United States
Environmental Protection
Agency

Office of
Emergency and
Remedial Response

EPA/ROD/R02-87/051
September 1987

EPA

Superfund Record of Decision:

Renora, NJ

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

1. REPORT NO. EPA/ROD/R02-87/051	2.	3. RECIPIENT'S ACCESSION NO
4. TITLE AND SUBTITLE SUPERFUND RECORD OF DECISION Renora Inc., NJ First Remedial Action		5. REPORT DATE September 29, 1987 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 Renora Inc. site, in Middlesex County, New Jersey, occupies a one-acre parcel of land in an area zoned for light industrial use. Within 2,000 feet of the site is a residential area with a nursery school, a senior citizens center and an apartment complex. The site consists of relatively flat land built up from a 100-year flood plain with three to twelve feet of demolition debris. From 1978 to 1982 Renora, Inc., certified as a collector/hauler of waste oils, transported and accepted materials containing hazardous substances for transfer, storage, blending and ultimately, disposal through abandonment at the site. State and local inspection reports indicate that the site was poorly maintained throughout the period of its operation. In July 1978 the New Jersey Department of Environmental Protection (NJDEP) detected several minor spills and determined that Renora, Inc. was acting as a Special Waste Transfer Station without proper registration. Subsequently Renora was ordered to remove all contaminated soil and drums. In May 1979 drums were leaking on the property. In March 1980 NJDEP ordered the cessation of all operations and the implementation of remedial actions at the site. By June 1980 operations had ceased, but no remedial action had taken place. In November 1980 NJDEP revoked Renora's registration to collect and haul solid waste. The site was abandoned by June 1982. A removal action, initiated in October 1984, disposed of 33,000 gallons of liquid waste, 28,000 gallons
(See Attached Sheet)

17. KEY WORDS AND DOCUMENT ANALYSIS

a. DESCRIPTORS	b. IDENTIFIERS/OPEN ENDED TERMS	c. COSATI Field/Group
Record of Decision Renora Inc., NJ First Remedial Action Contaminated Media: gw, soil Key contaminants: VOCs, PCBs, PCEs, PAHs, organics, metals, pesticides		

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EPA/ROD/R02-87/051
Renora Inc., NJ
First Remedial Action

16. ABSTRACT (continued)

of PCB-contaminated waste oil and 1,060 yd^3 of soil offsite. The primary contaminants of concern affecting the soil and ground water include: PCBs, PAHs, VOCs, other organics, heavy metals, PCE, phenols and pesticides.

The selected remedial action for this site includes: excavation of all PCB-contaminated soils containing concentrations above 5 mg/kg (1,100 yd^3) with offsite disposal (landfill or incineration); biodegradation of all PAH-contaminated soils containing concentrations above 10 mg/kg (4,400 yd^3); use of ground water as an irrigation medium for the biodegradation system; and backfilling, grading and revegetation. The present worth cost for this remedial action is $1,401,000 or $6,021,000 with landfilling and incineration, respectively.

DECLARATION FOR THE RECORD OF DECISION

SITE NAME AND LOCATION

Renora, Inc.
Edison Township (Bonhamtown), Middlesex County, New Jersey

STATEMENT OF PURPOSE

This decision document represents the selected remedial action for this site developed in accordance with CERCLA, as amended by SARA, and to the extent practicable, the National Contingency Plan.

The State of New Jersey has concurred on the selected remedy.

STATEMENT OF BASIS

This decision is based upon the administrative record which includes the following major documents:

- Remedial Investigation Report for the Renora, Inc. Site, prepared by BCM Eastern Inc. for the Renora RI/FS Trust, July 1987;

- Feasibility Study Report for the Renora, Inc. Site, prepared by BCM Eastern Inc. for the Renora RI/FS Trust, August 1987;

- The attached Summary of Remedial Alternative Selection for the Renora, Inc. Site;

- The attached Responsiveness Summary for the site, which incorporates public comments received and,

- Staff summaries and recommendations.

DESCRIPTION OF THE SELECTED REMEDY

The major components of the selected remedy can be summarized as follows:

- excavation and offsite landfilling of polychlorinated biphenyl (PCB) contaminated soils

- excavation and on-site biodegradation of polynuclear aromatic hydrocarbon (PAH) contaminated soils

- treatment of contaminated groundwater through its use as an irrigation medium in the bioremediation system

DECLARATION

The selected remedy is protective of human health and the environment, attains Federal and State requirements that are applicable or relevant and appropriate, and is cost-effective. This remedy satisfies the preference for treatment that reduces toxicity, mobility, or volume as a principal element. Finally, it is determined that this remedy utilizes permanent solutions and alternative treatment technologies to the maximum extent practicable.

Christopher J. Daggett
Regional Administrator

SEPTEMBER 29, 1987

SUMMARY OF REMEDIAL ALTERNATIVE SELECTION

RENORA INC.

EDISON TOWNSHIP, NEW JERSEY

SITE LOCATION AND DESCRIPTION

The Renora Inc. site, located at 83 South Main Street, in the Bonhamtown section of Edison Township, Middlesex County, New Jersey is an approximately one acre parcel of land in an area zoned for light industrial use. Adjacent to the site is a complex which includes an auto repair and body shop, welding, machinery, and electric supply shops. The surrounding area is residential with three sensitive uses, (a nursery school, senior citizens center and an apartment complex), within two thousand feet of the site.

The site is bordered on the north by Mill Brook, on the south by the New Jersey Turnpike, on the east by South Main Street and on the west by the Conrail railroad. The only structure at the site is a perimeter chain link fence with locking gates. Figures 1-1 and 1-2 depict the location of the site and surrounding land use respectively.

The site is relatively flat land built up from flood plain with three to twelve feet of what appears to be demolition debris and underlain by a one to six foot thick layer of sand and clayey silt. The fine grained sediments are partially overlain by gravelly sand to sandy gravel, which pinches out near Mill Brook. Highly weathered, clay-rich Brunswick shales underlie the alluvial deposits. Surface elevations range from 62.5 feet above mean sea level in the western corner of the site, to approximately 66 feet above mean sea level along the southeastern perimeter. The site lies within the regulatory (but not actual since the land was built up from the flood plain) 100 year flood plain and within the actual 500 year flood plain. Figures 5-8 and 4 depict a site cross section and flood plain boundaries respectively.

While there are no public supply well fields within one-half mile of the site, a well search tentatively identified twelve wells within one mile of the site of which eight are believed to be residential but no longer used for potable purposes. Edison Township maintains several public supply wells four to eight miles from the site but has reserved their use for emergency situations only.

All groundwater from the site discharges into Mill Brook, which has a drainage area of 3.1 square miles. The watershed is drained by Bonhamtown Creek, which is upgradient of the site, and Mill Brook.

SOURCE: USGS TOPOGRAPHY MAP: PERTH AMBOY, NJ QUAD, 1981.

