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Via Email and U.S. Mail

April 5, 2011

Mr. Steve Tarlton, Manager
Radiation Management Unit
Hazardous Materials and Waste Management Division
Colorado Department of Public Health and Environment
4300 Cherry Creek Drive South
Denver, Colorado 80246-1530

Subject: March 21, 2011 Letter from CDPHE
Re: TCE in Groundwater

Dear Mr. Tarlton:

As directed, please find enclosed Cotter Corporation (N.S.L.)'s work plan for determining the extent and degree of trichloroethene found in groundwater both on and off the facility Restricted Area at the Cañon City Milling Facility.

If you or your staff has any questions please contact Jim Cain or me.

Sincerely

John S. Hamrick
Vice President, Mill Operations

Enclosure

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Nature and Extent Investigation for Volatile Organic Compounds
Cotter Corporation (N.S.L.) Cañon City Milling Facility

INTRODUCTION

An investigation is proposed to evaluate the nature and extent of Volatile Organic Compounds (VOCs) that may be under the property of the Cotter Corporation (N.S.L.) (Cotter) Cañon City Milling Facility (CCMF) located in Fremont County, Colorado. Specifically, trichloroethene (TCE) was identified above the Maximum Contaminant Level (MCL) for that constituent in four of eleven monitor wells during a sampling event conducted in February 2011. All four wells are located within Cotter's property boundary. No substantive amounts of TCE have been used at the facility since a brief period from late 1983 to early 1984 when it was used to remove poly chlorinated biphenyl contamination from milling materials. There are no records of a spill or release of TCE at the CCMF. This plan is developed to further investigate the nature and extent of TCE at the CCMF and surrounding areas and to identify a source area, if such identification is possible.

BACKGROUND

Identification of elevated TCE was the result of a sampling event conducted by Cotter in October 2010 to determine if trihalomethanes (THMs) were present in groundwater beneath the property located directly north and west of the CCMF. The purpose of the initial sampling was to determine if THMs could have dissolved naturally occurring uranium from the Shadow Hills Golf Course soils. THMs are often the byproduct of chlorination of water supplies. Results of the THM sampling are shown on Figure 1. The data collection was intended to support an investigation into the nature and extent of elevated levels of uranium in the area north and west of the CCMF. Eleven wells were sampled as part of that effort. During analysis of the samples, the laboratory noted interferences due to the presence of TCE in samples collected from monitor wells 802 and 346. The TCE levels indicated by the laboratory exceeded the EPA MCL of 5 micrograms per liter (ug/l). The TCE concentrations reported by the laboratory were only considered estimates, because the samples required dilution in order to analyze for the target analytes THMs, and the TCE results were not in calibration range.

Resampling of monitor wells 802 and 346 in February 2011 and sampling of three additional monitor wells confirmed the presence of TCE at elevated levels in groundwater. The measured TCE concentrations are shown on Figure 2. TCE was not detected in a monitor well potentially located upgradient of the CCMF (well 024). The highest TCE concentration occurs in well 802 which is west of, and hydraulically cross gradient from, all milling activities. The source area of the elevated TCE is unknown.

HISTORICAL USE OF TCE AT THE CCMF

There are two known uses of TCE at the CCMF. One was for the removal of polychlorinated biphenyls from milling materials in late 1983 into early 1984. Milling solids and adjacent soils in the old mill float plant became contaminated from leakage of polychlorinated biphenyl heating oil from a holoflite dryer used in the recovery of source material. TCE was used to strip the

polychlorinated biphenyl from the solids. The solids were shipped to a disposal facility and the recovered polychlorinated biphenyl were shipped offsite for thermal destruction. The locations of the TCE use were in the bay of the grind and leach building (pre-mixing of the milling materials with TCE) and in the catalyst plant (TCE washing of the milling materials).

Secondly, very small amounts of TCE were used as a Hypalon® cleaning agent when patching of impoundment liners was required. This use likely started in 1978 and was discontinued in 2006 when xylene was substituted for TCE. This use is unlikely to have impacted groundwater as the TCE was applied to the liner surface as a cleaning agent and allowed to evaporate before proceeding with the liner repair. TCE was not disposed of at the property, and there are no areas of the site where surface contamination of TCE is known to have occurred.

