PROJECT INVESTIGATION REPORT
FOR
HOFF VC SITE
NEW HANOVER TOWNSHIP
MONTGOMERY COUNTY
PENNSYLVANIA

PADEP Requisition Number GTAC5-1-263

Leidos Project 301604.TM.100116

Prepared for:

Pennsylvania Department of Environmental Protection
Southeast Regional Office
2 East Main Street
Norristown, PA 19401

August 2014

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1.0 INTRODUCTION AND BACKGROUND

1.1 Project Introduction

Pennsylvania Department of Environmental Protection (PADEP) Bureau of Waste Management, Division of Remediation Services requested that Leidos Engineering, LLC (Leidos), formerly Science Applications International Corporation (SAIC), assist with a site investigation to determine the origin of chlorinated organic compound impacts to groundwater in private potable water wells in New Hanover Township, Pennsylvania (the Site) under the General Technical Assistance Contract (GTAC) SAP#4000013588 and requisition number GTAC5-1-263. PADEP requested assistance by Leidos in a letter dated August 26, 2011. The general area of the Site is depicted on **Figure 1**.

1.2 Project Background

The area of the Site was initially characterized by chlorinated organic impacts to groundwater at a limited group of residential properties along Layfield Road (Route 663) to the north of the intersection of Hoffmansville Road and Layfield Road in New Hanover Township, Pennsylvania. The affected properties included four single residences (314, 318, 322, and 325 Layfield Road) and a multi-tenant residential apartment building (324, 326, 328, 330, and 332 Layfield Road). **Figure 2** depicts the affected properties and nearby adjacent properties. All homes and businesses in the area obtain potable water from private wells and are served by on-lot septic systems.

The Montgomery County Health Department (MCHD) initially collected a potable water sample from the well serving the multi-tenant apartment building property on Layfield Road in June 2011 as a response to a heating oil leak at that property. Chlorinated organic compounds including trichloroethylene (TCE), cis-1,2-dichlroethylene (cis-1,2-DCE), 1,1-dichloroethylene (1,1-DCE), vinyl chloride (VC), and methyl tertiary-butyl ether (MTBE) were detected at levels exceeding the applicable drinking water maximum contaminant levels (MCLs). This property contains a multi-tenant structure consisting of five separate apartments served by the one potable well. PADEP then began collecting samples from potable water wells serving other nearby properties in July 2011. The above compounds in addition to 1,2-dichloroethane (1,2-DCA), benzene, 1,2-dichlorobenzene (1,2-DCB), and 1,4-dichlorobenzene (1,4-DCB) were

detected above the MCLs at single residences located at 314 Layfield Road, 318 Layfield Road, 322 Layfield Road, and 325 Layfield Road. Upon receiving the analysis results, the PADEP began providing bottled water to the nine affected addresses at the five identified properties. The residence at 322 Layfield Road had a carbon treatment system that was ineffective in removing all compounds.

1.3 Work Scope Evolution

In August 2011, PADEP requested that Leidos assist with a site investigation to determine the origin of chlorinated organic compound impacts to the groundwater in the private potable water wells discussed above. To initiate the scope of work, Leidos attended a scoping meeting on September 26, 2011, at PADEP's offices in Norristown, Pennsylvania, to meet with PADEP project personnel, review available information, and determine the project objectives. Scoping meeting attendees from the PADEP Southeast Regional Office Environmental Cleanup Program included Tim Cherry (Hazardous Sites Cleanup Act [HSCA] Supervisor) and Colin Wade (HSCA Project Officer). Noreen Wagner (Contract Officer) was in attendance on behalf of the PADEP Central Office Remediation Contracts Section. Marc Reeves (Program Manager) and Rich Merhar (Project Manager) represented Leidos.

It was determined the initial phase of work would include providing bottled water to affected residents, obtaining and reviewing available historical information for properties in the area, the performance of an evaluation for viable home water treatment technologies, installing bedrock monitoring wells in an attempt to delineate chlorinated organic impacts to groundwater, managing drilling-related investigation derived waste (IDW), conducting downhole geophysics at selected monitoring wells, a professional survey of the monitoring wells, and reporting. Following the scoping meeting, Leidos prepared a workplan and pricing to perform the initial phase of the work (Initial Work Plan). The finalized workplan was submitted to PADEP on November 17, 2011.

At the request of PADEP, an initial change order was prepared and submitted on January 10, 2012, for the performance of additional work scope items including the sampling of shallow monitoring wells at the Good Oil Company property (currently the Henkels and McCoy facility) and the review of the Gibraltar Rock mining permit at the PADEP Pottsville District

Mining Office. The Good Oil Company property shallow wells were sampled by Leidos later in January 2012.

The Initial Work Plan was then revised on March 5, 2012, to reflect changes to the management of IDW that would be generated during the bedrock monitoring well installation activities. Specifically, waters produced during bedrock drilling were to be captured and containerized for proper characterization and disposal rather than being allowed to discharge to the ground surface. The locations of the proposed bedrock monitoring wells were also modified based on the results of the shallow monitor well sampling work. The evaluation for viable home water treatment technologies was prepared and submitted to PADEP in March 2012. Six deep bedrock monitoring wells (MW-1D, MW-2D, MW-3D, MW-4D, MW-5D, MW-7D) and six shallow bedrock monitoring wells (MW-1S, MW-2S, MW-3S, MW-5S, MW-6S, MW-7S) were installed at the Site in March and April 2012, and borehole geophysics work was completed in May 2012.

A Straddle Packer Groundwater Sampling Work Scope was prepared by Leidos and submitted to PADEP on June 5, 2012. The straddle packer work scope was based on an evaluation of borehole characteristics at each of the six deep bedrock wells summarized in a memorandum prepared by Leidos and submitted to PADEP on May 22, 2012. The memorandum recommended straddle packer sampling at discreet fracture zones within the monitoring wells prior to the design and installation of permanent nested well screens in the wells. Straddle packer groundwater sampling within the newly installed bedrock monitoring wells was conducted in June 2012.

Leidos submitted an Additional Site Characterization Work Scope to PADEP on August 16, 2012. This work scope proposed the installation of nested well screens within the six deep bedrock monitoring wells, the completion of borehole geophysics, straddle packer groundwater sampling, and nested well screen installation at two additional off-Site bedrock wells already in existence (OW-4 and OW-6) and located to the south of the Site on land owned by the Gibraltar Rock Quarry Company, two rounds of groundwater sampling at all Site wells, and a soil vapor intrusion study at three residential properties (318 Layfield Road, 322 Layfield Road, and 324-332 Layfield Road). The completion of the borehole geophysics and straddle packer sampling at OW-4 and OW-6 was completed in late July and August 2012, and the installation of the nested well screens at the eight wells was conducted in September 2012. A

round of groundwater samples was then collected from the Site monitoring wells in October 2012 and again in May 2013.

The soil vapor intrusion study was initiated in November 2012 at the 318 Layfield Road residence. In response to high contaminant concentrations in raw water at that location, shower vapor samples were collected and evaluated. Elevated contaminant concentrations were detected and resulted in the expeditious installation of carbon treatment systems at the homes located at 314 Layfield Road, 318 Layfield Road, 322 Layfield Road, 324-332 Layfield Road, and 325 Layfield Road to eradicate the inhalation exposures during and after showering. The systems were installed in November 2012. Additional soil vapor intrusion study activities including the installation and sampling of sub-slab probes and indoor air sampling was conducted at the homes located at 318 Layfield Road, 322 Layfield Road, and 324-332 Layfield Road throughout 2013 and 2014.

An additional Site Characterization Work Scope 2 was prepared by Leidos and submitted to PADEP on January 24, 2013, for the installation of one additional on-Site deep bedrock monitoring well and two additional off-Site deep bedrock monitoring wells located to the southwest of the Site. The performance of borehole geophysics, straddle packer groundwater sampling, and nested well screen installation was also proposed at the additional wells. The work scope also proposed the completion of another round of groundwater sampling at most Site wells and the creation and presentation of a three-dimensional hydrogeologic and contaminant distribution model to accurately depict the information gathered at the Site along with the preparation of Site contaminant fate and transport modeling. The on-Site deep bedrock monitoring well (MW-8D) and associated activities were completed between April and June 2013. The third monitoring well sampling event was conducted in October 2013. The installation of the two off-Site wells was delayed due to access issues that were not resolved until November 2013. The installation of the two off-Site wells was then further delayed as a result of heavy precipitation followed by early and frequent snowfalls throughout the winter months into 2014 (soft ground situation). The installation of the off-Site wells (MW-9D and MW-10D) and related activities were completed between May and June 2014. A fourth round of groundwater sampling that included most Site wells was conducted in early July 2014. The three-dimensional modeling work was initiated in 2013 using existing Site data and was completed following the installation of wells MW-9D and MW-10D and the July 2014 groundwater sampling event.

Additionally in 2013 and at the request of PADEP, a Groundwater Remedial Alternative Assessment was conducted by Leidos for the Site. A memorandum was prepared and submitted to PADEP on August 20, 2013, that evaluated and presented four viable remedial options for the contaminants in groundwater beneath the Site.

A Potable Well Abandonment Work Plan was prepared by Leidos and submitted to PADEP in March 2014 for the proper abandonment of approximately 30 home wells at the area of the Site following the installation of a public water supply main and property connections funded by a grant from the PADEP. The work plan also proposed the removal of the existing carbon filter systems at the five residential properties following connection to the public water supply system. However, delays with the installation of the public water supply mains along Layfield Road have occurred. As a result, that work is unlikely to be finished before the end of August 2014, and Leidos will be unable to complete the well abandonment work scope as proposed under the existing GTAC5 contract with PADEP.

2.0 SITE SETTING

2.1 Site Location

The area of the Site is characterized by mixed residential, agricultural, and commercial use lands located approximately three miles west of Gilbertsville, Pennsylvania. The Site consists of a mixture of residential and commercial properties along Layfield Road (Route 663) to the north of its intersection with Hoffmansville Road (see **Figure 2**). Commercial properties include the Henkels and McCoy equipment yard and the Waite Enterprises Machine shop. Remaining lands consist of residential use properties, agricultural fields, or unused wooded land.

The Good Oil Company property located at 334 Layfield Road is currently leased by Henkels and McCoy and operates as a pipeline services field office and yard. This large commercial property is located immediately north and east of the affected residences. Henkels and McCoy reportedly began leasing the property from Good Oil Company approximately seven years ago for use as a pipeline service equipment storage and maintenance facility. Prior to that, the Swann Oil Company operated at the property since the late 1960's as a petroleum distributor. Numerous aboveground storage tanks (ASTs) and underground storage tanks (USTs) used for the storage of petroleum products were formerly present at that property. Good Oil Company purchased the property in the early 1990's. An open leaking underground storage tank (LUST) case with the PADEP related to the former operations is currently ongoing. Thirteen shallow monitoring wells (MW-1 through MW-10 and MW-12 through MW-14) were installed as part of the existing LUST case. A former Swann Oil Company employee reported to PADEP officials that TCE was used to wash petroleum delivery trucks at a parking area directly to the southwest of the main office building. Current operations by Henkels and McCoy at this property include large/heavy equipment repair, storage, and distribution. There is a large multi-bay repair shop, an equipment wash facility, and several offices.

A machine and tool shop operated as Waite Enterprises is present at 333 Layfield Road. This property is located to the north of the affected properties directly across Layfield Road from the Good Oil Company property. A residence is also present at this property. According to Mr. Waite, he has been performing machining operations at the property for eight years now and has not used TCE. Prior to that, the current machine shop building was used for

silversmithing operations. The supply well serving this property reportedly did not contain any chlorinated organic compounds.

Gibraltar Rock, Inc. owns large portions of wooded and agricultural use land directly adjacent to the east and farther south from the southern borders of the Good Oil Company property. The quarry company plans to quarry stone at portions of that property in the future. Numerous deep borings and monitor wells have been installed on the lands owned by Gibraltar Rock as part of their quarry permitting. Additional details related to the Gibraltar Rock permit are provided in **Section 3.5**.

2.2 Topography, Surface Water, and Climate

The ground surface at the Site slopes to the south/southwest from 420 feet above mean sea level (amsl) near the Henkels and McCoy office to approximately 340 feet amsl along the unnamed tributary as it crosses Hoffmansville Road to the south. The unnamed tributary of Swamp Creek flows to the southwest through the Site joining with Swamp Creek approximately 0.75 miles from the Site.

Climate data for Allentown indicate the average annual rainfall is 41.4 inches and the average annual snowfall is 20.4 inches. The average high temperature in July is 86.1 degrees Fahrenheit, and the average low temperature in January is 22.8 degrees Fahrenheit. The annual average wind speed is 9.5 miles per hour and comes predominantly from the northwest, west, and southwest (website: http://www.climate-zone.com/).

2.3 Regional Geology

Surface soil at the Site varies from urban land to loam. Urban land is characterized as typically a gently sloping area (typically less than 8 percent). Urban land constitutes the majority of the Good Oil Company property. The Lehigh silt loam is characterized as moderately well drained with a moderately low to moderately high capacity to transmit water. The area of the Site west of Layfield Road and south to Hoffmansville Road is mapped as Lehigh silt loam. The Croton silt loam is characterized as poorly drained with a very low to moderately high capacity to transmit water. The Croton silt loam brackets the western and eastern boundaries of the Site. This loam also is present to the southwest of the intersection of Layfield Road and

Hoffmansville Road. To the northwest of the Site, the Abbotstown silt loam, Bowmansville Knauers silt loam, and the Mount Lucas silt loams are present in smaller isolated areas (United States Department of Agriculture [USDA] Web Soil Survey May 23, 2012).

A map of local bedrock geology prepared by the Pennsylvania Department of Conservation and Natural Resources (PA DCNR) for the Sassamansville Quadrangle is provided as **Figure 3**. This map indicates a diabase dike propagating across the area of the Site from the northwest to the southeast. The surrounding rock is identified as Brunswick Formation. However, geologic reports for the area have identified three main classifications of rock type for the area of the Site consisting of the Brunswick Formation, Diabase Intrusion, and Zone of Contact Metamorphism (hornfels). The area of the Site is predominantly located within the Zone of Contact Metamorphism to the east of the diabase intrusions. Several diabase dikes have been mapped to the north and south of the Site area.

Brunswick Formation

The Brunswick Formation is Triassic in age and consists of predominantly reddish-brown shale, mudstone, and siltstone. The general thickness of this formation varies from 9,000 feet in Bucks County, Pennsylvania, to approximately 16,000 feet near Pottstown, Pennsylvania. Minerals such as feldspar, illite, chlorite, quartz, and calcite comprise the major minerals found within the Brunswick Formation. Joints and fractures of this formation are typically filled with calcite, quartz, and occasionally barite and pyrite (Longwill, 1965 and Satterthwaite, 2002).

Diabase Intrusions

Diabase dikes and sills have intruded the Brunswick Formation in southeastern Pennsylvania. Diabase dikes and sills are typically aphanitic, dark in color, and dense. The primary mineral composition consists of nearly 95 percent labradorite and augite. Generally thicknesses of dikes in the area are very narrow ranging from 5 to 100 feet thick. Sills are upwards of 1,000 feet thick in zones and are differentiated from dikes due to their phaneritic texture. Sills share similar mineralogical compositions as the aforementioned dikes. Zones of Contact Metamorphism can be seen adjacent to these intrusions (Longwill, 1965).

Zone of Contact Metamorphism

During intrusion of the diabase dikes, the country rock (Brunswick Formation) was altered by Contact Metamorphism. Heat from these intrusions created hornfels that is dark in color and

much tougher than its parent rock. These hornfels range in color from purple to black gradationally with respect to duration and intensity of baking. Adjacent to smaller dikes, these zones could be as narrow as 40 to 100 feet wide. However, in the presence of larger sills these areas could extend up to a mile in width. Typically the rocks closer to the outer reaches of the altered zone have subtle evidence of metamorphism.

Permeability of the Brunswick Formation, Diabase, and Zone of Contact Metamorphism is generally low; therefore, the primary transmission is typically through secondary openings that were developed by external forces following the deposition of beds (i.e., fractures and joints). A small portion of these openings are fractures that are found parallel to bedding planes, however, the majority of groundwater transport occurs through vertically intersecting joints (Longwill, 1965).

2.4 Regional Hydrogeology

The local geology consists primarily of the sedimentary and metamorphic rocks shale and hornfels, respectively. These rocks are characterized by low transmissivity to the point that the primary movement of water is through secondary openings, such as joints and fractures. Overall, the Brunswick's joints and fractures are well developed, generally wells drilled within this formation yield between a few gallons per minute (gpm) to over 100 gpm.

Longwill (1965) analyzed 199 wells in Montgomery and Berks Counties. A general trend that was noted by Longwill was that the deeper wells are drilled, the more water they will typically generate. A total of 151 wells were drilled between 185 and 550 feet deep; of these wells, 115 generated yields of over 50 gpm. Whereas the 35 wells that where less than 185 feet deep generally produced less than 50 gpm. Two main reasons are thought to be the primary governing forces behind this trend. First, wells drilled to greater depths have a greater chance of intersecting more joint sets. Secondly, joints and fractures that are intersected in the shallower beds are more likely to be plugged with clays derived from weathering of the rock.

Shallow and deeper bedrock water levels and groundwater flow direction information for the area of the Site are provided in **Section 6.0** of this report.

3.0 HISTORICAL INFORMATION

A land use evaluation consisting of obtaining and reviewing historical aerial photographs, topographic maps, and an environmental database radius report was conducted for the Site area and surrounding land. The historical materials were obtained from Environmental Data Resources, Inc. (EDR) of Milford, Connecticut. EDR reported that no historical Sanborn® fire insurance maps are available for the area.

3.1 Historical Aerial Photographs

Historical aerial photographs were obtained for the area of the Site and surrounding lands to evaluate historical land use. The aerial photographs were available for years 1942, 1955, 1957, 1968, 1971, 1981, 1987, 1992, 1999, 2005, and 2008 at scales ranging between 1 inch equals 500 feet and 1 inch equal 1,000 feet. Copies of the historical aerial photographs and topographic maps are provided in **Appendix A**.

The evolution of the Good Oil Company property can be seen from the historical aerial photographs dating from 1942 to 2008. The 1942 photograph depicts the areas surrounding the area of the Site as farmland with a few sparse homes. The Good Oil Company property is not yet visible. By 1955 and 1957, several houses have sprung up in the fields adjacent to the area of the Site; however, the Good Oil Company property is not yet visible. In the 1968 photographs, the Good Oil Company property can be seen with two large ASTs. The Good Oil Company property has also been developed into what appears to be a large parking lot southwest and northwest of the tanks with a rectangular building located between the road and the tanks. The 1971 aerial photograph shows more homes in the area. The Good Oil Company property has not increased in size, but appears to be used more heavily. By 1981, the Good Oil Company property has added several large ASTs as well as an additional smaller rectangular building between the larger original building and the ASTs. Development has increased along both Layfield Road and Hoffmansville Road in the form of residential homes; however, the majority of the area still consists predominantly of farmland. The 1987 aerial photograph shows little change with the exception of additional storage of what appears to be pipe on the Good Oil Company property. By 1992, the Good Oil Company property appears to have increased land usage as the area north-northeast of the property shows additional storage and another access road. Between 1999 and 2005, another increase in land usage is noted in a clearing of trees to

the east of the Good Oil Company property; however, most of the area is unused. An additional building had been constructed north of the ASTs and is visible on the 2005 aerial photograph. By 2008, the additional area to the east in the clearing of trees is heavily used, as well as the remainder of the Good Oil Company property. One of the ASTs is no longer in place.

The agricultural and residential development seen in the historical photographs shows a steady increase over the years. The apartments, located at 324 through 326 Layfield Road, are visible from 1942 through 2008, and the property at the southwestern corner of Layfield Road and Hoffmansville Road is visible from 1942 through 2005. Other properties involved in this Project Investigation Report, including 318 Layfield Road, 322 Layfield Road, and 325 Layfield Road, are visible on the aerial photographs from at least the 1955 aerial photograph onward.

3.2 Historical Topographic Maps

Topographic maps were obtained for the Boyertown and Sassamansville Quadrangles for all available map years including 1902, 1943, 1957, 1968, 1973, 1990, and 1999.

Due to the scale of the 1902 historic topographic map for Boyertown, it only depicts very few developed properties along Layfield Road and Hoffmansville Road. The map does depict a long unimproved road running perpendicular to Layfield Road to the north of the area of the Site, most likely a driveway. By 1943, more development has occurred near the area of the Site with additional smaller roads being constructed to the north. Also from this date forward the topographic map information is from the Sassamansville Quadrangle.

The resolution of the 1957 map is slightly finer; however, less development is depicted. More wooded area is shown from the previous map; this could be due to the difference in resolution. By 1968, less wooded area can be seen as development increases along the roadways. The Good Oil Company property and the ASTs onsite are depicted this year as well. The 1973 map shows an increase in development and also shows the addition of buildings and ASTs on the Good Oil Company property. Little change is noted in the 1990 and 1999 maps.

3.3 Environmental Database Report

A radius report of state and federal database sites was obtained for the area of the Site and surrounding lands. Over 80 different federal, state, and local databases were searched for sites that could be potential sources of chlorinated organic compounds to the groundwater aquifer in the area. The individual databases and associated search distances are listed in the EDR report. Additional physical setting information including topography, shallow soil data, and nearby water and gas wells is also included with the report. A copy of the report is provided in **Appendix B**.

Only one site with incidences was identified in the radius report. The Good Oil Company located at 334 Layfield Road in Sassamansville, Pennstlvania, had both a LUST and a leaking aboveground storage tank. The facility currently has a status of interim remedial actions initiated or completed.

3.4 City Directory Abstract Search

An abstract search of the Cole Criss-Cross Directory for available city directory data was conducted. However, the first year that data were available for the requested properties specified below was 2008.

- 317 Layfield Road – currently records indicate this is a residential property
- 324 Layfield Road – currently records indicate this is a residential property
- 325 Layfield Road – currently records indicate this is a residential property
- 333 Layfield Road – no data return on property
- 334 Layfield Road – currently records indicate this property is used by Pbb Global Logistics, Inc.
- 354 Layfield Road – currently records indicate this property is used by Swann Costume Shop

The listing information for the available years is provided on Page 4 of the abstract search, which is provided in **Appendix C**. No new or significant information was obtained from the abstract search.

3.5 File Review of Gibraltar Rock Quarry Permit

Leidos conducted a file review of the Gibraltar Rock Quarry permit application at the Pottsville District Mining Office on January 24, 2012. Copies of selected portions of the application are provided in **Appendix D** of this report. The application was prepared by EarthRes Group (EarthRes) on behalf of Gibraltar Rock, Inc. The application included a large volume of documents including, among other things, geologic and hydrogeologic investigation reports prepared by Waltar B. Satterthwaite Associates, Inc. The reports included logs from exploratory borings and monitoring wells, maps, and geologic cross-sections.

The geologic report indicates that, across the quarry property lands, altered Brunswick Formation was encountered below 100 feet at borings conducted at southern portions of quarry property, beneath a thinning veneer of unaltered Brunswick at central portions of the quarry property, and consisted of all altered Brunswick at northern portions of quarry property. Cross-sections A-A’ and B-B’ of the report depict the interpreted subsurface geology at the quarry lands. A-A’ is southwest to northeast trending and is to the southeast of the area of the Site crossing over Hoffmansville Road. Several dikes were reported during quarry investigation drilling and several more were inferred on the cross-section. From boring log and cross-section review, it is evident that siltstone in the southwest areas of the nearby quarry property grades into increased degrees of baked siltstones and hornfels to the northeast. Similar observations were observed in wells installed by Leidos at the area of the Site. In cross-section B-B’ of the report, shallow weathered siltstone grades to a more baked siltstone or hornfels at depth.

Observation wells OW-6 and OW-4 were installed by Gibraltar Rock, Inc. on nearby quarry lands to the southeast of the Site to assess the effect that quarry-related pumping would have on local groundwater. OW-4 was drilled to a depth of 350 feet and described as being argillaceous siltstone with some zones of hornfels. OW-6 was drilled to a depth of 400 feet and was described as a siltstone grading to an argillite at depth.

In response to PADEP comments to the application, EarthRes indicates there is a lack of connection between the regional aquifer and surface water features and that considerable time (15-20 years) is predicted before the cone of depression resulting from quarry pumping will advance beyond the permit area. EarthRes also reports the existence of a perched water table

that is not connected to the deeper aquifer based on artesian conditions that occasionally occurred when drilling advanced below 100 feet below grade (fbg).

4.0 HOME WELL INVESTIGATION AND RELATED ACTIVITIES

The following sections provide available information on potable water wells within the Site area and surrounding areas, PADEP home/potable well sampling results, PADEP bottled water delivery and home water treatment system installation, and a water treatment system remedial alternative evaluation.

4.1 PADEP Potable Well Sampling Locations

Potable well samples have been collected at 43 different locations during the course of the project. PADEP has been conducting potable well sampling at residences in the vicinity of the Site since July 2011. The locations of potable wells that have been sampled by PADEP are as follows:

- 313, 314, 317, 318, 322, 325, 326, 333, 334, 345, 354, 358, and 361 Layfield Road
- 1954, 1968, 1980, 1999, 2015, 2019, 2024, 2029, 2035, 2104, 2143, 2146, 2153, 2173, 2181, 2189, and 2145 Hoffmansville Road
- 2145, 2245, and 2234 Big Road
- 2131, 2141, 2169, 2172, and 2303 Colflesh Road
- 327, 328, and 333 Erb Road
- Perkiomen Valley Academy
- Upper Frederick Elementary School

4.2 PADEP Potable Well Sampling Results

Potable well sampling was initiated at multiple residences, commercial properties, and institutions in the vicinity of the Site by PADEP in 2011 after the discovery of chlorinated organic compounds, as well as 1,4-dioxane, in the water supply at an apartment complex on Layfield Road. Sample results for selected chlorinated organic compounds for sampling efforts between 2011 and 2014 are provided in **Table 1**. Well sample analytical data sheets are retained by PADEP. **Figure 4** depicts the potable well sample results for the most recent samples collected at each location.

Measureable levels of TCE and other chlorinated organic contaminants, as well as 1,4-dioxane, have been detected in home wells at the area of the Site. Historically, the highest levels of contamination have been detected in the potable water samples collected at 318 Layfield Road and the home wells located adjacent and to the southwest of what is currently the Henkels and McCoy facility (formerly Good Oil Company property).

TCE has been detected above the MCL of 5 micrograms per liter (µg/L) in potable well samples collected at seven different properties. Cis-1,2-DCE has been detected above the MCL of 70 µg/L in potable well samples collected at four different properties. 1,1-DCE has been detected above the MCL of 7 µg/L in potable well samples collected at six different properties. VC has been detected above the MCL of 2 µg/L in potable well samples collected at four different properties. 1,2-DCA has been detected above the MCL of 5 µg/L in potable well samples collected at two different properties. 1,1-DCA has been detected above the MCL of 31 µg/L in potable well samples collected at four different properties. MTBE has been detected above the MCL of 20 µg/L in potable well samples collected at four different properties. Benzene has been detected above the MCL of 5 µg/L in potable well samples collected at two different properties. 1,4-DCB has been detected above the MCL of 75 µg/L in potable well samples collected at one property. 1,2-DCB has been detected above the MCL of 600 µg/L in one potable well sample at one property. PCP has been detected above the MCL of 1 µg/L in potable well samples collected at three different properties. 1,4-Dioxane has been detected above the MCL of 6 µg/L in potable well samples collected at seven different properties.

The highest concentrations of TCE (624 µg/L), cis-1,2-DCE (1,580 µg/L), 1,2-DCA (8.28 µg/L), MTBE (417 µg/L), benzene (16.9 µg/L), 1,4-DCB (101 µg/L), and 1,2-DCB (727 µg/L) have been detected in potable well samples collected at 318 Layfield Road. The highest concentrations of 1,1-DCE (322 µg/L), VC (99.8 µg/L), 1,2-DCA (8.28 µg/L), PCP (1.19 µg/L), and 1,4-dioxane (83.7 µg/L) have been detected in potable well samples collected at 322 Layfield Road.

4.3 Bottled Water Delivery

Upon receipt of initial project funding, Leidos began providing bottled water to affected residents within the area of the Site in December 2011. Bottled water has been routinely delivered by

Nature's Source, Inc. of Emmaus, Pennsylvania, on a biweekly basis to the properties identified below:

- 314 Layfield Road (single family home)
- 318 Layfield Road (single family home)
- 322 Layfield Road (single family home)
- 324 Layfield Road (apartment)
- 325 Layfield Road (single family home)
- 326 Layfield Road (apartment)
- 328 Layfield Road (apartment)
- 330 Layfield Road (apartment)
- 332 Layfield Road (apartment)
- 2024 Hoffmansville Road (single family home)
- 2029 Hoffmansville Road (single family home)
- 2143 Hoffmansville Road (single family home)
- 2146 Hoffmansville Road (single family home)

4.4 Water Treatment System Remedial Alternative Evaluation

Leidos performed an evaluation of potential treatment technologies for the removal of Site-related contaminants found in residential potable well water at properties within the area of the Site in June 2012. Viable treatment methods including granular activated carbon (GAC), air stripping, ultraviolet light/peroxide, and ultraviolet light/ozone were evaluated. The evaluation concluded that 1,4-dioxane and MTBE are limiting contaminants in groundwater at the Site that would require either ultraviolet light/peroxide or ultraviolet light/ozone treatment to effectively remove at their present levels. Unfortunately, these methods are not feasible on smaller scale residential treatment systems. A common water supply system that obtains its water from an uncontaminated source or one that treats the water using a larger, separately housed and maintained/operated treatment system is recommended. A copy of the Remedial Alternative Analysis prepared by Leidos and submitted to PADEP on June 13, 2012, is provided in **Appendix E**.

4.5 Installation of Home Water Treatment Systems

In response to exposure concerns identified in October 2012 during the evaluation of indoor air during showering at the residence at 318 Layfield Road (discussed in **Section 7.1**), whole house water treatment systems were installed in November 2012 at the following residences:

- 314 Layfield Road
- 318 Layfield Road
- 322 Layfield Road
- 324-332 Layfield Road (apartments)
- 325 Layfield Road

The systems were installed between November 12 and November 15, 2012. Leidos subcontracted S&G Water Conditioning, Inc. to size and install the carbon filter treatment systems. The systems at each single family residence include either two or three carbon vessels in series (depending on raw water contaminant levels), each containing two to three cubic feet of washed, virgin coconut shell activated carbon, a sediment prefilter, a totalizer meter, and sample ports at influent, midfluent, and effluent locations. The system serving the apartment property (324-332 Layfield Road) was sized for higher capacity/increased water volume needs to serve the multiple tenants and consists of three series, each consisting of two carbon vessels. All systems were installed after the pressure/holding tank and before any other existing treatment equipment. Routine water system sampling and treatment system maintenance has been provided by the PADEP through the present.

In December 2013, residents at the apartment property began to complain of foul odors coming from the water supply. Further investigation determined that iron bacteria naturally present in the raw well water, were colonizing in the water treatment system equipment. To resolve the issue, a high flow, ported twin alternating sanitizer conditioner unit with iron selective resin was installed following the treatment system equipment.

5.0 MONITORING WELL INSTALLATION

A total of nine deep bedrock monitoring wells and six shallow bedrock monitoring wells were drilled by Leidos between March 2012 and June 2014 (**Figure 2**). Following drilling of the deep well boreholes, subsequent work included the completion of borehole geophysics, straddle packer well sampling, and the installation of multiple nested well screens within the deep wells.

5.1 Deep and Shallow Well Installation

Deep Wells

Monitoring wells MW-1D, MW-2D, MW-3D, MW-4D, MW-5D, and MW-7D were installed in March and April 2012. MW-8D was installed in April 2013. Wells MW-9D and MW-10D were installed in May/June 2014. The monitoring wells were installed by Duane Moyer Well Drilling of Lehighton, Pennsylvania, using air rotary drilling techniques. Prior to the initiation of the field work, the Pennsylvania One Call System, Inc. was contacted within the required time period to request a utility mark-out at all proposed well locations. Attempts were also made to perform soft dig utility clearance using an air knife/soil vacuum unit to depths of five feet below grade (fbg) at the well locations on the Good Oil Company property to avoid potential or unmapped subsurface utilities. This was not possible beyond depths of 1 to 3 feet at most locations due to the large ballast emplaced to increase the grade at portions of the Good Oil Company property. Non-intrusive surface geophysical methods were then employed to locate/verify the absence of possible buried, unmapped utilities at well locations MW-1D, MW-2D, and MW-4D.

The monitoring wells were installed using a VersaDrill V-1040-DP air rotary drill rig. Wells were installed by first drilling with a 10-inch air hammer to the target outer steel casing depth (40 fbg). Once the target casing depth was reached, six-inch steel casing was installed by welding sections of 20-foot steel pipe together. Once the casing was emplaced, a Portland cement and bentonite grout mix was piped downhole via a tremie pipe to ensure the entire annulus was completely filled. Grout was allowed to cure overnight to ensure a sufficient seal. Drilling then continued down through the steel casing the following day using a smaller 6-inch air hammer. After the well was completed to the target depth, the well was developed by pumping water down the borehole (if necessary) and surging the drill stem for approximately 30 minutes. Large volumes of production water were encountered at MW-9D and MW-10D and less development work was required at those locations. As the drill rods were removed from the well, a pressure

washer was used to decontaminate all equipment before moving to the next well locations. Wells were completed flush-to-grade within a manhole and concrete pad. A locking compression cap and keyed lock was placed on each wellhead to prevent the entry of surface water and restrict access to the well in the event the manhole cover is removed.

During drilling, well production water was captured at the rear of the drill rig/wellhead within a large containment structure built by the driller out of hay bales and plastic sheeting. As the mixture of water and cuttings accumulated within the containment structure, the cuttings and silt settled out and the water was then pumped into a 1,000-gallon poly tank managed by the driller and offloaded into a 20,000 gallon portable frac tank staged at the Good Oil Company property for later characterization and disposal during the initial 2012 well installations. Well production water generated during the installation of MW-8D in 2013, and MW-9D and MW-10D in 2014 was pumped directly to a waiting 3,000-gallon vac truck. Drill cuttings were placed in 55-gallon drums and transported by Veolia Environmental Services (Veolia) to the Good Oil Company property staging area for later characterization and disposal. Additional information related to the generation and management/disposal of IDW is provided in **Section 5.7**.

Shallow Wells

Leidos installed six shallow bedrock monitoring wells (MW-1S, MW-2S, MW-3S, MW-5S, MW-6S, and MW-7S) between April 4 and 12, 2012. Similar utility clearance protocols to those followed during the installation of the deeper monitoring wells were followed.

A six-inch air hammer was used to drill to a depth of 30 fbg into the shallow bedrock. Once the borehole was completed, a two-inch polyvinyl chloride (PVC) well was constructed within the open borehole with a screened interval (0.010-inch slot) from 5 to 30 fbg. A sand pack was installed across the screened interval to between one and two feet above the top of the screen. Bentonite chips (3/8-inch) were then used to seal the remaining annulus of the borehole to within one to two feet of grade. The remainder of the borehole was then finished with concrete and a flush-mount metal manhole set in a concrete skirt to house the wellhead. A locking compression cap and keyed lock was placed on each wellhead to prevent the entry of surface water and restrict access to the well in the event the manhole cover is removed.

Monitoring well construction details are provided in **Table 2**. Monitoring well logs documenting well construction information, lithologies, water-bearing zones, photoionization detector (PID)

readings, and other observations recorded/noted during coring/drilling are provided in **Appendix F**.

5.2 Well Boring Interpretations

Drill cuttings were captured by the driller every five feet and provided to a Leidos geologist for logging. Cuttings of distinct and changing lithologies from each boring were also kept and archived in compartmentalized boxes for future inspection and evaluation. Monitoring well boring logs are provided in **Appendix F**. Geologic cross-sections were prepared for the Site from the monitoring well logs and are provided as **Figures 5** and **6**. Specific lithologic/geologic details for each well boring are provided below.

MW-1D and MW-1S

Siltstone was encountered at approximately four fbg, just below the overburden of clayey silt. Hornfels was then encountered at 40 fbg to a depth of 95 fbg. Diabase was then encountered from 95 fbg to the completion of the boring at 300 fbg. During drilling, the well did not produce any water. However, water did seep into the well over the next few days and eventually reached a static level of 8.4 feet below top of casing (btoc). MW-1S was drilled to 30 fbg and screened from 5 to 30 fbg. PID readings remained at zero parts per million (ppm) during drilling the wells.

MW-2D and MW-2S

A thin veneer of clayey silt approximately one foot thick overlaying weathered hornfels was found at the MW-2 well pair location. Bedrock became competent at approximately eight fbg. A narrow finger of diabase was encountered from 140 to 145 fbg which was interpreted as cross cutting through the surrounding hornfels. The diabase was again encountered at 255 fbg and extended to the completion of the boring at 300 fbg. Upon completion, the blown yield of the well was estimated at 3 gpm. Static water levels were recorded at approximately nine fbg. MW-2S was drilled to 30 fbg and screened from 5 to 30 fbg. PID readings remained at zero ppm during drilling the wells.

MW-3D and MW-3S

Clayey silt was present from three to eight fbg, underlain by a weathered siltstone. The siltstone became competent at 11 fbg. The siltstone exhibits several color changes to 65 fbg where

hornfels was encountered. The hornfels extends from 65 fbg to the completion of the boring at 250 fbg. Upon completion, the blown yield of the well was estimated at less than 0.5 gpm. Static water levels were recorded at approximately seven fbg. MW-3S was drilled to 30 fbg and screened from 5 to 30 fbg. PID readings remained at zero ppm during drilling the wells.

MW-4D

Monitoring well MW-4D was constructed without a paired shallow well because a preexisting shallow well was already present nearby. Silty clay was encountered from three fbg to a depth of six fbg. Underlying the silty clay was a weathered siltstone, which became competent at 11 fbg. Hornfels was encountered at 40 fbg and extended to a depth of 150 fbg. Diabase was encountered at 150 fbg and extended to the completion of the boring at 250 fbg. Upon completion, the blown yield of the well was estimated at 4 gpm. The static water level was recorded at approximately 14 fbg. A PID reading of 50 ppm was recorded during shallow soil utility clearance work. However, PID readings remained at zero ppm during drilling.

MW-5D and MW-5S

Clayey silt was present down to 7 fbg and was underlain by hornfels. The remainder of the borehole, which was completed to 250 fbg, consisted of hornfels. Upon completion, the blown yield of the well was estimated at 8 gpm. MW-5S was drilled to 30 fbg and screened from 5 to 30 fbg. Static water levels were recorded at approximately 15 fbg. PID readings remained at zero ppm during drilling of the wells.

MW-6S

Hornfels was encountered the entire length of the borehole, with bedrock becoming competent at 6.5 fbg. MW-6S was drilled to 30 fbg and screened from 5 to 30 fbg. The static water level was recorded at approximately 22 fbg. PID readings remained at zero ppm during drilling.

MW-7D and MW-7S

Weathered siltstone was encountered approximately six inches from the surface and became competent at five fbg. Hornfels was encountered at 10 fbg and was present throughout the remainder of the borehole to 250 fbg. Upon completion, the blown yield of the well was estimated at 4 gpm. MW-7S was drilled to 30 fbg and screened from 5 to 30 fbg. Static water levels were recorded at approximately three fbg. No PID measurements were recorded during drilling the wells.

MW-8D

Monitoring well MW-8D was constructed without a paired shallow well because a preexisting shallow well was already present nearby. Weathered hornfels was encountered at eight fbg and became competent at 10 fbg. The hornfels extended to 120 fbg where a diabase dike was encountered. The diabase extended to the completion of the boring to 250 fbg. Upon completion, the blown yield of the well was estimated at 0.5 gpm. The static water level was recorded at approximately 14 fbg. PID readings of up to 4.0 ppm were recorded in the shallow crushed stone and ballast above the hornfels.

MW-9D

Clay with organic-rich material was first encountered from ground surface to six fbg. Weathered siltstone was encountered at six fbg and became competent at seven fbg. Hornfels was encountered at 19 fbg and continued throughout the remainder of the borehole to 220 fbg. Upon completion, the blown yield of the well was estimated at 50 gpm. The static water level was recorded at approximately 16 fbg. PID readings remained at zero ppm during drilling.

MW-10D

Clay with organic-rich material was first encountered from ground surface to three fbg. Weathered siltstone was encountered at three fbg through five fbg. Hornfels was encountered at five fbg and continued throughout the remainder of the borehole to 207 fbg. Upon completion, the blown yield of the well was estimated at 60 gpm. The static water level was recorded at approximately 29 fbg. PID readings remained at zero ppm during drilling.

5.3 Site Survey

A well location survey was conducted on April 25, 2012, by Geotec, Inc. (Geotec) of Hollidaysburg, Pennsylvania, a Pennsylvania-licensed professional surveyor. The survey included the monitoring well locations of MW-1S, MW-1D, MW-2S, MW-2D, MW-3S, MW-3D, MW-4D, MW-5S, MW-5D, MW-6S, MW-7S, and MW-7D. Nearby planimetric features were also surveyed and later incorporated into existing Leidos geographic information system (GIS) datasets for the Site. The survey data also includes elevation/vertical data for all the new monitoring wells and is included in **Table 2**.

Additional surveying work was conducted on October 17, 2012, by Geotec. The work included surveying the newly installed nested well screens in the deep bedrock monitoring wells and OW-4 and OW-6. The Good Oil Company monitoring wells (MW-1, MW-2, MW-4, MW-6, MW-8, MW-9, MW-10, MW-12, MW-13, and MW-14) were also resurveyed.

A third survey effort was conducted by Geotec on August 2, 2013. The work included surveying the newly installed well MW-8D, and well screens in wells MW-3D and MW-8D.

A fourth survey effort was conducted by Geotec on July 9, 2014, following the installation of MW-9D and MW-10D.

5.4 Borehole Geophysics Completion

Following well installation, borehole geophysical surveys were conducted on each of the deep bedrock monitoring wells by Earth Data Northeast, Inc. of Exton, Pennsylvania. Copies of borehole geophysical data are provided in **Appendix G**. The geophysics work was performed for the purposes of obtaining detailed geologic and hydrogeologic data to be used to develop an understanding of the local, shallow geology and groundwater system. The information collected is also being used to evaluate potential migration pathways for contaminants and trending of the features toward a potential source(s).

A suite of borehole geophysical logs were run at the deep bedrock monitoring wells to obtain information related to character (porosity and permeability) and thickness of geologic units, location and strike and dip of fractures/joints and lithologic contacts, location of water producing and water receiving zones, and the direction and rate of vertical flow within the borehole. The specific instruments included caliper, gamma, normal resistivity, temperature, heat pulse flow, and acoustic televiewer.

5.5 Straddle Packer Well Sampling

Straddle packer groundwater sampling was conducted following the borehole geophysics logging. The utilization of straddle packer groundwater sampling at specific/isolated fracture zones within the deep bedrock monitoring wells was conducted to aid in the identification of fractures or water-bearing zones containing chlorinated organic impacts. Nested well screens

were later installed based on the information gathered from the straddle packer groundwater sampling.

5.5.1 Straddle Packer Well Sampling Methodology

Leidos provided and operated the equipment for the performance of the straddle packer sampling work. The groundwater sampling procedure submitted to PADEP in the June 5, 2012, *Straddle Packer Groundwater Sampling Work Scope* was followed for the straddle packer work performed. Straddle packer sampling was conducted between June 11 and 19, 2012, for MW-1D, MW-2D, MW-3D, MW-4D, MW-5D, and MW-7D, and between August 21 and 24, 2012, for OW-4D and OW-6D. Straddle packer sampling was conducted on April 24 and 25, 2013, for MW-8D, and between June 2 and 4, 2014, for MW-9D and MW-10D.

A dual packer system with 20 or 30-foot spacing between the two packers was utilized to isolate as many as five targeted fracture zones within each well. The packer system was connected and lowered into the wells with two-inch galvanized steel piping (20-foot lengths). The packer system was installed to the lowest target fracture zone first and raised to successively shallower target fracture zones. The packer system utilized three pressure transducers to monitor fluid pressures above, within, and below the center packer zone to ensure an effective seal has been achieved with the packers once inflated. The packers were inflated with inert nitrogen gas. Once the packer system was placed at the designated interval and inflated, Leidos technicians lowered a stainless steel, two-inch-diameter Grundfos submersible pump down the inside of the galvanized piping and into the central packer zone. The central packer zone and piping was then purged of stagnant water (minimum of two volumes) and the fluid pressures were monitored to ensure evacuation of the target fracture zone is occurring rather than leakage past the packer and borehole wall into the central packer zone.

During pumping, well purge water was monitored by Leidos technicians with a water quality meter for various water quality parameters. The parameters were recorded and evaluated every five minutes until stabilization occurred. Parameters included: turbidity (10 percent for values greater than 1 nephelometric turbidity unit [NTU]), dissolved oxygen (DO) (10 percent), specific conductance (3 percent), temperature (3 percent), pH (± 0.1 unit). The pumping rate was monitored at the discharge using a flow meter. Fluid pressures were also monitored during the purging and sampling process to ensure the target fracture zone was adequately isolated.

Once stabilization had occurred, water samples were collected from the discharge tubing for target analytes.

Once sampling was completed at the first and lowest target depth of a well, the pump was removed from the piping, the packers were deflated, and the packer system was raised to the next shallower target interval and the sampling process was repeated. The pump and tubing were not decontaminated between successive target fracture zones in the same well, but were decontaminated between well locations. Purging activities at each target fracture zone within a well adequately removed any residual contaminants from the previous zone.

Purge water generated during the packer sampling work was drummed at locations expected to contain higher concentrations of chlorinated organic compounds (MW-4D, MW-5D, MW-7D, MW-8D) and later removed from the Site and properly disposed at a permitted disposal facility. The drummed purge water was removed and properly disposed by Veolia under the existing waste profiles (further discussed in **Section 5.7**). Purge water generated at wells MW-1D, MW-2D, MW-3D, MW-9D, MW-10D, OW-4, and OW-6 was pumped through a 30-gallon GAC vessel containing new, virgin carbon and discharged to the ground surface at the well area.

5.5.2 Straddle Packer Well Sampling Work

Based upon the individual well characteristics as summarized in the May 22, 2012, *Memorandum – Hydrogeologic Zones of Interest*, the August 15, 2012, *Memorandum – Hydrogeologic Zones of Interest: OW-4 & OW-6*, the April 19, 2013, *Memorandum – Hydrogeologic Zones of Interest: MW-8D*, and an email correspondence between Leidos and PADEP in May 2014 for MW-9D and MW-10D, the following straddle packer strategy was implemented at each well:

- MW-1D straddle packer zones: 130-150 and 250-270 feet
- MW-2D straddle packer zones: 45-65, 100-120, 200-220, and 270-290 feet
- MW-3D straddle packer zones: 50-70, 85-105, 155-175, and 215-235 feet
- MW-4D straddle packer zones: 90-120, 190-220, and 220-250 feet
- MW-5D straddle packer zones: 55-75, 75-95, 140-160, 170-190 feet
- MW-7D straddle packer zones: 85-115, 125-155, 180-210, and 210-240 feet
- MW-8D straddle packer zones: 40-90, 90-120, 120-150, 150-180, and 180-250 feet

- OW-4 straddle packer zones: 45-75, 130-160, 185-215, 223-253, and 260-350 feet
- OW-6 straddle packer zones: 25-55, 80-110, 155-185, 225-255, and 275-400 feet
- MW-9D straddle packer zones: 0-83, 85-105, 135-155, 155-175, and 194-214 feet
- MW-10D straddle packer zones: 0-75, 99-119, 119-139, 150-170, and 171-205 feet

Appendix H includes the above-referenced memorandums and email correspondence. Details associated with the collection of the samples were recorded on well sample forms that include information such as sample identification, dates/times, addresses, sampler, sample depth, field indicator parameters, and other important information or observations. Sampling forms are provided in **Appendix I**.

5.5.3 Straddle Packer Well Sampling Results

Straddle packer groundwater samples were collected from MW-1D, MW-2D, MW-3D, MW-4D, MW-5D, MW-7D, MW-8D, MW-9D, MW-10D, OW-4, and OW-6. Samples were collected from the planned intervals within each well if the interval was able to sustain a sufficient yield indicating formation water was actually entering the straddle packer system. With the exception of the June 2014 work at MW-9D and MW-10D, the samples were handled by the PADEP and submitted to the PADEP Bureau of Laboratories (BOL) in Harrisburg, Pennsylvania, for analysis. The samples collected at MW-9D and MW-10D were analyzed under expedited turnaround time by Eurofins Lancaster Laboratories of Lancaster, Pennsylvania, under contract with PADEP. Straddle packer sample results are presented in **Table 3**.

TCE and 1,1-DCE were detected in samples from four wells at concentrations above the applicable MSCs of 5 µg/L and 7 µg/L, respectively. Cis-1,2-DCE, VC, and benzene were detected in samples from two wells at concentrations above the applicable MSCs of 70 µg/L, 2 µg/L, and 5 µg/L, respectively. 1,1-DCA, MTBE, 1,2-DCB, chlorobenzene, 1,2-DCP, and p-dichlorobenzene were detected in samples from one well at concentrations above the applicable MSCs of 31 µg/L, 20 µg/L, 600 µg/L, 100 µg/L, 5.0 µg/L, and 75 µg/L, respectively. The highest concentrations of TCE, cis-1,2-DCE, VC, 1,1-DCA, benzene, and 1,2-DCB were all detected in the 90- to 120-foot interval of MW-4D.