BCM

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ENGINEERS, PLANNERS, and SCIENTISTS

BCM Project No. 00-4376-03

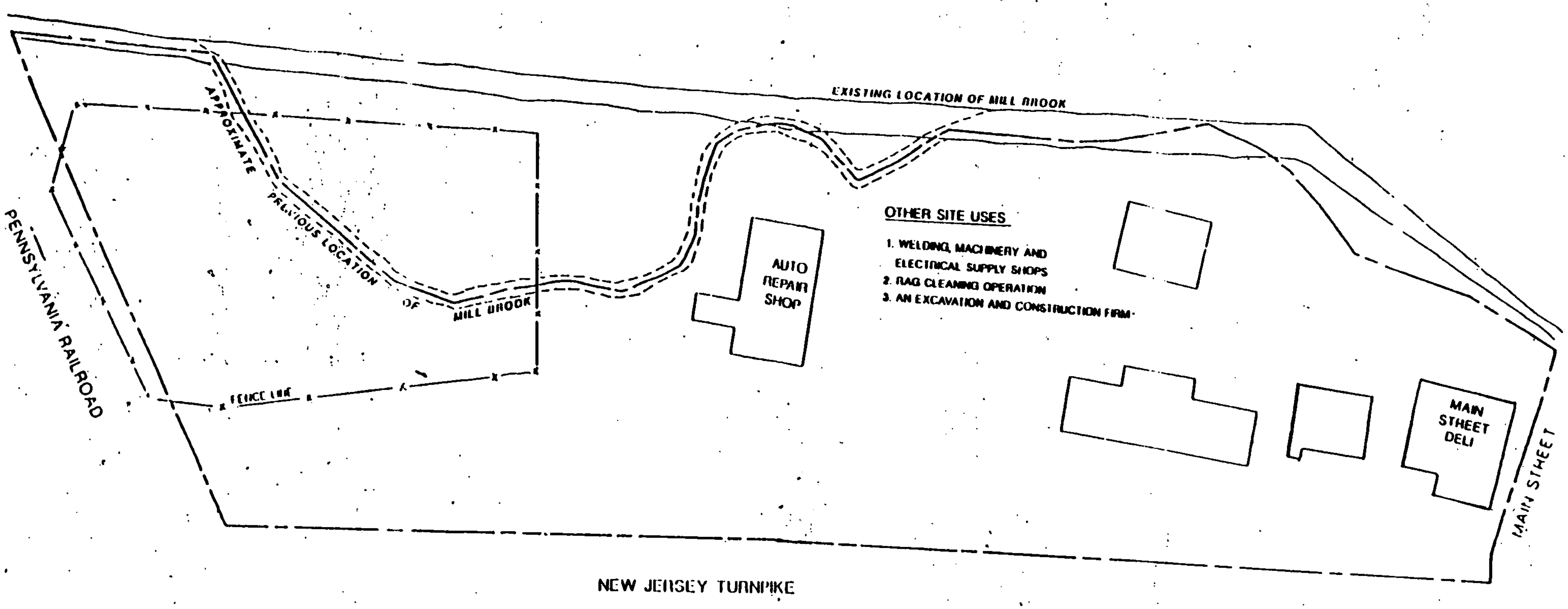
0 750 1500 Feet

FIGURE 1-1

Pitney, Hardin, Kipp & Szuch

Feasibility Study
RENORA, INC. SITE
Edison Township, New Jersey

SITE MAP



STUDY AREA BOUNDARY (FENCE LINE)

CLEMENTI PROPERTY LINE

0 30 60 120 Feet

FIGURE 1-2

Pitney, Hardin, Kipp & Szuch

Feasibility Study
RENORA, INC. SITE
Edison Township, New Jersey

SITE

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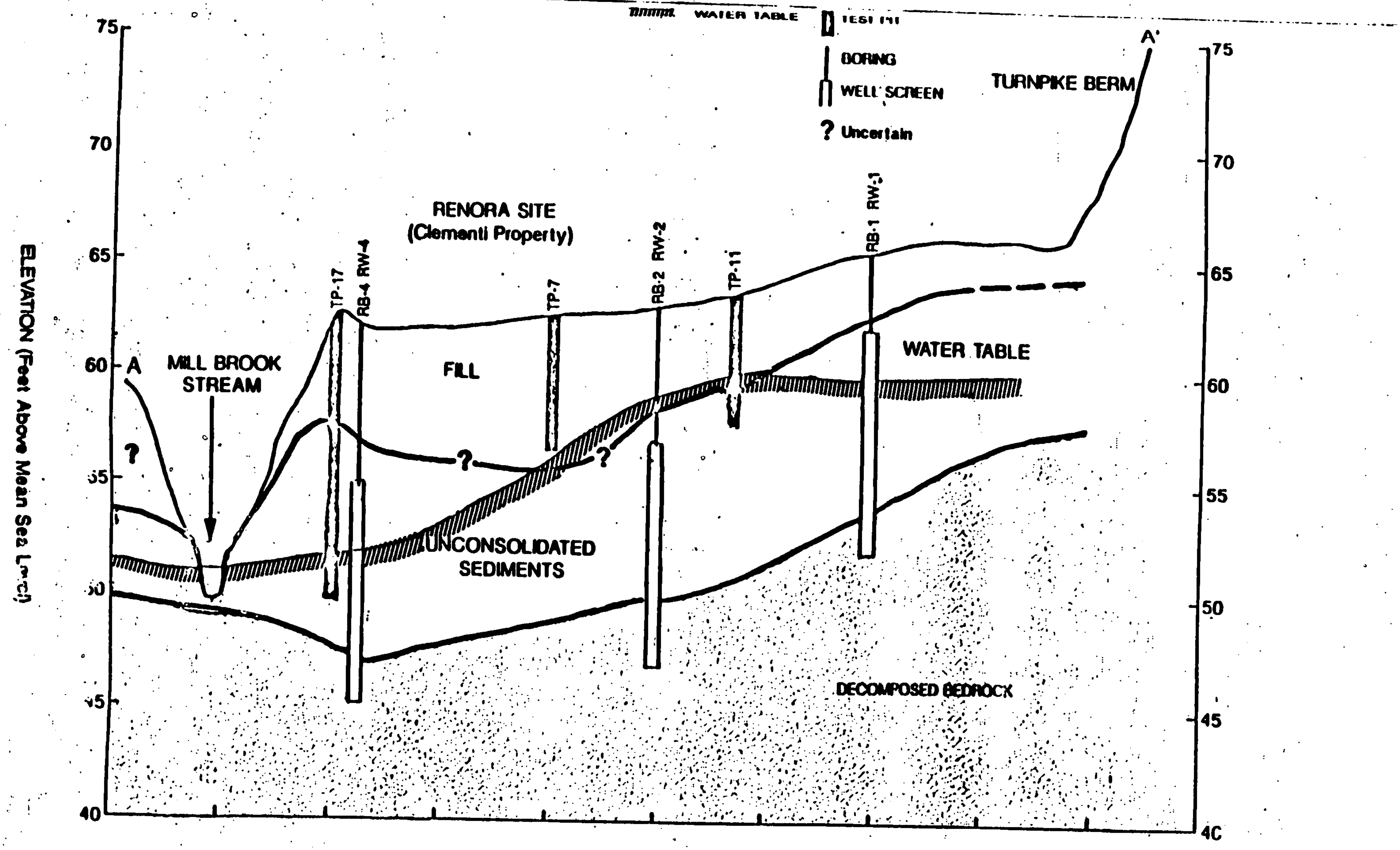
ENGINEERS, PLANNERS, and SCIENTISTS

