REMEDIAL ACTION POST-CONSTRUCTION MONITORING 2009 ANNUAL REPORT

DUPONT NECCO PARK
NIAGARA FALLS, NEW YORK

Prepared for:

E. I. du Pont de Nemours and Company
Corporate Remediation Group
Buffalo Avenue and 26th Street
Niagara Falls, NY 14302

Prepared by:

PARSONS
40 LaRiviere Drive Suite 350
Buffalo, NY 14202

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DuPont PN 507537
Parsons PN 445357

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ACRONYMS

Acronym	**Definition / Description**
AO	Administrative Order
ACO	Administrative Consent Order
AOA	Analysis of Alternatives
BFBT	Blast Fractured Bedrock Trench
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
cis-DCE	cis-1,2-dichloroethene
CMMP	Cap Maintenance and Monitoring Plan
COCs	Contaminant of Concern
CRG	DuPont Corporate Remediation Group
DCE	Dichloroethene
DDR	Data Deliverable Review
DNAPL	Dense Non-Aqueous Phase Liquid
GWTF	Groundwater Treatment Facility
HCBD	Hexachlorobutadiene
HCS	Hydraulic Controls System
HDPE	High-Density Polyethylene
LCS	Laboratory Control Sample
LCSD	Laboratory Control Sample Duplicate
LTGMP	Long-Term Groundwater Monitoring Plan
MDL	Method Detection Limit
MNA	Monitoring Natural Attenuation
MS	Matrix Spike
MSD	Matrix Spike Duplicate
Necco Park	DuPont Necco Park Site
NYSDEC	New York State Department of Environmental Conservation
O&M	Operation and Maintenance
ORP	Oxidation Reduction Potential
PCE	Tetrachloroethene (Perchloroethylene)
PDI	Pre-Design Investigation
POTW	Publicly Owned Treatment Works
PSM	Process Safety Management
PQL	Practical Quantitation Limit
QA/QC	Quality Assurance/Quality Control
QAPP	Quality Assurance and Project Plan
RAR	Remedial Action Report
ROD	Record of Decision
RPD	Relative Percent Difference
SAMP	Sampling, Analysis, and Monitoring Plan

SAR	Source Area Report
SFR	Subsurface Formation Repair
SIU	Significant Industrial User
SOW	Statement of Work
SVOCs	Semi-Volatile Organic Compound
TCE	Trichloroethene
TIC	Tentatively Identified Compound
TOC	Total Organic Carbon
trans-DCE	trans-1,2-dichloroethene
TVOCs	Total Volatile Organic Compounds
VC	Vinyl Chloride
VOCs	Volatile Organic Compound
USEPA	United States Environmental Protection Agency

EXECUTIVE SUMMARY

This fifth Annual Report for the Necco Park Remedial Action has been prepared pursuant to Administrative Order (AO) Index No. II Comprehensive Environmental Response, Compensation and Liability Act (Superfund) (CERCLA)-98-0215 dated September 28, 1998, and issued by United States Environmental Protection Agency (USEPA). This report describes hydraulic and chemistry monitoring conducted in 2009 as required by the Long-Term Groundwater Monitoring Plan, dated April 2005 for the DuPont Necco Park Site located in Niagara Falls, New York.

The Necco Park Remedial Action consists of an upgraded cap over the landfill and a groundwater hydraulic control system (HCS). The HCS includes a network of five groundwater pumping wells and a groundwater treatment facility (GWTF). Construction and startup of the HCS and GWTF was substantially complete on April 5, 2005. Thereafter, the systems have been operated in accordance with the Operations and Maintenance Plan (O&M Plan). System operation uptime for 2009 was 93.6%. Discounting scheduled maintenance shutdowns, system uptime for 2009 was 93.9%. Summaries of system operations and hydraulic head data have been provided to the USEPA and the New York State Department of Environmental Conservation (NYSDEC) previously in the 2009 Quarterly Data Packages. This Annual Report provides a detailed evaluation of system effectiveness with respect to the Performance Standards presented in the Necco Park Statement of Work (SOW).

Hydraulic monitoring data from 2009 show that overall; the HCS has maintained hydraulic control of the source area. Improved hydraulic control in the upper bedrock in the western portion of the site began in 4Q08 when a blast-fractured bedrock trench (BFBT) and a new B/C-Zone pumping well RW-11 were put into operation. Well RW-11 was installed to replace recovery well RW-10 that exhibited diminished hydraulic efficiency soon after startup in 2005.

In accordance with the Long-Term Groundwater Monitoring Plan (LTGMP), annual groundwater sampling began in 2008 after three years of biannual sampling. Groundwater sampling results from 2009 continue to show an overall decrease in concentrations of total volatile organic compounds (TVOCs) for all flow zones compared to historical results. The 2009 results indicate:

- With the exception of two near source zone wells, TVOC concentrations for the A-Zone were below 5 μg/l.
- TVOC concentrations at key source area limit wells, such as 150B and 172B, continue to have declining trends.
- Similar decreasing or stable TVOC concentrations are apparent in the deeper bedrock zones and at key source area limit wells such as 146E.

The 2009 results were compared to the zone-specific source area limits provided in the 100% design submittal for overburden and bedrock hydraulic controls. Compared to the first year of long term monitoring in 2005, the 2009 results for the respective groundwater flow zones indicate a general reduction in the number of wells where solubility criteria (1% of pure-phase and effective) are met. Groundwater chemistry results compiled since the HCS has been operational indicate declining TVOC trends at many of the monitoring locations and support modifications to chemical monitoring program starting in 2010.

Hydraulic monitoring completed since 4Q08 indicates operation of new recovery well RW-11 has enhanced the hydraulic control in the west portion of the site. Continued efforts will be made in 2010 to improve the hydraulic efficiency of recovery well RW-5 including evaluations to improve the long-term groundwater recovery at this location.

Results of the 2009 monitored natural attenuation (MNA) evaluation are consistent with the long term monitoring and previous four years of findings. The findings indicate natural attenuation of site constituents is occurring under anaerobic degradation processes. Concentrations of site constituents have decreased in the majority of downgradient wells monitoring the B- through F-Zones. The presence of biochemical reaction products and microbial populations capable of degrading site constituents confirms MNA is providing beneficial groundwater remediation. Results from the 2005-2009 MNA evaluations support the modification of the annual MNA evaluation and the implementation of a modified evaluation to be completed every five years.

Dense non-aqueous phase liquid (DNAPL) monitoring was completed monthly throughout 2009, but no DNAPL was identified or recovered. A total of 8,335 gallons of DNAPL has been removed since initiation of the recovery program in 1989.

1.0 PROJECT DESCRIPTION

1.1 Site Location

The DuPont Necco Park site (Necco Park) is located approximately 1.5 miles north of the Niagara River in a predominantly industrial area of Niagara Falls, New York (Figure 1-1). Necco Park is a 24-acre inactive industrial waste disposal site.

1.2 Source Area Remedial Action Documentation and Reporting

The approved remedy for the Necco Park Site included construction of the Bedrock and Overburden Source Area Hydraulic Controls and the Landfill Cap Upgrade. Completion of the remedy and compliance with the Performance Standards described in the Statement of Work (SOW) are documented in the Remedial Action Report (RAR). This 2009 Annual Report presents hydraulic and chemical monitoring results from the fifth year of operation of the hydraulic controls. In addition, this 2009 Annual Report includes historical groundwater chemistry results for assessment of trends in groundwater quality.

2.0 HCS OPERATIONS SUMMARY

The groundwater O&M Manual (CRG 2005), in conjunction with vendor O&M Manuals, describes normal operation and shutdown procedures, emergency shutdown procedures, alarm conditions, and trouble-shooting and preventative maintenance procedures for the treatment system and hydraulic controls. This section of the report summarizes the HCS operations in 2009.

2.1 Operational Summary

Operational information for the HCS is provided in the 2009 Quarterly Data Packages (DuPont CRG 2009, 2009a, Parsons 2009, 2010). A summary of system operations for 2009 follows:

	HCS Uptime (%)	HCS Uptime [excluding scheduled maintenance downtime] (%)	Groundwater Treated (Gallons)	DNAPL Removed (Gallons)
1Q09	88.7	89.6	4,442,026	0
2Q09	95.0	95.0	4,117,084	0
3Q09	95.0	95.0	4,069,280	0
4Q098	95.8	95.8	3,468,710	0
2009 Total	**93.6**	**93.9**	**16,292,130**	**0**

A summary of monthly groundwater quantities and uptime for each recovery well is provided in Table 2-1.

The HCS remained fully operational throughout 2009, averaging 93.6% total system uptime through December 31, 2009. The groundwater treatment facility (GWTF) downtime has been minimized by continuously monitoring operating conditions and implementing mechanical and procedural changes to the process equipment and the Honeywell Experion™ PKS operating system.

HCS downtime was a result of unexpected mechanical and process-related malfunctions, scheduled maintenance, and power failures. The following table summarizes HCS downtime in 2009:

Reason	Contributing Downtime %	Comments
Process Component Malfunction	4.9%	Unexpected process-related downtime as a result of mechanical component failure.
Scheduled Maintenance shutdowns and system upgrades/inspections	1.8%	Routine inspections, interlock verification, preventative maintenance, and mechanical upgrades to process-related infrastructure.
Power service disruption	0.7%	Primarily due to inclement weather

Scheduled maintenance shutdowns are based on operating conditions and the necessity to take corrective or preventative action to mitigate the need for future, larger scale maintenance. These shutdowns occur routinely to inspect, repair, and/or upgrade process-related components to ensure long-term operational success. Efforts to minimize downtime during planned maintenance shutdowns are employed. Influent tank capacity is utilized while maintenance occurs to minimize recovery well downtime. Additional maintenance activities associated with GWTF maintenance included:

- A shutdown, completed from January 4 to January 14, included repairing a small, non-reportable acid line leak which limited operation of the ABC zone well (RW-4, RW-5, and RW-11). Concurrent with the acid line repair, a blockage in the ABC header line was removed.
- On March 17 and 18, routine maintenance was completed consisting of using city water to flush ABC-Zone and DEF-Zone header lines.
- The downtime in the 3Q09 was attributed primarily to scheduled well maintenance at RW-5
- Downtime during 4Q09 occurred in October (attributed to a pump failure at RW-5) and November (attributed to scheduled well maintenance at RW-11).

2.2 GWTF Process Sampling

In accordance with the Sampling, Analysis and Monitoring Plan (SAMP), quarterly process sampling is conducted to assess the effectiveness of the treatment system in removing volatile organic compounds (VOCs) from groundwater. Two influent samples (one from the B/C-Zone influent tank and one from the D/E/F-Zone influent tank) are collected. One effluent sample is collected from the combined effluent tank. The samples are analyzed for VOCs, semi-volatile organic compounds (SVOCs), total barium, dissolved barium, and sulfate. A summary of results for the process sampling conducted in 2009 is provided in Table 2-2.

2.3 Process Sampling Summary

A Significant Industrial User (SIU) permit with the City of Niagara Falls publicly-owned treatment works (POTW) regulates the treated groundwater effluent discharged from the site. Quarterly sampling conducted at the permitted discharge point (MS#1) demonstrates that the GWTF is operating as designed. The Wastewater Discharge Permit (SIU Permit No. 64) was renewed in May 2009. The current discharge permit is valid from May 1, 2009 to May 1, 2014.

There was one permit violation during 2Q09 for the Annual Average Cyanide Limit. The SIU permit issued by the POTW in May 2009 included an increase in the average annual discharge limit for cyanide.

2.4 Recovery Well RW-5 Rehabilitation

Recovery well RW-5 was not operational on September 16, 2010 due to scheduled well maintenance. The bottom of the open-hole well was cleaned of sediment via air lifting methods. Using a drill rig and length of drill rod fitted with ½-inch diameter steel cable secured perpendicular to the drill rod, the open rock-hole portion of the well was scoured by rotating the drill string. Scrubbing of the rock hole was concentrated on the depth of the water-bearing fractures. After the well scrubbing, solids were removed from the well using air lift methods. After a period of short-term well yield increase, well yield returned to pre-cleaning levels. Subsequent well fouling has continued, and further analysis to alleviate the problem will be completed in 2010.

3.0 HCS PERFORMANCE

3.1 Hydraulic Head Monitoring

Groundwater hydraulic head measurements are used to evaluate control of groundwater in the overburden and bedrock groundwater flow zones by the HCS at Necco Park. Depth-to-water measurements and measuring point elevation data are used to calculate the elevation of groundwater and to generate hydrographs which show groundwater elevation trends in individual monitoring wells. These measurements are also used to generate potentiometric surface-contour maps, which depict groundwater elevation distribution for assessing flow directions and hydraulic gradients. Together, these data presentations are used to determine the extent and effectiveness of hydraulic control effect by the HCS at Necco Park. Potentiometric surface contour maps for the A-Zone through F-Zone include the zone-specific source area limits.

Quarterly groundwater level measurements collected during 2009 were provided in the Quarterly Data Packages (DuPont CRG 2009, 2009a, Parsons 2009, 2010). Potentiometric surface-contour maps for the AT-Zone (top-of-clay), A-Zone (overburden), and bedrock zones B, C, D, E, and F were also included in the 2009 Quarterly Data Packages, and they are used in this report to assess effectiveness of hydraulic control of the HCS. Monitoring and recovery well locations are shown in Figure 3-1. A list of groundwater level monitoring locations is provided in Table 3-1.

Long-term hydrographs for select wells and piezometers within each water-bearing zone are included as Figures 3-2 through Figure 3-8. The hydrographs show long-term groundwater hydraulic responses to startup and operation of the HCS.

Potentiometric surface-contour maps included in this report were selected from maps prepared and presented in the 2009 Quarterly Data Packages. A Kriging algorithm with a linear semi-variogram model and a slope of 1 was used as the standard method to interpolate groundwater elevations between wells, unless otherwise noted.

3.2 Hydraulic Control Assessment

As described in Section 2.5, measures were taken in 2008 to improve B/C-Zone hydraulic control in the western portion of the site. These measures included installation of a recovery well in a blast fractured bedrock trench (BFBT); and, the replacement of Recovery Well RW-10 with RW-11. Assessment results indicate improved hydraulic control through the operation of recovery well RW-11. A detailed discussion of the hydraulic influence of well RW-11 was provided in the Post-Construction Monitoring 2008 Annual Report for the Site (DuPont CRG, 2009b).

3.2.1 AT-Zone and A-Zone

The overburden materials comprising the A-Zone are generally characterized by high clay content and low hydraulic conductivity. Groundwater flow in the A-Zone is primarily downward to the more transmissive fractured bedrock. The AT-Zone (also known as the top-of-clay zone) is a thin, presumably perched, zone of saturation above the A-Zone. It is a discontinuous zone and is absent in the western portion of the site where the overburden thickness diminishes and within portions of the Necco property footprint where excavation/landfilling activities have eliminated any AT/A-Zone distinction.

Figures 3-9 and 3-10 present typical AT-Zone and A-Zone potentiometric surface contours (November 20, 2009) resulting from continuous operation of the HCS.

Long-Term Response to HCS Operation

Long-term AT and A-Zone baseline (non-pumping) hydraulic conditions were established on April 5, 2005. Calculated AT-Zone and A-Zone long-term drawdowns (expressed as positive numbers) are presented in Tables 3-2 and 3-3, respectively. The tables indicate that the HCS has maintained drawdowns in 2009 in both the AT-Zone and A-Zone.

As can be seen in Table 3-2, AT-Zone long-term 2009 drawdowns for selected piezometers ranged between 0.59 and 8.56 feet. All of the calculated responses are consistently positive (i.e. true drawdown) with an average of 4.68 ft of drawdown for the year. This indicates that substantial dewatering of the AT-Zone is being maintained by the continued operation of the HCS. All of the selected AT-Zone piezometers remained below their pre-startup elevations for all of 2009. A plot of November 20, 2009, AT-Zone drawdowns is presented in Figure 3-11.

As can be seen in Table 3-3, A-Zone long term drawdowns for selected wells during 2009 ranged between 0.23 and 8.98 feet. All drawdowns are consistently positive. This indicates that dewatering of the A-Zone is being maintained by the continued operation of the HCS. Groundwater elevations for the selected A-Zone piezometers remained below their pre-startup elevations in 2009 with an average of 3.59 ft of drawdown for the monitored locations. A plot of A-Zone drawdowns from November 20, 2009 is presented in Figure 3-12.

AT and A-Zone Hydraulic Control

Vertical gradients are generally downward (negative) between both the AT/A-Zones and A/B-Zones as presented in Tables 3-4 and 3-5 (2009 average gradients) and shown in Figures 3-13 and 3-14 (November 20, 2009 gradients). In Table 3-4, the upward gradients at the 185AT/A well pair is likely the result of slightly overlapping well screens or a result of the absence of any appreciable A-Zone thickness below the clay layer. Also, the average upward and flat gradients at the 119AT/A and 129AT/A well pairs are likely due to structural effects within the landfill.

3.2.2 B and C Bedrock Water-Bearing Zones

Groundwater flow direction in the B-Zone was generally consistent throughout 2009 (Table 3-6 and Figures 3-15 and 3-16). Hydraulic control in the B-Zone was generally maintained and is attributable to high recovery well up time and rehabilitation efforts completed at RW-5.

Groundwater flow directions in the C-Zone were consistent throughout 2009 (Table 3-7 and Figure 3-16) demonstrating strong influence from recovery wells RW-4, RW-5, and RW-11. C-Zone potentiometric contours based on the fourth quarter of 2009 water levels are presented in Figure 3-16.

B-Zone

Groundwater elevation hydrographs, along with potentiometric surface-contour maps, illustrate the hydraulic effects of the HCS in the B-Zone. RW-4, RW-5 and RW-11 have induced inward (toward the recovery wells) hydraulic gradients over a large area (Figures 3-4 and 3-15). B-Zone influence attributed to RW-4, RW-5, and RW-11 extends north to 120B, 123B, and 159B; west to 116B and 136B; and south to 137B and 168B.

B-Zone net drawdowns from static are presented in Table 3-6 and are calculated from May 4, 2004 static conditions. Drawdowns indicate that monitoring wells 151B and 163B exhibited reversals from static. Wells 151B and 163B are outside the designated source area. The August 13, 2008, reversal of D-14 (a B/C-Zone well) elevation above the April 2005 baseline elevation is attributed to the shutdown of RW-10.

C-Zone

Groundwater elevation hydrographs, along with potentiometric surface-contour maps, illustrate the hydraulic effects of the HCS in the C-Zone. The C-Zone influence attributed to RW-4, RW-5, and RW-11 extends north to 115C, 123C, and 159C, and west to 136C. The south extent of influence extends to 137C and is obscured by the CECOS Landfill between the recovery wells and monitoring wells 150C, 160C and 168C (Table 3-7 and Figures 3-5 and 3-16). Beginning in 2008, hydraulic control in the C-Zone was improved significantly with the early November rehabilitation of RW-5 and start-up of replacement well RW-11.

Similar to the B-Zone, C-Zone baseline hydraulic heads for comparison are from May 4, 2004. The 1Q09 water levels were below their baseline by an average of 0.71 feet with five locations above the May 4, 2004, baseline (Table 3-7). Drawdowns increased through the year with the average drawdown in C-Zone wells increasing to 1.26 feet in 2Q09 and only 2 wells above the baseline water levels. The 3Q09 C-Zone drawdowns averaged 1.76 and only one well had a water level higher than the baseline water level. All water levels were below the May 4, 2004 baseline in 4Q09 and the average drawdown was 1.78 feet.

3.2.3 D, E and F Bedrock Water-Bearing Zones

Groundwater elevation hydrographs, along with potentiometric surface-contour maps, illustrate the effectiveness of the HCS in maintaining hydraulic control in the D, E and F-Zones (Table 3-8, Figures 3-6 through 3-8 and 3-17 through 3-19).

All of the D-Zone water levels were below their baseline measurements in 2009. One well in both the E-Zone and the F-Zone was found above the baseline water level in 1Q09 but both wells were below their baseline water level measurement the remainder of 2009 by greater than 1.5 feet. Hydraulic gradients were toward the recovery wells throughout 2009 indicating the HCS is effectively controlling groundwater migration.

3.3 Groundwater Chemistry Monitoring

3.3.1 Background

Extensive monitoring has been conducted at Necco Park dating back to the early 1980s when groundwater investigations pursuant to the 1986 Consent Decree and the 1989 Administrative Consent Order (ACO) were completed. Pre-Design investigations in the early 2000s enhanced the understanding of conductivity variations within the flow zones and assisted in the initial estimation of source area extents as introduced in the Analysis of Alternatives (AOA) and negotiated Statement of Work (SOW). Groundwater monitoring continues to meet the following objectives as defined in the SOW:

- Monitor the effectiveness of the recovery wells in reducing chemical concentrations in the zone-specific source areas.
- Monitor the far-field groundwater chemistry to determine if the recovery system is controlling off-site migration of chemical constituents associated with the Necco Park site.
- Monitor for the presence of Dense Non-Aqueous Phase Liquid (DNAPL).
- Monitor natural attenuation and intrinsic bioremediation in the source area and far-field.
- Continue to evaluate the effectiveness of the remedial action.

The 2005 Annual Report, the first annual status report following completion of hydraulic control elements of the Necco Park remedy, included an extensive discussion of the first monitoring results and how these results compared to source area criteria introduced in the AOA report. This 2009 report provides an update of groundwater chemistry trends, Monitored Natural Attenuation (MNA) evaluation, and, as appropriate, an update of source area limits.

The list of wells used for long-term monitoring was prepared and is included in the LTGMP. In accordance with the LTGMP, chemical monitoring was conducted on a semi-annual basis during the first three years of system operation. Since the beginning of the fourth year of system operation, sampling has been annual. Monitoring completed in 2009 represents the second year of annual sampling. Locations of monitoring wells used for long-term monitoring are shown in Figure 3-1. Implementation of the long-term chemistry monitoring is discussed in Section 3.3.3. As discussed in Section 3.3.3, groundwater sample results from 2005 to 2009 support modification of existing chemical monitoring program.

3.3.2 Discussion of Results

Original source area limits were included in the AOA report. As described in the Final (100%) Design Report for Bedrock and Overburden Source Area Hydraulic Controls (CRG, 2003), source area limits for the A-Zone, B/C-Zones, and D/E/F-Zones were reassessed using results from the 2000 baseline groundwater sampling event. Sample results from the baseline event, in conjunction with historical DNAPL observations, were used to estimate source area limits as provided in the Source Area Report (SAR) (CRG, 2001). Source area limits presented in the report were used to determine Pre-Design Investigation (PDI) groundwater pumping well locations.

For the purposes of remedial design, the 2000 baseline and Phase 2 PDI groundwater sampling results were used to interpolate source area limits. One of the objectives of the Phase 2 PDI was to refine the southeast limits of the B/C-Zone source area based on Phase 1 PDI observations. Because refinement of the B/C-Zone source area required additional groundwater sampling and analysis, DuPont elected to include sampling of the lower bedrock to also refine the D/E/F-Zone source area limits. Pumping tests conducted during the PDIs and subsequent full-scale operation have shown that the HCS will achieve and maintain hydraulic control of flow-zone specific source areas defined in the 100% design submittal.

Results from the 2009 groundwater sampling have been compared to the same historically employed criterion to evaluate source area limits. Consistent with the AOA, any location where DNAPL was observed at least once was included in the source area. Groundwater chemistry data for the 2009 sampling events was also compared to solubility criteria to evaluate source area extent. Consistent with previous assessments, these included effective solubility for a given compound and one percent of a given compound’s pure-phase solubility.

Effective solubility is defined as the theoretical upper-level aqueous concentration of a constituent in groundwater in equilibrium with a mixed DNAPL. Effective solubility is equal to pure-phase solubility of a given constituent multiplied by the mole fraction of that component in DNAPL. Use of effective solubility criteria is believed to be more representative of sites with DNAPL that consist of relatively complex mixtures of organic compounds (Feenstra et al., 1991), such as those that are found at the Necco Park site. Calculated solubility criteria for DNAPL compounds evaluated during this study are presented in Table 3-9. A comparison of 2005 through 2009 data to the effective solubility and one percent of pure-phase solubility criteria are provided in Tables 3-10 and 3-11, respectively. A discussion of the results by flow zone is provided below.

A-Zone

The A-Zone source area has been defined as the Necco Park property and a limited area south of the property line. The A-Zone source limits have not changed from those provided with the 100% design submittal. The 2009 sample results indicate no exceedances of the solubility criteria. There has been only one exceedance of the solubility criteria since long term monitoring began. The 2005 first round results for well D-11 reported hexachlorobutadiene (HCBD) above the one percent of solubility criteria.

Monthly DNAPL observations conducted at A-Zone well locations in 2009 indicated no DNAPL present at the monitoring locations. The most recent DNAPL observation at an A-Zone well was at well 131A in May 2006. This well is located on the landfill.

Groundwater flow in the A-Zone is predominantly downward. Therefore, hydraulic control of the upper bedrock groundwater flow will capture flow from the A-Zone. As discussed in Section 3.3, hydraulic monitoring completed with new (November 2008) recovery well RW-11 in operation indicates an enhanced degree of A-Zone hydraulic control. Based on the results of the 2009 HCS monitoring, the system is effective in controlling the A-Zone source area.

B/C-Zone

The B-Zone source limits have not changed from those provided with the 100% design submittal. Results for the B-Zone wells indicated no exceedances of the effective solubility criteria. The 2009 sample results from wells 145C and 168C support the 2005 Annual Report conclusion of a less extensive C-Zone source area.

Exceedances of the more conservative one percent solubility criteria at well location 172B for HCBD represent the limit of the B-Zone source area. As discussed in Section 3.5, TVOC concentrations are trending lower at location 172B. The area under hydraulic control includes location 172B. B/C-Zone wells that exceeded the one percent criteria in 2009 include 139B, 172B, 105C, 136B, and 136C.

As discussed in Section 3.7, the frequency of DNAPL observations in B/C-Zone wells has decreased with no observations in 2009.

Well 105C, located on the landfill near known disposal areas, reported exceedances of the effective solubility and one percent pure phase solubility for tetrachloroethene and trichloroethene. This well is used to monitor MNA in the source area. Well 136C, located near the west side of the landfill, reported an exceedance of the effective solubility and one percent pure phase solubility for tetrachloroethene.

Operation of recovery wells RW-4, RW-5, and RW-10/RW-11 has achieved and maintained hydraulic control of the B/C-Zone source area. As discussed in Section 3.3, improved B/C-Zone hydraulic control in the western portion of the site from the operation of recovery well RW-11 is apparent.

Cleaning of recovery well RW-5 in September 2009 improved short-term well yield. However, as discussed elsewhere RW-5 yields appear to be returning to its low pre-cleaning yield.

D/E/F-Zone

Analytical results from well 146E indicate no exceedances for either solubility criteria since long term chemistry monitoring began in April 2005. The 2002 sample results for this location reported trichloroethene (TCE) above the more conservative one percent solubility criterion. As such, previously reported constituent concentrations at this location appear to be more indicative of aqueous constituents than the presence of DNAPL.

Based upon on an exceedance of the more conservative one percent of pure phase solubility criteria for HCBD at well location 165E, the southwest limit of the D/E/F-Zone source area limit lies between well locations 165 and 137. This is consistent with the previous sampling results.

Well 105D, located on the landfill near known disposal areas, had exceedances of the effective solubility and one percent pure phase solubility for a number of compounds. This well is used to monitor MNA in the source area. Well 137D, located south of the landfill, reported exceedances of the effective solubility and one percent pure phase solubility for tetrachloroethene and trichloroethene.

Monitoring conducted during 2009 confirms that the operation of recovery wells RW-8 and RW-9 has achieved and maintained hydraulic control of the D/E/F-Zone.

3.3.3 Sample Collection and Analysis

In accordance with the LTGMP, annual groundwater sampling following three years of semi-annual sampling began in 2008. The annual sampling event was completed between June 8 and June 19, 2009. TestAmerica of Amherst, New York completed sampling with oversight by URS Diamond and Parsons for DuPont. Samples and associated quality assurance/quality control (QA/QC) samples were analyzed by TestAmerica located in North Canton, Ohio.

As described in the Necco Park SAMP, groundwater sampling was conducted using USEPA low-flow sampling methodology. Air-driven bladder pumps equipped with disposable Teflon© bladders were used for sample collection. The pumps were fitted with dedicated Teflon©-lined high-density polyethylene (HDPE) tubing. All monitoring wells were purged and sampled at flow rates between 100 and 600 milliliters per minute to minimize potential volatilization. Geochemical parameters (pH, temperature, dissolved oxygen, oxidation/reduction potential, specific conductivity, and turbidity) were recorded at 5-minute intervals throughout the entire purging period to determine when stabilization was achieved. Geochemical parameters were considered stable when all parameter values were within 10 percent of the previously recorded value with the exception of plus or minus 0.2 units for pH.

A review of field measurements from selected A-Zone, B-Zone and C-Zone monitoring wells indicated that the significant increases in pH observed during the 2008 sampling event as compared to the previous six sampling events was also observed in June 2009. The pH levels from A-Zone overburden wells D-11, 137A, and 146A exhibited an increase of 2 or more standard units in the 2008 sampling event, greater than levels observed in the previous two sampling rounds.

Select A-Zone Field pH Measurements

Location	Sample Event							
	2Q05	4Q05	2Q06	4Q06	2Q07	4Q07	3Q08	2Q09
D-11	8.77	9.98	8.16	8.92	7.46	7.56	12.16	12.44
137A	8.99	9.20	8.01	10.16	7.72	9.07	12.69	12.59
146AR	8.46	7.66	7.58	7.55	7.48	7.48	9.48	9.58

Similar magnitude increases were observed at B-Zone bedrock wells at locations 136, 137, 141, 145, 146, 149, and 151.

Select B-Zone Field pH Measurements

Location	Sample Event							
	2Q05	4Q05	2Q06	4Q06	2Q07	4Q07	3Q08	2Q09
136B	8.65	8.49	7.9	7.33	7.37	7.28	9.49	9.75
137A	9.96	9.60	8.20	8.95	7.69	8.16	12.96	12.59
141B	9.54	7.88	--	7.48	--	7.51	10.65	10.45
145B	9.40	7.96	7.73	7.31	7.34	7.63	10.00	7.75
146B	9.39	8.79	8.07	8.17	7.60	7.84	11.90	11.73
149B	8.20	7.76	7.96	8.12	7.45	7.73	10.54	10.74
151B	9.65	7.48	8.05	8.73	8.02	7.85	12.5	12.91

Select C-Zone Field pH Measurements

Location	Sample Event							
	2Q05	4Q05	2Q06	4Q06	2Q07	4Q07	3Q08	2Q09
136C	11.52	8.84	8.17	7.84	7.77	7.87	12.32	12.25
137C	11.16	8.85	--	7.40	--	7.61	10.44	8.51
141C	8.34	7.82	--	7.52	--	7.16	10.07	9.81
146C	8.59	8.57	8.07	7.58	7.50	7.71	9.69	9.28

One, deeper zone, bedrock well, 148D, reported an elevated pH level in both 2008 and 2009.

Given the wide distribution of wells both horizontally and vertically, and the absence of more than two rounds of data with elevated levels, no conclusions to the cause of the rise in pH is proposed at this time.

Samples were collected at 56 monitoring well locations during the annual event and included sampling at well locations used for the MNA evaluation. The well locations are listed in Table 3-12. Analytical indicator parameters and MNA parameters are listed in Tables 3-13 and 3-14, respectively. Analytical results for the sampling event conducted in 2009 are provided as Appendix A. For reporting purposes, the results are discussed as TVOCs. This is consistent with historic reporting where TVOCs are indicator compounds used to assess groundwater contamination and trends over time. Results for the respective flow zones are discussed below.

3.3.4 A-Zone

Results from the seven LTGMP A-Zone wells indicate TVOC concentrations are all below 500 μg/l. Sampling results for well D-11 (480.2 μg/l) represents the location of the highest reported A-Zone TVOCs. With the exception of well D-11 and another near source well 137A, TVOC concentrations were below 5 μg/l for the other five sampling wells. The 2009 results are consistent with historical results in that they show no significant off-site horizontal chemical migration in the overburden.

Compared to historical sample results, TVOC results at source area well D-9 and D-13 have decreased by an order of magnitude. Further discussion of groundwater chemistry trends for all flow zones is provided in Section 3.6.

3.3.5 B/C-Zone

B-Zone

Results from the fourteen LTGMP B-Zone wells indicate TVOC concentrations generally below 10,000 μg/l, with three wells exceeding 25,000 μg/l. TVOC concentrations at six of the locations were below 100 μg/l. TVOC concentrations for wells near the B/C-Zone source area limits ranged from 271.1 to 49,020 μg/l. Similar to previous years, the highest TVOC concentration (49,020 μg/l) was reported for the sample collected at well 139B. This well is located very close to the landfill and is well within the area of hydraulic control.

Key source area limit wells 171B and 172B show a continued TVOC decline in 2009. Biogenic daughter compounds including cis-1,2-dichloroethene (cis-DCE) and vinyl chloride (VC) dominate TVOC results at these well locations. The trend towards increased daughter compounds coupled with a near absence of source area constituents is evident at well location 171B based on the 2007 through 2009 VOC results.

Compared to historical sample results, TVOC results at source area well 111B have decreased by two orders of magnitude. Far-field well 150B has decreased by three orders of magnitude.

C-Zone

Results from the ten LTGMP C-Zone wells indicate TVOC concentrations in three of the ten wells below 10,000 μg/l. This includes wells within the source area such as 136C. Consistent with previous long term monitoring results, TVOC concentrations at well locations outside the source area limits were less than 100 μg/l and ranged from 0.95 μg/l to 29.74 μg/l.

Compared to historical results, source area well 145C continues to show a significant reduction in TVOC concentrations. Since sampling began at 150C in 2005, this location has also shown an 88% decline in TVOC concentrations from near 250 μg/l to below 30 μg/l in 2009.

3.3.6 D/E/F-Zone

D-Zone

Results from the eleven LTGMP D-Zone wells indicate TVOC concentrations within the source zone between 136.2 μg/l (165D) to 831,000 μg/l (105D). TVOC concentrations outside of the source zone ranged from 0.97 μg/l (149D) to 604.9 μg/l (145D). Consistent with previous long-term monitoring results, biogenic daughter compounds including cis-DCE and VC dominate TVOC results for wells 136D, 145D, 147D, and 165D. With the exception of 145D, TVOC concentrations at well locations outside the source area limits were less than 150 μg/l. TVOC concentrations at well 136D have decreased by two orders of magnitude since the 2000 baseline sampling and have steadily declined since 2000, with the lowest concentration in the well found in 2009. Monitoring has shown hydraulic control from the HCS extends beyond the D/E/F-Zone source area limits.

Compared to historical sample results, TVOC results at source area well 139D have decreased by an order of magnitude. The decreased TVOC at well 139D is significant considering DNAPL was observed in the well in the past.

TVOC results for well 145D, located outside the source area limits, show a decline of one order of magnitude, with the lowest TVOC concentration since 2000 found in 2009, discounting the low TVOC concentration for the 2005 second round event. TVOC concentrations at near source area well 165D indicate a return to historically lower TVOC levels.

E-Zone

Results from the six LTGMP E-Zone wells indicate TVOC concentrations were below 1,000 μg/l, with the exception of one well (165E, 30,960 μg/l). TVOC results for well 136E, the closest E-Zone well to the landfill, were under 100 μg/l. Biogenic daughter compounds including cis-DCE and VC dominate TVOC results for all the E-Zone wells. As discussed in Section 3.6, the presence of these biogenic daughter compounds is indicative of natural attenuation processes occurring. With the exception of wells 145E, 146E, and 150E, TVOC concentrations at well locations outside the source area limits were less than 100 μg/l and ranged from 0.7 to 66.47 μg/l.

TVOC results for well 136E located outside the source area limits have been relatively lower concentrations following an anomalous high in 1998. Well 145E has been on a downward trend since 2000 and the 2009 TVOC result was the lowest at this location with the exception of the second round of 2006. At 156E, TVOC concentration was the lowest ever at this location and have been on a decreasing trend since 2000.

F-Zone

Results from the five LTGMP F-Zone wells indicate TVOC concentrations generally below 1,000 μg/l, which is consistent with the 2008 results. The one exception to this was location 146F where TVOC concentration was 15,764 μg/l. Similar to the results from the E-Zone wells TVOC results for all the F-Zone wells are dominated by biogenic daughter compounds cis-DCE and VC. TVOC concentrations at well locations outside the source area limits (147F and 156F) ranged from 1.66 μg/l to 17.48 μg/l. TVOC concentrations at near source well 136F have steadily declined since HCS startup from 8,458 μg/l in 2005 to 239 μg/l in 2008, increasing slightly in 2009 to 674.9 μg/l.

Compared to historical sample results, TVOC results at far-field well 156F have decreased by two orders of magnitude since 2000. TVOC results at far-field well 147F have decreased by an order of magnitude.

3.3.7 G-Zone

Although they were not included in the SOW as a groundwater flow zone requiring hydraulic control, far-field wells 147G1, 147G2, and 147G3 were included in the long-term chemical monitoring program. TVOC concentrations from these well locations range from 1,794 μg/l to 4,540 μg/l. TVOC results continue to be dominated by biogenic daughter compounds including cis-DCE and, at greater concentrations, VC.

3.4 Data Quality Control/Quality Assurance

The 2009 annual groundwater samples were submitted to TestAmerica Laboratories in North Canton, Ohio for all chemical analyses except gas phase hydrocarbons, which were analyzed at the TestAmerica Austin, Texas facility.

3.4.1 Sample Collection

The samples were collected in accordance with the scope and technical requirements defined in the project Work Plan and Quality Assurance Project Plan (CRG, 2005). Samples were submitted in 10 delivery groups received at the laboratories between June 9, 2009 and June 20, 2009. Based on laboratory receipt records, all samples were received in satisfactory condition, and within EPA holding time and temperature requirements (<4 degrees centigrade). Field QC samples collected during the sampling round included 4 field duplicate pairs, 10 daily equipment blank samples, and 10 trip blanks (volatile organics). In addition to the routine monitoring program analyses, the June 2009 sampling round included the collection of samples for gas phase hydrocarbons and natural attenuation/water quality parameters.

In-House Data Evaluation

The quality of the data set was evaluated by the URS ADQM Group, using the analytical results provided in hard-copy CLP-type data packages in conjunction with an automated data evaluation of the electronic data deliverables (the DuPont DDR process described below). The laboratory data packages presented a review of the QA/QC procedures conducted by the laboratory and included case narratives identifying any significant issues associated with sample receipt, preparation, and analysis.

The electronic data was processed through an automated program developed by DuPont, referred to as the Data Deliverable Review (DDR), where a series of checks were performed on the data, resulting in essentially a summary level validation. The data were evaluated against holding time criteria, checked for laboratory blank, equipment blank, and trip blank contamination, and assessed against the following:

- Matrix spike(MS)/matrix spike duplicate (MSD) recoveries
- Relative percent differences (RPDs) between MS/MSD samples
- Laboratory control sample (LCS)/control sample duplicate (LCSD) recoveries
- RPDs between LCS/LCSD
- RPDs between laboratory replicates
- Surrogate spike recoveries
- RPDs between field duplicate samples

The DDR also applied the following data qualifiers to analysis results, as warranted:

Default qualifiers

Qualifier	Definition
B	Not detected substantially above the level reported in the laboratory or field blanks.
R	Unusable result. Analyte may or may not be present in the sample.
J	Analyte present. Reported value may not be accurate or precise.
UJ	Not detected. Reporting limit may not be accurate or precise.

It was noted that some method detection limits (MDL) and/or quantitation limits (PQL) reported by the laboratory for the inorganic and wet chemistry analyses differed from those specified in the project QAPP. In addition, some acceptance limits for laboratory control spikes and matrix spikes have been updated by the laboratory since the QAPP was written. The laboratories used their most recent statistically derived limits to report the data, therefore these limits were also used to evaluate data quality.

The precision between the four sets of field duplicate pairs was generally very good. Dilutions required due to matrix interferences and/or high levels of target compounds affected a number of volatile and semi-volatile matrix spike and surrogate recoveries. In all cases, except as noted below, the results were qualified J or UJ, but were determined to be usable.

Elevated reporting limits were noted for a number of organic and inorganic target analytes. Based on the laboratory case narratives, matrix interferences were a significant factor in the analysis of these samples.

A number of the inorganic / wet chemistry target analytes, including chloride, sulfate, alkalinity, nitrate-nitrite, and total organic carbon, and the metals iron, manganese, and barium, were detected at trace levels in the equipment blanks. The results for the associated well samples that were reported in the same concentration range as the blanks were qualified with a B flag. Total sulfide and manganese were detected in the laboratory method blanks above the analyte reporting limits.

All analytes reported between the MDL and PQL were J qualified as estimated concentrations. The site-specific, non-target semi-volatile reported as tentatively identified compound (TIC) 01 was also J-qualified as an estimated concentration.

3.4.2 Independent Data Validation

In addition to the in-house evaluation, approximately 10% of the sample locations, plus the associated field and laboratory QC samples were submitted for independent data validation by Environmental Standards, Inc., Valley Forge, PA. The wells were selected for validation based on importance to the program (key perimeter wells), and include well locations VH-136D (plus its field duplicate), VH-145C, VH-146E, VH-172B, and VH-D-11. A copy of the Data Validation Summary report is included in Appendix B as an electronic file.

There were a number of validation qualifiers applied to the samples due to non-compliant QC checks, spike recoveries, or blanks contamination. Three sets of sample results were qualified as unusable due to an exceedance of the preparation holding time. The results for some SVOCs from the samples VH-136D, VH-145B, VH-151B have been qualified as unusable (R).

3.5 Groundwater Chemistry Trends

An analysis of short-term and long-term groundwater chemistry trends has been completed to assess the effectiveness of the HCS and the former extraction system in reducing organic compound concentrations in groundwater. This analysis utilized TVOC concentration data from monitoring wells to identify chemistry trends in the flow zones units. The evaluation also serves to identify locations where TVOC concentrations exhibit significant changes (generally, changes greater than an order of magnitude). Where applicable, historic TVOC data was used to assess long-term chemistry trends. TVOC concentration versus time plots for A-Zone overburden and bedrock B- through F-Zone monitoring wells are presented in Appendix C.

In general, operation of the HCS and the former groundwater recovery system, combined with the presence of the Subsurface Formation Repair (SFR), has contributed to an overall trend of declining TVOC concentrations in the A-Zone overburden and bedrock fractures zones. More recently, TVOC concentration decreases at several near source area and far-field wells are significant and coincide strongly with the onset of HCS operations in April 2005. Natural attenuation processes, as discussed in Section 3.6, are also contributing to the reduction in chemical mass in the bedrock fracture zones.

A-Zone Overburden

Three of the seven wells used to monitor A-Zone chemistry, D-9, D-13, and 137A exhibit a decreasing TVOC trend. These wells are located directly south of the landfill. The greatest TVOC decline is at wells D-9 and 137A where concentrations have decreased by an order of magnitude. TVOC results for the remaining A-Zone wells show no discernable trends. TVOC concentrations at these four wells: D-13, 145A, 146AR, and 150A have been less than 200 μg/l since the 2000 baseline sampling event and were below 5 μg/l in 2009.

The 2009 results are consistent with historical results in that they demonstrate an insignificant downgradient plume in the overburden.

B/C-Zone

B-Zone monitoring wells 111B, 150B, 171B, and 172B show a trend of decreasing TVOC concentrations. At source area well location 111B, TVOC concentrations have decreased by two orders of magnitude since 1996. A long-term trend of decreasing TVOC is also observed at far-field well 150B, where TVOC concentrations have decreased by two orders of magnitude since 1998.

Continuing TVOC decreases have occurred at key wells used to define source area limits including 171B and 172B. TVOC concentrations at these monitoring locations have decreased by an order of magnitude between the 2005 and 2009 sampling events. These TVOC decreases coincident with the HCS startup demonstrate the effectiveness of the B/C-Zone extraction wells in hydraulically controlling the source area.

Similarly, historical C-Zone chemical results indicate a decrease in TVOC at source area well 145C. This well has been historically used to define the C-Zone source area limit. The long-term decreasing TVOC trend may be associated with the long term reduction in off-site migration resulting from hydraulic gradient reversal across the source area limits (as described above for the B-Zone). In spite of a few anonymously high TVOC concentrations, an overall trend of decreasing TVOC since HCS startup is evident.

Within the C-Zone source area, well 105C has shown a dramatic decline in TVOC concentrations since it was first sampled in 2005. Between 2005 and 2009 TVOC concentrations have steadily declined from over 700,000 μg/l to under 150,000 μg/l. While outside of the source area for the C-Zone and of lower TVOC concentrations, well 150C shows a very similar trend to well 105C. At well 150C concentrations have steadily dropped from near 250 μg/l in 2005 to under 30 μg/l in 2009.

A marked decrease in TVOC concentration at well locations 145C and 146C was observed shortly after completion of the SFR in 1989. The SFR increased the capture zones of the former groundwater recovery wells and reduced off-site chemical migration. Based on the widespread drawdown observed since it began operation, it is expected that the HCS will further enhance the C-Zone capture zone.

Another notable C-Zone trend is the decline in TVOC concentrations for far-field well 151C by greater than an order of magnitude since 2000. From a historical perspective, TVOC concentrations have decreased three orders of magnitude. With the exception of the 2005 second biannual results of 223 μg/l, TVOC concentrations at well 151C have been less than 25 μg/l since long term monitoring began. TVOC concentrations are stable at source area well 168C following a declining TVOC trend in 2005 and 2006. The TVOC decline is significant considering the observation of DNAPL in the well shortly after installation of well in 2002.

TVOC trend plots for the declining B-Zone and C-Zone wells show an apparent relationship between HCS startup and decreasing TVOC concentrations. TVOC results for near source area wells including 171B, 172B, 150C and 168C illustrate that the hydraulic effects of the HCS extend to the southeastern portions of the B/C source limits.

D/E/F-Zone

Historical TVOC results for the D/E/F-Zone indicate an overall pattern of decreasing or stable chemistry trends. TVOC concentrations at far-field wells 147F and 156F have decreased by two orders of magnitude since 1996. The 2009 results support this significant trend of decreasing TVOCs in the far-field.

TVOC results for source area well 139D have shown a significant decrease since 2000 and show a pattern of continuing TVOC reduction. TVOC concentrations have decreased by an order of magnitude at this location since startup of the HSC. With the exception of the 2008 results indicating a short-term slight increase, results for near source area well 136D show a trend to TVOC concentrations below 500 μg/l that were reported for this well in the 1990s. The 2009 TVOC result at this location was below 100 μg/l, the lowest TVOC level found to date at this location. A similar decreasing trend is occurring in the F-Zone at this location where TVOC concentrations have declined from 8,458 μg/l in 2005 to 674.9 μg/l in 2009 at well 136F. TVOC results for near source limit well 165D indicate decreasing trend after a short-term TVOC increase in 2006.

TVOC trend plots for far-field wells 146E and 146F show an overall decrease in TVOCs. The recent short-term TVOC increases at these locations (post-HCS start-up results) are attributed to the increased concentrations of cis-DCE and VC.

TVOC concentration trends for the D/E/F-Zone wells also correlate to the startup of the HCS. As illustrated on the trend plots for wells 136D, 139D, 145E, 136F, 150F and 156F. TVOC concentrations have apparently decreased at these locations in response to the startup of the HCS. The TVOC decline at far-field well 156F is significant considering its location in the distant far field.

G-Zone

Results for wells 147G1, 147G2, and 147G3 indicate an overall trend of declining TVOC since 2005. Biodegradation daughter compounds dominate TVOCs reported at these locations. A short-term increase at these locations in 2005 was followed by declining TVOC concentrations from 2006 through 2009.

3.6 Monitoring Natural Attenuation (MNA) Assessment

This section focuses on the natural attenuation via anaerobic biodegradation of chlorinated solvent ethenes in groundwater at the Necco Park Site. Primary constituents of concern are tetrachloroethene (PCE) and TCE. Degradation products, including three isomers of dichloroethene (DCE) – cis-DCE, trans-DCE, and 1,1-DCE – and VC are also present in the groundwater.

3.6.1 MNA Background

One of the requirements of the Record of Decision (ROD) for the Necco Park Source Area Operable Unit is to further characterize groundwater in the far-field area. As defined in the ROD, the far-field is the area outside the source area where chemical constituents attributable to the Necco Park site have been found to have contaminated groundwater. The annual reports from 2005 through 2008 confirmed that concentrations of the target constituents (PCE, TCE and reduced byproducts) decrease as groundwater flows south and west away from the Necco Park site. Additionally, in many wells, historic TVOC results showed significant reduction in target constituents over time. These results are consistent with a published reference showing active anaerobic microbial degradation transforming PCE and TCE to cis-DCE, VC and ultimately ethene in all zones (Lee et al, 1993)

The initial MNA assessment for this site is contained in the 2005 Annual Report. The 2005 report presented data on the concentrations of chlorinated solvents in the groundwater and DNA results indicating the presence of a microbial population competent for degrading chlorinated ethenes. This report on 2009 groundwater conditions at Necco Park is intended as an update to the 2006, 2007, and 2008 Annual Reports and the comprehensive 2005 report. The three recognized lines of evidence for monitored natural attenuation of contaminants are as follows (USEPA, 1999):

- Reduction of contaminant concentrations over time or distance,
- Geochemical data that demonstrate conditions favorable for contaminant destruction, and
- Microbiological data from field or microcosm studies that directly demonstrate the occurrence of a natural attenuation process and its ability to degrade contaminants of concern.

With regard to chlorinated degradation, additional evidence is found in the creation of degradation product DCE, VC, ethene and ethane (USEPA, 1998), which is considered part of the first line of evidence (i.e. reduction of concentrations). Based on past and present sampling results, all three of these lines of evidence are observable at Necco Park.

Details of the Necco Park MNA monitoring program are presented in the *Long Term Groundwater Monitoring Plan* (CRG, 2005b). The MNA monitoring wells were sampled for a full suite of MNA parameters in 2000 and more recently during the 2005 through 2009 sampling events. The resultant data are discussed in the following sections for the B/C-Zone and the D/E/F-Zone.

3.6.2 B/C Zone Results

The results of the MNA monitoring program for the 13 B/C-Zone wells are shown in the figures in Appendix D. For each of the B/C-Zone wells, the data from the sampling events are plotted as a function of time so that concentration trends are apparent. Concentrations are plotted in millimoles (molar equivalents) so that the relationships between parent compounds and daughter compounds (degradation products) are comparable on a molar basis. Observations of data trends, along with select data from the most recent sampling event in parts per billion (ppb), are posted in the figures. A summary of the MNA results in all of the B/C-Zone wells is presented in Table 3-15. The wells listed in each of these tables are arranged in the order of Upgradient, Source Area then Downgradient/Sidegradient. They are discussed below in that order. Geochemical parameters that help evaluate the degree to which biological reductive dechlorination is occurring are presented in Appendix D.

Upgradient B/C-Zone Wells

Both upgradient B/C-Zone wells, 141B and 141C are essentially free of chlorinated ethenes. Only trace levels of PCE and TCE (each below 1 µg/L) were detected in 141C.

Source Area B/C-Zone Wells

All source area wells, except 137C demonstrated declining chlorinated ethene levels in 2009 compared to 2008. In the source area B/C-Zone wells, total chlorinated ethene levels decreased on average by about one-half. In two of the B/C-Zone source wells (111B and 139B), the predominant chlorinated ethene species are the daughter products cis-DCE and VC. All wells, exhibited moderate or good production in the ultimate daughter product, ethene. Ethene more than doubled in well 137C between 2008 and 2009. The results in 111B and 139B, (increasing dechlorinated daughter products and continued ethene production) are similar to the other source area wells (137B, 105C, and 137C) and are strongly indicative of active natural attenuation of chlorinated solvents via reductive dechlorination. Geochemical data indicating low ORP conditions conducive to reductive dechlorination support this interpretation. Ferrous iron and methane are reduced products demonstrating that the biological processes of iron reduction and methanogenesis (both processes occurring under low redox conditions) are active. Similarly, the depression in sulfate concentrations and elevated sulfide in these wells indicates that sulfate reduction (also a biological process that occurs at low redox potential) is active. The process of sulfate reduction may compete with reductive dechlorination processes for electron donor (e.g. total organic carbon (TOC)) so decreased levels of sulfate may result in additional electron donor available to drive reductive dechlorination. All of the wells in the B/C zone have negative ORP values indicating anaerobic conditions. In addition, each of the source area wells (except for 137B) show elevated dissolved iron concentrations relative to upgradient wells and methane levels detected in all of the B/C-Zone was above background wells. All of the source zone wells are depleted in sulfate relative to the upgradient wells in the B/C zone. The source wells 137C, 111B, 105C and 137C were positive for *Dehalococcoides sp*. in 2008 indicating that the key microbes for complete degradation of chlorinated ethenes are present at elevated population levels.

Downgradient/Sidegradient B/C-Zone Wells

There are five downgradient wells (145B, 145C, 149C, 151B, and 151C) and one sidegradient well (153B) in the B/C zone. The sidegradient well has very low levels of chlorinated ethenes (0.37 µg/L cis-DCE and 0.47 µg/L trans-1,2-dichloroethene (trans-DCE)). Two of the downgradient wells, 151B and 151C, exhibited very low levels of chlorinated ethenes during the 2009 sampling and are characterized mainly by reductive dechlorination daughter products cis-DCE and trans-DCE, and VC. Well 151C had previously (2000) contained elevated levels of chlorinated ethenes, but concentrations dropped dramatically between 2005 and 2006.

Total chlorinated ethenes in 151C and 151B declined by about half from the 2008 sampling, however, all VOC compounds in 151B are only marginally above the detection limit and less than 1 µg/L. In these wells, the dominant chlorinated ethene species are cis-DCE and VC. Three of the downgradient B/C Zone wells (145B, 145C, and 149C) had total chlorinated ethenes increase between 2008 and 2009. While 145B and 145C increased chlorinated ethane concentrations by a half, 149C increased only slightly.

All B/C zone wells had negative ORP levels and 145B and 149C contained methane (methane was not analyzed in samples from the other B/C zone wells). The highest level of dissolved iron of the B/C zone wells was found in 145C, while dissolved iron was also found in well 151C. Sulfide in the B/C zone was found in each of the downgradient wells except 151B. As noted above, these compounds are indicative of microbial processes that occur in low ORP environments, indicating conditions that support reductive dechlorination and consistent with the observation dechlorinated daughter products.

This overall downward trend in the downgradient wells continues to support the site conceptual model of a shrinking chlorinated ethene plume in the downgradient B/C-Zone.

3.6.3 D/E/F-Zone Results

The results of the MNA monitoring program for the 14 D/E/F-Zone wells are shown in the figures in Appendix D. A summary of the MNA results in all of the D/E/F-Zone wells is presented in Table 3-16. Geochemical parameters that help evaluate the degree to which biological reductive dechlorination is occurring are presented in Appendix D.

Source Area D/E/F-Zone Wells

Total chlorinated ethene concentrations increased in all three of the source area D/E/F-Zone wells 137D, 139D, and 165D. The total chlorinated ethane concentrations in well 137D were only up marginally from 2008 (about 4 percent) but were still lower than the total chlorinated ethenes at this location in 2007. At 139D, chlorinated ethenes increased approximately 75 percent from 2008 and were the highest found at this location since 2005. While total chlorinated ethenes were five times greater at well 165D in 2009 than in 2008, concentrations are still much lower than the concentrations found at this location in 2005, 2006, and 2007. While total chlorinated ethane concentrations show an increase in 2009, the overall trend still appears to be decreasing in wells 165D and 139D, while 137D appears to be flat. MNA processes appear to have been very active in 165D where concentrations have dropped below groundwater standards for all chlorinated ethenes except for the reductive dechlorination daughter product, VC (110 µg/L) and trans-DCE (8.6 µg/L). Low redox conditions supportive of natural attenuation via reductive dechlorination are present in these wells as indicated by the elevated methane, elevated dissolved iron (in wells 137D and 139D) and low ORP values.

