EPA/ROD/R03-95/189
1995

EPA Superfund
Record of Decision:

YORK COUNTY SOLID WASTE AND REFUSE AUTHORITY LANDFILL
EPA ID: PAD980830715
OU 01
HOPEWELL TOWNSHIP, PA
12/29/1994

RECORD OF DECISION
YORK COUNTY SOLID WASTE LANDFILL SITE

DECLARATION

SITE NAME AND LOCATION

York County Solid Waste Landfill
Hopewell Township
York County, Pennsylvania

STATEMENT OF BASIS AND PURPOSE

This decision document presents the selected remedial action for the York County solid Waste Landfill Site ("the Site"), in Hopewell Township, York County, Pennsylvania. The remedial action was chosen in accordance with the requirements of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 ("CERCLA"), as amended by the Superfund Amendments and Reauthorization Act of 1986 ("SARA"), 42 U.S.C. §§ 9601 et. seq.; and to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan ("NCP"), 40 C.F.R. Part 300. This decision document explains the factual and legal basis for selecting the remedy for this Site. This decision is based on the Administrative Record for this Site.

In accordance with §114 (a) of CERCLA, 42 U.S.C. §9614 (a), nothing in this CERCLA response action shall be construed or interpreted as preempting the Commonwealth of Pennsylvania-from imposing any additional liability or requirements with respect to the release of hazardous substances from the Site.

The Commonwealth of Pennsylvania 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 REMEDY

The selected remedy for the Site will restore contaminated ground water to its beneficial use by treating the contaminated ground water to background levels as established by Pennsylvania Department of Environmental Resources (PADER) or to Maximum Contaminant Level ("MCLs") established under the Federal Safe Drinking Water Act ("SDWA"), whichever is more stringent. The remedy will also protect the public from exposure to contaminated ground water. The selected remedy as described below is the only planned CERCLA response action for the Site.

The selected remedy includes the following major components:

- Continued operation of the currently existing ground water extraction and air stripper treatment system at the landfill.
- Continued operation and maintenance of the Point of Entry ("POE") ground water carbon filter treatment systems and/or provisions for bottled water for affected private wells as necessary.
- Continued maintenance of the landfill's soil and vegetated cap and the passive landfill gas venting system currently in place at the landfill.
- Continued periodic sampling of ground water and treated water to ensure that treatment components are effective and ground water remediation is progressing towards the required cleanup levels.
- Implementation of a monitoring program to assess the effectiveness of the ground water treatment system and its impact (e.g. dewatering) on downgradient surface water and wetland habitat.
- Implementation of a monitoring program to assess the impact of the treated effluent discharge on the environmental quality of surface waters and sediments in the streams where the outfalls are located.

- Deed Restrictions to prohibit the installation of new on-Site wells in areas of contamination which do not meet applicable or relevant and appropriate requirements ("ARARs"). These restrictions can be withdrawn when ARARs are achieved.

- Deed Restrictions to prohibit the excavation or disturbance of the soil cap which results in exposing the fill materials for reasons other than studying the landfill mining option.

DECLARATION OF STATUTORY DETERMINATION

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, and ia cost-effective. The selected remedy utilizes permanent solutions and alternative treatment or resource recovery technologies, to the maximum extent practicable, and satisfies the statutory preference for remedies that employ treatment that reduces toxicity, mobility, or volume as a principal element. Implementation of the selected remedy will not involve extensive construction, excavation, or other remedial action measures that would pose any appreciable short-term risks to the public or to the workers during construction or implementation.

Because this remedy will result in hazardous substances remaining onsite above health-based levels, a review under Section 121(c) of CERCLA, 42 U.S.C. §9621(c) will be conducted within five years after the initiation of the remedy to ensure that the selected remedy continues to provide adequate protection of human health and the environment.

_____ _____

Thomas C. Voltaggio Date
Director,
Hazardous Waste Management Division

TABLE OF CONTENTS
YORK COUNTY SOLID WASTE LANDFILL
RECORD OF DECISION

RECORD OF DECISION
YORK COUNTY SOLID WASTE LANDFILL SITE

DECISION SUMMARY

I. SITE NAME, LOCATION AND DESCRIPTION

SITE DESCRIPTION

The Superfund Site addressed in this Record of Decision ("ROD") is defined as the York County Solid Waste Landfill Superfund Site ("Site") which consists of three inactive/unlined portions ("former landfill"), and the plume of contamination that emanates from them. The adjacent operating, permitted municipal solid waste landfill which consists of three lined cells, both active and inactive, is not part of the Superfund Site.

In accordance with §114(a) of CERCLA, 42 U.S.C. §9614(a), nothing in this CERCLA response action shall be construed or interpreted as preempting the Commonwealth of Pennsylvania from imposing any additional liability or requirements with respect to the release of hazardous substances from the Site.

The former landfill is located at latitude 39°46'54"N and longitude 76°35'24"W and is approximately two (2) miles northwest of the center of Stewartstown Borough, Pennsylvania, and about 3.5 miles east of the Shrewsbury interchange of Highway I-83 in Hopewell Township, York County, Pennsylvania. The former landfill is approximately 135 acres in area and contains unlined cells that were used to dispose of municipal solid waste. The landfill was operational between 1974 and 1985, and was filled by trench and area fill techniques in accordance with Pennsylvania Department of Environmental Resources ("PADER") Permit No. 100962.

The former landfill is bounded on the south by Plank Road and is traversed by Althouse School Road and is surrounded by both residential and agricultural areas. A location map is provided in Figure 1, Appendix A.

Adjacent to the former landfill is a currently operating landfill which is approximately 45 acres in area. This active landfill is equipped with liners and a leachate collection system and is operating in accordance with the modification to PADER Permit No 100962, issued on February 15, 1985.

There are approximately 300 people living within a one mile radius of the former landfill, with the closest residence less than 1,000 feet. Ground water is the only source of potable water in the area for nearby residences. Residents near the former landfill are dependent on private wells. Private residences having domestic wells, are located adjacent to the former landfill. Those residents that are impacted from site contamination have been equipped with a whole-house point of entry filtration system and/or bottled water. EPA has classified this aquifer as a Clase IIA aguifer, a current source of drinking water, in accordance with the EPA document "Guidelines for Ground water Classification" (Final Draft, December 1986).

Surface drainage from the former landfill flows into three different surface watersheds. Water from the northwest portion of the landfill eventually drains into Cordorus Creek; the northeast portion drains into Muddy Creek; and, the southern portion drains into Deer Creek. All eventually flow into the Susquehanna River. Beside surface drinage, several storm water detention basins are on the former landfill. Wetlands have been identified adjacent to the former landfill.

There are no known endangered species or critical habitats within the immediate vicinity of the former landfill.

II. SITE HISTORY AND ENFORCEMENT ACTIVITIES

1. SITE HISTORY INVESTIGATIONS

The York County Solid Waste and Refuse Authority ("YCSWRA") was established in December 1971. Construction of the York County Solid Waste Landfill ("Site") began during the summer of 1974. YCSWRA owns and previously operated the Site as a municipal landfill since 1974 under a Pennsylvania Department of Environmental Resource. ("PADER") Solid Waste Permit (Permit No. 100962).

The inactive municipal landfill was divided into units or "cellar". Municipal solid waste and non-hazardous commercial waste were disposed in these unlined cells. The unlined cells-Phase I, II, IIIA-(Figure 2) are approximately 135 acres in area. The former landfill was permitted to accept

municipal waste and received approximately 400 tons of such waste daily. The acceptance of wastes at the former landfill halted in 1985, and it was closed in accordance with the PADER approved landfill Closure Plan.

Prior to the establishment of the municipal landfill, the land consisted of seven individual land parcels which were privately owned. Preconstruction land use and development within and contiguous to the formers landfill was primarily agricultural, consisting of farms and widely-spaced single-family residential structures. The most intense development in proximity to the former landfill was a 33-unit mobile home park, which was subsequently acquired by the YCSWRA in 1986, and abandoned and removed, and a strip of seven single-family dwellings located southeast of the former landfill along Plank Road.

A portion of the former landfill northeast of the intersection of Plank Road and Althouse School Road was within a Residential district zoning classification. This district extended into the former landfill for approximately 1200 feet along the north side of Plank Road. The remaining portion of the former landfill was zoned Agricultural. The zoning classification of the area within a one mile radius of the center of the former landfill consisted of a Commercial district located southeast of the former landfill at the intersection of Route 24 and Plank Road; a Residential district on the south side of Plank Road east of Althouse School Road; and an Agricultural district surrounding the former landfill on its northeastern, northwestern, and southwestern outer boundaries.

Adjacent to the former landfill is a currently operating landfill consisting of three lined cells A-1, A-2, and A-3 is approximately 45 acres in area. This landfill is not permitted to accept hazardous waste, and although the YCSWRA received a permit amendment in March of 1987 allowing the disposal of residual waste at the operating landfill, YCSWRA has not accepted such waste pursuant to the permit amendment. Only one lined cell is currently active at this landfill cell: A-3, which receives municipal incinerator ash produced by the incinerator located at the York County Solid Waste and Refuse Authority's Resource Recovery Center.

During the former landfill's operation, the following wastes containing hazardous substances were disposed in the unlined cells:

- 13.75 tons of waste material which contained 71 percent volatile organic compounds ("VOCs") including: butyl acetate, toluene, ethyl acetate, and isopropyl alcohol;

- Reclaimed cellulose fiber from a paper company's wastewater treatment process was permitted for one year's experimental use as part of daily, intermediate, and final (slope stabilization) covers. A total of 577 dry tons (de-watered) of this material at an average 29% solids was utilized on the former landfill from November 1982 thru April 1983. (The material was later found to contain the following: arsenic, barium, cadmium, chromium, copper, lead, mercury, molybdenum, nickel, selenium, silver, zinc, chloroform, methylene chloride, perchloroethylene ("PCE"));

- Various laboratory chemicals from the University of Maryland were disposed at the former landfill. These materials containing largely organic wastes, were later excavated and removed along with contaminated soils and refuse. The excavation of approximately 74 tons of this contaminated refuse and soil began in December 1980. The contaminated refuse and soil were taken to an authorized landfill and the cleanup was completed to the satisfaction of PADER.

The release and subsequent migration of these hazardous substances from the landfill's unlined cells resulted in contamination of ground water beneath and beyond the boundaries of the landfill.

The YCSWRA confirmed ground water contamination beneath and beyond the landfill boundaries in 1983. At that time, the following were detected in the ground water beneath and adjacent to the Site: acetone, benzene, chloroethane, 2-chloroethylvinyl ether, dichlorodifluoromethane, 1,1-dichloroethane, methylene chloride, methyl ethyl ketone, methyl isobutyl ketone, 4-methyl-2-pentanone, tetrachloroethylene, toluene, 1,1,1-trichloroethane, trichloroethylene, trichlorofluoromethane, and vinyl chloride.

From 1982 though 1984, PADER identified VOCs migrating from the landfill and contaminating adjacent residential wells. In May 1984 YCSWRA entered into a Consent Order and Agreement with PADER that required YCSWRA to: 1) construct a lined landfill; 2) implement a ground water monitoring and treatment program for the Site; and 3) provide a potable water supply to residences whose water was contaminated by the Site.

Since then, YCSWRA has implemented a program to address the ground water contamination and the affected residential wells surrounding the landfill which are impacted by the ground water contamination. The ground water program, required by the 1984 PADER Consent Order with the YCSWRA, had YCSWRA install and operate a ground water extraction/containment/ collection treatment system, supply a alternative water

supply and point-of-entry ("POE") water treatment systems to the affected residents, conduct ground water and residential well sampling and monitoring.

YCSWRA initially began supplying bottled water to 26 affected residents in June of 1984. The Eppley Trailer Park adjacent to the former landfill contained 21 residences that received bottled water. In May 1986, the YCSWRA purchased and removed from use adjacent properties that had underlying ground water contamination.

In 1984 and 1985, YCSWRA installed additional ground water monitoring wells, constructed and started operating the lined landfill, and constructed and started operating the ground water contamination containment/extraction and treatment system. The treatment system is currently in operation at the Site.

The on-site ground water treatment system consists of 16 pumping wells and 3 air stripping towers. Off-gas from the air stripping towers is passed through carbon filters far treatment prior to emission to the atmosphere. Effluent from the air stripping towers is discharged to two National Pollutant Discharge Elimination System ("NPDES") permitted outfalls to streams adjacent to the farmer landfill: Rambo Run and Ebaugh's Run.

The ground water treatment system consists of sixteen wells (Figure 3) from which ground water is continuously withdrawn along the property boundaries in the northwest, northeast, southeast, and southwest drainage areas and 3 air stripping towers. Six wells; DGC-1, DGC-25, DGC-28, DGC-47, DGC-9, and DGC-32 withdraw ground water along the northern boundary. Six wells; DGC-13, DGC-31, DGC-29, DGC-24, DGC-6, and DGC-49 withdraw ground water along the southern boundary and four wells; DGC-48, DGC-20, DGC-46, and DGC-2 withdraw water from the northwest and west boundaries.

The lined cells at the adjacent, active landfill were added in 1985. The lined area is approximately 45 acres, and is equipped with a leachate collection system. The operation of the lined area is permitted by the Solid Waste Program of PADER. While this lined, newer area was not part of the RI/FS study area, the ground water underlying it is sampled and monitored on a routine basis. Two of the lined cells received municipal and commercial non-hazardous wastes until their closure in December 1989. They were closed in accordance with an approved landfill Closure Plan. Currently, only one lined cell is receiving waste at the adjacent landfill. It receives ash from the YCSWRA's municipal solid waste Resource Recovery Center's ("RRC") incinerator located in York, Pennsylvania.

As required in the 1984 Consent Order with PADER, YCSWRA also supplies and maintains the whole-house point-of-entry ("POE") carbon filter treatment systems for eight (8) residents as necessary. These systems are installed in the supply line prior to any taps. The carbon system consists of two filters installed in series (Figure 4). Samples are collected on a regular basis (based on expected rate of carbon depletion) from the exit point of the first filter. When that filter shows breakthrough it is removed from service. The second filter is then moved to be first in series and a new filter is installed as the second in series.

Samples from residential wells taken prior to the treatment units, are collected every three months and are analyzed for VOCs and some inorganics. The filter systems in the POEs are maintained on a regular schedule by the YCSWRA. YCSWRA also provides bottled water for drinking purposes to two residences though Site-related contaminants have not been detected in these two domestic wells.

EPA completed the Preliminary Assessment/Site Investigation ("PA/SI.) for the Site in July 1984. The sampling program implemented by the PADER and the YCSWRA, which was on-going at the landfill and the surrounding community at that time, indicated that the ground water beneath and beyond the landfill was contaminated primarily with VOCs, and that contamination had migrated to adjacent domestic wells.

Due to the release of hazardous substances from the Site and the resulting ground water contamination, EPA proposed the Site for inclusion in the National Priorities List ("NPL") in April 1985. The Site was finalized on the NPL on July 22, 1987.

As a result of the NPL listing, PADER and the YCSWRA entered into a Consent Order and Agreement in December 1987 for YCSWRA to perform a RI/FS at the Site.

The RI started in 1988, and a RI Report was finalized and approved by PADER and EPA in 1992. The YCSWRA submitted a Draft FS Report in December 1992. The FS was revised and resubmitted in May 1994.

CERCLA ENFORCEMENT

The entity that has been identified as a Potentially Responsible Party is the York County Solid Waste and Refuse Authority ("YCSWRA"). YCSWRA owns, and operated the Site as a landfill from 1974 thru 1985 under a Pennsylvania Department of Environmental Resources ("PADER") Solid Waste Permit (Permit No. 100962). The YCSWRA also owns and operates the adjacent landfill in accordance with a 1985 modification of this permit.

Potential Responsible Party

YCSWRA, the current owner/operator of the landfill has been identified by EPA as a Potentially Responsible Party ("PRP") for contamination at the York County Solid Waste Landfill Site. EPA issued YCSWRA a General Notice Letter ("GNL") on March 21, 1986. YCSWRA conducted a Remedial Investigation/Feasibility Study ("RI/FS") at the Site pursuant to the terms of a December 1987 Consent Order with the Commonwealth of Pennsylvania. The purpose of the RI/FS was to characterize the nature and extent of contamination from the Site, to quantify any existing or potential human health risks, to develop alternatives to remediate the contamination. The RI/FS Reports were submitted by YCSWRA in June 1992, and May 1994 respectively.

III. HIGHLIGHTS OF COMMUNITY PARTICIPATION

The Remedial Investigation/Feasibility Study ("RI/FS") Report and the Proposed Plan for the York County Solid Waste Landfill Site were released to the public for comment on July 21, 1994 in accordance with Sections 113(k)(2)(B), 117(a), and 121(f)(1)(G) of CERCLA, 42 U.S.C. §§ 9613(k)(2)(B), 9617(a), 9621(f)(1)(G). These two documents were made available to the public in both the administrative record maintained at the EPA Region 3 Administrative Record Reading Room, and the information repository located at the Mason-Dixon Library, Stewartstown, Pennsylvania. The notice of availability for these documents and the notice for the public meeting were published in the York Dispatch and Daily Record on July 22, 1994, and the Weekly Record on July 26, 1994. A public comment period on the documents was held from July 22, 1994 to August 21, 1994. In addition, a public meeting was held on August 15, 1994 at the Eureka Fire Hall in Stewartstown, Pennsylvania. At this meeting, representatives from EPA and Pennsylvania Department of Environmental Resources ("PADER") answered questions about the Site and the remedial alternatives considered. A Fact Sheet containing Site related information was distributed at the Public Meeting.

EPA's response to all comments on the Proposed Plan and related documents received during the comment period is included in the Responsiveness Summary in this ROD. A copy of the transcript of the public meeting has been placed in the administrative record file and information repository.

IV. SCOPE AND ROLE OF RESPONSE ACTION

This Record of Decision ("ROD") mandates remediation of contaminated ground water and addresses the drinking water sources (residential wells) affected by contamination at the Site. This ROD is the only planned CERCLA response action for the Site.

The Response Action will address the threat posed by the release of hazardous substances at the Site. The threat posed by the Site is the ground water contamination that resulted from the release of VOCs into the ground water from the formerly used unlined cells. The concentrations of chemicals detected in the ground water plume exceed the levels allowed by the Safe Drinking Water Act and Site related ground water contamination poses an unacceptable level of carcinogenic risks.

EPA classifies ground water aquifers using the following criteria:

Aquifer Type	Classification Criteria
Class I Special Ground Water	Highly vulnerable ground water that is irreplaceable with no alternative source of drinking water available to substantial
Class IIA	Ground water currently used.
Class IIB	Ground water that could potentially be used.
Class III	Ground water not a potential source of drinking water because of quality.

EPA has classified the affected aquifer at the York County Solid Waste Landfill Site as a Class. IIA aquifer, a current source of drinking water, in accordance with the EPA document "Guidelines for Ground water Classification" (Final Draft, December 1986). Ingestion of, and contact with, contaminated ground water poses the primary risk to human health being addressed by this ROD. The concentrations of contaminants in the ground water at the Site are above Maximum Contaminant Levels ("MCLs" are enforceable, health-based drinking water standards established under the Safe Drinking Water Act ("SDWA"), 42 U.S.C. §§300f to 300j-26. EPA policy requires remedial action for Class I and Class II aquifers if MCLs are exceeded.

Currently, the YCSWRA is performing a ground water response action at the Site pursuant to a May 17, 1984 Commonwealth of Pennsylvania Consent Order and Agreement ("COA"). The COA required the YCSWRA to perform the following: 1) install and maintain a ground water pump and treatment system to remediate contaminated ground water to levels which exceeds the more stringent of PADER or EPA drinking water standards; 2) provide affected residents an alternate drinking water supply (bottled water) as necessary; 3) provide affected residents a point-of-entry ("POE") filtration system and maintain the equipment as necessary, 4) perform routine monitoring on residential wells to determine the effectiveness of the POE system; 5) perform monitoring of the ground water treatment system at the Site; and 6) construct a new lined landfill.

The response action selected in this ROD is consistent with the work that YCSWRA is currently implementing at the Site pursuant to the COA.

During the RI it was determined that MCLs are exceeded as follows (Data is supplied in Tables 1A, 1B and 2, Appendix B)

Well Location	Chemical MCLs Exceeded
On-site Shallow Wells	bis(2-ethylhexyl)phthalate, methylene chloride, tetrachloroethene, trichloroethene, vinyl chloride, antimony, beryllium, cadmium, mercury
On-site Deep Wells	bis(2-ethylhexyl)phthalate, methylene chloride, tetrachloroethene, antimony, arsenic, barium, beryllium, cadmium, chromium, mercury, nickel
Private Wells	tetrachloroethene, vinyl chloride.

The purpose of the selected CERCLA response action at the site is to restore the contaminated ground water to its beneficial use by treating the contaminated ground water to background levels as established by PADER or to Maximum Contaminant Levels ("MCLs") established under the Federal Safe Drinking Water Act ("SDWA"), whichever is more stringent.

In accordance with §114(a) of CERCLA, 42 U.S.C. §9614(a), nothing in this CERCLA response action shall be construed or interpreted as preempting the Commonwealth of Pennsylvania from imposing any additional liability or requirements with respect to the release of hazardous substances from the Site.

