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September1991

Superfund Record of Decision:

Heleva Landfill (Amendment), PA

50272-101

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15. Supplementary Notes

16. Abstract (Limit: 200 words)

The 25-acre Heleva Landfill site is a former sanitary landfill in North Whitehall Township, Lehigh County, Pennsylvania. Land use in the area is predominantly rural with scattered residences. The estimated 150 people who reside within one-quarter mile of the site used the ground water underlying the site as their drinking water supply prior to 1986. From 1967 to 1981, the Heleva Landfill accepted municipal and dustrial wastes, which included large volumes of liquid TCE. As a result of leva's denied requests for solid waste permits and refusal to implement a State ordered biostimulation project, the State closed the landfill in 1981. A number of subsequent State investigations revealed ground water contamination by VOCs, other organics, and DNAPLs at levels that exceeded State and Federal ground water limits. A 1985 Record of Decision (ROD) addressed onsite ground water contamination and provided for extending an existing water main; capping the entire landfill; constructing surface water diversions and gas venting systems; constructing an onsite ground water treatment facility; establishing a pumping and treating system for the contaminated neargradient ground water; and ground water sampling and monitoring. Construction of all of these major remedial activities has been completed except for

(See Attached Page)

17. Document Analysis a. Descriptors

Record of Decision - Heleva Landfill, PA
First Remedial Action (Amendment) - Final
Contaminated Medium: gw
Key Contaminants: VOCs (benzene, PCE, TCE, toluene, xylenes)

b. Identifiers/Open-Ended Terms

c. COSATI Field/Group

Availability Statement	19. Security Class (This Report)	21. No. of Pages
	None	26
	20. Security Class (This Page)	22. Price
	None	

(See ANSI-Z39.18) See Instructions on Reverse OPTIONAL FORM 272 (4-77) (Formerly NTIS-35) Department of Commerce

stract (Continued)

the ground water extraction and treatment component. This ROD amends the ground water component based on data from the 1989 predesign study which determined that collection of downgradient ground water is technically feasible. The primary contaminants of concern affecting the ground water are VOCs including benzene, PCE, TCE, toluene, and xylenes.

The amended remedial action for this site includes continuing with the selected remedy from the previous ROD and replacing the ground water portion with extracting near gradient ground water to contain the highly contaminated dissolved plume immediately in the vicinity of DNAPL contamination in the ground water; pumping and onsite treatment of the downgradient portion of the aquifer, and discharging the treated ground water onsite to surface water. The estimated present worth cost for this amended remedial action is $40,950,000, which includes an annual O&M cost of $1,848,000 for 30 years.

PERFORMANCE STANDARDS OR GOALS: Downgradient ground water will be remediated to State background levels including benzene 0.2 ug/l, PCE 0.03 ug/l, TCE 0.03 ug/l, and toluene 0.2 ug/l. The State and Federal ARARs for remediation of neargradient ground water to background levels and MCLs will be waived due to technical impracticability.

RECORD OF DECISION AMENDMENT
HELEVA LANDFILL SITE

DECLARATION

SITE NAME AND LOCATION

Heleva Landfill Site
Lehigh County, Pennsylvania

STATEMENT OF BASIS AND PURPOSE

This decision document presents an amendment to the United States Environmental Protection Agency's (EPA) selected remedial action chosen in a Record of Decision signed on March 22, 1985 (the "1985 ROD") for the Heleva Landfill Site, in Lehigh County, Pennsylvania. This amended remedy was chosen in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended, 42 U.S.C. § 9601, et seq., and is consistent, to the extent practicable, with the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 CFR Part 300. This amendment is made in accordance with Section 117 of CERCLA, 42 U.S.C. § 9617, and 40 CFR § 300.435(c)(2)(ii). This decision is based on information contained in the Administrative Record file for the site.

The Commonwealth of Pennsylvania has not concurred with the selected remedy. The Commonwealth does not agree with EPA that the State ARAR for cleanup of neargradient ground water to background levels and the Federal ARAR for cleanup to MCLs and non-zero MCLGs should be waived at this time on the grounds of technical impracticability.

ASSESSMENT OF THE SITE

Pursuant to duly delegated authority, I hereby determine, pursuant to Section 106 of CERCLA, 42 U.S.C. § 9606, that actual or threatened releases of hazardous substances from the site, as discussed in the section entitled "Summary Of Site Risks" below, may present an imminent and substantial endangerment to the public health, welfare, or the environment.

DESCRIPTION OF THE ORIGINAL SELECTED REMEDY

The remedial action selected in the 1985 ROD consists of:

1) Extending an existing water main from Ironton to Ormrod

2) Capping the entire 25-acre landfill according to Resource Conservation and Recovery Act (RCRA) standards

3) Constructing surface water diversion and gas venting systems

4) Conducting a predesign study to delineate fully the source of contamination and determine sinkhole activity

5) Pumping and treating of the neargradient ground water to reduce the source of ground water contamination

6) constructing appropriate ground water treatment facilities so that the treated ground water may be discharged to nearby Coplay Creek.

Construction of all of the major components of the 1985 ROD has been completed with the exception of components relating to ground water extraction and treatment.

DESCRIPTION OF THE AMENDED SELECTED REMEDY

The original selected remedy remains the same except for the ground water pump and treatment component, which is amended as follows:

> Pump and treat both the neargradient ground water to contain the dissolved plume associated with contaminants in the form of Dense Non-Aqueous Phase Liquids (DNAPLS), and the downgradient ground water to restore that portion of the aquifer to useability.

STATUTORY DETERMINATIONS

The remedial action specified in this amendment was determined to be necessary in order to return the aquifer, to the extent possible, to a useable state and to contain contamination where the ground water cannot be restored. During the predesign studies for the original pump and treat system, it was demonstrated that an assumption made in the 1985 ROD--that it was not feasible to effectively collect ground water downgradient of the Site--was, in fact, erroneous. In addition, the recently recognized effects of the DNAPLS, which provide a continuing source of contamination, will preclude the restoration of the ground water by the particular pump and treatment component of the remedy selected in the 1985 ROD. As explained in more detail below, the pump and treatment component of the amended selected remedy will contain contamination in the area of the DNAPLs (neargradient) and restore the downgradient ground water to useability.

The amended selected remedy is protective of human health and the environment and is cost-effective. EPA believes that the amended selected remedy will meet all Federal and State requirements that are applicable or relevant and appropriate to the remedial action with the sole exception of the Commonwealth's requirement to remediate ground water to background concentrations in the area neargradient to the Site. Accordingly, I hereby waive the provisions of 25 PA Code 264 with respect to ground water background concentrations in the area neargradient to the Site due to technical impracticability. This remedy uses permanent solutions and alternative treatment technologies to the maximum extent practicable. The extension of the water main, landfill cover and ground water extraction and treatment remedy selected

by this amended decision document satisfies the statutory preference for remedies that employ treatment that reduces toxicity, mobility or volume as a principal element.