In contrast to the B/C-Zone wells, a parent compound, TCE, is the dominant chlorinated ethene species in the two source area wells 137D and 139D, and ethene concentrations are much lower. For example, the ratio of ethene to total chlorinated ethenes is on a molar basis are 0.007 and 0.077 in these two wells compared to 0.70 in 137C and 0.29 in 139B. However, the presence of ethene in these wells is indicative of ongoing natural attenuation processes.

Concentration trends in the source area wells are also difficult to interpret because they are within the hydraulic capture zone of the pumping system and do not represent consistent flow conditions. Regardless of the difficulties in interpretation of the flow paths, the molar proportion of degradation products is 9% to 24% in wells 137D and 139D, supporting the interpretation that degradation is occurring. Additionally, 16SrDNA tests were positive for *Dehalococcoides sp.* in well 139D in 2008.

Downgradient D/E/F-Zone Wells

As shown in Table 3-16, concentrations of total chlorinated ethenes are decreasing in three of the eight downgradient D/E/F-zone wells (156D, 156E, and 146F), and essentially flat in four of the eight wells (136D, 136E, 147D, and 148D). Although the concentration of chlorinated ethenes in 136D doubled from 2007 to 2008 (520 to 1,011 µg/L), concentrations dropped to the lowest level observed at this location in 2009 (68 µg/L) and consists predominantly of dechlorinated daughter products cis-DCE and VC. Additionally, ethene has increased steadily in this well since 2002, but was not measured in 2009. Chloroethenes in three (148D, 156D, and 156E) of the eight wells were reported at very low concentrations.

Comparing total chlorinated ethane results of 2008 and 2009, all wells demonstrated a decrease from 2008 or stayed the same, except for well 136E, which increased from 9 µg/L to 39 µg/L. Closer inspection of the individual compounds shows that this result in 2009 was largely due to an increase in degradation products (VC, cis-DCE, and trans-DCE) while TCE increased slightly. This well exhibited the lowest ORP (-430 mV), elevated methane and high sulfide levels, indicating an environment conducive to natural attenuation via reductive dechlorination.

Well 146F had previously (2005, 2006, and 2007) exhibited the highest chlorinated ethene levels among the downgradient D/E/F-Zone wells. However, its concentration dropped by about 25% in the 2008 sampling and was slightly lower again in 2009, although again the highest of the downgradient D/E/F-Zone wells. Furthermore, degradation products DCE and VC represent 99% of the chlorinated ethenes on a molar basis indicating natural attenuation processes have been active. The ORP at this well was strongly negative at -353 mV and the presence of dissolved iron, sulfide, and methane are indicative of a low redox potential environment consistent with natural attenuation of chlorinated ethenes via reductive dechlorination.

The two other downgradient wells exhibiting elevated levels of chlorinated ethenes were 146E and 147D. Whereas both of these wells exhibit a rather flat concentration history, both decreased in 2009 compared to the 2008 sampling and were at the lowest level observed at these locations. At 146E, the low ORP (-422 mV) and elevated dissolved iron and sulfide are important indicators of conditions supportive of reductive dechlorination. At 147D, the low TOC (electron donor) and relatively elevated ORP (-121 mV) and indicate conditions less supportive for reductive dechlorination. At this well, the total chlorinated ethenes level has remained constant at a relatively low concentration, albeit completely comprised of the daughter products DCE and VC suggesting that reductive dechlorination does occur in this area.

The overall downward trend in the downgradient wells continues to support the site conceptual model of a active natural attenuation processes resulting in a shrinking chlorinated ethene plume in the downgradient D/E/F-Zone.

Sidegradient D/E/F-Zone Wells

There are three sidegradient D/E/F-Zone wells: 149D, 145E, and 150F. 149D, while technically exhibiting an increasing trend in concentration, has very low concentrations (<1 µg/L), with all chlorinated ethene levels below groundwater standards and an increasing trend for ethene. Total chlorinated ethenes also decreased significantly at this location between 2008 and 2009. The other two wells (145E and 150F) exhibit slightly decreasing chlorinated ethene concentration trends consisting almost entirely of the daughter products DCE and VC. Between 2008 and 2009, well 145E and 150F total chlorinated ethane concentrations dropped by 64 and 27 percent, respectively. Both wells had low ORP levels (-304 mV and -331 mV). At 150F, dissolved iron and sulfide is elevated. At 145E, sulfide and methane are elevated. These conditions are consistent with natural attenuation of chlorinated ethenes via reductive dechlorination.

3.6.4 MNA Recommendations

The review of MNA parameters presented in this section demonstrates that biological activity continues to actively reduce concentrations of chlorinated ethenes in groundwater and contribute to the prevention of groundwater plume expansion. These results are consistent with the results from previous evaluations completed from 2005 to 2008. The continuation of the annual MNA monitoring is unlikely to provide any additional relevant data that will impact the remedy that is currently in place. As a result, the frequency of the MNA sampling and evaluation should be reduced to every five years, with the next event being schedule for 2014.

3.7 DNAPL Monitoring and Recovery

As described in the LTGMP and the DNAPL Monitoring and Recovery Plan, monitoring for the occurrence of DNAPL has been conducted routinely at the Necco Park site since the early 1980s. A monitoring and recovery program was instituted in 1989 to remove free-phase DNAPL from monitoring and groundwater recovery wells. The historically established monitoring program was modified based on results of the PDIs. The 2009 monthly DNAPL monitoring results are summarized in Table 3-17.

In 2009, no DNAPL was identified or recovered. Approximately 512 gallons of DNAPL was recovered in 2008, all of which was recovered from well RW-5. The last observation of DNAPL was in well RW-5 and was made in October 2008. The total quantity of DNAPL recovered since the program has been in place is approximately 8,335 gallons.

4.0 CAP MAINTENANCE

Remaining punch list items for the 2005 landfill cap construction activities were completed in June and August 2006. The August 2006 overseeding event has been successful as permanent vegetation is established across the entire site, including the slopes. A lawn maintenance contractor maintains both the landfill cap and ditch vegetation. Landfill cap maintenance activities are conducted in accordance with the CMMP. Results of the landfill cap maintenance inspection conducted on October 27, 2009 are provided in Appendix E.

5.0 CONCLUSIONS AND RECOMMENDATIONS

5.1 Hydraulic Control Effectiveness

5.1.1 Conclusions

Groundwater elevation hydrographs along with potentiometric surface-contour maps, calculated drawdowns, and calculated horizontal hydraulic gradients illustrate the effectiveness of the HCS in creating source area hydraulic control in the AT, A, B, C, D, E and F-Zones at the DuPont Necco Park site. A qualitative summary of the 2009 effectiveness of the HCS on each zone is presented below as determined by a review of drawdowns, potentiometric contours, system pumping rates, and previous extents of hydraulic control effectiveness:

- AT-Zone: HCS was effective for the entire zone for 2009.
- A-Zone: HCS was effective for the entire zone for 2009.
- B-Zone: HCS was generally effective for 2009.
  - RW-4: good hydraulic control for all of 2009.
  - RW-5: moderate hydraulic control in 2009. Hydraulic control improves following periodic well rehabilitation but fouling reoccurs.
  - RW-11: moderate hydraulic control for 2009 with a significant increase in capture area from 4Q2008.
- C-Zone: HCS was generally effective for 2009.
  - RW-4: good hydraulic control for all of 2009.
  - RW-5: moderate hydraulic control in 2009. Hydraulic control improves following periodic well rehabilitation but fouling reoccurs.
  - RW-11: moderate hydraulic control for 2009 with a significant increase in capture area from 4Q2008.
- D-Zone: HCS is effective for the entire zone.
- E-Zone: HCS is effective for the entire zone.
- F-Zone: HCS is effective for the entire zone.

The addition of RW-11 and the BFBT in 2008 has led to an improvement in the southwestern part of the Site. This observation is consistent with the preliminary results included in the 2008 Annual report. The increases in flow zone transmissivities have resulted in an increase in the recovery well pumping rate, an increase in the extent of hydraulic influence and measureable drawdowns in distant wells. Additionally, there was significant improvement in the hydraulic control of the A-Zone as shown in the A-Zone potentiometric contours as compared to previous A-Zone contours.

5.1.2 Recommendations

- Prepare a plan for routine rehabilitation of RW-5.
- Review and present options for continual or permanent rehabilitation or modification of RW-5.

5.2 Groundwater Chemistry Monitoring

5.2.1 Conclusions

The 2009 and historical chemistry monitoring results indicate the following:

- An overall decrease in TVOC concentrations for all groundwater flow zones in the source area and far-field.
- A-Zone chemistry results are consistent with historical results in that they show no significant off-site horizontal chemical migration in the overburden.
- TVOC decreases have occurred at key B/C-Zone source area limit wells including 171B and 172B. There was a slight increase in the TVOC concentration in 172B in 2009 but the overall historical trend is downward.
- TVOC concentrations in the D/E/F-Zone are either stable or decreasing. TVOC concentrations at far-field wells 147F and 156F have decreased by two orders of magnitude since 1996.
- Analytical results for 2009 would not significantly change the A-Zone and B/C-Zone source area limits as delineated in the SAR.
- Analytical results for 2009 support the 2005 Annual Report conclusion of a reduced source area limit for the D/E/F-Zone as delineated in the SAR based on the analytical results from well 146E.
- The 2008 and 2009 sample results indicate an increase in groundwater pH at select overburden and upper bedrock monitoring locations that requires further monitoring to determine the significance of the increases.
- Results from groundwater sampling events completed since the startup of the HCS show that the HCS is effectively controlling zone-specific source areas.
- Groundwater chemistry results from 2005 to 2009 support modification of the existing chemical monitoring well network.

5.2.2 Recommendations

The 2009 sampling results represent the eighth groundwater sampling event of the long term monitoring program. An assessment of the groundwater sample results compiled to date support a reduction of the number of monitoring locations as presented in this report.

The current list of wells used for chemical monitoring was prepared for the LTGMP before the HSC was operational. As described in previous annual reports, TVOC concentrations at many monitoring locations are either very low or are decreasing. This is especially true for the far-field wells. In accordance with Section 5.2 of the LTGMP, modification of the chemical monitoring program during remedial action is acceptable. A proposed list of wells to be used for modified chemical monitoring starting in 2011 is included below. With Agency approval of the modifications to the chemical monitoring program, implementation of the proposed changes will begin in 2010.

Proposed list of wells to be monitored

MONITORING WELL	ZONE	MONITORING WELL	ZONE
137A	A	136D	D
145A	A	**137D**	D
146AR	A	145D	D
150A	A	148D	D
136B	B	165D	D
137B	B	146E	E
145B*	B	150E	E
146B	B	165E	E
150B	B	136F	F
168B	B	146F	F
171B	B	150F*	F
172B	B		
137C	C		
145C*	C		
146C*	C		
150C*	C		
168C	C		

*Well does not meet bedrock zone water bearing criteria ($k<10^{-4}$ cm/sec).
Wells shown in **bold** are used solely for the MNA evaluation and will not be used for Long-term chemistry monitoring.

5.3 Monitored Natural Attenuation Assessment

5.3.1 Conclusions

Data on chlorinated ethenes in Necco Park is consistent with lines of evidence required for natural attenuation of contaminants (USEPA, Monitored Natural Attenuation Directive, 1999). Specifically, the results summarized above and in the 2009 report continue to show the following:

- Contaminant concentrations in groundwater decrease along flowpaths from the source area to the down gradient zone.
- Geochemical conditions are indicative of low redox conditions required for reductive dechlorination.
- Previous results (2005) confirmed the presence of bacteria with the ability to complete dechlorination of chlorinated ethenes to ethane. The continued evidence of natural attenuation of chlorinated solvents is consistent with the presence of these organisms.

Overall, the observed stable to decreasing trends in total chlorinated solvents and the presence of dechlorinated intermediates (cis-DCE, VC and ethene) strongly supports the interpretation that natural attenuation of chlorinated ethenes continues to occur at this site.

5.3.2 Recommendations

The continuation of the annual MNA monitoring is unlikely to provide any additional relevant data that will impact the remedy that is currently in place. As a result, the frequency of the MNA sampling and evaluation should be reduced to every five years, with the next event being schedule for 2014.

5.4 DNAPL Monitoring and Recovery

5.4.1 Conclusions

Results of the 2009 DNAPL monitoring and historical recovery efforts indicate the following:

- Monitoring for the presence of DNAPL was completed monthly during 2009.
- No DNAPL was observed in 2009.
- Approximately 8,335 gallons of DNAPL has been recovered since the recovery program was initiated in 1989.

5.4.2 Recommendations

Continue DNAPL monitoring and recover DNAPL where encountered.

5.5 Landfill Cap

5.5.1 Conclusions and Recommendations

With establishment of a continuous vegetative cover, the landfill cap construction is complete and will be now be maintained in accordance with the CMMP.

6.0 REFERENCES

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TABLES

Table 2-1

HCS Recovery Well Performance Summary*
2009
DuPont Necco Park

	B/C-ZONE						D/E/F-ZONE			
	RW-4		RW-5		RW-11		RW-8		RW-9	
	Total Gallons Pumped	Uptime	Total Gallons Pumped	Uptime	Total Gallons Pumped	Uptime	Total Gallons Pumped	Uptime	Total Gallons Pumped	Uptime
JANUARY	2,959	63.3%	85,959	56.4%	438,945	60.2%	392,188	99.2%	446,220	99.2%
FEBRUARY	3,349	96.5%	119,473	90.9%	652,213	97.1%	353,299	99.1%	408,741	99.1%
MARCH	9,052	94.0%	119,797	88.3%	678,762	91.6%	366,218	97.5%	364,851	97.5%
APRIL	4,110	95.2%	127,393	93.8%	635,480	94.2%	386,451	98.0%	428,833	98.0%
MAY	5,612	96.0%	130,194	96.3%	483,076	94.7%	389,159	98.6%	335,295	87.4%
JUNE	8,039	98.6%	117,786	90.6%	361,747	88.1%	349,306	97.9%	354,603	97.9%
JULY	8,656	90.3%	130,728	86.4%	397,243	89.8%	332,603	90.8%	326,467	99.8%
AUGUST	12,613	98.9%	117,902	92.0%	503,279	97.5%	362,164	97.9%	381,416	97.9%
SEPTEMBER	20,052	100.0%	120,444	91.2%	396,397	97.9%	650,146	100.0%	401,185	100.0%
OCTOBER	14,549	98.1%	127,413	87.8%	335,301	97.9%	389,720	98.1%	403,680	98.1%
NOVEMBER	9,442	97.9%	118,540	95.5%	297,862	84.3%	337,655	100.0%	276,635	100.0%
DECEMBER	8,416	95.6%	131,550	95.1%	405,394	95.9%	330,151	96.2%	269,099	96.1%
TOTAL / AVG.	106,849	93.7%	1,447,179	88.7%	5,585,699	90.8%	4,639,060	97.8%	4,397,025	97.6%

* Time taken for routine maintenance was not calculated as down-time

Table 2-2
GWTF Process Sampling Results
2009
DuPont Necco Park
Niagara Falls, NY

Analyte		B/C INFLUENT				D/E/F INFLUENT				COMBINED EFFLUENT			
		2/19/09	5/14/09	8/21/09	11/20/09	2/19/09	5/14/09	8/21/09	11/20/09	2/19/09	5/14/09	8/21/09	11/20/09
Field Parameters													
SPECIFIC CONDUCTANCE	μmhos/cm	9168	10320	8915	11330	4881	4931	4280	4442	7011	6476	5872	7700
TEMPERATURE	^{o}C	9.2	13.2	17.1	13.5	11.4	14.7	16.4	12.4	11.1	15.6	19.3	14.1
COLOR	ns	GREY	BLUE TINT	GREY	GREY	GREY	GREY	GREY	GREY	GREY	GREY	GREY	GREY
ODOR	ns	MODERATE	MODERATE	MODERATE	MODERATE	MODERATE	MODERATE	MODERATE	MODERATE	SLIGHT	SLIGHT	SLIGHT	Slight
PH	std units	5.39	6.73	6.31	5.5	7.03	7.01	6.68	6.87	7.37	7.31	6.32	5.41
REDOX	mv	-104	-140	-90	-123	-255	-218	-193	-227	-138	-88	47	-43
TURBIDITY	ntu	89.4	95.1	75.5	116	47.2	48.5	54	65.9	108.5	71.6	70.8	120
Inorganics													
BARIUM, DISSOLVED	μg/l	53500	77800	60800	116000	110 J	100 J	120 J	510	1.5J	780	9400	510
BARIUM, TOTAL	μg/l	112000	143000	123000	275000	100 J	83 J	83 J	48900	48000	23600	20900	48900
SULFATE	μg/l	4000	4500	3600 J	4500	899000	959000	879000	377000	379000	399000	370000	377000
Volatile Organics													
1,1,2,2-TETRACHLOROETHANE	μg/l	2100	2600	1800	2200 J	2100	2000	1500	1500 J	1200	1100	620	900 J
1,1,2-TRICHLOROETHANE	μg/l	2600	2600	1800	2100	3300	2900	2200	2700	810	690	410	610
1,1-DICHLOROETHENE	μg/l	370	330	250 J	340	400	420	310 J	320 J	<4.8	<7.6	<3.8	<19
1,2-DICHLOROETHANE	μg/l	360	400	290 J	460	240	210 J	170 J	240 J	49	42	26	58 J
CARBON TETRACHLORIDE	μg/l	1200	930	670	920	1400	1300	1000	1300	<3.2	<5.2	<2.6	<13
CHLOROFORM	μg/l	13000	13000	9400	13000	5600	4300	3500	4800	350	270	160	410
CIS-1,2-DICHLOROETHENE	μg/l	3700	4500	3600	5900	13000	12000	11000	13000	140	210	210	280
METHYLENE CHLORIDE	μg/l	2200	2600	1700	2200	6500	6400	5000	5800	160	200	190	110
TETRACHLOROETHENE	μg/l	3900	3300	2300 J	3500 J	2000	1700	1300 J	1800 J	29	25 J	12 J	64 J
TRANS-1,2-DICHLOROETHENE	μg/l	280	290 J	210 J	340	940	860	710	850	<4.8	<7.6	4.7 J	<19
TRICHLOROETHENE	μg/l	13000	11000	8500	12000	10000	7500	6700	8800	130	90	66	170
VINYL CHLORIDE	μg/l	1800	1600	1100	2000	2800	2700	1900	1900	<5.5	<8.8	<4.4	<22
Semivolatile Organics													
2,4,5-TRICHLOROPHENOL	μg/l	57J	79 J	65 J	100 J	330	360	370	360	190	190	220	280
2,4,6-TRICHLOROPHENOL	μg/l	13J	30 J	17 J	<80	150	160	180	180 J	79	110	110	140
3-METHYLPHENOL & 4-METHYLPHENOL	μg/l	<0.75	<0.75	130 J	150 J	17 J	<0.75	21 J	16 J	<0.75	<0.75	60 J	<0.75
HEXACHLOROBENZENE	μg/l	<1	<1.2	<1.2	<10	<1	<1.2	<1.2	<2	<0.5	<1	<1	<1.2
HEXACHLOROBUTADIENE	μg/l	280	300	370	3100	37 J	40 J	36 J	40 J	24 J	54 J	49 J	350
HEXACHLOROETHANE	μg/l	78J	98 J	130 J	390 J	10 J	13 J	11 J	<16	<4	<8	<8	29 J
PENTACHLOROPHENOL	μg/l	94J	130 J	110 J	<240	510	530 J	560 J	770 J	370	330 J	430 J	610 J
PHENOL	μg/l	69J	110 J	160	200 J	38 J	39 J	48 J	41 J	97	83 J	110	98 J
TIC-1	μg/l	1200J	1400 J	71 J	2700 J	380 J	450 J	570 J	580 J	50 J	200 J	270 J	730 J
TOTAL VOLATILES	μg/l	**44,510**	**43,150J**	**31,620 J**	**44,960 J**	**48,280**	**42,290 J**	**33,790 J**	**43,010 J**	**2,868**	**2,627**	**1,699 J**	**2,602 J**

< and ND = Non detect at stated reporting limit
J= Analyte present. Reported value may not be precise.
UJ= Not detected. Reporting limit may not be accurate or precise.
NS= Not sampled
NA= Not applicable

Table 3-1
Hydraulic Monitoring Locations
Long-Term Groundwater Monitoring
DuPont Necco Park

Well ID	Zone	Monitoring Frequency	Well ID	Zone	Monitoring Frequency	Well ID	Zone	Monitoring Frequency
111A	A	Quarterly	111B	B	Quarterly	151C	C	Quarterly
119A	A	Quarterly	115B	B	Quarterly	160C	C	Quarterly
123A	A	Quarterly	116B	B	Quarterly	161C	C	Quarterly
129A	A	Quarterly	118B	B	Quarterly	162C	C	Quarterly
131A	A	Quarterly	119B	B	Quarterly	168C	C	Quarterly
137A	A	Quarterly	120B	B	Quarterly	204C	C	Quarterly
140A	A	Quarterly	129B	B	Quarterly	105D	D	Quarterly
145A	A	Quarterly	130B	B	Quarterly	115D	D	Quarterly
146AR	A	Quarterly	136B	B	Quarterly	123D	D	Quarterly
150A	A	Quarterly	137B	B	Quarterly	129D	D	Quarterly
159A	A	Quarterly	138B	B	Quarterly	130D	D	Quarterly
173A	A	Quarterly	145B	B	Quarterly	136D	D	Quarterly
174A	A	Quarterly	146B	B	Quarterly	139D	D	Quarterly
175A	A	Quarterly	149B	B	Quarterly	145D	D	Quarterly
176A	A	Quarterly	150B	B	Quarterly	148D	D	Quarterly
179A	A	Quarterly	159B	B	Quarterly	149D	D	Quarterly
184A	A	Quarterly	160B	B	Quarterly	159D	D	Quarterly
185A	A	Quarterly	161B	B	Quarterly	163D	D	Quarterly
187A	A	Quarterly	167B	B	Quarterly	164D	D	Quarterly
188A	A	Quarterly	168B	B	Quarterly	202D	D	Quarterly
189A	A	Quarterly	169B	B	Quarterly	203D	D	Quarterly
191A	A	Quarterly	171B	B	Quarterly	RW-8	D/E/F	Quarterly
192A	A	Quarterly	172B	B	Quarterly	129E	E	Quarterly
193A	A	Quarterly	201B	B	Quarterly	136E	E	Quarterly
194A	A	Quarterly	BZTW-1	B	Quarterly	142E	E	Quarterly
D-11	A	Quarterly	BZTW-2	B	Quarterly	145E	E	Quarterly
RDB-3	A	Quarterly	D-23	B	Quarterly	146E	E	Quarterly
RDB-5	A	Quarterly	PZ-B	B	Quarterly	163E	E	Quarterly
D-13	A	Quarterly	D-10	B/C	Quarterly	164E	E	Quarterly
PZ-A	A	Quarterly	D-14	B/C	Quarterly	165E	F	Quarterly
129AT	AT	Quarterly	RW-10	B/C	Quarterly	203E	F	Quarterly
168A	A	Quarterly	RW-4	B/C	Quarterly	129F	F	Quarterly
184AT	AT	Quarterly	RW-5	B/C	Quarterly	130F	F	Quarterly
185AT	AT	Quarterly	105C	C	Quarterly	145F	F	Quarterly
188AT	AT	Quarterly	112C	C	Quarterly	146F	F	Quarterly
189AT	AT	Quarterly	115C	C	Quarterly	148F	F	Quarterly
190AT	AT	Quarterly	123C	C	Quarterly	150F	F	Quarterly
191AT	AT	Quarterly	129C	C	Quarterly	163F	F	Quarterly
192AT	AT	Quarterly	130C	C	Quarterly	164F	F	Quarterly
193AT	AT	Quarterly	136C	C	Quarterly	165F	F	Quarterly
194AT	AT	Quarterly	137C	C	Quarterly	202F	F	Quarterly
PZ-195AT+	*AT*	Quarterly	138C	C	Quarterly	203F	F	Quarterly
PZ-196AT+	*AT*	Quarterly	139C	C	Quarterly	130G	G	Quarterly
PZ-197AT+	*AT*	Quarterly	145C	C	Quarterly	136G	G	Quarterly
MW-198AT+	*AT*	Quarterly	146C	C	Quarterly	141G	G	Quarterly
PZ-199AT+	*AT*	Quarterly	149C	C	Quarterly	143G	G	Quarterly
PZ-200AT+	*AT*	Quarterly						

AT = Top-of-clay

Notes: 1. Well 204C installed in 2008 to replace 112C. Water levels began in 1Q09.
2. Piezometers PZ-A, PZ-B, and 168A installed in 2008.

Table 3-2
Select AT-Zone 2009 Drawdowns
Post HCS Startup
DuPont Necco Park

Well	4/5/05 (feet)	2/19/09 (feet)	5/14/09 (feet)	8/21/09 (feet)	11/20/09 (feet)
119AT	0.00	3.43	3.67	3.92	4.20
129AT	0.00	3.43	3.41	3.61	4.11
180AT	0.00	3.75	8.56	5.87	7.48
184AT	0.00	3.99	5.25	4.98	5.81
185AT	0.00	3.99	5.34	5.10	5.96
186AT	0.00	4.06	5.60	5.32	6.21
187AT	0.00	3.93	5.62	5.27	6.29
188AT	0.00	4.19	6.17	5.94	7.07
189AT	0.00	4.31	6.46	6.19	7.30
190AT	0.00	4.21	6.44	6.34	7.34
191AT	0.00	4.08	6.33	5.96	7.38
192AT	0.00	0.59	1.56	2.57	3.25
193AT	0.00	1.61	3.75	3.15	4.74
194AT	0.00	0.66	1.40	1.70	3.42
Average	--	3.30	4.97	4.71	5.75

Notes:
1) Drawdowns calculated using April 5, 2005, water level event as baseline.
2) Monitoring well hydraulic heads above baseline (negative values) have been shaded.

Table 3-3
Select A-Zone 2009 Drawdowns
Post HCS Startup
DuPont Necco Park

Well	4/5/05 (feet)	2/19/09 (feet)	5/14/09 (feet)	8/21/09 (feet)	11/20/09 (feet)
111A	0.00	4.77	4.95	5.15	5.26
119A	0.00	3.62	3.48	3.86	4.17
123A	0.00	2.03	2.16	2.58	2.71
129A	0.00	3.37	3.44	3.96	4.26
146AR	0.00	0.83	1.96	1.99	1.64
163A	0.00	0.82	1.32	1.36	0.85
173A	0.00	2.73	3.47	3.37	3.99
174A	0.00	2.39	3.62	3.18	3.93
175A	0.00	0.72	1.02	1.48	1.91
176A	0.00	3.41	4.55	4.28	5.02
178A	0.00	3.83	5.02	4.73	5.53
179A	0.00	3.39	4.57	4.30	4.78
184A	0.00	1.76	2.99	2.75	3.45
185A	0.00	4.92	5.34	5.12	5.92
186A	0.00	4.58	4.46	4.51	5.50
187A	0.00	6.03	6.16	6.06	7.31
188A	0.00	8.36	7.95	7.78	8.98
189A[4]	0.00	7.29	7.23	7.21	8.20
190A	0.00	5.06	5.02	4.30	6.09
191A	0.00	1.83	2.65	2.94	3.66
192A	0.00	0.77	2.80	3.09	3.68
193A	0.00	0.78	0.94	0.47	1.88
194A	0.00	2.05	2.46	2.53	3.39
D-11	0.00	4.31	5.22	4.79	5.56
D-13	0.00	2.00	2.84	2.69	1.41
D-9	0.00	3.07	3.92	3.79	4.35
RDB-3	0.00	0.73	0.23	0.27	0.92
RDB-5	0.00	0.83	1.19	0.96	0.74
Average	--	3.08	3.61	3.55	4.11

Notes:
1) Drawdowns calculated using April 5, 2005 water level event as baseline.
2) Monitoring well hydraulic heads above baseline (negative values) have been shaded.
3) NA = not availible.
4) Baseline elevation was recorded on May 5, 2004.

Table 3-4
2009 Average AT-Zone to A-Zone Vertical Gradients
DuPont Necco Park

Well Pair		A 2009 Average AT-Zone Head	B 2009 Average A-Zone Head	C AT-Zone Mid-Point of Well Screen	D A-Zone Mid-Point of Well Screen	Vertical Gradtient[1,2] (B-A) / (C-D)
119AT	119A	572.77	572.96	570.92	564.73	0.03
129AT	129A	572.95	572.86	567.24	563.25	-0.02
184AT	184A	570.92	571.16	570.46	564.65	-0.02
185AT	185A	570.94	571.15	569.24	566.50	0.18
186AT	186A	571.02	567.75	569.58	561.13	-0.84
187AT	187A	571.33	567.37	570.33	561.99	-0.79
188AT	188A	571.86	564.60	570.43	559.21	-0.96
189AT	189A	571.99	566.16	569.76	559.30	-0.92
190AT	190A	571.94	567.96	569.81	558.23	-0.62
191AT	191A	572.08	571.00	569.48	558.20	-0.27
192AT	192A	571.62	571.39	569.82	556.10	-0.17
193AT	193A	576.41	572.09	572.38	559.76	-0.54
194AT	194A	574.41	571.07	571.12	558.80	-0.38

Note:
1) Unitless (ft/ft).
2) Negative values indicate a downward (from AT-Zone to A-Zone) gradient.
3) Average gradients were used to better reflect typical vertical gradients at the site.

Table 3-5
2009 Average A-Zone to B-Zone Vertical Gradients
DuPont Necco Park

Well Pair		A 2009 Average A-Zone Head	B 2009 Average B-Zone Head	C A-Zone Mid-Point of Well Screen	D B-Zone Fracture Elevation[1]	Vertical Gradtient[2,3] (B-A) / (C-D)
111A	111B	571.99	570.23	573.94	561.80	-0.14
119A	119B	572.96	571.22	571.63	556.90	-0.12
129A	129B	572.86	571.00	570.10	557.80	-0.15
137A	137B	570.59	570.28	570.10	561.30	-0.03
145A	145B	572.19	569.41	564.19	546.30	-0.16
150A	150B	571.78	569.87	564.69	553.18	-0.17
159A	159B	577.60	573.88	580.62	562.90	-0.21

Note:
1) A B-Zone fracture was not observed in the 145B borehole, therefore the midpoint of the open hole was used.
2) Unitless (ft/ft).
3) Negative values indicate a downward (from A-Zone to B-Zone) gradient.
4) Average gradients were used to better reflect typical vertical gradients at the site.

Table 3-6
Select B-Zone 2009 Drawdowns
Post HCS Startup
DuPont Necco Park

Well[1]	5/4/04 (feet)	8/13/08 (feet)	2/19/09 (feet)	5/14/09 (feet)	8/21/09 (feet)	11/20/09 (feet)
102B	0.00	2.24	1.31	1.91	2.31	2.71
111B	0.00	1.74	3.02	3.17	2.94	3.27
112B	0.00	1.99	10.52	1.71	1.95	2.46
116B	0.00	0.49	0.38	0.69	0.69	1.01
118B	0.00	1.47	0.75	1.73	2.35	2.47
119B	0.00	6.33	5.61	5.82	6.01	6.37
120B	0.00	2.65	2.37	2.77	2.85	3.37
129B	0.00	1.77	1.43	1.56	1.58	1.52
130B	0.00	3.30	2.86	3.33	3.55	3.76
136B	0.00	0.31	0.10	0.44	0.52	0.46
137B	0.00	0.40	1.06	1.72	1.57	2.08
138B	0.00	2.44	1.98	2.88	2.61	3.26
139B	0.00	3.11	3.17	3.08	2.55	3.75
145B	0.00	0.53	0.08	0.43	0.92	1.30
146B	0.00	0.09	0.03	0.61	0.39	0.55
149B	0.00	0.06	0.27	0.39	0.28	1.58
150B	0.00	0.24	0.63	1.10	1.10	1.33
151B	0.00	-0.85	-0.88	-0.43	0.08	-0.07
159B	0.00	0.36	0.76	1.11	1.36	1.74
160B	0.00	1.15	0.18	1.26	1.53	2.08
161B	0.00	2.20	1.14	2.22	2.14	2.84
163B	0.00	0.02	-0.18	0.25	0.25	-0.02
167B	0.00	4.62	3.97	4.47	4.88	5.16
168B	0.00	2.36	0.85	1.08	3.43	2.42
169B	0.00	2.01	1.35	2.15	2.28	2.84
171B	0.00	1.21	0.38	1.35	1.68	2.04
172B	0.00	0.82	0.06	0.97	1.35	1.76
PZ-B[3]	--	0.00	2.55	2.47	2.38	2.51
D-14	0.00	-0.51	1.92	1.85	1.82	2.01
D-23	0.00	7.42	6.69	6.42	5.72	7.48
Average	--	1.67	1.85	2.01	2.14	2.52
RW-4	0.00	24.42	22.83	23.73	21.34	29.03
RW-5	0.00	12.91	14.37	13.20	13.02	13.30
RW-10	0.00	0.49	3.39	4.83	4.81	4.68
RW-11[3]	--	0.00	3.52	2.02	2.00	3.43

Notes:
1) Drawdowns calculated using May 4, 2004 water level event as baseline.
2) Monitoring well hydraulic heads above baseline (negative values) have been shaded.
3) Baseline water elevation collected on August 13, 2008.

Table 3-7
Select C-Zone 2009 Drawdowns
Post HCS Startup
DuPont Necco Park

Well[1]	5/4/04 (feet)	8/13/08 (feet)	2/19/09 (feet)	5/14/09 (feet)	8/21/09 (feet)	11/20/09 (feet)
105C	0.00	-0.20	2.00	4.80	2.17	2.00
112C	0.00	0.69	-0.67	0.86	2.03	2.01
115C	0.00	0.55	2.13	2.14	2.16	2.46
129C	0.00	2.96	2.75	2.65	2.97	3.11
130C	0.00	-1.45	1.39	1.30	1.24	1.33
136C	0.00	0.87	0.24	0.48	0.13	0.51
137C	0.00	-3.50	0.91	0.99	1.02	1.42
138C	0.00	-0.20	1.42	1.21	1.33	1.22
139C	0.00	-6.37	1.41	-0.15	5.30	4.01
145C	0.00	1.68	-0.57	1.26	2.07	1.86
146C	0.00	5.05	-0.47	0.01	-0.13	0.26
149C	0.00	-1.88	0.04	0.63	0.59	1.10
150C	0.00	-1.05	0.13	0.37	0.47	0.82
151C	0.00	-2.38	-0.71	-0.22	0.23	0.12
159C	0.00	6.51	0.18	0.41	0.49	0.95
160C	0.00	-7.68	-0.31	1.84	3.46	2.70
161C	0.00	-0.25	0.10	2.13	3.70	3.09
162C	0.00	6.93	2.51	1.66	2.46	2.99
168C	0.00	-1.55	0.84	2.05	2.73	2.70
D-14	0.00	-1.51	0.92	0.85	0.82	1.01
Average	--	-0.14	0.71	1.26	1.76	1.78
RW-4	0.00	24.42	24.42	24.42	24.42	24.42
RW-5	0.00	12.91	12.91	12.91	12.91	12.91
RW-10	0.00	0.49	0.49	0.49	0.49	0.49
RW-11[3]	--	--	2.02	2.00	3.43	570.52

Notes:
1) Drawdowns calculated using May 4, 2004 water level event as baseline unless otherwise noted.
2) Monitoring well hydraulic heads above baseline (negative values) have been shaded.
3) Baseline water elevation collected on August 13, 2008.

Table 3-8
Select D, E, and F-Zone 2009 Drawdowns
Post HCS Startup
DuPont Necco Park

Well[1]	5/4/04 (feet)	2/19/09 (feet)	5/14/09 (feet)	8/21/09 (feet)	11/20/09 (feet)
105D	0.00	6.28	6.50	6.58	6.89
111D	0.00	6.21	5.69	5.72	6.82
115D	0.00	6.13	6.22	6.50	6.77
123D	0.00	1.31	3.05	4.22	3.90
130D	0.00	5.54	4.96	6.31	6.36
136D	0.00	6.31	6.37	6.49	6.72
139D	0.00	0.50	2.09	4.10	3.11
145D	0.00	0.19	2.01	2.89	2.58
148D	0.00	2.36	1.03	0.19	1.47
149D	0.00	4.96	5.46	5.11	5.95
159D	0.00	6.62	6.72	6.84	7.15
163D	0.00	5.98	4.75	4.69	5.23
164D	0.00	4.79	3.74	3.67	4.02
Average	--	4.40	4.51	4.87	5.15
129E	0.00	0.26	2.45	4.10	3.43
136E	0.00	6.40	6.57	6.68	6.95
145E	0.00	-0.55	1.82	3.72	2.93
146E	0.00	6.79	6.75	6.71	7.20
150E	0.00	4.08	4.86	5.54	5.41
163E	0.00	7.20	6.67	6.92	7.26
164E	0.00	7.16	6.66	6.71	6.97
165E	0.00	6.99	6.69	6.74	6.96
Average	--	4.79	5.31	5.89	5.89
112F[3]	0.00	-0.27	1.92	2.00	2.94
129F	0.00	0.13	2.49	4.01	3.33
130F	0.00	6.19	5.54	6.66	6.71
136F	0.00	6.74	6.88	6.87	7.13
145F	0.00	0.16	2.00	3.83	3.14
146F	0.00	6.46	6.42	6.34	7.00
148F	0.00	2.42	2.33	1.92	3.34
150F	0.00	4.06	4.77	5.23	5.29
163F	0.00	6.85	6.87	6.65	7.20
164F	0.00	6.90	6.93	7.05	7.22
164F	0.00	7.20	7.29	7.39	7.44
Average	--	4.26	4.86	5.27	5.52
RW-8	0.00	9.12	9.11	9.17	9.15
RW-9	0.00	8.19	8.25	8.29	8.24

Note:
1) Drawdowns calculated using May 4, 2004, water level event as baseline.
2) Monitoring well hydraulic heads above baseline (negative values) have been shaded.
3) Baseline water elevation collected on May 8, 2005.

Table 3-9
DNAPL Components and Solubility Criteria Values
DuPont Necco Park

Contaminant	Mole Fraction in DNAPL (%)	Pure-Phase Solubility (ug/l)	One-Percent Pure-Phase solubility (ug/l)	Effective Solubility (ug/l)
Hexachlorobutadiene	59	2,000	20	1,180
Hexachloroethane	9	50,000	500	4,500
Hexachlorobenzene	2	11	0.11	0.22
Carbon tetrachloride	5	800,000	8,000	40,000
Chloroform	1	8,000,000	80,000	80,000
Tetrachloroethene	3	150,000	1,500	4,500
1,1,2,2-Tetrachloroethane	5	2,900,000	29,000	145,000
Trichloroethene	4	1,100,000	11,000	44,000

Table 3-10
2005 - 2009 Annual Sampling
Effective Solubility Concentration Exceedances for DNAPL Compounds
DuPont Necco Park

Well ID	Flow Zone	Analyte	Criteria (ppb)	2005		2006		2007		2008	2009
				1st Event	2nd Event	1st Event	2nd Event	1st Event	2nd Event		
105C	C	Carbon Tetrachloride	40,000	NS	NS	NS	BC	NS	BC	BC	BC
		Hexachlorobutadiene	1,180	1,700	BC	NS	NS	NS	NS	NS	NS
		Chloroform	80,000	BC	180,000	NS	120,000	NS	90,000	82,000	BC
		Tetrachloroethene	4,500	32,000	35,000	NS	36,000	NS	37,000 J	32,000	13,000
		Trichloroethene	44,000	280,000	190,000	NS	190,000	NS	160,000	140,000	74,000
105D	D	Carbon Tetrachloride	40,000	150,000	83,000	NS	170,000	NS	190,000	BC	200,000
		Chloroform	80,000	98,000	35,000	NS	80,000	NS	90,000	96,000	120,000
		Tetrachloroethene	4,500	12,000	57,000	NS	11,000	NS	13,000 J	12,000	16,000
		Trichloroethene	44,000	120,000	51,000	NS	110,000	NS	120,000	130,000	180,000
136C	C	Tetrachloroethene	4,500	4,100	3,600	3,300	3,100	5,200	3,800	14,800	5,600
137C	C	Tetrachloroethene	4,500	8,500	22,000	NS	7,900	NS	BC	BC	BC
137D	D	Tetrachloroethene	4,500	5,100	4,900	NS	BC	NS	7,200	5,300 J	4,700
		Trichloroethene	44,000	64,000	76,000	NS	BC	NS	91,000	70,000	76,000
		Hexachlorobenzene	0.22	3.0	11.0	NS	NS	NS	NS	NS	NS
139D	D	Hexachlorobutadiene	1,180	1,200	BC	NS	NS	NS	NS	NS	NS
171B	B	Hexachlorobutadiene	1,180	2,100	BC	BC	BC	NS	BC	BC	BC
		Hexachlorobenzene	0.22	BC	4.0	31 J	3.4 J	NS	1.4 J	BC	< 0.4

BC: Below Criteria
NS: Not Sampled
Note: Wells 105C and 105D are located on the landfill and are MNA Source Area wells.
"<" = compound not identified above the detection limit.

Table 3-11
2005 - 2009 Annual Sampling
1% of Pure-Phase Solubility Concentration Exceedances for DNAPL Compounds
DuPont Necco Park

Well ID	Flow Zone	Analyte	Criteria (ppb)	2005 1st Event	2005 2nd Event	2006 1st Event	2006 2nd Event	2007 1st Event	2007 2nd Event	2008	2009
105C	C	Hexachlorobutadiene	20	1,700	BC	NS	NS	NS	NS	NS	NS
		Carbon Tetrachloride	8,000	25,000	BC	NS	BC	NS	BC	BC	BC
		Chloroform	80,000	250,000	180,000	NS	120,000	NS	90,000	82,000	BC
		Tetrachloroethene	1,500	32,000	35,000	NS	36,000	NS	37,000 J	32,000 J	13,000
		Trichloroethene	11,000	280,000	190,000	NS	190,000	NS	160,000	140,000	74,000
105D	D	Hexachlorobutadiene	20	95.0	BC	NS	NS	NS	NS	NS	N/S
		Carbon Tetrachloride	8,000	150,000	83,000	NS	170,000	NS	190,000	190,000	200,000
		Chloroform	80,000	98,000	BC	NS	80,000	NS	90,000	96,000	120,000
		Tetrachloroethene	1,500	12,000	5,700	NS	11,000	NS	13,000 J	12,000 J	16,000
		1,1,2,2-Tetrachlorethane	29,000	NS	NS	NS	88,000	NS	79,000	76,000	79,000
		Trichloroethene	11,000	120,000	51,000	NS	110,000	NS	120,000	130,000	180,000
136C	C	Tetrachloroethene	1,500	4,100	3,600	3,300	3,100	5,200	3,800	4,800	5,600
137C	C	Tetrachloroethene	1,500	8,500	22,000	NS	7,900	NS	2,200	2,700	BC
		Trichloroethene	11,000	BC	19,000	NS	16,000	NS	20,000	70,000	BC
137D	D	Tetrachloroethene	1,500	5,100	4,900	NS	BC	NS	7,200	5,300	4,700
		Trichloroethene	11,000	64,000	76,000	NS	27,000	NS	91,000	70,000	76,000
139B	B	Tetrachloroethene	1,500	NS	NS	NS	2000 J	NS	4,600	3,100	3,200
		Hexachlorobutadiene	20	78	BC	NS	NS	NS	NS	NS	NS
		1,1,2,2-Tetrachlorethane	29000	NS	NS	NS	29,000	NS	BC	BC	BC
139D	D	Hexachlorobenzene	0.11	38.0	11.0	NS	NS	NS	NS	NS	NS
		Tetrachloroethene	1,500	1,900	BC	NS	BC	NS	BC	BC	BC
165E	E	Hexachlorobutadiene	20	27.0	BC	32 J	46 J	BC	45 J	91 J	44 J
168C	C	Hexachlorobutadiene	20	330	64.0	54 J	NS	44 J	BC	BC	NS
171B	B	Hexachlorobutadiene	20	2,100	130	BC	BC	BC	BC	BC	BC
		Hexachlorobenzene	0.11	BC	4.0	3.1 J	3.4 J	BC	1.4 J	BC	< 0.4
172B	B	Hexachlorobutadiene	20	140	89	140 J	110	BC	110	54	170
		Tetrachloroethene	1,500	1,800	BC	BC	BC	BC	BC	BC	BC
D-11	A	Hexachlorobutadiene	20	29	BC	BC	BC	BC	BC	BC	BC

BC: Below Criteria
NS: Not Sampled
Note: Wells 105C and 105D are located on the landfill and are MNA Source Area wells.
"<" = compound not identified above the detection limit.

Table 3-12
Chemical Monitoring List
Long-Term Monitoring
DuPont Necco Park

MONITORING WELL	ZONE	MONITORING WELL	ZONE
D-11	A	**105D**	D
D-13	A	123D	D
D-9	A	136D	D
137A	A	**137D**	D
145A	A	145D	D
146AR	A	148D	D
150A	A	**139D**	D
111B	B	147D	D
136B	B	149D*	D
137B	B	156D	D
139B	B	165D	D
141B	B	136E	E
145B*	B	145E	E
146B	B	146E	E
149B*	B	150E	E
150B	B	156E	E
151B*	B	165E	E
153B	B	136F	F
168B	B	146F	F
171B	B	147F	F
172B	B	150F*	F
105C	C	156F	F
136C	C	147G1	G1
137C	C	147G2	G2
141C*	C	147G3	G3
145C*	C		
146C*	C		
149C	C		
150C*	C		
151C	C		
168C	C		

*Well does not meet bedrock zone water bearing criteria (k<10^{-4} cm/sec).

Wells shown in **bold** are used solely for the MNA evaluation and will not be used for Long-term chemistry monitoring.

Table 3-13
Indicator Parameter List
Long-Term Groundwater Monitoring
DuPont Necco Park

INORGANIC AND GENERAL WATER QUALITY PARAMETERS	VOLATILE ORGANIC COMPOUNDS	SEMIVOLATILE ORGANIC COMPOUNDS
pH*	Vinyl chloride	Hexachloroethane
Specific conductivity*	1,1-dichloroethene	Hexachlorobutadiene
Temperature*	Trans-1,2-dichloroethene	Phenol
Turbidity*	Cis-1,2-dichloroethene	2,4,6-trichlorophenol
Dissolved oxygen *	Chloroform	2,4,5-trichlorophenol
Redox potential*	Carbon tetrachloride	Pentachlorophenol
Chloride	1,2-dichloroethane	Hexachlorobenzene
Dissolved barium	Trichloroethene	4-methlyphenol
	1,1,2-trichloroethane	TIC-1
	Tetrachloroethene	
	1,1,2,2-tetrachloroethane	

*Field parameter

Table 3-14
Monitored Natural Attenuation Parameters
DuPont Necco Park

Field Parameters	**Miscellaneous Parameters**
Specific Conductance	Alkalinity
Temperature	Chloride
Dissolved Oxygen	Nitrate Nitrogen
pH	Sulfate
Eh (Redox)	Sulfide as S
Gases	Total Organic Carbon
Ethane	
Ethene	
Methane	
Propane	
Dissolved Metals	
Iron	
Manganese	

Table 3-15
MNA B/C Zone Wells
DuPont Necco Park

Well	Location	Last NAPL observation	Conc. Trend 2005 - 2009	Dominant Cl - Ethene species	2009 Ethene Production	2005 Total Cl-Ethenes (ug/L)	2006 Total Cl-Ethenes (ug/L)	2007 Total Cl-Ethenes (ug/L)	2008 Total Cl-Ethenes (ug/L)	2009 Total Cl-Ethenes (ug/L)	ORP (mv)	Fe (ug/L)	Cl (ug/L)	SO^4 (ug/L)	S (ug/L)	CH^4 (ug/L)	TOC (ug/L)
141B	Upgradient	NA	Clean	NA	ND	0	0	0	0	0	-347	0	1E+06	871000	5000	ND	13000
141C	Upgradient	NA	Flat	PCE, TCE, VC	ND	2	1	1	2	0.95	-298	0	906000	362000	2100	ND	18000
111B	Source Area	NA	Slight Increase	cDCE, VC	Good	758	398	746	1,657	821	-399	38000	6E+06	2600	0	5810	1E+06
137B	Source Area	NA	Decreasing	TCE, cDCE, VC	Moderate	1,114	664	750	463	267	-620	0	475000	12900	0	3280	24000
139B	Source Area	1992	Increasing	PCE, TCE, tDCE, cDCE, VC	Good	1,447	23,800	50,300	41,200	36,400	-274	291000	6E+06	156000	2400	8840	150000
105C	Source Area	1992	Slight Decrease	PCE, TCE cDCE, tDCE, 1,1 DCE, VC	Good	260,800	260,800	231,200	202,900	101,870	-248	2300	6E+06	278000	3200	890	3E+06
137C	Source Area	NA	Decreasing	PCE, TCE cDCE, VC	Good	51,200	45,110	38,220	8,760	12,934	-489	170	1E+06	201000	38000	5160	36000
145B	Downgradient	NA	Slight Increase	TCE, cDCE, VC	Good	4,400	29,850	30,690	17,350	25,680	-390	0	2E+06	329000	11000	7960	36000
145C	Downgradient	NA	Flat	cDCE, VC	ND	8,900	7,650	15,560	6,412	9,440	-257	420000	9E+07	573000	4200	ND	150000
149C	Downgradient	NA	Flat	cDCE, VC	Weak	10	16	27	12	13	-276	0	324000	274000	2600	1870	7000
151C	Downgradient	NA	Decreasing	cDCE, tDCE, VC	ND	220	12	8	12	7.28	-463	810	1E+06	2E+06	43000	ND	6000
151B	Downgradient	NA	Slight Decrease	TCE, cDCE, tDCE	ND	0	2.24	8.36	3.8	1.48	-288	0	388000	5000	0	ND	2000
153B	Sidegradient	NA	Clean	NA	BDL	0	0	0	0	0.84	-177	31400	2E+06	1E+06	1900	2510	14000

NA = Not Applicable
ND= No Data
BDL = Below Detection Limit
ORP = Oxidation/Reduction Potential
Fe = Dissolved Iron
Cl = Chloride
SO^4 = Sulfate
S = Sulfide
CH^4 = Methane
TOC = Total Organic Carbon
(ug/L) = Micrograms per Liter
(mv) = Millivolts

Table 3-16
MNA D/E/F Zone Wells
DuPont Necco Park

Well	Location	Last NAPL Observation	Conc. Trend 2005 - 2009	Dominant Cl - Ethene Species	2009 Ethene Production	2005 Total Cl-Ethenes (ug/L)	2006 Total Cl-Ethenes (ug/L)	2007 Total Cl-Ethenes (ug/L)	2008 Total Cl-Ethenes (ug/L)	2009 Total Cl-Ethenes (ug/L)	ORP (mv)	Fe (ug/L)	Cl (ug/L)	SO^4 (ug/L)	S (ug/L)	CH^4 (ug/L)	TOC (ug/L)
137D	Source Area	NA	Flat	PCE, TCE , cDCE, VC, tDCE, 1,1,DCE	Moderate	94,500	35,470	120,700	93,700	97,200	-468	210	2E+06	1E+06	94000	1430	230000
139D	Source Area	1992	Decreasing	TCE, PCE	Weak	2,690	1,843	1,845	1,219	2,139	-241	2700	850000	1E+06	3200	842	4000
165D	Source Area	NA	Decreasing	VC	Moderate	1,102	597	498	23	125	-358	0	451000	58200	0	1050	21000
136D	Downgradient	NA	Flat	TCE, cDCE, VC	ND	1,819	1,170	468	950	68	-134	87	210000	337000	13000	ND	8000
147D	Downgradient	NA	Flat	cDCE, VC	ND	183	168	164	172	130	-121	390	37200	1E+06	1600	ND	1000
148D	Downgradient	NA	Flat	cDCE	ND	1	1	1	1	1	-310	0	93700	330000	0	ND	5000
156D	Downgradient	NA	Slight Decrease	cDCE, tDCE, VC	ND	5	3	2	2	1	-303	350	304000	816000	3800	ND	3000
136E	Downgradient	NA	Flat	TCE, cDCE, VC , tDCE	Good	17	16	36	9	39	-430	0	189000	360000	14000	776	8000
146E	Downgradient	NA	Increase	cDCE, VC	ND	17,120	15,060	12,020	18,430	5,970	-422	120	584000	1E+06	87000	ND	27000
156E	Downgradient	NA	Slight Decrease	cDCE, VC	ND	3	2	1	1	1	-206	3900	227000	730000	1800	ND	2000
146F	Downgradient	NA	Slight Decrease	cDCE, VC	Moderate	20,470	20,310	22,160	15,720	15,560	-353	240	3E+06	722000	12000	2960	80000
149D	Sidegradient	NA	Flat	cDCE, VC	Weak	0	1	2	4	1	-390	0	568000	500000	20000	2280	5000
145E	Sidegradient	NA	Slight Decrease	cDCE, VC	Good	11,750	3,010	14,760	9,647	3,465	-304	0	2E+06	179000	1600	1350	23000
150F	Sidegradient	NA	Slight Decrease	cDCE, VC	ND	2,755	1,740	1,707	1,220	890	-331	227000	1E+07	1E+06	5000	ND	240000

NA = Not Applicable
ND= No Data
BDL = Below Detection
ORP = Oxidation/Reduction Potential
Fe = Dissolved Iron
Cl = Chloride
SO^4 = Sulfate
S = Sulfide
CH^4 = Methane
TOC = Total Organic Carbon
(ug/L) = Micrograms per Liter
(mv) = Millivolts

Table 3-17
2009 DNAPL Recovery Summary
DuPont Necco Park

Well ID	Frequency	22-Jan		19-Feb		26-Mar		30-Apr		29-May		29-Jun		3-Aug		21-Aug		25-Sep		30-Oct		20-Nov		29-Dec	
		FT	GALS	FT	GALS	FT	GALS	FT	GALS	FT	GALS	FT	GALS	FT	GALS	FT	GALS	FT	GALS	FT	GALS	FT	GALS	FT	GALS
RW-1	Monthly	0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0	
RW-2	Monthly	0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0	
RW-4	Monthly	0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0	
RW-5	Monthly	0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0	
TRW-6	Monthly	0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0	
TRW-7	Monthly	0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0	
D-23	Monthly	0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0	
VH-117A	Monthly	0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0	
VH-123A	Monthly	0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0	
VH-129A	Monthly	0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0	
VH-129C	Monthly	0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0	
VH-160B	Monthly	0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0	
VH-160C	Monthly	0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0	
VH-161B	Monthly	0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0	
VH-161C	Monthly	0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0	
VH-162C	Monthly	0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0	
VH-190A	Monthly	0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0	
VH-167B	Monthly	0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0	
VH-168B	Monthly	0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0	
VH-168C	Monthly	0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0	
VH-169B	Monthly	0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0	
VH-170B	Monthly	0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0	
VH-171B	Monthly	0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0	
VH-172B	Monthly	0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0	
VH-131A	Semi-annually	na		na		0.0		0.0		0.0		0.0		na		na		0.0		na		na		na	
VH-139A	Semi-annually	na		na		0.0		0.0		na		0.0		na		na		0.0		na		na		na	
VH-139C	Semi-annually	na		na		0.0		0.0		na		0.0		na		na		0.0		na		na		na	
CECOS52SR	Semi-annually	na		na		0.0		0.0		na		0.0		na		na		0.0		na		na		na	
CECOS18SR	Semi-annually	na		na		0.0		0.0		na		0.0		na		na		0.0		na		na		na	
CECOS-53	Semi-annually	na		na		0.0		0.0		na		0.0		na		na		0.0		na		na		na	

na - not applicable/not taken
GALS - gallons purged

FIGURES

PARSONS
40 La Riviere Dr., Suite 350
Buffalo, NY 14202
(716) 541-0730

N

Source:
Google Earth 2010

78° 59′ 37″ W
43° 05′ 44″ N

FIGURE 1-1
SITE LOCATION MAP
NECCO PARK SITE,
NIAGARA FALLS, NY

FILE NAME: P:\DUPONT PROGRAM\NECCO PARK\ENGR\CAD\FIGURES\445357-SLM.DWG
PLOT DATE: 2/23/2010 9:34 AM PLOTTED BY: RUSSO, JILL

Legend

- DuPont Monitoring Well
- Allied Waste Monitoring Well
- DuPont Extraction Well
- Former DuPont Extraction Well
- DuPont Peizometer
- Chemical Monitoring Location

Peizometer ID Conversions	
New ID	Former ID
184A	RDB-12
185A	177A
187A	RDB-15
188A	166A
189A	181A
190A	167A
191A	182A
192A	183A
193A	RDB-22

NOTE:
- Wells in bold will be used for the MNA evaluation.
- Former Groundwater Recovery Wells RW-1 and RW-2 Abandoned in 2008.

