

AMENDED FINAL PLAN OF REMEDIAL ACTION



SYNTECH SITE OPERABLE UNIT (OU) 2

*785 Dawson Drive
Newark, DE*

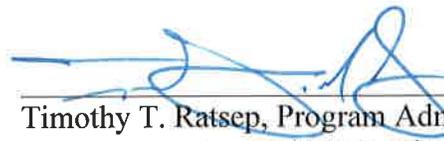
*August 2014
DNREC Project No. DE-0173*

This Amended Final Plan of Remedial Action (Amended Final Plan) presents clean-up actions required by the Department of Natural Resources and Environmental Control (DNREC) to address environmental contamination at the Syntech Site Operable Unit (OU) 2.

DNREC issued public notice of the Amended Proposed Plan of Remedial Action (Amended Proposed Plan) for the Syntech Site OU-2 on July 6, 2014 and opened a 20-day public comment period that ended on July 28, 2014. The Amended Proposed Plan is attached. The Department received written comments from the public regarding the Amended Proposed Plan. The Department coordinated with the interested parties and prepared a response to these comments, which is included in Attachment A. The Amended Proposed Plan has been adopted as the Amended Final Plan.

Approval:

This Amended Final Plan meets the requirements of the Hazardous Substance Cleanup Act.



Timothy T. Ratsep, Program Administrator
Site Investigation and Restoration Section

August 28, 2014

Date

**Department Responsiveness Summary
For Public Comments
Proposed Plan of Remedial Action Syntech Site -Operable Unit 2 (DE-0173)**

Response to Comments from Tom Coleman, PE, Director of Public Works and Water Resources Department, City of Newark, Delaware, regarding the Proposed Plan of Remedial Action Syntech Site -Operable Unit 2 (DE-0173) Newark, Delaware July 2014

DNREC's PPRA: Page 5-6, paragraphs 6-9: "In July 2003, DNREC SIRS issued a Final Plan of Remedial Action (FPRA) for the Site based on the revised FFS by Tetra Tech which called for the application of hydrogen reducing compound (HRC) and oxygen reducing compound (ORC) to treat the groundwater across the Site. In September 2008, Tetra Tech performed an additional subsurface investigation both on and offsite. Groundwater samples collected from within a portion of the main building indicated that there was significant VOC groundwater contamination remaining under the building that had not been remediated."

City of Newark Comment: The City of Newark's Public Well PW-16 was in service between approximately 1969 and 1992, when the City halted production in 1992 due to elevated concentrations of Iron. Following the completion of the City's Iron and Manganese Filter Plant, PW-16 returned to service in 2003. However, the well was shutdown in 2007 when concentrations of 1,2-dichloroethane, a Dense Non-Aqueous Phase Liquid (DNAPL), elevated to a level that the City's existing aerator no longer could remediate. Continuous water quality monitoring of the source ("raw") water at the PW-16 between 2003 and 2007 identified a continual increase in 1,2-dichloroethane elevations peaking at 55.6 ug/L in March 2007.

DNREC's Response: The following chlorinated contaminants of concern (COCs) have been detected in the groundwater at Syntech ("Site"): 1,2-Dichloroethane (1,2-DCA), Chloroform, Carbon Tetrachloride, Chlorobenzene, 1,4-Dichlorobenzene and 4-Chloroaniline. In their pure phase, these COCs are considered to be Dense Non-Aqueous Liquids (DNAPLs) since their density is greater than 1.0 gram per cubic centimeter (gm/cm^3). The behavior of these COCs in the subsurface is complicated and controlled by their physical and chemical properties including density, solubility, vapor pressure, and partitioning coefficients. For example, both 1,2-DCA and chloroform are highly soluble ($>8,000$ mg/L) and weakly adsorbed to soil; therefore, the chemical properties of both 1,2-DCA and chloroform favor transport in the aqueous phase. The physical properties of these contaminants listed above are listed in Table 6 in BrightFields Final Remedial Investigation Report, February 2014.

Since it is very difficult to verify the presence of a DNAPL through direct observation, the presence of DNAPL is indirectly estimated based on groundwater concentration data and the "1 percent of solubility" rule-of-thumb. Under this approach, DNAPL is suspected to be present when the concentration of a chemical in groundwater is greater than 1 percent of its pure-phase solubility.

Applying the "1 percent of solubility" rule-of-thumb to the historic Site groundwater data, the following COCs have been reported concentrations in groundwater at greater than 1% solubility:

- Chlorobenzene was detected at 7.1 milligrams per liter (mg/L), which is approximately 1.5% of its solubility, from MW-13 at the pilot plant as reported in the Camp, Dresser & McKee Remedial Investigation Report of March 1999; and
- Carbon Tetrachloride was detected at 47 mg/L, which is approximately 6% of its solubility, in a grab groundwater sample collected from location SYN-Grab12D in the main plant

during the Supplemental Investigation included in the Final Feasibility Study Report by BrightFields May 2014 (See Table 6 and Figure 2).

During the most recent Remedial Investigation performed by BrightFields in 2013, 1,2-DCA was detected in groundwater at a maximum concentration of 3.5 mg/L from location SYN-GW03 in the main plant area (See Table 4 and Figure 12). The highest concentrations of 1,2-DCA found in Site groundwater historically do not indicate the presence of that contaminant at concentrations greater than 1% of the solubility of 1,2-DCA, which is 86.9 mg/L.

