
13 May 2013

Ms. Liza Finley
U.S. Army Corps of Engineers - Baltimore District
Engineering Division-HTRW Branch
10 South Howard Street
10th Floor – CENAB-EN-HT
Baltimore, Maryland 21201

**Subject: Technical Memorandum for Performing Well Abandonment,
Abandonment of Underground Piping, and Debris Removal
Marsh Run Park FUDS Project No. C03PA040301
New Cumberland, Fairview Township, York County, Pennsylvania
Contract No. W912DR-09-D-0018
Delivery Order No. 0003**

Dear Ms. Finley,

EA Engineering, Science, and Technology, Inc. (EA) prepared this Technical Memorandum to present the approach for abandonment of monitoring wells, soil-vapor extraction (SVE) wells, groundwater extraction wells, and associated underground piping at the Marsh Run Park Formerly Used Defense Site (FUDS) located in New Cumberland, Fairview Township, York County, Pennsylvania. This Memorandum also describes debris at the site that will be disposed during this field effort. The abandonment of the wells and underground piping and debris removal will be performed to allow for the restoration and return of the site to the property owner, Fairview Township. The field located on the FUDS will be restored to its former use as a recreational facility, Marsh Run Park, and, in particular, to soccer fields. The site will have an environmental covenant to restrict groundwater use and limit the disturbance of site soils.

Wells were installed at the site during various stages of investigation and monitoring by the U.S. Army Corps of Engineers (USACE). In 1987, Woodward-Clyde Consultants installed MW-1A, MW-2A, and MW-3A as part of the Confirmation Study. EA installed wells MW-1, MW-2, MW-4, MW 4A, MW-5, MW-5A, MW-6, MW-6A, MW-7, MW-7A, WP-1, WP-2, and WP-3 during the Remedial Investigation in 1989. EA also installed EW-1 and EW-2 in 1990, and EW-3 in 1993. As part of remedial activities at the site, Plexus Scientific Corporation installed well pairs MW-8/8A and MW-9/9A in 2003, and MW-10, MW-11, MW-12, MW-13, and MW-14 in 2005. EA installed monitoring well MW-15 in 2010.

EA anticipates initiating well and piping abandonment in June 2013 using the methodology outlined below. Abandonment/decommissioning of the wells and piping will be scheduled in consultation with USACE once approval and concurrence on the approach is received from USACE. Well abandonment will be performed in accordance with the *Pennsylvania Department of Environmental Protection (PADEP) Ground Water Monitoring Guidance Manual, Chapter 7*, which complies with the Pennsylvania Department of Conservation and Natural Resources

(DCNR) Pennsylvania (PA) Act 610, the Water Well Drillers License Act, and *USACE Engineering Manual 1110-1-4000, Monitoring Well Design, Installation, and Documentation and Hazardous, Toxic, and Radioactive Waste Sites*. In accordance with the Water Well Drillers License Act, EA notified DCNR, Bureau of Topographic and Geologic Survey (BTGS) on 8 October 2012, of the intent to decommission the wells at least 10 days before the wells are sealed or filled.

1. Scope of Well and Piping Abandonment and Debris Removal Efforts

The abandonment and debris removal effort is detailed in the Scope of Work (SOW) dated 28 June 2010 for Modification No. 2 to Delivery Order (D.O.) No. 0003, Contract No. W912DR-09-D-0018. In the referenced SOW, 23 monitoring wells, 58 SVE wells, 3 groundwater extraction wells, and associated underground piping are identified for abandonment. During site reconnaissance, additional wells requiring abandonment were discovered; specifically two observation well points (WP-1 and WP-2) and a well near each of MW-1 (UN-1) and Extraction Well (EW)-2 (UN-2). Each of these wells will also be abandoned. With the exception of MW-9, all wells will be abandoned during the mobilization. The proposed dates for the abandonment of these wells will be between 3 and 14 June, 2013. Figure 1 (depicting well locations), Table 1 (summarizing well construction details), and Table 2 (presenting details on SVE wells) are included in Attachment A.

Monitoring and extraction well abandonment will include removal of aboveground appurtenances, including casings, to at least 1 ft below ground surface (bgs). Protective bollards also will be removed. The SVE wells have protective boxes with a ½-in. water line and 1½-in. vapor line exiting the box at approximately 1½ft below the box lid (Attachment A, Figure 2). The boxes also house a pressure gauge. The appurtenances within the boxes and the boxes themselves will be removed and disposed. EW-2 and EW-3 each have an associated adjacent manhole which will be removed as part of future site restoration work.

Two underground soil vapor lines and one water line from the SVE well system, as well as the outfall line from the treatment building, will be abandoned in place. The approximate trenching locations for accessing these lines for abandonment are presented in Attachment A, Figure 3. Procedures are described below.

In addition, debris located along the southern perimeter fence line (in the vicinity of MW-3A) will be removed during this field effort. The debris consists of PVC pipes, manhole frames and covers, several unused bollards, miscellaneous building materials and a partial roll of ethylene propylene diene monomer (EPDM) (synthetic cap material). The partial roll of EPDM will be placed on top of the existing EPDM synthetic cap prior to departure from the site.

2. Underground Piping Abandonment Procedures

Selected portions of underground piping associated with the existing soil-vapor extraction system will be abandoned in place to eliminate a potential migration pathway. The Plexus Scientific As-Built Yard Piping drawing includes a depiction of the pipelines that will be abandoned (Attachment A, Figure 3). Specific pipelines to be abandoned are the 6-in. “V-1” and “V-2” lines, the 2-inch “L” line present in the Extraction Piping Trench, and the terminus of the Marsh Run Creek effluent discharge pipeline. (This pipeline is depicted, but not labeled, in Figure 3, the Plexus Scientific As-Built Yard Piping drawing.) The lines are expected to be approximately 30 in. below ground surface. Three trenches to approximately 3 ft below ground surface are proposed to access the lines (Attachment A, Figure 3). If the depth of the excavation must exceed 4 feet below ground surface to access the pipes, then the work will cease to allow additional required trench excavation safety procedures to be implemented.

Prior to excavation, utility clearance will be conducted via the PA One Call System. Electrical service is currently supplied to the SVE building. Although no live electrical lines currently service the blower shed (located in the vicinity of one of the proposed excavations), the main breaker for the SVE building will be turned off prior to performing any excavation in order to de-energize the lines. A tag indicating that the lines have been de-energized to allow excavation will be placed on the breaker circuit box and the building door, which will be locked during excavation. An excavation approximately 2 ft wide by 5 ft long by 3 ft deep will be installed to expose the piping. The pipes will be severed and inert material, such as paper, will be placed approximately 8 -10 in. into the line as a backing support. Bentonite chips will then be placed within the pipe and hydrated, to form a bentonite plug inside the pipe between the inert backing and the cut end of the pipe. A cement grout mixture consisting of Portland cement, bentonite powder, and water will be prepared using a ratio of one 94 lb bag of cement and 6 lbs of bentonite, per 6 gallons of water. Cement grout will be placed in and around the cut end of the pipe. Following confirmation of the set-up of the grout (approximately 2 hours), the excavated soil will be gently placed back into the trench to minimize disturbance of the grout, and will be left slightly mounded to allow for settlement. It is estimated that the abandonment of the above-described piping will be completed in one day. Field and photo-documentation will be collected during piping abandonment activities.