BCM Project No. 00-4376-03



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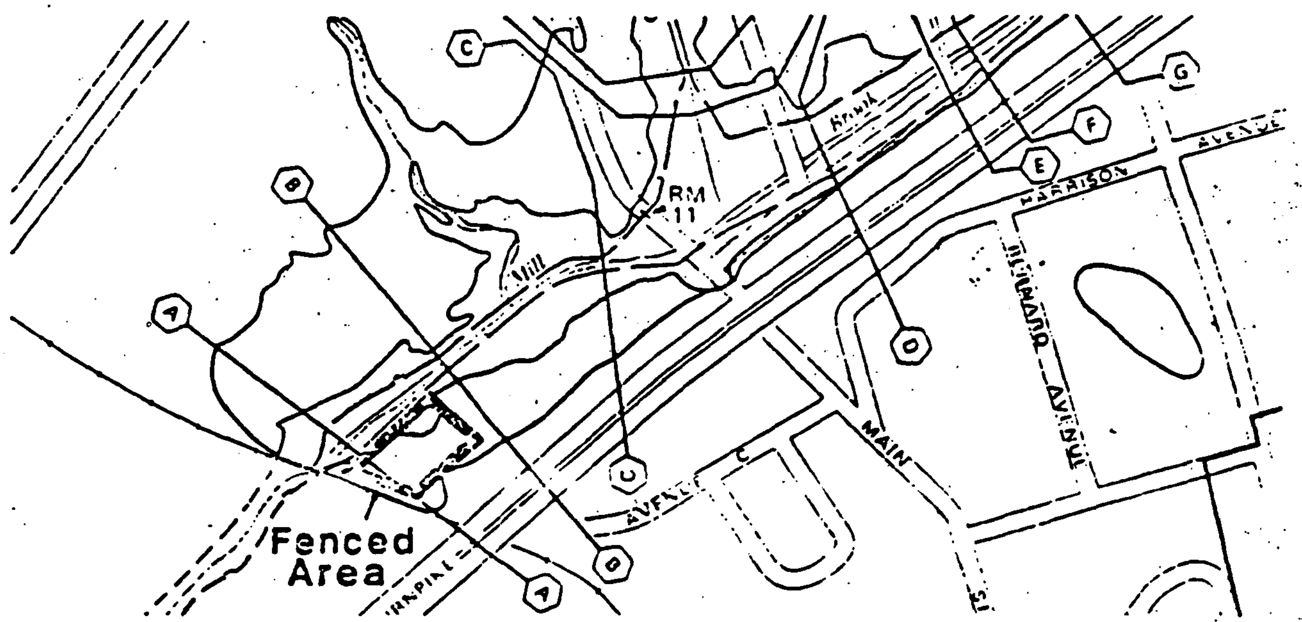
BCM Project No. 00-4376-02

FIGURE 5-8

Pitney, Hardin, Kipp & Szuch

REMEDIAL INVESTIGATION
RENORA, INC. SITE
Edison Township, New Jersey

WATER TABLE



KEY TO MAP

500-Year Flood Boundary
100-Year Flood Boundary
FLOODWAY FRINGE
FLOODWAY
100-Year Flood Boundary
500-Year Flood Boundary
Approximate 100-Year Flood Boundary
Cross Section Line (A)——(A)
Elevation Reference Mark RM7 x

APPROXIMATE SCALE 500 0 500 FEET

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY (FEET NGVD)	WITH FLOODWAY (FEET NGVD)	INCREASE
Mill Brook								
A	14,935[1]	100	524	2.5	59.7	59.7	59.7	0.0
B	15,265[1]	31	187	6.9	59.8	59.8	59.8	0.0
C	15,760[1]	32	127	10.1	61.3	61.3	61.3	0.0

TABLE 1 - SUMMARY OF DISCHARGES

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. miles)	PEAK DISCHARGES (cfs) 10-YEAR	50-YEAR	100-YEAR	500-YEAR
MILL BROOK					
At the Conrail bridge	3.1	670	1,060	1,290	1,910
Upstream of the confluence of Bonhamtown Brook	1.5	615	940	1,120	1,640

SOURCE. FEMA, 1984, TOWNSHIP OF EDISON, N.J.

BCM Eastern Inc.
ENGINEERS, PLANNERS, and SCIENTISTS
BCM Project No. 00-4376-02

FIGURE 4

Pitney, Hardin, Kipp & Szuch

REMEDIAL INVESTIGATION
RENORA, INC. SITE
Edison Township, New Jersey

FLOOD BOUNDARY

SITE HISTORY

From 1950 to 1952 the New Jersey Turnpike (NJTP) Authority acquired parcels of land that form the present site. Between 1969 and 1974 the area underlying the present site was filled with what appears to be demolition debris and the Mill Brook stream channel was relocated at various points approximately 25 to 100 feet north to its present position. In November, 1976 Clementi Brothers Inc. acquired the site from the NJTP Authority.

In October, 1977 the New Jersey Board of Public Utilities Commissioners issued Renora, Inc. a Certificate of Public Convenience and Necessity as a collector/hauler of waste oils and in 1978 Ronald Kaschner, President of Renora, Inc. leased the site from Clementi Bros. Inc., via an oral agreement.

From 1978 to 1982 Renora Inc., transported and accepted materials containing hazardous substances for transfer, storage, blending and ultimately, disposal through abandonment at the site.

New Jersey Department of Environmental Protection (NJDEP) and Edison Township Department of Health and Human Resources (DOH) inspection reports indicate that the site was poorly maintained throughout the period of its operation. An NJDEP inspection in July, 1978 detected several minor spills and determined that Renora Inc., was acting as a Special Waste Transfer Station without proper registration. At that time Kaschner was advised to register with NJDEP Solid Waste Administration (SWA). In October, 1978 an oil spill at the site was reported to the DOH. NJDEP and the DOH the conducted an investigation which led to an order to remove all contaminated soil and drums.

A Temporary Operating Authorization (TOA) was issued to Kaschner in December, 1978 with an expiration date of April 30, 1979. An NJDEP investigation of May, 1979 reported leaking drums on the property. In June, 1979 NJDEP SWA sent formal notification of the expiration of Renora Inc.'s TOA.

