United States
Environmental Protection
Agency

Office of
Emergency and
Remedial Response

EPA/ROD/R02-86/030
Sept 1986

EPA

Superfund Record of Decision:

Sharkey Landfill, NJ

TECHNICAL REPORT DATA
(Please read Instructions on the reverse before completing)

1. REPORT NO. EPA/ROD/R02-86/030	2.	3. RECIPIENT'S ACCESSION NO.
4. TITLE AND SUBTITLE SUPERFUND RECORD OF DECISION Sharkey Landfill, NJ		5. REPORT DATE September 29, 1986
		6. PERFORMING ORGANIZATION CODE
7. AUTHOR(S)		8. PERFORMING ORGANIZATION REPORT NO.
9. PERFORMING ORGANIZATION NAME AND ADDRESS		10. PROGRAM ELEMENT NO.
		11. CONTRACT/GRANT NO.
12. SPONSORING AGENCY NAME AND ADDRESS U.S. Environmental Protection Agency 401 M Street, S.W. Washington, D.C. 20460		13. TYPE OF REPORT AND PERIOD COVERED Final ROD Report
		14. SPONSORING AGENCY CODE 800/00

15. SUPPLEMENTARY NOTES

16. ABSTRACT

The Sharkey Landfill site comprises approximately 90 acres in the Parsippany - Troy Hills and East Hanover Townships, Morris County, NJ. The site consists of 4 disconnected areas: North Fill, South Fill, Northwest Fill, Southwest Fill. Two aquifers are found at this site. The upper aquifer, which comes into contact with fill material in portions of the landfill, primarily drains into the bordering Rockaway and Whippany Rivers. These rivers are used for recreational activities, and the Rockaway serves as a potable water source further downstream. The Passaic Valley Water Commission utilizes this aquifer for public supply. The lower aquifer completes a public supply well in East Hanover Township. In 1945 the site began accepting municipal solid waste from NJ counties. Between 1962 and 1969, Ciba-Geigy Co. allegedly disposed of 753,000 lbs. of hazardous and/or toxic materials. From April 1972 to May 1972, 25,700 tons of non-chemical wastes and 1,160 tons of "liquid and/or chemical wastes" described as cesspool-type, and sludge from the adjacent Parsippany-Troy Hills Sewage Treatment Plant (PTHSTP) were also deposited at the site. Between 1979 and 1981 refuse was removed from the South Fill portion of the site and re-disposed in the North Fill area for a PTHSTP expansion. Currently, landfill contaminants have migrated and continue to migrate into the shallow aquifer beneath the site and the adjacent surface water bodies. Although available data do not suggest that significant quantities of (See Attached Sheet)

17. KEY WORDS AND DOCUMENT ANALYSIS

a. DESCRIPTORS	b. IDENTIFIERS/OPEN ENDED TERMS	c. COSATI Field/Group
Record of Decision Sharkey Landfill, NJ Contaminated Media: gw, sw, soil, Key contaminants: VOCs, TCE, organics, inorganics, heavy metals		

18. DISTRIBUTION STATEMENT	19. SECURITY CLASS *(This Report)* None	21. NO. OF PAGES 66
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EPA/ROD/R02-86/030
Sharkey Landfill, NJ

16. ABSTRACT (continued)

hazardous substances are being released at the present time, there exists the potential for future releases of contaminants at levels which could pose a serious threat to public health and the environment. The primary contaminants of concern include: VOCs, TCE, organics, inorganics, and heavy metals.

The selected remedial action includes: capping of the landfill in accordance with relevant RCRA Act requirements, including the appropriate grading of fill areas; a venting system for landfill gases; extraction and treatment of shallow ground water and leachate; surface water controls to accommodate seasonal precipitation and storm runoff as well as erosion control for river banks; security fencing to restrict site access; and environmental monitoring program to ensure the effectiveness of the remedial action. The estimated capital cost is $23,173,000 with annual O&M of $330,000.

RECORD OF DECISION

REMEDIAL ALTERNATIVE SELECTION

Site

Sharkey Landfill, Morris County, New Jersey

Documents Reviewed

I am basing my decision on the following documents, which describe the analysis of remedial alternatives considered for the Sharkey Landfill site.

- Remedial Investigation Report, prepared by Alfred Crew Consulting Engineers, and Hazen and Sawyer, dated July 1986
- Evaluation of Alternatives (Feasibility Study) Report, prepared by Alfred Crew Consulting Engineers, and Hazen and Sawyer, dated August 1986
- Responsiveness Summary, dated September 1986
- Staff summaries and recommendations

Description of Selected Remedy

- Capping of the landfill in accordance with relevant Resource Conservation and Recovery Act requirements, including the appropriate grading of fill areas
- A venting system for landfill gases
- Extraction and treatment of shallow groundwater and leachate
- Surface water controls to accommodate seasonal precipitation and storm runoff as well as erosion control for river banks
- Security fencing to restrict site access
- An environmental monitoring program to ensure the effectiveness of the remedial action

Declarations

Consistent with the Comprehensive Environmental Response, Compensation and Liability Act of 1980, and the National Oil and Hazardous Substances Pollution Contingency Plan (40 CFR Part 300), I have determined that the alternative described herein is a permanent remedy that will control the source of contamination and mitigate off-site migration of contaminants.

I have further determined that this remedy is the lowest cost alternative that is both technically feasible and reliable. It effectively mitigates and minimizes threats to and provides adequate protection of public health and the environment. At the same time, it meets all applicable and relevant Federal and State public health and environmental requirements. Further, the selected remedy is appropriate when balanced against the availability of Trust Fund monies for use at other sites.

The State of New Jersey has been consulted and agrees with the selected remedy.

September 29, 1986
Date

Christopher J. Daggett
Regional Administrator

SUMMARY FOR REMEDIAL ALTERNATIVE SELECTION

SHARKEY LANDFILL SITE

SITE LOCATION AND DESCRIPTION

The Sharkey Landfill site is located in the Townships of Parsippany-Troy Hills and East Hanover, Morris County, New Jersey. The study area lies within the area bounded by Route 46 to the north, New Road to the west, and the Rockaway River to the east. To the south, sections of the site extend beyond Route 280 into the neck between Troy Meadows and the Hatfield Swamp. The general area in which the landfill is located can be described as residential and light industrial to the north and west, with the Whippany River and considerable swamp land to the east and south. The site location is shown in Figure 1.

The site is located approximately 1/2 mile southwest of the Pine Brook section of the Township of Montville, and is centered approximately at 40° 50' 50" north latitude and 74° 20' 50" west longitude. The landfill site consists of approximately 90 acres of irregularly-shaped, disconnected areas. The site has been divided into the following areas as shown in Figure 2:

- North Fill: The North Fill area is located on an island at the northern end of Sharkey Road, and is bounded by branches of the Rockaway River. The North Fill Bridge over the west branch provides limited access from the South Fill to the 26-acre island. The island is owned by the Township of Parsippany-Troy Hills.

  This island site contains fill with intermittent soil cover to a depth of 80 feet, resulting in steep, sparsely vegetated slopes containing a number of leachate seeps and eroded gullies. The highest portions of the North Fill were deposited there from the South Fill during the second expansion of the Parsippany-Troy Hills Sewage Treatment Plant (STP). The Rockaway River has undercut the landfill's banks and exposed waste materials along the steep banks.

- South Fill: Most of the South Fill site is located southeast of Sharkey Road and is generally bounded on the east by the Rockaway River, on the south by the Parsippany-Troy Hills STP and the Whippany River, and on the west by the STP and an adjacent wooded area off Edwards Road. This fill also includes the area northwest of Sharkey Road between two ponds and the Rockaway River. The South Fill site is owned by the Township of Parsippany-Troy Hills.

  The South Fill, excluding the sewage treatment plant, is approximately 29 acres in size. The original treatment plant structures were reportedly built on piles over the landfilled wastes, but most of the wastes were removed from the areas during construction of the expanded plant facilities.

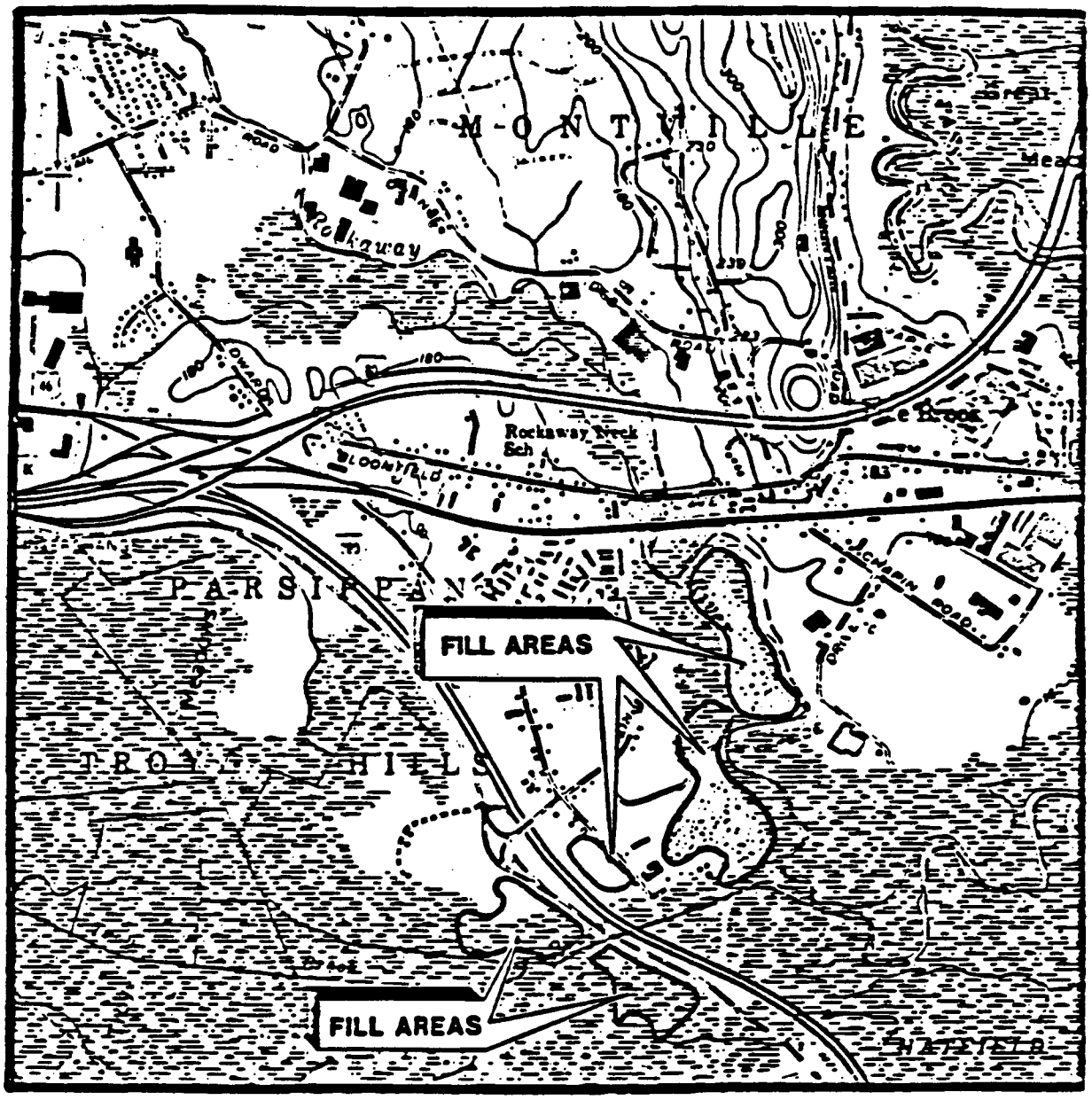


FIGURE 1

SHARKEY LANDFILL LOCATION PLAN

0 2000
SCALE

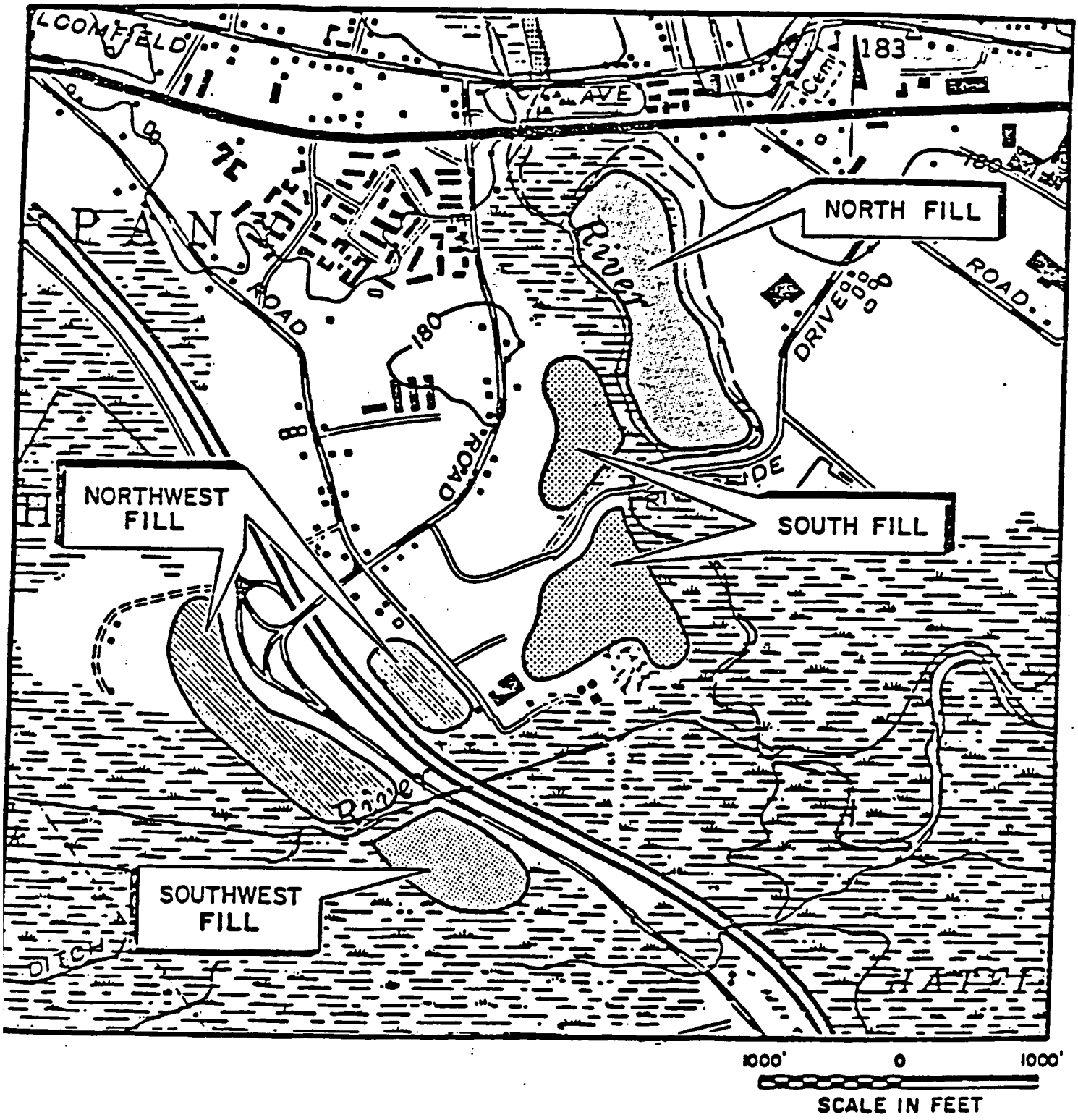


Figure 2 : Sharkey Farms Landfill Site Map

The removed material associated with the first expansion was relocated immediately northwest of the plant where it formed the upper portion of the mound on the South Fill. The fill deposited in this area ranged up to 70 feet high. The mound's side slopes are steep but the earth cover appears to be fairly uniform and, except where some erosion has occurred, to be supporting vegetation. Gas vents are located along the top of the South Fill mound where the re-deposition occurred, but some of the vents have been vandalized and are inoperative.