3. Well Abandonment Procedures

PADEP guidance stipulates that, provided that the monitoring wells are functioning as designed, it is permissible to abandon the wells in place, unless “the well design precludes complete and effective placement of sealant and wells are in locations subject to future disturbance that could compromise the abandonment. In such instances all tubing, screens, casings, aggregate, backfilling, and sealant should be cleared from the boring and the hole should be completely filled with an appropriate sealant.” Wells located onsite have been functioning as designed, have no impediments that would affect sealant, and will not be disturbed in the future. Future disturbances will be precluded by an environmental covenant being placed on the property that will prohibit excavation. The offsite wells also have been functioning as designed, have no impediments that would affect sealant, and are located on the Defense Depot, Susquehanna Post (DDSP) or are adjacent to the Susquehanna River on property that is unlikely to be developed. Therefore, wells will be abandoned in place using the procedural guidance detailed below.

- Bladder pumps, if present, will be removed, bagged, labeled with the well from which they were removed, and stockpiled inside of the onsite building for reuse or disposal by USACE. One functioning bladder pump will be reserved for placement into MW-9.
- With the exception of the SVE well boxes, protective casings, riser pipes, tubing, and other appurtenances at the surface which cannot be removed will be cut off (to approximately 1 ft below grade). The pressure gauges at each SVE well will be removed and disposed. Appurtenances and depth of casing removed will be recorded.
- Total well depth and water level will be recorded, and total well volume to be grouted will be calculated and recorded. In the event grouting is anticipated to displace groundwater in the well, groundwater will be collected and managed appropriately by pumping into a temporary holding container as the well is being grouted, and will be disposed through carbon filtration to the surface.
- Portland cement, in a ratio of one 94-lb bag and 6 lb of bentonite powder (6 percent) per 6 gallons of water, will be used as cement grout.
- Grout material will be combined in an aboveground container and mechanically blended to produce a lump-free mixture. The mixed grout will be recirculated through the grout pump prior to placement.
- It is anticipated that prior to and as part of SVE protective box removal, the lines entering the box will be severed. No abandonment in-place or grouting of the ½ inch diameter water line or the 1 ½ inch diameter vapor lines is required.
- The cement grout mixture will be placed into the well from the bottom using a grout pump and Tremie pipe to grade, and allowed to settle for 24 hours. After 24 hours, the grout will be checked for settlement. Any settlement depression will be filled with grout and rechecked 24 hours later. This process will be repeated until firm grout remains.
- Dates, descriptions, and total quantities of bentonite chip, water, and cement grout (including the quantities of cement, water, and bentonite powder used will be recorded.
- The area of the abandoned wells will be photographed before and after abandonment efforts.

Wells located on DDSP property (i.e., MW-5, 5A, 6, 6A, and 7) will require coordination with the facility to gain access. A form for coordinating access to DDSP is included in Attachment B. This form will be submitted to Mr. Brian Hurlbut (717-770-7092) or Mr. Tom Haskell (717-770-7280) of DDSP a minimum of 72 hours in advance of the scheduled work.

Refuse from well abandonment and debris from inside and along the southern perimeter fence will be disposed at a Subtitle D landfill (see also Item 6 below).

4. Well Abandonment Subcontractor

The proposed PA-licensed well driller to be subcontracted for well abandonment services is Eichelbergers, Inc. EA will perform oversight of the PA-licensed drilling contractor during field activities and will ensure that onsite personnel follow established work and health and safety procedures. The Eichelbergers, Inc. onsite representative will report directly to the EA Site Manager. It is estimated that the abandonment of the wells; with the exception of MW-9, will be completed within 10 working days, plus a 1-day mobilization for removal of wastes.

After well abandonment, EA's subcontracted, PA-licensed well driller will provide completed BTGS standard Well Abandonment Forms to BTGS online using the WebDriller program, and will forward the completed and signed forms to EA. Attachment C presents an example of the BTGS Well Abandonment Form.

5. Submittal of Pennsylvania Well Abandonment Forms

After receipt of the signed Well Abandonment Forms from Eichelbergers, Inc., EA will submit a package of information to the PA DCNR BTGS. This package of materials will be prepared in accordance with the *PADEP Ground Water Monitoring Guidance Manual* and Act 610 and will include the Well Abandonment Forms, available construction details for the abandoned wells, photographs of before and after conditions, and a brief table of well abandonment details.

6. Debris Removal and Disposal

The debris located inside and adjacent to the southern perimeter fence line includes concrete-filled bollards, piping, building materials, manhole covers, and well casing (PVC). A representative from Fairview Township was contacted to determine whether the Township will take possession of the material (e.g., manhole covers, concrete pipe sections). The Township declined; therefore these materials will be recycled and/or disposed. Attempts will be made to recycle the manhole covers, although many recycling centers do not accept manhole covers. Therefore, as needed, a letter stating their origin will be submitted to the recycling facility to gain concurrence from the facility that they will be accepted. If the facility will not accept the covers, they will be disposed with the other debris in a roll-off container that will be delivered and picked up by a waste disposal firm. Due to the weight limit on the Marsh Run Bridge, transport of the roll-off container through DDSP will be arranged. The form for arranging transport through DDSP is included as Attachment B.

7. Safety Considerations

The *Site-Specific Addendum to the General Health & Safety Plan (GHASP) For Hazardous Waste & Environmental Service for Sampling at Marsh Run Park (Formerly New Cumberland Army Depot) New Cumberland, Pennsylvania*, dated May 2011, will be utilized as the health and safety plan during this field effort. Additional activity hazard analyses for well abandonment and excavation are included in Attachment D, Tables 3 and 4.

8. Submittal of Letter Report

At the completion of the well and piping abandonment and debris removal, EA will submit copies of the well abandonment forms to BTGS. Fairview Township and USACE will both be provided a copy of what is submitted to BTGS.

We appreciate the opportunity to continue to support USACE on this project. Should you have any questions or comments, please do not hesitate to contact us.

Respectfully yours,

EA ENGINEERING, SCIENCE,
AND TECHNOLOGY, INC.