The current distribution of TCE in groundwater, based on the available data, is shown on Figure 2. The highest TCE levels from the recent sampling round were detected at monitor well 802 and generally decrease to the northeast. Monitor well 802 is located over 450 feet west of the Restricted Area. Well 802 is located west of and across the Sand Creek drainage from the Mill Area. There are no visible ground disturbances from aerial photographs that suggest the area of well 802 was used for storage of materials of any type. Well 802 appears to be hydraulically cross-gradient from the Mill Area based on available potentiometric surface data.

PROPERTIES OF TCE

Trichloroethene (also commonly called trichloroethylene) is one of a group of chemicals known as volatile organic compounds which readily evaporate at room temperature. TCE is a nonflammable, colorless manufactured liquid with a somewhat sweet odor and sweet burning taste. TCE is heavier than water, having a density of 1.46 gm/cc at 20 C^o. It is also very soluble in water (1.260 gm/l at 25 C^o).

TCE is a chlorinated solvent that was widely used in dry cleaning businesses and by industry for metal degreasing and is now a common contaminant at hazard waste sites and many federal facilities. Besides being used for degreasing, TCE has been used as an extractant and as a chemical intermediate.

PROPOSED INVESTIGATION

Because groundwater is the only current pathway for potential exposure, this investigation targets that media to determine the extent of impacts. An extensive monitoring network already exists at the CCMF and surrounding areas. A phased approach is proposed for sampling groundwater to determine the extent of offsite impacts (if any) and the distribution of elevated TCE onsite. The existing monitoring network will be utilized for the initial phase of the investigation. The monitoring well network is shown on Figure 3.

Sample Locations

Monitoring wells selected for the initial phase of sampling are shown on Figure 4. A total of 23 wells are proposed for VOC analysis. Monitoring locations are focused on the following areas:

- Wells nearest to those identified with elevated TCE in the February 2011 sampling event, including: 037, 045, 046, and 047;

- Wells located apparently upgradient or cross gradient from those identified with elevated TCE, including: 035, 036, 358 and 385;

- Wells located along the predominant groundwater pathway toward the SCS Dam, including: 804, 336, 333, 021, 005, 331, 051 and 006;

- Wells located in the area north and west of CCMF (Shadow Hills Course), including: 803, 009, 805, 806, and 043; and

- Wells located within Lincoln Park, i.e., 019 and 020.

Additional sampling of monitor locations may be conducted depending on the results of this phase of investigation.

Analytical Method

Samples will be submitted to a qualified contract laboratory for analysis of VOCs by EPA Method 8260B.

Sampling Method

Groundwater samples will be collected from each of the designated monitoring wells using Cotter's standard water quality sampling protocols established in the Remedial Action Plan, Radiological Program Plan Procedures, and the Quality Assurance Program Plan. One modification may be implemented in the method of collecting the samples with respect to purging of the well prior to sampling. Low-flow sampling techniques as described below may be substituted for the method of purging of three casing volumes of water from the well to be sampled.

Low-flow sampling techniques may be used in order to minimize purge water generation, minimize well drawdown and minimize volatilization of the collected sample. If low flow is the selected method of sampling, the protocol will be as follows:

- Prior to purging and sampling, a static water level will be measured and recorded from the top of the well casing. Another water level will be measured and recorded once the pump is placed in the well prior to low-flow purging. A final water level will be measured and recorded after sampling was completed.

- Purging and sampling will be conducted using a suitable submersible pump capable of flow rates of less than 1,000 milliliter per minute (ml/min). The pump will be placed in each well within the screened interval. When practical, the pump will be placed in the well to a

depth such that a minimum of 10 feet of water is above the pump intake. Low-flow pumping rates will range from 200 to 1000 ml/min. These flow rates are approximately an order of magnitude lower than flow rates used in the previous sampling activities where a three casing volume purge goal was implemented.