Access to this fill is mostly unrestricted except for gates recently constructed at the entrance of Sharkey Road and one near the North Fill Bridge. The two ponds, located northwest of the South Fill adjacent to Sharkey Road, are reportedly clean and supporting fish, amphibians, and aquatic vegetation, despite the presence of plastics and gas bubbles.

- Northwest Fill: The Northwest Fill consists of two fill areas divided by Route 280 and relocated Edwards Road. The area southwest of Edwards Road, estimated at 15 acres, is bordered by the new Whippany River to the south, Troy Meadow to the west, and by a heavily-wooded area south of the New Road/Edwards Road intersection. This portion of the Northwest Fill site is owned by COMG Realty, c/o Ringlieb Family.

  The area northeast of Route 280 is bounded by Edwards Road to the northeast, the Whippany River to the southeast, and a wooded area bordering New Road to the northwest. This portion of the Northwest Fill site, with an estimated area of 11 acres, is owned by Dowel Associates.

  The two portions of this fill area have sparse to intermittent soil cover with many large areas of exposed refuse, including rusted drums, particularly in the portion southwest of Edwards Road. The topographic relief created by the landfill operations in these areas is not as pronounced as in the North and South Fill areas, generally reaching an estimated elevation of 20 to 30 feet above the adjacent swamp to the southwest. Access to these site areas is limited only by the terrain.

- Southwest Fill: This fill area is located in East Hanover, and is bounded by Ridgedale Avenue to the northeast, a drainage ditch to the southeast, the old Whippany River channel to the southwest, and the relocated new Whippany River to the northwest. The Southwest Fill site, with an estimated area of 9 acres, is owned by Wildlife Preserves.

The Southwest Fill is relatively level and ranges about 10 to 20 feet above the adjacent swampland. It also displays generally good soil cover and vegetative growth. Part of the original landfill was reportedly used for the redisposition of approximately 184,000 cubic yards of wastes and cover material excavated during the construction of Route 280 through the landfill. However, recollections of New Jersey Department of Transportation personnel during the construction period indicate that some of the excavated wastes were deposited in the southwest portion of the South Fill. Access to the Southwest Fill is limited only by the terrain.

SITE HISTORY

During the 1930's, the site was used as a pig farm, and in 1945, landfilling operations began. In addition to accepting municipal solid waste from several counties in northern New Jersey, the landfill allegedly received hazardous and/or toxic materials between 1962 and 1969 from Ciba-Geigy Company. Records indicate that approximately 560,000 lbs of toluene, 130,000 lbs of benzene, 40,000 lbs of chloroform, 20,000 lbs of methylene chloride, and 3,000 lbs of dichloroethylene were disposed at the site.

Operating reports filed by Sharkey Farms, Inc. with New Jersey Department of Environmental Protection (NJDEP) for the period from April 13, 1972 to May 10, 1972 indicate that approximately 25,700 tons of non-chemical wastes (90 percent household, 8 percent commercial, and 2 percent industrial) and 1,160 tons of "liquid and/or chemical wastes" described as cesspool-type were deposited at the site. In addition to the aforementioned wastes, sludge from the adjacent Parsippany-Troy Hills STP was deposited in the landfill.

Sharkey Farms ceased landfill operations on September 9, 1972. However, it has been reported but not verified that about three million gallons of wastewater of unknown composition were taken to "Sharkey Disposal-Pine Brook" between 1972 and 1974. It is not known, however, whether this is the Sharkey Landfill site. The source of this wastewater was Koppers Chemical Company which manufactured organic compounds. Koppers is no longer in operation.

The Sharkey Landfill is believed to have remained inactive until 1979, when excavation began for the expansion of the Parsippany-Troy Hills STP. Several acres of refuse were removed from the South Fill and re-disposed in the North Fill area. No evidence of chemical waste disposal was reported during the excavation. The expansion project was completed in 1981. Since that time, the site has apparently remained unchanged.

GEOLOGY

The site is located in the Piedmont Physiographic Province. It is situated within the Rockaway and Whippany River floodplains, in which recent deposition of clay, silt, and sand have occurred. The area is characterized by a swampy lowland with a few surrounding ridges and isolated hills rising above the plain. Most of the area lies between the elevations of 170 and 440 feet above the mean sea level. The alluvial deposits are underlain by stratified sands and gravels of glacial outwash of the Wisconsin Epoch of Pleistocene Age.

The Wisconsin glaciation of Pleistocene Age has resulted in significant morphological change of topography within this physiographic province. During the Pleistocene Era, this area was located near the northwestern shoreline of a very large glacial lake, termed Lake Passaic, bordered by the highlands to the southeast. This lake was fed by outwash from a northerly retreating glacier that formerly occupied the area. The natural drainage outlets for the pre-lake area were to the southeast, near Summit, New Jersey. This outlet area was blocked by glacial moraine during the development of the lake. Lake Passaic grew in size as the glacier retreated northward. The nearest that the Lake Passaic shoreline came to the landfill was near Boonton, approximately five miles northwest of the site.

As the glacier retreated and Lake Passaic grew, coarser outwash deposits were deposited in areas to the south of the retreating glacial front. Shoreline areas also received sediment-laden runoff from the highlands to the west and the Basalt ridges to the north and east. As the glacier retreated even further northward from this area, silt and varved clay lake deposits accumulated on the floor of the expanding lake. Both vertical and lateral changes in composition occur in this type of deposit.

Pleistocenic glaciation buried the previous topography including the preglacial stream valley in the area. The western portion of Essex County delineates the extent of some of these buried valleys. According to this data, the southern part of the site lies near the western fringe of the buried Millburn Valley. The buried valley may be influencing groundwater flow patterns in the area.

Bedrock belonging to the Brunswick Formation of Triassic Age underlies the unconsolidated deposits at the site. The depth to bedrock on the site is believed to be approximately 150 feet on the southern end of the landfill decreasing to 30 feet on the northern end. The bedrock is composed of interbedded red shale and sandstone with occasional conglomeritic beds. The thickness ranges from 6000 feet to 8000 feet.

The southern tip of a Triassic basalt flow known as Towoco Mountain occurs less than 1/2 mile north of the site. It is much more resistant than the adjoining shale and sandstone and thus forms a prominent, crescent shaped ridge approximately seven miles long. The Triassic rocks exhibit as monoclinal feature and dip west-northwest at about eight to ten degrees. An extensive northeast-southwest trending normal fault has uplifted Precambrian Age metamorphic rock to ground level, approximately seven miles west of the site.

CURRENT SITE STATUS

During the remedial investigation of the Sharkey Landfill site, the following activities were undertaken:

- Electromagnetic and magnetometer survey of the entire site
- Installation of twenty-six monitoring wells
- Air monitoring
- Collection and priority pollutant analysis of the following:
  - Five shallow soil samples
  - Thirty-two groundwater samples
  - Eighteen surface water and sediment samples from the Rockaway and Whippany Rivers

The results of the chemical analyses of these samples are presented in Appendix 1.

The remedial investigation revealed that the site is characterized by five distinct material types: fill, upper alluvial deposits, varved clay, lower glacial outwash deposits, and bedrock. The two aquifers found at this site - one in the upper alluvial deposits (the upper aquifer) and one in the lower glacial outwash deposits (lower aquifer) - are separated by the clay layer. This clay layer is estimated to have an average thickness of about 25 feet, an overall permeability of 1.3×10^{-7} centimeters per second (cm/sec), and is believed to be continuous throughout the site.

The upper aquifer, which comes in contact with the fill material in portions of the landfill, primarily drains into the Rockaway and Whippany Rivers. These rivers are used for recreational activities in areas near the landfill, and the Rockaway serves as a potable water source further downstream. While no public groundwater supplies are known to be derived from this aquifer in the immediate area, three private wells are believed to exist, upgradient of the site. The Passaic Valley Water Commission does utilize this aquifer for public supply, although the intake for this water supply is greater than eight miles downstream of the Rockaway/Passaic River confluence.

The lower aquifer, which is a major drinking water source in the area, primarily flows in the southwest direction. A public supply well in East Hanover Township, which reportedly produces 500,000 gallons per day, is completed in this aquifer. This well is within two miles of the site in an upgradient direction. Three other private wells are also installed in this aquifer within a mile of the site, and are likewise considered upgradient.

In general, while some contaminants have been found in the sampled media at and near the Sharkey site, they were found at relatively low concentrations. Based on the types and concentrations of these contaminants, the site does not pose a significant public health or environmental risk at this time. Results from the air monitoring performed during the installation of the monitoring wells suggest low probability of respiratory or dermal hazard from air-borne volatile organics under ambient conditions.

During the electromagnetic survey, five anomalous electromagnetic conductivity areas were delineated. Subsequent magnetometer surveys indicated that four of these anomalies were probably caused by buried iron mass. A soil sample was taken of the remaining anomalous area, but no significant detection of organic compounds was reported.

The soil sampling points were selected at leachate seep drainageways, storm water drainageways and the area of unexplained anomalous electromagnetic readings. Seven volatile organic compounds were identified from these samples at relatively low concentrations: acetone, 2-butanone, naphthalene, phenanthrene, 2-methylnaphthalene, fluoranthene, and pyrene. Acetone and 2-butanone were also found in groundwater samples. In addition, four pesticides were identified in these soil samples: dieldrin, 4,4'-DDD, endrin, ketone, and PCB-Aroclor 1254. Several inorganic compounds were also detected, but at very low concentrations.

Of the twenty-six monitoring wells installed at the site, fourteen were screened in the upper aquifer and twelve were screened in the lower aquifer. In addition to these monitoring wells, groundwater samples were taken from nearby residential, commercial, and public supply wells. Three of the residential/commercial wells were screened in the shallow aquifer; two were screened in the lower aquifer, and one in the bedrock aquifer.

The analytical results of the samples of the shallow aquifer monitoring wells indicated low levels of organic contamination, with only benzene and trichloroethene exceeding drinking water standards. Inorganic chemicals, primarily heavy metals, were also detected in the shallow aquifer. Some of these contaminants were also found in excess of drinking water standards in both rivers near the landfill. However, a short distance downstream, the contaminant levels are low. The overall adverse effects of the landfill on the water quality of the Rockaway and Whippany Rivers appears to be minimal at this time. Also, the next surface water intake, for the purpose of public consumption, is approximately eight miles downstream of the site; thus, any contaminants would be diluted.

The analytical results of the samples of the deeper aquifer reveal the presence of cadmium, lead, chromium, iron, manganese, mercury, and nickel at concentrations in excess of drinking water standards, indicating that the landfill has impacted the aquifer. The analyses of the lower aquifer also found one organic compound, benzene, in one well at a concentration of 13 micrograms per liter (ug/l). However, this detection is believed to be an isolated occurrence which does not indicate significant organic contamination in the lower aquifer.

While none of the samples of the residential and commercial wells contained organic compounds, iron and manganese were found to exceed drinking water standards in all wells. However, iron and manganese appear to be common to the area. Low levels of cyanide, phenols and chromium were found in the East Hanover public supply well; they were below drinking water standards. Based on the results of the remedial investigation, the location of the existing potable wells in the vicinity of the Sharkey site, and the flow direction of the two aquifers, the landfill does not appear to be adversely affecting potable water quality in the area at this time.

Two rounds of surface water, sediment, and leachate samples were taken, one during dry weather conditions and the other during wet weather conditions. The dry and wet weather surveys detected low concentrations of organic or inorganic priority pollutants. Cadmium and mercury concentrations exceeded the drinking water standards downstream of the site at the Whippany River during wet weather conditions and lead concentrations exceeded the standards at the Rockaway River during dry weather. However, cadmium and lead were found at higher concentrations upstream of the site, and iron and manganese exceeded drinking water standards at upstream sampling locations. The data suggest that the site may not be the only source of these metals. Cyanide was found during the wet weather survey at location SD-7, which is close to the South Fill, at a concentration of 33 ug/l, which is well below the drinking water standard of 200 ug/l. This may indicate that cyanide is not an environmental concern.

ENFORCEMENT

The U.S. Environmental Protection Agency (EPA) sent Information Request Letters and Notice Letters to potentially responsible parties (PRP's) during the years 1983 and 1984. The PRP's declined to undertake the remedial investigation and feasibility study (RI/FS). Ciba-Geigy met with EPA and NJDEP in May of 1984 to discuss previous site investigations and planned RI/FS activities.

Additional Information Request Letters were sent by EPA in September 1986. Notice Letters asking the PRP's to voluntary undertake the Remedial Design and Remedial Action activities will be issued after the designated deadline for response to the information letters. On September 22, 1986, EPA and NJDEP met with counsel for Ciba-Geigy to discuss the company's efforts to locate additional parties who may have disposed of hazardous waste at the site.

EVALUATION OF ALTERNATIVES

The evaluation of the results of the Remedial Investigation provided the basis for establishing the cleanup goals and objectives for site remediation. The cleanup goals and objectives for the Sharkey Landfill site include the following:

° Minimize the potential for migration of the low levels of groundwater contamination

° Minimize the risk to the public from exposure to waste and contaminated soil on the site

The purpose of a Feasibility Study (FS) is to develop and assess remedial action alternatives based on site-specific conditions. At a minimum, one alternative should be developed for each of five categories outlined in the National Contingency Plan and EPA's FS Guidance. The development and screening of remedial technologies for the Sharkey Landfill involved the following procedure:

- From results of Remedial Investigation, identify site problems and pathways of contamination;
- Identify general response actions that address site problems and meet cleanup goals and objectives;
- Identify and screen possible remedial technologies in each general response action based on applicability to site conditions;
- Combine technologies into feasibile alternatives;
- Screen alternatives based on protecting the environment, public health, public welfare, and cost.

