U. S. EPA Superfund Program

Proposed Plan for Interim Remedial Action

Foster Wheeler Energy Corporation/Church Road TCE Superfund Site
Mountain Top, PA

EPA ANNOUNCES PROPOSED PLAN **May 2018**

The United States Environmental Protection Agency (EPA) is issuing this Proposed Plan to present EPA's Preferred Interim Remedial Action for the Foster Wheeler Energy Corporation/Church Road TCE Superfund Site (the Site). EPA is the lead agency for the Site and the Pennsylvania Department of Environmental Protection (PADEP) is the support agency. The Preferred Interim Remedial Action is based on the findings of the June 2017 Remedial Investigation (RI) and the December 2017 Feasibility Study (FS). The aforementioned documents are contained in the Administrative Record file for the Site.

Dates to Remember

May 9, 2018 to
June 8, 2018
Public Comment Period on EPA's Proposed Plan

Public Meeting
May 23, 2018
7:00 pm
St. Jude's School
422 Mountain Blvd
Mountain Top, PA 18707.

The Site consists of three primary areas, the former Foster Wheeler Energy Corporation (FWEC) Facility, the Affected Area, and the Surrounding Industrial Properties (SIPs). This Proposed Plan presents EPA's Preferred Interim Remedial Action to address contaminated sediment, soil, and groundwater at the former FWEC Facility and Site-wide vapor intrusion. The Affected Area and SIPs will be addressed under subsequent actions.

The National Superfund Database Identification Number is PAD003031788.

This Proposed Plan is being issued as part of EPA's public participation requirements under Section 117 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended, 42 U.S.C. § 9617, commonly known as Superfund, and Section 430(f)(2) of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 C.F.R. § 300.430(f)(2). The purpose of this Proposed Plan is to solicit public comments on the proposed interim remedy for the former FWEC Facility and Site-wide vapor intrusion.

EPA and PADEP encourage the public to review and comment on this Proposed Plan. This Proposed Plan and additional Site information can be found in the Administrative Record at the locations listed below.
Interested parties may comment during the 30-day public comment period, which begins on

May 9, 2018 and closes on June 8, 2018. On May 23, 2018, EPA will hold a public meeting to discuss the remedial alternatives and proposed interim remedy. It will be held at St. Jude's School, 422 S Mountain Blvd., Mountain Top, PA 18707 at 7:00 pm.

EPA, in consultation with PADEP, will select an interim remedy for the Site after reviewing and considering all information submitted during the public comment period.

Comments should be submitted in writing or emailed to:

Will Geiger (3HS21)
Remedial Project Manager
Environmental Protection Agency Region III
1650 Arch Street
Philadelphia, PA 19103
(215) 814-3144
geiger.william@epa.gov

Or

Larry Johnson (3HS52)
Community Involvement Coordinator
Environmental Protection Agency Region III
1650 Arch Street
Philadelphia, PA 19103
(215) 814-3239
Johnson.larry-c@epa.gov

After the close of the public comment period and consideration of the public's comments, EPA will announce its selection of the interim remedy in a Record of Decision (ROD). The public's comments and EPA's responses to those comments will be presented in the Responsiveness Summary of the Interim Action ROD. EPA encourages the public to review the documents that make up the Administrative Record to gain a more comprehensive understanding of the Site and the Superfund activities that have been conducted at the Site.

The Administrative Record for the Site can be accessed at https://semspub.epa.gov/src/collection/03/AR65604, or at the following locations:

Marian Sutherland Kirby Library
35 Kirby Avenue
Mountaintop, PA 18707
(570) 474-9313

EPA Administrative Records Room
Administrative Coordinator
1650 Arch Street
Philadelphia, PA 19103
Phone: 215-814-3157
Hours: Monday- Friday 8:30 am to 4:30 pm
By appointment only

Based on the available information, the Preferred Interim Remedial Action Alternative proposed for public comment at this time is ***Alternative 5: Capping, Source Area Treatment, & Groundwater Extraction and Treatment System (GETS) Optimization.*** This Alternative includes the following components:

- Capping and soil vapor extraction (SVE) treatment of Source Area Soils;
- Continued groundwater extraction and treatment using the existing GETS;
- Optimization of the GETS;
- Sediment removal and restoration at the Former Wastewater Treatment Pond (FWWTP);
- Vapor Intrusion monitoring and mitigation;
- Groundwater monitoring; and
- Land and groundwater use restrictions

EPA has determined that the Preferred Interim Remedial Action will be the most effective in addressing contaminated sediment, soil, and groundwater at the former FWEC Facility, as well as Site-wide vapor intrusion.

The Proposed Plan includes the following sections:

I. **Site Background** – Provides facts about the Site which provide the context for the subsequent sections of the Proposed Plan;

II. **Site Characteristics** – Describes the nature and extent of contamination at the Site;

III. **Scope and Role of This Action** – Describes how the response action fits into the overall Site strategy;

IV. **Summary of Site Risks** – Summarizes the results of the baseline risk assessment, and the land use and groundwater use assumptions used in the analysis;

V. **Remedial Action Objectives** – Describes what the proposed Site cleanup is expected to accomplish;

VI. **Summary of Interim Remedial Action Alternatives** – Describes the options for attaining the identified remedial action objectives;

VII. **Evaluation of Alternatives** – Explains the rationale for selecting the Preferred Interim Remedial Action Alternative;

VIII. **EPA's Preferred Interim Remedial** Action **Alternative** – Describes the Preferred Interim Remedial Action Alternative and affirms that it is expected to fulfill statutory and regulatory requirements, and

IX. **Community Participation** – Provides information on how the public can provide input to the remedy selection process.

I. SITE BACKGROUND

Site Location and Description

The Site is located in Mountain Top, Wright Township, Luzerne County, Pennsylvania approximately 5 to 6 miles south of Wilkes-Barre, PA, and is depicted on **Figure 1**. The Site includes the following three areas, as shown on **Figure 2**:

- Former FWEC Facility, located in the northeastern portion of the Site at 348 Crestwood Drive, is approximately 105 acres;
- The Affected Area, which extends from east to west along Church Road and Watering Run, is approximately 295 acres in size, and is generally located south and southwest of the former FWEC Facility; and
- The Surrounding Industrial Properties (SIPs), located immediately south and west of the former FWEC Facility and consisting of eight separate properties.

Site History

Former FWEC Facility

FWEC operated the former FWEC Facility from 1953 until 1984, where it manufactured large pressure vessels utilized in oil refineries, electric utility plants, and the shipping industry. FWEC ceased operations at the property in 1984. From 1989-1997, Morrison-Knudsen (MK) and its successors manufactured and remanufactured locomotives, small power control units (PCUs), and flat cars for rail transportation of tractor-trailers. Westinghouse Air Brake Technologies (Wabtec) re-initiated operations at the former FWEC Facility, and the property has been used for warehousing of products (primarily fiberglass insulation products) by third parties under a lease agreement. The property is currently used for tractor-trailer parking.

Affected Area

The Affected Area consists of primarily residential development along Church Road, Sunset Gardens, Elbe Road, and South Mountain Boulevard, with limited commercial properties in the westernmost portion. Saint Jude's Church complex, which includes an elementary school, is located adjacent to the intersection of Church Road and Route 309.

Surrounding Industrial Properties

The former FWEC Facility is located within Crestwood Industrial Park. Crestwood Industrial Park is approximately 1,050 acres in size and is utilized by industries and manufacturers for mixed industrial use. Eight SIPs are located within approximately 0.25-mile of Watering Run. Some, but not all, of these commercial properties are located between the former FWEC Facility and the Affected Area. These facilities represent the most proximal industrial locations, besides the former FWEC Facility, that could potentially be contributing contaminants via single or multiple migration pathways to Watering Run and groundwater.

Regulatory History and Previous Investigations

The following is a summary of environmental investigations and environmental remediation activities at the Site. More detailed information can be found in the RI Report.

On February 11, 1980, an electrical transformer in the main bay of the Main Building at the former FWEC Facility leaked Pyranol, a coolant containing polychlorinated biphenyls (PCBs), onto the concrete floor of the former FWEC Facility. The estimated area affected by the spill was 30 feet by 70 feet and included an area along the interior railroad tracks. FWEC reported the spill to authorities, cleaned the area affected by the spill, and disposed of the waste at a permitted facility.

Prior to a potential sale of the property, a prospective purchaser conducted an environmental assessment (EA) of the former FWEC Facility. The EA included the review of plant operations; sampling and analysis for asbestos; drilling of eleven soil borings; chemical analysis of selected samples for trichloroethylene (TCE), polychlorinated biphenyls (PCBs), and oil; sampling of surface and subsurface soils in the former vapor degreaser area for TCE; sampling for PCBs in the former spill area; and sampling and analysis of the contents of the hydrotesting sump. The EA concluded that further investigation be undertaken at the former vapor degreaser, the PCBs spill site area, and the hydrotesting sump. Soil samples taken from the area close to the sealed vapor degreaser indicated concentrations of TCE ranging from 0.08 to 13.1 parts per million (ppm).

In August 1986, EPA conducted a preliminary assessment (PA) for the Site. On February 24, 1988, FWEC, EPA, and the Pennsylvania Department of Environmental Resources (PADER), now PADEP, entered into a Consent Agreement and Order, Docket Number III-88-08-DC (1988 Order). The 1988 Order required FWEC to begin the implementation of a Site Investigation Program. FWEC submitted its Site Investigation Plan to EPA and PADER in 1988, and by December 1989, FWEC had completed its Site Remediation Program Report.

Prior to purchasing the property in September 1989, MK performed investigation activities at the Site in August and September 1989. The investigation included a review of aerial photographs, a record search, a soil investigation in select areas of the former FWEC Facility, and installation and sampling of 13 groundwater monitoring wells.

Following MK's purchase of the property in September 1989, MK removed six former underground storage tanks (UST) from the Site. The following USTs were excavated and disposed of off-Site: two fuel oil USTs (1000- and 10,000-gallon) north and west of the X-Ray Building; three 30,000-gallon fuel oil USTs east-southeast of the Finish Paint Building; and one 500-gallon gasoline UST west of the southeastern corner of the Main Building.

In 1991, pursuant to the 1988 Order, FWEC implemented design and construction of an Interim Remedial Measure (IRM) consisting of a groundwater extraction and treatment system (GETS) to remove contaminants, specifically TCE, from groundwater through air-stripping, and to control and stabilize the contamination downgradient of source areas and near the Site boundary. The interim groundwater treatment system commenced operations in October 1993 and is still in

operation today. Treated effluent from the GETS is discharged to the headwaters of Watering Run, a drainage feature located at the southern portion of the former FWEC Facility property. Four extraction wells, two near the former vapor degreaser source area and two near the former FWEC property's southern boundary, remove and treat groundwater affected by TCE from the hydrostratigraphic units underlying the Site. Quarterly (1995 through September 1997), and then annual (1998 through present) sampling has been conducted to monitor the effectiveness of the GETS. ***The GETS is a common component of four (4) of the alternatives presented in this Proposed Plan.***

Wabtec entered into a Consent Order and Agreement with PADEP in October 2003 (Act 2 Agreement) for Remediation/Reuse of a Special Industrial Area Site under the Pennsylvania Land Recycling and Environmental Remediation Standards Act (Act 2). The Act 2 Agreement includes stipulations that the "intended use of the Site is for industrial activity in accordance with local zoning," and "reuse excludes development of the Site for recreational areas, schools, nursing homes, and other residential-style functions unless a residential Site-wide health standard is first attained and approved by the PADEP." The Act 2 Agreement also includes the following restrictions; (1) prohibition on the use of groundwater at the Site for any purpose, (2) limiting use of the Site to industrial uses, and (3) restrictions on excavations in the area of the former vapor degreaser and the craneway strip on the Site. These requirements currently remain in effect at the Site.

In September 2004, groundwater samples were collected from 16 wells located at residential properties along Church Road. Analytical results indicated that the detected concentrations of TCE in 15 of the 16 samples collected, ranging up to 160 micrograms per liter (µg/l). Fourteen of the samples contained concentrations above the EPA Maximum Contaminant Level (MCL) of 5 µg/l (see 40 CFR § 141.61(a)(5)). Bottled water was provided to affected residences, and additional samples from residential wells were collected. Carbon filtration systems were installed at residences where TCE was detected in samples collected from residential wells and were operated until the residences were permanently connected to the public water supply.

In 2005, FWEC and EPA executed an Administrative Settlement Agreement and Order by Consent for Removal Response Action for the Church Road TCE Site, dated August 29, 2005, Docket No. CERC-03-2005-0349DC (2005 Order). The 2005 Order required FWEC to perform quarterly sampling, connect affected properties to public water and abandon residential wells. By July 21, 2007, FWEC had completed the final connections to public water at all 36 locations for which FWEC had received signed Water Line Agreements. For the one residence where FWEC could not secure a Water Line Agreement for connection to public water, FWEC purchased three carbon filter tanks for that residence. After the affected residences were connected to public water, sampling was conducted quarterly at the six sentinel well properties and selected seeps within the Affected Area. The final quarterly sampling event was completed in February 2013.

On April 2, 2009, EPA and FWEC amended the 2005 Order to connect four additional homes adjacent to the Affected Area to public water and to cover a groundwater seep with gravel. In December 2009, FWEC removed vegetation and placed a filter fabric and gravel over the seep to eliminate the potential for human and animal contact with groundwater contaminated with TCE.

FWEC installed an enhancement to the seep IRM in September-October 2011. The enhancement consisted of installation of an electric powered aeration system to aerate the water in the man-made structure located adjacent to the seep to reduce the concentrations of TCE in the surface water seep adjacent to the structure. In September 2012, the Response Action Report was issued to close out activities required in the 2005 Order.

On April 9, 2009, EPA and FWEC entered into an Administrative Settlement Agreement and Order on Consent for Remedial Investigation/Feasibility Study (RI/FS AOC), Docket No. 03-CERC-2009-0061DC. Under the RI/FS AOC, FWEC agreed to investigate and evaluate cleanup options following the Superfund Alternative Approach (SAA).

FWEC commenced RI activities in 2010. Field activities included a Site reconnaissance, surface geophysical surveys, direct-push soil borings with direct sensing tools, a groundwater screening evaluation, monitoring well installation, and sampling of environmental media including soil, groundwater, surface water, sediment, pore water, porous bedrock matrix, soil vapor, and indoor air. The data were evaluated and presented in the RI.

