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D-Area Drip Irrigation-Phytoremediation Project: SRTC Final Report

By

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Executive Summary

Groundwater in D-Area at the Savannah River Site (SRS) is contaminated with trichloroethylene (TCE) and by-products resulting from discharges of this organic solvent during past operations. Several potential clean-up strategies are being or have been investigated, including a novel drip irrigation-phytoremediation process that is the focus of the treatability study described in this report. The contaminated groundwater in D-Area occurs primarily at depths of 30 to 50 feet below ground surface, well below the depths that are typically penetrated by plant roots. The system investigated in this study involved pumping water from the contaminated aquifer and discharging the water into overlying test plots below the surface using drip irrigation. The test plots contained pines, cottonwoods, or no vegetation (controls). The primary objective was to determine the overall effectiveness of the process for TCE removal and to make clear the biotic and abiotic pathways for its removal.

The treatability study system began operation 8/31/00 following several months of planning, preparation of field test sites and installation of irrigation equipment. Initial operation (Phase 1) involved pumping groundwater to four test plots from an existing monitoring well and utilizing a stainless steel holding tank. This system provided inadequate concentrations (<15 μg/kg) of TCE to the test plots to enable tracking of the various dispersal pathways and no TCE was measurable in soil samples. Subsequent operation (Phase 2) involved pumping directly from a newly developed well to six test plots (two each for pine, cottonwood and no vegetation). The modifications facilitated a >20-fold increase in the total amount of TCE and by-products including perchloroethylene (PCE) and cis-dichloroethylene (DCE) being discharged onto the plots. TCE concentrations in water pumped from the new well and discharged from the irrigation system were higher than concentrations from the initial well by a factor of >4 and flow rates were increased by a factor of >5. Savannah River Technology Center (SRTC) personnel were responsible for collection and analyses of four types of samples; water, soil, soil gas samples obtained from lysimeters and gas samples indicative of volatilization obtained from flux chambers on the surface of the plots. Savannah River Ecology Laboratory (SREL) personnel conducted concurrent plant tissue sampling. Phase 1 sampling occurred on various occasions between September 2000 and November 2000. Phase 2 involved weekly water sampling and occasional soil sampling from April 2001 through September 2001 along with comprehensive sampling of soil, water, soil gas, and volatilization during two seasonal sampling events (November 2001 and April 2002).

Overall, the results of the study suggested that the process provides a viable method to remove TCE-contaminated groundwater. The data clearly show that TCE was reduced to non-detectable levels within the upper two feet of soil (rhizosphere) in all test plots with the flow rates that were tested.

The project was terminated prematurely because of a change in regulatory driven priorities. Thus, a definitive understanding of the pathways being utilized for TCE

dissipation and the relative importance of each pathway was not been achieved nor was the maximum loading of TCE to the system without breakthrough (i.e. TCE penetrating >8 ft in the soil column) determined.

Further system operation, plant and microbial analyses, soil column testing, and evapotranspiration measurements would be needed to complete the evaluation of the D-Area drip irrigation-phytoremediation process and determine the optimal use of this technology. However, under the conditions tested (that included flows of 700 gallons/0.2-acre testplot/day with TCE concentrations averaging 86-93 μg/L) , the project successfully demonstrated that complete environmental restoration of the TCE-contaminated groundwater. Complete restoration was defined as minimal release to the atmosphere and measurements of <0.1ppm TCE in the pore water, and soil within the upper two feet of soil when the contaminant was applied using drip irrigation.

Introduction/Overview

The overall objective of this project was to evaluate a novel drip irrigation-phytoremediation process (Figure1) for remediating volatile organic contaminants (VOCs), primarily trichloroethylene (TCE), from groundwater in D-Area at the Savannah River Site (SRS). D-Area has a large dilute plume (>100 ppb) of TCE that is close to the Savannah River. The process has the potential to be less expensive and more beneficial to the environment than traditional TCE remediation technologies. The process could safely reduce plumes of TCE in D-Area groundwater to below drinking water standards (<5 ppb), while facilitating the growth of plants that can be used in timber production. Most of the TCE-contaminated groundwater in D-Area occurs near the bottom of an approximately 30-50 ft. thick aquifer, well below the depth of typical tree root penetration. Thus, the drip irrigation component of the proposed process provides a means to allow plant and associated microbial communities an opportunity to remediate contaminated groundwater from depths otherwise unavailable to plant systems. The removal of TCE is effectuated by both abiotic (adsorption, absorption, volatilization) and biotic (phytoremediation) pathways. The phytoremediation pathways involve three mechanisms: (1) rhizodegradation, or the breakdown of organic contaminants by microbial activity enhanced by the presence of plant roots, (2) phytodegradation (also known as phytotransformation), the breakdown of contaminants by plant metabolic processes, and (3) transrespiration, physical process including volatilization and transpiration.

Overall, the project was scheduled in the following three phases:

Phase 1. (2000 - 2001) – Setup and Evaluation of System

- Develop study plan.
- Obtain appropriate permits.
- Delineate plots and prepare field test area.
- Set up a field test system.
- Evaluate process equipment and monitoring techniques.

Phase 2. (2001 - 2003) – Process Development/Proof of Principal

- Expand field test area and testing protocols.
- Measure TCE dissipation based on sampling of plants, soil, water and gases.
- Evaluate seasonal and growth effects on the comparative efficacy of different plant treatments.
- Determine a mass balance for TCE removal pathways.

Phase 3. (2003 - 2004) – Optimization and Validation of Performance

- Define optimal process conditions including maximum, minimum and optimal flow rates.
- Validate performance to justify scale-up to the entire area requiring cleanup
- Compare costs with alternative clean up strategies.

Phase 1 was completed on schedule. The project was terminated prior to the completion of Phase 2. All sampling activities and results obtained from the beginning of the project until its termination are described in this report.

Methods and Materials

Description of Drip system

Drip irrigation lines were installed in four 0.6-acre test blocks above the TCE-contaminated groundwater in D-Area. Each test block consists of three adjacent 0.2-acre test plots that were each randomly assigned to receive one of three treatments (Figure 2). The plots were prepared by removing all vegetation in two of the plots and all vegetation except mature pine trees in the third plot. One of the two completely cleared plots in each block serves as non-vegetated control and the other was planted with cottonwood trees in the spring of 2001 (in preparation for Phase 2 studies). Each treatment plot is 94 ft X 94 ft. Although the entire plot is plumbed for irrigation, sampling is restricted to the interior 66-ft X 66-ft (0.1 acre) region, thus providing a 28 ft buffer zone along the exterior portion of each plot.

The irrigation design for each plot consisted of 23 irrigation feed lines spaced 4 ft apart and running the entire distance of the plot. During Phase 1, water was pumped from monitoring well DCB-8C to a 2500-gallon stainless steel holding tank. The water was then pumped, at timed intervals from the tank to the irrigation system of the plots via a 1" diameter manifold line. Irrigation feed lines branched from the manifold line. Each feed line was attached to a drip line consisting of emitters spaced at 2 ft intervals. The emitter lines were buried approximately 2 inches below the surface. There were four connections between each feed line and emitter line and these were equipped with pulsators, which helped regulate flow among emitters. During Phase 1, flow was restricted to a maximum of 120 gallons per day to only four of the 12 plots because of limitations on the single well in operation. Two new wells were installed for Phase2 and produced flows of > 700 gallons per day.

Initial Soil Characterization

Prior to the initiation of flow to the system, the USDA-Natural Resources Conservation Service conducted a soil characterization study of the soil to a depth of 8 ft in each of the 12 test plots. Baseline measurements of TCE/PCE levels, anion concentrations and microbial densities were also conducted from soil samples at depths of 2 ft and 8 ft prior to the initiation of irrigation. Soil pH was also measured (Forster, 1995). Field and analytical methods for the study were as follows:

Water sampling

Water sampling activities along with all other field sampling activities are shown in Tables 1 and 2. Field methods for water sampling involved collecting duplicate samples during irrigation. Ten (10) milliliters (mL) of water are added to 22 ml headspace vials and crimped immediately. The samples were then transported to the lab for analyses. Vials were kept refrigerated and inverted prior to measurements of TCE and by-products.

In the lab, liquid head space samples were analyzed using EPA Procedure 8260B**.** The samples were analyzed using an Agilent 5890 gas chromatograph with an Agilent 5972 mass selective detector equipped with an HP-5 analytical column (0.2mm-id 50m) or equivalent. Sample introduction was done using an Agilent 7694 automatic headspace injector, manually, or with a Tekmar 6000 automatic desorber. The gas chromatograph/mass spectrometer (GC/MS) system uses an internal standard for MS calibration and external standards prepared from vendor prepared standard stocks for quantification of TCE and byproducts.

Soil Sampling

Dates of soil sampling are shown in Tables1 and 2. Soil samples were collected by hand auger at 6” depth intervals from the surface to a depth of 8 ft. Each soil sample (2.5 - 5 ml) was collected with a modified plastic syringe and placed directly into a 22 mL glass headspace vial with 5 mL deionized water and immediately sealed for subsequent VOC analysis.

TCE and PCE analyses were performed on samples in sealed glass vials using headspace gas chromatography (Hewlett-Packard 5890 gas GC equipped with a flame ionization detector and a 60-m SPB1™ column) according to EPA Procedure 5021. Chloride, nitrite, nitrate, phosphate, and sulfate concentrations were measured with a Dionex DX500 ion chromatograph equipped with a conductivity detector, and a 250-mm Dionex IonPac AS14 Analytical column (4-mm ID, 16-µm bead; Dionex Corp., Sunnyvale, CA), operated at ambient temperatures. A 3.5 mM sodium carbonate/1 mM sodium bicarbonate buffer solution was used as the eluent (1.2 mL/min). Samples were taken from the supernatant of a solution prepared from 5 g of dry soil (dried at 121°C for 24 hours) and 5-mL of deionized water vortexed for 1 minute then centrifuged for 5 minutes at 2500 rpm.

The methodology for determining bacteriological densities involved collecting approximately 100 g soil in sterile whirl-pack bags, keeping the samples refrigerated in the field, and transporting them to the lab within hours for immediate microbiological processing. Total microbial population densities in the soil samples were determined by the Acridine Orange Direct Count (AODC) method, using 0.2-µm polycarbonate membranes according to Hobbie et al., 1977. Viable microbial population densities of aerobic and facultative heterotrophic bacteria were determined using spread plate techniques. A l% Peptone-Trypticase-Yeast extract-Glucose (PTYG) media was used (Balkwill, 1989). The spread plates were prepared in triplicate and read after a seven day incubation period.

Metabolic chambers were set up with a respirometer (Columbus Instruments Inc., Columbus, OH) to measure microbial respiration in the soil cores as previously described (WSRC-TR-2000-00373). This method measures the rates of soil oxygen consumption and carbon dioxide production as a function of soil microbial activity. These measurements were made in June, 2000, after the plots had all been cleared, with the exception of mature pines in selected plots, and the first planting of cottonwoods had been completed. Two soil samples were taken from one Pine (P1) and one control plot (NV1) with a stainless steel hand auger. A shallow sample was taken at a depth 2 ft below the surface and a "deep" sample was collected from 8 ft below the surface. A control was made from a mixture of all soils and was autoclaved three times before testing.

Lysimeter Sampling
Lysimeters as shown in Figure 3 were installed at two depths (2 ft and 8 ft) at two randomly selected locations in each of the six test plots being watered in Phase 2 of the study.   The lysimeters were installed prior to initiation of the irrigation system. The existing cap of the lysimeter is replaced with a cap containing a self-sealing quick disconnect fitting and tubing attached to a vacuum pump. The vacuum pump is operated using a portable generator. A Tedlar air bag was inflated and subsequently deflated three times to purge the lysimeter. Then, the bag was inflated a 4^{th} time and an aliquot from the bag was sampled for TCE and by-products using GC/MS. All gas samples collected in this manner were stored in a cool environment and were analyzed within 24 hours of collection.

Volatilization Sampling
Flux chambers (Figure 4) were used to sample volatilization to the atmosphere during irrigation. These 1 cu. ft. stainless steel chambers (2 per plot) were placed on the soil surface over emitters at least two days prior to the scheduled sampling period. After irrigation had been in operation for at least one hour, a vacuum pump (powered by a portable generator) was attached to a self-sealing quick disconnect fitting on the flux chamber and gasses from inside the chamber were pumped to fill a Tedlar Bag. Following this, air from the flux chamber was pumped through a carbon desorber tube for 5 minutes. The tube was then sealed for subsequent VOC analysis using GC/MS. An aliquot from the Tedlar bag was analyzed by GC/MS within 24 hours of collection.

Modeling
In addition to the field sampling during Phase 1, a multiphase numerical model was developed to simulate future phytoremediation experiments at the D Area phytoremediation experiment site. The model was designed to capture the basic equilibrium partitioning behavior of aqueous phase TCE in the soil as it is applied by drip irrigation to experimental plots with different varieties of plants and trees. Results from a numerical simulation approximating actual operating conditions indicate that the maximum concentration of aqueous phase TCE would be between 15 and 20 ug/L in the probable root zone, around 2 ft below ground surface (bgs) after one month of irrigation.

The first phase of the activities used an isothermal model (19° C) with no advective components other than those associated with the drip irrigation. Three irrigation application rates were simulated covering the range of field rates, and the TCE concentration was assumed to be approximately the maximum available from nearby wells. The numerical simulations were therefore set up as optimal scenarios for transferring aqueous TCE to the root zone of the phytoremediation system. No biological degradation and minimal sorption loss was assumed in these simulations. Figure 5 depicts the one-dimensional grid used for the simulations. A total of 65 grid blocks were used to describe the soil column from ground surface to the water table (depth of 3.75 meters) for the simulations with 1-cm resolution for the uppermost half meter where the emitters were located. The upper boundary condition was a very large grid block (30 meters) to simulate unlimited capacity for TCE that volatilized from the soil column. Two different types of sediments were included in the model using soil property data from actual SRS soils that are similar to those in the experimental area. The uppermost sediments (0 to 0.62 meters bgs) were simulated using soil sample MOX2A, a sandy soil with some fine grain sediments. The lower sediments (0.62 to 2.75 meters bgs) were simulated using MHB4Tc, another sandy soil but with more fine grain sediments than MOX2A. The simulations were started with soil moisture contents at gravity drainage values. Simulations were run with the emitter at 2” and 12” bgs to study the effects of varying the depth of the emitter. The actual placement of the emitters is nominally 2” bgs. The volume of water supplied to the system was scaled to the one dimensional to coincide with the specified rates of application. The three flow rates used in the simulations were 120, 540, and 1200 gallons per day (gpd) per plot. The concentration of aqueous phase TCE was set at 200 ug/L for all of the simulations, slightly higher than the 166 ug/L measured in one of the new wells utilized in Phase 2 of the study.

Results

Baseline Soil characterization and modeling

Soil profile data based on borings near the center of each of the 12 test plots are summarized in Table 3. Baseline characterization studies prior to irrigation showed that TCE and PCE levels in the soil were <1 mg/Kg in all plots. The pH of the soil ranged from 4.17 - 5.0.1 in the 4 plots sampled for pH and studied in Phase 1. Measurements of pH in the six plots (Plots 4-9) sampled in Phase 2 ranged from 3.15-5.38. There was no discernable relationship between soil pH and plot vegetation treatment. Metabolic rates from soil samples collected prior to irrigation are shown in Table 4.

Modeling results are shown in Figures 6-10. Figure 6 shows the concentration profile with depth for two application rates after one month of irrigation. It is clear that the highest concentrations occur at the point of injection (emitter location) and range between 15 and 20 ug/L at depths between 0.35 and 0.62 meters bgs for application rates of 540 gpd. The 1200 gpd simulations show concentrations between 35 and 45 ug/L at the same depths. Both simulations were run using an assumed fraction of organic carbon (FOC) of 0.0001. Figure 7 shows a comparison of the concentration profile with depth when emitters are located at 2” or 12” below ground surface (bgs). Both of these simulations were run at an application rate of 1200 galloons per day (gpd) per plot and FOC was assumed to be 0.001. There is obviously less loss to the atmosphere when the emitter is located deeper in the subsurface. Figure 8 shows plots comparing two application rates (120 and 1200 gpd per plot) and two different FOCs. From this plot it’s clear that lower FOC corresponds to higher concentrations in the aqueous phase. Figure 9 shows plots comparing the concentration profile developing through time. The concentrations begin to reach a steady state after one year. The application rate for these plots was 120 gpd.

Figure 10 shows plots comparing modes of application. The two modes are continuous injection through the emitter and pulsed injection where the maximum allowable volume per day is injected in one hour. Both plots have a daily application rate of 1200 gallons per plot. These data show that the pulsed application produces slightly higher aqueous concentrations at depth than the continuous.

Water sampling

Results from all of the GC analyses of water sampling conducted in Phase 1 and Phase 2 are presented in Appendix A, Tables A-1 and A-2, respectively. There were numerous unplanned interruptions to the irrigation schedule during Phase 1. Brief summaries of some of the major "lessons learned" are provided in Table 5. Average TCE concentrations applied to the plots during Phase 2 are shown in Table 6. The water sampling results from Phase 2 were subjected to statistical analyses to address the following questions we developed to address system operation:

1. Is there a significant difference (95% confidence) between TCE concentrations at the Well, DRW-1, and Plots 4-9?

2. Is there a discernible pattern with regard to TCE concentrations relative to proximity of test plots to the well (9 is closest, 4 is farthest)?

3. Is there a significant loss (decrease) of TCE between the header and non-header sides of the plots?

4. Is there a consistent temporal change in TCE (based on water samples) over the course of the study?

Complete summaries of the results of the statistical analyses are shown in Appendix B.

(Re. Question 1.) There was not a significant difference (95% confidence) between the TCE water sample average concentration at the pump for DRW-1 and any plot location (4,5,6,7,8,9).

(Re. Question 2.) There was no discernible pattern with regard to TCE water sample concentrations relative to proximity of test plots to the well (Plot 9 is closest, Plot 4 is farthest).

(Re. Question 3.) There was a significant (>95% confidence) loss (decrease) of TCE between the header and non-header sides of the plots. Dripline TCE concentration averaged 14.1 μg/L more on the header sides than on the non-header sides of the plots.

(Re. Question 4.) There was no consistent temporal change in TCE for the water samples over the course of the study.

Soil Sampling

Results from all of the soil sampling conducted in Phase 1 and Phase 2 are presented in Appendices A-1 and A-2, respectively. TCE was virtually absent from all samples at all depths prior to irrigation and was present only at depths of 2 ft or less after the irrigation system became operational in Phase 2. Statistical analyses were performed to answer the following two questions we developed to address system operation:

- Is there a consistent pattern of TCE buildup in the soil over the course of the study?
- Are there any significant differences in soil concentrations of TCE, PCE or c-DCE in relation to plot treatment (pine, cottonwood, and no vegetation)?

Results of the statistical analyses are summarized in Appendix B. Basically, there was no consistent pattern of TCE buildup in the soil over the course of the study and there were no significant differences in soil concentrations of TCE, PCE or cis-DCE in relation to plot treatment (pine, cottonwood, no vegetation).

Total bacteria quantities (Table 7) did not show any significant trends relative to irrigation or plot vegetation treatment. However, quantities of viable bacteria (colony forming units) (Table 8) were substantially higher following irrigation relative to the baseline measurements performed prior to irrigation. The Ion Chromatograph (IC) analyses of anions in soil (Tables 9-12) did not show discernable patterns other than a tendency for the sulfate levels (Table 12) to be lower at 8 ft than at 2 ft. This may be indicative of sulfate-reducing bacteria at the greater depth. Soil and groundwater chloride levels (Table 9 were much too low to be indicative of aerobic TCE transformation with the relatively low (μg/L) TCE concentrations being applied to the soil.

Lysimeter Sampling

Lysimeters were not sampled in Phase 1 because the soil cores revealed no significant TCE penetration below the surface. Results from the lysimeter sampling conducted in Phase 2 corroborate the soil core sampling results in terms of confirming that TCE is virtually absent at a depth of 8 ft. There were no obvious differences in the lysimeter measurements relative to plot treatment

Volatilization Sampling

Volatilization sampling utilizing flux chambers was conducted exclusively in Phase 2. Results are presented in Table 14. Volatilization showed a strong tendency to be related to the vegetation treatments. Average ppb concentrations were 313, 234 and 80 for pine cottonwood and no vegetation, respectively. It appears that the presence of trees retards volatilization and that the shallower root system of the pines is the most effective for preventing TCE volatilization to the atmosphere with the drip irrigation process.

Discussion

The results suggest that the drip irrigation/phytoremediation process that was tested in D-Area provides a viable alternative to remove TCE-contaminated groundwater and simultaneously enhance tree growth. The data clearly show that TCE is being reduced to non-detectable levels within the upper two feet of soil in all test plots utilized. It appears that the presence of trees retards volatilization. However, a definitive understanding of the pathways being utilized for TCE dissipation and the relative importance of each has not been achieved at this point nor has the maximum loading of TCE to the system without breakthrough (TCE penetrating >8 ft in the soil column) been determined.

The initial sampling (Phase 1) identified the need for several modifications to the process. With the original design, substantial quantities of TCE were being lost by volatilization to the atmosphere from a holding tank. An attempt to solve this problem involved installing a floating glass bead cover on the surface of the water in the tank. This proved to be problematic as the beads could not be contained in the tank and clogged filters in the distribution lines. Because of the clogging problems and unplanned shutdowns caused by freezing equipment TCE/PCE results for samples collected after September 2001could not be clearly explained. However, the initial TCE/PCE monitoring data, along with initial modeling data strongly suggested that even with decreased volatilization from the holding tank, TCE input to the system with the original well (DCB-8C) was not sufficient to facilitate the delivery of measurable quantities of TCE to the zone of influence for phytoremediation processes. Several corrective actions were initiated in response to this problem. Two wells were drilled in the areas with higher TCE concentrations than the original well. This permitted the application of much higher water flows with water containing much higher TCE levels to the plots. A series of soil moisture sensors with continuous data acquisition were installed in some of the plots. This facilitated measuring the movement of irrigation water throughout a plot without having to rely exclusively on relatively expensive VOC measurements.

Baseline sampling of metabolic rates in soils prior to irrigation showed that oxygen consumption and CO_2 evolution was higher in non-vegetated plots compared to the pine plots. This may have been caused in part by decay activities in residual stump material left in the soil when the plots were cleared. Both total bacteria counts and colony forming bacteria counts were higher in the non-vegetated plots relative to the pine plots.

Modeling results indicated that there is a considerable loss of TCE to the atmosphere in this irrigation system even without barometric flow and surface heating of the soil. More accurate simulations of the system would be needed to show these effects which are likely to show greater aqueous reductions in the soil. It seems evident that in order to produce sufficient concentrations of TCE at a depth where significant phytoremediation activities can occur, it is best to apply the irrigation water as deeply as possible, with as much volume as possible.

Initial attempts at describing degradation rates and mass balance calculations are inconclusive and more testing would be necessary. For example, the data from Plot 8 for November 2001 was selected to illustrate a mass balance of the results. This plot and sampling date were selected because a relatively high TCE concentration occurs in the flux chamber measurements (2.6 ug/kg) and the greatest average TCE in the soil over all plots is 1.69 ug/kg . The mean dripline TCE for Plot 8 was 54.8 ug/L. A pie chart (Figure 11) was prepared showing percent of water TCE (from dripline measurements) that can be accounted for by TCE in soil samples and volatilization (converted flux chamber measurement). The mass balance illustration shows that at least 92% of TCE was unaccounted, degraded or possibly metabolized in plants.

Another approach to defining mass balance and TCE degradation is presented in Figure 12. The figure shows that the effectiveness of the D-Area Drip Irrigation-Phytoremediation Project can be evaluated by using a mass balance around the reaction zone at steady state. In this approach, it is assumed that the contaminants introduced by the drip irrigation system at the surface must equal the contaminants infiltrating the groundwater; the contaminants being evapotranspired and the contaminants being degraded.

$$(Qgw \times Cgw) = (Qinf \times Cinf) - (Qet \times Cet) + D/A$$

Or

$$D = [(Qgw \times Cgw) - (Qinf \times Cinf) - (Qet \times Cet)]/A$$

Where:

D = Degradation Rate (mg/m^2 min)
Qgw = Groundwater Flow to Drip System (m^3/min) = Flow per emitter x Number of emitters = (Qemt x Emt)
Cgw = Concentration in drip system (mg/m^3)
Qinf = Infiltration Flow (m^3/min) = (Qgw-Qet)
Cinf = Infiltration Concentration (mg/m^3)
Qet = Evapotranspiration "Flow" (m^3/min)
Cet = Evapotranspiration Concentration (mg/m^3)
A = Irrigation Area (m^2)
Qemt = Groundwater Flow to individual emitter (m^3/min emitter)
Emt = Number of emitters

Note: Negligible rainfall occurred during the test period and hence no rainfall term is included in the present analysis.

<u>Known Values</u>
For Phase 2, fall quarter, it was determined that:

Qemt = 0.0036 m^3/min emitter
Emt = 1058 emitters
Qgw = 3.8088 m^3/min
Cgw = 54.8 mg/m^3
A = 809.4 m^2

In addition, although there was no rainfall during the test period (November 27-28, 2001, it is assumed that the water applied at the surface (via the drip irrigation system) behaved in a manner similar to rainfall and thus historic rainfall infiltration information could be used here. Thus, since approximately $1/6^{th}$ to $1/3^{rd}$ of rainfall infiltrates the groundwater, it is assumed that a similar infiltration range is valid for Qgw. And, since the source of that infiltration is Qgw, it is further assumed that Cinf = Cgw.

Utilizing the above values and assumptions, the amount of contaminants applied to the test plot can be compared to the amount of contaminants degraded by the test plot. And thus a removal efficiency range for the phytoremediation system can be determined.

For: Qinf = 1/3 Qgw

$D = 0.166\ mg/\ m^2\ min$

With

Total Contaminants introduced to the test plot = 208.7 mg/min

Total Contaminants removed from the test plot = 134.2 mg/min

Resulting in a removal efficiency of 64%.

Whereas:

For: Qinf = 1/6 Qgw

$D = 0.207\ mg/m^2\ min$

With

Total Contaminants introduced to the test plot = 208.7 mg/min

Total Contaminants removed from the test plot = 167.72 mg/min

Resulting in a removal efficiency of 80%.

Utilizing the above stated analysis and assumptions, the current removal efficiency rate of the D-Area Drip Irrigation-Phytoremediation Project is estimated to be between 64% and 80%. Virtually all TCE was removed before reaching a depth of two feet in the soil column.

It is obvious from the above analysis that there is a direct relationship between the infiltration rate and the removal efficiency. Increases in infiltration rates translate to decreased removal efficiencies. In order to improve system operation a greater understanding of the processes impacting infiltration is required.

Further system operation, plant and microbial analyses, and more soil column information are needed for a more complete understanding of mechanisms involved in the removal of contaminants using drip irrigation/phytoremediation. It is recommended that subsequent work should involve a site with higher groundwater TCE concentrations than was the case in the current study. Higher TCE concentrations would aid in differentiation between biological and physicochemical TCE removal pathways and would facilitate an evaluation of the optimal use of this technology. Standardization of biological activity would be aided with complete stump removal and holding tanks, if used, should be sealed to prevent volatilization.

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Table 1. Phase 1 Sampling Activities by SRTC/EBS

Sampling Date	Locations sampled	Type samples	Type analyses
Phase 1			
6/19/00	Plots 1,3,5 and 6 (Baseline)	water and soil	respirometry, VOCs, IC, microbes
8/2/00	Plots 1 through 12 (sampling by USDA-NRCS)	Soil series	characterizations
9/14/00	Tank inlet and outlet, driplines, and emitters plus soil cores in Plot 3	water and soil	VOCs
9/22/00	Tank inlet and outlet, driplines, and emitters plus soil cores in Plots 1 and 3	water and soil	VOCs
11/2/00	Pump and distribution system	water	VOCs
11/6/00	Pump and distribution system	water	VOCs
11/7/00	Pump	water	VOCs
11/9/00	Pump	water	VOCs
11/14/00	Pump and distribution system	water	VOCs
11/17/00	Pump and distribution system	water	VOCs
11/21/00	Pump and distribution system	water	VOCs
3/22/01	Plots 2 and 4 (Baseline)	Soil	VOCs, IC, microbes
3/27/01	Plots 8 and 11 (Baseline)	Soil	VOCs, IC, microbes

Table 2 Phase 2 Sampling Activities by SRTC/EBS

Sampling Date	Locations sampled	Type samples	Type analyses
4/23/01	DRW-1 and DRW-2	Water	VOCs
5/8/01	DRW-2 and Plots 4, 2, 8, and 11	Water	VOCs
5/17/01	Plots 7, 8, & 9 (baseline)	Water and soil	VOCs, IC, Microbes
5/31/01	DRW-1 and Plots 4, 5, 6, 7, 8, & 9	Water	VOCs
6/5/01	DRW-1 and Plots 4, 5, 6, 7, 8, & 9	Water	VOCs
6/20/01	DRW-1 and Plots 4, 5, 6, 7, 8, & 9	Water	VOCs
6/27/01	DRW-1 and Plots 4, 5, 6, 7, 8, & 9	Water	VOCs
7/5/01	DRW-1 and Plots 4, 5, 6, 7, 8, & 9	Water	VOCs
7/13/01	DRW-1 and Plots 4, 5, 6, 7, 8, & 9	Water	VOCs
7/17/01	DRW-1 and Plots 4, 5, 6, 7, 8, & 9	Water	VOCs
7/24/01	DRW-1 and Plots 4, 5, 6, 7, 8, & 9	Water	VOCs
8/2/01	DRW-1 and Plots 4, 5, 6, 7, 8, & 9	Water	VOCs
8/8/01	DRW-1 and Plots 4, 5, 6, 7, 8, & 9	Water	VOCs
8/16/01	DRW-1 and Plots 4, 5, 6, 7, 8, & 9	Water and soil	VOCs
8/22/01	DRW-1 and Plots 4, 5, 6, 7, 8, & 9	Water	VOCs
8/29/01	DRW-1 and Plots 8 & 9	Water	VOCs
9/12/01	DRW-1 and Plot 9	Water and soil	VOCs
9/20/01	DRW-1 and Plots 8 & 9	Water and soil	VOCs
9/26/01	DRW-1 and Plots 8 & 9	Water and soil	VOCs
11/27/01	DRW-1 and Plots 7,8 & 9	Water, soil, lysimeters, flux chambers, desorber tubes	VOCs, IC, microbes
11/28/01	DRW-1 and Plots 4,5, &6	Water, soil, lysimeters, flux chambers, desorber tubes	VOCs, IC, microbes
4/16/02	DRW-1 and Plots 4 and 5	Water, soil, lysimeters, flux chambers, desorber tubes	VOCs, IC, microbes
4/17/02	DRW-1 and Plots 6 and 7	Water, soil, lysimeters, flux chambers, desorber tubes	VOCs, IC, microbes
4/18/02	DRW-1 and Plots 8and 9	Water, soil, lysimeters, flux chambers, desorber tubes	VOCs, IC, microbes

Table 3. Soil Characterization: D-Area Drip irrigation /Phytoremediation Project

Plot	Vegetation	Soil series	Classification	Water Table
1	None	Ocilla loamy sand	Loamy, siliceous, semiactive, thermic Aquic Arenic Paleudult	14 inches: free water at 81 inches – 6/22/00
2	Cottonwood	Ocilla loamy sand	Loamy, siliceous, semiactive, thermic Aquic Arenic Paleudult	21 inches; free water at 89 inches – 6/22/00
3	Pine	Ocilla loamy sand	Loamy, siliceous, semiactive, thermic Aquic Arenic Paleudult	22 inches; no free water 6/22/00
4	Cottonwood	Ailey loamy sand	Loamy, kaolinitic, thermic Arenic Kanhapludult	37inches; no free water 6/27/00
5	Pine	Wagram sand (taxaadjunct)*	Loamy, kaolintic, thermic Arenic Kandiudult	48 inches; no free water – 7/12/00
6	None	Ocilla sand	Loamy, siliceous, semiactive, thermic Arenic Paleudult	26 inches; free water at 62 inches – 7/12/00
7	Pine	Williman sandy loam	Loamy, siliceous, thermic Arenic Endoaquult	58 inches; free water at 58 inches – 7/26/00
8	Cottonwood	Williman loamy sand	Loamy, siliceous, thermic Arenic Endoaquult	36 inches; free water at 36 inches – 7/26/00
9	None	Ocilla sand	Loamy, siliceous, semiactive, thermic Aquic Arenic Paleudult	22 inches; free water at 36 inches –7/26/00
10	None	Norfolk sand (taxadjunct)*	Fine-loamy, kaolinitic, thermic Typic Kandiudult	37 inches; free water at 45 inches – 7/26/00
11	Cottonwood	Ocilla sand	Loamy, siliceous, semiactive, thermic Aquic Arenic Paleudult	14 inches; free water at 37 inches- 7/26/00
12	Pine	Norfolk sand (taxadjunct)*	Fine-loamy, kaolinitic, thermic Typic Kandiudult	41 inches. No free water- 7/26/00

Note: (taxajunct)* These soils differ from the series because of higher seasonal water tables and a drop off in texture in the control sections.