WARNING

IT IS VIOLATION OF SECTION 7209, SUBDIVISION 2, OF THE NEW YORK STATE EDUCATION LAW FOR ANY PERSON OTHER THAN WHOSE SEAL APPEARS ON THIS DRAWING, TO ALTER IN ANY WAY AN ITEM ON THIS DRAWING. IF AN ITEM IS ALTERED, THE ALTERING ENGINEER SHALL AFFIX TO TO THE ITEM HIS SEAL AND THE NOTATION "ALTERED BY" FOLLOWED BY HIS SIGNATURE AND THE DATE OF SUCH ALTERATION, AND A SPECIFIC DESCRIPTION OF THE ALTERATION.

N:\18983203.00005\DB\GIS\locations.apr CHEMICAL MONITORING LOCATIONS_2 3/27/2009

NO.	DATE	DESCRIPTION	NO.	DATE	DESCRIPTION
1	11/08/05	REVISION #1			

REVISIONS

DESIGNED BY: SPM
DRAWN BY: CNE
CHECKED BY: XXX
PROJ. ENGR. XXX

URS Group Consultants
77 Goodell Street, Buffalo, New York 14203
(716)856-5636 - (716)856-2545 fax

JOB No. 18983203.00005

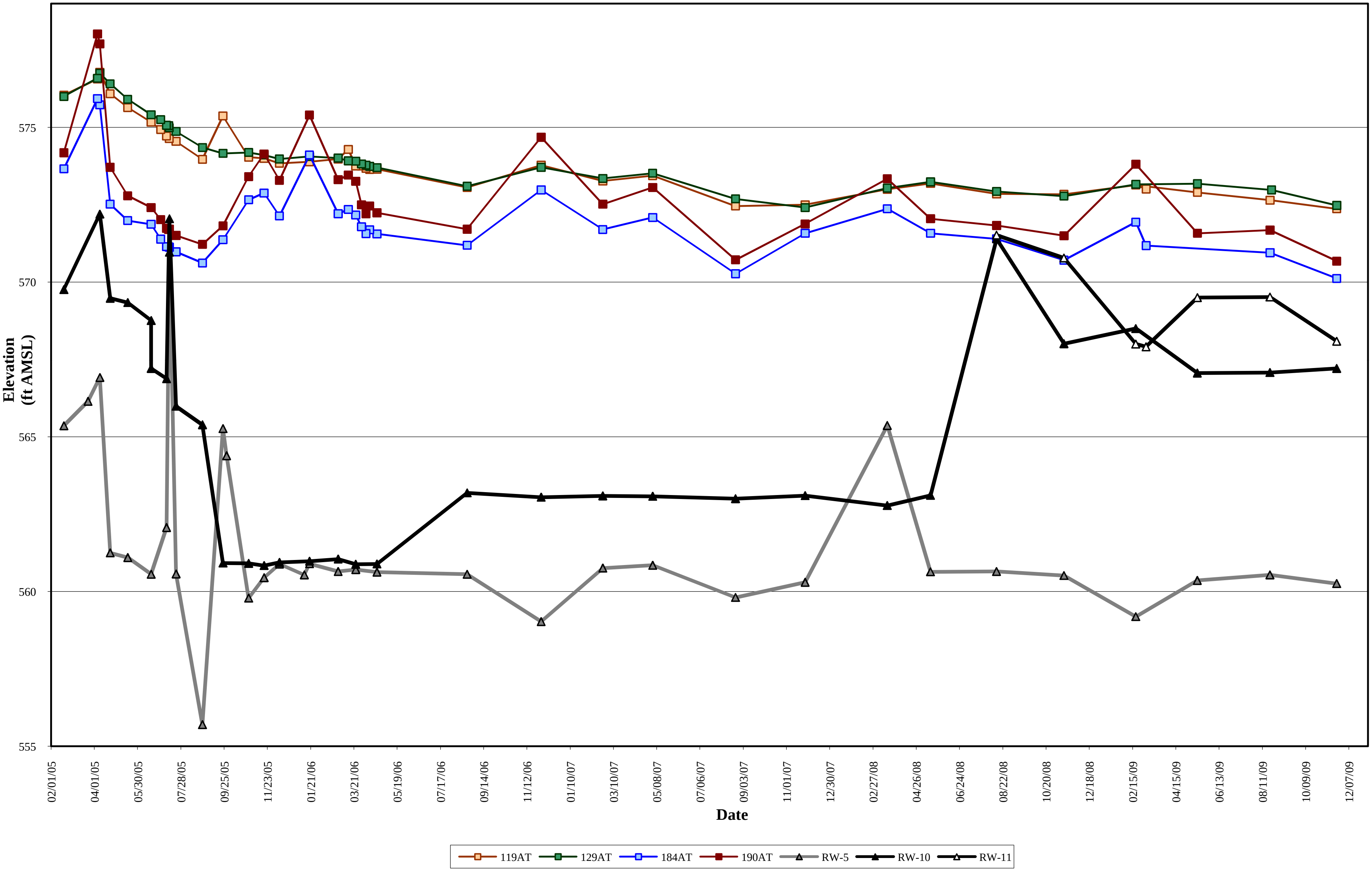
DUPONT NECCO PARK
NIAGARA FALLS NEW YORK

WELL AND PIEZOMETER LOCATIONS DUPONT NECCO PARK

175 0 175 350 Feet

Scale: 1" = 175' - 0'
Date: OCT 2005
FIGURE 3-1

Figure 3-2
Select AT-Zone Monitoring Wells
Groundwater Elevations 2005 Through 2009
DuPont Necco Park



3/15/2010
5:17 PM

Necco 2009 A&AT Zone Water Elev Trends Final.xlsx

Figure 3-3
Select A-Zone Monitoring Wells
Groundwater Elevations 2005 Through 2009
DuPont Necco Park

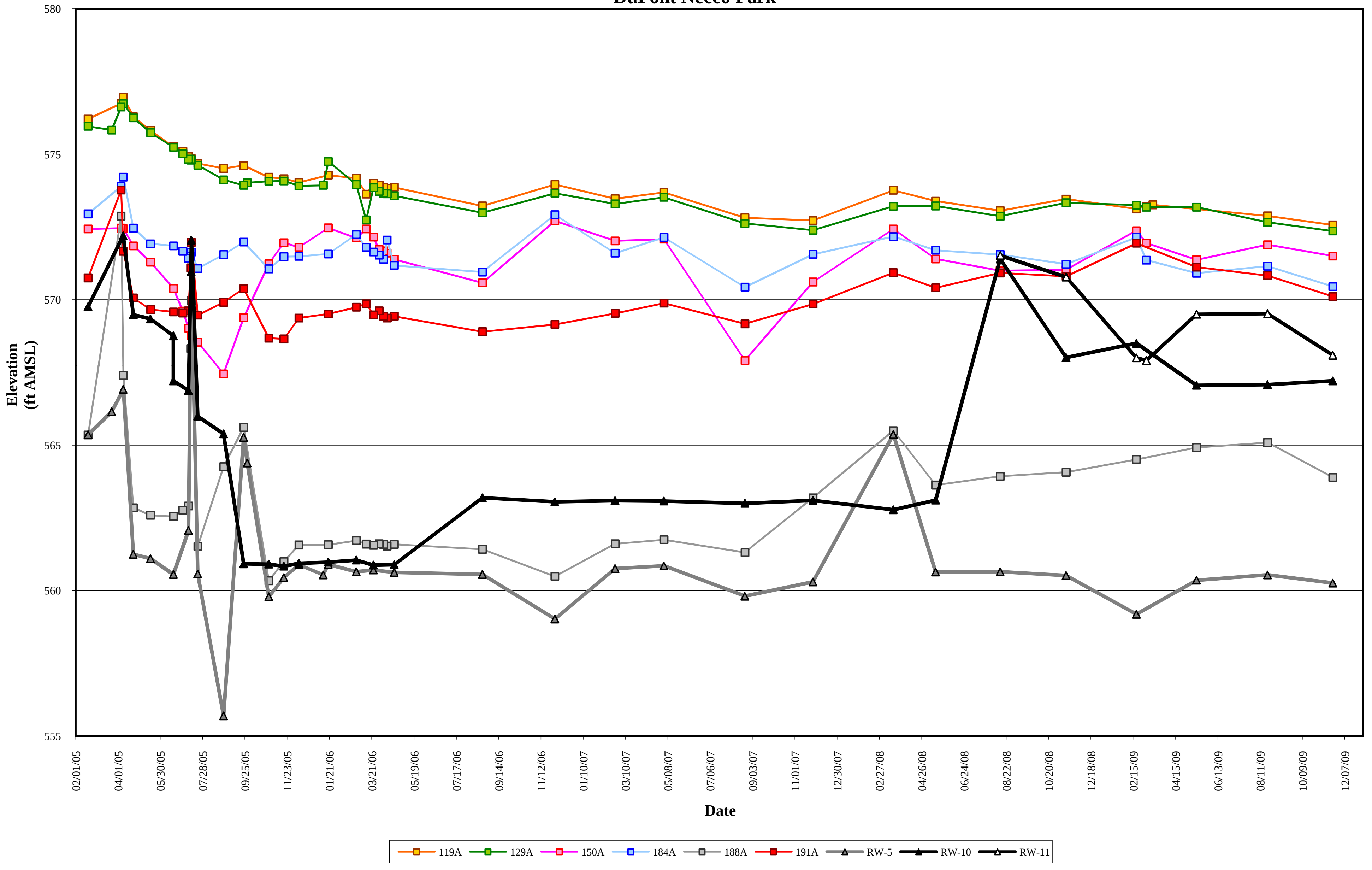


Figure 3-4
Select B-Zone Monitoring Wells
Groundwater Elevations 2005 through 2009
DuPont Necco Park

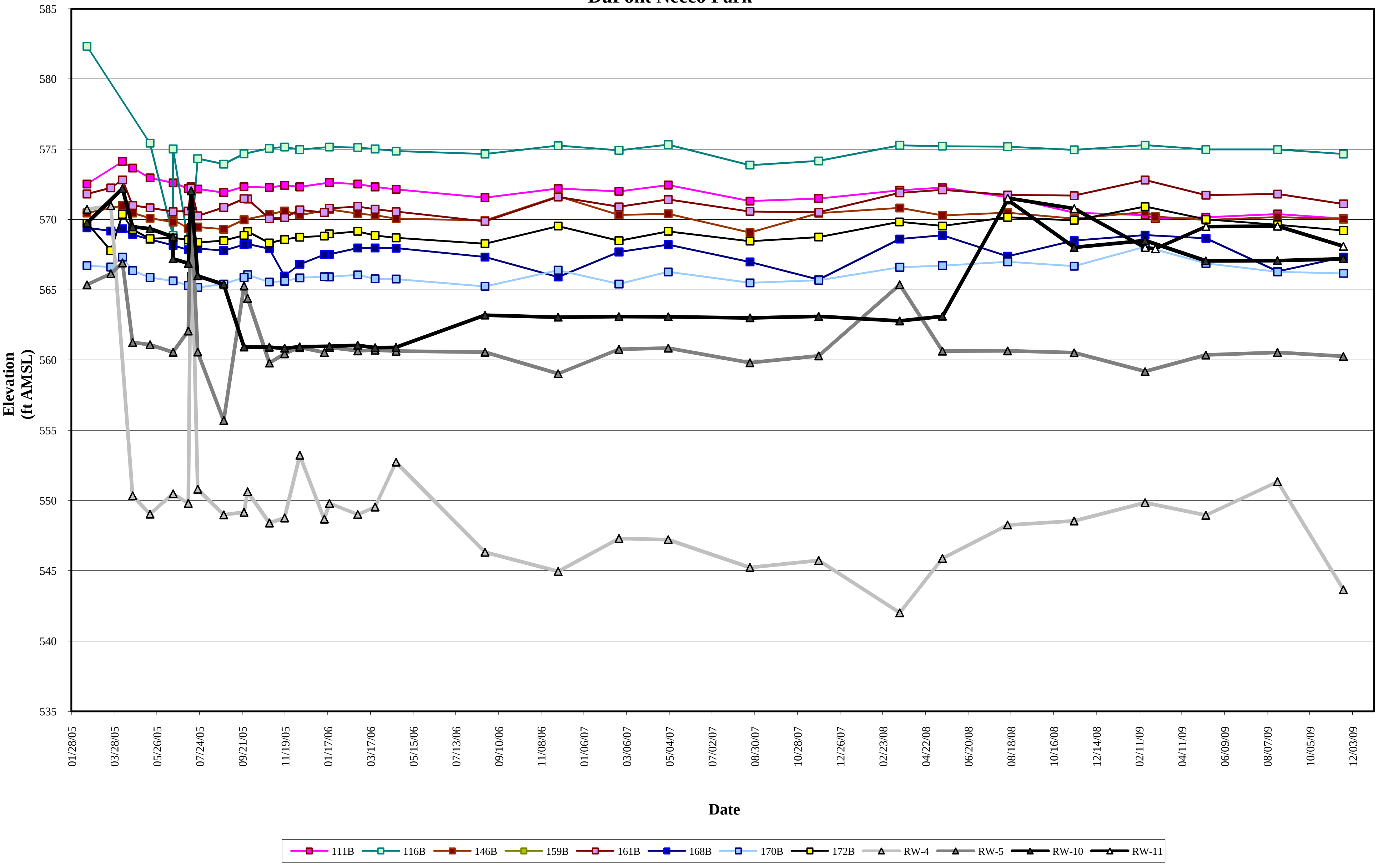


Figure 3-5
Select C-Zone Monitoring Wells
Groundwater Elevations 2005 Through 2009
DuPont Necco Park

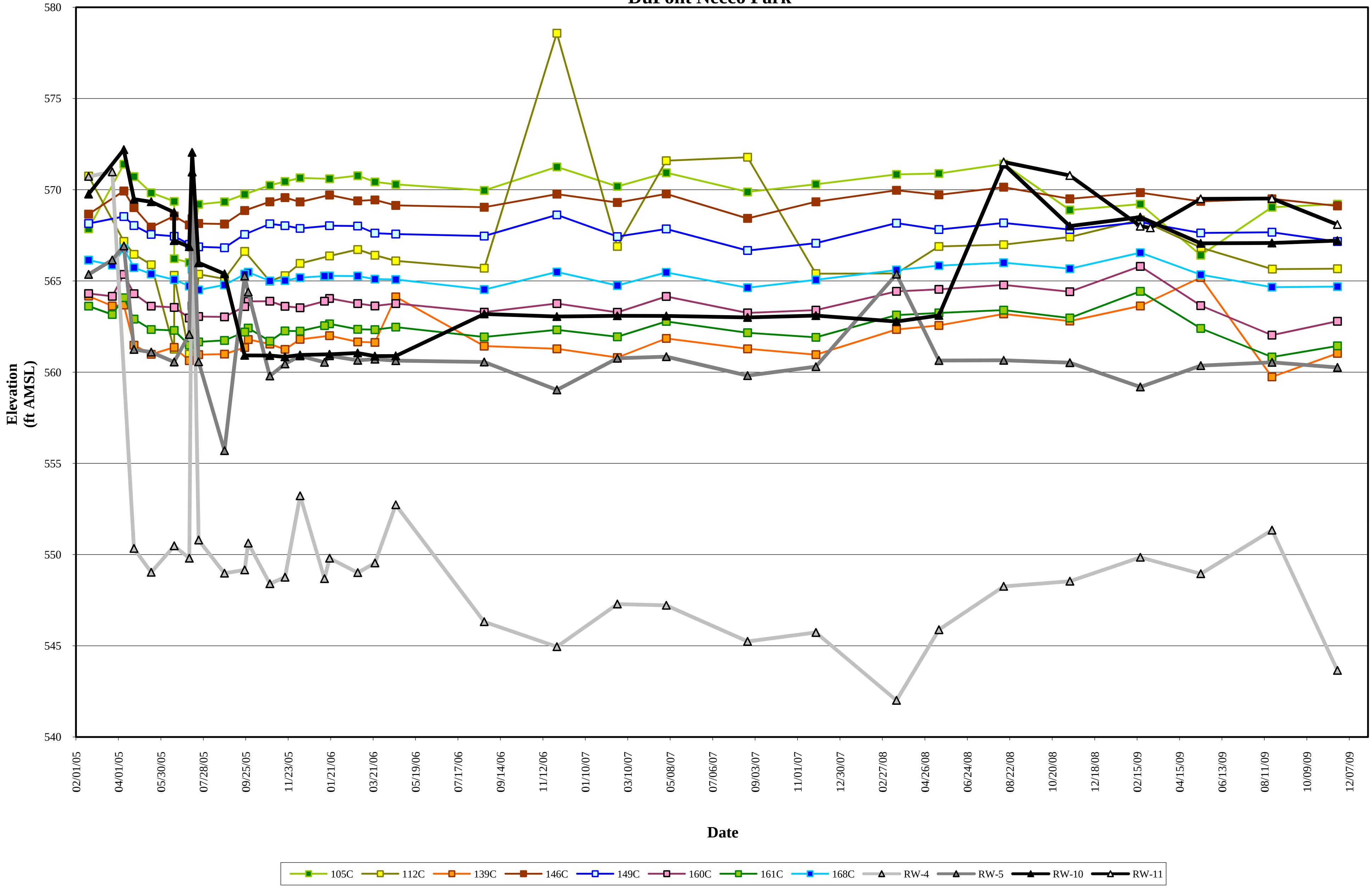


Figure 3-6
Select D-Zone Monitoring Wells
Groundwater Elevations 2005 through 2009
DuPont Necco Park

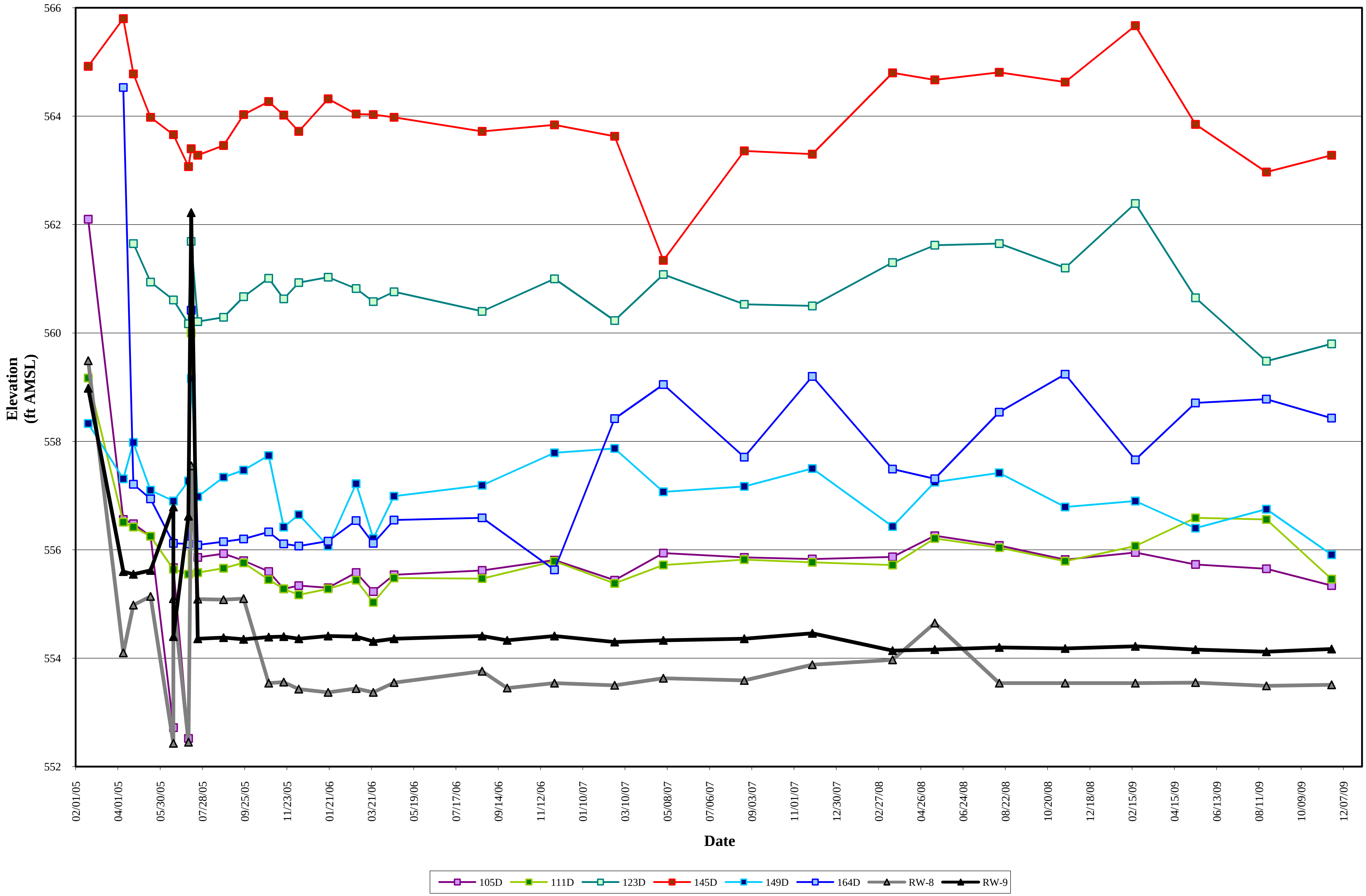


Figure 3-7
Select E-Zone Monitoring Wells
Groundwater Elevations 2005 Through 2009
DuPont Necco Park

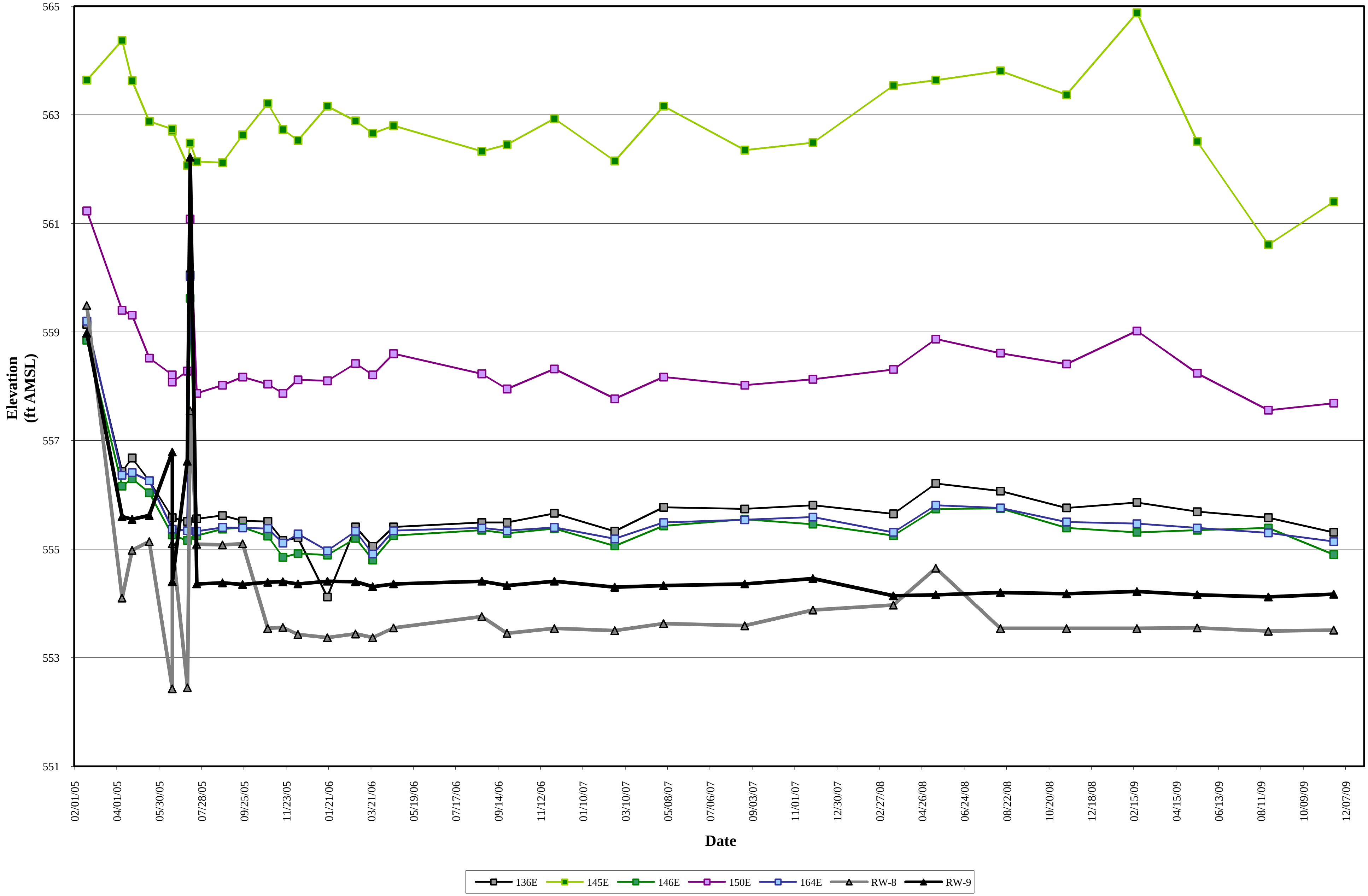
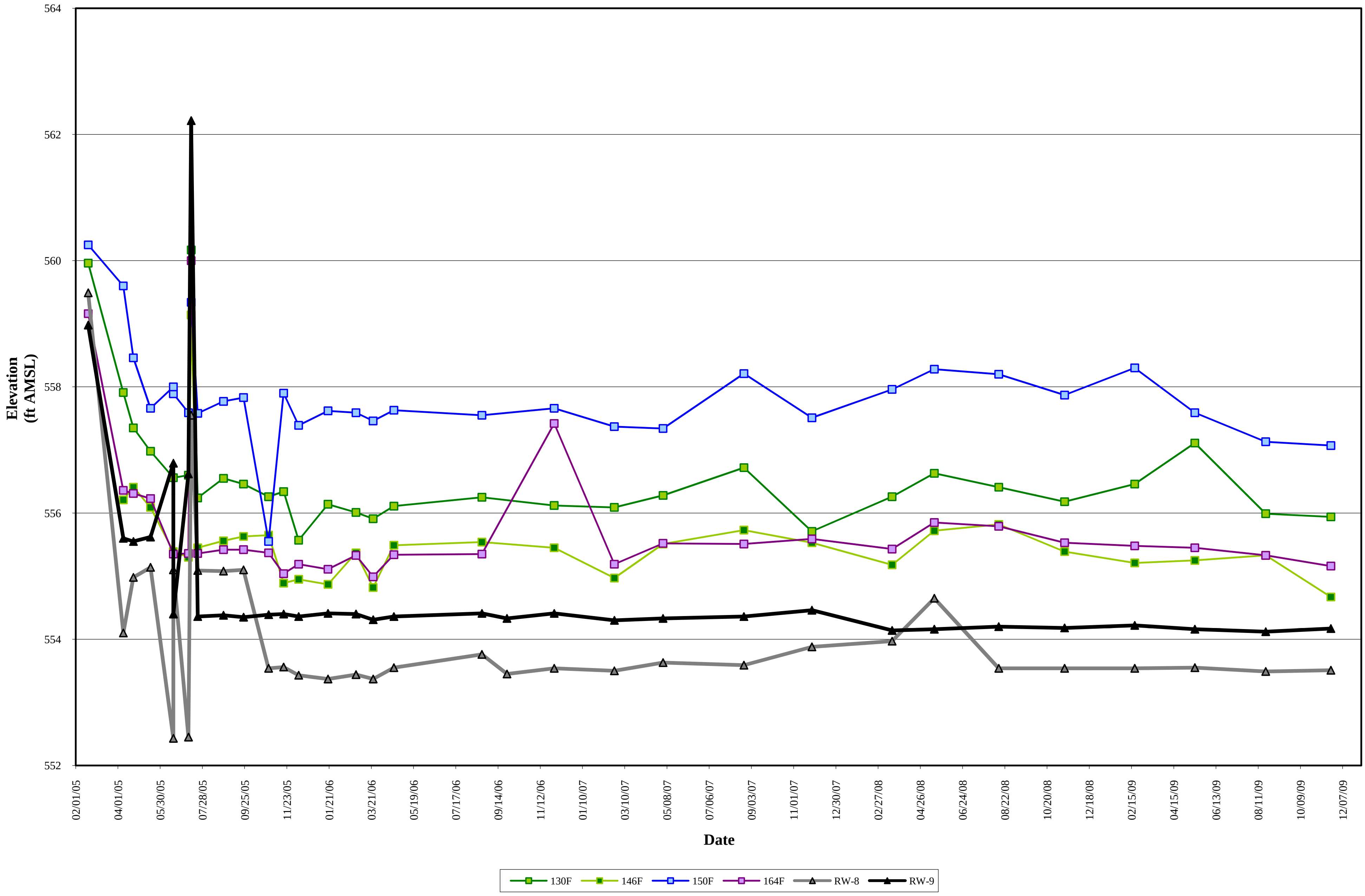
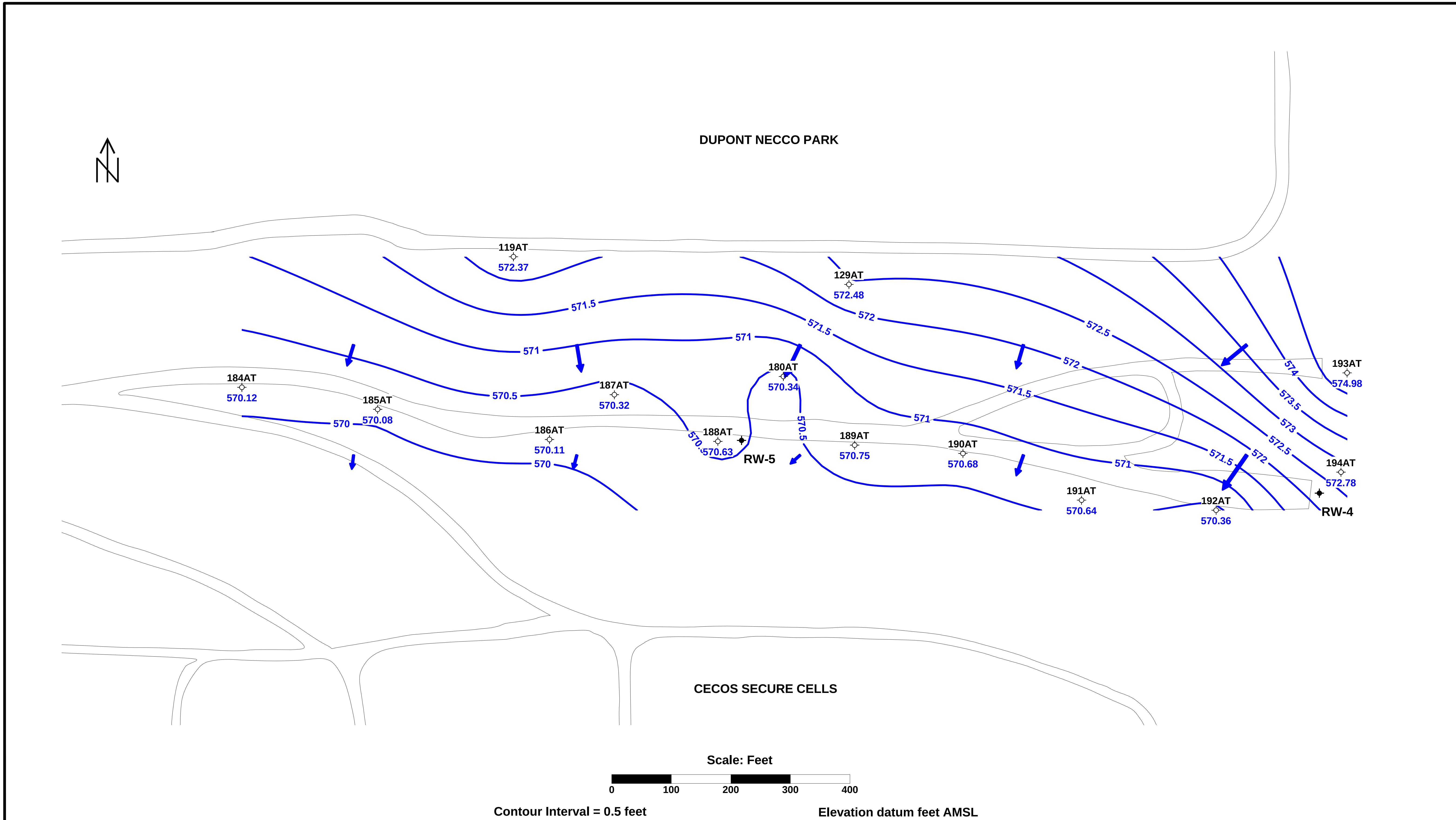


Figure 3-8
Select F-Zone Monitoring Wells
Groundwater Elevations 2005 Through 2009
DuPont Necco Park





PARSONS

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Buffalo, NY 14202

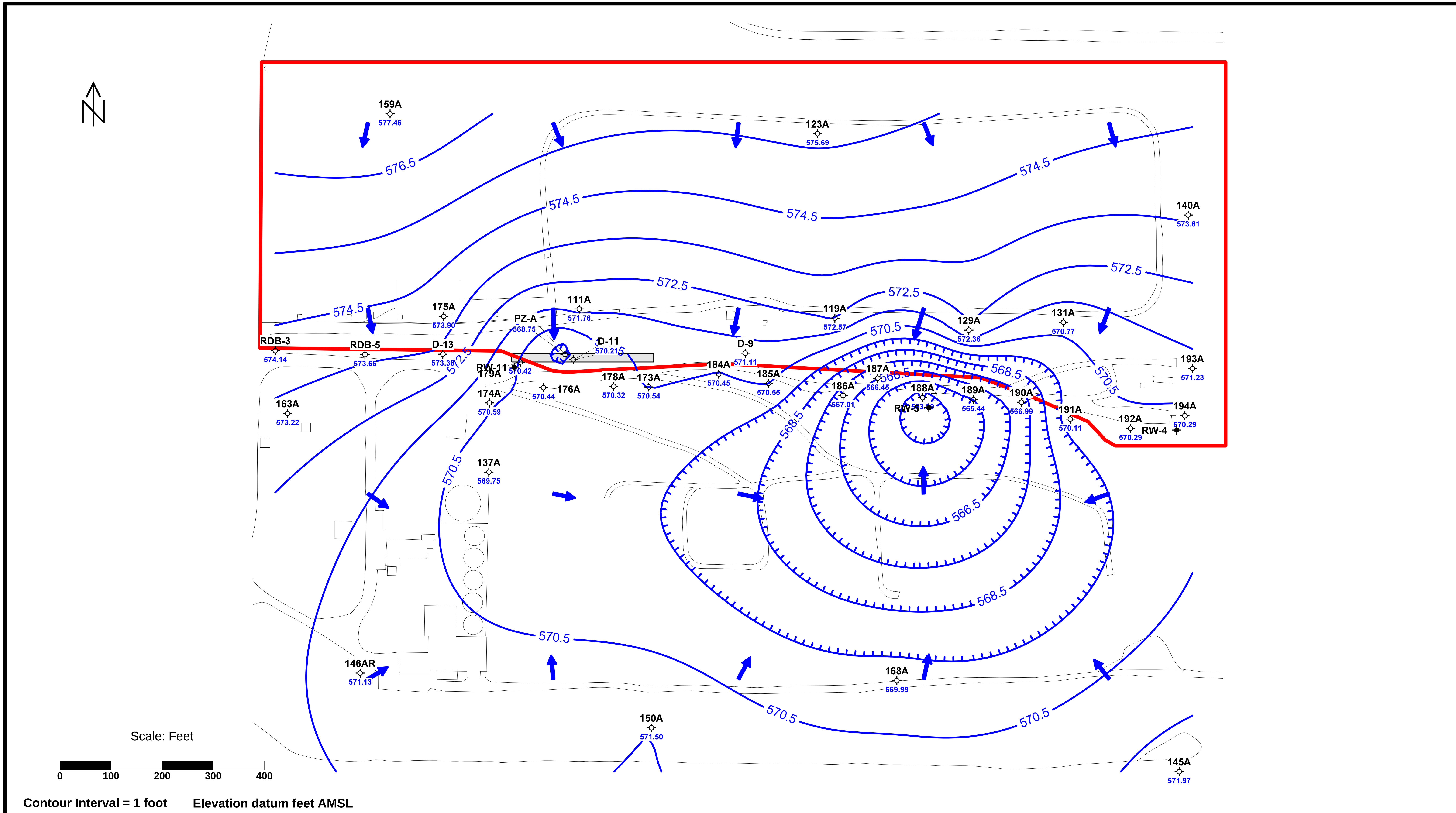
Created by	JWS
Checked by	
Approved by	
Project Manager	JSP
Job number: 445357.02021	

LEGEND

3B	Well ID		Potentiometric Contour
	Monitoring Well		Structure
	Pumping Well		Road

Figure 3-9
Potentiometric Surface Map
DuPont Necco Park: AT-Zone
November 20, 2009

P:/Ekonol/445144/Remediation/workplan/2010-11-20 - F1, F2 & F3.srf



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Buffalo, NY 14202
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Checked by: EAF	Date: 02-18-10
Approved by: JSP	Date: 03-18-10
Project Manager: JSP	Date: 03-18-10

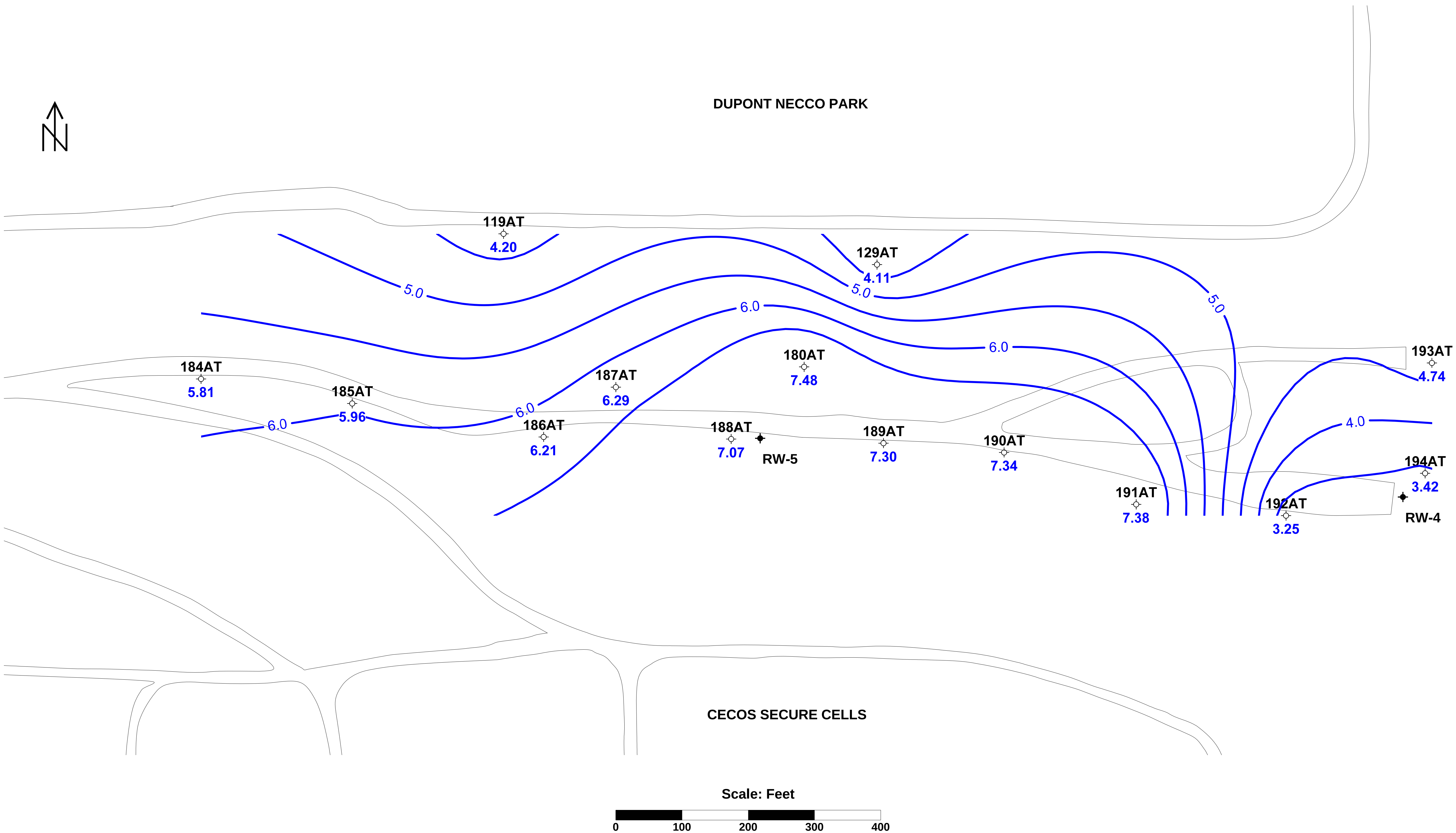
Job number: 445231.05040

LEGEND

3B	Well ID	Potentiometric Contour	Source Area Delineation
	Monitoring Well	Structure	Bedrock Fractured Blast Trench
	Pumping Well	Road	

Figure 3-10
Potentiometric Surface Map
DuPont Necco Park: A-Zone
November 20, 2009

P:/000DuPont Temporary/Necco/Groundwater/2009-11-2009 - F4.srf



Contour Interval = 0.5 feet

Elevation datum feet AMSL

PARSONS

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Buffalo, NY 14202

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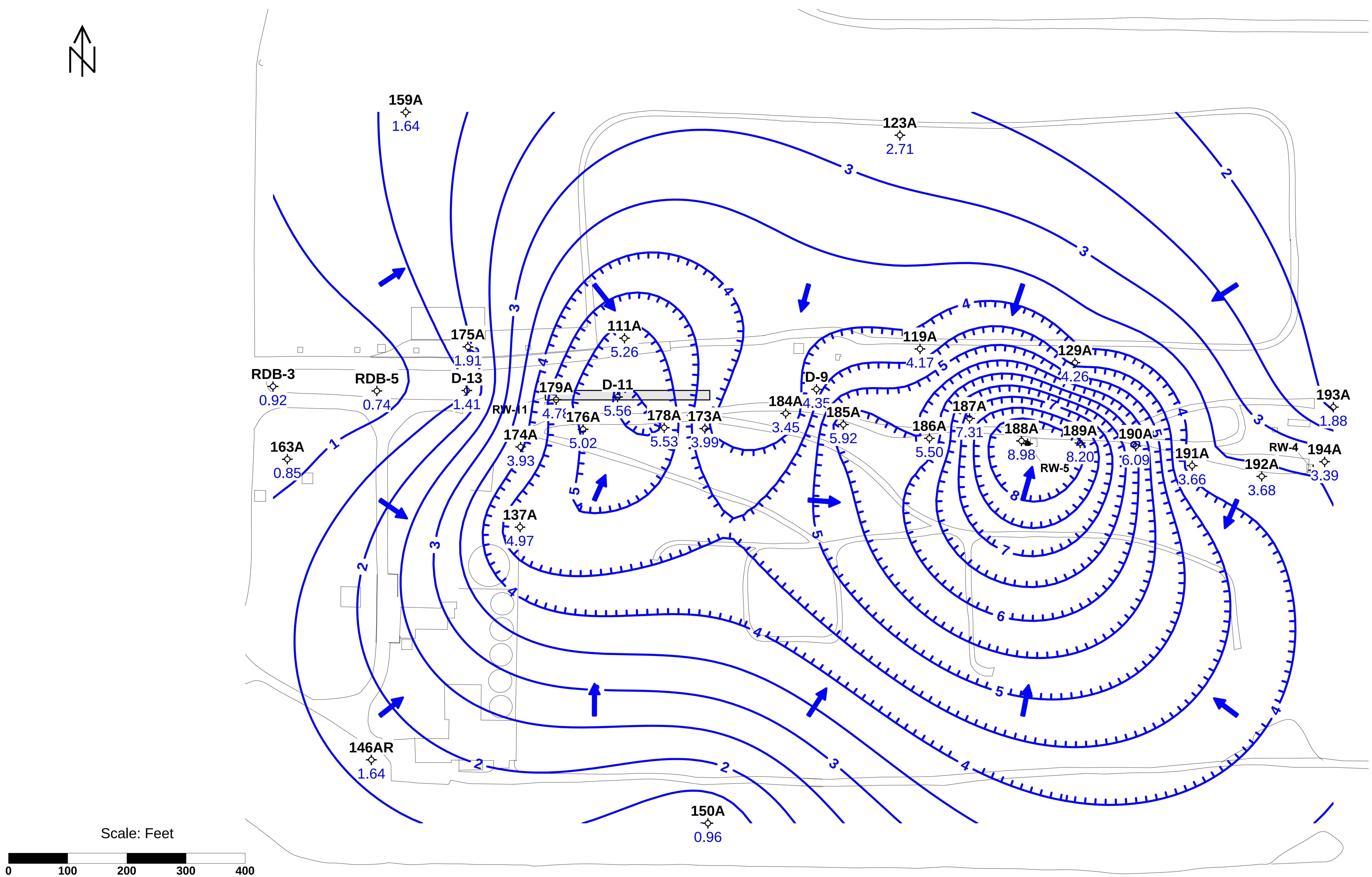
Checked by	EAF
Approved by	JSP
Project Manager	JSP
Job number: 445357.02021	

LEGEND

3B	Well ID		Potentiometric Contour
	Monitoring Well		Structure
	Pumping Well		Road

Figure 3-11
Drawdown Contour Map
DuPont Necco Park: AT-Zone
April 5, 2005 (Static) to November 20, 2009

P:/Ekonol/445144/Remediation/workplan/2010-11-20 - F1, F2 & F3.srf



Contour interval = 0.5 feet

Elevation datum feet AMSL

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(716) 541-0730

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Checked by: EAF	Date: 03-03-10
Approved by: JSP	Date: 03-11-10
Project Manager: JSP	Date: 03-11-10
Job number: 445231.05040	

LEGEND

3B	Well ID	Potentiometric Contour	Structure
	Monitoring Well		
	Pumping Well	Road	Bedrock Fractured Blast Trench

Figure 3-12
Drawdown Contour Map
DuPont Necco Park: A-Zone
April 5, 2005 (Static) to November 20, 2009

P:/000DuPont Temporary/Necco/GW Contours/2009-11-20 - F12, F14.srf

Negative value indicates downward vertical gradient

Elevation datum feet AMSL

PARSONS

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Buffalo, NY 14202

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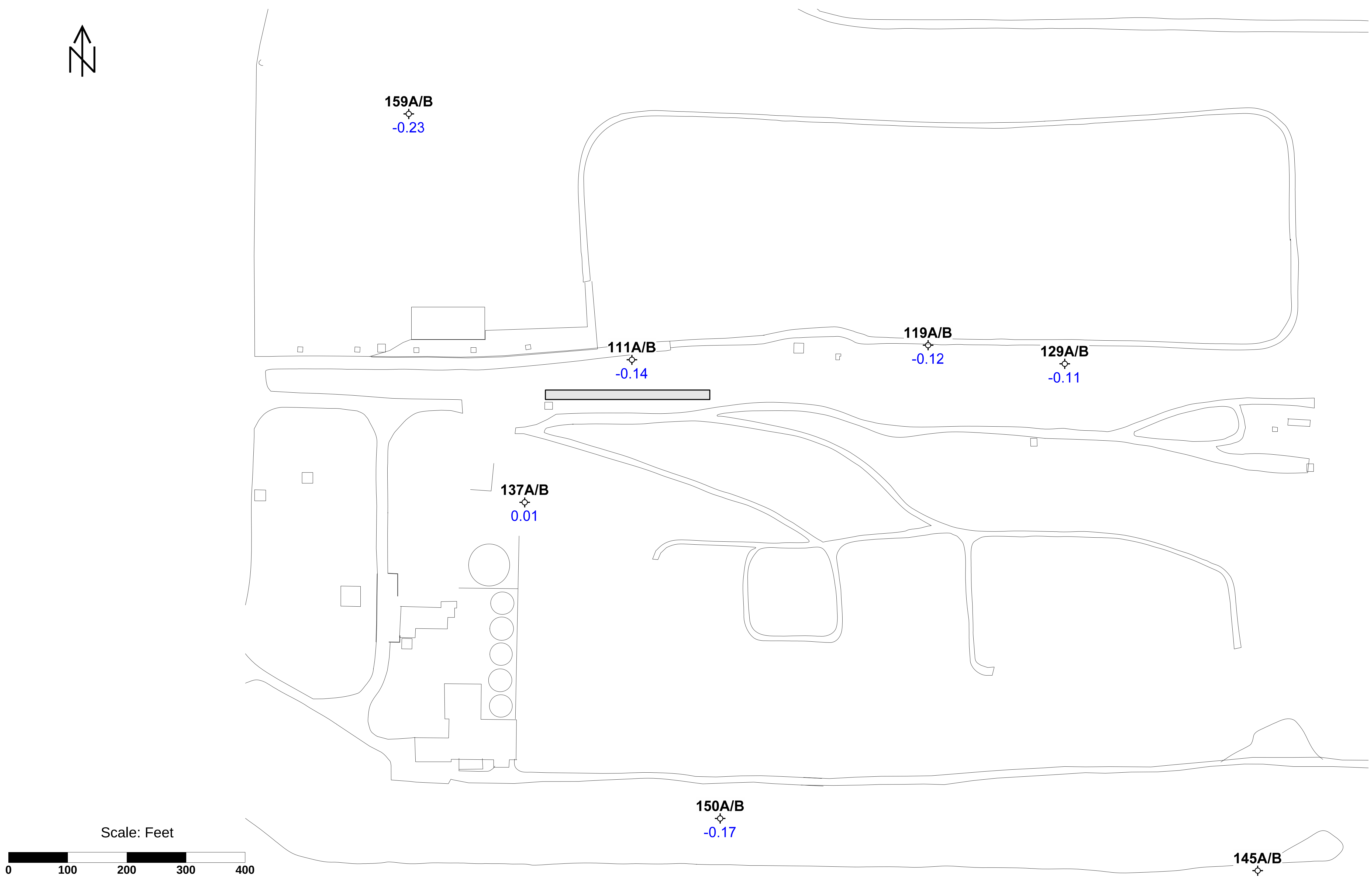
Checked by	JSP
Approved by	JSP
Project Manager	JSP
Job number: 445357.02021	

LEGEND

3B	Well ID		Potentiometric Contour
	Monitoring Well		Structure
	Pumping Well		Road

Figure 3-13
Vertical Gradient: AT-Zone to A-Zone
DuPont Necco ParK
November 20, 2009

P:/Necco/gwcontours/GW_annual/2010-11-20 - F3-9, 11, 13.srf



Negative value indicates downward gradient

Elevation datum feet AMSL

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Buffalo, NY 14202
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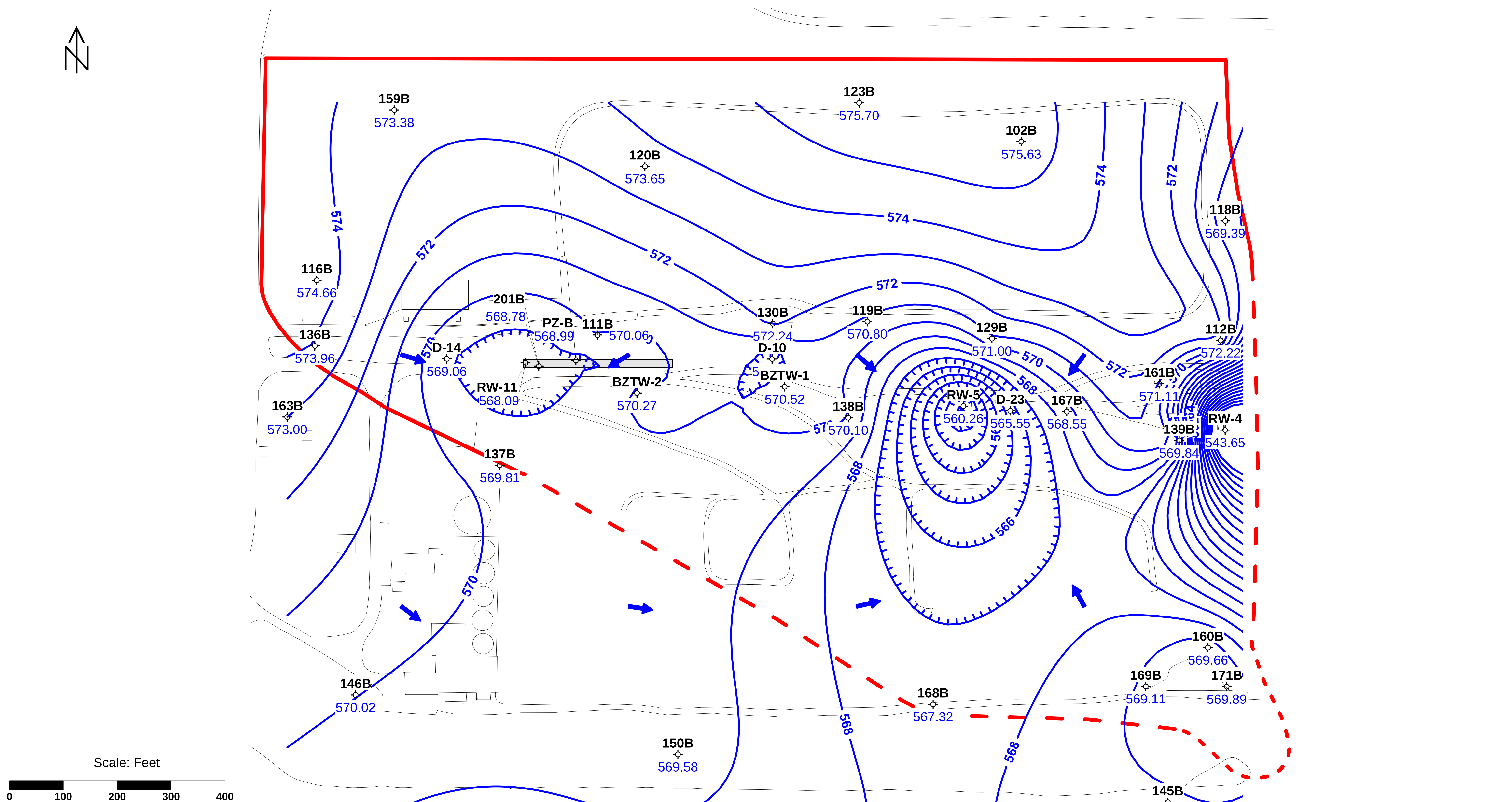
Checked by: EAF	Date: 03-03-10
Approved by: JSP	Date: 03-11-10
Project Manager: JSP	Date: 03-11-10
Job number: 445231.05040	

LEGEND

3B	Well ID	Potentiometric Contour	Structure
⌖	Monitoring Well		
◆	Pumping Well	Road	Bedrock Fractured Blast Trench

Figure 3-14
Vertical Gradient: A-Zone to B-Zone
DuPont Necco Park
November 20, 2009