Because this remedy will result in hazardous substances remaining onsite above levels allowing unrestricted use and unlimited access, a review under Section 121(c) of CERCLA, 42 U.S.C. §9621(c) will be conducted within five years of this action, and every five years thereafter, to ensure that the remedy continues to provide adequate protection of human health and the environment.

Edwin B. Erickson
for Regional Administrator
Region III

9-30-91
Date

RECORD OF DECISION AMENDMENT
HELEVA LANDFILL SITE

DECISION SUMMARY

I. SITE NAME, LOCATION, AND DESCRIPTION

The Heleva Landfill Site (the "Site") consists of a 25-acre landfill and adjacent land, located on a 93-acre tract of land owned by the Heleva family in North Whitehall Township, Lehigh County, Pennsylvania. The Site is located between Ironton and Ormrod and is bounded by Legislative Route 39049 on the south and east, Township Route 687 (Hill Street) on the north and Legislative Route 39038 (Main Street) on the west (See Figure 1).

The area surrounding the Site is primarily rural and has small, single-family residential developments. Approximately 35 families reside in Ormrod, located about one-quarter mile southeast of the Site. Ironton, located approximately one-quarter mile west of the Site, has a population of about 150 residents (see Figure 2). Beginning in 1989, approximately 30 new homes were constructed along the north side of Hill Street, adjacent to the Site. The Ironton Elementary School is located within 1,500 feet, south of the Site.

Ground water beneath the Site has the characteristics of a Class IIB aquifer (i.e. potentially available for drinking water, agricultural, or other beneficial use) and flows in a southeasterly direction towards Coplay Creek. The communities of Ironton and Ormrod were connected to a municipal water supply system in 1987 after the discovery of contamination in the West Ormrod Water Association public water supply well located southeast of the landfill area.

This ROD Amendment is necessary because, as explained in more detail below, the ground water pump and treat remedy chosen in the 1985 ROD (the "Original Remedy") stated that ground water downgradient of the Site could not be remediated. However, a better understanding of Site conditions, based on the study "Field Data Acquisition For Design of Ground Water Extraction and Treatment System", September 1989, has led to a reconsideration of this portion of the Original Remedy. This ROD Amendment specifies cleanup of the downgradient ground water via extraction and treatment.

This ROD Amendment acknowledges that cleanup of Dense Non Aqueous Phase Liquids (DNAPLs), the major source of ground water contamination at this Site, is not feasible at this time. The ROD Amendment, instead, aims to hydraulically contain the dissolved portion of the plume in the immediate vicinity of the DNAPLs (the "neargradient" ground water), while the dissolved plume which has migrated downgradient from the subsurface DNAPL source will be remediated and that portion of the aquifer (the "downgradient" ground water) restored to useability. Both the containment and the remediation will be accomplished by ground water extraction and treatment (the "Amended Remedy").

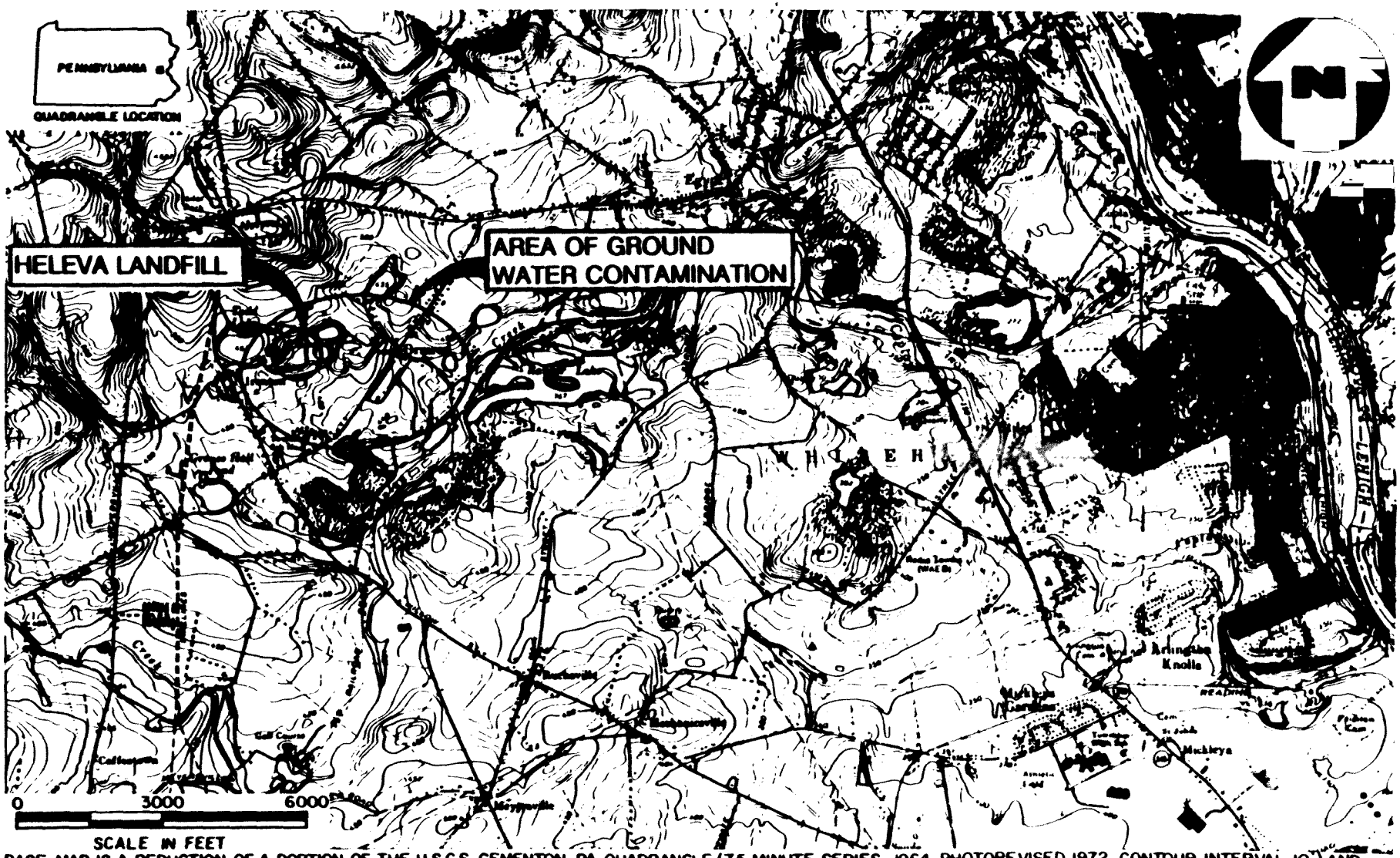
II. SITE HISTORY AND ENFORCEMENT ACTIVITIES

The Site began operations as a sanitary landfill in 1967 and accepted 250 to 350 tons/day of general mixed refuse, paper, wood, and orchard wastes from the Allentown area. In addition to the municipal wastes, industrial wastes were sent to the Site as early as 1967. State inspection reports from the early 1970s indicate that the landfill accepted large volumes of liquid trichloroethene (TCE), an industrial degreaser, from at least one industry in the area.