- Temperature, pH, conductivity, and water level will be monitored and recorded during the purging and sampling process. Field parameters are to be collected at three to five minute intervals, once a steady low-flow rate was established. Field parameter measurements will be recorded until a minimum of three successive readings are recorded within 10 percent (or 0.1 pH units) reproducibility. After parameter stabilization, three 40-milliliter volatile organic analysis (VOA) vials will be collected from each well for VOC analysis.

- Decontamination procedures consist of an Alconox wash through and over the pump, and a deionized water rinse of the pump and all field equipment. Decontamination will be performed prior to the start of a sampling event, and prior to sampling at each well. All purge water and decontamination water generated during the sampling will be containerized in 55-gallon drums or suitable storage container, and labeled as to the contents (including well sampled, date of sampling and approximate volume of fluids). If TCE is determined to be a mill-derived material, all investigation-derived liquids will be disposed in on-site impoundments for evaporation.

QUALITY ASSURANCE AND QUALITY CONTROL

Field quality control will be monitored through collection of equipment blanks, trip blanks, and field duplicates. Laboratory quality control will be monitored through evaluation of matrix spikes, laboratory control samples, surrogate spikes, and blanks. Results from these analyses are assessed during the investigation to monitor precision and accuracy, as described in the following sections.

Field Quality Control

Trip blanks will be provided by the laboratory conducting the analysis. The trip blanks will accompany the sample bottles from the laboratory to the sampling site and will be returned to the laboratory for analysis along with the samples. Trip blanks are designed to assess the introduction of cross-contamination during sample bottle shipment, storage, sample collection, preparation, and analysis. Trip blanks are used to assess potential sample bias, and are, therefore, part of the evaluation of analytical accuracy. Trip blanks are prepared by the analytical laboratory from ultra-pure and organic-free water. One trip blank should be included in the bottle shipment to the Site with each cooler that contains sample bottles for analysis of VOCs.

An equipment blank will be collected during each full day of sampling by running laboratory-supplied, organic-free water through the tubing and the pump system. The equipment blank will be collected after pump decontamination following sampling activities at selected wells. Equipment blanks are collected to monitor decontamination procedures, as well as any ambient contamination that may be introduced into samples during sampling. Results from equipment blanks are used to assess bias and accuracy. When used in conjunction with the results from trip blanks and laboratory method blanks, results from equipment blanks can be used to isolate

potential bias and variability in the sampling process. Equipment blanks are handled in the field in the same manner as field samples.

Field duplicate samples will be collected to measure the combined precision of the sampling procedures and laboratory analysis. Field duplicates will be collected at a frequency of approximately one per every ten wells sampled. The field duplicate sample will be collected at the same time and using the same protocols as the primary sample. The field duplicate sample will be "blind" (i.e., given a sample identifier in the Chain-of-Custody (COC) unrelated to the primary sample), and will be recorded in the field logs.

All samples will be placed on ice immediately after sample collection, and will be maintained on ice through sample shipment and delivery to the laboratory. Samples will be collected such that no air bubbles are present in the sample vials. Per CDPHE guidance, samples collected for analysis of VOCs will not be preserved with acid, thus removing the potential for reactions between the acid and groundwater matrix. Samples will be placed in coolers with the tops facing down (inverted) to minimize potential losses of VOCs through the sample caps.

A COC form will serve as the request for analysis and will also document sample custody and traceability from sample collection through receipt of the samples by the laboratory. COCs are important documents and must be carefully reviewed for correctness against sample labels and requested analytical methods before samples are submitted to the laboratory. The following information should be included during the preparation of each COC form:

- Sampling location and Site name;
- Sample identification number;
- Sample collection date and time (time is omitted for blind duplicate samples);
- Sample matrix type;
- Parameters requested and methods of analysis;
- Sample container type, volume, and preservation method;
- Samplers names and affiliation;
- Shipping cooler number (if applicable);
- Common carrier name (if applicable);
- Date shipped to laboratory;
- Any special instructions or notes;
- Contact name and phone number; and
- Signature of person relinquishing custody with date and time.