P:/000DuPont Temporary/Necco/GW Contours/2009-11-20 - F12, F14.srf



Contour interval = 1.0 foot

Elevation datum feet AMSL

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Buffalo, NY 14202
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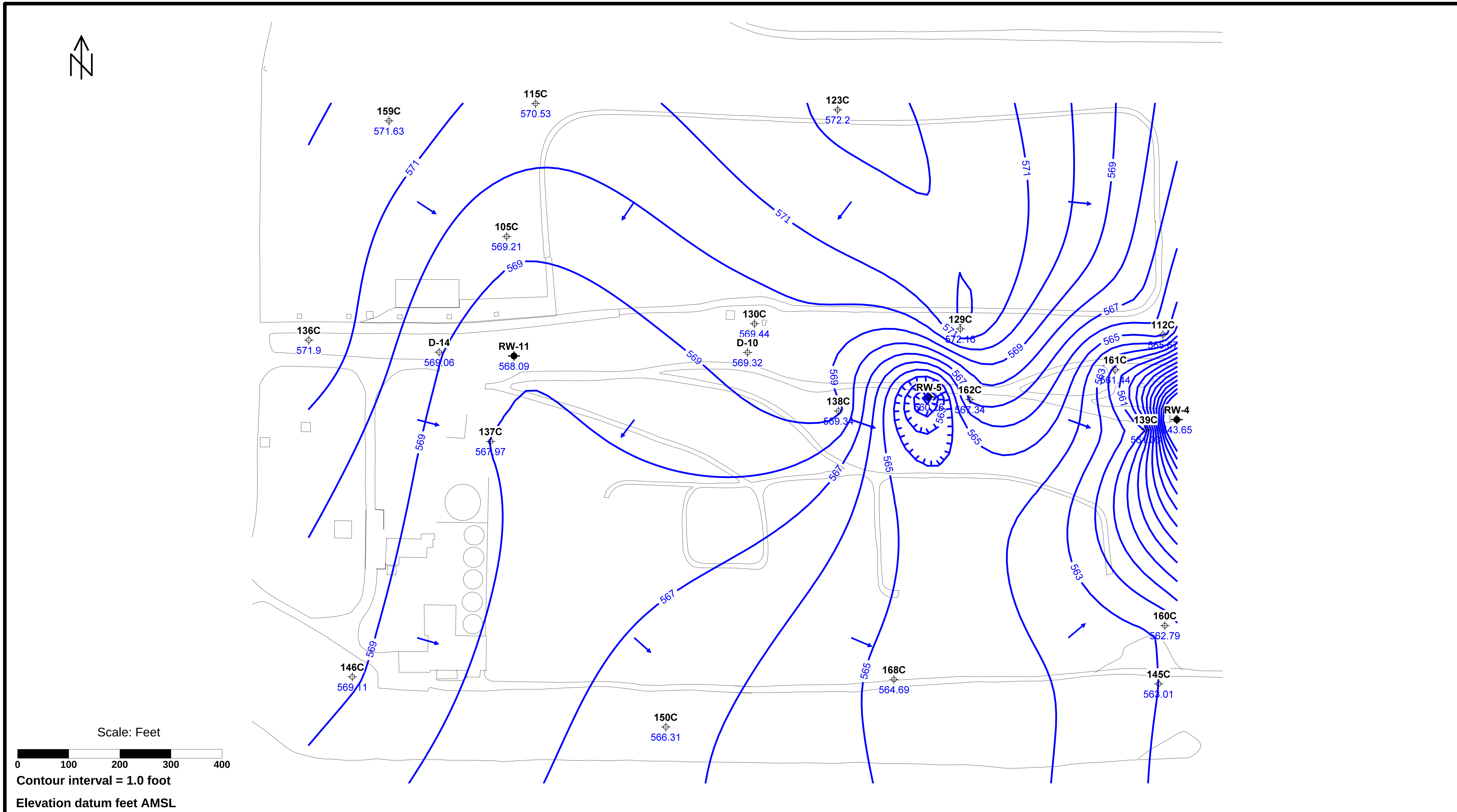
Checked by: EAF	Date: 03-11-10
Approved by: JSP	Date: 03-11-10
Project Manager: JSP	Date: 03-11-10
Job number: 445231.05040	

LEGEND

3B	Well ID	Potentiometric Contour	Source Area Delineation
	Monitoring Well	Structure	Bedrock Fractured Blast Trench
	Pumping Well	Road	

Figure 3-15
Potentiometric Surface Map
DuPont Necco Park: B-Zone
November 20, 2009

P:/000DuPont Temporary/Necco/GW_contours/2009-11-20-PZ B - 3-15.srf



PARSONS

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(716) 541-0730

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Checked by: EAF	Date: 03-11-10
Approved by: JSP	Date: 03-11-10
Project Manager: JSP	Date: 03-11-10

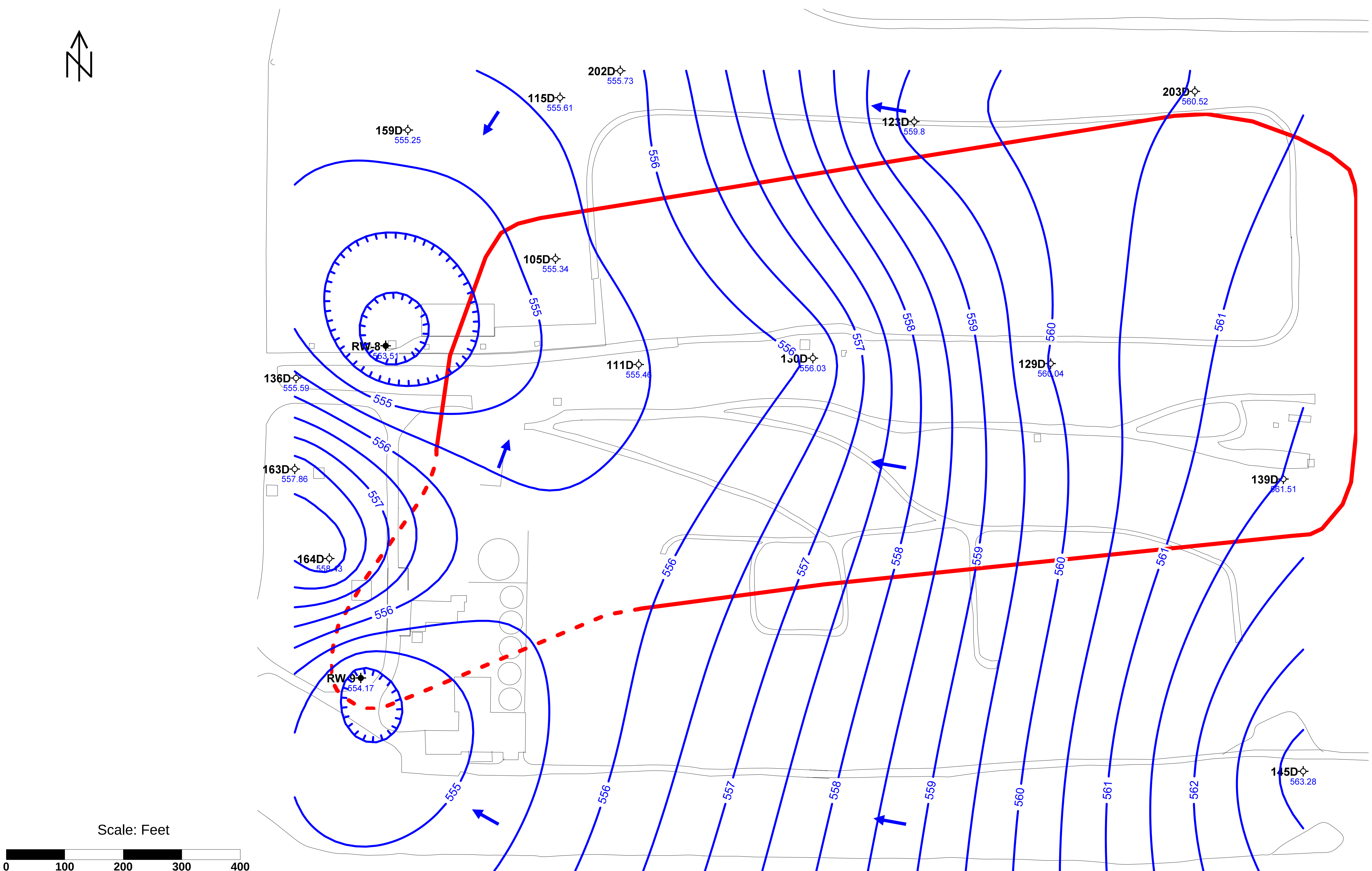
Job number: 445231.05040

LEGEND

3B Well ID	Potentiometric Contour
Monitoring Well	Structure
Pumping Well	Road

Figure 3-16
Potentiometric Surface Map
DuPont Necco Park: C-Zone
November 20, 2009

*** Math Text Error ***



Contour interval = 0.5 feet

Elevation datum feet AMSL

PARSONS

40 La Riviere Dr, Suite 350
Buffalo, NY 14202
(716) 541-0730

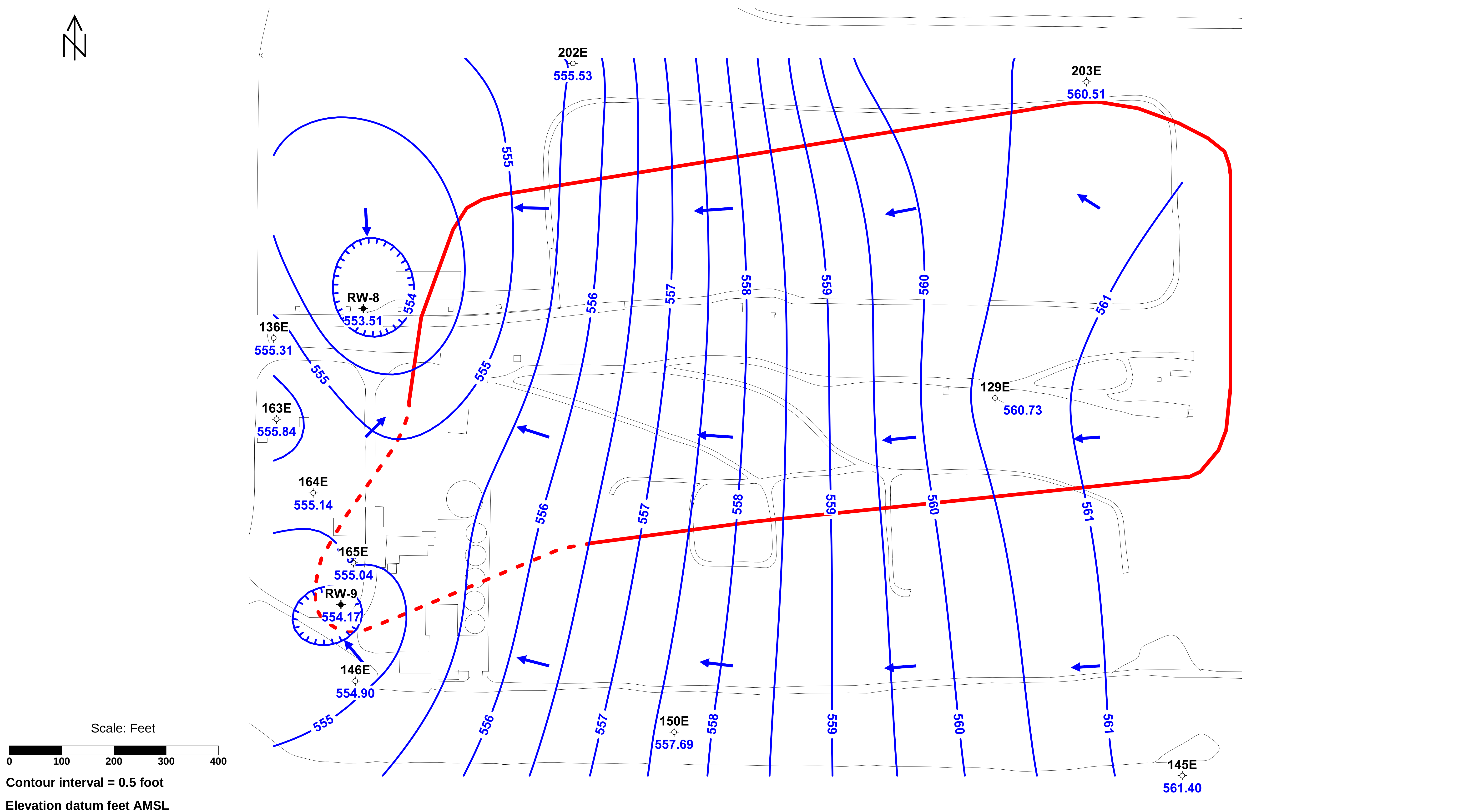
Created by: JWS	Date: 10-02-09
Checked by: EAF	Date: 03-03-10
Approved by: JSP	Date: 03-11-10
Project Manager: JSP	Date: 03-11-10
Job number: 445231.05040	

LEGEND

3B	**Well ID**	**Potentiometric Contour**	**Source Area Delineation**
◇	**Monitoring Well**	**Structure**	
◆	**Pumping Well**	**Road**	

Figure 3-17
Potentiometric Surface Map
DuPont Necco Park: D-Zone
November 20, 2009

2009Q3 Data Packet 2009-08-21 NEC Contour Tool - DRAFT/2009-08-21 - PZ DF3-17.srf



Contour interval = 0.5 foot

Elevation datum feet AMSL

PARSONS
40 La Riviere Dr, Suite 350
Buffalo, NY 14202
(716) 541-0730

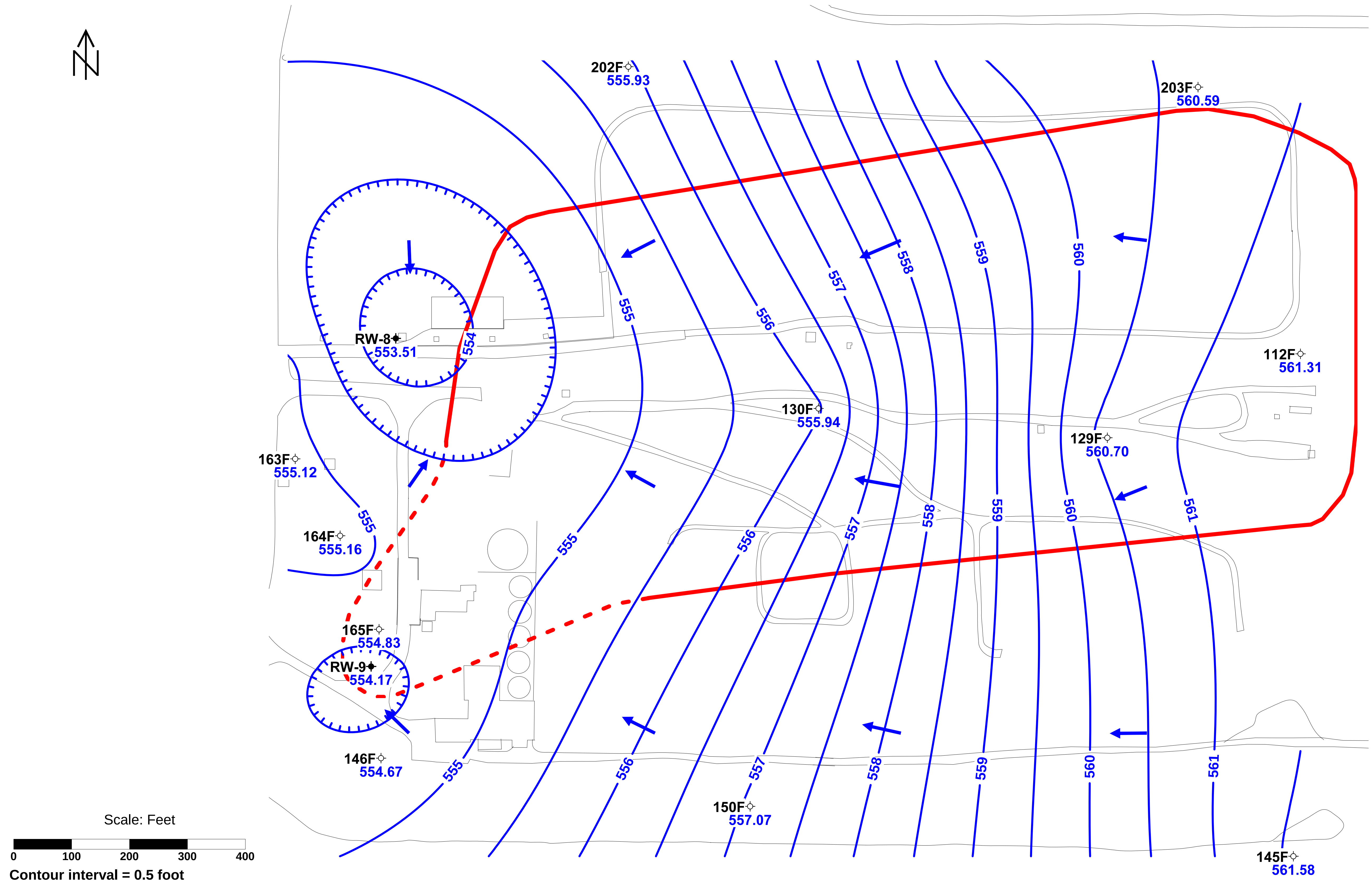
Created by: JWS	Date: 02-12-10
Checked by: EAF	Date: 03-03-10
Approved by: JSP	Date: 03-11-10
Project Manager: JSP	Date: 03-11-10
Job number: 445231.05040	

LEGEND

3B	Well ID		Potentiometric Contour
	Monitoring Well		Structure
	Pumping Well		Road
	Source Area Delineation		

Figure 3-18
Potentiometric Surface Map
DuPont Necco Park: E-Zone
November 20, 2009

P:/000DuPont Temporary/Necco/GW_contours/2009_annual/2009-11-20 - PZ E F3-18.srf



Contour interval = 0.5 foot

Elevation datum feet AMSL

PARSONS 40 La Riviere Dr, Suite 350 Buffalo, NY 14202 (716) 541-0730	Created by: JWS	Date: 02-16-10
	Checked by: EAF	Date: 03-03-10
	Approved by: JSP	Date: 03-11-10
	Project Manager: JSP	Date: 03-11-10
	Job number: 445231.05040	

LEGEND

3B	**Well ID**		**Potentiometric Contour**		**Source Area Delineation**
	Monitoring Well		**Structure**		
	Pumping Well		**Road**		

Figure 3-19
Potentiometric Surface Map
DuPont Necco Park: F-Zone
November 20, 2009

2009Q3 Data Packet 2009-08-21 NEC Contour Tool - DRAFT/2009-08-21 - PZ F F3-19.srf

APPENDIX A
2009 ANNUAL GROUNDWATER SAMPLING RESULTS

Summary of Analytical Results
Necco Park
Annual Groundwater Monitoring 2009

		A-ZONE WELLS						
	Location	VH-D-9	VH-D-11	VH-D-13	VH-137A	VH-145A	VH-146AR	VH-150A
	Date	6/19/09	6/10/09	6/19/09	6/15/09	6/17/09	6/18/09	6/11/09
Analyte	**Duplicate**	FS	FS	FS	FS	FS	FS	FS
	Units							
Field Parameters								
COLOR QUALITATIVE (FIELD)	NS	YELLOW	CLEAR	CLEAR	CLEAR	CLEAR	CLEAR	CLEAR
ODOR (FIELD)	NS	SLIGHT	NONE	SLIGHT	NONE	NONE	NONE	NONE
PH (FIELD)	STD UNITS	7.19	12.44	9.25	12.59	7.13	9.58	7
REDOX (FIELD)	MV	-290	-375	-321	-547	-250	-404	-173
SPECIFIC CONDUCTANCE (FIELD)	UMHOS/CM	5930	4250	2280	3310	1630	1750	2140
TEMPERATURE (FIELD)	DEG. C	12.6	13.1	13.1	14.4	11.4	12.1	11.7
TURBIDITY QUANTITATIVE (FIELD)	NTU	36.4	1.54	3.98	3.86	3.13	5.82	10.9
DEPTH TO WATER FROM TOC	Feet	9.65	8.7	7.78	7.93	5.06	6.21	5.7
DISSOLVED OXYGEN (FIELD)	UG/L	550	280	120	500	180	80	1170
Volatile Organics								
1,1,2,2-TETRACHLOROETHANE	UG/L	<0.18 UJ	<0.9	<0.18 UJ	<0.18	<0.18	<0.18	<0.18
1,1,2-TRICHLOROETHANE	UG/L	<0.27	<1.4	<0.27	<0.27	<0.27	<0.27	<0.27
1,1-DICHLOROETHENE	UG/L	<0.19	17	<0.19	4	<0.19	0.45 J	<0.19
1,2-DICHLOROETHANE	UG/L	3.1	4.3 J	<0.22	1	<0.22	<0.22	<0.22
CARBON TETRACHLORIDE	UG/L	0.25 J	<0.65	<0.13	<0.13	<0.13	<0.13	<0.13
CHLOROFORM	UG/L	<0.16	2.1 J	<0.16	0.7 J	<0.16	<0.16	<0.16
CIS-1,2 DICHLOROETHENE	UG/L	<0.17	130	0.54 J	25	0.64 J	0.31 J	0.44 J
TETRACHLOROETHYLENE	UG/L	<0.29	81	<0.29	16	<0.29	<0.29	<0.29
TRANS-1,2-DICHLOROETHENE	UG/L	0.2 J	8.8	0.75 J	2.5	<0.19	<0.19	<0.19
TRICHLOROETHENE	UG/L	<0.17	150	1.7	37	0.29 J	<0.17	<0.17
VINYL CHLORIDE	UG/L	<0.22	87	<0.22	14	<0.22	1.4	0.22 J
Semivolatile Organics								
2,4,5-TRICHLOROPHENOL	UG/L	<0.75	1.7 J	<0.3	<1.5	1.1 J	3.8 J	<0.3
2,4,6-TRICHLOROPHENOL	UG/L	<2	<1.6	<0.8	<4	<0.8	<0.8	<0.8
3- AND 4- METHYLPHENOL	UG/L	<0.75	20 J	<0.75	12 J	<0.75	<0.75	<0.75
HEXACHLOROBENZENE	UG/L	<0.25	<0.2	<0.1	<0.5	<0.1	<0.1	<0.1
HEXACHLOROBUTADIENE	UG/L	<0.68	18 J	<0.27	<1.4	<0.27	<0.27	<0.27
HEXACHLOROETHANE	UG/L	<2	<1.6	<0.8	<4	<0.8	<0.8	<0.8
PENTACHLOROPHENOL	UG/L	<6	5.4 J	<2.4	<12	12 J	<2.4	<2.4
PHENOL	UG/L	<1.5	57	<0.6	100	<0.6	<0.6	<0.6
TIC01	UG/L	3.9 J	100 J	2.4 J	25 J	<NS J	1.2 J	<NS J
Inorganics								
BARIUM (Dissolved)	UG/L	130 J	650	92 J	2100	46 B	19 B	57 B
IRON (Dissolved)	UG/L	NS	NS	NS	NS	NS	NS	NS
MANGANESE (Dissolved)	UG/L	NS	NS	NS	NS	NS	NS	NS
ALKALINITY, BICARB. as CACO3 at PH 4.5	UG/L	NS	NS	NS	NS	NS	NS	NS
CHLORIDE	UG/L	1900000 B	782000 B	431000 B	176000 B	37700 B	434000 B	113000 B
NITRATE/NITRITE NITROGEN	UG/L	NS	NS	NS	NS	NS	NS	NS
SULFATE	UG/L	NS	NS	NS	NS	NS	NS	NS
SULFIDE	UG/L	NS	NS	NS	NS	NS	NS	NS
TOTAL ORGANIC CARBON	UG/L	NS	NS	NS	NS	NS	NS	NS
Gases								
ETHANE	UG/L	NS	NS	NS	NS	NS	NS	NS
ETHENE	UG/L	NS	NS	NS	NS	NS	NS	NS
METHANE	UG/L	NS	NS	NS	NS	NS	NS	NS
PROPANE	UG/L	NS	NS	NS	NS	NS	NS	NS
Total Volatiles	UG/L	3.55J	480.2J	2.99J	100.2J	0.93J	2.16J	0.66J

<= Non detect at stated reporting limit
<NSJ = TIC#1 not detected
J= Analyte present at estimated conc.
UJ= Analyte not detected. Reporting limit is estimated
B= Analyte detected in blank at similar conc.

		B-ZONE WELLS														
	Location	VH-111B	VH-136B	VH-137B	VH-137B	VH-139B	VH-141B	VH-145B	VH-146B	VH-149B	VH-150B	VH-151B	VH-153B	VH-168B	VH-171B	VH-172B
	Date	6/16/09	6/16/09	6/15/09	6/15/09	6/17/09	6/11/09	6/17/09	6/18/09	6/12/09	6/11/09	6/9/09	6/12/09	6/15/09	6/16/09	6/10/09
Analyte	Duplicate	FS	FS	FS	DUP	FS	FS	FS	FS	FS	FS	FS	FS	FS	FS	FS
	Units															
Field Parameters																
COLOR QUALITATIVE (FIELD)	NS	YELLOW	GREY	CLEAR	NS	CLEAR	CLEAR	CLEAR	CLEAR	CLEAR	GREY	CLEAR	BLACK	YELLOW	CLEAR	GREY
ODOR (FIELD)	NS	SLIGHT	NONE	NONE	NS	NONE	SLIGHT	NONE	NONE	NONE	SLIGHT	NONE	SLIGHT	MODERATE	NONE	NONE
PH (FIELD)	STD UNITS	7.61	9.75	13.11	NS	6.69	10.45	7.75	11.73	10.74	8.01	12.91	6.83	7.01	6.58	6.68
REDOX (FIELD)	MV	-399	-418	-620	NS	-274	-347	-390	-514	-234	-381	-288	-177	-395	-258	-174
SPECIFIC CONDUCTANCE (FIELD)	UMHOS/CM	16000	2230	6070	NS	35700	4230	18600	1540	2410	3510	5060	7980	37400	15200	9450
TEMPERATURE (FIELD)	DEG. C	13.9	13.6	13.8	NS	13.9	13.2	11.9	11.7	13.6	11.3	18.7	14.6	12.7	15.4	11.9
TURBIDITY QUANTITATIVE (FIELD)	NTU	20.8	5.58	1.08	NS	4.8	3.52	3.65	2.5	2.99	8.76	4.92	40.8	9.3	17.6	32.4
DEPTH TO WATER FROM TOC	Feet	15.2	8.93	7.84	NS	16.21	5.77	6.43	7.66	4.82	6.91	7.21	7.07	10.81	9.88	7.94
DISSOLVED OXYGEN (FIELD)	UG/L	70	100	90	NS	100	350	90	70	1210	190	470	1330	100	260	630
Volatile Organics																
1,1,2,2-TETRACHLOROETHANE	UG/L	<4.5	<4.5	<0.45	<0.45	7900	<0.72	620	<0.18	<0.18	<0.45	<0.18	<0.18	<130	<0.45	720
1,1,2-TRICHLOROETHANE	UG/L	<6.8	<6.8	<0.68	<0.68	890	<1.1	320 J	<0.27	<0.27	<0.68	<0.27	<0.27	2000	1.3 J	36 J
1,1-DICHLOROETHENE	UG/L	96	4.9 J	9.1	8.9	<63	<0.76	220 J	5.7	<0.19	<0.48	<0.19	<0.19	300 J	0.95 J	14 J
1,2-DICHLOROETHANE	UG/L	140	<5.5	2.7	2.5	230 J	<0.88	<73	<0.22	<0.22	<0.55	<0.22	<0.22	720	1.2 J	<11
CARBON TETRACHLORIDE	UG/L	<3.2	<3.2	<0.32	<0.32	<43	<0.52	<43	<0.13	<0.13	<0.32	<0.13	<0.13	<93	<0.32	30 J
CHLOROFORM	UG/L	150	<4	1.1 J	1 J	3600	<0.64	420	<0.16	<0.16	<0.4	<0.16	<0.16	130 J	2.8	120
CIS-1,2 DICHLOROETHENE	UG/L	340	620	70	67	19000	<0.68	18000	29	9.1	<0.42	0.55 J	0.37 J	19000	170	1300
TETRACHLOROETHYLENE	UG/L	<7.2	1600	51	49	3200	<1.2	160 J	<0.29	<0.29	<0.72	<0.29	<0.29	<210	<0.72	520
TRANS-1,2-DICHLOROETHENE	UG/L	20 J	20 J	5.2	5.1	3600	<0.76	1500	2.5	0.77 J	0.81 J	0.41 J	0.47 J	230 J	21	180
TRICHLOROETHENE	UG/L	35	320	93	89	3700	<0.68	2900	2.1	0.73 J	<0.42	0.52 J	<0.17	<120	3.6	320
VINYL CHLORIDE	UG/L	330	26	39	38	6900	<0.88	2900	11	7.1	0.7 J	<0.22	<0.22	13000	210	210
Semivolatile Organics																
2,4,5-TRICHLOROPHENOL	UG/L	NS	940 J	49	43	NS	NS	<3	24 J	12	<1.2	<0.3 R	<0.3	<3.8	<1.2	<2
2,4,6-TRICHLOROPHENOL	UG/L	NS	390 J	12 J	10 J	NS	NS	<8	4.9 J	1.3 J	<3.2	<0.8 R	<0.8	<10	<3.2	<5.3
3- AND 4- METHYLPHENOL	UG/L	NS	<0.75	18 J	17 J	NS	NS	30 J	6.8 J	1.3 J	10 J	<0.75 R	<0.75	260	<0.75	<0.75
HEXACHLOROBENZENE	UG/L	NS	<10	<0.25	<0.25	NS	NS	<1	<0.1 R	<0.1	<0.4	<0.1 R	<0.1	<1.2	<0.4	<0.67
HEXACHLOROBUTADIENE	UG/L	NS	<27	1 J	1 J	NS	NS	<2.7	<0.27 R	<0.27	<1.1	<0.27 R	<0.27	<3.4	2.2 J	170
HEXACHLOROETHANE	UG/L	NS	<80	<2	<2	NS	NS	<8	<0.8 R	<0.8	<3.2	<0.8 R	<0.8	<10	<3.2	18 J
PENTACHLOROPHENOL	UG/L	NS	4200 J	22 J	16 J	NS	NS	<24	32 J	<2.4	<9.6	<2.4 R	<2.4	<30	<9.6	<16
PHENOL	UG/L	NS	<60	100	97	NS	NS	<6	3.7 J	<0.6	<2.4	<0.6 R	<0.6	290	<2.4	<4
TIC01	UG/L	NS	<NS J	31 J	25 J	NS	NS	1000 J	5 J	4.8 J	3.7 J	6.3 J	<NS J	27000 J	180 J	47 J
Inorganics																
BARIUM (Dissolved)	UG/L	NS	78 B	3600	3600	NS	NS	58 B	21 B	52 B	1300	310	NS	390	78 B	27 B
IRON (Dissolved)	UG/L	38000	NS	<81	<81	291000	<81	<81	NS	NS	NS	<81	31400	NS	NS	NS
MANGANESE (Dissolved)	UG/L	1000	NS	1.1 B	<0.41	3700	1 B	290	NS	NS	NS	0.67 B	580	NS	NS	NS
ALKALINITY, BICARB. as CACO3 at PH 4.5	UG/L	780000	NS	1100000	1100000	200000 B	91000 B	100000 B	NS	NS	NS	850000	220000 B	NS	NS	NS
CHLORIDE	UG/L	5730000	237000 B	475000 B	484000 B	6230000 B	1050000	2380000 B	310000 B	472000 B	1050000	388000 B	2360000	14800000 B	6280000	2730000 B
NITRATE/NITRITE NITROGEN	UG/L	<20	NS	60 B	60 B	<20	<20	<20	NS	NS	NS	500 B	30 B	NS	NS	NS
SULFATE	UG/L	2600 B	NS	12900 B	13000 B	156000 B	871000 B	329000 B	NS	NS	NS	5000 B	1220000 B	NS	NS	NS
SULFIDE	UG/L	<370	NS	<370	<370	2400 B	5000	11000 B	NS	NS	NS	<370	1900	NS	NS	NS
TOTAL ORGANIC CARBON	UG/L	1300000	NS	24000	24000	150000	13000	36000	NS	NS	NS	2000	14000	NS	NS	NS
Gases																
ETHANE	UG/L	<0.0615	NS	27.1	36.3	149	NS	45.8	NS	NS	NS	NS	67.1	NS	NS	NS
ETHENE	UG/L	2580	NS	130	153	3200	NS	2030	NS	NS	NS	NS	<0.0569	NS	NS	NS
METHANE	UG/L	5810	NS	3280	3140	8840	NS	7960	NS	NS	NS	NS	2510	NS	NS	NS
PROPANE	UG/L	<0.088	NS	1.53	2.12	13.5	NS	3.17	NS	NS	NS	NS	1.75	NS	NS	NS
Total Volatiles	UG/L	1111J	2590.9J	271.1J	260.5J	49020J	0	27040J	50.3	16.2	1.51J	1.48J	0.84J	35380J	410.85J	3450J

<= Non detect at stated reporting limit
<NSJ = TIC#1 not detected
J= Analyte present at estimated conc.
UJ= Analyte not detected. Reporting limit is estimated
B= Analyte detected in blank at similar conc.

Summary of Analytical Results
Necco Park
Annual Groundwater Monitoring 2009

		C-ZONE WELLS									
	Location	VH-105C	VH-136C	VH-137C	VH-141C	VH-145C	VH-146C	VH-149C	VH-150C	VH-151C	VH-168C
	Date	6/18/09	6/16/09	6/15/09	6/11/09	6/10/09	6/18/09	6/12/09	6/11/09	6/9/09	6/15/09
Analyte	**Duplicate**	FS	FS	FS	FS	FS	FS	FS	FS	FS	FS
	Units										
Field Parameters											
COLOR QUALITATIVE (FIELD)	NS	YELLOW	CLEAR	CLEAR	CLEAR	CLEAR	CLEAR	CLEAR	GREY	ORANGE	BLACK
ODOR (FIELD)	NS	SLIGHT	NONE	SLIGHT	NONE	MODERATE	NONE	NONE	SLIGHT	NONE	SLIGHT
PH (FIELD)	STD UNITS	9.7	12.25	8.51	9.81	6.43	9.28	9.55	8.71	7.8	6.29
REDOX (FIELD)	MV	-248	-550	-489	-298	-257	-420	-276	-416	-463	-351
SPECIFIC CONDUCTANCE (FIELD)	UMHOS/CM	20200	2550	3760	3370	9290	1630	1600	5590	4100	56800
TEMPERATURE (FIELD)	DEG. C	12.4	12.8	12.8	13.9	25.3	12	13.8	11.7	18.5	15.5
TURBIDITY QUANTITATIVE (FIELD)	NTU	17.9	2.32	3.66	12.2	9.4	9.2	5.05	2.68	40.9	10.8
DEPTH TO WATER FROM TOC	Feet	25.77	10.62	10.02	15.83	13.94	7.21	6.73	9.78	8.11	14.98
DISSOLVED OXYGEN (FIELD)	UG/L	230	50	170	300	280	100	1110	280	50	580
Volatile Organics											
1,1,2,2-TETRACHLOROETHANE	UG/L	<360	<12	210	<0.18	<45	<0.18	<0.18	<0.18	<0.18	2100
1,1,2-TRICHLOROETHANE	UG/L	6000	<18	120 J	<0.27	270	<0.27	<0.27	<0.27	<0.27	2600
1,1-DICHLOROETHENE	UG/L	1100 J	<13	94 J	<0.19	110 J	<0.19	0.45 J	1.3	<0.19	270
1,2-DICHLOROETHANE	UG/L	730 J	<15	<37	<0.22	150 J	<0.22	<0.22	<0.22	<0.22	110
CARBON TETRACHLORIDE	UG/L	<260	<8.7	120 J	<0.13	<32	<0.13	<0.13	<0.13	<0.13	840
CHLOROFORM	UG/L	37000	<11	1700	<0.16	<40	<0.16	<0.16	0.24 J	<0.16	1700
CIS-1,2 DICHLOROETHENE	UG/L	11000	66 J	4600	<0.17	6000	2.5	5.9	12	1.7	1900
TETRACHLOROETHYLENE	UG/L	13000	5600	1300	0.66 J	<72	<0.29	<0.29	1.5	<0.29	410
TRANS-1,2-DICHLOROETHENE	UG/L	2000	13 J	240	<0.19	180 J	0.23 J	0.82 J	2.1	1.2	380
TRICHLOROETHENE	UG/L	74000	1300	3600	0.29 J	150 J	0.68 J	<0.17	6.6	0.68 J	3500
VINYL CHLORIDE	UG/L	770 J	<15	3100	<0.22	3000	3.3	5.5	6	3.7	610
Semivolatile Organics											
2,4,5-TRICHLOROPHENOL	UG/L	NS	<150	NS	NS	<15	<0.3	2 J	3 J	<1.2	NS
2,4,6-TRICHLOROPHENOL	UG/L	NS	1800 J	NS	NS	<40	<0.8	1 J	<0.8	<3.2	NS
3- AND 4- METHYLPHENOL	UG/L	NS	<0.75	NS	NS	98 J	<0.75	2.7 J	<0.75	<0.75	NS
HEXACHLOROBENZENE	UG/L	NS	<50	NS	NS	<5	<0.1	<0.1	<0.1	<0.4	NS
HEXACHLOROBUTADIENE	UG/L	NS	<140	NS	NS	<14	0.68 J	<0.27	<0.27	<1.1	NS
HEXACHLOROETHANE	UG/L	NS	<400	NS	NS	<40	<0.8	<0.8	<0.8	<3.2	NS
PENTACHLOROPHENOL	UG/L	NS	35000	NS	NS	<120	<2.4	<2.4	<2.4	<9.6	NS
PHENOL	UG/L	NS	<300	NS	NS	220 J	<0.6	0.71 J	<0.6	<2.4	NS
TIC01	UG/L	NS	<NS J	NS	NS	14000 J	1.1 J	5.6 J	24 J	9.3 J	NS
Inorganics											
BARIUM (Dissolved)	UG/L	NS	77 B	NS	NS	690	26 B	36 B	60 B	59 B	260
IRON (Dissolved)	UG/L	2300	NS	170	<81	420000	NS	<81	NS	810	NS
MANGANESE (Dissolved)	UG/L	6.2 B	NS	91	12 J	12700	NS	20	NS	93	NS
ALKALINITY, BICARB. as CACO3 at PH 4.5	UG/L	1900000	NS	180000 B	76000 B	62000 B	NS	26000 B	NS	170000 B	NS
CHLORIDE	UG/L	6310000	242000 B	1060000 B	906000 B	94200000	243000 B	324000 B	1070000	1240000 B	37600000
NITRATE/NITRITE NITROGEN	UG/L	<20	NS	<20	<20	<20	NS	<20	NS	<20	NS
SULFATE	UG/L	278000 B	NS	201000 B	362000 B	573000 B	NS	274000 B	NS	1570000 B	NS
SULFIDE	UG/L	3200 B	NS	38000	2100	4200 J	NS	2600	NS	43000	NS
TOTAL ORGANIC CARBON	UG/L	2600000	NS	36000	18000	150000	NS	7000	NS	6000	NS
Gases											
ETHANE	UG/L	2.18	NS	134	NS	NS	NS	3.64	NS	NS	NS
ETHENE	UG/L	54.3	NS	2680	NS	NS	NS	53.6	NS	NS	NS
METHANE	UG/L	890	NS	5160	NS	NS	NS	1870	NS	NS	NS
PROPANE	UG/L	0.23 J	NS	<0.088	NS	NS	NS	<0.088	NS	NS	NS
Total Volatiles	UG/L	145600J	6979J	15084J	0.95J	9860J	6.71J	12.67J	29.74J	8.48J	14420

<= Non detect at stated reporting limit
<NSJ = TIC#1 not detected
J= Analyte present at estimated conc.
UJ= Analyte not detected. Reporting limit is estimated
B= Analyte detected in blank at similar conc.

Summary of Analytical Results
Necco Park
Annual Groundwater Monitoring 2009

		D-ZONE WELLS											
	Location	VH-105D	VH-123D	VH-136D	VH-136D	VH-137D	VH-139D	VH-145D	VH-147D	VH-148D	VH-149D	VH-156D	VH-165D
	Date	6/18/09	6/19/09	6/10/09	6/10/09	6/15/09	6/17/09	6/17/09	6/8/09	6/8/09	6/12/09	6/9/09	6/12/09
Analyte	**Duplicate**	FS	FS	FS	DUP	FS	FS	FS	FS	FS	FS	FS	FS
	Units												
Field Parameters													
COLOR QUALITATIVE (FIELD)	NS	GREY	CLEAR	CLEAR	NS	BLACK	CLEAR	CLEAR	CLEAR	CLEAR	CLEAR	CLEAR	GREY
ODOR (FIELD)	NS	MODERATE	SLIGHT	SLIGHT	NS	SLIGHT	SLIGHT	SLIGHT	NONE	NONE	NONE	NONE	NONE
PH (FIELD)	STD UNITS	6.18	9.07	8.81	NS	6.79	7.2	6.55	7	10.12	9.31	7.55	9.49
REDOX (FIELD)	MV	-225	-361	-134	NS	-468	-241	-293	-121	-310	-390	-303	-358
SPECIFIC CONDUCTANCE (FIELD)	UMHOS/CM	17600	3210	1014	NS	8580	4800	38600	2130	928	2770	2480	1640
TEMPERATURE (FIELD)	DEG. C	11.9	13	13.6	NS	16.9	13.7	14.2	12.1	14.8	14.5	14.1	13.7
TURBIDITY QUANTITATIVE (FIELD)	NTU	13.1	5.58	17.6	NS	11.1	9.2	15.4	0.27	10.7	9.08	2.47	13.4
DEPTH TO WATER FROM TOC	Feet	40.76	37.3	24.93	NS	12.98	26.38	11.94	26.46	8.92	16.77	40.33	14.71
DISSOLVED OXYGEN (FIELD)	UG/L	370	300	5120	NS	210	220	90	310	280	150	180	280
Volatile Organics													
1,1,2,2-TETRACHLOROETHANE	UG/L	79000	<0.18 UJ	<0.26	<0.36	580 J	58	<1.2	<0.36	<0.18	<0.18	<0.18	<0.6
1,1,2-TRICHLOROETHANE	UG/L	200000	<0.27	0.6 J	0.68 J	9500	15 J	<1.8	<0.54	<0.27	<0.27	<0.27	1.1 J
1,1-DICHLOROETHENE	UG/L	3700 J	0.64 J	0.44 J	0.39 J	2800	<4.8	<1.3	<0.38	<0.19	<0.19	<0.19	1.9 J
1,2-DICHLOROETHANE	UG/L	9900	<0.22	3	3	<550	<5.5	4.9 J	<0.44	<0.22	<0.22	<0.22	9.9
CARBON TETRACHLORIDE	UG/L	200000	0.21 J	<0.19	<0.26	<320	<3.2	<0.87	<0.26	<0.13	<0.13	<0.13	<0.43
CHLOROFORM	UG/L	120000	<0.16	1 J	1.1 J	68000	84	<1.1	<0.32	<0.16	<0.16	<0.16	<0.53
CIS-1,2 DICHLOROETHENE	UG/L	17000	2.4	34	32	11000	58	280	75	1.4	0.32 J	0.36 J	4.7
TETRACHLOROETHYLENE	UG/L	16000	0.47 J	<0.41	<0.58	4700	210	<1.9	<0.58	<0.29	<0.29	<0.29	<0.97
TRANS-1,2-DICHLOROETHENE	UG/L	5400 J	<0.19	1 J	1.1 J	2700	33	<1.3	2	<0.19	<0.19	0.23 J	8.6
TRICHLOROETHENE	UG/L	180000	0.98 J	4.4	4	76000	1800	<1.1	<0.34	<0.17	<0.17	<0.17	<0.57
VINYL CHLORIDE	UG/L	<1800	0.88 J	28	29	1600 J	38	320	53	<0.22	0.65 J	0.86 J	110
Semivolatile Organics													
2,4,5-TRICHLOROPHENOL	UG/L	NS	<12	9 J	8.3 J	NS	NS	<3	<0.3	<0.6	<0.3	<0.3	84
2,4,6-TRICHLOROPHENOL	UG/L	NS	<32	2.7 J	2.7 J	NS	NS	<8	<0.8	<1.6	<0.8	<0.8	4.5 J
3- AND 4- METHYLPHENOL	UG/L	NS	45 J	<0.75 R	1.8 J	NS	NS	6.2 J	<0.75	16 J	<0.75	<0.75	12 J
HEXACHLOROBENZENE	UG/L	NS	<4	<0.1 R	<0.1	NS	NS	<1	<0.1	<0.2	<0.1	<0.1	<0.4
HEXACHLOROBUTADIENE	UG/L	NS	<11	<0.27 R	<0.27	NS	NS	<2.7	<0.27	<0.54	<0.27	<0.27	<1.1
HEXACHLOROETHANE	UG/L	NS	<32	<0.8 R	<0.8	NS	NS	<8	<0.8	<1.6	<0.8	<0.8	<3.2
PENTACHLOROPHENOL	UG/L	NS	<96	<2.4 R	<2.4	NS	NS	<24	<2.4	<4.8	<2.4	<2.4	<9.6
PHENOL	UG/L	NS	1000	<0.6 R	<0.6	NS	NS	33 J	<0.6	40	<0.6	<0.6	5.5 J
TIC01	UG/L	NS	<NS J	8.2 J	6.4 J	NS	NS	1500 J	<NS J	<NS J	1.7 J	<NS J	70 J
Inorganics													
BARIUM (Dissolved)	UG/L	NS	21 B	130 J	140 J	NS	NS	2700	46 B	33 B	36 B	39 B	34 B
IRON (Dissolved)	UG/L	14100	NS	87 J	90 J	210	2700	NS	390	<81	<81	350	<81
MANGANESE (Dissolved)	UG/L	600	NS	210	220	690	420	NS	37	7 B	35	58	130
ALKALINITY, BICARB. as CACO3 at PH 4.5	UG/L	900000	NS	140000 B	33000 B	680000	270000 B	NS	200000 B	23000 B	26000 B	290000 B	62000 B
CHLORIDE	UG/L	6860000	187000 B	210000 B	199000 B	1810000 B	850000 B	5780000 B	37200 B	93700 B	568000 B	304000 B	451000 B
NITRATE/NITRITE NITROGEN	UG/L	<20	NS	<20	<20	<20	100 B	NS	100 B	40 B	<20	<20	<20
SULFATE	UG/L	1100000 B	NS	337000 B	398000 B	1330000 B	1240000 B	NS	1220000 B	330000 B	500000 B	816000	58200 B
SULFIDE	UG/L	11000 J	NS	13000 J	1100 J	94000	3200 B	NS	1600 B	<370	20000	3800	<740
TOTAL ORGANIC CARBON	UG/L	1600000	NS	8000	11000	230000	4000	NS	1000 B	5000 J	5000	3000	21000
Gases													
ETHANE	UG/L	0.773	NS	NS	NS	8.64	6.15	NS	NS	NS	4.04	NS	5.88
ETHENE	UG/L	43.6	NS	NS	NS	163	35.8	NS	NS	NS	20.2	NS	571
METHANE	UG/L	35.7	NS	NS	NS	1430	842	NS	NS	NS	2280	NS	1050
PROPANE	UG/L	0.114 J	NS	NS	NS	2.24	0.623	NS	NS	NS	0.502	NS	0.93
Total Volatiles	UG/L	831000J	5.58J	72.44J	71.27J	176880J	2296J	604.9J	130	1.4	0.97J	1.45J	136.2J

<= Non detect at stated reporting limit
<NSJ = TIC#1 not detected
J= Analyte present at estimated conc.
UJ= Analyte not detected. Reporting limit is estimated
B= Analyte detected in blank at similar conc.

Summary of Analytical Results
Necco Park
Annual Groundwater Monitoring 2009

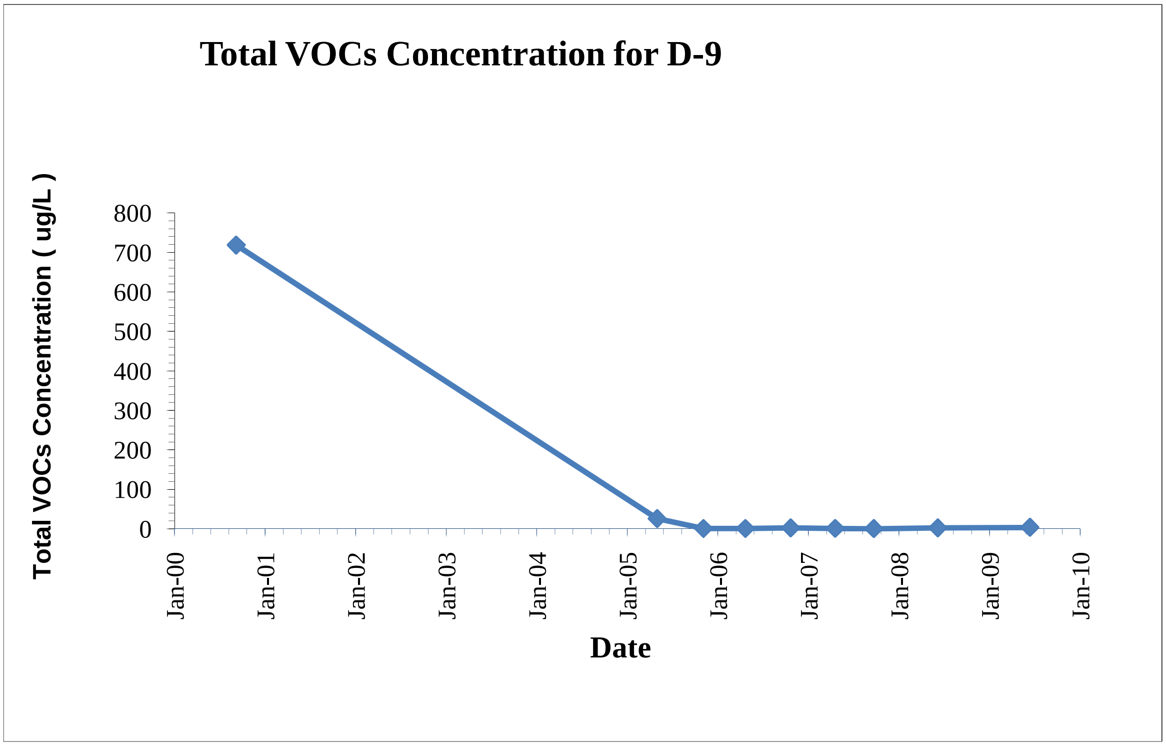
		E-ZONE WELLS							F-ZONE WELLS						G-ZONE WELLS				
	Location	VH-136E	VH-136E	VH-145E	VH-146E	VH-150E	VH-156E	VH-165E	VH-136F	VH-146F	VH-147F	VH-150F	VH-156F	VH-147G1	VH-147G1	VH-147G1	VH-147G2	VH-147G3
	Date	6/16/09	6/16/09	6/17/09	6/10/09	6/11/09	6/9/09	6/12/09	6/16/09	6/18/09	6/8/09	6/11/09	6/9/09	6/8/09	6/8/09	6/8/09	6/8/09	6/8/09
Analyte	Duplicate	FS	DUP	FS	FS	FS	FS	FS	FS	FS	FS	FS	FS	FS	FS	DUP	FS	FS
	Units																	
Field Parameters																		
COLOR QUALITATIVE (FIELD)	NS	CLEAR	NS	CLEAR	BLACK	GREY	CLEAR	GREY	CLEAR	BLACK	CLEAR	GREY	CLEAR	GREY	NS	NS	CLEAR	CLEAR
ODOR (FIELD)	NS	NONE	NS	NONE	MODERATE	MODERATE	SLIGHT	SLIGHT	SLIGHT	MODERATE	NONE	MODERATE	NONE	SLIGHT	NS	NS	NONE	NONE
PH (FIELD)	STD UNITS	8.32	NS	8.92	6.99	6.39	8.25	7.65	8.68	7.31	7.05	7.09	7.4	6.95	NS	NS	9.5	6.74
REDOX (FIELD)	MV	-430	NS	-304	-422	-452	-206	-329	-405	-353	-137	-331	-304	-291	NS	NS	-339	-377
SPECIFIC CONDUCTANCE (FIELD)	UMHOS/CM	1480	NS	13580	4200	18600	1409	4700	1305	10450	2940	27300	2510	4410	NS	NS	6480	1009
TEMPERATURE (FIELD)	DEG. C	14.5	NS	12.6	12.3	13.1	13.7	12.9	13.8	12.1	12.5	13.9	14.4	12.9	NS	NS	13.1	12.4
TURBIDITY QUANTITATIVE (FIELD)	NTU	2.15	NS	11.8	10.7	10.9	24.6	14.3	11.6	78.6	14.7	5.05	3.06	12.6	NS	NS	3.31	6.08
DEPTH TO WATER FROM TOC	Feet	27.22	NS	15.98	20.93	17.96	40.99	24.02	30.32	20.43	22.73	18.17	39.38	25.11	NS	NS	25.39	25.35
DISSOLVED OXYGEN (FIELD)	UG/L	70	NS	720	170	200	170	140	110	90	290	840	180	100	NS	NS	230	210
Volatile Organics																		
1,1,2,2-TETRACHLOROETHANE	UG/L	0.97 J	0.88 J	<4.5	<22	<3.6	<0.18	460 J	<1.2	<75	<0.18	<3	<0.18	NS	36 J	31 J	<20	<20
1,1,2-TRICHLOROETHANE	UG/L	3.2	3	<6.8	<34	<5.4	<0.27	500 J	8.5	130 J	<0.27	<4.5	<0.27	NS	19 J	19 J	<30	31 J
1,1-DICHLOROETHENE	UG/L	<0.19	<0.19	<4.8	320	19 J	<0.19	300 J	2.9 J	520	<0.19	<3.2	<0.19	NS	<7.6	<6.3	<21	<21
1,2-DICHLOROETHANE	UG/L	23	23	8.1 J	<28	<4.4	<0.22	360 J	15	<92	<0.22	<3.7	1.5	NS	82	81	320	43 J
CARBON TETRACHLORIDE	UG/L	<0.13	<0.13	<3.2	<16	<2.6	<0.13	120 J	<0.87	<54	<0.13	<2.2	<0.13	NS	<5.2	<4.3	<14	<14
CHLOROFORM	UG/L	<0.16	<0.16	<4	130	14 J	<0.16	370 J	7.4	74 J	<0.16	<2.7	0.38 J	NS	15 J	14 J	<18	50 J
CIS-1,2 DICHLOROETHENE	UG/L	5.9	5.8	1700	3300	570	0.22 J	17000	140	11000	0.66 J	430	3.4	NS	52	44	190	110
TETRACHLOROETHYLENE	UG/L	<0.29	<0.29	19 J	<36	<5.8	<0.29	490 J	<1.9	<120	<0.29	<4.8	<0.29	NS	<12	<9.7	<32	<32
TRANS-1,2-DICHLOROETHENE	UG/L	10	11	240	190	24	<0.19	460 J	32	570	<0.19	<3.2	1.3	NS	190	180	230	360
TRICHLOROETHENE	UG/L	8.4	8.4	5.9 J	460	40	<0.17	1700	9.1	270 J	<0.17	<2.8	1.4	NS	<6.8	<5.7	<19	<19
VINYL CHLORIDE	UG/L	15	14	1500	1700	480	0.48 J	9200	460	3200	1	460	9.5	NS	1400	1100	3800	3700
Semivolatile Organics																		
2,4,5-TRICHLOROPHENOL	UG/L	<0.3	<0.3	<1.5	18 J	<3.8	<0.3	630	7.4 J	160	<0.3	<3.8	1.4 J	NS	2.1 J	2.2 J	3.6 J	<1.2
2,4,6-TRICHLOROPHENOL	UG/L	<0.8	<0.8	<4	10 J	<10	<0.8	51 J	<3.2	42 J	<0.8	<10	<0.8	NS	<0.8	<0.8	<0.8	<3.2
3- AND 4- METHYLPHENOL	UG/L	<0.75	<0.75	4.2 J	17 J	<0.75	<0.75	61 J	4.1 J	44 J	<0.75	26 J	<0.75	NS	<0.75	<0.75	<0.75	<0.75
HEXACHLOROBENZENE	UG/L	<0.1	<0.1	<0.5	<1	<1.2	<0.1	<2.5	<0.4	<1.2	<0.1	<1.2	<0.1	NS	<0.1	<0.1	<0.1	<0.4
HEXACHLOROBUTADIENE	UG/L	<0.27	<0.27	<1.4	<2.7	<3.4	<0.27	44 J	<1.1	<3.4	<0.27	<3.4	<0.27	NS	<0.27	<0.27	<0.27	<1.1
HEXACHLOROETHANE	UG/L	<0.8	<0.8	<4	<8	<10	<0.8	<20	<3.2	<10	<0.8	<10	<0.8	NS	<0.8	<0.8	<0.8	<3.2
PENTACHLOROPHENOL	UG/L	<2.4	<2.4	<12	<24	<30	<2.4	<60	<9.6	<30	<2.4	<30	<2.4	NS	<2.4	<2.4	<2.4	<9.6
PHENOL	UG/L	<0.6	<0.6	<3	<6	260	<0.6	88 J	<2.4	250	<0.6	200	<0.6	NS	1.4 J	1.8 J	0.64 J	<2.4
TIC01	UG/L	39 J	26 J	280 J	800 J	770 J	0.61 J	600 J	33 J	38 J	<NS J	640 J	1.5 J	NS	3499 J	3599 J	15099 J	10099 J
Inorganics																		
BARIUM (Dissolved)	UG/L	180 J	140 J	230	48 B	130 J	28 B	860	310	42 B	43 B	120 J	18 B	NS	28 B	29 B	27 B	35 B
IRON (Dissolved)	UG/L	<81	<81	<81	120	NS	3900	NS	NS	240	NS	227000	NS	NS	NS	NS	NS	NS
MANGANESE (Dissolved)	UG/L	150	150	920	190	NS	210	NS	NS	670	NS	2600	NS	NS	NS	NS	NS	NS
ALKALINITY, BICARB. as CACO3 at PH 4.5	UG/L	180000 B	180000 B	40000 B	320000 B	NS	150000 B	NS	NS	310000 B	NS	170000 B	NS	NS	NS	NS	NS	NS
CHLORIDE	UG/L	189000 B	184000 B	1830000 B	584000 B	6900000	227000 B	1520000	365000 B	3320000 B	172000 B	12400000	206000 B		751000 B	755000 B	1940000 B	2520000 B
NITRATE/NITRITE NITROGEN	UG/L	<20	<20	20 B	<20	NS	<20	NS	NS	<20	NS	40 B	NS	NS	NS	NS	NS	NS
SULFATE	UG/L	360000 B	354000 B	179000	1430000 B	NS	730000	NS	NS	722000 B	NS	1090000 B	NS	NS	NS	NS	NS	NS
SULFIDE	UG/L	14000 J	13000 J	1600 B	87000 J	NS	1800	NS	NS	12000 J	NS	5000	NS	NS	NS	NS	NS	NS
TOTAL ORGANIC CARBON	UG/L	8000	9000	23000	27000	NS	2000	NS	NS	80000	NS	240000	NS	NS	NS	NS	NS	NS
Gases																		
ETHANE	UG/L	3.11	3.61	34.4	NS	NS	NS	NS	NS	57	NS	NS	NS	NS	NS	NS	NS	NS
ETHENE	UG/L	740	1480	225	NS	NS	NS	NS	NS	200	NS	NS	NS	NS	NS	NS	NS	NS
METHANE	UG/L	776	1540	1350	NS	NS	NS	NS	NS	2960	NS	NS	NS	NS	NS	NS	NS	NS
PROPANE	UG/L	1.84	2.57	2.88	NS	NS	NS	NS	NS	2.5	NS	NS	NS	NS	NS	NS	NS	NS
Total Volatiles	UG/L	66.47J	66.08J	3473J	6100	1147J	0.7J	30960J	674.9J	15764J	1.66J	890	17.48J	0	1794J	1469J	4540	4294J

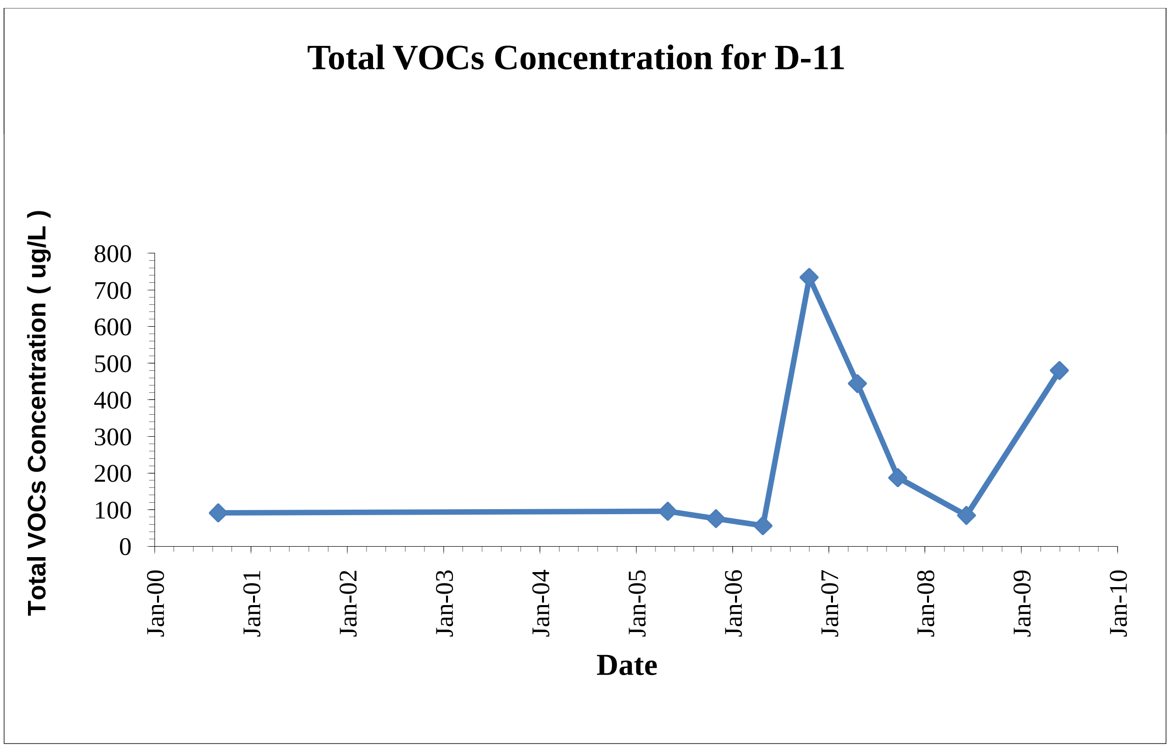
<= Non detect at stated reporting limit
<NSJ = TIC#1 not detected
J= Analyte present at estimated conc.
UJ= Analyte not detected. Reporting limit is estimated
B= Analyte detected in blank at similar conc.