Analytical data provided to DNREC-SIRS by the City of Newark from samples collected from PW-16 since 2007 has shown that the concentrations of 1,2-dichloroethane (1,2-DCA) have decreased from 55.6 micrograms per liter (ug/L) or parts per billion (ppb) that were reported from the well in March 2007. During a 9 day test of PW-16 at 200 gpm in February 2013, the highest concentration of 1,2-DCA observed in the well was 5.08 µg/L and during an 18 day test at 200 gpm in April 2013, the highest concentration of 1,2-DCA observed in the well was 12.0 µg/L. These concentrations indicate that 1,2-DCA is present in the dissolved phase in the Potomac Aquifer and not as a DNAPL. As noted in the Final Feasibility Study Addendum, completed by BrightFields dated May 2014, the 1,2-DCA in the Potomac may have originated from other than the Syntech Site.

So in summary, by applying the “1 percent of solubility” rule-of-thumb to the groundwater analytical data that has been collected over the years at the Site, Chlorobenzene and Carbon Tetrachloride could potentially be present as residual DNAPL at the Site. Applying that same rule of thumb to the groundwater analytical data collected, the COCs detected in PW-16 are more likely to be present in the Potomac Aquifer in the dissolved phase and not as DNAPL.

City of Newark Comment: Based on the lack of effective remedial activities implemented between 2003 and 2005 (detailed in 2008 Tetra Tech report) coupled with the increasing concentrations observed at the PW-16 site, the City is concerned that a portion of the contamination occurring at the Syntech site has migrated to the PW-16 well location. Additionally, the City requests the Department of Natural Resources and Environmental Control (DNREC) to detail any remedial activities presented in the 2014 proposed plan to assist the City in re-utilizing PW-16.

DNREC’s Response: In November 2005, a remedial action was undertaken by Tetra Tech at the Site in accordance with the Final Plan of Remedial Action issued in 2004. The remedial action was designed to treat the contaminated groundwater in the Columbia Aquifer on-site. Subsequent groundwater monitoring indicated that the remedial action was effective in reducing the overall concentration of the Site COCs which includes 1, 2-dichloroethane (1,2-DCA) among others. However, the concentrations of contaminants in several wells near the building and pilot plant were still elevated.

In 2008, Tetra Tech performed a limited investigation beneath the footprint of the Syntech building which indicated the presence of Site related COCs beneath the building. In 2012, the buildings on the property were decommissioned by BrightFields and later demolished by BrightFields in 2013. Following the demolition of the buildings, BrightFields conducted a remedial investigation, which included the collection of soil and groundwater samples from beneath the footprints of the main plant and the pilot plant buildings. Several areas of concern in groundwater were identified in the BrightFields February 2014 Remedial Investigation Report and a supplemental investigation was performed as part of the May 2014 Feasibility Study Addendum. The investigations performed by BrightFields have identified the location of the remaining “source areas” for the Site COCs in the Columbia Aquifer which are under the footprint of the former main plant and pilot plant buildings.

DNREC's Proposed Plan for OU-2 is to remediate the groundwater contamination in the Columbia Aquifer at the Site. The remedial effort will target the mass of COCs remaining at the Site in the areas identified by BrightFields thus removing the COCs and eliminating any potential for the COCs to migrate into the Potomac Aquifer. Hopefully, the proposed remedial actions will enable the City to reuse PW-16 if even only on a limited basis without additional treatment to remove volatile organic contaminants.

City of Newark General Comment: To understand the complexity of the Syntech Site, the Final Feasibility Study Addendum in May 2014 was reviewed by City of Newark staff. Comments specific to this report are listed later in this document.

DNREC's PPRA: Page 6, 8th paragraph: "The Department needs to achieve an effective, timely and cost effective remediation of the source of groundwater contamination beneath the footprint of the buildings to restore the aquifer to potable use."

City of Newark Comment: The City of Newark depends on safe groundwater quality and sufficient availability. Can DNREC elaborate on its intent to restore the aquifer to potable use? It should be noted that the City of Newark Water Department is on the record as opposing this use within their wellhead protection area but were unable to stop the project due to its location within the County. PW-16 is capable of producing 0.57 MGD or roughly 1/8th of the total average demand for the City of Newark. Regaining use of PW-16 through remediation or additional treatment, or finding a suitable alternative well site(s) to make up this difference will be essential to ensure the long term sustainability of Newark's water supply.

DNREC's Response: Since the Site is a "source area" for contamination in the Columbia Aquifer, the goal of the July 2014 Proposed Plan of Remedial Action for OU-2 is to remediate the groundwater contamination in the Columbia Aquifer and restore the Columbia Aquifer to potability. By achieving this goal, any contamination that is migrating into the Potomac Aquifer from the Columbia Aquifer at the Site should be significantly reduced if not eliminated. As noted in the BrightFields Remedial Investigation Report, there may be other potential sources for the contamination that is found in the Potomac Aquifer and impacting PW-16. Further investigation of Potomac Aquifer to determine the sources of the contamination and contaminant migration pathways may be initiated in the future, as funding is available. The restoration of the Potomac Aquifer will be evaluated in a Feasibility Study after an investigation of that aquifer is completed.

DNREC's PPRA: Page 7, number 5: "Develop and implement a DNREC -approved Long-Term Stewardship (LTS) Plan. The LTS Plan will detail: 1) the groundwater monitoring network and schedule to be followed in order to monitor the attenuation of the groundwater COCs, and 2) the inspection schedule to be followed in order to ensure the long-term integrity of the remedy."

City of Newark Comment: Will DNREC require the installation of additional Potomac Aquifer monitoring wells? If so, will the new wells be constructed to specifically monitor and discretely sample for DNAPLs?

