LMS/PIN/N01628

Pinellas County, Florida, Site Environmental Restoration Project

Sitewide Environmental Monitoring Semiannual Progress Report for the Young – Rainey STAR Center

December 2010 Through May 2011

June 2011

U.S. DEPARTMENT OF ENERGY | Legacy Management

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Abbreviations

cDCE	*cis*-1,2-dichloroethene
CMIP	Corrective Measures Implementation Plan
CMS	Corrective Measures Study
CMT	continuous multichannel tubing
COPC	contaminant of potential concern
CTL	cleanup target level
DCE	dichloroethene
DHE	*Dehalococcoides ethenogenes*
DOE	U.S. Department of Energy
EMS	Environmental Management System
EPA	U.S. Environmental Protection Agency
F.A.C.	*Florida Administrative Code*
FDEP	Florida Department of Environmental Protection
ft	feet (foot)
HSWA	Hazardous and Solid Waste Amendments
IC	Institutional Control
IWNF	industrial wastewater neutralization facility
LDA	large-diameter auger
LM	Office of Legacy Management
MCL	maximum contaminant level
µg/L	micrograms per liter
mg/L	milligrams per liter
NAPL	nonaqueous phase liquid
POTW	Publicly Owned Treatment Works
QA/QC	quality assurance/quality control
RBCA	Risk-Based Corrective Action
RCRA	Resource Conservation and Recovery Act
RFA	RCRA Facility Assessment
RPD	relative percent difference
STAR Center	Young - Rainey Science, Technology, and Research Center
SWMU	solid-waste management unit
TCE	trichloroethene

TCOPCs	total contaminants of potential concern
tDCE	*trans*-1,2-dichloroethene
VC	vinyl chloride
WWNA	Wastewater Neutralization Area/Building 200 Area

1.0 Introduction

The Young - Rainey Science, Technology, and Research Center (STAR Center) is a former U.S. Department of Energy (DOE) facility constructed in the mid-1950s in Pinellas County, Florida. The 99-acre STAR Center is located in Largo, Florida, and lies in the northeast quarter of Section 13, Township 30 South, Range 15 East (Figure 1). While it was owned by DOE, the facility primarily manufactured neutron generators for nuclear weapons. Other products manufactured at the STAR Center have included radioisotope-powered thermoelectric generators, thermal batteries, specialty capacitors, crystal resonators, neutron detectors, lightning-arrestor connectors, and vacuum-switch tubes. In 1987, the U.S. Environmental Protection Agency (EPA) performed a Resource Conservation and Recovery Act (RCRA) Facility Assessment (RFA) (EPA 1988) at the site to gather information on potential releases of hazardous materials. In February of 1990, EPA issued a Hazardous and Solid Waste Amendments (HSWA) permit to DOE, enabling DOE to investigate and perform remediation activities in those areas designated as solid-waste management units (SWMUs) contaminated by hazardous materials resulting from DOE operations.

On March 17, 1995, DOE sold the facility to the Pinellas County Industrial Council. The sales contract included clauses to ensure continued compliance with federal, state, and local regulations while DOE remediates the site. On July 1, 1999, the Pinellas County Industrial Council was disestablished, and ownership of the STAR Center changed to the Pinellas County Industrial Development Authority. In November 2000, the State of Florida received HSWA authorization from EPA. The Florida Department of Environmental Protection (FDEP) issued a new HSWA permit to DOE in January 2002. The permit was reissued on August 21, 2007, and was modified under the provisions of Section 403.722, Florida Statutes, and Chapters 62-4, 62-160, 62-730, 62-777, and 62-780, *Florida Administrative Code* (F.A.C.), to incorporate the Global Risk-Based Corrective Action (RBCA) regulations.

The administration of DOE activities at the facility is the responsibility of the DOE Office of Legacy Management (LM) in Grand Junction, Colorado. S.M. Stoller Corporation, a prime contractor to LM, provides technical support to DOE for remediation and closure of all active SWMUs on site.

The EPA RFA Report and the HSWA permit identified 15 sites at the former DOE facility that might have environmental contamination as a result of past activities. Upon completion of the RCRA Facility Investigation (DOE 1991a), 11 of the 15 SWMUs were recommended by DOE and approved by EPA Region 4 and FDEP for no further action (DOE 1994). A twelfth site, the Former Pistol Range Site, was remediated in 1993; it was recommended by DOE, and approved by EPA Region 4 and FDEP, for no further action.

Two additional SWMUs, the West Fenceline Site and the Wastewater Neutralization Area/ Building 200 Area (WWNA), were identified after the HSWA permit was issued, bringing the total to 17 SWMUs that have been identified and investigated at the STAR Center. The remediation of the West Fenceline Site was completed in 1997, and DOE recommended—and EPA Region 4 and FDEP approved—no further action, for a total of 13 SWMUs remediated. A Corrective Measures Study (CMS)/Corrective Measures Implementation Plan (CMIP) was prepared and submitted in 1997 to EPA Region 4 and FDEP to address the contamination at the WWNA.

Therefore, four active SWMUs currently exist at the STAR Center. These four SWMUs are the Old Drum Storage Site (PIN06), the Industrial Drain Leaks-Building 100 Area (PIN12), the Northeast Site (PIN15), and the WWNA (PIN18). Two SWMUs, PIN06 and PIN12, are collectively known as the Building 100 Area. Figure 2 depicts the location of the four SWMUs.

DOE plans to proceed with closure of the WWNA under RBCA Risk Management Option IID and to apply the default poor quality arsenic cleanup target level (CTL) of 100 micrograms per liter (µg/L) to on-site groundwater. Closure monitoring was completed in October 2006. A No Further Action with Controls Proposal for the site was approved by FDEP in May 2007. Acceptance of this closure proposal by FDEP indicates that both soil and groundwater cleanup are complete. Closure of the site can be finalized once Institutional Controls (ICs) are implemented.

DOE is working with the landowner (Pinellas County Industrial Development Authority) to establish ICs at the STAR Center that will (1) restrict future land use to nonresidential purposes, (2) prohibit the installation of shallow wells for groundwater use, and (3) limit the depth of excavations. Once ICs are in place, there will be no potential for current or future exposure to contaminated groundwater. ICs will need to be established and approved by FDEP before a formal No Further Action determination can be made. Currently, DOE is working with the STAR Center in the development of a covenant that incorporates the ICs that will then become part of DOE's Long-Term Surveillance and Maintenance Plan at this site.

Additional background information relative to each SWMU is briefly described below. This document also serves as the semiannual progress report for each of these four SWMUs. The results of monitoring activities and a summary of ongoing and projected work are provided in this report.

1.1 Building 100 Area

The Building 100 Area is made up of two SWMUs: the Industrial Drain Leaks/Building 100 (PIN12) and the Old Drum Storage Site (PIN06). The Old Drum Storage Site lies beneath and adjacent to the northwest corner of the main building that covers approximately 11 acres, located near the southeast corner of the STAR Center (Figure 2). Building 100 is the most notable feature of the STAR Center, having housed the majority of the laboratory and production facilities during DOE ownership of the facility. One source of contamination at the Building 100 Area is leaks from a liquid waste drain system composed of individual drainage systems previously used for health physics, chemical, sanitary, and storm-water systems. The drain systems were flushed, grouted, and abandoned by 1997, and some of the chemical drain systems were replaced by an aboveground system (DOE 1997b).

Located at the northwest corner of the Building 100 Area is the Old Drum Storage Site, which is the former location of a concrete storage pad. This area was equipped with a drain and containment system and was once used to store hazardous waste. The waste stored at this location included methylene chloride, ignitable liquids, arsenic, and calcium chromate solids. Empty drums containing residual waste solvents also were stored in this area.

A RCRA Facility Investigation was conducted in 1991 at the Pinellas Plant to fulfill the requirements of the HSWA permit, and a RCRA Facility Investigation report was produced in 1991. A subsequent report addendum was completed in March 1992. Based on the findings in these two documents, in accordance with the HWSA permit, EPA notified DOE of the requirement for a CMS for the Old Drum Storage Site and the Industrial Drain Leaks/Building 100 SWMU.

The CMS report for the Industrial Drain Leaks/Building 100 and the Old Drum Storage Site proposed remediation of these two SWMUs together (collectively referred to as the Building 100 Area). The report was submitted to EPA and was subsequently approved on June 9, 1994. FDEP approved the CMS report on January 18, 1995.

The CMS report concluded that pump-and-treat with the existing air-stripping system was the preferred corrective measure for the Building 100 Area. This conclusion was based on shallow monitoring well data that suggested contamination was confined to shallow groundwater at the northwest corner of the building. However, that characterization was later found to be incomplete. Two recovery wells were installed at the northwest corner of the building in 1995. The *Building 100 Corrective Measures Implementation Plan* (DOE 1996a) describes the installation of the wells and the operations and monitoring plan.

These recovery wells, PIN12-RW01 and -RW02, extracted groundwater and pumped the water through secondary containment piping to the Northeast Site treatment system for pretreatment, air stripping, and discharge to the STAR Center industrial wastewater neutralization facility (IWNF) prior to transfer to the Publicly Owned Treatment Works (POTW). The Northeast Site treatment system was decommissioned in April 2004, so a smaller air-stripper treatment system was installed at the Northeast Site to treat the groundwater recovered via the two Building 100 Area recovery wells.

Subsequent to recovery well installation, additional investigations were conducted by installing monitoring wells at multiple depths both outside the building and through the floor of the building. In 1996, these investigations were summarized in the *Building 100 Area Data Report* (DOE 1996b) and the *Building 100 Area Subsurface Investigations, Phases I, II, and III* (DOE 1996c). Results of these investigations indicated that significant contaminant concentrations were present at intermediate and deep depths under the building and that low levels of contamination were present at the south and east sides of the building. The *Building 100 Area Data Report* recommended that DOE continue operating the two recovery wells that were installed in accordance with the CMS/CMIP, conduct additional characterization under the building and east of the building, conduct additional contaminant transport modeling, and evaluate the potential for occurrence of dense nonaqueous phase liquids (NAPLs). These recommendations were addressed in the *Building 100 Area Corrective Measures Implementation Plan Addendum* (DOE 1998).

A pilot test study was conducted to determine the effectiveness of biological enhancement for this site. Results of the pilot test, although positive, did not result in significant elimination of vinyl chloride (VC) in low-concentration areas. Therefore, biological enhancement technologies were not considered for use at the Building 100 Area at that time.

The *Building 100 Area Corrective Measures Study Report Addendum* (DOE 2006) was finalized in July 2006. The document concluded that DOE's original remediation objective of meeting maximum contaminant levels (MCLs) throughout the contaminant plume does not appear to be reasonable given current knowledge of the site. At that time, it appeared that containment of the contaminant plume had been achieved, and it was determined that human health and the environment were protected.

The document proposed that ICs be placed on the site property to prevent inappropriate groundwater use, and that MCLs for site-related contaminants of potential concern (COPCs) be applied as groundwater cleanup goals outside the IC boundary. Because the two existing groundwater recovery wells did not contribute significantly to either contaminant plume containment or mass removal, DOE also proposed shutting down these wells and the associated treatment system. Operation of these recovery wells and the treatment system was terminated on August 21, 2006, with the approval of FDEP.

An interim remedial action plan was submitted to FDEP in March 2009 and approved in July 2009. The plan recommended using groundwater pumping to collect hydraulic information for use in a feasibility study to identify the most appropriate groundwater plume management technology for the Building 100 Area. One recovery well (PIN12-RW03) was installed and became operational in July 2009. The purpose of this well is to capture the contaminated groundwater, which is transported to an on-site air stripper for treatment and subsequent discharge to the IWNF.

Pinellas County Utilities started a major water line replacement effort along Belcher Road in October 2010, and Pinellas County Public Works plans a significant road construction project along Belcher and Bryan Dairy Roads that is scheduled to start in summer 2011. DOE installed new monitoring wells at the property boundary along these two roads in October 2007 and in January and February 2008 to further define the contaminant plume prior to these activities, and this investigation confirmed that the plume was off site south of Bryan Dairy Road, on the county right-of-way. DOE performed the required notification to FDEP regarding the off-site plume.

Additional plume delineation was conducted on the property at 8040 Bryan Dairy Road by the installation of three continuous multichannel tubing (CMT) wells in September 2009 (PIN12-0567, -0568, and -0569). Contaminant concentrations exceeded CTLs in well 0569. DOE reported this discovery to FDEP and to the property owner in October 2009, in accordance with FDEP notification requirements. Two additional CMT wells were installed on this property in March 2010 (PIN12-0570 and -0571).

To further investigate the extent of the off-site contamination to the south of the STAR Center, plume delineation work was conducted at 10980 Belcher Road on August 16–30, 2010, using direct push technology to collect groundwater samples from temporary locations. This property is located across Bryan Dairy Road immediately south of the Building 100 Area at the STAR Center. The results of this investigation indicated that the contaminant plume enters the 10980 Belcher Road property on the eastern side and extends southeastward (in the direction of groundwater flow) to the southern property boundary. DOE reported this discovery to FDEP and to the property owner in October 2010, in accordance with FDEP notification requirements. The

results of this investigation are reported in the *Data Report for Rally Stores Property* (DOE 2010a), included in Appendix A.

The results from that investigation suggested that the contaminant plume extended south onto property at 10950 Belcher Road. Plume delineation was conducted at this property on December 6–16, 2010, and April 4–6, 2011. Additional delineation was conducted in the median of Belcher Road just east of this property on January 24–28, 2011. The results of these investigations demonstrated that the contaminant plume extends in a southeasterly direction from the northern property boundary to the eastern property boundary, but not to the median of Belcher Road. The results of these investigations are reported in the *South Belcher Road Data Report* (Daniel 2011a) and the *Better Business Forms Data Report* (Daniel 2011b), included in Appendix A.

DOE has evaluated the effect that the Building 100 Area contaminant plume might have on the water line and road construction activities, and has chosen to capture and treat groundwater that will be produced by dewatering conducted during excavation actions. Once brought to the surface through dewatering activities, groundwater will be transported to an on-site air stripper for treatment, and the treated water will be discharged to the STAR Center's IWNF and subsequently discharged to the POTW.

1.2 Northeast Site

The Northeast Site is located in the northeast corner of the STAR Center (Figure 2). In the late 1960s, before construction of the East Pond in 1968, drums of waste and construction debris were disposed of in the swampy area of the Northeast Site. In 1986, an expansion of the East Pond was initiated to create additional storm-water retention capacity, but excavation activities ceased when contamination was detected directly west of the pond. EPA identified the Northeast Site as a SWMU (EPA 1992). An Interim Corrective Measures Study (DOE 1991b) was developed and submitted to EPA, and approval of this document was received in October 1991.

An interim groundwater recovery system for the Northeast Site was installed, and operation commenced in January 1992. The groundwater treatment system, as initially installed, consisted of four recovery wells equipped with pneumatic recovery pumps, a holding tank, centrifugal transfer pumps, and approximately 2,500 feet (ft) of transfer and secondary containment piping. During 1993, DOE proposed a reconfigured system for the site consisting of four shallow and three deep recovery wells. After EPA approved the upgrade, the system was reconfigured and became operational on March 1, 1994.

Between August and October 1995, a portion of the Northeast Site was excavated to remove debris, drums of waste, and other materials that could inhibit future corrective measures. Location of the areas of excavation was based primarily on the results of a geophysical survey and knowledge of existing utility locations. Detailed descriptions of the debris removal activities were submitted to EPA and FDEP as part of the *Northeast Site Interim Measures Quarterly Progress Report* (DOE 1996e).

In 1996, DOE submitted the *Northeast Site Corrective Measures Implementation Plan* (DOE 1996d) to EPA Region 4 and FDEP. This plan was approved by both regulatory agencies in 1997. As part of the Northeast Site CMS and CMIP, a pump-and-treat system in conjunction

with a subsurface hydrogeologic barrier wall to prevent migration of the contaminant plume was identified as the best available technology. The pump-and-treat system included a pretreatment system for iron removal, an air stripper unit, and a tank for holding treated groundwater before discharge to the STAR Center IWNF prior to transfer to the POTW. The treatment system was constructed in early 1997 and became operational by July 1997, processing groundwater from seven Northeast Site recovery wells and two Building 100 Area recovery wells. Subsequently, several additional recovery wells were installed at the Northeast Site, and some of the old recovery wells were abandoned.

During 1997, anaerobic bioremediation and rotary steam-stripping pilot tests were conducted in the northern and southern portions of the Northeast Site, respectively. These tests were designed by the Innovative Treatment Remediation Demonstration group of regulatory and industry members to provide remedial options at the STAR Center. At the conclusion of the field tests in July 1997, pump-and-treat technology resumed at the Northeast Site.

NAPLs were identified in a few monitoring and recovery wells in 1998. An *Interim Measures Work Plan for Remediation of Non-Aqueous Phase Liquids at the Northeast Site* (DOE 2001) was submitted to FDEP in late November 2001. The purpose of this document was to present the plan to remediate NAPLs at two areas (NAPL Areas A and B) of the Northeast Site using a thermal remediation method. FDEP approved this document on January 10, 2002.

Construction of the NAPL Area A treatment system began in late May 2002, and system startup occurred on September 26, 2002. NAPL treatment was completed on February 28, 2003. The *Northeast Site Area A NAPL Remediation Final Report* (DOE 2003b) describes the thermal remediation of Area A.

Construction of the NAPL Area B treatment system began in July 2004 and was completed in early August 2005, and operations began on August 16, 2005. NAPL treatment was completed on August 29, 2006. The *Final Report Northeast Site Area B NAPL Remediation Project at the Young - Rainey STAR Center Largo, Pinellas County, Florida* (DOE 2007) describes Area B remediation.

Monitoring wells were installed at the former NAPL areas to monitor the remaining dissolved-phase plumes. Groundwater samples from a few of the wells continued to show high concentrations of contaminants. Soil samples were collected from 12 soil borings in August 2007 to evaluate the potential for a contaminant source remaining in the subsurface at these locations. Results indicated high contaminant concentrations in soil at most of these borings, so a second phase of sampling was conducted in March and April 2008, during which samples were collected from 45 soil borings. Ten additional borings were sampled in May and 11 more were sampled in June. These 78 soil borings defined two areas containing a source of contamination.

To address this contamination source, DOE prepared an interim remedial action plan for soil excavation using the large-diameter auger method in accordance with the RBCA regulations and submitted the document to FDEP in August 2008. This plan was approved on August 22, 2008. An engineering design was developed, and a source removal subcontract was awarded in 2008. Source removal in the form of LDA excavation began on January 14, 2009, and was completed on May 22, 2009. Two hundred forty-three large-diameter and 352 small-diameter borings were completed. Approximately 8,387 cubic yards of soil were excavated, including 4,667 cubic yards

removed as clean overburden and 3,720 cubic yards of contaminated soils that were removed, characterized for waste disposal, and disposed of as nonhazardous waste at a RCRA Subtitle D landfill. Additional information regarding the Northeast Site LDA work is available in the *Data Report for Overburden Soil at the Northeast Site and the 4.5 Acre Site* (DOE 2009b) and the *Interim Remedial Action for Source Removal at the Northeast Site Final Report* (DOE 2009c).

As a follow-up to the LDA work, emulsified soybean oil and the *Dehalococcoides ethenogenes* (DHE) microorganism were injected into the subsurface at 75 points at the site in January and February 2010. The *Injection of Emulsified Soybean Oil at the Northeast Site and 4.5 Acre Site* (DOE 2010b) was prepared to describe the work required for this task. This project should result in a significant decrease in contaminant mass and concentration around the former contaminant source areas and in the downgradient contaminant plume.

With the completion of the LDA project to remove contaminant source material and the follow-up enhanced bioremediation project, DOE is proceeding to close the Northeast Site under the FDEP's RBCA rules (Chapter 62-780.680, F.A.C.). The *Closure Monitoring Plan for the Northeast Site and 4.5 Acre Site* (DOE 2009a) describes the closure monitoring that is necessary under RBCA, according to the requirements for Post Active Remediation Monitoring (Chapter 62-780.750 F.A.C.). That document was approved by FDEP on December 21, 2009. In the approval letter, FDEP suggested semiannual instead of quarterly closure monitoring, and this was implemented starting with the March 2010 sampling event.

1.3 WWNA

The WWNA (PIN18) includes the IWNF, the area south of the IWNF (including the parking lot), and Building 200 (Figure 2). In April 1993, the WWNA and the Building 200 Area were identified as potential SWMUs, and an RFA was conducted (EPA 1994). The RFA recommended that the WWNA and Building 200 be considered one SWMU, and this SWMU is now referred to as the WWNA. RFA field activities began in September 1994 and included soil characterization, monitoring well installation, and groundwater sampling. Arsenic was identified as the major COPC. Trichloroethene (TCE) and VC were detected at low concentrations in groundwater and were subsequently dismissed as COPCs once their concentrations decreased below cleanup levels.

A CMS/CMIP (DOE 1997a) was completed for this SWMU in 1997. The recommended remediation alternative for the WWNA was groundwater recovery with the Building 100 Area wells and an additional recovery well located in the WWNA. The CMIP recommended (1) that the recovery well in the WWNA withdraw surficial aquifer groundwater directly from the arsenic plume, thereby reducing contaminant mass and preventing contaminant migration, and (2) that the recovered water be discharged directly to the STAR Center's wastewater neutralization facility.

Because FDEP expressed concerns about elevated concentrations of arsenic in the soil, DOE conducted extensive sampling and analysis of soil in January and February 1999 in an effort to locate the source of arsenic contamination. Elevated levels of arsenic were identified at several locations and at various depths within the SWMU. A treatability study was conducted to determine the leachability of arsenic from the soil into the groundwater. The study concluded that arsenic leachability from the soil was very limited, as demonstrated by a measured average

soil/water distribution coefficient of 63 liters per kilogram. DOE then conducted a statistical evaluation of arsenic soil data that resulted in the proposal to excavate two areas where the highest concentrations of arsenic were identified. Follow-up monitoring of strategically located wells would then determine whether arsenic concentrations in the groundwater decrease with time.

This proposal was approved by FDEP in September 1999. An excavation plan was developed to address logistics, sampling and analytical concerns, and waste management issues regarding the generation of contaminated media. This document and the statistical evaluation are included in the WWNA CMIP Addendum (DOE 2000). Excavation of the two areas was completed in early October 1999. Subsequently, the existing recovery well was abandoned, and two recovery wells were installed to continue plume control in the area. In addition, a third recovery well was created by converting the monitoring well with the highest arsenic concentration (PIN18-0501) to a recovery well.

On December 20, 2005, DOE received concurrence from FDEP to shut down the groundwater recovery system and begin monitoring to determine a closure approach through FDEP's RBCA regulations, promulgated by the Florida Legislature in 2003. The 1-year RBCA closure monitoring program specified by FDEP began in October 2005 and was completed in October 2006.

A No Further Action with Controls proposal was submitted to FDEP on March 14, 2007. FDEP approved the document on May 24, 2007, and requested that DOE submit an updated Statement of Basis for the WWNA. As of June 2011, submittal of the Statement of Basis was awaiting finalization of ICs at the STAR Center.

The goal of the 1999 soil excavation was to remove the areas containing the highest arsenic concentrations such that the remaining soils met the industrial CTL of 12 milligrams per kilogram. Soils containing arsenic concentrations above the residential CTL of 2.1 milligrams per kilogram were left in place because the current site use is solely industrial. After the No Further Action with Controls proposal was submitted in 2007, FDEP expressed concern about arsenic exceeding the residential standard in shallow soils (less than 2 ft deep). In response, DOE determined that one course of action was to identify the area where the residential arsenic standard is exceeded and apply an IC to this area that would prohibit future residential development in this area and would prohibit movement of soil from this area to other parts of the STAR Center or to off-site locations. This area covered by this IC would be approximately 2.5 acres. Subsequently, the decision was made to apply the deed restriction prohibiting residential construction to the entire STAR Center property. As of June 2011, negotiations to apply the IC were ongoing.

1.4 Site Update

- The sitewide annual sampling was conducted from March 7–22, 2011, and included collection of water samples from 128 wells and 3 ponds. Water level measurements were obtained from all accessible monitoring wells, recovery wells, and ponds on March 9.
- Delineation of the Building 100 Area plume south of Bryan Dairy Road was conducted in December 2010 and in January and April 2011. Four permanent triple monitoring wells were installed in this area in late May 2011.

- Delineation of the east plume at the Building 100 Area began in May 2011 and will continue into the summer.
- Preparation for the dewatering project associated with Pinellas County road construction continued in anticipation of startup in July 2011.
- Building 100 Area recovery well PIN12-RW03 continued to capture contaminated groundwater along the southern property boundary of the STAR Center. This well began operation on July 23, 2009.
- The results of the annual monitoring were reported (this document).

1.5 Waste Minimization

The RCRA HSWA permit (No. 0034170/HH/003) for the site was reissued by FDEP on August 21, 2007. The permit includes waste minimization requirements under title 40, *Code of Federal Regulations*, part 264.73(b)(9); RCRA section 3005(h); and title 42, *United States Code*, section 6925(h). The permit states the following:

"The Permittee must certify, no less than annually, that:

a. The Permittee has a program in place to reduce the volume and toxicity of hazardous waste generated to the degree determined by the Permittee to be economically practicable;

b. The proposed method of treatment, storage or disposal is the most practicable method available to the Permittee, which minimizes the present and future threat to human health and the environment, and

c. The Permittee shall maintain copies of certification in the facility operating record as required by title 40, *Code of Federal Regulations*, part 264.73(b)(9).

d. The Department of Energy Legacy Management Pollution Program will meet the requirement of a. and b. of this part."

The Pinellas Project maintains the above annual certification in the on-site records. LM implements the Environmental Management System (EMS) sustainability programs under three documents, the *Environmental Management System Programs Manual* (LMS/POL/S04388), the *Environmental Management System Description* (LMS/POL/S04346), and the *Environmental Protection Manual* (LMS/POL/S04329). The EMS program includes a Waste Minimization and Pollution Prevention Plan as part of the EMS Programs Manual, which describes the process of implementing and tracking the progress of pollution prevention achieved by decreasing the purchase of hazardous chemicals and replacing them with chemicals that are more environmentally friendly and less toxic. The plan also describes the process of implementing and tracking the progress of waste minimization achieved by establishing mechanisms to recycle or reuse, to the extent feasible, solid waste and hazardous chemicals that result from LM operations.

