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Pinellas Environmental Restoration Project

Sitewide Environmental Monitoring Semiannual Progress Report for the Young - Rainey STAR Center January through May 2006

June 2006

U.S. Department of Energy

Office of Legacy Management

Work Performed Under DOE Contract No. DE–AC01–02GJ79491
for the U.S. Department of Energy Office of Legacy Management.
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Acronyms and Abbreviations

bls	below land surface
°C	degrees Celsius
CMS	Corrective Measures Study
CMIP	Corrective Measures Implementation Plan
COPC	contaminants of potential concern
CRDL	contract required detection limit
DCE	dichloroethene
DOE	U.S. Department of Energy
EA	environmental assessment
EPA	U.S. Environmental Protection Agency
FDEP	Florida Department of Environmental Protection
FONSI	Finding of No Significant Impacts
ft	feet
ft/ft	feet per foot
gpm	gallons per minute
HSWA	Hazardous and Solid Waste Amendment
HRC	Hydrogen Release Compound®
ICM	interim corrective measures
IDL	instrument detection limit
IMW	Interim Measures Work (Plan)
IWNF	Industrial Wastewater Neutralization Facility
MCL	maximum contaminant level
MSL	mean sea level
µmhos/cm	micromhos per centimeter
µg/L	micrograms per liter
mg/L	milligrams per liter
mV	millivolt
NAPL	non-aqueous phase liquid
NEPA	National Environmental Policy Act
NGVD	national geodetic vertical datum
NTU	Nephelometric Turbidity Units
PCIC	Pinellas County Industrial Council
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
TCOPC	total contaminants of potential concern
VC	vinyl chloride
VOCs	volatile organic compounds
WWNA	Wastewater Neutralization 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). The STAR Center, while owned by DOE, primarily manufactured neutron generators for nuclear weapons. Other products manufactured at the STAR Center have included radioisotopically 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 Amendment (HSWA) permit to DOE, enabling DOE to investigate and perform remediation activities in those areas contaminated by hazardous materials resulting from DOE operations. On March 17, 1995, DOE sold the facility to the Pinellas County Industrial Council (PCIC). 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 PCIC was disestablished and ownership of the STAR Center changed to the Pinellas County government. In November 2000, the State of Florida received HSWA authorization from the EPA. The Florida Department of Environmental Protection (FDEP) issued a new HSWA permit to DOE in January 2002.

Administration of DOE activities at the facility is the responsibility of the DOE Office of Legacy Management in Grand Junction, Colorado. S.M. Stoller Corporation (Stoller), a prime contractor to DOE's Office of Legacy Management in Grand Junction, provides technical support to DOE for remediation and closure of all active solid-waste management units (SWMUs) on site.

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

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

Therefore, there are currently four sites that have contamination in the surficial aquifer ground water at levels in excess of protective standards. These four SWMUs, the Old Drum Storage Site (PIN06), the Industrial Drain Leaks-Building 100 Area (PIN12), the Northeast Site (PIN15), and the WWNA/Building 200 Area (PIN18), are undergoing remediation activities. Two SWMUs, PIN06 and PIN12, are currently being remediated together because of their similar ground water contamination and proximity. These two SWMUs are collectively known as the Building 100

Area. Figure 2 depicts the location of the four SWMUs. 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, a summary of the treatment system performance, and a summary of ongoing and projected work are provided in this report.

1.1 Building 100 Area

The Building 100 Area (PIN06 and PIN12) is located in the southeast portion of the STAR Center. The Old Drum Storage Site is the former location of a concrete storage pad equipped with a drain and containment system used to store hazardous waste including dichloromethane (also known as methylene chloride), ignitable liquids, arsenic, and calcium chromate solids (DOE 1987a). Empty drums containing residual waste solvents were also stored in this area (DOE 1987b). The concrete pad was located near the northwest corner of Building 100. The pad was removed in October 1983 in accordance with an FDEP closure permit (DOE 1987a), and a closure report was submitted to the FDEP in August 1986 (DOE 1986). The decommissioning of the pad and the cessation of drum storage effectively removed the potential for a future contaminant source at PIN06.

Building 100 is the largest building at the STAR Center and covers approximately 11 acres. In the past, offices, laboratories, and production facilities for the DOE were housed in the building. SWMU PIN12 consists of the liquid waste drainage system that formerly served Building 100. Four individual drainage systems (sanitary, chemical, health physics, and storm water) were present within the building. In 1989, all four drainage systems were investigated, including verifying the system routing and the condition of underground and above-ground piping and ancillary equipment (EMC 1989). As a result of this investigation, the health physics and chemical drainage systems were flushed, grouted, and abandoned (DOE 1997). Some of the chemical drain lines were replaced by an above-ground system currently used by tenants of the building.

A CMS and CMIP were completed and approved for the Building 100 Area because volatile organic compounds (VOCs) concentrations measured in ground water at the Old Drum Storage Site (PIN06) and one monitoring well located at the northwest corner of Building 100 (PIN12) exceeded the Safe Drinking Water Act and FDEP maximum contaminant levels (MCLs). Subsequent investigations revealed elevated VOCs concentrations under Building 100 and downgradient to the southeast as well. On August 15, 2000, EPA approved the Building 100 CMIP Addendum. FDEP approved this same document on November 15, 1999.

In May 2001, DOE began an analysis of the potential remediation strategies for the three Building 100 Area tasks: plume control, source treatment, and dissolved phase treatment. The *Building 100 Area Remediation Technology Screening Report* (DOE 2001) assembled a list of remediation technologies, categorized them into the remediation tasks, and conducted an initial screening of the technologies. This initial screening eliminated the technologies that obviously would not work and recommended technologies that should be retained for detailed evaluation at a later time. The final technology for each task will be identified at a later date.

The *Building 100 Area Plume Control Technology Selection Report*, prepared in February 2002, conducted a detailed evaluation of five plume control technologies and recommended that enhanced bioremediation should be implemented for plume control at the Building 100 Area.

In-situ enhanced bioremediation to control the plume of dissolved contaminants at the Building 100 Area began as a pilot study on March 11, 2003. Hydrogen Release Compound® (HRC) was injected through nine injection points surrounding each of three monitoring wells. Ground water samples were collected from each of the three monitoring wells at approximately 2-month intervals through May 2004 to track the progress of HRC at remediating site contaminants. HRC was selected because it is an effective technology for optimizing degradation rates of chlorinated hydrocarbons dissolved in ground water. The continuous hydrogen source provided by the HRC can reduce the concentration of dissolved phase chlorinated hydrocarbons by greatly enhancing the reductive declorination process that occurs naturally at the Building 100 Area. The *In-Situ Enhanced Bioremediation Technology to Control the Plume of Dissolved Contaminants at the Building 100 Area of the Young - Rainey STAR Center Pilot Test* final report was received from the subcontractor on April 5, 2004. The results of the pilot test indicate that the injection of HRC had a limited influence in the pilot test area. This conclusion is based on increasing concentrations of the metabolic acids (as produced from HRC) and the decreasing concentrations of sulfate and iron and the observation of ethene at one location. A supplemental sampling event was conducted in May 2004, after which the pilot test was considered complete.

1.2 Northeast Site

In the late 1960s, before construction of the East Pond, drums of waste and construction debris were disposed of in the swampy area of the Northeast Site. The East Pond was excavated in 1968 as a borrow pit. In 1986, an expansion of the East Pond was initiated to create additional storm-water retention capacity. Excavation activities ceased when contamination was detected directly west of the East Pond. EPA identified the Northeast Site as a SWMU (EPA 1992). An Interim Corrective Measures (ICM) Study was developed and submitted to EPA and approval of this document was received in October 1991. An interim ground water recovery system for the Northeast Site was installed, and operation commenced in January 1992.

The ground water 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, after EPA and FDEP approval, a portion of the Northeast Site was excavated to remove debris 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 1996).

In 1996, DOE submitted a CMIP to EPA Region IV 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. A pretreatment system for iron removal, an air stripper unit, and a tank for holding treated ground water before discharge to the Pinellas County Publicly Owned Treatment Works were recommended. The treatment system was constructed in early 1997 and became operational by July 1997 with seven Northeast Site recovery wells and two Building 100 recovery wells pumping to the system influent tank. Subsequently several additional recovery wells were installed, 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 an 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.

An *Interim Measures Work* (IMW) *Plan for Remediation of Non-Aqueous Phase Liquids at the Northeast Site* was submitted to FDEP in late November 2001. The purpose of this document was to present the plan for the interim measure to remediate non-aqueous phase liquids (NAPLs) at the Northeast Site. An ICM is warranted because it supports the long-term corrective action to remediate the dissolved phase contamination in the surficial aquifer to FDEP drinking water MCLs. Without this measure, NAPLs will continue to act as a source of dissolved contamination, resulting in contaminant concentrations in ground water well above the MCLs. FDEP approved this document on January 10, 2002.

Concurrent with the preparation of the IMW Plan, a National Environmental Policy Act (NEPA) Environmental Checklist recommending a Categorical Exclusion was approved by DOE on December 19, 2001. Categorically excluding the Area A pilot test activity was approved based upon the fact that the NAPL remediation of Area A was a small-scale, short-term cleanup action and the siting, construction, and operation of treatment facilities were temporary and pilot-scale in size. Additionally, activities of this nature were evaluated in the 1995 *Environmental Assessment of Corrective Action at the Northeast Site* (EA) (DOE 1995).

A NEPA Action Review was conducted for the interim measure source removal action at Area B in October of 2002. A summary of the review concluded that Area B remediation would impact an area of approximately 38,000 square ft. The footprint of the above ground treatment system would be about 80 ft by 80 ft, and an estimated 84,000 gallons per day of ground water would be processed over a 24-week period of operation. The proposed interim measure, although not specifically identified in the 1995 EA, was determined to be within the scope of the proposed actions. The remedial activity would occur within the same physical boundaries and address the same contaminants identified in the EA, but in a more concentrated form. Because the EA provided for "design modifications to reflect technological advances or site-specific conditions," it was determined that the NAPL remediation of Area B was within the scope of the existing EA. However, this flexibility was not mentioned in the Finding of No Significant Impacts (FONSI) document signed in May 1995 (Glass 1995). Therefore, it was determined that the appropriate action under NEPA would require an amendment to the FONSI to include the broader scope of activities from the EA and any additional impacts from the NAPL removal action. The FONSI was amended, reviewed by the DOE-Idaho NEPA Planning Board, and approved by the DOE Grand Junction Office NEPA Compliance Officer on February 24, 2003.

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. Three post-treatment sampling events occurred in March, May, and August 2003. Demobilization activities began in early March and were completed in September 2003. The *Northeast Site Area A NAPL Remediation Final Report* (DOE 2003), describing thermal remediation of Area A, was sent to stakeholders on September 25, 2003.

At the end of February 2004, a contract was awarded for the remediation of NAPL Area B using Electro-Thermal Dynamic Stripping Process. Construction of the NAPL Area B treatment system began in July 2004, and was completed in early August 2005. Operations began on August 16, 2005. Significant events associated with NAPL remediation during this reporting period are presented in the *Northeast Site Non-Aqueous Phase Liquids Interim Measures Progress Report October through December 2005* (DOE 2006).

1.3 WWNA/Building 200 Area

The WWNA/Building 200 Area includes the active Industrial Wastewater Neutralization Facility (IWNF), the area around Building 200, and the area south of the neutralization facility. The IWNF refers to the physical treatment facility that currently receives sanitary and industrial wastewater and has been in operation since 1957.

A CMS Report and CMIP were completed in 1997 for this SWMU because vinyl chloride (VC), trichloroethene (TCE), and arsenic were detected in surficial aquifer ground water at concentrations above Federal and State MCLs. The recommended remediation alternative for the WWNA/Building 200 Area was ground water recovery with the Building 100 Area wells and an additional recovery well located in the WWNA. The CMIP recommended that recovered water from the additional well be discharged directly to the IWNF and that the recovery well in the WWNA/Building 200 Area will withdraw surficial aquifer ground water directly from the arsenic plume and thereby reduce the contaminant mass and prevent contaminant migration.

FDEP response to the CMS/CMIP concerning arsenic contamination in the upper 2 ft of soil suggested that a treatment technology, air sparging, was eliminated too early. DOE then proposed a multi-phased Interim Action that included operating the recovery well for 6 months, then pulsing the system, as well as performing geochemical analyses and leaching studies of the site. On January 21, 1999, FDEP approved the proposed interim remedial action.

Additionally, EPA Region IV also approved the interim remedial action and concurred with the FDEP's position regarding the arsenic contamination. EPA also requested an addendum or modification to the CMIP that addresses DOE's final selection of the remediation technology and a timeline for the completion of these activities.

In early June 1999, the WWNA recovery well commenced operation. All arsenic concentrations in water from the WWNA recovery well, PIN18−RW01, were below the STAR Center's daily maximum discharge standard for arsenic in wastewater of 0.20 milligrams per liter (mg/L) until shutdown.

Additional details concerning the impacts of ground water extraction are reported in the WWNA/Building 200 Area CMIP Addendum (DOE 2000b). Modifications to the recovery of ground water were proposed based on data collected through November 1999 and consisted of the installation of two new recovery wells screened at shallow intervals and the abandonment of RW01. The CMIP Addendum was submitted to the regulators and approved by FDEP and EPA in 2000. A Statement of Basis (DOE 2000a) was issued by DOE in late September 2000. This document provides a summary of environmental investigations and proposed cleanup alternatives for the WWNA/Building 200 Area. Part of DOE's proposed final action for the WWNA was to shut down the three extraction wells and begin a 1-year monitoring period. Verbal approval for this action was received from FDEP on December 20, 2005, and the wells were shut down that day.

1.4 Site Update

Risk Based Corrective Action (RBCA) legislation is currently being evaluated for applicability to assist in expediting closure at some or all of the SWMUs at the STAR Center. Technical discussions between FDEP and DOE regarding RBCA as the proposed final action continued. Additionally, DOE currently is evaluating remediation alternatives for the Building 100 Area in light of the RBCA legislation. A proposed path forward is scheduled for submittal to FDEP in the summer of 2006.

1.5 Site Activities

- Obtained water-level measurements from all accessible monitoring wells, recovery wells, and ponds on March 7, 2006.
- Conducted the semiannual sampling event in March 2006. The sampling event included collecting water samples from 177 monitoring and recovery wells. VOCs samples were collected at 161 wells and arsenic was sampled at 35 wells.
- Reported the results of the semiannual sampling events (this document).
- Bioremediation parameters were collected at 20 wells.

2.0 Water-Level Elevations

2.1 Work Conducted and Methods

Within an 8-hour period on March 6, 2006, depth-to-water measurements were taken at all accessible monitoring wells and extraction wells at the STAR Center. The water levels were measured with an electronic water-level indicator. Ground water and surface-water elevations are listed in Table 1.

2.2 Ground Water Flow

Ground water and surface-water elevations were used to construct sitewide ground water 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 (Figure 3 through Figure 6, respectively).

The water levels throughout the STAR Center indicate that the water table is highest in the general area around the West Pond (Plates 1 and 2). As ground water flows from this recharge area, it disperses to the west and east. These flow patterns are similar for both the shallow and deep surficial aquifers, and are consistent with previously observed flow patterns.

At the Northeast Site, a new flow pattern first observed in October 2005 was again seen in March 2006. As can be seen in Plates 1 and 2, a large ground water capture zone was developed around Area B. Ground water is flowing toward this area from all directions in response to the extraction occurring as part of the Area B NAPL project. Ground water extraction in Area B is expected to continue through May 2006. Along the northern boundary of the Northeast Site, the contours near the slurry wall for the past several years have indicated that the wall has been a significant barrier to ground water flow. This pattern was observed again in March 2006. As seen on Figure 4, in March there was a differential of about 0.8 ft between the downgradient and upgradient sides of the wall as measured in monitoring wells PIN15−M24D and −M33D, respectively. This differential, however, is less than the historical range of about 2 to 5 ft. Water-table elevations indicate that the East Pond was recharging the shallow surficial aquifer in March 2006 (Figure 3).

In the shallow surficial aquifer at the Northeast Site, the hydraulic gradient was about 0.005 feet per foot (ft/ft), with flow toward the area of ground water extraction in Area B (Plate 1). Using Darcy's Law, along with approximations of 1 ft/day for hydraulic conductivity and 0.3 for effective porosity, ground water at the Northeast Site is estimated to move about 6 ft/year. This velocity is less than the historical estimates of 17 and 22 ft/year. Similar flow patterns were observed in the deep surficial aquifer (Plate 2).

In the south-central part of the STAR Center, surficial aquifer flow is influenced by ground water withdrawals from recovery wells PIN12−RW01 and –RW02 at Building 100, and the resulting capture zones can be seen in Figures 5 and 6. For the past 3 years, shallow ground water beneath Building 100 has been observed to flow to the southeast under a very slight gradient. This flow pattern was observed again in March 2006. The hydraulic gradient at the Building 100 Area was about 0.001 ft/ft. Using the approximations mentioned above, ground water flow velocity in this area is estimated to be less than 2 ft/year. Shallow ground water at the WWNA also flows to the southeast.

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 at a similar elevation in March 2006 to that in October 2005.

A downward vertical hydraulic differential of approximately 8.2 ft existed between the surficial aquifer wells and Floridan aquifer wells at the Northeast Site. Table 3 illustrates the vertical hydraulic differential. This differential is similar to that observed in October 2005 and is consistent with the historical range of 5 to 9 ft.

Surface-water elevations were recorded from the East, South, and Southwest Ponds at the site and are presented in Table 4. A surface water elevation for the West Pond could not be read because construction activities damaged the staff gauge in the West Pond. New measuring points

will be surveyed for both the West Pond and the new (fifth) pond during the summer of 2006. The ponds are hydraulically connected to the shallow surficial aquifer system (Plate 1).

3.0 Ground Water Sampling and Analytical Results

3.1 Work Performed

During annual sampling in March 2006, ground water samples were collected from 132 monitoring and recovery wells. VOCs analyses were performed on 116 samples using EPA SW-846 Method 8260. Arsenic was analyzed in 33 samples using EPA SW-846 Method 6010. Laboratory reports are provided in Appendix A.

During the period of January 1 to March 31, 2006, VOCs, iron, and hardness (as $CaCO_3$) were measured for the Building 100 treatment system and results are provided in Appendix B.

Samples were also collected for dissolved gases and microbial activity analyses. The dissolved gases are ethene, ethane, hydrogen, methane, and carbon dioxide. The microbiological analysis is for dehalococcoides ethenogenes. Analytical results for these gases and this microorganism are summarized in Table 5.

All samples were collected in accordance with the Stoller *Sampling Procedures for the Young - Rainey STAR Center and 4.5 Acre Site* (DOE 2004), using FDEP procedures. All samples collected were submitted to Accutest Laboratories in Orlando, Florida, for analysis. Accutest is accredited by the Florida Department of Health in accordance with the National Environmental Laboratory Accreditation Conference, certification number E83510. All monitoring wells were micropurged using a dedicated bladder pump, and sampling was performed when the field measurements stabilized. Extraction wells were sampled using their associated flowlines with dedicated sampling ports. Table 6 lists field measurements of pH, specific conductance, dissolved oxygen, oxidation-reduction potential, turbidity, and temperature recorded at the time the samples were collected. Measurements were made with a flow cell and a multiparameter instrument.

3.2 Analytical Results

3.2.1 Northeast Site (PIN15)

Table 7 shows the results of arsenic sampling at four Northeast Site wells. Arsenic concentrations ranged from nondetect to 0.0294 mg/L in PIN15−M14S.

Concentrations of contaminants of potential concern (COPCs) in samples collected from wells at the Northeast Site (PIN15) are included in Table 8, which also shows the previous four quarters of data for comparison purposes. Figure 7 shows the total COPCs (TCOPCs) concentrations.

No COPCs were detected in the 35 monitoring wells listed below:

PIN15–0506	PIN15–0520	PIN15–0561	PIN15–0571	PIN15–M16S
PIN15–0507	PIN15–0523	PIN15–0562	PIN15–0572	PIN15–M24D
PIN15–0510	PIN15–0530	PIN15–0563	PIN15–M03D	PIN15–M27D
PIN15–0513	PIN15–0534	PIN15–0564	PIN15–M03S	PIN15–M27S
PIN15–0515	PIN15–0535	PIN15–0565	PIN15–M12D	PIN15–M32D
PIN15–0516	PIN15–0559	PIN15–0568	PIN15–M12S	PIN15–M32S
PIN15–0518	PIN15–0560	PIN15–0570	PIN15–M14S	PIN15–M33D

The 14 monitoring wells listed below contained detectable COPCs:

PIN15–0514	PIN15–0567	PIN15–0574	PIN15–0577	PIN15–M16D
PIN15–0537	PIN15–0569	PIN15–0575	PIN15–0578	PIN15–RW16
PIN15–0566	PIN15–0573	PIN15–0576	PIN15–M14D	

TCOPCs concentrations ranged from below detection limit to 116.4 micrograms per liter (µg/L) in PIN15−0537. The COPC compound detected at the highest concentration was VC at 111 µg/L.

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

Table 6 shows the results of arsenic sampling in the Building 100 Area. Arsenic values ranged from nondetect to 0.0525 mg/L in PIN12−S68B.

TCOPCs concentrations in samples collected from the seven wells sampled at the Building 100 Area are included in Table 9, which also shows the previous four quarters of data for comparison purposes. Figure 8 shows the TCOPCs concentrations.

No COPCs were detected in the 31 wells listed below.

PIN06–0500	PIN12–0511	PIN12–0527	PIN12–S71B	PIN21–0503
PIN06–0501	PIN12–0512	PIN12–0528	PIN12–S72B	PIN21–0504
PIN09–0500	PIN12–0515	PIN12–S31B	PIN12–S72D	PIN21–0505
PIN10–0500	PIN12–0516	PIN12–S32B	PIN12–S73B	
PIN12–0508	PIN12–0517	PIN12–S36B	PIN12–S73D	
PIN12–0509	PIN12–0522	PIN12–S68B	PIN21–0500	
PIN12–0510	PIN12–0523	PIN12–S69B	PIN21–0502	

The 31 wells listed below contained detectable COPCs. The wells are:

PIN12–0513	PIN12–0526	PIN12–S67B	PIN12–S70B	PIN12–TE03
PIN12–0514	PIN12–RW01	PIN12–S67C	PIN12–S70C	PIN21–0501
PIN12–0518	PIN12–RW02	PIN12–S67D	PIN12–S70D	PIN21–0512
PIN12–0520	PIN12–S29C	PIN12–S68C	PIN12–S71C	
PIN12–0521	PIN12–S33C	PIN12–S68D	PIN12–S71D	
PIN12–0524	PIN12–S35B	PIN12–S69C	PIN12–S72C	
PIN12–0525	PIN12–S37B	PIN12–S69D	PIN12–S73C	

TCOPCs concentrations ranged from nondetect to 94, 950 µg/L. The COPC compound detected at the highest concentration was cis-1,2-DCE at 53,200 µg/L in PIN12−S35B.

3.2.3 Wastewater Neutralization Area (PIN18)

The volatile COPC at the WWNA is VC. No VOC was detected in the following four wells:

PIN18–0523	PIN18–RW02	PIN18–RW03	PIN18–RW0501

One well, PIN18−0523, had VC detected at a concentration of 5.2 µg/L.

No arsenic was detected in the 18 wells listed below.

PIN18–0503	PIN18–0506	PIN18–0509	PIN18–0521	PIN18–0523
PIN18–0504	PIN18–0507	PIN18–0510	PIN18–0522	PIN18–0526
PIN18–0505	PIN18–0508	PIN18–0520	PIN18–0522	
PIN18–0503	PIN18–0506	PIN18–0509	PIN18–0521	

The seven monitoring and recovery wells listed below had detectable arsenic concentrations.

PIN18–0500	PIN18–0524	PIN18–RW02	PIN18–RW0501
PIN18–0502	PIN18–0525	PIN18–RW03	

The highest concentration of arsenic detected was 145 µg/L in PIN18−RW0501 (note that the units for arsenic are converted from mg/L to µg/L so that TCOPCs for this area could be calculated using consistent units).

3.3 Quality Assurance/Quality Control

The analytical results from the analytical laboratory, Accutest, were checked for quality assurance/quality control (QA/QC) through duplicate samples and trip blanks. Detected analytes (VOCs and arsenic) for each duplicate sample are listed in Table 11. The duplicate sample results were compared and the relative percent differences (RPDs) between the results were calculated. Six duplicates were analyzed for VOCs, and three for arsenic.

A total of 217 duplicate analyses for individual analytes were performed. All data passed QA/QC criteria at a Class A level, indicating that the data may be used for quantitative and qualitative purposes.

Duplicate samples should be collected at a frequency of one duplicate for every 20 or fewer samples. There were 116 ground water samples analyzed for VOCs, with six duplicate VOC samples collected. There were 33 ground water samples analyzed for arsenic, with three duplicate samples. The duplicate requirements for this sampling event were met.

There were 24 trip blanks collected during this event and all were nondetect for volatile compounds.

A data validation software module for identifying and tracking anomalous ground water data points within the SeePRO database was used to print a report of analytical results that fall outside of historical minimum or maximum values.