The RI identified 14 potential or known sources of contamination at the former FWEC Facility from prior investigation activities. Based on an evaluation of the historic documents, data obtained during previous remedial investigations at nine (9) of the 14 potential/known sources or areas of contamination at the former FWEC Facility indicated that each of those nine areas (i) has been remediated or otherwise satisfactorily addressed, (ii) does not contain contaminants above current applicable criteria, and/or (iii) is not associated with a potential exposure pathway. No further remedial investigation of these areas was required by EPA as part of the RI. The five (5) remaining potential sources of contamination at the former FWEC Facility which were further evaluated as part of the RI include:

- Former Vapor Degreaser Area (FVDA), also known as Membrane Interface Probe (MIP) Area #1;
- Former Shot Blast Area (FSBA);
- Former Expended Waste Area (EWA);
- Former Paint Storage Area (FPSA) near former Finish Paint Building and Buildings located east of Finish Paint Building (e.g., Solvent Building and Paint Storage Building), also known as MIP Area #2; and
- Former Wastewater Treatment Pond (FWWTP).

II. SITE CHARACTERISTICS

General Physiographic and Ecological Setting

Regionally, ground surface elevations rise to the east of the former FWEC Facility property and generally slope downward to the north, west, and south. Immediately west of the northern portion of the former FWEC Facility and localized to this area, ground surface slopes upward to a plateau-like ridge occupied by the Philips Lighting Facility property. Ground surface slopes

radially from the Philips Lighting Facility, consistent with the regional topography. In the SIPs, localized ground topography is significantly impacted by the industrial development in the area. In general, south and west of the former FWEC Facility, ground surface elevations slope to the south and west toward the Affected Area, with decreases in elevation from approximately 1,620 feet mean sea level (msl) at the former FWEC Facility to approximately 1,300 feet msl at the downgradient edge of the Affected Area.

The former FWEC Facility is covered by large former building cement slabs, asphalt and gravel parking lots and access roads and open field areas formerly used as storage areas. A FWWTP is also present and covers an area of approximately 0.16 acres. While evidence of wildlife occurrence on the former FWEC Facility was observed, the lack of significant habitat present in the developed portion of the former FWEC Facility limits its value for supporting significant populations of ecological receptors. The FWWTP is now a small emergent wetland that drains into an unnamed tributary of Bow Creek. It is breeding habitat for amphibians as its shallow depth and intermittent nature prevent it from supporting fish.

The Affected Area is approximately 295 acres of mixed land use centered along the main channel of Watering Run, the primary surface water feature in the Site area. This area consists of riparian, wetland and open water habitats of Watering Run. Tributaries and groundwater seeps and springs discharge along the channel course. The riparian and wetland habitats present include upland broadleaf deciduous forests, low land broadleaf deciduous forests, emergent wetland areas and ephemeral springs. The open water channel of Watering Run originates on the former FWEC Facility and flows downgradient, converging with multiple tributaries and ephemeral springs along the length of the Affected Area. The aquatic, riparian and terrestrial habitats present within the Affected Area represent the most significant habitats present at the Site.

The SIPs are also adjacent to the channel of Watering Run and downstream of the former FWEC Facility. The SIP area consists of multiple industrial and commercial properties with associated impervious asphalt parking areas, mowed lawn and landscaping features. The developed nature of the SIPs does not afford significant value as wildlife habitat. The only exceptions are isolated, fragmented or adjacent forested areas present on the properties associated with the forested corridor of Watering Run.

Geology, Hydrogeology, and Surface Water Hydrology

The local geology is comprised of two primary stratigraphic units – overburden and bedrock. The overburden consists of unconsolidated glacial till with minor occurrences of fill in the SIP area. The glacial till is underlain by incompetent sedimentary bedrock, consisting of weathered bedrock underlain by highly-fractured bedrock. Less fractured, competent bedrock underlies the incompetent bedrock. The bedrock is sedimentary rock of the Catskill Formation.

Groundwater flow direction on and near the former FWEC Facility is generally to the south-southwest and, at more distal locations from the former FWEC Facility, in the Affected Area, groundwater flow direction is generally to the west. A groundwater elevation high is consistently observed in the southeast corner of the CertainTeed facility, which is located directly south of the former FWEC Facility, resulting in a localized occurrence of northwesterly

groundwater flow which also influences the primary groundwater flow direction to the west down the valley. Groundwater flowing southwesterly from the former FWEC Facility through some of the SIPs is directed into a more westerly flow direction by the northwesterly flow gradient caused by the localized groundwater elevation high. Groundwater flow south of the former FWEC Facility, in the area of the CertainTeed and Bergen Machine facilities, might be migrating locally in a northerly direction onto the former FWEC Facility property as a result of groundwater gradients induced by the currently operating GETS.

Although regional studies indicate that bedding plane orientation controls groundwater flow, Site-specific data indicate that the primary controlling factors dictating groundwater flow direction in the Affected Area are the overall shape of the valley, the presence of Watering Run (as a local groundwater discharge point), and the top of the bedrock surface. Rainfall variation appears to influence the groundwater flow direction on portions of the former FWEC Facility and has a less pronounced effect on off-property areas where the valley shape and bedrock configuration constrain groundwater flow more consistently.

FWEC performed three rounds of groundwater sampling during the RI: May 2013 (Round1), September 2013 (Round 2), and April 2014 (Round 3). Rounds 1 and 2 were performed during relatively low rainfall periods and have a similar, westerly flow pattern, particularly in the northern portion of the former FWEC Facility. In contrast, Round 3, which was performed during a relatively high rainfall total period, shows more of a south-southwesterly flow direction. An effect on contaminant transport from this variation is not apparent. The presence of the perennial gaining stream (Watering Run) along the valley floor also helps to channel groundwater flow along the topographic contours of the valley. At a large scale, geologic structure (i.e., bedding and fracture planes) does not appear to have a significant controlling influence on groundwater flow. Groundwater flow is affected by changes in hydraulic head and geologic heterogeneity, resulting in local variability in vertically downward and upward flow gradients, as well as steeper gradients in the eastern portions of the Site and less steep gradients in the western portions of the Site.

While the macro-scale distribution of hydraulic head has a net flow direction from the former FWEC Facility to the western margin of the Affected Area, locally, vertical hydraulic head gradients are complex and appear to be caused by the combined influences of the primary groundwater flow direction, extraction well operation at the former FWEC Facility, and localized artesian conditions.

Flow within the glacial till is influenced by heterogeneity, with some degree of preferential flow as a function of the differences in hydraulic conductivity. Flow within the weathered bedrock is likely to be variably influenced by the local degree of weathering, dominated by former fractures (secondary porosity). Flow within the highly-fractured bedrock and less-fractured, competent bedrock is likely to be dominated by fracture flow.

The former FWEC Facility is located at a surface water drainage divide, with the northern portion of the property draining to the north towards Bow Creek and the central and southern portions of the property draining to the south towards the surface feature that drains into Watering Run.

Contaminant Presence, Fate and Transport
The RI indicates that sources of chlorinated solvent-related contamination, specifically TCE and, to a lesser extent 1,1,1-TCA, remain on the former FWEC Facility, mainly in the FVDA. Spatial data evaluation also indicates potential TCE contaminant sources in the vicinity of the CertainTeed, Bergen Machine, and Fabri-Kal facilities within the SIP area.

The migration of constituents from impacted areas/soil matrices to groundwater, and then within groundwater following the local flow direction, is the principal environmental fate and transport mechanism for the Site. The shallow and bedrock discharge of impacted groundwater into wetland and pond areas, and/or into Watering Run and tributaries is also an environmental fate and transport mechanism.

TCE-contaminated groundwater is present within unconsolidated glacial till and bedrock, including weathered bedrock, highly-fractured bedrock, and less-fractured, competent bedrock lithologies. In the glacial till, groundwater impacts are evident near source areas on the former FWEC Facility and the SIPs, and downgradient near the western boundary of the Affected Area **(Figure 3)**. In the bedrock groundwater, impacts extend from source areas on the former FWEC Facility to within the Affected Area **(Figure 4)**.

At the former FWEC Facility, the plume appears to be vertically continuous through the saturated section of the glacial till and into all bedrock lithologies, i.e., there do not appear to be distinct or isolated aquifers or hydrostratigraphic units separated by aquitards or aquitard-like conditions. Differences in the hydrogeologic properties of the glacial till and the bedrock lithologies influence migration; however, groundwater in bedrock at depth may be under confined or semi-confined conditions in the SIP Area, where artesian wells are present. As a result, contaminant migration and/or attenuation at different locations will vary accordingly.

Based upon the local groundwater flow direction, generally south-southwest to west, and groundwater quality data, constituents in groundwater originating from the various suspected potential source areas at the former FWEC Facility, and near the CertainTeed, Bergen Machine, and Fabri-Kal facilities, have migrated, and will continue to migrate until dilution and removal mechanisms such as adsorption, degradation, precipitation, and limited volatilization result in their eventual non-detection and/or until the impacted groundwater discharges to the seeps/springs and/or Watering Run. Vertically, groundwater data also show that Site-related constituents have migrated to and within the bedrock via fracture flow to depths greater than 300 feet bgs, with concentrations significantly decreasing with increasing depth.

Summary of Groundwater Modeling Results
A groundwater flow, capture zone, and fate and transport model was used to simulate groundwater flow conditions for three distinct hydrostratigraphic units underlying the former FWEC Facility and SIPS.

The results of the groundwater modeling indicate that, consistent with the results of field investigations performed previously, the most permeable zone within the bedrock is estimated to be within the first 30 to 50 feet of bedrock underlying the glacial till. This is referred to as

partially weathered bedrock, with decreasing permeability as the bedrock becomes increasingly competent with depth.

Although regional studies indicate that bedding plane orientation controls groundwater flow, Site specific data indicate that the primary controlling factors dictating groundwater flow direction are the overall shape of the valley, the presence of Watering Run (as a local groundwater discharge point), and the top of the bedrock surface.

The results of the groundwater modeling indicate that groundwater capture by the existing GETS is effective in times of seasonal low groundwater levels, but that some impacted flow from the former FWEC Facility may escape capture during seasonal high groundwater levels. Groundwater modeling indicated that increasing pumping rates in existing recovery wells and the addition of one new extraction well to the system would provide complete capture during all seasonal water level conditions.

Vapor Intrusion Investigation

In 2010, FWEC performed a comprehensive vapor intrusion (VI) evaluation at residences and public buildings within the Affected Area that were identified as having the greatest potential for VI. This evaluation considered multiple lines of evidence and concluded that the levels of TCE measured at two residences associated with unique hydrogeologic and/or subsurface conditions (i.e., residential construction on the Site of a natural spring and a leaking former well pump flooding the material beneath the foundation slab of another residence) could pose an unacceptable human health inhalation risk due to VI. As a result, active soil depressurization (ASD) mitigation systems were installed at both residences. Operation of these mitigation systems effectively eliminates this potential exposure pathway at these locations. ***The VI mitigation systems continue to operate and are a common component of four (4) of the alternatives presented in this Proposed Plan.*** The data and VI analysis for the Affected Area do not indicate a basis to conclude that there is a similar VI risk at other locations.

Based on approximately 10 years of groundwater data from groundwater monitoring wells and VI investigation sampling, the contaminant plume in the Affected Area appears to be stable and the contaminant concentrations have declined over time due to continued operation of the GETS at the former FWEC Facility and potentially from natural attenuation processes. In addition, the closure and cessation of pumping at the former private wells in the Affected Area has reduced the induced migration of groundwater toward the residences. This also has led to a reduction in the concentrations of volatile groundwater contaminants beneath the structures and a corresponding reduction in potential VI at these locations. These ongoing activities and natural processes are expected to lead to further declines in the concentrations of the shallow volatile organic compound (VOC) groundwater contaminants in the Affected Area, and a further reduction in the potential for VI at these locations in the future. Based on the apparent downward trend in contaminant concentrations and the installation and operation of the two VI mitigation systems, the current VI health risks for the Affected Area via the indoor air exposure pathway have been mitigated. However, a potential future VI risk will remain as long as the groundwater in the Affected Area is impacted by VOCs.

III. SCOPE AND ROLE OF THIS ACTION

The alternatives presented in this Proposed Plan constitute an interim remedial approach for soil, sediment, and groundwater contamination at the former FWEC Facility portion of the Site. This Proposed Plan presents the preferred alternative for a final action for Site-wide vapor intrusion. More information is needed to screen and evaluate alternatives for contaminated groundwater at the SIPs and in the Affected Area. The final remedy for the entire Site (former FWEC Facility, SIPS, and Affected Area), including Site-wide groundwater, will be selected in a future decision document.

The Preferred Interim Remedial Action Alternative, proposed herein, will prevent current and potential future exposure to contaminated soils, sediments, groundwater and resultant vapors, through a combination of containment, treatment, and institutional controls. Through the use of treatment technologies, this proposed interim remedy will permanently reduce the toxicity, mobility, and volume of contaminants in Site media.

IV. SUMMARY OF SITE RISKS

During the RI/FS, a Human Health Risk Assessment (HHRA) and Baseline Ecological Risk Assessment (BERA) were conducted to determine the current and potential future effects of contaminated media on human health and the environment in the absence of any cleanup actions at the Site.

Human Health Risk Assessment

The HHRA was conducted to characterize and quantify the current and potential future human health risks that would occur if no remedial action were taken to address contaminated media at the Site. The HHRA identifies the potential exposure pathways in which people may be exposed to Site contaminants, the toxicity of the contaminants present, and the potential for carcinogenic and non-carcinogenic effects to occur from exposure to the contaminants. EPA has set a target risk range of 10^{-4} to 10^{-6} for a lifetime excess carcinogenic risk. For non-carcinogenic contaminants, EPA sets a target of a Hazard Index (HI) of no greater than 1. Carcinogenic risks and non-carcinogenic hazards were found to be at or in exceedance of regulatory thresholds for the following exposure scenarios:

Former FWEC Facility

- Future direct contact with soil by hypothetical Residents, on-Site Commercial Workers, and Construction/utility workers:
    - Carcinogenic risk of 1.4×10^{-3};
    - Non-carcinogenic HI of 79.

- Future groundwater ingestion as tap water by hypothetical future Residents and on-Site Commercial Workers and contact during an excavation for Construction/utility Workers:
    - Carcinogenic risk of 7.3×10^{-4};

- Non-carcinogenic HI of 85.

- Future indoor inhalation of VOCs from groundwater by hypothetical residents and on-Site Commercial Workers:
  - Carcinogenic risk of 2.2×10^{-3};
  - Non-carcinogenic HI of 274.

Affected Area

- Current use of groundwater as drinking water by residents (currently mitigated by municipal water supply connections or in-home treatment system):
  - Non-carcinogenic HI of 4.6.

- Current and future inhalation of indoor air at two residential locations (currently mitigated by active soil depressurization):
  - Carcinogenic risk of 1.7×10^{-4};
  - Non-carcinogenic HI of 25.