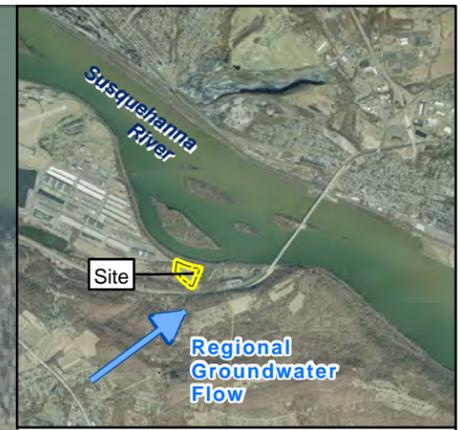
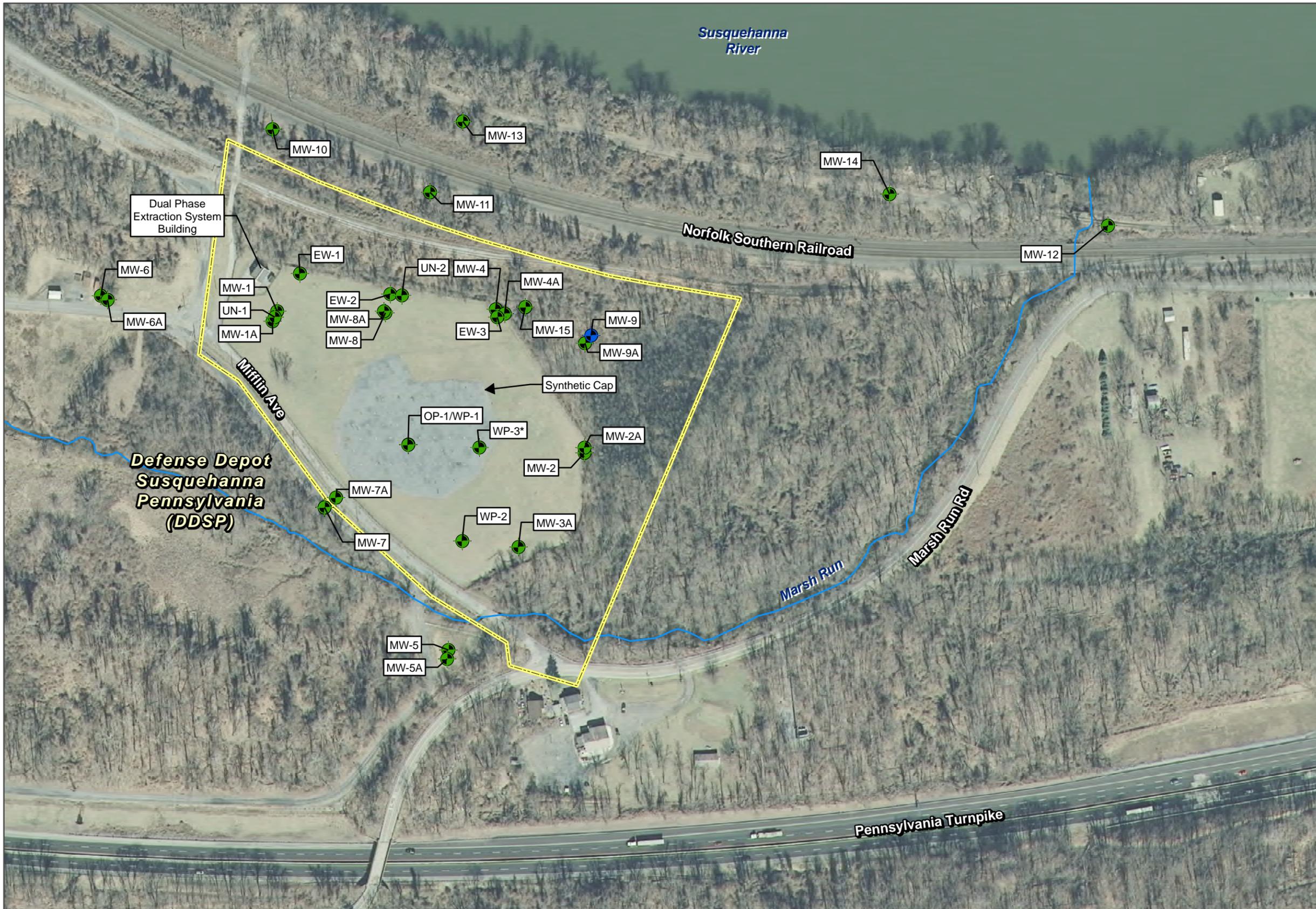
Michael Dorman, PMP
Project Manager

Attachments:

- A: Information on Wells to Be Abandoned and Underground Line Abandonment Locations
- B: Form DL 1818 (for access to DDSP)
- C: Example BTGS Well Abandonment Form
- D: Activity Hazard Analyses

ATTACHMENT A

**INFORMATION ON WELLS TO BE ABANDONED
AND UNDERGROUND LINE ABANDONMENT LOCATIONS**



Legend

- Monitoring Well/ Injection Well/ Well Point
- Extraction Well/ Well Point To Be Abandoned
- Monitoring Well To Remain
- ▭ Formerly Used Defense Site (FUDS) Boundary
- ~ Stream

MW = Monitoring Well
 EW = Extraction Well
 WP/OP = Observation Well Point
 UN = Additional Observation or Injection Well - observed during site reconnaissance (details unknown)

Note:
 * Well was not located during site reconnaissance.

Aerial Photograph Source:
 PAMAP Program, PA Department of Conservation and Natural Resources, Bureau of Topographic and Geologic Survey, 2008



Marsh Run Park FUDS
 Fairview Township, New Cumberland, Pennsylvania
 FUDS Project No. C03PA040301

Project Number:
 6233003

Date:
 May 2013

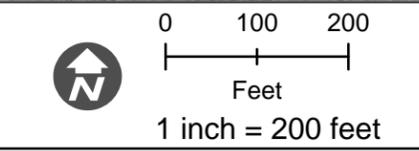


Figure 1
 Wells To Be Abandoned

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TABLE 1: ABANDONMENT OF WELLS AT MARSH RUN PARK
SUMMARY OF WELL CONSTRUCTION INFORMATION

Well ID	Aquifer	Location	Construction Type	Approximate Total Well Depth (ft)	Screen Position (ft bgs)	Approximate Outer Casing Depth (ft)	PVC Casing Diameter	Borehole Diameter (in.)
MW-1	Bedrock	Onsite	PVC Screen	50	40-50	18.5	2	6
MW-1A	Overburden	Onsite	PVC Screen	15	5-15	NA	2	8
MW-2	Bedrock	Onsite	PVC Screen	50	40-50	20	2	6
MW-2A	Overburden	Onsite	PVC Screen	13	3-13	NA	2	8
MW-3A	Overburden	Onsite	PVC Screen	15	10-15	NA	2	8
MW-4	Bedrock	Onsite	PVC Screen	50	40-50	30	2	6
MW-4A	Overburden	Onsite	PVC Screen	15	5-15	NA	2	8
MW-5	Bedrock	Offsite	PVC Screen	50	40-50	25	2	6
MW-5A	Overburden	Offsite	PVC Screen	15	5-15	NA	2	8
MW-6	Bedrock	Offsite	PVC Screen	50	40-50	20	2	6
MW-6A	Overburden	Offsite	PVC Screen	15	5-15	NA	2	8
MW-7	Bedrock	Offsite	PVC Screen	50	40-50	20	2	6
MW-7A	Overburden	Offsite	PVC Screen	15	5-15	NA	2	8
MW-8	Bedrock	Onsite	Open Borehole	55	NA	23	NA	8
MW-8A	Overburden	Onsite	PVC Screen	14	4-14	4	2	8
MW-9*	Bedrock	Onsite	Open Borehole	60	NA	23	NA	6
MW-9A	Overburden	Onsite	PVC Screen	12	4-12	4	2	8
MW-10	Bedrock	Offsite	Open Borehole	35	NA	26	NA	6
MW-11	Bedrock	Offsite	Open Borehole	38	NA	28	NA	6
MW-12	Bedrock	Offsite	Open Borehole	60	NA	26	NA	6
MW-13	Bedrock	Offsite	Open Borehole	41	NA	30	NA	6
MW-14	Bedrock	Offsite	Open Borehole	41	NA	28	NA	6
MW-15	Bedrock	Onsite	PVC Screen	205	156-166	18	2	6
EW-1	Bedrock	Onsite	PVC Screen	100	50-100	25.5	4	8
EW-2	Bedrock	Onsite	PVC Screen	100	50-100	23.5	4	8
EW-3	Bedrock	Onsite	PVC Screen	100	50-100		4	10
OP-1/WP-1	Overburden	Onsite	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown
WP-2	Overburden	Onsite	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown
WP-3 ¹	Overburden	Onsite	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown
UN-1	Unknown	Onsite	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown
UN-2	Unknown	Onsite	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown