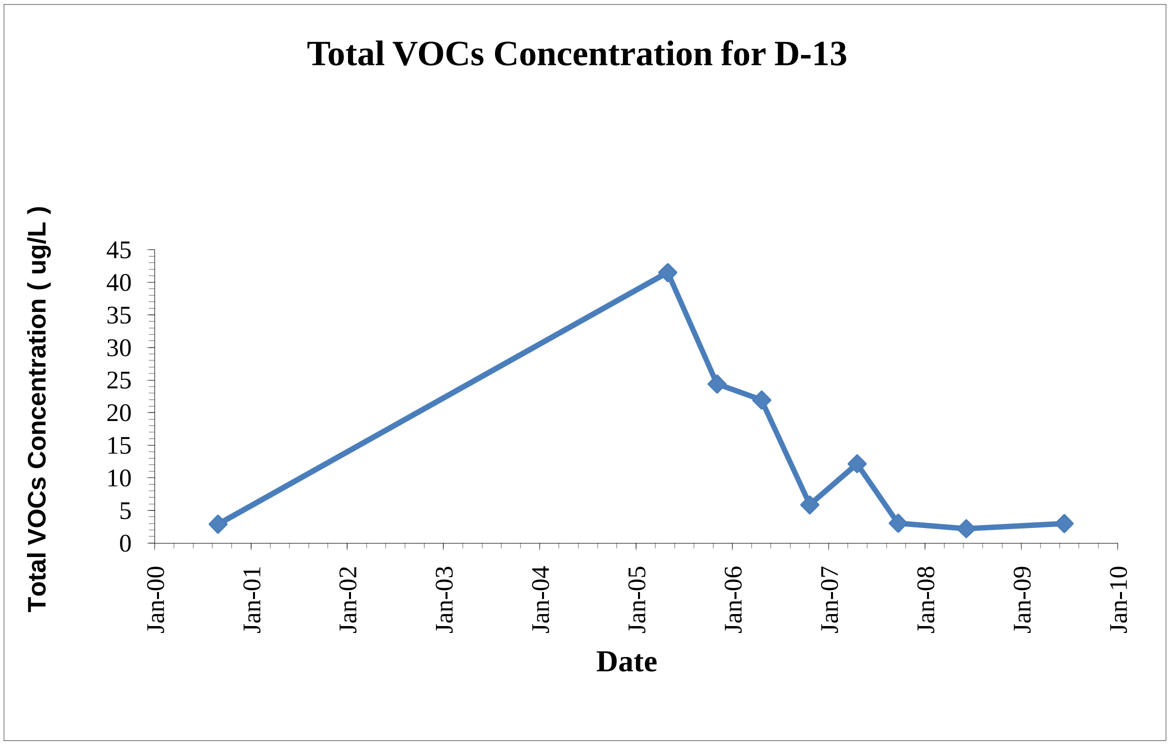
APPENDIX B
DATA VALIDATION SUMMARY LABORATORY REPORTS

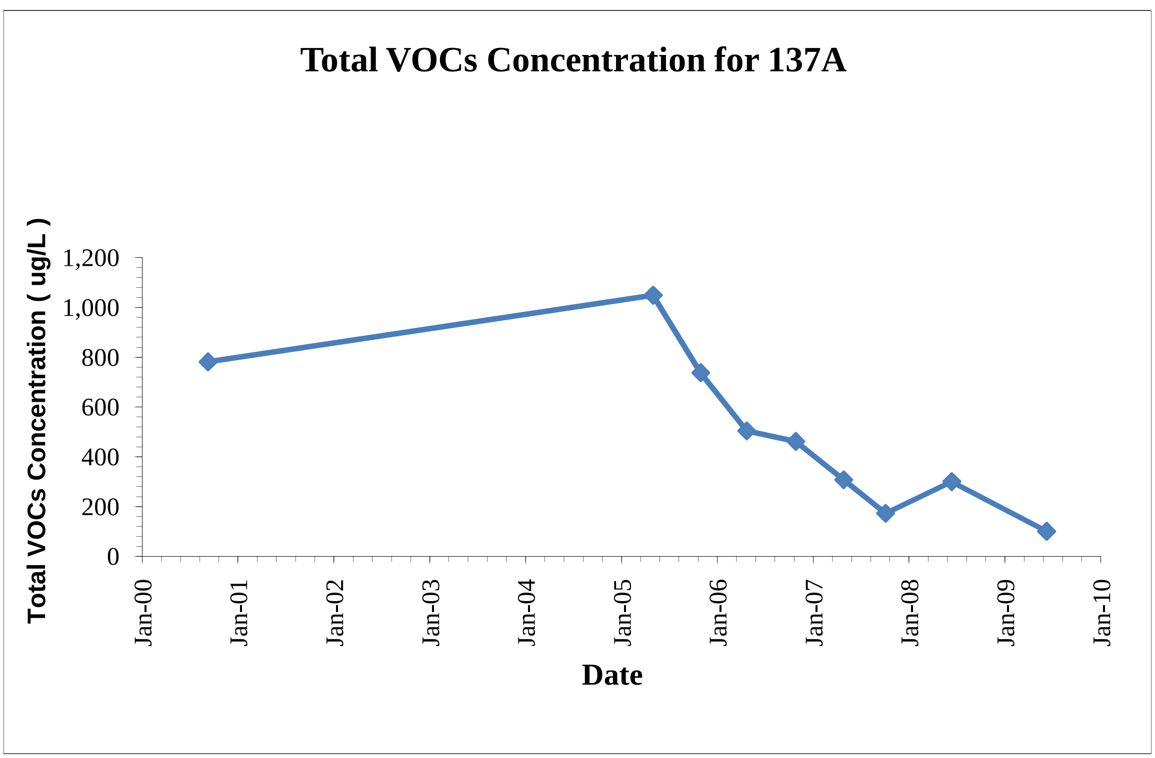
(ELECTRONIC ONLY)

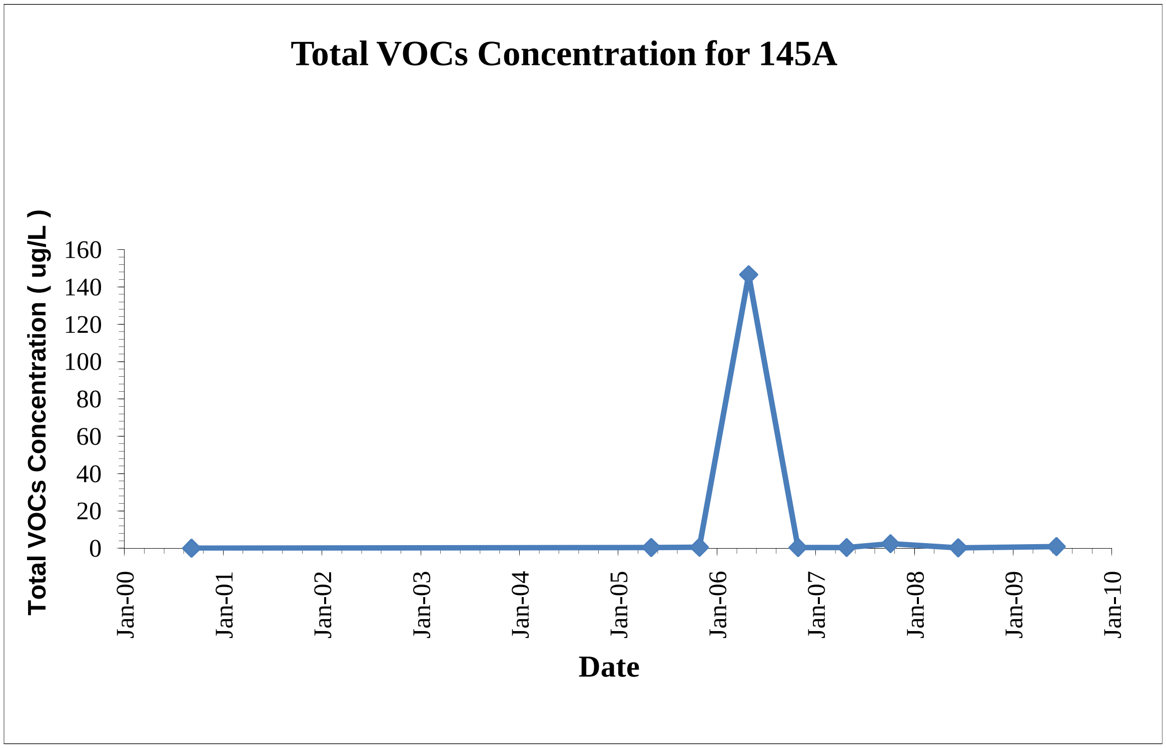
APPENDIX C
TVOC TREND PLOTS

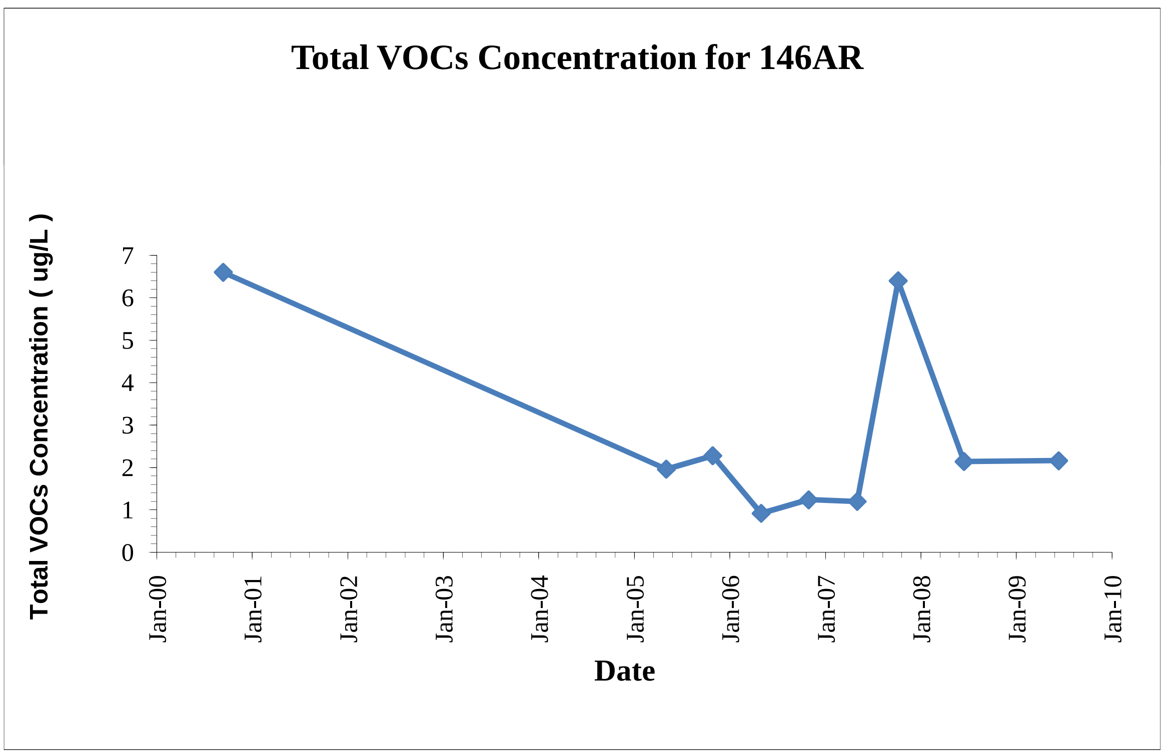

Total VOCs Concentration for D-9
Total VOCs Concentration (ug/L)
800
700
600
500
400
300
200
100
0
Jan-00
Jan-01
Jan-02
Jan-03
Jan-04
Jan-05
Jan-06
Jan-07
Jan-08
Jan-09
Jan-10
Date

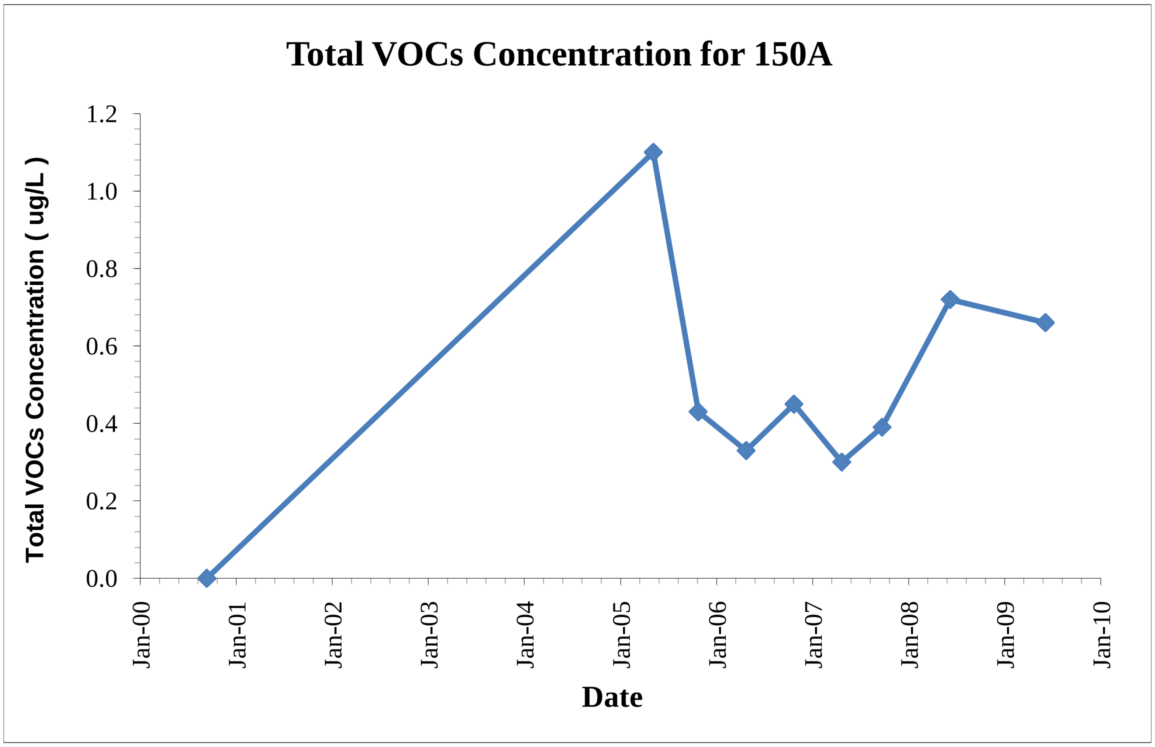

Total VOCs Concentration for D-11
Total VOCs Concentration (ug/L)
800
700
600
500
400
300
200
100
0
Jan-00
Jan-01
Jan-02
Jan-03
Jan-04
Jan-05
Jan-06
Jan-07
Jan-08
Jan-09
Jan-10
Date

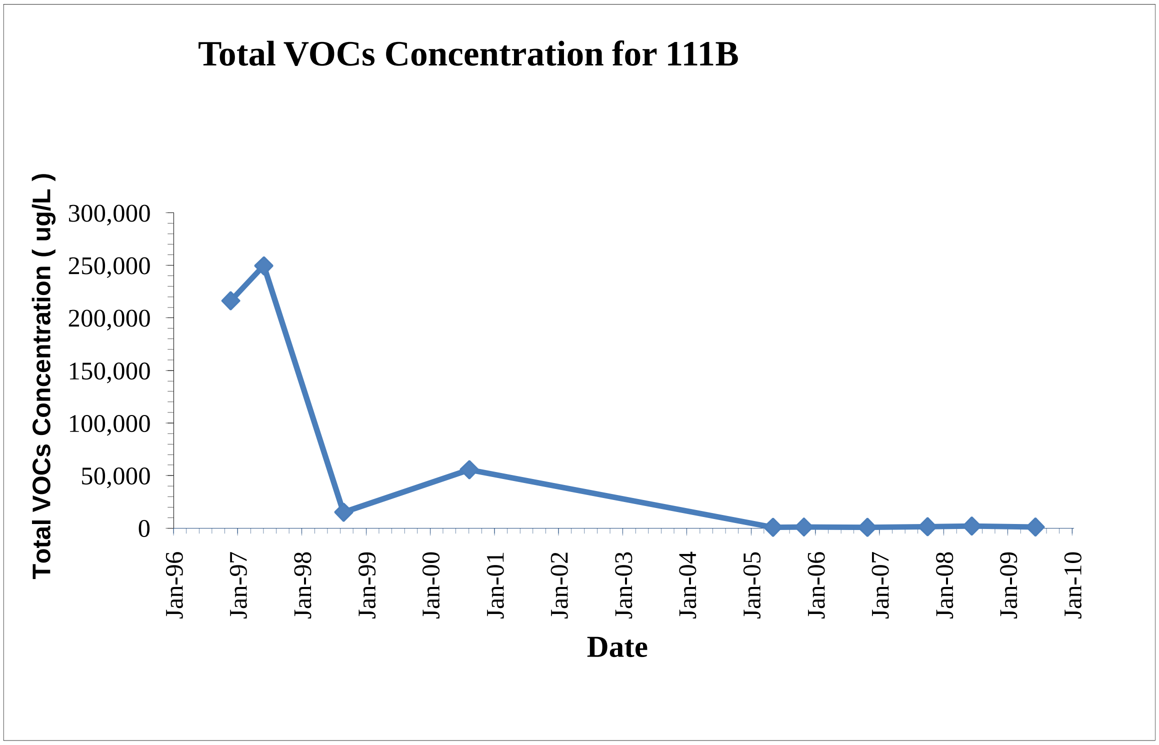

Total VOCs Concentration for D-13
Total VOCs Concentration (ug/L)
45
40
35
30
25
20
15
10
5
0
Jan-00
Jan-01
Jan-02
Jan-03
Jan-04
Jan-05
Jan-06
Jan-07
Jan-08
Jan-09
Jan-10
Date

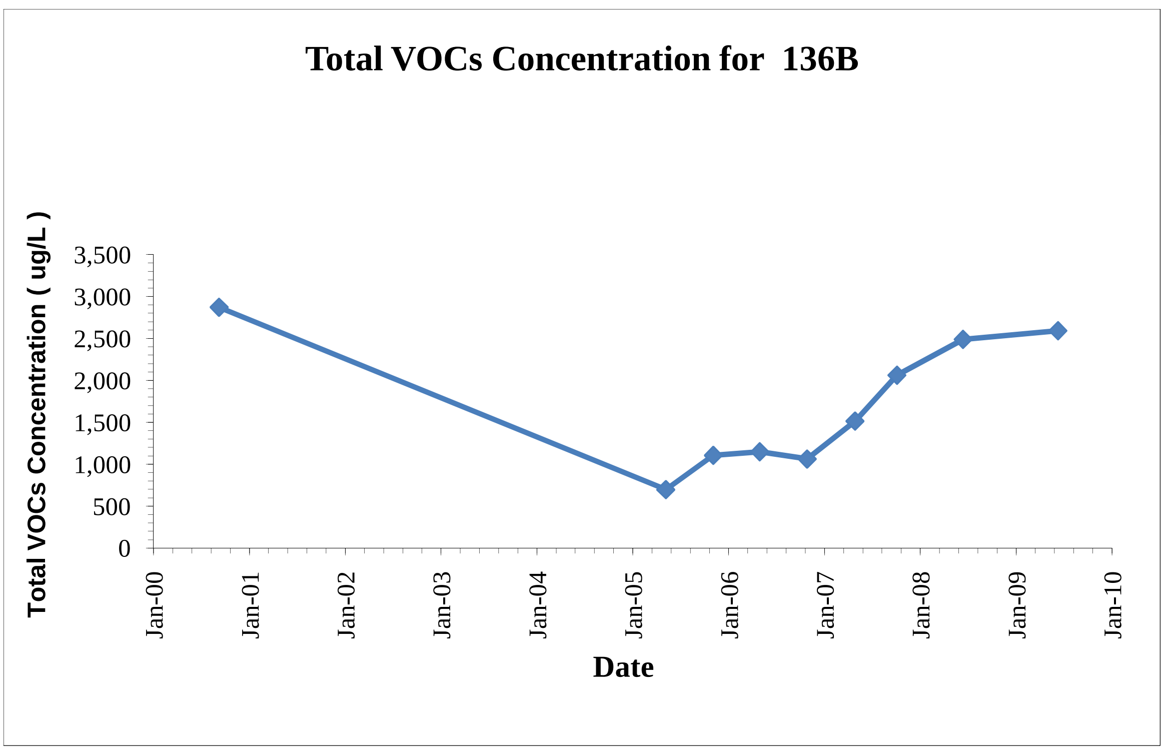

Total VOCs Concentration for 137A
Total VOCs Concentration (ug/L)
1,200
1,000
800
600
400
200
0
Jan-00
Jan-01
Jan-02
Jan-03
Jan-04
Jan-05
Jan-06
Jan-07
Jan-08
Jan-09
Jan-10
Date

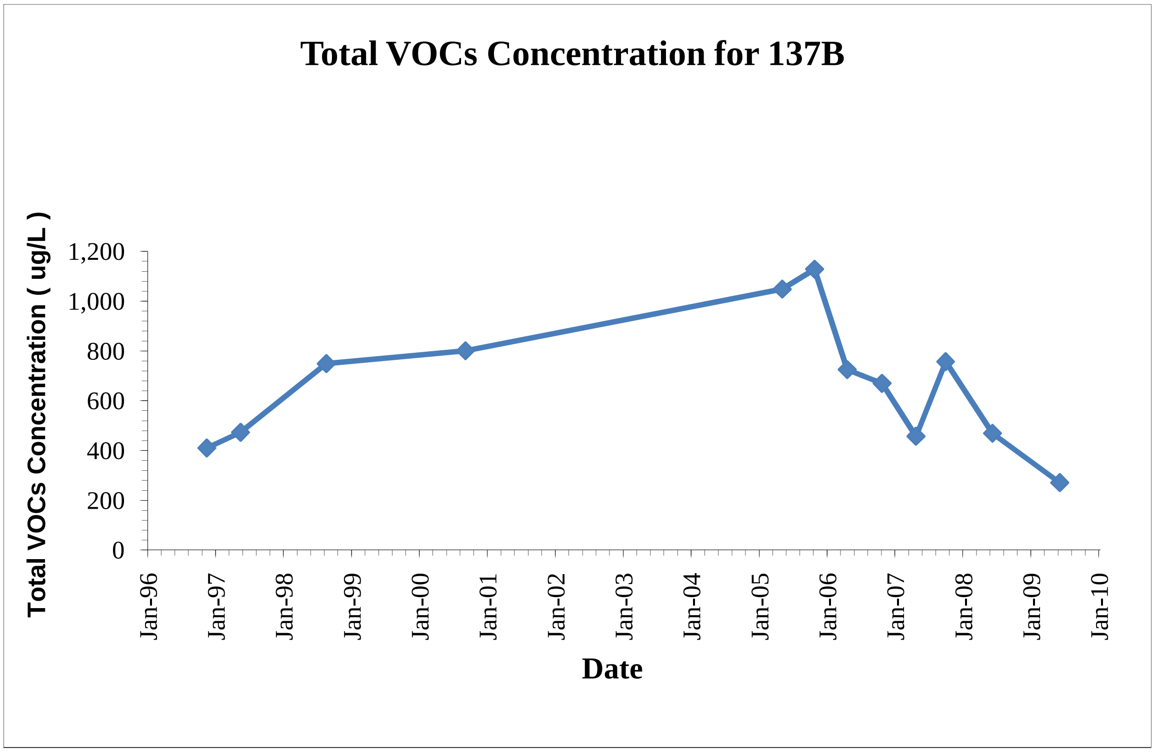

Total VOCs Concentration for 145A
Total VOCs Concentration (ug/L)
160
140
120
100
80
60
40
20
0
Jan-00
Jan-01
Jan-02
Jan-03
Jan-04
Jan-05
Jan-06
Jan-07
Jan-08
Jan-09
Jan-10
Date

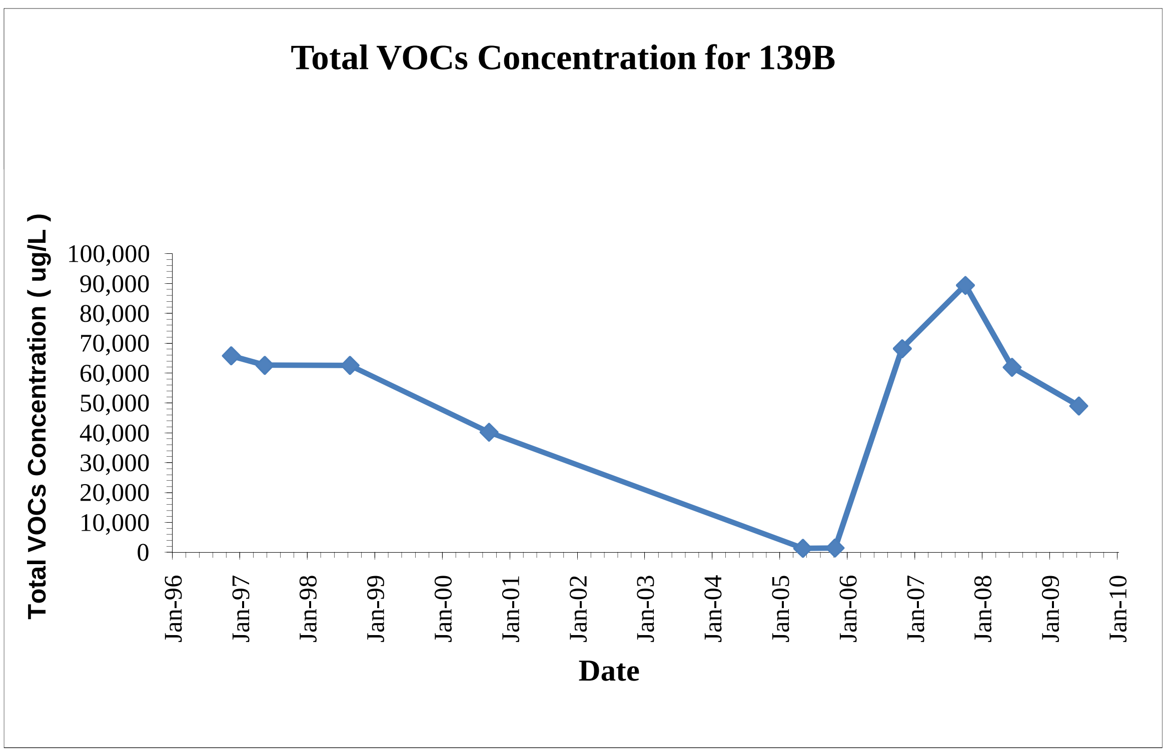

Total VOCs Concentration for 146AR
Total VOCs Concentration (ug/L)
7
6
5
4
3
2
1
0
Jan-00
Jan-01
Jan-02
Jan-03
Jan-04
Jan-05
Jan-06
Jan-07
Jan-08
Jan-09
Jan-10
Date

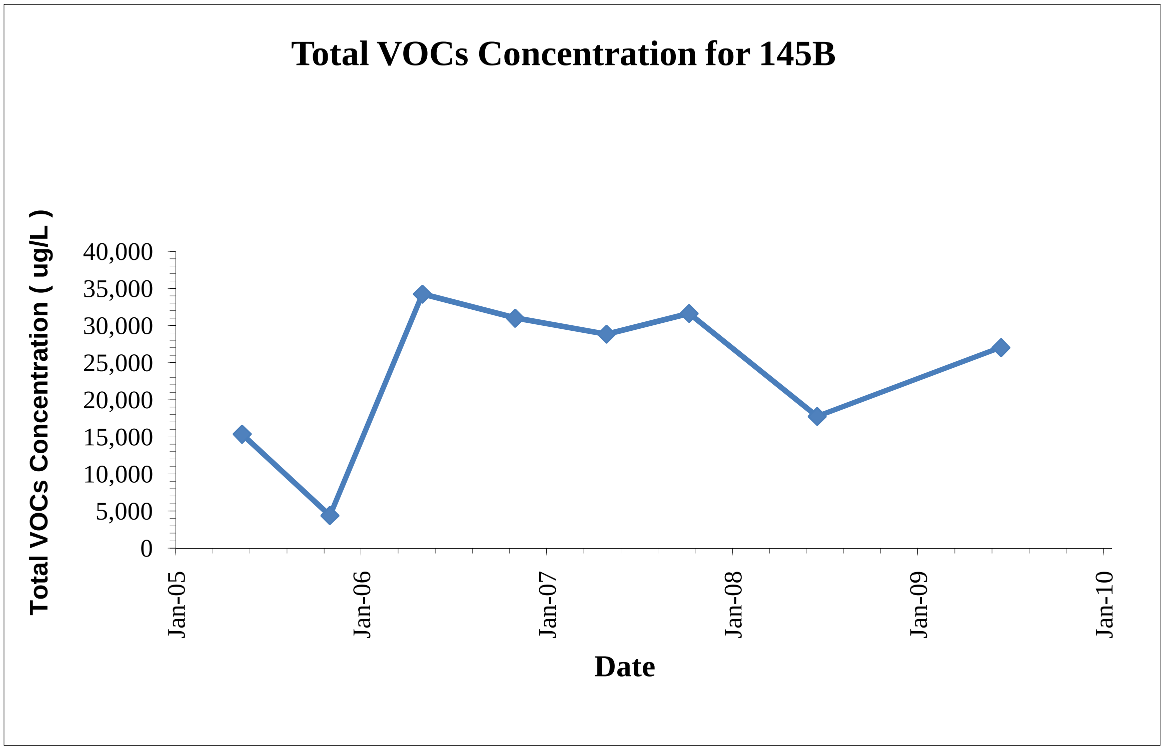

Total VOCs Concentration for 150A
Total VOCs Concentration (ug/L)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
Jan-00
Jan-01
Jan-02
Jan-03
Jan-04
Jan-05
Jan-06
Jan-07
Jan-08
Jan-09
Jan-10
Date

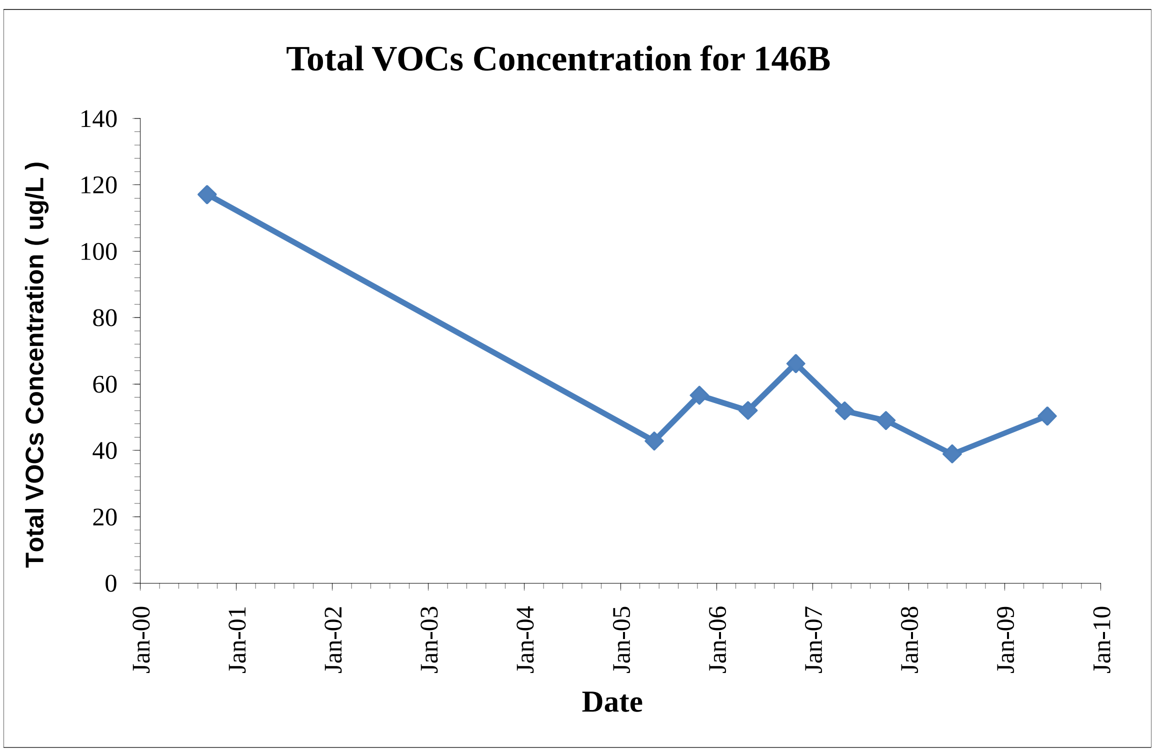

Total VOCs Concentration for 111B
Total VOCs Concentration (ug/L)
300,000
250,000
200,000
150,000
100,000
50,000
0
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
Jan-01
Jan-02
Jan-03
Jan-04
Jan-05
Jan-06
Jan-07
Jan-08
Jan-09
Jan-10
Date

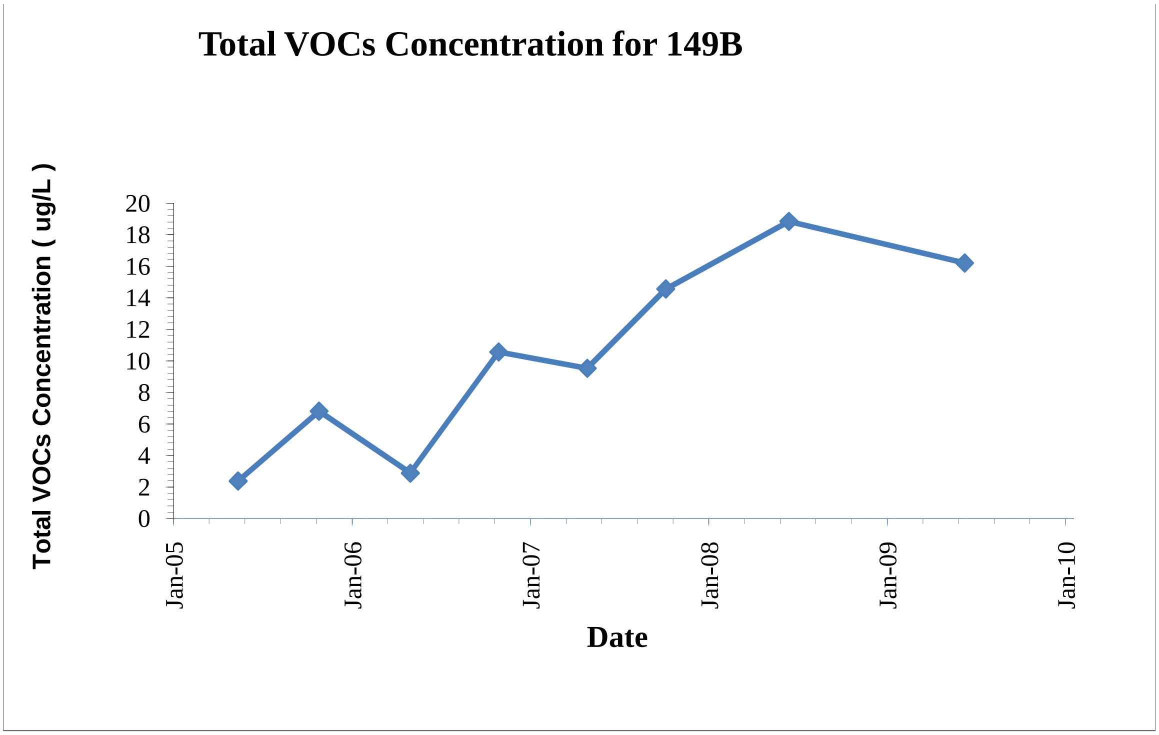

Total VOCs Concentration for 136B
Total VOCs Concentration (ug/L)
3,500
3,000
2,500
2,000
1,500
1,000
500
0
Jan-00
Jan-01
Jan-02
Jan-03
Jan-04
Jan-05
Jan-06
Jan-07
Jan-08
Jan-09
Jan-10
Date

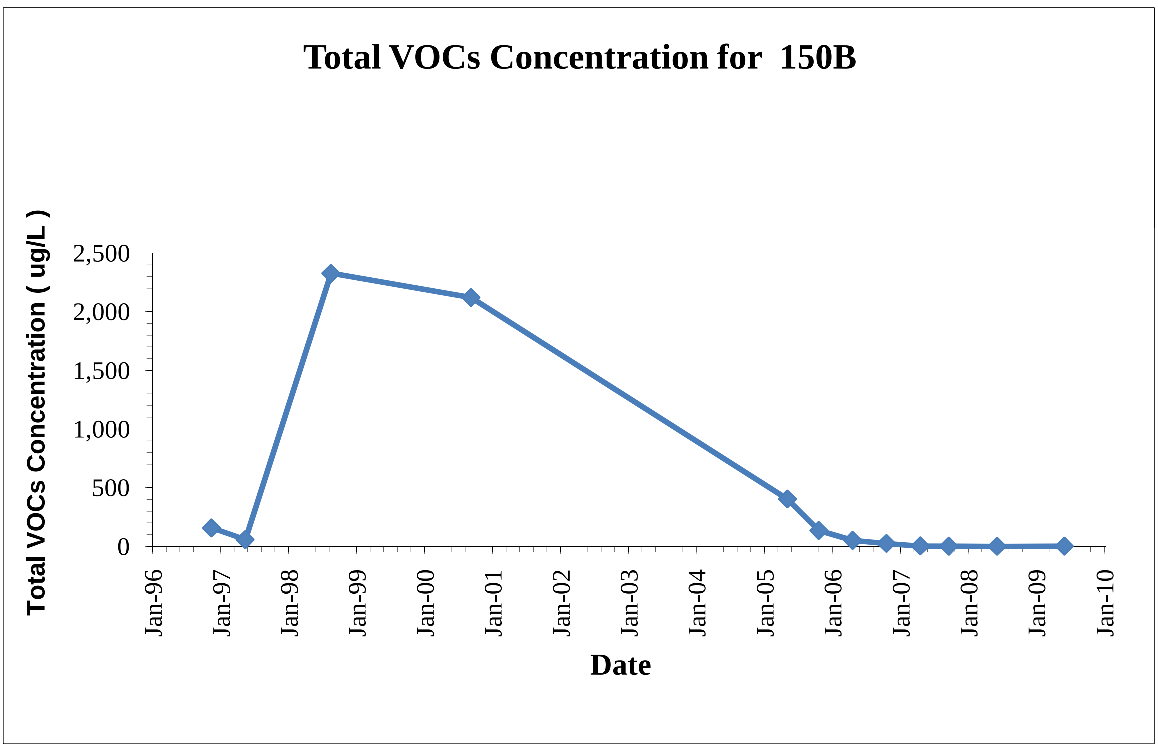

Total VOCs Concentration for 137B
Total VOCs Concentration (ug/L)
1,200
1,000
800
600
400
200
0
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
Jan-01
Jan-02
Jan-03
Jan-04
Jan-05
Jan-06
Jan-07
Jan-08
Jan-09
Jan-10
Date

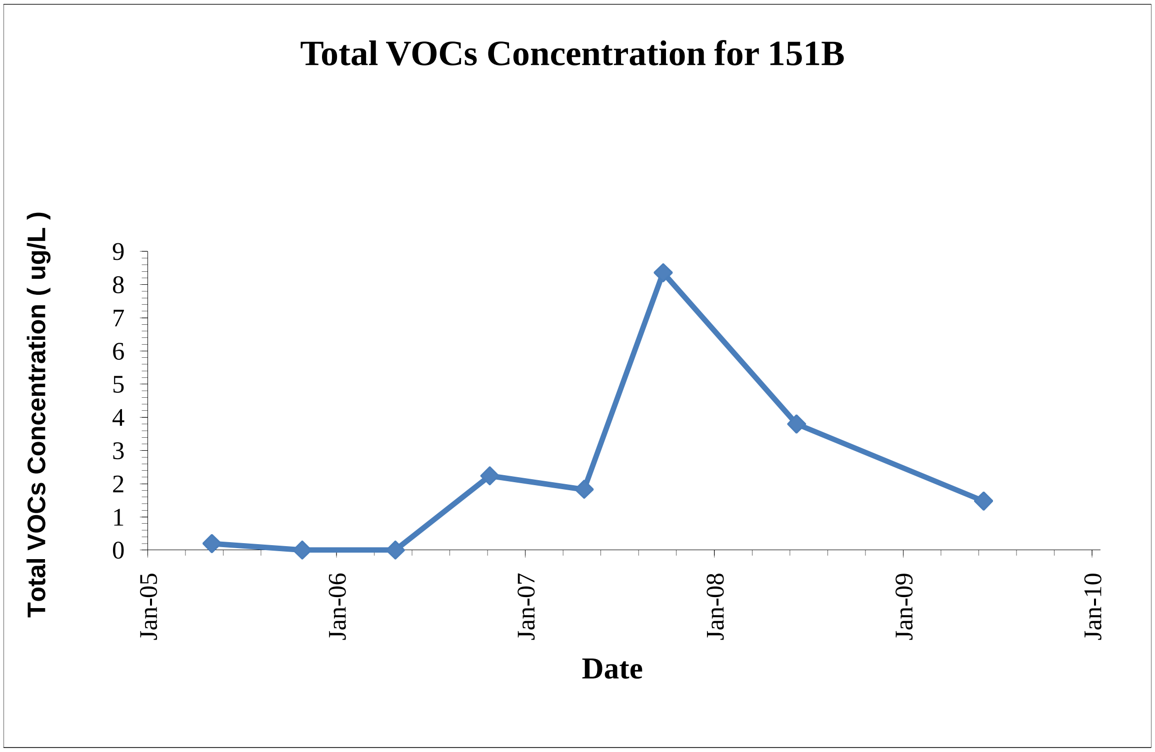

Total VOCs Concentration for 139B
Total VOCs Concentration (ug/L)
100,000
90,000
80,000
70,000
60,000
50,000
40,000
30,000
20,000
10,000
0
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
Jan-01
Jan-02
Jan-03
Jan-04
Jan-05
Jan-06
Jan-07
Jan-08
Jan-09
Jan-10
Date

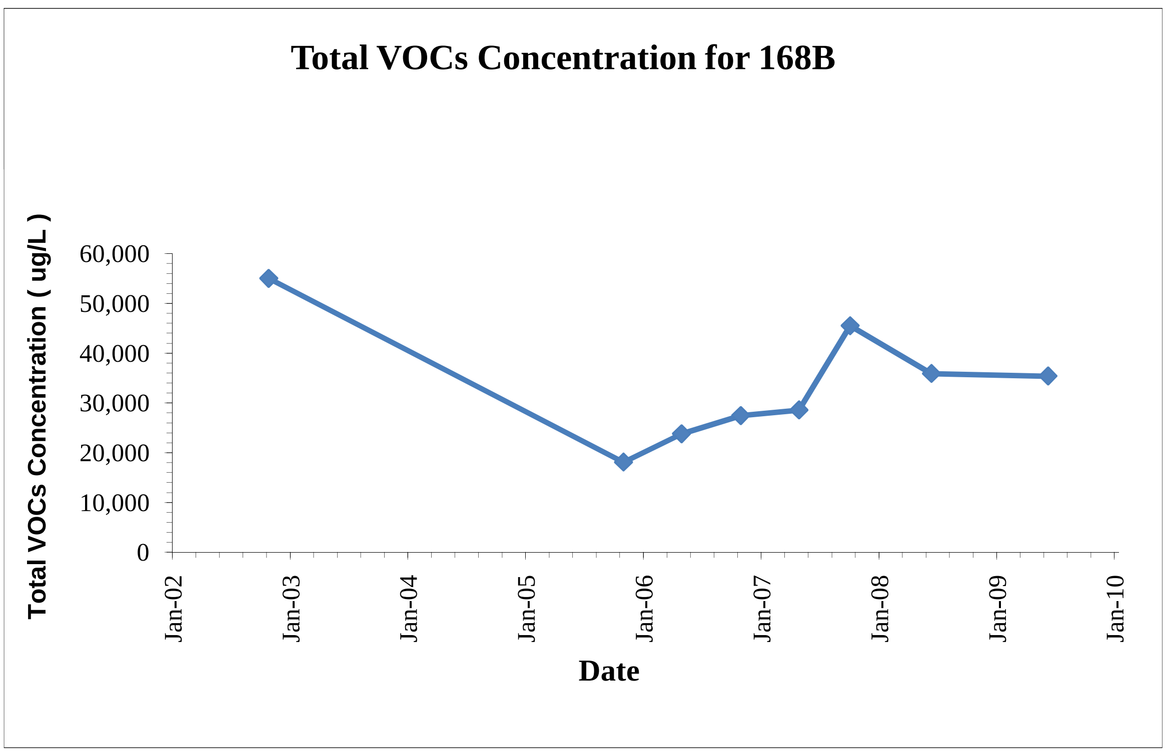

Total VOCs Concentration for 145B
Total VOCs Concentration (ug/L)
40,000
35,000
30,000
25,000
20,000
15,000
10,000
5,000
0
Jan-05
Jan-06
Jan-07
Jan-08
Jan-09
Jan-10
Date

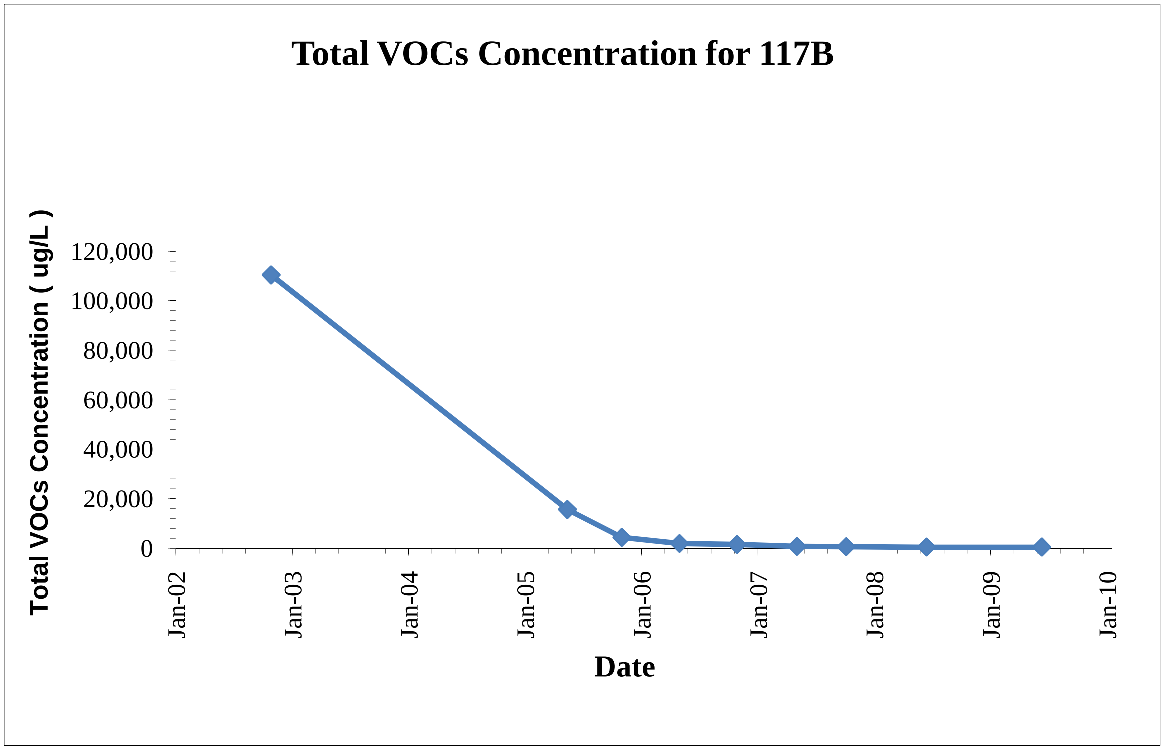

Total VOCs Concentration for 146B
Total VOCs Concentration (ug/L)
140
120
100
80
60
40
20
0
Jan-00
Jan-01
Jan-02
Jan-03
Jan-04
Jan-05
Jan-06
Jan-07
Jan-08
Jan-09
Jan-10
Date

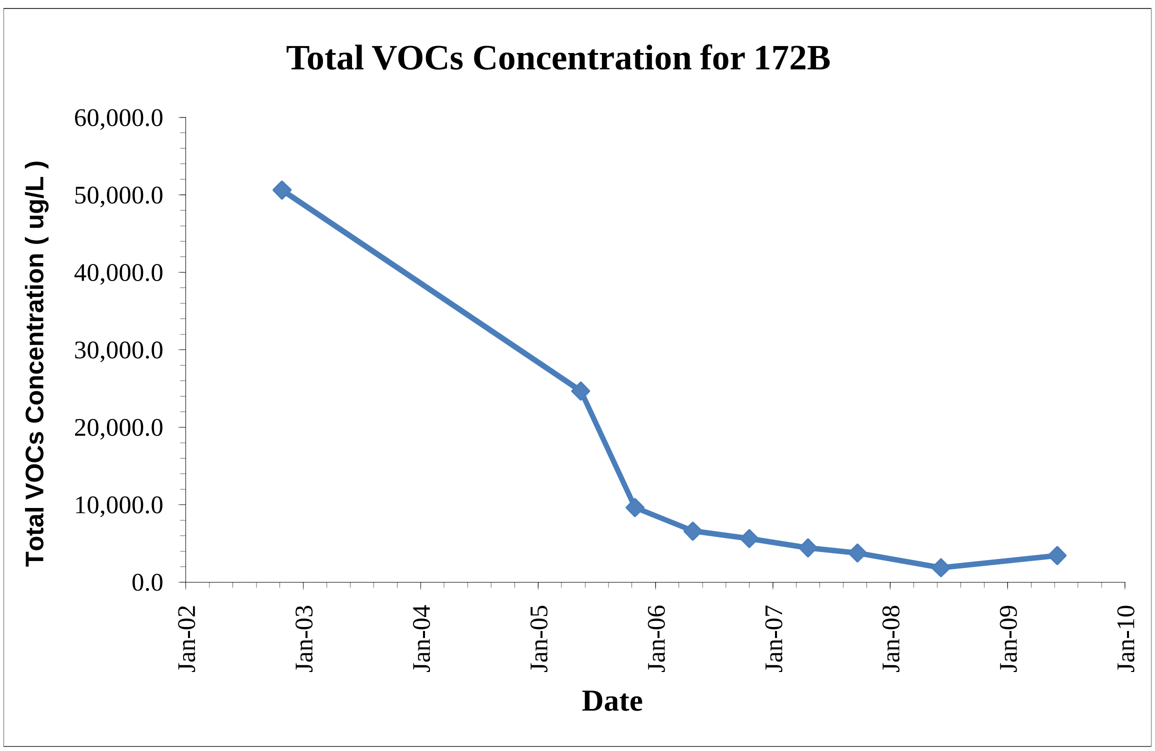

Total VOCs Concentration for 149B
Total VOCs Concentration (ug/L)
0
2
4
6
8
10
12
14
16
18
20
Jan-05
Jan-06
Jan-07
Jan-08
Jan-09
Jan-10
Date