SIPs

- Hypothetical future resident and commercial worker via ingestion of groundwater:
  - Non-carcinogenic HI of 9.1.

- Future direct contact with shallow groundwater by a construction/utility worker in a trench.
  - Non-carcinogenic HI of 2.1.

The contaminants of concern (COCs) identified for each scenario are listed below. **Table 1** provides a summary of COCs, exposure pathways, and preliminary remediation goals.

Groundwater at the Former FWEC Facility

Risk-based COCs for groundwater used as tap water, and groundwater in an excavation trench:

- TCE

WHAT IS RISK AND HOW IS IT CALCULATED?

A Superfund human health risk assessment estimates the baseline risk. This is an estimate of the likelihood of health problems occurring if no cleanup action were taken at a site. To estimate the baseline risk at a Superfund site, EPA undertakes a four-step process:

Step 1: Analyze Contamination
Step 2: Estimate Exposure
Step 3: Assess Potential Health Dangers
Step 4: Characterize Site Risk

In Step 1, EPA looks at the concentrations of contaminants found at a site as well as past scientific studies on the effects these contaminants have had on people (or animals, when human studies are unavailable). Comparisons between site-specific concentrations and concentrations reported in past studies help EPA to determine which contaminants are most likely to pose the greatest threat to human health.

In Step 2, EPA considers the different ways that people might be exposed to the contaminants identified in Step 1, the concentrations that people might be exposed to, and the potential frequency and duration of exposure. Using this information, EPA calculates a reasonable maximum exposure (RME) scenario, which portrays the highest level of human exposure that could reasonably be expected to occur.

In Step 3, EPA uses the information from Step 2 combined with information on the toxicity of each chemical to assess potential health risks. EPA considers two types of risk: cancer risk and non-cancer risk. The likelihood of any kind of cancer resulting from a Superfund site is generally expressed as an upper bound probability; for example, a 1 in 10,000 chance. In other words, for every 10,000 people exposed, one extra cancer may occur as a result of exposure to site contaminants. An extra cancer case means that one more person could get cancer than would normally be expected, given the background cancer rate. For non-cancer adverse health effects, EPA calculates a hazard index. The key concept here is that a threshold level (measured usually as a hazard index of less than 1) exists below which non-cancer adverse health effects are no longer predicted.

In Step 4, EPA determines whether site risks are great enough to cause health problems for people at or near the Superfund site. The results of the three previous steps are combined, evaluated and summarized. EPA adds up the potential risks from the individual contaminants and exposure pathways and calculates a total site risk.

Groundwater at the Affected Area

Risk-based COCs for groundwater used as tap water in the Affected Area:

- TCE

Groundwater at the Surrounding Industrial Properties

Risk-based COCs for groundwater use as tap water, and groundwater in an excavation trench:

- TCE

Indoor Air at the Former FWEC Facility

Risk-based COCs for VOCs in groundwater potentially migrating into indoor air:

- 1,1,1-Trichloroethane;
- 1,1,2-Trichloroethane;
- 1,1-Dichloroethane;
- 1,1-Dichloroethene;
- Naphthalene;
- Tetrachloroethene (PCE);
- TCE; and
- Xylenes, Total

Soil at the Former FWEC Facility

Risk-based COCs for soil in the (MIP-1 FVDA) (residential use unless otherwise noted):

- 1,1,2-Trichloroethane; and
- TCE

Ecological Risk Assessment Summary

A Screening Level Ecological Risk Assessment (SLERA) was conducted to determine whether Site-related contaminants posed an unacceptable risk to ecological receptors. The conclusion of the SLERA was that contaminants posed potential risk in various media. FWEC collected additional surface water, sediment and soil samples and completed a Baseline Ecological Risk Assessment (BERA). Four assessment endpoints were evaluated in the BERA:

> Assessment Endpoint #1: Evaluate the potential for adverse changes in the survival, reproduction, and growth of resident fish populations utilizing Watering Run resulting from potential exposures to Contaminants of Potential Ecological Concern (COPECs) in surface water and sediment;

Assessment Endpoint #2: Evaluate the potential for adverse changes in the survival, reproduction, and growth of resident benthic invertebrate populations utilizing the FWWTP and Watering Run resulting from potential exposures to COPECs in surface water and sediment;

Assessment Endpoint #3: Evaluate the potential for adverse changes in the survival, reproduction, and growth of terrestrial plant and insect populations resulting from potential exposures to COPECs in groundwater and/or surface soil;

Assessment Endpoint #4: Evaluate the potential for adverse changes in the survival, reproduction, and growth of populations of higher tropic level organisms (herbivorous, insectivorous, omnivorous, piscivorous, and carnivorous species) potentially utilizing the Site resulting from exposures to COPECs in surface water, sediment, surface soil, and/or prey.

The BERA concluded that the potential for risk to the aquatic and semi-aquatic biota inhabiting Watering Run and its tributary is negligible and does not warrant further ecological evaluation or remedial action. The potential for risk to terrestrial biota is negligible and does not warrant further ecological evaluation or remedial action. However, the potential for risk to macroinvertebrates and amphibians from COPECs in the FWWTP from the combination of surface water and sediment contamination exceeds acceptable levels and warrants further action. Surface water and sediment COPECs for the FWWTP are listed in Tables 2 and 3, respectively.

Risk Assessment Summary

In summary, the HHRA and BERA for the Site demonstrate the presence of unacceptable risks to human health and the environment, and that remedial actions are necessary to reduce the risks to within or below EPA's acceptable risk range. Therefore, EPA has determined that response actions are necessary to protect the public health, welfare, or the environment from actual or threatened releases of hazardous substances into the environment. However, because more information is needed to select an appropriate remedy for groundwater at the SIPs and the Affected Area, this Proposed Plan will only address groundwater, sediment, soil, and indoor air at the former FWEC Facility.

Principal Threat Waste

The NCP establishes an expectation that EPA will use treatment to address the principal threats posed by a Site wherever practicable (40 C.F.R. Section 300.430(a)(1)(iii)(A)). The principal threat concept is applied to the characterization of source materials at a Superfund site. A source material is material that includes or contains hazardous substances, pollutants or contaminants that act as a reservoir for migration of contamination, for example, to ground water. Principal threat wastes are those source materials considered to be highly toxic or highly mobile, which would present a significant risk to human health or the environment should exposure occur.

EPA has not identified any principal threats at the Site. The contaminated soils at the former FWEC Facility are considered a low-level threat waste.

V. REMEDIAL ACTION OBJECTIVES

The following Remedial Action Objectives (RAOs) were developed to protect human health and the environment from current and potential future risk at the Site.

- Remedial Action Objectives- Groundwater:
  - Prevent future human ingestion, inhalation, or dermal contact exposure with impacted groundwater at the former FWEC Facility with COC concentrations that present unacceptable risk to human receptors.
  - Restore the groundwater aquifer at the Former FWEC Facility area to its beneficial use by reducing COC concentrations to the MCLs for drinking water or non-zero MCL Goals (MCLGs) for those contaminants for which there is no corresponding MCL, as well as to concentrations that would result in an unacceptable cumulative human health risk.
  - Prevent migration of the groundwater contaminant plume.

- Remedial Action Objectives - Soil:
  - Prevent future direct contact, ingestion, and inhalation exposure to surface and subsurface soil at the Site with COC concentrations that present unacceptable risks to human health. (Source Area Soils).
  - Reduce leaching of COCs from Source Area Soils to reduce COC migration to groundwater.

- Remedial Action Objective - Sediment:
  - Prevent ecological receptor ingestion exposure to sediment and overlying surface water with COPECS above acceptable levels at the FWWTP.

- Remedial Action Objectives - Soil Vapor:
  - Prevent future human inhalation exposure due to intrusion of soil vapor COC concentrations that would result in an unacceptable risk to human health.

VI. SUMMARY OF INTERIM REMEDIAL ACTION ALTERNATIVES

The following interim remedial action alternatives will focus on the former FWEC Facility and Site-wide Vapor Intrusion. More information is needed to screen and evaluate alternatives for groundwater at the SIPs and the Affected Area. The Affected Area and SIPs, therefore, will be addressed under subsequent actions.

EPA, in consultation with PADEP, evaluated the following alternatives for the former FWEC Facility and Sitewide Vapor Intrusion:

Alternative 1: No Action
Alternative 2: Operation and Maintenance of Existing Groundwater and VI Mitigation Systems

Alternative 3: Capping and Groundwater Extraction and Treatment System (GETS) Optimization
Alternative 4: Excavation and GETS Optimization
Alternative 5: Capping, Source Area Treatment, and GETS Optimization

The Preferred Interim Remedial Action Alternative proposed for public comment is ***Alternative 5: Capping, Source Area Treatment, & GETS Optimization.*** EPA has determined that the Preferred Interim Remedial Alternative will be the most effective in addressing contaminated sediment, soil, and groundwater at the former FWEC Facility, as well as Site-wide vapor intrusion. This Alternative includes the following components:

- Capping and soil vapor extraction (SVE) treatment of Source Area Soils;
- Continued groundwater extraction and treatment using the existing GETS;
- Optimization of the GETS;
- Sediment removal and wetland restoration at the FWWTP
- Vapor Intrusion monitoring and mitigation;
- Groundwater monitoring; and
- Land and groundwater use restrictions

Common Components of Remedial Alternatives

Each of the remedial alternatives, with the exception of *Alternative One: No Action*, include the following common components:

Institutional Controls

Institutional controls (ICs) are non-engineered administrative or legal instruments (e.g., deed restrictions, deed notices, ordinances, easements, covenants, zoning) that impose restrictions on the use of impacted property or resources to help minimize the potential for human exposure to those impacts and/or protect the integrity of the remedy.

The ICs to be imposed at the former FWEC Facility will be maintained until groundwater meets drinking water standards (MCLs) for TCE. These ICs include the following:

- Limit the former FWEC Facility property to industrial use;
- Prohibit groundwater use at the former FWEC Facility; and
- Prohibit disturbance of any remedial component at the former FWEC Facility, such as the GETS building and monitoring and extraction wells, and the soil cap.

The first two ICs listed above are currently covered by the Act 2 Agreement, described in **Section I** of this Proposed Plan under ***Summary of Previous Environmental Investigations and Actions***, and will continue to remain in place at the former FWEC Facility. The additional ICs described in the third bullet will be implemented by modifying the existing deed restrictions or via an environmental covenant. The need for ICs in the Affected Area and the SIPs will be evaluated in a future decision document.

Engineering Controls

Engineering controls (ECs) encompass a variety of engineered and constructed physical systems or barriers (e.g., fences, signage, subsurface venting systems or vapor mitigation barriers) to contain and/or prevent exposure to impacted media on a property. All the alternatives, with the exception of the no action alternative, include the following ECs, which were described above in **Section I** of this Proposed Plan, under ***Summary of Previous Environmental Investigations and Actions***:

1. Continued operation of the existing GETS System
2. Continued operation of the existing residential vapor mitigation systems

EPA will evaluate the need for continued ECs during each Five-Year Review, as described below. Annual inspections will be performed to verify the integrity of the ECs, including documenting evidence of unauthorized development or disturbance of remedy infrastructure, such as fencing, signs, and monitoring wells.

Former Wastewater Treatment Pond

Sediments containing COPECs that pose an unacceptable risk to ecological receptors will be removed from the FWWTP and disposed of off-Site, and the pond will be restored for maximum beneficial ecological use.

Five-Year Reviews

In accordance with CERCLA Section 121(c), 42 U.S.C. § 9621(c), a performance evaluation must be conducted at least every five (5) years when a remedial action results in any hazardous substances, pollutants, or contaminants remaining on-Site. Five-Year Reviews (FYR) will be conducted every five years from the start of on-Site construction of the Interim Remedial Action. For the purpose of estimating costs, a period of 30 years has been assumed. Therefore, it is assumed that six (6) FYRs will be performed, at a minimum, within the 30-year period and will continue to be conducted beyond 30 years, as necessary, until cleanup levels are achieved.

Description of Remedial Alternatives

The following remedial alternatives were developed and described in the FS. Total present worth costs were calculated for each alternative using an annual discount rate of 7%.

Alternative 1: No Action

Capital Cost:	*$0*
Total O&M Costs:	*$0*
Total Present Worth Cost:	*$0*

Under Alternative 1, no action would be taken at the Site. This “no action” alternative is included because the NCP requires that a “no action” alternative be retained as a baseline alternative to which the other alternatives may be compared. For the purpose of this Proposed Plan, this

alternative hypothetically assumes that all existing mitigation systems are shut down. This alternative would not reduce human health or ecological risks to acceptable levels, and would not achieve the remedial action objectives. This alternative would not be protective of human health, and will not be considered further.

Alternative 2: Operation & Maintenance of Existing Groundwater and VI Mitigation Systems

Capital Cost: *$424,000*
Total O&M Costs: *$4,345,000*
Total Present Worth Cost: *$4,769,000*

Alternative 2 consists of sediment removal at the FWWTP, continued O&M of the existing GETS and the two existing VI mitigation systems, as well as mitigation at any location where unacceptable VI risk is identified in the future. Alternative 2 also includes the ICs described above to protect the interim remedy and to prohibit any reuses of the Site that would pose a risk. Long-term groundwater monitoring would be performed in wells within the existing monitoring network on a regular basis to assess concentration trends. It is assumed that O&M on all existing mitigation systems, the GETS, and groundwater monitoring would be conducted for 30 years

Alternative 3: Capping & GETS Optimization

Capital Cost: *$842,000*
Total O&M Costs: *$3,876,000*
Total Present Worth Cost: *$4,718,000*

Alternative 3 includes all components in Alternative 2, with the addition of a cap over impacted Source Area Soils and optimization of the GETS. An engineered surface cap consisting of a 60-millimeter liner, sand, and a 6-inch soil cover would be installed over Source Area Soils in the FDVA. The cap would be designed to prevent direct contact exposure and limit storm water infiltration, while incorporating existing wells in the area.

The existing GETS would continue to be operated and maintained, with a preliminary optimization strategy of increasing the withdrawal rate of one of the four (4) existing recovery wells by approximately 30 percent and installing and operating one (1) new recovery well, for a total of five (5) recovery wells. Details on the optimization would be further defined during the design phase based on the results of groundwater capture zone modeling. Preliminary results of this modeling indicate that this optimization of the existing GETS will result in full capture of the TCE plume, preventing its migration beyond the downgradient property line of the former FWEC Facility.