A list of general response actions that appeared to be appropriate for the Sharkey site is presented in Table 1. This table also lists the associated remedial technologies for each action along with an assessment of the applicability of each remedial action based on site characterisitics, waste problems, and existing contamination at the site. Some of the technologies considered were innovative.

TABLE 1

SHARKEY LANDFILL

SCREENING OF ALTERNATIVES

APPLICABILITY/LIMITATION OF SPECIFIC TECHNOLOGIES

ACTION	APPLICABILITY	SITE/WASTE LIMITATIONS TO TECHNOLOGY
1. Surface Water Controls		
A. Capping	Yes	Slopes may restrict use of certain materials. Also capping is required by NJDEP for closure.
1. Synthetic membrane	Maybe	Incompatibility with site wastes; slope considerations; may be part of multimedia cap.
2. Clay	Yes	Probably as part of multilayered cap.
3. Asphalt	No	Rigidity unsuitable for unstable land-
4. Concrete	No	fill environment; also may be incom- patible with waste.
5. Chemical additives/ Stabilizers	Maybe	May be useful in reducing shrink/swell behavior or neutralizing acid cover soils.
6. Multilayered Cap	Yes	An effective solution.
B. Grading	Yes	In conjunction with cap; not suitable by itself. Slope should be sufficient to promote runoff without erosion.
1. Scarification	Yes	Primarily used for preparing top cap
2. Tracking	Yes	layer for revegetation.
3. Contour Furrowing	Yes	Tracking used principally in steep slopes.
C. Revegetation	Yes	Necessary to prevent erosion and desi- cation of cap layers.
1. Grasses	Yes	
2. Legumes, shrubs, trees	No	Root systems would crack cap allowing infiltration.

TABLE 1 (Page 2 of 7)
SHARKEY LANDFILL
SCREENING OF REMEDIAL TECHNOLOGIES

ACTION	APPLICABILITY	SITE/WASTE LIMITATIONS TO TECHNOLOGY
D. Diversion and Collection System	Yes	Required to control erosion, runoff during construction and as a secondary device for storm water control.
1. Berms	Yes	Particularly applicable during construction; should be used in conjunction with other controls in a permanent system.
2. Ditches, trenches and swales	Yes	Effective perimeter collection mechanisms.
3. Terraces and benches	Yes	Primarily used in conjunction with grading.
4. Chutes and downpipes	Maybe	Only if necessary during construction. Not long-term erosion control measure.
5. Seepages or recharge basins	Maybe	Possible for surface water diversion depending on permeability of soils.
6. Storage ponds	Maybe	In conjunction with surface water collection systems. Can be used to dampen runoff flows from site.
7. Levee/flood walls	Maybe	Probably ineffective due to inherent localized flooding.
2. Leachates and Groundwater Controls		
A. Capping (See 1.A)	Yes	
B. Barriers	Yes	Geology of site may enhance effective placement of barrier in shallow aquifer. The varved clay provides conceptually the potential for "keying" a vertical retention barrier or slurry wall.
1. Location		
a. Downgradient	Yes	
b. Upgradient	Maybe	
c. Horizontal (bottom sealing)	[illegible]	Already present in form of natu[illegible] clay deposit.

TABLE 1 (Page 3 of 7)
SHARKEY LANDFILL
SCREENING OF REMEDIAL TECHNOLOGIES

ACTION	APPLICABILITY	SITE/WASTE LIMITATIONS TO TECHNOLOGY
2. Material/Construction		
a. Soil/bentonite slurry wall	Maybe	May be chemically attached by leachate resulting in greater permeability; strong acids or bases may dissolve soil/bentonite.
b. Cement/bentonite slurry wall	No	Extra strength provided by cement makes wall more permeable.
c. Grout curtains	Maybe	Grout can be mixed to set up fast enough to fill large voids, but is very expensive. May be chemically attacked by leachate.
d. Sheet piling (steel)	Maybe	
e. Synthetic membrane	Maybe	(See 1.A.1).
C. In-Situ Permeable Treatment Beds	No	Most treatment bed materials are not effective for organic contaminants. Volume of leachate generated at site would quickly surpass capability of beds.
D. Groundwater Pumping	Yes	Used in conjunction with capping and treatment. To lower groundwater and extract leachate/groundwater.
E. Subsurface Collection System	Maybe	Effective leachate/groundwater collection mechanism for shallow aquifer. Combination cap and slurry wall, if implemented, would limit effectiveness.
1. Drainage ditches/trenches	Yes	May have clogging problems.
2. French drains/tile	No	Easily clogged. Difficult to maintain.
3. Pipe drains (multimedia drains)	Yes	May require filter cloth envelopes to prevent clogging.

TABLE 1 (Page 4 of 7)
SHARKEY LANDFILL
SCREENING OF REMEDIAL TECHNOLOGIES

ACTION	APPLICABILITY	SITE/WASTE LIMITATIONS TO TECHNOLOGY
3. Excavation and Removal of Waste and Soil	Maybe	Although some excavation of waste and soil may be necessary as part of site grading, the volume of waste/soil at the site will probably preclude complete removal/excavation, unless a new RCRA facility is created on or off-site.
4. Removal/Containment of Contaminated Sediments		Not applicable as contaminated sediment was not measured at the site.
A. Sediment Removal	No	
B. Sediment/turbidity controls		
1. Silt curtains		
2. Cofferdams/sheet pile stream diversion/barriers	Maybe	Use if cannot excavate during dry weather.
5. In-Situ Treatment	Maybe	Generally unproven, experimental technologies often waste specific.
6. Water Treatment		
A. Incineration/Destruction	No	Not applicable for site. Potential contamination or existing contamination is at very low levels which are not suitable for incineration technology.
B. Gaseous Waste Treatment	No	No gas problems or potential volatile organics were observed or monitored at the site.
C. Liquid Waste Treatment	No	Existing contamination levels and
1. Biological treatment		specific compounds found (volat[illegible] organics) suggest on-site biol[illegible]al treatment is not applicable.

TABLE 1 (Page 5 of 7)
SHARKEY LANDFILL
SCREENING OF REMEDIAL TECHNOLOGIES

ACTION	APPLICABILITY	SITE/WASTE LIMITATIONS TO TECHNOLOGY
2. Chemical treatment	No	Same waste limitations as for biological treatment
3. Physical treatment a. Activated carbon b. Air stripping	Maybe	On-site treatment of the shallow aquifer could involve activated carbon and/or air stripping due to the volatile organics found in the shallow wells and at very low concentrations.
4. Discharge to publicly owned treatment works	Maybe	POTW on-site (Parsippany-Troy Hills Advanced Waste Treatment System)
D. Sludge Handling and Treatment 1. Thickening/Dewatering 2. Treatment	No	No observed sludge problems at the site.
E. Solidification/Encapsulation 1. Solidification 2. Encapsulation	No	Waste and site characteristics indicate that this technology is not applicable for the site.
7. Land Disposal/Storage		
A. Landfills	Maybe	Although no known RCRA off-site facility has landfill capacity in the immediate area, EPA guidelines suggest that this alternative be screened.
B. Surface Impoundments	Maybe	Liquid waste (leachate) could not be merely collected and stored. May require treatment depending on the contamination concentrations.
C. Land Application	No	Potential toxicity/hazardousness of waste preclude land application.

TABLE 1 (Page 6 of 7)
SHARKEY LANDFILL
SCREENING OF REMEDIAL TECHNOLOGIES

ACTION	APPLICABILITY	SITE/WASTE LIMITATIONS TO TECHNOLOGY
D. Waste Piles	No	Need further treatment/disposal.
E. Deep Well Injection	No	Lower aquifer is used as potable water source.
F. Temporary Storage	No	Not applicable.
8. Contaminated Water Supplies		
A. Alternate drinking water supply	No	Public or residential potable wells indicate concentrations below drinking water standards. Some temporary measures may be applicable as other long-term remedial actions are pursued if wells were to become contaminated.
1. Deeper wells	Maybe	If future conditions indicate contamination, these subtechnologies may be applicable. Note: Sampling of lower aquifer which is used for water supply did not indicate any organic contamination.
2. Cistern or tanks	Maybe	
3. Municipal water system	Maybe	
B. Individual Treatment Units	Maybe	In future, if contamination is isolated or if low levels of contamination are found.
9. Relocation	No	Unless emergency or unexpected circumstances occurs.
10. Access Restriction	Yes	Restricting access to site will reduce chances of physical contact with contaminants and reduce chances of normal personal injuries.
A. Signs	Yes	
B. Fencing	Yes	
C. Security guards	No	Security guards would not be cost-effective.

TABLE 1 (Page 7 of 7)
SHARKEY LANDFILL
SCREENING OF REMEDIAL TECHNOLOGIES

ACTION	APPLICABILITY	SITE/WASTE LIMITATIONS TO TECHNOLOGY
11. Erosion Control of River Banks	Yes	Must control refuse materials (tires, bottles, debris) from leaving the site along North Fill and South Fill into the Rockaway River.
12. Gas Migration Controls	Yes	The level of methane system may require an active system. Additional air sampling is required to defined methane levels. In any event, NJDEP required at least passive controls for landfill closures.
A. Passive pipe vents	Yes	
B. Passive trench vents	No	
C. Active gas collection system	Maybe	

In following the procedure defined above, screened alternatives were combined to form more definitive alternatives which addressed the Sharkey Landfill's remedial objectives and EPA guidance requirements for Comprehensive Environmental Response Compensation, and Liability Act (CERCLA) feasibility studies. The results are presented in Table 2 where six preliminary alternatives are listed along with the corresponding remedial technologies. Table 3 lists these alternatives and sub-alternatives along with the associated capital and operation and maintenance costs. These remedial alternatives are discussed below:

1. No Action

The National Contingency Plan requires that a No Action alternative be evaluated. Alternative 1, No Action, would involve only long-term monitoring. This monitoring program would include sampling of air, groundwater, and surface water at several locations on a semi-annual basis. Three new shallow wells and one intermediate well, into the lower aquifer, would be installed at the site as part of this alternative. This alternative would allow contaminants to continue to migrate into the environment unchecked. While the present environmental impact is limited, the data does show that hazardous materials are currently migrating from the landfill with the surrounding surface water. Since there were confirmed reports of hazardous waste disposal at the site, there is a potential for a future release of hazardous materials should this alternative be implemented.

2. Minimal Action

Although Alternative 1 provides a program for monitoring at the site, additional actions would be needed to reduce existing site problems. Alternative 2 includes erosion control for the banks of the Rockaway River, soil covering of the exposed areas, rehabilitation of the North Bridge, additional site security to control vehicle and pedestrian access to the Sharkey Landfill, and a long-term monitoring program. Figure 3 shows the areas to be fenced and exposed areas to be covered with clean fill.

Areas of severe erosion are located at the northern tip of the North Fill and along the banks of the South Fill, both on the Rockaway River. In addition, there is no fill cover on the banks of the Rockaway River along these two fill areas, and garbage, tires, glass and rags are exposed. Under Alternative 2, the affected banks would be stabilized through the use of gabion walls.

TABLE 2
LISTING OF PRELIMINARY REMEDIAL ACTIONS
AND ASSOCIATED REMEDIAL TECHNOLOGIES

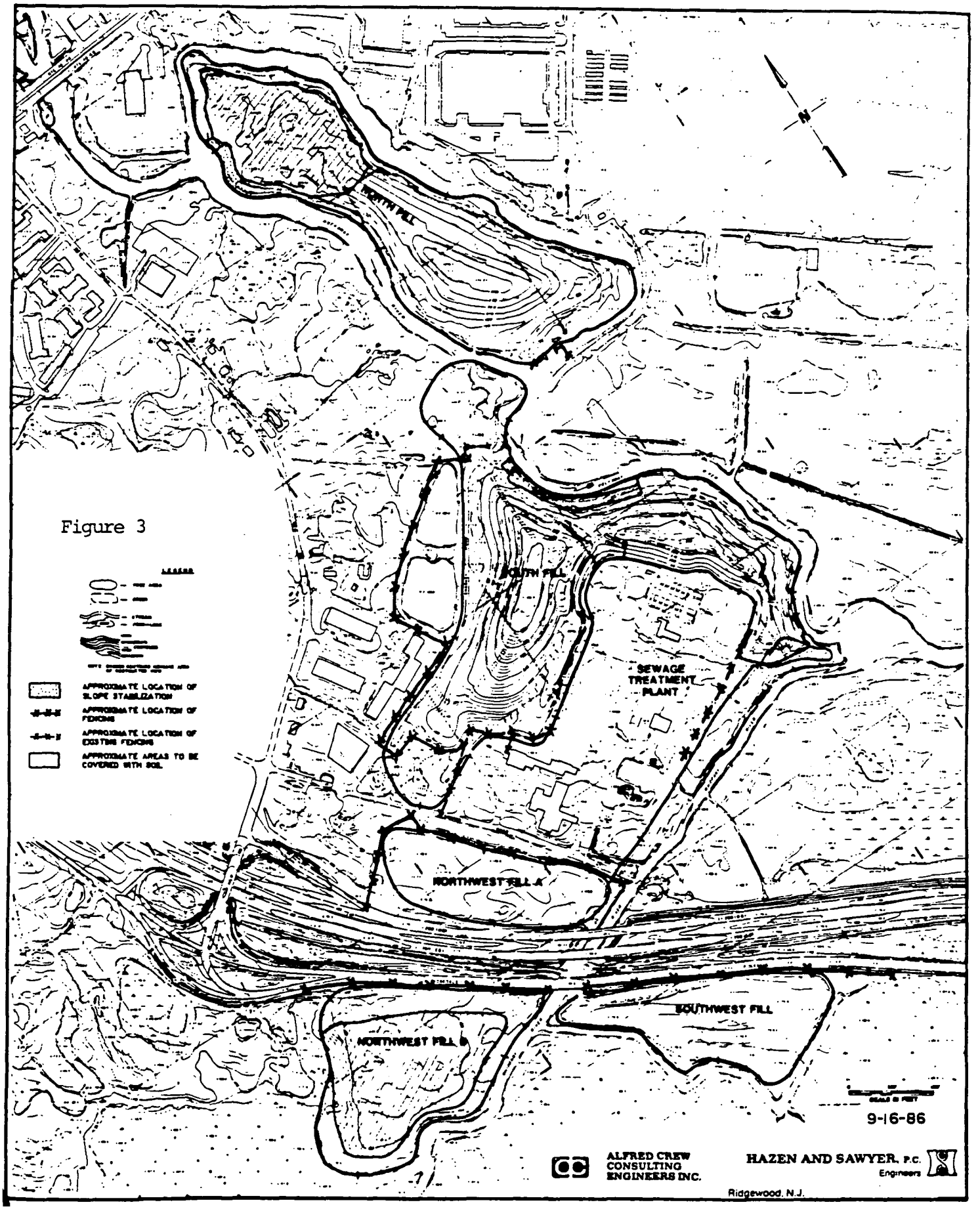
Preliminary Remedial Actions	Remedial Technologies										
	Monitoring	Site Security Control	Cover Exposed Areas	Erosion Control	Capping (Grading) Stormwater Control	Contain-ment Barriers	On-Site Treatment	Off-Site Treatment	Ground-water Pumping	Excavation	Off-Site Disposal
1. No Action	X										
2. Minimal Action	X	X	X	X							
3. Capping	X	X		X	X						
4. Containment of Site Contaminants and Capping	X	X		X	X	X					
5. Capping and Groundwater Pumping, Treatment, Reinjection	X	X		X	X		X	X	X		
6. Excavation of Landfill & Off-Site Disposal	X	X		X	X					X	X