All COC forms received by the laboratory must be signed and dated by the laboratory custodian. A copy of the signed original COC form will be provided by the laboratory as part of the analytical report package. The sample custodian should note the condition of samples received, the temperature of the samples, and the dates of sampling. These observations will be used to ensure that the laboratory can meet required holding times. The condition of the samples received and any anomalies noted regarding the sample receipt should be documented by the laboratory and reported in a narrative summary provided with the analytical reports.

Laboratory Quality Control

The laboratory will provide results of quality control sample analyses that document analytical precision and accuracy. These analyses include matrix spike (MS) and matrix spike duplicates (MSD), laboratory control sample (LCS) and laboratory control sample duplicates (LCSD), surrogate spikes, and laboratory blanks. Results of these analyses will be assessed against the laboratory control limit provided.

MS and MSD results provide a measure of precision and accuracy in an actual field sample matrix. Whenever possible, it is preferred that MS and MSD analyses should be performed on site-specific investigation samples (rather than on laboratory batch samples which may not represent the location, chemistry, or matrix of the site samples). If project-specific MS/MSD analyses are required, sufficient sample volume must be provided to the laboratory so that the sample selected for spiking can be analyzed at least three times (original analysis, MS analysis, and MSD analysis).

LCS and LCSD results provide a measure of precision and accuracy for the sample method, without any influence of sample matrix. LCS recoveries must be in control to demonstrate that they laboratory analyses and procedures are functioning properly.

Surrogates are organic compounds similar to the target analytes in chemical composition and behavior in the analytical process, but which are not normally found in environmental samples. Surrogates will be added to all samples, controls, and blanks, in accordance with the method requirements. When the recovery of a surrogate is outside the acceptance limits, the laboratory must perform corrective actions in accordance with its Standard Operating Procedures. Re-extractions, if necessary, will be done within the holding times.

Laboratory method blanks are evaluated to determine if there is any bias present in the analytical system. Target VOCs should not be detected in any method blanks at concentrations exceeding reporting limits. If VOCs are detected in method blanks at concentrations less than reporting limits, but greater than method detection limits (which are typically three-ten times less than reporting limits), evaluation will be performed to determine if sample results are biased due to laboratory contamination.

All sample preparation and analysis shall be completed within the method-required holding times. For the VOC analyses, the holding time is 14 days from the time of sample collection.

Data Review

All final laboratory results will be reviewed to document the quality of the data presented in terms of the precision and accuracy metrics described above. Any quality control deviations that results in potential impacts to data quality will be discussed with the report of findings for the groundwater investigation.

INVESTIGATION RESULTS REPORTING

Results of the VOC sampling investigation will be included in a summary report. The summary report will include all laboratory analytical reports, a tabulation of all analytical results, maps illustrating the distribution of VOCs, and a site conceptual model of the source (if identified) and migration pathway for TCE at the site. Recommendations for additional investigation will be prepared, as needed, based on the results of the groundwater sampling to further characterize the nature and extent of TCE impacts. The summary report will be provided within 45 days of receiving all analytical reports for VOC analysis from the laboratory.

SCHEDULE

A tentative schedule for completion of the sampling analyses and reporting is provided below.

- Initiate groundwater sampling - May 5, 2011
- Complete groundwater sampling - May 20, 2011
- Receive Laboratory Analyses - June 10, 2011
- Submit Summary Report - July 11, 2011