During the July 2005 event, one well, PIN15−0566 showed an anomalous level of TCE of 160 µg/L. Previous levels of TCE seen in this well have been at, or near the detection limit. The two subsequent sampling events have shown TCE at < 1 µg/L, so the TCE value of 160 µg/L from July 2005 has been rejected as anomalous.

Suspect values for oxidation reduction potential were seen at wells PIN12−S31B. –S32B, −S35B, PIN15−0569, −0573, and –0574 during the October 2005 sampling event. Follow-up tracking of these wells during subsequent sampling events will be used to determine whether or not the data should be qualified.

4.0 Data Interpretation

The purpose of this data interpretation section is to aid in evaluation of remediation progress and plume stability. Time versus concentration plots and plume maps were generated to aid the interpretation.

4.1 Contaminant Concentration Trends

Monitoring wells PIN15–0537 and –0569 were chosen to evaluate plume stability and plume control at the Northeast Site. The concentration with time plots for cDCE and VC in well 0537, located close downgradient from NAPL Area B (Figure 7), are depicted in Figure 9. Both cDCE and VC showed increasing concentrations in 1999 and 2000, but have since shown decreasing concentration trends. Thermal remediation of NAPL Area B, located just north of well 0537, began in mid-August 2005. The significant concentration decreases observed in March 2006 may be due to the ground water extraction associated with this system.

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). This well was out of the area of influence of the NAPL Area B groundwater pumping, so this decreasing trend probably is due to biodegradation. This conclusion is supported by the presence of the dechlorinating organism *Dehalococcoides ethenogenes* along with the presence of the biodegradation daughter products ethane and ethane (Table 5). This decreasing concentration trend indicates a stable or shrinking contaminant plume in the vicinity of this well.

At the WWNA, three wells were chosen to depict remediation progress. Wells PIN18−0500, −0522, and −0525 were chosen because they are shallow wells containing high arsenic concentrations (Figure 11). The arsenic concentration in wells 0500 and 0522 continues to show a decreasing trend, with the arsenic concentration in well 0522 having decreased to below the 10 µg/L MCL. The arsenic concentration in well 0525 has previously shown an increasing trend, but has shown a decreasing trend over the last 2 years. These decreasing trends likely indicate that the arsenic plume is shrinking. These three recovery wells were turned off December 20, 2005.

Monitoring wells PIN21–0512 and PIN12–S73C were chosen to evaluate plume stability at the Building 100 Area because they are the monitoring wells nearest the property boundaries. Well 0512 lies along the southern boundary and well S73C lies along the eastern boundary of the STAR Center.

Figure 12 depicts the VC concentration over time in well 0512, and Figure 13 shows the VC concentration in well S73C. Well 0512 shows a consistent VC concentration trend (considering the inherent sampling and analytical variability of low concentrations), with concentrations ranging between 0.3 and 8.6 µg/L since November 1998. Well S73C shows a decreasing VC concentration trend from 2002 to late 2003, followed by a stable trend since that time. These stable and decreasing concentration trends indicate a stable or shrinking contaminant plume near the property boundaries.

Figure 14 shows the TCE, cis-1,2-, trans-1,2-, and VC concentrations in well PIN12−0524. Well 0524, located near the southeast corner of Building 100, is an additional well that shows plume movement. The concentration trends in this well suggests that a slug of TCE, DCE, and VC is moving through the aquifer. The concentration trends in well 0524 indicate that the slug is nearly past the well, based on distinct declining trends for TCE and cDCE. The slightly increasing VC trend likely is due to biodegradation of TCE and DCE to VC. Adjacent shallow well 0525 showed a similar trend earlier. Based on the observed trends in these wells, it appears likely that the concentrations in well 0524 will return to near non-detect levels over the next few years.

4.2 Plume Maps

For each SWMU, plume maps were generated for the TCOPCs as well as selected contaminants. The compound-specific MCL has been utilized to draw the inferred plume boundary for each contaminant (i.e., concentrations below the MCL were not included in the plume area). Estimated values (J or B qualified data) were not used when the TCOPCs values were calculated. The outline of the 2005 plume is also shown on the maps for comparison.

Plume maps for the Northeast Site have been generated for TCOPCs (Figure 7), TCE (Figure 15), cDCE (Figure 16), VC (Figure 17), methylene chloride (Figure 18), toluene (Figure 19), and benzene (Figure 20). A factor that must be considered when observing Northeast Site plume maps is the abandonment of many of the monitoring and recovery wells in and near NAPL Area B prior to the April 2004 sampling event. These wells were abandoned to ensure that they would not interfere with the operation of the NAPL remediation activities, but these wells also helped define the plume at the Northeast Site. Therefore, most of the plumes defined in 2003 were left as is for 2004, 2005, and 2006, unless the plumes required modification based on data collected since 2003. After NAPL remediation is completed in 2006, new monitoring wells will be installed to define the extent and magnitude of the remaining plume in that area.

Figure 21 depicts the 2006 arsenic plume at the WWNA. The 2006 arsenic plume remains the same size as the 2005 plume, although concentration is decreasing as discussed in Section 4.1.

Plume maps for the Building 100 Area have been generated for TCOPCs (Figure 8), TCE (Figure 22), cDCE (Figure 23), and VC (Figure 24). The 2006 TCE and cDCE plumes are similar in size to the 2005 plumes, but the 2006 VC plume is slightly larger than the 2005 plume due to the reappearance of VC above the MCL in wells 21-0512, 12-S69C, 12–S70B, C, and D, and 12-S72C.

4.3 Geochemical Parameters

Geochemical parameters measured in the field in all wells at the STAR Center during March 2006 are summarized in Table 5. Conditions across the STAR Center generally are reducing as evidenced by the low values of dissolved oxygen and oxygen reduction potential. Hydrogen is another indicator of redox conditions (Table 5), and all concentrations measured in March 2006 were >1 nanomolar, indicating reducing conditions that are conducive to reductive dechlorination (EPA 2000).

5.0 Treatment System and Recovery Well Performance

5.1 Building 100

From January 1 through May 31, 2006, 508,053 gallons of ground water were processed by the Building 100 treatment system from the Building 100 Area recovery wells. For the month of January, 122,064 gallons of ground water were recovered and 3.2 pounds of VOCs were removed. In February, 128,793 gallons of ground water were recovered and 9.4 pounds of VOCs were removed. For March, 153,327 gallons of ground water were recovered and 10.8 pounds of VOCs were removed. For April, 79,225 gallons of ground water were recovered and 5.7 pounds of VOCs were removed. For May, 142,678 gallons of ground water were recovered and 9.6 pounds of VOCs were removed. Interruptions to operations were experienced due to high level alarms in the surge tank. The first of two potential solutions was implemented in May (chemical cleaning of the air stripper); this appears to have solved the problem.

Figure 25 presents the historical monthly volume of ground water recovered and mass of VOCs removed. Analytical results of samples collected from the Building 100 Area treatment system influent and effluent streams are listed in Table 12.

Since startup of the Building 100 treatment system, a summary of ground water recovery volume from the Building 100 Area recovery wells is shown in Table 13. Table 14 presents the calculated mass of selected analytes recovered with the Building 100 Area treatment system for each month of this reporting period. These monthly results are based on the influent ground water concentration and flow.

5.2 Wastewater Neutralization Area

The WWNA recovery wells were shut down December 20, 2005, thus commencing DOE's 1-year monitoring period.

6.0 Conclusions

The following conclusions are based on the semiannual sampling conducted in January.

- The surficial ground water flow rate and flow direction throughout the site were similar to those observed previously.
- The highest concentration of COPCs was detected at the Building 100 Area in well PIN12−S35B.

7.0 Tasks to be Performed Semiannually

The following tasks are expected to be conducted during the next semiannual period (June 2005 through November 2006):

- Semiannual sampling and analysis of ground water in September 2006.
- Collect water level measurements in September 2006.
- Monthly sampling and analysis of the Building 100 treatment system will continue in order to provide compliance and system operations data.
- Utilization of the dedicated bladder pumps for semiannual sampling using the micropurging technique will continue.

8.0 References

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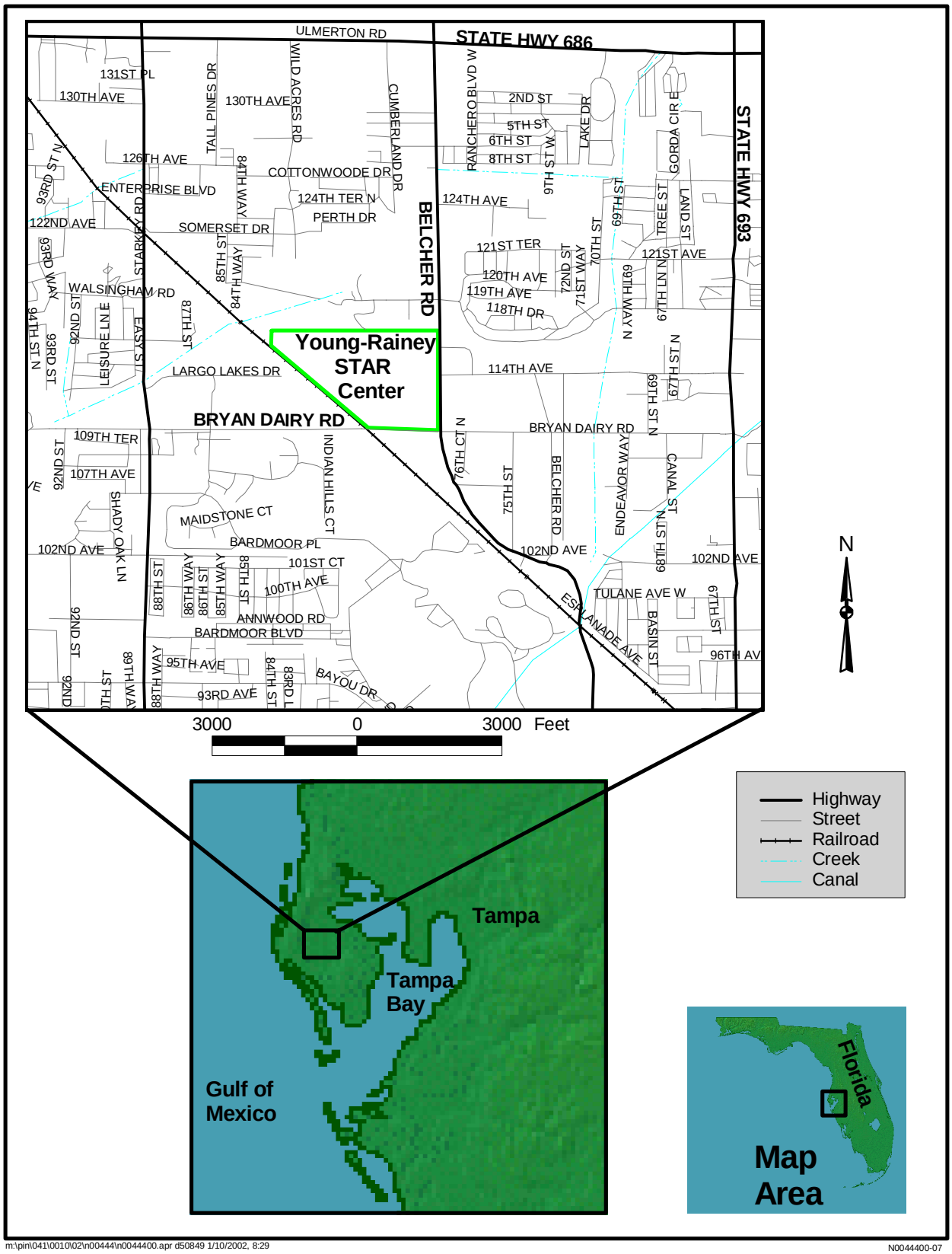

Figure 1. Young - Rainey STAR Center Location

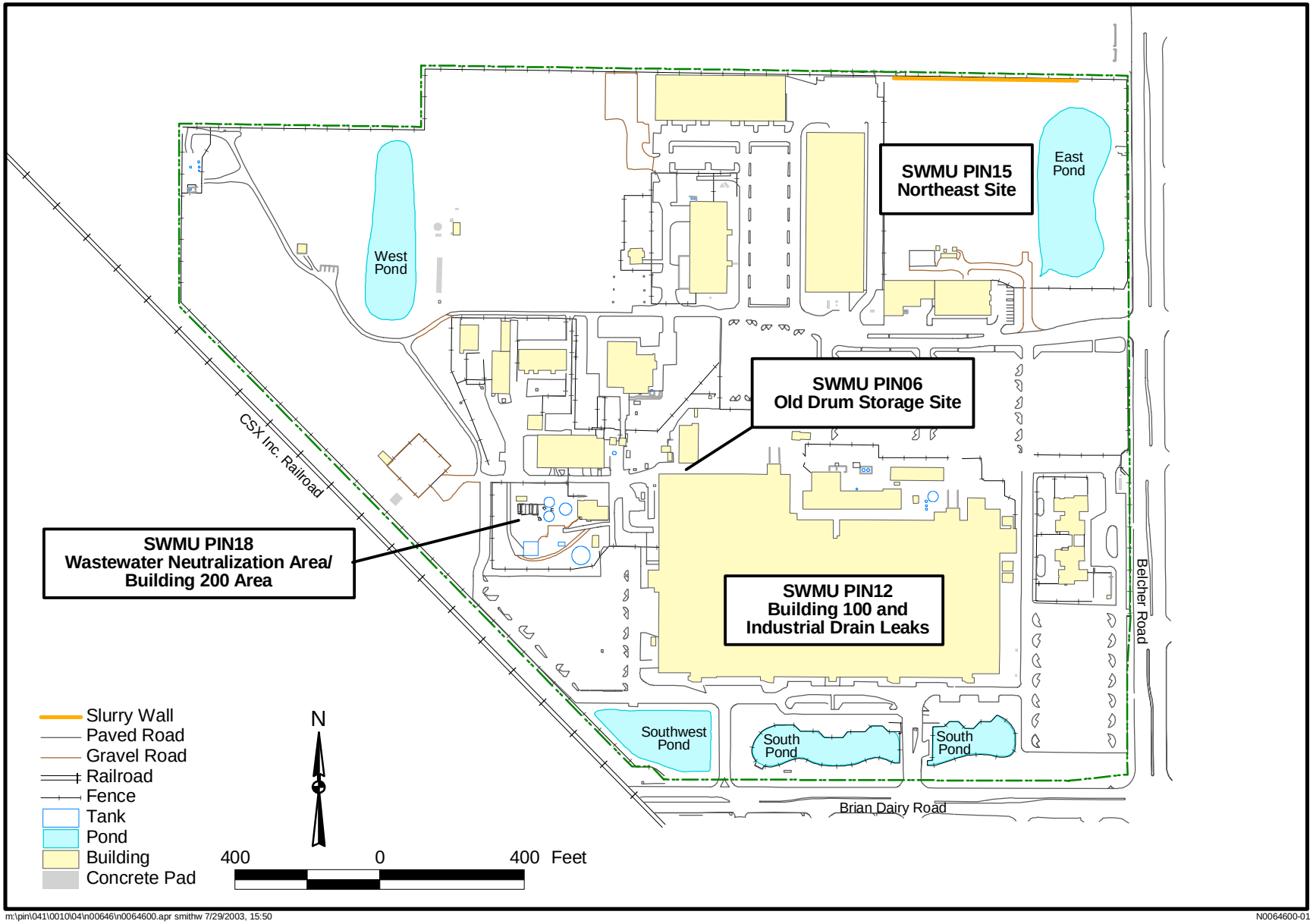

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Figure 2. Location of STAR Center Solid Waste Management Units (SWMUs)

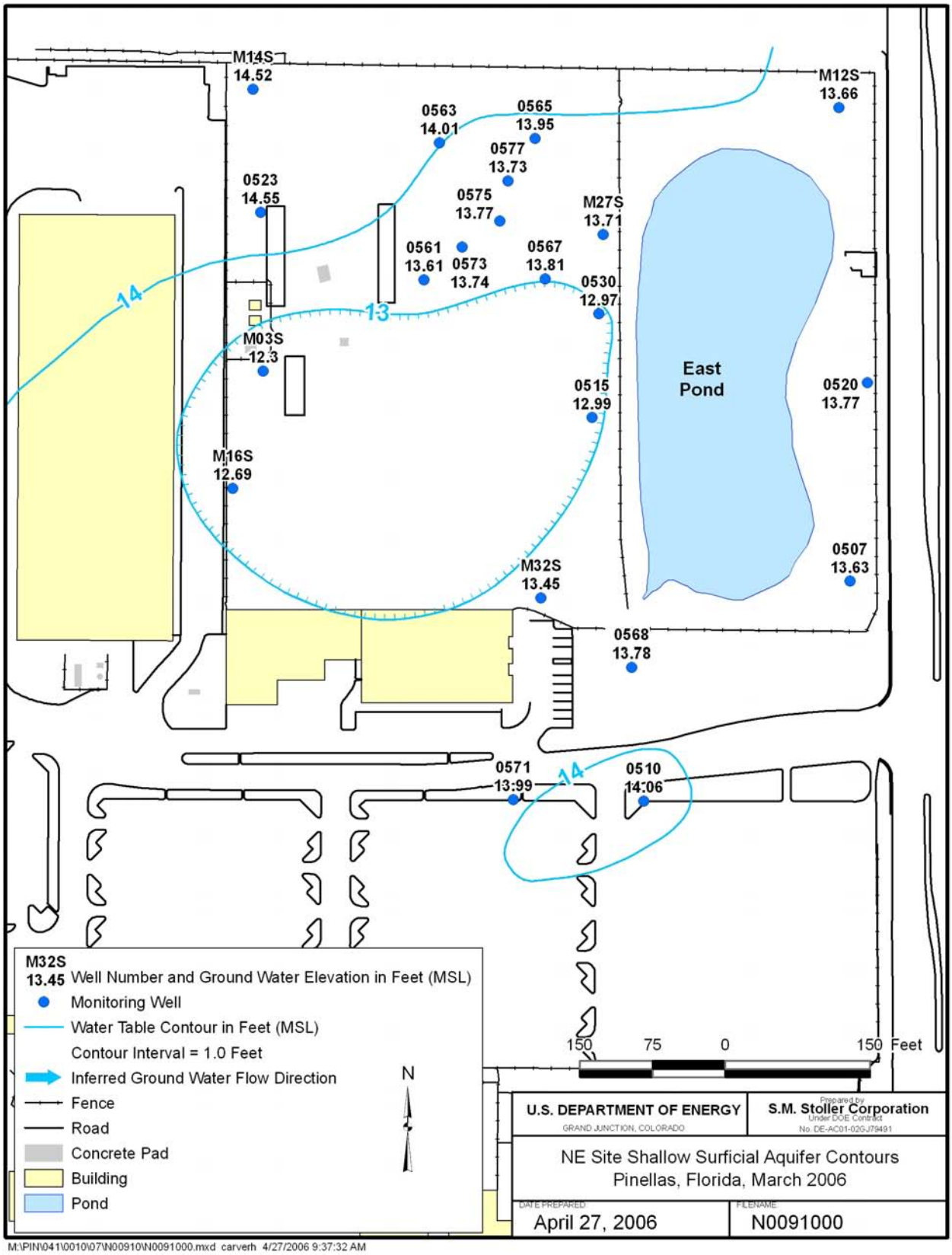


Figure 3. Ground Water Elevations and Shallow Surficial Aquifer Flow, Northeast Site, March 2006

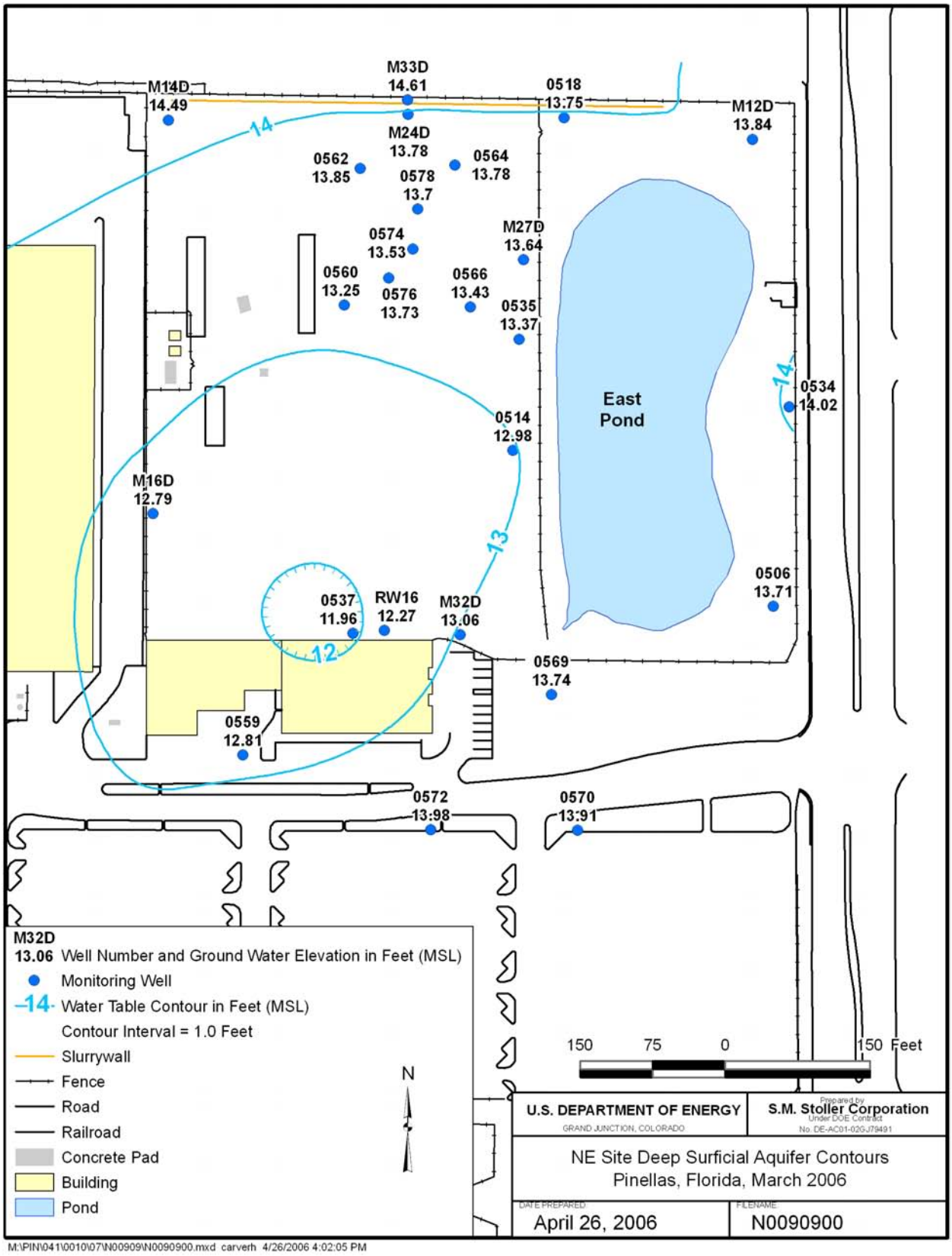


Figure 4. Ground Water Elevations and Deep Surficial Aquifer Flow, Northeast Site, March 2006

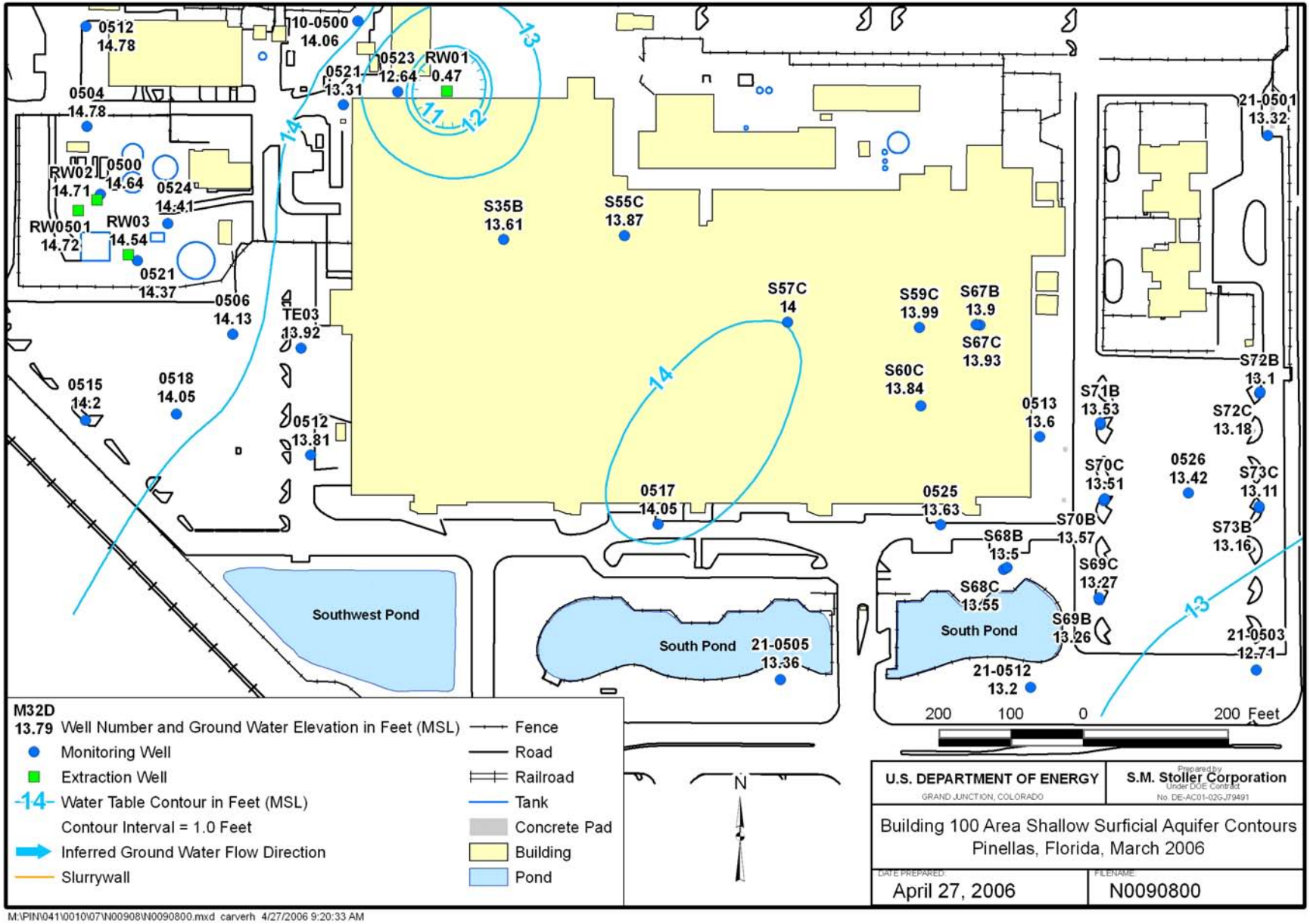


Figure 5. Ground Water Elevations and Shallow Surficial Aquifer Flow, Building 100 Area, March 2006

