# 2011 KEY WELL SAMPLING REPORT
# FORMER YORK NAVAL ORDNANCE PLANT

**SAIC Project 4501020172/8000/100**

**Prepared for:**

## Harley-Davidson Motor Company Operations, Inc.
**York, PA**

**December 2011**

***SAIC Energy, Environment, & Infrastructure, LLC***
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Respectfully submitted,

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# TABLE OF CONTENTS

***Page***



## LIST OF FIGURES



## LIST OF TABLES

# LIST OF ACRONYMS

| | | |
|---|---|---|
| °C | - | degrees Celsius |
| 1,1-DCE | - | dichloroethene |
| µg/L | - | micrograms per liter |
| µmhos/cm | - | micromhos per centimeter |
| cis-1,2-DCE | - | cis-1,2-dichloroethene |
| Cr+3 | - | trivalent chromium |
| Cr+6 | - | hexavalent chromium |
| EDDs | - | electronic data deliverables |
| EPBA | - | Eastern Property Boundary Area |
| EPA | - | United States Environmental Protection Agency |
| fYNOP | - | former York Naval Ordnance Plant |
| GSC | - | Groundwater Sciences Corporation |
| GWTS | - | groundwater treatment system |
| Harley-Davidson | - | Harley-Davidson Motor Company Operations, Inc. |
| mg/L | - | milligrams per liter |
| MSCs | - | medium-specific concentrations |
| MS/MSD | - | matrix spike/matrix spike duplicate |
| MTBE | - | methyl tertiary-butyl ether |
| NETT | - | North End of the Test Track |
| NPBA | - | Northeast Property Boundary Area |
| NTUs | - | nephelometric turbidity units |
| O&M | - | operations and maintenance |
| PADEP | - | Pennsylvania Department of Environmental Protection |
| PCE | - | tetrachloroethene |
| QAPP | - | Quality Assurance Project Plan |
| QA/QC | - | quality assurance/quality control |
| QC | - | quality control |
| RI | - | remedial investigation |
| RLs | - | reporting limits |
| RPD | - | relative percent difference |
| SAIC | - | Science Applications International Corporation |
| SPBA | - | Southern Property Boundary Area |
| TCA | - | 1,1,1-trichloroethane |
| TCE | - | trichloroethene |
| TCL | - | target compound list |
| UST | - | underground storage tank |
| VOC | - | volatile organic compound |
| WPL | - | West Parking Lot |
| WWPL | - | West of the West Parking Lot |
| YCRTA | - | York County Rail Trail Authority |

# 1.0 INTRODUCTION

SAIC Energy, Environment & Infrastructure, LLC (SAIC) has prepared this report to summarize the results of the 2011 key well sampling event, including collection (pumping) and off-site wells, for the former York Naval Ordnance Plant (fYNOP). The fYNOP facility is located at the Harley-Davidson Motor Company Operations, Inc. (Harley-Davidson) York facility in Springettsbury Township, York, Pennsylvania, as shown on **Figure 1**. This report provides the most recent sampling results (June–July 2011) and a limited analysis of historic results and observed trends. A more complete groundwater chemistry analysis considering the entire historical record in the database is provided in the Supplemental Site-Wide Groundwater Remedial Investigation (RI) Report (Groundwater Sciences Corporation [GSC], September 2011[1]).

A key well sampling program was initiated in February 1992 in which a subset of wells was selected as key wells to be sampled for the following purposes:

- To establish a database of groundwater quality.
- To monitor changes in groundwater chemistry across the site.

Each year, available information is reviewed, and as determined necessary, the key well sampling plan is amended to meet the goals of the program. The number of locations sampled during the 2011 key well event was based on reviewing data for the 80 locations that were sampled during the 2010 event. **Table 1** provides a list of all historical key wells and identifies the 40 non-pumping locations that were sampled in 2011 including information such as the general location of the monitoring location, portion of the aquifer monitored, rationale for inclusion, and year when the location was added. **Figure 2** identifies the sampling locations within and surrounding the site, as follows:

[1] Groundwater Sciences Corporation (GSC). Supplemental Remedial Investigation Groundwater Report (Part 1), Former York Naval Ordnance Plant. September 23, 2011

- Groundwater extraction wells (green circle with a cross and two quadrants filled in).

- Typical annual key well/monitoring locations (red circle with a red dot inside). (Note: All of the locations identified on the map as key locations were not sampled in 2011.)

- Other existing groundwater monitoring well/location (black circle with a cross and all quadrants empty).

- Stream gauge locations (black triangle).

- Springs (blue filled circle).

- Location of the groundwater treatment system (GWTS) features.

In addition to the collection of samples from the key wells, samples were collected from the 15 collection wells as a requirement of the operations and maintenance (O&M) contract. The results from these samples are being included herein; however, detailed analysis of these data is beyond the scope of this report. Analysis of the groundwater collection system sampling results will be completed and provided in the 2011 Groundwater Extraction and Treatment System Annual Operation Report and the Supplemental Site-Wide Groundwater Report.

## 2.0 GROUNDWATER ELEVATION DATA

The depth to groundwater was measured at all available groundwater monitoring locations on June 17, 2011, which included 159 monitoring locations consisting of on-site monitoring wells, groundwater collection wells, piezometers, and off-site locations. Using the depth-to-groundwater measurements and previously established elevation reference points at the monitoring locations, groundwater elevations were calculated. The depth-to-groundwater data and the calculated groundwater surface elevation data for June 17, 2011, are provided on **Table 2**. In addition, surface water stage measurements (included on **Table 2**) were made at two locations established on the Codorus Creek, designated as Codorus 1 and Codorus 2, and corresponding surface water elevations were calculated.

The calculated groundwater elevations from June 17, 2011 (**Table 2**) were used to develop **Figure 3**, which presents the interpreted groundwater table surface elevation contours. Only groundwater elevations from "shallow" wells were used in preparing the interpreted groundwater table elevation contours. All of the calculated groundwater elevations are included on **Figure 3**, but the locations and elevations that were not used to prepare the interpreted groundwater table contours have been slightly shaded (i.e., the "deep" wells). The surface water monitoring locations and elevations are included on **Figure 3** for reference purposes.

The configuration of the groundwater table at the site is consistent with previous monitoring, which has indicated a horizontal gradient toward the west-southwest. The groundwater table gradient determined from the June 17, 2011, data is relatively steep beneath the eastern portion of the site, which is underlain by sandstone bedrock. The groundwater table gradient is relatively flat beneath the western portion of the site, which is underlain by limestone bedrock.

**Figure 3** displays areas of groundwater depression as depicted by closed contours around active collection (pumping) wells at the site. At the downgradient side of the closed depression, a groundwater divide is created by active pumping of collection wells and lowering of the groundwater table. Groundwater on the inside of the closed depression flows toward the

collection well, while water on the outside of the depression will follow the direction of the natural gradient. The most noteworthy example of a closed depression is the 340-foot contour line representing the groundwater elevation beneath the majority of the West Parking Lot (WPL). This condition is created by groundwater extraction that is occurring at the four WPL collection wells (CW-9, CW-13, CW-15A, and CW-17).

The differences in groundwater elevations between multilevel piezometers or well pairs (26 locations) within 9 areas across the site have been evaluated, and the results of this evaluation are provided on **Table 3**. In general, upward vertical gradients are present at the following locations:

- Beneath the Northeast Property Boundary Area (NPBA) (well pairs MW-16, MW-18, and MW-20). At times in the past, MW-16 has displayed the presence of artesian conditions (i.e., flowing at the surface) in the deep piezometer.

- Along the approximate spring line, near the sandstone contact (well pairs MW-86 and MW-43).

- West of the WPL area (mild upward gradient at well pairs MW-98, MW-99, and MW-100 along the Codorus Levee).

- Northern WPL (well pairs MW-49, MW-51, MW-74, and MW-96).

- In the off-site wells east of the Eastern Property Boundary Area (EPBA) (well pairs MW-108 and MW-109).

- At one location at the landfill area (well pair MW-65).

- At two locations (well pairs MW-70 and MW-102) along the north end of the former test track.

Downward vertical gradients are evident from the elevation data in the piezometers located in the following areas:

- Southern WPL (well pairs MW-37, MW-75, and MW-93).
- Northern WPL (well pairs MW-39 and MW-50).
- Southeast corner of the Southern Property Boundary Area (SPBA) (well pair MW-64).
- One location at the landfill area (well pair MW-66).
- One location in the north test track area (MW-103, also in the vicinity of the approximate spring line near the sandstone contact). The magnitude of this downward gradient is approximately double the upward gradient noted for nearby well pair MW-86.

Overall, groundwater elevation data for the site show a flow direction from northeast to southwest. Groundwater flow beneath the majority of the site is ultimately being directed toward the WPL as a result of the four active groundwater collection wells (CW-9, CW-13, CW-15A, and CW-17).

## 3.0 KEY WELL SAMPLING PROCESS

The key well sampling event was conducted between June 20 and July 1, 2011, subsequent to the site-wide groundwater level measurements that were obtained on June 17, 2011. Collection wells were sampled from sample ports provided through the GWTS; and spring or lift station samples were collected by dipping the glassware or with a bucket. For all other key wells, SAIC utilized the following sample collection methodology:

1. Prior to the initiation of well purging activities, the depth to groundwater was measured to the nearest 0.01 foot with an electronic water-indicating probe.

2. Prior to sample collection, the wells were purged with a submersible pump using a well yield match purge technique as described in the Field Sampling Plan for Supplemental Remedial Investigations (SAIC, 2006) and summarized here. The purge rate was set at or below the well yield to minimize the drawdown of the groundwater level in the well. During purging, water quality field parameters were measured using a Horiba U-22 water quality instrument and recorded on approximate five-minute intervals. Once the field parameters stabilized over three consecutive readings, the sample was collected, as described below. If the well had a low yield, an attempt was made to purge at least one open interval (well screen plus borehole volume) without exposing the entire filter pack or water-bearing zones to reach stabilized field parameters prior to collecting the sample. If the well cavitated before the desired volume was purged, the well was allowed to recharge, and the sample was collected as soon as sufficient volume of groundwater was present in the well. All purge water was containerized and processed through the on-site GWTS via the Softail lift station.

   The following water quality field parameter criteria were used to determine stable conditions and acceptability for sample collection:

   - Temperature (±0.5 degrees Celsius [°C])

- pH (±0.1 standard units)
- Conductivity (±25 micromhos/centimeter [µmhos/cm])
- Dissolved oxygen (±0.2 milligrams/liter [mg/L])
- Turbidity (less than 50 nephelometric turbidity units [NTUs])

Decontamination of the pump between sampling locations was performed using a potable water and Alconox® solution wash with a deionized water rinse to prevent cross-contamination between wells and samples. Dedicated disposable nitrile gloves were used when handling the pump, sampling equipment, and during sample collection.

3. Groundwater samples were collected as soon as practical after purging was completed. The groundwater samples were collected from each monitoring well through new disposable polyethylene tubing used during purging or a dedicated disposable polyethylene bailer (if the well cavitated). Samples for laboratory analysis of dissolved metals were field-filtered using a single-use, disposable, in-line 0.45-micron filter.

4. Identification labels were immediately affixed to the sample containers. The containers were immediately placed in coolers with ice and chilled to approximately 4°C for shipment to the TestAmerica laboratory (Pittsburgh, Pennsylvania) under chain-of-custody protocol.

Groundwater samples were analyzed for specific parameters based on historic sampling results and site-specific knowledge of the individual investigation areas. Target compound list (TCL) volatile organic compounds (VOCs) analysis by United States Environmental Protection Agency (EPA) Method 8260B was completed on 54 groundwater samples. Total and dissolved metals were analyzed using EPA Method ICP MS SW846 6020 for arsenic (one well), beryllium (one well), chromium (four wells), lead (two wells), and nickel (one well). Additionally, groundwater from four wells was analyzed for hexavalent chromium (total and dissolved) using Method SW846 7196A, and one well was analyzed for total cyanide (EPA Method 335.4) and free/available cyanide (Method OI1677).

All of the groundwater samples were submitted to TestAmerica's Pittsburgh location for analysis. The individual analyses completed at each monitoring location are provided on **Table 4**.

# 4.0 KEY WELL SAMPLING RESULTS

A summary of the analytical results from the 2011 key well sampling is provided on **Table 5**. Graduated symbol posting maps for the total VOCs, trichloroethene (TCE), tetrachloroethene (PCE), trivalent chromium ($Cr^{+3}$), and hexavalent chromium ($Cr^{+6}$) are presented as **Figure 4** through **Figure 8**. Analytical data received from TestAmerica are handled in accordance with SAIC's Quality Assurance Project Plan (QAPP, July 2009). Ten percent of the laboratory data packages were evaluated by SAIC for completeness, technical holding times, blanks, duplicates, laboratory control samples, matrix spike samples, surrogates, and calibration to standards (i.e., data validation). Electronic data deliverables (EDDs) from the laboratory are entered into the fYNOP data base, which is stored in the ARC IMS system and checked for completeness against the chain-of-custody record. Verified electronic analytical data with qualifiers are entered into the fYNOP data base. Electronic analytical data are stored on an SAIC server, as well as at the laboratory. Laboratory records are retained at TestAmerica for a period of five years after the report is issued.

## 4.1 NPBA Groundwater Chemistry

Off-site locations (RW-2, RW-4 Folk, and S-6 Tate), and collection wells (CW-1 through CW-7, CW-1A, and CW-7A) were sampled at the NPBA in the 2011 key well sampling event. Spring location S-7 (Herman) could not be sampled in 2011 due to the presence of dense undergrowth and poison ivy. The most prevalent VOC found in groundwater beneath the NPBA was TCE, with varying amounts of cis-1,2-dichloroethene (cis-1,2-DCE) and some PCE also present. This is consistent with historical data trends for this area. TCE concentrations in the off-site sampling locations were all undetected or below the Pennsylvania Department of Environmental Protection (PADEP) Act 2 medium-specific concentration (MSC) for residential used aquifers (5 micrograms per liter [μg/L]).

Total lead was detected at a concentration of 8.7 μg/L at the RW-4 Folk off-site sampling location, which is above the PADEP Act 2 MSC for residential used aquifers (5 μg/L); however,

the dissolved lead concentration in the sample (3.3 μg/L) was below the MSC. Total lead was detected during the 2008 Supplemental RI round 1 sampling at 28.9 μg/L; at 23 μg/L during round 2; at 6.1 μg/L during the 2009 sampling; and at 9 μg/L during the 2010 key well sampling. The presence of lead at this sampling location is likely due to contact with residential piping, as the sample was collected from a spigot connected to the well.

### 4.2 Trichloroethane (TCA) Tank Area Groundwater Chemistry

The TCA Tank Area is the site of a historic TCA spill which occurred prior to the initial sampling performed in 1989. The TCA release resulted in elevated concentrations of TCA (up to 100,000 μg/L at MW-32D in 1990) in the groundwater of this area. Groundwater extraction and treatment initiated at CW-8 in 1991 resulted in a rapid decrease in TCA concentrations in wells near the release, with adjacent monitoring wells exhibiting slow declines.

As groundwater extraction has progressed in the TCA Tank Area, the dominant VOC present in the area has generally shifted from TCA to TCE. TCA was not detected in the sample from CW-8 during the 2011 sampling, and the TCE concentration was 340 μg/L. The TCE concentrations in the area wells have remained steady.

### 4.3 WPL Groundwater Chemistry

Thirteen WPL monitoring wells (MW-7, MW-47, MW-50S, MW-50D, MW-51S, MW-51D, MW-75S, MW-95, MW-96S, MW-96D, MW-106, MW-107, and CW-20) and four collection wells (CW-9, CW-13, CW-15A, and CW-17) were sampled during the 2011 key well sampling event.

The dominant VOCs detected in the WPL monitoring wells are TCE and PCE. Historically, PCE is more prevalent in the southwest corner of the WPL while TCE is more prevalent throughout all other areas in the WPL.

The following noteworthy observations for the WPL sampling locations were identified with the 2011 key well sampling event chemistry data:

- Concentrations of TCE and PCE detected at MW-75S represent the highest detections at the site (**Figure 4**). During the initial sampling events at this location (September 1999–June 2002), maximum TCE and PCE concentrations at MW-75S were 15,100 and 39,000 μg/L, respectively. The 2011 concentrations of TCE and PCE at MW-75S were nearly half of the historical maximums at 6,300 and 16,000 μg/L, respectively, which was slightly less than what was detected in 2010 (7,200 μg/L and 22,000 μg/L, respectively).

- The concentrations of TCE and PCE at CW-20 (3,300 μg/L and 2,400 μg/L, respectively) increased from the 2010 sampling (520 μg/L and 880 μg/L, respectively).

- Analysis for dissolved chromium was performed on northern WPL wells (MW-7, MW-47, MW-51S, and MW-51D) as illustrated on **Figure 7**. Two wells (MW-51S and MW-47) within the WPL had dissolved chromium detections (260 μg/L and 2,900 μg/L, respectively) that were above the PADEP Act 2 MSC for nonresidential used aquifer (100 μg/L). Dissolved chromium was not detected above the MSC in MW-7 and MW-51D (99 μg/L and 3.8 μg/L, respectively).

- Analysis for dissolved hexavalent chromium was performed on northern WPL wells (MW-7, MW-47, MW-51S, and MW-51D) as illustrated on **Figure 8**. Three wells (MW-7, MW-51S, and MW-47) within the WPL had dissolved hexavalent chromium detections (110 μg/L, 320 μg/L, and 3,500 μg/L, respectively) that were above the PADEP Act 2 MSC for nonresidential used aquifer (100 μg/L). Dissolved hexavalent chromium was not detected in MW-51D.

### 4.4 SPBA Groundwater Chemistry

Two on-site monitoring wells (MW-64S, and MW-64D) and seven off-site wells (MW-108S, MW-109S, MW-110, MW-4 (Cole), Cole D, Cole F, and RW-5) were sampled during the 2011 key well sampling event in the area of the SPBA. The dominant VOC detected in groundwater beneath this area is TCE, which is consistent with historical sampling data collected from this area.

The highest on-site concentrations of TCE and PCE in the SPBA area continue to be observed at MW-64D (810 μg/L and 560 μg/L, respectively), which is located in the southeast corner of the property (**Figures 5** and **6**).

Off-site monitoring wells MW-108S and RW-5 did not contain VOCs at levels above laboratory reporting limits (RLs). Off-site monitoring well MW-109S did not contain detectable levels of TCE. During the 2011 key well sampling event, groundwater from well MW-109S was noted to contain detected concentrations of benzene, ethylbenzene, methyl tertiary-butyl ether (MTBE), and xylenes, which are constituents of gasoline. These detections are most likely associated with the documented release from a nearby convenience store that dispenses gasoline located on the corner of Route 30 and North Sherman Street and not related to Harley-Davidson. MW-110 was installed in November 2007 and has been sampled four times with relatively consistent, fluctuating TCE results (from 66 μg/L to 99 μg/L). The detected concentration of TCE in the sample collected during 2011 was 56 μg/L.

One well near the SPBA (MW-108S) was sampled for lead, arsenic, beryllium, and nickel during 2011. The total lead result for the sample from MW-108S was 14 μg/L, which exceeds the PADEP Act 2 MSC for residential used aquifers of 5 μg/L. Dissolved lead was not detected in the sample from MW-108S. The metals and VOC sampling results presented for the SPBA are consistent or slightly decreased with those from previous sampling events.

### 4.5 EPBA/Landfill Groundwater Chemistry

One key monitoring well (MW-2) was sampled to monitor groundwater quality near Harley-Davidson's EPBA. PCE is the dominant VOC detected in groundwater from MW-2, and it was detected at a concentration of 59 μg/L in 2011 (**Figure 6**).

