RECORD OF DECISION AMENDMENT FOR REMEDIAL ACTION

NORTH PENN AREA 6 SUPERFUND SITE OPERABLE UNIT 3 CENTRAL SPRINKLER PARCEL

LANSDALE, MONTGOMERY COUNTY, PENNSYLVANIA

U. S. ENVIRONMENTAL PROTECTION AGENCY
REGION 3, PHILADELPHIA, PENNSYLVANIA
SEPTEMBER 2018

NORTH PENN AREA 6 SUPERFUND SITE
OPERABLE UNIT 3
CENTRAL SPRINKLER PARCEL
LANSDALE BOROUGH, MONTGOMERY COUNTY, PENNSYLVANIA

RECORD OF DECISION AMENDMENT

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LIST OF ACRONYMS

AR	Administrative Record
ARARs	Applicable or Relevant and Appropriate Requirements
CD	Consent Decree
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CERCLIS	Comprehensive Environmental Response, Compensation and Liability Information System
CFR	Code of Federal Regulations
Cis-1,2-DCE	Cis-1,2-Dichloroethene
COC	Contaminant of Concern
EPA	United States Environmental Protection Agency
ERD	Enhanced Reductive Dechlorination
EVO	Emulsified Vegetable Oil
gpm	Gallons Per Minute
HHRA	Human Health Risk Assessment
HI	Hazard Index
MCL	Maximum Contaminant Level
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
ND	Non-Detect
NPL	National Priorities List
NPWA	North Penn Water Authority
O&M	Operation and Maintenance
OSWER	Office of Solid Waste and Emergency Response
OU	Operable Unit
PA/SI	Preliminary Assessment/ Site Investigation
PADEP	Pennsylvania Department of Environmental Protection
PCE	Tetrachloroethylene
ppb	Parts Per Billion
ppm	Parts Per Million
RA	Remedial Action
RAO	Remedial Action Objective
RD	Remedial Design
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
RP	Responsible Party
RSL	Regional Screening Level
SLERA	Screening-Level Ecological Risk Assessment
SVOC	Semi-Volatile Organic Compound
TCE	Trichloroethylene
UAO	Unilateral Administrative Order
USC	U.S. Code
VOC	Volatile Organic Compound

I. DECLARATION

NORTH PENN AREA 6 SUPERFUND SITE
OPERABLE UNIT 3
CENTRAL SPRINKLER PARCEL
MODIFIED REMEDIAL ACTION

LANSDALE BOROUGH, MONTGOMERY COUNTY, PENNSYLVANIA

RECORD OF DECISION AMENDMENT FOR MODIFIED REMEDIAL ACTION
NORTH PENN AREA 6 SUPERFUND SITE
OPERABLE UNIT 3
CENTRAL SPRINKLER PARCEL

DECLARATION

1.0 SITE NAME AND LOCATION

North Penn Area 6 Superfund Site
Operable Unit 3
Central Sprinkler Parcel
Lansdale Borough, Montgomery County, Pennsylvania
CERCLIS ID Number PAD980926976

2.0 STATEMENT OF BASIS AND PURPOSE

This Record of Decision (ROD) Amendment selects a modification (Modified Remedial Action) to the remedy selected for the Central Sprinkler Parcel by the U.S. Environmental Protection Agency (EPA) in the August 10, 2000 ROD (Selected Remedial Action) for Operable Unit 3 (OU3) of the North Penn Area 6 Superfund Site (Site). This is the final action for the Central Sprinkler Parcel. The Modified Remedial Action was chosen in accordance with the Comprehensive Environmental Response, Compensation and Liability Act of 1980, as amended (CERCLA), 42 U.S.C. § 9601 et seq., and to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 C.F.R. Part 300.

This decision document is based on the Administrative Record (AR) for the Central Sprinkler Parcel, which was developed in accordance with Section 113(k) of CERCLA, 42 U.S.C. § 9613(k). The AR file is available for review online at http://www.epa.gov/arweb, at the U.S. Environmental Protection Agency Region III Records Center in Philadelphia, Pennsylvania, and at the Lansdale Borough Public Library, Susquehanna Avenue and Vine Street, Lansdale, Pennsylvania. The AR Index (Appendix A) identifies each document contained in the AR upon which the selection of the remedy is based.

The Commonwealth of Pennsylvania concurs with the Remedy Modification (Appendix C).

3.0 ASSESSMENT OF THE SITE

The Site was discovered in 1979, when North Penn Water Authority (NPWA) identified elevated levels of contamination in its drinking water supply wells. The wells were immediately taken out of service because of the elevated levels of trichloroethene (TCE) in the groundwater. The NPWA began sampling wells in the area to determine the extent of contamination in the groundwater. The production well at the Central Sprinkler Parcel was sampled and showed significant levels of TCE. The Site was referred to EPA, which conducted a Preliminary Assessment/Site Investigation (PA/SI) which was used to support the addition of the Site to the National Priorities List (NPL) in March 1989.

To address the Site contamination, EPA separated the Site into three operable units (OUs). EPA completed the Remedial Investigation and Feasibility Study (RI/FS) for OU3 in 1999, and issued the OU3 ROD in 2000. The Selected Remedial Action set forth in the OU3 ROD consists of groundwater extraction and treatment, connecting impacted residences to public water, monitoring of residential wells, and long-term monitoring of the groundwater. The Modified Remedial Action for OU3 selected in this ROD Amendment, modifies the Selected Remedial Action for OU3 only at the Central Sprinkler Parcel.

The Modified Remedial Action selected in this ROD Amendment is necessary to protect human health from actual or threatened releases of hazardous substances into the environment.

4.0 DESCRIPTION OF THE MODIFIED REMEDIAL ACTION

The Modified Remedial Action described in this ROD Amendment modifies the Selected Remedial Action to address groundwater contamination at the Central Sprinkler Parcel more effectively. The Selected Remedial Action as set forth in the 2000 ROD consists of the following components:

1. Completion of a groundwater remedial design study to determine the most efficient design of a groundwater extraction and treatment system.
2. Installation, operation, and maintenance of onsite groundwater extraction wells to remove contaminated groundwater from beneath the Site and to prevent contaminants from migrating offsite.
3. Installation, operation, and maintenance of air stripping equipment and discharge piping to treat groundwater to required cleanup levels.
4. Periodic sampling of groundwater and treated water to ensure treatment components are effective and groundwater remediation is progressing toward the cleanup levels.
5. Connection of homes to public water where Site Contaminants of Concerns (COCs) were detected above Maximum Contaminant Levels (MCLs) in residential drinking water supply wells.
6. Performance of long-term groundwater monitoring in accordance with the terms of the EPA-approved Operation and Maintenance Plan for 30 years at approximately 50 locations to evaluate the effectiveness of the treatment system.

The Modified Remedial Action described herein would replace groundwater extraction and treatment with Enhanced Reductive Dechlorination (ERD). ERD is capable of restoring contaminated groundwater at the Central Sprinkler Parcel more effectively than the Selected Remedial Action in the OU3 ROD through the use of treatment technologies that will permanantly reduce the toxicity, mobility, and volume of contaminants in groundwater as well as protect human health and the environment.

ERD consists of the injection of substrate into the subsurface through injection wells to treat contaminated groundwater. ERD injections will enhance the conditions for naturally occurring microorganisms to break down the contaminants in the groundwater. The intermediate breakdown products of the ERD process (*cis*-1,2-DCE and vinyl chloride) are included in the list of Site COCs. The end products of the ERD process are non-toxic substances such as ethene and ethane.

The estimated cost to implement the Modified Remedial Action is $343,910, which includes two additional ERD injection events (if required), post-injection and long-term groundwater monitoring, and abandonment of monitoring and injection wells.

5.0 STATUTORY DETERMINATIONS

The Modified Remedial Action meets the mandates of CERCLA § 121 and the regulatory requirements of the NCP. The Modified Remedial Action is protective of human health and the environment, complies with Federal and State requirements that are applicable or relevant and appropriate requirements (ARARs) to the Modified Remedial Action, is cost effective, and utilizes a permanent solution to the maximum extent practicable.

The Modified Remedial Action also satisfies the statutory preference for treatment as a principal element of the remedy (i.e., reduction of the toxicity, mobility, or volume of hazardous substances).

A remedy review will be conducted within five years after initiation of the Modified Remedial Action to ensure that the remedy continues to provide adequate protection of human health and the environment. Five-year reviews will be conducted at least every five years after the date of the initiation of the Modified Remedial Action and continue until hazardous substances are no longer present above levels that allow for unlimited use and unrestricted exposure.

6.0 ROD CERTIFICATION CHECKLIST

The following information is included in the Decision Summary (Part II) of this ROD Amendment, while additional information can be found in the AR file for the Central Sprinkler Parcel:

ROD CERTIFICATION CHECKLIST	
Information	**Location/Page Number**
Chemicals of concern and respective concentrations	Section 5.3, p.6 and Section 11.1, p.20
Baseline risk represented by the chemicals of concern	Section 7.1, p.10
Clean-up levels established for chemicals of concern and the basis for these levels	Section 11.1, p.20
Current and reasonably anticipated future land use assumptions and potential future beneficial uses of groundwater	Section 6.0, p.8
Estimated capital, annual operation and maintenance, and total present worth costs, discount rate, and the number of years over which the remedy cost estimates are projected	Section 10.7, p.17 and Section 11.3, p.20

7.0 AUTHORIZING SIGNATURE

This ROD Amendment documents the Modified Remedial Action for the Central Sprinkler Parcel at OU3 of the Site and is based on the AR for the Site. EPA selected the Modified Remedial Action with the concurrence of the Pennsylvania Department of Environmental Protection (PADEP).

Approved by:

Karen Melvin, Director
Hazardous Site Cleanup Division
EPA Region III

Date:

SEP 26 2018

II. DECISION SUMMARY

NORTH PENN AREA 6 SUPERFUND SITE
OPERABLE UNIT 3
CENTRAL SPRINKLER PARCEL
MODIFIED REMEDIAL ACTION

LANSDALE BOROUGH, MONTGOMERY COUNTY, PENNSYLVANIA

1.0 SITE NAME, LOCATION AND DESCRIPTION

The Site (CERCLIS Identification No. PAD980926976) is located within the NPWA service district in Montgomery County, Pennsylvania. Five other NPL sites (North Penn Areas 1, 2, 5, 7, and 12) and a state Superfund Site (North Penn Area 4) have also been identified in the NPWA area.

The Site is located in the Borough of Lansdale and small portions of Hatfield, Towamencin, and Upper Gwynedd Townships. The preliminary boundaries of the Site were determined based on groundwater quality data. The Site is situated over a large area with commercial, industrial, and residential uses, and consist of various parcels. The parcel related to this document is the Central Sprinkler Parcel, formerly known as TYCO Industries. The Central Sprinkler Parcel is located at 451 North Cannon Avenue, Lansdale, PA. It encompasses approximately 5.3 acres, with a 16,000-square foot main building and a 4,800-square foot satellite storage building. The area around the buildings is paved, except for a narrow grassy strip along the southeastern side of the main building. Previously, the Central Sprinkler Parcel was used as a manufacturing and testing facility by the Central Sprinkler Corporation (Central Sprinkler). Currently, the buildings are being leased as office space and for file storage.