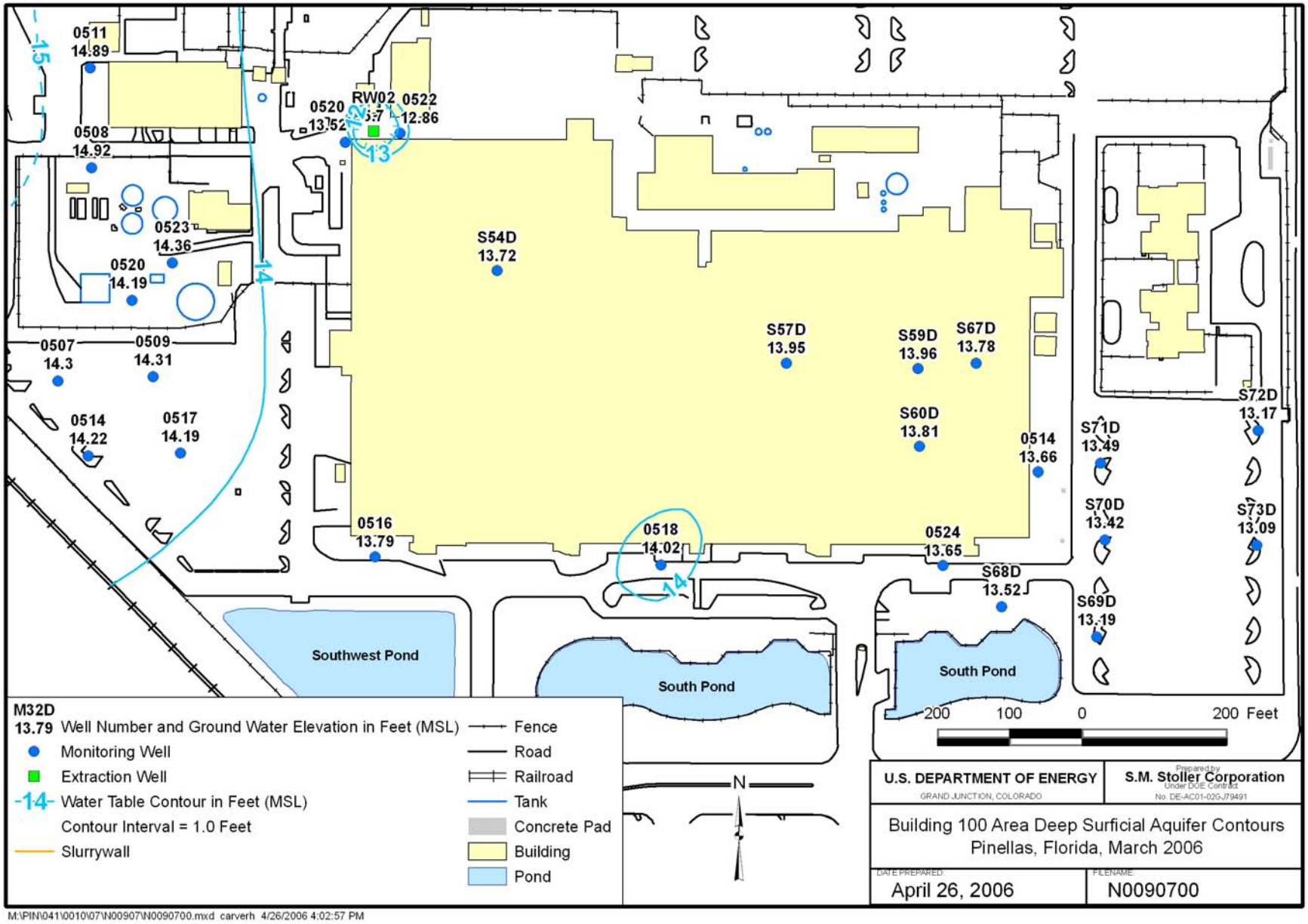


Figure 6. Ground Water Elevations and Deep Surficial Aquifer Flow, Building 100 Area, March 2006