All wells presented above are targeted for abandonment, with the exception of the well with "*".

* = Wells targeted for abandonment during subsequent mobilization

NA = Not Applicable

ft = feet

bgs = below ground surface

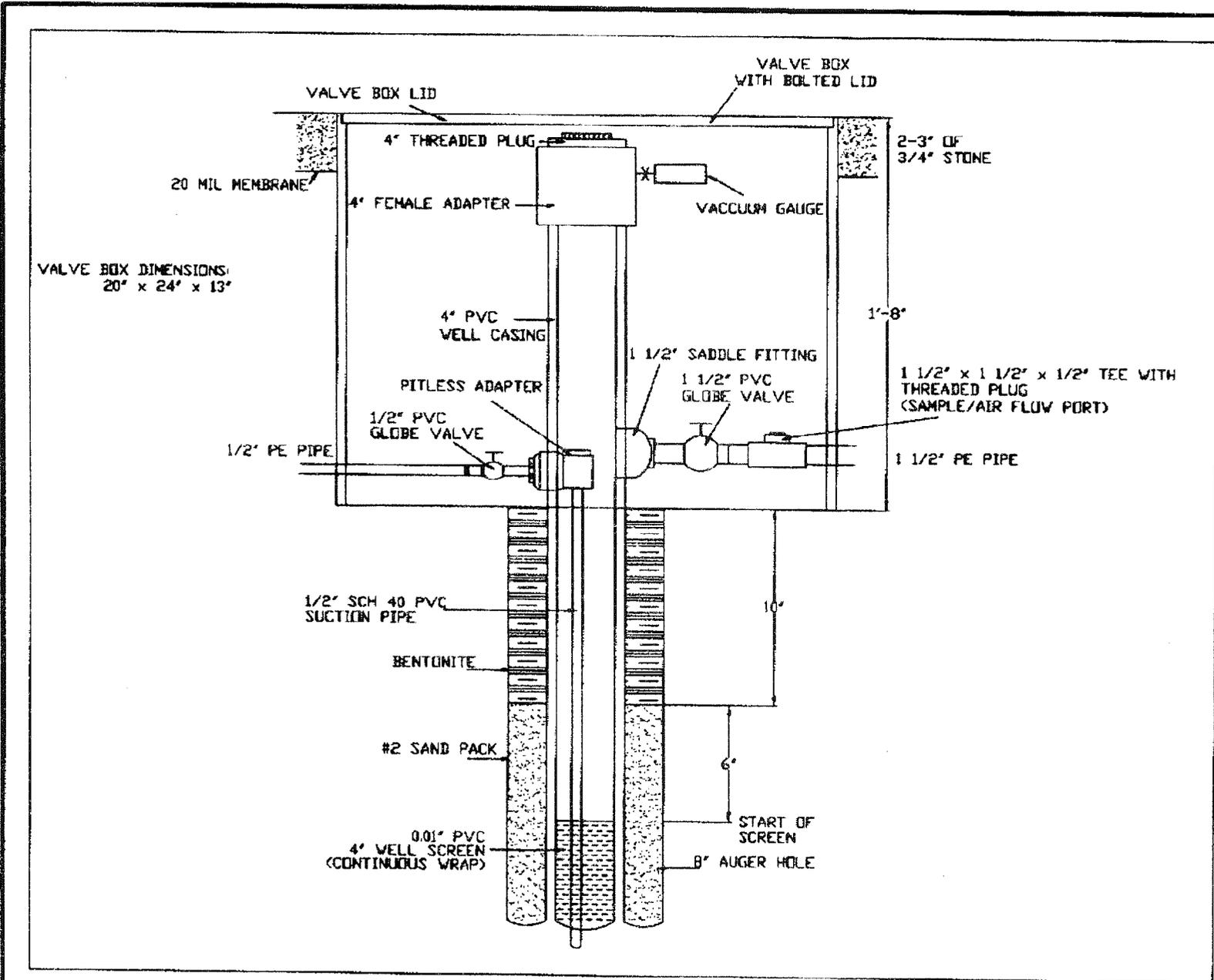
in. = inches

¹ Well was not located during site reconnaissance

Table 2
MARSH RUN DPSVE WELL SPECS
EXHIBIT 1

Permanent Well ID	Drilling Well #	Length of Screen	Well Depth	Vacuum Test Results			Connect to Vapor line
				Measured " H2O	Converted "Hg	Measured CFM	
A-1	58	4	7.5	14	0.9	22	V-1
B-1	56	5	8	80	5.4	7	V-2
B-2	57	5	8	18	1.2	24	V-1
C-1	1	10	13	30	2.0	35	V-1
C-2	2	7.5	11	60	4.1	39	V-2
C-3	3	6	9.5	40	2.7	28	V-2
C-4	4	4.5	7.5	40	2.7	28	V-2
C-5	5	5.5	8.5	59	4.0	29	V-2
C-6	6	6	9	60	4.1	9	V-2
C-7	7	7	10	48	3.3	28	V-2
D-1	16	6.5	9.5	50	3.4	28	V-2
D-2	15	7.5	10.5	12	0.8	22	V-1
D-3	14	7	10	22	1.5	28	V-1
D-4	13	8	11	70	4.7	26	V-2
D-5	12	7.5	12.5	70	4.7	28	V-2
D-6	11	7	10	56	3.8	30	V-2
D-7	10	6.5	10	70	4.7	28	V-2
D-8	9	7	10	14	0.9	39	V-1
D-9	8	7.5	10.5	16	1.1	29	V-1
E-1	17	6	9.5	66	4.5	28	V-2
E-2	18	7	10.5	18	1.2	22	V-1
E-3	19	7	10.5	17	1.2	30	V-1
E-4	20	7	10.5	70	4.7	26	V-2
E-5	21	7	10	39	2.6	28	V-2
E-6	22	7	10	56	3.8	31	V-2
E-7	23	7.5	11	58	3.9	12	V-2
E-8	24	7	10.5	37	2.5	44	V-2
E-9	25	7	10.5	60	4.1	15	V-2
F-1	26	7.5	12.5	15	1.0	28	V-1
F-2	27	8	11	17	1.2	25	V-1
F-3	28	7	10.5	16	1.1	28	V-1