In March, 1980 NJDEP SWA issued a Notice of Prosecution to Renora Inc., ordering the cessation of all operations and the implementation of remedial actions at the site. A subsequent NJDEP inspection of the site in June, 1980 indicated that, although operations had ceased, no remedial action had taken place. In July, 1980 NJDEP issued Renora Inc. a Directive/Notice of Violation. The Directive/Notice was not complied with and a meeting was arranged between Kaschner/Renora and NJDEP. In August, 1980, Kaschner/Renora and NJDEP entered into an Order and Settlement Agreement for site cleanup with a scheduled completion date of October, 1980. In November, 1980, the NJDEP revoked Kaschner's registration to collect and haul solid waste for Renora, effectively putting him out of business. Kaschner abandoned cleanup activities in December, 1980 due to lack of funds.

On or about July 29, 1981, NJDEP sued Renora, Kaschner and Anthony and Catherine Clementi, and obtained an injunction requiring them to do the following:

1) end and remedy all statuatory violations at the facility,

2) cease accepting wastes, petroleum products, and hazardous substances,

3) permit NJDEP to enter the facility for inspections and other investigative activities, and

4) post a performance bond.

In June of 1982 the site was abandoned and in December, 1982 the site was included on the EPA's National Priorities List (NPL).

On September 28, 1984 EPA issued an Administrative Order to conduct surficial cleanup at the site to all the known potentially responsible parties (PRPs). A group of these PRPs then formed the Renora Surficial Cleanup Trust (Trust).

A removal action was initiated in October, 1984 and continued through April, 1985. During the cleanup, approximately 33,000 gallons of liquid waste and 28,000 gallons of PCB contaminated waste oil along with approximately 500 cubic yards of non-PCB contaminated soils and 560 cubic yards of PCB-contaminated soils were shipped off-site for proper disposal.

On September 17, 1984 EPA sent Notice Letters to all the members of the Trust to perform a Remedial Investigation/ Feasibility Study (RI/FS).

In May 1985, an Administrative Consent Order was signed between EPA and a group of potential responsible parties (Renora RI/FS Trust) who volunteered to undertake the studies. The RI/FS was conducted by BCM Eastern Inc. under contract to the Trust between May 1985 and May 1987. The work was conducted under EPA oversight. In support of the RI/FS, Camp, Dresser & McKee under contract to EPA conducted an endangerment assessment in order to determine the magnitude of risk to public health and the environment posed by the site.

CURRENT SITE STATUS

The RI, completed May, 1987, includes investigations of soil, groundwater, surface water, sediment and air. Findings and conclusions as a result of the RI are as follows:

1) Surficial soils (0-2 feet) are primarily contaminated with polychlorinated biphenyl (PCBs) and polynuclear aromatic hydrocarbons (PAHs) and to a lesser extent with volatile organic compounds (VOCs), acid extractable compounds (AECs), other base/neutral organic compounds (BNCs) and heavy metals. The southwest corner of the site contains greatest contamination at the site.

2) Shallow groundwater beneath the site is contaminated with low levels of chloroethane, (a volatile organic compound) and heavy metals.

3) Surface water and sediment samples show levels of heavy metals, tetrachloroethene, phenols and pesticides.

4) No evidence of air contamination was found at the site.

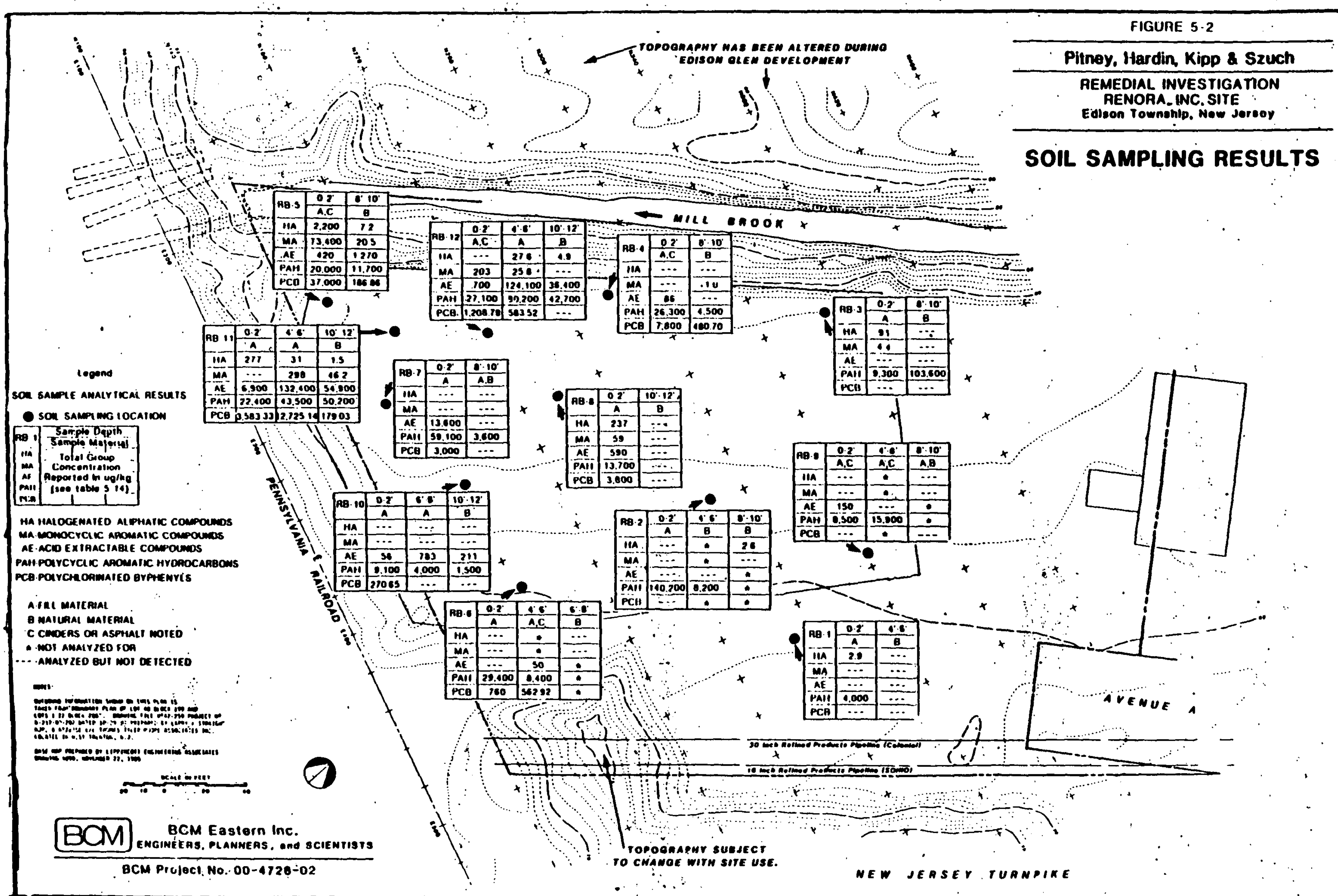
5) No buried drums were found at the site.

A detailed analysis of each aspect of the RI is presented below.

SOIL INVESTIGATION

Twelve sampling locations were selected based on the site history, test pit program results, removal action observations and results, and field observations. Two to three depths were sampled at each location to determine the degree of vertical contamination. The bulk of the contamination is limited to surficial soil as a result of the contaminants high rate of adsorption and low solubility. Concentrations and locations of soil/fill samples are depicted on Figure 5-2. A summary of the chemical analysis of soil samples is presented in Table 1.