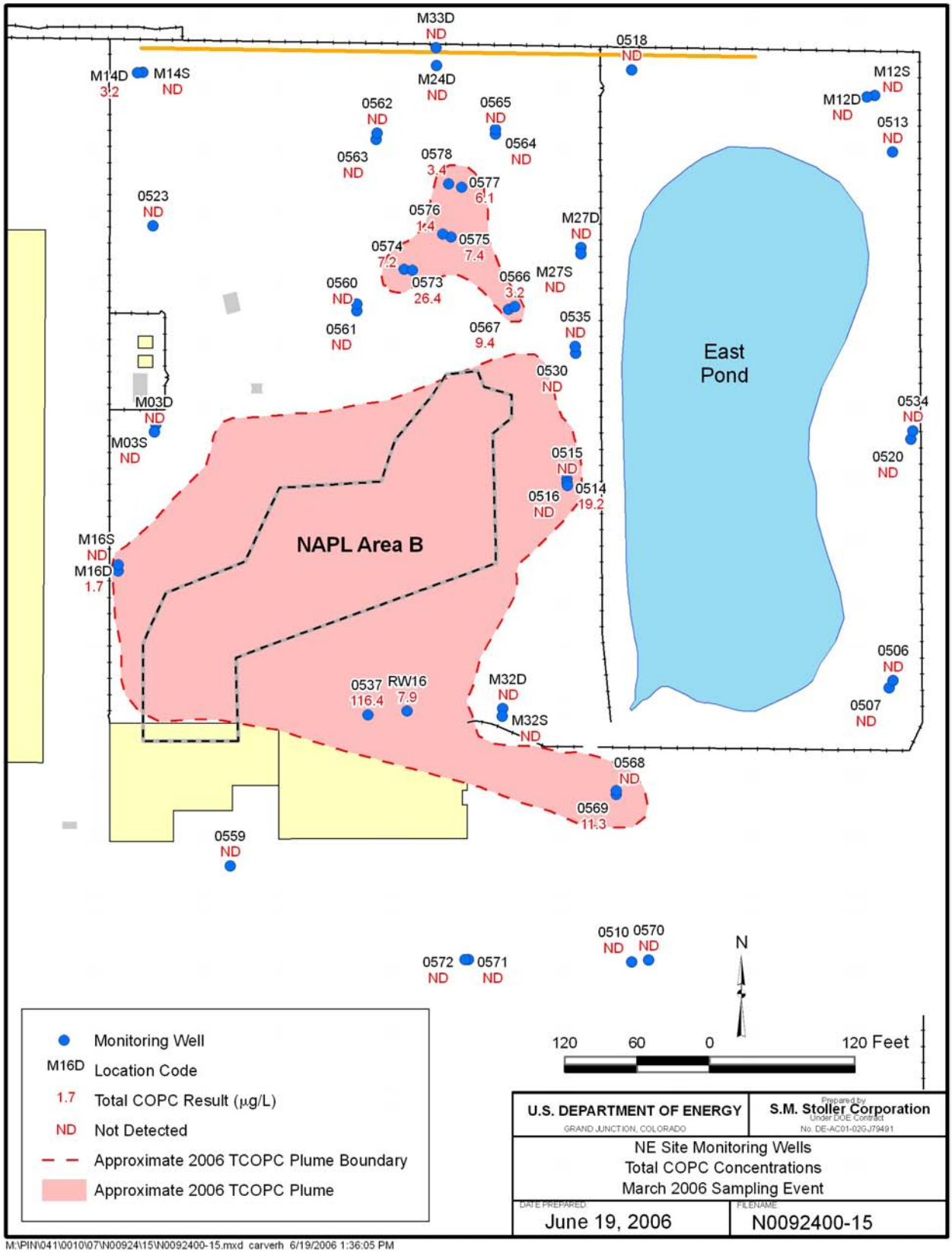


Figure 7. Northeast Site Total COPC Concentrations March 2006 Sampling Event

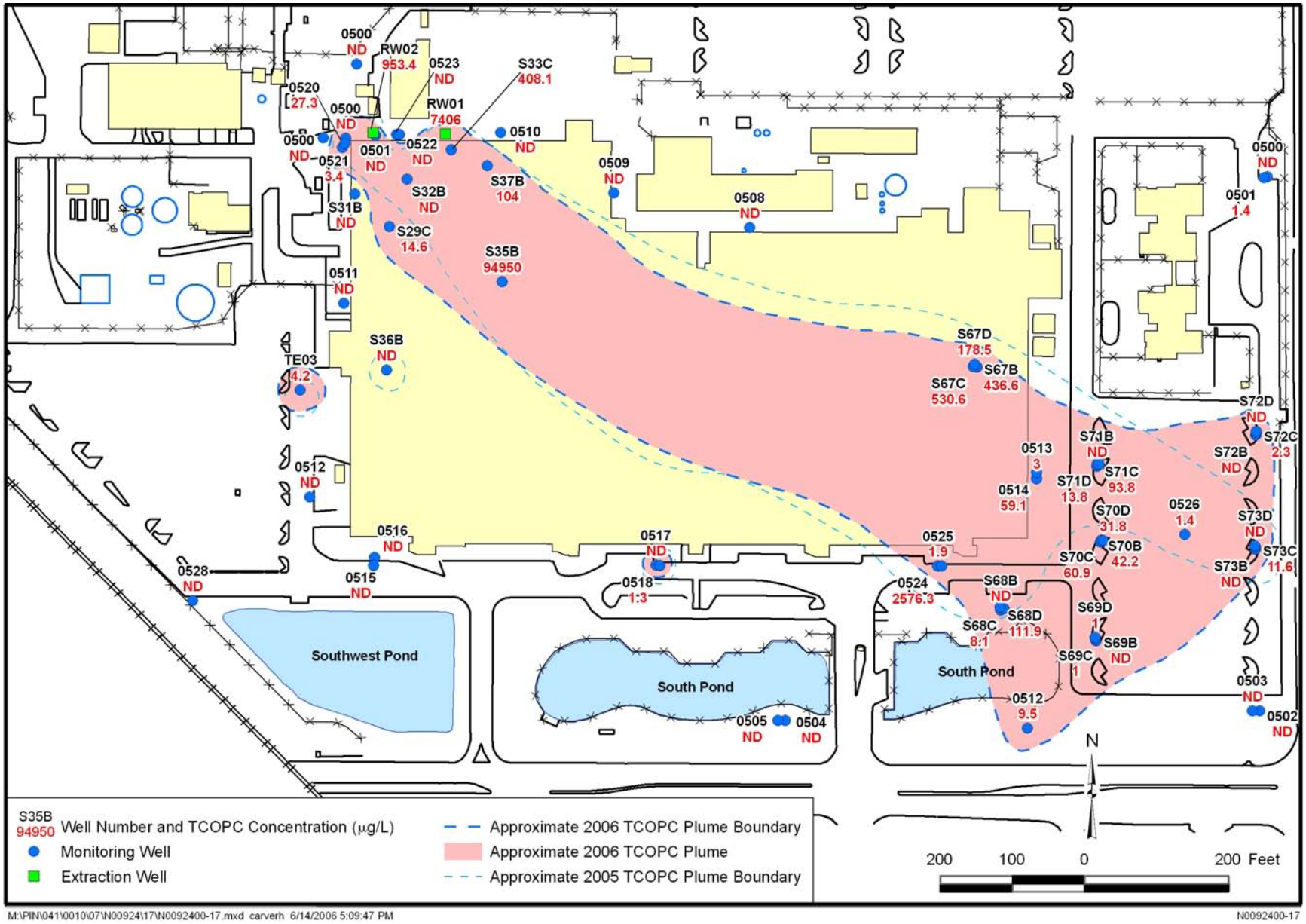


Figure 8. Building 100 Area Total COPC Concentrations March 2006 Sampling Event

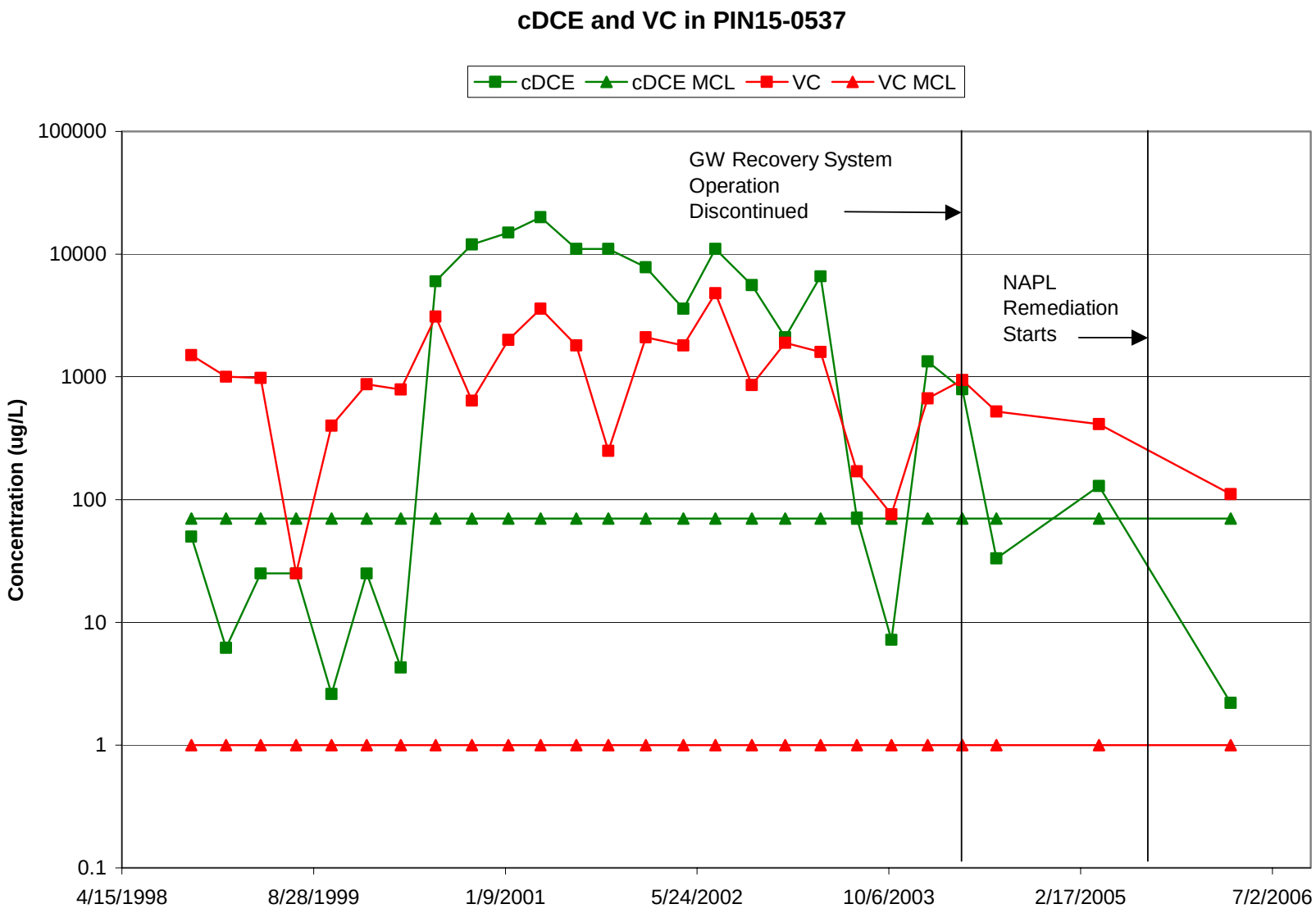


Figure 9. cDCE and VC in PIN15−0537

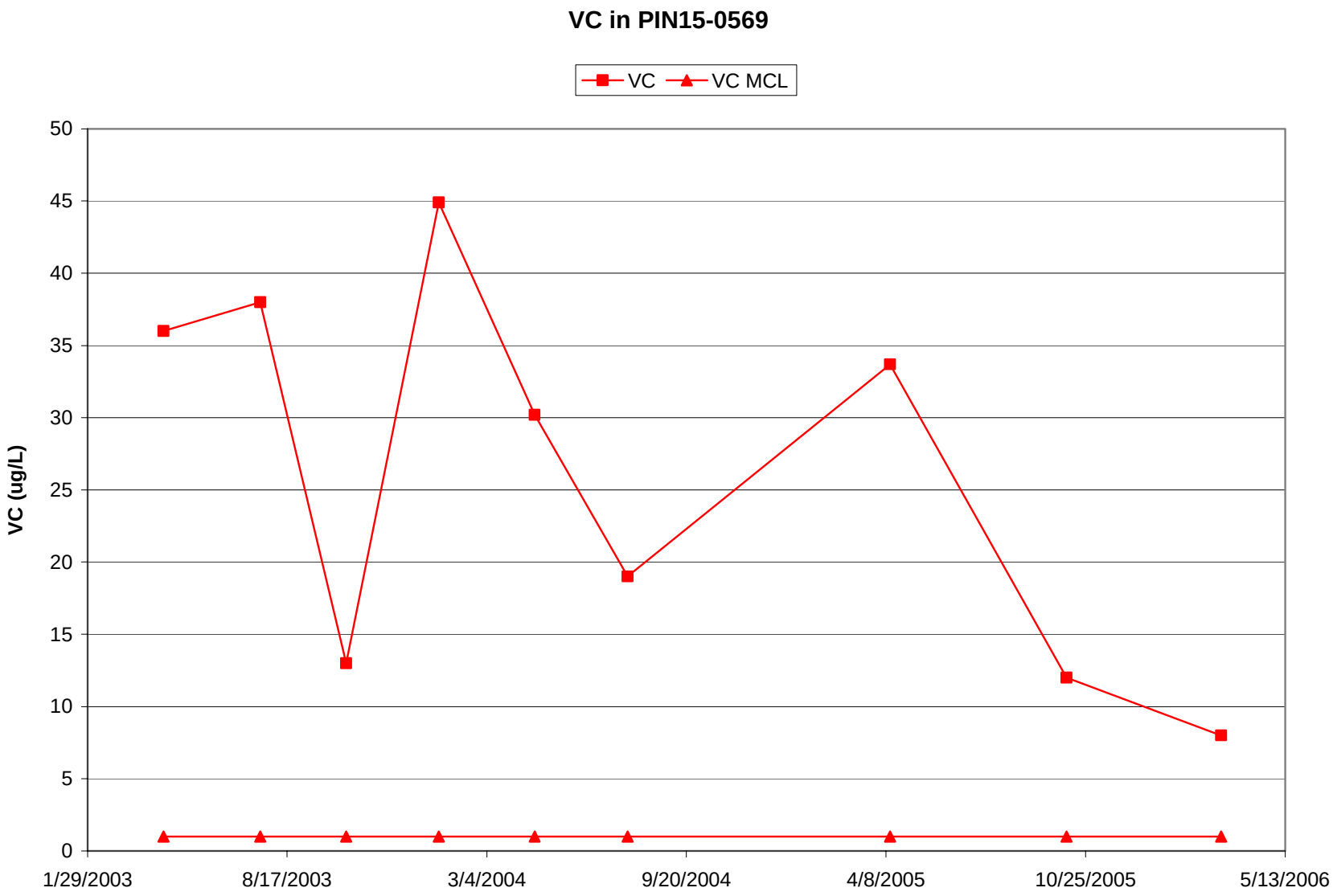


Figure 10. VC in PIN15−0569

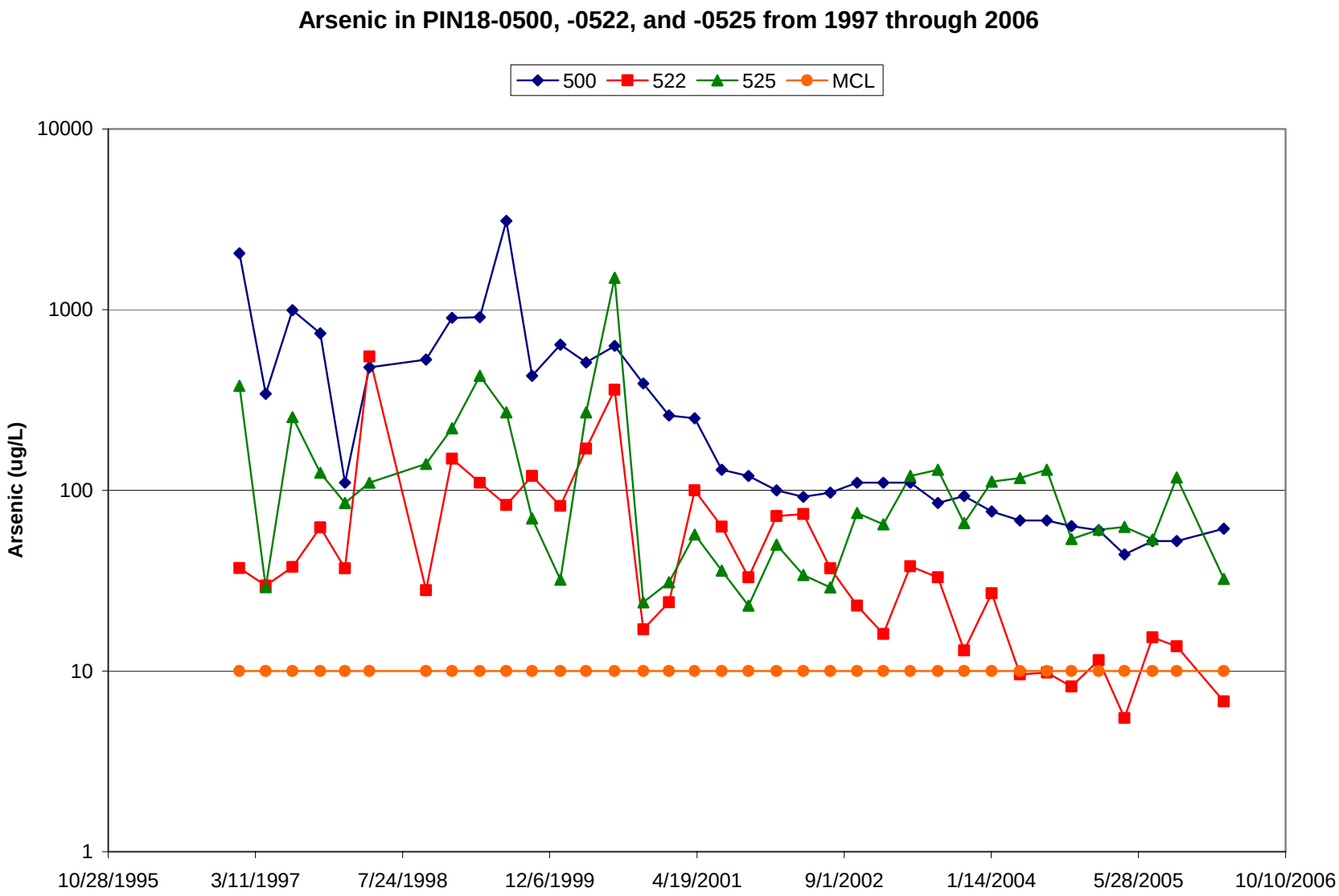


Figure 11. Arsenic in PIN18−0500, −0522, and −0525 from 1997 through 2006

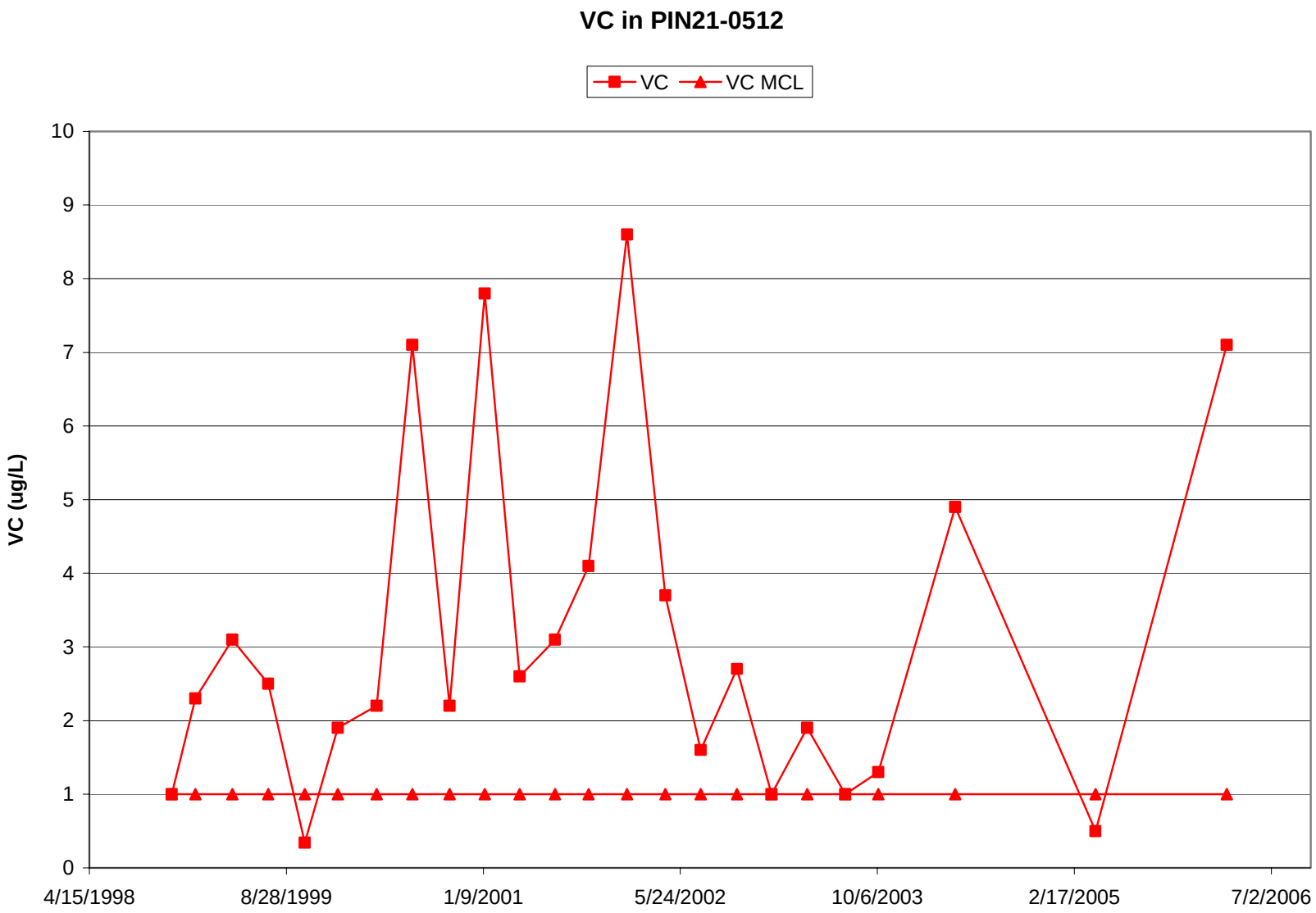


Figure 12. VC in PIN21−0512

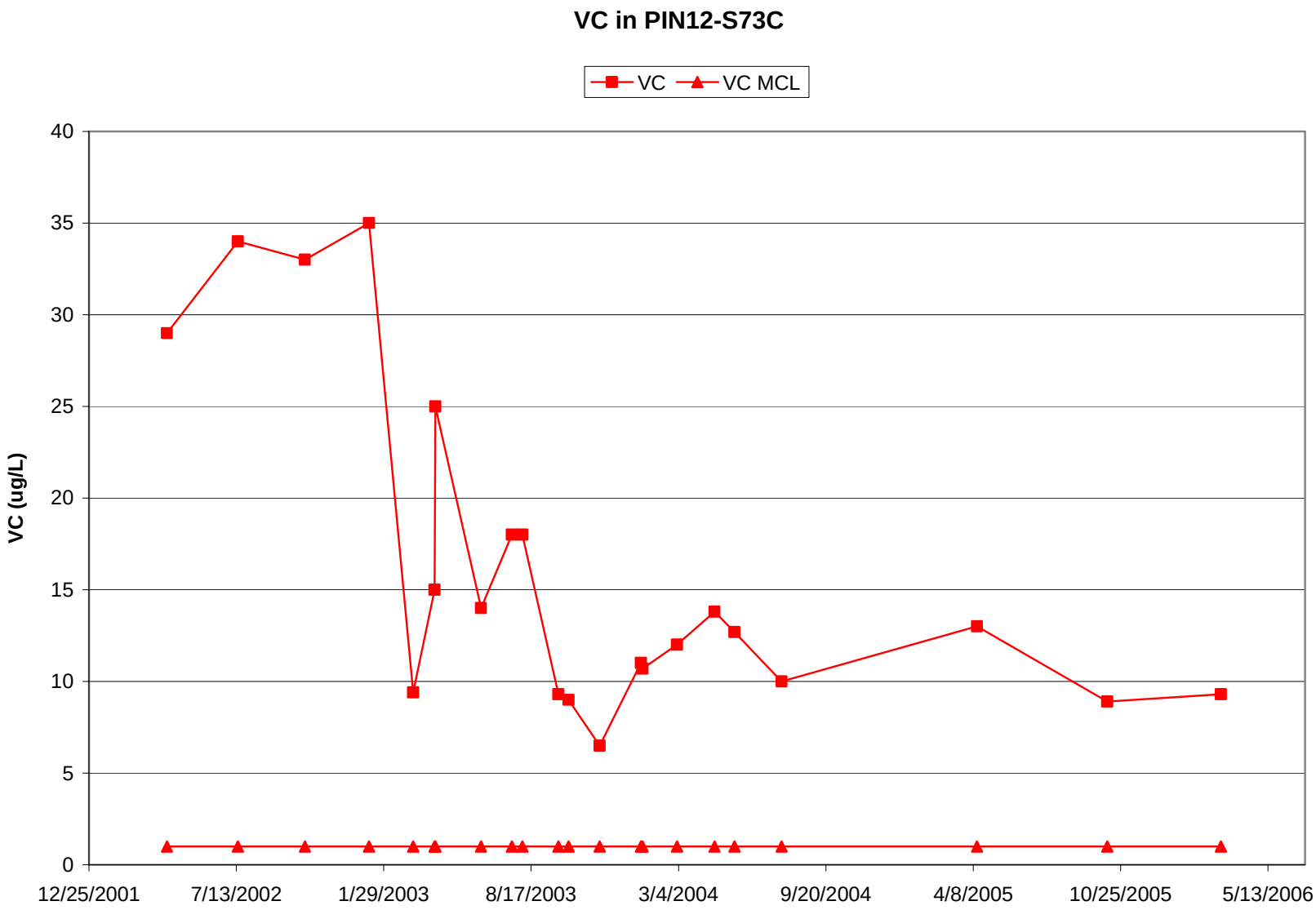


Figure 13. VC in PIN12−S73C

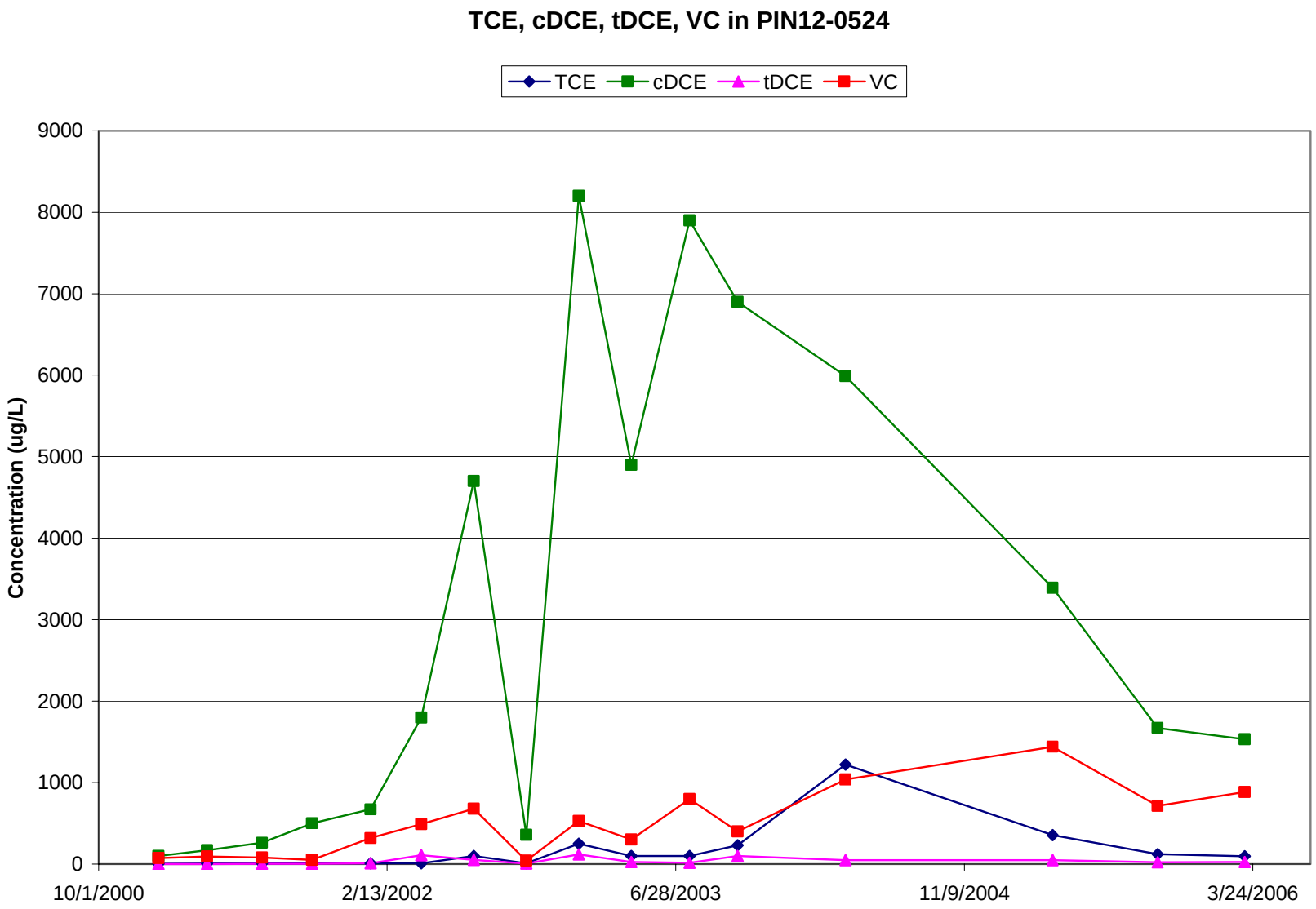


Figure 14. TCE, cDCE, tDCE,

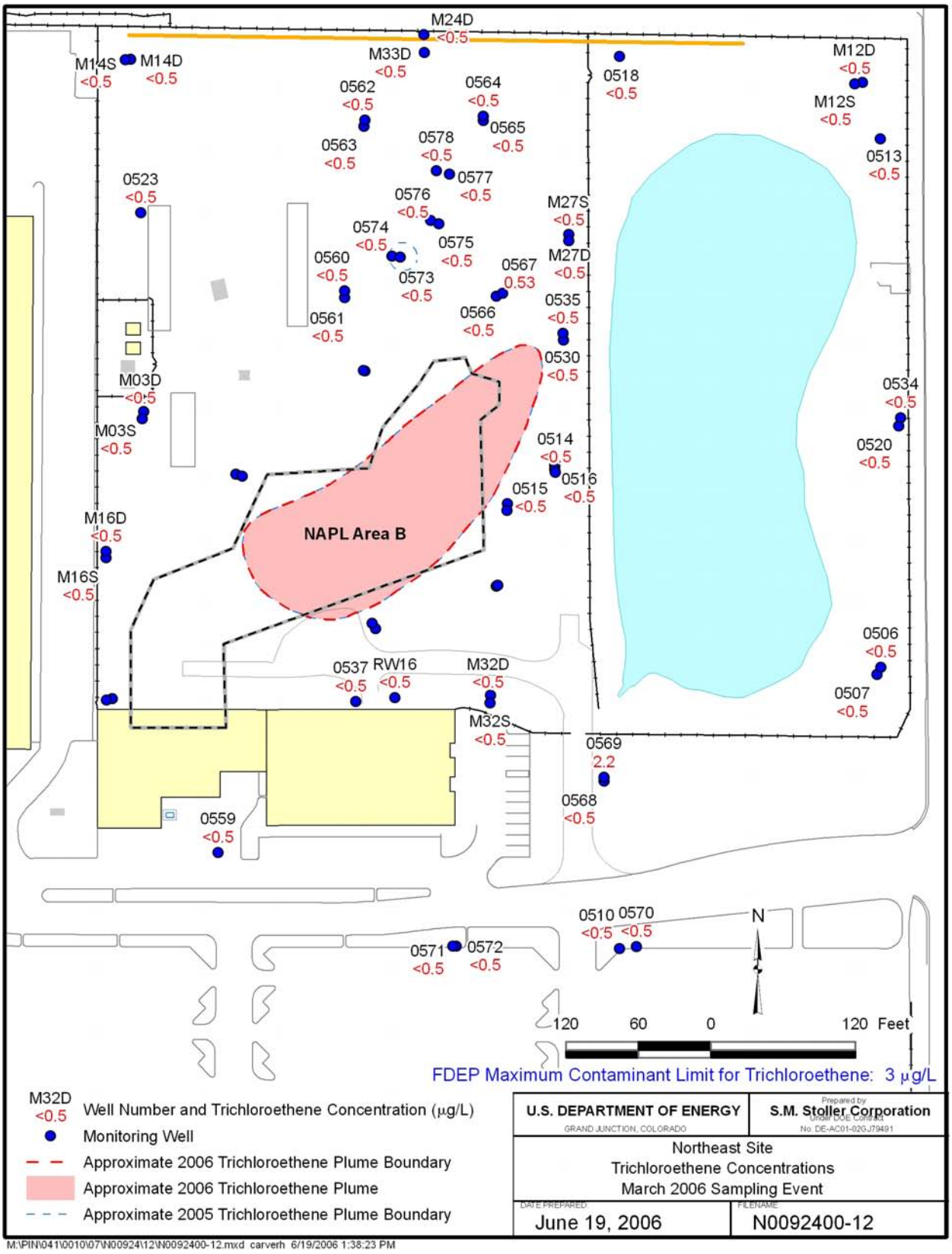


Figure 15. Northeast Site TCE Concentrations March 2006 Sampling Event

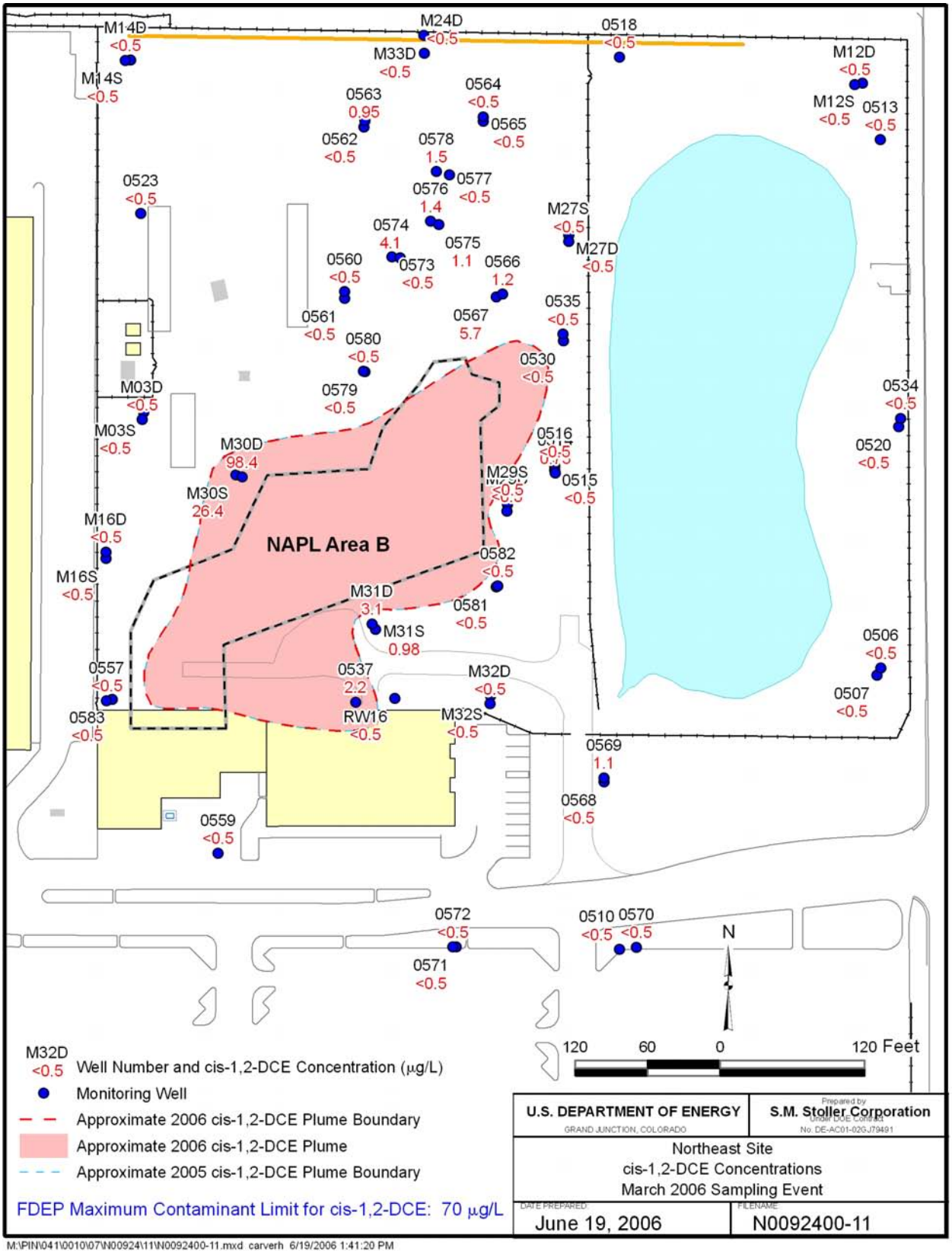


Figure 16. Northeast Site cis-1,2-DCE Concentrations March 2006 Sampling Event

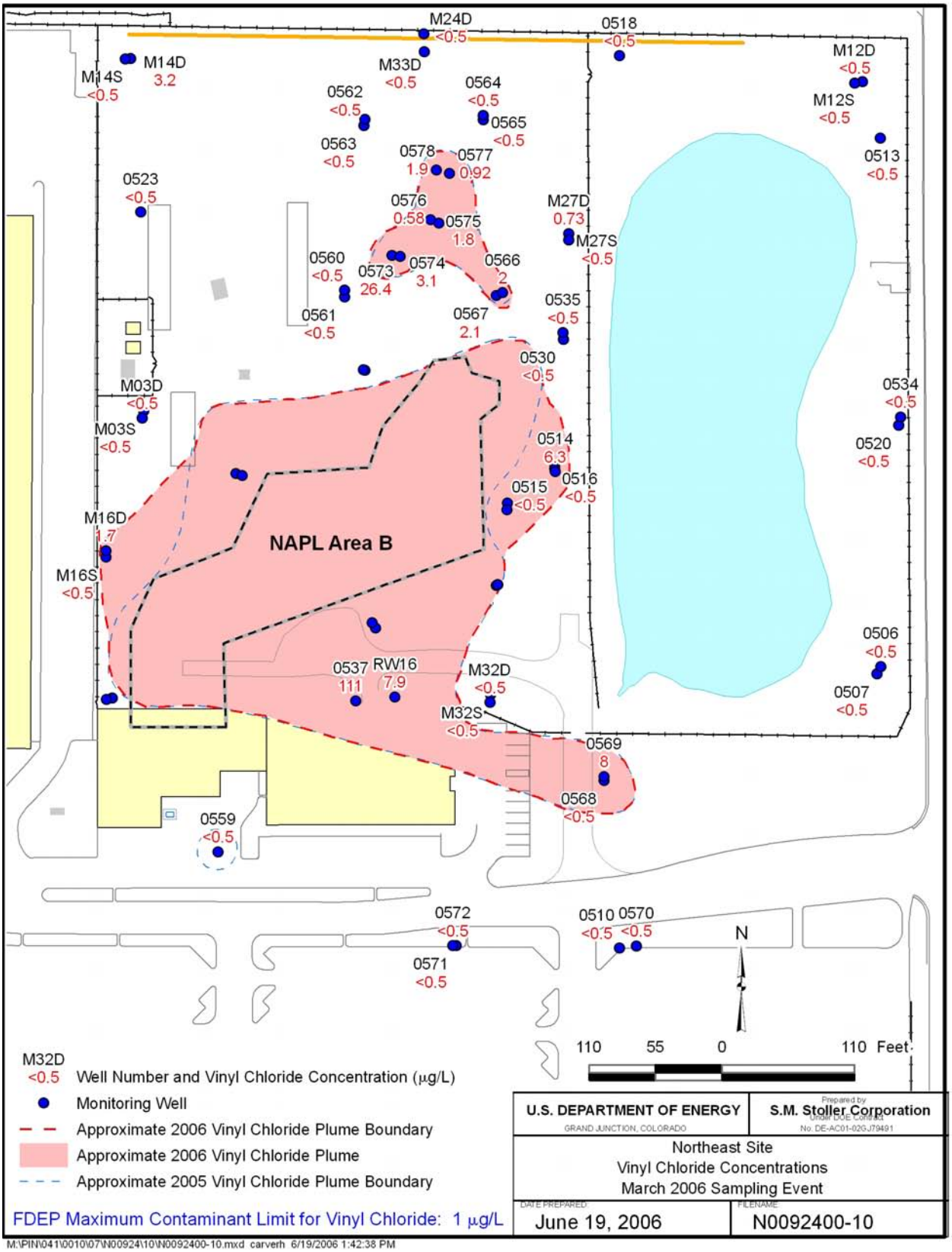


Figure 17. Northeast Site VC Concentrations March 2006 Sampling Event

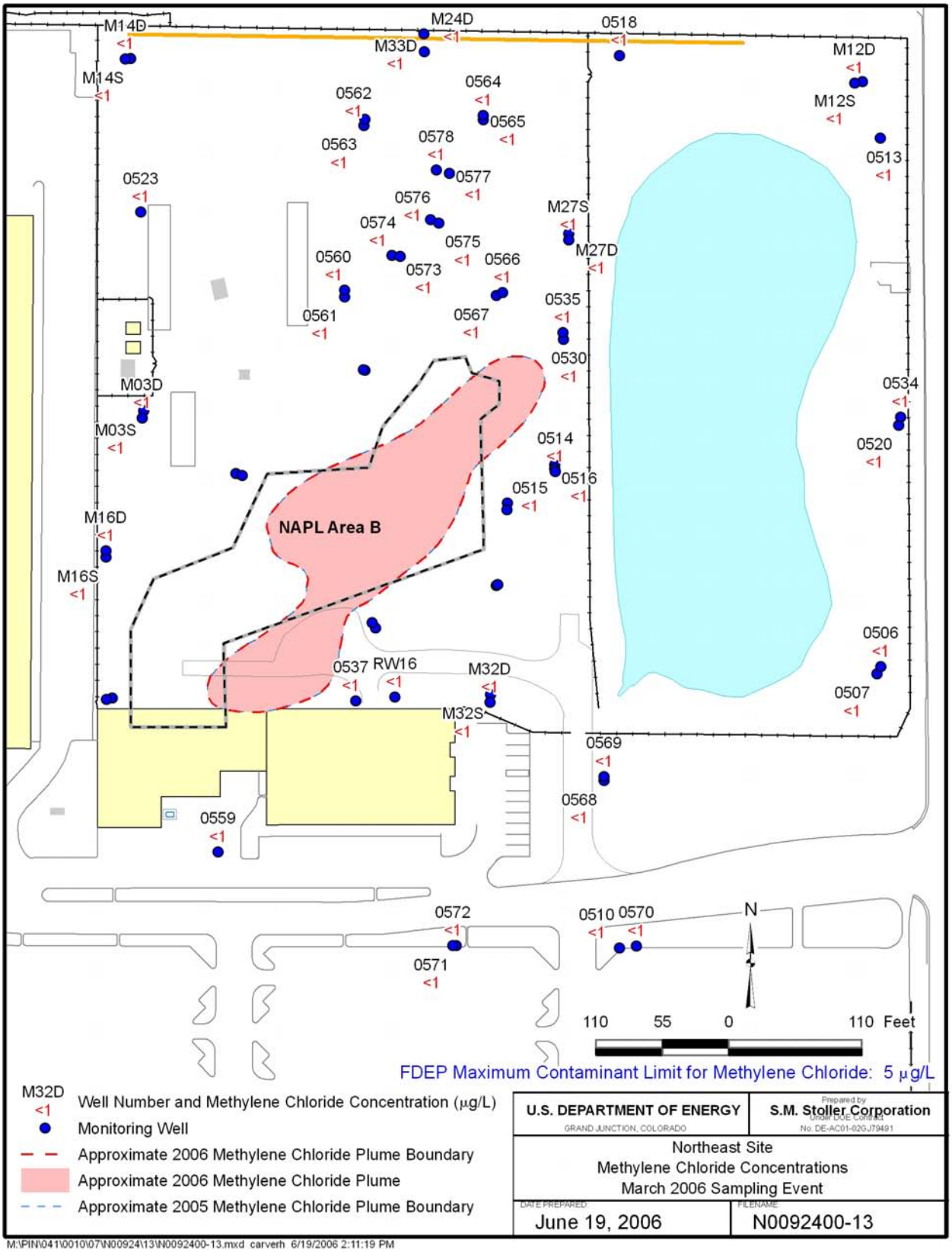


Figure 18. Northeast Site Methylene Chloride Concentrations March 2006 Sampling Event