Table 3

Summary of Capital and Present Worth Costs

Alternative	Capital Costs	Present Worth* O&M Costs	Total Present Worth
1. No Action	$ 40,000	$ 792,000	$ 832,000
2. Minimal Action	1,300,000	1,339,000	2,639,000
3. Multimedia Cap			
A. Sanitary closure	15,240,000	1,377,000	16,617,000
B. Synthetic liner	17,700,000	1,424,000	19,124,000
C. RCRA clay	21,400,000	1,502,000	22,902,000
D. RCRA clay and synthetic liner	34,700,000	1,801,000	36,501,000
4. Capping and Containment			
A. RCRA "model" cap	54,800,000	2,226,000	57,026,000
B. RCRA "model" cap for three areas and sanitary closure for two areas	48,700,000	2,152,000	50,852,000
C. RCRA clay cap	41,500,000	1,971,000	43,471,000
5. Capping and Groundwater Treatment			
A. Air stripping system			
a. RCRA "model" cap	36,500,000	2,952,000	39,452,000
b. RCRA clay cap	23,173,000	2,697,000	25,870,000
B. Sewage Treatment Plant			
a. RCRA "model" cap	36,400,000	4,602,000	41,002,000
b. RCRA clay cap	23,100,000	4,348,000	27,448,000
6. Excavation and Removal			
A. Existing RCRA site	617,000,000	-	617,000,000
B. Sanitary landfill	201,000,000	-	201,000,000
C. New RCRA site	289,000,000	-	289,000,000

* Based on 30 years and 10% interest (factor 9.43)



FIVE SITE OPTION

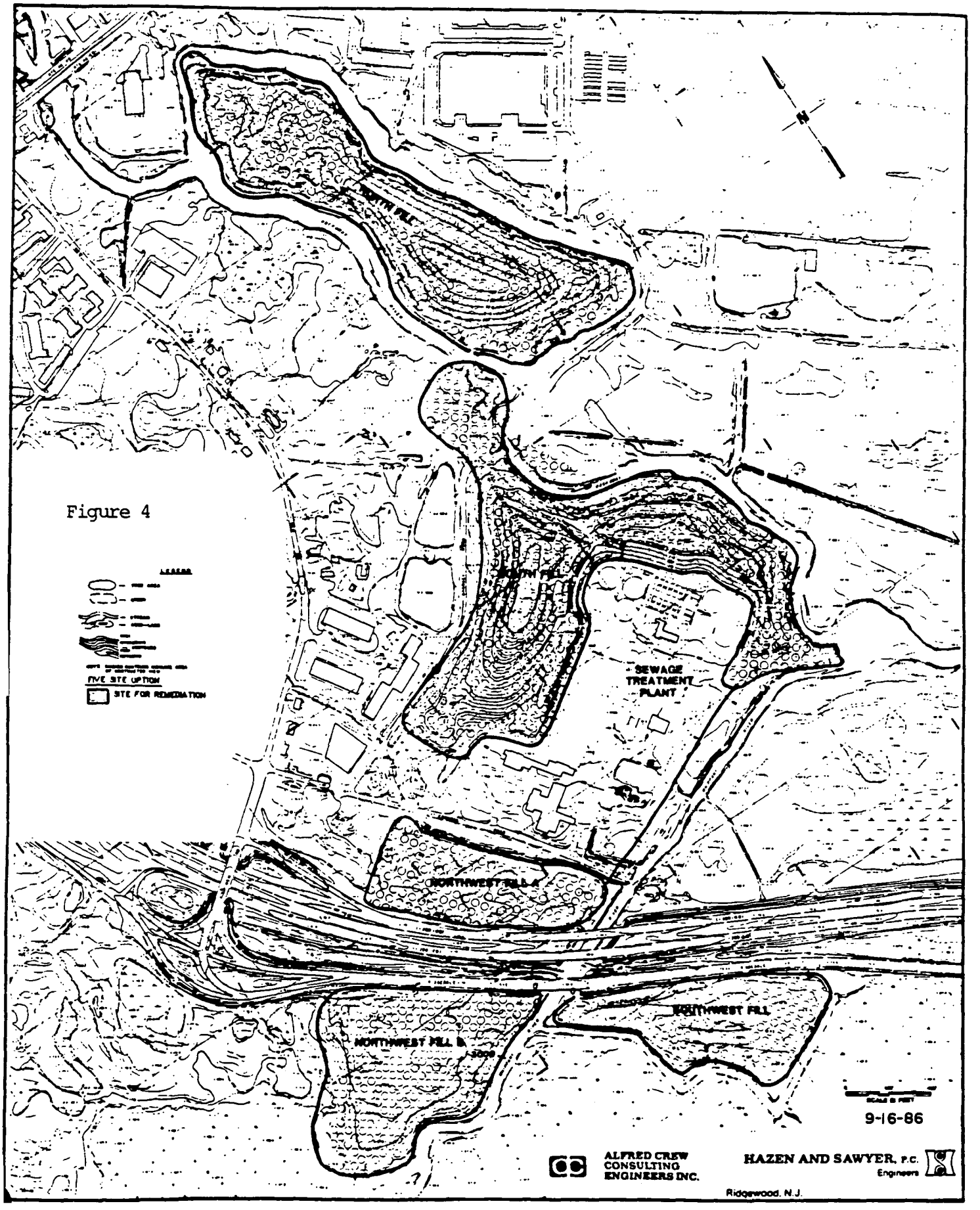
ALTERNATIVE 2 - MINIMAL ACTION

There are areas of exposed refuse which need to be covered in the North Fill, South Fill and the Northwest Fill south of Route 280. These exposed areas could be a potential source of air emissions and also provide a mechanism for precipitation to come in contact with hazardous substances and carry contaminants into the aquifer beneath the site. Covering these exposed areas will include clearing and grading; placing a layer of clean fill; and seeding, fertilizing and mulching. In order to work in areas in the North Fill, the North Bridge which accesses the fill needs to be rehabilitated. Alternative 2, like Alternative 1, would allow contaminants to continue to migrate into the environment and would not reduce the potential for a future release of contaminants that may pose a public health or environmental threat.

3. Multimedia Cap

There is documentation of hazardous waste dumping at Sharkey Landfill. Although available data indicate that the level of contamination at present is relatively low and localized in the shallow aquifer which drains into the Rockaway and Whippany Rivers, the potential exists for detection of higher levels of contamination in the future. Alternative 3 includes a multimedia cap over the Sharkey Landfill (Figure 4), surface water (runoff) control, erosion control for the banks of the Rockaway River, rehabilitation of the North Bridge, installation of gas collection vents, additional site security, and long-term monitoring. This alternative would control the migration of contaminants off-site by reducing the rate of leachate produced through infiltration of precipitation. However, there would still be a natural exchange between the landfill and rivers, especially on the North Fill and part of the South Fill, where a portion of the fill material is actually situated below the surface water level of the Rockaway River. The potential environmental and public health risks associated with the exposure of fill material and leachate seeps are greatly reduced by this alternative.

Four capping options were evaluated, each providing a different degree of protection and reliability. They include capping with clay, capping with a synthetic liner, and capping with a combination of clay and a synthetic liner (Response Conservation and Recovery Act (RCRA) "model" cap).



FIVE SITE OPTION

ALTERNATIVE 3, 4, 6 AREAS OF REMEDIAL ACTION

A. Clay Cap - Sanitary Landfill Closure

The Sharkey Landfill can not be considered a sanitary landfill because hazardous waste dumping at the site is documented. Therefore, Alternative 3-A, which would close the site as a sanitary landfill, is not considered appropriate. However, it does satisfy the objective of evaluating remedial actions which do not attain applicable or relevant public health or environmental standards but would reduce the likelihood of present and future threats from hazardous substances.

For this alternative, a complete cap typically consists of the following: a bedding layer placed and compacted on top of the solid waste; an impervious layer; a drainage layer; and a vegetative layer. Figure 5 shows the detailed typical cross-section of the cap.

The implementation of sanitary landfill closure is based on known technologies and engineering principles and is effective in reducing infiltration. Although increased air emissions would be expected during grading, this alternative will provide some long-term benefits. These benefits include a reduction in ponding of rain water on the fill, a reduction in leachate generation and subsequent off-site migration of contaminants, and a reduction in potential air emmissions due to inadequate cover. However, the wastes would still remain in contact with the groundwater, specifically in the North Fill and areas of the South Fill, could cause some leachate production and off-site contamination. This alternative is implementable, provides some degree of reliability, and involves minimal operation and maintenance.

B. Synthetic Liner Cap

This alternative, which would include the same closure standards as for Alternative 3-A, considers the use of a synthetic liner as the component of the impervious layer instead of clay. The capping criteria would be as follows: a 6-inch sand bedding; a 30-mil synthetic liner; a 1-foot drainage layer; and 1 foot of topsoil and vegetation.

The environmental benefits and the implementability of this alternative are similar to those for Alternative 3-A. However, because of the steep slopes at the site, the synthetic liner is not considered as reliable as clay.

This alternative does not attain all of the environmental standards but would reduce the likelihood of present and future threats from hazardous substances.

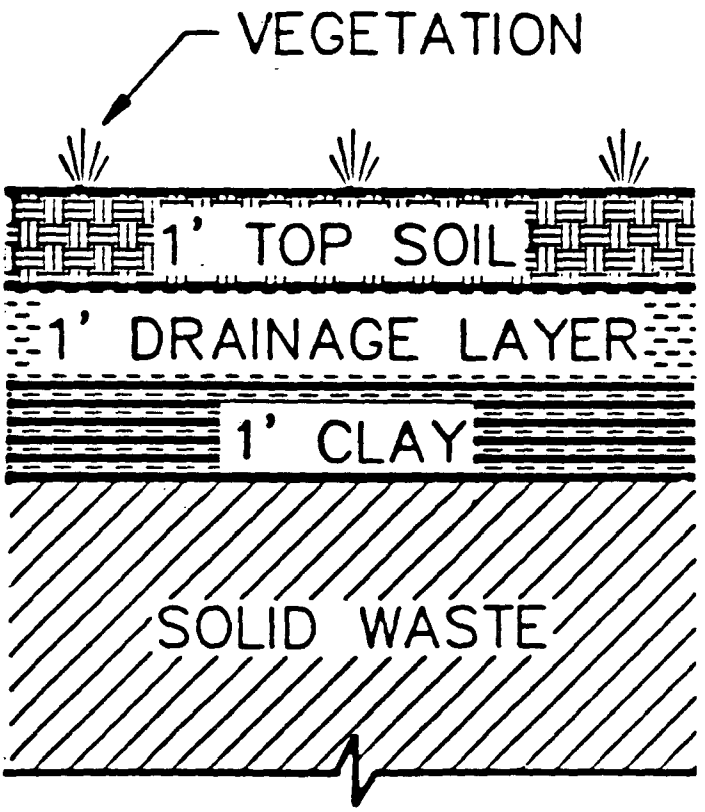


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FIGURE 5	SANITARY LANDFILL CAP	

C. Clay Cap

This alternative considers the closure of the landfill as a hazardous waste site in accordance with relevant RCRA and State requirements.

Instead of using one foot of clay for the impervious layer, as in Alternative 3-A, Alternative 3-C would include two feet of clay. This alternative meets the performance requirements of RCRA Subtitle C which includes a multimedia cap with a permeability of 10^{-7} cm/sec. It also is consistent with State of New Jersey requirements for the closure of landfills which accepted all types of solid wastes.

There is evidence of hazardous waste dumping at the landfill and hazardous substances were found to be present. Although available RI/FS data do not indicate that significant quantities of contaminants are currently being released to the environment, there exists the possibility of future releases which may cause serious environmental and public health impacts. This capping alternative would consider such a potential threat and provide a more protective and reliable cover than Alternative 3-A or 3-B. Figure 6 shows the detailed typical cross-section of the cap.

The environmental benefits of this alternative are greater than those for Alternative 3-A, based on the more impermeable and reliable surface barrier. However, wastes would still remain in contact with the groundwater as in the previously described capping alternatives, which could cause leachate production and off-site contamination.

Implementation of this capping option is based on known technologies and engineering principles and is effective in reducing infiltration. This alternative has similar, but increased benefits compared to Alternative 3-A, and involves minimal operation and maintenance.

D. Clay and Synthetic Liner Cap - RCRA "Model" Cap

This alternative involves the closure of the site as a hazardous waste landfill utilizing a RCRA "model" cap. The "model" cap consists of the following: a bedding layer installed on top of the solid waste; an impervious layer (clay); a second bedding layer; a second impervious layer (synthetic liner); a drainage layer; and a vegetative layer (see Figure 7). The cover requirement used for this alternative also meets NJDEP Regulations pursuant to N.J.A.C. 7:26-10, "Additional Operational and Design Standards for Hazardous Waste Facilities", specifically N.J.A.C. 7:28-10.8,"Hazardous Waste Landfills".