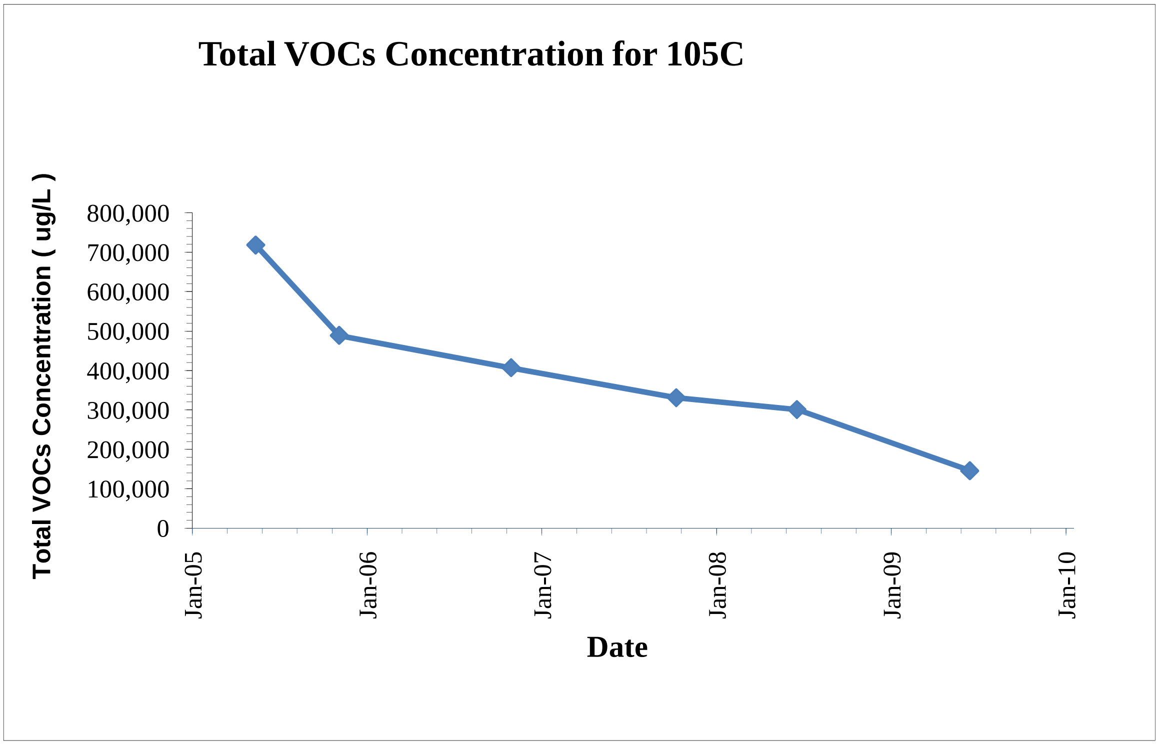

Total VOCs Concentration for 150B
Total VOCs Concentration (ug/L)
0
500
1,000
1,500
2,000
2,500
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
Jan-01
Jan-02
Jan-03
Jan-04
Jan-05
Jan-06
Jan-07
Jan-08
Jan-09
Jan-10
Date

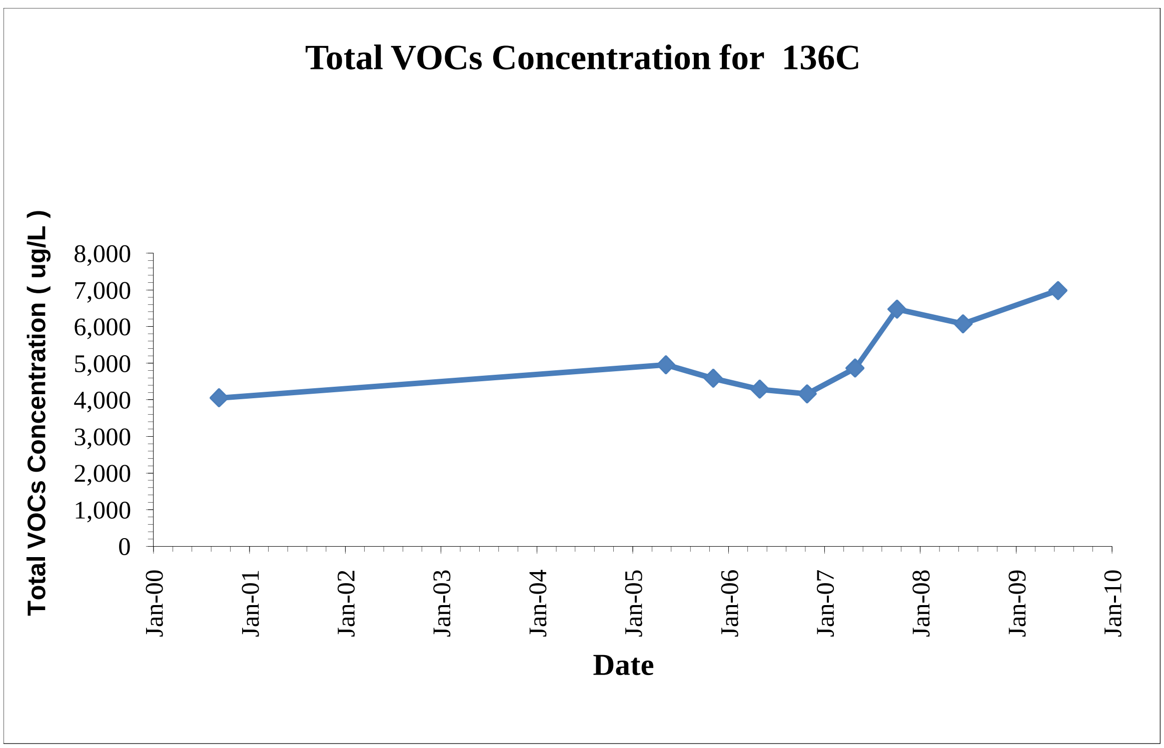

Total VOCs Concentration for 151B
Total VOCs Concentration (ug/L)
0
1
2
3
4
5
6
7
8
9
Jan-05
Jan-06
Jan-07
Jan-08
Jan-09
Jan-10
Date

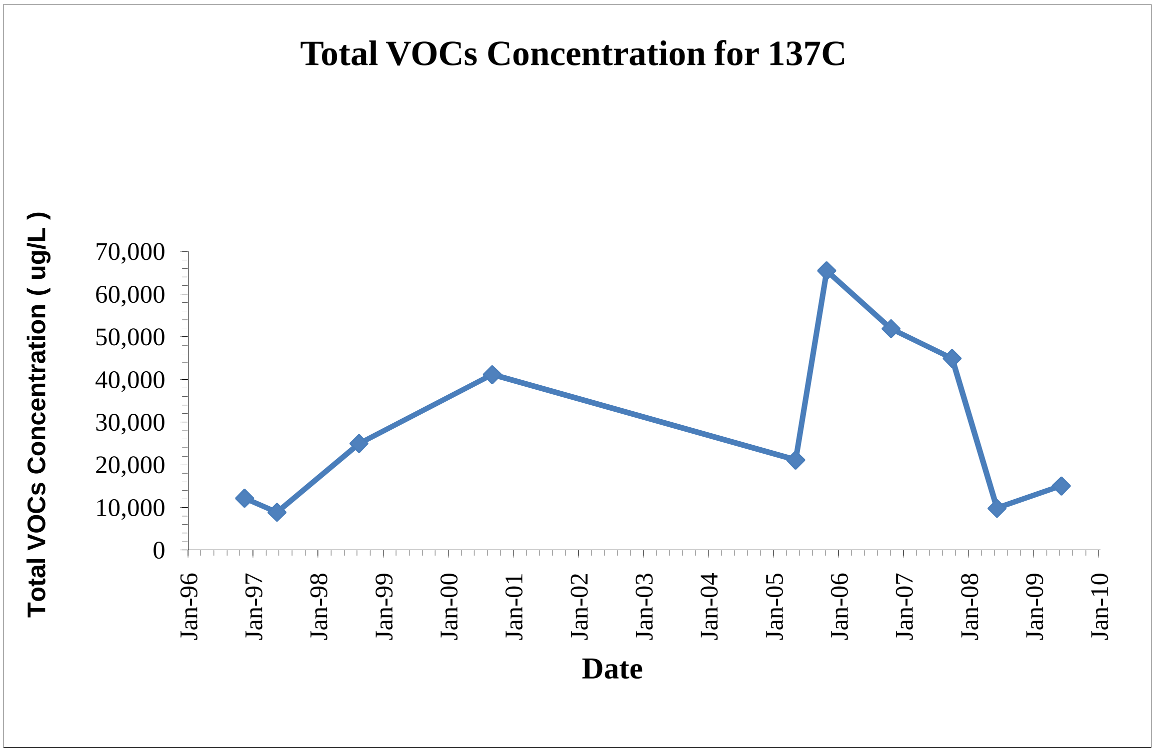

Total VOCs Concentration for 168B
Total VOCs Concentration (ug/L)
0
10,000
20,000
30,000
40,000
50,000
60,000
Jan-02
Jan-03
Jan-04
Jan-05
Jan-06
Jan-07
Jan-08
Jan-09
Jan-10
Date

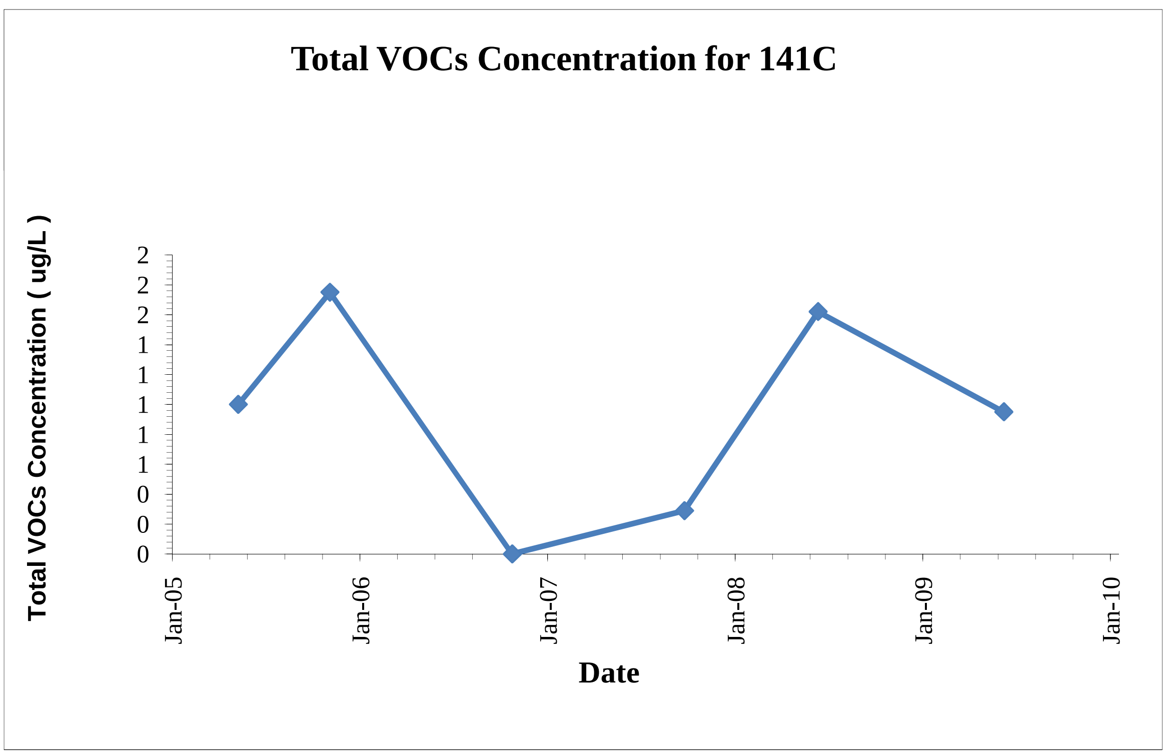

Total VOCs Concentration for 117B
Total VOCs Concentration (ug/L)
120,000
100,000
80,000
60,000
40,000
20,000
0
Jan-02
Jan-03
Jan-04
Jan-05
Jan-06
Jan-07
Jan-08
Jan-09
Jan-10
Date

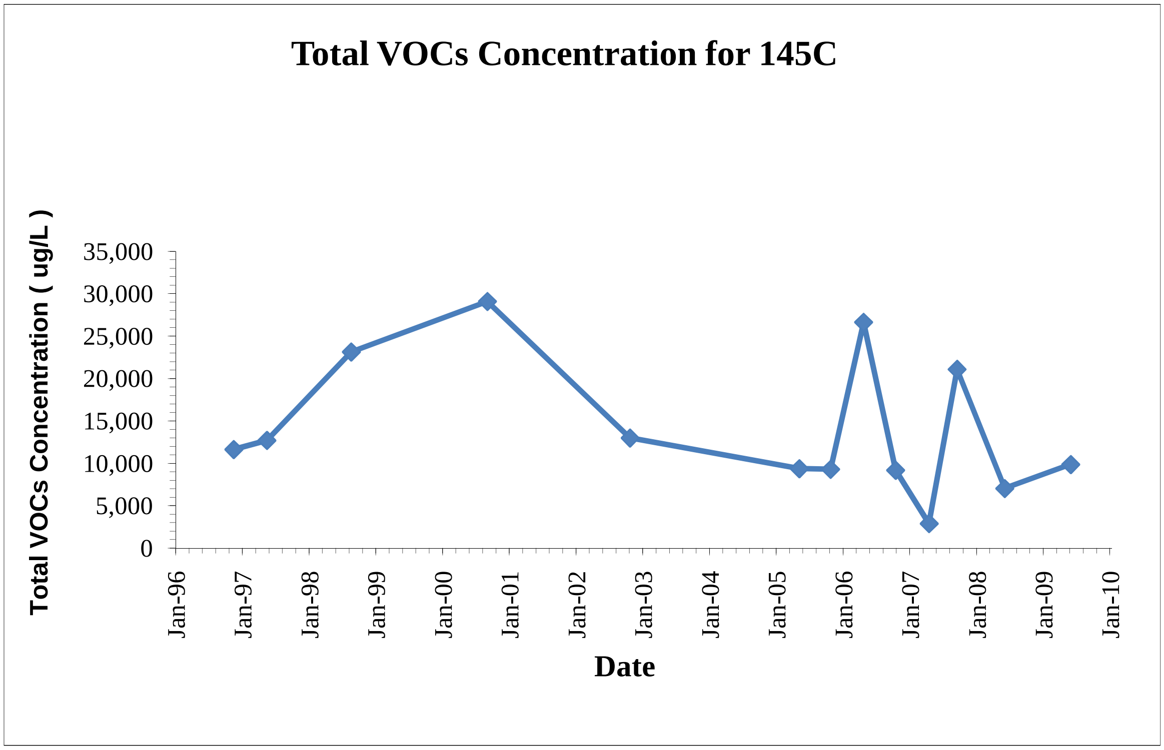

Total VOCs Concentration for 172B
Total VOCs Concentration (ug/L)
60,000.0
50,000.0
40,000.0
30,000.0
20,000.0
10,000.0
0.0
Jan-02
Jan-03
Jan-04
Jan-05
Jan-06
Jan-07
Jan-08
Jan-09
Jan-10
Date

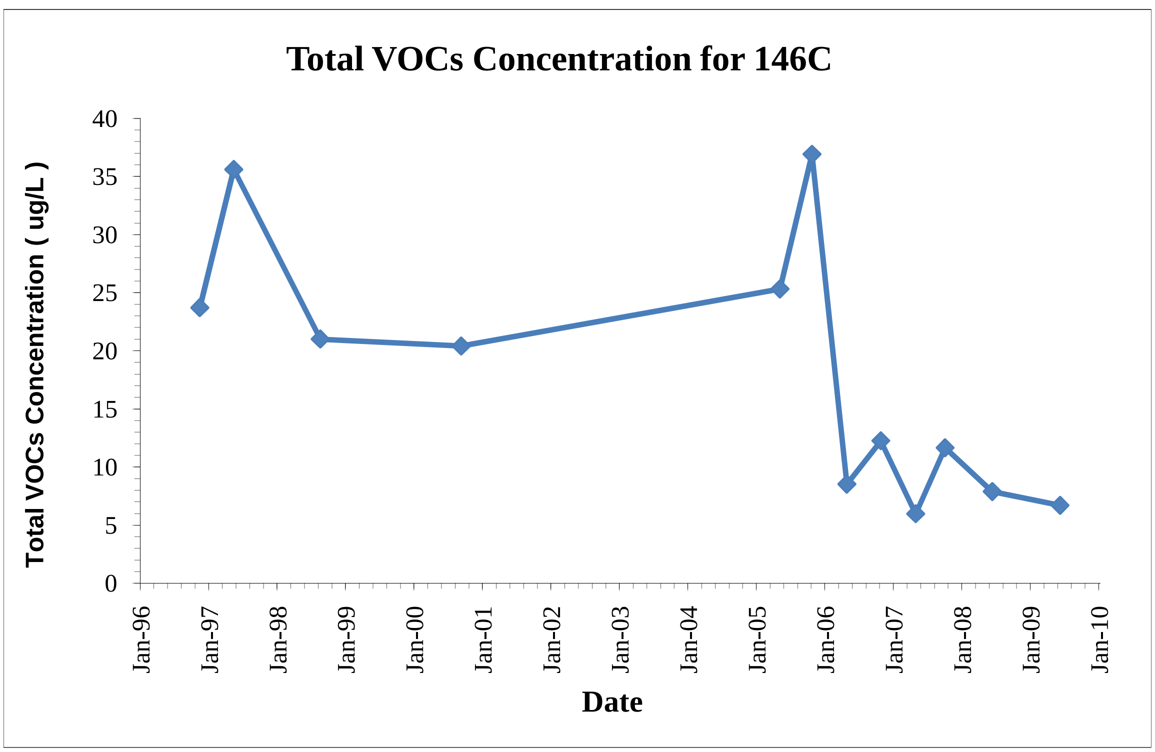

Total VOCs Concentration for 105C
Total VOCs Concentration (ug/L)
800,000
700,000
600,000
500,000
400,000
300,000
200,000
100,000
0
Jan-05
Jan-06
Jan-07
Jan-08
Jan-09
Jan-10
Date

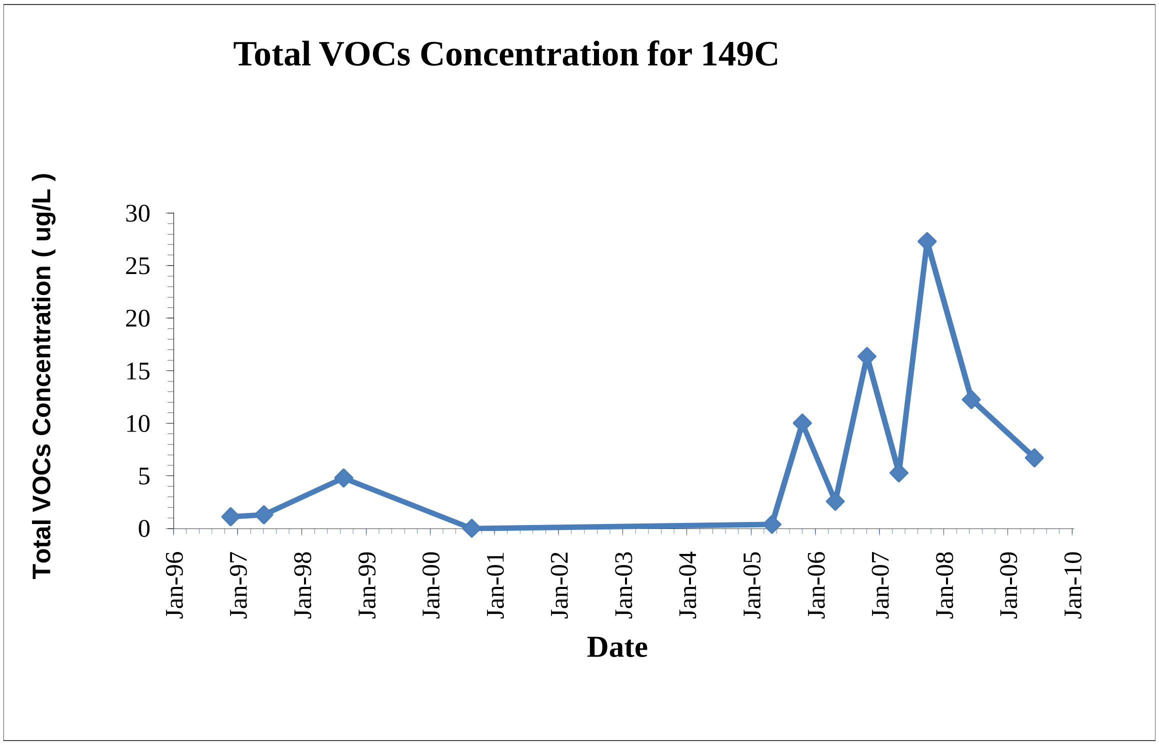

Total VOCs Concentration for 136C
Total VOCs Concentration (ug/L)
8,000
7,000
6,000
5,000
4,000
3,000
2,000
1,000
0
Jan-00
Jan-01
Jan-02
Jan-03
Jan-04
Jan-05
Jan-06
Jan-07
Jan-08
Jan-09
Jan-10
Date

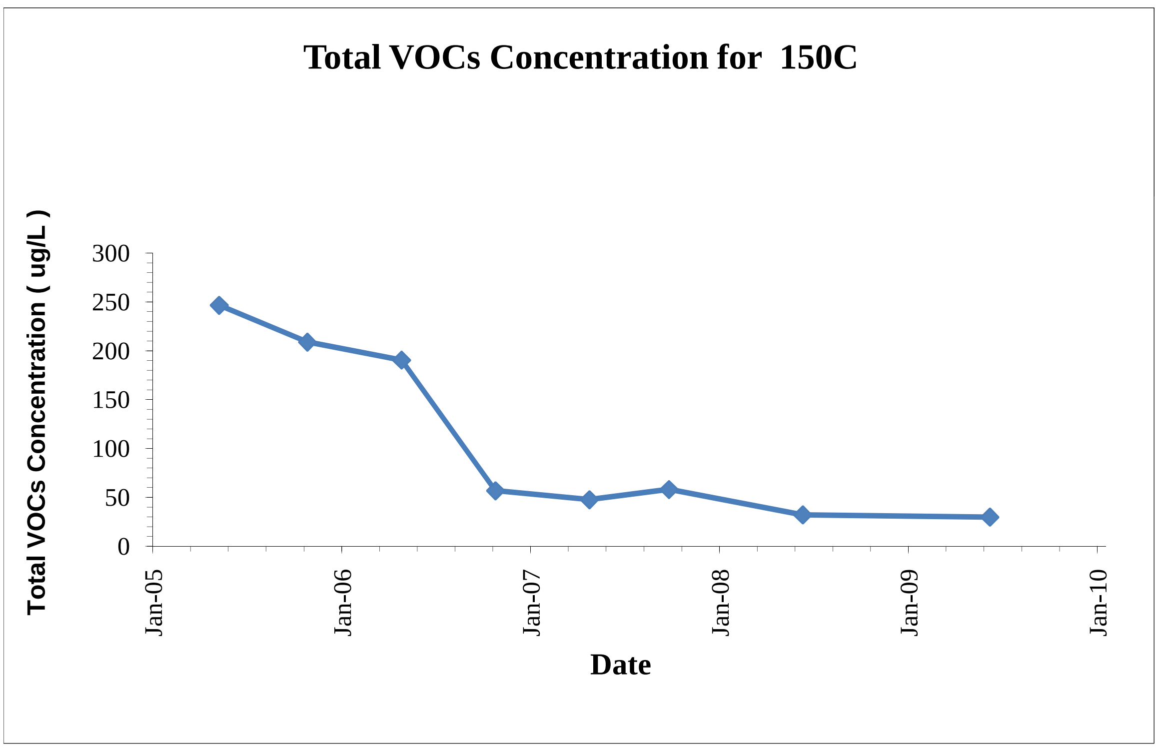

Total VOCs Concentration for 137C
Total VOCs Concentration (ug/L)
70,000
60,000
50,000
40,000
30,000
20,000
10,000
0
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
Jan-01
Jan-02
Jan-03
Jan-04
Jan-05
Jan-06
Jan-07
Jan-08
Jan-09
Jan-10
Date

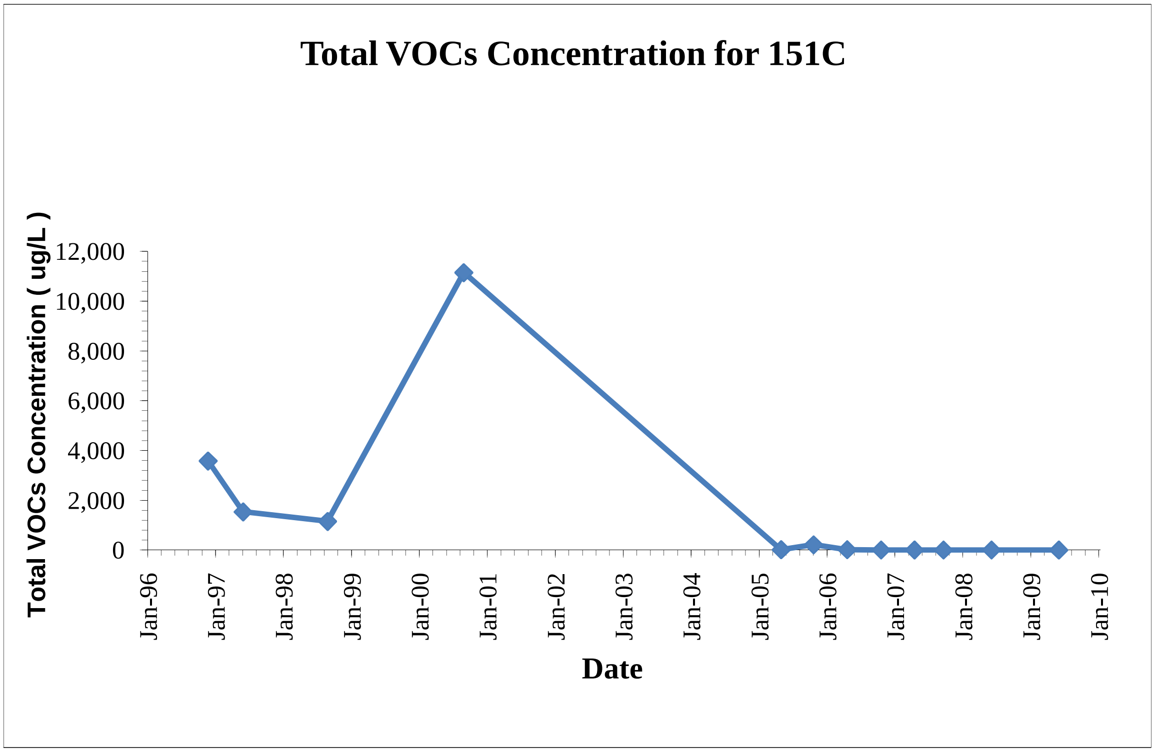

Total VOCs Concentration for 141C
Total VOCs Concentration (ug/L)
2
2
2
1
1
1
1
1
0
0
0
Jan-05
Jan-06
Jan-07
Jan-08
Jan-09
Jan-10
Date

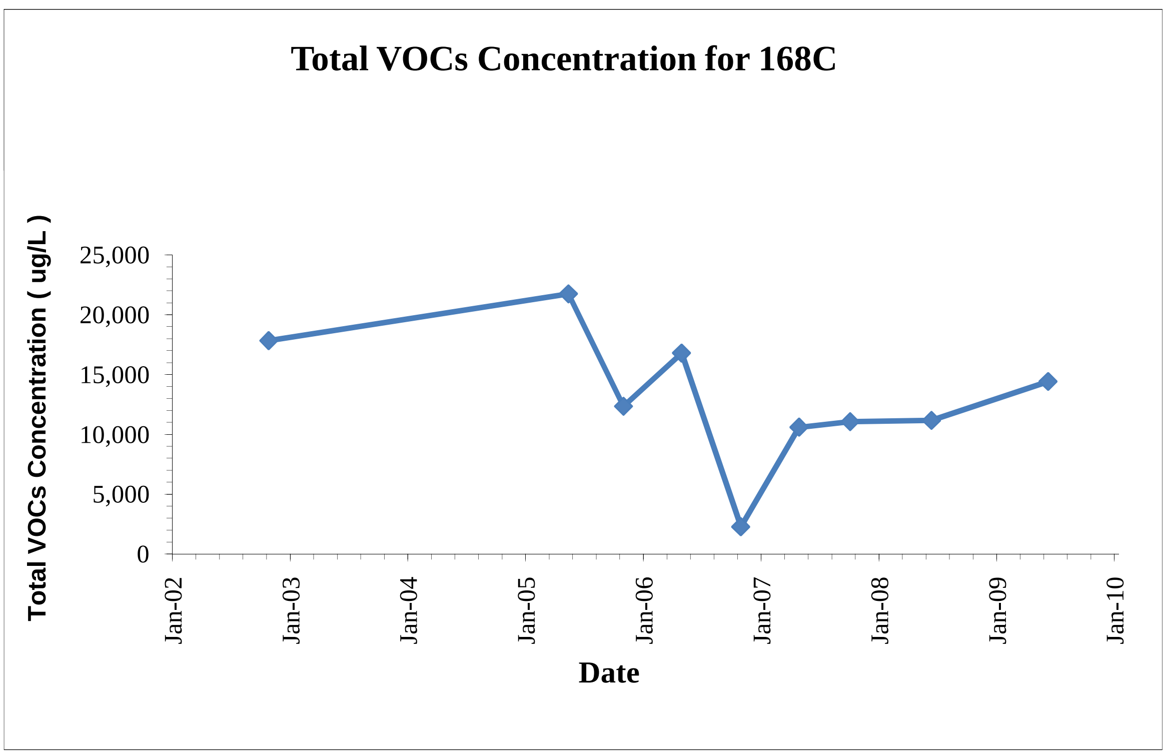

Total VOCs Concentration for 145C
Total VOCs Concentration (ug/L)
35,000
30,000
25,000
20,000
15,000
10,000
5,000
0
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
Jan-01
Jan-02
Jan-03
Jan-04
Jan-05
Jan-06
Jan-07
Jan-08
Jan-09
Jan-10
Date

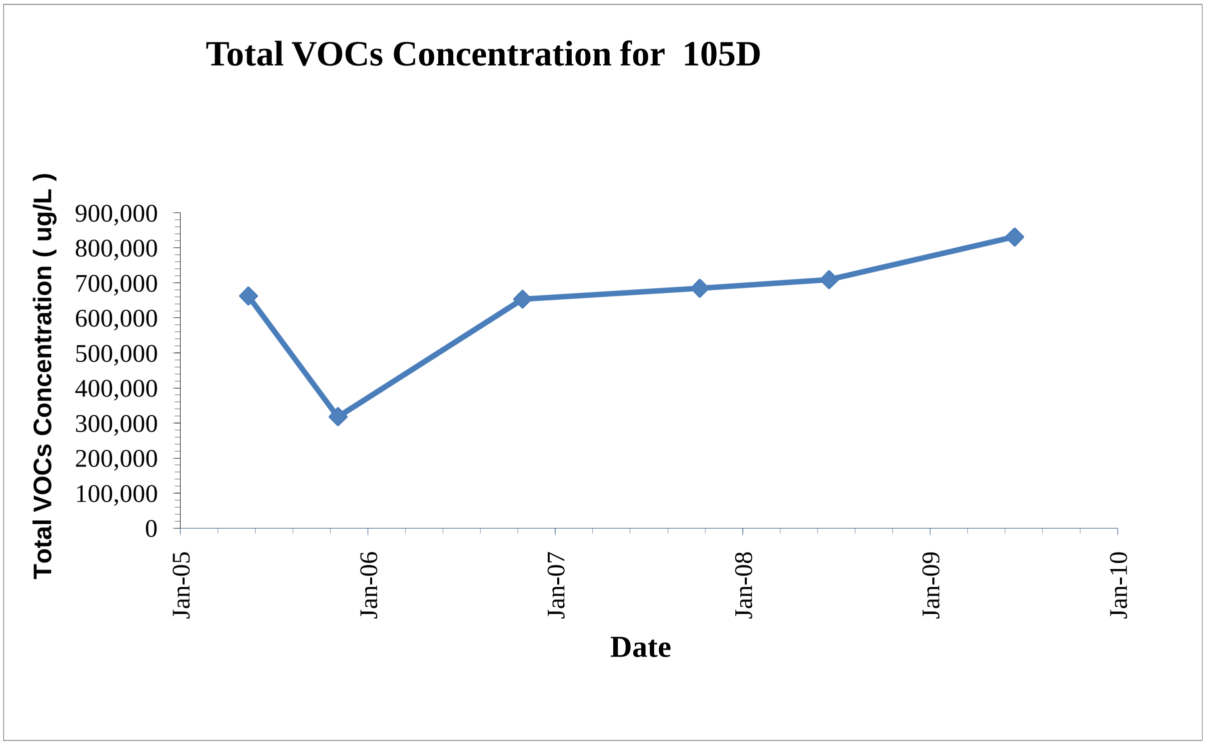

Total VOCs Concentration for 146C
Total VOCs Concentration (ug/L)
40
35
30
25
20
15
10
5
0
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
Jan-01
Jan-02
Jan-03
Jan-04
Jan-05
Jan-06
Jan-07
Jan-08
Jan-09
Jan-10
Date

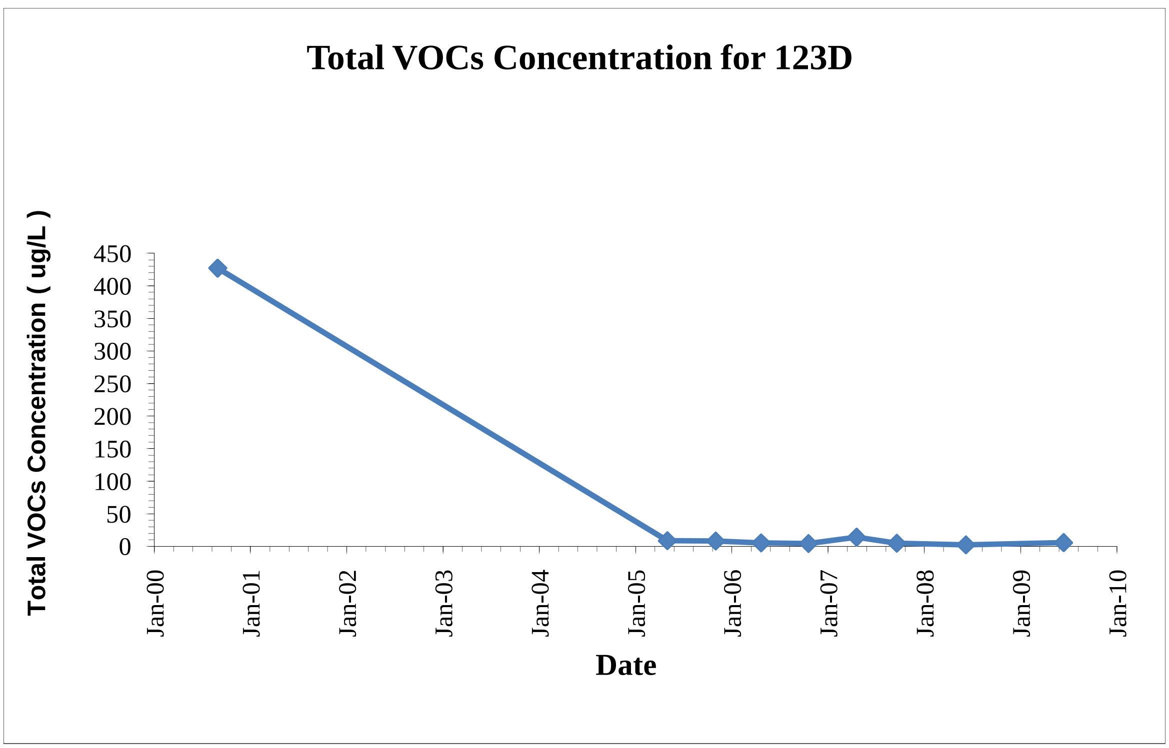

Total VOCs Concentration for 149C
Total VOCs Concentration (ug/L)
0
5
10
15
20
25
30
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
Jan-01
Jan-02
Jan-03
Jan-04
Jan-05
Jan-06
Jan-07
Jan-08
Jan-09
Jan-10
Date

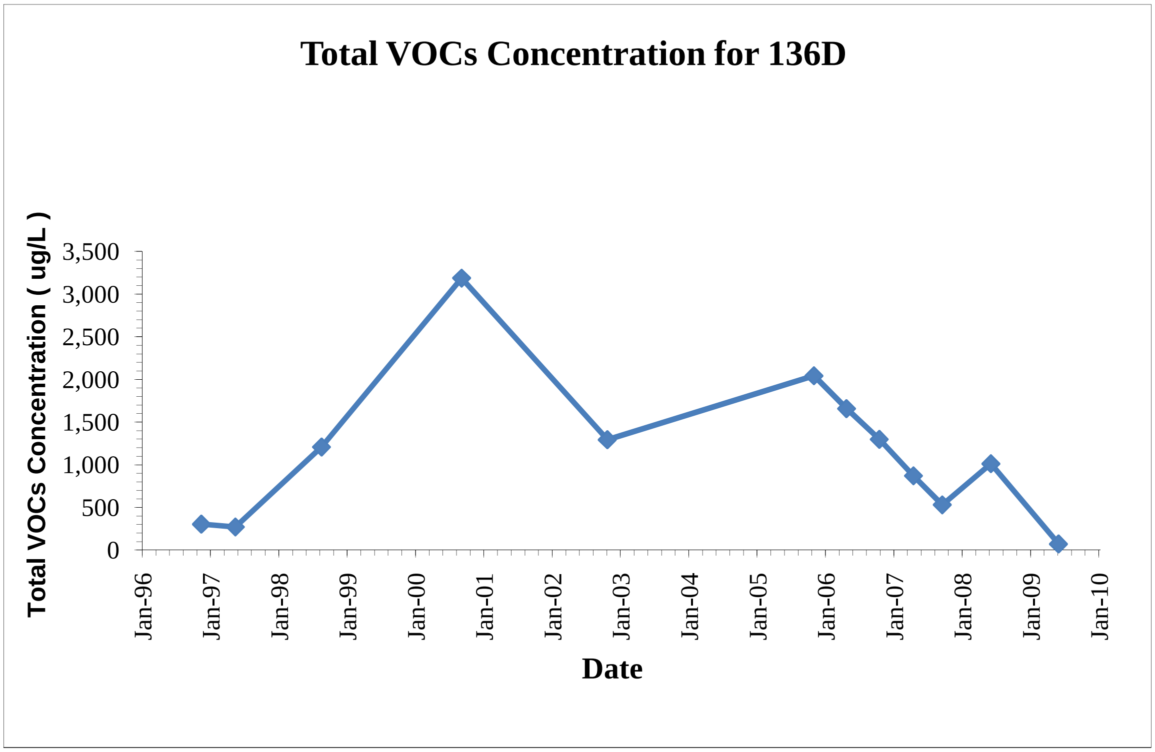

Total VOCs Concentration for 150C
Total VOCs Concentration (ug/L)
0
50
100
150
200
250
300
Jan-05
Jan-06
Jan-07
Jan-08
Jan-09
Jan-10
Date

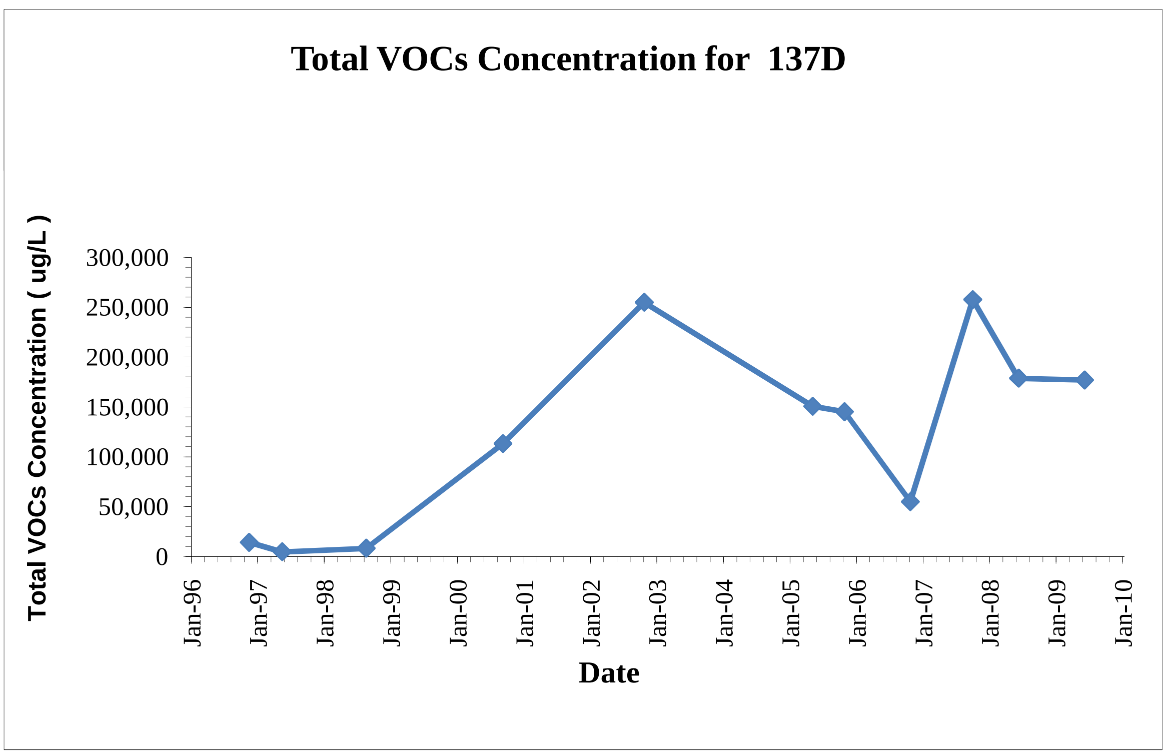

Total VOCs Concentration for 151C
Total VOCs Concentration (ug/L)
12,000
10,000
8,000
6,000
4,000
2,000
0
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
Jan-01
Jan-02
Jan-03
Jan-04
Jan-05
Jan-06
Jan-07
Jan-08
Jan-09
Jan-10
Date

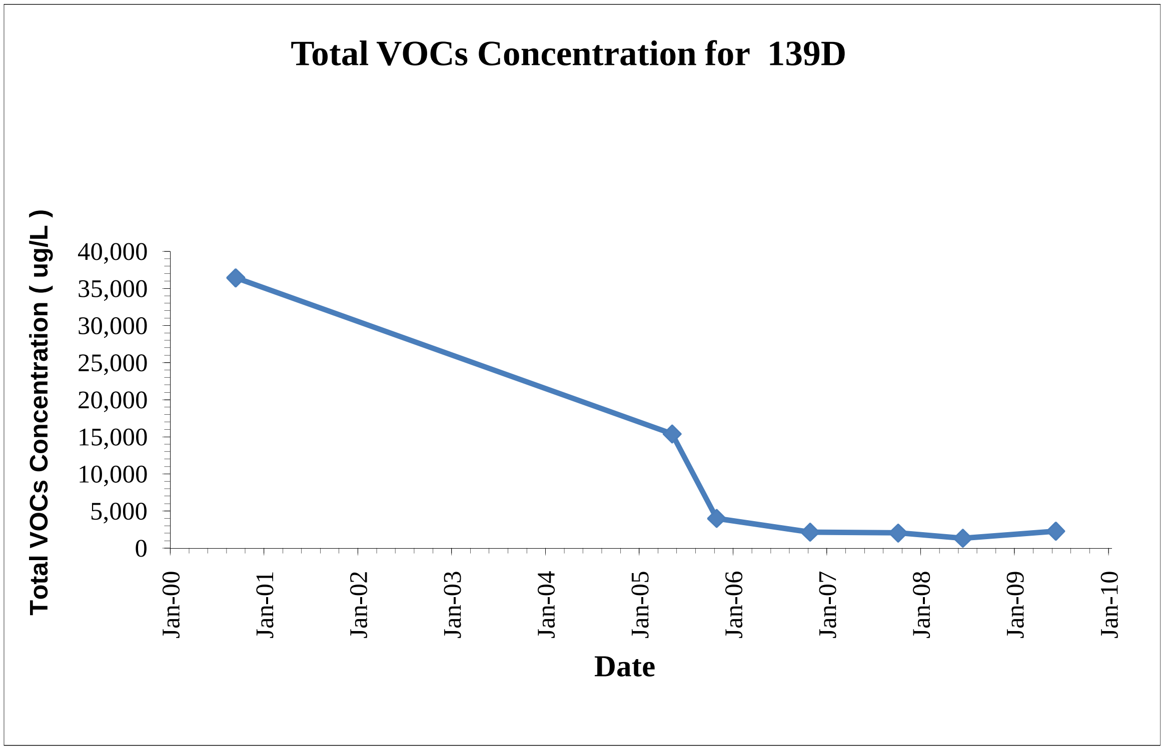

Total VOCs Concentration for 168C
Total VOCs Concentration (ug/L)
25,000
20,000
15,000
10,000
5,000
0
Jan-02
Jan-03
Jan-04
Jan-05
Jan-06
Jan-07
Jan-08
Jan-09
Jan-10
Date

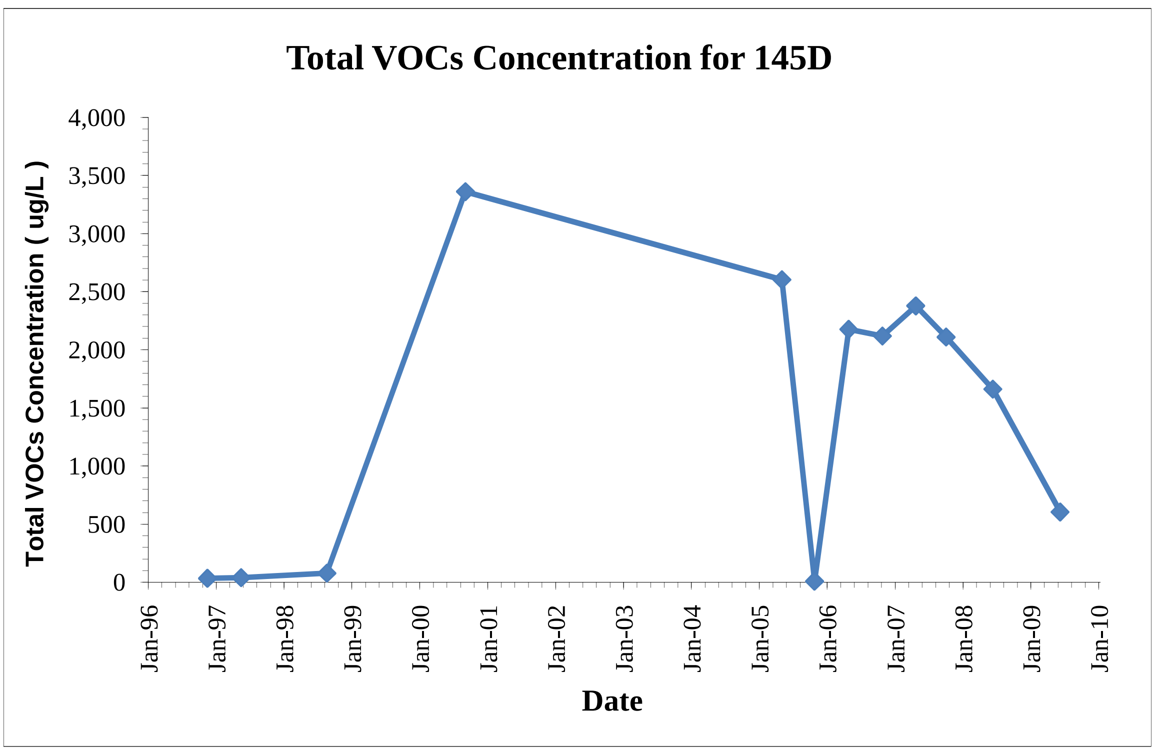

Total VOCs Concentration for 105D
Total VOCs Concentration (ug/L)
900,000
800,000
700,000
600,000
500,000
400,000
300,000
200,000
100,000
0
Jan-05
Jan-06
Jan-07
Jan-08
Jan-09
Jan-10
Date


Total VOCs Concentration for 123D
Total VOCs Concentration (ug/L)
450
400
350
300
250
200
150
100
50
0
Jan-00
Jan-01
Jan-02
Jan-03
Jan-04
Jan-05
Jan-06
Jan-07
Jan-08
Jan-09
Jan-10
Date


Total VOCs Concentration for 136D
Total VOCs Concentration (ug/L)
3,500
3,000
2,500
2,000
1,500
1,000
500
0
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
Jan-01
Jan-02
Jan-03
Jan-04
Jan-05
Jan-06
Jan-07
Jan-08
Jan-09
Jan-10
Date


Total VOCs Concentration for 137D
Total VOCs Concentration (ug/L)
300,000
250,000
200,000
150,000
100,000
50,000
0
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
Jan-01
Jan-02
Jan-03
Jan-04
Jan-05
Jan-06
Jan-07
Jan-08
Jan-09
Jan-10
Date


Total VOCs Concentration for 139D
Total VOCs Concentration (ug/L)
40,000
35,000
30,000
25,000
20,000
15,000
10,000
5,000
0
Jan-00
Jan-01
Jan-02
Jan-03
Jan-04
Jan-05
Jan-06
Jan-07
Jan-08
Jan-09
Jan-10
Date


Total VOCs Concentration for 145D
Total VOCs Concentration (ug/L)
4,000
3,500
3,000
2,500
2,000
1,500
1,000
500
0
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
Jan-01
Jan-02
Jan-03
Jan-04
Jan-05
Jan-06
Jan-07
Jan-08
Jan-09
Jan-10
Date