F-4	29	7	10	20	1.4	48	V-1
F-5	30	7	10	16	1.1	29	V-1
F-6	31	7	10.5	20	1.4	22	V-1
F-7	32	7	10	10	0.7	35	V-1
F-8	33	7	10	22	1.5	31	V-1
F-9	34	7	10	20	1.4	38	V-1
G-1	43	7.5	11	44	3.0	25	V-2
G-2	42	7	10.5	43	2.9	24	V-2
G-3	41	8	11.5	16	1.1	30	V-1
G-4	40	7.5	10.5	80	5.4	7	V-2
G-5	39	8	11	45	3.0	21	V-2
G-6	38	7.5	11	27	1.8	25	V-1
G-7	37	7.5	11	70	4.7	9	V-2
G-8	36	7.5	11	38	2.6	31	V-2
G-9	35	7.5	10.5	62	4.2	9	V-2
H-1	44	7	10.5	16	1.1	30	V-1
H-2	45	10	13.5	18	1.2	34	V-1
H-3	46	10	13.5	39	2.6	28	V-2
H-4	47	7.5	11	70	4.7	25	V-2
H-5	48	7.5	11	70	4.7	20	V-2
H-6	49	7	10.5	21	1.4	21	V-1
H-7	50	7	10.5	70	4.7	12	V-2
H-8	51	7	10	22	1.5	22	V-1
I-1	55	7	10.5	18	1.2	31	V-1
I-2	54	7	10.5	20	1.4	22	V-1
I-3	53	7	10.5	20	1.4	26	V-1
I-4	52	7	10.5	66	4.5	21	V-2

Screen revised 5/21



VALVE BOX DIMENSIONS:
20' x 24' x 13'

Figure 2: Well Head Schematic

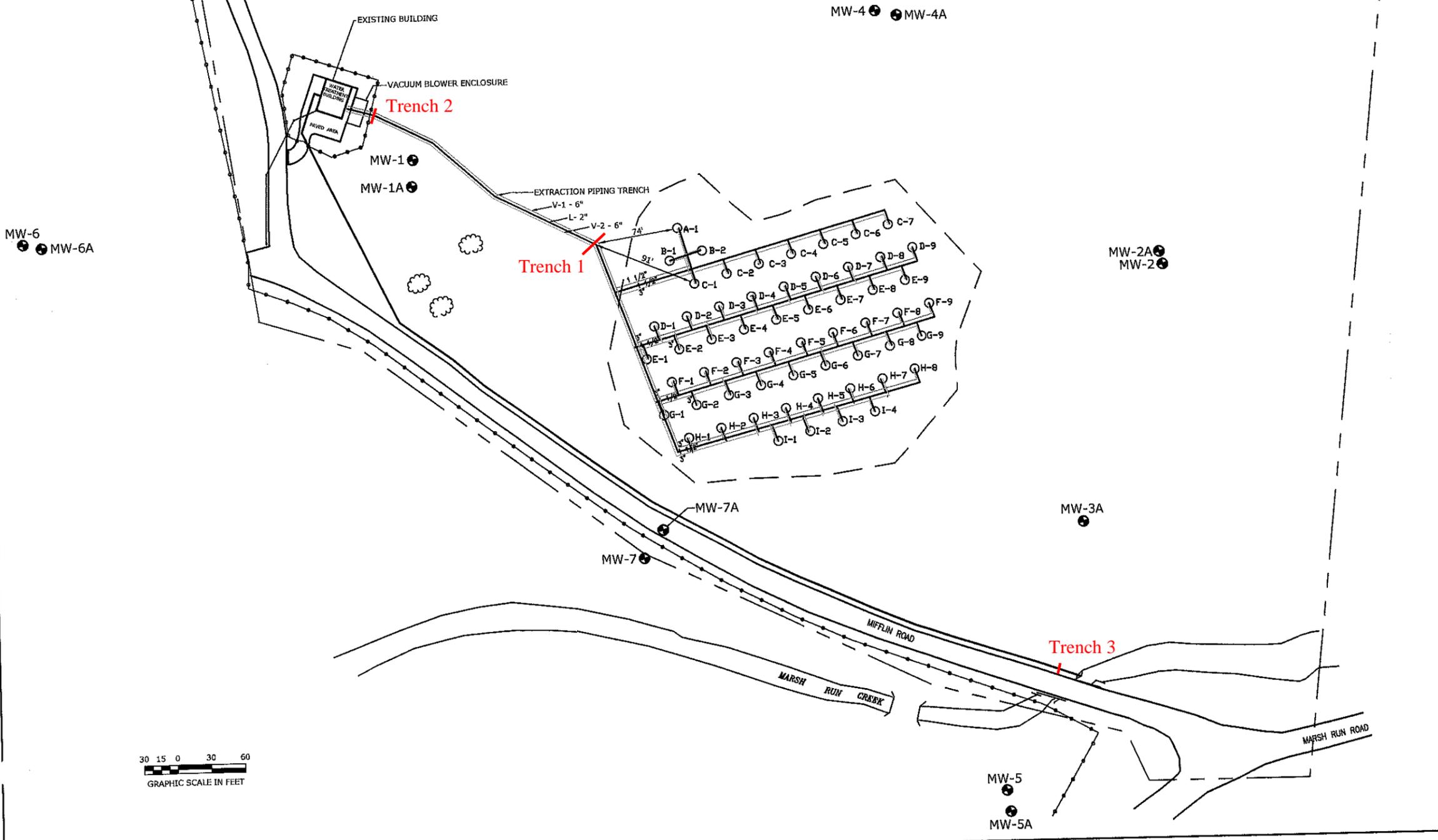
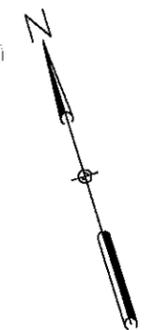
FIGURE 4-3
 DUAL PHASE SOIL
 VAPOR EXTRACTION
 WELL HEAD DESIGN
 MARSH RUN PARK
 DUAL PHASE SOIL
 VAPOR EXTRACTION
 SYSTEM

NEW CUMBERLAND PENNSYLVANIA

U.S. NAVY ENGINEER DISTRICT, BALTIMORE
 CORPS OF ENGINEERS
 MILTRON, MARYLAND



PROJECT NO: 02M-009 FILE NO: WELLDAG.DWG



- LEGEND**
- DPSVE WELLS
 - V-1 2" Hg VACUUM LINE
 - V-2 5" Hg VACUUM LINE
 - L LIQUID EXTRACTION LINE - 27" Hg
 - MONITORING WELL
 - ══ RAILROAD

