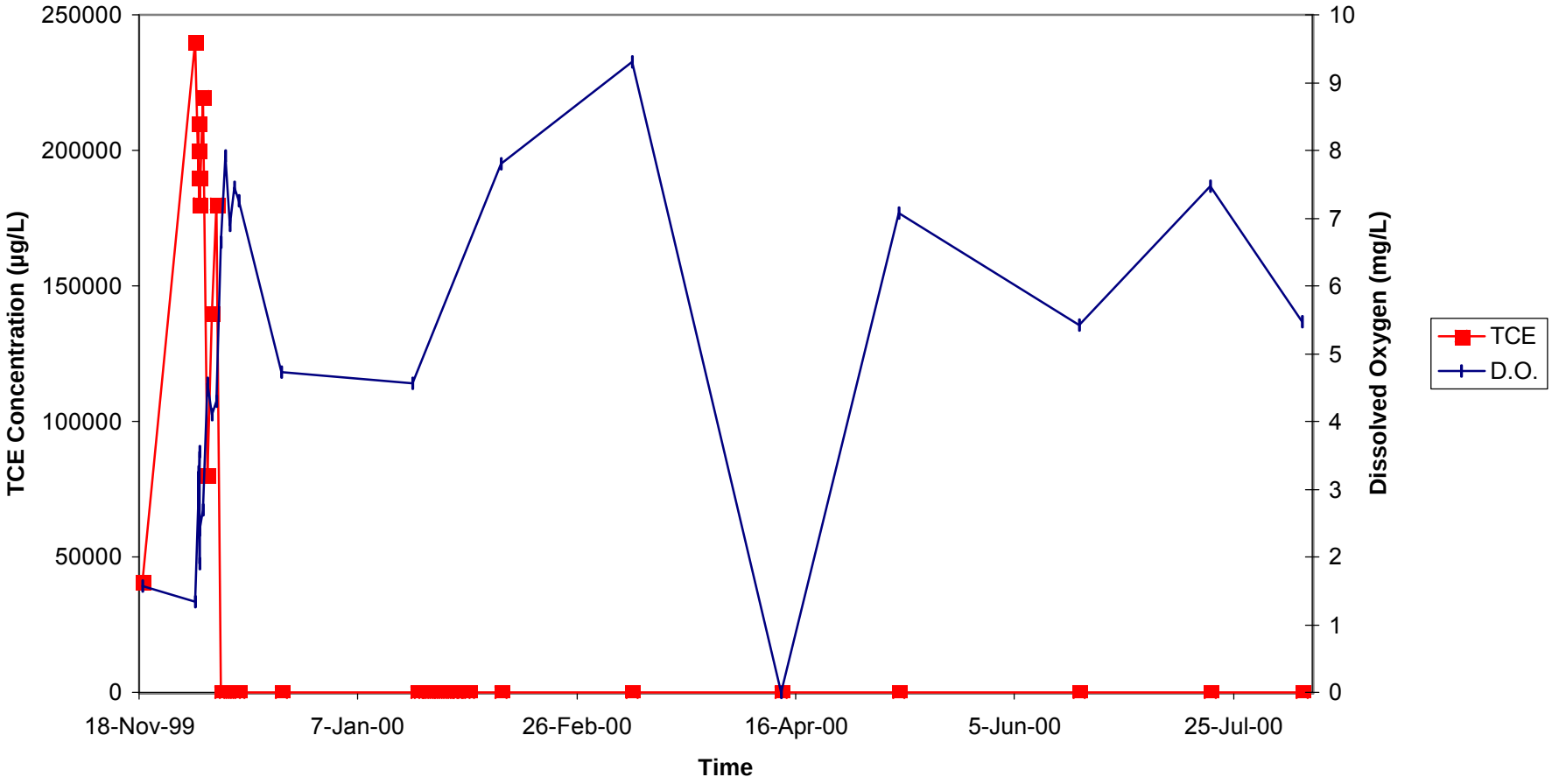

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Figure 4-40
TCE Area - PZ-99-06 TCE/Dissolved Oxygen
Pilot-Scale Treatability Study Report
Stratford Army Engine Plant

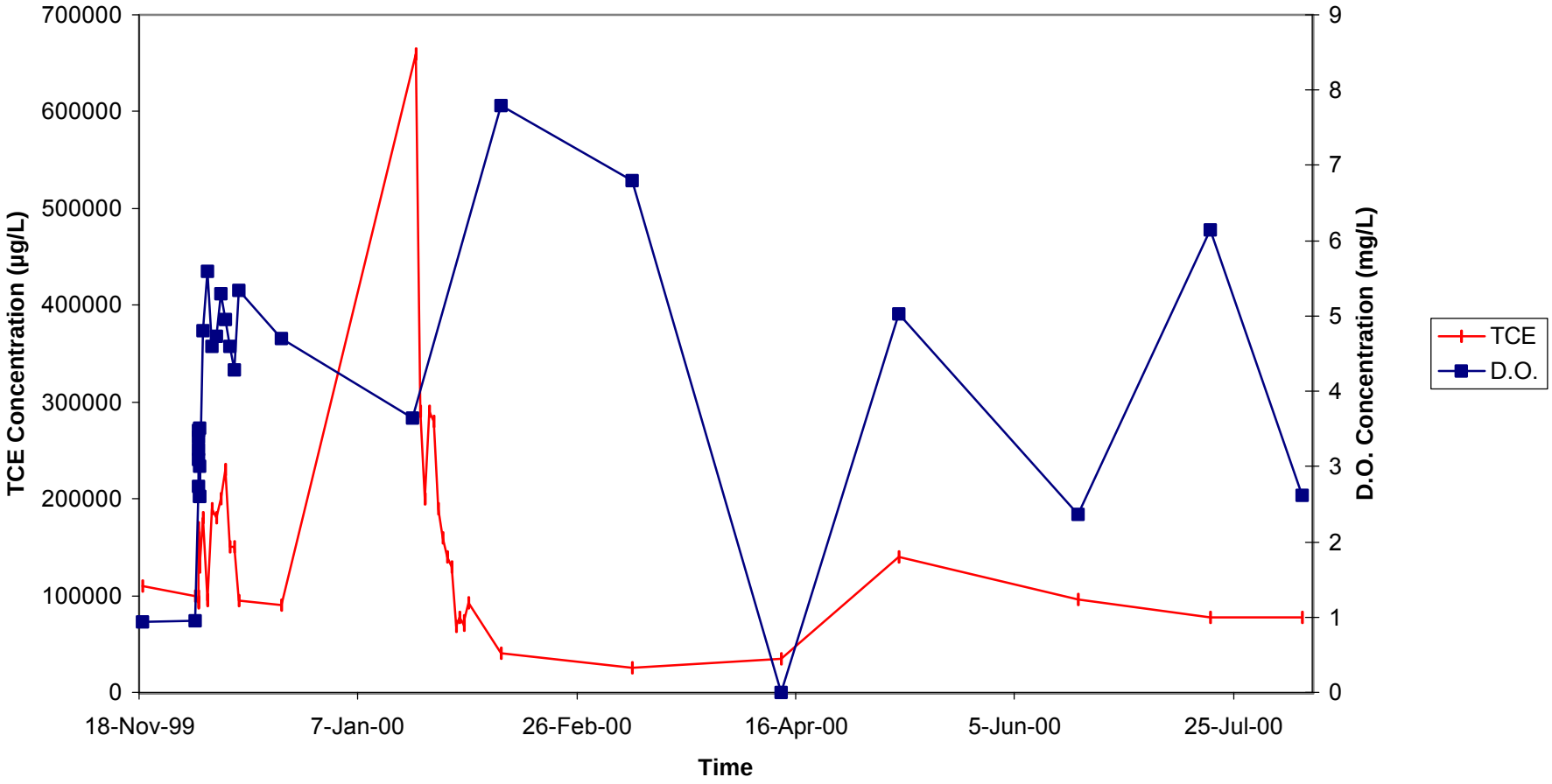

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Figure 4-41
Hexavalent Chrome Area - PZ-99-10 Cr(VI)/Dissolved Oxygen
Pilot-Scale Treatability Study Report
Stratford Army Engine Plant

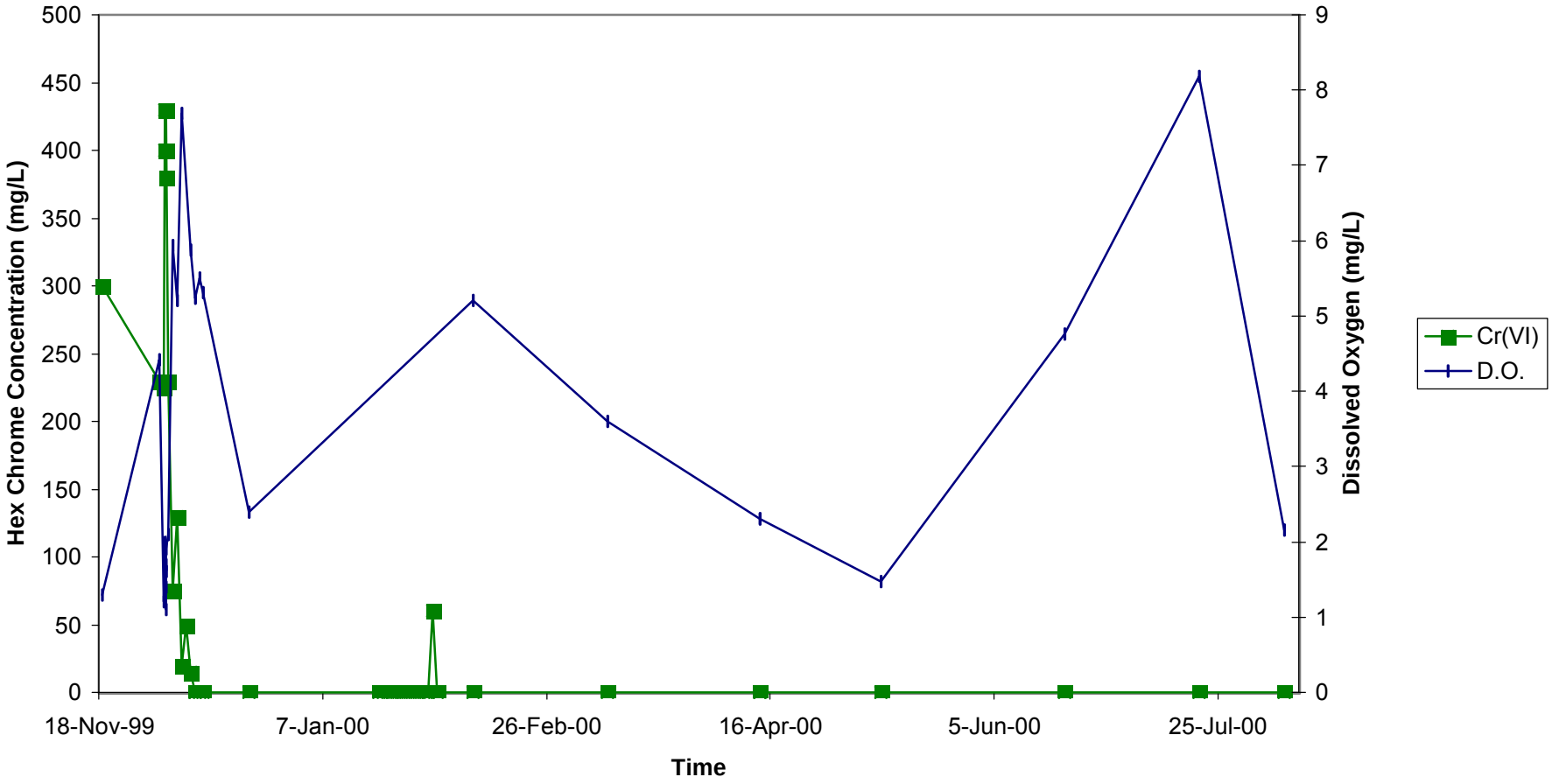

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Figure 4-42
Hexavalent Chrome Area - PZ-99-11 Cr(VI)/Dissolved Oxygen
Pilot-Scale Treatability Study Report
Stratford Army Engine Plant

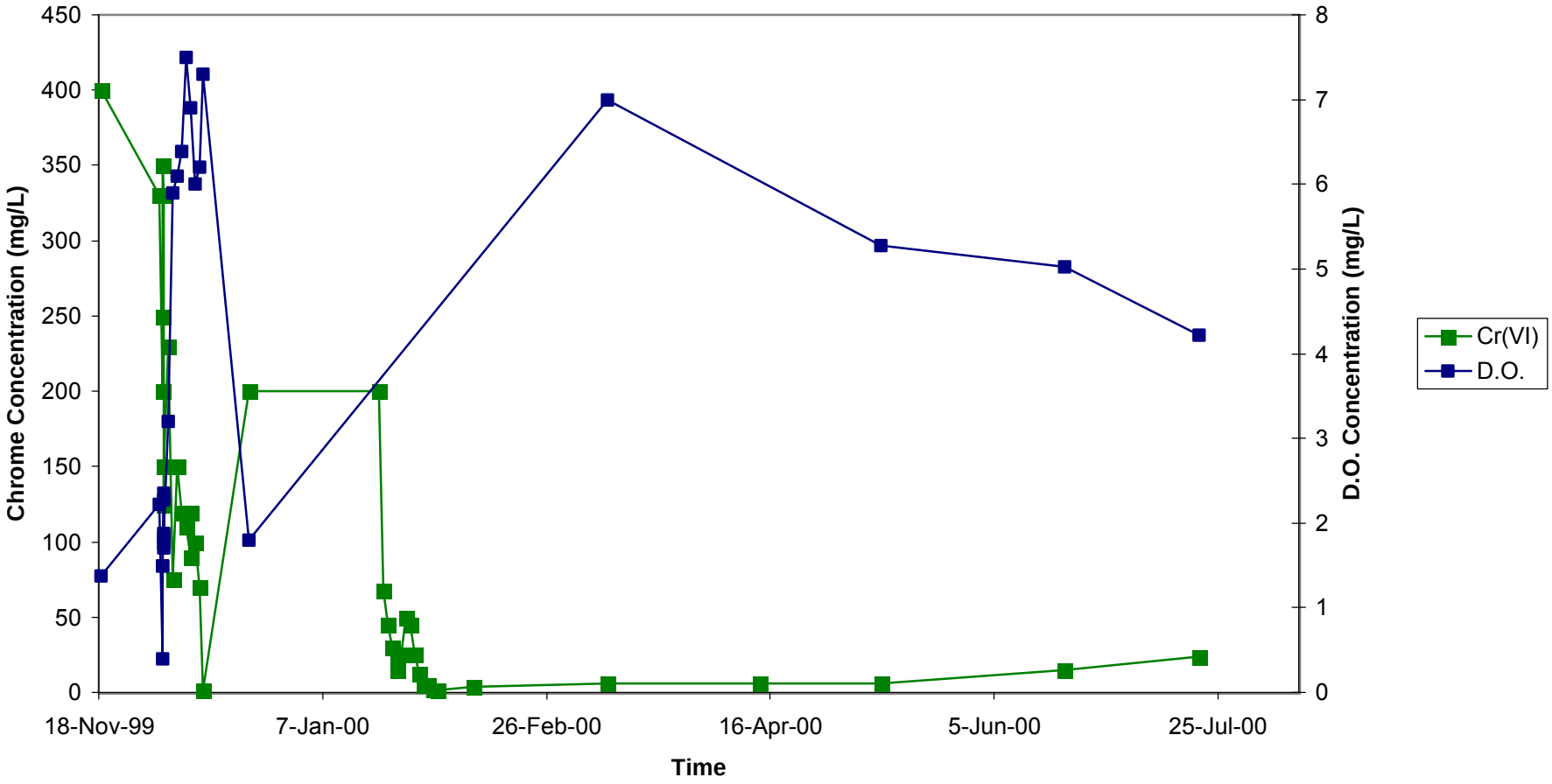

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Figure 4-43
TCE Area - PZ-99-07 TCE/Oxidation Reduction Potential
Pilot-Scale Treatability Study Report
Stratford Army Engine Plant

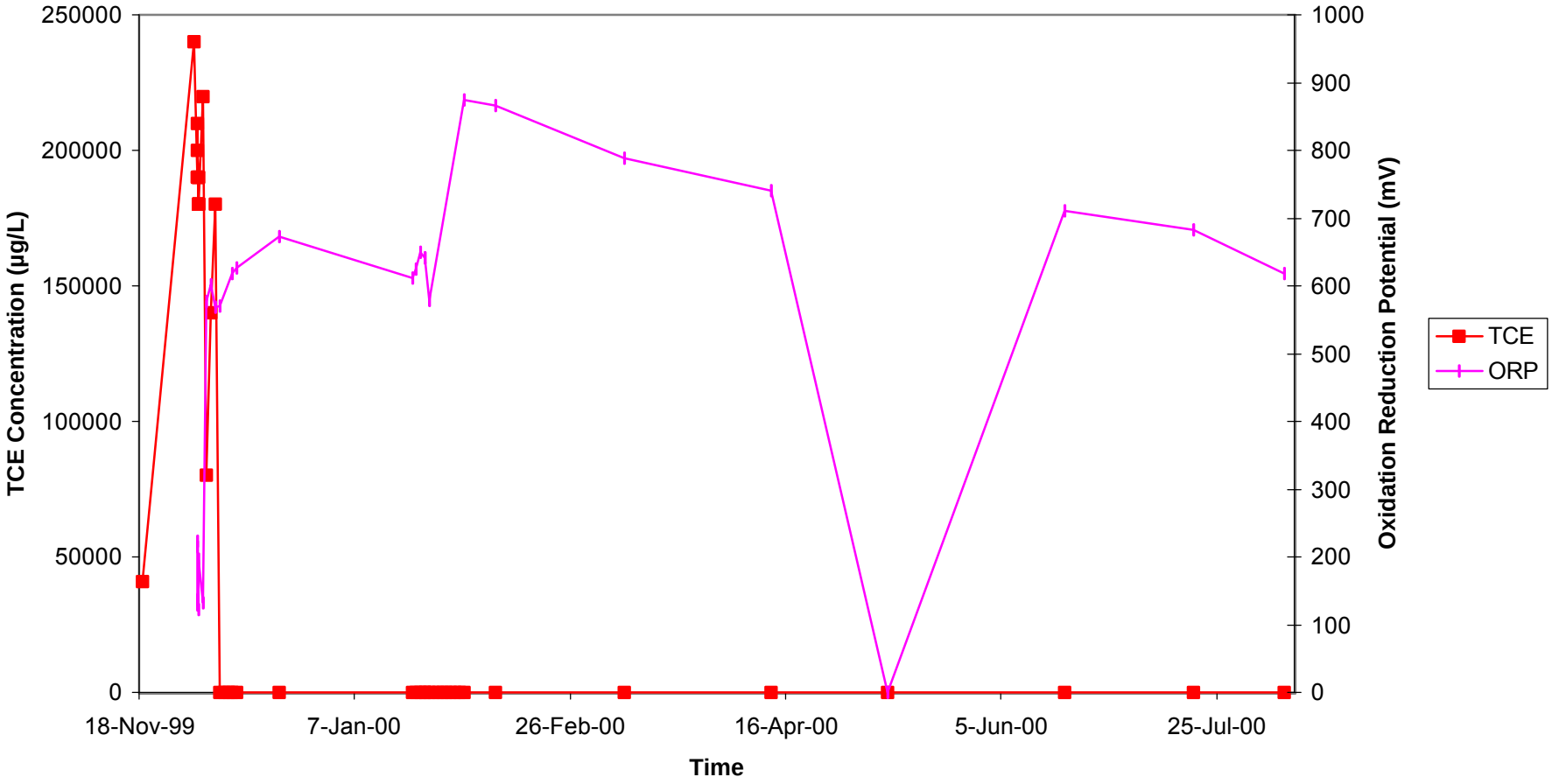

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Figure 4-44
TCE Area - PZ-99-06 TCE/Oxidation Reduction Potential
Pilot-Scale Treatability Study Report
Stratford Army Engine Plant

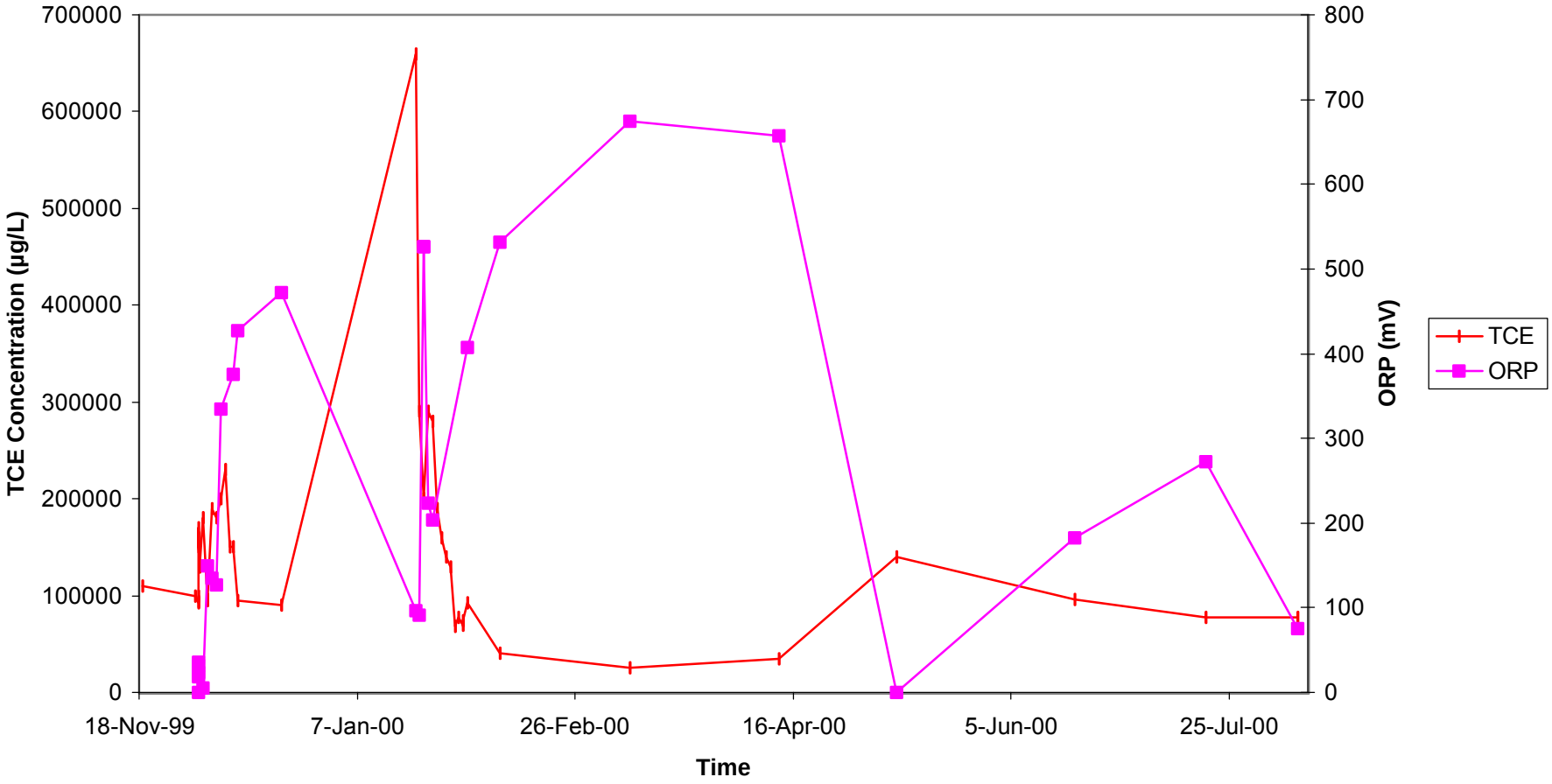

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Figure 4-45
Hexavalent Chrome Area - PZ-99-10 Cr(VI)/Oxidation Reduction Potential
Pilot-Scale Treatability Study Report
Stratford Army Engine Plant

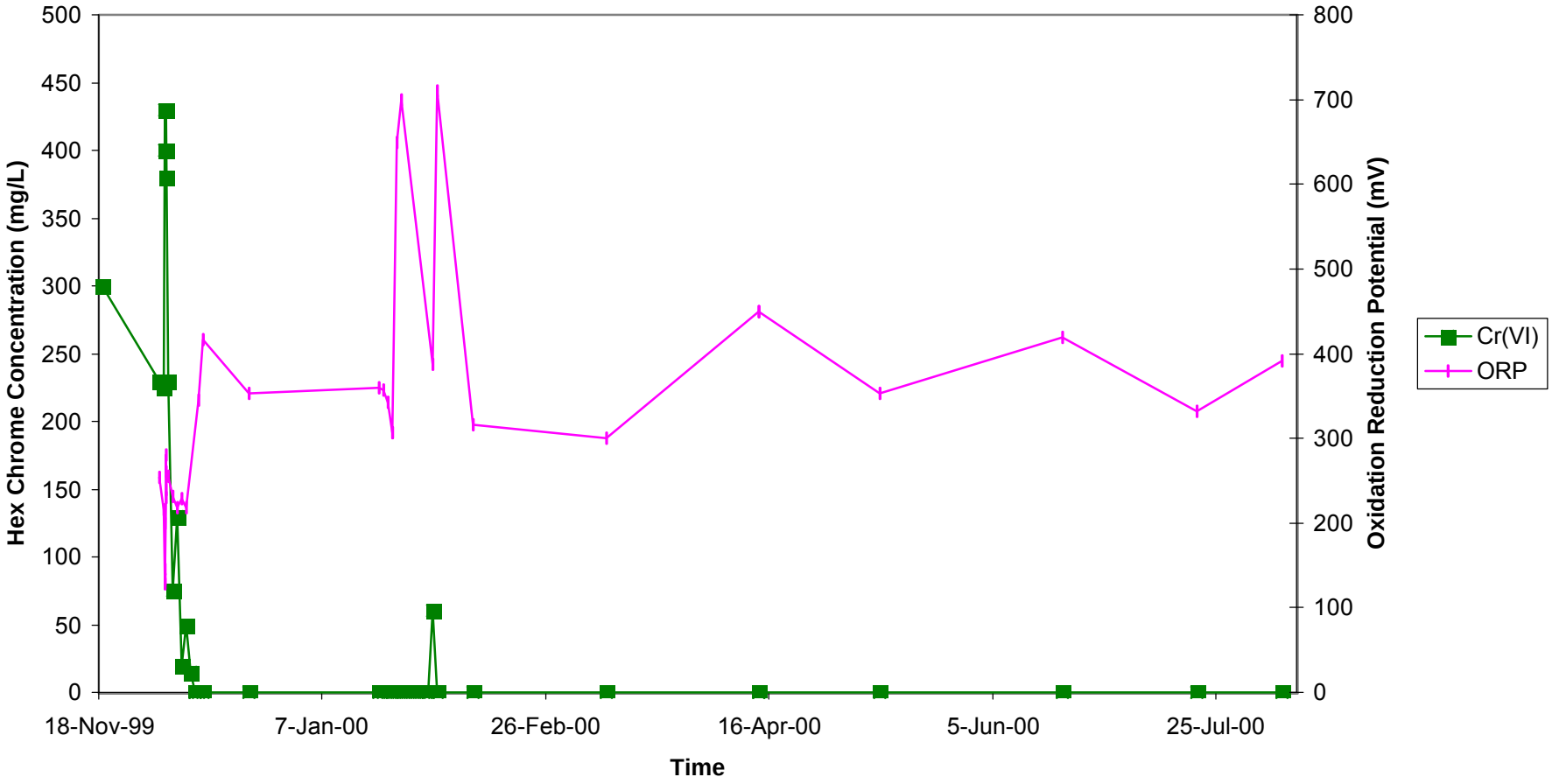

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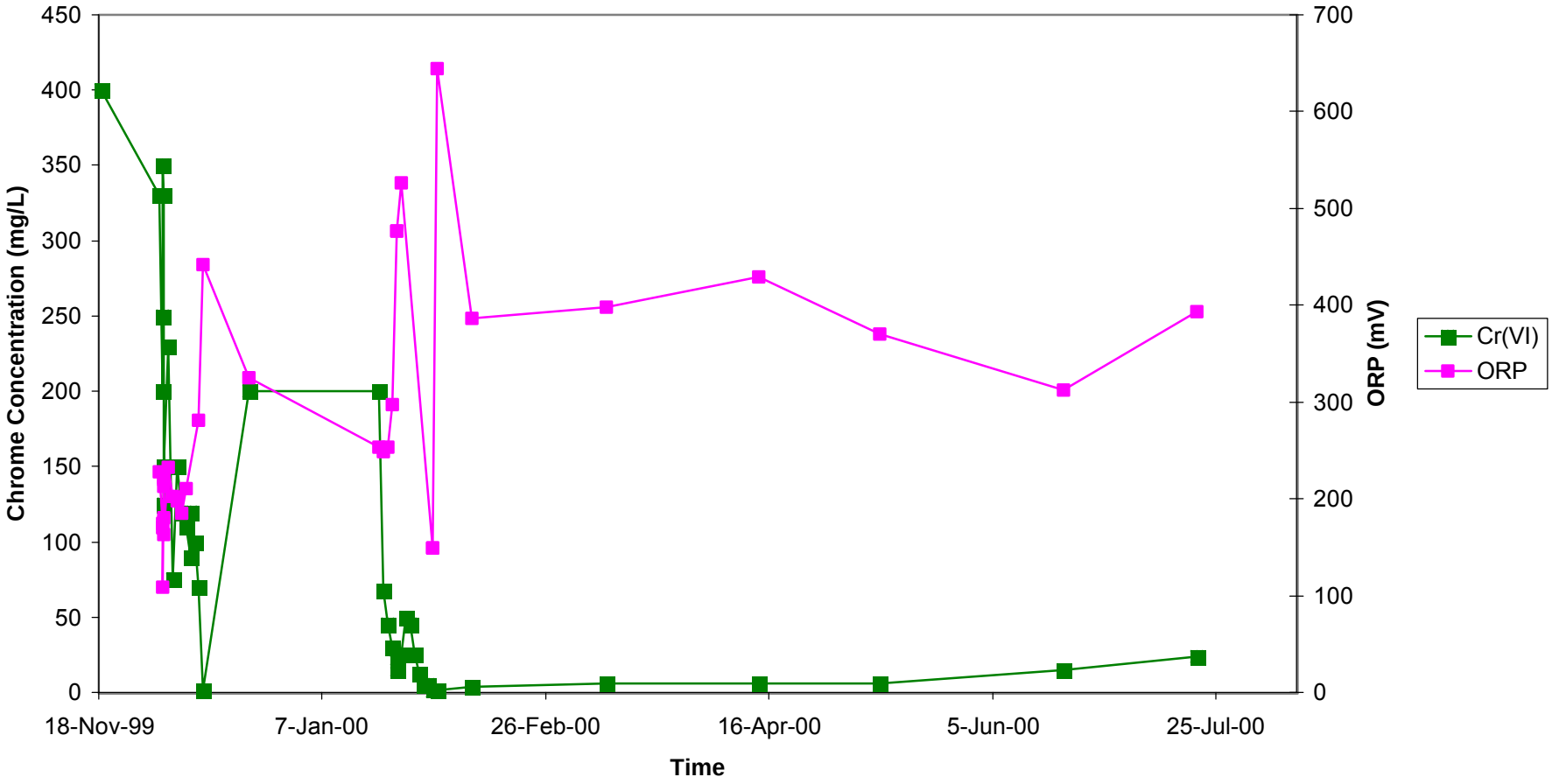
Figure 4-46
Hexavalent Chrome Area - PZ-99-11 Cr(VI)/Oxidation Reduction Potential
Pilot-Scale Treatability Study Report
Stratford Army Engine Plant



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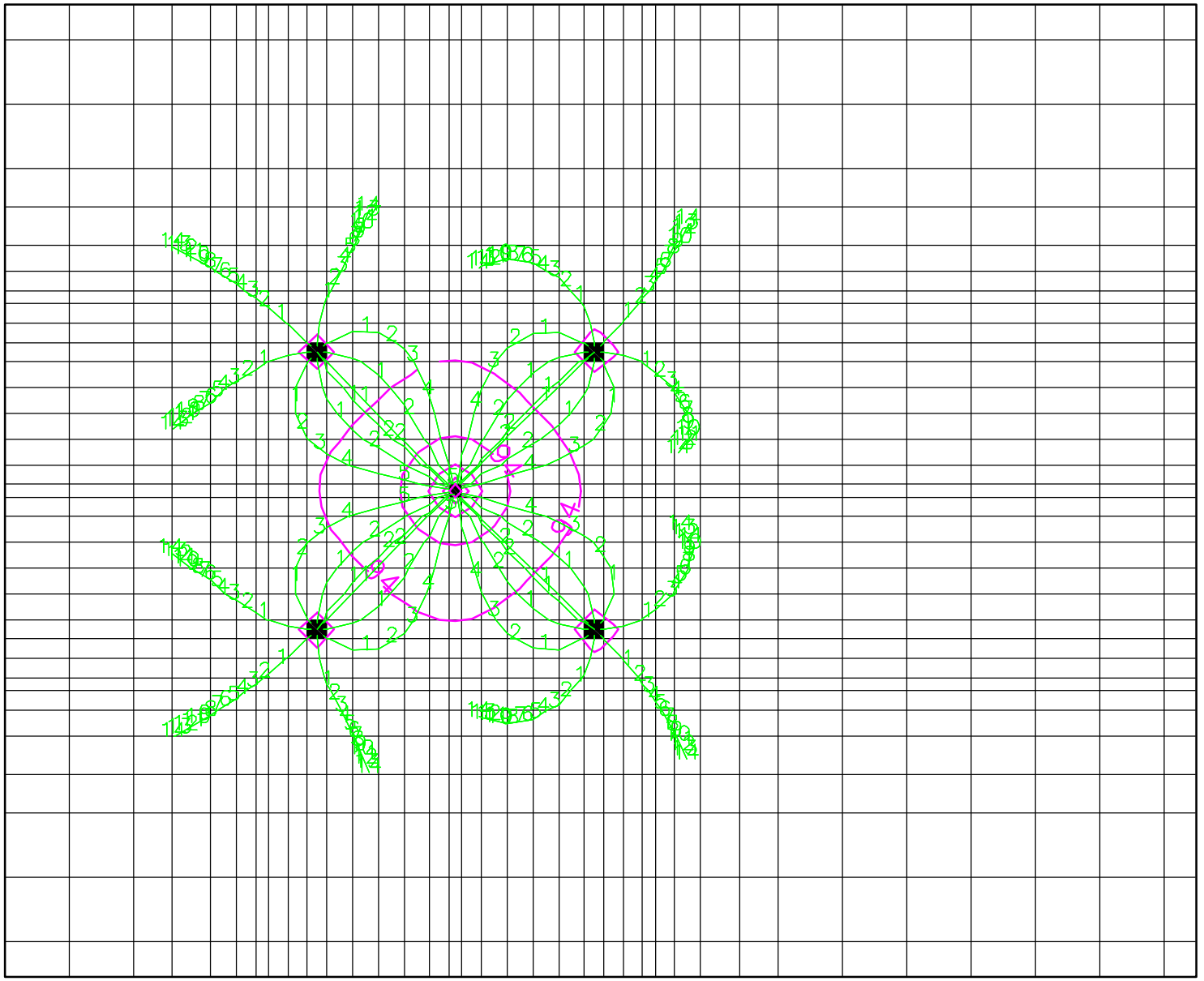


STRAT 7
TRAVEL TIME=14 DAYS
EXTRACTION RATE=3 GPM
INJECTION RATE=1 GPM EACH

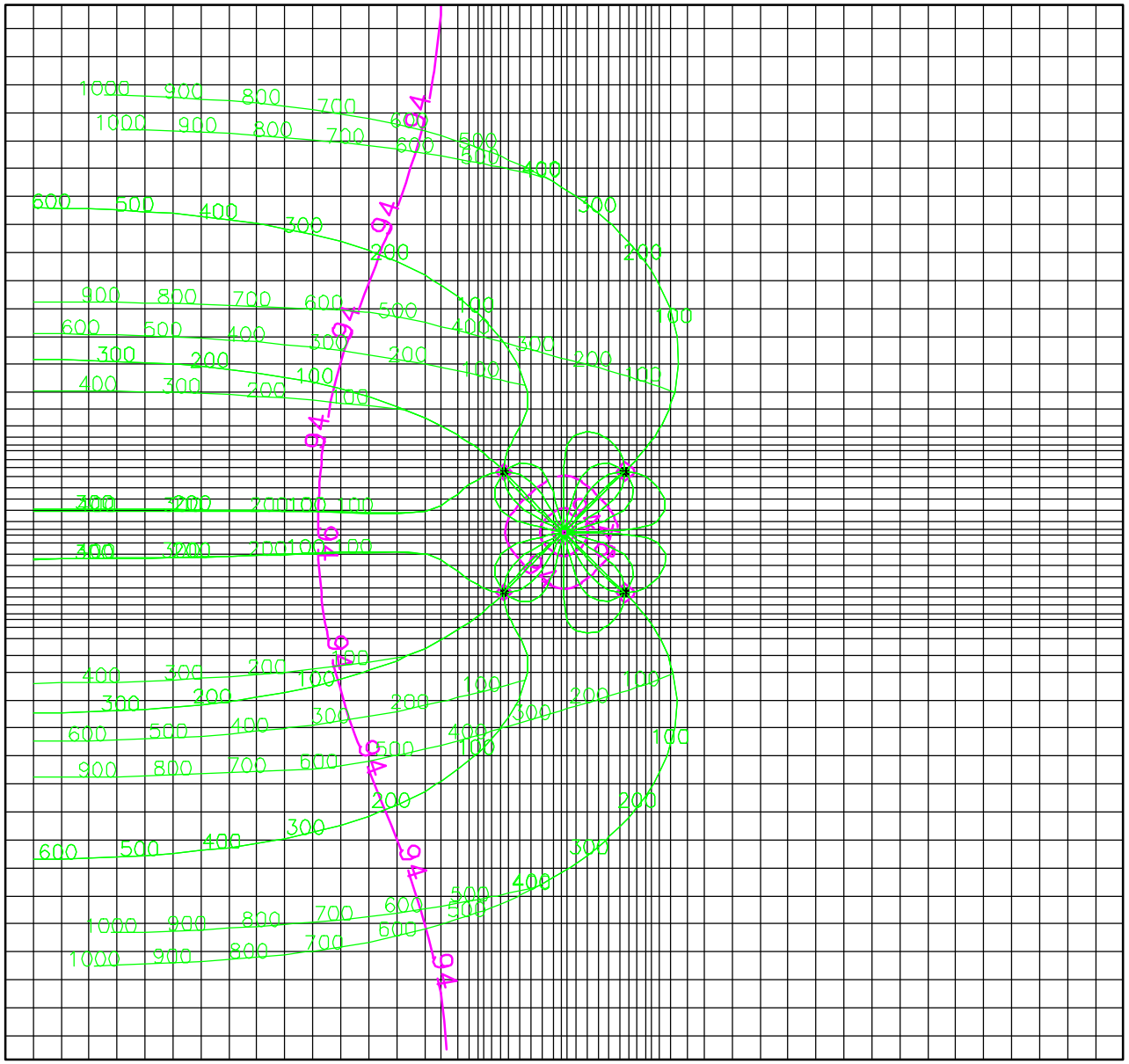
—94— GROUNDWATER HEAD CONTOUR (NUMBER SHOWN REFERS TO FEET OF WATER FROM BOTTOM OF MODEL)

— 3 — PARTICLE PATH (NUMBER=DAYS)

■ WELL

FIGURE 4-47
PILOT TEST GROUNDWATER MODEL PARTICLE TRACK
3 GPM EXTRACTION RATE, 14 DAY TIME PERIOD
STRATFORD ARMY ENGINE PLANT
Harding Lawson Associates

P:\Projects\TERCS\Projects\D020\Pilot_Test\figures\47254220.dwg Wed, 11 Jul 2001 – 1:31pm jphanley



STRAT 7
TRAVEL TIME=1000 DAYS
EXTRACTION RATE=3 GPM
INJECTION RATE=1 GPM EACH

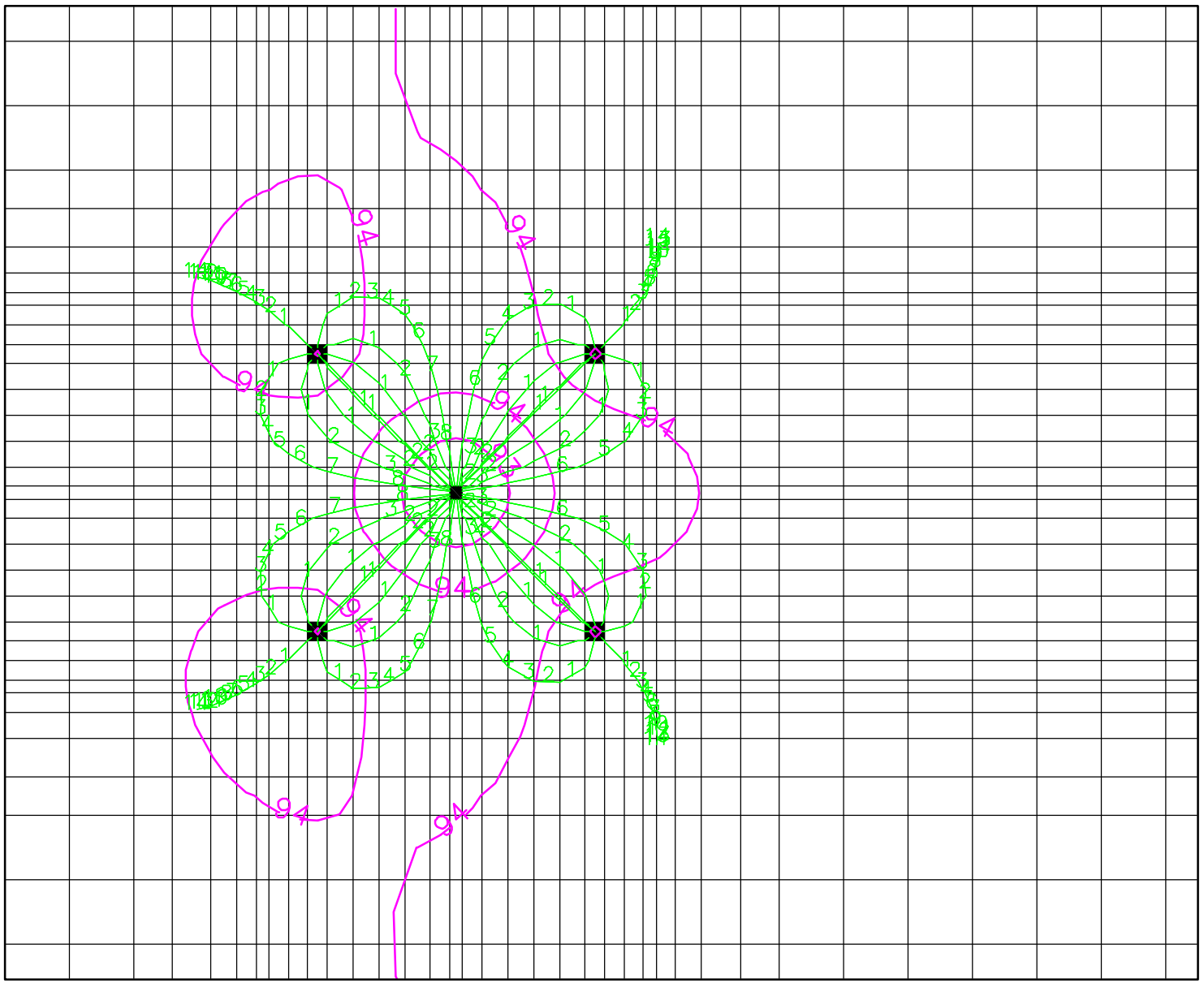
—94— GROUNDWATER HEAD CONTOUR (NUMBER SHOWN REFERS TO FEET OF WATER FROM BOTTOM OF MODEL)

— 100 — PARTICLE PATH (NUMBER=DAYS)

■ WELL

FIGURE 4-48
PILOT TEST GROUNDWATER MODEL PARTICLE TRACK
3 GPM EXTRACTION RATE, 1000 DAY TIME PERIOD
STRATFORD ARMY ENGINE PLANT
Harding Lawson Associates

P:\Projects\TERCS\Projects\D020\Pilot_Test\figures\47254221.dwg Wed, 11 Jul 2001 - 1:34pm jphanley



STRAT 8
TRAVEL TIME=14 DAYS
EXTRACTION RATE=4 GPM
INJECTION RATE=1 GPM EACH

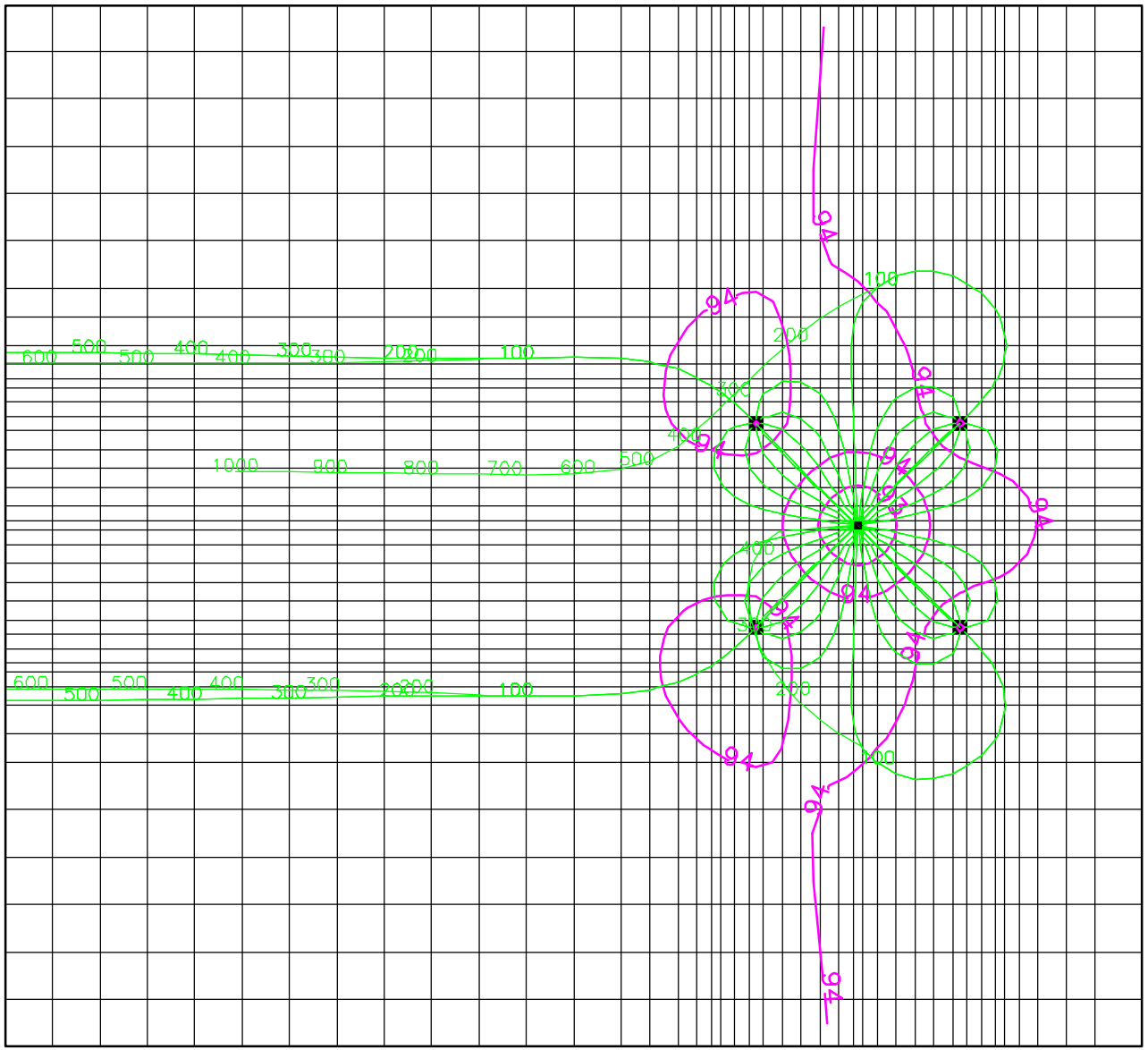
—94— GROUNDWATER HEAD CONTOUR (NUMBER SHOWN REFERS TO FEET OF WATER FROM BOTTOM OF MODEL)

— 3 — PARTICLE PATH (NUMBER=DAYS)

■ WELL

FIGURE 4-49
PILOT TEST GROUNDWATER MODEL PARTICLE TRACK
4 GPM EXTRACTION RATE, 14 DAY TIME PERIOD
STRATFORD ARMY ENGINE PLANT
Harding Lawson Associates

P:\Projects\TERCS\Projects\D020\Pilot_Test\figures\47254222.dwg Wed, 11 Jul 2001 - 1:43pm jphanley