EPA is the lead Agency for the Site and PADEP is the support Agency. The cleanup is being financed by the Central Sprinkler Corporation.

2.0 SITE HISTORY AND ENFORCEMENT ACTIVITIES

This section of the ROD Amendment provides the history of the Site and a discussion of EPA and PADEP investigations and response activities.

The Site was discovered in 1979 when NPWA identified elevated levels of contamination in its drinking water supply wells. The wells were immediately taken out of service because of the elevated levels of TCE in the groundwater. The NPWA began sampling wells in the area in 1979 to determine the extent of contamination in the groundwater. The production well at the Central Sprinkler Parcel was sampled and showed significant levels of TCE. The Site was referred to EPA, which conducted a PA/SI. The data from the PA/SI were used to support the addition of the Site to the NPL in March 1989.

To address the Site contamination, EPA separated the Site into three operable units (OUs) as follows:

> ***Operable Unit 1 (OU1)*** – Twenty-six properties were initially identified by EPA as potential sources of contamination at the Site. Beginning in 1993, EPA evaluated twenty of the properties as part of the OU1 RI/FS. Based on the OU1 RI/FS, EPA determined that soil contamination at four of the properties may have contributed to groundwater contamination and required remedial action. In September 1995, EPA issued the OU1 ROD, which required soil remediation at the four properties.
>
> ***Operable Unit 2 (OU2)*** – OU2 consists of six properties identified initially as having contributed to soil contamination at the Site, but which were not addressed in the OU1

effort. Under OU2, the owners or operators of these six properties conducted soil investigations in accordance with an Administrative Order on Consent (AOC) for RI/FS under EPA oversight. The responsible party (RP) at four of the properties have completed the work required at their respective properties under the RI/FS AOC. RPs are addressing contaminated soil at one of the remaining properties and EPA is addressing contaminated soil at the final property.

Operable Unit 3 (OU3) – The groundwater at the Site is being addressed as OU3. EPA completed the RI/FS for OU3 in 1999, and issued the OU3 ROD in 2000. The remedy set forth in the OU3 ROD consists of groundwater extraction and treatment, connecting residences with wells contaminated above MCLs to public water, monitoring of residential wells, and long-term monitoring of the groundwater. Currently, ten properties have been selected for installation of groundwater extraction and treatment systems, including the Central Sprinkler Parcel. EPA is responsible for implementing the remedy at six of the ten properties, and the remedy at the remaining four properties is being implemented by the respective RPs. To date, EPA has installed groundwater extraction and treatment systems at five of the six EPA-lead properties. The Central Sprinkler Parcel is one of the four properties where the RP entered into a Consent Decree to implement the OU3 remedy. As a result, a groundwater extraction and treatment system was planned to be built and operated at the Central Sprinkler Parcel by the RP. This ROD Amendment modifies the original OU3 Selected Remedial Action by replacing the groundwater extraction and treatment system with ERD at the Central Sprinkler Parcel.

3.0 COMMUNITY PARTICIPATION

The Request for ROD Amendment letter (June 2016) by Tyco Fire Products LP, the proposed remedial action plan (PRAP), and other documents relating to the Central Sprinkler Parcel at OU3 of the Site are contained in the AR supporting selection of this Modified Remedial Action, which can be viewed at https://semspub.epa.gov/src/collections/03/AR/PAD980926976 (for documents relating to OU3, select the link for Remedial - 03) or at the following locations:

EPA AR Room,
Attention: Administrative Coordinator
1650 Arch Street
Philadelphia, PA
(215) 814-3157
Hours: Monday through Friday, 8:00am to 4:30pm; by appointment only.

Lansdale Public Library
301 Vine Street
Lansdale, PA 19446
Hours: Call (215) 855-3228

A notice of availability of these documents was published in *The Reporter*, a Lansdale newspaper, on March 30, 2018. In addition, EPA sent a fact sheet summarizing the Agency's preferred remedial alternative for the Central Sprinkler Parcel at OU3 to residences and businesses near the Central Sprinkler Parcel in April 2018.

EPA held a 30-day comment period from March 30 through April 30, 2018 to accept public comments on the remedial alternatives presented in the PRAP, as well as on the other documents contained within the AR file. On April 12, 2018, EPA held a public meeting to discuss the PRAP

and accept comments. A transcript of this meeting is included in the AR for this Modified Remedial Action. The summary of significant comments received during the public comment period and EPA's responses are included in the Responsiveness Summary which is a part of this ROD.

4.0 SCOPE AND ROLE OF RESPONSE ACTION

The Modified Remedial Action described in this ROD Amendment modifies the portions of the Selected Remedial Action at the Central Sprinkler portion of OU3 only. The Selected Remedial Action for the remaining parcels that comprise OU3 will not be modified.

The Selected Remedial Action in the OU3 ROD included groundwater extraction and treatment to restore groundwater to its beneficial use and established federal MCLs as the cleanup levels. The Modified Remedial Action for the Central Sprinkler Parcel would replace groundwater extraction and treatment with ERD. ERD is capable of restoring contaminated groundwater more effectively than the Selected Remedial Action in the OU3 ROD through the use of treatment technologies that would permanantly reduce the toxicity, mobility, and volume of contaminants in groundwater as well as protect human health and the environment. The Modified Remedial Action would continue to provide protection to human health and the environment by eliminating potential exposure to contaminated groundwater at the Central Sprinkler Parcel.

5.0 SITE CHARACTERISTICS

This section of the ROD Amendment provides an overview of the Site's geology and hydrogeology, the sampling strategy used during Site investigations, and the nature and extent of contamination. Additional information regarding the nature and extent of contamination can be found in the Request for ROD Amendment letter, as well as in the three ERD Injections reports and other documents in the AR.

5.1 Surface Features, Geology and Hydrogeology, Soils, and Topography and Surface Drainage

5.1.1 Surface Features

The Central Sprinkler Parcel encompasses approximately 5.3 acres, with a 16,000-square foot main building and a 4,800-square foot satellite storage building. The area around the buildings is paved, except for a narrow grassy strip along the southeastern side of the main building. Previously, the Central Sprinkler Parcel was used as a manufacturing and testing facility by Central Sprinkler. Currently, the buildings are being leased as office space and for file storage.

5.1.2 Geology and Hydrogeology

Lansdale, Pennsylvania lies within the Triassic Lowlands section of the Piedmont physiographic province. Bedrock in the Lansdale Borough area is composed of the lower beds of the Brunswick Group and the older underlying Lockatong Formation. The Brunswick group consists of thin, discontinuous beds of reddish-brown shale interbedded with mudstone and siltstone. The total

thickness of the Brunswick Formation in Montgomery County is approximately 9,000 feet, but thins to zero at locations where the underlying unit outcrops.

The Lockatong consists of massive beds of medium and dark gray argillite interbedded with thin beds of gray to black shale and siltstone. The Lockatong is more resistant to erosion than the Brunswick and tends to form low ridges when outcropping at the surface. The maximum thickness of the Lockatong, near the Site, is approximately 4,000 feet.

The Stockton Formation underlies the Lockatong and consists of interbedded layers of sandstone and shale. The formation is typically divided into three members: the upper member, made of very fine-grained arkose and siltstone with an extremely hard and resistant layer of red and gray shale; the middle member, made of brown, red and gray fine to medium grained arkosic sandstone with thick beds of red shale and siltstone; the lower member, made of red to gray, medium to coarse grained arkosic sandstone and conglomerate. Near the Site, the total thickness of the Stockton is approximately 6,000 feet.

Groundwater occurs and flows mainly in the joints and fractures of the bedrock, after infiltrating down through soil and weathered bedrock. Primary porosity and the storage capacity of the bedrock is very low. The well-developed, nearly vertical joints occurring in many of the rock units are the primary pathways for groundwater flows. The distribution of these fractures controls the general flow of groundwater. The intergranular porosity in sandstone may act as storage for groundwater, but groundwater flow in the primary porosity is limited.

5.1.3 Soils

Most of the soils in Montgomery County, especially near the Site, are moderate to deep in depth and gently sloping. They are generally acidic and have moderately slow drainage. Only limited Site-specific soil data is available. Because of the amount of construction in the urbanized part of the Site, not much native or undisturbed soil is expected to be present. Soil that is present probably consists mostly of residual soil reworked by construction activity.

5.1.4 Topography and Surface Drainage

The Site is located within the Piedmont Physiographic Province in the Triassic Lowland and is underlain by the Triassic sedimentary rocks of the Newark Basin. The surrounding topography is generally flat to gently rolling, with low ridges and hills underlain by sedimentary rocks that are more resistant to erosion and, in some cases, by even more resistant igneous rocks intruded into the sedimentary deposits. The Lansdale area is a relatively flat upland terrain which forms a surface water divide between the Wissahickon Creek to the southeast, Towamencin Creek to the west and southwest, and tributaries of the West Branch of the Neshaminy Creek to the north and northeast. The study area is drained by Neshaminy Creek and its tributaries, that flow generally eastward and discharge ultimately into the Delaware River, and by Towamencin and Wissahickon Creeks and their tributaries, which generally flow southward to the Schuylkill River. Surface elevations vary from approximately 200 to 600 feet above mean sea level. In the vicinity of the Site, surface runoff mostly moves toward the unnamed tributaries of the West Branch of Neshaminy Creek, toward Wissahickon Creek, or toward the tributaries of Towamencin Creek, although some runoff may be directed elsewhere by storm water collection systems.

5.2 Remedial Investigation and Feasibility Study

EPA completed the RI/FS for OU3 in August 1999, to determine the extent of the groundwater contamination and to evaluate alternatives for cleaning up the contamination. The RI/FS included gathering background information, identifying contamination sources at the properties through sampling and analysis, evaluating analytical data, modeling contaminant fate and transport, and assessing human health and environmental risk associated with the contaminated groundwater.

While EPA conducted the OU3 RI/FS at the Central Sprinkler Parcel, Central Sprinkler performed an independent comprehensive groundwater investigation. This investigation included the installation of seven monitoring wells that investigated 29 discrete water bearing zones. The wells were installed as shallow, intermediate, and deep monitoring wells, and monitoring data obtained from these wells showed that there is very little communication between the different water bearing zones. Groundwater samples indicated that tetrachloroethene (PCE) was the most prevalent COC at the Central Sprinkler Parcel, with low concentrations of both TCE and *cis*-1,2-dichloroethene (*cis*-1,2-DCE). Vinyl chloride was not detected.

5.3 OU3 Record of Decision

EPA issued the OU3 ROD selecting the remedy for contaminated groundwater at the Site on August 10, 2000. The Selected Remedial Action in the OU3 ROD generally consisted of extraction and treatment of contaminated groundwater and included the following major components:

1. Completion of a groundwater remedial design study to determine the most efficient design of a groundwater extraction and treatment system.
2. Installation, operation, and maintenance of onsite groundwater extraction wells to remove contaminated groundwater from beneath the Site and to prevent contaminants from migrating offsite.
3. Installation, operation, and maintenance of air stripping equipment and discharge piping to treat groundwater to required cleanup levels.
4. Periodic sampling of groundwater and treated water to ensure treatment components are effective and groundwater remediation is progressing toward the cleanup levels.
5. Connection of homes to public water where Site COCs were detected above MCLs in residential drinking water supply wells.
6. Performance of long-term groundwater monitoring for 30 years at approximately 50 locations to evaluate the effectiveness of the treatment system.