Groundwater from well MW-2 is also sampled and analyzed for total and available cyanide, due to a historical release and cleanup of cyanide waste in this vicinity of the property (approximately 75 feet east of MW-2). Groundwater from MW-2 contained detectable concentrations of total and available cyanide (which is free cyanide, plus cyanide complexes that easily dissociate). The reported concentrations of cyanide in the MW-2 sample were 670 μg/L total cyanide (similar to the concentration detected 2010 of 660 μg/L) with no detectable free cyanide. The MW-2 total cyanide is above the PADEP Act 2 MSC for nonresidential used aquifers (200 μg/L). The historical trend of total cyanide has been decreasing, since a high of approximately 3,900 μg/L was detected in 2001. Free cyanide has shown a similar decreasing trend.

### 4.6 West of the West Parking Lot Groundwater Chemistry Data

Ten monitoring wells were sampled west of the WPL (WWPL) (MW-98D, MW-98I, MW-98S, MW-99D, MW-99S, MW-100D, MW-100I, MW-100S, MW-101D, and MW-101S). All of these wells were installed in 2008 on the property now owned by the York County Rail Trail Authority (YCRTA) along the eastern side of the Codorus Creek Levee (**Figure 2**).

Consistent with the sampling performed previously, PCE and TCE are the dominant VOCs detected in groundwater in the WWPL wells (**Figures 5** and **6**). Samples from all wells except MW-98D contained concentrations above the PADEP Act 2 MSCs for residential used aquifers. Five of the ten wells contained concentrations of PCE that were above the MSC of 5 μg/L. Wells with samples not exceeding the MSC for PCE are MW-98S, MW-98I, MW-98D, MW-101D, and MW-101S. Detected PCE concentrations ranged from 1.8 μg/L (MW-98S) to 110 μg/L (MW-100D) and are consistent with the concentrations detected in 2010 (2.6 μg/L

[MW-98S] to 130 μg/L [MW-100D]). Nine of the ten wells exceeded the MSC for TCE of 5 μg/L. Detected TCE concentrations ranged from 0.53 μg/L (MW-98D) to 210 μg/L (MW-100D) and are consistent with the concentrations detected in 2010 (<1.0 μg/L [MW-98D] to 210 μg/L [MW-100D]). The only other noteworthy VOC detection for the WWPL wells was the cis-1,2-DCE concentration (75 μg/L) detected at MW-100D, which is lower than the concentration detected in 2010 (83 μg/L). This is the only WWPL well with a reported cis-1,2-DCE concentration that is above the PADEP Act 2 MSCs for residential used aquifers (70 μg/L).

### 4.7 North End of the Test Track (NETT) Groundwater Chemistry Data

No wells or springs were sampled in the NETT during 2011.

### 4.8 Additional Site-Wide Groundwater Chemistry Data

Six additional monitoring wells not summarized above were sampled as part of the 2011 key well sampling round to monitor groundwater quality at or near the Harley-Davidson facility. One well (MW-82) is located along the property line in the north-central portion of the facility (**Figure 2**). Three off-site wells were sampled along the south side of US Route 30 (south of the Harley-Davidson facility) on property owned by K. G. Whiteford, located at 1201 Eden Road (formerly Cole Steel/Pfaltzgraff Company site). These wells are identified as Cole D, Cole F, and MW-4 (Cole). The remaining two wells (MW-77 and MW-116) monitor groundwater beneath the central portion of the facility. Noteworthy items from the sampling of these wells are summarized below:

- Well MW-82 monitors deep groundwater quality along the north-central property line just north of the contractors' parking area (**Figure 2**). TCE was not detected above laboratory RLs from 2004 to 2007; however, in 2008 to 2010, TCE was detected at concentrations above the above the PADEP Act 2 MSCs for nonresidential used aquifers value of 5 μg/L. During the 2011 sampling event, TCE was detected at a concentration

of 23 μg/L. All of the other detected VOCs were below the MSCs. The roadway along this portion of the property is being modified during late 2011 to ease a sharp curve, and this well location will be adjacent to the new property boundary.

- The Cole Steel wells that were sampled contained low levels of TCE and PCE, with the highest concentrations found at Cole D (15 μg/L and 42 μg/L, respectively). The detected levels of TCE and PCE at monitoring well MW-4 (Cole) did not exceed the PADEP Act 2 MSCs for residential used aquifers. TCE (7.5 μg/L) was the only VOC detected in Cole F at a concentration above the MSC. The TCE concentrations in the samples from Cole D and Cole F (15 μg/L and 7.5 μg/L, respectively) are slightly lower than the concentrations detected in 2010 (16 μg/L and 33 μg/L, respectively). Likewise, the PCE concentrations detected in Cole D and Cole F were 42 μg/L and 2.6 μg/L, respectively.

- Well MW-77 monitors the groundwater quality in the area of the former underground storage tank (UST) T-4 that was located to the west of Building 45 (**Figure 2**). Former gasoline and diesel USTs were located in this area. Fuel-related VOCs were detected in the sample from MW-77, with benzene and MTBE detected at concentrations of 1,500 μg/L and 520 μg/L, respectively, that are above the PADEP Act 2 MSCs for nonresidential used aquifers (5 μg/L and 20 μg/L, respectively). The concentrations of benzene and MTBE detected in 2011 are lower than the concentrations detected in 2010 (2,000 μg/L and 700 μg/L, respectively).

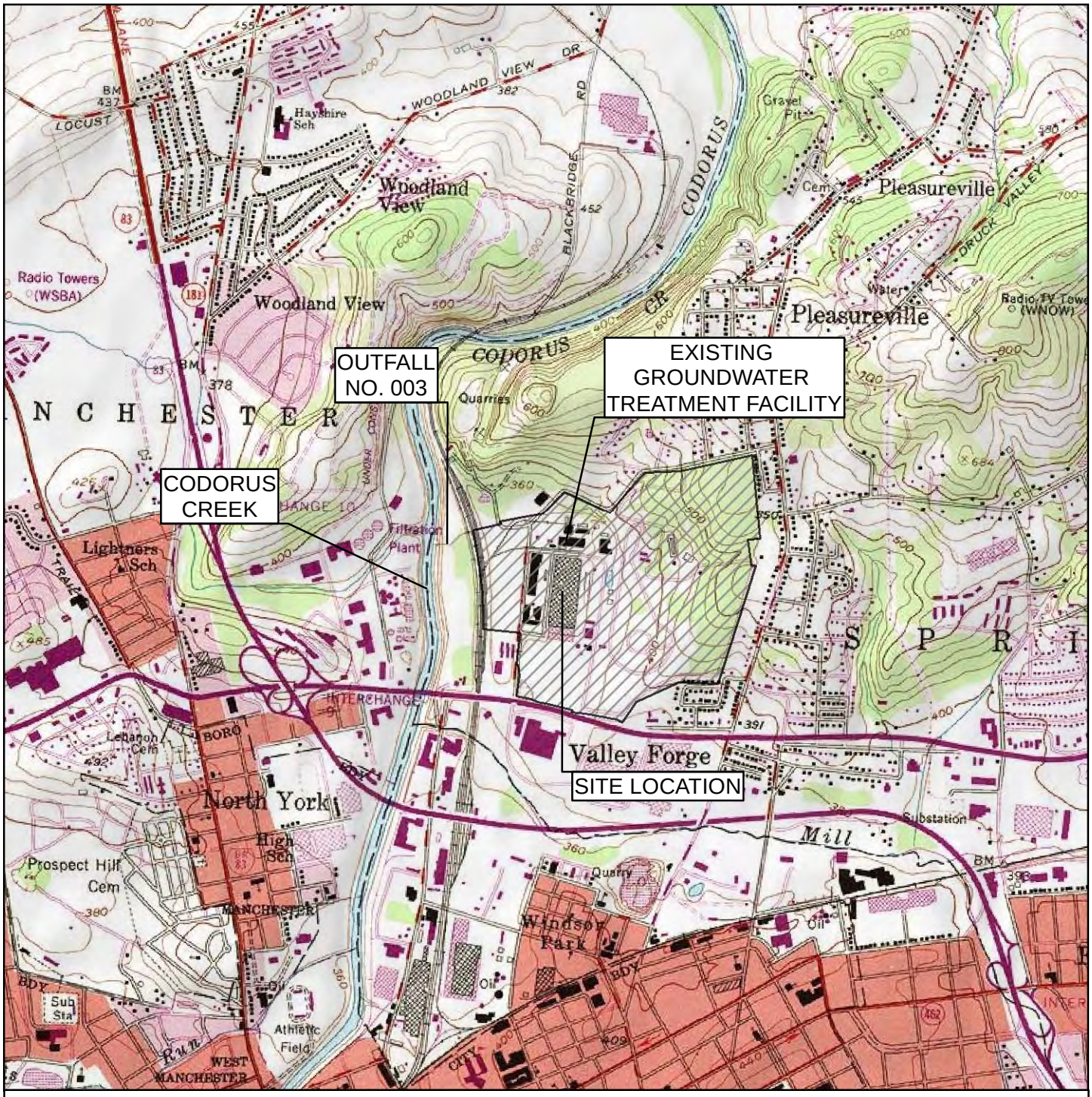
- Monitoring well MW-116 was installed in 2008 on the west side of Building 41 (**Figure 2**). Cis-1,2-DCE (1,300 μg/L), 1,1-DCE (37J), PCE (270 μg/L), TCE (420 μg/L), and vinyl chloride (84 μg/L) were detected above the PADEP Act 2 MSCs for nonresidential used aquifers in MW-116. The VOC concentrations detected in MW-116 in 2011 are higher than the concentrations detected in 2010. This area is currently undergoing demolition and an interim removal action.

## 4.9 Quality Assurance/Quality Control (QA/QC)

As part of the QA/QC process, EDDs from the laboratory are entered into the fYNOP database, which is stored in the ARC IMS system and checked for completeness against the chain-of-custody record. Ten percent of the laboratory data packages are randomly selected for further validation review by SAIC to determine if laboratory qualifiers are properly applied. The data validation process includes evaluation for completeness, technical holding times, blanks, duplicates, laboratory control samples, matrix spike samples, surrogates, and calibration to standards. Verified electronic analytical data with qualifiers are then entered into the fYNOP data base and stored on the SAIC server. Laboratory records are also retained at TestAmerica for a period of five years after the report is issued.

For quality control (QC) purposes, daily trip blanks for VOCs, duplicate samples, and matrix spike/matrix spike duplicate (MS/MSD) samples were collected and submitted for analysis. None of the trip blank samples contained detectable levels of any of the target VOC analytes. Duplicate results are shown on **Table 5** for wells MW-99D, MW-100I, and MW-4 (Cole). All of the duplicate and MS/MSD sample results were within acceptable limits. Therefore, the data set is considered usable, as qualified on **Table 5**.

# FIGURES




NOTE: Map based on USGS 7.5 minute series York quadrangle.

0 1,000 2,000 4,000 '

1 inch = 2,000 feet

N
W E
S

YORK

QUADRANGLE LOCATION

**FORMER YORK NAVAL ORDNANCE PLANT**

1425 EDEN ROAD, YORK, PA 17402

# SITE LOCATION MAP

| | | | |
|---|---|---|---|
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SAIC From Science to Solutions

NPBA CONTROL BUILDING

NPBA GROUNDWATER CONVEYANCE PIPE TO TREATMENT PLANT

NPBA GROUNDWATER COLLECTION PIPE TO CONTROL BUILDING

TREATMENT SYSTEM DISCHARGE LINE

WPL COLLECTION PIPES TO TREATMENT PLANT

LIFT STATION

SOFTAIL DEWATERING SYSTEM

CODORUS CREEK

Norfolk Southern

Maple Crest Blvd

Fading Way

Sand Bank

EDEN RD

PARADISE RD

Ant View DR

City View RD

Ridgewood

Mt. Herman

Hamilton St.

N. SHERMAN ST

Topper St.

Canford St.

Canterbury Ln

ARSENAL ROAD

U.S. RT 30

Metal Chip Bin Area

North End Test Track

Bunker and Shell Ranges

East Landfill Area

Underground Storage Tank T-4

Building 2 Drum Storage Area

TCA Tank Area

West Parking Lot

Cyanide Spill Area

North Property Boundary Area

South Property Boundary Area

Lift Station Deep Foundation

Spring at Bldg 14 S2

Spring at Bldg 14 S1

S-6-Tate Spring

S-7-Herman Spring

Folk (RW-4)

RW-6 RW-5 RW-1 RW-2 RW-3

CW-1 CW-1A CW-2 CW-3 CW-4 CW-5 CW-6 CW-7 CW-7A CW-8 CW-9 CW-13 CW-14 CW-15 CW-15A CW-16 CW-17 CW-18 CW-20

MW-1 MW-2 MW-3 MW-5 MW-6 MW-7 MW-8 MW-9 MW-10 MW-11 MW-12 MW-15 MW-16D MW-16S MW-17 MW-18D MW-18S MW-19 MW-20D MW-20M MW-20S MW-22 MW-26 MW-27 MW-28 MW-29 MW-30 MW-31D MW-31S MW-32D MW-32S MW-33 MW-34D MW-34S MW-35D MW-35S MW-36D MW-36S MW-37D MW-37S MW-38D MW-39D MW-40D MW-42M MW-43D MW-43S MW-45 MW-46 MW-47 MW-49D MW-49S MW-50D MW-50S MW-51D MW-51S MW-54 MW-55 MW-56 MW-57 MW-64D MW-64S MW-65D MW-65S MW-66D MW-66S MW-67D MW-67S MW-68 MW-69 MW-70D MW-75D MW-75S MW-77 MW-78 MW-79 MW-80 MW-81D MW-81S MW-82 MW-83 MW-84 MW-85 MW-86D MW-86S MW-87 MW-88 MW-91 MW-92 MW-93D MW-93S MW-94 MW-95 MW-96D MW-96S MW-97 MW-98D MW-98I MW-98S MW-99D MW-99S MW-100D MW-100I MW-100S MW-101D MW-101S MW-102D MW-103D MW-103S MW-104 MW-105 MW-106 MW-107 MW-108D MW-108S MW-109D MW-109S MW-110 MW-111 MW-112 MW-113 MW-114 MW-115 MW-116 MW-117

WPL-SS-7 WPL-SS-8

## Legend

- Monitoring Well and Designation
- Extraction Well and Designation
- Key Well and Designation
- Spring
- Treatment System Features
- NPBA Area
- TCA Area
- WPL Area
- Codorus Creek
- Existing Building
- Removed Building
- Harley-Davidson Property Boundary
- Roads Curb Boundary
- Railroad

N

*NOTE:*
1. *Base data (Buildings, Building Boundaries, Roads and Curbs) from NuTec Survey conducted in 2006.*

0 225 450 900

SCALE IN FEET

**FORMER YORK NAVAL ORDNANCE PLANT**

1425 Eden Rd York, Pa 17402

# GROUNDWATER TREATMENT SYSTEM LOCATION

| | | | |
|---|---|---|---|
| drawn AGM | checked | approved | figure no. 2 |
| date 9/26/2011 | date | date | |
| job no. 4501020172/8000/100 | | file no. Fig_2_Site_Map_20090825 | |

| initials | date | revision |
|---|---|---|
| | | |

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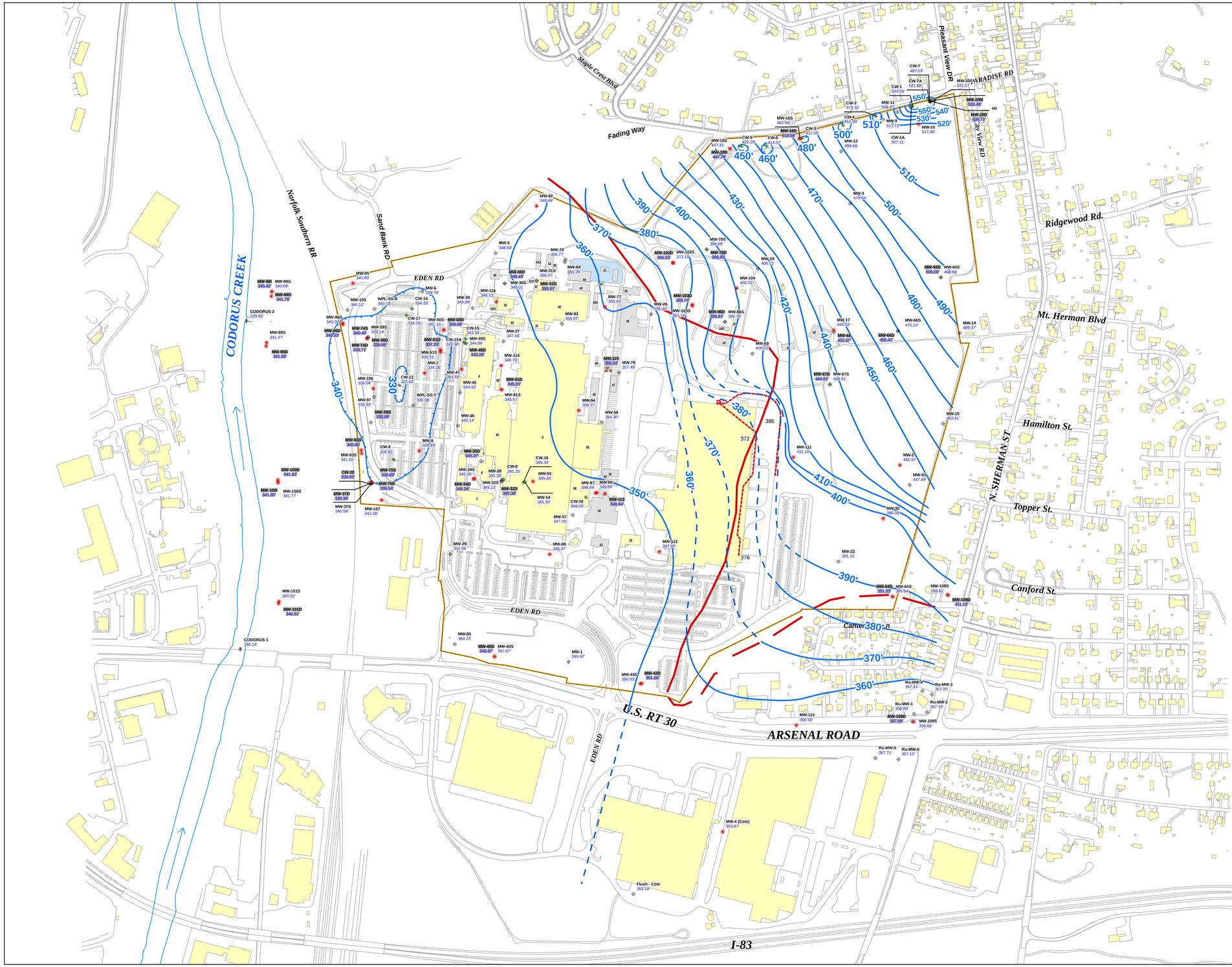


**Harley-Davidson Motor Co. Operations Inc.**
**Groundwater Withdrawal: June 17, 2011**

| Well ID | Daily Flow (Gallons) | Average Daily Pumping Rate (GPM) |
|---|---|---|
| CW-1 | 3,456 | 2.40 |
| CW-1A | 312 | 0.22 |
| CW-2 | 644 | 0.45 |
| CW-3 | 10,156 | 7.05 |
| CW-4 | 3,121 | 2.17 |
| CW-5 | 1,851 | 1.29 |
| CW-6 | 4,580 | 3.18 |
| CW-7 | 1,431 | 0.99 |
| CW-7A | 2,344 | 1.63 |
| CW-8 | 143,800 | 99.86 |
| CW-9 | 106,648 | 74.06 |
| CW-13 | 99,632 | 69.19 |
| CW-15A | 1,233 | 0.86 |
| CW-17 | 100,327 | 69.67 |
| Liftstation | 1,180 | 0.82 |

## Legend

- Monitoring Well and Designation
- Key Well and Designation
- Extraction Well and Designation
- Stream Gauge and Designation
- Groundwater Contour (Feet)
- Inferred Groundwater Contour (Feet)
- Groundwater Contour Sink (Feet)
- Bedrock Contact
- Groundwater Interceptor Trench
- Harley - Davidson Property Boundary
- Existing Buildings
- Removed Buildings
- Stormwater Basin
- Cordorus Creek
- Roads and Curb Boundary