The Site operated through the 1970s without a permit. On May 3, 1977, Heleva Landfill, Inc. ("Heleva Landfill"), submitted an application to the Pennsylvania Department of Environmental Resources (PADER) for a solid waste permit. On July 8, 1977, this permit application was denied, and the landfill was ordered to cease operation by PADER. On July 11, 1977, Heleva Landfill filed an appeal with the Pennsylvania Environmental Hearing Board to have the permit denial overturned. On May 19, 1980, a consent order was signed by PADER and Heleva Landfill which settled the permit appeal. In this consent order, Heleva Landfill agreed to: control erosion to Todd Lake, control leachate generation, cease dumping in currently filled areas, limit dumping in unfilled areas, and initiate a biostimulation pilot project for TCE reduction in the contaminated soil and ground water. On November 25, 1980, PADER's Bureau of Solid Waste Management denied Heleva Landfill's application to expand the landfill operation because of Heleva Landfill's failure to implement the biostimulation project to the Bureau's satisfaction. Operations at the Site continued until its closure by PADER on May 1, 1981. As part of the closure procedures, Heleva Landfill was required to cover the landfill with two feet of topsoil and then revegetate it. Attempts to seed the covered area were not effective due to the low fertility of the cover material; much of the land had little vegetation and many erosion gullies were present.

The Site was listed as potentially hazardous on November 15, 1979 by PADER and the U.S. Environmental Protection Agency (EPA) under the Resource Conservation and Recovery Act (RCRA) Section 7003 Dumpsite Program. A Site Inspection Report under this program ranked the Site's apparent seriousness as high. A Hazard Ranking System (HRS) model was first generated on August 4, 1982, and was updated on September 2, 1982. The aggregate HRS score of 50.22 resulted in the listing of the Heleva Landfill Site on the CERCLA National Priorities List (NPL) in September 1983.

EPA conducted a Remedial Investigation/Feasibility Study (RI/FS) in 1984 to evaluate the nature and extent of Site contamination and develop a remedial strategy. This investigation determined that Site related TCE had contaminated two residential wells at concentrations above the 10^{-6} risk level. In addition, the 1985 ROD concluded that, if concentrations of Site related contaminants in the residential wells rose to the levels found in the monitoring wells, users of those wells would be exposed to chronic toxicity effects. The remedial actions selected in the



BASE MAP IS A REDUCTION OF A PORTION OF THE U.S.G.S. CEMENTON, PA QUADRANGLE (7.5 MINUTE SERIES, 1964, PHOTOREVISED 1972, CONTOUR INTERVAL 10') AND THE CATASAUQUA, PA QUADRANGLE (7.5 MINUTE SERIES, 1964, PHOTOREVISED 1972, CONTOUR INTERVAL 10').

FIGURE 1

NUS CORPORATION

LOCATION MAP

HELEVA LANDFILL SITE, NORTH WHITEHALL TWP., PA

POOR QUALITY ORIGINAL

FIGURE 2

0 400 800
SCALE IN FEET

NUS CORPORATION

HELEVA LANDFILL SITE NORTH WHITEHALL TWP PA

POOR QUALITY ORIGINAL

1985 ROD consisted of 1) extending an existing water main from Ironton to Ormrod, 2) capping the entire landfill according to RCRA standards, 3) constructing surface water diversion and gas venting systems, 4) conducting a predesign study to delineate fully the source of contamination and determine sinkhole activity, 5) constructing a ground water treatment facility onsite, 6) pumping and treating highly contaminated ground water, 7) monitoring and sampling existing wells and surface water, and 8) conducting operation and maintenance for at least two years.

In accordance with the 1985 ROD, a number of remedial activities have been completed. Ormrod was connected to the municipal water system in 1986. Construction of a synthetic membrane cap, surface water diversion, and gas venting system over the 25 acre landfill was completed in May, 1990. Predesign studies were conducted in 1986, 1987 and 1989 to delineate more fully the source of ground water contamination and to determine if collection of ground water at the source would be effective in reducing the Site contamination.

The following additional actions were taken in conjunction with the 1985 ROD:

Under an agreement with EPA dated October 1, 1986, AT&T Technologies, Inc. reimbursed EPA for costs of construction of the new water mains between Ironton and Ormrod, PA.

Under an Administrative Order By Consent, issued August 5, 1988, AT&T Technologies, Inc. agreed to provide an alternate water supply to three locations not connected to public water supply mains.

Under an Administrative Order By Consent, issued October 28, 1988 to Stephen D. and Lois M. Heleva, EPA obtained access to property necessary to perform the designated remedial response.

Under an Administrative Order By Consent, issued October 28, 1988 to Arthur J. Heleva and Mary Ann Klugh, EPA obtained access to property necessary to perform the designated remedial response.

Under a December 21, 1990, amendment to the Administrative Order By Consent issued August 5, 1988, AT&T Technologies agreed to connect the three locations being provided bottled water to the public water supply main.

A Remedial Investigation ("RI") was conducted during 1989 and 1990 to evaluate areas of contaminated soil. Ground water samples were also taken from soil boreholes where water was present. High concentrations of TCE and acetone were found in the ground water as well as 2-butanone, chloroform, dichloroethene (DCE), and methylene chloride, all widely used industrial solvents (see Table 1). Exposure to contaminants would occur if the contaminated ground water were ingested or used for showering or bathing. One or more samples of the ground

water found the following contaminants of concern in excess of their respective Maximum Contaminant Levels (MCLs): TCE, vinyl chloride, 1,1-dichloroethene, 1,1,1-trichloroethane, chloroform, benzene, tetrachloroethene, toluene, ethylbenzene, total xylenes. In addition, the total carcinogenic risk from consuming or showering and bathing with this contaminated ground water is greater than the 10^{-4} to 10^{-6} risk range.

III. COMMUNITY RELATIONS HISTORY

In accordance with Sections 113(k) and 117(a) of CERCLA, 42 U.S.C. §§9613(k) and 9617, EPA issued a Proposed Remedial Action Plan on July 19, 1991 (the "Proposed Plan"), and held a public comment period from July 19, 1991 through September 18, 1991 for the proposed remedial actions described in that Proposed Plan. The Proposed Plan identified a proposed amendment to the selected alternative in the 1985 ROD and announced the comment period. The notice of availability of the Proposed Plan and supporting Administrative Record was published in the Allentown Call-Chronicle on July 19, 1991. Several potentially responsible parties (PRPs) were notified directly of the Proposed Plan. The opportunity for a community public meeting was offered in the Proposed Plan and the newspaper notification, but no request for a meeting was received from the community. Written comments regarding the Preferred Remedy in the Proposed Plan were received from one member of the public as well as one PRP. Responses to significant comments can be found in the Responsiveness Summary section located at the end of this document.