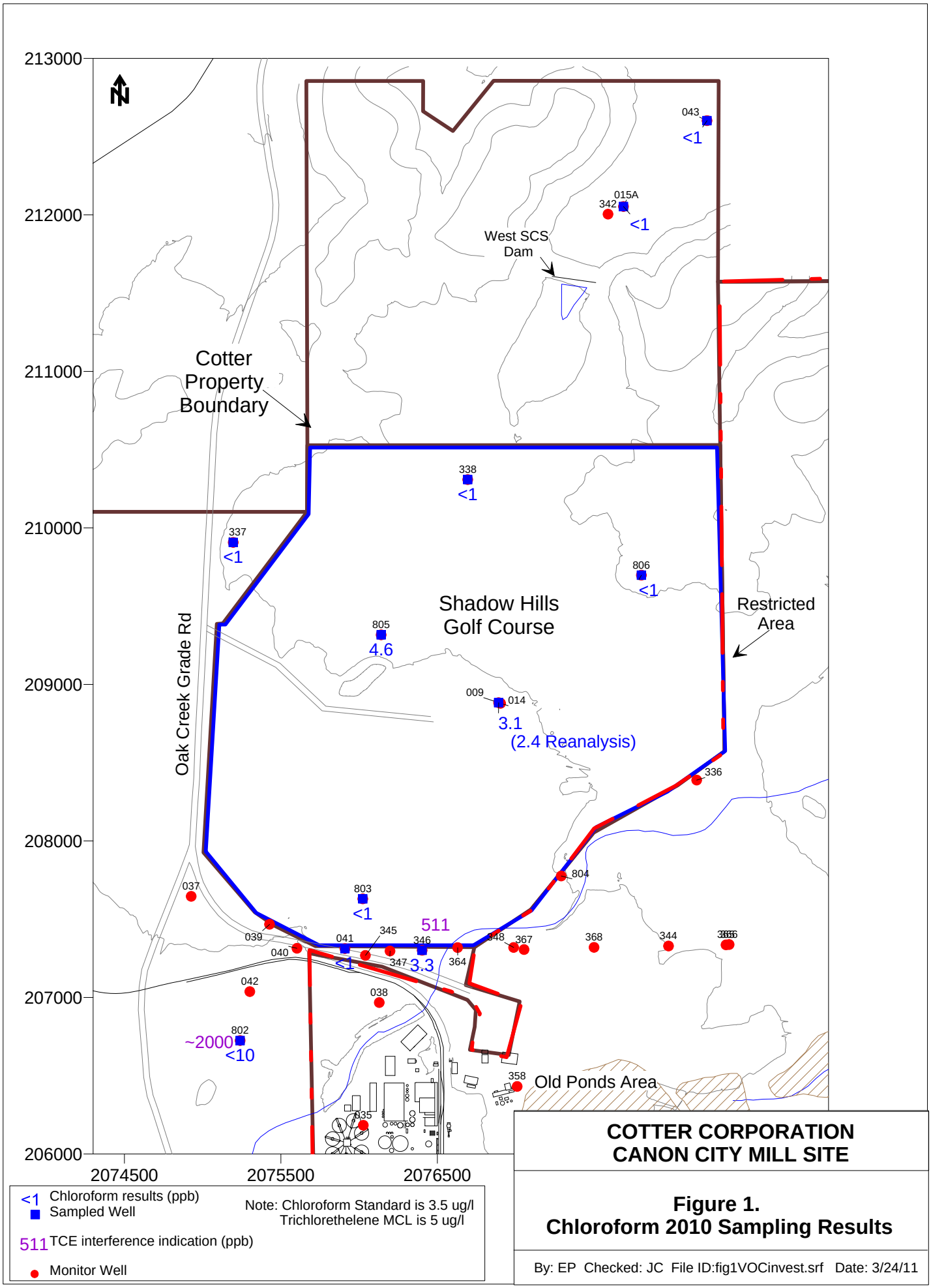

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