STRAT 8
TRAVEL TIME=1000 DAYS
EXTRACTION RATE=4 GPM
INJECTION RATE=1 GPM EACH

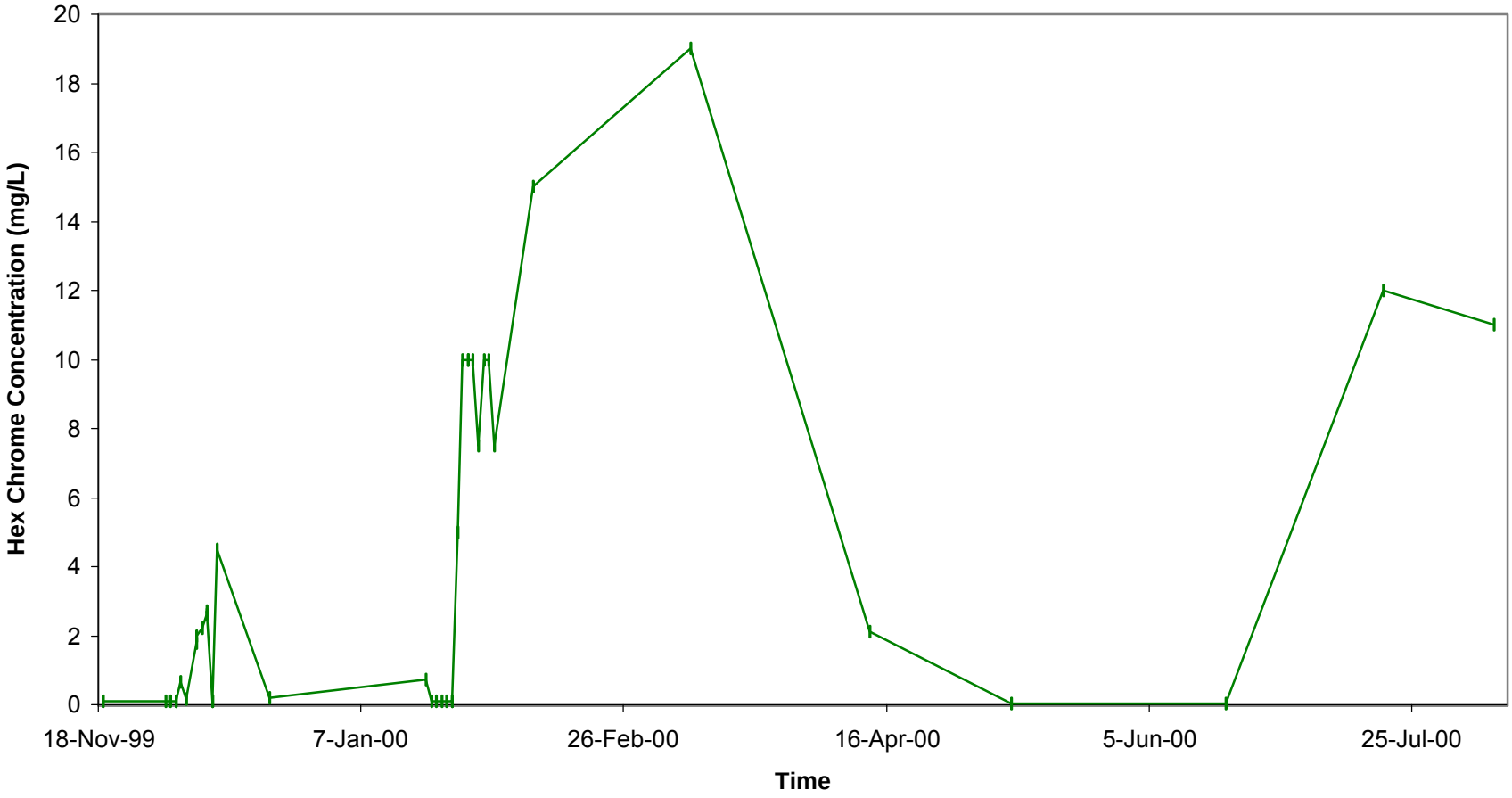
—94— GROUNDWATER HEAD CONTOUR (NUMBER SHOWN REFERS TO FEET OF WATER FROM BOTTOM OF MODEL)

— 100 — PATH CONTOUR (NUMBER=DAYS)

■ WELL

FIGURE 4-50
PILOT TEST GROUNDWATER MODEL PARTICLE TRACK
4 GPM EXTRACTION RATE, 1000 DAY TIME PERIOD
STRATFORD ARMY ENGINE PLANT
Harding Lawson Associates

Figure 4-51
Hexavalent Chrome in TCE Area - EW-99-02
Pilot-Scale Treatability Study Report
Stratford Army Engine Plant



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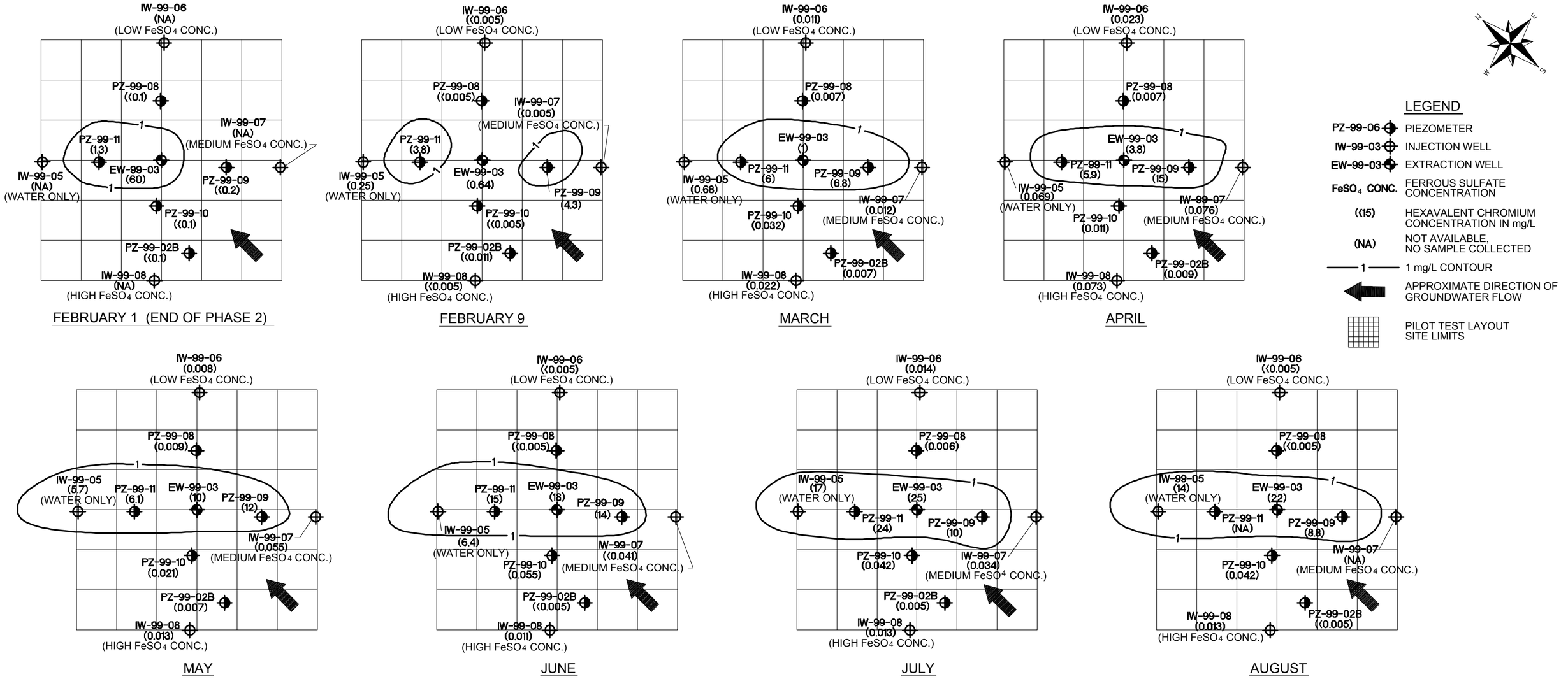
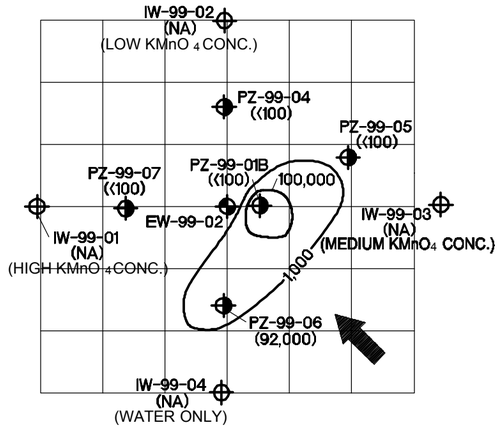


FIGURE 4-52
CHROMIUM PLATING FACILITY
HEXAVALENT CHROMIUM AREA REBOUND
OU2 PILOT-SCALE TREATABILITY STUDY
STRATFORD ARMY ENGINE PLANT
Harding Lawson Associates



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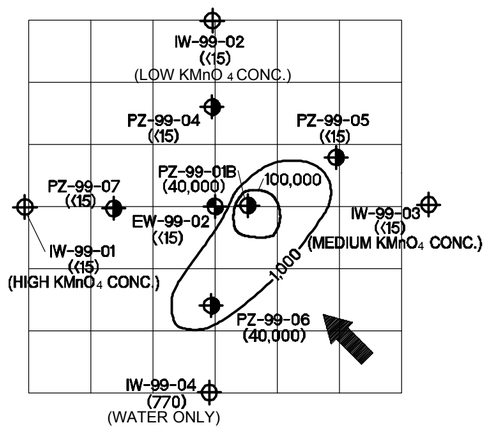

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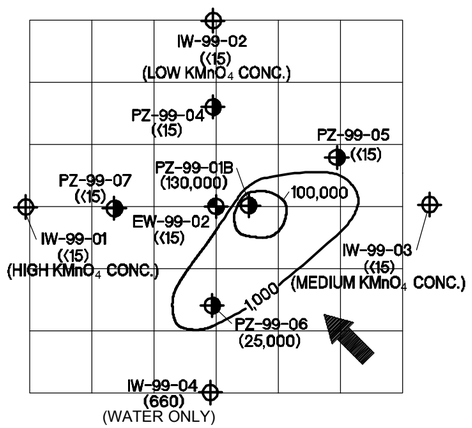

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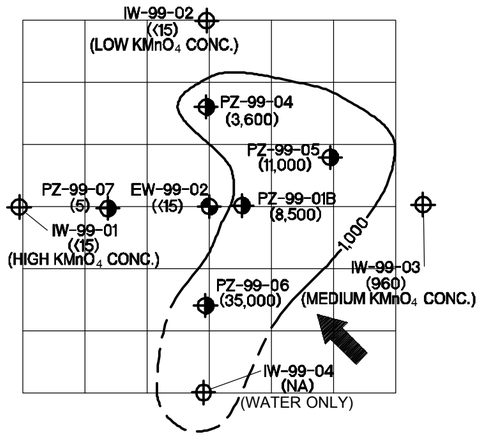

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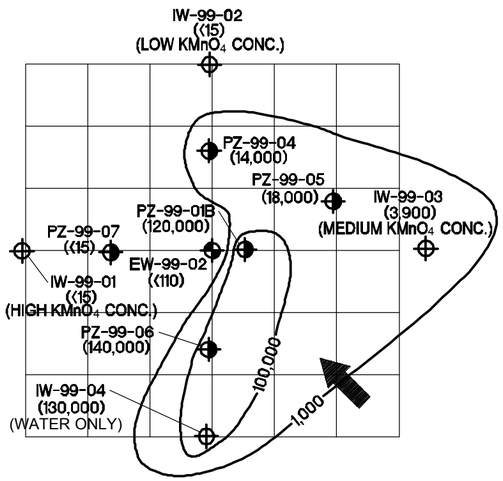
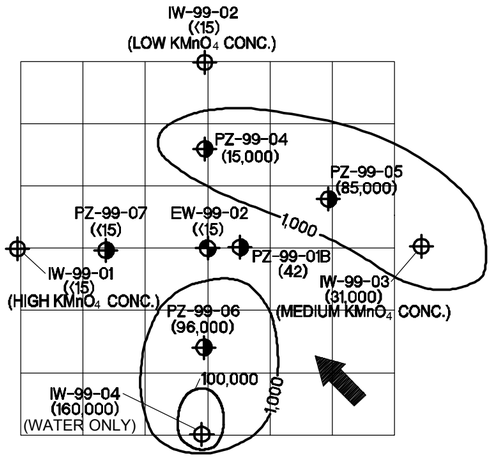


MAY



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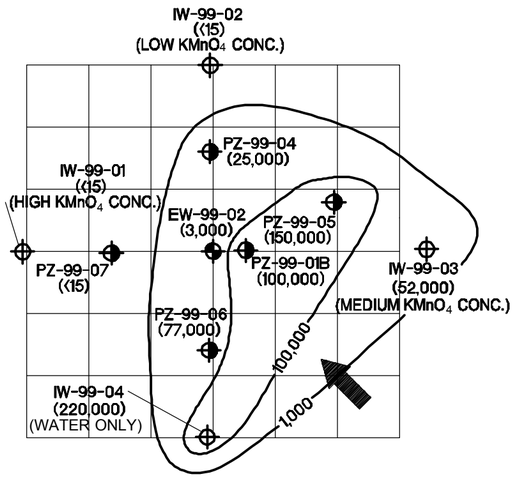

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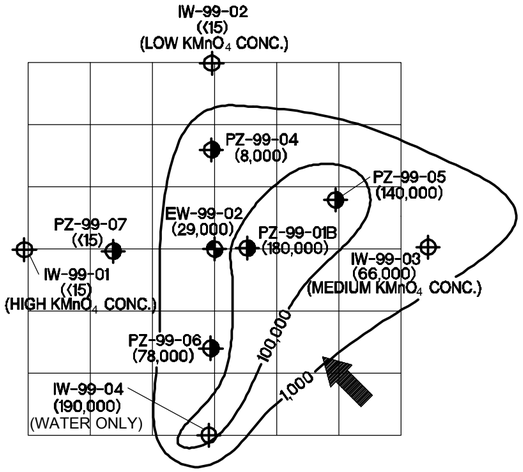
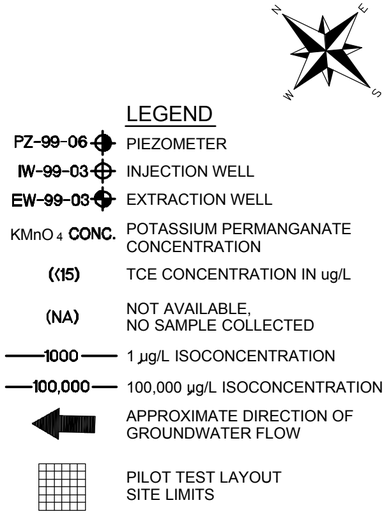


AUGUST



0 5 10 20 FEET

SCALE: 1"=10'

FIGURE 4-53
CHROMIUM PLATING FACILITY
TCE AREA REBOUND
OU2 PILOT-SCALE TREATABILITY STUDY
STRATFORD ARMY ENGINE PLANT
Harding Lawson Associates

TABLES

TABLE 3-1
PIEZOMETER, INJECTION, AND EXTRACTION WELL CONSTRUCTION SUMMARY

PILOT-SCALE TREATABILITY STUDY REPORT
STRATFORD ARMY ENGINE PLANT

Exploration ID	Date Installed	Total Depth (ft bgs)	Screened Interval (ft bgs)	Construction Material
INJECTION WELLS, EXTRACTION WELLS, AND PIEZOMETERS INSTALLED FOR PILOT TEST				
IW-99-01	11/10/99	35	25-35	Schedule 40 PVC
IW-99-02	11/11/99	33	23-33	Schedule 40 PVC
IW-99-03	11/16/99	35	25-35	Schedule 40 PVC
IW-99-04	11/10/99	35.5	25-35	Schedule 40 PVC
IW-99-05	11/16/99	37	27-37	Schedule 40 PVC
IW-99-06	11/15/99	37	27-37	Schedule 40 PVC
IW-99-07	11/16/99	37	27-37	Schedule 40 PVC
IW-99-08	11/16/99	37	27-37	Schedule 40 PVC
EW-99-02	11/9/99	37	23-33	Schedule 40 PVC
EW-99-03	11/11/99	40	27.8-37.8	Schedule 40 PVC
PZ-99-04	11/12/99	32.5	22.5-32.5	Schedule 40 PVC
PZ-99-05	11/11/99	35	25-35	Schedule 40 PVC
PZ-99-06	11/12/99	35	25-35	Schedule 40 PVC
PZ-99-07	11/11/99	35	25-35	Schedule 40 PVC
PZ-99-08	11/15/99	37	27-37	Schedule 40 PVC
PZ-99-09	11/15/99	37	27-37	Schedule 40 PVC
PZ-99-10	11/16/99	37	27-37	Schedule 40 PVC
PZ-99-11	11/15/99	37.5	27-37	Schedule 40 PVC
PREVIOUSLY INSTALLED PIEZOMETERS				
PZ-99-01A	8/23/99	60	4-9	Schedule 40 PVC
PZ-99-01B	8/23/99	60	30-35	Schedule 40 PVC
PZ-99-01C	8/23/99	60	45-50	Schedule 40 PVC
PZ-99-02A	8/18/99	52	4-9	Schedule 40 PVC
PZ-99-02B	8/18/99	52	30-35	Schedule 40 PVC
PZ-99-02C	8/18/99	52	45-50	Schedule 40 PVC

NOTES:

bgs=	below ground surface
EW=	extraction well
ft=	feet
IW=	injection well
PVC=	polyvinyl chloride
PZ=	piezometer

TABLE 3-2
HEXAVALENT CHROMIUM TEST AREA SAMPLE COLLECTION

PILOT-SCALE TREATABILITY STUDY REPORT
STRATFORD ARMY ENGINE PLANT

Location	Sample Type	Sampling Frequency	Purpose of Monitoring
EW-99-03, IW-99-05, IW-99-06, IW-99-07, IW-99-08, PZ-99-02 PZ-99-08, PZ-99-09, PZ-99-10, PZ-99-11	Soil and Groundwater PZ-99-02 [A/B/C] Groundwater only	One sample collected during installation phase.	Characterize hexavalent chromium at the beginning of the test for each lobe of the test area.
All Piezometers	Water Elevation	daily	Monitor for hydraulic control of the treatment area.
PZ-99-08, PZ-99-09, PZ-99-11	Groundwater	0, 20, 21, 22, 23, 24, 25, 26, 27, 28 hours, daily thereafter	Monitor for movement of the ferrous sulfate front through the treatment zone. These piezometers are positioned at approximately 1 day travel time from the injection wells.
PZ-99-10	Groundwater	0, 24, 32, 33, 34, 35, 36, 37, 38, 39, 40 hours, daily thereafter	Monitor for movement of the ferrous sulfate front through the treatment zone. This piezometer is positioned at approximately 1.5 days travel time from the injection well.
EW-99-03, PZ-99-02[A/B/C]	Groundwater	0, 24, 44, 45, 46, 47, 48, 49, 50, 51, 52 hours, daily thereafter	Monitor for movement of the ferrous sulfate front through the treatment zone. The extraction well and this piezometer are positioned at approximately 2 days travel time from the injection well.
All piezometers and wells	Groundwater	Round 1, one week after completion of 10 day test; Rounds 2-7, monthly after completion of test	Check for contaminant concentration rebound due to leaching from soil to groundwater.
Treated Water Frac Tank	Water	One sample from each tank prior to discharge to CWTP	Verify removal of VOCs prior to discharge to CWTP.

Note: Well, piezometer, and boring designations are as referenced on Figure 3-1
CWTP = chemical waste treatment plant
EW = extraction well
IW = injection well
PZ = piezometer
VOCs = volatile organic compounds

TABLE 3-3
HEXAVALENT CHROMIUM TEST AREA SAMPLE ANALYSIS

PILOT-SCALE TREATABILITY STUDY REPORT
STRATFORD ARMY ENGINE PLANT

Sample Type	Cr(VI)	Cr(total)	VOCs	Fe(II)	pH	Conductivity	Elevation	ORP
Soil - Collected during installation	x	x	x					
Groundwater - Collected during installation	x	x	x		x	x		x
Groundwater - During test	x	x	x(1)	x	x	x	x	x
Groundwater - 1 week after test and 2 weeks after test	x	x		x	x	x	x	x
Water - From treated water frac tanks.	x		x		x			x

Notes: (1) VOCs to be analyzed for samples from EW-99-03 only.
Cr(VI) by Field Test Kit or EPA Method 360A/7196
Cr(total) by Field Test Kit or SW846 Method 6010/7000
VOCs by SW846 Method 8260B
Fe(II) by field test kit or SW846 Method 6010
pH, Conductivity, and ORP by portable field instrumentation.
Cr(VI) = hexavalent chromium
Cr(total) = total chromium
Fe(II) = ferrous iron
ORP = oxidation-reduction potential
VOCs = volatile organic compounds
EW = extraction well
EPA = Environmental Protection Agency

TABLE 3-4
TCE TEST AREA SAMPLE COLLECTION

PILOT-SCALE TREATABILITY STUDY REPORT
STRATFORD ARMY ENGINE PLANT

Location	Sample Type	Sampling Frequency	Purpose of Monitoring
EW-99-02, IW-99-01, IW-99-02, IW-99-03, IW-99-04, PZ-99-04, PZ-99-05, PZ-99-06, PZ-99-07	Soil and Groundwater	One sample collected during installation.	Characterize TCE at the beginning of the test for each lobe of the test area.
All Piezometers	Water Elevation	daily	Monitor for hydraulic control of the treatment area.
PZ-99-04, PZ-99-06, PZ-99-07	Groundwater	0, 20, 21, 22, 23, 24, 25, 26, 27, 28 hours, daily thereafter	Monitor for movement of the potassium permanganate front through the treatment zone. These piezometers are positioned at approximately 1 day travel time from the injection wells.
PZ-99-01$^{A/B/C}$	Groundwater	0, 24, 32, 33, 34, 35, 36, 37, 38, 39, 40 hours, daily thereafter	Monitor for movement of the potassium permanganate front through the treatment zone. This piezometer is positioned at approximately 1.5 days travel time from the injection well.
EW-99-02, PZ-99-05	Groundwater	0, 24, 44, 45, 46, 47, 48, 49, 50, 51, 52 hours, daily thereafter	Monitor for movement of the potassium permanganate front through the treatment zone. The extraction well and this piezometer are positioned at approximately 2 days travel time from the injection well.
All piezometers and wells	Groundwater	Round 1 one week after completion of 10 day test; Rounds 2-7,monthly after completion of test	Check for contaminant concentration rebound due to leaching from soil to groundwater.
Treated Water Frac Tank	Water	One sample from each tank prior to discharge to CWTP	Verify removal of VOCs prior to discharge to CWTP.

Note: Well, piezometer, and boring designations are as referenced on Figure 3-1
CWTP = chemical waste treatment plant
EW = extraction well
IW = injection well
PZ = piezometer
VOCs = volatile organic compounds

TABLE 3-5
TCE TEST AREA SAMPLE ANALYSIS

PILOT-SCALE TREATABILITY STUDY REPORT
STRATFORD ARMY ENGINE PLANT

Sample Type	Cr(VI)	Cr(total)	Mn(total)	TOC	VOCs	Fe(II)	pH	Conductivity	Elevation	ORP
Soil - Collected during installation	x	x	x	x	x					
Groundwater - Collected during installation	X	x	x	x	x		x	x	x	x
Groundwater - During test	x(1)		x		x		x	x	x	x
Groundwater - 1 week after test; and 2 weeks after test	X	x	x	x	x		x	x	x	x
Water - From treated water frac tanks.	X				x		x			x

Notes: (1) Cr(VI) to be analyzed for samples from EW-99-02 only.
Cr(VI) by Field Test Kit or EPA Method 360A/7196
Cr(total) by Field Test Kit or SW846 Method 6010/7000
Mn(total) by Field Test Kit or EPA Method 6010/7000
TOC by SW846 Method 415.1 or 9060
VOCs by SW846 Method 8260B
Fe^{2+} by field test kit or SW846 Method 6010
pH, Conductivity, and ORP by portable field instrumentation.
Cr(VI) = hexavalent chromium
Cr(total) = total chromium
Mn(total) = total manganese
TOC = total organic carbon
VOC = volatile organic compound
Fe(II) = ferrous iron
ORP = oxidation-reduction potential

TABLE 3-6
ESTIMATED CONTAMINANT MASS IN CHROMIUM AND TCE TEST AREAS

PILOT-SCALE TREATABILITY STUDY REPORT
STRATFORD ARMY ENGINE PLANT

SAMPLE LOCATION	WATER						SOIL					
	TCE ug/L		TOC mg/L		Cr(VI) mg/L		TCE ug/kg		TOC Percent		Cr(VI) mg/kg	
EW-99-02	50000.0		1.9		0	U	670		0.16		1.1	
IW-99-01	260000.0		1.0	U	0	U	57000	D	0.11		0.8	
IW-99-02	44000.0		1.5		0	U	37000	D	0.18		0.8	
IW-99-03	350000.0		1.0	U	0	U	86000	D	0.1	U	0.58	
IW-99-04	150000.0		1.0	U	0	U	600		0.15		1.1	
PZ-99-04	23000.0		1.0	U	0	U	29000	D	0.1	U	1.3	
PZ-99-05	74000.0		1.0	U	0	U	67000	D	0.14		0.9	
PZ-99-06	110000.0		1.0	U	0	U	43000	D	0.1	U	0.53	
PZ-99-07	41000.0		1.0	U	0	U	69000	D	0.13		0.3	
PZ-99-01B	200000.0		-		0	U	-		-		-	
Average	130200.0		1.2		0.0		55428.6		0.13		0.8	
Surface area of treatment by a single injection well (from groundwater flow evaluation)=											112.0	ft^2
Porosity (assumed)=											0.3	
Thickness of treatment zone=											10.0	ft
Density of in-place soil (assumed)=											110.0	lb/cf
Estimated Mass of TCE per lobe=											4.3	kg
Estimated Mass of TOC per lobe=											72.7	kg
EW-99-03	92000.0		-		350		300		-		0.8	
IW-99-05	95000.0		-		200		330	U	-		0.98	
IW-99-06	84000.0		-		200		7300		-		0.73	
IW-99-07	73000.0		-		300		14000		-		1.7	
IW-99-08	94000.0		-		350		14000		-		0.3	
PZ-99-08	93000.0		-		200		13000		-		0.71	
PZ-99-09	86000.0		-		200		20000		-		12	
PZ-99-10	88000.0		-		300		14000		-		0.8	
PZ-99-11	93000.0		-		400		10000		-		1.1	
PZ-99-02B	77000.0		-		200		-		-		-	
Average	87500.0		-		270.0		10325.6		-		2.1	
Surface area of treatment by a single injection well (from groundwater flow evaluation)=											112.0	ft^2
Porosity (assumed)=											0.3	
Thickness of treatment zone=											10.0	ft
Density of in-place soil (assumed)=											110.0	lb/cf
Estimated Mass of hexavalent chromium per lobe=											2.7	kg

NOTES:
Sample results that were below the detection limit were not included in the calculation of average concentrations.
U = Analyte not detected above detection limit.
D = Sample was diluted
µg/L = micrograms per liter
mg/L = milligrams per liter
TCE = Trichloroethene
EW= extraction well
IW = injection well
PZ = piezometer
Cr(VI) = hexavalent chromium
µg/kg = micrograms per kilogram
mg/kg = milligrams per kilogram
TOC = total organic carbon

TABLE 3-7
ESTIMATED MASS OF CHEMICAL INJECTED IN CHROMIUM AND TCE TEST AREAS

PILOT-SCALE TREATABILITY STUDY REPORT
STRATFORD ARMY ENGINE PLANT

Location	Estimated Mass of Contaminant (kg)	Estimated Moles of Contaminant (moles)	Molar Ratio From Work Plan	Moles of Chemical Required Based on Work Plan (moles)	Mass of Chemical Required Based on Work Plan (kg)	Phase 1 Estimated Mass of Chemical Delivered (kg)	Phase 1 Estimated Moles of Chemical Delivered (moles)	Phase 1 Estimated Molar Ratio	Phase 1&2 Estimated Mass of Chemical Delivered (kg)	Phase 1&2 Estimated Moles of Chemical Delivered (moles)	Phase 1&2 Estimated Molar Ratio
IW-99-01	4.3	33	2.5	82	13	24	152	5	83	528	16
IW-99-03	4.3	33	1.5	49	8	15	97	3	58	370	11
IW-99-02	4.3	33	1	33	5	11	68	2	45	282	9
IW-99-04	4.3	33	0	0	0	0	0	0	0	0	0
IW-99-05	2.7	52	0	0	0	0	0	0	0	0	0
IW-99-06	2.7	52	3	156	43	53	191	4	228	818	16
IW-99-07	2.7	52	6	312	87	106	379	7	334	1201	23
IW-99-08	2.7	52	9	467	130	159	571	11	575	2068	40

NOTES:
Mass of ferrous sulfate required includes the mass of water bound to ferrous sulfate as delivered (I.e., mass of FeSO4-7H2O)
IW = injection well
kg = kilograms
FeSO4-7H2O = ferrous sulfate heptahydrate

Table 4-1
Pilot Test Analytical Results
Pilot-Scale Treatability Study Report
Stratford Army Engine Plant

LOCATION	SAMPLE ID:	DATE&TIME SAMPLED	DATE&TIME VOCs ANALYZED	VC µg/L	1,1-DCE µg/L	t1,2-DCE µg/L	c1,2-DCE µg/L	1,1,1-TCA µg/L	TCE µg/L	PCE µg/L	Cr(VI) mg/L	Cr(total) mg/L	Fe(II) mg/L	Mn(total) mg/L	DEPTH TO WATER ft. TOR	TEMP. °C	pH	TURB. NTU	COND. mS/cm	D.O. mg/L	ORP mV
C1EF	C1EF1201991545	12/1/99 3:45 PM	-	100 U	100 U	100 U	100 U	100 U	100 U	100 U	-	-	-	-	-	22.2	6.46	0	1.87	0.61	45.4
C1EF	C1EF1201991545D	12/1/99 3:45 PM	-	100 U	100 U	100 U	100 U	100 U	100 U	100 U	-	-	-	-	-	-	-	-	-	-	-
C1EF	C1EF1202991600	12/2/99 4:00 PM	-	100 U	100 U	100 U	100 U	100 U	100 U	100 U	-	-	-	-	-	-	-	-	-	-	-
C1EF	C1EF1203991530	12/3/99 3:30 PM	-	100 U	100 U	100 U	100 U	100 U	100 U	100 U	-	-	-	-	-	22.1	6.2	0	1.5	1	170
C1EF	C1EF1204991530	12/4/99 3:30 PM	-	100 U	100 U	100 U	100 U	100 U	100 U	100 U	-	-	-	-	-	22.1	6.27	0	1.34	1.6	214
C1EF	C1EF1205991530	12/5/99 3:30 PM	-	100 U	100 U	100 U	100 U	100 U	100 U	100 U	-	-	-	-	-	21.5	6.21	0	1.26	1.2	238
C1EF	C1EF1206991530	12/6/99 3:30 PM	-	100 U	100 U	100 U	100 U	100 U	100 U	100 U	-	-	-	-	-	21.7	6.32	0	1.18	1.66	184
C1EF	C1EF1207991530	12/7/99 3:30 PM	-	100 U	100 U	100 U	100 U	100 U	100 U	100 U	-	-	-	-	-	21.5	6.23	0	1.16	2.14	250
C1EF	C1EF1207991530D	12/7/99 3:30 PM	-	100 U	100 U	100 U	100 U	100 U	100 U	100 U	-	-	-	-	-	-	-	-	-	-	-
C1EF	C1EF1208991530	12/8/99 3:30 PM	-	100 U	100 U	100 U	100 U	100 U	100 U	100 U	-	-	-	-	-	20.6	6.46	0	1.08	2.24	-
C1EF	C1EF1209991530	12/9/99 3:30 PM	-	100 U	100 U	100 U	100 U	100 U	100 U	100 U	-	-	-	-	-	20.4	6.3	0	1.22	2.3	120
C1EF	C1EF1210991530	12/10/99 3:30 PM	-	100 U	100 U	100 U	100 U	100 U	100 U	100 U	-	-	-	-	-	20.4	6.31	0	1	2	194
C1EF	C1EF0120000800	1/20/00 8:00 AM	-	100 U	100 U	100 U	100 U	100 U	100 U	100 U	-	-	-	-	-	20.1	5.97	-	1.08	-	139
C1EF	C1EF0121000700	1/21/00 7:00 AM	-	100 U	100 U	100 U	100 U	100 U	100 U	100 U	-	-	-	-	-	20.1	6.14	-	1.07	-	238
C1EF	C1EF0122000700	1/22/00 7:00 AM	-	100 U	100 U	100 U	100 U	100 U	100 U	100 U	-	-	-	-	-	20	6.05	-	1.03	-	156
C1EF	C1EF0123000700	1/23/00 7:00 AM	-	100 U	100 U	100 U	100 U	100 U	100 U	100 U	-	-	-	-	-	19.5	6.03	-	1.07	-	181
C2EF	C2EF0123000700	1/23/00 7:00 AM	-	100 U	100 U	100 U	100 U	100 U	100 U	100 U	-	-	-	-	-	13	6.37	-	1.08	-	163
C2EF	C2EF0124000700	1/24/00 7:00 AM	1/24/00 7:53 AM	100 U	100 U	100 U	100 U	100 U	100 U	100 U	-	-	-	-	-	14.7	6.4	-	1.04	-	317
C2EF	C2EF0125000700	1/25/00 7:00 AM	1/25/00 8:54 AM	100 U	100 U	100 U	100 U	100 U	100 U	100 U	-	-	-	-	-	14.9	5.98	-	1.15	-	-
C2EF	C2EF0126000700	1/26/00 7:00 AM	1/26/00 9:06 AM	100 U	100 U	100 U	100 U	100 U	100 U	100 U	-	-	-	-	-	14.7	4.64	-	1.46	-	-
C2EF	C2EF0127000700	1/27/00 7:00 AM	1/27/00 1:14 PM	100 U	100 U	100 U	100 U	100 U	100 U	100 U	-	-	-	-	-	16	5.16	-	1.1	-	-
C2EF	C2EF0128000700	1/28/00 7:00 AM	1/28/00 8:31 AM	100 U	100 U	100 U	100 U	100 U	100 U	100 U	-	-	-	-	-	12.5	5.31	-	0.964	-	-
C2EF	C2EF0128000700D	1/28/00 7:00 AM	1/28/00 8:49 AM	100 U	100 U	100 U	100 U	100 U	100 U	100 U	-	-	-	-	-	12.5	5.31	-	0.964	-	-
C2EF	C2EF0129000700	1/29/00 7:00 AM	1/29/00 9:02 AM	100 U	100 U	100 U	100 U	100 U	100 U	100 U	-	-	-	-	-	12.8	5.44	-	1.28	-	-
C2EF	C2EF0130000700	1/30/00 7:00 AM	1/30/00 9:21 AM	100 U	100 U	100 U	100 U	100 U	100 U	100 U	-	-	-	-	-	16.7	5.41	-	0.912	-	-
C2EF	C2EF0131000700	1/31/00 7:00 AM	1/31/00 9:06 AM	100 U	100 U	100 U	100 U	100 U	100 U	100 U	-	-	-	-	-	13.2	5.89	-	0.928	-	-
C2EF	C2EF0201000700	2/1/00 7:00 AM	2/1/00 9:18 AM	100 U	100 U	100 U	100 U	100 U	100 U	100 U	-	-	-	-	-	13.8	5.91	-	0.92	-	253
C3EF	C3EF1202991200	12/2/99 12:00 PM	-	100 U	100 U	100 U	100 U	100 U	100 U	100 U	-	-	-	-	-	18.2	9.15	0	4.56	1.26	209.7
C3EF	C3EF1203990930	12/3/99 9:30 AM	-	100 U	100 U	100 U	100 U	100 U	100 U	100 U	-	-	-	-	-	18.6	8.8	0	4.7	0.8	184
C3EF	C3EF1204990930	12/4/99 9:30 AM	-	100 U	100 U	100 U	100 U	100 U	100 U	100 U	-	-	-	-	-	19.3	7.98	0	4.73	0.6	158
C3EF	C3EF1205990930	12/5/99 9:30 AM	-	100 U	100 U	100 U	100 U	100 U	100 U	100 U	-	-	-	-	-	18.8	7.21	0	4.76	0.64	155
C3EF	C3EF1206991230	12/6/99 12:30 PM	-	100 U	100 U	100 U	100 U	100 U	**240**	100 U	-	-	-	-	-	18.8	6.87	0	4.75	0.7	244
C3EF	C3EF0120001400	1/20/00 2:00 PM	-	100 U	100 U	100 U	100 U	100 U	100 U	100 U	-	-	-	-	-	17.4	9.01	-	4.84	-	164
C3EF	C3EF0121001400	1/21/00 2:00 PM	-	100 U	100 U	100 U	100 U	100 U	**300**	100 U	-	-	-	-	-	17	9.03	-	4.41	-	251
C3EF	C3EF0122001400	1/22/00 2:00 PM	-	500 U	500 U	500 U	500 U	500 U	**610**	500 U	-	-	-	-	-	17.1	7.15	-	4.4	-	325
C3EF	C3EF0125001400	1/25/00 2:00 PM	1/25/00 3:18 PM	100 U	100 U	100 U	100 U	100 U	**470**	100 U	-	-	-	-	-	16.3	7.8	-	4.4	-	-
C4EF	C4EF1209990815	12/9/99 8:15 AM	-	100 U	100 U	100 U	100 U	100 U	100 U	100 U	-	-	-	-	-	15.3	7.63	1	4.84	1.5	-
C4EF	C4EF1209990900	12/9/99 9:00 AM	-	-	-	-	-	-	-	-	-	-	-	-	-	15.7	8.02	0	4.9	1.18	-
C4EF	C4EF1210990830	12/10/99 8:30 AM	-	100 U	100 U	100 U	100 U	100 U	100 U	100 U	-	-	-	-	-	16.1	7.55	1	5.01	0.27	250
C4EF	C4EF0122001630	1/22/00 4:30 PM	-	100 U	100 U	100 U	100 U	100 U	100 U	100 U	-	-	-	-	-	-	-	-	-	-	-
C4EF	C4EF0123001400	1/23/00 2:00 PM	-	100 U	100 U	100 U	100 U	100 U	100 U	100 U	-	-	-	-	-	14.6	7.98	-	4.54	-	299
C4EF	C4EF0124001400	1/24/00 2:00 PM	1/24/00 2:34 PM	100 U	100 U	100 U	100 U	100 U	100 U	100 U	-	-	-	-	-	-	-	-	-	-	-
C4EF	C4EF0125001700	1/25/00 5:00 PM	1/25/00 5:34 PM	100 U	100 U	100 U	100 U	100 U	100 U	100 U	-	-	-	-	-	-	-	-	-	-	-
C4EF	C4EF0126001400	1/26/00 2:00 PM	1/26/00 3:22 PM	100 U	100 U	100 U	100 U	100 U	100 U	100 U	-	-	-	-	-	15.1	6.48	-	4.62	-	-
C4EF	C4EF0127001100	1/27/00 11:00 AM	1/27/00 12:56 PM	100 U	100 U	100 U	100 U	100 U	100 U	100 U	-	-	-	-	-	13.4	7.25	-	4.26	-	-
C4EF	C4EF0128001400	1/28/00 2:00 PM	1/28/00 2:47 PM	100 U	100 U	100 U	100 U	100 U	100 U	100 U	-	-	-	-	-	14.5	4.22	-	4.04	-	-
C4EF	C4EF0129001400	1/29/00 2:00 PM	1/29/00 4:04 PM	1000 U	1000 U	1000 U	1000 U	1000 U	**3800**	1000 U	-	-	-	-	-	14.5	5.08	-	3.81	-	-
C4EF	C4EF0130001400	1/30/00 2:00 PM	1/30/00 2:33 PM	100 U	100 U	100 U	100 U	100 U	100 U	100 U	-	-	-	-	-	15.6	5.09	-	3.72	-	-
C4EF	C4EF0131001400	1/31/00 2:00 PM	1/31/00 4:22 PM	100 U	100 U	100 U	100 U	100 U	100 U	100 U	-	-	-	-	-	11.1	5.49	-	3.6	-	236
C4EF	C4EF0201001400	2/1/00 2:00 PM	2/1/00 4:19 PM	100 U	100 U	100 U	100 U	100 U	100 U	100 U	-	-	-	-	-	14.2	5.92	-	3.52	-	582
EW02	EW021118991815	11/18/99 6:15 PM	-	2000 U	2000 U	2000 U	2000 U	2000 U	**50000**	2000 U	0.1 U	2.3 U	0.1 U	0.1 U	-	21.6	6.75	20	2.09	1	-
EW02	EW021118991815D	11/18/99 6:15 PM	-	2000 U	2000 U	2000 U	2000 U	2000 U	**49000**	2000 U	0.1 U	2.3 U	0.1 U	0.1 U	-	-	-	-	-	-	-
EW02	EW021130991740	11/30/99 5:40 PM	-	200 U	200 U	200 U	200 U	200 U	**3800**	200 U	0.1 U	-	-	0.1 U	5.59	21.8	6.35	9	1.44	1.75	-
EW02	EW021201991700	12/1/99 5:00 PM	-	2000 U	2000 U	2000 U	2000 U	2000 U	**50000**	2000 U	0.1 U	-	-	**0.5**	-	21.9	6.22	0	2.21	1.12	22.8
EW02	EW021202991230	12/2/99 12:30 PM	-	1000 U	1000 U	1000 U	1000 U	1000 U	**46000 J**	1000 U	-	-	-	**0.5**	-	22.3	6.26	0	1.71	2.17	-
EW02	EW021202991330	12/2/99 1:30 PM	-	1000 U	1000 U	1000 U	1000 U	1000 U	**45000 J**	1000 U	-	-	-	0.1 U	-	22	6.32	6	1.69	2.63	68
EW02	EW021202991430	12/2/99 2:30 PM	-	1000 U	1000 U	1000 U	1000 U	1000 U	**48000**	1000 U	-	-	-	0.1 U	-	21.9	6.21	0	1.7	1.89	32.7
EW02	EW021202991530	12/2/99 3:30 PM	-	1000 U	1000 U	1000 U	1000 U	1000 U	**51000 EJ**	1000 U	-	-	-	0.1 U	-	22.1	6.22	0	1.67	2.25	70.3
EW02	EW021202991630	12/2/99 4:30 PM	-	1000 U	1000 U	1000 U	1000 U	1000 U	**46000 J**	1000 U	0.1 U	-	-	**0.3**	5.55	22.4	6.3	0	1.7	2.4	43
EW02	EW021202991630D	12/2/99 4:30 PM	-	-	-	-	-	-	-	-	0.1 U	-	-	**0.3**	-	-	-	-	-	-	-

Table 4-1
Pilot Test Analytical Results
Pilot-Scale Treatability Study Report
Stratford Army Engine Plant

LOCATION	SAMPLE ID:	DATE&TIME SAMPLED	DATE&TIME VOCs ANALYZED	VC µg/L	1,1-DCE µg/L	t1,2-DCE µg/L	c1,2-DCE µg/L	1,1,1-TCA µg/L	TCE µg/L	PCE µg/L	Cr(VI) mg/L	Cr(total) mg/L	Fe(II) mg/L	Mn(total) mg/L	DEPTH TO WATER ft. TOR	TEMP. °C	pH	TURB. NTU	COND. mS/cm	D.O. mg/L	ORP mV
EW02	EW021202991730	12/2/99 5:30 PM	-	1000 U	1000 U	1000 U	1000 U	1000 U	**47000 J**	1000 U	-	-	-	**0.5**	-	22.6	6.3	3	1.7	2.9	20
EW02	EW021202991830	12/2/99 6:30 PM	-	1000 U	1000 U	1000 U	1000 U	1000 U	**45000 J**	1000 U	-	-	-	0.1 U	-	22.5	6.2	0	1.6	2.2	33
EW02	EW021202991930	12/2/99 7:30 PM	-	1000 U	1000 U	1000 U	1000 U	1000 U	**47000 J**	1000 U	-	-	-	0.1 U	-	21.2	6.1	1	1.6	2.2	64
EW02	EW021202991930D	12/2/99 7:30 PM	-	1000 U	1000 U	1000 U	1000 U	1000 U	**47000 J**	1000 U	-	-	-	0.1 U	-	-	-	-	-	-	-
EW02	EW021202992030	12/2/99 8:30 PM	-	1000 U	1000 U	1000 U	1000 U	1000 U	**46000 J**	1000 U	-	-	-	0.1 U	-	21.8	6.1	1	1.6	2	80
EW02	EW021203991630	12/3/99 4:30 PM	-	1000 U	1000 U	1000 U	1000 U	1000 U	**42000 J**	1000 U	**0.65**	**2.3**	-	**0.15**	5.54	22.3	6.28	0	1.5	1.8	50
EW02	EW021204991630	12/4/99 4:30 PM	-	5000 U	5000 U	5000 U	5000 U	5000 U	**56000**	5000 U	**0.15**	**4.5**	-	0.1 U	5.6	22	6.23	0	1.34	2.3	84
EW02	EW021205991630	12/5/99 4:30 PM	-	5000 U	5000 U	5000 U	5000 U	5000 U	**64000**	5000 U	-	-	-	0.1 U	5.68	21.8	6.25	1	1.25	2.46	99
EW02	EW021206991630	12/6/99 4:30 PM	-	5000 U	5000 U	5000 U	5000 U	5000 U	**59000**	5000 U	**1.8**	**4.5**	-	0.1 U	5.61	21.6	6.32	4	1.39	2.9	35
EW02	EW021206991630D	12/6/99 4:30 PM	-	-	-	-	-	-	-	-	**2**	**6.8**	-	0.1 U	-	-	-	-	-	-	-
EW02	EW021207991630	12/7/99 4:30 PM	-	5000 U	5000 U	5000 U	5000 U	5000 U	**50000**	5000 U	**2.2**	-	-	0.1 U	5.6	21.2	6.34	5	1.18	3.6	-
EW02	EW021208991630	12/8/99 4:30 PM	-	5000 U	5000 U	5000 U	5000 U	5000 U	**38000**	5000 U	**2.6**	-	-	0.1 U	6.09	20.6	6.28	3	1.08	3.21	-
EW02	EW021208991630D	12/8/99 4:30 PM	-	5000 U	5000 U	5000 U	5000 U	5000 U	**38000**	5000 U	**2.7**	-	-	0.1 U	-	-	-	-	-	-	-
EW02	EW021209991630	12/9/99 4:30 PM	-	5000 U	5000 U	5000 U	5000 U	5000 U	**38000 J**	5000 U	**0.1**	**16**	-	0.1 U	5.7	20.5	6.22	3	1.01	2.92	620
EW02	EW021209991630D	12/9/99 4:30 PM	-	-	-	-	-	-	-	-	**0.1**	**16**	-	0.1 U	-	-	-	-	-	-	-
EW02	EW021210991630	12/10/99 4:30 PM	-	1000 U	1000 U	1000 U	1000 U	1000 U	**17000 J**	1000 U	**4.5**	**14**	-	**8**	5.72	20.4	6.25	3	1.01	3.48	655
EW02	EW021220991500	12/20/99 3:00 PM	-	300 U	300 U	300 U	300 U	300 U	**10000**	300 U	**0.2**	-	-	0.1 U	5.15	20.1	6.67	1	0.493	0.1	488.1
EW02	EW020119000800	1/19/00 8:00 AM	-	5000 U	5000 U	5000 U	5000 U	5000 U	**19000**	5000 U	**0.73**	**5**	-	**0.2**	5.47	19.9	7	-	0.662	1.95	-
EW02	EW020120000730	1/20/00 7:30 AM	-	100 U	100 U	100 U	100 U	100 U	**140**	100 U	0.1 U	2.3 U	-	**0.3**	5.93	20.8	6.05	-	0.737	-	127
EW02	EW020120000730D	1/20/00 7:30 AM	-	100 U	100 U	100 U	100 U	100 U	**150**	100 U	- U	- U	-	**0.3**	5.93	20.8	6.05	-	0.737	-	127
EW02	EW020121000800	1/21/00 8:00 AM	-	100 U	100 U	100 U	100 U	100 U	**200**	100 U	0.1 U	2.3 U	-	**0.3**	5.85	21	6.3	-	0.753	-	65
EW02	EW020122000800	1/22/00 8:00 AM	-	100 U	100 U	100 U	100 U	100 U	**120**	100 U	0.1 U	2.3 U	-	**4.5**	5.93	20.5	6.26	-	0.797	-	525
EW02	EW020123000800	1/23/00 8:00 AM	-	200 U	200 U	200 U	200 U	200 U	**330**	200 U	0.1 U	-	-	**5**	5.9	-	-	-	-	-	-
EW02	EW020124000800	1/24/00 8:00 AM	1/24/00 3:26 PM	100 U	100 U	100 U	100 U	100 U	100 U	100 U	0.1 U	-	-	**3.5**	5.89	19.5	6.24	-	1.06	-	658
EW02	EW020125000800	1/25/00 8:00 AM	1/25/00 3:36 PM	100 U	100 U	100 U	100 U	100 U	100 U	100 U	**5**	-	-	**3.5**	5.83	18.8	6.41	-	0.99	-	-
EW02	EW020126000800	1/26/00 8:00 AM	1/26/00 3:04 PM	100 U	100 U	100 U	100 U	100 U	100 U	100 U	**10**	-	-	**7.5**	5.9	18	6.07	-	0.99	-	-
EW02	EW020127000800	1/27/00 8:00 AM	1/27/00 4:21 PM	100 U	100 U	100 U	100 U	100 U	100 U	100 U	**10**	-	-	**5**	5.97	18.2	5.7	-	0.95	-	-
EW02	EW020127000800D	1/27/00 8:00 AM	1/27/00 4:48 PM	100 U	100 U	100 U	100 U	100 U	100 U	100 U	**10**	-	-	**5**	5.97	18.2	5.7	-	0.95	-	-
EW02	EW020128000800	1/28/00 8:00 AM	1/28/00 3:43 PM	100 U	100 U	100 U	100 U	100 U	100 U	100 U	**10**	-	-	**6**	5.93	17.9	5.9	-	0.97	-	-
EW02	EW020128000800D	1/28/00 8:00 AM	-	-	-	-	-	-	-	-	-	-	-	**6**	5.93	17.9	5.9	-	0.97	-	-
EW02	EW020129000800	1/29/00 8:00 AM	1/29/00 3:27 PM	100 U	100 U	100 U	100 U	100 U	100 U	100 U	**7.5**	-	-	**7**	6	17.5	5.58	-	0.949	-	-
EW02	EW020129000800D	1/29/00 8:00 AM	-	-	-	-	-	-	-	-	-	-	-	**7**	6	17.5	5.58	-	0.949	-	-
EW02	EW020130000800	1/30/00 8:00 AM	1/30/00 2:15 PM	100 U	100 U	100 U	100 U	100 U	100 U	100 U	**10**	-	-	**6**	6.03	17.5	5.26	-	0.948	-	-
EW02	EW020131000800	1/31/00 8:00 AM	1/31/00 2:00 PM	100 U	100 U	100 U	100 U	100 U	100 U	100 U	**10**	-	-	**6**	5.73	17.8	4.89	-	0.92	-	-
EW02	EW020201000800	2/1/00 8:00 AM	2/1/00 2:06 PM	100 U	100 U	100 U	100 U	100 U	100 U	100 U	**7.5**	-	-	**10**	5.87	17.2	5.1	-	0.97	-	766
EW02	EW020208001550	2/8/00 3:50 PM	-	15 U	15 U	15 U	15 U	15 U	15 U	15 U	**15**	-	-	**112**	6.59	18	6	20	1.3	5.4	778
EW02	EW020309001550	3/9/00 3:50 PM	-	15 U	15 U	15 U	15 U	15 U	15 U	15 U	**19**	**10.8**	-	**10.4**	5.28	19.1	6.8	-	0.9	3.4	695
EW02	EW020412001743	4/12/00 5:43 PM	-	15 U	15 U	15 U	15 U	15 U	15 U	15 U	**2.1**	**1**	-	**7.78 E**	-	19.3	6.12	5	0.91	1.73	606
EW02	EW020509001605	5/9/00 4:05 PM	-	3 U	3 U	3 U	3 U	3 U	**110**	**6**	**0.035**	**48.2**	-	**1.57**	5	20.2	6.32	2	0.847	1.47	-
EW02	EW020619001540	6/19/00 3:40 PM	-	15 U	15 U	15 U	15 U	15 U	15 U	**4 J**	**0.0**	**25.6**	-	**18.5**	5	21.2	6.2	3.5	1.3	2.9	631
EW02	EW020719001402	7/19/00 2:02 PM	-	15 U	15 U	15 U	15 U	15 U	**3000**	15 U	**12.0**	**9.52**	-	**10.3**	5.21	21.5	6.21	11	1.5	6.31	600
EW02	EW020809001550	8/9/00 3:50 PM	-	300 U	300 U	300 U	300 U	300 U	**29000**	300 U	**11.0** J	**9.44**	-	**1.12**	4.75	22	5.98	-	2	1.69	219.4
EW03	EW031118991550	11/18/99 3:50 PM	-	2000 U	2000 U	2000 U	2000 U	2000 U	**92000**	2000 U	**350**	**290**	0.1 U	-	-	15.6	6.38	0	4.83	1.72	-
EW03	EW031118991550D	11/18/99 3:50 PM	-	2000 U	2000 U	2000 U	2000 U	2000 U	**88000**	2000 U	**350**	**270**	0.1 U	-	-	-	-	-	-	-	-
EW03	EW031201991150	12/1/99 11:50 AM	-	2000 U	2000 U	2000 U	2000 U	2000 U	**93000**	2000 U	**400**	**440**	0.1 U	-	-	17	6.26	4	4.92	1.66	225.1
EW03	EW031201991150D	12/1/99 11:50 AM	-	-	-	-	-	-	-	-	**430**	**430**	0.1 U	-	-	-	-	-	-	-	-
EW03	EW031202991100	12/2/99 11:00 AM	-	2000 U	2000 U	2000 U	2000 U	2000 U	**92000**	2000 U	**100**	**450**	0.1 U	-	9.08	18.1	6.29	1	4.73	2.64	227
EW03	EW031202991100D	12/2/99 11:00 AM	-	2000 U	2000 U	2000 U	2000 U	2000 U	**91000**	2000 U	-	-	-	-	-	-	-	-	-	-	-
EW03	EW031203990630	12/3/99 6:30 AM	-	-	-	-	-	-	-	-	**400**	**410**	0.1 U	-	-	18.2	6.3	0	4.8	3.4	226
EW03	EW031203990730	12/3/99 7:30 AM	-	-	-	-	-	-	-	-	**380**	**430**	0.1 U	-	-	18.2	6.3	0	4.8	1.9	253
EW03	EW031203990830	12/3/99 8:30 AM	-	-	-	-	-	-	-	-	**430**	**470**	0.1 U	-	-	18.3	6.27	1	4.83	2.14	272
EW03	EW031203990830D	12/3/99 8:30 AM	-	-	-	-	-	-	-	-	**430**	**450**	0.1 U	-	-	-	-	-	-	-	-
EW03	EW031203990930	12/3/99 9:30 AM	-	-	-	-	-	-	-	-	**400**	**410**	0.1 U	-	-	18.5	6.3	1	4.8	2.5	248
EW03	EW031203991030	12/3/99 10:30 AM	-	2000 U	2000 U	2000 U	2000 U	2000 U	**90000 J**	2000 U	**430**	**450**	0.1 U	-	10.72	18.1	6.31	0	5.87	2.13	216
EW03	EW031203991130	12/3/99 11:30 AM	-	-	-	-	-	-	-	-	**350**	**430**	0.1 U	-	-	18.4	6.3	6	4.8	2.3	131
EW03	EW031203991230	12/3/99 12:30 PM	-	-	-	-	-	-	-	-	**380**	**450**	0.1 U	-	-	18.5	6.3	0	4.8	4.4	227
EW03	EW031203991330	12/3/99 1:30 PM	-	-	-	-	-	-	-	-	**330**	**470**	0.1 U	-	-	18.6	6.3	0	4.8	1.3	252
EW03	EW031203991430	12/3/99 2:30 PM	-	-	-	-	-	-	-	-	**280**	**470**	0.1 U	-	-	18.4	6.28	0	4.36	1.1	2.48
EW03	EW031204991030	12/4/99 10:30 AM	-	2000 U	2000 U	2000 U	2000 U	2000 U	**85000 J**	2000 U	**75**	**500**	0.1 U	-	10.87	18.5	6.27	2	4.77	2.4	270
EW03	EW031205991030	12/5/99 10:30 AM	-	5000 U	5000 U	5000 U	5000 U	5000 U	**95000**	5000 U	**330**	**470**	0.1 U	-	10.81	18.5	6.26	1	4.75	3.3	255