Table 4. Rhizosphere Soil Metabolic Rates.

Plot	Treatment	Depth	O_2 uL/gram Dry weight	CO_2 uL/gram Dry weight
5	Pine	2 ft.	0.033	0.010
5		8 ft.	0.026	0.014
3	Pine	2 ft.	0.043	0.058
3		8 ft.	0.061	0.028
6	No veg.	2 ft.	0.205	0.056
6		8 ft.	0.069	0.020
1	No veg.	2 ft.	0.188	0.084
1		8 ft	0.422	0.158

Table 5. Summary of Lessons Learned from Phase 1

Topic	Problem	Solution
Fouling	Microscopic glass beads were added to holding tank in an effort to reduce TCE volatilization- Beads could not be contained in the tank and fouled the distribution lines	Holding tank was replaced by bladder tank for Phase 2 –Fouled lines were flushed and beads not used in Phase 2.
Inadequate TCE flow	The concentration of TCE distributed to the plots was very low because of low concentrations in the well water (<60 ppb), a limited flow rate (ca. 1 gpm) from the well being used (DCB-8C), and losses through the tank and piping system. Concentrations at the emitters were 20 ppb or less and no TCE was found in the soil.	Two additional wells were installed to provide higher TCE concentrations and flow rates.
Freeze damage	Prolonged below freezing temperatures caused damage to some of the equipment requiring unscheduled shut-downs to repair and replace parts.	The irrigation system was not operated during the winter (mid December until early March) in Phase 2. Critical components of the system were weatherized and protected.

Table 6. Mean concentrations (μg/L) of TCE at Well DRW-1 and Plots 4-9

Location or Plot	Treatment	Mean	Observations	Std Dev	Std Err Mean	Lower 95%	Upper 95%
4	CW	92.7589	112	54.6598	5.1649	82.524	102.99
8	CW	89.0887	124	74.9603	6.7316	75.764	102.41
DRW-1	Well	98.9070	43	47.3849	7.2261	84.324	113.49
6	NV	88.0000	109	51.7837	4.9600	78.168	97.83
9	NV	82.7165	127	46.6823	4.1424	74.519	90.91
5	P	92.2202	109	67.5698	6.4720	79.392	105.05
7	P	86.3761	109	51.3928	4.9225	76.619	96.13

Table 7. Total Bacteria Counts (Per g Dry Wt.) in Soil

Veg. *	Plot & depth	6/19/00	3/22/01	3/27/01	5/17/01	11/27/01	11/28/01	4/16/02	4/17/02	4/18/02
NV	1- 2ft	1.31E+7								
NV	1-8ft	2.87E+5								
CW	2-2ft		1.15E+7							
CW	2-8ft		2.68E+8							
P	3-2ft	7.76E+6								
P	3-8ft	2.26E+5								
CW	4-2ft		5.26E+7				6.42E+7	2.32E+7		
CW	4-8ft		1.30E+7				3.79E+7	3.08E+6		
P	5-2ft	3.42E+7					3.85E+7	5.42E+7		
P	5-8ft	2.20E+5					2.36E+7	5.04E+6		
NV	6-2ft	1.31E+7					3.57E+8		4.29E+6	
NV	6-8ft	2.87E+5					2.86E+7		2.25E+6	
P	7-2ft				1.29E+9	5.02E+7			5.21E+6	
P	7-8ft				3.62E+9	1.11E+8			1.59E+6	
C4	8-2ft			1.43E+7	4.80E+7	8.93E+7				2.86E+7
C4	8-8ft			5.00E+6	3.39E+6	3.07E+7				1.80E+6
NV	9-2ft				3.30E+7	1.67E+8				5.08E+7
NV	9-8ft				4.12E+7	5.72E+6				1.50E+6
NV	10-2ft									
NV	10-8ft									
CW	11-2ft			1.44E+7						
CW	11-8ft			9.34E+6						
P	12-2ft									
P	12-8ft									

*** NV = No vegetation**
C = Cottonwoods
P = Pine

Table 8. Bacteria Plate Counts (Colony Forming Units Per g Dry Wt.) in Soil

Veg.*	Plot & depth	6/19/00	3/22/01	3/27/01	5/17/01	11/27/01	11/28/01	4/16/02	4/17/02	4/18/02
NV	1- 2ft	3.18E+5								
NV	1-8ft	4.28E+5								
CW	2-2ft		2.81E+4							
CW	2-8ft		3.30E+4							
P	3-2ft	1.22E+5								
P	3-8ft	3.00E+4								
CW	4-2ft		4.52E+5				4.89E+5	5.64E+5		
CW	4-8ft		3.01E+4				3.97E+5	1.93E+6		
P	5-2ft	8.94E+4					5.11E+5	1.61E+6		
P	5-8ft	1.18E+4					4.53E+5	1.12E+6		
NV	6-2ft	3.80E+5					5.30E+4		3.78E+4	
NV	6-8ft	1.17E+5					1.03E+5		3.05E+5	
P	7-2ft				1.98E+5	1.41E+6			5.52E+4	
P	7-8ft				3.16E+4	1.82E+6			3.56E+4	
C4	8-2ft			9.63E+4	6.77E+3	8.86E+5				1.76E+5
C4	8-8ft			1.99E+4	6.29E+3	3.41E+5				1.31E+6
NV	9-2ft				7.98E+3	3.39E+5				6.35E+5
NV	9-8ft				1.61E+4	2.24E+5				1.64E+5
NV	10-2ft									
NV	10-8ft									
CW	11-2ft			4.58E+4						
CW	11-8ft			1.34E+4						
P	12-2ft									
P	12-8ft									

*** NV = No vegetation**
C = Cottonwoods
P = Pine

Table 9. Chloride Concentration Measurements*

Veg.**	Plot & depth	6/19/00	3/22/01	3/27/01	5/17/01	11/27/01	11/28/01	4/16/02	4/17/02	4/18/02
NV	1- 2ft	3.0								
NV	1-8ft	2.9								
CW	2-2ft		5.8							
CW	2-8ft		7.9							
P	3-2ft	2.0								
P	3-8ft	3.2								
CW	4-2ft		3.7				0.5	1.0		
CW	4-8ft		7.6				1.0	5.4		
P	5-2ft	1.8					0.5	0.7		
P	5-8ft	2.8					1.5	11.7		
NV	6-2ft	2.7					ND		5.3	
NV	6-8ft	3.1					1.0		0.4	
P	7-2ft				7.2	ND			3.7	
P	7-8ft				41.4	1.0			0.6	
C4	8-2ft			2.0	7.1	ND				2.7
C4	8-8ft			2.0	8.4	1				0.6
NV	9-2ft				20.2	0.5				2.0
NV	9-8ft				9.5	1.0				0.3
NV	10-2ft									
NV	10-8ft									
CW	11-2ft			1.9						
CW	11-8ft			1.9						
P	12-2ft									
P	12-8ft									
DRW1	H_2O Well								2.6	2.6

* mg/Kg except DRW-1 well samples which are reported in mg/L

** NV = No vegetation
C = Cottonwoods
P = Pine
DRW-1 = Water supply well

Table 10. Nitrate Concentration Measurements *

Veg.**	Plot & depth	6/19/00	3/22/01	3/27/01	5/17/01	11/27/01	11/28/01	4/16/02	4/17/02	4/18/02
NV	1- 2ft	1.7								
NV	1-8ft	1.6								
CW	2-2ft		4.9							
CW	2-8ft		4.8							
P	3-2ft	ND								
P	3-8ft	ND								
CW	4-2ft		5.2				2.0	1.4		
CW	4-8ft		4.8				0.5	0.5		
P	5-2ft	ND					0.5	1.5		
P	5-8ft	ND					0.5	0.3		
NV	6-2ft	1.6					ND		ND	
NV	6-8ft	ND					0.5		0.6	
P	7-2ft				ND	ND			ND	
P	7-8ft				ND	ND			ND	
C4	8-2ft			4.6	ND	ND				0.4
C4	8-8ft			4.5	ND	ND				0.3
NV	9-2ft				ND	0.5				8.6
NV	9-8ft				ND	2.5				0.7
NV	10-2ft									
NV	10-8ft									
CW	11-2ft			4.5						
CW	11-8ft			4.5						
P	12-2ft									
P	12-8ft									
DRW1	H_2O well								6.3	6.5

* mg/Kg except DRW-1 well samples which are reported in mg/L
** NV = No vegetation
C = Cottonwoods
P = Pine
DRW-1 = Water supply well

Table 11. Phosphate Measurements*

Veg.**	Plot & depth	6/19/00	3/22/01	3/27/01	5/17/01	11/27/01	11/28/01	4/16/02	4/17/02	4/18/02
NV	1- 2ft	ND								
NV	1-8ft	ND								
CW	2-2ft		4.9							
CW	2-8ft		4.8							
P	3-2ft	ND								
P	3-8ft	ND								
CW	4-2ft		5.3				ND	ND		
CW	4-8ft		3.9				ND	ND		
P	5-2ft	ND					ND	ND		
P	5-8ft	ND					ND	ND		
NV	6-2ft	3.6					ND		ND	
NV	6-8ft	ND					ND		ND	
P	7-2ft				4.4	ND			ND	
P	7-8ft				24.5	ND			ND	
C4	8-2ft			1.7	5.4	ND				ND
C4	8-8ft			ND	4.5	ND				ND
NV	9-2ft				12.7	ND				ND
NV	9-8ft				5.6	ND				ND
NV	10-2ft									
NV	10-8ft									
CW	11-2ft			1.4						
CW	11-8ft			2.1						
P	12-2ft									
P	12-8ft									
DRW1	H_2O well								ND	ND

* mg/Kg except DRW-1 well samples which are reported in mg/L
** NV = No vegetation
C = Cottonwoods
P = Pine
DRW-1 = Water supply well

Table 12. Sulfate Measurements*

Veg.**	Plot & depth	6/19/00	3/22/01	3/27/01	5/17/01	11/27/01	11/28/01	4/16/02	4/17/02	4/18/02
NV	1- 2ft	16.0								
NV	1-8ft	2.0								
CW	2-2ft		20.0							
CW	2-8ft		3.4							
P	3-2ft	7.2								
P	3-8ft	1.4								
CW	4-2ft		17.0				>10	21.5		
CW	4-8ft		2.4				ND	0.3		
P	5-2ft	6.7					ND	12.0		
P	5-8ft	1.9					>10	1.0		
NV	6-2ft	10.0					ND		0.3	
NV	6-8ft	1.3					>10		7.0	
P	7-2ft				1.0	>10			4.7	
P	7-8ft				<1	>10			12	
C4	8-2ft			10.0	9.4	>10				24.5
C4	8-8ft			3.4	8.7	>10				14.5
NV	9-2ft				20.0	>10				6.3
NV	9-8ft				9.9	>10				4.9
NV	10-2ft									
NV	10-8ft									
CW	11-2ft			5.2						
CW	11-8ft			1.5						
P	12-2ft									
P	12-8ft									
DRW1	H_2O well								9.6	9.7

*** mg/Kg except DRW-1 well samples which are reported in mg/L**
**** NV = No vegetation**
C = Cottonwoods
P = Pine
DRW-1 = Water supply well

Table 13. Lysimeter gas Sampling Results: TCE ppm (vol/vol)

Veg.*	Plot & Depth	11/27/01	11/28/01	4/16/02	4/17/02	4/18/02
CW	4-2ft		0.03	BDL		
CW	4-8ft		BDL	BDL		
P	5-2ft		0.01	BDL		
P	5-8ft		BDL	BDL		
NV	6-2ft		0.01		BDL	
NV	6-8ft		NS		BDL	
P	7-2ft	BDL			BDL	
P	7-8ft	BDL			BDL	
C4	8-2ft	0.03				0.02
C4	8-8ft	BDL				BDL
NV	9-2ft	0.02				0.05
NV	9-8ft	BDL				BDL

*** NV = No vegetation**
C = Cottonwoods
P = Pine

Table 14. Volatilization (Flux Chamber Measurements: Gas concentrations of TCE in ppb (vol/vol)

Veg. *	Plot & Dripline	11/27/01	11/28/01	4/16/02	4/17/02	4/18/02
CW	4-D1		359	153		
CW	4-D2		177	71		
P	5-D1		96	44		
P	5-D2		76	BDL		
NV	6-D1		398		431	
NV	6-D2		411		323	
P	7-D1	125			125	
P	7-D2	93			83	
C4	8-D1	463				222
C4	8-D2	274				156
NV	9-D1	123				310
NV	9-D2	131				376

*** NV = No vegetation**
C = Cottonwoods
P = Pine

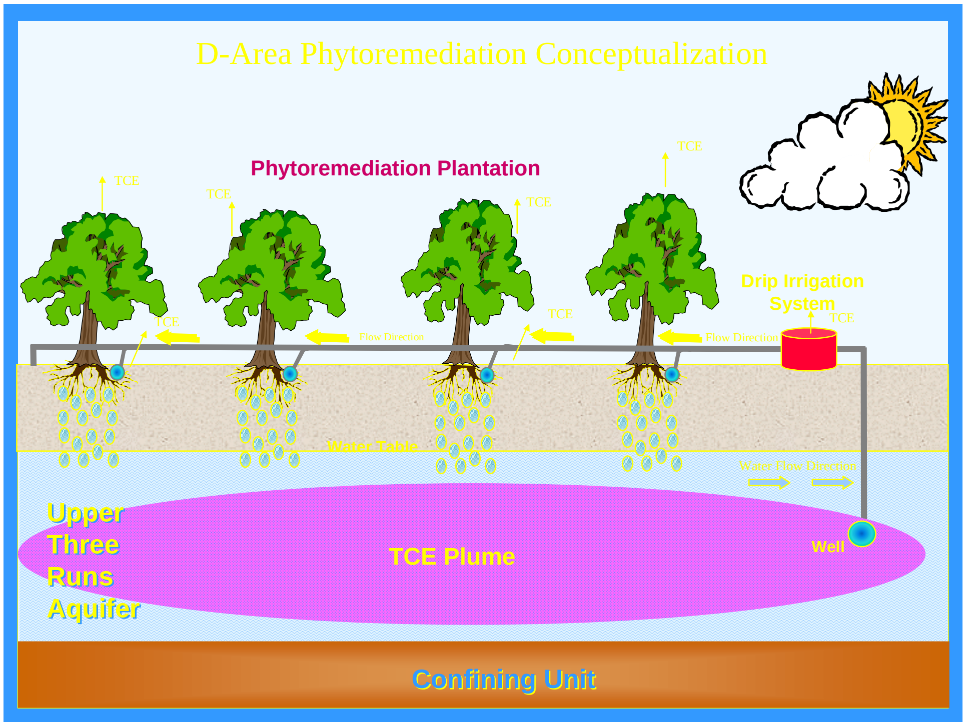


Figure 1. Conceptual design of drip irrigation/phytoremediation process

Figure 2. Aerial Photograph Showing Labeling of Sampling Plots and Treatment Designations (prior to clearing) for D-Area Drip Irrigation-Phytoremediation Project

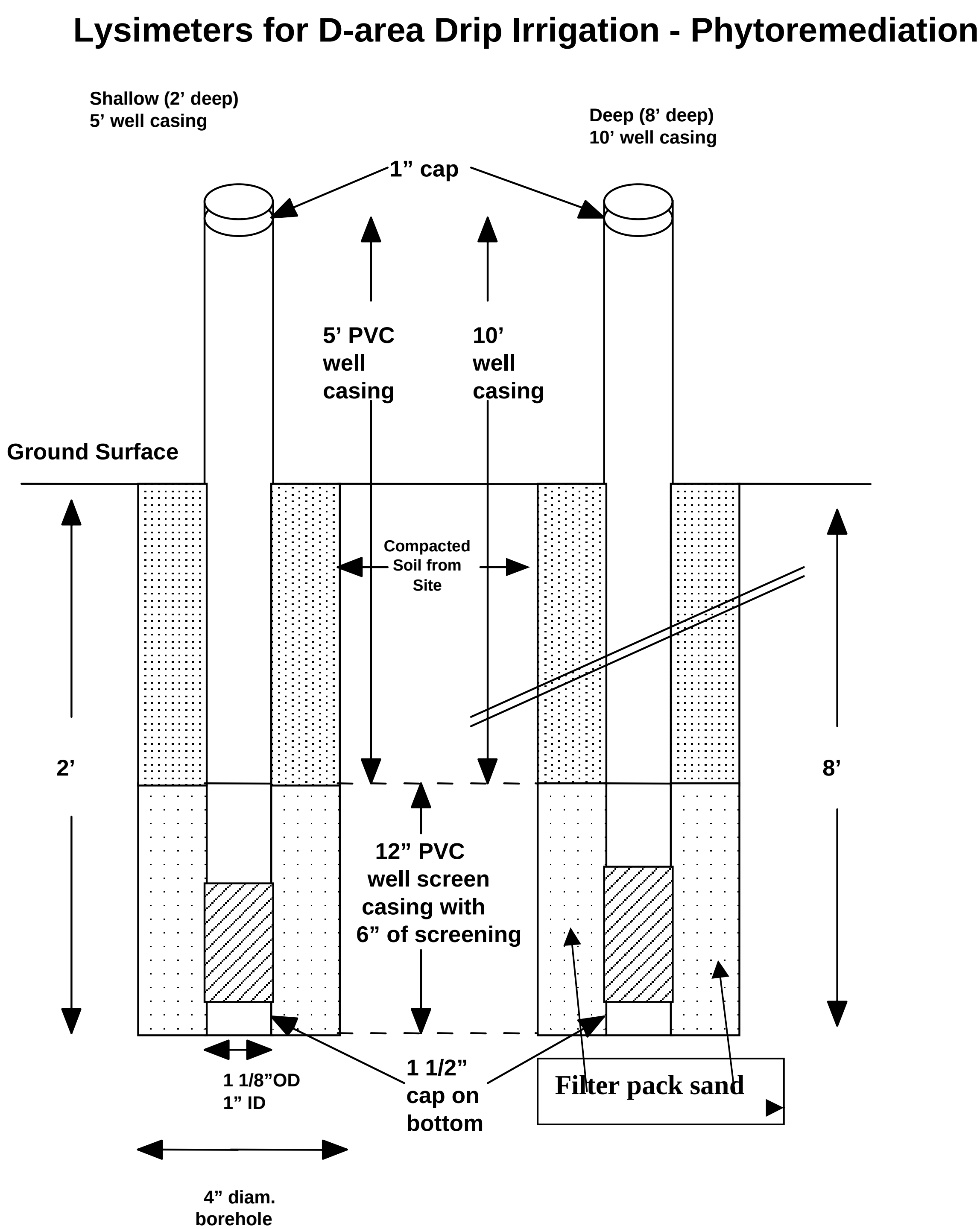


Figure 3. Configuration of Lysimeters Installed in Test Plots

Figure 4. Flux chamber used to measure volatilization.

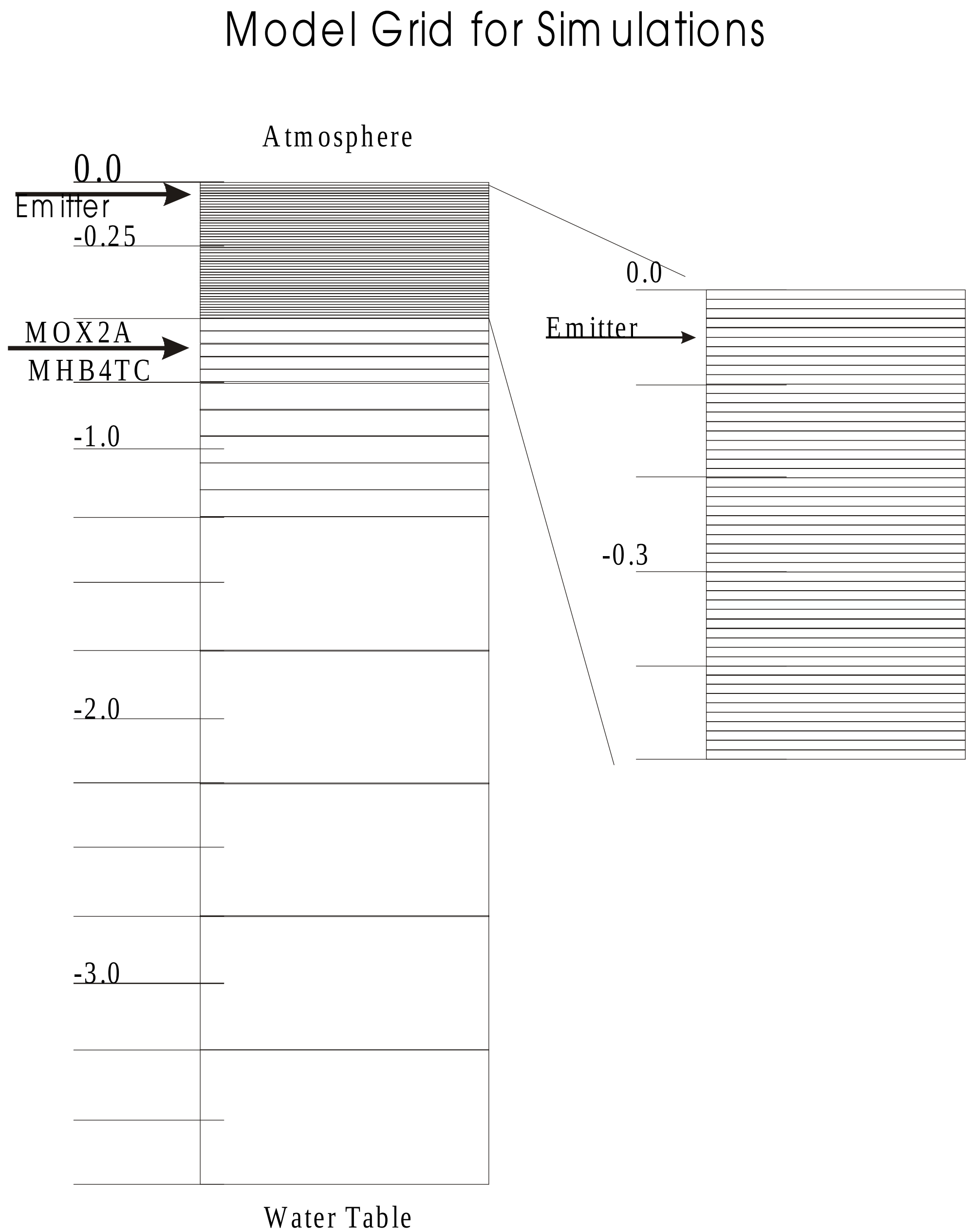


Figure 5. Grid for One Dimensional Numerical Simulations.

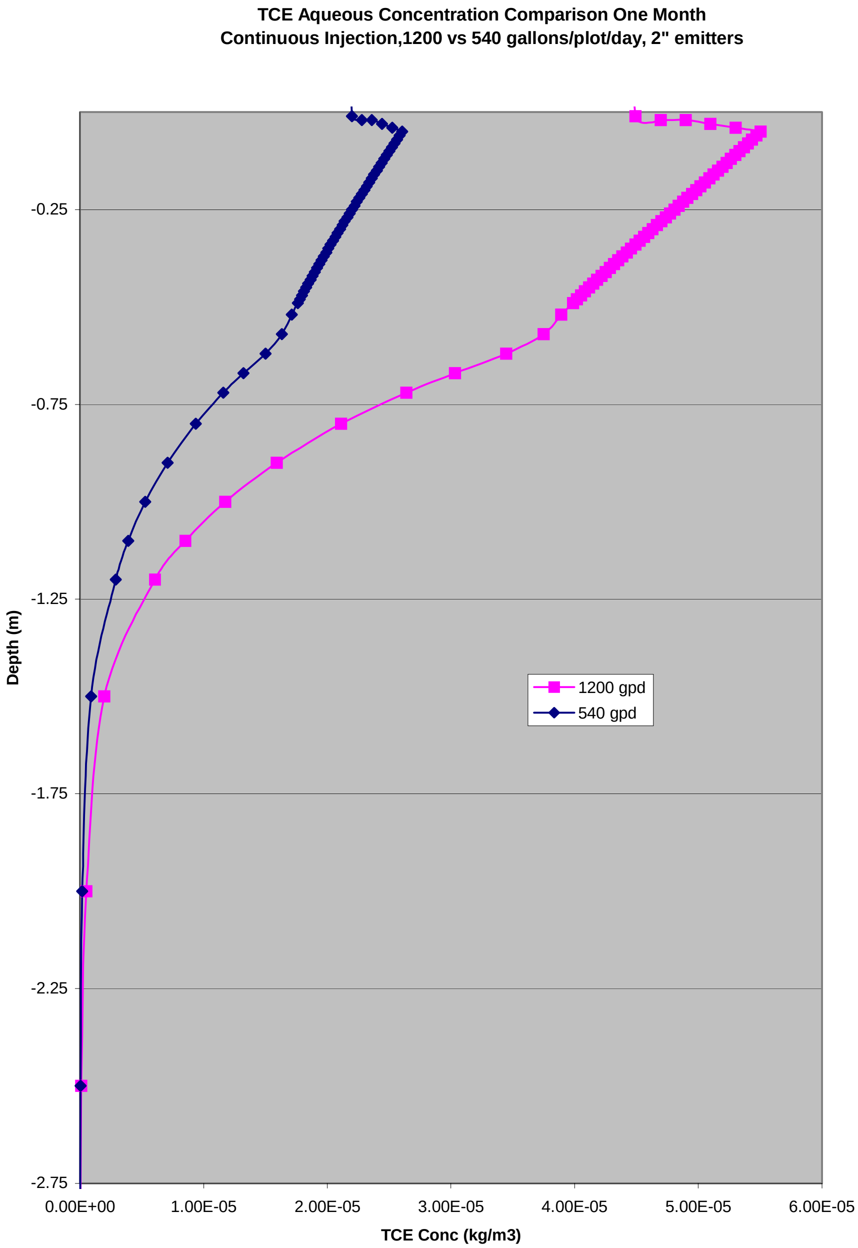


Figure 6. Plot of Aqueous TCE Concentrations for Two Different Application Rates after One Month.

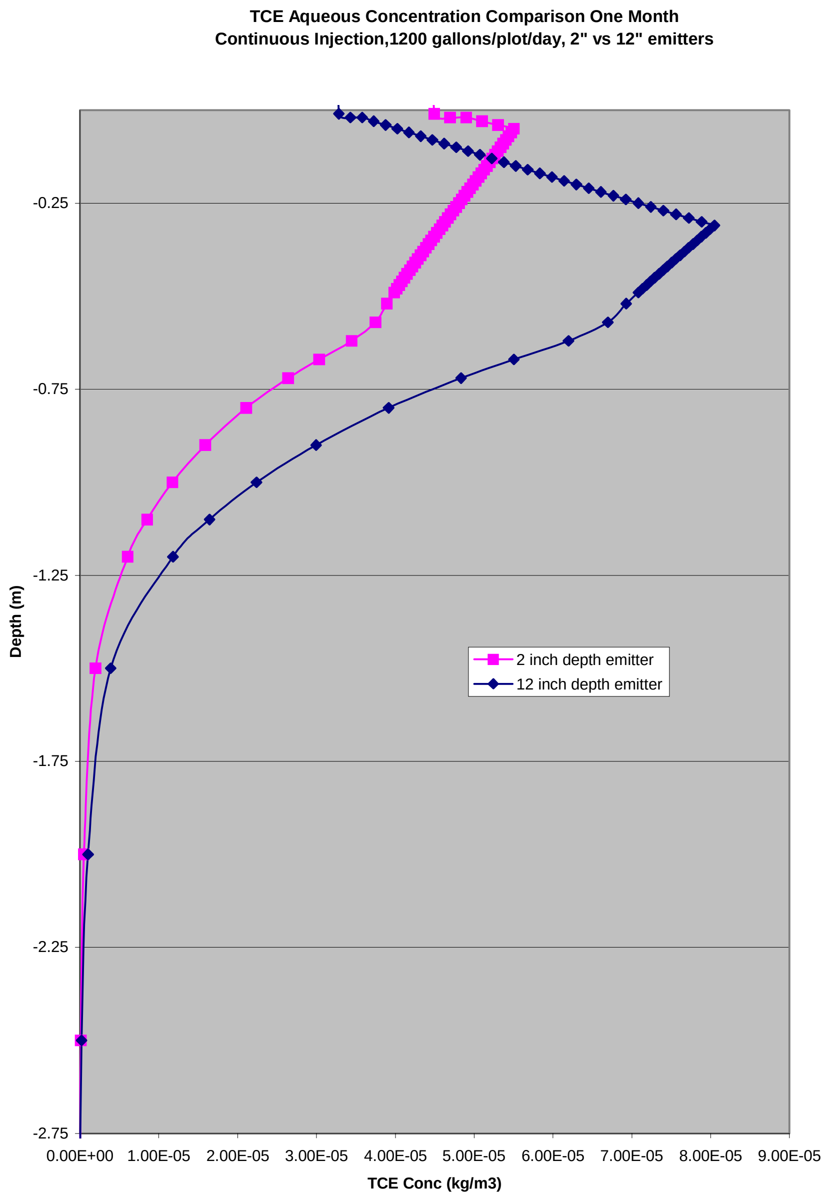


Figure 7. Concentration Profile with Depth Comparing Locations of Emitters.