DNREC's Response: In the Feasibility Study, BrightFields reviewed the borehole logs and well construction details and re-evaluated the aquifer test that was conducted in November 2008. In addition to Potomac wells, PW-1, PW-2 and PW-3, monitor wells LFMW-2, LFMW-3, and MW-21 are now interpreted as being Potomac wells. Monitor wells, PW-1, PW-2 and PW-3, were installed in the Potomac Aquifer at the Site to determine if contamination present at the Syntech Site was migrating into the Potomac Aquifer. The well screens for these deeper monitoring wells were set at the base of the sand unit consistent with the screened zone in PW-16. Any investigation of the Potomac Aquifer would

involve the installation of additional Potomac wells and would be initiated as funding becomes available. New monitor wells will be constructed to evaluate preferential pathways for contaminant transport in the Potomac Aquifer. New wells will not be constructed specifically to monitor and discretely sample for DNAPLs unless there is a strong indication from data collected during the investigation that DNAPLs are present in the Potomac Aquifer. The analytical data that has been collected from the Potomac monitor wells at Syntech as well as from PW-16 indicates that the COCs present in the Potomac Aquifer are present in the dissolved phase and are not present as a DNAPL. DNREC is of the opinion based on the available analytical data that DNAPLs, if present at all, may only be present in the Columbia Aquifer.

City of Newark Comment: Will the LTS Plan be available for public review and comment?

DNREC's Response: The LTS plan will be available for public review but not for public comment.

DNREC's PPRA: Page 11, Figure 3: 2013 Groundwater Contaminants of Concern and Page 12, Figure 4: Syntech Site Groundwater Contaminants Exceeding Screening Levels March 2014.

City of Newark Comment: It is unclear if the field work, groundwater sampling, and data gathering from previous reports fully characterizes the extent of DNAPL contamination within the Potomac Aquifer and the site's potential impact on the City of Newark's Public Well 16 (PW-16). The majority of the groundwater samples suggest a sampling interval (generally 10 feet) from which water was extracted and analyzed for various contaminants of concern. Without knowing if the samples were discretely acquired from wells screened and grouted appropriately at the base of Potomac Formation Clay, the City of Newark questions the validity of sample results (specific to DNAPLs) evaluated and illustrated in Figures 3 & 4.

DNREC's Response: The analytical data presented on Figures 3 and 4 of the July 2014 Proposed Plan for OU-2 was collected from groundwater samples from the Columbia Aquifer during the Remedial Investigation by BrightFields. Monitor wells such as MW-5, 6D, 7, 10, 11, 13, 15, 16 and 18) have been screened at the top of the confining unit at the base of the sand in the Columbia Aquifer at the Site to monitor for DNAPLs.

The monitor wells, PW-1, PW-2 and PW-3, in the Potomac Aquifer at the Site were installed to determine if contamination present at the Syntech Site was migrating into the Potomac Aquifer. The well screens for these deeper monitoring wells were set at the base of the sand unit consistent with the screened zone in PW-16.

The previous investigations were designed to characterize and address the contamination in the Columbia Aquifer and to evaluate the potential for contaminants from the Columbia Formation to migrate into the Potomac Aquifer. The remedial actions in the July 2014 Proposed Plan for OU-2 will reduce and possibly eliminate any migration of contaminants from the Syntech Site into the Potomac Aquifer. Additional investigation of the Potomac Aquifer may be addressed after the remediation of the source area in the Columbia at the Syntech Site is implemented, and funding becomes available. Once again, the concentrations of COCs in the Potomac Aquifer indicates the presence of dissolved phase contaminants and do not indicate the presence of DNAPL in that aquifer.

City of Newark Comment: In November 2008, a 4 day pumping test was performed on the City of Newark's Public Well PW-16 to characterize its influence on the Potomac Aquifer in the area. Based on the data detailed in the above paragraph, it is evident that the pumping of PW-16

effects the hydrogeologic characteristics at the Syntech site. Furthermore, any groundwater contamination at the Site is likely to migrate towards PW-16 when the well is in use.

DNREC's Response: Groundwater in both the Columbia and Potomac Aquifers flows to the southeast under non-pumping conditions. The pumping of PW-16 does affect the hydrogeologic characteristics at the Site. In the Feasibility Study, BrightFields reviewed the borehole logs and well construction details and re-evaluated the aquifer test that was conducted in November 2008. Several of the wells (LFMW-2, LFMW-3, and MW-21) are now interpreted as being Potomac wells and not Columbia wells. The most significant effects of pumping PW-16 were on the monitor wells that are screened in the Potomac Aquifer; however, the only two Columbia wells that showed the effects of pumping MW-16 were MW-10 and LFMW-5, which are located in the northern portion of the Site and the Lilly Fasteners property respectively. Therefore, the Potomac Aquifer in the vicinity of the Site is confined or partially confined. Based on the data obtained during the BrightFields investigations in 2013 and 2014, there was no area of the Site where the Potomac clay was absent. The vertical hydraulic conductivity measurement of 1.2×10^{-4} cm/sec. from PC-GP22 indicates that movement through the clay is possible in this area and might explain the response observed in the nearby MW-10 when PW-16 was pumped.