The cleanup levels for the Site COCs set forth in the OU3 ROD are:

Table 1. OU3 ROD COCs and Cleanup Levels

COC	Cleanup Levels (µg/l)
Tetrachloroethene (PCE)	5
Trichloroethene (TCE)	5
Cis-1,2-dichloroethene (*cis*-1,2-DCE)	70
Vinyl Chloride (VC)	2

Central Sprinkler agreed to implement the OU3 Selected Remedial Action with respect to the Central Sprinkler Parcel under a 2005 Consent Decree (CD), entered by the U.S. District Court in *U.S. v. Central Sprinkler Corp.*, Civil Action No. 05-1351 (E.D. Pa.).

A total of 17 residences with wells impacted by the Central Sprinkler Parcel groundwater contamination were connected to public water between June 2005 and August 2006 by Central Sprinkler under EPA oversight.

5.4 Enhanced Reductive Dechlorination Pilot Test

Central Sprinkler initiated the remedial design in 2005 for construction of a groundwater extraction and treatment system at the Central Sprinkler Parcel in accordance with the OU3 ROD. While performing the investigation to support the remedial design, Central Sprinkler installed several wells that identified only low levels of contamination in groundwater at the Central Sprinkler Parcel. Based on these findings, Central Sprinkler submitted a pilot test work plan in April 2012 to evaluate using ERD as an alternative remedy to address contaminated groundwater at the Central Sprinkler Parcel. ERD consists of injecting a substrate into the groundwater to enhance the conditions for naturally occurring microorganisms to break down contamination. The resulting end-products of this process are non-toxic compounds such as ethene or ethane.

The initial pilot test was performed in May 2012 and consisted of injecting 24,000 gallons of potassium lactate into one injection well. Monitoring conducted four months after the initial injection event indicated that the wells in the flow path from the injection well were being influenced by the injections. A significant decrease in PCE concentrations was initially observed in two wells (reductions of 59% and 57%); however, the level in one well rebounded after several months to pre-injection concentrations while the level in the other well increased by 5%.

A revised ERD approach was approved in April 2013, changing the substrate from potassium lactate to emulsified vegetable oil (EVO) with a lactate component. The EVO portion of the substrate would have a longer residence time near the injection and the lactate portion of the substrate would continue to travel as it did in the first injection, treating more distant portions of the contaminant plume.

Monitoring of the groundwater at the Central Sprinkler Parcel conducted one month after the second injection showed biological activity with reductions of PCE between 85% and 95% in the wells within the expected area of influence in the flow path. Samples collected three months after the second injection event showed a reduction of PCE greater than 99%. All wells that were sampled, except for one well, showed concentrations of Site COCs below MCLs, which are the cleanup levels for groundwater at the Site.

Based on the successful reduction of Site COCs to below MCLs within the anticipated area of influence at the Central Sprinkler Parcel and the sustainability of those reductions, expansion of the pilot testing to a broader area was proposed in June 2014. To affect a wider area, four additional injection points were installed. The third injection event occurred in July 2014, reducing concentrations of all Site COCs in all monitoring wells associated with the Central Sprinkler Parcel to below MCLs.

Sampling since the third injection event has demonstrated sustained reduction levels of Site COCs (below MCLs) with no apparent rebound effect. Only recently have there been exceedances of the MCL (2 µg/l) for vinyl chloride in MW-10 (2.7 µg/l on March 28, 2017, and 7.7 µg/l on September 26, 2017). Continued monitoring of the wells is recommended to detect any rebound effect. In addition, the implementation of this technology has created a temporary change in the soil and groundwater chemistry, which allowed naturally occurring arsenic to temporarily enter the groundwater. In several of the monitoring wells, the arsenic level increased to greater than the MCL (10 µg/l); however, this trend is reversing as the soil and groundwater chemistry return to pre-injection conditions. Arsenic will also continue to be monitored.

6.0 CURRENT AND POTENTIAL FUTURE LAND USE AND RESOURCE USES

The majority of the Site is located in the Borough of Lansdale. There are over 7,200 housing units in the Borough most of the units rely on public potable water systems. The study area is a mixed residential, light industrial, commercial and agricultural area. Portions of the Site are also located in Hatfield, Towamencin, and Upper Gwynedd Townships, which are smaller municipalities than Lansdale. The Site encompasses mostly residential areas from these townships. Land use in the vicinity of the Site is not expected to change.

The Central Sprinkler Parcel was historically used as a manufacturing facility and is currently used as office space and for file storage. It is anticipated that the Central Sprinkler Parcel will continue to be used for commercial purposes in the future.

7.0 SUMMARY OF SITE RISK

This section summarizes the results of the Human Health Risk Assessment (HHRA) and Screening-Level Ecological Risk Assessment (SLERA) that were performed during the RI. These baseline risk assessments (before any cleanup) provide the basis for taking a response action and indicate the exposure pathway(s) that need to be addressed by the Selected Remedial Action and Modified Remedial Action. For more detailed human health and ecological risk information, please refer to the 2000 ROD and the 1999 RI Report in the AR.

Table 2. How is human health risk calculated?

A Superfund human health risk assessment estimates the baseline risk. The baseline risk is an estimate of the likelihood of developing cancer or non-cancer health effects if no cleanup action were taken at a site. To estimate 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). Comparison between site-specific concentrations and concentrations reported in past studies helps EPA to determine which concentrations 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 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" scenario, which portrays the highest level of 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 risks. EPA considers two types of risk: cancer 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 that could be 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 to from all other causes. For non-cancer 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 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. Generally, cancer risks between 10^{-4} and 10^{-6}, and a non-cancer hazard index of 1 or less are considered acceptable for Superfund sites.

7.1 Summary of Human Health Risk Assessment

The HHRA evaluated the groundwater dermal contact and ingestion exposure pathways for current and future adult and child residents of the overall Site. Contaminants that were historically detected in groundwater at the Central Sprinkler Parcel are similar to the contaminants detected at the overall Site; therefore, the HHRA findings are generally applicable to the Central Sprinkler Parcel. Human health risks identified in the HHRA are summarized in the table below.

Table 3. Risk Summary

Exposure Scenario	Maximum Non-Carcinogenic Risk (HI)	Maximum Carcinogenic Risk
Current and Future Adult Resident	22	2.2×10^{-4}
Current and Future Child Resident	49	3.7×10^{-4}

Arsenic was detected in groundwater during the ERD pilot studies at concentrations exceeding the MCL of 10 µg/L. The MCL of 10 µg/L is equivalent to a carcinogenic risk level of 1.94×10^{-4}, which is at the upper bound of EPA's acceptable risk range of 10^{-4} to 10^{-6} for excess lifetime carcinogenic risk. Therefore, arsenic will be added as a COC in this ROD Amendment.

7.2. Summary of Ecological Risk Assessment

Using sampling results for contaminants in surface water and sediments, EPA performed assessments on the headwaters potentially affected by the contamination. The SLERA performed on the headwaters located at the Site indicated a potential risk to aquatic organisms. This level of risk varied between the four micro-watersheds that were evaluated. The southern Towamencin Creek micro-watershed, in which the Central Sprinkler Parcel is located, presented an ecological risk to aquatic organisms by the presence of polycyclic aromatic hydrocarbons and pesticides. The other three micro-watersheds posed low ecological risk to aquatic organisms from the same contaminants. However, those contaminants are primarily associated with urban developments and not believed to be Site-related. Therefore, no response actions to address ecological risk at any of the watersheds were selected in the OU3 ROD.

7.3 Basis for Remedial Action

In summary, the HHRA and SLERA for the Site demonstrated the presence of unacceptable risks to human health and the environment. EPA determined that remedial actions are necessary to reduce the risks to within or below EPA's acceptable risk range. Therefore, it is EPA's determination that implementation of the Selected Remedial Action and Modified Remedial Action are necessary to protect human health and the environment from actual or threatened releases of hazardous substances at the Central Sprinkler Parcel.

8.0 REMEDIAL ACTION OBJECTIVES

The OU3 ROD does not specify Remedial Action Objectives (RAOs) for the Selected Remedy. However, the OU3 ROD does indicate that the goal of the Selected Remedial Action is to restore the aquifer to its beneficial use as a potable aquifer. The OU3 ROD also established groundwater cleanup goals as MCLs for all COCs. Exposure to contaminated groundwater via ingestion or direct contact could present an unacceptable risk to human health for future adult and child residents. Therefore, the RAOs for this Modified Remedial Action are as follows:

- Prevent current or future exposure (ingestion and/or direct contact to contaminated groundwater) which would result in unacceptable risk to human health;

- Restore contaminated groundwater at the Central Sprinkler Parcel to beneficial use, where practicable, defined as meeting the following criteria:

    a. Federal MCLs; and,
    b. Reduction of cumulative excess carcinogenic risk to less than or equal to 1 in 10,000 (i.e., 10^{-4}) and cumulative excess non-carcinogenic risk to a HI of less than or equal to 1.

9.0 DESCRIPTION OF REMEDIAL ALTERNATIVES

CERCLA requires that any Remedial Action selected under CERCLA Section 121 to address contamination at a Superfund site be protective of human health and the environment, cost effective, in compliance with regulatory and statutory provisions that are ARARs, and compliant with the NCP, to the extent practicable. Permanent solutions to contamination, which reduce the volume, toxicity, or mobility of the contaminants, should be developed whenever possible. Emphasis is also placed on treating the wastes at a site whenever possible, and on applying innovative technologies to clean up the contaminants.

With this ROD Amendment, EPA is modifying the OU3 Selected Remedial Action for contaminated groundwater at the Central Sprinkler Parcel portion of the Site. The OU3 Selected Remedial Action for the remaining parcels that comprise OU3, as well as the remaining components of the OU3 Selected Remedial Action for the Central Sprinkler Parcel, will not be modified. The following Remedial Alternatives are evaluated in this ROD Amendment:

Table 4. Remedial Alternatives

Alternative	Description
1	No Action
2	Groundwater Extraction and Treatment
3	Enhanced Reductive Dechlorination

The Remedial Alternatives are discussed in detail below.

ALTERNATIVE 1: NO ACTION

The NCP, 40 C.F.R. Part 300, which governs Superfund response actions, requires that EPA evaluate a "No Action" alternative for every NPL site in order to establish a baseline for the comparison of alternatives. Under this alternative, EPA would take no further action to remediate or treat contaminated groundwater or to reduce present or future exposure risk at the Central Sprinkler Parcel. This alternative would not remediate or contain the plume, thus allowing continued migration of contaminants through the groundwater. In accordance with Section 121(c) of CERCLA, 42 U.S.C. § 9621(c), and Section 300.430(f)(4)(ii) of the NCP, 40 C.F.R. § 300.430(f)(4)(ii), review of Site conditions would be required every five years under this

alternative, as long as hazardous substances, pollutants, or contaminants remain at the Central Sprinkler Parcel above levels that allow for unlimited use and unrestricted exposure.