Trench = proposed excavation for underground line abandonment

MW-6 ● MW-6A

MW-4 ● MW-4A

MW-2A ● MW-2 ●

MW-7A ● MW-7 ●

MW-3A ●

MW-5 ● MW-5A ●

30 15 0 30 60
GRAPHIC SCALE IN FEET

Figure 3:
AS BUILT
YARD PIPING

MARSH RUN PARK
DUAL PHASE SOIL
VAPOR EXTRACTION
SYSTEM

NEW CUMBERLAND PENNSYLVANIA

U.S. ARMY ENGINEER DISTRICT, BALTIMORE
CORPS OF ENGINEERS
BALTIMORE, MARYLAND



PROJECT NO. 0034-009 FILE NO. WELL_PLAN.DWG

ATTACHMENT B

**FORM DL1818
(for access to DDSP)**

ATTACHMENT C

EXAMPLE BTGS WELL ABANDONMENT FORM

WELL ABANDONMENT FORM

CONTRACTOR/AGENT: _____ REGISTRATION NO. _____

DATE: _____ TYPE OF SITE OR PROGRAM: _____

1. WELL LOCATION: (Show sketch of location on back of this form.)

Municipality _____ County _____

Quadrangle _____
(Road, community, subdivision, lot no.)

Latitude _____ Longitude _____

2. OWNER AND ADDRESS: _____

3. TOPOGRAPHY: (Circle) hilltop, slope, stream terrace, valley, stream channel, draw, local depression, flat

4. USE OF WELL: _____

WELL DIAGRAM:
sketch a diagram showing depths of well casing (if present), grouting materials, perforations, etc.

5. DEPTH OF WELL: _____ DIAMETER OF WELL: _____

6. AMOUNT OF CASING REMOVED: _____ DIAMETER: _____

7. SEALING MATERIAL:	_____	neat	sand
	bags	cement	cement
	(94 lb):	_____	_____
	gal of water:	_____	_____
	yd of sand:	_____	_____

OTHER MATERIAL: _____ amount: _____

8. EXPLAIN METHOD OF EMPLACEMENT OF MATERIAL:

9. CERTIFICATION: We hereby certify that this well abandonment record is true and exact, and was accomplished on _____ day of the month of _____, _____, with our active participation and that we are qualified to participate in such abandonment actions.

1. Signature of Participant: _____ 2. Signature of Participant: _____
Date: _____ Address: _____ Date: _____ Address: _____

ATTACHMENT D
ACTIVITY HAZARD ANALYSES

**Table 3: ACTIVITY HAZARD ANALYSIS
WELL ABANDONMENT**

Activity/Work Task:	Well Abandonment	Overall Risk Assessment Code (RAC) (use highest code from all subtasks):	M				
Project Location:	Marsh Run Park, Fairview Township, New Cumberland, PA	Risk Assessment Code (RAC) Matrix					
Project Number:	6233003	Severity	Probability				
Date Prepared:	25 January 2012		1 Frequent	2 Likely	3 Occasional	4 Seldom	5 Unlikely
Prepared By:	K. Hoiem, CIH	1 Catastrophic	E	E	H	H	M
		2 Critical	E	H	H	M	L
		3 Marginal	H	M	M	L	L
Reviewed By:	P. Garger, CIH,CSP	4 Negligible	M	L	L	L	L
Competent Person:	TBD						

Step 1: Review each "hazard" and determine RAC.

Probability = the likelihood to cause an incident, near miss, or accident. Identified as frequent, likely, occasional, seldom, or unlikely.

Severity = the outcome/degree if an incident, near miss, or accident did occur. Identified as catastrophic, critical, marginal, or negligible.

Step 2: Identify the RAC as E, H, M, or L for each hazard on AHA. Select the highest RAC and note at the top of the form.

RAC Chart

E = Extremely High Risk

H = High Risk

M = Moderate Risk

L = Low Risk

TASK BREAKDOWN, HAZARDS AND CONTROLS: WELL ABANDONMENT

Work Task Steps	Hazards	Controls	RAC
			Severity/ Probability /RAC
Utility Clearance	None	None	NA
Well Abandonment	Physical Hazard: Slips, Trips, Falls	Keep work area free of excess material and debris.	3/3/M
		Remove all trip hazards by keeping materials/objects organized and out of walkways.	
		Be aware of uneven surfaces while walking around sampling locations.	
		Wear appropriate PPE including non-slip rubber boots if working on wet or slick surfaces.	
		Stay aware of footing and do not run.	
	Physical Hazard: Injury from heavy equipment (grout truck and support vehicles).	Be aware of the location of equipment, where high visibility safety colors, establish eye contact with operator.	2/4/M
		Be aware of pinch points, swinging chains, etc..	
Where appropriate PPE (hard hat) when working in proximity to rig.			

Table 3: ACTIVITY HAZARD ANALYSIS
WELL ABANDONMENT

Work Task Steps	Hazards	Controls	RAC
			Severity/ Probability /RAC
		Inspect all hand tools prior to use, if faulty or inappropriate, do not proceed until repaired or replaced.	
Well Abandonment	Physical Hazard: Moving Equipment	Clear area of obstructions and communicate with all workers involved that work activity is beginning.	3/4/L
		Stay clear of rotating equipment (grout mixer).	
		Use long-handled shovel to clear away cuttings when auger has stopped.	
		Secure loose clothing.	
		Do not walk under suspended loads.	
		When possible, remove overhead hazards promptly.	
	Physical Hazard: Faulty or Inappropriate Equipment	Qualified operator must inspect heavy equipment (grout truck) prior to use; if faulty or inappropriate, do not proceed until repaired or replaced.	2/4/M
		Inspect all hand tools prior to use; if faulty or inappropriate, do not proceed until repaired or replaced.	
	Physical Hazard: Hearing loss.	Wear appropriate PPE (plugs) when working in proximity to loud equipment.	3/4/L
	Physical Hazard: Material Handling, Moving, Lifting	Observe proper lifting techniques.	3/4/L
		Use two or more persons for heavy bulk lifting.	
		Use mechanical lifting equipment (hand carts, trucks, etc.) to move large awkward loads.	
		Obey sensible lifting limits (60 lb maximum per person manual lifting).	
	Physical Hazard: Heat/Cold Stress	Take breaks as needed.	3/4/L
Be aware of weather conditions and dress appropriately.			
Consume adequate food/beverages.			
If possible, adjust work schedule to avoid heat/cold stresses.			
Physical Hazard: Fire/Explosion	Ensure type ABC, fully charged fire extinguisher on-site.	1/5/M	
	Perform utility clearance (Pennsylvania One Call) to avoid possible gas lines. Interview property owner for location of possible private gas/utility lines.		
	Stop work if hazardous conditions are identified.		
Physical Hazard: Electrical	Inspect work areas for spark sources, maintain safe distances, properly illuminate work areas, and provide barriers to prevent inadvertent contact.	1/5/M	