*NOTE:*

1. *Base data (Buildings, Building Boundaries, Roads and Curbs, and Contour Lines, from NuTec Survey conducted in 2006)*
2. *Gauging data that was used was from the 6/17/2011 gauging event.*
3. *The shallow groundwater elevation was used when contouring at well pairs (in black). Gray water levels are from deep wells and are presented for comparison only.*
4. *The groundwater elevations at MW-29 and MW-85 were not used for contouring because they are considered to be anomalously high.*

0 300 600 1,200

SCALE IN FEET

**FORMER YORK NAVAL ORDNANCE PLANT**

1425 EDEN ROAD, YORK, PA 17402

**GROUNDWATER SURFACE CONTOUR MAP JUNE 2011**

| | | | |
|---|---|---|---|
| drawn JWS | checked | approved | figure no. 3 |
| date 9/23/2011 | date | date | |
| job no. 4501020172/8000/100 | | file no. Fig_3_GW_Con_Jun_11 | |

| initials | date | revision |
|---|---|---|
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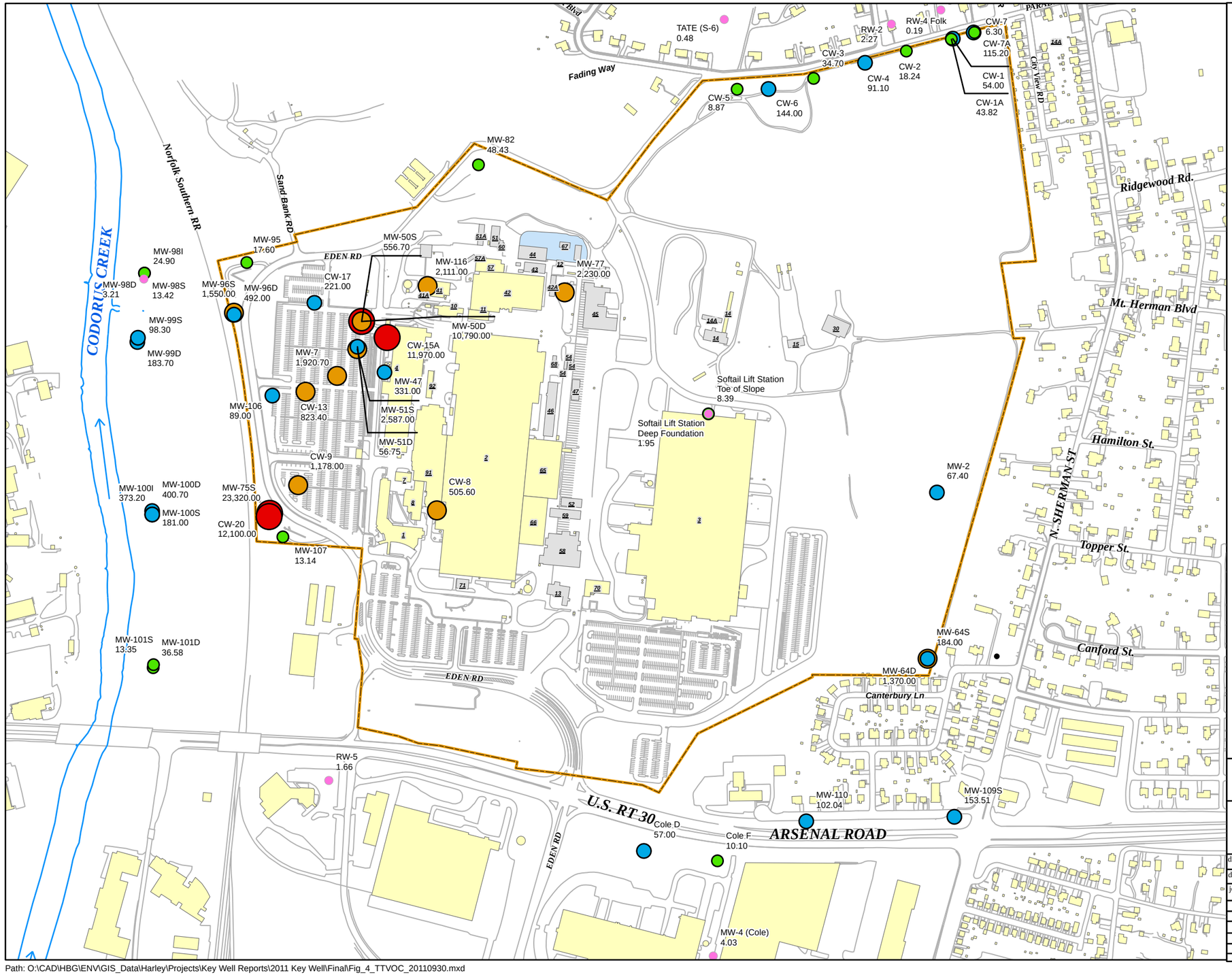


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## Total VOCs in µg/l

- ND
- < 5.0
- 5.01 - 50.0
- 50.1 - 500.0
- 500.01 - 5000.
- >5000.01

- Cordorus Creek
- Harley-Davidson Property Boundary
- Existing Building
- Removed Building
- Storm Water Basin
- Roads Curb Boundary

*NOTE:*
*1. ND = Not detected above laboratory reporting limit.*

500 250 0 500 Feet

1 inch = 500 feet

**FORMER YORK NAVAL ORDNANCE PLANT**

1425 EDEN ROAD, YORK, PA 17402

**Key Well Chemistry Map**
**Total VOCs - June/July 2011**

| | | | |
|---|---|---|---|
| drawn JWS | checked | approved | figure no. 4 |
| date 10/04/2011 | date | date | |
| job no. 4501020172/8000/100 | | file no. Fig_4_TTVOC_20110930 | |

| initials | date | revision |
|---|---|---|
| | | |
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| | | |
| | | |
| | | |

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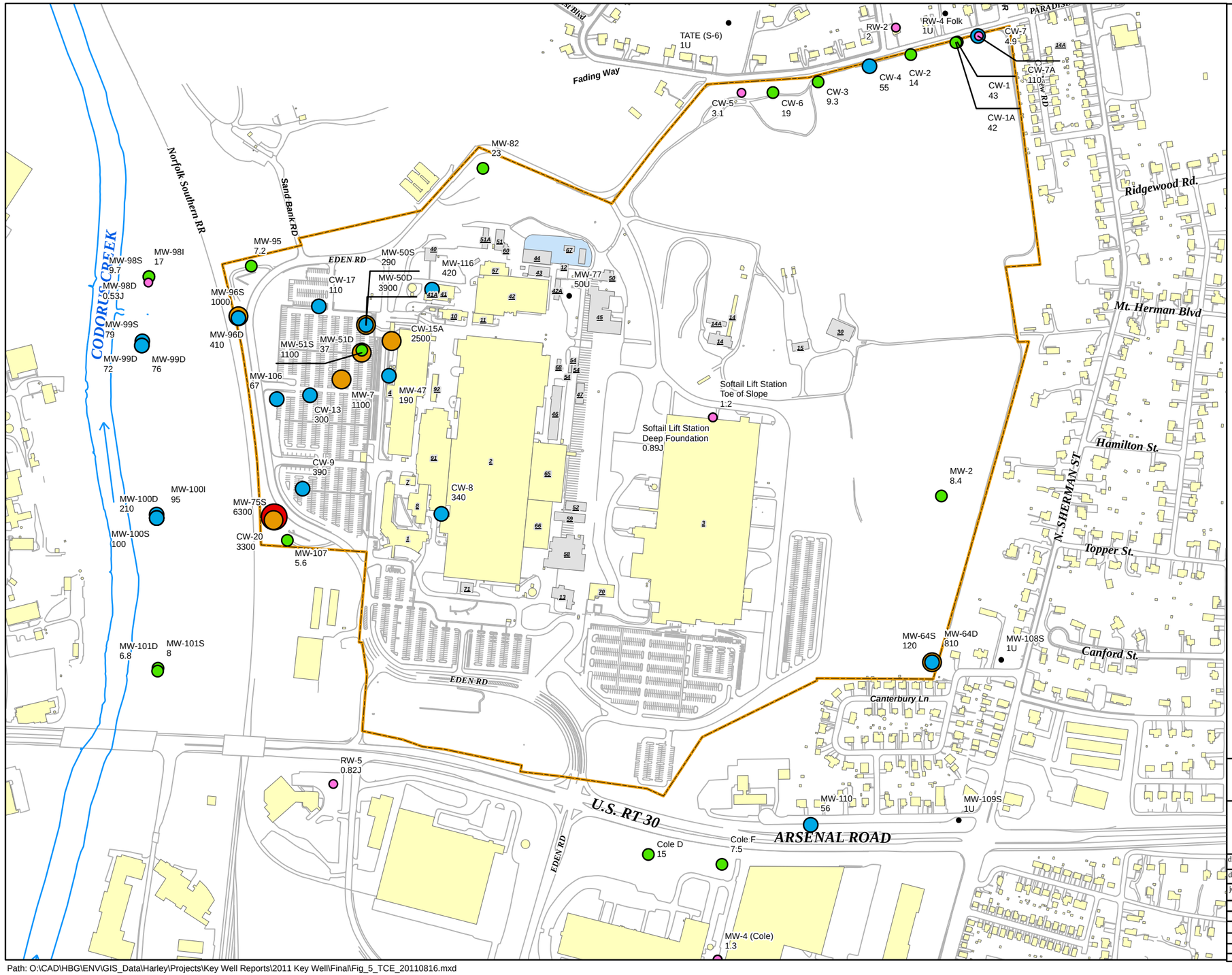


N

W E

S

## Trichloroethene (TCE) in µg/l

- ND
- < 5.0
- 5.1 - 50.0
- 50.1 - 500.0
- 500.1 - 5000.0
- >5000.1
- Cordorus Creek
- Harley-Davidson Property Boundary
- Existing Building
- Removed Building
- Storm Water Basin
- Roads Curb Boundary

*NOTE:*

1. *ND = Not detected above laboratory reporting limit.*
2. *U = Not detected above laboratory reporting limit.*
3. *J = Estimated result. Result is less than reporting limit but greater than the detection limit.*

500 250 0 500 Feet

1 inch = 500 feet

**FORMER YORK NAVAL ORDNANCE PLANT**

1425 EDEN ROAD, YORK, PA 17402

**Key Well Chemistry Map**
**TCE - June/July 2011**

| | | | |
|---|---|---|---|
| drawn JWS | checked | approved | figure no. 5 |
| date 9/30/2011 | date | date | |
| job no. 4501020172/8000/100 | | file no. Fig_5_TCE_20110816 | |

| initials | date | revision |
|---|---|---|
| | | |

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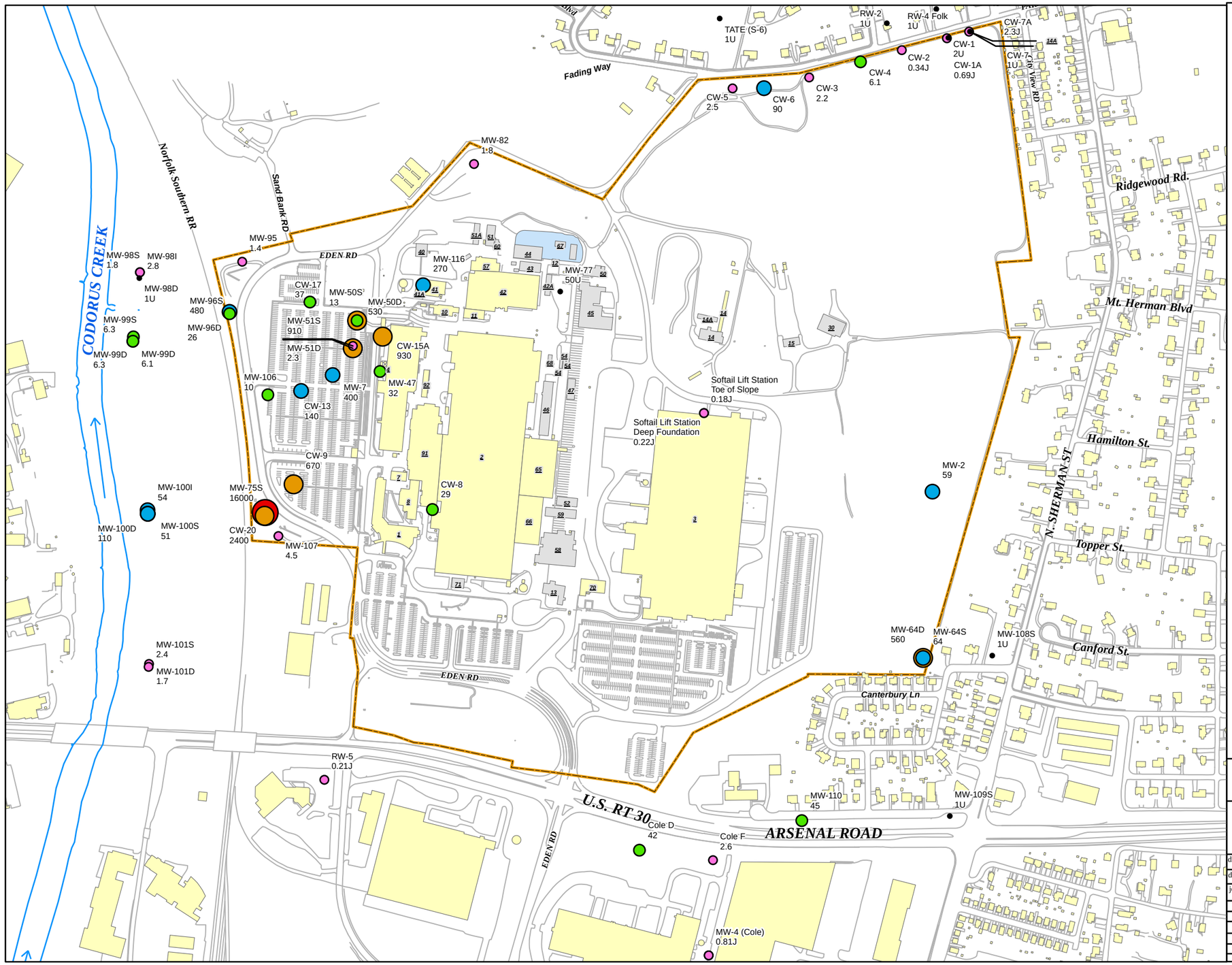


N
W E
S

## Tetrachloroethene (PCE) in µg/l

- ND
- < 5.0
- 5.1 - 50.0
- 50.1 - 500.0
- 500.1 - 5000.0
- >5000.1

- Cordorus Creek
- Existing Building
- Removed Building
- Harley-Davidson Property Boundary
- Stormwater Basin
- Roads Curb Boundary

*NOTE:*
1. *ND = Not detected above laboratory reporting limit.*
2. *U = Not detected above laboratory reporting limit.*
3. *J = Estimated result. Result is less than reporting limit but greater than the detection limit.*

500 250 0 500 Feet

1 inch = 500 feet

**FORMER YORK NAVAL ORDNANCE PLANT**

1425 EDEN ROAD, YORK, PA 17402

**Key Well Chemistry Map**
**PCE - June/July 2011**

| | | | |
|---|---|---|---|
| drawn JWS | checked | approved | figure no. |
| date 9/29/2011 | date | date | 6 |
| job no. 4501020172/8000/100 | | file no. Fig_6_PCE_20110929 | |

| initials | date | revision |
|---|---|---|
| | | |

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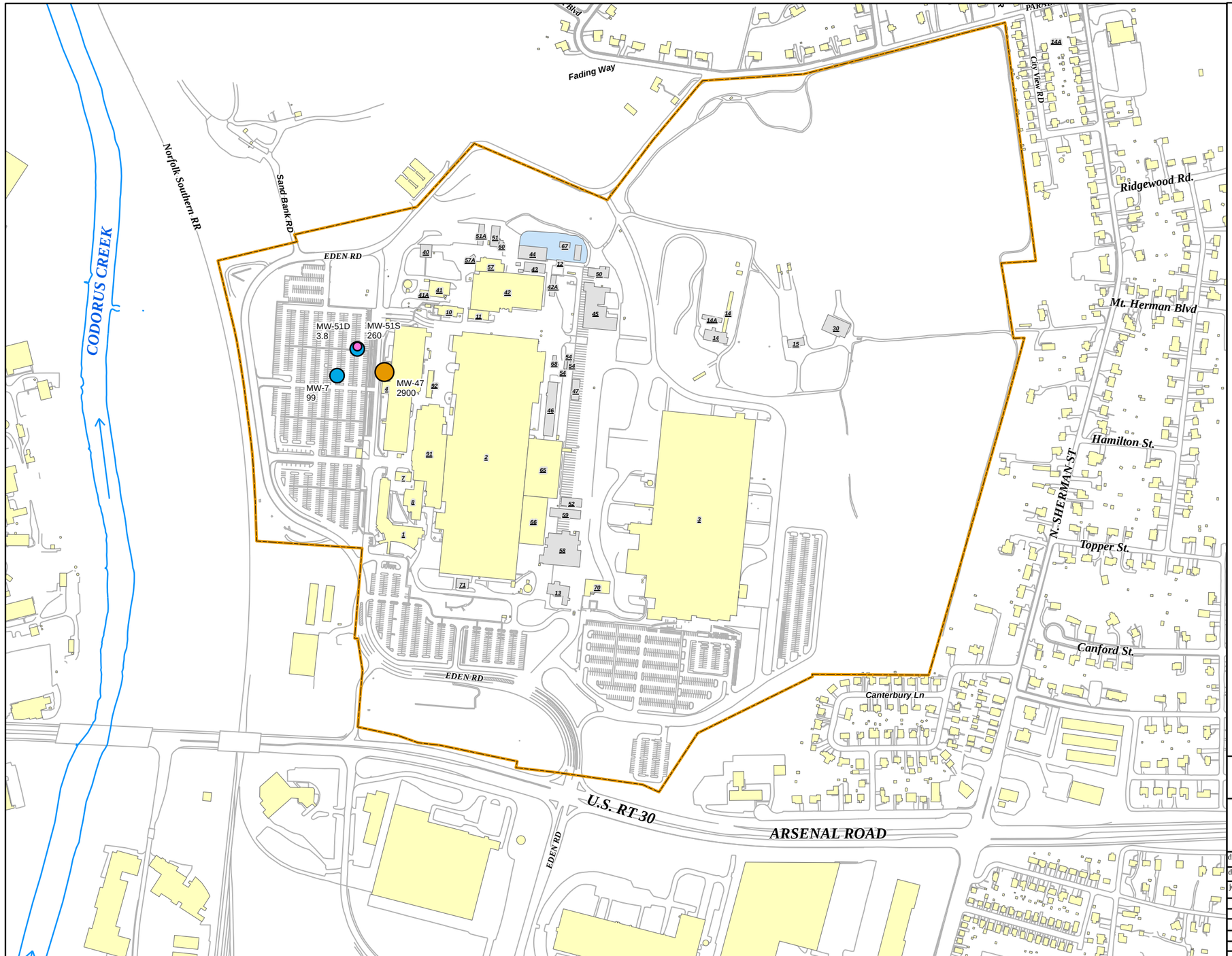


N
W E
S

## Total Chromium (Cr+3 and Cr+6, dissolved) in µg/l

- ND
- < 5.00
- 5.01 - 50.00
- 50.01 - 500.00
- 500.01 - 5000.00
- >5000.01
- Cordorus Creek
- Harley-Davidson Property Boundary
- Existing Building
- Removed Building
- Storm Water Basin
- Roads Curb Boundary

*NOTE:*
1. *ND = Not detected above laboratory reporting limit.*
2. *U = Not detected above laboratory reporting limit.*
3. *J = Estimated result. Result is less than reporting limit but greater than the detection limit.*