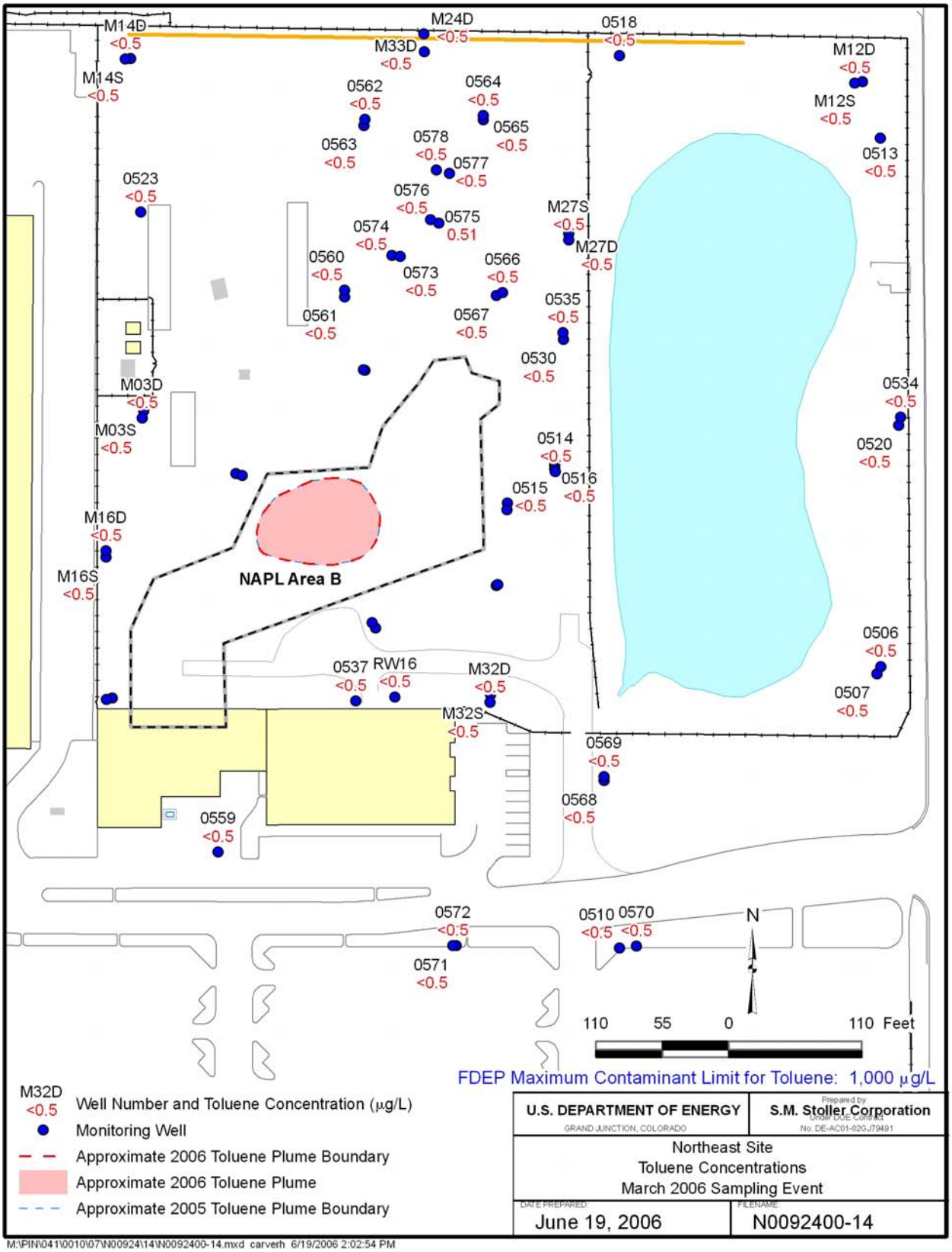


Figure 19. Northeast Site Toluene Concentrations March 2006 Sampling Event

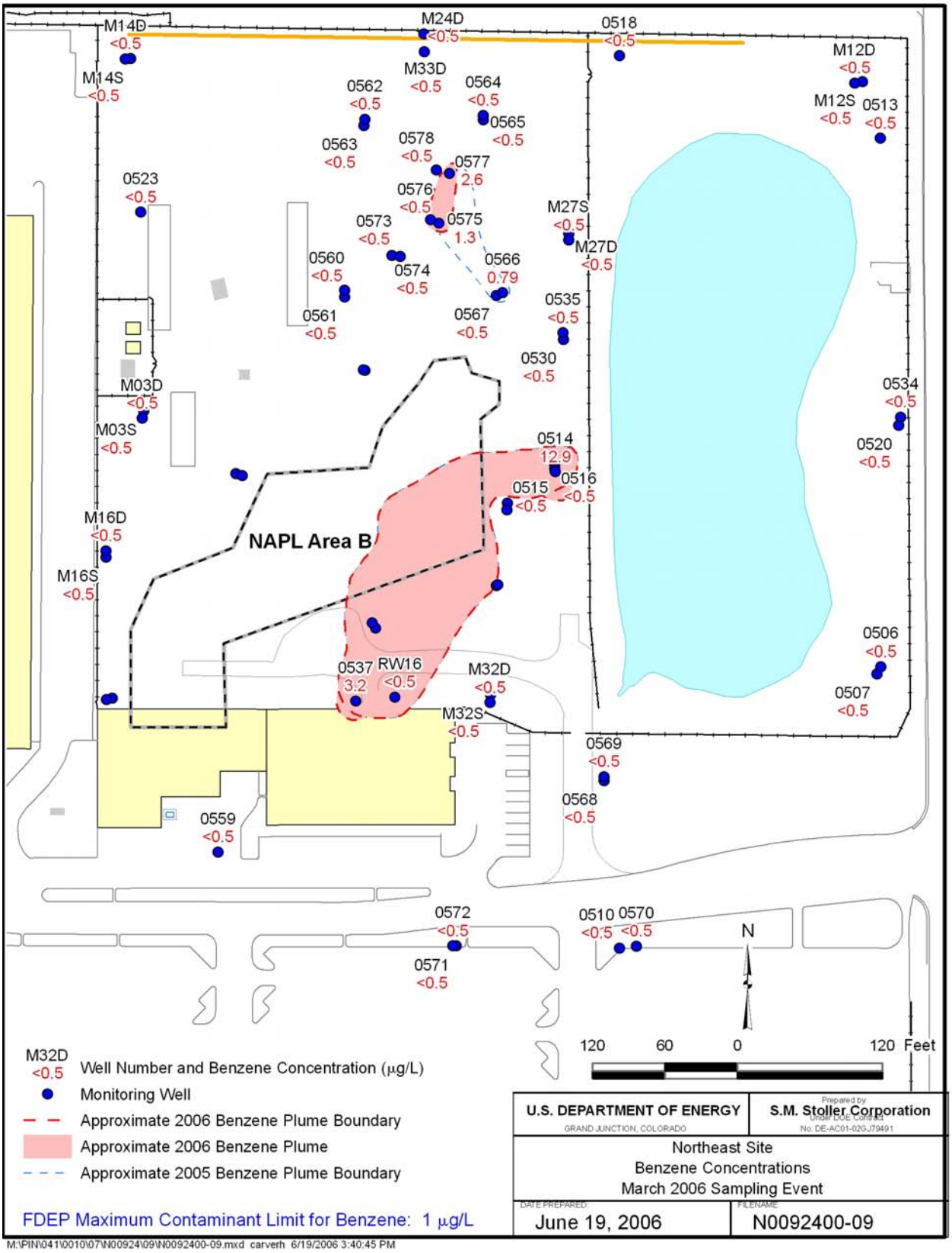


Figure 20. Northeast Site Benzene Concentrations March 2006 Sampling Event

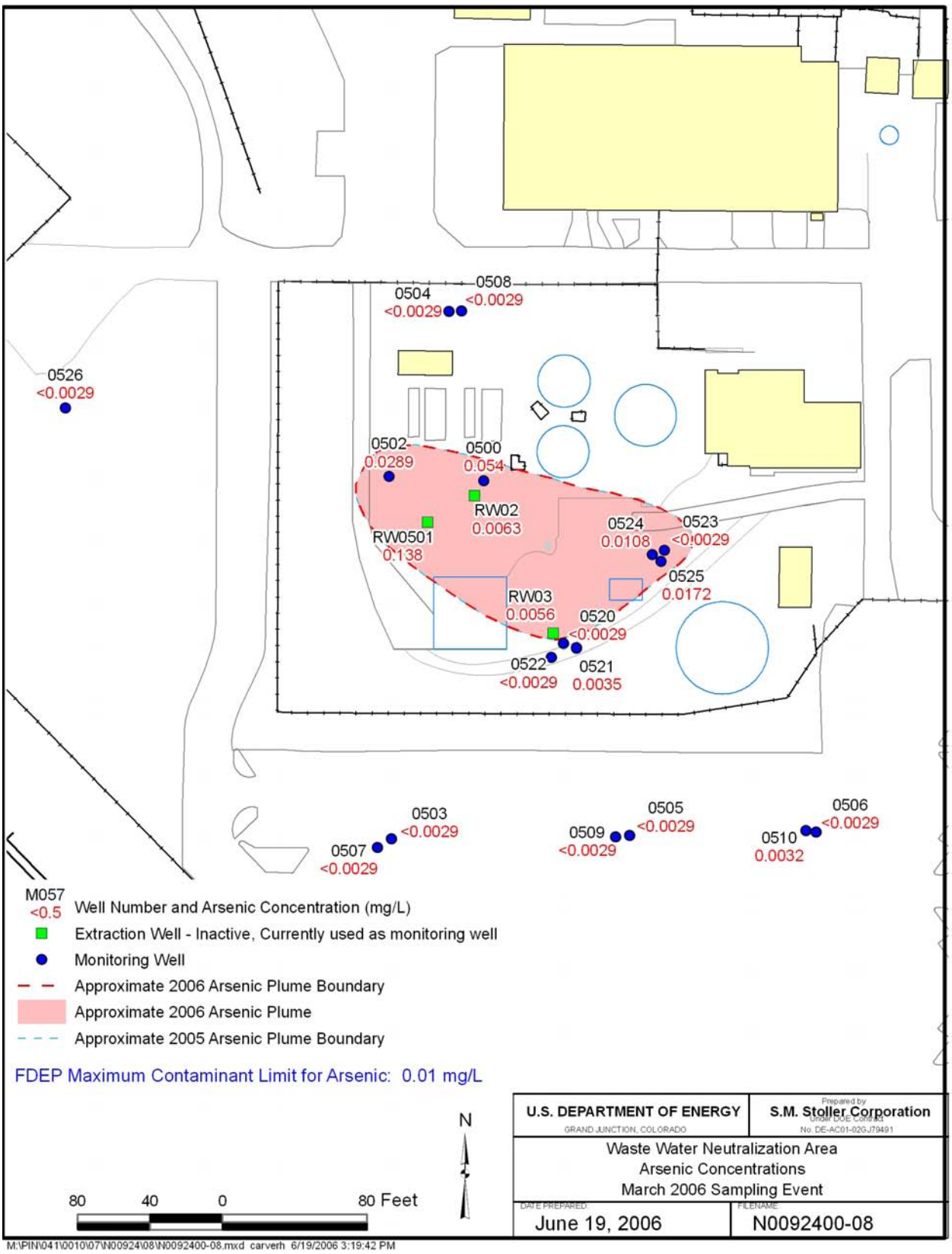


Figure 21. WWNA Arsenic Concentrations March 2006 Sampling Event

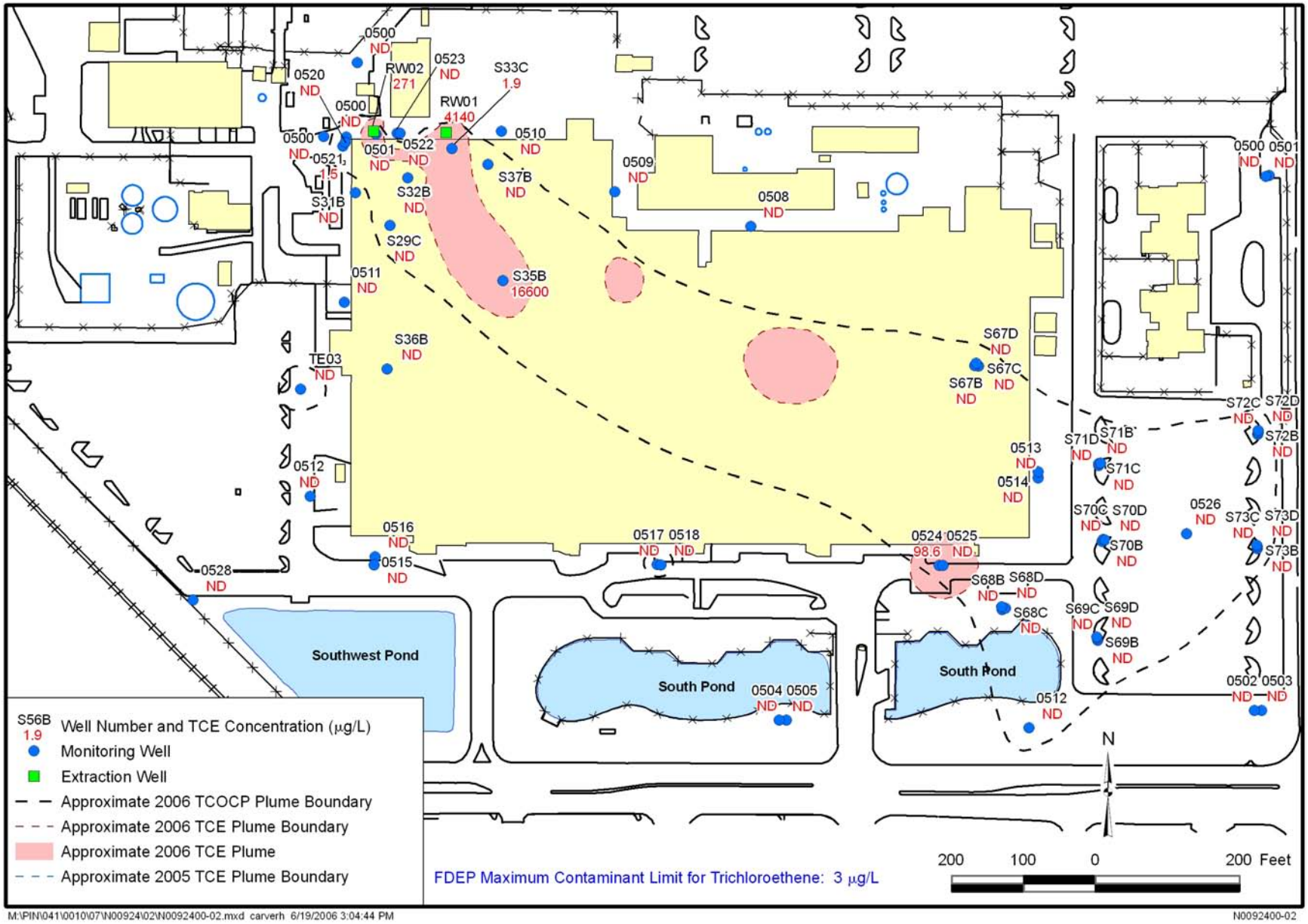


Figure 22. Building 100 Area TCE Plume March 2006

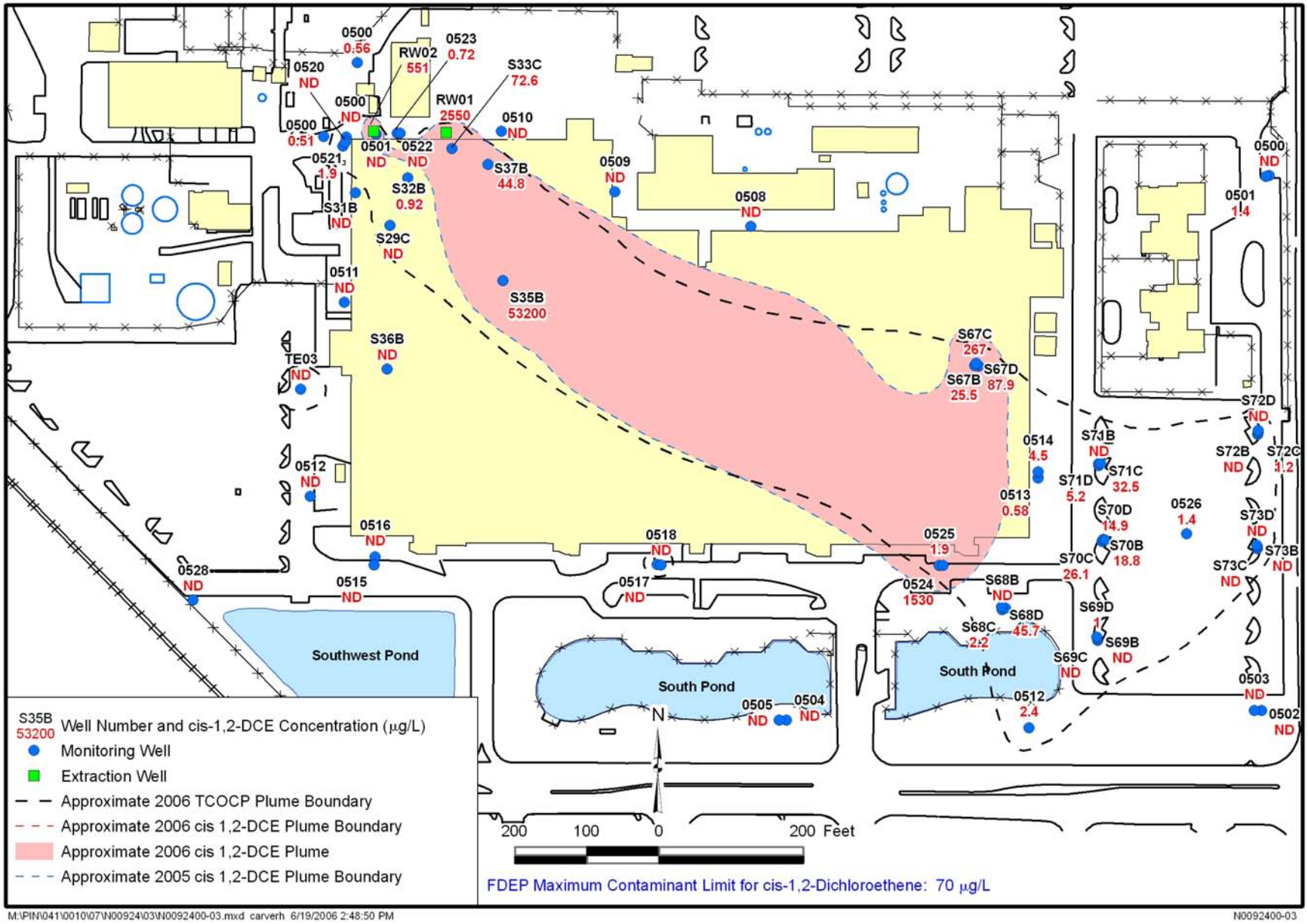


Figure 23. Building 100 Area cis-1,2-DCE Plume March 2006

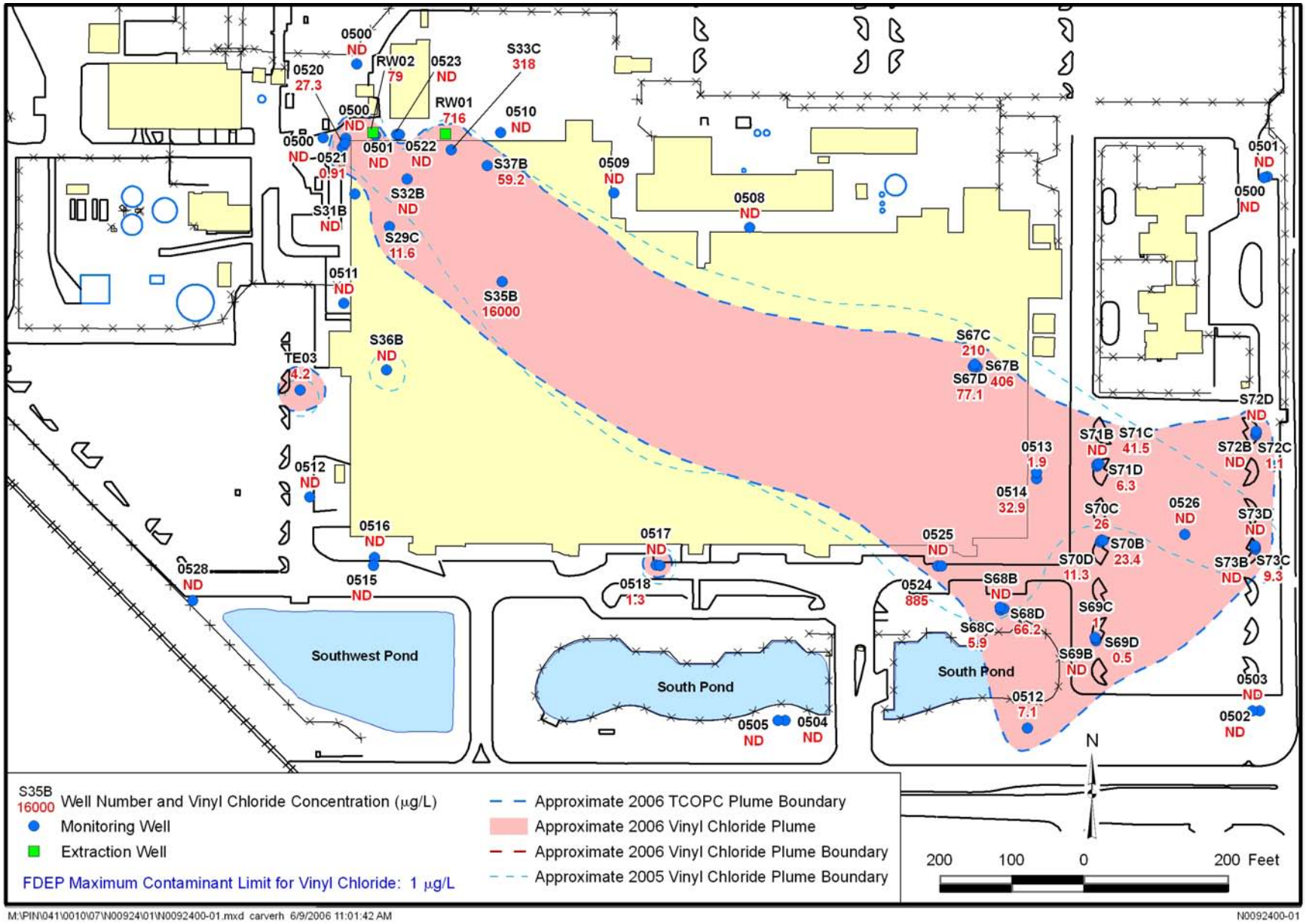


Figure 24. Building 100 Area VC Plume March 2006

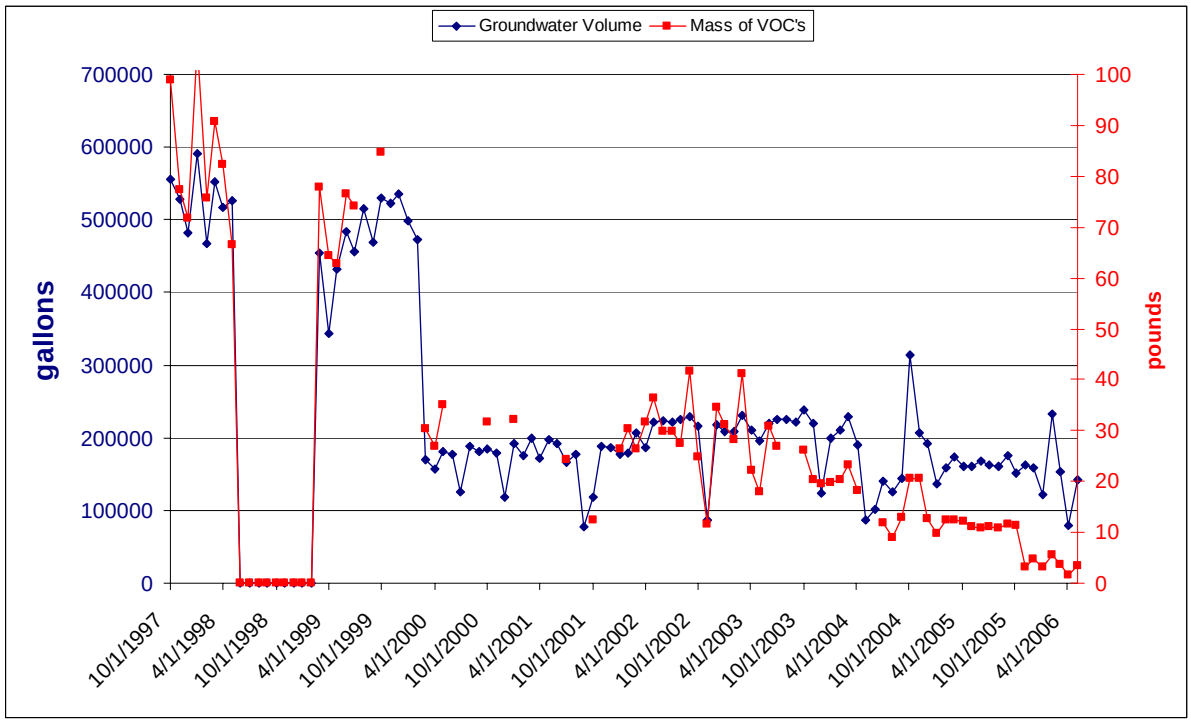


Figure 25. Building 100 Ground Water Recovery and VOC Mass Removal

Table 1. Water-Level Data at the STAR Center

Location	Measurement		Water Depth From Land Surface (ft)	Ground Water Elevation (ft NGVD)
	Date	Time		
PIN06	**Industrial Drain Leaks Building 100/Old Drum Storage Site**			
0500	3/7/2006	10:49	4.25	13.75
0501	3/7/2006	10:47	4.73	13.57
PIN09				
0500	3/7/2006	10:53	4.01	13.96
PIN10				
0500	3/7/2006	10:55	3.84	14.06
PIN12				
0508	3/7/2006	10:38	4.24	14.12
0509	3/7/2006	10:36	4.1	13.94
0510	3/7/2006	10:41	5.57	12.49
0511	3/7/2006	13:11	4.04	13.76
0512	3/7/2006	13:31	3	13.81
0513	3/7/2006	13:27	4.9	13.6
0514	3/7/2006	13:27	4.84	13.66
0515	3/7/2006	13:35	4.22	13.68
0516	3/7/2006	13:36	4.21	13.79
0517	3/7/2006	13:46	3.85	14.05
0518	3/7/2006	13:47	3.92	14.02
0520	3/7/2006	10:50	4.49	13.52
0521	3/7/2006	10:51	4.74	13.31
0522	3/7/2006	10:45	5.34	12.86
0523	3/7/2006	10:46	5.52	12.64
0524	3/7/2006	13:44	3.76	13.65
0525	3/7/2006	13:47	3.79	13.63
0526	3/7/2006	13:25	3.4	13.42
0527	3/7/2006	12:47	12.48	5.59
0528	3/7/2006	13:29	12.07	5.53
RW01	3/7/2006	10:43	17.78	0.47
RW02	3/7/2006	10:47	12.63	5.7
S29C	3/7/2006	09:29	5.03	13.48
S30B	3/7/2006	09:17	5.04	13.47
S31B	3/7/2006	08:56	4.89	13.62
S32B	3/7/2006	09:00	5.05	13.46
S33C	3/7/2006	09:07	5.19	13.32
S35B	3/7/2006	09:40	4.9	13.61
S36B	3/7/2006	08:51	4.83	13.68
S37B	3/7/2006	09:12	4.96	13.55
S54D	3/7/2006	09:45	4.79	13.72
S55B	3/7/2006	09:52	4.68	13.83
S55C	3/7/2006	09:53	4.64	13.87
S56B	3/7/2006	10:04	4.56	13.95
S56C	3/7/2006	10:05	4.52	13.99
S56D	3/7/2006	10:05	4.5	14.01

Table 1 (continued). Water-Level Data at the STAR Center

Location	Measurement		Water Depth From Land Surface (ft)	Ground Water Elevation (ft NGVD)
	Date	Time		
S57B	3/7/2006	09:58	4.5	14.01
S57C	3/7/2006	09:59	4.51	14
S57D	3/7/2006	10:00	4.56	13.95
S59B	3/7/2006	10:28	4.53	13.98
S59C	3/7/2006	10:29	4.52	13.99
S59D	3/7/2006	10:30	4.55	13.96
S60B	3/7/2006	10:34	4.67	13.84
S60C	3/7/2006	10:35	4.67	13.84
S60D	3/7/2006	10:36	4.7	13.81
S67B	3/7/2006	10:47	4.57	13.9
S67C	3/7/2006	10:43	4.54	13.93
S67D	3/7/2006	10:45	4.7	13.78
S68B	3/7/2006	12:18	4.4	13.5
S68C	3/7/2006	14:16	4.35	13.55
S68D	3/7/2006	14:21	4.38	13.52
S69B	3/7/2006	14:10	2.74	13.26
S69C	3/7/2006	14:08	2.73	13.27
S69D	3/7/2006	14:07	2.81	13.19
S70B	3/7/2006	14:00	3.13	13.57
S70C	3/7/2006	13:58	3.19	13.51
S70D	3/7/2006	11:57	3.28	13.42
S71B	3/7/2006	13:49	4.87	13.53
S71C	3/7/2006	13:52	4.91	13.49
S71D	3/7/2006	13:44	4.91	13.49
S72B	3/7/2006	13:35	5.1	13.1
S72C	3/7/2006	13:38	5.02	13.18
S72D	3/7/2006	13:40	5.03	13.17
S73B	3/7/2006	13:15	3.84	13.16
S73C	3/7/2006	13:20	3.89	13.11
S73D	3/7/2006	13:30	3.91	13.09
TE03	3/7/2006	13:07	3.08	13.92
PIN15	**Northeast Site**			
0506	3/7/2006	08:08	3.29	13.71
0507	3/7/2006	08:09	3.37	13.63
0510	3/7/2006	13:05	3.46	14.06
0513	3/7/2006	08:02	11.95	5.65
0514	3/7/2006	09:14	4.52	12.98
0515	3/7/2006	09:15	4.51	12.99
0516	3/7/2006	09:46	3.79	13.61
0518	3/7/2006	08:00	4.05	13.75
0520	3/7/2006	08:06	3.43	13.77
0523	3/7/2006	07:49	3.45	14.55
0530	3/7/2006	09:12	4.43	12.97
0534	3/7/2006	08:05	3.28	14.02
0535	3/7/2006	09:11	4.23	13.37

Table 1 (continued). Water-Level Data at the STAR Center

Location	Measurement		Water Depth From Land Surface (ft)	Ground Water Elevation (ft NGVD)
	Date	Time		
0537	3/7/2006	09:21	6.64	11.96
0559	3/7/2006	12:50	5.98	12.81
0560	3/7/2006	09:07	4.75	13.25
0561	3/7/2006	09:06	4.39	13.61
0562	3/7/2006	08:38	3.95	13.85
0563	3/7/2006	08:39	3.79	14.01
0564	3/7/2006	08:36	3.42	13.78
0565	3/7/2006	08:35	3.25	13.95
0566	3/7/2006	09:09	4.07	13.43
0567	3/7/2006	09:10	3.69	13.81
0568	3/7/2006	14:41	4.72	13.78
0569	3/7/2006	14:45	4.64	13.74
0570	3/7/2006	14:27	4.07	13.91
0571	3/7/2006	14:34	3.48	13.99
0572	3/7/2006	14:36	3.53	13.98
0573	3/7/2006	14:59	4.64	13.74
0574	3/7/2006	08:27	4.89	13.53
0575	3/7/2006	14:56	4.07	13.77
0576	3/7/2006	08:25	3.75	13.73
0577	3/7/2006	14:54	3.91	13.73
0578	3/7/2006	08:33	3.82	13.7
E001	3/7/2006	08:12	2.6	13.42
M03D	3/7/2006	09:30	5.15	12.95
M03S	3/7/2006	09:26	5.8	12.3
M12D	3/7/2006	08:00	3.36	13.84
M12S	3/7/2006	08:01	3.84	13.66
M14D	3/7/2006	07:53	3.51	14.49
M14S	3/7/2006	07:54	3.48	14.52
M16D	3/7/2006	09:32	5.41	12.79
M16S	3/7/2006	09:33	5.51	12.69
M24D	3/7/2006	07:57	4.02	13.78
M27D	3/7/2006	08:20	3.96	13.64
M27S	3/7/2006	08:21	3.89	13.71
M32D	3/7/2006	09:17	4.74	13.06
M32S	3/7/2006	09:18	4.35	13.45
M33D	3/7/2006	07:56	2.99	14.61
RW16	3/7/2006	09:19	5.73	12.27
PIN18	**Wastewater Neutralization Area**			
0500	3/7/2006	11:09	5.46	14.64
0502	3/7/2006	11:13	5.43	14.57
0503	3/7/2006	13:01	3.23	14.45
0504	3/7/2006	11:15	4.82	14.78
0506	3/7/2006	13:05	3.58	14.13
0507	3/7/2006	13:00	3.43	14.3
0508	3/7/2006	11:16	4.58	14.92

Table 1 (continued). Water-Level Data at the STAR Center

Location	Measurement		Water Depth From Land Surface (ft)	Ground Water Elevation (ft NGVD)
	Date	Time		
0509	3/7/2006	13:04	3.52	14.31
0511	3/7/2006	10:52	3.91	14.89
0512	3/7/2006	10:50	3.82	14.78
0513	3/7/2006	10:51	3.89	14.91
0514	3/7/2006	13:21	3.56	14.22
0515	3/7/2006	13:22	4.21	14.2
0516	3/7/2006	13:19	4.22	14.19
0517	3/7/2006	13:15	4.06	14.19
0518	3/7/2006	13:14	4.15	14.05
0519	3/7/2006	13:17	4.22	14.06
0520	3/7/2006	11:03	3.81	14.19
0521	3/7/2006	11:03	3.73	14.37
0522	3/7/2006	11:04	3.63	14.47
0523	3/7/2006	11:01	5.04	14.36
0524	3/7/2006	11:02	4.59	14.41
0525	3/7/2006	11:01	4.31	14.59
0526	3/7/2006	12:55	4.53	14.07
RW02	3/7/2006	11:09	5.39	14.71
RW03	3/7/2006	11:07	3.76	14.54
RW0501	3/7/2006	11:10	5.28	14.72
PIN21	**Perimeter Monitoring Wells**			
0500	3/7/2006	13:14	4.6	13.5
0501	3/7/2006	13:13	4.68	13.32
0502	3/7/2006	13:35	2.39	12.81
0503	3/7/2006	13:36	2.49	12.71
0504	3/7/2006	13:53	4.26	13.34
0505	3/7/2006	13:51	4.04	13.36
0512	3/7/2006	13:42	4.1	13.2
PIN23	**Southwest Pond**			
SW01	3/7/2006	14:15		13.48
PIN37	**South Pond**			
S001	3/7/2006	14:10		13.43

Table 2. Floridan Aquifer Monitoring Well Water Elevations

Well Identification	October 2005 Water Level Elevation (ft, MSL)	March 2006 Water Level Elevation (ft, MSL)
PIN15−0513	5.71	5.65
PIN12−0527	5.72	5.59
PIN12−0528	5.81	5.53

Table 3. Vertical Hydraulic Differential

Water Level Measured From	Well Identification	Water Level Elevation (ft, MSL)
Deep Surficial Aquifer	PIN15−M12D	13.84
Floridan Aquifer	PIN15−0513	5.65

Table 4. Surface Water Elevations

Pond Location	October 2005 Water Level Elevation (ft, MSL)	March 2006 Water Level Elevation (ft, MSL)
East Pond	13.47	13.42
South Pond	13.05	13.43
West Pond	Not measured	Not measured
Southwest Pond	13.12	13.48

Table 5. Dissolved Gas and Dehalococcoides ethenogenes

Location		Date Sampled	Ethane µg/L	Ethene µg/L	Hydrogen nmol/L	Methane µg/L	Carbon dioxide mg/L	Dehalococcoides ethenogenes copy numbers/L