Table 4-1
Pilot Test Analytical Results
Pilot-Scale Treatability Study Report
Stratford Army Engine Plant

LOCATION	SAMPLE ID:	DATE&TIME SAMPLED	DATE&TIME VOCs ANALYZED	VC µg/L	1,1-DCE µg/L	t1,2-DCE µg/L	c1,2-DCE µg/L	1,1,1-TCA µg/L	TCE µg/L	PCE µg/L	Cr(VI) mg/L	Cr(total) mg/L	Fe(II) mg/L	Mn(total) mg/L	DEPTH TO WATER ft. TOR	TEMP. °C	pH	TURB. NTU	COND. mS/cm	D.O. mg/L	ORP mV
EW03	EW031205991030D	12/5/99 10:30 AM	-	5000 U	5000 U	5000 U	5000 U	5000 U	**97000**	5000 U	-	-	-	-	-	-	-	-	-	-	-
EW03	EW031206991030	12/6/99 10:30 AM	-	10000 U	10000 U	10000 U	10000 U	10000 U	**96000**	10000 U	**330**	**430**	0.1 U	-	10.96	18.5	6.24	0	4.75	2.22	233.2
EW03	EW031207991030	12/7/99 10:30 AM	-	10000 U	10000 U	10000 U	10000 U	10000 U	**87000**	10000 U	**300**	**410**	0.1 U	-	10.96	-	-	-	-	-	227
EW03	EW031208991030	12/8/99 10:30 AM	-	10000 U	10000 U	10000 U	10000 U	10000 U	**80000**	10000 U	**300**	**290**	0.1 U	-	14.9	17.9	6.31	5	5	4.2	-
EW03	EW031209991030	12/9/99 10:30 AM	-	10000 U	10000 U	10000 U	10000 U	10000 U	**78000** J	10000 U	**250**	**290**	0.1 U	-	14.64	17.8	6.29	10	5.17	3.68	-
EW03	EW031210991030	12/10/99 10:30 AM	-	10000 U	10000 U	10000 U	10000 U	10000 U	**76000**	10000 U	**230**	**270**	0.1 U	-	6.67	18.6	6.29	18	5.21	2.9	244
EW03	EW031210991030D	12/10/99 10:30 AM	-	-	-	-	-	-	-	-	**200**	**250**	0.1 U	-	-	-	-	-	-	-	-
EW03	EW031211990930	12/11/99 9:30 AM	-	5000 U	5000 U	5000 U	5000 U	5000 U	**80000** J	5000 U	**200**	**280**	0.1 U	-	14.03	17.5	6.23	27	5.41	3.32	306
EW03	EW031221991500	12/21/99 3:00 PM	-	3000 U	3000 U	3000 U	3000 U	3000 U	**37000**	3000 U	**200**	**180**	0.1 U	-	4.44	16.9	6.19	10	3.25	1.09	216.1
EW03	EW031221991500D	12/21/99 3:00 PM	-	-	-	-	-	-	-	-	**200**	-	0.1 U	-	-	-	-	-	-	-	-
EW03	EW030119001500	1/19/00 3:00 PM	-	5000 U	5000 U	5000 U	5000 U	5000 U	**20000**	5000 U	**150**	**150**	0.1 U	-	4.67	15	6.5	-	2.31	-	265
EW03	EW030119001500D	1/19/00 3:00 PM	-	-	-	-	-	-	-	-	**150**	**150**	0.1 U	-	4.67	15	6.5	-	2.31	-	265
EW03	EW030120001500	1/20/00 3:00 PM	-	5000 U	5000 U	5000 U	5000 U	5000 U	**17000**	5000 U	**10**	**140**	0.1 U	-	11.26	15.9	6.32	-	1.71	-	241
EW03	EW030121001500	1/21/00 3:00 PM	-	10000 U	10000 U	10000 U	10000 U	10000 U	**58000**	10000 U	**15**	**320**	0.1 U	-	11.41	16.2	6.02	-	4.41	-	273
EW03	EW030122001500	1/22/00 3:00 PM	-	10000 U	10000 U	10000 U	10000 U	10000 U	**52000**	10000 U	**75**	**110**	0.1 U	-	11.43	16.1	5.57	-	4.32	-	315
EW03	EW030123001500	1/23/00 3:00 PM	-	10000 U	10000 U	10000 U	10000 U	10000 U	**48000**	10000 U	**10**	**200**	0.1 U	-	11.65	16.1	5.36	-	4.48	-	411
EW03	EW030123001500D	1/23/00 3:00 PM	-	10000 U	10000 U	10000 U	10000 U	10000 U	**50000**	10000 U	-	-	-	-	11.65	16.1	5.36	-	4.48	-	411
EW03	EW030124001500	1/24/00 3:00 PM	1/24/00 6:33 PM	10000 U	10000 U	10000 U	10000 U	10000 U	**40000**	10000 U	**110**	**140**	0.1 U	-	11.65	-	-	-	-	-	-
EW03	EW030125001500	1/25/00 3:00 PM	1/25/00 4:33 PM	10000 U	10000 U	10000 U	10000 U	10000 U	**93000**	10000 U	**100**	**110**	0.1 U	-	12	15.8	5.02	-	4.24	-	-
EW03	EW030126001500	1/26/00 3:00 PM	1/26/00 4:51 PM	20000 U	20000 U	20000 U	20000 U	20000 U	**31000**	20000 U	**65**	**95**	0.1 U	-	-	15.5	4.06	-	4.23	-	-
EW03	EW030127001500	1/27/00 3:00 PM	1/27/00 6:19 PM	10000 U	10000 U	10000 U	10000 U	10000 U	**37000**	10000 U	**50**	**92**	0.1 U	-	9.6	14.6	3.54	-	4.04	-	-
EW03	EW030127001500D	1/27/00 3:00 PM	1/27/00 6:37 PM	10000 U	10000 U	10000 U	10000 U	10000 U	**40000**	10000 U	**55**	**97**	0.1 U	-	9.6	14.6	3.54	-	4.04	-	-
EW03	EW030128001500	1/28/00 3:00 PM	1/28/00 4:21 PM	10000 U	10000 U	10000 U	10000 U	10000 U	**30000**	10000 U	**60**	**110**	0.1 U	-	-	14.9	3.28	-	3.87	-	-
EW03	EW030129001500	1/29/00 3:00 PM	1/30/00 9:39 AM	10000 U	10000 U	10000 U	10000 U	10000 U	**32000**	10000 U	**73**	**86**	0.1 U	-	-	14.8	3.4	-	3.89	-	-
EW03	EW030130001500	1/30/00 3:00 PM	1/30/00 3:57 PM	5000 U	5000 U	5000 U	5000 U	5000 U	**34000**	5000 U	**78**	**99**	0.1 U	-	-	14.9	3.43	-	3.79	-	-
EW03	EW030131001500	1/31/00 3:00 PM	1/31/00 5:10 PM	5000 U	5000 U	5000 U	5000 U	5000 U	**31000**	5000 U	**100**	**77**	0.1 U	-	7.81	14.4	5.15	-	3.71	-	297
EW03	EW030201001500	2/1/00 3:00 PM	2/1/00 4:37 PM	5000 U	5000 U	5000 U	5000 U	5000 U	**36000**	5000 U	**60**	**72**	0.1 U	-	10	9.9	5.14	-	0.258	-	551
EW03	EW030209001450	2/9/00 2:50 PM	-	-	-	-	-	-	-	-	**0.64**	**15.6**	1 U		4.88	13	3.03	55	1.26	6.16	457
EW03	EW030310001550	3/10/00 3:50 PM	-	-	-	-	-	-	-	-	**1**	**25.3**	**1.1**		4.57	13.6	2.9	0	1.6	4.1	540
EW03	EW030310001550D	3/10/00 3:50 PM	-	-	-	-	-	-	-	-	**0.96**	**24.8**	**1.2**		4.57	13.6	2.9	0	1.6	4.1	540
EW03	EW030413001525	4/13/00 3:25 PM	-	-	-	-	-	-	-	-	**3.8**	**19**	0.5 U		-	14.5	3.13	0	1.63	-	511.4
EW03	EW030510001606	5/10/00 4:06 PM	-	-	-	-	-	-	-	-	**10**	**21.1**	**0.241**	**19.8**	4.1	14.5	3.27	1	1.87	2.36	454
EW03	EW030620001745	6/20/00 5:45 PM	-	-	-	-	-	-	-	-	**18**	**24.4**	0.5 U	**22.4**	4.21	18.2	3.47	0	1.97	1.89	120
EW03	EW030720001530	7/20/00 3:30 PM	-	-	-	-	-	-	-	-	**25**	**26**	0.5 U		4.51	19.8	3.57	0	1.92	8.38	435.6
EW03	EW030808001655	8/8/00 4:55 PM	-	-	-	-	-	-	-	-	**22**	**25.8**	0.5 U		4.38	19.8	3.54	68	1.97	1.09	133.2
FT01	FT011206990730	12/6/99 7:30 AM	-	1000 U	1000 U	1000 U	1000 U	1000 U	**6400**	1000 U	**250**	-	-	-	-	15.3	8.8	3	4.58	1.25	225
FT01	FT011206990730D	12/6/99 7:30 AM	-	-	-	-	-	-	-	-	**250**	-	-	-	-	-	-	-	-	-	-
FT01	FT010121001030	1/21/00 10:30 AM	-	100 U	100 U	100 U	100 U	100 U	100 U	100 U	**150**	-	-	-	-	7.8	9.31	-	4.62	-	531
FT01	FT010124001830	1/24/00 6:30 PM	1/24/00 6:51 PM	100 U	100 U	100 U	100 U	100 U	100 U	100 U	-	-	-	-	-	6.3	6.32	-	4.69	-	-
FT01	FT010127001100	1/27/00 11:00 AM	1/27/00 12:37 PM	100 U	100 U	100 U	100 U	100 U	100 U	100 U	-	-	-	-	-	6.5	6.59	-	4.51	-	-
FT01	FT010130001600	1/30/00 4:00 PM	1/30/00 5:03 PM	100 U	100 U	100 U	100 U	100 U	100 U	100 U	**2.5**	-	-	-	-	7	5.55	-	0.395	-	-
FT01	FT010130001600D	1/30/00 4:00 PM	1/30/00 5:21 PM	100 U	100 U	100 U	100 U	100 U	100 U	100 U	-	-	-	-	-	7	5.55	-	0.395	-	-
FT02	FT021203991400	12/3/99 2:00 PM	-	100 U	100 U	100 U	100 U	100 U	100	100 U	**200**	**250**	0.1 U	-	-	-	-	-	-	-	-
FT02	FT021203991400D	12/3/99 2:00 PM	-	-	-	-	-	-	-	-	**230**	**270**	0.1 U	-	-	-	-	-	-	-	-
FT02	FT021210992100	12/10/99 9:00 PM	-	100 U	100 U	100 U	100 U	100 U	100 U	100 U	**100**	**113**	-	-	-	-	-	-	-	-	-
FT02	FT020123001630	1/23/00 4:30 PM	-	100 U	100 U	100 U	100 U	100 U	100 U	100 U	-	-	-	-	-	-	-	-	-	-	-
FT02	FT020125001700	1/25/00 5:00 PM	1/25/00 5:52 PM	100 U	100 U	100 U	100 U	100 U	100 U	100 U	-	-	-	-	-	5.9	7.89	-	4.46	-	-
FT02	FT020129001400	1/29/00 2:00 PM	1/29/00 3:45 PM	500 U	500 U	500 U	500 U	500 U	**950**	500 U	-	-	-	-	-	9.5	4.82	-	3.95	-	-
FT02	FT020130000900	1/30/00 9:00 AM	1/30/00 11:49 AM	100 U	100 U	100 U	100 U	100 U	100 U	100 U	-	-	-	-	-	8.9	5.72	-	2.58	-	-
FT03	FT031204991730	12/4/99 5:30 PM	-	100 U	100 U	100 U	100 U	100 U	100 U	100 U	0.1 U	2.3 U	-	-	-	18.5	6.66	2	1.46	2.31	55
FT03	FT031204991730D	12/4/99 5:30 PM	-	100 U	100 U	100 U	100 U	100 U	100 U	100 U	0.1 U	2.3 U	-	-	-	-	-	-	-	-	-
FT03	FT031208990415	12/8/99 4:15 AM	-	-	-	-	-	-	-	-	**190**	**230**	-	-	-	-	-	-	-	-	-
FT03	FT031209990300	12/9/99 3:00 AM	-	100 U	100 U	100 U	100 U	100 U	100 U	100 U	**100**	**110**	-	-	-	-	-	-	-	-	-
FT03	FT031211991030	12/11/99 10:30 AM	-	100 U	100 U	100 U	100 U	100 U	100 U	100 U	**1.4**	-	-	-	-	-	-	-	-	-	-
FT03	FT030120001200	1/20/00 12:00 PM	-	100 U	100 U	100 U	100 U	100 U	100 U	100 U	-	-	-	-	-	18	7.65	-	1.2	-	490
FT03	FT030125000730	1/25/00 7:30 AM	1/25/00 8:36 AM	100 U	100 U	100 U	100 U	100 U	100 U	100 U	-	-	-	-	-	4.7	7.43	-	2.15	-	-
FT03	FT030129001430	1/29/00 2:30 PM	1/29/00 2:51 PM	100 U	100 U	100 U	100 U	100 U	100 U	100 U	-	-	-	-	-	10.7	5.32	-	1.13	-	-
FT03	FT030129001430D	1/29/00 2:30 PM	1/29/00 4:22 PM	100 U	100 U	100 U	100 U	100 U	100 U	100 U	-	-	-	-	-	10.7	5.32	-	1.13	-	-
FT03	FT030131001400	1/31/00 2:00 PM	1/31/00 4:04 PM	100 U	100 U	100 U	100 U	100 U	100 U	100 U	-	-	-	-	-	12.8	5.29	-	1.87	-	393
FT03	FT030201000700	2/1/00 7:00 AM	2/1/00 8:59 AM	100 U	100 U	100 U	100 U	100 U	100 U	100 U	-	-	-	-	-	11.7	5.62	-	1.63	-	264

Table 4-1
Pilot Test Analytical Results
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Stratford Army Engine Plant

LOCATION	SAMPLE ID:	DATE&TIME SAMPLED	DATE&TIME VOCs ANALYZED	VC µg/L	1,1-DCE µg/L	t1,2-DCE µg/L	c1,2-DCE µg/L	1,1,1-TCA µg/L	TCE µg/L	PCE µg/L	Cr(VI) mg/L	Cr(total) mg/L	Fe(II) mg/L	Mn(total) mg/L	DEPTH TO WATER ft. TOR	TEMP. °C	pH	TURB. NTU	COND. mS/cm	D.O. mg/L	ORP mV
FT04	FT041202991900	12/2/99 7:00 PM	-	100 U	100 U	100 U	100 U	100 U	100 U	100 U	-	-	-	-	-	-	-	-	-	-	-
FT04	FT041207990800	12/7/99 8:00 AM	-	100 U	100 U	100 U	100 U	100 U	100 U	100 U	0.1 U	2.3 U	-	-	-	17.1	6.45	7	1.21	3.22	160
FT04	FT041209992345	12/9/99 11:45 PM	-	100 U	100 U	100 U	100 U	100 U	100 U	100 U	**130**	**140**	-	-	-	-	-	-	-	-	-
FT04	FT040122001630	1/22/00 4:30 PM	-	100 U	100 U	100 U	100 U	100 U	100 U	100 U	-	-	-	-	-	-	-	-	-	-	-
FT04	FT040122001630	1/22/00 4:30 PM	1/22/00 6:08 PM	100 U	100 U	100 U	100 U	100 U	100 U	100 U	-	-	-	-	-	-	-	-	-	-	-
FT04	FT040127001400	1/27/00 2:00 PM	1/27/00 6:01 PM	100 U	100 U	100 U	100 U	100 U	100 U	100 U	-	-	-	-	-	9.8	6.31	-	1.09	-	-
FT04	FT040128001030	1/28/00 10:30 AM	-	-	-	-	-	-	-	-	**0.1**	-	-	-	-	-	-	-	-	-	-
IW01	IW011118991739	11/18/99 5:39 PM	-	20000 U	20000 U	20000 U	20000 U	20000 U	**260000**	20000 U	0.1 U	2.3 U	**0.6**	**0.5**	-	20.8	6.36	12	3.3	1.42	-
IW01	IW011220991345	12/20/99 1:45 PM	-	30 U	30 U	30 U	30 U	30 U	30 U	30 U	-	-	-	**63**	5.18	17.2	3.96	184	1.19	9.54	920.6
IW01	IW010208001655	2/8/00 4:55 PM	-	15 U	15 U	15 U	15 U	15 U	15 U	15 U	**2.2**	-	-	**568**	5.44	15.2	3.52	514	2.01	10.6	1036
IW01	IW010309001410	3/9/00 2:10 PM	-	15 U	15 U	15 U	15 U	15 U	15 U	15 U	**1.4**	**0.441**	-	**494**	5.39	19.4	3.5	282	2	12.7	973
IW01	IW010412001340	4/12/00 1:40 PM	-	15 U	15 U	15 U	15 U	15 U	15 U	15 U	**1.8**	**0.641**	-	**393 E**	-	20.2	3.67	999	2.01	-	885
IW01	IW010412001340D	4/12/00 1:40 PM	-	15 U	15 U	15 U	15 U	15 U	15 U	15 U	**2.6**	**0.722**	-	**415 E**	-	20.2	3.67	999	2.01	-	885
IW01	IW010509001402	5/9/00 2:02 PM	-	15 U	15 U	15 U	15 U	15 U	15 U	15 U	**2.4**	**1.62**	-	**335**	5.01	20.6	3.76	394	2	12.9	-
IW01	IW010619001746	6/19/00 5:46 PM	-	15 U	15 U	15 U	15 U	15 U	15 U	15 U	**3.1**	**2.55**	-	**255**	5.09	21.2	3.88	121	1.83	11.83	936
IW01	IW010719001648	7/19/00 4:48 PM	-	15 U	15 U	15 U	15 U	15 U	15 U	15 U	**0.85**	**3.99**	-	**198**	5.25	21.6	4.04	36	1.75	9.77	913
IW01	IW010809001712	8/9/00 5:12 PM	-	15 U	15 U	15 U	15 U	15 U	15 U	15 U	**2.2** J	**3.46**	-	**187**	4.79	22	3.72	-	1.69	10.5	-
IW02	IW021118991835	11/18/99 6:35 PM	-	2000 U	2000 U	2000 U	2000 U	2000 U	**44000**	2000 U	0.1 U	2.3 U	**2**	**0.3**	-	21.7	6.59	68	1.67	1.5	-
IW02	IW021220991400	12/20/99 2:00 PM	-	30 U	30 U	30 U	30 U	30 U	30 U	30 U	-	-	-	**53**	5.19	17.3	4.26	4	0.95	5.87	899
IW02	IW020208001530	2/8/00 3:30 PM	-	15 U	15 U	15 U	15 U	15 U	15 U	15 U	**0.39**	-	-	**113**	5.6	12.9	4.07	27	0.7	7.6	912
IW02	IW020309001350	3/9/00 1:50 PM	-	15 U	15 U	15 U	15 U	15 U	15 U	15 U	**1.3**	**1.05**	-	**47.3**	5.3	18.1	3.79	10	0.718	5.73	867
IW02	IW020412001530	4/12/00 3:30 PM	-	15 U	15 U	15 U	15 U	15 U	15 U	15 U	**1.8**	**1.58**	-	**36 E**	-	19	3.87	51	0.628	-	889.9
IW02	IW020509001717	5/9/00 5:17 PM	-	15 U	15 U	15 U	15 U	15 U	15 U	15 U	**0.92**	**1.79**	-	**30.5**	5.17	20.2	4.45	8	0.64	7.18	-
IW02	IW020619001723	6/19/00 5:23 PM	-	15 U	15 U	15 U	15 U	15 U	15 U	15 U	**2.5**	**3.44**	-	**12.9**	5.06	20.8	4.4	1	0.66	5.36	778
IW02	IW020719001436	7/19/00 2:36 PM	-	15 U	15 U	15 U	15 U	15 U	15 U	15 U	**0.65**	**2.01**	-	**9.51**	5.25	21.4	4.48	0	0.607	5.65	832.5
IW02	IW020809001710	8/9/00 5:10 PM	-	15 U	15 U	15 U	15 U	15 U	15 U	15 U	**3.4 J**	**3.13**	-	**4.75**	4.78	21.3	4.45	5	0.619	5.6	615.1
IW03	IW031118991805	11/18/99 6:05 PM	-	20000 U	20000 U	20000 U	20000 U	20000 U	**350000**	20000 U	0.1 U	2.3 U	0.1 U	**0.5**	-	21.4	6.4	10	3.57	1.08	-
IW03	IW031220991410	12/20/99 2:10 PM	-	30 U	30 U	30 U	30 U	30 U	30 U	30 U	-	-	-	**15**	5.04	18.3	4.86	13	0.619	6.38	855.6
IW03	IW030208001725	2/8/00 5:25 PM	-	15 U	15 U	15 U	15 U	15 U	15 U	15 U	**0.48**	-	-	**74**	5.59	13.2	3.96	62	0.552	7.64	958.4
IW03	IW030309001510	3/9/00 3:10 PM	-	15 U	15 U	15 U	15 U	15 U	15 U	15 U	**1.4**	**1.52**	-	**7.35**	5.17	19.4	3.93	10	0.567	4.8	867.4
IW03	IW030412001725	4/12/00 5:25 PM	-	30 U	30 U	30 U	30 U	30 U	**960**	30 U	**3.8**	**2.39**	-	**9.55 E**	-	21.4	4.69	47	0.426	-	768
IW03	IW030509001757	5/9/00 5:57 PM	-	150 U	150 U	150 U	150 U	150 U	**3900**	150 U	**2.9**	**2.34**	-	**4.53**	4.5	21.3	4.77	324	0.452	6.04	-
IW03	IW030620001410	6/20/00 2:10 PM	-	300 U	300 U	300 U	300 U	300 U	**31000 D**	300 U	**3.4**	**2.9**	-	**2.62**	-	21.6	5.15	450	0.709	3.08	581
IW03	IW030719001605	7/19/00 4:05 PM	-	15 U	15 U	15 U	15 U	15 U	**52000**	**24**	**4.8**	**3.58**	-	**3.55**	-	21.7	4.9	0	0.991	2.45	610.6
IW03	IW030809001555	8/9/00 3:55 PM	-	300 U	300 U	300 U	300 U	300 U	**66000**	300 U	**3** J	**2.79**	-	**3.54**	-	21.7	4.91	30	0.942	2.77	116.2
IW04	IW041118991720	11/18/99 5:20 PM	-	10000 U	10000 U	10000 U	10000 U	10000 U	**150000**	10000 U	0.1 U	2.3 U	**0.4**	**0.4**	-	20	6.41	10	2.63	1.2	-
IW04	IW041220991445	12/20/99 2:45 PM	-	3000 U	3000 U	3000 U	3000 U	3000 U	**26000**	3000 U	-	-	-	0.1 U	5.12	17.4	6.72	2	0.292	6.6	653.1
IW04	IW040208001720	2/8/00 5:20 PM	-	15 U	15 U	15 U	15 U	15 U	**770**	15 U	**0.081**	-	-	**0.101**	5.56	14.2	6.83	14	0.19	9.3	665
IW04	IW040309001628	3/9/00 4:28 PM	-	30 U	30 U	30 U	30 U	30 U	**660**	30 U	**0.023**	**0.0256**	-	**0.208**	5.26	20.3	7.2	-	0.2	6.5	405
IW04	IW040510001400	5/10/00 2:00 PM	-	300 U	300 U	300 U	300 U	300 U	**130000 D**	300 U	**0.028**	**0.0381**	-	**1.19**	4.5	20.5	6.22	1	2.07	1.31	260
IW04	IW040619001407	6/19/00 2:07 PM	-	300 U	300 U	300 U	300 U	300 U	**160000 D**	**52 J**	**0.01**	**0.0202 M**	-	**1.48**	-	21.6	6.35	3	2.37	1.23	153
IW04	IW040719001520	7/19/00 3:20 PM	-	15 U	15 U	15 U	**24**	15 U	**220000**	**80**	**0.024**	**0.0185**	-	**1.37**	5.17	22	6.61	0	2.12	5.76	7.3
IW04	IW040809001417	8/9/00 2:17 PM	-	300 U	300 U	300 U	300 U	300 U	**190000**	300 U	**0.014** J	**0.0118**	-	**1.73**	-	22.1	6.21	10	2.34	0.84	31.5
IW05	IW051118991455	11/18/99 2:55 PM	-	2000 U	2000 U	2000 U	2000 U	2000 U	**95000**	2000 U	**200**	**320**	0.1 U	-	-	17	6.47	10	5.34	1.7	-
IW05	IW051221991330	12/21/99 1:30 PM	-	-	-	-	-	-	-	-	**130**	**110**	0.1 U	-	4.26	16	6.5	1000	3.86	1	307
IW05	IW050209001410	2/9/00 2:10 PM	-	-	-	-	-	-	-	-	**0.25 J**	**0.321**	1 U	-	4.7	11	6.52	315	0.201	9.84	389
IW05	IW050310001355	3/10/00 1:55 PM	-	-	-	-	-	-	-	-	**0.68**	**0.586**	1 U	-	4.52	14.7	7	34	0.2	5.6	374
IW05	IW050413001347	4/13/00 1:47 PM	-	-	-	-	-	-	-	-	**0.069**	**0.907**	0.5 U	-	-	15.4	5.99	175	0.32	0	398
IW05	IW050510001714	5/10/00 5:14 PM	-	-	-	-	-	-	-	-	**5.7**	**4.13**	0.5 U	-	4.9	14.9	6.24	14	0.66	4.69	313
IW05	IW050620001732	6/20/00 5:32 PM	-	-	-	-	-	-	-	-	**6.4**	**4.98**	0.5 U	**0.185**	4.35	21	6.82	137	0.427	4.2	321
IW05	IW050720001400	7/20/00 2:00 PM	-	-	-	-	-	-	-	-	**17**	**18.2**	0.5 U	-	4.38	21.3	6.63	5	0.97	4.41	351
IW05	IW050808001635	8/8/00 4:35 PM	-	-	-	-	-	-	-	-	**14**	**12.7**	0.5 U	-	-	21.5	6.44	16	1.27	3.52	252.9
IW06	IW061118991500	11/18/99 3:00 PM	-	2000 U	2000 U	2000 U	2000 U	2000 U	**84000**	2000 U	**200**	**200**	0.1 U	-	-	16.7	6.7	0	5	0.73	-
IW06	IW061221991355	12/21/99 1:55 PM	-	-	-	-	-	-	-	-	0.1 U	2.3 U	**8.2**	-	4.36	15.9	3.68	68	4.43	0.1	150
IW06	IW060209001525	2/9/00 3:25 PM	-	-	-	-	-	-	-	-	0.005 UJ	**0.042**	1 U	-	4.74	10.7	3.81	507	0.566	8.83	322
IW06	IW060310001450	3/10/00 2:50 PM	-	-	-	-	-	-	-	-	**0.011**	**0.0583**	**50**	-	4.54	14.8	3.6	22	1.8	3.1	293
IW06	IW060413001445	4/13/00 2:45 PM	-	-	-	-	-	-	-	-	**0.023**	**0.033**	**68**	-	-	15.3	3.36	0	1.61	-	304.2
IW06	IW060510001504	5/10/00 3:04 PM	-	-	-	-	-	-	-	-	**0.008**	**0.0422**	**26**	-	-	15.2	3.6	5	1.66	2.51	491
IW06	IW060620001620	6/20/00 4:20 PM	-	-	-	-	-	-	-	-	**0.005 U**	**0.038**	**38**	**26.3**	4.25	21.1	3.56	153	1.58	3.62	292
IW06	IW060720001725	7/20/00 5:25 PM	-	-	-	-	-	-	-	-	**0.014**	**0.0178**	**26**	-	4.41	19.1	3.78	0	1.65	7.94	278.1

Table 4-1
Pilot Test Analytical Results
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Stratford Army Engine Plant

LOCATION	SAMPLE ID:	DATE&TIME SAMPLED	DATE&TIME VOCs ANALYZED	VC µg/L	1,1-DCE µg/L	t1,2-DCE µg/L	c1,2-DCE µg/L	1,1,1-TCA µg/L	TCE µg/L	PCE µg/L	Cr(VI) mg/L	Cr(total) mg/L	Fe(II) mg/L	Mn(total) mg/L	DEPTH TO WATER ft. TOR	TEMP. °C	pH	TURB. NTU	COND. mS/cm	D.O. mg/L	ORP mV
IW06	IW060808001504	8/8/00 3:04 PM	-	-	-	-	-	-	-	-	**0.005 U**	**0.0303**	**34**	-	4.39	20	3.72	56	1.6	3.33	324
IW07	IW071118991600	11/18/99 4:00 PM	-	2000 U	2000 U	2000 U	2000 U	2000 U	**73000**	2000 U	**300**	**380**	0.1 U	**0.829**	-	15.2	6.47	10	4.63	1.28	-
IW07	IW071221991440	12/21/99 2:40 PM	-	-	-	-	-	-	-	-	**100**	**197**	0.1 U	-	4.07	16.5	3.39	1000	4.29	0.1	412
IW07	IW070209001556	2/9/00 3:56 PM	-	-	-	-	-	-	-	-	0.005 UJ	**0.114**	1 U	-	4.49	10.6	5.63	7	0.576	8.74	294.3
IW07	IW070310001345	3/10/00 1:45 PM	-	-	-	-	-	-	-	-	**0.012**	**0.627**	**51**	-	4.33	15	3.26	132	1.94	2.16	282.5
IW07	IW070413001350	4/13/00 1:50 PM	-	-	-	-	-	-	-	-	**0.076**	**0.192**	**42**	-	-	15.4	3.43	37	1.66	-	289.5
IW07	IW070510001353	5/10/00 1:53 PM	-	-	-	-	-	-	-	-	**0.055**	**0.236**	**25**	-	-	15.3	3.65	29	1.55	4	522
IW07	IW070620001455	6/20/00 2:55 PM	-	-	-	-	-	-	-	-	**0.041**	**0.142**	**36**	**33.4**	4.01	19.2	3.83	70	1.29	3.01	295
IW07	IW070720001405	7/20/00 2:05 PM	-	-	-	-	-	-	-	-	**0.041**	**0.176**	**33**	-	4.2	19.9	4	98	1.28	8.38	300.7
IW07	IW070808001340	8/8/00 1:40 PM	-	-	-	-	-	-	-	-	**0.034**	**0.199**	**1.1**	-	4.15	20.3	3.91	113	1.3	1.74	267.2
IW08	IW081118991630	11/18/99 4:30 PM	-	2000 U	2000 U	2000 U	2000 U	2000 U	**94000**	2000 U	**350**	**330**	0.1 U	-	-	16.5	5.98	10	4.35	1.51	-
IW08	IW081221991325	12/21/99 1:25 PM	-	-	-	-	-	-	-	-	0.1 U	-	**8.2**	-	4.74	15.3	3.22	10	4.04	0.32	330.9
IW08	IW080209001540	2/9/00 3:40 PM	-	-	-	-	-	-	-	-	0.005 UJ	**0.803**	1 U	-	5.17	10.2	3.32	15	2.36	7.74	338.8
IW08	IW080310001543	3/10/00 3:43 PM	-	-	-	-	-	-	-	-	**0.022**	**3.64**	**49**	-	4.94	14	3.06	4	2.35	2.53	330.3
IW08	IW080413001607	4/13/00 4:07 PM	-	-	-	-	-	-	-	-	**0.073**	**4.4**	**250**	-	-	15	3.23	7	2.56	1.73	449.8
IW08	IW080510001600	5/10/00 4:00 PM	-	-	-	-	-	-	-	-	**0.013**	**5.51**	**30**	-	4.57	14.7	3.3	2	2.59	2.01	319
IW08	IW080620001601	6/20/00 4:01 PM	-	-	-	-	-	-	-	-	**0.011**	**5.08**	**39**	**44.4**	4.6	17.5	3.76	0	2.21	1.19	431
IW08	IW080720001507	7/20/00 3:07 PM	-	-	-	-	-	-	-	-	**0.013**	**5.36**	**32**	-	4.77	19	3.54	7	2.22	2.26	317
IW08	IW080808001525	8/8/00 3:25 PM	-	-	-	-	-	-	-	-	**0.013**	**5.21**	**30**	-	4.76	19.7	3.34	4	2.23	0.98	293.8
PZ04	PZ041118991850	11/18/99 6:50 PM	-	2000 U	2000 U	2000 U	2000 U	2000 U	**23000**	2000 U	0.1 U	2.3 U	**1.4**	**0.2**	-	21.7	6.43	82	1.53	0.44	-
PZ04	PZ041130991645	11/30/99 4:45 PM	-	2000 U	2000 U	2000 U	2000 U	2000 U	**37000**	2000 U	-	-	-	0.1 U	5.31	21.6	6.23	110	1.66	1.09	-
PZ04	PZ041130991645D	11/30/99 4:45 PM	-	2000 U	2000 U	2000 U	2000 U	2000 U	**39000**	2000 U	-	-	-	0.1 U	-	-	-	-	-	-	-
PZ04	PZ041201991230	12/1/99 12:30 PM	-	2000 U	2000 U	2000 U	2000 U	2000 U	**41000**	2000 U	-	-	-	**0.4**	5.25	21.2	6.26	62	2.69	2.33	105.2
PZ04	PZ041201991330	12/1/99 1:30 PM	-	2000 U	2000 U	2000 U	2000 U	2000 U	**45000**	2000 U	-	-	-	**0.2**	5.25	21.5	6.35	40	1.39	3.52	112.2
PZ04	PZ041201991430	12/1/99 2:30 PM	-	2000 U	2000 U	2000 U	2000 U	2000 U	**62000**	2000 U	-	-	-	**0.1**	5.25	21.4	6.29	17	1.59	2.54	89.2
PZ04	PZ041201991530	12/1/99 3:30 PM	-	2000 U	2000 U	2000 U	2000 U	2000 U	**74000**	2000 U	-	-	-	0.1 U	5.26	21.6	6.28	52	1.68	3.1	104.1
PZ04	PZ041201991630	12/1/99 4:30 PM	-	2000 U	2000 U	2000 U	2000 U	2000 U	**30000**	2000 U	-	-	-	0.1 U	5.25	21.4	6.36	48	2.64	3.25	44.9
PZ04	PZ041201991730	12/1/99 5:30 PM	-	2000 U	2000 U	2000 U	2000 U	2000 U	**55000**	2000 U	-	-	-	**0.3**	5.25	21.4	6.61	44	2.54	3.04	64.1
PZ04	PZ041201991830	12/1/99 6:30 PM	-	2000 U	2000 U	2000 U	2000 U	2000 U	**51000**	2000 U	-	-	-	0.1 U	-	21.1	6.24	7	1.65	1.94	-
PZ04	PZ041201991930	12/1/99 7:30 PM	-	2000 U	2000 U	2000 U	2000 U	2000 U	**51000**	2000 U	-	-	-	0.1 U	-	20.9	6.2	2	1.6	1.9	-
PZ04	PZ041201991930D	12/1/99 7:30 PM	-	2000 U	2000 U	2000 U	2000 U	2000 U	**51000**	2000 U	-	-	-	0.1 U	-	-	-	-	-	-	-
PZ04	PZ041201992030	12/1/99 8:30 PM	-	2000 U	2000 U	2000 U	2000 U	2000 U	**24000**	2000 U	-	-	-	**0.35**	-	21.4	6.2	1	1.6	2.4	-
PZ04	PZ041202991630	12/2/99 4:30 PM	-	2000 U	2000 U	2000 U	2000 U	2000 U	**77000 J**	2000 U	-	-	-	0.1 U	5.25	21.3	6.2	31	1.6	3.1	53
PZ04	PZ041203991630	12/3/99 4:30 PM	-	2000 U	2000 U	2000 U	2000 U	2000 U	**64000 J**	2000 U	-	-	-	0.1 U	5.25	20.6	6.48	7	0.76	4.8	478
PZ04	PZ041204991630	12/4/99 4:30 PM	-	2000 U	2000 U	2000 U	2000 U	2000 U	**84000 J**	2000 U	**7.5**	-	-	0.1 U	5.27	20.1	6.6	11	1.6	5.1	399
PZ04	PZ041205991630	12/5/99 4:30 PM	-	5000 U	5000 U	5000 U	5000 U	5000 U	**85000**	5000 U	-	-	-	0.1 U	5.29	19.5	6.52	14	1.32	5.3	466
PZ04	PZ041206991630	12/6/99 4:30 PM	-	10000 U	10000 U	10000 U	10000 U	10000 U	**190000**	10000 U	-	-	-	0.1 U	5.23	19.3	6.38	15	1.62	5.04	611
PZ04	PZ041207991630	12/7/99 4:30 PM	-	10000 U	10000 U	10000 U	10000 U	10000 U	**99000**	10000 U	-	-	-	0.1 U	5.27	18.4	6.29	30	1.34	5.6	-
PZ04	PZ041208991630	12/8/99 4:30 PM	-	100 U	100 U	100 U	100 U	100 U	100 U	100 U	-	-	-	**0.1**	5.3	18	6.03	60	0.615	6.3	-
PZ04	PZ041209991630	12/9/99 4:30 PM	-	100 U	100 U	100 U	100 U	100 U	**1200**	100 U	-	-	-	0.1 U	5.27	18.6	6.11	86	2.4	5.65	669.7
PZ04	PZ041210991630	12/10/99 4:30 PM	-	100 U	100 U	100 U	100 U	100 U	100 U	100 U	-	-	-	**15**	5.22	18	5.71	205	1.51	6.91	696.4
PZ04	PZ041220991330	12/20/99 1:30 PM	-	3 U	3 U	3 U	3 U	3 U	3 U	3 U	-	-	-	3.8	5.16	19.2	5.99	4	0.584	5.59	701.4
PZ04	PZ040119000745	1/19/00 7:45 AM	-	5000 U	5000 U	5000 U	5000 U	5000 U	**26000**	5000 U	-	-	-	0.1 U	5.44	19.8	6.23	-	1.2	-	-
PZ04	PZ040119000745D	1/19/00 7:45 AM	-	5000 U	5000 U	5000 U	5000 U	5000 U	**27000**	5000 U	-	-	-	0.1 U	5.44	19.8	6.23	-	1.2	-	-
PZ04	PZ040120000810	1/20/00 8:10 AM	-	50000 U	50000 U	50000 U	50000 U	50000 U	**140000**	50000 U	-	-	-	**0.1**	5.45	20.4	6.41	-	2.64	-	109
PZ04	PZ040121000800	1/21/00 8:00 AM	-	50000 U	50000 U	50000 U	50000 U	50000 U	**110000**	50000 U	-	-	-	0.1 U	5.41	20	6.41	-	0.54	-	605
PZ04	PZ040122000800	1/22/00 8:00 AM	-	5000 U	5000 U	5000 U	5000 U	5000 U	**32000**	5000 U	-	-	-	**5**	5.51	19.2	4.14	-	2.29	-	644
PZ04	PZ040123000800	1/23/00 8:00 AM	-	50000 U	50000 U	50000 U	50000 U	50000 U	**320000**	50000 U	-	-	-	0.1 U	5.5	18.4	6.3	-	4.01	-	607
PZ04	PZ040124000800	1/24/00 8:00 AM	1/24/00 10:56 AM	50000 U	50000 U	50000 U	50000 U	50000 U	**220000**	50000 U	-	-	-	**0.1**	5.5	17.3	6.24	-	3.3	-	609
PZ04	PZ040125000800	1/25/00 8:00 AM	1/25/00 11:02 AM	50000 U	50000 U	50000 U	50000 U	50000 U	**61000**	50000 U	-	-	-	0.1 U	5.41	15.7	6.39	-	2.01	-	-
PZ04	PZ040126000800	1/26/00 8:00 AM	1/26/00 2:27 PM	10000 U	10000 U	10000 U	10000 U	10000 U	**26000**	10000 U	-	-	-	**0.2**	5.4	15	6.09	-	2.08	-	-
PZ04	PZ040127000800	1/27/00 8:00 AM	1/27/00 3:40 PM	200 U	200 U	200 U	200 U	200 U	**340**	200 U	-	-	-	**7**	5.46	13.8	5.5	-	1.89	-	-
PZ04	PZ040128000800	1/28/00 8:00 AM	1/28/00 1:31 PM	200 U	200 U	200 U	200 U	200 U	**400**	200 U	-	-	-	**7**	5.53	13.4	5.53	-	1.87	-	-
PZ04	PZ040129000800	1/29/00 8:00 AM	1/29/00 11:45 AM	100 U	100 U	100 U	100 U	100 U	100 U	100 U	-	-	-	**28**	5.5	13.3	3.1	-	1.17	-	-
PZ04	PZ040130000800	1/30/00 8:00 AM	1/30/00 11:10 AM	100 U	100 U	100 U	100 U	100 U	100 U	100 U	-	-	-	**38**	5.03	12.7	3.88	-	0.901	-	-
PZ04	PZ040131000800	1/31/00 8:00 AM	1/31/00 1:23 PM	100 U	100 U	100 U	100 U	100 U	100 U	100 U	-	-	-	**28**	5.43	12.5	4.26	-	0.98	-	-
PZ04	PZ040201000800	2/1/00 8:00 AM	2/1/00 11:07 AM	100 U	100 U	100 U	100 U	100 U	100 U	100 U	-	-	-	**45**	5.49	12.8	4.63	-	0.917	-	806
PZ04	PZ040208001620	2/8/00 4:20 PM	-	15 U	15 U	15 U	15 U	15 U	15 U	15 U	**5**	-	-	**198**	5.64	15.6	5.95	5	0.777	8.78	797.6
PZ04	PZ040309001410	3/9/00 2:10 PM	-	15 U	15 U	15 U	15 U	15 U	15 U	15 U	**8.5**	**13.1**	-	**56.4**	5.28	18.7	5.9	10	0.831	7.14	727.2
PZ04	PZ040309001410D	3/9/00 2:10 PM	-	15 U	15 U	15 U	15 U	15 U	15 U	15 U	**10**	**13**	-	**52.7**	5.28	18.7	5.9	10	0.831	7.14	727.2