500 250 0 500 Feet

1 inch = 500 feet

**FORMER YORK NAVAL ORDNANCE PLANT**

1425 EDEN ROAD, YORK, PA 17402

**Key Well Chemistry Map**
**Total Chromium ($Cr^{+3}$ and $Cr^{+6}$, Dissolved Phase) June/July 2011**

| | | | |
|---|---|---|---|
| drawn JWS | checked | approved | figure no. 7 |
| date 9/30/2011 | date | date | |
| job no. 4501020172/8000/100 | | file no. Fig_7_TotCh_20110930 | |

| initials | date | revision |
|---|---|---|
| | | |

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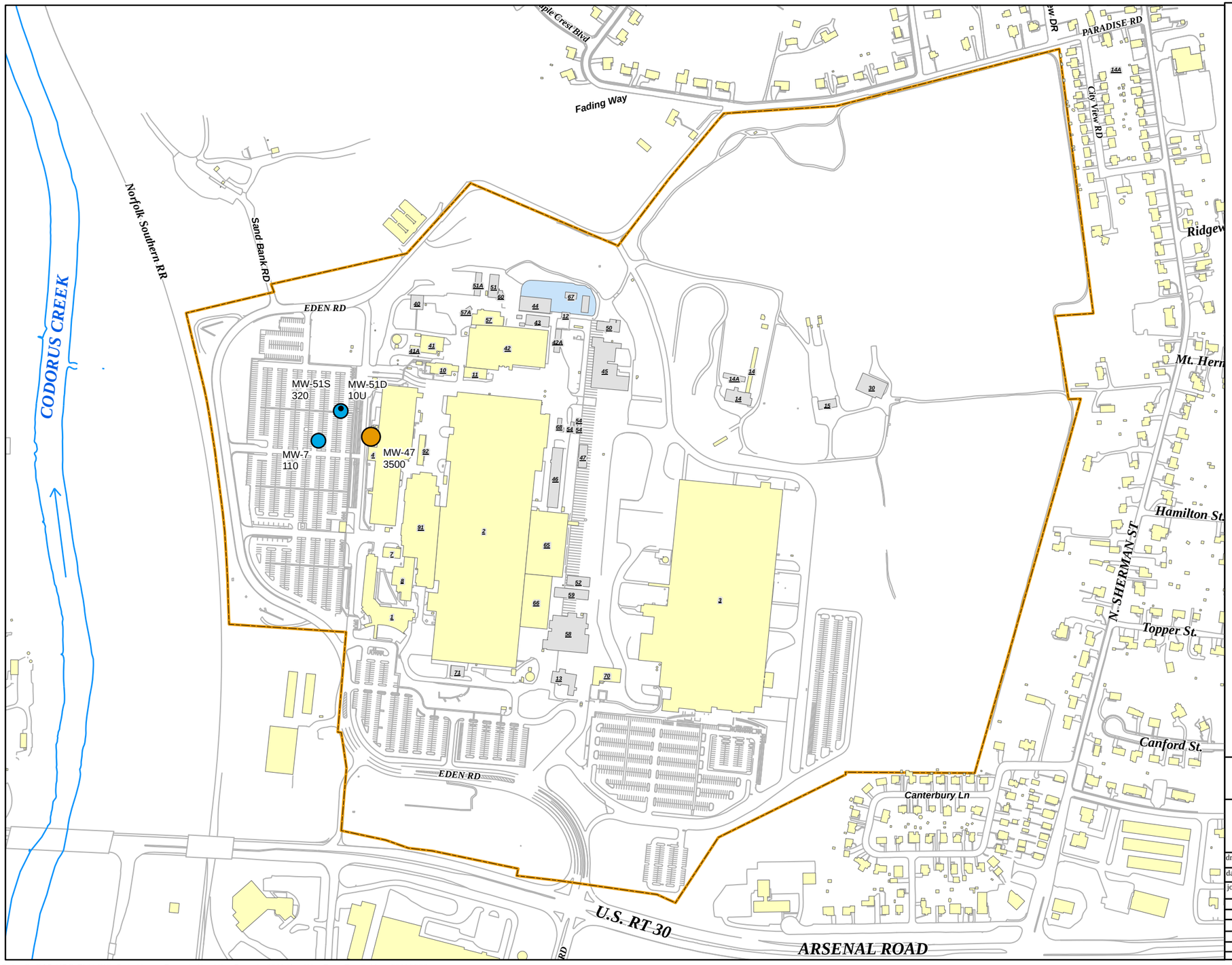


N

W E

S

## Dissolved Hexavalent Chromium (Cr+6) in µg/l

- ND
- < 5.0
- 5.1 - 50.0
- 50.1 - 500.0
- 500.1 - 5000.0
- >5000.1

- Cordorus Creek
- Existing Building
- Removed Building
- Harley-Davidson Property Boundary
- Stormwater Basin
- Roads Curb Boundary

*NOTE:*

1. *ND = Not detected above laboratory reporting limit.*
2. *U = Not detected above laboratory reporting limit.*
3. *B = Estimated result. Result is less than reporting limit but greater than the detection limit.*

450 225 0 450 Feet

1 inch = 450 feet

**FORMER YORK NAVAL ORDNANCE PLANT**

1425 EDEN ROAD, YORK, PA 17402

**Key Well Chemistry Map**
**Dissolved Hexavalent Chromium (Cr+6) in µg/l June/July 2011**

| drawn | checked | approved | figure no. |
|---|---|---|---|
| JWS | | | 8 |
| date 9/29/11 | date | date | |
| job no. 4501020172/8000/100 | | file no. Fig_8_Hex_20110930 | |

| initials | date | revision |
|---|---|---|
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# TABLES

**TABLE 1**
**SUMMARY OF MONITORING POINTS TO BE SAMPLED IN 2011**
Former York Naval Ordnance Plant

| Well ID | Area | Aquifer | Rationale | Notes |
|---|---|---|---|---|
| Cole D | Off-site/SPBA | Unknown | Off-site trend for VOC | Key well added in 2010 |
| Cole F | Off-site/SPBA | Unknown | Off-site trend for VOC | Key well added in 2010 |
| Cole MW-4 | Off-site/SPBA | Unknown | Off-site trend for VOC | Key well added in 2010 |
| CW-20 | WPL | Deep Bedrock | SW Corner issue/Boundary | Key well added in 2010 |
| RW-2 | Off-site/NPBA | Unknown | Off-site residential trend for VOC | Key well |
| RW-4 Folk | Off-site/NPBA | Unknown | Off-site residential trend for VOC | Key well added in 2009 |
| RW-5 | Off-site | Unknown | Off-site residential trend for VOC | Key well added in 2006 |
| S-6 | Off-site/NPBA | Spring | Off-site trend for VOC | Added in 2009 |
| S-7 | Off-site/NPBA | Spring | Off-site trend for VOC | Added in 2009 |
| MW-2 | CN | Deep Bedrock | Monitor CN area | Key well |
| MW-7 | WPL | Shallow Bedrock | Monitor GW downgradient of potential Cr source | Key well added in 2003 |
| MW-8 | WPL | Shallow Bedrock | VOC trend for CW-9 | Key well added in 2010 |
| MW-10 | NPBA | Deep Bedrock | VOC trend for NPBA | Key well |
| MW-16D | NPBA | Deep Bedrock | VOC trend for NPBA | Key well added in 2010 |
| MW-16S | NPBA | Shallow Bedrock | VOC trend for NPBA | Key well added in 2009 |
| MW-17 | Bunkers/ELF | Shallow Bedrock | Monitor GW downgradient of landfill | Key well |
| MW-18D | NPBA | Deep Bedrock | VOC trend for NPBA | Key well added in 2009 |
| MW-18S | NPBA | Shallow Bedrock | VOC trend for NPBA | Key well added in 2009 |
| MW-34D | Bldg 2/TCA | Deep Bedrock | VOC trend for CW-8 | Key well |
| MW-34S | Bldg 2/TCA | Deep Bedrock | VOC trend for CW-8 | Key well |
| MW-35S | Bldg 2/TCA | Shallow Bedrock | VOC trend for CW-8 | Key well added in 2010 |
| MW-37S | WPL | Shallow Bedrock | Monitor GW downgradient of WPL | Key well |
| MW-40D | SPBA | Deep Bedrock | Monitor GW along SPBA | Key well |
| MW-40S | SPBA | Shallow Bedrock | Monitor GW along SPBA | Key well |
| MW-43D | SPBA | Deep Bedrock | Monitor GW along SPBA | Key well |
| MW-43S | SPBA | Overburden | Monitor GW along SPBA | Key well |
| MW-47 | Bldg 4 fmr Plater area | Overburden | Monitor GW downgradient of potential Cr source | Key well added in 2003 |
| MW-50D | WPL | Deep Bedrock | VOC trend for CW-15A/NB4 remedial actions | Key well added in 2004 |
| MW-50S | WPL | Deep Bedrock | VOC trend for CW-15A/NB4 remedial actions | Key well added in 2004 |
| MW-51D | WPL | Deep Bedrock | VOC trend for CW-15A/NB4 remedial actions | Key well |
| MW-51S | WPL | Shallow Bedrock | VOC trend for CW-15A/NB4 remedial actions | Key well |
| MW-55 | Bldg 2/TCA | Shallow Bedrock | Lead trend for CW-16/CW-8 | Key well added in 2009 |
| MW-64D | SPBA | Shallow Bedrock | VOC trend for SPBA/SE Boundary | Key well |
| MW-64S | SPBA | Overburden | VOC trend for SPBA/SE Boundary | Key well |
| MW-74D | WPL | Deep Bedrock | Downgradient WPL | Key well added in 2001 |
| MW-74S | WPL | Deep Bedrock | Downgradient WPL | Key well added in 2001 |
| MW-75S | WPL | Deep Bedrock | SW Corner issue/Boundary | Key well added in 2001 |
| MW-77 | UST-T4 | Overburden | VOC trend for fmr Bldg 45 UST-T4 area | Key well added in 2009 |
| MW-80 | Bldgs 58/59 | Overburden | Near potential VOC source | Key well added in 2010 |
| MW-81D | Paint (91) Shop | Deep Bedrock | Potential source area | Key well added in 2001 |
| MW-81S | Paint (91) Shop | Shallow Bedrock | Potential source area | Key well added in 2001 |
| MW-82 | NP | Deep Bedrock | North Corner/Boundary | Key well added in 2001 |
| MW-87 | Bldgs 58/59 | Overburden | Near potential VOC source | Key well added in 2001 |
| MW-88 | SB2 | Deep Bedrock | SE corner of Bldg 2 | Key well added in 2001 |
| MW-92 | EPBA/CN | Deep Bedrock | Monitor CN area | Key well added in 2001 |
| MW-93S | WPL | Shallow Bedrock | SW Corner issue/Boundary | Key well added in 2005 |
| MW-93D | WPL | Deep Bedrock | SW Corner issue/Boundary | Key well added in 2005 |
| MW-94 | B2 FCOTA | Overburden | New Supplemental RI well - build database for trend | Key well added in 2009 |
| MW-95 | WPL | Shallow Bedrock | NW Corner issue/Boundary | Key well added in 2009 |
| MW-96D | WPL - Area B | Shallow Bedrock | NW Corner issue/Boundary | Key well added in 2009 |
| MW-96S | WPL - Area B | Shallow Bedrock | NW Corner issue/Boundary | Key well added in 2009 |
| MW-98D | WWPL | Deep Bedrock | Off-site Levee/Codorus Creek | Key well added in 2009 |
| MW-98I | WWPL | Shallow Bedrock | Off-site Levee/Codorus Creek | Key well added in 2009 |
| MW-98S | WWPL | Shallow Bedrock | Off-site Levee/Codorus Creek | Key well added in 2009 |
| MW-99D | WWPL | Deep Bedrock | Off-site Levee/Codorus Creek | Key well added in 2009 |
| MW-99S | WWPL | Shallow Bedrock | Off-site Levee/Codorus Creek | Key well added in 2009 |
| MW-100D | WWPL | Deep Bedrock | Off-site Levee/Codorus Creek | Key well added in 2009 |
| MW-100I | WWPL | Shallow Bedrock | Off-site Levee/Codorus Creek | Key well added in 2009 |
| MW-100S | WWPL | Shallow Bedrock | Off-site Levee/Codorus Creek | Key well added in 2009 |
| MW-101D | WWPL | Deep Bedrock | Off-site Levee/Codorus Creek | Key well added in 2009 |
| MW-101S | WWPL | Shallow Bedrock | Off-site Levee/Codorus Creek | Key well added in 2009 |
| MW-102D | NETT | Shallow Bedrock | New Supplemental RI well - build database for trend | Key well added in 2009 |
| MW-102S | NETT | Overburden | New Supplemental RI well - build database for trend | Key well added in 2009 |
| MW-103D | NETT | Deep Bedrock | New Supplemental RI well - build database for trend | Key well added in 2009 |
| MW-103S | NETT | Overburden | New Supplemental RI well - build database for trend | Key well added in 2009 |
| MW-104 | NETT | Overburden | New Supplemental RI well - build database for trend | Key well added in 2009 |
| MW-106 | WPL | Overburden | West-central Boundary | Key well added in 2009 |
| MW-107 | WPL | Overburden | SW Corner issue/Boundary | Key well added in 2009 |
| MW-108S | Off-site | Overburden | Off-site SE area - York Water | Key well added in 2009 |
| MW-109S | Off-site | Overburden | Off-site SE area - Rutters | Key well added in 2009 |
| MW-110 | Off-site | Shallow Bedrock | Off-site SE area - Old Arsenal Rd. | Key well added in 2009 |
| MW-111 | Softail | Deep Bedrock | New Supplemental RI well - build database for trend | Key well added in 2009 |
| MW-112 | Softail | Deep Bedrock | New Supplemental RI well - build database for trend | Key well added in 2009 |
| MW-113 | Bldgs 58/59 | Deep Bedrock | New Supplemental RI well - build database for trend | Key well added in 2009 |
| MW-114 | Bldg 2/4 corridor | Deep Bedrock | Near potential VOC source | Key well added in 2009 |
| MW-115 | Bldg 2 DS | Deep Bedrock | New Supplemental RI well - build database for trend | Key well added in 2009 |
| MW-116 | Bldg 41 | Overburden | Monitor GW downgradient of IWTP SWMUs | Key well added in 2009 |
| MW-117 | Bldg 41 | Overburden | New well - build database for trend | Key well added in 2009 |
| Spring at Bldg 14 S-2 | Bunkers | Spring | Lead trend for Firing Range | Added in 2009 |
| | | | Proposed 2011 Key Well | |
| | | | Un-available well due to Demolition | |
| | | | Sample if well available - may be obstructed | |

**TABLE 2**

**SITE-WIDE GROUNDWATER LEVELS AND ELEVATION DATA**

FORMER YORK NAVAL ORDNANCE PLANT

1425 Eden Road, York PA 17402

| Monitoring Location | Date | Time | Reference Elevation (ft. AMSL) | Depth (ft.) | Water Level (ft. AMSL) |
|---|---|---|---|---|---|
| CODORUS 1 | 6/17/2011 | | 379.69 | 39.55 | 340.14 |
| CODORUS 2 | 6/17/2011 | | 341.63 | 1.27 | 339.56 |
| Cole B | 6/17/2011 | | 363.75 | NM | NM |
| Cole D | 6/17/2011 | | 370.15 | NM | NM |
| Cole E deep | 6/17/2011 | | 369.17 | NM | NM |
| Cole E shallow | 6/17/2011 | | 369.54 | NM | NM |
| Cole F | 6/17/2011 | | 370.39 | NM | NM |
| Flush - Cole | 6/17/2011 | 11:22 | 361.92 | 8.74 | 353.18 |
| MW-4 (Cole) | 6/17/2011 | 11:28 | 367.21 | 13.34 | 353.87 |
| CW-1* | 6/17/2011 | | 570.07 | 26.01 | 544.06 |
| CW-1A* | 6/17/2011 | | 568.28 | 61.17 | 507.11 |
| CW-2* | 6/17/2011 | | 556.95 | 77.63 | 479.32 |
| CW-3* | 6/17/2011 | | 518.66 | 81.66 | 437 |
| CW-4* | 6/17/2011 | | 541.55 | 89.56 | 451.99 |
| CW-5* | 6/17/2011 | | 470.34 | 48.05 | 422.29 |
| CW-6* | 6/17/2011 | | 484.67 | 70.6 | 414.07 |
| CW-7* | 6/17/2011 | | 573.78 | 86.65 | 487.13 |
| CW-7A* | 6/17/2011 | | 573.91 | 52.03 | 521.88 |
| CW-8* | 6/17/2011 | 9:37 | 362.7 | 21.45 | 341.25 |
| CW-9* | 6/17/2011 | | 356.82 | 24.01 | 332.81 |
| CW-13* | 6/17/2011 | | 358.85 | 33.03 | 325.82 |
| CW-14 | 6/17/2011 | | 358.92 | 24.64 | 334.28 |
| CW-15 | 6/17/2011 | | 361.48 | 18.12 | 343.36 |
| CW-15A* | 6/17/2011 | | 361.4 | 36.5 | 324.9 |
| CW-16 | 6/17/2011 | 11:09 | 364.6 | 19.18 | 345.42 |
| CW-17* | 6/17/2011 | | 358.7 | 24.42 | 334.28 |
| CW-18 | 6/17/2011 | 9:21 | 364.72 | 16.67D | 348.05D |
| CW-19 | 6/17/2011 | | 384.94 | D | D |
| CW-20 | 6/17/2011 | | 361.49 | 21.89 | 339.6 |
| Kinsley Well | 6/17/2011 | | 465.83 | 70.4 | 395.43 |
| MW-1 | 6/17/2011 | 10:32 | 380.73 | 33.76 | 346.97 |
| MW-2 | 6/17/2011 | | 508.88 | 62.31 | 446.57 |
| MW-3 | 6/17/2011 | | 541.1 | 61.56 | 479.54 |
| MW-5 | 6/17/2011 | 8:05 | 369.71 | 21.03 | 348.68 |
| MW-6 | 6/17/2011 | | 359.62 | 19.83 | 339.79 |
| MW-7 | 6/17/2011 | | 359.48 | 25.2 | 334.28 |
| MW-8 | 6/17/2011 | | 358.09 | 18.6 | 339.49 |
| MW-9 | 6/17/2011 | | 558.78 | 45.05 | 513.73 |
| MW-10 | 6/17/2011 | | 567.8 | 50.52 | 517.28 |
| MW-11 | 6/17/2011 | | 563.08 | 24.71 | 538.37 |
| MW-12 | 6/17/2011 | | 535.93 | 36.25 | 499.68 |
| MW-14 | 6/17/2011 | | 519.54 | 30.17 | 489.37 |
| MW-15 | 6/17/2011 | | 524.09 | 60.68 | 463.41 |
| MW-16D | 6/17/2011 | | 516.51 | 5.95 | 510.56 |

*Note:*



D= Location was dry.

*= Active extraction well. NM= Not measured.

