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1995

EPA Superfund
Record of Decision:

**NORTH PENN - AREA 6
EPA ID: PAD980926976
OU 01
LANSDALE, PA
09/29/1995**

Text:

Declaration for the Record of Decision

Site Name and Location

North Penn Area 6 Site
Source Control Remedial Action--Operable Unit 1 (OU1)
Lansdale, Montgomery County, Pennsylvania

Statement of Basis and Purpose

This decision document presents the selected remedial action for contaminated soil at the North Penn Area 6 Site in Lansdale, Montgomery County, Pennsylvania. This remedial action was chosen in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended, (CERCLA), and, to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). This decision document explains the factual and legal basis for selecting the remedy for Operable Unit 1. This decision is based on the administrative record for this Site.

The Pennsylvania Department of Environmental Resources has not indicated whether or not it concurs with the selected remedy,

Assessment of the Site

Actual or threatened releases of hazardous substances from this Site, if not addressed by implementing the response action selected in this Record of Decision (ROD), may present an imminent and substantial endangerment to public health, welfare, or the environment.

Description of the Selected Remedy

Alternative 7, In Place Processing with Hot Air Injection is the selected remedy for soil contamination at four properties at the Site. (Excavation and Offsite Disposal is the backup alternative if Alternative 7 is not able to obtain cleanup standards).

Alternative 7 for source control will involve the processing of soils at each of the four properties with an excavator or similar equipment equipped with devices to inject hot air into the contaminated soil. The unit digs into the soil while injecting the hot air, driving off the volatiles. The vapors are then collected in a hood that sits on top of the soil above the digging arm, and captured in a carbon adsoprtion unit. Cement or other binder materials will be added during the last round of processing at locations where metals are present, to bind up the metals.

If this technique is not successful in meeting the soil cleanup levels, the contaminated soils will be excavated. The soil would be shipped to an EPA-approved facility for disposal. The remediation levels were developed for each property by evaluating the concentration of contaminants, the depth to ground water, the subsurface conditions, and other factors. These levels vary by as much as an order of magnitude due to the different soil conditions, concentrations, and other factors at each property that affect the potential for migration of the contamination to ground water. The performance standards for remediating the soils, and the estimated quantity of soils needing to be removed for each property, are:

Propery	Remediation Level	Estimated Quantity
Electra Products	182 ppb (PCE)	117 cubic yds.
John Evans Sons	84 ppb (TCE)	466 cubic yds.
Keystone Hydraulics	769 ppb (TCE)	575 cubic yds.
Tate Andale	131 ppb (TCE)	700 cubic yds.

Based on comments submitted durng the comment period, EPA plans to reevaluate the remediation levels listed above. Therefore, the numerical remediation levels listed may change before the remedial action is implemented. If a significant change results from this reevaluation, EPA will issue an Explanation of Significant Differences or a ROD Amendment. The performance standard of the remedy, however will not change; protection of ground water to background levels (using minimum detection limits) remains as the performance standard for this remedy.

Implementation of Alternative 7 (or Alternative 6 if necessary) for the soil contamination operable unit will remove any threat of direct contact exposure, and will also improve ground water quality by eliminating a continuing source of contamination. Once the contaminated soil is removed, the levels of PCE and TCE entering the drinking water aquifer should be significantly reduced.

Statutory Determinations

The selected remedy is protective of human health and the environment, complies with Federal and State requirements that are legally applicable or relevant and appropriate to the remedial action (or a waiver can be justified for any federal and state applicable or relevant and appropriate requirements that will not be met) and is cost-effective. This remedy utilizes permanent solutions and alternative treatment (or resource recovery) technologies to the maximum extent practicable, and it satisfies the statutory preference for remedies that employ treatment that reduce toxicity, mobility, or volume as their principal element.

_______________________________ _______________
Thomas C. Voltaggio, Director Date
Hazardous Waste Management Division

North Penn Area 6 Site
Lansdale, PA
Operable Unit 1

1. Site Name, Location, and Description

Source Control Operable Unit - Remedial Action
Lansdale, Montgomery County, Pennsylvania

This Record of Decision (ROD) describes the selection of the remedial action plan to address the sources of contamination at the North Penn Area 6 Site. This ROD primarily addresses the soil contamination at the Site for the properties that the Environmental Protection Agency (EPA) investigated. For some properties, the property owners have agreed to conduct the soils investigations under EPA oversight. The EPA-lead portion of the source control remedial action has been designated as Operable Unit 1 (OU1), the investigations by property owners has been designated as operable unit 2 (OU2), and the ground water contamination remedial action has been designated as operable unit 3 (OU3) for purposes of organizing and identifying remedial actions at this Site. This ROD is for OU1.

This Site is located in Lansdale, Montgomery County, Pennsylvania, and was listed due to contamination of ground water by volatile organic compounds (VOCs). The contamination at the North Penn Area 6 Site was first noted in 1979 in several North Penn Water Authority (NPWA) wells in the area. The affected wells were immediately taken out of service because of the high trichloroethylene levels in the ground water. (Trichloroethylene is also known as trichloroethene, which is abbreviated as TCE. The term TCE is used in this document). On the basis of this contamination, the Site was proposed for the National Priorities List (NPL) in January 1987, and was placed on the NPL in March 1989. (Five other sites in the North Penn area were also listed on the NPL due to similar ground water contamination.)

The Site is located in an area that contains a mixture of commercial, industrial and residential uses. All residences within the immediate area use public drinking water supplies. EPA arranged for the connection of a number of residences to public water supplies that had formerly used private wells for drinking water, but which had become contaminated. There are additional private wells in use outside the known area of ground water contamination. The boundaries of the Site are shown in Figure 1.

After the ground water contamination was identified, potentially responsible party (PRP) searches by EPA and others identified twenty-six facilities in the area that may have contributed to the ground water contamination. Nineteen of these facilities were evaluated in the Remedial Investigation/Feasibility Study (RI/FS) that forms the basis for this ROD. The RI/FS investigated the soil at these properties to assess its contribution to the ground water contamination. (The other seven will be evaluated as part of OU2). The results of the soil sampling work done during the RI/FS revealed that significant levels of Site-related contamination exist at four of the nineteen properties.

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The four facilities on which Site-related soil contamination was found, and which therefore may have contributed contamination to the ground water, are: Electra Products, John Evans and Sons, Keystone Hydraulics, and Tate Andale. Locations of the facilities are shown circled in Figure 1. Figure 1 also shows the dimensions of the Site based on the locations of the facilities and the approximate distribution of contaminated ground water in the bedrock aquifer.

2. Site History and Enforcement Activities

After the identification of contamination in the ground water in the area in 1979, the NPWA initiated an investigation into the source or sources of the contamination. EPA and the Pennsylvania Department of Environmental Protection (PADEP) were notified of the contamination, and over the next several years were involved in investigating the sources.

Sampling was conducted at several wells in the area, to determine the types and levels of contamination in the ground water. The following contaminants were identified:

- Trichloroethene (TCE)
- Tetrachloroethylene (PCE)
- 1,1,1-Trichloroethane (1,1,1-TCA)
- 1,1,2-Trichloroethane
- 1,1-Dichloroethane (1,1-DCA)
- 1,2-Dichloroethane (1,2-DCA)
- 1,1-Dichloroethene (1,1-DCE)
- cis- and trans-1,2-Dichloroethene (1,2-DCE)
- Chloroform
- Carbon Tetrachloride
- Trichlorofluoromethane
- Vinyl Chloride
- Methylene Chloride

The most frequent contaminant found, and the one found at the highest level, is TCE. These contaminants were found in a number of wells throughout the area at various times at levels up to 9,240 parts per billion (ppb).

The history of each of the properties identified as potential sources of the contamination is discussed below. On August 5, 1991, EPA issued general notice letters to the owners and/or operators of each of the properties pursuant to Section 107(a) of CERCLA, to inform them of their potential Superfund liability as owners or operators of the properties. On June 30, 1992, EPA again notified the owners and/or operators of these properties of their potential liability for this Site. After several discussions with them concerning the nature and extent of EPA's work to be performed, the owners or operators of nineteen of the properties indicated that they were not willing and/or able to perform or finance the RI/FS for operable unit 1 (to prevent a release or threatened release of hazardous substances, pollutants, or contaminants from the facility). Therefore, EPA decided to perform the response for these nineteen properties (Operable Unit 1) with funds from the Hazardous Substance Superfund as authorized by Section 104 of CERCLA, 42 U.S.C. §7604. (Negotiations continued with owners or operators of the remaining seven properties, resulting in an administrative consent order, signed May 11, 1995, under which the owners/operators will conduct a soils investigation under EPA oversight. These will be investigated under Operable Unit 2.)

In March, 1993, EPA initiated the RI/FS for this Site. EPA performed investigations that included soil boring and soil sampling and analysis. The soil sampling defined soil characteristics and levels of soil contamination by VOCs at each of the nineteen facilities.

3. Highlights of Community Participation

The EPA issued the Proposed Plan for this Site for public comment on June 30, 1995. The RI/FS report, summarized in the Proposed Plan, was also made available to the public. EPA published a notice of availability of these two documents in the North Penn Reporter on July 3, 1995. These and other Site-related documents were made available to the public in the administrative record file maintained at the EPA Docket Room in Region III and at an information repository at the Lansdale Public Library in Lansdale, PA.

In accordance with Sections 113(k)(2)(B)(i-v) and 117 of CERCLA, 42 U.S.C. §§ 9613(k)(2)(B)(i-v) and 9617, EPA held a public comment period from July 5, 1995 through September 1, 1995 (including an extension as reguested at the public meeting). In addition, EPA held a public meeting on July 11, 1995 at the Lansdale Borough Hall. Both the public comment period and the meeting were announced in the notice of availability. At this meeting, EPA presented the proposed plan, answered questions, and received comments. Responses to the comments received during the public comment period are included in the Responsiveness Summary, which is attached as part of this Record of Decision.

This decision document presents the selected final remedial action for operable unit 1 of the North Penn Area 6 Site in Lansdale, Montgomery County, Pennsylvania, chosen in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended (CERCLA), 42 U.S.C. Sections 9601 et. seq., and to the extent practicable, the National Contingency Plan (NCP, 40 C.F.R. Part 300). The decision for this Site is based on the Administrative Record.

4. Scope and Role of Operable Unit 1 Within Site Stratagy

The remedial work at this Site has been divided into three separate planned remedial actions. The first operable unit is the source control operable unit (OU1). This Record of Decision (ROD) selects a final remedial action for OU1, which addresses the soil contamination from four of the nineteen properties that are contributing to ground water contamination. The second operable unit (OU2) will address the remaining properties at which the property owners or operators are conducting the soils investigation work under EPA oversight. The third operable unit (OU3) will address the ground water contamination.

This ROD describes EPA's selection of the remedy for the soil contamination. Organic solvents were used in commercial/industrial operations over varying periods of time at each property, and are still being used at John Evans and Sons. Through spills or discharges, these solvents contaminated the soils beneath the properties, and eventually migrated to the ground water. EPA and others have measured contamination in the ground water that exceeds the levels established in the Safe Drinking Water Act for public water supplies. Continued migration of the contamination remaining in the soil could exacerbate the ground water contamination problem, and could also result in direct exposure to anyone excavating or working in the soil in the areas of contamination.

As described in the Proposed Plan, the objectives of this remedial action are to eliminate the source of contamination migrating to ground water and to remove the potential exposure risk from the contaminated soil.

5. Summary of Site Characteristics

EPA completed a Remedial Investigation/Feasibility Study (RI/FS) for OU1 at the Site in December, 1994. The purposes of the RI/FS were to:

- Define the nature and extent of contamination in the soil at the relevant properties, and define the Site boundaries.

- Determine which of the nineteen identified properties contributed to the ground water contamination by identifying those properties with soil contamination.

- Identify the nature of contaminant migration at the Site, including pathways related to soil and ground water.

- Perform a risk assessment to evaluate any potential threat to human health and the environment.

- Develop and evaluate a range of final remedial action alternatives to control any identified human health or environmental threats for operable unit 1.

During the remedial investigation (RI) activities at the Site, EPA investigated the nature and extent of soil contamination by volatile organic compounds (VOCs). The results of the investigation are presented in this section.

Soils

The nature and extent of VOC contamination in soils at each of the nineteen facilities was investigated to determine if any of the facilities may have been sources of contamination which migrated to the ground water and whether any of the facilities may continue to be sources of ground water contamination. Soils investigation took place in two sampling events; August 9, 1993 through October 1, 1993, and April 18, 1994 through April 26, 1994. During the first event, soil gas and/or subsurface soil samples were collected at 18 of the 19 site properties under the original scope of work.

During the second sampling event, soil samples were collected from the properties of Royal Cleaners (the nineteenth property), American Olean Tile, and a field adjacent to Lehigh Valley Dairies (formerly part of the dairy) which had not been sampled during the first sampling event. Additional soil samples were collected from the properties of REP and Westside Industries.

The locations at each site property were numbered consecutively, using the following conventions; SG(sample number)for soil gas and SB(sample numbor) for the subsurface soil samples and SS (sample number) for the surface soil samples. The procedures used to collect the soil gas and soil samples are described in the RI report.

Soil samples were collected at all of the 19 properties. Soil gas samples were collected at some of the larger properties to determine if any contamination "hot spots" were present. In cases where soil gas samples were collected, soil samples were collected as a follow-up to any positive detections as well as to confirm non-detections.

Soil gas samples were analyzed in an offsite laboratory within 24 hours. Soil samples were analyzed in the field with a gas chromatograph (GC) in a close support laboratory (CSL) staged less than 2 miles from the site. In the close support laboratory, soil samples were analyzed for volatile organics within 48 to 72 hours. Duplicates of approximately 10 percent of all of the samples were sent to Contract Laboratory Program (CLP) laboratories for analysis based on a more complete list of analyses. The soil samples sent through the

CLP program were selected to provide information on the areal extent of contamination at the facility and to quantify levels of contamination at the facility for use in the risk assessment.