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Stratford Army Engine Plant

LOCATION	SAMPLE ID:	DATE&TIME SAMPLED	DATE&TIME VOCs ANALYZED	VC µg/L	1,1-DCE µg/L	t1,2-DCE µg/L	c1,2-DCE µg/L	1,1,1-TCA µg/L	TCE µg/L	PCE µg/L	Cr(VI) mg/L	Cr(total) mg/L	Fe(II) mg/L	Mn(total) mg/L	DEPTH TO WATER ft. TOR	TEMP. °C	pH	TURB. NTU	COND. mS/cm	D.O. mg/L	ORP mV
PZ04	PZ040412001600	4/12/00 4:00 PM	-	150 U	150 U	150 U	150 U	150 U	**3600**	150 U	**23**	**20.9**	-	**5.66 E**	-	19.4	5.71	4	0.9	-	713.1
PZ04	PZ040509001642	5/9/00 4:42 PM	-	300 U	300 U	300 U	300 U	300 U	**14000**	300 U	**25**	**22.7**	-	**0.0244**	4.99	20.3	6.34	2	1.06	4.65	-
PZ04	PZ040619001629	6/19/00 4:29 PM	-	300 U	300 U	300 U	300 U	300 U	**15000**	300 U	**6.2**	**5.05**	-	**2.34**	5.03	21	6.73	2	1.21	3.49	565
PZ04	PZ040719001358	7/19/00 1:58 PM	-	300 U	300 U	300 U	300 U	300 U	**25000**	300 U	**2.8**	**2.45**	-	**0.252**	5.2	21.9	6.45	0	1.46	4.59	460
PZ04	PZ040809001755	8/9/00 5:55 PM	-	300 U	300 U	300 U	300 U	300 U	**8000**	300 U	**3.2** J	**3.01**	-	**23.2**	4.74	21.9	6.54	675	1.45	4.88	498.8
PZ05	PZ051118991820	11/18/99 6:20 PM	-	2000 U	2000 U	2000 U	2000 U	2000 U	**74000**	2000 U	0.1 U	2.3 U	**1**	**0.4**	-	21.3	6.51	20	2.78	0.57	-
PZ05	PZ051130991700	11/30/99 5:00 PM	-	2000 U	2000 U	2000 U	2000 U	2000 U	**91000**	2000 U	-	-	-	**0.3**	5.2	21.5	6.77	328	4.44	0.87	-
PZ05	PZ051201991630	12/1/99 4:30 PM	-	5000 U	5000 U	5000 U	5000 U	5000 U	**170000**	5000 U	-	-	-	**0.3**	5.15	21.3	6.66	91	4.7	1.41	150
PZ05	PZ051202991230	12/2/99 12:30 PM	-	5000 U	5000 U	5000 U	5000 U	5000 U	**200000**	5000 U	-	-	-	**0.4**	-	20.7	6.63	47	4.94	1.6	50
PZ05	PZ051202991330	12/2/99 1:30 PM	-	5000 U	5000 U	5000 U	5000 U	5000 U	**190000**	5000 U	-	-	-	**0.3**	-	20.4	6.56	30	3.54	2.63	107
PZ05	PZ051202991430	12/2/99 2:30 PM	-	5000 U	5000 U	5000 U	5000 U	5000 U	**160000**	5000 U	-	-	-	0.1 U	-	20.7	6.7	3	3.62	3.44	17
PZ05	PZ051202991430D	12/2/99 2:30 PM	-	5000 U	5000 U	5000 U	5000 U	5000 U	**160000**	5000 U	-	-	-	0.1 U	-	-	-	-	-	-	-
PZ05	PZ051202991530	12/2/99 3:30 PM	-	5000 U	5000 U	5000 U	5000 U	5000 U	**200000 J**	5000 U	-	-	-	**0.3**	-	21.2	6.67	2	3.79	3.33	60
PZ05	PZ051202991630	12/2/99 4:30 PM	-	5000 U	5000 U	5000 U	5000 U	5000 U	**180000 J**	5000 U	-	-	-	**0.3**	-	21.4	6.6	1	3.6	4.1	36
PZ05	PZ051202991730	12/2/99 5:30 PM	-	5000 U	5000 U	5000 U	5000 U	5000 U	**210000 J**	5000 U	-	-	-	**0.4**	-	21.4	6.8	0	4.4	3.5	10
PZ05	PZ051202991830	12/2/99 6:30 PM	-	5000 U	5000 U	5000 U	5000 U	5000 U	**210000 J**	5000 U	-	-	-	**0.4**	-	21.4	6.7	0	4.3	3	5
PZ05	PZ051202991930	12/2/99 7:30 PM	-	-	-	-	-	-	-	-	-	-	-	0.1 U	-	20.7	6.8	1	4.7	4.3	75
PZ05	PZ051202992030	12/2/99 8:30 PM	-	5000 U	5000 U	5000 U	5000 U	5000 U	**210000 J**	5000 U	-	-	-	**0.4**	-	21.2	6.7	0	4.9	3.3	69
PZ05	PZ051203991630	12/3/99 4:30 PM	-	5000 U	5000 U	5000 U	5000 U	5000 U	**200000 J**	5000 U	-	-	-	0.1 U	5.17	21.2	6.7	3	5.6	1.8	75
PZ05	PZ051204991630	12/4/99 4:30 PM	-	20000 U	20000 U	20000 U	20000 U	20000 U	**180000**	20000 U	-	-	-	**0.3**	5.18	20.3	6.72	19	2.96	3.81	232
PZ05	PZ051205991630	12/5/99 4:30 PM	-	20000 U	20000 U	20000 U	20000 U	20000 U	**170000**	20000 U	-	-	-	0.1 U	5.18	20.5	6.68	16	5.11	2.73	115
PZ05	PZ051206991630	12/6/99 4:30 PM	-	20000 U	20000 U	20000 U	20000 U	20000 U	**200000**	20000 U	-	-	-	0.1 U	5.17	19.5	6.51	13	2.8	3.87	585
PZ05	PZ051207991630	12/7/99 4:30 PM	-	20000 U	20000 U	20000 U	20000 U	20000 U	**150000**	20000 U	-	-	-	0.1 U	5.17	19.1	6.49	25	2.69	4.47	-
PZ05	PZ051208991630	12/8/99 4:30 PM	-	10000 U	10000 U	10000 U	10000 U	10000 U	**76000**	10000 U	-	-	-	0.1 U	5.21	18.6	6.47	50	1.89	5.1	-
PZ05	PZ051209991630	12/9/99 4:30 PM	-	10000 U	10000 U	10000 U	10000 U	10000 U	**68000 J**	10000 U	-	-	-	0.1 U	5.18	18.2	6.44	27	2.16	4.56	636.5
PZ05	PZ051210991630	12/10/99 4:30 PM	-	5000 U	5000 U	5000 U	5000 U	5000 U	**65000**	5000 U	-	-	-	0.1 U	5.12	17.9	6.38	16	1.86	5.51	641.5
PZ05	PZ051210991630D	12/10/99 4:30 PM	-	5000 U	5000 U	5000 U	5000 U	5000 U	**64000**	5000 U	-	-	-	-	-	-	-	-	-	-	-
PZ05	PZ051220991420	12/20/99 2:20 PM	-	150 U	150 U	150 U	150 U	150 U	**8100**	150 U	-	**17.8**	-	**1.81 J**	5.08	19	6.21	6	0.553	6.14	722
PZ05	PZ050119000845	1/19/00 8:45 AM	-	-	-	-	-	-	-	-	-	-	-	0.1 U	5.33	20.2	6.4	-	1.47	3.15	-
PZ05	PZ050120000815	1/20/00 8:15 AM	-	50000 U	50000 U	50000 U	50000 U	50000 U	**120000**	50000 U	-	-	-	0.1 U	5.36	20.4	6.3	-	3.74	-	124
PZ05	PZ050121000800	1/21/00 8:00 AM	-	100 U	100 U	100 U	100 U	100 U	100 U	100 U	-	-	-	**38**	5.31	19.8	5.88	-	1.78	-	705
PZ05	PZ050121000800D	1/21/00 8:00 AM	-	100 U	100 U	100 U	100 U	100 U	100 U	100 U	-	-	-	**40**	5.31	19.8	5.88	-	1.78	-	705
PZ05	PZ050122000800	1/22/00 8:00 AM	-	100 U	100 U	100 U	100 U	100 U	100 U	100 U	-	-	-	**15**	5.4	18.5	5.83	-	2.03	-	700
PZ05	PZ050123000800	1/23/00 8:00 AM	-	50000 U	50000 U	50000 U	50000 U	50000 U	**64000**	50000 U	-	-	-	**2**	5.4	17.5	5.99	-	2.49	-	669
PZ05	PZ050124000800	1/24/00 8:00 AM	1/24/00 12:45 PM	10000 U	10000 U	10000 U	10000 U	10000 U	**48000**	10000 U	-	-	-	**1.5**	5.39	16.6	6.1	-	2.48	-	661
PZ05	PZ050125000800	1/25/00 8:00 AM	1/25/00 11:57 AM	5000 U	5000 U	5000 U	5000 U	5000 U	**12000**	5000 U	-	-	-	**2**	5.33	15.9	6.19	-	2.1	-	-
PZ05	PZ050126000800	1/26/00 8:00 AM	1/26/00 3:41 PM	100 U	100 U	100 U	100 U	100 U	100 U	100 U	-	-	-	**10**	5.33	15.4	6.08	-	1.72	-	-
PZ05	PZ050127000800	1/27/00 8:00 AM	1/27/00 12:19 PM	100 U	100 U	100 U	100 U	100 U	100 U	100 U	-	-	-	**10**	5.38	14.4	5.42	-	1.64	-	-
PZ05	PZ050128000800	1/28/00 8:00 AM	1/28/00 1:12 PM	100 U	100 U	100 U	100 U	100 U	100 U	100 U	-	-	-	**10**	5.4	14.1	5.56	-	1.26	-	-
PZ05	PZ050129000800	1/29/00 8:00 AM	1/29/00 12:25 PM	100 U	100 U	100 U	100 U	100 U	100 U	100 U	-	-	-	**15**	5.43	13.9	5.69	-	1.12	-	-
PZ05	PZ050130000800	1/30/00 8:00 AM	1/30/00 12:25 PM	100 U	100 U	100 U	100 U	100 U	100 U	100 U	-	-	-	**23**	5.61	13.3	5.08	-	0.886	-	-
PZ05	PZ050130000800D	1/30/00 8:00 AM	1/30/00 12:44 PM	100 U	100 U	100 U	100 U	100 U	100 U	100 U	-	-	-	**23**	5.61	13.3	5.08	-	0.886	-	-
PZ05	PZ050131000800	1/31/00 8:00 AM	1/31/00 1:05 PM	100 U	100 U	100 U	100 U	100 U	100 U	100 U	-	-	-	**20**	5.32	13.1	5.04	-	1.09	-	-
PZ05	PZ050201000800	2/1/00 8:00 AM	2/1/00 1:47 PM	100 U	100 U	100 U	100 U	100 U	100 U	100 U	-	-	-	**23**	5.41	13	5.43	-	1.09	-	703
PZ05	PZ050208001700	2/8/00 5:00 PM	-	15 U	15 U	15 U	15 U	15 U	15 U	15 U	**10**	-	-	**93.6**	5.55	15.4	6.12	12	0.633	8.75	791.9
PZ05	PZ050208001700D	2/8/00 5:00 PM	-	15 U	15 U	15 U	15 U	15 U	15 U	15 U	**9.5**	-	-	**95.5**	5.55	15.4	6.12	12	0.633	8.75	791.9
PZ05	PZ050309001445	3/9/00 2:45 PM	-	15 U	15 U	15 U	15 U	15 U	15 U	15 U	**19**	**20.2**	-	**23.3**	5.21	18.7	5.99	10	0.681	7.11	724
PZ05	PZ050412001750	4/12/00 5:50 PM	-	300 U	300 U	300 U	300 U	300 U	**11000**	300 U	**20**	**18.6**	-	**0.0855 E**	-	19.4	5.66	3	0.94	-	620.6
PZ05	PZ050509001438	5/9/00 2:38 PM	-	300 U	300 U	300 U	300 U	300 U	**18000**	300 U	**8.8**	**7.24**	-	**1.27**	4.9	20.3	6.02	0	1.05	8.7	-
PZ05	PZ050619001414	6/19/00 2:14 PM	-	300 U	300 U	300 U	300 U	300 U	**85000 D**	300 U	**31**	**36.5**	-	**7**	4.95	21	6.3	2	1.26	4.35	656
PZ05	PZ050719001520	7/19/00 3:20 PM	-	15 U	15 U	15 U	**28**	15 UJ	**150000**	**52**	**28**	**22.4**	-	**0.0519**	5.1	21.3	6.16	0	1.52	2.54	587.7
PZ05	PZ050809001625	8/9/00 4:25 PM	-	300 U	300 U	300 U	300 U	300 U	**140000**	300 U	**20** J	**18.9**	-	**0.057**	4.65	21.6	6.18	1	1.78	2.54	124.2
PZ06	PZ061118991754	11/18/99 5:54 PM	-	10000 U	10000 U	10000 U	10000 U	10000 U	**110000**	10000 U	0.1 U	2.3 U	**1.2**	**0.5**	-	21.4	6.5	10	2.82	0.94	-
PZ06	PZ061130991720	11/30/99 5:20 PM	-	10000 U	10000 U	10000 U	10000 U	10000 U	**100000**	10000 U	-	-	-	0.1 U	5.36	21.4	6.83	62	5.62	0.95	-
PZ06	PZ061201991230	12/1/99 12:30 PM	-	2000 U	2000 U	2000 U	2000 U	2000 U	**93000**	2000 U	-	-	-	0.1 U	5.31	21.5	6.63	68	3.2	2.73	23.8
PZ06	PZ061201991230D	12/1/99 12:30 PM	-	2000 U	2000 U	2000 U	2000 U	2000 U	**94000**	2000 U	-	-	-	0.1 U	-	-	-	-	-	-	-
PZ06	PZ061201991330	12/1/99 1:30 PM	-	2000 U	2000 U	2000 U	2000 U	2000 U	**100000**	2000 U	-	-	-	**0.1**	5.29	21.5	6.63	6	2.47	3.39	36.2
PZ06	PZ061201991430	12/1/99 2:30 PM	-	5000 U	5000 U	5000 U	5000 U	5000 U	**170000**	5000 U	-	-	-	0.1 U	5.3	21.6	6.64	21	2.7	3.23	31.9
PZ06	PZ061201991530	12/1/99 3:30 PM	-	5000 U	5000 U	5000 U	5000 U	5000 U	**160000**	5000 U	-	-	-	0.1 U	5.3	21.6	6.56	6	3.09	3.1	19.1
PZ06	PZ061201991630	12/1/99 4:30 PM	-	5000 U	5000 U	5000 U	5000 U	5000 U	**160000**	5000 U	-	-	-	0.1 U	5.31	21.4	6.81	33	3.03	3.48	23.1

Table 4-1
Pilot Test Analytical Results
Pilot-Scale Treatability Study Report
Stratford Army Engine Plant

LOCATION	SAMPLE ID:	DATE&TIME SAMPLED	DATE&TIME VOCs ANALYZED	VC µg/L	1,1-DCE µg/L	t1,2-DCE µg/L	c1,2-DCE µg/L	1,1,1-TCA µg/L	TCE µg/L	PCE µg/L	Cr(VI) mg/L	Cr(total) mg/L	Fe(II) mg/L	Mn(total) mg/L	DEPTH TO WATER ft. TOR	TEMP. °C	pH	TURB. NTU	COND. mS/cm	D.O. mg/L	ORP mV
PZ06	PZ061201991730	12/1/99 5:30 PM	-	5000 U	5000 U	5000 U	5000 U	5000 U	**150000**	5000 U	-	-	-	0.1 U	5.29	21.5	6.79	18	2.71	3.51	0.4
PZ06	PZ061201991830	12/1/99 6:30 PM	-	5000 U	5000 U	5000 U	5000 U	5000 U	**140000**	5000 U	-	-	-	**0.3**	-	21.3	6.5	5	2.1	3	-
PZ06	PZ061201991930	12/1/99 7:30 PM	-	5000 U	5000 U	5000 U	5000 U	5000 U	**150000**	5000 U	-	-	-	**0.2**	-	21.4	6.5	6	2.5	2.6	-
PZ06	PZ061201992030	12/1/99 8:30 PM	-	5000 U	5000 U	5000 U	5000 U	5000 U	**130000**	5000 U	-	-	-	**0.4**	-	21.5	6.5	6	2.5	2.6	-
PZ06	PZ061202991630	12/2/99 4:30 PM	-	5000 U	5000 U	5000 U	5000 U	5000 U	**180000 J**	5000 U	-	-	-	0.1 U	5.32	20.7	6.8	9	2.1	4.8	5
PZ06	PZ061203991630	12/3/99 4:30 PM	-	5000 U	5000 U	5000 U	5000 U	5000 U	**96000**	5000 U	-	-	-	**0.2**	5.32	19.4	6.9	6	1.33	5.6	150
PZ06	PZ061203991630D	12/3/99 4:30 PM	-	5000 U	5000 U	5000 U	5000 U	5000 U	**95000**	5000 U	-	-	-	0.1 U	-	-	-	-	-	-	-
PZ06	PZ061204991630	12/4/99 4:30 PM	-	10000 U	10000 U	10000 U	10000 U	10000 U	**190000**	10000 U	-	-	-	**0.1**	5.33	19.8	6.7	10	2.6	4.6	135
PZ06	PZ061205991630	12/5/99 4:30 PM	-	20000 U	20000 U	20000 U	20000 U	20000 U	**180000**	20000 U	-	-	-	**0.1**	5.35	19.1	6.76	11	2.12	4.73	127
PZ06	PZ061206991630	12/6/99 4:30 PM	-	20000 U	20000 U	20000 U	20000 U	20000 U	**200000**	20000 U	-	-	-	0.1 U	5.34	19.4	6.6	9	2.96	5.3	335
PZ06	PZ061207991630	12/7/99 4:30 PM	-	20000 U	20000 U	20000 U	20000 U	20000 U	**230000**	20000 U	-	-	-	**0.1**	5.33	16.8	6.6	6	2.52	4.95	-
PZ06	PZ061208991630	12/8/99 4:30 PM	-	10000 U	10000 U	10000 U	10000 U	10000 U	**150000**	10000 U	-	-	-	**0.4**	5.4	18.5	6.58	4	2.33	4.6	-
PZ06	PZ061209991630	12/9/99 4:30 PM	-	10000 U	10000 U	10000 U	10000 U	10000 U	**150000 J**	10000 U	-	-	-	**0.1**	5.36	18.3	6.6	5	2.41	4.29	375
PZ06	PZ061210991630	12/10/99 4:30 PM	-	10000 U	10000 U	10000 U	10000 U	10000 U	**95000**	10000 U	-	-	-	0.1 U	5.3	17.7	6.55	6	1.67	5.34	427
PZ06	PZ061220991450	12/20/99 2:50 PM	-	3000 U	3000 U	3000 U	3000 U	3000 U	**90000**	3000 U	-	-	-	0.1 U	5.24	18.3	6.84	11	0.614	4.7	472
PZ06	PZ060119000852	1/19/00 8:52 AM	-	-	-	-	-	-	-	-	-	-	-	**0.3**	5.51	20.1	6.65	-	2.21	3.64	-
PZ06	PZ060120000825	1/20/00 8:25 AM	-	100000 U	100000 U	100000 U	100000 U	100000 U	**660000**	100000 U	-	-	-	**0.5**	5.5	20.1	6.63	-	2.52	-	96
PZ06	PZ060121000800	1/21/00 8:00 AM	-	100000 U	100000 U	100000 U	100000 U	100000 U	**290000**	100000 U	-	-	-	**0.2**	5.48	17.3	6.93	-	1.18	-	91
PZ06	PZ060122000800	1/22/00 8:00 AM	-	100000 U	100000 U	100000 U	100000 U	100000 U	**200000**	100000 U	-	-	-	0.1 U	5.58	15.8	5.3	-	1.69	-	526
PZ06	PZ060122000800D	1/22/00 8:00 AM	-	100000 U	100000 U	100000 U	100000 U	100000 U	**200000**	100000 U	-	-	-	0.1 U	5.58	15.8	5.3	-	1.69	-	526
PZ06	PZ060123000800	1/23/00 8:00 AM	-	50000 U	50000 U	50000 U	50000 U	50000 U	**290000**	50000 U	-	-	-	**0.5**	5.58	15.4	6.7	-	1.81	-	224
PZ06	PZ060124000800	1/24/00 8:00 AM	1/24/00 11:32 AM	50000 U	50000 U	50000 U	50000 U	50000 U	**280000**	50000 U	-	-	-	**0.4**	5.55	14.7	7.15	-	1.84	-	204
PZ06	PZ060125000800	1/25/00 8:00 AM	1/25/00 1:28 PM	50000 U	50000 U	50000 U	50000 U	50000 U	**190000**	50000 U	-	-	-	**0.1**	5.5	13.4	6.72	-	1.11	-	-
PZ06	PZ060126000800	1/26/00 8:00 AM	1/26/00 2:46 PM	50000 U	50000 U	50000 U	50000 U	50000 U	**160000**	50000 U	-	-	-	**0.3**	5.48	13.1	6.51	-	1.12	-	-
PZ06	PZ060127000800	1/27/00 8:00 AM	1/27/00 2:45 PM	50000 U	50000 U	50000 U	50000 U	50000 U	**140000**	50000 U	-	-	-	**0.3**	5.52	12.6	5.81	-	1.05	-	-
PZ06	PZ060128000800	1/28/00 8:00 AM	1/28/00 10:38 AM	50000 U	50000 U	50000 U	50000 U	50000 U	**130000**	50000 U	-	-	-	**0.3**	5.57	12.4	5.91	-	1.12	-	-
PZ06	PZ060129000800	1/29/00 8:00 AM	1/29/00 10:15 AM	50000 U	50000 U	50000 U	50000 U	50000 U	**68000**	50000 U	-	-	-	**0.3**	5.58	12	5.52	-	0.559	-	-
PZ06	PZ060130000800	1/30/00 8:00 AM	1/30/00 10:52 AM	10000 U	10000 U	10000 U	10000 U	10000 U	**77000**	10000 U	-	-	-	**0.2**	5.45	11.8	6.72	-	0.59	-	-
PZ06	PZ060131000800	1/31/00 8:00 AM	1/31/00 11:15 AM	10000 U	10000 U	10000 U	10000 U	10000 U	**69000**	10000 U	-	-	-	**0.2**	5.49	11.7	5.67	-	0.692	-	-
PZ06	PZ060131000800D	1/31/00 8:00 AM	1/31/00 11:33 AM	10000 U	10000 U	10000 U	10000 U	10000 U	**74000**	10000 U	-	-	-	**0.2**	5.49	11.7	5.67	-	0.692	-	-
PZ06	PZ060201000800	2/1/00 8:00 AM	2/1/00 10:49 AM	10000 U	10000 U	10000 U	10000 U	10000 U	**92000**	10000 U	-	-	-	**0.2**	5.36	11.8	6.03	-	0.686	-	407
PZ06	PZ060208001745	2/8/00 5:45 PM	-	300 U	300 U	300 U	300 U	300 U	**40000**	300 U	-	-	-	**0.45**	5.68	16	6.61	0	0.39	7.8	531
PZ06	PZ060309001520	3/9/00 3:20 PM	-	300 U	300 U	300 U	300 U	300 U	**25000 D**	300 U	**20**	**20.4**	-	**9.32**	5.36	19.3	6.5	-	0.9	6.8	675
PZ06	PZ060412001500	4/12/00 3:00 PM	-	1500 U	1500 U	1500 U	1500 U	1500 U	**35000**	1500 U	**9.4**	**11.7**	-	**2.91 E**	-	19.6	5.9	6	0.855	-	657.6
PZ06	PZ060509001527	5/9/00 3:27 PM	-	300 U	300 U	300 U	300 U	300 U	**140000 D**	300 U	**2.2**	**1.97**	-	**1.1**	5.02	20.6	6.51	5	1.39	5.03	-
PZ06	PZ060619001455	6/19/00 2:55 PM	-	300 U	300 U	300 U	300 U	300 U	**96000 D**	300 U	**0.18**	**0.172**	-	**1.22**	5.11	21.5	6.5	2	2.3	2.36	183.1
PZ06	PZ060719001438	7/19/00 2:38 PM	-	300 U	300 U	300 U	300 U	300 U	**77000**	300 U	**0.12**	**0.123**	-	**1.26**	5.3	21.8	6.68	0	2.44	6.15	273
PZ06	PZ060809001504	8/9/00 3:04 PM	-	300 U	300 U	300 U	300 U	300 U	**78000**	300 U	**0.061 J**	**0.068**	-	**1.3**	4.84	22.5	6.33	10	2.55	2.62	74.8
PZ07	PZ071118991700	11/18/99 5:00 PM	-	2000 U	2000 U	2000 U	2000 U	2000 U	**41000**	2000 U	0.1 U	2.3 U	0.1 U	**0.4**	-	20.8	6.29	0	1.97	1.57	-
PZ07	PZ071130991735	11/30/99 5:35 PM	-	10000 U	10000 U	10000 U	10000 U	10000 U	**240000**	10000 U	-	-	-	**0.4**	5.28	21.5	6.64	144	4.1	1.34	-
PZ07	PZ071201991230	12/1/99 12:30 PM	-	10000 U	10000 U	10000 U	10000 U	10000 U	**190000**	10000 U	-	-	-	**0.1**	5.24	21.3	6.56	115	2.98	2.91	223.2
PZ07	PZ071201991330	12/1/99 1:30 PM	-	10000 U	10000 U	10000 U	10000 U	10000 U	**210000**	10000 U	-	-	-	0.1 U	5.23	21.4	6.57	29	3.01	2.87	214.1
PZ07	PZ071201991430	12/1/99 2:30 PM	-	10000 U	10000 U	10000 U	10000 U	10000 U	**190000**	10000 U	-	-	-	**0.25**	5.21	21.4	6.56	16	3	2.68	136.6
PZ07	PZ071201991530	12/1/99 3:30 PM	-	10000 U	10000 U	10000 U	10000 U	10000 U	**200000**	10000 U	-	-	-	0.1 U	5.23	21.6	6.51	25	3.01	3.25	128.6
PZ07	PZ071201991630	12/1/99 4:30 PM	-	10000 U	10000 U	10000 U	10000 U	10000 U	**190000**	10000 U	-	-	-	0.1 U	5.24	21.4	6.42	18	3.03	2.56	122.8
PZ07	PZ071201991730	12/1/99 5:30 PM	-	10000 U	10000 U	10000 U	10000 U	10000 U	**180000**	10000 U	-	-	-	0.1 U	5.23	21.6	6.47	20	3.11	3.55	197
PZ07	PZ071201991730D	12/1/99 5:30 PM	-	10000 U	10000 U	10000 U	10000 U	10000 U	**190000**	10000 U	-	-	-	0.1 U	-	-	-	-	-	-	-
PZ07	PZ071201991830	12/1/99 6:30 PM	-	10000 U	10000 U	10000 U	10000 U	10000 U	**180000**	10000 U	**1.5**	-	-	**0.3**	-	21.4	6.43	6	3	2.5	-
PZ07	PZ071201991930	12/1/99 7:30 PM	-	10000 U	10000 U	10000 U	10000 U	10000 U	**180000**	10000 U	**1.5**	-	-	0.1 U	-	21.2	6.3	9	3.1	1.9	-
PZ07	PZ071201992030	12/1/99 8:30 PM	-	10000 U	10000 U	10000 U	10000 U	10000 U	**180000**	10000 U	**1.4**	-	-	0.1 U	-	21.2	6.3	25	3	2.4	-
PZ07	PZ071202991630	12/2/99 4:30 PM	-	10000 U	10000 U	10000 U	10000 U	10000 U	**220000 J**	10000 U	-	-	-	0.1 U	5.26	21.2	6.4	14	3.5	2.7	133
PZ07	PZ071203991630	12/3/99 4:30 PM	-	5000 U	5000 U	5000 U	5000 U	5000 U	**80000 J**	5000 U	-	-	-	0.1 U	5.2	20.2	6.5	20	1.22	4.56	577
PZ07	PZ071204991630	12/4/99 4:30 PM	-	20000 U	20000 U	20000 U	20000 U	20000 U	**140000**	20000 U	-	-	-	0.1 U	5.21	19.6	6.31	17	2.38	4.1	602
PZ07	PZ071205991630	12/5/99 4:30 PM	-	10000 U	10000 U	10000 U	10000 U	10000 U	**180000**	10000 U	-	-	-	**0.4**	5.26	19.6	6.53	12	2.23	4.3	568
PZ07	PZ071206991630	12/6/99 4:30 PM	-	100 U	100 U	100 U	100 U	100 U	100 U	100 U	-	-	-	**1.4**	5.19	19.6	6.56	30	4.31	6.65	570
PZ07	PZ071207991630	12/7/99 4:30 PM	-	100 U	100 U	100 U	100 U	100 U	100 U	100 U	-	-	-	**5**	5.15	19.6	6.57	72	0.443	7.91	-
PZ07	PZ071208991630	12/8/99 4:30 PM	-	100 U	100 U	100 U	100 U	100 U	100 U	100 U	-	-	-	**2.5**	5.28	19.6	6.29	48	0.469	6.9	-
PZ07	PZ071209991630	12/9/99 4:30 PM	-	100 U	100 U	100 U	100 U	100 U	100 U	100 U	-	-	-	**38**	5.23	19.6	6.07	39	0.591	7.46	618.1
PZ07	PZ071210991630	12/10/99 4:30 PM	-	100 U	100 U	100 U	100 U	100 U	100 U	100 U	-	-	-	**30**	5.18	17.9	6.02	70	0.689	7.25	627.1
PZ07	PZ071220991315	12/20/99 1:15 PM	-	30 U	30 U	30 U	30 U	30 U	**11 J**	30 U	-	-	-	**14**	5.13	18.8	6.21	3	0.686	4.73	672.4

Table 4-1
Pilot Test Analytical Results
Pilot-Scale Treatability Study Report
Stratford Army Engine Plant

LOCATION	SAMPLE ID:	DATE&TIME SAMPLED	DATE&TIME VOCs ANALYZED	VC µg/L	1,1-DCE µg/L	t1,2-DCE µg/L	c1,2-DCE µg/L	1,1,1-TCA µg/L	TCE µg/L	PCE µg/L	Cr(VI) mg/L	Cr(total) mg/L	Fe(II) mg/L	Mn(total) mg/L	DEPTH TO WATER ft. TOR	TEMP. °C	pH	TURB. NTU	COND. mS/cm	D.O. mg/L	ORP mV
PZ07	PZ070119000858	1/19/00 8:58 AM	-	-	-	-	-	-	-	-	-	-	-	**2.5**	5.41	20	6.24	-	0.942	4.56	-
PZ07	PZ070120000830	1/20/00 8:30 AM	-	100 U	100 U	100 U	100 U	100 U	100 U	100 U	-	-	-	**20**	5.41	20	6.52	-	0.906	-	611
PZ07	PZ070121000800	1/21/00 8:00 AM	-	100 U	100 U	100 U	100 U	100 U	100 U	100 U	-	-	-	**48**	5.33	19.7	6.47	-	1.02	-	624
PZ07	PZ070122000800	1/22/00 8:00 AM	-	100 U	100 U	100 U	100 U	100 U	100 U	100 U	-	-	-	**35**	5.43	18.7	6.37	-	0.958	-	650
PZ07	PZ070123000800	1/23/00 8:00 AM	-	100 U	100 U	100 U	100 U	100 U	100 U	100 U	-	-	-	**30**	5.45	17.3	6.38	-	1.06	-	641
PZ07	PZ070123000800D	1/23/00 8:00 AM	-	100 U	100 U	100 U	100 U	100 U	100 U	100 U	-	-	-	**35**	5.45	17.3	6.38	-	1.06	-	641
PZ07	PZ070124000800	1/24/00 8:00 AM	1/24/00 11:50 AM	100 U	100 U	100 U	100 U	100 U	100 U	100 U	-	-	-	**38**	5.44	16.3	6.52	-	1.12	-	579
PZ07	PZ070125000800	1/25/00 8:00 AM	1/25/00 1:46 PM	100 U	100 U	100 U	100 U	100 U	100 U	100 U	-	-	-	**35**	5.4	15.6	6.28	-	1.14	-	-
PZ07	PZ070126000800	1/26/00 8:00 AM	1/26/00 11:33 AM	100 U	100 U	100 U	100 U	100 U	100 U	100 U	-	-	-	**55**	5.4	15.1	6.14	-	1.18	-	-
PZ07	PZ070127000800	1/27/00 8:00 AM	1/27/00 1:32 PM	100 U	100 U	100 U	100 U	100 U	100 U	100 U	-	-	-	**55**	5.43	14.7	5.68	-	1.3	-	-
PZ07	PZ070128000800	1/28/00 8:00 AM	1/28/00 10:20 AM	100 U	100 U	100 U	100 U	100 U	100 U	100 U	-	-	-	**68**	5.47	14.5	5.46	-	1.74	-	-
PZ07	PZ070129000800	1/29/00 8:00 AM	1/29/00 9:57 AM	100 U	100 U	100 U	100 U	100 U	100 U	100 U	-	-	-	**65**	5.51	14.8	4.7	-	1.76	-	-
PZ07	PZ070130000800	1/30/00 8:00 AM	1/30/00 10:34 AM	100 U	100 U	100 U	100 U	100 U	100 U	100 U	-	-	-	**60**	5.52	14.8	4.6	-	1.95	-	-
PZ07	PZ070131000800	1/31/00 8:00 AM	1/31/00 10:01 AM	100 U	100 U	100 U	100 U	100 U	100 U	100 U	-	-	-	**90**	5.4	14.7	4.3	-	2.14	-	-
PZ07	PZ070201000800	2/1/00 8:00 AM	2/1/00 10:31 AM	100 U	100 U	100 U	100 U	100 U	100 U	100 U	-	-	-	**140**	5.46	14.7	4.29	-	3.17	-	875
PZ07	PZ070208001625	2/8/00 4:25 PM	-	15 U	15 U	15 U	15 U	15 U	15 U	15 U	**13**	-	-	**663**	5.58	17.4	5.11	5	2.09	7.8	866
PZ07	PZ070309001445	3/9/00 2:45 PM	-	15 U	15 U	15 U	15 U	15 U	15 U	15 U	**10**	**10.2**	-	**219**	5.26	19.1	5.7	0	1.5	9.3	788
PZ07	PZ070412001435	4/12/00 2:35 PM	-	15 U	15 U	15 U	15 U	15 U	5 **J**	15 U	**13**	**13.4**	-	**119** **E**	-	19.5	5.26	2	0.99	-	739.9
PZ07	PZ070509001445	5/9/00 2:45 PM	-	15 U	15 U	15 U	15 U	15 U	15 U	15 U	**0.16**	**10**	-	**95.8**	4.95	20.4	5.89	166	1.03	7.07	-
PZ07	PZ070619001706	6/19/00 5:06 PM	-	15 U	15 U	15 U	15 U	15 U	15 U	15 U	**0.042**	**14.3**	-	**87.5**	5.02	21.2	6.24	0	1.27	5.42	710
PZ07	PZ070719001615	7/19/00 4:15 PM	-	15 U	15 U	15 U	15 U	15 U	15 U	15 U	**1.7**	**10**	-	**98.6**	5.18	21.8	6.4	0	1.45	7.47	682
PZ07	PZ070809001628	8/9/00 4:28 PM	-	15 U	15 U	15 U	15 U	15 U	15 U	15 U	**0.59** J	**8.19**	-	**71**	4.74	22.2	6.24	10	1.55	5.47	617.4
PZ08	PZ081118991525	11/18/99 3:25 PM	-	2000 U	2000 U	2000 U	2000 U	2000 U	**93000**	2000 U	**200**	**200**	0.1 U	-	-	14.7	6.41	0	4.67	2.36	-
PZ08	PZ081201991110	12/1/99 11:10 AM	-	-	-	-	-	-	-	-	**300**	**290**	0.1 U	-	5.17	16.7	6.57	56	4	1.79	256.5
PZ08	PZ081202990700	12/2/99 7:00 AM	-	-	-	-	-	-	-	-	**200**	**320**	0.1 U	-	-	17	6.84	51	4.9	1.7	190
PZ08	PZ081202990800	12/2/99 8:00 AM	-	-	-	-	-	-	-	-	**200**	**270**	0.1 U	-	-	18	6.9	68	4	1.6	80
PZ08	PZ081202990900	12/2/99 9:00 AM	-	-	-	-	-	-	-	-	**280**	**320**	0.1 U	-	-	18	6.9	36	4	1.3	139
PZ08	PZ081202991000	12/2/99 10:00 AM	-	-	-	-	-	-	-	-	**280**	**290**	0.1 U	-	-	17.3	6.8	71	4	1	155
PZ08	PZ081202991100	12/2/99 11:00 AM	-	-	-	-	-	-	-	-	**150** J	**290**	0.1 U	-	5.09	18.1	6.9	21	4	1.5	166
PZ08	PZ081202991100D	12/2/99 11:00 AM	-	-	-	-	-	-	-	-	**225** J	**290**	0.1 U	-	-	-	-	-	-	-	-
PZ08	PZ081202991200	12/2/99 12:00 PM	-	-	-	-	-	-	-	-	**75**	**250**	0.1 U	-	-	18	6.85	9	3.98	1.3	256
PZ08	PZ081202991300	12/2/99 1:00 PM	-	-	-	-	-	-	-	-	**150**	**270**	0.1 U	-	-	18	6.84	17	3.99	1.9	100
PZ08	PZ081202991400	12/2/99 2:00 PM	-	-	-	-	-	-	-	-	**150**	**270**	0.1 U	-	-	17.8	6.83	5	3.97	2	178
PZ08	PZ081202991500	12/2/99 3:00 PM	-	-	-	-	-	-	-	-	**150**	**200**	0.1 U	-	-	17.8	6.83	27	3.93	1.1	181
PZ08	PZ081203991030	12/3/99 10:30 AM	-	-	-	-	-	-	-	-	**230**	**250**	0.1 U	-	5.37	17.8	6.9	20	4	1.1	231
PZ08	PZ081204991030	12/4/99 10:30 AM	-	-	-	-	-	-	-	-	**75**	**230**	0.1 U	-	5.35	17.8	6.92	11	2.88	2.86	200
PZ08	PZ081204991030D	12/4/99 10:30 AM	-	-	-	-	-	-	-	-	**100**	**200**	0.1 U	-	-	-	-	-	-	-	-
PZ08	PZ081205991030	12/5/99 10:30 AM	-	-	-	-	-	-	-	-	**75**	**140**	0.1 U	-	5.33	17.8	6.98	15	2.24	4.3	163
PZ08	PZ081206991030	12/6/99 10:30 AM	-	-	-	-	-	-	-	-	**55**	**110**	0.1 U	-	5.36	17.2	6.94	10	1.65	5.66	216.5
PZ08	PZ081207991030	12/7/99 10:30 AM	-	-	-	-	-	-	-	-	**50**	**68**	0.1 U	-	5.3	16.6	7.01	48	1.33	6.41	135
PZ08	PZ081208991030	12/8/99 10:30 AM	-	-	-	-	-	-	-	-	**25**	**26**	0.1 U	-	6.02	16.7	6.9	17	1.7	5.8	-
PZ08	PZ081209991030	12/9/99 10:30 AM	-	-	-	-	-	-	-	-	**20**	**23**	0.1 U	-	5.92	16.2	6.81	14	1.08	6.11	-
PZ08	PZ081210991030	12/10/99 10:30 AM	-	-	-	-	-	-	-	-	**15**	**16**	0.1 U	-	4.51	15.6	6.95	7	1.2	5.1	294
PZ08	PZ081211990930	12/11/99 9:30 AM	-	-	-	-	-	-	-	-	**1.2**	**4.5**	0.1 U	-	5.9	15.1	6.14	13	1.23	6.4	434
PZ08	PZ081211990930D	12/11/99 9:30 AM	-	-	-	-	-	-	-	-	**1.2**	**4.5**	0.1 U	-	-	-	-	-	-	-	-
PZ08	PZ081221991425	12/21/99 2:25 PM	-	-	-	-	-	-	-	-	**20**	**13.2**	0.1 U	-	4.23	16.2	6.35	10	2.54	0.4	310
PZ08	PZ080119001540	1/19/00 3:40 PM	-	-	-	-	-	-	-	-	**100**	**86**	0.1 U	-	4.56	16.5	6.68	-	3.21	-	254
PZ08	PZ080120001500	1/20/00 3:00 PM	-	-	-	-	-	-	-	-	**2.5**	**2.3**	0.1 U	-	5.37	16.3	3.97	-	1.35	-	387
PZ08	PZ080120001500D	1/20/00 3:00 PM	-	-	-	-	-	-	-	-	**0.1**	**2.3**	0.1 U	-	5.37	16.3	3.97	-	1.35	-	387
PZ08	PZ080121001500	1/21/00 3:00 PM	-	-	-	-	-	-	-	-	0.1 U	**2.3**	**8**	-	5.27	15	4.03	-	2.68	-	334
PZ08	PZ080122001500	1/22/00 3:00 PM	-	-	-	-	-	-	-	-	0.1 U	**2.3**	**9**	-	5.35	14	4.2	-	2.34	-	370
PZ08	PZ080123001500	1/23/00 3:00 PM	-	-	-	-	-	-	-	-	0.1 U	2.3 U	**3**	-	5.35	13.6	4.72	-	2.19	-	520
PZ08	PZ080124001500	1/24/00 3:00 PM	-	-	-	-	-	-	-	-	0.1 U	2.3 U	**7.8**	-	5.28	13	4.75	-	1.91	-	-
PZ08	PZ080125001500	1/25/00 3:00 PM	-	-	-	-	-	-	-	-	0.1 U	2.3 U	**45**	-	5.22	12.7	4.82	-	1.81	-	-
PZ08	PZ080126001500	1/26/00 3:00 PM	-	-	-	-	-	-	-	-	0.1 U	2.3 U	**60**	-	-	12.3	4.61	-	1.82	-	-
PZ08	PZ080127001500	1/27/00 3:00 PM	-	-	-	-	-	-	-	-	0.1 U	2.3 U	**55**	-	4.95	11	4.2	-	1.72	-	-
PZ08	PZ080128001500	1/28/00 3:00 PM	-	-	-	-	-	-	-	-	0.1 U	2.3 U	**60**	-	5.58	11.5	4.33	-	1.66	-	-
PZ08	PZ080128001500D	1/28/00 3:00 PM	-	-	-	-	-	-	-	-	0.1 U	2.3 U	**62**	-	5.58	11.5	4.33	-	1.66	-	-
PZ08	PZ080129001500	1/29/00 3:00 PM	-	-	-	-	-	-	-	-	0.1 U	2.3 U	**60**	-	5.37	11	4.45	-	1.7	-	-
PZ08	PZ080130001500	1/30/00 3:00 PM	-	-	-	-	-	-	-	-	0.1 U	2.3 U	**20**	-	5.18	4.58	10.8	-	1.54	-	-

Table 4-1
Pilot Test Analytical Results
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LOCATION	SAMPLE ID:	DATE&TIME SAMPLED	DATE&TIME VOCs ANALYZED	VC µg/L	1,1-DCE µg/L	t1,2-DCE µg/L	c1,2-DCE µg/L	1,1,1-TCA µg/L	TCE µg/L	PCE µg/L	Cr(VI) mg/L	Cr(total) mg/L	Fe(II) mg/L	Mn(total) mg/L	DEPTH TO WATER ft. TOR	TEMP. °C	pH	TURB. NTU	COND. mS/cm	D.O. mg/L	ORP mV
PZ08	PZ080131001500	1/31/00 3:00 PM	-	-	-	-	-	-	-	-	0.1 U	2.3 U	**10**	-	4.6	9.1	5.23	-	2.56	-	147
PZ08	PZ080201001500	2/1/00 3:00 PM	-	-	-	-	-	-	-	-	0.1 U	2.3 U	**27**	-	5	10.2	4.82	-	1.77	-	556
PZ08	PZ080209001505	2/9/00 3:05 PM	-	-	-	-	-	-	-	-	0.005 UJ	**1.12**	1 U	-	4.69	12.7	4.91	36	1.74	2.3	178.6
PZ08	PZ080310001515	3/10/00 3:15 PM	-	-	-	-	-	-	-	-	**0.007**	**0.146**	**49**	-	4.52	14.2	4.9	4	1.7	4.7	214
PZ08	PZ080413001505	4/13/00 3:05 PM	-	-	-	-	-	-	-	-	**0.007**	**0.127**	**44**	-	-	14.5	4.23	0	1.69	-	249.1
PZ08	PZ080510001535	5/10/00 3:35 PM	-	-	-	-	-	-	-	-	**0.009**	**0.11**	**27**	-	-	14.9	4.48	6	1.76	3.03	444
PZ08	PZ080620001654	6/20/00 4:54 PM	-	-	-	-	-	-	-	-	0.005 U	**0.0776**	**40**	**26.1**	4.2	20.1	4.88	186	1.69	4.33	230
PZ08	PZ080720001645	7/20/00 4:45 PM	-	-	-	-	-	-	-	-	**0.006**	**0.201**	**39**	-	4.37	19.3	4.87	7	1.8	8.66	225.4
PZ08	PZ080808001545	8/8/00 3:45 PM	-	-	-	-	-	-	-	-	0.005 U	**0.0862**	**34**	-	4.33	21.1	4.72	52	1.73	5.1	224.7
PZ09	PZ091118991545	11/18/99 3:45 PM	-	2000 U	2000 U	2000 U	2000 U	2000 U	**86000**	2000 U	**200**	**350**	0.1 U	-	-	15.3	6.28	10	3.83	1.36	-
PZ09	PZ091201991118	12/1/99 11:18 AM	-	-	-	-	-	-	-	-	**400**	**430**	0.1 U	-	4.54	16.9	6.06	221	3.77	2.33	257.7
PZ09	PZ091202990700	12/2/99 7:00 AM	-	-	-	-	-	-	-	-	**350**	**430**	0.1 U	-	-	17.4	5.97	49	3.87	2	170
PZ09	PZ091202990700D	12/2/99 7:00 AM	-	-	-	-	-	-	-	-	**350**	**410**	0.1 U	-	-	-	-	-	-	-	-
PZ09	PZ091202990800	12/2/99 8:00 AM	-	-	-	-	-	-	-	-	**300**	**360**	0.1 U	-	-	18.1	5.9	114	3.9	2.1	179
PZ09	PZ091202990900	12/2/99 9:00 AM	-	-	-	-	-	-	-	-	**350**	**350**	0.1 U	-	-	18	5.9	25	3.8	1.3	150
PZ09	PZ091202991000	12/2/99 10:00 AM	-	-	-	-	-	-	-	-	**280**	**360**	0.1 U	-	-	16.9	5.9	20	3.95	1.1	192
PZ09	PZ091202991100	12/2/99 11:00 AM	-	-	-	-	-	-	-	-	**275**	**360**	0.1 U	-	4.43	18	5.88	10	3.9	1.1	207
PZ09	PZ091202991200	12/2/99 12:00 PM	-	-	-	-	-	-	-	-	**150**	**360**	0.1 U	-	-	18	5.88	2	3.91	0.9	271
PZ09	PZ091202991300	12/2/99 1:00 PM	-	-	-	-	-	-	-	-	**100**	**340**	0.1 U	-	-	18	5.86	41	3.86	0.8	-
PZ09	PZ091202991400	12/2/99 2:00 PM	-	-	-	-	-	-	-	-	**200**	**340**	0.1 U	-	-	17.5	5.89	24	3.91	2.16	166
PZ09	PZ091202991500	12/2/99 3:00 PM	-	-	-	-	-	-	-	-	**150**	**340**	0.1 U	-	-	17.8	5.85	19	3.85	0.8	248
PZ09	PZ091203991030	12/3/99 10:30 AM	-	-	-	-	-	-	-	-	**300**	**380**	0.1 U	-	4.6	18	6	9	3.45	2	245
PZ09	PZ091203991030D	12/3/99 10:30 AM	-	-	-	-	-	-	-	-	**230**	**360**	0.1 U	-	-	-	-	-	-	-	-
PZ09	PZ091204991030	12/4/99 10:30 AM	-	-	-	-	-	-	-	-	**150**	**290**	0.1 U	-	4.59	18.1	5.89	26	2.79	3.5	233
PZ09	PZ091205991030	12/5/99 10:30 AM	-	-	-	-	-	-	-	-	**200**	**250**	0.1 U	-	4.6	18.1	5.91	8	2.38	4.02	204
PZ09	PZ091206991030	12/6/99 10:30 AM	-	-	-	-	-	-	-	-	**180**	**180**	0.1 U	-	4.59	17.6	5.91	17	1.7	5.41	223.5
PZ09	PZ091207991030	12/7/99 10:30 AM	-	-	-	-	-	-	-	-	**30**	**110**	0.1 U	-	4.57	-	6.06	-	1.25	-	199
PZ09	PZ091208991030	12/8/99 10:30 AM	-	-	-	-	-	-	-	-	**55**	**90**	0.1 U	-	4.95	17.1	6.12	35	1.17	6.5	-
PZ09	PZ091209991030	12/9/99 10:30 AM	-	-	-	-	-	-	-	-	**50**	**90**	0.1 U	-	4.93	16.5	6.02	34	1.2	6.3	-
PZ09	PZ091210991030	12/10/99 10:30 AM	-	-	-	-	-	-	-	-	**33**	**41**	0.1 U	-	4.21	16.3	6.06	23	1.32	5.38	427
PZ09	PZ091211990930	12/11/99 9:30 AM	-	-	-	-	-	-	-	-	**25**	**32**	0.1 U	-	4.91	15.8	5.39	81	1.18	6.23	485
PZ09	PZ091221991455	12/21/99 2:55 PM	-	-	-	-	-	-	-	-	**130**	**118**	0.1 U	-	4.24	16.5	6.51	97	2.19	2.6	291
PZ09	PZ090119001545	1/19/00 3:45 PM	-	-	-	-	-	-	-	-	**150**	**120**	0.1 U	-	4.53	16.1	6.26	-	1.41	-	260
PZ09	PZ090120001500	1/20/00 3:00 PM	-	-	-	-	-	-	-	-	**30**	**34**	0.1 U	-	4.66	16.1	5.18	-	-	-	294
PZ09	PZ090121001500	1/21/00 3:00 PM	-	-	-	-	-	-	-	-	**25**	**41**	0.1 U	-	4.68	15.7	6.06	-	1.61	-	310
PZ09	PZ090121001500D	1/21/00 3:00 PM	-	-	-	-	-	-	-	-	**20**	**32**	0.1 U	-	4.68	15.7	6.06	-	1.61	-	310
PZ09	PZ090122001500	1/22/00 3:00 PM	-	-	-	-	-	-	-	-	**38**	**38**	0.1 U	-	4.77	15.9	5.4	-	1.51	-	301
PZ09	PZ090123001500	1/23/00 3:00 PM	-	-	-	-	-	-	-	-	**30**	**41**	0.1 U	-	4.78	16.3	5.71	-	1.88	-	478
PZ09	PZ090124001500	1/24/00 3:00 PM	-	-	-	-	-	-	-	-	**23**	**29**	0.1 U	-	5.68	16.2	5.14	-	1.72	-	-
PZ09	PZ090125001500	1/25/00 3:00 PM	-	-	-	-	-	-	-	-	**50**	**52**	0.1 U	-	4.65	16.1	5.22	-	1.92	-	-
PZ09	PZ090126001500	1/26/00 3:00 PM	-	-	-	-	-	-	-	-	**25**	**38**	0.1 U	-	-	15.9	4.6	-	1.89	-	-
PZ09	PZ090127001500	1/27/00 3:00 PM	-	-	-	-	-	-	-	-	**30**	**36**	0.1 U	-	4.6	15.3	4.33	-	2	-	-
PZ09	PZ090128001500	1/28/00 3:00 PM	-	-	-	-	-	-	-	-	**18**	**27**	0.1 U	-	4.8	15.2	3.77	-	2.09	-	-
PZ09	PZ090129001500	1/29/00 3:00 PM	-	-	-	-	-	-	-	-	**30**	**32**	0.1 U	-	4.73	15.5	3.79	-	2.1	-	-
PZ09	PZ090129001500D	1/29/00 3:00 PM	-	-	-	-	-	-	-	-	**30**	**32**	0.1 U	-	4.73	15.5	3.79	-	2.1	-	-
PZ09	PZ090130001500	1/30/00 3:00 PM	-	-	-	-	-	-	-	-	**13**	**16**	0.1 U	-	4.68	15.2	3.41	-	2.1	-	-
PZ09	PZ090131001500	1/31/00 3:00 PM	-	-	-	-	-	-	-	-	**29**	**23**	0.1 U	-	-	14	5.63	-	0.73	-	225
PZ09	PZ090201001500	2/1/00 3:00 PM	-	-	-	-	-	-	-	-	**0.2**	**4.5**	**2**	-	4.59	14.5	4.23	-	1.39	-	594
PZ09	PZ090209001545	2/9/00 3:45 PM	-	-	-	-	-	-	-	-	**2.5** J	**27.5**	1 U	-	4.71	14.1	4.2	122	1.58	4.72	354
PZ09	PZ090209001545D	2/9/00 3:45 PM	-	-	-	-	-	-	-	-	**4.3** J	**27.8**	1 U	-	4.71	14.1	4.2	122	1.58	4.72	354
PZ09	PZ090310001401	3/10/00 2:01 PM	-	-	-	-	-	-	-	-	**6.8**	**15.5**	**1.3**	-	4.5	14.6	3.73	16	1.44	3.45	368
PZ09	PZ090413001410	4/13/00 2:10 PM	-	-	-	-	-	-	-	-	**15**	**31.9**	**0.9**	-	-	14.7	3.83	50	1.84	-	366.1
PZ09	PZ090510001430	5/10/00 2:30 PM	-	-	-	-	-	-	-	-	**12**	**21.4**	**0.52**	-	4.21	14.9	4.37	80	2.03	3.46	480
PZ09	PZ090620001538	6/20/00 3:38 PM	-	-	-	-	-	-	-	-	**14**	**17.4**	0.5 U	**32.2**	4.2	20.2	4.65	74	1.66	3.82	312
PZ09	PZ090720001445	7/20/00 2:45 PM	-	-	-	-	-	-	-	-	**10**	**15**	0.5 U	-	4.35	21	4.44	20	1.87	8.58	350.6
PZ09	PZ090808001420	8/8/00 2:20 PM	-	-	-	-	-	-	-	-	**8.8**	**23.4**	0.5 U	-	4.27	20.3	4.39	109	1.88	4.04	285.6
PZ10	PZ101118991515	11/18/99 3:15 PM	-	2000 U	2000 U	2000 U	2000 U	2000 U	**88000**	2000 U	**300**	**320**	0.1 U	-	-	17.2	6.44	10	4.31	1.3	-
PZ10	PZ101201991120	12/1/99 11:20 AM	-	-	-	-	-	-	-	-	**230**	**230**	0.1 U	-	4.83	17.5	6.48	274	2	4.42	254.3
PZ10	PZ101202991100	12/2/99 11:00 AM	-	-	-	-	-	-	-	-	**225**	**360**	0.1 U	-	4.72	18.3	6.17	120	3.51	1.2	216
PZ10	PZ101202991900	12/2/99 7:00 PM	-	-	-	-	-	-	-	-	**430**	**450**	0.1 U	-	-	16.8	6.1	174	3.6	2	134

