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29 January 2013

Via Email and Federal Express

Ms. Sharon Fang (3H521), Remedial Project Manager
U.S. Environmental Protection Agency – Region III
1650 Arch Street
Philadelphia, PA 19103

Subject: Remedial Design Work Plan (RDWP)
Operable Unit 2 North Penn Area 5 Superfund Site
Unilateral Administrative Order (UAO)
Docket No. CERCLA-03-2012-0205DC

Dear Ms. Fang:

On behalf of Stabilus, Inc., please find enclosed three (3) copies of the Remedial Design Work Plan (RDWP) dated 29 January 2013 to fulfill the requirements of Section VI Paragraph 25.a of the Unilateral Administrative Order (UAO) Docket No. CERCLA-03-2012-0205DC dated 26 June 2012, for the interim remedy for Operable Unit 2 (OU2) of the North Penn Area 5 Superfund Site. If you have any questions, please do not hesitate to contact me.

Sincerely,

Derek W. Tomlinson, P.E.
Project Coordinator

Attachment: Remedial Design Work Plan dated 29 January 2013

cc: Tim Cherry, PADEP *(via email & 1 hardcopy first class mail)*
M. Joel Bolstein, FoxRothschild
Chris Voci, Geosyntec
File: PH0013

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REMEDIAL DESIGN WORK PLAN

Operable Unit 2 North Penn Area 5 Superfund Site
Unilateral Administrative Order (UAO)
Docket No. CERCLA-03-2012-0205DC

Submitted on Behalf of

Stabilus, Inc.
1201 Tulip Drive
Gastonia, NC 28052

Prepared by

Geosyntec Consultants, Inc.
1787 Sentry Parkway West
Building 18, Suite 120
Blue Bell, PA 19422

Project Number PH0013

29 January 2013

Geosyntec consultants

CERTIFICATION

Except as provided below, I certify that the information contained in or accompanying this Remedial Design Work Plan (RDWP) is true, accurate, and complete.

As to those portions of this RDWP for which I cannot personally verify their accuracy, I certify under penalty of law that this RDWP and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Signature: _____

Name: Craig Posplech

Title: CFO

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LIST OF ACRONYMS

AFCEE	Air Force Center for Engineering and the Environment
ARARs	Applicable or Relevant and Appropriate Requirements
CSI	Construction Specification Institute
CSM	conceptual site model
cDCE	cis-1,2-dichloroethene; cis-1,2-dichloroethylene
CQAP	Construction Quality Assurance Plan
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
COCs	chemicals of concern
CSM	conceptual site model
Dhc	dehalococcoides
EISB	enhanced *in situ* bioaugmentation
FS	Feasibility Study
FSP	Field Sampling Plan

HASP	Health and Safety Plan
ICP	Institutional Control Plan
ITRC	Interstate Technology and Regulatory Council
MCL	maximum contaminant level
µg/L	microgram per liter
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NELAP	National Accredited Laboratory Accreditation Program
NP5	North Penn Area 5
NPL	National Priorities List
NPWA	North Penn Water Authority
O&M	operation and maintenance
OPCC	opinion of probable construction cost
OSHA	Occupational Safety and Health Administration
OU	operable unit
OU1	Operable Unit 1
OU2	Operable Unit 2
OU3	Operable Unit 3
PADEP	Pennsylvania Department of Environmental Protection
P&ID	piping and instrumentation diagram
PPC	Preparedness, Prevention and Contingency
PCE	tetrachloroethene; tetrachloroethylene; perchloroethene
PDI	pre-design investigation
PFD	process flow diagram
PPE	protective personal equipment
PRP	Potential Responsible Party
QA	quality assurance
QAPP	Quality Assurance Project Plan
QA/QC	quality assurance and quality control

QC	quality control
RA	Remedial Action
RAO	Remedial Action Objectives
RD	Remedial Design
RD/RA	Remedial Design and Remedial Action
RDWP	Remedial Design Work Plan
RI	Remedial Investigation
RI/FS	Remedial Investigation and Feasibility Study
ROD	Record of Decision
RPM	Remediation Project Manager
SMP	Site Management Plan
SOP	standard operating procedure
SPCC	Spill Prevention, Control and Countermeasure
TCE	trichloroethene, trichloroethylene
UAO	Unilateral Administrative Order
UIC	Underground Injection Control
USEPA	United States Environmental Protection Agency
VC	vinyl chloride
VOCs	volatile organic compounds
WMP	Waste Management Plan

1. INTRODUCTION

This Remedial Design Work Plan (RDWP) was prepared by Geosyntec Consultants, Inc. (Geosyntec) on behalf of Stabilus, Inc. (Stabilus), one of the named Respondents to the Unilateral Administrative Order (UAO) Docket No. CERCLA-03-2012-0205DC dated 26 June 2012 (USEPA, 2012), for the interim remedy selected by the United States Environmental Protection Agency (USEPA) for Operable Unit 2 (OU2) of the North Penn Area 5 Superfund Site in Hatfield and New Britain Townships, Montgomery and Bucks Counties, Pennsylvania (the "Site" or "NP5 Site", Figures 1 and 2).

This RDWP is being submitted to the USEPA pursuant to Section VI Paragraph 25.a of the UAO. The UAO was issued for the completion of the Remedial Design (RD) and Remedial Action (RA) to implement the 7 September 2011 Record of Decision (Interim ROD) for the interim remedy for enhanced *in situ* bioaugmentation (EISB; USEPA, 2011; AFCEE, 2007; ITRC, 2005, 2007 and 2008).

The USEPA selected the EISB remedy to address elevated levels of volatile organic compounds (VOCs), which have been historically detected in the OU2 overburden groundwater. This RDWP provides the framework and process for the EISB remedy design set forth in the Interim ROD and was developed in accordance with the applicable USEPA guidance documents (USEPA 1990; USEPA 1992; USEPA 1995a; USEPA 1995b).

Figure 3 presents the area within OU2 that is the focus of this RDWP.

1.1 Remedial Design Objectives

The USEPA established Remedial Action Objectives (RAOs) in the OU2 Interim ROD. The RAOs for the interim OU2 EISB remedy are as follows:

- Reduce a source of contamination by restoring groundwater quality in the treatment area of the overburden to maximum contaminant levels (MCLs) established under the Safe Drinking Water Act;
- Prevent or minimize further migration of contaminants from the overburden; and
- Prevent future exposure to contaminated groundwater at concentrations above MCLs.

The primary objectives of the RD are to gather supplemental information at OU2, perform engineering evaluations to support the preparation of construction drawings and specifications for implementing EISB to achieve the RAOs, and meeting the other performance standards and requirements set forth within the Interim ROD and UAO summarized in Section 1.4. The RD will be developed with these RAOs and remedy performance standards as the goal of the implemented RA.

1.2 Summary of Interim OU2 EISB Remedy

The major components of the EISB remedy as described in the Interim OU2 ROD are as follows:

- Investigation of the overburden groundwater to more fully delineate the extent of the contamination;
- Implementation of EISB to address VOC contamination in the overburden groundwater;
- Monitoring to evaluate the performance of EISB;
- Implementation of institutional controls to protect the integrity of the interim remedy and to prevent exposure to site-related contamination.

1.3 Overview of Remedial Design Process

This RDWP provides the framework for the RD process and is the first step in the design sequence. Section VI Paragraph 25.b of the UAO identifies four design reports to be submitted to USEPA for review, comment and approval. Per the UAO, submittals will occur at approximately 30%, 60%, 90% and 100% completion points of the RD. The preliminary (30%) design submittal will include a pre-design investigation (PDI) work plan for the collection of pre-design data. The PDI will be completed to collect additional overburden information and will follow the scope of work presented in the preliminary (30%) design submittal. A treatability study to aid in the EISB design will be performed as part of the PDI. The protocols and methods for the treatability study will be detailed in the preliminary (30%) design submittal.

The intermediate (60%) design submittal will present the data collected during the PDI, and the Preliminary RD including the performance monitoring well network design. The pre-final (90%), and final (100%) design submittals will incorporate the Pre-Final RD and Final RD, respectively.

Additional details regarding the EISB engineering design are presented within Section 3. Details of the contents of each design submittal are presented within Section 4. The RD implementation timeline is presented in Section 5.

1.4 Remedy Performance Standards

The performance standard or requirements for the RD/RA are summarized within Section 12.2 of the Interim ROD. Performance standards are summarized in the Interim ROD for the following:

- Delineation of VOCs in the overburden (Interim ROD Section 12.2.1),
- EISB (Interim ROD Section 12.2.2),
- Performance Monitoring (Interim ROD Section 12.2.3), and
- Institutional Controls / Groundwater Use Restrictions (Interim ROD Section 12.2.4).

Additionally, the interim remedy must comply with all applicable or relevant and appropriate requirements (ARARs; Interim ROD Table 4).

1.5 Remedial Design Team

The organizational structure for the RD team is presented in Figure 4 and summarized as follows:

- **USEPA:** The USEPA is the lead governmental agency for the Site. The USEPA will oversee all aspects of the interim remedy RD/RA. Ms. Sharon Fang is the Remedial Project Manager (RPM) for USEPA, responsible for overall oversight of the NP5 site and OU2 interim remedy and monitoring compliance of the interim remedy with the Interim ROD and UAO.
- **USEPA RD Oversight Contractor:** The USEPA RD Oversight Contractor assists the USEPA RPM on oversight of the RD, RD site activities, and other technical aspects of the completion of the RD for the interim remedy. Hydrogeologic, Inc. in Philadelphia, Pennsylvania will serve as the USEPA RD Oversight Contractor.
- **Pennsylvania Department of Environmental Protection (PADEP):** PADEP is the support agency to USEPA for the Site. PADEP will review and provide their input or concurrence, as needed during completion of the RD/RA

components of the interim remedy. Mr. Tim Cherry of PADEP is the current point of contact.