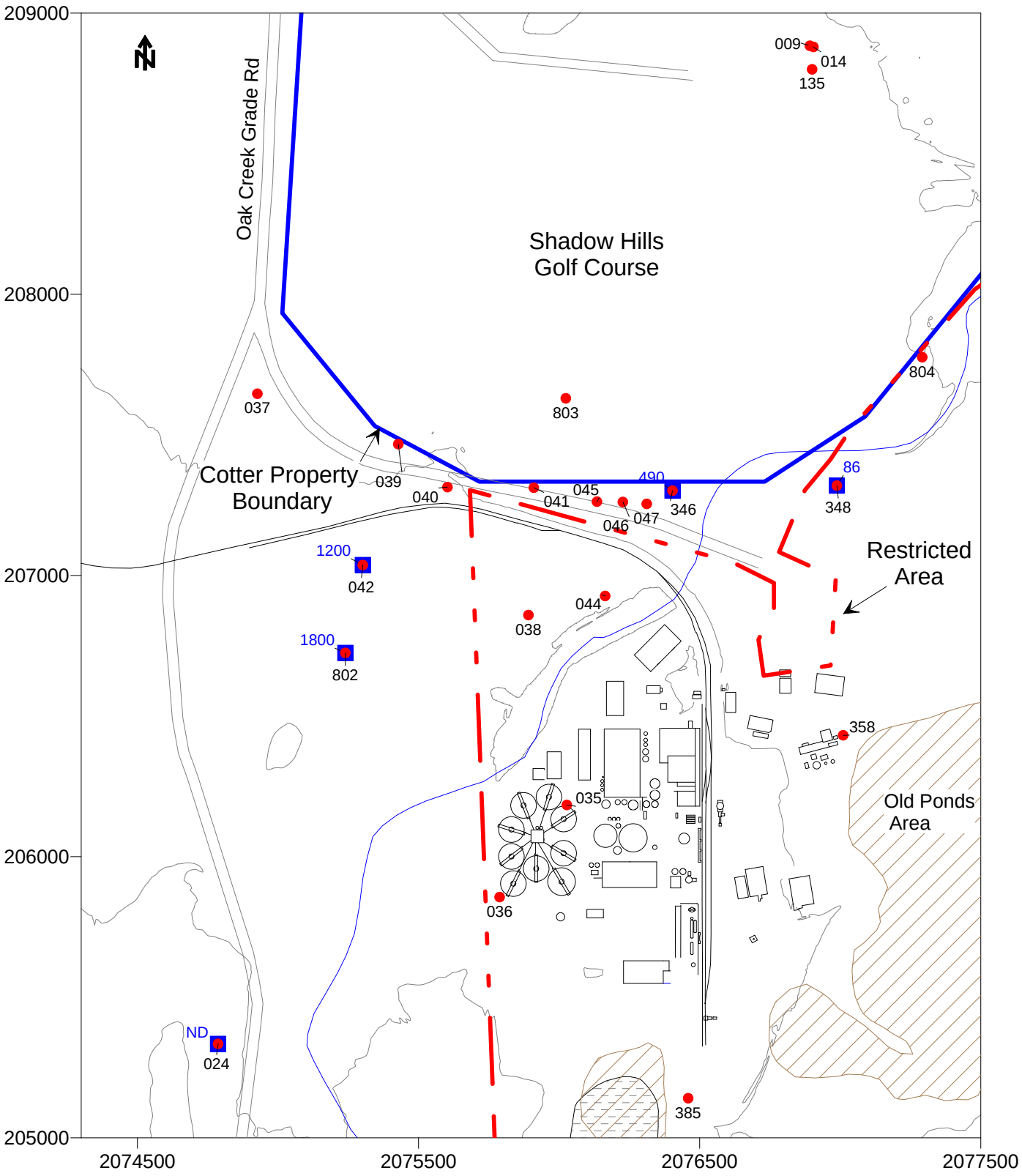
Figure 1.
Chloroform 2010 Sampling Results