ALTERNATIVE 2: GROUNDWATER EXTRACTION AND TREATMENT

Alternative 2 is the current groundwater extraction and treatment component of the Selected Remedy in the OU3 ROD. This alternative requires installation of extraction wells to remove contaminated groundwater from beneath the Central Sprinkler Parcel and prevent contaminant migration. The extracted groundwater would be treated using an air stripper to remove contaminants. A vapor phase granular activated carbon or ultraviolet oxidation unit would be installed to treat off-gas from the air stripper. A pump house would be constructed to enclose the treatment system. Trenches and piping would be installed to discharge the treated groundwater to a storm sewer or directly to surface water. Long-term groundwater monitoring would also be performed. Groundwater extraction and treatment and groundwater monitoring would continue until COC levels in groundwater meet MCLs throughout the groundwater contaminant plume at the Central Sprinkler Parcel.

At the time of the OU3 ROD, EPA estimated that the Selected Remedial Action for all ten of the parcels that comprise OU3 would cost $20,402,692 to implement. Therefore, for purposes of comparing the alternatives, EPA will assume the estimated cost to implement the Selected Remedial Action in the OU3 ROD at the Central Sprinkler Parcel would be approximately 1/10th of the total OU3 Selected Remedial Action cost. The estimated present worth cost to construct and operate the groundwater extraction and treatment system at the Central Sprinkler Parcel for 20 years, with 30 years of groundwater monitoring, and the connection to public water of residences that had wells affected by the contamination is $2,040,269. However, all the connections to the public water system were completed in 2006 so the cost of the groundwater extraction and treatment component at the Central Sprinkler Parcel would likely be lower.

ALTERNATIVE 3: ENHANCED REDUCTIVE DECHLORINATION (ERD)

Alternative 3 consists of the injection of ERD substrate into the subsurface through injection wells to treat contaminated groundwater if the levels of contaminants in the groundwater at the Central Sprinkler Parcel rebound and increase above the cleanup levels. Sampling conducted since the third injection event of the ERD pilot study has generally demonstrated sustained reduction levels (below MCLs) with very minimal rebound effect. There have been exceedances of the MCL (2 µg/l) for vinyl chloride in MW-10 (2.7 µg/l on March 28, 2017, and 7.7 µg/l on September 26, 2017). Continued monitoring of the wells is required to detect any rebound effect. This alternative assumes that two additional ERD injection events will be necessary to achieve and maintain MCLs, if the levels of vinyl chloride continue to exceed MCLs. However, these ERD injections may not be necessary. Due to the success that was demonstrated during the pilot tests, it is expected that EVO with a lactate component will be used as the ERD substrate in any future ERD injections; however, alternative substrates may be used if determined to be appropriate for Site conditions. Information on the type of substrate to be used in any future ERD injection events would be provided to the public prior to each injection.

ERD injections will enhance the conditions for naturally occurring microorganisms to break down contaminants in the groundwater. The intermediate breakdown products of the ERD process (*cis*-

1,2-DCE and vinyl chloride) are included in the list of COCs with groundwater cleanup levels and will be monitored during the ERD treatment process. The end products of the ERD process are non-toxic substances such as ethene and ethane.

ERD injections, if required, and post-injection groundwater monitoring would continue until the groundwater meets MCLs throughout the groundwater contaminant plume at the Central Sprinkler Parcel. Post-injection monitoring would consist of sampling conducted one month, four months, and seven months after each injection and then at least semi-annually thereafter. However, the post-injection monitoring schedule may be modified by EPA based on monitoring results.

Once the cleanup levels are achieved throughout the groundwater plume, long-term groundwater monitoring will be performed for a total of 10 years. Long-term monitoring is anticipated to consist of annual groundwater monitoring for four years, followed by three biennial groundwater monitoring events (i.e., monitoring in the 6^{th}, 8^{th}, and 10^{th} years after cleanup levels are achieved), to evaluate the long-term effectiveness of the ERD. The long-term groundwater monitoring schedule may be modified by EPA based on monitoring results. Monitoring and injection wells will be abandoned in accordance to local regulations after completion of the long-term monitoring period.

Because short-term increases in arsenic concentrations in groundwater were observed during the pilot studies, arsenic will be added as a COC with a cleanup level and included in the long-term groundwater monitoring program under Alternative 3. The monitoring will evaluate the expected long-term reduction in arsenic concentrations as the soil and groundwater chemistry return to pre-injection conditions.

The estimated cost to implement Alternative 3 is $242,624, which includes two additional ERD injection events (if required), post-injection and long-term groundwater monitoring, and abandonment of monitoring and injection wells.

10.0 SUMMARY OF COMPARATIVE ANALYSIS 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 analyzes the relative performance of each alternative against the evaluation criteria, noting how each alternative compares to the other options under consideration. Additional information supporting this analysis of remedy alternatives can be found in the AR file for OU3 of the Site.

These evaluation criteria relate directly to requirements of Section 121 of CERCLA, 42 U.S.C. § 9621, for determining the overall feasibility and acceptability of a remedial action. The nine criteria fall into three groups described as follows:

Threshold criteria must be satisfied in order for a remedial action to be eligible for selection. The first two criteria are threshold criteria: (1) overall protection of human health and the environment, and (2) compliance with ARARs. The selected remedial action must meet the first criterion as well as the second criterion unless an ARARs waiver is invoked.

Primary balancing criteria are used to weigh major tradeoffs between remedies. The next five criteria are the primary balancing criteria: (3) long-term effectiveness and permanence; (4) reduction of toxicity, mobility or volume through treatment; (5) short-term effectiveness; (6) implementability; and (7) cost.

Modifying criteria are formally taken into account after public comment is received on the PRAP. The modifying criteria include the remaining two criteria: (8) State acceptance and (9) community acceptance.

The following discussion summarizes the evaluation of the remedial alternatives developed for the Central Sprinkler Parcel against the nine evaluation criteria.

10.1 Overall Protection of Human Health and the Environment

Alternative 1, No Action, would not effectively protect human health and the environment. This alternative provides no additional action or monitoring. In the original OU3 ROD, this alternative included a monitoring component in accordance with ROD policy and guidance. Current EPA policy and guidance do not include monitoring as part of the No Action alternative, therefore, monitoring costs are not included in the No Action alternative in this ROD Amendment.

The No Action alternative does not provide for any treatment or monitoring of groundwater if COC contamination remains above MCLs. In addition, current levels of arsenic are above the MCL (10 µg/L). Although those concentrations are expected to decrease to below the MCL once the local geochemistry returns to pre-injection conditions, there would be no way to confirm this under Alternative 1. Since Alternative 1 would not provide for groundwater monitoring, it would also be impossible to determine if additional cleanup actions are necessary. Alternative 1 would not satisfy this threshold criterion; therefore, it is not eligible for selection and is eliminated from further consideration and discussion under the remaining eight criteria.

Alternative 2, Groundwater Extraction and Treatment, would be expected to achieve overall protection of human health and the environment by reducing the levels of contaminants groundwater to MCLs. The continuous pumping of extraction wells would prevent further migration of the groundwater contaminants. The air-stripper would remove the contaminants from the extracted groundwater. Extracting and treating the groundwater contamination at the source is expected to reduce human exposure to the contaminated groundwater and restore the aquifer at the Central Sprinkler Parcel to its beneficial use.

Alternative 3, ERD, would be expected to achieve overall protection of human health and the environment by reducing the levels of contaminants groundwater to MCLs. Alternative 3 is expected to reduce human exposure to the contaminated groundwater and restore the aquifer at the Central Sprinkler Parcel to its beneficial use.

10.2 Compliance with Applicable or Relevant and Appropriate Requirements (ARARs)

This criterion addresses whether a remedy will meet applicable or relevant and appropriate requirements under Federal environmental laws and State environmental or facility siting laws (collectively referred to as "ARARs") or provide grounds for invoking a waiver under CERCLA

Section 121(d)(4), 42 U.S.C. § 9621(d)(4), and the NCP at 40 C.F.R. § 300.430(f)(1)(ii)(C). The ARARs from the OU3 ROD remain the same (although some of the names and citations have changed since the OU3 ROD was issued). Compliance of Alternative 2 with ARARs was evaluated in the OU3 ROD, and Alternative 2 would comply with the ARARs.,

Alternative 3 includes some additional ARARs, which are identified in Table 5, below. Specifically, the Safe Drinking Water Act (SDWA) Underground Injection Control (UIC) regulations are included as ARARs because Alternative 3 includes the injection of ERD substrate into the subsurface to treat contaminated groundwater. In addition, Table 5 identifies some advisories, criteria, or guidance to be considered (TBCs) that are relevant to both Alternative 2 and Alternative 3. Table 5 includes EPA's *Guidance for Evaluating Completion of Groundwater Restoration Remedial Actions* (OSWER Directive 9355.0-129), dated November 25, 2013, and EPA's *Groundwater Remedy Completion Strategy* (OSWER Directive 9200.2-144), dated May 12, 2014, as TBCs because they will be used to evaluate remedy performance and achievement of cleanup levels. Alternative 3 is expected to comply with all ARARs from the Selected Remedial Action, as well as any new ARARs that have been updated since the Selected Remedial Action (see table 5).

10.3 Long-term Effectiveness and Permanence

Both Alternative 2 and Alternative 3 are effective in the long-term and both will permanently reduce contamination through treatment of contaminated groundwater at the Central Sprinkler Parcel. In Alternative 2, the groundwater contamination would be treated, at the source locations, allowing remaining low concentration of contaminants to attenuate. Source contaminants leaching from the vadose zone would be contained and eventually collected by the extraction wells.

The pilot studies demonstrated the effectiveness of ERD in reducing PCE concentrations within the zone of influence by 98 to 100% compared to the pre-injection concentrations. Additional ERD injection events (if necessary), post-injection monitoring, and long-term monitoring will ensure that no rebound in contaminant concentrations occurs. After cleanup levels have been met, Alternative 3 includes 10 years of long-term groundwater monitoring to monitor the sustainability of the reduced concentrations to the MCLs. Arsenic will be added as a Site COC and included in the groundwater monitoring program under Alternative 3 to monitor the anticipated reduction in arsenic concentrations as the soil and groundwater chemistry return to pre-injection conditions, which is expected to occur within five years.

10.4 Reduction of Toxicity, Mobility, or Volume through Treatment

Both Alternative 2 and Alternative 3 reduce toxicity, mobility, and volume of contaminants in the groundwater through treatment. The groundwater extraction and treatment system in Alternative 2 will contain the plume, thus reducing the mobility of contaminants. In addition, the volume and toxicity will be reduced as contaminants are removed by the air stripper and treated by carbon or UV light.