Elevated concentrations of all five of the analytical parameter groups (PCBs, PAHs, VOCs, AECs, BNCs, and heavy metals) were detected at the site with the major constituents being PCBs and PAHs. Distribution of these contaminants was not uniform; the greatest concentrations of contaminants were generally found in the southwest portion of the site.



RB-5	0-2'	8'-10'
	A,C	B
HA	2,200	7.2
MA	73,400	20.5
AE	420	1,270
PAH	20,000	11,700
PCB	37,000	186.86

RB-12	0-2'	4'-6'	10'-12'
	A,C	A	B
HA	---	27.6	4.9
MA	203	25.8	---
AE	700	124,100	36,400
PAH	27,100	90,200	42,700
PCB	1,208.78	583.52	---

RB-4	0-2'	8'-10'
	A,C	B
HA	---	---
MA	---	.1 U
AE	86	---
PAH	26,300	4,500
PCB	7,800	480.70

RB-3	0-2'	8'-10'
	A	B
HA	91	---
MA	4.4	---
AE	---	---
PAH	9,300	103,600
PCB	---	---

RB-11	0-2'	4'-6'	10'-12'
	A	A	B
HA	277	31	1.5
MA	---	298	46.2
AE	6,900	132,400	54,900
PAH	72,400	43,500	50,200
PCB	3,583.33	12,725.14	179.03

RB-7	0-2'	8'-10'
	A	A,B
HA	---	---
MA	---	---
AE	13,600	---
PAH	59,100	3,600
PCB	3,000	---

RB-8	0-2'	10'-12'
	A	B
HA	237	---
MA	59	---
AE	590	---
PAH	13,700	---
PCB	3,800	---

RB-9	0-2'	4'-6'	8'-10'
	A,C	A,C	A,B
HA	---	•	---
MA	---	•	---
AE	150	---	•
PAH	8,500	15,900	•
PCB	---	•	---

RB-10	0-2'	6'-8'	10'-12'
	A	A	B
HA	---	---	---
MA	---	---	---
AE	56	783	211
PAH	9,100	4,000	1,500
PCB	270.65	---	---

RB-2	0-2'	4'-6'	8'-10'
	A	B	B
HA	---	•	2.6
MA	---	•	---
AE	---	---	•
PAH	140,700	8,200	•
PCB	---	•	•

RB-6	0-2'	4'-6'	6'-8'
	A	A,C	B
HA	---	•	---
MA	---	•	---
AE	---	50	•
PAH	29,400	8,400	•
PCB	760	562.92	•

RB-1	0-2'	4'-6'
	A	B
HA	2.9	---
MA	---	---
AE	---	---
PAH	4,000	---
PCB	---	---

SUMMARY OF CHEMICAL ANALYSES
SOILS

RENORA SITE
EDISON TOWNSHIP, NEW JERSEY

Table 1

CompuChem No.:	89760	89672	115091	89667	115092	89671	89124	89126	114971	89123	89125	114972
BCM No.:	86-10516	86-10518	87-00995	86-10515	87-00996	86-10517	86-10372	86-10374	87-00873	86-10371	86-10373	87-00874
BCM I.D.:	RB-1-2	RB-1-6	RB-1-6	RB-2-2	RB-2-6	RB-2-10	RB-3-2	RB-3-10	RB-3-10	RB-4-2	RB-4-10	RB-4-10
Sample Depth:	0-2'	4-6'	4-6'	0-2'	4-6'	8-10'	0-2'	8-10'	8-10'	0-2'	8-10'	8-10'
Sampling Date:	06/04/86	06/04/86	01/14/87	06/04/86	01/14/87	06/04/86	06/04/86	06/04/86	01/13/87	06/04/86	06/04/86	01/13/87
Volatile Organics (ug/kg)												
Acetone	80.0 B**	13.0 JB**	•	7.3 JB**	•	16.0 B**	10.0 JB**	260.0**	•	9.2 JB**	83.0 B**	•
Benzene	---	---	•	---	•	---	---	---	•	---	---	•
2-Butanone	---	---	•	---	•	---	---	---	•	---	---	•
Carbon Disulfide	---	---	•	---	•	2.6 J	---	---	•	---	---	•
Chloroform	---	---	•	---	•	---	---	---	•	---	---	•
1,1-Dichloroethene	---	---	•	---	•	---	---	---	•	---	---	•
Trans-1,2-dichloroethene	---	---	•	---	•	---	---	---	•	---	---	•
Ethyl Benzene	---	---	•	---	•	---	---	---	•	---	---	•
Methylene Chloride	18.0 B**	1.0 B**	•	13.0 B**	•	41.0 B**	36.0 B**	170.0 B**	•	43.0 B**	160.0 B**	•
4-Methyl-2-pentanone	---	---	•	---	•	---	---	---	•	---	---	•
Styrene	---	---	•	---	•	---	---	---	•	---	---	•
Tetrachloroethene	---	---	•	---	•	2.6 J	78.0	---	•	---	---	•
Toluene	---	---	•	---	•	---	4.4 J	---	•	---	11.0 J	•
1,1,1-Trichloroethane	---	---	•	---	•	---	13.0	---	•	---	---	•
Trichloroethene	2.9 J	---	•	---	•	---	---	---	•	---	---	•
Vinyl Chloride	---	---	•	---	•	---	---	---	•	---	---	•