The following materials were recycled by the Pinellas Project from December 2010 through May 2011:

- 44.2 pounds of paper
- 98 pounds of cardboard

- 5.8 pounds of plastic
- 42.8 pounds of magazines
- 3.8 pounds of aluminum
- 0.2 pound of newspaper
- 25 pounds of phone books
- 6.4 pounds of batteries

2.0 Water-Level Elevations

During this reporting period, depth-to-water measurements were taken at all accessible monitoring wells, former extraction wells, piezometers, and ponds (including two off-site ponds) at the STAR Center on March 9, 2011. The water levels were measured with an electronic water level indicator or directly from a staff gauge. Groundwater elevations are listed in Table 1.

2.1 Groundwater Flow

Groundwater and surface water elevations were used to construct sitewide groundwater contour maps of the shallow and deep surficial aquifers (Plates 1 and 2, respectively). Individual contour maps were also constructed for the shallow and deep surficial aquifers at the Northeast Site and the Building 100 Area (Figures 3 through 6).

In March 2011, groundwater in the shallow surficial aquifer beneath the Northeast Site was observed to flow primarily to the east. This flow pattern is consistent with the patterns observed for the past few years at the Northeast Site. Water table elevations indicate that the East Pond acted as a discharge point for the shallow surficial aquifer in March 2011 (Figure 3). In the shallow surficial aquifer, the hydraulic gradient was about 0.002 ft/ft. Calculations using Darcy's Law, along with approximations of 1 ft/day for hydraulic conductivity and 0.3 for effective porosity, indicate that groundwater at the Northeast Site was estimated to move about 2−3 ft/year. This velocity is on the low end of the velocities observed since March 2006. Groundwater elevations in the deep surficial aquifer were relatively flat in March 2011 (Figure 4).

For the past 6 years, shallow groundwater beneath Building 100 has been observed to flow to the southeast under a very slight gradient, and this flow pattern was observed again in March 2011 (Figure 5). A similar flow pattern was observed in the deep surficial aquifer (Figure 6). The effect of recovery well PIN12-RW03 on the flow patterns south of Building 100 can be seen in the area around that well on Plate 1 and Plate 2. The hydraulic gradient in the Building 100 Area in March 2011, outside of the radius of influence of RW03, was about 0.003 ft/ft. Using the approximations for hydraulic conductivity and porosity mentioned above, groundwater velocity in this area is estimated to be about 3−4 ft/year.

An aquifer test conducted in July 2009 in the area around recovery well RW03 indicated that the hydraulic conductivity of the surficial aquifer around well RW03 might be higher than that observed in other parts of the STAR Center. Analysis of the aquifer test yielded an estimated

hydraulic conductivity of 6.7 to 7.4 ft/day, which is higher than previous tests conducted in other areas of the STAR Center, where estimated hydraulic conductivities were closer to 1 ft/day.

Water level elevations in the three wells screened in the upper part of the Floridan aquifer are presented in Table 2. The water levels in these wells indicate that the potentiometric surface of the Floridan aquifer at the site was about 0.9 ft lower in March 2011 than in March 2010.

Surface water elevations were recorded in March 2011 from the East, South, Southwest, and West Ponds, Pond 5, and the pond just east of Belcher Road, and they are presented in Table 3. All the ponds are hydraulically connected to the shallow surficial aquifer system (Plate 1).

3.0 Groundwater Sampling and Analytical Results

3.1 Work Performed

During the annual sampling event at the STAR Center in March 2011, groundwater samples were collected from 128 monitoring wells and 3 ponds. Volatile organic compounds were analyzed in 131 samples using EPA method SW-846 8260B. Aluminum and iron were analyzed in eight samples from Northeast Site wells using EPA method SW-846 6010B. Laboratory reports are provided in Appendix B.

All samples were collected in accordance with the *Sampling and Analysis Plan for U.S. Department of Energy Office of Legacy Management Sites* (LMS/PLN/S04351), using FDEP procedures. All samples were submitted to TestAmerica, Denver, Colorado, for analysis. TestAmerica Denver is accredited by the Florida Department of Health in accordance with the National Environmental Laboratory Accreditation Conference (certification number E87667). All monitoring wells were micropurged using a dedicated bladder pump or a peristaltic pump. Sampling was performed when the field measurements stabilized.

Table 4 lists field measurements of temperature, specific conductance, turbidity, pH, oxidation-reduction potential, and dissolved oxygen recorded at the time the samples were collected during the sampling event. Measurements were made with a flow cell and a multiparameter instrument, and turbidity was measured using a nephelometer.

3.2 Analytical Results

3.2.1 Northeast Site (PIN15)

Concentrations of COPCs in samples collected from wells at the Northeast Site (PIN15) are presented in Table 5, which, for comparison, also shows the previous year of data. The March 2011 sampling event continued closure monitoring for the Northeast Site, as described in the *Closure Monitoring Plan for the Northeast Site and 4.5 Acre Site* (DOE 2009a), so only the nine wells designated for closure monitoring were sampled.

Figure 7 shows the total contaminants of potential concern (TCOPCs) concentrations at the Northeast Site in March 2011. The highest TCOPCs concentration, 592 µg/L, was measured in

well PIN15-0594. This well also contained the highest concentration for any single analyte, toluene at 380 µg/L.

Eight wells were sampled for aluminum and iron in March 2011 (Table 6).

3.2.2 Building 100 Area (PIN06, PIN09, PIN10, PIN12, and PIN21)

COPCs concentrations in samples collected from wells at the Building 100 Area in March 2011 are included in Table 7, which, for comparison, also shows the previous year of data. Figures 8 and 9 show the March 2011 TCOPCs concentrations, the highest of which was measured in well 12-S35B at 87,900 µg/L. This well also contained the highest concentration for any single analyte, *cis*-1,2-dichloroethene (cDCE) at 52,000 µg/L.

Two on-site triple wells and all 11 off-site CMT triple wells were sampled for 1,4-dioxane in March 2011. The maximum concentration detected was 43 µg/L in well 12-0540. 1,4-dioxane was detected below the 3.2 µg/L CTL in 7 other wells.

Recovery well PIN12-RW03 began operations in July 2009 and continued during this reporting period. The recovered groundwater is treated by a shallow-tray air stripper and then discharged to the STAR Center's wastewater facility. Pre- and post-treatment data are listed in Table 8.

3.3 Quality Assurance/Quality Control

The results from the analytical laboratory, TestAmerica Laboratories Denver, were checked for quality assurance/quality control (QA/QC) through duplicate samples and trip blanks. Detected analytes for each duplicate sample collected in March 2011 from the STAR Center are listed in Table 9. The duplicate sample results were compared, and the relative percent differences (RPDs) between the results were calculated.

All analytes in the duplicate samples met the EPA-recommended laboratory duplicate criteria of less than 20 RPD for results that are greater than 5 times the practical quantitation limit with the exception of VC in well PIN15-0594. There were no errors identified that would explain the poor precision of the VC result. This result was "J" qualified as an estimated value due to the poor RPD value. With the exception of the VC data from this well, all data passed QA/QC criteria at a Class A level, indicating that the data may be used for quantitative and qualitative purposes.

As specified in the *Sampling and Analysis Plan for U.S. Department of Energy Office of Legacy Management Sites*, duplicate samples should be collected at a frequency of one duplicate for every 20 or fewer samples. For the STAR Center and the 4.5 Acre Site, 150 samples and 8 duplicates were collected for volatiles analysis, and 8 samples and 1 duplicate were collected for metals analysis. The duplicate requirements for this sampling event were met. Thirteen trip blanks and five equipment blanks were collected during this event.

A data validation software module for identifying and tracking anomalous groundwater data within the SEEPro database was used to generate a report of analytical results that fall outside of historical minimum or maximum values. There were no errors associated with these results, and the data are acceptable as qualified.

4.0 Data Interpretation

The purpose of this data interpretation section is to aid in the evaluation of plume stability and evaluate the performance of the enhanced bioremediation project at the Northeast Site. Time-concentration plots are presented in Section 4.1, plume maps are presented in Section 4.2, and site geochemistry is discussed in Section 4.3.

While most of the previous documents for the Pinellas site have compared groundwater contaminant concentrations to drinking water standards, those standards are not the applicable default CTLs for evaluating site remediation under RBCA. Based on a comprehensive review of background data for the site (DOE 2003a), it has been determined that aluminum and iron levels in the shallow groundwater in the site vicinity are naturally elevated and far exceed State of Florida secondary drinking water standards (Chapter 62-550, F.A.C.). Specifically, the average background concentration of 1.1 milligrams per liter (mg/L) for aluminum exceeds the 0.2 mg/L secondary standard, and the average background concentration for iron (9.3 mg/L) exceeds the 0.3 mg/L secondary standard. The ambient shallow groundwater in the area is therefore designated as "poor quality" as defined in Chapter 62-780.200 (35), F.A.C. Thus, the applicable groundwater CTLs are those for groundwater of "low yield/poor quality" provided in Table 1 of Chapter 62-777, F.A.C. In essence, these CTL values for poor water quality groundwater are a factor of 10 higher than the CTL values for drinking water.

4.1 Contaminant Concentration Trends

Monitoring well PIN15-0569 was chosen to evaluate plume stability at the Northeast Site. Well PIN15-0569 is located near the leading edge of the contaminant plume at the Northeast Site (Figure 7). The VC concentration in this well shows an overall decreasing concentration trend (Figure 10), and concentrations have been below the 10 µg/L poor water quality CTL since September 2008. This trend indicates a shrinking contaminant plume in the vicinity of this well.

Monitoring wells PIN15-0530, -0537, and -0594 were chosen to monitor performance of the enhanced bioremediation project at the Northeast Site because these wells are located within the zone of influence of the emulsified soybean oil injection. Figures 11, 12, and 13 show significant decreasing contaminant concentration trends in these wells following the injection in January and February 2010.

At the Building 100 Area, monitoring wells PIN12-0530, -S73C, and -0524 were chosen to evaluate plume stability. Figure 14 shows cDCE and VC concentrations in well PIN12-0530 at the Building 100 Area. Both of these COPCs show a decreasing trend. This well is located near recovery well PIN12-RW03, and the significant concentration decreases after the March 2009 sampling are most likely due to the operation of RW03, which began in July 2009. In addition, as can be seen on Figures 5 and 6 and in Table 7, monitoring wells PIN12-0552-1, -2, and -3, located south of Bryan Dairy Road, appear to be within the influence of RW03 and show significant decreasing concentration trends. Therefore, RW03 likely is controlling the southern limb of the contaminant plume.

Figure 15 shows the VC concentration in well S73C. Well S73C shows a relatively stable VC trend since 2004 and a decrease to below the 10 µg/L poor water quality CTL since 2009. This

stable concentration trend likely indicates a stable contaminant plume near the eastern property boundary.

Figure 16 shows the TCE, cDCE, and VC concentrations in well PIN12-0524, located near the southeast corner of Building 100. The concentration trends in this well suggest that a pulse of TCE, dichloroethene (DCE), and VC is moving through the aquifer. The decreasing concentration trends indicate that the pulse is nearly past the well.

4.2 Plume Maps

For each SWMU, plume maps based on results from the March 2011 annual sampling event were generated for the TCOPCs as well as selected COPCs. The compound-specific CTL was used to draw the inferred plume boundary for each COPC (i.e., concentrations below the CTL were not included in the plume area). The outline of the previous year's plume is also shown on the maps for comparison. A sitewide plume map is included as Plate 3. The plumes on STAR Center property are drawn to the poor water quality CTL, and the off-site plumes are drawn to the regular CTL. At the request of FDEP, the plume maps for the individual COPCs now show the on-site plume as defined by both the poor water quality CTL and the regular CTL.

Plume maps for the Northeast Site have been generated for TCOPCs (Figure 7) and VC (Figure 17). From 2010 to 2011, the VC concentrations decreased at all wells and the plume decreased in size. Plume maps for TCE and cDCE have been shown in past reports, but maps for these COPCs are not shown because in the nine closure monitoring wells sampled in March 2011, TCE was not detected and cDCE was detected in only one well at a concentration of 0.4 µg/L. This lack of TCE and cDCE detections is significant and reflects the recent efforts at contaminant source removal (spring 2009; the LDA areas shown on plume maps) and enhancement of naturally occurring biodegradation that was initiated by injection of emulsified soybean oil in February 2010.

Plume maps for the Building 100 Area have been generated for TCOPCs (Figures 8 and 9), TCE (Figure 18), cDCE (Figures 19 and 20), and VC (Figures 21 and 22). As described in Section 1.1, several recent phases of plume delineation using direct push technology to collect groundwater samples from temporary locations have been conducted south of Bryan Dairy Road. This action defined the extent of the southern off-site plume. The results of these investigations are reported in the *Data Report for Rally Stores Property* (DOE 2010a), the *South Belcher Road Data Report* (Daniel 2011a), and the *Better Business Forms Data Report* (Daniel 2011b), all included in Appendix A. The results of the investigations are not shown on the plume maps, but the plume boundaries as defined by the investigations are shown.

4.3 Geochemical Parameters

Geochemical parameters measured in the field at the STAR Center during March 2011 are listed in Table 4. Conditions are moderately reducing as evidenced by the low values of dissolved oxygen and oxidation-reduction potential.

In addition to the usual field parameters, a suite of biogeochemical data was collected for the enhanced bioremediation project at the Northeast Site (Table 10). Most of these data were

produced by Microseeps, located in Pittsburgh, Pennsylvania. Analysis for the DHE microorganism was conducted by Microbial Insights, located in Rockford, Tennessee.

These data show that conditions are moderately to strongly reducing and anaerobic, conducive to biodegradation of TCE, DCE, and VC. Organic carbon electron donors are present in the form of the various organic acids that are degradation products of the injected soybean oil, and these conditions are supportive of DHE growth. Bioaugmentation using DHE was conducted in conjunction with the emulsified soybean oil injection, and concentrations of DHE are sufficient in most wells to support contaminant biodegradation. Concentrations of ethene and ethane, along with the decreasing contaminant concentration trends presented in Section 4.1, demonstrate that contaminant biodegradation is occurring near wells within the influence of the soybean oil injection. In summary, the enhanced biodegradation project at the Northeast Site appears to be successfully degrading contaminants in areas that are within the influence of the emulsified soybean oil injection.

5.0 Upcoming Tasks

The following major tasks are planned for the next semiannual period (June 2011 through November 2011):

- Delineation of the east plume at the Building 100 Area in late spring and summer 2011.
- Final systems testing will be completed in June 2011 in preparation for the dewatering project associated with Pinellas County road construction activities. Startup of the dewatering project is scheduled for July 2011.
- Semiannual sampling and analysis of groundwater and water level measurement in September 2011.

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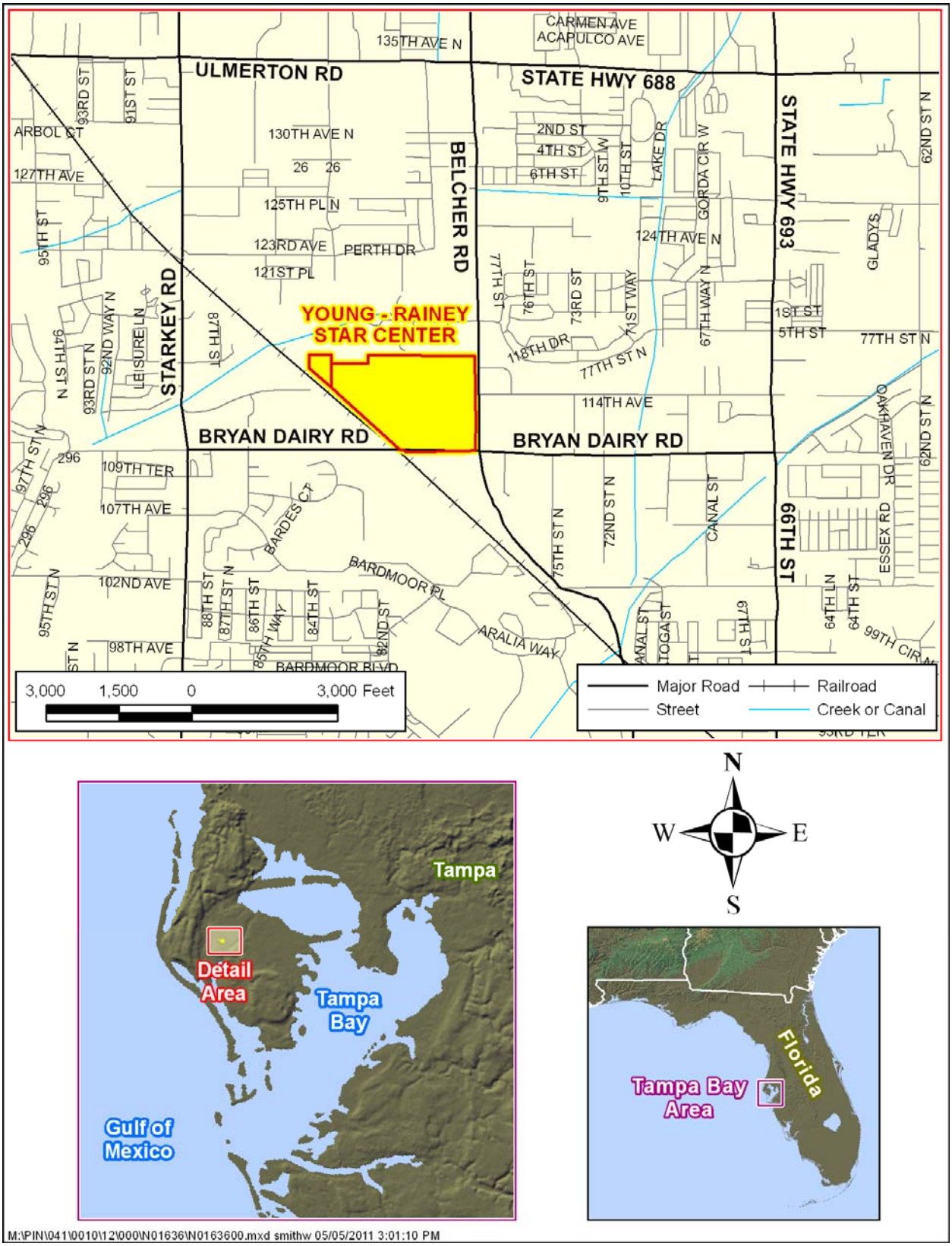


Figure 1. Young - Rainey STAR Center Location

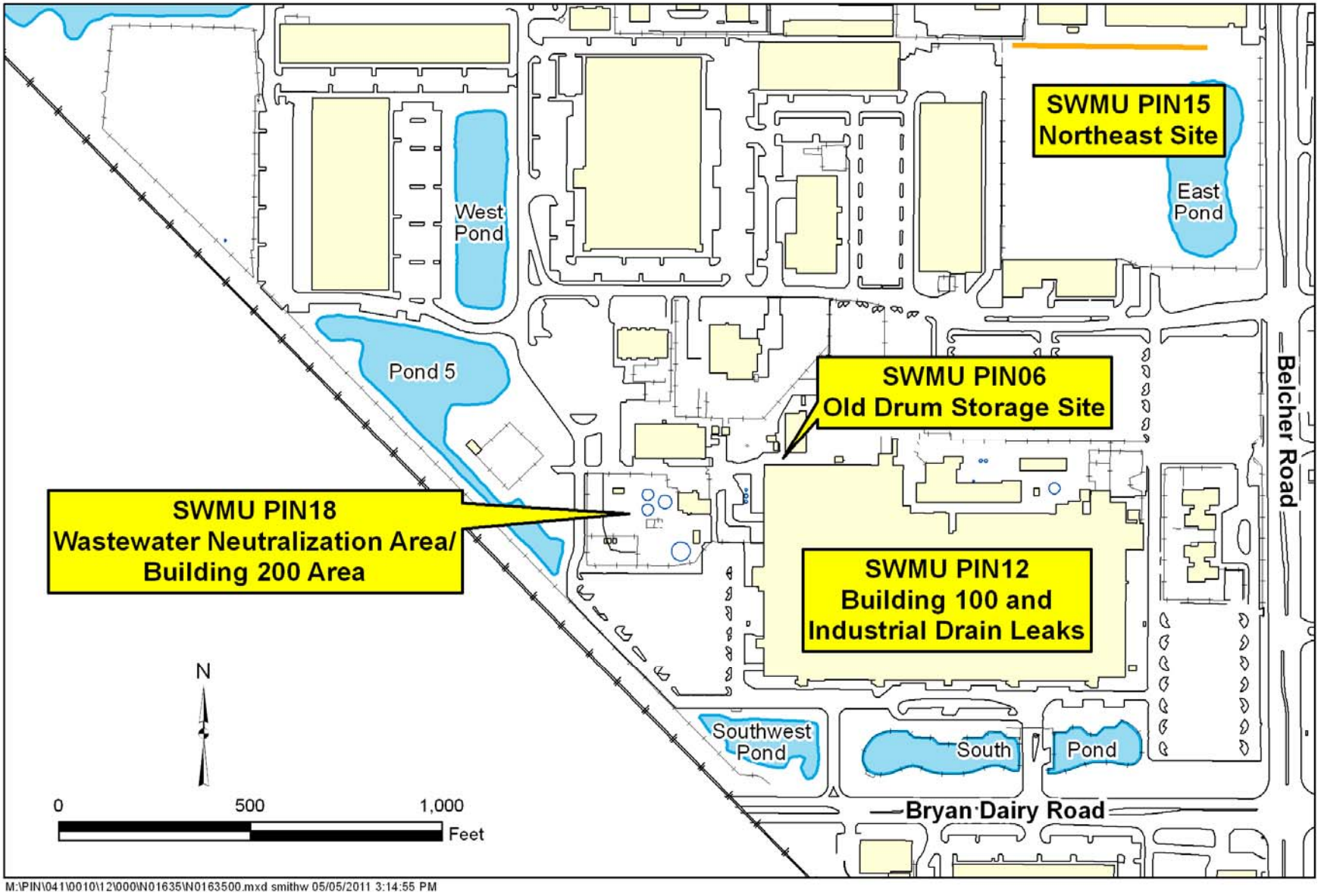


Figure 2. Location of STAR Center Solid Waste Management Units (SWMUs)