This decision document presents the amended selected remedial action for the Heleva Landfill Site chosen in accordance with CERCLA and, to the extent practicable, with the NCP. All documents supporting the remedy selection decisions contained in this ROD are included in the Administrative Record for this Site and can be reviewed or referred to for additional information.

IV. SUMMARY OF SITE CHARACTERISTICS

The relative distribution of contaminants observed in the ground water during the most recent sampling approximated past sampling events, however, the concentrations found most recently tended to be much higher. In addition, acetone, which had not been observed in any of the ground water samples previously taken at the Site, was found in high concentrations. In the vicinity of a portion of the Site known as "the TCE Spill Area" very high levels of acetone (up to 1,900,000 µg/L) and TCE (up to 930,000 µg/L) were found. Vinyl chloride was also detected at high concentrations (up to 19,000 µg/L). At the "Abandoned Building Spill Area", acetone (up to 590,000 µg/L), and TCE (up to 280,000 µg/L) were detected. Vinyl chloride was detected at a moderate level (2,200 µg/L) northeast of the abandoned building inside the landfill boundary.

The distribution of contamination in ground water at the Site indicates that there are two contiguous areas exhibiting different levels of contamination. The area of higher levels of

TABLE 1

CONTAMINANTS OF CONCERN - NEARGRADIENT GROUND WATER

Compound	Concentration Range (µg/L)	Average Concentration (µg/L)	Number of Hits/Total Number Samples
Vinyl Chloride	2-19000	1715	16/33
Methylene Chloride	13-660	23	3/33
Acetone	25-1900000	82724	14/33
1,1-Dichloroethene	18-4400	214	6/33
1,1-Dichloroethane	1-1500	67	8/33
Total 1,2-Dichloroethene	5-160000	23443	30/33
Chloroform	19-31000	3449	9/33
2-Butanone	110-120000	8040	8/33
1,1,1-Trichloroethane	44-19800	1006	7/33
Trichloroethene	4-930000	125091	28/33
Benzene	4-8	3	7/33
Tetrachloroethene	17-1400	64	7/33
Toluene	8-2800	163	10/33
Ethylbenzene	10-4000	263	14/33

contamination, which is closer to the landfill, contains DNAPLs. DNAPLs are defined as hydrocarbon liquids which, in their pure state, have densities greater than that of water, causing them to sink through the water column. After sinking, water that comes into contact with the pure chemical causes the chemical to dissolve into the water slowly over time. Thus, the pure chemical is a continual source of contamination. Current scientific research suggests that if contaminants with certain physical and chemical properties are present as free phase liquids in the subsurface, concentrations in the ground water will be at least a percent or more of the pure aqueous solubility limit. TCE, which has a solubility of 1100 ppm (1,100,000 µg/L), has been detected in the ground water at this Site at levels up to ninety percent of that limit. Thus, although actual DNAPL pools have not be located, EPA believes that DNAPLs exist at this Site where the concentration of any individual chlorinated hydrocarbon solvent listed in Table 1 is equal to or greater than 1% of its pure aqueous solubility limit. At this time, further sampling is necessary to more precisely identify the DNAPL areas. For the purposes of this ROD Amendment, the "neargradient" area is the area in which DNAPLs are present. The area of lower levels of contamination, in which DNAPLs are not present, is the "downgradient" area. The DNAPLs present in the aquifer provide an overwhelmingly large percentage of contaminant loading to the ground water compared to other known source areas. These DNAPLs will continue to recontaminate the ground water to levels which will cause excedences of MCLs or other health based levels.

V. DESCRIPTION OF ALTERNATIVES

Construction of all of the major components of the 1985 ROD has been completed with the exception of the components relating to ground water extraction and treatment. For that reason, EPA seeks to amend only the ground water portion of the selected remedy, as described below:

1. Proposed Amendment - Containment of Neargradient Ground water, Cleanup of Downgradient Ground water

Estimated Capital Cost:	***$ 12,541,500***
Estimated O&M Cost:	***$ 1,848,000***
Estimated Present Worth:	***$ 40,950,000***

This alternative utilizes the pumping of ground water wells to extract contaminated water from the aquifer. Ground water wells would be installed in the contaminated ground water plume with two separate purposes. Because the DNAPLs in the aquifer will continue to recontaminate the ground water to levels above MCLs or non-zero Maximum Contaminant Level Goals (MCLGs) and those specified in Federal and State Applicable or Relevant and Appropriate Requirements (ARARs) as long as the DNAPL resides in the aquifer, wells will be installed and the ground water extracted in order to contain the highly contaminated dissolved plume immediately in the vicinity of the DNAPLs. With this highly contaminated plume prevented from moving away from the

Site, other extraction wells will be located downgradient of the Site to clean the downgradient portion of the aquifer to background levels as required by State ARARs. As discussed in EPA document EPA/540/4-91-002 regarding DNAPLs, there are no technologies presently in existence capable of locating or remediating DNAPL pools or accumulations in fractured bedrock such as at this Site. Drilling, in fact, may remobilize stabilized masses and exacerbate the situation. Therefore, for the area of ground water containment (neargradient), the State ARAR for cleanup to background levels and the Federal ARAR for cleanup to MCLs and non-zero MCLGs will be waived on the grounds of technical infeasibility.

Appropriate treatment facilities will be constructed so that, after treatment, ground water extracted from both the neargradient and downgradient areas can be discharged into nearby Coplay Creek in compliance with Federal and State ARARs.

The following ARARS apply to this proposed amendment:

This action will cause no violation of NAAQS due to fugitive dust generated during construction activities (Clean Air Act, 40 C.F.R. §50.6 and 40 C.F.R. §52.21(j).

The downgradient ground water will be cleaned to "background" levels as required by 25 PA Code §§264.90 - 264.100, specifically 25 PA Code §§264.97(i) and (j) and 264.100(a)(9) or to Federal MCLs or non-zero MCLGs, if such Federal standards are more stringent.

Any surface water discharge will comply with the Clean Water Act NPDES discharge regulations (40 C.F.R. §§122.41-122.50), the Pennsylvania NPDES regulations (25 PA Code §92.31), and the Pennsylvania Wastewater Treatment Regulations (25 PA Code §§95.1 -95.3).

Onsite treatment will comply with RCRA regulations and standards for owners and operators of hazardous waste treatment, storage, and disposal facilities 40 C.F.R. §§ 264.170 - 264.178(containers), §§ 264.190 - 264.200 (tanks), §§ 264.220 -264.249 (surface impoundments) and §§264.601 - 264.603 (miscellaneous units) and will comply with §§ 264.1032 - 264.1033 which regulate air emissions from process vents and §§ 264.1052 - 264.1062 which regulate air emissions from equipment leaks.