- **Supervising Contractor and Project Coordinator:** Per Section VI Paragraph 24 of the UAO, Stabilus has selected, and USEPA RPM approved in letter dated 1 October 2012, Geosyntec as the Supervising Contractor and Mr. Derek W. Tomlinson, P.E., of Geosyntec as the Project Coordinator. The Project Coordinator will act as a liaison between the USEPA, Stabilus, RD contractors and subcontractors, and RA contractors and subcontractors. The Project Coordinator will verify that the remedial investigation, PDI, RD, and RA activities are performed in substantial accordance with the UAO and Interim ROD and other related technical design requirements.
- **Remedial Design Contractor:** Per Section VI Paragraph 24 of the UAO, Stabilus has selected, and USEPA RPM has approved in letter dated 15 October 2012, Geosyntec as the RD Contractor. The RD Contractor will fulfill the requirements of the UAO specific to the RD of the USEPA selected remedy. The RD Engineer will be Mr. Derek W. Tomlinson, P.E., and the RD Geologist will be Mr. Christopher Voci, P.G., both of Geosyntec and licensed within the Commonwealth of Pennsylvania.
- **Remedial Design Subcontractors:** The RD Subcontractors for this effort are:
  - SiREM Laboratories, Inc. (Sirem) of Guelph, Ontario, Canada will perform the EISB treatability study and related analytical services in conjunction within the PDI activities for this RD.
  - Lancaster Laboratories, Inc. (Lancaster) of Lancaster, Pennsylvania will perform laboratory analytical analysis services related to the RD. The PDI activities include the analysis of groundwater from the overburden delineation, and the analysis of groundwater from the installation of performance monitoring wells. Lancaster is a National Accredited Laboratory Accreditation Program (NELAP) and PADEP certified laboratory (Certification No. 36-00037).
  - Advanced Drilling, Inc. (Advanced) of Pittstown, New Jersey will perform drilling related services related to the remedial design. The PDI activities include completion of overburden groundwater delineation, and installation of performance monitoring wells within both the overburden and shallow bedrock. Advanced is a licensed driller within the Commonwealth of Pennsylvania (Registration No. 2178).

- Earth Data NE, Inc. (Earthdata) of Exton, Pennsylvania will perform the geophysical and packer testing related activities anticipated as part of the shallow bedrock performance monitoring well installation activities.

1.6 Remedial Design Work Plan Organization

This RDWP is organized as follows:

- **Section 2:** Background Information. An overview of the Site, regulatory history, historic Site conditions and data generation needs pertaining to OU2.
- **Section 3:** Engineering Design Process. Outlines the various design components and discusses the anticipated procedure to complete the design for EISB.
- **Section 4:** Remedial Design Submittals. Summary of the contents of each RD submittal.
- **Section 5:** Remedial Design Implementation Timeline. Estimated timeline to complete the design.
- **Section 6:** References.

2. BACKGROUND INFORMATION

Detailed information on the Site history is set forth in Section III of the UAO, Section II of the ROD, and Section II of the Interim ROD (USEPA, 2011, 2004, and 2012). Background information relative to the interim remedy to be performed at OU2 is set forth below.

2.1 Site Description

The Site layout and setting, geology and hydrogeology are summarized below.

2.1.1 Layout and Setting

The Site is located within Hatfield and New Britain Townships, in Montgomery and Bucks Counties, Pennsylvania (Figure 1). NP5 encompasses an approximately five square-mile area generally bounded by Richardson Road to the southeast, Bethlehem Pike (Route 309) to the west, Trewigtown Road to the northwest and Schoolhouse Road to the east (Figure 2). As noted, the focus of this RDWP is the overburden area of OU2 located on the former Stabilus property and the former BAE Systems, Inc. and BAE Systems Information and Electronic Systems Integration, Inc. (BAE) property shown on Figure 3.

Although the NP5 Site is within an area comprised of commercial and industrial businesses, residences, undeveloped woodland properties, parkland and farmland, the area where the interim remedy is to be performed at OU2 is entirely within the former Stabilus and former BAE industrial properties. The topography within OU2 slopes gently from the northwest and southeast toward the West Branch of the Neshaminy Creek. Large portions of the Site are relatively flat-lying from grading associated with construction or agriculture. The major surface water bodies in the vicinity of the Site include the West Branch of the Neshaminy Creek, its Western and Eastern tributaries, and an unnamed tributary to the Neshaminy Creek as shown on Figures 1 and 2.

2.1.2 Geology

NP5 is situated within the Triassic Lowlands section of the Piedmont Physiographic Province. The Site is underlain by an overburden layer that overlies fractured bedrock. The thickness of the overburden layer is typically between 10 to 40 feet and is comprised of soil and unconsolidated weathered bedrock consisting of silt, clay, and some sand. The overburden materials are generally more competent and less permeable

with depth. The upper portion of the overburden is generally unsaturated; however saturated conditions do occur within the overburden. Generally, the base of the overburden and the thicker sections of overburden are perennially saturated during normal precipitation conditions.

The bedrock underlaying the Site is comprised of the sedimentary rocks of the Brunswick and Lockatong Formations of the Newark Supergroup. The lower beds of the Brunswick Formation consist of red to reddish brown and gray to greenish-gray mudstones, clay, and mud-shales. The bedding is irregular and wavy. The Brunswick Formation rocks are thinly-bedded and evenly bedded shales and siltstone that are medium to dark gray and olive to greenish-gray.

The bedrock has low primary porosity, but moderate to high secondary porosity via a network of fractures, bedding-planes, and high-angle joints throughout which groundwater exists and can flow vertically and horizontally. Most of the water-bearing fractures are located within the upper 80 to 100 feet of the surface. The frequency of fractures generally decreases with depth.

2.1.3 Hydrogeology

Groundwater originates from infiltration of local precipitation through the overburden into the bedrock fracture network, and eventually discharges to surface water features (i.e., streams, rivers). The overburden is largely unsaturated, but does contain groundwater at its base above the bedrock, especially during periods of higher seasonal recharge. The thicker sections of overburden, such as that in the vicinity of the former BAE and former Stabilus properties, have historically contained a saturated zone of approximately 3 to 10 feet in thickness year-round. The depth to groundwater in this overburden unit has historically ranged from 4 to 10 feet below grade. The groundwater flow direction in the overburden unit is locally variable, but overall vertical. Groundwater enters the bedrock fracture system from the overburden and flows through the vertical joints and horizontal fractures in the shale and siltstone bedrock. Groundwater may occur under confined or unconfined conditions within bedrock depending upon the thickness of the overlying overburden.

The shallow portion of the bedrock aquifer consists of a fracture zone that exists at depths of approximately 90 to 100 feet below the surface. The depth to groundwater in this aquifer has historically varied from 10 to 30 feet below grade. Groundwater flow in this aquifer has been influenced by the local bedrock structure and in response to gradients induced by historic regional pumping. Historically, groundwater in this portion of the aquifer generally flows in a direction similar to topographic gradient

generally towards the West Branch Neshaminy Creek and its tributaries. Groundwater flow north of the West Branch Neshaminy Creek is generally southeasterly, and groundwater flow south of the creek is generally northeasterly. Groundwater in this portion of the aquifer eventually discharges to the surface streams or provides recharge to the deeper aquifer system.

The deeper portion of the bedrock aquifer consists of the fracture zone greater than 100 feet below the surface to an approximate maximum depth of 500 feet. The geology and groundwater flow conditions of the deeper portion of the bedrock aquifer are similar to that of the shallower, albeit with fewer water-bearing fractures.

2.2 Overview of OU2 Regulatory History

NP5 was first identified in 1979 with the detection of VOCs in groundwater from North Penn Water Authority (NPWA) supply well NP-21. In 1986, USEPA completed an assessment of contamination in the NP5 area. Based on the results of the 1986 assessment, USEPA proposed the Site to be listed on the National Priorities List (NPL) on 22 January 1987. On 31 March 1989, USEPA finalized the listing of the Site on the NPL. For NP5, three primary areas of groundwater contamination were identified and defined as separate and distinct operable units (OU). Per the UAO, the general location of OU1, OU2 and OU3 are described as follows:

- **OU1:** located at and in the vicinity of the property located at 305 Richardson Road in Colmar, Pennsylvania, formerly owned and operated by BAE, and currently owned and operated by Sensor and Antenna Systems Lansdale, Inc. (Sensor) with portions that may extend to other properties. EPA identified BAE as the sole responsible party at OU1.
- **OU2:** located at and in the vicinity of three industrial properties, including the industrial property located at 92 County Line Road in Colmar, Pennsylvania, currently operated by Constantia Colmar, Inc. and formerly operated by Stabilus, the industrial property located at 305 Richardson Road, formerly owned and operated by BAE, and the industrial property located at 4379 County Line Road owned and operated by Kema-Powertest, with portions that may extend to other properties. EPA issued general or special notice letters for OU2 to Stabilus, BAE, Honeywell, Inc., Kema-Powertest, ZF Sachs Automotive of America, Inc., Constantia, County Line Land Limited, and County Line Land Corporation.