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FIGURE 6	RCRA CLAY CAP	

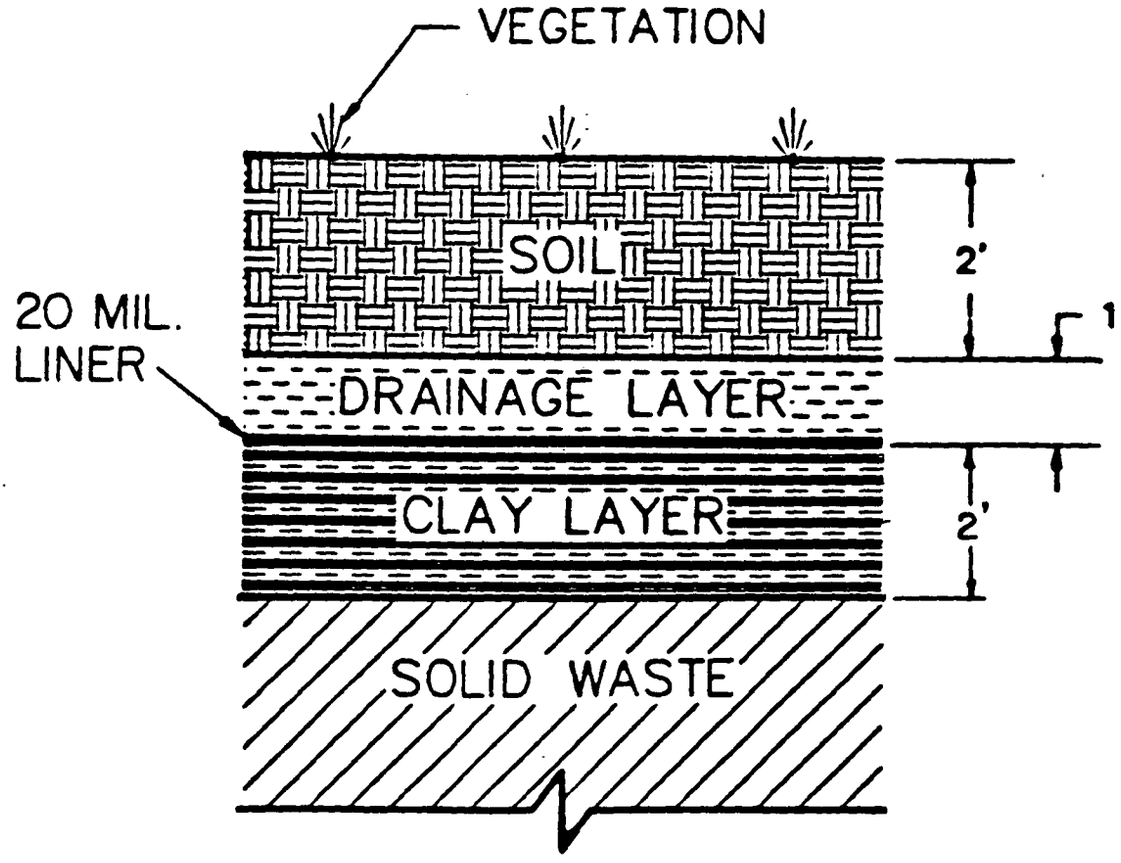

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FIGURE 7	RCRA "MODEL" CAP	

The environmental benefits of this alternative are similar to, but greater than those for any of the other capping options. The "model" cap would provide a more impermeable surface barrier than the other capping options. However, because the waste would remain in contact with the groundwater, the alternative does not achieve greater compliance with RCRA Subtitle C, Hazardous Waste Management Regulations.

Although this alternative does not attain all the environmental standards, it would reduce the likelihood of present and future threats from hazardous substances.

4. Multimedia Cap and Containment Barrier (Slurry Wall)

This alternative adds to Alternative 3 by providing an additional component to the remedial action, containment of the shallow aquifer. The alternative controls migration of contaminants from the landfill through a multilayered cap which controls leachate production, and a slurry wall barrier along the perimeter of the fill areas which control the migration of contaminated groundwater in the shallow aquifer. The slurry wall would be keyed to the clay layer beneath the site.

The slurry wall would minimize the lateral groundwater flow into and out of the fill areas. The total length of the proposed slurry wall would be approximately 21,000 linear feet with an average depth of 40 feet. The remedial technologies associated with Alternative 4 would be the same as Alternative 3, in addition to the construction of the slurry wall. Groundwater containment by use of slurry wall is a proven, effective technology.

Based on the present data and past references, three options have been considered under this alternative.

Option A - Installing a RCRA "model" cap and a slurry wall throughout the entire fill area. The cap will be installed with the same specifications as for Alternative 3-D.

Option B - Installing a RCRA "model" cap and slurry wall for the North and South Fills, and installing a sanitary landfill cap in the Northwest (North and South of Route 280) and Southwest Fills. The sanitary landfill cap is well explained in Alternative 3-A.

Option C - Installing a RCRA clay cap and slurry wall throughout the entire area. The components of the cap are described in Alternative 3-C.

This alternative meets applicable or relevant public health and environmental standards and will satisfy both Federal and State requirements concerning the closure of hazardous waste landfills. This alternative prevents the contact of waste with the groundwater, complying with RCRA Subtitle C, Hazardous Waste Management Regulations. Therefore, this alternative provides more environmental protection than Alternative 3.

5. Multimedia Cap, Groundwater Pumping and Treatment

This alternative would control migration of contaminated material off-site through installation of a multimedia cap and groundwater extraction and treatment. Based on EPA and NJDEP requirements for closure of a landfill, treating groundwater without providing a surface cap is not considered an acceptable alternative.

Under this alternative, groundwater would be pumped from the landfill areas, as shown in Figure 8, to extract contaminated groundwater from the shallow aquifer. Groundwater would be removed from the shallow aquifer at a rate equivalent to the estimated recharge to that aquifer. It is projected, however, that the refuse in some areas of the landfill will exist below present and anticipated post-closure groundwater levels. Therefore, there would be a continuing interaction between groundwater and refuse materials. Extraction of the groundwater should effectively isolate the contaminants from the surrounding ground and surface waters.

Under this alternative, a series of perimeter recovery wells would be constructed along a line parallel to the Rockaway and Whippany Rivers, bordering all five areas, and linked by a common trench along the pumping line. The contaminated groundwater could be either treated on-site using a separate air stripping treatment system or treated at the Parsippany-Troy Hills sewage treatment plant, which is on the site. These two treatment alternatives are discussed below:

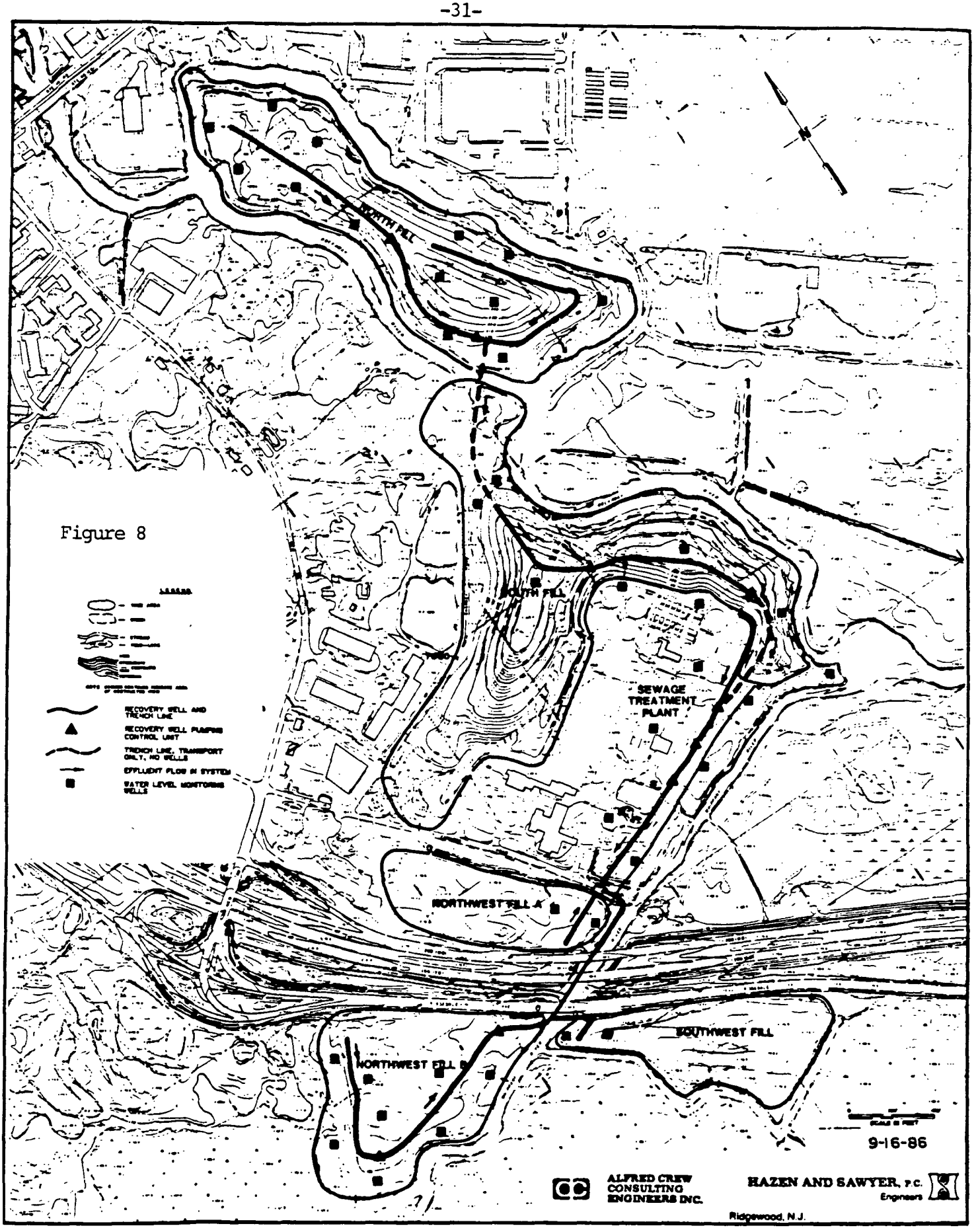
Option A: On-Site Air Stripping Treatment System

This alternative would involve a centralized treatment system with discharge of treated effluent to the Rockaway River. A preliminary unit sizing for an air stripping system would be a 2.5 feet diameter packed column with 15 to 20 feet depth of plastic media.

Option B: Parsippany-Troy Hills Sewage Treatment Plant

The existing sewage treatment plant includes secondary biological treatment with seasonal nitrification and denitrification. Since the contaminants detected in the groundwater are biodegradable, the contaminated groundwater could be treated by the sewage treatment facility.

The environmental benefits of this alternative exceed those of Alternative 3. Not only is leachate production reduced through the installation of a cap, but contaminants would not migrate off-site because of the effective isolation of the waste through groundwater pumping.



FIVE SITE OPTION

ALTERNATIVE 5 - CAPPING AND GROUNDWATER PUMPING

The isolation of wastes through groundwater management is a demonstrated, reliable technology, and is implementable. In addition, this alternative meets applicable or relevant public health and environmental standards.

6. Excavation and Off-Site Disposal of Waste

This alternative would control migration of materials off-site from the Sharkey Landfill through the excavation and removal of the entire landfill, and transporting the excavated material for disposal at an approved landfill site. The entire fill area as shown in Figure 4 was considered for off-site disposal. Three disposal options were considered in assessing this alternative.

- Option A - Transport the waste to an approved existing RCRA disposal facility, such as at Model City, New York.
- Option B - Transport the material to a local sanitary landfill, such as at the Meadowlands, New Jersey.
- Option C - Transport the waste to a new RCRA facility to be constructed as part of this alternative.

The estimated amount of material to be removed is 3,900,000 cubic yards of fill. The excavated areas would be backfilled, regraded up to an elevation of approximately 175 feet above mean sea level, and seeded. The backfilling operation would require approximately 1,500,000 cubic yards of fill. Since the actual location(s) of areas of potential contamination were not positively defined from historical information or from the remedial investigation, total removal and disposal of the Sharkey Landfill material was the only case considered for the off-site disposal.

This alternative meets the CERCLA remedial objective that requires evaluation of an alternative which provides for treatment or disposal of hazardous substances in an approved off-site facility. By removing all the fill material, one can expect the site to be considered clean after completing the filling, grading and revegetation. Therefore, this alternative also satisfies the requirements of examining a remedial alternative which exceeds existing standards. This alternative would provide a highly effective means to mitigate the potential exposure to any contaminants in the landfill or any material remaining at the site.

COMMUNITY RELATIONS

A public meeting was held on November 29, 1984 at the Parsippany-Troy Hills Municipal Building to discuss the proposed RI/FS.

Notices announcing the meeting were sent to local officials and interested parties as outlined in the Sharkey Landfill Community Relations Plan. At this meeting, NJDEP officials and their consultants discussed in detail the work to be conducted as part of the RI/FS for the site.

The RI/FS report was made public on August 13, 1986. A public comment period began on that day and was closed on September 2, 1986. A second public meeting was held on August 21, 1986 to discuss the results of the RI/FS and the preferred alternative. Concern expressed by the public and other entities are addressed in the Responsiveness Summary appended to this documment (Appendix 2).

CONSISTENCY WITH OTHER ENVIRONMENTAL LAWS

In addition to accepting municipal solid waste, the Sharkey Landfill allegedly received hazardous and/or toxic materials between 1962 and 1969 from Ciba-Geigy, a pharmaceutical company. Sharkey Farms Landfill was permitted by the local health department to operate until 1970, when State regulations preempted all local regulations. A certificate to conduct a refuse disposal operation (Certificate No. 1458300) for refuse, chemical waste (liquid and solid), and waste oils was issued on July 10, 1970 by NJDEP. The landfill reportedly operated for six days a week until a July 6, 1972 order issued by the New Jersey Department of Public Utilities required the discontinuance of Saturday service in order to provide the time needed to install sufficient cover material, in accordance with Chapter 8 of the New Jersey Sanitary Code.

The sanitary landfill closure alternative considered the history of the site and the relevant State guidelines and regulations. However, the documentation of hazardous waste dumping, and available chemical data indicating the presence of hazardous substances in the landfill site, suggest that implementation of the sanitary landfill closure alternative is not appropriate. To cap the site as a sanitary landfill to comply with the New Jersey "Non-hazardous Waste Management" Regulations would not provide a sufficient level of protection to accomodate the potential future releases of contaminants. Moreover, this alternative is not consistent with applicable Federal requirements under RCRA for hazardous waste facilities.

Because of evidence of hazardous waste dumping and the detection of some hazardous substances at the site, the relevant and appropriate standards for closure are stated in RCRA Subtitle C. The hazardous waste cap and groundwater barrier alternative was developed as a remedial alternative to comply with RCRA. The RCRA cap with groundwater extraction, and the RCRA cap alone, would allow the waste to come into contact with the groundwater, specifically in the North Fill and part of the South Fill. Therefore, these alternatives would not ensure compliance with RCRA Subtitle C as fully as would the cap with the slurry wall.