Alternative 3 will reduce the toxicity and volume of contaminants through the ERD. ERD injections enhance the conditions for naturally occurring microorganisms to break down the toxic contaminants in the groundwater. Through metabolic functions, the microbes consume and degrade the contaminants as well as their breakdown products. The intermediate breakdown products of the

ERD process, *cis*-1,2-DCE and vinyl chloride, are included in the list of COCs. The end products of the ERD process are non-toxic substances such as ethene and ethane. Alternative 3 will destroy the COCs in the groundwater at the Central Sprinkler Parcel, thus limiting contaminant volume and mobility. The effectiveness of Alternative 3 in treating and reducing the levels of COCs was demonstrated by the pilot studies. Short-term increases in arsenic concentrations in groundwater were observed during the pilot studies. Arsenic will be included in groundwater monitoring under Alternative 3 to monitor the expected long-term reduction in arsenic concentrations as the soil and groundwater chemistry return to pre-injection conditions.

10.5 Short-term Effectiveness

Alternative 2 would be effective in limiting contaminant migration in the short term; however, it would take longer than Alternative 3 to achieve the groundwater cleanup levels at the Central Sprinkler Parcel. Alternative 2 includes containment and capture of contaminated groundwater via the groundwater extraction and treatment system. The groundwater extraction and treatment system would capture and eliminate migration of contaminated groundwater within the first year of operation; however, it would likely take a decade or possibly longer for the system to achieve the groundwater cleanup levels. Due to the time needed to achieve clean-up standards, the aquifer could not be used for drinking water. . Existing institutional controls are in effect to prevent this situation.

Alternative 3 will be more effective at reaching the groundwater cleanup levels in the short term (as demonstrated by the recent ERD pilot testing and subsequent sampling events) by destroying the source and preventing contaminant migration quicker than Alternative 2.

During construction of either alternatives, workers would have to use appropriate protective personal equipment (PPE) to prevent dermal contact and/or inhalation of contaminated water or volatiles present in the water.

10.6 Implementability

For Alternative 2, construction of the groundwater extraction and treatment system which would include the pump system, air stripper and sampling, would take longer than Alternative 3 and would involve a significantly greater investment of effort and resources than Alternative 3. In addition, due to the nature of the fractured bedrock environment, system optimization efforts very likely would be needed to maximize the efficiency of the Selected Remedy in order to achieve the clean-up standards.

The successful pilot tests demonstrate that Alternative 3 is implementable. All the necessary wells have already been constructed and were used successfully to deliver the ERD substrate into the subsurface to reduce the contaminant concentrations to the cleanup levels, as shown by subsequent sampling events. If any additional ERD injections are necessary to address any contaminant rebound, all necessary wells have been constructed and are ready. Additionally, the ERD substrate is widely commercially available and can be injected using proven technologies.

10.7 Cost

When the OU3 ROD was issued on August 10, 2000, EPA estimated the OU3 ROD Selected Remedial Action would cost $20,402,692 to construct groundwater extraction and treatment systems at all ten properties included in OU3 and to connect all residences with impacted wells to public water (the connection of residences with impacted wells to public water has already been completed), as set forth below:

Capital Cost:	$2,117,428
Long-Term Monitoring:	$2,472,406
Operation and Maintenance:	$9,557,965
Total Present Worth Cost:	$20,402,692 (All 10 Site Locations)

Note: The total present worth cost ($20,402,692) is a sum of the costs shown above and other estimated engineering, land lease, and contingency costs for all ten Site properties included in OU3, as set forth in the OU3 ROD.

The estimated cost in the OU3 ROD to complete the Selected Remedial Action at the Central Sprinkler Parcel is assumed to be approximately 1/10th of the total present worth cost of the Selected Remedial Action for all 10 properties; therefore, the estimated cost to implement Alternative 2 at the Central Sprinkler Parcel is $2,040,269, minus the cost of connecting residences with impacted wells to public water, which has already been completed. Based on experience designing, constructing, and operating systems similar to the Selected Remedial Action, implementation of Alternative 2 may currently cost more than the amount estimated in the OU3 ROD. In addition, the Selected Remedial Action cost estimate was prepared in August 2000, and actual costs to implement the Selected Remedial Action could be significantly higher when adjusted for inflation.

The estimated present worth of the total cost for Alternative 3 is $242,624. EPA recognizes that contaminant levels may rebound and increase in the future; therefore, the estimated total present worth cost ($242,624) includes periodic costs ($99,760) for two additional ERD injection events with post-injection monitoring. The estimated total present worth cost of Alternative 3 also includes long-term monitoring costs for 10 years after achieving cleanup levels.

Long-Term Monitoring:	$24,415/year for 10 years
Operation and Maintenance:	$0
Periodic Costs:	$99,760 - two additional ERD injections and well abandonment
Total Present Worth Cost:	$242,624

10.8 State Acceptance

PADEP concurred with the selection of Alternative 3 in a letter dated XX, 2018 (Appendix C).

10.9 Community Acceptance

EPA held a 30-day public comment period from March 30, 2018 through April 30, 2018 to accept public comments on the remedial alternatives presented in the PRAP and on the other documents contained in the AR file compiled in support of the PRAP. On April 12, 2018, EPA held a public meeting to discuss the PRAP and accept comments. A transcript of this meeting is included in the

AR. No comments were received during the public meeting, nor were any written comments received via postal mail, electronic mail, or telephone. A summary of the public comment period is included in the Responsiveness Summary which is a part of this ROD Amendment.

10.10 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 groundwater. 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.

There is no principal threat waste associated with the Central Sprinkler Parcel.

11.0 MODIFIED REMEDIAL ACTION

Following review and consideration of the information in the AR supporting selection of this remedial action, the requirements of CERCLA and the NCP, public comments, and State acceptance, EPA has selected Alternative 3, Enhanced Reductive Dechlorination, as the Modified Remedial Action at the Central Sprinkler Parcel portion of OU3 at the Site.

11.1 Modified Remedial Action Components and Performance Standards

As indicated in this ROD Amendment, the Selected Remedial Action in the OU3 ROD included the following components:

1. Completion of a groundwater remedial design study to determine the most efficient design of a groundwater extraction and treatment system.
2. Installation, operation, and maintenance of onsite groundwater extraction wells to remove contaminated groundwater from beneath the Site and to prevent contaminants from migrating offsite.
3. Installation, operation, and maintenance of air stripping equipment and discharge piping to treat groundwater to required cleanup levels.
4. Periodic sampling of groundwater and treated water to ensure treatment components are effective and groundwater remediation is progressing toward the cleanup levels.
5. Connection of homes to public water where Site COCs were detected above MCLs in residential drinking water supply wells.
6. Performance of long-term groundwater monitoring for 30 years at approximately 50 locations to evaluate the effectiveness of the treatment system.

The Modified Remedial Action will replace the groundwater extraction and treatment system and modify the long-term monitoring components of the Selected Remedial Action only (items 1, 2, 3, 4, and 6, above). Item 5 of the Selected Remedial Action, which has already been completed, will not be modified. The Modified Remedial Action will consist of the following components:

1. Conduct groundwater monitoring to determine if groundwater cleanup levels have been achieved throughout the groundwater contaminant plume. Monitoring shall be conducted semi-annually, at a minimum, until results indicate that COC concentrations have achieved groundwater cleanup levels for four consecutive semi-annual monitoring events.

2. If COC concentrations exceed groundwater cleanup levels during four consecutive monitoring events, inject ERD substrate into the subsurface through injection wells. Details of the substrate material to be used shall be made publicly available prior to any ERD injection events through community involvement activities.

3. If additional injection of ERD substrate is required, conduct post-injection groundwater monitoring to determine if groundwater cleanup levels have been achieved throughout the groundwater contaminant plume. Post-injection monitoring shall be conducted one month, four months, and seven months after the injection and semi-annually thereafter, at a minimum. The post-injection monitoring schedule may be modified by EPA based on monitoring results.

4. If the post-injection groundwater monitoring indicates that groundwater cleanup levels have not been achieved throughout the groundwater contaminant plume for four consecutive semi-annual monitoring events, conduct additional ERD injections followed by periodic post-injection groundwater monitoring (as described in items number 2 and 3, above) until groundwater cleanup levels have been achieved for four consecutive semi-annual monitoring events.

5. Once the groundwater cleanup levels for the COCs are achieved throughout the groundwater contaminant plume at the Central Sprinkler Parcel for four consecutive semi-annual monitoring events, conduct long-term groundwater monitoring to evaluate the long-term effectiveness of the ERD. This groundwater monitoring will also assess the presence of dissolved arsenic concentrations to determine if arsenic levels in the groundwater exceed the groundwater cleanup level as a result of the temporary change in the soil and groundwater chemistry caused by the ERD injections. Long-term monitoring is anticipated to consist of annual groundwater monitoring for four years, followed by three biennial groundwater monitoring events (i.e., monitoring in the 6^{th}, 8^{th}, and 10^{th} years after cleanup levels are achieved), to evaluate the long-term effectiveness of the ERD. The long-term groundwater monitoring schedule may be modified by EPA based on monitoring results.

6. Implement institutional controls to prohibit the installation and operation of any water supply well for domestic or industrial purposes, including drinking water, at the Central Sprinkler Parcel until groundwater cleanup levels are achieved and maintained throughout the groundwater contaminant plume, unless approved in writing by EPA and PADEP.

The Modified Remedial Action will be subject to the following performance standards:

1. The following groundwater cleanup levels shall be achieved and maintained throughout the groundwater contaminant plume at the Central Sprinkler Parcel:

Table 5. Modified COCs and Cleanup Levels

COC	Cleanup Level (µg/l)
Tetrachloroethene (PCE)	5
Trichloroethene (TCE)	5
Cis-1,2-dichloroethene (*cis*-1,2-DCE)	70
Vinyl Chloride (VC)	2
Arsenic	10

11.2 Rationale for Modified Remedial Action

EPA is selecting Alternative 3 because pilot studies have demonstrated that ERD can effectively address contaminants in groundwater at the Central Sprinkler Parcel by the natural breakdown of the contaminants via microorganisms. Alternative 3 is expected to achieve groundwater cleanup levels within a shorter time frame and at a lower cost than Alternative 2, while still providing protection of human health and the environment in both the short and long-term.

11.3 Cost Estimate for the Remedy Modification

The estimated present worth of the total cost for Alternative 3 is $242,624. EPA recognizes that contaminant levels may rebound and increase in the future; therefore, the estimated total present worth cost ($242,624) includes periodic costs ($99,760) for two additional ERD injection events with post-injection monitoring. The estimated total present worth cost of Alternative 3 also includes long-term monitoring costs for 10 years after achieving cleanup levels.

Long-Term Monitoring:	$24,415/year for 10 years
Operation and Maintenance:	$0
Periodic Costs:	$99,760 - two additional ERD injections and well abandonment
Total Present Worth Cost:	$242,624

11.4 Expected Outcomes of the Modified Remedial Action

The Modified Remedial Action is expected to protect current and future industrial and residential receptors at the Central Sprinkler Parcel from adverse health effects that may result from exposure to contaminated groundwater. Additionally, the Modified Remedial Action is expected to achieve groundwater contamination cleanup levels at the Central Sprinkler Parcel and help to restore groundwater to beneficial use by achieving groundwater cleanup levels more effectively and in a shorter time frame than the current Selected Remedial Action.