- **OU3:** located in the vicinity of Advance Lane and Enterprise Lane in Colmar, Pennsylvania. EPA identified no potential responsible parties (PRPs) for OU3.

USEPA initiated a fund-lead Remedial Investigation and Feasibility Study (RI/FS) in 1998, under which the USEPA studied a five square-mile area that included properties associated with eight commercial businesses. The RI revealed that trichloroethene (TCE) and related VOCs are present in the groundwater at each OU (USEPA, 2002a, 2002b, 2002c, and 2003).

In 2002, USEPA issued a proposed remedial action plan (PRAP) setting forth its preferred remedy for each OU at the Site (USEPA, 2002d). After reviewing the extensive comments submitted during the public comment period, USEPA decided to reassess the preferred remedy for OU2. In June 2004, the USEPA issued a ROD for OU1 and OU3 (USEPA, 2004) to conduct in situ chemical oxidation (ISCO).

USEPA issued a revised proposed plan for interim remedial action at OU2 on 15 September 2008 (Interim PRAP; USEPA, 2008). The Interim PRAP presented EISB as the interim remedial action for the overburden within OU2 at the former Stabilus property and the former BAE property (Figure 3). The decision by USEPA on the selection of EISB is embodied in the Interim ROD (USEPA, 2011).

Finally, the execution of the RD/RA has been required with the issuance of the UAO on 26 June 2012, with this RDWP as a required RD submittal.

2.3 Site History

The Site history is well documented within the RI/FS (USEPA, 2002a and 2002b); Supplemental I RI/FS (USEPA, 2002c), Supplemental II RI/FS (USEPA, 2003), PRAP, (USEPA, 2002d), ROD (USEPA, 2004), Interim PRAP (USEPA, 2008), Interim ROD (USEPA, 2011), and UAO (USEPA, 2012). Specific to the OU2 overburden the two affected properties are the former Stabilus property and the former BAE property. A summary of the ownership history and operations for these two properties follows (USEPA, 2011 and 2012):

- **Former Stabilus Property:** The former Stabilus property is approximately 11-acres. From 1979 to 1998, Stabilus (formerly Stabilus/Gas Springs Company) manufactured gas pistons or shock absorber type “springs” utilized in automobile hatch-backs, gates and trunks. From 1953 to 1979, approximately 4 acres of the southern portion of the property, which is an area included in the interim remedy for OU2, was owned by Tracor Aerospace Systems, Inc./American Electronic Laboratory, the predecessor to BAE. Constantia

Colmar Group, formerly part of H&N Packaging, Inc., has operated on the property since 1999.

- **Former BAE Property:** The former BAE property is a 67-acre property consisting of an electronics manufacturing and testing facility that began operations in 1953. From 1953 to 2008, the property was owned an operated by BAE Systems Information and Electronics Systems, Inc., and is formerly known as Marconi Aerospace Electronic Systems, Inc., Tracor Aerospace Systems, Inc., and American Electronics Laboratory. Historically, the operations included degreasing, anodizing, and nickel, copper, tin, and lead plating. Several buildings on site contained operations, which included a plating shop and a plating effluent waste treatment facility and product testing. Since February 2008, Sensor has owned the property.

2.4 Historic Site Conditions

Specific to the OU2 overburden, elevated levels of VOC were detected in the overburden on the former Stabilus property and the former BAE property as presented in the Supplemental II RI/FS (USEPA, 2003) and shown on Figure 3. The 2003 USEPA investigation identified two areas of observed elevated levels of TCE with one near the loading dock of the former Stabilus property and the other located within the former BAE property near W-4 and RI-31.

The origins of the TCE near the former Stabilus property loading dock is presumed to be from a spill caused by Baron Blakeslee, Inc., later Honeywell, which is identified in Section III Paragraph 9.e of the Findings of Fact in the UAO.

Based upon the public record for NP5 and as noted in the USEPA prepared documents, including the Responsiveness Summary issued by USEPA with the Interim ROD in September 2011 (USEPA, 2011), USEPA has not identified a specific source for the elevated level of TCE in the overburden on the former BAE property. Overburden investigation is expected to provide additional data about the nature and extent of groundwater contamination at OU2, including possible sources.

2.5 Data Generation

As noted, the last USEPA investigation of the overburden in OU2 was completed in 2003. The overburden groundwater sampling to be performed at OU2 prior to the implementation of the EISB interim remedy will help identify the nature and extent of the groundwater contamination and the groundwater flow in the overburden. In

addition, it will provide data relating to the chemical composition of the VOC suite, which are essential to the successful implementation of the EISB remedy given the potential for chlorinated ethene degradation to be inhibited in the presence of some VOC mixtures. The EISB design, specifically the selection of appropriate biostimulants and bioaugmentation cultures, requires a full understanding of the current contaminant makeup and groundwater biogeochemistry. This data will all be generated as part of a PDI.

3. ENGINEERING DESIGN PROCESS

This section describes the engineering design process for the RD. Specifically, this section outlines the various design components for the RD. As summarized within Section 1.3, the RD submittals will remain as four major deliverables. The RD will proceed after the approval of this RDWP and will encompass the engineering design process as follows:

1. Overburden groundwater investigation.
2. EISB treatability study.
3. Preliminary design for EISB injection network and system.
4. Design and install performance monitoring well network.
5. Finalize design of EISB injection network and system.

The design process will involve several design submittals to the USEPA and PADEP, and will incorporate industry standard and best engineering practices (AFCEE, 2004 and 2007; USEPA, 2000; ITRC, 2005, 2007, 2008). Details of the contents of each design submittal are summarized in Section 4. A RD timeline is presented in Section 5. The following sections outline the engineering process for each major component of the RD.

3.1 Pre-Design Investigation – Overburden Groundwater

The objective of the PDI is to provide updated data relative to the current nature and extent of chemicals of concern (COCs) in the overburden groundwater at the Site. These data will be used to define the EISB treatment zone and the design of the EISB injection network. The composition of the VOC contaminant suite and overall groundwater biogeochemistry are also important data to be used in the selection of the appropriate EISB biostimulant, bioamendment, and buffer.

As summarized in Sections 2.4 and 2.5 and as required within the UAO, the overburden groundwater conditions observed during the RI/FS (USEPA, 2002a and 2002b) and related Supplemental I and II RI/FS (USEPA, 2002c and 2003) activities require delineation of the COCs, specifically TCE and related parent and daughter products (i.e., PCE, cDCE, VC, etc.).

As noted above, the most recent overburden groundwater sampling performed at OU2 occurred in 2003. It is unclear whether current conditions reflect the levels of TCE

found in 2003 and shown on Figure 3. The ROD and UAO acknowledge that additional overburden sampling needs to be performed to identify the current levels of VOCs, including those requiring EISB treatment as defined by groundwater TCE concentrations exceeding 100 µg/L.

The PDI activities will include soil and groundwater sampling in the overburden. The UAO acknowledged that delineation of the overburden is a necessary part of the RD. Knowledge and understanding of the nature and extent of the contamination and contaminant sources are necessary to define the OU2 overburden treatment zone and remediation approach. This information will be gathered during the PDI and evaluated with the prior RI data to complete the overburden delineation, provide the basis for a revised overburden conceptual site model (CSM) and to enable the design of the EISB injection well and performance monitoring well networks.

Details of the methods to complete the overburden investigation will be presented in the PDI Work Plan as part of the preliminary (30%) design submittal (Section 4.3.1), and the results presented in the PDI Report as part of the intermediate (60%) design submittal (Section 4.3.2).

3.2 Pre-Design Investigation – EISB Treatability Study

As discussed in Section 1.3, an EISB treatability study will be performed as part of the PDI to develop EISB design criteria to be used in the RD. The specific details and scope of work for the EISB treatability study will be presented in the preliminary (30%) design submittal, but in general, the EISB treatability study is expected to consist of construction of the microcosm, microcosm incubation, sampling and analysis over a period of about six months. The microcosms constructed for the EISB treatability study would typically consist of a sterile control, anaerobic intrinsic control, electron donor amended and bioaugmented (e.g., dehalococcoides, Dhc) microcosms. Anticipated analysis during the treatability study may include the following:

- COCs (e.g., TCE, cDCE, VC): to assess reduction in concentrations and creation of daughter products;
- hydrocarbon gases (e.g., ethane, ethane, or methane): to assess complete biodegradation;
- volatile fatty acids (e.g., lactate, acetate, and propionate): to permit evaluation of electron donor fermentation and longevity;
- pH: to assess the need for and performance of buffering; and

- other anions (i.e., sulfate, nitrate, chloride and phosphate): to aid in the assessment of the degradation processes.

Results of the EISB treatability study will be presented in the PDI Report as part of the intermediate (60%) design submittal (Section 4.3.2).

3.3 Preliminary Design for EISB Injection Network and System

The Preliminary RD for EISB will incorporate the results from the PDI activities discussed in Sections 3.1 and 3.2. The Preliminary RD will factor the contaminant concentrations, treatment zone dimensions, amount of biostimulant required for effective treatment, inclusion of other reagents or amendments to address site-specific conditions, source of make-up or chase water, dilution of the biostimulant in water, injection well spacing and vertical injection depths, and injection well design (AFCEE, 2004 and 2007). The primary design components considering the above will include:

- Selection of the biostimulant, bioaugment and buffering agents based upon the results from the overburden groundwater investigation and EISB treatability study;
- Injection point layout for the application of the EISB remedy; and
- Initial injection system process flow and instrumentation.