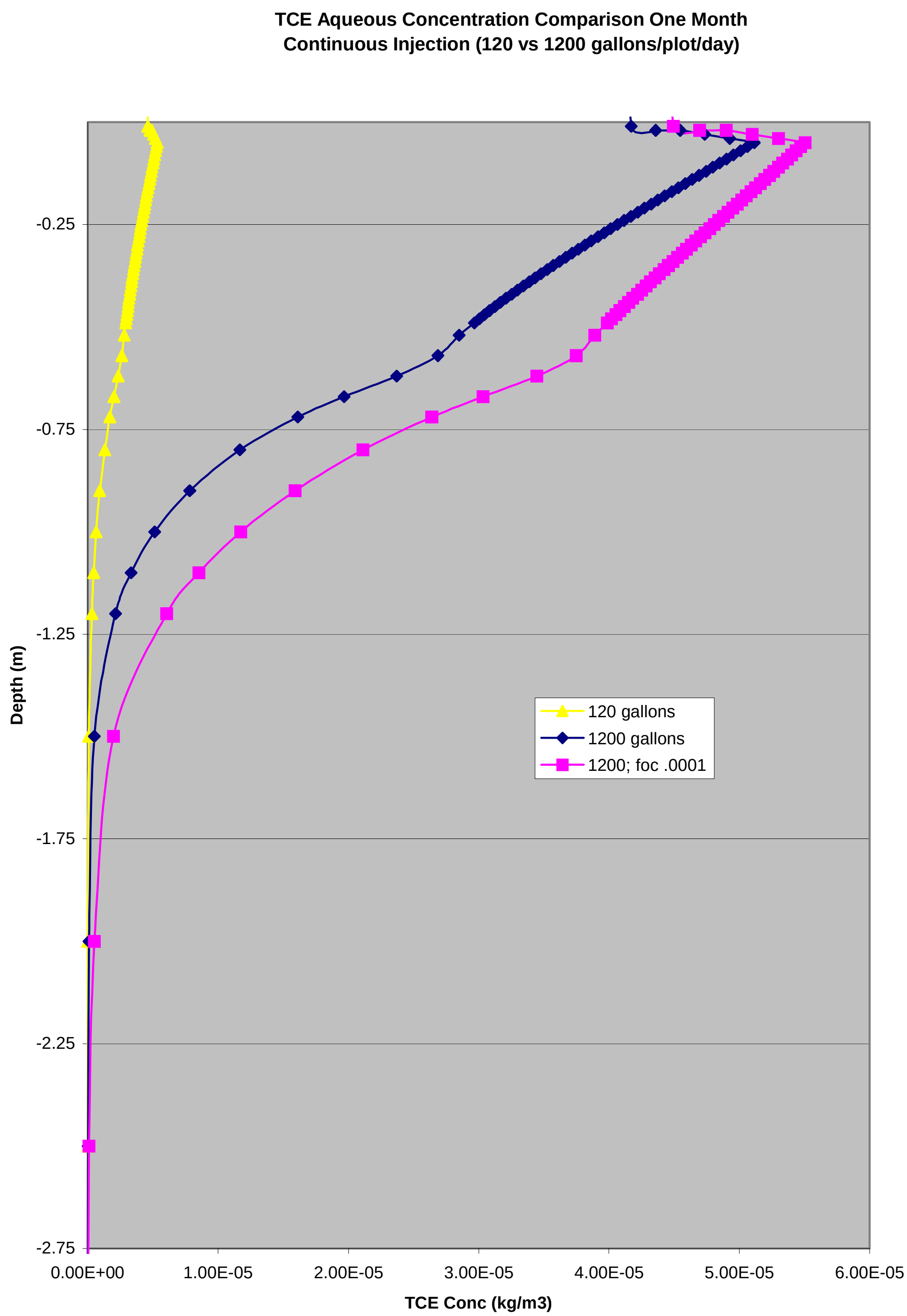


Figure 8. Concentration Profile with Depth Comparing FOC and Application Rate.

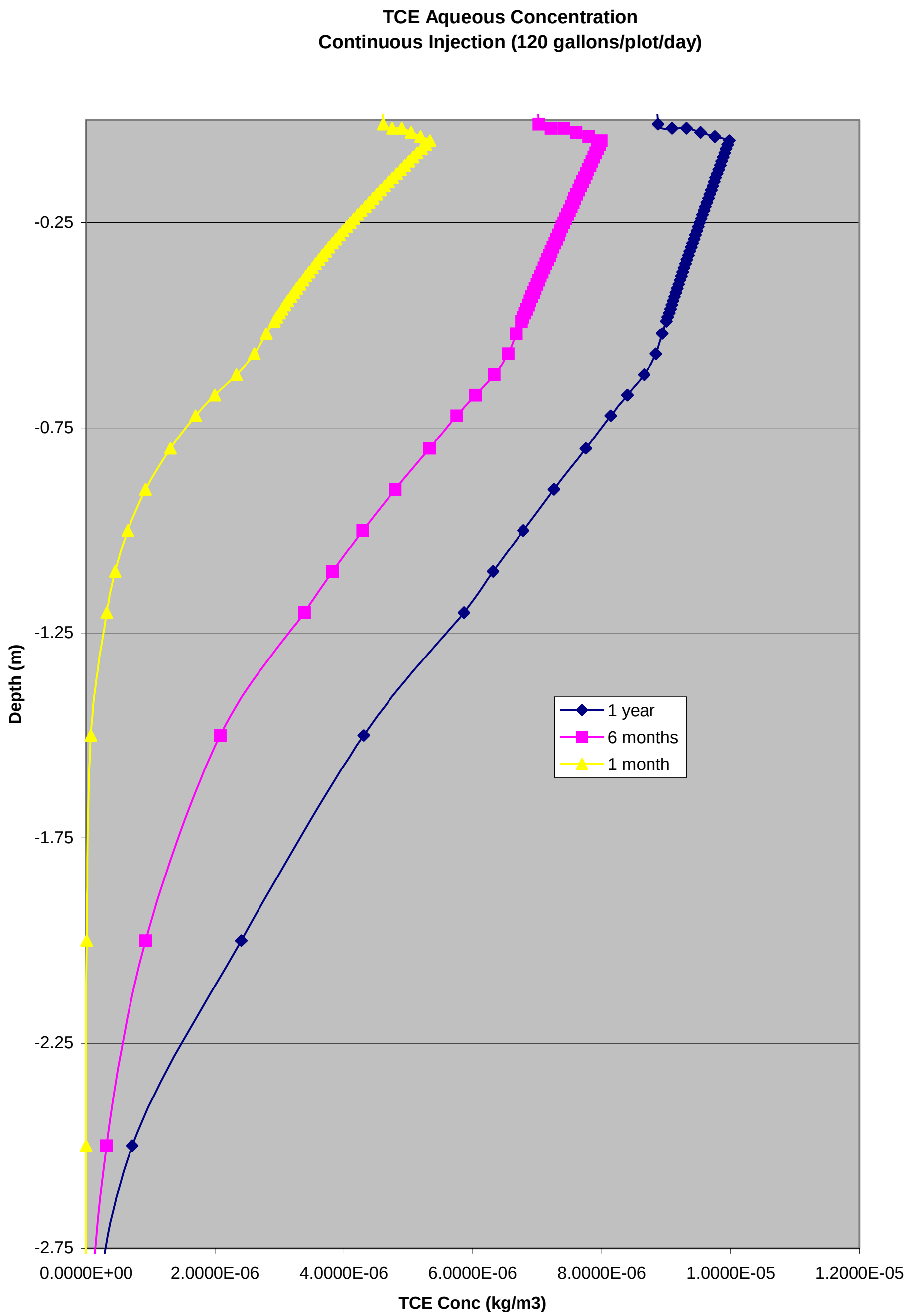


Figure 9. Concentration Profile with Depth Comparing Time of Application.

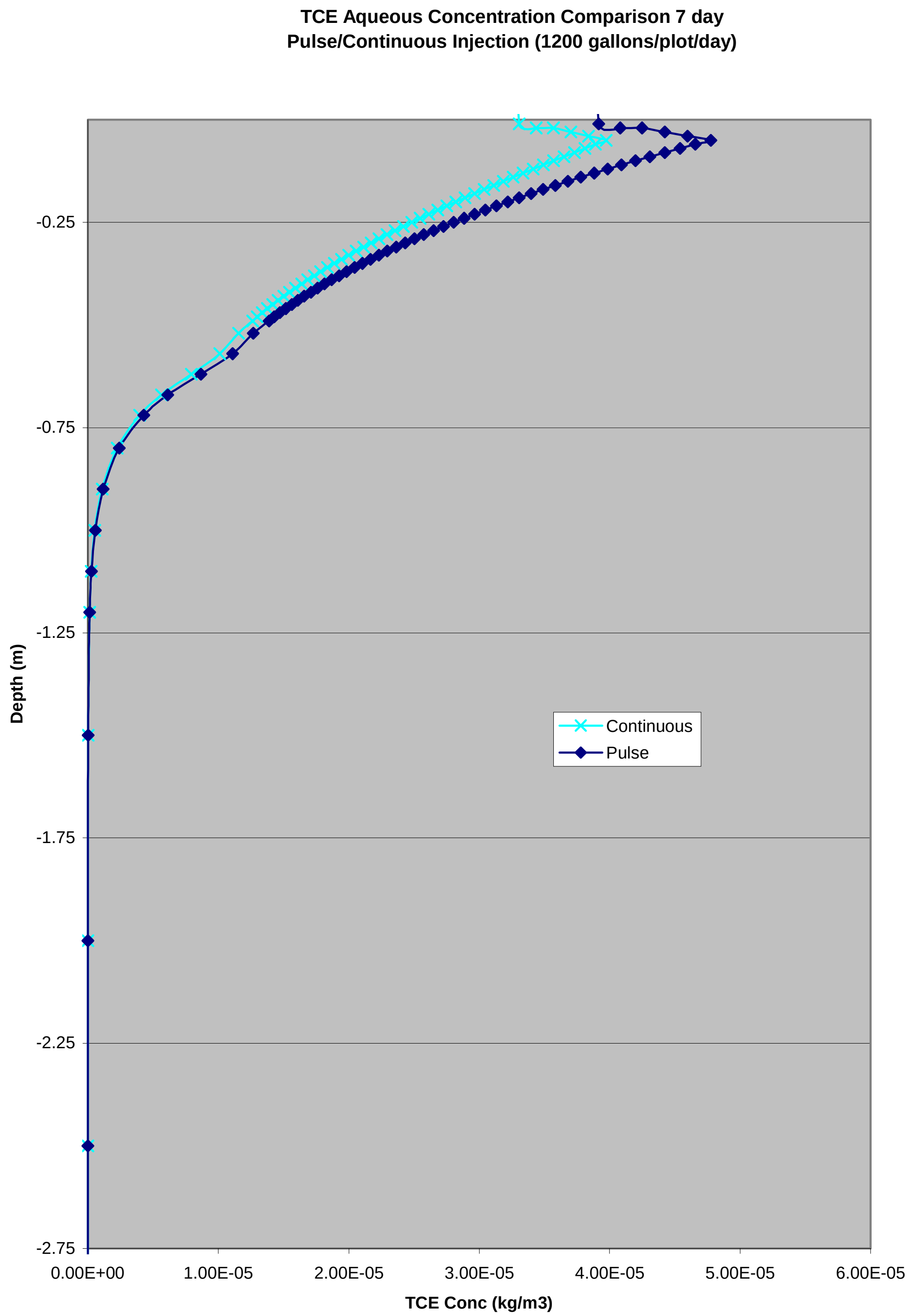


Figure 10. Concentration Profile with Depth Comparing Rate of Application.

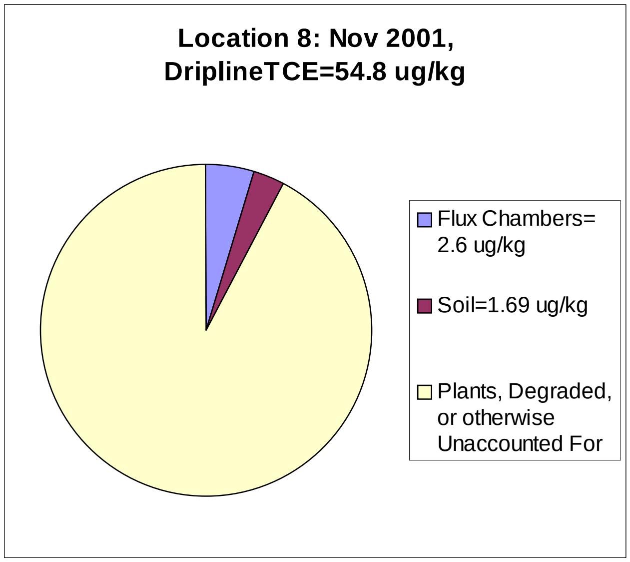
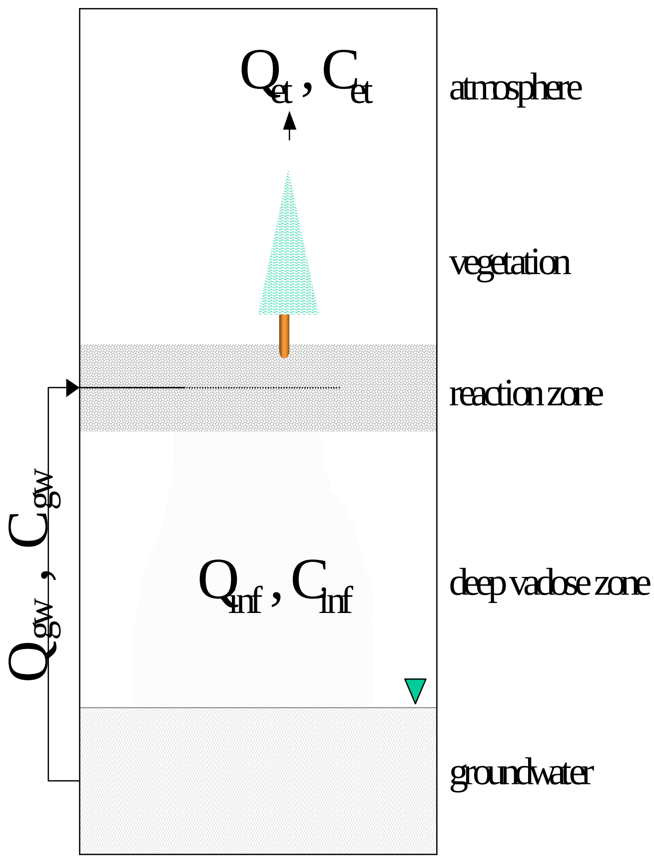


Figure 11. Preliminary description of TCE dissipation



By using a mass balance around the reaction zone at steady state:

$$\text{inputs} = \text{outputs}$$

$$(Q_{gw} C_{gw}) = (Q_{inf} C_{inf}) + (Q_{et} C_{et}) + (D)(A)$$

or

$$D = [(Q_{gw} C_{gw}) - (Q_{inf} C_{inf}) - (Q_{et} C_{et})] / A$$

where:

Q_{gw} = flow of groundwater to drip system (m^3/ min)
C_{gw} = concentration in drip system (mg/m^3)
Q_{et} = evapotranspiration "flow" (m^3/ min)
C_{gw} = evapotranspiration concentration (mg/m^3)
Q_{inf} = infiltration flow (m^3/ min) = $Q_{gw} - Q_{et}$
C_{inf} = concentration in infiltration (mg/m^3)
A = irrigation area (m^2)
D = degradation rate (mg / m^2 min)

simplifying assumptions include the following:

water and contaminant mass incorporated into tree growth at steady state may be neglected compared to other fluxes, air collected from beneath plot assumed to be in equilibrium with infiltrating water, etc.

also,

evapotranspiration terms can be bounded based on theory and other terms can be easily measured using direct (water) analysis or by measuring concentrations in soil gas (65 ug/L water would result in approx 12 ppmv soil gas at steady state).

Figure 12. Equation for TCE degradation by Phytoremediation

Appendix A

This appendix includes the following two tables that capture the analytical results of the VOC analyses:

Table A-1: Phase 1 Water and Soil Sampling Results
Table A-2: Phase 2 Water and Soil Sampling Results

Qualifiers to understanding the sample identification are described using the example below:

Sample ID = 4D1-HA 11/28/01

4 stands for Plot #4
D1 stands for drip line #1 (There were two drip lines per plot with sampling ports)
H stands for Header end of drip line (as opposed to NH = non-header side)
A stands for replicate A (rather than replicate B)
11/28/01 stands for the date the sample was collected

Table A-1 Phase 1 Water Sampling Results: Water concentrations in μg/L soil concentrations in μg/Kg

Sample ID	Sample Date	Run Date	TCE	PCE	c-DCE	Soil / Water
DCB-8 Pump Running –A	9/14/00	9/18/00	58	9		water
DCB-8 Pump not Running –A	9/14/00	9/18/00	46	6		water
Plot 3 Emitter –A	9/14/00	9/18/00	20	<4		water
Tank Outlet –A	9/14/00	9/18/00	23	<4		water
Drip Line Up - A	9/14/00	9/18/00	28	<4		water
Drip Line Down – A	9/14/00	9/18/00	10	ND		water
Plot 3Surface A	9/14/00	9/18/00	ND	ND		soil
Plot 3 6" Core- A	9/14/00	9/18/00	ND	ND		soil
Plot 3 12" Core- A	9/14/00	9/18/00	ND	ND		soil
Plot 3 18" Core- A	9/14/00	9/18/00	ND	ND		soil
Plot 3 24" Core- A	9/14/00	9/18/00	ND	ND		soil
Plot 3 30" Core- A	9/14/00	9/18/00	ND	ND		soil
Plot 3 36" Core- A	9/14/00	9/18/00	ND	ND		soil
Plot 1 D1B emitter	9/22/00	9/23/00	17	<2		water
Plot 2 D1A emitter	9/22/00	9/23/00	<2	<2		water
Plot1 Supply-Lead-A	9/22/00	9/23/00	24	<2		water
Plot 3 Dripline inlet-A	9/22/00	9/23/00	23	<2		water
Plot 3 Dripline NH–A	9/22/00	9/23/00	17	<2		water
Tanks to Plots - A	9/22/00	9/23/00	24	<2		water
Well to Tank - A	9/22/00	9/23/00	51	<2		water
Plot 3 D2-emitter – A	9/22/00	9/23/00	20	<2		water
Plot 1 D2A emitter	9/22/00	9/25/00	14	<1		water
Plot 3 D1A SOIL SURFACE	9/22/00	9/25/00	ND	ND		soil
Plot 3 D1A SOIL 6"	9/22/00	9/25/00	ND	ND		soil
Plot 3 D1A SOIL 12"	9/22/00	9/25/00	ND	ND		soil
Plot 3 D2A SOIL 12"	9/22/00	9/25/00	ND	ND		soil
Plot 3 D2A SOIL 6"	9/22/00	9/25/00	ND	ND		soil
Plot 3 D2A SOIL SURFACE	9/22/00	9/25/00	ND	ND		soil
Plot 1 D1A SOIL 12"	9/22/00	9/25/00	ND	ND		soil
Plot 1 D1A SOIL 6"	9/22/00	9/25/00	ND	ND		soil
Plot 1 D1A SOIL SURFACE	9/22/00	9/25/00	ND	ND		soil
Well to Tank Pump on B	9/22/00	9/28/00	38	1		water
Tanks to Plots B	9/22/00	9/28/00	17	0		water
Plot 3 D2 NHA	9/22/00	9/28/00	12	0		water
Plot 3D2 HA	9/22/00	9/28/00	16	0		water
Plot 1 Drip line supply leak b	9/22/00	9/28/00	18	0		water
Plot 3 D2B Emitter	9/22/00	9/28/00	13	1		water
Plot 3 D1B Emitter	9/22/00	9/28/00	12	0		water

Table A-1 Phase 1 Water Sampling Results (cont.)

Sample ID	Sample Date	Run Date	TCE (ug/kg)	PCE (ug/l)	c-DCE (ug/l)	Soil / Water
Plot 1 D2B Emitter	9/22/00	9/28/00	14	0		water
Plot1 D2A Emitter	9/22/00	9/28/00	11	0		water
Plot 1 D1B Soil Surface B	9/22/00	9/28/00	ND	ND		soil
Plot1-D1B Soil 6"	9/22/00	9/28/00	ND	ND		soil
Plot1-D1B Soil 12"	9/22/00	9/28/00	ND	ND		soil
Plot 3 D2B Soil Surface	9/22/00	9/28/00	ND	ND		soil
Plot3-D2b Soil 6"	9/22/00	9/28/00	ND	ND		soil
Plot3 –D2b Soil 12" broke vial	9/22/00	9/28/00	ND	ND		soil
Plot 3-D1b Soil 12"	9/22/00	9/28/00	ND	ND		soil
Plot 3D1b Soil surface	9/22/00	9/28/00	ND	ND		soil
Plot3 D1b Soil surface	9/22/00	9/28/00	ND	ND		soil
DCB-8 PUMP A, 27.309 g 0900	11/2/00	11/6/00	24	3		water
DCB-8 PUMP B, 26.892 g 0900	11/2/00	11/6/00	24	3		water
DCB-8 PUMP A, 27.971 g 0935	11/2/00	11/6/00	25	3		water
DCB-8 PUMP B, 27.117 g 0935	11/2/00	11/6/00	27	3		water
DCB-8 PUMP A, 25.990 g 1005	11/2/00	11/6/00	26	3		water
DCB-8 PUMP B, 25.527 g 1005	11/2/00	11/6/00	26	4		water
DCB-8 PUMP A, 25.531 g 1203	11/2/00	11/6/00	36	4		water
DCB-8 PUMP b, 27.908 g 1203	11/2/00	11/6/00	27	3		water
Tank to Plots-1, 27.408 g 0900	11/2/00	11/6/00	21	<3		water
Tank to Plots-2, 25.592 g 0900	11/2/00	11/6/00	21	3		water
Tank to Plots-3, 24.954 g 0900	11/2/00	11/6/00	21	3		water
Tank to Plots-4, 25.589 g 0900	11/2/00	11/6/00	20	3		water
Tank to Plots-5, 25.6389 g 0900	11/2/00	11/6/00	20	3		water

Table A-1 Phase 1 Water Sampling Results (cont.)

Tank to Plots-6, 24.950 g0905	11/2/00	11/6/00	19	3		water
Tank to Plots-7, 26.267 g 0905	11/2/00	11/6/00	17	3		water
Tank to Plots-8, 26.587 g 0905	11/2/00	11/6/00	17	3		water
Tank to Plots-9, 27.114 g 0905	11/2/00	11/6/00	14	<3		water
Tank to Plots-9, 27.457 g 0905	11/2/00	11/6/00	13	<3		water
DCB-8 PUMP, 27.137 g 0950 Pump not running	11/6/00	11/6/00	14	<3		water
DCB-8 PUMP, 28.955 g 0915 Pump not running	11/6/00	11/6/00	14	<3		water
DCB-8 PUMP, 29.941 g 0920 Pump not running	11/6/00	11/6/00	13	<3		water
Tank to Plots, 27.796g 0950	11/6/00	11/6/00	18	<3		water
Tank to Plots, 29.294g 0915	11/6/00	11/6/00	17	<3		water
Tank to Plots, 30.049 g 0920	11/6/00	11/6/00	18	<3		water
DCB-8C-1, 27.066 g 11/7/00 0910	11/7/00	7-Nov	27	3		water
DCB-8C-2, 25.434 g 11/7/00 0910	11/7/00	7-Nov	26	4		Water
DCB-8C-3, 26.159 g 11/7/00 0910	11/7/00	7-Nov	22	3		Water
DCB-8C-4, 30.287 g 11/7/00 0910	11/7/00	7-Nov	19	<3		Water
DCB-8C-5, 25.644 g 11/7/00 0910	11/7/00	7-Nov	25	4		Water
Tank to Plots, 29.415 g 11/7/00 0910	11/7/00	7-Nov	18	<3		Water
Tank to Plots, 29.281 g 11/7/00 0910	11/7/00	7-Nov	17	<3		Water

Table A-1 Phase 1 Water Sampling Results (cont.)

DCB-8C 11/9/00 A 1155 29.672	11/9/00	11/9/00	48	<3		Water
DCB-8C 11/9/00 b 1155 27.332	11/9/00	11/9/00	46	3		Water
DCB-8C 11/9/00 c	11/9/00	11/9/00	47	3		Water

1155 26.272						
Dcb-8c 11/14	11/14/00	1/6/01	18	3		Water
Dcb-8c 11/14	11/14/00	1/6/01	19	2		Water
dcb-8c tank to plots 11/14	11/14/00	1/6/01	18	4		Water
Dcb-8c 11/17	11/17/00	1/6/01	20	1		Water
dcb-8c tank to plots 11/17	11/17/00	1/6/01	19	1		Water
dcb-8c tank to plots 11/17	11/17/00	1/6/01	18	1		Water
Dcb-8c 11/21	11/21/00	1/6/01	18	1		Water
dcb-8c tank to plots 11/21	11/21/00	1/6/01	18	1		Water
dcb-8c tank to plots 11/21	11/21/00	1/6/01	17	1		Water
dcb-8c tank to plots 11/21	11/21/00	1/6/01	17	1		Water
dcb-8c tank to plots 11/21	11/21/00	1/6/01	19	1		Water
dcb-8c tank to plots 11/21	11/21/00	1/6/01	21	1		Water
Plot 4 2ft (a)		3/29/01	ND	< 1ppb		Soil
Plot 4-2ft (b)		3/29/01	< 1ppb	< 1ppb		Soil
Plot 4-8ft (a)		3/29/01	ND	< 1ppb		Soil
Plot 4-8ft (b)		3/29/01	ND	< 1ppb		Soil
Plot 2-2ft (a)		3/29/01	ND	< 1ppb		Soil
Plot 2-2ft (b)		3/29/01	< 1ppb	< 1ppb		Soil
Plot 2-8ft (a)		3/29/01	ND	< 1ppb		Soil
Plot 2-8ft (b)		3/29/01	< 1ppb	ND		Soil
Plot 11-2ft (a)		3/29/01	ND	ND		Soil
Plot 11-2ft (b)		3/29/01	ND	ND		Soil
Plot 11-8ft (a)		3/29/01	< 1ppb	< 1ppb		Soil
Plot 11-8ft (b)		3/29/01	< 1ppb	ND		Soil
Plot 8-2ft (a)		3/29/01	< 1ppb	< 1ppb		Soil
Plot 8-2ft (b)		3/29/01	ND	ND		Soil
Plot 8-8ft (a)		3/29/01	< 1ppb	< 1ppb		Soil
Plot 8-8ft (b)		3/29/01	ND	ND		Soil

Table A-2 Phase 2 water and Soil Sampling Results: Water concentrations in μg/L, soil concentrations in μg/Kg

Location	Sample ID	Sample Date	Analysis Date	TCE	PCE	c-DCE	Sample Matrix
DRW2	DRW # 2 (A)	4/23/01	4/25/01	41	20	Ns	water
DRW2	DRW # 2 (B)	4/23/01	4/25/01	35	19	Ns	water
DRW2	DRW # 2 (C)	4/23/01	4/25/01	45	28	Ns	water
DRW1&2	DRW # 1+ 2 (A)	4/23/01	4/30/01	63	27	Ns	water
DRW1&2	DRW # 1+2 (B)	4/23/01	4/30/01	59	24	Ns	water
DRW1&2	DRW # 1+2 (C)	4/23/01	4/30/01	69	39	Ns	water
DRW1	DRW # 1 (A)	4/23/01	4/25/01	146	50	Ns	water
DRW1	DRW # 1 (B)	4/23/01	4/25/01	138	45	Ns	water
DRW1	DRW # 1 (C)	4/23/01	4/25/01	200	76	Ns	water
2	2 1H 5/8/01 B	5/8/01	5/14/01	34	16	6	water
2	2 D2 H 5/8/01 B	5/8/01	5/14/01	40	10	7	water
2	2 1NH B	5/8/01	5/14/01	31	13	7	water
2	2 2N H B	5/8/01	5/14/01	20	5	6	water
4	4 D1 H 5/8/01 B	5/8/01	5/14/01	42	11	8	water
4	4 D2 H 5/8/01 B	5/8/01	5/14/01	38	20	7	water
4	4 D2 NH B 5/8/01	5/8/01	5/14/01	30	12	6	water
4	4 D1 NH 5/8/01 B	5/8/01	5/14/01	23	11	<5	water
8	8 1H 5/8/01 B	5/8/01	5/14/01	40	10	7	water
8	8 2H B 5/8/01	5/8/01	5/14/01	38	19	7	water
8	8 1NH B 5/8/01	5/8/01	5/16/01	23	6	<5	water
8	8 2NH B 5/8/01	5/8/01	5/16/01	21	6	<5	water
11	11 D1 H 5/8/01 B	5/8/01	5/14/01	34	15	7	water
11	11 D2 H 5/8/01 B	5/8/01	5/14/01	39	20	7	water
11	11 D1 NH B 5/8/01	5/8/01	5/14/01	31	13	7	water
11	11 D2 NH B 5/8/01	5/8/01	5/14/01	32	13	7	water
DRW2	DRW-2 5/8/01	5/8/01	5/14/01	40	20	7	water
7	7, 8 ft, A	5/17/01	5/17/01	<0.071	<0.071	<4	soil
7	7, 2 ft, A	5/17/01	5/17/01	<0.071	<0.071	<5	soil
7	7, 2 ft, B	5/17/01	5/18/01	<0.071	<0.071	<3	soil
8	8, 8ft, A	5/17/01	5/17/01	<0.071	<0.071	<3	soil
8	8, 2ft, A	5/17/01	5/17/01	<0.071	<0.071	<3	soil
8	8, 8ft, B	5/17/01	5/18/01	<0.071	<0.071	<3	soil
8	8, 2ft, B	5/17/01	5/18/01	<0.071	<0.071	<3	soil
9	9, 8 ft, A	5/17/01	5/17/01	<0.071	<0.071	<3	soil
9	9, 2 ft, A	5/17/01	5/17/01	<0.071	<0.071	<3	soil
9	9, 2 ft, B	5/17/01	5/18/01	<0.071	<0.071	<3	soil
4	4-D1-HA	5/31/01	6/1/01	121	57	27	water
4	4-D1-NHA	5/31/01	6/1/01	109	42	27	water
4	4-D2-HA	5/31/01	6/1/01	115	53	26	water
4	4-D2-NHA	5/31/01	6/1/01	107	41	28	water
5	5-D1-HA	5/31/01	6/1/01	111	51	25	water

Table A-2 (Cont.)

5	5-D1-NHA	5/31/01	6/1/01	108	42	28	water
5	5-D2-HA	5/31/01	6/1/01	101	48	24	water
5	5-D2-NHA	5/31/01	6/1/01	94	37	25	water
5	6-D1-HA	5/31/01	6/1/01	116	53	26	water
6	6-D1-NHA	5/31/01	6/1/01	91	36	26	water
6	6-D2-HA	5/31/01	6/1/01	111	51	26	water
6	6-D2-NHA	5/31/01	6/1/01	57	29	<20	water
7	7-D1-HA	5/31/01	6/1/01	82	43	<20	water
7	7-D1-NHA	5/31/01	6/1/01	76	35	20	water
7	7-D2-HA	5/31/01	6/1/01	85	44	21	water
7	7-D2-NHA	5/31/01	6/1/01	66	29	<20	water
8	8-D1-HA	5/31/01	6/1/01	82	43	<20	water
8	8-D1-NHA	5/31/01	6/1/01	79	35	20	water
8	8-D2-HA	5/31/01	6/1/01	83	43	<20	water
8	8-D2-NHA	5/31/01	6/1/01	39	12	<20	water
9	9-D1-HA	5/31/01	6/1/01	80	41	<20	water
9	9-D1-NHA	5/31/01	6/1/01	73	33	<20	water
9	9-D2-HA	5/31/01	6/1/01	82	42	20	water
9	9-D2-NHA	5/31/01	6/1/01	77	34	20	water
DRW1	DRW-1A	5/31/01	6/1/01	122	62	29	water
4	4-D1-HB	5/31/01	6/6/01	158	95	NS	water
4	4-D1-HB	5/31/01	6/6/01	153	92	NS	water
4	4-D1-NHB	5/31/01	6/6/01	143	71	NS	water
4	4-D2-HB	5/31/01	6/6/01	159	95	NS	water
4	4-D2-NHB	5/31/01	6/6/01	136	66	NS	water
5	5-D1-NHB	5/31/01	6/6/01	132	65	NS	water
5	5-D2-HB	5/31/01	6/6/01	151	92	NS	water
5	5-D2-NHB	5/31/01	6/6/01	104	53	NS	water
6	6-D1-HB	5/31/01	6/6/01	157	95	NS	water
6	6-D1-NHB	5/31/01	6/6/01	NS	NS	NS	water
6	6-D2-HB	5/31/01	6/6/01	155	94	NS	water
6	6-D2-NHB	5/31/01	6/6/01	135	69	NS	water
7	7-D1-HB	5/31/01	6/6/01	165	104	NS	water
7	7-D1-NHB	5/31/01	6/6/01	140	74	NS	water
7	7-D2-HB	5/31/01	6/6/01	163	102	NS	water
7	7-D2-NHB	5/31/01	6/6/01	150	81	NS	water
DRW1	DRW-1B	5/31/01	6/6/01	155	101	NS	water
4	4-D1-HA	6/5/01	6/7/01	152	91	NS	water
4	4-D1-NHA	6/5/01	6/7/01	150	80	NS	water
4	4-D2-HA	6/5/01	6/7/01	151	91	NS	water
4	4-D2-NHA	6/5/01	6/7/01	141	74	NS	water
5	5-D1-HA	6/5/01	6/7/01	152	91	NS	water
5	5-D1-NHA	6/5/01	6/7/01	139	70	NS	water
5	5-D2-HA	6/5/01	6/7/01	123	82	NS	water

Table A-2 (Cont.)