The RCRA cap with groundwater pumping would effectively isolate the waste so that generated leachate does not migrate off-site. Groundwater would be extracted and treated either on-site or at the sewage treatment plant. The excavation and off-site disposal alternative would also comply with RCRA because the disposal facility would be required to comply with the appropriate regulations.

RECOMMENDED ALTERNATIVE

In evaluating the alternatives, it was determined that Alternative 5-A(b) would provide sufficient protection of public health and the environment, would meet the performance standards of the applicable requirements, is cost-effective and has a legal basis for remedial action under Superfund.

As stated previously, hazardous wastes were disposed of at the Sharkey Landfill site, which was not properly closed after operations ceased. As a result, landfill contaminants have migrated and continue to migrate into the shallow aquifer beneath the site and the adjacent surface water bodies. Although available data do not suggest that significant quantities of hazardous substances are being released at the present time, there exists the potential for future releases of contaminants at levels which could pose a serious threat to public health and the environment. Therefore, Alternative 1 (No Action) and Alternative 2 (Minimal Action) are not considered adequate because they do not meet the proper closure requirements for landfills nor do they address the potential threat of a future release of contaminants.

Alternative 3 addresses capping of the landfill in accordance with RCRA and State requirements. However, wastes that may contain hazardous substances are known to be in contact with the groundwater which discharges into the surface waters surrounding the site. This condition could cause the production of leachate and off-site migration of contaminants. Therefore, Alternative 3 was not considered appropriate.

Alternative 6 (Excavation and Removal) would totally remove the threat to public health and the environment. However, this alternative is extremely expensive, difficult to implement, and unwarranted based on the level of risk associated with the site.

The two alternatives which address leachate production and the off-site migration of landfill contaminants into the groundwater are Alternative 4 (Capping and Containment) and Alternative 5 (Capping and Groundwater Treatment). In view of the level of health or environmental risk, it is believed that Alternative 5 would provide sufficient control of the migration of contaminants through the groundwater pathway. Alternative 4 would more effectively isolate the wastes from the environment and thus provide a higher degree of control of contaminant migration. However, the substantial higher cost to implement Alternative 4 is not considered cost-effective in comparison to Alternative 5.

In evaluating the options within Alternative 5, RCRA and State closure requirements were considered, as were groundwater treatment requirements. As discussed previously, the Sharkey Landfill is considered a hazardous waste site. Therefore, the relevant and appropriate Federal statute governing closure is RCRA Subtitle C. The recommended alternative meets the performance requirements of the relevant RCRA regulations (multimedia cap with a permeability of 10^{-7} cm/sec), although it does not meet the compositional criteria of the RCRA "model" cap. The "model" cap with the added synthetic liner would significantly increase the costs without showing a corresponding increase in effectiveness. It is considered unwarranted for this site. If a synthetic liner is required in the future, the additional grading of the fill areas will facilitate installation.

The multimedia cap of Alternative 5-A(b) will reduce the infiltration of precipition through the landfill, and the use of a pumping and treatment system will prevent contaminants from migrating off-site. The pumping system, as explained in Alternative 5, will be installed to capture contaminated groundwater.

One final option which was considered and rejected involved treating some fill areas as hazardous waste sites and others as sanitary landfills. Based on information concerning the time of hazardous waste dumping and the transfer of waste materials among the various fill areas during construction of a highway and sewage treatment plant, it was determined that such a distinction (i.e., hazardous versus non-hazardous) could not definitely be made. Because of the lack of information confirming the absence of hazardous waste at any of the fill areas, the recommended alternative includes capping and groundwater pumping for all five fill areas.

A cap cross-section and a site lay-out illustrating the recommended alternative are provided in Figures 4 and 7. The features of the selected alternative are described in Table 4.

OPERATION AND MAINTENANCE

Upon installation of the recommended remedial action, operation and maintenance (O&M) will consist of:

- O&M of the groundwater pumping and treatment system
- Routine maintenance of the landfill cap and gas vents
- Routine maintenance of the site to control erosion and surface water runoff
- Long-term monitoring to assess the quality of the groundwater (lower and upper aquifers) and surface waters (Rockaway and Whippany Rivers)

The annual operation and maintenance cost is estimated at $330,000.

Table 4

Capital Cost Estimate For Alternative 5-A(b)

Activity	Capital Cost*
1 - Capping all five areas	$18,513,000
2 - Groundwater pumping and recovery system	1,700,000
3 - Air stripping treatment system	100,000
4 - Clear, grub and grade sites	327,000
5 - Cover exposed areas	454,000
6 - Methane collection vents	284,000
7 - Shoreline stabilization	192,000
8 - Storm water control	1,319,000
9 - Improvement of site security	145,000
10 - Rehabilitation of North Fill Bridge	91,000
11 - Long-term monitoring (installation of additional monitoring wells)	48,000
Total Capital Cost	23,173,000

* 10 percent for contingency and 10 percent for engineering, legal adminstration, and startup costs are included.

SCHEDULE

Project	Date
- Record of Decision	September 1986
- Initiate Enforcement Action	September 1986
- Obligate Design Funds	Pending CERCLA Reauthorization or State Funding
- Amend Cooperative Agreement for Design	Pending CERCLA Reauthorization or State Funding
- Initiate Design	Pending CERCLA Reauthorization or State Funding
- Complete Design	Pending CERCLA Reauthorization or State Funding

APPENDIX I

SUMMARY

OF

SAMPLING RESULTS

SUMMARY OF RESULTS

NORTH FILL

ORGANICS (PPB)	WS-9	WS-11	WS-12	WS-13	WI-15	WI-16	SD-5	SD-10&11	L-6	L-8	S-5
Chlorobenzene	17		18								
Toluene	14	73									
Ethylbenzene	27	42									
Methyl Chloride		32						940*			
Xylene			22	21				310*			
Chloroform				34							
Benzene				22							
Benzo (a) Pyrene					27		15				
Acetone								940*			16
Tetrachloroethene								940*			
Trichloroethene								310*			
INORGANICS (PPB)											
Chromium	146	334	75	182			60				60
Lead	480		77						32		776
Mercury	1.6										
Nickel	564	1390	320	405			70	70	46		
Barium				1440							
Cadmium						19			6.1		
Cyanide									332		

WS = Shallow wells
WI = Intermediate wells
WD = Deep wells
SD = Surface water samples * Sediment Samples
L = Leachate samples
S = Soil samples

(Cont. SUMMARY OF RESULTS)

SOUTH FILL

ORGANICS (PPB)	WS-2	WS-6	WS-7	WS-8	WS-17	WI-6	WI-7	WI-8	WI-17	WD-2	SD-3	SD-6	SD-7	SD-8&9	L-3&4	S-4
Chloroform		75														
Trichloroethene		13														
Benzene		6							13							
ACID BASE NEUTRAL (PPB)																
Bis(2-Ethylhexyl) Phthalete											370*					
Phenanthrene											270*					
Flouranthene											670*					
Pyrene											200*					
Benzo (a) Anthracene											200*					
Benzo (k) Fluoranthene											330*					
INORGANICS (PPB)																
Chromium		4990				97			206							
Nickel		87	63	60	41	49	16	31	181	39	60	60			80	
Lead		63			145						70*					138
Cadmium										25	13			12		
Mercury											2.1					
Cyanide													33		32	
Barium															1020	

WS = Shallow wells
WI = Intermediate wells
WD = Deep Wells
SD = Surface Water Samples * Sediment Samples
L = Leachate Samples
S = Soil Samples

(Cont. SUMMARY OF RESULTS)

NORTHWEST (S) FILL

ORGANICS (PPB)	WS-5	WI-5	L-2	SD-2
Chlorobenzene	23		10	
Benzene	28			
INORGANICS (PPB)				
Chromium			80	60
Nickel			50	

NORTHWEST (N) FILL

ORGANICS (PPB)	WS-3	WI-3	WD-3	L-5	S-3
Acetone					57
Benzo (a) Pyrene					1500
INORGANICS (PPB)					
Chromium	54	68	143		
Lead	290		80		159
Cyanide	248				
Nickel	172	72	307	100	27

SOUTHWEST FILL

INORGANICS (PPB)	WS-4	WI-4	SD-2	L-1	S-1
Chromium	341		60	69	
Lead	81				28
Nickel	246	17			50

BACKGROUND

ACID BASE NEUTRALS (PPB)	WS-14	WS-10†	SD-1	SD-4
Bis(2-Ethylhexyl) Phthalate				370
Fluoranthene				200
INORGANICS (PPB)				
Chromium	89	492		70
Nickel	60	594		70
Cadmium			13	
Lead			80	
Barium		1280		

WS = Shallow Wells
WI = Intermediate Wells
WD = Deep Wells
SD = Surface Water Samples * Sediment Samples
L = Leachate Samples
S = Soil Samples
† Undetermined as background

APPENDIX II

RESPONSIVENESS

SUMMARY

Sharkey Farms Landfill
Parsippany-Troy Hills and East Hanover Townships
Morris County
New Jersey

Responsiveness Summary
for comments on the
On-site Feasibility Study

This community relations responsiveness summary, prepared as part of the Record of Decision (ROD), is divided into the following sections:

I. Background on Community Involvement and Concerns
This is a brief history of community interest concerning the Sharkey Farms Landfill site and a summary of community relations activities conducted by the New Jersey Department of Environmental Protection (NJDEP) and the United States Environmental Protection Agency (USEPA) prior to and during the Remedial Investigation/Feasibility Study (RI/FS).

II. Summary of Major Questions and Comments Received during the August 21, 1986 Public Meeting
This is a summary of major questions and comments directed to NJDEP during the August 21, 1986 public meeting regarding the results of the Feasibility Study. NJDEP's responses are included in this section.

III. Remaining Concerns from the August 21, 1986 Public Meeting
This is a discussion of remaining community concerns of which NJDEP and USEPA should be aware in conducting the remedial design and remedial actions at the Sharkey Landfill site.

IV. NJDEP's Revised Recommended Alternative
This is a list of the components of the revised recommended alternative.

V. Summary of Major Written Questions and Comments Received during the Public Comment Period and NJDEP's Responses

Attachments
A. Passaic River Coalition letter 2/83
B. Attendance sheet and information package distributed at the 11/29/84 public meeting
C. Copy of information package submitted by Mr. and Mrs. Jurgel on 1/4/85 and 1/18/85
D. Mailing list for Sharkey Farms Landfill site
E. Attendance sheet and information package distributed at the 8/21/86 public meeting
F. Copies of letters received by NJDEP during public comment period

I. Background on Community Involvement and Concerns
The main area of concern raised prior to the Remedial Investigation/Feasibility Study (RI/FS) was that the Sharkey Landfill site clean-up progress as quickly as possible. The Passaic River Coalition expressed their interest in the site in a letter to the NJDEP in February 1983. Ella

Filippone, Executive Administrator of the Coalition, stressed the Coalition's interest in the Passaic River Watershed basin, and in particular, the possibility of pollutants moving into the aquifers from the landfill. A particular concern was the fact that the landfill operated before regulations existed. The Coalition requested that a monitoring program be implemented prior to cleanup, and that "containment and cleanup... be expedited, as it poses a grave threat to a designated sole source aquifer" (see attachment A).

In addition to the Passaic River Coalition, there were various requests for information on the landfill status from various parties. These included requests from then Assemblyman Dean Gallo's office, the Townships of Parsippany-Troy Hills, East Hanover, Montville and Washington, the Boonton-Montville League of Women Voters, individual citizens, the Star Ledger and WMTR radio. Again, the primary issues of concern were potential contamination of the aquifers and that site clean-up be implemented in a timely manner. In each case, information on the Sharkey site was given over the telephone by the NJDEP's, Bureau of Community Relations and all interested parties were placed on the mailing list for this site.

An attempt was made by NJDEP to locate any additional interested parties or active citizen groups in the area. In contacts with the Parsippany-Troy Hills and East Hanover Town Halls and Health Departments, it was determined that there were no additional organized active citizens/environmental groups in the area.

On November 29, 1984 NJDEP held a public meeting at the Parsippany-Troy Hills Town Hall to discuss the initiation of the RI/FS at the site. Notification of the meeting was accomplished through press releases and direct mailing of notices to local, state and federal officials, as well as all concerned citizens and citizens groups. Approximately 30 people attended the meeting and agendas and information packages were distributed (see attendance sheet and information package, Attachment B). Issues and concerns raised during the meeting and responses given included:

Comment: Concern about creating unnecessary fear among local residents and spending so much money when previous DEP monitoring did not indicate the presence of a toxic condition.

Response: It was pointed out that a careful definition of hazardous and toxic terms was important. EPA sampling in 1980 and 1981 indicated that toxic substances may be present at the landfill. DEP sampling was conducted in 1978 when sampling techniques were not as advanced as they are today (1984).

Comment: The Parsippany-Troy Hills Volunteer Fire Department expressed concern about the emergency response plan and offered to point out locations where fires have occurred on the site.

Response: A copy of the health and safety plan was offered to the Fire Department, and their collaboration on it was welcomed. In addition, they were offered a key to the trailer where special fire-fighting equipment would be stored. It was pointed out that the DEP emergency unit is available on a 24-hour basis.

Comment: A question was raised about responsible party pursuit, and an offer was made to review observations of landfill operations during its active period.

Response: The principal sources of information are the 1976 State Industrial Survey and a similar study conducted by the federal government in 1980. Activities conducted by the NJDEP as a follow-up to the public meeting included briefing the Parsippany-Troy Hills Fire Department on the Emergency Response Plan, as well as informing them of planned well-drilling, etc., and consultation with Mrs. Dorothy Jurgel, a resident of New Road regarding past operating procedures at the landfill. In January 1985, Mr. and Mrs. Jurgel submitted a 27-page compilation of information on the Sharkey Landfill including news articles, letters, ordinances and regulations, photographs and personal notes (see Attachment C).

II. Summary of Major Questions/Comments Received During the Public Comment Period and NJDEP's Responses

On August 13, 1986 the RI/FS was placed in the following repositories for public review: East Hanover Municipal Building, Parsippany-Troy Hills Municipal Building, Morris County Public Library in Whippany, Parsippany-Troy Hills Public Library, East Hanover Public Library and the NJDEP, Division of Hazardous Site Mitigation in Trenton. NJDEP issued a press release and contacted local officials, as well as interested citizen groups regarding the availability of the RI/FS at these repositories.