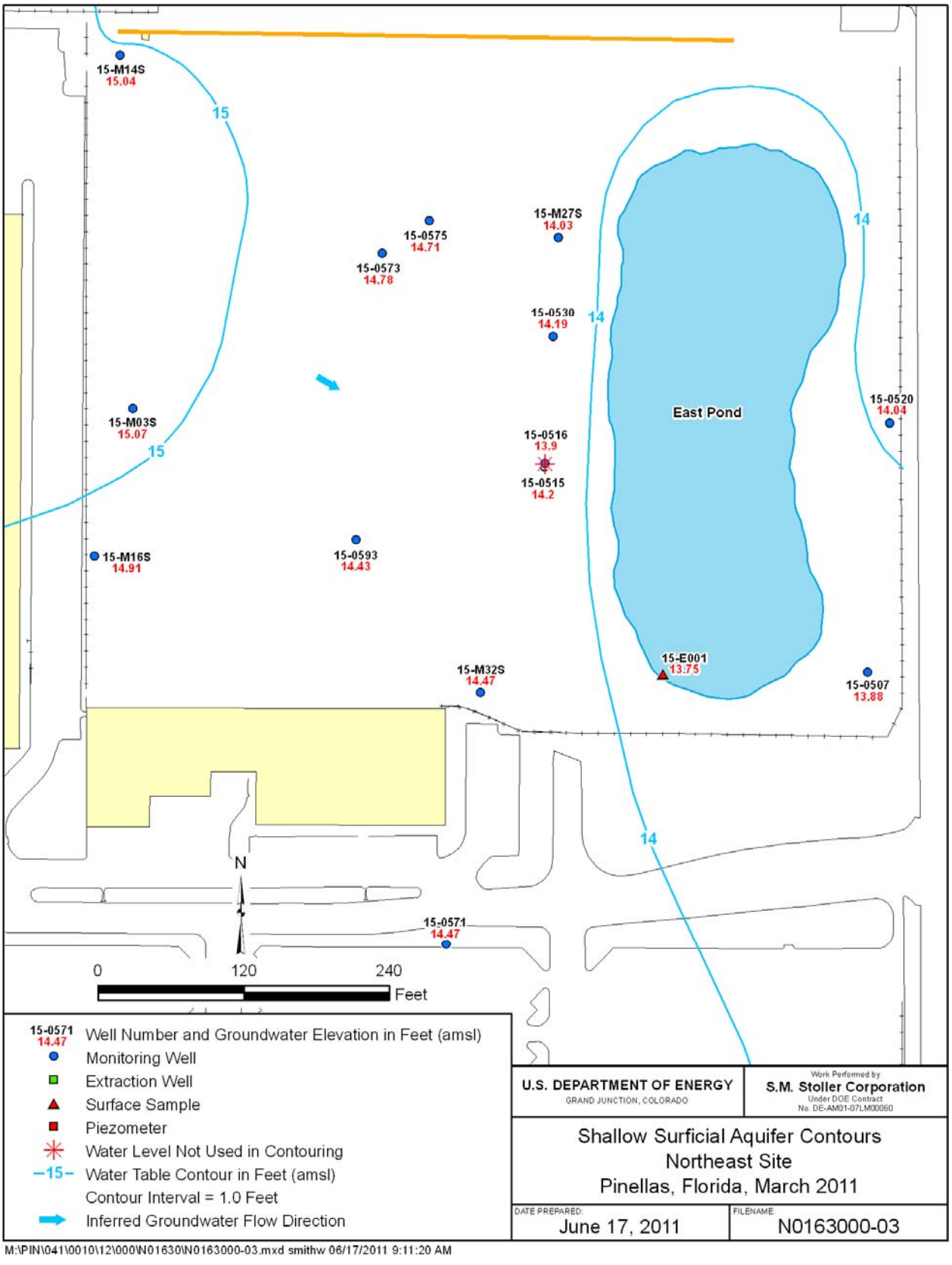


Figure 3. Northeast Site Shallow Surficial Aquifer Flow, March 2011

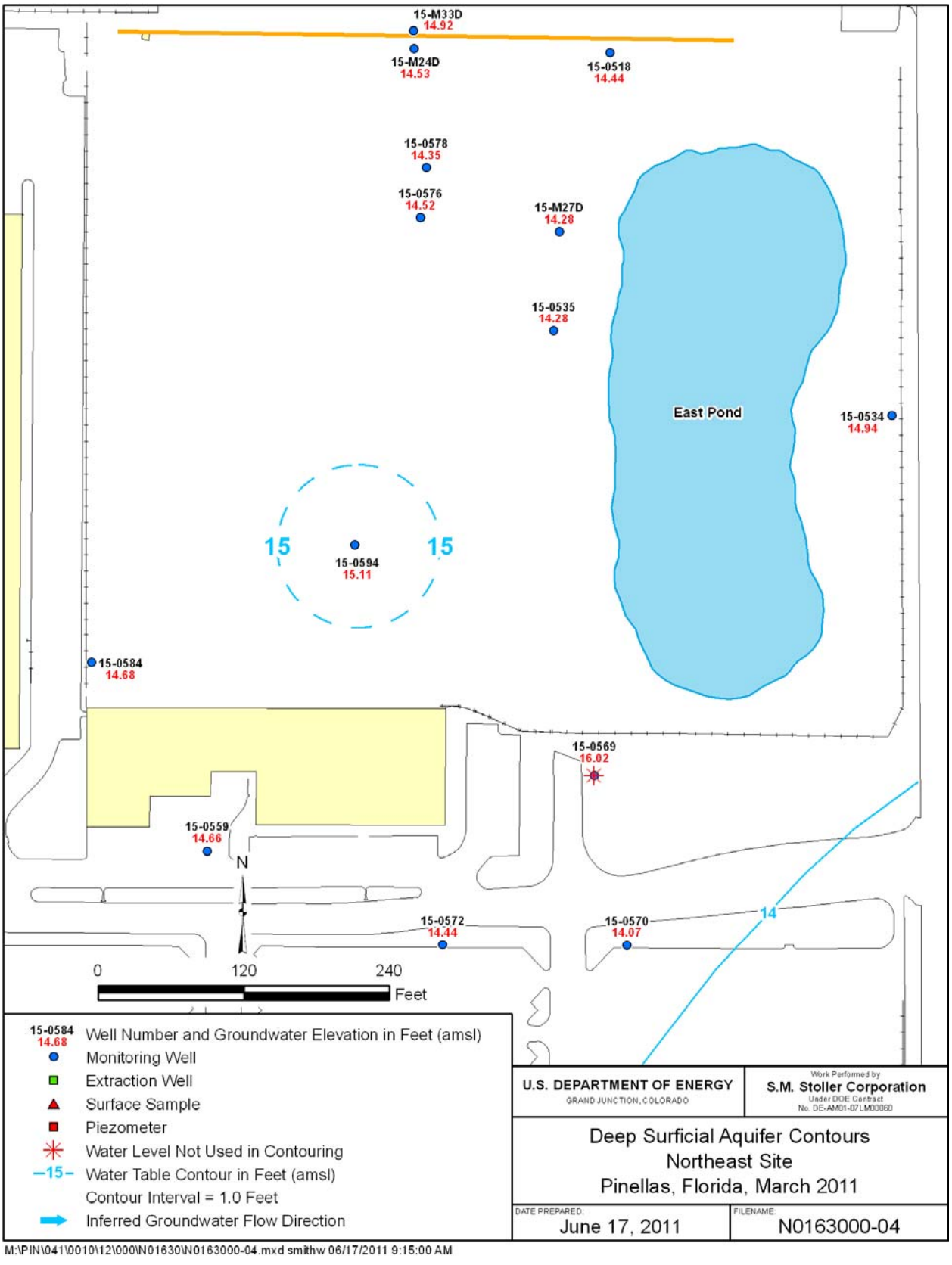


Figure 4. Northeast Site Deep Surficial Aquifer Flow, March 2011

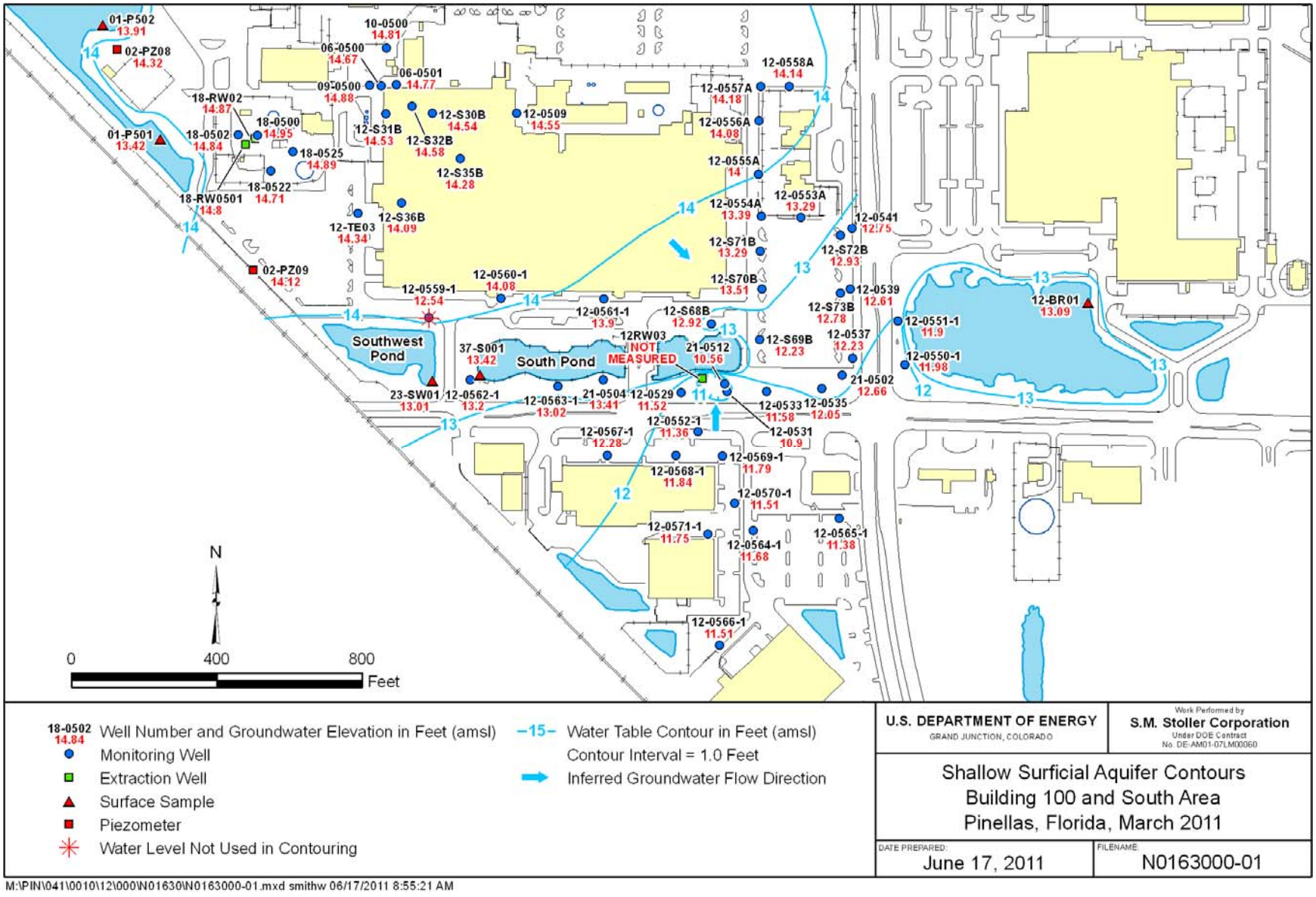


Figure 5. Building 100 Area Shallow Surficial Aquifer Flow, March 2011

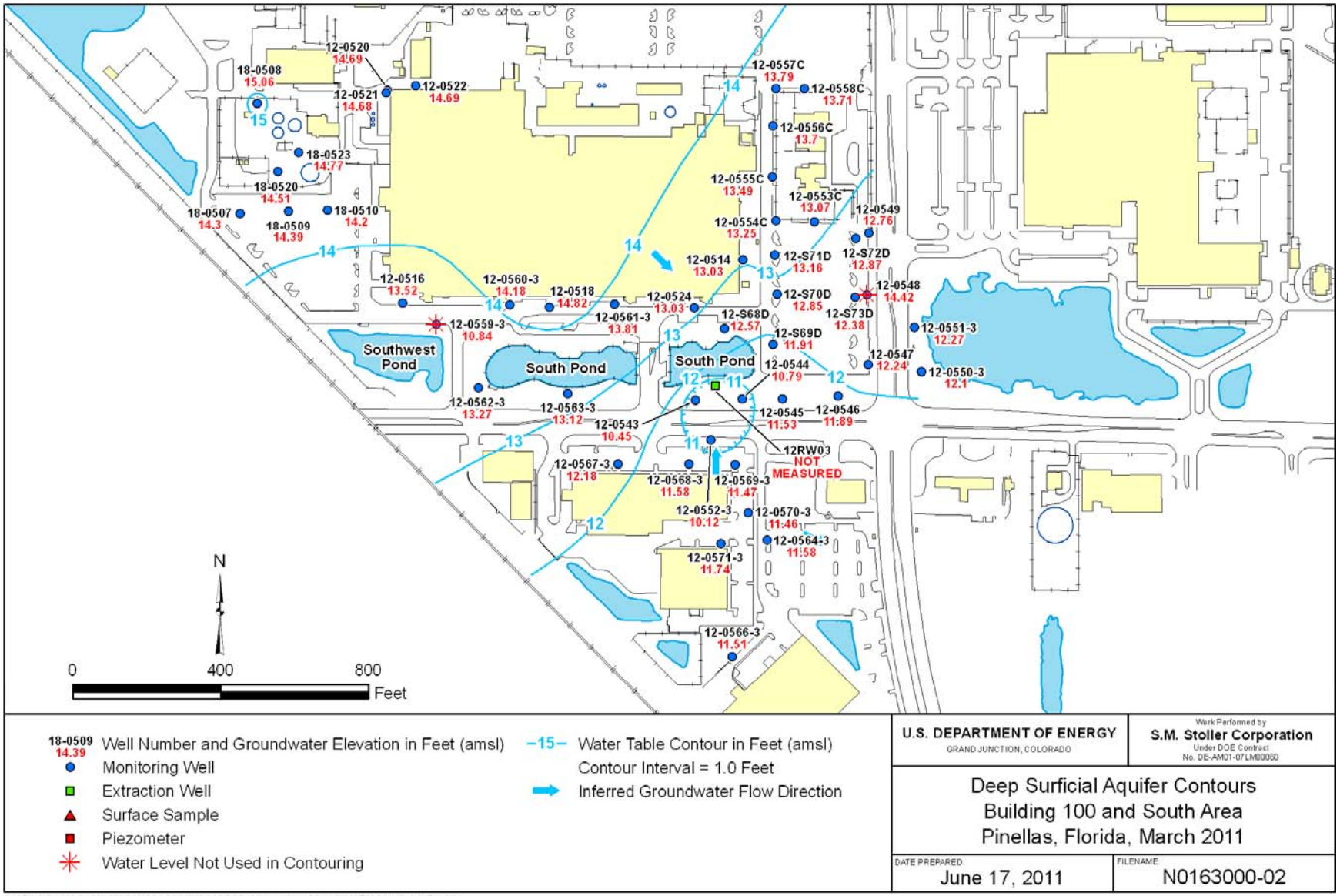


Figure 6. Building 100 Area Deep Surficial Aquifer Flow, March 2011

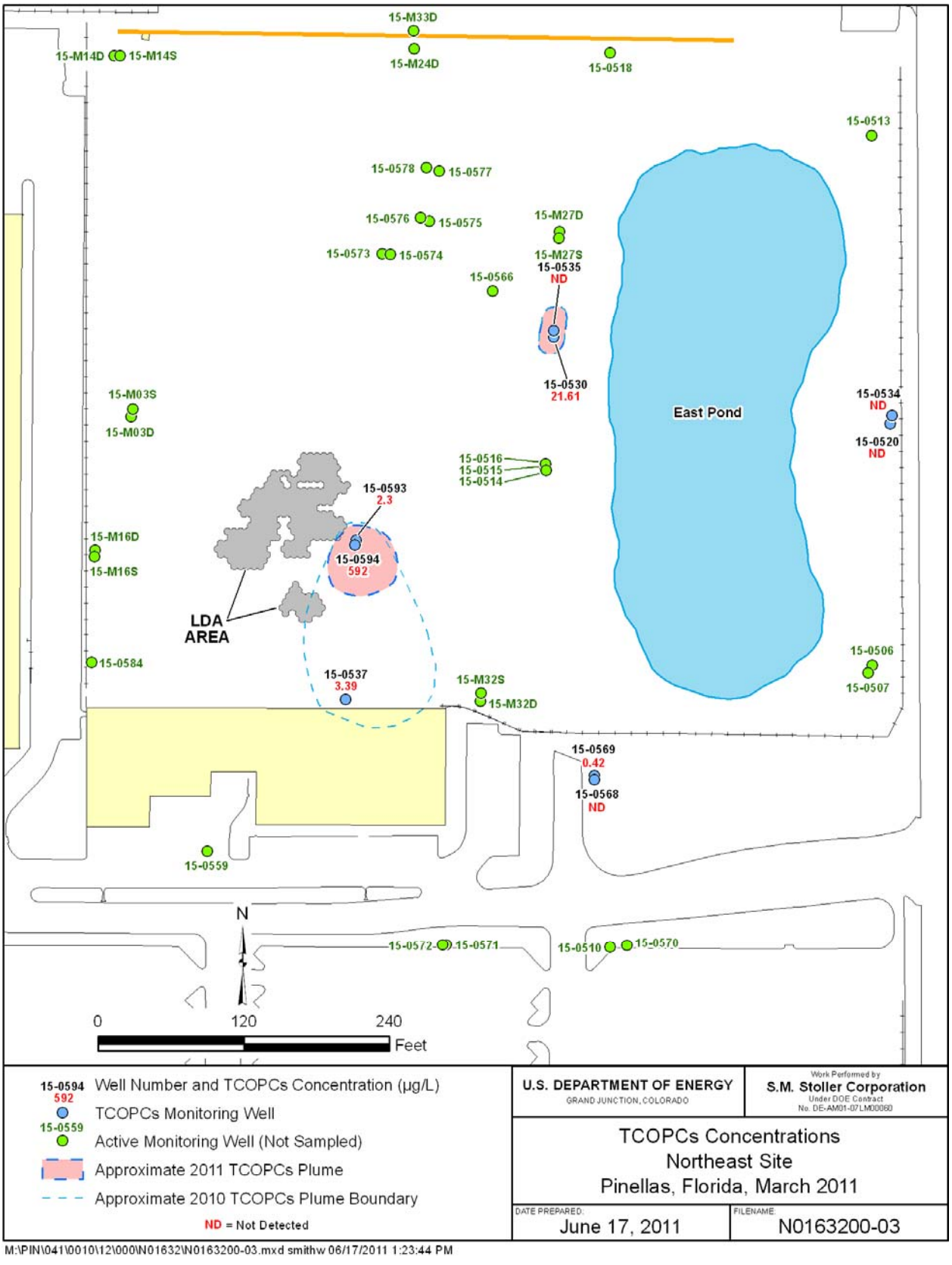


Figure 7. Northeast Site TCOPCs Concentrations, March 2011

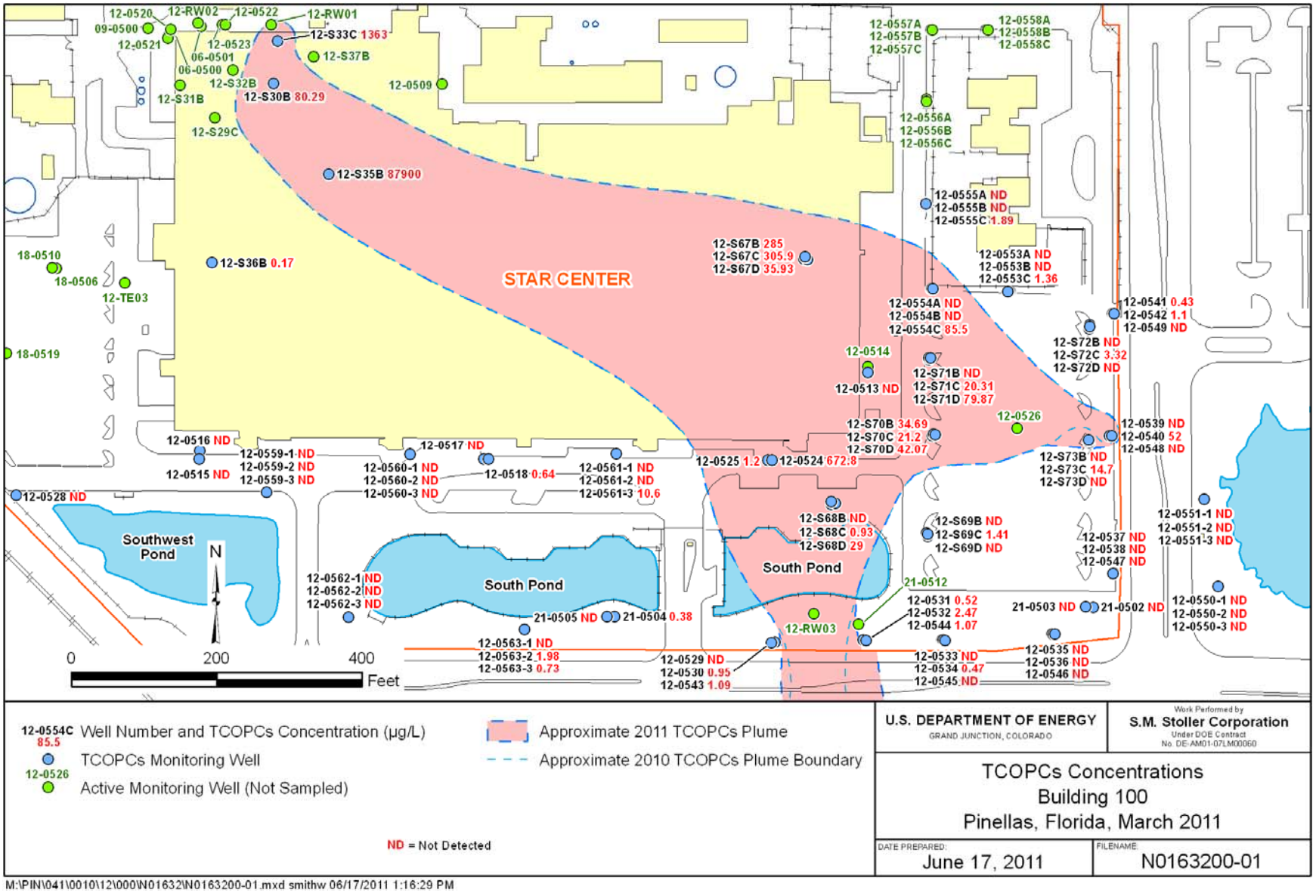


Figure 8. Building 100 Area TCOPCs Concentrations, March 2011

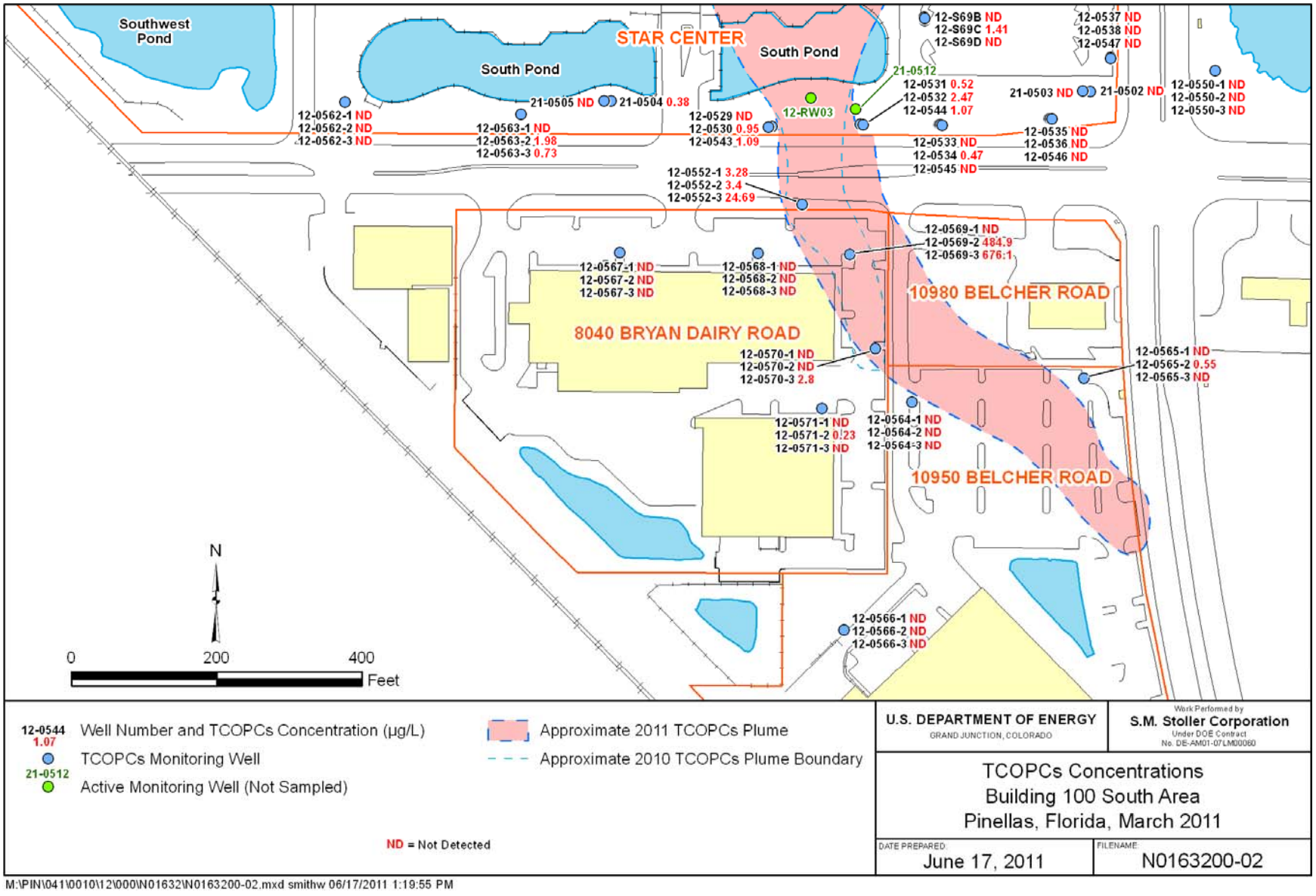


Figure 9. Building 100 Area South TCOPCs Concentrations, March 2011

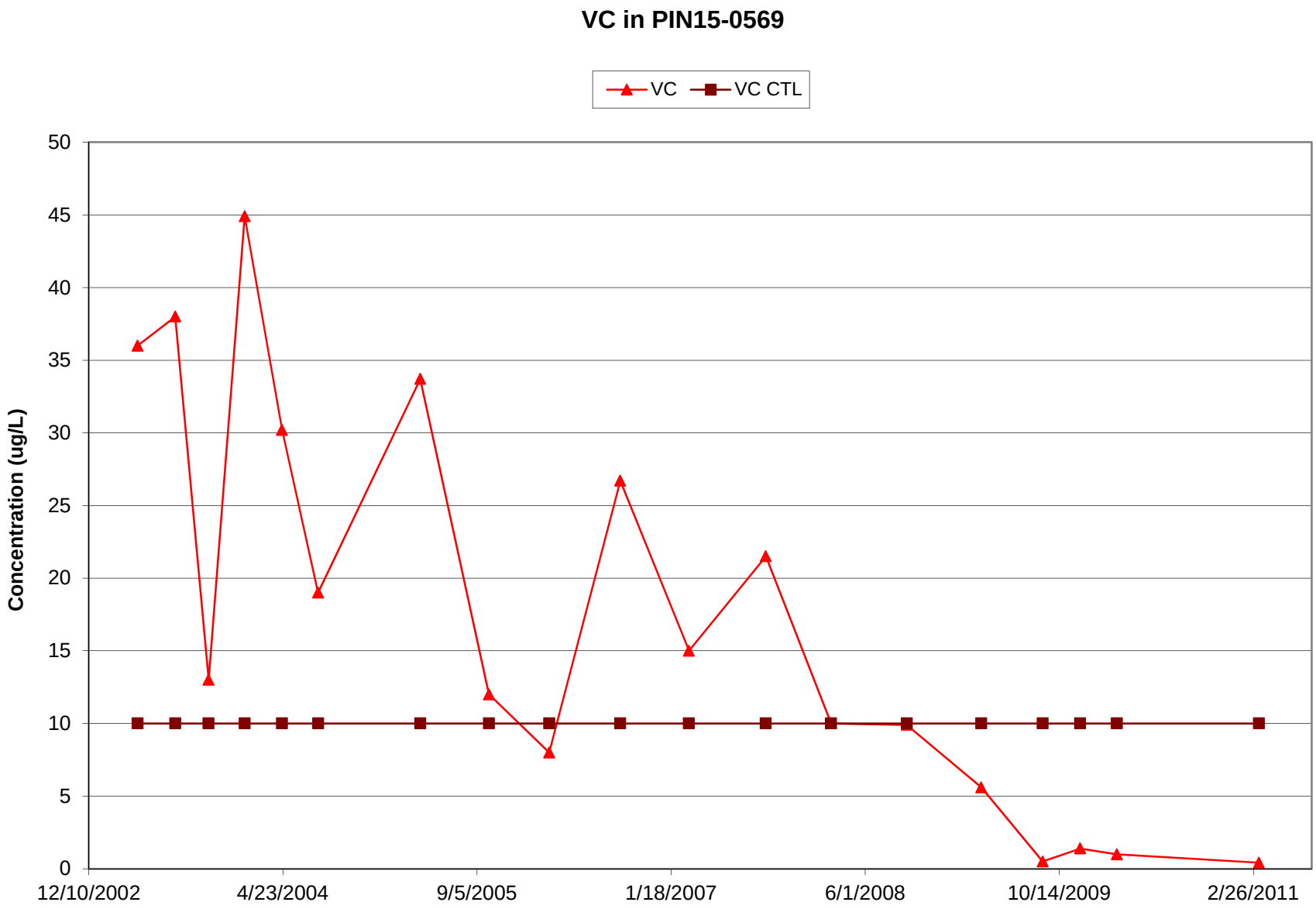


Figure 10. VC in Well PIN15-0569, Northeast Site

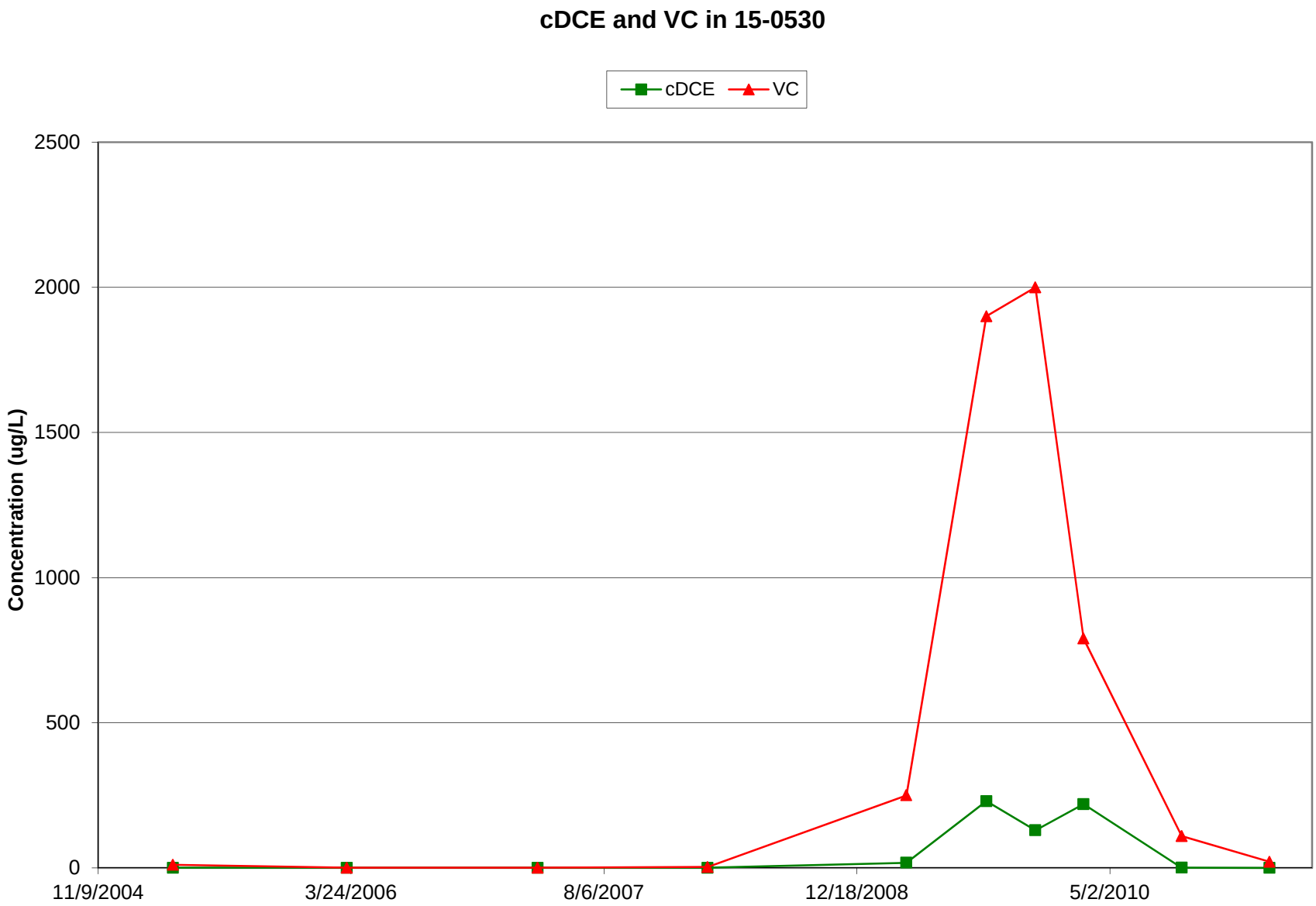


Figure 11. cDCE and VC in Well PIN15-0530, Northeast Site

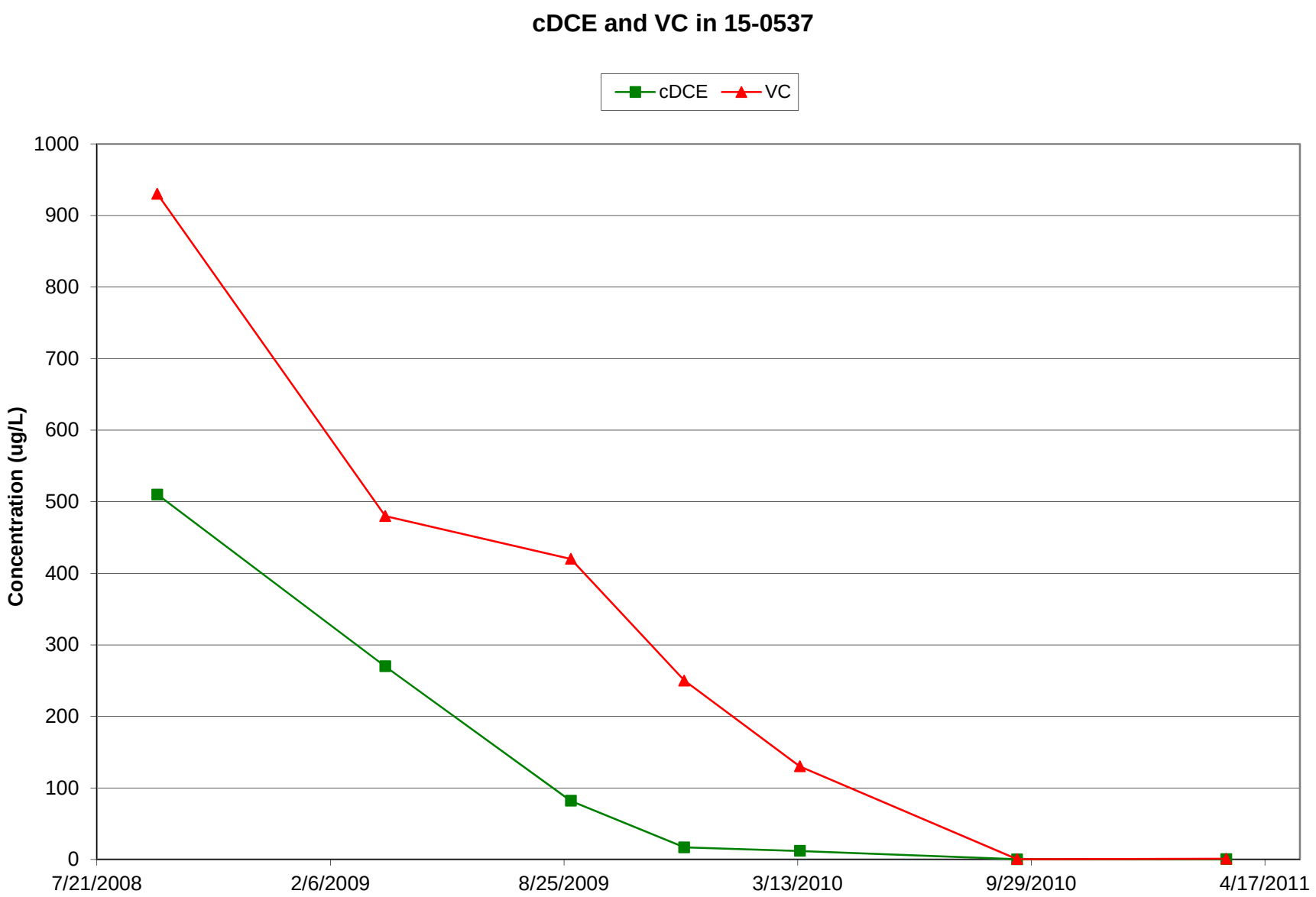


Figure 12. cDCE, and VC in Well PIN15-0537, Northeast Site

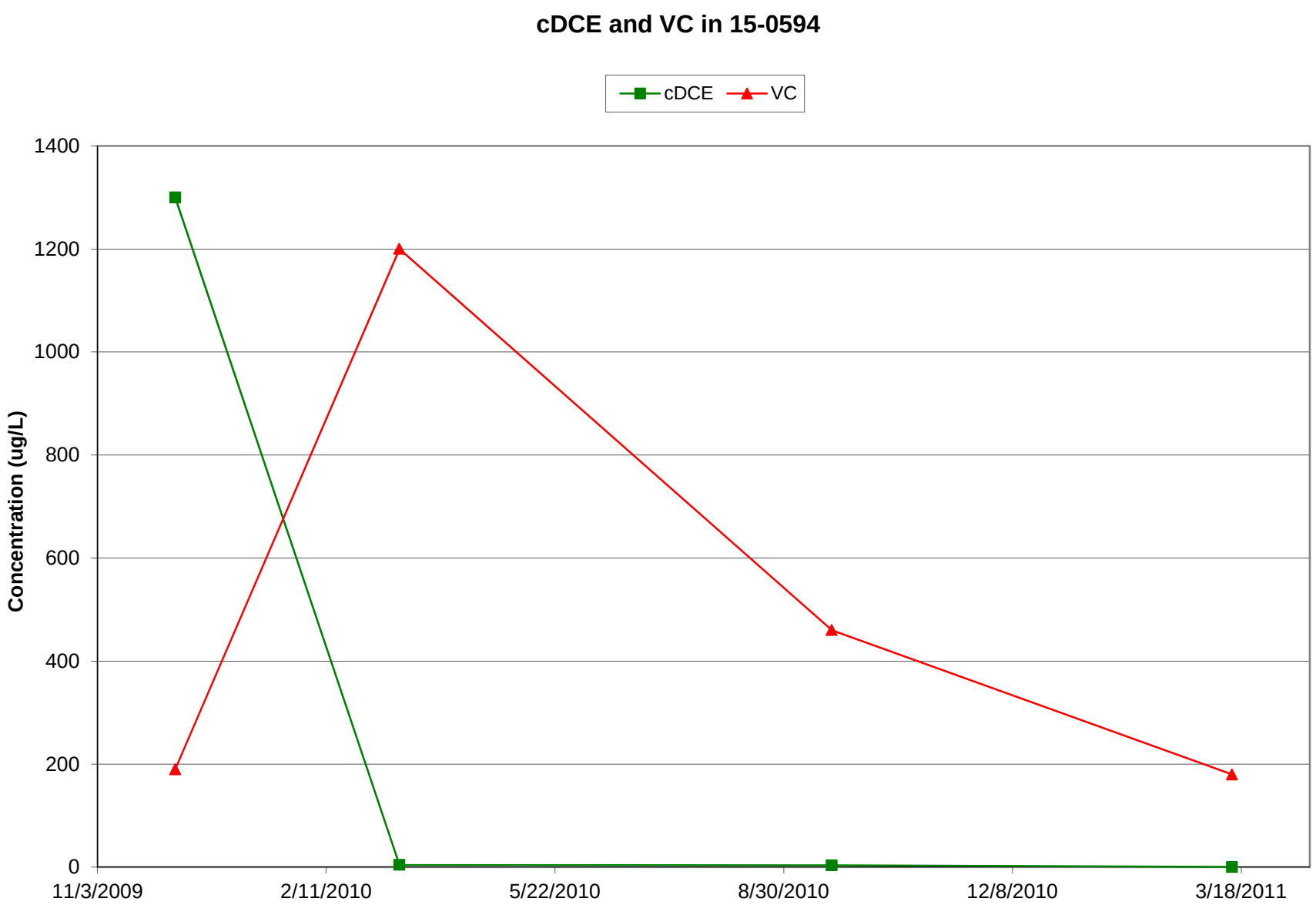


Figure 13. cDCE and VC in Well PIN15-0594, Northeast Site

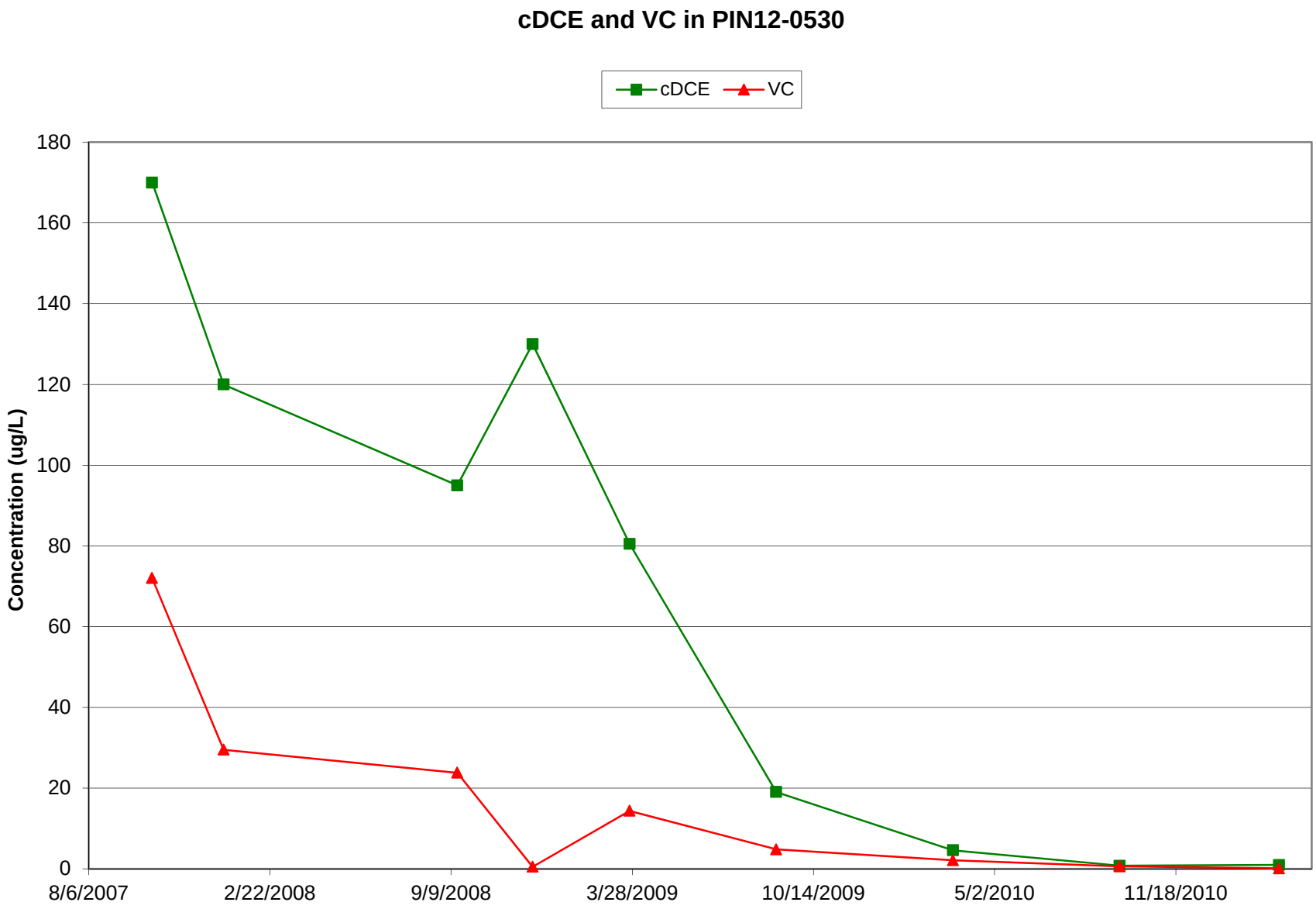


Figure 14. cDCE and VC in Well PIN12-0530, Building 100 Area

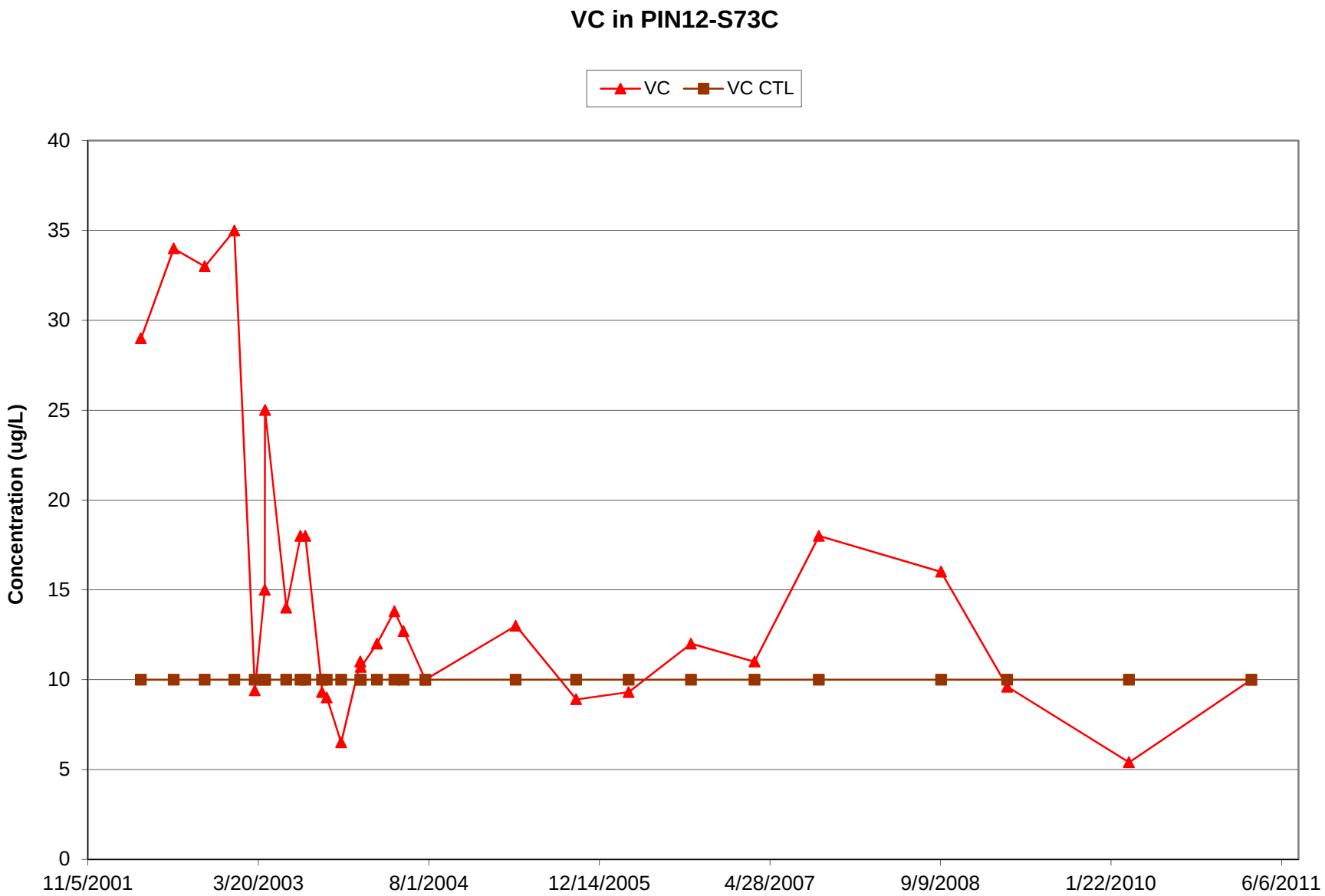


Figure 15. VC in Well PIN12-S73C, Building 100 Area

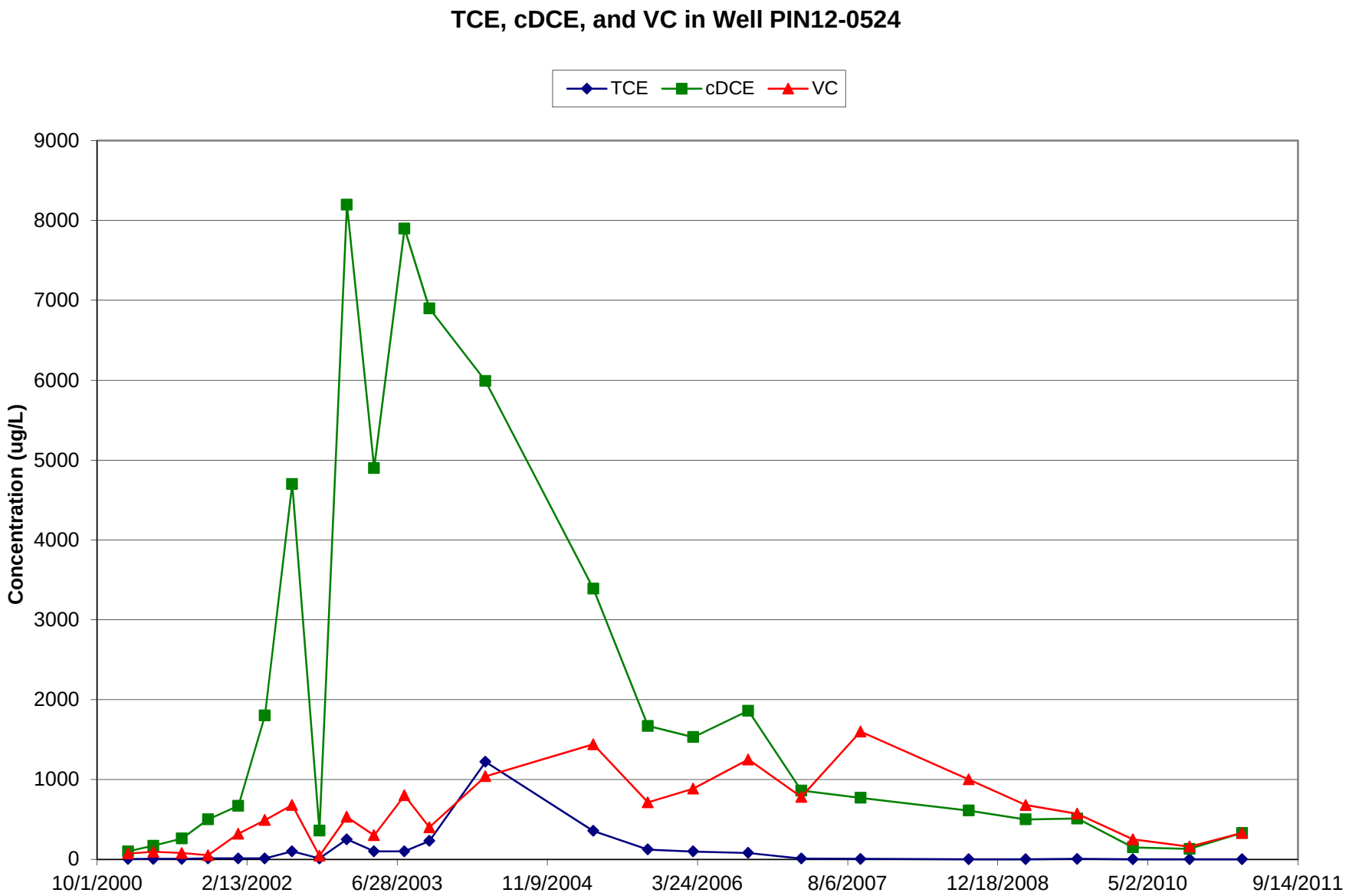


Figure 16. TCE, cDCE, and VC in Well PIN12-0524, Building 100 Area

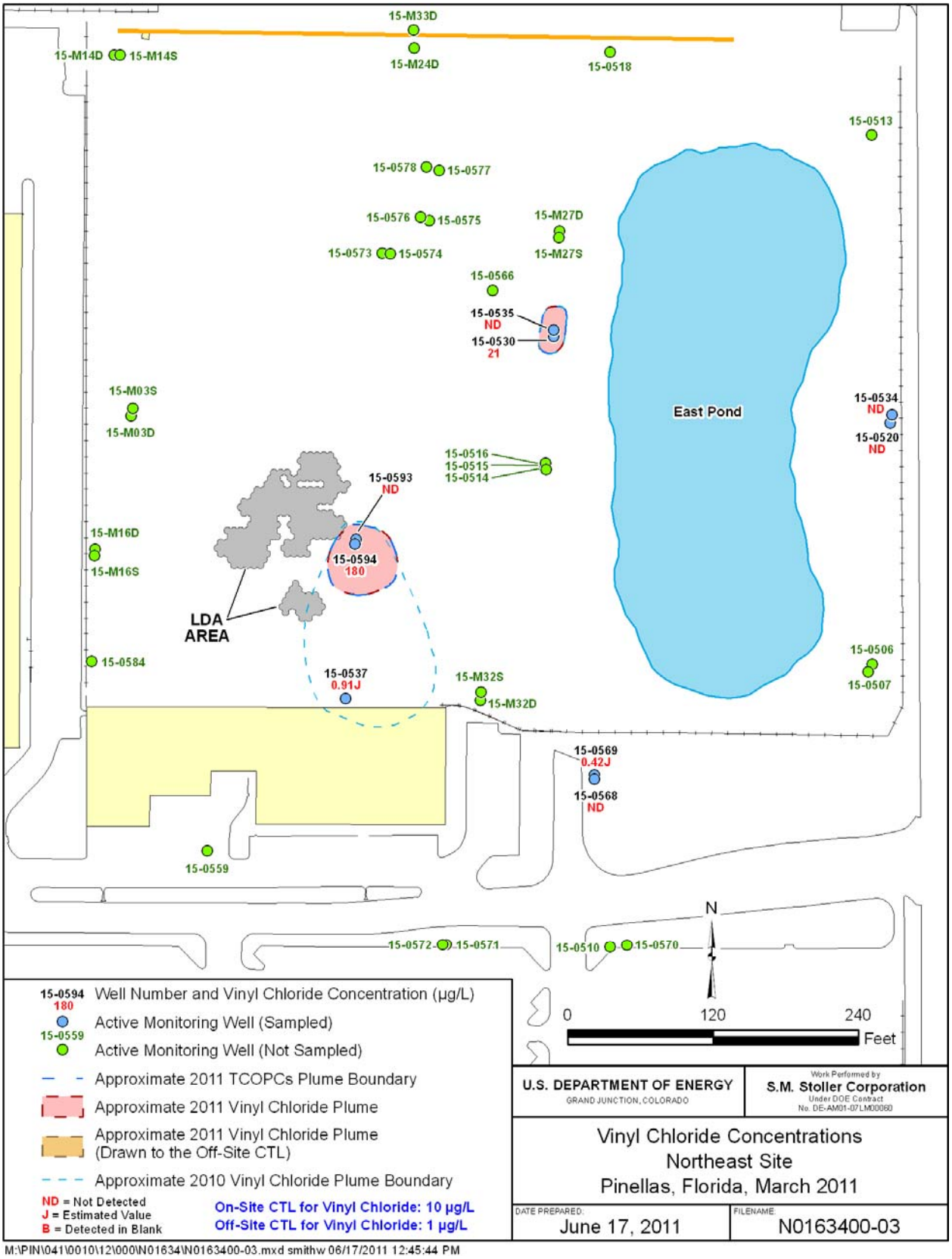


Figure 17. Northeast Site VC Plume Map, March 2011

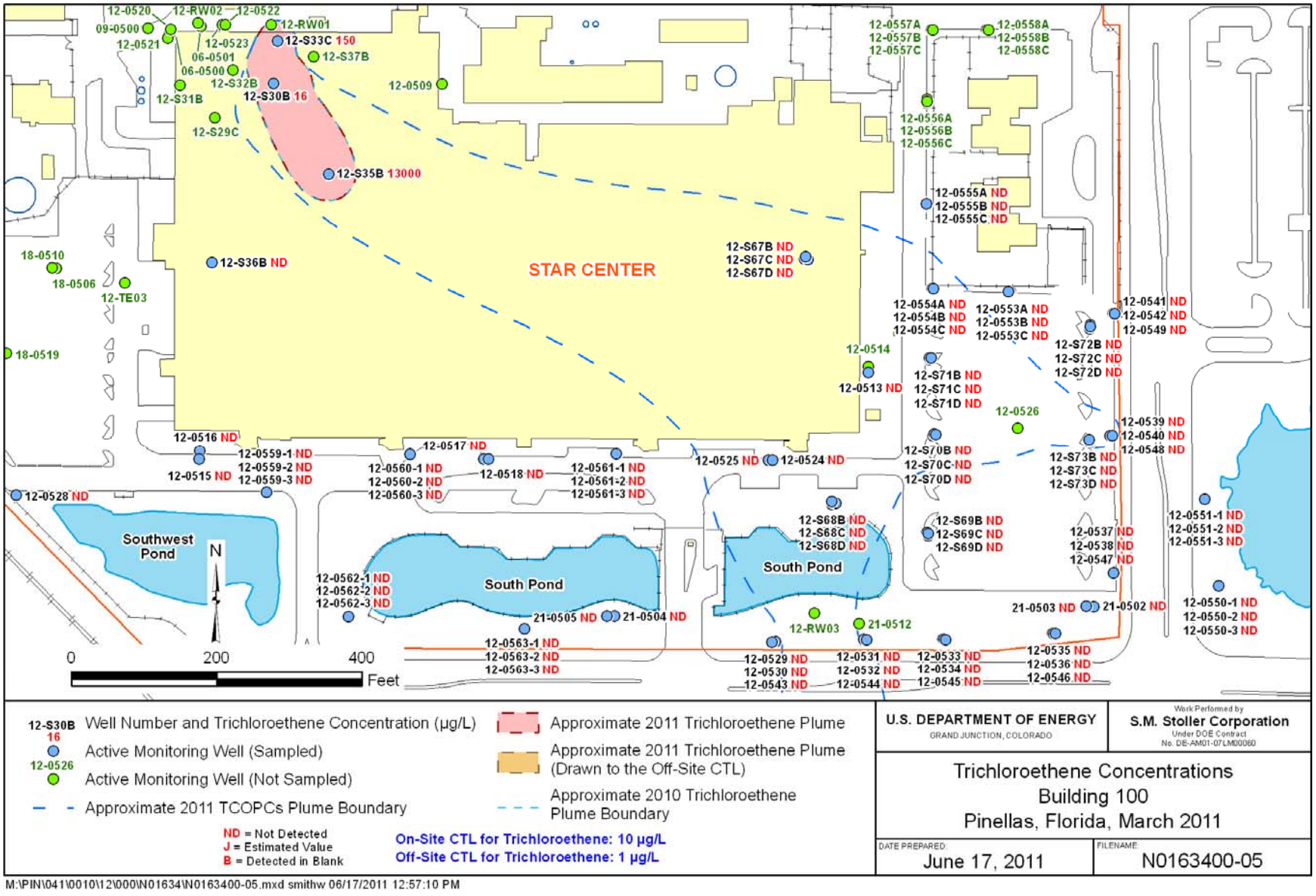


Figure 18. Building 100 Area TCE Plume Map, March 2011

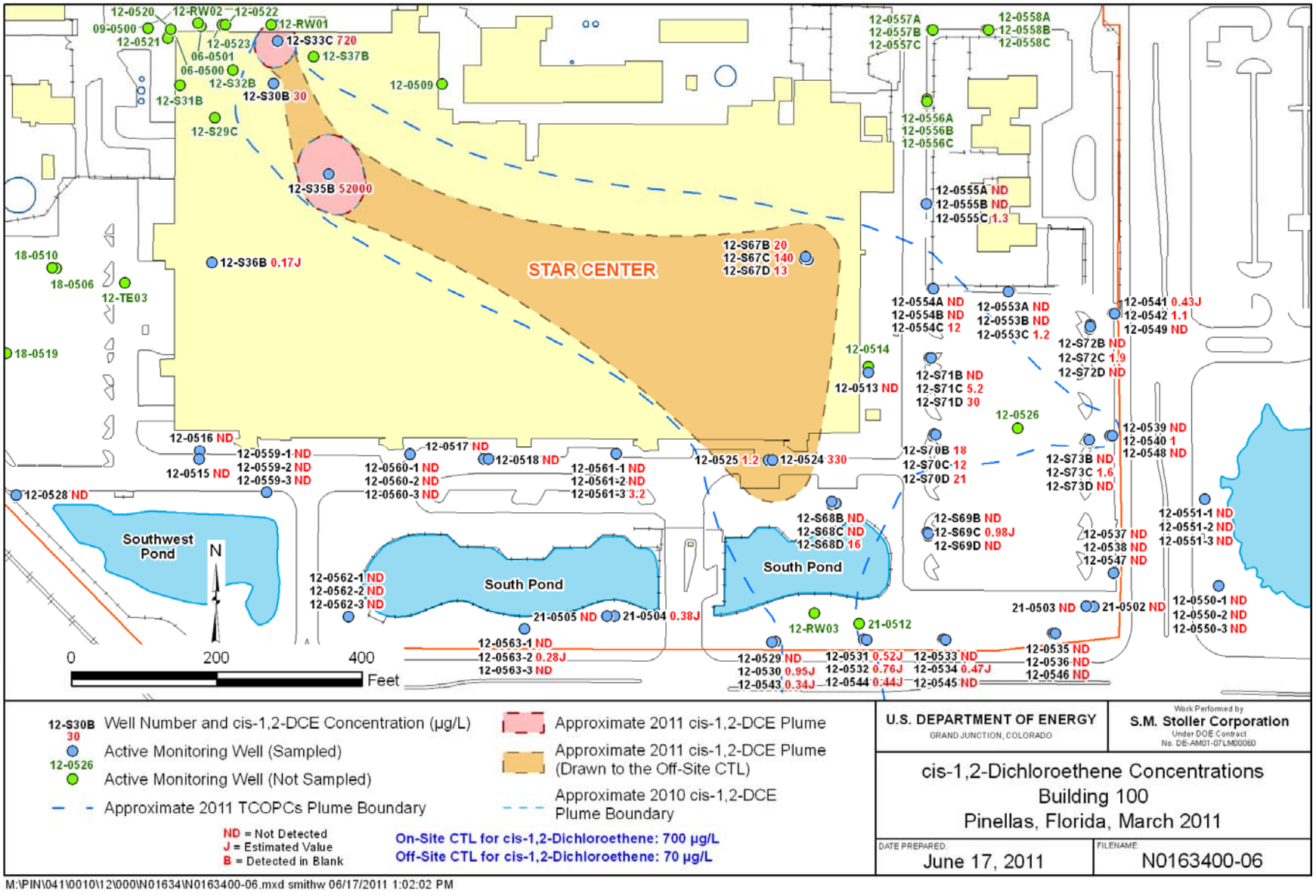


Figure 19. Building 100 Area cDCE Plume Map, March 2011

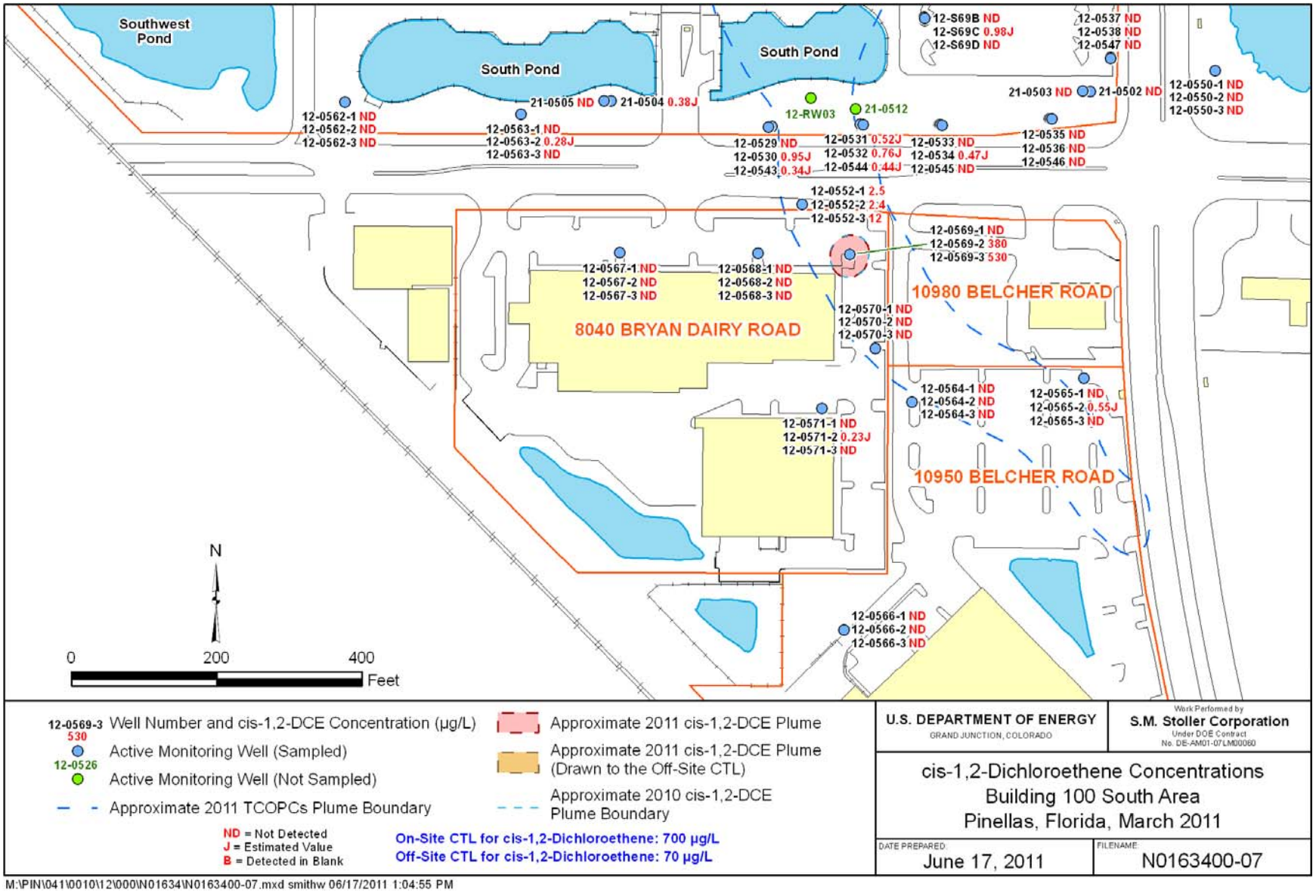


Figure 20. Building 100 Area South cDCE Plume Map, March 2011

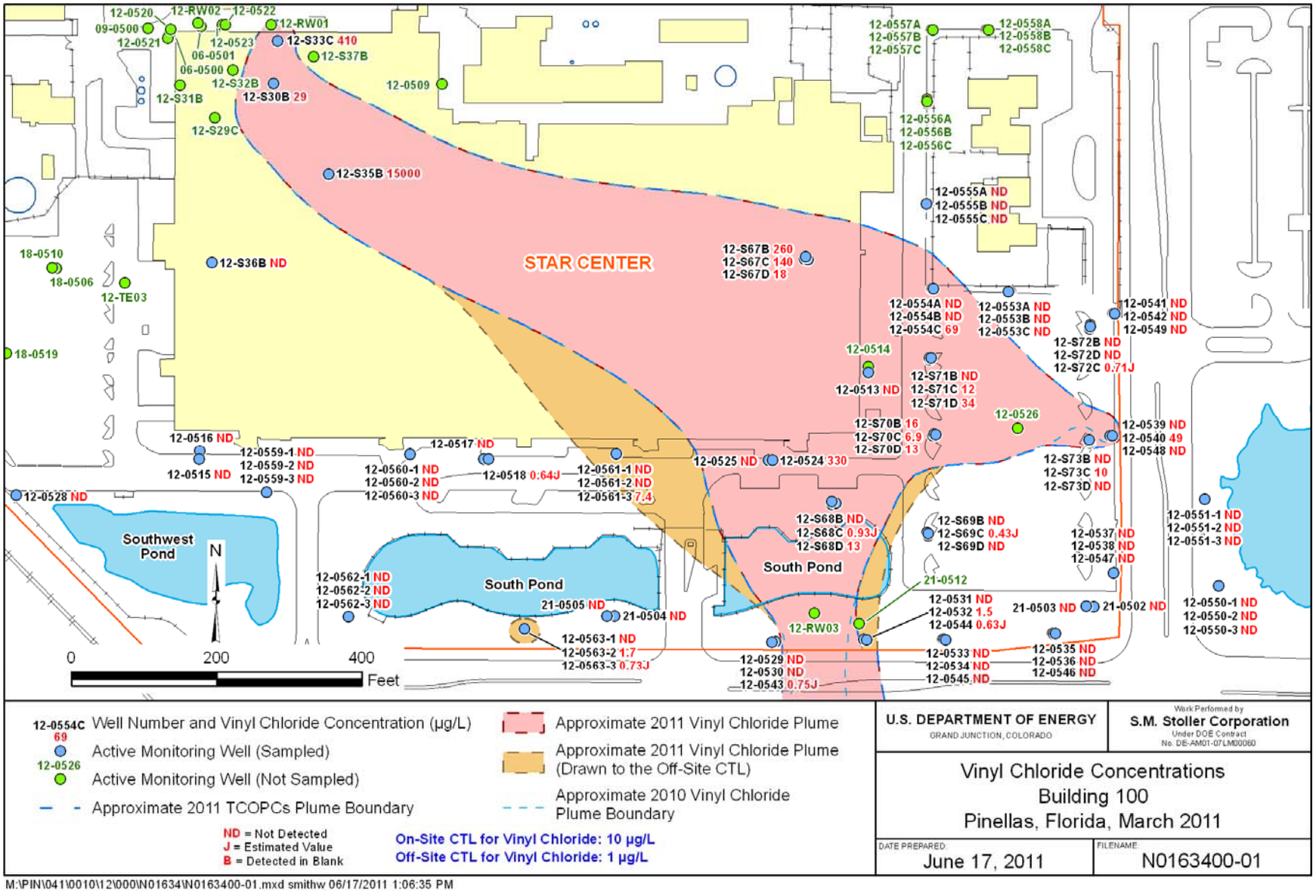


Figure 21. Building 100 Area VC Plume Map, March 2011

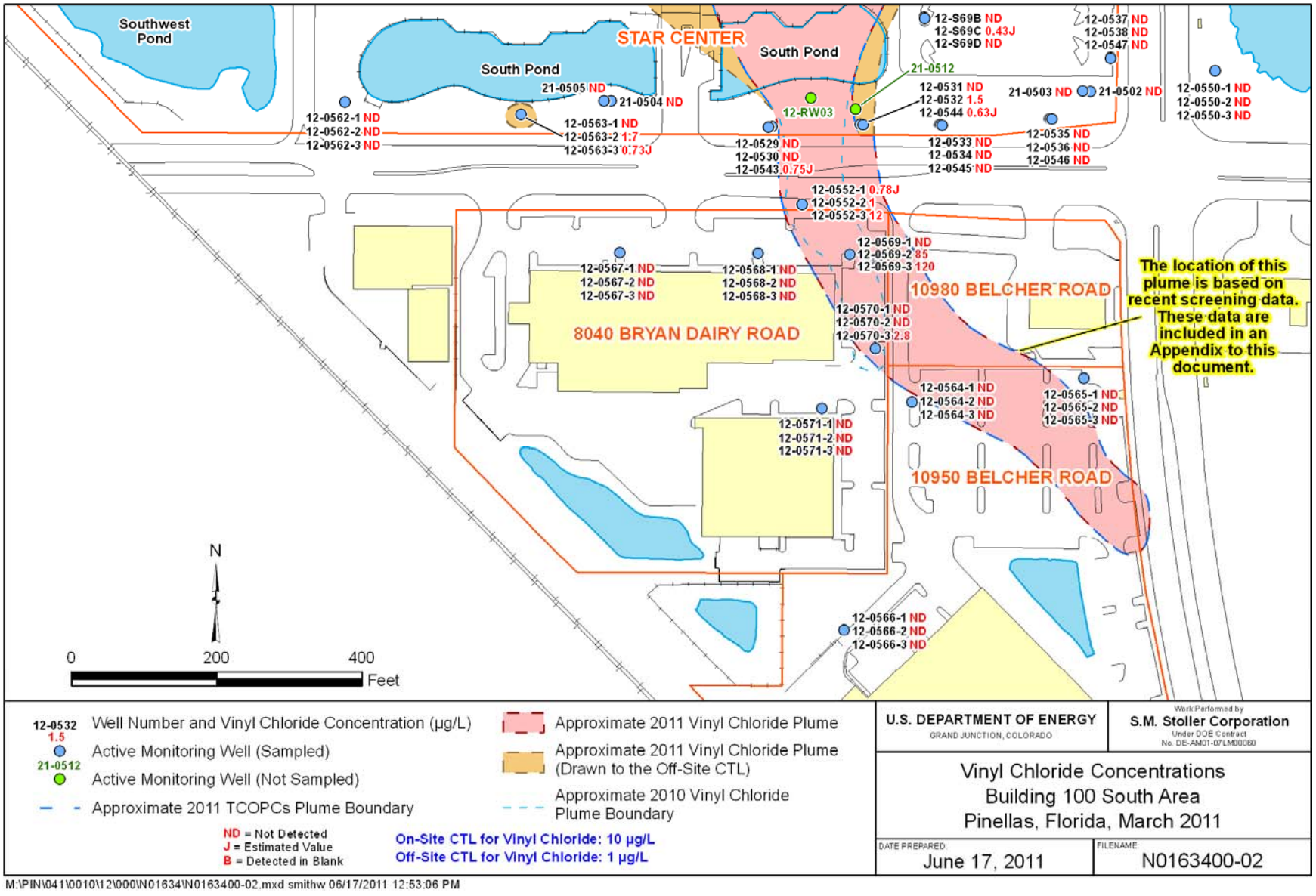


Figure 22. Building 100 Area South VC Plume Map, March 2011