The Preliminary RD for EISB injection network and system will be presented within the intermediate (60%) design submittal (Section 4.3.2).

3.4 Performance Monitoring Well Network Design and Installation

The locations and monitoring well construction specifications (e.g. screened interval) of the performance monitoring well network will be included in the intermediate (60%) design submittal (Section 4.3.2). The primary purpose of the performance monitoring well network will be to enable the collection of groundwater data from locations within and directly below the future EISB treatment zone useful for the evaluation of the remedy performance. It is anticipated that some of the existing overburden and bedrock monitoring wells will be included in the performance monitoring well network.

3.5 EISB Final Design

The Final RD of EISB injection network and system will be completed and presented within the pre-final (90%) design submittal (Section 4.3.3) and the final (100%) design submittal (Section 4.3.4).

4. REMEDIAL DESIGN SUBMITTALS

The submittals for the RD are anticipated to be as follows:

- Monthly Progress Reports
- Annual Status of Work Reports
- Engineering Design Deliverables

General content of these submittals is summarized herein.

4.1 Monthly Progress Reports

Per Section VI Paragraph 26.a of the UAO, Monthly Progress Reports will be prepared on or before the 5th of each month following the effective date of the UAO and will include the following:

- Actions that have been taken toward achieving compliance with the UAO during the previous month;
- All results of sampling and tests and all other data pertaining to the Work received or generated by Stabilus or its contractors or agents (and not previously submitted to USEPA) in the previous month;
- Identify work plans, plans, and other deliverables required by the UAO that were completed and submitted during the previous month;
- Describe actions including, but not limited to, data collection and implementation of work plans, which are scheduled for the next month; and provide other information relating to the progress of construction including, but not limited to, critical path diagrams, Gantt charts, and Pert charts;
- Include information regarding the percentage of completion of the work, delays encountered or anticipated that may affect the future schedule for implementation of the work, and a description of efforts made to mitigate those delays or anticipated delays;
- Describe any modifications to the work plans or other schedules that Stabilus has proposed to USEPA or that have been approved by USEPA; and

- Describe activities, as approved by USEPA under Section XIX of UAO (Community Relations), undertaken in support of the Community Relations Plan during the previous month and those to be undertaken in the next month.

4.2 Annual Status of Work Reports

Per Section VI Paragraph 26.d of the UAO, Annual Status of Work Reports (Annual Reports) will be prepared summarizing the major milestones achieved in the preceding year, a statement of tasks remaining to be accomplished, and a timeline for implementation of the remaining effort. Per the UAO, Annual Reports will be submitted to USEPA within thirty (30) days of the effective date of the UAO. The due date for the Annual Reports will be on or before July 26th of each year.

4.3 Engineering Design Deliverables

As summarized within Section 1.3, the RD submittals will remain as four (4) major deliverables. The four RD submittals will be as follows:

- Preliminary (30%) design submittal,
- Intermediate (60%) design submittal,
- Pre-Final (90%) design submittal, and
- Final (100%) design submittal.

Details of the content within each of the RD submittals are presented herein.

4.3.1 Preliminary (30%) Design Submittal

The first of the four regulatory submittals of the progress of the detailed design will occur at about 30% completion point. This preliminary (30%) design submittal will include the following:

- **Pre-Design Investigation Work Plan:** The PDI Work Plan will include the Design Sampling and Analysis Plan and Field Sampling Plan (FSP) for the overburden investigation activities. The FSP will include a survey of all new sampling locations and verify existing well locations with OU2 by a Pennsylvania licensed land surveyor. The PDI Work Plan will also include the Bioaugmentation (i.e., EISB) Treatability Study Work Plan and will outline the bench scale testing to be completed. The EISB work plan will include details around the microcosm construction including the size and number of

microcosms, microcosm incubation periods, sampling, analysis, as well as the timeline and reporting.

- **Quality Assurance Project Plan (QAPP):** The QAPP will describe the quality assurance/quality control (QA/QC) procedures, routines, and specifications for activities to be completed during the RD activities. These RD activities will be the PDI and performance monitoring well network installation. The QAPP will be prepared following USEPA *Guidance for Quality Assurance Project Plans* (USEPA, 2002e), and USEPA *Requirements for Quality Assurance Project Plans* (USEPA, 2001). The QAPP will address sampling procedures, personnel qualifications and data reduction, validation, and reporting. The QA/QC procedures and standard operating procedures (SOPs) for laboratories used during the RD will also be included in the QAPP including their qualifications as necessary.
- **Health and Safety Plan (HASP):** A HASP will be prepared to establish the procedures, personnel responsibilities and training necessary to protect the health and safety of on-site personnel during the completion of field activities for the RD. The HASP will be prepared per Occupational Safety and Health Administration (OSHA) 29 CFR 1910.120 requirements providing procedures and plans for routine field activities and for unexpected Site emergencies. The HASP will include delineation of exclusion zones, describe the on-site personnel responsible for implementing the HASP, protective personal equipment (PPE), decontamination procedures, workspace air monitoring, and medical surveillance and other requirements defined in 29 CFR 1910.120.
- **Site Management Plan (SMP):** The SMP will be prepared to describe how the project team will manage the RD to complete the work required at the Site. The overall objective of the SMP is to provide a written understanding and commitment of how various project aspects such as access, security, contingency procedures, management responsibilities, community relations, waste disposal, budgeting, and data handling are being managed. Community relations are not anticipated to be necessary as part of the RD activities, and the USEPA RPM indicated during a meeting on 11 October 2012 that if deemed necessary USEPA will manage community relations as part of the RD. Permits are not anticipated to be necessary during the completion of the RD field activities.
- **Waste Management Plan (WMP):** The WMP is a component of the SMP that will address waste generated during the completion of the RD field activities and

how they will be handled including: waste prevention, waste collection, material reuse, recycling, and hazardous waste disposal.

- **Spill Prevention, Control and Countermeasure (SPCC) Plan:** The SPCC Plan will focus on spill prevention, preparedness, and response in the event of a discharge during the completion of the RD field activities. The SPCC Plan is designed to protect public health, public welfare, and the environment from potential harmful effects of a discharge to nearby water sources. The SPCC Plan will be prepared per USEPA Clean Water Act regulation (40 CFR 112), and PADEP Clean Stream Law for Preparedness, Prevention and Contingency (PPC) regulation (25 PA Code 91.34). This SPCC Plan will be updated to include the RA activities as part of the Pre-Final (90%) Design Submittal (see Section 4.3.3).
- **Contingency Plan:** Per the 11 October 2012 meeting, a Contingency Plan is not deemed necessary as part of the RD activities. As part of the Preliminary (30%) Design Submittal, air monitoring during RD field activities will be addressed within the HASP, and a SPCC Plan for RD field activities will be provided.

4.3.2 Intermediate (60%) Design Submittal

The second of the four regulatory submittals for the RD will occur at about 60% completion point and constitute the intermediate (60%) design submittal. This submission will include the following:

- **Preliminary Pre-Design Investigation Report:** The PDI Report will summarize the results from the overburden investigation and EISB treatability study. Given the schedule requirements for deliverables within the UAO, the PDI Report within the intermediate (60%) design submittal will only report interim results of the EISB treatability study. EISB treatability study interim results are expected from approximately the first 30 days of testing. The overburden investigation is anticipated to include groundwater concentrations, aquifer field geochemistry parameters, natural gases, and other analyses necessary to understand both the nature and extent needed to aid in the RD. As noted in the RD Implementation Timeline (Section 5), the overburden investigation may require additional investigation beyond that scheduled, which will require an extension of the Intermediate (60%) Design submittal. Reporting from the EISB treatability study will report the concentration changes for VOCs, anions, dissolved gases, volatile fatty acids, and pH, and other observations.

- **Preliminary Design Criteria Report:** The Preliminary Design Criteria Report will present a discussion of the approaches, parameters, and assumptions that will be used to ensure that the design of the remedy meets the performance standards of the Interim ROD and complies with pertinent codes, ARARs, and good engineering practices. The Preliminary Design Criteria Report will include a project description; design requirements and provisions including treatment schemes, rates, and required waste streams; and long-term performance, monitoring, and operation and maintenance (O&M) requirements for the various elements of the interim remedy. Where appropriate, supporting calculations and documentation will be provided to demonstrate how the design meets the applicable requirements. Other technical factors of importance to design and construction that may be considered in the Preliminary Design Criteria Report include use of currently accepted environmental control measures, constructability of design, and use of currently accepted construction practices and techniques.
- **Basis of Design Report:** The Basis of Design Report will justify the design assumptions summarized in the Preliminary Design Criteria Report and provide a project delivery strategy. The report will include a description of evaluations conducted to select the RD approach, a summary of the calculations completed to support RD assumptions, and a draft process flow diagram (PFD) illustrating the overall treatment process. Calculations completed during the preliminary design stages will be provided, along with identification of calculations to be performed during subsequent design stages. The report will summarize how the RAOs will be met and will include plans for satisfying permit equivalencies.
- **Preliminary Design Drawings:** Preliminary plans and details will be prepared for the remedy components, as well as a list of drawings to be included during subsequent design stages. As appropriate, general details for the remedy components will be included on the preliminary plans, along with typical design details that are not expected to change during the course of the design work. These preliminary plans will serve as the basis from which subsequent design submittals will be derived. The drawings and plans that are currently anticipated to be included in the Preliminary RD are as follows:
    - title sheet with site location map and list of drawings;
    - base site plan with existing site features;
    - site plan with locations of RD features;

- process flow diagram (PFD);
- piping and instrumentation diagram (P&ID);
- preliminary EISB system and injection point layout;
- preliminary performance monitoring well network locations;
- preliminary performance monitoring well construction details for overburden and bedrock wells;
- general equipment arrangement.