Industrial Drain Leaks Building 100/Old Drum Storage Site								
PIN12	0514	3/13/2006	0.11	0.54	1.8	3,500	140	9,000,000
	0524	3/10/2006	0.19	13	1.4	1,200	160	2,000,000
	0526	3/9/2006	0.009J	0.011	1.4	1,700	270	<10,000
	S35B	3/9/2006	190	1600	1.2	4,000	200	<20,000
	S73C	3/10/2006	0.11	0.43	2.5	9,500	280	3,000,000
Pinellas Northeast Site								
PIN15	0567	3/13/2006	2	0.028	2	52	130	<10,000
	0569	3/10/2006	300	<0.01	1.4	1,100	130	
	0574	3/13/2006	0.89	0.029	1.9	2,100	71	
	0576	3/13/2006	0.92	0.006J	2	990	96	<7,000
	0577	3/13/2006	110	0.011	1.6	3,800	310	500,000

"<"=not detected above the associated value

Table 6. Field Measurements of Samples Collected at the STAR Center

Location	Screen Depth (ft bls)	Temperature (°C)	Specific Conductance (µmhos/cm)[a]	Turbidity (NTU)	pH	Oxidation Reduction Potential (mV)	Dissolved Oxygen (mg/L)
PIN06	**Industrial Drain Leaks Bldg 100 / Old Drum Storage Site**						
0500	3–13	22.6	451	1.2	6.85	-49.5	0.51
0501	3–13	21.2	652	2.4	6.61	92.5	0.73
PIN09							
0500	3–13	24.3	609	1.1	6.94	-99.5	0.52
PIN10							
0500	3–13	22.1	484	8.8	6.83	-31.3	0.54
PIN12							
0508	3–13	20.7	320	1.2	6.64	50	0.61
0509	3–13	22	682	7.8	6.8	50.6	0.4
0510	3–13	21.4	828	23.8	6.19	115.2	0.79
0511	3–13	24.11	180	18.6	6.55	94.6	0.96
0512	3–13	25.45	462	2.4	6.8	-63.3	0.51
0513	15–25	22.9	610	7.48	6.69	-95.9	0.42
0514	30–40	23.18	1,047	330	6.56	-121.4	0.68
0515	15–25	25	384	0.85	6.91	-87.4	0.43
0516	30–40	25.84	894	1.72	6.71	-94.3	0.64
0517	15–25	26.8	342	114	7.08	-132.9	0.29
0518	30–40	26.8	427	17.1	6.83	-50.2	0.42
0520	36–46	24	967	22.5	6.73	-21.8	0.78
0521	19.5–29.5	24.6	447	7.1	6.96	-101.9	0.73
0522	32–42	23.4	909	8.4	6.72	-13	1.03
0523	18–28	23.1	400	6.7	6.88	-93.2	0.51
0524	27–37	26.13	971	6.72	6.58	-64.8	1
0525	12–22	26.5	518	18.7	6.84	-87.2	0.43
0526	19.5–29.5	28.78	2,134	3.42	6.49	-146.4	1.18
0527	118–137.9	27.33	1,102	8.97	6.97	-102.3	0.35
0528	127–146.9	24.59	841	0.63	7.13	-221.8	0.4
S29C	14–24	22.9	1,505	7.1	6.9	-83.3	0.33
S31B	5–15	23.3	1,506	8.8	6.98	-71	0.4
S32B	5.5–15.5	22.7	1,892	1.1	6.81	-50.5	0.43
S33C	11–21	22.9	1,558	66.5	6.81	-91.3	0.37
S35B	5–15	22.7	954	6	6.45	-43	0.52
S36B	5–15	23.4	1,452	7.5	6.58	-50.8	0.5
S37B	5–15	21.8	1,467	16.4	6.91	-98.7	0.23
S67B	10–19.83	21.3	836	10.2	6.72	-72.3	0.89
S67C	20–29.83	21.8	713	36.6	6.74	-78.1	0.58
S67D	30–39.83	22	788	160	6.73	-82	0.52
S68B	10–20	23.5	567	12.5	6.54	-47.6	0.66
S68C	18–28	25.1	640	33.2	6.68	-46.2	0.56
S68D	30–40	24.7	839	1.65	6.67	-60.8	0.58
S69B	10–20	26.72	437	>1,000	6.91	-94.5	0.19
S69C	20–30	26.84	621	94.4	6.74	-30	0.34

Table 6 (continued). Field Measurements of Samples Collected at the STAR Center

Location	Screen Depth (ft bls)	Temperature (°C)	Specific Conductance (µmhos/cm)[a]	Turbidity (NTU)	pH	Oxidation Reduction Potential (mV)	Dissolved Oxygen (mg/L)
S69D	30–40	27.01	983	39.8	6.73	-50.8	0.31
S70B	10–20	25.82	1,104	213	6.68	-43.1	0.3
S70C	20–30	26.7	1,018	392	6.63	-59.6	0.31
S70D	30–40	26.97	1,033	30.6	6.61	-57.6	0.32
S71B	10–20	26.84	1,246	98.4	6.62	-82.8	0.33
S71C	20–30	27.62	1,038	908	6.63	-73.7	0.3
S71D	30–40	28.01	968	212	6.65	-63.7	0.36
S72B	10–20	27.89	1,271	>1,000	6.3	-45.9	0.4
S72C	20–30	28.48	553	13.5	6.68	-78.3	0.39
S72D	30–40	28.13	974	239	6.72	-8	0.42
S73B	10–20	25.72	723	>1,000	6.49	-58.4	0.28
S73C	20–30	26.59	1,290	139	6.4	-62.2	0.52
S73D	30–40	25.59	1,586	63.1	6.17	-46.7	0.45
TE03	–	26.4	483	11.5	6.8	-51.5	0.55
PIN15	**Northeast Site**						
0506	12–21.5	23.39	870	6.09	6.84	-72.6	0.7
0507	5–14.5	22.72	374	9.38	6.88	-36.4	0.53
0510	4–13.5	25.79	256	18.2	7.21	-8.2	0.29
0513	135–149.6	24.18	896	0.86	7.14	-262.7	0.43
0514	15.5–25.5	23.8	1,037	13.1	6.52	-46.3	0.58
0515	7.6–17.6	22.07	425	0.71	6.95	-68.8	0.47
0516	0.3–10.3	22.72	505	4.11	6.88	37.4	0.93
0518	23–28	23.46	1,047	14.1	6.66	-79.9	1.08
0520	5–14.5	22.21	433	3.62	6.8	28.7	0.61
0523	5–14.5	21.83	648	64.6	6.76	-77.4	0.34
0530	5–14.5	22.77	394	9.25	6.93	-62.1	0.51
0534	19.5–29	24.1	1,199	30	6.69	21.4	0.7
0535	20.5–30	24.4	1,180	80	6.6	-81.3	0.68
0537	17.5–30	22.49	782	5.88	6.74	-19.7	0.48
0559	22–31.5	27.68	981	69.3	6.69	23.4	0.34
0560	19–28.5	24.07	589	4.4	6.63	-71.2	0.65
0561	5–14.5	22.34	1,005	0.81	6.6	-73.8	0.94
0562	20–29.5	26.58	878	6.18	6.64	-43.5	0.76
0563	5–14.5	25.66	1,142	25.3	6.57	-26.2	0.76
0564	20–29.5	25.88	1,061	1.34	6.66	-9.2	0.69
0565	5–14.5	24.1	572	0.95	6.73	-4.5	0.62
0566	19–28.5	27.55	1,056	218	6.66	-159.1	0.55
0567	5–14.5	26.04	6.84	14.7	6.7	-35	0.64
0568	10–20	23.39	861	519	6.73	-29.5	0.31
0569	20–30	24.48	932	18.1	6.66	-85.5	0.91
0570	20–30	26.37	1,451	70.2	6.63	-7.6	0.47
0571	10–20	25.48	571	396	6.87	-49.5	0.31
0572	20–30	26.4	767	94.2	6.75	-33.6	0.35
0573	5–15	28.84	1,309	8.9	6.77	-3.4	0.9

Table 6 (continued). Field Measurements of Samples Collected at the STAR Center

Location	Screen Depth (ft bls)	Temperature (°C)	Specific Conductance (µmhos/cm)[a]	Turbidity (NTU)	pH	Oxidation Reduction Potential (mV)	Dissolved Oxygen (mg/L)
0574	18–28	31.24	961	1.35	7.01	-91.6	0.54
0575	5–15	25.48	1,439	2.97	7.05	-147.3	0.78
0576	20–30	33.28	1,098	9.06	7.04	62.2	0.44
0577	5–15	26.18	1,357	18.2	6.79	-118.6	0.55
0578	20–30	30.57	856	2.53	6.43	-53.7	1.04
M03D	15–25	22.78	815	71.1	6.49	-50.2	0.56
M03S	2.5–12	21.07	687	9.07	6.66	-7.3	0.8
M12D	22.5–32.5	23.65	734	18.6	6.74	-110.9	0.6
M12S	5–14.5	22.15	186	30.4	7.17	-165.7	0.71
M14D	18.5–28.5	24.51	595	68.2	6.62	-64.2	0.8
M14S	4–14	23.1	441	19.8	6.81	2.5	0.64
M16D	18.5–28.5	24.68	687	15	6.64	-67.2	0.78
M16S	5–14.5	23.88	555	>1,000	6.86	22.4	0.8
M24D	20–30	24.94	961	79.1	6.7	-90.3	0.67
M27D	21–31	24.33	921	9.47	6.67	-65.1	0.52
M27S	6–16	23.88	542	9.62	6.85	-15.5	0.49
M32D	14–24	23.88	451	266	7.02	-67.7	0.65
M32S	3–13	21.91	542	12.5	6.83	-13.4	0.4
M33D	20–30	24.88	460	38.4	6.78	-76.1	0.58
RW16	20–30	22.43	821	1.03	6.94	-37.2	0.4
PIN18	**Wastewater Neutralization Area**						
0500	11–16	22.9	309	6.6	7.32	-138	0.47
0502	11–16	23.1	433	10.3	6.82	-72.5	0.4
0503	10–20	26.61	646	1.56	6.62	-95.8	0.71
0504	13–22	23.9	361	7.2	6.92	45.6	0.54
0505	10.5–20.5	25.36	456	13.5	6.76	23.6	0.64
0506	12–22	25.21	466	3.52	6.74	-20	0.6
0507	27–37	27.27	991	8.08	6.71	-43.4	0.77
0508	31–41	25.1	508	5	6.75	-99.2	0.57
0509	27.5–37.5	26.47	848	3.73	6.8	-2.9	0.72
0510	27.5–37.5	25.85	558	66.4	6.92	-51.1	0.54
0519	12.5–22.5	26.06	701	9.12	6.81	-89.3	0.57
0520	32.5–42.5	24.1	1,076	15.9	6.91	-37.3	0.46
0521	20–30	24.2	517	10	6.91	-51.1	0.51
0522	5–15	22.5	309	10.2	6.93	72	0.5
0523	32.5–42.5	25	652	19.4	6.89	-51.9	0.47
0524	20–30	24.9	432	13.1	6.88	-116.7	0.36
0525	5–15	22.6	178	12.1	6.67	39.3	0.83
0526	19.5–29	23.7	378	62.7	6.51	-87.7	0.78
RW02	10–20	23.4	323	38.5	7.04	-30.6	0.47
RW03	9–24	24.4	397	7.8	6.88	20.5	0.73
RW0501	11–16	23.4	477	5	6.87	-123.7	0.55

Table 6 (continued). Field Measurements of Samples Collected at the STAR Center

Location	Screen Depth (ft bls)	Temperature (°C)	Specific Conductance (µmhos/cm)[a]	Turbidity (NTU)	pH	Oxidation Reduction Potential (mV)	Dissolved Oxygen (mg/L)
PIN21	**Perimeter Monitoring Wells**						
0500	7–17	24.25	451	10.8	6.84	-47.7	0.39
0501	20–28	26.06	991	7.04	6.75	-53.1	0.42
0502	7–17	22.16	581	3.56	6.79	15.9	0.43
0503	20–28	23.85	556	839	6.77	-32.1	0.38
0504	7–17	21.3	454	9.38	6.99	-119.5	0.28
0505	20–28	23.6	624	5.11	6.8	-13.3	0.34
0512	20–29.5	24	661	5.77	6.76	-62.5	0.84

[a]Temperature corrected to 25°C.