Listed below is a summary of target contaminants in each well with concentrations that exceeded the applicable medium-specific concentrations (MSCs):

- **MW-4D**: TCE (633 µg/L at 90-120 fbg, 405 µg/L at 190-220 fbg, and 502 µg/L at 220-250 fbg); cis-1,2-DCE (3,180 µg/L at 90-120 fbg, 2,530 µg/L at 190-220 fbg, and 2,880 µg/L at 220-250 fbg); 1,1-DCE (63.2 µg/L at 90-120 fbg, 52.6 µg/L at 190-220 fbg, and 58.7 µg/L at 220-250 fbg); VC (24.2 µg/L at 90-120 fbg, 18 µg/L at 190-220 fbg, and 20.3 µg/L at 220-250 fbg); 1,1-DCA (128 µg/L at 90-120 fbg, 108 µg/L at 190-220 fbg, and 116 µg/L at 220-250 fbg); MTBE (21.3 µg/L at 90-120 fbg); benzene (17.1 µg/L at 90-120 fbg, 13.5 µg/L at 190-220 fbg, and 14.6 µg/L at 220-250 fbg); 1,2-DCB (2,150 µg/L at 90-120 fbg, 1,080 µg/L at 190-220 fbg, and 1,280 µg/L at 220-250 fbg)
- **MW-5D**: TCE (40.2 µg/L at 55-75 fbg, 28.2 µg/L at 75-95 fbg, 42.2 µg/L at 140-160 fbg, and 8.2 µg/L at 170-190 fbg); 1,1-DCE (91 µg/L at 55-75 fbg, 83.2 µg/L at 75-95 fbg, 92.2 µg/L at 140-160 fbg, and 20.6 µg/L at 170-190 fbg)
- **MW-7D**: TCE (8 µg/L at 85-115 fbg, 32.4 µg/L at 180-210 fbg, and 14.4 µg/L at 210-240 fbg); 1,1-DCE (31.6 µg/L at 85-115 fbg, 126 µg/L at 180-210 fbg, and 97.3 µg/L at 210-240 fbg)
- **MW-8D**: TCE (390 µg/L at 40-90 fbg, 220 µg/L at 90-120 fbg, 140 µg/L at 120-150 fbg, and 96 µg/L at 180-250 fbg)

5.6 Nested Screen Installation

Leidos installed nested well screens at selected monitoring wells based upon the review of straddle packer sampling data combined with previous information including the monitoring well installation/drilling logs and the borehole geophysical logs. Leidos completed the installation of nested well screens in September 2012, June 2013, and June 2014, following the specifications and methodologies identified in the August 16, 2012, *Additional Site Characterization Work Scope.* Leidos' recommendations for nested well screen installation were provided in the August 16, 2012, *Additional Site Characterization Work Scope*, September 13, 2012, *Memorandum – Hydrogeologic Zones of Interest: OW-4 & OW-6*, the May 17, 2013, *Memorandum – Nested Screen Zones: MW-3D and MW-8D*, and an email correspondence between Leidos and PADEP in June 2014. The August 2012 work scope and aforementioned memorandums and email correspondence regarding the nested screen zones are provided in **Appendix J**. The final well screen intervals for each well are provided in **Table 2**. Additional well screen construction information is included on the monitoring well logs provided in **Appendix F**.

5.7 Management of Investigation Derived Waste

IDW consisting of well production water and drummed drill cuttings was generated during the monitoring well installation and straddle packer sampling activities conducted in 2012, 2013, and 2014. Containerized IDW was temporarily stored at the Good Oil Company property at 334 Layfield Road. All IDW was characterized, removed/transported, and properly disposed by Veolia under subcontract with Leidos.

Well production water was containerized at the individual wells sites and transferred to a 20,000-gallon mobile frac tank staged at the Good Oil Company property during the initial, large scale well installation work in 2012. In 2013 and 2014, well production water generated during well installation work at MW-8D, MW-9D, and MW-10D was pumped directly to a waiting 3,000-gallon vac truck and taken off-Site for disposal. All drill cuttings were drummed. A total of 140 drums of drill cuttings and 3,030 gallons of well production water were generated and managed during the drilling work performed in April 2012. An additional nine drums of purge water were generated during the straddle packer sampling work performed in June 2012. In 2013, approximately 800 gallons (4.27 tons) of water and 20 drums of cuttings were generated during the drilling of MW-8D. An additional six drums of water were later generated during subsequent straddle packer and routine groundwater sampling work. In 2014, approximately 3,000 gallons of water and 30 drums of cuttings were generated during the drilling of MW-9D and MW-10D in May 2014.

The IDW was transported and properly disposed under manifest at the Environmental Recovery Corporation facility in Lancaster, Pennsylvania. Copies of the disposal manifests are provided in **Appendix K**.

6.0 GROUNDWATER AND SURFACE WATER SAMPLING

Leidos performed routine groundwater sampling activities associated with the Site investigation between January 2012 and July 2014. Existing wells were sampled by Leidos in January 2012, October 2012, April 2013, October 2013, and July 2014. PADEP staff also conducted a round of groundwater sampling in May 2012. During the May and October 2013 sampling events, samples were also collected at select wells utilizing HydraSleeve™ samplers to evaluate the comparability of sample results between the different sampling methods.

6.1 Routine Monitoring Well Sampling Procedures

Routine monitoring well sampling was performed by Leidos in accordance with the low stress/low flow sampling methodologies specified in the August 2012 *Additional Site Characterization Work Scope*. Copies of the groundwater sampling forms for the groundwater sampling events are provided in **Appendix L**. Once collected, samples were handled by PADEP and submitted to the PADEP BOL in Harrisburg, Pennsylvania, for analyses including VOCs, semi-volatile organic compounds (SVOCs), 1,4-Dioxane, and metals. Samples collected during the July 2014 sampling event were submitted to Eurofins Lancaster Laboratory in Lancaster, Pennsylvania for expedited turnaround of results.

Access to wells at the Good Oil Company property was often difficult due to the presence of heavy machinery or other types of equipment or piled supplies directly over the wells. In addition, wells could not be located at times due to the buildup of surficial soil/gravel in the areas of a well by heavy equipment movement or storm water runoff.

6.2 PADEP May-June 2012 Monitoring Well Sampling Activities

PADEP staff performed a round of groundwater monitoring using submersible pumps in wells MW-1S, MW-2S, MW-2D, MW-3S, MW-3D, MW-4D, MW-5S, MW-5D MW-6S, MW-7S, MW-7D from May 15-17, 2012. MW-7D was sampled at depths of 50 fbg and 200 fbg. The samples were submitted to PADEP BOL for analysis of VOCs.

PADEP staff also performed groundwater monitoring using Passive Diffusion Bag (PDB) samplers at some wells. A PDB was used to collect a groundwater sample from MW-1D prior to

the installation of nested well screens at that well. It was installed on May 9, 2012 at 250 fbg and retrieved on May 30, 2012. A PDB sampler was installed in OW-6 at 200 fbg on May 9, 2012 and retrieved on May 30, 2012. A PDB sampler was installed in OW-4 at 200 fbg on May 30, 2012 and retrieved on June 19, 2012. Four PDB samplers were installed at depths of 80, 170, 210, 270 fbg in OW-5 on January 3, 2013 and retrieved on January 31, 2013. All PDB samples were submitted to PADEP BOL for VOC analysis.

6.3 Groundwater Gradients

The groundwater monitoring data collected during the sampling events are included in **Table 4**. Well construction details are provided in **Table 2**. **Figures 7** through **16** present groundwater contours for the different monitoring events. The shallow water table aquifer exists within the shallow bedrock at the Site. As a result, shallow bedrock and deep bedrock groundwater contour maps were prepared.

Groundwater sampling of the Good Oil Company wells was performed in January 2012. The groundwater flow direction in the shallow wells was to the southeast toward the unnamed tributary flowing through the Good Oil Company property at varying gradients that range from 0.033 ft/ft to 0.13 ft/ft (**Figure 7**).

In May 2012, PADEP performed a round of groundwater monitoring at the newly installed bedrock wells (MW-1S, MW-1D, MW-2S, MW-2D, MW-3S, MW-3D, MW-4D, MW-5S, MW-5D, MW-7S, MW-7D) and off-Site wells OW-4 and OW-6 at the Gibraltar Rock, Inc. property. The groundwater elevations were recorded in April 2012 by Leidos prior to the PADEP well sampling work in May. OW-4 and OW-6 were not gauged during the monitoring event. The groundwater gradient in the deep bedrock wells was to the southwest at a gradient of 0.04 ft/ft (**Figure 8**).

In October 2012, April 2013, October 2013, and July 2014 Leidos performed Site-wide groundwater monitoring events at all available wells. Gradients in the shallow bedrock aquifer ranged between 0.036 and 0.05 ft/ft and was consistently to the southwest and south at western portions of the Site (**Figures 9, 11, 13, 15**). Shallow bedrock groundwater gradients were a bit steeper at the eastern portions of the Site and were towards the southeast and east towards the unnamed tributary flowing through the Good Oil Company property. Gradients in the deep

bedrock aquifer ranged between 0.025 and 0.036 ft/ft and was consistently to the southwest (**Figures 10, 12, 14, 16**).

6.4 Groundwater Sample Analytical Results

Groundwater sample analytical results for all the groundwater monitoring events are presented in **Table 4** and on **Figures 7** through **16.** The groundwater monitoring data provided by BOL is maintained by PADEP and is not provided with this report. The Eurofins Lancaster Laboratories groundwater monitoring reports for the July 2014 event are provided in **Appendix M**. The following target contaminants were detected with concentrations that exceeded the applicable MSCs for Used, Residential aquifers during the routine low stress/low flow monitoring efforts:

- TCE was detected at concentrations exceeding the MSC of 5 µg/L in samples collected from MW-4D Upper, MW-4D Lower, MW-5D Lower, MW-7D Lower, MW-8D Upper, MW-8D Lower, MW-4, MW-6, MW-8, MW-12, and MW-13. The highest concentration of TCE was detected in MW-4D Upper at a concentration of 641 µg/L in October 2012.

- Cis-1,2-DCE was detected at concentrations exceeding the MSC of 70 µg/L in samples collected from MW-4D Upper, MW-4D Lower, MW-8D Upper, MW-8D Lower, MW-4, MW-8, and MW-14. The highest concentration of cis-1,2-DCE was detected in MW-4D Lower at a concentration of 2,770 µg/L in May 2013.

- 1,1-DCE was detected at concentrations exceeding the MSC of 7 µg/L in samples collected from MW-4D Upper, MW-4D Lower, MW-7D Lower, MW-8D Upper, MW-8D Lower, MW-4, MW-8, and MW-13. The highest concentration of 1,1-DCE was detected in MW-4 at a concentration of 1,660 µg/L in January 2012.

- VC was detected at concentrations exceeding the MSC of 2 µg/L in samples collected from MW-4D Upper, MW-4D Lower, MW-8D Upper, MW-8D Lower, MW-3, MW-4, MW-7, MW-8, MW-13, and MW-14. The highest concentration of VC was detected in MW-8 at a concentration of 69.7 µg/L in January 2012.

- 1,1,1-TCA was detected at concentrations exceeding the MSC of 200 µg/L in samples collected from MW-4 and MW-8. The highest concentration of 1,1,1-TCA was detected in MW-4 at a concentration of 2,000 µg/L in January 2012.

- 1,1-DCA was detected at concentrations exceeding the MSC of 31 µg/L in samples collected from MW-4D Upper, MW-4D Lower, MW-7D Lower, MW-8D Upper, MW-8D Lower, MW-4, and MW-8. The highest concentration of 1,1,-DCA was detected in MW-13 at a concentration of 289 µg/L in October 2012.

- 1,2-DCA was detected at concentrations exceeding the MSC of 5 µg/L in the samples collected from MW-14. The highest concentration of 1,2-DCA was recorded at 32.7 µg/L in January 2012.

- MTBE was detected at concentrations exceeding the MSC of 20 µg/L in samples collected from MW-4D Upper, MW-8, and MW-14. The highest concentration of MTBE was detected in MW-14 at a concentration of 8,210 µg/L in October 2012.

- Benzene was detected at concentrations exceeding the MSC of 5 µg/L in samples collected from MW-4D Upper, MW-4D Lower, MW-8D Upper, MW-8D Lower, MW-4, MW-6, MW-7, MW-8, and MW-14. The highest concentration of benzene was detected in MW-14 at a concentration of 469 µg/L in January 2012.

- 1,2-DCB was detected at concentrations exceeding the MSC of 600 µg/L in samples collected from MW-4D Upper, MW-4D Lower, MW-8D Upper, MW-4, and MW-8. The highest concentration of 1,2-DCB was detected in MW-8 at a concentration of 3,480 µg/L in October 2013.

- 1,4-DCB was detected at concentrations exceeding the MSC of 75 µg/L in samples collected from MW-4D Upper, MW-4D Lower, MW-8D Upper, MW-4, MW-6, MW-7, and MW-8. The highest concentration of 1,4-DCB was detected in MW-8 at a concentration of 460 µg/L in October 2013.

- 1,2,4-TMB and 1,3,5-TMB were detected at concentrations exceeding the MSC of 15 µg/L and 13 µg/L, respectively, in samples collected from MW-5, MW-6, and MW-7. The

highest concentration of 1,2,4-TMB was detected in MW-7 at a concentration of 208 µg/L in January 2012 and the highest concentration of 1,3,5-TMB was detected in MW-6 at a concentration of 20.6 µg/L in October 2012.

- Chlorobenzene was detected at concentrations exceeding the MSC of 100 µg/L in samples collected from MW-4D, MW-4D Upper, MW-4D Lower, MW-8D Upper, MW-4, MW-6, MW-7, MW-8, and MW-10. The highest concentration of chlorobenzene was detected in MW-7 at a concentration of 4,560 µg/L in January 2012.

- PCP was detected at concentrations exceeding the MSC of 1 µg/L in samples collected from MW-2S, MW-4D Upper, and MW-8. The highest concentration of PCP was detected in MW-4D Upper at a concentration of 5.01 µg/L in May 2013.

- Bis(2-ethylhexyl)phthalate was detected at concentrations exceeding the MSC of 6 µg/L in samples collected from MW-1S, MW-1D Upper, and MW-6. The highest concentration of bis(2-ethylhexyl)phthalate was detected in MW-1D Upper at a concentration of 7.84 µg/L in May 2013.

- 1,4-Dioxane was detected at concentrations exceeding the MSC of 6.4 µg/L in samples collected from MW-4D Upper, MW-4D Lower, MW-7D Lower, MW-8D Upper, MW-8D Lower, MW-4, MW-7, MW-8, MW-12, MW-13, and MW-14. The highest concentration of 1,4-dioxane was detected in MW-14 at a concentration of 481 µg/L in October 2012.

The highest concentrations of chlorinated organic compounds were detected in the Good Oil property LUST case wells MW-4, MW-8, MW-13 and MW-4 and PADEP HSCA wells MW-1S, MW- 4D Upper and Lower, and MW-8D Upper and Lower. These wells are all located at the Good Oil Company property.

6.5 HydraSleeve™ Sampling

PADEP requested the use of HydraSleeve™ samplers at a small group of monitoring wells during the April/May 2013 and October 2013 monitoring rounds to evaluate the comparability of sample results to conventional low stress/low flow sample method results. The same wells were also sampled following conventional low stress/low flow methodologies.

HydraSleeve™ sampling was conducted at wells MW-2D Upper, MW-4D Upper, MW-7S, MW-7D Lower, MW-13, and OW-6 Upper. These wells provided a variation in specific contaminants and contaminant concentrations for comparison. The HydraSleeve™ samples were collected from the wells immediately prior to performing the low stress/low flow sampling at each well. The samplers were installed at same pre-determined sample collection zones that the well pumps were set at for the low stress/low flow sampling in the selected wells. Sample results from both sampling techniques were then evaluated to determine the suitability of the HydraSleeve™ samplers for future use at the Site.

6.5.1 HydraSleeve™ Sampling Procedures

The HydraSleeve™ samplers were first assembled according to the manufacturer's instructions. The samplers were then slowly lowered into each well using calibrated tether cord to within the pre-determined sampling zones. Top and bottom weights were used with the samplers as recommended by the manufacturer depending upon the placement of the sampler in a particular well. The tether cord was then secured at the top of the well and the samplers were allowed to equilibrate within the well for a period of 24 hours. The samplers were then retrieved by slowly pulling them upwards and allowing them to fill with the groundwater within the target recovery zone. The groundwater recovered in the sampler was then transferred to the appropriate bottleware that had been provided by the PADEP.

6.5.2 HydraSleeve™ Sampling Results

During the April/May 2013 event, the plastic sleeve of the 4-liter HydraSleeve™ samplers ruptured during recovery in monitoring wells MW-2D Upper, MW-4D Upper, and MW-7D Lower resulting in a total loss of those samples. The rupturing of the samplers in MW-2D Upper and MW-4D Upper was attributed to scouring within the screened sections of the wells (the lower sections of the recovered sleeves were severely scoured). The HydraSleeve™ in MW-7D Lower was thought to have ruptured due to the sampler and attached weights becoming lodged in the well casing upon retrieval. The 4-liter samplers recovered from wells OW-6 Upper, MW-7S, and MW-13 had leaking pinholes upon recovery but were able to provide adequate sample volume.

As a result of the difficulties encountered during the April/May 2013 sampling event, one-liter Armored HydraSleeves™ were instead used in wells MW-2D Upper, MW-4D Upper, and MW-7D Lower during the October 2013 monitoring event. Three of the one-liter samplers were linked together to obtain adequate sample volume from each well. Samples were successfully obtained from all six wells using the HydraSleeve™ samplers during the October 2013 sampling event.

April/May 2013 Results

As discussed above, HydraSleeve™ samplers were only successfully retrieved from wells MW-7S, OW-6 Upper, and MW-13 during the April/May 2013 sampling event. The sample results are provided in **Table 4**.

In the HydraSleeve™ sample from MW-7S, PCP and bis(2-ethylhexyl)phthalate were both detected in exceedance of their respective MCLs, at 4.57 µg/L and 27.6 µg/L, respectively. These compounds were either not detected or detected at lower levels in the conventional low stress/low flow sample. 1,2-DCB was not detected in the HydraSleeve™ sample but was detected at trace levels in the conventional low stress/low flow sample.

The HydraSleeve™ sample results and the conventional low stress/low flow sample results for OW-6 Upper were nearly identical for most detected compounds. Similarly, the results from the two different sampling methodologies were nearly identical for the samples collected at MW-13.

October 2013 Results

The HydraSleeve™ samples collected at wells MW-2D Upper, MW-7S, OW-6 Upper, and MW-13 were very similar to the conventional low stress/low flow samples collected from those wells. The HydraSleeve™ samples collected at wells MW-4D Upper and MW-7D Lower were significantly dissimilar.

Most of the analytes detected in the MW-4D Upper HydraSleeve™ sample were significantly lower than the same analytes detected in the conventional low stress/low flow sample. In most instances, the detected values of compounds in the the HydraSleeve™ sample are typically half or less than the values of the regular samples. This is true for detections of TCE, cis-1,2-DCE, trans-1,2-DCE, 1,1-DCE, VC, 1,1,1-TCA, 1,1-DCA, 1,2-DCA, benzene, 1,2-DCB, 1,4-DCB, 1,2,4-TCB, chlorobenzene, 1,2-DCP, t-butyl alcohol, and 1,4-dioxane. Similarly, the

HydraSleeve™ sample collected at MW-7D Lower had lower concentrations of detected compounds or did not detect the compounds at all.

One plausible explanation for the difference in sample results at some of the wells may simply be the operation of the HydraSleeve™ sampler as it is recovered. If the valve at the top of the sampler was not to open immediately upon initiation of recovery of the sampler as it is supposed to, the collection of the sample into the sampler would more effectively occur at a higher interval within the well that is either less or more highly impacted. In general, it can be concluded from this exercise that the HydraSleeve™ samplers do produce very comparable results to those obtained from conventional low stress/low flow sampling methodologies.

6.6 PADEP Surface Water Sampling

PADEP performed surface water sampling of two unnamed tributaries within and to the south of the area of the Site in January and February 2012 and May 2013. The samples were collected and analyzed to determine if shallow groundwater impacts were discharging to surface water features in the area of the Site.

6.6.1 PADEP Surface Water Sampling Locations

Surface water sample locations for the 2012 and 2013 sampling events are presented on **Figures 17** and **18**, respectively. The easterly tributary originates near the northern Good Oil Company property boundary and flows to the south through the Good Oil Company property and the Gibraltar Rock Inc. property before merging with Swamp Creek. The westerly tributary originates to the west of the Good Oil Company property just north of Hoffmansville Road and flows to the south through agricultural lands before merging with Swamp Creek. Surface water samples were collected at numerous locations along both tributaries as depicted on the figures. Surface water sampling at the western tributary was limited in 2012 due to property access restrictions at that time.

6.6.2 PADEP Surface Water Sampling Results

The surface water samples were analyzed by the PADEP BOL for VOCs in January 2012 and for VOCs, 1,4-dioxane, and SVOCs in February 2012 and May 2013. Compounds detected in

the surface water samples are presented in **Table 5**. The compound concentrations were compared to the Human Health Criteria of the Water Quality Criteria for Toxic Substances table (Table 5) presented in Chapter 93 Section 8c of the Pennsylvania Code.

In 2012 surface water samples, TCE and VC were detected at concentrations exceeding the specified criteria in sample Hoff SW-3 from the eastern tributary within the Good Oil Company property. Bis(2-ethylhexyl)phthalate was detected at a concentration exceeding the specified criteria in sample Hoff SW-2.

In 2013 surface water samples, Benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, bis(2-ethylhexyl)phthalate, chrysene, cis-1,2-DCE, TCE, and VC were detected at concentrations exceeding the specified criteria in sample Hoff SW-B13 from the eastern tributary within the Good Oil Company property. Benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, bis(2-ethylhexyl)phthalate, and chrysene were detected at concentrations exceeding the specified criteria in sample Hoff SW-C13 from the eastern tributary within the Good Oil Company Property. Bis(2-ethylhexyl)phthalate was detected at concentrations exceeding the specified criteria in samples Hoff SW-D13, Hoff SW-E13, and Hoff SW-F13.

No target compounds were detected in the surface water samples collected from the western tributary to Swamp Creek. 1,4-dioxane was not detected in any of the surface water samples.

7.0 VAPOR INTRUSION INVESTIGATION

The soil vapor intrusion study was initiated in late October 2012 at the 318 Layfield Road residence. In response to high contaminant concentrations in raw water at that location, shower vapor samples were collected and evaluated. Elevated contaminant concentrations were detected and resulted in the expeditious installation of carbon treatment systems at the homes located at 314 Layfield Road, 318 Layfield Road, 322 Layfield Road, 324-332 Layfield Road, and 325 Layfield Road to eradicate the inhalation exposures during and after showering. The systems were installed in November 2012.

Additional soil vapor intrusion study activities including home inspection/planning visits, the installation and sampling of basement sub-slab probes, and indoor air sampling was conducted at the homes located at 318 Layfield Road, 322 Layfield Road, and 324-332 Layfield Road throughout 2013 and 2014. Those activities were performed in accordance with the vapor intrusion study work scope presented in the August 2012 *Additional Site Characterization Work Scope*.

7.1 Shower Vapor Monitoring – 318 Layfield Road

Monitoring of indoor air to evaluate potential exposure during showering was performed at 318 Layfield Road on October 31, 2012. The work was performed in response to concerns by the Montgomery County Department of Health and the Agency for Toxic Substances and Disease Registry based on the concentrations of VOCs in the potable well water at that location.

Air samples were collected using 6-liter passivated Summa canisters provided by the laboratory. Two air samples (318 Layfield-House Pre and 318 Layfield Shower Pre) were collected immediately prior to the actual shower air samples to evaluate background home indoor air conditions. Then a shower air sample (318 Layfield Shower) and duplicate sample (Duplicate) were collected of the air within the shower enclosure while it was operating at typical shower water temperature. Once the shower air sample was stopped, a post shower sample (318 Layfield-Bathroom Post) was collected. All indoor air samples were collected over a duration of 15 to 20 minutes. An outdoor ambient sample (Ambient) was also collected throughout the duration of the indoor air sampling work. Copies of the indoor air sampling forms used to record all information during the sampling process are provided in **Appendix N**.

The air samples were analyzed for VOCs by USEPA Method TO-15. The laboratory analytical results of the shower vapor monitoring work are provided in **Table 6**. Copies of the laboratory analytical reports are provided in **Appendix O**. Numerous VOCs, primarily chlorinated organic compounds, were detected in the pre, during, and post air shower samples at concentrations above the USEPA Region 3 Regional Screening Levels for Resident Air (May 2014). The shower air samples had significantly elevated concentrations of the VOCs compared to the pre samples. Post samples also contained elevated concentrations of the contaminants relative to the pre samples. To mitigate the exposure risk, a whole house water treatment system was immediately installed at the residence.

7.2 Home Inspection/Planning Visits and Sub-Slab Probe Installation

Leidos personnel visited the homes at 318 Layfield Road, 322 Layfield Road, and 324-332 Layfield Road between October and December 2012 to perform inspections of the homes, interview residents, and plan for future vapor intrusion work. Copies of the home survey/inspection forms are provided in **Appendix P**.

Sub-slab soil gas probes were installed in the basements of the three residences at locations determined during the home inspection and planning visits. **Figure 19** depicts the basement layouts for each residence and the locations of the sub-slab soil gas probes. Based on the size of the basements, two sub-slab probes were installed in each basement. Pre-fabricated sub-slab probe devices were obtained from AMS, Inc. and consist of stainless steel vapor implants that have 3-inch long screens and are 0.57-inches in diameter. The probes were installed by the methodologies specified in the August 2012 *Additional Site Characterization Work Scope*.

7.3 Basement Sub-Slab Soil Gas Monitoring

7.3.1 Sub-Slab Sampling Procedures

Upon arrival at the homes, Leidos technicians first checked the probes for the presence of water. If the water level was three inches or less below the bottom of the slab, sampling was not performed based upon prior unsuccessful experience and the likelihood that water would be drawn up through the probe and into the sampling equipment.

If the water level was greater than three inches below the bottom of the slab or if no water was present at all, sampling was performed. Before initiating the sampling process, the probes were purged of three to five volumes of air using a variable flow electric vacuum pump or simple hand pump to remove the stagnant air from within the device. After purging was completed, the soil gas samples were collected using laboratory-provided, evacuated, 6-liter stainless steel Summa® canisters connected to the sample devices via dedicated disposable Teflon®-lined plastic tubing. Each sample was collected as a grab sample over a 60-minute period at a rate of less than 200 milliliters per minute (mL/min) using laboratory calibrated flow controllers. The potential for leakage of atmospheric air or background contaminants into the sample was addressed by using helium as a tracer gas. Helium gas was discharged into a plastic enclosure placed over the sampling apparatus and associated sample tubing. Helium concentrations within the enclosure were then monitored during sample collection using a gas leak detector capable of detecting helium at various concentrations.

Details associated with the collection of samples were recorded on Soil Gas Sampling Forms provided in **Appendix N**. Quality assurance samples collected during each sampling event included one upwind ambient air sample and one duplicate sample. The Summa® canisters and a completed chain-of-custody forms were submitted to Eurofins Lancaster Laboratories in Lancaster, Pennsylvania for analysis. The samples were analyzed for VOCs via USEPA Method TO-15 and helium as a tracer via modified Method 3C.

7.3.2 Sub-Slab Sampling Results

Sampling of the sub-slab soil gas probes in the basements of the three residences was attempted numerous times throughout 2013 and 2014 and often unable to be accomplished due to the presence of shallow groundwater just beneath the basement floor slabs of the homes (water in the sub-slab probes). At all three locations, typically only one of the probes could be sampled during a sampling event.

The analytical results for the sub-slab soil gas sampling events are summarized in **Table 7**. The laboratory analytical reports are provided in **Appendix O**. Results were screened against the USEPA Region 3 Regional Screening Levels for Resident Air (May 2014) divided by an attenuation factor of 0.026 for sub-slab soil gas screening.

Compounds detected above the screening criteria at 318 Layfield Road included chloroform and naphthalene. Compounds detected above the screening criteria at 322 Layfield Road included 1,2-dibromoethane, 1,4-dichlorobenzene, ethylbenzene, and naphthalene. Compounds detected above the screening criteria at 324-332 Layfield Road included 1,1,2,2-tetrachloroethane, 1,4-dichlorobenzene, and naphthalene.

Numerous chlorinated organic and petroleum hydrocarbon VOCs were detected in the ambient air samples indicating the escape of soil gas to the atmosphere. Heavy truck traffic along the nearby Layfield Road is also a likely source of petroleum hydrocarbon VOCs in the ambient samples. The ambient sample results were not screened against the soil gas criteria since an attenuation factor for soil gas below a concrete slab to indoor air is in use.

Helium was not detected in any of the sub-slab soil gas samples indicating cross contamination by ambient air did not occur during the sampling activities.

7.4 Basement Sump Sampling

In October 2013, PADEP representatives collected water samples from the sump pits in the basements of 322 Layfield Road and 324-332 Layfield Road. The residence at 318 Layfield Road does not have a sump pit and instead has floor drains that drain to the front yard of the property. The sump water samples were collected on October 3, 2013 at 324-332 Layfield Road and on October 10, 2013 at 322 Layfield Road. The samples were submitted to the PADEP BOL for analysis of VOCs. The sample results are presented in **Table 8**. No VOCs were detected in the sample collected from the sump at 322 Layfield Road. Various VOCs including MTBE, naphthalene, vinyl chloride, 1,4-dichlorobenzene, cis-1,2-dichloroethene, 1,2-dichlorobenzene, 1,1-dichloroethane, 1,1-dichloroethene, trichloroethylene and chlorobenzene were detected at low levels below 5 µg/L in the sump sample from 324-332 Layfield Road.

7.5 Basement Indoor Air Monitoring

As a result of the complications frequently encountered during sub-slab sampling attempts and the results of the sump water sample collected in the basement of 324-332 Layfield Road, PADEP decided to implement indoor air sampling at the three study residences (318 Layfield

Road, 322 Layfield Road, and 324-332 Layfield Road) in early 2014. Indoor air sampling events were conducted at both 318 Layfield Road and 324-332 Layfield Road in January and April 2014. Indoor air sampling work was not performed at 322 Layfield Road during either sampling event due to strong heating oil odors in the basement and upper floor of the residence due to an aged and rusting (but not leaking) heating oil UST in the basement of the residence that had just been filled prior to the pre-sampling visit in January 2014.

7.5.1 Indoor Air Quality Sampling Procedures

Each residence was visited by Leidos technicians at least 2 days prior to the indoor air sampling work to remove any potential background sources of VOCs from the basements. A high-resolution PID capable of measuring VOCs in parts per billion (ppb) was used to scan for products emitting VOCs.

Indoor air, duplicate, and outdoor ambient air samples were collected in laboratory-provided evacuated six-liter Summa® canisters provided by the laboratory. The canisters were fitted with a vacuum gauge and a dedicated flow control device calibrated to collect a continuous sample over approximately 24 hours. In the basements, the canisters were placed at a height within the typical breathing zone and away from doors, windows, furnaces, or other features that might cause increased air movement and bias sample results.

Vacuum measurements from the Summa® canisters were documented before and after sample collection along with interior and exterior air temperatures, wind direction, sampling times, etc. Details associated with the collection of samples were recorded on Indoor Air Sampling Forms provided in **Appendix N**. The indoor air samples were submitted to Eurofins Lancaster Laboratories for analysis of VOCs by USEPA Method TO-15.

7.5.2 Indoor Air Quality Sampling Results

The analytical results for the indoor air sampling events are summarized in **Table 6**. The laboratory analytical reports are provided in **Appendix O**. Results were screened against the USEPA Region 3 Regional Screening Levels for Resident Air (May 2014).

Compounds detected in basement indoor air above the screening criteria at 318 Layfield Road included benzene and ethylbenzene. Compounds detected above the screening criteria at

324-332 Layfield Road included 1,2,4-trichlorobenzene, 1,4-dichlorobenzene, benzene, ethylbenzene, naphthalene, TCE, and VC.

In general, the ambient samples contained similar compounds as the indoor air samples, but usually at lower concentrations. This is a strong indicator that those compounds are present in indoor as the result of soil vapor intrusion and not a result of background sources.

7.6 PADOH Letter Health Consultation

At the request of PADEP, the Pennsylvania Department of Health (PADOH), Division of Environmental Health Epidemiology, in collaboration with the Agency for Toxic Substances and Disease Registry (ATSDR), reviewed the vapor intrusion data for the Site and prepared a letter health consultation (LHC) for risks related to the exposure of Site-related contaminants in indoor air at the three residences included in the vapor intrusion study. The LHC concluded that exposure to the levels of chemicals detected do not pose apparent health hazards at the three residences at this time. PADOH does not recommend further vapor intrusion sampling work. A copy of the PADOH LHC is provided in **Appendix Q**.

8.0 SITE CONCEPTUAL MODEL

8.1 Site Geology and Hydrogeology

8.1.1 Geology

A review of geologic reports for the general area presented in **Section 2.3** identified three main classifications of rock type consisting of the Brunswick Formation, Diabase Intrusion, and Zone of Contact Metamorphism (hornfels). Monitoring wells drilled as part of the Site investigation within the Site area primarily encountered hornfels as well as diabase as discussed in **Section 5.2** and presented on the geologic cross sections (**Figures 5** and **6)**.

Figure 5 is a cross section that traverses the northern area of the Site from northwest to southeast beginning near MW-5D and extending to MW-3D (A-A'). The subsurface geology of the cross section is characterized by a thin layer of clayey silt up to approximately eight feet in thickness overlying shallow bedrock consisting of hornfels. Diabase was encountered below the Hornfels at wells MW-2D and MW-8D and not at the ground surface as indicated by the PA DCNR Topogeo Sassamansville Quadrangle (**Figure 3**). Additionally, MW-3D did not encounter diabase by its completion depth of 250 fbg. Diabase was not encountered immediately in the subsurface at any location drilled at the Site.

Figure 6 is a cross section that traverses the area of the Site from northeast to southwest beginning near MW-9D and extending to MW-1D (B-B'). The subsurface geology of the cross section is characterized primarily by a layer of siltstone overlying hornfels within the majority of the cross section. Diabase was encountered at depth at MW-1D and MW-2D. Diabase was not encountered at MW-7D or MW-9D.

The diabase intrusion was encountered at 95-300 fbg at MW-1D, 140-145 fbg and 255-300 fbg at MW-2D, 150-250 fbg at MW-4D, and 120-250 fbg at MW-8D. These well locations are all at the Good Oil property. Wells MW-3D, MW-5D, and MW-7D surround the diabase intrusion and encountered hornfels to the depth of completion.

Review of the acoustic televiewer logs indicates that bedding planes orientations in the deep bedrock wells are variable across the Site. The bedding planes strike NE-SW in wells MW-1D,

MW-8D, MW-10D, OW-4 and OW-6 at dip angles between 40 and 70 degrees to the SE. The bedding orientation in wells MW-3D and MW-5D is highly variable between NW/N/NE-SE/S/SW and most commonly dips to the W and SW at angles between 20 and 40 degrees. Bedding orientation in wells MW-2D, MW-4D, MW-7D, and MW-9D is orientated NW-SE and dipping to the SW at angles of 20 to 40 degrees.

Fracture strike and dip information obtained from the acoustic televiewer logs indicates the primary fracture/joint orientation within the deep bedrock wells is NE/SW and dipping to the SE at angles between 40 and 80 degrees. The primary fracture orientation at MW-9 is noticeably different as the primary fracture strike orientation is NW-SE at dip angles between 10 and 50 degrees to the SW. Secondary fracture/joint orientations of NW-SE, N-S, and NNE-SSW also occur in some of the wells most commonly dipping to the SE or NW. Wells MW-4D and MW-8D are within what is assumed to be the footprint of the source area at the Good Oil property based on high contaminant concentrations within upper and lower well screens. The strike of fractures within these wells is predominantly NE-SW with few secondary fractures/joint sets.

Monitoring wells MW-9D and MW-10D, located farther to the southwest and further from the diabase intrusion, were heavily fractured, and produced large amounts of water during drilling. Borehole video logs were completed at wells MW-9D and MW-10D and a high degree of fracturing was observed.

8.1.2 Hydrogeology

As discussed in **Section 2.3**, the bedrock underlying the Site are characterized by low transmissivity and therefore groundwater flow is assumed to occur primarily through secondary openings, such as joints and fractures. As discussed above, the predominant fracture/joint strike direction in Site wells is NE/SW and dipping to the SE. Groundwater flow directions/ gradients depicted on the deep bedrock groundwater elevation maps (**Figures 8, 10, 12, 14 16**) are to the SW indicating that the primary mechanism of bedrock aquifer flow is through fractures.

During drilling, little groundwater was encountered in/produced from the deep bedrock wells located at the Good Oil property. None of the wells produced more than 8 gpm during drilling. Few significant fractures were identified in these wells during drilling. Conversely, wells MW-9D

and MW-10D located farther to the south and southwest produced between 50 and 60 gpm of groundwater by depths of 220 fbg during drilling.

Heat pulse flow data for all the wells was collected during the borehole geophysics work (**Appendix G**) and indicated there was very little vertical water movement (no inflow or outflow fractures/zones) in the deep bedrock wells at the Good Oil Company property within or in very close proximity to the diabase intrusion (MW-1D, MW-2D, MW-3D, MW-4D, MW-8D). Upward flow was detected in well MW-5D located farther to the west and wells MW-7D, OW-4, and OW-6 located to the south. Wells MW-7D and OW-6 are frequently artesian. Well MW-9D located farther to the southwest had zones of both upward and downward flow within the borehole (multiple inflow and outflow zones) and MW-10D displayed downward flow within the upper 100 feet of the borehole.

8.2 3D Contaminant Distribution Model

Leidos utilized EarthVision ® (version 8.1) by Dynamic Graphics®, Inc. to construct a three-dimensional (3D) hydrostratigraphic computer model of the Site to provide an enhanced conceptual understanding of the Site subsurface geology and contaminant distribution. The model was constructed and calibrated using input from Site data including:

- Well boring logs,
- Geophysical logs,
- Straddle packer groundwater sample results,
- Home potable well sample results,
- Monitoring well sample results,
- Survey data,
- Light Detection and Ranging (LIDAR) topographic data,
- Site groundwater elevations,
- Geologic and hydrogeologic reports from the adjacent quarry property, and
- Publically available geologic/hydrogeologic reports, maps, and publications.

EarthVision ® is used to create 3D structural models and to estimate spatial variation in various properties such as contaminant concentrations. EarthVision ® does not simulate groundwater flow, contaminant transport, or contaminant degradation. Instead EarthVision ® utilizes spatial

data to contour and estimate parameters in 3D. Therefore, the model created by Leidos, represents static conditions based upon available input data and professional judgment and does not simulate or predict contaminant flow, fate, and transport.

8.2.1 Model Construction

The first phase of the model construction was to assemble the hydrogeologic framework of the site. This entailed assembling available geologic information into a series of input files consisting of geographic coordinates and elevations. Leidos utilized the Pennsylvania State Plane coordinate system Zone 3702 in feet with reference to the North American Datum of 1983 (NAD83) and North American Vertical Datum of 1988 (NAVD88) for the model. The upper surface of the model was defined by the site topographic surface and was derived from LIDAR data and Site survey data. Site lithology was defined by four zones: overburden, siltstone/argillite, hornfels, and diabase. The surfaces of the zones were defined by lithologic data from well logs, quarry reports, and available geologic maps and reports. Lithologic depths were converted to elevations and the data was contoured to produce surface elevation grids. The grids were then stacked and assembled into a 3D structural model. Model results were then adjusted and modified to reduce extrapolation errors at the model boundaries, areas of sparse data and areas with closely spaced but varying data.

The second phase of model construction was to contour the 3D distribution of four Site contaminants, including: TCE, 1,2-dichlorobenzene, 1,4-dioxane, and MTBE. Data for the contaminants were derived from monitoring well sampling, home well sampling, straddle packer sampling, and stream sampling. For each set of input data, the most recent sampling data was utilized. However, since the sample data was collected over a range of time, the model is based on data from different sampling events and time-periods. Model results were then adjusted and modified to reduce extrapolation errors at the model boundaries, areas of sparse data and areas with closely spaced but varying data.

Appendix R presents a series of images from the model. The first 25 images display the Site wells, lithologic layers, aerial photos, and 3D structural model. These images present the general process of generating the structural model. The next 39 images present the 3D contaminant distribution for TCE, 1,2-dichlorobenzene, 1,4-dioxane, and MTBE. The last 8 images present the contaminant distribution projected onto a 2D surface. Also included are the

cross-section lines for section A and B. Images are provided for contaminant distribution along the cross section lines.

8.2.2 Model Results

Model results indicate TCE concentrations are highest near MW-4D and 318 Layfield Road. Results also indicate that TCE is transported downward from the source area towards MW-7D. The area with TCE concentrations estimated to be greater than the MCL of 5 ppb extends from the Good Oil Property across Layfield Road and west of the intersection of Layfield Road and Hoffmansville Road.

The MCL for 1,2-dichlorobenzene is 600 ppb. Model results indicate the area with 1,2-dichlorobenzene concentrations greater than the MCL is primarily confined to the Good Oil Property, but also extends across Layfield Road near the 318 Layfield Road property. Similar to the TCE concentrations, 1,2-dichlorobenzene is estimated to be transported downward from the source area towards MW-7D.

The MCL for 1,4-dioxane is 6.4 ppb. Model results indicate the area with 1,4-dioxane concentrations greater than the MCL the extends from the Good Oil Property across Layfield Road and to the west of the intersection of Layfield Road and Hoffmansville Road. Similar to the TCE concentrations, 1,4-dioxane is estimated to be transported downward from the source area towards MW-7D.

The MCL for MTBE is 20 ppb. Model results indicate the area with MTBE concentrations greater than the MCL extends from the Good Oil Property (MW-14) southwest across Layfield Road and to the south near MW-7D. The MTBE plume is estimated to migrate downwards towards MW-7D, but the plume (above 20 ppb) stops prior to reaching MW-7D.

8.2.3 Model Limitations

The 3D model is based on available site data and represents a simplification of a complex natural system. The spatial and temporal distribution of data introduces uncertainty into the model. In addition, the variation in lithologic logging between the input data sources also introduces uncertainty into the model. Due to the complex Site hydrogeology and uncertainties

inherent with the input data, Leidos utilized professional judgment to shape and control the model predictions and depiction of the subsurface and contaminant distribution. The model is intended to provide a general representation of the subsurface in order to guide further investigation and/or characterization activities. The model is not intended to be an exact representation of contaminant distribution or Site geology. Instead the model represents one potential simplistic representation of estimated Site conditions.

8.3 Contaminant Fate and Transport

Leidos prepared contaminant fate and transport projections for TCE, 1,2-DCB, 1,4-dioxane, and MTBE to estimate the spatially and temporal change in contaminant concentrations. Leidos utilized USEPA BIOCHLOR version 2.2 to simulate TCE solute transport both with and without decay (biotransformation from TCE to DCE to VC to Ethane). MTBE, 1,4-dioxane, and 1,2-DCB fate and transport projections were made using the PADEP Quick Domenico spreadsheet version 3b.

8.3.1 TCE Fate and Transport Modeling

The following input parameters were used in the BIOCHLOR model:

- Type of Chlorinated Solvent: Ethenes
- Hydraulic Conductivity: 0.000021 cm/s (0.06 ft/day) (Taken from GRI Groundwater Pumping Evaluation Report (2003) page 5)
- Hydraulic Gradient: 0.069 ft/ft (MW-4D Upper to MW-9D Upper. 59.12 ft over 850 ft
- Effective Porosity: 0.1
- Ax: 40 ft (10% of plume length from MW-13 to point near MW-7D)
- Ay:Ax: 0.1 (default value)
- Az:Ax: 0.05 (default value)
- Soil Bulk Density: 1.7 (default/assumed value)
- Fraction Organic Carbon: 0.001 (estimated value)
- Partition Coefficient: (default values)
    - PCE: 426 L/kg
    - TCE: 130 L/kg
    - DCE: 125 L/kg
    - VC: 30 L/kg

  - o Ethene: 302 L/kg
- Lambda (default)
  - o PCE->TCE: 0.077/yr
  - o TCE->DCE: 0.053/yr
  - o DCE->VC: 0.231/yr
  - o VC->Ethene: 0.139/yr
- Half Life (conservative estimates)
  - o PCE->TCE: 9.0 yrs
  - o TCE->DCE: 13 yrs
  - o DCE->VC: 3 yrs
  - o VC->Ethene: 5 yrs
- Simulation Time: 10 to 100 years
- Modeled Area Width: 1500 ft
- Modeled Area Length: 1500 ft
- Zone 1 Length: 1500 ft
- Zone 2 Length: 0 ft
- Type: Decaying Spatially-Varying
- Source Thickness in Sat Zone: 30 ft
- Width Y1, Y2, Y3: 440 ft, 770 ft, 1240 ft
- Concentration and k_s:

Conc. (mg/L)*	**C1**	**C2**	**C3**	**ks (1/yr)**
PCE	0	0	0	0.000572
TCE	450	100	5	0.000572
DCE	2700	200	60	0.000572
VC	25	10	0	0.000572
ETH	0	0	0	0.000572

- Field Data Sources: MW-7D, MW-9D, OW-6, 2104 Hoffmansville Road, 314 Layfield Road, and 2035 Hoffmansville Road.

Results were plotted on graphs (**Appendix S**) to show the variation in concentration with distance for simulation times ranging from 10 to 100 years. Results indicate that if biodegradation occurs, it will lead to a significant reduction in TCE and DCE concentrations. However biodegradation will also lead to the production of VC and ethene. VC concentrations are estimated to be greater than 450 ppb at a distance of 150 ft after 50 years. If no

biodegradation occurs, VC and ethene concentrations will remain low, while TCE and DCE concentration slowly increase with increasing distance over time.

Site data are significantly lowered than the modeled data assuming no biodegradation. Site data are less than modelled data assuming biodegradation. If it is assumed that contaminant concentrations are at steady-state, then it may be concluded that biodegradation is occurring. However, the low concentrations of VC suggest that contaminant degradation may be stalling at DCE and not continuing to VC. Additional groundwater sampling for ethene may be useful for assessing the progress of biodegradation.

8.3.2 MTBE Fate and Transport Modeling

The following input parameters were used in the PADEP Quick Domenico simulation for MTBE:

- Source: Assumed to be a release near MW-14 (4,870 ppb)
- Model Length, Width: 1,000 ft, 200 ft (distance from MW-14 to location SW of 2104 Hoffmansville Road)
- Ax: 100 ft (default value, 0.1*X where X is model length)
- Ay: 10 ft (default value, 0.1*Ax)
- Az: 0.001 (default value)
- Lambda: 0 (default value, assumes no decay)
- Source Width: 150 ft (distance between MW-12 and MW-10)
- Source Thickness: 10 ft (estimated)
- Time: 25, 30, and 35 years
- Hydraulic Conductivity: 0.06 ft/day (value for OW-04 from GRI Report 2003)
- Hydraulic Gradient: 0.0531 ft/ft (MW-14 to MW-7S)
- Porosity: 0.2 (assume shallow flow through fractured argillite)
- Soil Bulk Density: 1.7 g/cm^3 (estimated)
- KOC: 12 L/kg (default for MTBE)
- Fraction Organic Carbon: 0.001 (estimated)
- Field Data Source: MW-1, MW7S, MW-14, Apartments, 322 Layfield Road, 318 Layfield Road, 314 Layfield Road, 2104 Hoffmansville Road.

Results were plotted on graphs (**Appendix S**) to show the variation in concentration with distance for simulation times ranging from 25 to 35 years. Results indicate that MTBE concentrations are estimated to decline rapidly with distance. Field data indicate rapid decline in concentrations with distance.

8.3.3 1,4-Dioxane Fate and Transport Modeling

Leidos utilized similar input parameters for each Quick Domenico simulation. Difference between the input parameters for the MTBE model and the 1,4-dioxane model are listed below:

- Source: Assumed to be a release near MW-13 (250 ppb)
- Model Length, Width: 1,740 ft, 200 ft (distance from MW-13 to MW-10D)
- Ax: 174 ft (default value, 0.1*X where X is model length)
- Ay: 17.4 ft (default value, 0.1*Ax)
- Az: 0.001 (default value)
- Source Width: 240 ft (estimated based on MW-2S, MW-10, MW-14)
- Source Thickness: 20 ft (estimated)
- Time: 50, 75, and 100 years
- KOC: 7.8 L/kg (default for MTBE)
- Field Data Source: MW-12, MW-13, MW-14, MW-5S, MW-7D, MW-10D, Apartments, 322 Layfield Road, 318 Layfield Road, 314 Layfield Road, 317 Layfield Road, 325 Layfield Road, 313 Layfield Road, and 2024 Hoffmansville Road.

Results were plotted on graphs (**Appendix S**) to show the variation in concentration with distance for simulation times ranging from 50 to 100 years. Results indicate that 1,4-dioxane concentrations are estimated to reach 0 ppb at approximately 1,000 ft (50 year), 1,400 ft (75 year), and 1,550 ft (100 year). Field data indicate a trend that differs slightly from modeled results. Field data appear to follow a trend line described by the equation $y = -50.18 * \ln(x) + 365.55$, where y is the concentration in ppb, and x is the distance. This trend indicates a concentration of 0 ppb at a distance of approximately 1475 feet.