Table 1. Groundwater-Level Data at the STAR Center, March 2011

Location	Measurement		Water Depth (ft bls[a])	Groundwater Elevation (ft amsl[b])
	Date	Time		
PIN02	**Sitewide Piezometers**			
PZ03	3/9/2011	08:54	3.78	15.92
PZ04	3/9/2011	08:55	2.80	15.40
PZ05	3/9/2011	09:04	3.23	14.87
PZ08	3/9/2011	09:18	4.08	14.32
PZ09	3/9/2011	09:44	3.88	14.12
PZ10	3/9/2011	08:59	4.75	14.13
PZ11	3/9/2011	09:04	4.56	14.32
Building 100 Area				
PIN06				
0500	3/9/2011	11:30	3.33	14.67
0501	3/9/2011	11:43	3.53	14.77
PIN09				
0500	3/9/2011	11:15	3.09	14.88
PIN10				
0500	3/9/2011	11:34	3.09	14.81
PIN12				
0509	3/9/2011	11:58	3.49	14.55
0513	3/9/2011	14:02	5.76	12.74
0514	3/9/2011	14:10	5.47	13.03
0515	3/9/2011	09:54	4.42	13.48
0516	3/9/2011	09:56	4.48	13.52
0517	3/9/2011	10:09	3.81	14.09
0518	3/9/2011	09:57	3.12	14.82
0520	3/9/2011	11:28	3.32	14.69
0521	3/9/2011	11:25	3.37	14.68
0522	3/9/2011	11:49	3.51	14.69
0523	3/9/2011	11:56	3.47	14.69
0524	3/9/2011	10:13	4.38	13.03
0525	3/9/2011	10:10	3.95	13.47
0526	3/9/2011	13:51	4.09	12.73
0527	3/9/2011	11:16	12.50	5.57
0528	3/9/2011	09:50	12.37	5.23
0529	3/9/2011	12:19	5.28	11.52
0530	3/9/2011	12:29	6.30	10.50
0531	3/9/2011	12:34	5.10	10.90
0532	3/9/2011	12:35	5.04	10.96
0533	3/9/2011	12:36	3.92	11.58
0534	3/9/2011	12:42	3.98	11.52
0535	3/9/2011	12:43	3.25	12.05
0536	3/9/2011	12:47	3.53	11.77

Table 1 (continued). Groundwater-Level Data at the STAR Center, March 2011

Location	Measurement		Water Depth (ft bls[a])	Groundwater Elevation (ft amsl[b])
	Date	Time		
0537	3/9/2011	13:03	3.33	12.23
0538	3/9/2011	12:59	3.31	12.25
0539	3/9/2011	13:11	3.82	12.61
0540	3/9/2011	13:19	3.81	12.62
0541	3/9/2011	13:33	4.91	12.75
0542	3/9/2011	13:33	4.94	12.72
0543	3/9/2011	12:30	6.48	10.45
0544	3/9/2011	12:36	5.17	10.79
0545	3/9/2011	12:43	3.97	11.53
0546	3/9/2011	12:48	3.40	11.89
0547	3/9/2011	13:04	3.40	12.24
0548	3/9/2011	13:20	2.02	14.42
0549	3/9/2011	13:29	4.90	12.76
0550-1	3/9/2011	09:22	2.72	11.98
0550-2	3/9/2011	09:26	2.64	12.06
0550-3	3/9/2011	09:27	2.60	12.10
0551-1	3/9/2011	09:03	3.50	11.90
0551-2	3/9/2011	09:19	3.18	12.22
0551-3	3/9/2011	09:21	3.13	12.27