On August 21, 1986 NJDEP held a public meeting to present the results of, and receive comments/questions regarding the RI/FS. Notification of the meeting was accomplished through press releases and direct mailing of notices to local, state and federal officials, as well as concerned citizens and citizen groups (see Attachment D). Approximately 30 people attended the meeting, and each received an agenda, fact sheet, an overview of the community relations program and a paper copy of the slides used in the contractors presentation. (attendance sheet and hand-out, see Attachment E). The public comment period was held from August 13, 1986 through September 2, 1986. In addition to the comments made during the public meeting, four letters were received by the Department during this period (See Attachment F).

During the public meeting, Dr. George Kehrberger of Alfred Crow Consulting Engineers presented six remedial alternatives for long-term site remediation.

These are:

- No action, except long-term monitoring;
- Long-term monitoring, erosion control, site security and covering exposed areas;
- Long-term monitoring, erosion control, site security and a multimedia cap;
- Long-term monitoring, erosion control, site security, a multimedia cap and containment barrier;
- Long-term monitoring, erosion control, site security, a multimedia cap and pumping and treatment of ground water; and
- Excavation and removal of waste materials.

Richard Salkie, Acting Director of NJDEP's Division of Hazardous Site Mitigation, then discussed NJDEP's recommended alternative which includes site security and access, erosion control and shoreline stabilization, capping, gas collection system, storm water control and long-term monitoring of the site. Comments and questions were then received from the audience. In addition to Director Salkie, and Dr. Kehrberger, representatives assisting with the RI/FS of R.E. Wright Associates, HydroQual and Hazen and Sawyer were present and responded to questions relevant to their areas of expertise.

Questions and Comments from the August 21, 1986 Public Meeting

Note: Subsequent to the August 21, 1986 public meeting, the NJDEP has been in consultation with the USEPA at Region II and Headquarters in Washington, D.C. The USEPA has requested the NJDEP to recommend additional remedial measures for an extra margin of control of contamination release based upon documentation of waste disposal at this site. These additional measures included implementation of a ground water recovery and treatment system and capping fill areas to meet federal Resource Conservation and Recovery Act (RCRA) requirements. From this landfill. The responses to comments below are as given at the public meeting and represent NJDEP's position on August 21, 1986.

In general, the tone of the public comments was very positive. Several individuals, including Parsippany-Troy Hills Mayor Frank Priore and Dr. Daniel Van Abs of the Passaic River Coalition, expressed that they were "pleased" and "relieved" at the findings of the study. The Mayor stated that he realized that excavation and removal were unrealistic, and felt that the recommended alternative was "ambitious". There were, however, some areas of concern raised, and these are summarized by subject as follows:

- Movement of contamination off-site;
- Sampling results and laboratory procedure;
- Police officers' use of pistol range on-site;
- Concerns of the Fire Department;
- Methane gas recovery;
- Responsible party involvement; and
- Other issues.

Movement of Contamination off-Site

The primary concern expressed at the meeting was the possibility that contamination was present at the landfill but had not yet moved through the fill and into the aquifer. Residents were assured that the long-term monitoring program recommended by NJDEP would detect any such movement of contaminants.

Comment: What if the chemical wastes were deposited on the landfill during its "warning years" of operation and are just now working their way down through the 80 feet of fill?

Response: That is a possibility, and the long-term monitoring program is set up for just this reason; to detect any contamination moving into the ground water from the landfill. This monitoring would be conducted on a semi-annual basis for 30 years.

Comment: Was the sampling done at various levels? I'm concerned that in your drilling, you might have drilled right through something instead of actually sampling it.

Response: Monitoring wells were installed in the lower regions of the shallow aquifer. The wells were screened in the shallow aquifer and evacuated three times to insure a representative sample of the shallow aquifer.

Comment: Was there any analysis of soil borings and were any samples of the aquitard taken?

Response: The plan was to use a Photo Ionization Detector (HNU Meter) to scan soil borings for the presence of organic contaminants. If we had gotten any positive readings, we would have then taken the sample(s) back to the lab for further analysis. We did not experience any positive readings.

Comment: Capping makes a lot of sense. I'm concerned, however, that the possibility still exists that wastes are in the fill and haven't yet migrated. With this cap, could they still leave the site?

Response: The greatest potential for the leachate to migrate from the landfill occurs during the 2-3 year period after the capping, when the landfill is being drained. Again, that is the reason for our semi-annual monitoring program. In the event any leachate was leaving the site, our monitoring program would detect it. (see NJDEP's Revised Recommended Alternative p.10)

Comment: We (the Passaic River Coalition) recommend that the possibility of ground water treatment be left open, in case contamination is detected.

Response: That is exactly what we are planning. We would develop a monitoring system and if any problem were detected, we would then put in a ground water treatment system. (see NJDEP's Revised Recommended Alternative. p.10)

Comment: Will this monitoring program be looking only for certain gases and metals?

Response: We would be looking for the whole range of Priority Pollutants.

<u>Sampling Results and Laboratory Procedure</u>

Comment: You are saying that the consultant found contamination at the site, then the state sampled again and found none. How is this explained?

Response: We were concerned when some of the wells in the area showed contamination, so the state sampled a second time. The second set of sampling didn't show what the first set did. It is difficult to draw conclusions based on this. Laboratory procedures could account for the difference. It is not unusual to have contamination levels of 10-20 ppb in the samples themselves as a result of laboratory procedures. In a number of cases we found contamination in the blanks. For these

reasons, we will conduct a third round of sampling to confirm our earlier results.

Comment: If there was laboratory interference, could the state use a different laboratory?

Response: The second round of sampling did go to a different laboratory for just that reason.

Comment: Have the results of the second round of sampling on the Homestead Well been forwarded to the East Hanover Township Water Department?

Response: No, we received them two days ago and they must go through our Quality Assurance program. After that, they will be sent.

Comment: Did NJDEP do this testing?

Response: No, a private laboratory conducted the testing.

Comment: What is the time frame for the third round of sampling?

Response: Some samples have already been collected; the others will be collected shortly.

Police Officer's Use of Pistol Range On-Site

Comment: As you know, the police department has a pistol range on the site. We want "the bottom line" - are our officers safe to go onto the landfill?

Response: Of the areas we sampled, we found no significant contamination in the soils or aquifer. We are recommending additional sampling even though we don't feel there is a problem. The only time we were concerned was when we were drilling wells. The fence is primarily to keep out children who might get in and damage the cap or get into the leachate.

Concerns of the Fire Department

Comment: As Assistant Chief of the Fire Department, I'm concerned about a methane fire bursting through the cap.* How much damage would we do to the cap if we had to go in and put out a methane fire?

Response: The vents along the trenches would collect the methane. This is a passive system and we don't foresee a problem with methane coming through the cap.

Comment: Is there any danger in going on the site, and if not, why is there a decontamination zone? Should we decontaminate our equipment?

Response: The decontamination zone was used primarily during our field investigation. It is a routine procedure to assure that while we are investigating the site we do not bring any contamination onto the site or take any out. We assume that you would use normal fire-fighting precautions, but there are no plans for fire-fighters to decontaminate their equipment.

*The issue of methane gas at the site is addressed separately in this responsiveness summary.

Comment: If there was a fire and we had to go in and put it out, is there someone we would have to notify or contact?

Response: The police know the combination to the locks and in the event of a fire, you would just go right in. We would like to be notified, but not if it is going to delay you in performing your duties.

At this point a member of the audience asked the Assistant Fire Chief if there had been any recent fires at the site. He responded that none had been reported; perhaps there were underground fires he was not aware of. Director Salkie pointed out that the investigation would have revealed any underground fires, if there had been any.

Methane Gas Recovery

Comment: What are the quantities of methane gas? The town might be interested in recovering it for use in the incinerator at the sewage treatment facility.

Response: We believe that at this point, 14 years after the landfill operated, most of the biological activity has already taken place, and there are no significant levels of methane gas. We did not encounter any methane on the surface, and only small amounts when we were drilling.

Comment: What about the bubbling in the ponds?

Response: This is normal anerobic activity. We monitored the ponds and found no contaminants of any degree.

Responsible Party Involvement

General interest and concern was expressed regarding the party or parties involved in bringing the wastes into the landfill, particularly Ciba-Geigy, and the state's pursuit of extracting payment from the responsible party.

Comment: How did Ciba Geigy move this material in? Was it liquid, solid, in barrels, or what?

Response: We have no records of how it got there or where it was put on the landfill. We have no records of whether it was dry, liquid, etc.

Comment: Did you find any barrels during your investigation?

Response: No.

Comment: Who was responsible for what was coming into the landfill? Weren't there any standards?

Response: The problem is at that time - 1945 to 1974 - when Sharkeys operated, there were very few standards. The NJDEP was not formed until 1970.

(Note: The following answer was not provided at the public meeting. It is expanded here to provide clarification.)

Basically the landfill operator is responsible for what comes into a landfill although the generators do bear the liabilities of their waste and past disposal practices.

Landfill regulations began on July 1, 1958 when the New Jersey Department of Health Regulations were put in effect under Chapter VIII of the State Sanitary Code. Operational procedures (ie. dust control, scavenge control etc.) were the focus of this early regulations. When the NJDEP was formed in 1970, Chapter VIII was expanded. Effective July 1, 1970 the NJDEP began registration, permitting and were requesting engineering design reports including slope design, capacity and categories and amount of waste accepted during the previous year. Haulers had to be registered and proper labeling and "bills of lading" were to accompany shipments of hazardous and chemical wastes. Chapter VIII continued to evolve. In 1976 landfills began to be regulated by the type of waste that could be accepted by waste classifications indicated on landfill permits.

Comment: So the only way you would ever know what was dumped is if someone came out and admitted it?

Response: We do have some records, but they are limited. Early records are non-specific and it is difficult to determine in some cases what was dumped in the past. Certainly if someone admits to disposing material, that is a key indication of what was dumped and when.

Comment: Who will pay for this remedial alternative?

Response: Superfund monies will be used. If Superfund is not reauthorized, state funds would then be used.

Comment: What about trying to get the responsible party to pay?

Response: At this point, I can only say that we would use public funds - either Superfund or state. The enforcement process usually involves litigation and we're not at liberty to discuss this aspect of the case.

Comment: I feel the state is responsible since they allowed this landfill to operate.

Comment: From my experience (working with EPA) it seems like any involvement on the part of Ciba-Geigy indicates a potential for dioxin or dibenzo-furans. Has this possibility been investigated?

Response: We have no reason to test for the potential presence of dioxin or dibenzo-furans at this site. We do have a list of chemicals disposed at this location by Ciba Geigy. That list provides no indication that the presence of dioxin or dibenzo-furans would be expected.

Other Issues

Comment: With the recommended alternative, would all five fill areas be capped?

Response: At this point, three would definitely be capped. At the other two areas, no contamination was found. One of these areas is a wildlife preserve. We will study and monitor these areas further. If no

contamination is found, it may not be necessary to cap them. (see NJDEP's Revised Recommended Alternative, p.10)

Comment: What is the cost of the recommended remedial alternative?

Response: Approximately $21 million to cap all five areas, and approximately $16 million to cap three areas. (see NJDEP's Revised Recommended Alternative, p.10)

Comment: Is NJDEP responsible for all 90 acres of the site?

Response: The actual landfill is larger than 90 acres. The fill areas comprise 90 acres. Of that, 70 acres have been found to have some levels of contamination.

Comment: What is the time frame for this project?

Response: After we will receive your comments, we will prepare a responsiveness summary, sign a Record of Decision and come up with a remediation design. That whole process takes about six months. The design phase lasts approximately one year, procuring a contractor takes approximately three months, and the construction phase takes approximately two to three years. We would hope to have the landfill close-out in about four years.

Comment: What priority does this site have on your list?

Response: Each site is a separate project - we don't like to prioritize them. We hope to have enough money to clean-up all of our sites.

Comment: Could we ever build on top of this landfill?

Response: We would not recommend doing that. It is difficult to monitor if there is a building on top of the area. In the event that construction is considered at any former landfill operation in New Jersey, permits and approvals must first be obtained from NJDEP. Division of Solid Waste Management.

Comment: In the RI/FS you recommend the installation of four additional monitoring wells. Is one of these wells planned for installation in the clay depression found at this site.

Response: Yes, an additional monitoring well is recommended to be installed into that clay channel location.

III. Remaining Concerns from the August 21, 1986 Public Meeting

In general, the community near the Sharkey Landfill was pleased and relieved at the results of the RI/FS. They regarded it as good news for the most part, and were especially relieved that their water supply does not appear to be threatened. The primary concern that remains is the potential for movement of contamination off-site. The citizens and officials of the community have been assured by NJDEP that a long-term monitoring program will be in effect at the site for 30 years. Any movement of contamination

which threatens their water supply would be detected and acted upon in a timely manner.

IV. NJDEP's Revised Recommended Alternative

The revised recommended alternative presented below will provide an extra margin of control for contamination release from this landfill at a cost of approximately $28.1 million. The components of this alternative are:

V. Summary of Major Written Questions and Comments Received during the Public Comment Period and NJDEP's Responses.

Responses to Written Comments Received
During Public Comment Period
August 13, 1986 to September 2, 1986

During this public comment period two packages of extensive written comments were received. One package contained three letters discussing and supporting of the same issue and will be referred to as one commenter.

In general, both commenters addressed the fact that the RI adequately evaluated and characterized the nature of contamination and hydrogeology at this site. They both agree that this site presents no significant contamination and thus minimal risk to the public or environment. One commenter primarily directs his comments towards the result of the effects of the FS on the Northwest (North of Route 280) Fill area, while the other commenter is concerned with the overall scope of the project and its cost-effectiveness.

The written comments have been listed according to the five following categories:

- Site Characteristics and Classification
- Adherence to Regulatory Obligations
- Effectiveness of the Remedial Alternatives
- Recommendations for Alternatives
- Future Site Development

Each comment will be considered prior to selecting a final remedial alternative and is accompanied by NJDEP's and/or EPA's response, and the position concerning long-term remediation at this site.

Site Characteristics and Classification

Comment: The data (RI/FS) clearly indicates that the site represents a typical municipal solid waste landfill and identified organic compounds are ubiquitous in household products. The leachate from the Sharkey Landfill represents a typical municipal solid waste leachate that should be addressed within the context of sanitary landfill regulatory requirements.

Response: Documents show that hazardous wastes were dumped at the site. Therefore, the landfill is considered a hazardous waste site. Contamination has been found at low concentrations in the shallow aquifer and in the Rockaway and Whippany Rivers.

Comment: Although, industrial waste may have been received by the landfill, there is really nothing about the leachate or contaminated groundwater which could not be attributed to a municipal solid waste leachate. In fact, the character of the leachate is indicative of an older well leached sanitary landfill which, of course, the Sharkey's site is.