- **Specifications Outline:** A preliminary outline of the construction specifications required for each element of the remedy will be developed during the Preliminary RD. These specifications will be developed in parallel with the drawings, and together they will provide for implementation of the remedy. The specifications will focus on technical specifications for the work, not administrative or general specifications. The construction specifications will be prepared in standard Construction Specification Institute (CSI) format, and will include preliminary specifications for construction, installation, site preparation, and fieldwork standards.
- **Performance Monitoring Well Network Work Plan:** This work plan will provide the proposed location and construction of the overburden and shallow bedrock monitoring network for performance monitoring during the implementation of EISB. The work plan will include the location and construction specifications for the wells, including the installation method, development, and geophysical and packer testing of the wells.
- **Preliminary Construction/Remedial Action Schedule:** A preliminary construction/RA schedule highlighting the critical path will be prepared as part of Preliminary RD activities. This will reflect the anticipated sequence and duration of all major construction activities, as well as related activities such as mobilization, agency reviews, and other RA-related activities.

4.3.3 Pre-Final (90%) Design Submittal

The third of the four regulatory submittals for the RD will occur at about 90% completion point and constitute the pre-final (90%) design submittal. This submission will include the following:

- **Final Pre-Design Investigation Report:** The Final PDI Report will include the results not reported within the intermediate (60%) design submittal. This will

summarize the overburden groundwater sampling results and include the EISB treatability study final results.

- **Pre-Final Design Drawings:** The preliminary plans and drawings will be further updated, expanded, and revised during the pre-final design phase to serve as final design documents for the RD. The drawings and plans that are currently anticipated to be included in the Pre-Final/Final RD are as follows:
  - title sheet with site location map and list of drawings;
  - legend sheet;
  - base site plan with existing site features;
  - site plan with locations of RD features;
  - process flow diagram (PFD);
  - piping and instrumentation diagram (P&ID);
  - EISB system and injection point layout;
  - EISB system details and specifications;
  - performance monitoring well network locations;
  - performance monitoring well details and specifications;
  - general construction specifications;
  - other general specifications / information.
- **Pre-Final Specifications:** Pre-Final RD specifications will be developed for the major components of the remedy in accordance with the specifications outline prepared during Preliminary RD. These written specifications will be developed in parallel with the Pre-Final RD drawings. The specifications will be technical specifications for the work, not administrative or general specifications. These specifications will serve as a complete set of technical specifications for implementation of the RA.
- **Pre-Final Construction/Remedial Action Schedule:** An updated construction/RA schedule highlighting the critical path will be prepared as part of pre-final design activities. This schedule will be an update of the preliminary construction/RA schedule, and will further refine the anticipated sequence and duration of all major construction activities, as well as related activities such as mobilization, agency reviews, and other RA-related activities.

- **Operation and Maintenance (O&M) Plan:** The O&M Plan will provide the procedures necessary to operate the EISB system, and completion of the performance monitoring related to the RA. The O&M Plan is anticipated to include a system description, routine O&M procedures, emergency response action plan, performance monitoring requirements, record keeping, and other aspects typically within an O&M Plan for an EISB remedy.
- **Construction Quality Assurance Plan (CQAP):** The CQAP will establish project procedures, general responsibilities of project management and field personnel, and ensure that the RA activities will be executed in accordance with the RD. Per the UAO, the CQAP will detail the approach to quality assurance during construction activities and specify the quality assurance official (QA Official), independent of the Supervising Contractor, to conduct a quality assurance program during the construction phase of the project.
- **Remedial Action Field Sampling Plan:** A FSP for performance monitoring during execution of the RA will be prepared. This FSP will provide the means and methods to measure the performance of the EISB remedy towards meeting the performance standards.
- **Remedial Action Quality Assurance Project Plan:** The QAPP will be revised and/or updated to include the QA/QC procedures, routines, and specifications for the performance monitoring to be conducted during the completion of the RA activities. The QAPP will be prepared following USEPA *Guidance for Quality Assurance Project Plans* (USEPA, 2002e), and USEPA *Requirements for Quality Assurance Project Plans* (USEPA, 2001). The QAPP will address sampling procedures, personnel qualifications and data reduction, validation, and reporting. The QA/QC procedures and SOPs for laboratories used during the RA will also be included in the QAPP including their qualifications as necessary.
- **Remedial Action Health and Safety Plan:** The HASP prepared for RD activities will be updated to include the health and safety requirements for the RA activities. Specific tasks and requirements will be developed as part of the RD activities, but will likely include groundwater sampling, EISB injection safety procedures and other safety concerns related to completion of the RA. The updated HASP will be prepared per OSHA 29 CFR 1910.120 requirements.
- **Remedial Action Contingency Plan:** As discussed during the 11 October 2012 meeting, a RA Contingency Plan is not required. Given liquids will be handled

and injected into the subsurface a Spill Prevention, Control and Countermeasure (SPCC) Plan is anticipated to still be necessary.

- **Spill Prevention, Control and Countermeasure (SPCC) Plan:** The SPCC Plan will focus on spill prevention, preparedness, and response in the event of a discharge during the RA. The SPCC Plan is designed to protect public health, public welfare, and the environment from potential harmful effects of a discharge to nearby water sources. The SPCC Plan will be prepared per USEPA Clean Water Act regulation (40 CFR 112), and PADEP Clean Stream Law for Preparedness, Prevention and Contingency (PPC) regulation (25 PA Code 91.34).
- **Institutional Control Plan (ICP):** The ICP will describe measures to be taken to plan, implement, maintain, and enforce activities associated with the institutional control selected as part of the RD. Per the UAO the ICP will describe pathways for potential human exposure to waste material that may remain during and/or after completion of construction of the RA, describe areas where human activities should be restricted, including legal descriptions for such areas as set forth in Sections VIII and XVI of the UAO. The ICP will identify the structures, devices, and other components of the RD/RA that should not be interfered with or disturbed by future site activities.
- **Permitting Requirements Plan:** In accordance with 40 CFR 121(e) of CERCLA and Section 300.400(e) of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), federal, state, or local permits are not required for any remedial actions conducted entirely on site. However, compliance with the substantive requirements of ARARs is required. Therefore, permit equivalencies will be sought, as needed, for the RA to ensure concurrence on proposed activities from applicable regulatory agencies. Per Table 4 in the Interim ROD, the permit equivalencies anticipated for the RA are as follows (USEPA, 2011):
    - Erosion and Sediment Control (25 PA Code Sections 102.4(b), 102.11, 102.22),
    - Pennsylvania Storm Water Management Act (32 PA Code Section 680.13),
    - Fugitive Emissions (25 PA Code Sections 123.1-2), and
    - Underground Injection Control (UIC) Program (40 CFR Sections 141.1(g), 144.11, 144.12(a), 144.82, 146.6, 146.7, 146.8, and 146.10(c)).

- **Remedial Action Waste Management Plan:** The WMP for RA activities will address waste generated during the completion of the RA activities and how they will be handled including: waste prevention, waste collection, material reuse, recycling, and hazardous waste disposal. The WMP will also include the RA decontamination plan for the EISB remedy.
- **Remedial Action and O&M Cost Estimate:** A RA and O&M opinion of probable construction costs (OPCC) estimate will be developed and included with the pre-final design deliverables. The cost estimate will be within 15% greater than, and 5% less than, the final cost of the RA and anticipated annual O&M, with contingencies identified separately. The cost estimate will be broken down into labor, materials, and equipment, with unit prices, overhead, profit, and other categories shown as separate items.

Per the UAO, the Revised Design Criteria Report, and Revised Basis of Design Report will only be prepared and included in the Pre-Final (90%) Design Submittal if USEPA determines them to be necessary.

4.3.4 Final (100%) Design Submittal

The final (100%) design submittal required by the UAO will incorporate USEPA and PADEP comments received on the pre-final (90%) design submittal, and the Pre-Final RD. If required, written responses will be prepared to USEPA/PADEP comments on the Pre-Final RD as to whether a design change is warranted as a result of each comment and how such a change will affect the remedy, RD/RA costs, and schedule.

5. REMEDIAL DESIGN IMPLEMENTATION TIMELINE

A RD implementation timeline is included in this RDWP as Figure 5. This timeline presents the sequence and anticipated durations of the RD tasks described in this RDWP. The timeline is built upon a logical sequencing of investigation and design activities, taking into account the required predecessor and successor for each task, and accounting for the process of review and comment by USEPA and PADEP provided for in the UAO. The RD implementation timeline assumes that the PDI field activities will begin following EPA approval of the preliminary (30%) design submittal. Similarly, the performance monitoring well network field activities will begin following the EPA approval of the intermediate (60%) design submittal. As noted in Section 4.3.2, the results of the PDI activities may not be available to be included within the intermediate (60%) design submittal due to schedule requirements within the UAO. The overburden investigation may require additional time than provided in the timeline shown in Figure 5. If initial laboratory analytical results indicate further delineation is required, an extension of the submittal of the Intermediate (60%) Design will be requested to USEPA. If extension of submittal of the Intermediate (60%) Design submittal is not granted by USEPA, then partial overburden groundwater delineation results will be provided in the Intermediate (60%) Design submittal with the remaining results submitted within the Pre-Final (90%) Design submittal. For purposes of this RDWP, the RD implementation timeline shown in Figure 5 assumes that the groundwater delineation activities and preliminary interim treatability study results will be reported within the intermediate (60%) design submittal, and the final treatability study results will be presented within the pre-final (90%) design submittal. As noted in Sections 4.3.2 and 4.3.3, these results will be reported within the Preliminary PDI Report and Final PDI Report, respectively.