8.3.4 1,2-DCB Fate and Transport Modeling

Leidos utilized similar input parameters for each Quick Domenico simulation. Difference between the input parameters for the MTBE model and the 1,2-DCB model are listed below:

- Source: Assumed to be a release near MW-8 and MW-4 (1,700 and 1,300 ppb)
- Model Length, Width: 1,000 ft, 200 ft (based on EV model)
- Ax: 500 ft (estimated value based on sample concentrations)
- Ay: 10 ft (estimated value)
- Az: 0.001 (default value)
- Source Width: 200 ft (estimated based on MW-2S, MW-10, MW-14)
- Source Thickness: 20 ft (estimated)
- Time: 50, 75, and 100 years
- KOC: 350 L/kg (default for MTBE)
- Field Data Source: MW-4D, MW-8D, MW-7, MW-10D, 325 Layfield Road, 318 Layfield Road, 2029 Hoffmansville Road, 2104 Hoffmansville Road, and 2024 Hoffmansville Road.

Results were plotted on graphs (**Appendix S**) to show the variation in concentration with distance for simulation times ranging from 50 to 100 years. Results indicate that 1,2-DCB concentrations are estimated to reach 0 ppb at approximately 800 ft (50 year), 900 ft (75 year), and 1,000 ft (100 year). Field data display concentrations that are significantly higher than model results. Compared to MTBE and 1,4-dioxane, 1,2-DCB has a much higher organic partitioning coefficient (K_{oc} = 350 l/kg vs 12l/kg and 7.8 l/kg). The higher K_{oc} indicates that 1,2-DCB is more likely to partition onto organic material, hence model results for 1,2-DCB are more heavily influenced by the fraction of organic carbon (f_{oc}). However solely adjusting the foc value does not provide a good fit between model data and field data.Therefore Leidos conducted a separate model run and adjusted various parameters fit the field data. A summary of the revised parameters utilized in the alternate model run are:

- Ax: 75 ft (compared to 500 ft above)
- Ay: 1 ft (compared to 10 ft above)
- Porosity: 0.1 (compared to 0.2)
- Fraction Organic Carbon: 0.0002 (compared to 0.001)

Results of the alternate model were plotted on graphs (**Appendix S**) to show the variation in concentration with distance for simulation times ranging from 50 to 100 years. Results indicate that 1,2-DCB concentrations are estimated to reach 0 ppb at approximately 1000 ft (50 year), 1100 ft (75 year), and 1,200 ft (100 year). The revised model results fit the field data for values within approximately 600 feet, however for larger distances the model over predicts the concentrations. The alternate model for 1,2-DCB indicates that the fate and transport of 1,2-DCB differs from MTBE and 1,4-dioxane and may likely be due to variations in f_{oc} and aquifer parameters.

8.4 Contaminant Migration Assessment

Elevated concentrations of Site contaminants including various chlorinated organic compounds, 1,4-Dioxane, and petroleum hydrocarbon compounds have migrated from source areas at the Good Oil Property to adjacent and other properties to the west and south. Groundwater sample results and the modeling presented above clearly demonstrate this. The mechanisms controlling contaminant migration are strongly related to the flow of groundwater through bedrock fractures from areas of higher pressure within the aquifer to areas of lower pressure or surficial discharge points.

The natural aquifer conditions in the area of the Site are characterized by recharge areas to the aquifer at topographically higher locations (to the north) that flow to the south and west before discharging to the two tributaries discussed in **Section 6.6**. The artesian well conditions that often exist at wells MW-7D, OW-4, and OW-6 support this scenario. The pumping of home wells at properties to the southwest and south of the Good Oil property as well as agricultural wells in those directions is also expected to influence the migration of contaminants along the predominant fracture features in these directions to locations as far away as OW-6 (nearly 1,000 feet to the south of MW-4D) and the home well at 2024 Hoffmansville Road (800 feet from MW-4D).

The migration of contaminants has also occurred to the west of the Good Oil Property as a result of the pumping of home wells that creates a zone of lower pressure within the aquifer and a resulting groundwater flow path through secondary fractures/joint sets orientated NW-SE. This, along with close proximity, is believed to be the reason for the migration of elevated levels

of contaminants to the home wells at 314 Layfield Road, 318 Layfield Road, 322 Layfield Road, 324-332 Layfield Road, 325 Layfield Road.

9.0 SIGNIFICANT FINDINGS

The following significant findings are presented based upon the results of the characterization actions that have been completed at the Site.

- TCE and other chlorinated organic contaminants, as well as 1,4-dioxane, have been detected above MCLs in home wells at the area of the Site. Historically, the highest levels of contamination have been detected in the potable water samples collected at 318 Layfield Road and the home wells located adjacent and to Good Oil Company property.

- The Brunswick Formation is the mapped bedrock in the area of the Site. However, Jurassic-aged diabase intrusions have been identified in the area. This was confirmed during drilling of monitoring wells MW-1D, MW-2D, MW-4D and MW-8D at the Good Oil Company property. Adjacent shales and siltstones have been metamorphosed into hornfels. Bedrock monitoring wells drilled within the diabase and nearby hornfels contained few significant fractures and produced less than 10 gpm each.

- The rocks at the area of the Site are characterized by low transmissivity to the point that the primary movement of groundwater is through secondary openings, such as joints and fractures. The predominant fracture/joint strike direction indicated by borehole geophysics data obtained during the Site investigation is NE-SW.

- Groundwater gradients in the shallow bedrock aquifer ranged between 0.036 and 0.05 ft/ft and were consistently to the southwest and south at western portions of the Site. Shallow bedrock groundwater gradients were a bit steeper at the eastern portions of the Site and were towards the southeast and east towards the unnamed tributary flowing through the Good Oil Company property. Gradients in the deep bedrock aquifer ranged between 0.025 and 0.036 ft/ft and were consistently to the southwest.

- The highest concentrations of chlorinated organic compounds were detected in the Good Oil property LUST case wells MW-4, MW-8, MW-13 and MW-4 and PADEP HSCA wells MW-1S, MW- 4D Upper and Lower, and MW-8D Upper and Lower. These wells are all located at the Good Oil Company property. The highest concentrations of TCE

were detected in MW-4D Upper at concentrations as high as 641 µg/L. Other related compounds detected above the MCL in Site monitoring wells include Cis-1,2 DCE, 1,1-DCE, VC, 1,1,1-TCA, 1,1-DCA, 1,2-DCA, 1,2-DCB, 1,4-DCB, 1,2,4-TMB and 1,3,5-TMB, chlorobenzene, PCP and 1,4-Dioxane. Bis(2-ethylhexyl)phthalate, MTBE and benzene were also detected above their MCLs in groundwater.

- Benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, bis(2-ethylhexyl)phthalate, chrysene, cis-1,2-DCE, TCE, and VC were detected at concentrations exceeding the specified criteria in surface water samples collected from the unnamed tributary to Swamp Creed at locations within the boundaries of the Good Oil Company property.

- Subslab soil gas sampling was conducted at three homes adjacent to the Good Oil Company property between late 2102 and early 2014. Compounds detected above the screening criteria at 318 Layfield Road included chloroform and naphthalene. Compounds detected above the screening criteria at 322 Layfield Road included 1,2-dibromoethane, 1,4-dichlorobenzene, ethylbenzene, and naphthalene. Compounds detected above the screening criteria at 324-332 Layfield Road included 1,1,2,2-tetrachloroethane, 1,4-dichlorobenzene, and naphthalene.

- Indoor air sampling was conducted at two homes directly adjacent to the Good Oil Company property in early 2014. Compounds detected in basement indoor air above the screening criteria at 318 Layfield Road included benzene and ethylbenzene. Compounds detected above the screening criteria at 324-332 Layfield Road included 1,2,4-trichlorobenzene, 1,4-dichlorobenzene, benzene, ethylbenzene, naphthalene, TCE, and VC.

- At the request of PADEP, the PADOH, Division of Environmental Health Epidemiology, in collaboration with the ATSDR, reviewed the vapor intrusion data for the Site and prepared a letter health consultation (LHC) for risks related to the exposure of Site-related contaminants in indoor air at the three residences included in the vapor intrusion study. The LHC concluded that exposure to the levels of chemicals detected do not pose apparent health hazards at the three residences at this time. PADOH does not recommend further vapor intrusion sampling work.

- 3D geologic and contaminant distribution modeling performed for the Site indicates the source areas of the target contaminants are shallow bedrock at the Good Oil property. The modeling also suggests the migration of contaminants has occurred both vertically and laterally and has reached a relatively steady state.

- Fate and transport contaminant projections for TCE suggests TCE degradation to DCE is occurring, but that DCE to VC degradation is not occurring at the expected rate.

- The primary mechanism of contaminant migration from the source area(s) at the Good Oil property is by fracture flow to the south and southwest along primary fracture features and to the west along secondary fracture features. These conditions are the result of aquifer pressure differentials with the aquifer created by recharge, topography, local geology, and groundwater extraction by wells.

10.0 RECOMMENDATIONS

Based on the results presented herein and the significant findings discussed above, the following recommendations are provided:

- Continued monitoring of shallow and deep bedrock monitoring wells via conventional monitoring techniques or using HydraSleeve™ samplers to evaluate the natural degradation of target chlorinated organic compounds in groundwater.

- Continued monitoring of the unnamed tributary flowing through the Good Oil Company property between the northern property border and Hoffmansville Road where chlorinated organic compounds were detected in surface water samples in 2012 and 2013.

- The abandonment of home wells following the installation of the public water supply system at the area of the Site. Home wells located at 2015 Hoffmansville Road, 2104 Hoffmansville Road, and 2143 Hoffmansville Road may be useful for future monitoring activities and should not be abandoned if viable as monitoring points.

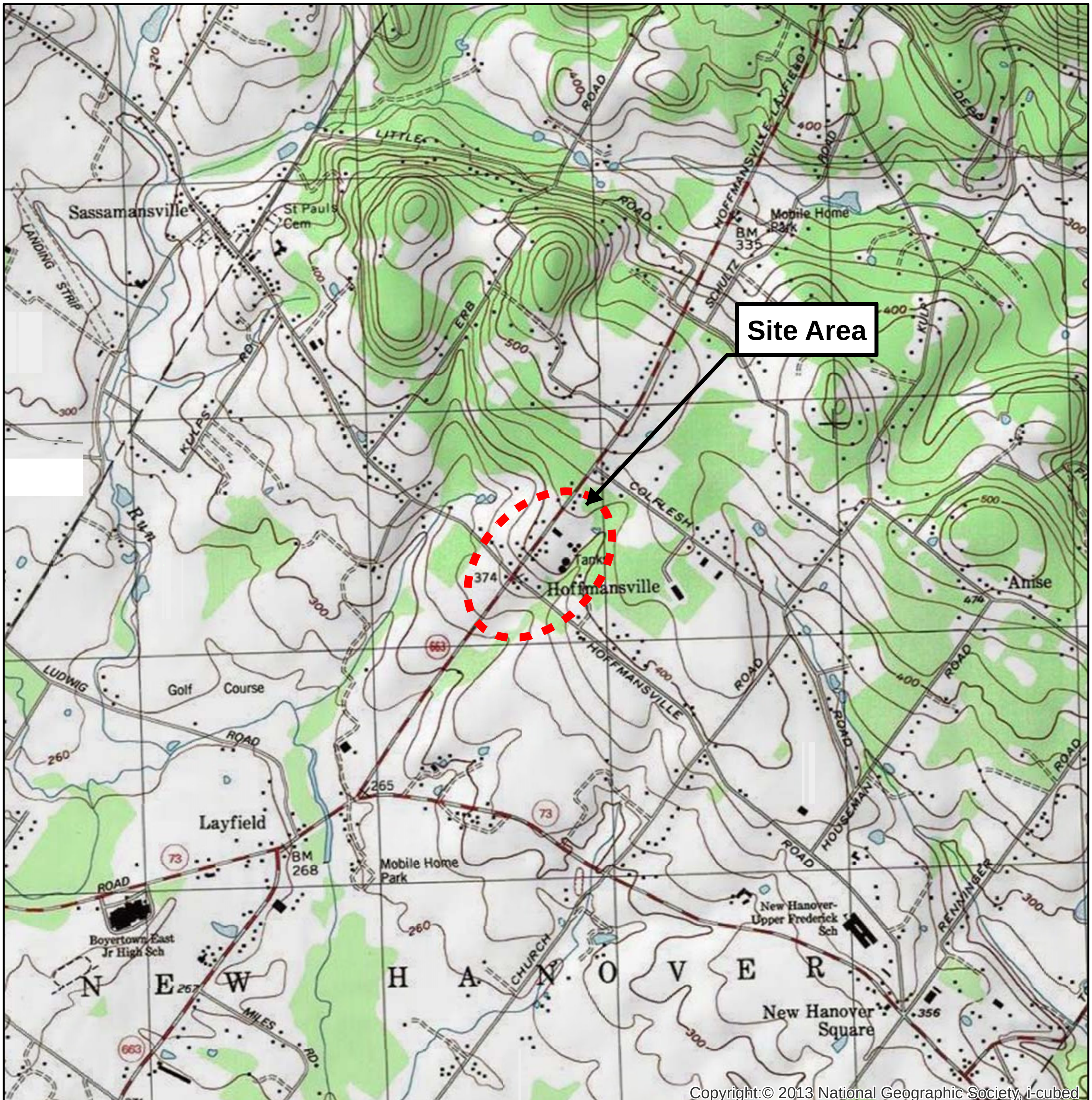
11.0 REFERENCES

Longwill, Stanley M., Charles R. Wood; 1965, *Ground-Water Resources of the Brunswick Formation in Montgomery and Berks Counties, Pennsylvania*, Ground Water Report W 22, pg 6.

Satterthwaite, Walter B., Paul White, 2002, *Geologic Investigation Report Gibraltar Rock, Inc. Proposed non-Coal Surface Mine, New Hanover Township Montgomery County, Pennsylvania,* Gibralter Rock Quarry Permit, Submitted 2004.

United States Department of Agriculture (USDA) – Natural Resource Conservation Service (NRCS); May 23, 2012; "Web Soil Survey"; http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx

FIGURES



0 1,000 2,000 4,000
Feet

1 inch = 2,000 feet

N

Hoff VC HSCA Site

New Hanover Township
Montgomery County, PA

Site Location Map

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date 01/07/2014	date	date	
job no. 2603100116/3012		file no. Fig 1 - Site Location	

initials	date	revision

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Source Imagery:
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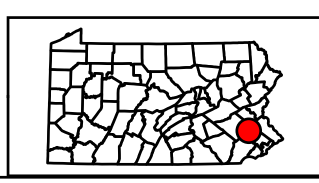

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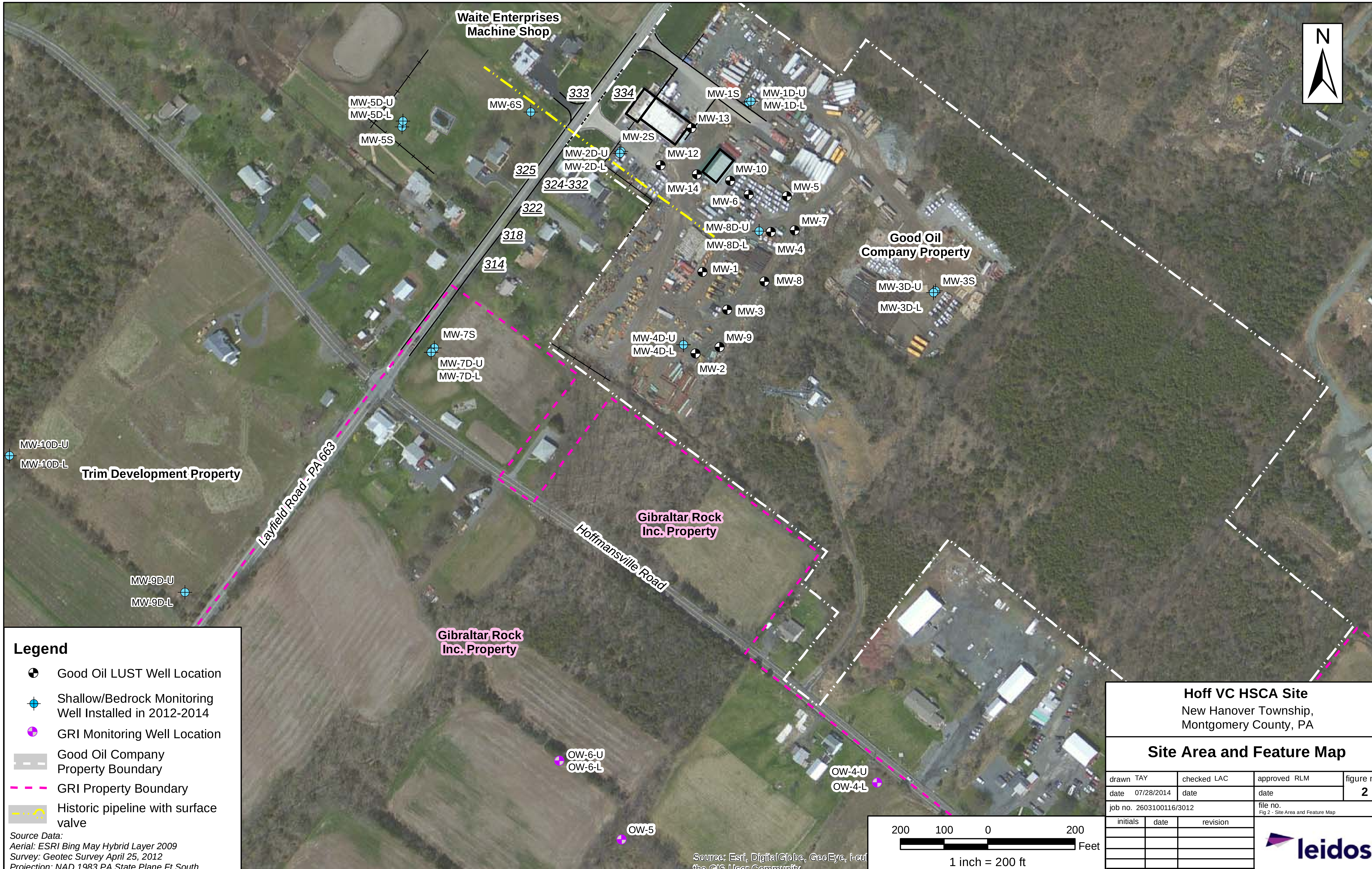

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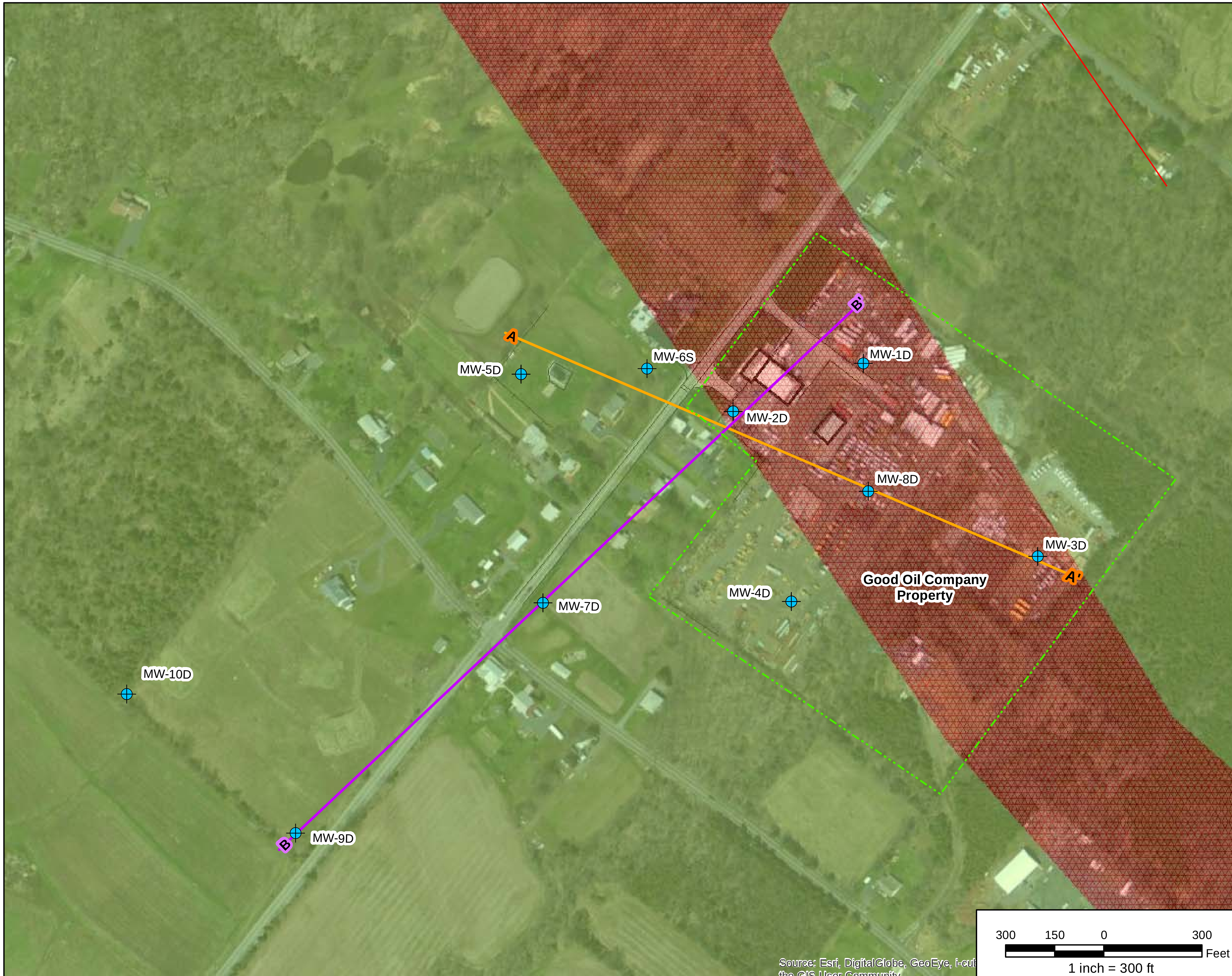

Hoff VC HSCA Site
New Hanover Township,
Montgomery County, PA

Local Bedrock Geology Map

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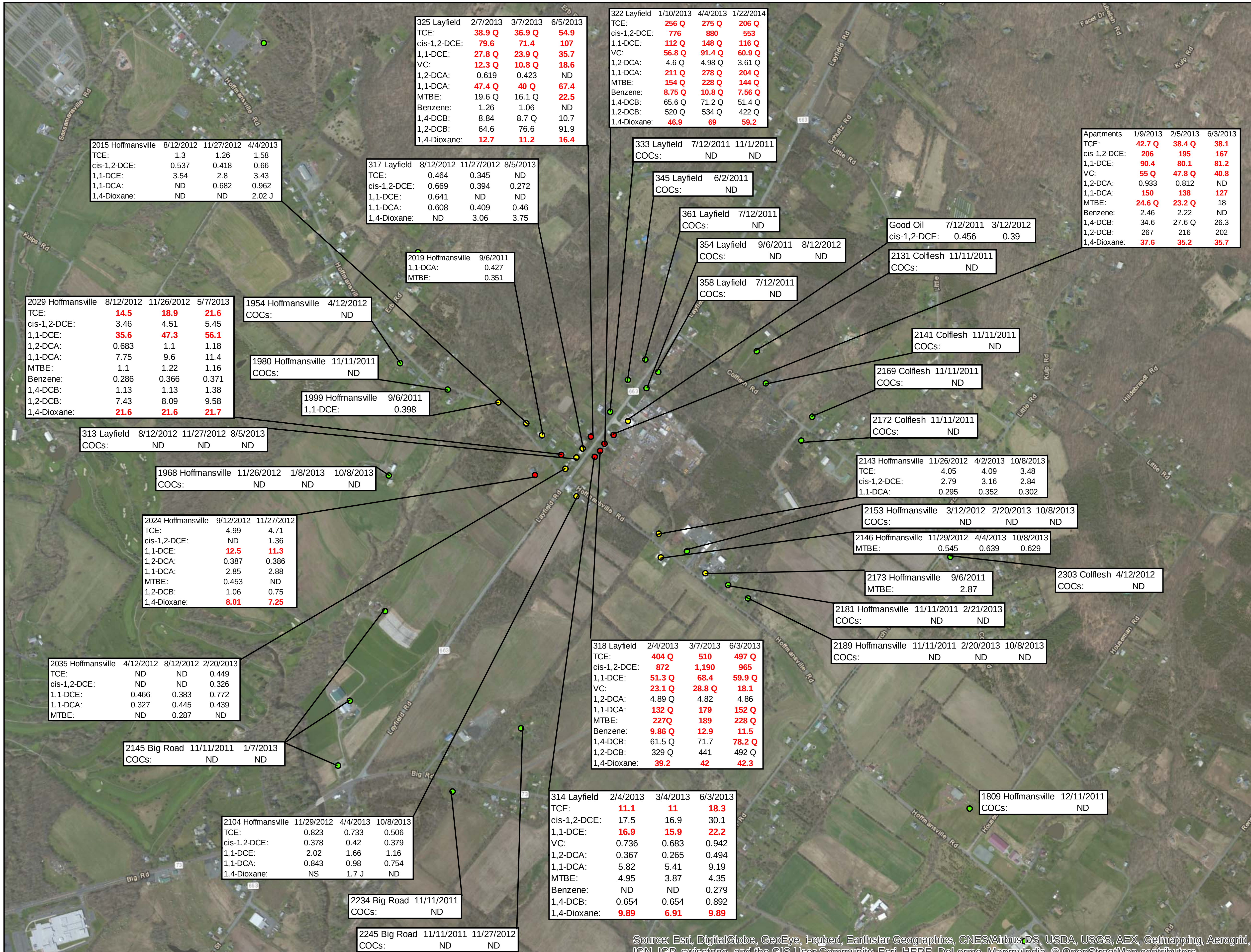


325 Layfield	2/7/2013	3/7/2013	6/5/2013
TCE:	**38.9 Q**	**36.9 Q**	**54.9**
cis-1,2-DCE:	**79.6**	**71.4**	**107**
1,1-DCE:	**27.8 Q**	**23.9 Q**	**35.7**
VC:	**12.3 Q**	**10.8 Q**	**18.6**
1,2-DCA:	0.619	0.423	ND
1,1-DCA:	**47.4 Q**	**40 Q**	**67.4**
MTBE:	19.6 Q	16.1 Q	**22.5**
Benzene:	1.26	1.06	ND
1,4-DCB:	8.84	8.7 Q	10.7
1,2-DCB:	64.6	76.6	91.9
1,4-Dioxane:	**12.7**	**11.2**	**16.4**

322 Layfield	1/10/2013	4/4/2013	1/22/2014
TCE:	**256 Q**	**275 Q**	**206 Q**
cis-1,2-DCE:	**776**	**880**	**553**
1,1-DCE:	**112 Q**	**148 Q**	**116 Q**
VC:	**56.8 Q**	**91.4 Q**	**60.9 Q**
1,2-DCA:	4.6 Q	4.98 Q	3.61 Q
1,1-DCA:	**211 Q**	**278 Q**	**204 Q**
MTBE:	**154 Q**	**228 Q**	**144 Q**
Benzene:	**8.75 Q**	**10.8 Q**	**7.56 Q**
1,4-DCB:	65.6 Q	71.2 Q	51.4 Q
1,2-DCB:	520 Q	534 Q	422 Q
1,4-Dioxane:	**46.9**	**69**	**59.2**

333 Layfield	7/12/2011	11/1/2011
COCs:	ND	ND

345 Layfield	6/2/2011
COCs:	ND

361 Layfield	7/12/2011
COCs:	ND

354 Layfield	9/6/2011	8/12/2012
COCs:	ND	ND

358 Layfield	7/12/2011
COCs:	ND

Good Oil	7/12/2011	3/12/2012
cis-1,2-DCE:	0.456	0.39

2131 Colflesh	11/11/2011
COCs:	ND

Apartments	1/9/2013	2/5/2013	6/3/2013
TCE:	**42.7 Q**	**38.4 Q**	**38.1**
cis-1,2-DCE:	**206**	**195**	**167**
1,1-DCE:	**90.4**	**80.1**	**81.2**
VC:	**55 Q**	**47.8 Q**	**40.8**
1,2-DCA:	0.933	0.812	ND
1,1-DCA:	**150**	**138**	**127**
MTBE:	**24.6 Q**	**23.2 Q**	18
Benzene:	2.46	2.22	ND
1,4-DCB:	34.6	27.6 Q	26.3
1,2-DCB:	267	216	202
1,4-Dioxane:	**37.6**	**35.2**	**35.7**

2015 Hoffmansville	8/12/2012	11/27/2012	4/4/2013
TCE:	1.3	1.26	1.58
cis-1,2-DCE:	0.537	0.418	0.66
1,1-DCE:	3.54	2.8	3.43
1,1-DCA:	ND	0.682	0.962
1,4-Dioxane:	ND	ND	2.02 J

317 Layfield	8/12/2012	11/27/2012	8/5/2013
TCE:	0.464	0.345	ND
cis-1,2-DCE:	0.669	0.394	0.272
1,1-DCE:	0.641	ND	ND
1,1-DCA:	0.608	0.409	0.46
1,4-Dioxane:	ND	3.06	3.75

2019 Hoffmansville	9/6/2011
1,1-DCA:	0.427
MTBE:	0.351

2029 Hoffmansville	8/12/2012	11/26/2012	5/7/2013
TCE:	**14.5**	**18.9**	**21.6**
cis-1,2-DCE:	3.46	4.51	5.45
1,1-DCE:	**35.6**	**47.3**	**56.1**
1,2-DCA:	0.683	1.1	1.18
1,1-DCA:	7.75	9.6	11.4
MTBE:	1.1	1.22	1.16
Benzene:	0.286	0.366	0.371
1,4-DCB:	1.13	1.13	1.38
1,2-DCB:	7.43	8.09	9.58
1,4-Dioxane:	**21.6**	**21.6**	**21.7**

1954 Hoffmansville	4/12/2012
COCs:	ND

1980 Hoffmansville	11/11/2011
COCs:	ND

1999 Hoffmansville	9/6/2011
1,1-DCE:	0.398

2141 Colflesh	11/11/2011
COCs:	ND

2169 Colflesh	11/11/2011
COCs:	ND

2172 Colflesh	11/11/2011
COCs:	ND

313 Layfield	8/12/2012	11/27/2012	8/5/2013
COCs:	ND	ND	ND

1968 Hoffmansville	11/26/2012	1/8/2013	10/8/2013
COCs:	ND	ND	ND

2143 Hoffmansville	11/26/2012	4/2/2013	10/8/2013
TCE:	4.05	4.09	3.48
cis-1,2-DCE:	2.79	3.16	2.84
1,1-DCA:	0.295	0.352	0.302

2153 Hoffmansville	3/12/2012	2/20/2013	10/8/2013
COCs:	ND	ND	ND

2146 Hoffmansville	11/29/2012	4/4/2013	10/8/2013
MTBE:	0.545	0.639	0.629

2024 Hoffmansville	9/12/2012	11/27/2012
TCE:	4.99	4.71
cis-1,2-DCE:	ND	1.36
1,1-DCE:	**12.5**	**11.3**
1,2-DCA:	0.387	0.386
1,1-DCA:	2.85	2.88
MTBE:	0.453	ND
1,2-DCB:	1.06	0.75
1,4-Dioxane:	**8.01**	**7.25**

2173 Hoffmansville	9/6/2011
MTBE:	2.87

2303 Colflesh	4/12/2012
COCs:	ND

2181 Hoffmansville	11/11/2011	2/21/2013
COCs:	ND	ND

318 Layfield	2/4/2013	3/7/2013	6/3/2013
TCE:	**404 Q**	**510**	**497 Q**
cis-1,2-DCE:	**872**	**1,190**	**965**
1,1-DCE:	**51.3 Q**	**68.4**	**59.9 Q**
VC:	**23.1 Q**	**28.8 Q**	**18.1**
1,2-DCA:	4.89 Q	4.82	4.86
1,1-DCA:	**132 Q**	**179**	**152 Q**
MTBE:	**227Q**	**189**	**228 Q**
Benzene:	**9.86 Q**	**12.9**	**11.5**
1,4-DCB:	61.5 Q	71.7	**78.2 Q**
1,2-DCB:	329 Q	441	492 Q
1,4-Dioxane:	**39.2**	**42**	**42.3**

2189 Hoffmansville	11/11/2011	2/20/2013	10/8/2013
COCs:	ND	ND	ND

2035 Hoffmansville	4/12/2012	8/12/2012	2/20/2013
TCE:	ND	ND	0.449
cis-1,2-DCE:	ND	ND	0.326
1,1-DCE:	0.466	0.383	0.772
1,1-DCA:	0.327	0.445	0.439
MTBE:	ND	0.287	ND

2145 Big Road	11/11/2011	1/7/2013
COCs:	ND	ND

314 Layfield	2/4/2013	3/4/2013	6/3/2013
TCE:	**11.1**	**11**	**18.3**
cis-1,2-DCE:	17.5	16.9	30.1
1,1-DCE:	**16.9**	**15.9**	**22.2**
VC:	0.736	0.683	0.942
1,2-DCA:	0.367	0.265	0.494
1,1-DCA:	5.82	5.41	9.19
MTBE:	4.95	3.87	4.35
Benzene:	ND	ND	0.279
1,4-DCB:	0.654	0.654	0.892
1,4-Dioxane:	**9.89**	**6.91**	**9.89**

1809 Hoffmansville	12/11/2011
COCs:	ND

2104 Hoffmansville	11/29/2012	4/4/2013	10/8/2013
TCE:	0.823	0.733	0.506
cis-1,2-DCE:	0.378	0.42	0.379
1,1-DCE:	2.02	1.66	1.16
1,1-DCA:	0.843	0.98	0.754
1,4-Dioxane:	NS	1.7 J	ND

2234 Big Road	11/11/2011
COCs:	ND

2245 Big Road	11/11/2011	11/27/2012
COCs:	ND	ND

Legend

- Result exceeds the Federal Drinking Water MCL or PADEP Act 2 Residential MSC
- Result detected below the applicable Act 2 MSC
- No Compounds Detected

Detected COCs for Home Wells

Sample Location Compound	Sample Date MCL / MSC
Trichloroethene	5
cis-1,2-Dichloroethene	70
1,1-Dichloroethene	7.0
Vinyl Chloride	2
1,2-Dichloroethane	5
1,1-Dichloroethane	31
Methyl-T-Butyl-Ether	20
Benzene	5
1,4-Dichlorobenzene	75
1,2-Dichlorobenzene	600
1,4-Dioxane	6

306 Bold red text indicates concentration that exceeds the Federal Drinking Water MCL or PADEP Act 2 Residential MSC.

Detected Results Only

All results in micrograms per liter (µg/L)

Results from last/most recent three samples for each location are presented.

N

0 500 1,000 2,000 Feet

1 inch = 1,000 feet

Hoff VC HSCA Site

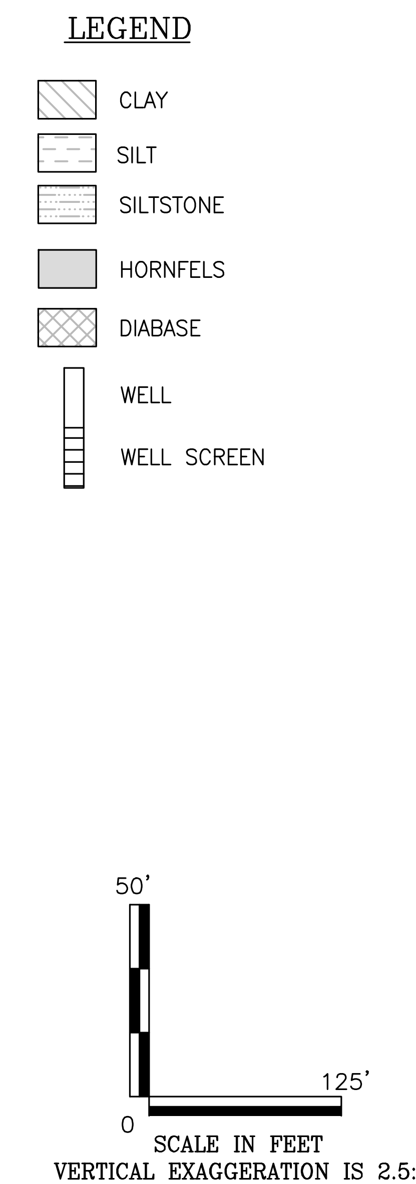
New Hanover Township
Montgomery County, PA

Home Well Sampling Results

drawn TAY	checked LAC	approved RLM	figure no.
date 07/30/2014	date	date	4
job no. 301604.TM.100116.2070.0207		file no. Fig 4 - Home Well Sampling Map July 2014	
initials	date	revision	

leidos

Path: G:\GTAC\Hoff_VC\Projects\Fig 4 - Home Well Sampling Map July 2014.mxd



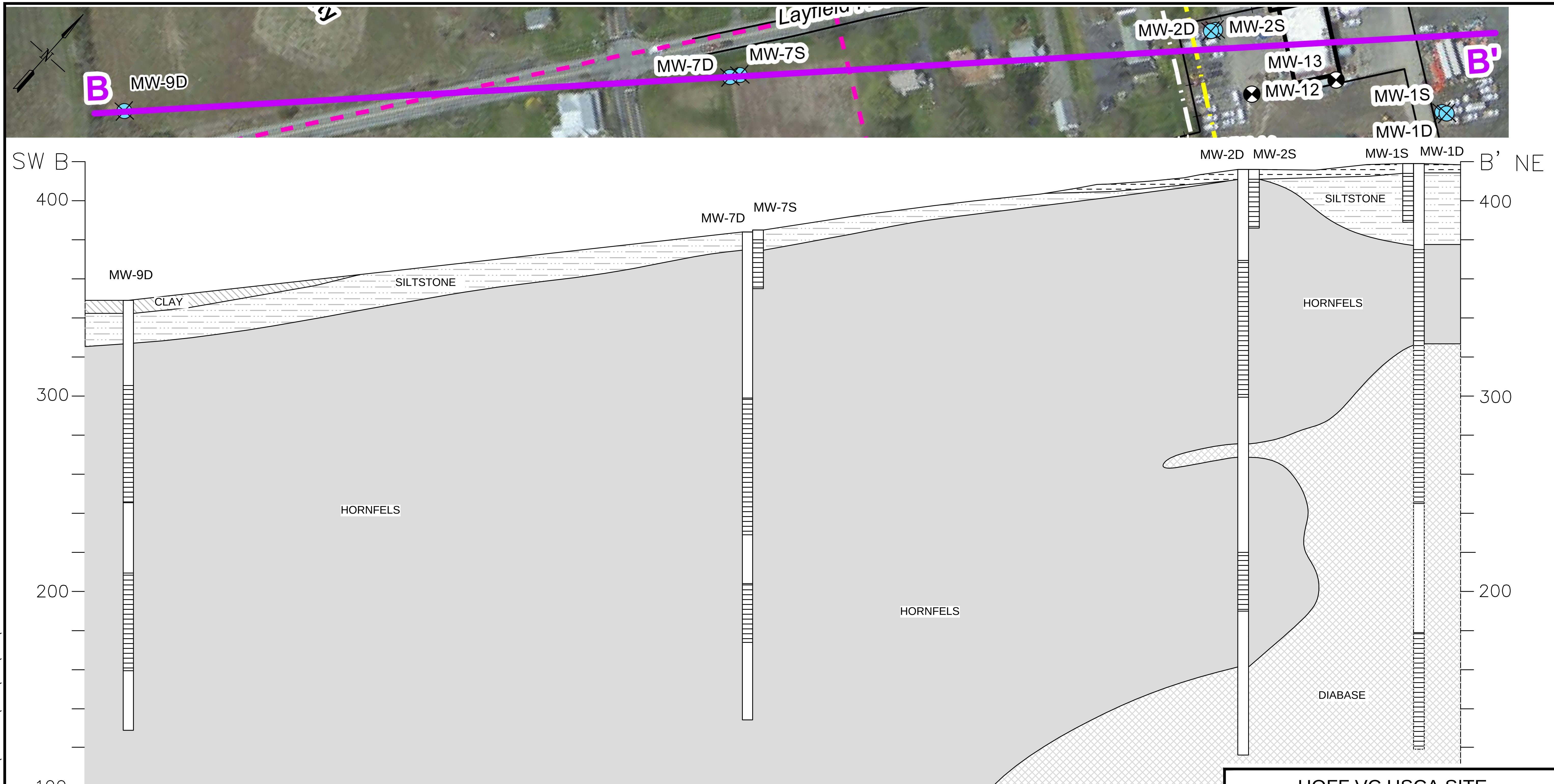
HOFF VC HSCA SITE

NEW HANOVER TOWNSHIP, MONTGOMERY COUNTY, PA

GEOLOGIC CROSS-SECTION A-A'

leidos

job no. 301604.TM.100116.2070.0207		
file no. X-Sect_001.dwg		
drawn RAM	date 07/29/14	figure no.
checked	date	5
approved	date	



LEGEND

- CLAY
- SILT
- SILTSTONE
- HORNFELS
- DIABASE
- WELL
- WELL SCREEN

50'
0
125'
SCALE IN FEET
VERTICAL EXAGGERATION IS 2.5:1

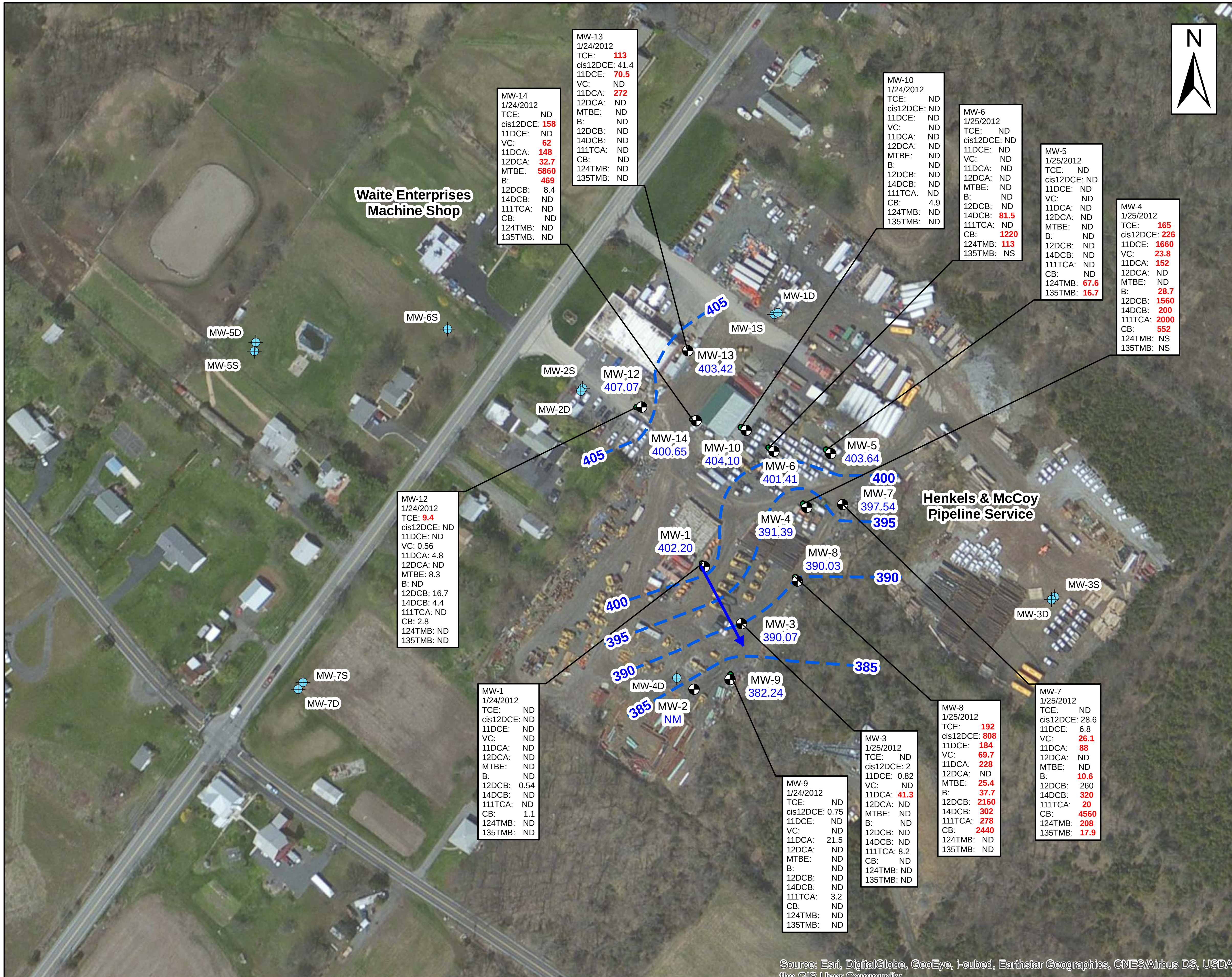
HOFF VC HSCA SITE

NEW HANOVER TOWNSHIP, MONTGOMERY COUNTY, PA

GEOLOGIC CROSS-SECTION B-B'

leidos

job no.	301604.TM.100116.2070.0207
file no.	X-Sect_001.dwg
drawn RAM	date 07/29/14
checked	date
approved	date
figure no.	6



Legend

- Monitoring Well
- Shallow/Bedrock Monitoring Well Installed in April 2012
- 402.20 Groundwater Elevation in feet above mean sea level (AMSL)
- Groundwater Elevation Contour in feet AMSL (Dashed where inferred)
- Inferred Groundwater Flow Direction

Well ID
Sample Date

Compound	GW MSC
Trichloroethene	5
cis-1,2-Dichloroethene	70
1,1-Dichloroethene	7
Vinyl Chloride	2
1,1-Dichloroethane	31
1,2-Dichloroethane	5
Methyl-T-Butyl-Ether	20
Benzene	5
1,2-Dichlorobenzene	600
1,4-Dichlorobenzene	75
1,1,1-Trichloroethane	200
Chlorobenzene	200
1,2,4-Trimethylbenzene	15
1,3,5-Trimethylbenzene	13

ND Not Detected

ug/l Micrograms per Liter

306 Bold red text indicates concentration that exceeds the applicable Used Aquifer Residential Act 2 MSC

All Sampling Results in ug/L

Note:
MW-2 was not sampled because it could not be located during groundwater gauging and sampling.