Total Xylenes	---	---	•	---	•	---	---	---	•	---	---	•
Acid Extractables (ug/kg)												
2,4-Dimethylphenol	---	•	---	---	---	•	---	•	---	47 J	•	---
2-Methylphenol	---	•	---	---	---	•	---	•	---	---	•	---
4-Methylphenol	---	•	---	---	---	•	---	•	---	---	•	---
Phenol	---	•	---	---	---	•	---	•	---	39 J	•	---
Base/Neutral Organics (ug/kg)												
Acenaphthene	---	•	---	870 J	110 J	•	82 J	•	1,500 J	180 J	•	46 J
Acenaphthylene	56.0 J	•	---	2,600	250 J	•	170 J	•	550 J	270 J	•	46 J
Anthracene	130 J	•	---	4,000	340 J	•	160 J	•	3,400 J	620	•	120 J
Benzo(a)anthracene	410	•	---	12,000	630	•	390	•	8,000	2,200	•	310 J
Benzo(b)fluoranthene II	590	•	---	15,000	1,100	•	850	•	7,000	3,700	•	770
Benzo(k)fluoranthene II	590	•	---	15,000	1,100	•	850	•	7,000	3,700	•	770
Benzo(a)pyrene	500	•	---	16,000	680	•	440	•	5,200	2,200	•	360 J
Benzo(g,h,i)perylene	---	•	---	4,900	250 J	•	---	•	2,200	1,200	•	140 J
Benzoic Acid	---	•	---	---	---	•	---	•	---	---	•	---
Bis(2-Ethylhexyl)phthalate	700	•	270 J**	1,500 J	850	•	3,000	•	---	2,900 B**	•	320 J
Butyl Benzyl Phthalate	---	•	---	---	---	•	960	•	---	210 J	•	---
Chrysene	450	•	---	15,000	780	•	920	•	8,800	2,100	•	400 J
Dibenzo(a,h)anthracene	---	•	---	1,800 B	86 J	•	---	•	670 J	480	•	---
Dibenzofuran	---	•	---	850 J	140 J	•	74 J	•	1,600 J	120 J	•	---
1,2-dichlorobenzene	---	•	---	---	---	•	---	•	---	---	•	---
1,4-dichlorobenzene	---	•	---	---	---	•	---	•	---	---	•	---
Di-n-butyl Phthalate	38 J	•	---	---	---	•	---	•	---	120 J	•	---
Di-n-octyl Phthalate	130 J	•	---	500 J	---	•	170 J	•	---	160 J	•	---
Fluoranthene	690	•	---	23,000	1,100	•	850	•	14,000	3,900	•	630
Fluorene	45 J	•	---	2,600	360 J	•	170 J	•	4,400	320 J	•	97 J
Indeno(1,2,3-cd)pyrene	160 J	•	---	4,700	220 J	•	---	•	1,900 J	1,100	•	130 J
Isophorone	---	•	---	---	---	•	---	•	---	180 J	•	---
2-Methylnapthalene	---	•	---	920 J	340 J	•	800	•	3,400	230 J	•	130 J
Napthalene	---	•	---	920 J	370 J	•	1,500	•	6,000	210 J	•	190 J
N-Nitrosodiphenylamine	---	•	---	---	---	•	170 J	•	---	---	•	---
Phenanthrene	280 J	•	---	14,000	140 J	•	1,800	•	21,000	2,300	•	500
Pyrene	720	•	---	21,000	1,300	•	1,100	•	14,000	5,000	•	600
1,2,4-trichlorobenzene	---	•	---	---	---	•	47 J	•	---	350 J	•	---
Pesticides and PCBs (ug/kg)												
PCB-1260	---	---	•	---	•	---	---	---	•	7,800	---	480.90+
Metals (mg/kg)												
Antimony	---	•	---	---	---	•	---	•	---	---	•	---
Arsenic	0.115	•	2.02	0.343	5.82	•	0.675	•	1.14	14.7	•	14.5
Beryllium	5.25	•	0.28	4.50	0.50	•	0.22	•	1.18	---	•	0.79
Cadmium	1.79	•	---	1.79	0.11	•	8.14	•	0.67	1.54	•	---
Chromium	8.52	•	7.77	9.03	12.3	•	12.9	•	57.3	8.26	•	12.5
Copper	113	•	7.51	29.9	25.6	•	23.0	•	45.5	23.0	•	19.7
Lead	50.5	•	21.7	78.5	58.7	•	288	•	97.5	55.0	•	62.7
Mercury	---	•	---	0.25**	0.131	•	0.75**	•	0.160	0.20**	•	0.103
Nickel	5.31	•	5.13	5.51	7.51	•	8.20	•	13.5	5.52	•	9.30
Selenium	---	•	---	---	---	•	---	•	0.334	---	•	---
Silver	0.32	•	---	---	---	•	1.21	•	---	0.45	•	---
Thallium	---	•	---	---	---	•	6.0	•	---	---	•	---
Zinc	169	•	15.1	197	65.2	•	1,760	•	176	70.1	•	85.1
Miscellaneous												
Total Phenols (mg/kg)	---	•	•	---	•	•	---	•	49	0.08	•	0.67
Total Petroleum Hydrocarbons (mg/kg)	•	---	---	•	239	---	•	640	1,112	•	680	1,053