Surface soil samples were analyzed in CLP laboratories for the full Target Compound List organics. Samples from four properties, John Evans and Sons, Keystone Hydraulics, Rybond, Inc., and Mattero Brothers were also analyzed for Target Analyte List metals.

After all of the properties had been sampled and the results from the close support laboratory became available, the properties were ranked in terms of the extent of contamination. Undisturbed soil samples were then collected at the five most contaminated properties. The samples were analyzed for physical and additional chemical parameters needed for fate and transport evaluations. A summary of all sampling at each property is given in the following sections.

Soil Contamination

The target contaminants for this soil investigation, as discussed in the Work Plan and the RI, were those detected in the ground water:

Vinyl chloride	1, 1,1-Trichloroethane
1,1-Dichloroethane	Carbon tetrachloride
Methylene chloride	1,2-Dichloroethane
trans-1,2-Dichloroethene	Trichloroethene
cis-1, 2-Dichloroethene	Tetrachloroethene
Chloroform	

Soil samples collected during the field investigation were analyzed for all of the volatile organic compounds on the target compound list (TCL). The following compounds were detected in the soil samples collected:

Chloromethane	chloroform
Vinyl chloride	1, 1,1-Trichloroethane
Acetone	Carbon tetrachloride
Methylene chloride	Trichloroethene
Carbon disulfide	Toluene
trans-1,Z-dichloroethene	1,1,2-Trichloroethane
2-butanone	2-Hexanone
cis-1,2-Dichloroethene	Tetrachloroethene
Ethyl benzene	
m-Xylene/p-xylene	
o-Xylene/styrene	

Nearly all of the detected values for chloromethane, acetone, methylene chloride, 2-butanone, and chloroform are qualified as "B", indicative of possible blank contamination. These most likely do not reflect actual soil condition. Unless property-specific information indicated the presence of these compounds, they were not considered as site-related contaminants.

Low concentrations of carbon disulfide (less than 100 mg/kg) were detected at several locations. This compound commonly occurs in oxygen-depleted environments associated with anaerobic microbiological processes. Although industrial sources of carbon disulfide may be significant, septic systems have been found to produce abnormal levels of carbon disulfide in soil and ground water. Therefore, carbon disulfide was not evaluated further because it could not be related to specific past operations or detected at higher concentrations, and has not been found in ground water.

The CLP results include TAL metals and TCL volatiles, semivolatiles, and PCBs/pesticides. Volatile organic contaminants occur at high levels on some properties. Semivolatile and nonvolatile organics have been detected in soil samples from several properties, some at significant levels. The contaminants relevant to each individual property are discussed below. For those properties for which soil samples were subjected to TAL metal analysis, discussion will focus on those metals (1) that exceed the background levels and (2) are attributable to contamination. No discussion is provided for metals that are found in background samples at levels that exceed the detected levels.

Evaluation of Detect-& Contaminants at Individual Properties

This section discusses the type, concentration, and distribution of contaminants found at each property. The nature and extent of contamination on each property is evaluated using the sampling results. The properties where no significant contamination by target contaminants was found were eliminated from additional evaluation.

Crystal Soap

Fourteen soil gas samples were collected. Except for SG1 where cis-1,2-dichloroethene was detected at 3.3 parts per billion (ppb), all other sample results for the listed contaminants indicated nothing above the detection limits (1 ppb).

No contamination was found at the five locations where soil samples were collected for close support laboratory analysis. Soil samples from two depths at four locations and from one depth at one location were analyzed and contaminant levels were below detection limits.

This property was not evaluated further because no target contaminants were detected at significant levels, and the base/neutral contaminants detected by a CLP laboratory all have very low water solubility and high adsorption affinity to soils. At the detected levels, these soil contaminants should have minimal impact on ground water quality, and do not present a threat to human health or the environment.

Decision Data

Soil samples were collected from six locations at Decision Data. All but one location had two depths sampled. Only xylenes (meta, para, and ortho) and styrene were detected at levels less than 10 ppb ; but all values are qualified with a "B" for possible blank contamination. The samples collected from SB03 for CLP laboratory analysis did not contain any detectable levels of TCL organic contaminants. This property was not evaluated further.

Dip'N Strip

Acetone and methylene chloride were detected at most of the five sampling locations in Dip'N Strip. All values are qualified with a "B", indicating that these compounds were also found in a laboratory blank. However, because these detections correspond to the type of compounds used in the property, it is possible that these values reflect the actual site conditions. Acetone was detected in 5 of the 9 samples collected. Its concentrations ranged from 6 to 15 ppb. The concentration of methylene chloride, which was detected in all samples, ranged from 5.3 to 7.0 ppb. If not due to lab contamination, these values should reflect maximum levels of soil contamination near the furniture treatment building because soil samples had been collected from locations where maximum concentrations were expected. However, these levels are commonly found in laboratory blanks, and since no higher levels were found in the soils, these results are believed to be due to laboratory contamination. The soil samples collected from SB04 and SB05 for CLP laboratory analysis did not contain detectable levels of TCL organic contaminacts. This property was not evaluated further.

Eaton Laboratories

Significant contamination was found in only one location, SB01. The contaminants found were cis-1,2-dichloroethene (14 ppb), benzene (15 ppb), toluene (59 ppb), 2-hexanone (130 ppb), ethyl benzene (510 ppb), m- and p-xylenes (220 ppb), and o-xylene/styrene (260 ppb).

One of the samples collected for CLP laboratory analysis (SB08) contained elevated levels of contamination. Nineteen base/neutral compounds and three pesticide/PCBs were detected. The highest levels detected were 6,600 ppb fluoranthene among the base/neutral compounds and 130 ppb methoxychlor among the pesticide/PCBs. In a replicate sample collected from the same location and depth, however, a smaller number of base/neutral compounds with considerably lower values and no pesticide/PCBs were detected.

The detected compounds should not impact the ground water significantly; however, there could be some human health risks associated with these contaminants. Further evaluations are given in the Risk Assessment section.

Electra Products

Nine soil gas samples were collected, and the results showed possible contamination at only one location. The detected compounds in the soil gas sample (SG6) were cis-1, 2-dichloroethene (1.1 ppb), trichloroethene (6.3 ppb), and tetrachloroethene (48 ppb). Soil gas samples from all other locations had contaminant levels less than 1.0 ppb, the detection limit.

Soil sampling results confirmed the presence of contaminants in the vicinity of SG6. The SG6 location was revisited during soil sampling as SB09. At the 5-foot depth, the soil sample from this location showed the highest levels of contaminants: about 1,100 ppb of tetrachloroethene, 50 ppb of trichloroethene, and possibly 340 ppb of cis-1,2-dichloroethene. Contamination was also found in soil samples collected from locations SB10 and SB11.

Figure 2 shows the levels of contamination found in this property. The major contaminants found in the soil samples generally correspond well to those found in the soil gas samples. Low levels of toluene, ethyl benzene, and m- and p-xylenes were detected at SB02, SB03, and SB09. However, concern over these compounds at these low levels is much less than concern over chlorinated compoubds found at higher levels.

Additional contaminants were detected in soil samples from SB02 during a CLP laboratory analysis (results are in Appendix C of the RI/FS). These contaminants include low levels of base/neutral and pesticide/PCB compounds. The highest levels of detection among 6 detected base/neutral compounds were 52 ppb of pyrene. Only Aroclor-1254 and -1260, among pesticide/PCBs, were detected at levels up to 92 and 84 ppb, respectively.

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John Evans and Sons

The levels of contamination on this property are shown in Figure 3A. The highest levels of cis-1,2-dichloroethene, trichloroethene, and tetrachloroethene were found in soil samples collected from location SB07. At SB07, the detected concentrations of both trichloroethene and tetrachloroethene reach as high as 1,400 ppb, and the highest concentration of cis-1,2-dichloroethene was 880 ppb. At location SBO9, a similar concentration was detected for tetrachloroethene (up to 1,900 ppb), while less than 200 ppb of cis-1,2-dichloroethene and trichloroethene were detected. Lower levels of contaminants were found at locations SB04, SB05, and SB06 in the vicinity of SB07 and SB09.

Soil samples at this property were collected and sent to a CLP laboratory for metal analysis. Metals found include barium, cadmium, chromium, copper, lead, mercury, nickel, selenium, thallium, vanadium, and zinc (Appendix C of the RI/FS). Table 1 summarizes the range of concentrations for these metals in 16 samples from 9 locations.

Cadmium, chromium, lead, nickel, vanadium, and zinc significantly exceed the possible range of background levels. Barium and copper are just less than two times the possible range of background values. There were no background detections for mercury and thallium. The low levels of these two metals detected in site soils may reflect actual soil contamination. The differences between selenium concentrations in the site and background soil samples are not very significant. Existing data does not allow a reliable determination of whether the detected selenium is attributable to actual contamination.

Since the volatile contaminants on the Evans property were close to the property line with the American Olean Tile Company (AOT), samples were collect on the AOT side of the property line to determine if contamination existed on both sides of the line. Results for this property are shown in Figure 3B. Among the eleven locations sampled in the area adjacent to the John Evans and Sons property, only one sample (SB09 at 8 feet) contains a significant level of contamination by tetrachloroethene (270 ppb). Another location with elevated level of contamination is SB10 (70 ppb cis-1,2-dichloroethene). Samples from SB06, SB07, SB08, and SBll contain contaminants less than 15 ppb. The data indicates that the contamination in the John Evans and Sons property have not extended more than several feet across the property line.

Keystone Hydraulics

Among those investigated, the Keystone Hydraulics property was found to have the highest levels of soil contamination.

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Table 1 Potential Metal Contamination at John Evans and Sons

	Detected (mg/kg)	Background(mg/kg) Average/Max	Locations Exceed Background1
Barium	41-260	118/143	SB04,11,12,SS02
Cadmium	ND2-262	ND2	SB05,11,SS01,02
Chromium	17-550	23/27.3	SB05,06,11,12,SS
Copper	10-155	24.2/85.4	SB05,11.SS01,02
Lead	9.7-450	11.3/14.7	SB05,11,12,SS01,
Mercury	ND2-1.4	ND2	SB05,SS02
Nickel	13-476	19.7/37.5	SB11,SS01,02
Selinium	ND2	0.16/0.29	SS01,02
Thallium	ND2-3.4	ND2	SB02,04,11,12,SS
Vanadium	14.2-636	30/39.2	SB05,11,12,SS01,
Zinc	36.385	46.1/95	SB03,05,11.SS01,

1. Only those exceeding the maximum background levels are listed
2. Undetected

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Figure 4 shows the extent of contamination on two sides of the existing building on the property. Primary areas of contamination seem to be chlorinated hydrocarbons on the east side and toluene, ethyl benzene, xylenes and styrene (TEXS) on the west side of the property.

Different investigative approaches were applied to the east and west sides of the property. The east side had been identified by a previous NPWA investigation as an area contaminated with chlorinated hydrocarbons (trichloroethene and tetrachloroethene). Therefore, no soil gas sampling was deemed necessary before soil sampling on the east side although it was used on the west side to help select sampling locations. However to provide a basis for comparison, one soil gas sample was collected from east side location SG10 where the highest cis-1,2-dichloroethene, trichloroethene, and tetrachloroethene concentrations were detected in soil samples (SB02) at the time of investigation. Extremely high concentrations of cis-1,2-dichloroethene (8,388 ppb) and trichloroethene (1,135 ppb), and elevated levels of tetrachloroethene (51 ppb), trans-1,2-dichloroethene (41 ppb), 1,1-dichlorothene (17 ppb), and 1,1-dichloroethane (3.2 ppb) were found in the soil gas sample. In the soil sample from the same location (SB02), the primary contaminants are cis-1,2-dichloroethene (up to 43,000 ppb), trichloroethene (up to 34,000 ppb), and tetrachloroethene (up to 6,700 ppb), with the rest generally undetected.

Samples collected at SB35, a location west of SB02, contain even higher levels of these contaminants. At the 5 foot depth, the detected concentrations are 180,000 ppb for cis-1,2-dichloroethene, 210,000 ppb for trichloroethene, and 60,000 ppb for tetrachloroethene. At both SB02 and SB35, contaminant concentrations in soils are generally much higher at the 5 foot depth than at the 2.5 foot depth.

The results for the east side are generally consistent with those from the NPWA investigation. Contaminant concentrations in soils are the highest in the middle portion of the area. Soil samples from the south portion of the area have much lower contaminant concentrations, while samples collected from the north portion contain only trace levels of contaminants.

The toluene, ethyl benzene, xylenes, and styrene contamination, in levels higher than 100 ppb, appears to be limited to the northeast corner of the west side of the property. The highest level of such contamination is found at locations SB16 and S839. At SB16, soil samples contain about 23,000 ppb toluene, 160,000 ppb ethyl benzene, 140,000 ppb m- and p-xylenes, and 200,000 ppb o-xylene/styrene. At SB39, the soil at 5 foot depth contains 440,000 ppb ethylbenzene and 1,200,000 ppb m- and p-xylenes. Chlorinated hydrocarbon contamination appears to be less than the east side. There are isolated locations, such as SB30, where low levels of cis-1,2-dichloroethene (19 ppb), trichloroethene (50 ppb), and tetrachloroethene (S4 ppb) are found in the soil.

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The depth to the refusal layer on this property, presumably the bedrock, varies from 5 to 10 feet. Contamination appears to have extended to this layer, with the highest levels of contaminants normally found in the upper 5 feet of the soil column. No obvious cause can be found for the TEXS contamination in the west side of the property. The chlorinated hydrocarbon contamination on the east side, however, appears to be linked to an abandoned underground storage tank, because the highest levels of contamination are found in SB35 and SB02, close to the tank.

Elevated levels of base/neutral compounds and pesticide/PCBs were detected in soil samples sent to a CLP laboratory for analysis of full TCL contaminants. In terms of the base/neutral compounds detected, the most prominent locations are SB04, SB06, SB16, SBl9, SB24, SB28, and SB33 because of the number of compounds detected or the level of detection. At SB28, 23,000 ppb of naphthalene and 42,000 ppb of 2-methylnaphthalene were detected in soils at the 5 foot depth. At location SB16, samples at the 5 foot depth were found to contain 15 base/neutral compounds.