Fugitive dust emissions generated during construction activities will comply with fugitive dust regulations in the Federally approved State Implementation Plan for the Commonwealth of Pennsylvania (Clean Air Act, 40 C.F.R. Part 52, Subpart NN, §§ 52.2020 - 52.2023, State Implementation Plans for National Ambient Air Quality Standards).

Handling, treatment and disposal of any residual considered a hazardous waste under 40 C.F.R. §261.3 will comply with 40 C.F.R. §§ 264.1 - 264.50 and 25 PA Code §75.264(v) which

requirements regulate the land disposal of hazardous wastes.

Offsite transportation of contaminated materials or treatment residuals will be done in compliance with Federal regulations applicable to generators and transporters of hazardous wastes (40 C.F.R. Part 262 and 40 C.F.R. Part 263) as well as with Pennsylvania regulations (25 PA Code §75.263).

Off-gas from any air strippers used to clean the ground water before discharge will comply with OSWER Directive 9355.0-28 which requires air pollution controls for air strippers with certain emission rates.

2. Selected Alternative in 1985 ROD - Cleanup of Highly Contaminated Ground water Under the Landfill, No Action On Downgradient Ground water

Estimated Capital Cost:	***$1,127,224***
Estimated Annual O&M Cost:	***$ 324,000***
Estimated Present Worth:	***$3,944,000***

This alternative called for drilling wells into the bottom of the landfill to capture the highly contaminated ground water in the unconsolidated deposits beneath the Site. These wells were to be pumped until monitoring of wells in the surrounding area showed that ground water contamination levels had been reduced to between 5μg/L and 50μg/L for TCE and 10μg/L for vinyl chloride. A treatment plant was to be constructed onsite to remove the contaminants from the water before it was discharged into nearby Coplay Creek.

Because of the highly fractured nature of the downgradient bedrock, the complete interception or total collection of the downgradient ground water was, at that time, judged not practical, effective, or technically feasible.

The 1985 ROD declared the following environmental laws to be potentially applicable or relevant to the implementation of the original selected remedy:

- National Environmental Policy Act (NEPA)
- Clean Air Act (CAA)
- Clean Water Act (CWA)
- Safe Drinking Water Act (SDWA)
- Resource Conservation And Recovery Act (RCRA)
- Pennsylvania Clean Streams Act

All substantive requirements of these laws were to be met by the original selected remedy with the exception of RCRA. The 1985 ROD stated that because the capture of downgradient ground water was judged to be not technically feasible, this portion of the RCRA closure requirements could not be met.

VI. COMPARATIVE ANALYSIS OF ALTERNATIVES

The proposed amendment to the selected remedy and the original selected remedy were evaluated under the nine evaluation criteria described in 40 CFR Part 300.430(e)(9). These nine criteria are:

- Overall protection of human health and the environment
- Compliance with ARARs
- Long-term effectiveness and permanence
- Reduction of toxicity, mobility, or volume through treatment
- Short-term effectiveness
- Implementability
- Cost
- State acceptance
- Community acceptance

Overall Protection.

If feasible, the Original Remedy would achieve a greater degree of protectiveness for the ground water under and neargradient to the Site as it seeks to achieve a contamination level between 5µg/L and 50µg/L for TCE and 10µg/L for vinyl chloride in all parts of the aquifer, while the Amended Remedy does not envision the cleanup of the neargradient aquifer. The DNAPLs present in the aquifer will, however, prevent the pumping and treatment selected under the Original Remedy from achieving the cleanup levels called for in the 1985 ROD within a reasonable time frame. The Amended Remedy will achieve a greater level of protectiveness in the downgradient ground water as it calls for cleanup of this ground water to "background" levels and will contain the neargradient ground water to limit potential exposure. Thus, the Amended Remedy will provide greater overall protection of human health and the environment.

Compliance with ARARs. Both the Original Remedy and the Amended Remedy would meet the contaminant-specific ARARs for the discharge of treated wastewater into Coplay Creek. The Amended Remedy will meet contaminant specific ARARs, including the State ARAR for cleanup to background, in the downgradient ground water, and will waive all contaminant specific ARARs for the neargradient ground water on the grounds of technical infeasibility. The Original Remedy would not meet contaminant specific ARARs in the neargradient or downgradient ground water and does not waive these ARARs for either area. (The State ARAR for cleanup of ground water to background was not asserted by the Commonwealth of Pennsylvania until after the 1985 ROD had been signed. EPA did not consider State regulations as ARARs until 1986. Therefore, this "background" standard did not become an ARAR until the decision was made to amend the 1985 ROD.)

No location specific ARARs were identified for the site. It is expected that action-specific ARARs (e.g., Clean Air Act regulations and federal and state regulations for hazardous material transport) would be met for both of the alternatives.

Long-Term Effectiveness and Permanence.

Because of the DNAPLs, the Original Remedy would not achieve any long-term effectiveness in the neargradient aquifer, as the DNAPLS will continue to provide a source of contamination to the aquifer. This is also true in the downgradient aquifer as the Original Remedy would rely on natural attenuation to clean this area. The continuing recontamination of the neargradient ground water by dissolution of the DNAPLs will not allow natural attenuation to occur.

The Amended Remedy will provide greater long-term effectiveness as it will contain the dissolved plume in the vicinity of the DNAPLs to the neargradient ground water, thereby allowing pumping of the downgradient ground water to restore that portion of the aquifer. The expected timeframe for this downgradient restoration is 30 to 40 years.

Both the Original Remedy and the Amended Remedy would permanently remove contaminants from the ground water, though the Amended Remedy will remove them from the entire aquifer while the Original Remedy would remove them only from the neargradient portion. Thus, the Amended Remedy achieves more long term effectiveness and permanence than the Original Remedy.

Reduction of Contaminant Toxicity, Mobility, or Volume Through Treatment.

The Amended Remedy will reduce the contaminant mobility by containing the dissolved plume associated with the DNAPLs, as well as other contamination, to the neargradient aquifer in which the DNAPLs presently exist. In the downgradient aquifer, the Amended Remedy will reduce the volume of contaminants by extracting the water from the aquifer and treating it to remove those contaminants. The Original Remedy would reduce the volume of contaminants to a lesser extent by extracting ground water from the neargradient aquifer and treating it to remove those contaminants, but would not affect the contamination in the downgradient aquifer.

Short-Term Effectiveness. Both the Original Remedy and the Amended Remedy include some degree of treatment and, therefore, present a potential risk of contaminant exposure to site workers, the community, and the environment in the event of treatment system failures. In general, the degree of risk increases with the amount of time required to implement the remedial action. The Amended Remedy envisions pumping the neargradient ground water for an indefinite period of time due to the necessity of containing the dissolved DNAPL contamination. The overall risk is considered small as perimeter and work area air monitoring, personal protective equipment for site workers, spill control procedures, process equipment checks, and other health and safety procedures would all help to minimize risks associated with onsite activities.