150 75 0 150 Feet

1 inch = 150 ft

Source Imagery:
ESRI Bing May Hybrid Layer 2009
2009 Sassamansville PA NE PA 24k
Projection: NAD 1983, UTM Zone 18

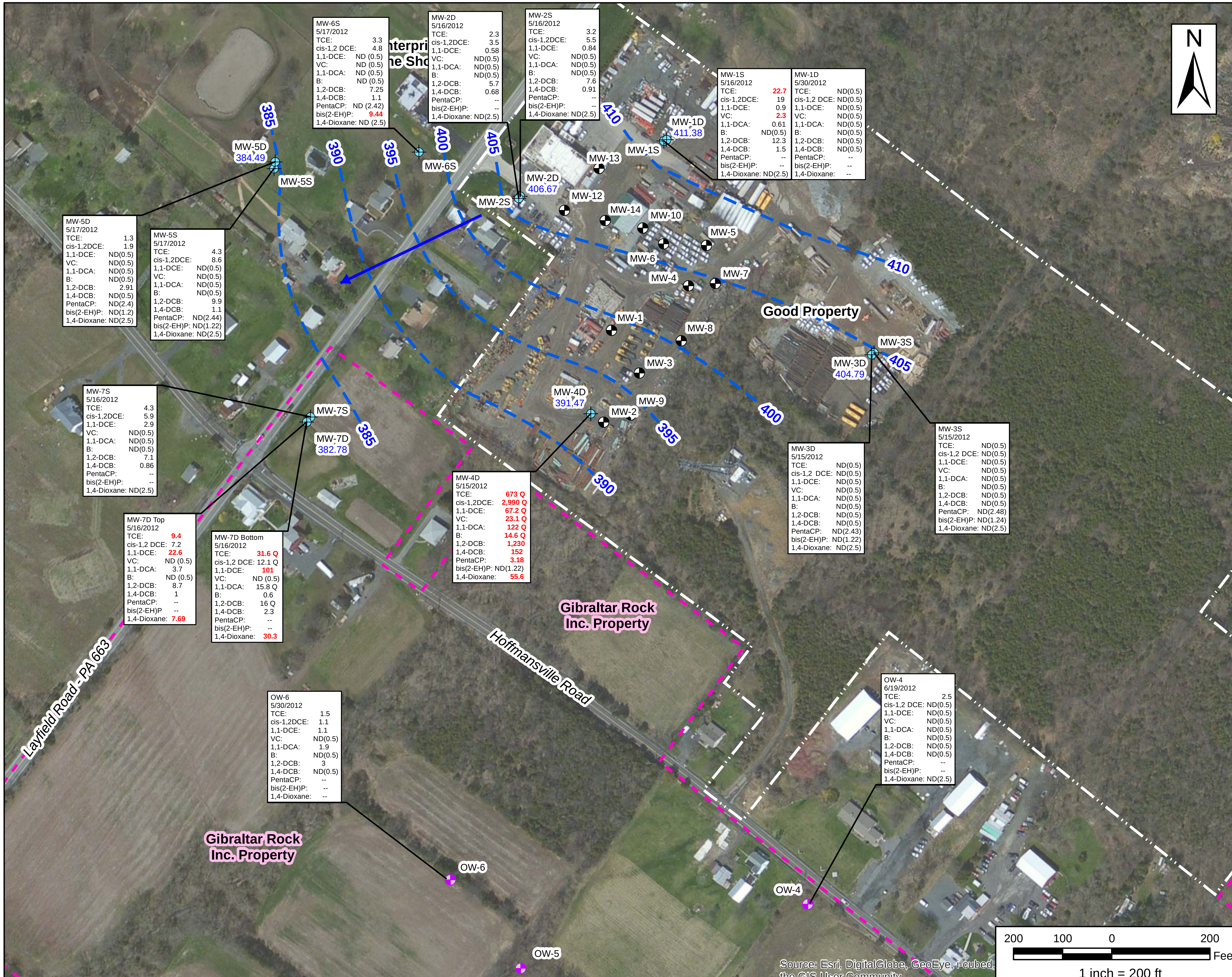
Hoff VC HSCA Site

New Hanover Township, Montgomery County, PA

Groundwater Contour and Chemistry Map January 2012

drawn JWS	checked DQ	approved RLM	figure no.
date 6/5/12	date 6/5/12	date	7
job no.		file no. Fig 5 - Chem Jan2012 Map.mxd	

Path: G:\GTAC\Hoff_VC\Projects\Investigation_Rpt\Fig 5 - Chem Jan2012 Map.mxd



Legend

- Monitoring Well
- Shallow/Bedrock Monitoring Well Installed in April 2012
- GRI Monitoring Well
- Good Property Boundary
- GRI Property Boundary
- 384.49 Groundwater Elevation in feet above mean sea level (AMSL)
- Groundwater Elevation Contour in feet AMSL (Dashed where inferred)
- Inferred Groundwater Flow Direction

Well ID
Sample Date

Compound	GW MSC
Trichloroethene	5
cis-1,2-Dichloroethene	70
1,1-Dichloroethene	7
Vinyl Chloride	2
1,1-Dichloroethane	31
Benzene	5
1,2-Dichlorobenzene	600
1,4-Dichlorobenzene	75
Pentachlorophenol	1
bis(2-ethylhexyl)phthalate	6
1,4-Dioxane	6.4

ND Not Detected

Q Analysis was run multiple times

ug/l Micrograms per Liter

306 Bold red text indicates concentration that exceeds the applicable Used Aquifer Residential Act 2 MSC

All Sampling Results in ug/L

Source Data:
Aerial: ESRI Bing May Hybrid Layer 2009
Survey: Geotec Survey April 25, 2012
Projection: NAD 1983 PA State Plane Ft South

Hoff VC HSCA Site

New Hanover Township, Montgomery County, PA

Groundwater Contour and Chemistry Map
April-June 2012

drawn JWS	checked DQ	approved RLM	figure no.
date 12/06/12	date 12/06/12	date	8
job no.		file no. Fig 5 - Chem Jan2012 Map.mxd	

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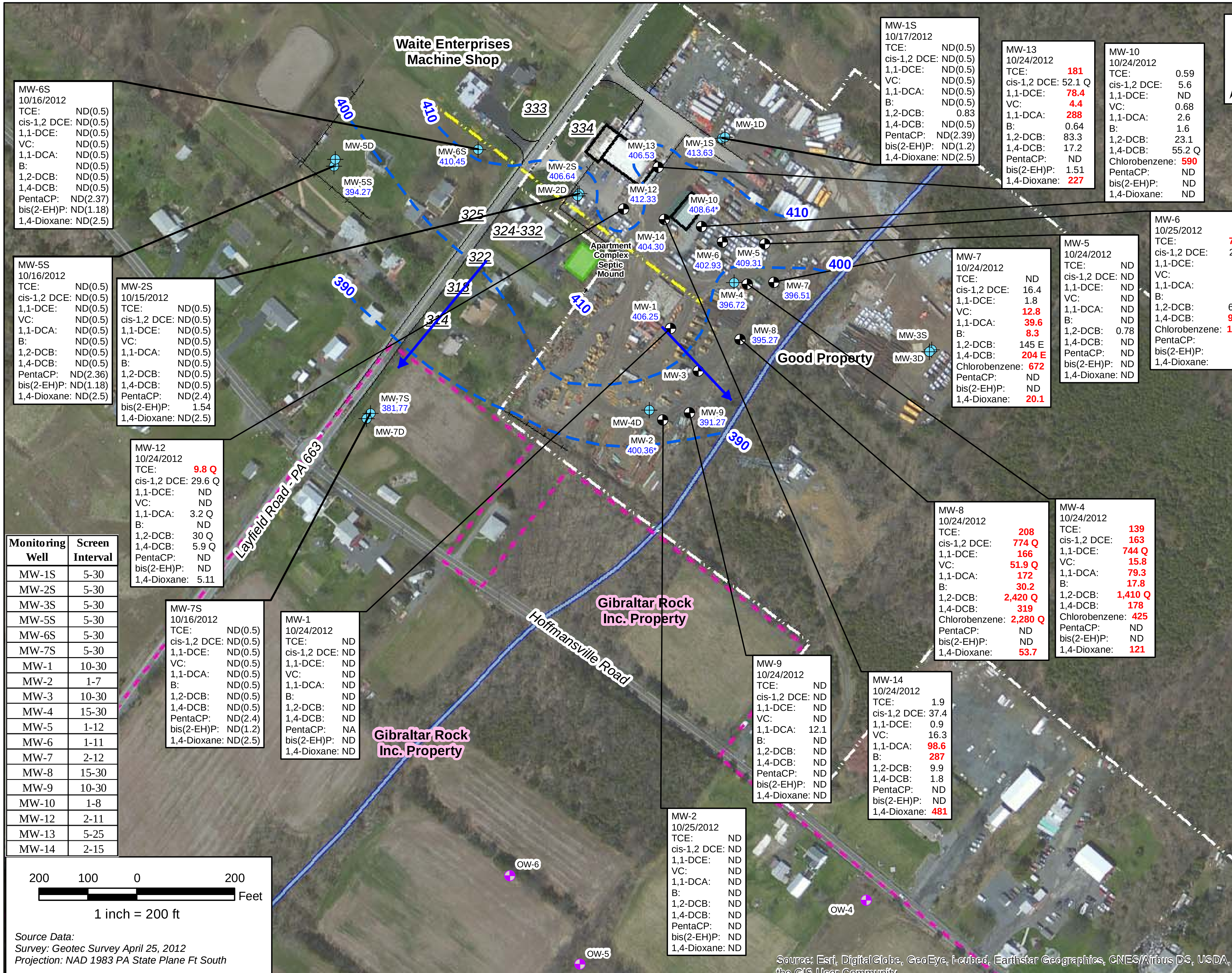

Monitoring Well	Screen Interval
MW-1S	5-30
MW-2S	5-30
MW-3S	5-30
MW-5S	5-30
MW-6S	5-30
MW-7S	5-30
MW-1	10-30
MW-2	1-7
MW-3	10-30
MW-4	15-30
MW-5	1-12
MW-6	1-11
MW-7	2-12
MW-8	15-30
MW-9	10-30
MW-10	1-8
MW-12	2-11
MW-13	5-25
MW-14	2-15

200 100 0 200 Feet

1 inch = 200 ft

Source Data:
Survey: Geotec Survey April 25, 2012
Projection: NAD 1983 PA State Plane Ft South

Legend

- Good Oil LUST Well Location
- Shallow/Bedrock Monitoring Well Installed in April 2012
- GRI Monitoring Well Location
- Good Property Boundary
- GRI Property Boundary
- Historic pipeline with surface valve
- Local Unnamed Tributary
- 384.49 Groundwater Elevation in feet above mean sea level (AMSL)
- Groundwater Elevation Contour in feet AMSL (Dashed where inferred)
- Inferred Groundwater Flow Direction
- * Elevation not used in groundwater contouring

Well ID Sample Date Compound	GW MSC
Trichloroethene	5
cis-1,2-Dichloroethene	70
1,1-Dichloroethene	7
Vinyl Chloride	2
1,1-Dichloroethane	31
Benzene	5
1,2-Dichlorobenzene	600
1,4-Dichlorobenzene	75
Chlorobenzene	100
Pentachlorophenol	1
bis(2-ethylhexyl)phthalate	6
1,4-Dioxane	6.4

ND Not Detected

Q Analysis was run multiple times

ug/l Micrograms per Liter

306 Bold red text indicates concentration that exceeds the applicable Used Aquifer Residential Act 2 MSC

All Sampling Results in ug/L

Hoff VC HSCA Site

New Hanover Township, Montgomery County, PA

Shallow Bedrock Groundwater Contour and Chemistry Map - October 15-24, 2012

drawn JWS	checked RLM	approved RLM	figure no.
date 12/17/12	date 12/17/12	date	9
job no.	file no.		

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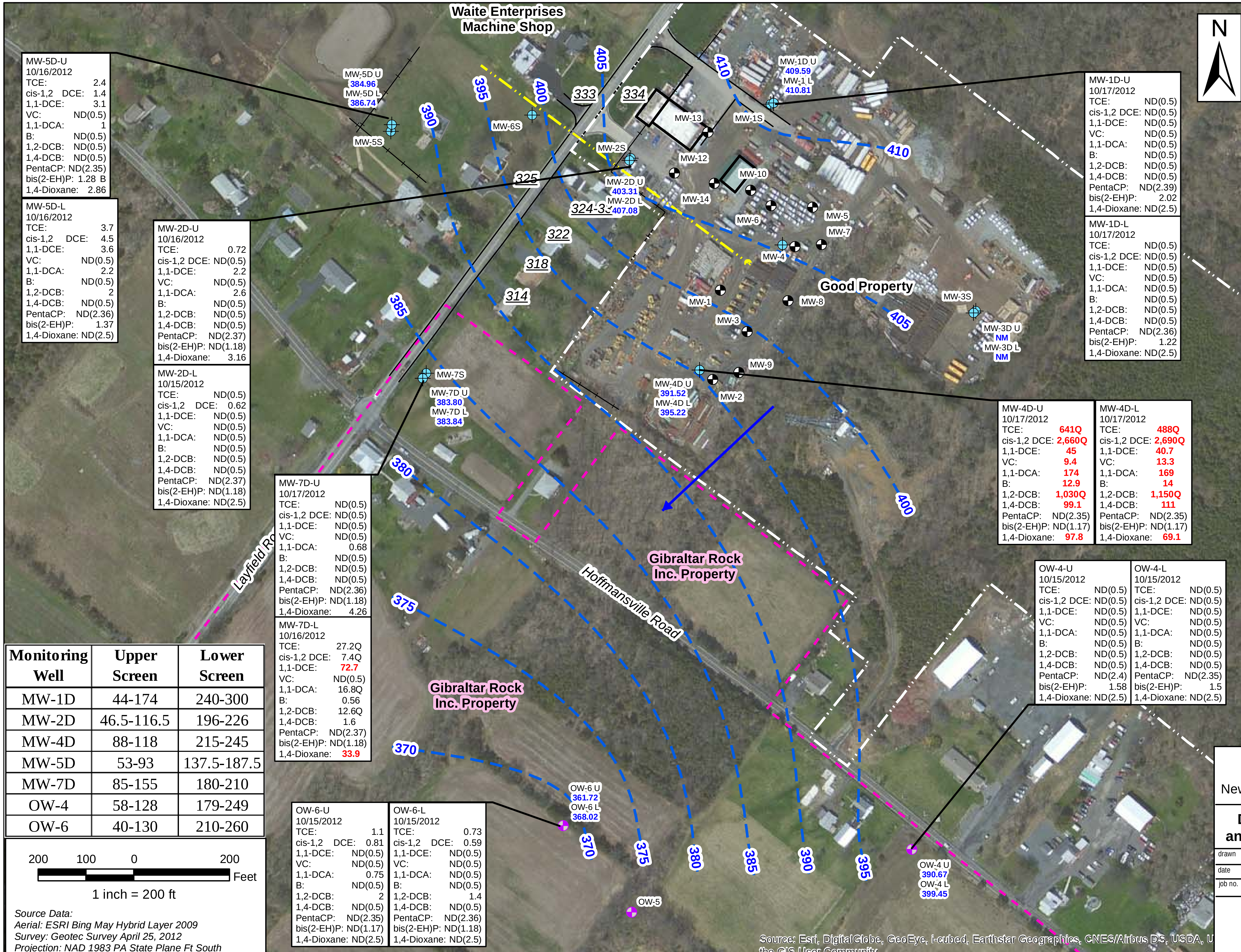

Monitoring Well	Upper Screen	Lower Screen
MW-1D	44-174	240-300
MW-2D	46.5-116.5	196-226
MW-4D	88-118	215-245
MW-5D	53-93	137.5-187.5
MW-7D	85-155	180-210
OW-4	58-128	179-249
OW-6	40-130	210-260

200 100 0 200 Feet

1 inch = 200 ft

Source Data:
Aerial: ESRI Bing May Hybrid Layer 2009
Survey: Geotec Survey April 25, 2012
Projection: NAD 1983 PA State Plane Ft South

Legend

- Good Oil LUST Well Location
- Shallow/Bedrock Monitoring Well Installed in April 2012
- GRI Monitoring Well Location
- Good Property Boundary
- GRI Property Boundary
- Historic pipeline with surface valve
- 384.49 Groundwater Elevation in feet above mean sea level (AMSL)
- Groundwater Elevation Contour for Lower Screen Interval in feet AMSL (Dashed where inferred)
- Inferred Groundwater Flow Direction

Well ID
Sample Date

Compound	GW MSC
Trichloroethene	5
cis-1,2-Dichloroethene	70
1,1-Dichloroethene	7
Vinyl Chloride	2
1,1-Dichloroethane	31
Benzene	5
1,2-Dichlorobenzene	600
1,4-Dichlorobenzene	75
Pentachlorophenol	1
bis(2-ethylhexyl)phthalate	6
1,4-Dioxane	6.4

ND Not Detected

NM Not Measured

Q Analysis was run multiple times

RP Results Pending

ug/l Micrograms per Liter

306 Bold red text indicates concentration that exceeds the applicable Used Aquifer Residential Act 2 MSC

All Sampling Results in ug/L

Hoff VC HSCA Site

New Hanover Township, Montgomery County, PA

Deep Bedrock Groundwater Elevation and Chemistry Map - October 15-17, 2012

drawn	checked	approved	figure no.
JWS	RLM	RLM	10
date 12/17/12	date 12/17/12	date	
job no.	file no.		

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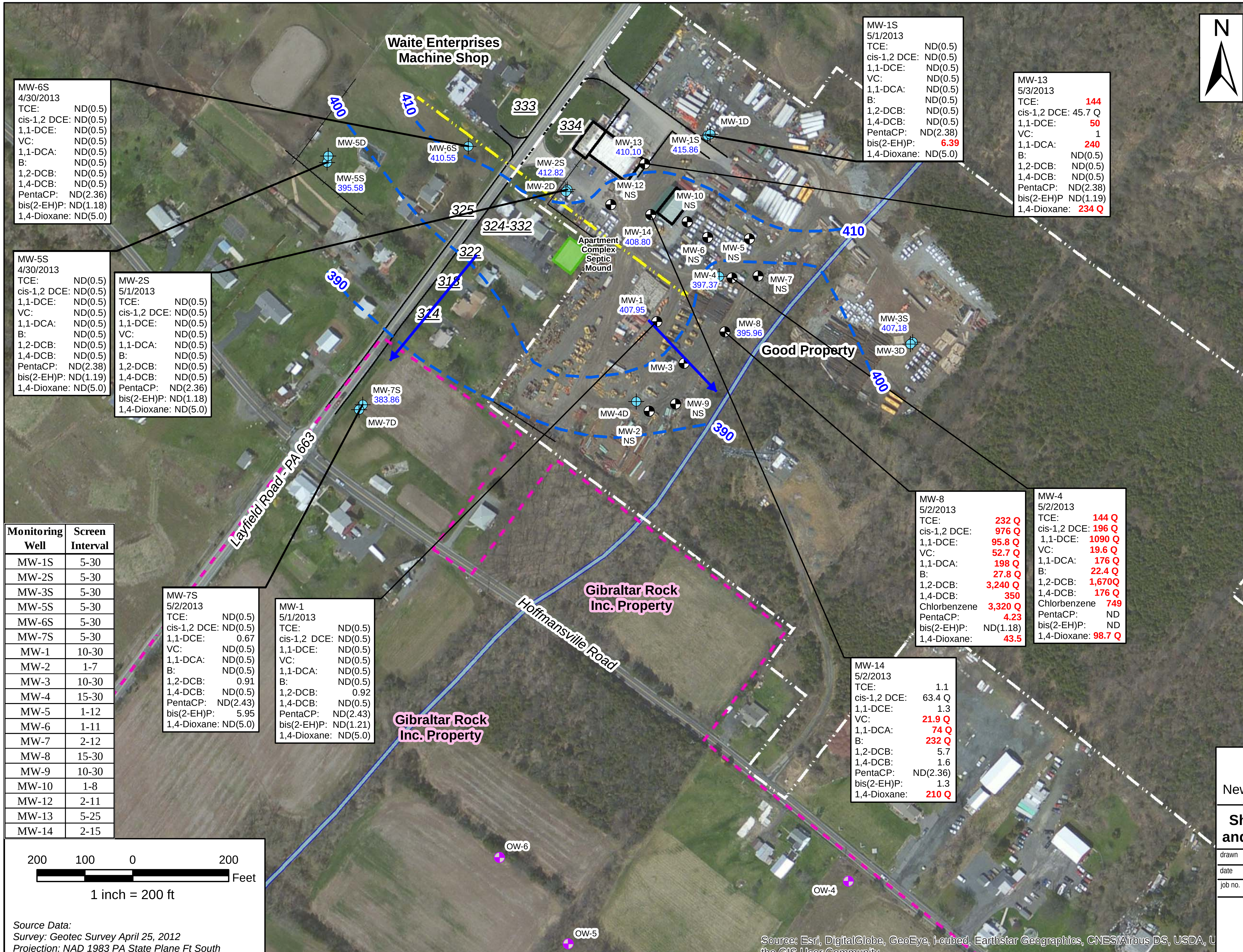

Monitoring Well	Screen Interval
MW-1S	5-30
MW-2S	5-30
MW-3S	5-30
MW-5S	5-30
MW-6S	5-30
MW-7S	5-30
MW-1	10-30
MW-2	1-7
MW-3	10-30
MW-4	15-30
MW-5	1-12
MW-6	1-11
MW-7	2-12
MW-8	15-30
MW-9	10-30
MW-10	1-8
MW-12	2-11
MW-13	5-25
MW-14	2-15

Legend

- Good Oil LUST Well Location
- Shallow/Bedrock Monitoring Well Installed in April 2012
- GRI Monitoring Well Location
- Good Property Boundary
- GRI Property Boundary
- Historic pipeline with surface valve
- Local Unnamed Tributary
- 384.49 Groundwater Elevation in feet above mean sea level (AMSL)
- Groundwater Elevation Contour in feet AMSL (Dashed where inferred)
- Inferred Groundwater Flow Direction
- * Elevation not used in groundwater contouring

Well ID
Sample Date

Compound	GW MSC
Trichloroethene	5
cis-1,2-Dichloroethene	70
1,1-Dichloroethene	7
Vinyl Chloride	2
1,1-Dichloroethane	31
Benzene	5
1,2-Dichlorobenzene	600
1,4-Dichlorobenzene	75
Chlorbenzene	100
Pentachlorophenol	1
bis(2-ethylhexyl)phthalate	6
1,4-Dioxane	6.4

ND Not Detected

Q Analysis was run multiple times

ug/l Micrograms per Liter

306 Bold red text indicates concentration that exceeds the applicable Used Aquifer Residential Act 2 MSC

All Sampling Results in ug/L

Hoff VC HSCA Site

New Hanover Township, Montgomery County, PA

Shallow Bedrock Groundwater Contour and Chemistry Map - April 30-May 3, 2013

drawn	JWS	checked	RLM	approved	RLM	figure no.
date	7/23/13	date		date		11
job no.		file no.				

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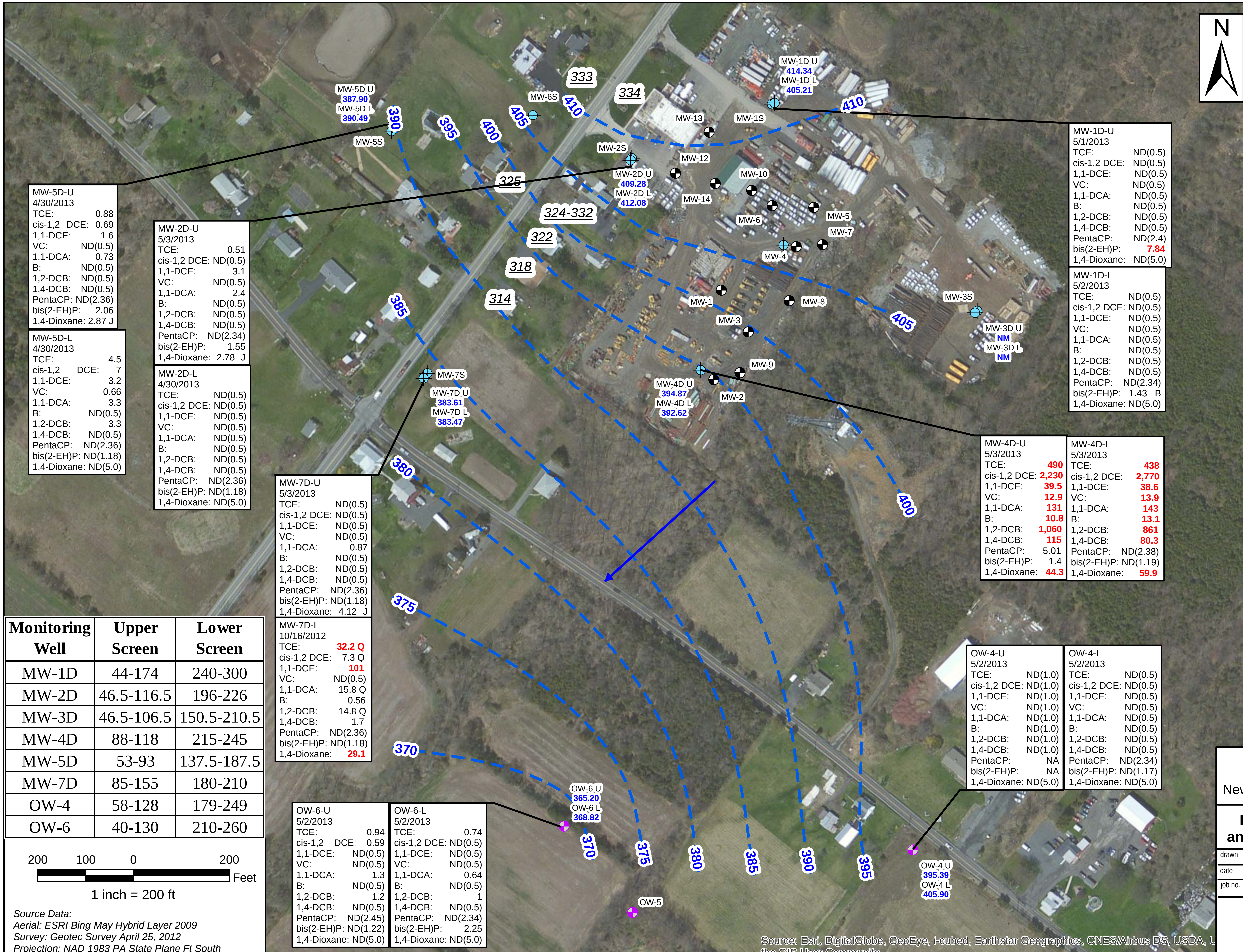

Compound	MW-5D-U 4/30/2013	MW-5D-L 4/30/2013	MW-2D-U 5/3/2013	MW-2D-L 4/30/2013	MW-7D-U 5/3/2013	MW-7D-L 10/16/2012
TCE:	0.88	4.5	0.51	ND(0.5)	ND(0.5)	**32.2 Q**
cis-1,2 DCE:	0.69	7	ND(0.5)	ND(0.5)	ND(0.5)	7.3 Q
1,1-DCE:	1.6	3.2	3.1	ND(0.5)	ND(0.5)	**101**
VC:	ND(0.5)	0.66	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)
1,1-DCA:	0.73	3.3	2.4	ND(0.5)	0.87	15.8 Q
B:	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	0.56
1,2-DCB:	ND(0.5)	3.3	ND(0.5)	ND(0.5)	ND(0.5)	14.8 Q
1,4-DCB:	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	1.7
PentaCP:	ND(2.36)	ND(2.36)	ND(2.34)	ND(2.36)	ND(2.36)	ND(2.36)
bis(2-EH)P:	2.06	ND(1.18)	1.55	ND(1.18)	ND(1.18)	ND(1.18)
1,4-Dioxane:	2.87 J	ND(5.0)	2.78 J	ND(5.0)	4.12 J	**29.1**

Compound	MW-1D-U 5/1/2013	MW-1D-L 5/2/2013	MW-4D-U 5/3/2013	MW-4D-L 5/3/2013
TCE:	ND(0.5)	ND(0.5)	**490**	**438**
cis-1,2 DCE:	ND(0.5)	ND(0.5)	**2,230**	**2,770**
1,1-DCE:	ND(0.5)	ND(0.5)	**39.5**	**38.6**
VC:	ND(0.5)	ND(0.5)	**12.9**	**13.9**
1,1-DCA:	ND(0.5)	ND(0.5)	**131**	**143**
B:	ND(0.5)	ND(0.5)	**10.8**	**13.1**
1,2-DCB:	ND(0.5)	ND(0.5)	**1,060**	**861**
1,4-DCB:	ND(0.5)	ND(0.5)	**115**	**80.3**
PentaCP:	ND(2.4)	ND(2.34)	5.01	ND(2.38)
bis(2-EH)P:	**7.84**	1.43 B	1.4	ND(1.19)
1,4-Dioxane:	ND(5.0)	ND(5.0)	**44.3**	**59.9**

Compound	OW-4-U 5/2/2013	OW-4-L 5/2/2013	OW-6-U 5/2/2013	OW-6-L 5/2/2013
TCE:	ND(1.0)	ND(0.5)	0.94	0.74
cis-1,2 DCE:	ND(1.0)	ND(0.5)	0.59	ND(0.5)
1,1-DCE:	ND(1.0)	ND(0.5)	ND(0.5)	ND(0.5)
VC:	ND(1.0)	ND(0.5)	ND(0.5)	ND(0.5)
1,1-DCA:	ND(1.0)	ND(0.5)	1.3	0.64
B:	ND(1.0)	ND(0.5)	ND(0.5)	ND(0.5)
1,2-DCB:	ND(1.0)	ND(0.5)	1.2	1
1,4-DCB:	ND(1.0)	ND(0.5)	ND(0.5)	ND(0.5)
PentaCP:	NA	ND(2.34)	ND(2.45)	ND(2.34)
bis(2-EH)P:	NA	ND(1.17)	ND(1.22)	2.25
1,4-Dioxane:	ND(5.0)	ND(5.0)	ND(5.0)	ND(5.0)

Monitoring Well	Upper Screen	Lower Screen
MW-1D	44-174	240-300
MW-2D	46.5-116.5	196-226
MW-3D	46.5-106.5	150.5-210.5
MW-4D	88-118	215-245
MW-5D	53-93	137.5-187.5
MW-7D	85-155	180-210
OW-4	58-128	179-249
OW-6	40-130	210-260

200 100 0 200 Feet

1 inch = 200 ft

Source Data:
Aerial: ESRI Bing May Hybrid Layer 2009
Survey: Geotec Survey April 25, 2012
Projection: NAD 1983 PA State Plane Ft South

Legend

- Good Oil LUST Well Location
- Shallow/Bedrock Monitoring Well Installed in April 2012
- GRI Monitoring Well Location
- Good Property Boundary
- GRI Property Boundary
- Historic pipeline with surface valve
- 384.49 Groundwater Elevation in feet above mean sea level (AMSL)
- Groundwater Elevation Contour for Lower Screen Interval in feet AMSL (Dashed where inferred)
- Inferred Groundwater Flow Direction

Well ID
Sample Date

Compound	GW MSC
Trichloroethene	5
cis-1,2-Dichloroethene	70
1,1-Dichloroethene	7
Vinyl Chloride	2
1,1-Dichloroethane	31
Benzene	5
1,2-Dichlorobenzene	600
1,4-Dichlorobenzene	75
Pentachlorophenol	1
bis(2-ethylhexyl)phthalate	6
1,4-Dioxane	6.4

ND Not Detected

NM Not Measured

Q Analysis was run multiple times

RP Results Pending

ug/l Micrograms per Liter

306 Bold red text indicates concentration that exceeds the applicable Used Aquifer Residential Act 2 MSC

All Sampling Results in ug/L

Hoff VC HSCA Site
New Hanover Township, Montgomery County, PA

Deep Bedrock Groundwater Elevation and Chemistry Map - April 30-May 3, 2013

drawn JWS	checked RLM	approved RLM	figure no.
date 7/8/2013	date	date	12
job no.	file no.		

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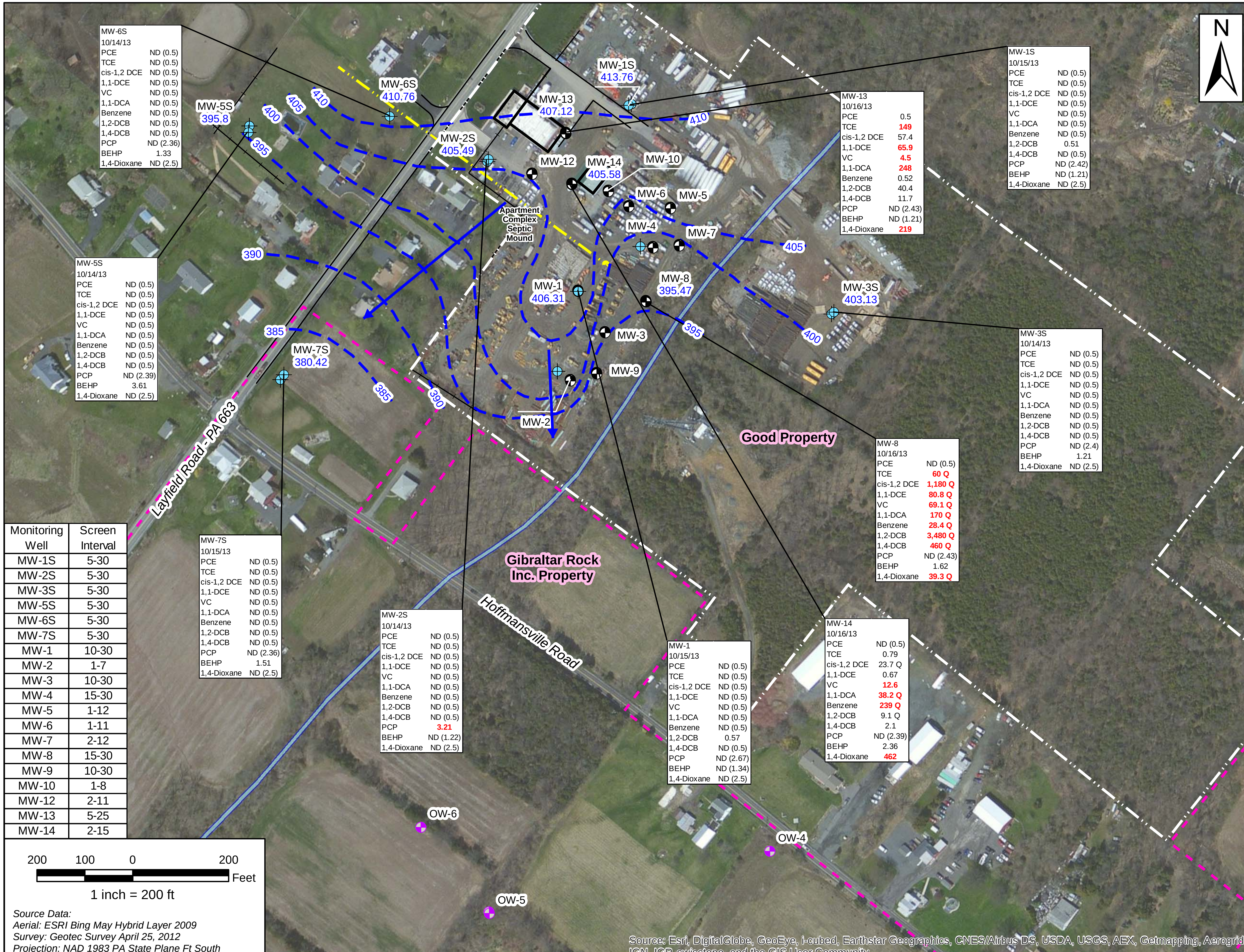

Monitoring Well	Screen Interval
MW-1S	5-30
MW-2S	5-30
MW-3S	5-30
MW-5S	5-30
MW-6S	5-30
MW-7S	5-30
MW-1	10-30
MW-2	1-7
MW-3	10-30
MW-4	15-30
MW-5	1-12
MW-6	1-11
MW-7	2-12
MW-8	15-30
MW-9	10-30
MW-10	1-8
MW-12	2-11
MW-13	5-25
MW-14	2-15

200 100 0 200 Feet

1 inch = 200 ft

Source Data:
Aerial: ESRI Bing May Hybrid Layer 2009
Survey: Geotec Survey April 25, 2012
Projection: NAD 1983 PA State Plane Ft South

Legend

- Good Oil LUST Well Location
- PADEP Monitoring Well
- GRI Monitoring Well Location
- Good Property Boundary
- GRI Property Boundary
- Historic pipeline with surface valve
- 384.49 Groundwater Elevation in feet above mean sea level (AMSL)
- Groundwater Elevation Contour for Lower Screen Interval in feet AMSL (Dashed where inferred)
- Inferred Groundwater Flow Direction
- Stream

Well ID
Sample Date

Compound	GW MSC
Trichloroethene	5
cis-1,2-Dichloroethene	70
1,1-Dichloroethene	7
Vinyl Chloride	2
1,1-Dichloroethane	31
Benzene	5
1,2-Dichlorobenzene	600
1,4-Dichlorobenzene	75
Pentachlorophenol	1
bis(2-ethylhexyl)phthalate	6
1,4-Dioxane	6.4

ND Not Detected

NM Not Measured

Q Analysis was run multiple times

µg/L Micrograms per Liter

306 Bold red text indicates concentration that exceeds the applicable Used Aquifer Residential Act 2 MSC

All Sampling Results in ug/L

Hoff VC HSCA Site

New Hanover Township, Montgomery County, PA

Shallow Bedrock Groundwater Contour and Chemistry Map - October, 2013

drawn TAY	checked RLM	approved RLM	figure no. 13
date 01/22/2014	date	date	
job no. 2601300116/3012		file no.	

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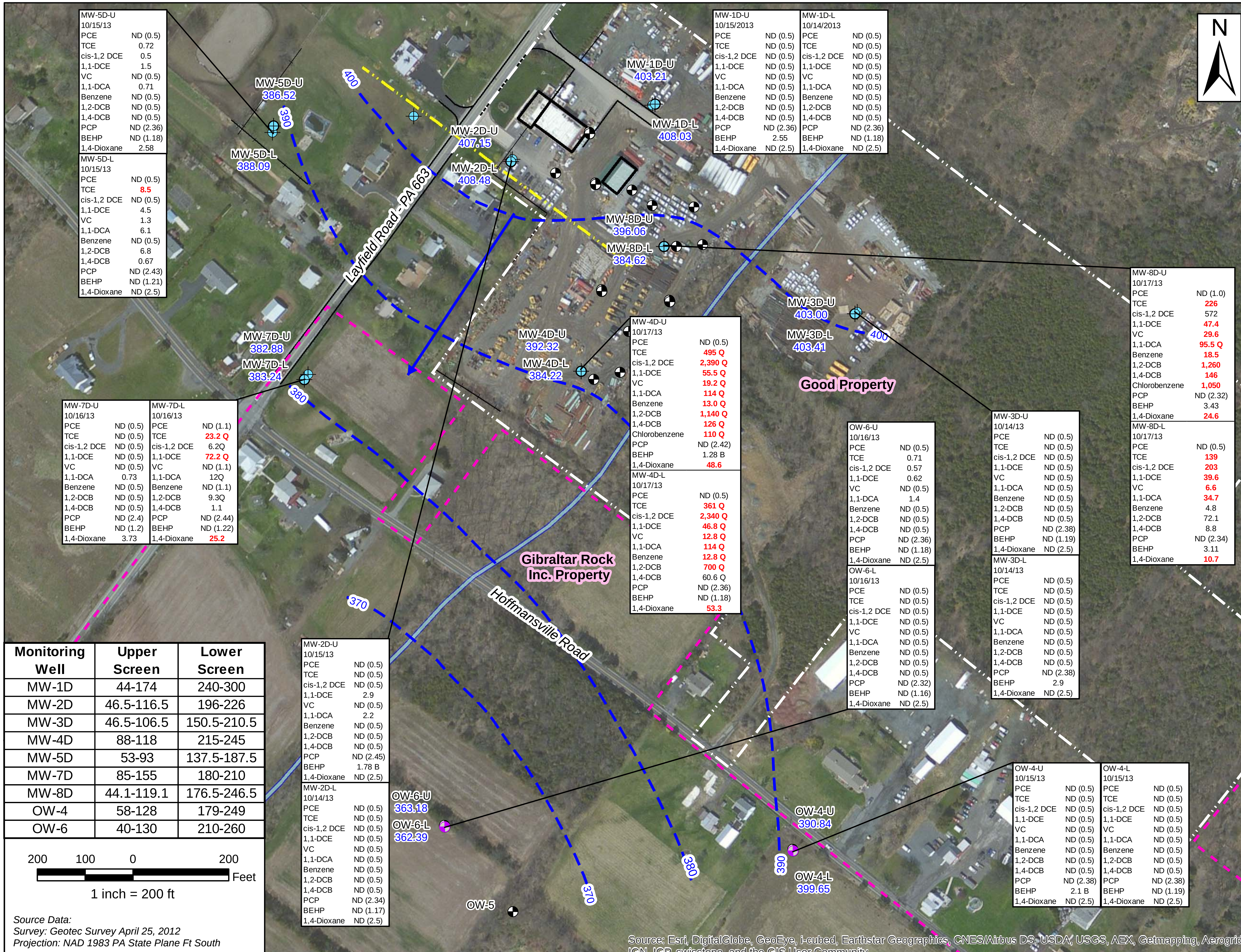
Path: G:\GTAC\Hoff_VC\Projects\3Q13\Oct13 Shallow Cont-Chem Map.mxd



MW-5D-U 10/15/13	
PCE	ND (0.5)
TCE	0.72
cis-1,2 DCE	0.5
1,1-DCE	1.5
VC	ND (0.5)
1,1-DCA	0.71
Benzene	ND (0.5)
1,2-DCB	ND (0.5)
1,4-DCB	ND (0.5)
PCP	ND (2.36)
BEHP	ND (1.18)
1,4-Dioxane	2.58

MW-5D-L 10/15/13	
PCE	ND (0.5)
TCE	**8.5**
cis-1,2 DCE	ND (0.5)
1,1-DCE	4.5
VC	1.3
1,1-DCA	6.1
Benzene	ND (0.5)
1,2-DCB	6.8
1,4-DCB	0.67
PCP	ND (2.43)
BEHP	ND (1.21)
1,4-Dioxane	ND (2.5)

MW-1D-U 10/15/2013		MW-1D-L 10/14/2013	
PCE	ND (0.5)	PCE	ND (0.5)
TCE	ND (0.5)	TCE	ND (0.5)
cis-1,2 DCE	ND (0.5)	cis-1,2 DCE	ND (0.5)
1,1-DCE	ND (0.5)	1,1-DCE	ND (0.5)
VC	ND (0.5)	VC	ND (0.5)
1,1-DCA	ND (0.5)	1,1-DCA	ND (0.5)
Benzene	ND (0.5)	Benzene	ND (0.5)
1,2-DCB	ND (0.5)	1,2-DCB	ND (0.5)
1,4-DCB	ND (0.5)	1,4-DCB	ND (0.5)
PCP	ND (2.36)	PCP	ND (2.36)
BEHP	2.55	BEHP	ND (1.18)
1,4-Dioxane	ND (2.5)	1,4-Dioxane	ND (2.5)

MW-8D-U 10/17/13	
PCE	ND (1.0)
TCE	**226**
cis-1,2 DCE	572
1,1-DCE	**47.4**
VC	**29.6**
1,1-DCA	**95.5 Q**
Benzene	**18.5**
1,2-DCB	**1,260**
1,4-DCB	**146**
Chlorobenzene	**1,050**
PCP	ND (2.32)
BEHP	3.43
1,4-Dioxane	**24.6**

MW-8D-L 10/17/13	
PCE	ND (0.5)
TCE	**139**
cis-1,2 DCE	**203**
1,1-DCE	**39.6**
VC	**6.6**
1,1-DCA	**34.7**
Benzene	4.8
1,2-DCB	72.1
1,4-DCB	8.8
PCP	ND (2.34)
BEHP	3.11
1,4-Dioxane	**10.7**

MW-7D-U 10/16/13		MW-7D-L 10/16/13	
PCE	ND (0.5)	PCE	ND (1.1)
TCE	ND (0.5)	TCE	**23.2 Q**
cis-1,2 DCE	ND (0.5)	cis-1,2 DCE	6.2Q
1,1-DCE	ND (0.5)	1,1-DCE	**72.2 Q**
VC	ND (0.5)	VC	ND (1.1)
1,1-DCA	0.73	1,1-DCA	12Q
Benzene	ND (0.5)	Benzene	ND (1.1)
1,2-DCB	ND (0.5)	1,2-DCB	9.3Q
1,4-DCB	ND (0.5)	1,4-DCB	1.1
PCP	ND (2.4)	PCP	ND (2.44)
BEHP	ND (1.2)	BEHP	ND (1.22)
1,4-Dioxane	3.73	1,4-Dioxane	**25.2**

MW-4D-U 10/17/13	
PCE	ND (0.5)
TCE	**495 Q**
cis-1,2 DCE	**2,390 Q**
1,1-DCE	**55.5 Q**
VC	**19.2 Q**
1,1-DCA	**114 Q**
Benzene	**13.0 Q**
1,2-DCB	**1,140 Q**
1,4-DCB	**126 Q**
Chlorobenzene	**110 Q**
PCP	ND (2.42)
BEHP	1.28 B
1,4-Dioxane	**48.6**

MW-4D-L 10/17/13	
PCE	ND (0.5)
TCE	**361 Q**
cis-1,2 DCE	**2,340 Q**
1,1-DCE	**46.8 Q**
VC	**12.8 Q**
1,1-DCA	**114 Q**
Benzene	**12.8 Q**
1,2-DCB	**700 Q**
1,4-DCB	60.6 Q
PCP	ND (2.36)
BEHP	ND (1.18)
1,4-Dioxane	**53.3**

OW-6-U 10/16/13	
PCE	ND (0.5)
TCE	0.71
cis-1,2 DCE	0.57
1,1-DCE	0.62
VC	ND (0.5)
1,1-DCA	1.4
Benzene	ND (0.5)
1,2-DCB	ND (0.5)
1,4-DCB	ND (0.5)
PCP	ND (2.36)
BEHP	ND (1.18)
1,4-Dioxane	ND (2.5)

OW-6-L 10/16/13	
PCE	ND (0.5)
TCE	ND (0.5)
cis-1,2 DCE	ND (0.5)
1,1-DCE	ND (0.5)
VC	ND (0.5)
1,1-DCA	ND (0.5)
Benzene	ND (0.5)
1,2-DCB	ND (0.5)
1,4-DCB	ND (0.5)
PCP	ND (2.32)
BEHP	ND (1.16)
1,4-Dioxane	ND (2.5)

MW-3D-U 10/14/13	
PCE	ND (0.5)
TCE	ND (0.5)
cis-1,2 DCE	ND (0.5)
1,1-DCE	ND (0.5)
VC	ND (0.5)
1,1-DCA	ND (0.5)
Benzene	ND (0.5)
1,2-DCB	ND (0.5)
1,4-DCB	ND (0.5)
PCP	ND (2.38)
BEHP	ND (1.19)
1,4-Dioxane	ND (2.5)

MW-3D-L 10/14/13	
PCE	ND (0.5)
TCE	ND (0.5)
cis-1,2 DCE	ND (0.5)
1,1-DCE	ND (0.5)
VC	ND (0.5)
1,1-DCA	ND (0.5)
Benzene	ND (0.5)
1,2-DCB	ND (0.5)
1,4-DCB	ND (0.5)
PCP	ND (2.38)
BEHP	2.9
1,4-Dioxane	ND (2.5)

MW-2D-U 10/15/13	
PCE	ND (0.5)
TCE	ND (0.5)
cis-1,2 DCE	ND (0.5)
1,1-DCE	2.9
VC	ND (0.5)
1,1-DCA	2.2
Benzene	ND (0.5)
1,2-DCB	ND (0.5)
1,4-DCB	ND (0.5)
PCP	ND (2.45)
BEHP	1.78 B
1,4-Dioxane	ND (2.5)

MW-2D-L 10/14/13	
PCE	ND (0.5)
TCE	ND (0.5)
cis-1,2 DCE	ND (0.5)
1,1-DCE	ND (0.5)
VC	ND (0.5)
1,1-DCA	ND (0.5)
Benzene	ND (0.5)
1,2-DCB	ND (0.5)
1,4-DCB	ND (0.5)
PCP	ND (2.34)
BEHP	ND (1.17)
1,4-Dioxane	ND (2.5)

OW-4-U 10/15/13		OW-4-L 10/15/13	
PCE	ND (0.5)	PCE	ND (0.5)
TCE	ND (0.5)	TCE	ND (0.5)
cis-1,2 DCE	ND (0.5)	cis-1,2 DCE	ND (0.5)
1,1-DCE	ND (0.5)	1,1-DCE	ND (0.5)
VC	ND (0.5)	VC	ND (0.5)
1,1-DCA	ND (0.5)	1,1-DCA	ND (0.5)
Benzene	ND (0.5)	Benzene	ND (0.5)
1,2-DCB	ND (0.5)	1,2-DCB	ND (0.5)
1,4-DCB	ND (0.5)	1,4-DCB	ND (0.5)
PCP	ND (2.38)	PCP	ND (2.38)
BEHP	2.1 B	BEHP	ND (1.19)
1,4-Dioxane	ND (2.5)	1,4-Dioxane	ND (2.5)

Monitoring Well	Upper Screen	Lower Screen
MW-1D	44-174	240-300
MW-2D	46.5-116.5	196-226
MW-3D	46.5-106.5	150.5-210.5
MW-4D	88-118	215-245
MW-5D	53-93	137.5-187.5
MW-7D	85-155	180-210
MW-8D	44.1-119.1	176.5-246.5
OW-4	58-128	179-249
OW-6	40-130	210-260

200 100 0 200 Feet

1 inch = 200 ft

Source Data:
Survey: Geotec Survey April 25, 2012
Projection: NAD 1983 PA State Plane Ft South

Legend

Good Oil LUST Well Location

PADEP Monitoring Well

GRI Monitoring Well Location

Good Property Boundary

GRI Property Boundary

Historic pipeline with surface valve

384.49 Groundwater Elevation in feet above mean sea level (AMSL)

Groundwater Elevation Contour for Lower Screen Interval in feet AMSL (Dashed where inferred)

Inferred Groundwater Flow Direction

Stream

Well ID Sample Date Compound	GW MSC
Trichloroethene	5
cis-1,2-Dichloroethene	70
1,1-Dichloroethene	7
Vinyl Chloride	2
1,1-Dichloroethane	31
Benzene	5
1,2-Dichlorobenzene	600
1,4-Dichlorobenzene	75
Chlorobenzene	100
Pentachlorophenol	1
bis(2-ethylhexyl)phthalate	6
1,4-Dioxane	6.4

ND Not Detected

NM Not Measured

Q Analysis was run multiple times

µg/L Micrograms per Liter

306 Bold red text indicates concentration that exceeds the applicable Used Aquifer Residential Act 2 MSC

All Sampling Results in ug/L

Hoff VC HSCA Site

New Hanover Township, Montgomery County, PA

Deep Bedrock Groundwater Contour and Chemistry Map - October, 2013

drawn	TAY	checked	RLM	approved	RLM	figure no.
date	01/22/2014	date		date		14
job no.	2601300116/3012			file no.		