Table 4-1
Pilot Test Analytical Results
Pilot-Scale Treatability Study Report
Stratford Army Engine Plant

LOCATION	SAMPLE ID:	DATE&TIME SAMPLED	DATE&TIME VOCs ANALYZED	VC µg/L	1,1-DCE µg/L	t1,2-DCE µg/L	c1,2-DCE µg/L	1,1,1-TCA µg/L	TCE µg/L	PCE µg/L	Cr(VI) mg/L	Cr(total) mg/L	Fe(II) mg/L	Mn(total) mg/L	DEPTH TO WATER ft. TOR	TEMP. °C	pH	TURB. NTU	COND. mS/cm	D.O. mg/L	ORP mV
PZ10	PZ101202991900D	12/2/99 7:00 PM	-	-	-	-	-	-	-	-	**430**	**430**	0.1 U	-	-	-	-	-	-	-	-
PZ10	PZ101202991930	12/2/99 7:30 PM	-	-	-	-	-	-	-	-	**400**	**410**	0.1 U	-	-	15	6.1	193	3.7	1.7	200
PZ10	PZ101202992030	12/2/99 8:30 PM	-	-	-	-	-	-	-	-	**400**	**410**	0.1 U	-	-	17.5	6.1	55	3.5	1.7	145
PZ10	PZ101202992130	12/2/99 9:30 PM	-	-	-	-	-	-	-	-	**400**	**450**	0.1 U	-	-	17.7	6.1	20	3.6	1.1	128
PZ10	PZ101202992230	12/2/99 10:30 PM	-	-	-	-	-	-	-	-	**400**	**430**	0.1 U	-	-	16.8	6	46	3.6	1.4	230
PZ10	PZ101202992330	12/2/99 11:30 PM	-	-	-	-	-	-	-	-	**380**	**360**	0.1 U	-	-	16.9	6.1	110	3.6	1.6	240
PZ10	PZ101203990030	12/3/99 12:30 AM	-	-	-	-	-	-	-	-	**380**	**410**	0.1 U	-	-	17.1	5.7	200	3.4	1.7	254
PZ10	PZ101203990130	12/3/99 1:30 AM	-	-	-	-	-	-	-	-	**430**	**450**	0.1 U	-	-	16.7	6.1	29	3.6	1.6	280
PZ10	PZ101203990230	12/3/99 2:30 AM	-	-	-	-	-	-	-	-	**430**	**430**	0.1 U	-	-	14.2	6.1	100	3.7	1.9	261
PZ10	PZ101203991030	12/3/99 10:30 AM	-	-	-	-	-	-	-	-	**230**	**380**	0.1 U	-	5.02	18.1	6.2	80	3.8	2.1	255
PZ10	PZ101204991030	12/4/99 10:30 AM	-	-	-	-	-	-	-	-	**75**	**200**	0.1 U	-	4.36	17.9	5.92	>1000	2.02	5.93	232
PZ10	PZ101205991030	12/5/99 10:30 AM	-	-	-	-	-	-	-	-	**130**	**110**	0.1 U	-	4.87	18.2	6.11	270	2.19	5.2	218
PZ10	PZ101206991030	12/6/99 10:30 AM	-	-	-	-	-	-	-	-	**20**	**20**	0.1 U	-	5.04	15.7	6.03	590	0.415	7.69	229.3
PZ10	PZ101207991030	12/7/99 10:30 AM	-	-	-	-	-	-	-	-	**50**	**58**	0.1 U	-	5.03	-	-	-	-	-	218
PZ10	PZ101208991030	12/8/99 10:30 AM	-	-	-	-	-	-	-	-	**15**	**45**	0.1 U	-	5.33	17.1	6.08	643	1.59	5.87	-
PZ10	PZ101209991030	12/9/99 10:30 AM	-	-	-	-	-	-	-	-	0.1 U	**6.8**	**4.6**	-	5.2	16.9	3.7	410	1.67	5.23	-
PZ10	PZ101209991030D	12/9/99 10:30 AM	-	-	-	-	-	-	-	-	0.1 U	**6.8**	**4.6**	-	-	-	-	-	-	-	-
PZ10	PZ101210991030	12/10/99 10:30 AM	-	-	-	-	-	-	-	-	0.1 U	2.3 U	**100**	-	4.15	16.7	3.63	>1000	1.87	5.5	345
PZ10	PZ101211990930	12/11/99 9:30 AM	-	-	-	-	-	-	-	-	0.1 U	2.3 U	**7**	-	4.94	16.2	4.04	690	1.56	5.31	416
PZ10	PZ101221991350	12/21/99 1:50 PM	-	-	-	-	-	-	-	-	0.1 U	**2.3**	**3**	-	4.14	16.6	3.75	33	0.755	2.4	353.1
PZ10	PZ100119001530	1/19/00 3:30 PM	-	-	-	-	-	-	-	-	0.1 U	**2.3**	**4**	-	4.46	16.3	3.83	-	1.34	-	360
PZ10	PZ100120001500	1/20/00 3:00 PM	-	-	-	-	-	-	-	-	0.1 U	**2.3**	**5**	-	4.68	16.1	3.51	-	1.91	-	357
PZ10	PZ100121001500	1/21/00 3:00 PM	-	-	-	-	-	-	-	-	0.1 U	**2.3**	**35**	-	4.6	15.4	3.69	-	2.44	-	342
PZ10	PZ100122001500	1/22/00 3:00 PM	-	-	-	-	-	-	-	-	0.1 U	**2.3**	**110**	-	4.72	16.2	3.46	-	2.87	-	307
PZ10	PZ100122001500D	1/22/00 3:00 PM	-	-	-	-	-	-	-	-	0.1 U	**2.3**	**100**	-	4.72	16.2	3.46	-	2.87	-	307
PZ10	PZ100123001500	1/23/00 3:00 PM	-	-	-	-	-	-	-	-	0.1 U	**2.3**	**55**	-	4.72	16.2	3.35	-	2.85	-	649
PZ10	PZ100124001500	1/24/00 3:00 PM	-	-	-	-	-	-	-	-	0.1 U	**4.5**	**55**	-	5.65	15.9	3.3	-	3.03	-	700
PZ10	PZ100125001500	1/25/00 3:00 PM	-	-	-	-	-	-	-	-	0.1 U	**2.3**	**125**	-	4.57	15.4	3.52	-	2.5	-	-
PZ10	PZ100126001500	1/26/00 3:00 PM	-	-	-	-	-	-	-	-	0.1 U	**4.5**	**115**	-	4.68	14.9	3.35	-	2.83	-	-
PZ10	PZ100127001500	1/27/00 3:00 PM	-	-	-	-	-	-	-	-	0.1 U	**2.3**	**110**	-	4.5	14.3	2.99	-	2.73	-	-
PZ10	PZ100128001500	1/28/00 3:00 PM	-	-	-	-	-	-	-	-	0.1 U	**2.3**	**80**	-	4.61	14.3	3.01	-	2.74	-	-
PZ10	PZ100129001500	1/29/00 3:00 PM	-	-	-	-	-	-	-	-	0.1 U	**2.3**	**75**	-	4.58	14.1	3.07	-	2.4	-	-
PZ10	PZ100130001500	1/30/00 3:00 PM	-	-	-	-	-	-	-	-	0.1 U	**2.3**	**125**	-	4.62	13.8	3.01	-	2.72	-	-
PZ10	PZ100130001500D	1/30/00 3:00 PM	-	-	-	-	-	-	-	-	0.1 U	**2.3**	**125**	-	4.62	13.8	3.01	-	2.72	-	-
PZ10	PZ100131001500	1/31/00 3:00 PM	-	-	-	-	-	-	-	-	**60**	**54**	0.1 U	-	-	12	4.05	-	1.41	-	387
PZ10	PZ100201001500	2/1/00 3:00 PM	-	-	-	-	-	-	-	-	0.1 U	**4.5**	**6**	-	-	13.4	3.38	-	2.8	-	710
PZ10	PZ100209001518	2/9/00 3:18 PM	-	-	-	-	-	-	-	-	0.005 UJ	**4.02**	**1.2**	-	4.63	13.4	3.7	121	1.49	5.2	316.2
PZ10	PZ100310001610	3/10/00 4:10 PM	-	-	-	-	-	-	-	-	**0.032**	**1.67**	**50**	-	4.4	13	3.8	5.3	1	3.6	300
PZ10	PZ100413001436	4/13/00 2:36 PM	-	-	-	-	-	-	-	-	**0.11**	**20.1**	**38**	-	-	15.1	3.39	37	1.33	2.31	449
PZ10	PZ100413001436D	4/13/00 2:36 PM	-	-	-	-	-	-	-	-	**0.083**	**10.3**	**30**	-	-	15.1	3.39	37	1.33	2.31	449
PZ10	PZ100510001633	5/10/00 4:33 PM	-	-	-	-	-	-	-	-	**0.021**	**2.24**	**13**	-	4.3	14.1	4.04	6	0.53	1.48	353
PZ10	PZ100620001645	6/20/00 4:45 PM	-	-	-	-	-	-	-	-	**0.055**	**6.73**	**39**	**25.8**	4.14	19.6	3.73	0	1.06	4.76	419
PZ10	PZ100720001602	7/20/00 4:02 PM	-	-	-	-	-	-	-	-	**0.042**	**7.52**	**34**	-	4.26	19.7	3.66	84	1.79	8.18	331.4
PZ10	PZ100808001559	8/8/00 3:59 PM	-	-	-	-	-	-	-	-	**0.042**	**7.24**	**35**	-	4.35	20	3.43	31	0.699	2.15	391.5
PZ11	PZ111118991437	11/18/99 2:37 PM	-	2000 U	2000 U	2000 U	2000 U	2000 U	**93000**	2000 U	**400**	**400**	0.1 U	-	-	17.3	6.33	32	4.6	1.38	-
PZ11	PZ111201991105	12/1/99 11:05 AM	-	-	-	-	-	-	-	-	**330**	**320**	0.1 U	-	5.02	16.2	6.31	999	3.72	2.22	228.5
PZ11	PZ111202990700	12/2/99 7:00 AM	-	-	-	-	-	-	-	-	**200**	**320**	0.1 U	-	-	16.4	6.4	>1000	3.6	0.4	175
PZ11	PZ111202990800	12/2/99 8:00 AM	-	-	-	-	-	-	-	-	**250**	**350**	0.1 U	-	-	18	6.4	>1000	3.8	1.5	170
PZ11	PZ111202990900	12/2/99 9:00 AM	-	-	-	-	-	-	-	-	**350**	**410**	0.1 U	-	-	18	6.4	>1000	3.8	1.5	109
PZ11	PZ111202991000	12/2/99 10:00 AM	-	-	-	-	-	-	-	-	**330**	**340**	0.1 U	-	-	15.8	6.43	>1000	3.8	2.36	220
PZ11	PZ111202991100	12/2/99 11:00 AM	-	-	-	-	-	-	-	-	**150**	**320**	0.1 U	-	5.06	18	6.44	>1000	3.72	2.27	212.8
PZ11	PZ111202991200	12/2/99 12:00 PM	-	-	-	-	-	-	-	-	**125**	**360**	0.1 U	-	-	17.7	6.5	825	3.6	1.84	222
PZ11	PZ111202991200D	12/2/99 12:00 PM	-	-	-	-	-	-	-	-	**125**	**340**	0.1 U	-	-	-	-	-	-	-	-
PZ11	PZ111202991300	12/2/99 1:00 PM	-	-	-	-	-	-	-	-	**150**	**360**	0.1 U	-	-	18.1	6.38	584	5.88	1.7	-
PZ11	PZ111202991400	12/2/99 2:00 PM	-	-	-	-	-	-	-	-	**150**	**320**	0.1 U	-	-	17.8	6.46	524	3.61	1.76	180
PZ11	PZ111202991500	12/2/99 3:00 PM	-	-	-	-	-	-	-	-	**150**	**250**	0.1 U	-	-	18	6.47	202	3.58	1.88	163
PZ11	PZ111203991030	12/3/99 10:30 AM	-	-	-	-	-	-	-	-	**230 J**	**250**	0.1 U	-	5.35	18	6.54	420	3	3.2	232
PZ11	PZ111204991030	12/4/99 10:30 AM	-	-	-	-	-	-	-	-	**75**	**160**	0.1 U	-	5.31	18	6.64	300	1.55	5.9	203
PZ11	PZ111205991030	12/5/99 10:30 AM	-	-	-	-	-	-	-	-	**150**	**180**	0.1 U	-	5.33	17.7	6.54	140	1.29	6.1	198
PZ11	PZ111206991030	12/6/99 10:30 AM	-	-	-	-	-	-	-	-	**120**	**160**	0.1 U	-	5.35	17.2	6.48	270	1.55	6.39	185

Table 4-1
Pilot Test Analytical Results
Pilot-Scale Treatability Study Report
Stratford Army Engine Plant

LOCATION	SAMPLE ID:	DATE&TIME SAMPLED	DATE&TIME VOCs ANALYZED	VC µg/L	1,1-DCE µg/L	t1,2-DCE µg/L	c1,2-DCE µg/L	1,1,1-TCA µg/L	TCE µg/L	PCE µg/L	Cr(VI) mg/L	Cr(total) mg/L	Fe(II) mg/L	Mn(total) mg/L	DEPTH TO WATER ft. TOR	TEMP. °C	pH	TURB. NTU	COND. mS/cm	D.O. mg/L	ORP mV
PZ11	PZ111207991030	12/7/99 10:30 AM	-	-	-	-	-	-	-	-	**110**	**90**	0.1 U	-	5.28	16.6	6.61	304	1.03	7.5	211
PZ11	PZ111208991030	12/8/99 10:30 AM	-	-	-	-	-	-	-	-	**90**	**140**	0.1 U	-	5.91	16.6	6.59	104	1.52	6.9	-
PZ11	PZ111208991030D	12/8/99 10:30 AM	-	-	-	-	-	-	-	-	**120**	**140**	0.1 U	-	-	-	-	-	-	-	-
PZ11	PZ111209991030	12/9/99 10:30 AM	-	-	-	-	-	-	-	-	**100**	**110**	0.1 U	-	5.91	16.3	6.47	49	1.73	6	
PZ11	PZ111210991030	12/10/99 10:30 AM	-	-	-	-	-	-	-	-	**70**	**90**	0.1 U	-	4.65	15.5	6.78	45	0.55	6.2	281
PZ11	PZ111211990930	12/11/99 9:30 AM	-	-	-	-	-	-	-	-	**1.2**	**79**	0.1 U	-	5.83	14.7	6.49	103	0.778	7.3	442
PZ11	PZ111221991340	12/21/99 1:40 PM	-	-	-	-	-	-	-	-	**200**	**190**	0.1 U	-	4.46	16.7	6.35	354	4.92	1.8	325
PZ11	PZ110119001535	1/19/00 3:35 PM	-	-	-	-	-	-	-	-	**200**	**180**	0.1 U	-	4.79	16.5	6.4	-	4.09	-	253
PZ11	PZ110120001500	1/20/00 3:00 PM	-	-	-	-	-	-	-	-	**68**	**120**	0.1 U	-	5.41	16.3	6.37	-	2.77	-	249
PZ11	PZ110121001500	1/21/00 3:00 PM	-	-	-	-	-	-	-	-	**45**	**52**	0.1 U	-	5.33	15	6.87	-	0.58	-	253
PZ11	PZ110122001500	1/22/00 3:00 PM	-	-	-	-	-	-	-	-	**30**	**38**	0.1 U	-	5.45	14.1	6.49	-	1.13	-	297
PZ11	PZ110123001500	1/23/00 3:00 PM	-	-	-	-	-	-	-	-	**20**	**25**	0.1 U	-	5.46	13.9	6.55	-	0.821	-	477
PZ11	PZ110123001500D	1/23/00 3:00 PM	-	-	-	-	-	-	-	-	**15**	**20**	0.1 U	-	5.46	13.9	6.55	-	0.821	-	477
PZ11	PZ110124001500	1/24/00 3:00 PM	-	-	-	-	-	-	-	-	**25**	**38**	0.1 U	-	5.4	13.6	6.44	-	1.82	-	527
PZ11	PZ110125001500	1/25/00 3:00 PM	-	-	-	-	-	-	-	-	**50**	**50**	0.1 U	-	5.32	13.1	6.39	-	3.34	-	-
PZ11	PZ110126001500	1/26/00 3:00 PM	-	-	-	-	-	-	-	-	**45**	**50**	0.1 U	-	5.6	12.6	6.53	-	2.59	-	-
PZ11	PZ110127001500	1/27/00 3:00 PM	-	-	-	-	-	-	-	-	**25**	**27**	0.1 U	-	5.14	-	-	-	-	-	-
PZ11	PZ110128001500	1/28/00 3:00 PM	-	-	-	-	-	-	-	-	**13**	**23**	0.1 U	-	5.61	11.4	5.93	-	0.349	-	-
PZ11	PZ110129001500	1/29/00 3:00 PM	-	-	-	-	-	-	-	-	**5**	**6.8**	0.1 U	-	5.5	10.1	5.37	-	0.241	-	-
PZ11	PZ110130001500	1/30/00 3:00 PM	-	-	-	-	-	-	-	-	**5**	**4.5**	0.1 U	-	5.31	10.4	4.85	-	0.701	-	-
PZ11	PZ110131001500	1/31/00 3:00 PM	-	-	-	-	-	-	-	-	**0.4**	**2.2**	0.1 U	-	4.7	8.6	5.78	-	0.516	-	149
PZ11	PZ110131001500D	1/31/00 3:00 PM	-	-	-	-	-	-	-	-	**0.4**	**2.2**	0.1 U	-	4.7	8.6	5.78	-	0.516	-	149
PZ11	PZ110201001500	2/1/00 3:00 PM	-	-	-	-	-	-	-	-	**1.3**	**4.5**	0.1 U	-	5.11	14	3.8	-	3.65	-	644
PZ11	PZ110209001430	2/9/00 2:30 PM	-	-	-	-	-	-	-	-	**3.8** J	**3.52**	1 U	-	4.98	11	6.25	13	0.264	-	386
PZ11	PZ110310001420	3/10/00 2:20 PM	-	-	-	-	-	-	-	-	**6**	**3.25**	1 U	-	4.73	14	7.1	124	0.3	7	398
PZ11	PZ110413001410	4/13/00 2:10 PM	-	-	-	-	-	-	-	-	**5.9**	**5.14**	0.5 U	-	-	14.9	6.26	134	0.38	-	429
PZ11	PZ110510001647	5/10/00 4:47 PM	-	-	-	-	-	-	-	-	**6.1**	**5.69**	0.5 U	-	4.33	14.9	6.46	14	0.669	5.28	370
PZ11	PZ110620001810	6/20/00 6:10 PM	-	-	-	-	-	-	-	-	**15**	**14**	0.5 U	**0.086**	4.41	18.2	6.65	101	0.56	5.02	312
PZ11	PZ110720001430	7/20/00 2:30 PM	-	-	-	-	-	-	-	-	**24**	**20.8**	0.5 U	-	4.61	20.6	6.41	13	0.95	4.22	393
PZ1A	PZ1A1118991840	11/18/99 6:40 PM	-	100 U	100 U	100 U	100 U	100 U	100 U	100 U	**0.2**	**2**	0.1 U	-	-	21.4	6.98	0	0.476	1.23	-
PZ1A	PZ1A1130991710	11/30/99 5:10 PM	-	100 U	100 U	100 U	100 U	100 U	100 U	100 U	-	-	-	0.1 U	5.3	21.9	6.78	17	0.421	0.82	-
PZ1A	PZ1A1201991630	12/1/99 4:30 PM	-	100 U	100 U	100 U	100 U	100 U	100 U	100 U	-	-	-	0.1 U	5.28	21.7	6.74	21	3.89	1.99	8.4
PZ1A	PZ1A1202990030	12/2/99 12:30 AM	-	100 U	100 U	100 U	100 U	100 U	100 U	100 U	-	-	-	**0.1**	-	21.4	6.6	4	0.4	0.2	-
PZ1A	PZ1A1202990130	12/2/99 1:30 AM	-	100 U	100 U	100 U	100 U	100 U	100 U	100 U	-	-	-	0.1 U	-	21.7	6.6	1	0.4	0.8	50
PZ1A	PZ1A1202990230	12/2/99 2:30 AM	-	100 U	100 U	100 U	100 U	100 U	100 U	100 U	-	-	-	**0.1**	-	21.7	6.8	0	0.5	1	25
PZ1A	PZ1A1202990330	12/2/99 3:30 AM	-	100 U	100 U	100 U	100 U	100 U	100 U	100 U	-	-	-	0.1 U	-	21.5	6.8	2	0.4	1.2	60
PZ1A	PZ1A1202990330D	12/2/99 3:30 AM	-	100 U	100 U	100 U	100 U	100 U	100 U	100 U	-	-	-	0.1 U	-	-	-	-	-	-	-
PZ1A	PZ1A1202990430	12/2/99 4:30 AM	-	100 U	100 U	100 U	100 U	100 U	100 U	100 U	-	-	-	**0.1**	-	21.6	6.9	2	0.4	1.1	20
PZ1A	PZ1A1202990530	12/2/99 5:30 AM	-	100 U	100 U	100 U	100 U	100 U	100 U	100 U	-	-	-	**0.1**	-	20.7	7.1	0	0.4	1.3	55
PZ1A	PZ1A1202990630	12/2/99 6:30 AM	-	100 U	100 U	100 U	100 U	100 U	100 U	100 U	-	-	-	0.1 U	-	20.6	6	0	0.4	2	192
PZ1A	PZ1A1202990730	12/2/99 7:30 AM	-	100 U	100 U	100 U	100 U	100 U	100 U	100 U	-	-	-	**0.1**	-	21.6	6.7	4	0.4	0.8	4
PZ1A	PZ1A1202990830	12/2/99 8:30 AM	-	100 U	100 U	100 U	100 U	100 U	100 U	100 U	-	-	-	0.1 U	-	21.5	6.6	9	0.4	1.3	175
PZ1A	PZ1A1202991630	12/2/99 4:30 PM	-	100 U	100 U	100 U	100 U	100 U	**100**	100 U	-	-	-	0.1 U	5.28	21.9	6.6	1	0.4	1.3	76
PZ1A	PZ1A1203991630	12/3/99 4:30 PM	-	100 U	100 U	100 U	100 U	100 U	100 U	100 U	-	-	-	0.1 U	21.9	5.25	6.74	10	0.41	1.43	204
PZ1A	PZ1A1204991630	12/4/99 4:30 PM	-	100 U	100 U	100 U	100 U	100 U	100 U	100 U	-	-	-	0.1 U	5.18	22	6.63	5	0.38	1	168
PZ1A	PZ1A1205991630	12/5/99 4:30 PM	-	100 U	100 U	100 U	100 U	100 U	100 U	100 U	-	-	-	0.1 U	5.25	21.9	6.62	2	0.383	0.71	137
PZ1A	PZ1A1206991630	12/6/99 4:30 PM	-	100 U	100 U	100 U	100 U	100 U	100 U	100 U	-	-	-	0.1 U	5.27	21.8	6.58	1	0.37	0.87	185
PZ1A	PZ1A1207991630	12/7/99 4:30 PM	-	100 U	100 U	100 U	100 U	100 U	100 U	100 U	-	-	-	0.1 U	5.27	21.9	6.61	2	0.38	0.34	-
PZ1A	PZ1A1208991630	12/8/99 4:30 PM	-	100 U	100 U	100 U	100 U	100 U	100 U	100 U	-	-	-	0.1 U	5.19	21.8	6.53	2	0.356	0.87	-
PZ1A	PZ1A1209991630	12/9/99 4:30 PM	-	100 U	100 U	100 U	100 U	100 U	100 U	100 U	-	-	-	0.1 U	5.29	21.7	6.55	1	0.347	0.8	420
PZ1A	PZ1A1210991630	12/10/99 4:30 PM	-	100 U	100 U	100 U	100 U	100 U	100 U	100 U	-	-	-	0.1 U	4.78	21.6	6.52	5	0.347	0.9	434
PZ1A	PZ1A1220991515	12/20/99 3:15 PM	-	3 U	**6**	3 U	3 U	**15**	**150**	3 U	-	-	-	0.1 U	5.17	21.9	6.78	0	0.354	0.1	438
PZ1A	PZ1A0119000825	1/19/00 8:25 AM	-	-	-	-	-	-	-	-	-	-	-	**0.1**	5.48	22.1	6.71	-	0.366	1	-
PZ1A	PZ1A0120000750	1/20/00 7:50 AM	-	100 U	100 U	100 U	100 U	100 U	100 U	100 U	-	-	-	**0.1**	5.47	22.3	6.44	-	0.365	-	137
PZ1A	PZ1A0121000800	1/21/00 8:00 AM	-	100 U	100 U	100 U	100 U	100 U	100 U	100 U	-	-	-	**0.1**	5.3	22.1	6.52	-	0.355	-	158
PZ1A	PZ1A0122000800	1/22/00 8:00 AM	-	100 U	100 U	100 U	100 U	100 U	100 U	100 U	-	-	-	**0.1**	5.57	22	6.45	-	358	-	176
PZ1A	PZ1A0123000800	1/23/00 8:00 AM	-	100 U	100 U	100 U	100 U	100 U	100 U	100 U	-	-	-	**0.2**	5.43	21.6	6.37	-	372	-	117
PZ1A	PZ1A0124000800	1/24/00 8:00 AM	1/24/00 8:48 AM	100 U	**110**	100 U	100 U	100 U	100 U	100 U	-	-	-	**0.2**	5.49	21.7	6.49	-	370	-	313
PZ1A	PZ1A0124000800D	1/24/00 8:00 AM	1/24/00 9:06 AM	100 U	100 U	100 U	100 U	100 U	100 U	100 U	-	-	-	**0.2**	5.49	21.7	6.49	-	370	-	313
PZ1A	PZ1A0125000800	1/25/00 8:00 AM	1/25/00 11:20 AM	100 U	100 U	100 U	100 U	100 U	100 U	100 U	-	-	-	0.1 U	5.44	21.6	6.54	-	0.367	-	-

Table 4-1
Pilot Test Analytical Results
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LOCATION	SAMPLE ID:	DATE&TIME SAMPLED	DATE&TIME VOCs ANALYZED	VC µg/L	1,1-DCE µg/L	t1,2-DCE µg/L	c1,2-DCE µg/L	1,1,1-TCA µg/L	TCE µg/L	PCE µg/L	Cr(VI) mg/L	Cr(total) mg/L	Fe(II) mg/L	Mn(total) mg/L	DEPTH TO WATER ft. TOR	TEMP. °C	pH	TURB. NTU	COND. mS/cm	D.O. mg/L	ORP mV
PZ1A	PZ1A0126000800	1/26/00 8:00 AM	1/26/00 9:25 AM	100 U	100 U	100 U	100 U	100 U	100 U	100 U	-	-	-	0.1 U	5.44	21.6	5.79	-	0.384	-	-
PZ1A	PZ1A0127000800	1/27/00 8:00 AM	1/27/00 1:50 PM	100 U	100 U	100 U	100 U	100 U	100 U	100 U	-	-	-	**0.1**	5.5	21.6	5.92	-	0.378	-	-
PZ1A	PZ1A0128000800	1/28/00 8:00 AM	1/28/00 9:44 AM	100 U	100 U	100 U	100 U	100 U	100 U	100 U	-	-	-	**0.2**	5.48	21.4	5.85	-	0.372	-	-
PZ1A	PZ1A0129000800	1/29/00 8:00 AM	1/29/00 9:21 AM	100 U	100 U	100 U	100 U	100 U	100 U	100 U	-	-	-	**0.2**	5.42	21.5	5.32	-	0.369	-	-
PZ1A	PZ1A0130000800	1/30/00 8:00 AM	1/30/00 11:28 AM	100 U	100 U	100 U	100 U	100 U	100 U	100 U	-	-	-	**0.2**	5.55	21.6	5.92	-	0.361	-	-
PZ1A	PZ1A0131000800	1/31/00 8:00 AM	1/31/00 10:20 AM	100 U	100 U	100 U	100 U	100 U	100 U	100 U	-	-	-	**0.2**	5.33	21.5	5.98	-	0.361	-	-
PZ1A	PZ1A0201000800	2/1/00 8:00 AM	2/1/00 9:54 AM	100 U	100 U	100 U	100 U	100 U	100 U	100 U	-	-	-	**0.2**	5.52	21.1	6.19	-	0.38	-	463
PZ1A	PZ1A0208001415	2/8/00 2:15 PM	-	3 U	**5**	3 U	3 U	**10**	**51**	3 U	**0.2**	-	-	**0.567**	5.67	22.1	5.37	0	0.33	-	-
PZ1A	PZ1A0309001540	3/9/00 3:40 PM	-	3 U	**4**	3 U	3 U	**11**	**50**	3 U	**0.32**	**0.382**	-	**0.344**	5.32	22.4	6.43	0	0.314	1.8	489.8
PZ1A	PZ1A0412001352	4/12/00 1:52 PM	-	3 U	**6**	3 U	**1 J**	**13**	**33**	**1 J**	**0.88**	**0.592**	-	**0.327 E**	-	22.6	5.66	0	0.343	0.34	257
PZ1A	PZ1A0509001721	5/9/00 5:21 PM	-	15 U	15 U	15 U	15 U	15 U	**34**	15 U	**0.77**	**0.642**	-	**0.281**	5	21.5	6.42	0	0.35	2	-
PZ1A	PZ1A0619001504	6/19/00 3:04 PM	-	300 U	300 U	300 U	**960**	300 U	**75000**	300 U	**0.67**	**0.679**	-	**0.301**	-	21.8	6.72	0	0.35	2.64	444
PZ1A	PZ1A0718001455	7/18/00 2:55 PM	-	3 U	**4**	3 U	3 U	**5**	**27** J	3 U	**0.49**	**0.474**	-	**0.342**	5.25	23.1	6.33	0.36	0.358	2.23	78.7
PZ1A	PZ1A0809001415	8/9/00 2:15 PM	-	3 U	3 U	3 U	3 U	**4**	**24**	3 U	**0.58 J**	**0.57**	-	**0.348**	4.83	23.3	6.28	0	0.35	2.2	208.1
PZ1B	PZ1B1118991830	11/18/99 6:30 PM	-	10000 U	10000 U	10000 U	10000 U	10000 U	**200000**	10000 U	0.1 U	**2**	**4**	-	-	21	6.9	0	4.18	1.4	-
PZ1B	PZ1B1130991725	11/30/99 5:25 PM	-	2000 U	2000 U	2000 U	**68000**	2000 U	**64000**	2000 U	-	-	-	**1.3**	-	21.4	6.67	11	5.57	1.02	-
PZ1B	PZ1B1201991630	12/1/99 4:30 PM	-	5000 U	5000 U	5000 U	5000 U	5000 U	**220000 J**	5000 U	-	-	-	**0.5**	5.32	21.4	6.74	81	4.27	0.82	66.5
PZ1B	PZ1B1202990030	12/2/99 12:30 AM	-	5000 U	5000 U	5000 U	5000 U	5000 U	**230000**	5000 U	-	-	-	**0.8**	-	21.3	6.7	0	4.4	0.3	-
PZ1B	PZ1B1202990130	12/2/99 1:30 AM	-	5000 U	5000 U	5000 U	5000 U	5000 U	**230000**	5000 U	-	-	-	**0.7**	-	21.3	6.7	0	4.3	1	75
PZ1B	PZ1B1202990230	12/2/99 2:30 AM	-	5000 U	5000 U	5000 U	5000 U	5000 U	**220000**	5000 U	-	-	-	**0.7**	-	21.4	6.7	3	4.3	0.6	80
PZ1B	PZ1B1202990330	12/2/99 3:30 AM	-	5000 U	5000 U	5000 U	5000 U	5000 U	**240000**	5000 U	-	-	-	**0.8**	-	21.4	6.7	1	4.4	1.5	75
PZ1B	PZ1B1202990430	12/2/99 4:30 AM	-	5000 U	5000 U	5000 U	5000 U	5000 U	**220000**	5000 U	-	-	-	**0.75**	-	21.4	6.7	1	4.3	0.8	73
PZ1B	PZ1B1202990530	12/2/99 5:30 AM	-	5000 U	5000 U	5000 U	5000 U	5000 U	**240000**	5000 U	-	-	-	**0.7**	-	21.3	6.7	1	4.2	1.5	89
PZ1B	PZ1B1202990630	12/2/99 6:30 AM	-	5000 U	5000 U	5000 U	5000 U	5000 U	**230000**	5000 U	-	-	-	**0.85**	-	20.6	6.8	5	11.2	2.3	25
PZ1B	PZ1B1202990630D	12/2/99 6:30 AM	-	5000 U	5000 U	5000 U	5000 U	5000 U	**220000**	5000 U	-	-	-	**0.8**	-	-	-	-	-	-	-
PZ1B	PZ1B1202990730	12/2/99 7:30 AM	-	5000 U	5000 U	5000 U	5000 U	5000 U	**220000**	5000 U	-	-	-	**0.7**	-	21.1	6.7	0	4.3	1.1	0
PZ1B	PZ1B1202990830	12/2/99 8:30 AM	-	5000 U	5000 U	5000 U	5000 U	5000 U	**240000**	5000 U	-	-	-	**0.8**	-	21.3	6.7	1	4.4	1.9	40
PZ1B	PZ1B1202991630	12/2/99 4:30 PM	-	5000 U	5000 U	5000 U	5000 U	5000 U	**260000 EJ**	5000 U	-	-	-	**0.6**	5.28	21.6	6.7	0	4.2	1.8	40
PZ1B	PZ1B1203991630	12/3/99 4:30 PM	-	5000 U	5000 U	5000 U	5000 U	5000 U	**240000 J**	5000 U	-	-	-	0.1 U	5.38	21.5	6.7	0	4.39	0.5	10
PZ1B	PZ1B1204991630	12/4/99 4:30 PM	-	5000 U	5000 U	5000 U	5000 U	5000 U	**250000 J**	5000 U	-	-	-	**0.6**	5.4	21.5	6.69	0	4.29	0.9	25
PZ1B	PZ1B1205991630	12/5/99 4:30 PM	-	50000 U	50000 U	50000 U	50000 U	50000 U	**500000**	50000 U	-	-	-	**0.6**	5.43	21.3	6.71	0	4.07	0.91	0.38
PZ1B	PZ1B1206991630	12/6/99 4:30 PM	-	50000 U	50000 U	50000 U	50000 U	50000 U	**430000**	50000 U	-	-	-	**0.8**	5.37	21.2	6.67	0	3.92	0.6	90
PZ1B	PZ1B1207991630	12/7/99 4:30 PM	-	50000 U	50000 U	50000 U	50000 U	50000 U	**350000**	50000 U	-	-	-	**0.6**	5.36	20.8	6.69	0	3.96	0.33	
PZ1B	PZ1B1207991630D	12/7/99 4:30 PM	-	50000 U	50000 U	50000 U	50000 U	50000 U	**360000**	50000 U	-	-	-	**0.6**	-	-	-	-	-	-	-
PZ1B	PZ1B1208991630	12/8/99 4:30 PM	-	50000 U	50000 U	50000 U	50000 U	50000 U	**280000 J**	50000 U	-	-	-	**0.4**	5.45	20.5	6.69	0	3.09	0.52	
PZ1B	PZ1B1209991630	12/9/99 4:30 PM	-	20000 U	20000 U	20000 U	20000 U	20000 U	**190000 J**	20000 U	-	-	-	0.1 U	5.41	20	7.03	0	1.84	2.04	292
PZ1B	PZ1B1210991630	12/10/99 4:30 PM	-	20000 U	20000 U	20000 U	20000 U	20000 U	**120000**	20000 U	**2.5**	22.5	-	**0.1**	5.37	19.9	7.17	0	1.5	3.27	297
PZ1B	PZ1B1220991520	12/20/99 3:20 PM	-	3000 U	3000 U	3000 U	3000 U	3000 U	**370000**	3000 U	-	-	-	0.1 U	5.24	20	7.02	0	3.61	0.1	319
PZ1B	PZ1B0119000830	1/19/00 8:30 AM	-	-	-	-	-	-	-	-	-	-	-	**1**	5.5	20.2	6.83	-	4.5	0.42	-
PZ1B	PZ1B0120000755	1/20/00 7:55 AM	-	50000 U	50000 U	50000 U	50000 U	50000 U	**230000**	50000 U	-	-	-	**0.2**	5.56	20.2	6.56	-	0.338	-	5
PZ1B	PZ1B0121000800	1/21/00 8:00 AM	-	50000 U	50000 U	50000 U	50000 U	50000 U	**290000**	50000 U	-	-	-	**0.4**	5.54	20.2	6.7	-	3.01	-	116
PZ1B	PZ1B0122000800	1/22/00 8:00 AM	-	100000 U	100000 U	100000 U	100000 U	100000 U	**260000**	100000 U	-	-	-	0.1 U	5.59	20.1	6.6	-	2.78	-	139
PZ1B	PZ1B0123000800	1/23/00 8:00 AM	-	100000 U	100000 U	100000 U	100000 U	100000 U	**160000**	100000 U	**0.5**	-	-	**0.2**	5.61	19.8	6.7	-	2.86	-	198
PZ1B	PZ1B0124000800	1/24/00 8:00 AM	1/24/00 10:01 AM	50000 U	50000 U	50000 U	50000 U	50000 U	**150000**	50000 U	-	-	-	0.1 U	5.6	19.7	6.62	-	2.81	-	243
PZ1B	PZ1B0125000800	1/25/00 8:00 AM	1/25/00 12:15 PM	10000 U	10000 U	10000 U	10000 U	10000 U	**42000**	10000 U	-	-	-	0.1 U	5.53	19.3	6.5	-	2.07	-	-
PZ1B	PZ1B0125000800D	1/25/00 8:00 AM	1/25/00 12:33 PM	10000 U	10000 U	10000 U	10000 U	10000 U	**43000**	10000 U	-	-	-	0.1 U	5.53	19.3	6.5	-	2.07	-	-
PZ1B	PZ1B0126000800	1/26/00 8:00 AM	1/26/00 11:14 AM	10000 U	10000 U	10000 U	10000 U	10000 U	**48000 J**	10000 U	-	-	-	0.1 U	5.53	18.9	6.37	-	2.26	-	-
PZ1B	PZ1B0127000800	1/27/00 8:00 AM	1/27/00 3:22 PM	500 U	500 U	500 U	500 U	500 U	**3400**	500 U	-	-	-	**4**	5.56	18.4	6.03	-	1.73	-	-
PZ1B	PZ1B0128000800	1/28/00 8:00 AM	1/28/00 3:05 PM	1000 U	1000 U	1000 U	1000 U	1000 U	**8000**	1000 U	-	-	-	**4**	5.62	18.2	5.92	-	1.77	-	-
PZ1B	PZ1B0129000800	1/29/00 8:00 AM	1/30/00 9:03 AM	100 U	100 U	100 U	100 U	100 U	100 U	100 U	-	-	-	**5.5**	5.66	18	5.92	-	1.33	-	-
PZ1B	PZ1B0130000800	1/30/00 8:00 AM	1/30/00 1:02 PM	100 U	100 U	100 U	100 U	100 U	100 U	100 U	-	-	-	**7.5**	5.66	17.6	5.86	-	1.09	-	-
PZ1B	PZ1B0131000800	1/31/00 8:00 AM	1/31/00 1:42 PM	100 U	100 U	100 U	100 U	100 U	100 U	100 U	-	-	-	**7.5**	5.53	17.3	5.94	-	1.2	-	-
PZ1B	PZ1B0201000800	2/1/00 8:00 AM	2/1/00 2:24 PM	100 U	100 U	100 U	100 U	100 U	100 U	100 U	-	-	-	**9**	5.6	17.1	6.09	-	1.09	-	653
PZ1B	PZ1B0201000800D	2/1/00 8:00 AM	2/1/00 2:42 PM	100 U	100 U	100 U	100 U	100 U	100 U	100 U	-	-	-	**9**	5.6	17.1	6.09	-	1.09	-	653
PZ1B	PZ1B0208001430	2/8/00 2:30 PM	-	300 U	300 U	300 U	**140 J**	300 U	**140000**	300 U	**15**	-	-	**0.943**	5.73	18.4	6.97	5	1.84	2.67	273
PZ1B	PZ1B0309001603	3/9/00 4:03 PM	-	300 U	300 U	300 U	**350**	300 U	**130000 D**	300 U	**3.4**	**8.6**	-	**2.33**	5.36	19	7.16	-	3.43	1.2	309.6
PZ1B	PZ1B0412001432	4/12/00 2:32 PM	-	300 U	300 U	300 U	300 U	300 U	**8500**	300 U	**18**	**19.8**	-	**49 E**	-	19.1	6.42	11	2.87	2.96	581
PZ1B	PZ1B0509001651	5/9/00 4:51 PM	-	300 U	300 U	300 U	**2900**	300 U	**120000 D**	300 U	**7.4**	**4.53**	-	**7.64**	4.95	20.1	6.82	4	4.58	1.44	-
PZ1B	PZ1B0619001545	6/19/00 3:45 PM	-	3 U	**4**	3 U	**2 J**	**9**	**42**	**1 J**	**13**	**15.3**	-	**5.4**	-	20.9	7.26	0	3.57	2.22	195
PZ1B	PZ1B0718001425	7/18/00 2:25 PM	-	300 U	300 U	300 U	**1400**	300 U	**100000**	300 U	**4.2**	**2.21**	-	**7.1**	5.31	21.8	7.15	0	4.3	6.22	-184

Table 4-1
Pilot Test Analytical Results
Pilot-Scale Treatability Study Report
Stratford Army Engine Plant

LOCATION	SAMPLE ID:	DATE&TIME SAMPLED	DATE&TIME VOCs ANALYZED	VC µg/L	1,1-DCE µg/L	t1,2-DCE µg/L	c1,2-DCE µg/L	1,1,1-TCA µg/L	TCE µg/L	PCE µg/L	Cr(VI) mg/L	Cr(total) mg/L	Fe(II) mg/L	Mn(total) mg/L	DEPTH TO WATER ft. TOR	TEMP. °C	pH	TURB. NTU	COND. mS/cm	D.O. mg/L	ORP mV
PZ1B	PZ1B0809001440	8/9/00 2:40 PM	-	300 U	300 U	300 U	**2600**	300 U	**180000**	300 U	**6.1 J**	**4.65**	-	**7.04**	4.71	21.5	7.03	4	5.04	1.51	208
PZ1C	PZ1C1118991900	11/18/99 7:00 PM	-	100 U	100 U	100 U	100 U	100 U	**2800**	100 U	0.1 U	2.3 U	**0.8**	-	-	19.9	6.91	0	8.51	2	-
PZ1C	PZ1C1130991730	11/30/99 5:30 PM	-	100 U	100 U	100 U	100 U	100 U	**2200**	100 U	-	-	-	**1**	5.24	20.7	6.94	17	11.1	1.52	-
PZ1C	PZ1C1201991630	12/1/99 4:30 PM	-	100 U	100 U	100 U	100 U	100 U	**2400**	100 U	-	-	-	**1.2**	5.24	20.6	6.79	8	10.8	1.7	30.5
PZ1C	PZ1C1202990030	12/2/99 12:30 AM	-	100 U	100 U	100 U	100 U	100 U	**2300**	100 U	-	-	-	**1.1**	-	20.6	6.7	2	10.8	0.8	-
PZ1C	PZ1C1202990130	12/2/99 1:30 AM	-	100 U	100 U	100 U	100 U	100 U	**2500**	100 U	-	-	-	**1.2**	-	20.7	6.7	0	8.9	0.9	15
PZ1C	PZ1C1202990230	12/2/99 2:30 AM	-	100 U	100 U	100 U	100 U	100 U	**2400**	100 U	-	-	-	**1.3**	-	20.8	6.9	2	10.9	1.6	40
PZ1C	PZ1C1202990330	12/2/99 3:30 AM	-	100 U	100 U	100 U	100 U	100 U	**2600**	100 U	-	-	-	**1.2**	-	20.9	6.8	2	10.8	2.2	33
PZ1C	PZ1C1202990430	12/2/99 4:30 AM	-	100 U	100 U	100 U	100 U	100 U	**2400**	100 U	-	-	-	**1.1**	-	20.7	7.2	2	10.9	3.1	4.1
PZ1C	PZ1C1202990530	12/2/99 5:30 AM	-	100 U	100 U	100 U	100 U	100 U	**2700**	100 U	-	-	-	**1.4**	-	20.7	6.8	3	8.9	3	24
PZ1C	PZ1C1202990630	12/2/99 6:30 AM	-	100 U	100 U	100 U	100 U	100 U	**2100**	100 U	-	-	-	**1.1**	-	20	6.6	0	4.5	0.6	50
PZ1C	PZ1C1202990730	12/2/99 7:30 AM	-	100 U	100 U	100 U	100 U	100 U	**2400**	100 U	-	-	-	**0.65**	-	19.3	6.66	4	11.2	1.6	155
PZ1C	PZ1C1202990830	12/2/99 8:30 AM	-	100 U	100 U	100 U	100 U	100 U	**2400**	100 U	-	-	-	**1.1**	-	20.6	6.8	0	11.1	1.9	4
PZ1C	PZ1C1202991630	12/2/99 4:30 PM	-	100 U	100 U	100 U	100 U	100 U	**2800 J**	100 U	-	-	-	**0.7**	5.28	20.7	6.8	0	11	1.6	10
PZ1C	PZ1C1202991630D	12/2/99 4:30 PM	-	100 U	100 U	100 U	100 U	100 U	**2800 J**	100 U	-	-	-	**0.8**	-	-	-	-	-	-	-
PZ1C	PZ1C1203991630	12/3/99 4:30 PM	-	200 U	200 U	200 U	200 U	200 U	**2800**	200 U	-	-	-	**1.0**	5.31	20.6	6.7	0	11.6	1.6	187
PZ1C	PZ1C1204991630	12/4/99 4:30 PM	-	100 U	100 U	100 U	100 U	100 U	**2600**	100 U	-	-	-	**1.1**	5.36	20.8	6.7	0	11.3	1.8	15
PZ1C	PZ1C1205991630	12/5/99 4:30 PM	-	200 U	200 U	200 U	200 U	200 U	**2900**	200 U	-	-	-	**1**	5.38	20.8	6.67	2	9.28	1.43	25.2
PZ1C	PZ1C1206991630	12/6/99 4:30 PM	-	200 U	200 U	200 U	200 U	200 U	**3000**	200 U	-	-	-	**1.1**	5.32	20.8	6.61	0	11.4	0.8	6
PZ1C	PZ1C1207991630	12/7/99 4:30 PM	-	200 U	200 U	200 U	200 U	200 U	**2600**	200 U	-	-	-	**1**	5.3	20.5	6.66	0	9.61	1.86	-
PZ1C	PZ1C1208991630	12/8/99 4:30 PM	-	200 U	200 U	200 U	200 U	200 U	**2600 J**	200 U	-	-	-	**1.8**	5.33	20.6	6.59	1	11.8	1.3	-
PZ1C	PZ1C1209991630	12/9/99 4:30 PM	-	200 U	200 U	200 U	200 U	200 U	**2800 J**	200 U	-	-	-	**1.8**	5.35	20.4	6.6	0	11.8	1.66	259
PZ1C	PZ1C1210991630	12/10/99 4:30 PM	-	200 U	200 U	200 U	200 U	200 U	**2700**	200 U	-	-	-	0.1 U	5.28	20.4	6.55	0	12	1.61	364
PZ1C	PZ1C1220991530	12/20/99 3:30 PM	-	60 U	60 U	60 U	60 U	60 U	**4000**	60 U	-	-	-	0.1 U	5.21	20.4	6.96	6	9.1	2.3	310
PZ1C	PZ1C0119000835	1/19/00 8:35 AM	-	-	-	-	-	-	-	-	-	-	-	**1.7**	5.43	20.2	6.81	-	8.85	0.5	-
PZ1C	PZ1C0120000800	1/20/00 8:00 AM	-	200 U	200 U	200 U	**300**	200 U	**350**	200 U	-	-	-	**0.1**	5.43	22.2	6.48	-	0.375	-	46
PZ1C	PZ1C0121000800	1/21/00 8:00 AM	-	500 U	500 U	500 U	500 U	500 U	**2400**	500 U	-	-	-	**1.6**	5.44	20.2	6.84	-	9.1	-	27
PZ1C	PZ1C0122000800	1/22/00 8:00 AM	-	500 U	500 U	500 U	500 U	500 U	**2400**	500 U	-	-	-	**1.4**	5.55	20.2	6.55	-	9.09	-	51
PZ1C	PZ1C0123000800	1/23/00 8:00 AM	-	100 U	100 U	100 U	100 U	100 U	**140**	100 U	-	-	-	**0.2**	5.58	22	6.62	-	0.375	-	208
PZ1C	PZ1C0124000800	1/24/00 8:00 AM	1/24/00 1:21 PM	500 U	500 U	500 U	500 U	500 U	**2600**	500 U	-	-	-	**1.8**	5.63	20.1	6.62	-	9.52	-	249
PZ1C	PZ1C0125000800	1/25/00 8:00 AM	1/25/00 10:44 AM	500 U	500 U	500 U	500 U	500 U	**2400**	500 U	-	-	-	**0.9**	5.48	20	6.64	-	9.6	-	-
PZ1C	PZ1C0126000800	1/26/00 8:00 AM	1/26/00 10:01 AM	500 U	500 U	500 U	500 U	500 U	**3000 J**	500 U	-	-	-	**1.5**	5.43	20	6.52	-	9.71	-	-
PZ1C	PZ1C0126000800D	1/26/00 8:00 AM	1/26/00 10:19 AM	500 U	500 U	500 U	500 U	500 U	**2700 J**	500 U	-	-	-	**1.3**	5.43	20	6.52	-	9.71	-	-
PZ1C	PZ1C0127000800	1/27/00 8:00 AM	1/27/00 3:03 PM	500 U	500 U	500 U	500 U	500 U	**2300**	500 U	-	-	-	**1.1**	5.51	19.9	6.09	-	9.77	-	-
PZ1C	PZ1C0128000800	1/28/00 8:00 AM	1/28/00 10:02 AM	500 U	500 U	500 U	500 U	500 U	**2000**	500 U	-	-	-	**1**	5.51	19.9	6.05	-	9.49	-	-
PZ1C	PZ1C0129000800	1/29/00 8:00 AM	1/29/00 9:39 AM	500 U	500 U	500 U	500 U	500 U	**2000**	500 U	-	-	-	**1.8**	5.57	19.9	6.04	-	9.68	-	-
PZ1C	PZ1C0130000800	1/30/00 8:00 AM	1/30/00 10:16 AM	500 U	500 U	500 U	500 U	500 U	**2200**	500 U	-	-	-	**1.5**	5.5	19.8	5.99	-	9.73	-	-
PZ1C	PZ1C0131000800	1/31/00 8:00 AM	1/31/00 10:38 AM	500 U	500 U	500 U	500 U	500 U	**2400**	500 U	-	-	-	**1.8**	5.4	19.8	5.93	-	9.69	-	-
PZ1C	PZ1C0201000800	2/1/00 8:00 AM	2/1/00 10:12 AM	500 U	500 U	500 U	500 U	500 U	**1900**	500 U	-	-	-	**1.8**	5.49	19.7	6.23	-	9.87	-	410
PZ1C	PZ1C0208001510	2/8/00 3:10 PM	-	60 U	60 U	60 U	**77**	60 U	**3000**	60 U	0.005 U	-	-	**12.8**	5.81	20.1	6.95	1	8.46	1.15	23.4
PZ1C	PZ1C0309001623	3/9/00 4:23 PM	-	150 U	150 U	150 U	150 U	150 U	**2200**	150 U	0.005 U	0.0053 U	-	**11.6**	5.23	20	6.74	-	8.99	1.67	-68
PZ1C	PZ1C0412001714	4/12/00 5:14 PM	-	300 U	300 U	300 U	**55 J**	300 U	**1700**	300 U	**0.005**	**0.0073 B**	-	**11.4 E**	-	19.8	6.67	2	8.52	2.04	9
PZ1C	PZ1C0509001743	5/9/00 5:43 PM	-	150 U	150 U	150 U	150 U	150 U	**2000**	150 U	**0.007**	0.0064 U	-	**10.7**	-	20.2	6.63	1	8.81	1.16	-
PZ1C	PZ1C0619001622	6/19/00 4:22 PM	-	60 U	60 U	60 U	**630**	60 U	**1400**	**13 J**	**0.02**	0.0053 U	-	**12.5**	-	20.7	7.23	0	8.12	1.59	-170
PZ1C	PZ1C0718001421	7/18/00 2:21 PM	-	60 U	60 U	60 U	**960**	60 U	**1000**	60 U	**0.02**	0.0064 U	-	**12.7**	5.15	21.5	7.13	-	0.788	1.31	-179
PZ1C	PZ1C0809001515	8/9/00 3:15 PM	-	3 U	**3**	3 U	**640**	3 U	**750**	**10**	**0.021** J	**0.01**	-	**12.4**	4.76	20.9	7.23	1	8.29	1.61	-25.9
PZ2A	PZ2A1118991535	11/18/99 3:35 PM	-	1000 U	1000 U	1000 U	1000 U	1000 U	**14000**	1000 U	**100**	**55**	0.1 U	-	-	17.6	6.9	0	1.59	3	-
PZ2A	PZ2A1201991135	12/1/99 11:35 AM	-	-	-	-	-	-	-	-	**30**	**23**	0.1 U	-	4.87	16.2	6.92	145	1.12	1.39	87.3
PZ2A	PZ2A1202991100	12/2/99 11:00 AM	-	-	-	-	-	-	-	-	**22.5**	**27**	0.1 U	-	4.89	16.4	6.95	107	1.14	1.1	120
PZ2A	PZ2A1203990630	12/3/99 6:30 AM	-	-	-	-	-	-	-	-	**23**	**35**	0.1 U	-	-	15.9	6.9	15	1.4	2	185
PZ2A	PZ2A1203990630D	12/3/99 6:30 AM	-	-	-	-	-	-	-	-	**23**	**34**	0.1 U	-	-	-	-	-	-	-	-
PZ2A	PZ2A1203990730	12/3/99 7:30 AM	-	-	-	-	-	-	-	-	**43**	**36**	0.1 U	-	-	16	6.95	29	1.28	2.1	230
PZ2A	PZ2A1203990830	12/3/99 8:30 AM	-	-	-	-	-	-	-	-	**40**	**36**	0.1 U	-	-	16.2	7	21	1.3	2.1	217
PZ2A	PZ2A1203990930	12/3/99 9:30 AM	-	-	-	-	-	-	-	-	**28**	**32**	0.1 U	-	-	16	7	52	1.2	1.8	203
PZ2A	PZ2A1203991030	12/3/99 10:30 AM	-	-	-	-	-	-	-	-	**35**	**32**	0.1 U	-	4.83	16.5	7	36	1.2	1.8	190
PZ2A	PZ2A1203991130	12/3/99 11:30 AM	-	-	-	-	-	-	-	-	**50**	**32**	0.1 U	-	-	15.4	6.99	68	1.36	2.5	4.2
PZ2A	PZ2A1203991230	12/3/99 12:30 PM	-	-	-	-	-	-	-	-	**15**	**34**	0.1 U	-	-	16.3	6.96	67	1.3	1.9	208
PZ2A	PZ2A1203991330	12/3/99 1:30 PM	-	-	-	-	-	-	-	-	**24**	**45**	0.1 U	-	-	16.6	6.96	33	2	2	221
PZ2A	PZ2A1203991430	12/3/99 2:30 PM	-	-	-	-	-	-	-	-	**75**	**38**	0.1 U	-	-	16.2	6.95	24	2.2	2.2	228
PZ2A	PZ2A1204991030	12/4/99 10:30 AM	-	-	-	-	-	-	-	-	**18**	**65**	0.1 U	-	4.87	16.4	6.95	13	1.11	1.39	208