5	5-D2-NHA	6/5/01	6/7/01	139	70	NS	water
6	6-D1-HA	6/5/01	6/7/01	163	101	NS	water
6	6-D1-NHA	6/5/01	6/7/01	139	69	NS	water
6	6-D1-NHA	6/5/01	6/7/01	139	69	NS	water
6	6-D2-HA	6/5/01	6/7/01	164	100	NS	water
8	8-D1-HB	6/5/01	6/7/01	151	95	NS	water
8	8-D1-NHB	6/5/01	6/7/01	152	82	NS	water
8	8-D2-HB	6/5/01	6/7/01	158	98	NS	water
8	8-D2-NHB	6/5/01	6/7/01	83	26	NS	water
9	9-D1-HB	6/5/01	6/7/01	157	98	NS	water
9	9-D1-NHB	6/5/01	6/7/01	134	73	NS	water
9	9-D2-HB	6/5/01	6/7/01	163	102	NS	water
9	9-D2-NHB	6/5/01	6/7/01	150	80	NS	water
DRW-1	DRW-1A	6/5/01	6/7/01	171	134	NS	water
4	4-D1-HB	6/5/01	6/9/01	63	11	NS	water
4	4-D1-NHB	6/5/01	6/9/01	58	9	NS	water
4	4-D2-HB	6/5/01	6/9/01	63	11	NS	water
4	4-D2-NHB	6/5/01	6/9/01	56	8	NS	water
5	5-D1-HB	6/5/01	6/9/01	58	10	NS	water
5	5-D1-NHB	6/5/01	6/9/01	51	8	NS	water
5	5-D2-HB	6/5/01	6/9/01	58	10	NS	water
5	5-D2-NHB	6/5/01	6/9/01	49	7	NS	water
6	6-D1-HB	6/5/01	6/9/01	48	9	NS	water
6	6-D2-HB	6/5/01	6/9/01	52	9	NS	water
6	6-D2-NHA	6/5/01	6/9/01	61	9	NS	water
7	7-D1-HA	6/5/01	6/9/01	71	13	NS	water
7	7-D1-NHA	6/5/01	6/9/01	68	11	NS	water
7	7-D2-HA	6/5/01	6/9/01	71	13	NS	water
7	7-D2-NHA	6/5/01	6/9/01	62	10	NS	water
8	8-D1-HA	6/5/01	6/9/01	65	12	NS	water
8	8-D1-NHA	6/5/01	6/9/01	67	11	NS	water
8	8-D2-HA	6/5/01	6/9/01	72	13	NS	water
8	8-D2-NHA	6/5/01	6/9/01	65	10	NS	water
9	9-D1-HA	6/5/01	6/9/01	66	12	NS	water
9	9-D1-NHA	6/5/01	6/9/01	55	9	NS	water
9	9-D2-HA	6/5/01	6/9/01	66	12	NS	water
9	9-D2-NHA	6/5/01	6/9/01	59	9	NS	water
DRW-1	DRW-1B	6/5/01	6/9/01	60	11	NS	water
6	6-D1-NHB	6/5/01	6/12/01	63	9	<20	water
6	6-D2-NHB	6/5/01	6/12/01	55	7	<20	water
7	7-D1-HB	6/5/01	6/12/01	73	13	<20	water
7	7-D1-NHB	6/5/01	6/12/01	61	8	24	water
7	7-D2-HB	6/5/01	6/12/01	62	11	<20	water

Table A-2 (Cont.)

7	7-D2-NHB	6/5/01	6/12/01	59	9	<20	water
8	8-D1-HB	6/5/01	6/12/01	74	13	<20	water
8	8-D1-NHB	6/5/01	6/12/01	59	9	<20	water
8	8-D2-HB	6/5/01	6/12/01	50	9	<20	water
8	8-D2-NHB	6/5/01	6/12/01	65	10	<20	water
9	9-D1-HB	6/5/01	6/12/01	49	9	<20	water
9	9-D1-NHB	6/5/01	6/12/01	52	8	<20	water
9	9-D2-HB	6/5/01	6/12/01	62	11	24	water
9	9-D2-NHB	6/5/01	6/12/01	50	7	<20	water
4	D1 HA 4 PLOT6/20/01	6/20/01	6/21/01	112	67	NS	water
5	D1 HA 5 PLOT 6/20/01	6/20/01	6/21/01	104	62	NS	water
6	D1 HA 6 PLOT 6/20/01	6/20/01	6/21/01	127	76	NS	water
7	D1 HA 7 PLOT 6/20/01	6/20/01	6/21/01	109	69	NS	water
8	D1 HA 8 PLOT 6/20/01	6/20/01	6/21/01	100	60	NS	water
9	D1 HA 9 PLOT 6/20/01	6/20/01	6/21/01	117	73	NS	water
4	D1 HB 4 PLOT 6/20/01	6/20/01	6/21/01	100	58	NS	water
5	D1 HB 5 PLOT 6/20/01	6/20/01	6/21/01	106	63	NS	water
6	D1 HB 6 PLOT 6/20/01	6/20/01	6/21/01	106	64	NS	water
7	D1 HB 7 PLOT 6/20/01	6/20/01	6/21/01	106	67	NS	water
8	D1 HB 8 PLOT 6/20/01	6/20/01	6/21/01	106	66	NS	water
9	D1 HB 9 PLOT 6/20/01	6/20/01	6/21/01	106	64	NS	water
4	D1 NHA 4 PLOT 6/20/01	6/20/01	6/21/01	76	32	NS	water
5	D1 NHA 5 PLOT 6/20/01	6/20/01	6/21/01	92	46	NS	water
5	D1 NHA 5 PLOT 6/20/01	6/20/01	6/21/01	88	42	NS	water
6	D1 NHA 6 PLOT 6/20/01	6/20/01	6/21/01	101	53	NS	water
7	D1 NHA 7 PLOT 6/20/01	6/20/01	6/21/01	91	16	NS	water
8	D1 NHA 8 PLOT 6/20/01	6/20/01	6/21/01	99	53	NS	water
9	D1 NHA 9 PLOT 6/20/01	6/20/01	6/21/01	86	43	NS	water
4	D1 NHB 4 PLOT 6/20/01	6/20/01	6/21/01	57	18	NS	water
5	D1 NHB 5 PLOT 6/20/01	6/20/01	6/21/01	89	44	NS	water
6	D1 NHB 6 PLOT 6/20/01	6/20/01	6/21/01	119	61	NS	water
7	D1 NHB 7 PLOT 6/20/01	6/20/01	6/21/01	88	47	NS	water
8	D1 NHB 8 PLOT 6/20/01	6/20/01	6/21/01	107	57	NS	water
9	D1 NHB 9 PLOT 6/20/01	6/20/01	6/21/01	82	41	NS	water
4	D2 HA 4 PLOT 6/20/01	6/20/01	6/21/01	99	55	NS	water
4	D2 HA 4 PLOT 6/20/01	6/20/01	6/21/01	48	15	NS	water
5	D2 HA 5 PLOT 6/20/01	6/20/01	6/21/01	104	61	NS	water
6	D2 HA 6 PLOT 6/20/01	6/20/01	6/21/01	111	67	NS	water
77	D2 HA 7 PLOT 6/20/01	6/20/01	6/21/01	114	71	NS	water
8	D2 HA 8 PLOT 6/20/01	6/20/01	6/21/01	102	61	NS	water
9	D2 HA 9 PLOT 6/20/01	6/20/01	6/21/01	113	69	NS	water
4	D2 HB 4 PLOT 6/20/01	6/20/01	6/21/01	67	29	NS	water
5	D2 HB 5 PLOT 6/20/01	6/20/01	6/21/01	109	66	NS	water
6	D2 HB 6 PLOT 6/20/01	6/20/01	6/21/01	106	65	NS	water

Table A-2 (Cont.)

7	D2 HB 7 PLOT 6/20/01	6/20/01	6/21/01	106	66	NS	water
8	D2 HB 8 PLOT 6/20/01	6/20/01	6/21/01	115	23	NS	water
8	D2 HB 8 PLOT 6/20/01	6/20/01	6/21/01	115	23	NS	water
6	D2 NHA 6 PLOT 6/20/01	6/20/01	6/21/01	97	49	NS	water
7	D2 NHA 7 PLOT 6/20/01	6/20/01	6/21/01	81	36	NS	water
8	D2 NHA 8 PLOT 6/20/01	6/20/01	6/21/01	102	54	NS	water
9	D2 NHA 9 PLOT 6/20/01	6/20/01	6/21/01	102	53	NS	water
DRW-1	DW1A 6/20/01	6/20/01	6/21/01	122	25	NS	water
DRW-1	DW1B 6/20/01	6/20/01	6/21/01	113	86	NS	water
4	4-D1-HA	6/27/01	6/28/01	NS	NS	NS	water
4	4-D1-HB	6/27/01	6/28/01	85	20	<20	water
4	4-D1-NHA	6/27/01	6/28/01	277	43	<20	water
4	4-D1-NHB	6/27/01	6/28/01	71	14	<20	water
4	4-D2-HA	6/27/01	6/28/01	323	73	<20	water
4	4-D2-HB	6/27/01	6/28/01	61	16	<20	water
4	4-D2-NHA	6/27/01	6/28/01	262	12	<20	water
4	4-D2-NHB	6/27/01	6/28/01	59	10	<20	water
5	5-D1-HA	6/27/01	6/28/01	323	74	<20	water
5	5-D1-HB	6/27/01	6/28/01	78	20	<20	water
5	5-D1-NHA	6/27/01	6/28/01	304	41	<20	water
5	5-D1-NHB	6/27/01	6/28/01	70	14	<20	water
5	5-D2-HA	6/27/01	6/28/01	532	65	<20	water
5	5-D2-HB	6/27/01	6/28/01	70	19	<20	water
5	5-D2-NHA	6/27/01	6/28/01	203	24	<20	water
5	5-D2-NHB	6/27/01	6/28/01	37	8	<20	water
6	6-D1-HA	6/27/01	6/28/01	310	59	<20	water
6	6-D1-HB	6/27/01	6/28/01	53	20	<20	water
6	6-D1-NHA	6/27/01	6/28/01	255	11	<20	water
6	6-D1-NHB	6/27/01	6/28/01	73	16	<20	water
6	6-D2-HA	6/27/01	6/28/01	236	54	<20	water
6	6-D2-HB	6/27/01	6/28/01	73	20	<20	water
6	6-D2-NHA	6/27/01	6/28/01	242	36	<20	water
6	6-D2-NHB	6/27/01	6/28/01	59	13	<20	water
7	7-D1-HA	6/27/01	6/28/01	319	54	<20	water
7	7-D1-HB	6/27/01	6/28/01	NS	NS	NS	water
7	7-D1-NHA	6/27/01	6/28/01	223	39	<20	water
7	7-D1-NHB	6/27/01	6/28/01	42	9	<20	water
7	7-D2-HA	6/27/01	6/28/01	315	60	<20	water
7	7-D2-HB	6/27/01	6/28/01	48	15	<20	water
7	7-D2-NHA	6/27/01	6/28/01	174	9	<20	water
7	7-D2-NHB	6/27/01	6/28/01	36	9	<20	water
8	8-D1-HA	6/27/01	6/28/01	643	46	<20	water
8	8-D1-HB	6/27/01	6/28/01	45	14	<20	water
8	8-D1-NHA	6/27/01	6/28/01	214	28	<20	water

Table A-2 (Cont.)

8	8-D1-NHB	6/27/01	6/28/01	31	2	<20	water
8	8-D2-HA	6/27/01	6/28/01	252	46	<20	water
8	8-D2-HB	6/27/01	6/28/01	39	4	<20	water
8	8-D2-NHA	6/27/01	6/28/01	297	37	<20	water
8	8-D2-NHB	6/27/01	6/28/01	45	11	<20	water
9	9-D1-HA	6/27/01	6/28/01	184	55	<20	water
9	9-D1-HB	6/27/01	6/28/01	39	13	<20	water
9	9-D1-NHA	6/27/01	6/28/01	47	9	<20	water
9	9-D1-NHB	6/27/01	6/28/01	35	5	<20	water
9	9-D2-HA	6/27/01	6/28/01	134	26	<20	water
9	9-D2-HB	6/27/01	6/28/01	55	16	<20	water
9	9-D2-NHA	6/27/01	6/28/01	71	3	<20	water
9	9-D2-NHB	6/27/01	6/28/01	35	5	<20	water
DRW-1	DRW-1A	6/27/01	6/28/01	112	25	<20	water
DRW-1	DRW-1B	6/27/01	6/28/01	52	18	<20	water
4	4-D1-HA	7/5/01	7/5/01	54	35	NS	water
4	4-D1-NHA	7/5/01	7/5/01	46	24	NS	water
4	4-D2-HA	7/5/01	7/5/01	53	34	NS	water
4	4-D2-NHA	7/5/01	7/5/01	43	21	NS	water
5	5-D1-HA	7/5/01	7/5/01	48	31	NS	water
5	5-D1-NHA	7/5/01	7/5/01	44	24	NS	water
5	5-D2-HA	7/5/01	7/5/01	17	10	NS	water
5	5-D2-NHA	7/5/01	7/5/01	46	25	NS	water
6	6-D1-HA	7/5/01	7/5/01	47	29	NS	water
6	6-D1-NHA	7/5/01	7/5/01	36	19	NS	water
6	6-D2-HA	7/5/01	7/5/01	49	31	NS	water
6	6-D2-NHA	7/5/01	7/5/01	46	24	NS	water
7	7-D1-HA	7/5/01	7/5/01	50	32	NS	water
7	7-D1-NHA	7/5/01	7/5/01	42	23	NS	water
7	7-D2-HA	7/5/01	7/5/01	36	23	NS	water
7	7-D2-NHA	7/5/01	7/5/01	49	28	NS	water
8	8-D1-HA	7/5/01	7/5/01	49	32	NS	water
8	8-D1-NHA	7/5/01	7/5/01	51	30	NS	water
8	8-D2-HA	7/5/01	7/5/01	54	36	NS	water
8	8-D2-NHA	7/5/01	7/5/01	49	29	NS	water
9	9-D1-HA	7/5/01	7/5/01	52	33	NS	water
9	9-D1-NHA	7/5/01	7/5/01	43	23	NS	water
9	9-D2-HA	7/5/01	7/5/01	41	25	NS	water
9	9-D2-NHA	7/5/01	7/5/01	44	24	NS	water
DRW1	DRW 1 (A)	7/5/01	7/5/01	49	31	NS	water
4	4-D1-HB	7/5/01	7/6/01	48	19	NS	water
4	4-D1-NHB	7/5/01	7/6/01	45	14	NS	water
4	4-D2-HB	7/5/01	7/6/01	NS	NS	NS	water

Table A-2 (Cont.)

4	4-D2-NHB	7/5/01	7/6/01	42	13	NS	water
5	5-D1-HB	7/5/01	7/6/01	47	18	NS	water
5	5-D1-NHB	7/5/01	7/6/01	30	10	NS	water
5	5-D2-HB	7/5/01	7/6/01	49	19	NS	water
5	5-D2-NHB	7/5/01	7/6/01	43	14	NS	water
6	6-D1-HB	7/5/01	7/6/01	43	17	NS	water
6	6-D1-NHB	7/5/01	7/6/01	33	10	NS	water
6	6-D2-HB	7/5/01	7/6/01	32	12	NS	water
6	6-D2-NHB	7/5/01	7/6/01	34	11	NS	water
7	7-D1-HB	7/5/01	7/6/01	NS	NS	NS	water
7	7-D1-NHB	7/5/01	7/6/01	28	9	NS	water
7	7-D2-HB	7/5/01	7/6/01	48	19	NS	water
7	7-D2-NHB	7/5/01	7/6/01	44	15	NS	water
8	8-D1-HB	7/5/01	7/6/01	50	20	NS	water
8	8-D1-NHB	7/5/01	7/6/01	45	16	NS	water
8	8-D2-HB	7/5/01	7/6/01	50	20	NS	water
8	8-D2-NHB	7/5/01	7/6/01	26	9	NS	water
9	9-D1-HB	7/5/01	7/6/01	46	18	NS	water
9	9-D1-NHB	7/5/01	7/6/01	40	13	NS	water
9	9-D2-HB	7/5/01	7/6/01	44	17	NS	water
9	9-D2-NHB	7/5/01	7/6/01	NS	NS	NS	water
DRW!	DRW-1B	7/5/01	7/6/01	44	17	NS	water
4	4-D1-HA	7/13/01	7/16/01	103	46	<20	water
4	4-D1-NHA	7/13/01	7/16/01	18	8	<20	water
4	4-D2-HA	7/13/01	7/16/01	26	12	<20	water
4	4-D2-NHA	7/13/01	7/16/01	25	31	<20	water
5	5-D1-HA	7/13/01	7/16/01	26	35	<20	water
5	5-D1-NHA	7/13/01	7/16/01	19	26	<20	water
5	5-D2-HA	7/13/01	7/16/01	41	11	<20	water
5	5-D2-NHA	7/13/01	7/16/01	26	29	<20	water
6	6-D1-HA	7/13/01	7/16/01	17	28	<20	water
6	6-D1-NHA	7/13/01	7/16/01	21	26	<20	water
6	6-D2-HA	7/13/01	7/16/01	23	37	<20	water
6	6-D2-NHA	7/13/01	7/16/01	17	6	<20	water
7	7-D1-HA	7/13/01	7/16/01	31	12	<20	water
7	7-D1-NHA	7/13/01	7/16/01	19	8	<20	water
7	7-D2-HA	7/13/01	7/16/01	23	12	<20	water
7	7-D2-NHA	7/13/01	7/16/01	22	8	<20	water
8	8-D1-HA	7/13/01	7/16/01	19	6	<20	water
8	8-D1-NHA	7/13/01	7/16/01	13	6	<20	water
8	8-D2-HA	7/13/01	7/16/01	25	35	<20	water
8	8-D2-NHA	7/13/01	7/16/01	22	12	<20	water
9	9-D1-HA	7/13/01	7/16/01	23	12	<20	water
9	9-D1-NHA	7/13/01	7/16/01	16	22	<20	water

Table A-2 (Cont.)

9	9-D2-HA	7/13/01	7/16/01	22	28	<20	water
9	9-D2-NHA	7/13/01	7/16/01	18	7	<20	water
DRW1	DRW-1A	7/13/01	7/16/01	32	14	<20	water
DRW1	DRW-1B	7/13/01	7/19/01	115	48	ND	water
4	4-D1-HB	7/13/01	7/19/01	113	44	ND	water
4	4-D2-HB	7/13/01	7/19/01	109	42	ND	water
4	4-D1-NHB	7/13/01	7/19/01	100	35	ND	water
4	4-D2-NHB	7/13/01	7/19/01	90	31	ND	water
5	5-D1-HB	7/13/01	7/19/01	102	39	ND	water
5	5-D2-HB	7/13/01	7/19/01	89	34	ND	water
5	5-D1-NHB	7/13/01	7/19/01	91	30	ND	water
5	5-D2-NHB	7/13/01	7/19/01	83	28	ND	water
6	6-D1-HB	7/13/01	7/19/01	93	35	ND	water
6	6-D2-HB	7/13/01	7/19/01	81	7	ND	water
6	6-D1-NHB	7/13/01	7/19/01	85	28	ND	water
6	6-D2-NHB	7/13/01	7/19/01	NS	NS	NS	water
7	7-D1-HB	7/13/01	7/19/01	85	34	ND	water
7	7-D1-HB	7/13/01	7/19/01	85	34	ND	water
7	7-D1-NHB	7/13/01	7/19/01	NS	NS	NS	water
7	7-D2-NHB	7/13/01	7/19/01	85	33	ND	water
8	8-D1-HB	7/13/01	7/19/01	NS	NS	NS	water
8	8-D1-HB	7/13/01	7/19/01	NS	NS	NS	water
8	8-D1-NHB	7/13/01	7/19/01	87	NS	NS	ND
8	8-D2-NHB	7/13/01	7/19/01	86	31	NS	water
9	9-D1-HB	7/13/01	7/19/01	124	55	NS	water
9	9-D2-HB	7/13/01	7/19/01	123	52	NS	water
9	9-D1-NHB	7/13/01	7/19/01	99	38	NS	water
9	9-D2-NHB	7/13/01	7/19/01	100	37	NS	water
4	4-D1-HA	7/17/01	7/24/01	99	14	<20	water
4	4-D1-NHA	7/17/01	7/24/01	153	19	<20	water
4	4-D2-HA	7/17/01	7/24/01	191	27	<20	water
4	4-D2-NHA	7/17/01	7/24/01	71	10	<20	water
5	5-D1-HA	7/17/01	7/24/01	138	20	<20	water
5	5-D1-NHA	7/17/01	7/24/01	99	13	<20	water
5	5-D2-HA	7/17/01	7/24/01	130	18	<20	water
5	5-D2-NHA	7/17/01	7/24/01	163	21	<20	water
6	6-D1-HA	7/17/01	7/24/01	107	15	<20	water
6	6-D1-NHA	7/17/01	7/24/01	109	14	<20	water
6	6-D2-HA	7/17/01	7/24/01	65	28	<20	water
6	6-D2-NHA	7/17/01	7/24/01	81	10	<20	water
7	7-D1-HA	7/17/01	7/24/01	34	16	<20	water
7	7-D1-NHA	7/17/01	7/24/01	173	21	<20	water
7	7-D2-HA	7/17/01	7/24/01	179	24	<20	water

Table A-2 (Cont.)

7	7-D2-NHA	7/17/01	7/24/01	147	18	<20	water
8	8-D1-HA	7/17/01	7/24/01	57	9	<20	water
8	8-D1-NHA	7/17/01	7/24/01	68	9	<20	water
8	8-D2-HA	7/17/01	7/24/01	164	24	<20	water
8	8-D2-NHA	7/17/01	7/24/01	64	9	<20	water
9	9-D1-HA	7/17/01	7/24/01	52	8	<20	water
9	9-D1-NHA	7/17/01	7/24/01	54	7	<20	water
9	9-D2-HA	7/17/01	7/24/01	76	11	<20	water
9	9-D2-NHA	7/17/01	7/24/01	148	18	<20	water
DRW1	DRW-1A	7/17/01	7/24/01	76	12	<20	water
DRW1	DRW-1B	7/17/01	7/23/01	63	13	<20	water
4	4-D1-HB	7/17/01	7/23/01	54	10	<20	water
4	4-D2-HB	7/17/01	7/23/01	56	11	<20	water
4	4-D1-NHB	7/17/01	7/23/01	47	8	<20	water
4	4-D2-NHB	7/17/01	7/23/01	46	8	<20	water
5	5-D1-HB	7/17/01	7/23/01	43	8	<20	water
5	5-D2-HB	7/17/01	7/23/01	53	11	<20	water
5	5-D1-NHB	7/17/01	7/23/01	41	7	<20	water
5	5-D2-NHB	7/17/01	7/23/01	44	8	<20	water
6	6-D1-HB	7/17/01	7/23/01	43	9	<20	water
6	6-D2-HB	7/17/01	7/23/01	39	8	<20	water
6	6-D1-NHB	7/17/01	7/23/01	38	7	<20	water
6	6-D2-NHB	7/17/01	7/23/01	39	7	<20	water
7	7-D1-HB	7/17/01	7/23/01	47	9	<20	water
7	7-D1-HB	7/17/01	7/23/01	51	10	<20	water
7	7-D1-NHB	7/17/01	7/23/01	38	7	<20	water
7	7-D2-NHB	7/17/01	7/23/01	37	7	<20	water
8	8-D1-HB	7/17/01	7/23/01	38	8	<20	water
8	8-D1-HB	7/17/01	7/23/01	44	9	<20	water
8	8-D1-NHB	7/17/01	7/23/01	36	7	<20	water
9	8-D2-NHB	7/17/01	7/23/01	36	6	<20	water
9	9-D1-HB	7/17/01	7/23/01	37	8	<20	water
9	9-D2-HB	7/17/01	7/23/01	41	0	<20	water
9	9-D1-NHB	7/17/01	7/23/01	32	6	<20	water
9	9-D2-NHB	7/17/01	7/23/01	34	6	<20	water
DRW1	DRW-1A 7/25	7/24/01	7/25/01	138	24	ND	water
4	4-D1-HA 7/25	7/24/01	7/25/01	155	24	ND	water
4	4-D2-HA 7/25	7/24/01	7/25/01	55	19	ND	water
4	4-D1-NHA 7/25	7/24/01	7/25/01	75	19	<20	water
4	4-D2-NHA 7/25	7/24/01	7/25/01	64	19	<20	water
5	5-D1-HA 7/25	7/24/01	7/25/01	56	19	ND	water
5	5-D2-HA 7/25	7/24/01	7/25/01	75	20	<20	water

Table A-2 (Cont.)

5	5-D1-NHA 7/25	7/24/01	7/25/01	60	19	<20	water
5	5-D1-NHA 7/25	7/24/01	7/25/01	60	19	<20	water
5	5-D2-NHA 7/25	7/24/01	7/25/01	55	18	ND	water
6	6-D1-HA 7/25	7/24/01	7/25/01	90	21	<20	water
6	6-D2-HA 7/25	7/24/01	7/25/01	56	19	ND	water
6	6-D1-NHA 7/25	7/24/01	7/25/01	24	4	ND	water
6	6-D2-NHA 7/25	7/24/01	7/25/01	48	18	ND	water
7	7-D1-HA 7/25	7/24/01	7/25/01	59	19	<20	water
7	7-D2-HA 7/25	7/24/01	7/25/01	72	20	<20	water
7	7-D1-NHA 7/25	7/24/01	7/25/01	157	24	ND	water
7	7-D2-NHA 7/25	7/24/01	7/25/01	96	20	<20	water
7	8-D1-HA 7/25	7/24/01	7/25/01	59	19	<20	water
8	8-D2-HA 7/25	7/24/01	7/25/01	59	19	<20	water
8	8-D1-NHA 7/25	7/24/01	7/25/01	55	18	<20	water
8	8-D2-NHA 7/25	7/24/01	7/25/01	57	19	ND	water
9	9-D1-HA 7/25	7/24/01	7/25/01	56	19	<20	water
9	9-D2-HA 7/25	7/24/01	7/25/01	158	25	ND	water
9	9-D1-NHA 7/25	7/24/01	7/25/01	54	18	<20	water
9	9-D2-NHA 7/25	7/24/01	7/25/01	151	23	ND	water
DRW1	DRW-1B 7/25/01	7/24/01	7/27/01	23	11	<20	water
4	4-D1-HB	7/24/01	7/27/01	83	10	<20	water
4	4-D2-HB	7/24/01	7/27/01	87	11	<20	water
4	4-D1-NHB	7/24/01	7/27/01	84	8	<20	water
4	4-D2-NHB	7/24/01	7/27/01	81	8	<20	water
5	5-D1-HB	7/24/01	7/27/01	77	9	<20	water
5	5-D2-HB	7/24/01	7/27/01	75	8	<20	water
5	5-D1-NHB	7/24/01	7/27/01	70	6	<20	water
5	5-D2-NHB	7/24/01	7/27/01	75	7	<20	water
6	6-D1-HB	7/24/01	7/27/01	70	8	ND	water
6	6-D2-HB	7/24/01	7/27/01	71	8	ND	water
6	6-D1-NHB	7/24/01	7/27/01	68	6	<20	water
6	6-D2-NHB	7/24/01	7/27/01	65	6	ND	water
7	7-D1-HB	7/24/01	7/27/01	67	8	<20	water
7	7-D2-HB	7/24/01	7/27/01	59	7	<20	water
7	7-D1-NHB	7/24/01	7/27/01	61	5	ND	water
7	7-D2-NHB	7/24/01	7/27/01	66	6	<20	water
8	8-D1-HB	7/24/01	7/27/01	61	7	ND	water
8	8-D2-HB	7/24/01	7/27/01	59	7	ND	water
8	8-D1-NHB	7/24/01	7/27/01	58	5	<20	water
8	8-D2-NHB	7/24/01	7/27/01	54	5	ND	water
9	9-D1-HB	7/24/01	7/27/01	58	6	ND	water
9	9-D2-HB	7/24/01	7/27/01	60	6	ND	water
9	9-D1-NHB	7/24/01	7/27/01	57	5	ND	water
9	9-D2-NHA	7/24/01	7/27/01	58	5	ND	water

Table A-2 (Cont.)

DRW!	DRW-1A	8/2/01	8/2/01	43	9	NS	water
4	4-D1-HA 8/2/01	8/2/01	8/2/01	63	11	NS	water
4	4-D2-HA 8/2/01	8/2/01	8/2/01	130	16	NS	water
4	4-D1-NHA 8/2/01	8/2/01	8/2/01	50	9	NS	water
4	4-D2-NHA 8/2/01	8/2/01	8/2/01	34	<4	NS	water
5	5-D1-HA 8/2/01	8/2/01	8/2/01	50	10	NS	water
5	5-D2-HA 8/2/01	8/2/01	8/2/01	45	9	NS	water
5	5-D1-NHA 8/2/01	8/2/01	8/2/01	66	10	NS	water
5	5-D2-NHA 8/2/01	8/2/01	8/2/01	74	11	NS	water
6	6-D1-HA 8/2/01	8/2/01	8/2/01	90	13	NS	water
6	6-D2-HA 8/2/01	8/2/01	8/2/01	59	10	NS	water
6	6-D1-NHA 8/2/01	8/2/01	8/2/01	73	11	NS	water
6	6-D12-NHA 8/2/01	8/2/01	8/2/01	60	10	NS	water
7	7-D1-HA 8/2/01	8/2/01	8/2/01	157	19	NS	water
7	7-D2-HA 8/2/01	8/2/01	8/2/01	101	14	NS	water
7	7-D1-NHA 8/2/01	8/2/01	8/2/01	79	11	NS	water
7	7-D2-NHA 8/2/01	8/2/01	8/2/01	59	10	NS	water
8	8-D1-HA 8/2/01	8/2/01	8/2/01	71	11	NS	water
8	8-D2-HA 8/2/01	8/2/01	8/2/01	64	11	NS	water
8	8-D1-NHA 8/2/01	8/2/01	8/2/01	58	10	NS	water
8	8-D2-NHA 8/2/01	8/2/01	8/2/01	132	15	NS	water
9	9-D1-HA 8/2/01	8/2/01	8/2/01	62	11	NS	water
9	9-D2-HA 8/2/01	8/2/01	8/2/01	57	10	NS	water
9	9-D1-NHA 8/2/01	8/2/01	8/2/01	57	10	NS	water
9	9-D2-NHA 8/2/01	8/2/01	8/2/01	46	9	NS	water
DRW1	DRW-1-B 8/2/01	8/2/01	8/3/01	60	11	NS	water
4	4-D1-HB 8/2/01	8/2/01	8/3/01	44	9	NS	water
4	4-D2-HB 8/2/01	8/2/01	8/3/01	134	17	NS	water
4	4-D1-NHB 8/2/01	8/2/01	8/3/01	46	9	NS	water
4	4-D2-NHB 8/2/01	8/2/01	8/3/01	50	9	NS	water
5	5-D1-HB 8/2/01	8/2/01	8/3/01	80	12	NS	water
5	5-D2-HB 8/2/01	8/2/01	8/3/01	55	10	NS	water
5	5-D1-NHB 8/2/01	8/2/01	8/3/01	56	10	NS	water
5	5-D2-NHB 8/2/01	8/2/01	8/3/01	147	16	NS	water
6	6-D1-HB 8/2/01	8/2/01	8/3/01	80	12	NS	water
6	6-D2-HB 8/2/01	8/2/01	8/3/01	128	16	NS	water
6	6-D1-NHB 8/2/01	8/2/01	8/3/01	60	10	NS	water
6	6-D2-NHB 8/2/01	8/2/01	8/3/01	146	16	NS	water
7	7-D1-HB 8/2/01	8/2/01	8/3/01	148	18	NS	water
7	7-D2-HB 8/2/01	8/2/01	8/3/01	123	15	NS	water
7	7-D1-NHB 8/2/01	8/2/01	8/3/01	106	13	NS	water
7	7-D2-NHB 8/2/01	8/2/01	8/3/01	68	10	NS	water
8	8-D1-HB 8/2/01	8/2/01	8/3/01	96	13	NS	water
8	8-D1-HB 8/2/01	8/2/01	8/3/01	69	11	NS	water

Table A-2 (Cont.)