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Path: G:\GTAC\Hoff_VC\Projects\3Q13\Oct13 Deep Cont-Chem Map.mxd

Monitoring Well	Screen Interval
MW-1S	5-30
MW-2S	5-30
MW-3S	5-30
MW-5S	5-30
MW-6S	5-30
MW-7S	5-30
MW-1	10-30
MW-2	1-7
MW-3	10-30
MW-4	15-30
MW-5	1-12
MW-6	1-11
MW-7	2-12
MW-8	15-30
MW-9	10-30
MW-10	1-8
MW-12	2-11
MW-13	5-25
MW-14	2-15

300 150 0 300 Feet

1 inch = 300 feet

Source Data:
Survey: Geotec Survey April 25, 2012
Projection: NAD 1983 PA State Plane Ft South

Legend

- Good Oil LUST Well Location
- PADEP Monitoring Well
- GRI Monitoring Well Location
- Groundwater Elevation Contour in feet AMSL (Dashed where inferred)
- Inferred Groundwater Flow Direction
- GRI Property Boundary
- Good Property Boundary
- Stream
- Historic pipeline with surface valve

389.43 - Groundwater Elevation in feet above mean sea level (AMSL)

Compound	Well ID / Sample Date / GW MSC
Tetrachloroethene	5
Trichloroethene	5
cis-1,2 Dichloroethene	70
1,1-Dichloroethene	7
Vinyl Chloride	2
1,1-DCA:	31
Benzene:	5
1,2-Dichlorobenzene	600
1,4-Dichlorobenzene	75
Pentachlorophenol	1
bis(2-ethylhexyl)phthalate	6
1,4-Dioxane	6.4

ND - Not Detected

NM - Not Measured

µg/L - Micrograms per Liter

All sampling results in µg/L

306 - Bold red text indicates concentration that exceeds the applicable Used Aquifer Residential Act 2 MSC

Hoff VC HSCA Site

New Hanover Township, Montgomery County, PA

Shallow Bedrock Groundwater Contour and Chemistry Map - July 2014

drawn	TAY	checked	RLM	approved	RLM	figure no.
date	07/29/2014	date		date		15
job no.	2601300116/3012			file no.		

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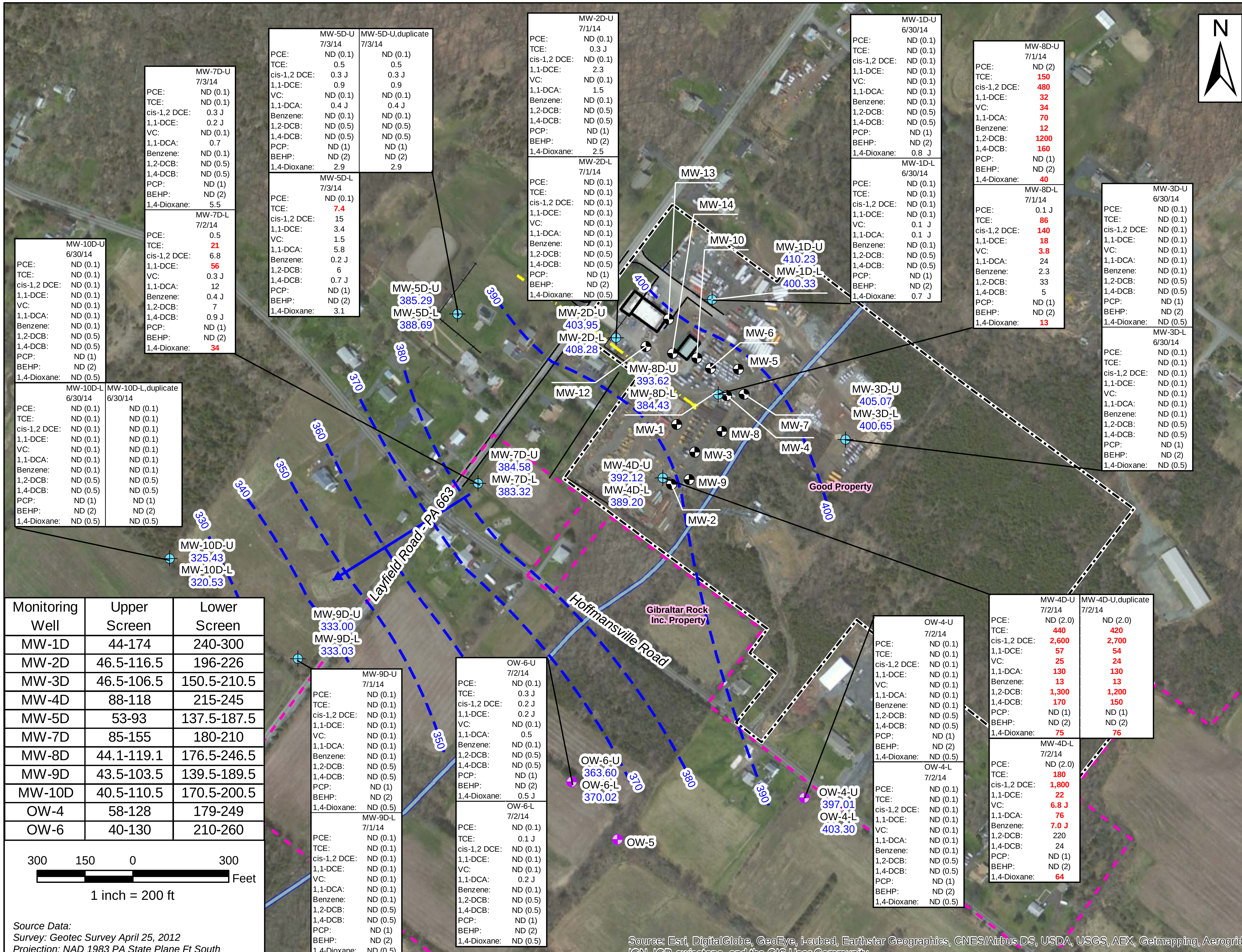
Path: G:\GTAC\Hoff_VC\Projects\3Q14\3Q14 Shallow Cont-Chem Map.mxd



	MW-7D-U 7/3/14
PCE:	ND (0.1)
TCE:	ND (0.1)
cis-1,2 DCE:	0.3 J
1,1-DCE:	0.2 J
VC:	ND (0.1)
1,1-DCA:	0.7
Benzene:	ND (0.1)
1,2-DCB:	ND (0.5)
1,4-DCB:	ND (0.5)
PCP:	ND (1)
BEHP:	ND (2)
1,4-Dioxane:	5.5

	MW-7D-L 7/2/14
PCE:	0.5
TCE:	**21**
cis-1,2 DCE:	6.8
1,1-DCE:	**56**
VC:	0.3 J
1,1-DCA:	12
Benzene:	0.4 J
1,2-DCB:	7
1,4-DCB:	0.9 J
PCP:	ND (1)
BEHP:	ND (2)
1,4-Dioxane:	**34**

	MW-5D-U 7/3/14	MW-5D-U,duplicate 7/3/14
PCE:	ND (0.1)	ND (0.1)
TCE:	0.5	0.5
cis-1,2 DCE:	0.3 J	0.3 J
1,1-DCE:	0.9	0.9
VC:	ND (0.1)	ND (0.1)
1,1-DCA:	0.4 J	0.4 J
Benzene:	ND (0.1)	ND (0.1)
1,2-DCB:	ND (0.5)	ND (0.5)
1,4-DCB:	ND (0.5)	ND (0.5)
PCP:	ND (1)	ND (1)
BEHP:	ND (2)	ND (2)
1,4-Dioxane:	2.9	2.9

	MW-5D-L 7/3/14
PCE:	ND (0.1)
TCE:	**7.4**
cis-1,2 DCE:	15
1,1-DCE:	3.4
VC:	1.5
1,1-DCA:	5.8
Benzene:	0.2 J
1,2-DCB:	6
1,4-DCB:	0.7 J
PCP:	ND (1)
BEHP:	ND (2)
1,4-Dioxane:	3.1

	MW-2D-U 7/1/14
PCE:	ND (0.1)
TCE:	0.3 J
cis-1,2 DCE:	ND (0.1)
1,1-DCE:	2.3
VC:	ND (0.1)
1,1-DCA:	1.5
Benzene:	ND (0.1)
1,2-DCB:	ND (0.5)
1,4-DCB:	ND (0.5)
PCP:	ND (1)
BEHP:	ND (2)
1,4-Dioxane:	2.5

	MW-2D-L 7/1/14
PCE:	ND (0.1)
TCE:	ND (0.1)
cis-1,2 DCE:	ND (0.1)
1,1-DCE:	ND (0.1)
VC:	ND (0.1)
1,1-DCA:	ND (0.1)
Benzene:	ND (0.1)
1,2-DCB:	ND (0.5)
1,4-DCB:	ND (0.5)
PCP:	ND (1)
BEHP:	ND (2)
1,4-Dioxane:	ND (0.5)

	MW-1D-U 6/30/14
PCE:	ND (0.1)
TCE:	ND (0.1)
cis-1,2 DCE:	ND (0.1)
1,1-DCE:	ND (0.1)
VC:	ND (0.1)
1,1-DCA:	ND (0.1)
Benzene:	ND (0.1)
1,2-DCB:	ND (0.5)
1,4-DCB:	ND (0.5)
PCP:	ND (1)
BEHP:	ND (2)
1,4-Dioxane:	0.8 J

	MW-1D-L 6/30/14
PCE:	ND (0.1)
TCE:	ND (0.1)
cis-1,2 DCE:	ND (0.1)
1,1-DCE:	ND (0.1)
VC:	0.1 J
1,1-DCA:	0.1 J
Benzene:	ND (0.1)
1,2-DCB:	ND (0.5)
1,4-DCB:	ND (0.5)
PCP:	ND (1)
BEHP:	ND (2)
1,4-Dioxane:	0.7 J

	MW-8D-U 7/1/14
PCE:	ND (2)
TCE:	**150**
cis-1,2 DCE:	**480**
1,1-DCE:	**32**
VC:	**34**
1,1-DCA:	**70**
Benzene:	**12**
1,2-DCB:	**1200**
1,4-DCB:	**160**
PCP:	ND (1)
BEHP:	ND (2)
1,4-Dioxane:	**40**

	MW-8D-L 7/1/14
PCE:	0.1 J
TCE:	**86**
cis-1,2 DCE:	**140**
1,1-DCE:	**18**
VC:	**3.8**
1,1-DCA:	24
Benzene:	2.3
1,2-DCB:	33
1,4-DCB:	5
PCP:	ND (1)
BEHP:	ND (2)
1,4-Dioxane:	**13**

	MW-3D-U 6/30/14
PCE:	ND (0.1)
TCE:	ND (0.1)
cis-1,2 DCE:	ND (0.1)
1,1-DCE:	ND (0.1)
VC:	ND (0.1)
1,1-DCA:	ND (0.1)
Benzene:	ND (0.1)
1,2-DCB:	ND (0.5)
1,4-DCB:	ND (0.5)
PCP:	ND (1)
BEHP:	ND (2)
1,4-Dioxane:	ND (0.5)

	MW-3D-L 6/30/14
PCE:	ND (0.1)
TCE:	ND (0.1)
cis-1,2 DCE:	ND (0.1)
1,1-DCE:	ND (0.1)
VC:	ND (0.1)
1,1-DCA:	ND (0.1)
Benzene:	ND (0.1)
1,2-DCB:	ND (0.5)
1,4-DCB:	ND (0.5)
PCP:	ND (1)
BEHP:	ND (2)
1,4-Dioxane:	ND (0.5)

	MW-10D-U 6/30/14
PCE:	ND (0.1)
TCE:	ND (0.1)
cis-1,2 DCE:	ND (0.1)
1,1-DCE:	ND (0.1)
VC:	ND (0.1)
1,1-DCA:	ND (0.1)
Benzene:	ND (0.1)
1,2-DCB:	ND (0.5)
1,4-DCB:	ND (0.5)
PCP:	ND (1)
BEHP:	ND (2)
1,4-Dioxane:	ND (0.5)

	MW-10D-L 6/30/14	MW-10D-L,duplicate 6/30/14
PCE:	ND (0.1)	ND (0.1)
TCE:	ND (0.1)	ND (0.1)
cis-1,2 DCE:	ND (0.1)	ND (0.1)
1,1-DCE:	ND (0.1)	ND (0.1)
VC:	ND (0.1)	ND (0.1)
1,1-DCA:	ND (0.1)	ND (0.1)
Benzene:	ND (0.1)	ND (0.1)
1,2-DCB:	ND (0.5)	ND (0.5)
1,4-DCB:	ND (0.5)	ND (0.5)
PCP:	ND (1)	ND (1)
BEHP:	ND (2)	ND (2)
1,4-Dioxane:	ND (0.5)	ND (0.5)

	MW-9D-U 7/1/14
PCE:	ND (0.1)
TCE:	ND (0.1)
cis-1,2 DCE:	ND (0.1)
1,1-DCE:	ND (0.1)
VC:	ND (0.1)
1,1-DCA:	ND (0.1)
Benzene:	ND (0.1)
1,2-DCB:	ND (0.5)
1,4-DCB:	ND (0.5)
PCP:	ND (1)
BEHP:	ND (2)
1,4-Dioxane:	ND (0.5)

	MW-9D-L 7/1/14
PCE:	ND (0.1)
TCE:	ND (0.1)
cis-1,2 DCE:	ND (0.1)
1,1-DCE:	ND (0.1)
VC:	ND (0.1)
1,1-DCA:	ND (0.1)
Benzene:	ND (0.1)
1,2-DCB:	ND (0.5)
1,4-DCB:	ND (0.5)
PCP:	ND (1)
BEHP:	ND (2)
1,4-Dioxane:	ND (0.5)

	OW-6-U 7/2/14
PCE:	ND (0.1)
TCE:	0.3 J
cis-1,2 DCE:	0.2 J
1,1-DCE:	0.2 J
VC:	ND (0.1)
1,1-DCA:	0.5
Benzene:	ND (0.1)
1,2-DCB:	ND (0.5)
1,4-DCB:	ND (0.5)
PCP:	ND (1)
BEHP:	ND (2)
1,4-Dioxane:	0.5 J

	OW-6-L 7/2/14
PCE:	ND (0.1)
TCE:	0.1 J
cis-1,2 DCE:	ND (0.1)
1,1-DCE:	ND (0.1)
VC:	ND (0.1)
1,1-DCA:	0.2 J
Benzene:	ND (0.1)
1,2-DCB:	ND (0.5)
1,4-DCB:	ND (0.5)
PCP:	ND (1)
BEHP:	ND (2)
1,4-Dioxane:	ND (0.5)

	OW-4-U 7/2/14
PCE:	ND (0.1)
TCE:	ND (0.1)
cis-1,2 DCE:	ND (0.1)
1,1-DCE:	ND (0.1)
VC:	ND (0.1)
1,1-DCA:	ND (0.1)
Benzene:	ND (0.1)
1,2-DCB:	ND (0.5)
1,4-DCB:	ND (0.5)
PCP:	ND (1)
BEHP:	ND (2)
1,4-Dioxane:	ND (0.5)

	OW-4-L 7/2/14
PCE:	ND (0.1)
TCE:	ND (0.1)
cis-1,2 DCE:	ND (0.1)
1,1-DCE:	ND (0.1)
VC:	ND (0.1)
1,1-DCA:	ND (0.1)
Benzene:	ND (0.1)
1,2-DCB:	ND (0.5)
1,4-DCB:	ND (0.5)
PCP:	ND (1)
BEHP:	ND (2)
1,4-Dioxane:	ND (0.5)

	MW-4D-U 7/2/14	MW-4D-U,duplicate 7/2/14
PCE:	ND (2.0)	ND (2.0)
TCE:	**440**	**420**
cis-1,2 DCE:	**2,600**	**2,700**
1,1-DCE:	**57**	**54**
VC:	**25**	**24**
1,1-DCA:	**130**	**130**
Benzene:	**13**	**13**
1,2-DCB:	**1,300**	**1,200**
1,4-DCB:	**170**	**150**
PCP:	ND (1)	ND (1)
BEHP:	ND (2)	ND (2)
1,4-Dioxane:	**75**	**76**

	MW-4D-L 7/2/14
PCE:	ND (2.0)
TCE:	**180**
cis-1,2 DCE:	**1,800**
1,1-DCE:	**22**
VC:	**6.8 J**
1,1-DCA:	**76**
Benzene:	**7.0 J**
1,2-DCB:	220
1,4-DCB:	24
PCP:	ND (1)
BEHP:	ND (2)
1,4-Dioxane:	**64**

Monitoring Well	Upper Screen	Lower Screen
MW-1D	44-174	240-300
MW-2D	46.5-116.5	196-226
MW-3D	46.5-106.5	150.5-210.5
MW-4D	88-118	215-245
MW-5D	53-93	137.5-187.5
MW-7D	85-155	180-210
MW-8D	44.1-119.1	176.5-246.5
MW-9D	43.5-103.5	139.5-189.5
MW-10D	40.5-110.5	170.5-200.5
OW-4	58-128	179-249
OW-6	40-130	210-260

300 150 0 300 Feet

1 inch = 200 ft

Source Data:
Survey: Geotec Survey April 25, 2012
Projection: NAD 1983 PA State Plane Ft South

Legend

- Good Oil LUST Well Location
- PADEP Monitoring Well
- GRI Monitoring Well Location
- Groundwater Elevation Contour for Lower Screen Interval in feet AMSL (Dashed where inferred)
- Inferred Groundwater Flow Direction
- GRI Property Boundary
- Good Property Boundary
- Stream
- Historic pipeline with surface valve

389.43 - Groundwater Elevation in feet above mean sea level (AMSL)

Compound	Well ID Sample Date GW MSC
Tetrachloroethene	5
Trichloroethene	5
cis-1,2 Dichloroethene	70
1,1-Dichloroethene	7
Vinyl Chloride	2
1,1-DCA:	31
Benzene:	5
1,2-Dichlorobenzene	600
1,4-Dichlorobenzene	75
Pentachlorophenol	1
bis(2-ethylhexyl)phthalate	6
1,4-Dioxane	6.4

ND - Not Detected

NM - Not Measured

µg/L - Micrograms per Liter

All sampling results in µg/L

306 - Bold red text indicates concentration that exceeds the applicable Used Aquifer Residential Act 2 MSC

Hoff VC HSCA Site

New Hanover Township, Montgomery County, PA

Deep Bedrock Groundwater Contour and Chemistry Map - July 2014

drawn TAY	checked RLM	approved RLM	figure no. 16
date 07/29/2014	date	date	
job no. 2601300116/3012		file no.	

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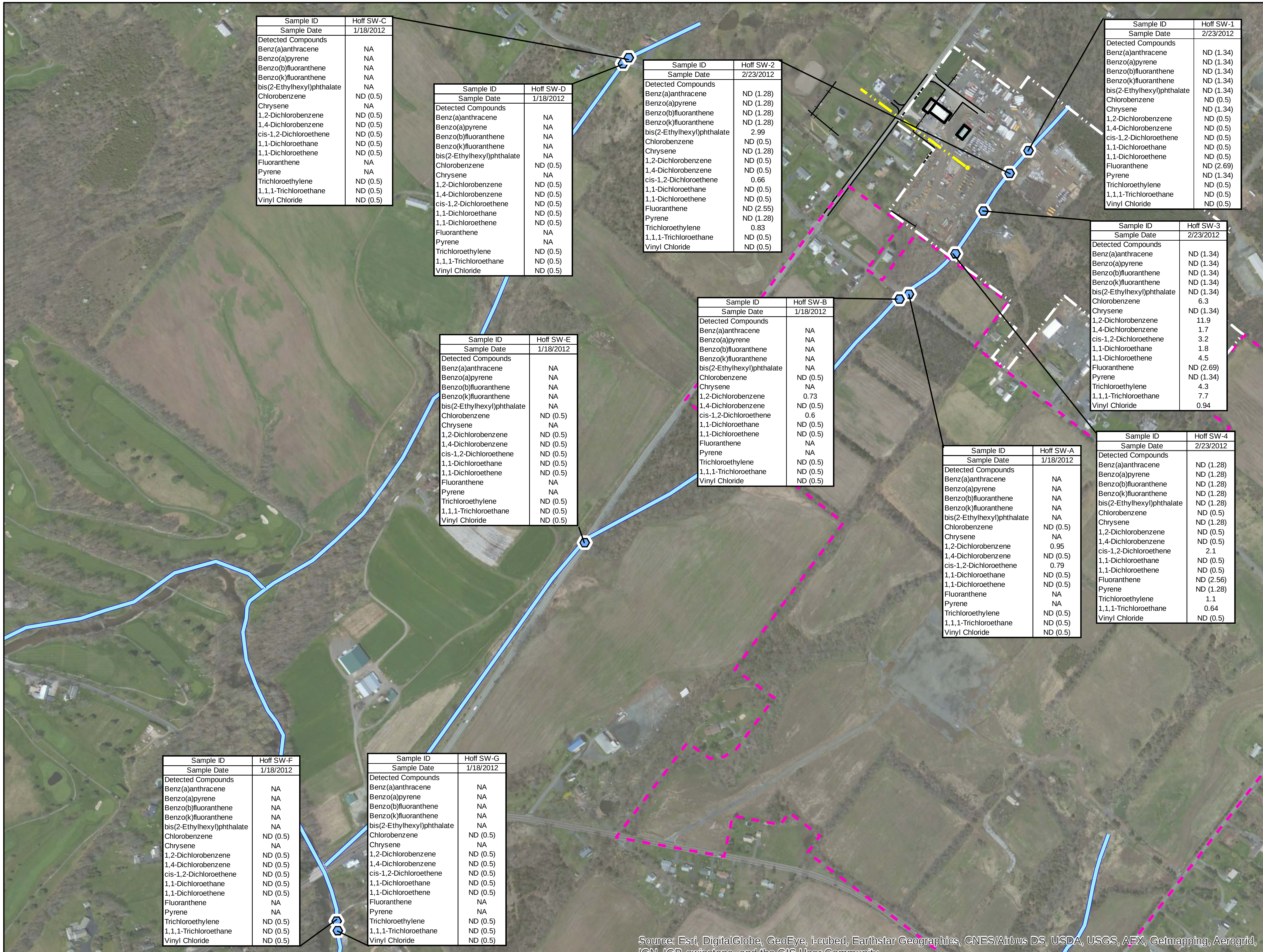
Path: G:\GTAC\Hoff_VC\Projects\3Q14\3Q14 Deep Cont-Chem Map.mxd



Sample ID	Hoff SW-C	Hoff SW-D	Hoff SW-2	Hoff SW-1	Hoff SW-E	Hoff SW-B	Hoff SW-3	Hoff SW-A	Hoff SW-4	Hoff SW-F	Hoff SW-G
Sample Date	1/18/2012	1/18/2012	2/23/2012	2/23/2012	1/18/2012	1/18/2012	2/23/2012	1/18/2012	2/23/2012	1/18/2012	1/18/2012
Detected Compounds											
Benz(a)anthracene	NA	NA	ND (1.28)	ND (1.34)	NA	NA	ND (1.34)	NA	ND (1.28)	NA	NA
Benzo(a)pyrene	NA	NA	ND (1.28)	ND (1.34)	NA	NA	ND (1.34)	NA	ND (1.28)	NA	NA
Benzo(b)fluoranthene	NA	NA	ND (1.28)	ND (1.34)	NA	NA	ND (1.34)	NA	ND (1.28)	NA	NA
Benzo(k)fluoranthene	NA	NA	ND (1.28)	ND (1.34)	NA	NA	ND (1.34)	NA	ND (1.28)	NA	NA
bis(2-Ethylhexyl)phthalate	NA	NA	2.99	ND (1.34)	NA	NA	ND (1.34)	NA	ND (1.28)	NA	NA
Chlorobenzene	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	6.3	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
Chrysene	NA	NA	ND (1.28)	ND (1.34)	NA	NA	ND (1.34)	NA	ND (1.28)	NA	NA
1,2-Dichlorobenzene	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	0.73	11.9	0.95	ND (0.5)	ND (0.5)	ND (0.5)
1,4-Dichlorobenzene	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	1.7	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
cis-1,2-Dichloroethene	ND (0.5)	ND (0.5)	0.66	ND (0.5)	ND (0.5)	0.6	3.2	0.79	2.1	ND (0.5)	ND (0.5)
1,1-Dichloroethane	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	1.8	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
1,1-Dichloroethene	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	4.5	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
Fluoranthene	NA	NA	ND (2.55)	ND (2.69)	NA	NA	ND (2.69)	NA	ND (2.56)	NA	NA
Pyrene	NA	NA	ND (1.28)	ND (1.34)	NA	NA	ND (1.34)	NA	ND (1.28)	NA	NA
Trichloroethylene	ND (0.5)	ND (0.5)	0.83	ND (0.5)	ND (0.5)	ND (0.5)	4.3	ND (0.5)	1.1	ND (0.5)	ND (0.5)
1,1,1-Trichloroethane	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	7.7	ND (0.5)	0.64	ND (0.5)	ND (0.5)
Vinyl Chloride	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	0.94	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)

Legend

Surface Water Sampling Location

Good Property Boundary

GRI Property Boundary

Historic pipeline with surface valve

Surface Water Feature

ND Not Detected

NA Not Analyzed

Detected Results Presented in Micrograms per Liter (µg/L)

Well ID	
Sample Date	
Compound	WQC
Benz(a)anthracene	0.0038
Benzo(a)pyrene	0.0038
Benzo(b)fluoranthene	0.0038
Benzo(k)fluoranthene	0.0038
bis(2-Ethylhexyl)phthalate	1.2
Chlorobenzene	130
Chrysene	0.0038
1,2-Dichlorobenzene	420*
1,4-Dichlorobenzene	420*
cis-1,2-Dichloroethene	12
1,1-Dichloroethane	N/A
1,1-Dichloroethene	33
Fluoranthene	130
Pyrene	830
Trichloroethylene	2.5
1,1,1-Trichloroethane	N/A
Vinyl Chloride	0.025

WQC - Water Quality Criteria for Toxic Substances - Human Health

* - denote the WQC for Dichlorobenzene only.

500 250 0 500 Feet

N

1 inch = 500 feet

Source Data:
Aerial: ESRI Bing May Hybrid Layer 2009
Survey: Geotec Survey April 25, 2012
Projection: NAD 1983 PA State Plane Ft South

Hoff VC HSCA Site
New Hanover Township, Montgomery County, PA

Surface Water Sampling Location and Chemistry Map - January 18 and February 23, 2012

drawn TAY	checked RLM	approved RLM	figure no.
date 02/13/2014	date	date	17
job no. 301604.TM.100116.3012.0301		file no. Jan_Feb 2012 Stream Sample Chem Map	

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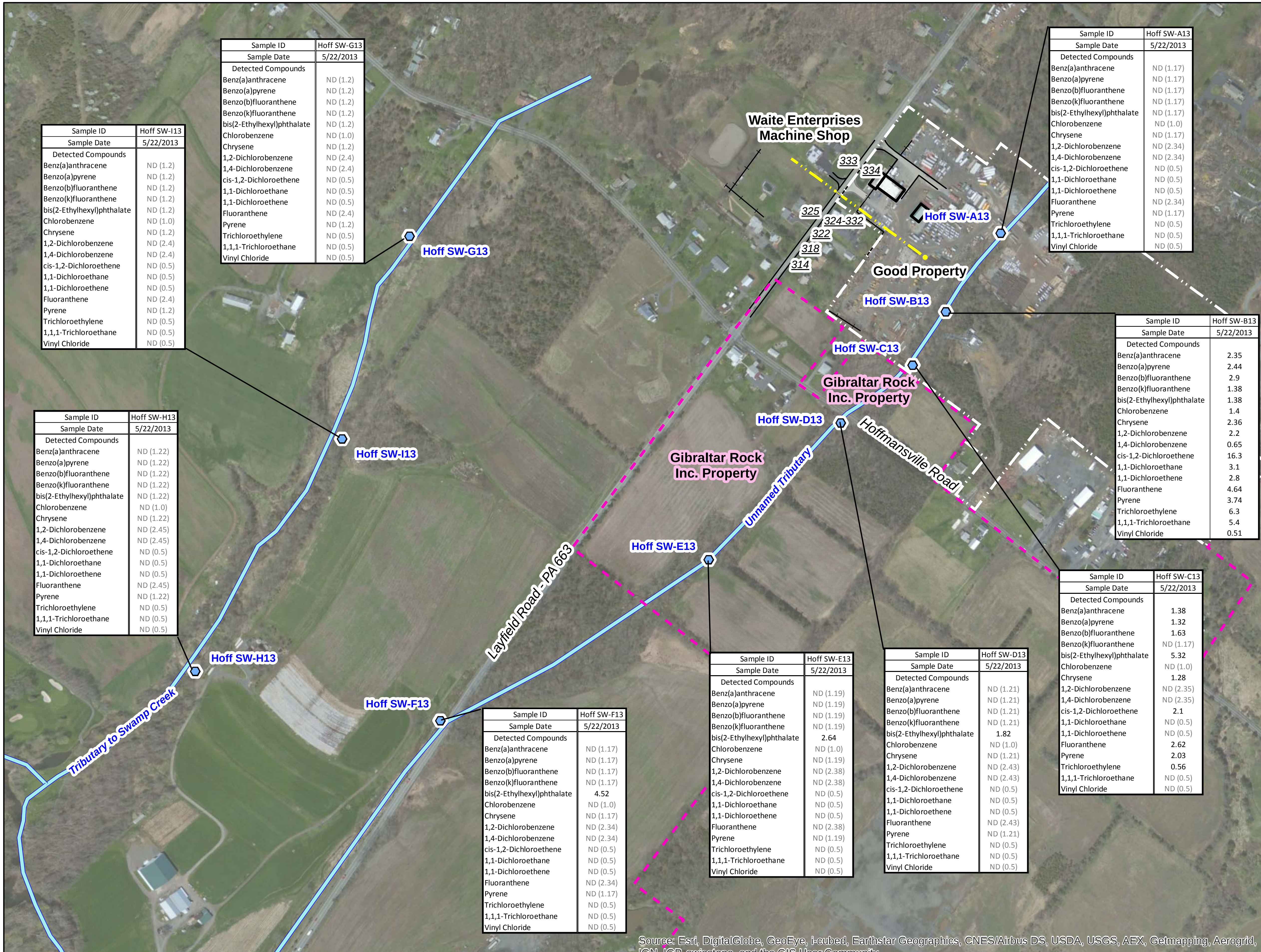
Path: G:\GTAC\Hoff_VC\Projects\Jan_Feb 2012 Stream Sample Chem Map.mxd



Sample ID	Hoff SW-G13
Sample Date	5/22/2013
Detected Compounds	
Benz(a)anthracene	ND (1.2)
Benzo(a)pyrene	ND (1.2)
Benzo(b)fluoranthene	ND (1.2)
Benzo(k)fluoranthene	ND (1.2)
bis(2-Ethylhexyl)phthalate	ND (1.2)
Chlorobenzene	ND (1.0)
Chrysene	ND (1.2)
1,2-Dichlorobenzene	ND (2.4)
1,4-Dichlorobenzene	ND (2.4)
cis-1,2-Dichloroethene	ND (0.5)
1,1-Dichloroethane	ND (0.5)
1,1-Dichloroethene	ND (0.5)
Fluoranthene	ND (2.4)
Pyrene	ND (1.2)
Trichloroethylene	ND (0.5)
1,1,1-Trichloroethane	ND (0.5)
Vinyl Chloride	ND (0.5)

Sample ID	Hoff SW-I13
Sample Date	5/22/2013
Detected Compounds	
Benz(a)anthracene	ND (1.2)
Benzo(a)pyrene	ND (1.2)
Benzo(b)fluoranthene	ND (1.2)
Benzo(k)fluoranthene	ND (1.2)
bis(2-Ethylhexyl)phthalate	ND (1.2)
Chlorobenzene	ND (1.0)
Chrysene	ND (1.2)
1,2-Dichlorobenzene	ND (2.4)
1,4-Dichlorobenzene	ND (2.4)
cis-1,2-Dichloroethene	ND (0.5)
1,1-Dichloroethane	ND (0.5)
1,1-Dichloroethene	ND (0.5)
Fluoranthene	ND (2.4)
Pyrene	ND (1.2)
Trichloroethylene	ND (0.5)
1,1,1-Trichloroethane	ND (0.5)
Vinyl Chloride	ND (0.5)

Sample ID	Hoff SW-H13
Sample Date	5/22/2013
Detected Compounds	
Benz(a)anthracene	ND (1.22)
Benzo(a)pyrene	ND (1.22)
Benzo(b)fluoranthene	ND (1.22)
Benzo(k)fluoranthene	ND (1.22)
bis(2-Ethylhexyl)phthalate	ND (1.22)
Chlorobenzene	ND (1.0)
Chrysene	ND (1.22)
1,2-Dichlorobenzene	ND (2.45)
1,4-Dichlorobenzene	ND (2.45)
cis-1,2-Dichloroethene	ND (0.5)
1,1-Dichloroethane	ND (0.5)
1,1-Dichloroethene	ND (0.5)
Fluoranthene	ND (2.45)
Pyrene	ND (1.22)
Trichloroethylene	ND (0.5)
1,1,1-Trichloroethane	ND (0.5)
Vinyl Chloride	ND (0.5)

Sample ID	Hoff SW-F13
Sample Date	5/22/2013
Detected Compounds	
Benz(a)anthracene	ND (1.17)
Benzo(a)pyrene	ND (1.17)
Benzo(b)fluoranthene	ND (1.17)
Benzo(k)fluoranthene	ND (1.17)
bis(2-Ethylhexyl)phthalate	4.52
Chlorobenzene	ND (1.0)
Chrysene	ND (1.17)
1,2-Dichlorobenzene	ND (2.34)
1,4-Dichlorobenzene	ND (2.34)
cis-1,2-Dichloroethene	ND (0.5)
1,1-Dichloroethane	ND (0.5)
1,1-Dichloroethene	ND (0.5)
Fluoranthene	ND (2.34)
Pyrene	ND (1.17)
Trichloroethylene	ND (0.5)
1,1,1-Trichloroethane	ND (0.5)
Vinyl Chloride	ND (0.5)

Sample ID	Hoff SW-E13
Sample Date	5/22/2013
Detected Compounds	
Benz(a)anthracene	ND (1.19)
Benzo(a)pyrene	ND (1.19)
Benzo(b)fluoranthene	ND (1.19)
Benzo(k)fluoranthene	ND (1.19)
bis(2-Ethylhexyl)phthalate	2.64
Chlorobenzene	ND (1.0)
Chrysene	ND (1.19)
1,2-Dichlorobenzene	ND (2.38)
1,4-Dichlorobenzene	ND (2.38)
cis-1,2-Dichloroethene	ND (0.5)
1,1-Dichloroethane	ND (0.5)
1,1-Dichloroethene	ND (0.5)
Fluoranthene	ND (2.38)
Pyrene	ND (1.19)
Trichloroethylene	ND (0.5)
1,1,1-Trichloroethane	ND (0.5)
Vinyl Chloride	ND (0.5)

Sample ID	Hoff SW-D13
Sample Date	5/22/2013
Detected Compounds	
Benz(a)anthracene	ND (1.21)
Benzo(a)pyrene	ND (1.21)
Benzo(b)fluoranthene	ND (1.21)
Benzo(k)fluoranthene	ND (1.21)
bis(2-Ethylhexyl)phthalate	1.82
Chlorobenzene	ND (1.0)
Chrysene	ND (1.21)
1,2-Dichlorobenzene	ND (2.43)
1,4-Dichlorobenzene	ND (2.43)
cis-1,2-Dichloroethene	ND (0.5)
1,1-Dichloroethane	ND (0.5)
1,1-Dichloroethene	ND (0.5)
Fluoranthene	ND (2.43)
Pyrene	ND (1.21)
Trichloroethylene	ND (0.5)
1,1,1-Trichloroethane	ND (0.5)
Vinyl Chloride	ND (0.5)

Sample ID	Hoff SW-C13
Sample Date	5/22/2013
Detected Compounds	
Benz(a)anthracene	1.38
Benzo(a)pyrene	1.32
Benzo(b)fluoranthene	1.63
Benzo(k)fluoranthene	ND (1.17)
bis(2-Ethylhexyl)phthalate	5.32
Chlorobenzene	ND (1.0)
Chrysene	1.28
1,2-Dichlorobenzene	ND (2.35)
1,4-Dichlorobenzene	ND (2.35)
cis-1,2-Dichloroethene	2.1
1,1-Dichloroethane	ND (0.5)
1,1-Dichloroethene	ND (0.5)
Fluoranthene	2.62
Pyrene	2.03
Trichloroethylene	0.56
1,1,1-Trichloroethane	ND (0.5)
Vinyl Chloride	ND (0.5)

Sample ID	Hoff SW-B13
Sample Date	5/22/2013
Detected Compounds	
Benz(a)anthracene	2.35
Benzo(a)pyrene	2.44
Benzo(b)fluoranthene	2.9
Benzo(k)fluoranthene	1.38
bis(2-Ethylhexyl)phthalate	1.38
Chlorobenzene	1.4
Chrysene	2.36
1,2-Dichlorobenzene	2.2
1,4-Dichlorobenzene	0.65
cis-1,2-Dichloroethene	16.3
1,1-Dichloroethane	3.1
1,1-Dichloroethene	2.8
Fluoranthene	4.64
Pyrene	3.74
Trichloroethylene	6.3
1,1,1-Trichloroethane	5.4
Vinyl Chloride	0.51

Sample ID	Hoff SW-A13
Sample Date	5/22/2013
Detected Compounds	
Benz(a)anthracene	ND (1.17)
Benzo(a)pyrene	ND (1.17)
Benzo(b)fluoranthene	ND (1.17)
Benzo(k)fluoranthene	ND (1.17)
bis(2-Ethylhexyl)phthalate	ND (1.17)
Chlorobenzene	ND (1.0)
Chrysene	ND (1.17)
1,2-Dichlorobenzene	ND (2.34)
1,4-Dichlorobenzene	ND (2.34)
cis-1,2-Dichloroethene	ND (0.5)
1,1-Dichloroethane	ND (0.5)
1,1-Dichloroethene	ND (0.5)
Fluoranthene	ND (2.34)
Pyrene	ND (1.17)
Trichloroethylene	ND (0.5)
1,1,1-Trichloroethane	ND (0.5)
Vinyl Chloride	ND (0.5)

Legend

- Surface Water Sampling Location
- Good Property Boundary
- GRI Property Boundary
- Historic pipeline with surface valve
- Surface Water Feature

ND Not Detected

Detected Results Presented in Micrograms per Liter (ug/L)

Well ID	
Sample Date	
Compound	WQC
Benz(a)anthracene	0.0038
Benzo(a)pyrene	0.0038
Benzo(b)fluoranthene	0.0038
Benzo(k)fluoranthene	0.0038
bis(2-Ethylhexyl)phthalate	1.2
Chlorobenzene	130
Chrysene	0.0038
1,2-Dichlorobenzene	420*
1,4-Dichlorobenzene	420*
cis-1,2-Dichloroethene	12
1,1-Dichloroethane	N/A
1,1-Dichloroethene	33
Fluoranthene	130
Pyrene	830
Trichloroethylene	2.5
1,1,1-Trichloroethane	N/A
Vinyl Chloride	0.025

WQC - Water Quality Criteria for Toxic Substances - Human Health

* - denote the WQC for Dichlorobenzene only.

400 200 0 400 Feet

N

1 inch = 400 ft

Source Data:
Aerial: ESRI Bing May Hybrid Layer 2009
Survey: Geotec Survey April 25, 2012
Projection: NAD 1983 PA State Plane Ft South

Hoff VC HSCA Site

New Hanover Township, Montgomery County, PA

Surface Water Sampling Location and Chemistry Map - May 22, 2013

drawn JWS	checked RLM	approved RLM	figure no.
date 7/23/13	date	date	18
job no.		file no. May2013 Stream Sample Chem Map	

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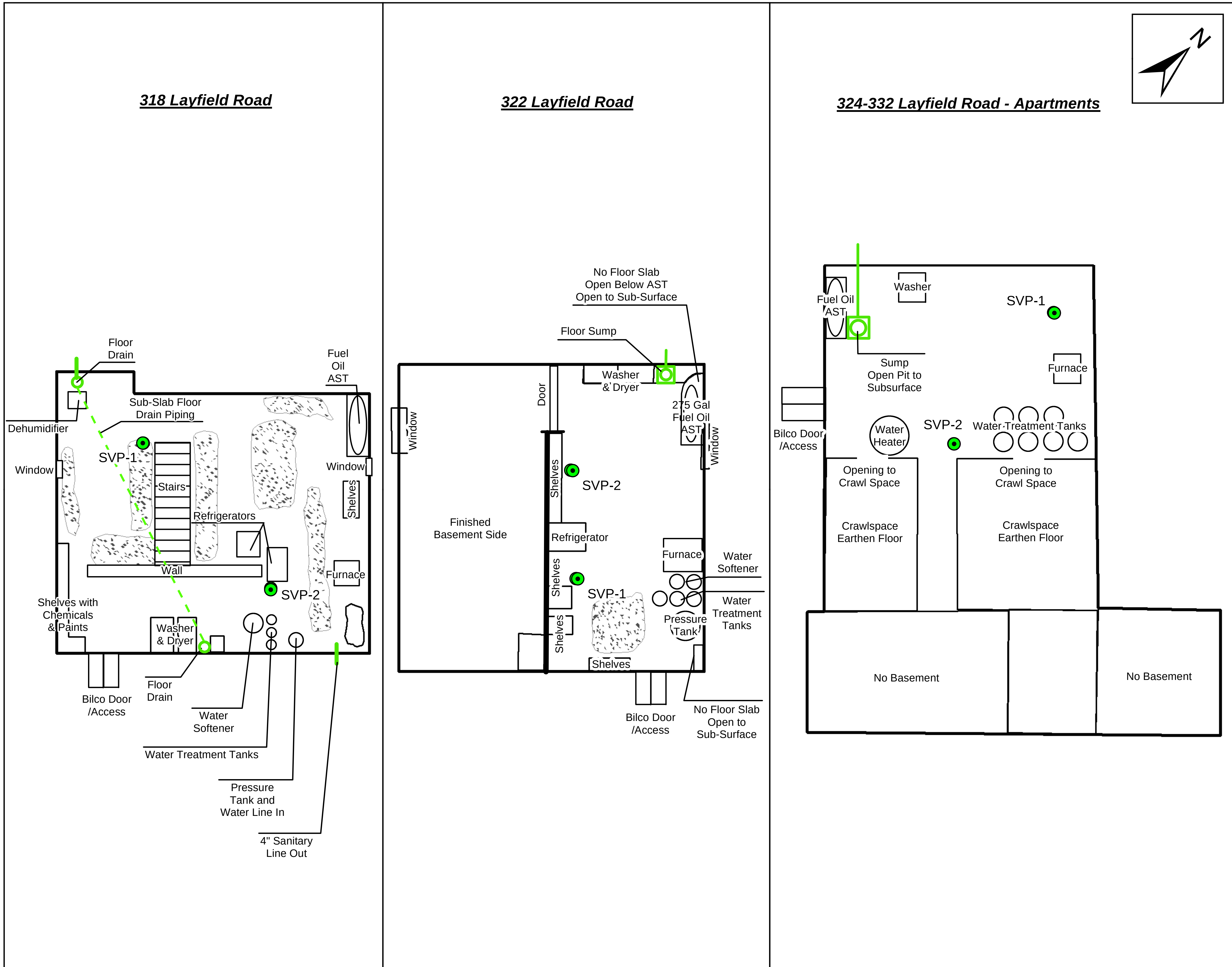
Path: G:\GTAC\Hoff_VC\Projects\2Q13\May2013 Stream Sample Chem Map.mxd



Legend

Sub-Slab Soil Vapor Sample Location

Stored Household Items

10 5 0 10

Feet

1 inch = 10 ft

Hoff VC HSCA Site

New Hanover Township, Montgomery County, PA

Vapor Intrusion Study
Building Basement Layout Map

drawn TAY	checked DQ	approved RLM	figure no. 19
date 07/29/2014	date 07/29/2014	date	
job no.		file no. Vapor Intrusion Study	

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Path: G:\GTAC\Hoff_VC\Projects\Vapor Intrusion Study.mxd