Among the pesticides/PCBs, up to 290 ppb of Aroclor-1260 were detected in samples from SB24. Up to 40 ppb of Aroclor-1254 were detected at SB06 and SB02. Other detections include endosulfan I, dieldrin, 4,4'-DDE, 4,4'-DDD, alpha-chlordane, and Aroclor-1248 at a small number of locations with concentrations ranging from less than 1 ppb to 12 ppb.

Among the analyzed TAL metals, arsenic, barium, chromium, copper, lead, mercury, nickel, selenium, silver, vanadium, and zinc concentrations are significant compared with background. Table 2 summarizes the results of 38 samples from 21 locations.

Arsenic, barium, copper, vanadium, and zinc concentrations found in site soils are generally less than two times the maximum possible background levels, except for one surface soil sample (SS02) which contains 37.2 mg/kg of arsenic. The presence of chromium, lead, and nickel appear to be largely related to contamination. Although selenium concentrations in soils from some locations exceed the possible range of background levels, these levels are near the detection limit for selenium. It appears questionable whether the selenium detected in site soil actually reflects soil contamination. There is no mercury or silver above the detection limit in the background samples; therefore, the detected concentrations for these metals in site soils appear to indicate some soil contamination.

Table 2 Potential Metal Contaminants at Keystone Hydraulics

	Detected (mg/kg)	Background(mg/kg) Average/Max	Locations Exceeding Background1
Arsenic	1-37.2	2.9/4.9	SB02, 16, 19, 37, 45,
Barium	49.2-315	118/143	SB04, 06, 24, 40, 42, SS03, 04, 05
Chromium	14-734	23/27.3	SB02, 19, 24, 40, 42,
Copper	8.6-154	24.2185.4	SB04, 19, 24, 40, 45,
Lead	6.9-319	11.3114.7	SB02, 04, 06, 15, 11, 25, 28, 29, 40, 42, 4 thru SS05
Mercury	ND²-2	ND	SB04, 09, 15, 16, 24,
Nickel	7.3-604	19.7/7.5	SB19, 28, 40, 42
Selenium	ND-1.3	0.16/0.29	SB04, 09,15, 19, 25,S
Silver	ND-1.3	ND	SB02,04,06,11, 16, 19
Vanadium	8-59.2	30/9.2	SB02, 04,19, 37,40, 4
Zinc	25.6-151	46.1/95	SB16,24,25,49,SS01 th

1. Only those exceeding the maximum background levels are listed.
2. Undetected

Landacq Associates

Soil gas sampling at this property revealed one location, SG1, with an elevated level of tetrachloroethene (14 :g/l). Results from the subsequent soil sampling of SB03 through SB06 did not confirm the presence of this contaminant at SGT. Soil samples from other locations in this property (SB01, SB02, and SB07 through SB12) did not contain any contaminants at significant levels of concern.

Soil samples sent to a CLP laboratory contained low levels of base/neutral compounds, ranging between 40 and 190 ppb. These compounds include naphthalene (40 ppb), 2-methylnaphthalene (75 ppb), phenanthrene (up to 190 ppb), di-n-butylphthalate (44 ppb), fluoranthene (75 ppb), and pyrene (87 ppb). Up to 4,700 ppb of Aroclor-1254 were also found in soil samples. All these detections were from SB01 and SB02 soil samples.

The current level and extent of contamination at this property will not significantly impact the ground water. However, some of the detected contaminants may pose human health risks. Further evaluations will be given in the Risk Assessment section.

Lansdale Realty

No contaminants were detected in soil gas samples at levels above the detection limit of 1 mg/l. Subsequent soil sampling at 9 locations revealed that soils from SB01, at a depth of 5 feet, contained 2-hexanone (up to 2,200 ppb), ethyl benzene (12,000 ppb), and m- and p-xylenes (7,200 ppb). SB01 was near an underground gasoline tank that could be responsible for the benzene detection. o-Xylene/styrene was also detected, but the concentration of 360 ppb is not sufficiently high to rule out the possibility of laboratory contamination. The sample from the 9.5 foot depth detected these contaminants, but the values were not reliable because of possible cross contamination during-analysis.

The CLP results showed no base/neutral and pesticide/PCBs in samples from SB05. Although these low levels of contaminants will not significantly impact the ground water, further evaluations will be given to the property because of the human health risks associated with the contaminants.

Lehigh Valley Dairies

Soil gas samples collected from Lehigh Valley Dairies contained no contaminants of concern above the detection level of 1 mg/l. Only one soil sample (7 feet deep, SB08) contained significant levels of ethyl benzene (520 ppb), m- and p-xylenes (300 ppb), and o-xylene/styrene (360 ppb).

The samples sent to a CLP laboratory (SB01) contained 14 base/neutral compounds, with concentrations ranging from 21 ppb to 41 ppb.

A portion the property formerly owned by Lehigh Valley, and now being developed by Hassan Builders, was sampled in the second round. Soil samples collected from this property and sent to the close support laboratory during the second sampling event contained no significant levels of contaminants of concern. Only one of the samples sent to the CLP laboratory (SB15) contained 60 ppb of fluoranthene and pyrene.

Although the current levels of contamination are not any indication of the extent of past contamination, for the purpose of this RI, which is to identify and remediate the current contamination sources for the ground water, no further evaluations were given to this property. These contaminants are not likely to impact the ground water or pose significant human health risks.

Mattero Brothers

Close support laboratory results of soil samples from two locations did not indicate the presence of contaminants of concern on this property.

The samples sent to a CLP laboratory contained metals that may be attributable to site contamination. These metals include arsenic, barium, cadmium, chromium, copper, lead, mercury, selenium, silver, and zinc.

Cadmium, mercury, and silver were not detected in background samples; therefore, the presence of these metals in site soils is probably attributable to site contamination. The maximum concentrations of arsenic, chromium, and copper detected in site soils are less than or not much higher than two times the background values. This indicates that contamination contributed these metals at concentrations less than their naturally occurring levels. Selenium concentrations in site soils exceed background values, but these detections are largely near the detection limit.

Philadelphia Toboggan

Close support laboratory analysis of soil samples from this property reveals trace levels of carbon tetrachloride at SB01 (3.7 and 5.2 ppb at depths of 5 and 6 feet, respectively). In subsequent confirmation sampling, samples at SB09 detected the same contaminant at slightly higher levels (22 and 42 ppb at 4 and 6 foot depths, respectively).

Other contaminants detected in these soil samples include up to 24 ppb of trichloroethene from SB06, SBQ7, and SB08. These values may reflect cross-contamination of samples during laboratory analysis and the actual trichloroethene levels could be lower.

CLP laboratory results indicate that samples from SB09 contained elevated levels of base/neutral compounds. Nineteen compounds were detected at the two foot depth intervals at SB09 with concentrations of different compounds ranging from 170 ppb to 9,500 ppb. In addition, 2.4 ppb beta-BHC was detected at the same location among the pesticide/PCB compounds.

Further evaluations were given to only the volatiles detected at the property. Other contaminants were found at low levels and should not impact the ground water significantly or pose a significant threat to human health.

REP

The close support laboratory results for soil samples collected from this property indicate low levels of chlorinated hydrocarbon contamination. A soil sample collected from SB11 at a depth of 8 feet (next to the west corner of the factory building) showed the highest levels of contamination with tetrachloroethene (200 ppb), trichloroethene (19 ppb), and cis-1,2-dichloroethene (33 ppb). A sample collected at a shallower depth (5 feet) at the same location did not contain any of these contaminants above the detection limit of 5 ppb. During the second sampling event, two additional samples were collected from the same vicinity (SB16 and SB17). The two samples did not contain the same contaminants above the detection limit of 5 ppb.

In the main area south of the building, soil samples from SB03 (5 feet deep) contained 52-88 ppb of tetrachloroethene, 37-66 ppb of 1,1,1-trichloroethane, and 11-22 ppb of 1,1-dichloroethane. Two values are provided for each contaminant because sample duplicates were collected in the field and analyzed separately.

The depth to the refusal layer is about 5 feet at all sampling locations. This depth probably reflects the vertical extent of any contamination in the area. The lateral extent of contamination is spotty with several locations showing trace levels of contaminants.

There were no significant levels of base/neutral compounds detected in samples sent to a CLP laboratory for analysis.

Royal Cleaners

The highest levels of tetrachloroethene and trichloroethene found on this property were 42 and 35 ppb, respectively in samples fram SB08. The most significant levels of cis-1,2-dichloroethene were found in samples from SB03 (260 ppb), SB01 (110 ppb), and SB08 (51 ppb). Contaminants in samples from other locations were either undetected or generally below 20 ppb.

Rybond Industrial Park

Soil samples sent to the close support laboratory for analysis contained trace levels of contaminants. The most significant contaminant is methylene chloride, detected under 10 ppb in all soil samples. However, these values very likely reflect sample contamination during analysis.

The CLP results did not show significant amounts of base/neutral compounds or pesticide/PCBs in the site soils. The only detection was 0.23 ppb of gamma-chlordane (a pesticide/PCB) at SB02.

For the six samples that were analyzed for TAL metals, only the concentrations of chromium at SB03 (73.6 ppb), and silver at SB04 (0.59 ppb) and SB05 (0.72 ppb) appeared to be higher than the background range.

Although the levels of contamination are not any indication of the extent of past contamination, for the purpose of this RI, which is to identify and remediate the current contamination sources for the ground water, no further evaluations were given to this property. The levels of contaminants will not significantly impact the ground water or pose significant human health risks.

Tate Andale Company

Soil gas sampling results revealed five locations (SG2 through SG5, and SG10) potentially containing elevated levels of contaminants. The highest level of contamination indicated by the soil gas results was SG3, where soil vapor contained 862 ppb of trichloroethene, 96 ppb of cis-1,2-dichloroethene, 8.1 ppb of trans-1,2-dichloroethene, and 4.O ppb of 1,1-dichloroethene.

Figure 5 shows the extent of contamination at the property based on the results from soil samples analyzed in the close support laboratory. Soils in the two sampled areas contained elevated levels of contaminants. These two areas were the old storage area on the west side and an open area on the east side of property. Contaminant concentrations found in soils on the west side are generally lower than the east side.

On the west side, the highest level of contamination was found at SB01. At a depth of 7 feet the detections included: 1,1-dichloroethane (170 ppb), 1,1,1-trichloroethane (140 ppb), 1,1-dichloroethene (66 ppb), cis-3,2-dichloroethene (54 ppb), trichloroethene (22 ppb), 1,1,1-trichloroethane (17 ppb), and tetrachloroethene (9.6 ppb). It appears that the lateral extent of contamination is limited to a small area between SB01 and SB04. Vertically, contaminant concentrations in soils are higher at lower depth at these four locations.

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Soil contaminant levels on the east side are much higher than on the west side. The highest concentrations of contaminants on the east side were found at SB07 at a depth of 6 feet. Detected concentrations of close support laboratory analyzed contaminants were 4,600 ppb of trichloroethene, 2,600 ppb of cis-1,2-dichloroethene, 310 ppb of vinyl chloride, 76 ppb of trans-1,2-dichloroethene, and 16 ppb of 1,1-dichloroethene. The lateral extent of contamination appears to be limited to a strip through SB06, SB07, SB08, and SB14. Of the two depths sampled at each location, the lower depth generally contained higher levels of contaminants.

The CLP laboratory results did not show any significant levels of base/neutral or pesticide/PCBs in soil samples collected from SB03 and SB07.

Tri-xris Co., Inc.

The three locations sampled for the close support laboratory analyses did not show evidence of soil contamination with the target contaminants.

The CLP laboratory analysis detected up to 130 ppb Aroclor-1254 among the pesticide/PCB compounds in the soil sample collected from SB03. In the same soil sample, levels up to 59 ppb of di-n-butylphthalate were detected.

Although the levels of contamination are not any indication of the extent of past contamination, for the purpose of this RI, which is to identify and remediate the current contamination sources for the ground water, no further evaluations were given to this property. The levels of contaminants should not significantly impact the ground water or pose significant human health risks.

United Knitting mills (NP Industrial)

The only location with significant levels of contamination at this property was SB06 near the former paint shed at the rear corner of the property. At depths of 5 and 7 feet, 19 and 36 ppb of 1,1,1-trichloroethane were detected. At SB05, a location farther away from the shed, lower concentrations of 1,1,1-trichloroethane to a maximum of 8.4 ppb were found in soils. Other contaminants include low levels (up to 8.4 ppb) of 1,1-dichloroethane in SB05 and SB06.

There were no detections of base/neutral or pesticide/PCB compounds in samples sent for a CLP laboratory analysis.

Westside Industries

The maximum levels of contaminants found in this property were 100 ppb of tetrachloroethene and 16 ppb of trichloroethene in soil samples collected from SB14 (depth of 7 feet). Analysis of samples collected during a revisit (SB17 through SB19) revealed up to 100 ppb tetrachloroethene, 12 ppb cis-1,2-dichloroethene, and less than 10 ppb trichloroethene. Soil samples from another location (SB11) also contained low levels of contaminants (up to 17 ppb of tetrachloroethene). Results from the second sampling event did not indicate significant levels of contamination in the former drum staging area.

The CLP laboratory analysis results for 6 samples collected from 3 locations indicated that only soil samples from SB18 had significant detections of 19 base/neutral compounds. The concentrations of different compounds ranged from 58 ppb to 16,000 ppb. However, none of these detects are the target compounds for this RI. No pesticide/PCBs were detected. A water sample collected from a cistern located inside the factory building and analyzed in a CLP laboratory contained 920 ppb 1,2 dichloroethene (total), 420 ppb vinyl chloride, and 120 ppb trichloroethene. The 1,2-dichloroethene (total) concentration had been reported as high as 2,600 ppb during previous samplings of the cistern.