The remedy will also protect the public from exposure to contaminated ground water. The selected response action is to prevent current or future exposure to the contaminated ground water, to protect uncontaminated ground water for current and future use, and to eliminate carcinogenic risks associated with the contaminated ground water plume. Pumping and treating ground water is the most expeditious way to reduce the contaminant levels that have been detected.

V. SUMMARY OF SITE CHARACTERISTICS

A. SITE CHARACTERISTICS

1. Geology

The landfill is underlain by the Wissahickon Schist formation. Dominant rock types are muscovite-chlorite-quartz schist and albite-muscovite-chlorite-quartz schist. The schist has weathered deeply over much of the Site forming saprolitic soils from 6 to over 30 feet thick.

The schist is predominantly fractured along axial cleavage planes which have a strike and dip direction generally North 34 degree East, 53 to 56 degrees Northwest, respectively. Fracture and foliation traces trend toward the North 2 to 6 degrees East and North 64 to 65 degrees West, respectively.

2. Hydrogeology

The major water bearing strata in this area is within the Wissahickon Schist formation. Well depths in the area are generally 40 to 150 feet in depth and can sometimes provide yields of up to 400 gallons per minute. The data provided also indicate that ground water flows from the landfill in 3 different directions due to ground water divides running through the property. In the northeast corner of the landfill flow is to the northeast, while at the southern portion of the property flow is to the south or southwest, and in the western portion of the property flow is to the northwest. The operation of the existing ground water treatment system alters the natural ground water flow pattern.

Ground water at the York County Solid Waste Landfill exists as an unconfined flow system, meaning that ground water flows from recharge areas (hilltops) to discharge areas (streams). The recharge areas are separated by ground water divides. These divides reflected topographic divides. The existing ground water pump and treatment system affected the location of these divides. Ground water is fully contained between the divide and discharge zone, with no flow across the divide or beneath the discharge zone.

The ground water divides tend to follow the topographic divides. The only significant deviation of the ground water divides from topographic divides is the ground water divide separating the northwest and northeast drainage areas, or between cells Phase I and A-1. The ground water divide here has moved eastward from its original position beneath the topographic divide to an area which is beneath cell Phase I. This has been caused by drainage of the ground water system beneath the lined cells as a result of decreased recharge caused by the impervious cell liners, potential mounding of the ground water table in response to the stockpiling of excavated earth materials on Phase I and by pumping from the remediation wells.

The new pumping wells added to the system since December, 1989 have increased the impact on the ground water divides. The central ground water divide from the unlined Phase I area to between the unlined Phase II and Phase III-A areas still exists but its northward extension under the topographic ridge has been truncated because of 2 pumping wells. The other divides located in the western portion of the landfill have been nearly eliminated because of the new pumping wells and the continuing impact of the lined cells on ground water recharge.

Monitoring Well Network Description

The monitoring well network is composed of forty-three DGC-series wells (DGC-1 through DGC-49 with several skipped numbers), twenty-six P-series wells (P-1 through P-26), and four MP-series (MP-1, MP-2, MP-6 and MP-7A) totaling seventy-three monitoring points from which ground water elevation data for the landfill is compiled for analysis with the exception of RI wells DGC-36 to DGC-45. The older MP-series wells were drilled in the 1970's.

Several of these wells are former homeowner wells (i.e. DGC-21 and DGC-27) which were incorporated into the monitoring network and given DGC numbers. Most of the DGC-series wells are between 80 and 110 feet in depth. Sixteen of the DGC wells are used currently for the ground water interception system which pumps contaminated ground water through air-stripping towers.

The P-series or piezometer wells are small diameter (1.5-inch) versions of the DGC wells which were installed for the primary purpose of providing additional ground water elevation information and for assessing hydraulic gradient reversals induced by pumping and ground water withdrawal in areas not well represented by the DGC and MP wells. All of the P-series wells were drilled at least 20 feet into the ground water aquifer.

Natural Ground Water System.

Ground water levels in the swales and valleys adjust more quickly to cyclic seasonal precipitation because of the presence of fractures. Hillside and hilltop wells adjust more slowly because precipitation either runs off or requires more time for infiltration to greater depths beneath ths topographic highs as a result of the lower permeability of the saprolite.

Ground water continues to flow into the landfill from the southwest near MP-1 and DGC-18, and fro. the east near DGC-7 and DGC-8. The ground water that flowed from the Naylor Winery and into the unlined Phase I landfill has been intercepted by two pumping wells. Inflowing ground water and infiltrating rainfall move towards the center of the contaminated drainage areas before migrating either north or south. Infiltrating water from the surface of the unlined landfill becomes mixed with leachate and in part is diluted by the inflowing ground water from the southwest and east. The ground water interception wells then remove this water for treatment.

The ground water elevation high, historically between the Northeast and Northwest Drainage Areas, has migrated eastward beneath Phase I. The result has been a significantly enhanced potential for leachate from Phase I to enter the ground water system and migrate west and northwest beneath lined cell A-1, thereby contaminating the northwest drainage area in the vicinity of DGC-23.

Surface Water

The surface waters adjacent to the former landfill are: Cooper Pond, Ebaughs Run, Rambo Run, and Ebaughs Creek. These surface waters are headwaters to Cordorus, Muddy and Deer Creeks that are classified by the Commonwealth of Pennsylvania as high quality waters.

Surface drainage from the former landfill flows into three different surface watersheds. Water from the northwest portion of the former landfill eventually drains into Cordorus Creek; the northeast portions drains into Muddy Creek; and, the southern portion drains into Deer Creek. All eventually flow into the Susquehanna River. Beside surface drainage, several storm water detention basins are on the former landfill. Wetlands have been identified adjacent to the former landfill.

4. Meteorology

The former landfill is located in south central York County, Pennsylvania. The climate of York County is classified as humid continental, with limited influence by the Atlantic Ocean. The mean annual temperature is about 53°F, and the average annual precipitation is approximately 40 inches. Average annual lake evaporation is approximately 34 inches, indicating a net annual precipitation of approximately 6 inches. Winds are generally out of the west to southwest averaging 8-10 miles per hour.

5. Natural Resources

No known threatened or endangered plant or animal species have bean identified at the former landfill. The former landfill is mowed and relatively unattractive for most wildlife; however, many species of migratory birds would be expected to use the open grassed areas, adjacent streams, and various ponds and the landfill's storm water detention basins. During a brief half-day visit in March 1993 the following species were observed or evidence of presence seen: American crow, Carolina wren, white-tailed deer, unidentified small mammal (probably meadow vole), American robin, red-tailed hawk, American kestrel, common flicker, turkey vulture, mourning dove, northern cardinal, common grackle, red-winged blackbird, song sparrow, mallard and common snipe.

The wetlands near and downgradient of the former landfill are not extensive. They are, however used by wildlife including waterfowl, wading birds, songbirds, raccoons, deer, and other species. Cooper's Pond and the pond downstream of Outfall #2 are the largest wetland habitats of the areas investigated related to the Site. The pond downstream of Outfall #2 is connected by drainage to palustrine emergent wetlands further downstream. The types and extent of wetlands in the vicinity of the landfill are typical of wetlands found throughout the geographic region, which are generally associated with the intermittent creeks and larger water bodies that occur along the natural drainage patterns in the valleys.

B. NATURE AND EXTENT OF CONTAMINATION

The nature and extent of contamination at the Site was characterized through sampling ground water monitoring wells the Site RI/FS wells, residential drinking water wells, surface waters and sediments.

1. Ground Water

Ground Water

Ground Water Samples

A total of 17 existing wells and the 10 RI/FS wells were sampled for the compounds on the target compound list ("TCL") plus dichlorodifluoromethane. The 10 RI/FS monitoring wells were sampled twice. The first round of sampling was for the full TCL plus dichlorodifluoromethane. The second round of samples were analyzed only for the TCL volatile organics plus dichlorodifluoromethane. A total of 14 residential wells were sampled for TCL volatile organics plus dichlorodifluoromethane.

The ground water sampling conducted during the RI indicated shallow, intermediate and deep zone contamination. The ground water underneath the landfill is contaminated by organic and inorganic compounds. Contaminants identified in the RI are: 1,1-dichloroethane; acetone, tetrachloroethene, benzoic acid; vinyl chloride; chloroethane; trichloroethene; methylene chloride; dichlorodifluoromethane; bis (2-ethylhexyl)phtalate; 1,1,1-trichloroethane; benzene; toluene; xylene; arsenic; barium; cadmium;

chromium; copper; lead; mercury; and selenium (reference Table 2 RI wells).

The ground water contamination has been detected in the landfill's perimeter wells and in off-site monitoring and residential wells. While off-site migration is currently controlled by the ground water treatment system, past migration of contaminants from the landfill was primarily along the northern and southern boundaries.

Residential Well Sampling

Data from several years of sampling the residential wells have shown levels of VOCs in nine of the fourteen wells sampled. The most prevalent contaminant is dichlorodifluoromethane. Eight residential wells currently have POE treatment systems on them.

2. Surface Water

YCSWRA performed an Ecological Assessment ("EA") during the RI. The EA examined the impacts on the receptors (wildlife) that were identified in the vicinity of the landfill for both surface water and sediment.

During the RI, four surface water locations and the two NPDES outfall locations were sampled in a one-time sampling event in 1989 for the inorganics as specified in the RI work plan. The analysis indicated that surface water concentrations of aluminum, cadmium, cyanide, iron, mercury, silver, selenium, and bis(2-ethylhexyl) phtalate exceed either the PADER Water Quality Criteria and/or the Federal Ambient water Quality Criteria ("AWQC"). Aquatic lite in the surface water bodies located within the vicinity of the Site may experience chronic adverse effects, particularly from exposure to cadmium, silver and mercury. Cadmium exceeded both its chronic and acute AWQC.

While the YCSWRA has performed additional sampling in conjunction with their NPDES permitted outfalls, the initial suite of inorganic contaminants, analyzed during the RI, have not been repeated. Additional data is required in order to make definitive determinations regarding inorganic exceedances and the proper response action, if necessary. This data should ideally consist of sampling results reflecting the seasonal variations over the period of one year.

3. Sediments

One round of sediment sampling and inorganic analysis was performed during the RI in 1989. The data generated are limited, and additional data are needed in order to make definitive determinations regarding the inorganic exceedances, and the proper response action, it necessary.

A NPDES permitted outfall is located on both Ebaugh and Rambo Runs. The treated ground water is discharged to these outfalls. Elevated levels of arsenic and mercury were detected in the sediments in Ebaugh Run and Rambo Run. The presence of these constituents in the stream sediment may indicate that they are due to the landfill since the ground water is not treated for inorganics.

Arsenic and mercury were not found at levels hazardous to human health. Because aquatic organisms are susceptible to metals, and because mercury, which has a bioconcentration potential, was consistently detected in Site surface water and sediment, EPA is requiring YCSWRA perform additional surface water and sediment chemical analysis and toxicity characterization studies. The contaminants found in the sediments and surface waters are likely attributable to the two NPDES permitted outfalls from the existing ground water treatment system. These outfalls, are permitted under the NPDES program administered by PADER. Currently, the discharges from these outfalls which go to Ebaugh Run and Rambo Run, are in compliance with their permitted criteria.

The landfill's current NPDES permit does not include discharge limits for metals. NPDES permits must be renewed at 5-year intervals. Metal discharge limits may be imposed at some future time. The PADER has the authority to require the amendment of HPDES permits as necessary.

In accordance with §114(a) of CERCLA; 42 U.S.C. §9614(a), nothing in this remedy shall be construed or interpreted as preempting the Commonwealth of Pennsylvania from amending the NPDES permits to contain limitations for additional pollutants or from imposing any additional liability or requirements with respect to the release of hazardous substances from the Site.

The detection of metals in surface water and sediments are at levels of biological concern (in both total and dissolved phases). Mercury is of special concern, as it is the most consistently detected metal in surface water and sediment and has a very high bioconcentration factor.

4. Landfill Gas

Landfill generated methane gas has not been a problem at the former landfill. The methane gas which is generated from the decomposition of the waste at the closed portion of the landfill is passively vented through a series of vents positioned into the waste. The YCSWRA has conducted monitoring of combustible gas levels in soils around the landfill perimeter. The results of this monitoring to date indicates that combustible gas is present on the landfill, but concentrations of combustible gas taper off to levels not detectable with field instruments within the landfill boundary. Based on this information, it was concluded in the RI that the existing passive vent system is effectively controlling the migration of ths landfill gas from the landfill.

VI. SUMMARY OF SITE RISKS

The section of the ROD summarizes the results of the baseline rising assessment which was conducted as part of the RI/FS. The risk assessment for the Site characterizes the current and potential threats to human health and the environment based on reasonable maximum exposures ("RMEs") to contaminants in the ground water, soil, and subsurface soil, the migration of contaminants to surface water, sediments, and exposure to contaminants in the air if no remedial action were taken. Where it was not possible to evaluate the RME concentration, both the mean and maximum exposures were assessed.

The risk assessment consisted of identification of contaminants of concern, a toxicity assessment, an exposure assessment, and risk characterization. The first task in the risk assessment was the selection of Site-related contaminants for which risks were assessed. In the data evaluation, sampling data were reviewed by media. The list was based on chemical toxicity characteristics, the occurrence and distribution of the chemical in the medium, potential exposure routes, and contaminant migration characteristics.

The Risk Assessment ("RA") performed during the RI/FS identified ground water contamination beneath and beyond the boundaries of the Site as posing an unacceptable level of risk.

The RA studies the carcinogenic and non-carcinogenic, current and future risks at the Site based on the levels of contaminants found during the RI and a reasonable maximum exposure. Risks were calculated based on a combination of inhalation, ingestion, and dermal absorption of ground water. Tables 3, 4 and 5 in Appendix B contain a summary of the Risk Scenarios evaluated for the Site.

The National Contingency Plan ("NCP"), 40 CFR Part 300, establishes a range of acceptable levels of carcinogenic risk for Superfund sites that range between one in 10,000 and one in 1 million additional cancer cases if cleanup action is not taken at a site. Expressed in scientific notation, this translates to an acceptable risk range of between 1E-04 and 1E-06-over a defined period of exposure to site related contaminants.

In addition to carcinogenic risk, chemical contaminants that are ingested, inhaled or dermally absorbed may present non-carcinogenic risks to different organs of the human body. The non-carcinogenic risks or toxic effect are expressed as a Hazard Index ("HI"). EPA considers a HI exceeding one to be an unacceptable non-carcinogenic risk.

The RA is used to evaluate the need for remedial action. It also helps in determining the levels to which site related contaminants have to be treated ta ensure the protection of human health and the environment. The risk assessment is based on the assumption that exposure to Site related contaminants can occur only if a complete exposure pathway exists. The exposure pathway consists of the following elements: contaminants; a medium (such as water, soil, air) through which contaminants are transported; a point of contact with the contaminants (exposure point); and a route of exposure (such as ingestion, inhalation, or dermal (skin) contact) at the exposure point.

The first step in the RA was to summarize all the chemicals found in ground water (shallow and deep portions of the aquifer), surface water, and sediment on or near the Site. All organic chemicals detected were initially selected as chemicals of potential concern. Inorganic chemicals of potential concern were selected for each environmental media based on a comparison to background concentrations. As a result of this analysis, a total of 30 organic chemicals and 19 inorganic chemicals were selected as chemicals of potential concern.

A. EXPOSURE ASSESSMENT

Current land use in the vicinity of the Site is residential and agricultural. Future land use in the vicinity of the Site is also expected to be residential and agricultural.

Ground water beneath the Site is classified as a Class IIA aquifer, a current source of drinking water. Contaminants from the Site have migrated towards private drinking water wells through the ground water flow system and contaminants these wells. Based on current and potential future land use at the Site, the following populations were evaluated in the risk assessment:

- Residents (both adult and children) who currently obtain water from private wells assuming the in-piece point of entry ("POE") carbon filter treatment systems is not used;
- Direct human contact with the sediments and surface waters in Cooper Pond, Ebaughs Creek, Ebaughs Run, and Rambo Run;
- Hypothetical future residents (both adult and children) of the Site that would obtain water from shallow and deep ground water wells at the Site.

Exposure Analysis

The Risk Assessment compiled a list of contaminants of concern from the results of the various sampling activities at the Site. These contaminants of concern were selected based on concentrations at the Site, toxicity, physical/chemical properties that affect transport/movement in a specific environmental medium, and prevalence/persistence in these media. These contaminants of concern were used in the Risk Assessment to evaluate potential health risks at the Site.

Contaminants of concern were selected and associated risks calculated for the different media and potential exposure routes at the Site. The following chemicals were selected as contaminants of concern because of their presence in the contaminated media at the Site and because of their potential chronic health affects: shallow ground water: tetrachloroethene, vinyl chloride, antimony, mercury, manganese; deep ground water: antimony, aluminum, arsenic, barium, beryllium, cadmium, chromium, manganese, nickel, vanadium; residential ground water: 1,1-dichloroetbene, carbon tetrachloride, tetrachloroethene, vinyl chloride (reference Table 6, Appendix B).

Possible human exposure to the chemicals of potential concern was characterized through exposure pathways. Several exposure pathways were selected for detailed evaluation under both the current and future Site conditions. The exposure pathways quantitatively evaluated under current land use conditions included: 1) inhalation, ingestion, and dermal contact of ground water from off-site potable wells by residents assuming no institutional controls and in-place carbon filter treatment systems are not used; and 2) direct contact with sediments in Cooper Pond, Ebaughs Creek, Ebaughs Run, and Rambo Run by children and teenagers. The exposure pathways quantitatively evaluated for the future land use conditions included the ingestion, inhalation, and dermal contact of ground water from the shallow and deep portions of the aquifer by-hypothetical residents on the landfill.

Generally, exposure point concentrations of chemicals were based upon the 95 percent upper confidence limit of the mean for positive detections, or were the mean and maximum for small data sets. Intake factors (e.g. amount of soil ingested, rate of dermal contact, exposure frequency, and duration) were selected in accordance with EPA risk assessment guidance so that the combination of all variables conservatively results in the maximum exposure that can reasonably be expected to occur at the Site.

The contaminant intake equations and intake parameters were derived from standard literature sources and data from EPA guidance documents. The exposure assumptions used to calculate chemical intakes were selected based on the reasonable maximum exposure ("RME") which is defined as the highest exposure that is reasonably expected to occur at a Site.

B. Toxicity Assessment and Risk Characterization

Projected intakes for each risk scenario and each contaminant were compared to acceptable intake levels for carcinogenic and noncarcinogenic effects. With respect to protected intake levels for noncarcinogenic compounds, a comparison was made to references doses ("RfDs"). RfDs have been developed by EPA for chronic (lifetime) and/or subchronic (less than lifetime) exposures to chemicals based on an estimate that is likely to be without an appreciable risk of deleterious effects. The chronic RfD for a chemical is an estimate of a lifetime daily exposure level for the human population, including sensitive subpopulations, that is likely to be without an appreciable risk of deleterious effects. The potential for non-cancer health effects is evaluated by comparing an exposure level over a specified time period with the RfD derived by the EPA for a similar exposure period. This ratio of exposure to toxicity is called the hazard quotient.

The non-cancer hazard quotient assumes that there is a threshold level of exposure (i.e. RfD) below which it is unlikely for even the most sensitive populations to experience adverse health effects. If the

exposure level exceeds the threshold (i.e., the hazard quotient exceed a value greater than 1.0) there may be concern for potential non-cancer effects. The more the value of the hazard quotient or hazard index exceeds one, the greater the level of concern for potential health impacts.

For carcinogenics, risks are estimated as the incremental probability of an individual developing cancer over a lifetime (70 years) as a result of exposure to a potential human carcinogen. The EPA's Carcinogenic Assessment Group has developed carcinogen potency factors ("CPFs") for suspected and known human carcinogens which are used to convert daily intakes averaged over a lifetime of exposure directly to incremental risk. The CPF is generally expressed in units of risk per milligram chemical per kilogram body weight per day of exposure (i.e., risk units per mg/kg/day). The CPF or cancer slope factor ("CSF") is the upper 95th percentile upper confidence limit of the extrapolation (slope) from high dose animal data to very much lower doses in humans.

The use of the upper limit produces a risk estimate that has a 95 percent probability of exceeding the actual risk, which may actually be zero. The CSF is multiplied by the predicted intake to result in a unitless expression of an individual's likelihood of developing cancer as a result of the defined exposure. An incremental cancer risk of 1E-06 indicates that the exposed receptor has an additional risk of one in one million of developing cancer. For exposures to multiple carcinogens the upper limits of cancer risks are summed to derive a total cancer risk.

Ground Water Risks

Over the course of the RI, certain methods of performing risk assessments changes. By the end of the RI, conventions for grouping wells and assessing dermal and inhalation pathways had been updated.

Both the carcinogenic risk ("CR") and the noncarcinogenic risks or Hazard Indices ("HI") were calculated for contaminated ground water in the RI shallow wells and the deep wells at the landfill, and for the residential wells.

The shallow wells were grouped to calculate the HI and CR risks. The wells were grouped to assess the most contaminated area or center of the plume, if inhalation and dermal assessments were performed, and if childhood risks were assessed. For shallow wells, the mean HI is 4.9 for adults and 9.7 for children; the maximum HI is 8.9 for adults and 18 for children. The mean cancer risk is 2E-04 , and the maximum cancer risk is 4E-04.