Alternative 4: Excavation & GETS Optimization

Capital Cost: *$1,635,000*
Total O&M Costs: *$3,047,000*
Total Present Worth Cost: *$4,682,000*

Alternative 4 is identical to Alternative 3, with the exception that approximately 5,200 cy of impacted Source Area Soils would be excavated and disposed of off-Site instead of capped in

place. Existing wells located within the areas to be excavated would be abandoned and replaced after excavation is complete. Based on data presented in the RI, for costing purposes it is assumed soils would be disposed of off-Site as non-RCRA Hazardous contaminated waste at a Class II facility.

Alternative 5: Capping, Source Area Treatment, & GETS Optimization
Capital Cost: *$1,218,000*
Total O&M Costs: *$2,932,000*
Total Present Worth Cost: *$4,150,000*

Alternative 5 is identical to Alternative 3 with the addition of soil vapor extraction (SVE) to treat Source Area Soils. SVE involves drilling one or more extraction wells into the contaminated soil to a depth above the water table. A blower or vacuum pump is then used to pull vapors through the soil and up the wells to the ground surface for treatment. The cap will ensure that the vacuum does not pull air from above into the system, and will also prevent any vapors from escaping from the ground to the air above. A SVE system would be installed within Source Area Soils to remove and treat VOC mass from the soils. A pilot test would be conducted to assess whether SVE can be effective at removing mass from the weathered bedrock zone directly above the water table. It is assumed that O&M on the SVE system would be conducted for 2 years, in addition to the O&M activities performed in Alternatives 3.

VII. EVALUATION OF ALTERNATIVES

In this section, the remedial alternatives summarized above are compared to each other using the criteria set forth in 40 C.F.R. § 300.430(e)(9)(iii). In the remedial decision-making process, EPA profiles the relative performance of each alternative against the evaluation criteria, noting how each compares to the other options under consideration. A detailed analysis of alternatives can be found in the Feasibility Study, which is in the Administrative Record file for the Site.

Evaluation Criteria for Superfund Remedial Alternatives
Threshold criteria: *Must be satisfied in order for a remedy to be eligible for selection.*
1. Overall Protection of Human Health and the Environment determines whether an alternative eliminates, reduces, or controls threats to public health and the environment through institutional controls, engineering controls, or treatment.
2. Compliance with ARARs evaluates whether an alternative will meet all applicable or relevant and appropriate requirements (ARARSs) of Federal and State environmental statutes, regulations, and other requirements that pertain to a site, and/or justifies a waiver.
Primary balancing criteria: *Used to weigh major tradeoffs between remedial alternatives.*
3. Long-term Effectiveness and Permanence considers the expected residual risk and the ability of an alternative to maintain protection of human health and the environment over time.

4. Reduction of Toxicity, Mobility, or Volume of Contaminants through Treatment evaluates the anticipated performance of an alternative's use of treatment to reduce the harmful effects of principal contaminants, their ability to move in the environment, and the amount of contamination present.
5. Short-term Effectiveness considers the length of time needed to implement an alternative and the risks the alternative poses to workers, residents, and the environment during the construction and implementation period, until cleanup goals are achieved.
6. Implementability considers the technical and administrative feasibility of implementing an alternative, including the availability of goods and services needed to implement a particular option.
7. Cost includes estimated capital and annual operations and maintenance costs, compared as present worth costs.
Modifying criteria: *Considered by EPA after public comment is received on the Proposed Plan.*
8. State/ Support Agency Acceptance addresses whether the State concurs or has comments on the Preferred Interim Remedial Alternative, as described in the Proposed Plan.
9. Community Acceptance considers whether the local community agrees with EPA's analysis of the Preferred Interim Remedial Alternative, as described in the Proposed Plan.

These evaluation criteria address statutory requirements and considerations for cleanup actions in accordance with the NCP. The nine criteria fall into three groups: Threshold, Primary Balancing, and Modifying. Each alternative (except no-action) must meet the threshold criteria. The primary balancing criteria are used to weigh major trade-offs among alternatives. The modifying criteria, State and Community Acceptance, can only be fully considered after State and public comment is received on the Proposed Plan.

Detailed Analysis of Proposed Remedial Alternatives

1. Overall Protection of Human Health and the Environment

A no action alternative (Alternative 1) must be evaluated in accordance with CERCLA and the NCP to serve as a basis for comparison with the other alternatives. Alternative 1 is not protective of human health and the environment because it does not address the unacceptable exposures to contaminated soil, sediment, groundwater and indoor air described in Section IV. The No Action alternative fails to meet the threshold criterion of protectiveness and will not be considered further.

The remaining 4 alternatives would provide overall protection of human health and the environment through the remediation of soil, sediment and groundwater at the former FWEC Facility, the use of VI mitigation systems, and the ECs and ICs described above.

3. Compliance with ARARs

Table 4 provides the list of ARARs identified for the retained alternatives and describes how the alternatives will comply with the ARARs. Alternatives 2 through 5 will comply with all ARARs except for federal MCLs for groundwater beyond the former FWEC Facility. The proposed interim action remedy will address the source areas with the highest concentrations and is intended to prevent further degradation of groundwater. However, more information is needed to

screen and evaluate alternatives for contaminated groundwater at the SIPs and in the Affected Area. Therefore, EPA proposed to waive the MCL as an ARAR for those areas in the interim until such a time as a final remedy for Site-wide groundwater can be selected. Section 12l(d)(4)(A) of CERCLA provides that EPA may select a remedial action that does not meet an applicable or relevant and appropriate standard, requirement, criteria, or limitation if the remedial action is only part of a total remedial action that will attain such level or standard of control when completed. Because this remedial action is part of a total remedial action that will meet ARARs when completed, EPA proposes to waive, and this interim remedial action will not meet, ARARs establishing groundwater cleanup standards beyond the former FWEC Facility. Specifically, EPA proposes to waive the requirement that all Site groundwater meet MCLs for COCs established pursuant to the Safe Drinking Water Act, 42 U.S.C. §§ 300f et seq. These requirements are proposed to be waived pursuant to the interim action waiver set forth in Section l2l(d)(4)(A) of CERCLA and 40 C.F.R. § 430(f)(l)(ii)(C)(l).

3. Long-Term Effectiveness and Permanence

All four alternatives have the same degree of long-term effectiveness and permanence for contaminated sediment, as all four include removal of contaminated sediment in the FWWTP.

Alternative 2 would have a low degree of long-term effectiveness and permanence compared to the other alternatives as it does not include active remediation of Source Area Soils, nor optimization of the GETS. Alternative 2 would not achieve soil RAOs, and would likely require an unreasonable amount of time to reach groundwater RAOs.

Alternative 3 would have a moderate degree of long-term effectiveness and permanence compared to the other alternatives. Capping Source Area Soils will prevent exposure to contaminants, as well as reduce the likelihood of contaminants leaching to groundwater. Optimizing the GETS will clean up groundwater more quickly than continuing to operate the GETS under current conditions. Alternative 3 may be less effective than Alternatives 4 and 5 in the long term because it does not treat or remove Source Area Soils.

Alternative 4 would offer a high degree of long term effectiveness and permanence by removing impacted soils and transferring them off-Site, which would eliminate exposure to contaminants as well as prevent those contaminants from impacting groundwater. As with Alternative 3, optimization of the GETS will clean up the groundwater more quickly than continuing to operate the GETS under current conditions.

Alternative 5 would offer a high degree of long term effectiveness and permanence by capping and treating impacted Source Area Soils. As with Alternative 4, this would eliminate both exposure to soil contamination, as well as the leaching of soil contamination to groundwater. As with Alternatives 3 and 4, optimization of the GETS will clean up the groundwater more quickly than continuing to operate the GETS under current conditions.

4. Reduction of Toxicity, Mobility, or Volume through Treatment

All the remaining alternatives will reduce the toxicity, mobility, and volume of contaminants in sediment (through removal) and groundwater (through treatment by the GETS). Alternative 2 would be less effective in treating groundwater than Alternatives 3, 4, and 5 because Alternative 2 does not include GETS optimization.

Alternative 5 is the only alternative that would reduce the toxicity, mobility, and volume of COCs in Source Area Soils through treatment by SVE. Alternatives 2, 3, and 4 would not reduce the toxicity, mobility, and volume of COCs because they do not contain a treatment component for contaminated soils.

5. Short-Term Effectiveness

For Alternatives 2, 3, 4, and 5, the period of time needed to implement each alternative would be similar. Alternative 2 would likely take the shortest amount of time, as it only involves sediment removal and restoration of the FWWTP. Short term protectiveness would be provided by implementing measures to protect remedial construction workers, and through compliance with Occupational Safety and Health Administration (OSHA) work standards during sediment removal and restoration at the FWWTP, capping of soils (Alternatives 3 and 5), excavation and off-Site disposal of soils (Alternative 4), and treatment of Source Area Soils (Alternative 5). Implementation of Alternatives 2, 3, 4, and 5 are not expected to pose any risk to residents from construction activities because there are no residents in the immediate vicinity of the former FWEC Facility.

6. Implementability

All the remaining alternatives are readily implementable from a technical and administrative feasibility perspective. However, Alternative 2 would be easier to implement from a technical perspective than Alternatives 3, 4, and 5 because it only requires sediment removal and restoration, the implementation of ICs and continued O&M of the existing GETS. Of the remaining 3 alternatives, Alternative 4 may be more difficult than Alternatives 3 and 5 to implement due to the difficulty of excavating contaminated soils from the glacial till and weathered bedrock. The implementation of Alternative 5 (SVE) may also be difficult because of the difficulties extracting soil vapor through the compact glacial till. These difficulties would be addressed to the extent practicable by performing a pilot test prior to implementing full-scale SVE and modifying the design of the SVE system accordingly. Treatment of groundwater under Alternatives 2, 3, 4, and 5 would be easily implementable because the existing GETS is already installed and has been in operation for many years. The existing GETS can continue to operate with optimizations that would be easy to implement to improve its effectiveness, as described above.

7. Cost

Estimated costs associated with implementation of the remedial alternatives are presented in **Table 5**. The alternatives all have relatively similar cost estimates. Alternative 5 has the lowest

present value costs ($4,150,000), while Alternative 2 has the highest present value cost ($4,769,000). The costs for Alternative 2 are higher than Alternatives 3, 4, and 5 because it is assumed that the GETS system will have to operate longer and will have more O&M costs as a result.

8. State Acceptance

The State acceptance of the Preferred Interim Remedial Action Alternative will be evaluated after the public comment period ends. Substantive comments will be described in the Responsiveness Summary Section of the ROD.

9. Community Acceptance

Community acceptance of the Preferred Interim Remedial Action Alternative will be evaluated after the public comment period ends. Substantive comments will be described in the Responsiveness Summary Section of the ROD.

VIII. EPA'S PREFERRED INTERIM REMEDIAL ACTION ALTERNATIVE

EPA's Preferred Interim Remedial Action Alternative is **Alternative 5: Capping, Source Area Treatment, & GETS Optimization**. The estimated cost for Alternative 5 is $4,150,000, and the major components are shown on **Figure 5**. EPA is recommending Alternative 5 over the other alternatives because it is protective of human health and the environment, it will comply with ARARs, it uses treatment to the maximum extent practicable, it is readily implementable, and the alternative is cost-effective.

EPA's Preferred Interim Remedial Alternative includes the following:

A. Groundwater Extraction and Treatment

1. Treat and discharge groundwater to meet the substantive Pennsylvania Water Quality Standards for COCs.

2. Monitor air emissions in accordance with OSWER Directive 9355.0-28: *Control of Air Emissions from Air Strippers at Superfund Groundwater Sites* (June 15, 1989).

3. Extract and treat groundwater until RAOs (MCLs) are achieved throughout the contaminant plume at the former FWEC Facility.

4. Perform a capture zone analysis after optimization of the GETS to ensure full capture of the plume, and every five years thereafter.

5. Monitor groundwater for containment and capture of the GETS. Evaluate VOC concentration trends over time and contaminant plume stability.

6. Once the numerical performance standards are achieved, perform a cumulative risk assessment to ensure that exposure to groundwater would result in a cumulative excess carcinogenic risk of less than or equal to 10^{-4} and a cumulative excess non-carcinogenic HI of less than or equal to 1.

B. Soil Vapor Extraction

Before installation of a full-scale SVE system, a pilot test will be conducted to ensure that this technology will be effective. The performance standards listed below will be used as a baseline, but they may be modified as more data are collected during the pilot test design. Criteria for determining how long to operate the SVE system (if implemented) will also be developed during the design phase.

1. Achieve an air flow rate greater than 15 standard cubic feet per minute (scfm) at vacuum levels less than 16 inches of mercury (in Hg) through the impacted soil and/or weathered bedrock zones;

2. Achieve a 30-day time interval radius of influence of 10 feet or greater in all lateral directions from the extraction well;

3. Achieve soil air-phase permeabilities greater than $1x10^{-10}$ cm^2;

4. Chemicals shall be volatile and exhibit appropriate Henry's Law constants (0.01 dimensionless) and vapor pressures (0.1 mm Hg) for effective removal by SVE;

5. Depth to water table shall exceed 10 feet; and

6. Highly permeable fill or man-made passageways (e.g., sewers, pipe ways, or soil/weathered bedrock preferential pathways) should be absent to minimize airflow short circuiting or preferential flow.

C. Sediment Removal

1. Remove sediments that pose an unacceptable risk to ecological receptors in the FWWTP.

2. Restore the FWWTP with native wetland vegetation for maximum beneficial reuse.

D. Cap over Source Area Soils

The cap over Source Area Soils will be applied where contamination in the soil exceeds the PADEP Medium Specific Concentration (MSC) standard for TCE, which is 0.5 milligrams per kilogram (mg/kg). The cap shall meet the following requirements:

1. Provide long-term minimization of the migration of liquids through the closed impoundment;

2. Function with minimum maintenance;

3. Promote drainage and minimize erosion or abrasion of the final cover;

4. Accommodate settling and subsidence so that the cover's integrity is maintained; and

5. The cap shall have a permeability less than or equal to the permeability of the primary liner or a permeability no greater than 1 x 10^{-7} cm/sec, whichever is less.

E. Vapor Intrusion Monitoring and Mitigation

Conduct vapor intrusion sampling at any new construction within 100 feet of the contaminated groundwater plume, and at existing structures if concentrations of contaminants increase by an order of magnitude:

1. Vapor intrusion sampling shall consist of sub-slab, indoor air, and outdoor air sampling at each location, where practicable, in accordance with current EPA guidance;

2. Conduct vapor intrusion mitigation where sub-slab,[1] indoor air, and outdoor air sampling results indicate that actual or potential migration of Site-related compounds from contaminated groundwater to indoor air would result in unacceptable human health risk ; and

3. Vapor intrusion mitigation shall continue until:

    a) Groundwater beneath or within 100 lateral or vertical feet of the mitigated structure meets MCLs, and

    b) Sub-slab, indoor air, and outdoor air sampling results indicate that actual or potential migration of Site-related compounds from contaminated groundwater to indoor air would result in a cumulative excess carcinogenic risk of less than or equal to 10^{-6} and a cumulative excess non-carcinogenic HI of less than or equal to 1.