City of Newark Comment: **The migration of DNAPLs are more controlled by the elevation of the confining unit, in this case the base of the Potomac Aquifer, than groundwater flow direction. Figure 3 -Geologic Cross Section A-A' and Figure 4 -Elevation of the Top of Potomac Clay suggest DNAPL migration both to the southeast (toward PW-16) and northeast (toward LFMW-2) possibly explaining VOC impacts observed in PW-16 and LFMW-2. The Page 17 paragraphs referenced above are contradicted later in the report within the Density section on Page 18 "*Most of the COCs are denser than water. These chemicals have a tendency to sink until they encounter clay or other confining unit, especially if they have enough mass to form non-aqueous phase liquids. The movement of contaminants that are denser than water may be controlled more by the configuration of the confining unit than by groundwater flow.*"**

DNREC's Response: Chlorinated solvents are usually released in liquid phase (DNAPL) though in some cases an aqueous solution containing dissolved VOCs may be released, which may have been the case at the Site. Once in the subsurface, the chlorinated solvents can exist in four phases: DNAPL, aqueous, vapor, or adsorbed. The movement of DNAPL in the subsurface is controlled substantially by a multitude of factors including: the nature of the release, the DNAPL density, interfacial tension, and viscosity, porous media capillary properties, aquifer matrix heterogeneity and, usually to a lesser extent, hydraulic forces. As stated previously, it is very difficult to verify the presence of DNAPL through direct observation in soil and groundwater samples where the DNAPL is transparent, present in low saturation, or distributed heterogeneously.

The importance of aquifer matrix heterogeneity as a primary factor controlling contaminant migration cannot be underestimated. During the investigations performed by BrightFields in 2013 and 2014, soil data was collected with a GeoProbe in order to describe the lithology of the Columbia Aquifer and to delineate the clay layer at the base of the Columbia Aquifer. In addition, vertical profiling of the COCs in the Columbia Aquifer was accomplished with a Membrane Interface Probe. (See the geologic cross-sections illustrated on Figures 6 and 7 in the Remedial Investigation Report).

The common approach of averaging out heterogeneities and representing the subsurface as homogeneous inadequately represents the subsurface and makes it more difficult to predict contaminant migration. The conceptual model for the Site investigation was that the COCs in the process area traveled along the Potomac Clay until they reached a pathway through the confining unit. However, BrightFields did not find any area on the Site where the Potomac Clay was absent, nor did BrightFields observe the presence of any DNAPL in any of the soil borings. The surface of the Potomac Clay (See Figure 4 in the May

2014 Final Feasibility Addendum) appears to be irregular in the area of the former buildings. There are various low spots in the clay surface where COCs may have become trapped. Data collected during the recent investigations suggests that Carbon Tetrachloride may possibly be present as residual DNAPL in the Columbia Aquifer at the pilot plant.

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AMENDED PROPOSED PLAN OF REMEDIAL ACTION

SYNTECH SITE
OPERABLE UNIT 2 (OU-2)
Newark, Delaware
DNREC Project No. DE-0173



July 2014

Delaware Department of Natural Resources and Environmental Control
Division of Waste and Hazardous Substances
Site Investigation & Restoration Section
391 Lukens Drive
New Castle, Delaware 19720

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AMENDED PROPOSED PLAN OF REMEDIAL ACTION

SYNTECH SITE
OPERABLE UNIT 2 (OU-2)
Newark, Delaware
DNREC Project No. DE-0173



Approval:

This Proposed Plan meets the requirements of the Hazardous Substance Cleanup Act.

Approved by:	
 TR	
Timothy Ratsep, Environmental Program Administrator Site Investigation & Restoration Section	
7/2/14	
Date	



What is the Amended Proposed Plan of Remedial Action for OU-2?

The Amended Proposed Plan of Remedial Action (Amended Proposed Plan) for Operable Unit 2 (OU-2) summarizes the clean-up (remedial) actions that are being proposed to address groundwater contamination found at the Syntech Site (“the Site”) for public comment. A legal notice is published in the newspaper for a 20-day comment period. DNREC considers and addresses all public comments received and publishes an Amended Final Plan of Remedial Action (Amended Final Plan) for the Site. The previous plan of remedial action is being amended to address a change in the technology for the remediation of the groundwater contamination in the surficial Columbia aquifer at the Site.

What is the Syntech Site OU-2?

The Syntech Site consists of one tax parcel (11-010.00-068) covering approximately 3.5 acres at 785 Dawson Drive, Newark, New Castle County, Delaware (Figure 1). The Site is located south of the intersection of Shea Way and Dawson Drive within the Delaware Industrial Park. The Site is zoned commercial and the surrounding land use is commercial and light industrial.

The Site is bordered to the north by Dawson Drive, to the south by Interstate 95, to the east by DuHadaway Tool and Die Company, and to the west by Maaco Automobile Painting Company and Murphy Steel, Inc. (Figure 2). Up until 2013, the Site consisted of a main plant area, a boiler room, a pilot plant, a drum storage area and an office when those structures were removed. Presently, there are no structures on the Site.

The Site is fenced, unoccupied, and covered with vegetation, broken asphalt, crushed concrete and concrete building footers. The Delaware Economic Development Office (DEDO) is the current owner of the Site.

This amended proposed plan addresses Operable Unit-2 (OU-2), which consists of the groundwater at the Site. Soil was evaluated independently under Operable Unit-1 (OU-1), for which no remedial action was required.

What happened at the Syntech Site?

Between 1981 and 1987, Helix Associates (Helix) operated a specialty chemicals manufacturing and processing facility on the Site which reportedly recovered iodine from waste sulfuric acid solutions. In 1986, an explosion in a 750-gallon reactor vessel destroyed a portion of the manufacturing building and eventually led to closure of the Helix facility.

In July 1989, Synthesis Technologies, Inc. (Syntech) began operations on the Site by manufacturing specialty batch diazo compounds, including dyes for cloth, color photography, and biological tissue staining until its closing in February 1991. In 1990, a reactor leaked vapors containing heptanes and nitric acid into the outside atmosphere.

What is the environmental problem at the Syntech Site?

As a result of releases of hazardous substances from historical operations at the Site, groundwater in the surficial Columbia and the semi-confined Potomac Aquifer has been contaminated.