**Table 3: ACTIVITY HAZARD ANALYSIS
WELL ABANDONMENT**

Work Task Steps	Hazards	Controls	RAC
			Severity/ Probability /RAC
		Maintain minimum clearance distances for overhead energized electrical lines. Use a spotter to confirm clearance of overhead lines and other obstructions.	
Well Abandonment (cont'd.)	Physical Hazard: Electrical (cont'd.)	Confirm that electricity to site has been de-activated.	1/5/M
		Perform utility clearance (Pennsylvania One Call) to avoid possible buried electrical lines. Interview property owners on location of possible private utilities.	
	Physical Hazard: Weather	Monitor radio for up-to-date severe weather forecasts.	2/4/M
		Discontinue work during thunderstorms and severe weather events. Rally point will be site building or site vehicles.	
	Chemical Hazards	Perform environmental monitoring as required in APP. Wear appropriate PPE (including nitrile gloves) as indicated in APP.	2/4/M
		Wear proper PPE (including nitrile gloves) and a face shield or goggles when contact with groundwater is to occur (if appropriate).	
	Biological Hazards: Insects, Snakes, Wildlife, Vegetation	Inspect work areas when arriving at a sampling site to identify hazard(s).	3/3/M
		Use insect repellent as necessary.	
		Stay alert and safe distance away from biological hazards.	
		Wear appropriate PPE including work gloves, long sleeves and pants, and snake chaps if probability of encountering snakes, ticks, poison ivy or oak. Workers with allergies should carry antidote kits, if necessary.	
Ambient Air Monitoring	Chemical/Physical Hazard: Elevated Organic Vapors and/or Combustible Gases	Approach and stay upwind of potential sources of vapors.	3/3/M
		Ensure personnel have been trained on instrument use and site specific action levels/upgrades.	
		Calibrate instrument prior to use.	
Equipment Decontamination	Chemical Hazard: Decontamination Material Handling and Contaminated Media Residue Exposure	Only those personnel with HAZWOPER training will be allowed to perform equipment decontamination.	3/4/L
		Material safety data sheets will be maintained on site for decontamination materials/fluids (e.g., detergents, isopropyl alcohol, etc.).	
		Proper PPE will be required, including nitrile gloves and safety glasses. If vigorous scrubbing is required (creating a splash hazard) a face shield and/or disposable coverall may be required at the discretion of the SSHO.	

Table 3: ACTIVITY HAZARD ANALYSIS
WELL ABANDONMENT

REQUIRED EQUIPMENT, INSPECTION AND TRAINING:

Equipment	Inspection Requirements	Training Requirements (including Competent Person and Qualified Personnel, if applicable)
<ul style="list-style-type: none"> • Support vehicle • Monitoring equipment • PPE • Grout equipment • Support vehicle • Power tools/hand tools • Emergency equipment including first aid kit, eye wash, fire extinguishers • Decontamination equipment 	<ul style="list-style-type: none"> • Inspect PPE prior to each use • Inspect vehicle daily • Calibrate environmental monitoring equipment daily prior to use. • Use appropriate PPE • Underground hazards require clearance • Inspect emergency equipment/supplies daily (first aid kit, eye wash, fire extinguisher) 	<ul style="list-style-type: none"> • Use and limitations of PPE • Valid driver's license • Use of monitoring equipment • Any large equipment operator will be trained in equipment use and maintenance • Lifting • APP and AHA review • First aid/CPR—at least 2 people on site • Hazardous waste sites require 40 hour HAZWOPER training, annual updates for any intrusive activities. • SSHO will require HAZWOPER Training and 30-hour OSHA Construction Safety Course.

**Table 4: ACTIVITY HAZARD ANALYSIS
EXCAVATION**

Activity/Work Task:	Excavation	Overall Risk Assessment Code (RAC) (use highest code from all subtasks):	M				
Project Location:	Marsh Run Park, Fairview Township, New Cumberland, PA	Risk Assessment Code (RAC) Matrix					
Project Number:	6233003	Severity	Probability				
Date Prepared:	25 January 2012		1 Frequent	2 Likely	3 Occasional	4 Seldom	5 Unlikely
Prepared By:	K. Hoiem, CIH	1 Catastrophic	E	E	H	H	M
		2 Critical	E	H	H	M	L
		3 Marginal	H	M	M	L	L
Reviewed By:	P. Garger, CIH, CSP	4 Negligible	M	L	L	L	L
Competent Person:	TBD						

Step 1: Review each "hazard" and determine RAC.

Probability = the likelihood to cause an incident, near miss, or accident. Identified as frequent, likely, occasional, seldom, or unlikely.

Severity = the outcome/degree if an incident, near miss, or accident did occur. Identified as catastrophic, critical, marginal, or negligible.

Step 2: Identify the RAC as E, H, M, or L for each hazard on AHA. Select the highest RAC and note at the top of the form.

RAC Chart

E = Extremely High Risk

H = High Risk

M = Moderate Risk

L = Low Risk

TASK BREAKDOWN, HAZARDS AND CONTROLS: LINE EXCAVATION

Work Task Steps	Hazards	Controls	RAC
			Severity/ Probability /RAC
Utility Clearance and General Hazards	Physical Hazard: Slips, Trips, Falls	Keep work area free of excess material and debris.	3/3/M
		Remove all trip hazards by keeping materials/objects organized and out of walkways.	
		Be aware of uneven surfaces while walking around excavation locations.	
		Wear appropriate PPE including non-slip rubber boots if working on wet or slick surfaces.	
		Stay aware of footing and do not run.	
	Biological Hazards: Insects, Snakes, Wildlife, Vegetation	Inspect work areas when arriving at a sampling site to identify hazard(s).	3/3/M
		Use insect repellent as necessary.	
		Stay alert and safe distance away from biological hazards.	
		Wear appropriate PPE including work gloves, long sleeves and pants, and snake chaps if probability of encountering snakes, ticks, poison ivy or oak.	
	Physical Hazard: Weather	Workers with allergies should carry antidote kits, if necessary.	2/4/M
Monitor radio for up-to-date severe weather forecasts.			
		Discontinue work during thunderstorms and severe weather events. Rally point will be site building or site vehicles.	