8	8-D1-NHB 8/2/01	8/2/01	8/3/01	76	11	NS	water
8	8-D2-NHB 8/2/01	8/2/01	8/3/01	99	13	NS	water
9	9-D1-HB 8/2/01	8/2/01	8/3/01	41	9	NS	water
9	9-D2-HB 8/2/01	8/2/01	8/3/01	128	16	NS	water
9	9-D1-NHB 8/2/01	8/2/01	8/3/01	45	9	NS	water
9	9-D2-NHB 8/2/01	8/2/01	8/3/01	43	9	NS	water
DRW1	DWA-1A	8/8/01	8/9/01	140	20	NS	water
4	4-D1-HA 080801	8/8/01	8/9/01	46	8	NS	water
4	4-D2-HA 080801	8/8/01	8/9/01	125	18	NS	water
4	4-D1-NHA 080801	8/8/01	8/9/01	54	8	NS	water
4	4-D2-NHA 080801	8/8/01	8/9/01	112	14	NS	water
5	5-D1-HA 080801	8/8/01	8/9/01	144	21	NS	water
5	5-D2-HA 080801	8/8/01	8/9/01	48	8	NS	water
5	5-D1-NHA 080801	8/8/01	8/9/01	129	17	NS	water
5	5-D2-NHA 080801	8/8/01	8/9/01	79	11	NS	water
6	6-D1-HA 080801	8/8/01	8/9/01	86	13	NS	water
6	6-D2-HA 080801	8/8/01	8/9/01	108	16	NS	water
6	6-D1-NHA 080801	8/8/01	8/9/01	128	16	NS	water
6	6-D2-NHA 080801	8/8/01	8/9/01	85	11	NS	water
7	7-D1-HA 080801	8/8/01	8/9/01	141	21	NS	water
7	7-D2-HA 080801	8/8/01	8/9/01	46	8	NS	water
7	7-D1-NHA 080801	8/8/01	8/9/01	88	12	NS	water
7	7-D2-NHA 080801	8/8/01	8/9/01	134	17	NS	water
8	8-D1-HA 080801	8/8/01	8/9/01	71	11	NS	water
8	8-D2-HA 080801	8/8/01	8/9/01	128	19	NS	water
8	8-D1-NHA 080801	8/8/01	8/9/01	100	13	NS	water
8	8-D2-NHA 080801	8/8/01	8/9/01	128	17	NS	water
9	9-D1-HA 080801	8/8/01	8/9/01	107	16	NS	water
9	9-D2-HA 080801	8/8/01	8/9/01	57	9	NS	water
9	9-D1-NHA 080801	8/8/01	8/9/01	95	13	NS	water
9	9-D2-NHA 080801	8/8/01	8/9/01	67	10	NS	water
DRW1	DWR-1B	8/8/01	8/10/01	65	11	NS	water
4	4-D1-HB 080801	8/8/01	8/10/01	119	17	NS	water
4	4-D2-HB 080801	8/8/01	8/10/01	150	21	NS	water
4	4-D1-NHB 080801	8/8/01	8/10/01	134	17	NS	water
4	4-D2-NHB 080801	8/8/01	8/10/01	57	8	NS	water
5	5-D1-HB 080801	8/8/01	8/10/01	129	18	NS	water
5	5-D2-HB 080801	8/8/01	8/10/01	71	11	NS	water
5	5-D1-NHB 080801	8/8/01	8/10/01	73	10	NS	water
5	5-D2-NHB 080801	8/8/01	8/10/01	82	11	NS	water
6	6-D1-HB 080801	8/8/01	8/10/01	143	20	NS	water
6	6-D2-HB 080801	8/8/01	8/10/01	126	18	NS	water
6	6-D1-NHB 080801	8/8/01	8/10/01	112	14	NS	water

Table A-2 (Cont.)

6	6-D2-NHB 080801	8/8/01	8/10/01	54	8	NS	water
7	7-D1-HB 080801	8/8/01	8/10/01	100	16	NS	water
7	7-D2-HB 080801	8/8/01	8/10/01	138	20	NS	water
7	7-D1-NHB 080801	8/8/01	8/10/01	78	11	NS	water
7	7-D2-NHB 080801	8/8/01	8/10/01	47	7	NS	water
8	8-D1-HB 080801	8/8/01	8/10/01	105	16	NS	water
8	8-D2-HB 080801	8/8/01	8/10/01	141	20	NS	water
8	8-D1-NHB 080801	8/8/01	8/10/01	52	8	NS	water
8	8-D2-NHB 080801	8/8/01	8/10/01	39	6	NS	water
9	9-D1-HB 080801	8/8/01	8/10/01	122	18	NS	water
9	9-D2-HB 080801	8/8/01	8/10/01	93	14	NS	water
9	9-D1-NHB 080801	8/8/01	8/10/01	42	7	NS	water
9	9-D2-NHB 080801	8/8/01	8/10/01	94	13	NS	water
	10-D2-0	8/16/01	8/18/01	95	ND	ND	soil
10	10-D2-0.5	8/16/01	8/17/01	0.1	ND	ND	soil
10	10-D2-1	8/16/01	8/17/01	<0.1	ND	ND	soil
10	10-D2-1.5	8/16/01	8/17/01	BDL	ND	ND	soil
10	10-D2-2	8/16/01	8/17/01	BDL	ND	ND	soil
4	4-D1-0	8/16/01	8/18/01	1.8	ND	ND	soil
4	4-D1-0.5	8/16/01	8/18/01	0.2	ND	ND	soil
4	4-D1-1	8/16/01	8/18/01	<0.1	ND	ND	soil
4	4-D1-1.5	8/16/01	8/18/01	<0.1	ND	ND	soil
4	4-D1-2	8/16/01	8/18/01	<0.1	ND	ND	soil
4	4-D2-0	8/16/01	8/18/01	71	ND	ND	soil
4	4-D2-0.5	8/16/01	8/18/01	NS	NS	NS	soil
4	4-D2-1	8/16/01	8/18/01	BDL	ND	ND	soil
4	4-D2-1.5	8/16/01	8/18/01	0.1	ND	ND	soil
4	4-D2-2	8/16/01	8/18/01	0.2	ND	ND	soil
5	5-D1-0	8/16/01	8/18/01	48	ND	ND	soil
5	5-D1-0.5	8/16/01	8/18/01	139	ND	ND	soil
5	5-D1-1	8/16/01	8/18/01	0.1	ND	ND	soil
5	5-D1-1.5	8/16/01	8/18/01	<0.1	ND	ND	soil
5	5-D1-2	8/16/01	8/18/01	<0.1	ND	ND	soil
5	5-D2-0	8/16/01	8/18/01	220	ND	ND	soil
5	5-D2-0.5	8/16/01	8/18/01	<0.1	ND	ND	soil
5	5-D2-1	8/16/01	8/18/01	<0.1	ND	ND	soil
5	5-D2-1.5	8/16/01	8/18/01	38	ND	ND	soil
5	5-D2-2	8/16/01	8/18/01	<0.1	ND	ND	soil
6	6-D1-0	8/16/01	8/19/01	2.0	ND	ND	soil
6	6-D1-0.5	8/16/01	8/18/01	0.5	ND	ND	soil
6	6-D1-1	8/16/01	8/18/01	<0.1	ND	ND	soil
6	6-D1-1.5	8/16/01	8/18/01	<0.1	ND	ND	soil
6	6-D1-2	8/16/01	8/18/01	<0.1	ND	ND	soil
6	6-D2-0	8/16/01	8/19/01	137	ND	ND	soil

Table A-2 (Cont.)

6	6-D2-0.5	8/16/01	8/19/01	BDL	ND	ND	Soil
6	6-D2-1	8/16/01	8/19/01	0.1	ND	ND	Soil
6	6-D2-1.5	8/16/01	8/19/01	<0.1	ND	ND	Soil
6	6-D2-2	8/16/01	8/19/01	<0.1	ND	ND	Soil
7	7-D1-0	8/16/01	8/19/01	<0.1	ND	ND	Soil
7	7-D1-0.5	8/16/01	8/19/01	<0.1	ND	ND	Soil
7	7-D1-1	8/16/01	8/19/01	0.2	ND	ND	Soil
7	7-D1-1.5	8/16/01	8/19/01	BDL	ND	ND	Soil
7	7-D1-2	8/16/01	8/19/01	BDL	ND	ND	Soil
8	8-D1-.5	8/16/01	8/16/01	<0.1	ND	ND	Soil
8	8-D1-0	8/16/01	8/16/01	7.4	ND	ND	Soil
8	8-D1-1	8/16/01	8/16/01	0.23	ND	ND	Soil
8	8-D1-1.5	8/16/01	8/16/01	BDL	ND	ND	Soil
8	8-D1-2	8/16/01	8/16/01	BDL	ND	ND	Soil
8	8-D2-.5	8/16/01	8/16/01	<0.1	ND	ND	Soil
8	8-D2-0	8/16/01	8/16/01	11.7	ND	ND	Soil
8	8-D2-1	8/16/01	8/16/01	BDL	ND	ND	Soil
8	8-D2-1.5	8/16/01	8/16/01	BDL	ND	ND	Soil
8	8-D2-2	8/16/01	8/16/01	BDL	ND	ND	Soil
9	9-D1-.5	8/16/01	8/16/01	BDL	ND	ND	Soil
9	9-D1-0	8/16/01	8/16/01	13.7	ND	ND	Soil
9	9-D1-1	8/16/01	8/16/01	<0.1	ND	ND	Soil
9	9-D1-1.5	8/16/01	8/16/01	<0.1	ND	ND	Soil
9	9-D1-2	8/16/01	8/16/01	BDL	ND	ND	Soil
9	9-D2-.5	8/16/01	8/16/01	<0.1	ND	ND	Soil
9	9-D2-0	8/16/01	8/16/01	9.6	ND	ND	Soil
9	9-D2-1	8/16/01	8/17/01	<0.1	ND	ND	Soil
9	9-D2-1.5	8/16/01	8/17/01	<0.1	ND	ND	Soil
9	9-D2-2	8/16/01	8/17/01	<0.1	ND	ND	Soil
4	4-D1-HA-081601	8/16/01	8/19/01	25	<5	<20	Water
4	4-D2-HA-081601	8/16/01	8/19/01	23	<5	<20	Water
4	4-D1-NHA-081601	8/16/01	8/19/01	18	<5	<20	Water
4	4-D2-NHA-081601	8/16/01	8/19/01	62	8	<20	Water
5	5-D1-HA-081601	8/16/01	8/19/01	16	<5	BDL	Water
5	5-D2-HA-081601	8/16/01	8/19/01	22	<5	<20	Water
5	5-D1-NHA-081601	8/16/01	8/19/01	15	6	<20	Water
5	5-D2-NHA-081601	8/16/01	8/19/01	40	6	BDL	Water
6	6-D1-HA-081601	8/16/01	8/19/01	36	6	BDL	Water
6	6-D2-HA-081601	8/16/01	8/19/01	17	<5	BDL	Water
6	6-D1-NHA-081601	8/16/01	8/19/01	26	<5	<20	Water
6	6-D2-NHA-081601	8/16/01	8/19/01	63	9	<20	Water
7	7-D1-HA-081601	8/16/01	8/19/01	25	<5	<20	Water
7	7-D2-HA-081601	8/16/01	8/19/01	45	7	BDL	Water

Table A-2 (Cont.)

7	7-D1-NHA-081601	8/16/01	8/19/01	40	6	BDL	Water
7	7-D2-NHA-081601	8/16/01	8/19/01	43	6	<20	Water
8	8-D1-HA-081601	8/16/01	8/19/01	18	<5	BDL	Water
8	8-D2-HA-081601	8/16/01	8/19/01	24	<5	<20	Water
8	8-D1-NHA-081601	8/16/01	8/19/01	56	8	<20	Water
8	8-D2-NHA-081601	8/16/01	8/19/01	29	5	<20	water
9	9-D1-HA-081601	8/16/01	8/19/01	49	8	BDL	water
9	9-D2-HA-081601	8/16/01	8/19/01	45	7	<20	water
9	9-D1-NHA-081601	8/16/01	8/19/01	61	8	<20	water
9	9-D2-NHA-081601	8/16/01	8/19/01	66	8	<20	water
DRW1	DWR-1A-081601	8/16/01	8/19/01	66	10	<20	water
4	4-D1-HB-081601	8/16/01	8/19/01	62	9	<20	water
4	4-D2-HB-081601	8/16/01	8/19/01	25	<5	<20	water
4	4-D1-NHB	8/16/01	8/19/01	16	<5	BDL	water
4	4-D2-NHB-081601	8/16/01	8/19/01	20	<5	BDL	water
5	5-D1-HB-081601	8/16/01	8/19/01	21	<5	BDL	water
5	5-D2-HB-081601	8/16/01	8/19/01	54	8	<20	water
5	5-D1-NHB-081601	8/16/01	8/19/01	54	7	<20	water
5	5-D2-NHB-081601	8/16/01	8/19/01	57	8	<20	water
6	6-D1-HB-081601	8/16/01	8/19/01	59	9	<20	water
6	6-D2-HB-081601	8/16/01	8/19/01	24	<5	<20	water
6	6-D1-NHB-081601	8/16/01	8/19/01	23	<5	<20	water
6	6-D2-NHB-081601	8/16/01	8/19/01	57	8	<20	water
7	7-D1-HB-081601	8/16/01	8/19/01	25	<5	<20	water
7	7-D2-HB-081601	8/16/01	8/19/01	62	9	<20	water
7	7-D1-NHB-081601	8/16/01	8/19/01	60	8	<20	water
7	7-D2-NHB-081601	8/16/01	8/19/01	14	BDL	BDL	water
8	8-D1-HB-081601	8/16/01	8/19/01	22	<5	<20	water
8	8-D2-HB-081601	8/16/01	8/19/01	62	10	<20	water
8	8-D1-NHB-081601	8/16/01	8/19/01	26	<5	<20	water
8	8-D2-NHB-081601	8/16/01	8/19/01	53	8	<20	water
9	9-D1-HB-081601	8/16/01	8/19/01	51	7	<20	water
9	9-D2-HB-081601	8/16/01	8/19/01	61	9	<20	water
9	9-D1-NHB-081601	8/16/01	8/19/01	24	<5	<20	water
9	9-D2-NHB-081601	8/16/01	8/19/01	25	<5	<20	water
DRW1	DWR-1B-081601	8/16/01	8/19/01	23	<5	<20	water
DRW1	DRW-1A	8/22/01	8/22/01	70	BDL	<20	water
4	4-D1-HA	8/22/01	8/22/01	123	<5	<20	water
4	4-D2-HA	8/22/01	8/22/01	89	<5	<20	water
4	4-D1-NHA	8/22/01	8/22/01	107	<5	<20	water
4	4-D2-NHA	8/22/01	8/22/01	106	<5	<20	water
5	5-D1-HA	8/22/01	8/22/01	118	<5	<20	water
5	5-D2-HA	8/22/01	8/22/01	81	BDL	<20	water
5	5-D1-NHA	8/22/01	8/22/01	116	<5	<20	water

Table A-2 (Cont.)

5	5-D2-NHA	8/22/01	8/22/01	24	BDL	<20	water
6	6-D1-HA	8/22/01	8/22/01	127	5	<20	water
6	6-D2-HA	8/22/01	8/22/01	130	7	<20	water
6	6-D1-NHA	8/22/01	8/22/01	98	BDL	<20	water
6	6-D2-NHA	8/22/01	8/22/01	74	BDL	<20	water
7	7-D1-HA	8/22/01	8/22/01	118	5	<20	water
7	7-D2-HA	8/22/01	8/22/01	47	BDL	<20	water
7	7-D1-NHA	8/22/01	8/22/01	109	<5	<20	water
7	7-D2-NHA	8/22/01	8/22/01	106	<5	<20	water
8	8-D1-HA	8/22/01	8/22/01	71	BDL	<20	water
8	8-D2-HA	8/22/01	8/22/01	123	6	<20	water
8	8-D1-NHA	8/22/01	8/22/01	101	<5	<20	water
8	8-D2-NHA	8/22/01	8/22/01	106	<5	<20	water
99	9-D1-HA	8/22/01	8/22/01	113	<5	<20	water
9	9-D2-HA	8/22/01	8/22/01	115	5	<20	water
9	9-D1-NHA	8/22/01	8/22/01	74	BDL	<20	water
9	9-D2-NHA	8/22/01	8/22/01	32	BDL	<20	water
DRW1	DRW-1B	8/22/01	8/22/01	117	6	<20	water
4	4-D1-HB	8/22/01	8/22/01	NS	NS	NS	water
4	4-D2-HB	8/22/01	8/22/01	NS	NS	NS	water
4	4-D1-NHB	8/22/01	8/22/01	115	BDL	<20	water
4	4-D2-NHB	8/22/01	8/22/01	115	BDL	<20	water
5	5-D1-HB	8/22/01	8/22/01	115	<5	<20	water
5	5-D2-HB	8/22/01	8/22/01	114	<5	<20	water
5	5-D1-NHB	8/22/01	8/22/01	103	BDL	<20	water
5	5-D2-NHB	8/22/01	8/22/01	93	BDL	<20	water
6	6-D1-HB	8/22/01	8/22/01	122	5	<20	water
6	6-D2-HB	8/22/01	8/22/01	120	<5	<20	water
6	6-D1-NHB	8/22/01	8/22/01	104	BDL	<20	water
6	6-D2-NHB	8/22/01	8/22/01	102	BDL	<20	water
7	7-D1-HB	8/22/01	8/22/01	62	BDL	<20	water
7	7-D2-HB	8/22/01	8/22/01	117	5	<20	water
7	7-D1-NHB	8/22/01	8/22/01	112	<5	<20	water
7	7-D2-NHB	8/22/01	8/22/01	108	BDL	<20	water
8	8-D1-HB	8/22/01	8/22/01	36	BDL	<20	water
8	8-D2-HB	8/22/01	8/22/01	118	5	<20	water
8	8-D1-NHB	8/22/01	8/22/01	104	<5	<20	water
8	8-D2-NHB	8/22/01	8/22/01	54	BDL	<20	water
9	9-D1-HB	8/22/01	8/22/01	80	BDL	<20	water
9	9-D2-HB	8/22/01	8/22/01	111	<5	<20	water
9	9-D1-NHB	8/22/01	8/22/01	32	BDL	<20	water
9	9-D2-NHB	8/22/01	8/22/01	47	BDL	<20	water
DRW1	DRW-1A 082901	8/29/01	8/30/01	178	21	<20	water

Table A-2 (Cont.)

8	8-D1-HA 8/29/01	8/29/01	8/30/01	251	30	<20	water
8	8-D2-HA 082901	8/29/01	8/30/01	263	32	<20	water
8	8-D1-NHA 082901	8/29/01	8/30/01	186	19	<20	water
8	8-D2-NHA 082901	8/29/01	8/30/01	143	15	<20	water
9	9-D1-HA 082901	8/29/01	8/30/01	180	21	<20	water
9	9-D2-HA 082901	8/29/01	8/30/01	150	17	<20	water
9	9-D1-NHA 082901	8/29/01	8/30/01	110	11	<20	water
9	9-D2-NHA 082901	8/29/01	8/30/01	137	14	<20	water
DRW1	DRW-1B 082901	8/29/01	8/30/01	145	17	<20	water
8	8-D1-HB 082901	8/29/01	8/30/01	326	38	<20	water
8	8-D2-HB 082901	8/29/01	8/30/01	121	13	<20	water
8	8-D1-NHB 082901	8/29/01	8/30/01	86	9	<20	water
8	8-D2-NHB 082901	8/29/01	8/30/01	136	14	<20	water
9	9-D1-HB 082901	8/29/01	8/30/01	145	17	<20	water
9	9-D2-HB 082901	8/29/01	8/30/01	190	22	<20	water
9	9-D1-NHB 082901	8/29/01	8/30/01	148	15	<20	water
99	9-D2-NHB 082901	8/29/01	8/30/01	240	26	<20	water
9	9-D1-12 (A) 9/12	9/12/01	9/13/01	0	ND	ND	soil
9	9-D1-18 (A) 9/12	9/12/01	9/13/01	0	ND	ND	soil
9	9-D1-24 (A) 9/12	9/12/01	9/13/01	0	ND	ND	soil
9	9-D1-5 (A) 9/12	9/12/01	9/13/01	34	ND	ND	soil
9	9-D1-6 (A) 9/12	9/12/01	9/13/01	0	ND	ND	soil
9	9-D2-12 (B) 9/12	9/12/01	9/13/01	0	ND	ND	soil
9	9-D2-18 (A) 9/12	9/12/01	9/13/01	0	ND	ND	soil
9	9-D2-24 (B) 9/12	9/12/01	9/13/01	0	ND	ND	soil
9	9-D2-5 (A) 9/12	9/12/01	9/13/01	2	ND	ND	soil
9	9-D2-6 (A) 9/12	9/12/01	9/13/01	0	ND	ND	soil
9	9-H1-A 9/12	9/12/01	9/13/01	136	ND	ND	water
9	9-H1-B 9/12	9/12/01	9/13/01	58	ND	ND	water
9	9-H2-A 9/12	9/12/01	9/13/01	57	ND	ND	water
9	9-H2-B 9/12	9/12/01	9/13/01	78	ND	ND	water
9	9-NH1-A 9/12	9/12/01	9/13/01	74	ND	ND	water
9	9-NH1-B 9/12	9/12/01	9/13/01	142	ND	ND	water
9	9-NH2-A 9/12	9/12/01	9/13/01	22	ND	ND	water
9	9-NH2-B 9/12	9/12/01	9/13/01	162	ND	ND	water
DRW1	DRW-1 (A) 9/12	9/12/01	9/12/01	44	ND	ND	water
	DRW-1 (B) 9/12	9/12/01	9/13/01	49	ND	ND	water
9	9-D1-S (B) 9/12	9/12/01	9/19/01	113	<1	<20	soil
9	9-D1 6 (B) 9/12	9/12/01	9/19/01	<1	<1	<20	Soil
9	9-D1-12 (B) 9/12	9/12/01	9/19/01	<1	1	<20	Soil
9	9-D1-18 (B) 9/12	9/12/01	9/19/01	<1	<1	<20	Soil
9	9-D1-24 (B) 9/12	9/12/01	9/19/01	<1	<1	<20	Soil

Table A-2 (Cont.)

9	9-D2-S (B) 9/12	9/12/01	9/19/01	<1	<1	<20	Soil
9	9-D2-6 (B) 9/12	9/12/01	9/19/01	<1	<1	<20	Soil
9	9-D2-18 (B) 9/12	9/12/01	9/19/01	<1	<1	<20	Soil
9	9-D2-24 (B) 9/12	9/12/01	9/19/01	<1	<1	<20	Soil
8	8-D2-NHB	9/20/01	9/20/01	NS	NS	NS	Water
8	S-8D1-24A	9/20/01	9/20/01	<0.5	<0.5	<20	Soil
8	S-8D1-18A	9/20/01	9/20/01	<0.5	<0.5	<20	Soil
8	S-8D1-12A	9/20/01	9/20/01	1	<0.5	<20	Soil
8	S-8D1-6A	9/20/01	9/20/01	1	<0.5	<20	Soil
8	S-8D1-SA	9/20/01	9/20/01	19	2	<20	Soil
8	8-D1-HA	9/20/01	9/20/01	NS	NS	NS	Water
8	8-D1-NHA	9/20/01	9/20/01	NS	NS	NS	Water
8	S-8D2-24A	9/20/01	9/20/01	<0.5	<0.5	<20	Soil
8	S-8D2-18A	9/20/01	9/20/01	<0.5	<0.5	<20	Soil
8	S-8D2-12A	9/20/01	9/20/01	<0.5	<0.5	<20	Soil
8	S-8D2-6A	9/20/01	9/20/01	1	<0.5	<20	Soil
8	S-8D2-SA	9/20/01	9/20/01	1	<0.5	<20	Soil
8	8-D2-HA	9/20/01	9/20/01	NS	121	<20	Water
8	8-D2-NHA	9/20/01	9/20/01	NS	132	<20	Water
8	S-8D1-24b	9/20/01	9/20/01	9	1	<20	Soil
8	S-8D1-18B	9/20/01	9/20/01	18	2	<20	Soil
8	S-8D1-12B	9/20/01	9/20/01	<0.5	<0.5	<20	Soil
8	S-8D1-6B	9/20/01	9/20/01	1	<0.5	<20	Soil
8	S-8D1-SB	9/20/01	9/20/01	36	4	<20	Soil
8	8-D1-HB	9/20/01	9/20/01	NS	NS	NS	Water
8	8-D1-NHB	9/20/01	9/20/01	NS	NS	NS	Water
8	S-8D2-24B	9/20/01	9/20/01	<0.5	<0.5	<20	Soil
8	S-8D2-18B	9/20/01	9/20/01	<0.5	<0.5	<20	Soil
8	S-8D2-12B	9/20/01	9/20/01	<0.5	<0.5	<20	Soil
8	S-8D2-6B	9/20/01	9/20/01	1	<0.5	<20	Soil
8	S-8D2-SB	9/20/01	9/20/01	1	<0.5	<20	Soil
8	8-D2-HB	9/20/01	9/20/01	NS	NS	NS	Water
8	8-D2-NHB	9/20/01	9/20/01	NS	NS	NS	Water
9	S-9D1-24A	9/20/01	9/20/01	<0.5	<0.5	<20	Soil
9	S-9D1-18A	9/20/01	9/20/01	<0.5	<0.5	<20	Soil
9	S-9D1-12A	9/20/01	9/20/01	<0.5	<0.5	<20	Soil
9	S-9D1-6A	9/20/01	9/20/01	<0.5	<0.5	<20	Soil
9	S-9D1-SA	9/20/01	9/20/01	13	3	<20	Soil
9	9-D1-HA	9/20/01	9/20/01	266	38	<20	Water
9	9-D1-NHA	9/20/01	9/20/01	NS	NS	NS	Water
9	S-9D2-24A	9/20/01	9/20/01	<0.5	<0.5	<20	Soil
9	S-9D2-18A	9/20/01	9/20/01	<0.5	<0.5	<20	Soil
9	S-9D2-12A	9/20/01	9/20/01	<0.5	<0.5	<20	Soil
9	S-9D2-6A	9/20/01	9/20/01	<0.5	<0.5	<20	Soil

Table A-2 (Cont.)

9	S-9D2-SA	9/20/01	9/20/01	33	5	<20	Soil
9	9-D2-HA	9/20/01	9/20/01	NS	NS	NS	Water
9	9-D2-NHA	9/20/01	9/20/01	NS	NS	NS	Water
9	S-9D1-24B	9/20/01	9/20/01	2	<0.5	<20	Soil
9	S-9D1-18B	9/20/01	9/20/01	<0.5	<0.5	<20	Soil
9	S-9D1-12B	9/20/01	9/20/01	2	<0.5	<20	Soil
9	S-9D1-6B	9/20/01	9/20/01	1	<0.5	<20	Soil
9	S-9D1-SB	9/20/01	9/20/01	1	<0.5	<20	Soil
9	9-D1-HB	9/20/01	9/20/01	NS	NS	NS	Water
9	9-D1-NHB	9/20/01	9/20/01	NS	NS	NS	Water
9	S-9D2-24B	9/20/01	9/20/01	<0.5	<0.5	<20	Soil
9	S-9D2-18B	9/20/01	9/20/01	<0.5	<0.5	<20	Soil
9	S-9D2-12B	9/20/01	9/20/01	<0.5	<0.5	<20	Soil
9	S-9D2-6B	9/20/01	9/20/01	1	<0.5	<20	Soil
9	S-9D2-SB	9/20/01	9/20/01	<0.5	<0.5	<20	Soil
9	9-D2-HB	9/20/01	9/20/01	NS	NS	NS	Water
9	9-D2-NHB	9/20/01	9/20/01	49	5	<20	Water
DRW1	DWR-1A	9/20/01	9/20/01	112	16	<20	Water
DRW1	DWR-1B	9/20/01	9/20/01	155	20	<20	Water
8	8S D1 24 092601	9/26/01	9/27/01	0.7	1.3	<20	Soil
8	8S D1 18 092601	9/26/01	9/27/01	<0.2	<1	<20	Soil
8	8S D1 12 092601	9/26/01	9/27/01	<0.2	<1	<20	Soil
8	8S D1 6 092601	9/26/01	9/27/01	<0.2	<1	<20	Soil
8	8S D1 S 092601	9/26/01	9/27/01	0.2	<1	<20	Soil
8	8-D1-HA	9/26/01	9/27/01	NS	NS	NS	Water
8	8-D1-NHA	9/26/01	9/27/01	NS	NS	NS	Water
8	8S D2 24 092601	9/26/01	9/27/01	0.2	<1	<20	Soil
8	8S D2 18 092601	9/26/01	9/27/01	<0.2	<1	<20	Soil
8	8S D2 12 092601	9/26/01	9/27/01	<0.2	<1	<20	Soil
8	8S D2 6 092601	9/26/01	9/27/01	<0.2	<1	<20	Soil
8	8S D2 S 092601	9/26/01	9/27/01	<0.2	<1	<20	Soil
8	8-D2 HA	9/26/01	9/27/01	NS	NS	NS	Water
8	8-D2 NHA	9/26/01	9/27/01	NS	NS	NS	Water
9	9S D1 18 092601	9/26/01	9/27/01	1.0	<1	<20	Soil
9	9S D1 12 092601	9/26/01	9/27/01	0.4	<1	<20	Soil
9	9S D1 6 092601	9/26/01	9/27/01	0.8	<1	<20	Soil
9	9S D1 S 092601	9/26/01	9/27/01	4.8	1.0	<20	Soil
9	9-D1-HA	9/26/01	9/27/01	163	21	<20	Water
9	9-D1-NHA	9/26/01	9/27/01	99	12	<20	Water
9	9S D2 24 092601	9/26/01	9/27/01	1	<1	<20	Soil
9	9S D2 18 092601	9/26/01	9/27/01	0	<1	<20	Soil
9	9S D2 12 092601	9/26/01	9/27/01	1	<1	<20	Soil
9	9S D2 6 092601	9/26/01	9/27/01	0	<1	<20	Soil
9	9S D2 S 092601	9/26/01	9/27/01	10	2	<20	Soil

Table A-2 (Cont.)