0552-1	3/9/2011	08:57	5.34	11.36
0552-2	3/9/2011	08:59	5.55	11.15
0552-3	3/9/2011	09:02	6.58	10.12
0553A	3/9/2011	13:35	4.82	13.29
0553B	3/9/2011	13:34	5.05	13.06
0553C	3/9/2011	13:29	5.04	13.07
0554A	3/9/2011	13:20	4.85	13.39
0554B	3/9/2011	13:27	4.97	13.27
0554C	3/9/2011	13:28	4.99	13.25
0555A	3/9/2011	13:20	3.89	14.00
0555B	3/9/2011	13:18	4.43	13.46
0555C	3/9/2011	13:14	4.40	13.49
0556A	3/9/2011	13:03	3.93	14.08
0556B	3/9/2011	13:12	4.24	13.77
0556C	3/9/2011	13:12	4.31	13.70
0557A	3/9/2011	12:54	3.94	14.18
0557B	3/9/2011	12:55	4.35	13.77
0557C	3/9/2011	11:41	4.33	13.79
0558A	3/9/2011	13:02	4.07	14.14
0558B	3/9/2011	12:55	4.50	13.71
0558C	3/9/2011	13:00	4.50	13.71

Table 1 (continued). Groundwater-Level Data at the STAR Center, March 2011

Location	Measurement		Water Depth (ft bls[a])	Groundwater Elevation (ft amsl[b])
	Date	Time		
0559-1	3/9/2011	10:23	5.36	12.54
0559-2	3/9/2011	10:46	5.02	12.88
0559-3	3/9/2011	10:47	7.06	10.84
0560-1	3/9/2011	10:47	3.64	14.08
0560-2	3/9/2011	10:51	3.55	14.17
0560-3	3/9/2011	10:52	3.54	14.18
0561-1	3/9/2011	10:52	4.32	13.90
0561-2	3/9/2011	11:26	4.44	13.78
0561-3	3/9/2011	11:26	4.41	13.81
0562-1	3/9/2011	11:34	5.06	13.20
0562-2	3/9/2011	11:36	4.99	13.27
0562-3	3/9/2011	11:37	4.99	13.27
0563-1	3/9/2011	11:37	4.25	13.02
0563-2	3/9/2011	11:46	4.14	13.13
0563-3	3/9/2011	11:47	4.15	13.12
0564-1	3/9/2011	07:58	3.82	11.68
0564-2	3/9/2011	07:58	3.89	11.61
0564-3	3/9/2011	07:58	3.92	11.58
0565-1	3/9/2011	07:51	4.32	11.38
0565-2	3/9/2011	07:51	4.38	11.32
0566-1	3/9/2011	08:04	4.09	11.51
0566-2	3/9/2011	08:04	4.07	11.53
0566-3	3/9/2011	08:04	4.09	11.51
0567-1	3/9/2011	08:52	5.98	12.28
0567-2	3/9/2011	08:54	6.05	12.21
0567-3	3/9/2011	08:55	6.08	12.18
0568-1	3/9/2011	08:42	6.42	11.84
0568-2	3/9/2011	08:50	6.68	11.58
0568-3	3/9/2011	08:50	6.68	11.58
0569-1	3/9/2011	08:38	6.32	11.79
0569-2	3/9/2011	08:38	6.63	11.48
0569-3	3/9/2011	08:38	6.64	11.47
0570-1	3/9/2011	08:32	6.29	11.51
0570-2	3/9/2011	08:32	6.36	11.44
0570-3	3/9/2011	08:32	6.34	11.46
0571-1	3/9/2011	08:25	6.45	11.75
0571-2	3/9/2011	08:25	6.50	11.70
0571-3	3/9/2011	08:25	6.46	11.74