12.0 STATUTORY DETERMINATIONS

Under CERCLA § 121 and the NCP at 40 C.F.R. § 300.430(f)(5)(ii), EPA must select remedies that are protective of human health and the environment, comply with ARARs, are cost effective,

and utilize permanent solutions and alternative treatment technologies or resource recovery to the maximum extent possible. There is also a preference for remedies that use treatment that permanently and significantly reduce the volume, toxicity, or mobility of hazardous wastes as a principal element. The following sections discuss how the Modified Remedial Action meets these statutory requirements.

12.1 Protection of Human Health and the Environment

The Modified Remedial Action would achieve protection of human health and the environment by reducing groundwater contamination to cleanup levels at the Central Sprinkler Parcel. By reducing the groundwater contamination, the Modified Remedial Action would reduce human exposure to the contaminated groundwater and restore the aquifer at the Central Sprinkler Parcel to its beneficial use.

12.2 Compliance with Applicable or Relevant and Appropriate Requirements

The NCP, at 40 C.F.R. § 300.430(f)(5)(ii)(B) and (C), requires that a ROD describe Federal and State ARARs that the remedy modification will attain or, if not, provide a justification for any waivers. Applicable requirements are those cleanup standards, standards of control, and other substantive environmental protection requirements, criteria, or limitations promulgated under Federal or State law that specifically address a hazardous substance, pollutant, or contaminant; remedial action; location; or other circumstance at a CERCLA site. Relevant and appropriate requirements, while not legally applicable to a hazardous substance, pollutant, or contaminant; remedial action; location; or other circumstances at a particular CERCLA site, address problems or situations sufficiently similar to those encountered at the site such that their use is considered well-suited to the particular site.

Each of the components of the Modified Remedial Action will comply with ARARs (See Table 6). All ARARs identified in the OU3 ROD will continue to be met by the Selected Remedial Action and will be met by the Modified Remedial Action. Those ARARs are described in detail in Tables 21 through 23 of the OU3 ROD.

12.3 Cost Effectiveness

Cost effectiveness is determined by evaluating the remedy's long-term effectiveness and permanence; reduction in toxicity, mobility, or volume through treatment; and short-term effectiveness. If the overall cost of the remedy is proportional to its overall effectiveness, then it is cost effective. The Modified Remedial Action satisfies the criteria listed above because it offers a permanent solution through the treatment of contaminants in groundwater, and costs less than the other action alternative, the Selected Remedial Action. Therefore, the Modified Remedial Action is cost effective.

12.4 Utilization of Permanent Solutions to the Maximum Extent Practicable

EPA has determined that the Modified Remedial Action represents the maximum extent to which permanent solutions and treatment are practicable at the Site. When compared to the current

Selected Remedial Action, EPA has determined that the Modified Remedial Action provides the best balance of tradeoffs in terms of the five balancing criteria, as well as the preference for treatment as a principal element. The Modified Remedial Action also has State and community acceptance.

The Modified Remedial Action will meet the statutory preference for treatment as a principal element by addressing contaminated groundwater at the Central Sprinkler Parcel via ERD.

12.5 Five Year Review Requirements

CERCLA § 121(c) and the NCP at 40 C.F.R. § 300.430(f)(4)(ii) provide the statutory and legal basis for conducting Five Year Reviews. The Modified Remedial Action will result in hazardous substances remaining onsite above levels that allow for unlimited use and unrestricted exposure. Therefore, a statutory review will be conducted within five years after initiation of the Modified Remedial Action to ensure the remedy is, or will be, protective of human health and the environment.

13.0 DOCUMENTATION OF SIGNIFICANT CHANGES

The PRAP was released for public comment on March 30, 2018. The public comment period for the PRAP was held from March 30, 2018 to April 30, 2018 and EPA held a public meeting on April 12, 2018 to present the Preferred Alternatives in the PRAP to the public. No comments were received during the public comment period.

However, one significant change was made to the Preferred Alternative presented in the PRAP, which is the inclusion of institutional controls (ICs) as part of the Modified Remedial Action. ICs are administrative or legal controls that help protect the integrity of the remedy and help minimize the potential for human exposure to contamination by limiting land or resource use. They are generally used in conjunction with engineering measures such as groundwater remediation. Examples of ICs include easements, use restrictions on real property, and prohibitions on the use of groundwater or other resources.

The Selected Remedial Action in the original OU3 ROD did not require ICs nor any other action that could act as an IC. During the preparation of this ROD Amendment, EPA determined that ICs are necessary to ensure long-term protection of human health and the environment because groundwater COCs are present at the Central Sprinkler Parcel at concentrations exceeding groundwater cleanup levels. Therefore, the Modified Remedial Action includes the following IC at the Central Sprinkler Parcel:

- The installation and operation of any water supply well for domestic or industrial purposes, including drinking water, shall be prohibited at the Central Sprinkler Parcel until groundwater cleanup levels are achieved and maintained throughout the groundwater contaminant plume, unless approved in writing by EPA and PADEP.

The addition of ICs does not significantly change the cost or remediation timeframe of the Preferred Alternative presented in the PRAP.

EPA expects that ICs will be implemented by the Montgomery County Health Department's Division of Water Quality Management (MCHD Division of Water Quality Management) Individual Water Supply Regulations which require review and permitting of new water supply wells and are designed to potential human exposure to contaminated groundwater within the immediate vicinity of known contamination.

III. RESPONSIVENESS SUMMARY

NORTH PENN AREA 6 SUPERFUND SITE
OPERABLE UNIT 3
CENTRAL SPRINKLER PARCEL
MODIFIED REMEDIAL ACTION

LANSDALE BOROUGH, MONTGOMERY COUNTY, PENNSYLVANIA

1.0 RESPONSIVENESS SUMMARY

This section summarizes the questions and comments received during the public comment period for the North Penn Area 6 Superfund Site (the Site), Operable Unit 3 (OU3), Central Sprinkler Parcel. The Proposed Remedial Action Plan (PRAP) was released for public comment March 30, 2018. The public comment period extended from March 30, 2018 to April 30, 2018. A public meeting was held at the Lansdale Municipal Building in Lansdale, Pennsylvania on the evening of April 12, 2018. During the public meeting and comment period, no comments were submitted by residents, elected officials, or media personnel in attendance. A transcript of the public meeting is available in the AR for OU3 at the Site.

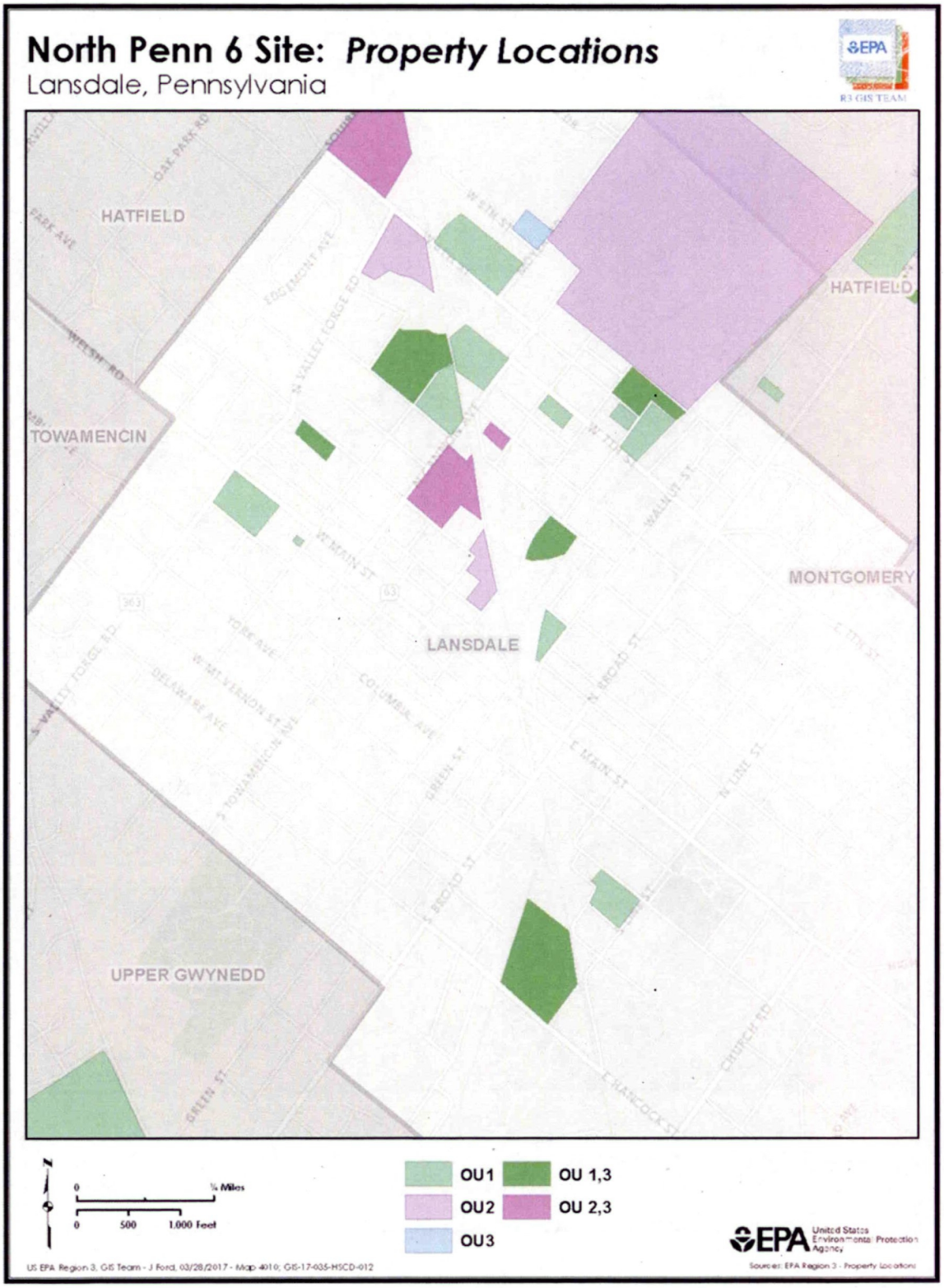

North Penn 6 Site: Property Locations
Lansdale, Pennsylvania
R3 GIS TEAM
HATFIELD
HATFIELD
TOWAMENCIN
MONTGOMERY
LANSDALE
UPPER GWYNEDD
0
¼ Miles
0
500
1,000 Feet
OU1
OU 1,3
OU2
OU 2,3
OU3
US EPA Region 3, GIS Team - J Ford, 03/28/2017 - Map 4010; GIS-17-035-MSCD-012
United States Environmental Protection Agency
Sources: EPA Region 3 - Property Locations