9	9-D2-HA	9/26/01	9/27/01	126	17	<20	Water
9	9-D2-NHA	9/26/01	9/27/01	150	17	<20	Water
8	8-D1-HB	9/26/01	9/27/01	179	23	<20	Water
8	8-D1-NHB	9/26/01	9/27/01	127	15	<20	Water
8	8-D2-HB	9/26/01	9/27/01	129	18	<20	Water
8	8-D2-NHB	9/26/01	9/27/01	76	9	<20	Water
4	4D1-HA 11/28/01	11/28/01	11/29/01	221	43	<20	Water
4	4D1-HB 11/28	11/28/01	11/30/01	98	45	<20	Water
4	4D1-HB 11/28	11/28/01	11/30/01	90	41	<20	Water
4	4D1-NHA 11/28/01	11/28/01	11/29/01	180	32	<20	Water
4	4-D1-NHB 11/28	11/28/01	11/30/01	95	41	<20	Water
4	4D2-HA 11/28/01	11/28/01	11/29/01	130	26	<20	Water
4	4D2-NHA 11/28/01	11/28/01	11/29/01	199	35	<20	Water
4	4-D2-NHB 11/28	11/28/01	11/30/01	89	36	<20	Water
4	4-S-D1-0.5 11/28	11/28/01	12/8/01	<0.5	<1	ND	Soil
4	4-S-D1-1.0 11/28	11/28/01	12/9/01	<0.5	<1	<20	Soil
4	4-S-D1-1.5 11/28	11/28/01	12/8/01	<0.5	<1	<20	Soil
4	4-S-D1-2.0 11/28	11/28/01	12/9/01	<0.5	<1	<20	Soil
4	4-S-D1-2.5 11/28	11/28/01	12/8/01	<0.5	<1	<20	Soil
4	4-S-D1-3.0 11/28	11/28/01	12/8/01	<0.5	<1	ND	Soil
4	4-S-D1-3.5 11/28	11/28/01	12/8/01	<0.5	<1	ND	Soil
4	4-S-D1-4.0 11/28	11/28/01	12/8/01	<0.5	<1	ND	Soil
4	4-S-D1-4.5 11/28	11/28/01	12/8/01	<0.5	<1	ND	Soil
4	4-S-D1-5.0 11/28	11/28/01	12/8/01	<0.5	<1	ND	Soil
4	4-S-D1-5.5 11/28	11/28/01	12/8/01	<0.5	<1	55	Soil
4	4-S-D1-6.0 11/28	11/28/01	12/8/01	<0.5	<1	ND	Soil
4	4-S-D1-6.5 11/28	11/28/01	12/8/01	<0.5	<1	ND	Soil
4	4-S-D1-7.0 11/28	11/28/01	12/8/01	<0.5	<1	ND	Soil
4	4-S-D1-7.5 11/28	11/28/01	12/8/01	<0.5	<1	ND	Soil
4	4-S-D1-8.0 11/28	11/28/01	12/8/01	<0.5	<1	ND	Soil
4	4-S-D1-S 11/28	11/28/01	12/9/01	<0.5	<1	91	Soil
4	4-S-D2-0.5 11/28	11/28/01	12/11/01	<0.5	<1	ND	Soil
4	4-S-D2-1.0 11/28	11/28/01	12/10/01	<0.5	<1	ND	Soil
4	4-S-D2-1.5 11/28	11/28/01	12/11/01	<0.5	<1	ND	Soil
4	4-S-D2-2.0 11/28	11/28/01	12/10/01	<0.5	<1	ND	Soil
4	4-S-D2-2.5 11/28	11/28/01	12/11/01	<0.5	<1	ND	Soil
4	4-S-D2-3.0 11/28	11/28/01	12/10/01	<0.5	<1	ND	Soil
4	4-S-D2-3.5 11/28	11/28/01	12/11/01	<0.5	<1	ND	Soil
4	4-S-D2-4.0 11/28	11/28/01	12/10/01	<0.5	<1	ND	Soil
4	4-S-D2-4.5 11/28	11/28/01	12/11/01	<0.5	<1	ND	Soil
4	4-S-D2-5.0 11/28	11/28/01	12/10/01	<0.5	<1	ND	Soil
4	4-S-D2-5.5 11/28	11/28/01	12/11/01	<0.5	<1	ND	Soil
4	4-S-D2-6.0 11/28	11/28/01	12/10/01	<0.5	<1	ND	Soil

Table A-2 (Cont.)

4	4-S-D2-6.5 11/28	11/28/01	12/11/01	<0.5	<1	ND	Soil
4	4-S-D2-7.0 11/28	11/28/01	12/10/01	<0.5	<1	ND	Soil
4	4-S-D2-7.5 11/28	11/28/01	12/8/01	<0.5	<1	ND	Soil
4	4-S-D2-8.0 11/28	11/28/01	12/9/01	<0.5	<1	ND	Soil
4	4-S-D2-S 11/28	11/28/01	12/10/01	<0.5	<1	ND	Soil
5	5D1-HA 11/28/01	11/28/01	11/29/01	204	40	<20	Water
5	5-D1-HB 11/28	11/28/01	12/2/01	NS	NS	NS	Water
5	5D1-NHA 11/28/01	11/28/01	11/29/01	208	35	<20	water
5	5-D1-NHB 11/28	11/28/01	12/2/01	81	33	<20	water
5	5D2-HA 11/28/01	11/28/01	11/29/01	206	40	<20	water
5	5-D2-HB 11/28	11/28/01	12/2/01	103	48	<20	water
5	5D2-NHA 11/28/01	11/28/01	11/30/01	175	28	<20	water
5	5-D2-NHB 11/28	11/28/01	12/2/01	92	38	<20	water
5	5-S-D1-0.5 11/28	11/28/01	12/8/01	<0.5	<1	133	Soil
5	5-S-D1-1.0 11/28	11/28/01	12/10/01	<0.5	<1	<20	Soil
5	5-S-D1-1.5 11/28	11/28/01	12/8/01	<0.5	<1	<20	Soil
5	5-S-D1-2.0 11/28	11/28/01	12/10/01	<0.5	<1	ND	Soil
5	5-S-D1-2.5 11/28	11/28/01	12/8/01	<0.5	<1	ND	Soil
5	5-S-D1-3.0 11/28	11/28/01	12/10/01	<0.5	<1	<20	Soil
5	5-S-D1-3.5 11/28	11/28/01	12/8/01	<0.5	<1	<20	Soil
5	5-S-D1-4.0 11/28	11/28/01	12/10/01	<0.5	<1	ND	Soil
5	5-S-D1-4.5 11/28	11/28/01	12/8/01	<0.5	<1	ND	Soil
5	5-S-D1-5.0 11/28	11/28/01	12/10/01	<0.5	<1	ND	Soil
5	5-S-D1-5.5 11/28	11/28/01	12/8/01	<0.5	<1	ND	Soil
5	5-S-D1-6.0 11/28	11/28/01	12/10/01	<0.5	<1	ND	Soil
5	5-S-D1-6.5 11/28	11/28/01	12/8/01	<0.5	<1	ND	Soil
5	5-S-D1-7.0 11/28	11/28/01	12/10/01	<0.5	<1	ND	Soil
5	5-S-D1-7.5 11/28	11/28/01	12/8/01	<0.5	<1	ND	Soil
5	5-S-D1-8.0 11/28	11/28/01	12/10/01	<0.5	<1	ND	Soil
5	5-S-D1-S 11/28	11/28/01	12/10/01	19	9	<20	Soil
5	5-S-D2-0.5 11/28	11/28/01	12/11/01	1	<1	ND	Soil
5	5-S-D2-1.0 11/28	11/28/01	12/8/01	<0.5	<1	<20	Soil
5	5-S-D2-1.5 11/28	11/28/01	12/11/01	<0.5	<1	ND	Soil
5	5-S-D2-2.0 11/28	11/28/01	12/8/01	<0.5	<1	ND	Soil
5	5-S-D2-2.5 11/28	11/28/01	12/11/01	<0.5	<1	ND	Soil
5	5-S-D2-3.0 11/28	11/28/01	12/8/01	<0.5	<1	ND	Soil
5	5-S-D2-3.5 11/28	11/28/01	12/11/01	<0.5	<1	ND	Soil
5	5-S-D2-4.0 11/28	11/28/01	12/10/01	<0.5	<1	ND	Soil
5	5-S-D2-4.5 11/28	11/28/01	12/11/01	<0.5	<1	ND	Soil
5	5-S-D2-5.0 11/28	11/28/01	12/10/01	<0.5	<1	ND	Soil
5	5-S-D2-5.5 11/28	11/28/01	12/11/01	<0.5	<1	ND	Soil
5	5-S-D2-6.0 11/28	11/28/01	12/10/01	<0.5	<1	ND	Soil
5	5-S-D2-6.5 11/28	11/28/01	12/11/01	<0.5	<1	ND	Soil
5	5-S-D2-7.0 11/28	11/28/01	12/10/01	<0.5	<1	ND	Soil
5	5-S-D2-7.5 11/28	11/28/01	12/11/01	<0.5	<1	ND	Soil

Table A-2 (Cont.)

5	5-S-D2-8.0 11/28	11/28/01	12/10/01	<0.5	<1	ND	Soil
5	5-S-D2-S 11/28	11/28/01	12/8/01	<0.5	<1	ND	Soil
6	6D1-HA 11/28/01	11/28/01	11/30/01	196	38	<20	water
6	6-D1-HB 11/28	11/28/01	12/2/01	66	30	<20	water
6	6D1-NHA 11/28/01	11/28/01	11/30/01	168	30	<20	water
6	6-D1-NHB 11/28	11/28/01	12/2/01	86	35	<20	water
6	6D2-HA 11/28/01	11/28/01	11/30/01	52	6	<20	water
6	6-D2-HB 11/28	11/28/01	12/2/01	52	24	<20	water
6	6D2-NHA 11/28/01	11/28/01	11/30/01	136	23	<20	water
6	6-D2-NHB 11/28	11/28/01	12/2/01	NS	NS	NS	water
6	6-S-D1-0.5 11/28	11/28/01	12/8/01	<0.5	<1	ND	Soil
6	6-S-D1-1.0 11/28	11/28/01	12/8/01	<0.5	<1	ND	Soil
6	6-S-D1-1.5 11/28	11/28/01	12/8/01	<0.5	<1	ND	Soil
6	6-S-D1-2.0 11/28	11/28/01	12/8/01	<0.5	<1	ND	Soil
6	6-S-D1-2.5 11/28	11/28/01	12/8/01	<0.5	<1	ND	Soil
6	6-S-D1-3.0 11/28	11/28/01	12/8/01	<0.5	<1	ND	Soil
6	6-S-D1-3.5 11/28	11/28/01	12/8/01	<0.5	<1	ND	Soil
6	6-S-D1-4.0 11/28	11/28/01	12/8/01	<0.5	<1	<20	Soil
6	6-S-D1-4.5 11/28	11/28/01	12/8/01	<0.5	<1	ND	Soil
6	6-S-D1-5.0 11/28	11/28/01	12/8/01	<0.5	<1	ND	Soil
6	6-S-D1-5.5 11/28	11/28/01	12/8/01	<0.5	<1	ND	Soil
6	6-S-D1-6.0 11/28	11/28/01	12/8/01	<0.5	<1	ND	Soil
6	6-S-D1-6.5 11/28	11/28/01	12/8/01	<0.5	<1	ND	Soil
6	6-S-D1-7.0 11/28	11/28/01	12/8/01	<0.5	<1	ND	Soil
6	6-S-D1-7.5 11/28	11/28/01	12/8/01	<0.5	<1	ND	Soil
6	6-S-D1-8.0 11/28	11/28/01	12/8/01	<0.5	<1	ND	Soil
6	6-S-D1-S 11/28	11/28/01	12/8/01	2	2	54	Soil
6	6-S-D2-0.5 11/28	11/28/01	12/8/01	<0.5	<1	ND	Soil
6	6-S-D2-1.0 11/28	11/28/01	12/8/01	<0.5	<1	ND	Soil
6	6-S-D2-1.5 11/28	11/28/01	12/8/01	<0.5	<1	<20	Soil
6	6-S-D2-2.0 11/28	11/28/01	12/8/01	<0.5	<1	ND	Soil
6	6-S-D2-2.5 11/28	11/28/01	12/8/01	<0.5	<1	ND	Soil
6	6-S-D2-3.0 11/28	11/28/01	12/8/01	<0.5	<1	ND	Soil
6	6-S-D2-3.5 11/28	11/28/01	12/8/01	<0.5	<1	ND	Soil
6	6-S-D2-4.0 11/28	11/28/01	12/8/01	<0.5	<1	ND	Soil
6	6-S-D2-4.5 11/28	11/28/01	12/8/01	<0.5	<1	ND	Soil
6	6-S-D2-5.0 11/28	11/28/01	12/8/01	<0.5	<1	ND	Soil
6	6-S-D2-5.5 11/28	11/28/01	12/8/01	<0.5	<1	ND	Soil
6	6-S-D2-6.0 11/28	11/28/01	12/8/01	<0.5	<1	ND	Soil
6	6-S-D2-6.5 11/28	11/28/01	12/8/01	<0.5	<1	ND	Soil
6	6-S-D2-7.0 11/28	11/28/01	12/8/01	<0.5	<1	ND	Soil
6	6-S-D2-7.5 11/28	11/28/01	12/8/01	<0.5	<1	ND	Soil
6	6-S-D2-8.0 11/28	11/28/01	12/7/01	<0.5	<1	<20	Soil
6	6-S-D2-S 11/28	11/28/01	12/8/01	<0.5	<1	<20	Soil
7	7-D1-HA 11/27	11/27/01	12/3/01	102	47	<20	water

Table A-2 (Cont.)

7	7-D1-HB 11/27	11/27/01	11/28/01	80	9	<20	water
7	7-D1-NHA 11/27	11/27/01	12/3/01	97	37	<20	water
7	7-D1-NHB 11/27	11/27/01	11/28/01	52	5	<20	water
7	7-D2-HA 11/27	11/27/01	12/3/01	99	44	<20	water
7	7-D2-HB 11/27	11/27/01	11/28/01	52	6	<20	water
7	7-D2-NHA 11/27	11/27/01	12/3/01	98	39	<20	water
7	7-D2-NHB 11/27	11/27/01	11/28/01	92	9	<20	water
7	7-S-D1-0.5 11/27	11/27/01	12/6/01	<0.5	<1	22	Soil
7	7-S-D1-1.5 11/27	11/27/01	12/6/01	<0.5	<1	ND	Soil
7	7-S-D1-1.5 11/27	11/27/01	12/7/01	<0.5	<1	ND	Soil
7	7-S-D1-2' 1127	11/27/01	12/3/01	<0.5	<1	ND	Soil
7	7-S-D1-2.5 11/27	11/27/01	12/6/01	<0.5	<1	<20	Soil
7	7-S-D1-3' 11/27	11/27/01	11/28/01	<0.5	<1	ND	Soil
7	7-S-D1-3.5 11/27	11/27/01	12/7/01	<0.5	<1	ND	Soil
7	7-S-D1-4' 1127	11/27/01	12/3/01	<0.5	<1	34	Soil
7	7-S-D1-4.5 11/27	11/27/01	12/5/01	<0.5	<1	ND	Soil
7	7-S-D1-5' 11/27	11/27/01	11/28/01	<0.5	<1	ND	Soil
7	7-S-D1-5.5 11/27	11/27/01	12/5/01	<0.5	<1	ND	Soil
7	7-S-D1-6' 11/27	11/27/01	12/3/01	<0.5	<1	ND	Soil
7	7-S-D1-6.5' 1127	11/27/01	12/3/01	<0.5	<1	ND	Soil
7	7-S-D1-7' 11/27	11/27/01	11/28/01	<0.5	<1	ND	Soil
7	7-S-D1-7.5 11/27	11/27/01	12/5/01	<0.5	<1	ND	Soil
7	7-S-D1-8.0' 1127	11/27/01	12/3/01	<0.5	<1	ND	Soil
7	7-S-D1-S' 1127	11/27/01	12/3/01	1	<1	45	Soil
7	7-S-D2-0.5 11/27	11/27/01	12/6/01	<0.5	<1	ND	Soil
7	7-S-D2-1' 11/27	11/27/01	12/4/01	<0.5	<1	<20	Soil
7	7-S-D2-1.5 11/27	11/27/01	12/6/01	<0.5	<1	ND	Soil
7	7-S-D2-2'	11/27/01	11/29/01	<0.5	<1	ND	Soil
7	7-S-D2-2.5 11/27	11/27/01	12/6/01	<0.5	<1	ND	Soil
7	7-S-D2-3' 11/27	11/27/01	12/4/01	<0.5	<1	ND	Soil
7	7-S-D2-3.5 11/27	11/27/01	12/6/01	<0.5	<1	ND	Soil
7	7-S-D2-4'	11/27/01	11/29/01	<0.5	<1	ND	Soil
7	7-S-D2-4.5 11/27	11/27/01	12/6/01	<0.5	<1	<20	Soil
7	7-S-D2-5' 11/27	11/27/01	12/4/01	<0.5	<1	ND	Soil
7	7-S-D2-5.5 11/27	11/27/01	12/6/01	<0.5	<1	ND	Soil
7	7-S-D2-6'	11/27/01	11/29/01	<0.5	<1	<20	Soil
7	7-S-D2-6.5 11/27	11/27/01	12/6/01	<0.5	<1	ND	Soil
7	7-S-D2-7' 11/27	11/27/01	12/4/01	<0.5	<1	ND	Soil
7	7-S-D2-7.5 11/27	11/27/01	12/6/01	<0.5	<1	ND	Soil
7	7-S-D2-8'	11/27/01	11/29/01	<0.5	<1	ND	Soil
7	7-S-D2-S'	11/27/01	11/29/01	1	<1	<20	Soil
8	8-D1-HA 11/27	11/27/01	12/3/01	88	40	<20	water
8	8-D1-HB 11/27	11/27/01	11/28/01	59	7	<20	water
8	8-D1-NHA 11/27	11/27/01	12/3/01	97	36	<20	water
8	8-D1-NHB 11/27	11/27/01	11/28/01	39	4	<20	water

Table A-2 (Cont.)

8	8-D2-HA 11/27	11/27/01	12/3/01	90	41	<20	water
8	8-D2-HB 11/27	11/27/01	11/28/01	41	4	<20	water
8	8-D2-NHA 11/27	11/27/01	12/3/01	NS	NS	NS	water
8	8-D2-NHB 11/27	11/27/01	11/28/01	NS	NS	NS	water
8	8-S-D1-0.5 11/27	11/27/01	12/7/01	<0.5	<1	ND	Soil
8	8-S-D1-1' 11/27	11/27/01	11/29/01	<0.5	<1	ND	Soil
8	8-S-D1-1.5 11/27	11/27/01	12/7/01	<0.5	<1	44	Soil
8	8-S-D1-2' 11/27	11/27/01	12/4/01	<0.5	<1	ND	Soil
8	8-S-D1-2.5 11/27	11/27/01	12/7/01	<0.5	<1	<20	Soil
8	8-S-D1-3' 11/27	11/27/01	11/29/01	<0.5	<1	ND	Soil
8	8-S-D1-3.5 11/27	11/27/01	12/7/01	<0.5	<1	24	Soil
8	8-S-D1-4' 11/27	11/27/01	12/4/01	<0.5	<1	ND	Soil
8	8-S-D1-4.5 11/27	11/27/01	12/7/01	<0.5	<1	ND	Soil
8	8-S-D1-5' 11/27	11/27/01	11/29/01	<0.5	<1	ND	Soil
8	8-S-D1-5.5 11/27	11/27/01	12/7/01	<0.5	<1	110	Soil
8	8-S-D1-6' 11/27	11/27/01	12/4/01	<0.5	<1	ND	Soil
8	8-S-D1-6' 11/27	11/27/01	12/4/01	<0.5	<1	ND	Soil
8	8-S-D1-6.5 11/27	11/27/01	12/7/01	<0.5	<1	ND	Soil
8	8-S-D1-7' 11/27	11/27/01	11/29/01	<0.5	<1	ND	Soil
8	8-S-D1-7.5 11/27	11/27/01	12/7/01	<0.5	<1	ND	Soil
8	8-S-D1-8' 11/27	11/27/01	12/4/01	<0.5	<1	ND	Soil
8	8-S-D1-S' 11/27	11/27/01	12/4/01	<0.5	<1	<20	Soil
8	8-S-D2-0.5 11/27	11/27/01	12/5/01	1	<1	ND	Soil
8	8-S-D2-1' 11/27	11/27/01	12/5/01	1	<1	ND	Soil
8	8-S-D2-1.5 11/27	11/27/01	12/7/01	<0.5	<1	ND	Soil
8	8-S-D2-2' 11/27	11/27/01	11/29/01	1	<1	ND	Soil
8	8-S-D2-2.5 11/27	11/27/01	12/7/01	<0.5	<1	ND	Soil
8	8-S-D2-3' 11/27	11/27/01	12/5/01	<0.5	<1	ND	Soil
8	8-S-D2-3.5 11/27	11/27/01	12/7/01	<0.5	<1	ND	Soil
8	8-S-D2-4' 11/27	11/27/01	11/29/01	<0.5	<1	ND	Soil
8	8-S-D2-4.5 11/27	11/27/01	12/7/01	<0.5	<1	<20	Soil
8	8-S-D2-5' 11/27	11/27/01	12/5/01	<0.5	<1	ND	Soil
8	8-S-D2-5.5 11/27	11/27/01	12/7/01	<0.5	<1	<20	Soil
8	8-S-D2-6' 11/27	11/27/01	11/29/01	<0.5	<1	ND	Soil
8	8-S-D2-6.5 11/27	11/27/01	12/7/01	<0.5	<1	ND	Soil
8	8-S-D2-7' 11/27	11/27/01	12/4/01	<0.5	<1	ND	Soil
8	8-S-D2-7.5 11/27	11/27/01	12/7/01	<0.5	<1	ND	Soil
8	8-S-D2-8' 11/27	11/27/01	11/29/01	<0.5	<1	ND	soil
8	8-S-D2-S 11/27	11/27/01	11/29/01	2	<1	NS	soil
9	9-D1-HA 11/27	11/27/01	12/3/01	NS	NS	NS	water
9	9-D1-HB 11/27	11/27/01	11/28/01	116	12	<20	water
9	9-D1-NHA 11/27	11/27/01	12/3/01	NS	NS	NS	water
9	9-D1-NHB 11/27	11/27/01	11/28/01	54	5	<20	water
9	9-D2-HA 11/27	11/27/01	12/3/01	NS	NS	NS	water
9	9-D2-HB 11/27	11/27/01	11/28/01	90	10	<20	water

Table A-2 (Cont.)

9	9-D2-NHA 11/27	11/27/01	12/3/01	NS	NS	NS	water
9	9-D2-NHB 11/27	11/27/01	11/28/01	82	8	<20	water
9	9-S-D1-0.5 11/27	11/27/01	12/2/01	<0.5	<1	ND	Soil
9	9-S-D1-1' 11/27	11/27/01	11/30/01	<0.5	<1	28	Soil
9	9-S-D1-2' 11/27	11/27/01	12/2/01	<0.5	<1	ND	Soil
9	9-S-D1-2.5 11/27	11/27/01	12/7/01	<0.5	<1	ND	Soil
9	9-S-D1-3' 11/27	11/27/01	11/30/01	<0.5	<1	ND	Soil
9	9-S-D1-3.5 11/27	11/27/01	12/7/01	<0.5	<1	ND	Soil
9	9-S-D1-4' 11/27	11/27/01	12/2/01	<0.5	<1	ND	Soil
9	9-S-D1-4.5 11/27	11/27/01	12/7/01	<0.5	<1	ND	Soil
9	9-S-D1-5' 11/27	11/27/01	11/30/01	<0.5	<1	<20	Soil
9	9-S-D1-5.5 11/27	11/27/01	12/7/01	<0.5	<1	<20	Soil
9	9-S-D1-6' 11/27	11/27/01	12/2/01	<0.5	<1	ND	Soil
9	9-S-D1-6.5 11/27	11/27/01	12/7/01	<0.5	<1	ND	Soil
9	9-S-D1-7' 11/27	11/27/01	11/30/01	<0.5	<1	<20	Soil
9	9-S-D1-7.5 11/27	11/27/01	12/7/01	<0.5	<1	ND	Soil
9	9-S-D1-8' 11/27	11/27/01	12/2/01	<0.5	<1	ND	Soil
9	9-S-D1-8' 11/27	11/27/01	12/5/01	<0.5	<1	<20	Soil
9	9-S-D1-S 11/27	11/27/01	12/2/01	<0.5	<1	ND	Soil
9	9-S-D2-0.5 11/27	11/27/01	12/7/01	<0.5	<1	ND	Soil
9	9-S-D2-1' 11/27	11/27/01	12/3/01	<0.5	<1	ND	Soil
9	9-S-D2-1.5 11/27	11/27/01	12/7/01	<0.5	<1	ND	Soil
9	9-S-D2-2' 11/27	11/27/01	11/30/01	<0.5	<1	<20	Soil
9	9-S-D2-2.5 11/27	11/27/01	12/7/01	<0.5	<1	ND	Soil
9	9-S-D2-3' 11/27	11/27/01	12/2/01	<0.5	<1	ND	Soil
9	9-S-D2-3.5 11/27	11/27/01	12/7/01	<0.5	<1	ND	Soil
9	9-S-D2-4' 11/27	11/27/01	11/30/01	<0.5	<1	ND	Soil
9	9-S-D2-4.5 11/27	11/27/01	12/7/01	<0.5	<1	ND	Soil
9	9-S-D2-5' 11/27	11/27/01	12/2/01	<0.5	<1	<20	Soil
9	9-S-D2-5.5 11/27	11/27/01	12/7/01	<0.5	<1	ND	Soil
9	9-S-D2-6' 11/27	11/27/01	11/30/01	<0.5	<1	ND	Soil
9	9-S-D2-6.5 11/27	11/27/01	12/7/01	<0.5	<1	ND	Soil
9	9-S-D2-7' 11/27	11/27/01	12/2/01	<0.5	<1	ND	Soil
9	9-S-D2-7.5 11/27	11/27/01	12/7/01	<0.5	<1	ND	Soil
9	9-S-D2-8' 11/27	11/27/01	11/30/01	<0.5	<1	ND	soil
9	9-S-D2-S' 11/27	11/27/01	11/30/01	49	5	<20	soil
DRW1	DRW-1A 11/27	11/27/01	12/3/01	90	45	<20	water
DRW1	DRW-1A 11/28/01	11/28/01	11/30/01	208	41	<20	water
DRW1	DRW-1B	11/27/01	11/28/01	69	14	<20	water
DRW1	DRW-1B 11/28	11/28/01	12/2/01	102	47	<20	water
4	4-D1-0.5	04/16/02	04/17/02	<0.5	0	0	Soil
4	4-D1-1.0	04/16/02	04/17/02	0	0	0	Soil
4	4-D1-1.5	04/16/02	04/17/02	0	0	0	Soil
4	4-D1-2.0	04/16/02	04/17/02	0	0	0	Soil
4	4-D1-2.5	04/16/02	04/17/02	0	0	0	Soil

Table A-2 (Cont.)

4	4-D1-3.0	04/16/02	04/17/02	0	0	0	Soil
4	4-D1-3.5	04/16/02	04/17/02	0	0	0	Soil
4	4-D1-4.0	04/16/02	04/17/02	0	0	0	Soil
4	4-D1-4.5	04/16/02	04/17/02	0	0	0	Soil
4	4-D1-5.0	04/16/02	04/17/02	0	0	0	Soil
4	4-D1-5.5	04/16/02	04/17/02	0	0	0	Soil
4	4-D1-6.0	04/16/02	04/17/02	0	0	0	Soil
4	4-D1-6.5	04/16/02	04/17/02	0	0	0	Soil
4	4-D1-7.0	04/16/02	04/17/02	0	0	0	Soil
4	4-D1-7.5	04/16/02	04/17/02	0	0	0	Soil
4	4-D1-8.0	04/16/02	04/17/02	0	0	0	Soil
4	4-D1-HA	04/16/02	04/16/02	105	15	<5	Water
4	4-D1-HB	04/16/02	04/17/02	114	16	<5	Water
4	4-D1-NHA	04/16/02	04/16/02	106	14	<5	Water
4	4-D1-NHB	04/16/02	04/17/02	109	14	<5	Water
4	4-D1-S	04/16/02	04/17/02	0	0	0	Soil
4	4-D2-0.5	04/16/02	04/17/02	1	<0.5	0	Soil
4	4-D2-1.0	04/16/02	04/17/02	0	0	0	Soil
4	4-D2-1.5	04/16/02	04/17/02	0	0	0	Soil
4	4-D2-2.0	04/16/02	04/17/02	0	0	0	Soil
4	4-D2-2.5	04/16/02	04/17/02	0	0	0	Soil
4	4-D2-3.0	04/16/02	04/17/02	0	0	0	Soil
4	4-D2-3.5	04/16/02	04/17/02	0	0	0	Soil
4	4-D2-4.0	04/16/02	04/17/02	0	0	0	Soil
4	4-D2-4.5	04/16/02	04/17/02	0	0	0	Soil
4	4-D2-5.0	04/16/02	04/17/02	0	0	0	Soil
4	4-D2-5.5	04/16/02	04/17/02	0	0	0	Soil
4	4-D2-6.0	04/16/02	04/17/02	0	0	0	Soil
4	4-D2-6.5	04/16/02	04/17/02	0	0	0	Soil
4	4-D2-7.0	04/16/02	04/17/02	0	0	0	Soil
4	4-D2-7.5	04/16/02	04/17/02	0	0	0	Soil
4	4-D2-8.0	04/16/02	04/17/02	0	0	0	Soil
4	4-D2-HA	04/16/02	04/16/02	106	15	<5	Water
4	4-D2-HB	04/16/02	04/17/02	109	15	<5	Water
4	4-D2-NHA	04/16/02	04/16/02	94	11	<5	Water
4	4-D2-NHB	04/16/02	04/17/02	109	14	<5	Water
4	4-D2-S	04/16/02	04/17/02	0	0	0	Soil
5	5-D1-0.5	04/16/02	04/18/02	0	0	0	Soil
5	5-D1-1.0	04/16/02	04/18/02	0	0	0	Soil
5	5-D1-1.5	04/16/02	04/18/02	0	0	0	Soil
5	5-D1-2.0	04/16/02	04/18/02	0	0	0	Soil
5	5-D1-2.5	04/16/02	04/26/02	0	0	0	Soil
5	5-D1-3.0	04/16/02	04/26/02	0	0	0	Soil
5	5-D1-3.5	04/16/02	04/26/02	0	0	0	Soil
5	5-D1-4.0	04/16/02	04/18/02	0	0	0	Soil

Table A-2 (Cont.)