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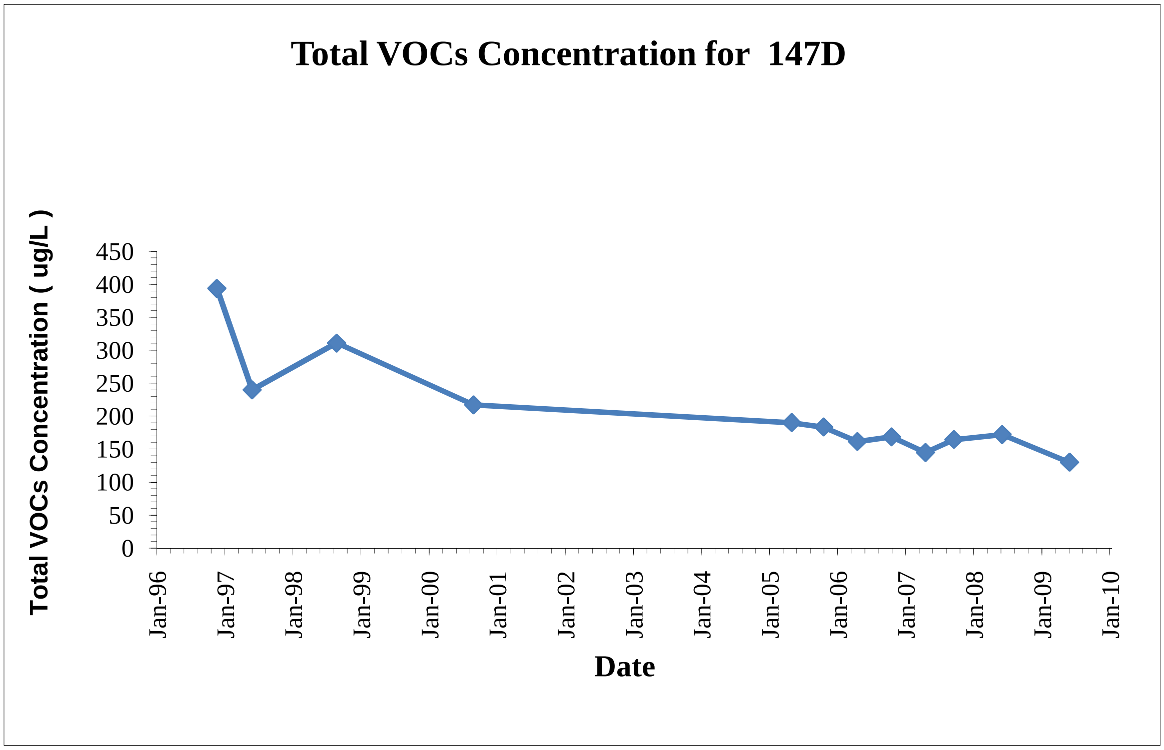
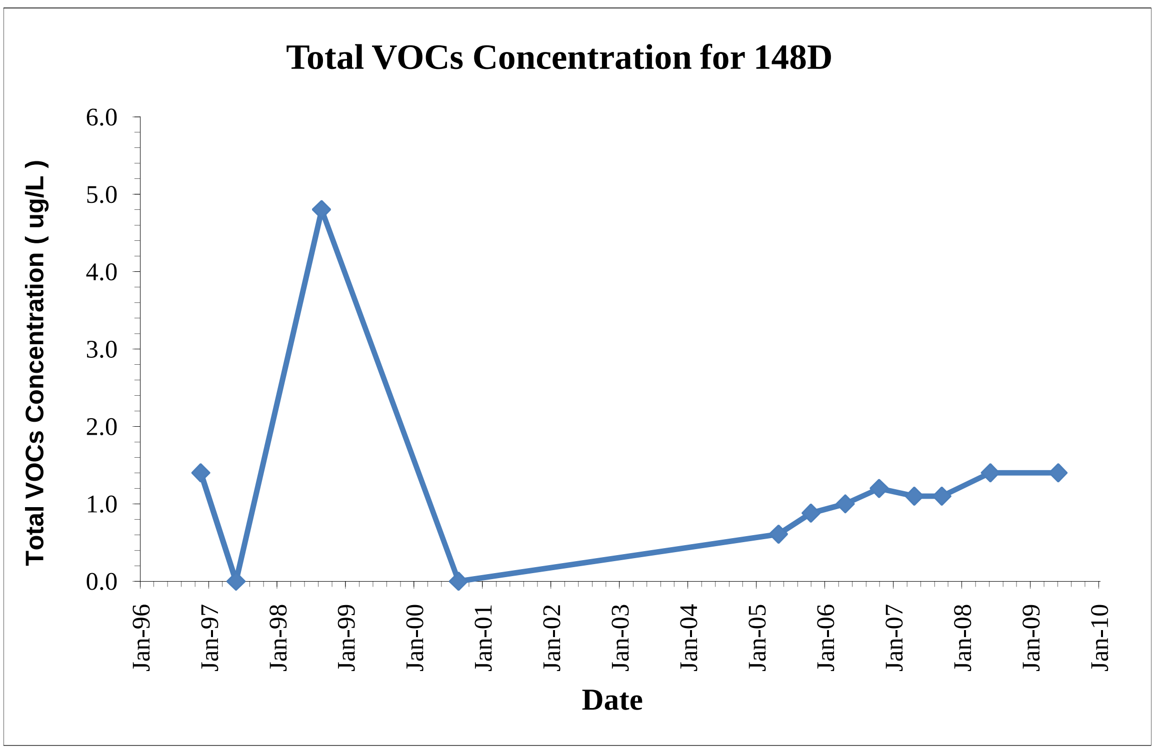
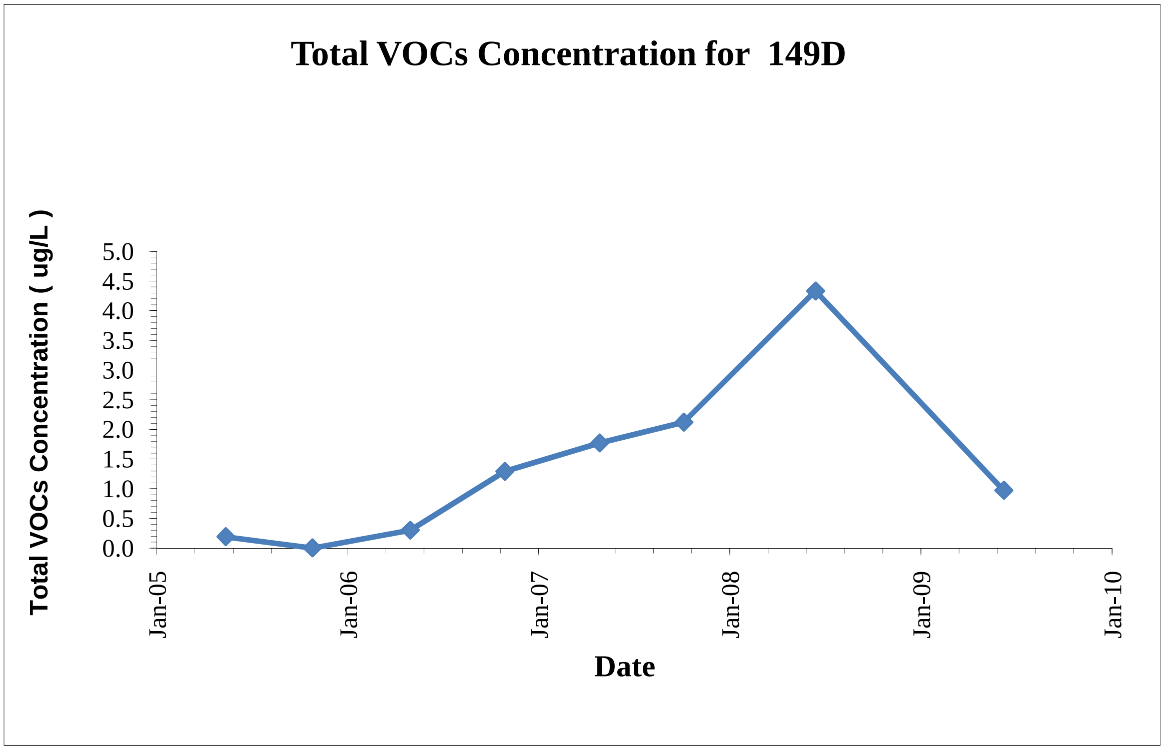
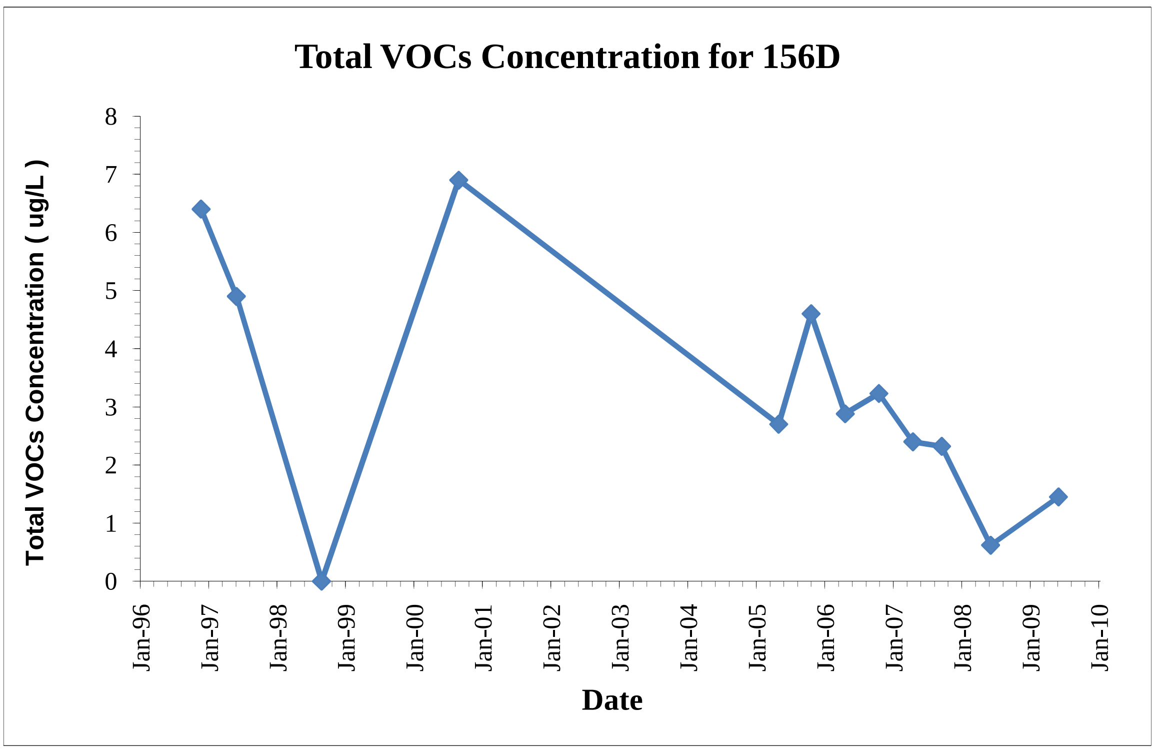
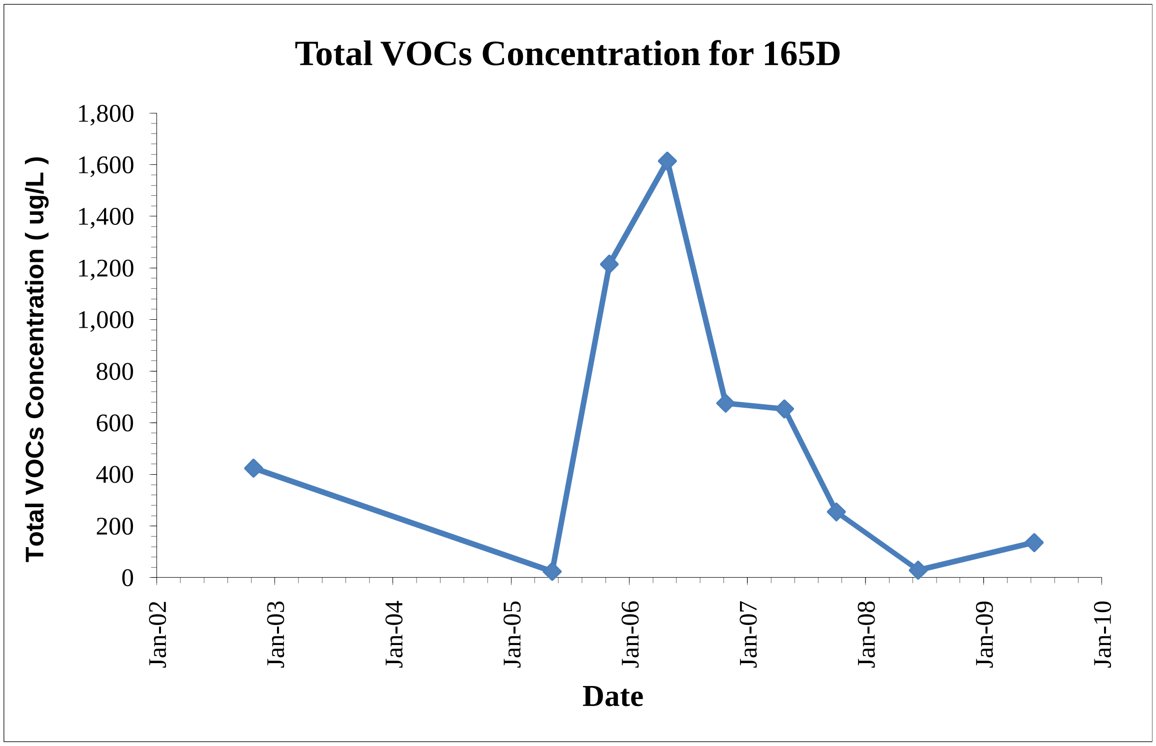
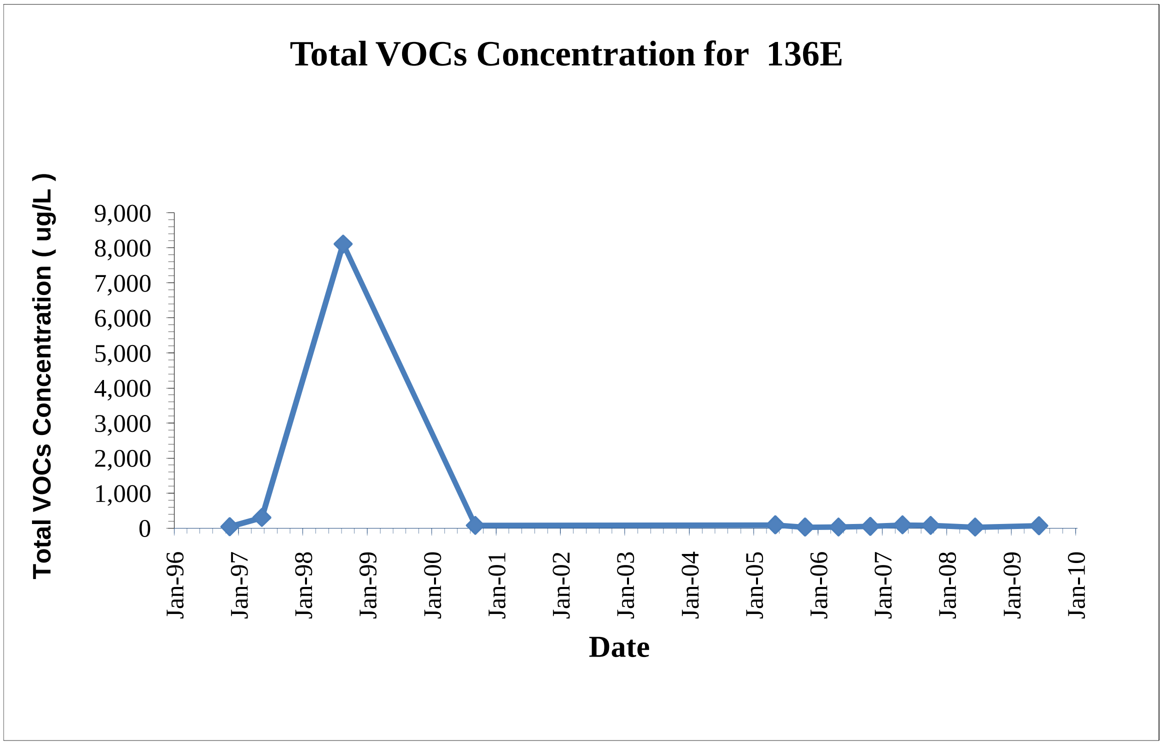

Total VOCs Concentration for 147D
Total VOCs Concentration (ug/L)
450
400
350
300
250
200
150
100
50
0
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
Jan-01
Jan-02
Jan-03
Jan-04
Jan-05
Jan-06
Jan-07
Jan-08
Jan-09
Jan-10
Date

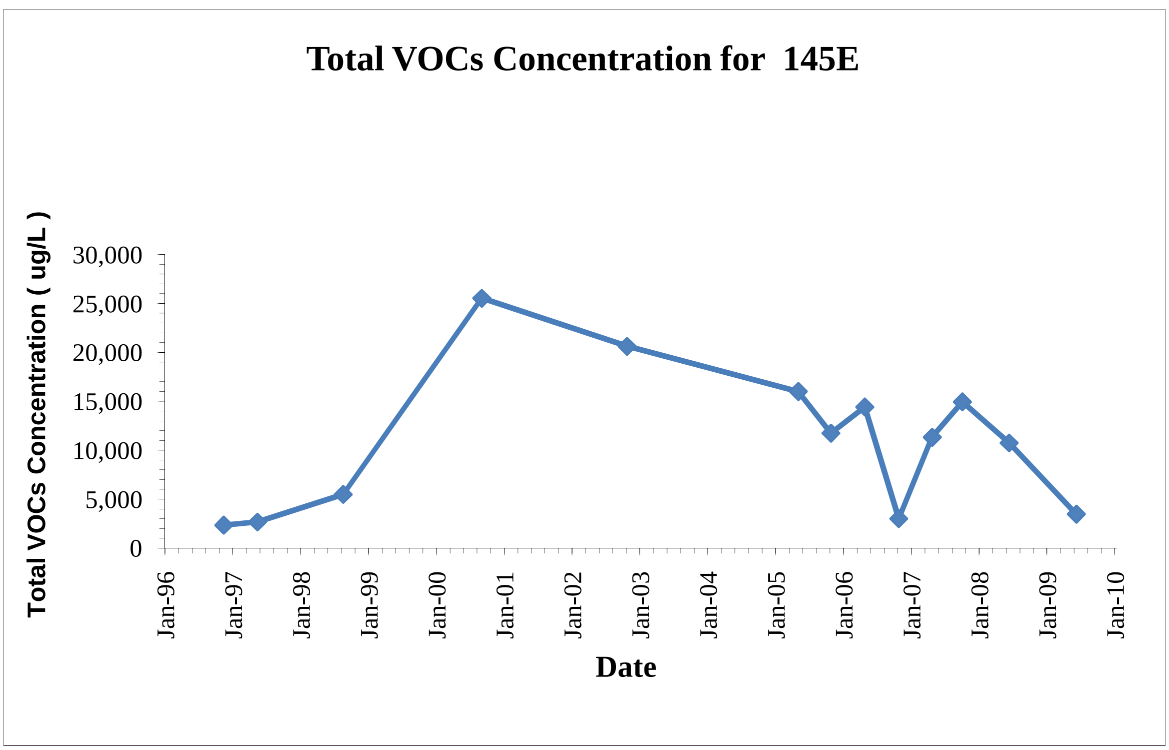

Total VOCs Concentration for 148D
Total VOCs Concentration (ug/L)
6.0
5.0
4.0
3.0
2.0
1.0
0.0
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
Jan-01
Jan-02
Jan-03
Jan-04
Jan-05
Jan-06
Jan-07
Jan-08
Jan-09
Jan-10
Date

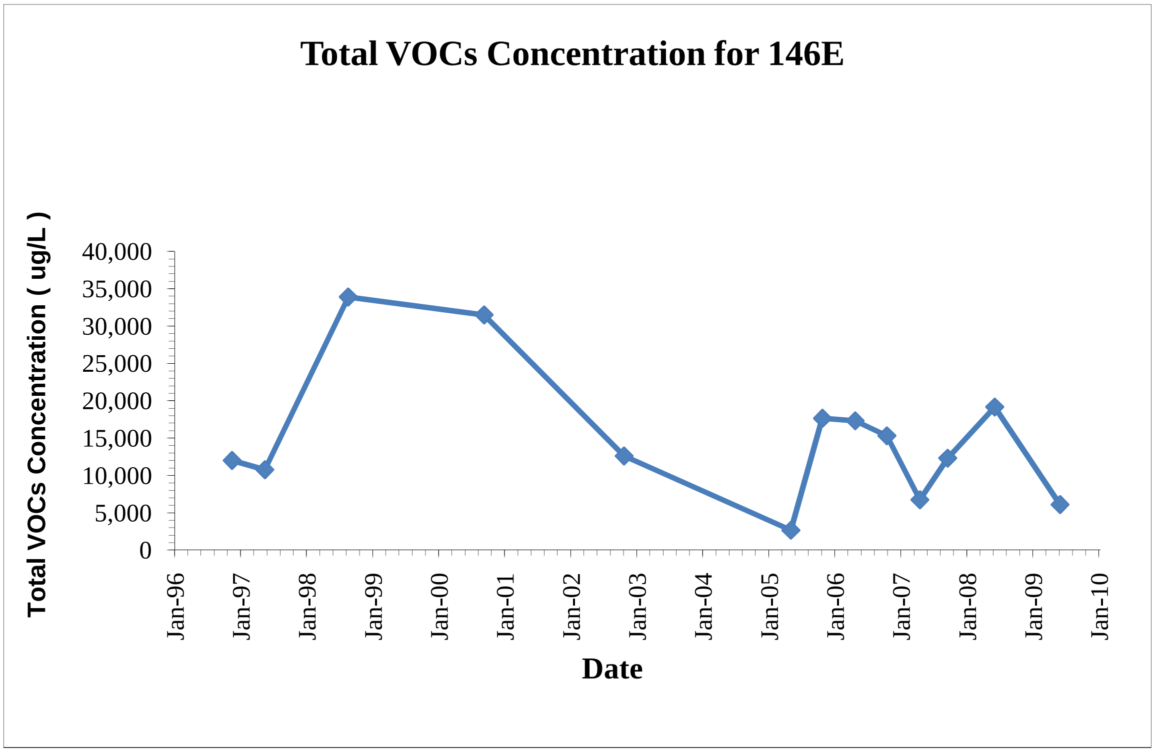

Total VOCs Concentration for 149D
Total VOCs Concentration (ug/L)
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
Jan-05
Jan-06
Jan-07
Jan-08
Jan-09
Jan-10
Date

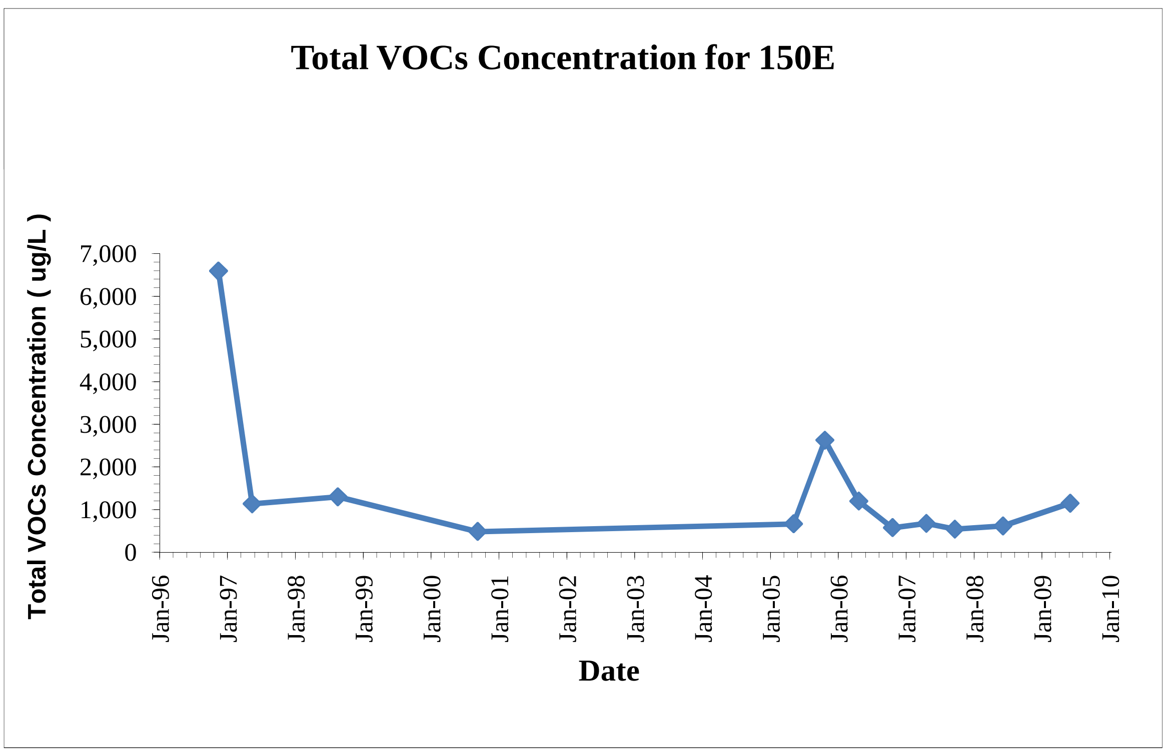

Total VOCs Concentration for 156D
Total VOCs Concentration (ug/L)
8
7
6
5
4
3
2
1
0
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
Jan-01
Jan-02
Jan-03
Jan-04
Jan-05
Jan-06
Jan-07
Jan-08
Jan-09
Jan-10
Date

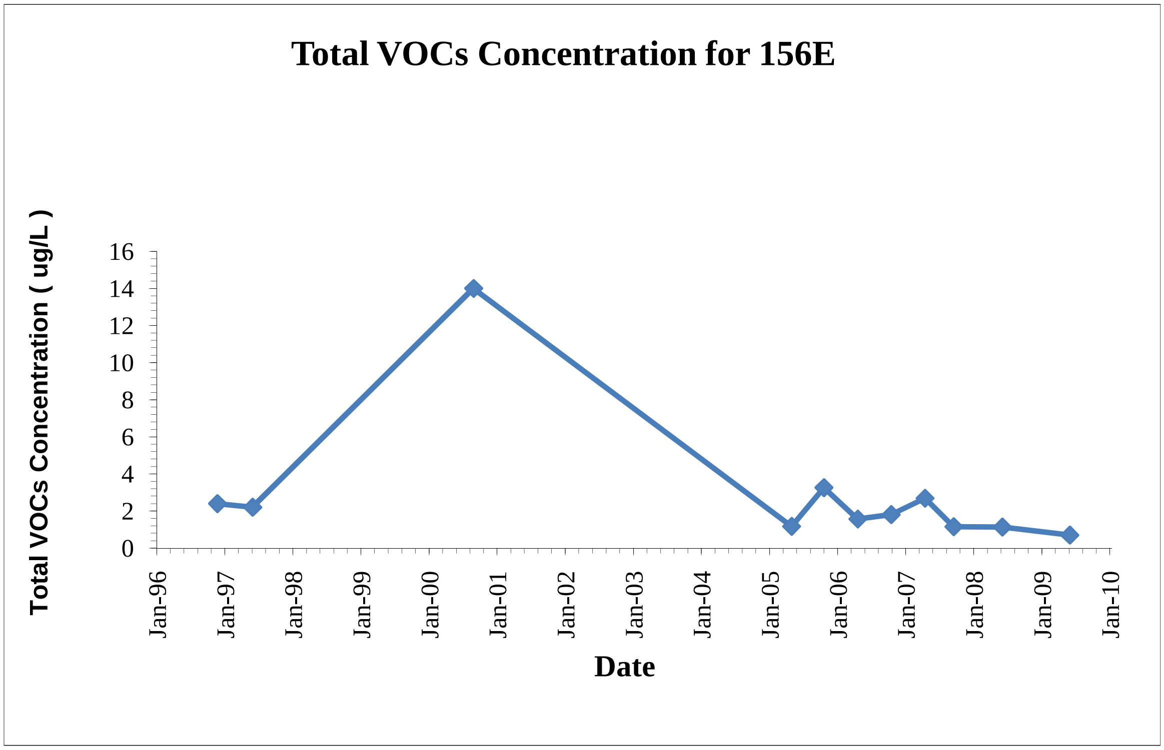

Total VOCs Concentration for 165D
Total VOCs Concentration (ug/L)
1,800
1,600
1,400
1,200
1,000
800
600
400
200
0
Jan-02
Jan-03
Jan-04
Jan-05
Jan-06
Jan-07
Jan-08
Jan-09
Jan-10
Date

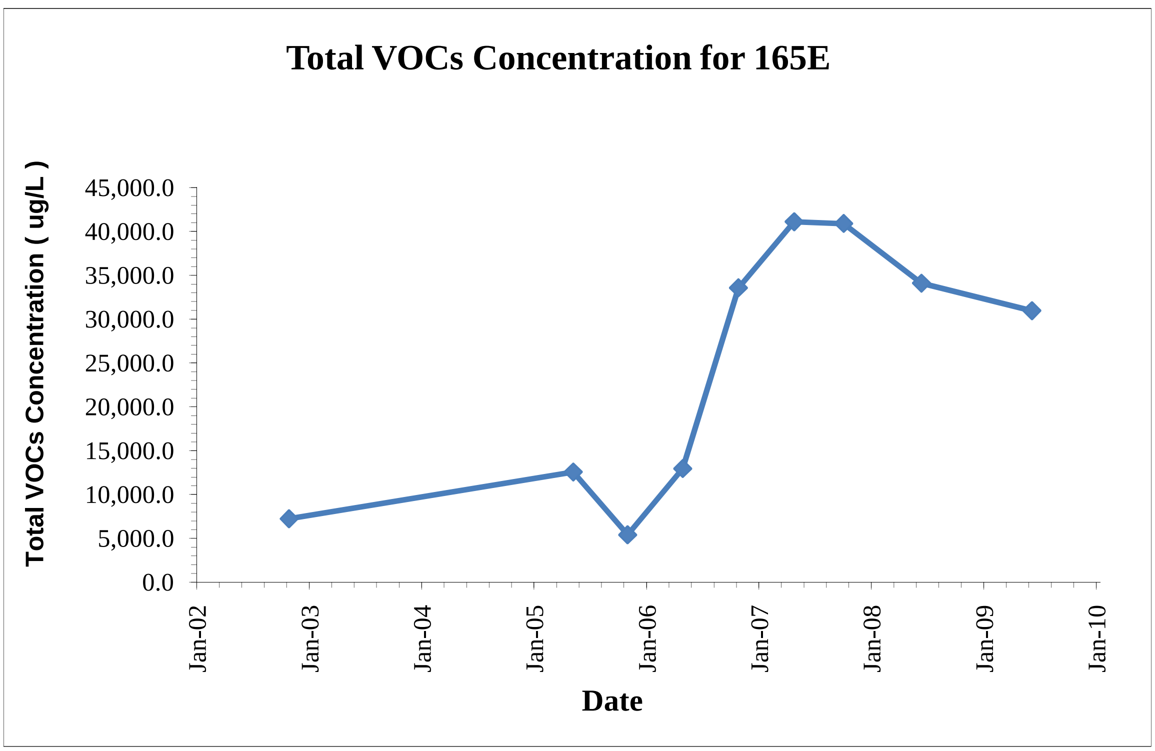

Total VOCs Concentration for 136E
Total VOCs Concentration (ug/L)
9,000
8,000
7,000
6,000
5,000
4,000
3,000
2,000
1,000
0
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
Jan-01
Jan-02
Jan-03
Jan-04
Jan-05
Jan-06
Jan-07
Jan-08
Jan-09
Jan-10
Date

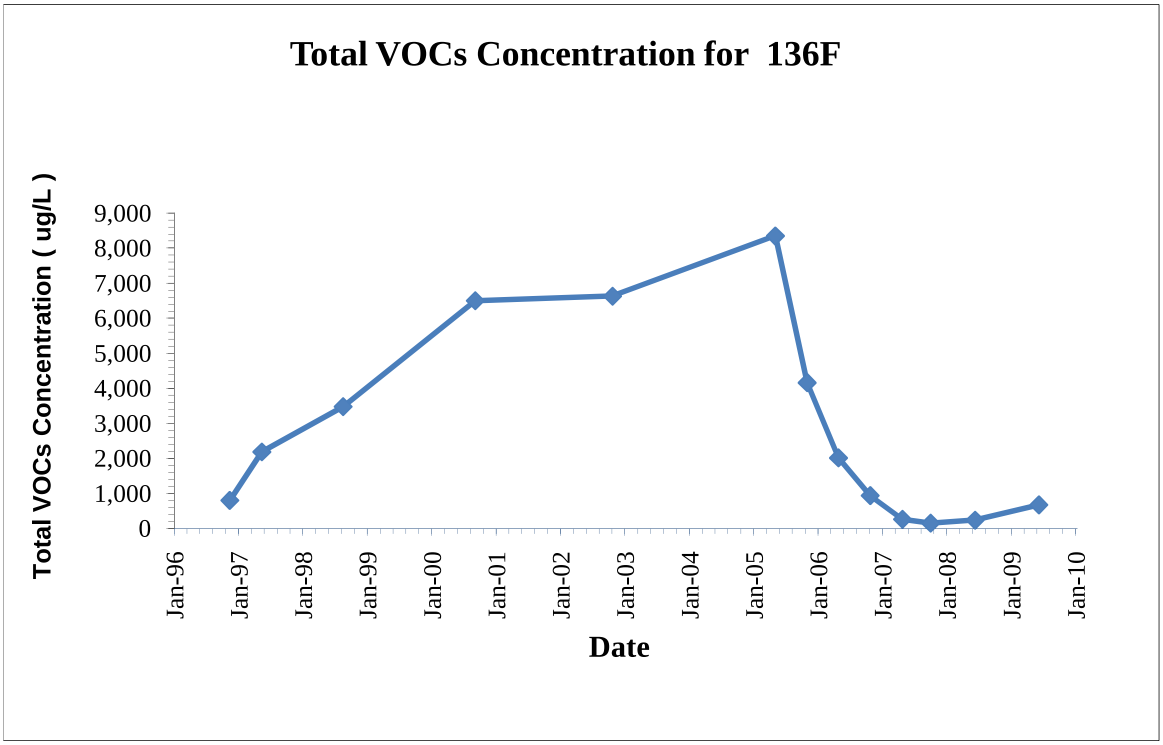

Total VOCs Concentration for 145E
Total VOCs Concentration (ug/L)
30,000
25,000
20,000
15,000
10,000
5,000
0
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
Jan-01
Jan-02
Jan-03
Jan-04
Jan-05
Jan-06
Jan-07
Jan-08
Jan-09
Jan-10
Date

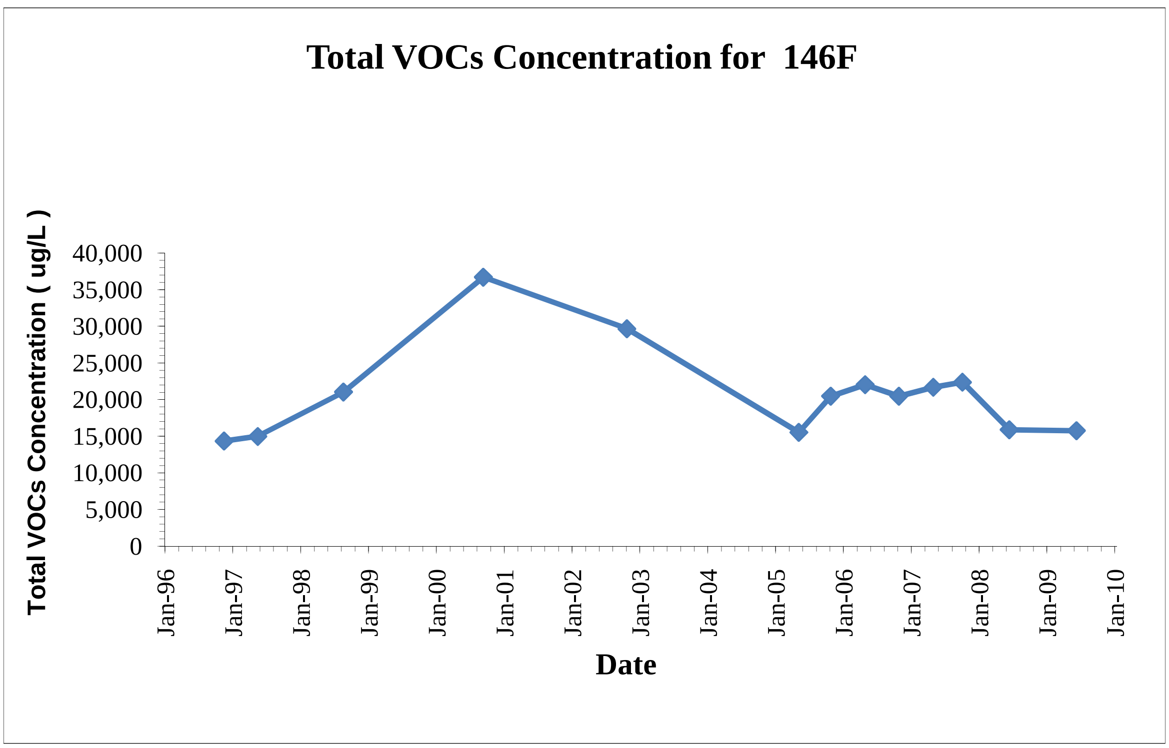

Total VOCs Concentration for 146E
Total VOCs Concentration (ug/L)
40,000
35,000
30,000
25,000
20,000
15,000
10,000
5,000
0
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
Jan-01
Jan-02
Jan-03
Jan-04
Jan-05
Jan-06
Jan-07
Jan-08
Jan-09
Jan-10
Date

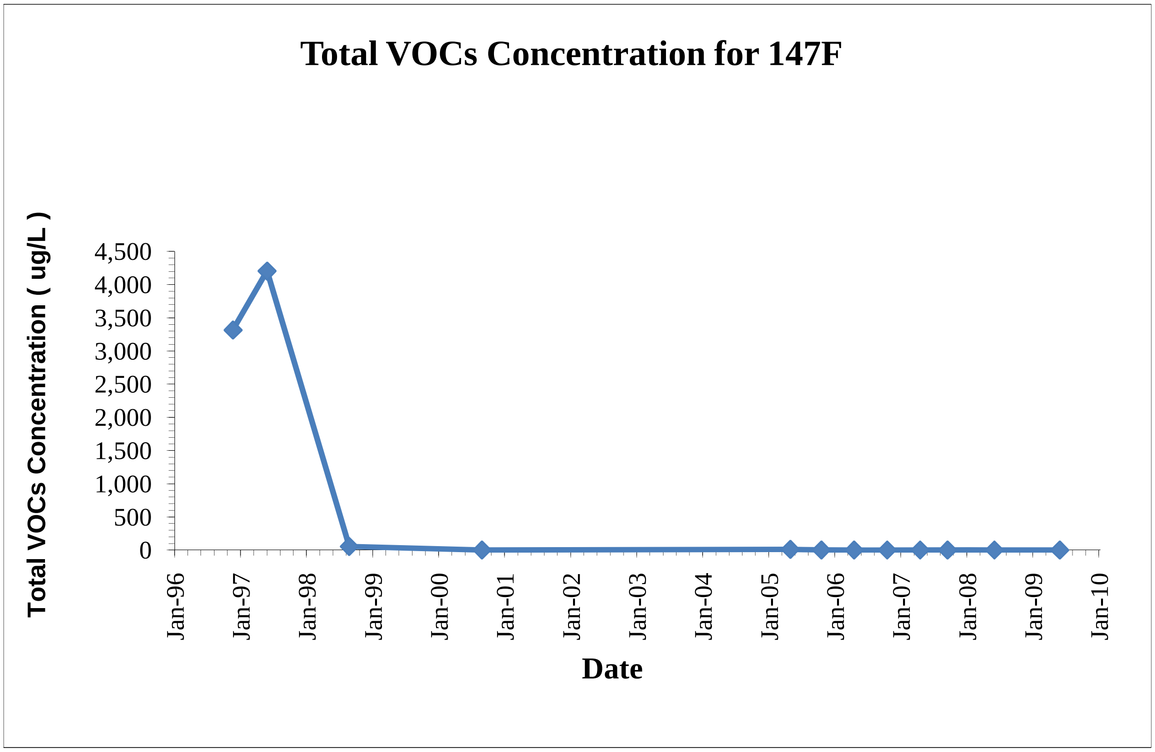

Total VOCs Concentration for 150E
Total VOCs Concentration (ug/L)
7,000
6,000
5,000
4,000
3,000
2,000
1,000
0
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
Jan-01
Jan-02
Jan-03
Jan-04
Jan-05
Jan-06
Jan-07
Jan-08
Jan-09
Jan-10
Date

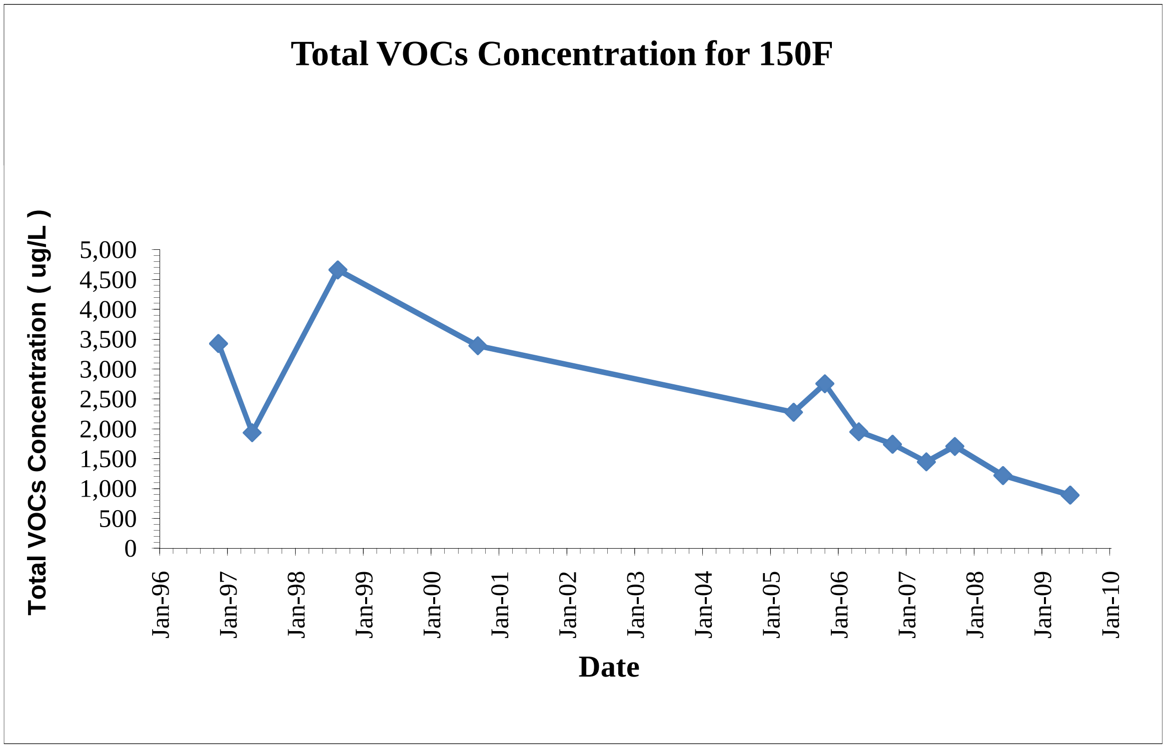

Total VOCs Concentration for 156E
Total VOCs Concentration (ug/L)
16
14
12
10
8
6
4
2
0
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
Jan-01
Jan-02
Jan-03
Jan-04
Jan-05
Jan-06
Jan-07
Jan-08
Jan-09
Jan-10
Date


Total VOCs Concentration for 165E
Total VOCs Concentration (ug/L)
45,000.0
40,000.0
35,000.0
30,000.0
25,000.0
20,000.0
15,000.0
10,000.0
5,000.0
0.0
Jan-02
Jan-03
Jan-04
Jan-05
Jan-06
Jan-07
Jan-08
Jan-09
Jan-10
Date


Total VOCs Concentration for 136F
Total VOCs Concentration (ug/L)
9,000
8,000
7,000
6,000
5,000
4,000
3,000
2,000
1,000
0
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
Jan-01
Jan-02
Jan-03
Jan-04
Jan-05
Jan-06
Jan-07
Jan-08
Jan-09
Jan-10
Date


Total VOCs Concentration for 146F
Total VOCs Concentration (ug/L)
40,000
35,000
30,000
25,000
20,000
15,000
10,000
5,000
0
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
Jan-01
Jan-02
Jan-03
Jan-04
Jan-05
Jan-06
Jan-07
Jan-08
Jan-09
Jan-10
Date


Total VOCs Concentration for 147F
Total VOCs Concentration (ug/L)
4,500
4,000
3,500
3,000
2,500
2,000
1,500
1,000
500
0
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
Jan-01
Jan-02
Jan-03
Jan-04
Jan-05
Jan-06
Jan-07
Jan-08
Jan-09
Jan-10
Date


Total VOCs Concentration for 150F
Total VOCs Concentration (ug/L)
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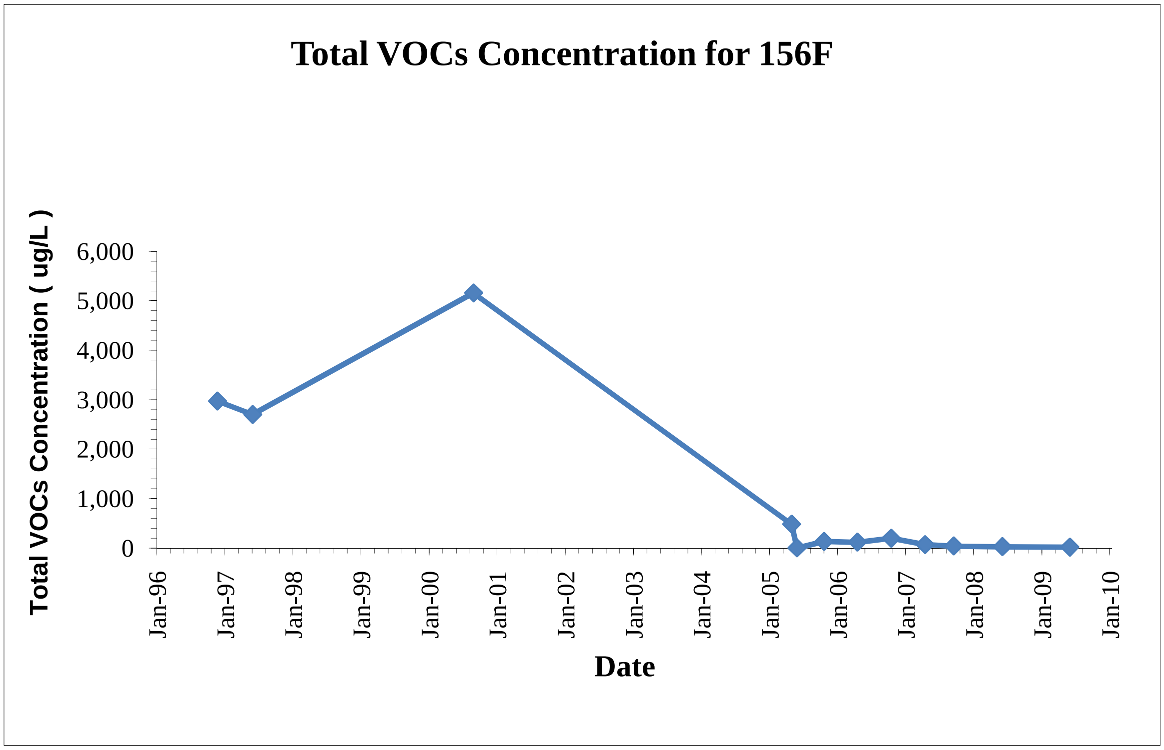
4,500
4,000
3,500
3,000
2,500
2,000
1,500
1,000
500
0
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
Jan-01
Jan-02
Jan-03
Jan-04
Jan-05
Jan-06
Jan-07
Jan-08
Jan-09
Jan-10
Date


Total VOCs Concentration for 156F
Total VOCs Concentration (ug/L)
6,000
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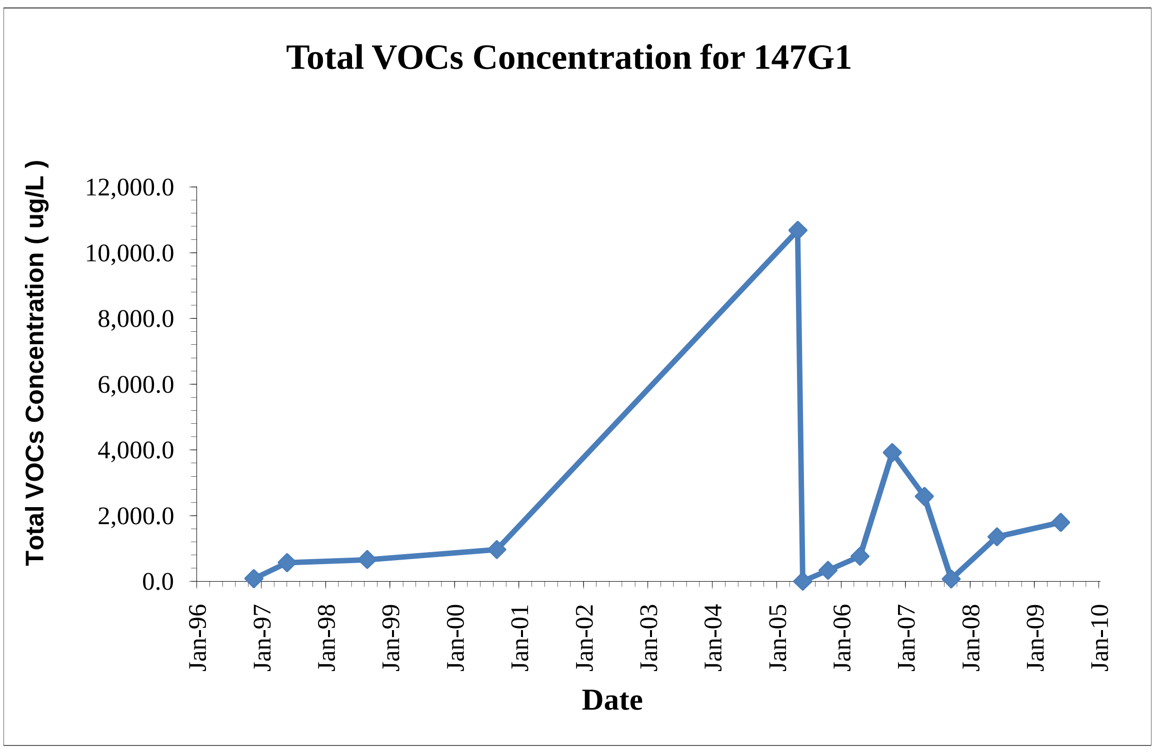
4,000
3,000
2,000
1,000
0
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
Jan-01
Jan-02
Jan-03
Jan-04
Jan-05
Jan-06
Jan-07
Jan-08
Jan-09
Jan-10
Date


Total VOCs Concentration for 147G1
Total VOCs Concentration (ug/L)
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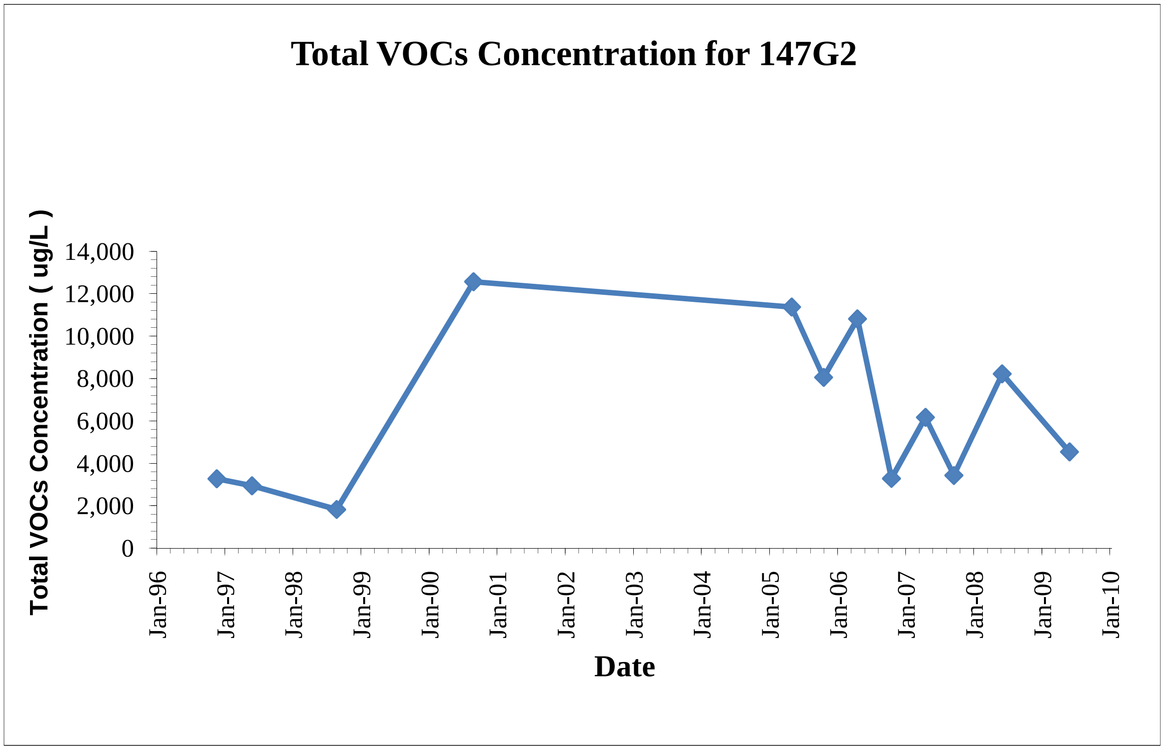
8,000.0
6,000.0
4,000.0
2,000.0
0.0
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
Jan-01
Jan-02
Jan-03
Jan-04
Jan-05
Jan-06
Jan-07
Jan-08
Jan-09
Jan-10
Date


Total VOCs Concentration for 147G2
Total VOCs Concentration (ug/L)
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10,000
8,000
6,000
4,000
2,000
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Jan-96
Jan-97
Jan-98
Jan-99
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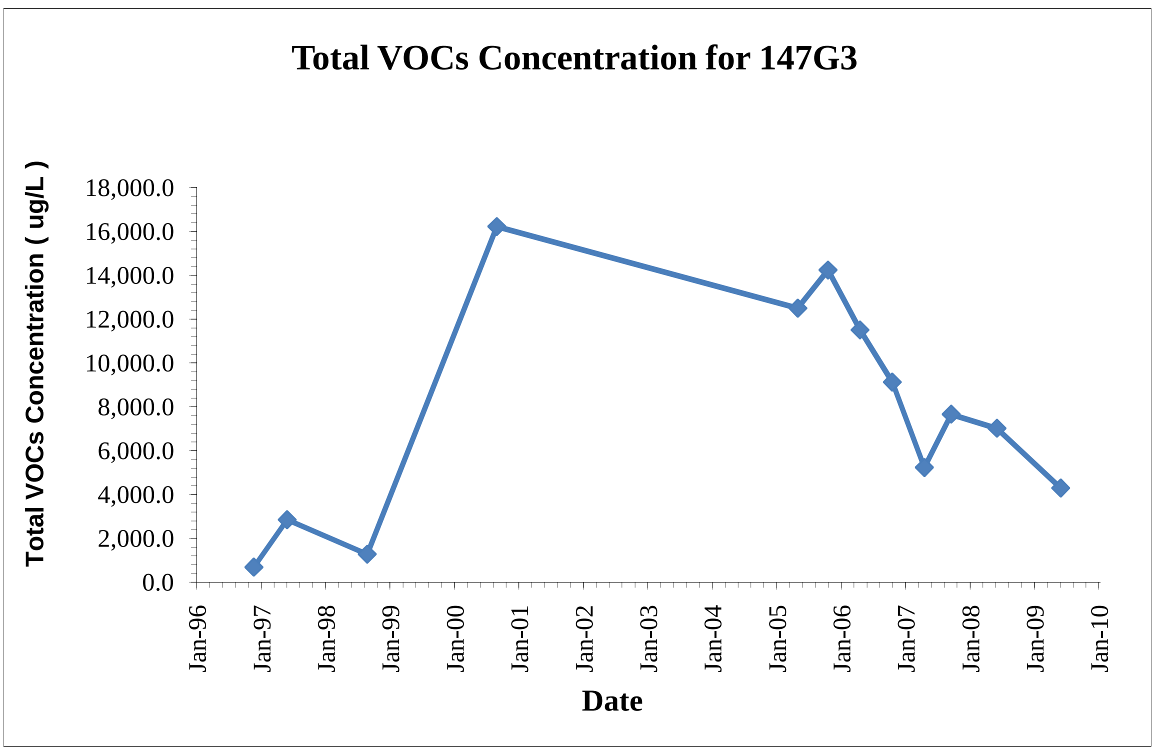
Jan-06
Jan-07
Jan-08
Jan-09
Jan-10
Date


Total VOCs Concentration for 147G3
Total VOCs Concentration (ug/L)
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12,000.0
10,000.0
8,000.0
6,000.0
4,000.0
2,000.0
0.0
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
Jan-01
Jan-02
Jan-03
Jan-04
Jan-05
Jan-06
Jan-07
Jan-08
Jan-09
Jan-10
Date

APPENDIX D
CHLORINATED ETHENES & ETHENE

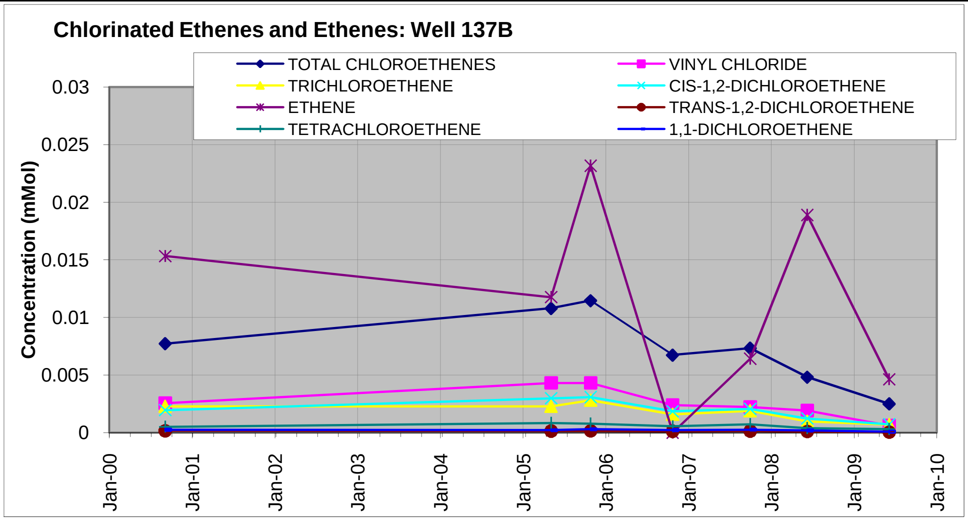
Appendix D: Chlorinated Ethenes and Ethene
B/C - Zone Wells
DuPont Necco Park

WELL 137B

Monitoring Well Summary

- Source area
- Decrease of Total Chlorinated Ethenes 2005-2009
- Mostly TCE, cDCE, VC
- Ethene Production