Implementability. The Original Remedy is considered no longer implementable as it requires cleanup of the neargradient aquifer to a level between 5µg/L and 50µg/L for TCE and 10µg/L for vinyl chloride. Attainment of these levels in the neargradient ground water within any reasonable time frame is not technically feasible as the DNAPLs present will continue to recontaminate the aquifer. The Amended Remedy can be readily implemented. Once the dissolved plume associated with the DNAPLs is contained by the neargradient pumping wells, the downgradient aquifer can be restored to usability.

Cost. The estimated present worth cost of the ground water portion of the Amended Remedy is $ 40,950,000 (see Table 2 for a detailed cost estimate). The estimated present worth of the ground water portion of the Original Remedy is $3,944,000.

State and Community Acceptance

No comments were received from the local community regarding the proposed amendment. An opportunity for a public meeting was offered, but EPA received no request for such a meeting. Comments were received from one individual and one PRP which are answered in the Responsiveness Summary section of this document.

At this time, the Commonwealth of Pennsylvania has not concurred with this amendment. The Commonwealth has expressed the concern that EPA has not presented sufficient information to support the assertion that DNAPLs are present in the ground water at the Site. The Commonwealth suggests that this amendment should require cleanup of all ground water at the Site to background levels, with contingency language that allows for future waiver of State and Federal ARARs. EPA believes that data in the Administrative Record provides ample evidence of the existence of DNAPLs in the ground water at this Site and does not agree with the Commonwealth's position.

VII. SELECTED REMEDY

1. Proposed Amendment - Containment of Neargradient Ground Water, Cleanup of Downgradient Ground Water

INTRODUCTION

After careful consideration of the proposed remedial alternatives and evaluation by the nine criteria listed above, EPA has decided to amend the Original Remedy selected in the 1985 ROD. In the judgment of EPA, the Amended Remedy represents the best balance among the evaluation criteria when compared to the Original Remedy.

The 1985 ROD declared that collection of downgradient ground water was technically infeasible due to the highly fractured bedrock underlying the Site. This amendment to the ground water portion of that ROD determines that, based on data collected during the 1989 predesign study for the ground water extraction

TABLE 2

COST SUMMARY FOR AMENDED GROUND WATER REMEDY

Capital Cost		
Direct Costs	$ 8,375,500	
Indirect Costs[1]	$ 1,330,000	
	$ 9,705,500	Total Field Costs
Cash Reserve[2]	$ 1,455,600	
Construction Mgmt	$ 1,380,000	
Total Construction Costs	$ 12,541,500	
Operation & Maintenance	$ 1,848,000	
Present Worth[3]	$ 40,950,000	

[1] Calculated using an industry average 70% x direct labor costs
[2] 15% of total labor cost
[3] 30 Years @ discount rate = 5%

system, collection of the downgradient ground water is technically feasible and will be implemented.

The 1985 ROD called for collection of the highly contaminated ground water under the landfill until contaminant concentrations were reduced to between 5 and 50µg/L for TCE and 10µg/L for vinyl chloride. This amendment determines that reduction of contaminant concentrations in the neargradient ground water to those levels is not presently feasible, as the DNAPLs will continue to recontaminate the aquifer to well above those levels for many years. Although the area of DNAPLs can be identified generally, there are no technologies presently in existence capable of locating or remediating specific DNAPL pools or accumulations in the ground water under this Site because of the extremely heterogeneous distribution, both horizontally and vertically, of fractures within the bedrock. Drilling, in fact, may remobilize stabilized masses and exacerbate the situation. At other sites, it may be possible to locate and remove DNAPLs which have pooled on the surface of unfractured bedrock. Under this Amendment, the purpose of the extraction of this neargradient ground water is to contain the high concentrations of TCE and other chemicals to an area near the landfill. The neargradient area will encompass that portion of the contamination plume containing levels of chlorinated hydrocarbon solvents indicative of DNAPLs.

Because the above containment will prevent the highly contaminated dissolved plume associated with the DNAPLs, as well as other contamination, from migrating, EPA believes it is possible to restore the ground water downgradient of the DNAPLs to a usable condition. Under this Amended Remedy the ground water downgradient of the DNAPL source will be cleaned to levels complying with present ARARs. Under the Original Remedy this would not be accomplished.

In summary, this Amended Remedy replaces the ground water portion of the 1985 ROD with the following:

a) pumping of neargradient ground water to contain the dissolved plume associated with DNAPLs to that limited area.

b) pumping of downgradient ground water to clean that portion of the aquifer to "background" levels.

c) treatment of all extracted ground water to levels which will allow for discharge into nearby Coplay Creek in compliance with the requirements of State and Federal discharge regulations.

All other portions of the 1985 ROD remain the same.

PERFORMANCE STANDARDS

The Amended Remedy will achieve containment of the DNAPL source in the neargradient area to prevent further recontamination of the downgradient ground water. The neargradient area is the area in which DNAPLs are present. DNAPLs will be assumed to be present in any area where the concentration in the ground water of any individual chlorinated hydrocarbon solvent listed in Table 1 is greater than 1% of its aqueous product solubility. Extraction wells will be located so that the dissolved portion of the DNAPL plume will be prevented from moving downgradient.

The Amended Remedy will achieve the background levels (Table 3) for the contaminants in the downgradient ground water, which is a relevant and appropriate requirement under the PA Hazardous Waste Management Regulations. The Pennsylvania ARAR for hazardous substances in ground water is that all ground water must be remediated to "background" quality as specified by 25 PA Code §§ 264.90 - 264.100, specifically 25 PA Code §§ 264.97(i) and (j) and § 264.100(a)(9). The Commonwealth of Pennsylvania also maintains that the requirement to remediate to background is also found in other legal authorities.

In order to remediate the downgradient ground water, the extraction system implemented under this Amended Remedy shall operate until ground water monitoring shows that the concentrations of contaminants of concern have been reduced to the "background" levels specified in Table 3. To this end, monitoring wells shall be installed in the downgradient area and sampled on a quarterly basis for at least 30 years. The number and location of these wells will be specified in the design of the extraction system. If sampling confirms that background levels have been attained throughout the downgradient area and remain at the required levels for twelve consecutive quarters, operation of the extraction system can be suspended. If, subsequent to the extraction system shutdown, quarterly monitoring shows the ground water concentrations of any contaminant of concern to be above the levels specified in Table 3, the extraction system shall be restarted and continued until the levels in Table 3 have once more been attained for twelve consecutive quarters.

All extracted ground water will be treated to levels which will allow for discharge into nearby Coplay Creek in compliance with the requirements of State and Federal discharge regulations.