5	5-D1-4.5	04/16/02	04/26/02	0	0	0	Soil
5	5-D1-5.0	04/16/02	04/26/02	0	0	0	Soil
5	5-D1-5.5	04/16/02	04/26/02	0	0	0	Soil
5	5-D1-6.0	04/16/02	04/18/02	0	0	0	Soil
5	5-D1-6.5	04/16/02	04/26/02	0	0	0	Soil
5	5-D1-7.0	04/16/02	04/26/02	0	0	0	Soil
5	5-D1-7.5	04/16/02	04/26/02	0	0	0	Soil
5	5-D1-8.0	04/16/02	04/18/02	0	0	0	Soil
5	5-D1-HA	04/16/02	04/16/02	85	13	<5	Water
5	5-D1-HB	04/16/02	04/17/02	86	14	<5	Water
5	5-D1-NHA	04/16/02	04/16/02	84	11	<5	Water
5	5-D1-NHB	04/16/02	04/17/02	79	10	<5	Water
5	5-D1-S	04/16/02	04/18/02	0	0	0	Soil
5	5-D2-0.5	04/16/02	04/18/02	0	0	0	Soil
5	5-D2-1.0	04/16/02	04/18/02	0	0	0	Soil
5	5-D2-1.5	04/16/02	04/18/02	0	0	0	Soil
5	5-D2-2.0	04/16/02	04/18/02	0	0	0	Soil
5	5-D2-2.5	04/16/02	04/26/02	0	0	0	Soil
5	5-D2-3.0	04/16/02	04/26/02	0	0	0	Soil
5	5-D2-3.5	04/16/02	04/26/02	0	0	0	Soil
5	5-D2-4.0	04/16/02	04/18/02	0	0	0	Soil
5	5-D2-4.5	04/16/02	04/26/02	0	0	0	Soil
5	5-D2-5.0	04/16/02	04/26/02	0	0	0	Soil
5	5-D2-5.5	04/16/02	04/26/02	0	0	0	Soil
5	5-D2-6.0	04/16/02	04/18/02	0	0	0	Soil
5	5-D2-6.5	04/16/02	04/26/02	0	0	0	Soil
5	5-D2-7.0	04/16/02	04/26/02	0	0	0	Soil
5	5-D2-7.5	04/16/02	04/26/02	0	0	0	Soil
5	5-D2-8.0	04/16/02	04/26/02	NS	NS	NS	Soil
5	5-D2-HA	04/16/02	04/16/02	90	15	<5	Water
5	5-D2-HB	04/16/02	04/17/02	85	14	0	Water
5	5-D2-NHA	04/16/02	04/16/02	84	11	5	Water
5	5-D2-NHB	04/16/02	04/17/02	85	12	<5	Water
5	5-D2-S	04/16/02	04/18/02	38	6	0	Soil
DRW1	DRW-1A	04/16/02	04/16/02	95	16	<5	Water
DRW1	DRW-1B	04/16/02	04/16/02	133	19	6	Water
6	6-D1-0.5	04/17/02	04/19/02	0	0	0	Soil
6	6-D1-1.0	04/17/02	04/19/02	0	0	0	Soil
6	6-D1-1.5	04/17/02	04/19/02	0	0	0	Soil
6	6-D1-2.0	04/17/02	04/19/02	0	0	0	Soil
6	6-D1-2.5	04/17/02	04/26/02	0	0	0	Soil
6	6-D1-3.0	04/17/02	04/26/02	0	0	0	Soil
6	6-D1-3.5	04/17/02	04/26/02	0	0	0	Soil
6	6-D1-4.0	04/17/02	04/19/02	0	0	0	Soil
6	6-D1-4.5	04/17/02	04/26/02	0	0	0	Soil

Table A-2 (Cont.)

6	6-D1-5.0	04/17/02	04/26/02	0	0	0	Soil
6	6-D1-5.5	04/17/02	04/26/02	0	0	0	Soil
6	6-D1-6.0	04/17/02	04/19/02	0	0	0	Soil
6	6-D1-6.5	04/17/02	04/27/02	0	0	0	Soil
6	6-D1-7.0	04/17/02	04/27/02	0	0	0	Soil
6	6-D1-7.5	04/17/02	04/27/02	0	0	0	Soil
6	6-D1-8.0	04/17/02	04/19/02	0	0	0	Soil
6	6-D1-HA	04/17/02	04/18/02	83	14	<5	Water
6	6-D1-HB	04/17/02	04/18/02	84	14	<5	Water
6	6-D1-NHA	04/17/02	04/18/02	87	12	5	Water
6	6-D1-NHB	04/17/02	04/18/02	78	11	0	Water
6	6-D1-S	04/17/02	04/19/02	43	4	0	Soil
6	6-D2-0.5	04/17/02	04/19/02	0	0	0	Soil
6	6-D2-1.0	04/17/02	04/19/02	0	0	0	Soil
6	6-D2-1.5	04/17/02	04/19/02	0	0	0	Soil
6	6-D2-2.0	04/17/02	04/19/02	0	0	0	Soil
6	6-D2-2.5	04/17/02	04/27/02	0	0	0	Soil
6	6-D2-3.0	04/17/02	04/27/02	0	0	0	Soil
6	6-D2-3.5	04/17/02	04/27/02	0	0	0	Soil
6	6-D2-4.0	04/17/02	04/19/02	0	0	0	Soil
6	6-D2-4.5	04/17/02	04/27/02	0	0	0	Soil
6	6-D2-5.0	04/17/02	04/27/02	0	0	0	Soil
6	6-D2-5.5	04/17/02	04/27/02	0	0	0	Soil
6	6-D2-6.0	04/17/02	04/19/02	0	0	0	Soil
6	6-D2-6.5	04/17/02	04/27/02	0	0	0	Soil
6	6-D2-7.0	04/17/02	04/27/02	0	0	0	Soil
6	6-D2-7.5	04/17/02	04/27/02	0	0	0	Soil
6	6-D2-8.0	04/17/02	04/19/02	0	0	0	Soil
6	6-D2-HA	04/17/02	04/18/02	86	14	<5	Water
6	6-D2-HB	04/17/02	04/18/02	81	14	<5	Water
6	6-D2-NHA	04/17/02	04/18/02	85	12	<5	Water
6	6-D2-NHB	04/17/02	04/18/02	88	13	6	Water
6	6-D2-S	04/17/02	04/19/02	7	1	0	Soil
7	7-D1-0.5	04/17/02	04/19/02	0	0	0	Soil
7	7-D1-1.0	04/17/02	04/19/02	1	<0.5	0	Soil
7	7-D1-1.5	04/17/02	04/19/02	2	<0.5	0	Soil
7	7-D1-2.0	04/17/02	04/19/02	0	0	0	Soil
7	7-D1-2.5	04/17/02	04/27/02	0	0	0	Soil
7	7-D1-3.0	04/17/02	04/27/02	0	0	0	Soil
7	7-D1-3.5	04/17/02	04/27/02	0	0	0	Soil
7	7-D1-4.0	04/17/02	04/19/02	0	0	0	Soil
7	7-D1-4.5	04/17/02	04/27/02	0	0	0	Soil
7	7-D1-5.0	04/17/02	04/27/02	0	0	0	Soil
7	7-D1-5.5	04/17/02	04/27/02	0	0	0	Soil
7	7-D1-6.0	04/17/02	04/19/02	0	0	0	Soil

Table A-2 (Cont.)

7	7-D1-6.5	04/17/02	04/27/02	0	0	0	Soil
7	7-D1-7.0	04/17/02	04/28/02	0	0	0	Soil
7	7-D1-7.5	04/17/02	04/28/02	0	0	0	Soil
7	7-D1-8.0	04/17/02	04/19/02	0	0	0	Soil
7	7-D1-HA	04/17/02	04/18/02	84	16	5	Water
7	7-D1-HB	04/17/02	04/19/02	80	14	6	Water
7	7-D1-NHA	04/17/02	04/18/02	82	13	<5	Water
7	7-D1-NHB	04/17/02	04/19/02	74	12	5	Water
7	7-D1-S	04/17/02	04/19/02	2	<0.5	0	Soil
7	7-D2-0.5	04/17/02	04/19/02	0	0	0	Soil
7	7-D2-1.0	04/17/02	04/19/02	0	0	0	Soil
7	7-D2-1.5	04/17/02	04/19/02	0	0	0	Soil
7	7-D2-2.0	04/17/02	04/19/02	0	0	0	Soil
7	7-D2-2.5	04/17/02	04/28/02	0	0	0	Soil
7	7-D2-3.0	04/17/02	04/28/02	0	0	0	Soil
7	7-D2-3.5	04/17/02	04/28/02	0	0	0	Soil
7	7-D2-4.0	04/17/02	04/19/02	<0.5	0	0	Soil
7	7-D2-4.5	04/17/02	04/28/02	0	0	0	Soil
7	7-D2-5.0	04/17/02	04/28/02	0	0	0	Soil
7	7-D2-5.5	04/17/02	04/28/02	0	0	0	Soil
7	7-D2-6.0	04/17/02	04/19/02	0	0	0	Soil
7	7-D2-6.5	04/17/02	04/28/02	0	0	0	Soil
7	7-D2-7.0	04/17/02	04/28/02	0	0	0	Soil
7	7-D2-7.5	04/17/02	04/28/02	0	0	0	Soil
7	7-D2-8.0	04/17/02	04/19/02	0	0	0	Soil
7	7-D2-HA	04/17/02	04/18/02	79	14	<5	Water
7	7-D2-HB	04/17/02	04/19/02	75	13	<5	Water
7	7-D2-NHA	04/17/02	04/18/02	76	12	5	Water
7	7-D2-NHB	04/17/02	04/19/02	80	12	<5	Water
7	7-D2-S	04/17/02	04/19/02	111	16	9	Water
7	DRW-1A	04/17/02	04/18/02	103	17	8	Water
DRW1	DRW-1B	04/17/02	04/18/02	80	13	<5	Water
8	8-D1-0.5	04/18/02	04/21/02	0	0	0	Soil
8	8-D1-1.0	04/18/02	04/21/02	0	0	0	Soil
8	8-D1-1.5	04/18/02	04/21/02	0	0	0	Soil
8	8-D1-2.0	04/18/02	04/21/02	0	0	0	Soil
8	8-D1-2.5	04/18/02	04/28/02	0	0	0	Soil
8	8-D1-3.0	04/18/02	04/28/02	0	0	0	Soil
8	8-D1-3.5	04/18/02	04/28/02	0	0	0	Soil
8	8-D1-4.0	04/18/02	04/21/02	0	0	0	Soil
8	8-D1-4.5	04/18/02	04/28/02	0	0	0	Soil
8	8-D1-5.0	04/18/02	04/28/02	0	0	0	Soil
8	8-D1-5.5	04/18/02	04/28/02	0	0	0	Soil
8	8-D1-6.0	04/18/02	04/22/02	0	0	0	Soil
8	8-D1-6.5	04/18/02	04/28/02	0	0	0	Soil

Table A-2 (Cont.)

8	8-D1-7.0	04/18/02	04/28/02	0	0	0	Soil
8	8-D1-7.5	04/18/02	04/28/02	0	0	0	Soil
8	8-D1-8.0	04/18/02	04/22/02	0	0	0	Soil
8	8-D1-HA	04/18/02	04/19/02	102	15	<5	Water
8	8-D1-HB	04/18/02	04/20/02	92	13	0	Water
8	8-D1-NHA	04/18/02	04/19/02	91	12	5	Water
8	8-D1-NHB	04/18/02	04/20/02	86	10	<5	Water
8	8-D1-S	04/18/02	04/21/02	33	3	0	Soil
8	8-D2-0.5	04/18/02	04/22/02	1	<0.5	0	Soil
8	8-D2-1.0	04/18/02	04/22/02	5	1	0	Soil
8	8-D2-1.5	04/18/02	04/22/02	1	<0.5	0	Soil
8	8-D2-2.0	04/18/02	04/22/02	0	0	0	Soil
8	8-D2-2.5	04/18/02	04/28/02	0	0	0	Soil
8	8-D2-3.0	04/18/02	04/29/02	0	0	0	Soil
8	8-D2-3.5	04/18/02	04/29/02	0	0	0	Soil
8	8-D2-4.0	04/18/02	04/22/02	0	0	0	Soil
8	8-D2-4.5	04/18/02	04/29/02	0	0	0	Soil
8	8-D2-5.0	04/18/02	04/29/02	0	0	0	Soil
8	8-D2-5.5	04/18/02	04/29/02	0	0	0	Soil
8	8-D2-6.0	04/18/02	04/22/02	0	0	0	Soil
8	8-D2-6.5	04/18/02	04/29/02	0	0	0	Soil
8	8-D2-7.0	04/18/02	04/29/02	0	0	0	Soil
8	8-D2-7.5	04/18/02	04/29/02	0	0	0	Soil
8	8-D2-8.0	04/18/02	04/22/02	0	0	0	Soil
8	8-D2-HA	04/18/02	04/19/02	71	13	<5	Water
8	8-D2-HB	04/18/02	04/20/02	95	13	0	Water
8	8-D2-NHA	04/18/02	04/19/02	83	11	0	Water
8	8-D2-NHB	04/18/02	04/20/02	85	11	<5	Water
8	8-D2-S	04/18/02	04/22/02	4	<0.5	0	Soil
9	9-D1-0.5	04/18/02	04/22/02	0	0	0	Soil
9	9-D1-1.0	04/18/02	04/22/02	0	0	0	Soil
9	9-D1-1.5	04/18/02	04/22/02	0	0	0	Soil
9	9-D1-2.0	04/18/02	04/22/02	0	0	0	Soil
9	9-D1-2.5	04/18/02	04/29/02	0	0	0	Soil
9	9-D1-3.0	04/18/02	04/29/02	0	0	0	Soil
9	9-D1-3.5	04/18/02	04/29/02	0	0	0	Soil
9	9-D1-4.0	04/18/02	04/22/02	0	0	0	Soil
9	9-D1-4.5	04/18/02	04/29/02	0	0	0	Soil
9	9-D1-5.0	04/18/02	04/29/02	0	0	0	Soil
9	9-D1-5.5	04/18/02	04/29/02	0	0	0	Soil
9	9-D1-6.0	04/18/02	04/22/02	0	0	0	Soil
9	9-D1-6.5	04/18/02	04/29/02	0	0	0	Soil
9	9-D1-7.0	04/18/02	04/29/02	0	0	0	Soil
9	9-D1-7.5	04/18/02	04/29/02	0	0	0	Soil
9	9-D1-8.0	04/18/02	04/22/02	0	0	0	Soil

Table A-2 (Cont.)

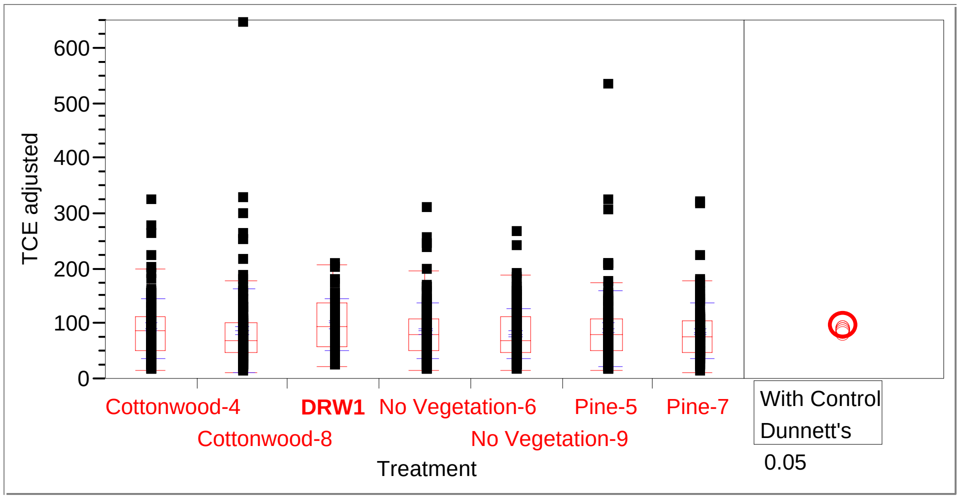
9	9-D1-HA	04/18/02	04/20/02	78	13	<5	Water
9	9-D1-HB	04/18/02	04/20/02	76	13	<5	Water
9	9-D1-NHA	04/18/02	04/20/02	71	11	<5	Water
9	9-D1-NHB	04/18/02	04/20/02	72	10	<5	Water
9	9-D1-S	04/18/02	04/22/02	40	2	0	Soil
9	9-D2-0.5	04/18/02	04/22/02	0	0	0	Soil
9	9-D2-1.0	04/18/02	04/22/02	0	0	0	Soil
9	9-D2-1.5	04/18/02	04/22/02	0	0	0	Soil
9	9-D2-2.0	04/18/02	04/22/02	0	0	0	Soil
9	9-D2-2.5	04/18/02	04/29/02	0	0	0	Soil
9	9-D2-3.0	04/18/02	04/29/02	0	0	0	Soil
9	9-D2-3.5	04/18/02	04/29/02	0	0	0	Soil
9	9-D2-4.0	04/18/02	04/22/02	0	0	0	Soil
9	9-D2-4.5	04/18/02	04/29/02	0	0	0	Soil
9	9-D2-5.0	04/18/02	04/29/02	0	0	0	Soil
9	9-D2-5.5	04/18/02	04/29/02	0	0	0	Soil
9	9-D2-6.0	04/18/02	04/22/02	0	0	0	Soil
9	9-D2-6.5	04/18/02	04/29/02	0	0	0	Soil
9	9-D2-7.0	04/18/02	04/29/02	0	0	0	Soil
9	9-D2-7.5	04/18/02	04/29/02	0	0	0	Soil
9	9-D2-8.0	04/18/02	04/22/02	0	0	0	Soil
9	9-D2-HA	04/18/02	04/20/02	77	13	6	Water
9	9-D2-HB	04/18/02	04/20/02	77	14	<5	Water
9	9-D2-NHA	04/18/02	04/20/02	72	10	<5	Water
9	9-D2-NHB	04/18/02	04/20/02	74	10	0	Water
9	9-D2-S	04/18/02	04/22/02	0	0	0	Soil
9	DRW-1A	04/18/02	04/19/02	95	17	5	Water
DRW1	DRW-1B	04/18/02	04/20/02	80	15	5	Water

NS = sample damaged or lost. ND = none detected

Appendix B
Statistical Analyses

The statistical analyses were performed on the “adjusted” data. Data points labeled as below detection were replaced by (Detection Limit) /2.

Table B1: No TCE mean difference between DRW1 and any Plot Location (4,5,6,7,8,9) (Water Samples)



TCE Quantities

Level	Minimum	10%	25%	Median	75%	90%	Maximum
Cottonwood-4	16	31.2	53.25	89	115	153	323
Cottonwood-8	13	30	50	71	103.5	151.5	643
DRW1	23	43.4	60	95	138	164.6	208
No Vegetation-6	17	33	52.5	81	111.5	146	310
No Vegetation-9	16	35	49	71	113	150	266
Pine-5	15	37	52	81	108.5	151	532
Pine-7	14	36	50.5	78	106	150	319

TCE Means and Std Deviations

Level	Number	Mean	Std Dev	Std Err Mean	Lower 95%	Upper 95%
Cottonwood-4	112	92.7589	54.6598	5.1649	82.524	102.99
Cottonwood-8	124	89.0887	74.9603	6.7316	75.764	102.41
DRW1	43	98.9070	47.3849	7.2261	84.324	113.49
No Vegetation-6	109	88.0000	51.7837	4.9600	78.168	97.83
No Vegetation-9	127	82.7165	46.6823	4.1424	74.519	90.91
Pine-5	109	92.2202	67.5698	6.4720	79.392	105.05
Pine-7	109	86.3761	51.3928	4.9225	76.619	96.13

Alpha=
0.05

Comparisons with a control using Dunnett's Method

Control Group =
DRW1

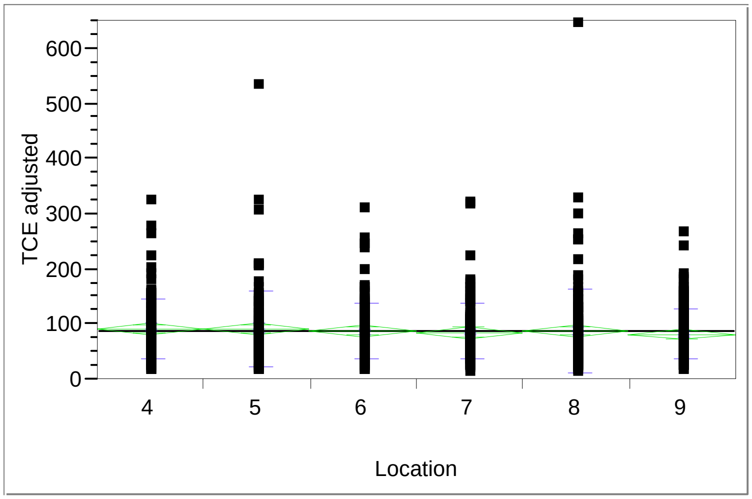
|d|
2.47152

Abs(Dif)-LSD	DRW1
DRW1	-31.025
Cottonwood-4	-19.660
Pine-5	-19.219
Cottonwood-8	-15.641
No Vegetation-6	-14.999
Pine-7	-13.375
No Vegetation-9	-9.191

Positive values show pairs of means that are significantly different.

Table B2: There was no discernible pattern with regard to TCE concentrations

relative to proximity of test plots to the well (9 is the closest, 4 is farthest)
(Water Samples)



TCE Quantities

Level	Minimum	10%	25%	Median	75%	90%	Maximum
4	16	31.2	53.25	89	115	153	323
5	15	37	52	81	108.5	151	532
6	17	33	52.5	81	111.5	146	310
7	14	36	50.5	78	106	150	319
8	13	30	50	71	103.5	151.5	643
9	16	35	49	71	113	150	266

TCE Anova

Summary of Fit

Rsquare	0.003515
Adj Rsquare	-0.00377
Root Mean Square Error	58.80527
Mean of Response	88.4058
Observations (or Sum Wts)	690

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio	Prob > F
Location	5	8343.8	1668.75	0.4826	0.7894
Error	684	2365312.6	3458.06		
C. Total	689	2373656.4			

TCE Means and Std Deviations

Level	Number	Mean	Std Dev	Std Err Mean	Lower 95%	Upper 95%
4	112	92.7589	54.6598	5.1649	82.524	102.99
5	109	92.2202	67.5698	6.4720	79.392	105.05
6	109	88.0000	51.7837	4.9600	78.168	97.83
7	109	86.3761	51.3928	4.9225	76.619	96.13
8	124	89.0887	74.9603	6.7316	75.764	102.41
9	127	82.7165	46.6823	4.1424	74.519	90.91

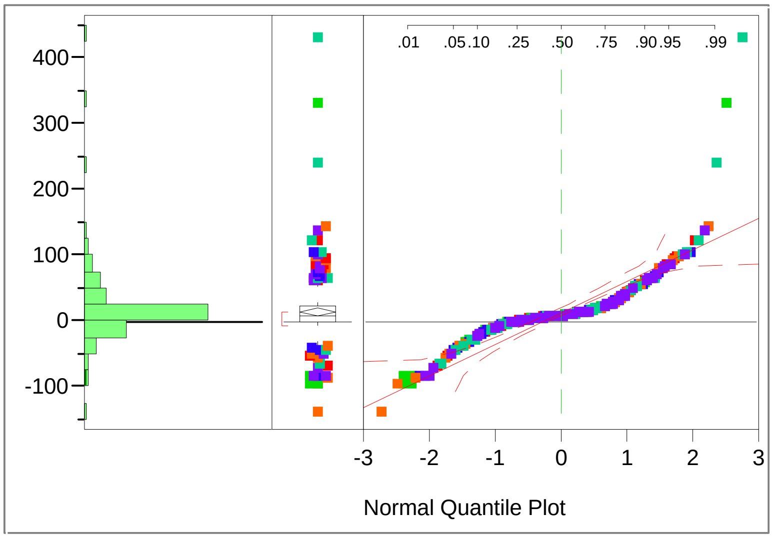
Table B3: There is a significant loss (decrease) of TCE between the header and non-header sides of the plot? The header side is 14.1 ug/kg higher on average than the

non-header side. The 95% confidence interval for the mean difference (H-NH) is 8.7 to 19.4 ug/kg.

(Water Samples)

Distributions

Delta= H-NH



Quantities

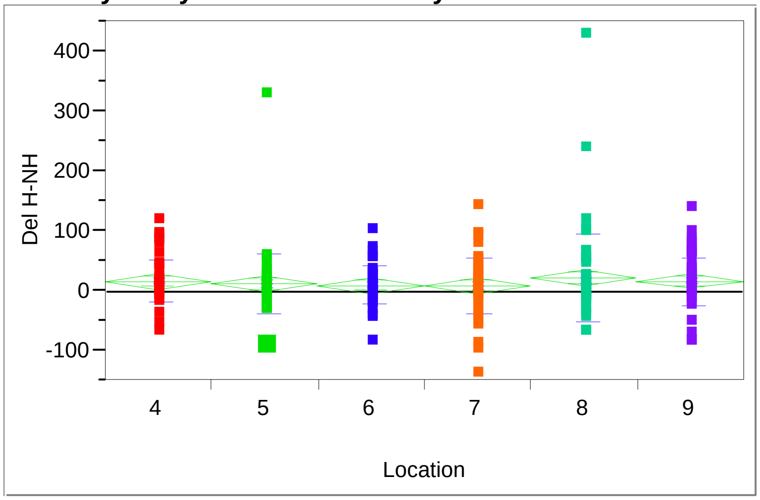
100.0%	maximum	429.0
99.5%		369.5
97.5%		103.4
90.0%		62.0
75.0%	quartile	23.0
50.0%	median	7.0
25.0%	quartile	-2.0
10.0%		-24.0
2.5%		-72.3
0.5%		-114.6
0.0%	minimum	-139.0

Moments

Mean	14.056604
Std Dev	48.178984
Std Err Mean	2.7017432
Upper 95% Mean	19.372218
Lower 95% Mean	8.7409897
N	318

Table B3 Continued

One-way Analysis of Delta H-NH by Location



Quantities (H-NH)

Level	Minimum	10%	25%	Median	75%	90%	Maximum
4	-69	-13.8	1	8	19	83.2	120
5	-92	-29	-2.25	7	16.75	37.2	329
6	-84	-20	-4	8	25	54.8	103
7	-139	-49	-0.5	8.5	25.75	54.8	141
8	-68	-29.4	-5	5	17	79	429
9	-84	-21	1	7	35	70	137

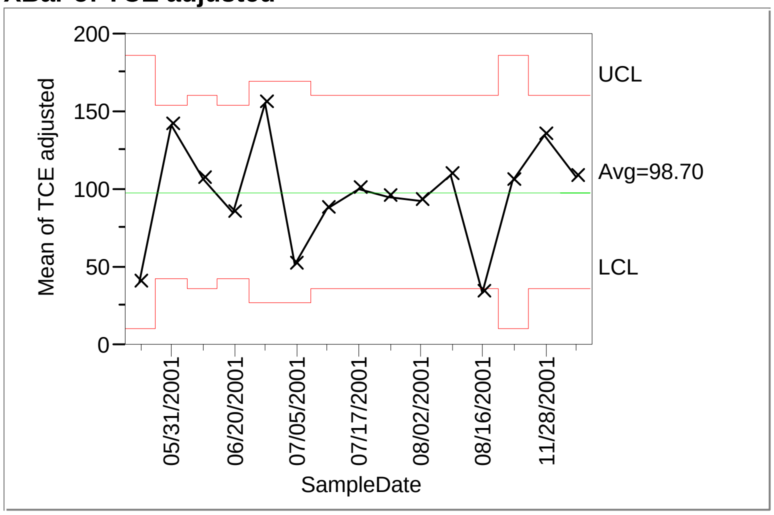
Means and Std Deviations (H-NH)

Level	Number	Mean	Std Dev	Std Err Mean	Lower 95%	Upper 95%
4	51	16.3333	35.5689	4.9806	6.329	26.337
5	52	11.0769	50.9786	7.0695	-3.116	25.269
6	51	9.8627	30.9264	4.3306	1.165	18.561
7	50	8.1400	46.2054	6.5344	-4.991	21.271
8	55	21.4545	73.0474	9.8497	1.707	41.202
9	59	16.4576	39.9850	5.2056	6.037	26.878

Table B4: There is no consistent temporal change in TCE (based on water samples) over the course of the study. Separate plots were done by treatment and side (Header or Non-Header).

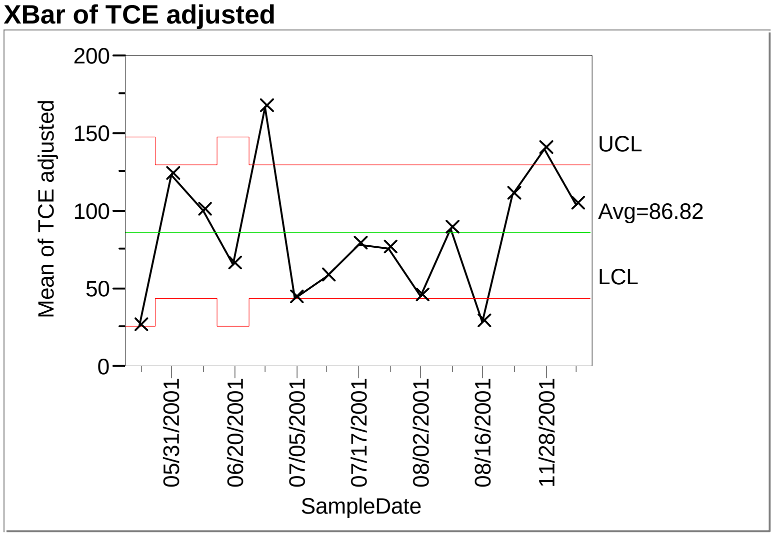
(Water Samples)

Location=4, Side=H
XBar of TCE adjusted



Note: Sigma used for limits based on range.

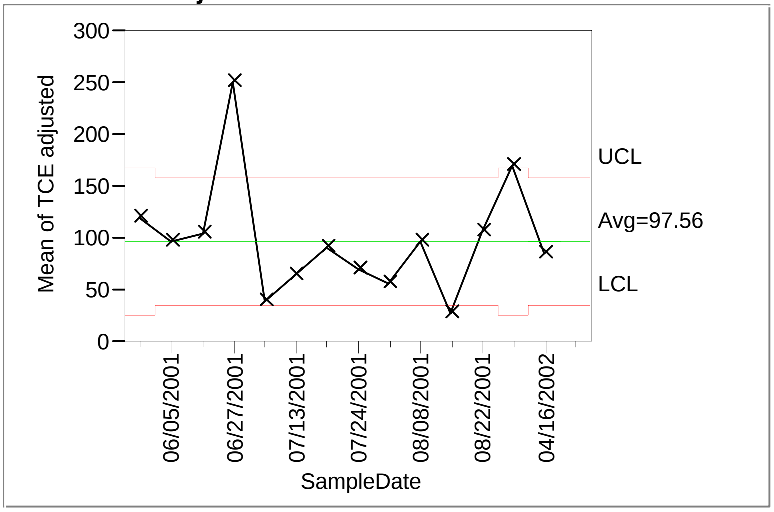
Location=4, Side=NH
XBar of TCE adjusted



Note: Sigma used for limits based on range.

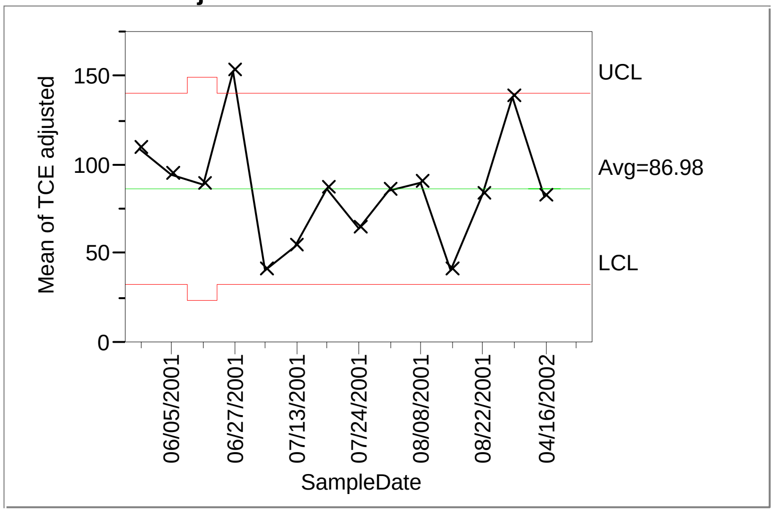
Table B4 Continued

Location=5, Side=H
XBar of TCE adjusted



Note: Sigma used for limits based on range.