**Table 4: ACTIVITY HAZARD ANALYSIS
EXCAVATION**

Work Task Steps	Hazards	Controls	RAC
			Severity/ Probability /RAC
Excavation	Physical Hazard: Slips, Trips, Falls	Keep work area free of excess material and debris.	3/3/M
		Remove all trip hazards by keeping materials/objects organized and out of walkways.	
		Be aware of uneven surfaces while walking around excavation locations.	
		Wear appropriate PPE including non-slip rubber boots if working on wet or slick surfaces.	
		Stay aware of footing and do not run.	
	Physical Hazard: Injury from heavy equipment (back hoe).	Be aware of the location of equipment, wear high visibility vest, establish eye contact with operator.	2/4/M
		Be aware of pinch points, swinging chains, buckets, equipment swing radius, etc.	
		Wear appropriate PPE (hard hat) when working in proximity to rig and overhead hazards.	
	Physical Hazard: Faulty or Inappropriate Equipment	Qualified operator must inspect heavy equipment (backhoe) prior to use, if faulty or inappropriate, do not proceed until repaired or replaced. (i.e., backup alarms)	2/4/M
Inspect all hand tools prior to use; if faulty or inappropriate, do not proceed until repaired or replaced.			
Excavation	Physical Hazard: Moving Equipment	Clear area of obstructions and communicate with all workers involved that excavation is beginning.	3/4/L
		Use long-handled shovel to clear away soil when equipment has stopped.	
		Secure loose clothing.	
		Do not walk under suspended loads.	
		When possible, remove overhead hazards promptly.	
		Wear appropriate PPE including hard hat and steel-toed boots.	
	Use spotters when moving in/out of nominal clearance areas.		
	Physical Hazard: Confined Entry	Excavations greater than 4 feet will not be entered	2/4/M
	Physical Hazard: Collapse	Do not enter excavation.	2/4/M
		If it is necessary to enter excavation that is more than 5 feet, proper sloping is to be utilized	
Physical Hazard: Vibrations (Potential Cause of Collapse)	Locate the vibratory equipment as far away from the excavation or trench as possible.	2/4/M	
	Divert traffic away from the excavation		

**Table 4: ACTIVITY HAZARD ANALYSIS
EXCAVATION**

Work Task Steps	Hazards	Controls	RAC
			Severity/ Probability /RAC
	Physical Hazard: Water (Potential Cause of Collapse)	Construct diversion ditches and/or dikes to prevent water from accumulating in an excavation or trench.	2/4/M
Excavation (cont'd.)	Physical Hazard: Water (Potential Cause of Collapse) (cont'd.)	Pumps should be used to keep rain and/or ground water from collecting at the bottom of an excavation or trench.	2/4/M
	Physical Hazard: Weight (Potential Cause of Collapse)	Locate all equipment as far away from the excavation or trench as possible.	2/4/M
		Spoils piles shall be stored at least two (2) feet or more from the edge of the excavation or trench.	
	Physical Hazard: Temperature (Potential Cause of Collapse)	Be aware in changes of soil cohesiveness due to temperature Thawing can cause seemingly stable soil to become less stable, potentially resulting in mudslides or cave-ins.	2/4/M
		The amount of time that an excavation or trench is open and exposed to natural weathering will adversely affect the cohesiveness of soil.	
	Physical Hazard: Material Handling, Moving, Lifting	Observe proper lifting techniques.	3/4/L
		Use two or more persons for heavy bulk lifting.	
		Use mechanical lifting equipment (hand carts, trucks, etc.) to move large awkward loads.	
	Physical Hazard: Heat/Cold Stress	Obey sensible lifting limits (60 lb maximum per person manual lifting).	3/4/L
		Take breaks as needed.	
Be aware of weather conditions and dress appropriately.			
Physical Hazard: Fire/Explosion	Consume adequate food/beverages.	1/5/M	
	If possible, adjust work schedule to avoid heat/cold stresses.		
	Ensure type ABC, fully charged fire extinguisher on-site.		
	Perform utility clearance (Pennsylvania One Call) to avoid possible gas lines. Interview property owner for location of possible private gas/utility lines.		
		Stop work if hazardous conditions are identified.	
		Maintain minimum clearance distances for overhead energized electrical lines. Use a spotter to confirm clearance of overhead lines and other obstructions.	

**Table 4: ACTIVITY HAZARD ANALYSIS
EXCAVATION**

Work Task Steps	Hazards	Controls	RAC
			Severity/ Probability /RAC
	Physical Hazard: Weather	Perform utility clearance (Pennsylvania One Call) to avoid possible buried electrical lines. Interview property owners on location of possible private utilities.	2/4/M
		Monitor radio for up-to-date severe weather forecasts.	
		Discontinue work during thunderstorms and severe weather events. Rally point will be site building or site vehicles.	
Excavation (cont'd.)	Chemical Hazards	Perform environmental monitoring as required in APP. Wear appropriate PPE (including nitrile gloves) as indicated in APP.	2/4/M
		Wear proper PPE (including nitrile gloves) and a face shield or goggles when sampling sludge or sediments (if appropriate).	
	Biological Hazards: Insects, Snakes, Wildlife, Vegetation	Inspect work areas when arriving at a sampling site to identify hazard(s).	3/3/M
		Use insect repellent as necessary.	
		Stay alert and safe distance away from biological hazards.	
		Wear appropriate PPE including work gloves, long sleeves and pants, and snake chaps if probability of encountering snakes, ticks, poison ivy or oak. Workers with allergies should carry antidote kits, if necessary.	
Ambient Air Monitoring	Chemical/Physical Hazard: Elevated Organic Vapors and/or Combustible Gases	Approach and stay upwind of potential sources of vapors.	3/3/M
		Ensure personnel using have been trained on instrument use and site specific action levels/upgrades.	
		Calibrate instrument prior to use. Monitor for oxygen deficiency and combustible gas prior to the start of each shift and prior to entry of excavation 4 feet or greater in depth.	
Equipment Decontamination	Chemical Hazard: Decontamination Material Handling and Contaminated Media Residue Exposure	Only those personnel with HAZWOPER training will be allowed to perform equipment decontamination.	3/4/L
		Material safety data sheets will be maintained on site for decontamination materials/fluids (e.g., detergents, isopropyl alcohol, etc.).	
		Proper PPE will be required, including nitrile gloves and safety glasses. If vigorous scrubbing is required (creating a splash hazard) a face shield and/or disposable coverall may be required at the discretion of the SSHO.	

Table 4: ACTIVITY HAZARD ANALYSIS
EXCAVATION

REQUIRED EQUIPMENT, INSPECTION AND TRAINING:

Equipment	Inspection Requirements	Training Requirements (including Competent Person and Qualified Personnel, if applicable)
<ul style="list-style-type: none"> • Support vehicle • Monitoring equipment • PPE • Heavy equipment (backhoe) • Hand tools • Emergency equipment including first aid kit, eye wash, fire extinguishers • Excavating heavy equipment • Decontamination equipment 	<ul style="list-style-type: none"> • Inspect PPE prior to each use • Inspect vehicle daily • Calibrate environmental monitoring equipment daily prior to use. • Use appropriate PPE • Underground hazards require clearance • Inspect emergency equipment/supplies daily (first aid kit, eye wash, fire extinguisher) 	<ul style="list-style-type: none"> • Use and limitations of PPE • Valid driver's license • Use of monitoring equipment • Heavy equipment operator will be trained in equipment use and maintenance • Lifting • APP and AHA review • First aid/CPR—at least 2 people on site • Hazardous waste sites require 40 hour HAZWOPER training, annual updates for any intrusive activities. • SSHO will require HAZWOPER 40-Hour Workers Training and 30-hour OSHA Construction Safety Course.