Table 1 (continued). Groundwater-Level Data at the STAR Center, March 2011

Location	Measurement		Water Depth (ft bls[a])	Groundwater Elevation (ft amsl[b])
	Date	Time		
S29C	3/9/2011	12:18	3.76	14.75
S30B	3/9/2011	12:17	3.97	14.54
S31B	3/9/2011	11:51	3.98	14.53
S32B	3/9/2011	12:16	3.93	14.58
S33C	3/9/2011	12:16	3.88	14.63
S35B	3/9/2011	12:18	4.23	14.28
S36B	3/9/2011	12:19	4.42	14.09
S68B	3/9/2011	10:21	4.98	12.92
S68C	3/9/2011	10:13	5.28	12.62
S68D	3/9/2011	10:21	5.33	12.57
S69B	3/9/2011	13:43	3.77	12.23
S69C	3/9/2011	13:34	3.98	12.02
S69D	3/9/2011	13:42	4.09	11.91
S70B	3/9/2011	13:44	3.19	13.51
S70C	3/9/2011	13:49	3.78	12.92
S70D	3/9/2011	13:50	3.85	12.85
S71B	3/9/2011	13:55	5.11	13.29
S71C	3/9/2011	13:59	5.22	13.18
S71D	3/9/2011	14:01	5.24	13.16
S72B	3/9/2011	13:22	5.27	12.93
S72C	3/9/2011	13:26	5.32	12.88
S72D	3/9/2011	13:28	5.33	12.87
S73B	3/9/2011	13:11	4.22	12.78
S73C	3/9/2011	13:10	4.40	12.60
S73D	3/9/2011	13:04	4.62	12.38
TE03	3/9/2011	09:37	2.66	14.34
PIN21				
0502	3/9/2011	12:51	2.54	12.66
0503	3/9/2011	12:49	2.91	12.29
0504	3/9/2011	11:51	4.19	13.41
0505	3/9/2011	11:47	4.41	12.99
0512	3/9/2011	12:32	6.74	10.56
PIN15	**Northeast Site**			
0506	3/9/2011	07:35	3.14	13.86
0507	3/9/2011	07:36	3.12	13.88
0513	3/9/2011	07:44	11.92	5.68
0514	3/9/2011	09:48	3.28	14.22
0515	3/9/2011	09:47	3.30	14.20
0516	3/9/2011	09:15	3.50	13.90
0518	3/9/2011	07:47	3.36	14.44
0520	3/9/2011	07:39	3.16	14.04

Table 1 (continued). Groundwater-Level Data at the STAR Center, March 2011

Location	Measurement		Water Depth (ft bls[a])	Groundwater Elevation (ft amsl[b])
	Date	Time		
0530	3/9/2011	09:55	3.21	14.19
0534	3/9/2011	07:43	2.36	14.94
0535	3/9/2011	09:49	3.32	14.28
0537	3/9/2011	08:11	3.98	14.62
0559	3/9/2011	11:07	4.13	14.66
0566	3/9/2011	09:56	3.06	14.44
0569	3/9/2011	11:04	2.36	16.02
0570	3/9/2011	11:30	3.91	14.07
0571	3/9/2011	11:27	3.00	14.47
0572	3/9/2011	11:20	3.07	14.44
0573	3/9/2011	10:46	3.60	14.78
0574	3/9/2011	10:43	3.91	14.51
0575	3/9/2011	10:01	3.13	14.71
0576	3/9/2011	10:08	2.96	14.52
0578	3/9/2011	10:29	3.17	14.35
0584	3/9/2011	08:02	4.02	14.68
0593	3/9/2011	10:53	4.06	14.43
0594	3/9/2011	10:48	3.39	15.11
M03S	3/9/2011	08:44	3.03	15.07
M14D	3/9/2011	07:53	3.01	14.99
M14S	3/9/2011	08:39	2.96	15.04
M16D	3/9/2011	07:58	3.28	14.92
M16S	3/9/2011	08:01	3.29	14.91
M24D	3/9/2011	07:49	3.27	14.53
M27D	3/9/2011	10:00	3.32	14.28
M27S	3/9/2011	09:59	3.57	14.03
M32D	3/9/2011	11:03	3.42	14.38
M32S	3/9/2011	10:53	3.33	14.47
M33D	3/9/2011	07:52	2.68	14.92
PIN18	**WWNA**			
0500	3/9/2011	10:47	5.15	14.95
0502	3/9/2011	09:41	5.16	14.84
0503	3/9/2011	09:26	3.27	14.41
0504	3/9/2011	10:37	4.54	15.06
0505	3/9/2011	09:31	3.34	14.54
0506	3/9/2011	09:36	2.96	14.75
0507	3/9/2011	09:29	3.43	14.30
0508	3/9/2011	10:40	4.44	15.06
0509	3/9/2011	09:29	3.44	14.39
0510	3/9/2011	09:33	3.56	14.20
0519	3/9/2011	09:40	3.93	14.35

Table 1 (continued). Groundwater-Level Data at the STAR Center, March 2011

Location	Measurement		Water Depth (ft bls[a])	Groundwater Elevation (ft amsl[b])
	Date	Time		
0520	3/9/2011	11:00	3.49	14.51
0521	3/9/2011	11:02	3.42	14.68
0522	3/9/2011	10:56	3.39	14.71
0523	3/9/2011	11:13	4.63	14.77
0524	3/9/2011	11:12	4.23	14.77
0525	3/9/2011	11:06	4.01	14.89
0526	3/9/2011	09:25	4.44	14.16
RW02	3/9/2011	10:45	5.23	14.87
RW03	3/9/2011	10:50	3.64	14.66
RW0501	3/9/2011	10:42	5.20	14.80

[a] bls = below land surface
[b] amsl = above mean sea level

Table 2. Floridan Aquifer Monitoring Well Water Elevations

Location	March 2010 Water Elevation (ft amsl[a])	September 2010 Water Elevation (ft amsl[a])	March 2011 Water Elevation (ft amsl[a])
PIN12-0527	6.54	7.63	5.57
PIN12-0528	6.19	7.42	5.23
PIN15-0513	6.56	7.53	5.68

[a] amsl = above mean sea level

Table 3. Surface Water Elevations, March 2011

Location	Measurement		Surface Water Elevation (ft amsl[a])
	Date	Time	
PIN01	**Pond 5**		
P501	3/9/2011	09:19	13.42
P502	3/9/2011	09:15	13.91
PIN02	**West Pond**		
W005	3/9/2011	09:09	14.14
PIN 12	**Belcher Road Pond**		
BR01	3/9/2011	09:27	13.09
PIN15	**East Pond**		
E001	3/9/2011	11:04	13.75
PIN23	**Southwest Pond**		
SW01	3/9/2011	11:30	13.37
PIN37	**South Pond**		
S001	3/9/2011	11:30	13.42
S002	3/9/2011	12:30	13.39

[a] amsl = above mean sea level

Table 4. Field Measurements of Samples Collected at the STAR Center, March 2011

Location	Screen Depth (ft bls[a])	Temperature (°C)	Specific Conductance (µmhos/cm)[b,c]	Turbidity (NTU)[d]	pH	Oxidation Reduction Potential (mV)[e]	Dissolved Oxygen (mg/L)
Building 100 Area							
PIN12							
0513	15–25	22.0	717	6	6.65	-62	0.2
0515	15–25	25.5	624	3	6.67	-74	0.4
0516	30–40	25.6	1,567	4	6.60	-44	0.7
0517	15–25	26.4	582	50	6.93	-111	0.3
0518	30–40	26.3	693	13	6.68	-44	0.4
0524	27–37	25.1	1,488	4	6.53	-62	0.6
0525	12–22	24.7	741	16	6.70	-78	0.4
0528	127–146.9	24.2	1,279	0.7	6.84	-273	-
0529	10–20	22.7	522	18	6.67	94	1.2
0530	19.5–29.5	21.9	635	2	6.68	-61	0.7
0531	10–20	23.3	824	7	6.66	-95	0.5
0532	20–30	24.1	1,205	6	6.57	-75	0.5
0533	10–20	22.5	856	37	6.65	-77	0.7
0534	20–30	23.2	1,165	3	6.56	-61	0.6
0535	10–20	20.7	798	5	6.78	-63	1.2
0536	20–30	22.5	729	3	6.77	-53	1.3
0537	10–20	27.7	968	-	6.80	-92	1.2
0538	20–30	27.6	1,147	0.8	6.65	-62	1.2
0539	9.5–19.5	25.1	696	14	6.64	-62	0.5
0540	20–30	26.1	1,370	5	6.51	-54	1.0
0541	10–20	25.2	662	12	6.69	-75	1.0
0542	20–30	26.2	754	13	6.71	-73	0.8
0543	28–38	25.0	1,480	9	6.63	-31	0.4
0544	30–40	23.3	1,511	3	6.63	-38	0.8
0545	29.5–39.5	23.5	1,560	4	6.58	-26	0.6
0546	29.5–39.5	23.8	1,156	15	6.60	-44	0.6
0547	29.5–39.5	26.9	1,328	5	6.67	-55	1.3
0548	30–40	28.1	1,827	9	6.56	-58	1.3
0549	30–40	27.0	1,442	11	6.68	-48	1.0
0550-1	9–18	21.5	1,234	2	6.52	-48	1.1
0550-2	20–29	22.8	1,275	13	6.59	-47	0.9
0550-3	31–40	22.3	1,389	2	6.65	-40	0.9
0551-1	9–18	22.9	1,120	5	6.48	-39	0.8
0551-2	20–29	23.6	1,166	3	6.52	-42	0.7
0551-3	31–40	24.2	1,408	12	6.62	-24	1.0
0552-1	9–18	22.5	1,737	4	6.64	-66	2.6
0552-2	20–29	24.2	1,706	0.9	6.66	-72	2.6
0552-3	31–40	25.7	1,352	4	6.62	-70	1.4

Table 4 (continued). Field Measurements of Samples Collected at the STAR Center, March 2011

Location	Screen Depth (ft bls[a])	Temperature (°C)	Specific Conductance (µmhos/cm)[b,c]	Turbidity (NTU)[d]	pH	Oxidation Reduction Potential (mV)[e]	Dissolved Oxygen (mg/L)
0553A	3–13	24.9	1,231	20	6.46	3	-
0553B	13–23	26.2	1,322	98	6.48	-67	0.8
0553C	23–33	26.5	727	1000	6.72	-93	0.6
0554A	3–13	24.4	629	13	6.40	-135	1.6
0554B	13–23	25.4	655	426	6.61	-91	1.5
0554C	23–33	26.3	786	15	6.68	-63	0.3
0555A	2.5–12.5	23.4	396	88	6.47	-73	1.1
0555B	13–23	24.8	339	237	7.11	-110	0.4
0555C	23–33	25.1	603	1000	5.77	14	1.0
0559-1	9–18	25.2	1,577	7	6.69	-27	0.8
0559-2	20–29	24.9	1,791	10	6.67	12	0.6
0559-3	31–40	24.2	1,125	9	6.59	-30	0.6
0560-1	9–18	23.7	766	2	6.64	-41	0.8
0560-2	20–29	24.4	652	5	6.68	-57	0.7
0560-3	31–40	24.0	880	8	6.61	-22	0.6
0561-1	9–18	22.2	504	4	6.98	-45	0.8
0561-2	20–29	23.3	675	3	6.81	-91	0.7
0561-3	31–40	23.9	1,218	4	6.64	-43	0.8
0562-1	9–18	19.9	1,060	2	6.68	-61	1.3
0562-2	20–29	19.2	1,743	5	6.68	-10	0.9
0562-3	31–40	25.7	583	0.8	6.94	-84	3.8
0563-1	9–18	19.9	629	6	6.90	-79	1.0
0563-2	20–29	21.1	1,177	1	6.64	-33	0.7
0563-3	31–40	22.0	1,567	1	6.68	-65	0.8
0564-1	9–18	17.7	1,444	0.8	6.58	-33	1.4
0564-2	20–29	18.5	1,384	0.7	6.59	-38	1.2
0564-3	31–40	20.0	1,499	0.9	6.63	-42	1.1
0565-1	9–18	27.0	975	0.3	6.72	-57	3.6
0565-2	20–29	27.0	1,149	0.7	6.66	-65	3.4
0565-3	31–40	26.0	1,480	0.3	6.59	-46	3.5
0566-1	10–19	27.1	769	1	6.59	-52	6.5
0566-2	21–30	27.2	535	0.6	6.84	-70	4.2
0566-3	32–41	26.0	1,014	0.8	6.77	-65	5.0
0567-1	9–18	18.0	1,717	1	6.57	-32	1.1
0567-2	20–29	19.7	725	0.5	6.81	-64	1.4
0567-3	31–40	20.7	1,263	2	6.75	-26	2.9
0568-1	9–18	18.7	1,694	6	6.57	-25	1.3
0568-2	20–29	21.3	1,700	4	6.50	-80	5.0
0568-3	31–40	22.0	1,742	5	6.50	-86	2.9
0569-1	9–18	23.5	1,812	4	6.58	-46	1.1

Table 4 (continued). Field Measurements of Samples Collected at the STAR Center, March 2011

Location	Screen Depth (ft bls[a])	Temperature (°C)	Specific Conductance (µmhos/cm)[b,c]	Turbidity (NTU)[d]	pH	Oxidation Reduction Potential (mV)[e]	Dissolved Oxygen (mg/L)
0569-2	20–29	25.4	1,199	5	6.59	-65	0.9
0569-3	31–40	26.1	1,369	3	6.64	-79	0.9
0570-1	9–18	21.2	1,676	0.5	6.56	-21	1.2
0570-2	20–29	22.0	1,435	0.4	6.63	-44	1.0
0570-3	31–40	21.5	1,441	2	6.70	-69	1.0
0571-1	9–18	19.4	1,160	11	6.56	-44	1.0
0571-2	20–29	19.6	1,143	2	6.61	-52	1.1
0571-3	31–40	19.7	1,149	2	6.57	-51	0.9
S30B	5–15	22.2	1,255	21	6.83	-58	0.5
S33C	11–21	22.2	702	85	6.77	-67	0.5
S35B	5–15	22.3	1,518	8	6.50	14	0.6
S36B	5–15	22.4	731	55	6.45	-34	0.8
S67B	10–19.83	20.3	1,084	38	6.71	-50	0.4
S67C	20–29.83	20.7	882	23	6.73	-60	0.6
S67D	30–39.83	21.1	975	200	6.73	-65	0.4
S68B	10–20	23.0	830	12	6.57	-63	0.3
S68C	18–28	23.2	969	8	6.53	-24	0.4
S68D	30–40	22.9	1,351	1	6.49	-26	0.3
S69B	10–20	24.1	675	16	6.72	-72	0.7
S69C	20–30	25.3	796	10	6.69	-51	0.6
S69D	30–40	25.0	1,585	3	6.60	-19	0.6
S70B	10–20	25.6	1,055	41	6.54	-53	0.6
S70C	20–30	26.9	1,388	175	6.45	-65	0.5
S70D	30–40	26.6	1,532	39	6.43	-58	0.4
S71B	10–20	26.0	953	27	6.57	-97	0.7
S71C	20–30	27.0	1,232	307	6.50	-95	0.8
S71D	30–40	27.0	1,519	15	6.50	-68	0.8
S72B	10–20	27.3	2,031	12	6.00	-26	0.6
S72C	20–30	28.5	792	16	6.60	-34	0.5
S72D	30–40	27.8	-	15	7.26	49	7.3
S73B	10–20	25.6	849	33	6.44	-220	-
S73C	20–30	26.1	1,814	73	6.38	-53	-
S73D	30–40	27.6	2,288	23	6.34	-51	0.8
PIN21							
0502	7–17	21.2	777	3	6.79	-53	-
0503	20–28	22.9	843	25	6.78	-59	-
0504	7–17	21.1	647	17	6.91	-74	-
0505	20–28	22.8	800	8	6.78	-21	-

Table 4 (continued). Field Measurements of Samples Collected at the STAR Center, March 2011

Location	Screen Depth (ft bls[a])	Temperature (°C)	Specific Conductance (µmhos/cm)[b,c]	Turbidity (NTU)[d]	pH	Oxidation Reduction Potential (mV)[e]	Dissolved Oxygen (mg/L)
PIN23							
SW01	Southwest Pond	20.1	303	8	7.36	125	6.7
PIN37							
S002	South Pond	20.5	319	2	6.78	151	8.42
PIN15	**Northeast Site**						
0520	5–14.5	21.5	814	11	6.76	-32	0.5
0530	5–14.5	21.8	1,177	8	6.57	-46	1.1
0534	19.5–29	23.9	1,860	-	6.70	56	0.4
0535	20.5–30	24.3	1,758	145	6.57	2	0.9
0537	17.5–30	21.5	1,165	161	6.66	-42	1.0
0568	10–20	24.0	993	15	6.90	-33	0.4
0569	20–30	24.0	1,358	58	6.62	-30	0.6
0593	10–20	-	-	-	-	-	-
0594	20–30	-	-	>1,000	-	-	-
E001	East Pond	19.3	326	22	7.53	27	7.1

[a] bls = below land surface
[b] Temperature corrected to 25 °C
[c] µmhos/cm = micromhos per centimeter
[d] NTU = nephelometric turbidity units
[e] mV = millivolts
- = not measured

Table 5. COPC Concentrations at the Northeast Site (µg/L)[a]

Location	Screen Depth (ft)	Date Sampled	TCE	cDCE	Total 1,2-DCE[c]	Vinyl chloride	Methylene chloride	Benzene	Toluene	TCOPCs[d]
Cleanup Target Level[b]			**30**	**700**	**630**	**10**	**50**	**10**	**10,000**	
PIN15										
0520	5–14.5	3/11/2010	<0.16	<0.15	ND	<0.4	<0.32	<0.16	<0.17	ND
		9/20/2010	<0.16	<0.15	ND	<0.4	<0.32	<0.16	<0.17	ND
		3/12/2011	<0.16	<0.15	ND	<0.1	<0.32	<0.16	<0.17	ND
0530	5–14.5	3/11/2010	<0.16	220	238	790	<0.32	0.8J	<0.17	1,028.8
		9/21/2010	<0.16	1.1	1.47	110	<0.32	0.75J	<0.17	112.22
		3/14/2011	<0.16	<0.15	ND	21	<0.32	0.61J	<0.17	21.61
0534	19.5–29	3/11/2010	<0.16	<0.15	ND	<0.4	<0.32	<0.16	<0.17	ND
		9/20/2010	<0.16	<0.15	ND	<0.4	<0.32	<0.16	<0.17	ND
		3/12/2011	<0.16	<0.15	ND	<0.1	<0.32	<0.16	<0.17	ND
0535	20.5–30	3/11/2010	<0.16	0.24J	0.24	16	<0.32	0.31J	<0.17	16.55
		9/21/2010	<0.16	<0.15	ND	0.73J	<0.32	<0.16	<0.17	0.73
		3/14/2011	<0.16	<0.15	ND	<0.1	<0.32	<0.16	<0.17	ND
0537	17.5–30	3/15/2010	<0.16	12	12	130	<0.32	3.3	<0.17	145.3
		9/20/2010	<0.16	0.28J	0.28	<0.4	<0.32	2	<0.17	2.28
		3/15/2011	<0.16	0.38J	0.38	0.91J	<0.32	2.1J	<0.17	3.39
0568	10–20	3/11/2010	<0.16	<0.15	ND	<0.4	<0.32	<0.16	<0.17	ND
		9/20/2010	<0.16	<0.15	ND	<0.4	<0.32	<0.16	<0.17	ND
		3/12/2011	<0.16	<0.15	ND	<0.1	<0.32	<0.16	<0.17	ND
0569	20–30	3/11/2010	<0.16	<0.15	ND	1	<0.32	<0.16	<0.17	1
		9/20/2010	<0.16	<0.15	ND	<0.4	<0.32	<0.16	<0.17	ND
		3/12/2011	<0.16	<0.15	ND	0.42J	<0.32	<0.16	<0.17	0.42
0593	10–20	3/15/2010	<0.16	5.8	6.1	23	<0.32	3.4	11	43.5
		9/20/2010	<0.16	<0.15	ND	<0.4	<0.32	1.8	26	27.8
		3/14/2011	<0.16	<0.15	ND	<0.1	<0.32	2.3	<0.17	2.3
0594	20–30	3/15/2010	<1.6	4.5J	4.5	1,200	<3.2	34	660	1,898.5
		9/20/2010	<0.32	3.7	3.7	460	<0.64	31	530	1,024.7
		3/14/2011	<0.32	<0.3	ND	180J	<0.64	32	380	592
E001	East Pond	3/11/2010	<0.16	<0.15	ND	<0.4	<0.32	<0.16	<0.17	ND
		3/11/2011	<0.16	<0.15	ND	<0.1	<0.32	<0.16	<0.17	ND

Notes:
Arsenic, while a COPC, is not included in this table or in the TCOPCs value.
[a] "<" values are method detection limits
[b] The off-site CTL is a factor of 10 lower than the listed on-site, poor water quality CTL.
[c] Total 1,2-DCE is the sum of cDCE and *trans*-1,2-dichloroethene (tDCE).
[d] TCOPCs is the sum of the individual COPC concentrations. The cDCE value is not part of the TCOPCs value because cDCE is already included in the Total 1,2-DCE value.

Abbreviations:
J = Estimated value, result is between the reporting limit and the method detection limit.
ND = Not detected.

Table 6. Aluminum and Iron Concentrations Measured at the Northeast Site, March 2011 (µg/L)

Well	Date Sampled	Aluminum	Iron
Cleanup Target Level:		**2,000**	**3,000**
0520	3/12/2011	320	1,900
0530	3/14/2011	270	2,300
0534	3/12/2011	1,600	510
0535	3/14/2011	3,100	670
0537	3/15/2011	2,900	2,600
0568	3/12/2011	310	790
0569	3/12/2011	460	3,200
0593	3/14/2011	1,000	2,000
0594	3/14/2011	3,000	2,000

Table 7. COPC Concentrations at the Building 100 Area (µg/L)[a]

Location	Screen Depth (ft)	Date Sampled	TCE	cDCE	tDCE	Total 1,2-DCE[b]	1,1-DCE[c]	Vinyl chloride	TCOPCs[d]
Cleanup Target Level[e]			**30**	**700**	**1,000**	**630**	**70**	**10**	
PIN06									
0500	3–13	3/17/2010	<0.16	0.26J	<0.15	0.26	<0.23	<0.4	0.26
PIN12									
0509	3–13	3/17/2010	<0.16	0.19J	<0.15	0.19	<0.23	<0.4	0.19
0513	15–25	3/16/2010	<0.16	0.17J	<0.15	0.17	<0.23	0.64J	0.81
		3/10/2011	<0.16	<0.15	<0.15	ND	<0.23	<0.1	ND
0515	15–25	3/13/2010	<0.16	<0.15	<0.15	ND	<0.23	<0.4	ND
		3/12/2011	<0.16	<0.15	<0.15	ND	<0.23	<0.1	ND
0516	30–40	3/13/2010	<0.16	<0.15	<0.15	ND	<0.23	<0.4	ND
		3/12/2011	<0.16	<0.15	<0.15	ND	<0.23	<0.1	ND
0517	15–25	3/13/2010	<0.16	<0.15	<0.15	ND	<0.23	<0.4	ND
		3/12/2011	<0.16	<0.15	<0.15	ND	<0.23	<0.1	ND
0518	30–40	3/13/2010	<0.16	<0.15	<0.15	ND	<0.23	0.63J	0.63
		3/12/2011	<0.16	<0.15	<0.15	ND	<0.23	0.64J	0.64
0521	19.5–29.5	3/17/2010	5.3	6.5	0.64J	7.14	<0.23	1.4	13.84
0524	27–37	3/13/2010	<0.16	150	3.4	153.4	4.5	250	407.9
		9/18/2010	<0.16	130J	3.6J	133.6	7.2J	160J	300.8
		3/12/2011	<0.32	330	4.4	334.4	8.4	330	672.8
0525	12–22	3/13/2010	<0.16	1.3	<0.15	1.3	<0.23	<0.4	1.3
		9/18/2010	<0.16	1.5	<0.15	1.5	<0.23	<0.4	1.5
		3/12/2011	<0.16	1.2	<0.15	1.2	<0.23	<0.1	1.2
0526	19.5–29.5	3/16/2010	<0.16	0.3J	1.2	1.5	<0.23	3.2	4.7
0527	118–137.9	3/18/2010	<0.16	<0.15	<0.15	ND	<0.23	<0.4	ND
0528	127–146.9	3/18/2010	<0.16	<0.15	<0.15	ND	<0.23	<0.4	ND
		3/10/2011	<0.16	<0.15	<0.15	ND	<0.23	<0.1	ND
0529	10–20	3/17/2010	<0.16	<0.15	<0.15	ND	<0.23	<0.4	ND
		9/17/2010	<0.16	<0.15	<0.15	ND	<0.23	<0.4	ND
		3/16/2011	<0.16	<0.15	<0.15	ND	<0.23	<0.1	ND
0530	19.5–29.5	3/17/2010	<0.16	4.6	<0.15	4.6	<0.23	2.1	6.7
		9/17/2010	<0.16	0.77J	<0.15	0.77	<0.23	0.57J	1.34
		3/12/2011	<0.16	0.95J	<0.15	0.95	<0.23	<0.1	0.95
0531	10–20	3/17/2010	<0.16	0.93J	<0.15	0.93	<0.23	<0.4	0.93
		9/17/2010	<0.16	0.68J	<0.15	0.68	<0.23	<0.4	0.68
		3/16/2011	<0.16	0.52J	<0.15	0.52	<0.23	<0.1	0.52
0532	20–30	3/17/2010	<0.16	1J	<0.15	1	<0.23	2.7	3.7
		9/17/2010	<0.16	0.51J	<0.15	0.51	<0.23	1	1.51
		3/16/2011	<0.16	0.76J	0.21J	0.97	<0.23	1.5	2.47

Table 7 (continued). COPC Concentrations at the Building 100 Area (µg/L)[a]