Table 4-1
Pilot Test Analytical Results
Pilot-Scale Treatability Study Report
Stratford Army Engine Plant

LOCATION	SAMPLE ID:	DATE&TIME SAMPLED	DATE&TIME VOCs ANALYZED	VC µg/L	1,1-DCE µg/L	t1,2-DCE µg/L	c1,2-DCE µg/L	1,1,1-TCA µg/L	TCE µg/L	PCE µg/L	Cr(VI) mg/L	Cr(total) mg/L	Fe(II) mg/L	Mn(total) mg/L	DEPTH TO WATER ft. TOR	TEMP. °C	pH	TURB. NTU	COND. mS/cm	D.O. mg/L	ORP mV
PZ2A	PZ2A1205991030	12/5/99 10:30 AM	-	-	-	-	-	-	-	-	**35**	**43**	0.1 U	-	4.89	16.5	6.99	6	1.29	3.1	191
PZ2A	PZ2A1206991030	12/6/99 10:30 AM	-	-	-	-	-	-	-	-	**24**	**36**	0.1 U	-	4.91	16.2	6.89	15	1.15	1.07	200.4
PZ2A	PZ2A1207991030	12/7/99 10:30 AM	-	-	-	-	-	-	-	-	**30**	**22**	0.1 U	-	4.86	15.7	6.94	29	1.14	1.36	125
PZ2A	PZ2A1208991030	12/8/99 10:30 AM	-	-	-	-	-	-	-	-	**5.8**	**25**	0.1 U	-	4.91	15.9	6.95	57	1.35	0.65	-
PZ2A	PZ2A1209991030	12/9/99 10:30 AM	-	-	-	-	-	-	-	-	**21**	**24**	0.1 U	-	4.9	15.6	6.75	13	1.08	1.12	-
PZ2A	PZ2A1210991030	12/10/99 10:30 AM	-	-	-	-	-	-	-	-	**28**	**45**	0.1 U	-	4.74	15.5	6.7	47	1.07	0.64	216
PZ2A	PZ2A1211990930	12/11/99 9:30 AM	-	-	-	-	-	-	-	-	**40**	**52**	0.1 U	-	4.88	15.2	6.73	12	1.1	1.37	315
PZ2A	PZ2A1221991410	12/21/99 2:10 PM	-	-	-	-	-	-	-	-	**50**	**45**	0.1 U	-	4.77	15.1	6.92	10	1.5	0.1	260.6
PZ2A	PZ2A0119001515	1/19/00 3:15 PM	-	-	-	-	-	-	-	-	**1.1**	**4.5**	0.1 U	-	5.01	12.2	7.1	-	0.658	-	185
PZ2A	PZ2A0120001500	1/20/00 3:00 PM	-	-	-	-	-	-	-	-	**1.3**	**4.5**	0.1 U	-	2.01	11.4	7.92	-	0.929	-	69
PZ2A	PZ2A0121001500	1/21/00 3:00 PM	-	-	-	-	-	-	-	-	**1.4**	**14**	0.1 U	-	5.05	12.1	8.16	-	0.929	-	229
PZ2A	PZ2A0122001500	1/22/00 3:00 PM	-	-	-	-	-	-	-	-	**1.4**	**11**	0.1 U	-	5.1	12	7.36	-	1.04	-	255
PZ2A	PZ2A0123001500	1/23/00 3:00 PM	-	-	-	-	-	-	-	-	**25**	**32**	0.1 U	-	5.17	12.2	7.34	-	1.11	-	359
PZ2A	PZ2A0124001500	1/24/00 3:00 PM	-	-	-	-	-	-	-	-	**18**	**18**	0.1 U	-	5.15	12.2	7.41	-	1.12	-	409
PZ2A	PZ2A0124001500D	1/24/00 3:00 PM	-	-	-	-	-	-	-	-	**18**	**20**	0.1 U	-	5.15	12.2	7.41	-	1.12	-	409
PZ2A	PZ2A0125001500	1/25/00 3:00 PM	-	-	-	-	-	-	-	-	**50**	**34**	0.1 U	-	5.05	12	7.42	-	1.15	-	-
PZ2A	PZ2A0126001500	1/26/00 3:00 PM	-	-	-	-	-	-	-	-	**35**	**36**	0.1 U	-	5.15	11.9	7.08	-	1.29	-	-
PZ2A	PZ2A0127001500	1/27/00 3:00 PM	-	-	-	-	-	-	-	-	**20**	**23**	0.1 U	-	5.13	11.5	6.7	-	1.28	-	-
PZ2A	PZ2A0128001500	1/28/00 3:00 PM	-	-	-	-	-	-	-	-	**50**	**59**	0.1 U	-	5.19	10.9	6.39	-	1.36	-	-
PZ2A	PZ2A0129001500	1/29/00 3:00 PM	-	-	-	-	-	-	-	-	**30**	**30**	0.1 U	-	5.22	11.4	6.37	-	1.27	-	-
PZ2A	PZ2A0130001500	1/30/00 3:00 PM	-	-	-	-	-	-	-	-	**40**	**61**	0.1 U	-	5.14	11.5	6.47	-	1.3	-	-
PZ2A	PZ2A0131001500	1/31/00 3:00 PM	-	-	-	-	-	-	-	-	**20**	**29**	0.1 U	-	5.06	11	6.56	-	1.28	-	127
PZ2A	PZ2A0201001500	2/1/00 3:00 PM	-	-	-	-	-	-	-	-	**35**	**52**	0.1 U	-	5.05	11	6.76	-	1.28	-	404
PZ2A	PZ2A0201001500D	2/1/00 3:00 PM	-	-	-	-	-	-	-	-	**40**	**54**	0.1 U	-	5.05	11	6.76	-	1.28	-	404
PZ2A	PZ2A0209001420	2/9/00 2:20 PM	-	-	-	-	-	-	-	-	**26** J	**29.6**	1 U	-	5.29	10.4	7.08	4	1.1	1.63	337.1
PZ2A	PZ2A0310001433	3/10/00 2:33 PM	-	-	-	-	-	-	-	-	**16**	**13.4**	1 U	-	5.03	10.6	7.09	2	0.91	1.62	194
PZ2A	PZ2A0413001504	4/13/00 3:04 PM	-	-	-	-	-	-	-	-	**20**	**15.8**	**0.8**	-	-	13.2	6.75	6	0.707	1.99	318
PZ2A	PZ2A0510001533	5/10/00 3:33 PM	-	-	-	-	-	-	-	-	**8.9**	**8.07**	0.5 U	-	4.9	13.9	6.88	0	0.38	3.28	251
PZ2A	PZ2A0608001517	6/20/00 3:17 PM	-	-	-	-	-	-	-	-	**9.4**	**8.3**	0.5 U	**1**	4.7	19.5	7.2	0	0.51	1.5	290
PZ2A	PZ2A0720001700	7/20/00 5:00 PM	-	-	-	-	-	-	-	-	**13**	**11.6**	0.5 U	-	4.86	21.9	7.32	0	0.56	2.08	248
PZ2A	PZ2A0808001418	8/8/00 2:18 PM	-	-	-	-	-	-	-	-	**9.1**	**8.82**	0.5 U	-	4.65	23.4	7.02	0	0.436	0.76	164.7
PZ2B	PZ2B1118991510	11/18/99 3:10 PM	-	2000 U	2000 U	2000 U	2000 U	2000 U	**77000**	2000 U	**200**	**280**	0.1 U	-	-	17.1	6.19	0	4.4	1.46	-
PZ2B	PZ2B1201991135	12/1/99 11:35 AM	-	-	-	-	-	-	-	-	**280**	**290**	0.1 U	-	4.93	17.7	6.07	22	4.31	1.14	158.8
PZ2B	PZ2B1202991100	12/2/99 11:00 AM	-	-	-	-	-	-	-	-	**50**	**270**	0.1 U	-	4.84	18	5.79	3	3.53	2.33	207
PZ2B	PZ2B1203990630	12/3/99 6:30 AM	-	-	-	-	-	-	-	-	**150**	**140**	0.1 U	-	-	16.5	5.7	3	2.6	4.5	250
PZ2B	PZ2B1203990730	12/3/99 7:30 AM	-	-	-	-	-	-	-	-	**150**	**158**	0.1 U	-	-	16.8	5.7	1	2.5	5.9	252
PZ2B	PZ2B1203990830	12/3/99 8:30 AM	-	-	-	-	-	-	-	-	**180**	**180**	0.1 U	-	-	17.3	5.8	2	2.4	5.5	242
PZ2B	PZ2B1203990930	12/3/99 9:30 AM	-	-	-	-	-	-	-	-	**180**	**160**	0.1 U	-	-	17.4	5.8	3	2.3	5.2	230
PZ2B	PZ2B1203991030	12/3/99 10:30 AM	-	-	-	-	-	-	-	-	**150**	**160**	0.1 U	-	4.97	17.7	5.8	5	2.3	5	220
PZ2B	PZ2B1203991130	12/3/99 11:30 AM	-	-	-	-	-	-	-	-	**130**	**160**	0.1 U	-	-	17.4	5.7	9	2.3	5.5	4
PZ2B	PZ2B1203991230	12/3/99 12:30 PM	-	-	-	-	-	-	-	-	**150**	**140**	0.1 U	-	-	17.4	5.6	6	2.2	5	205
PZ2B	PZ2B1203991330	12/3/99 1:30 PM	-	-	-	-	-	-	-	-	**130**	**160**	0.1 U	-	-	17.7	5.6	7	2.22	5.2	227
PZ2B	PZ2B1203991430	12/3/99 2:30 PM	-	-	-	-	-	-	-	-	**150**	**140**	0.1 U	-	-	17.3	5.5	7	2.21	5.4	224
PZ2B	PZ2B1204991030	12/4/99 10:30 AM	-	-	-	-	-	-	-	-	**50**	**45**	0.1 U	-	4.98	17.1	3.7	102	2.1	5.6	407
PZ2B	PZ2B1205991030	12/5/99 10:30 AM	-	-	-	-	-	-	-	-	0.1 U	**6.8**	**10**	-	4.99	16.8	3.61	256	1.52	6	379
PZ2B	PZ2B1206991030	12/6/99 10:30 AM	-	-	-	-	-	-	-	-	0.1 U	**2.3**	**15**	-	5.15	16.2	3.66	126	1.5	5.91	319
PZ2B	PZ2B1207991030	12/7/99 10:30 AM	-	-	-	-	-	-	-	-	0.1 U	2.3 U	**85**	-	4.97	15.8	3.92	36	1.73	6.8	295
PZ2B	PZ2B1208991030	12/8/99 10:30 AM	-	-	-	-	-	-	-	-	0.1 U	2.3 U	**50**	-	5.26	15.7	3.97	41	1.94	6.3	-
PZ2B	PZ2B1209991030	12/9/99 10:30 AM	-	-	-	-	-	-	-	-	0.1 U	2.3 U	**30**	-	5.25	15.6	4.1	11	2.5	5.41	-
PZ2B	PZ2B1210991030	12/10/99 10:30 AM	-	-	-	-	-	-	-	-	0.1 U	2.3 U	**88**	-	4.69	15.4	3.82	48	2.35	5	266
PZ2B	PZ2B1211990930	12/11/99 9:30 AM	-	-	-	-	-	-	-	-	0.1 U	2.3 U	**35**	-	5.24	14.8	3.91	25	2.82	5.4	230
PZ2B	PZ2B1221991430	12/21/99 2:30 PM	-	-	-	-	-	-	-	-	0.1 U	**2.82**	**6**	-	4.81	16	3.57	10	3.27	0.1	377.2
PZ2B	PZ2B0119001520	1/19/00 3:20 PM	-	-	-	-	-	-	-	-	0.1 U	2.3 U	**20**	-	5.11	16.6	3.75	-	2.74	-	169
PZ2B	PZ2B0120001500	1/20/00 3:00 PM	-	-	-	-	-	-	-	-	0.1 U	2.3 U	**8**	-	5.1	14.5	3.73	-	2.96	-	109
PZ2B	PZ2B0121001500	1/21/00 3:00 PM	-	-	-	-	-	-	-	-	0.1 U	2.3 U	**35**	-	5.06	15.2	3.86	-	3.16	-	358
PZ2B	PZ2B0122001500	1/22/00 3:00 PM	-	-	-	-	-	-	-	-	0.1 U	2.3 U	**110**	-	5.17	13.8	3.54	-	3.1	-	269
PZ2B	PZ2B0123001500	1/23/00 3:00 PM	-	-	-	-	-	-	-	-	0.1 U	**2.3**	**100**	-	5.18	12.9	3.67	-	3.22	-	654
PZ2B	PZ2B0124001500	1/24/00 3:00 PM	-	-	-	-	-	-	-	-	0.1 U	2.3 U	**85**	-	5.1	12	3.65	-	3.06	-	682
PZ2B	PZ2B0125001500	1/25/00 3:00 PM	-	-	-	-	-	-	-	-	0.1 U	2.3 U	**90**	-	5.04	11.4	3.76	-	2.85	-	-
PZ2B	PZ2B0125001500D	1/25/00 3:00 PM	-	-	-	-	-	-	-	-	0.1 U	2.3 U	**90**	-	5.04	11.4	3.76	-	2.85	-	-

Table 4-1
Pilot Test Analytical Results
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Stratford Army Engine Plant

LOCATION	SAMPLE ID:	DATE&TIME SAMPLED	DATE&TIME VOCs ANALYZED	VC µg/L	1,1-DCE µg/L	t1,2-DCE µg/L	c1,2-DCE µg/L	1,1,1-TCA µg/L	TCE µg/L	PCE µg/L	Cr(VI) mg/L	Cr(total) mg/L	Fe(II) mg/L	Mn(total) mg/L	DEPTH TO WATER ft. TOR	TEMP. °C	pH	TURB. NTU	COND. mS/cm	D.O. mg/L	ORP mV
PZ2B	PZ2B0126001500	1/26/00 3:00 PM	-	-	-	-	-	-	-	-	0.1 U	2.3 U	**110**	-	5.15	10.9	3.54	-	2.78	-	-
PZ2B	PZ2B0127001500	1/27/00 3:00 PM	-	-	-	-	-	-	-	-	0.1 U	2.3 U	**125**	-	5.07	10.6	3.18	-	2.79	-	-
PZ2B	PZ2B0128001500	1/28/00 3:00 PM	-	-	-	-	-	-	-	-	0.1 U	2.3 U	**180**	-	5.25	10.3	3.12	-	2.74	-	-
PZ2B	PZ2B0129001500	1/29/00 3:00 PM	-	-	-	-	-	-	-	-	0.1 U	2.3 U	**130**	-	5.25	10.2	3.18	-	2.76	-	-
PZ2B	PZ2B0130001500	1/30/00 3:00 PM	-	-	-	-	-	-	-	-	0.1 U	2.3 U	**260**	-	5.21	10.2	3.18	-	2.75	-	-
PZ2B	PZ2B0131001500	1/31/00 3:00 PM	-	-	-	-	-	-	-	-	0.1 U	2.3 U	**150**	-	4.89	10.1	3.63	-	2.72	-	276
PZ2B	PZ2B0201001500	2/1/00 3:00 PM	-	-	-	-	-	-	-	-	0.1 U	2.3 U	**110**	-	4.95	9.8	3.55	-	2.53	-	670
PZ2B	PZ2B0209001440	2/9/00 2:40 PM	-	-	-	-	-	-	-	-	**0.011 J**	**1.73**	**1.1**	-	5.28	12.2	3.22	0	2.6	2.89	315.9
PZ2B	PZ2B0310001451	3/10/00 2:51 PM	-	-	-	-	-	-	-	-	**0.007**	**1.57**	**49**	-	5.05	14.2	3.14	2	2.55	0.88	266.3
PZ2B	PZ2B0413001524	4/13/00 3:24 PM	-	-	-	-	-	-	-	-	**0.009**	**1.18**	**120**	-	-	15.6	3.45	4	2.57	2.51	367.4
PZ2B	PZ2B0510001441	5/10/00 2:41 PM	-	-	-	-	-	-	-	-	**0.007**	**0.999**	**4.9**	-	4.71	15.3	5.88	3	9.1	2.3	290
PZ2B	PZ2B0608201409	6/20/00 2:09 PM	-	-	-	-	-	-	-	-	0.005 U	**0.793**	**39**	**28.7**	4.72	19.9	3.74	0	2.51	0.95	451
PZ2B	PZ2B0720001555	7/20/00 3:55 PM	-	-	-	-	-	-	-	-	**0.005**	**0.641**	**27**	-	4.9	19	3.84	0	2.44	3.2	282
PZ2B	PZ2B0808001450	8/8/00 2:50 PM	-	-	-	-	-	-	-	-	0.005 U	**0.696**	**31**	-	4.6	21.1	3.66	11	2.36	1.39	225.7
PZ2C	PZ2C1118991447	11/18/99 2:47 PM	-	2000 U	2000 U	2000 U	2000 U	2000 U	**27000**	2000 U	**130**	**120**	0.1 U	-	-	17.2	6.23	0	12.3	1.05	-
PZ2C	PZ2C1201991140	12/1/99 11:40 AM	-	-	-	-	-	-	-	-	**180**	**180**	0.1 U	-	5.04	16.8	6.08	8	12.5	1.69	208.4
PZ2C	PZ2C1202991100	12/2/99 11:00 AM	-	-	-	-	-	-	-	-	**10**	**6.8**	0.1 U	-	5.02	17.4	6.39	1	14	1.68	220
PZ2C	PZ2C1203990630	12/3/99 6:30 AM	-	-	-	-	-	-	-	-	**1.2**	**2.3**	0.1 U	-	-	17.2	6.4	0	14.5	0.9	216
PZ2C	PZ2C1203990730	12/3/99 7:30 AM	-	-	-	-	-	-	-	-	**7.5**	**4.5**	0.1 U	-	-	17.2	6.3	0	14.5	1	263
PZ2C	PZ2C1203990830	12/3/99 8:30 AM	-	-	-	-	-	-	-	-	**7.5**	**22**	0.1 U	-	-	17.4	6.35	0	14.5	1.9	257
PZ2C	PZ2C1203990930	12/3/99 9:30 AM	-	-	-	-	-	-	-	-	**7.5**	**5**	0.1 U	-	-	17.5	6.4	0	14.5	1.8	252
PZ2C	PZ2C1203991030	12/3/99 10:30 AM	-	-	-	-	-	-	-	-	**5**	**2**	0.1 U	-	4.94	17.7	6.4	0	14.5	1	238
PZ2C	PZ2C1203991130	12/3/99 11:30 AM	-	-	-	-	-	-	-	-	**1.2**	**2**	0.1 U	-	-	17.5	6.3	0	14.5	1.5	4.1
PZ2C	PZ2C1203991230	12/3/99 12:30 PM	-	-	-	-	-	-	-	-	**5**	**4.5**	0.1 U	-	-	17.8	6.34	0	14.6	0.8	229
PZ2C	PZ2C1203991330	12/3/99 1:30 PM	-	-	-	-	-	-	-	-	**1.3**	**4.5**	0.1 U	-	-	18	6.37	0	14.5	0.9	247
PZ2C	PZ2C1203991430	12/3/99 2:30 PM	-	-	-	-	-	-	-	-	**5**	**4.5**	0.1 U	-	-	17.5	6.4	0	14.4	0.9	266
PZ2C	PZ2C1203991430D	12/3/99 2:30 PM	-	-	-	-	-	-	-	-	**5**	**4.5**	0.1 U	-	-	-	-	-	-	-	-
PZ2C	PZ2C1204991030	12/4/99 10:30 AM	-	-	-	-	-	-	-	-	**0.3**	**2.3**	0.1 U	-	4.95	17.9	6.15	0	14.2	0.94	322
PZ2C	PZ2C1205991030	12/5/99 10:30 AM	-	-	-	-	-	-	-	-	**0.85**	**2.3**	0.1 U	-	4.94	17.8	6.13	0	14.3	1.3	264
PZ2C	PZ2C1206991030	12/6/99 10:30 AM	-	-	-	-	-	-	-	-	**0.65**	**2.3**	0.1 U	-	4.92	17.7	6.03	0	14.3	0.72	251.3
PZ2C	PZ2C1207991030	12/7/99 10:30 AM	-	-	-	-	-	-	-	-	**0.35**	**2.3**	0.1 U	-	4.89	17.4	6.43	1	14.6	0.64	220
PZ2C	PZ2C1207991030D	12/7/99 10:30 AM	-	-	-	-	-	-	-	-	**0.35**	**2.3**	0.1 U	-	-	-	-	-	-	-	-
PZ2C	PZ2C1208991030	12/8/99 10:30 AM	-	-	-	-	-	-	-	-	**0.15**	**0.45**	0.1 U	-	-	17.2	6.12	0	15	1.5	-
PZ2C	PZ2C1209991030	12/9/99 10:30 AM	-	-	-	-	-	-	-	-	**0.2**	**2.3**	0.1 U	-	4.95	17	6.02	0	14.9	0.57	-
PZ2C	PZ2C1210991030	12/10/99 10:30 AM	-	-	-	-	-	-	-	-	**0.28**	**2.3**	0.1 U	-	4.86	17.2	5.95	6	15.1	0.6	127
PZ2C	PZ2C1211990930	12/11/99 9:30 AM	-	-	-	-	-	-	-	-	**0.2**	2.3 U	0.1 U	-	5.17	16.9	5.83	0	15.2	0.9	280
PZ2C	PZ2C1221991440	12/21/99 2:40 PM	-	-	-	-	-	-	-	-	**20**	**16.7**	0.1 U	-	4.91	16.7	6.37	10	15.3	0.1	193.5
PZ2C	PZ2C0119001525	1/19/00 3:25 PM	-	-	-	-	-	-	-	-	**140**	**100**	0.1 U	-	5.22	16.5	5.69	-	8.82	-	251
PZ2C	PZ2C0120001500	1/20/00 3:00 PM	-	-	-	-	-	-	-	-	**20**	**32**	0.1 U	-	5.09	15.7	5.94	-	10.1	-	120
PZ2C	PZ2C0121001500	1/21/00 3:00 PM	-	-	-	-	-	-	-	-	**7.5**	**6.8**	0.1 U	-	4.97	16.6	6.21	-	10.3	-	127
PZ2C	PZ2C0122001500	1/22/00 3:00 PM	-	-	-	-	-	-	-	-	**5**	**4.5**	0.1 U	-	5.17	16.5	5.95	-	10.5	-	188
PZ2C	PZ2C0123001500	1/23/00 3:00 PM	-	-	-	-	-	-	-	-	**0.9**	**2.3**	**0.5**	-	5.07	16.7	5.97	-	11.2	-	473
PZ2C	PZ2C0124001500	1/24/00 3:00 PM	-	-	-	-	-	-	-	-	**0.9**	**2.3**	0.1 U	-	5.1	16.6	5.87	-	11	-	518
PZ2C	PZ2C0125001500	1/25/00 3:00 PM	-	-	-	-	-	-	-	-	**0.4**	**2.3**	0.1 U	-	4.95	16.4	5.84	-	11.3	-	-
PZ2C	PZ2C0126001500	1/26/00 3:00 PM	-	-	-	-	-	-	-	-	**0.3**	**2.3**	0.1 U	-	5.21	5.71	16.3	-	11.3	-	-
PZ2C	PZ2C0126001500D	1/26/00 3:00 PM	-	-	-	-	-	-	-	-	**0.3**	**2.3**	0.1 U	-	5.21	5.71	16.3	-	11.3	-	-
PZ2C	PZ2C0127001500	1/27/00 3:00 PM	-	-	-	-	-	-	-	-	**0.2**	**2.3**	**1.4**	-	5.25	16.3	5.55	-	11.4	-	-
PZ2C	PZ2C0128001500	1/28/00 3:00 PM	-	-	-	-	-	-	-	-	**0.4**	**2.3**	0.1 U	-	5.36	16.4	5.38	-	11.4	-	-
PZ2C	PZ2C0129001500	1/29/00 3:00 PM	-	-	-	-	-	-	-	-	**0.3**	**2.3**	0.1 U	-	5.34	16.2	5.33	-	11.5	-	-
PZ2C	PZ2C0130001500	1/30/00 3:00 PM	-	-	-	-	-	-	-	-	**0.15**	**2.3**	**0.4**	-	5.34	16.5	5.29	-	11.6	-	-
PZ2C	PZ2C0131001500	1/31/00 3:00 PM	-	-	-	-	-	-	-	-	0.1 U	2.3 U	**40**	-	5.16	16.1	5.76	-	11.6	-	146
PZ2C	PZ2C0201001500	2/1/00 3:00 PM	-	-	-	-	-	-	-	-	0.1 U	**2.3**	**0.6**	-	5.23	15.9	5.7	-	11.7	-	462
PZ2C	PZ2C0209001500	2/9/00 3:00 PM	-	-	-	-	-	-	-	-	0.005 UJ	**0.719**	1 U	-	5.34	15.7	5.99	1	10.6	1.49	67.1
PZ2C	PZ2C0310001510	3/10/00 3:10 PM	-	-	-	-	-	-	-	-	**25**	**184**	1 U	-	5.1	15.7	5.95	6	10.1	1.26	272.1
PZ2C	PZ2C0413001539	4/13/00 3:39 PM	-	-	-	-	-	-	-	-	**320**	**332**	**1**	-	-	16	6.16	4	8.26	2.39	308.7
PZ2C	PZ2C0510001513	5/10/00 3:13 PM	-	-	-	-	-	-	-	-	**0.28**	**327**	**0.77**	-	4.85	15.1	3.5	0	2.58	2	266
PZ2C	PZ2C0608201451	6/20/00 2:51 PM	-	-	-	-	-	-	-	-	**390**	**296**	**0.95**	**6.96**	4.74	19.4	6.38	0	8.5	2.07	250
PZ2C	PZ2C0720001621	7/20/00 4:21 PM	-	-	-	-	-	-	-	-	**270**	**258**	**0.58**	-	4.94	19.1	6.27	1	9.24	2.33	317
PZ2C	PZ2C0808001340	8/8/00 1:40 PM	-	-	-	-	-	-	-	-	**470**	**419**	**33**	-	4.63	21.2	6.29	13	7.39	2.23	183.7

Table 4-1
Pilot Test Analytical Results
Pilot-Scale Treatability Study Report
Stratford Army Engine Plant

LOCATION	SAMPLE ID:	DATE&TIME SAMPLED	DATE&TIME VOCs ANALYZED	VC µg/L	1,1-DCE µg/L	t1,2-DCE µg/L	c1,2-DCE µg/L	1,1,1-TCA µg/L	TCE µg/L	PCE µg/L	Cr(VI) mg/L	Cr(total) mg/L	Fe(II) mg/L	Mn(total) mg/L	DEPTH TO WATER ft. TOR	TEMP. °C	pH	TURB. NTU	COND. mS/cm	D.O. mg/L	ORP mV

NOTES:
All data presented was generated on site except for cells that are shaded. Off-site data was entered for graphing purposes where on-site data was not available.
All VOC results represent analysis results after allowing time for sample reactions to procede in the sample jar.
Off-site data for samples collected in February 8, 2000 and after have not been validated.

µg/L=	micrograms per liter	Trichloroethene	FT=	Frac Tank
mg/L=	milligrams per liter	Tetrachloroethene	°C=	Degrees Celsius
mS/cm=	millisiements per centi	Top of Riser	Mn(total)=	Total Manganese
mV=	millivolts	Dissolved Oxygen	Cr(VI)=	Hexavalent Chromium
VC=	Vinyl Chloide	Oxidation Reduction Potential	Cr(total)=	Total Chromium
1,1-DCE=	1,1-Dichloroethene	Extraction Well	Fe(II)=	Ferrous Iron
t1,2-DCE=	trans-1,2-Dichloroethe	Injection Well	NTU=	Nephelometric Turbidity Units
c1,2-DCE=	cis-1,2-Dichloroethene	Piezometer	Temp.=	Temperature
1,1,1-TCA=	1,1,1-Trichloroethane	Carbon Unit 1 Effluent	Turb.=	Turbidity
			Cond.=	Conductivity

OFF-SITE ANALYTICAL RESULTS

DATA VALIDATION SUMMARY REPORT
OU2 PILOT STUDY
STRATFORD ARMY ENGINE PLANT
March 27, 2000

1.0 INTRODUCTION

The purpose of this report is to summarize data validation activities and actions for aqueous samples collected during the OU2 Pilot study. Samples were collected by HLA in November 1999 through February 1, 2000 and analyzed by Laucks Testing Laboratory in Seattle Washington. Data validation was completed by Environmental Data Quality, Inc., in Exton, Pennsylvania using USEPA Region I Tier II guidelines (USEPA, 1996). Results were reported in delivery groups identified as STR01 through STR11.

1.1 Analytical Methods

The analytical program included the following methods:

- Volatile Organic Compounds by Method 5035/ 8260B
- Hexavalent Chromium by Method 7196A
- Manganese and Chromium by Method 6010B

2.0 DATA QUALITY EVALUATION

The majority of the results provided by the laboratory were determined to be adequate for use in contamination and risk evaluations. A subset of results has been qualified as estimated J values based on the validation guidance. For some results potential bias have been identified for the reported results. A subset of results have also been qualified rejected R and are considered to be unusable. Unless noted below quality control measurements associated with these data sets were within method specifications. A summary of validation actions is provided in the following subsections for each analytical method.

2.1 VOA

For some samples dilution reanalyses were necessary to bring target compounds into the instrument calibration range. Sample results from the original and dilution analyses have been combined to obtain final results for all target compounds. The following data validation actions were completed:

- Positive detections of acetone were qualified non-detect U in a subset of samples due to associated blank contamination.

- Results for xlyenes and styrene in samples EW020120000730, PZ05012000800, PZ1A0124000800, PZ1C0126000800, and PZ1B0125000800 were qualified

estimated J due to continuing calibration response. Results were non-detect in these samples.

- Results for chloromethane, carbon disulfide, styrene, 2-butanone, 4-methyl-2-pentanone, and 2-hexanone in a subset of samples were qualified estimated J due to initial or continuing calibration response.

- Results for acetone and 2-butanone in subset of samples have been rejected R due to low response in calibration standards.

- Low recovery was reported in matrix spikes associated with samples EW021210991630, EW031205991030, FT031204991730, FT041207990800, EW021208991630, and PZ1B1207991630. Results were qualified estimated J with a potential low bias.

2.2 Hexavalent Chromium

- Results for samples EW0301190001500, PZ090121001500 were qualified estimated J due to missed holding times. The 24 hour holding time specified in the method was exceeded by one hour. Results are interpreted to be usable with a possible low bias.

- Results for samples EW020131000800, EW02013100080D, PZ110131001500, and PZ2A0201001500 in STR09, samples EW031201991150, PZ091202990630, PZ081202991100, and PZ111202991200 in STR04, and all samples in STR11 were qualified estimated J due to missed holding times. Results are interpreted to be usable with a possible low bias.

- Results for hexavalent chromium in samples PZ9910032XX and PZ9910032XD were qualified estimated J due to low recovery reported in the associated matrix spike. Results may be biased low.

2.3 Inorganics (manganese and chromium)

- Results for chromium in samples EW0301190001500, PZ080120001500, and PZ090121001500 results were qualified estimated J due to differences in the associated laboratory duplicate analysis.

- Results for manganese in samples IW071118991600 and PZ071118991700 were qualified estimated J due to differences in the associated laboratory duplicate analysis

- Results for chromium in samples IW9906032XX, IW9907032XX, PZ99098032XX, and IW9905032XX were qualified estimated J due to serial dilution results.

- Results for manganese in sample PZ051220991420, IW9904030XX, IW9902030XX, PZ9907030XX, and PZ9905030XX were qualified estimated J due to low recovery in the associated matrix spike. Results are potentially biased low.

References:

U.S. Environmental Protection Agency (USEPA), 1996. "Region 1 EPA-NE Data Validation Guidelines For Evaluating Environmental Analyses"; Quality Assurance Unit Staff; Office of Environmental Measurement and Evaluation; December 1996

Table C-1
Off-site Soil Data
Pilot-Scale Treatability Study Report
Stratford Army Engine Plant

			SAMPLE ID:	EW9902030XX		EW9903032XX		IW9901030XX		IW9902030XX		IW9903030XX	
			DATE COLLECTED:	11/9/99		11/9/99		11/10/99		11/11/99		11/12/99	
			SAMPLE DELIVERY GROUP NO.:	STR01		STR01		STR01		STR01		STR01	
ANALYTE CATEGORY	ANALYTE	CAS NO.	UNITS	Result	Final Qual	Result	Final Qual	Result	Final Qual	Result	Final Qual	Result	Final Qual
Inorganics	Chromium	7440-47-3	MG/KG	34.8		19		7		12.4		36.7	
	Chromium, Hexavalent	18540-29-9	MG/KG	1.1		0.8		0.8		0.8		0.58	
	Manganese	7439-96-5	MG/KG	114				107		91.9	J	134	
TOC	Total Organic Carbon	7440-44-0	PERCENT	0.16				0.11		0.18		0.1	U
VOA	1,1,1-Trichloroethane	71-55-6	UG/KG	350	U	300	U	380	U	330	U	350	U
	1,1,2,2-Tetrachloroethane	79-34-5	UG/KG	350	U	300	U	380	U	330	U	350	U
	1,1,2-Trichloroethane	79-00-5	UG/KG	350	U	300	U	380	U	330	U	350	U
	1,1-Dichloroethane	75-34-3	UG/KG	350	U	300	U	380	U	330	U	350	U
	1,1-Dichloroethene	75-35-4	UG/KG	350	U	300	U	380	U	330	U	350	U
	1,2-Dichloroethane	107-06-2	UG/KG	350	U	300	U	380	U	330	U	350	U
	1,2-Dichloropropane	78-87-5	UG/KG	350	U	300	U	380	U	330	U	350	U
	2-Butanone	78-93-3	UG/KG	590	UJ	490	UJ	640	UJ	550	UJ	590	U
	2-Hexanone	591-78-6	UG/KG	590	UJ	490	UJ	640	UJ	550	UJ	590	U
	4-Methyl-2-pentanone	108-10-1	UG/KG	590	UJ	490	UJ	640	UJ	550	UJ	590	U
	Acetone	67-64-1	UG/KG	590	R	490	R	640	R	550	R	590	R
	Benzene	71-43-2	UG/KG	350	U	300	U	380	U	330	U	350	U
	Bromodichloromethane	75-27-4	UG/KG	350	U	300	U	380	U	330	U	350	U
	Bromoform	75-25-2	UG/KG	350	U	300	U	380	U	330	U	350	U
	Bromomethane	74-83-9	UG/KG	350	U	300	U	380	U	330	U	350	U
	Carbon disulfide	75-15-0	UG/KG	350	UJ	300	UJ	380	UJ	330	U	350	U
	Carbon tetrachloride	56-23-5	UG/KG	350	U	300	U	380	U	330	U	350	U
	Chlorobenzene	108-90-7	UG/KG	350	U	300	U	380	U	330	U	350	U
	Chloroethane	75-00-3	UG/KG	350	U	300	U	380	U	330	U	350	U
	Chloroform	67-66-3	UG/KG	350	U	300	U	380	U	330	U	350	U
	Chloromethane	74-87-3	UG/KG	350	U	300	U	380	U	330	U	350	U
	cis-1,2-Dichloroethene	156-59-2	UG/KG	350	U	300	U	380	U	330	U	350	U
	cis-1,3-Dichloropropene	10061-01-5	UG/KG	350	U	300	U	380	U	330	U	350	U
	Dibromochloromethane	124-48-1	UG/KG	350	U	300	U	380	U	330	U	350	U
	Ethylbenzene	100-41-4	UG/KG	350	U	300	U	380	U	330	U	350	U
	m,p-Xylene	108-38-3	UG/KG	350	U	300	U	380	U	330	U	350	U
	Methylene chloride	75-09-2	UG/KG	350	U	300	U	380	U	330	U	350	U
	o-Xylene	95-47-6	UG/KG	350	U	300	U	380	U	330	U	350	U
	Styrene	100-42-5	UG/KG	350	U	300	U	380	U	330	U	350	U
	Tetrachloroethene	127-18-4	UG/KG	350	U	300	U	380	U	330	U	350	U
	Toluene	108-88-3	UG/KG	350	U	300	U	380	U	330	U	350	U
	trans-1,2-Dichloroethene	156-60-5	UG/KG	350	U	300	U	380	U	330	U	350	U
	trans-1,3-Dichloropropene	10061-02-6	UG/KG	350	U	300	U	380	U	330	U	350	U
	Trichloroethene	79-01-6	UG/KG	670		300	U	57,000		37,000		86,000	
	Vinyl chloride	75-01-4	UG/KG	350	U	300	U	380	U	330	U	350	U

NOTES

CAS NO.	chemical abstract service number
MG/KG	milligrams per kilogram
J	result is estimated
R	sample result rejected
U	result is below detection limit
UG/KG	micrograms per kilogram

Table C-1
Off-site Soil Data
Pilot-Scale Treatability Study Report
Stratford Army Engine Plant

			SAMPLE ID:	IW9904030XX		IW9905032XX		IW9906032XX		IW9907032XX		IW9908032XX		PZ9904030XX	
			DATE COLLECTED:	11/10/99		11/15/99		11/15/99		11/15/99		11/16/99		11/12/99	
			SAMPLE DELIVERY GROUP NO.:	STR01		STR02		STR02		STR02		STR02		STR01	
ANALYTE CATEGORY	ANALYTE	CAS NO.	UNITS	Result	Final Qual	Result	Final Qual	Result	Final Qual	Result	Final Qual	Result	Final Qual	Result	Final Qual
Inorganics	Chromium	7440-47-3	MG/KG	30.9		59.4	J	37	J	161	J	158		36	
	Chromium, Hexavalent	18540-29-9	MG/KG	1.1		0.98		0.73		1.7		0.3	U	1.3	
	Manganese	7439-96-5	MG/KG	42.3	J									142	
TOC	Total Organic Carbon	7440-44-0	PERCENT	0.15										0.1	U
VOA	1,1,1-Trichloroethane	71-55-6	UG/KG	340	U	330	U	330	U	410	U	360	U	330	U
	1,1,2,2-Tetrachloroethane	79-34-5	UG/KG	340	U	330	U	330	U	410	U	360	U	330	U
	1,1,2-Trichloroethane	79-00-5	UG/KG	340	U	330	U	330	U	410	U	360	U	330	U
	1,1-Dichloroethane	75-34-3	UG/KG	340	U	330	U	330	U	410	U	360	U	330	U
	1,1-Dichloroethene	75-35-4	UG/KG	340	U	330	U	330	U	410	U	360	U	330	U
	1,2-Dichloroethane	107-06-2	UG/KG	340	U	330	U	330	U	410	U	360	U	330	U
	1,2-Dichloropropane	78-87-5	UG/KG	340	U	330	U	330	U	410	U	360	U	330	U
	2-Butanone	78-93-3	UG/KG	560	UJ	540	UJ	550	UJ	680	UJ	600	UJ	550	U
	2-Hexanone	591-78-6	UG/KG	560	UJ	540	UJ	550	UJ	680	UJ	600	UJ	550	U
	4-Methyl-2-pentanone	108-10-1	UG/KG	560	UJ	540	UJ	550	UJ	680	UJ	600	UJ	550	U
	Acetone	67-64-1	UG/KG	560	R	540	R	550	R	680	R	600	R	550	R
	Benzene	71-43-2	UG/KG	340	U	330	U	330	U	410	U	360	U	330	U
	Bromodichloromethane	75-27-4	UG/KG	340	U	330	U	330	U	410	U	360	U	330	U
	Bromoform	75-25-2	UG/KG	340	U	330	U	330	U	410	U	360	U	330	U
	Bromomethane	74-83-9	UG/KG	340	U	330	U	330	U	410	U	360	U	330	U
	Carbon disulfide	75-15-0	UG/KG	340	U	330	U	330	U	410	U	360	U	330	U
	Carbon tetrachloride	56-23-5	UG/KG	340	U	330	U	330	U	410	U	360	U	330	U
	Chlorobenzene	108-90-7	UG/KG	340	U	330	U	330	U	410	U	360	U	330	U
	Chloroethane	75-00-3	UG/KG	340	U	330	U	330	U	410	U	360	U	330	U
	Chloroform	67-66-3	UG/KG	340	U	330	U	330	U	410	U	360	U	330	U
	Chloromethane	74-87-3	UG/KG	340	U	330	U	330	U	410	U	360	U	330	U
	cis-1,2-Dichloroethene	156-59-2	UG/KG	340	U	330	U	330	U	410	U	360	U	330	U
	cis-1,3-Dichloropropene	10061-01-5	UG/KG	340	U	330	U	330	U	410	U	360	U	330	U
	Dibromochloromethane	124-48-1	UG/KG	340	U	330	U	330	U	410	U	360	U	330	U
	Ethylbenzene	100-41-4	UG/KG	340	U	330	U	330	U	410	U	360	U	330	U
	m,p-Xylene	108-38-3	UG/KG	340	U	330	U	330	U	410	U	360	U	330	U
	Methylene chloride	75-09-2	UG/KG	340	U	330	U	330	U	410	U	360	U	330	U
	o-Xylene	95-47-6	UG/KG	340	U	330	U	330	U	410	U	360	U	330	U
	Styrene	100-42-5	UG/KG	340	U	330	U	330	U	410	U	360	U	330	U
	Tetrachloroethene	127-18-4	UG/KG	340	U	330	U	330	U	410	U	360	U	330	U
	Toluene	108-88-3	UG/KG	340	U	330	U	330	U	410	U	360	U	330	U
	trans-1,2-Dichloroethene	156-60-5	UG/KG	340	U	330	U	330	U	410	U	360	U	330	U
	trans-1,3-Dichloropropene	10061-02-6	UG/KG	340	U	330	U	330	U	410	U	360	U	330	U
	Trichloroethene	79-01-6	UG/KG	600		330	U	7,300		14,000		14,000		29,000	
	Vinyl chloride	75-01-4	UG/KG	340	U	330	U	330	U	410	U	360	U	330	U

NOTES

CAS NO.	chemical abstract service number
MG/KG	milligrams per kilogram
J	result is estimated
R	sample result rejected
U	result is below detection limit
UG/KG	micrograms per kilogram

Table C-1
Off-site Soil Data
Pilot-Scale Treatability Study Report
Stratford Army Engine Plant