6. Summary of Site Risks

This section summarizes the baseline risk assessment for nine selected properties in the North Penn Area 6 site area that was completed as part of the RI/FS. These nine properties were selected from a total of 19 that were studied as part of Source Control Operable Unit (OU1). Data from surface and subsurface soil samples collected at these nine properties were analyzed for the risk assessment. The properties included in the baseline risk assessment are as follows:

- Electra Products
- John Evans and Sons
- Keystone Hydraulics
- REP
- Tate Andale Company
- Eaton Laboratories
- Landacq Associates
- Lansdale Realty
- Westside Industries

Because of the types and quantities of the contaminants detected in soils at Eaton Laboratories, Landacq Associates, Lansdale Realty, and Westside Industries, the risk assessment for these four properties was performed only at the screening level.

A detailed risk assessment was performed for each of the remaining properties.

This baseline risk assessment evaluates the potential risks to human health and the environment due to releases of contaminants at the properties evaluated as part of the North Penn Area 6 Site. Combined with fate and transport modeling, it provides the basis for determining whether a remedial action is necessary. The specific objectives of the baseline human health risk assessment are listed below:

- Identify and provide analysis of baseline risks (defined as risks that might exist if no remediation or institutional controls were applied at the site) and help determine what action is needed at the site;
- Provide a basis for determining the levels of chemicals that can remain onsite without impacting public health; and
- Provide a basis for comparing potential health impacts of various remedial alternatives.

The baseline risk assessment provides an assessment of potential risk to human health and to the environment due to the potential exposure to the contaminants released from the properties at North Penn Area 6.

The surface and subsurface samples collected at the 9 properties included in the risk assessment were analyzed for volatile, semi-volatile, and pesticide/PCB organic compounds. At the John Evans and Sons and Keystone Hydraulics properties, samples were also collected for Target Analyte List (TAL) inorganics.

Two volatile organic compounds (trichloroethene and tetrachloroethene) were most freguently detected in the properties. All of the properties had some semi-volatile compounds, including several carcinogenic polynuclear aromatic hydrocarbons (PAXs). Most of the semi-volatile compounds were detected at low levels with a few samples showing detections of greater than 1,000 ppb. Several inorganics were detected at the John Evans and Sons and Keystone Hydraulics properties, although levels were generally low with respect to background levels. A discussion of the procedure used to eliminate chemicals from the risk assessment, with the rationale for elimination, is presented in the RI/FS. A list of the chemicals of potential concern in the soil for each property is given in Table 3. This table is separated into two parts, for the overall risk assessment (0-10 feet) , and for the assessment of risk due to surface contamination (0-2 feet)

Table 3

Chemicals of Potential Concern in Soi
North Penn Area 6 RI/
Risk Assessment

John Evans and Sons	Electra Products	Keytone Hydraul	
Compound or Analyte	Compound or Analyte	Compound or Ana	Compoand or Analyte
Volatile Organics	Base Neutral Organics:	Volatile Organi	Organics
Trichloroethene	2-Methylnaphthalene	Trichloroethene	2-Methylnaphthalene
	Acenaphthylene	Tetrachloroethe	
Base Neutral	Dibenzofuran	1,1-Dichloroeth	Benzo(g,h,i)perylene
Phenanthrene	Phenaunthrene	Vinyl chloride	
	Benzo(b)fluoranthene		
Pesticides/PCBs:	Benzo(a)pyrene	Base Neutral Or	
Aroclor-1260	Benzo(g,h,i)perylene	2-Methylnaphtha	
		Phenonthrene	
Inorganics:		Benzo(a)pyrene	
Arsenic		Benzo(g,h,i)per	
Cadmium			
Chromium		Inorganics:	
Leed		Arsenic	
Manganese		Chromium	
Nickel		Lead	
Thallium		Manganese	
		Nickel	
		Thallium	

Chemicals of Potential Concern in Surface
North Penn Area 6 RI/FS
Risk Assessment

John Evans and Sons	Electra Products	Kegstone Hydraul	
Compound or Analyte	Compound or Analyte	Compound or Anal	Compound or Analyte
Base Neutral Organics	Base Neutral Organics	Base Neutral Org	Neutral Organics
Phenanthrene	2-Methyinaphthalene	2-Methylnaphthal	2-Methylnaphthalene
	Acenaphthylene	Phenanthrene	
Pesticides/PCBs:	Dibenzofuran	Benze(a)pyrene	
Aroclor-1260	Phenanthrene	Benzo(g,h,i)pery	
	Benzo(a)anthracene		
Inorganics:	Benzo(b)fluoranthene	Pesticides/PCBs:	
Arsenic	Benzo(a)pyrene	Aroclor-1260	
Cadmium	Dibenz(a,h)anthracene		
Chromium	Benzo(g,h,i)perylene	Inorganics:	
Lead		Arsenic	
Manganese		Lead	
Nickel		Manganese	
Vanadium			

Risk associated with the site contaminants was characterized using 2 approaches depending on the types and quantities of contaminants found at each property. Soils in Eaton Laboratories, Landacq Associates, Lansdale Realty, and Westside Industries contained low levels of a small number of contaminants. Risk assessment for these properties was evaluated using the maximum concentrations of contaminants of concern at each property (screening level). If the screening level calculations indicated significant risks associated with the contaminants at these properties, a more detailed risk assessment would have been performed. In contrast, the Monte Carlo method was used to evaluate the ranges of risk associated with the contaminants found in the soil of Electra Products, John Evans and Sons, Keystone Hydraulics, REP, and Tate Andale Company.

The cancer risks from the screening of contamination associated with the Eaton Laboratories, Landacq Associates, and Westside Industries properties are all in the 10-6 range or lower. There is no non-cancer toxicity data available for these contaminants. Because the calculations used the maximum contaminant concentrations found in the properties, these risk values most likely represent the upper limit of the actual risks for the contaminated soils. The levels of contamination found at Lansdale Realty (mostly petroleum fuel related compounds) were below even the screening levels for these compounds. Therefore, these properties were eliminated from further evaluation.

Noncarcinogenic Risks - An evaluation of the noncarcinogenic risk as presented in the RI/FS indicates the ranges of total hazard quotients under the future use onsite resident scenario. The reasonable maximum exposure (RME) noncarcinogenic risks are less than 1.0 for Tate Andale Company, Electra Products, and REP properties for both adult and child residents, and Keystone Hydraulics property for adult residents only. Total hazard quotients (RME) for future residents are between 1 and 11 for John Evans and Sons (10.4 for child and 1.6 for adult) and Keystone Hydraulics (2.35, child only) properties. The noncarcinogenic risk to future residents at John Evans and Sons is due mainly to incidental ingestion of cadmium and dermal contact with cadmium and nickel in the surface soil. At Keystone Hydraulics, the risk is primarily due to incidental ingestion of arsenic in the surface soil. A hazard index that exceeds 1.0 is indicative of some degree of noncarcinogenic risk.

The total hazardous quotients for the construction worker scenario are less than 1 for all properties except for John Evans and Sons. At this property, the total hazardous quotient (RME) is 3.5. The primary contribution to the high value at John Evans and Sons is from ingestion of cadmium (0.46) and arsenic (0.15), dermal contact of cadmium (0.59), and inhalation of manganese (2.0).

Carcinogenic Risk - The total carcinogenic risk (RME) for future onsite residents (both adult and Child) falls between 4.8x10-7 and 8.9x10-5 for all properties. The higher carcinogenic risks to future residents are due mainly to ingestion of and dermal contact with surface soil containing arsenic at Keystone Hydraulics (8.9x105 for child and 4.2x105 for adult). At John Evans and Sons, ingestion of and dermal contact with surface soil containing arsenic can contribute about 75% of the total risk (6.2x10-5 for child and 3.1x10-5 for adult). It should be noted that only two surface samples were taken, both in one corner of the property. The entire area is fenced and is not accessible to the public, and that the remainder of the area is paved.

The total carcinogenic risk (RME) for construction workers ranges from 10-8 to 1.3x10-6 for Electra Products, John Evans and Sons, Keystone Hydraulics, and Tate Andale Company. There are no contaminants of concern at REP under this scenario.

Although the volatile organic compound contamination in the soil at these properties does not pose significant risks in and of itself, the levels are high enough in the soil at four of these properties that continued migration from the soil to ground water could result in ground water concentrations that exceed maximum contaminant levels (MCLs) and/or pose a threat to anyone consuming this water.

Conclusion of Summary of Site Risks

Actual or threatened releases of hazardous substances from this Site, if not addressed by implementing the response action presented in this ROD, may present an imminent and substantial endangerment to public health, welfare, or the environment.

7. Description of Alternatives

In accordance with section 300.430(e)(9) of the National Oil and Hazardous Substances Contingency Plan (NCP), 40 C.F.R. § 300.430(e)(9), remedial response actions were identified and screened for effectiveness, implementability, and cost during the Feasibility Study to meet remedial action objectives at the Site. The technologies that passed the screening were developed into remedial alternatives. EPA assessed these alternatives against the nine criteria specified in the NCP at 40 C.F.R. Section 300.430(e)(9)(iii). In addition, EPA evaluated the No Action Alternative (Alternative 1) as required by the National Contingency Plan (NCP). These alternatives are presented and discussed below for the soil contamination operable unit. All projected costs and implementation time frames provided for the alternatives below are estimates.

The time frames, except where noted, are estimated times for meeting the remedial objectives, not just for completion of construction activities.

Source Control Alternatives

The following alternatives were evaluated for the source control operable unit (addressing the soil contamination at the four properties). For estimates of the length of time for cleanup and for the soil cleanup levels, the Multi-Med model was used, with protection of ground water to background levels (using minimum detection limits) as the cleanup standard.

Alternative 1: No Action

Capital Cost:	$60,000
O&M Costs:	$67,800 (avg. per year)
Present Worth:	$303,000
Time to Implement:	3 months (for well installation)

Under the No Action alternative, no control or remediation of contaminated soil would take place. EPA evaluates a "No Action" alternative for every remedial action in order to establish a baseline for comparison of alternatives, as required by the National Contingency Plan (NCP), 40 C.F.R. Part 300, which regulates Superfund Actions.

The contamination levels in the soil would gradually decline due to natural attenuation processes that break down the contamination. These processes include biodegradation, volatilization, adsorption, dispersion, and photolysis. It would take between 8 and 25 years for these processes to reduce the soil contamination to levels considered protective of human health and the environment (not considering ground water exposure). During this time, no monitoring or testing of the soil contamination levels or conditions would occur.

The No Action alternative will include only ground water monitoring. Ground water quality monitoring will be conducted below the contaminated soil zones. One upgradient and two downgradient monitoring wells screened in the bedrock will be installed at each of the four properties designated for long term monitoring. Long term monitoring would be performed for 30 years. Ground water samples will be collected quarterly during the first ten years, semiannually during the following ten years, and annually during the last ten years. Analysis of the ground water will be used to evaluate if the contaminant has leached into the aquifer. The ground water samples will be analyzed for volatile organics including trichloroethene (TCE) and tetrachloroethene (PCE).

Alternative 2: Cap Containment

Capital Cost:	$441,128
O&M Costs:	$8,700
Present Worth:	$702,500
Time to Implement:	1 year

Alternative 2, cap containment, consists of covering the contaminated soils, preventing direct contact with the contaminants and reducing erosion and infiltration and the associated contaminant migration to ground water. Alternative 2 will also include long term ground water monitoring. Each site will have three monitoring wells for this purpose.

The cover recommended by EPA Resource Conservation and Recovery Act (RCRA) program has a multilayer cover system that incorporates natural soil (clay) and geomembrane barrier layers as well as drainage and vegetation layers. While EPA may consider alternative cover designs that are innovative and utilize site-specific information, the recommended alternative design must be as effective as the RCRA cover design.

The contaminated site properties consist of small parcels of land primarily zoned for commercial or light industrial use. All of the properties are graded and one property (John Evans and Sons) is paved. The contaminated soil zones at John Evans and Sons and Keystone Hydraulics have nearby businesses and/or residential buildings. Consequently, the cover alternative should maintain a final finished grade, similar to existing grades. This grading requirement may preclude the use of the RCRA cover system because a minimum 5 foot thickness is required. However, this alternative proposes the use of a 1 foot thick cover that will have the same performance as the RCRA cover. In order to maintain the existing grade, 1 foot of excavation will be performed for the cap so that the final grade of the cover is flush with adjacent areas. The excavated materials will be transported and disposed of at appropriate RCRA waste facilities. Capping of the soil at Reystone Hydraulics will include the removal of an existing underground storage tank. Liquids from the tank will be removed with a vacuum tanker and disposed.

Alternative 3 - In Situ Remediation - Vapor Extraction

Capital Cost: $1,143,200
O&M Costs: $35,700 (one year)
Present Worth: $1,178,900
Time to Implement: 1 year

Vapor extraction is an accepted technique for the removal of volatile Qrganic compounds from the unsaturated zone. As an "in-situ" technology, at least to the extent that excavation is not required, it may offer considerable cost savings over soil excavation and above ground treatment or offsite disposal.

Vacuum extraction can be carried out in a variety of modes; however, the general procedure involves applying a vacuum at a well to extract volatile subsurface contaminants. The recovered air stream is processed through a vapor phase granulated activated carbon (GAC) unit to remove organics and finally is discharged into the atmosphere.

To increase removal efficiencies, an air or hot gas injection system may be used. In cases where the permeability is low, pneumatic fracturing of the formation may increase recovery rates. The decision to use these alternatives would be evaluated following a treatability study.

Vapor extraction can be used for contaminated soils at all properties except for John Evans and Sons. The soil at this property would have to be excavated and disposed of at a RCRA landfill even after vapor extraction because of the high human health risk associated with metals. Processing the soil at Keystone Hydraulics will include the removal of an existing underground storage tank. Liquids from the tank will be removed with a vacuum tanker and disposed.