+ Compound not analyzed for
** Analyte was detected at a concentration less than 10 times that found in any blank. The result is, therefore, questionable.
\# Soil resampled June 8-9, 1987, reanalyzed June 9, 1987.
--- Compound analyzed for but not detected
J Estimated value
B Analyte found in blank as well as sample
II Denotes indistinguishable isomers

Source: BCM Eastern Inc. (BCM Project No. 00-4376-02)

SUMMARY OF CHEMICAL ANALYSES
SOILS

RENORA SITE
EDISON TOWNSHIP, NEW JERSEY

Table 1 Con't.

CompuChem No.:	88437	88478	114857	87474	115096	87476	87720	87725	114860
BCM No.:	86-10255	86-10256	87-00875	86-09721	87-00997	86-09722	86-09804	86-09806	87-00876
BCM I.D.:	RB-5-2	RB-5-10	RB-5-10	RB-6-2	RB-6-6	RB-6-8	RB-7-2	RB-7-10	RB-7-10
Sample Depth:	0-2'	8-10'	8-10'	0-2'	4-6'	6-8'	0-2'	8-10'	8-10'
Sampling Date:	06/02/86	06/02/86	01/14/87	05/23/86	01/14/87	05/23/86	05/27/86	05/27/86	01/13/87
Volatile Organics (ug/kg)									
Acetone	23,000 B**	940 B**	16 B**	48**	*	44**	37 B**	250 B**	780 B
Benzene	360 J	---	---	---	*	---	---	---	---
2-Butanone	22,000 J**	72 J	---	---	*	---	---	---	160
Carbon Disulfide	---	---	---	---	*	---	---	---	---
Chloroform	---	---	1.2 J**	---	*	---	---	---	3.5 J**
1,1-Dichloroethene	---	---	---	---	*	---	---	---	---
Trans-1,2-dichloroethene	1,200	---	4.0 J	---	*	---	---	---	---
Ethyl Benzene	9,000	---	---	---	*	---	---	---	---
Methylene Chloride	2,000**	440 B**	23 B**	29 B**	*	8.0 B**	11 B**	39 B**	8.5 B**
4-Methyl-2-pentanone	2,300	---	---	---	*	---	---	---	---
Styrene	---	---	---	---	*	---	---	---	---
Tetrachloroethene	970	---	3.2 J	---	*	---	---	---	---
Toluene	24,000	---	2.5 J	---	*	---	---	---	---
1,1,1-Trichloroethane	---	---	---	---	*	---	---	---	---
Trichloroethene	---	---	---	---	*	---	---	---	---
Vinyl Chloride	---	---	---	---	*	---	---	---	---
Total Xylenes	40,000	---	18.0	---	*	---	---	---	---
Acid Extractables (ug/kg)									
2,4-Dimethylphenol	---	*	560	---	50 J	*	7,800 J	*	---
2-Methylphenol	420	*	160 J	---	---	*	---	*	---
4-Methylphenol	---	*	100 J	---	---	*	5,800 J	*	---
Phenol	---	*	450	---	---	*	---	*	---
Base/Neutral Organics (ug/kg)									
Acenaphthene	180 J	*	---	630	77 J	*	---	*	---
Acenaphthylene	440	*	350 J	120 J	100 J	*	---	*	---
Anthracene	290 J	*	210 J	1,600	160 J	*	2,300 J	*	---
Benzo(a)anthracene	460	*	680	2,100	740	*	5,600 J	*	310 J
Benzo(b)fluoranthene II	670	*	1,700	3,700	1,600	*	8,500 J	*	940
Benzo(k)fluoranthene II	670	*	1,700	3,700	1,600	*	8,500 J	*	940
Benzo(a)pyrene	400	*	1,200	2,200	870	*	4,800 J	*	340 J
Benzo(g,h,i)perylene	190 J	*	430	740	400	*	---	*	---
Benzoic Acid	---	*	---	---	---	*	---	*	---
Bis(2-Ethylhexyl)phthalate	2,000	*	4,900	140 JB**	320 J**	*	---	*	170 J
Butyl Benzyl Phthalate	340 J	*	---	---	---	*	---	*	---
Chrysene	390 J	*	750	2,300	700	*	5,600 J	*	470 J
Dibenzo(a,h)anthracene	64 J	*	130 J	290 J	200 J	*	---	*	---
Dibenzofuran	---	*	---	340	66 J	*	---	*	---
1,2-dichlorobenzene	71 J	*	---	---	---	*	---	*	---
1,4-dichlorobenzene	---	*	52 J	---	---	*	---	*	---
Di-n-butyl phthalate	260 J	*	190 J	---	---	*	---	*	---
Di-n-octyl phthalate	580 J	*	660	---	---	*	---	*	---
Fluoranthene	910	*	1,400	5,300	940	*	13,000 J	*	620 J
Fluorene	560	*	190 J	660	130 J	*	---	*	---
Indeno(1,2,3-cd)pyrene	160 J	*	360 J	720	360 J	*	---	*	130 J
Isophorone	---	*	880	---	---	*	---	*	---
2-Methylnapthalene	4,700	*	380	140 J	200 J	*	---	*	---
Napthalene	7,500	*	480	270 J	66 J	*	---	*	---
N-Nitrosodiphenylamine	---	*	---	---	---	*	---	*	---
Phenanthrene	2,000	*	570	3,400	720	*	8,300 J	*	240 J
Pyrene	1,100	*	2,000	4,900	1,100	*	11,000 J	*	560 J
1,2,4-trichlorobenzene	1,400	*	700	---	---	*	---	*	---
Pesticides and PCBs (mg/kg)									
PCB-1260	37,000	---	182.26 J•	760	562.92•	*	3,000	---	---
Metals (mg/kg)									
Antimony	0.11**	*	---	0.05**	---	*	0.07**	*	---
Arsenic	0.890	*	0.446	0.635	3.59	*	0.990	*	0.755
Beryllium	---	*	0.39	---	0.35	*	---	*	1.88
Cadmium	2.42	*	0.36	1.42	0.11	*	1.84	*	3.63
Chromium	2.61	*	23.7	6.95	12.1	*	9.69	*	43.5
Copper	36.8	*	34.8	1.90	24.2	*	33.4	*	83.4
Lead	169	*	147	57.8	74.5	*	87.2	*	174
Mercury	**	*	0.502	**	0.473	*	---	*	0.103
Nickel	8.90	*	11.7	8.09	7.51	*	9.79	*	20.6
Selenium	---	*	0.324	---	---	*	---	*	0.091
Silver	0.45	*	---	---	---	*	0.20	*	---
Thallium	---	*	---	---	---	*	---	*	---
Zinc	364	*	383	57.2	59.5	*	89.5	*	441
Miscellaneous									
Total Phenols (mg/kg)	3.34	*	1.38	---	*	*	40.4	*	---
Total Petroleum Hydrocarbons (mg/kg)	*	768	6,706	*	3,097	---	*	1,909	1,112

* Compound not analyzed for
** Analyte was detected at a concentration less than 10 times that found in any blank. The result is, therefore, questionable.
• Soil resampled June 8-9, 1987, reanalyzed June 9, 1987.
--- Compound analyzed for but not detected
J Estimated value
B Analyte found in laboratory blank as well as sample
II Denotes indistinguishable isomers

Source: BCM Eastern Inc. (BCM Project No. 00-4376-02)

[redacted]

SUMMARY OF CHEMICAL ANALYSES
SOILS

RENORA SITE
EDISON TOWNSHIP, NEW JERSEY

Table 1 Con't.