For deep wells, the HI is 890 for adults and 2100 for children; the cancer risk is 1E-03. The risk assessment was performed in the RI, modified in the FS, and further modified by EPA. For both the shallow and the deep wells an on-site action is triggered since the risks would exceed an HI of 1, and a cancer risk of 1E-04.

Existing residential wells were also assessed. The data used for the calculations were obtained from the sampling the analysis performed on these wells. If a POE is installed on a residential well, samples were taken prior to the POE treatment unit. When the risks were calculated, the cancer risks for the most part, were less than 1E-04 and HIs were less than 1. The exception is one well which had an estimated cancer risk of 1E-04 resulting from the combination of four VOCs, and using current EPA methodology. Again, these are the risks prior to the POE unit. This well currently has a POE carbon filter installed on it, which is designed to remove contaminants, thereby lowering the HIs and cancer risk.

Based on the results of the RA computations, a remedial action is triggered. Site-related ground water contamination poses an unacceptable level of HIs and carcinogenic risks in all cases for potential future ground water use.

Surficial Soil Risk

Due to ths existing 3.5-13 foot vegetated soil cap over the at the former landfill no risk to human health or the environment is currently present nor should any future risk occur as long as the cap integrity is maintained.

C. ENVIRONMENTAL RISKS

No known threatened or endangered plant or animal species have been identified in the immediate vicinity of the former landfill. The former Landfill is mowed and relatively unattractive for most wildlife; however, many species of migratory birds would be expected to use the open grassed areas, adjacent streams, and various ponds and storm water detention basin. During a brief half-day site visit in March 1993 the following species were observed or evidence of presence seen: American crow, Carolina wren,

white-tailed deer, unidentified small mammal (probably meadow vole), American robin, red-tailed hawk, American kestrel, common flicker, turkey vulture, mourning dove, northern cardinal, common grackle, red-winged blackbird, song sparrow, mallard and common snipe.

Surface Water

During the RI, four surface water locations and the two NPDES permitted outfalls, (Outfall 1 and Outfall 2), locations were sampled in a one-time sampling event in 1989 for the inorganics specified in the RI work plan. The analysis indicated surface water concentrations of aluminum, cadmium, cyanide, iron, mercury, selenium, silver, and bis(2-ethylhexyl)phtalate exceed either the PADER Water-Quality Criteria and/or-the-Federal Ambient Water Quality Criteria ("AWQC").

There is no apparent current risk to the human health caused by treated effluent being discharged at Outfalls 1 and 2, but aquatic life, (which are more susceptible than humans to the effects of inorganics), in the surface water bodies located within the vicinity of the landfill may experience chronic adverse effects, particularly from exposure to cadmium, silver and mercury. Data presented in the RI/FS indicates cadmium exceeds both the chronic and acute AWQC.

While the YCSWRA has performed sampling in conjunction with their NPDES-permitted outfalls, the list of contaminates which were analyzed in the additional rounds, were less extensive than the initial suite of inorganics which were analyzed during the RI. The same level of sampling and analysis performed in the RI has not yet bean repeated. Additional data is required in order to make definitive determinations regarding inorganic exceedances and the proper response action, if necessary. This data should ideally consist of sampling results reflecting seasonal variations over the period of one year and should include surface water organic and inorganic sampling and analysis and toxicity characterization studies.

Sediments

One round of sediment sampling and inorganic analysis was performed during the RI in 1989. The data-generated are limited, and additional data are needed in order to make definitive determinations regarding the inorganic exceedances, and the proper response action, if necessary.

Elevated levels of arsenic and mercury were detected in the sediments in Ebaugh Run and Rambo Run. The contaminated ground water at the Site is not treated for inorganics. The treated ground water is discharged to two NPDES permitted outfalls one located on each Run. These two outfalls, are permitted under the NPDES program administered by PADER. Currently, the discharges from these outfalls go to Ebaugh Run and Rambo Run, are in compliance with their permitted criteria. However, the NPDES permit does not include limits for the discharge of inorganics.

Because the RI identified these inorganics to be Site-related groundwater contaminants, the presence of these metals in the stream sediment may indicate that they are due to the Site. These contaminants were not found at levels hazardous to human health, and there is no apparent current risk to the human health. In order to make definitive determinations-regarding inorganic exceedances, and its connection to the Site, data from additional sampling rounds are needed.

Because aquatic organisms are susceptible to metals and because mercury, which has a high bioconcentration potential, was consistently detected in Site surface water and sediment, EPA is requiring that YCSWRA perform additional sediment sampling and chemical analysts and toxicity characterization studies.

D. CONCLUSION

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

VII. DESCRIPTION OF ALTERNATIVES

A Feasibility Study ("FS") was conducted to identify and evaluate remedial alternatives for remediation of contaminated ground water at the York County Solid Waste Landfill Site. Applicable remediation technologies were initially screened in the FS based on effectiveness, implementability, and cost. The alternatives meeting these criteria were then evaluated and compared to nine criteria required by the National Contingency Plan ("NCP"). The NCP requires that a "No Action" alternative be evaluate as a point of comparison for other alternatives that do require a remedial action.

The alternatives evaluated are described below. All costs and time frames discussed below are estimates (reference Table 7). The alternatives describe final remedial actions for ground water remediation. The RI/FS reports dated June 15, 1992 and May 1994 respectively discuss the alternatives evaluated for the Site and provide supporting information leading to the alternative selection by EPA.

Landfill Mining Reuse

In the FS, YCSWRA proposed an innovative remediation and reuse of the Site. It involves the excavation of the former landfill, transporting the excavated materials to the YCSWRA's incinerator, recycling of materials as appropriate, and the future reuse of the excavated area as a lined landfill.

By the time this option wan offered for consideration by YCSWRA, the RI was finalized. The scope of the RI and its Data Quality Objectives ("DQOs") were not geared to generate the type of data and information necessary to consider this option at the FS stage, as a result, EPA screened out this remediation approach due to insufficient data.

While this option is not evaluated in this ROD with the remedial alternatives, it is presented for reference below.

The landfill mining option consists of all the components of the Alternative 2A (see below), with the addition of the following components: 1) excavation of the unlined closed cells (Phase I, II, and IIIA); 2) resource recycling of-excavated materials as appropriate, 3) incineration of excavated non-reusable, non-recyclable materials, 4) disposal of the resulting incinerator ash, 5) construction of a lined landfill call(s) in areas of the excavated cells to dispose of YCSWRX's incinerator ash.

The landfill source area would be excavated, and the excavated soils would be stockpiled for possible reuse at the landfill. The excavated refuse would then be segregated, and combustible materials would be transported and incinerated at the YCSWRA's facility in York, Pennsylvania, approximately 20 miles from the landfill. In would be necessary to perform Treatability studies to determine the ash's composition and determine if the resulting incinerator ash, could be disposed of in the adjacent operating landfill's ash disposal cell.

Any excavated recyclable materials would be marketed. The humus and miscellaneous waste would be stockpiled and eventually redeposited at the Site. A landfill liner and leachate collection system meeting applicable RCRA regulations would be installed in the excavated areas. The operation of the existing ground water collection/treatment system currently operating at the Site would continue at the Site as in Alternative 2A (see below).

Placement of ash and/or humus in either an existing or new onsite, lined landfill cell would prevent continued ground-water contamination through source containment. The installation of lined landfill cells at the Site could decrease the remedial effectiveness of the ground water treatment system by an estimated 65 percent, but will not impact the effectiveness of the system as a containment action.

A landfill mining study specific to the Site estimates that 1,394,000 cubic yards of processible fill materials can be excavated and incinerated.

The costs and implementation time associated with this option are unknown. It has been estimated that the ground water treatment time is between 60 to 90 years in order to reach MCLs, and 75 to 125 years to reach PADER background levels for ground water remediation.

YCSWRA is currently conducting further studies on this alternative to explore this option in greater details.

ALTERNATIVE 1: No Action

Capital Costs*	$ 0
Annual Operation & Maintenance (O&M) Costs*	$ 0
Present-Worth Cost*	$ 0
Implementation Time*	Immediate

This alternative involves taking no action at the Site to remove, remediate, or contain the contaminated ground water. The current actions that YCSWRA is performing to contain, collect, and treat the contaminated ground water at the Site would cease. The existing landfill cap, that ranges in depth from

3.5 to 13 feet, currently covering portions of the three unlined cells would remain. The cap would be somewhat effective to minimize the precipitation infiltration through the landfill and prevent exposure of contaminated soil at the surface, but there would be no actions taken to maintain its grading or vegetative layer and thus its integrity. The passive landfill gas venting system currently in place would also remain, but maintenance and monitoring of its effectiveness would stop.

The provisions for supplying potable water and POE treatment systems to the affected residences would be discontinued. The currently on-going ground water monitoring, sampling and analysis program would cease.

Because this alternative would result in contaminated ground water remaining at the Site, 5-year Site reviews pursuant to Section 121(c) of CERCLA would be required to monitor the effectiveness of this alternative. There are no capital costs for this alternative. This alternative could be implemented immediately.

Alternative 1 allows for the continued migration of Site contamination and the further degradation of the ground water. Risks from the Site would remain and could potentially increase with time.

Alternative 1: Standards

Alternative 1 does not include ground water remediation as a component of the remedy. Alternative 1 would not meet the standards for ground water remediation and treatment, under, the Federal Safe Drinking Water Act ("SDWA") and the Pennsylvania background standard. The SDWA specifies MCLs for drinking water which shall be achieved throughout the entire contaminated ground water plume. These MCLs, as set forth at 40 C.F.R. §141.61(a), will not be achieved by the selection of this alternative. As specified by 25 Pa. Code §§ 264.97(i), (j) and 264.100(a)(9), Pennsylvania specifies that all contaminated groundwater must be remediated to "background" levels. The Commonwealth of Pennsylvania also maintains that the requirement to remediate to background is also found in other legal authorities. Pennsylvania background standard will not be achieved by the selection of thin alternative.

In accordance with §114(a) of CERCLA, 42 U.S.C. §9614(a), nothing in this CERCLA response action shall be construed or interpreted as preempting the Commonwealth of Pennsylvania from imposing any additional liability or requirements with respect to the release of hazardous substances from the Site.

Alternative 1 would not comply with EPA's Ground Water Protection Strategy Policy for a Class IIA aquifer, which is a to be considered ("TBC") standard.

Alternative 2A - Existing Treatment Scheme

The components of Alternative 2A are described below.

ALTERNATIVE 2A SUMMARY:

ALTERNATIVE 2A COSTS*	$ 0
Capital Costs	$ 510,400
Annual Operation & Maintenance (O&M) Costs	$ 510,400
Present Worth Cost	$ 7,844,900

Components of Alternative 2A:

1) continued operation of the ground water extraction and treatment system that currently exists for the treatment of VOCs to background levels; 2) continued operation and maintenance of the POE ground water treatment systems and/or bottled water for the affected residents as necessary; 3) continued maintenance of the soil and vegetated cap and the passive landfill gas venting system currently in place at the landfill; 4) continued ground water sampling and monitoring program; 5) implementation of a monitoring program to assess the effectiveness of the ground water treatment system and its impact (e.g. dewatering) on downgradient surface water and wetland habitat, and the impact of the treated effluent discharge on the environmental quality of surface waters and sediments in the streams where the outfalls are located; and 6) institutional controls at the Site that include deed restrictions on installation of new wells in on-site areas of contamination which exceed MCLs and deed restrictions to prohibit the excavation or disturbance of the soil cap which results in exposing the fill materials for reasons other than studying the landfill mining option.

The ground water extraction and treatment system that exists at the landfill due to the 1-984 PADER Consent Order consists of sixteen pumping wells that are used to control the migration of contaminants from the Site. The collected ground water is pumped to three air stripping towers for treatment. The treated ground water is then discharged to the two outfalls. The outfalls' discharge limits are regulated by a NPDES Permit. She off-gas from the stripping towers, is passed through carbon filters prior to its emission to the atmosphere.

Monitoring and sampling of the ground water at the Site and the surface water discharges from the landfill would continue in accordance with the PADER Order for ground water treatment. The monitoring and sampling regime currently consists of the 16 pumping wells, 16 monitoring wells, 13 residential wells, and 26 piezometers. If needed, additional pumping wells may be added to the system to optimize the treatment system's operation. The current monitoring program components may be modified in the future to maintain a program that is satisfactory for regulatory requirements. Additionally, the impact of the ground water extraction system on wetlands and surface water habitat around the landfill will be assessed as a component of the remedy.

The existing, variable depth (3.5 to approximately 13 feed) soil cap that covers the three unlined cells would remain in place. The cap is equipped with passive gas vents and is graded to promote runoff of precipitation into three stormwater management ponds. The cap's caver and grading are maintained on a regular basis and would continue.

This alternative includes providing residents who have contaminated drinking water with an alternate supply of water and/or, providing POE water treatment as necessary.

Deed restrictions on well installations within the contaminated ground water plume on-site and prohibition on the excavation of the soil cap, for reasons other than studying the landfill mining option, would be implemented as institutional controls at the Site.

Provisions for surface water agreement for erosion and sediment control currently being performed at the Site would continue.

The treated ground water from the air stripping towers is discharged to two outfalls located on streams adjacent to the Site. While some inorganics contamination has been identified in surface water and sediments, and it is likely that it may be attributable to the Site, a direct connection to the Site has not been established. This remedial alternative does not include a provision for the removal of inorganics from the extracted ground water. The inorganics impact on the surface waters and the sediments of these steams are required to be assessed through a monitoring program that will occur post ROD.

This alternative requires post ROD toxicity testing and monitoring be performed on the surface waters and sediments that may be impacted by the Site's outfalls. The monitoring program will include water toxicity testing and organic and inorganic chemical sampling and analysis of the surface water and inorganic sampling and analysis of sediments. The intent of the program is to determine the nature and extent of any environmental impact associated with discharges from all NPDES permitted outfalls.

The existing ground water treatment system is currently in compliance with the existing NPDES permit for the outfalls. At some future time, the NPDES outfall permit may be modified to include discharge levels for inorganics. As a result of this requirement, the existing treatment system may have to include treatment for inorganic to meet the requirements in the modified NPDES permit. Additionally, this alternative also requires the monitoring of downgradient surface water and wetlands for any reduction in surface water habitat and decreases in abundance, diversity, and density of wetland vegetation.

In accordance with §114 (a) of CERCLA, 42 U.S.C. §3614(a), nothing in this CERCLA response action shall be construed or interpreted as preempting the Commonwealth of Pennsylvania from imposing any additional liability or requirements with respect to the release of hazardous substances from the Site.

Because this alternative would result in contaminated ground water remaining at the Site, 5-year Site reviews pursuant to Section 121(c) of CERCLA would be required to monitor the effectiveness of this alternative.

For costing purposes the remediation time for this alternative was based on 30 years (the maximum period of performance used by EPA for costing purposes). It is anticipated, however, that this alternative would take more than 30 years to achieve the ground water goals.

Implementation time considers the time required to design and construct the alternative. Implementation time for this alternative is estimated to be immediate.

Compliance with ARARs; (the following ARARs section is common to Alternatives 2& thru 2D, 3A thru 3D, and 4A thru 4D

In accordance with 5114(a) of CERCLA, 42 U.S.C. §9614(a), nothing in this CERCLA response action shall be construed or interpreted as preempting the Commonwealth of Pennsylvania from imposing any additional liability or requirements with respect to the release of hazardous substances from the Site.

These alternatives would comply with the Pennsylvania "background" ARAR for ground water. The Pennsylvania ARAR for groundwater for hazardous substances is that all groundwater must be remediated to "background" quality as specified by 25 Pa. Code §§ 264.97(i),(j) and 264.100(a)(9). EPA has determined that 25 Pa. Code §§ 264.97(i),(j), and 264.100(a)(9) are relevant and appropriate in the present case while the Commonwealth maintains that these provisions are applicable. The Commonwealth of Pennsylvania also maintains that the requirement to remediate to background is also found in other legal authorities. This requirement that all ground water be remediated to background levels is a relevant and appropriate requirement.

These alternatives would comply with the Pennsylvania's Hazardous Waste Management Regulations, 25 Pa. Code § 264, Subchapter F regarding ground water monitoring requirements.

These alternatives are designed to meet the MCLs established under the SDWA for the contaminants of concern. Also, these alternatives would meet the risk-based action levels as referenced in the NCP as acceptable ground water cleanup criteria.

These alternatives would comply with fugitive emissions control requirements according to the Federal Clean Air Act, RCRA (40 C.F.R. Part 264, Subpart AA), the Pennsylvania Air Quality Regulation., (25 Pa. Code Chapter 127), and EPA's OSWER Directive 9355.0-28 regarding the control of air emissions from Superfund air strippers at Superfund ground water sites.

These remedial alternatives would comply with the requirement for treated water discharged through a "point source" to "waters of the United States" to comply with the Clean Water Act, 33 U.S.C. §§ 1251 et seq., the National Pollutant Discharge Elimination System ("NPDES") regulations promulgated pursuant thereto at 40 C.F.R. Parts 122-124, including any state and federal regulations promulgated pursuant to Section 402(p) of the Clean Water Act, 33 U.S.C. § 1342(p) (Municipal and Industrial Stormwater Discharge"), the Pennsylvania NPDES regulations (25 Pa. Code § 92.31), and the Pennsylvania Water Quality Standards (25 Pa. Code §§ 93.1-93.9).

These remedial alternatives will comply with 40 C.F.R. Part 264, Subpart AA (relating to air emission standards for process vents).

These remedial alternatives would comply with the EPA OSWER Directive 9834.11 and CERCLA §121(d)(3) which prohibit the disposal of Superfund Site waste at a facility not in compliance with §3004 and §3005 of RCRA and all applicable State
requirements.

These remedial alternatives would comply with the Hazardous Waste Management Regulations, Article VII, Chapters 260 - 270 (25 Pa. Code 260.1 - 270.1 et. seq.), and the Solid Waste Management act, Act of July 7, 1980, P.L. 380, No. 97, as amended, 35 P.S. Sections 6018.101 et. seq. Article VII applies to the identification and listing, generation, transportation, storage, treatment and disposal of hazardous waste, and, contains the requirements under the federal RCRA program for the state to implement an approved hazardous waste program.

These remedial alternatives would comply with Pennsylvania ARAR for groundwater for hazardous substances that all groundwater must be remediated to "background" quality as specified by 25 Pa. Code §§ 264.97(i),(j) and 264.100(a)(9). EPA has determined that 25 Pa. Code §§ 264.97(i),(j), and 264.100(a)(9) are relevant and appropriate in the present case while the Commonwealth maintains that these provisions are applicable. The Commonwealth of Pennsylvania also maintains that the requirement to remediate to background is also found in other legal authorities.

These remedial alternatives would comply with the Pennsylvania "Ground Water Quality Protection Strategy", dated February 1992, a "to be considered" ("TBC") requirement, setting out the background quality requirement as a remediation goal and provides for protective levels above background when the background ground water quality goal can not feasibly be achieved.

These remedial alternatives would comply with Water Quality Toxics Strategy, 25 PA Code Chapter 16, for water quality guidance.

These remedial alternatives may require additional extraction wells. These remedial alternatives would comply with the requirement that well drilling, and any waters extracted during the construction/test stage are managed according to 25 Pa. Code Chapters 260 - 270. The drilling of additional wells must meet the Water Well Drillers License Act, Act of May 29, 1956, P.L. 1840, 32 P.S. Sections 645.1 et. seq., and 25 Pa Code Sections 107.1 et. seq. The disposal/treatment of contaminated drill cuttings must be managed according to 25 Pa. Code Chapters 260-270.

These remedial alternatives would comply with the Residual Waste Management Regulations, Chapter 281 - 299 (25 Pa. Code 287.1 - 299.101 et. seq.), and the Solid Waste Management Act, Act of July 7, 1980, P.L. 380, No.97, as amended, 35 P.S. Sections 6018.101 et. seq.

These remedial alternatives would comply with the Municipal Waste Management Regulations, Chapter 271 - 285 (25 Pa. Code 271.1 et. seq., and the Solid Waste Management Act, Act of July 7, 1980, P.L. 380, No.97, as amended, 35 P.S. Sections 6016.101 et. seq. These regulations contain provisions generally applicable to all municipal waste activities. If removal of non-hazardous inorganic metals in steam sediments occurs, these remedial alternatives will comply with the requirement at 25 Pa. Code Section 271.1, and the provisions of Chapters 271 - 285 as stated in 25 Pa. Code Section 287.2(b)(1) that require dredged sediment to be defined as a construction/demolition waste.

These remedial alternatives would comply with the requirement that the existing soil cap, cap drainage and gas vents to be maintained according to 25 Pa. Code Chapter 271 - 285.

These remedial alternatives would comply with the Air Quality Control Regulation, Chapters 123, 127 and 131 (25 Pa. Code 123.1, 127.1 and 131.1 et. seq., and the Air Pollution Control Act, Act of January 8, 1960, P.S. 2119, 35 P.S. Section 4001, et. seq. These regulations set forth standards for fugitive emissions, federal and state "Ambient Air Quality Standards" and provides for the "Best Available Technology" for control of new sources through construction, modification and reactivation.

Any volatilization from these remedial alternatives would comply the requirements of 25 PA Code Chapters 123, 127 and 131.