Alternative 4: Offsite Treatment - Thermal Desorption

Capital Cost: $2,368,800
O&M Costs: $0
Present Worth: $2,368,800
Time to Implement: 1 year

Under Alternative 4, contaminated soil from the four properties will be excavated and treated. This treatment may occur at a centralized location within the Lansdale area with contaminated soils brought from each property to one location, or at on offsite location consisting of an approved treatment facility outside of the Lansdale area. Excavation, treatment, and backfilling of each property, if necessary, will be completed separately to eliminate the potential for soil mixing or cross-contamination between the properties. Excavation at Keystone Hydraulics will include removal of an unused underground storage tank.

The soil treatment scheme of Alternative 4 is a low temperature (LT) thermal desorption treatment system listed as an innovative technology. The scheme treats soil contaminated with volatile organic compounds (VOCs) and semi-volatile organic compounds (SVOCs) by thermally desorbing the contaminants from the soil without heating it to combustion temperatures. The LT System uses an indirect heat exchanger.

Contaminated soil is first processed to separate oversized materials from the soil feed. The remaining soil is fed to a thermal processor for treatment. The thermal processor mixes and heats the soil with the use of sweep gases from a burner. Treated soil from the thermal processor is discharged into a conditioner where it is sprayed with water to lower the temperature and minimize dust emissions.

Desorbed organics and sweep gas from the thermal processor are first filtered to pre-treat dust particles. The filtered gas is condensed to remove most of the organics and water vapor. The remaining organics in the gas are next removed by an activated carbon column. Process wastewater is treated with a carbon adsorption system. Large size soil particles and treated residues will require offsite disposal.

After desorption treatment, the soil that is tested to contain significant amount of metal contaminants will be stabilized using cementation. Treated soil will be either disposed of at a RCRA Subtitle D landfill, or used as backfill for the excavated area. The treated soil from John Evans and Sons and Tate Andale, however, may have to be disposed of at the landfill because these soils may be considered as listed wastes under the Resource Conservation and Recovery Act (RCRA)

If the treated soils are used as backfill, excavation, treatment, and backfilling will be completed for each site separately to reduce mixing of soils from different properties. All equipment will be decontaminated after treatment as each property is completed.

The backfilled areas will be compacted and restored. Backfill will consist of common earth fill. Compaction will most likely be completed by hand because of the small contaminated areas and restricted access for heavy machinery. Two site properties, Electra Products and John Evans and Sons will require bituminous concrete surfacing after backfilling and compaction. Keystone Hydraulics will require gravel surfacing and Tate Andale

Company (east) will require seeding.

Alternative 5: Soil Washing/Biotreatment

Capital Cost: $2,032,600
O&M Costs: $0
Present Worth: $2,032,600
Time to Implement: 1 year

This alternative utilizes an innovative technology to remediate the contaminated soils. Contaminated soil at the properties will be excavated and transported for treatment. This treatment may occur at a centralized location within the Lansdale area with contaminated soils brought from each property to one location, or at on offsite location consisting of an approved treatment facility outside of the Lansdale area. During excavation, an underground storage tank will be removed at Keystone Hydraulics property. A soil washing/biotreatment combination treatment system will be used to remove organic contaminants from soil. Contaminated soil is fed into a pretreatment tank where it is heated and mixed with water and biosurfactant chemicals to form a slurry. The slurry is then fed into a collision chamber where it mixes with water and cleaning chemicals.

After a sufficient mixing time the slurry flows to scrubbers. The scrubbers allow thorough wetting of particles to further weaken the bonds between soil particles and contaminants. The slurry is eventually fed into a centrifuge for final solid-liquid separation. The solids go to a clean soil pile while the liquid is biotreated.

After washing treatment, the soil that is tested to contain significant amounts of metal contaminants will be stabilized using cementation. Treated soil will be either disposed of at a RCRA Subtitle D landfill, or used as backfill for the excavated area. The treated soil from John Evans and Sons and Tate Andale, however, may be disposed of at the landfill because these soils may be considered as listed wastes under the Resource Conservation and Recovery Act (RCRA).

If the treated soils are used as backfill, excavation, treatment and backfilling will be completed for each property separately to reduce mixing of soils from different properties. All equipment will be decontaminated prior to relocation to the next property and after treatment of each property is completed.

The backfilled areas will be compacted and restored. Compaction will most likely be completed by hand because of the small contaminated areas and restricted access for heavy machinery. Two sites, Electra Products and John Evans and Sons will require bituminous concrete surfacing after backfilling and compaction. Keystone Hydraulics will require gravel surfacing and Tate Andale Company (east) will require seeding.

Alternative 6: Excavation - Offsite Disposal

Capital Cost: $2,341,900
O&M Costs: $0
Present Worth: $2,341,900
Time to Implement: 1 year

For this alternative, the entire volume of contaminated soils will be excavated, loaded into covered and lined trucks, and shipped to RCRA approved waste facilities. Excavation at Keystone Hydraulics will include the removal of an existing underground storage tank. Liquids from the tank will be removed with a vacuum tanker and disposed.

If Toxic Characteristic Leachate Procedure (TCLP) testing confirms that soils are not hazardous, excavated soils from Electra Products and Keystone Hydraulics will be disposed of at a RCRA Subtitle D landfill. If hazardous, they will be sent to a RCRA Subtitle C facility for disposal. The contaminated soils from Tate Andale and John Evans and Sons are considered to be listed wastes, and must therefore be sent to a RCRA Subtitle C landfill for disposal.

The backfilled areas will be compacted and restored. Backfill will consist of common earth fill. Compaction will most likely be completed by hand because of the small contaminated areas and restricted access for heavy machinery. Two site properties, Electra Products and John Evans and Sons will require bituminous concrete surfacing after backfilling and compaction. Keystone Hydraulics will require gravel surfacing and Tate Andale Company (east) will require seeding.

Alternative 7 - In Place Processina of Contaminated Soils with
Hot Air Injection

Capital Cost: $425,300

O&M Costs: $0
Present Worth: $425,300
Time to Implement: 4 months

This alternative is a relatively new technique of using an excavator or similar construction equipment with special attachments to dig into the area of contamination while injecting hot air (in excess of 1000 degrees Fahrenheit). The hot air drives off the volatile contaminants, which are then captured in a hood that is placed over the unit. Smaller sizes of equipment are available to do this processing in restricted areas. This process is similar to soil vapor extraction (as discussed in Alternative 3 above), except that the entire area is processed with the device to quickly drive off the volatiles, rather that running the extraction system for months to allow collection of the contamination. This alternative was not included in the Feasibility Study, but is discussed in other documents in the Administrative Record.

Processing the soil at Reystone Hydraulics will include the removal of an existing underground storage tank. Liquids from the tank will be removed with a vacuum tanker and disposed.

If only small amounts of soil contain metals above acceptable levels, this soil may be shipped offsite for treatment and disposal.

After in-place processing is completed for volatiles, the soil that is tested to contain significant amounts of metal contaminants will be stabilized using cementation. This method can also be used to solidify/stabilize metals contamination in soil in addition to treating volatiles. Cement or other binder materials can be added in during the last processing cycle. These materials will bind with metals in the soils, and make them less mobile and less available for leaching to ground water. The costs noted above include the addition of these materials where needed. (Also, the costs above are higher than those presented in the Proposed Plan. The cost estimate was refined since the Plan was issued.) Treated soil will be either disposed of at a RCRA Subtitle D landfill, or used as backfill for the excavated area. The treated soil from John Evans and Sons and Tate Andale, however, may be disposed of at the landfill because these soils may be considered as listed wastes under the Resource Conservation and Recovery Act (RCRA).

The treated areas will be compacted and restored. Compaction will most likely be completed by hand or using smaller compaction equipment because of the small contaminated areas and restricted access for heavy machinery. Two site properties, Electra Products and John Evans and Sons will require bituminous concrete surfacing after compaction. Keystone Hydraulics will require gravel surfacing and Tate Andale Company (east) will require seeding.

8. Summary of Comparative Analysis of Alternatives

The Alternatives discussed above were compared on the basis of the nine criteria set forth in the NCP at 40 C.F.R. Section 300.430(e)(9) in order to select a remedy for the Source Control Operable Unit. These nine criteria are categorized according to the three groups below:

THRESHOLD CRITERIA

Overall protection of human health and the environment
Compliance with applicable or relevant and appropriate requirements (ARARs)

PRIMARY BALANCING CRITERIA

Long-term effectiveness and permanence
Reduction of toxicity, mobility, or volume through treatment
Short-term effectiveness
Implementability
Cost

MODIFYING CRITERIA

Community acceptance
State acceptance

These evaluation criteria relate directly to the requirements in Section 121 of CERCLA, 42 U.S.C. § 9621, which determine the overall feasibility and acceptability of the remedy.

Threshold criteria must be satisfied in order for a remedy to be eligible for selection. Primary balancing criteria are used to weigh major trade-offs among remedies. State and community acceptance are modifying criteria formally taken into account after public comment is received on the Proposed Plan. A summary of each of the criteria is presented below, followed by a summary of the relative performance of the source control alternatives with respect to each of the nine criteria. These summaries provide the basis for determining which alternative provides the "best balance" of trade-offs with respect to the nine criteria.

Overall Protection of Human Health and the Environment

CERCLA requires that the selected remedial action be protective of human health and the environment. A remedy is protective if it reduces current and potential risks to acceptable levels within the established risk range posed by each exposure pathway to the contamination.

Comoliance With ARARs

This criterion addresses whether a remedy will meet ARARs or provide grounds for invoking a waiver under the NCP at 40 C.F.R. Section 300.430(f)(1)(ii)(C) and CERCLA, Section 121(d)(4), 42 U.S.C. § 9621(d)(4). Under Section 121(d) of CERCLA, remedial actions at CERCLA Sites must attain applicable or relevant and appropriate standards, requirements, criteria, and limitations (collectively referred to as "ARARs") under federal environmental laws and promulgated State environmental or facility siting laws, unless such ARARs are waived pursuant to Section 121(d)(4) of CERCLA.

Applicable requirements are those substantive environmental standards, requirements, criteria, or limitations promulgated under Federal or State law that are legally applicable to the remedial action to be completed at the Site. A "legally applicable" requirement is one which would legally apply to the response action if that action were not taken pursuant to Sections 104, 106, or 122 of CERCLA. Relevant and appropriate requirements are those substantive environmental protection standards, requirements, criteria, or limitations promulgated under Federal or State law which, while not being legally applicable to the remedial action, do pertain to problems or situations sufficiently similar to those encountered at the Site that their use is well suited to the Site. ARARs may relate to the substances addressed by the remedial action, to the location of the Site, or to the manner in which the remedial action is implemented.

CERCLA requires that remedial actions meet applicable or relevant and appropriate requirements (ARARs) of other Federal and state environmental laws or provide grounds for invoking a waiver. These laws may include, but are not limited to, the Toxic Substances Control Act, the Clean Water Act, the Safe Drinking Water Act, and the Resource Conservation and Recovery Act.

In addition, Section 121(d)(2)(A) of CERCLA requires a level of cleanup "which at least attains Maximum Contaminant Level Goals (MCLG) established under the Safe Drinking Water Act (42 U.S.C.A. § 300f et seq.) and water quality criteria (WQC) established under section 304 or 303 of the Clean Water Act (33 U.S.C.A. § 1314 or 1313), where such goals or criteria are relevant and appropriate under the circumstances of the release . . . ." 42 U.S.C. § 121(d)(2)(A). In accordance with the NCP, relevance and appropriateness of a requirement is determined by comparing, where pertinent, the circumstances of a release to eight factors discussed below. Pertinence of a factor depends, in part, on whether a requirement addresses a chemical, location, or action [40 C.F.R. § 300.400(g)(2)].

The actions taken under this remedial action will have to comply with the applicable and relevant and appropriate sections of Pennsylvania regulations, found at 25 Pa. Code Chapters 260-270, Hazardous Waste. The selected alternative will also need to comply with the substantive requirements of Pennsylvania Erosion Control Regulations, codified at 25 Pa. Code Chapter 102.

On-site activities of the selected alternative must also be performed in compliance with all other applicable legal requirements (e.g., worker health and safety laws and regulations, see 40 C.F.R. Section 300.150) that are not within the scope of federal environmental or state environmental or facility siting laws.

Lonq Term Effectiveness /Permanence

This evaluation criterion addresses the long-term protection of human health and the environment after remedial action cleanup standards have been achieved, and focuses on residual risks that will remain after completion of the remedial action.

Reduction of Contaminant Toxicity, Mobility, and Volume Through Treatment

This evaluation criterion addresses the degree to which a technology or remedial alternative reduces the toxicity, mobility, or volume of a hazardous substance. Section 121(b) of CERCLA, 42 U.S.C. § 9621(b), establishes a preference for remedial actions that permanently and significantly reduce the toxicity, mobility, or volume of hazardous substances. A combination of treatment and engineering controls may be used, as appropriate, to achieve protection of human health and the environment, as set forth in the NCP at 40 C.F.R. Section 300.430(a)(iii). Treatment should be utilized to address the principal threats (such as liquids, high concentrations of toxic compounds, and highly mobile materials) presented by a Site and engineering controls such as containment will be considered for wastes that pose a relatively low, long term threat or where treatment is impracticable. See 40 C.F.R. § 300.430ta)(iii).

Short-term Effectiveness

This evaluation criterion addresses the period of time needed to achieve protection of human health and the environment, and any adverse impacts that may be posed by construction and implementation of a remedy.

Implementability

This evaluation criterion addresses the technical and administrative feasibility of each remedy, including the availability of materials and services needed to implement the chosen remedy.

Cost

The cost of each of the alternatives is evaluated, and compared to the no action alternative.

State Acceptance

The EPA, as lead agency for this Site, selects the remedy in consultation with the State. EPA has provided the information on which this Record of Decision is based to the Pennsylvania Department of Environmental Protection (PADEP), and has had discussions on this matter with PADEP representatives. PADEP has not indicated whether or not it concurs with the final action for OU1 and the interim action for OU2.