F. Institutional Controls

The institutional controls shall consist of the following requirements:

[1] In order to evaluate the potential risk posed to human health by sub-slab soil vapor, an attenuation factor shall be applied to the sub-slab soil vapor data to represent the extent to which sub-slab soil vapor is expected to enter the indoor air of a structure. For the purposes of this Proposed Plan, and in accordance with current EPA guidance, an attenuation factor of 0.03 shall be utilized.

1. Use and/or contact with groundwater at the former FWEC Facility, via ingestion, dermal contact, or vapor inhalation, within the contaminated plume that would result in unacceptable risks to human health shall be prohibited;

2. Activities that adversely impact the selected interim remedy, such as excavation or construction, shall be prohibited without prior written EPA approval;

3. Conduct vapor intrusion sampling at any new construction within 100 feet of the contaminant plume;

    a) Vapor intrusion sampling shall consist of sub-slab, indoor air, and outdoor air sampling at each location, where practicable, in accordance with current EPA guidance;

    b) Vapor intrusion mitigation shall be conducted if sub-slab, indoor air, and outdoor air sampling results indicate that actual or potential migration of Site-related compounds from contaminated groundwater to indoor air would result in a cumulative excess carcinogenic risk of greater than or equal to 10^{-4} and/or a cumulative excess non-carcinogenic Hazard Index (HI) greater than 1; and

    c) Vapor intrusion mitigation shall continue until:

        i. Groundwater beneath or within 100 lateral or vertical feet of the mitigated structure meets MCLs and,

        ii. Sub-slab, indoor air, and outdoor air sampling results indicate that actual or potential migration of Site-related compounds from contaminated groundwater to indoor air would result in a cumulative excess carcinogenic risk of less than or equal to 10^{-6} and a cumulative excess non-carcinogenic HI of less than or equal to 1.

Based on the information available at this time, EPA believes the Preferred Alternative, Alternative 5: Capping, Source Area Treatment, & GETS Optimization, meets the threshold criteria and provides the best balance with respect to the balancing criteria. EPA expects the Preferred Alternative to satisfy the following statutory requirements of CERCLA § 121, 42 U.S.C. § 9621: 1) be protective of human health and the environment; 2) comply with ARARs (or justify a waiver); 3) be cost-effective; 4) utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable; and 5) satisfy the preference for treatment as a principal element.

IX. COMMUNITY PARTICIPATION

EPA relies on public input so that the remedy selected for each Superfund site meets the needs and concerns of the local community.

Public Comment Period - To ensure that the community's concerns are being addressed, a public comment period will open **May 9, 2018 and close June 8, 2018**. During the public comment period, the public is encouraged to submit to EPA any comments on the Proposed Plan.

Public Meeting - A public meeting will be held to discuss the Proposed Plan on **May 23, 2018 at 7:00 p.m**. The public meeting will be held at St. Jude's School, 422 Mountain Blvd, Mountain Top, PA 18707.

During the comment period, you are invited to participate in any of the following ways: 1) by letter to Will Geiger or Larry Johnson at the addresses listed to the right, 2) by email to: geiger.william@epa.gov or Johnson.larry-c@epa.gov, and/or 3) in person at the public meeting. If you have any questions about the public meeting, contact Will Geiger or Larry Johnson at the address or telephone numbers listed.

Written comments, questions about the Proposed Plan or public meeting, and requests for information can be sent to either representative below:

Will Geiger, 3HS21
Remedial Project Manager
U.S. EPA
1650 Arch Street
Philadelphia, PA 19103-2029
215-814-3413
Geiger.William@epa.gov

Larry Johnson, 3HS52
Community Involvement Coordinator
U.S. EPA
1650 Arch Street
Philadelphia, PA 19103-2029
215-814-3239
Johnson.Larry-c@epa.gov

It is important to note that although EPA has proposed its Preferred Interim Remedial Alternative, the interim remedy has not yet been selected for the Site. All relevant comments received will be considered and addressed by EPA before the interim remedy is selected for the former FWEC Facility.

Detailed information on the material discussed herein may be found in the Administrative Record for the Site, which includes the RI/FS and other information used by EPA in the decision-making process. EPA encourages the public to review the Administrative Record in order to gain a more comprehensive understanding of the Site and the Superfund activities that have taken place there. Copies of the Administrative Record are available for review at https://semspub.epa.gov/src/collection/03/AR65604, or at the following locations:

Marian Sutherland Kirby Library
35 Kirby Avenue
Mountaintop, PA 18707
(570) 474-9313

EPA Administrative Records Room
Attention: Administrative Coordinator
1650 Arch Street
Philadelphia, PA
(215) 814-3157

Hours: Monday through Friday,
8:00am to 4:30pm; by appointment
only

Following the conclusion of the public comment period on this Proposed Plan, a Responsiveness Summary will be prepared. The Responsiveness Summary will summarize and respond to substantive comments on EPA's Preferred Interim Remedial Action Alternative for the former FWEC Facility. EPA will then prepare a formal decision document, the ROD, which summarizes the decision process and the interim remedy for the Site. The ROD will include the Responsiveness Summary. Copies of the ROD will be available for public review in the designated repositories, described above.

Table 1: Human Health Contaminants of Concern (COCs)
FWEC/Church Road TCE Site

Exposure Point	Compound of Concern [a]	Pathway	Units	EPC [c]	Preliminary Remediation Goal [b]		Preliminary Remediation Goal [b]			Potential ARAR/TBC	Selected Remediation Level	Basis
					HI = 0.1	HI = 1	1.E-06	1.E-05	1.E-04			
Soil										**PADEP MSC (ARAR)**		
Former FWEC Facility Soil - Former Vapor Degreaser Area	1,1,2-Trichloroethane	Residential Direct Contact	mg/kg	2.94E+00	2.0E-01	2.0E+00	1.5E+00	1.5E+01	1.5E+02	NA (d)	NA	PADEP MSC
	Trichloroethene	Residential Direct Contact	mg/kg	4.10E+02	5.2E-01	5.2E+00	2.8E-01	2.8E+00	2.8E+01	5.0E-01	5.0E-01	PADEP MSC
	Trichloroethene	Commercial Direct Contact	mg/kg	4.10E+02	2.4E+00	2.4E+01	8.1E+00	8.1E+01	8.1E+02	5.0E-01	5.0E-01	PADEP MSC
	Trichloroethene	Construction/Utility Worker Direct Contact	mg/kg	4.10E+02	2.2E+00	2.2E+01	1.5E+02	1.5E+03	1.5E+04	5.0E-01	5.0E-01	PADEP MSC
Groundwater										**MCL (ARAR)**		
Former FWEC	Trichloroethene	Residential Tap Water	mg/L	7.46E-01	**8.8E-04**	8.8E-03	**1.0E-03**	1.0E-02	1.0E-01	5.0E-03	5.0E-03	MCL
	Trichloroethene	Commercial Tap Water	mg/L	7.46E-01	1.4E-02	1.4E-01	6.8E-03	6.8E-02	6.8E-01	5.0E-03	5.0E-03	MCL
	Trichloroethene	Future Construction in a Trench	mg/L	7.46E-01	2.7E-03	2.7E-02	2.3E-01	2.3E+00	2.3E+01	5.0E-03	5.0E-03	MCL
Affected Area	Trichloroethene	Residential Tap Water	mg/L	3.01E-02	**6.5E-04**	6.5E-03	**8.1E-04**	8.1E-03	8.1E-02	5.0E-03	5.0E-03	MCL
Surrounding Industrial Properties	Trichloroethene	Residential Tap Water	mg/L	5.95E-02	**6.5E-04**	6.5E-03	**8.2E-04**	8.2E-03	8.2E-02	5.0E-03	5.0E-03	MCL
	Trichloroethene	Future Construction in a Trench	mg/L	5.95E-02	**2.8E-03**	2.8E-02	2.4E-01	2.4E+00	2.4E+01	5.0E-03	5.0E-03	MCL
Vapor Intrusion - Indoor Air PRGs as Calculated from Groundwater - Remediation Levels are selected for subslab soil vapor only										**VISL (Indoor Air) (TBC)**		
Former FWEC Facility Indoor Air PRG Calcs	1,1,1-Trichloroethane	Residential VI	mg/m3	4.21E+01	5.2E-01	5.2E+00	--	--	--	5.2E+00	NA	
	1,1,1-Trichloroethane	Commercial VI	mg/m3	4.21E+01	2.2E+00	2.2E+01	--	--	--	2.2E+01	NA	
	1,1,2-Trichloroethane	Residential VI	mg/m3	3.93E-02	2.1E-05	2.1E-04	1.8E-04	1.8E-03	1.8E-02	1.8E-04	NA	
	1,1,2-Trichloroethane	Commercial VI	mg/m3	3.93E-02	8.7E-05	8.7E-04	7.7E-04	7.7E-03	7.7E-02	7.7E-04	NA	
	1,1-Dichloroethane	Residential VI	mg/m3	2.88E+00	--	--	1.7E-03	1.7E-02	1.7E-01	1.8E-03	NA	
	1,1-Dichloroethane	Commercial VI	mg/m3	2.88E+00	--	--	7.6E-03	7.6E-02	7.6E-01	7.7E-03	NA	
	1,1-Dichloroethene	Residential VI	mg/m3	6.19E+00	2.1E-02	2.1E-01	--	--	--	2.1E-01	NA	
	1,1-Dichloroethene	Commercial VI	mg/m3	6.19E+00	8.7E-02	8.7E-01	--	--	--	8.8E-01	NA	
	Naphthalene	Residential VI	mg/m3	2.10E-02	3.1E-04	3.1E-03	8.2E-05	8.2E-04	8.2E-03	8.3E-05	NA	
	Naphthalene	Commercial VI	mg/m3	2.10E-02	1.3E-03	1.3E-02	3.6E-04	3.6E-03	3.6E-02	3.6E-04	NA	
	Tetrachloroethene	Residential VI	mg/m3	6.41E-02	4.3E-03	4.3E-02	1.1E-02	1.1E-01	1.1E+00	1.1E-02	NA	
	Trichloroethene	Residential VI	mg/m3	6.64E-02	2.1E-04	2.1E-03	1.0E-04	1.0E-03	1.0E-02	4.8E-04	NA	
	Trichloroethene	Commercial VI	mg/m3	6.64E-02	8.7E-04	8.7E-03	3.0E-03	3.0E-02	3.0E-01	3.0E-03	NA	
	Xylenes, Total	Residential VI	mg/m3	2.97E-01	1.1E-02	1.1E-01	--	--	--	1.0E-01	NA	
Vapor Intrusion - Subslab ARARs/TBCs protective of Indoor Air										**VISL (Subslab Soil Vapor) (TBC)**		
Former FWEC Facility Subslab ARAR/TBC Selection	1,1,1-Trichloroethane	Residential VI	mg/m3		--	--	--	--	--	1.7E+02	1.7E+02	VISL (Resi)
	1,1,1-Trichloroethane	Commercial VI	mg/m3		--	--	--	--	--	7.3E+02	7.3E+02	VISL (Com)
	1,1,2-Trichloroethane	Residential VI	mg/m3		--	--	--	--	--	5.8E-03	5.8E-03	VISL (Resi)
	1,1,2-Trichloroethane	Commercial VI	mg/m3		--	--	--	--	--	2.6E-02	2.6E-02	VISL (Com)
	1,1-Dichloroethane	Residential VI	mg/m3		--	--	--	--	--	5.8E-02	5.8E-02	VISL (Resi)
	1,1-Dichloroethane	Commercial VI	mg/m3		--	--	--	--	--	2.6E-01	2.6E-01	VISL (Com)
	1,1-Dichloroethene	Residential VI	mg/m3		--	--	--	--	--	7.0E+00	7.0E+00	VISL (Resi)
	1,1-Dichloroethene	Commercial VI	mg/m3		--	--	--	--	--	2.9E+01	2.9E+01	VISL (Com)
	Naphthalene	Residential VI	mg/m3		--	--	--	--	--	2.8E-03	2.8E-03	VISL (Resi)
	Naphthalene	Commercial VI	mg/m3		--	--	--	--	--	1.2E-02	1.2E-02	VISL (Com)
	Tetrachloroethene	Residential VI	mg/m3		--	--	--	--	--	3.6E-01	3.6E-01	VISL (Resi)
	Trichloroethene	Residential VI	mg/m3		--	--	--	--	--	1.6E-02	1.6E-02	VISL (Resi)
	Trichloroethene	Commercial VI	mg/m3		--	--	--	--	--	1.0E-01	1.0E-01	VISL (Com)
	Xylenes, Total	Residential VI	mg/m3		--	--	--	--	--	3.5E+00	3.5E+00	VISL (Resi)

Notes:

-- No PRG calculated

ARAR/TBC - Applicable or Relevant and Appropriate Requirements/To Be Considered.

EPC - Exposure Point Concentration.

MCL - Maximum Contamination Level (USEPA, 2017a)

NA - Not applicable.

PADEP - The State of Pennsylvania Department of Environmental Protection (PADEP) Medium Specific Concentration (MSC), Table 3b - Soil to Groundwater Numeric Values.
Land Recycling Program 25 Pa Code, Chapter 250 Subchapter C, Pennsylvania Department of Environmental Protection (PADEP) Statewide Health Standards, sets forth concentrations of regulated substances with a specific environmental medium, designated as Medium Specific Concentrations (MSCs) (ARAR).

PRG - Preliminary Remediation Goal

VISL - Vapor Intrusion Screening Level Calculator Version 3.5 for Residential and Commercial Use (June, 2017) Target hazard index of 1 and target cancer risk of $1x10^{-6}$ (USEPA, 2017b).

(a) COCs have been selected as per Table 1.

(b) PRGs have been calculated as per Table 2.

(c) EPCs are documented in the BHHRA. Groundwater concentrations shown for the groundwater to indoor air pathway are the maximum detected concentrations used for COPC selection.

(d) TCE is the primary risk driver in soil for which risk exceeds 1x10-4 and HI equal or greater to 1; therefore RGs were not selected for other co-located compounds such as 1,1-TCA because remediation of TCE in soil would address these related compounds that are present at low concentrations and do not pose significant risk on their own.