To the extent that new point source air emissions result from the implementation of the remedial alternative, 25 Pa. Code Section 127.12(a)(5) is applicable, requiring that emissions be reduced to the minimum obtainable levels through the use of Best Available Technology ("BAT") as defined in 25 Pa. Code Section 121.1. The guidance manual, "Air Quality Permitting Criteria for Remediation Projects Involving Air Strippers and Soil Decontamination Units", provides a permit exemption policy for remediation projects involving the Bureau of Air Quality Control regulations.

Water Quality Management Regulations, Chapters 92, 93, 94, 95, and 97., and the Clean Streams Law, Act of June 22, 1937, P.L. 1987, as amended, 35 P.S. Section 691.1 et. seq.

These remedial alternatives would comply with 25 Pa. Code Chapter 93 which provides specific water quality criteria and designates water use protection requirements for surface waters in Pennsylvania.

These remedial alternatives would comply with 25 Pa. Code Chapter 95 which sets forth waste treatment requirements for all dischargers.

These remedial alternatives would comply with 25 Pa. Code Chapter 101 which contains provisions for incidences which would endanger downstream users of Pennsylvania waters, and specifies actions to be taken.

These remedial alternatives would comply with 25 Pa. Code Chapter 16, water Quality Toxics Strategy, for water quality guidance and "Toxics Management Strategy" guidance.

In accordance with §114(a) of CERCLA, 42 U.S.C. §9614(a), nothing in this CERCLA response action shall be construed or interpreted as preempting the Commonwealth of Pennsylvania from amending the NPDES permits to contain limitations for additional pollutants or from imposing any additional liability or requirements with respect to the release of hazardous substance from the Site. Discharge of treated water must meet the effluent standards and monitoring requirements of Chapter 92, 25 Pa. Code Chapter 92.1 et. seq. (NPDES program).

<u>Dams, Waterways and Wetlands.</u>

These remedial alternatives would comply with the Storm Water Management Act of October 4, 1978, P.L. 864, No. 167, as amended, 32 P.S, Sections 680.1 - 680.17 addresses control of storm-water runoff during actions that disturb land, such as grading or excavation. These activities must meet construction criteria consistent with the county watershed management plan.

These remedial alternatives would comply with the Dams waterways and Wetlands, Chapter 105, 25 Pa. Code Sections 105.1 et. seq. These regulations address the restoration of wetland areas. See guidance document "Pennsylvania Wetlands Protection Program Regulations, Policy and Procedure and Ecological Considerations."

Inorganic Removal Options:

Alternatives 2B through 2D contain variations on Alternatives 2A to add inorganics removal from the ground water. Alternatives 2B through 2D contain all the components of Alternative 2A with the addition of the inorganics removal technologies. These Alternatives are discussed below. Inorganics removal may be accomplished by: Reverse Osmosis (Alternative 2B: Existing Treatment Schame with Inorganics Removal using Reverse osmosis), Microfiltration (Alternative 2C: Existing Treatment Scheme with Inorgenics Removal using Microfiltration), or Electrochemical Precipitation (Alternative 2D: Existing Treatment Scheme with Inorganics Removal using Electrochemical Precipitation).

Alternative 2B - Existing Treatment Scheme with Inorganics Removal by Reverse Osmosis

Alternative 2B contains all the components of Alternative 2A, along with the addition of removal of inorganics by the process of reverse osmosis, and the treatment and/or disposal of the wastes that are generated from this process. This process would produce a reject streams of heavy metals requiring dewatering and disposal.

The reverse osmosis ("RO") process is used to reduce the concentration of dissolved solids, both organic and inorganic, by use of a semipermeable membrane and hydrostatic pressure. Osmosis is the process where the solvent flows from the high solvent concentration solution through a semipermeable membrane to the low solvent concentration solution. The RO process separates ions from water by opposing the natural osmotic movement through the use of an applied pressure that is greater than the osmotic pressure. RO has seen limited use at ground-water remediation sites due to its sensitivity to fouling. High pressures are required for RO systems and they are expensive to operate. Membranes may become fouled and need replacement. Reverse osmosis membranes produce a waste steam containing high concentrations of heavy metals that requires dewatering and disposal. Reverse osmosis is more typically used as a finishing step for high quality water and usually at low flow rates.

Bench/pilot testing would be necessary to accurately evaluate the effectiveness of this technology and whether it can meet remediation goals at the Site.

Alternative 2C - Existing Treatment Scheme with Inorganics Removal by Microfiltration

Alternative 2C contains all of the components of Alternative 2A, along with the addition of removal of inorganics by the process of microfiltration, and the treatment and/or disposal of the waste stream that is generated from this process. This alternative would produce solids that need to be dewatered and disposed.

Microfiltration is a technology that physically removes inorganics from aqueous flowstreams. The first step in the microfiltration process involves chemical precipitation of inorganics in the treatment stream. The pH of the ground water is adjusted and a small amount of coagulating agent is added to enhance the agglomeration characteristics of the precipitates. The precipitates, along with particles down to 0.2 to 0.1 micron, are then typically removed by using a 0.2 to 0.1 micron filter media. The solids from the filtration process must then be collected and dewatered for disposal. The filtrate usually must be neutralized prior to discharge. The microfiltration membrane filter media must be removed and replaced periodically.

A treatability test would be performed to determine the most appropriate treatment pH, precipitant, and coagulant to evaluate whether microfiltration can meet remediation goals at the Site.

Alternative 2D - Existing Treatment Scheme with Inorganics Removal by Electrochemica1 Precipitation

Alternative No. 2D contains all of the components of Alternative 2A, along with the addition of removal of inorganics by the process of electrochemical precipitation, and the treatment and/or disposal of the waste stream that is generated from this process. This process produces a sludge that must be dewatered and disposed.

The Electrochemical precipitation process uses electrical current (AC or DC) to neutralize ion and particle charges, thus causing the particles to destabilize and precipitate from the, groundwater. The precipitated inorganics are than collected and removed as a sludge for treatment and/or disposal. Electrochemical precipitation methods use a variety of configurations for the anode and cathode including

plates, balls, fluidized-bed, spheres, wire mesh, and rods. The principal cathode reaction is the reduction of hydrogen ions to hydrogen gas. The anode reaction is the release of metal ions into solution. The released metal ions react with the wastewater constituents to destabilize them and form a precipitant matrix that enmeshes other precipitants. The anode materials, tube sizes and lengths, voltages applied, pH, Eh, and conductivity levels of the wastewater can all be varied to achieve maximum contaminant removal from the water. Oxidants, reductants, polymers and other chemicals can be introduced to stimulate the desired reactions. Electrochemical precipitation does not effectively remove compounds that do not tend to form precipitates (sodium, potassium and light-weight solvents like toluene and benzene. However, under certain circumstances reduction in organic compound concentrations can be achieved. Electrochemical precipitation is potentially applicable at the Site for inorganics removal.

A treatability test and/or bench scale studies would be conducted to determine the most appropriate treatment parameters using this technology.

Alternative 2B, 2C, 2D Additional ARARs

These remedial alternatives would comply with the requirement that residuals produced as a result of these treatments must meet the requirements of 25 Pa. Code Chapter. 260 - 270.

These remedial alternatives would comply with the requirements of 40 C.F.R. Part 268. These remedial alternatives would comply with the EPA OSWER Directive 9834.11 and CERCLA §121(d)(3) which prohibit the disposal of Superfund Site waste at a facility not in compliance with §3004 and §3005 of RCRA and all applicable State requirements.

The following table summarizes the time periods for each of the inorganice removal alternative under Alternative 2:

INORGANIC REMOVAL ALTERNATIVES 2B, 2C AND 2D TIME PERIODS

Alternative	Implementation Time* (months)	Treatment Time* (MCLs) (years)	Treatment Time* (Background) (years)
2B, 2C, 2D	12	40-60	55-85

* All Time periods are Estimated.

Implementation time considers the time required to design and construct the alternative. Implementation time for these alternatives are estimated to be one year.

The following table summarizes the cost far each of the Alternatives involving inorganics removal under Alternative 2:

INORGANIC REMOVAL ALTERNATIVES: 2B, 2C and 2D COSTS

Costs*	Alt. 2B	Alt. 2C	Alt. 2D
Capital Costs	$ 851,500	$ 1,004,900	$ 676,000
Annual O&M Costs	S 632,900	$ 632,900	$ 597,400
Present-Worth Cost	$ 10,579,200	$10,732,600	$ 9,858,000

* All Costs are Estimated

For costing purposes the remediation time for these remedial alternatives were based on 30 years (the maximum period of performance used by EPA for costing purposes). It is anticipated, however, that each of these alternatives would take more than 30 years to reach ground water remediation goals.

Alternative No. 3A: Existing Treatment Scheme plus Capping

Alternative 3A consists of all the components of Alternative 2A, with the addition of the following component: 1) construction of a multilayer cap over the three unlined cells of the Site, and 2) maintenance of the multilayer cap.

ALTERNATIVE 3A OVERVIEW:

ALTERNATIVE 3A COSTS*

Capital Costs	$ 13,553,800
Annual operation & Maintenance (O&M) Costs	$ 523,600
Present-Worth Cost	$ 21,601,500

All Costs are Estimated

ALTERNATIVE 3A TIME PERIODS*

Implementation Time	Immediate Ground water Treatment and 1 additional year for capping
Treatment Time to reach Federal MCLs (years)	60 - 90
Treatment Time to reach Background (years)	75 - 125

The construction of a multilayer landfill cap over the three unlined landfill cells would be an effective means of controlling infiltration into, and stop the leaching of the landfill materials to the ground water. The decrease in precipitation percolation from the source area of the landfill may decrease the effectiveness of the existing ground water treatment system in its removal of organic contaminants from the source area.

Pilot testing and thorough ground water characterization will be needed to evaluate the influence of the cap on the operation and effectiveness of ground water treatment system. The long-term effectiveness of the cap is less certain due to the unavoidable natural decay of the cap's integrity. Additionally, installation of the multilayered cap over the 135 acre landfill is a major remediation project.

This alternative would result in contaminated ground water remaining at the Site, 5-year Site reviews pursuant to Section 121(c) of CERCLA would be required to monitor the effectiveness of this alternative.

For costing purposes the remediation time for this alternative was based on 30 years (the maximum period of performance used by EPA for costing purposes). It is anticipated, however, that this alternative would take more than 30 years to reach ground water remediation goals.

Implementation time considers the time required to design and construct the alternative. Implementation time for this alternative is estimated to be immediate for the ground water treatment and an additional 1 year for capping.

Inorganic Removal Options:

As with Alternatives 2B through 2D, Alternatives 3B through 3D contain variations with regard to inorganics removal from the ground water. Alternatives 3B through 3D contain all the components of Alternative 3A, with the addition of the inorganics remova1 technologies that are discussed more fully in Alternatives 2B through 2D. Inorganics removal may be accomplished by: Reverse Osmosis (Alternative 3B: Existing Treatment Scheme with Inorganics Removal using Reverse Osmosis plus Capping), Microfiltration (Alternative 3C: Existing treatment Scheme with Inorganics Removal using Microfiltration plus Capping), or Electrochemical Precipitation (Alternative 3D: Existing Treatment Scheme with Inorganics Removal using Electrochemical Precipitation plus Capping).

The following table summarizes the time periods for each of the Alternatives involving inorganics removal under Alternative 3:

INORGANIC REMOVAL ALTERNATIVES 3B, 3C and 3D TIME PERIODS

Alternative	Implementation Time* (months)	Treatment Time* (MCLs) (years)	Treatment Time (Background) (years)
3B, 3C, 3D	18-24	60-90	75-125

* All Time Periods are Estimated

Implementation time considers the time required to design and construct the Alternative. Implementation time for these alternatives are estimated to be 18 months to 2 years for inorganic ground water treatment studies and capping.

The following table summarizes the costs for each of the Alternatives involving inorganics removal under Alternative 3:

INORGANIC REMOVAL ALTERNATIVES 3B, 3C, and 3D COSTS

Costs*	Alt. 3B	Alt. 3C	Alt. 3D
Capital Costs	$ 14,405,300	$ 14,558,700	$ 14,229,800
Annual O&M Costs	$ 694,000	$ 694,000	$ 658,000
Present-Worth Cost	$ 25,072,000	$ 25,225,500	$ 24,351,000

* All Costs are Estimated

For costing purposes the remediation time for these alternatives were based on 30 years (the maximum period of performance used by EPA for costing purposes). It is anticipated, however, that each of these alternatives would take more than 30 years to reach ground water remediation goals. Alternatives 3A, 3B, 3C, and 3D: compliance with ARARs;

All the ARARS listed in Alternatives 2A-2D above would also apply to Alternatives 3A-3D with the addition the following:

These remedial alternatives would comply with the 1-ft thick intermediate landfill cap cover requirement conforming to Pennsylvania Municipal Waste Regulation 273.233.

Alternatives 3B, 3C, 3D Additional ARARs

The residuals produced as a result of these remedial alternatives would comply with the requirements of 25 Pa. Code Chapters 260 - 270.

These remedial alternatives would comply with the requirements of 40 C.F.R. Part 268.

These remedial alternatives would comply with the EPA OSWER Directive 9834.11 and CERCLA 5121(d)(3) which prohibit the disposal of Superfund Site waste at a facility not in compliance with §3004 and §3005 of RCRA and all applicable State requirements.

Alternative No 4A: Existing Treatment Scheme with Enhanced Biodegredation

Alternative 4A contains all the components-of the Alternative 2A with the addition of the following equipment components: 1) the installation of a distribution and re-infiltration system for the treated effluent from the ground water treatment system; and 2) the installation of an equalization capacity for storage of treated effluent so as to provide a buffer for the re-infiltration system.

ALTERNATIVE 4A OVERVIEW

ALTERNATIVE 4A COSTS*	
Capital Costs	$ 2,429,600
Annual operation & Maintenance (O&M) Costs	$ 567,500
Present-Worth Cost	$ 11,152,000

* All Cost are Estimated

ALTERNATIVE 4A TIME PERIODS *

Implementation Time	Immediate Ground water Treatment and 1 additional year for treatability studies and upgrades to existing system
Treatment Time to reach Federal MCLs (years)	30 - 65
Treatment Time to reach Background (years)	45 - 80

* All Time Periods are Estimated

The increased moisture content in the fill areas will provide a more suitable environment for microbial degradation of organic compounds, thereby increasing the rate of degradation of the compounds. Nutrient addition to the re-infiltrated water is a potential expansion on this alternative, and a treatability study would have to be conducted to determine if this would effectively enhance the treatment system.

This alternative would result in contaminated ground water remaining at the Site, 5-year Site reviews pursuant to Section 121(c) of CERCLA would be required to monitor the effectiveness of this-alternative.

For costing purposes the remediation time for this alternative was based on 30 years (the maximum period of performance used by EPA for costing purposes). It is anticipated, however, that this alternative would take more than 30 years to reach ground water remediation goals.

Implementation time considers the time required to design and construct the alternative. Implementation time for this alternative is estimated to be immediate for ground water treatment with 1 Year for treatability studies and upgrades to the existing system.

Alternatives 4B, 4C, and 4D: Inorganic Removal Options

As with Alternatives 2B through 2D, Alternatives 4B through 4D contain variations with regard to inorganics removal from the ground water. The variations under these alternatives, contain all the components of Alternative 4A, with the addition of the inorganics removal technologies discussed more fully in Alternatives 2B through 2D.

In conjunction with Alternative 4A, inorganics removal may be accomplished by Reverse Osmosis (Alternative 4B: Existing Treatment Scheme, Inorganics Removable by Reverse Osmosis with Enhanced Biodegradation), Microfiltration (Alternative 4C: Existing Treatment Scheme, Inorganics Removal by Microfiltration with Enhanced Biodegradation), or Electrochemical Precipitation (Alternative 4D: Existing Treatment Scheme, Inorganics Removal by Electrochemical Precipitation with Enhanced Biodegradation).

The following table summarizes the time periods for each of the Alternatives involving inorganics removal under Alternative 4

INORGANIC REMOVAL ALTERNATIVES 4B, 4C and 4D TIME PERIODS

Alternative	Implementation Time* (months)	Treatment Time* (MCLs) (years)	Treatment Time* (Background) (years)
4B, 4C, 4D	12	35-65	45-85

* All Time Periods are Estimated

Implementation time considers the time required to design and construct the alternative. Implementation time for these alternatives are estimated to be immediate for ground water treatment with 1 Year for treatability studies and upgrades to the existing system.

The following table summarizes each of the Alternatives involving inorganics removal under Alternative 4:

INORGANIC REMOVAL ALTERNATIVES 4B, 4C AND 4D COSTS

Costs*	Alt. 4B	Alt. 4C	Alt. 4D
Capital Costs	$ 2,915,900	$ 3,069,300	$ 2,740,400
Annual O&M Costs	$ 690,000	$ 690,000	$ 654,500
Present-Worth Cost	$ 13,521,200	$ 13,674,600	$ 12,800,000

* All Costs are Estimated

For costing purposes the remediation time for these alternatives were based on 30 years (the maximum period of performance used by EPA for costing purposes). It is anticipated, however, that each of these alternatives would take more than 30 years to reach remediation goals.

Alternatives 4A, 48, 4C, and 4D Compliance with ARARs;

All the ARARS listed in Alternatives 2A-2D above would also apply to Alternatives 4A-4D. Alternatives 4A, 4B, 4C, 4D would not comply with the Pennsylvania Municipal Waste Regulation, Section 273.274, which deals with requirements for leachate recirculation at a landfill.

Alternative 4B, 4C, 4D Additional ARARs

The residuals produced as a result of these remedial alternatives would comply with the requirements of 25 Pa. Code Chapters 260 - 270.

These remedial alternatives would comply with the requirements of 40 C.F.R. Part 268.

These remedial alternatives would comply with the EPA OSWER Directive 9834.11 and CERCLA §121(d)(3) which prohibit the disposal of Superfund Site waste at a facility not in compliance with §3004 and §3005 of RCRA and all applicable State requirements.

VIII. SUMMARY OF COMPARATIVE ANALYSIS OF ALTERNATIVES

EPA evaluates each remedial alternative against the nine criteria specified in the National Contingency Plan ("NCP"). The alternative selected must first satisfy the threshold criteria. Next the primary balancing criteria are used to weigh the tradeoffs or advantages and disadvantages of each of the alternatives. Finally, after public comment has been obtained the modifying criteria are considered.

Below is a summary of the nine criteria used to evaluate remedial alternatives.

Threshold Criteria

Overall Protection of Human Health and the Environment:
Whether the remedy provides adequate protection and how risks posed through each pathway are eliminated, reduced or controlled through treatment, engineering controls, or institutional controls.

Compliance with ARARs:
Whether or not a remedy will meet all applicable or relevant and appropriate requirements ("ARARs") of Federal and State environmental statutes and/or whether there are grounds for invoking a waiver. Whether or not the remedy complies with advisories, criteria and/or guidance that may be relevant.

Primary Balancing Criteria

Long-Term Effectiveness and Permanence:
The ability of the remedy to afford long term, effective and permanent protection to human health and the environment along with the degree of certainty that the alternative will prove successful.

Reduction of Toxicity, Mobility or Volume:
The extent to which the alternative will reduce the toxicity, mobility, or volume of the contaminants causing the site risks.

Short Term Effectiveness:
The time until protection is achieved and the short term risk or impact to the community, on-site workers and the environment that may be posed during the construction and implementation of the alternative.

Implementability:
The technical and administrative feasibility of a remedy, including the availability of materials and services needed to implement that remedy.

Cost:
Includes estimated capital, operation and maintenance ("O&M"), and net present worth costs.

Modifying Criteria

State Acceptance:
Whether the State concur with, opposes, or has no comment on the Selected Remedial Alternative.

Community Acceptance:
Whether the public agrees with the Selected Remedial Alternative.

A. OVERALL PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT

A primary requirement of the Comprehensive Environmental Response, Compensation and Liability Act ("CERCLA") is that the selected remedial action be protective of human health and the environment. A remedy is protective if it eliminates, reduces, or controls current and potential risks posed through each exposure pathway to acceptable levels through treatment, engineering controls, or institutional controls.

Alternative 1, the No Action alternative, does not include treatment or controls, provides no reduction in risk, and is not protective of human health and the environment.

Alternatives 2A-D, 3A-D, and 4A-D are protective of human health and the environment. In Alternatives 2A-D, 3A-D and 4A-D, the contaminated ground water will be contained within the boundaries of the Site and access and use at to the Site is restricted. In these Alternatives, the provisions for sampling, monitoring, and supplying an alternate water supplies/system for affected residents as necessary are continued. Contaminants in the ground water will be treated to MCLs or PADER background levels, whichever is more stringent. The Pennsylvania ARAR for groundwater for hazardous substances is that all groundwater must be remediated to "background" quality as specified hy 25 Pa. Code §§ 264.97(i),(j) and 264.100(a)(9). EPA has determined that 25 Pa. Code §§ 264.97(i),(j), and 264.100(a)(9) are relevant and appropriate in the present case while the Commonwealth maintains that these provisions are applicable. The Commonwealth of Pennsylvania also maintains that the requirement to remediate to background is also found in other legal authorities.

Alternative 2A provides ground water containment and institutional controls to prevent public ingestion of contaminated ground water with the currently operating ground water treatment system. The treatment system is also assisted by precipitation and infiltration through the source area. Alternatives 2B through 2D add options of inorganic removal from the ground water if required.