TABLES

Table 1
Home Well Data
Hoff VC Site
New Hanover Township, PA

Sample Location	Date	TCE	cis-1,2-DCE	1,1-DCE	VC	1,2-DCA	1,1-DCA	MTBE	Benzene	1,4-DCB	1,2-DCB	PCP	1,4-Dioxane
MCL or SHS		5	70	7.0	2	5	31	20	5	75	600	1	6
313 Layfield Road	07/12/11	ND	0.403	ND	ND	ND	ND	ND	ND	ND	ND	NS	NS
	11/11/11	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NS	NS
	03/12/12	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	08/12/12	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	11/27/12	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	08/05/13	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
314 Layfield Road	07/12/11	**16.3**	25.6	**33**	0.858	0.576	9.54	6.21	0.285	0.72	4.06	NS	NS
	11/01/11	**7.37**	9.74	**16.6**	0.46	0.319	16.6	3.96	ND	0.424	2.81	ND	**8.76**
	03/01/12	**9.22**	13.7	**21.1**	0.853	ND	5.3	5.05	ND	0.724	5.71	ND	**9.36**
	08/12/12	**12.2**	21.4	**25.2**	0.974	0.517	7.74	5.97	ND	1.03	8.03	ND	**10.1**
	11/26/12	**10.1 /ND/ND**	13.4 /ND/ND	**16 /ND/ND**	0.546 /ND/ND	0.319 /ND/ND	4.99 /ND/ND	2.28 /ND/ND	ND/ND/ND	0.606 /ND/ND	ND/ND/ND	ND/ND/ND	**8.33 /ND/ND**
	01/08/13	**15.2 /ND/ND**	25.1 /ND/ND	**25.1 /ND/ND**	1.06 /ND/ND	0.526 /ND/ND	8.50 /ND/ND	6.7 /ND/ND	ND/ND/ND	0.838 /ND/ND	ND/ND/ND	ND/ND/ND	**8.52 /ND/ND**
	02/04/13	**11.1/ND/ND**	17.5/ND/ND	**16.9/ND/ND**	0.736/ND/ND	0.367/ND/ND	5.82/ND/ND	4.95/ND/ND	ND/ND/ND	0.654/ND/ND	ND/ND/ND	--/--/ND	**9.89/ND/ND**
	03/04/13	**11/ND/ND**	16.9/ND/ND	**15.9/ND/ND**	0.683/ND/ND	0.265/ND/ND	5.41/ND/ND	3.87/ND/ND	ND/ND/ND	0.654/ND/ND	ND/ND/ND	--/--/ND	**6.91/ND/ND**
	04/02/13	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/--/ND	--/ND/ND
	05/07/13	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/--/ND	--/ND/ND
	06/03/13	**18.3/ND/ND**	30.1/ND/ND	**22.2/ND/ND**	0.942/ND/ND	0.494/ND/ND	9.19/ND/ND	4.35/ND/ND	0.279/ND/ND	0.892/ND/ND	ND/ND/ND	--/--/ND	**9.89/ND/ND**
	07/01/13	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/--/ND	--/ND/ND
	08/05/13	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/--/ND	--/ND/ND
	09/16/13	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/--/ND	--/5.24/ND
	11/06/13	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/--/ND	--/ND/ND
	12/03/13	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/--/ND	--/ND/ND
	02/25/14	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/--/ND	--/ND/ND
	04/23/14	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/--/ND	--/ND/ND
317 Layfield Road	07/12/11	0.344	ND	0.398	ND	ND	0.646	ND	0.646	ND	ND	NS	NS
	11/01/11	ND	0.438	ND	ND	ND	0.456	ND	ND	ND	ND	NS	NS
	03/12/12	ND	0.387	ND	ND	ND	0.456	ND	ND	ND	ND	ND	**6.38**
	08/12/12	0.464	0.669	0.641	ND	ND	0.608	ND	ND	ND	ND	ND	ND
	11/27/12	0.345	0.394	ND	ND	ND	0.409	ND	ND	ND	ND	ND	3.06
	08/05/13	ND	0.272	ND	ND	ND	0.46	ND	ND	ND	ND	ND	3.75
318 Layfield Road	07/12/11	**624**	**1580**	**106**	**52.4**	**8.13**	**259**	**365**	**16.3**	**101**	**727**	NS	NS
	11/01/11	**470**	**1360**	**76.9**	**53.8**	**7.26**	**233**	**417**	**13.8**	57.1	349	ND	**78**
	03/20/12	**223**	**588**	**41.4**	**19.6**	**3.66**	**96.5**	**119**	**6.96**	39.1	261	NS	**35.7**
	08/12/12	**478**	**1110**	**93.1**	**52.8**	**8.28**	**239**	**356**	**15.3**	**85.2**	544	**1.07**	**68.8**
	11/28/12	**620 /ND/ND**	**1440 /ND/ND**	**92.6 Q/ND/ND**	**53.2 Q/ND/ND**	**7.93 /ND/ND**	**226 Q/ND/ND**	**328 Q/ND/ND**	**16.9 /ND/ND**	66.6 Q/ND/ND	398 Q/ND/ND	ND/ND/ND	**61 /ND/ND**
	01/10/13	**556 Q /ND/ND**	**1400 /ND/ND**	**82.9 Q/ND/ND**	**33.5 Q/ND/ND**	**7.26 Q /ND/ND**	**205 Q/ND/ND**	**257 Q/ND/ND**	**14.0 /ND/ND**	70.9 Q/ND/ND	472 Q/ND/ND	ND/ND/ND	**46.2 /ND/ND**
	02/04/13	**404 Q/ND/ND**	**872 /ND/ND**	**51.3 Q/ND/ND**	**23.1 Q/ ND/ND**	4.89 Q/ND/ND	**132 Q/ND/ND**	**227Q/ND/ND**	**9.86 Q/ND/ND**	61.5 Q/ND/ND	329 Q/ ND/ND	--/ND/ND	**39.2/ ND/ND**
	03/07/13	**510/ND/ND**	**1190 /ND/ND**	**68.4 /ND/ND**	**28.8 Q/ ND/ND**	4.82 /ND/ND	**179 /ND/ND**	**189 /ND/ND**	**12.9 /ND/ND**	71.7 /ND/ND	441 /ND/ND	--/ND/ND	**42 /ND/ND**
	04/04/13	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/--/ND	--/ND/ND
	05/07/13	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/--/ND	--/ND/ND
	06/03/13	**497 Q/ ND/ND**	**965 /ND/ND**	**59.9 Q /ND/ND**	**18.1 /ND/ND**	**4.86 /ND/ND**	**152 Q /ND/ND**	**228 Q /ND/ND**	**11.5 /ND/ND**	**78.2 Q/ND/ND**	492 Q/ND/ND	--/--/ND	**42.3 /ND/ND**
	07/02/13	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/--/ND	--/ND/ND
	08/05/13	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/--/ND	--/ND/ND
	09/19/13	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/--/ND	--/ND/ND
	11/06/13	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/--/ND	--/ND/ND
	12/04/13	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/--/ND	--/ND/ND
	02/25/14	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/--/ND	--/ND/ND
	04/23/14	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/--/ND	--/ND/ND
322 Layfield Road	08/02/11	**306/39.8/46.4**	**1030/7.66/43.7**	**155/ND/9.87**	**99.8/ND/ND**	**6.28/ND/ND**	**322/11.4/6.75**	**273/164/9.06**	**15.4/ND/ND**	71.5/ND/ND	ND/ND/ND	NS	NS
	11/01/11	**246/30.9/29.1**	**886/3.48/15.5**	**322/1.36/9.87**	**97.1/15/ND**	**6.43/ND/ND**	**322/35.1/1.95**	**268/206/18.5**	**13.0/1.18/0.812**	70.7/1.64/ND	484/14.1/ND	ND	**83.7**
	08/12/12	**134/25.5**	**401/3.59**	**216/1.87**	**70/1.75**	3.81/ND	**125/2.33**	**141/50.8**	**8.36/0.796**	47.9/ND	244/ND	**1.19/ND**	**186/92**
	11/29/12	**284 Q/ND/ND**	**796 /ND/ND**	**114 Q/ND/ND**	**55 Q/ND/ND**	4.96 /ND/ND	**214 Q/ND/ND**	**181 Q/ND/ND**	**10.4 /ND/ND**	59 Q/ND/ND	474 Q/ND/ND	ND/ND/ND	ND/ND/ND
	01/10/13	**256 Q/ND/ND**	**776 /ND/ND**	**112 Q/ND/ND**	**56.8 Q/ND/ND**	4.6 Q/ND/ND	**211 Q/ND/ND**	**154 Q/ND/ND**	**8.75 Q/ND/ND**	65.6 Q/ND/ND	520 Q/ND/ND	ND/ND/ND	**46.9/ND/ND**
	04/04/13	**275 Q/ND/ND**	**880 /ND/ND**	**148 Q/ND/ND**	**91.4 Q/ND/ND**	4.98 Q/ND/ND	**278 Q/ND/ND**	**228 Q/ND/ND**	**10.8 Q/ND/ND**	71.2 Q/ND/ND	534 Q/ND/ND	--/--/ND	**69 /ND/ND**
	01/22/14	**206 Q/ND/ND**	**553 /ND/ND**	**116 Q/ND/ND**	**60.9 Q/ND/ND**	3.61 Q/ND/ND	**204 Q/ND/ND**	**144 Q/ND/ND**	**7.56 Q/ND/ND**	51.4 Q/ND/ND	422 Q/ND/ND	--/--/--	**59.2 /19/ND**
325 Layfield Road	08/11/11	**39.8/47.7**	**86.7/76.7**	**25.2/26.3**	**12.2/11.6**	0.58/0.572	**45.7/43.4**	**20.5/19.8**	1.18/1.37	7.56/0.536	52.2/6.58	NS	NS
	11/01/11	**15.2**	**73.4**	**24.4**	**11.5**	0.825	**49.4**	**25.8**	0.626	0.661	6.26	ND	**15.2**
	03/12/12	**32.1**	**98.3**	**28.3**	**12.1**	0.679	**52.4**	**23.2**	1.07	2.79	32.6	ND	**14.3**
	08/12/12	**41.8**	**126**	**46.6**	**20.2**	1.12	**79.2**	**26**	1.4	ND	9.72	ND	**17.1**
	11/26/12	**42.8 Q/ND/ND**	**80.2 /ND/ND**	**28.5 Q/ND/ND**	**14 Q/ND/ND**	0.6 /ND/ND	**46.9 Q/ND/ND**	19.8 Q/ND/ND	1.25 /ND/ND	7.62 Q/ND/ND	62.3 /ND/ND	ND/ND/ND	**13.7 /ND/ND**
	01/10/13	**48.8 Q/ND/ND**	**104 /ND/ND**	**36.6 Q/ND/ND**	**18.2 Q/ND/ND**	0.831 /ND/ND	**62.6 Q/ND/ND**	24.6 Q/ND/ND	1.44 /ND/ND	10.2 Q/ND/ND	87.3 /ND/ND	ND/ND/ND	**14.1 /ND/ND**
	02/07/13	**38.9 Q/ND/ND**	**79.6 /ND/ND**	**27.8 Q/ND/ND**	**12.3 Q/ND/ND**	0.619 /ND/ND	**47.4 Q/ND/ND**	19.6 Q/ND/ND	1.26 /ND/ND	8.84 /ND/ND	64.6 /ND/ND	--/ND/ND	**12.7 /ND/ND**
	03/07/13	**36.9 Q/ND/ND**	**71.4 /ND/ND**	**23.9 Q/ND/ND**	**10.8 Q/ND/ND**	0.423 /ND/ND	**40 Q/ND/ND**	16.1 Q/ND/ND	1.06 /ND/ND	8.7 Q/ND/ND	76.6 /ND/ND	--/ND/ND	**11.2 /ND/ND**
	04/02/13	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/--/ND	--/ND/ND
	05/09/13	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/--/ND	--/ND/ND
	06/05/13	**54.9 /ND/ND**	**107 /ND/ND**	**35.7 /ND/ND**	**18.6 /ND/ND**	ND/ND/ND	**67.4 /ND/ND**	**22.5 /ND/ND**	ND/ND/ND	10.7 /ND/ND	91.9 /ND/ND	--/--/ND	**16.4 /ND/ND**
	07/01/13	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/--/ND	--/ND/ND
	08/05/13	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/--/ND	--/ND/ND
	09/19/13	--/--/ND	--/--/ND	--/--/ND	--/--/ND	--/--/ND	--/--/ND	--/--/ND	--/--/ND	--/--/ND	--/--/ND	--/--/ND	--/ND/ND
	11/06/13	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/--/ND	--/ND/ND
	12/03/13	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/--/ND	--/ND/ND
	02/25/14	**--/ND/38.6**	**--/ND/75.9**	**--/ND/32**	**--/ND/12**	--/ND/0.528	**--/ND/50.8**	--/ND/16.4	--/ND/1.08	--/ND/7.36	--/ND/66.7	--/--/ND	**--/ND/11.7**
	04/23/14	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/--/ND	--/3.32/ND

Table 1
Home Well Data
Hoff VC Site
New Hanover Township, PA

Sample Location	Date	TCE	cis-1,2-DCE	1,1-DCE	VC	1,2-DCA	1,1-DCA	MTBE	Benzene	1,4-DCB	1,2-DCB	PCP	1,4-Dioxane
MCL or SHS		5	70	7.0	2	5	31	20	5	75	600	1	6
326 Layfield (Apartments)	06/01/11	**58.4**	**396**	**94.8**	**70.3**	NS	**191**	**34**	3.6	48.4	384	NS	NS
	11/29/11	**44**	**336**	**96**	**54.9**	1.38	**194**	**37.9**	3.34	49.3	364	**1.08**	**52.3**
	08/12/12	**44.2**	**281**	**90.4**	**51.9**	1.41	**172**	**29.6**	2.82	41	304	**1.13**	**51.5**
	11/28/12	**46.1 /ND/ND**	**218 /ND/ND**	**88 /ND/ND**	**50.2 /ND/ND**	ND/ND/ND	**143 /ND/ND**	**24.8 /ND/ND**	2.83 /ND/ND	32.1 /ND/ND	261 /ND/0.385	ND/ND/ND	**38 /ND/ND**
	01/09/13	**42.7 Q /ND/ND**	**206 /ND/ND**	**90.4 /ND/ND**	**55 Q /ND/ND**	0.933/ND/ND	**150 /ND/ND**	**24.6 Q /ND/ND**	2.46 /ND/ND	34.6 /ND/ND	267 /ND/0.385	ND/ND/ND	**37.6 /ND/ND**
	02/05/13	**38.4 Q/ND/ND**	**195 /ND/ND**	**80.1 /ND/ND**	**47.8 Q/ND/ND**	0.812 /ND/ND	**138 /ND/ND**	**23.2 Q/ND/ND**	2.22 /ND/ND	27.6 Q/ND/ND	216 /ND/ND	--/ND/ND	**35.2 /ND/ND**
	03/07/13	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/--/ND	--/ND/ND
	04/04/13	--/ND/0.313	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/--/ND	--/ND/ND
	06/03/13	**38.1 /0.644/ND**	**167 /ND/ND**	**81.2 /ND/ND**	**40.8 /ND/ND**	ND/ND/ND	**127/ND/ND**	**18 /ND/ND**	ND/ND/ND	26.3 /ND/ND	202 /ND/ND	--/--/ND	**35.7 /ND/ND**
	07/01/13	--/ND/ND	--/ND/ND	--/ND/0.3	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/--/ND	--/ND/ND
	08/05/13	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/--/ND	--/ND/ND
	09/19/13	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/--/ND	--/ND/ND
	11/06/13	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/--/ND	--/6.3,ND,7.4/ND
	02/25/14	--/35.6/ND	--/125/ND	--/98/ND	--/45/ND	--/0.8/ND	--/133/ND	--/17.2/ND	--/1.64/ND	--/18/ND	--/144/ND	--/--/ND	--/23,7.8,32/ND
	04/23/14	--/ND/ND	--/ND/ND	--/ND/ND	--/1.1,0.39/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/ND/ND	--/--/ND	--/37,26,17.5/ND
333 Layfield Road (Waite Enterprises)	07/12/11	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NS	NS
	11/01/11	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NS	NS
334 Layfield Road (Good Oil)	07/12/11	ND	0.456	ND	ND	ND	ND	ND	ND	ND	ND	NS	NS
	03/12/12	ND	0.39	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
345 Layfield Road	06/02/11	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NS	NS
354 Layfield Road	09/06/11	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NS	NS
	08/12/12	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
358 Layfield Road	07/12/11	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NS	NS
361 Layfield Road	07/12/11	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NS	NS
1809 Hoffmansville	12/11/11	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NS	NS
1954 Hoffmansville Road	04/12/12	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NS	NS
1968 Hoffmansville Road	11/26/12	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NS	ND
	01/08/13	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	10/08/13	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1980 Hoffmansville Road	11/11/11	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NS	NS
1999 Hoffmansville	09/06/11	ND	ND	0.398	ND	ND	ND	ND	ND	ND	ND	NS	NS
2015 Hoffmansville	09/06/11	1.16	0.372	3.26	ND	ND	0.774	ND	ND	ND	ND	NS	NS
	11/01/11	0.922	0.392	2.52	ND	ND	0.551	ND	ND	ND	ND	ND	ND
	03/12/12	1.11	0.445	2.66	ND	ND	0.812	ND	ND	ND	ND	ND	ND
	08/12/12	1.3	0.537	3.54	ND	ND	ND	ND	ND	ND	ND	ND	ND
	11/27/12	1.26	0.418	2.8	ND	ND	0.682	ND	ND	ND	ND	ND	ND
	04/04/13	1.58	0.66	3.43	ND	ND	0.962	ND	ND	ND	ND	ND	2.02 J
2019 Hoffmansville Road	09/06/11	ND/ND	ND/ND	ND/0.376	ND/ND	ND/ND	0.427/0.315	0.351/ND	ND/ND	ND/ND	ND/ND	NS	NS
2024 Hoffmansville Road	09/12/12	4.99	ND	**12.5**	ND	0.387	2.85	0.453	ND	ND	1.06	ND	**8.01**
	11/27/12	4.71	1.36	**11.3**	ND	0.386	2.88	ND	ND	ND	0.75	ND	**7.25**
2029 Hoffmansville Road	09/06/11	ND/ND	ND/ND	ND/0.376	ND/ND	ND/ND	0.427/0.315	0.351/ND	ND/ND	ND/ND	ND/ND	NS	NS
	08/12/12	**14.5/ND**	3.46/ND	**35.6/0.342**	ND/ND	0.683/ND	7.75/0.432	1.1/0.342	0.286/ND	1.13/ND	7.43/ND	ND	**21.6/29.2**
	11/26/12	**18.9 /ND**	4.51 /ND	**47.3 /0.379**	ND/ND	1.1 /ND	9.6 /0.458	1.22 /ND	0.366 /ND	1.13 /ND	8.09 /ND	/ND	**21.6 /22.1**
	05/07/13	**21.6/ND**	5.45 /ND	**56.1 /0.465**	ND /ND	1.18 /ND	11.4 /0.481	1.16 /0.298	0.371 /ND	1.38 /ND	9.58 /ND	--/ND	**21.7 /21.4**
2035 Hoffmansville Road	07/12/11	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NS	NS
	11/01/11	0.31	ND	0.433	ND	ND	0.433	ND	ND	ND	ND	NS	NS
	04/12/12	ND	ND	0.466	ND	ND	0.327	ND	ND	ND	ND	NS	ND
	08/12/12	ND	ND	0.383	ND	ND	0.445	0.287	ND	ND	ND	ND	ND
	02/20/13	0.449	0.326	0.772	ND	ND	0.439	ND	ND	ND	ND	ND	ND
2104 Hoffmansville Road	09/06/11	ND	ND	ND	ND	ND	0.499	ND	ND	ND	ND	NS	NS
	05/12/12	ND	ND	ND	ND	ND	0.453	ND	ND	ND	ND	NS	NS
	08/12/12	0.343	0.344	0.941	ND	ND	ND	ND	ND	ND	ND	ND	ND
	11/29/12	0.823	0.378	2.02	ND	ND	0.843	ND	ND	ND	ND	ND	NS
	04/04/13	0.733	0.42	1.66	ND	ND	0.98	ND	ND	ND	ND	ND	1.7 J
	10/08/13	0.506	0.379	1.16	ND	ND	0.754	ND	ND	ND	ND	ND	ND
2143 Hoffmansville Road	03/11/12	3.77	3.04	ND	ND	ND	0.349	ND	ND	ND	ND	NS	NS
	08/12/12	**5.2**	4.56	ND	ND	ND	0.516	ND	ND	ND	ND	ND	ND
	11/26/12	4.05	2.79	ND	ND	ND	0.295	ND	ND	ND	ND	ND	ND
	04/02/13	4.09	3.16	ND	ND	ND	0.352	ND	ND	ND	ND	ND	ND
	10/08/13	3.48	2.84	ND	ND	ND	0.302	ND	ND	ND	ND	ND	ND

Table 1
Home Well Data
Hoff VC Site
New Hanover Township, PA

Sample Location	Date	TCE	cis-1,2-DCE	1,1-DCE	VC	1,2-DCA	1,1-DCA	MTBE	Benzene	1,4-DCB	1,2-DCB	PCP	1,4-Dioxane
MCL or SHS		**5**	**70**	**7.0**	**2**	**5**	**31**	**20**	**5**	**75**	**600**	**1**	**6**
2146 Hoffmansville Road	05/12/12	ND	ND	ND	ND	ND	ND	0.57	ND	ND	ND	ND	ND
	08/12/12	ND	ND	ND	ND	ND	ND	0.785	ND	ND	ND	ND	ND
	11/29/12	ND	ND	ND	ND	ND	ND	0.545	ND	ND	ND	ND	NS
	04/04/13	ND	ND	ND	ND	ND	ND	0.639	ND	ND	ND	ND	ND
	10/08/13	ND	ND	ND	ND	ND	ND	0.629	ND	ND	ND	ND	ND
2153 Hoffmansville Road	03/12/12	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NS	NS
	02/20/13	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	10/08/13	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2173 Hoffmansville Road	09/06/11	ND	ND	ND	ND	ND	ND	2.87	ND	ND	ND	NS	NS
2181 Hoffmansville Road	11/11/11	ND/ND	ND/ND	ND/ND/	ND/ND	ND/ND	ND/ND	ND/ND	ND/ND	ND/ND	ND/ND	NS	NS
	02/21/13	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2189 Hoffmansville Road	11/11/11	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NS	NS
	02/20/13	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	10/08/13	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2145 Big Road	11/11/11	ND/ND/ND/ND	ND/ND/ND/ND	ND/ND/ND/ND	ND/ND/ND/ND	ND/ND/ND/ND	ND/ND/ND/ND	ND/ND/ND/ND	ND/ND/ND/ND	ND/ND/ND/ND	ND/ND/ND/ND	NS	NS
	01/07/13	ND/ND/ND/ND	ND/ND/ND/ND	ND/ND/ND/ND	ND/ND/ND/ND	ND/ND/ND/ND	ND/ND/ND/ND	ND/ND/ND/ND	ND/ND/ND/ND	ND/ND/ND/ND	ND/ND/ND/ND	NS	NS
2245 Big Road	11/11/11	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NS	NS
	11/27/12	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2234 Big Road	11/11/11	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NS	NS
2131 Colflesh Road	11/11/11	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NS	NS
2141 Colflesh Road	11/11/11	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NS	NS
2169 Colflesh Road	11/11/11	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NS	NS
2172 Colflesh road	11/11/11	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NS	NS
2303 Colflesh Road	04/12/12	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NS	NS
327 Erb Road	11/11/11	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NS	NS
328 Erb Road	11/11/11	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NS	NS
333 Erb Road	11/11/11	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NS	NS
Perkiomen Valley Academy	12/11/11	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NS
Upper Frederick Elementary School	12/11/11	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NS

Notes:
All results in micrograms per liter (µg/L)
MCL or SHS = Maximum Contaminant Level or Statewide Health Standard
BOLD WITH SHADING = Contaminant concentration exceeds MCL or SHS
ND = Compound Not Detected
CVOCs = Chlorinated Volatile Organic Compounds
Blank Cells: Results are pending.
NS: Not Sampled.

//*** : Multiple samples were taken from a location. 322 LR-Carbon Filter; 325 LR -Pressure Tank; 2145 BR- Farm Fields
PCE = Tetrachloroethene
PCA = Tetrachloroethane
TCE = Trichloroethene
TCA = Trichloroethane
DCE = Dichloroethene
PCP = Pentachlorophenol
DCA = Dichloroethane
VC = Vinyl Chloride

Table 2
PADEP Monitoring Well and Good Oil Well Construction Data
Hoff VC Site
New Hanover Township, PA

Well	Install Date	Well Diameter (inches)	Screen Length (feet)	Casing Length (feet)	Total Depth of Well (fbg)	Screened Interval (fbg)	Top of Steel Casing Elevation (famsl)	Top of PVC Casing Elevation (famsl)	Latitude	Longitude	Notes:
PADEP Monitoring Wells											
MW-1S	4/12/2012	2	25	-	30	5-30	-	419.46	40.329534	-75.554923	Opening: 0.010 Slot
MW-1D	3/28/2012	6	-	40	300	-	419.08	419.08	40.329540	-75.554902	Open Borehole
MW-1D Upper	9/11/2012	2	130	-	174	44-174	419.08	418.64	40.329540	-75.554902	Opening: 0.040 Slot
MW-1D Lower	9/5/2012	2	60	-	300	240-300	419.08	418.43	40.329540	-75.554902	Opening: 0.040 Slot
MW-2S	4/4/2012	2	25	-	30	5-30	-	416.62	40.329245	-75.555981	Opening: 0.010 Slot
MW-2D	4/3/2012	6	-	40	300	-	416.22	416.22	40.329233	-75.555992	Open Borehole
MW-2D Upper	9/12/2012	2	70	-	116.5	46.5-116.5	416.22	415.88	40.329233	-75.555992	Opening: 0.040 Slot
MW-2D Lower	9/10/2012	2	30	-	226	196-226	416.22	415.88	40.329233	-75.555992	Opening: 0.040 Slot
MW-3S	4/11/2012	2	25	-	30	5-30	-	411.18	40.328322	-75.553425	Opening: 0.010 Slot
MW-3D	3/26/2012	6	-	40	250	-	410.62	410.62	40.328311	-75.553442	Open Borehole
MW-3D Upper	6/26/2013	2	60	-	106.5	46.5-106.5	410.62	410.21	40.328311	-75.553442	Opening: 0.020 Slot
MW-3D Lower	6/26/2013	2	60	-	210	150.5-210.5	410.62	410.26	40.328311	-75.553442	Opening: 0.020 Slot
MW-4D	3/30/2012	6	-	40	250	--	405.86	405.86	40.328022	-75.555506	Open Borehole
MW-4D Upper	9/18/2012	2	30	-	118	88-118	405.86	405.62	40.328022	-75.555506	Opening: 0.040 Slot
MW-4D Lower	9/18/2012	2	30	-	245	215-245	405.86	405.42	40.328022	-75.555506	Opening: 0.040 Slot
MW-5S	4/5/2012	2	25	-	30	5-30	-	400.9	40.329433	-75.557775	Opening: 0.010 Slot
MW-5D	4/5/2012	6	-	40	250	-	400.64	400.64	40.329470	-75.557766	Open Borehole
MW-5D Upper	9/14/2012	2	40	-	93	53-93	400.64	400.39	40.329470	-75.557766	Opening: 0.040 Slot
MW-5D Lower	9/13/2012	2	50	-	187.5	137.5-187.5	400.64	400.29	40.329470	-75.557766	Opening: 0.040 Slot
MW-6S	4/9/2012	2	25	-	30	5-30	-	412.45	40.329506	-75.556714	Opening: 0.010 Slot
MW-7S	4/9/2012	2	25	-	30	5-30	-	385.28	40.328042	-75.557553	Opening: 0.010 Slot
MW-7D	4/9/2012	6	-	40	250	-	383.94	383.94	40.328014	-75.557582	Open Borehole
MW-7D Upper	9/17/2012	2	70	-	155	85-155	383.94	383.38	40.328014	-75.557582	Opening: 0.040 Slot
MW-7D Lower	9/17/2012	2	30	-	210	180-210	383.94	383.32	40.328014	-75.557582	Opening: 0.040 Slot
MW-8D	4/9/2013	6	--	40	250	-	409.46	409.46	40.328725	-75.554861	Open Borehole
MW-8D Upper	6/25/2013	2	75	--	119	44.1-119.1	409.46	408.88	40.328725	-75.554861	Opening: 0.020 Slot
MW-8D Lower	6/25/2013	2	70	--	246.5	176.5-246.5	409.46	408.98	40.328725	-75.554861	Opening: 0.020 Slot
MW-9D	5/13/2014	6	-	38	220	-	349.86	349.86	40.326547	-75.559654	Open Borehole
MW-9D Upper	6/17/2014	2	60	-	103.5	43.5-103.5	349.86	349.5	40.326547	-75.559654	Opening: 0.020 Slot
MW-9D Lower	6/16/2014	2	50	-	189.5	139.5-189.5	349.86	349.5	40.326547	-75.559654	Opening: 0.020 Slot
MW-10D	5/13/2014	6	-	38	206	-	349.48	349.48	40.327434	-75.561067	Open Borehole
MW-10D Upper	6/26/2014	2	70	-	110.5	40.5-110.5	349.48	349.09	40.327434	-75.561067	Opening: 0.020 Slot
MW-10D Lower	6/17/2014	2	30	-	200.5	170.5-200.5	349.48	349.08	40.327434	-75.561067	Opening: 0.020 Slot
OW-4 Upper	9/24/2012	2	70	-	128	58-128	406.05	405.54	40.325246	-75.554002	Opening: 0.040 Slot
OW-4 Lower	9/21/2012	2	70	-	249	179-249	406.05	405.3	40.325246	-75.554002	Opening: 0.040 Slot
OW-6 Upper	9/26/2012	2	90	-	130	40-130	363.94	363.6	40.325430	-75.556613	Opening: 0.040 Slot
OW-6 Lower	9/25/2012	2	50	-	260	210-260	363.94	363.52	40.325430	-75.556613	Opening: 0.040 Slot
Good Oil Company Wells											
MW-1	8/30/2010	4	20	-	30.03	10-30	-	409.65	40.328497	-75.555350	Opening: 0.020 Slot
MW-2	8/30/2010	4	6	-	6.92	1-7	-	405.26	40.327973	-75.555412	Opening: 0.020 Slot
MW-3	8/30/2010	4	20	-	30.23	10-30	-	400.65	40.328243	-75.555143	Opening: 0.020 Slot
MW-4	8/30/2010	4	15	-	29.97	15-30	-	408.97	40.328738	-75.554788	Opening: 0.020 Slot
MW-5	8/30/2010	4	11	-	11.31	1-12	-	409.81	40.328961	-75.554655	Opening: 0.020 Slot
MW-6	8/31/2010	4	10	-	11.94	1-11	-	410.98	40.328976	-75.554969	Opening: 0.020 Slot
MW-7	8/31/2010	4	10	-	12.09	2-12	-	403.43	40.328730	-75.554572	Opening: 0.020 Slot
MW-8	9/1/2010	4	15	-	30.07	15-30	-	407.59	40.328431	-75.554841	Opening: 0.020 Slot
MW-9	9/1/2010	4	20	-	30.81	10-30	-	404.92	40.328031	-75.555210	Opening: 0.020 Slot
MW-10	8/31/2010	4	7	-	7.51	1-8	-	411.75	40.329064	-75.555119	Opening: 0.020 Slot
MW-11 (Destroyed)	NA	2	8.7	-	9.3	.5-9.3	-	NM	NA	NA	Opening: 0.020 Slot
MW-12	5/11/2011	4	9	-	11	2-11	-	415.87	40.329159	-75.555688	Opening: 0.020 Slot
MW-13	5/11/2011	4	20	-	25	5-25	-	417.25	40.329390	-75.555400	Opening: 0.020 Slot
MW-14	5/11/2011	4	10	-	15	2-15	-	415.75	40.329102	-75.555383	Opening: 0.020 Slot

Notes:
fbg = feet below ground
famsl = feet above mean sea level

Table 3
Straddle Packer Sample Data
Hoff VC Site
New Hanover Township, PA

Sample Location	Date	PCE	TCE	CIS-1,2-DCE	TRANS-1,2-DCE	1,1-DCE	VC	1,1,1-TCA	1,1-DCA	1,2-DCA	MTBE	ACETONE	BENZENE	1,2-DCB	1,3-DCB	1,2,4-TCB	CHLORO BENZENE	1,2-DCP	TOLUENE	1,4-Dioxane	SEC-BUTYL BENZENE	CARBAZOLE	CHLORO ETHANE	CUMENE (ISOPROPYL BENZENE)	P-DICHLORO BENZENE	DICHLORO METHANE	ETHYL BENZENE	TETRAHYDRO FURAN	1,1,2-TRICHLORO ETHANE
MCL or SHS		**5.0**	**5.0**	**70**	**100**	**7.0**	**2.0**	**200**	**31**	**5.0**	**20**	**33,000**	**5.0**	**600**	**600**	**70**	**100**	**5.0**	**1,000**		**1,500**	**33**	**230**	**840**	**75**	**5.0**	**700**	**25**	**5.0**
MW-1D (130-150)	06/14/12	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	**10.30**	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	**134 Q**	NA	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
MW-1D (250-270)	06/14/12	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	**7.40**	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	**41.3**	NA	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
MW-2D (40-65)	06/13/12	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	**5.30**	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	**104 Q**	NA	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
MW-2D (100-120)	06/13/12	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	**2.9**	ND (0.5)	ND (0.5)	**2.1**	ND (0.5)	ND (0.5)	ND (2.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	**49.6**	NA	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	**0.64**	ND (0.5)
MW-2D (200-220)	06/13/12	ND (0.5)	ND (0.5)	**0.75**	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	**23.8**	NA	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
MW-2D (270-290)	06/12/12	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	**3.30**	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	**39.3**	NA	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
MW-3D (50-70)	06/12/12	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	**2.5**	NA	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
MW-3D (85-105)	06/12/12	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	**20.6**	NA	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
MW-3D (155-175)	06/11/12	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (5.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	**100 Q**	NA	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
MW-3D (215-235)	06/11/12	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	**6.90**	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	**28.9**	NA	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
MW-4D (90-120)	06/18/12	ND (0.5)	**633**	**3,180**	**33.4 Q**	**63.2 Q**	**24.2 Q**	**9 Q**	**128 Q**	**1.1**	**21.3 Q**	ND (2.5)	**17.1 Q**	**2,150**	**13.8**	**8 Q**	**170 Q**	**5.4**	**11.8 Q**	NA	**2**	**0.79**	**2.9**	**0.99**	**272 Q**	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
MW-4D (190-220)	06/18/12	ND (0.5)	**405 Q**	**2,530**	**24.6 Q**	**52.6 Q**	**18 Q**	**5.8 Q**	**108 Q**	**0.9**	**15.4 Q**	ND (2.5)	**13.5 Q**	**1,080**	**5.7**	**2.4**	**108 Q**	**3.9**	**96.2 Q**	NA	**0.61**	ND (0.5)	**2.1**	ND (0.5)	**121 Q**	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
MW-4D (220-250)	06/18/12	ND (0.5)	**502 Q**	**2,880**	**32.6 Q**	**58.7**	**20.3 Q**	**7 Q**	**116 Q**	**0.95**	**16.8 Q**	ND (2.5)	**14.6 Q**	**1,280**	**7.4**	**3.2**	**122 Q**	**4.2**	**90 Q**	NA	**0.78**	ND (0.5)	**2.4**	ND (0.5)	**139 Q**	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
MW-5D (55-75)	06/15/12	ND (0.5)	**40.2 Q**	**28.4 Q**	ND (0.5)	**91**	ND (0.5)	**101**	**20.2 Q**	**0.57**	**3.9**	ND (2.5)	ND (0.5)	**1.8**	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	**7.2 Q**	NA	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
MW-5D (75-95)	06/15/12	ND (0.5)	**28.2 Q**	**22 Q**	ND (0.5)	**83.2**	ND (0.5)	**75.1**	**15.2 Q**	ND (0.5)	**3.5**	ND (2.5)	ND (0.5)	**4.8 Q**	ND (0.5)	ND (0.5)	**0.5**	ND (0.5)	**27.4 Q**	NA	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
MW-5D (140-160)	06/15/12	ND (1.0)	**42.2**	**29.4**	ND (1.0)	**92.2**	ND (1.0)	**101**	**22.4**	ND (1.0)	**4.8**	ND (5.0)	ND (1.0)	**18.4**	ND (1.0)	ND (1.0)	**1.3**	ND (1.0)	**67.3**	NA	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	**2.5**	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
MW-5D (170-190)	06/15/12	ND (0.5)	**8.2**	**6.7**	ND (0.5)	**20.6**	ND (0.5)	**17.8**	**6.2**	ND (0.5)	**1.3**	**2.90**	ND (0.5)	**2.5**	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	**27**	NA	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
MW-7D (85-115)	06/19/12	ND (0.5)	**8**	**3.1**	ND (0.5)	**31.6**	ND (0.5)	**12.8**	**4.4**	**0.54**	**1**	ND (2.5)	ND (0.5)	**5.2**	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	**44.5**	NA	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	**0.68**	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
MW-7D (125-155)	06/19/12	ND (0.5)	**0.54**	**0.59**	ND (0.5)	**1.6**	ND (0.5)	**0.53**	**0.97**	ND (0.5)	**0.87**	ND (2.5)	ND (0.5)	**0.79**	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	**2.3**	NA	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
MW-7D (180-210)	06/19/12	0.75	**32.4 Q**	**9 Q**	ND (0.5)	**126**	ND (0.5)	**52 Q**	**15.4 Q**	**2.2**	**1.6**	ND (2.5)	**0.66**	**16.2 Q**	ND (0.5)	ND (0.5)	**0.93**	ND (0.5)	**30.8 Q**	NA	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	**2.1**	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
MW-7D (210-240)	06/19/12	ND (0.5)	**14.4 Q**	**8.2 Q**	ND (0.5)	**97.3**	**0.61**	**31.6 Q**	**9.6 Q**	**1.2**	**1.8**	ND (2.5)	ND (0.5)	**8 Q**	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	**13.3 Q**	NA	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	**1**	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
MW-8D (40-90)	04/25/13	**0.9**	**390**	**260**	**3.9**	**69**	**7**	**41**	**23**	**0.5**	NA	ND (3.0)	**5.1**	NA	NA	NA	**24**	**0.3 J**	**97**	NA	NA	NA	**0.4 J**	NA	NA	**0.2 J**	ND (0.1)	NA	**0.5 J**
MW-8D (90-120)	04/25/13	**0.5**	**220**	**200**	**2.4**	**31**	**5**	**21**	**20**	**0.4 J**	NA	ND (3.0)	**3**	NA	NA	NA	**14**	**0.3 J**	**290**	NA	NA	NA	**0.2 J**	NA	NA	ND (0.2)	**0.1 J**	NA	**0.2 J**
MW-8D (120-150)	04/25/13	**0.3 J**	**140**	**140**	**3**	**24**	**3.1**	**16**	**13**	**0.2 J**	NA	**5.30**	**2**	NA	NA	NA	**9.3**	**0.2 J**	**330**	NA	NA	NA	**0.2 J**	NA	NA	ND (0.2)	**0.1 J**	NA	**0.1 J**
MW-8D (180-250)	04/24/13	**0.2 J**	**96**	**57**	**0.7**	**16**	**1.6**	**9.6**	**6.6**	**0.1 J**	NA	ND (3.0)	**1.3**	NA	NA	NA	**7.9**	ND (0.1)	**150**	NA	NA	NA	**0.1 J**	NA	NA	ND (0.2)	ND (0.1)	NA	ND (0.1)
MW-9D (0-83)	06/04/14	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (3.0)	ND (0.1)	NA	NA	NA	ND (0.1)	ND (0.1)	**90**	ND (0.5)	NA	NA	NA	NA	NA	NA	ND (0.1)	NA	ND (0.1)
MW-9D (85-105)	06/04/14	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (3.0)	ND (0.1)	NA	NA	NA	ND (0.1)	ND (0.1)	**8.2**	ND (0.5)	NA	NA	NA	NA	NA	NA	ND (0.1)	NA	ND (0.1)
MW-9D (135-155)	06/04/14	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (3.0)	ND (0.1)	NA	NA	NA	ND (0.1)	ND (0.1)	**79**	ND (0.5)	NA	NA	NA	NA	NA	NA	ND (0.1)	NA	ND (0.1)
MW-9D (155-175)	06/04/14	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (3.0)	ND (0.1)	NA	NA	NA	ND (0.1)	ND (0.1)	**45**	ND (0.5)	NA	NA	NA	NA	NA	NA	ND (0.1)	NA	ND (0.1)
MW-9D (194-214)	06/04/14	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (3.0)	ND (0.1)	NA	NA	NA	ND (0.1)	ND (0.1)	**6.3**	ND (0.5)	NA	NA	NA	NA	NA	NA	ND (0.1)	NA	ND (0.1)
MW-10D (0-75)	06/03/14	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (3.0)	ND (0.1)	NA	NA	NA	ND (0.1)	ND (0.1)	**34**	ND (0.5)	NA	NA	NA	NA	NA	NA	ND (0.1)	NA	ND (0.1)
MW-10D (99-119)	06/03/14	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (3.0)	ND (0.1)	NA	NA	NA	ND (0.1)	ND (0.1)	**64**	ND (0.5)	NA	NA	NA	NA	NA	NA	ND (0.1)	NA	ND (0.1)
MW-10D (119-139)	06/02/14	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (3.0)	ND (0.1)	NA	NA	NA	ND (0.1)	ND (0.1)	**14**	ND (0.5)	NA	NA	NA	NA	NA	NA	ND (0.1)	NA	ND (0.1)
MW-10D (150-170)	06/02/14	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (3.0)	ND (0.1)	NA	NA	NA	ND (0.1)	ND (0.1)	**29**	ND (0.5)	NA	NA	NA	NA	NA	NA	ND (0.1)	NA	ND (0.1)
MW-10D (171-205)	06/02/14	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (3.0)	ND (0.1)	NA	NA	NA	ND (0.1)	ND (0.1)	**5.5**	ND (0.5)	NA	NA	NA	NA	NA	NA	ND (0.1)	NA	ND (0.1)
OW-4 (45-75)	08/22/12	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	**2.50**	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	**106**	NA	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
OW-4 (185-215)	08/21/12	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	**18.1**	NA	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
OW-4 (223-253)	08/21/12	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	**61.2**	NA	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
OW-4 (260-350)	08/21/12	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	**68.6**	NA	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
OW-6 (25-55)	08/24/12	ND (0.5)	**1**	**0.96**	ND (0.5)	**0.87**	ND (0.5)	ND (0.5)	**1.7**	ND (0.5)	ND (0.5)	**3.40**	ND (0.5)	**2.2**	ND (0.5)	ND (0.5)	**3.8**	ND (0.5)	**102**	NA	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
OW-6 (80-110)	08/24/12	ND (0.5)	**1.2**	**0.99**	ND (0.5)	**0.98**	ND (0.5)	ND (0.5)	**1.9**	ND (0.5)	ND (0.5)	ND (2.5)	ND (0.5)	**2.7**	ND (0.5)	ND (0.5)	**4.5**	ND (0.5)	**90**	NA	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
OW-6 (225-255)	08/23/12	ND (0.5)	**1.3**	**1**	ND (0.5)	**1**	ND (0.5)	ND (0.5)	**2**	ND (0.5)	ND (0.5)	ND (2.5)	ND (0.5)	**2.7**	ND (0.5)	ND (0.5)	**5.7 Q**	ND (0.5)	**55.5**	NA	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
OW-6 (275-400)	08/23/12	ND (0.5)	**0.96**	**1**	ND (0.5)	**0.87**	ND (0.5)	ND (0.5)	**1.9**	ND (0.5)	ND (0.5)	ND (2.5)	ND (0.5)	**1.6**	ND (0.5)	ND (0.5)	**3.2**	ND (0.5)	**152**	NA	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
FIELD BLANK 1	06/12/12	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	NA	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
FIELD BLANK 2	06/13/12	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	NA	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
FIELD BLANK 3	06/14/12	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	NA	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
FIELD BLANK 4	06/15/12	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	NA	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
FIELD BLANK 5	06/18/12	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	NA	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
FIELD BLANK 6	06/19/12	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	NA	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
FIELD BLANK 7	04/25/13	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	NA	ND (3.0)	ND (0.1)	NA	NA	NA	ND (0.1)	ND (0.1)	ND (0.1)	NA	NA	NA	ND (0.1)	NA	NA	ND (0.2)	ND (0.1)	NA	ND (0.1)
TRIP BLANK 1	06/11/12	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	NA	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
TRIP BLANK 2	04/25/13	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	NA	ND (3.0)	ND (0.1)	NA	NA	NA	ND (0.1)	ND (0.1)	ND (0.1)	NA	NA	NA	ND (0.1)	NA	NA	ND (0.2)	ND (0.1)	NA	ND (0.1)
TRIP BLANK 3	06/02/14	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (3.0)	ND (0.1)	NA	NA	NA	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.5)	NA	NA	NA	NA	NA	NA	ND (0.1)	NA	ND (0.1)
TRIP BLANK 4	06/04/14	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (3.0)	ND (0.1)	NA	NA	NA	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.5)	NA	NA	NA	NA	NA	NA	ND (0.1)	NA	ND (0.1)
RINSE BLANK	06/03/14	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (3.0)	ND (0.1)	NA	NA	NA	ND (0.1)	ND (0.1)	**0.3 J**	ND (0.5)	NA	NA	NA	NA	NA	NA	ND (0.1)	NA	ND (0.1)

Notes:
All results in micrograms per liter (µg/L)
BOLD = Contaminant Concentration Detected Above Laboratory Detection Limit
BOLD WITH SHADING = Contaminant Concentration Exceeds MSC (Used Residential Aquifers; TDS ≤ 2500)
MCL = Maximum Contaminant Level
SHS = Statewide Health Standard
ND = Compound Not Detected at Listed Laboratory Detection Limit
Q = Contaminant Concentration reported from multiple analyses

PCE = Tetrachloroethene
PCA = Tetrachloroethane
TCE = Trichloroethene
DCE = Dichloroethene
VC = Vinyl Chloride
TCA = Trichloroethane
DCA = Dichloroethane

MTBE = Methyl tert-butyl ether
DCB = Dichlorobenzene
TCB = Trichlorobenzene
TMB = Trimethylbenzene
PCP = Pentachlorophenol
DCP = Dichloropropane

Table 4
PADEP Monitoring Well and Good Oil Well Sample Data
Hoff VC Site
New Hanover Township, PA

Sample Location	PDB/HS/Dup	Date	Top of Casing Elevation	Total Depth	Depth to Water	Depth to Product	Adjusted Groundwater Elevation	PCE	TCE	cis-1,2 DCE	trans-1,2 DCE	1,1-DCE	VC	1,1,1-TCA	1,1-DCA	1,2-DCA	MTBE	Acetone	Benzene	1,2-DCB	1,3-DCB	1,4-DCB	1,2,3-TCB	1,2,4-TCB	1,2,4-TMB	1,3,5-TMB	Carbon Disulfide	Chloro benzene	PCP	bis(2-Ethyl-hexyl) phthalate	1,2-DCP	TBA	Toluene	1,4-Dioxane
PADEP MSC			**ft amsl**	**in feet**	**ft btoc**	**ft btoc**	**ft amsl**	**5**	**5**	**70**	**100**	**7**	**2**	**200**	**31**	**5**	**20**	**33,000**	**5**	**600**	**600**	**75**	**70**	**40**	**15**	**13**	**1,500**	**100**	**1**	**6**	**5**	**--**	**1,000**	**6.4**
PADEP Monitoring Wells																																		
MW-1S		5/16/12[1]	419.46	30	3.49	--	415.97	4.50	**22.7**	19	ND (0.5)	0.9	**2.3**	ND (0.5)	0.61	ND (0.5)	ND (0.5)	5.2	ND (0.5)	12.3	ND (0.5)	1.5	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	3.7	1.9	NA	NA	ND (0.5)	ND (5.0)	13.2	ND (2.5)
		10/17/12	419.46	30	5.83	--	413.63	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	12.1	ND (0.5)	0.83	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	1.3	ND (2.39)	ND (1.2)	ND (0.5)	ND (5.0)	1.2	ND (2.5)
		5/1/13	419.46	30	3.6	--	415.86	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	8.1	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	0.83 J	ND (0.5)	ND (0.5)	ND (2.38)	**6.39**	ND (0.5)	ND (5.0)	2.1	ND (5.0)
		10/15/13	419.46	NM	5.70	--	413.76	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	80.4	ND (0.5)	0.51	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	0.69	1.7	ND (2.42)	ND (1.21)	ND (0.5)	ND (5)	3.6	ND (2.5)
		7/1/14	419.46	29.2	4.87	--	414.59	ND (0.1)	ND (0.1)	0.2 J	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	NA	4.5 J	ND (0.1)	ND (0.5)	ND (0.5)	ND (0.5)	NA	ND (0.5)	NA	NA	ND (0.4)	0.7	ND (1)	ND (2)	ND (0.1)	NA	2.9	ND (0.5)
MW-1D	PDB	5/30/12[1]	419.08	300	7.1	--	411.98	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	NA	NA	ND (0.5)	ND (5.0)	ND (0.5)	NA
MW-1D Upper		10/17/12	418.64	174	9.05	--	409.59	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.39)	2.02	ND (0.5)	ND (5.0)	ND (0.5)	ND (2.5)
		5/1/13	418.64	174	4.3	--	414.34	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	3.80	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.0)	ND (0.5)	ND (0.5)	ND (2.4)	**7.84**	ND (0.5)	ND (5.0)	ND (0.5)	ND (5.0)
		10/15/13	418.64	NM	15.43	--	403.21	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.36)	2.55	ND (0.5)	ND (5)	ND (0.5)	ND (2.5)
		6/30/14	418.64	174	8.41	--	410.23	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	NA	ND (3.0)	ND (0.1)	ND (0.5)	ND (0.5)	ND (0.5)	NA	ND (0.5)	NA	NA	ND (0.4)	ND (0.1)	ND (1)	ND (2)	ND (0.1)	NA	ND (0.1)	0.8 J
MW-1D Lower		10/17/12	418.43	300	7.62	--	410.81	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	6.7	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	1.8	ND (0.5)	ND (2.36)	1.22	ND (0.5)	ND (5.0)	ND (0.5)	ND (2.5)
		5/2/13	418.43	300	13.22	--	405.21	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	6.1	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.0)	1.4	ND (0.5)	ND (2.34)	1.43 B	ND (0.5)	ND (5.0)	ND (0.5)	ND (5.0)
		10/14/13	418.43	NM	10.40	--	408.03	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.36)	ND (1.18)	ND (0.5)	ND (5)	ND (0.5)	ND (2.5)
		6/30/14	418.43	300	18.1	--	400.33	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	0.1 J	ND (0.1)	0.1 J	ND (0.1)	NA	ND (3.0)	ND (0.1)	ND (0.5)	ND (0.5)	ND (0.5)	NA	ND (0.5)	NA	NA	ND (0.4)	ND (0.1)	ND (1)	ND (2)	ND (0.1)	NA	0.1 J	0.7 J
MW-2S		5/16/12[1]	416.62	30	9.22	--	407.40	ND (0.5)	3.2	5.5	ND (0.5)	0.84	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.5)	ND (0.5)	7.6	ND (0.5)	0.91	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	0.64	NA	NA	ND (0.5)	ND (5.0)	ND (0.5)	ND (2.5)
		10/15/12	416.62	30	9.98	--	406.64	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.4)	1.54	ND (0.5)	ND (5.0)	ND (0.5)	ND (2.5)
		5/1/13	416.62	30	3.8	--	412.82	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.0)	ND (0.5)	ND (0.5)	ND (2.36)	ND (1.18)	ND (0.5)	ND (5.0)	ND (0.5)	ND (5.0)
		10/14/13	416.62	NM	11.13	--	405.49	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	**3.21**	ND (1.22)	ND (0.5)	ND (5)	ND (0.5)	ND (2.5)
		7/1/14	416.62	29	8.6	--	408.02	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	NA	ND (3.0)	ND (0.1)	ND (0.6)	ND (0.6)	ND (0.6)	NA	ND (0.6)	NA	NA	ND (0.4)	ND (0.1)	ND (1)	ND (2)	ND (0.1)	NA	ND (0.1)	ND (0.5)
MW-2D		5/16/12[1]	416.22	300	8.4	--	407.82	ND (0.5)	2.3	3.5	ND (0.5)	0.58	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.5)	ND (0.5)	5.7	ND (0.5)	0.68	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	0.5	NA	NA	ND (0.5)	ND (5.0)	ND (0.5)	ND (2.5)
MW-2D Upper		10/16/12	415.88	116	12.57	--	403.31	ND (0.5)	0.72	ND (0.5)	ND (0.5)	2.2	ND (0.5)	ND (0.5)	2.6	ND (0.5)	ND (0.5)	ND (2.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.37)	ND (1.18)	ND (0.5)	ND (5.0)	ND (0.5)	3.16
		5/3/13	415.88	116	6.6	--	409.28	ND (0.5)	0.51	ND (0.5)	ND (0.5)	3.1	ND (0.5)	ND (0.5)	2.4	ND (0.5)	ND (0.5)	ND (2.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (1.0)	ND (2.34)	1.55	ND (0.5)	ND (2.5)	ND (0.5)	2.78 J
	HS	10/15/13	415.88	NM	8.73	--	407.15	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	2	ND (0.5)	ND (0.5)	1.5	ND (0.5)	ND (0.5)	ND (2.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.38)	2.31	ND (0.5)	ND (5)	ND (0.5)	ND (2.5)
		10/15/13	415.88	NM	8.73	--	407.15	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	2.9	ND (0.5)	ND (0.5)	2.2	ND (0.5)	ND (0.5)	ND (2.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (1)	ND (2.45)	1.78 B	ND (0.5)	ND (5)	ND (0.5)	ND (2.5)
		7/1/14	415.88	116.5	11.93	--	403.95	ND (0.1)	0.3 J	ND (0.1)	ND (0.1)	2.3	ND (0.1)	0.3 J	1.5	ND (0.1)	NA	ND (3.0)	ND (0.1)	ND (0.5)	ND (0.5)	ND (0.5)	NA	ND (0.5)	NA	NA	ND (0.4)	ND (0.1)	ND (1)	ND (2)	ND (0.1)	NA	ND (0.1)	2.5
MW-2D Lower		10/15/12	415.88	226	8.8	--	407.08	ND (0.5)	ND (0.5)	0.62	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.37)	ND (1.18)	ND (0.5)	ND (5.0)	ND (0.5)	ND (2.5)
		4/30/13	415.88	226	3.8	--	412.08	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (1.0)	ND (2.36)	ND (1.18)	ND (0.5)	ND (2.5)	ND (0.5)	ND (5.0)
		10/14/13	415.88	NM	7.40	--	408.48	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.34)	ND (1.17)	ND (0.5)	ND (5)	ND (0.5)	ND (2.5)
		7/1/14	415.88	226	7.60	--	408.28	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	NA	ND (3.0)	ND (0.1)	ND (0.5)	ND (0.5)	ND (0.5)	NA	ND (0.5)	NA	NA	ND (0.4)	ND (0.1)	ND (1)	ND (2)	ND (0.1)	NA	ND (0.1)	ND (0.5)
MW-3S		5/15/12[1]	411.18	30	5.21	--	405.97	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.48)	ND (1.24)	ND (0.5)	ND (5.0)	ND (0.5)	ND (2.5)
		10/15/12	411.18	NM	--	--	--	Not Sampled																										
		5/1/13	411.18	30	4	--	407.18	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (1.0)	ND (2.36)	ND (1.18)	ND (0.5)	ND (2.5)	ND (0.5)	ND (5.0)
		10/14/13	411.18	29.8	8.05	--	403.13	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.4)	1.21	ND (0.5)	ND (5)	ND (0.5)	ND (2.5)
		6/30/14	411.18	29.8	5.42	--	405.76	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	NA	ND (3.0)	ND (0.1)	ND (0.5)	ND (0.5)	ND (0.5)	NA	ND (0.5)	NA	NA	ND (0.4)	ND (0.1)	ND (1)	ND (2)	ND (0.1)	NA	ND (0.1)	ND (0.5)
MW-3D		5/15/12[1]	410.62	250	6.61	--	404.01	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.43)	ND (1.22)	ND (0.5)	ND (5.0)	ND (0.5)	ND (2.5)
		10/15/12	NM	NM	--	--	--	Not Sampled																										