Table 2:
Contaminants of Potential Ecological of Concern (COPECs)
FWWTP – Surface Water
FWEC/Church Road TCE Site

Exposure Point	Chemical *	Minimum Concentration	Maximum Detected Concentration	Location of Maximum Detected Concentration	Detection Frequency	Concentration Used for Screening	Notes (a)	Ecological Screening Level (b)	Reference (b)	Hazard Quotient (HQ) (c)	Maximum Detected Background Concentration	COPEC Flag (Y/N)	Rationale for Selection or Deletion (d)
Former Waste Water Treatment Pond	Acetone	2.5U	12	SW-04/2017	2/6	12	MAX	1,500	1	0.0080	3.9J	N	BSL
	Methylene chloride	1.0U	0.54J	SW-04/2017	1/2	0.54	MAX	98.1	1	0.0055	0.56J	N	BSL, BBL
	Toluene	0.54J	2.9	SW-01/2017	2/2	2.9	MAX	2.0	1	**1.5**	ND	**Y**	**ASL, ABL**
	Benzo(b)fluoranthene	1.0U	0.93J	SW-01/2017	1/2	0.93	MAX	2.6	2	0.36	ND	N	BSL
	Butylbenzylphthalate	10U	0.68J	SW02(DUP)/2011	8/10	0.68	MAX	16	1	0.043	ND	N	BSL
	Di-n-butylphthalate	0.13U	0.15J	SW02(DUP)/2011	1/6	0.15	MAX	19	1	0.0079	ND	N	BSL
	Fluoranthene	0.016U	0.055J	SW01/2011	3/10	0.055	MAX	0.040	1	**1.4**	ND	**Y**	**ASL, ABL**
	Phenanthrene	0.042U	0.061J	SW01/2011	2/6	0.061	MAX	0.40	1	0.15	ND	N	BSL
	Pyrene	0.016U	0.038J	SW02/2011	4/10	0.038	MAX	0.025	1	**1.5**	ND	**Y**	**ASL, ABL**
	Delta-BHC	0.018U	0.041J	SW01/2011	2/6	0.041	MAX	141	1	0.00029	ND	N	BSL
	Endosulfan I	0.02U	0.10	SW02&SW03/2011	3/6	0.10	MAX	0.051	1	**2.0**	ND	**Y**	**ASL, ABL**
	Aluminum	200 U	555	SW-01/2017	18/20	555	MAX	87	1	6.4	975	N	BBL
	Antimony	1.3U	1.6B	SW02/2011	3/12	1.6	MAX	30	1	0.053	ND	N	BSL
	Barium	10J	37.8J	SW-01/2017	20/20	37.8	MAX	4.0	1	**9.5**	37	**Y**	**ASL, ABL**
	Beryllium	0.23U	0.37B	SW03/2011	11/16	0.37	MAX	0.66	1	0.56	ND	N	BSL
	Cobalt	0.40U	0.70B	SW02(DUP)/2011	3/20	0.70	MAX	23	1	0.030	ND	N	BSL
	Copper	2.7U	8.7J	SW-01/2017	11/20	8.7	MAX	4.9	2	1.8	14.9J	N	BBL
	Lead	1.3U	6.8J	SW-01/2017	6/16	6.8	MAX	1.3	2	**5.2**	ND	**Y**	**ASL, ABL**
	Manganese	1.4J	454J	SW-01/2017	20/20	454	MAX	120	1	**3.8**	57J	**Y**	**ASL, ABL**
	Nickel	1.6U	7.6J	SW01/2011	3/16	7.6	MAX	29	2	0.26	ND	N	BSL
	Silver	0.68U	1.3B	SW02(DUP)/2011	2/8	1.3	MAX	0.23	1	**5.7**	ND	**Y**	**ASL, ABL**
	Thallium	2.4U	3.7B	SW02/2011	2/16	3.7	MAX	0.80	1	**4.6**	ND	**Y**	**ASL, ABL**
	Zinc	9.6J	127	SW01/2011	20/20	127	MAX	67	2	**1.9**	61.7	**Y**	**ASL, ABL**

Notes:
All concentrations in micrograms per liter (µg/L).
COPEC = Contaminant of Potential Ecological Concern.
ND = Not detected.

* = Calcium, iron, magnesium, and sodium were not included as they are considered to be essential nutrients.

Qualifiers:
J - The concentration is an estimated value.
U - The compound was not detected at the indicated concentration limit.
B - Reported value may be wholly or partially due to contamination in an associated blank sample.

Bold = Constiuent determined to be a COPEC in surface water

a MAX = Maximum detected concentration.
b 1 - United States Environmental Protection Agency (USEPA) Region III Biological Technical Assisstance Group (BTAG) Freshwater Screening Benchmarks (USEPA, 2006).
2 - USEPA Region 4 Ecological Risk Assessment Supplemental Guidance Interim Draft. Freshwater Screening Values used from the Surface Water Screening Values for Hazardous Waste Sites table (USEPA, 2015).
c Hazard quotient calculated by dividing the concentration used for screening by the ecological screening level.
d BSL = Below Screening Level
BBL = Below Background Level
ASL = Above Screening Level
ABL = Above Background Level

Table 3: Contaminants of Potential Ecological of Concern (COPECs)
FWWTP – Sediment
FWEC/Church Road TCE Site

Exposure Point	Chemical *	Minimum Concentration	Maximum Detected Concentration	Location of Maximum Detected Concentration	Detection Frequency	Concentration Used for Screening	Notes (a)	Ecological Screening Levels	Reference (b)	Hazard Quotient (HQ) (c)	Maximum Detected Background Concentration	COPEC Flag (Y or N)	Rationale for Selection or Deletion (d)
Former Waste Water Treatment Pond	1,4-Dichlorobenzene	0.0013U	0.07J	SD02(DUP)/2011	1/8	0.07	MAX	0.599	1	0.12	ND	N	BSL
	2-Butanone	0.0094J	0.026	SD-04/2017	4/4	0.026	MAX	0.992	2	0.026	0.0013J	N	BSL
	Carbon disulfide	0.0013U	0.0017J	SD-04/2017	2/4	0.0017	MAX	0.000851	1	**2.0**	ND	Y	ASL, ABL
	Toluene	0.0013U	0.00049J	SD-03/2017	2/4	0.00049	MAX	0.145	2	0.0034	ND	N	BSL
	2-Methylnaphthalene	0.0036U	5.3	SD01/2011	5/8	5.3	MAX	0.0202	1	**262**	0.0065	Y	ASL, ABL
	3&4-Methylphenol	0.021U	0.049J	SD-04/2017	3/8	0.049	MAX	0.67	1	0.073	0.016J	N	BSL
	4-Chloroaniline	0.017U	2.5J	SD01/2011	4/8	2.5	MAX	0.316	2	**7.9**	ND	Y	ASL, ABL
	Acenaphthene	0.0041U	29	SD01/2011	7/8	29	MAX	0.0067	1	**4328**	0.021J	Y	ASL, ABL
	Acenaphthylene	0.0049U	1.6	SD01/2011	5/8	1.6	MAX	0.0059	1	**271**	0.064	Y	ASL, ABL
	Anthracene	0.02J	56	SD01/2011	8/8	56	MAX	0.0572	1	**979**	0.047	Y	ASL, ABL
	Benzo[a]anthracene	0.093	140	SD01/2011	8/8	140	MAX	0.108	1	**1296**	0.17	Y	ASL, ABL
	Benzo[a]pyrene	0.13	110	SD01/2011	8/8	110	MAX	0.15	1	**733**	0.20	Y	ASL, ABL
	Benzo[b]fluoranthene	0.18	110	SD01/2011	8/8	110	MAX	0.0272	1	**4044**	0.21	Y	ASL, ABL
	Benzo[g,h,i]perylene	0.13	72	SD01/2011	8/8	72	MAX	0.17	1	**424**	0.15	Y	ASL, ABL
	Benzo[k]fluoranthene	0.068	51	SD01/2011	8/8	51	MAX	0.24	1	**213**	0.095	Y	ASL, ABL
	Biphenyl	0.13U	0.031J	SD-01/2017	1/4	0.031	MAX	1.22	1	0.025	ND	N	BSL
	Bis(2-ethylhexyl) phthalate	0.48U	0.59	SD-01/2017	6/8	0.59	MAX	0.18	1	**3.3**	ND	Y	ASL, ABL
	Carbazole	0.03J	46	SD01/2011	8/8	46	MAX	0.90	2	**51**	0.011	Y	ASL, ABL
	Chrysene	0.17	150	SD01/2011	8/8	150	MAX	0.166	1	**904**	0.27	Y	ASL, ABL
	Dibenzo[a,h]anthracene	0.025J	32	SD01/2011	8/8	32	MAX	0.033	1	**970**	0.012	Y	ASL, ABL
	Dibenzofuran	0.021U	22	SD01/2011	7/8	22	MAX	0.415	1	**53**	0.0051J	Y	ASL, ABL
	Fluoranthene	0.27	310J	SD01/2011	8/8	310	MAX	0.423	1	**733**	0.29	Y	ASL, ABL
	Fluorene	0.0056U	36	SD01/2011	7/8	36	MAX	0.077	1	**466**	0.02J	Y	ASL, ABL
	Indeno[1,2,3-cd]pyrene	0.12	67	SD01/2011	8/8	67	MAX	0.017	1	**3941**	0.13	Y	ASL, ABL
	Naphthalene	0.0037U	7.4	SD01/2011	4/8	7.4	MAX	0.176	1	**42**	0.016J	Y	ASL, ABL
	Phenanthrene	0.16	280	SD01/2011	8/8	280	MAX	0.204	1	**1373**	0.14	Y	ASL, ABL
	Pyrene	0.21	220	SD01/2011	8/8	220	MAX	0.195	1	**1128**	0.32	Y	ASL, ABL
	Aroclor-1248	0.00099U	1.3	SD01/2011	1/8	1.3	MAX	NC	NA	NA	ND	Y	ABL
	Aroclor-1260	0.1U	0.60	SD02(DUP)/2011	4/8	0.60	MAX	NC	NA	NA	ND	Y	ABL
	4,4'-DDD	0.01U	0.012J	SD01/2011	4/8	0.012	MAX	0.00488	1	**2.5**	ND	Y	ASL, ABL
	4,4'-DDE	0.0015U	0.0013J	SD02/2011	2/8	0.0013	MAX	0.00316	1	0.41	ND	N	BSL
	4,4'-DDT	0.00016U	0.014J	SD02/2011	2/8	0.014	MAX	0.00416	1	**3.4**	ND	Y	ASL, ABL
	Beta-BHC	0.00027U	0.00079J	SD02/2011	1/8	0.00079	MAX	0.0050	1	0.16	ND	N	BSL
	Delta-BHC	0.00016U	0.014J	SD01/2011	1/8	0.014	MAX	6.4	1	0.0022	ND	N	BSL
	Dieldrin	0.0017U	0.0059J	SD01/2011	3/8	0.0059	MAX	0.0019	1	**3.1**	ND	Y	ASL, ABL
	Endosulfan II	0.002U	0.0062J	SD02(DUP)/2011	3/8	0.0062	MAX	0.014	1	0.59	ND	N	BSL
	Endosulfan sulfate	0.0012U	0.0064J	SD02(DUP)/2011	3/8	0.0064	MAX	0.0054	1	**1.6**	ND	Y	ASL, ABL
	Endrin	0.01U	0.017J	SD01/2011	4/8	0.017	MAX	0.00222	1	**7.7**	ND	Y	ASL, ABL
	Endrin aldehyde	0.0022U	0.0041J	SD02(DUP)/2011	3/8	0.0041	MAX	0.46	3	0.0085	ND	N	BSL
	Endrin ketone	0.0018U	0.0092J	SD02(DUP)/2011	3/8	0.0092	MAX	NC	NA	NA	ND	Y	ABL
	Gamma-BHC (Lindane)	0.00016U	0.0054J	SD02(DUP)/2011	2/8	0.00540	MAX	0.00237	1	**2.3**	ND	Y	ASL, ABL
	Heptachlor	0.00023U	0.0073J	SD01/2011	2/8	0.0073	MAX	0.068	1	0.11	ND	N	BSL
	Heptachlor epoxide	0.01U	0.018J	SD01/2011	4/8	0.018	MAX	0.00247	1	**7.3**	ND	Y	ASL, ABL
	Methoxychlor	0.01U	0.031J	SD01/2011	4/8	0.031	MAX	0.0187	1	**1.7**	ND	Y	ASL, ABL
	Aluminum	4,400	13,800	SD-02/2017	8/8	13,800	MAX	25,000	2	0.55	6,170	N	BSL
	Antimony	6.0U	1.1J	SD01/2011	4/8	1.1	MAX	2.0	1	0.55	ND	N	BSL
	Arsenic	5.2K	11.3	SD-04/2017	8/8	11.3	MAX	9.8	1	**1.2**	4.8	Y	ASL, ABL
	Barium	31.8	89.8	SD-04/2017	8/8	89.8	MAX	20	2	**4.5**	56.3	Y	ASL, ABL
	Beryllium	1.3U	0.85	SD-02/2017	7/8	0.85	MAX	NC	NA	NA	1.1	N	BSL
	Cadmium	0.14L	5.8	SD-04/2017	8/8	5.8	MAX	0.99	1	**5.9**	ND	Y	ASL, ABL
	Chromium	14JB	36.1	SD-04/2017	8/8	36.1	MAX	43.4	1	0.83	14.1	N	BSL
	Cobalt	4.6	15.7	SD-04/2017	8/8	15.7	MAX	50	1	0.31	10.7J	N	BSL
	Copper	12J	108	SD-04/2017	8/8	108	MAX	31.6	1	**3.4**	10.2	Y	ASL, ABL
	Lead	14L	127J	SD-04/2017	8/8	127	MAX	35.8	1	**3.5**	21	Y	ASL, ABL
	Manganese	75JB	188	SD-04/2017	8/8	188	MAX	460	1	0.41	702	N	BSL, BBL
	Mercury	0.032	0.15	SD02/2011	8/8	0.15	MAX	0.18	1	0.83	0.016J	N	BSL
	Nickel	9.8J	40.8	SD-04/2017	8/8	40.8	MAX	22.7	1	**1.8**	14.8	Y	ASL, ABL
	Selenium	0.67U	0.75	SD02/2011	3/8	0.75	MAX	2.0	1	0.38	ND	N	BSL
	Silver	2.1L	170L	SD02(DUP)/2011	8/8	170	MAX	1.0	1	**170**	ND	Y	ASL, ABL
	Vanadium	13	31.7	SD-04/2017	8/8	31.7	MAX	50	4	0.63	12.1J	N	BSL
	Zinc	56JB	1,020	SD-04/2017	8/8	1,020	MAX	121	1	**8.4**	110	Y	ASL, ABL

Notes:
All concentrations in milligrams per kilogram (mg/kg).
COPEC = Contaminant of Potential Ecological Concern.
ND = Not detected.