**TABLE 2**

**SITE-WIDE GROUNDWATER LEVELS AND ELEVATION DATA**

FORMER YORK NAVAL ORDNANCE PLANT

1425 Eden Road, York PA 17402

| Monitoring Location | Date | Time | Reference Elevation (ft. AMSL) | Depth (ft.) | Water Level (ft. AMSL) |
|---|---|---|---|---|---|
| MW-16S | 6/17/2011 | | 516.6 | 35.04 | 481.56 |
| MW-17 | 6/17/2011 | | 456.86 | 11.83 | 445.03 |
| MW-18D | 6/17/2011 | | 464.19 | 16.43 | 447.76 |
| MW-18S | 6/17/2011 | | 464.12 | 16.71 | 447.41 |
| MW-19 | 6/17/2011 | | 427.36 | 20.85 | 406.51 |
| MW-20D | 6/17/2011 | | 573.85 | 34.14 | 539.71 |
| MW-20M | 6/17/2011 | | 574.19 | 41.71 | 532.48 |
| MW-20S | 6/17/2011 | | 574.05 | 42.48 | 531.57 |
| MW-22 | 6/17/2011 | | 447.57 | 56.26 | 391.31 |
| MW-26 | 6/17/2011 | 8:32 | 379.44 | 21.04 | 358.4 |
| MW-27 | 6/17/2011 | 8:09 | 361.29 | 13.81 | 347.48 |
| MW-28 | 6/17/2011 | 9:33 | 362.91 | 17.61 | 345.3 |
| MW-29 | 6/17/2011 | | 364.77 | 11.81 | 352.96 |
| MW-30 | 6/17/2011 | 8:08 | 362.26 | 13.37 | 348.89 |
| MW-31D | 6/17/2011 | 7:53 | 369.3 | 13.69 | 355.61 |
| MW-31S | 6/17/2011 | 7:54 | 369.28 | 13.21 | 356.07 |
| MW-32D | 6/17/2011 | 9:35 | 362.57 | 17.19 | 345.38 |
| MW-32S | 6/17/2011 | 9:36 | 362.44 | 17.22 | 345.22 |
| MW-33 | 6/17/2011 | 9:31 | 363.94 | NM | NM |
| MW-34D | 6/17/2011 | 9:46 | 361 | 15.72 | 345.28 |
| MW-34S | 6/17/2011 | 9:45 | 361 | 15.75 | 345.25 |
| MW-35D | 6/17/2011 | 9:48 | 360.6 | 15.33 | 345.27 |
| MW-35S | 6/17/2011 | 9:58 | 360.49 | NM | NM |
| MW-36D | 6/17/2011 | 7:51 | 370.96 | 22.53 | 348.43 |
| MW-36S | 6/17/2011 | 7:52 | 370.95 | 21.94 | 349.01 |
| MW-37D | 6/17/2011 | | 359.11 | 19.75 | 339.36 |
| MW-37S | 6/17/2011 | | 359.13 | 18.55 | 340.58 |
| MW-38D | 6/17/2011 | | 358.62 | 19.74 | 338.88 |
| MW-39D | 6/17/2011 | | 360.21 | 21.33 | 338.88 |
| MW-39S | 6/17/2011 | | 360.14 | 21 | 339.14 |
| MW-40D | 6/17/2011 | 10:39 | 374.65 | 27.68 | 346.97 |
| MW-40S | 6/17/2011 | 10:38 | 374.69 | 27.02 | 347.67 |
| MW-43D | 6/17/2011 | 10:54 | 380.08 | 29.02 | 351.06 |
| MW-43S | 6/17/2011 | 10:56 | 379.76 | 28.83 | 350.93 |
| MW-45 | 6/17/2011 | | 359.91 | 14.99 | 344.92 |
| MW-46 | 6/17/2011 | | 359.19 | 14.05 | 345.14 |
| MW-47 | 6/17/2011 | | 360.57 | 18.91 | 341.66 |
| MW-49D | 6/17/2011 | | 361.44 | 16.24 | 345.2 |
| MW-49S | 6/17/2011 | | 361.45 | 16.59 | 344.86 |
| MW-50D | 6/17/2011 | | 360.41 | 20.35 | 340.06 |
| MW-50S | 6/17/2011 | | 360.4 | 19.25 | 341.15 |
| MW-51D | 6/17/2011 | | 360.43 | 23.2 | 337.23 |
| MW-51S | 6/17/2011 | | 360.19 | 23.68 | 336.51 |
| MW-54 | 6/17/2011 | 9:40 | 365.26 | 19.93 | 345.33 |

*Note:*



D= Location was dry.

*= Active extraction well. NM= Not measured.

**TABLE 2**

**SITE-WIDE GROUNDWATER LEVELS AND ELEVATION DATA**

FORMER YORK NAVAL ORDNANCE PLANT

1425 Eden Road, York PA 17402

| Monitoring Location | Date | Time | Reference Elevation (ft. AMSL) | Depth (ft.) | Water Level (ft. AMSL) |
|---|---|---|---|---|---|
| MW-55 | 6/17/2011 | 9:42 | 365.22 | 19.89 | 345.33 |
| MW-56 | 6/17/2011 | 8:54 | 371.83 | 17.53 | 354.3 |
| MW-57 | 6/17/2011 | 9:26 | 364.54 | 17.29 | 347.25 |
| MW-64D | 6/17/2011 | | 416.43 | 65.1 | 351.33 |
| MW-64S | 6/17/2011 | | 416.34 | 30.5 | 385.84 |
| MW-65D | 6/17/2011 | | 546.8 | 46.71 | 500.09 |
| MW-65S | 6/17/2011 | | 546.82 | 47.96 | 498.86 |
| MW-66D | 6/17/2011 | | 506.92 | 37.51 | 469.41 |
| MW-66S | 6/17/2011 | | 506.73 | 36.59 | 470.14 |
| MW-67D | 6/17/2011 | | 446.26 | 1.45 | 444.81 |
| MW-67S | 6/17/2011 | | 446.26 | 9.35 | 436.91 |
| MW-68 | 6/17/2011 | | 458.06 | 5.49 | 452.57 |
| MW-69 | 6/17/2011 | | 411.9 | 5.88 | 406.02 |
| MW-70D | 6/17/2011 | | 416.31 | 19.41 | 396.9 |
| MW-70S | 6/17/2011 | | 416.21 | 19.41 | 396.8 |
| MW-74D | 6/17/2011 | | 359.79 | 19.08 | 340.71 |
| MW-74S | 6/17/2011 | | 359.85 | 19.45 | 340.4 |
| MW-75D | 6/17/2011 | | 359.85 | 20.31 | 339.54 |
| MW-75S | 6/17/2011 | | 359.03 | 19.14 | 339.89 |
| MW-77 | 6/17/2011 | 8:34 | 379.48 | 19.44 | 360.04 |
| MW-78 | 6/17/2011 | 7:57 | 375.32 | 18.55 | 356.77 |
| MW-79 | 6/17/2011 | 8:44 | 375.84 | 18.36 | 357.48 |
| MW-80 | 6/17/2011 | 9:00 | 370.29 | 21.4 | 348.89 |
| MW-81D | 6/17/2011 | 8:22 | 359.89 | 14.08 | 345.81 |
| MW-81S | 6/17/2011 | 8:22 | 360.12 | 14.45 | 345.67 |
| MW-82 | 6/17/2011 | 10:01 | 384.27 | 35.78 | 348.49 |
| MW-83 | 6/17/2011 | 8:27 | 363.69 | 7.62 | 356.07 |
| MW-84 | 6/17/2011 | 7:59 | 376.53 | 20.29 | 356.24 |
| MW-85 | 6/17/2011 | 10:44 | 371.54 | 6.82 | 364.72 |
| MW-86D | 6/17/2011 | | 406.56 | 7.75 | 398.81 |
| MW-86S | 6/17/2011 | | 406.5 | 9.74 | 396.76 |
| MW-87 | 6/17/2011 | 9:01 | 370.64 | 22.2 | 348.44 |
| MW-88 | 6/17/2011 | 9:29 | 367.93 | 21.46 | 346.47 |
| MW-91 | 6/17/2011 | | 501.18 | 53.69 | 447.49 |
| MW-92 | 6/17/2011 | | 476.87 | 20.79 | 456.08 |
| MW-93D | 6/17/2011 | | 360.14 | 19.34 | 340.8 |
| MW-93S | 6/17/2011 | | 360.76 | 19.71 | 341.05 |
| MW-94 | 6/17/2011 | 8:38 | 365.03 | 8.66 | 356.37 |
| MW-95 | 6/17/2011 | | 358.72 | 18.12 | 340.6 |
| MW-96D | 6/17/2011 | | 361 | 20.47 | 340.53 |
| MW-96S | 6/17/2011 | | 361.21 | 21.21 | 340 |
| MW-97 | 6/17/2011 | | 357.39 | 20.56 | 336.83 |
| MW-98D | 6/17/2011 | | 361.41 | 19.65 | 341.76 |
| MW-98I | 6/17/2011 | | 360.78 | 20.36 | 340.42 |

*Note:*



D= Location was dry.

*= Active extraction well. NM= Not measured.

**TABLE 2**

**SITE-WIDE GROUNDWATER LEVELS AND ELEVATION DATA**

FORMER YORK NAVAL ORDNANCE PLANT

1425 Eden Road, York PA 17402

| Monitoring Location | Date | Time | Reference Elevation (ft. AMSL) | Depth (ft.) | Water Level (ft. AMSL) |
|---|---|---|---|---|---|
| MW-98S | 6/17/2011 | | 360.77 | 20.08 | 340.69 |
| MW-99D | 6/17/2011 | | 359.91 | 18.32 | 341.59 |
| MW-99S | 6/17/2011 | | 360.37 | 18.9 | 341.47 |
| MW-100D | 6/17/2011 | | 362.14 | 20.22 | 341.92 |
| MW-100I | 6/17/2011 | | 361.81 | 20.01 | 341.8 |
| MW-100S | 6/17/2011 | | 362.28 | 20.51 | 341.77 |
| MW-101D | 6/17/2011 | | 356.22 | 15.71 | 340.51 |
| MW-101S | 6/17/2011 | | 356.54 | 16.02 | 340.52 |
| MW-102D | 6/17/2011 | | 405.23 | 8.7 | 396.53 |
| MW-102S | 6/17/2011 | | 405.41 | 32.22 | 373.19 |
| MW-103D | 6/17/2011 | | 401.61 | 15.87 | 385.74 |
| MW-103S | 6/17/2011 | | 402 | 14.26 | 387.74 |
| MW-104 | 6/17/2011 | | 428.72 | 28.2 | 400.52 |
| MW-105 | 6/17/2011 | | 362.05 | 21.93 | 340.12 |
| MW-106 | 6/17/2011 | | 360.15 | 24.11 | 336.04 |
| MW-107 | 6/17/2011 | | 363.56 | 22.5 | 341.06 |
| MW-108D | 6/17/2011 | | 426.35 | 15.22 | 411.13 |
| MW-108S | 6/17/2011 | | 425.46 | 26.65 | 398.81 |
| MW-109D | 6/17/2011 | | 389.12 | 31.43 | 357.69 |
| MW-109S | 6/17/2011 | | 388.39 | 31.73 | 356.66 |
| MW-110 | 6/17/2011 | | 378.36 | 21.78 | 356.58 |
| MW-111 | 6/17/2011 | 11:52 | 433.63 | 18.53 | 415.1 |
| MW-112 | 6/17/2011 | 9:14 | 393.52 | 45.6 | 347.92 |
| MW-113 | 6/17/2011 | 8:57 | 371.02 | 22.18 | 348.84 |
| MW-114 | 6/17/2011 | 8:11 | 360.71 | 14.95 | 345.76 |
| MW-115 | 6/17/2011 | 8:41 | 373.3 | 16.96 | 356.34 |
| MW-116 | 6/17/2011 | 7:39 | 364.59 | 16.46 | 348.13 |
| Ru-MW-1 | 6/17/2011 | | 389.69 | 31 | 358.69 |
| Ru-MW-2 | 6/17/2011 | | 391.5 | 34.31 | 357.19 |
| Ru-MW-3 | 6/17/2011 | | 395.86 | 38.66 | 357.2 |
| Ru-MW-4 | 6/17/2011 | | 394.17 | 36.76 | 357.41 |
| Ru-MW-5 | 6/17/2011 | | 378.8 | 21.09 | 357.71 |
| Ru-MW-6 | 6/17/2011 | | 383.28 | 26.16 | 357.12 |
| Ru-MW-7 | 6/17/2011 | | | NM | NM |
| Ru-MW-8 | 6/17/2011 | | | NM | NM |
| RW-2 | 6/17/2011 | | 548.27 | NM | NM |
| RW-5 | 6/17/2011 | | 375.54 | NM | NM |
| SOFTAIL LIFT STATION | 6/17/2011 | | 392.6 | NM | NM |
| WPL-SS-7 | 6/17/2011 | | 357.78 | 21.1 | 336.68 |
| WPL-SS-8 | 6/17/2011 | | 364.4 | 23.62 | 340.78 |

*Note:*



D= Location was dry.

*= Active extraction well. NM= Not measured.

**TABLE 3**
**HYDRAULIC GRADIENT DATA**
Former York Naval Ordnance Plant
1425 Eden Road, York PA 17402

| WELL ID | ELEV. TOC (FT. AMSL.) | SCREENED INTERVAL | MID-POINT SCREENED INTERVAL | MID-POINT ELEV (FT. AMSL.) | DIFFERENCE BETWEEN MID-POINTS | DEPTH TO WATER (FT.) | SWL ELEV (FT. AMSL. | DIFFERENCE BETWEEN SWL ELEV | VERTICAL GRADIENT (FT/FT) |
|---|---|---|---|---|---|---|---|---|---|
| **Northeast Property Boundary Area** | | | | | | | | | |
| MW-16S | 516.60 | 98-110 | 104.00 | 412.60 | -91.59 | 35.04 | 481.56 | -29.00 | 0.317 |
| MW-16D | 516.51 | 190-201 | 195.50 | 321.01 | | 5.95 | 510.56 | | |
| MW-18S | 464.12 | 45-65 | 55.00 | 409.12 | -79.93 | 16.71 | 447.41 | -0.35 | 0.004 |
| MW-18D | 464.19 | 130-140 | 135.00 | 329.19 | | 16.43 | 447.76 | | |
| MW-20S | 574.05 | 28-61 | 44.50 | 529.55 | -114.70 | 42.48 | 531.57 | -8.14 | 0.071 |
| MW-20D | 573.85 | 153-165 | 159.00 | 414.85 | | 34.14 | 539.71 | | |
| **Northern - West Parking Lot** | | | | | | | | | |
| MW-39S | 360.14 | 3-30 | 16.50 | 343.64 | -59.93 | 21.00 | 339.14 | 0.26 | -0.004 |
| MW-39D | 360.21 | 53-100 | 76.50 | 283.71 | | 21.33 | 338.88 | | |
| MW-49S | 361.45 | 135-155 | 145.00 | 216.45 | -23.01 | 16.59 | 344.86 | -0.34 | 0.015 |
| MW-49D | 361.44 | 158-178 | 168.00 | 193.44 | | 16.24 | 345.20 | | |
| MW-50S | 360.40 | 104-120 | 112.00 | 248.40 | -51.49 | 19.25 | 341.15 | 1.09 | -0.021 |
| MW-50D | 360.41 | 157-170 | 163.50 | 196.91 | | 20.35 | 340.06 | | |
| MW-51S | 360.19 | 29-51 | 40.00 | 320.19 | -63.76 | 23.68 | 336.51 | -0.72 | 0.011 |
| MW-51D | 360.43 | 88-120 | 104.00 | 256.43 | | 23.20 | 337.23 | | |
| MW-74S | 359.85 | 183-193 | 188.00 | 171.85 | -49.56 | 19.45 | 340.40 | -0.31 | 0.006 |
| MW-74D | 359.79 | 225-250 | 237.50 | 122.29 | | 19.08 | 340.71 | | |
| MW-96S | 361.21 | 29-39 | 34.00 | 327.21 | -48.71 | 21.21 | 340.00 | -0.53 | 0.011 |
| MW-96D | 361.00 | 77.5-87.5 | 82.50 | 278.50 | | 20.47 | 340.53 | | |
| **Southern - West Parking Lot** | | | | | | | | | |
| MW-37S | 359.13 | 11-33 | 22.00 | 337.13 | -111.02 | 18.55 | 340.58 | 1.22 | -0.011 |
| MW-37D | 359.11 | 125-141 | 133.00 | 226.11 | | 19.75 | 339.36 | | |
| MW-75S | 359.03 | 168-173 | 170.50 | 188.53 | -38.68 | 19.14 | 339.89 | 0.35 | -0.009 |
| MW-75D | 359.85 | 205-215 | 210.00 | 149.85 | | 20.31 | 339.54 | | |
| MW-93S | 360.76 | 26.2-41.2 | 33.70 | 327.06 | -106.62 | 19.71 | 341.05 | 0.25 | -0.002 |
| MW-93D | 360.14 | 134.7-144.7 | 139.70 | 220.44 | | 19.34 | 340.80 | | |
| **Southeast Corner - Southern Property Boundary Area** | | | | | | | | | |
| MW-64S | 416.34 | 35-40 | 37.50 | 378.84 | -34.91 | 30.50 | 385.84 | 34.51 | -0.989 |
| MW-64D | 416.43 | 70-75 | 72.50 | 343.93 | | 65.10 | 351.33 | | |
| **Landfill Area - Eastern Property Boundary Area** | | | | | | | | | |
| MW-65S | 546.82 | 75-85 | 80.00 | 466.82 | -17.32 | 47.96 | 498.86 | -1.23 | 0.071 |
| MW-65D | 546.80 | 92.3-102.3 | 97.30 | 449.50 | | 46.71 | 500.09 | | |
| MW-66S | 506.73 | 50-60 | 55.00 | 451.73 | -36.81 | 36.59 | 470.14 | 0.73 | -0.020 |
| MW-66D | 506.92 | 84.5-99.5 | 92.00 | 414.92 | | 37.51 | 469.41 | | |
| **Approximate Spring Line - Near Sandstone Contact** | | | | | | | | | |
| MW-43S | 379.76 | 19-48 | 33.50 | 346.26 | -51.68 | 28.83 | 350.93 | -0.13 | 0.003 |
| MW-43D | 380.08 | 79-92 | 85.50 | 294.58 | | 29.02 | 351.06 | | |
| MW-103S | 402.00 | 67.5-87.5 | 77.50 | 324.50 | -34.59 | 14.26 | 387.74 | 2.00 | -0.058 |
| MW-103D | 401.61 | 96.7-106.7 | 111.70 | 289.91 | | 15.87 | 385.74 | | |
| MW-86S | 406.50 | 12-27 | 19.50 | 387.00 | -55.44 | 9.74 | 396.76 | -2.05 | 0.037 |
| MW-86D | 406.56 | 70-80 | 75.00 | 331.56 | | 7.75 | 398.81 | | |

**TABLE 3**
**HYDRAULIC GRADIENT DATA**
Former York Naval Ordnance Plant
1425 Eden Road, York PA 17402

| WELL ID | ELEV. TOC (FT. AMSL.) | SCREENED INTERVAL | MID-POINT SCREENED INTERVAL | MID-POINT ELEV (FT. AMSL.) | DIFFERENCE BETWEEN MID-POINTS | DEPTH TO WATER (FT.) | SWL ELEV (FT. AMSL. | DIFFERENCE BETWEEN SWL ELEV | VERTICAL GRADIENT (FT/FT) |
|---|---|---|---|---|---|---|---|---|---|
| **West of West Parking Lot - Codorus Creek Levee** | | | | | | | | | |
| MW-98S | 360.77 | 61-68 | 64.50 | 296.27 | -37.99 | 20.08 | 340.69 | 0.27 | -0.007 |
| MW-98I | 360.78 | 100-105 | 102.50 | 258.28 | -47.87 | 20.36 | 340.42 | -1.34 | 0.028 |
| MW-98D | 361.41 | 131-171 | 151.00 | 210.41 | | 19.65 | 341.76 | | |
| MW-99S | 360.37 | 64.3-74.3 | 69.30 | 291.07 | -68.16 | 18.90 | 341.47 | -0.12 | 0.002 |
| MW-99D | 359.91 | 132-142 | 137.00 | 222.91 | | 18.32 | 341.59 | | |
| MW-100S | 362.28 | 46-51 | 48.50 | 313.78 | -15.47 | 20.51 | 341.77 | -0.03 | 0.002 |
| MW-100I | 361.81 | 61-66 | 63.50 | 298.31 | -45.17 | 20.01 | 341.80 | -0.12 | 0.003 |
| MW-100D | 362.14 | 104-114 | 109.00 | 253.14 | | 20.22 | 341.92 | | |
| MW-101S | 356.54 | 20-40 | 30.00 | 326.54 | -70.32 | 16.02 | 340.52 | 0.01 | 0.000 |
| MW-101D | 356.22 | 85-115 | 100.00 | 256.22 | | 15.71 | 340.51 | | |
| **North End of the Test Track** | | | | | | | | | |
| MW-70S | 416.21 | 18-33 | 25.50 | 390.71 | -47.40 | 19.41 | 396.80 | -0.10 | 0.002 |
| MW-70D | 416.31 | 68-78 | 73.00 | 343.31 | | 19.41 | 396.90 | | |
| MW-102S | 405.41 | 45-65 | 55.00 | 350.41 | -32.18 | 32.22 | 373.19 | -23.34 | 0.725 |
| MW-102D | 405.23 | 75-99 | 87.00 | 318.23 | | 8.70 | 396.53 | | |
| **Off Site Wells - Eastern Property Boundary** | | | | | | | | | |
| MW-108S | 425.46 | 25.1-55.1 | 40.10 | 385.36 | -69.81 | 26.65 | 398.81 | -12.32 | 0.176 |
| MW-108D | 426.35 | 72-149 | 110.80 | 315.55 | | 15.22 | 411.13 | | |
| MW-109S | 388.39 | 45-65 | 55.00 | 333.39 | -38.27 | 31.73 | 356.66 | -1.03 | 0.027 |
| MW-109D | 389.12 | 88-100 | 94.00 | 295.12 | | 31.43 | 357.69 | | |

Notes:
A negative vertical gradient value indicates a downward vertical gradient.
A positive vertical gradient value indicates an upward vertical gradient.
Depth to water data collected on June 17, 2011.
Top of casing (TOC) elevations re-established in March 2007.