			SAMPLE ID:	PZ9905030XX		PZ9906030XX		PZ9907030XX		PZ9908032XX		PZ9909032XX		PZ9910032XD	
			DATE COLLECTED:	11/11/99		11/12/99		11/11/99		11/15/99		11/12/99		11/16/99	
			SAMPLE DELIVERY GROUP NO.:	STR01		STR01		STR01		STR02		STR01		STR02	
ANALYTE CATEGORY	ANALYTE	CAS NO.	UNITS	Result	Final Qual	Result	Final Qual	Result	Final Qual	Result	Final Qual	Result	Final Qual	Result	Final Qual
Inorganics	Chromium	7440-47-3	MG/KG	7.6		64.7		6.9		144	J	505		371	
	Chromium, Hexavalent	18540-29-9	MG/KG	0.9		0.53		0.3		0.71		12		0.8	J
	Manganese	7439-96-5	MG/KG	129	J	66.5		164	J						
TOC	Total Organic Carbon	7440-44-0	PERCENT	0.14		0.1	U	0.13							
VOA	1,1,1-Trichloroethane	71-55-6	UG/KG	340	U	360	U	340	U	320	U	380	U	330	U
	1,1,2,2-Tetrachloroethane	79-34-5	UG/KG	340	U	360	U	340	U	320	U	380	U	330	U
	1,1,2-Trichloroethane	79-00-5	UG/KG	340	U	360	U	340	U	320	U	380	U	330	U
	1,1-Dichloroethane	75-34-3	UG/KG	340	U	360	U	340	U	320	U	380	U	330	U
	1,1-Dichloroethene	75-35-4	UG/KG	340	U	360	U	340	U	320	U	380	U	330	U
	1,2-Dichloroethane	107-06-2	UG/KG	340	U	360	U	340	U	320	U	380	U	330	U
	1,2-Dichloropropane	78-87-5	UG/KG	340	U	360	U	340	U	320	U	380	U	330	U
	2-Butanone	78-93-3	UG/KG	570	UJ	600	U	570	UJ	530	UJ	630	U	550	UJ
	2-Hexanone	591-78-6	UG/KG	570	UJ	600	U	570	UJ	530	UJ	630	U	550	UJ
	4-Methyl-2-pentanone	108-10-1	UG/KG	570	UJ	600	U	570	UJ	530	UJ	630	U	550	UJ
	Acetone	67-64-1	UG/KG	570	R	600	R	570	R	530	R	630	R	550	R
	Benzene	71-43-2	UG/KG	340	U	360	U	340	U	320	U	380	U	330	U
	Bromodichloromethane	75-27-4	UG/KG	340	U	360	U	340	U	320	U	380	U	330	U
	Bromoform	75-25-2	UG/KG	340	U	360	U	340	U	320	U	380	U	330	U
	Bromomethane	74-83-9	UG/KG	340	U	360	U	340	U	320	U	380	U	330	U
	Carbon disulfide	75-15-0	UG/KG	340	U	360	U	340	U	320	U	380	U	330	U
	Carbon tetrachloride	56-23-5	UG/KG	340	U	360	U	340	U	320	U	380	U	330	U
	Chlorobenzene	108-90-7	UG/KG	340	U	360	U	340	U	320	U	380	U	330	U
	Chloroethane	75-00-3	UG/KG	340	U	360	U	340	U	320	U	380	U	330	U
	Chloroform	67-66-3	UG/KG	340	U	360	U	340	U	320	U	380	U	330	U
	Chloromethane	74-87-3	UG/KG	340	U	360	U	340	U	320	U	380	U	330	U
	cis-1,2-Dichloroethene	156-59-2	UG/KG	340	U	360	U	340	U	320	U	380	U	330	U
	cis-1,3-Dichloropropene	10061-01-5	UG/KG	340	U	360	U	340	U	320	U	380	U	330	U
	Dibromochloromethane	124-48-1	UG/KG	340	U	360	U	340	U	320	U	380	U	330	U
	Ethylbenzene	100-41-4	UG/KG	340	U	360	U	340	U	320	U	380	U	330	U
	m,p-Xylene	108-38-3	UG/KG	340	U	360	U	340	U	320	U	380	U	330	U
	Methylene chloride	75-09-2	UG/KG	340	U	360	U	340	U	320	U	380	U	330	U
	o-Xylene	95-47-6	UG/KG	340	U	360	U	340	U	320	U	380	U	330	U
	Styrene	100-42-5	UG/KG	340	U	360	U	340	U	320	U	380	U	330	U
	Tetrachloroethene	127-18-4	UG/KG	340	U	360	U	340	U	320	U	380	U	330	U
	Toluene	108-88-3	UG/KG	340	U	360	U	340	U	320	U	380	U	330	U
	trans-1,2-Dichloroethene	156-60-5	UG/KG	340	U	360	U	340	U	320	U	380	U	330	U
	trans-1,3-Dichloropropene	10061-02-6	UG/KG	340	U	360	U	340	U	320	U	380	U	330	U
	Trichloroethene	79-01-6	UG/KG	67,000		43,000		69,000		13,000		20,000		14,000	
	Vinyl chloride	75-01-4	UG/KG	340	U	360	U	340	U	320	U	380	U	330	U

NOTES

CAS NO.	chemical abstract service number
MG/KG	milligrams per kilogram
J	result is estimated
R	sample result rejected
U	result is below detection limit
UG/KG	micrograms per kilogram

Table C-1
Off-site Soil Data
Pilot-Scale Treatability Study Report
Stratford Army Engine Plant

			SAMPLE ID:	PZ9910032XX		PZ9911032XX	
			DATE COLLECTED:	11/16/99		11/12/99	
			SAMPLE DELIVERY GROUP NO.:	STR02		STR01	
ANALYTE CATEGORY	ANALYTE	CAS NO.	UNITS	Result	Final Qual	Result	Final Qual
Inorganics	Chromium	7440-47-3	MG/KG	337		150	
	Chromium, Hexavalent	18540-29-9	MG/KG	55.8	J	1.1	
	Manganese	7439-96-5	MG/KG				
TOC	Total Organic Carbon	7440-44-0	PERCENT				
VOA	1,1,1-Trichloroethane	71-55-6	UG/KG	350	U	310	U
	1,1,2,2-Tetrachloroethane	79-34-5	UG/KG	350	U	310	U
	1,1,2-Trichloroethane	79-00-5	UG/KG	350	U	310	U
	1,1-Dichloroethane	75-34-3	UG/KG	350	U	310	U
	1,1-Dichloroethene	75-35-4	UG/KG	350	U	310	U
	1,2-Dichloroethane	107-06-2	UG/KG	350	U	310	U
	1,2-Dichloropropane	78-87-5	UG/KG	350	U	310	U
	2-Butanone	78-93-3	UG/KG	580	UJ	510	U
	2-Hexanone	591-78-6	UG/KG	580	UJ	510	U
	4-Methyl-2-pentanone	108-10-1	UG/KG	580	UJ	510	U
	Acetone	67-64-1	UG/KG	580	R	510	R
	Benzene	71-43-2	UG/KG	350	U	310	U
	Bromodichloromethane	75-27-4	UG/KG	350	U	310	U
	Bromoform	75-25-2	UG/KG	350	U	310	U
	Bromomethane	74-83-9	UG/KG	350	U	310	U
	Carbon disulfide	75-15-0	UG/KG	350	U	310	U
	Carbon tetrachloride	56-23-5	UG/KG	350	U	310	U
	Chlorobenzene	108-90-7	UG/KG	350	U	310	U
	Chloroethane	75-00-3	UG/KG	350	U	310	U
	Chloroform	67-66-3	UG/KG	350	U	310	U
	Chloromethane	74-87-3	UG/KG	350	U	310	U
	cis-1,2-Dichloroethene	156-59-2	UG/KG	350	U	310	U
	cis-1,3-Dichloropropene	10061-01-5	UG/KG	350	U	310	U
	Dibromochloromethane	124-48-1	UG/KG	350	U	310	U
	Ethylbenzene	100-41-4	UG/KG	350	U	310	U
	m,p-Xylene	108-38-3	UG/KG	350	U	310	U
	Methylene chloride	75-09-2	UG/KG	350	U	310	U
	o-Xylene	95-47-6	UG/KG	350	U	310	U
	Styrene	100-42-5	UG/KG	350	U	310	U
	Tetrachloroethene	127-18-4	UG/KG	350	U	310	U
	Toluene	108-88-3	UG/KG	350	U	310	U
	trans-1,2-Dichloroethene	156-60-5	UG/KG	350	U	310	U
	trans-1,3-Dichloropropene	10061-02-6	UG/KG	350	U	310	U
	Trichloroethene	79-01-6	UG/KG	14,000		10,000	
	Vinyl chloride	75-01-4	UG/KG	350	U	310	U

NOTES

CAS NO.	chemical abstract service number
MG/KG	milligrams per kilogram
J	result is estimated
R	sample result rejected
U	result is below detection limit
UG/KG	micrograms per kilogram

Table C-2
Off-Site Groundwater Data
Pilot-Scale Treatability Study Report
Stratford Army Engine Plant

			SAMPLE ID:	EW020120000730		EW020127000800		EW020127000DUP		EW020128000800		EW020129000800	
			DATE COLLECTED:	1/20/00		1/27/00		1/27/00		1/28/00		1/29/00	
			SAMPLE DELIVERY GROUP NO.:	STR07		STR08		STR08		STR08		STR09	
ANALYTE CATEGORY	ANALYTE	CAS NO.	UNITS	Result	Final Qual	Result	Final Qual	Result	Final Qual	Result	Final Qual	Result	Final Qual
Inorganics	Chromium	7440-47-3	UG/L										
	Chromium, Hexavalent	18540-29-9	MG/L										
	Hexavalent Chromium	18540-29-9	MG/L										
	Manganese	7439-96-5	UG/L	1,350		41,100		39,300		43,000		42,800	
TOC	Total Organic Carbon	7440-44-0	MG/L										
VOA	1,1,1-Trichloroethane	71-55-6	UG/L	3	U	15	U	15	U				
	1,1,2,2-Tetrachloroethane	79-34-5	UG/L	3	U	15	U	15	U				
	1,1,2-Trichloroethane	79-00-5	UG/L	3	U	15	U	15	U				
	1,1-Dichloroethane	75-34-3	UG/L	6		15	U	15	U				
	1,1-Dichloroethene	75-35-4	UG/L	3	U	15	U	15	U				
	1,2-Dichloroethane	107-06-2	UG/L	3	U	15	U	15	U				
	1,2-Dichloropropane	78-87-5	UG/L	3	U	15	U	15	U				
	2-Butanone	78-93-3	UG/L	5	U	25	U	25	U				
	2-Hexanone	591-78-6	UG/L	5	U	25	U	25	U				
	4-Methyl-2-pentanone	108-10-1	UG/L	5	U	25	U	25	U				
	Acetone	67-64-1	UG/L	5	U	25	U	25	U				
	Benzene	71-43-2	UG/L	3	U	15	U	15	U				
	Bromodichloromethane	75-27-4	UG/L	1	J	15	U	15	U				
	Bromoform	75-25-2	UG/L	3	U	15	U	15	U				
	Bromomethane	74-83-9	UG/L	3	U	15	U	15	U				
	Carbon disulfide	75-15-0	UG/L	3	U	15	U	15	U				
	Carbon tetrachloride	56-23-5	UG/L	3	U	15	U	15	U				
	Chlorobenzene	108-90-7	UG/L	3	U	15	U	15	U				
	Chloroethane	75-00-3	UG/L	3	U	15	U	15	U				
	Chloroform	67-66-3	UG/L	6		26		24					
	Chloromethane	74-87-3	UG/L	3	U	15	U	15	U				
	cis-1,2-Dichloroethene	156-59-2	UG/L	24		15	U	15	U				
	cis-1,3-Dichloropropene	10061-01-5	UG/L	3	U	15	U	15	U				
	Dibromochloromethane	124-48-1	UG/L	3	U	15	U	15	U				
	Ethylbenzene	100-41-4	UG/L	3	U	15	U	15	U				
	m,p-Xylene	108-38-3	UG/L	3	J	15	U	15	U				
	Methylene chloride	75-09-2	UG/L	3	U	15	U	15	U				
	o-Xylene	95-47-6	UG/L	3	J	15	U	15	U				
	Styrene	100-42-5	UG/L	3	J	15	U	15	U				
	Tetrachloroethene	127-18-4	UG/L	3		15	U	15	U				
	Toluene	108-88-3	UG/L	3	U	15	U	15	U				
	trans-1,2-Dichloroethene	156-60-5	UG/L	3	U	15	U	15	U				
	trans-1,3-Dichloropropene	10061-02-6	UG/L	3	U	15	U	15	U				
	Trichloroethene	79-01-6	UG/L	94		15	U	15	U				
	Vinyl chloride	75-01-4	UG/L	3	U	15	U	15	U				

NOTES:

CAS NO.	chemical abstract service number
MG/KG	milligrams per kilogram
J	result is estimated
R	sample result rejected
U	result is below detection limit
UG/KG	micrograms per kilogram

Table C-2
Off-Site Groundwater Data
Pilot-Scale Treatability Study Report
Stratford Army Engine Plant

			SAMPLE ID:	EW020131000800		EW02013100080D		EW021118991815		EW021201991700		EW021202991630		EW021202991930	
			DATE COLLECTED:	1/31/00		1/31/00		11/18/99		12/1/99		12/2/99		12/2/99	
			SAMPLE DELIVERY GROUP NO.:	STR09		STR09		STR03		STR04		STR04		STR04	
ANALYTE CATEGORY	ANALYTE	CAS NO.	UNITS	Result	Final Qual	Result	Final Qual	Result	Final Qual	Result	Final Qual	Result	Final Qual	Result	Final Qual
Inorganics	Chromium	7440-47-3	UG/L												
	Chromium, Hexavalent	18540-29-9	MG/L												
	Hexavalent Chromium	18540-29-9	MG/L	5.65	J	7	J					0.005	U		
	Manganese	7439-96-5	UG/L							2,490		2,270		2,300	
TOC	Total Organic Carbon	7440-44-0	MG/L					1.9							
VOA	1,1,1-Trichloroethane	71-55-6	UG/L							300	U			300	U
	1,1,2,2-Tetrachloroethane	79-34-5	UG/L							300	U			300	U
	1,1,2-Trichloroethane	79-00-5	UG/L							300	U			300	U
	1,1-Dichloroethane	75-34-3	UG/L							300	U			300	U
	1,1-Dichloroethene	75-35-4	UG/L							300	U			300	U
	1,2-Dichloroethane	107-06-2	UG/L							300	U			300	U
	1,2-Dichloropropane	78-87-5	UG/L							300	U			300	U
	2-Butanone	78-93-3	UG/L							500	U			500	U
	2-Hexanone	591-78-6	UG/L							500	U			500	U
	4-Methyl-2-pentanone	108-10-1	UG/L							500	U			500	U
	Acetone	67-64-1	UG/L							500	U			500	U
	Benzene	71-43-2	UG/L							300	U			300	U
	Bromodichloromethane	75-27-4	UG/L							300	U			300	U
	Bromoform	75-25-2	UG/L							300	U			300	U
	Bromomethane	74-83-9	UG/L							300	U			300	U
	Carbon disulfide	75-15-0	UG/L							300	U			300	U
	Carbon tetrachloride	56-23-5	UG/L							300	U			300	U
	Chlorobenzene	108-90-7	UG/L							300	U			300	U
	Chloroethane	75-00-3	UG/L							300	U			300	U
	Chloroform	67-66-3	UG/L							300	U			300	U
	Chloromethane	74-87-3	UG/L							300	U			300	U
	cis-1,2-Dichloroethene	156-59-2	UG/L							300	U			300	U
	cis-1,3-Dichloropropene	10061-01-5	UG/L							300	U			300	U
	Dibromochloromethane	124-48-1	UG/L							300	U			300	U
	Ethylbenzene	100-41-4	UG/L							300	U			300	U
	m,p-Xylene	108-38-3	UG/L							300	U			300	U
	Methylene chloride	75-09-2	UG/L							300	U			300	U
	o-Xylene	95-47-6	UG/L							300	U			300	U
	Styrene	100-42-5	UG/L							300	U			300	U
	Tetrachloroethene	127-18-4	UG/L							300	U			300	U
	Toluene	108-88-3	UG/L							300	U			300	U
	trans-1,2-Dichloroethene	156-60-5	UG/L							300	U			300	U
	trans-1,3-Dichloropropene	10061-02-6	UG/L							300	U			300	U
	Trichloroethene	79-01-6	UG/L							58,000				67,000	
	Vinyl chloride	75-01-4	UG/L							300	U			300	U

NOTES:

CAS NO.	chemical abstract service number
MG/KG	milligrams per kilogram
J	result is estimated
R	sample result rejected
U	result is below detection limit
UG/KG	micrograms per kilogram

Table C-2
Off-Site Groundwater Data
Pilot-Scale Treatability Study Report
Stratford Army Engine Plant

			SAMPLE ID:	EW021203991630		EW021208991630		EW021209991630		EW021210991630		EW021220991500		EW0301190001500	
			DATE COLLECTED:	12/3/99		12/8/99		12/9/99		12/10/99		12/20/99		1/19/00	
			SAMPLE DELIVERY GROUP NO.:	STR04		STR05		STR05		STR05		STR06		STR07	
ANALYTE CATEGORY	ANALYTE	CAS NO.	UNITS	Result	Final Qual	Result	Final Qual	Result	Final Qual	Result	Final Qual	Result	Final Qual	Result	Final Qual
Inorganics	Chromium	7440-47-3	UG/L							4,160				155,000	J
	Chromium, Hexavalent	18540-29-9	MG/L												
	Hexavalent Chromium	18540-29-9	MG/L			3.7				4	J			150	J
	Manganese	7439-96-5	UG/L	2,170		3,790		3,590		11,500					
TOC	Total Organic Carbon	7440-44-0	MG/L									4			
VOA	1,1,1-Trichloroethane	71-55-6	UG/L	300	U	3,000	UJ					300	U		
	1,1,2,2-Tetrachloroethane	79-34-5	UG/L	300	U	3,000	UJ					300	U		
	1,1,2-Trichloroethane	79-00-5	UG/L	300	U	3,000	UJ					300	U		
	1,1-Dichloroethane	75-34-3	UG/L	300	U	3,000	UJ					300	U		
	1,1-Dichloroethene	75-35-4	UG/L	300	U	3,000	UJ					300	U		
	1,2-Dichloroethane	107-06-2	UG/L	300	U	3,000	UJ					300	U		
	1,2-Dichloropropane	78-87-5	UG/L	300	U	3,000	UJ					300	U		
	2-Butanone	78-93-3	UG/L	500	U	5,000	UJ					500	U		
	2-Hexanone	591-78-6	UG/L	500	U	5,000	UJ					500	U		
	4-Methyl-2-pentanone	108-10-1	UG/L	500	U	5,000	UJ					500	U		
	Acetone	67-64-1	UG/L	500	U	5,000	UJ					500	U		
	Benzene	71-43-2	UG/L	300	U	3,000	UJ					300	U		
	Bromodichloromethane	75-27-4	UG/L	300	U	3,000	UJ					300	U		
	Bromoform	75-25-2	UG/L	300	U	3,000	UJ					300	U		
	Bromomethane	74-83-9	UG/L	300	U	3,000	UJ					300	U		
	Carbon disulfide	75-15-0	UG/L	300	U	3,000	UJ					300	U		
	Carbon tetrachloride	56-23-5	UG/L	300	U	3,000	UJ					300	U		
	Chlorobenzene	108-90-7	UG/L	300	U	3,000	UJ					300	U		
	Chloroethane	75-00-3	UG/L	300	U	3,000	UJ					300	U		
	Chloroform	67-66-3	UG/L	300	U	3,000	UJ					300	U		
	Chloromethane	74-87-3	UG/L	300	U	3,000	UJ					300	U		
	cis-1,2-Dichloroethene	156-59-2	UG/L	300	U	3,000	UJ					300	U		
	cis-1,3-Dichloropropene	10061-01-5	UG/L	300	U	3,000	UJ					300	U		
	Dibromochloromethane	124-48-1	UG/L	300	U	3,000	UJ					300	U		
	Ethylbenzene	100-41-4	UG/L	300	U	3,000	UJ					300	U		
	m,p-Xylene	108-38-3	UG/L	300	U	3,000	UJ					300	U		
	Methylene chloride	75-09-2	UG/L	300	U	3,000	UJ					300	U		
	o-Xylene	95-47-6	UG/L	300	U	3,000	UJ					300	U		
	Styrene	100-42-5	UG/L	300	U	3,000	UJ					300	UJ		
	Tetrachloroethene	127-18-4	UG/L	300	U	3,000	UJ					300	U		
	Toluene	108-88-3	UG/L	300	U	3,000	UJ					300	U		
	trans-1,2-Dichloroethene	156-60-5	UG/L	300	U	3,000	UJ					300	U		
	trans-1,3-Dichloropropene	10061-02-6	UG/L	300	U	3,000	UJ					300	U		
	Trichloroethene	79-01-6	UG/L	62,000		39,000	J					10,000			
	Vinyl chloride	75-01-4	UG/L	300	U	3,000	UJ					300	U		

NOTES:

CAS NO.	chemical abstract service number
MG/KG	milligrams per kilogram
J	result is estimated
R	sample result rejected
U	result is below detection limit
UG/KG	micrograms per kilogram

Table C-2
Off-Site Groundwater Data
Pilot-Scale Treatability Study Report
Stratford Army Engine Plant

			SAMPLE ID:	EW030123001500		EW030127001500		EW031201991150		EW031202991100		EW031203990830		EW031205991030	
			DATE COLLECTED:	1/22/00		1/27/00		12/1/99		12/2/99		12/3/99		12/5/99	
			SAMPLE DELIVERY GROUP NO.:	STR08		STR08		STR04		STR04		STR04		STR05	
ANALYTE CATEGORY	ANALYTE	CAS NO.	UNITS	Result	Final Qual	Result	Final Qual	Result	Final Qual	Result	Final Qual	Result	Final Qual	Result	Final Qual
Inorganics	Chromium	7440-47-3	UG/L			142,000		436,000				430,000			
	Chromium, Hexavalent	18540-29-9	MG/L												
	Hexavalent Chromium	18540-29-9	MG/L			130		0.43	J						
	Manganese	7439-96-5	UG/L												
TOC	Total Organic Carbon	7440-44-0	MG/L												
VOA	1,1,1-Trichloroethane	71-55-6	UG/L	300	U	300	U			1,500	U			3,000	UJ
	1,1,2,2-Tetrachloroethane	79-34-5	UG/L	300	U	300	U			1,500	U			3,000	UJ
	1,1,2-Trichloroethane	79-00-5	UG/L	300	U	300	U			1,500	U			3,000	UJ
	1,1-Dichloroethane	75-34-3	UG/L	300	U	300	U			1,500	U			3,000	UJ
	1,1-Dichloroethene	75-35-4	UG/L	300	U	300	U			1,500	U			3,000	UJ
	1,2-Dichloroethane	107-06-2	UG/L	300	U	300	U			1,500	U			3,000	UJ
	1,2-Dichloropropane	78-87-5	UG/L	300	U	300	U			1,500	U			3,000	UJ
	2-Butanone	78-93-3	UG/L	500	U	500	U			2,500	U			5,000	UJ
	2-Hexanone	591-78-6	UG/L	500	U	500	U			2,500	U			5,000	UJ
	4-Methyl-2-pentanone	108-10-1	UG/L	500	U	500	U			2,500	U			5,000	UJ
	Acetone	67-64-1	UG/L	500	U	500	U			2,500	U			5,000	UJ
	Benzene	71-43-2	UG/L	300	U	300	U			1,500	U			3,000	UJ
	Bromodichloromethane	75-27-4	UG/L	300	U	300	U			1,500	U			3,000	UJ
	Bromoform	75-25-2	UG/L	300	U	300	U			1,500	U			3,000	UJ
	Bromomethane	74-83-9	UG/L	300	U	300	U			1,500	U			3,000	UJ
	Carbon disulfide	75-15-0	UG/L	300	U	300	U			1,500	U			3,000	UJ
	Carbon tetrachloride	56-23-5	UG/L	300	U	300	U			1,500	U			3,000	UJ
	Chlorobenzene	108-90-7	UG/L	300	U	300	U			1,500	U			3,000	UJ
	Chloroethane	75-00-3	UG/L	300	U	300	U			1,500	U			3,000	UJ
	Chloroform	67-66-3	UG/L	300	U	300	U			1,500	U			3,000	UJ
	Chloromethane	74-87-3	UG/L	300	U	300	U			1,500	U			3,000	UJ
	cis-1,2-Dichloroethene	156-59-2	UG/L	300	U	300	U			1,500	U			3,000	UJ
	cis-1,3-Dichloropropene	10061-01-5	UG/L	300	U	300	U			1,500	U			3,000	UJ
	Dibromochloromethane	124-48-1	UG/L	300	U	300	U			1,500	U			3,000	UJ
	Ethylbenzene	100-41-4	UG/L	300	U	300	U			1,500	U			3,000	UJ
	m,p-Xylene	108-38-3	UG/L	300	U	300	U			1,500	U			3,000	UJ
	Methylene chloride	75-09-2	UG/L	300	U	300	U			1,500	U			3,000	UJ
	o-Xylene	95-47-6	UG/L	300	U	300	U			1,500	U			3,000	UJ
	Styrene	100-42-5	UG/L	300	U	300	U			1,500	U			3,000	UJ
	Tetrachloroethene	127-18-4	UG/L	300	U	300	U			1,500	U			3,000	UJ
	Toluene	108-88-3	UG/L	300	U	300	U			1,500	U			3,000	UJ
	trans-1,2-Dichloroethene	156-60-5	UG/L	300	U	300	U			1,500	U			3,000	UJ
	trans-1,3-Dichloropropene	10061-02-6	UG/L	300	U	300	U			1,500	U			3,000	UJ
	Trichloroethene	79-01-6	UG/L	61,000		55,000				130,000				120,000	J
	Vinyl chloride	75-01-4	UG/L	300	U	300	U			1,500	U			3,000	UJ

NOTES:

CAS NO.	chemical abstract service number
MG/KG	milligrams per kilogram
J	result is estimated
R	sample result rejected
U	result is below detection limit
UG/KG	micrograms per kilogram

Table C-2
Off-Site Groundwater Data
Pilot-Scale Treatability Study Report
Stratford Army Engine Plant

			SAMPLE ID:	EW031206991030		EW031210991030		EW031221991500		IW011118991739		IW011220991345		IW021118991835	
			DATE COLLECTED:	12/6/99		12/10/99		12/21/99		11/18/99		12/20/99		11/18/99	
			SAMPLE DELIVERY GROUP NO.:	STR05		STR05		STR06		STR03		STR06		STR03	
ANALYTE CATEGORY	ANALYTE	CAS NO.	UNITS	Result	Final Qual	Result	Final Qual	Result	Final Qual	Result	Final Qual	Result	Final Qual	Result	Final Qual
Inorganics	Chromium	7440-47-3	UG/L	365,000		279,000		180,000							
	Chromium, Hexavalent	18540-29-9	MG/L					190	J						
	Hexavalent Chromium	18540-29-9	MG/L												
	Manganese	7439-96-5	UG/L												
TOC	Total Organic Carbon	7440-44-0	MG/L							1	U	2.4		1.5	
VOA	1,1,1-Trichloroethane	71-55-6	UG/L					3,000	U			30	U		
	1,1,2,2-Tetrachloroethane	79-34-5	UG/L					3,000	U			30	U		
	1,1,2-Trichloroethane	79-00-5	UG/L					3,000	U			30	U		
	1,1-Dichloroethane	75-34-3	UG/L					3,000	U			30	U		
	1,1-Dichloroethene	75-35-4	UG/L					3,000	U			30	U		
	1,2-Dichloroethane	107-06-2	UG/L					3,000	U			30	U		
	1,2-Dichloropropane	78-87-5	UG/L					3,000	U			30	U		
	2-Butanone	78-93-3	UG/L					5,000	U			50	U		
	2-Hexanone	591-78-6	UG/L					5,000	U			50	U		
	4-Methyl-2-pentanone	108-10-1	UG/L					5,000	U			50	U		
	Acetone	67-64-1	UG/L					5,000	U			100			
	Benzene	71-43-2	UG/L					3,000	U			30	U		
	Bromodichloromethane	75-27-4	UG/L					3,000	U			10	J		
	Bromoform	75-25-2	UG/L					3,000	U			30	U		
	Bromomethane	74-83-9	UG/L					3,000	U			30	U		
	Carbon disulfide	75-15-0	UG/L					3,000	U			30	U		
	Carbon tetrachloride	56-23-5	UG/L					3,000	U			30	U		
	Chlorobenzene	108-90-7	UG/L					3,000	U			30	U		
	Chloroethane	75-00-3	UG/L					3,000	U			30	U		
	Chloroform	67-66-3	UG/L					3,000	U			50			
	Chloromethane	74-87-3	UG/L					3,000	U			30	U		
	cis-1,2-Dichloroethene	156-59-2	UG/L					3,000	U			30	U		
	cis-1,3-Dichloropropene	10061-01-5	UG/L					3,000	U			30	U		
	Dibromochloromethane	124-48-1	UG/L					3,000	U			30	U		
	Ethylbenzene	100-41-4	UG/L					3,000	U			30	U		
	m,p-Xylene	108-38-3	UG/L					3,000	U			30	U		
	Methylene chloride	75-09-2	UG/L					3,000	U			30	U		
	o-Xylene	95-47-6	UG/L					3,000	U			30	U		
	Styrene	100-42-5	UG/L					3,000	U			30	UJ		
	Tetrachloroethene	127-18-4	UG/L					3,000	U			30	U		
	Toluene	108-88-3	UG/L					3,000	U			30	U		
	trans-1,2-Dichloroethene	156-60-5	UG/L					3,000	U			30	U		
	trans-1,3-Dichloropropene	10061-02-6	UG/L					3,000	U			30	U		
	Trichloroethene	79-01-6	UG/L					37,000				30	U		
	Vinyl chloride	75-01-4	UG/L					3,000	U			30	U		

NOTES:

CAS NO.	chemical abstract service number
MG/KG	milligrams per kilogram
J	result is estimated
R	sample result rejected
U	result is below detection limit
UG/KG	micrograms per kilogram

Table C-2
Off-Site Groundwater Data
Pilot-Scale Treatability Study Report
Stratford Army Engine Plant

			SAMPLE ID:	IW021220991400		IW031118991805		IW031220991410		IW041118991720		IW041220991445		IW071118991600	
			DATE COLLECTED:	12/20/99		11/18/99		12/20/99		11/18/99		12/20/99		11/18/99	
			SAMPLE DELIVERY GROUP NO.:	STR06		STR03		STR06		STR03		STR06		STR03	
ANALYTE CATEGORY	ANALYTE	CAS NO.	UNITS	Result	Final Qual	Result	Final Qual	Result	Final Qual	Result	Final Qual	Result	Final Qual	Result	Final Qual
Inorganics	Chromium	7440-47-3	UG/L											464,000	
	Chromium, Hexavalent	18540-29-9	MG/L											340	
	Hexavalent Chromium	18540-29-9	MG/L												
	Manganese	7439-96-5	UG/L											829	J
TOC	Total Organic Carbon	7440-44-0	MG/L	4.6		1	U	7.3		1	U	2.2		1	U
VOA	1,1,1-Trichloroethane	71-55-6	UG/L	30	U			30	U			3,000	U	150	U
	1,1,2,2-Tetrachloroethane	79-34-5	UG/L	30	U			30	U			3,000	U	150	U
	1,1,2-Trichloroethane	79-00-5	UG/L	30	U			30	U			3,000	U	150	U
	1,1-Dichloroethane	75-34-3	UG/L	30	U			30	U			3,000	U	150	U
	1,1-Dichloroethene	75-35-4	UG/L	30	U			30	U			3,000	U	150	U
	1,2-Dichloroethane	107-06-2	UG/L	30	U			30	U			3,000	U	150	U
	1,2-Dichloropropane	78-87-5	UG/L	30	U			30	U			3,000	U	150	U
	2-Butanone	78-93-3	UG/L	22	J			50	U			5,000	U	250	R
	2-Hexanone	591-78-6	UG/L	50	U			50	U			5,000	U	250	UJ
	4-Methyl-2-pentanone	108-10-1	UG/L	50	U			50	U			5,000	U	250	UJ
	Acetone	67-64-1	UG/L	130				120				5,000	U	250	R
	Benzene	71-43-2	UG/L	30	U			30	U			3,000	U	150	U
	Bromodichloromethane	75-27-4	UG/L	10	J			30	U			3,000	U	150	U
	Bromoform	75-25-2	UG/L	30	U			30	U			3,000	U	150	U
	Bromomethane	74-83-9	UG/L	30	U			30	U			3,000	U	150	U
	Carbon disulfide	75-15-0	UG/L	30	U			30	U			3,000	U	150	U
	Carbon tetrachloride	56-23-5	UG/L	30	U			30	U			3,000	U	150	U
	Chlorobenzene	108-90-7	UG/L	30	U			30	U			3,000	U	150	U
	Chloroethane	75-00-3	UG/L	30	U			30	U			3,000	U	150	U
	Chloroform	67-66-3	UG/L	55				45				3,000	U	150	U
	Chloromethane	74-87-3	UG/L	30	U			30	U			3,000	U	150	U
	cis-1,2-Dichloroethene	156-59-2	UG/L	30	U			30	U			3,000	U	150	U
	cis-1,3-Dichloropropene	10061-01-5	UG/L	30	U			30	U			3,000	U	150	U
	Dibromochloromethane	124-48-1	UG/L	30	U			30	U			3,000	U	150	U
	Ethylbenzene	100-41-4	UG/L	30	U			30	U			3,000	U	150	U
	m,p-Xylene	108-38-3	UG/L	30	U			30	U			3,000	U	150	U
	Methylene chloride	75-09-2	UG/L	30	U			30	U			3,000	U	150	U
	o-Xylene	95-47-6	UG/L	30	U			30	U			3,000	U	150	U
	Styrene	100-42-5	UG/L	30	UJ			30	UJ			3,000	U	150	U
	Tetrachloroethene	127-18-4	UG/L	30	U			30	U			3,000	U	150	U
	Toluene	108-88-3	UG/L	30	U			30	U			3,000	U	150	U
	trans-1,2-Dichloroethene	156-60-5	UG/L	30	U			30	U			3,000	U	150	U
	trans-1,3-Dichloropropene	10061-02-6	UG/L	30	U			30	U			3,000	U	150	U
	Trichloroethene	79-01-6	UG/L	30	U			30	U			26,000		88,000	
	Vinyl chloride	75-01-4	UG/L	30	U			30	U			3,000	U	150	U

NOTES:

CAS NO.	chemical abstract service number
MG/KG	milligrams per kilogram
J	result is estimated
R	sample result rejected
U	result is below detection limit
UG/KG	micrograms per kilogram

Table C-2
Off-Site Groundwater Data
Pilot-Scale Treatability Study Report
Stratford Army Engine Plant

			SAMPLE ID:	IW071221991440		PZ2A0124001500		PZ2B0125001500		PZ2C0126001500		PZ1A0124000800		PZ1A1202990330	
			DATE COLLECTED:	12/21/99		1/22/00		1/25/00		1/26/00		1/22/00		12/2/99	
			SAMPLE DELIVERY GROUP NO.:	STR06		STR08		STR08		STR08		STR08		STR04	
ANALYTE CATEGORY	ANALYTE	CAS NO.	UNITS	Result	Final Qual	Result	Final Qual	Result	Final Qual	Result	Final Qual	Result	Final Qual	Result	Final Qual
Inorganics	Chromium	7440-47-3	UG/L	197,000		24,600		935		706					
	Chromium, Hexavalent	18540-29-9	MG/L												
	Hexavalent Chromium	18540-29-9	MG/L			27		0.013	J	0.91					
	Manganese	7439-96-5	UG/L									402		419	
TOC	Total Organic Carbon	7440-44-0	MG/L												
VOA	1,1,1-Trichloroethane	71-55-6	UG/L									11		30	U
	1,1,2,2-Tetrachloroethane	79-34-5	UG/L									3	U	30	U
	1,1,2-Trichloroethane	79-00-5	UG/L									3	U	30	U
	1,1-Dichloroethane	75-34-3	UG/L									10		30	U
	1,1-Dichloroethene	75-35-4	UG/L									5		30	U
	1,2-Dichloroethane	107-06-2	UG/L									3	U	30	U
	1,2-Dichloropropane	78-87-5	UG/L									3	U	30	U
	2-Butanone	78-93-3	UG/L									5	U	50	U
	2-Hexanone	591-78-6	UG/L									5	U	50	U
	4-Methyl-2-pentanone	108-10-1	UG/L									5	U	50	U
	Acetone	67-64-1	UG/L									5	U	50	U
	Benzene	71-43-2	UG/L									3	U	30	U
	Bromodichloromethane	75-27-4	UG/L									3	U	30	U
	Bromoform	75-25-2	UG/L									3	U	30	U
	Bromomethane	74-83-9	UG/L									3	U	30	U
	Carbon disulfide	75-15-0	UG/L									3	U	30	U
	Carbon tetrachloride	56-23-5	UG/L									3	U	30	U
	Chlorobenzene	108-90-7	UG/L									3	U	30	U
	Chloroethane	75-00-3	UG/L									3	U	30	U
	Chloroform	67-66-3	UG/L									1	J	30	U
	Chloromethane	74-87-3	UG/L									3	U	30	UJ
	cis-1,2-Dichloroethene	156-59-2	UG/L									3	U	30	U
	cis-1,3-Dichloropropene	10061-01-5	UG/L									3	U	30	U
	Dibromochloromethane	124-48-1	UG/L									3	U	30	U
	Ethylbenzene	100-41-4	UG/L									3	U	30	U
	m,p-Xylene	108-38-3	UG/L									3	J	30	U
	Methylene chloride	75-09-2	UG/L									3	U	30	U
	o-Xylene	95-47-6	UG/L									3	J	30	U
	Styrene	100-42-5	UG/L									3	J	30	U
	Tetrachloroethene	127-18-4	UG/L									3	U	30	U
	Toluene	108-88-3	UG/L									3	U	30	U
	trans-1,2-Dichloroethene	156-60-5	UG/L									3	U	30	U
	trans-1,3-Dichloropropene	10061-02-6	UG/L									3	U	30	U
	Trichloroethene	79-01-6	UG/L									76		190	
	Vinyl chloride	75-01-4	UG/L									3	U	30	U

NOTES:

CAS NO.	chemical abstract service number
MG/KG	milligrams per kilogram
J	result is estimated
R	sample result rejected
U	result is below detection limit
UG/KG	micrograms per kilogram

Table C-2
Off-Site Groundwater Data
Pilot-Scale Treatability Study Report
Stratford Army Engine Plant

			SAMPLE ID:	PZ1A1220991515		PZ1B0125000800		PZ1B0201000800		PZ1B1207991630		PZ1B1220991520		PZ1C0126000800	
			DATE COLLECTED:	12/20/99		1/25/00		2/1/00		12/7/99		12/20/99		1/26/00	
			SAMPLE DELIVERY GROUP NO.:	STR06		STR08		STR09		STR05		STR06		STR08	
ANALYTE CATEGORY	ANALYTE	CAS NO.	UNITS	Result	Final Qual	Result	Final Qual	Result	Final Qual	Result	Final Qual	Result	Final Qual	Result	Final Qual
Inorganics	Chromium	7440-47-3	UG/L												
	Chromium, Hexavalent	18540-29-9	MG/L												
	Hexavalent Chromium	18540-29-9	MG/L												
	Manganese	7439-96-5	UG/L			20,800		69,000		4,570				12,300	
TOC	Total Organic Carbon	7440-44-0	MG/L	3.2								10			
VOA	1,1,1-Trichloroethane	71-55-6	UG/L	15		300	U	15	U	3,000	UJ	3,000	U	300	U
	1,1,2,2-Tetrachloroethane	79-34-5	UG/L	3	U	300	U	15	U	3,000	UJ	3,000	U	300	U
	1,1,2-Trichloroethane	79-00-5	UG/L	3	U	300	U	5	J	3,000	UJ	3,000	U	300	U
	1,1-Dichloroethane	75-34-3	UG/L	14		300	U	15	U	3,000	UJ	3,000	U	300	U
	1,1-Dichloroethene	75-35-4	UG/L	6		300	U	15	U	3,000	UJ	3,000	U	300	U
	1,2-Dichloroethane	107-06-2	UG/L	3	U	300	U	15	U	3,000	UJ	3,000	U	300	U
	1,2-Dichloropropane	78-87-5	UG/L	3	U	300	U	15	U	3,000	UJ	3,000	U	300	U
	2-Butanone	78-93-3	UG/L	5	U	500	U	25	U	5,000	UJ	5,000	U	500	U
	2-Hexanone	591-78-6	UG/L	5	U	500	U	25	U	5,000	UJ	5,000	U	500	U
	4-Methyl-2-pentanone	108-10-1	UG/L	5	U	500	U	25	UJ	5,000	UJ	5,000	U	500	U
	Acetone	67-64-1	UG/L	5	U	500	U	25	J	5,000	UJ	5,000	U	500	U
	Benzene	71-43-2	UG/L	3	U	300	U	15	U	3,000	UJ	3,000	U	300	U
	Bromodichloromethane	75-27-4	UG/L	3	U	300	U	6	J	3,000	UJ	3,000	U	300	U
	Bromoform	75-25-2	UG/L	3	U	300	U	15	U	3,000	UJ	3,000	U	300	U
	Bromomethane	74-83-9	UG/L	3	U	300	U	15	U	3,000	UJ	3,000	U	300	U
	Carbon disulfide	75-15-0	UG/L	3	U	300	U	15	U	3,000	UJ	3,000	U	300	U
	Carbon tetrachloride	56-23-5	UG/L	3	U	300	U	15	U	3,000	UJ	3,000	U	300	U
	Chlorobenzene	108-90-7	UG/L	3	U	300	U	15	U	3,000	UJ	3,000	U	300	U
	Chloroethane	75-00-3	UG/L	3	U	300	U	15	U	3,000	UJ	3,000	U	300	U
	Chloroform	67-66-3	UG/L	2	J	300	U	38		3,000	UJ	3,000	U	300	U
	Chloromethane	74-87-3	UG/L	3	U	300	U	15	U	3,000	UJ	3,000	U	300	U
	cis-1,2-Dichloroethene	156-59-2	UG/L	3	U	140	J	15	U	3,000	UJ	1,900	J	300	U
	cis-1,3-Dichloropropene	10061-01-5	UG/L	3	U	300	U	15	U	3,000	UJ	3,000	U	300	U
	Dibromochloromethane	124-48-1	UG/L	3	U	300	U	15	U	3,000	UJ	3,000	U	300	U
	Ethylbenzene	100-41-4	UG/L	3	U	300	U	15	U	3,000	UJ	3,000	U	300	U
	m,p-Xylene	108-38-3	UG/L	3	U	300	J	15	U	3,000	UJ	3,000	U	300	J
	Methylene chloride	75-09-2	UG/L	3	U	300	U	15	U	3,000	UJ	3,000	U	300	U
	o-Xylene	95-47-6	UG/L	3	U	300	J	15	U	3,000	UJ	3,000	U	300	J
	Styrene	100-42-5	UG/L	3	UJ	300	J	15	U	3,000	UJ	3,000	U	300	J
	Tetrachloroethene	127-18-4	UG/L	3	U	300	U	15	U	3,000	UJ	3,000	U	300	U
	Toluene	108-88-3	UG/L	3	U	300	U	15	U	3,000	UJ	3,000	U	300	U
	trans-1,2-Dichloroethene	156-60-5	UG/L	3	U	300	U	15	U	3,000	UJ	3,000	U	300	U
	trans-1,3-Dichloropropene	10061-02-6	UG/L	3	U	300	U	15	U	3,000	UJ	3,000	U	300	U
	Trichloroethene	79-01-6	UG/L	150		86,000		15	U	370,000		370,000		2,800	
	Vinyl chloride	75-01-4	UG/L	3	U	300	U	15	U	3,000	UJ	3,000	U	300	U

NOTES:

CAS NO.	chemical abstract service number
MG/KG	milligrams per kilogram
J	result is estimated
R	sample result rejected
U	result is below detection limit
UG/KG	micrograms per kilogram

Table C-2
Off-Site Groundwater Data
Pilot-Scale Treatability Study Report
Stratford Army Engine Plant

			SAMPLE ID:	PZ1C1202991630		PZ1C1220991530		PZ2A0201001500		PZ2A1203990630		PZ2B1221991430		PZ2C1203991430	
			DATE COLLECTED:	12/2/99		12/20/99		2/1/00		12/3/99		12/21/99		12/3/99	
			SAMPLE DELIVERY GROUP NO.:	STR04		STR06		STR09		STR04		STR06		STR04	
ANALYTE CATEGORY	ANALYTE	CAS NO.	UNITS	Result	Final Qual	Result	Final Qual	Result	Final Qual	Result	Final Qual	Result	Final Qual	Result	Final Qual
Inorganics	Chromium	7440-47-3	UG/L					35,600		29,900		2,820		1,960	
	Chromium, Hexavalent	18540-29-9	MG/L												
	Hexavalent Chromium	18540-29-9	MG/L					29	J					1.4	
	Manganese	7439-96-5	UG/L	12,000											
TOC	Total Organic Carbon	7440-44-0	MG/L			1	U								
VOA	1,1,1-Trichloroethane	71-55-6	UG/L	150	U	60	U								
	1,1,2,2-Tetrachloroethane	79-34-5	UG/L	150	U	60	U								
	1,1,2-Trichloroethane	79-00-5	UG/L	150	U	60	U								
	1,1-Dichloroethane	75-34-3	UG/L	150	U	60	U								
	1,1-Dichloroethene	75-35-4	UG/L	150	U	60	U								
	1,2-Dichloroethane	107-06-2	UG/L	150	U	60	U								
	1,2-Dichloropropane	78-87-5	UG/L	150	U	60	U								
	2-Butanone	78-93-3	UG/L	250	U	100	U								
	2-Hexanone	591-78-6	UG/L	250	U	100	U								
	4-Methyl-2-pentanone	108-10-1	UG/L	250	U	100	U								
	Acetone	67-64-1	UG/L	250	U	100	U								
	Benzene	71-43-2	UG/L	150	U	60	U								
	Bromodichloromethane	75-27-4	UG/L	150	U	60	U								
	Bromoform	75-25-2	UG/L	150	U	60	U								
	Bromomethane	74-83-9	UG/L	150	U	60	U								
	Carbon disulfide	75-15-0	UG/L	150	U	60	U								
	Carbon tetrachloride	56-23-5	UG/L	150	U	60	U								
	Chlorobenzene	108-90-7	UG/L	150	U	60	U								
	Chloroethane	75-00-3	UG/L	150	U	60	U								
	Chloroform	67-66-3	UG/L	150	U	60	U								
	Chloromethane	74-87-3	UG/L	150	UJ	60	U								
	cis-1,2-Dichloroethene	156-59-2	UG/L	150	U	60	U								
	cis-1,3-Dichloropropene	10061-01-5	UG/L	150	U	60	U								
	Dibromochloromethane	124-48-1	UG/L	150	U	60	U								
	Ethylbenzene	100-41-4	UG/L	150	U	60	U								
	m,p-Xylene	108-38-3	UG/L	150	U	60	U								
	Methylene chloride	75-09-2	UG/L	150	U	60	U								
	o-Xylene	95-47-6	UG/L	150	U	60	U								
	Styrene	100-42-5	UG/L	150	U	60	UJ								
	Tetrachloroethene	127-18-4	UG/L	150	U	60	U								
	Toluene	108-88-3	UG/L	150	U	60	U								
	trans-1,2-Dichloroethene	156-60-5	UG/L	150	U	60	U								
	trans-1,3-Dichloropropene	10061-02-6	UG/L	150	U	60	U								
	Trichloroethene	79-01-6	UG/L	3,500		4,000									
	Vinyl chloride	75-01-4	UG/L	150	U	60	U								

NOTES:

CAS NO.	chemical abstract service number
MG/KG	milligrams per kilogram
J	result is estimated
R	sample result rejected
U	result is below detection limit
UG/KG	micrograms per kilogram

Table C-2
Off-Site Groundwater Data
Pilot-Scale Treatability Study Report
Stratford Army Engine Plant

			SAMPLE ID:	PZ2C1207991030		PZ2C1221991440		PZ040119000745		PZ041118991850		PZ041130991645		PZ041201992030	
			DATE COLLECTED:	12/7/99		12/21/99		1/19/00		11/18/99		11/30/99		12/1/99	
			SAMPLE DELIVERY GROUP NO.:	STR05		STR06		STR07		STR03		STR04		STR04	
ANALYTE CATEGORY	ANALYTE	CAS NO.	UNITS	Result	Final Qual	Result	Final Qual	Result	Final Qual	Result	Final Qual	Result	Final Qual	Result	Final Qual
Inorganics	Chromium	7440-47-3	UG/L	283		16,700									
	Chromium, Hexavalent	18540-29-9	MG/L												
	Hexavalent Chromium	18540-29-9	MG/L												
	Manganese	7439-96-5	UG/L					426				2,070		1,300	
TOC	Total Organic Carbon	7440-44-0	MG/L							1	U				
VOA	1,1,1-Trichloroethane	71-55-6	UG/L					300	U			300	U	300	U
	1,1,2,2-Tetrachloroethane	79-34-5	UG/L					300	U			300	U	300	U
	1,1,2-Trichloroethane	79-00-5	UG/L					300	U			300	U	300	U
	1,1-Dichloroethane	75-34-3	UG/L					300	U			300	U	300	U
	1,1-Dichloroethene	75-35-4	UG/L					300	U			300	U	300	U
	1,2-Dichloroethane	107-06-2	UG/L					300	U			300	U	300	U
	1,2-Dichloropropane	78-87-5	UG/L					300	U			300	U	300	U
	2-Butanone	78-93-3	UG/L					500	U			500	U	500	U
	2-Hexanone	591-78-6	UG/L					500	U			500	U	500	U
	4-Methyl-2-pentanone	108-10-1	UG/L					500	U			500	U	500	U
	Acetone	67-64-1	UG/L					500	U			500	U	500	U
	Benzene	71-43-2	UG/L					300	U			300	U	300	U
	Bromodichloromethane	75-27-4	UG/L					300	U			300	U	300	U
	Bromoform	75-25-2	UG/L					300	U			300	U	300	U
	Bromomethane	74-83-9	UG/L					300	U			300	U	300	U
	Carbon disulfide	75-15-0	UG/L					300	U			300	U	300	U
	Carbon tetrachloride	56-23-5	UG/L					300	U			300	U	300	U
	Chlorobenzene	108-90-7	UG/L					300	U			300	U	300	U
	Chloroethane	75-00-3	UG/L					300	U			300	U	300	U
	Chloroform	67-66-3	UG/L					300	U			300	U	300	U
	Chloromethane	74-87-3	UG/L					300	U			300	U	300	U
	cis-1,2-Dichloroethene	156-59-2	UG/L					300	U			300	U	300	U
	cis-1,3-Dichloropropene	10061-01-5	UG/L					300	U			300	U	300	U
	Dibromochloromethane	124-48-1	UG/L					300	U			300	U	300	U
	Ethylbenzene	100-41-4	UG/L					300	U			300	U	300	U
	m,p-Xylene	108-38-3	UG/L					300	U			300	U	300	U
	Methylene chloride	75-09-2	UG/L					300	U			300	U	300	U
	o-Xylene	95-47-6	UG/L					300	U			300	U	300	U
	Styrene	100-42-5	UG/L					300	U			300	U	300	U
	Tetrachloroethene	127-18-4	UG/L					300	U			300	U	300	U
	Toluene	108-88-3	UG/L					300	U			300	U	300	U
	trans-1,2-Dichloroethene	156-60-5	UG/L					300	U			300	U	300	U
	trans-1,3-Dichloropropene	10061-02-6	UG/L					300	U			300	U	300	U
	Trichloroethene	79-01-6	UG/L					27,000				43,000		33,000	
	Vinyl chloride	75-01-4	UG/L					300	U			300	U	300	U

NOTES:

CAS NO.	chemical abstract service number
MG/KG	milligrams per kilogram
J	result is estimated
R	sample result rejected
U	result is below detection limit
UG/KG	micrograms per kilogram

Table C-2
Off-Site Groundwater Data
Pilot-Scale Treatability Study Report
Stratford Army Engine Plant