* = Calcium, magnesium, and sodium were not included as they are considered to be essential nutrients. Aluminum was not included as it is only considered to be a COPEC in soils with a pH below 5.5. Iron was not included as it is considered to be non-toxic in soils with a pH range of 5.0 to 8.0.

Qualifiers:
J - The concentration is an estimated value.
U - The compound was not detected at the indicated concentration limit.
K - Reported concentration value may be biased high.
L - Reported concentration value may be biased low.
B - Reported value may be wholly or partially due to contamination in an associated blank sample.

a MAX = Maximum detected concentration.
b 1 - United States Environmental Protection Agency (USEPA) Region III Biological Technical Assistance Group (BTAG) Freshwater Sediment Screening Benchmarks (USEPA, 2006).
2 - USEPA Region 4 Ecological Risk Assessment Supplemental Guidance Interim Draft. Freshwater Ecological Screening Values for Step 2 (ESVs) used from Sediment Screening Values for Hazardous Waste Sites table (USEPA, 2015).
3 - USEPA Region 5 Resource Conservation and Recovery Act (RCRA) Ecological Screening Levels for Sediment (USEPA, 2003).
4 - National Oceanic and Atmospheric Administration (NOAA) Screening Quick Reference Tables. Background value used (Buchman, 2008).
c Hazard quotient calculated by dividing the concentration used for screening by the ecological screening level.
d BSL = Below Screening Level
BBL = Below Background Level
ASL = Above Screening Level
ABL = Above Background Level

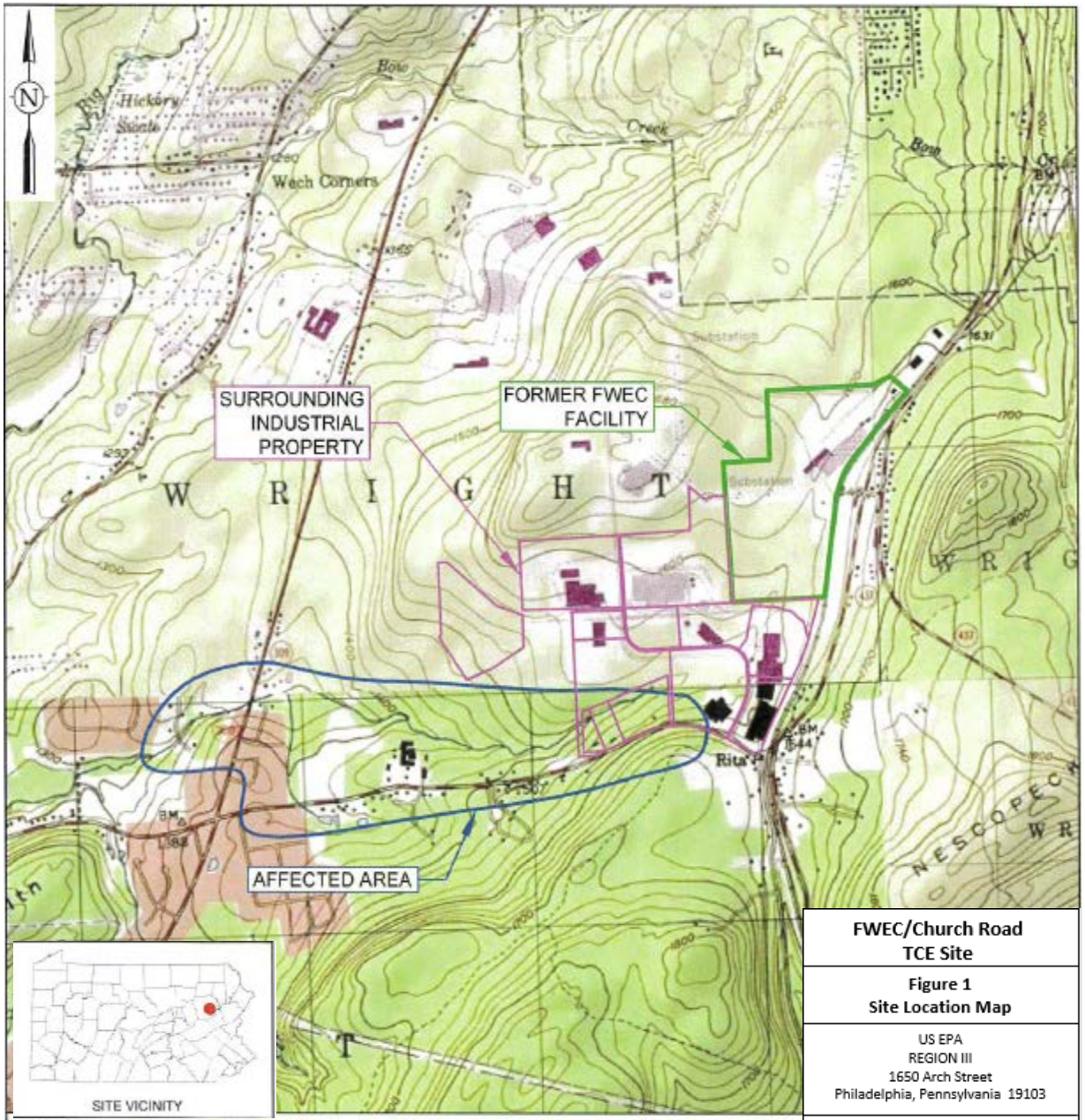
Bold = Constituent determined to be a COPEC in sediment

Table 5: Summary of Remedial Alternative Costs
FWEC/Church Road TCE Site

Remedial Alternative	Total Project Duration (Years)	Capital Cost (Base Year Cost)	Annual NPV O&M Cost	*Total NPV Cost
Alternative 1 No Action	0	$0	$0	$0
Alternative 2 Operation & Maintenance of Existing Mitigation Systems	30	$424,000	$4,345,000	$4,769,000
Alternative 3 Capping & GETS Optimization	30	$842,000	$3,876,000	$4,718,000
Alternative 4 Excavation & GETS Optimization	30	$1,635,000	$3,047,000	$4,682,000
Alternative 5 Capping, Source Area Treatment & GETS Optimization	30	$1,218,000	$2,932,000	$4,150,000

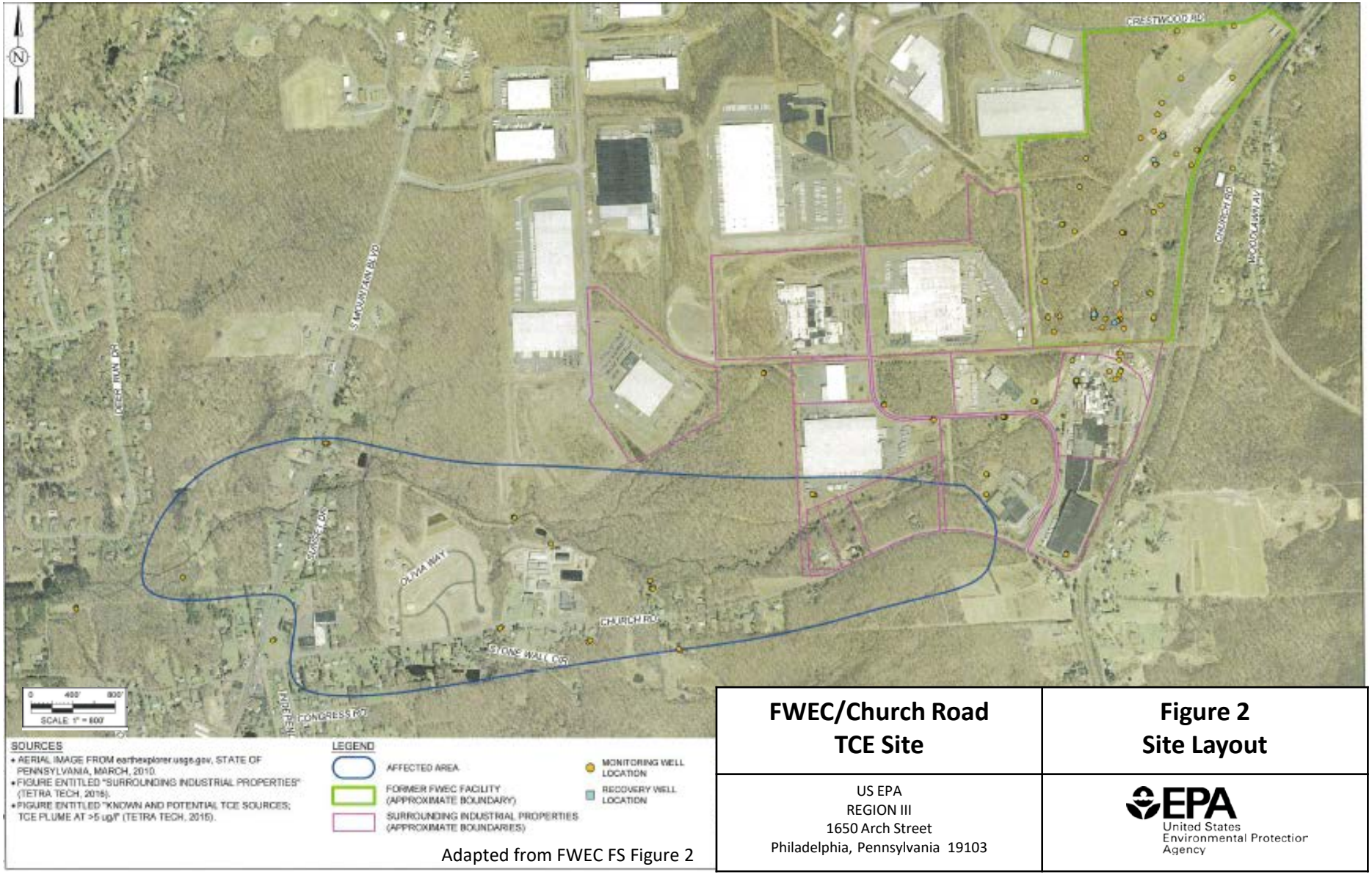
**Total present worth costs for each alternative calculated using an annual discount factor of 7% (EPA 1988, 2000)*

GETS = groundwater extraction and treatment system O&M = operations & maintenance NPV = net present value



Adapted from FWEC FS Figure 1

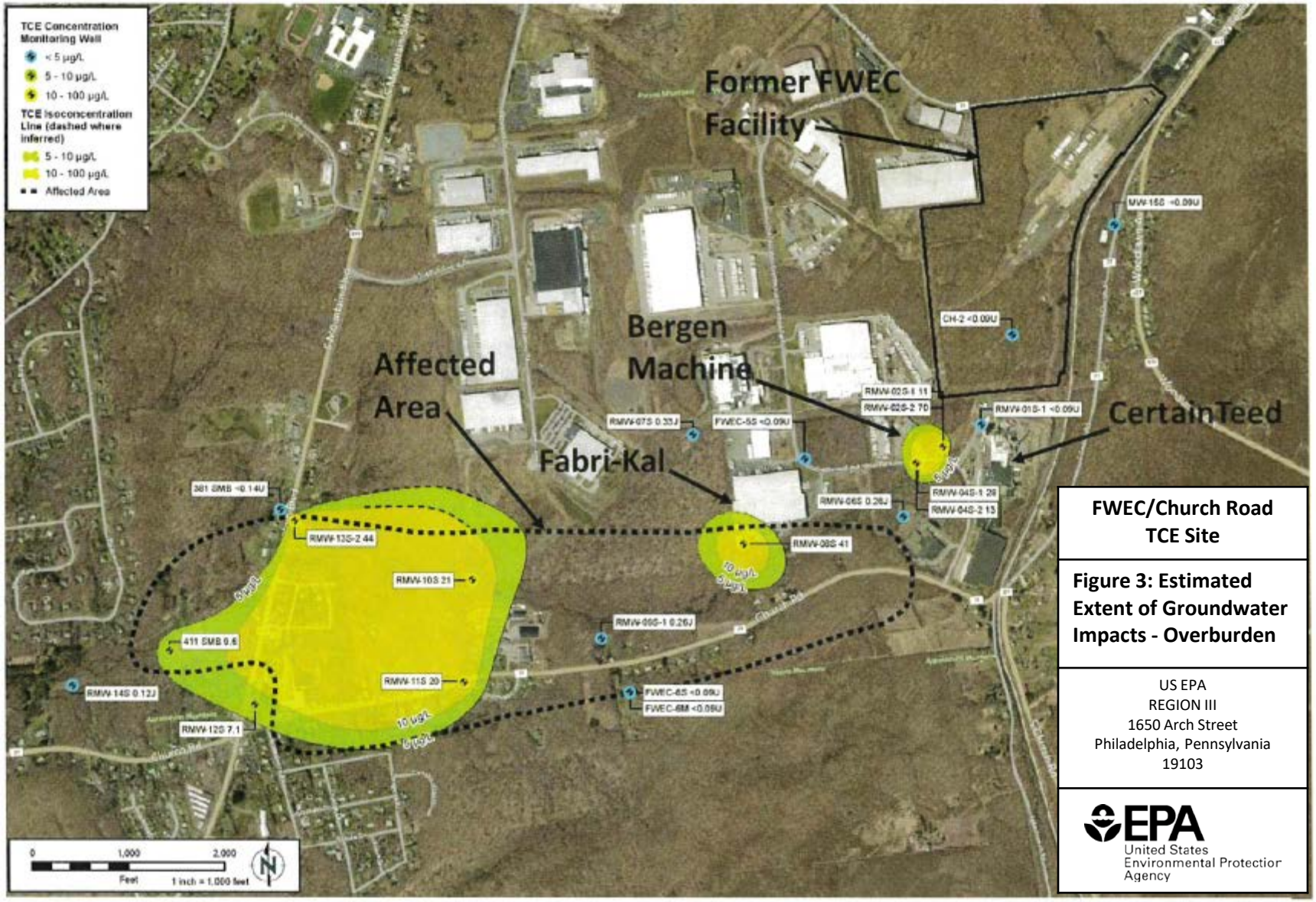
AR304127



Adapted from FWEC FS Figure 2

FWEC/Church Road TCE Site	Figure 2 Site Layout
US EPA REGION III 1650 Arch Street Philadelphia, Pennsylvania 19103	EPA United States Environmental Protection Agency