# Table 4
## Proposed 2011 Key Well Analytical List
Former York Naval Ordnance Plant

| Monitoring Location | 2011 Parameters | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Total VOCs (QAPP list) | Total & Dissolved Hexavalent Chromium | Total & Free Cyanide | Total & Dissolved Chromium | Total and Dissolved Lead (Pb) | Total & dissolved Arsenic (As) | Total & Dissolved Nickel (Ni) | Total & Dissolved Beryllium (Be) | MTBE &Benzene by GC/MS |
| Cole D | X | | | | | | | | |
| Cole F | X | | | | | | | | |
| MW-4 (Cole) | X | | | | | | | | |
| CW-1 | X | | | | | | | | |
| CW-2 | X | | | | | | | | |
| CW-3 | X | | | | | | | | |
| CW-4 | X | | | | | | | | |
| CW-5 | X | | | | | | | | |
| CW-6 | X | | | | | | | | |
| CW-7 | X | | | | | | | | |
| CW-7A | X | | | | | | | | |
| CW-8 | X | | | | | | | | |
| CW-9 | X | | | | | | | | |
| CW-13 | X | | | | | | | | |
| CW-15A | X | | | | | | | | |
| CW-17 | X | | | | | | | | |
| CW-1A | X | | | | | | | | |
| CW-20 | X | | | | | | | | |
| MW-2 | X | | X | | | | | | |
| MW-7 | X | X | | X | | | | | |
| MW-47 | X | X | | X | | | | | |
| MW-50D | X | | | | | | | | |
| MW-50S | X | | | | | | | | |
| MW-51D | X | X | | X | | | | | |
| MW-51S | X | X | | X | | | | | |
| MW-64D | X | | | | | | | | |
| MW-64S | X | | | | | | | | |
| MW-75S | X | | | | | | | | |
| MW-77 | X | | | | | | | | X |
| MW-82 | X | | | | | | | | |
| MW-95 | X | | | | | | | | |
| MW-96D | X | | | | | | | | |
| MW-96S | X | | | | | | | | |
| MW-98D | X | | | | | | | | |
| MW-98I | X | | | | | | | | |
| MW-98S | X | | | | | | | | |
| MW-99D | X | | | | | | | | |
| MW-99S | X | | | | | | | | |
| MW-100D | X | | | | | | | | |
| MW-100I | X | | | | | | | | |
| MW-100S | X | | | | | | | | |
| MW-101D | X | | | | | | | | |
| MW-101S | X | | | | | | | | |
| MW-106 | X | | | | | | | | |
| MW-107 | X | | | | | | | | |
| MW-108S | X | | | | X | X | X | X | |
| MW-109S | X | | | | | | | | |
| MW-110 | X | | | | | | | | |
| MW-116 | X | | | | | | | | |
| RW-2 | X | | | | | | | | |
| RW-4 FOLK | X | | | | X | | | | |
| RW-5 | X | | | | | | | | |
| S-6 | X | | | | | | | | |
| S-7 | X | | | | | | | | |
| Totals: 40 | **40** | **4** | **1** | **4** | **2** | **1** | **1** | **1** | **1** |

Proposed Key Wells and Parameters for sampling in 2011

Non-highlighted collection wells to be sampled and coordinated as part of the O&M activities

**Table 5.**
**Groundwater Data Summary - 2011 Key Well Sampling**
**Former York Naval Ordnance Plant - York, PA**

| Location/ID<br>Sample Date<br>Parameter | MSC Used Aquifer R (ug/L) | MSC Used Aquifer NR (ug/L) | Federal MCL (ug/L) | EPA RSL Tap Water (ug/L) | MW-2 6/29/2011 | MW-7 6/27/2011 | MW-47 6/27/2011 | MW-50D 6/23/2011 | MW-50S 6/29/2011 | MW-51D 6/24/2011 | MW-51S 6/24/2011 | MW-64D 6/21/2011 | MW-64S 6/22/2011 | MW-75S 6/22/2011 | MW-77 6/24/2011 | MW-82 6/20/2011 | MW-95 6/20/2011 | MW-96D 6/21/2011 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ***Cyanide, Free*** | | | | | | | | | | | | | | | | | | |
| Cyanide, Free | 200 | 200 | 200 | 730 | 2 U | | | | | | | | | | | | | |
| ***Cyanide, Total*** | | | | | | | | | | | | | | | | | | |
| Cyanide, Total | 200 | 200 | | 730 | 670 | | | | | | | | | | | | | |
| ***METAL (Total)*** | | | | | | | | | | | | | | | | | | |
| Arsenic | 10 | 10 | 10 | 0.045 | | | | | | | | | | | | | | |
| Beryllium | 4 | 4 | 4 | 73 | | | | | | | | | | | | | | |
| Chromium | 100 | 100 | 100 | | | 100 | 2700 | | | 2 U | 270 | | | | | | | |
| Hexavalent Chromium | 100 | 100 | | 0.043 | | 110 | 3300 | | | 10 U | 320 | | | | | | | |
| Lead | 5 | 5 | 15 | | | | | | | | | | | | | | | |
| Nickel | 100 | 100 | | 730 | | | | | | | | | | | | | | |
| ***METAL (Dissolved)*** | | | | | | | | | | | | | | | | | | |
| Arsenic | 10 | 10 | 10 | 0.045 | | | | | | | | | | | | | | |
| Beryllium | 4 | 4 | 4 | 73 | | | | | | | | | | | | | | |
| Chromium | 100 | 100 | 100 | | | 99 | 2900 | | | 3.8 | 260 | | | | | | | |
| Hexavalent Chromium | 100 | 100 | | 0.043 | | 110 | 3500 | | | 10 U | 320 | | | | | | | |
| Lead | 5 | 5 | 15 | | | | | | | | | | | | | | | |
| Nickel | 100 | 100 | | 730 | | | | | | | | | | | | | | |
| ***TOTAL VOC*** | | | | | | | | | | | | | | | | | | |
| | | | | | 67.4 | 1920.7 | 331 | 10790 | 556.7 | 56.75 | 2587 | 1370 | 184 | 23320 | 2230 | 48.43 | 17.6 | 492 |
| ***Volatile Organic Compound*** | | | | | | | | | | | | | | | | | | |
| 1,1,1,2-Tetrachloroethane | 70 | 70 | | 0.52 | 2.5 U | 50 U | 13 U | 250 U | 13 U | 1 U | 50 U | 50 U | 10 U | 1000 U | 50 U | 1 U | 1 U | 25 U |
| 1,1,1-Trichloroethane | 200 | 200 | 200 | 9100 | 2.5 U | 50 U | 13 U | 250 U | 13 U | 1 U | 50 U | 50 U | 10 U | 580 J | 50 U | 1 U | 1 U | 25 U |
| 1,1,2,2-Tetrachloroethane | 0.84 | 4.3 | | 0.067 | 2.5 U | 50 U | 13 U | 250 U | 13 U | 1 U | 50 U | 50 U | 10 U | 1000 U | 50 U | 1 U | 1 U | 25 U |
| 1,1,2-Trichloroethane | 5 | 5 | 5 | 0.24 | 2.5 U | 50 U | 13 U | 250 U | 13 U | 1 U | 50 U | 50 U | 10 U | 1000 U | 50 U | 1 U | 1 U | 25 U |
| 1,1-Dichloroethane | 31 | 160 | | 2.4 | 2.5 U | 50 U | 13 U | 1100 | 3.7 J | 0.43 J | 12 J | 50 U | 10 U | 1000 U | 50 U | 0.24 J | 1 U | 25 U |
| 1,1-Dichloroethene | 7 | 7 | 7 | 340 | 2.5 U | 41 J | 5.4 J | 460 | 13 U | 0.62 J | 50 | 50 U | 10 U | 1000 U | 50 U | 1 U | 1 U | 25 U |
| 1,2-Dibromoethane | 0.05 | 0.05 | 0.05 | 0.0065 | 2.5 U | 50 U | 13 U | 250 U | 13 U | 1 U | 50 U | 50 U | 10 U | 1000 U | 50 U | 1 U | 1 U | 25 U |
| 1,2-Dichloroethane | 5 | 5 | 5 | 0.15 | 2.5 U | 50 U | 13 U | 250 U | 13 U | 1 U | 50 U | 50 U | 10 U | 1000 U | 50 U | 1 U | 1 U | 25 U |
| 1,2-Dichloropropane | 5 | 5 | 5 | 0.39 | 2.5 U | 50 U | 13 U | 250 U | 13 U | 1 U | 50 U | 50 U | 10 U | 1000 U | 50 U | 1 U | 1 U | 25 U |
| 1,4-Dioxane | 6.4 | 32 | | 0.67 | 500 U | 10000 U | 2500 U | 50000 U | 2500 U | 200 U | 10000 U | 10000 U | 2000 U | 200000 U | 10000 U | 200 U | 200 U | 5000 U |
| 2-Butanone | 4000 | 4000 | | 7100 | 13 U | 250 U | 63 U | 1300 U | 63 U | 5 U | 250 U | 250 U | 50 U | 5000 U | 250 U | 5 U | 5 U | 130 U |
| 2-Hexanone | 11 | 44 | | 47 | 13 U | 250 U | 63 U | 1300 U | 63 U | 5 U | 250 U | 250 U | 50 U | 5000 U | 250 U | 5 U | 5 U | 130 U |
| 4-Methyl-2-Pentanone | 2900 | 8200 | | 2000 | 13 U | 250 U | 63 U | 1300 U | 63 U | 5 U | 250 U | 250 U | 50 U | 5000 U | 250 U | 5 U | 5 U | 130 U |
| Acetone | 33000 | 92000 | | 22000 | 13 U | 250 U | 63 U | 1300 U | 63 U | 5 U | 250 U | 250 U | 50 U | 5000 U | 250 U | 5 U | 5 U | 130 U |
| Acrylonitrile | 0.72 | 3.7 | | 0.045 | 50 U | 1000 U | 250 U | 5000 U | 250 U | 20 U | 1000 U | 1000 U | 200 U | 20000 U | 1000 U | 20 U | 20 U | 500 U |
| Benzene | 5 | 5 | 5 | 0.41 | 2.5 U | 50 U | 13 U | 250 U | 13 U | 1 U | 50 U | 50 U | 10 U | 1000 U | 1500 | 1 U | 1 U | 25 U |
| Bromochloromethane | 90 | 90 | | | 2.5 U | 50 U | 13 U | 250 U | 13 U | 1 U | 50 U | 50 U | 10 U | 1000 U | 50 U | 1 U | 1 U | 25 U |
| Bromodichloromethane | 80 | 80 | | 0.12 | 2.5 U | 50 U | 13 U | 250 U | 13 U | 1 U | 50 U | 50 U | 10 U | 1000 U | 50 U | 1 U | 1 U | 25 U |
| Bromoform | 80 | 80 | | 8.5 | 2.5 U | 50 U | 13 U | 250 U | 13 U | 1 U | 50 U | 50 U | 10 U | 1000 U | 50 U | 1 U | 1 U | 25 U |
| Bromomethane | 10 | 10 | | 8.7 | 2.5 U | 50 U | 13 U | 250 U | 13 U | 1 U | 50 U | 50 U | 10 U | 1000 U | 50 U | 1 U | 1 U | 25 U |
| Carbon Disulfide | 1500 | 6200 | | 1000 | 2.5 U | 50 U | 13 U | 250 U | 13 U | 1 U | 50 U | 50 U | 10 U | 1000 U | 50 U | 1 U | 1 U | 25 U |
| Carbon Tetrachloride | 5 | 5 | 5 | 0.44 | 2.5 U | 50 U | 13 U | 250 U | 13 U | 1 U | 50 U | 50 U | 10 U | 1000 U | 50 U | 1 U | 1 U | 25 U |
| Chlorobenzene | 100 | 100 | 100 | 91 | 2.5 U | 50 U | 13 U | 250 U | 13 U | 1 U | 50 U | 50 U | 10 U | 1000 U | 50 U | 1 U | 1 U | 25 U |
| Chlorodibromomethane | 80 | 80 | | 0.15 | 2.5 U | 50 U | 13 U | 250 U | 13 U | 1 U | 50 U | 50 U | 10 U | 1000 U | 50 U | 1 U | 1 U | 25 U |
| Chloroethane | 230 | 900 | | 21000 | 2.5 U | 50 U | 13 U | 250 U | 13 U | 1 U | 50 U | 50 U | 10 U | 1000 U | 50 U | 1 U | 1 U | 25 U |
| Chloroform | 80 | 80 | | 0.19 | 2.5 U | 9.7 J | 13 U | 250 U | 13 U | 1 U | 50 U | 50 U | 10 U | 1000 U | 50 U | 1 U | 1 U | 25 U |
| Chloromethane | 30 | 30 | | 190 | 2.5 U | 50 U | 13 U | 250 U | 13 U | 1 U | 50 U | 50 U | 10 U | 1000 U | 50 U | 1 U | 1 U | 25 U |
| cis-1,2-Dichloroethene | 70 | 70 | 70 | 73 | 2.5 U | 370 | 100 | 4800 | 250 | 15 | 500 | 50 U | 10 U | 440 J | 50 U | 23 | 9 | 56 |
| cis-1,3-Dichloropropene | 6.6 | 26 | | 0.43 | 2.5 U | 50 U | 13 U | 250 U | 13 U | 1 U | 50 U | 50 U | 10 U | 1000 U | 50 U | 1 U | 1 U | 25 U |
| Ethylbenzene | 700 | 700 | 700 | 1.5 | 2.5 U | 50 U | 13 U | 250 U | 13 U | 1 U | 50 U | 50 U | 10 U | 1000 U | 80 | 1 U | 1 U | 25 U |
| Methyl tert-butyl ether | 20 | 20 | | 12 | 2.5 U | 50 U | 13 U | 250 U | 13 U | 1 U | 50 U | 50 U | 10 U | 1000 U | 520 | 1 U | 1 U | 25 U |
| Methylene chloride | 5 | 5 | | 4.8 | 2.5 U | 50 U | 13 U | 250 U | 13 U | 1 U | 50 U | 50 U | 10 U | 1000 U | 50 U | 1 U | 1 U | 25 U |
| Styrene | 100 | 100 | 100 | 1600 | 2.5 U | 50 U | 13 U | 250 U | 13 U | 1 U | 50 U | 50 U | 10 U | 1000 U | 50 U | 1 U | 1 U | 25 U |
| Tetrachloroethene | 5 | 5 | 5 | 0.11 | 59 | 400 | 32 | 530 | 13 | 2.3 | 910 | 560 | 64 | 16000 | 50 U | 1.8 | 1.4 | 26 |
| Toluene | 1000 | 1000 | 1000 | 2300 | 2.5 U | 50 U | 13 U | 250 U | 13 U | 1.4 | 50 U | 50 U | 10 U | 1000 U | 56 | 1 U | 1 U | 25 U |
| trans-1,2-Dichloroethene | 100 | 100 | 100 | 110 | 2.5 U | 50 U | 3.6 J | 250 U | 13 U | 1 U | 50 U | 50 U | 10 U | 1000 U | 50 U | 0.39 J | 1 U | 25 U |
| trans-1,3-Dichloropropene | 6.6 | 26 | | 0.43 | 2.5 U | 50 U | 13 U | 250 U | 13 U | 1 U | 50 U | 50 U | 10 U | 1000 U | 50 U | 1 U | 1 U | 25 U |
| Trichloroethene | 5 | 5 | 5 | 2 | 8.4 | 1100 | 190 | 3900 | 290 | 37 | 1100 | 810 | 120 | 6300 | 50 U | 23 | 7.2 | 410 |
| Vinyl Chloride | 2 | 2 | 2 | 0.016 | 2.5 U | 50 U | 13 U | 250 U | 13 U | 1 U | 15 J | 50 U | 10 U | 1000 U | 50 U | 1 U | 1 U | 25 U |
| Xylenes (Total) | 10000 | 10000 | 10000 | 200 | 7.5 U | 150 U | 38 U | 750 U | 38 U | 3 U | 150 U | 150 U | 30 U | 3000 U | 74 J | 3 U | 3 U | 75 U |

Blank results = analyte not analyzed. U = Not detected. J = Organics; estimated. Inorganics; blank contamination. B = Organics; blank contamination. Inorganics; estimated. E = Inorganics: matrix interference.