If implementation of the Amended Remedy demonstrates, in corroboration with hydrogeological and chemical evidence, that it will not be possible to meet the remediation goals and it is thus technically impracticable to achieve and maintain background concentrations throughout the downgradient aquifer, then EPA, in consultation with the Commonwealth of Pennsylvania, may amend the ROD or issue an Explanation of Significant Differences to inform the public of alternative ground water goals which may include, but not be limited to, any of the following:

TABLE 3

"BACKGROUND" LEVELS FOR DOWNGRADIENT GROUND WATER (μg/L)

COMPOUND	BACKGROUND SCENARIO[1]
Vinyl Chloride	0.18
Methylene Chloride	0.25
Acetone	0.50
1,1-Dichloroethene	0.13
1,1-Dichloroethane	0.07
Trans 1, 2-Dichloroethene	0.10
Cis 1, 2-Dichloroethene	0.12[2]
Chloroform	0.05
2-Butanone	0.50
1,1,1-Trichloroethane	0.03
Trichloroethene	0.03
Benzene	0.20
Tetrachloroethene	0.03
Toluene	0.20
Ethylbenzene	0.20

1. Method 601/602 Detection Limits (40 C.F.R. Part 136) except where noted.
2. Method 524.2 Detection Limits (40 C.F.R. Part 141).

a) engineering controls such as physical barriers, or long-term gradient control provided by low level pumping, as containment measures;

b) chemical-specific ARARs will be waived for the cleanup of those portions of the aquifer based on the technical impracticability of achieving further contaminant reduction;

c) institutional controls will be provided/maintained to restrict access to those portions of the aquifer which remain above remediation goals;

d) continued monitoring of specified wells; and

e) periodic reevaluation of remedial technologies for ground water restoration.

The decision to invoke any or all of these measures may be made by EPA in consultation with PADER, during a periodic review of the remedial action, which occurs at least every five years, in accordance with Section 121(c) of CERCLA, 42 U.S.C. § 9621(c).

VIII. STATUTORY DETERMINATIONS

The Amended Remedy satisfies the remedy selection requirements of CERCLA and the NCP. This amendment will be protective of human health and the environment, will comply with or waive ARARs, would be cost effective, and would utilize permanent solutions and alternative treatment technologies to the maximum extent practicable. Because it would treat the ground water to remove contaminants, the Amended Remedy also would meet the statutory preference for the use of a remedy that involves treatment as a principal element.

Protection of Human Health and the Environment

The amended ground water portion of the selected remedial action protects human health and the environment by containing the heavily contaminated dissolved contaminant plume associated with the DNAPLs to an area near the Site and then cleaning the downgradient aquifer to background levels. All ground water extracted from the aquifer will be treated and discharged to a local stream in compliance with the substantive requirements of State and Federal discharge regulations.

Compliance with Applicable or Relevant and Appropriate Requirements

These standards are considered applicable to this action:

This action will cause no violation of NAAQS due to fugitive dust generated during construction activities (Clean Air Act, 40 C.F.R. §50.6 and 40 C.F.R. §52.21(j).

Any surface water discharge will comply with the Clean Water Act NPDES discharge regulations (40 C.F.R. §§122.41-122.50), the Pennsylvania NPDES regulations (25 PA Code §92.31), and the Pennsylvania Wastewater Treatment Regulations (25 PA Code §§95.1 -95.3).

Fugitive dust emissions generated during construction activities will comply with fugitive dust regulations in the Federally approved State Implementation Plan for the Commonwealth of Pennsylvania (Clean Air Act, 40 C.F.R. Part 52, Subpart NN, §§ 52.2020 - 52.2023, State Implementation Plans for National Ambient Air Quality Standards).

Handling, treatment or disposal of any residual considered a hazardous waste under 40 C.F.R. §261.3 will comply with 40 C.F.R. §§ 264.1 - 264.50 and 25 PA Code §75.264(v) which requirements regulate the land disposal of hazardous wastes.

Offsite transportation of contaminated materials or treatment residuals will be done in compliance with Federal regulations applicable to generators and transporters of hazardous wastes (40 C.F.R. Part 262 and 40 C.F.R. Part 263) as well as with Pennsylvania regulations (25 PA Code §75.263).

These standards are considered relevant and appropriate to this action:

Onsite treatment will comply with RCRA regulations and standards for owners and operators of hazardous waste treatment, storage, and disposal facilities 40 C.F.R. §§ 264.170 - 264.178(containers), §§ 264.190 - 264.200 (tanks), §§ 264.220 -264.249 (surface impoundments) and §§264.601 - 264.603 (miscellaneous units) and will comply with §§ 264.1032 - 264.1033 which regulate air emissions from process vents and §§ 264.1052 - 264.1062 which regulate air emissions from equipment leaks.

The downgradient ground water will be cleaned to "background" levels as required by 25 PA Code §§264.90 - 264.100, specifically 25 PA Code §§264.97(i) and (j) and 264.100(a)(9).

This directive is to be considered:

Off-gas from any air strippers used to clean the ground water before discharge will comply with OSWER Directive 9355.0-28 which requires air pollution controls for air strippers with certain emission rates.

Cost Effectiveness.

Cost effectiveness is determined by comparing the costs of the alternatives being considered with their overall effectiveness to determine whether costs are proportional to the effectiveness achieved. The estimated present worth cost of the ground water

portion of the Amended Remedy is $40,950,000. This Amended Remedy is judged to afford overall effectiveness proportional to its cost such that the remedy represents good value for the money. When the relationship between cost and overall effectiveness of the Amended Remedy is compared to the cost and overall effectiveness of the Original Remedy, the Amended Remedy is judged the more cost effective.

Utilization of Permanent Solutions and Alternative Treatment Technologies to the Maximum Extent Practicable.

EPA has determined that the Amended Remedy represents the maximum extent to which permanent solutions and alternative treatment technologies can be utilized while providing the best balance among the other evaluation criteria. The Amended Remedy provides the best balance in terms of the nine evaluation criteria

Preference for Treatment as a Principal Element.

The Amended Remedy satisfies the statutory preference for remedies that employ treatment as a principal element to permanently reduce the volume, toxicity, or mobility of hazardous substances. By extracting ground water from the aquifer and removing contamination from it before it is discharged to a local stream, the remedy addresses the primary risk posed by the Site through the treatment.

IX. EXPLANATION OF CHANGES TO THE PREFERRED ALTERNATIVE

The estimated cost for the Amended Remedy has been revised since publication of the Proposed Plan. This revision is based on updated cost information developed by EPA which lowered the capital cost estimate, and the recalculation of the 30-year present worth using a discount rate of 5%, which better reflects the present discount rate than the 11% used in the initial calculation.