Community Acceptance

The comments and concerns expressed by the public during the public meeting and during the comment period are considered. This criterion includes a determination of which components of the alternatives interested persons in the community support, have reservations about, or oppose based on public comments.

SOURCE CONTROL ALTERNATIVES

Overall Protection of Human Health and the Environment

Meeting the criterion of overall protection of human health and the environment involves achieving complete or near complete control over contaminant migration to human and various environmental receptors. Under various remedial alternatives, the contaminants may be removed, transformed, or contained in place so that future exposure of humans and other species is reduced to acceptable levels. The principal risk associated with site contaminants is leaching of contaminants to the ground water. Because leaching may cause ground water contaminant concentrationS to be above the MCLs permissible for ground water, health risk can be significant for people using the ground water. Therefore, this criterion is evaluated based on whether leaching of contaminants to the ground water is stopped.

Alternative 1 - No Action would not achieve this standard. This alternative does not provide protection to ground water. The contaminants in soil may continue to leach and contribute contaminants to the ground water possibly resulting in levels of contamination above ground water MCLs. Significant levels of future health risk remain for construction workers at John Evans and Sons.

Alternative 2 - Cap Containment would achieve overall protection of human health and the environment. However, there can be residual risk associated with the contaminants remaining in place, even though the risk may be small. In addition, shallow ground water moving horizontally could allow some contamination to migrate out from under the cap.

Alternative 3 - In Situ Treatment/Vapor extraction, Alternative 4 - Offsite Treatment/Low Temperature Thermal Desorption, Alternative 5 - Offsite Treatment/Soil Washing & Biotreatment, Alternative 6 - Excavation & Offsite Disposal, and Alternative 7, In Place Processing of Soils all would achieve overall protection of human health and the environment. These alternatives would remove contaminants from soils on the site properties, therefore eliminating the potential for ground water contamination.

Comaliance with ARARs

Meeting thia criterion involves compliance with all chemical-specific, location-specific, and action-specific ARARs. The chemical-specific ARARs apply standards of contaminants of concern to the soils in each of the site properties after each remedial alternative is implemented. Location-specific ARARs regulate the type of remedial activities that are allowed to occur in or near certain geographic and ecologic areas and historical settings. Action-specific ARARs may be specific regulations governing the type of operations during remedial activities. A detailed discussion appears in Sections 9 and 10.

The actions taken under this remedial action will have to comply with the applicable and relevant and appropriate sections of Pennsylvania regulations, found at 25 Pa. Code Chapters 260- 270. The selected alternative will also need to conply with the substantive requirements of Pennsylvania Erosion Control Regulations, codified at 25 Pa. Code Chapter 102.

On-site activities of the selected alternative must also be performed in compliance with all other applicable legal requirement. (e.g., worker health and safety laws and regulations, see 40 C.F.R. Section 300.150) that are not within the scope of federal environmental or state environmental or facility siting laws.

Alternative 1 - No Action would not meet the requirements of chemical-specific ARARs because the contaminated soils would not be remediated to protect ground water, and the underground storage tank (UST) at Keystone Hydraulics would not be removed. The drilling and sampling activities for the long term monitoring would be in compliance with all location-specific and action-specific ARARs.

Alternative 2 - Cap Containment reduces the amount of soil contaminants leached into ground water to an acceptable level, therefore effectively protecting ground water. This alternative complies with the chemical-specific, action-specific, and location-specific ARARs.

Alternative 3 - In Situ Treatment/Vapor Extraction, Alternative 4 - Offaite Treatment/Thermal Desorption, Alternative 5 - Offaite Treatment/Soil Washing & Biotreatment, Alternative 6 - Excavation and Offsite Disposal and Alternative 7, In Place Proceasing of Soils all remove the contaminants or contaminated soils, therefore protecting the ground water. All chenical-specific ARARe would be met. Compliance with location specific ARARs can be ensured by selecting appropriate offsite treatment locations. Permits may be required for transport of the contaminated soile (action-specific), but there should not be significant difficulties for compliance with theae ARARs.

Long Term Effectiveness/Permanence

This criterion evaluates whether remedial alternatives would permanently contain or remediate the contaminante in the soil of each site property. Becauee the objective is to protect the ground water, comparison of the remedial alternatives under this criterion mainly focuses on how well each alternative would prevent the contaminants from leaching into the ground water. To some extent, protection of human health for construction workers at John Evans and Sons is also considered.

Alternative 1 - No Action ranks the lowest because the ground water would continue to be impacted by the contaminants in soils of the site properties, and the UST would not be removed.

Alternative 2 - Cap Containment would be an effective long term remedial alternative because the cap would effectively contain the contaminants in the unsaturated zone. However, maintenance is required to maintain the effectiveness of the cap since the contamination stays in place underneath it, and horizontal migration could still occur.

Alternative 3 - In Situ Treatment/Vapor Extraction, Alternative 4 - Offsite Treatment/Thermal Desorption, Alternative 5 - Offsite Treatment/Soil Washing & Biotreatment, Alternative 6 - Excavation and Offsite Disposal, and Alternative 7, In Place Processing of Soils all use technologies to remove the contaminants or contaminated soils from the site properties, therefore achieving permanence of remediation. Once implemented, these 5 alternatives should have the best long term effectiveness/performance. The soil in the area of remediation at Keystone Hydraulics is not expected to contain significant levels of metal contaminants. However, the Vapor Extraction alternative will not be effective in removing these contaminants if metals become contaminants of concern after additional testing. This uncertainty would likely make Alternative 3 less desirable than the other alternatives. For Alternative 7, cement or other binder materials can be added during the processing, to bind up metals and prevent them from migrating.

The evaluation of the ability of the alternatives to comply with ARARs included a review of chemical-specific and action-specific ARARs that were presented in the Feasibility Study. There are no known location-specific ARARs for the Site.

Reduction of Toxicity, Mobility, and Volume Through Treatment

Under this criterion, the remedial alternatives are ranked based on toxicity, mobility, or volume reductions once the alternatives are implemented.

Alternative 1 - No Action would not reduce toxicity, mobility, or volume. Therefore, it ranks the lowest in this regard.

Alternative 2 - Cap Containment would not reduce toxicity and volume of contaminants. However, because the cap would significantly reduce infiltration, the mobility of the contaminants in the unsaturated zone would be reduced. Alternative 6, Excavation & Offsite Disposal ranks similarly. The contaminated soil is removed from this site, and made less mobile, but the contamination is not treated or the volume reduced.

Alternative 3 - In Situ Treatment/Vapor Extraction, Alternative 4 - Offsite Treatment/Thermal Desorption, Alternative 5 - Offsite Treatment/Soil Washing & Biotreatment, and Alternative 7, In Place Processing of Soils would all remove and/or treat the contaminated soils. The contaminants would be destroyed or converted into a non-toxic form. These alternatives therefore rank the highest in meeting this criterion.

Short-Term Effectiveness

This evaluation criterion addresses the period of time needed to achieve protection of human health and the environment, and any adverse impacts that may be posed by construction and implementation of a remedy.

Alternatives 1 and 3, No Action and Vapor Extraction, respectively, have relatively low impact on human health and the environment during implementation. Alternative 1 would involve drilling and Alternative 3 drilling and operation of the extraction system. It is expected that human and environmental exposure to contaminants for these two alternatives are low compared with other alternatives. Alternative 1 can be implemented within a few weeks, while Alternative 3 may take more than a year to implement.

Alternative 4 - Offsite Treatment/Thermal Desorption, Alternative 5 - Offsite Treatment/Soil Washing & Biotreatment, Alternative 6 - Excavation and Offaite Disposal, and Alternative 7, In Place Processing of Soils all require significant excavation and handling of contaminated soils. Therefore, they involve the highest potential levels of exposure to humans and the environment during implementation among all alternatives. However, these potential exposures can be minimized by careful use of proper remediation techniques and safety precautions. Alternatives 4, 5, 6, and 7 would take about 1.5, 3, 1, and 2 months, respectively, to implement.

Alternative 2 - Cap Containment would involve excavation of about 1 foot, and therefore could result in some exposure of humans and the environment to the contaminants. Because of the extent of excavation involved in this alternative, the exposure should be less than Alternatives 4, 5, and 6, but more than Alternatives 1 and 3. The expected time to implement this alternative is about one month.

Implementability

This criterion concerns the technical and administrative processes during the implementation of each alternative. The evaluation of this criterion will focus on difficulties that may significantly affect the implementation of each of the remedial alternatives.

Alternative 1 - No Action has technical difficulties in terms of a system design for the long term monitoring. Because of the remedial objective of protecting the ground water, the long term monitoring system should be designed to observe the impact of soil contaminants on ground water and any changes in ground water over time. Because of the nature of the underlying bedrock aquifer and because the ground water is already contaminated, special design of the long term monitoring system may be required.

Alternative 2 - Cap Containment should not encounter major difficulties in construction and obtaining the necessary permits for the cover. However, the monitoring system for this alternative may face the same difficulties as for Alternative 1. In addition, deed restrictions need to be placed after the covers are constructed to ensure that the cap is protected and maintained.

Alternative 3 - In Situ Treatment/Vapor Extraction involves drilling and operation of the extraction system. There should not be any technical difficulties associated with implementing this alternative, although the density and low permeability of the soil may necessitate the use of techniques to fracture the subsurface, improving the performance of this system. Because of the relatively long time required using this alternative to remediate the contaminated soil, this alternative would require coordination with existing commercial/industrial activities, in particular Keystone Hydraulics. In the case of Electra Products and Tate Andale Company, the contaminated areas are located in an open field away from existing site operations. Disruption to existing site activities should be minimal at these 2 properties. However, any ground water monitoring system for this alternative may face the same difficulties as for Alternative 1.

Alternative 4 - Offsite Treatment/Thermal Desorption and Alternative 5 - Offsite Treatment/Soil Washing & Biotreatment would both reguire treatability studies. Recent testing data suggests that there should be no technical difficulty implementing these alternatives. Because the contamination is at a relatively low level, there should be no difficulties for the contractors to obtain permits to transport the soil from site properties to the treatment location.

Implementation of Alternatives 4 and 5, however, may require significant administrative procedures preceding the operation of the treatment equipment. First, the selection of an offsite treatment location could face resistance from the local community. Secondly, the offsite treatment setup may involve unclear regulatory concerns. It is not certain that a permit waiver for CERCLA sites can be applied to this situation because the treatment equipment would be set up at a location that requires transport of the contaminated soils to an offsite location. One option would be to locate the treatment equipment at one of the site properties, and because the North Penn Area 6 Site covers the entire contaminated area, these remedial alternatives may be actually considered as "onsite" treatment. The site properties that may potentially serve as a treatment location include Electra Products and Tate Andale Company because the contaminated areas are away from existing facility operations. Tate Andale Compant may be more appropriate since it is located away from residential centers.

Alternative 7 will require a treatability study to determine the effectiveness of the treatment method with the TCE and related contaminants at this site, and the effectiveness of the hood in capturing the vapors. Also, the ability of the system to bind up metals in the soils would need to be verified. If metals levels exceed acceptable levels, offsite disposal may be required. The areas needing to be treated will have to be evaluated to see if the treatment unit will have room to maneuver, as some of the areas of contamination are adjacent to buildings. Based on information from other studies of this method, it does not appear that there would be implementability problems.

The only significant prerequisite for implementing Alternative 6 - Excavation and Offsite Disposal, may be a transport permit for the contaminated soils. This alternative ranks the highest in this evaluation criterion.

Cost

This section compares the cost of implementing each alternative as well as uncertainties associated with the estimates. One uncertainty common for all alternatives involving excavation is the volume of soil that needs to be treated or excavated. The total excavated soil volumes from the site properties have been assumed to be 30 percent more than the estimated volumes of contaminated soils, since a slope needs to be maintained during excavation. The actual additional amount of soil that needs to be excavated depends on soil type and may differ significantly from the assumed 30 percent.

Alternative 1 - No Action has the lowest cost; about $300,000 to install monitoring wells and conduct periodic sampling of ground water.

Alternative 2 - Cover Containment, has the lowest cost among the alternatives that call for significant remedial measures.

The total cost for capping the contaminated soils at the four properties is about $702,500. A significant portion of the cost is for installing and operating the long term monitoring system (about $50,000 for installing 12 100-foot wells and $234,000 for periodic sampling including contingency).

Alternative 4 - Offsite Treatment/Thermal Desorption, is among the highest cost alternatives. The total cost of this alternative is estimated at $2,368,800. About $130,000 can be saved if the metals in the soil at Keystone Hydraulics and John Evans and Sons do not need to be stabilized. The unit treatment cost depends largely on the amount and characteristics of the soil treated. Because the technology used in this alternative is relatively new, there have not been sufficient case studies to warrant a reliable cost estimate for the quantity of contaminated soils and type of contaminants involved in the site. In addition, the total cost would be significantly increased if individual site property owners chose to remediate the contamination separately.

The estimate for Alternative 3 - In Situ Treatment/Vapor Extraction is comparable with other alternatives, about $1,178,900. This cost assumes that the water table under the site properties is significantly below the contaminated soil, and there will not be the need for liquid phase carbon. If a liquid phase carbon system is needed, the new cost for this alternative would be about $1,459,400, making this alternative less desirable. This cost could increase significantly if the site property owners chose to conduct separate remediation requiring redundant equipment purchases.

Under Alternative 5 - Soil Washing & Biotreatment and Alternative 6 - Excavation and Offaite Disposal, total costs are estimated to be $2,032,600 and $2,341,900, respectively. Although soil washing/biotreatment is considered an innovative technology, the processes involved in this remedial technology are relatively simple and common. Because excavation and landfilling are common construction practices, the pricing should be relatively stable.

A significant portion of the cost for Alternative 6 includes disposal of the contaminated soils from Tate Andale and John Evans and Sons at a RCRA Subtitle C landfill. The Subtitle C landfill disposal cost is based on a unit price of $450/ton. The soil from John Evans and Sons will need only cement stabilization to treat the metals because the volatiles in the soil are expected to meet the TCLP requirements for RCRA Subtitle D landfill disposal.