Alternatives 3A-3D-are similar to Alternatives 2A-2D. Because of the cap in Alternatives 3A-3D, it does not allow for the added benefit of infiltration of precipitation through the source area. The cap will prevent the source area from surface exposure. Also the cap will act to slow the ground water treatment system, thus increasing the time period for reaching the background remediation goals at the Site.

In Alternatives 4A-4D, the source area is remediated by increased flushing and enhanced in-situ biodegradation of the source area. Relative to Alternatives 2A-2D, Alternatives 4A-4D provide an accelerated time-period for meeting the remediation goals at the Site.

2. Compliance with ARARs

In accordance with §114(a) of CERCLA, 42 U.S.C. §9614(a), nothing in these CERCLA response actions shall be construed or interpreted as preempting the Commonwealth of Pennsylvania from imposing any additional liability or requirements with respect to the release of hazardous substances from the Site.

Levels of volatile organics in the ground water are in excess of Safe Drinking Water Act Maximum Contaminant Levels ("MCLs"). The goal of the ground water remedy for the Site is to restore the quality of ground water to comply with Pennsylvania ARARs of background water quality. The Pennsylvania ARAR for groundwater for hazardous substances is that all groundwater must be remediated to "background" quality as specified by 25 Pa. Code §§ 264.97(i),(j) and 264.100(a)(9). EPA has determined that 25 Pa. Code II 264.97(i),(j), and 264.100(a)(9) are relevant and appropriate in the present case while the Commonwealth maintains that these provisions are applicable. The Commonwealth of Pennsylvania also maintains that the requirement to remediate to background is also found tn other legal authorities.

Alternatives 2A-2D, Alternatives 3A-3D and Alternatives 4A-4D have the potential to meet-Pennsylvania requirements with regard to ground water treatment to background.

The existing NPDES permit at the Site does not have discharge levels for inorganics. Alternative 2A is currently in compliance with the existing NPDES permit for the outfalls. The NPDES permit process rather than the CERCLA process is controlling since no CERCLA action is being taken to trigger discharge limits. The Alternatives 2B-2D and Alternatives 3B-3D that involve inorganic removal technologies are not appropriate at this time, and will not be discussed further.

Alternatives 2A and 3A have requirements for monitoring the downgradient surface water and wetlands for any reduction in surface water habitat and decrease in abundance, diversity, and density of wetland vegetation.

Alternatives 2A and 3A have the ability to comply with respective ARARs.

Alternatives 4A-4D will not meet the Pennsylvania ARAR regarding requirements for leachate recirculation.

3. Long-Term Effectiveness and Permanence

Alternative 2A and Alternative 3A could adequately control ground water contamination through the use of the existing ground water treatment system.

Alternative 3A provides an impermeable barrier to prevent infiltration of precipitation. This barrier should effectively minimize continued leachate generation from the source area. Capping is an effective long-term action provided that regular inspection and maintenance is conducted. Ground water and surface water (outfall) monitoring is a significant component of this alternative (as with Alternative 2A). The primary disadvantages of capping is that it will decrease the remedial efficiency of the current hydraulic containment system by approximately 65 percent and increase the impact to surface water and wetland habitat.

Alternative 2A provides a long-term remedial action for containing ground water contamination. The existing PADER approved soil cap allows for natural flushing of contaminants from the source contaminant area through precipitation infiltration. Alternative 2A will provide for long-term effectiveness and permanence.

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

Alternative 2A achieves reduction of the toxicity, mobility and volume of source area contaminants through treatment by allowing natural infiltration to flush the contaminants from the source area to the hydraulic containment system for collection and treatment. The treatment provided by the air stripping towers is irreversible in that VOCs are removed from the extracted ground water and sorbed onto activated carbon, which is then regenerated or disposed off-site. This alternative provides for the destruction of the VOC portion of the source contamination.

Alternative 2A has the ability to satisfy the statutory preference under CERCLA for remedial actions that employ treatment as a principal element due to the contaminant flushing, collection, and treatment provided by the soil cap and existing ground-water treatment system.

Alternative 3A will also reduce toxicity, mobility or volume through treatment, but not as readily as alternative 2A. Alternative 3A would stop the contaminant flushing pathway from the source area to the point where the ground water collection/treatment system would no longer be considered effective.

5. SHORT-TERM EFFECTIVENESS:

Alternatives 2A and 3A provide for the protection against contaminated groundwater consumption for the public and Site workers during the remedial actions. Potential health risks to the local community during the remedial action are associated with the ingestion of contaminated ground water. These risks would be controlled through the continued-operation of the ground water treatment system and the provision of domestic water treatment or bottled water to the local residents, as necessary.

Alternative 2A would require at least 40 to 60 years to reach MCLs or 55 to 85 years to reach background levels.

For Alternative 3A other risks to the local community may arise during the remedial action from the large-scale construction activities over the 135-acre Site, including the potential inhalation of dust during installation of the cap. Erosion and sedimentation control will be implemented to meet the

Pennsylvania Erosion and Sedimentation Control Regulations. Noise from construction activities will be minimized to the extent feasible. An groundwater impact assessment of Alternative 3A during its implementation is required (as with Alternative 2A) as to the effects of the localized drawdown of the aquifer.

Under Alternative 3A, approximately 60 to 90 years will be required to reach MCLs or 75 to 125 years to reach background levels.

6. IMPLEMENTABILITY

Alternative 2A may require construction of remedial treatment systems in addition to the existing operating ground water containment/collection/treatment system. Monitoring of the effectiveness of the existing treatment system may indicate that additional extraction wells are necessary. This addition could easily be implemented to augment the current system. The effectiveness and increased potential for surface water, sediments, and wetland impact of this remedial alternative can easily be monitored due to the existing monitoring well network at the Site and the extensive sampling required to comply with the current NPDES permit and other regulatory requirements. The remedial actions provided in this alternative have been undertaken by YCSWRA since 1984 in accordance with the existing Consent Orders with PADER. The YCSWRA has been coordinating the remedial activities at the Site with PADER and EPA since 1984. Implementation of Alternative 2A is immediate.

Alternative 3A proposes construction of a multilayered cap over the 135-acre Site using standard construction activities. Operation of the cap and the existing ground water alternative can be easily accomplished as with Alternative 2A. In Alternative 3A, ground water treatment is immediate, there is an additional 1 year required for capping.

7. C0ST

Evaluation of cost for each alternative includes calculation of the capital costs, O&M costs, and the net present worth. Capital costs consist of direct items such as labor, materials, equipment; and services. Operation and Maintenance costs or annual costs, are the post-construction costs necessary to maintain the remedial action. O&M costs include such items as operating labor, maintenance, auxiliary materials, and energy. O&M costs are based on a 30 year period of operation and a 5 percent discount rate. The present worth is based on both the capital and O&M costs, and provides the means of comparing the cost of different alternatives. Table 7, Appendix B presents the associated costs of all the Alternatives discussed.

Alternative 2A has an estimated Capital Costs of $0 an estimated Annual O&M Costs of: $510,400, and an Estimated Present-Worth Cost of: $7,844,900. The O&M cost breakdown for Alternative 2A is presented in Table 8, Appendix B.

Alternative 3A has an estimated Capital Costs of $13,553,800 an estimated Annual O&M Costs of: $523,600, and an Estimated Present-Worth Cost of: $21,601,500.

8. STATE ACCEPTANCE

The Commonwealth of Pennsylvania has concurred with the selected remedy.

9. COMMUNITY ACCEPTANCE

The Proposed Plan for the York County Solid Waste Landfill Site was released for public comment in July 1994. The Proposed Plan identified Alternative 2A (Existing Treatment Scheme) as the Preferred Alternative. EPA reviewed all written and oral comments submitted during the public comment period. The comments from the public did not seem supportive of the Preferred Alternative identified in EPA's Proposed Plan. A majority of the comments received indicated the public's desire to examine more closely, and implement, if possible, the landfill mining alternative (refer to Appendix C Responsive Summary for a complete discussion). EPA determined that no significant changes be made to the remedy, as it was originally identified in the Proposed Plan.

After application of the Nine Criteria, and consideration of public comment, the preferred alternative presented in the Proposed Plan was selected by EPA to be the selected remedy at the Site. EPA believes that the selected remedy represents the best balance of the remedial alternatives with respect to the nine criteria, and it best satisfies the statutory requirements of CERCLA, and Superfund guidance involving the selection of remedial alternatives at municipal solid waste landfill sites.

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, and is cost-effective. The selected remedy utilizes permanent solutions and alternative treatment or resource recovery technologies, to the maximum extent practicable, and satisfies the statutory preference for remedies that employ treatment that reduces toxicity, mobility, or volume as a principal element. Implementation of the selected remedy will not involve extensive construction, excavation, or other remedial action measures that would pose any appreciable short-term risks to the public or to the workers during construction or implementation.

IX. THE SELECTED REMEDY: DESCRIPTION AND PERFORMANCE STANDARD(S) FOR EACH COMPONENT OF THE REMEDY

In accordance with 5114(a) of CERCLA, 42 U.5.C. §9614(a), nothing in this CERCLA response action shall be construed or interpreted as preempting the Commonwealth of Pennsylvania from imposing any additional liability or requirements with respect to the release of hazardous substances from the Site.

A. GENERAL DESCRIPTION OF THE SELECTED REMEDY

EPA has selected Alternative 2A, (Existing Treatment Scheme) as the selected remedy for the York County solid Waste Landfill Site. A schematic of this treatment system is presented in Figure 5. This remedy will restore Site related contaminated ground water to background levels or MCLs, whichever is more stringent, and protect the public from exposure to contaminated ground water. Based on current information, this alternative provides the best balance among the alternatives with respect to the nine criteria EPA uses to evaluate each alternative. The selected remedy consists of the following components:

- Continued maintenance of the existing whole-house point of entry ("POE") carbon filtration systems on the private wells, and supply of potable water for those wells which contain contaminants which exceed their respective MCL or the acceptable carcinogenic and/or noncarcinogenic risk ranges;

- Supply of whole-house point of entry carbon filtration systems on the private wells, and supply of potable water as necessary to home wells that are found in the future to exceed MCLs or the acceptable carcinogenic and/or noncarcinogenic risk ranges;

- Continued operation and maintenance of the existing ground water extraction and pumping wells that remove contaminated ground water from beneath the Site and which prevent contaminants from migrating further;

- Continued operation and maintenance of the three existing air strippers at the landfill to treat the plume of contamination that emanates from the Site into the ground water to background or the MCLs, whichever is more stringent;

- Continued operation and maintenance of air emission equipment on the air strippers to maintain compliance with Federal and Commonwealth of Pennsylvania ARARs;

- Periodic sampling of ground water and treated water to ensure that treatment components are effective and that ground water remediation is progressing towards the cleanup goal;

- Implementation of a monitoring program to assess the effectiveness of the ground water treatment system and its impact (e.g. dewatering) on downgradient surface water and wetland habitat, and the impact of the treated effluent discharge on the environmental quality of surface waters and sediments in the streams where the outfalls are located. The monitoring program shall contain provisions for the sampling and analysis of ground water, surface water for organic and inorganic contaminants and sediments for inorganic contaminants.

- Periodic sampling of private wells to ensure that the POE units are functioning effectively.

- Deed Restrictions to prohibit the installation of new on Site wells in areas of contamination which do not meet applicable or relevant and appropriate requirements ("ARARs"). These restrictions can be withdrawn when ARARs are achieved.

- Deed Restrictions to prohibit the excavation or disturbance of the soil cap which results in exposing the fill materials for reasons other than studying the landfill mining option.

- Periodic assessment of the effectiveness of the existing ground water treatment system, and its upgrading, as necessary, to prevent contaminant migration and provide effective treatment.

Each component of the selected remedy and its performance standards is detailed in Section C below.

B. Strategy if the Selected Remedy is Not Achieved

Based on the information obtained during the RI, and the analysis of the remedial alternatives, EPA and the Commonwealth of Pennsylvania believe that it is possible to achieve the required ground water cleanup levels. However, the ability to achieve required cleanup levels at all points throughout the ground water plume of contamination cannot be determined until the plume's response is monitored over time.

If it is determined by EPA, in consultation with PADER, that on the basis of the system performance data, that certain portions of the aquifer cannot be restored to background levels, or MCLs, whichever is more stringent, and/or if EPA determines that it is technically impracticable ta restore the aquifer, EPA may amend the ROD or issue an Explanation of Significant Differences ("ESD") in accordance with the NCP. In such event, the likely alternative actions will attempt to remediate the ground water to its beneficial use that would be used as a drinking water source. If the aquifer cannot be restored to its beneficial use, EPA may require some or all of the following measures involving long-term management, as determined by EPA in consultation with PADER, for an indefinite period of time, as a modification of the existing system:

- additional long term gradient control may be provided by low level pumping as a containment measure;

- chemical-specific ARARs may be waived for those portions of the aquifer for which EPA in consultation with PADER determines that it is technically impracticable to achieve further contaminant reduction:

- institutional controls may be provided/maintained to restrict access to those portions of the aquifer where contaminants remain above Performance Standards,

- remedial technologies for ground water restoration may be reevaluated; and

- further sampling and/or monitoring of existing and/or new wells may be ordered.

C. PERFORMANCE STANDARDS

1) Maintenance of the Existing Whole-House Point of Entry Carbon Filtration System and/or Bottled Water as Necessary

a.) The existing whole house point-of-entry ("POE") carbon filtration system, previously installed by the YCSWRA in residences impacted by Site contamination, shall be maintained to achieve the MCL, as set forth at 40 C.F.R. §141.61(a), for each contaminant of concern. Such maintenance action will ensure that breakthrough of contaminants does not occur. If a MCL does not exist for a particular contaminant, maintenance will be performed on the POE systems if the contaminant's risk levels are greater than the 1x10-4 for carcinogens, or a Hazard Index greater than 1.0 for non-carcinogens. The supply, maintenance and proper disposal of these filters are requirements that YCSWRA must implement, as specified in their 1984 Consent Order ("CO") with PADER. POE filter replacement procedures and intervals are specified in YCSWRA's PADER approved workplan as specified in the CO.

b.) The residential area shall be reevaluated by EPA and EPA will determine whether the maintenance of the whole-house carbon filtration systems will be continued, upgraded, expanded to other residences, or eliminated.

POE treatment units will be maintained or provided to residences whose wells contain Site-related contaminants exceeding action levels. The action levels are Maximum Contaminant Levels (MCLs). If no MCL exists for a particular contaminant or if there is a cumulative risk from the contaminants, action will be taken if levels are greater than the 1x10-4 risk level for carcinogens or a Hazard Index greatest than 1.0 for non-carcinogens.

2) Ground Water Extraction and Treatment

The selected remedy includes ground water extraction and treatment which shall be required until such time as EPA in consultation with PADER determines that the Performance Standard (remediation to MCLs,

(set forth at 40 C.F.R. §141.61(a)) for each contaminant of concern or the Pennsylvania Background ARAR, whichever is more stringent), as identified in Table 9 Appendix B, in the ground water have been achieved throughout the entire plume of ground water contamination. The area of attainment for the cleanup will the ground water plume of contamination where the more stringent standard background or MCLs for the contaminants are exceeded and will be determined by EPA in consultation with PADER in post-ROD activities.

Pennsylvania regulations set forth at 25 Pa. Code §§ 109.202(1), 109.201(2), 109.203 and 109.503 establish drinking water quality standards at least as stringent as the federal MCLs. The Commonwealth of Pennsylvania standards specify that all groundwater containing hazardous substances must be remediated to "background" quality as specified by 25 Pa. Code §§ 264.97(i),(j) and 264.100(a)(9). EPA has determined that 25 Pa. Code §§ 264.g7(i),(j), and 264.100(a)(9) are relevant and appropriate in the present case while the Commonwealth maintains that these provisions are applicable. The Commonwealth of Pennsylvania also maintains that the requirement to remediate to background is also found in other legal authorities.

These background levels, if more stringent than MCLs, shall be attained as part of this remedial action unless EPA in consultation with PADER determines that attaining such levels is technically impracticable. The method(s) by which background levels will be determined are set forth is Section IX.C.2.b (Ground Water Cleanup Levels), below.

a) Ground Water Extraction System

The ground water shall be decontaminated through extraction and treatment of the contaminated ground water throughout the entire plume of contamination. The extraction shall create capture zones to capture contaminated ground water throughout the plume.

b) Ground Water Cleanup Levels

The well system for extracting ground water shall be operated until the Performance Standards are met and maintained throughout the entire plume of contamination for a period of 12 consecutive quarters in accordance with Subparagraph (e) below.

The Performance Standards for the remediation consist of the MCL for the contaminants of concern in the ground water (the federal ARAR for public drinking water supplies under the Safe Drinking Water Act) or background levels of that contaminant in the ground water (the Pennsylvania ground water ARAR) whichever is more stringent.

The background concentration for each contaminant of concern shall be established in accordance with the procedures outlined in 25 Pa. Code §264.97. The appropriate methods of analysis are set forth at 40 CFR Part 141 (Series 524.2 for organics and Series 200 for inorganics) and are listed in Table 10. Establishment of background concentrations shall not delay performance of the remedy. In the event that a contaminant of concern is not detected in samples taken for the establishment of background concentrations, the detection limit for the method of analysis utilized with respect to that contaminant shall constitute the "background" concentration of the contaminant.

The area of attainment for the cleanup will be the ground water plume of contamination where the more stringent standard background or MCLs for the contaminants are exceeded and will be determined by EPA in consultation with PADER.

c) Air Strippers and Air Emission Control Devices

The recovered ground water shall be treated using packed column air stripping units, and air emission control devices.

Currently carbon units are used as an air emission control device on the stripping units. The Performance Standard for the air emissions from the air stripping units shall be the requirements of the RCRA regulations set forth at 40 C.F.R. Part 264, Subpart AA - Air Emission Standards for Process Vents. The total organic emissions from the air stripping process vents must be less than 1.4 kg/hr (3 lb/hr) and 2800 kg/yr (3.1 tons/yr). Any vinyl chloride emissions from the ground water treatment system shall comply with Section 112 of the Clean Air Act, 42 U.S. C, Section 7412, National Emissions Standards for Hazardous Air Pollutants ("NESHAPs"). The relevant and appropriate NESHAP for vinyl chloride is set forth at 40 C.F.R. Part 61, Subpart F.

The air emissions will also comply with the Commonwealth of Pennsylvania regulations set forth at 25 Pa. Code, Chapter 127, Subchapter A. Those regulations require that emissions be reduced to the minimum obtainable levels through the use of best available technology, as defined in 25 Pa. Code §121.1

Compliance with 40 C.F.R. Part 264, Subpart AA (relating to air emission standards for process vents).

d) Discharge of Treated Water

Currently the effluent from the air stripping towers are discharged to two Outfalls. These discharges are permitted under the Commonwealth of Pennsylvania's NPDES program. Outfall #1 discharges to Rambo Run, and Outfall #2 discharges to Ebaughs Run. Any surface water discharge of treated effluent will comply with the substantive requirements of the Section 402 of the Clean Water Act, 33 U.S.C. §1342, and the National Pollutant Discharge Elimination System ("NPDES~) discharge regulations set forth at 40 C.F.R. Parts 122-124, the Pennsylvania NPDES regulations (25 Pa. Code 592.31, and the Pennsylvania Water Quality Standards (25 Pa. Code §§93.1-93.9).

The appropriate analytical method for the contaminants of concern is the "Superfund Analytical Methods for Low Concentration Water for Organic Analysis" 8/94 - OLC02.

e) Periodic Monitoring and System Shutdown

A long-term ground water monitoring program shall be implemented to evaluate the effectiveness of the ground water pumping and treatment system throughout the entire plume.

Semi-annual monitoring of the ground water shall continue for five years after the system is shutdown. If subsequent to an extraction system shutdown, monitoring shows that ground water concentrations of any contaminant of concern are above background levels, or the MCL for the contaminants of concern in the ground water (the federal ARAR for public drinking water supplies under the Safe Drinking Water Act) or background levels of that contaminant in the ground water (the Pennsylvania ground water ARAR) whichever is more stringent, the system shall be restarted and continued until the required levels have once more been attained for twelve consecutive quarters. Semi-annual monitoring shall continue until EPA determines, in consultation with PADER, that contaminants have reached stable levels.

A long-term monitoring program will be implemented to determine the amount and environmental quality of surface water and wetland habitat on and downgradient of the Site within the influence of the groundwater treatment system. The monitoring will look for reduction in surface water habitat; decrease in abundance, diversity, and density of wetland habitat; and, the level and toxicity of Site contaminants of concern in surface water and sediment. The YCSWRA will develop and implement such a monitoring program, and EPA in consultation with PADER will evaluate the adequacy of the surface water, sediment, and wetland monitoring program as part of post ROD activities.

These monitoring programs shall contain provisions for the sampling and analysis of ground water, surface water for organic and inorganic contaminants and sediments for inorganic contaminants.

f) Operation and Maintenance of Extraction and Treatment System

An operational and maintenance plan for the ground water extraction and treatment system shall be required. The performance of the ground water extraction and treatment system shall be carefully monitored on a regular basis and the system may be modified, as warranted by the performance data collected during operation. Samples of treated ground water shall be collected periodically to ensure that the treatment technologies employed are reducing contaminant levels to required standards. These modifications may include, for example, alternate pumping of extraction wells or the addition or elimination of certain extraction wells.