**Table 5.**
**Groundwater Data Summary - 2011 Key Well Sampling**
**Former York Naval Ordnance Plant - York, PA**

| Location/ID<br>Sample Date<br>Parameter | MSC Used Aquifer R (ug/L) | MSC Used Aquifer NR (ug/L) | Federal MCL (ug/L) | EPA RSL Tap Water (ug/L) | MW-96S 6/22/2011 | MW-98D 6/27/2011 | MW-98I 6/24/2011 | MW-98S 6/24/2011 | MW-99D 6/23/2011 | MW-99D Dup 6/23/2011 | MW-99S 6/23/2011 | MW-100D 6/23/2011 | MW-100I 6/21/2011 | MW-100I Dup 6/21/2011 | MW-100S 6/22/2011 | MW-101D 6/21/2011 | MW-101S 6/21/2011 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ***Cyanide, Free*** | | | | | | | | | | | | | | | | | |
| Cyanide, Free | 200 | 200 | 200 | 730 | | | | | | | | | | | | | |
| ***Cyanide, Total*** | | | | | | | | | | | | | | | | | |
| Cyanide, Total | 200 | 200 | | 730 | | | | | | | | | | | | | |
| ***METAL (Total)*** | | | | | | | | | | | | | | | | | |
| Arsenic | 10 | 10 | 10 | 0.045 | | | | | | | | | | | | | |
| Beryllium | 4 | 4 | 4 | 73 | | | | | | | | | | | | | |
| Chromium | 100 | 100 | 100 | | | | | | | | | | | | | | |
| Hexavalent Chromium | 100 | 100 | | 0.043 | | | | | | | | | | | | | |
| Lead | 5 | 5 | 15 | | | | | | | | | | | | | | |
| Nickel | 100 | 100 | | 730 | | | | | | | | | | | | | |
| ***METAL (Dissolved)*** | | | | | | | | | | | | | | | | | |
| Arsenic | 10 | 10 | 10 | 0.045 | | | | | | | | | | | | | |
| Beryllium | 4 | 4 | 4 | 73 | | | | | | | | | | | | | |
| Chromium | 100 | 100 | 100 | | | | | | | | | | | | | | |
| Hexavalent Chromium | 100 | 100 | | 0.043 | | | | | | | | | | | | | |
| Lead | 5 | 5 | 15 | | | | | | | | | | | | | | |
| Nickel | 100 | 100 | | 730 | | | | | | | | | | | | | |
| ***TOTAL VOC*** | | | | | | | | | | | | | | | | | |
| | | | | | 1550 | 3.21 | 24.9 | 13.42 | 94 | 89.7 | 98.3 | 400.7 | 177.5 | 195.7 | 181 | 36.58 | 13.35 |
| ***Volatile Organic Compound*** | | | | | | | | | | | | | | | | | |
| 1,1,1,2-Tetrachloroethane | 70 | 70 | | 0.52 | 50 U | 1 U | 1 U | 1 U | 5 U | 5 U | 5 U | 13 U | 5 U | 5 U | 10 U | 1 U | 1 U |
| 1,1,1-Trichloroethane | 200 | 200 | 200 | 9100 | 50 U | 1 U | 1 U | 1 U | 5 U | 5 U | 5 U | 13 U | 5 U | 5 U | 10 U | 1 U | 1 U |
| 1,1,2,2-Tetrachloroethane | 0.84 | 4.3 | | 0.067 | 50 U | 1 U | 1 U | 1 U | 5 U | 5 U | 5 U | 13 U | 5 U | 5 U | 10 U | 1 U | 1 U |
| 1,1,2-Trichloroethane | 5 | 5 | 5 | 0.24 | 50 U | 1 U | 1 U | 1 U | 5 U | 5 U | 5 U | 13 U | 5 U | 5 U | 10 U | 1 U | 1 U |
| 1,1-Dichloroethane | 31 | 160 | | 2.4 | 50 U | 1 U | 1 U | 0.12 J | 5 U | 5 U | 5 U | 13 U | 5 U | 5 U | 10 U | 0.44 J | 1 U |
| 1,1-Dichloroethene | 7 | 7 | 7 | 340 | 50 U | 1 U | 1 U | 1 U | 2.2 J | 2.2 J | 5 U | 5.7 J | 2.5 J | 2.7 J | 10 U | 0.49 J | 1 U |
| 1,2-Dibromoethane | 0.05 | 0.05 | 0.05 | 0.0065 | 50 U | 1 U | 1 U | 1 U | 5 U | 5 U | 5 U | 13 U | 5 U | 5 U | 10 U | 1 U | 1 U |
| 1,2-Dichloroethane | 5 | 5 | 5 | 0.15 | 50 U | 1 U | 1 U | 1 U | 5 U | 5 U | 5 U | 13 U | 5 U | 5 U | 10 U | 1 U | 1 U |
| 1,2-Dichloropropane | 5 | 5 | 5 | 0.39 | 50 U | 1 U | 1 U | 1 U | 5 U | 5 U | 5 U | 13 U | 5 U | 5 U | 10 U | 1 U | 1 U |
| 1,4-Dioxane | 6.4 | 32 | | 0.67 | 10000 U | 200 U | 200 U | 200 U | 1000 U | 1000 U | 1000 U | 2500 U | 1000 U | 1000 U | 2000 U | 200 U | 200 U |
| 2-Butanone | 4000 | 4000 | | 7100 | 250 U | 5 U | 5 U | 5 U | 25 U | 25 U | 25 U | 63 U | 25 U | 25 U | 50 U | 5 U * | 5 U * |
| 2-Hexanone | 11 | 44 | | 47 | 250 U | 5 U | 5 U | 5 U | 25 U | 25 U | 25 U | 63 U | 25 U | 25 U | 50 U | 5 U | 5 U |
| 4-Methyl-2-Pentanone | 2900 | 8200 | | 2000 | 250 U | 5 U | 5 U | 5 U | 25 U | 25 U | 25 U | 63 U | 25 U | 25 U | 50 U | 5 U | 5 U |
| Acetone | 33000 | 92000 | | 22000 | 250 U | 5 U | 5 U | 5 U | 25 U | 25 U | 25 U | 63 U | 25 U | 25 U | 50 U | 5 U * | 5 U * |
| Acrylonitrile | 0.72 | 3.7 | | 0.045 | 1000 U | 20 U | 20 U | 20 U | 100 U | 100 U | 100 U | 250 U | 100 U | 100 U | 200 U | 20 U | 20 U |
| Benzene | 5 | 5 | 5 | 0.41 | 50 U | 1.9 | 1 U | 1 U | 5 U | 5 U | 5 U | 13 U | 5 U | 5 U | 10 U | 1 U | 1 U |
| Bromochloromethane | 90 | 90 | | | 50 U | 1 U | 1 U | 1 U | 5 U | 5 U | 5 U | 13 U | 5 U | 5 U | 10 U | 1 U | 1 U |
| Bromodichloromethane | 80 | 80 | | 0.12 | 50 U | 1 U | 1 U | 1 U | 5 U | 5 U | 5 U | 13 U | 5 U | 5 U | 10 U | 1 U | 1 U |
| Bromoform | 80 | 80 | | 8.5 | 50 U | 1 U | 1 U | 1 U | 5 U | 5 U | 5 U | 13 U | 5 U | 5 U | 10 U | 1 U | 1 U |
| Bromomethane | 10 | 10 | | 8.7 | 50 U | 1 U | 1 U | 1 U | 5 U | 5 U | 5 U | 13 U | 5 U | 5 U | 10 U | 1 U | 1 U |
| Carbon Disulfide | 1500 | 6200 | | 1000 | 50 U | 1 U | 1 U | 1 U | 5 U | 5 U | 5 U | 13 U | 5 U | 5 U | 10 U | 1 U | 1 U |
| Carbon Tetrachloride | 5 | 5 | 5 | 0.44 | 50 U | 1 U | 1 U | 1 U | 5 U | 5 U | 5 U | 13 U | 5 U | 5 U | 10 U | 1 U | 1 U |
| Chlorobenzene | 100 | 100 | 100 | 91 | 50 U | 1 U | 1 U | 1 U | 5 U | 5 U | 5 U | 13 U | 5 U | 5 U | 10 U | 1 U | 1 U |
| Chlorodibromomethane | 80 | 80 | | 0.15 | 50 U | 1 U | 1 U | 1 U | 5 U | 5 U | 5 U | 13 U | 5 U | 5 U | 10 U | 1 U | 1 U |
| Chloroethane | 230 | 900 | | 21000 | 50 U | 1 U | 1 U | 1 U | 5 U | 5 U | 5 U | 13 U | 5 U | 5 U | 10 U | 1 U | 1 U |
| Chloroform | 80 | 80 | | 0.19 | 50 U | 1 U | 1 U | 1 U | 5 U | 5 U | 5 U | 13 U | 5 U | 5 U | 10 U | 1 U | 0.35 J |
| Chloromethane | 30 | 30 | | 190 | 50 U | 1 U | 1 U | 1 U | 5 U | 5 U | 5 U | 13 U | 5 U | 5 U | 10 U | 1 U | 1 U |
| cis-1,2-Dichloroethene | 70 | 70 | 70 | 73 | 58 | 1 U | 5.1 | 1.8 | 9.5 | 9.4 | 13 | 75 | 26 | 29 | 30 | 27 | 2.6 |
| cis-1,3-Dichloropropene | 6.6 | 26 | | 0.43 | 50 U | 1 U | 1 U | 1 U | 5 U | 5 U | 5 U | 13 U | 5 U | 5 U | 10 U | 1 U | 1 U |
| Ethylbenzene | 700 | 700 | 700 | 1.5 | 50 U | 1 U | 1 U | 1 U | 5 U | 5 U | 5 U | 13 U | 5 U | 5 U | 10 U | 1 U | 1 U |
| Methyl tert-butyl ether | 20 | 20 | | 12 | 50 U | 0.63 J | 1 U | 1 U | 5 U | 5 U | 5 U | 13 U | 5 U | 5 U | 10 U | 1 U | 1 U |
| Methylene chloride | 5 | 5 | | 4.8 | 12 J | 1 U | 1 U | 1 U | 5 U | 5 U | 5 U | 13 U | 5 U | 5 U | 10 U | 1 U | 1 U |
| Styrene | 100 | 100 | 100 | 1600 | 50 U | 1 U | 1 U | 1 U | 5 U | 5 U | 5 U | 13 U | 5 U | 5 U | 10 U | 1 U | 1 U |
| Tetrachloroethene | 5 | 5 | 5 | 0.11 | 480 | 1 U | 2.8 | 1.8 | 6.3 | 6.1 | 6.3 | 110 | 54 | 54 | 51 | 1.7 | 2.4 |
| Toluene | 1000 | 1000 | 1000 | 2300 | 50 U | 0.15 J | 1 U | 1 U | 5 U | 5 U | 5 U | 13 U | 5 U | 5 U | 10 U | 0.15 J | 1 U |
| trans-1,2-Dichloroethene | 100 | 100 | 100 | 110 | 50 U | 1 U | 1 U | 1 U | 5 U | 5 U | 5 U | 13 U | 5 U | 5 U | 10 U | 1 U | 1 U |
| trans-1,3-Dichloropropene | 6.6 | 26 | | 0.43 | 50 U | 1 U | 1 U | 1 U | 5 U | 5 U | 5 U | 13 U | 5 U | 5 U | 10 U | 1 U | 1 U |
| Trichloroethene | 5 | 5 | 5 | 2 | 1000 | 0.53 J | 17 | 9.7 | 76 | 72 | 79 | 210 | 95 | 110 | 100 | 6.8 | 8 |
| Vinyl Chloride | 2 | 2 | 2 | 0.016 | 50 U | 1 U | 1 U | 1 U | 5 U | 5 U | 5 U | 13 U | 5 U | 5 U | 10 U | 1 U | 1 U |
| Xylenes (Total) | 10000 | 10000 | 10000 | 200 | 150 U | 3 U | 3 U | 3 U | 15 U | 15 U | 15 U | 38 U | 15 U | 15 U | 30 U | 3 U | 3 U |

Blank results = analyte not analyzed. U = Not detected. J = Organics; estimated. Inorganics; blank contamination. B = Organics; blank contamination. Inorganics; estimated. E = Inorganics: matrix interference.

**Table 5.**
**Groundwater Data Summary - 2011 Key Well Sampling**
**Former York Naval Ordnance Plant - York, PA**

| Location/ID<br>Sample Date<br>Parameter | MSC Used Aquifer R (ug/L) | MSC Used Aquifer NR (ug/L) | Federal MCL (ug/L) | EPA RSL Tap Water (ug/L) | MW-106 6/27/2011 | MW-107 6/20/2011 | MW-108S 6/24/2011 | MW-109S 6/20/2011 | MW-110 6/20/2011 | MW-116 6/21/2011 | CW-1 6/22/2011 | CW-1A 6/22/2011 | CW-2 6/22/2011 | CW-3 6/22/2011 | CW-4 6/22/2011 | CW-5 6/22/2011 | CW-6 6/22/2011 | CW-7 6/22/2011 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ***Cyanide, Free*** | | | | | | | | | | | | | | | | | | |
| Cyanide, Free | 200 | 200 | 200 | 730 | | | | | | | | | | | | | | |
| ***Cyanide, Total*** | | | | | | | | | | | | | | | | | | |
| Cyanide, Total | 200 | 200 | | 730 | | | | | | | | | | | | | | |
| ***METAL (Total)*** | | | | | | | | | | | | | | | | | | |
| Arsenic | 10 | 10 | 10 | 0.045 | | | 2.8 | | | | | | | | | | | |
| Beryllium | 4 | 4 | 4 | 73 | | | 1.2 | | | | | | | | | | | |
| Chromium | 100 | 100 | 100 | | | | | | | | | | | | | | | |
| Hexavalent Chromium | 100 | 100 | | 0.043 | | | | | | | | | | | | | | |
| Lead | 5 | 5 | 15 | | | | 14 | | | | | | | | | | | |
| Nickel | 100 | 100 | | 730 | | | 12 | | | | | | | | | | | |
| ***METAL (Dissolved)*** | | | | | | | | | | | | | | | | | | |
| Arsenic | 10 | 10 | 10 | 0.045 | | | 0.32 J | | | | | | | | | | | |
| Beryllium | 4 | 4 | 4 | 73 | | | 0.14 J | | | | | | | | | | | |
| Chromium | 100 | 100 | 100 | | | | | | | | | | | | | | | |
| Hexavalent Chromium | 100 | 100 | | 0.043 | | | | | | | | | | | | | | |
| Lead | 5 | 5 | 15 | | | | 1 U | | | | | | | | | | | |
| Nickel | 100 | 100 | | 730 | | | 1.8 | | | | | | | | | | | |
| ***TOTAL VOC*** | | | | | | | | | | | | | | | | | | |
| | | | | | 89 | 13.14 | 0 | 153.51 | 102.04 | 2111 | 54 | 43.82 | 18.24 | 34.7 | 91.1 | 8.87 | 144 | 6.3 |
| ***Volatile Organic Compound*** | | | | | | | | | | | | | | | | | | |
| 1,1,1,2-Tetrachloroethane | 70 | 70 | | 0.52 | 5 U | 1 U | 1 U | 1 U | 1 U | 50 U | 2 U | 2 U | 1 U | 1 U | 2 U | 1 U | 5 U | 1 U |
| 1,1,1-Trichloroethane | 200 | 200 | 200 | 9100 | 5 U | 1 U | 1 U | 1 U | 1 U | 50 U | 2 U | 2 U | 1 U | 1 U | 2 U | 1 U | 5 U | 1 U |
| 1,1,2,2-Tetrachloroethane | 0.84 | 4.3 | | 0.067 | 5 U | 1 U | 1 U | 1 U | 1 U | 50 U | 2 U | 2 U | 1 U | 1 U | 2 U | 1 U | 5 U | 1 U |
| 1,1,2-Trichloroethane | 5 | 5 | 5 | 0.24 | 5 U | 1 U | 1 U | 1 U | 1 U | 50 U | 2 U | 2 U | 1 U | 1 U | 2 U | 1 U | 5 U | 1 U |
| 1,1-Dichloroethane | 31 | 160 | | 2.4 | 5 U | 1 U | 1 U | 1 U | 1 U | 50 U | 2 U | 2 U | 1 U | 1 U | 2 U | 1 U | 5 U | 1 U |
| 1,1-Dichloroethene | 7 | 7 | 7 | 340 | 5 U | 1 U | 1 U | 1 U | 1 U | 37 J | 2 U | 2 U | 1 U | 1 U | 2 U | 1 U | 5 U | 1 U |
| 1,2-Dibromoethane | 0.05 | 0.05 | 0.05 | 0.0065 | 5 U | 1 U | 1 U | 1 U | 1 U | 50 U | 2 U | 2 U | 1 U | 1 U | 2 U | 1 U | 5 U | 1 U |
| 1,2-Dichloroethane | 5 | 5 | 5 | 0.15 | 5 U | 1 U | 1 U | 1 U | 1 U | 50 U | 2 U | 2 U | 1 U | 1 U | 2 U | 1 U | 5 U | 1 U |
| 1,2-Dichloropropane | 5 | 5 | 5 | 0.39 | 5 U | 1 U | 1 U | 1 U | 1 U | 50 U | 2 U | 2 U | 1 U | 1 U | 2 U | 1 U | 5 U | 1 U |
| 1,4-Dioxane | 6.4 | 32 | | 0.67 | 1000 U | 200 U | 200 U | 200 U | 200 U | 10000 U | 400 U | 400 U | 200 U | 200 U | 400 U | 200 U | 1000 U | 200 U |
| 2-Butanone | 4000 | 4000 | | 7100 | 25 U | 5 U | 5 U | 1.6 J | 5 U | 250 U | 10 U | 10 U | 5 U | 5 U | 10 U | 5 U | 25 U | 5 U |
| 2-Hexanone | 11 | 44 | | 47 | 25 U | 5 U | 5 U | 1.2 J | 5 U | 250 U | 10 U | 10 U | 5 U | 5 U | 10 U | 5 U | 25 U | 5 U |
| 4-Methyl-2-Pentanone | 2900 | 8200 | | 2000 | 25 U | 5 U | 5 U | 5 U | 5 U | 250 U | 10 U | 10 U | 5 U | 5 U | 10 U | 5 U | 25 U | 5 U |
| Acetone | 33000 | 92000 | | 22000 | 25 U | 5 U | 5 U | 34 | 5 U | 250 U | 10 U | 10 U | 5 U | 4.2 J | 10 U | 5 U | 25 U | 5 U |
| Acrylonitrile | 0.72 | 3.7 | | 0.045 | 100 U | 20 U | 20 U | 20 U | 20 U | 1000 U | 40 U | 40 U | 20 U | 20 U | 40 U | 20 U | 100 U | 20 U |
| Benzene | 5 | 5 | 5 | 0.41 | 5 U | 1 U | 1 U | 23 | 1 U | 50 U | 2 U | 2 U | 1 U | 1 U | 2 U | 1 U | 5 U | 1 U |
| Bromochloromethane | 90 | 90 | | | 5 U | 1 U | 1 U | 1 U | 1 U | 50 U | 2 U | 2 U | 1 U | 1 U | 2 U | 1 U | 5 U | 1 U |
| Bromodichloromethane | 80 | 80 | | 0.12 | 5 U | 1 U | 1 U | 1 U | 1 U | 50 U | 2 U | 2 U | 1 U | 1 U | 2 U | 1 U | 5 U | 1 U |
| Bromoform | 80 | 80 | | 8.5 | 5 U | 1 U | 1 U | 1 U | 1 U | 50 U | 2 U | 2 U | 1 U | 1 U | 2 U | 1 U | 5 U | 1 U |
| Bromomethane | 10 | 10 | | 8.7 | 5 U | 1 U | 1 U | 1 U | 1 U | 50 U | 2 U | 2 U | 1 U | 1 U | 2 U | 1 U | 5 U | 1 U |
| Carbon Disulfide | 1500 | 6200 | | 1000 | 5 U | 1 U | 1 U | 1 U | 1 U | 50 U | 2 U | 2 U | 1 U | 1 U | 2 U | 1 U | 5 U | 1 U |
| Carbon Tetrachloride | 5 | 5 | 5 | 0.44 | 5 U | 1 U | 1 U | 1 U | 1 U | 50 U | 2 U | 2 U | 1 U | 1 U | 2 U | 1 U | 5 U | 1 U |
| Chlorobenzene | 100 | 100 | 100 | 91 | 5 U | 1 U | 1 U | 1 U | 1 U | 50 U | 2 U | 2 U | 1 U | 1 U | 2 U | 1 U | 5 U | 1 U |
| Chlorodibromomethane | 80 | 80 | | 0.15 | 5 U | 1 U | 1 U | 1 U | 1 U | 50 U | 2 U | 2 U | 1 U | 1 U | 2 U | 1 U | 5 U | 1 U |
| Chloroethane | 230 | 900 | | 21000 | 5 U | 1 U | 1 U | 1 U | 1 U | 50 U | 2 U | 2 U | 1 U | 1 U | 2 U | 1 U | 5 U | 1 U |
| Chloroform | 80 | 80 | | 0.19 | 5 U | 0.44 J | 1 U | 0.21 J | 0.6 J | 50 U | 2 U | 0.43 J | 1 U | 1 U | 2 U | 0.17 J | 5 U | 1.4 |
| Chloromethane | 30 | 30 | | 190 | 5 U | 1 U | 1 U | 1 U | 1 U | 50 U | 2 U | 2 U | 1 U | 1 U | 2 U | 1 U | 5 U | 1 U |
| cis-1,2-Dichloroethene | 70 | 70 | 70 | 73 | 12 | 2.3 | 1 U | 1 U | 0.44 J | 1300 | 11 | 0.7 J | 3.9 | 19 | 30 | 3.1 | 35 | 1 U |
| cis-1,3-Dichloropropene | 6.6 | 26 | | 0.43 | 5 U | 1 U | 1 U | 1 U | 1 U | 50 U | 2 U | 2 U | 1 U | 1 U | 2 U | 1 U | 5 U | 1 U |
| Ethylbenzene | 700 | 700 | 700 | 1.5 | 5 U | 1 U | 1 U | 6.1 | 1 U | 50 U | 2 U | 2 U | 1 U | 1 U | 2 U | 1 U | 5 U | 1 U |
| Methyl tert-butyl ether | 20 | 20 | | 12 | 5 U | 1 U | 1 U | 8.4 | 1 U | 50 U | 2 U | 2 U | 1 U | 1 U | 2 U | 1 U | 5 U | 1 U |
| Methylene chloride | 5 | 5 | | 4.8 | 5 U | 1 U | 1 U | 1 U | 1 U | 50 U | 2 U | 2 U | 1 U | 1 U | 2 U | 1 U | 5 U | 1 U |
| Styrene | 100 | 100 | 100 | 1600 | 5 U | 1 U | 1 U | 1 U | 1 U | 50 U | 2 U | 2 U | 1 U | 1 U | 2 U | 1 U | 5 U | 1 U |
| Tetrachloroethene | 5 | 5 | 5 | 0.11 | 10 | 4.5 | 1 U | 1 U | 45 | 270 | 2 U | 0.69 J | 0.34 J | 2.2 | 6.1 | 2.5 | 90 | 1 U |
| Toluene | 1000 | 1000 | 1000 | 2300 | 5 U | 0.3 J | 1 U | 1 U | 1 U | 50 U | 2 U | 2 U | 1 U | 1 U | 2 U | 1 U | 5 U | 1 U |
| trans-1,2-Dichloroethene | 100 | 100 | 100 | 110 | 5 U | 1 U | 1 U | 1 U | 1 U | 50 U | 2 U | 2 U | 1 U | 1 U | 2 U | 1 U | 5 U | 1 U |
| trans-1,3-Dichloropropene | 6.6 | 26 | | 0.43 | 5 U | 1 U | 1 U | 1 U | 1 U | 50 U | 2 U | 2 U | 1 U | 1 U | 2 U | 1 U | 5 U | 1 U |
| Trichloroethene | 5 | 5 | 5 | 2 | 67 | 5.6 | 1 U | 1 U | 56 | 420 | 43 | 42 | 14 | 9.3 | 55 | 3.1 | 19 | 4.9 |
| Vinyl Chloride | 2 | 2 | 2 | 0.016 | 5 U | 1 U | 1 U | 1 U | 1 U | 84 | 2 U | 2 U | 1 U | 1 U | 2 U | 1 U | 5 U | 1 U |
| Xylenes (Total) | 10000 | 10000 | 10000 | 200 | 15 U | 3 U | 3 U | 79 | 3 U | 150 U | 6 U | 6 U | 3 U | 3 U | 6 U | 3 U | 15 U | 3 U |