2009 Sample Results	(ppb)
PCE	51
TCE	93
Cis- 1,2 DCE	70
VC	39
Trans-1,2 DCE	5.2
1,1-DCE	9.1
TOTAL	**267**

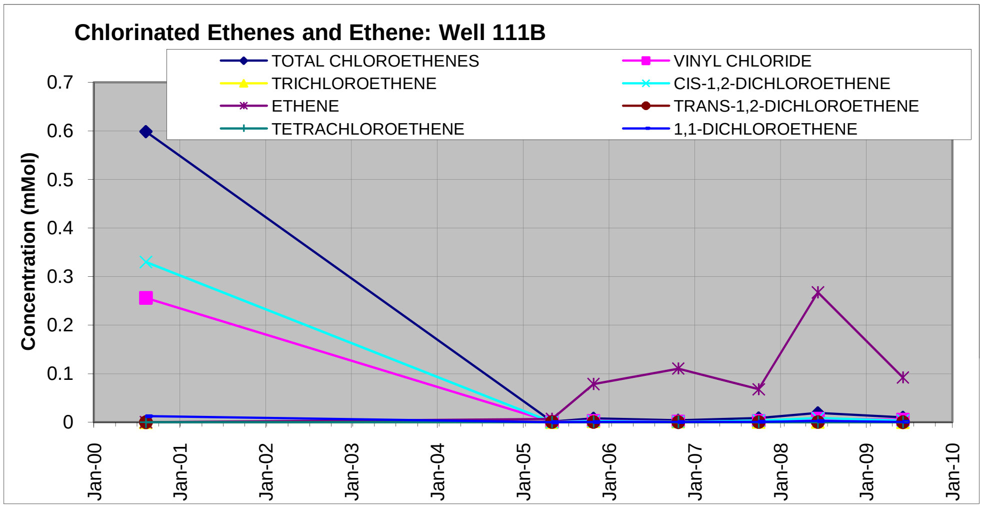


WELL 111B

Monitoring Well Summary

- Source area
- Slight increase in Total Chlorinated Ethenes 2005-2009 due to mostly cDCE, VC
- Moderate increase in 1,1- DCE from 2005-2009
- Notable ethene production

2009 Sample Results	(ppb)
PCE	<7.2
TCE	35
Cis- 1,2 DCE	340
VC	330
Trans-1,2 DCE	20 J
1,1-DCE	96
TOTAL	**821**

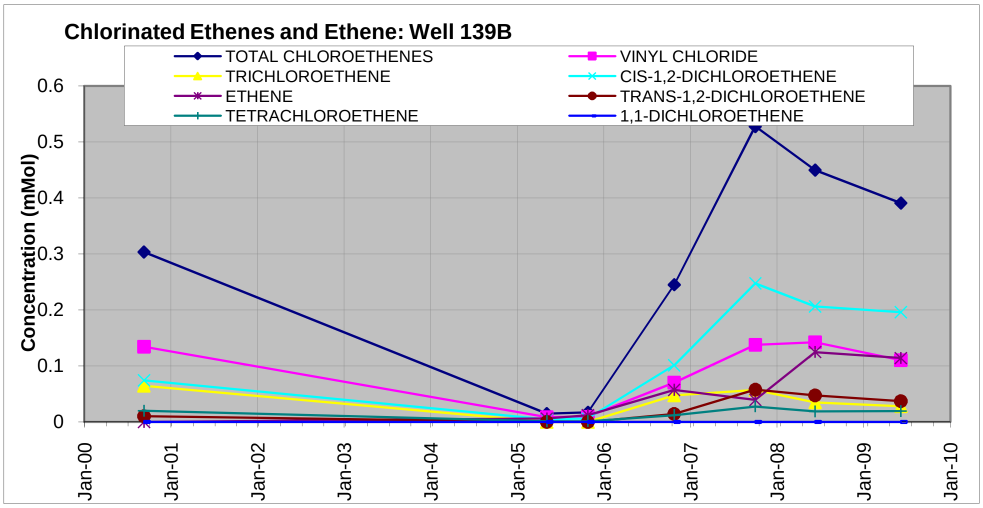


WELL 139B

Monitoring Well Summary

- Source area
- NAPL observed in 1992
- Apparent increase in Total Chlorinated Ethenes 2005-2009
- Mostly cDCE, VC, TCE, tDCE, PCE
- Notable ethene production
- Exceeds 1% Pure Phase Solubility Criteria (PCE)

2009 Sample Results	(ppb)
PCE	3,200
TCE	3,700
Cis- 1,2 DCE	19,000
VC	6,900
Trans-1,2 DCE	3,600
1,1-DCE	<63
TOTAL	**36,400**



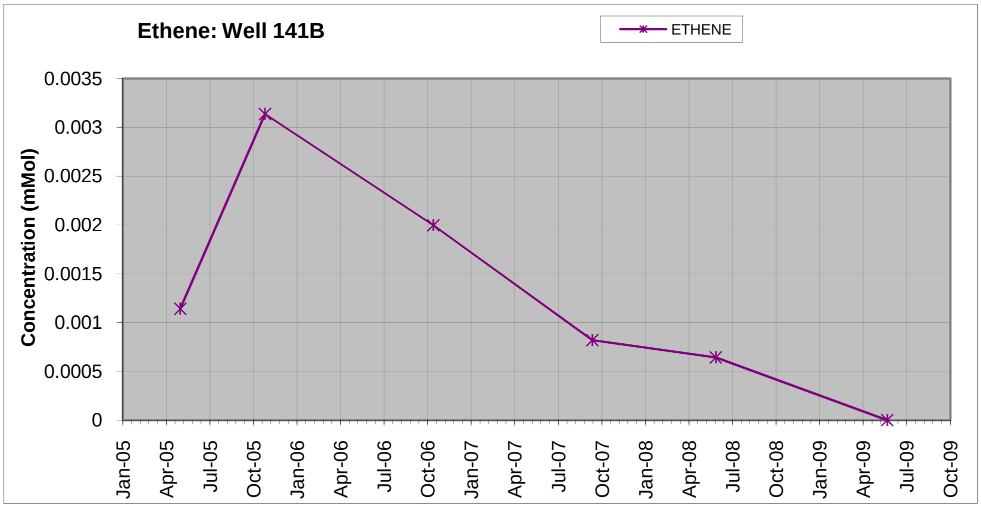
Appendix D: Chlorinated Ethenes and Ethene
B/C - Zone Wells
DuPont Necco Park

WELL 141B

Monitoring Well Summary

- Upgradient Well
- No Chlorinated Ethenes detected
- Moderate Ethene production

2009 Sample Results	(ppb)
PCE	<1.2
TCE	<0.68
Cis- 1,2 DCE	<0.68
VC	<0.88
Trans-1,2 DCE	<0.76
1,1-DCE	<0.76
TOTAL	**0**

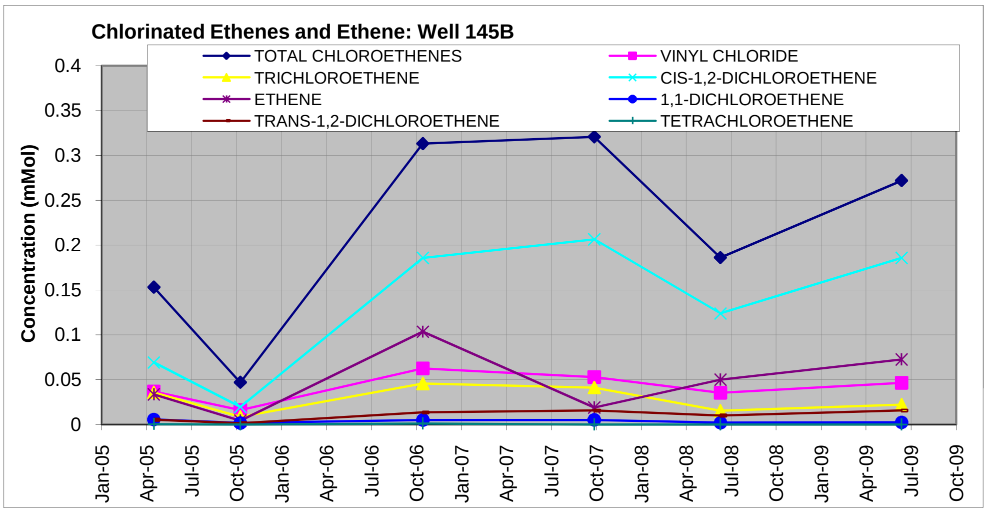


WELL 145B

Monitoring Well Summary

- Down gradient Well
- Slight increase in Total Chlorinated Ethenes 2005-2009
- Mostly degradation product cDCE
- Notable ethene production

2009 Sample Results	(ppb)
PCE	160 J
TCE	2,900
Cis- 1,2 DCE	18,000
VC	2,900
Trans-1,2 DCE	1,500
1,1-DCE	220 J
TOTAL	**25,680**

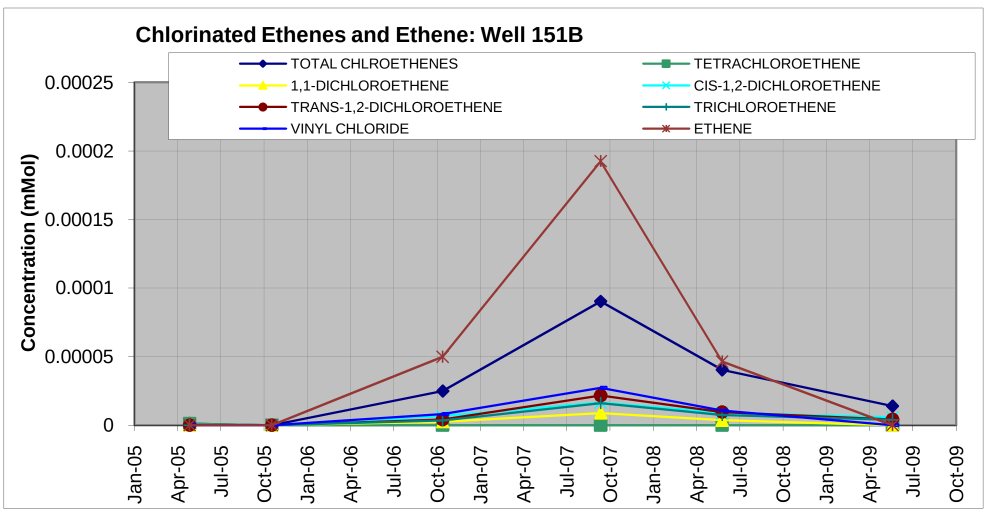


WELL 151B

Monitoring Well Summary

- Far downgradient well
- Slight decrease in Total Chlorinated Ethenes 2005-2009
- Mostly low conc. of VC, TCE, tDCE,cDCE
- Weak ethene production

2009 Sample Results	(ppb)
PCE	<0.29
TCE	0.52 J
Cis- 1,2 DCE	0.55 J
VC	<0.22
Trans-1,2 DCE	0.41 J
1,1-DCE	<0.19
TOTAL	**1.48**



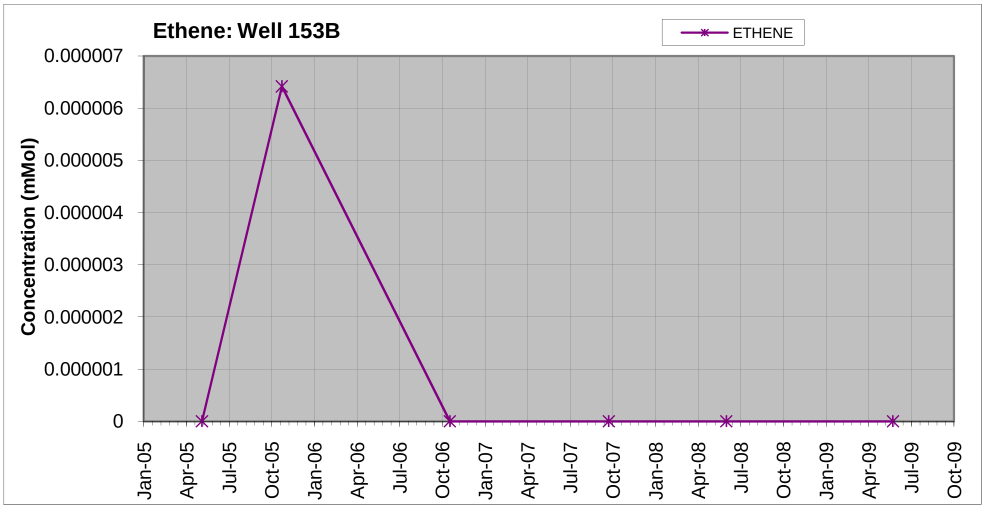
Appendix D: Chlorinated Ethenes and Ethene
B/C - Zone Wells
DuPont Necco Park

WELL 153B

Monitoring Well Summary

- East side gradient well
- Clean: No Chlorinated Ethenes detected

2009 Sample Results	(ppb)
PCE	<0.29
TCE	<0.17
Cis- 1,2 DCE	0.37 J
VC	<0.22
Trans-1,2 DCE	0.47 J
1,1-DCE	<0.19
TOTAL	**0.84**

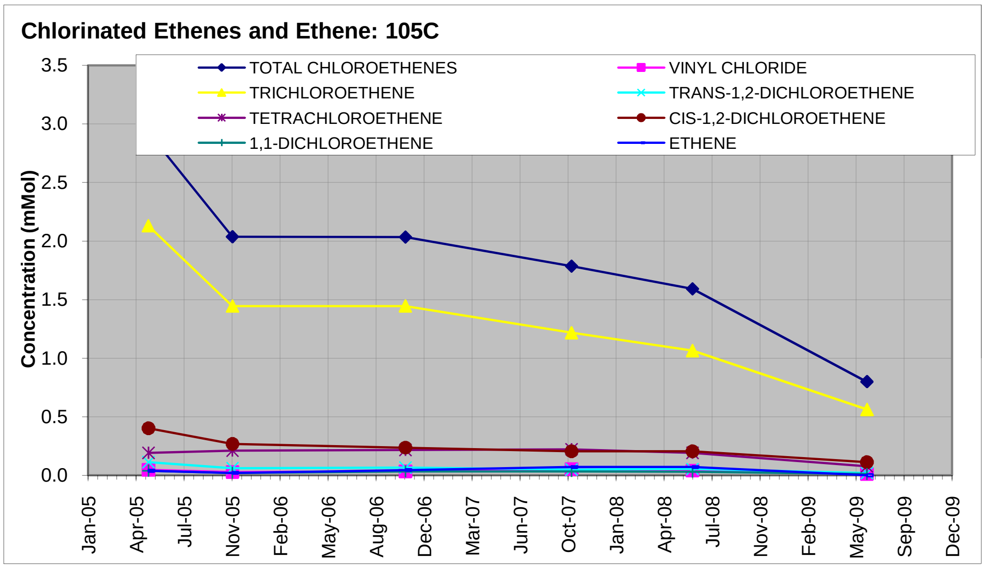


WELL 105C

Monitoring Well Summary

- Source area
- DNAPL observed in 1992
- Exceeds effective solubility and 1% absolute solubility for: PCE, TCE, CF
- Slight decrease Total Chlorinated Ethenes 2005-2009
- Ethene production
- High Chloroform: 37,000 ppb

2009 Sample Results	(ppb)
PCE	13,000
TCE	74,000
Cis- 1,2 DCE	11,000
VC	770 J
Trans-1,2 DCE	2,000
1,1-DCE	1,100 J
TOTAL	**101,870**

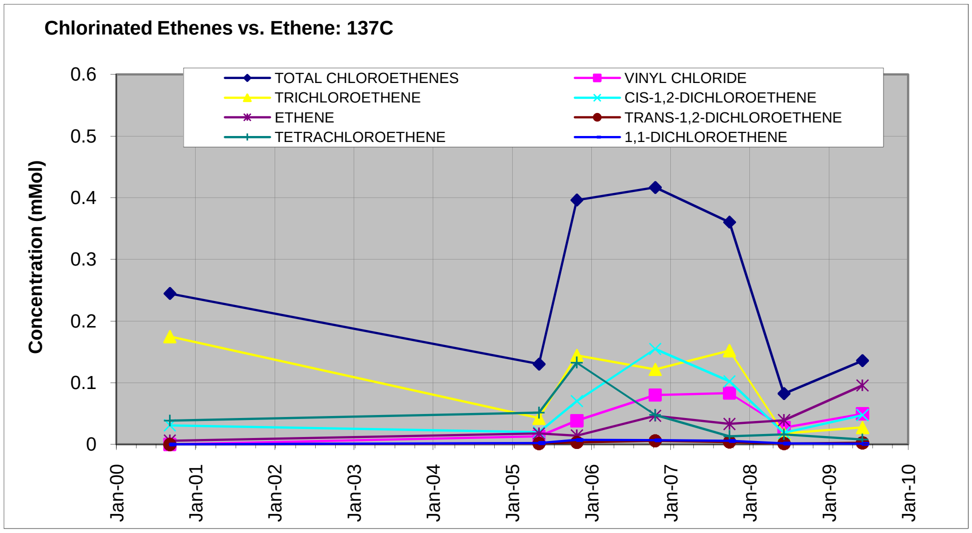


Appendix D: Chlorinated Ethenes and Ethene
C/D - Zone Wells
Necco Park

WELL: 137C

Monitoring Well Summary
- Source area
- Exceeds 1% Pure Phase Solubility (PCE, TCE)
- Decreasing Total chlorinated Ethenes 2005-2009
- Good Ethene production

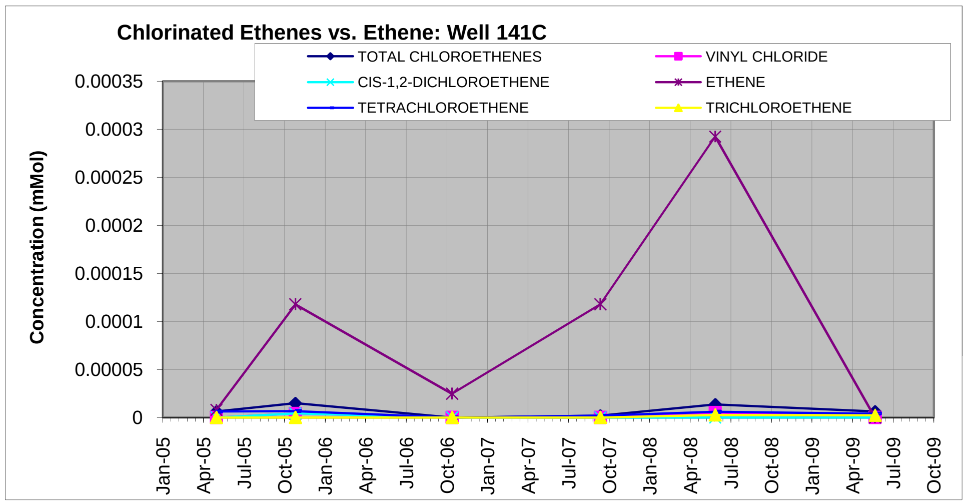
2009 Sample Results	(ppb)
PCE	1,300
TCE	3,600
Cis- 1,2 DCE	4,600
VC	3,100
Trans-1,2 DCE	240
1,1-DCE	94 J
TOTAL	**12,934**



WELL: 141C

Monitoring Well Summary
- Upgradient
- Low conc. of VC, TCE, PCE
- Weak ethene production
- Flat Total Chlorinated Ethenes 2005-2009

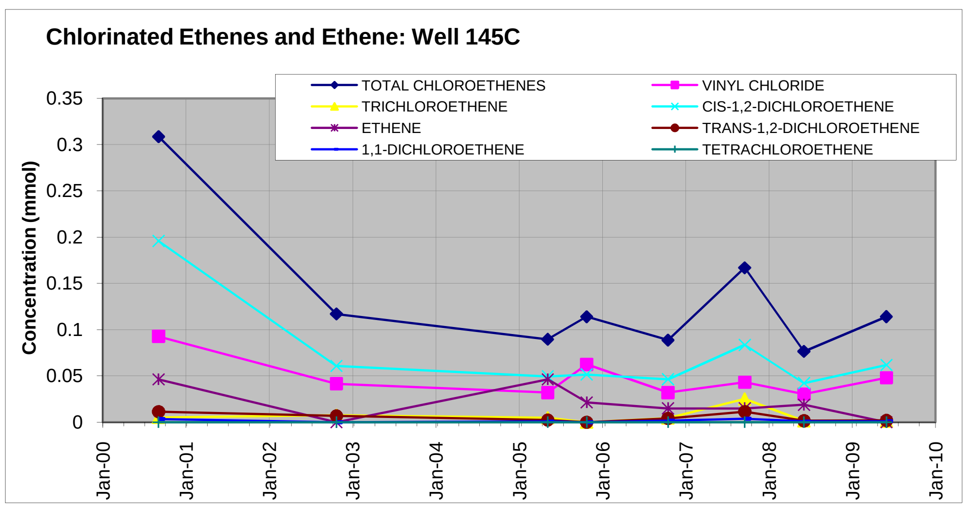
2009 Sample Results	(ppb)
PCE	0.66 J
TCE	0.29 J
Cis- 1,2 DCE	<0.17
VC	<0.22
Trans-1,2 DCE	<0.19
1,1-DCE	<0.19
TOTAL	**0.95**



WELL: 145C

Monitoring Well Summary
- Downgradient
- Near Source Boundary
- Flat Total Chlorinated Ethenes 2005-2009
- Mostly cDCE and VC
- Moderate ethene production

2009 Sample Results	(ppb)
PCE	<72
TCE	150 J
Cis- 1,2 DCE	6,000
VC	3,000
Trans-1,2 DCE	180 J
1,1-DCE	110 J
TOTAL	**9,440**



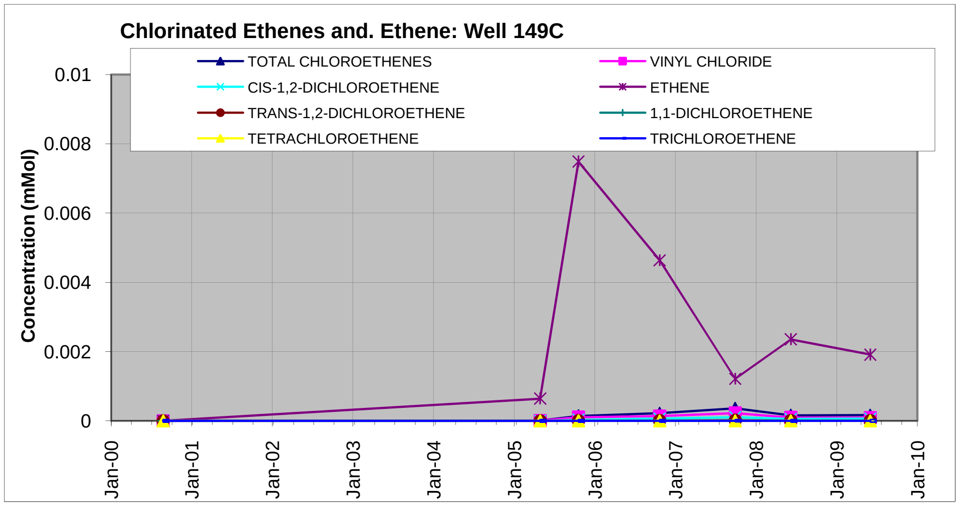
Appendix D: Chlorinated Ethenes and Ethene
C/D - Zone Wells
Necco Park

WELL: 149C

Monitoring Well Summary

- Downgradient
- Flat Total Chlorinated Ethenes 2005-2009
- Mostly cDCE, VC
- Weak ethene production

2009 Sample Results	(ppb)
PCE	<0.29
TCE	<0.17
Cis- 1,2 DCE	5.9
VC	5.5
Trans-1,2 DCE	0.82 J
1,1-DCE	0.45 J
TOTAL	**12.67**

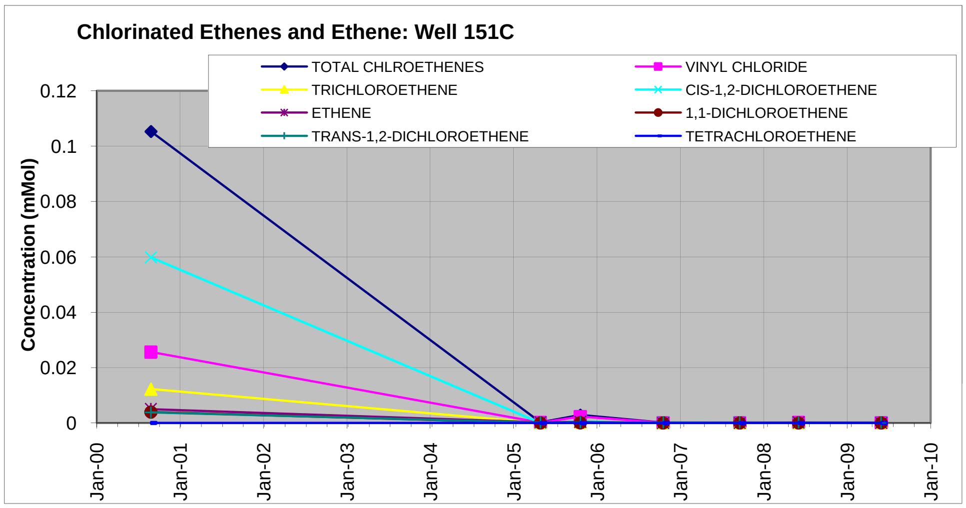


WELL: 151C

Monitoring Well Summary

- Far downgradient
- Declining Total Chlorinated Ethenes 2005-2009
- Mostly DCE, VC
- Weak ethene production

2009 Sample Results	(ppb)
PCE	<0.29
TCE	0.68 J
Cis- 1,2 DCE	1.7
VC	3.7
Trans-1,2 DCE	1.2
1,1-DCE	<0.19
TOTAL	**7.28**

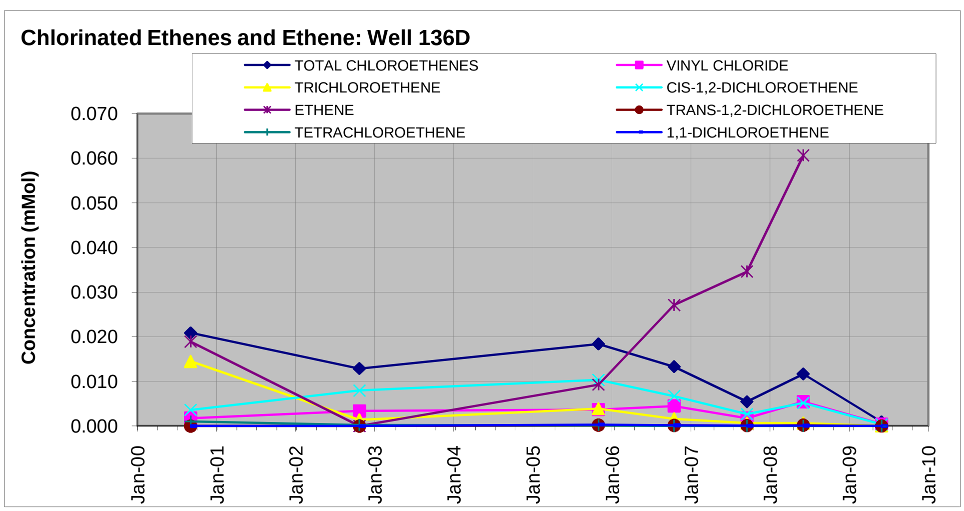


WELL: 136D

Monitoring Well Summary

- Near downgradient well
- Flat Total Chlorinated Ethenes 2005-2009
- Mostly TCE, cDCE, VC
- Good ethene production

2009 Sample Results	(ppb)
PCE	<0.41
TCE	4.4
Cis- 1,2 DCE	34
VC	28
Trans-1,2 DCE	1 J
1,1-DCE	0.44 J
TOTAL	**68**

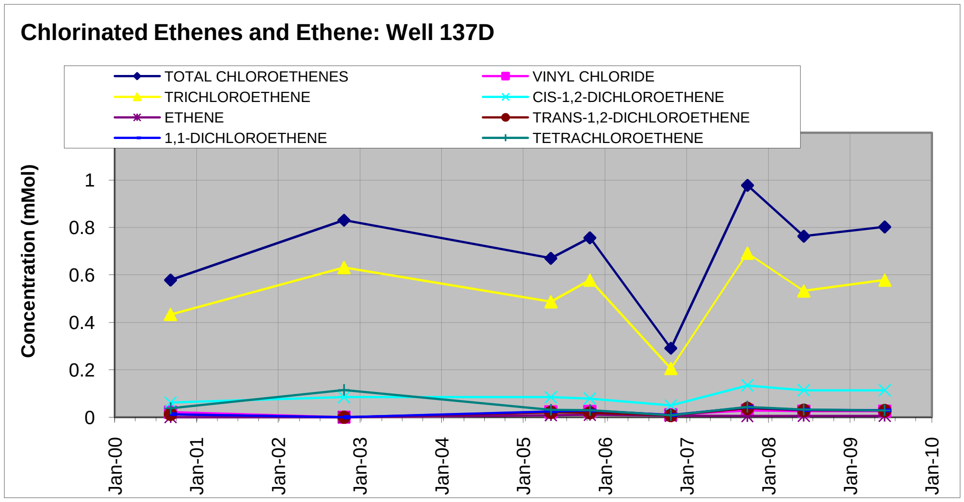


WELL: 137D

Monitoring Well Summary

- Source area
- Exceeds 1% solubility for PCE, TCE
- Flat Total Chlorinated Ethenes 2005-2009
- Exceeds effective solubility for PCE, TCE dominant species
- Moderate ethene production

2009 Sample Results	(ppb)
PCE	4,700
TCE	76,000
Cis- 1,2 DCE	11,000
VC	1600 J
Trans-1,2 DCE	2,700
1,1-DCE	2,800
TOTAL	**97,200**

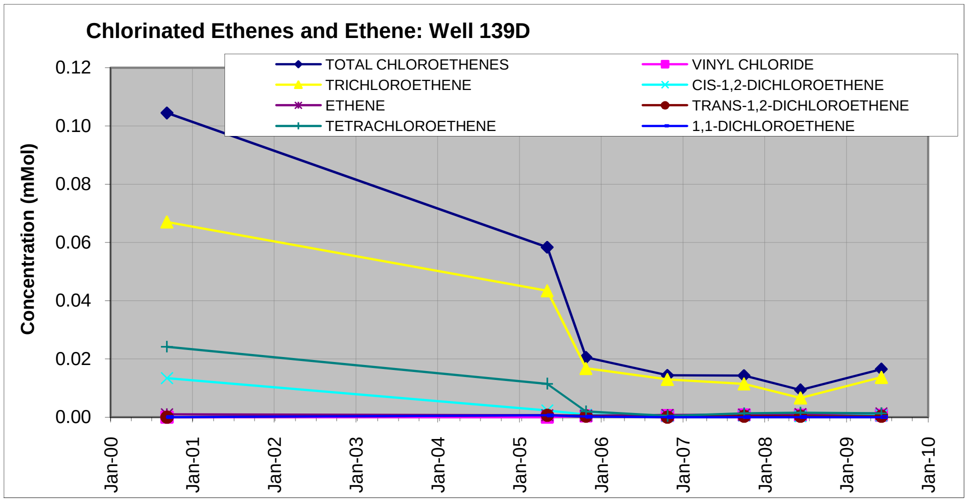


Appendix D: Chlorinated Ethenes and Ethene
D/E - Zone Wells
Necco Park

WELL: 139D

Monitoring Well Summary
- Source area
- DNAPL observed 1992
- Decrease in Total Chlorinated Ethenes 2005-2009
- Mostly TCE and PCE
- Weak ethene production

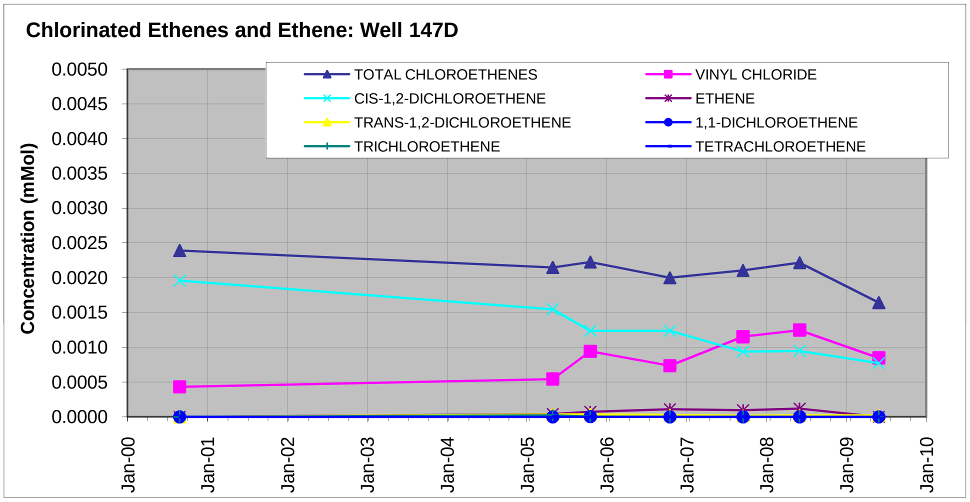
2009 Sample Results	(ppb)
PCE	210
TCE	1,800
Cis- 1,2 DCE	58
VC	38
Trans-1,2 DCE	33
1,1-DCE	<4.8
TOTAL	**2,139**



WELL: 147D

Monitoring Well Summary
- Far downgradient
- Flat Total Chlorinated Ethenes 2005-2009
- Mostly cDCE, VC
- Weak ethene production

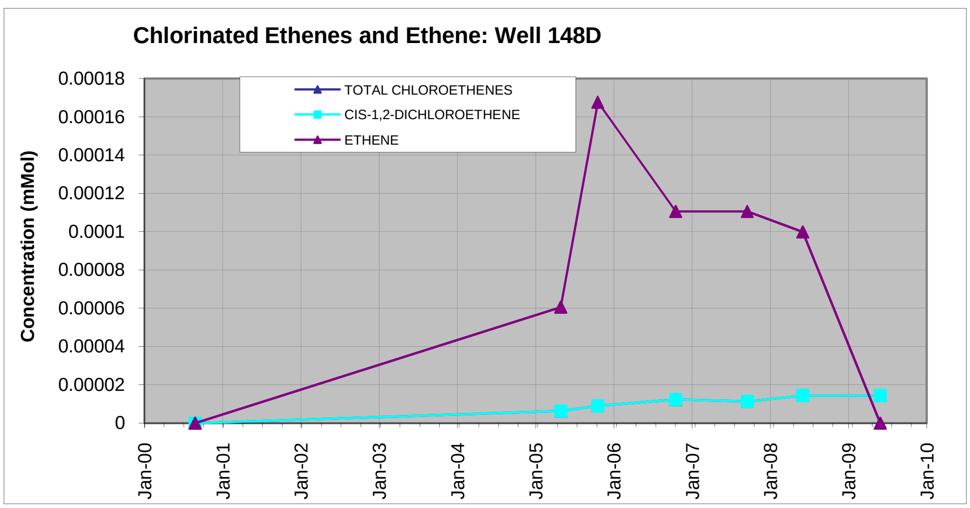
2009 Sample Results	(ppb)
PCE	<0.58
TCE	<0.34
Cis- 1,2 DCE	75
VC	53
Trans-1,2 DCE	2.0
1,1-DCE	<0.38
TOTAL	**130**



WELL: 148D

Monitoring Well Summary
- Downgradient
- Flat Total Chlorinated Ethene 2005-2009
- Mostly cDCE
- Weak ethene production

2009 Sample Results	(ppb)
PCE	<0.29
TCE	<0.17
Cis- 1,2 DCE	1.4
VC	<0.22
Trans-1,2 DCE	<0.19
1,1-DCE	<0.19
TOTAL	**1.4**

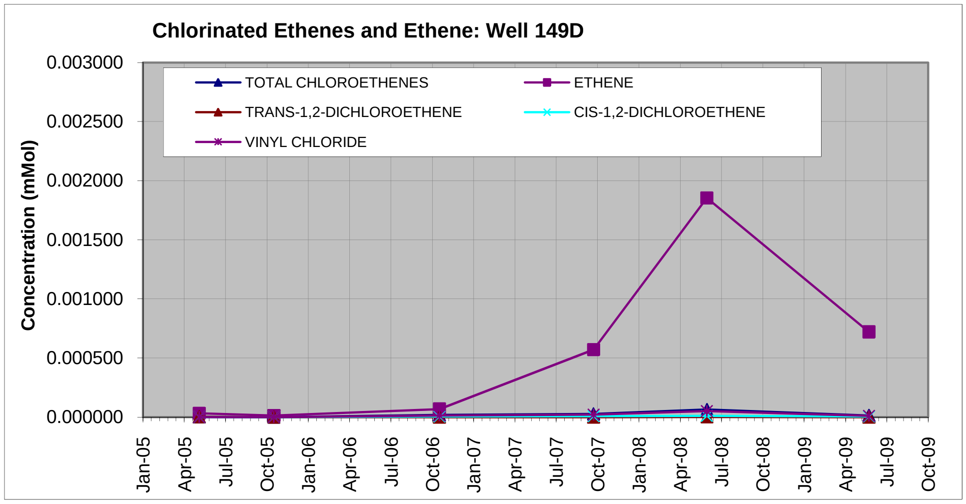


Appendix D: Chlorinated Ethenes and Ethene
D/E - Zone Wells
Necco Park

WELL: 149D

Monitoring Well Summary
- Side gradient
- Flat Total Chlorinated Ethene trend 2005-2009
- Mostly VC
- Weak Ethene production

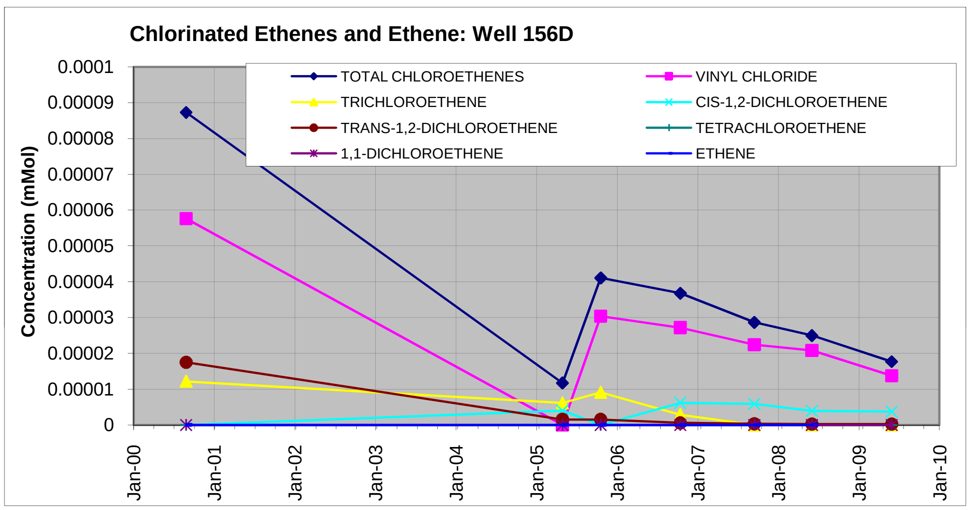
2009 Sample Results	(ppb)
PCE	<0.29
TCE	<0.17
Cis- 1,2 DCE	0.32 J
VC	0.65 J
Trans-1,2 DCE	<0.19
1,1-DCE	<0.19
TOTAL	**0.97**



WELL: 156D

Monitoring Well Summary
- Far downgradient
- Slight decrease Total Chlorinated Ethenes 2005-2009

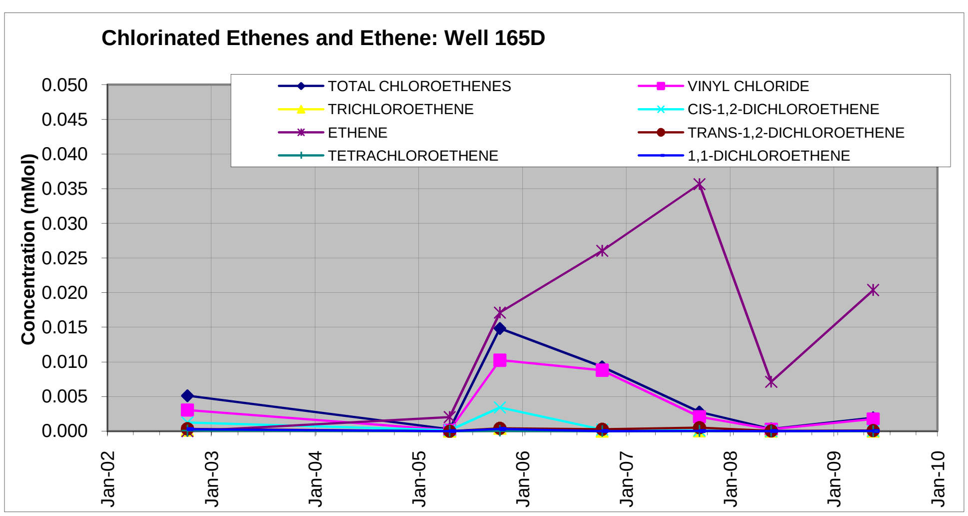
2009 Sample Results	(ppb)
PCE	<0.29
TCE	<0.17
Cis- 1,2 DCE	0.36 J
VC	0.86 J
Trans-1,2 DCE	0.23 J
1,1-DCE	<0.19
TOTAL	**1.45**



WELL: 165D

Monitoring Well Summary
- Source area
- Near source boundary
- Decreasing Total Chlorinated Ethenes 2005-2009
- Moderate ethene production
- Primarily VC

2009 Sample Results	(ppb)
PCE	<0.97
TCE	<0.57
Cis- 1,2 DCE	4.7
VC	110
Trans-1,2 DCE	8.6
1,1-DCE	1.9 J
TOTAL	**125.2**

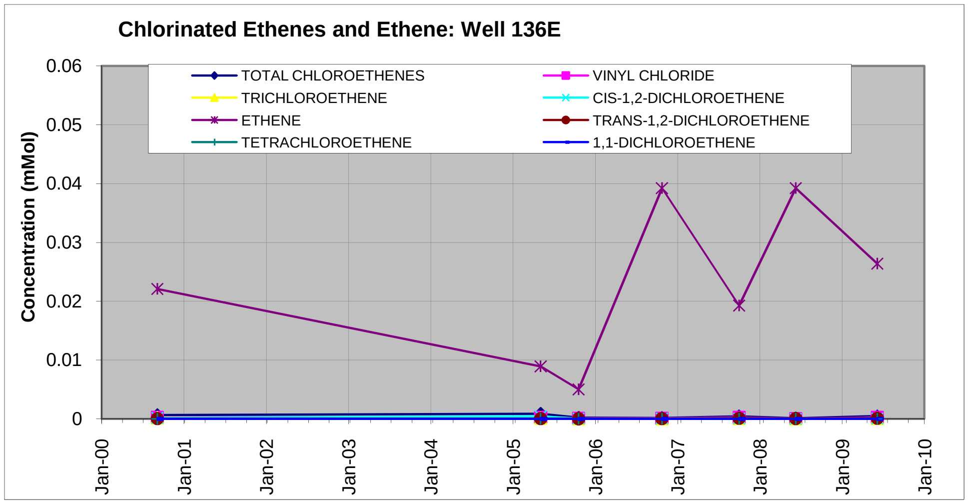


Appendix D: Chlorinated Ethenes and Ethene
D/E - Zone Wells
Necco Park

WELL: 136E

Monitoring Well Summary
- Near downgradient
- Flat Total Chlorinated Ethenes 2005-2009
- Good ethene production

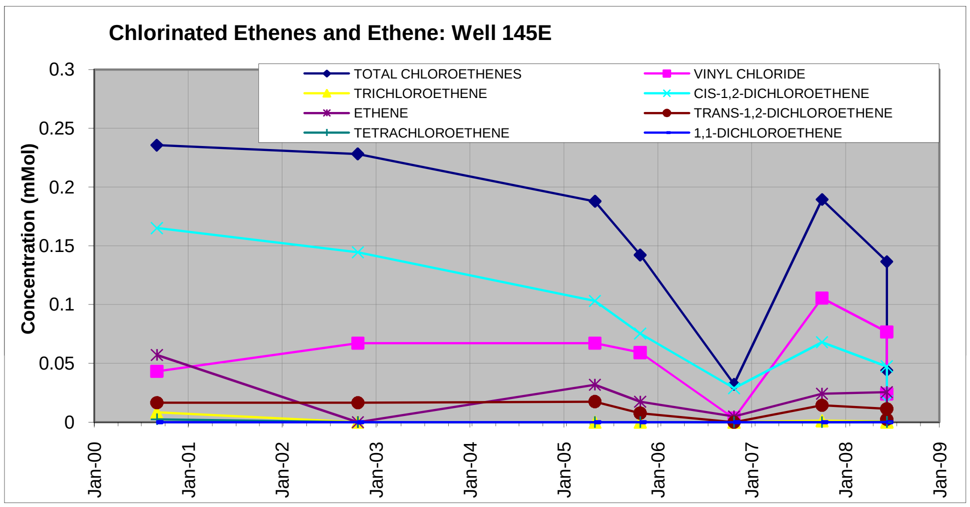
2009 Sample Results	(ppb)
PCE	<0.29
TCE	8.4
Cis- 1,2 DCE	5.9
VC	15
Trans-1,2 DCE	10
1,1-DCE	<0.19
TOTAL	**39.3**



WELL: 145E

Monitoring Well Summary
- Sidegradient
- Slight decrease in Total Chlorinated Ethenes 2005-2009
- Mostly cDCE, tDCE, VC
- Noteable ethene production

2009 Sample Results	(ppb)
PCE	19 J
TCE	5.9 J
Cis- 1,2 DCE	1,700
VC	1,500
Trans-1,2 DCE	240
1,1-DCE	<4.8
TOTAL	**3,465**



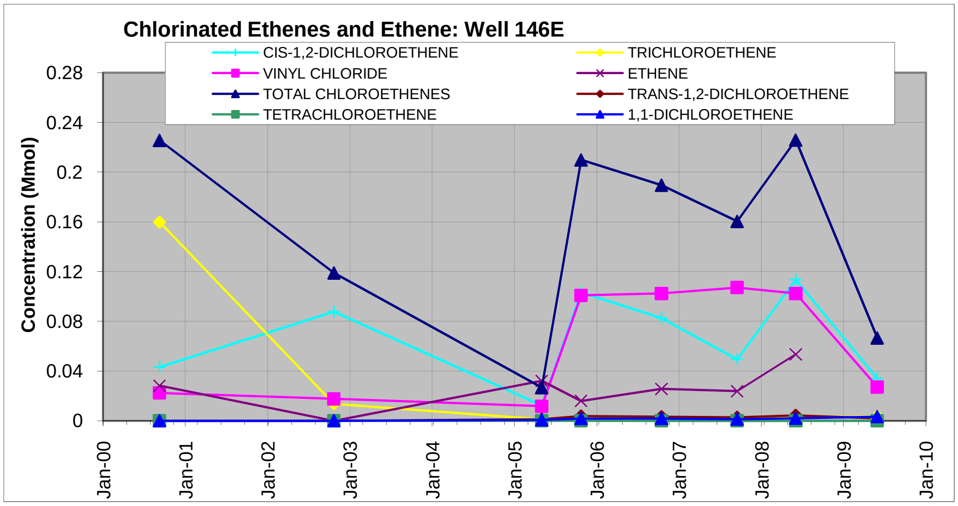
Appendix D: Chlorinated Ethene and Ethene
E/F - Zone Wells
Necco Park

WELL: 146E

Monitoring Well Summary

- Downgradient
- Near source boundary
- Increase in Total Chlorinated Ethenes 2005-2009
- Primarily VC and cDCE
- Good Ethene production

2009 Sample Results	(ppb)
PCE	<36
TCE	460
Cis- 1,2 DCE	3300
VC	1700
Trans-1,2 DCE	190
1,1-DCE	320
TOTAL	**5970**

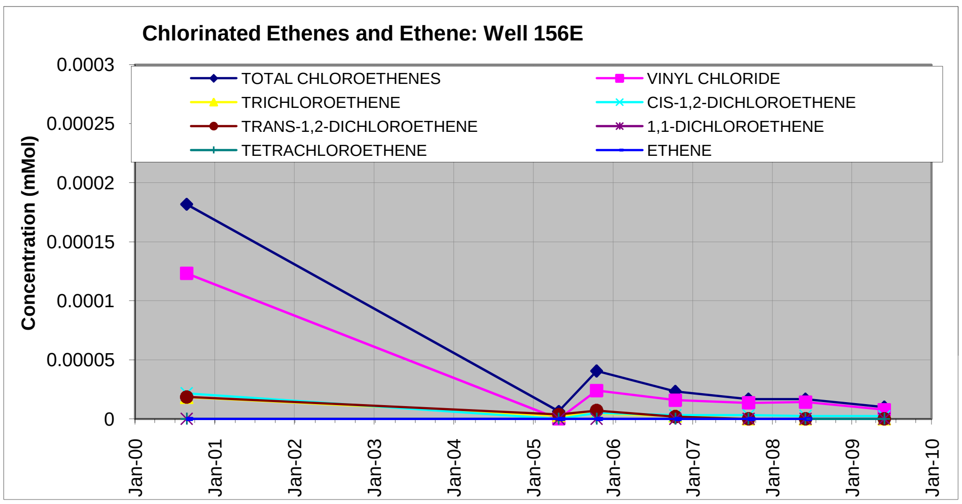


WELL: 156E

Monitoring Well Summary

- Far downgradient
- Slight decreaseTotal Chlorinated Ethenes 2007-2009

2009 Sample Results	(ppb)
PCE	<0.29
TCE	<0.17
Cis- 1,2 DCE	0.22 J
VC	0.48 J
Trans-1,2 DCE	<0.19
1,1-DCE	<0.19
TOTAL	**0.70**

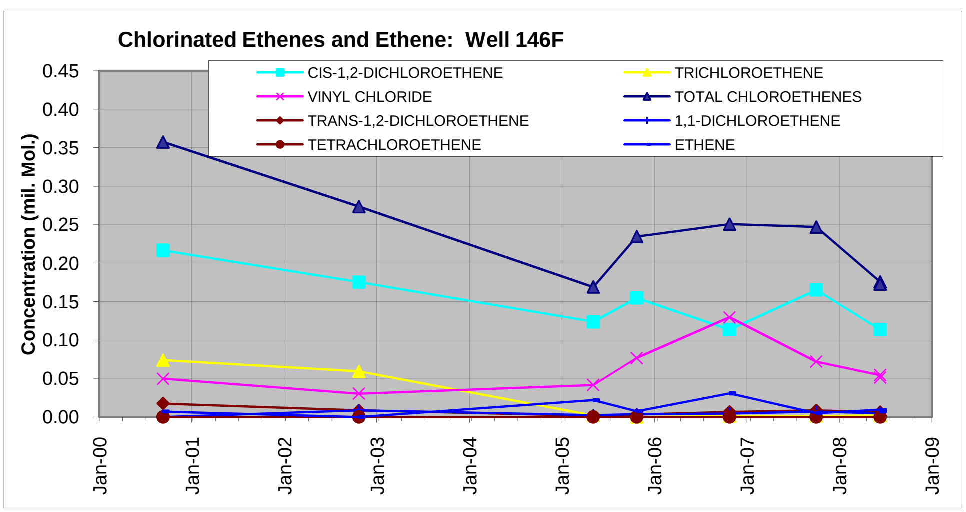


WELL: 146F

Monitoring Well Summary

- Downgradient
- Near source boundary
- Little change in Total Chlorinated Ethenes 2005-2009
- Primarily cDCE, VC
- Moderate Ethene production

2009 Sample Results	(ppb)
PCE	<120
TCE	270 J
Cis- 1,2 DCE	11000
VC	3200
Trans-1,2 DCE	570
1,1-DCE	520
TOTAL	**15560**

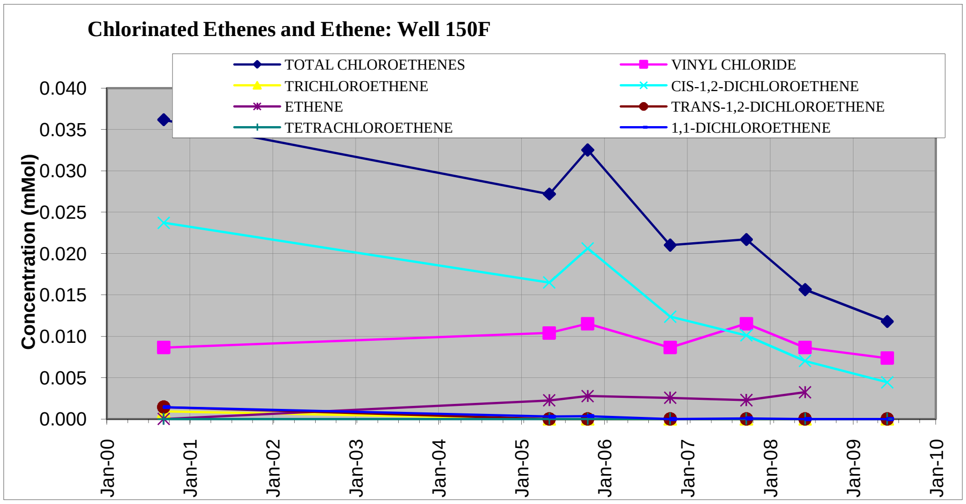


WELL: 150F

Monitoring Well Summary

- Sidegradient
- Slight decrease in Total Chlorinated Ethenes trend 2005-2009
- Mostly cDCE, VC
- Weak ethene production

2009 Sample Results	**(ppb)**
PCE	<4.8
TCE	<2.8
Cis- 1,2 DCE	430
VC	460
Trans-1,2 DCE	<3.2
1,1-DCE	<3.2
TOTAL	**890**



APPENDIX E
LANDFILL CAP INSPECTION RESULTS
(OCTOBER 2009)

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EXHIBIT A
NECCO PARK LANDFILL
CAP AND SURFACE WATER DRAINAGE
INSPECTION CHECKLIST

DATE: 10-27-09
INSPECTOR: Gerald Shepard
WITNESSES: Chuck Ogin

EMERGENCY CONTACT:
GERALD SHEPARD
716.278.5149

CONDITION: (Check) (Not Acceptable or Not Present require comments below)

	Acceptable	Not Acceptable	Present	Not Present	Remarks
1) Vegetative Cover, Ditches, Culverts	X				
a) Sediment Build-Up/Debris				X	
b) Pooling or Ponding				X	
c) Slope Integrity	X				
d) Overall Adequacy	X				
e) Culvert Condition	X				
2) Access Roads	X				
3) Landfill Cover System					
a) Erosion Damage			X		Minor Ruts on South Slope
b) Leachate Seeps				X	
c) Settlement				X	
d) Stone Aprons	X				
e) Vegetation	X				
f) Animal Burrows			X		Mole Burrows - Few Woodchuck Burrows
4) Slope Stability					
a) Landfill Top Soil	X				
b) Landfill Side Slope	X				
5) Gas Vents	X				1 Gas Vent Requires Repair
6) Monitoring Wells	X				

COMMENTS:

DESCRIPTION OF CONDITION:

- Landfill Recently Cut + Line Trimmed
- Ditch + Swale integrity acceptable
- Cap/Vegetation Acceptable

DESCRIPTION OF CONCERN:

- One gas Vent on South Side Requires Repair

DESCRIPTION OF REMEDY:

- Gas vent needs to be reattached to Coupling. Minor Repair

-JS.

EXHIBIT B
NECCO PARK LANDFILL
CAP AND SURFACE WATER DRAINAGE
MAINTENANCE CHECKLIST

DATE: 10-27-09
INSPECTOR: Gerald Shepard
WITNESSES: Chuck Ogin

EMERGENCY CONTACT:
GERALD SHEPARD
716.278.5149

Maintenance Performed (Check)	Item	Performed by:	Remarks
	1) Vegetative Cover:		
	a) Seeding	JS/CO	
	b) Fertilizing	" "	
	c) Topsoil Replaced	" "	
X	d) Removal of Undesirable Vegetation	JS/CO/Napier	Cut ditch vegetation
	2) Drainage Ditches		
	a) Sediment Removal	JS/CO	
	b) Fill	" "	
	c) Regrading	" "	
	d) Stone Apron Repair	" "	
	e) Vegetative Cover Placement	" "	
	f) Liner Replacement	" "	
	3) Access Road		
	a) Excavation	JS/CO	
	b) Fill	" "	
	c) Grading	" "	
	d) Stone Paving	" "	
	4) Landfill Cap		
	a) Excavation	JS/CO	
	b) Cover Materials	" "	
	- topsoil	" "	
	- barrier protection layer	" "	
	- drainage composite	" "	
	- geomembrane	" "	
	- geotextile	" "	
	c) Testing	" "	
	d) Barrier Protection Layer	" "	
	e) Vegetative Cover	" "	
	5) Gas Vents		
X	- Pipes	JS	Gas Vent Repair
	- Bedding and Adjacent Media		
	6) Other		

DESCRIPTION OF MAINTENANCE ACTIVITIES: ______