Table 7. Sitewide Arsenic Measurements

Location	Sample Date	Concentration (mg/L)
PIN06	**Industrial Drain Leaks Bldg 100 / Old Drum Storage Site**	
0501	3/15/2006	0.0084B
PIN09		
0500	3/14/2006	0.01
PIN10		
0500	3/14/2006	0.0126
PIN12		
0525	3/11/2006	0.0287
S31B	3/8/2006	0.0433
S32B	3/8/2006	0.0166
S33C	3/8/2006	0.0113
S35B	3/9/2006	0.0185
S68B	3/11/2006	0.0525
PIN15	**Northeast Site**	
0567	3/13/2006	0.0103
M03S	3/16/2006	<0.0029
M14S	3/14/2006	0.0294
M32S	3/16/2006	0.0205
PIN18	**Wastewater Neutralization Area**	
0500	3/14/2006	0.0613
0502	3/14/2006	0.0403
0503	3/11/2006	<0.0029
0504	3/13/2006	<0.0029
0505	3/11/2006	<0.0029
0506	3/11/2006	<0.0029
0507	3/11/2006	<0.0029
0508	3/13/2006	<0.0029
0509	3/11/2006	<0.0029
0510	3/11/2006	0.0032B
0520	3/14/2006	<0.0029
0521	3/14/2006	0.0035B
0522	3/14/2006	0.0068B
0523	3/13/2006	<0.0029
0524	3/13/2006	0.0384
0525	3/13/2006	0.0323
0526	3/15/2006	<0.0029
RW02	3/14/2006	0.0415
RW03	3/14/2006	0.0114
RW0501	3/14/2006	0.145

B = Inorganic result is between the IDL and CRDL
"<" values are method detection limits.

Table 8. COPC Concentrations at the Northeast Site
(reported in micrograms per liter)[a]

Location	Screen Depth (ft)	Date Sampled	TCE	cis-1,2-DCE	Total 1,2-DCE[b]	Vinyl chloride	Methylene chloride	Benzene	Toluene	Total COPC[c]
FDEP MCL			**3**	**70**	**63**	**1**	**5**	**1**	**1,000**	
PIN15	**Northeast Site**									
0506	12–21.5	4/7/2005	<0.5	<0.5	ND	<0.5	<1	<0.5	<0.5	ND
		3/15/2006	<0.5	<0.5	ND	<0.5	<1	<0.5	<0.5	ND
0507	5–14.5	4/7/2005	<0.5	<0.5	ND	<0.5	<1	<0.5	<0.5	ND
		3/15/2006	<0.5	<0.5	ND	<0.5	<1	<0.5	<0.5	ND
0510	4–13.5	4/8/2005	<0.5	<0.5	ND	<0.5	<1	<0.5	<0.5	ND
		3/15/2006	<0.5	<0.5	ND	<0.5	<1	<0.5	<0.5	ND
0513	135–149.6	4/14/2005	<0.5	<0.5	ND	<0.5	<1	<0.5	<0.5	ND
		3/15/2006	<0.5	<0.5	ND	<0.5	<1	<0.5	<0.5	ND
0514	15.5–25.5	4/6/2005	<0.5	<0.5	ND	<0.5	<1	15.7	<0.5	15.7
		3/16/2006	<0.5	0.73J	0.73J	6.3	<1	12.9	<0.5	19.2
0515	7.6–17.6	4/6/2005	<0.5	<0.5	ND	<0.5	<1	<0.5	<0.5	ND
		3/16/2006	<0.5	<0.5	ND	<0.5	<1	<0.5	<0.5	ND
0516	0.3–10.3	4/6/2005	<0.5	<0.5	ND	<0.5	<1	<0.5	<0.5	ND
		3/16/2006	<0.5	<0.5	ND	<0.5	<1	<0.5	<0.5	ND
0518	23–28	4/8/2005	<0.5	<0.5	ND	<0.5	<1	<0.5	<0.5	ND
		3/15/2006	<0.5	<0.5	ND	<0.5	<1	<0.5	<0.5	ND
0520	5–14.5	4/7/2005	<0.5	<0.5	ND	<0.5	<1	<0.5	<0.5	ND
		3/15/2006	<0.5	<0.5	ND	<0.5	<1	<0.5	<0.5	ND
0523	5–14.5	4/14/2005	<0.5	<0.5	ND	<0.5	<1	<0.5	<0.5	ND
		3/15/2006	<0.5	<0.5	ND	<0.5	<1	<0.5	<0.5	ND
0530	5–14.5	4/6/2005	<0.5	<0.5	ND	11	<1	<1	<0.5	11
		3/16/2006	<0.5	<0.5	ND	<0.5	<1	<0.5	<0.5	ND
0534	19.5–29	4/7/2005	<0.5	<0.5	ND	<0.5	<1	<0.5	<0.5	ND
		3/15/2006	<0.5	<0.5	ND	<0.5	<1	<0.5	<0.5	ND
0535	20.5–30	4/6/2005	<0.5	<0.5	ND	<0.5	<1	<0.5	<0.5	ND
		3/16/2006	<0.5	<0.5	ND	<0.5	<1	<0.5	<0.5	ND
0537	17.5–30	4/6/2005	1.3	129	130.5	413	<1	3.2	<0.5	548
		3/16/2006	<0.5	2.2	2.2	111	<1	3.2	<0.5	116.4
0559	22–31.5	4/13/2005	<0.5	<0.5	ND	1.4	<1	3.1	<0.5	4.5
		3/15/2006	<0.5	<0.5	ND	<0.5	<1	<0.5	<0.5	ND
0560	19–28.5	7/18/2005	<0.5	<0.5	ND	<0.5	<1	<0.5	<0.5	ND
		10/10/2005	0.86J	0.95J	0.95J	2.2	<1	<0.5	<0.5	2.2
		3/16/2006	<0.5	<0.5	ND	<0.5	<1	<0.5	<0.5	ND
0561	5–14.5	4/15/2005	<0.5	<0.5	ND	<0.5	<1	<0.5	<0.5	ND
		7/18/2005	<0.5	<0.5	ND	<0.5	<1	<0.5	<0.5	ND
		10/10/2005	<0.5	<0.5	ND	<0.5	<1	<0.5	<0.5	ND
		3/16/2006	<0.5	<0.5	ND	<0.5	<1	<0.5	<0.5	ND
0562	20–29.5	4/6/2005	<0.5	<0.5	ND	<0.5	<1	<0.5	<0.5	ND
		7/18/2005	<0.5	<0.5	ND	<0.5	1.1J	<0.5	<0.5	ND
		10/7/2005	<0.5	<0.5	ND	<0.5	<1	<0.5	<0.5	ND
		3/14/2006	<0.5	<0.5	ND	<0.5	<1	<0.5	<0.5	ND

Table 8 (continued). COPC Concentrations at the Northeast Site (reported in micrograms per liter)[a]

Location	Screen Depth (ft)	Date Sampled	TCE	cis-1,2-DCE	Total 1,2-DCE[b]	Vinyl chloride	Methylene chloride	Benzene	Toluene	Total COPC[c]
FDEP MCL			**3**	**70**	**63**	**1**	**5**	**1**	**1,000**	
0563	5–14.5	4/7/2005	<0.5	1.3	1.3	<0.5	<1	<0.5	<0.5	1.3
		7/18/2005	<0.5	1.1	1.1	<0.5	<1	<0.5	<0.5	1.1
		10/7/2005	0.51J	1.3	1.3	<0.5	<1	<0.5	<0.5	1.3
		3/14/2006	<0.5	0.95J	0.95J	<0.5	<1	<0.5	<0.5	ND
0564	20–29.5	4/14/2005	<0.5	<0.5	ND	<0.5	<1	<0.5	<0.5	ND
		7/18/2005	<0.5	<0.5	ND	<0.5	<1	<0.5	<0.5	ND
		10/7/2005	<0.5	<0.5	ND	<0.5	<1	<0.5	<0.5	ND
		3/14/2006	<0.5	<0.5	ND	<0.5	<1	<0.5	<0.5	ND
0565	5–14.5	4/14/2005	<0.5	<0.5	ND	<0.5	<1	<0.5	<0.5	ND
		7/18/2005	<0.5	<0.5	ND	<0.5	<1	<0.5	<0.5	ND
		10/7/2005	<0.5	<0.5	ND	<0.5	<1	<0.5	<0.5	ND
		3/14/2006	<0.5	<0.5	ND	<0.5	<1	<0.5	<0.5	ND
0566	19–28.5	4/14/2005	<0.5	4.9	4.9	4.8	<1	1.4	<0.5	11.1
		7/18/2005	160	83	84.3	20.5	<1	2	<0.5	266.8
		10/10/2005	0.82J	5.6	5.6	2.9	<1	1.1	<0.5	9.6
		3/15/2006	<0.5	1.2	1.2	2	<1	0.79J	<0.5	3.2
0567	5–14.5	4/14/2005	1.2	49.5	60.6	24.7	<1	5.6	<0.5	92.1
		7/18/2005	<0.5	5.7	7.2	3	<1	<0.5	<0.5	10.2
		10/5/2005	0.66J	7.7	10	1.9	<1	0.53J	<0.5	11.9
		3/13/2006	0.53J	5.7	7.3	2.1	<1	<0.5	<0.5	9.4
0568	10–20	4/13/2005	<0.5	<0.5	ND	<0.5	<1	<0.5	<0.5	ND
		3/15/2006	<0.5	<0.5	ND	<0.5	<1	<0.5	<0.5	ND
0569	20–30	4/12/2005	<0.5	1.3	1.3	33.7	<1	<0.5	10.6	45.6
		10/6/2005	<0.5	<0.5	ND	12	<1	<0.5	<0.5	12
		3/10/2006	2.2	1.1	1.1	8	<1	<0.5	<0.5	11.3
0570	20–30	4/13/2005	<0.5	<0.5	ND	<0.5	<1	<0.5	<0.5	ND
		3/15/2006	<0.5	<0.5	ND	<0.5	<1	<0.5	<0.5	ND
0571	10–20	4/13/2005	<0.5	<0.5	ND	<0.5	<1	<0.5	<0.5	ND
		3/15/2006	<0.5	<0.5	ND	<0.5	<1	<0.5	<0.5	ND
0572	20–30	4/13/2005	<0.5	<0.5	ND	<0.5	<1	<0.5	<0.5	ND
		3/15/2006	<0.5	<0.5	ND	<0.5	<1	<0.5	<0.5	ND
0573	5–15	4/7/2005	<0.5	5.3	5.3	24.8	<1	0.71J	1.3	31.4
		7/18/2005	<0.5	<0.5	ND	22.4	<1	<0.5	1.2	23.6
		10/7/2005	<0.5	0.57J	0.57J	20.1	<1	<0.5	1.8	21.9
		3/13/2006	<0.5	<0.5	ND	26.4	<1	<0.5	<0.5	26.4
0574	18–28	4/7/2005	15.4	39	39	13.8	<1	<0.5	<0.5	68.2
		7/18/2005	16.3	22.2	22.2	7.7	<1	<0.5	<0.5	46.2
		10/5/2005	2.9	13.5	13.5	6.7	<1	0.68J	<0.5	23.1
		3/13/2006	<0.5	4.1	4.1	3.1	<1	<0.5	<0.5	7.2

Table 8 (continued). COPC Concentrations at the Northeast Site (reported in micrograms per liter)[a]

Location	Screen Depth (ft)	Date Sampled	TCE	cis-1,2-DCE	Total 1,2-DCE[b]	Vinyl chloride	Methylene chloride	Benzene	Toluene	Total COPC[c]
FDEP MCL			**3**	**70**	**63**	**1**	**5**	**1**	**1,000**	
0575	5–15	4/15/2005	<0.5	2.8	3.9	15.1	<1	1.1	1.1	21.2
		7/18/2005	<0.5	<0.5	2.1	15.7	<1	1.4	1.2	20.4
		10/7/2005	<0.5	2.2	9.1	6.6	<1	2.2	1.5	19.4
		3/14/2006	<0.5	1.1	4.3	1.8	<1	1.3	0.51J	7.4
0576	20–30	4/15/2005	<0.5	27.8	27.8	20.1	<1	0.68J	<0.5	47.9
		7/18/2005	1.1	46.8	46.8	63.1	<1	<0.5	<0.5	111
		10/5/2005	<0.5	5.5	5.5	3.2	<1	0.53J	<0.5	8.7
		3/13/2006	<0.5	1.4	1.4	0.58J	<1	<0.5	<0.5	1.4
0577	5–15	4/15/2005	1.3	2.6	14.8	33	<1	4.1	6.6	59.8
		7/18/2005	<0.5	<0.5	11.6	4.9	<1	5.1	6.2	27.8
		10/5/2005	<0.5	<0.5	7.5	0.69J	<1	4.7	1.5	13.7
		3/13/2006	<0.5	<0.5	3.5	0.92J	<1	2.6	<0.5	6.1
0578	20–30	4/15/2005	<0.5	4.6	4.6	2.9	<1	<0.5	<0.5	7.5
		7/18/2005	<0.5	1.1	1.1	1.7	<1	<0.5	<0.5	2.8
		10/10/2005	<0.5	2.5	2.5	1.8	<1	<0.5	<0.5	4.3
		3/13/2006	<0.5	1.5	1.5	1.9	<1	<0.5	<0.5	3.4
M03D	15–25	4/15/2005	<0.5	<0.5	ND	0.79J	<1	<0.5	<0.5	ND
		3/16/2006	<0.5	<0.5	ND	<0.5	<1	<0.5	<0.5	ND
M03S	2.5–12	4/15/2005	<0.5	<0.5	ND	<0.5	<1	<0.5	<0.5	ND
		3/16/2006	<0.5	<0.5	ND	<0.5	<1	<0.5	<0.5	ND
M12D	22.5–32.5	4/14/2005	<0.5	<0.5	ND	<0.5	<1	<0.5	<0.5	ND
		3/15/2006	<0.5	<0.5	ND	<0.5	<1	<0.5	<0.5	ND
M12S	5–14.5	4/14/2005	<0.5	<0.5	ND	<0.5	<1	<0.5	<0.5	ND
		3/15/2006	<0.5	<0.5	ND	<0.5	<1	<0.5	<0.5	ND
M14D	18.5–28.5	4/8/2005	<0.5	<0.5	ND	<0.5	<1	<0.5	<0.5	ND
		3/14/2006	<0.5	<0.5	ND	3.2	<1	<0.5	<0.5	3.2
M14S	4–14	4/8/2005	<0.5	<0.5	ND	<0.5	<1	<0.5	<0.5	ND
		3/14/2006	<0.5	<0.5	ND	<0.5	<1	<0.5	<0.5	ND
M16D	18.5–28.5	4/15/2005	<0.5	<0.5	ND	<0.5	<1	<0.5	<0.5	ND
		3/16/2006	<0.5	<0.5	ND	1.7	<1	<0.5	<0.5	1.7
M16S	5–14.5	4/15/2005	<0.5	<0.5	ND	<0.5	<1	<0.5	<0.5	ND
		3/16/2006	<0.5	<0.5	ND	<0.5	<1	<0.5	<0.5	ND
M24D	20–30	4/8/2005	<0.5	<0.5	ND	<0.5	<1	<0.5	<0.5	ND
		3/14/2006	<0.5	<0.5	ND	<0.5	<1	<0.5	<0.5	ND
M27D	21–31	4/7/2005	<0.5	<0.5	ND	<0.5	<1	<0.5	<0.5	ND
		3/15/2006	<0.5	<0.5	ND	0.73J	<1	<0.5	<0.5	ND
M27S	6–16	4/7/2005	<0.5	<0.5	ND	<0.5	<1	<0.5	<0.5	ND
		3/15/2006	<0.5	<0.5	ND	<0.5	<1	<0.5	<0.5	ND
M32D	14–24	4/15/2005	<0.5	<0.5	ND	<0.5	<1	<0.5	<0.5	ND
		3/16/2006	<0.5	<0.5	ND	<0.5	<1	<0.5	<0.5	ND
M32S	3–13	4/15/2005	<0.5	<0.5	ND	<0.5	<1	<0.5	<0.5	ND
		3/16/2006	<0.5	<0.5	ND	<0.5	<1	<0.5	<0.5	ND

Table 8 (continued). COPC Concentrations at the Northeast Site (reported in micrograms per liter)[a]

Location	Screen Depth (ft)	Date Sampled	TCE	cis-1,2-DCE	Total 1,2-DCE[b]	Vinyl chloride	Methylene chloride	Benzene	Toluene	Total COPC[c]
FDEP MCL			**3**	**70**	**63**	**1**	**5**	**1**	**1,000**	
M33D	20–30	4/14/2005	<0.5	<0.5	ND	<0.5	<1	<0.5	<0.5	ND
		3/14/2006	<0.5	<0.5	ND	<0.5	<1	<0.5	<0.5	ND
RW16	20–30	4/15/2005	<0.5	1.6	1.6	110	<1	2.5	<0.5	114.1
		3/16/2006	<0.5	<0.5	ND	7.9	<1	<0.5	<0.5	7.9

[a]Before December 18, 2003 "<" values are reporting limits. On or after December 18, 2003 "<" values are method detection limits.
[b]Total 1,2-DCE is the sum of cis-1,2-DCE and trans-1,2-DCE.
[c]Total COPC is the sum of the individual COPC concentrations. The cis-1,2-DCE value is not part of the total COPC value because this value is included in the total 1,2-DCE value. "J" values are not included in the total COPC value.
ND = Not detected.
J = Estimated value, result is between the reporting limit and the method detection limit.
Arsenic, while a COPC, is not included in this table, nor in the Total COPC value.

Table 9. COPC Concentrations at the Building 100 Area
(reported in micrograms per liter)[a]

Location	Screen Depth (ft)	Date Sampled	TCE	cis-1,2-DCE	trans-1,2-DCE	Total 1,2-DCE[b]	1,1-DCE	Vinyl chloride	Total COPC[c]
FDEP MCL			**3**	**70**	**100**	**63**	**7**	**1**	
Industrial Drain Leaks Bldg 100 / Old Drum Storage Site									
PIN06									
0500	3–13	4/12/2005	<0.5	<0.5	<0.5	ND	<0.5	<0.5	ND
		3/15/2006	<0.5	<0.5	<0.5	ND	<0.5	<0.5	ND
0501	3–13	4/12/2005	<0.5	<0.5	<0.5	ND	<0.5	<0.5	ND
		3/15/2006	<0.5	<0.5	<0.5	ND	<0.5	<0.5	ND
PIN09									
0500	3–13	4/12/2005	<0.5	0.52J	<0.5	0.52J	<0.5	<0.5	ND
		3/14/2006	<0.5	0.51J	<0.5	0.51J	<0.5	<0.5	ND
PIN10									
0500	3–13	4/12/2005	<0.5	1.8	<0.5	1.8	<0.5	<0.5	1.8
		3/14/2006	<0.5	0.56J	<0.5	0.56J	<0.5	<0.5	ND
PIN12									
0508	3–13	4/12/2005	<0.5	<0.5	<0.5	ND	<0.5	<0.5	ND
		3/15/2006	<0.5	<0.5	<0.5	ND	<0.5	<0.5	ND
0509	3–13	4/12/2005	<0.5	<0.5	<0.5	ND	<0.5	<0.5	ND
		3/15/2006	<0.5	<0.5	<0.5	ND	<0.5	<0.5	ND
0510	3–13	4/12/2005	<0.5	<0.5	<0.5	ND	<0.5	<0.5	ND
		3/15/2006	<0.5	<0.5	<0.5	ND	<0.5	<0.5	ND
0511	3–13	4/9/2005	<0.5	<0.5	<0.5	ND	<0.5	<0.5	ND
		3/11/2006	<0.5	<0.5	<0.5	ND	<0.5	<0.5	ND
0512	3–13	4/9/2005	<0.5	<0.5	<0.5	ND	<0.5	<0.5	ND
		3/11/2006	<0.5	<0.5	<0.5	ND	<0.5	<0.5	ND
0513	15–25	4/12/2005	<0.5	2.4	1.3	3.7	<0.5	6.1	9.8
		3/11/2006	<0.5	0.58J	1.1	1.1	<0.5	1.9	3
0514	30–40	4/12/2005	<0.5	5.1	21.8	26.9	<0.5	24.5	51.4
		10/6/2005	<0.5	9.4	28.4	37.8	<0.5	35.6	73.4
		3/13/2006	<0.5	4.5	21.7	26.2	<0.5	32.9	59.1
0515	15–25	4/9/2005	<0.5	<0.5	<0.5	ND	<0.5	<0.5	ND
		3/11/2006	<0.5	<0.5	<0.5	ND	<0.5	<0.5	ND
0516	30–40	4/9/2005	<0.5	<0.5	<0.5	ND	<0.5	<0.5	ND
		3/11/2006	<0.5	<0.5	<0.5	ND	<0.5	<0.5	ND
0517	15–25	4/9/2005	<0.5	<0.5	<0.5	ND	<0.5	<0.5	ND
		3/11/2006	<0.5	<0.5	<0.5	ND	<0.5	<0.5	ND
0518	30–40	4/9/2005	<0.5	<0.5	<0.5	ND	<0.5	1.4	1.4
		3/11/2006	<0.5	<0.5	<0.5	ND	<0.5	1.3	1.3
0520	36–46	4/12/2005	<0.5	<0.5	<0.5	ND	<0.5	19.5	19.5
		3/15/2006	<0.5	<0.5	<0.5	ND	<0.5	27.3	27.3
0521	19.5–29.5	4/12/2005	1.5	1.6	<0.5	1.6	<0.5	<0.5	3.1
		3/15/2006	1.5	1.9	<0.5	1.9	<0.5	0.91J	3.4
0522	32–42	4/12/2005	<0.5	<0.5	<0.5	ND	<0.5	<0.5	ND
		3/15/2006	<0.5	<0.5	<0.5	ND	<0.5	<0.5	ND

Table 9 (continued). COPC Concentrations at the Building 100 Area (reported in micrograms per liter)[a]

Location	Screen Depth (ft)	Date Sampled	TCE	cis-1,2-DCE	trans-1,2-DCE	Total 1,2-DCE[b]	1,1-DCE	Vinyl chloride	Total COPC[c]
FDEP MCL			**3**	**70**	**100**	**63**	**7**	**1**	
0523	18–28	4/12/2005	<0.5	0.66J	<0.5	0.66J	<0.5	0.57J	ND
		3/15/2006	<0.5	0.72J	<0.5	0.72J	<0.5	<0.5	ND
0524	27–37	4/11/2005	356	3,390	<50	3,390	182	1,440	5,368
		10/10/2005	123	1,670	19.8	1,689.8	80.6	713	2,606.4
		3/10/2006	98.6	1,530	<25	1,530	62.7	885	2,576.3
0525	12–22	4/9/2005	<0.5	2	<0.5	2	<0.5	<0.5	2
		3/11/2006	<0.5	1.9	<0.5	1.9	<0.5	<0.5	1.9
0526	19.5–29.5	4/11/2005	<0.5	1.5	0.58J	1.5	<0.5	1.1	2.6
		10/10/2005	<0.5	3.4	1.4	4.8	<0.5	0.69J	4.8
		3/9/2006	<0.5	1.4	0.61J	1.4	<0.5	<0.5	1.4
0527	118–137.9	4/14/2005	<0.5	<0.5	<0.5	ND	<0.5	<0.5	ND
		3/15/2006	<0.5	<0.5	<0.5	ND	<0.5	<0.5	ND
0528	127–146.9	4/9/2005	<0.5	<0.5	<0.5	ND	<0.5	<0.5	ND
		3/11/2006	<0.5	<0.5	<0.5	ND	<0.5	<0.5	ND
RW01	19–29	4/5/2005	4,390	2,770	<50	2,770	<50	996	8,156
		7/6/2005	4,220	2,440	<50	2,440	<50	641	7,301
		10/4/2005	4,390	2,700	51.9J	2,700	<50	783	7,873
		3/2/2006	4,140	2,550	54.2J	2,550	<50	716	7,406
RW02	25–35	4/5/2005	298	556	42.6	598.6	13.6	89.4	999.6
		7/6/2005	264	470	34.9	504.9	12.7	55.6	837.2
		10/4/2005	398	562	51.3	613.3	22.1	88.5	1,121.9
		3/2/2006	271	551	37.4	588.4	15	79	953.4
S29C	14–24	4/6/2005	<0.5	<0.5	3.3	3.3	<0.5	<0.5	3.3
		3/8/2006	<0.5	<0.5	3	3	<0.5	11.6	14.6
S31B	5–15	4/6/2005	<0.5	0.95J	<0.5	0.95J	<0.5	<0.5	ND
		3/8/2006	<0.5	<0.5	<0.5	ND	<0.5	<0.5	ND
S32B	5.5–15.5	4/6/2005	<0.5	1.6	<0.5	1.6	<0.5	<0.5	1.6
		3/8/2006	<0.5	0.92J	<0.5	0.92J	<0.5	<0.5	ND
S33C	11–21	4/6/2005	<5	74.1	18	92.1	<5	385	477.1
		3/8/2006	1.9	72.6	14.6	87.2	1	318	408.1
S35B	5–15	4/8/2005	23,800	67,600	8,210	75,810	211	15,000	114,821
		10/7/2005	11,600	33,700	5,010	38,710	146E	7,500	57,956
		3/9/2006	16,600	53,200	9,150	62,350	139J	16,000	94,950
S36B	5–15	4/6/2005	<0.5	1.1	<0.5	1.1	<0.5	2.2	3.3
		3/8/2006	<0.5	<0.5	<0.5	ND	<0.5	<0.5	ND
S37B	5–15	4/6/2005	<0.5	58.9	1.1	60	<0.5	80.8	140.8
		3/8/2006	<0.5	44.8	0.87J	44.8	<0.5	59.2	104
S67B	10–19.83	4/12/2005	<5	25.1	<5	25.1	<5	572	597.1
		3/16/2006	<0.5	25.5	5.1	30.6	<0.5	406	436.6
S67C	20–29.83	4/12/2005	<10	616	88.2	704.2	<10	304	1,008.2
		3/16/2006	<0.5	267	49.5	316.5	4.1	210	530.6
S67D	30–39.83	4/11/2005	<1	147	16	163	1.6J	126	289
		3/16/2006	<1	87.9	13.5	101.4	1.4J	77.1	178.5