Blank results = analyte not analyzed. U = Not detected. J = Organics; estimated. Inorganics; blank contamination. B = Organics; blank contamination. Inorganics; estimated. E = Inorganics: matrix interference.

**Table 5.**
**Groundwater Data Summary - 2011 Key Well Sampling**
**Former York Naval Ordnance Plant - York, PA**

| Location/ID<br>Sample Date<br>Parameter | MSC<br>Used Aquifer R<br>(ug/L) | MSC<br>Used Aquifer NR<br>(ug/L) | Federal<br>MCL<br>(ug/L) | EPA RSL<br>Tap Water<br>(ug/L) | CW-7A<br>6/22/2011 | CW-8<br>6/27/2011 | CW-9<br>6/22/2011 | CW-13<br>6/22/2011 | CW-15A<br>6/22/2011 | CW-17<br>6/22/2011 | CW-20<br>6/27/2011 | Softail Lift Station Deep Foundation<br>6/28/2011 | Softail Lift Station Toe of Slope<br>6/28/2011 | Cole D<br>6/29/2011 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ***Cyanide, Free*** | | | | | | | | | | | | | | |
| Cyanide, Free | 200 | 200 | 200 | 730 | | | | | | | | | | |
| ***Cyanide, Total*** | | | | | | | | | | | | | | |
| Cyanide, Total | 200 | 200 | | 730 | | | | | | | | | | |
| ***METAL (Total)*** | | | | | | | | | | | | | | |
| Arsenic | 10 | 10 | 10 | 0.045 | | | | | | | | | | |
| Beryllium | 4 | 4 | 4 | 73 | | | | | | | | | | |
| Chromium | 100 | 100 | 100 | | | | | | | | | | | |
| Hexavalent Chromium | 100 | 100 | | 0.043 | | | | | | | | | | |
| Lead | 5 | 5 | 15 | | | | | | | | | | | |
| Nickel | 100 | 100 | | 730 | | | | | | | | | | |
| ***METAL (Dissolved)*** | | | | | | | | | | | | | | |
| Arsenic | 10 | 10 | 10 | 0.045 | | | | | | | | | | |
| Beryllium | 4 | 4 | 4 | 73 | | | | | | | | | | |
| Chromium | 100 | 100 | 100 | | | | | | | | | | | |
| Hexavalent Chromium | 100 | 100 | | 0.043 | | | | | | | | | | |
| Lead | 5 | 5 | 15 | | | | | | | | | | | |
| Nickel | 100 | 100 | | 730 | | | | | | | | | | |
| ***TOTAL VOC*** | | | | | | | | | | | | | | |
| | | | | | 115.2 | 505.6 | 1178 | 823.4 | 11970 | 221 | 12100 | 1.95 | 8.39 | 57 |
| ***Volatile Organic Compound*** | | | | | | | | | | | | | | |
| 1,1,1,2-Tetrachloroethane | 70 | 70 | | 0.52 | 5 U | 20 U | 50 U | 10 U | 400 U | 10 U | 500 U | 1 U | 1 U | 2 U |
| 1,1,1-Trichloroethane | 200 | 200 | 200 | 9100 | 5 U | 20 U | 41 J | 6.7 J | 3600 | 9.2 J | 500 U | 1 U | 1 U | 2 U |
| 1,1,2,2-Tetrachloroethane | 0.84 | 4.3 | | 0.067 | 5 U | 20 U | 50 U | 10 U | 400 U | 10 U | 500 U | 1 U | 1 U | 2 U |
| 1,1,2-Trichloroethane | 5 | 5 | 5 | 0.24 | 5 U | 20 U | 50 U | 10 U | 400 U | 10 U | 500 U | 1 U | 1 U | 2 U |
| 1,1-Dichloroethane | 31 | 160 | | 2.4 | 5 U | 20 U | 50 U | 3.6 J | 400 U | 3.5 J | 500 U | 1 U | 1 U | 2 U |
| 1,1-Dichloroethene | 7 | 7 | 7 | 340 | 5 U | 20 U | 50 U | 6.2 J | 840 | 6.3 J | 500 U | 1 U | 1 U | 2 U |
| 1,2-Dibromoethane | 0.05 | 0.05 | 0.05 | 0.0065 | 5 U | 20 U | 50 U | 10 U | 400 U | 10 U | 500 U | 1 U | 1 U | 2 U |
| 1,2-Dichloroethane | 5 | 5 | 5 | 0.15 | 5 U | 20 U | 50 U | 10 U | 400 U | 10 U | 500 U | 1 U | 1 U | 2 U |
| 1,2-Dichloropropane | 5 | 5 | 5 | 0.39 | 5 U | 20 U | 50 U | 10 U | 400 U | 10 U | 500 U | 1 U | 1 U | 2 U |
| 1,4-Dioxane | 6.4 | 32 | | 0.67 | 1000 U | 4000 U | 10000 U | 2000 U | 80000 U | 2000 U | 100000 U | 200 U | 200 U | 400 U |
| 2-Butanone | 4000 | 4000 | | 7100 | 25 U | 100 U | 250 U | 50 U | 2000 U | 50 U | 2500 U | 5 U | 5 U | 10 U |
| 2-Hexanone | 11 | 44 | | 47 | 25 U | 100 U | 250 U | 50 U | 2000 U | 50 U | 2500 U | 5 U | 5 U | 10 U |
| 4-Methyl-2-Pentanone | 2900 | 8200 | | 2000 | 25 U | 100 U | 250 U | 50 U | 2000 U | 50 U | 2500 U | 5 U | 5 U | 10 U |
| Acetone | 33000 | 92000 | | 22000 | 25 U | 100 U | 250 U | 50 U | 2000 U | 50 U | 2500 U | 5 U | 6.8 | 10 U |
| Acrylonitrile | 0.72 | 3.7 | | 0.045 | 100 U | 400 U | 1000 U | 200 U | 8000 U | 200 U | 10000 U | 20 U | 20 U | 40 U |
| Benzene | 5 | 5 | 5 | 0.41 | 5 U | 20 U | 50 U | 10 U | 400 U | 10 U | 500 U | 1 U | 1 U | 2 U |
| Bromochloromethane | 90 | 90 | | | 5 U | 20 U | 50 U | 10 U | 400 U | 10 U | 500 U | 1 U | 1 U | 2 U |
| Bromodichloromethane | 80 | 80 | | 0.12 | 5 U | 20 U | 50 U | 10 U | 400 U | 10 U | 500 U | 1 U | 1 U | 2 U |
| Bromoform | 80 | 80 | | 8.5 | 5 U | 20 U | 50 U | 10 U | 400 U | 10 U | 500 U | 1 U | 1 U | 2 U |
| Bromomethane | 10 | 10 | | 8.7 | 5 U | 20 U | 50 U | 10 U | 400 U | 10 U | 500 U | 1 U | 1 U | 2 U |
| Carbon Disulfide | 1500 | 6200 | | 1000 | 5 U | 20 U | 50 U | 10 U | 400 U | 10 U | 500 U | 1 U | 1 U | 2 U |
| Carbon Tetrachloride | 5 | 5 | 5 | 0.44 | 5 U | 20 U | 50 U | 10 U | 400 U | 10 U | 500 U | 1 U | 1 U | 2 U |
| Chlorobenzene | 100 | 100 | 100 | 91 | 5 U | 20 U | 50 U | 10 U | 400 U | 10 U | 500 U | 1 U | 1 U | 2 U |
| Chlorodibromomethane | 80 | 80 | | 0.15 | 5 U | 20 U | 50 U | 10 U | 400 U | 10 U | 500 U | 1 U | 1 U | 2 U |
| Chloroethane | 230 | 900 | | 21000 | 5 U | 20 U | 50 U | 10 U | 400 U | 10 U | 500 U | 1 U | 1 U | 2 U |
| Chloroform | 80 | 80 | | 0.19 | 1.3 J | 20 U | 50 U | 10 U | 400 U | 10 U | 500 U | 1 U | 1 U | 2 U |
| Chloromethane | 30 | 30 | | 190 | 5 U | 20 U | 50 U | 10 U | 400 U | 10 U | 500 U | 1 U | 1 U | 2 U |
| cis-1,2-Dichloroethene | 70 | 70 | 70 | 73 | 1.6 J | 130 | 77 | 360 | 4100 | 55 | 6400 | 0.84 J | 1 U | 2 U |
| cis-1,3-Dichloropropene | 6.6 | 26 | | 0.43 | 5 U | 20 U | 50 U | 10 U | 400 U | 10 U | 500 U | 1 U | 1 U | 2 U |
| Ethylbenzene | 700 | 700 | 700 | 1.5 | 5 U | 20 U | 50 U | 10 U | 400 U | 10 U | 500 U | 1 U | 1 U | 2 U |
| Methyl tert-butyl ether | 20 | 20 | | 12 | 5 U | 20 U | 50 U | 10 U | 400 U | 10 U | 500 U | 1 U | 1 U | 2 U |
| Methylene chloride | 5 | 5 | | 4.8 | 5 U | 20 U | 50 U | 10 U | 400 U | 10 U | 500 U | 1 U | 1 U | 2 U |
| Styrene | 100 | 100 | 100 | 1600 | 5 U | 20 U | 50 U | 10 U | 400 U | 10 U | 500 U | 1 U | 1 U | 2 U |
| Tetrachloroethene | 5 | 5 | 5 | 0.11 | 2.3 J | 29 | 670 | 140 | 930 | 37 | 2400 | 0.22 J | 0.18 J | 42 |
| Toluene | 1000 | 1000 | 1000 | 2300 | 5 U | 20 U | 50 U | 10 U | 400 U | 10 U | 500 U | 1 U | 0.21 J | 2 U |
| trans-1,2-Dichloroethene | 100 | 100 | 100 | 110 | 5 U | 6.6 J | 50 U | 10 U | 400 U | 10 U | 500 U | 1 U | 1 U | 2 U |
| trans-1,3-Dichloropropene | 6.6 | 26 | | 0.43 | 5 U | 20 U | 50 U | 10 U | 400 U | 10 U | 500 U | 1 U | 1 U | 2 U |
| Trichloroethene | 5 | 5 | 5 | 2 | 110 | 340 | 390 | 300 | 2500 | 110 | 3300 | 0.89 J | 1.2 | 15 |
| Vinyl Chloride | 2 | 2 | 2 | 0.016 | 5 U | 20 U | 50 U | 6.9 J | 400 U | 10 U | 500 U | 1 U | 1 U | 2 U |
| Xylenes (Total) | 10000 | 10000 | 10000 | 200 | 15 U | 60 U | 150 U | 30 U | 1200 U | 30 U | 1500 U | 3 U | 3 U | 6 U |

Blank results = analyte not analyzed. U = Not detected. J = Organics; estimated. Inorganics; blank contamination. B = Organics; blank contamination. Inorganics; estimated. E = Inorganics: matrix interference.

**Table 5.**
**Groundwater Data Summary - 2011 Key Well Sampling**
**Former York Naval Ordnance Plant - York, PA**

| Location/ID<br>Sample Date<br>Parameter | MSC<br>Used Aquifer R<br>(ug/L) | MSC<br>Used Aquifer NR<br>(ug/L) | Federal<br>MCL<br>(ug/L) | EPA RSL<br>Tap Water<br>(ug/L) | Cole F<br>6/29/2011 | MW-4 (Cole)<br>6/29/2011 | MW-4 (Cole) Dup<br>6/29/2011 | RW-2<br>7/1/2011 | RW-4 Folk<br>6/28/2011 | RW-5<br>6/28/2011 | TATE (S-6)<br>6/28/2011 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ***Cyanide, Free*** | | | | | | | | | | | |
| Cyanide, Free | 200 | 200 | 200 | 730 | | | | | | | |
| ***Cyanide, Total*** | | | | | | | | | | | |
| Cyanide, Total | 200 | 200 | | 730 | | | | | | | |
| ***METAL (Total)*** | | | | | | | | | | | |
| Arsenic | 10 | 10 | 10 | 0.045 | | | | | | | |
| Beryllium | 4 | 4 | 4 | 73 | | | | | | | |
| Chromium | 100 | 100 | 100 | | | | | | | | |
| Hexavalent Chromium | 100 | 100 | | 0.043 | | | | | | | |
| Lead | 5 | 5 | 15 | | | | | | 8.7 | | |
| Nickel | 100 | 100 | | 730 | | | | | | | |
| ***METAL (Dissolved)*** | | | | | | | | | | | |
| Arsenic | 10 | 10 | 10 | 0.045 | | | | | | | |
| Beryllium | 4 | 4 | 4 | 73 | | | | | | | |
| Chromium | 100 | 100 | 100 | | | | | | | | |
| Hexavalent Chromium | 100 | 100 | | 0.043 | | | | | | | |
| Lead | 5 | 5 | 15 | | | | | | 3.3 | | |
| Nickel | 100 | 100 | | 730 | | | | | | | |
| ***TOTAL VOC*** | | | | | | | | | | | |
| | | | | | 10.1 | 2.11 | 1.92 | 2.27 | 0.19 | 1.66 | 0.48 |
| ***Volatile Organic Compound*** | | | | | | | | | | | |
| 1,1,1,2-Tetrachloroethane | 70 | 70 | | 0.52 | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U |
| 1,1,1-Trichloroethane | 200 | 200 | 200 | 9100 | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U |
| 1,1,2,2-Tetrachloroethane | 0.84 | 4.3 | | 0.067 | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U |
| 1,1,2-Trichloroethane | 5 | 5 | 5 | 0.24 | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U |
| 1,1-Dichloroethane | 31 | 160 | | 2.4 | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U |
| 1,1-Dichloroethene | 7 | 7 | 7 | 340 | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U |
| 1,2-Dibromoethane | 0.05 | 0.05 | 0.05 | 0.0065 | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U |
| 1,2-Dichloroethane | 5 | 5 | 5 | 0.15 | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U |
| 1,2-Dichloropropane | 5 | 5 | 5 | 0.39 | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U |
| 1,4-Dioxane | 6.4 | 32 | | 0.67 | 200 U | 200 U | 200 U | 200 U | 200 U | 200 U | 200 U |
| 2-Butanone | 4000 | 4000 | | 7100 | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U |
| 2-Hexanone | 11 | 44 | | 47 | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U |
| 4-Methyl-2-Pentanone | 2900 | 8200 | | 2000 | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U |
| Acetone | 33000 | 92000 | | 22000 | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U |
| Acrylonitrile | 0.72 | 3.7 | | 0.045 | 20 U | 20 U | 20 U | 20 U | 20 U | 20 U | 20 U |
| Benzene | 5 | 5 | 5 | 0.41 | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U |
| Bromochloromethane | 90 | 90 | | | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U |
| Bromodichloromethane | 80 | 80 | | 0.12 | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U |
| Bromoform | 80 | 80 | | 8.5 | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U |
| Bromomethane | 10 | 10 | | 8.7 | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U |
| Carbon Disulfide | 1500 | 6200 | | 1000 | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U |
| Carbon Tetrachloride | 5 | 5 | 5 | 0.44 | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U |
| Chlorobenzene | 100 | 100 | 100 | 91 | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U |
| Chlorodibromomethane | 80 | 80 | | 0.15 | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U |
| Chloroethane | 230 | 900 | | 21000 | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U |
| Chloroform | 80 | 80 | | 0.19 | 1 U | 1 U | 1 U | 0.27 J | 0.19 J | 1 U | 0.48 J |
| Chloromethane | 30 | 30 | | 190 | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U |
| cis-1,2-Dichloroethene | 70 | 70 | 70 | 73 | 1 U | 1 U | 1 U | 1 U | 1 U | 0.63 J | 1 U |
| cis-1,3-Dichloropropene | 6.6 | 26 | | 0.43 | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U |
| Ethylbenzene | 700 | 700 | 700 | 1.5 | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U |
| Methyl tert-butyl ether | 20 | 20 | | 12 | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U |
| Methylene chloride | 5 | 5 | | 4.8 | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U |
| Styrene | 100 | 100 | 100 | 1600 | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U |
| Tetrachloroethene | 5 | 5 | 5 | 0.11 | 2.6 | 0.81 J | 0.72 J | 1 U | 1 U | 0.21 J | 1 U |
| Toluene | 1000 | 1000 | 1000 | 2300 | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U |
| trans-1,2-Dichloroethene | 100 | 100 | 100 | 110 | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U |
| trans-1,3-Dichloropropene | 6.6 | 26 | | 0.43 | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U |
| Trichloroethene | 5 | 5 | 5 | 2 | 7.5 | 1.3 | 1.2 | 2 | 1 U | 0.82 J | 1 U |
| Vinyl Chloride | 2 | 2 | 2 | 0.016 | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U |
| Xylenes (Total) | 10000 | 10000 | 10000 | 200 | 3 U | 3 U | 3 U | 3 U | 3 U | 3 U | 3 U |

Blank results = analyte not analyzed. U = Not detected. J = Organics; estimated. Inorganics; blank contamination. B = Organics; blank contamination. Inorganics; estimated. E = Inorganics: matrix interference.