4) Dead Restrictions

Deed restrictions shall be developed and submitted to EPA for approval. Once approved, these deed restrictions shall be placed in the deed to the Site by filing said restrictions with the Recorder of Deeds of the appropriate County.

The deed restrictions shall prohibit the use of groundwater in the Site, for as long as contamination remains above performance standards.

The deed restrictions shall prohibit excavation or disturbance of the soil cap which results in exposing the fill materials for reasons other than studying the landfill mining option.

The deed restrictions shall be valid and binding in the Township and the Commonwealth in which the Site is located. The continuing need for these restrictions shall be re-evaluated during the Five-year Site reviews which are conducted under CERCLA Section 121(c), 42 U.S.C. Section 9621(c).

5) Worker Safety

During all Site work, Occupational Safety and Health Administration ("OSHA") standards set forth at 29 C.F.R. Parts 1910, 1926 and 1904 governing worker safety during hazardous waste operations, shall be complied with.

6) Five Year Reviews

Five Year reviews shall be conducted after the remedy is implemented to assure that the remedy continues to protect human health and the environment.

X. STATUTORY DETERMINATIONS

In accordance with §114(a) of CERCLA, 42 U.S.C. §9614(a), nothing in this CERCLA response action shall be construed or interpreted as preempting the Commonwealth of Pennsylvania from imposing any additional liability or requirements with respect to the release of hazardous substance from the Site.

EPA's primary responsibility at Superfund sites is to select remedial actions that are protective of human health and the environment. Section 121 of CERCLA also requires that the selected remedial action comply with ARARs, be cost effective, and utilize permanent treatment technologies to the maximum extent practicable. The following sections discuss how the selected remedy for the York County solid Waste Landfill Site meets these statutory requirements.

A. PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT

The selected remedy will provide adequate protection of human health and the environment by the continuation of the extraction and treatment of the contaminated ground water to achieve MCLs established under the SDWA or background levels, whichever is more stringent, maintenance of the existing whole-house point-of-entry ("POE") carbon filtration systems, and the continued monitoring of the effectiveness of the treatment scheme.

Implementation of the selected remedy will not pose unacceptable short-term risks or cross-media impacts. The remedial technologies employed in the selected remedy are proven to reduce the concentrations of volatile organic compounds to acceptable levels.

B. COMPLIANCE WITH AND ATTAINMENT OF APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS ("ARARs")

The selected remedy will comply with all applicable or relevant and appropriate chemical specific, location-specific, and action-specific ARARs. Those ARARa are:

1. Chemical-Specific ARARs

The selected remedy will be designed to achieve compliance with chemical-specific ARARa related to ground water at the Site. The Safe Drinking Water Act-specifies MCLs for drinking water. The contaminants of concern for tho Site and their respective MCLs which are listed in Table 9 are relevant and appropriate for this remedial action. These MCLs shall be achieved throughout the entire contaminated ground water plume. These MCLs, as set forth at 40 C.F.R. §141.61(a), are listed in Table 9.

Pennsylvania regulations set forth at 25 Pa. Code §5109.202(1), 109.201(2), 109.203 and 109.503 establish drinking water quality standards at least as stringent as the federal MCLs.

The Commonwealth of Pennsylvania standards specify that all ground water containing hazardous substances must be remediated to "background" quality aa specified by 25 Pa. Code §§ 264.97(i),(j) and 264.100(a)(9). EPA has determined that 25 Pa. Code §§ 264.97(i),(j), and 264.100(a)(9) are relevant and appropriate in the present case while the Commonwealth maintains that these provisions are applicable.

The Commonwealth of Pennsylvania also maintains that the requirement to remediate to background is also found in other Legal authorities.

These background levels, if more stringent than MCLs, shall be attained as part of this remedial action unless EPA in consultation with PADER determines that attaining such levels is technically impracticable.

Vinyl chloride emissions from the ground water treatment system shall comply with Section 112 of the Clean Air Act, 42 U.S. C. Section 7412, National Emissions Standards for Hazardous Air Pollutants ("NESHAPs"). The relevant and appropriate NESHAP for vinyl chloride is set forth at 40 C.F.R. Part 61, Subpart F.

2. Location-Specific ARARs

The substantive requirements of the 40 C.F.R. Part 6, Section 6.302(a) and Appendix A which governs on-Site wetlands and floodplains requirements is applicable, as well aa 25 Pa. Code §105.451, Dam Safety and Water Management. These regulations passed pursuant to the Dam Safety and Encroachments Act, 32 PS §§693.1-693.27 are applicable.

The existing soil cap, including vegetation, cap drainage and gas vents must be maintained according to 25 Pa. Code Chapter 271-285. These provisions are applicable requirements.

3. Action-Specific ARARs

The federal Clean Air Act requirements, 42 U.S.C. §§7401 et seq. are applicable and must be met for the discharge of contaminants to the air. Pennsylvania's Air Pollution Control Act is also applicable, as are Pennsylvania's Air Pollution Control Regulations (25 Pa. Code Chapters 121-142).

The requirements of Subpart AA (Air Emission Standards for Process Vents) of the Federal RCRA regulations set forth at 40 C.F.R. Part 264 are relevant and appropriate and, (depending upon the levels of organics in the extracted ground water and treatment residuals) may be applicable to the air stripping operations conducted as part of the selected remedy. These regulations require that total organic emissions from the air stripping process vents must be less than 1.4 kg/hr (3 lb/hr) and 2800 kg/yr (3.1 tons/yr).

The 25 Pa. Code Section 123.31 is applicable to the selected remedy and prohibits malodors detectable beyond the Site property line.

The 25 Pa. Code Section 127.12(a)(5) will apply to new point air emissions that result from implementation of the selected remedy. These Commonwealth of Pennsylvania regulations require that emissions be reduced to the minimum obtainable levels through the use of best available technology ("BAT") as defined in 25 Pa. Code § 121.1.

The 25 Pa. Code Section 127.11 will apply to the selected remedy alternative. These Commonwealth of Pennsylvania regulations require a plan for approval for most air stripping and soil venting/ decontamination projects designed to remove volatile contaminants from soil, water, and other materials regardless of emission rate.

The 40 C.F.R. Part 264, Subpart AA (relating to air emission standards for process vents).

The 25 Pa. Code Chapter 264, Subchapter F, regarding ground water monitoring is applicable to the selected remedy.

Any surface water discharge of treated effluent will comply with the substantive and procedural requirements of the Section 402 of the Clean Water Act, 33 U.S.C. §1342, and the National Pollutant Discharge Elimination System ("NPDES") discharge regulations set forth at 40 C.F.R. Parts 122-124, the Pennsylvania NPDES regulations (25 Pa. Code §92.31, and the Pennsylvania Water Quality Standards (25 Pa. Code §§93.1-93.9).

The Occupational Safety and Health Act ("OSMA") regulations codified at 29 C.F.R. Section 1910.170 are applicable for all activities conducted during the implementation of the selected remedy.

The Pennsylvania Hazardous Substance. Transportation Regulations, Pa. Code Titles 13 & 15, and Pennsylvania Department of Transportation, Act of June 1, 1945 (P.L. 1242, No. 428) (36 P.S. Sections 670-411, 670-420, 670-421, and 670-702).

4. To Be Considered ("TBC") Standards

Pennsylvania's Ground Water Quality protection strategy dated February 1992 is a to be considered ("TBC") standard.

EPA Directive 9355.0-28, which covers emissions from air strippers at Superfund ground water sites is a to be considered ("TBC") standard.

Pennsylvania Bureau of Air Quality memorandum, "Air Quality Permitting Criteria for Remediation Project. Involving Air Strippers and Soil Decontamination Units" is a to be considered standard.

EPA's Ground Water Protection Strategy, dated July, 1991, is a to be considered standard ("TBC").

C. COST-EFFECTIVENESS

The selected remedy is cost-effective in providing overall protection in proportion to cost, and meets all other requirements of CERCLA. The NCP, 40 C.F.R. Section 300.430(f)(ii)(D), requires EPA evaluate cost-effectiveness by comparing all the alternatives which meet the threshold criteria - overall protection of human health and the environment and compliance with ARARS - against three additional balancing criteria: long-term effectiveness and permanence reduction of toxicity, mobility and volume through treatment; and short-term effectiveness. The selected remedy meets these criteria and provides for overall effectiveness in proportion to its cost. The estimated present worth cost for the selected remedy is: $7,844.900.

D. UTILIZATION 0F PERMANENT SOLUTIONS AND ALTERNATIVE TREATMENT TECHNOLOGIES TO THE MAXIMUM EXTENT PRACTICABLE

EPA has determined that the selected remedy represents the maximum extent to which permanent solutions and treatment technologies can be utilized while providing the best balance among the other evaluation criteria. Of those alternatives evaluated that are protective of human health and the environment and meet ARARs, the selected remedy provides the best balance of tradeoffs in terms of long-term and short-term effectiveness and permanence, cost, implementability, reduction in toxicity, mobility, or volume through treatment, State and community acceptance, and preference for treatment as a principal element.

The selected remedy will reduce contaminant levels in ground water and reduce the risks associated with direct contact and ingestion of the ground water to the maximum extent practicable, as well as provide long-term effectiveness.

E. PREFERENCE FOR TREATMENT AS A PRINCIPAL ELEMENT

The selected remedy satisfies CERCLA's statutory preference for treatment as a principal element. The selected remedy addresses the primary threat of future ingestion and direct contact of contaminated ground water through treatment using air strippers.

XI. DOCUMENTATION OF SIGNIFICANT CHANGES

The Proposed Plan for the York County Solid Waste Landfill Site was released for public comment in July 1994. The Proposed Plan identified Alternative 2A as the preferred alternative. EPA reviewed all written and oral comments submitted during the public comment period, it was determined that no significant changes be made to the remedy, as it was originally identified in the Proposed Plan.

APPENDIX A

FIGURES

<IMG SRC 0395189>
<IMG SRC 0395189A>
<IMG SRC 0395189B>
<IMG SRC 0395189C>
<IMG SRC 0395189D>

APPENDIX B

TABLE 1A: GROUNDWATER WELLS SAMPLING YOUR COUNTY LANDFILL (concent

CONTAMINANTS	DGC-24 10/89	DGC-28 10/89	DGC-2 10/89	DCG-13 10/89	DCG-20 10/89	MP-7A 10/89	DCG-7	MP-2
DICHLORODIFLUOROMETHANE	210 E	99	360 D	80	590 D	77 J		
VINYL CHLORIDE	2 U	2 U	2 U	2 U	4	6		
CHLOROETHANE	2 U	2 U	2 U	2 U	7	2 U		
METHYLENE CHLORIDE	34	17	9	5 U	310 D	5 U		
ACETONE	10 UJ	10 UJ	10 UJ	10 UJ	10 U	10 U		
TRICHLOROFLUOROMETHANE	56	4	9	2	16	18		
1,1-DICHLOROETHENE	2 U	2 U	2 U	2 U	2 U	2 U		
1,1-DICHLOROETHANE	6	16	2	2 U	37 D	36 D		
CHLOROFORM	2 U	2 U	4	2 U	2 U	2 U	2 U	
1,1,1-TRICHLOROETHANE	27	33	7 JD	3	8	2		
TRICHLOROETHENE	2 U	2 J	5	2 U	18 D	16 D	2 U	
TETRACHLOROETHENE	13	16	23 D	6	22 D	49 D	2 J	
BENZENE	2 U	2 U	2 U	2 U	2	3	2 U	
TOLUENE	2 U	2 U	2 U	2 U	2 U	2 U	2 U	
ETHYLBENZENE	2 U	2 U	2 U	2 U	2 U	2 U		
M-XYLENE	2 U	2 U	2 U	2 U	2 U	2 U		
O & P-XYLENES	2 U	2 U	2 U	2 U	2 U	2 U		
1,3-DICHLOROBENZENE	2 U	2 U	2 U	2 U	2 U	2 U		
BENZOIC ACID	50 U	50 U	50 U	50 U	50 U	50 U		
PHENANTHRENE	2 U	2 U	2 U	2 U	2 U	2 U		
FLUORANTHENE	2 U	2 U	2 U	2 U	2 U	2 U		
PYRENE	2 U	2 U	2 U	2 U	2 U	2 U	2 U	
BIS(2-ETHYLHEXYL)PHTHALATE	20 U	20 U	8 J	20 U	10 J	20 U		

U= Analyte analyzed for but not detected (concentration less than sample

J= Estimated value; mass spectral data indicates presence of compound th
than sample
quantitaion limit but greater than zero or estimated due to data vali

D= Compound identified in an analysis at a secondary dilution factor

R= Rejected, did not meet QA/AC requirements

E= Concentration exceeded calibration range of GC/MS

TABLE 18: GROUNDWATER WELLS SAMPLING YOUR COUNTY LANDFILL (concent

CONTAMINANTS	MP-6 10/89	DGC-10 10/89	DGC-27 10/89	p-11 10/89	p-13 10/89
DICHLORODIFLUOROMETHANE	99 J	67 J	29 J	260 DJ	18 J
VINYL CHLORIDE	2 U	2 U	2 U	2 U	2 U
CHLOROETHANE	2 U	2 U	2 U	7	2 U
METHYLENE CHLORIDE	5 U	5 U	5 U	70 DJ	8 J 37 DJ
ACETONE	10 UJ	10 UJ	10 UJ	R	R R
TRICHLOROFLUOROMETHANE	8	2 U	2 U	6	2 U
1,1-DICHLOROETHENE	2 U	2 U	2 U	2 U	2 U
1,1-DICHLOROETHANE	2 U	2 U	2 U	15 D	14 4
CHLOROFORM	2 U	2 U	2 U	2 U	2 U 2 U
1,1,1-TRICHLOROETHANE	9	3	2 J	2 JD	11 3
TRICHLOROETHENE	2 U	2 J	2 U	7 D	2 U 2
TETRACHLOROETHENE	2 U	2 J	3	47 D	2 4
BENZENE	2 U	2 U	2 JD	2 U	2 U 2 U
TOLUENE	2 U	2 U	2 U	2 U	2 U
ETHYLBENZENE	2 U	2 U	2 U	2 U	2 U
M-XYLENE	2 U	2 U	2 U	2 U	2 U
O & P-XYLENES	2 U	2 U	2 U	2 U	2 U
1,3-DICHLOROBENZENE	2 U	2 U	2 U	2 U	2 U
BENZOIC ACID	50 U	50 U	50 U	50 U	50 U
PHENANTHRENE	2 U	2 U	2 U	2 U	2 U
FLUORANTHENE	2 U	2 U	2 U	2 U	2 U
PYRENE	2 U	2 U	2 U	2 U	2 U 2 U
BIS(2-ETHYLHEXYL)PHTHALATE	20 U	8 J	20 U	20 U	10 U

U= Analyte analyzed for but not detected (concentration less than sample

J= Estimated value; mass spectral data indicates presence of compound th
than sample
quantitaion limit but greater than zero or estimated due to data vali

D= Compound identified in an analysis at a secondary dilution factor

R= Rejected, did not meet QA/AC requirements

E= Concentration exceeded calibration range of GC/MS

TABLE 2: GROUNDWATER WELLS DGC-36 THRU 39) SAMPLING ;YOUR COUNTY L
(concentration in µg/l)

CONTAMINANTS	DGC-36	DGC-36	DGC-37	DCG-37	DCG-38	DGC-39(OUP)	DCG-39	DGC-39(OUP)
	10/89	2/90	10/89	2/90	10/89	2/90		
DICHLORODIFLUOROMETHANE	310	130	2 U	2 U	71 J	2 U		
VINYL CHLORIDE	2 U	2 U	2 U	2 U	2 U	2 U		
CHLOROETHANE	2 U	2 J	2 U	2 U	2 U	2 U		
METHYLENE CHLORIDE	49	44	5 U	5 U	14 J	5 U	5 U	5 U
ACETONE	22 J	10 U	10 U	10 U	16	10 U		
TRICHLOROFLUOROMETHANE	2 U	2	2 U	2 U	2 U	2 U		
1,1-DICHLOROETHENE	2 U	2 U	2 U	2 U	2 U	U		
1,1-DICHLOROETHANE	6	4	2 U	2	14			
CHLOROFORM	2 U	2 U	2 U	2 U	2 U	2 U		
1,1,1-TRICHLOROETHANE	3	3	2 U	1 J	8			
TRICHLOROETHENE	3	3	2 U	2 U	2 U	U		
TETRACHLOROETHENE	5	5	2 U	2 U	5	3		
BENZENE	2 U	2 U	2 U	2 U	2U	2 U		
TOLUENE	11	2 U	2 U	2	2 U	2 U		
ETHYLBENZENE	2 U	2 U	2 U	2 U	2 U	2 U		
M-XYLENE	2 U	2 U	2 U	2 U	2 U			
O & P-XYLENES	2 U	2 U	2 U	2 U	2 U			
1,3-DICHLOROBENZENE	2 U	2 U	2 U	2 U	2 U			
BENZOIC ACID	50 U	NA	50 U	NA	50 U	NA		
PHENANTHRENE	2 U	NA	2 U	NA	2 U	NA	2 U	
FLUORANTHENE	2 U	NA	2 U	NA	2 U	NA		
PYRENE	2 U	NA	2 U	NA	2 U	NA	2 U	
BIS(2-ETHYLHEXYL)PHTHALATE	31 U	NA	2 J	NA	5 J	NA		

+ = Total for all THMs combined cannot exceed the 80 µg/l level
U = Analyte analyzed for but not detected (concentration less than sample
J = Estimated value; mass spectral data indicates presence of compound th
than sample
quantitaion limit but greater than zero or estimated due to data vali
D = Compound identified in an analysis at a secondary dilution factor
R = Rejected, did not meet QA/AC requirements
E = Concentration exceeded calibration range of GC/MS

TABLE 2: (continued) : RI/FS GROUNDWATER WELLS DGC-40 THRU 44 YORK
(concentration in µg/l)

CONTAMINANTS	DGC-40 10/89	DGC-40 2/90	DGC-41 10/89	DCG-41 2/90	DCG-41 10/89	DCG-42 2/90	DGC-43	DCG-44	DGC-40
DICHLORODIFLUOROMETHANE	2 U	2 U	2 U	17	2 U				
VINYL CHLORIDE	2 U	2 U	2 U	2 U	2 U	2 U			
CHLOROETHANE	2 U	2 U	2 U	2 U	2 U	2 U			
METHYLENE CHLORIDE	5 U	5 U	5 J	5 U	5 U				
ACETONE	R	22	R	10 U	R	10			
TRICHLOROFLUOROMETHANE	2 U	2 U	1 J	1 J	2 U	2 U			
1,1-DICHLOROETHENE	2 U	2 U	2 U	2 U	2 U				
1,1-DICHLOROETHANE	2 U	2 U	2 U	2 U	2 U				
CHLOROFORM	2 U	2 U	2 U	2 U	2 U	2 U			
1,1,1-TRICHLOROETHANE	2 U	2U	3	2	2				
TRICHLOROETHENE	2 U	2 U	2 U	2 U	2 U				
TETRACHLOROETHENE	2 U	2 U	2 U	2 U	2 U				
BENZENE	2 U	2 U	2 U	2 U	2 U	2 U			
TOLUENE	2 U	1 U	2 U	2 U	2 U	2 U	2 U	2 U	
ETHYLBENZENE	2 U	2 U	2 U	2 U	2 U	2 U			
M-XYLENE	2 U	2 U	2 U	2 U	2 U				
O & P-XYLENES	2 U	2 U	2 U	2 U	2 U				
1,3-DICHLOROBENZENE	2 U	2 U	2 U	2 U	2 U				
BENZOIC ACID	50 U	NA	50 U	NA	50 U	NA			
PHENANTHRENE	2 U	NA	2 U	NA	2 U	NA	2 U		
FLUORANTHENE	2 U	NA	2 U	NA	2 U	NA			
PYRENE	2 U	NA	2 U	NA	2 U	NA	2 U		
BIS(2-ETHYLHEXYL)PHTHALATE	39 U	NA	19 J	NA	R	20 U	NA		

\+ = Total for all THMs combined cannot exceed the 80 µg/l level
U = Analyte analyzed for but not detected (concentration less than sample
J = Estimated value; mass spectral data indicates presence of compound th
than sample
quantitaion limit but greater than zero or estimated due to data vali
D = Compound identified in an analysis at a secondary dilution factor
R = Rejected, did not meet QA/AC requirements
E = Concentration exceeded calibration range of GC/MS

TABLE 2: (continued) : RI/FS GROUNDWATER WELLS DGC-45 YORK CO
(concentration in µg/l)

CONTAMINANTS	DGC-45 10/89	DGC-45 2/90
DICHLORODIFLUOROMETHANE	2 U	2 U
VINYL CHLORIDE	2 U	2 U
CHLOROETHANE	2 U	2 U
METHYLENE CHLORIDE	5 U	5 U
ACETONE	R	10 U
TRICHLOROFLUOROMETHANE	2 U	2 U
1,1-DICHLOROETHENE	2 U	2 U
1,1-DICHLOROETHANE	2 U	2 U
CHLOROFORM	2 U	2 U
1,1,1-TRICHLOROETHANE	2 U	2U
TRICHLOROETHENE	2 U	2 U
TETRACHLOROETHENE	2 U	2 U
BENZENE	2 U	2 U
TOLUENE	2 U	2 J
ETHYLBENZENE	2 U	2 U
M-XYLENE	2 U	2 U
O & P-XYLENES	2 U	2 U
1,3-DICHLOROBENZENE	2 U	2 U
BENZOIC ACID	50 U	NA
PHENANTHRENE	2 U	NA
FLUORANTHENE	2 U	NA
PYRENE	2 U	NA
BIS(2-ETHYLHEXYL)PHTHALATE	3 J	NA