Location	Screen Depth (ft)	Date Sampled	TCE	cDCE	tDCE	Total 1,2-DCE[b]	1,1-DCE[c]	Vinyl chloride	TCOPCs[d]
Cleanup Target Level[e]			**30**	**700**	**1,000**	**630**	**70**	**10**	
0533	10–20	3/18/2010	<0.16	<0.15	<0.15	ND	<0.23	<0.4	ND
		9/18/2010	<0.16	<0.15	<0.15	ND	<0.23	<0.4	ND
		3/17/2011	<0.16	<0.15	<0.15	ND	<0.23	<0.1	ND
0534	20–30	3/18/2010	<0.16	0.23J	<0.15	0.23	<0.23	<0.4	0.23
		9/18/2010	<0.16	0.36J	<0.15	0.36	<0.23	<0.4	0.36
		3/17/2011	<0.16	0.47J	<0.15	0.47	<0.23	<0.1	0.47
0535	10–20	3/18/2010	<0.16	<0.15	<0.15	ND	<0.23	<0.4	ND
		9/17/2010	<0.16	<0.15	<0.15	ND	<0.23	<0.4	ND
		3/22/2011	<0.16	<0.15	<0.15	ND	<0.23	<0.1	ND
0536	20–30	3/18/2010	<0.16	<0.15	<0.15	ND	<0.23	<0.4	ND
		9/17/2010	<0.16	<0.15	<0.15	ND	<0.23	<0.4	ND
		3/22/2011	<0.16	<0.15	<0.15	ND	<0.23	<0.1	ND
0537	10–20	3/16/2010	<0.16	<0.15	<0.15	ND	<0.23	<0.4	ND
		9/16/2010	<0.16	<0.15	<0.15	ND	<0.23	<0.4	ND
		3/21/2011	<0.16	<0.15	<0.15	ND	<0.23	<0.1	ND
0538	20–30	3/16/2010	<0.16	<0.15	<0.15	ND	<0.23	<0.4	ND
		9/16/2010	<0.16	<0.15	<0.15	ND	<0.23	<0.4	ND
		3/22/2011	<0.16	<0.15	<0.15	ND	<0.23	<0.1	ND
0539	9.5–19.5	3/17/2010	<0.16	<0.15	<0.15	ND	<0.23	<0.4	ND
		9/16/2010	<0.16	<0.15	<0.15	ND	<0.23	<0.4	ND
		3/17/2011	<0.16	<0.15	<0.15	ND	<0.23	<0.1	ND
0540	20–30	3/17/2010	<0.16	<0.15	0.83J	0.83	<0.23	14	14.83
		9/16/2010	<0.16	<0.15	0.33J	0.33	<0.23	5.3	5.63
		3/21/2011	<0.16	1	2	3	<0.23	49	52
0541	10–20	3/16/2010	<0.16	0.6J	<0.15	0.6	0.24J	<0.4	0.84
		9/17/2010	<0.16	0.58J	<0.15	0.58	<0.23	<0.4	0.58
		3/17/2011	<0.16	0.43J	<0.15	0.43	<0.23	<0.1	0.43
0542	20–30	3/16/2010	<0.16	1.8	<0.15	1.8	0.56J	<0.4	2.36
		9/17/2010	<0.16	1.5	<0.15	1.5	0.47J	<0.4	1.97
		3/17/2011	<0.16	1.1	<0.15	1.1	<0.23	<0.1	1.1
0543	28–38	3/17/2010	<0.16	1.1	<0.15	1.1	<0.23	0.81J	1.91
		9/17/2010	<0.16	0.37J	<0.15	0.37	<0.23	0.88J	1.25
		3/16/2011	<0.16	0.34J	<0.15	0.34	<0.23	0.75J	1.09
0544	30–40	3/17/2010	<0.16	0.49J	<0.15	0.49	<0.23	0.82J	1.31
		9/17/2010	<0.16	0.38J	<0.15	0.38	<0.23	0.69J	1.07
		3/17/2011	<0.16	0.44J	<0.15	0.44	<0.23	0.63J	1.07
0545	29.5–39.5	3/18/2010	<0.16	<0.15	<0.15	ND	<0.23	<0.4	ND
		9/18/2010	<0.16	<0.15	<0.15	ND	<0.23	<0.4	ND
		3/17/2011	<0.16	<0.15	<0.15	ND	<0.23	<0.1	ND

Table 7 (continued). COPC Concentrations at the Building 100 Area (µg/L)[a]

Location	Screen Depth (ft)	Date Sampled	TCE	cDCE	tDCE	Total 1,2-DCE[b]	1,1-DCE[c]	Vinyl chloride	TCOPCs[d]
Cleanup Target Level[e]			**30**	**700**	**1,000**	**630**	**70**	**10**	
0546	29.5–39.5	3/18/2010	<0.16	<0.15	<0.15	ND	<0.23	<0.4	ND
		9/17/2010	<0.16	<0.15	<0.15	ND	<0.23	<0.4	ND
		3/17/2011	<0.16	<0.15	<0.15	ND	<0.23	<0.1	ND
0547	29.5–39.5	3/17/2010	<0.16	<0.15	<0.15	ND	<0.23	<0.4	ND
		9/16/2010	<0.16	<0.15	<0.15	ND	<0.23	<0.4	ND
		3/22/2011	<0.16	<0.15	<0.15	ND	<0.23	<0.1	ND
0548	30–40	3/17/2010	<0.16	<0.15	<0.15	ND	<0.23	<0.4	ND
		9/16/2010	<0.16	<0.15	<0.15	ND	<0.23	<0.4	ND
		3/21/2011	<0.16	<0.15	<0.15	ND	<0.23	<0.1	ND
0549	30–40	3/16/2010	<0.16	<0.15	<0.15	ND	<0.23	<0.4	ND
		9/17/2010	<0.16	<0.15	<0.15	ND	<0.23	<0.4	ND
		3/17/2011	<0.16	<0.15	<0.15	ND	<0.23	<0.1	ND
0550-1	9–18	3/11/2010	<0.16	<0.15	<0.15	ND	<0.23	<0.4	ND
		9/21/2010	<0.16	<0.15	<0.15	ND	<0.23	<0.4	ND
		3/11/2011	<0.16	<0.15	<0.15	ND	<0.23	<0.1	ND
0550-2	20–29	3/11/2010	<0.16	<0.15	<0.15	ND	<0.23	<0.4	ND
		9/21/2010	<0.16	<0.15	<0.15	ND	<0.23	<0.4	ND
		3/11/2011	<0.16	<0.15	<0.15	ND	<0.23	<0.1	ND
0550-3	31–40	3/11/2010	<0.16	<0.15	<0.15	ND	<0.23	<0.4	ND
		9/22/2010	<0.16	<0.15	<0.15	ND	<0.23	<0.4	ND
		3/11/2011	<0.16	<0.15	<0.15	ND	<0.23	<0.1	ND
0551-1	9–18	3/11/2010	<0.16	<0.15	<0.15	ND	<0.23	<0.4	ND
		9/20/2010	<0.16	<0.15	<0.15	ND	<0.23	<0.4	ND
		3/11/2011	<0.16	<0.15	<0.15	ND	<0.23	<0.1	ND
0551-2	20–29	3/11/2010	<0.16	<0.15	<0.15	ND	<0.23	<0.4	ND
		9/20/2010	<0.16	<0.15	<0.15	ND	<0.23	<0.4	ND
		3/11/2011	<0.16	<0.15	<0.15	ND	<0.23	<0.1	ND
0551-3	31–40	3/11/2010	<0.16	<0.15	<0.15	ND	<0.23	<0.4	ND
		9/21/2010	<0.16	<0.15	<0.15	ND	<0.23	<0.4	ND
		3/11/2011	<0.16	<0.15	<0.15	ND	<0.23	<0.1	ND
0552-1	9–18	3/16/2010	<0.16	14	0.15J	14.15	0.52J	3.9	18.57
		9/22/2010	<0.16	5.8	<0.15	5.8	0.25J	1.5	7.55
		3/16/2011	<0.16	2.5	<0.15	2.5	<0.23	0.78J	3.28
0552-2	20–29	3/16/2010	<0.16	24	0.29J	24.29	1	6.8	32.09
		9/22/2010	<0.16	6.8	<0.15	6.8	0.29J	2.1	9.19
		3/16/2011	<0.16	2.4	<0.15	2.4	<0.23	1	3.4
0552-3	31–40	3/16/2010	<0.16	48	0.7J	48.7	2	30	80.7
		9/22/2010	<0.16	27	0.36JJ	27.36	1.2	22	50.56
		3/16/2011	<0.16	12	0.18J	12.18	0.51J	12	24.69

Table 7 (continued). COPC Concentrations at the Building 100 Area (µg/L)[a]

Location	Screen Depth (ft)	Date Sampled	TCE	cDCE	tDCE	Total 1,2-DCE[b]	1,1-DCE[c]	Vinyl chloride	TCOPCs[d]
Cleanup Target Level[e]			**30**	**700**	**1,000**	**630**	**70**	**10**	
0553A	3–13	3/12/2010	<0.16	<0.15	<0.15	ND	<0.23	<0.4	ND
		9/17/2010	<0.16	<0.15	<0.15	ND	<0.23	<0.4	ND
		3/16/2011	<0.16	<0.15	<0.15	ND	<0.23	<0.1	ND
0553B	13–23	3/12/2010	<0.16	<0.15	<0.15	ND	<0.23	<0.4	ND
		9/17/2010	<0.16	<0.15	<0.15	ND	<0.23	<0.4	ND
		3/16/2011	<0.16	<0.15	<0.15	ND	<0.23	<0.1	ND
0553C	23–33	3/12/2010	<0.16	0.72J	<0.15	0.72	<0.23	<0.4	0.72
		9/17/2010	<0.16	0.97J	<0.15	0.97	<0.23	<0.4	0.97
		3/16/2011	<0.16	1.2	0.16J	1.36	<0.23	<0.1	1.36
0554A	3–13	3/12/2010	<0.16	<0.15	<0.15	ND	<0.23	<0.4	ND
		9/17/2010	<0.16	<0.15	<0.15	ND	<0.23	<0.4	ND
		3/16/2011	<0.16	<0.15	<0.15	ND	<0.23	<0.1	ND
0554B	13–23	3/16/2010	<0.16	<0.15	<0.15	ND	<0.23	<0.4	ND
		9/17/2010	<0.16	<0.15	<0.15	ND	<0.23	<0.4	ND
		3/16/2011	<0.16	<0.15	<0.15	ND	<0.23	<0.1	ND
0554C	23–33	3/16/2010	<0.16	16	4.6	20.6	1.5	82	104.1
		9/17/2010	<0.16	13	3.8	16.8	1.5	75	93.3
		3/16/2011	<0.16	12	3.4	15.4	1.1	69	85.5
0555A	2.5–12.5	3/16/2010	<0.16	<0.15	<0.15	ND	<0.23	<0.4	ND
		9/17/2010	<0.16	<0.15	<0.15	ND	<0.23	<0.4	ND
		3/8/2011	<0.16	<0.15	<0.15	ND	<0.23	<0.1	ND
0555B	13–23	3/16/2010	<0.16	<0.15	<0.15	ND	<0.23	<0.4	ND
		9/17/2010	<0.16	<0.15	<0.15	ND	<0.23	<0.4	ND
		3/16/2011	<0.16	<0.15	<0.15	ND	<0.23	<0.1	ND
0555C	23–33	3/16/2010	<0.16	1.2	0.61J	1.81	<0.23	<0.4	1.81
		9/17/2010	<0.16	1.3	0.61J	1.91	<0.23	<0.4	1.91
		3/16/2011	<0.16	1.3	0.59J	1.89	<0.23	<0.1	1.89
0559-1	9–18	3/18/2010	<0.16	<0.15	<0.15	ND	<0.23	<0.4	ND
		9/18/2010	<0.16	<0.15	<0.15	ND	<0.23	<0.4	ND
		3/11/2011	<0.16	<0.15	<0.15	ND	<0.23	<0.1	ND
0559-2	20–29	3/18/2010	<0.16	<0.15	<0.15	ND	<0.23	<0.4	ND
		9/18/2010	<0.16	<0.15	<0.15	ND	<0.23	<0.4	ND
		3/11/2011	<0.16	<0.15	<0.15	ND	<0.23	<0.1	ND
0559-3	31–40	3/18/2010	<0.16	<0.15	<0.15	ND	<0.23	<0.4	ND
		9/18/2010	<0.16	<0.15	<0.15	ND	<0.23	<0.4	ND
		3/11/2011	<0.16	<0.15	<0.15	ND	<0.23	<0.1	ND
0560-1	9–18	3/18/2010	<0.16	<0.15	<0.15	ND	<0.23	<0.4	ND
		9/18/2010	<0.16	<0.15	<0.15	ND	<0.23	<0.4	ND
		3/11/2011	<0.16	<0.15	<0.15	ND	<0.23	<0.1	ND

Table 7 (continued). COPC Concentrations at the Building 100 Area (µg/L)[a]

Location	Screen Depth (ft)	Date Sampled	TCE	cDCE	tDCE	Total 1,2-DCE[b]	1,1-DCE[c]	Vinyl chloride	TCOPCs[d]
Cleanup Target Level[e]			**30**	**700**	**1,000**	**630**	**70**	**10**	
0560-2	20–29	3/18/2010	<0.16	<0.15	<0.15	ND	<0.23	<0.4	ND
		9/18/2010	<0.16	<0.15	<0.15	ND	<0.23	<0.4	ND
		3/11/2011	<0.16	<0.15	<0.15	ND	<0.23	<0.1	ND
0560-3	31–40	3/18/2010	<0.16	<0.15	<0.15	ND	<0.23	<0.4	ND
		9/18/2010	<0.16	<0.15	<0.15	ND	<0.23	<0.4	ND
		3/11/2011	<0.16	<0.15	<0.15	ND	<0.23	<0.1	ND
0561-1	9–18	3/18/2010	<0.16	<0.15	<0.15	ND	<0.23	<0.4	ND
		9/18/2010	<0.16	<0.15	<0.15	ND	<0.23	<0.4	ND
		3/12/2011	<0.16	<0.15	<0.15	ND	<0.23	<0.1	ND
0561-2	20–29	3/18/2010	<0.16	<0.15	<0.15	ND	<0.23	<0.4	ND
		9/18/2010	<0.16	<0.15	<0.15	ND	<0.23	<0.4	ND
		3/12/2011	<0.16	<0.15	<0.15	ND	<0.23	<0.1	ND
0561-3	31–40	3/18/2010	<0.16	<0.15	<0.15	ND	<0.23	<0.4	ND
		9/18/2010	<0.16	<0.15	<0.15	ND	<0.23	<0.4	ND
		3/12/2011	<0.16	3.2	<0.15	3.2	<0.23	7.4	10.6
0562-1	9–18	3/16/2010	<0.16	<0.15	<0.15	ND	<0.23	<0.4	ND
		9/15/2010	<0.16	<0.15	<0.15	ND	<0.23	<0.4	ND
		3/11/2011	<0.16	<0.15	<0.15	ND	<0.23	<0.1	ND
0562-2	20–29	3/16/2010	<0.16	<0.15	<0.15	ND	<0.23	<0.4	ND
		9/15/2010	<0.16	<0.15	<0.15	ND	<0.23	<0.4	ND
		3/11/2011	<0.16	<0.15	<0.15	ND	<0.23	<0.1	ND
0562-3	31–40	3/16/2010	<0.16	<0.15	<0.15	ND	<0.23	<0.4	ND
		9/15/2010	<0.16	<0.15	<0.15	ND	<0.23	<0.4	ND
		3/9/2011	<0.16	<0.15	<0.15	ND	<0.23	<0.1	ND
0563-1	9–18	3/17/2010	<0.16	<0.15	<0.15	ND	<0.23	<0.4	ND
		9/15/2010	<0.16	<0.15	<0.15	ND	<0.23	<0.4	ND
		3/11/2011	<0.16	<0.15	<0.15	ND	<0.23	<0.1	ND
0563-2	20–29	3/17/2010	<0.16	0.29J	<0.15	0.29	<0.23	<0.4	0.29
		9/15/2010	<0.16	<0.15	<0.15	ND	<0.23	1.2	1.2
		3/11/2011	<0.16	0.28J	<0.15	0.28	<0.23	1.7	1.98
0563-3	31–40	3/17/2010	<0.16	<0.15	<0.15	ND	<0.23	0.54J	0.54
		9/15/2010	<0.16	<0.15	<0.15	ND	<0.23	<0.4	ND
		3/11/2011	<0.16	<0.15	<0.15	ND	<0.23	0.73J	0.73
0564-1	9–18	3/13/2010	<0.16	<0.15	<0.15	ND	<0.23	<0.4	ND
		9/20/2010	<0.16	<0.15	<0.15	ND	<0.23	<0.4	ND
		3/11/2011	<0.16	<0.15	<0.15	ND	<0.23	<0.1	ND
0564-2	20–29	3/13/2010	<0.16	<0.15	<0.15	ND	<0.23	<0.4	ND
		9/20/2010	<0.16	<0.15	<0.15	ND	<0.23	<0.4	ND
		3/11/2011	<0.16	<0.15	<0.15	ND	<0.23	<0.1	ND

Table 7 (continued). COPC Concentrations at the Building 100 Area (µg/L)[a]

Location	Screen Depth (ft)	Date Sampled	TCE	cDCE	tDCE	Total 1,2-DCE[b]	1,1-DCE[c]	Vinyl chloride	TCOPCs[d]
Cleanup Target Level[e]			**30**	**700**	**1,000**	**630**	**70**	**10**	
0564-3	31–40	3/13/2010	<0.16	<0.15	<0.15	ND	<0.23	<0.4	ND
		9/20/2010	<0.16	<0.15	<0.15	ND	<0.23	<0.4	ND
		3/11/2011	<0.16	<0.15	<0.15	ND	<0.23	<0.1	ND
0565-1	9–18	3/13/2010	<0.16	0.2J	<0.15	0.2	<0.23	<0.4	0.2
		9/20/2010	<0.16	<0.15	<0.15	ND	<0.23	<0.4	ND
		3/8/2011	<0.16	<0.15	<0.15	ND	<0.23	<0.1	ND
0565-2	20–29	3/13/2010	<0.16	0.54J	0.2J	0.74	<0.23	<0.4	0.74
		9/20/2010	<0.16	0.48J	<0.15	0.48	<0.23	<0.4	0.48
		3/8/2011	<0.16	0.55J	<0.15	0.55	<0.23	<0.1	0.55
0565-3	31–40	3/13/2010	<0.16	0.22J	<0.15	0.22	<0.23	<0.4	0.22
		9/20/2010	<0.16	0.66J	0.27J	0.93	<0.23	<0.4	0.93
		3/8/2011	<0.16	<0.15	<0.15	ND	<0.23	<0.1	ND
0566-1	10–19	3/15/2010	<0.16	<0.15	<0.15	ND	<0.23	<0.4	ND
		9/20/2010	<0.16	<0.15	<0.15	ND	<0.23	<0.4	ND
		3/9/2011	<0.16	<0.15	<0.15	ND	<0.23	<0.1	ND
0566-2	21–30	3/15/2010	<0.16	<0.15	<0.15	ND	<0.23	<0.4	ND
		9/20/2010	<0.16	<0.15	<0.15	ND	<0.23	<0.4	ND
		3/9/2011	<0.16	<0.15	<0.15	ND	<0.23	<0.1	ND
0566-3	32–41	3/15/2010	<0.16	<0.15	<0.15	ND	<0.23	<0.4	ND
		9/20/2010	<0.16	<0.15	<0.15	ND	<0.23	<0.4	ND
		3/9/2011	<0.16	<0.15	<0.15	ND	<0.23	<0.1	ND
0567-1	9–18	3/16/2010	<0.16	<0.15	<0.15	ND	<0.23	<0.4	ND
		9/18/2010	<0.16	<0.15	<0.15	ND	<0.23	<0.4	ND
		3/12/2011	<0.16	<0.15	<0.15	ND	<0.23	<0.1	ND
0567-2	20–29	3/16/2010	<0.16	<0.15	<0.15	ND	<0.23	<0.4	ND
		9/18/2010	<0.16	<0.15	<0.15	ND	<0.23	<0.4	ND
		3/12/2011	<0.16	<0.15	<0.15	ND	<0.23	<0.1	ND
0567-3	31–40	3/16/2010	<0.16	<0.15	<0.15	ND	<0.23	<0.4	ND
		9/18/2010	<0.16	<0.15	<0.15	ND	<0.23	<0.4	ND
		3/12/2011	<0.16	<0.15	<0.15	ND	<0.23	<0.1	ND
0568-1	9–18	3/15/2010	<0.16	<0.15	<0.15	ND	<0.23	<0.4	ND
		9/22/2010	<0.16	<0.15	<0.15	ND	<0.23	<0.4	ND
		3/11/2011	<0.16	<0.15	<0.15	ND	<0.23	<0.1	ND
0568-2	20–29	3/15/2010	<0.16	<0.15	<0.15	ND	<0.23	<0.4	ND
		9/22/2010	<0.16	<0.15	<0.15	ND	<0.23	<0.4	ND
		3/16/2011	<0.16	<0.15	<0.15	ND	<0.23	<0.1	ND
0568-3	31–40	3/16/2010	<0.16	<0.15	<0.15	ND	<0.23	<0.4	ND
		9/22/2010	<0.16	<0.15	<0.15	ND	<0.23	<0.4	ND
		3/16/2011	<0.16	<0.15	<0.15	ND	<0.23	<0.1	ND

Table 7 (continued). COPC Concentrations at the Building 100 Area (µg/L)[a]

Location	Screen Depth (ft)	Date Sampled	TCE	cDCE	tDCE	Total 1,2-DCE[b]	1,1-DCE[c]	Vinyl chloride	TCOPCs[d]
Cleanup Target Level[e]			**30**	**700**	**1,000**	**630**	**70**	**10**	
0569-1	9–18	3/15/2010	<0.16	0.24J	<0.15	0.24	<0.23	<0.4	0.24
		9/21/2010	<0.16	<0.15	<0.15	ND	<0.23	<0.4	ND
		3/14/2011	<0.16	<0.15	<0.15	ND	<0.23	<0.1	ND
0569-2	20–29	3/15/2010	<0.16	170	1.7	171.7	10	65	246.7
		9/21/2010	<0.32	290J	2.8J	292.8	9.7J	150J	452.5
		3/14/2011	<0.32	380	3.9	383.9	16	85	484.9
0569-3	31–40	3/15/2010	<0.8	1,200	8.4	1,208.4	56	350	1,614.4
		9/21/2010	<0.32	780	6.6	786.6	37	250	1,073.6
		3/14/2011	<0.32	530	5.1	535.1	21	120	676.1
0570-1	9–18	3/30/2010	<0.16	<0.15	<0.15	ND	<0.23	<0.4	ND
		9/21/2010	<0.16	<0.15	<0.15	ND	<0.23	<0.4	ND
		3/11/2011	<0.16	<0.15	<0.15	ND	<0.23	<0.1	ND
0570-2	20–29	3/30/2010	<0.16	<0.15	<0.15	ND	<0.23	0.94J	0.94
		9/21/2010	<0.16	<0.15	<0.15	ND	<0.23	<0.4	ND
		3/11/2011	<0.16	<0.15	<0.15	ND	<0.23	<0.1	ND
0570-3	31–40	3/30/2010	<0.16	<0.15	<0.15	ND	<0.23	2.5	2.5
		9/21/2010	<0.16	<0.15	<0.15	ND	<0.23	3.1	3.1
		3/11/2011	<0.16	<0.15	<0.15	ND	<0.23	2.8	2.8
0571-1	9–18	4/1/2010	<0.16	<0.15	<0.15	ND	<0.23	<0.4	ND
		9/21/2010	<0.16	<0.15	<0.15	ND	<0.23	<0.4	ND
		3/12/2011	<0.16	<0.15	<0.15	ND	<0.23	<0.1	ND
0571-2	20–29	4/1/2010	<0.16	0.21J	<0.15	0.21	<0.23	<0.4	0.21
		9/21/2010	<0.16	0.2J	<0.15	0.2	<0.23	<0.4	0.2
		3/12/2011	<0.16	0.23J	<0.15	0.23	<0.23	<0.1	0.23
0571-3	31–40	4/1/2010	<0.16	<0.15	<0.15	ND	<0.23	<0.4	ND
		9/21/2010	<0.16	<0.15	<0.15	ND	<0.23	<0.4	ND
		3/12/2011	<0.16	<0.15	<0.15	ND	<0.23	<0.1	ND
S30B	5–15	3/12/2010	39B	150	15	165	3.3	81	288.3
		3/10/2011	16	30	4.6	34.6	0.69J	29	80.29
S33C	11–21	3/12/2010	76	1,000	20	1,020	54	590	1,740
		3/10/2011	150	720	44	764	39	410	1,363
S35B	5–15	3/12/2010	10,000	37,000	5,900	42,900	790	8,700	62,390
		3/10/2011	13,000	52,000	6,400	58,400	1,500	15,000	87,900
S36B	5–15	3/12/2010	<0.16	<0.15	<0.15	ND	<0.23	<0.4	ND
		3/10/2011	<0.16	0.17J	<0.15	0.17	<0.23	<0.1	0.17
S67B	10–19.83	3/17/2010	<0.32	20	4.5	24.5	<0.46	300	324.5
		3/10/2011	<0.32	20	5	25	<0.46	260	285
S67C	20–29.83	3/17/2010	<0.16	130	26	156	1.9	140	297.9
		3/10/2011	<0.16	140	24	164	1.9	140	305.9

Table 7 (continued). COPC Concentrations at the Building 100 Area (µg/L)[a]

Location	Screen Depth (ft)	Date Sampled	TCE	cDCE	tDCE	Total 1,2-DCE[b]	1,1-DCE[c]	Vinyl chloride	TCOPCs[d]
Cleanup Target Level[e]			**30**	**700**	**1,000**	**630**	**70**	**10**	
S67D	30–39.83	3/17/2010	<0.16	17	5.6	22.6	<0.23	27	49.6
		3/10/2011	<0.16	13	4.7	17.7	0.23J	18	35.93
S68B	10–20	3/16/2010	<0.16	<0.15	<0.15	ND	<0.23	<0.4	ND
		3/10/2011	<0.16	<0.15	<0.15	ND	<0.23	<0.1	ND
S68C	18–28	3/15/2010	<0.16	2.8	<0.15	2.8	<0.23	4.5	7.3
		3/10/2011	<0.16	<0.15	<0.15	ND	<0.23	0.93J	0.93
S68D	30–40	3/15/2010	<0.16	54	0.94J	54.94	<0.23	43	97.94
		3/10/2011	<0.16	16	<0.15	16	<0.23	13	29
S69B	10–20	3/15/2010	<0.16	0.16J	<0.15	0.16	<0.23	<0.4	0.16
		3/10/2011	<0.16	<0.15	<0.15	ND	<0.23	<0.1	ND
S69C	20–30	3/15/2010	<0.16	0.37J	<0.15	0.37	<0.23	<0.4	0.37
		3/10/2011	<0.16	0.98J	<0.15	0.98	<0.23	0.43J	1.41
S69D	30–40	3/15/2010	<0.16	0.7J	<0.15	0.7	<0.23	<0.4	0.7
		3/10/2011	<0.16	<0.15	<0.15	ND	<0.23	<0.1	ND
S70B	10–20	3/15/2010	<0.16	16	0.5J	16.5	<0.23	11	27.5
		3/9/2011	<0.16	18	0.69J	18.69	<0.23	16	34.69
S70C	20–30	3/15/2010	<0.16	18	5.2	23.2	0.39J	11	34.59
		3/9/2011	<0.16	12	2.3	14.3	<0.23	6.9	21.2
S70D	30–40	3/15/2010	<0.16	21	7.4	28.4	0.64J	8	37.04
		3/9/2011	<0.16	21	7.5	28.5	0.57J	13	42.07
S71B	10–20	3/12/2010	<0.16	<0.15	<0.15	ND	<0.23	<0.4	ND
		3/8/2011	<0.16	<0.15	<0.15	ND	<0.23	<0.1	ND
S71C	20–30	3/12/2010	<0.16	6.3	3.9	10.2	<0.23	12	22.2
		3/8/2011	<0.16	5.2	2.7	7.9	0.41J	12	20.31
S71D	30–40	3/12/2010	<0.16	14	8.5	22.5	0.3J	25	47.8
		3/8/2011	<0.16	30	15	45	0.87J	34	79.87
S72B	10–20	3/16/2010	<0.16	<0.15	<0.15	ND	<0.23	<0.4	ND
		3/8/2011	<0.16	<0.15	<0.15	ND	<0.23	<0.1	ND
S72C	20–30	3/16/2010	<0.16	2.2	<0.15	2.2	0.91J	1.3	4.41
		3/8/2011	<0.16	1.9	<0.15	1.9	0.71J	0.71J	3.32
S72D	30–40	3/16/2010	<0.16	<0.15	<0.15	ND	<0.23	<0.4	ND
		3/8/2011	<0.16	<0.15	<0.15	ND	<0.23	<0.1	ND
S73B	10–20	3/17/2010	<0.16	<0.15	<0.15	ND	<0.23	<0.4	ND
		3/10/2011	<0.16	<0.15	<0.15	ND	<0.23	<0.1	ND
S73C	20–30	3/16/2010	<0.16	0.21J	1.2	1.41	<0.23	5.4	6.81
		3/10/2011	<0.16	1.6	3.1	4.7	<0.23	10	14.7
S73D	30–40	3/16/2010	<0.16	<0.15	<0.15	ND	<0.23	<0.4	ND
		3/8/2011	<0.16	<0.15	<0.15	ND	<0.23	<0.1	ND

Table 7 (continued). COPC Concentrations at the Building 100 Area (µg/L)[a]

Location	Screen Depth (ft)	Date Sampled	TCE	cDCE	tDCE	Total 1,2-DCE[b]	1,1-DCE[c]	Vinyl chloride	TCOPCs[d]
Cleanup Target Level[e]			**30**	**700**	**1,000**	**630**	**70**	**10**	
PIN21									
0502	7–17	3/17/2010	<0.16	<0.15	<0.15	ND	<0.23	<0.4	ND
		9/17/2010	<0.16	<0.15	<0.15	ND	<0.23	<0.4	ND
		3/10/2011	<0.16	<0.15	<0.15	ND	<0.23	<0.1	ND
0503	20–28	3/17/2010	<0.16	<0.15	<0.15	ND	<0.23	<0.4	ND
		9/17/2010	<0.16	<0.15	<0.15	ND	<0.23	<0.4	ND
		3/10/2011	<0.16	<0.15	<0.15	ND	<0.23	<0.1	ND
0504	7–17	3/18/2010	<0.16	<0.15	<0.15	ND	<0.23	<0.4	ND
		9/17/2010	<0.16	<0.15	<0.15	ND	<0.23	<0.4	ND
		3/10/2011	<0.16	0.38J	<0.15	0.38	<0.23	<0.1	0.38
0505	20–28	3/18/2010	<0.16	<0.15	<0.15	ND	<0.23	<0.4	ND
		9/17/2010	<0.16	<0.15	<0.15	ND	<0.23	<0.4	ND
		3/10/2011	<0.16	<0.15	<0.15	ND	<0.23	<0.1	ND
PIN23									
SW01	Southwest Pond	3/18/2010	0.39J	<0.15	<0.15	ND	<0.23	<0.4	0.39
		3/16/2011	0.35J	<0.15	<0.15	ND	<0.23	<0.1	0.35
PIN37									
S002	South Pond	3/18/2010	<0.16	<0.15	<0.15	ND	<0.23	<0.4	ND
		3/16/2011	<0.16	<0.15	<0.15	ND	<0.23	<0.1	ND

Notes:
Arsenic, while a COPC, is not included in this table or in the TCOPCs value.
[a] "<" values are method detection limits.
[b] Total 1,2-DCE is the sum of cDCE and tDCE.
[c] 1,1-DCE = 1,1-dichloroethene.
[d] TCOPCs is the sum of the individual COPCs concentrations. The Total 1,2-DCE value is not included in the TCOPCs value because the cDCE and tDCE values are already included in the TCOPCs value.
[e] The off-site CTL is a factor of 10 lower than the listed on-site, poor water quality CTL.