The contaminants of concern (COCs) in the groundwater are 1,2-dichloroethane (DCA), chlorobenzene, benzene, carbon tetrachloride, 4-chloroaniline, chloroform, 1,4-dichlorobenzene, tetrachloroethene, and ethylbenzene (Figure 3). These COCs are present in the groundwater in the area beneath the footprint of the former main plant, and continue to source the dissolved groundwater contaminant plume that has migrated offsite from the Site to commercial properties to the southeast (Figure 4). These COCs pose a risk to human health.

Based on the results from the Johnson & Ettinger Model, there is a potential risk from vapor intrusion to indoor air from the COCs in groundwater if a new structure is constructed in the focused evaluation area.

What clean-up actions have been taken at the Syntech Site?

Helix conducted an investigation of the Site in August 1989. Volatile organic compounds (VOCs) were detected in groundwater at the Site in milligram per liter (mg/l) or parts per million (ppm) concentrations with the highest levels of VOCs occurring in the groundwater east/southeast of the building where the vessel had exploded.

During an inspection on February 8, 1991, the DNREC Emergency Response Branch (ERB) discovered over 500 drums of unknown waste chemicals throughout the Site; many of the drums had visible leaks. Syntech began to classify, over pack and dispose of the chemicals off-site at a RCRA facility under an Imminent Hazard Order from DNREC. The company ceased operations and dissolved its corporation prior to completing the cleanup, and DNREC contracted with a private consultant to complete the work.

In 1994, DNREC performed a facility evaluation (FE) of the Site. Monitoring wells were installed at the Site and additional on-site soil and groundwater samples were collected. Two domestic wells located south of the Site, along with six water supply wells from the City of Newark's South Well Field were also sampled.

In the fall of 1995, WIK Associates, Inc. conducted a FE of the former Process Industries Site (DE-1032) located immediately to the east of Syntech at 801 Dawson Drive, which is now owned by DuHadaway Tool and Dye Company. Two monitoring wells were installed to evaluate groundwater quality on the property. Contaminants associated with the Syntech were present in the sample from the well located on the property boundary with the Site.

Between 1998 and 1999, DNREC's contractor, Camp Dresser and McKee (CDM), completed a remedial investigation (RI), a human risk assessment (HRA), and feasibility study (FS) of the Site. Additional monitoring wells were installed in the surficial water-bearing sands of the Columbia Formation and also in the uppermost confined sand aquifer of the Potomac Formation. 1,2-DCA was reported from the 2 background monitoring wells that were installed on the Lilly Fasteners property located 700 feet to the east of the Site.

In November 1999, DNREC completed a Site Inspection (SI) at the Lilly Fasteners Site (DE-0295) located at 855 Dawson Drive to determine if the Site was the source of the 1,2 DCA in the groundwater. The SI reported that the soil samples did not contain VOCs and the groundwater was impacted with high concentrations of 1,2-DCA, and low concentrations of trichloroethylene (TCE), carbon tetrachloride (CT), benzene, and chloroform.

In the fall of 2000, DNREC's contractor, Tetra Tech, Inc. (Tetra Tech), conducted a direct push sampling event in the former plant area. Carbon tetrachloride (CT) was detected in groundwater at a concentration of 47 mg/l suggesting that CT might be present in the groundwater as a dense non-aqueous phase liquid (DNAPL).

In July 2001, Tetra Tech performed additional groundwater sampling activities at the Syntech Site in order to obtain current data on groundwater quality. The concentrations of chlorobenzene reported from groundwater samples taken during this sampling event ranged from 3.5 mg/l to 5 mg/l suggesting that chlorobenzene might also be present in the groundwater as a DNAPL.

Between February 19 and 21, 2002, Tetra Tech's subcontractor, Columbia Technologies, completed a Membrane Interface Probing (MIP) program at Syntech, which identified a "hot spot" between 10 to 12 feet below ground surface located outside of the door at the rear of the main plant near the boiler room. Tetra Tech used this additional data to revise the FS, originally prepared by CDM in August 1999, and submitted a focused feasibility study update (FFSU) to DNREC on April 15, 2002.

In July 2003, DNREC SIRS issued a Final Plan of Remedial Action (FPRA) for the Site based on the revised FFS by Tetra Tech which called for the application of hydrogen reducing compound (HRC) and oxygen reducing compound (ORC) to treat the groundwater across the Site.

In April 2004, a Groundwater Management Zone (GMZ) was implemented to restrict the use of groundwater at the Site and within the extent of the contaminant plume.

In November 2005, Tier DE removed an 8,000 gallon underground heating oil tank from the Site. The tank was intact and contained approximately 300-400 gallons of heating oil.

In accordance with the FPRA, Tier DE also applied approximately 1,500 pounds of HRC and ORC in a series of test pits to treat the groundwater across the Site. The remedial action was completed in December 2005.

Between 2005 and 2008, Tetra Tech performed groundwater monitoring at the Site to determine the effectiveness of the remedial action.

In September 2008, Tetra Tech performed an additional subsurface investigation both on and off-site. Groundwater samples collected from within a portion of the main building indicated that there was significant VOC groundwater contamination remaining under the building that had not been remediated.

In February 2010, the GMZ was revised to incorporate a larger offsite area.

Tetra Tech completed a FS for the Site and submitted the report in March 2011.

Between February 12, 2013 and March 15, 2013, BrightFields Inc. (BrightFields) completed the demolition of the buildings at the Site leaving only concrete slabs and retaining walls. All materials were recycled, composted, or disposed of in compliance with industry demolition practices.

BrightFields performed a Remedial Investigation of the Site in May 2013 to collect data from groundwater and soil within the former footprint of the buildings and submitted the report in February 2014.