By: EP Checked: JC File ID:fig1VOCinvest.srf Date: 3/24/11



Monitor Well

86 Trichloroethene results (ug/L)
Sampled Well

Note: TCE MCL is 5 ug/l

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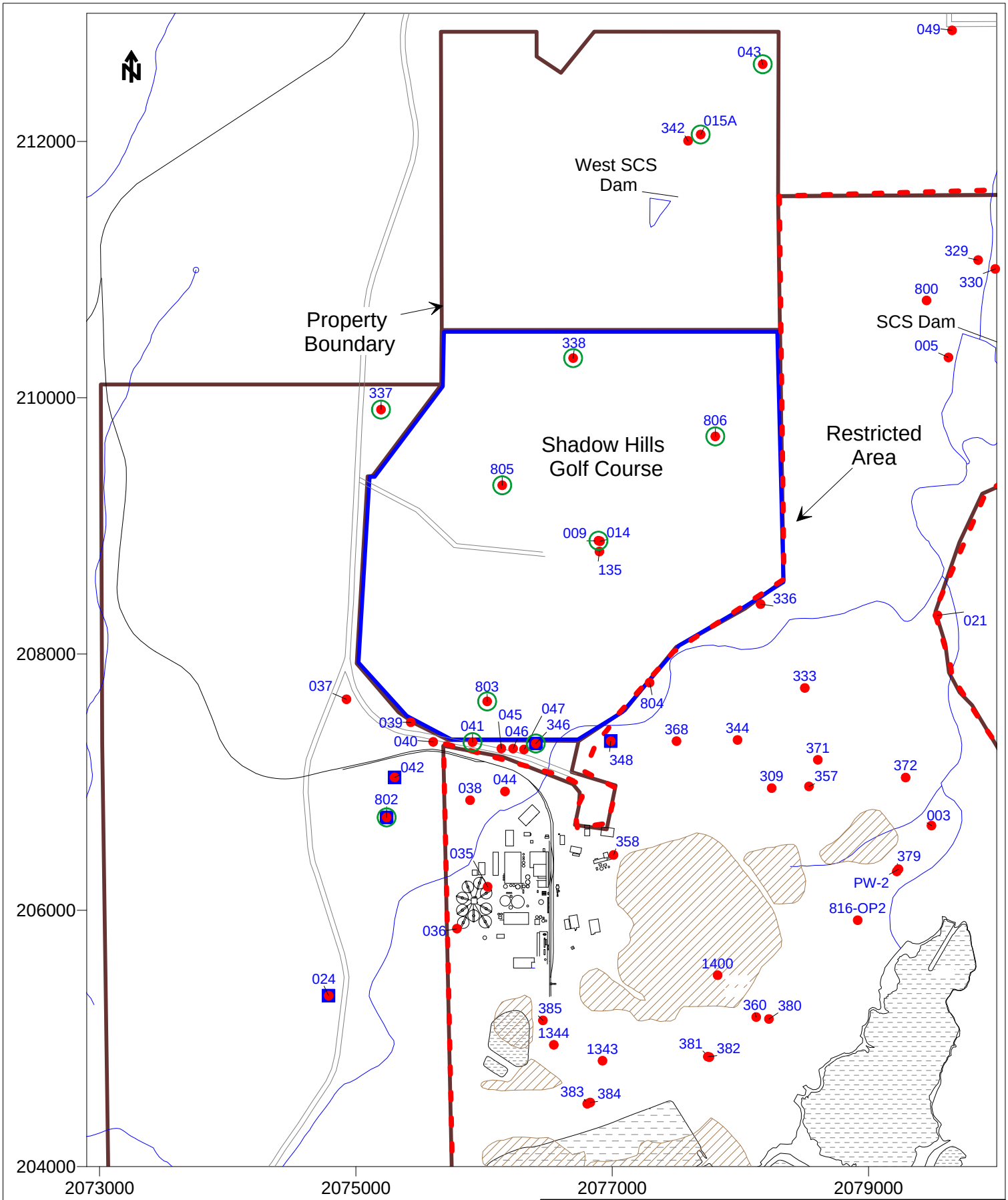
Figure 2. Trichloroethene
February 2011 Sampling Results