The durations of various tasks shown on the timeline within Figure 5 are estimates based upon the current understanding of the work and on experiential knowledge from other CERCLA sites. The start dates and durations of field tasks are subject to changes resulting from field investigation activities, site conditions, third-party review cycles, and other circumstances beyond the ability of the RD contractor to identify prior to implementation. Revisions to the RD implementation timeline will be summarized within the monthly reports as necessary.

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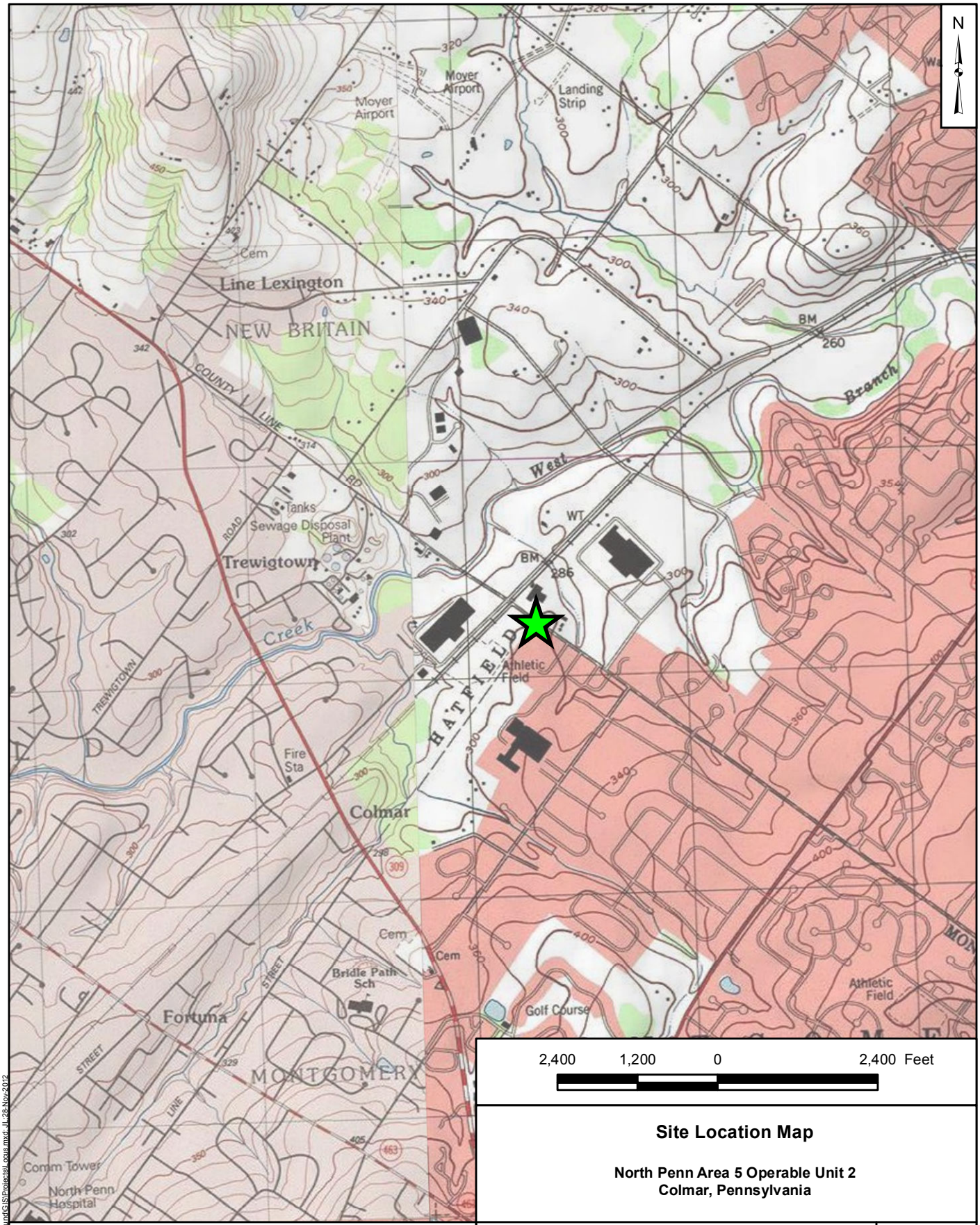
FIGURES



Site Location Map

North Penn Area 5 Operable Unit 2
Colmar, Pennsylvania

Notes

Base Map: USGS Doylestown(1999) and Telford (1997)
7.5 Minute Quadrangles.

Geosyntec consultants

Blue Bell, PA | 29 November 2012

Figure 1

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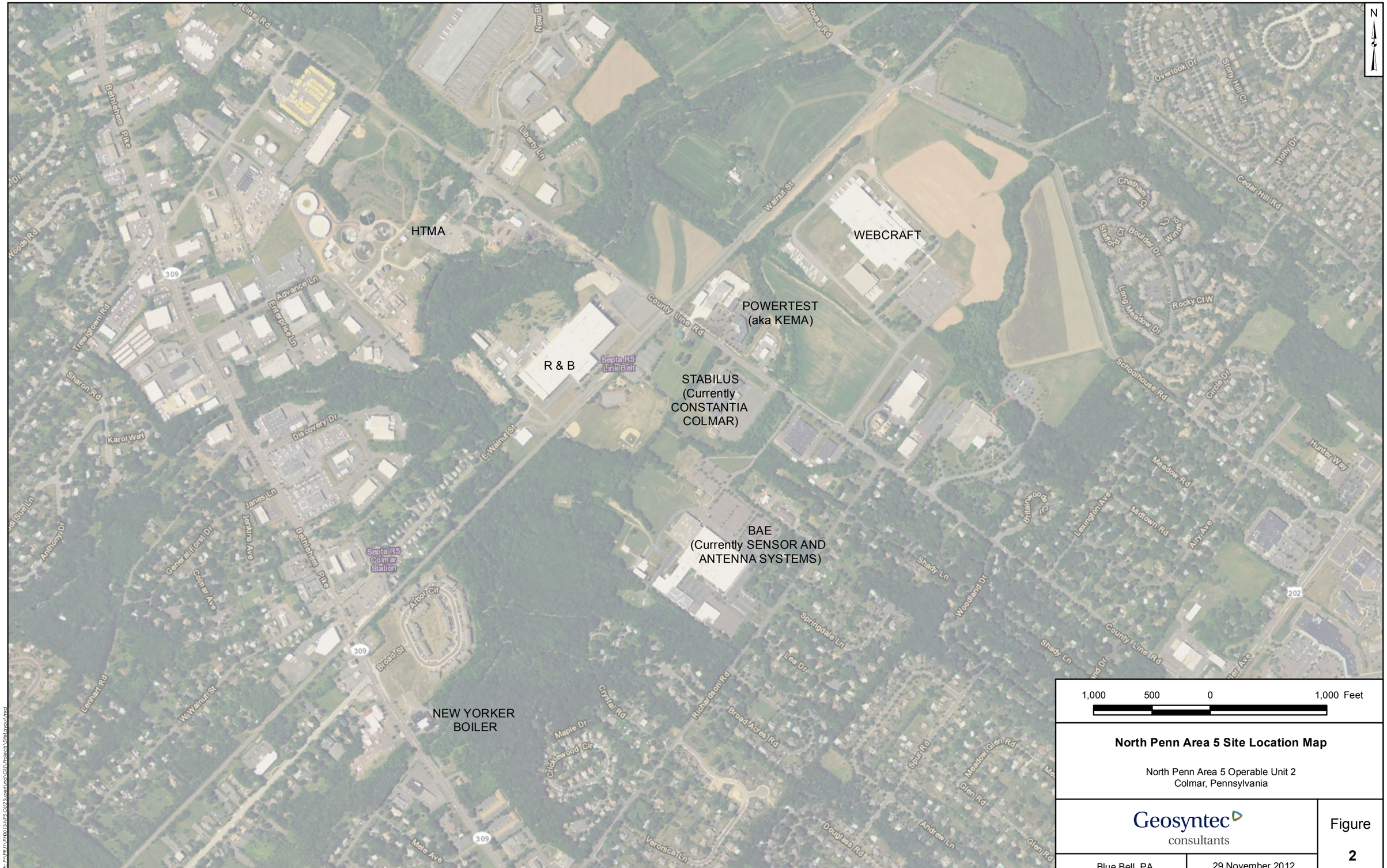