Figure 1

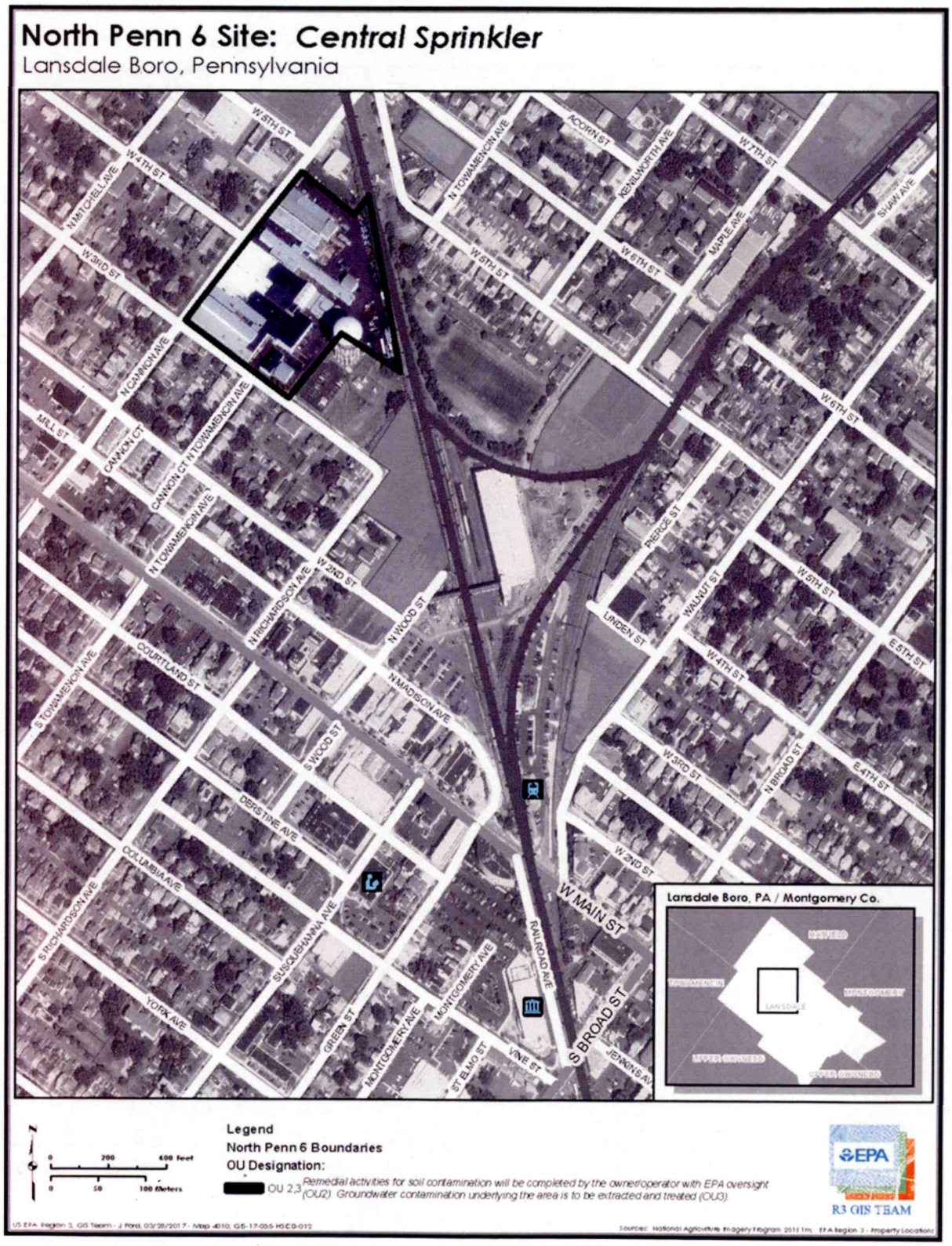
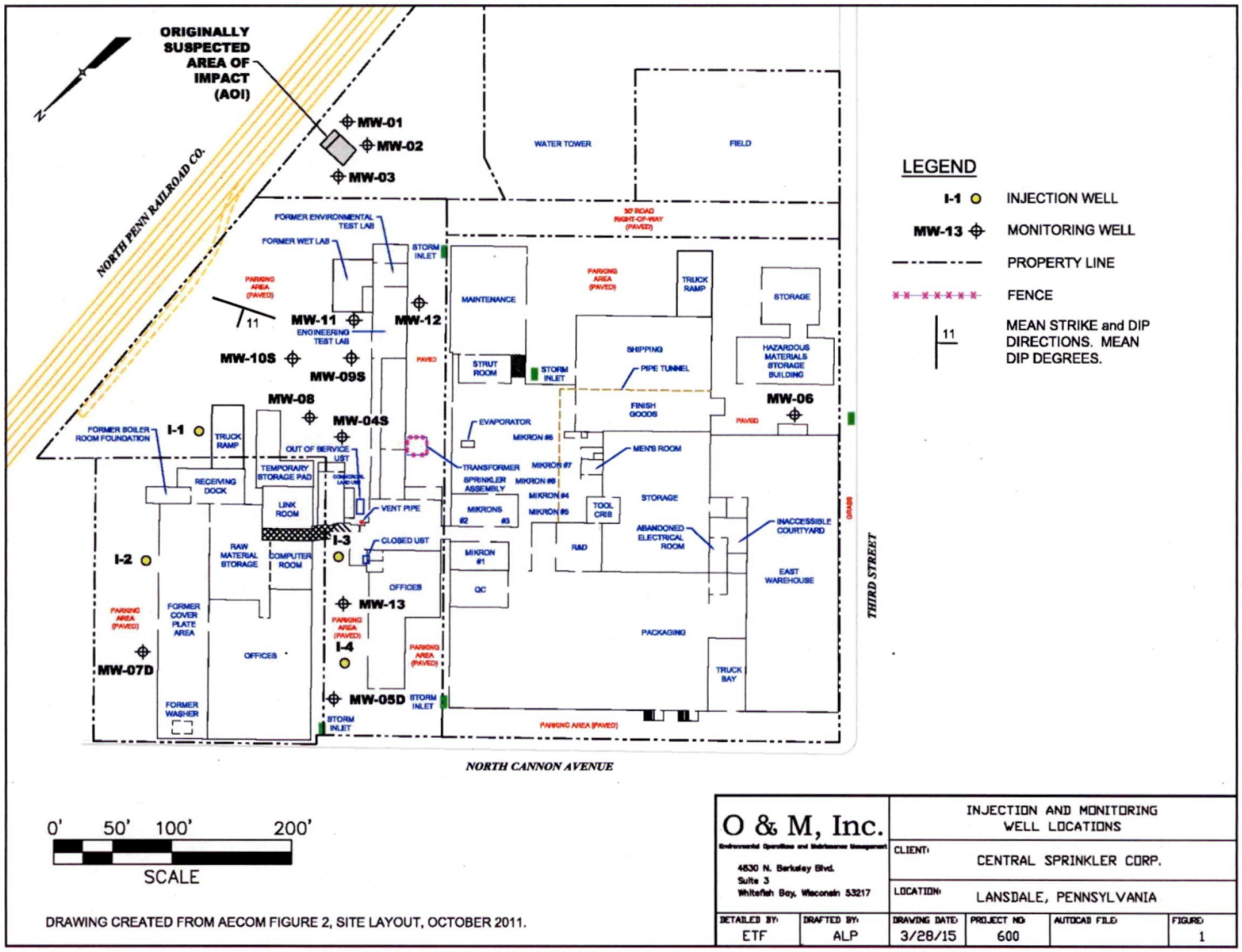

North Penn 6 Site: Central Sprinkler
Lansdale Boro, Pennsylvania
W 5TH ST
W 4TH ST
W 3RD ST
W 2ND ST
W 6TH ST
W 7TH ST
N TOWAMENCIN AVE
ACORN ST
KENILWORTH AVE
MAPLE AVE
SHAW AVE
MITCHELL AVE
N CANNON AVE
MILL ST
CANNON CT
N RICHARDSON AVE
N WOOD ST
N MADISON AVE
COURTLAND ST
S TOWAMENCIN AVE
S WOOD ST
DERSTINE AVE
COLUMBIA AVE
S RICHARDSON AVE
SUSQUEHANNA AVE
YORK AVE
GREEN ST
MONTGOMERY AVE
ST ELMO ST
VINE ST
PIERCE ST
WALNUT ST
LINDEN ST
E 5TH ST
E 4TH ST
N BROAD ST
W MAIN ST
RAILROAD AVE
S BROAD ST
JENKINS AV
Lansdale Boro, PA / Montgomery Co.
Legend
North Penn 6 Boundaries
OU Designation:
OU 2,3
Remedial activities for soil contamination will be completed by the owner/operator with EPA oversight (OU2). Groundwater contamination underlying the area is to be extracted and treated (OU3).
EPA
R3 GIS TEAM

Figure 2

Figure 3



O & M, Inc.		INJECTION AND MONITORING WELL LOCATIONS			
4830 N. Berkeley Blvd. Suite 3 Whitefish Bay, Wisconsin 53217		CLIENT: CENTRAL SPRINKLER CORP.			
		LOCATION: LANSDALE, PENNSYLVANIA			
DETAILED BY: ETF	DRAFTED BY: ALP	DRAWING DATE: 3/28/15	PROJECT NO: 600	AUTOCAD FILE:	FIGURE: 1

AR301677

Tables

Table 6. Applicable or Relevant and Appropriate Requirements

Requirement/ Standard	Legal Citation	ARAR/TBC Classification	Requirement Synopsis	Applicability to Proposed Remedies
SDWA UIC Regulations	40 CFR §§ 144.1(g), 144.11, 144.12(a), 144.82, 146.6, 146.7, 146.8, 146.10(c)	Applicable	Establishes classes of injection wells and requirements for those wells pursuant to the UIC Program.	These regulations apply to the installation of injection wells and the injection of material into the subsurface under Alternative 3. Alternative 3 will comply with the substantive requirements of these regulations.
EPA Guidance for Evaluating Completion of Groundwater Restoration Remedial Actions	EPA Office of Solid Waste and Emergency Response (OSWER) Directive 9355.0-129, November 25, 2013	TBC	Presents EPA's recommendations for evaluating Superfund groundwater remedy performance and determining when aquifer restoration and a groundwater restoration remedial action are complete.	This guidance will be used to evaluate remedy performance and achievement of cleanup levels for the Site COCs under Alternative 2 and Alternative 3.
EPA Groundwater Remedy Completion Strategy	EPA Office of Solid Waste and Emergency Response (OSWER) Directive 9200.2-144, May 12, 2014	TBC	Presents EPA's recommendations for evaluating Superfund groundwater remedy performance, operation, and progress toward attainment of Remedial Action Objectives (RAOs) and associated cleanup levels in a reasonable timeframe.	This guidance will be used to evaluate remedy performance and achievement of cleanup levels for the Site COCs under Alternative 2 and Alternative 3.
Pennsylvania Water Well Drillers License Act (Act 610) (referenced in OU3 ROD as Water Drillers Act); and Regulations in Chapter 47 of the Pennsylvania Code – Drilling Water Wells	32 P.S. §§ 645.1 - 645.13; and Updated citation for regulations: 17 Pa. Code §§ 47.1 – 47.8 (referenced in OU3 ROD by its former citation: 25 Pa. Code Chapter 107)	Relevant and appropriate	Requirements for the licensing of water well drillers, notification of intent to drill, record-keeping for wells, and notification of well abandonment.	Applies to Alternative 2 and Alternative 3. The substantive requirements of this statute and these regulations will be followed in connection with the installation or abandonment of wells.
PADEP Groundwater Monitoring Guidance Manual, Chapter 7 - Well Abandonment Procedures, December 1, 2001	http://www.elibrary.dep.state.pa.us/dsweb/Get/Document-48361/383-3000-001.pdf	Relevant and appropriate	Requirements for abandonment of wells.	Applies to Alternative 2 and Alternative 3. The substantive requirements of Chapter 7 will be followed in connection with the abandonment of wells.