AR304128



FWEC/Church Road TCE Site

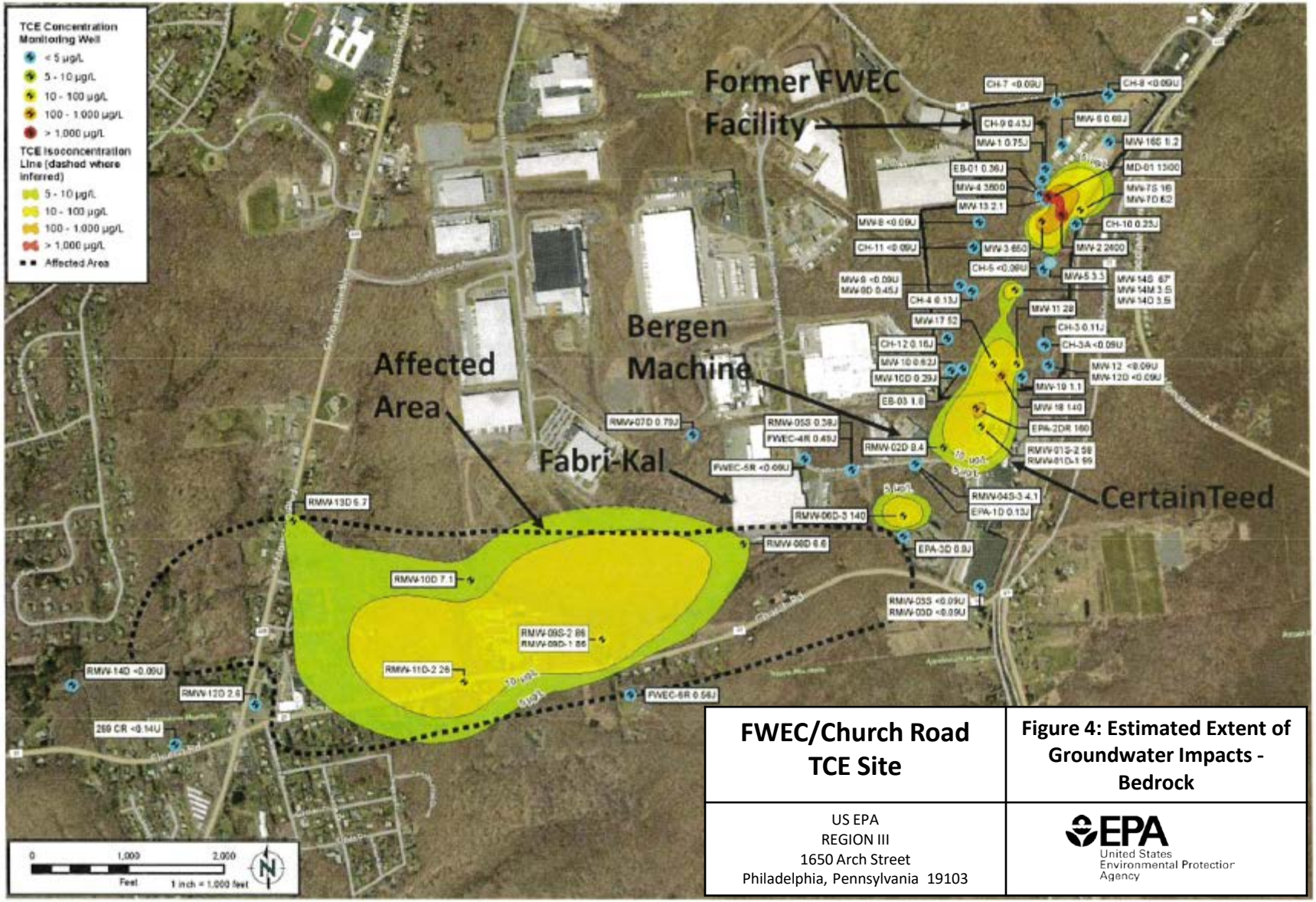
Figure 3: Estimated Extent of Groundwater Impacts - Overburden

US EPA
REGION III
1650 Arch Street
Philadelphia, Pennsylvania
19103

EPA United States Environmental Protection Agency

Adapted from FWEC FS Figure 8

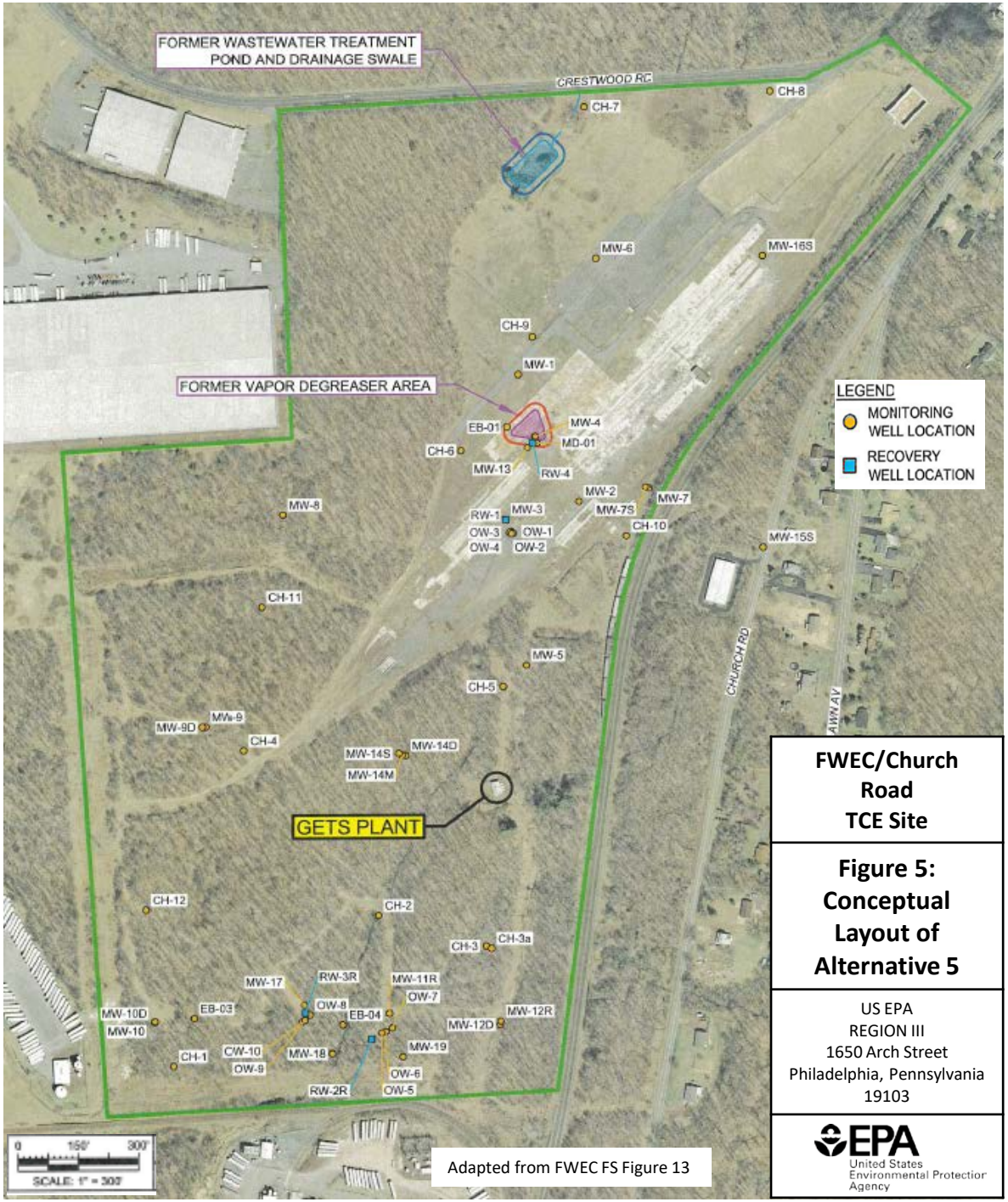
AR304129



FWEC/Church Road TCE Site	Figure 4: Estimated Extent of Groundwater Impacts - Bedrock
US EPA REGION III 1650 Arch Street Philadelphia, Pennsylvania 19103	EPA United States Environmental Protection Agency

Adapted from FWEC FS Figure 9

AR304130



Adapted from FWEC FS Figure 13

FWEC/Church Road TCE Site

Figure 5: Conceptual Layout of Alternative 5

US EPA
REGION III
1650 Arch Street
Philadelphia, Pennsylvania
19103

EPA United States Environmental Protection Agency

AR304131

Table 4
Applicable or Relevant and Appropriate Requirements
Foster Wheeler Energy Corporation/Church Road TCE Superfund Site, Mountain Top, PA

ARAR	Legal Citation	ARAR Class	Requirement Synopsis	Applicability to Proposed Interim Remedy
Chemical Specific ARARs				
Pennsylvania Water Quality Standards	25 Pa. Code §§ 93.7(a) and (b), 93.8c(a)	Relevant and Appropriate	These are specific water quality criteria established pursuant to Section 304 of the Clean Water Act (CWA). These provisions set the concentrations of pollutants that are allowable at levels that preserve human health based on water and fish ingestion and to preserve aquatic life. Ambient water quality criteria may be relevant and appropriate to the CERCLA cleanups based on uses of a water body.	The discharge of treated groundwater will be required to meet the criteria established for protection of human health and aquatic life.
Safe Drinking Water Act Maximum Contaminant Levels (MCLs)	40 CFR §141.61(a)(5)	Relevant and Appropriate	Under the Federal Safe Drinking Water Act, MCLs are enforceable standards for public drinking water supply systems that have at least 15 service connections or are used by at least 25 persons. MCLs are relevant and appropriate requirements for groundwater cleanup.	Groundwater at the Site is a potential future source of drinking water; therefore, the drinking water MCLs for contaminants of concem (COCs) must be met in the groundwater plume. Because this proposed interim remedy only addresses groundwater at the former FWEC Facility, this requirement is being waived for the remainder of the Site pursuant to the interim action waiver set forth in Section l2l(d)(4)(A) of CERCLA and 40 C.F.R. § 430(f)(l)(ii)(C)(l).

Table 4
Applicable or Relevant and Appropriate Requirements
Foster Wheeler Energy Corporation/Church Road TCE Superfund Site, Mountain Top, PA

ARAR	Legal Citation	ARAR Class	Requirement Synopsis	Applicability to Proposed Interim Remedy
Location-Specific ARARs				
Susquehanna River Basin Commision	18 C.F.R. 807.1	Applicable	Requires registration if withdrawing more than 10,000 gallons of groundwater per day for any consecutive 30 day period in the Susquehana River Basin.	Extraction of groundwater for treatment will meet the substantive requirements of these regulations.
Compensatory Mitigation for Loss of Aquatic Resources	40 C.F.R. § 230.93	Relevant and Appropriate	Describes the standards and criteria for establishing compensatory mitigation of wetlands	Minor disruption to potential wetlands may occur during excavation of contaminated sediment
Dam Safety and Waterway Management	Substantive requirements of 25 Pa. Code §§105.18a and 105.20a	Relevant and Appropriate	Establishes criteria for placing structures and conducting activities in wetlands	Minor disruption to potential wetlands may occur during excavation of contaminated sediment
Action-Specific ARARs				
A. Water				
Pennsylvania Water Quality Toxics Management Strategy	25 Pa. Code §§ 16.24, 16.32 – 16.33, and 16.51 25 Pa. Code § 16 Appendix A Table 2B	Applicable	These regulations provide standards and criteria for protection of human health and aquatic life in waters of the Commonwealth.	The groundwater treatment system will comply with the substantive requirements of these discharge standards.
National Pollutant Discharge Elimination System Requirements	40 C.F.R. § 122.44(a)(1), (b)(1)(first sentence), (d), (e), (i)(1), and (k); 122.45(a), (c)-(f)	Relevant and Appropriate	The substantive requirements provided by these regulations establish effluent limitations for discharges to waters of the United States.	The groundwater treatment system will comply with the substantive requirements of these provisions.
Pennsylvania National Pollutant Discharge Elimination System Requirements	25 Pa. Code §§ 92a.12(a), 92a.41(a)(4) and (5), 92a.41(c), 92a.61(d), (e), and (i)	Relevant and Appropriate	The substantive requirements provided by these regulations that are more stringent than the federal requirements, establish effluent limitations for discharges to waters of Pennsylvania.	The groundwater treatment system will comply with the substantive requirements of these provisions.

Table 4
Applicable or Relevant and Appropriate Requirements
Foster Wheeler Energy Corporation/Church Road TCE Superfund Site, Mountain Top, PA

ARAR	Legal Citation	ARAR Class	Requirement Synopsis	Applicability to Proposed Interim Remedy
B. Soil				
Erosion and Sediment Control	25 Pa. Code §§102.4(b)(1), 102.11(a), 102.22	Applicable	Identifies erosion and sediment control requirements and criteria for activities involving land clearing, grading and other earth disturbances and establishes erosion and sediment control criteria.	These regulations apply to construction activities at the Site that disturb the ground surface including clearing grading, excavation, or well installation.
C. Wastes				
Pennsylvania Hazardous Waste Management Regulations Pennsylvania has an EPA authorized hazardous waste program; therefore, the EPA-authorized hazardous waste regulations for the Commonwealth of Pennsylvania are identified here as the applicable federal hazardous waste standard.	25 PA Code § 264a.1 (incorporating by reference 40 C.F.R. Part 264, but limited to the substantive portions of Section 264.171-.175, .179)	Relevant and Appropriate	These provisions govern the management of containers.	These requirements must be followed for any groundwater treatment remedy that generates and stores hazardous waste.
	25 PA Code § 264a.1 (incorporating by reference 40 C.F.R. Part 264, but limited to the substantive portions of Section 264.228(a)(2)(iii))	To Be Considered	These provisions provide performance standards for final cover and grading of caps.	These provisions will be considered in any remedy requiring a cap over contaminated soils or sediments.
Pennsylvania operating requirements for municipal waste landfills.	25 PA Code § 273.234(a)(1)(i)	To Be Considered	These provisions provide performance standards for final cover and grading of caps.	These provisions will be considered in any remedy requiring a cap over contaminated soils or sediments.
D. Air				

Table 4
Applicable or Relevant and Appropriate Requirements
Foster Wheeler Energy Corporation/Church Road TCE Superfund Site, Mountain Top, PA

ARAR	Legal Citation	ARAR Class	Requirement Synopsis	Applicability to Proposed Interim Remedy
Fugitive Air Emissions	40 C.F.R. § 50.6 – 50.7 25 Pa Code §§ 123.1(a) and (c), 123.2, 123.31, 123.41	Applicable	Establishes the fugitive dust regulation for particulate matter.	Any construction and/or excavation activities will comply with the substantive requirements of these regulations.
Federal – Control of Air Emissions from Air Strippers at Superfund Groundwater Sites	OSWER Directive 9355.0-28, June 15, 1989	To Be Considered	This policy guides the requirement for additional controls on air strippers at Superfund Sites.	To be considered regarding air emissions from existing GETS.