By: EP Checked: WH File ID:fig2VOC.srf Date: 3/24/11



037 Monitor Location

Sampled for TCE 2/2011

Sampled for THM 10/2010

Impoundments

Historic

Current

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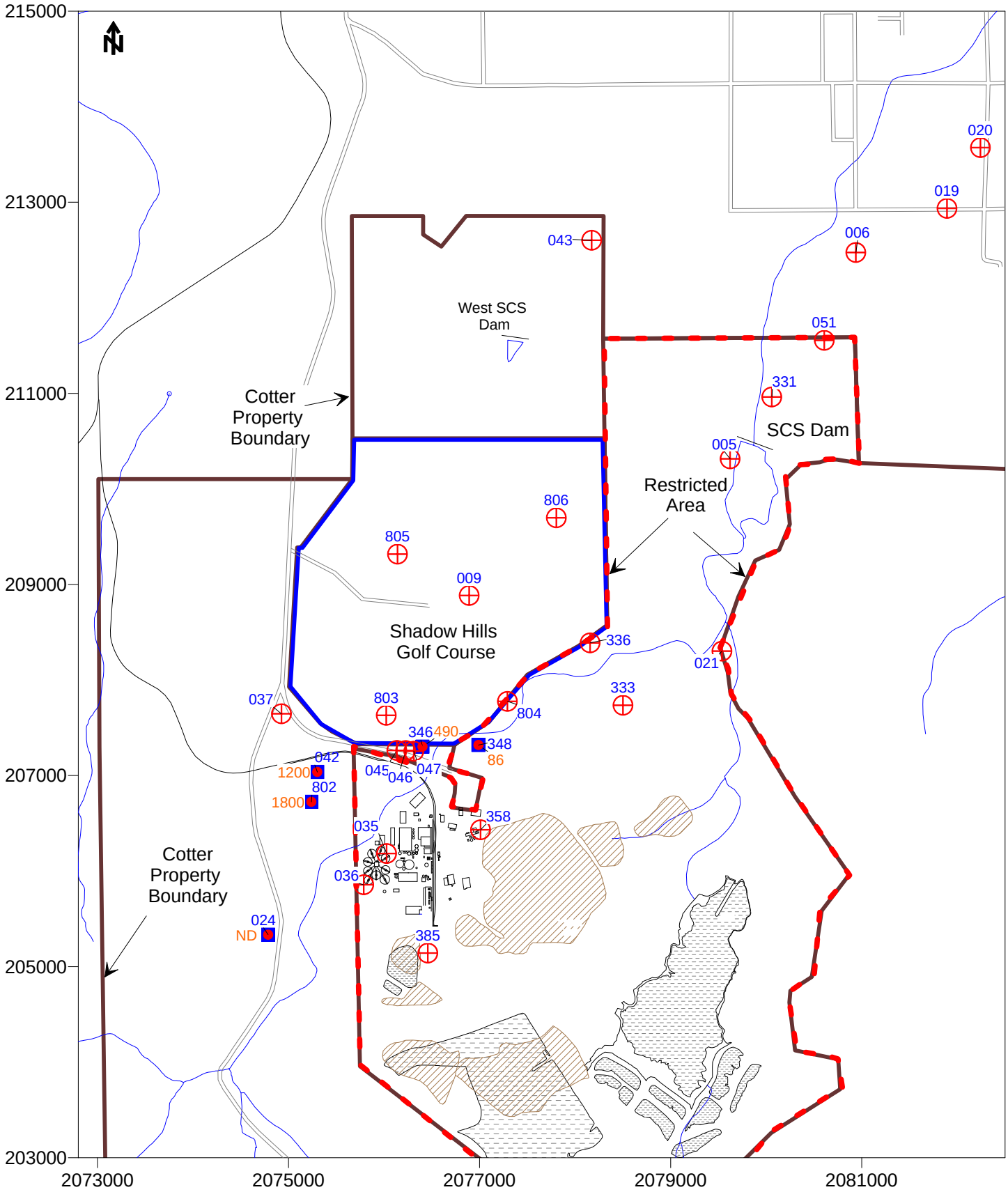
Figure 3
Groundwater Monitoring Locations

By: EPL Checked: JC File ID:fig3GWMP.srf Date:3/24/11



86 TCE Concentration 2/2011

037 Proposed TCE Sample Location

Impoundments

Historic

Current

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Figure 4.
Proposed TCE Sampling Locations

By: EPL Checked: JC File ID:fig4GWMP.srf Date:3/24/11