BrightFields completed a Final Feasibility Study Addendum in May 2014.

What does the Department want to do at the Syntech Site OU-2?

The Department needs to achieve an effective, timely and cost effective remediation of the source groundwater contamination beneath the footprint of the buildings to restore the aquifer to potable use.

What additional clean-up actions are needed at the Syntech Site OU-2?

Based on the Final Feasibility Study Addendum, dated May 2014, prepared by BrightFields, Inc., DNREC proposes the following remedial actions for the Site, which need to be completed before a Certificate of Completion of Remedy (COCR) can be issued:

1. Remove all building footers.
2. Pump out, clean and remove all Site sumps and below ground holding tanks.
3. Implement Alternative 2: In-Situ Chemical Treatment which involves using in-situ chemical oxidation (ISCO) and in-situ chemical reduction (ISCR) technologies, and enhanced bioremediation.
4. Record an Environmental Covenant, consistent with Delaware's Uniform Environmental Covenants Act (Title 7, Del. Code Chapter 79, Subtitle II) (UECA), in the office of the Recorder of Deeds to include the following:

[a.] Use Restriction. Use of the Property shall be restricted solely to those non-residential type uses permitted within Commercial, Manufacturing, or Industrial Districts;

[b.] Interference with Remedy. There shall be no digging, drilling, excavating, grading, constructing, earth moving, or any other land disturbing activities on the Property without the prior written approval of DNREC-SIRS;

[c.] Limitation of Groundwater Withdrawal. No groundwater wells shall be installed, and no groundwater shall be withdrawn from any well, on the Property without the prior written approval of DNREC-SIRS and DNREC Division of Water;

[d.] Compliance with Long Term Stewardship Plan. Perform all work required by the Long Term Stewardship Plan (“LTS Plan”), as issued, approved, modified or amended by DNREC;

[e.] Compliance with Final Plan. Perform all work required by the Final Plan, the Amended Final Plan, etc. (“Final Plan”), as issued, approved, modified or amended by DNREC;

4. Develop a DNREC approved contaminated materials management plan (CMMP) to allow construction workers to safely handle any potential contaminated soil and groundwater at the Site.
5. Develop and implement a DNREC-approved Long-Term Stewardship (LTS) Plan. The LTS Plan will detail: 1) the groundwater monitoring network and schedule to be followed in order to monitor the attenuation of the groundwater COCs, and 2) the inspection schedule to be followed in order to ensure the long-term integrity of the remedy.
6. Perform a soil gas survey prior to redevelopment of the Site to evaluate remedial effectiveness and potential risk to future Site users.

What are the long term plans for the Syntech Site OU-2 after the cleanup?

The Site use will be restricted to non-residential (commercial/industrial) purposes by recording the environmental covenant. The CMMP will be completed and available for the Site.

How can I find additional information or comment on the Proposed Plan?

The complete file on the Site including the Feasibility Study and the various reports are available at the DNREC office, 391 Lukens Drive in New Castle, 19720. Most documents are also found on:

<http://www.nav.dnrec.delaware.gov/DEN3/>

The 20-day public comment period begins on July 6, 2014 and ends at close of business (4:30 pm) on July 28, 2014. Please send written comments to the DNREC office at 391 Lukens Drive, New Castle, DE 19720 to Robert C. Asreen, Jr., Project Officer or Robert Newsome, Public Information Officer.

Figure 1: General Site Location Map

Figure 2: Former Syntech Site Features

Figure 3: 2013 Groundwater Contaminants of Concern

Figure 4: Groundwater Contaminants Exceeding Screening Levels March 2014

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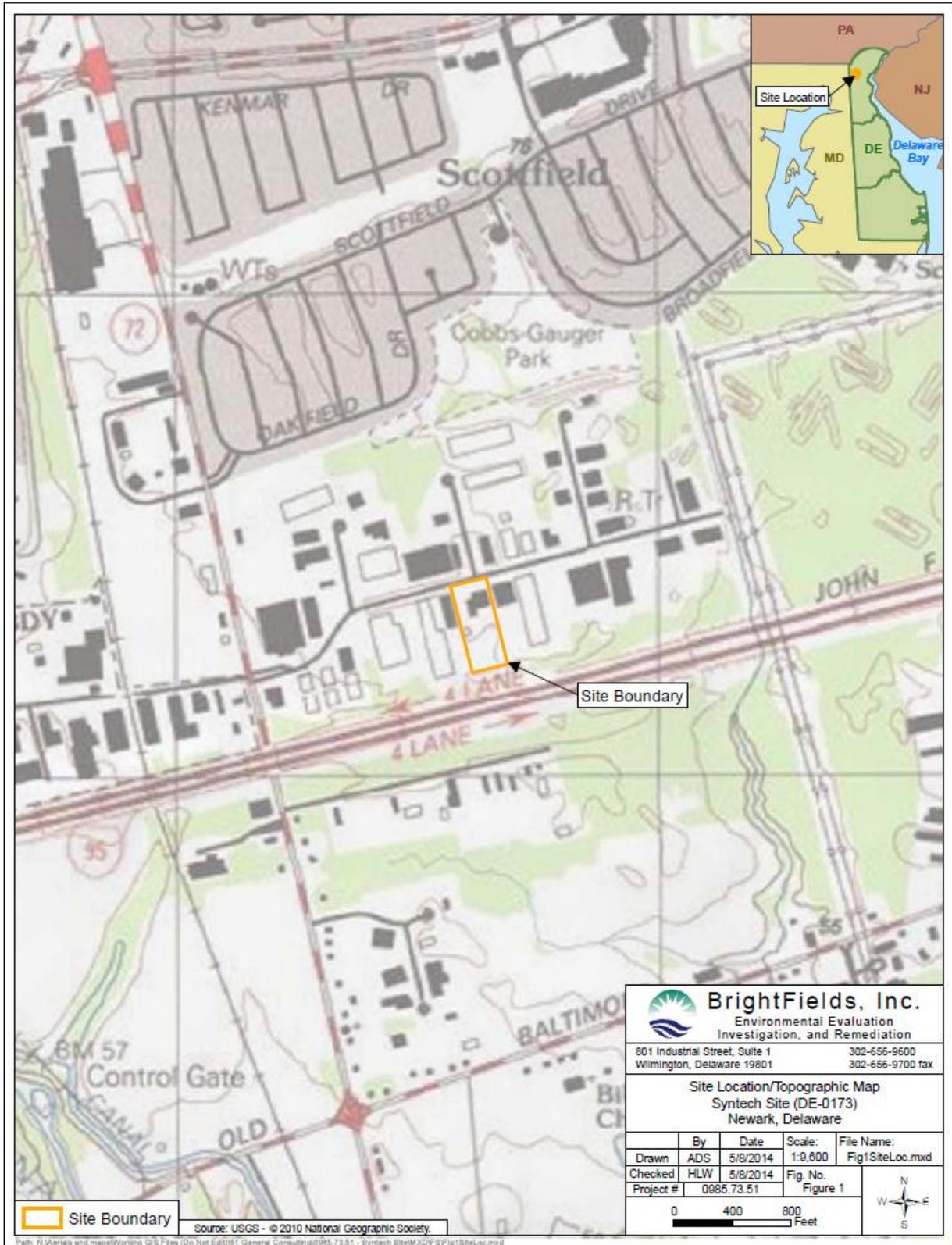