North Penn Area 5 Site Location Map

North Penn Area 5 Operable Unit 2
Colmar, Pennsylvania

Geosyntec consultants

Blue Bell, PA | 29 November 2012

Figure 2

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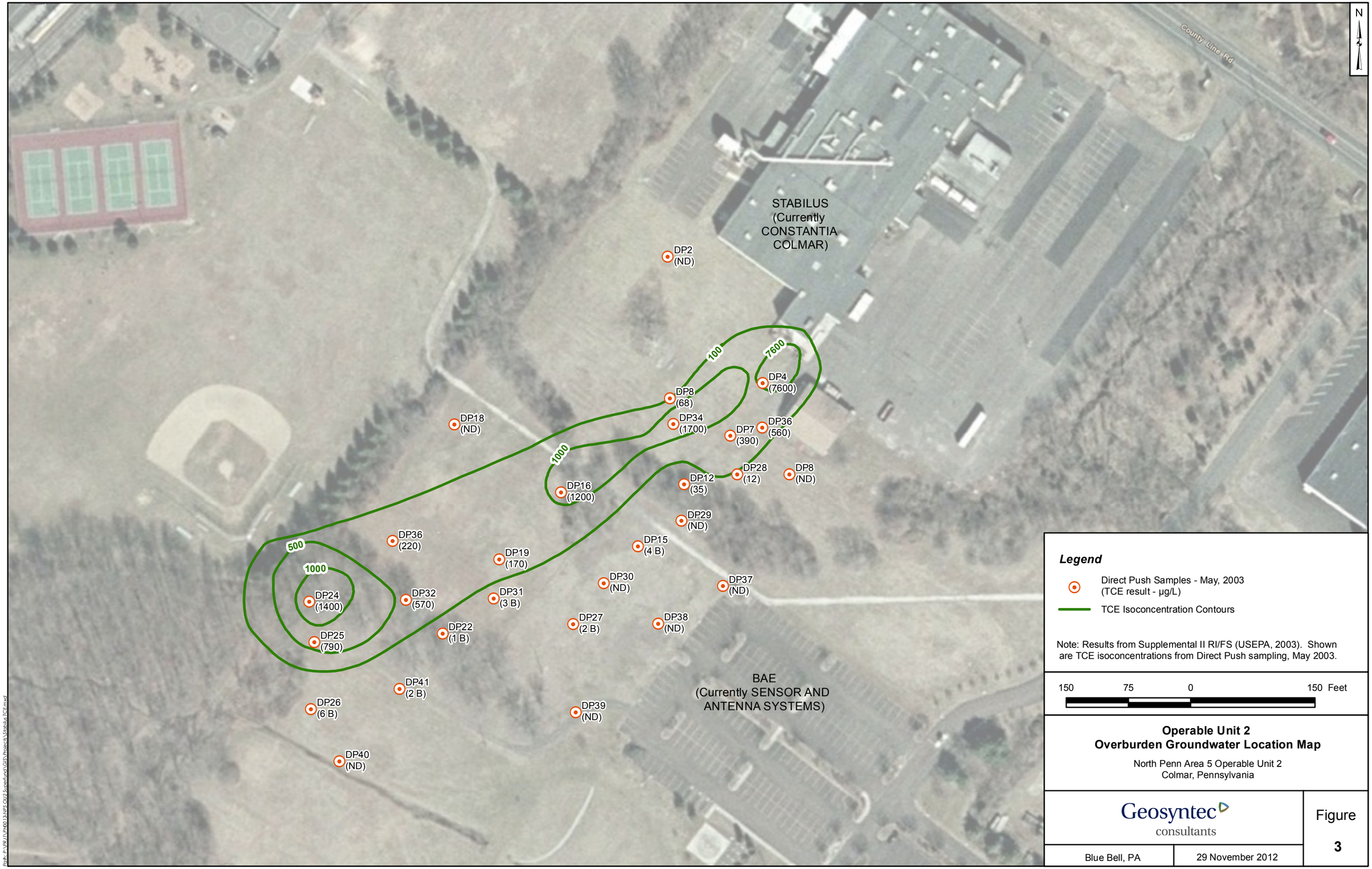
N
County Line Rd
STABILUS
(Currently
CONSTANTIA
COLMAR)
BAE
(Currently SENSOR AND
ANTENNA SYSTEMS)
100
7600
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DP2
(ND)
DP4
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DP8
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DP18
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DP36
(560)
DP28
(12)
DP8
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DP12
(35)
DP16
(1200)
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DP36
(220)
DP15
(4 B)
DP19
(170)
DP30
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DP37
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DP24
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DP32
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DP31
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DP27
(2 B)
DP38
(ND)
DP22
(1 B)
DP25
(790)
DP41
(2 B)
DP26
(6 B)
DP39
(ND)
DP40
(ND)
Legend
Direct Push Samples - May, 2003
(TCE result - µg/L)
TCE Isoconcentration Contours
Note: Results from Supplemental II RI/FS (USEPA, 2003). Shown
are TCE isoconcentrations from Direct Push sampling, May 2003.
150 75 0 150 Feet
Operable Unit 2
Overburden Groundwater Location Map
North Penn Area 5 Operable Unit 2
Colmar, Pennsylvania
Geosyntec
consultants
Blue Bell, PA
29 November 2012
Figure
3

FIGURE 4: Remedial Design Project Team Organization
North Penn Area 5 Operable Unit 2 (NP5OU2)
Unilateral Administrative Order (UAO)
Docket No. CERCLA-03-2012-0205DC

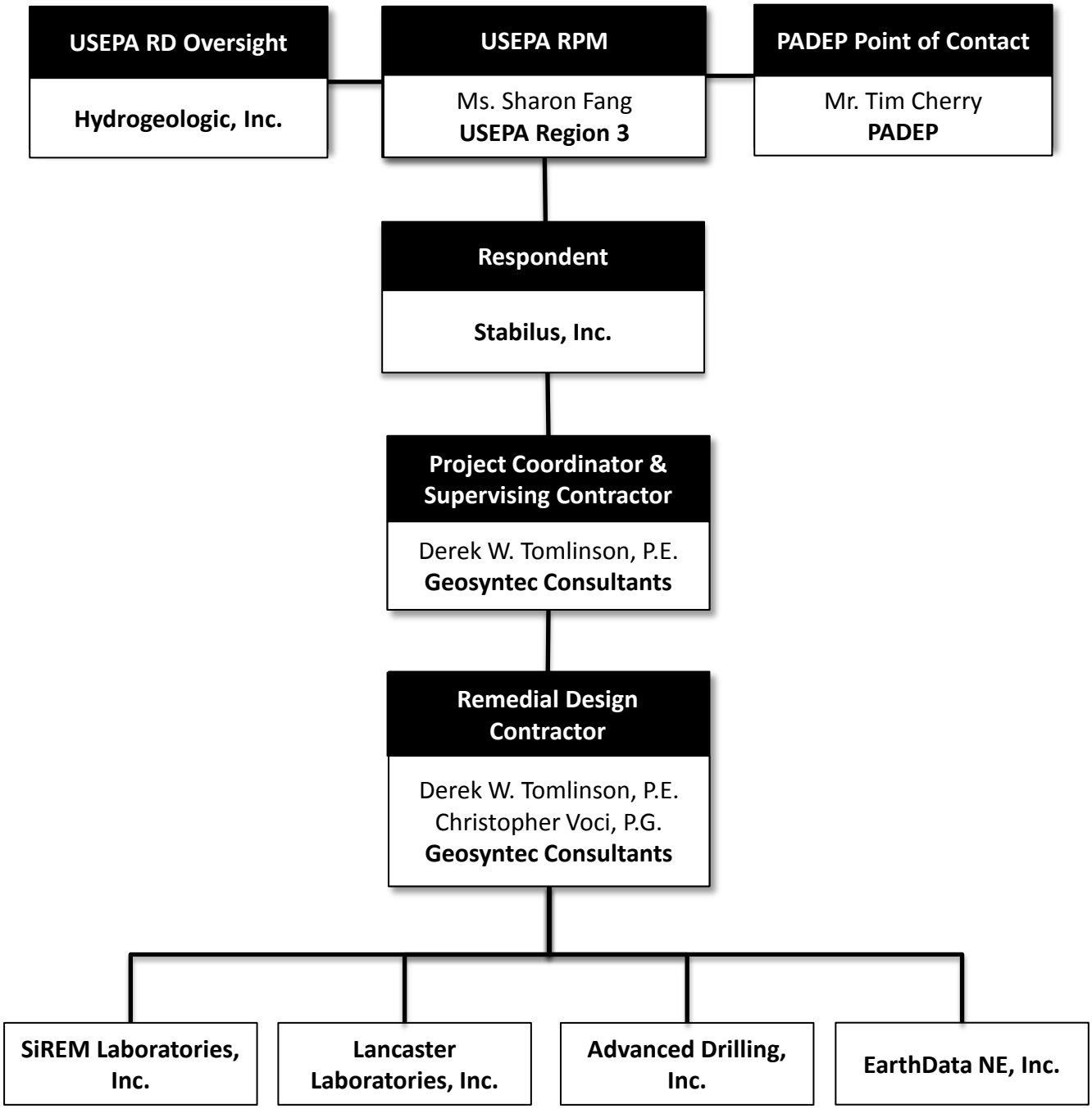
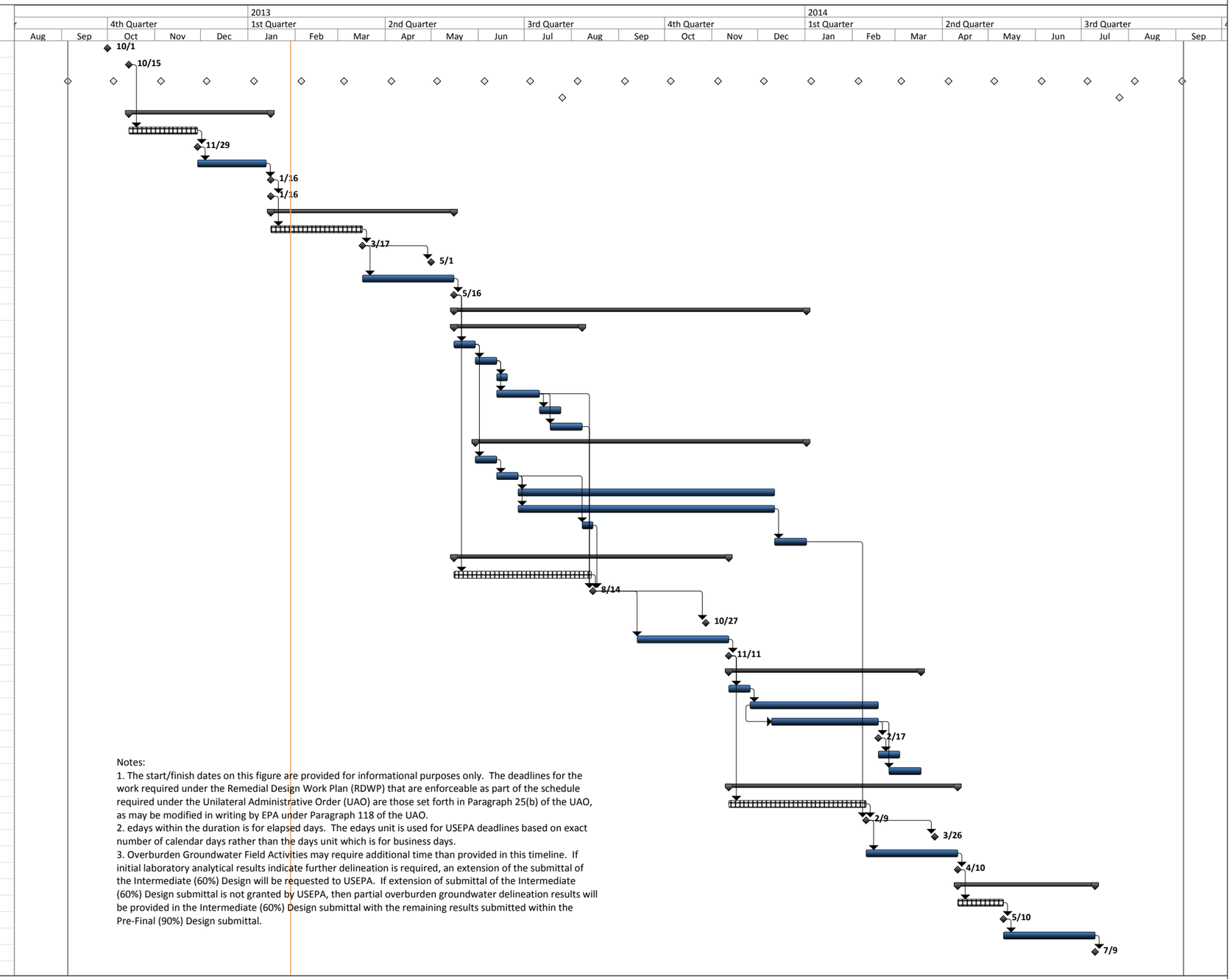