Table 9 (continued). COPC Concentrations at the Building 100 Area (reported in micrograms per liter)[a]

Location	Screen Depth (ft)	Date Sampled	TCE	cis-1,2-DCE	trans-1,2-DCE	Total 1,2-DCE[b]	1,1-DCE	Vinyl chloride	Total COPC[c]
FDEP MCL			**3**	**70**	**100**	**63**	**7**	**1**	
S68B	10–20	4/11/2005	<0.5	<0.5	<0.5	ND	<0.5	<0.5	ND
		3/11/2006	<0.5	<0.5	<0.5	ND	<0.5	<0.5	ND
S68C	18–28	4/11/2005	<0.5	3.6	<0.5	3.6	<0.5	4.6	8.2
		3/11/2006	<0.5	2.2	<0.5	2.2	<0.5	5.9	8.1
S68D	30–40	4/11/2005	<0.5	56.7	0.87J	56.7	<0.5	45.6	102.3
		3/11/2006	<0.5	45.7	0.72J	45.7	<0.5	66.2	111.9
S69B	10–20	4/12/2005	<0.5	<0.5	<0.5	ND	<0.5	<0.5	ND
		3/14/2006	<0.5	<0.5	<0.5	ND	<0.5	<0.5	ND
S69C	20–30	4/12/2005	<0.5	<0.5	<0.5	ND	<0.5	<0.5	ND
		3/14/2006	<0.5	<0.5	<0.5	ND	<0.5	1	1
S69D	30–40	4/12/2005	<0.5	0.53J	<0.5	0.53J	<0.5	<0.5	ND
		3/14/2006	<0.5	1	<0.5	1	<0.5	0.5J	1
S70B	10–20	4/12/2005	<0.5	18.5	<0.5	18.5	<0.5	<0.5	18.5
		3/14/2006	<0.5	18.8	<0.5	18.8	<0.5	23.4	42.2
S70C	20–30	4/12/2005	<0.5	18.1	4.7	22.8	0.59J	<0.5	22.8
		3/14/2006	<0.5	26.1	8.8	34.9	0.95J	26	60.9
S70D	30–40	4/12/2005	<0.5	11.3	4.1	15.4	0.51J	<0.5	15.4
		3/14/2006	<0.5	14.9	5.6	20.5	<0.5	11.3	31.8
S71B	10–20	4/13/2005	<0.5	0.58J	<0.5	0.58J	<0.5	<0.5	ND
		3/14/2006	<0.5	<0.5	<0.5	ND	<0.5	<0.5	ND
S71C	20–30	4/13/2005	<0.5	53.2	26.8	80	1.2	59.3	140.5
		3/14/2006	<0.5	32.5	19.8	52.3	0.73J	41.5	93.8
S71D	30–40	4/13/2005	<0.5	5.2	1.6	6.8	<0.5	2.7	9.5
		3/14/2006	<0.5	5.2	2.3	7.5	<0.5	6.3	13.8
S72B	10–20	4/13/2005	<0.5	<0.5	<0.5	ND	<0.5	<0.5	ND
		3/13/2006	<0.5	<0.5	<0.5	ND	<0.5	<0.5	ND
S72C	20–30	4/13/2005	<0.5	<0.5	<0.5	ND	<0.5	<0.5	ND
		3/13/2006	<0.5	1.2	<0.5	1.2	0.57J	1.1	2.3
S72D	30–40	4/13/2005	<0.5	<0.5	<0.5	ND	<0.5	<0.5	ND
		3/13/2006	<0.5	<0.5	<0.5	ND	<0.5	<0.5	ND
S73B	10–20	4/13/2005	<0.5	<0.5	<0.5	ND	<0.5	<0.5	ND
		3/14/2006	<0.5	<0.5	<0.5	ND	<0.5	<0.5	ND
S73C	20–30	4/13/2005	<0.5	2	5.1	7.1	<0.5	13	20.1
		10/7/2005	<0.5	1	3.6	4.6	<0.5	8.9	13.5
		3/10/2006	<0.5	<0.5	2.3	2.3	<0.5	9.3	11.6
S73D	30–40	4/13/2005	<0.5	<0.5	<0.5	ND	<0.5	<0.5	ND
		3/14/2006	<0.5	<0.5	<0.5	ND	<0.5	<0.5	ND
TE03	–	4/9/2005	<0.5	<0.5	<0.5	ND	<0.5	4.2	4.2
		3/11/2006	<0.5	<0.5	<0.5	ND	<0.5	4.2	4.2
PIN21		**Perimeter Monitoring Wells**							
0500	7–17	4/13/2005	<0.5	<0.5	<0.5	ND	<0.5	<0.5	ND
		3/13/2006	<0.5	<0.5	<0.5	ND	<0.5	<0.5	ND
0501	20–28	4/13/2005	<0.5	1.5	<0.5	1.5	<0.5	<0.5	1.5
		3/13/2006	<0.5	1.4	<0.5	1.4	<0.5	<0.5	1.4

Table 9 (continued). COPC Concentrations at the Building 100 Area (reported in micrograms per liter)[a]

Location	Screen Depth (ft)	Date Sampled	TCE	cis-1,2-DCE	trans-1,2-DCE	Total 1,2-DCE[b]	1,1-DCE	Vinyl chloride	Total COPC[c]
FDEP MCL			**3**	**70**	**100**	**63**	**7**	**1**	
0502	7–17	4/12/2005	<0.5	<0.5	<0.5	ND	<0.5	<0.5	ND
		3/15/2006	<0.5	<0.5	<0.5	ND	<0.5	<0.5	ND
0503	20–28	4/12/2005	<0.5	<0.5	<0.5	ND	<0.5	<0.5	ND
		3/15/2006	<0.5	<0.5	<0.5	ND	<0.5	<0.5	ND
0504	7–17	4/11/2005	<0.5	<0.5	<0.5	ND	<0.5	<0.5	ND
		3/11/2006	<0.5	<0.5	<0.5	ND	<0.5	<0.5	ND
0505	20–28	4/11/2005	<0.5	<0.5	<0.5	ND	<0.5	<0.5	ND
		3/11/2006	<0.5	<0.5	<0.5	ND	<0.5	<0.5	ND
0512	20–29.5	4/12/2005	<0.5	1.7	<0.5	1.7	<0.5	<0.5	1.7
		3/11/2006	<0.5	2.4	<0.5	2.4	<0.5	7.1	9.5

[a]Before December 18, 2003 "<" values are reporting limits. On or after December 18, 2003 "<" values are method detection limits.
[b]Total 1,2-DCE is the sum of cis-1,2-DCE and trans-1,2-DCE.
[c]Total COPC is the sum of the individual COPC concentrations. The cis-1,2-DCE and trans-1,2-DCE values are not part of the total COPC value because these values are included in the total 1,2-DCE value. "J" values are not included in the total COPC value.

ND = Not detected.
J = Estimated value, result is between the reporting limit and the method detection limit.
Arsenic, while a COPC, is not included in this table, nor in the Total COPC value.

Table 10. COPC Concentrations at the Wastewater Neutralization Area (reported in micrograms per liter)[a]

Location	Screen Depth (ft)	Date Sampled	Arsenic	Total COPC[b]
FDEP MCL			**50**	
PIN18	**Wastewater Neutralization Area**			
0500	11–16	4/11/2005	44.1	44.1
		7/15/2005	52.4	52.4
		10/5/2005	52.3	52.3
		3/14/2006	61.3	61.3
0502	11–16	4/11/2005	16.9	16.9
		7/15/2005	35.6	35.6
		10/5/2005	33.7	33.7
		3/14/2006	40.3	40.3
0503	10–20	4/9/2005	<3.5	ND
		3/11/2006	<2.9	ND
0504	13–22	4/11/2005	<3.5	ND
		3/13/2006	<2.9	ND
0505	10.5–20.5	4/9/2005	<3.5	ND
		3/11/2006	<2.9	ND
0506	12–22	4/9/2005	<3.5	ND
		3/11/2006	<2.9	ND
0507	27–37	4/9/2005	<3.5	ND
		3/11/2006	<2.9	ND
0508	31–41	4/11/2005	<3.5	ND
		3/13/2006	<2.9	ND
0509	27.5–37.5	4/9/2005	<3.5	ND
		3/11/2006	<2.9	ND
0510	27.5–37.5	4/9/2005	<3.5	ND
		3/11/2006	3.2B	ND
0520	32.5–42.5	4/11/2005	<3.5	ND
		3/14/2006	<2.9	ND
0521	20–30	4/11/2005	<3.5	ND
		7/14/2005	<2.9	ND
		10/5/2005	<2.9	ND
		3/14/2006	3.5B	ND
0522	5–15	4/11/2005	5.5B	ND
		7/14/2005	15.4	15.4
		10/5/2005	13.7	13.7
		3/14/2006	6.8B	ND
0523	32.5–42.5	4/11/2005	<3.5	ND
		7/14/2005	<2.9	ND
		10/5/2005	<2.9	ND
		3/13/2006	<2.9	ND

Table 10 (continued). COPC Concentrations at the Wastewater Neutralization Area (reported in micrograms per liter)[a]

Location	Screen Depth (ft)	Date Sampled	Arsenic	Total COPC[b]
FDEP MCL			**50**	
0524	20–30	4/11/2005	14.6	14.6
		7/14/2005	23.1	23.1
		10/5/2005	8.9B	ND
		3/13/2006	38.4	38.4
0525	5–15	4/11/2005	62.7	62.7
		7/14/2005	53.6	53.6
		10/5/2005	118	118
		3/13/2006	32.3	32.3
0526	19.5–29	4/9/2005	<3.5	ND
		3/15/2006	<2.9	ND
RW02	10–20	4/5/2005	50.9	50.9
		7/6/2005	33.5	33.5
		10/4/2005	46.6	46.6
		3/14/2006	41.5	41.5
RW03	9–24	4/5/2005	83.8	83.8
		7/6/2005	48.8	48.8
		10/4/2005	98.6	98.6
		3/14/2006	11.4	11.4
RW0501	11–16	4/5/2005	91.6	91.6
		7/6/2005	240	240
		10/4/2005	344	344
		3/14/2006	145	145

[a]Before December 18, 2003 "<" values are reporting limits. On or after December 18, 2003 "<" values are method detection limits.
[b]Total COPC is the sum of the individual COPC concentrations. "J" values or "B"-qualified arsenic values are not included in the total COPC value.

ND = Not detected.
B = Estimated value for inorganics; result is between the instrument detection limit and the reporting limit.

Table 11. Relative Percent Difference (RPD) for Duplicate Samples

Sample ID	Duplicate ID	Lab Req	Analyte	S	D	Ratio	DL	5xDL	Fail
PIN06–0501	PIN24–0500	F39278	Nondetect for Arsenic Nondetect for VOCs						
PIN12–0508	PIN24–0501	F39313	Nondetect for VOCs						
PIN12–0528	PIN24–0502	F392224	Nondetect for VOCs						
PIN12–S35B	PIN24–0503	F39137	1,1-Dichloroethane	24.7	24.8	0.4	0.5	2.5	
			1,1-Dichloroethene	139	150	7.6	100	500	
			1,2-Dichloropropane	0.63	0.51	21.1	0.5	2.5	
			Benzene	49.7	49.2	1.0	0.5	2.5	
			Chloroethane	3.2	3.5	9.0	1	5	
			cis-1,2-Dichloroethene	53,200	53,900	1.3	500	2,500	
			m,p-Xylene	6.5	6.4	1.6	0.5	2.5	
			o-Xylene	2.8	2.6	7.4	0.5	2.5	
			Toluene	40.2	36.4	9.9	0.5	2.5	
			Total Xylene	1.4	1.4	0.0	0.5	2.5	
			trans-1,2-Dichloroethene	9,150	8,610	6.1	100	500	
			Trichloroethene	16,600	16,400	1.2	100	500	
			Vinyl chloride	16,000	15,700	1.9	100	500	
PIN15–0513	PIN24–0504	F39278	Nondetect for VOCs						
PIN15–M32S	PIN24–0505	F39313	Nondetect for Arsenic Nondetect for VOCs						
PIN18–0507	PIN24–0506	F39224	Nondetect for Arsenic						

[a]S = Original sample (N001), VOC concentrations in µg/L and metals in mg/L.
[b]D = Duplicate sample (N002), VOC concentrations in µg/L and metals in mg/L.
[c]RL = Reporting limit.
[d]Fail = Volatiles "Fail" when the RPD is greater than ± 30% and the concentration is more than 5 times the reporting limit. Metals "Fail" when the samples are more than 5 times the reporting limit and the RPD is greater than 20%. For metals samples that are less than 5 times the reporting limit the difference must be less than ± the reporting limit (this includes the case when only one of the duplicate/sample values is less than 5 times the reporting limit).

Table 12. Summary of Analytical Results for the Building 100 Area Treatment System (reported in micrograms per liter unless otherwise noted)[a]

Location[b]	Date	TCE	cDCE	tDCE	Total DCE[c]	1,1-DCE	VC	Total COPC[d]	$CaCO_3$ mg/L	Fe mg/L
TRTI	1/5/2006	1,320	1,540	40J	1540	<25	166	3026	372	4.9
	2/7/2006	1,230	1,410	32.9	1443	18.2J	218	2891	378	5.2
	3/2/2006	1,230	1,490	36.4	1526	17.6J	191	2947	369	5.0
	4/4/2006	1,120	1,240	30.9	1271	<10	167	2558	378	5.2
	5/3/2006	1,220	1,390	36.1	1426	16.3J	185	2831	374	5.1
TRTE	1/5/2006	<0.5	1.5	<0.5	1.5	<0.5	<0.5	1.5	380	5.2
	2/7/2006	<0.5	0.77J	<0.5	ND	<0.5	<0.5	ND	376	5.2
	3/2/2006	<0.5	1.4	<0.5	1.4	<0.5	<0.5	1.4	371	4.9
	4/4/2006	<0.5	0.91J	<0.5	ND	<0.5	<0.5	ND	372	5.1
	5/3/2006	<0.5	<0.5	<0.5	ND	<0.5	<0.5	ND	366	5.0

[a]"<" values are method detection limits.
[b]TRTI is the system influent and TRTE is the system effluent.
[c]Total 1,2-DCE is the sum of cis-1,2-DCE and trans-1,2-DCE.
[d]Total COPC is the sum of the individual COPC concentrations. The cis-1,2-DCE and trans-1,2-DCE values are not part of the total COPC value because this value is included in the total 1,2-DCE value. "J" values are not included in the total COPC value.

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

Table 13. Summary of Historical Ground Water Recovery from the Building 100 Recovery Wells

Report Date	Quarterly (gallons)	Cumulative Total To Date (gallons)
April−June 2004	188,490	188,490
July−September 2004	410,734	599,224
October−December 2004	589,242	1,188,466
January−March 2005	470,708	1,659,174
April−June 2005	490,041	2,149,215
July−September 2005	498,292	2,647,507
October−December 2005	471,778	3,119,285
January−May 2006	504,053	3,623,338

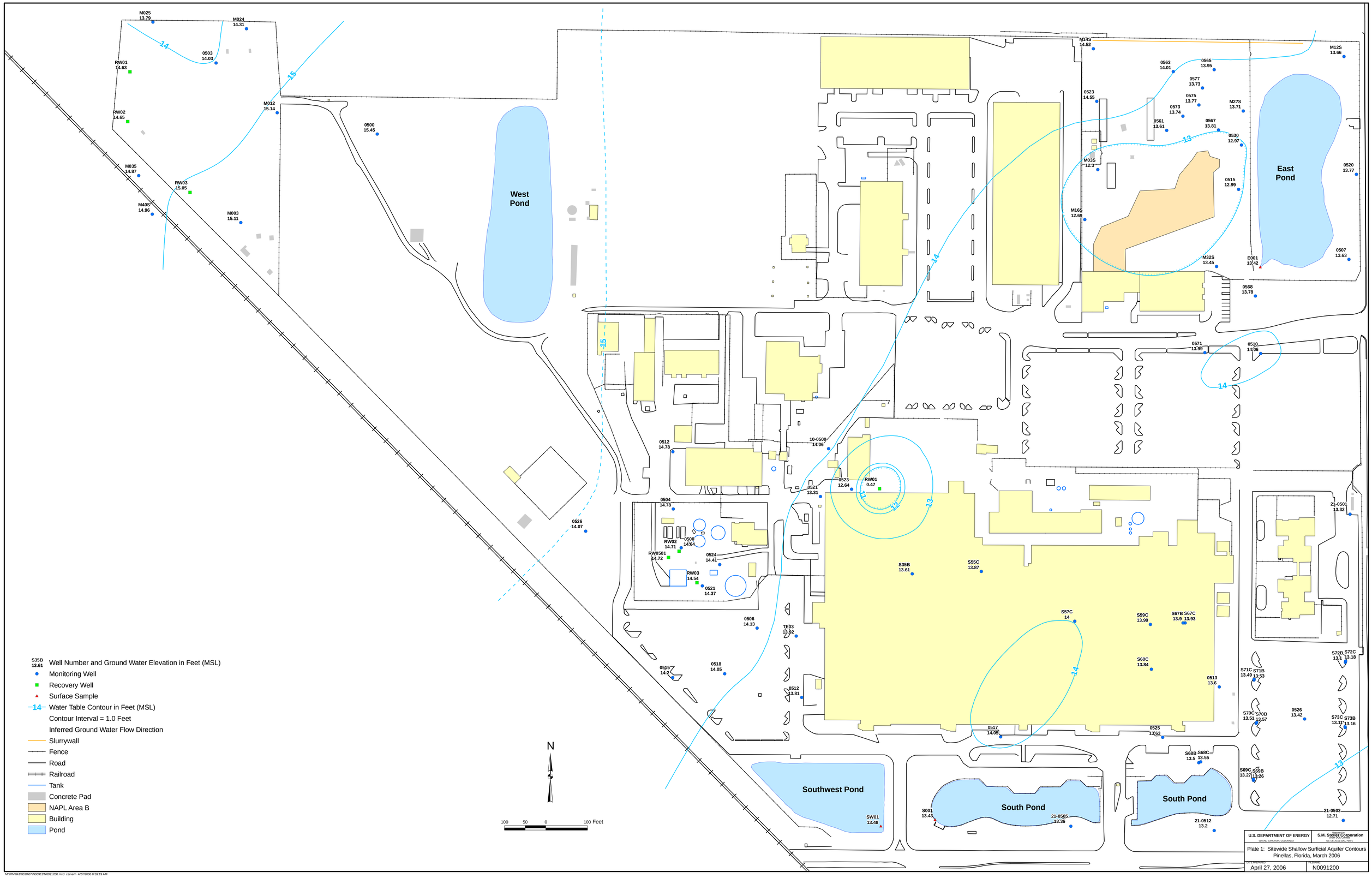
Note: The Building 100 Ground Water Treatment System started operations in May 2004.

Table 14. Estimated Mass of VOCs Recovered from the Building 100 Recovery Wells During January through May 2006

Date	Volume treated (gal)	Concentration[a]					
		TCE (µg/L)	cDCE (µg/L)	tDCE (µg/L)	1,1-DCE (µg/L)	VC (µg/L)	total COPC (µg/L)
January 2006	122,064	1,320	1,540	40J	<25	166	3,026
February 2006	128,793	1,230	1,410	32.9	18.2J	218	2,891
March 2006	153,327	1,230	1,490	36.4	17.6J	191	2,947
April 2006	79,255	1,120	1,240	30.9	<10	167	2,558
May 2006	142,678	1,220	1,390	36.1	16.3J	185	2,831

Date	Volume treated (gal)	Mass Recovered[b]					
		TCE (lbs)	cDCE (lbs)	tDCE (lbs)	1,1-DCE (lbs)	VC (lbs)	total COPC (lbs)
January 2006	122,064	1.3	1.6	0.04	0.01	0.17	3.1
February 2006	128,793	1.3	1.5	0.04	0.02	0.23	3.1
March 2006	153,327	1.6	1.9	0.05	0.02	0.24	3.8
April 2006	79,255	0.7	0.8	0.02	0.003	0.11	1.7
May 2006	142,678	1.5	1.7	0.04	0.02	0.22	3.4

[a]These concentrations represent the average of monthly treatment system influent sampling results.
[b]Includes "J" (estimated) values. For any detection of "<", which indicates the laboratory could not detect that analyte, 50 percent of the "<" value was used for the calculation of recovery.



U.S. DEPARTMENT OF ENERGY
GRAND JUNCTION, COLORADO

S.M. Stoller Corporation
Stoller Project No. OE-ACS-GDU7941

Plate 1: Sitewide Shallow Surficial Aquifer Contours
Pinellas, Florida, March 2006

DATE PREPARED: April 27, 2006

FILENAME: N0091200

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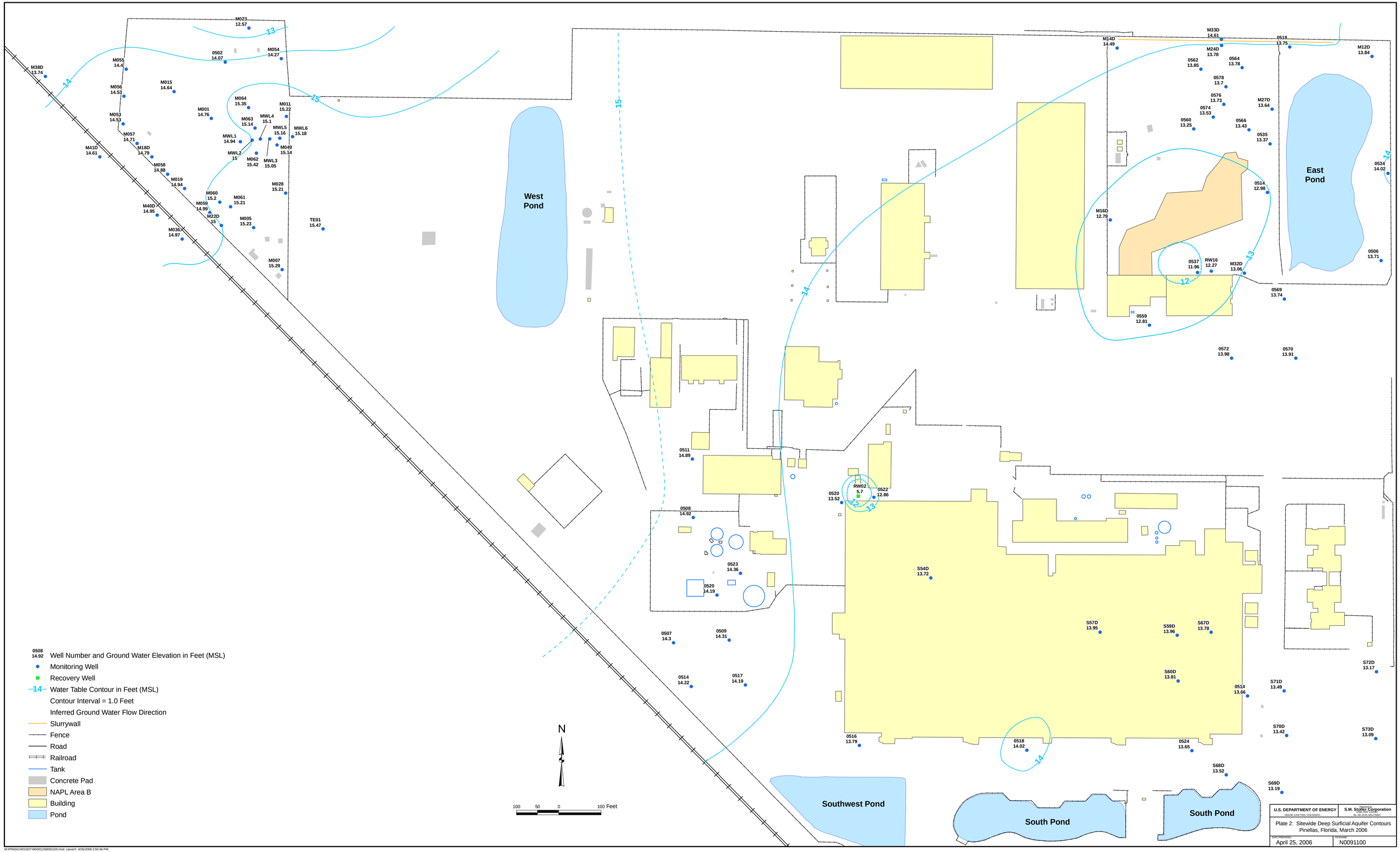

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Appendix A

Laboratory Reports—January 2006 Semiannual Results

Click here to view technical report F39137
Click here to view technical report F39187
Click here to view technical report F39224
Click here to view technical report F39224R
Click here to view technical report F39278
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Appendix B

Laboratory Reports for
Building 100 Treatment System—January through May 2006

Click here to view technical report F37650
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