Figure 1: Syntech General Location Map



Figure 2: Former Syntech Site Features

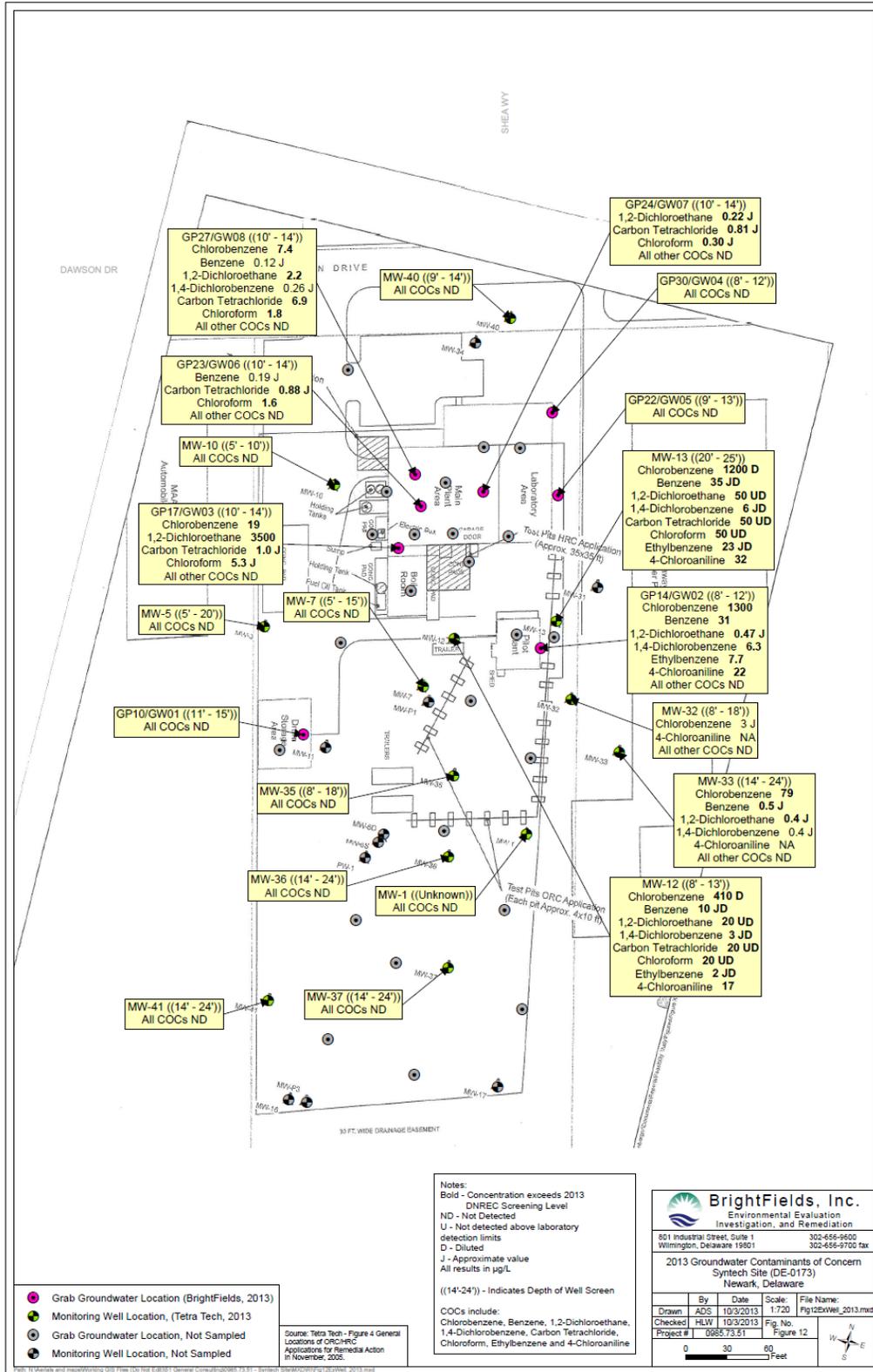


Figure 3: 2013 Groundwater Contaminants of Concern

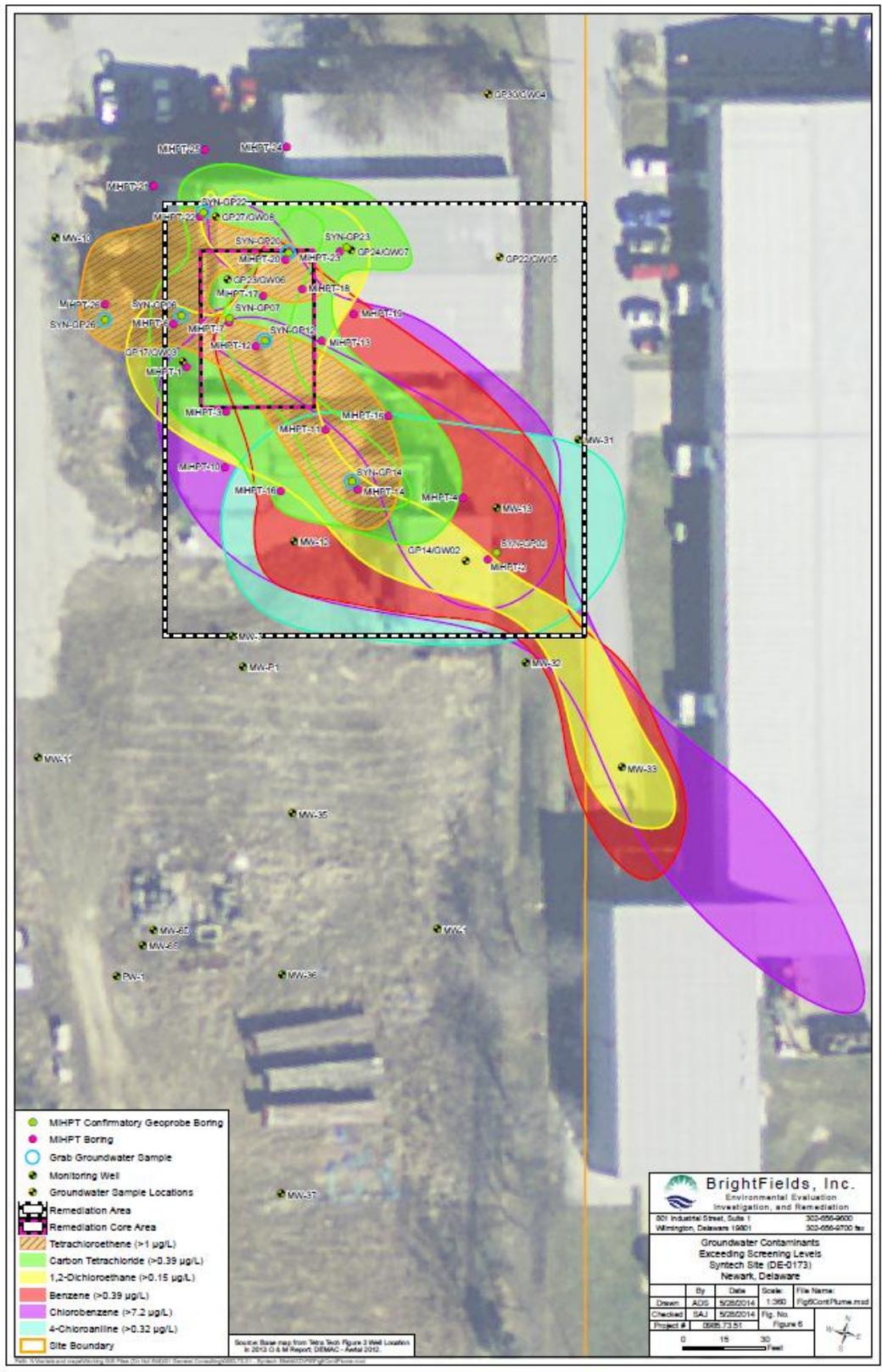


Figure 4: Syntech Site Groundwater Contaminants Exceeding Screening Levels March 2014

Glossary of Terms Used in this Proposed Plan

Certification of Completion of Remedy (COCR)	A formal determination by the Secretary of DNREC that remedial activities required by the Final Plan of Remedial Action have been completed.
Contaminant of Concern (COC)	Potentially harmful substances at concentrations above acceptable levels.
Contaminated Materials Management Plan	A written plan specifying how potentially contaminated material at a Site will be sampled, evaluated, staged, transported and disposed of properly.
Final Plan of Remedial Action	DNREC's adopted plan for cleaning up a hazardous site.
Hazardous Substance Cleanup Act (HSCA)	Delaware Code Title 7, Chapter 91. The law that enables DNREC to identify parties responsible for hazardous substances releases and requires cleanup with oversight of the Department.
Human Health Risk Assessment (HHRA)	An assessment done to characterize the potential human health risk associated with exposure* to site related chemicals.
Preliminary Risk Assessment	A quantitative evaluation of only the most obvious and likely risks at a site
Risk	Likelihood or probability of injury, disease, or death.
Restricted Use	Commercial or Industrial setting
Site Inspection (SI)	Environmental study of a site which includes the sampling of soils, groundwater, surface water, sediment and/or wastes on the property, as appropriate. This evaluation is performed on behalf of the United States Environmental Protection Agency (U.S. EPA).
SIRS	Site Investigation Restoration Section of DNREC, which oversees cleanup of sites that were contaminated as a result of past use, from dry cleaners to chemical companies