+ = Total for all THMs combined cannot exceed the 80 µg/l level
U = Analyte analyzed for but not detected (concentration less than sample
J = Estimated value; mass spectral data indicates presence of compound th
than sample
quantitaion limit but greater than zero or estimated due to data vali
D = Compound identified in an analysis at a secondary dilution factor
R = Rejected, did not meet QA/AC requirements
E = Concentration exceeded calibration range of GC/MS

TABLE 3: YORK COUNTY LANDFILL SUMMARY OF RISK OF RISK ASSESSMENT BY VARIOUS METHODS SHALLOW WELLS (page 1 of 2)

CHEMICAL	RI HI HI	RI CE CR	GROUP MEAN HI	GROUP CR
DICHLORODIFLUOROMETHANE	.09	N/A	.4	N/A
	.2	.2		
METHYLENE CHLORIDE	.1	3E-5	.08	2E-5 .2
	.2	.3		
TRICHLOROFLUOROMETHANE	.003	N/A	.004	N/A
	.003	.004		
1,1-DICHLOROETHANE	.01	4E-5	.01	N/A
	.01	.02		
CHLOROFORM	.001	3E-7	.008	2E-6 .02 5E-6
	.02	.05		
1,1,1-TRICHLOROETHANE	.005	N/A	.003	N/A
	.006	.007		
TRICHLOROETHENE	.04	1E-6	.1	5E-6 .2
	.3	.6		
TETRACHLOROETHENE	.2	4E-5	.3	8E-5 .5 2E-4
	.8	1.6		
BIS(2-ETHYLHEXYL) PHTHALATE	.02	2E-6	.04	5E-6
	.08	.09		
VINYL CHLORIDE	N/A	1E-4	N/A	1E-4 N/A
BENZENE	N/A	9E-7	.05	2E-6 .08 3E-6
	N/A	N/A		
CHLOROETHANE	NC	NC	.004	N/A .01
	.008	.02		
ALUMINUM	NC	NC	.005	N/A .01 N/A
	.01	.02		
MERCURY	.1	N/A	.3	N/A 1 N/A
	.6	2.3		
MANGANESE	.6	N/A	1.7	N/A 2.4 N/A
	4	5.6		
ZINC	.01	N/A	.004	N/A .009
	.009	.02		
BARIUM	__	__	.01	N/A .02 N/A
	.03	.05		
ANTIMONY	2	N/A	1.4	N/A 3 N/A
	3.3	7		
COPPER	--	--	.008	N/A .02 N/A
	.02	.03		
VANADIUM	.1	N/A	.04	N/A .08 N/A
	.08	.2		
NICKEL	.05	N/A	.01	N/A .03
	.03	.07		
CHLORODIFLUOROMETHANE	NC	NC	--	-- --
1,2-DICHLOROETHANE	N/A	2E-6	--	-- --

TABLE 3 (Continued) : YORK COUNTY LANDFILL SUMMARY OF RISK ASSESSMENT BY VARIOUS METHODS SHALLOW WELLS (page 2 of 2)

CHEMICAL	RI HI HI	RI CR CR	GROUP MEAN HI	GROUP CR
ARSENIC	.03	3E-5	- -	- -
BERYLLIUM	.005	4E-5	- -	- -
DICHLOROFLUOROMETHANE	NC	NC	- -	- -
DIETHYL PHTHALATE	4E-5	N/A	- -	- -
CADMIUM	.08	N/A	- -	- -
CHROMIUM	.05	N/A	- -	- -
SELENIUM	.02	N/A	- -	- -
ACETONE	- -	- -	- -	- -
LEAD	UBK	N/A	UBK	N/A
BENZYL ALCOHOL	- -	- -	- -	- -
TOLUENE	- -	- -	- -	- -
TOTAL	4	3E-4	4.9	2E-4
	9.7		18	

TOTAL	8.9	4E-4					

HI = Hazard Index
CR = Cancer Risk
-- = Chemical not detected in this aquifer or well grouping
N/A= This assessment not applicable (i.e, cancer risk for Group D carino
NC = Not calculated; either screened out or no dose-response parameters
UBK= Should be evaluated by Uptake-Biokinetic Model
For split colums, top number is adult risk; bottom number is child risk

TABLE 4: YORK COUNTY LANDFILL SUMMARY OF RISK ASSESSMENT BY VARIOUS METHODS DEEP WELLS (Page 1 of 2)

CHEMICAL	RI HI	RI CR	DEEP HI	DEEP CR
DICHLORODIFLUOROMETHANE	.02	N/A	.01	N/A
	.04			
METHYLENE CHLORIDE	.005	9E-7	.005	1E-6
	.01			
TRICHLOROFLUOROMETHANE	2E-4	N/A	.0006	N/A
	.0005			
1,1-DICHLOROETHANE	.001	5E-6	.003	N/A
	.003			
CHLOROFORM	- -	- -	- -	- -
1,1,1-TRICHLOROETHANE	.002	N/A	.002	N/A
	.004			
TRICHLOROETHENE	.01	4E-7	.03	1E-6
	.08			
TETRACHLOROETHENE	.009	2E-6	.03	1E-5
	.1			
BIS(2-ETHYLHEXYL) PHTHALATE	.09	1E-5	.2	4E-5
	.5			
VINYL CHLORIDE	- -	- -	- -	- -
BENZENE	- -	- -	- -	- -
CHLOROETHANE	- -	- -	- -	- -
ALUMINUM	N/C	N/C	12	N/A
	28			
MERCURY	.06	N/A	.06	N/A
	.1			
MANGANESE	20	N/A	860	N/A
	2000			
ZINC	.6	N/A	.4	N/A
	.9			
BARIUM	2	N/A	1.1	N/A
	2.5			
ANTIMONY	7	N/A	6.7	N/A
	16			
COPPER	- -	- -	- -	- -
VANADIUM	.6	N/A	.6	N/A
	1.4			
NICKEL	1	N/A	1.4	N/A
	3.2			
CHLORODIFLUOROMETHANE	- -	- -	- -	- -
1,2-DICHLOROETHANE	- -	- -	- -	- -
ARSENIC	.5	4E-4	1.6	4E-4
	3.6			
BERYLLIUM	.06	6E-4	.07	8E-4
	.2			

TABLE 4 (CONTINUED) : YORK COUNTY LANDFILL SUMMARY OF RISK ASSESSMENT BY VARIOUS METHODS DEEP WELLS (page 2 or 2)

CHEMICAL	RI HI	RI CR	DEEP HI	DEEP C
DICHLOROFLUOROMETHANE	NC	NC	NC	NC
DIETHYL PHTHALATE	- -	- -	- -	- -
CADMIUM	.7	N/A	1.4	N/A
	3.2			
CHROMIUM	3	N/A	3.2	N/A
	7.5			
SELENIUM	.02	N/A	.004	N/A
	.01			
ACETONE	.005	N/A	.005	N/A
	.01			
LEAD	- -	- -	- -	- -
BENZOIC ACID	2E-5	N/A	2E-5	N/A
	5E-5			
TOLUENE	3E-4	N/A	.003	N/A
	.007			
TOTAL	40	1E-3	890	1E-3
	2100			

HI = Hazard Index
CR = Cancer Risk
-- = Chemical not detected in this aquifer or well grouping
N/A= This assessment not applicable (i.e, cancer risk for Group D carino
NC = Not calculated; either screened out or no dose-response parameters
UBK= Should be evaluated by Uptake-Biokinetic Model
For split columns, top number is adult risk; bottom number is child risk

TABLE 5: YORK COUNTY LANDFILL SUMMARY OF RISK ASSESSMENT BY VARIOUS METHODS -RESIDENTIAL WELLS :RI DATA PRE-APRIL 1990

WELL NAME	RI HI	RI CR	NEW HI	NEW CR
PS-1	.001 .003	N/A .0009	.008 .02	N/A 3E-7
PS-2	.04 .01	N/A 3E-6	.02	N/A
PS-3	.02 ND	ND ND	ND ND	ND
PS-4	ND .007	N/A .007	N/A	
PS-5	.02 .003	8E-6 .02	N/A	
PS-6	.02 .01	2E-7 .02	1E-6	
PS-7	.04 .004	N/A .003	N/A	
PS-8	.008 ND	ND ND	ND ND	
PS-9	ND .0003	N/A .002	N/A	
PS-10	.0007 .001	N/A .007	N/A	
PS-11	.003 .0002	N/A .001	N/A	
PS-12	.0004 .0005	N/A .003	N/A	
PS-13	.001 ND	ND ND	ND ND	
	ND .004	N/A .004	N/A	
PS-15	.009 .2	8E-5 .5	1E-4	
PS-16	.4			

HI Hazard Index
CR Cancer risk
ND Chemical not detected in this aquifer or well grouping
N/A This assessment not applicable (i.e., cancer risk for Group D carci
For split columns, top number is adult risk; bottom number is child risk

TABLE 6: CONTAMINANT8 OF CONCERN (chemicals with Cancer Risks > 1E04 or

MEDIUM	ORGANICS	INORGANI
SHALLOW GROUNDWATER (ON-SITE)	Tetrachloroethene Vinyl Chloride	Antimony Mercury Manganese
DEEP GROUNDWATER (ON-SITE)	NONE	Antimony Aluminum Arsenic Barium Beryllium Cadmium Chromium Manganese Nickel Vanadium
RESIDENTIAL GROUNDWATER (CombiDation of VOCs trigger action)	1,1-dichloroethene Carbon Tetrachloride Tetrachloroethene Vinyl Chloride	

TABLE 7: REMEDIAL ALTERNATIVES IMPLEMENTATION TIME AND COSTS

Alternatives		Time to Implement, Months*	Capital Cost, $M* $Thousands*
1	No Action	0	0
2A	Existing Treatment Scheme	0	0
2B	Existing Treatment Scheme and Inorganice Removal - (RO)	12	0.85
2C	Existing Treatment Scheme and Inorganic Removal - (MF)	12	1.0
2D	Existing Treatment Scheme and Inorganics Removal - (EP)	12	0.676
3A	Existing Treatment Scheme plus Capping	12	13.55
3B	Existing Treatment Scheme plus Capping and Inorganics Removal RO	18 to 24	14.41
3C	Existing Treatment Scheme plus Capping and Inorganics Removal MF	18 to 24	14.56
3D	Existing Treatment Scheme plus Capping and Inorganics Removal EP	18 to 24	14.23
4A	Existing Treatment Scheme with Enhanced Biodegradation	12	2.43
4B	Existing Treatment Scheme with Enhanced Biodegradation and Inorganics Rmvl (RO)	12	2.92
4C	Existing Treatment Scheme with Enhanced Biodegradatlon and Inorganics Rmvl (MF)	12	3.07
4D	Existing Treatment Scheme with Enhanced Biodegradation and Inorganics Rmvl (EP)	12	2.74

NOTE: * = All Time and Cost Figures are Estimates

TABLE 8: ESTIMATE OF ANNUAL OPERATION & MAINTENANCE C0STS FOR THE SEL
(2A)

Item	Description	Q (
1	Monthly Inspections	
2	Lawn Mowing	
	! Labor	
	! Equipment	
3	Cap Maintenance	
	! Labor	
	! Equipment/Materials	
4	Groundwater Collection/ Treatment	
	! Equipment / Materials	
	! Labor --------- --------	
5	Supplying Domestic Treatment	
	POE Units / Bottled Water	
6	Monthly Sampling Costs	
	! Analytical	
	! Direct Expense	
	! Labor	
7	Quarterly Sampling Costs	
	! Analytical	
	! Direct Expense	
	! Labor	
8	Annual Sampling Costs	
	! Analytical	
	! Direct Expense	
	! Labor	
	TOTAL	

NOTE: * = All Time and Cost Figures are Estimates

TABLES 9: MCLs or SMCLs FOR THE CONTAMINANTS OF CONCERN

CONTAMINANT	MCL (mg/l)
1,1-DICHLOROETHENE	0.007
CARBON TETRACHLORIDE	0.005
TETRACHLOROETHENE	0.005
VINYL CHLORIDE	0.002
ANTIMONY	0.006
ALUMINUM	0.05-0.2 (SMCL)
ARSENIC	0.05
BARIUM	2
BERYLLIUM	0.004
CADMIUM	0.005
CHROMIUM	0.1
MANGANESE	0.05 (SMCL)
MERCURY	0.002
NICKEL	0.1
VANADIUM	--

SMCL = Secondary Maximum Contaminant Levels

TABLE 10: ANALYTICAL METHODS and QUANTITATION LIMITS FOR CONTAMINATS OF

CONTAMINANT	METHOD	Quantitati
1,1-DICHLOROETHENe	524.2↑	0.0
CARBON TETRACHLORIDE	524.2↑	0.0
TETRACHLOROETHENE	524.2↑	0.0
VINYL CHLORIDE	524.2↑	0.0
ANTIMONY	200 SERIES↑↑	0.0
ALUMINUM	200 SERIES↑↑	0
ARSENIC	200 SERIES↑↑	0.0
BARIUM	200 SERIES↑↑	0.0
BERYLLIUM	200 SERIES↑↑	0.0
CADMIUM	200 SERIES↑↑	0.0
CHROMIUM	200 SERIES↑↑	0.0
MANGANESE	200 SERIES↑↑	0.0
MERCURY	200 SERIES↑↑	0.0
NICKEL	200 SERIES↑↑	0.0
VANADIUM	200 SERIES↑↑	0.0

SMCL = Secondary Maximum Contaminant Levels
-- = MCL or SMCL not established
* = Quantitation Limits (QLs) are specified in the Superfund Analytica
Organic Analysis"B/94 -
OLCO2
↑ = Analytical Method Series 524.2 is at 40 CFR% 141.24(f)(16)(v)
↑↑ = Analytical Method Series 200 is at 40 CRF 141.23

APPENDIX C

RESPONSIVENESS SUMMARY

YORK COUNTY SOLID WASTE LANDFILL SITE
HOPEWELL TOWNSHIP, YORK COUNTY, PENNSYLVANIA

This community relations responsiveness summary is divided into the following sections:

Overview: This section discusses EPA's Preferred Alternative for remedial action.

Background: This section provides a brief history of community interest and concerns raised during remedial planning at the York County Solid Waste Landfill Site.

Part 1: This section provides a summary of commenters' major issues and concerns, and expressly acknowledges and responds to those raised by the local community. "Local community" may include local homeowners, businesses, the municipality, and not infrequently, potentially responsible parties ("PRPs").

Part II: This section provides a comprehensive response to all significant comments and is comprised primarily of the specific legal and technical questions raised during the public comment period. If necessary, this section will elaborate with technical details on answers covered in Part I.

Any points of conflict or ambiguity between information provided in Part I and II of this responsiveness summary will be resolved in favor of the detailed technical and legal presentation contained in Part II.

OVERVIEW

On July 21, 1994, EPA announced the public comment period and published a Proposed Remedial Action Plan ("Proposed Plan") setting forth its preferred alternative for the York County Solid Waste Landfill Superfund Site, located in Hopewell Township, York County Pennsylvania. EPA screened 13 possible alternatives to remediate Site contamination, giving consideration to nine key evaluation criteria:

Threshold Criteria, including:

- Overall Protection of Human Health and the Environment;
- Compliance with Federal, State and local environmental health laws

Balancing Criteria, including:

- Long-Term Effectiveness and Permanence;
- Reduction of Toxicity, Mobility or Volume;
- Short Term Effectiveness:
- Ability to Implement;
- Cost, and

Modifying Criteria, including:

- State Acceptance;
- Community Acceptance.

EPA carefully considered State and Community acceptance of the remedy prior to reaching the final decision regarding the remedy.

The Agency's preferred remedy, Alternative 2A, includes the following components:

The selected remedy includes the following major components:

- Continued operation of the currently existing ground water extraction and treatment system at the Site.
- Continued operation and maintenance of the Point of Entry (POE) ground water treatment systems and/or bottled water for affected private wells as necessary.
- Continued maintenance of the landfill's soil and vegetated cap and the passive landfill gas venting system currently in place at the landfill.
- Continued periodic sampling of ground water and treated water to ensure that treatment components are effective and ground water remediation is progressing towards the required cleanup levels.
- Implementation of a monitoring program to assess the effectiveness of the ground water treatment system and its impact (e.g. dewatering) on downgradient surface water and wetland habitat, and the impact of the treated effluent discharge on the environmental quality of surface waters and sediments in the streams where the outfalls are located.
- Deed Restrictions to prohibit the installation of new on-Site wells in areas of contamination which do not meet applicable or relevant and appropriate requirements ("ARARs"). These restrictions can be withdrawn when ARARs are achieved.
- Deed Restrictions on the exposure of fill materials resulting from the excavation of the landfill's existing soil cap for reasons other than studying the landfill mining option.

This alternative satisfies the key criteria for remedy selection and minimizes the need far long-term treatment and management.

There is currently a ground water remedial action on-going at the Site which is comprised of most of the components of the selected remedy.

BACKGROUND

EPA completed the Preliminary Assessment/Site Investigation ("PA/SI") for the Site in July 1984. The sampling program implemented by the Pennsylvania Department of Environmental Resources ("PADER") and the York County Solid Waste and Refuse Authority ("YCSWRA"), which was on-going at the Site and the surrounding community and that time, indicated that the ground water beneath and beyond the landfill was contaminated primarily with VOCs, and that contamination had migrated to adjacent domestic wells.

The PADER and the YCSWRA entered into a Consent Order in 198, which required the YCSWRA to supply and maintain whole-house point-of-entry ("POE") carbon filter treatment systems for residents that are affected by contamination from the Site as necessary. Samples from the residential wells taken prior to the treatment units, are collected every three months and are analyzed for VOCs and some inorganics. The filter systems in the POEs are maintained on a regular schedule by the YCSWRA. YCSWRA also provides bottled water for drinking purposes to two residences though Site-related contaminants have not been detected in these two domestic wells.

Currently, eight residents have carbon filter systems on their water supply and two residents are provided with bottle water. These systems are installed in the supply line prior to any taps.

Due to the release of hazardous substances from the Site and the resulting ground water contamination, EPA proposed the Site for inclusion in the National Priorities List ("NPL") in April 1985. The Site was finalized on the NPL on July 22, 1987.

As a result of the NPL listing, PADER and the YCSWRA entered into a Consent Order and Agreement in December 1987 for YCSWRA to perform a Remedial Investigation/ Feasibility Study ("RI/FI") at the Site.

The RI started in 1988, and a RI Report was finalized and approved by PADER and EPA in 1992. The YCSWRA submitted a Draft FS Report in December 1992. The FS was revised and resubmitted in May 1994.

On July 21, 1994, the EPA released the Proposed Remedial Action Plan, which presented EPA's Preferred Alterative for the cleanup at the Site along with the RI/FS, for public comment. A public meeting on the Proposed Plan was held on August 15, 1994. Those in attendance at the meeting included local area residents, State, and local officials, representatives from EPA, PADER, and the YCSWRA.

EPA announced the opening of the public comment period in a newspaper display placed in the July 22, 1994 edition of the York Dispatch and Daily Record, and the Weekly Record on July 26, 1994. A public comment period on the documents was held from July 22, 1994 to August 21, 1994.

A public meeting was held on August 15, 1994 at the Eureka Fire Hall in Stewartstown, Pennsylvania. At this meeting, representatives from EPA and Pennsylvania Department of Environmental Resources (PADER) answered questions about the site and the remedial alternatives considered. A Fact Sheet containing site related information was distributed at the Public Meeting.

In addition, EPA established a site information repository at the Mason-Dixon Library, Stewartstown, Pennsylvania. The repository contain the Administrative Record for the Site which includes: the RI/F-5 report, the Proposed Plan, and other relevant documents. Additionally, a copy of the administrative record is maintained at EPA Region III's Administrative Record Reading Room, in Philadelphia, Pennsylvania.

PART I: SUMMARY OF COMMENTERS' MAJOR ISSUES AND CONCERNS

This section provides a summary of commenters' major issues and concerns, and expressly acknowledges and responds to those raised by the local community.

Major concerns and issues raised during the August 15, 1994 public meeting:

1. A local resident asked if children are taken into account along with adult population in computation of the Risk Assessment.

EPA responses: Both populations, adults and children, are accounted for in the risk computations (reference Appendix B, Tables 3, 4, and 5 of the ROD). The Risk Assessments presented in the RI and FS documents did not address children, but the EPA tables account for children.

2. Several area residents do not support EPA's selection of the Preferred Alternative. They feel landfill mining and re-use of the landfill's area would be the most effective method of removing contamination and restoring the Site to a beneficial usage.

   Several area residents feel EPA acted prematurely in screening-out the landfill mining and re-use alternative. Some residents feel EPA selected Alternative 2A because it is the least expensive of all the alternatives examined.