Alternative 7 is estimated to cost $425,300. This includes treatment of the soils to remove volatile contamination, and the addition of cement or other binders to the soils in those areas where excess metals are present. This also includes removal of the underground storage tank at Keystone Hydraulics.

State Acceptance

PADEP has not indicated whether or not it concurs with the remedy for OU1.

Community Accentance

This criterion includes a determination of which components of the alternatives interested persons in the community support, have reservations about, or oppose based on public comments. A public meeting was held on the proposed plan on July 11, 1995 in Lansdale, Pennsylvania. A public comment period was open from July 5 through September 1, 1995 (the comment period was extended 30 days as a result of a written request). Comments received at the meeting and during the comment period are discussed in the Responsiveness Summary attached to this Record of Decision. There was general support for the proposed alternative, although several other remediation techniques were suggested.

9. Selected Remedy and Performance Standards

Based on the comparisons of the nine evaluation factors for each of the alternatives, Alternative 7 for source control operable unit (In Place Processing of contaminated soil with Hot Air Injection) is the selected remedy for the Site. The backup alternative (in the event this method does not meet the designated cleanup standards), will be excavation and offsite disposal. The Proposed Plan for the North Penn Area 6 Site was released on June 30, 1995. The Proposed Plan identified the alternative listed above as the preferred alternative. EPA reviewed all written and verbal comments submitted during the public comment period. Upon review of these comments, it was determined that no significant changes to the remedies, as originally identified in the Proposed Plan, were necessary.

Source Control Operable Unit

Alternative 7 for the remediation of contaminated soil will involve the in-place processing of soils at each of the four properties with contamination that exceeds the remediation levels. The remediation levels were developed for each property by evaluating the concentration of contaminants, the depth to ground water, the subsurface conditions, and other factors. These levels vary by as much as an order of magnitude due to the different soil conditions, concentrations, and other factors at each property that affect the potential for migration of the contamination to ground water. The performance standards for remediating the soils, and the estimated quantity of soils needing to be removed for each property, are presented below.

These were developed with protection of ground water to background levels (using minimum deteation limits) as the cleanup standard.

Property	Remediation Levels for Soils	Estimated Quantity of Soil
Electra Products	182 ppb (PCE)	117 cubic yds.
John Evans Sons	84 ppb (TCE)	466 cubic yds.
former Reystone Hydraulics	769 ppb (TCE)	575 cubic yds.
former Tate Andale	131 ppb (TCE)	700 cubic yds.

During the comment period, one commentor questioned the methods used to develop these soil remediation levels. Upon review of the comments, EPA determined that some of the comments may have merit, and therefore the methods need to be reviewed. During the design process for this operable unit, EPA will reevaluate the remediation levels in light of the comments made. Therefore, the numerical remediation levels listed above may change before the remedial action is implemented. If a significant change results from thia reevaluation, EPA will issue an Explanation of Significant Differences or a ROD Amendment. The performance standard of the remedy, however will not change; protection of ground water to background levels (using minimum detection limits) remains as the performance standard for this remedy.

Once the treatment starts, soil samples will be collected as soil is processed in the areas of contamination, and the processing with hot air injection will be continued until the remaining soil meets the remediation levels listed above. This may require that the processing unit make multiple passes over all areas of contamination, reducing the contamination levels in stages. A treatability study of this treatment process may be conducted on one of the properties to determine its effectiveness in treatment the contamination, and to ensure that the public is not exposed to vapors from the processing unit.

In the event that the method above does not prove to be effective, the contaminated soil in areas not meeting the standards will be excavated and shipped to an approved, off-site disposal facility. The contaminated soil would be placed in covered dump trucks or dumpsters until proper transport and disposal can be arranged. The contaminated soil will be disposed of at an EPA-approved facility that is permitted to accept such wastes. When all the contaminated soil is removed, clean fill will be brought in, the areas will be returned to their original contours and restored to previous conditions to the extent possible. The generation, storage, and transport of the contaminated soil will comply with the applicable and relevant and appropriate requirements of 25 PA Code §§ 262.12, .13, .20, .30, and .34 or corresponding sections of 40 C.F.R. to the extent that the state has not received authorization for these sections.

During the treatment or excavation process, appropriate measures will be taken to minimize exposure of workers and nearby residents to contamination. EPA and/or its contractors will conduct air monitoring, and levels will be established which, if exceeded, will require the implementation of additional control measures or the cessation of all work activities. Barriers or fences will be installed to limit access to the processing and staging areas.

Implementation of this alternative for the source control operable unit will remove any threat of direct contact exposure. In addition, an objective of this action, in conjunction with the remedial action to be taken at a later time under OU3, is to remediate ground water to levels established in the ARARs.

The specific elements of the remedy and the associated performance standards are presented below.

A. Treatability Study/Contingency Trigger

1. A treatability study shall be performed to clearly demonstrate the technical feasibility of in-place processing with hot air injection in achieving the cleanup levels listed in above within a reasonable period of time. If EPA determines that the studies demonstrate the technical feasibility of in-place processing with hot air injection, this technology shall be implemented.

2. If EPA determines that in-place processing with hot air injection is not technically feasible based on the studies, excavation with offsite disposal shall be triggered as the treatment technology to be implemented OU1.

B. Soil Treatment and/or Excavation and Backfill

1. Fugitive dust emissions generated during remedial activities will be controlled in order to comply with fugitive dust regulations in the federally-approved State Implementation Plan for the Commonwealth of Pennsylvania, 25 Pennsylvania Code §§ 123.1 through 123.2 and the National Ambient Air Quality Standards for Particulate Matter in 40 C.F.R. § 50.6 and Pennsylvania Code §§ 131.2 and 131.3. Air monitoring for site-related contaminants shall be performed in accordance with 40 C.F.R. Part 50 to ensure air emissions conform with these standards. Measures shall be taken to prevent dispersion of the materials during excavation and transportation. Controlled amounts of water shall be sprayed onto the soils and tarps shall be placed over the loaded trucks. If dust emission problems persist, excavation shall be suspended until conditions improve.

2. Erosion and sediment control measures shall be installed in accordance with the substantive requirements of the Pennsylvania Erosion Control Regulations, 25 Pennsylvania Code §§ 102.1 through 102.5, 102.11 through 102.13, and 102.21 through 102.24. An erosion and sediment control plan shall be prepared during the remedial design. Surface water run-off shall be diverted away from the excavation areas, and appropriate erosion and sediment control measures shall be implemented. In the event of rain or potential Site flooding during excavation, appropriate measures shall be taken to prevent contaminant migration.

3. All equipment used during excavation of contaminated soil shall be decontaminated before entering uncontaminated areas. The design and specifications for the decontamination facilities shall be approved by EPA as part of the remedial design.

4. Excavated areas shall be backfilled with appropriately treated soil/sediment or clean fill and re-vegetated.

5. Sampling and analysis of soil shall be performed prior to excavation to delineate the complete extent of contamination for excavation purposes. Sampling and analysis shall also be performed after excavation, and after backfilling, to confirm that cleanup levels set forth above have been achieved. Methods for determining compliance with the cleanup levels shall be finalized and approved by EPA during the remedial design and will be based upon EPA 230/02-89-042, February 1989, Methods for Evaluatina the Attainment of Cleanun Standards. Vol 1: Soils and Solid Media.

C. Soil Disposal

1. Available information for each of the properties will be evaluated to determine whether the wastes are considered to be "RCRA listed wastes". If the excavated soils are determined to be listed wastes, they will be transported for disposal to a permitted RCRA Subtitle C Hazardous Waste Landfill in accordance with applicable laws and regulations. The appropriate determinations will be made prior to disposal to determine if further treatment is necessary prior to disposal under RCRA land disposal restrictions. If determined to be hazardous wastes, the remedy shall be implemented consistent with the following substantive requirements, which are applicable, of 25 Pennsylvania Code §§ 262.11 and 262.12 (relating to hazardous waste determination and identification numbers), 25 Pennsylvania Code §§ 262.20 through 262.23 (relating to manifesting requirements for offsite shipments of hazardous wastes), and 25 Pennsylvania Code §§ 262.30 through 262.34 (relating to pre-transport requirements); 25 Pennsylvania Code §§ 263.10 through 263.31 (relating to transporters of hazardous wastes); and with respect to the operations at the Site generally, with the substantive reguirements of Pennsylvania Code §§ 264.10 through 264.56 and 264.171 through 264.177 (in the event that hazardous waste generated as part of the remedy is managed in containers); and if prohibited by land disposal restrictions, 40 C.F.R. Part 268 Subparts A and C.

   Excavated soils that are not listed wastes will be sampled and analyzed for waste characterization prior to treatment and disposal offsite in accordance with 40 C.F.R. § 261.24 by the Toxic Characteristic Leaching Procedure (TCLP) at the appropriate RCRA permitted treatment and/or disposal facility.

D. Miscellaneous Performance Standards/Institutional Controls

1. Appropriate measures shall be taken during any field activities to prevent exposure to off-site individuals and/or pedestrians. Security fencing shall be installed to prevent unauthorized access in areas set for ongoing remedial activities.

2. On-Site activities of the selected alternative will also be. performed in compliance with all other applicable legal requirements (e.g., worker health and safety laws and regulations, see 40 C.F.R. § 300.150) that are not within the scope of federal environmental or state environmental or

facility siting laws.

10. Statutory Determinations

Under its legal authorities, EPA's primary responsibility at CERCLA Sites is to undertake remedial actions that achieve adequate protection of human health and the environment. In addition, Section 121 of CERCLA establishes several other statutory requirements and preferences. One such requirement is that, when complete, the Selected Remedy implemented at the Site must comply with applicable or relevant and appropriate environmental standards established under federal and state environmental laws unless a statutory waiver is justified. The Selected Remedy also must be cost-effective and utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. Finally, the statute includes a preference for remedies that employ trgatment as a principal element to permanently and significantly reduce the volume, toxicity, or mobility of hazardous wastes. The following sections discuss how the Selected Remedy meets these statutory requirements.

A. Protection of Human Health and the Environment

The Site, in its existing condition, does present a potential threat to human health or the environment. Levels of TCE, PCE and other VOCs in ground water have been identified at levels that exceed the MCLs. Levels found in the soil are continuing to contribute to contamination in the drinking water aquifer. If the plume continues to spread, additional wells may be affected. Therefore, the alternative selected here is designed to remove the potential threat to the drinking water supply. Treatment or removal of the contaminated soil will eliminate the source of the ground water contamination. Implementation of the selected remedy will protect human health and the environment by eliminating the source of contamination and protecting drinking water supplies in the area.

B. Compliance with Aonlicable or Relevant and Approgriate Requirements (ARARs)

Under Section 121(d) of CERCLA, 42 U.S.C. § 9621(d), and EPA guidance, remedial actions at Superfund sites must attain legally applicable or relevant and appropriate Federal and state environmental standards, requirements, criteria, and limitations (collectively referred to as ARARs). Applicable requirements are those substantive environmental protection requirements, criteria, or limitations promulgated under Federal or state law that specifically address hazardous material found at the Site, the remedial action to be implemented at the Site, the location of the Site, or other circumstances at the Site. Relevant and appropriate requirements are those which, while not applicable to the Site, nevertheless address problems or situations sufficiently similar to those encountered at the Site that their use is well suited to that Site.

The selected remedy will comply with all ARARs. The site-specific ARARs and the To Be Considered (TBC) criteria for the selected remedies are presented below.

1. Chemical Specific ARARs

! The remedy shall be implemented consistent with the following substantive requirements, which are applicable, of 25 Pennsylvania Code §§ 262.11 and 262.12 (relating to hazardous wante determination and identification numbers); and with respect to the operations at the Site generally, with the substantive requirements of 25 Pennsylvania Code §§ 264.10 through 264.56 and 264.171 through 264.177 (in the event that hazardous waste generated as part of the remedy is managed in containers).

2. Action-Specific ARARs

- ! 40 C.F.R. Part 264, Subpart I, and Pennsyivania Code §§ 264.10 through 264.56 and 264.171 through 264.177 (in the event that hazardous waste generated as part of the remedy is managed in containers) regulate the use and management of containers of hazardous wastes during the cleanup.

3. Location-Specific ARARs

- ! Any land-disturbing activities associated with the selected remedy will comply with the Pennsylvania Erosion Control Regulations, 25 Pennsylvania Code §§ 102.1 through 102.5, 102.11 through 102.13, and 102.21 through 102.24, which regulate erosion and sedimentation control. These regulations are applicable to the grading and excavation activities associated with the selected remedy.

4. Criteria, Advisories, or Guidance To Be Considered (TBCs)

- ! Contained-in Policy (EPA OSWER Directive 9347.3-05FS) states that environmental media mixed with a RCRA listed hazardous waste must, upon collection, be managed as if it were a hazardous waste until it no longer contains the listed hazardous-waste.

- ! Methods for Evaluating the Attainment of Cleanup Standards Volume 1 (Soils and Solid Media), EPA 230/02-89-042, provides statistical methods to confirm compliance with soil/solid media clean-up levels.

The June 30, 1995 Proposed Plan discussed the Commonwealth of Pennsylvania relevant and appropriate standards for impact from contaminated soils on ground water. At the time of the proposed plan the relevant and appropriate standards specified that all ground water containing hazardous substances must be remediated to "background" quality pursuant to 25 Pennsylvania Code Sections 264.97(i), (j), and 264.100(a)(9). However, when the Proposed Plan was issued, Pennsylvania Senate Bill #1, referred to as the Land Recycling and Environmental Remediation Standards Act (now referred to as Act II) was signed into law on May 19, 1995 and became effective on July 19, 1995, which was during the comment period. EPA has had time to review and evaluate the applicability of Act II to the selected remedy. EPA does not consider the Land Recycling and Environmental Remediation Standards Act to be an ARAR for the North Penn Area 6 site at this time.