Table 4
PADEP Monitoring Well and Good Oil Well Sample Data
Hoff VC Site
New Hanover Township, PA

Sample Location	PDB/HS/Dup	Date	Top of Casing Elevation	Total Depth	Depth to Water	Depth to Product	Adjusted Groundwater Elevation	PCE	TCE	cis-1,2 DCE	trans-1,2 DCE	1,1-DCE	VC	1,1,1-TCA	1,1-DCA	1,2-DCA	MTBE	Acetone	Benzene	1,2-DCB	1,3-DCB	1,4-DCB	1,2,3-TCB	1,2,4-TCB	1,2,4-TMB	1,3,5-TMB	Carbon Disulfide	Chloro benzene	PCP	bis(2-Ethyl-hexyl) phthalate	1,2-DCP	TBA	Toluene	1,4-Dioxane
PADEP MSC			ft amsl	in feet	ft btoc	ft btoc	ft amsl	5	5	70	100	7	2	200	31	5	20	33,000	5	600	600	75	70	40	15	13	1,500	100	1	6	5	--	1,000	6.4
		5/1/13	410.21	250	4.22	--	405.99	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.0)	ND (0.5)	ND (0.5)	ND (2.38)	ND (1.19)	ND (0.5)	ND (5.0)	ND (0.5)	ND (5.0)
MW-3D Upper		7/30/13	410.21	106	5.21	--	405.00	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	NA	NA	ND (0.5)	ND (5.0)	ND (0.5)	ND (2.5)
		10/14/13	410.21	NM	7.21	--	403.00	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.38)	ND (1.19)	ND (0.5)	ND (5)	ND (0.5)	ND (2.5)
		6/30/14	410.21	106	5.14	--	405.07	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	NA	ND (3.0)	ND (0.1)	ND (0.5)	ND (0.5)	ND (0.5)	NA	ND (0.5)	NA	NA	ND (0.4)	ND (0.1)	ND (1)	ND (2)	ND (0.1)	NA	ND (0.1)	ND (0.5)
		5/1/13	410.26	250	4.22	--	406.04	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (1.0)	ND (2.34)	ND (1.17)	ND (0.5)	ND (2.5)	ND (0.5)	ND (5.0)
		7/30/13	410.26	210	5.0	--	406.04	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (4.93)	ND (1.23)	ND (0.5)	ND (5.0)	ND (0.5)	ND (2.5)
MW-3D Lower	Dup 1	7/30/13	410.26	--	--	--	--	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (4.81)	ND (1.2)	ND (0.5)	ND (5.0)	ND (0.5)	ND (2.5)
		10/14/13	410.26	NM	6.85	--	403.41	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.38)	2.9	ND (0.5)	ND (5)	ND (0.5)	ND (2.5)
		6/30/14	410.26	210	9.61	--	400.65	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	NA	ND (3.0)	ND (0.1)	ND (0.5)	ND (0.5)	ND (0.5)	NA	ND (0.5)	NA	NA	0.7	ND (0.1)	ND (1)	ND (2)	ND (0.1)	NA	ND (0.1)	ND (0.5)
MW-4D		5/15/12[1]	405.86	250	13.9	--	391.96	0.51	**673 Q**	**2,990 Q**	34 Q	**67.2 Q**	**23.1 Q**	7.9 Q	**122 Q**	0.82	11.4 Q	ND (2.5)	**14.6 Q**	**1,230**	ND (2.44)	**152**	0.58	4.41	ND (0.5)	ND (0.5)	ND (0.5)	**126 Q**	**3.18**	ND (1.22)	2.8	326 Q	ND (0.5)	**55.60**
		10/17/12	405.62	118	14.1	--	391.52	ND (0.5)	**641 Q**	**2,660 Q**	23.4	**45**	**9.4**	7.7	**174**	1	14.2	ND (2.5)	**12.9**	**1,030 Q**	8.7	**99**	ND (0.5)	3.8	ND (0.5)	ND (0.5)	ND (0.5)	80.2	ND (2.35)	ND (1.17)	2.5	126	2.9	**97.80**
		5/3/13	405.62	118	10.75	--	394.87	ND (0.5)	**490**	**2,230**	21.7	**39.5**	**12.9**	6.3	**131**	1.1	**31.2**	ND (2.5)	**10.8**	**1,060**	6.8	**115**	ND (0.5)	2.8	ND (0.5)	ND (0.5)	1.1	**143**	**5.01**	1.4	1.8	110	1.8	**44.30**
		10/17/13	405.62	113	13.3	--	392.32	ND (0.5)	**495 Q**	**2,390 Q**	28.1Q	**55.5 Q**	**19.2 Q**	6.8Q	**114 Q**	1.5	**46.4 Q**	3.3	**13.0 Q**	**1,140 Q**	6.9	**126 Q**	ND (0.5)	3.4	ND (0.5)	ND (0.5)	1.0	**110 Q**	ND (2.42)	1.28 B	2.4	168 Q	1.4	**48.6**
MW-4D Upper	Dup 3	10/17/13	405.62	113	13.3	--	392.32	ND (1.0)	**454**	**2,160**	27.6	**49.7**	**15.3**	6.2	**110 Q**	1.3	**43.1**	ND (5)	**12.3**	**1,080**	ND (1)	**113**	ND (1)	2.9	ND (1)	ND (1)	ND (1)	**107 Q**	ND (2.34)	1.52 B	2.1	152	1.4	**49.1**
	HS	10/17/13	405.62	113	13.3	--	392.32	ND (0.5)	**238**	**644**	4.2	**11.6**	**3.9**	1.4	**31.9**	ND (0.5)	6.7	4.8	3.8	326	1.6	25	ND (0.5)	0.89	ND (0.5)	ND (0.5)	4.3	51.4 Q	ND (2.44)	2.51	0.65	ND (5.0)	0.85	**24**
	Dup	7/2/14	405.62	--	--	--	--	ND (2.0)	**420**	**2,700**	24	**54**	**24**	6.8 J	**130**	ND (2.0)	NA	ND (60)	**13**	**1,200**	7	**150**	NA	4	NA	NA	ND (8.0)	**150**	ND (1)	ND (2)	ND (2.0)	NA	ND (2.0)	**76**
		7/2/14	405.62	118	13.5	--	392.12	ND (2.0)	**440**	**2,600**	25	**57**	**25**	7.3 J	**130**	2.1 J	NA	ND (60)	**13**	**1,300**	8	**170**	NA	4	NA	NA	ND (8.0)	**160**	ND (1)	ND (2)	ND (2.0)	NA	ND (2.0)	**75**
		10/17/12	405.42	245	10.2	--	395.22	ND (0.5)	**488 Q**	**2,690 Q**	22.8	**40.7**	**13.3**	7.3	**169**	0.94	14.2	2.8	**14**	**1,150 Q**	6	**111**	ND (0.5)	2.4	ND (0.5)	ND (0.5)	ND (0.5)	**117**	ND (2.35)	ND (1.17)	2.4	242	36	**69.10**
MW-4D Lower		5/3/13	405.42	245	12.8	--	392.62	ND (0.5)	**438**	**2,770**	21.1	**38.6**	**13.9**	5.3	**143**	0.94	13.6	ND (2.5)	**13.1**	**861**	4	**80.3**	ND (0.5)	1.8	ND (0.5)	ND (0.5)	ND (0.5)	**123**	ND (2.38)	ND (1.19)	2.5	200	30.4	**59.90**
		10/17/13	405.42	NM	21.2	--	384.22	ND (0.5)	**361 Q**	**2,340 Q**	21.4 Q	**46.8 Q**	**12.8 Q**	4.8	**114 Q**	1.1	15.8 Q	ND (2.5)	**12.8 Q**	**700 Q**	ND (0.5)	60.6 Q	ND (0.5)	1.8	ND (0.5)	ND (0.5)	0.52	67.6 Q	ND (2.36)	ND (1.18)	3.0	208 Q	7.4 Q	**53.3**
		7/2/14	405.42	245	16.22	--	389.20	ND (2.0)	**180**	**1,800**	11	**22**	**6.8 J**	ND (2.0)	**76**	ND (2.0)	NA	ND (60)	**7.0 J**	220	1	24	NA	0.5 J	NA	NA	ND (8.0)	29	ND (1)	ND (2)	ND (2.0)	NA	3.9 J	**64**
		5/17/12[1]	400.90	30	13.71	--	387.19	ND (0.5)	4.3	8.6	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.5)	ND (0.5)	9.9	ND (0.5)	1.1	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	0.91	ND (2.44)	ND (1.22)	ND (0.5)	ND (5.0)	ND (0.5)	ND (2.5)
		10/16/12	400.90	30	6.63	--	394.27	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.36)	ND (1.18)	ND (0.5)	ND (5.0)	ND (0.5)	ND (2.5)
MW-5S		4/30/13	400.90	30	5.32	--	395.58	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.38)	ND (1.19)	ND (0.5)	ND (2.5)	ND (0.5)	ND (5.0)
		10/14/13	400.90	NM	5.10	--	395.80	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.39)	3.61	ND (0.5)	ND (5.0)	ND (0.5)	ND (2.5)
		6/30/14	400.90	29.4	7.03	--	393.87	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	NA	ND (3.0)	ND (0.1)	ND (0.5)	ND (0.5)	ND (0.5)	NA	ND (0.5)	NA	NA	ND (0.4)	ND (0.1)	ND (1)	ND (2)	ND (0.1)	NA	ND (0.1)	ND (0.5)
MW-5D		5/17/12[1]	400.64	250	15.53	--	385.11	ND (0.5)	1.3	1.9	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.5)	ND (0.5)	2.91	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.4)	ND (1.2)	ND (0.5)	ND (5.0)	ND (0.5)	ND (2.5)
		10/16/12	400.39	93	15.43	--	384.96	ND (0.5)	2.4	1.4	ND (0.5)	3.1	ND (0.5)	5.2	1	ND (0.5)	ND (0.5)	ND (2.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.35)	1.28 B	ND (0.5)	ND (5.0)	ND (0.5)	2.86
		4/30/13	400.39	93	12.49	--	387.90	ND (0.5)	0.88	0.69	ND (0.5)	1.6	ND (0.5)	2.2	0.73	ND (0.5)	ND (0.5)	ND (2.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.36)	2.06	ND (0.5)	ND (2.5)	ND (0.5)	2.87 J
MW-5D Upper		10/15/13	400.39	NM	13.87	--	386.52	ND (0.5)	0.72	0.5	ND (0.5)	1.5	ND (0.5)	1.6	0.71	ND (0.5)	ND (0.5)	ND (2.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.36)	ND (1.18)	ND (0.5)	ND (5.0)	ND (0.5)	2.58
		7/3/14	400.39	93	15.1	--	385.29	ND (0.1)	0.5	0.3 J	ND (0.1)	0.9	ND (0.1)	1.2	0.4 J	ND (0.1)	NA	ND (3.0)	ND (0.1)	ND (0.5)	ND (0.5)	ND (0.5)	NA	ND (0.5)	NA	NA	ND (0.4)	ND (0.1)	ND (1)	ND (2)	ND (0.1)	NA	ND (0.1)	2.9
	Dup	7/3/14	400.39	--	--	--	--	ND (0.1)	0.5	0.3 J	ND (0.1)	0.9	ND (0.1)	1.2	0.4 J	ND (0.1)	NA	ND (3.0)	ND (0.1)	ND (0.5)	ND (0.5)	ND (0.5)	NA	ND (0.5)	NA	NA	ND (0.4)	ND (0.1)	ND (1)	ND (2)	ND (0.1)	NA	ND (0.1)	2.9
		10/16/12	400.29	187	13.55	--	386.74	ND (0.5)	3.7	4.5	ND (0.5)	3.6	ND (0.5)	2.4	2.2	ND (0.5)	1.3	ND (2.5)	ND (0.5)	2	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.36)	1.37	ND (0.5)	ND (5.0)	ND (0.5)	ND (2.5)
MW-5D Lower		4/30/13	400.29	187	9.8	--	390.49	ND (0.5)	4.5	7	ND (0.5)	3.2	0.66	ND (0.5)	3.3	ND (0.5)	2.3	ND (2.5)	ND (0.5)	3.3	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.36)	ND (1.18)	ND (0.5)	ND (2.5)	ND (0.5)	ND (5.0)
		10/15/13	400.29	NM	12.20	--	388.09	ND (0.5)	**8.5**	ND (0.5)	ND (0.5)	4.5	1.3	ND (0.5)	6.1	ND (0.5)	5	ND (2.5)	ND (0.5)	6.8	ND (0.5)	0.67	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (1)	ND (2.43)	ND (1.21)	ND (0.5)	5.7	ND (0.5)	ND (2.5)
		7/3/14	400.29	187.5	11.60	--	388.69	ND (0.1)	**7.4**	15	0.2 J	3.4	1.5	ND (0.1)	5.8	0.1 J	NA	ND (3.0)	0.2 J	6	ND (0.5)	0.7 J	NA	ND (0.5)	NA	NA	ND (0.4)	0.4 J	ND (1)	ND (2)	ND (0.1)	NA	ND (0.1)	3.1
		5/17/12[1]	412.45	30	22.56	--	389.89	ND (0.5)	3.3	4.8	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	5.2	ND (0.5)	7.25	ND (0.5)	1.1	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.42)	**9.44**	ND (0.5)	ND (5.0)	ND (0.5)	ND (2.5)
		10/16/12	412.45	30	2	--	410.45	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.37)	ND (1.18)	ND (0.5)	ND (5.0)	ND (0.5)	ND (2.5)
MW-6S		4/30/13	412.45	30	1.9	--	410.55	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.36)	ND (1.18)	ND (0.5)	ND (2.5)	ND (0.5)	ND (5.0)
		10/14/13	412.45	28.8	1.69	--	410.76	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.36)	1.33	ND (0.5)	ND (5.0)	ND (0.5)	ND (2.5)
		6/30/14	412.45	28.9	3.85	--	408.60	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	NA	ND (3.0)	ND (0.1)	ND (0.6)	ND (0.6)	ND (0.6)	NA	ND (0.6)	NA	NA	ND (0.4)	ND (0.1)	ND (1)	ND (2)	ND (0.1)	NA	ND (0.1)	ND (0.5)

Table 4
PADEP Monitoring Well and Good Oil Well Sample Data
Hoff VC Site
New Hanover Township, PA

Sample Location	PDB/HS/Dup	Date	Top of Casing Elevation	Total Depth	Depth to Water	Depth to Product	Adjusted Groundwater Elevation	PCE	TCE	cis-1,2 DCE	trans-1,2 DCE	1,1-DCE	VC	1,1,1-TCA	1,1-DCA	1,2-DCA	MTBE	Acetone	Benzene	1,2-DCB	1,3-DCB	1,4-DCB	1,2,3-TCB	1,2,4-TCB	1,2,4-TMB	1,3,5-TMB	Carbon Disulfide	Chloro benzene	PCP	bis(2-Ethyl-hexyl) phthalate	1,2-DCP	TBA	Toluene	1,4-Dioxane
PADEP MSC			**ft amsl**	**in feet**	**ft btoc**	**ft btoc**	**ft amsl**	**5**	**5**	**70**	**100**	**7**	**2**	**200**	**31**	**5**	**20**	**33,000**	**5**	**600**	**600**	**75**	**70**	**40**	**15**	**13**	**1,500**	**100**	**1**	**6**	**5**	**--**	**1,000**	**6.4**
MW-7S		5/16/12¹	385.28	30	3.39	--	381.89	ND (0.5)	4.3	5.9	ND (0.5)	2.9	ND (0.5)	1	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.5)	ND (0.5)	7.1		0.86	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	NA	NA	ND (0.5)	ND (5.0)	ND (0.5)	ND (2.5)
		10/16/12	385.28	30	3.51	--	381.77	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.4)	ND (1.2)	ND (0.5)	ND (5.0)	ND (0.5)	ND (2.5)
		5/2/13	385.28	30	1.42	--	383.86	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	0.67	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.5)	ND (0.5)	0.91	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.0)	ND (0.5)	ND (0.5)	ND (2.43)	5.95	ND (0.5)	ND (5.0)	ND (0.5)	ND (5.0)
	Dup 1	5/2/13	385.28	--	--	--	--	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	0.8	ND (0.5)	ND (0.5)	ND (2.5)	ND (0.5)	0.99	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.48)	ND (1.24)	ND (0.5)	ND (5.0)	ND (0.5)	ND (2.5)
	HS	5/2/13	385.28	30	1.42	--	383.86	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	0.53	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.0)	ND (0.5)	ND (0.5)	**4.57**	**27.6**	ND (0.5)	ND (5.0)	ND (0.5)	ND (5.0)
		10/15/13	385.28	NM	4.86	--	380.42	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.36)	1.51	ND (0.5)	ND (5.0)	ND (0.5)	ND (2.5)
	Dup 1	10/15/13	385.28	--	--	--	--	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.45)	ND (1.22)	ND (0.5)	ND (5.0)	ND (0.5)	ND (2.5)
	HS	10/15/13	385.28	NM	4.86	--	380.42	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.38)	**17**	ND (0.5)	ND (5.0)	ND (0.5)	ND (2.5)
		6/30/14	385.28	29.4	2.5	--	382.78	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	NA	ND (3.0)	ND (0.1)	ND (0.6)	ND (0.6)	ND (0.6)	NA	ND (0.6)	NA	NA	ND (0.4)	ND (0.1)	ND (1)	ND (2)	ND (0.1)	NA	ND (0.1)	ND (0.5)
MW-7D	T-50'	5/16/12¹	383.94	250	0.65	--	383.29	ND (0.5)	**9.4**	7.2	ND (0.5)	**22.6**	ND (0.5)	8.1	3.7	ND (0.5)	1	ND (2.5)	ND (0.5)	8.7	ND (0.5)	1	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	NA	NA	ND (0.5)	ND (5.0)	ND (0.5)	**7.69**
	B-200'	5/16/12¹	383.94	250	0.65	--	383.29	0.76	**31.6 Q**	12.1 Q	ND (0.5)	**101**	ND (0.5)	39.2 Q	15.8 Q	2	1.9	ND (2.5)	0.6	16 Q	ND (0.5)	2.3	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	NA	NA	ND (0.5)	ND (5.0)	ND (0.5)	**30.30**
MW-7D Upper		10/17/12	383.38	155	-0.42	--	383.80	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	0.68	ND (0.5)	0.81	ND (2.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.36)	ND (1.18)	ND (0.5)	ND (5.0)	ND (0.5)	4.26
		5/3/13	383.38	155	-0.23	--	383.61	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	0.87	ND (0.5)	0.83	ND (2.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.36)	ND (1.18)	ND (0.5)	ND (2.5)	ND (0.5)	4.12 J
		10/16/13	383.38	NM	0.50	--	382.88	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	0.73	ND (0.5)	0.84	ND (2.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.4)	ND (1.2)	ND (0.5)	ND (5.0)	ND (0.5)	3.73
		7/3/14	383.38	155	-1.20	--	384.58	ND (0.1)	ND (0.1)	0.3 J	ND (0.1)	0.2 J	ND (0.1)	ND (0.1)	0.7	ND (0.1)	NA	ND (3.0)	ND (0.1)	ND (0.5)	ND (0.5)	ND (0.5)	NA	ND (0.5)	NA	NA	ND (0.4)	0.1 J	ND (1)	ND (2)	ND (0.1)	NA	ND (0.1)	5.5
MW-7D Lower		10/16/12	383.32	210	-0.52	--	383.84	0.68	**27.2 Q**	7.4 Q	ND (0.5)	**72.7**	ND (0.5)	43 Q	16.8 Q	2.2	1.5	ND (2.5)	0.56	12.6 Q	ND (0.5)	1.6	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.37)	ND (1.18)	ND (0.5)	ND (5.0)	ND (0.5)	**33.9**
		5/3/13	383.32	210	-0.15	--	383.47	0.81	**32.2 Q**	7.3 Q	ND (0.5)	**101**	ND (0.5)	42.8 Q	15.8 Q	2.6	1.3	ND (2.5)	0.56	14.8 Q	ND (0.5)	1.7	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.0)	ND (0.5)	ND (0.5)	ND (2.36)	ND (1.18)	ND (0.5)	ND (5.0)	ND (0.5)	**29.1**
	Dup 3	5/4/13	383.32	--	--	--	--	0.72	**34.6**	7.4	ND (0.5)	**17.1**	ND (0.5)	46.9	**114**	2.6	1.2	ND (2.5)	0.62	16.4	ND (0.5)	1.8	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.36)	ND (1.18)	ND (0.5)	ND (5.0)	ND (0.5)	**28.7**
		10/16/13	383.32	NM	0.08	--	383.24	ND (1.1)	**23.2 Q**	6.2Q	ND (1.1)	**72.2 Q**	ND (1.1)	31.8Q	12Q	2	1.5	ND (5.5)	ND (1.1)	9.3Q	ND (1.1)	1.1	ND (1.1)	ND (1.1)	ND (1.1)	ND (1.1)	ND (1.1)	ND (1)	ND (2.44)	ND (1.22)	ND (1.1)	ND (11)	ND (1.1)	**25.2**
	HS	10/16/13	383.32	NM	0.08	--	383.24	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	0.82	ND (0.5)	0.8	ND (2.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	0.88	ND (0.5)	ND (2.4)	**6.63**	ND (0.5)	ND (5.0)	ND (0.5)	4.14
		7/2/14	383.32	210	0.00	--	383.32	0.5	**21**	6.8	0.1 J	**56**	0.3 J	24	12	2	NA	ND (3.0)	0.4 J	7	ND (0.5)	0.9 J	NA	ND (0.5)	NA	NA	ND (0.4)	0.7	ND (1)	ND (2)	ND (0.1)	NA	ND (0.1)	**34**
MW-8D Upper		7/30/13	408.88	119	13.00	--	395.88	0.79	**338**	**376**	4.90	**53.4 Q**	**13.50**	ND (0.5)	**44.50**	0.71	2.9	ND (2.5)	**8.70**	467.00	2.70	56.8 Q	ND (0.5)	1.80	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (4.67)	**8.94**	ND (0.5)	59.50	5.6	**11.30**
		10/17/13	408.88	NM	12.82	--	396.06	ND (1.0)	**226**	**572**	9.8	**47.4**	**29.6**	29.1	**95.5 Q**	1.5	8.9	ND (5.0)	**18.5**	**1260**	7	**146**	ND (1.0)	5.5	ND (1.0)	ND (1.0)	ND (1.0)	**1,050**	ND (2.32)	3.43	ND (1.0)	175	2.3	**24.6**
		7/1/14	408.88	119	15.26	--	393.62	ND (2)	**150**	**480**	6.4 J	**32**	**34**	22	**70**	ND (2.0)	NA	ND (60)	**12**	**1200**	7	**160**	NA	6	NA	NA	ND (8.0)	**1,000**	ND (1)	ND (2)	ND (2.0)	NA	ND (2.0)	**40**
MW-8D Lower		7/30/13	408.98	246	13.81	--	395.17	ND (0.5)	**208**	**259**	4.5	**43.7**	**7.4**	ND (0.5)	**33.3**	0.68	2.2	10.1	**6.7**	182	ND (0.5)	21	ND (0.5)	0.59	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (4.74)	**6.7**	ND (0.5)	52.40	37.4	**12.30**
		10/17/13	408.98	NM	24.36	--	384.62	ND (0.5)	**139**	**203**	2.1	**39.6**	**6.6**	23.2	**34.7**	0.68	2.7	7.8	4.8	72.1	ND (0.5)	8.8	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	68.3	ND (2.34)	3.11	ND (0.5)	71.9	8.6	**10.7**
		7/1/14	408.98	246.5	24.55	--	384.43	0.1 J	**86**	**140**	1.6	**18**	**3.8**	16	24	0.5	NA	7.5	2.3	33	ND (0.5)	5	NA	ND (0.5)	NA	NA	ND (0.4)	30	ND (1)	ND (2)	0.2 J	NA	2.2	**13**
MW-9D-Upper		7/1/14	349.50	102.5	16.50	--	333.00	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	NA	ND (3.0)	ND (0.1)	ND (0.5)	ND (0.5)	ND (0.5)	NA	ND (0.5)	NA	NA	ND (0.4)	ND (0.1)	ND (1)	ND (2)	ND (0.1)	NA	ND (0.1)	ND (0.5)
MW-9D Lower		7/1/14	349.50	191	16.47	--	333.03	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	NA	ND (3.0)	ND (0.1)	ND (0.5)	ND (0.5)	ND (0.5)	NA	ND (0.5)	NA	NA	ND (0.4)	ND (0.1)	ND (1)	ND (2)	ND (0.1)	NA	ND (0.1)	ND (0.5)
MW-10D Upper		6/30/14	349.09	110	23.66	--	325.43	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	NA	ND (3.0)	ND (0.1)	ND (0.5)	ND (0.5)	ND (0.5)	NA	ND (0.5)	NA	NA	ND (0.4)	ND (0.1)	ND (1)	ND (2)	ND (0.1)	NA	ND (0.1)	ND (0.5)
MW-10D Lower		6/30/14	349.08	200	28.55	--	320.53	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	NA	ND (3.0)	ND (0.1)	ND (0.5)	ND (0.5)	ND (0.5)	NA	ND (0.5)	NA	NA	ND (0.4)	ND (0.1)	ND (1)	ND (2)	ND (0.1)	NA	ND (0.1)	ND (0.5)
	Dup	6/30/14	349.08	--	--	--	--	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	NA	ND (3.0)	ND (0.1)	ND (0.5)	ND (0.5)	ND (0.5)	NA	ND (0.5)	NA	NA	ND (0.4)	ND (0.1)	ND (1)	ND (2)	ND (0.1)	NA	ND (0.1)	ND (0.5)

Sample Location	PDB/HS/Dup	Date	Top of Casing Elevation	Total Depth	Depth to Water	Depth to Product	Adjusted Groundwater Elevation	PCE	TCE	cis-1,2 DCE	trans-1,2 DCE	1,1-DCE	VC	1,1,1-TCA	1,1-DCA	1,2-DCA	MTBE	Acetone	Benzene	1,2-DCB	1,3-DCB	1,4-DCB	1,2,3-TCB	1,2,4-TCB	1,2,4-TMB	1,3,5-TMB	Carbon Disulfide	Chloro benzene	PCP	bis(2-Ethyl-hexyl) phthalate	1,2-DCP	TBA	Toluene	1,4-Dioxane
PADEP MSC			**ft amsl**	**in feet**	**ft btoc**	**ft btoc**	**ft amsl**	**5**	**5**	**70**	**100**	**7**	**2**	**200**	**31**	**5**	**20**	**33,000**	**5**	**600**	**600**	**75**	**70**	**40**	**15**	**13**	**1,500**	**100**	**1**	**6**	**5**	**--**	**1,000**	**6.4**
OW-4	PDB	6/19/12[2]	405.00	NM	--	--	--	ND (0.5)	2.5	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	NA	NA	ND (0.5)	ND (5.0)	ND (0.5)	ND (2.5)
OW-4 Upper		10/15/12	405.54	127	14.87	--	390.67	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.4)	1.58	ND (0.5)	ND (5.0)	0.6	ND (2.5)
		5/2/13	405.54	127	10.15	--	395.39	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (5.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (0.5)	ND (2.34)	**9.02**	ND (1.0)	ND (10)	ND (1.0)	ND (5.0)
		10/15/13	405.54	NM	14.70	--	390.84	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	0.51	ND (0.5)	ND (2.38)	2.1 B	ND (0.5)	ND (5.0)	ND (0.5)	ND (2.5)
		7/2/14	405.54	128	8.53	--	397.01	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	NA	ND (3.0)	ND (0.1)	ND (0.5)	ND (0.5)	ND (0.5)	NA	ND (0.5)	NA	NA	ND (0.4)	ND (0.1)	ND (1)	ND (2)	ND (0.1)	NA	ND (0.1)	ND (0.5)
OW-4 Lower		10/15/12	405.30	249	5.85	--	399.45	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.35)	1.5	ND (0.5)	ND (5.0)	ND (0.5)	ND (2.5)
		5/2/13	405.30	249	-0.60	--	405.90	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.0)	ND (0.5)	ND (0.5)	ND (2.34)	ND (1.17)	ND (0.5)	ND (5.0)	ND (0.5)	ND (5.0)
		10/15/13	405.30	NM	5.65	--	399.65	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.38)	ND (1.19)	ND (0.5)	ND (5.0)	ND (0.5)	ND (2.5)
		7/2/14	405.30	249	2.00	--	403.30	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	NA	ND (3.0)	ND (0.1)	ND (0.5)	ND (0.5)	ND (0.5)	NA	ND (0.5)	NA	NA	ND (0.4)	ND (0.1)	ND (1)	ND (2)	ND (0.1)	NA	ND (0.1)	ND (0.5)
OW-5	PDB-80'	1/31/13	--	NM	--	--	--	ND (0.5)	1.8 Q	1.4 Q	ND (0.5)	0.85 Q	ND (0.5)	ND (0.5)	0.64 Q	ND (0.5)	ND (0.5)	ND (5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	NA	NA	ND (0.5)	ND (5)	ND (0.5)	NA
	PDB-170'	1/31/13	--	NM	--	--	--	ND (0.5)	1.9	1.30	ND (0.5)	0.81	ND (0.5)	ND (0.5)	0.61	ND (0.5)	ND (0.5)	ND (5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	NA	NA	ND (0.5)	ND (5)	ND (0.5)	NA
	PDB-210'	1/31/13	--	NM	--	--	--	ND (0.5)	0.7	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	NA	NA	ND (0.5)	ND (5)	ND (0.5)	NA
	PDB-270'	1/31/13	--	NM	--	--	--	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	NA	NA	ND (0.5)	ND (5)	ND (0.5)	NA
OW-6	PDB	5/30/12[2]	358.00	NM	--	--	--	ND (0.5)	1.5	1.1	ND (0.5)	1.1	ND (0.5)	ND (0.5)	1.9	ND (0.5)	ND (0.5)	ND (2.5)	ND (0.5)	3	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	NA	NA	ND (0.5)	5	ND (0.5)	NA
OW-6 Upper		10/15/12	363.60	129	1.88	--	361.72	ND (0.5)	1.1	0.81	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	0.75	ND (0.5)	ND (0.5)	ND (2.5)	ND (0.5)	2	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.35)	ND (1.17)	ND (0.5)	ND (5.0)	0.76	ND (2.5)
		5/2/13	363.60	129	-1.60	--	365.20	ND (0.5)	0.94	0.59	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	1.3	ND (0.5)	ND (0.5)	ND (2.5)	ND (0.5)	1.2	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.45)	ND (1.22)	ND (0.5)	ND (5.0)	ND (0.5)	ND (5.0)
	HS	5/2/13	363.60	129	-1.60	--	365.20	ND (0.5)	1.1	0.67	ND (0.5)	0.82	ND (0.5)	ND (0.5)	1.6	ND (0.5)	ND (0.5)	ND (2.5)	ND (0.5)	1.6	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.0)	ND (0.5)	ND (0.5)	ND (2.38)	1.79 B	ND (0.5)	ND (5.0)	ND (0.5)	ND (5.0)
		10/16/13	363.60	NM	0.42	--	363.18	ND (0.5)	0.71	0.57	ND (0.5)	0.62	ND (0.5)	ND (0.5)	1.4	ND (0.5)	ND (0.5)	ND (2.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (1.0)	ND (2.36)	ND (1.18)	ND (0.5)	ND (5.0)	ND (0.5)	ND (2.5)
	HS	10/16/13	363.60	NM	0.42	--	363.18	ND (0.5)	0.64	ND (0.5)	ND (0.5)	0.54	ND (0.5)	ND (0.5)	1.3	ND (0.5)	ND (0.5)	ND (2.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (1.0)	ND (2.63)	ND (1.32)	ND (0.5)	ND (5.0)	ND (0.5)	ND (2.5)
		7/2/14	363.60	130	0.00	--	363.60	ND (0.1)	0.3 J	0.2 J	ND (0.1)	0.2 J	ND (0.1)	ND (0.1)	0.5	ND (0.1)	NA	ND (3.0)	ND (0.1)	ND (0.5)	ND (0.5)	ND (0.5)	NA	ND (0.5)	NA	NA	ND (0.4)	ND (0.1)	ND (1)	ND (2)	ND (0.1)	NA	ND (0.1)	0.5 J
OW-6 Lower		10/15/12	363.52	253	-4.5	--	368.02	ND (0.5)	0.73	0.59	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.5)	ND (0.5)	1.4	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.36)	ND (1.18)	ND (0.5)	ND (5.0)	ND (0.5)	ND (2.5)
		5/2/13	363.52	253	-5.30	--	368.82	ND (0.5)	0.74	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	0.64	ND (0.5)	ND (0.5)	ND (2.5)	ND (0.5)	1	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.34)	2.25	ND (0.5)	ND (5.0)	ND (0.5)	ND (5.0)
	Dup 2	5/2/13	363.52	--	--	--	--	ND (0.5)	0.66	ND (0.5)	ND (0.5)	0.71	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.5)	ND (0.5)	1.1	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.34)	ND (1.17)	ND (0.5)	ND (5.0)	ND (0.5)	ND (2.5)
		10/16/13	363.52	NM	1.13	--	362.39	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.32)	ND (1.16)	ND (0.5)	ND (5.0)	ND (0.5)	ND (2.5)
	Dup 2	10/16/13	363.52	--	--	--	--	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.5)	ND (0.5)	ND (0.5)	ND (2.35)	ND (2.35)	ND (0.5)	ND (2.35)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.35)	ND (1.17)	ND (0.5)	ND (5.0)	ND (0.5)	ND (2.5)
		7/2/14	363.52	253	-6.50	--	370.02	ND (0.1)	0.1 J	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	0.2 J	ND (0.1)	NA	ND (3.0)	ND (0.1)	ND (0.5)	ND (0.5)	ND (0.5)	NA	ND (0.5)	NA	NA	ND (0.4)	0.3 J	ND (1)	ND (2)	ND (0.1)	NA	ND (0.1)	ND (0.5)
Good Oil Company Wells																																		
MW-1		1/24/12	409.65	30.03	1.75	--	407.90	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.5)	ND (0.5)	0.54	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	1.1	NA	NA	NA	NA	NA	NA
		10/24/12	409.65	30.03	3.4	--	406.25	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.5)
		5/1/13	409.65	30.03	1.7	--	407.95	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.5)	ND (0.5)	0.92	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.0)	ND (0.5)	2	ND (2.43)	ND (1.21)	ND (0.5)	ND (5.0)	ND (0.5)	ND (5.0)
		10/15/13	409.65	NM	3.34	--	406.31	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.5)	ND (0.5)	0.57	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	0.94	ND (2.67)	ND (1.34)	ND (0.5)	ND (5.0)	ND (0.5)	ND (2.5)
		7/1/14	409.65	30.10	2.07	--	407.58	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	NA	ND (3.0)	ND (0.1)	ND (0.5)	ND (0.5)	ND (0.5)	NA	ND (0.5)	NA	NA	ND (0.4)	0.1 J	ND (1)	ND (2)	ND (0.1)	NA	ND (0.1)	ND (0.5)
MW-2		1/24/12	405.26	NM	--	--	--	**Not Sampled - Well Could Not Be Located**																										
		10/25/12	405.26	6.92	4.9	--	400.36	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	NA	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.5)
MW-3		1/25/12	400.65	30.23	10.58	--	390.07	ND (0.5)	ND (0.5)	2	ND (0.5)	0.82	ND (0.5)	8.2	**41.3**	ND (0.5)	ND (0.5)	ND (2.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	NA	NA	NA	NA	NA	NA
		10/24/12	400.65	NM	--	--	--	**Not Sampled - Well Covered By Heavy Equipment**																										
MW-4		1/25/12	408.97	29.97	11.8	--	397.17	ND (0.5)	**165**	**226**	ND (0.5)	**1,660**	**23.8**	**2,000**	**152**	ND (0.5)	ND (0.5)	ND (2.5)	**28.7**	**1,560**	9.2	**200**	18.7	17.5	ND (0.5)	ND (0.5)	ND	**552**	NA	NA	NA	NA	127	NA
		10/24/12	408.97	29.97	12.25	--	396.72	1	**139**	**163**	2.3	**744 Q**	**15.8**	**960 Q**	**79.3**	1.1	ND (0.5)	ND (2.5)	**17.8**	**1,410 Q**	8.6	**178**	1.8	15.1	ND (0.5)	ND (0.5)	ND	**425**	ND	ND	ND (0.5)	ND (0.5)	ND (0.5)	**121**
		5/2/13	408.97	29.97	11.6	--	397.37	0.85	**144 Q**	**196 Q**	2.6	**1,090**	**19.6 Q**	**1,240**	**176 Q**	ND (0.5)	3.5	ND (2.5)	**22.4 Q**	**1,670**	8.3	**176 Q**	1.7	14.6 Q	ND (0.5)	ND (2.0)	ND (0.5)	**749**	NA	NA	ND (0.5)	83.2 Q	0.55	**98.7 Q**
		7/2/14	408.97	30.00	12.3	--	396.67	ND (2.0)	**96**	**110**	ND (2.0)	**1,000**	**17**	**1,400**	**150**	ND (2.0)	NA	ND (60)	**20**	**1,100**	7	**150**	NA	11	NA	NA	ND (8.0)	**370**	ND (1)	ND (2)	ND (2.0)	NA	ND (2.0)	**140**

Table 4
PADEP Monitoring Well and Good Oil Well Sample Data
Hoff VC Site
New Hanover Township, PA

Sample Location	PDB/HS/Dup	Date	Top of Casing Elevation	Total Depth	Depth to Water	Depth to Product	Adjusted Groundwater Elevation	PCE	TCE	cis-1,2 DCE	trans-1,2 DCE	1,1-DCE	VC	1,1,1-TCA	1,1-DCA	1,2-DCA	MTBE	Acetone	Benzene	1,2-DCB	1,3-DCB	1,4-DCB	1,2,3-TCB	1,2,4-TCB	1,2,4-TMB	1,3,5-TMB	Carbon Disulfide	Chloro benzene	PCP	bis(2-Ethyl-hexyl) phthalate	1,2-DCP	TBA	Toluene	1,4-Dioxane
PADEP MSC			ft amsl	in feet	ft btoc	ft btoc	ft amsl	5	5	70	100	7	2	200	31	5	20	33,000	5	600	600	75	70	40	15	13	1,500	100	1	6	5	--	1,000	6.4
MW-5		1/25/12	409.81	11.31	0.4	--	409.41	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	**67.6**	**16.7**	ND (0.5)	ND	NA	NA	NA	NA	NA	NA
		10/24/12	409.81	11.31	0.5	--	409.31	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.5)	ND (0.5)	0.78	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND	ND	ND	ND (0.5)	38.4	ND (0.5)	ND (2.5)
MW-6		1/25/12	410.98	11.94	3.82	--	407.16	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.5)	ND (0.5)	ND (0.5)	ND (0.5)	**81.5**	ND (0.5)	ND (0.5)	**113**	ND (0.5)	ND (0.5)	**1,220**	NA	NA	NA	NA	NA	NA
		10/25/12	410.98	11.94	8.05	--	402.93	ND (0.5)	**7.2 Q**	26.2 Q	1.2	1	**4.9**	0.74	3.7	ND (0.5)	5.5	16.6	**40 Q**	64.6 Q	4.7	**98.6 Q**	ND (0.5)	4.18	**139**	**20.6 Q**	ND (0.5)	**1,250**	NA	**6.51**	ND (0.5)	94.5 Q	1.8	ND (2.5)
MW-7		1/25/12	403.43	12.09	5.89	--	397.54	ND (0.5)	ND (0.5)	28.6	ND	6.8	**26.1**	20	**88**	ND (0.5)	ND (0.5)	ND (2.5)	**10.6**	260	18.8	**320**	ND (0.5)	ND (0.5)	**208**	**17.9**	ND (0.5)	**4,560**	NA	NA	NA	NA	NA	NA
		10/24/12	403.43	12.09	6.92	--	396.51	ND (0.5)	ND (0.5)	16.4	0.98	1.8	**12.8**	6.4	**39.6**	ND (0.5)	ND (0.5)	6.4	**8.3**	145 E	16.9	**204 E**	ND (0.5)	1.8	**149 E**	**18.2**	ND (0.5)	**672**	ND	ND	ND (0.5)	ND (0.5)	1.1	**20.1**
MW-8		1/25/12	407.59	30.07	11.85	--	395.74	ND (0.5)	**192**	**808**	12.8	**184**	**69.7**	**278**	**228**	ND	**25.4**	ND (2.5)	**37.7**	**2,160**	12.4	**302**	ND	13.1	ND (0.5)	ND (0.5)	ND (0.5)	**2,440**	NA	NA	NA	NA	532	NA
		10/24/12	407.59	30.07	12.32	--	395.27	0.92	**208**	**774 Q**	10.8	**166**	**51.9 Q**	**268**	**172**	1.5	19.2	ND (2.5)	**30.2**	**2,420 Q**	16.2	**319**	1.3	10.6	ND (0.5)	ND (0.5)	ND (0.5)	**2,280 Q**	ND	ND	0.94	352	1.2	**53.7**
		5/2/13	407.59	30.07	11.63	--	395.96	0.72	**232 Q**	**976 Q**	12.5 Q	**95.8 Q**	**52.7 Q**	175 Q	**198 Q**	ND (0.5)	17.4 Q	ND (2.5)	**27.8 Q**	**3,240 Q**	14.8 Q	**350**	1.4	17.4 Q	ND (0.5)	ND (2.0)	ND (0.5)	**3,320**	**4.23**	ND (1.18)	1.1	435 Q	0.88	**43.5**
		10/16/13	407.59	NM	12.12	--	395.47	ND (0.5)	**60 Q**	**1,180 Q**	14.2 Q	**80.8 Q**	**69.1 Q**	102 Q	**170 Q**	1.5	14.8Q	ND (2.5)	**28.4 Q**	**3,480 Q**	18 Q	**460 Q**	2.3	19.3Q	ND (0.5)	ND (0.5)	0.71	**2,680 Q**	ND (2.43)	1.62	1.2	ND (5.0)	0.98	**39.3 Q**
		7/2/14	407.59	30.10	15.6	--	391.99	ND (2.0)	**120**	**760**	12	**43**	**95**	75	**150**	ND (2.0)	NA	ND (60)	**20**	**1,700**	12	**250**	NA	12	NA	NA	ND (8.0)	**2,000**	ND (1)	ND (2)	ND (2.0)	NA	2.7 J	**57**
MW-9		1/24/12	404.92	30.81	17.0	--	387.92	ND (0.5)	ND (0.5)	0.75	ND (0.5)	ND (0.5)	ND (0.5)	3.2	21.5	ND (0.5)	ND (0.5)	ND (2.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	NA	NA	NA	NA	NA	NA
	Dup	1/24/12	404.92	--	--	--	--	ND (0.5)	ND (0.5)	0.74	ND (0.5)	ND (0.5)	ND (0.5)	3.3	21.7	ND (0.5)	ND (0.5)	ND (2.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	NA	NA	NA	NA	NA	NA
		10/24/12	404.92	30.81	13.65	--	391.27	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	1	12.1	ND (0.5)	ND (0.5)	ND (2.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND	ND	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.5)
MW-10		1/24/12	411.75	7.51	1.89	--	409.86	0.74	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	4.9	NA	NA	NA	NA	NA	NA
		10/24/12	411.75	7.51	3.11	--	408.64	1.8	0.59	5.6	0.52	ND	0.68	ND (0.5)	2.6	ND (0.5)	ND (0.5)	ND (2.5)	1.6	23.1	2.6	55.2 Q	ND (0.5)	ND (0.5)	7.9	ND (0.5)	ND (0.5)	**590**	ND	ND	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.5)
MW-12		1/24/12	415.87	11	2.95	--	412.92	ND (0.5)	**9.4**	ND	0.63	ND (0.5)	0.56	ND (0.5)	4.8	ND (0.5)	8.3	ND (2.5)	ND (0.5)	16.7	ND (0.5)	4.4	ND (0.5)	2.1	ND (0.5)	ND (0.5)	ND (0.5)	2.8	NA	NA	NA	NA	NA	NA
		10/24/12	415.87	11	3.54	--	412.33	ND (0.5)	**9.8 Q**	29.6 Q	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	3.2 Q	ND (0.5)	6.8 Q	ND (2.5)	ND (0.5)	30 Q	ND (0.5)	5.9 Q	ND (0.5)	1.6 Q	ND (0.5)	ND (0.5)	ND (0.5)	4.4 Q	ND	ND	ND (0.5)	ND (0.5)	ND (0.5)	5.11
		7/1/14	415.87	10	3.15	--	412.72	ND (0.1)	**5.4**	24	0.5	0.2 J	2.7	ND (0.1)	2.2	ND (0.1)	NA	5.6	0.5 J	21	ND (0.5)	4	NA	1 J	NA	NA	ND (0.4)	3.9	ND (1)	ND (2)	ND (0.1)	NA	ND (0.1)	**6.8**
MW-13		1/24/12	417.25	25	8.04	--	409.21	ND	**113**	41.4	ND (0.5)	**70.5**	ND	ND	**272**	ND (0.5)	ND (0.5)	ND (2.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND	NA	NA	NA	ND (0.5)	ND (0.5)	ND (2.5)
		10/24/12	417.25	25	10.72	--	406.53	0.54	**181**	52.1 Q	0.86	**78**	**4.4**	0.9	**288**	1.2	5.2	ND (2.5)	0.64	83.3	3.3	17.2	ND (0.5)	1.6	ND (0.5)	ND (0.5)	ND (0.5)	46.8	ND	1.51	0.62	ND (0.5)	ND (0.5)	**227**
	Dup	10/24/12	417.25	--	--	--	--	ND (0.5)	**189**	49.4	ND (0.5)	**77**	ND	ND (0.5)	**289**	ND (0.5)	ND (0.5)	ND (2.5)	ND (0.5)	89.4	ND (0.5)	16.4	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	44	ND	2.74	ND (0.5)	ND (0.5)	ND (0.5)	**258**
		5/3/13	417.25	25	7.15	--	410.10	ND (0.5)	**144**	45.7	0.65	**50**	1	1.1	**240**	0.98	4.8	ND (2.5)	ND (0.5)	ND (0.5)	2.8	ND (0.5)	ND (0.5)	0.61	ND (0.5)	ND (0.5)	ND (0.5)	ND (1.0)	ND (2.38)	ND (1.19)	0.55	ND (2.5)	ND (0.5)	**234 Q**
	HS	5/3/13	417.25	25	7.15	--	410.10	ND (0.5)	**138 Q**	42.4 Q	0.62	**50**	1	1.1	**253 Q**	1.1	4.7	ND (2.5)	ND (0.5)	0.88	2.8	0.63	ND (0.5)	0.68	ND (0.5)	ND (2.0)	ND (0.5)	0.87	ND (2.35)	ND (1.17)	0.62	ND (5.0)	ND (0.5)	**240 Q**
		10/16/13	417.25	NM	10.13	--	407.12	0.5	**149**	57.4	1	**65.9**	**4.5**	1.3	**248**	1.4	6.3	ND (2.5)	0.52	40.4	3.4	11.7	ND (0.5)	1.2	ND (0.5)	ND (0.5)	ND (0.5)	30.4	ND (2.43)	ND (1.21)	0.82	ND (5.0)	ND (0.5)	**219**
	HS	10/16/13	417.25	NM	10.13	--	407.12	ND (0.5)	**141 Q**	46.6 Q	0.68	**48.1**	**2.7**	1	**223 Q**	1.2	5	ND (2.5)	ND (0.5)	28.8 Q	2.2	6.7 Q	ND (0.5)	0.92	ND (0.5)	ND (0.5)	ND (0.5)	22.2 Q	ND (2.6)	2.8	0.58	ND (5.0)	ND (0.5)	**222**
		7/1/14	417.25	25.1	10.0	--	407.25	0.4 J	**100**	31	0.7	**40**	**2.7**	1.6	**170**	0.9	NA	ND (3.0)	1	38	4	6	NA	2	NA	NA	ND (0.4)	33	ND (1)	ND (2)	0.5 J	NA	ND (0.1)	**240**
	Dup	7/1/14	417.25	--	--	--	--	0.4 J	**100**	30	0.6	**38**	**2.6**	1.5	**170**	0.9	NA	ND (3.0)	1	32	4	6	NA	2	NA	NA	ND (0.4)	31	ND (1)	ND (2)	0.4 J	NA	ND (0.1)	**250**
MW-14		1/24/12	415.75	15	9.37	--	406.38	ND (0.5)	ND (0.5)	**158**	ND (0.5)	ND (0.5)	**62**	ND (0.5)	**148**	**32.7**	**5,860**	ND (2.5)	**469**	8.4	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	NA	NA	NA	ND (0.5)	ND (0.5)	ND (2.5)
		10/24/12	415.75	15	11.45	--	404.30	0.56	1.9	37.4	ND (0.5)	0.9	**16.3**	ND (0.5)	**98.6**	**20**	**8,210**	ND (2.5)	**287**	9.9	ND (0.5)	1.8	ND (0.5)	ND (0.5)	1.4	ND (0.5)	ND (0.5)	5.2	ND	ND	1.1	5,440 Q	0.67	**481**
		5/2/13	415.75	15	6.95	--	408.80	ND (0.5)	1.1	63.4 Q	ND (0.5)	1.3	**21.9 Q**	ND (0.5)	**74 Q**	**22.7**	**4,460 Q**	2.8	**232 Q**	5.7	ND (0.5)	1.6	ND (0.5)	ND (0.5)	0.58	ND (2.0)	0.75	3.6	ND (2.36)	1.3	ND (0.5)	2,940 Q	ND (0.5)	**210 Q**
		10/16/13	415.75	NM	10.17	--	405.58	ND (0.5)	0.79	23.7 Q	2.2	0.67	**12.6**	ND (0.5)	**38.2 Q**	**13.5 Q**	**4,870 Q**	3.9	**239 Q**	9.1 Q	ND (0.5)	2.1	ND (0.5)	ND (0.5)	0.52	ND (0.5)	ND (0.5)	5.2 Q	ND (2.39)	2.36	0.76	3,150 Q	ND (0.5)	**462**
		7/2/14	417.75	14.45	9.25	--	408.50	ND (0.5)	ND (0.5)	17	0.7 J	0.8 J	**8.9**	0.8 J	19	**7**	NA	ND (15)	**130**	2	ND (0.5)	0.6 J	NA	ND (0.5)	NA	NA	ND (2.0)	2.5	ND (1)	ND (2)	ND (0.5)	NA	ND (0.5)	**140**

Notes:

All results in micrograms per liter (µg/L)

MSC = PADEP Medium Specific Concentration for Used, Residential aquifers or Statewide Health Standard

BOLD WITH SHADING = Contaminant Concentration Exceeds MSC

ND = Compound Not Detected

NM= Not Measured

NA=Not Analyzed

Q = Result Qualified By Laboratory

J = Result is lab-estimated value due to low detection level

[1] Groundwater elevations calculated from depth to water measurements collected April 12, 2012

[2] Groundwater elevations approximated from 2' contour interval topographic map and assuming a 2' stick-up casing.