Abbreviations:
J = Estimated value, result is between the reporting limit and the method detection limit
ND = Not detected

Table 8. Summary of Analytical Results for RW03 and the Building 100 Area Treatment System (µg/L)

Location	Date Sampled	Volume Recovered by RW03 (a) (gallons)	TCE	cDCE	tDCE	1,1-DCE	VC	Sum of COPCs Concentrations	Mass of COPCs Recovered (pounds)
PIN12-RW03 (Air Stripper Influent)	7/23/2009	46,649	150	1,500	15J	76	230	1,971	0.81
	7/24/2009		250	1,800	17J	110	290	2,467	
	7/27/2009		410	1,600	18	120	220	2,368	
	7/28/2009		280	1,500	14	98	250	2,142	
	7/29/2009		170	1,100	13	86	150	1,519	
	8/3/2009	40,800	100J	800	6.9	50	130	1,086.9	0.35
	8/4/2009		120	710	8.2	50	150	1,038.2	
	8/5/2009		100	700	7.3	49	150	1,006.3	
	8/6/2009		97J	640	7.1	48	140	932.1	
	9/9/2009	205,634	82	630	6.7	47	140	905.7	1.53
	9/16/2009		63	480J	5.5	31	120	699.5	
	9/23/2009		52J	510J	5.1J	26J	130J	723.1	
	October 2009	270,063	38J	390J	15J	17J	79J	539	1.21
	November 2009	46,173	not sampled (b)						0.21
	December 2009	23,050	57	330	3.8	25	72	487.8	0.09
	January 2010	94,049	not sampled (b)						0.38
	February 2010	0	not sampled (b)						0.00
	March 2010	256,716	33J	240J	2.3J	15J	42J	332.3	0.71
	April 2010	276,192	30	(c)	2.2	14	54	100.2	0.23
	May 2010	273,717	29	(c)	1.9	11	43	84.9	0.19
	June 2010	228,446	27	250	1.9	13	43	334.9	0.64
	July 2010	228,558	24	190	1.2	8	34	257.2	0.49
	August 2010	242,460	24	200	1.3	9.4	33	267.7	0.54
	September 2010	171,640	19	180	1.7	7.6	31	239.3	0.34
	October 2010	148,247	25	210	1.6	10	44	290.6	0.36
	November 2010	225,677	27	210	1.7	11	42	291.7	0.55
	December 2010	311,281	20	190	1.4	8.6	37	257	0.67
	January 2011	259,011	22	190	1.5	10	36	259.5	0.56
	February 2011	198,703	21	160	1.3	8.5	34	224.8	0.37
	March 2011	301,154	18	160	1.1	6.7	25	210.8	0.53
	April 2011	292,542	21	160	1.2	7.4	35	224.6	0.55
	May 2011	307,861	16	140	0.78J	4.9	22	183.68	0.47
	Total Volume:	**4,448,623**				**Total Mass Recovered by RW03:**			**11.76**

Table 8 (continued). Summary of Analytical Results for RW03 and the Building 100 Area Treatment System (µg/L)

Location	Date Sampled	Volume Recovered by RW03 (a) (gallons)	TCE	cDCE	tDCE	1,1-DCE	VC	Sum of COPCs Concentrations	Mass of COPCs Recovered (pounds)
Air Stripper Effluent Location AS1-E	7/23/2009	–	1.5	15	<0.44	<0.45	2.6	19.1	
	7/24/2009	–	<0.5	5.4	<0.44	<0.45	<0.5	5.4	
	7/27/2009	–	1.3	12	<0.44	<0.45	<0.5	13.3	
	7/28/2009	–	0.91J	11	<0.44	<0.45	<0.5	11.91	
	7/29/2009	–	<0.5	6.9	<0.44	<0.45	<0.5	6.9	
	8/4/2009	–	<0.5	3.5	<0.44	<0.45	<0.5	3.5	
	9/9/2009	–	<0.5	3	<0.44	<0.45	<0.5	3	
	9/16/2009	–	<0.5	2.6J	<0.44	<0.45	<0.5	2.6	
	9/23/2009	–	<0.5	4.5J	<0.44	<0.45	<0.5	4.5	
	October 2009	–	<0.5	1.1J	<0.44	<0.45	<0.5	1.1	
	November 2009	–	not sampled (b)						
	December 2009	–	0.5J	7.8	<0.44	<0.45	<0.5	8.3	
	January 2010	–	not sampled (b)						
	February 2010	–	not sampled (b)						
	March 2010	–	<0.5J	0.79J	<0.44J	<0.45J	<0.5J	0.79	
	April 2010	–	0.21J	(c)	<0.15	<0.14	<0.17	0.21	
	May 2010	–	0.22J	(c)	<0.15	<0.14	<0.17	0.22	
	June 2010	–	<0.16	0.26J	<0.15	<0.14	<0.17	0.26	
	July 2010	–	<0.16	<0.15	<0.15	<0.14	<0.17	ND	
	August 2010	–	<0.16	0.16J	<0.15	<0.14	<0.17	0.16	
	September 2010	–	<0.16	0.17J	<0.15	<0.14	<0.17	0.17	
	October 2010	–	<0.16	0.52J	<0.15	<0.14	<0.17	0.52	
	November 2010	–	<0.16	0.37J	<0.15	<0.14	<0.17	0.37	
	December 2010	–	<0.16	3	<0.15	<0.14	<0.17	3	
	January 2011	–	<0.16	0.36J	<0.15	<0.14	<0.17	0.36	
	February 2011	–	<0.16	1.4	<0.15	<0.14	<0.17	1.4	
	March 2011	–	<0.16	0.38J	<0.15	<0.14	<0.17	0.38	
	April 2011	–	0.16J	1.3	<0.15	<0.14	<0.17	1.46	
	May 2011 (d)	–	0.17J	2.1	<0.15	<0.14	<0.17	2.27	

Notes:
For months with multiple sampling events, the concentrations were averaged to calculate contaminant mass recovered.
(a) The volumes listed are those recovered using RW03. The volume exiting the air stripper is slightly larger due to rainwater captured at the treatment system location.
(b) No sample was collected during these months due to various problems with the treatment system, so contaminant concentrations from the previous month were used to calculate the contaminant mass.
(c) cDCE was not analyzed during these sampling events.
(d) Groundwater recovered by RW03 in May 2011 was treated through air stripper #2 instead of air stripper #1.

Abbreviations:
"<" values are reporting limits. J = Estimated value, result is between the reporting limit and the method detection limit – = not measured

Table 9. Relative Percent Difference (RPD) for Duplicate Samples, March 2011 (reported in µg/L)

Sample ID[a]	Duplicate ID	Analyte	Result	Duplicate Result	MDL	RPD
PIN12-0524	PIN12-2869	1,1-Dichloroethene	8.4	8	0.23	5
		Benzene	2.4	2.2	0.16	9
		cis-1,2-Dichloroethene	330	320	1.5	3
		trans-1,2-Dichloroethene	4.4	4.2	0.15	5
		Vinyl Chloride	330	310	1	6
PIN12-0540	PIN12-2870	1,1-Dichloroethane	5.2	5.7	0.22	9
		cis-1,2-Dichloroethene	1	1.2	0.15	18
		trans-1,2-Dichloroethene	2	2.1	0.15	5
		Vinyl Chloride	49	52	0.1	6
PIN12-S68D	PIN12-2872	1,1-Dichloroethane	3.5	3.2	0.22	9
		cis-1,2-Dichloroethene	16	16	0.15	0
		Vinyl Chloride	13	13	0.1	0
PIN15-0530	PIN15-2873	Aluminum	270	280	18	4
		Iron	2,300	2,300	22	0
		Vinyl Chloride	21	20	0.1	5
PIN15-0594	PIN15-2874	1,2,4-Trimethylbenzene	6.7	6.5	0.15	3
		1,3,5-Trimethylbenzene	4	4	0.16	0
		4-Isopropyltoluene	2.5	2.4	0.2	4
		Benzene	32	30	0.16	6
		Ethylbenzene	12	12	0.16	0
		n-Butylbenzene	1.5	1.4	0.14	7
		n-Propylbenzene	2.1	2	0.16	5
		Toluene	380	330	1.7	14
		Total Xylenes	22	21	0.19	5
		Vinyl Chloride	180	140	1	25

Notes:
[a] A duplicate sample was collected from well PIN12-0548 but no analytes were detected.

Abbreviations:
MDL = method detection limit.

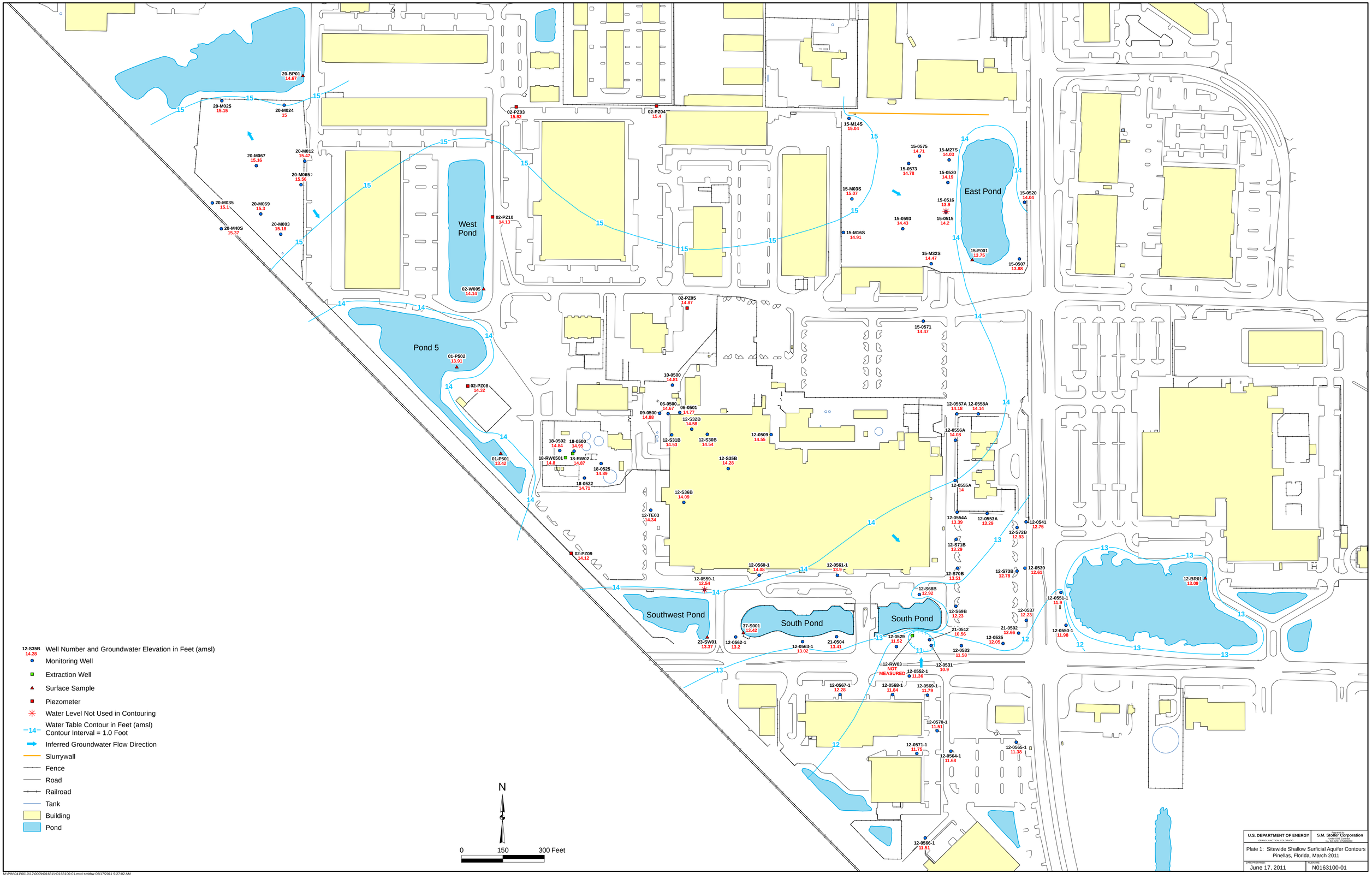
Table 10. Northeast Site Biogeochemical Data, March 2011

Location	Chloride (mg/L)	Iron (mg/L)	Iron (II) (mg/L)	Nitrate as NO_3 (mg/L)	Nitrite (mg/L)	Ammonia Total as N (mg/L)	Total Kjeldahl Nitrogen (mg/L)	Phosphorus (mg/L)	Sulfate (mg/L)	Sulfide (mg/L)	Carbon Dioxide (mg/L)	Ethane (µg/L)	Ethene (µg/L)	Hydrogen (nmol/L)[a]	Methane (µg/L)	Dissolved Oxygen (mg/L)
PIN15																
0530	72	2.1	1.4N	<0.5	<0.5	2.4B	3.8J	0.073	9.5	<0.007	130	30	0.39	1.1	6,000	2.7
0535	170	1.7	0.2JN	<0.5	<5	0.53B	2.6	1.1	2.3	0.3	200	24	<0.01	1.2	9,100	1.3
0537	59	2.5	3.2N	<0.5	<0.5	2B	2.3	0.22	45N	<0.14	100	350	0.029	3.8	5,600	2.3
0594	330	2.5	0.25JN	0.16J	<5	1.2B	0.56J	0.48	1.8	2.9	130	6.5	61	2.7	3,200	4.3

Location	Acetic Acid (mg/L)	Butanoic Acid, 3-Methyl- (µg/L)	Butyric Acid (mg/L)	Hexanoic Acid (µg/L)	Isohexanoic acid (µg/L)	Lactic Acid (mg/L)	Propionic Acid (mg/L)	Pyruvic Acid (mg/L)	Valeric Acid (µg/L)	Dehalococcoides ethenogenes (cells/L)
PIN15										
0530	0.054J	<150	0.11	160N	<50	<0.1BN	0.083	<0.15	<70	6,020,000
0535	0.052J	<150	<0.05	140N	<50	<0.1BN	<0.05	<0.15	<70	1,700
0537	0.046J	<150	<0.05	210N	<50	<0.1BN	<0.05	<0.15	<70	74,400,000
0594	85	320	4.2	75N	<50	0.95J	4.7	0.16	<70	80,700

Notes:
[a] nanomoles per liter

Abbreviations:
B = analyte found in method blank
J = estimated value
N = matrix spike percent recovery outside control limits



U.S. DEPARTMENT OF ENERGY GRAND JUNCTION, COLORADO	S.M. Stoller Corporation Under DOE Contract No. DE-AC01-07LM00030
Plate 1: Sitewide Shallow Surficial Aquifer Contours Pinellas, Florida, March 2011	
DATE PREPARED: June 17, 2011	FILENAME: N0163100-01

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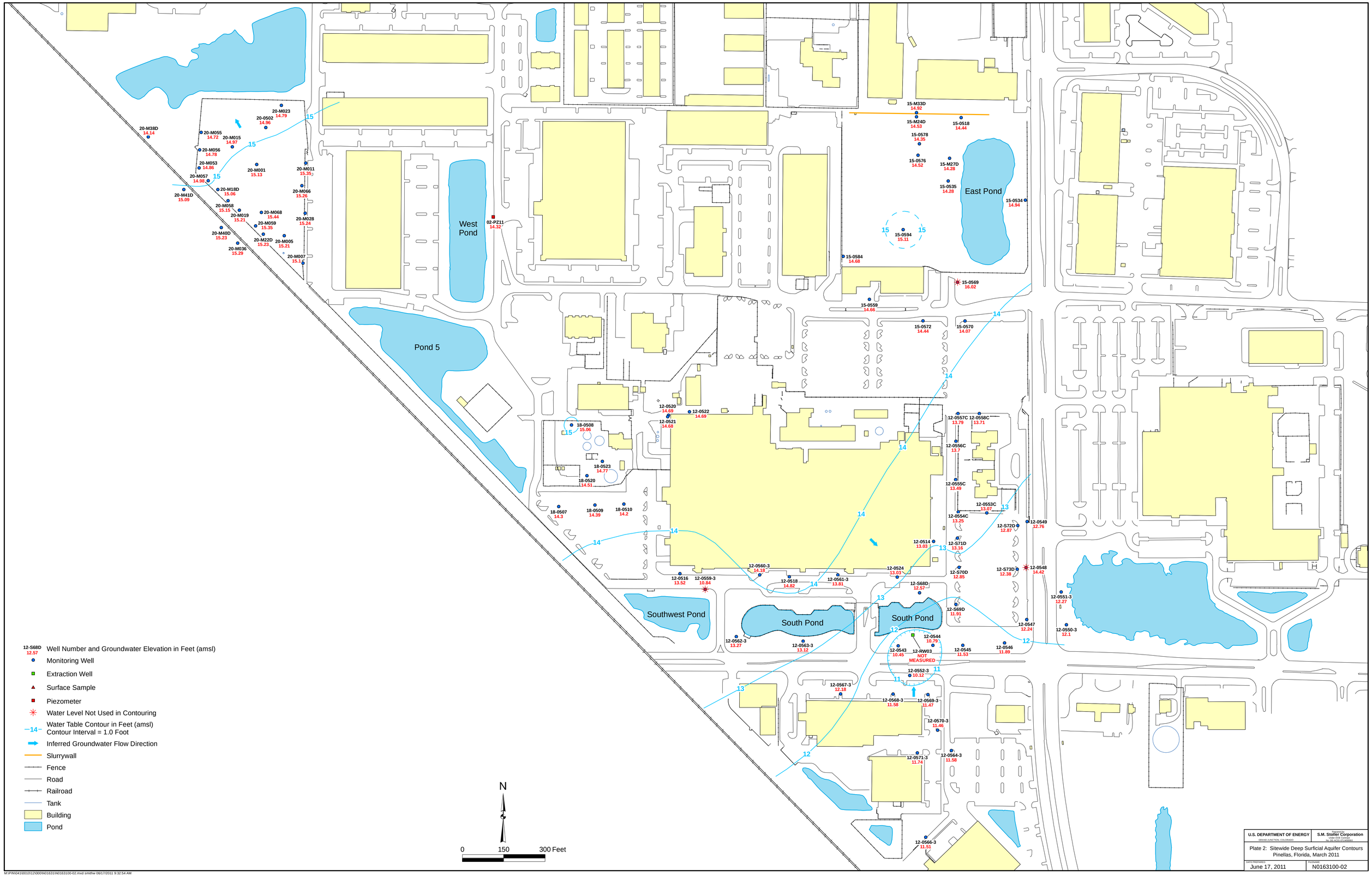

U.S. DEPARTMENT OF ENERGY GRAND JUNCTION, COLORADO	Prepared by S.M. Stoller Corporation Under DOE Contract No. DE-AC01-CLM00002
Plate 2: Sitewide Deep Surficial Aquifer Contours Pinellas, Florida, March 2011	
DATE PREPARED June 17, 2011	PLN/AMD N0163100-02

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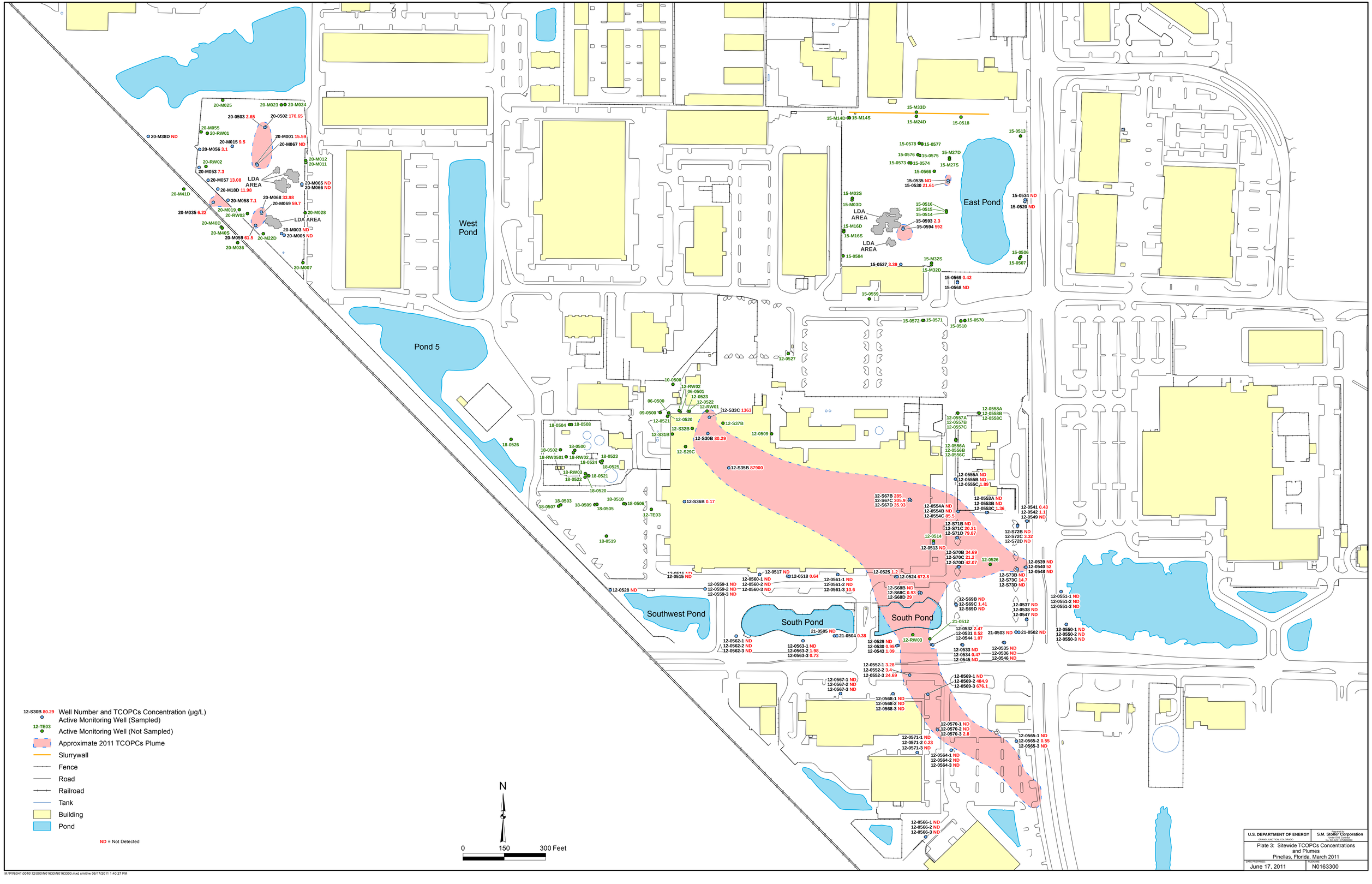

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