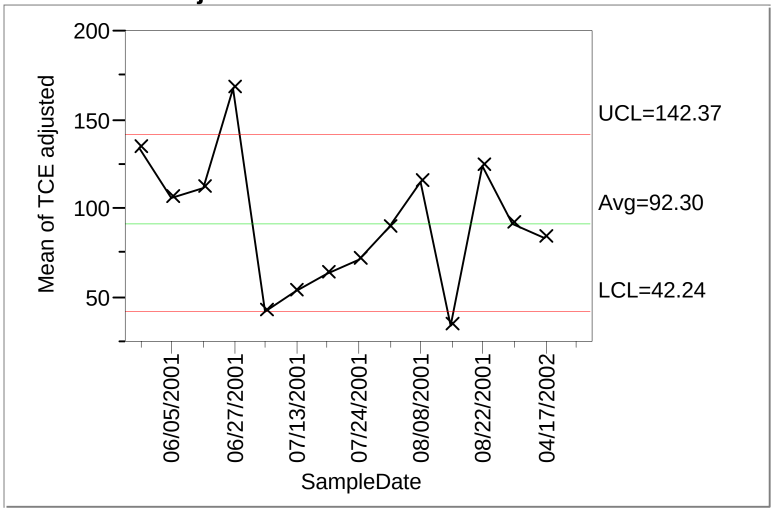
Location=5, Side=NH
XBar of TCE adjusted



Note: Sigma used for limits based on range.

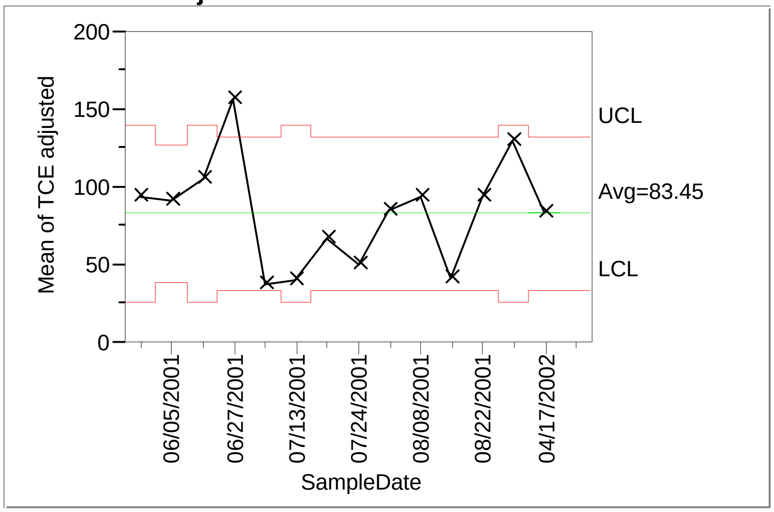
Table B-4 (Cont.)

Location=6, Side=H
XBar of TCE adjusted



Note: Sigma used for limits based on range.

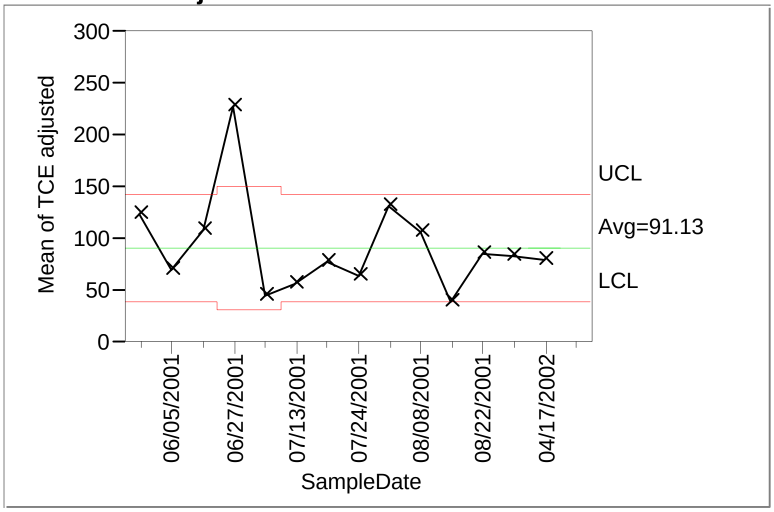
Location=6, Side=NH
XBar of TCE adjusted



Note: Sigma used for limits based on range.

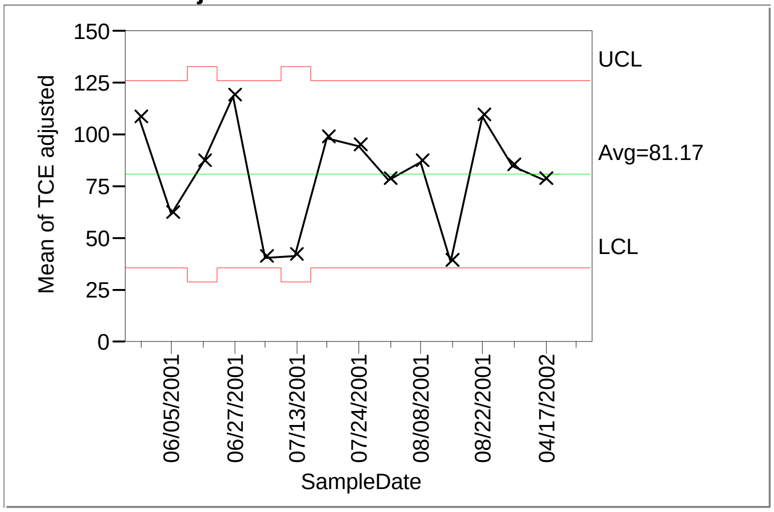
Table B-4 (Cont.)

Location=7, Side=H
XBar of TCE adjusted



Note: Sigma used for limits based on range.

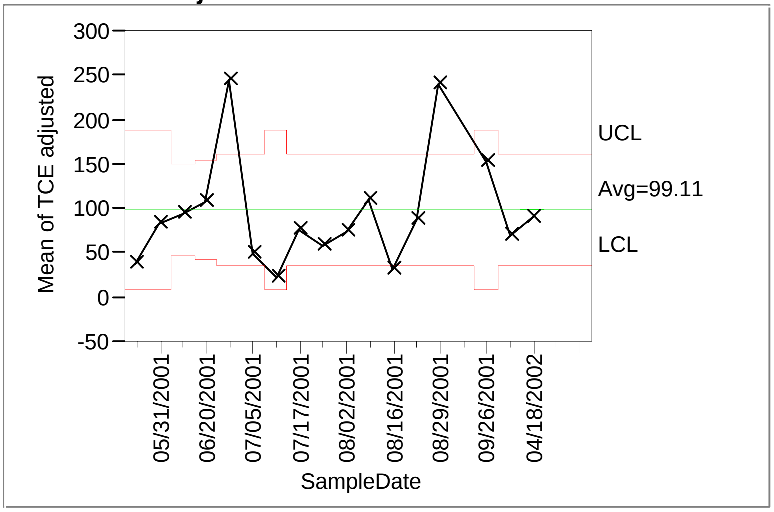
Location=7, Side=NH
XBar of TCE adjusted



Note: Sigma used for limits based on range.

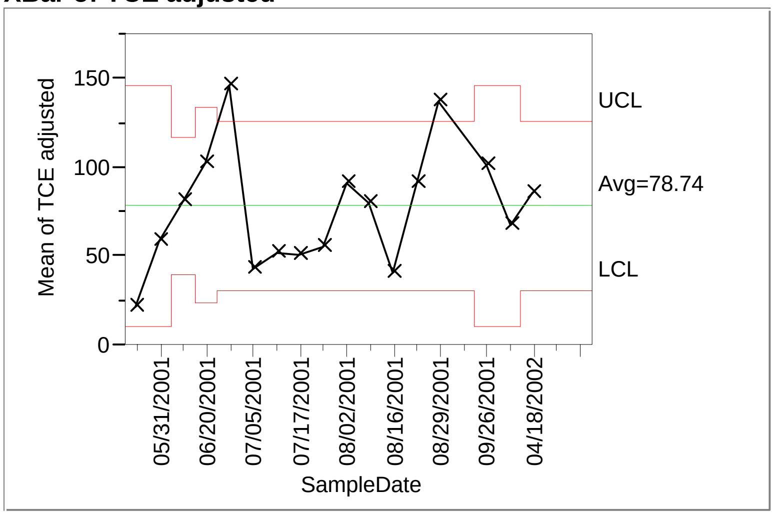
Table B-4 (Cont.)

Location=8, Side=H
XBar of TCE adjusted



Note: Sigma used for limits based on range.

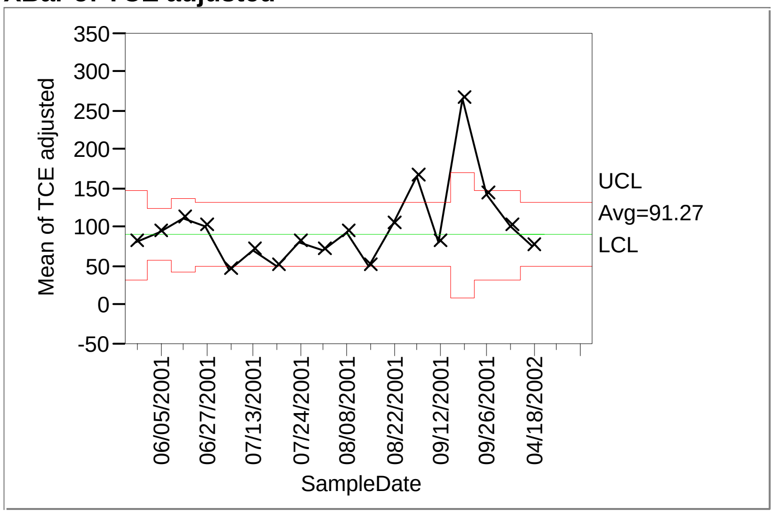
Location=8, Side=NH
XBar of TCE adjusted



Note: Sigma used for limits based on range.

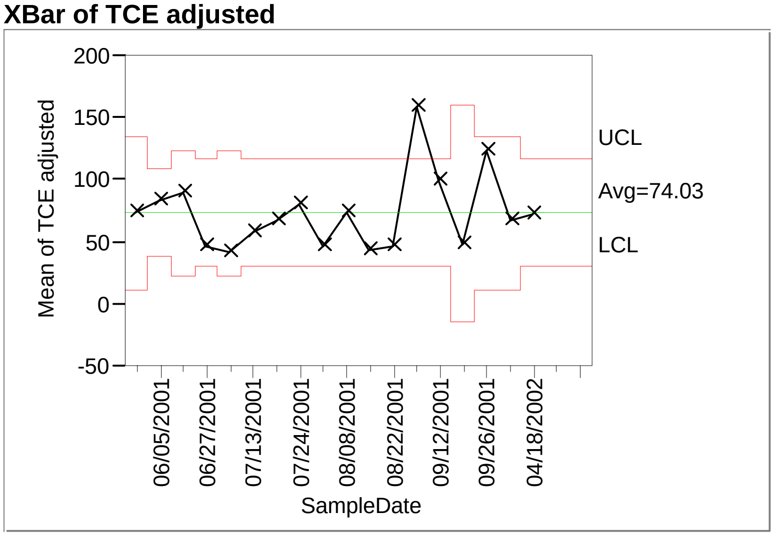
Table B-4 (Cont.)

Location=9, Side=H
XBar of TCE adjusted



Note: Sigma used for limits based on range.

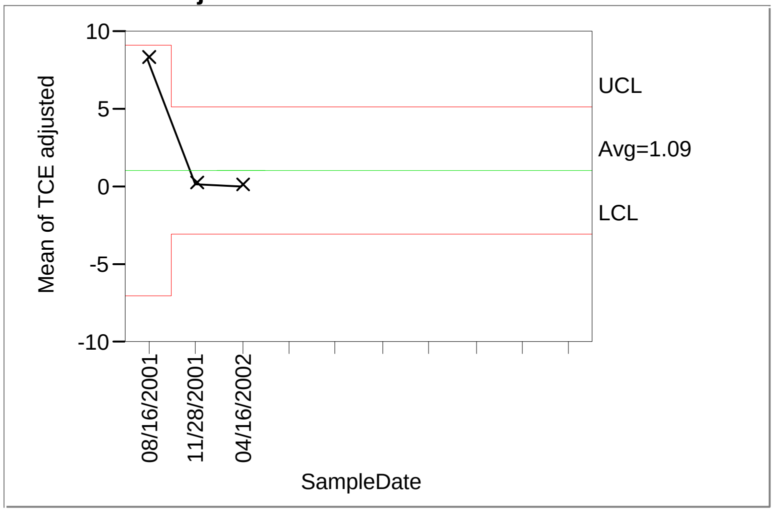
Location=9, Side=NH
XBar of TCE adjusted



Note: Sigma used for limits based on range.

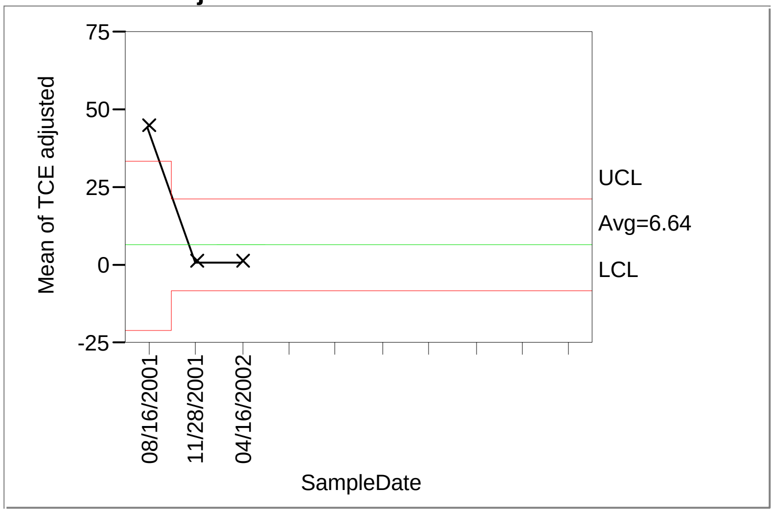
Table B5: There is no consistent pattern of TCE buildup in the soil over the course of the study?
(Soil Samples)

Location=4
XBar of TCE adjusted



Note: Sigma used for limits based on range.

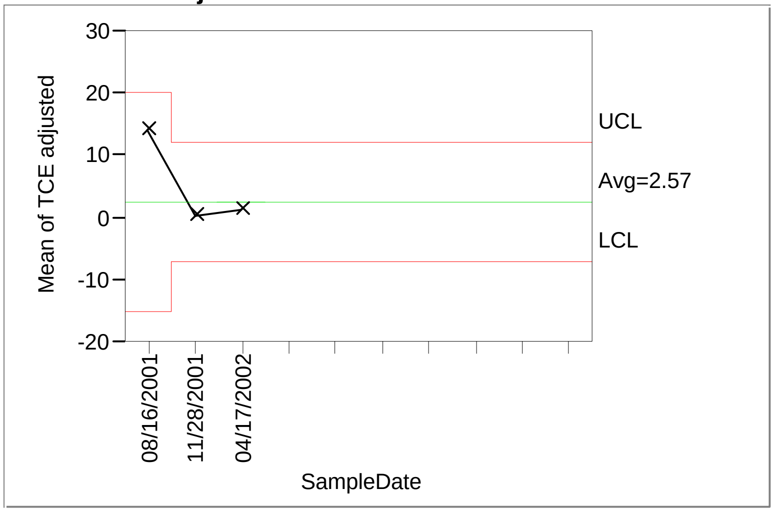
Location=5
XBar of TCE adjusted



Note: Sigma used for limits based on range.

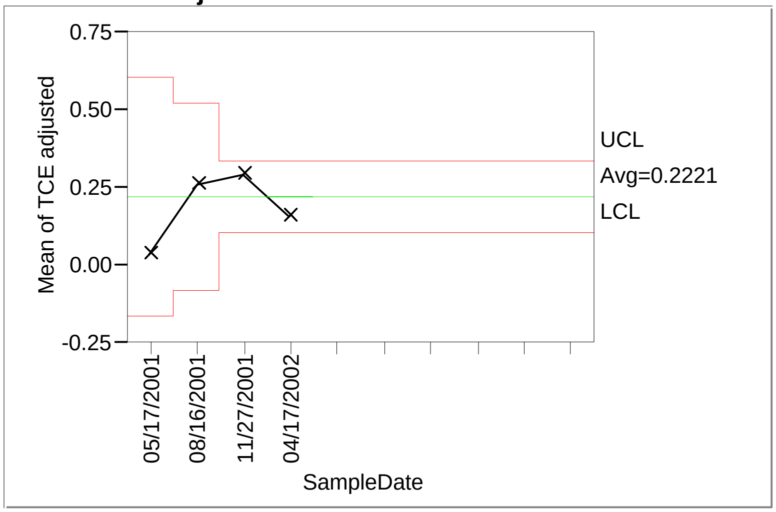
Table B5 Continued

Location=6
XBar of TCE adjusted



Note: Sigma used for limits based on range.

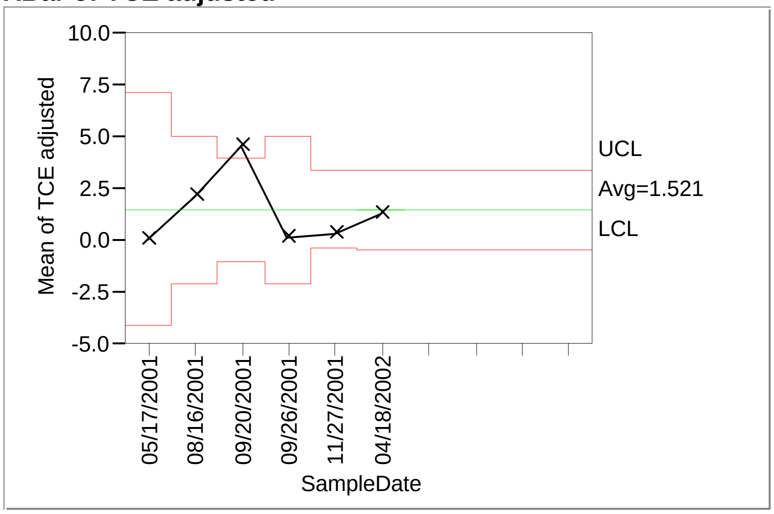
Location=7
XBar of TCE adjusted



Note: Sigma used for limits based on range.

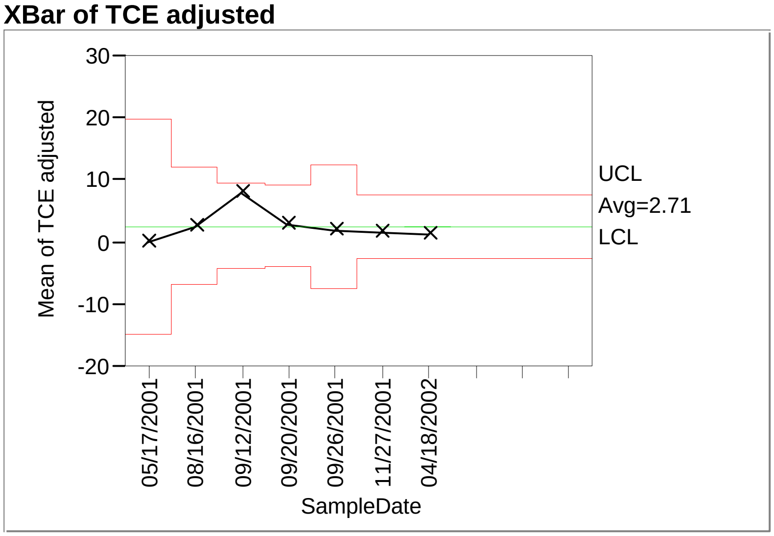
Table B5 Continued

Location=8
XBar of TCE adjusted



Note: Sigma used for limits based on range.

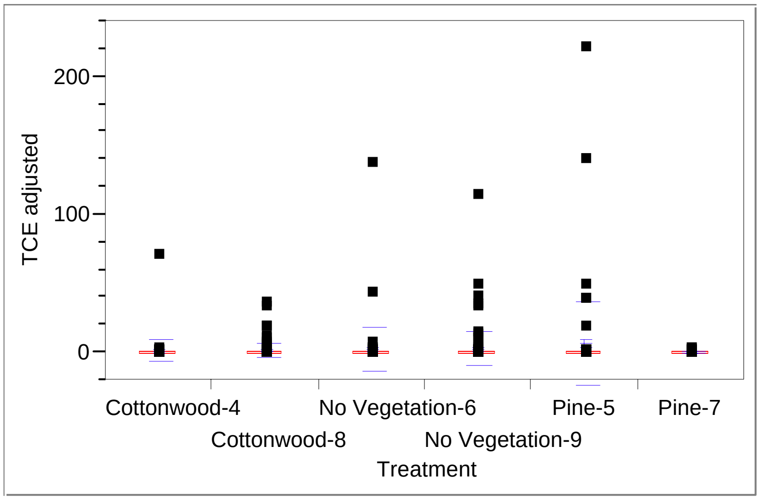
Location=9
XBar of TCE adjusted



Note: Sigma used for limits based on range.

Table B6: There are no significant differences in soil concentrations of TCE, PCE or c-DCE in relation to plot treatment (pine, cottonwood, and no vegetation)?
(Soil Samples)

TCE



TCE Quantities

Level	Minimum	10%	25%	Median	75%	90%	Maximum
Cottonwood-4	0	0	0	0.25	0.25	0.25	71
Cottonwood-8	0	0	0	0.25	0.375	1	36
No Vegetation-6	0	0	0	0.25	0.25	0.275	137
No Vegetation-9	0	0	0	0.25	0.25	2	113
Pine-5	0	0	0	0.25	0.25	0.4	220
Pine-7	0	0	0	0.25	0.25	0.35	2

TCE Means and Std Deviations

Level	Number	Mean	Std Dev	Std Err Mean	Lower 95%	Upper 95%
Cottonwood-4	77	1.08701	8.0759	0.9203	-0.746	2.920
Cottonwood-8	113	1.52099	5.2971	0.4983	0.534	2.508
No Vegetation-6	78	2.57179	16.1815	1.8322	-1.077	6.220
No Vegetation-9	129	2.71478	12.0741	1.0631	0.611	4.818
Pine-5	77	6.64091	30.3231	3.4556	-0.242	13.523
Pine-7	75	0.22209	0.3660	0.0423	0.138	0.306

PCE

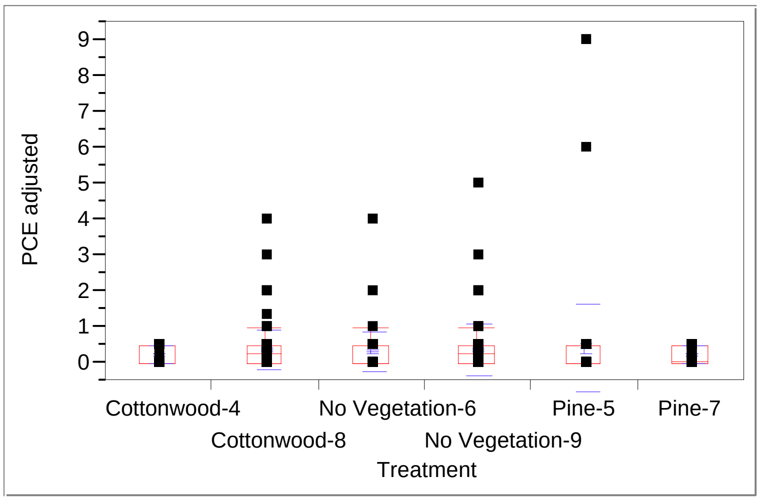


Table B6 Continued

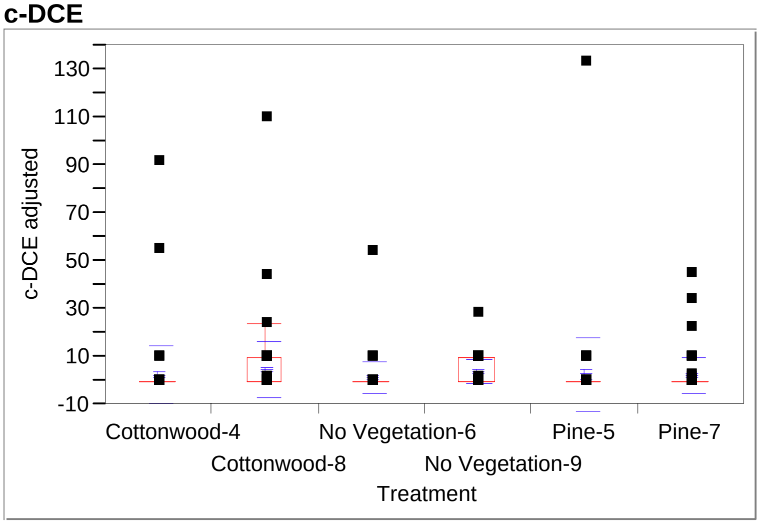
PCE Quantities

Level	Minimum	10%	25%	Median	75%	90%	Maximum
Cottonwood-4	0	0	0	0	0.5	0.5	0.5
Cottonwood-8	0	0	0	0.25	0.5	0.5	4
No Vegetation-6	0	0	0	0	0.5	0.5	4
No Vegetation-9	0	0	0	0.25	0.5	0.5	5
Pine-5	0	0	0	0	0.5	0.5	9
Pine-7	0	0	0	0.0355	0.5	0.5	0.5

PCE Means and Std Deviations

Level	Number	Mean	Std Dev	Std Err Mean	Lower 95%	Upper 95%
Cottonwood-4	77	0.224026	0.24863	0.02833	0.16759	0.28046
Cottonwood-8	113	0.364531	0.54989	0.05173	0.26204	0.46703
No Vegetation-6	78	0.301282	0.53658	0.06076	0.18030	0.42226
No Vegetation-9	129	0.369043	0.71019	0.06253	0.24532	0.49277
Pine-5	77	0.409091	1.21592	0.13857	0.13311	0.68507
Pine-7	75	0.238087	0.24495	0.02828	0.18173	0.29444

c-DCE



c-DCE Quantities

Level	Minimum	10%	25%	Median	75%	90%	Maximum
Cottonwood-4	0	0	0	0	0	0	91
Cottonwood-8	0	0	0	0	10	10	110
No Vegetation-6	0	0	0	0	0	0	54
O Vegetation-9	0	0	0	0	10	10	28
Pine-5	0	0	0	0	0	2	133
Pine-7	0	0	0	0	0	10	45

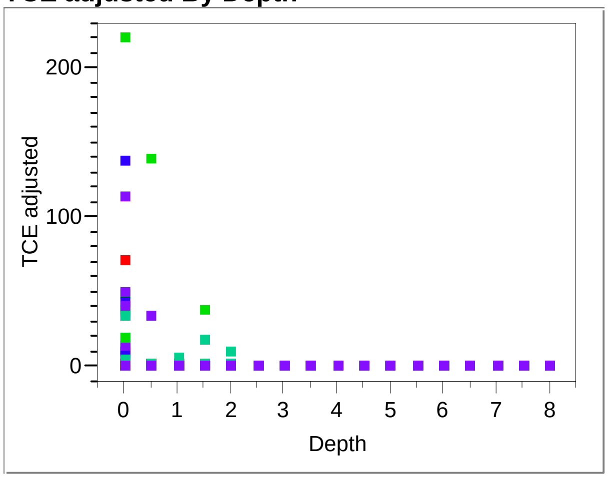
c-DCE Means and Std Deviations

Level	Number	Mean	Std Dev	Std Err Mean	Lower 95%	Upper 95%
Cottonwood-4	77	2.41558	12.1702	1.3869	-0.347	5.1779
Cottonwood-8	112	4.67857	11.8434	1.1191	2.461	6.8961
No Vegetation-6	78	1.20513	6.4493	0.7302	-0.249	2.6592
No Vegetation-9	129	3.74031	5.2187	0.4595	2.831	4.6495
Pine-5	77	2.50649	15.3062	1.7443	-0.968	5.9806
Pine-7	75	2.09333	7.2119	0.8328	0.434	3.7526

Table B7: Constituents by Depth of Sample

Soil Samples

TCE adjusted By Depth



PCE adjusted By Depth

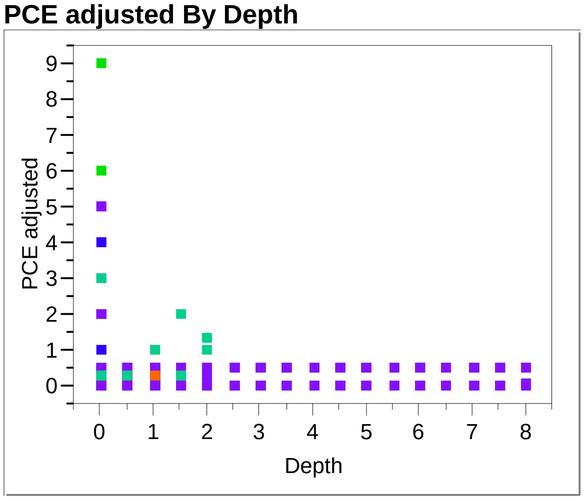


Table B7 Continued

Bivariate Fit of c-DCE adjusted By Depth

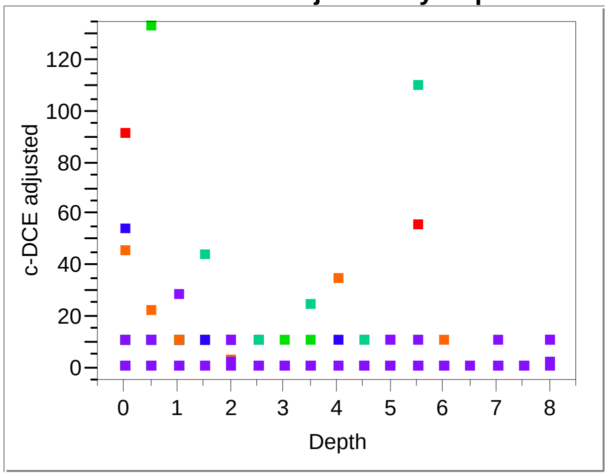
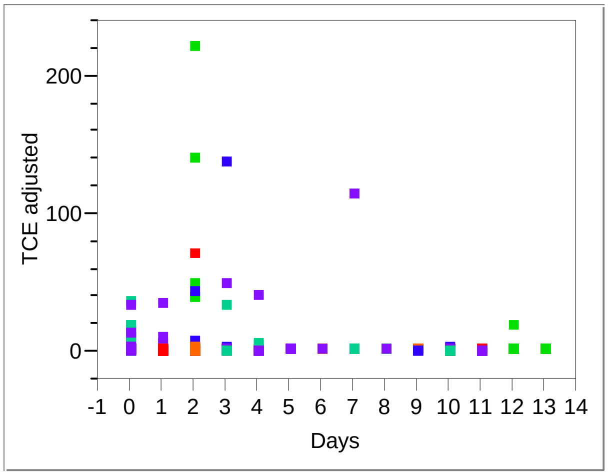


Table B8: Number of Days between Sample and Analysis

Martix=soil



Martix=water