X. RESPONSIVENESS SUMMARY

This Responsiveness Summary documents significant public concerns and comments regarding the proposed amendment to the 1985 ROD expressed during the public comment period. The summary also documents EPA's responses to the comments and concerns that were received. The public comment period for the Heleva Landfill Site began on July 19, 1991, and extended to September 18, 1991. The opportunity for a community public meeting was offered in the Proposed Plan and the newspaper notification, but no request for a meeting was received from the community. Written comments were received from one individual ("Commentor 1") and one Potentially Responsible Party ("Commentor 2"). EPA's responses to significant comments appear below.

COMMENTOR 1

Comment: The length of the comment period did not allow enough time to review the administrative record.

Response: EPA believes that the 30 day period specified in the Proposed Plan provided, in this instance, an adequate opportunity for the public to review the administrative record and comment on the Proposed Plan. In addition, the NCP gives the public an opportunity to request an extension of that period for another 30 days. This commentor did not request an extension. However, a timely request for an extension was received from another party and the comment period was extended for another 30 days. Notice of that extension was published in the Bethlehem Globe Times on August 20, 1991.

Comment: The Proposal does not identify any specific new information which supports the proposed changes to the ROD.

Response: The Proposed Plan specifically cites the data gathered during the 1989-90 RI/FS as providing evidence that DNAPLs are present in the aquifer under the Site and goes on to explain that these DNAPLs will prevent the Original Remedy from achieving its goals. The Proposed Plan also encourages the public to review the Administrative Record to gain a more comprehensive understanding of the Site and the activities conducted there. EPA believes that, together, the Proposed Plan and the Administrative Record provide a firm basis for the decision to pursue a ROD amendment.

Comment: Why is there TCE in the downgradient area? Does EPA believe it migrated from the landfill?

Response: The 1989-90 RI/FS and the numerous past ground water investigations conducted at the Heleva Landfill Site all clearly show that the chemical contamination in the aquifer originates at or near the landfill and migrates downgradient from the Site. These investigations are reproduced in the Administrative Record which is available for public review. Furthermore, EPA has evidence of disposal of large quantities of liquid waste solvents, containing TCE and acetone, at the Site.

Comment: Was the prior geological conclusion as to fractures in subsurface water bearing strata confirmed by the subsequent RI?

Response: The 1985 ROD declared that the complete interception or total collection of the downgradient ground water was, at that time, not practical, effective, or technically feasible because of the highly fractured nature of the downgradient bedrock. The April 1990 Remedial Investigation was conducted specifically to investigate an area of contaminated soils that was found during the predesign studies which took place prior to construction of the landfill cap. As part of this investigation, borings were drilled through the unconsolidated material and each boring was terminated when bedrock was encountered. As such, no new information on the nature of the bedrock was developed and the prior conclusion regarding fractures was neither confirmed nor refuted.

Comment: In EPA's analysis of the short term effectiveness of the Amended Remedy, EPA's discussion of risk minimization is not a proper substitute for a risk analysis.

Response: EPA disagrees. The commentor is, in effect, asking EPA to conduct a risk assessment based on assumptions regarding the level of emissions from, frequency of spills at, and other presently unknowable information about, a remedial action which has not yet undergone a final design. The usefulness of the results of such an analysis would be questionable at best. Risk to the public from construction and operation of the Amended Remedy will be evaluated during the design stage in order to minimize any such risks. Based on ongoing remedial actions at other Sites, the short term risk of implementing the Amended Remedy is judged to be small and is so stated in the body of this ROD.

Comment: Did EPA perform a risk analysis of exposures generated by "pump and treat" remedies versus static remedies? The proposed remedy is not grounded on a proper risk analysis.

Response: In the absence of any explanation by the commentor of the phrase "static remedies", EPA assumes that a "No Action" alternative was meant. The "No Action" and "Pump and Treat" alternatives were evaluated in the 1985 ROD, among others. Risk analysis was performed as part of the RI/FS on which the 1985 ROD was based, but addressed only the risk to public health from consumption or other use of ground water. No analysis was performed of risk from construction or operation of any of the alternatives as the usefulness of such an analysis would be questionable, at best (see above response).

Comment: The commentor postulates the following five "intuitive" sources for the contamination in the ground water, discusses each in detail, and claims that a remedy can not be selected until all of these sources have been evaluated:

1. Other TCE disposal into the soils above the downgradient plume.

2. Migration of dissolved TCE in ground water from unknown areas outside the covered area.
3. Migration of TCE as nonaqueous phase liquid from unknown areas outside the covered area.
4. Migration of dissolved TCE in ground water from the covered area.
5. Migration of TCE as nonaqueous phase liquid from the covered area.

Response: In regard to the postulated sources of contamination, EPA has been studying this Site since its inclusion on the NPL, and has data which was developed by the Site owner prior to that time. EPA has no information that any disposal of TCE took place at any location other than at the Heleva Landfill Superfund Site. This does not mean, however, that EPA believes that all of the TCE that has contaminated the ground water was disposed of in the area which is now covered by the cap. As the Administrative Record clearly shows, there is an area of disposal, marked by grossly contaminated soils and underlying materials, that lies mostly outside the covered area but still within the Site boundary. Migration of DNAPLs and the associated dissolved plume from this area was taken into account in developing the Amended Remedy.

EPA perceives a general misunderstanding of the Amended Remedy on the part of this commentor. As explained in this ROD Amendment, EPA does not intend to install the containment wells at the edge of the capped landfill area and expect to contain the DNAPLs. On the contrary, the ground water data and other technical information will be analyzed to determine the likely areal extent of the DNAPLs and extraction wells will be located so as to prevent the dissolved plume of contamination associated with those DNAPLs from moving downgradient.

Comment: Does EPA find the cost of the preferred alternative reasonable?

Response: EPA believes that the cost of the Amended Remedy is reasonable. As stated in the body of this ROD Amendment, the Amended Remedy is judged to afford overall effectiveness proportional to its cost such that the remedy represents good value for the money. When the relationship between cost and overall effectiveness of the Amended Remedy is compared to the cost and overall effectiveness of the Original Remedy, the Amended Remedy is judged the more cost effective.

COMMENTOR 2

Comment: The Proposed Plan does not indicate whether the new goal of containment for the neargradient ground water includes treatment of the neargradient ground water.

Response: Although EPA believes that the Proposed Plan's Preferred Alternative, when read in its entirety, does indicate that neargradient ground water will be treated, language has been included in the body of this ROD Amendment to highlight the fact

that the ground water extracted from both the neargradient and downgradient will be treated before discharge to Coplay Creek.

Comment: If the goal is containment only, there is no need for ground water withdrawal or treatment of neargradient ground water at all.

Response: EPA disagrees. As the commentor has provided no rationale for this conclusion, EPA can only refer to the Administrative Record and to the discussion in the body of this ROD Amendment to demonstrate the need for extraction and treatment of the neargradient ground water to contain the dissolved contaminant plume in the vicinity of the DNAPLs.