Topographic map provided as plan sheet 1 from the March 28, 2002 Hydrogeologic Investigation report by Walter B. Satterhwaite associates, Inc.

Dup = Duplicate Sample
HS = HydraSleeve
PDB = Passive Diffusion Bag

PCE = Tetrachloroethene
PCA = Tetrachloroethane
TCE = Trichloroethene
DCE = Dichloroethene
VC = Vinyl chloride
TCA = Trichloroethane
DCA = Dichloroethane

MTBE = Methyl tert-butyl ether
DCB = Dichlorobenzene
TCB = Trichlorobenzene
TMB = Trimethylbenzene
PCP = Pentachlorophenol
DCP = Dichloropropane
TBA = tert Butyl alcohol

Table 5
Surface Water Sampling Data
Detected Compounds
Hoff VC Site
New Hanover Township, PA

Sample ID	Sample Date	Benzo(a)-anthracene	Benzo(a)pyrene	Benzo(b) fluor-anthene	Benzo(k) fluor-anthene	bis(2-Ethyl-hexyl) phthalate	Chloro-benzene	Chrysene	1,2-Dichloro-benzene	1,4-Dichloro-benzene	cis-1,2-Dichloro-ethene	1,1-Dichloro-ethane	1,1-Dichloro-ethene	Fluoran-thene	Pyrene	Trichloro-ethylene	1,1,1-Trichloro-ethane	Vinyl Chloride
WQC - Human Health		0.0038	0.0038	0.0038	0.0038	1.2	130	0.0038	420*	420*	12	--	33.0	130	830	2.5	--	0.025
Hoff SW-A13	5/22/2013	ND (1.17)	ND (1.17)	ND (1.17)	ND (1.17)	ND (1.17)	ND (1.0)	ND (1.17)	ND (2.34)	ND (2.34)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.34)	ND (1.17)	ND (0.5)	ND (0.5)	ND (0.5)
Hoff SW-B13	5/22/2013	2.35	2.44	2.9	1.38	1.38	1.4	2.36	2.2	0.65	16.3	3.1	2.8	4.64	3.74	6.3	5.4	0.51
Hoff SW-C13	5/22/2013	1.38	1.32	1.63	ND (1.17)	5.32	ND (1.0)	1.28	ND (2.35)	ND (2.35)	2.1	ND (0.5)	ND (0.5)	2.62	2.03	0.56	ND (0.5)	ND (0.5)
Hoff SW-D13	5/22/2013	ND (1.21)	ND (1.21)	ND (1.21)	ND (1.21)	1.82	ND (1.0)	ND (1.21)	ND (2.43)	ND (2.43)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.43)	ND (1.21)	ND (0.5)	ND (0.5)	ND (0.5)
Hoff SW-E13	5/22/2013	ND (1.19)	ND (1.19)	ND (1.19)	ND (1.19)	2.64	ND (1.0)	ND (1.19)	ND (2.38)	ND (2.38)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.38)	ND (1.19)	ND (0.5)	ND (0.5)	ND (0.5)
Hoff SW-F13	5/22/2013	ND (1.17)	ND (1.17)	ND (1.17)	ND (1.17)	4.52	ND (1.0)	ND (1.17)	ND (2.34)	ND (2.34)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.34)	ND (1.17)	ND (0.5)	ND (0.5)	ND (0.5)
Hoff SW-G13	5/22/2013	ND (1.2)	ND (1.2)	ND (1.2)	ND (1.2)	ND (1.2)	ND (1.0)	ND (1.2)	ND (2.4)	ND (2.4)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.4)	ND (1.2)	ND (0.5)	ND (0.5)	ND (0.5)
Hoff SW-H13	5/22/2013	ND (1.22)	ND (1.22)	ND (1.22)	ND (1.22)	ND (1.22)	ND (1.0)	ND (1.22)	ND (2.45)	ND (2.45)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.45)	ND (1.22)	ND (0.5)	ND (0.5)	ND (0.5)
Hoff SW-I13	5/22/2013	ND (1.2)	ND (1.2)	ND (1.2)	ND (1.2)	ND (1.2)	ND (1.0)	ND (1.2)	ND (2.4)	ND (2.4)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.4)	ND (1.2)	ND (0.5)	ND (0.5)	ND (0.5)
Hoff SW1	2/23/2012	ND (1.34)	ND (1.34)	ND (1.34)	ND (1.34)	ND (1.34)	ND (0.5)	ND (1.34)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.69)	ND (1.34)	ND (0.5)	ND (0.5)	ND (0.5)
Hoff SW2	2/23/2012	ND (1.28)	ND (1.28)	ND (1.28)	ND (1.28)	2.99	ND (0.5)	ND (1.28)	ND (0.5)	ND (0.5)	0.66	ND (0.5)	ND (0.5)	ND (2.55)	ND (1.28)	0.83	ND (0.5)	ND (0.5)
Hoff SW3	2/23/2012	ND (1.34)	ND (1.34)	ND (1.34)	ND (1.34)	ND (1.34)	6.3	ND (1.34)	11.9	1.7	3.2	1.8	4.5	ND (2.69)	ND (1.34)	4.3	7.7	0.94
Hoff SW4	2/23/2012	ND (1.28)	ND (1.28)	ND (1.28)	ND (1.28)	ND (1.28)	ND (0.5)	ND (1.28)	ND (0.5)	ND (0.5)	2.1	ND (0.5)	ND (0.5)	ND (2.56)	ND (1.28)	1.1	0.64	ND (0.5)
Hoff TB	2/23/2012	ND (1.22)	ND (1.22)	ND (1.22)	ND (1.22)	ND (1.22)	ND (0.5)	ND (1.22)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.44)	ND (1.22)	ND (0.5)	ND (0.5)	ND (0.5)
Hoff SWA	1/18/2012	NA	NA	NA	NA	NA	ND (0.5)	NA	0.95	ND (0.5)	0.79	ND (0.5)	ND (0.5)	NA	NA	ND (0.5)	ND (0.5)	ND (0.5)
Hoff SWB	1/18/2012	NA	NA	NA	NA	NA	ND (0.5)	NA	0.73	ND (0.5)	0.6	ND (0.5)	ND (0.5)	NA	NA	ND (0.5)	ND (0.5)	ND (0.5)
Hoff SWC	1/18/2012	NA	NA	NA	NA	NA	ND (0.5)	NA	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	NA	NA	ND (0.5)	ND (0.5)	ND (0.5)
Hoff SWD	1/18/2012	NA	NA	NA	NA	NA	ND (0.5)	NA	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	NA	NA	ND (0.5)	ND (0.5)	ND (0.5)
Hoff SWE	1/18/2012	NA	NA	NA	NA	NA	ND (0.5)	NA	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	NA	NA	ND (0.5)	ND (0.5)	ND (0.5)
Hoff SWF	1/18/2012	NA	NA	NA	NA	NA	ND (0.5)	NA	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	NA	NA	ND (0.5)	ND (0.5)	ND (0.5)
Hoff SWG	1/18/2012	NA	NA	NA	NA	NA	ND (0.5)	NA	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	NA	NA	ND (0.5)	ND (0.5)	ND (0.5)

Notes:
All values are presented in micrograms per liter (ug/L)
WQC - Human Health = Water Quality Criteria for Toxic Substances - Human Health Criteria
ND = Compound not detected at concentration indicated
NA = Compound was not analyzed
* = WQC for dichlorobenzene

Table 6
Indoor Air Sample Data
Hoff VC Site
New Hanover Township, PA

Sample ID	Units	EPA Region 3 RSL - May 2014 Carcinogenic Target Risk (TR) = 1E-06	EPA Region 3 RSL - May 2014 Noncancer Hazard Index (HI) = 1	Indoor Air Quality/Basement Samples					Indoor Air Quality/Basement Samples			
				Ambient	318 Layfield	318 Layfield Duplicate	324-332 Layfield	324-332 Layfield Duplicate	040214 Ambient	318 Layfield	324 Layfield	040214 Dup
Sample Date				01/30/2014	1/30-31/2014	1/30-31/2014	01/30/2014	01/30/2014	4/2/2014	4/2/2014	4/2/2014	4/2/2014
1,1,1,2-Tetrachloroethane	ug/m3	0.38		ND (1.4)	ND (1.4)	ND (1.4)	ND (1.4)	ND (1.4)	ND (1.4)	ND (1.4)	ND (1.4)	ND (1.4)
1,1,1-Trichloroethane	ug/m3		5,200	ND (1.1)	ND (1.1)	ND (1.1)	ND (1.1)	ND (1.1)	ND (1.1)	ND (1.1)	ND (1.1)	ND (1.1)
1,1,2,2-Tetrachloroethane	ug/m3	0.048		ND (1.4)	ND (1.4)	ND (1.4)	ND (1.4)	ND (1.4)	ND (1.4)	ND (1.4)	ND (1.4)	ND (1.4)
1,1,2-Trichloroethane	ug/m3	0.18	0.21	ND (1.1)	ND (1.1)	ND (1.1)	ND (1.1)	ND (1.1)	ND (1.1)	ND (1.1)	ND (1.1)	ND (1.1)
1,1-Dichloroethane	ug/m3	1.8		ND (0.81)	ND (0.81)	ND (0.81)	ND (0.81)	ND (0.81)	ND (0.81)	ND (0.81)	ND (0.81)	ND (0.81)
1,1-Dichloroethene	ug/m3		210	ND (0.79)	ND (0.79)	ND (0.79)	ND (0.79)	ND (0.79)	ND (0.79)	ND (0.79)	ND (0.79)	ND (0.79)
1,2,3-Trichloropropane	ug/m3		0.31	ND (1.2)	ND (1.2)	ND (1.2)	ND (1.2)	ND (1.2)	ND (1.2)	ND (1.2)	ND (1.2)	ND (1.2)
1,2,4-Trichlorobenzene	ug/m3		2.1	ND (3.7)	ND (3.7)	ND (3.7)	**12 J**	**12 J**	ND (3.7)	ND (3.7)	ND (3.7)	ND (3.7)
1,2,4-Trimethylbenzene	ug/m3		7.3	ND (0.98)	1.1 J	ND (0.98)	3.5 J	3.5 J	ND (0.98)	ND (0.98)	ND (0.98)	ND (0.98)
1,2-Dibromoethane	ug/m3	0.0047	9.4	ND (1.5)	ND (1.5)	ND (1.5)	ND (1.5)	ND (1.5)	ND (1.5)	ND (1.5)	ND (1.5)	ND (1.5)
1,2-Dichlorobenzene	ug/m3		210	ND (1.2)	1.5 J	ND (1.2)	4.6 J	4.6 J	ND (1.2)	ND (1.2)	ND (1.2)	ND (1.2)
1,2-Dichloroethane	ug/m3	0.11	7.3	ND (0.81)	ND (0.81)	ND (0.81)	ND (0.81)	ND (0.81)	ND (0.81)	ND (0.81)	ND (0.81)	ND (0.81)
1,2-Dichloropropane	ug/m3	0.28	4.2	ND (0.92)	ND (0.92)	ND (0.92)	ND (0.92)	ND (0.92)	ND (0.92)	ND (0.92)	ND (0.92)	ND (0.92)
1,3,5-Trimethylbenzene	ug/m3	--	--	ND (0.98)	ND (0.98)	ND (0.98)	1.5 J	1.5 J	ND (0.98)	ND (0.98)	ND (0.98)	ND (0.98)
1,3-Butadiene	ug/m3	0.094	2.1	ND (0.88)	ND (0.88)	ND (0.88)	ND (0.88)	ND (0.88)	ND (0.88)	ND (0.88)	ND (0.88)	ND (0.88)
1,3-Dichlorobenzene	ug/m3	--	--	ND (1.2)	ND (1.2)	ND (1.2)	3.7 J	3.7 J	ND (1.2)	ND (1.2)	ND (1.2)	ND (1.2)
1,4-Dichlorobenzene	ug/m3	0.26	830	ND (1.2)	ND (1.2)	ND (1.2)	**3.4 J**	**3.4 J**	ND (1.2)	ND (1.2)	ND (1.2)	ND (1.2)
1,4-Dioxane	ug/m3	0.56	31	ND (1.8)	ND (1.8)	ND (1.8)	ND (1.8)	ND (1.8)	ND (1.8)	ND (1.8)	ND (1.8)	ND (1.8)
2-Butanone	ug/m3		5,200	ND (1.5)	3.0 J	ND (1.5)	4.2 J	4.2 J	ND (1.5)	2.6 J	3.5 J	1.9 J
2-Hexanone	ug/m3		31	ND (2.0)	ND (2.0)	ND (2.0)	ND (2.0)	ND (2.0)	ND (2.0)	ND (2.0)	ND (2.0)	ND (2.0)
3-Chloropropene	ug/m3	--	--	ND (0.63)	ND (0.63)	ND (0.63)	ND (0.63)	ND (0.63)	ND (0.63)	ND (0.63)	ND (0.63)	ND (0.63)
4-Ethyltoluene	ug/m3	--	--	ND (0.98)	ND (0.98)	ND (0.98)	1.0 J	1.0 J	ND (0.98)	ND (0.98)	ND (0.98)	ND (0.98)
4-Methyl-2-Pentanone	ug/m3		3,100	ND (2.0)	ND (2.0)	ND (2.0)	ND (2.0)	ND (2.0)	ND (2.0)	ND (2.0)	ND (2.0)	ND (2.0)
Acetone	ug/m3		32,000	9.8	16	5.2	18	18	14	18	22	15
Benzene	ug/m3	0.36	31	**0.92 J**	**1.1 J**	**1.0 J**	**1.2 J**	**1.2 J**	**0.81 J**	**0.86 J**	**0.73 J**	**1.2 J**
Bromobenzene	ug/m3		63	ND (1.3)	ND (1.3)	ND (1.3)	ND (1.3)	ND (1.3)	ND (1.3)	ND (1.3)	ND (1.3)	ND (1.3)
Bromodichloromethane	ug/m3	0.076		ND (1.3)	ND (1.3)	ND (1.3)	ND (1.3)	ND (1.3)	ND (1.3)	ND (1.3)	ND (1.3)	ND (1.3)
Bromoform	ug/m3	2.6		ND (2.1)	ND (2.1)	ND (2.1)	ND (2.1)	ND (2.1)	ND (2.1)	ND (2.1)	ND (2.1)	ND (2.1)
Bromomethane	ug/m3		5.2	ND (0.78)	ND (0.78)	ND (0.78)	ND (0.78)	ND (0.78)	ND (0.78)	ND (0.78)	ND (0.78)	ND (0.78)
Carbon Disulfide	ug/m3		730	ND (1.6)	ND (1.6)	ND (1.6)	1.7 J	1.7 J	ND (1.6)	ND (1.6)	ND (1.6)	ND (1.6)
Carbon Tetrachloride	ug/m3	0.47	100	ND (1.3)	ND (1.3)	ND (1.3)	ND (1.3)	ND (1.3)	ND (1.3)	ND (1.3)	ND (1.3)	ND (1.3)
Chlorobenzene	ug/m3		52	ND (0.92)	ND (0.92)	ND (0.92)	ND (0.92)	ND (0.92)	ND (0.92)	ND (0.92)	ND (0.92)	ND (0.92)
Chlorodifluoromethane	ug/m3		52,000	1.2 J	1.2 J	1.1 J	1.2 J	1.2 J	1.0 J	1.1 J	1.1 J	1.1 J
Chloroethane	ug/m3		10,000	ND (0.53)	ND (0.53)	ND (0.53)	ND (0.53)	ND (0.53)	ND (0.53)	ND (0.53)	ND (0.53)	ND (0.53)
Chloroform	ug/m3	0.12	100	ND (0.98)	ND (0.98)	ND (0.98)	ND (0.98)	ND (0.98)	ND (0.98)	ND (0.98)	ND (0.98)	ND (0.98)
Chloromethane	ug/m3		94	1.3 J	1.1 J	1.0 J	1.1 J	1.1 J	1.1 J	0.98 J	1.1 J	0.94 J
cis-1,2-Dichloroethene	ug/m3	--	--	ND (0.79)	ND (0.79)	ND (0.79)	ND (0.79)	ND (0.79)	ND (0.79)	ND (0.79)	ND (0.79)	ND (0.79)
cis-1,3-Dichloropropene	ug/m3	--	--	ND (0.91)	ND (0.91)	ND (0.91)	ND (0.91)	ND (0.91)	ND (0.91)	ND (0.91)	ND (0.91)	ND (0.91)
Cumene	ug/m3		420	ND (0.98)	ND (0.98)	ND (0.98)	ND (0.98)	ND (0.98)	ND (0.98)	ND (0.98)	ND (0.98)	ND (0.98)
Dibromochloromethane	ug/m3	0.1		ND (1.7)	ND (1.7)	ND (1.7)	ND (1.7)	ND (1.7)	ND (1.7)	ND (1.7)	ND (1.7)	ND (1.7)
Dibromomethane	ug/m3		4.2	ND (1.4)	ND (1.4)	ND (1.4)	ND (1.4)	ND (1.4)	ND (1.4)	ND (1.4)	ND (1.4)	ND (1.4)
Dichlorodifluoromethane	ug/m3		100	3.2 J	3.0 J	2.7 J	2.9 J	2.9 J	2.4 J	2.7 J	2.5 J	2.9 J
Dichlorofluoromethane	ug/m3	--	--	ND (0.84)	ND (0.84)	ND (0.84)	ND (0.84)	ND (0.84)	ND (0.84)	ND (0.84)	ND (0.84)	ND (0.84)
Ethylbenzene	ug/m3	1.1	1,000	ND (0.87)	**1.1 J**	0.91 J	**3.0 J**	**3.0 J**	ND (0.87)	ND (0.87)	ND (0.87)	ND (0.87)
Freon 113	ug/m3	--	--	ND (3.8)	ND (3.8)	ND (3.8)	ND (3.8)	ND (3.8)	ND (3.8)	ND (3.8)	ND (3.8)	ND (3.8)
Freon 114	ug/m3	--	--	ND (1.4)	ND (1.4)	ND (1.4)	ND (1.4)	ND (1.4)	ND (1.4)	ND (1.4)	ND (1.4)	ND (1.4)
Heptane	ug/m3	--	--	ND (0.82)	ND (0.82)	ND (0.82)	ND (0.82)	ND (0.82)	ND (0.82)	ND (0.82)	ND (0.82)	ND (0.82)
Hexachloroethane	ug/m3	0.26	31	ND (1.9)	ND (1.9)	ND (1.9)	ND (1.9)	ND (1.9)	ND (1.9)	ND (1.9)	ND (1.9)	ND (1.9)
Hexane	ug/m3		730	ND (0.70)	ND (0.70)	ND (0.70)	ND (0.70)	ND (0.70)	ND (0.70)	ND (0.70)	ND (0.70)	ND (0.70)
Isooctane	ug/m3	--	--	ND (0.93)	ND (0.93)	ND (0.93)	ND (0.93)	ND (0.93)	ND (0.93)	ND (0.93)	ND (0.93)	ND (0.93)

Table 6
Indoor Air Sample Data
Hoff VC Site
New Hanover Township, PA

Sample ID	Units	EPA Region 3 RSL - May 2014 Carcinogenic Target Risk (TR) = 1E-06	EPA Region 3 RSL - May 2014 Noncancer Hazard Index (HI) = 1	Indoor Air Quality/Basement Samples					Indoor Air Quality/Basement Samples			
				Ambient	318 Layfield	318 Layfield Duplicate	324-332 Layfield	324-332 Layfield Duplicate	040214 Ambient	318 Layfield	324 Layfield	040214 Dup
Sample Date				01/30/2014	1/30-31/2014	1/30-31/2014	01/30/2014	01/30/2014	4/2/2014	4/2/2014	4/2/2014	4/2/2014
m/p-Xylene	ug/m3		100	1.1 J	2.9 J	2.4 J	9.6	9.7	ND (0.87)	0.89 J	ND (0.87)	ND (0.87)
Methyl t-Butyl Ether	ug/m3	11	3,100	ND (0.72)	ND (0.72)	ND (0.72)	ND (0.72)	ND (0.72)	ND (0.72)	ND (0.72)	ND (0.72)	ND (0.72)
Methylene Chloride	ug/m3	100	630	0.94 J	0.86 J	1.6 J	0.90 J	0.90 J	0.85 J	1.1 J	0.92 J	0.96 J
Naphthalene	ug/m3	0.083	310	ND (2.1)	ND (2.1)	ND (2.1)	**7.4**	**7.5**	ND (2.1)	ND (2.1)	ND (2.1)	ND (2.1)
Octane	ug/m3	--	--	ND (0.93)	ND (0.93)	ND (0.93)	1.6 J	1.6 J	ND (0.93)	ND (0.93)	ND (0.93)	ND (0.93)
o-Xylene	ug/m3		100	ND (0.87)	1.6 J	1.2 J	5.0	5.1	ND (0.87)	ND (0.87)	ND (0.87)	ND (0.87)
Pentane	ug/m3		1,000	1.2 J	1.3 J	1.5 J	5.1	1.4 J	1.7 J	2.8 J	1.9 J	2.4 J
Styrene	ug/m3		1,000	ND (0.85)	ND (0.85)	ND (0.85)	5.2	ND (0.85)	ND (0.85)	ND (0.85)	ND (0.85)	ND (0.85)
Tetrachloroethene	ug/m3	11	42	ND (1.4)	ND (1.4)	ND (1.4)	5.3	1.9 J	ND (1.4)	ND (1.4)	ND (1.4)	ND (1.4)
Toluene	ug/m3		5,200	ND (0.75)	1.1 J	1.1 J	5.4	1.4 J	0.94 J	1.4 J	1.0 J	0.85 J
trans-1,2-Dichloroethene	ug/m3	--	--	ND (0.79)	ND (0.79)	ND (0.79)	5.5	ND (0.79)	ND (0.79)	ND (0.79)	ND (0.79)	ND (0.79)
trans-1,3-Dichloropropene	ug/m3	--	--	ND (0.91)	ND (0.91)	ND (0.91)	5.6	ND (0.91)	ND (0.91)	ND (0.91)	ND (0.91)	ND (0.91)
Trichloroethene	ug/m3	0.48	2.1	ND (1.1)	ND (1.1)	ND (1.1)	**5.7**	ND (1.1)	ND (1.1)	ND (1.1)	ND (1.1)	ND (1.1)
Trichlorofluoromethane	ug/m3		730	1.5 J	4.5 J	4.4 J	5.8	1.4 J	1.2 J	4.5 J	1.2 J	4.8 J
Vinyl Chloride	ug/m3	0.17	100	ND (0.51)	ND (0.51)	ND (0.51)	**5.9**	ND (0.51)	ND (0.51)	ND (0.51)	ND (0.51)	ND (0.51)
Xylenes, Total	ug/m3		100	1.1 J	4.5 J	3.6 J	14.6	14.8	ND (0.87)	0.89 J	ND (0.87)	ND (0.87)

Notes:
All results presented in micrograms per cubic meter (ug/m3)
J = Result is lab-estimated value due to low detection level
ND = Compound Not Detected
Bolded and shaded concentrations exceed either criteria

Table 7
Sub-Slab Sample Data
Hoff VC Site
New Hanover Township, PA

Sample ID	Units	EPA Region 3 RSL - May 2014 Carcinogenic Target Risk (TR) = 1E-06	EPA Region 3 RSL - May 2014 Noncancer Hazard Index (HI) = 1	318 Layfield Road								322 Layfield Road					324 Layfield Road (Apartments)		
				Ambient	318 Layfield SVP-2	318 Layfield Duplicate	Ambient	318 Layfield SVP-1	318 Layfield SVP-2	Ambient	318 Layfield SVP-2	Ambient	322 Layfield SVP-2	322 Layfield Duplicate	322 Layfield SVP-2	322 Layfield Duplicate	324 Layfield SVP-1	Ambient	324 Layfield SVP-1
Sample Date				11/21/2012	11/21/2012	11/21/2012	10/3/2013	10/3/2013	10/3/2013	1/31/2014	1/31/2014	12/20/2012	12/20/2012	12/20/2012	04/04/2013	04/04/2013	11/21/2012	04/04/2013	04/04/2013
1,1,1,2-Tetrachloroethane	ug/m3	14.6		ND (1.4)	ND (1.4)	ND (1.4)	ND (1.4)	ND (1.4)	ND (1.4)	ND (1.4)	ND (1.4)	1.8 J	1.7 J	ND (3.1)	ND (1.4)	ND (1.4)	ND (2.7)	ND (1.4)	ND (1.4)
1,1,1-Trichloroethane	ug/m3		200,000	ND (1.1)	ND (1.1)	ND (1.1)	ND (1.1)	1.6 J	ND (1.1)	ND (1.1)	ND (1.1)	ND (1.1)	ND (1.1)	ND (2.5)	ND (1.1)	ND (1.1)	ND (2.2)	ND (1.1)	ND (1.1)
1,1,2,2-Tetrachloroethane	ug/m3	1.85		1.5 J	ND (1.4)	ND (1.4)	ND (1.4)	ND (1.4)	ND (1.4)	ND (1.4)	ND (1.4)	6.8 J	ND (1.4)	ND (3.1)	ND (1.4)	1.5 J	**5.8 J**	ND (1.4)	ND (1.4)
1,1,2-Trichloroethane	ug/m3	6.92	8.08	ND (1.1)	ND (1.1)	ND (1.1)	ND (1.1)	ND (1.1)	ND (1.1)	ND (1.1)	ND (1.1)	ND (1.1)	ND (1.1)	ND (2.5)	ND (1.1)	ND (1.1)	ND (2.2)	ND (1.1)	ND (1.1)
1,1-Dichloroethane	ug/m3	69.2		ND (0.81)	8.6	8.1	ND (0.81)	14	2.2 J	ND (0.81)	2.4 J	ND (0.81)	7.4	5.3 J	1.4 J	2.0 J	2.0 J	ND (0.81)	3.9 J
1,1-Dichloroethene	ug/m3		8,077	ND (0.79)	ND (0.79)	ND (0.79)	ND (0.79)	ND (0.79)	ND (0.79)	ND (0.79)	ND (0.79)	ND (0.79)	ND (0.79)	ND (1.8)	ND (0.79)	ND (0.79)	ND (1.6)	ND (0.79)	ND (0.79)
1,2,3-Trichloropropane	ug/m3		11.92	ND (1.2)	ND (1.2)	ND (1.2)	ND (1.2)	ND (1.2)	ND (1.2)	ND (1.2)	ND (1.2)	3.3 J	4.7 J	ND (2.7)	ND (1.2)	ND (1.2)	2.9 J	ND (1.2)	ND (1.2)
1,2,4-Trichlorobenzene	ug/m3		81	ND (3.7)	ND (3.7)	ND (3.7)	ND (3.7)	ND (3.7)	ND (3.7)	16	23	14 J	31	ND (8.3)	10 J	5.2 J	11 J	ND (3.7)	ND (3.7)
1,2,4-Trimethylbenzene	ug/m3		281	3.0 J	ND (0.98)	ND (0.98)	ND (0.98)	ND (0.98)	ND (0.98)	3.8 J	7	21	41	11 J	9.1	6.3	12	1.4 J	5.1
1,2-Dibromoethane	ug/m3	0.1808	362	ND (1.5)	ND (1.5)	ND (1.5)	ND (1.5)	ND (1.5)	ND (1.5)	ND (1.5)	ND (1.5)	3.5 J	**3 J**	ND (3.5)	ND (1.5)	ND (1.5)	ND (3.1)	ND (1.5)	ND (1.5)
1,2-Dichlorobenzene	ug/m3		8,077	4.7 J	ND (1.2)	ND (1.2)	ND (1.2)	ND (1.2)	1.6 J	5.1 J	9.2	25	31	ND (2.7)	8.4	7.8	18	1.5 J	5.3 J
1,2-Dichloroethane	ug/m3	4.23	281	ND (0.81)	ND (0.81)	ND (0.81)	ND (0.81)	ND (0.81)	ND (0.81)	ND (0.81)	ND (0.81)	ND (0.81)	ND (0.81)	ND (1.8)	ND (0.81)	ND (0.81)	ND (1.6)	ND (0.81)	ND (0.81)
1,2-Dichloropropane	ug/m3	10.8	162	ND (0.92)	ND (0.92)	ND (0.92)	ND (0.92)	ND (0.92)	ND (0.92)	ND (0.92)	ND (0.92)	ND (0.92)	ND (0.92)	ND (2.1)	ND (0.92)	ND (0.92)	ND (1.8)	ND (0.92)	ND (0.92)
1,3,5-Trimethylbenzene	ug/m3	--	--	2.2 J	ND (0.98)	ND (0.98)	ND (0.98)	ND (0.98)	ND (0.98)	1.8 J	3.0 J	17	24	3.9 J	5.6	4.3 J	8.8 J	1.4 J	3.5 J
1,3-Butadiene	ug/m3	3.62	81	ND (1.1)	ND (1.1)	ND (1.1)	ND (1.1)	ND (1.1)	ND (1.1)	ND (0.88)	ND (0.88)	ND (1.1)	ND (1.1)	ND (2.5)	ND (1.1)	ND (1.1)	ND (2.2)	ND (1.1)	ND (1.1)
1,3-Dichlorobenzene	ug/m3	--	--	4.4 J	ND (1.2)	ND (1.2)	ND (1.2)	ND (1.2)	1.4 J	4.2 J	7.5	23	28	ND (2.7)	7.2	7.3	18	1.4 J	4.8 J
1,4-Dichlorobenzene	ug/m3	10	31,923	4.8 J	ND (1.2)	ND (1.2)	ND (1.2)	ND (1.2)	1.5 J	4.1 J	7.5	24	**29**	ND (2.7)	7.5	7.6	**19**	1.4 J	5.0 J
1,4-Dioxane	ug/m3	21.5	1,192	ND (1.8)	ND (1.8)	ND (1.8)	ND (1.8)	ND (1.8)	ND (1.8)	ND (1.8)	ND (1.8)	ND (1.8)	ND (1.8)	ND (4.1)	ND (1.8)	ND (1.8)	ND (3.6)	ND (1.8)	ND (1.8)
2-Butanone	ug/m3		200,000	ND (1.5)	2.2 J	ND (1.5)	1.8 J	ND (1.5)	ND (1.5)	ND (1.5)	2.2 J	1.8 J	13	27	1.9 J	4.7 J	ND (2.9)	ND (1.5)	1.7 J
2-Hexanone	ug/m3		1,192	ND (2.0)	ND (2.0)	ND (2.0)	ND (2.0)	ND (2.0)	ND (2.0)	ND (2.0)	ND (2.0)	ND (2.0)	ND (2.0)	ND (4.6)	ND (2.0)	ND (2.0)	ND (4.1)	ND (2.0)	ND (2.0)
3-Chloropropene	ug/m3	--	--	ND (0.63)	ND (0.63)	ND (0.63)	ND (0.63)	ND (0.63)	ND (0.63)	ND (0.63)	ND (0.63)	ND (0.63)	ND (0.63)	ND (1.4)	ND (0.63)	ND (0.63)	ND (1.3)	ND (0.63)	ND (0.63)
4-Ethyltoluene	ug/m3	--	--	1.8 J	ND (0.98)	ND (0.98)	ND (0.98)	ND (0.98)	ND (0.98)	ND (0.98)	1.7 J	15	24	3.1 J	4.3 J	3.7 J	8.2 J	ND (0.98)	2.7 J
4-Methyl-2-Pentanone	ug/m3		119,231	ND (2.0)	ND (2.0)	ND (2.0)	ND (2.0)	ND (2.0)	ND (2.0)	ND (2.0)	ND (2.0)	ND (2.0)	ND (2.0)	ND (4.6)	ND (2.0)	ND (2.0)	ND (4.1)	ND (2.0)	ND (2.0)
Acetone	ug/m3		1,230,769	9.9	15	9.3	18	13	10	7.7	16	17	49	150	5.2	7.8	9.4 J	4.5 J	8
Benzene	ug/m3	13.8	1,192	1.1 J	ND (0.64)	ND (0.64)	1.4 J	ND (0.64)	ND (0.64)	1.1 J	0.95 J	8	11	12	ND (0.64)	ND (0.64)	ND (1.3)	ND (0.64)	ND (0.64)
Bromobenzene	ug/m3		2,423	ND (1.3)	ND (1.3)	ND (1.3)	ND (1.3)	ND (1.3)	ND (1.3)	ND (1.3)	ND (1.3)	7.2	9	ND (2.9)	1.8 J	2.1 J	4.7 J	ND (1.3)	1.3 J
Bromodichloromethane	ug/m3	2.92		ND (1.3)	ND (1.3)	ND (1.3)	ND (1.3)	ND (1.3)	ND (1.3)	ND (1.3)	ND (1.3)	ND (1.3)	ND (1.3)	ND (3)	ND (1.3)	ND (1.3)	ND (2.7)	ND (1.3)	ND (1.3)
Bromoform	ug/m3	100		ND (2.1)	ND (2.1)	ND (2.1)	ND (2.1)	ND (2.1)	ND (2.1)	ND (2.1)	ND (2.1)	11	9.9 J	ND (4.7)	ND (2.1)	ND (2.1)	6.0 J	ND (2.1)	ND (2.1)
Bromomethane	ug/m3		200	ND (0.78)	ND (0.78)	ND (0.78)	ND (0.78)	ND (0.78)	ND (0.78)	ND (0.78)	ND (0.78)	ND (0.78)	ND (0.78)	ND (1.7)	ND (0.78)	ND (0.78)	ND (1.6)	ND (0.78)	ND (0.78)
Carbon Disulfide	ug/m3		28,077	ND (1.6)	3.9	1.7 J	3.7	7.1	7	8.1	5.4	ND (1.6)	6.5	6.2 J	5.1	4.5	ND (3.1)	ND (1.6)	ND (1.6)
Carbon Tetrachloride	ug/m3	18.1	3,846	ND (1.3)	ND (1.3)	ND (1.3)	ND (1.3)	ND (1.3)	ND (1.3)	ND (1.3)	ND (1.3)	ND (1.3)	ND (1.3)	ND (2.8)	ND (1.3)	ND (1.3)	ND (2.5)	ND (1.3)	ND (1.3)
Chlorobenzene	ug/m3		2,000	0.97 J	ND (0.92)	ND (0.92)	ND (0.92)	ND (0.92)	ND (0.92)	ND (0.92)	ND (0.92)	3.6 J	4.6 J	ND (2.1)	ND (0.92)	ND (0.92)	3.0 J	ND (0.92)	ND (0.92)
Chlorodifluoromethane	ug/m3		2,000,000	ND (0.71)	4.3	4.5	1.5 J	ND (0.71)	ND (0.71)	1.1 J	3.2 J	1.2 J	ND (0.71)	ND (1.6)	ND (0.71)	ND (0.71)	ND (1.4)	ND (0.71)	ND (0.71)
Chloroethane	ug/m3		384,615	ND (0.53)	ND (0.53)	ND (0.53)	ND (0.53)	ND (0.53)	ND (0.53)	ND (0.53)	ND (0.53)	ND (0.53)	ND (0.53)	ND (1.2)	ND (0.53)	ND (0.53)	ND (1.1)	ND (0.53)	ND (0.53)
Chloroform	ug/m3	4.62	3,846	ND (0.98)	1.7 J	1.6 J	ND (0.98)	**7.9**	**7**	ND (0.98)	3.0 J	ND (0.98)	2.9 J	2.8 J	2.6 J	ND (0.98)	ND (2.0)	ND (0.98)	ND (0.98)
Chloromethane	ug/m3		3,615	ND (0.41)	ND (0.41)	ND (0.41)	2.1	ND (0.41)	ND (0.41)	1.0 J	ND (0.41)	1.2 J	ND (0.41)	ND (0.93)	0.82 J	ND (0.41)	ND (0.83)	1.3 J	ND (0.41)
cis-1,2-Dichloroethene	ug/m3	--	--	ND (0.79)	ND (0.79)	ND (0.79)	ND (0.79)	ND (0.79)	ND (0.79)	ND (0.79)	ND (0.79)	ND (0.79)	5.6	3.1 J	2.0 J	3.2 J	ND (1.6)	ND (0.79)	ND (0.79)
cis-1,3-Dichloropropene	ug/m3	--	--	ND (0.91)	ND (0.91)	ND (0.91)	ND (0.91)	ND (0.91)	ND (0.91)	ND (0.91)	ND (0.91)	ND (0.91)	ND (0.91)	ND (2.0)	ND (0.91)	ND (0.91)	ND (1.8)	ND (0.91)	ND (0.91)
Cumene	ug/m3		16,154	ND (0.98)	ND (0.98)	ND (0.98)	ND (0.98)	ND (0.98)	ND (0.98)	ND (0.98)	ND (0.98)	4.7 J	6.1	ND (2.2)	ND (0.98)	ND (0.98)	ND (2.0)	ND (0.98)	ND (0.98)
Dibromochloromethane	ug/m3	3.85		ND (1.7)	ND (1.7)	ND (1.7)	ND (1.7)	ND (1.7)	ND (1.7)	ND (1.7)	ND (1.7)	2.8 J	ND (1.7)	ND (3.8)	ND (1.7)	ND (1.7)	ND (3.4)	ND (1.7)	ND (1.7)
Dibromomethane	ug/m3		162	ND (1.4)	ND (1.4)	ND (1.4)	ND (1.4)	ND (1.4)	ND (1.4)	ND (1.4)	ND (1.4)	ND (1.4)	ND (1.4)	ND (3.2)	ND (1.4)	ND (1.4)	ND (2.8)	ND (1.4)	ND (1.4)
Dichlorodifluoromethane	ug/m3		3,846	1.7 J	2.7 J	2.9 J	3.2 J	3.6 J	3.7 J	2.8 J	3.3 J	3.3 J	2.7 J	ND (2.2)	3.5 J	ND (0.99)	ND (2.0)	2.5 J	2.8 J
Dichlorofluoromethane	ug/m3	--	--	ND (0.84)	ND (0.84)	ND (0.84)	ND (0.84)	ND (0.84)	ND (0.84)	ND (0.84)	ND (0.84)	ND (0.84)	ND (0.84)	ND (1.9)	ND (0.84)	ND (0.84)	ND (1.7)	ND (0.84)	ND (0.84)
Ethylbenzene	ug/m3	42.3	38,462	7.8	ND (0.87)	ND (0.87)	ND (0.87)	ND (0.87)	ND (0.87)	2.7 J	5.7	30	**43**	25	5.1	5.9	25	1.6 J	3.7 J
Freon 113	ug/m3	--	--	ND (3.8)	ND (3.8)	ND (3.8)	ND (3.8)	ND (3.8)	ND (3.8)	ND (3.8)	ND (3.8)	ND (3.8)	ND (3.8)	ND (8.6)	ND (3.8)	ND (3.8)	ND (7.7)	ND (3.8)	ND (3.8)
Freon 114	ug/m3	--	--	ND (1.4)	ND (1.4)	ND (1.4)	ND (1.4)	ND (1.4)	ND (1.4)	ND (1.4)	ND (1.4)	ND (1.4)	ND (1.4)	ND (3.1)	ND (1.4)	ND (1.4)	ND (2.8)	ND (1.4)	ND (1.4)
Heptane	ug/m3	--	--	ND (0.82)	ND (0.82)	ND (0.82)	4.4	ND (0.82)	ND (0.82)	ND (0.82)	ND (0.82)	6.7	13	8.3 J	3.2 J	0.89 J	ND (1.6)	ND (0.82)	ND (0.82)
Hexachloroethane	ug/m3	10	1,192	ND (1.9)	ND (1.9)	ND (1.9)	ND (1.9)	ND (1.9)	ND (1.9)	4.5 J	7.0 J	18	ND (1.9)	ND (4.4)	ND (1.9)	ND (1.9)	ND (3.9)	ND (1.9)	ND (1.9)
Hexane	ug/m3		28,077	ND (0.70)	ND (0.70)	ND (0.70)	5.3	0.72 J	ND (0.70)	ND (0.70)	ND (0.70)	8.6	15	15	1.8 J	ND (0.70)	ND (1.4)	ND (0.70)	ND (0.70)
Isooctane	ug/m3	--	--	ND (0.93)	ND (0.93)	ND (0.93)	25	ND (0.93)	ND (0.93)	ND (0.93)	ND (0.93)	ND (0.93)	3 J	2.9 J	ND (0.93)	ND (0.93)	ND (1.9)	ND (0.93)	ND (0.93)
m/p-Xylene	ug/m3		3,846	24	3.3 J	2.0 J	1.4 J	ND (0.87)	1.0 J	8.6	19	81	140	220	3.7	4	76	4.7	2.8
Methyl t-Butyl Ether	ug/m3	423	119,231	ND (0.72)	1.1 J	0.95 J	ND (0.72)	ND (0.72)	ND (0.72)	ND (0.72)	ND (0.72)	ND (0.72)	ND (0.72)	8.1 J	ND (0.72)	ND (0.72)	ND (1.4)	ND (0.72)	ND (0.72)
Methylene Chloride	ug/m3	3,846	24,231	ND (0.69)	ND (0.69)	ND (0.69)	2.6 J	1.8 J	ND (0.69)	0.90 J	3.4 J	1.6 J	2.3 J	4 J	5.4	ND (0.69)	1.5 J	0.76 J	ND (0.69)
Naphthalene	ug/m3	3.19	11,923	ND (2.1)	ND (2.1)	ND (2.1)	ND (2.1)	ND (2.1)	ND (2.1)	12	**18**	**13**	**29**	ND (4.7)	2.1	**3.8 J**	**7.7 J**	ND (2.1)	2.2 J
Octane	ug/m3	--	--	2.6 J	ND (0.93)	ND (0.93)	1.4 J	ND (0.93)	ND (0.93)	1.2 J	2.9 J	11	19	16	1.9 J	1.9 J	7.2 J	ND (0.93)	1.0 J
o-Xylene	ug/m3		3,846	13	1.2 J	ND (0.87)	ND (0.87)	ND (0.87)	ND (0.87)	4.4	10	53	74	94	2.5	2.5	41	2.9 J	7.6
Pentane	ug/m3		38,462	3.3	ND (0.59)	ND (0.59)	22	0.82 J	ND (0.59)	1.1 J	0.81 J	3.9	9	20	1.1 J	0.78 J	ND (1.2)	ND (0.59)	ND (0.59)
Styrene	ug/m3		38,462	0.99 J	ND (0.85)	ND (0.85)	ND (0.85)	ND (0.85)	ND (0.85)	ND (0.85)	ND (0.85)	7.6	11	ND (1.9)	1.8 J	1.1 J	8.6	ND (0.85)	1.3 J
Tetrachloroethene	ug/m3	423	1,615	2.5 J	ND (1.4)	ND (1.4)	ND (1.4)	ND (1.4)	ND (1.4)	9.8	3.0 J	4.8 J	13	ND (3.1)	3.6 J	3.3 J	6.4 J	ND (1.4)	1.8 J
Toluene	ug/m3		200,000	2.9 J	ND (0.75)	ND (0.75)	0.93 J	ND (0.75)	ND (0.75)	0.88 J	1.7 J	6.2	37	35	1.9 J	1.9 J	3.4 J	ND (0.75)	0.82 J
trans-1,2-Dichloroethene	ug/m3	--	--	ND (0.79)	ND (0.79)	ND (0.79)	ND (0.79)	ND (0.79)	ND (0.79)	ND (0.79)	ND (0.79)	ND (0.79)	ND (0.79)	ND (1.8)	ND (0.79)	ND (0.79)	ND (1.6)	ND (0.79)	ND (0.79)
trans-1,3-Dichloropropene	ug/m3	--	--	ND (0.91)	ND (0.91)	ND (0.91)	ND (0.91)	ND (0.91)	ND (0.91)	ND (0.91)	ND (0.91)	ND (0.91)	ND (0.91)	ND (2.0)	ND (0.91)	ND (0.91)	ND (1.8)	ND (0.91)	ND (0.91)
Trichloroethene	ug/m3	18.5	81	ND (1.1)	4.6 J	4.0 J	ND (1.1)	7.7	6.3	ND (1.1)	1.7 J	ND (1.1)	12	3.4 J	4.2 J	5.1 J	ND (2.1)	ND (1.1)	1.3 J
Trichlorofluoromethane	ug/m3		28,077	1.5 J	1.9 J	2.0 J	1.9 J	2.9 J	3.2 J	1.4 J	1.8 J	1.8 J	1.7 J	ND (2.5)	3.1 J	1.5 J	ND (2.2)	1.3 J	1.4 J
Vinyl Chloride	ug/m3	6.54	3,846	ND (0.51)	ND (0.51)	ND (0.51)	ND (0.51)	ND (0.51)	ND (0.51)	ND (0.51)	ND (0.51)	ND (0.51)	ND (0.51)	ND (1.2)	ND (0.51)	ND (0.51)	ND (1.0)	ND (0.51)	ND (0.51)
Xylenes, Total	ug/m3		3,846	37	4.5 J	2.0 J	1.4 J	ND	1.0 J	13	29	134	214	314	6.2	6.5	117	4.7	10.4
Helium	%		--	--	ND (1.0)	ND (1.0)	--	ND (1.0)	ND (1.0)	--	ND (1.0)	--	ND (1.5)	ND (4.5)	ND (1.0)	ND (1.5)	ND (1.0)	--	ND (1.0)

Notes:
All results presented in micrograms per cubic meter (ug/m3)
Screening criteria are EPA Region 3 Regional Screening Level Resident Air Supporting values divided by attenuation factor of 0.026 for sub-slab soil gas screening.
J = Result is lab-estimated value due to low detection level
ND = Compound Not Detected
Bolded and shaded concentrations exceed either criteria

Ambient sample from 11/21/12 was taken at 318 Layfield Road
Ambient sample from 12/20/12 was taken at 322 Layfield Road
Ambient sample from 4/4/13 was taken at 322 Layfield Road
318 Layfield DUP 112112 is a duplicate of 318 Layfield SVP-2

Table 8
Home Sump Sample Data
Detected Compounds
Hoff VC Site
New Hanover Township, PA

Sample Location	Sample Date	**TCE**	**cis-1,2 DCE**	**1,1-DCE**	**VC**	**1,1-DCA**	**MTBE**	**1,2-DCB**	**1,4-DCB**	**Chlorobenzene**	**Naphthalene**
322 Layfield Rd	10/10/2013	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
324 Layfield Rd	10/3/2013	0.79	3.1	1.5	0.58	2.9	0.5	3.1	0.96	5.1	0.58

Notes:
All values are presented in micrograms per liter (ug/L)
ND = Compound not detected at concentration indicated
TCE = Trichloroethene
DCE = Dichloroethene
VC = Vinyl chloride
DCA = Dichloroethane
MTBE = Methyl tert-butyl ether
DCB = Dichlorobenzene