			SAMPLE ID:	PZ041220991330		PZ050121000800		PZ050130000800		PZ051118991820		PZ051202991430		PZ051210991630	
			DATE COLLECTED:	12/20/99		1/21/00		1/30/00		11/18/99		12/2/99		12/10/99	
			SAMPLE DELIVERY GROUP NO.:	STR06		STR07		STR09		STR03		STR04		STR05	
ANALYTE CATEGORY	ANALYTE	CAS NO.	UNITS	Result	Final Qual	Result	Final Qual	Result	Final Qual	Result	Final Qual	Result	Final Qual	Result	Final Qual
Inorganics	Chromium	7440-47-3	UG/L												
	Chromium, Hexavalent	18540-29-9	MG/L												
	Hexavalent Chromium	18540-29-9	MG/L												
	Manganese	7439-96-5	UG/L			112,000		97,900				2,120			
TOC	Total Organic Carbon	7440-44-0	MG/L	1.9						1	U				
VOA	1,1,1-Trichloroethane	71-55-6	UG/L	3	U	30	U	15	U			300	U	3	U
	1,1,2,2-Tetrachloroethane	79-34-5	UG/L	3	U	30	U	15	U			300	U	3	U
	1,1,2-Trichloroethane	79-00-5	UG/L	7		13	J	15	U			300	U	8	
	1,1-Dichloroethane	75-34-3	UG/L	3	U	30	U	15	U			300	U	3	U
	1,1-Dichloroethene	75-35-4	UG/L	3	U	30	U	15	U			300	U	3	U
	1,2-Dichloroethane	107-06-2	UG/L	3	U	30	U	15	U			300	U	1	J
	1,2-Dichloropropane	78-87-5	UG/L	3	U	30	U	15	U			300	U	3	U
	2-Butanone	78-93-3	UG/L	10		50	U	25	U			500	U	2	J
	2-Hexanone	591-78-6	UG/L	5	U	50	U	25	U			500	U	5	U
	4-Methyl-2-pentanone	108-10-1	UG/L	5	U	50	U	25	UJ			500	U	5	U
	Acetone	67-64-1	UG/L	33		25	J	15	J			500	U	10	
	Benzene	71-43-2	UG/L	3	U	30	U	15	U			300	U	3	U
	Bromodichloromethane	75-27-4	UG/L	8		30	U	7	J			300	U	8	
	Bromoform	75-25-2	UG/L	1	J	30	U	15	U			300	U	2	J
	Bromomethane	74-83-9	UG/L	3	U	30	U	15	U			300	U	3	U
	Carbon disulfide	75-15-0	UG/L	3	U	30	U	15	U			300	U	3	U
	Carbon tetrachloride	56-23-5	UG/L	3	U	30	U	15	U			300	U	1	J
	Chlorobenzene	108-90-7	UG/L	3	U	30	U	15	U			300	U	3	U
	Chloroethane	75-00-3	UG/L	3	U	30	U	15	U			300	U	3	U
	Chloroform	67-66-3	UG/L	58		56		31				300	U	51	
	Chloromethane	74-87-3	UG/L	3	U	30	U	15	U			300	U	3	U
	cis-1,2-Dichloroethene	156-59-2	UG/L	3	U	30	U	15	U			300	U	3	U
	cis-1,3-Dichloropropene	10061-01-5	UG/L	3	U	30	U	15	U			300	U	3	U
	Dibromochloromethane	124-48-1	UG/L	1	J	30	U	15	U			300	U	1	J
	Ethylbenzene	100-41-4	UG/L	3	U	30	U	15	U			300	U	3	U
	m,p-Xylene	108-38-3	UG/L	3	U	30	J	15	U			300	U	3	U
	Methylene chloride	75-09-2	UG/L	3	U	30	U	15	U			300	U	3	U
	o-Xylene	95-47-6	UG/L	3	U	30	J	15	U			300	U	3	U
	Styrene	100-42-5	UG/L	3	UJ	30	J	15	U			300	U	3	U
	Tetrachloroethene	127-18-4	UG/L	3	U	30	U	15	U			300	U	6	
	Toluene	108-88-3	UG/L	3	U	30	U	15	U			300	U	3	U
	trans-1,2-Dichloroethene	156-60-5	UG/L	3	U	30	U	15	U			300	U	3	U
	trans-1,3-Dichloropropene	10061-02-6	UG/L	3	U	30	U	15	U			300	U	3	U
	Trichloroethene	79-01-6	UG/L	3	U	30	U	15	U			170,000		38	
	Vinyl chloride	75-01-4	UG/L	3	U	30	U	15	U			300	U	3	U

NOTES:

CAS NO.	chemical abstract service number
MG/KG	milligrams per kilogram
J	result is estimated
R	sample result rejected
U	result is below detection limit
UG/KG	micrograms per kilogram

Table C-2
Off-Site Groundwater Data
Pilot-Scale Treatability Study Report
Stratford Army Engine Plant

			SAMPLE ID:	PZ051220991420		PZ060122000800		PZ060131000800		PZ061118991754		PZ061201991230		PZ061201991230D	
			DATE COLLECTED:	12/20/99		1/22/00		1/31/00		11/18/99		12/1/99		12/1/99	
			SAMPLE DELIVERY GROUP NO.:	STR06		STR08		STR09		STR03		STR04		STR04	
ANALYTE CATEGORY	ANALYTE	CAS NO.	UNITS	Result	Final Qual	Result	Final Qual	Result	Final Qual	Result	Final Qual	Result	Final Qual	Result	Final Qual
Inorganics	Chromium	7440-47-3	UG/L	17,800				20.8							
	Chromium, Hexavalent	18540-29-9	MG/L												
	Hexavalent Chromium	18540-29-9	MG/L												
	Manganese	7439-96-5	UG/L	1,810	J	1,730		751				1,760		1,830	
TOC	Total Organic Carbon	7440-44-0	MG/L	2.9						1	U				
VOA	1,1,1-Trichloroethane	71-55-6	UG/L	150	U	300	U	300	U			300	U	300	U
	1,1,2,2-Tetrachloroethane	79-34-5	UG/L	150	U	300	U	300	U			300	U	300	U
	1,1,2-Trichloroethane	79-00-5	UG/L	150	U	300	U	300	U			300	U	300	U
	1,1-Dichloroethane	75-34-3	UG/L	150	U	300	U	300	U			300	U	300	U
	1,1-Dichloroethene	75-35-4	UG/L	150	U	300	U	300	U			300	U	300	U
	1,2-Dichloroethane	107-06-2	UG/L	150	U	300	U	300	U			300	U	300	U
	1,2-Dichloropropane	78-87-5	UG/L	150	U	300	U	300	U			300	U	300	U
	2-Butanone	78-93-3	UG/L	250	U	500	U	500	U			500	U	500	U
	2-Hexanone	591-78-6	UG/L	250	U	500	U	500	U			500	U	500	U
	4-Methyl-2-pentanone	108-10-1	UG/L	250	U	110	J	500	UJ			500	U	500	U
	Acetone	67-64-1	UG/L	250	U	500	U	500	U			500	U	500	U
	Benzene	71-43-2	UG/L	150	U	300	U	300	U			300	U	300	U
	Bromodichloromethane	75-27-4	UG/L	150	U	300	U	300	U			300	U	300	U
	Bromoform	75-25-2	UG/L	150	U	300	U	300	U			300	U	300	U
	Bromomethane	74-83-9	UG/L	150	U	300	U	300	U			300	U	300	U
	Carbon disulfide	75-15-0	UG/L	150	U	300	U	300	U			300	U	300	U
	Carbon tetrachloride	56-23-5	UG/L	150	U	300	U	300	U			300	U	300	U
	Chlorobenzene	108-90-7	UG/L	150	U	300	U	300	U			300	U	300	U
	Chloroethane	75-00-3	UG/L	150	U	300	U	300	U			300	U	300	U
	Chloroform	67-66-3	UG/L	52	J	130	J	300	U			300	U	300	U
	Chloromethane	74-87-3	UG/L	150	U	300	U	300	U			300	U	300	U
	cis-1,2-Dichloroethene	156-59-2	UG/L	150	U	300	U	300	U			300	U	300	U
	cis-1,3-Dichloropropene	10061-01-5	UG/L	150	U	300	U	300	U			300	U	300	U
	Dibromochloromethane	124-48-1	UG/L	150	U	300	U	300	U			300	U	300	U
	Ethylbenzene	100-41-4	UG/L	150	U	300	U	300	U			300	U	300	U
	m,p-Xylene	108-38-3	UG/L	150	U	300	U	300	U			300	U	300	U
	Methylene chloride	75-09-2	UG/L	150	U	300	U	300	U			300	U	300	U
	o-Xylene	95-47-6	UG/L	150	U	300	U	300	U			300	U	300	U
	Styrene	100-42-5	UG/L	150	UJ	300	U	300	U			300	U	300	U
	Tetrachloroethene	127-18-4	UG/L	150	U	300	U	300	U			300	U	300	U
	Toluene	108-88-3	UG/L	150	U	300	U	300	U			300	U	300	U
	trans-1,2-Dichloroethene	156-60-5	UG/L	150	U	300	U	300	U			300	U	300	U
	trans-1,3-Dichloropropene	10061-02-6	UG/L	150	U	300	U	300	U			300	U	300	U
	Trichloroethene	79-01-6	UG/L	8,100		240,000		96,000				150,000		170,000	
	Vinyl chloride	75-01-4	UG/L	150	U	300	U	300	U			300	U	300	U

NOTES:

CAS NO.	chemical abstract service number
MG/KG	milligrams per kilogram
J	result is estimated
R	sample result rejected
U	result is below detection limit
UG/KG	micrograms per kilogram

Table C-2
Off-Site Groundwater Data
Pilot-Scale Treatability Study Report
Stratford Army Engine Plant

			SAMPLE ID:	PZ061203991630		PZ061220991450		PZ070123000700		PZ071118991700				PZ071201991730	
			DATE COLLECTED:	12/3/99		12/20/99		1/22/00		11/18/99		11/18/99		12/1/99	
			SAMPLE DELIVERY GROUP NO.:	STR04		STR06		STR08		STR03		STR03		STR04	
ANALYTE CATEGORY	ANALYTE	CAS NO.	UNITS	Result	Final Qual	Result	Final Qual	Result	Final Qual	Result	Final Qual	Result	Final Qual	Result	Final Qual
Inorganics	Chromium	7440-47-3	UG/L							53	U				
	Chromium, Hexavalent	18540-29-9	MG/L							0.007					
	Hexavalent Chromium	18540-29-9	MG/L												
	Manganese	7439-96-5	UG/L	775				281,000		1,680	J			2,650	
TOC	Total Organic Carbon	7440-44-0	MG/L			1.3				1	U	1	U		
VOA	1,1,1-Trichloroethane	71-55-6	UG/L	300	U	3,000	U			3	U			300	U
	1,1,2,2-Tetrachloroethane	79-34-5	UG/L	300	U	3,000	U			3	U			300	U
	1,1,2-Trichloroethane	79-00-5	UG/L	300	U	3,000	U			34				300	U
	1,1-Dichloroethane	75-34-3	UG/L	300	U	3,000	U			4				300	U
	1,1-Dichloroethene	75-35-4	UG/L	300	U	3,000	U			25				300	U
	1,2-Dichloroethane	107-06-2	UG/L	300	U	3,000	U			8				300	U
	1,2-Dichloropropane	78-87-5	UG/L	300	U	3,000	U			3	U			300	U
	2-Butanone	78-93-3	UG/L	500	U	5,000	U			22	J			500	U
	2-Hexanone	591-78-6	UG/L	500	U	5,000	U			5	UJ			500	U
	4-Methyl-2-pentanone	108-10-1	UG/L	500	U	5,000	U			5	UJ			500	U
	Acetone	67-64-1	UG/L	500	U	5,000	U			5	R			500	U
	Benzene	71-43-2	UG/L	300	U	3,000	U			3	U			300	U
	Bromodichloromethane	75-27-4	UG/L	300	U	3,000	U			3	U			300	U
	Bromoform	75-25-2	UG/L	300	U	3,000	U			3	U			300	U
	Bromomethane	74-83-9	UG/L	300	U	3,000	U			3	U			300	U
	Carbon disulfide	75-15-0	UG/L	300	U	3,000	U			3	U			300	U
	Carbon tetrachloride	56-23-5	UG/L	300	U	3,000	U			8				300	U
	Chlorobenzene	108-90-7	UG/L	300	U	3,000	U			3	U			300	U
	Chloroethane	75-00-3	UG/L	300	U	3,000	U			3	U			300	U
	Chloroform	67-66-3	UG/L	300	U	3,000	U			99	J			300	U
	Chloromethane	74-87-3	UG/L	300	U	3,000	U			3	U			300	U
	cis-1,2-Dichloroethene	156-59-2	UG/L	300	U	3,000	U			48				300	U
	cis-1,3-Dichloropropene	10061-01-5	UG/L	300	U	3,000	U			3	U			300	U
	Dibromochloromethane	124-48-1	UG/L	300	U	3,000	U			3	U			300	U
	Ethylbenzene	100-41-4	UG/L	300	U	3,000	U			3	U			300	U
	m,p-Xylene	108-38-3	UG/L	300	U	3,000	U			3	U			300	U
	Methylene chloride	75-09-2	UG/L	300	U	3,000	U			3	U			300	U
	o-Xylene	95-47-6	UG/L	300	U	3,000	U			3	U			300	U
	Styrene	100-42-5	UG/L	300	U	3,000	U			3	U			300	U
	Tetrachloroethene	127-18-4	UG/L	300	U	3,000	U			82				300	U
	Toluene	108-88-3	UG/L	300	U	3,000	U			3	U			300	U
	trans-1,2-Dichloroethene	156-60-5	UG/L	300	U	3,000	U			6				300	U
	trans-1,3-Dichloropropene	10061-02-6	UG/L	300	U	3,000	U			3	U			300	U
	Trichloroethene	79-01-6	UG/L	78,000		90,000				28,000				260,000	
	Vinyl chloride	75-01-4	UG/L	300	U	3,000	U			3	U			300	U

NOTES:

CAS NO.	chemical abstract service number
MG/KG	milligrams per kilogram
J	result is estimated
R	sample result rejected
U	result is below detection limit
UG/KG	micrograms per kilogram

Table C-2
Off-Site Groundwater Data
Pilot-Scale Treatability Study Report
Stratford Army Engine Plant

			SAMPLE ID:	PZ071220991315		PZ080120001500		PZ080128001500		PZ08012800150D		PZ081202991100		PZ081204991030	
			DATE COLLECTED:	12/20/99		1/20/00		1/28/00		1/28/00		12/2/99		12/4/99	
			SAMPLE DELIVERY GROUP NO.:	STR06		STR07		STR08		STR08		STR04		STR05	
ANALYTE CATEGORY	ANALYTE	CAS NO.	UNITS	Result	Final Qual	Result	Final Qual	Result	Final Qual	Result	Final Qual	Result	Final Qual	Result	Final Qual
Inorganics	Chromium	7440-47-3	UG/L			29,300	J	2,930		2,950		258,000		157,000	
	Chromium, Hexavalent	18540-29-9	MG/L												
	Hexavalent Chromium	18540-29-9	MG/L			0.68		0.005	UJ	0.005	UJ	0.27	J		
	Manganese	7439-96-5	UG/L					14,400							
TOC	Total Organic Carbon	7440-44-0	MG/L	2.7											
VOA	1,1,1-Trichloroethane	71-55-6	UG/L	30	U										
	1,1,2,2-Tetrachloroethane	79-34-5	UG/L	30	U										
	1,1,2-Trichloroethane	79-00-5	UG/L	30	U										
	1,1-Dichloroethane	75-34-3	UG/L	30	U										
	1,1-Dichloroethene	75-35-4	UG/L	30	U										
	1,2-Dichloroethane	107-06-2	UG/L	30	U										
	1,2-Dichloropropane	78-87-5	UG/L	30	U										
	2-Butanone	78-93-3	UG/L	50	U										
	2-Hexanone	591-78-6	UG/L	50	U										
	4-Methyl-2-pentanone	108-10-1	UG/L	50	U										
	Acetone	67-64-1	UG/L	53											
	Benzene	71-43-2	UG/L	30	U										
	Bromodichloromethane	75-27-4	UG/L	30	U										
	Bromoform	75-25-2	UG/L	30	U										
	Bromomethane	74-83-9	UG/L	30	U										
	Carbon disulfide	75-15-0	UG/L	30	U										
	Carbon tetrachloride	56-23-5	UG/L	30	U										
	Chlorobenzene	108-90-7	UG/L	30	U										
	Chloroethane	75-00-3	UG/L	30	U										
	Chloroform	67-66-3	UG/L	42											
	Chloromethane	74-87-3	UG/L	30	U										
	cis-1,2-Dichloroethene	156-59-2	UG/L	30	U										
	cis-1,3-Dichloropropene	10061-01-5	UG/L	30	U										
	Dibromochloromethane	124-48-1	UG/L	30	U										
	Ethylbenzene	100-41-4	UG/L	30	U										
	m,p-Xylene	108-38-3	UG/L	30	U										
	Methylene chloride	75-09-2	UG/L	30	U										
	o-Xylene	95-47-6	UG/L	30	U										
	Styrene	100-42-5	UG/L	30	UJ										
	Tetrachloroethene	127-18-4	UG/L	30	U										
	Toluene	108-88-3	UG/L	30	U										
	trans-1,2-Dichloroethene	156-60-5	UG/L	30	U										
	trans-1,3-Dichloropropene	10061-02-6	UG/L	30	U										
	Trichloroethene	79-01-6	UG/L	11	J										
	Vinyl chloride	75-01-4	UG/L	30	U										

NOTES:

CAS NO.	chemical abstract service number
MG/KG	milligrams per kilogram
J	result is estimated
R	sample result rejected
U	result is below detection limit
UG/KG	micrograms per kilogram

Table C-2
Off-Site Groundwater Data
Pilot-Scale Treatability Study Report
Stratford Army Engine Plant

			SAMPLE ID:	PZ081221991425		PZ090121001500		PZ090129001500		PZ091202990630		PZ091203991030		PZ091221991455	
			DATE COLLECTED:	12/21/99		1/21/00		1/29/00		12/2/99		12/3/99		12/21/99	
			SAMPLE DELIVERY GROUP NO.:	STR06		STR07		STR09		STR04		STR04		STR06	
ANALYTE CATEGORY	ANALYTE	CAS NO.	UNITS	Result	Final Qual	Result	Final Qual	Result	Final Qual	Result	Final Qual	Result	Final Qual	Result	Final Qual
Inorganics	Chromium	7440-47-3	UG/L	13,200		70,100	J	57,200		360,000		325,000		118,000	
	Chromium, Hexavalent	18540-29-9	MG/L												
	Hexavalent Chromium	18540-29-9	MG/L			82	J			0.29	J				
	Manganese	7439-96-5	UG/L												
TOC	Total Organic Carbon	7440-44-0	MG/L												
VOA	1,1,1-Trichloroethane	71-55-6	UG/L												
	1,1,2,2-Tetrachloroethane	79-34-5	UG/L												
	1,1,2-Trichloroethane	79-00-5	UG/L												
	1,1-Dichloroethane	75-34-3	UG/L												
	1,1-Dichloroethene	75-35-4	UG/L												
	1,2-Dichloroethane	107-06-2	UG/L												
	1,2-Dichloropropane	78-87-5	UG/L												
	2-Butanone	78-93-3	UG/L												
	2-Hexanone	591-78-6	UG/L												
	4-Methyl-2-pentanone	108-10-1	UG/L												
	Acetone	67-64-1	UG/L												
	Benzene	71-43-2	UG/L												
	Bromodichloromethane	75-27-4	UG/L												
	Bromoform	75-25-2	UG/L												
	Bromomethane	74-83-9	UG/L												
	Carbon disulfide	75-15-0	UG/L												
	Carbon tetrachloride	56-23-5	UG/L												
	Chlorobenzene	108-90-7	UG/L												
	Chloroethane	75-00-3	UG/L												
	Chloroform	67-66-3	UG/L												
	Chloromethane	74-87-3	UG/L												
	cis-1,2-Dichloroethene	156-59-2	UG/L												
	cis-1,3-Dichloropropene	10061-01-5	UG/L												
	Dibromochloromethane	124-48-1	UG/L												
	Ethylbenzene	100-41-4	UG/L												
	m,p-Xylene	108-38-3	UG/L												
	Methylene chloride	75-09-2	UG/L												
	o-Xylene	95-47-6	UG/L												
	Styrene	100-42-5	UG/L												
	Tetrachloroethene	127-18-4	UG/L												
	Toluene	108-88-3	UG/L												
	trans-1,2-Dichloroethene	156-60-5	UG/L												
	trans-1,3-Dichloropropene	10061-02-6	UG/L												
	Trichloroethene	79-01-6	UG/L												
	Vinyl chloride	75-01-4	UG/L												

NOTES:

CAS NO.	chemical abstract service number
MG/KG	milligrams per kilogram
J	result is estimated
R	sample result rejected
U	result is below detection limit
UG/KG	micrograms per kilogram

Table C-2
Off-Site Groundwater Data
Pilot-Scale Treatability Study Report
Stratford Army Engine Plant

			SAMPLE ID:	PZ100122001500		PZ100130001500		PZ101202991900		PZ101209991030		PZ110131001500		PZ111202991200	
			DATE COLLECTED:	1/22/00		1/30/00		12/2/99		12/9/99		1/31/00		12/2/99	
			SAMPLE DELIVERY GROUP NO.:	STR08		STR09		STR04		STR05		STR09		STR04	
ANALYTE CATEGORY	ANALYTE	CAS NO.	UNITS	Result	Final Qual	Result	Final Qual	Result	Final Qual	Result	Final Qual	Result	Final Qual	Result	Final Qual
Inorganics	Chromium	7440-47-3	UG/L	28,700		50,600		389,000		30,900		461		311,000	
	Chromium, Hexavalent	18540-29-9	MG/L												
	Hexavalent Chromium	18540-29-9	MG/L									0.52	J	0.42	J
	Manganese	7439-96-5	UG/L												
TOC	Total Organic Carbon	7440-44-0	MG/L												
VOA	1,1,1-Trichloroethane	71-55-6	UG/L												
	1,1,2,2-Tetrachloroethane	79-34-5	UG/L												
	1,1,2-Trichloroethane	79-00-5	UG/L												
	1,1-Dichloroethane	75-34-3	UG/L												
	1,1-Dichloroethene	75-35-4	UG/L												
	1,2-Dichloroethane	107-06-2	UG/L												
	1,2-Dichloropropane	78-87-5	UG/L												
	2-Butanone	78-93-3	UG/L												
	2-Hexanone	591-78-6	UG/L												
	4-Methyl-2-pentanone	108-10-1	UG/L												
	Acetone	67-64-1	UG/L												
	Benzene	71-43-2	UG/L												
	Bromodichloromethane	75-27-4	UG/L												
	Bromoform	75-25-2	UG/L												
	Bromomethane	74-83-9	UG/L												
	Carbon disulfide	75-15-0	UG/L												
	Carbon tetrachloride	56-23-5	UG/L												
	Chlorobenzene	108-90-7	UG/L												
	Chloroethane	75-00-3	UG/L												
	Chloroform	67-66-3	UG/L												
	Chloromethane	74-87-3	UG/L												
	cis-1,2-Dichloroethene	156-59-2	UG/L												
	cis-1,3-Dichloropropene	10061-01-5	UG/L												
	Dibromochloromethane	124-48-1	UG/L												
	Ethylbenzene	100-41-4	UG/L												
	m,p-Xylene	108-38-3	UG/L												
	Methylene chloride	75-09-2	UG/L												
	o-Xylene	95-47-6	UG/L												
	Styrene	100-42-5	UG/L												
	Tetrachloroethene	127-18-4	UG/L												
	Toluene	108-88-3	UG/L												
	trans-1,2-Dichloroethene	156-60-5	UG/L												
	trans-1,3-Dichloropropene	10061-02-6	UG/L												
	Trichloroethene	79-01-6	UG/L												
	Vinyl chloride	75-01-4	UG/L												

NOTES:

CAS NO.	chemical abstract service number
MG/KG	milligrams per kilogram
J	result is estimated
R	sample result rejected
U	result is below detection limit
UG/KG	micrograms per kilogram

Table C-2
Off-Site Groundwater Data
Pilot-Scale Treatability Study Report
Stratford Army Engine Plant

			SAMPLE ID:	PZ111208991030	
			DATE COLLECTED:	12/8/99	
			SAMPLE DELIVERY GROUP NO.:	STR05	
ANALYTE CATEGORY	ANALYTE	CAS NO.	UNITS	Result	Final Qual
Inorganics	Chromium	7440-47-3	UG/L	125,000	
	Chromium, Hexavalent	18540-29-9	MG/L		
	Hexavalent Chromium	18540-29-9	MG/L		
	Manganese	7439-96-5	UG/L		
TOC	Total Organic Carbon	7440-44-0	MG/L		
VOA	1,1,1-Trichloroethane	71-55-6	UG/L		
	1,1,2,2-Tetrachloroethane	79-34-5	UG/L		
	1,1,2-Trichloroethane	79-00-5	UG/L		
	1,1-Dichloroethane	75-34-3	UG/L		
	1,1-Dichloroethene	75-35-4	UG/L		
	1,2-Dichloroethane	107-06-2	UG/L		
	1,2-Dichloropropane	78-87-5	UG/L		
	2-Butanone	78-93-3	UG/L		
	2-Hexanone	591-78-6	UG/L		
	4-Methyl-2-pentanone	108-10-1	UG/L		
	Acetone	67-64-1	UG/L		
	Benzene	71-43-2	UG/L		
	Bromodichloromethane	75-27-4	UG/L		
	Bromoform	75-25-2	UG/L		
	Bromomethane	74-83-9	UG/L		
	Carbon disulfide	75-15-0	UG/L		
	Carbon tetrachloride	56-23-5	UG/L		
	Chlorobenzene	108-90-7	UG/L		
	Chloroethane	75-00-3	UG/L		
	Chloroform	67-66-3	UG/L		
	Chloromethane	74-87-3	UG/L		
	cis-1,2-Dichloroethene	156-59-2	UG/L		
	cis-1,3-Dichloropropene	10061-01-5	UG/L		
	Dibromochloromethane	124-48-1	UG/L		
	Ethylbenzene	100-41-4	UG/L		
	m,p-Xylene	108-38-3	UG/L		
	Methylene chloride	75-09-2	UG/L		
	o-Xylene	95-47-6	UG/L		
	Styrene	100-42-5	UG/L		
	Tetrachloroethene	127-18-4	UG/L		
	Toluene	108-88-3	UG/L		
	trans-1,2-Dichloroethene	156-60-5	UG/L		
	trans-1,3-Dichloropropene	10061-02-6	UG/L		
	Trichloroethene	79-01-6	UG/L		
	Vinyl chloride	75-01-4	UG/L		

NOTES:

CAS NO.	chemical abstract service number
MG/KG	milligrams per kilogram
J	result is estimated
R	sample result rejected
U	result is below detection limit
UG/KG	micrograms per kilogram

DATA QUALITY SUMMARY REPORT

APPENDIX D
ON-SITE LABORATORY DATA QUALITY SUMMARY REPORT
Ou 2 PILOT TESTS
STRATFORD ARMY ENGINE PLANT
STRATFORD, CONNECTICUT

1.0 Introduction

The purpose of this report is to provide a summary of data quality evaluations and interpretations completed for on-site screening data collected during the Pilot Test at the Stratford Army Engine Plant Site. Water samples were collected and analyzed on-site between November 18th, 1999 and February 1st, 2000 for selected volatile organic compounds (VOCs) and metals. Split samples were submitted at a frequency of 10 percent to Laucks Testing Laboratories, Inc., Seattle, Washington, to evaluate the accuracy and usability of on-site laboratory results. Data quality objectives (DQOs) for the screening data included:

- identify of the presence, absence, and distribution of selected VOCs and metals;
- compare contaminant concentrations to Connecticut Department of Environmental Protection Remediation Standard Regulations for Surface Water Protection (CTDEP RSR for SW); and,
- investigate the effectiveness of in-situ treatment technologies at reducing concentrations of hexavalent chromium (Cr^{+6}) and VOC trichloroethene (TCE).

2.0 Analytical Method

VOCs were analyzed in accordance with the Stratford Army Engine Plant (SAEP) Modified 8021B VOC Analyses Standard Operating Procedures (SOP). The screening procedure is based on SW-846 Method 8021B with a modified target compound list and reporting limits. Analysis was completed using a Hewlett-Packard 5890 Series II gas chromatograph equipped with an electrolytic conductivity detector. A reporting limit of 100 micrograms per liter (µg/L) was established for all VOCs. Water samples were analyzed on-site for the following target compounds:

- 1,1,1-trichloroethane (1,1,1-TCA)
- cis-1,2-dichloroethene (cis-1,2,DCE)
- trans-1,2-dichloroethene (trans-1,2-DCE)
- TCE
- tetrachloroethene (PCE)
- vinyl chloride

Metal samples were analyzed in accordance with Hach test kit manufacture specifications. Water samples were analyzed for total chromium (Cr), Cr^{+6}, total manganese (Mn), and ferrous iron (Fe^{2+}) using colorimetric Hach test kits. Field duplicates were analyzed at a frequency of 10 percent and relative percent difference (RPD) goals were established at 30 percent. Holding time for Fe^{2+} and Cr^{+6} was 24 hours.

3.0 Instrument Calibration

Initial Calibration

Three point initial calibrations were performed as outlined in the SAEP Modified 8021B VOC Analyses SOP. Initial calibration goals included the analysis of a low concentration standard at a concentration equivalent to the sample reporting limit, and demonstration of linearity using a linear regression curve with a correlation coefficient of .98 or greater. All initial calibrations were within the established quality control (QC) limits.

Samples PZ1B1202991630 and EW021202991530 exceeded the calibration range. Due to their high concentrations of TCE, the samples were not reanalyzed and were qualified E.

Continuing Calibration Standards

Continuing calibrations were performed as outlined in the SAEP Modified 8021B VOC Analyses SOP. Continuing calibrations were analyzed daily prior to samples and after every 10 samples. A percent difference of ±25% was used for control limits of the calibration response. The majority of continuing and closing standard results were within control limits. In some continuing calibrations, one or more target compounds had responses that exceeded upper control limits indicating a high response in the standard. Target compounds with positive detections were qualified as estimated. A subset of sample results were qualified as described below:

The closing standard C4VT012900G1XF for 01/29/00 did not run. The previous continuing standard C3VT012900G1XF was within the QC limits. Matrix spike/matrix spike duplicate (MS/MSD) samples for FT030129001430 were analyzed after C3VT012900G1XF and were within QC limits. Since C3VT012900G1XF and the MS/MSD were in control, the MS/MSD were not reanalyzed. No data qualification was done.

TCE and cis-1,2-DCE were above the QC limits for continuing standards C3VT120399G1XF and C4VT120399G1XF. There were no positive cis-1,2-DCE results associated with these standards. Positive detections of TCE in associated samples PZ051202991530, EW021202991530, EW021202991230, EW021202991330, PZ1B1202991630, PZ1C1202991630, PZ1C1202991630D, PZ041202991630, PZ051202991630, PZ061202991630, PZ071202991630, EW021202991630, PZ051202991730, EW021202991730, PZ051202991830, EW021202991830, PZ051202991930, PZ051202992030, EW021202991930, EW021202991930D, EW021202992030, and EW031203991030 were considered biased high and were qualified estimated J.

TCE response was above the QC limit for continuing standard C8VT120599G1XF. Positive TCE results for associated samples PZ041203991630, PZ051203991630, PZ071203991630, EW021203991630, PZ1B1203991630, EW031204991030, PZ1B1204991630, and PZ041204991630 were considered potentially biased high and qualified as estimated J.

TCE was above the QC limits for continuing standard C3VT120999G1XF. TCE results for associated samples PZ1B1208991630, PZ1C1208991630, EW031209991030, PZ1B1209991630, PZ1C1209991630, EW021209991630, PZ051209991630, and PZ061209991630 were considered biased high and qualified as estimated J.

TCE, 1,1,1-TCA, 1,1-DCE, and trans-1,2-DCE were above the QC limits for continuing standard C2VT121199G1XF. TCE results for associated samples EW021210991630 and EW031211990930 were considered biased high and qualified as estimated. There were no positive 1,1,1-TCA, 1,1-DCE, or trans-1,2-DCE results in any samples associated with C2VT120799G1XF and no qualification was done.

TCE, 1,1,1-TCA, cis-1,2-DCE, and trans-1,2-DCE were above the QC limits for continuing standard C2VT012600G1XF. TCE results for associated samples PZ1C0126000800, PZ1C0126000800D, and PZ1B0126000800 were considered biased high and qualified as estimated J. There were no positive 1,1,1-TCA, cis-1,2-DCE, or trans-1,2-DCE results above the reporting limit of 100 µg/L in any samples associated with C2VT012600G1XF and therefore no qualification was done.

Holding Times

All VOC sample holding times were met as outlined in the SAEP Modified 8021B VOC Analyses SOP.

All Cr^{+6} holding times were met except for sample PZ111203991030 that was sampled on 12/03/99 at 10:30 and analyzed on 12/04/99 at 11:02. The Cr^{+6} result was qualified as estimated J.

4.0 Surrogate Percent Recoveries

Surrogate percent recovery limits were outlined in the SAEP Modified 8021B VOC Analyses SOP 50% - 150%. Surrogate recoveries were within the established QC limits for all samples.

5.0 Blank Contamination

All method blank results were below the reporting limit indicating that laboratory contamination did not contribute to the detection of target analytes in samples.

6.0 Field Duplicates

VOC field duplicates were collected at a rate of 10% for the sample set. All field duplicate RPDs were within the project RPD limit of 30% indicating good precision of measurement for the sampling and analytical methods.

Metal field duplicates were performed at a frequency of 10 percent. All field duplicate RPDs were within the established QC limits except for Cr^{+6} in samples PZ081202991100 and PZ080120001500. RPDs exceeded the 30 percent goal for Cr^{+6} and results were qualified as estimated J.

Sample PZ061203991630 had a low detection of Mn where the associated field duplicate did not. Since the result in the sample was at the low end of the detection range, results were not qualified.

7.0 Matrix Spikes

Matrix spikes were performed as outlined in the SAEP Modified 8021B VOC Analyses SOP. Control limits of 60% - 140% were used to evaluate method accuracy.

Sample PZ1C0126000800 had high recoveries in the MS for cis-1,2-DCE, 1,1,1-TCA, and PCE. There were no positive results in the associated sample. No qualifications were necessary.

Low MS/MSD recoveries for TCE were reported for samples EW021118991815, EW031118991550, PZ061201991230, PZ041201991930, PZ1B1202990630, EW031202991100, PZ051202991430, EW021202991930, and EW031205991030. These samples contained high concentration of TCE in the original sample. Due to high concentrations of TCE in the original samples MS/MSD percent recovery results were not interpreted to be valid and no data qualification was done.

A subset of samples had low MS recovery for all target compounds. Based on chemist observations (purple color), these samples had high amounts of potassium permanganate ($KMnO_4$). $KMnO_4$ was used as the oxidation agent during the pilot study. MS/MSD samples PZ050121000800, PZ070123000800, EW020127000800, PZ050130000800, FT010130001600, and PZ1B0201000800 had high concentrations $KMnO_4$. Low recoveries in these samples were attributed to the oxidation of the spike analytes upon contact with the sample matrix. Compounds that were spiked into the samples were oxidize, and MS/MSD percent recoveries and RPDs could not be calculated. No data qualification was done for these samples.

8.0 On-site/Off-site Split Sample Data Comparison

Approximately 10% of the samples analyzed at the on-site laboratory were split and submitted for off-site laboratory analysis for VOCs, hexavalent chromium, total chromium, and manganese. The on-site/off-site split sample data for VOCs and hexavalent chromium were evaluated using two types of comparisons described below. Analytical objectives of the VOCs and hexavalent chromium screening program was to provide data on the concentration of contaminants within the treatment zones, and to obtain quantitative results that could be compared to the Connecticut Department of Environmental Protection Remediation Standard Regulations for Surface Water Protection (CTDEP RSR SW). The objective of the on-site total chromium analysis was to provide additional data on the concentrations of chromium in the groundwater samples. The objective of the manganese analyses was to obtain qualitative data on manganese to track the movement of the remediation agent in the groundwater pilot test zones. Results of the split samples are presented in Tables D-1 through D-4.

8.1 Comparison Descriptions

<u>Comparison 1</u>

In Comparison 1 results from the on-site and off-site laboratories are compared to applicable standards being used as action levels to make decisions in the investigation. The goal is to determine if the on-site data is usable to determine if groundwater contamination is above or below the action levels. For the Pilot Study action levels were defined as the CTDEP RSR SW. In the Pilot study a subset of VOCs, and hexavalent chromium results, had CTDEP RSR SW standards. Five VOCs on the on-site laboratory screening list have standards including vinyl chloride, 1,1-dichloroethene, 1,1,1-trichloroethane, trichloroethene, and tetrachloroethene. The split sample results for these compounds and hexavalent chromium were organized into four categories defined below:

1. Both on-site and off-site analyses had the target compounds at concentrations less than the action levels
2. Both on-site and off-site analyses had the target analytes detected at concentrations greater than action levels
3. The target compounds were reported above action levels for on-site and the off-site data results were less than action levels
4. The target compounds were reported above the action level off-site and the on-site results were less than action levels

A primary assumption of the comparison is that the off-site data represents the accurate, definitive data when comparing results as follows:

- Category 1 and 2 results indicate agreement between the on-site and off-site laboratories
- Category 3 results suggests a high bias to the on-site date results
- Category 4 results suggests a low bias to the on-site data results

Comparison 2

In Comparison 2 the quantitative comparability of split sample results is assessed. On-site and off-site results are evaluated using USEPA Region I field duplicate precision goal for waters of 30% (USEPA, 1996). The relative percent difference (RPDs) is calculated for split sample results. In some split samples the concentration reported by the on-site laboratory were less than the quantitation limits reports by the off-site laboratory. The RPDs in these split results were reported as 0. The RPD is reported as 0 with the assumption that the results show quantitative agreement.

Split results are presented for detected target compounds on Tables D-1 through D-4.

8.2 Hexavalent Chromium Split Sample Evaluation

Results of the hexavalent chromium split samples are presented on Table D-1.

In Comparison 1, results showed complete agreement when compared to the CTDEP RSR SW for the presence or absence of hexavalent chromium. All data fell into categories 1 and 2. Detections above the CTDEP RSR SW were reported in 16 split samples with an RPD of 83.

In Comparison 2, the majority of samples showed good agreement with the concentrations reported.

8.2.1 Conclusion

The split sample data indicate excellent comparability of on-site data to off-site results relative to CTDEP RSR SW standards with all results in categories 1 or 2. Based on this comparison, Cr^{+6} data are interpreted to be quantitative and usable for the purposes of this investigation including contamination assessments, field program decision and direction of explorations, and assessment of contamination concentrations to applicable standards.

8.3 VOC Split Sample Evaluation

Off-site split samples were analyzed for VOCs by USEPA Method 8260B to provide definitive confirmation of the on-site laboratory screening data set (USEPA, 1993). Results for the split sample comparison are presented in Table D-2.

In Comparison 1, results showed near complete agreement when compared to the CTDEP RSR SW with all but one set of results in category 1 and 2. Ninety-seven percent of the on-site/off-site comparison data fell into categories 1 or 2. There was one exception in sample PZ051210991630 which was biased high for on-site. Detections above the CTDEP RSR SW were reported in 24 split samples.

In Comparison 2, result showed good quantitative agreement with the majority of results with RPD less than 30% and an average relative percent difference of 30.

8.3.1 Conclusion

The split sample data indicate excellent comparability of on-site data to off-site results. No results fell into category 4 indicating that low bias results at the on-site laboratory did not occur. These results indicate that the on-site VOC results are adequate for the evaluation of groundwater contamination against the CTDEP RSR SW standards, and VOC results are interpreted to be usable for quantitative contamination assessments.

8.4 Total Chromium Split Sample Evaluation

Total chromium results were evaluated only for quantitative agreement under comparison 2. Results of the split sample comparison are presented on Table D-3. On-site total chromium was analyzed using Hach test kit titration method while the off-site total chromium was analyzed by method 6010B. Fair agreement was observed between the data sets with an average RPD of 62. The quantitative agreement decreased for samples with concentrations at the low end of the reporting range. However, the results showed good qualitiative agreement with the relative concentrations in split samples clearly showing agreement with high and low concentrations.

8.4.1 Conclusion

The on-site results of the total chromium analyses are adequate for use in qualitative and quantitative evaluations of total chromium. Results are less reliable at concentations near the reporting limits (2 – 50 mg/L).

8.5 Manganese Split Sample Evaluation

Manganese results were evaluated only for quantitative agreement under comparison 2. Manganese results are presented in Table D-4. On-site manganese was analyzed using Hach test kit colorimetric method while the off-site manganese was analyzed by method 6010. Large differences in the split samples were observed throughout the data set. The majority of the on-site results are lower than off-site results. Average RPD for the data set is 143. Increasing concentrations in on-site data demonstrate an increasing trend in manganese. Based on field observations, the sample matrix was a purple color due to the presence of potassium permanganate. The colorimetric field kits used a purple color to identify the concentrations of manganese in samples. Differences in the on-site and off-site data are interpreted to be due to the matrix interference, which caused the on-site results to be biased low. Based on a general review of the split data, the highest off-site concentrations of manganese correspond with the highest on-site concentrations, indicating that the data is usable for qualitative assessment of relative concentrations of manganese in samples. However, the results of the on-site manganese data are interpreted to be of low quantitative reliability, and are biased low.

TABLE D-1
SUMMARY OF HEXAVALENT CHROMIUM SPLIT SAMPLE RESULTS

Stratford Army Engine Plant
Stratford, Connecticut

Sample ID	Parameter	Field mg/L	Off-site mg/L	RPD	Category
EW020131000800	Hexavalent Chromium	10	5.65 J	56	2
EW021208991630	Hexavalent Chromium	2.6	3.7	35	2
EW021210991630	Hexavalent Chromium	4.5	4 J	12	2
EW030127001500	Hexavalent Chromium	50	130	89	2
EW031201991150	Hexavalent Chromium	400	430 J	7	2
EW031221991500	Hexavalent Chromium	200	190 J	5	2
IW071118991600	Hexavalent Chromium	300	340	13	2
PZ071118991700	Hexavalent Chromium	0.1 U	0.007	0	1
PZ080120001500	Hexavalent Chromium	2.5 J	0.68	114	2
PZ081202991100	Hexavalent Chromium	150 J	270 J	57	2
PZ090121001500	Hexavalent Chromium	25	82 J	107	2
PZ110131001500	Hexavalent Chromium	0.4	0.52 J	26	2
PZ111202991200	Hexavalent Chromium	125	420 J	108	2
PZ2A0124001500	Hexavalent Chromium	18	27	40	2
PZ2A0201001500	Hexavalent Chromium	35	29 J	19	2
PZ2B0125001500	Hexavalent Chromium	0.1 U	0.013 J	0	1
PZ2C0126001500	Hexavalent Chromium	0.3	0.91	101	2
PZ2C1203991430	Hexavalent Chromium	5	1.4	113	2
			AVERAGE RPD:	50	

NOTES:
RPD = Relative Percent Difference
J = Result estimated
U = Non-detect
CTDEP RSR SW = Connecticut Department of Environmental Protection Remediation Standard Regulations for Surface Water Prot
Category 1 = Both field GC and off-site results are below the CTDEP RSR SW
Category 2 = Both field GC and off-site results are above the CTDEP RSR SW
Category 3 = Field GC results above / off-site results below CTDEP RSR SW
Category 4 = Field GC results below / off-site results above CTDEP RSR fSW

TABLE D-2
SUMMARY OF VOC ON-SITE/OFF-SITE SPLIT SAMPLE RESULTS

Stratford Army Engine Plant
Stratford, Connecticut

Sample ID	Parameter	Field GC mg/L	Off-site mg/L	RPD	Category
EW020120000730	Tetrachloroethene	0.1 U	0.003	0	1
	cis-1,2-Dichloroethene	0.1 U	0.024	0	1
	Trichloroethene	0.14	0.094	39	1
EW021201991700	Trichloroethene	50	58	15	2
EW021202991930	Trichloroethene	47 J	67	35	2
EW021203991630	Trichloroethene	42 J	62	38	2
EW021208991630	Trichloroethene	38	39 J	3	2
EW030123001500	Trichloroethene	48	61	24	2
EW030127001500	Trichloroethene	37	55	39	2
EW031202991100	Trichloroethene	92	130	34	2
EW031205991030	Trichloroethene	95	120 J	23	2
IW071118991600	Trichloroethene	73	88	19	2
PZ040119000745	Trichloroethene	26	27	4	2
PZ041130991645	Trichloroethene	37	43	15	2
PZ041201992030	Trichloroethene	24	33	32	2
PZ051202991430	Trichloroethene	160	170	6	2
PZ051210991630	Tetrachloroethene	1 U	0.006	0	1
	Trichloroethene	65	0.038	200	3
PZ060122000800	Trichloroethene	200	240	18	2
PZ060131000800	Trichloroethene	69	96	33	2
PZ061201991230	Trichloroethene	93	150	47	2
PZ061201991230D	Trichloroethene	94	170	58	2
PZ061203991630	Trichloroethene	96	78	21	2
PZ071118991700	Tetrachloroethene	2 U	0.082	0	1
	cis-1,2-Dichloroethene	2 U	0.048	0	1
	trans-1,2-Dichloroethene	2 U	0.006	0	1
	1,1-Dichloroethene	2 U	0.025	0	1
	Trichloroethene	41	28	38	2
PZ071201991730	Trichloroethene	180	260	36	2
PZ1A0124000800	1,1,1-Trichloroethane	0.1 U	0.011	0	1
	1,1-Dichloroethene	0.11	0.005	183	1
	Trichloroethene	0.1	0.076	27	1
PZ1A1202990330	Trichloroethene	0.1 U	0.19	62	1
PZ1B0125000800	cis-1,2-Dichloroethene	10 U	0.14 J	0	1
	Trichloroethene	42	86	69	2
PZ1B1207991630	Trichloroethene	350	370	6	2
PZ1C0126000800	Trichloroethene	3 J	2.8	7	2
PZ1C1202991630	Trichloroethene	2.8 J	3.5	22	2
			AVERAGE RPD:	30	

NOTES:
RPD = Relative Percent Difference
J = Result estimated
U = Non-detect
CTDEP RSR SW = Connecticut Department of Environmental Protection Remediation Standard Regulations for Surface Water Prot
Category 1 = Both field GC and off-site results are below the CTDEP RSR SW
Category 2 = Both field GC and off-site results are above the CTDEP RSR SW
Category 3 = Field GC results above / off-site results below CTDEP RSR SW
Category 4 = Field GC results below / off-site results above CTDEP RSR fSW

TABLE D-3
SUMMARY OF TOTAL CHROMIUM SPLIT SAMPLE RESULTS

Stratford Army Engine Plant
Stratford, Connecticut

Sample ID	Parameter	Field mg/L	Off-site mg/L	RPD
EW021210991630	Chromium	14	4.16	108
EW030127001500	Chromium	92	142	43
EW031201991150	Chromium	440	436	1
EW031203990830	Chromium	470	430	9
EW031206991030	Chromium	430	365	16
EW031210991030	Chromium	270	279	3
IW071118991600	Chromium	380	464	20
PZ080120001500	Chromium	2.3	29.3 J	171
PZ080128001500	Chromium	2.3 U	2.93	24
PZ081202991100	Chromium	290	258	12
PZ081204991030	Chromium	230	157	38
PZ090121001500	Chromium	41	70.1 J	52
PZ090129001500	Chromium	32	57.2	57
PZ091203991030	Chromium	380	325	16
PZ100122001500	Chromium	2.3	28.7	170
PZ100130001500	Chromium	2.3	50.6	183
PZ101202991900	Chromium	450	389	15
PZ101209991030	Chromium	6.8	30.9	128
PZ110131001500	Chromium	2.3	0.461	133
PZ111202991200	Chromium	360	311	15
PZ111208991030	Chromium	140	125	11
PZ2A0124001500	Chromium	18	24.6	31
PZ2A0201001500	Chromium	52	35.6	37
PZ2A1203990630	Chromium	34	29.9	13
PZ2B0125001500	Chromium	2.3 U	0.935	84
PZ2C0126001500	Chromium	2.3	0.706	106
PZ2C1203991430	Chromium	4.5	1.96	79
PZ2C1207991030	Chromium	2.3	0.283	156
			AVERAGE RPD:	62

NOTES:
RPD = Relative Percent Difference
J = Result estimated
U = Non-detect

TABLE D-4
SUMMARY OF MANGANESE SPLIT SAMPLE RESULTS

Stratford Army Engine Plant
Stratford, Connecticut

Sample ID	Parameter	Field mg/L	Off-site mg/L	RPD
EW020120000730	Manganese	0.3	1.35	127
EW020127000800	Manganese	5	41.1	157
EW020128000800	Manganese	6	43	151
EW020129000800	Manganese	7	42.8	144
EW021201991700	Manganese	0.5	2.49	133
EW021202991630	Manganese	0.3	2.27	153
EW021202991930	Manganese	0.1 U	2.3	183
EW021203991630	Manganese	0.15	2.17	174
EW021208991630	Manganese	0.1 U	3.79	190
EW021209991630	Manganese	0.1 U	3.59	189
EW021210991630	Manganese	8	11.5	36
PZ040119000745	Manganese	0.1 U	0.426	124
PZ041130991645	Manganese	0.1 U	2.07	182
PZ041201992030	Manganese	0.35	1.3	115
PZ050121000800	Manganese	38	112	99
PZ050130000800	Manganese	23	97.9	124
PZ051202991430	Manganese	0.1 U	2.12	182
PZ051220991420	Manganese	1.8	1.81 J	1
PZ060122000800	Manganese	0.1 U	1.73	178
PZ060131000800	Manganese	0.2	0.751	116
PZ061201991230	Manganese	0.1 U	1.76	178
PZ061201991230D	Manganese	0.1 U	1.83	179
PZ061203991630	Manganese	0.2	0.775	118
PZ071118991700	Manganese	0.4	1.68 J	123
PZ071201991730	Manganese	0.1 U	2.65	185
PZ1A0124000800	Manganese	0.2	0.402	67
PZ1A1202990330	Manganese	0.1 U	0.419	123
PZ1B0125000800	Manganese	0.1 U	20.8	198
PZ1B0201000800	Manganese	9	69	154
PZ1B1207991630	Manganese	0.6	4.57	154
PZ1C0126000800	Manganese	1.5	12.3	157
PZ1C1202991630	Manganese	0.7	12	178
			AVERAGE RPD:	143

NOTES:
RPD = Relative Percent Difference
J = Result estimated
U = Non-detect