FIGURE 5: Remedial Design Implementation Timeline

North Penn Area 5 Superfund Site Operable Unit 2

ID	Task Name	Work Duration	Start	Finish	Predecessors
1	Supervising Contractor / Project Coordinator Approved	0 days	10/1/12	10/1/12	
2	Remedial Design Contractor Approved	0 days	10/15/12	10/15/12	
3	**Monthly Progress Reports**	**522 days**	**9/5/12**	**9/5/14**	
29	**Annual Status of Work Reports**	**261 days**	**7/26/13**	**7/26/14**	
32	**Remedial Design Work Plan (RDWP)**	**67 days**	**10/15/12**	**1/16/13**	
33	Prepare Draft RDWP	45 edays	10/15/12	11/29/12	2
34	Submit Draft RDWP	0 days	11/29/12	11/29/12	33
35	EPA Review	45 edays	11/29/12	1/13/13	34
36	Technical Meeting	0 days	1/16/13	1/16/13	35
37	EPA RDWP Approval	0 days	1/16/13	1/16/13	36
38	**Preliminary (30%) Design Submittal**	**86 days**	**1/16/13**	**5/16/13**	
39	Prepare Draft Report	60 edays	1/16/13	3/17/13	37
40	Submit Draft Report	0 days	3/17/13	3/17/13	39
41	Technical Meeting	45 edays	3/17/13	5/1/13	40
42	EPA Review	60 edays	3/17/13	5/16/13	40
43	EPA Preliminary Design Approval	0 days	5/16/13	5/16/13	42
44	**Pre-Design Investigation (PDI) activities**	**165 days**	**5/16/13**	**1/1/14**	
45	**Overburden Groundwater Field Activities**	**60 days**	**5/16/13**	**8/7/13**	
46	Coordination / Access / Mobilization	10 days	5/16/13	5/29/13	43
47	Delineation field activities	10 days	5/30/13	6/12/13	46
48	Surveying locations	5 days	6/13/13	6/19/13	47
49	Laboratory analytical results	20 days	6/13/13	7/10/13	47
50	Data validation	10 days	7/11/13	7/24/13	49
51	Data interpretation / reporting	15 days	7/18/13	8/7/13	49FS+5 days
52	**Treatability Study Activities**	**155 days**	**5/30/13**	**1/1/14**	
53	Groundwater and Soil collection / shipping	10 days	5/30/13	6/12/13	46
54	Treatability study microcosm construction	10 days	6/13/13	6/26/13	53
55	Treatability study microcosm incubation	6 mons	6/27/13	12/11/13	54
56	Treatability study sampling and analysis	6 mons	6/27/13	12/11/13	54
57	Treatability study interim results reporting (~30 days)	5 days	8/8/13	8/14/13	54FS+30 days
58	Treatability study final results reporting (~150 days)	15 days	12/12/13	1/1/14	56
59	**Intermediate (60%) Design Submittal**	**128 days**	**5/16/13**	**11/11/13**	
60	Prepare Draft Report	90 edays	5/16/13	8/14/13	43
61	Submit Draft Report (include overburden groundwater results & treatability study interim results)	0 days	8/14/13	8/14/13	49,51,57,60
62	Technical Meeting	45 edays	9/12/13	10/27/13	61
63	EPA Review	60 edays	9/12/13	11/11/13	61
64	EPA Intermediate Design Approval	0 days	11/11/13	11/11/13	63
65	**Performance well installation activities (Tentative)**	**90 days**	**11/12/13**	**3/17/14**	
66	Coordination / Access / Mobilization	10 days	11/12/13	11/25/13	64
67	Well installation activities	60 days	11/26/13	2/17/14	66
68	Packer testing / geophysical testing	50 days	12/10/13	2/17/14	67SS+10 days
69	Well construction technical meeting	0 days	2/17/14	2/17/14	68
70	Well construction / completion	10 days	2/18/14	3/3/14	69
71	Performance well installation summary report	15 days	2/25/14	3/17/14	68FS+5 days
72	**Pre-Final (90%) Design Submittal**	**108 days**	**11/11/13**	**4/10/14**	
73	Prepare Draft Report	90 edays	11/11/13	2/9/14	64
74	Submit Draft Report (include treatability study final results)	0 days	2/9/14	2/9/14	58,73
75	Technical Meeting	45 edays	2/9/14	3/26/14	74
76	EPA Review	60 edays	2/9/14	4/10/14	74
77	EPA Comments	0 days	4/10/14	4/10/14	76
78	**Final (100%) Design Submittal**	**64 days**	**4/10/14**	**7/9/14**	
79	Prepare Final Report (address EPA Comments)	30 edays	4/10/14	5/10/14	77
80	Submit Final Report	0 days	5/10/14	5/10/14	79
81	EPA Review	60 edays	5/10/14	7/9/14	80
82	EPA Final Design Approval	0 days	7/9/14	7/9/14	81



Notes:
1. The start/finish dates on this figure are provided for informational purposes only. The deadlines for the work required under the Remedial Design Work Plan (RDWP) that are enforceable as part of the schedule required under the Unilateral Administrative Order (UAO) are those set forth in Paragraph 25(b) of the UAO, as may be modified in writing by EPA under Paragraph 118 of the UAO.
2. edays within the duration is for elapsed days. The edays unit is used for USEPA deadlines based on exact number of calendar days rather than the days unit which is for business days.
3. Overburden Groundwater Field Activities may require additional time than provided in this timeline. If initial laboratory analytical results indicate further delineation is required, an extension of the submittal of the Intermediate (60%) Design will be requested to USEPA. If extension of submittal of the Intermediate (60%) Design submittal is not granted by USEPA, then partial overburden groundwater delineation results will be provided in the Intermediate (60%) Design submittal with the remaining results submitted within the Pre-Final (90%) Design submittal.

Project: 2012_1130_NP5OU2_Ge
Date: 1/29/13

Task		Summary		External Milestone		Inactive Summary		Manual Summary Rollup		Finish-only	
Split		Project Summary		Inactive Task		Manual Task		Manual Summary		Deadline	
Milestone		External Tasks		Inactive Milestone		Duration-only		Start-only		Progress	