Appendix A
Administrative Record Index

NORTH PENN - AREA 6
OU 3 RECORD OF DECISION (ROD) AMENDMENT
ADMINISTRATIVE RECORD FILE *
INDEX OF DOCUMENTS

III. REMEDIAL RESPONSE PLANNING

1. Report: Phase II Remedial Investigation/Feasibility Study (RI/FS) and Focused Feasibility Study (FFS) Work Plan, North Penn Area 6, Part 1 of 2, prepared by CH2M Hill, 1/24/91. P. 300001-300223. Δ

2. Report: Phase II Remedial Investigation/Feasibility Study (RI/FS) and Focused Feasibility Study (FFS) Work Plan, North Penn Area 6, Part 2 of 2, prepared by CH2M Hill, 1/24/91. P. 300224-300425. Δ

3. Report: Pilot Test Work Plan, Enhanced Reductive Dechlorination, Central Sprinkler Corporation Site, OU3, Lansdale, Pennsylvania, prepared by O & M, Inc., Rev. 4/2/12. P. 300426-300570.

4. Letter Report to Mr. Huu Ngo, U.S. EPA, from Mr. Eric Frauen, O & M, Inc., re: Site Summary of Enhanced Reductive Dechlorination (ERD) Injection Activities, 2/18/13. P. 300571-300585.

5. Report: Work Plan, Additional Investigation, Enhanced Reductive Dechlorination, Central Sprinkler Corporation Site, North Penn 6 OU3, prepared by O & M, Inc., 4/13. P. 300586-300609.

6. Report: Work Plan, Enhanced Reductive Dechlorination Pilot Test, Central Sprinkler Corporation Site, North

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* Administrative Record File Available 3/30/2018, updated __/___/ 18. The North Penn Area 6 Administrative Record File for Operable Unit 3 (OU3) is incorporated herein by reference and the Index of Documents finalized on 9/30/09 is attached.

Δ Document has been redacted to protect the privacy of individuals. Redactions are evident from the face of the document.

Penn 6, OU3, Lansdale, Pennsylvania, prepared by O & M, Inc., Rev. 6/14. P. 300610-300646.

7. Letter Report to Mr. Huu Ngo, U.S. EPA, from Mr. Eric Frauen, O & M, Inc., re: Site Summary of Additional Investigation/Second Enhanced Reductive Dechlorination (ERD) Injection and Monitoring Pilot Test, Rev. 6/17/14. P. 300647-300922.

8. Letter Report to Mr. Huu Ngo, U.S. EPA, from Mr. Eric Frauen, O & M, Inc., re: Site Summary of the Third Enhanced Reductive Dechlorination (ERD) Injection and Monitoring Pilot Test, Rev. 7/1/15. P. 300923-301175.

9. Report: Monthly Progress Report, For Period of October 2015, Tyco Fire Protection Products, Central Sprinkler Corporation, North Penn Area 6 Superfund Site, prepared by O & M, Inc., 10/15. P. 301176-301182.

10. Letter Report to Mr. Huu Ngo, U.S. EPA, from Mr. Eric Frauen, O & M, Inc., re: Summary of Groundwater Sampling - 4th Quarter 2015, 5/12/16. P. 301183-301381.

11. Letter Report to Mr. Christopher Corbett, U.S. EPA, from Mr. Eric Frauen, O & M, Inc., re: Request for Amendment to the Record of Decision (ROD), Remedies for Groundwater, Operable Unit 3, North Penn - Area 6, Central Sprinkler Superfund Site, Lansdale, PA, 6/14/16. P. 301382-301395.

12. Letter Report to Mr. Huu Ngo, U.S. EPA, from Mr. Eric Frauen, O & M, Inc., re: Summary of Groundwater Sampling - 3rd Quarter 2016, 10/31/16. P. 301396-301590.

13. Proposed Remedial Action Plan, North Penn - Area 6 Superfund Site, Operable Unit 3, Central Sprinkler/Tyco Parcel, 3/18. P. 301591-301618.

14. Table, Groundwater Sampling Results, Attachment 1, Central Sprinkler Corporation, (undated). P. 301619-301626.

15. Table, Groundwater Geochemical Results, Central Sprinkler Corporation, (undated). P. 301627-301630.

16. Figures, Record of Decision (ROD) Amendment Figures 1-4, prepared by O & M Inc., (undated). P. 301631-301637.

17. Calculation of Alternative Costs, Record of Decision

(ROD) Amendment Support, Central Sprinkler Corporation, (undated). P. 301638-301639.

18. Record of Decision (ROD) Amendment, North Penn - Area 6 Superfund Site, Operable Unit 3, Central Sprinkler Parcel, Lansdale Borough, Montgomery County, Pennsylvania, //18. P. 2261090.

V. COMMUNITY INVOLVEMENT

1. Transcript of Public Meeting, North Penn - Area 6 Superfund Site, Operable Unit 3, Central Sprinkler/Tyco Parcel, 4/12/18. P. 2256699.

Appendix B

Central sprinkler Corp Site
Lansdale PA
ROD Amendment Support
Calculation of Alternative Costs

No Action Alternative

Annual Long-Term Monitoring Cost - $34,481 (see attached spread sheet for detailed breakdown)

Year 1 thru 29:

Multi-Year Discount Rate for 29 Years (7% discount rate) = 12.278

$34,481 X 12.278 = $423,358

Year 30:

$34,481 (monitoring) plus $33,700 (well abandonment) = $68,181

Present Value - $68,181 X 0.131 = $8,932

Total Present Value - $423,358 + $8,932 = $432,290

The Scope of the No Action alternative includes 30 years of groundwater monitoring.

EPA Calculated ROD Alternative 4 (ROD, 8/10/00)

Present Value - $20,402,692 for 10 sites in the North Penn Area 6

$20,402,692/10 = $2,040,269

This estimate was for 10 properties that jointly make up the North Penn 6 Superfund Site. A cost allocation specifying the dollar amount calculated for each of the 10 sites was not able to be located and may not exist. The ROD Remedy appears to treat the 10 properties as being the same, with the same remedy for each. Therefore, the estimated cost to complete the ROD Remedy at the Central Sprinkler Corporation property is assumed to be $1/10^{th}$ of the total North Penn Area 6 ROD Remedy cost.

Based on O & M, Inc experience designing, constructing, operating, maintaining, and monitoring systems similar to the Alternative 4 ROD Remedy, the actual cost would be considerably higher than the cost estimated by the EPA.

Alternative Remedy

Cost to date for pilot testing, monitoring, reporting, and project management: $495,000

Future Cost:

$343,910 (see attached spread sheet for detailed breakdown)

Present Value of Estimated Future Cost (7% discount rate):

Year	Long-Term Monitoring	Periodic Cost	Total Annual Cost	Present Value
1	$24,415		$24,415	$22,828
2	$24,415	$33,030 EVO Inj	$57,445	$50,149
3	$24,415		$24,415	$19,923
4	$24,415	$33,030 EVO Inj	$57,445	$43,831
5	$24,415		$24,415	$17,408
6	$24,415		$24,415	$16,260
7	$24,415		$24,415	$15,211
8	$24,415		$24,415	$14,210
9	$24,415		$24,415	$13,282
10	$24,415	$33,700 Abandon Wells	$58,115	$29,522
	$244,150	$99,760	$343,910	$242,624

The estimated present value cost for the Alternative Remedy is $737,624, including costs already incurred for ERD to date ($495,000). At the suggestion of the EPA, the estimated cost includes two additional ERD injection events, although these are not anticipated to be required; and 10 years of annual groundwater sampling (10 wells).

Appendix C

pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

September 25, 2018

Ms. Karen Melvin, Director
Hazardous Site Cleanup Division
United States Environmental Protection Agency
Region III
1650 Arch Street
Philadelphia, PA 19103-2029

Re: Letter of Concurrence with the ROD Amendment for Central Sprinkler Parcel (OU-3),
North Penn Area 6 NPL Site,
Lansdale Borough, Montgomery County, PA

Dear Ms. Melvin:

The Record of Decision Amendment (ROD Amendment) for the Central Sprinkler Parcel part of the Operable Unit 3 (OU-3) of the North Penn Area 6 NPL Site, received by this office on July 17, 2018, has been reviewed by the Pennsylvania Department of Environmental Protection (DEP)

DEP recognizes the ROD Amendment modification of the remedy for the Central Sprinkler Parcel includes the following major components:

1. Semi-annual groundwater monitoring events to determine if clean up levels for have been achieved for at least four consecutive events.

2. If clean up levels have not been achieved for four consecutive events, the injection of ERD substrate.

3. If ERD substrate injection is required, groundwater monitoring events one month, seven months after the injection, followed by semi-annual groundwater monitoring.

4. Additional ERD substrate injections, and monitoring as described if clean up levels have not been achieved for four consecutive semi-annual monitoring events.

5. Once clean up level have been achieved for four consecutive semi-annual monitoring events, long-term monitoring for 10 years consisting of annual monitoring for four years, and then three biannual monitoring events.

6. Prohibition of the groundwater use at the Central Sprinkler Parcel until clean up levels have been achieved and maintained unless approved by USEPA and DEP.

DEP hereby concurs with the U.S. Environmental Protection Agency's (USEPA) selected remedy with the following conditions:

1. USEPA will give the DEP the opportunity to fully participate in any negotiations with responsible parties.

2. DEP reserves the right and responsibility to take independent enforcement actions pursuant to state law.

3. DEP concurrence with the selected remedial action is not intended to provide any assurances pursuant to CERCLA Section 104 (c) (3), 42 U.S.C. Section 9604 (c) (3).

4. DEP concurrence shall not be construed as a determination that completion of the remedy will result in the relief from liability available under Pennsylvania's Land Recycling and Environmental Remediation Standards Act, Act of May 19, 1995, P.L. No. 2, 35 P.S. 6026.101 et seq.

5. DEP will be given the opportunity to concur with the decisions related to the Remedial Design and Remedial Action to assure compliance with DEP cleanup ARARs and design specific ARARs.

6. Substantive changes to the ROD Amendment after the date of this letter may result the rescindment of DEP's concurrence.

This letter documents DEP's concurrence with USEPA's ROD Amendment for the Central Sprinkler Parcel, North Penn Area 6 NPL Site, OU-3. Should you have any questions regarding the matter of this letter, please feel free to contact me.

Sincerely,

Patrick L. Patterson
Regional Director
Southeast Regional Office

cc: Ms. N. Wagner
Mr. S. Shankar, P.E.
Mr. R. Patel
Mr. T. Cherry
Ms. G. Thomas, Esq.
Mr. C. Wad
Mr. J. Redmond, USEPA
File
Re 30 (cm18ecb) 268