C. Cost-Effectiveness

Section 300.430(f)(1)(ii)(D) of the NCP, 40 C.F.R. § 300.430(f)(1)(ii)(D), requires that the selected remedy be cost-effective. That section of the NCP states that cost-effectiveness is determined by first evaluating the following three of the five "balancing" criteria to determine overall effectiveness of the remedy: long-term effectiveness and permanence, reduction of toxicity, mobility, or volume through treatment, and short-term effectiveness. Overall effectiveness is then compared to cost to ensure that the remedy is cost-effective. A remedy is cost-effective if its costs are proportional to its overall effectiveness.

The remedy selected for the soil contamination operable unit is expected to be cost effective in protecting human health and the environment. Alternative 7 is the second least expensive alternative evaluated, costing more than only the no action alternative. It effectively removes the contamination that is contributing to ground water contamination. If the soil cleanup is not completed, the cost for cleanup of ground water will be much greater. It is more cost-effective to eliminate the source of the contamination in the soil rather than to treat the ground water once it becomes further contaminated.

The backup method, excavation and offsite disposal, is the second most expensive alternative of the seven. However, the cost estimates for this option are fairly certain, as opposed to some of the costs for treatment options, which can increase as the project is implemented and difficulties arise. There are also difficulties in finding a location for treatment under Alternatives 4 and 5. In addition, even if the in place processing system is only partially effective, it will still reduce the quantity of soil that might need to be shipped offsite.

D. Utilization of Permanent Solutions and Alternative Treatment (or Resource Recovery) Technologies to the Maximum Extent Practicable

The primary alternative selected is a permanent solution to the contamination at the Site. The in place processing of soils (and excavation and removal if necessary) will permanently eliminate the source of the ground water contamination. No resource recovery options were feasible for the conditions present at this Site.

Consequently, EPA has determined that the selected remedies utilize permanent solutions and alternative treatment technologies to the maximum extent practicable, while providing the best balance in terms of long-term effectiveness and permanence; reduction of toxicity, mobility, or volume through treatment; short term effectiveness; implementability; and cost.

E. Preference for Treatment as a Principal Element

The in place processing remedy selected for the source control operable unit does satisfy the CERCLA preference for remedies that incorporate treatment as a principal element.

The backup method, excavation and offsite disposal of soil, does not specify a treatment alternative. Although EPA reviewed several additional treatment technologies for application to this Site, EPA believes that none of these additional treatment technologies are practicable for use in cleaning up this Site. This is primarily due to the fact that four different properties would reauire treatment, and the quantity of soil at each property is small. Soil conditions at the Site limit or eliminate the use of some possible soil treatment techniques. Further, EPA determined that the treatment alternatives did not provide the overall best balance in meeting the nine criteria for selection of remedial actions.

11. Documentation of Siqnificant Changes

The Proposed Plan for the North Penn Area 6 Site was released in June 1995. The Proposed Plan identified in place processing of soil with hot air injection (Alternative 7) as the primary remedy, with excavation and offsite disposal of contaminated soil (Alternative 6) as a backup for operable unit 1. EPA reviewed all the verbal comments received at the public meeting and written comments received during the comment period. Upon review of these comments, it was determined that no significant changes to the remedy, as it was originally identified in the Proposed Plan, were necessary.

Responsiveness Summary
North Penn Area Site
Landsdale, Montgomery county, Pennsylvania

This Responsiveness Summary documents public comments received by EPA during the public comment period on the Proposed Plan for the North Penn Area 6 Site ("the Site"). It also provides EPA's responses to those comments. The Responsiveness Summary is organized as follows:

SECTION I Overview

This section summarizes recent actions at the Site and the public's reeponse to the remedial alternatives listed in the Proposed Remedial Action Plan (Proposed Plan). The Proposed Plan outlines various cleanup alternatives available to address Site contamination and highlights EPA's preferred alternatives.

SECTION II Background on Community Involvement

This section provides a brief history of community interest in the site and identifies key issues.

SECTION III Summary of Major Comments and Questions Received During the Public Meeting and EPA's Responses

This section documents comments and questions from the public that were voiced during the public meeting regarding the Site and EPA's responses to them.

SECTION IV Summary of Major Written Comments and Questions Received During the Public Comment Period, with EPA's Responses

This section documents comments and questions from the public that were received during the public comment period regarding the Site and EPA's responses to them.

I. Overview

The public comment period on the Proposed Plan for this Site began on July 5, l995 and ended on September 1, 1995. EPA held a public meeting at the Lansdale Borough Hall on July 11, 1995. Copies of the newapaper advertisements announcing the meeting and comment period are attached.

The following EPA participants were present at the meeting:

Amy Barnett	Community Relations Coordinator
Gregory Ham	Remedial Project Manager

At the meeting, EPA representatives summarized the results of the Remedial Investigation (RI), Feasibility Study (FS), and the Risk Assessment performed for the Site. EPA presented the preferred alternatives to addrese Site contamination. The Proposed Plan addressed the areas of soil contamination on four properties. The preferred alternative for the Site presented to the public was the in-place processing of contaminated soils with hot air injection. Excavation and offsite disposal of soil from the four affected facilities was proposed as the backup method if necessary.

The public was given an opportunity to ask questions or submit written comments on the alternatives outlined in the Proposed Plan and the results of the RI/FS for the Site. The verbal and written comments, and EPA's responses, are summarized in Seetions III and TV of this document. They are not presented in the order received at the meeting. The complete transcript of the public meeting is contained in the Administrative Record file for the Site.

SECTION II Background on Community Involvment

This Site was placed on the National Priorities List on March of 1989. Upon being listed, EPA began the Remedial Investigation/Feasibility Study (RI/PS) process, and in July of 1993 EPA held an informational meeting to summarize the status of the Site and EPA's plans for the RI/FS.

For thia Record of Decision, a formal public meeting, as discussed above, waa held. At the public meeting, attendees were invited to ask questions directly to EPA representativea about the Proposed Plan and the work that has been done at the Site during the Remedial Investigation/Feasibility Study, and about the preferred alternatives for cleaning up the Site.

SECTION III Summary of Comments and Questions from the Public Meeting

The comments raised at the public meeting primarily concerned three areas: liability, recovery of costs, and the nature of the proposed remedial actions. The issues raised, and the EPA responses to these issues, are presented below.

Comment #1: Several commentors suggested the use of other remediation technigues than the preferred alternative. Two that were specifically mentioned were thermally enhanced soil vapor extraction and low temperature thermal desorption.

Response: In the Feasibility Study, EPA reviewed a number of remediation techniques for suitability. A preliminary screening was done aa the first step to eliminate those techniques that are clearly not suited for the conditions present at this site. The remaining alternatives are then evaluated based on tho criteria specified in the National Contingency Plan tNCP). Low temperature thermal desorption and soil vapor extraction were both evaluated as alternatives. These were not selected for various reasons, as explained in the Record of Decision. Both commentors were invited to submit additional information on these methods for consideration by EPA, but no information was provided.

Comment #2: A number of questions were raised about the proposed cleanup alternative, including: to what depth can this method treat contaminated soils?; is this method suitable for the soils in this area?; and, how many vendors are using this technology?

Response: There are several similar methods for treating soils in this way. One uses an excavator with an attachment designed for digging trencher, with the addition of the hot air injection lines. Another uses an auger device with the hot air injection. Both of these are capable of reaching the depths needed at this site, which is less than ten feet below the surface (bedrock is usually 7 to 8 feet in this area). Yes, because these methods are intrusive and actually dig into the entire area of contamination, the natural permeability of the soils does not significantly affect the effectiveness of these systems. In heavy, rocky, or wet soils, additional proceasing time may be required, but the contamination can still be recovered. EPA is aware of at least two vendors using this technology. It is important to note that EPA is not selecting a specific vendor at this time, but only the type of technique to be used. Any vendor that is qualified and can conduct this type of soil treatment should be eligible to compete for any future work.

Comment #3: One requestor asked for an extension to the comment period since he had not received sufficient advance notice for the public meeting, and also requested copies of presentation materials from the public meeting.

Response: The requestor wao asked to submit the request for the extension in writing. This request was received, and the comment period was subsequently extend d to September 1, 1995. A copy of the presentation materials was provided to the requestor.

Comment #4: What standards were used to derive the soil-cleanup standards.

Response: The cleanup standard. were set at levels to prevent the contamination in the soil on each of these properties from reaching ground water at levels that would be detectable. The standards were developed baeod on levels ot contamination found in the soil, the physical and chemical characteriatics of the soils at each property (permeability, organic content, etc.), infiltration rates, and detection limit. for the contaminents. This information was inputted to an approved mathematical model, which provided the cleanup goals for each property.

Comment #5: Once the soil cleanup work begins, how will the levels of contamination remaining in the soil be verified to determine when cleanup levels are obtained?

Response: As the treatment of the soil proceeds, samples will be collected from various locations within the area of contamination. Samples will be collected periodically during the treatment process until a statistically significant number of sample results indicate that the cleanup levels have been achieved.

Comment #6: How will EPA determine the effect of the soil cleanup on the actual ground water contamination levels?

Response: Because of the extent and levels of contamination in the ground water, it may not be possible to determine the direct effect of each of the soil cleanups on ground water levels. There are still seven additional properties that need to be evaluated to see if additional cleanups are needed. However, it is still important for this soil cleanup to be done, or else future ground water remediation efforts will be less effective if there is still contamination in the soil that is contributing to the ground water contamination.

SECTION IV Summary of Written comments and Questions

Comments were received from only one commentor, a representative of a PRP, during the public comment period. This commentor submitted extensive comments on the methods used to develop the soil remediation goals and on the risk assessment conducted on the sampling results at the Site.

Comment #1: The commentor states that the soil cleanup level for its property was not calculated using the proper input data. They questioned the used of the MULTIMED model to calculate the soil remediation goals, and also questioned specific factors that were used in the modeling presented in the Rememial Investigation/Feasibility Study (RI/FS) report.

Response: After reviewing the comments submitted on the development of the ground water remediation levels, EPA believes that some of the comments are valid, and agrees that the methods for calculating the soil cleanup levels need to be reviewed. Therefore, preceding or during the design stage, the remediation levels will be reevaluated for all four properties. If significant changes are needed, EPA will issue an Explanation of Significant Differences or a ROD amendment.

Comment #2: The commentor states "the use of site specific data or the use of this applicable, relevant and appropriate DEP [Pennsylvania Department of Environmental protection] soil standard result" in the conclusion that no action is required at this property.

Response: For sites on the National Priorities List, EPA generally completes a site specific analysis of the conditions and potential impacta of contamination on ground water. PADEP also generally requires that where data is available, a site specific analysis is required, rather than using generic soil cleanup levels. Therefore, while some of the specific factors used to develop the methods may need to be revised, EPA believes that it is appropriate to complete a site apecific analysis at this Site, and not to use the generic soil cleanup standards.

Comment #3: The commentor states that the risk assessment results regarding metals did not properly reflect site conditions. Much of the discussion regarding metals focuses on two surface samples that were collected, and this is not a representative survey. Also, some of the default values were overly conservative.

Response: The objective of the RI/FS for this operable unit was to identify properties that had soil contaminated with volatile organic compounds that may have contributed to ground water contamination under the Site. Volatile organic compounds vaporize readily if exposed to air. Therefore, most of the sampling for this investigation was subsurface; any volatiles on the surface would have vaporized, while volatiles migrating down into the soil might still be there. For each property that had contamination, several surface soil samples were collected to evaluate the potential impact of volatiles or other contaminates on the people potentially exposed to the contaminates.

At the John Evans and Sons property, most of the area where the contamination was found ia paved. The surface soil samples were collected from the one corner where soil could be found. These samples did reveal elevated levels of several metals, and the risk assessment in the RI/FS did indicate elevated risk levels. However, the risk identified from these two samples was not the primary factor for recommending the cleanup of contaminated soil on this property. The primary concern is the volatile contamination found in the soil on this property, and the impact that this contamination has on ground water. As noted in comment #1 above, EPA will reevaluate the soil cleanup levels for the four properties where remediation is planned.

The risk assessment conducted as part of the RI/FS followed the EPA Risk Assessment Guidance for Superfund, including the use of default values recommended in that guidance. However, as noted above the primary factor in remediating these four properties is the impact of the contamination on the ground water, and not the risk posed by direct contact or other exposures to the contamination in the soil.

Comment #4: Off-site disposal of soil from this property as hazardous waste is not justifiable. This interpretation is based on an overly conservative interpretation of the applicable regulations.

Response: The information that was presented in the Proposed Plan on waste disposal was based on a preliminary review of the status of each of the four properties. Prior to actual disposal, all available information for each of the properties will be evaluated prior to disposal to determine whether the wastes are considered to be "RCRA hazardous wastes" (listed wastes or characteristic wastes). If the excavated soils are determined to be hazardous wastes, then they must be transported for disposal to a permitted RCRA Subtitle C Hazardous Waste Landfill in accordance with applicable laws and regulations. The appropriate determinations will be made prior to disposal to determine if further treatment is necessary prior to disposal under RCRA land disposal restrictions. If determined not to be hazardous wastes, the remedy shall be implemented consistent with the appropriate regulations for such non-hazardous wastes.

Comment #5: The commentor supported the remedy as the beat of the alternatives presented (for those properties needing to be remediated), due to the cost, time involved, and level of intrusion. However, they suggested the implementation of this remedy be delayed until Operable Unit #2 is completed (the soils investigation for the remaining 7 properties).

Response: The investigation for Operable Unit #2 is primarily being conducted by the potentially responsible parties (PRPs) at each of the properties affected (six properties; EPA is conducting the investigation at one), under EPA oversight. If it is determined that soil remediation needs to be done at any of these properties, the PRPs may be offered the opportunity to complete the remediation, and they may also propose the method for completing the necessary soil cleanup, subject to EPA approval. Therefore, different methods may be used and different parties may be arranging for the cleanup at each different property. Therefore, there is no advantage for EPA to delay the work being done under Operable Unit #1, as this is an independent project. Also, by removing this soil contamination as soon as possible, lese contamination will be able to migrate into ground water, where it is more difficult to recover.