   Some area residents feel Alternatives which re-circulate the treated ground water, (Alternatives 4A, 4B, 4C or 4D), are better able to address ground water re-charge issues of the area.

EPA Response: EPA believes that although landfill excavation and incineration of the landfill materials would be effective at removing and destroying the contaminants in the landfill materials, incineration would not be significantly more effective at reducing the risks to human health and the environment. This is based on the fact that the underlying ground water would still remain contaminated, and the excavation and incineration process would create additional short-term risks to human health and the environment. Even if the landfill source material was removed, the ground water contamination would still remain, and require treatment. EPA believes that any remediation considered at the Site would have to include a ground water extraction and treatment (ground water pump and treat) component to address the ground water contamination risk at the Site. EPA believes the excavation, transportation and incineration of the fill materials would introduce short term risks to the population and result in releases of contaminated material to the air t contaminated fill, soils, particulates, dust).

EPA does not believe it acted hastily in screening-out the Landfill Mining Alternative. It is not EPA policy to select remedies which involve the excavation of municipal landfills. In the EPA guidance document: Conducting Remedial Investigations/Feasibility Studies for CERCLA Municipal Landfill Sites, EPA/540/P-91/001, February 1991, containment has been identified as the most practicable remedial technology for municipal landfills because the volume and heterogeneity of landfill contents often makes treatment such as incineration impracticable. Information and data that were gathered during the Remedial Investigation phase at the Site were not adequate to properly evaluate the mining alternative, the characterization of the fill material was not performed. To properly evaluate this alternative, a treatability study would have to be performed. Data including landfill characterization, implementation, short-term risks, disposal criteria, waste residuals (ash characterization), and costs would have to be included in this study. EPA is not aware of any existing studies which include all these items.

Selected remedies for Superfund Sites are, by statute, required to be cost effective. The Preferred Alternative was selected by EPA because it is expected to provide protection of human health and the

environment without short term risks of air and surface releases and worker and residential exposure introduced by the excavation necessary for the implementation of incineration alternatives and because it is cost effective.

The greatest risk from the Site is from the potential use of contaminated ground water. The ground water extraction and treatment component of the remedy, which is already in place, is a proven technology for the remediation of ground water.

EPA believes that ground water extraction and treatment to halt migration and cleanup the existing contaminated ground water plume along with the continued supply of an alternate water source will be an effective remediation approach for the Site.

While an alternative that re-circulates treated ground water has the potential to be more efficient and decrease treatment times, there is no scientific evidence to indicate that this remedy would assist in re-charging the regional ground water supply. Moreover, re-circulation of treated ground water is prohibited in Pennsylvania.

3. An area resident asked if EPA's Preferred Alternative (Alternative 2A Existing Treatment Scheme), includes a provision to supply an alternate drinking water supply (i.e. bottled water, and/or whole-house point-of-entry systems) to only adjacent homes currently affected, or if contamination is found to proceed beyond those homes, will additional homes be provided with an alternate water supply?

   The same resident also asked, if after the remediation, the effluent leaving the Site will meet federal drinking water standards? If not, what standards are we going to apply? Is there a concern for the water being tested for dioxins?

EPA Responses The preferred alternative does have provisions for supplying additional alternate water supplies to residences that may become impacted by Site related contamination at a future time.

The ground water will he treated to the Federal MCL or to background, which is lowest. The treated ground water is discharged to two outfalls one located on Rambo Run and another on Ebaugh's Run. The discharge must comply with the limitations specified in the Pennsylvania NPDES permit.

Dioxin will not be sampled for, since there is no indication that this contaminant is present at the site.

4. An area resident asked a question regarding deed restrictions on future use of the landfill are under Alternative 2, and a Possible recreational future use of the area was mentioned.

EPA RESPONSE: The potential development of the landfill is limited by the deed restriction which will be imposed on the property. EPA believes that as long as the currently existing soil cap/cover's integrity is not compromised, the public is not at risk from the contaminated fill materials and soils. EPA does not believe it would pose any additional risks to convert the Site to recreational usage, as long as the treatment system, gas vents, and cap were not disturbed.

5. An area resident asked if simply supplying bottled water to the affected area residents could be the selected remedy. This commentor also asked if all of Alternative 2A has to be implemented when there isn't any indication that the pump and treat component is effective. The citizen also mentioned that the No Action Alternative should be considered with the inclusion of just supplying the bottled water. The citizen is also against the mining activities. He mentioned that 15 to 20 springs on his property have dried up, wetlands have dried up, and Ebaugh Run no longer exists except in the form of the effluent from Outfall 2 (The citizen's property has been adversely impacted due to the pump and treat system).

EPA Response: EPA must by statute select Superfund remedies that are protective of human health and the environment. Additionally, the statute and the NCP, specify a preference for remedies that employ treatment which permanently and significantly reduces the toxicity, mobility or volume of the hazardous substances as a principal element.

The suggested option of only continuing to supply bottled water and the POE whole-house filtration systems to affected residents was not examined in the Feasibility Study. While this option restricts human exposure to the contaminated ground water and may be protective of human health, it is not protective of the environment, and does not provide for treatment of the contaminated ground water as specified in the statutory requirements.

In regard to the drying-up of the springs on adjacent properties, EPA recognizes that the extraction wells for the ground water treatment system may be responsible for this occurrence. Despite this problem, EPA continues to believe that the selected remedy is the best remedy for the Site. The operation of the system will be monitored and extraction rates modified as necessary to minimize these effects.

6. A local official asked EPA to delay its decision on ROD issuance for a few months so that during that time, perhaps the PADER could change their law and the effluent could be irrigated through the landfill to recharge aquifer and thus the water table wouldn't suffer as much.

EPA Response: EPA feels that there is no reason to delay the ROD issuance. A ROD issued at this time, or a ROD issued at a future date will have to include ground water treatment by pump and treat as a component. If the Commonwealth of Pennsylvania changes regulations regarding leachate recirculation, then the ROD can be amended to incorporate this change.

PART II: RESPONSE TO WRITTEN COMMENTS

This section provides responses to comments or questions on the York County Solid Waste Landfill Superfund Site. These comments were received by mail during the public comment period.

Comments from the YCSWRA on the Proposed Plan (August 19, 1994 letter). Page numbers and comment locations reference those of the Proposed Plan

1. Page 5, column 1, 3rd paragraph:

COMMENT:
"Not all lined cells were constructed in 1985. This is when the first lined cell was constructed. The others were constructed up through 1991. Also Cells A1 and A2 ceased accepting unprocessed MSW (municipal solid waste) in 1990 and were finally certified as closed in 1992."

EPA RESPONSE:
This factual information on the landfill has been incorporated into the ROD.

2. Page 5, column 5, 3rd paragraph:

COMMENT:
"Approval to proceed with the RI Work Plan was issued to YCSWRA in May 1989."

EPA RESPONSE:
This factual information on the landfill has been incorporated into the ROD.

3. Page 5, column 2, 4th paragraph:

COMMENT:
"Should read '...supply an alternative water supply or point-of-entry...'"

EPA RESPONSE:
This is a typographical error, and has been corrected.

4. Page 6, beginning column 1:

COMMENT:
"Since worst case exposures and related risks, as evaluated in the absence of controls on stripping tower air emissions, are minimal, carbon control of those emissions should not be part of the ROD."

EPA RESPONSE:
Air emission control devices are required pursuant to PADER regulations, and as such are ARARs, and are part of the ROD. The selected remedy will comply with fugitive emissions control requirements according to the Federal Clean Air Act, RCRA (40 C.F.R. Part 264, Subpart AA), the Pennsylvania Air Quality Regulations, (25 Pa. code Chapter 127), and EPA's OSWER Directive 9355.0-28 regarding the control of air emissions from Superfund air strippers at Superfund ground water sites.

5. Page 6, column 1, 2nd paragraph:

COMMENT:
"At least every 3 months a sample is gathered at the post-primary sample point of residential treatment systems, not necessarily prior to the primary filter.

EPA COMMENT:
This factual information has been incorporated into the ROD.

6. Page 6, Residential Well Sampling:

COMMENT:
"It should be made clear that only eight residential wells have been fitted with POE systems because only eight have been impacted by the Landfill."

EPA RESPONSE:
This factual information has been incorporated into the ROD.

7. Page 7, top of column 1:

COMMENT:
"Surface water discharge from the site to the Cordus, Muddy and Deer Creek drainage basins. However, it does so through unnamed tributaries to the East Branch of Cordus Creek, North Branch of Muddy Creek, and Deer Creek which are designated as high quality cold water fishery, cold water fishery, and cold water fishery waters, respectively. (25 PA Code Chapter 93, November 1991)."

EPA RESPONSE:
This factual information has been incorporated into the ROD.

8. Page 7, top of column 1, 2nd paragraph

COMMENT:
"A link between surface water contamination and the landfill has not been scientifically established. This point should be stressed, as should the historic and existing local agricultural activity, which is a possible source of source water contamination."

EPA RESPONSE:
The EPA is requiring post-ROD implementation of a monitoring program to assess the effectiveness of the ground water treatment system and its impact (e.g. dewatering) on downgradient surface water and wetland habitat, and the impact of the treated effluent discharge on the environmental quality of surface waters and sediments in the streams where the outfalls are located.

The following comments from the YCSWRA have been grouped together due to their similar nature, they are addressed following their grouping (page numbers refer to the Proposed Plan);

page 6, Beginning of 2nd Column
COMMENT:
"The conclusions reached in the RI regarding ground water contamination with inorganics were, unfortunately, based on limited sampling data. Subsequent review of RI and additional data disputes the conclusions regarding inorganics contamination expressed in the Proposed Plan. Also, it is only VOC contamination that has been detected in off-site residential wells. The ROD should reflect both these points."

Page 7, Sediment:
COMMENT:
"Again, no link has been established between the landfill and sediment contamination. This should be stated. Sampling of surface water effluent from stripping towers does not show the presence of metals above background ground water concentrations. The absence of a statement to this effect is misleading, as is the statement regarding the absence of metals limits in the NPDES permit without also informing the reader that tower discharges are analyzed for metals monthly, and results do not show a connection to sediment contamination."

page 7, column 2, 3rd paragraph:
COMMENT:
"Results of samples from tower discharges indicate no need for toxicity testing of surface waters. In general, the Proposed Plan presents the site scenario based solely on data generated during the RI. This ignores an additional five (5) years worth of very important post-RI data aimed at answering questions raised during the RI. On the other hand, the options assessed for site remediation did consider this important data. This should be described in the ROD."

page 9, column 1, 2nd paragraph:

COMMENT:
"For purposes of the RI, chemicals of potential concern were identified by comparison to background data generated during RI field activities. The scope of that comparison should be mentioned here."

page 12, column 1, 1st paragraph:
COMMENT:
"Again, based on ongoing analysis of stripping tower surface water discharge constituents, there is no basis for requiring toxicity testing of surface waters.

Page 13, column 1, 4th paragraph:
COMMENT:
"There is no basis for the statement that inorganic contamination of surface water and sediments '...is likely attributable to the Site...' It ignores post-RI data and the historic land use in the vicinity of the site.

Page 13, column 2:
COMMENT:
"Again statements regarding the absence of metals limits in the current NPDES permit should be followed by statements that monitoring of those discharges indicates metals concentrations on the range of background ground water quality."

EPA RESPONSE:
Residential wells have historically only been sampled for a limited number of inorganics contaminants. The wells have not been regularly sampled for all the inorganics which may be associated with the landfill. YCSWRA's recommendation to include a statement in the ROD reflecting that only VOC contamination has been detected in the residential wells is not incorporated since it fails to mention that not all of the metals have been sampled.

EPA does not agree with YCSWRA's comparison of metal concentrations in surface water discharges to that of background.

EPA has the following concerns with YCSWRA's comparison of metal concentrations in surface water to background ground water, and the five years of sampling data YCSWRA cites: 1) this comparison was done by YCSWRA without prior review or approval by EPA and FADER; 2) the data used in the comparison (including location of background ground water samples) and the subsequent comparison have not been provided to the EPA for their review; and 3) such comparison can not be considered to represent or replace an adequate environmental risk assessment.

The data in the RI and the new surface water discharge data presented in the May 1994 Revised Draft ES may establish a link between the landfill, surface water contamination, and sediment contamination, since the same contaminants detected in these media are also found at the Site. Additional monitoring of these media for contaminant impact, as required by the ROD, will allow for an adequate assessment to determine if the outfalls are impacted the surface waters and sediments. Toxicity testing will be utilized to determine the outfalls impact on the surface water and the sediments.

The YCSWRA may have confused the use of background and environmental effects data. Background data provides information about the condition or level of a substance present in an area beyond/outside site influence. The Ambient Water Quality Criteria (AWQC) provides a measure or reference value based on bioassays that estimates the level of a substance in surface water having the potential to affect fish and other aquatic biota. In fact, background water samples may have substances at levels that will affect fish and other aquatic biota. The YCSWRA's statement about AWQC's not being relevant is biologically and technically inaccurate, and as such is not incorporated into the ROD.

9. Page 7, column 2, 2nd paragraph:
COMMENT:
"What is the meaning of the first sentence in this paragraph in relation to the landfill.

EPA RESPONSE:
This sentence is a-word-processing error, and should instead read: "The detection of metals in surface water and sediments are at levels of biological concern (in both total and dissolved phases)."

On the basis of this data, the ROD requires the implementation of a monitoring program to assess the impact of the treated effluent discharge on the environmental quality of surface waters and sediments in the streams where the outfalls are located.

10. Page 10, top of column 2:
COMMENT:
"It is important for EPA to elaborate on what it means by the term, "screened out" with respect to Alternative 5 (landfill mining). Specifically, as evident from comments at EPA's August 15, 1994 public meeting, the language in the Proposed Plan regarding alternative 5 has been misapprehended as establishing a prohibition on landfill mining. We understand that was not EPA's intention. To avoid any further confusion, we believe it is imperative for EPA to include the following points in the ROD regarding landfill mining:

a) EPA's selection of Alternative 2A does not prohibit landfill mining in the future provided that such activities would not interfere with the effectiveness of the ground water pump and treat system.

b) The risks to human health and the environment currently associated with the site are not of a magnitude to necessitate landfill mining, within the context of CERCLA. It is important to distinguish between the CERCLA process and the process ongoing among Hopewell, PADER and YCSWRA to explore the feasibility of landfill mining.

c) Any procedural steps necessary for future approval of landfill mining will be streamlined as much as possible in order to facilitate implementation of an environmentally-beneficial project endorsed by local and state officials, as well as the PRP."

EPA RESPONSE: These issues have been addressed previously in the Responsiveness Summary, refer to Section I.2 above for additional information. The selected remedy will impose deed restrictions on the exposure of fill materials resulting from the excavation of the landfill's existing soil cap for reasons other than studying the landfill mining option. Plane for the landfill mining study will have to be prepared by YCSWRA and submitted to PADER and EPA for approval. The ROD is not the place to provide for future provisions of streamlining activities for the landfill mining alternative.

11. page 12, bottom of column 1:
COMMENT:
"A monitoring program to assess the effectiveness of the ground water treatment has been in effect since system startup. Continuation of that program in a part of Alternative 2A."

EPA RESPONSE: As a component of Alternative 2A, the ground water treatment system will be monitored for its effectiveness, in capturing and treating the contaminant plume. This monitoring program will also require upgrades to the existing system as necessary to capture contamination that may be migrating from the site.

12. page 12, column 2, 2nd paragraph:
COMMENT:
"Calculation have shown that untreated air emissions of VOCs from the towers result in negligible contributions to overall site risks. Since those low concentrations of VOCs are not practically and effectively treatable using available technology, the ROD should not require such treatment."

EPA RESPONSE: Air emission control devices are required as part of the remedy since they are ARARs. Air emission control devices are required pursuant to PADER regulations, and as such are ARARs, and are part of the ROD. The selected remedy will comply with fugitive emissions control requirements according to the Federal Clean Air Act, RCRA (40 C.F.R. Pert 264, Subpart AA), the Pennsylvania Air Quality Regulations, (25 Pa. code Chapter 127), and EPA's OSWER Directive 9355.0-28 regarding the control of air emissions from Superfund air strippers at Superfund ground water sites.

13. Page 12, bottom of column 2:
COMMENT:
"The Proposed Plan's recommendation for assessment of the impacts of ground water extraction on wetland areas should specify a point of references. Since there is essentially no historical data in this regard, tho ROD should call for monitoring of future impacts.

EPA RESPONSE: YCSWRA notes a lack of any historical data for determining the past impact of ground water extraction on wetland habitat. As ground water treatment began only recently the YCSWRA should compare historical and recent serial photography to identify where changes in area habitat/landscape have occurred and than field verify if the altered area were wetlands. Remnant vegetation and soil characteristics (e.g., low chrome in the matrix of the soil) associated with a wetland will remain for a time even if soil hydrology has been changed. In fact, the parameters used to determine if an area's soil, vegetation, and hydrology are sufficient to classify an area as a wetland should also be used to monitor wetlands for future impacts from implementation of the Site remedy.

21. Page 21, Implemetability:
COMMENT:
"post-rod monitoring of the existing treatment systems has not yet occurred. Contrary to the statement in the proposed Plan the large data base available indicates that the existing system is effectively containing flow of ground water on site."

EPA RESPONSE: This statement is a typo-graphical error. Post-ROD monitoring will indicate the effectiveness of the treatment system

The following comments were contained a letter from the Hopewell Township Supervisors:

1. COMMENT:
"There is at least one other alternative which we believe should be explored in the same level as the others: mining of the refuse coupled with continued ground water pumping....because of the extensive time frames projected to be associated with clean-up under the chosen alternative (40 to 85 years), we strongly suggest that solutions which have shorter clean-up times be studied... "

EPA RESPONSE: Reference previous response, Part I.2, regarding landfill mining. In selecting the remedy for the Site, EPA used the nine point criteria as outlined in the NCP. Implementation time and cleanup time are considered in EPA's selection of the remedy. The selected remedy, Alternative 2A, provides for the overall best balance of the factors of the nine-criteria. The cleanup times that are presented for all the alternatives are estimates. Alternatives 4A, 4B, 4C and 4D have the potential to reduce the cleanup time, but those remedies do not have the ability to fully comply with ARARs.

2. COMMENT:
" ... we respectfully request that tho proposed plan adoption be delayed until the alternative of mining and ground water pumping is explored to the same level as the others. If such an option is shown to significantly reduce the time frame of ground water removal from the aquifers serving the Township, this alternative must be seriously considered."

EPA RESPONSE: There is no reason to delay issuance of the Response of Decision. The risk posed at the Site is future consumption of ground water. The selected remedy is a ground water treatment remedy.

The exploration of the landfill mining would not change the selected ground water action that would be chosen at the Site. Under the landfill mining alternative, the ground water would have to be treated in the same manner as in the selected remedy. The selected remedy does not exclude the continued exploration of landfill mining.

EPA believes that delaying the issuance of the ROD will not be a benefit to the community.

3. COMMENT:
"...alternative 4 must also be seriously considered, and perhaps a "benefit credit " to offset costs should be allocated for those options which lessen the ground water pump time frame below the estimate for Alternative 2..."

EPA RESPONSE: Alternatives 4A, 4B, 4C and 4D were considered in the Proposed Plan, but were screened out due to their inability to meet ARARs. The re-injection/recirculation of the treated ground water into the landfill is classified as leachate recirculation. Alternatives 4A, 4B, 4C, 4D would not comply with the Pennsylvania Municipal Waste Regulation, Section 273.274, which deals with prohibition/requirements for leachate recirculation at a landfill.

There is not a provision in CERCLA for a "benefit credit"., CERCLA uses a nine point criteria, as is outlined in the NCP, to balance alternatives.

4. COMMENT:
"Given the Township's desire to preserve ground water resources in the area...(suggestion for) a modified ground water pumping system, incorporating more wells than are currently being pumped, but pumping a leaser quality daily."

EPA RESPONSE: The ground water treatment system is pumping at a rate that is optimal for treatment efficiency. A decreased pumping rate may increase the cleanup time, and also allow for contamination to migrate from the Site.

5. COMMENT:
"....we suggest that EPA word its final decision to allow for expansion to the remediation (such as mining, adding more pumping wells, etc.) without the need to "reopen the CERCLA -SUPERFUND -RI/FS Book".

EPA RESPONSE: The selected remedy addresses the contamination in regard to the risk pathways. The remedy is ground water pump and treat. An entirely new RI/FS would not have to be performed for the Site if the selected remedy was to be modified after the issuance of the ROD.

A citizen commented:

1. "We support plan 4B-D. existing Treatment Scheme with Enhanced Biodegradation using Inorganics Removal Technologies. The currently operating water treatment system may be effectively controlling the contamination at this time but what about the future? Clean it up!!"

EPA Response: EPA did consider Alternatives 4A, 4B, 4C, and 4D in the Proposed Plan. Alternatives 4A, 48, 4C and 4D were considered in the Proposed Plan, but were screened out due to their inability to meet ARARs. The re-injection/recirculation of the treated ground water into the landfill is classified as leachate recirculation. Alternatives 4A, 48, 4C, 4D would not comply with the Pennsylvania Municipal Waste Regulation, Section 273.274, which deals with prohibition/requirements for leachate recirculation at a landfill. EPA feels the selected remedy will adequately address the risk posed by site-related contamination.