Response: The presence of hazardous wastes on-site creates a potential for migration and possible exposure to humans. Lack of high levels of contaminants in leachates does not rule out presence of chemicals on site.

Comment: In the preparation of the site wide water budget there is an apparent error in the calculation of the volume of groundwater moving through the clay aquitard.

Response: We do recognize that an error was made in calculating this figure. The correct figure of 860 gpd should replace 100 gpd on page 3-108 of the RI. We also agree with your evaluation that the correct volume (rate) is still a small percentage of the total flow.

Comment: The piezometric surface contour maps for the water bearing zone presented in the RI report are quite unusual for a relatively high permeability, confined aquifer and must be considered suspect.

Response: The piezometric surface contour maps were developed using the data obtained from the field. Groundwater level was measured at each of the 26 monitoring well locations. The data was plotted on a scaled site map, and interpolation was used to draw the contour lines. The NJDEP and EPA believe that the data substantiate the contours as shown.

Comment: Because the site is essentially a sanitary landfill, (Ciba-Geigy Corporation generated only a tiny fraction of the material disposed of at Sharkey's, less than one ten thousandth of the total, with the bulk of the remainder being municipal waste) it is highly unlikely that it will ever contaminate drinking water supplies.

Response: The site is classified as a hazardous waste site, as explained in prior responses. Although, no contamination has been detected at present in the drinking water supply, the site is classified as a hazardous waste site, as explained in prior comments. A potential release of contaminants may cause contamination of the drinking water supply in the future.

The amount of hazardous waste dumped by Ciba-Geigy at the site exceeds the maximum allowed in a sanitary landfill, even though the total amount of hazardous waste may be considered a small percentage of the total amount of solid waste in the entire landfill.

Comment: The risk to drinking water at a more distant site would be even smaller, since it is well established that all groundwater transport involves substantial dilution.

Response: We agree that the risk of contaminant exposure to drinking water is diminished through various mechanisms (i.e. bio-degradation, absortion, dilution). However, consideration must be given to the degradation of groundwater quality at the site as well as to the risk presented at distant drinking water sources.

Adherence to Regulatory Obligations

Comment: Is the "Superfund" to be applied the closure of a relatively innocuous sanitary landfill site?

Response: "Superfund" is not to be applied to the closure of an "innocuous landfill site", but "Superfund" may appropriately be used in the closure of this site. At this site, the selected alternative was based on the results of the RI/FS and documents supporting the hazardous waste dumping. Sharkey Landfill is an open dump as defined in 40 CFR Part 207, "Criteria for Classification for Solid Waste Disposal Facilities and Practices." RCRA, Section 4005(a), which is relevant and appropriate to this site, states that dumps should be closed properly. A proper closure, including a multimedia cap as discussed in the ROD is eligible for federal funds.

Comment: The Department's contractor excluded that option (groundwater treatment without capping), which might be more cost-effective than a cap because of its perception that state landfill regulations preclude that alternative. That perception may be incorrect and is not dispositive as to the selection of alternative under CERCLA.

Response: The USEPA Feasibility Study Guidance recommends that alternatives be developed that satisfy the five criteria as listed on page 2-5 of the Task 6 report "Evaluation of Alternatives". These criteria were followed in the study. The alternative of groundwater treatment without capping was included in the screening of alternatives and rejected.

Comment: The State Action Level II figures for organics in drinking water contained in the January, 1986 NJDEP Drinking Water Guidance would also be met by such a 10-fold dilution (downstream or away from the site). In that regard, the decision of the contractor to use Action Level I for the Guidance as appropriate state standards for drinking water is clearly erroneous as a matter of law. Existing drinking water systems in current use throughout the state are not legally compelled to meet Action Level I concentrations; it makes no sense to require that the water in a landfill do so.

Response: The use of Action Level I figures for organics in drinking water was appropriate as a measure of comparison to applicable and relevant guidance. We agree that recommending remedial action (other than monitoring) based on Action Level I concentrations is inappropriate. The NJDEP did not recommend remedial action based on those levels.

Comment: The Department's contractor assumed that any landfill closure is required by the Department to meet current landfill closure requirements. If this view is correct, even landfills which were closed prior January 1, 1982 must meet the standards of N.J.A.C. 7-26 Subpart 2, which implement the State's Solid Waste Management Act.

Response: It is NJDEP and USEPA policy to implement remedial actions at Superfund sites that attain or exceed the relevant and appropriate requirements of environmental laws and to consider other criteria, advisories, guidance and standards. Within this policy, NJDEP considers current state landfill standards relevant to this site. We do not intend to imply that all landfills closed prior to January 1, 1982 must meet the standards of N.J.A.C. 7-26, Subpart 2.

Effectiveness of Remedial Alternatives

Comments: To what standard of clean-up are we to address the remedial action?

Response: This question is not relevant here. The system at this site is containment system to control future migration of hazardous substances from the site. In contrast, a clean-up standard is appropriate, for example, when contaminated soil is removed.

For this site, discharge standards for the options involving groundwater treatment pursuant to New Jersey Pollution Discharge Elimination System permits or local industrial pre-treatment standards will be used. This remedial action addresses the objectives identified on pages 124-125 of the Task 6 report.

Comment: How are the various alternatives to be compared so that their effectiveness in meeting the standards can be judged?

Response: For a containment system, the alternatives are compared to each other based on reliability, implementability, safety, environmental and public health impact, institutional requirements and cost. The comparision is used in fulfilling the remedial objectives and the requirements of the law.

Comment: The cost-effectiveness analysis presented in the Feasibility Study does not conform to the methodology presented in the Cooperative Agreement for the site dated December 26, 1983.

Response: The Cooperative Agreement (CA) between NJDEP and USEPA pertains to a preliminary scope of work and costs, which are subject to revision and negotiation. The methodology proposed in the CA may not reflect the actual method used by the contrator since the award of a contract is based in the actual proposal of the contractor and subsequent negotiations between the contractor and NJDEP. The actual cost-effectiveness methodology used complies with the requirements of the National Contingency Plan (NCP), 40 CFR 300.

Comment: The method by which the effectiveness ratings have been assigned is clearly subjective and arbitrary, and lacks a sound technical basis.

Response: The effectiveness ratings were assigned in a consistent manner and reflect sound professional judgment. The effectiveness ratings are one factor among many others used to select the remedial alternative.

Comment: The suggested remedy does not meet the cost-effectiveness requirements of the National Contingency Plan.

Response: The Alternative 5-A(b) complies with the cost-effectiveness requirements of the NCP.

Comment: Certainly, neither CERCLA nor the NCP require that the cost-effectiveness alternative identified in the FS by the contractor be adopted. To the contrary, the lead agency has a legal obligation to make its own determination of cost-effectiveness, and select the alternative which adequately protects the public interest at the lowest cost. If a remedial alternative was selected based on the ordinary cost-effectiveness method used by the contractor, the decision would be arbitrary and capricious and out of keeping with the standards for decision making under well understood principles of federal and state administrative law.

Response: USEPA made a determination of the cost-effectiveness of the remedial alternative which adequately protects the public interest at the lowest cost. USEPA in consultation with NJDEP used the RI/FS as a basis for selecting the appropriate remedy for this CERCLA site. In addition, the decision was based on the comments received during the public comment period.

Recommendations for Alternatives

Comment: It is the position of the commenter that the property (Northwest (N) Fill) should not be affected by the selected remedial alternative or long-term site clean-up and excluded from the effect of any further action by the NJDEP and USEPA. We also request that this parcel be removed from the Sharkey Landfill designation on the NPL.

Response: Based on the information available, the Northwest (N) Fill may not appropriately be removed from the Sharkey Landfill designation on the NPL. As explained in the ROD, this site presents a threat of release of hazardous substances. It is unlikely that this property can be excluded from the selected alternative

for remediation unless the owner presents USEPA with a plan for the use of the property that clearly provides a level of protection equal to or greater than the selected remedial alternative.

Comment: The data (RI/FS) clearly indicates that the site represents a typical municipal solid waste landfill. We concur with the conclusion of the RI report that this site represents minimal risk to the public health and environment and is clearly a candidate for a "No Action" or a "Minimal Action" remedial program.

Response: The location of the site, the length of time required to implement corrective action for a future release and the potential threat to the public health were considered in the selection of alternatives as explained in previous responses. For these reasons, a No Action or Minimal Action Alternative will not provide adequate protection for human health and the environment.

Comment: In the absence of a quantitative Risk Assessment, the FS has failed to demonstrate a significant risk to the environment or to the public health. Accordingly, selection of a costly remedial action has not been shown to provide demonstrable benefit to the environment or public health and is not supported by the evidence.

Response: While the contaminants detected at present at the site pose little or no environmental and public health risk at current concentrations, there is a potential threat of release which cannot be quantified. Since documentation shows hazardous waste was disposed of at the site, there exists a threat of a future release of these substances. The selected alternative addresses the potential threat of release.

Comment: Since the site poses no substantial present risk, relatively modest remedial measures are all that is required, and the expenditure of vast sums at the site would be wasteful. The best approach would be one involving site stabilization (North and South sites to prevent erosion) and access control (deleting requirement for access control at the two Northwest and Southwest sites) coupled with continued monitoring and contingency plans for capping or groundwater treatment, re. a modification of Alternative 2.

Response: It is agreed that the expenditure of vast sums of money at this site would be wasteful. The selected alternative is consistent with health and environmental concerns and not excessive in cost.

As explained in previous responses, the site has been classified as a hazardous waste site and the Minimal Action Alternative will not adequately protect human health and the environment. Furthermore, in the long-term monitoring program designed to sample every six months, a potential release of contaminants could be detected six months after its occurrence. After such a release of contamination was detected, the process for construction of a cap would take three years to complete. A contingency plan which would take three and a half years to be implemented is not acceptable because of the risk posed to the public health and the environment.

Comment: No ones interest is served by the expenditure of greater amounts of money at a particular site than are necessary to protect fully the health and the safety of the public, whether those funds are provided from "Superfund" or by potentially responsible parties.

Response: We agree.

Comment: A pump and treat alternative without capping deserves favorable consideration in light of the possibility that future monitoring would show that additional remedial measures are needed. The capital cost and operating cost calculated for the pump and threat portion of Alternative 5 (FS pp B-12, B-13) suggest that the total cost of collecting and treatment might be sustantially less than the cost of capping along, depending on the extent of the pumping program and the degree of treatment.

Response: As explained in the ROD, the closure of Sharkey Landfill is governed by RCRA. Closure requires a cap in accordance with the proper requirements. The implementation of groundwater treatment without capping is an incomplete measure which will allow water infiltrate through the landfill, carrying potential contamination to the aquifer.

Comment: It is true that the quantity of groundwater requiring treatment of the entire site would be greater under an alternative involving no-cap than the contractors estimate for Alternative 5 with a cap. However, the

cost would not necessarily be greater. The RI indicates that concentration levels are the highest at the North Fill site (RI pp 3-114 to 3-117). Accordingly, if pumping ever became necessary, it may be needed only at the North site.

Response: The alternative of treating the groundwater with no-cap not only increase the quantity of groundwater to be treated, but may carry contamination to the shallow aquifer. The alternative of no capping is not as reliable as the selected alternative.

In addition, as explained in prior responses, the entire site is considered to contain hazardous wastes. Although concentrations of hazardous substances were higher in the North Fill area, the other four areas cannot be excluded for groundwater treatment.

Comment: A capping alternative is unnecessary and would be excessively expensive. Before any cap alternative is adopted, the Department should take into account the degree to which Alternative 2 reduced the need for Alternative 3. In the event that a cap remedy is choosen, the Department should restrict capping to the North and South Fill sites. Imposing an expensive capping remedy at the Northwest and Southwest sites can only be justified if, following the investigation, it could be said that they properly form a portion at the Superfund site. In addition, the Department should defer a choice between a clay cap and the less costly synthetic cap until the design phase.

Response: As stated before, the use of a cap is necessary for the proper closure of the entire site, and capping cannot be restricted to the North and South Fills. Photographs show fill activity in the Northwest Fill until somewhere between 1961 to 1966. During this period, hazardous materials from Cieba-Geigy are believed to have been disposed of in an undefined area of the site. Southwest Fill was used by the Department of Transportation to dump excavated material containing hazardous waste from the Northwest Fill during the construction of Route 280 from 1971 to 1974.

In addition, the cap with synthetic liner was considered in the evaluation of alternatives. This cap is not as reliable as the clay cap. A synthetic liner does not meet the requirements for a hazardous waste site.

Comment: Adopting an alternative which may not withstand legal scrutiny could result in either (i) a substantial delay in implementing a remedial program for the site or (ii) the inability of the government to obtain full, much less prompt, cost recovery because an unnecessarily expensive alternative was picked.

Response: The alternative of capping and treating the groundwater meets all applicable requirements and is the most cost-effective alternative. The selected remedial alternative satisfies the requirements of RCRA and the NCP. There is no pre-enforcement review of action taken under CERCLA. Therefore, no delay or inability of the government to obtain full cost recovery is expected.

Comment: One commenter reported that at the August 21, 1986 Public Meeting, he questioned Mr. Richard C. Salkie, Acting Director of the Division of Hazardous Site Mitigation in NJDEP, about capping option the NJDEP favored (all five areas or just the three with contamination).

Response: Director Salkie did not reply, as stated in this commenter's follow-up letter, that the Dowel Associates portion of the landfill was not being considered for remediation activity. Director Salkie did respond that three areas were likely to be capped.

Two areas were referred to by Dr. Kehrberger. He said no contamination was found in the Wildlife Preserve (Southwest Fill) and the Northwest (N) Fill. USEPA does not agree with the conclusion of Dr. Kehrberger. The results of the RI/FS indicate contamination in all areas; in Southwest Fill, concentrations are almost at standard levels.

Future Development

Comment: The proper development for this site (Northwest (N) Fill) provides superior environmental control for the property in question (Block 768, Lot 2 Parsippany-Troy Hills) than could ever be achieved by capping.

Response: There is no indication that the plan submitted for this development would provide the measure of protection over this entire fill area to control the potential for contamination release.

Comment: It is clear that the above referenced RI/FS did not conclude that the commentator's site is unsuitable for construction. In short, we would appreciate the NJDEP's consideration of the issuance of a letter to the commentator indicating that there is no impediment or objection to development of the site as proposed by the commentator and that further construction as proposed by the commentator will not interfere with the NJDEP's investigation and enforcement activities regarding the site.

Response: Based on the determination that this property (Northwest North Fill) represents a threat of release of hazardous substances requiring proper closure, this site is unsuitable for development and use as proposed.