CompuChem No.:	87772	114847	87727	114852	87798	115098	97799	87800
BCM No.:	86-U9805	87-00R77	86-09807	87-00878	86-09912	87-00998	86-09913	86-09914
BCM I.D.:	RB-8-2	RB-8-12	RB-8-12	RB-8D-12	RB-9-2	RB-9-6	RB-9-10	RB-9D-10
Sample Depth:	0-2'	10-12'	10-12'	10-12'	0-2'	4-6'	8-10'	8-10'
Sampling Date:	05/27/86	01/13/87	05/27/86	01/13/87	05/28/86	01/14/87	05/28/86	05/28/86
Volatile Organics (ug/kg)								
Acetone	24 B**	210 B**	270 B**	91 B**	14 B**	*	19 B**	22 B**
Benzene	---	---	---	---	---	*	---	---
2-Butanone	---	51	28.0	30	---	*	---	---
Carbon Disulfide	---	---	---	---	---	*	---	---
Chloroform	---	6.2 J**	---	---	---	*	---	---
1,1-Dichlorethene	---	---	---	---	---	*	---	---
Trans-1,2-dichloroethene	8.1	---	---	---	---	*	---	---
Ethyl Benzene	---	---	---	---	---	*	---	---
Methylene Chloride	25 B**	28 B**	24 B**	9.8 B**	8.7 B**	*	11 B**	69 B**
4-Methyl-2-pentanone	---	---	---	---	---	*	---	---
Styrene	---	---	---	---	---	*	---	---
Tetrachloroethene	73.0	---	---	---	---	*	---	---
Toluene	2.0 J	---	---	---	---	*	---	---
1,1,1-Trichloroethane	59.0	---	---	---	---	*	---	---
Trichloroethene	97.0	---	---	---	---	*	---	---
Vinyl Chloride	---	---	---	---	---	*	---	---
Total Xylenes	57.0	---	---	---	---	*	---	---
Acid Extractables (ug/kg)								
2,4-Dimethylphenol	260 J	---	*	---	---	---	*	*
2-M thylphenol	160 J	---	*	---	---	---	*	*
4-Methylphenol	---	---	*	---	---	---	*	*
Phenol	170 J	---	*	---	150 J	---	*	*
Base/Neutral Organics (ug/kg)								
Acenaphthene	140 J	---	*	---	56 J	480	*	*
Acenaphthylene	430	---	*	---	110 J	70 J	*	*
Anthracene	2,000	---	*	---	160 J	570 J	*	*
Benzo(a)anthracene	690	---	*	---	710	1,300	*	*
Benzo(b)fluoranthene II	1,100	---	*	---	1,000	2,100	*	*
Benzo(k)fluoranthene II	1,100	---	*	---	1,000	2,100	*	*
Benzo(a)pyrene	740	---	*	---	610	1,000	*	*
Benzo(g,h,i)perylene	220 J	---	*	---	280 J	390 J	*	*
Benzoic Acid	---	---	*	---	63 J	---	*	*
Bis(2-Ethylhexyl)phthalate	4,000 B**	59 J	*	390 J	1,500 B**	360 J	*	*
Butyl Benzyl Phthalate	860	---	*	---	170 J	---	*	*
Chrysene	630	---	*	---	980	1,200	*	*
Dibenzo(a,h)anthracene	---	---	*	---	---	160 J	*	*
Dibenzofuran	---	---	*	---	48 J	290 J	*	*
1,2-dichlorobenzene	---	---	*	---	---	---	*	*
1,4-dichlorobenzene	---	---	*	---	---	---	*	*
Di-n-butyl phthalate	750	---	*	---	---	---	*	*
Di-n-octyl phthalate	1,400	---	*	---	---	---	*	*
Fluoranthene	1,400	---	*	---	1,600	2,500	*	*
Fluorene	430	---	*	---	100 J	580	*	*
Indeno(1,2,3-cd)pyrene	160 J	---	*	---	220 J	360 J	*	*
Isophorone	610	---	*	---	110 J	---	*	*
2-Methylnapthalene	700	---	*	---	---	130 J	*	*
Napthalene	460	---	*	---	52 J	91 J	*	*
N-Nitrosodiphenylamine	---	---	*	---	---	---	*	*
Phenanthrene	2,000	---	*	---	340 J	2,200	*	*
Pyrene	2,000	---	*	---	2,100	2,500	*	*
1,2,4-trichlorobenzene	1,300	---	*	---	---	---	*	*
Pesticides and PCBs (ug/kg)								
PCB-1260	3,800	---	---	---	--	*	---	*
Metals (mg/kg)								
Antimony	0.05**	---	*	---	0.06**	---	*	*
Arsenic	1.05	0.849	*	1.21	0.930	9.49	*	*
Beryllium	---	0.34	*	0.35	---	0.49	*	*
Cadmium	1.88	---	*	---	1.54	---	*	*
Chromium	85.6	8.76	*	8.31	8.50	10.7	*	*
Copper	17.8	9.12	*	5.14	71.3	9.49	*	*
Lead	2.98	22.6	*	20.7	47.4	33.0	*	*
Mercury	0.10**	---	*	---	0.15**	0.103**	*	*
Nickel	7.66	5.73	*	4.54	5.74	12.3	*	*
Selenium	---	0.477	*	0.547	---	0.046	*	*
Silver	0.41	---	*	---	0.20	---	*	*
Thallium	---	---	*	---	---	---	*	*
Zinc	39.4	31.8	*	20.5	139	41.9	*	*
Miscellaneous								
Total Phenols (mg/kg)	0.728	0.12	*	---	0.038	*	*	*
Total Petroleum Hydrocarbons (mg/kg)	*	95	976	---	*	1,799	---	*

* Compound not analyzed for
** Analyte was detected at a concentration less than 10 times that found in any blank. The result is, therefore, questionable.
--- Compound analyzed for but not detected
J Estimated value
B Analyte found in blank as well as sample
II Denotes indistinguishable isomers

Source: BCM Eastern Inc. (BCM Project No. 00-4376-02)

SUMMARY OF CHEMICAL ANALYSES
SOILS

RENORA SITE
EDISON TOWNSHIP, NEW JERSEY

Table 1 Con't.

CompuChem No.:	115099	115101	115106	115106	115107	115108	115109	115110	115112	115111
BCM No.:	87-00999	87-01000	87-01001	87-01002	87-01003	87-01004	87-01005	87-01006	87-01008	87-01007
BCM I.D.:	RB-10-2	RB-10-8	RB-10-12	RB-11-2	RB-11-6	RB-11-12	RB-12-2	RB-12-6	RB-12-6	RB-12-12
Sample Depth:	0-2'	6-8'	10-12'	0-2'	4-6'	10-12'	0-2'	4-6'	4-6'	10-12'
Sampling Date:	01/14/87	01/14/87	01/14/87	01/14/87	01/14/87	01/14/87	01/14/87	01/14/87	01/14/87	01/14/87
Volatile Organics (ug/kg)										
Acetone	16 B**	57 B**	110**	1,700 B	1,000	460 B	12 B**	76 B**	620 B	210 B
Benzene	---	---	---	18 J	2.5 J	---	---	---	---	---
2-Butanone	---	---	---	570	130	140	--	9.8 J	140	26
Carbon Disulfide	---	---	4.3 J	---	---	---	---	---	---	---
Chloroform	---	---	8.5**	11 J**	3.0 J**	1.4 J**	1.1 J**	---	5.1 J**	---
1,1-Dichloroethene	---	---	---	7.6 J	---	---	---	---	---	---
Trans-1,2-dichloroethene	---	---	---	60	9.6	---	---	---	---	---
Ethyl Benzene	---	---	---	500	19	5.2 J	11	2.8 J	---	---
Methylene Chloride	14 B**	15 B**	26**	58 B**	34**	17 B**	12 B**	26 B**	64 B**	54 B**
4-Methyl-2-pentanone	---	---	---	630	80	46	---	---	---	---
Styrene	---	---	---	98	--	--	--	---	---	---
Tetrachloroethene	---	---	---	170	17	1.5 J	---	---	---	---
Toluene	---	---	---	1,400	96	11	12	2.0 J	3.5 J	---
1,1,1-Trichloroethane	---	---	---	14 J	4.4 J	---	---	1.6 J	---	4.9 J
Trichloroethene	---	---	---	6.4 J	---	---	---	---	---	---
Vinyl Chloride	---	---	---	19 J	---	---	---	---	---	---
Total Xylenes	---	---	---	2,800	180	30	180	21	---	---
Acid Extractables (ug/kg)										
2,4-Dimethylphenol	56 J	370 J	120 J	2,900	68,000	28,000	700	79,000	26,000	18,000
2-Methylphenol	---	---	---	2,700	2,600 J	1,300 J	---	2,900	990 J	700 J
4-Methylphenol	---	330 J	91 J	840	56,000	22,000	---	39,000	20,000	16,000
Phenol	---	83 J	---	480	5,800	3,600	---	3,200	1,900 J	1,700
Base/Neutral Organics (ug/kg)										
Acenaphthene	92 J	72 J	---	180 J	1,400 J	1,700 J	400	1,600 J	1,000 J	1,000 J
Acenaphthylene	81 J	---	---	1,100	---	190 J	850	760 J	---	---
Anthracene	360 J	140 J	70 J	570	1,800 J	1,800 J	860	3,300	2,000 J	1,900 J
Benzo(a)anthracene	810	350 J	140 J	630	2,600 J	3,200	1,400	4,800	2,700	2,700
Benzo(b)fluoranthene II	1,400	560	220 J	1,500	3,900	4,100	2,500	8,200	4,200	3,800
Benzo(k)fluoranthene II	1,400	560	220 J	1,500	3,900	4,100	2,500	8,200	4,200	3,800
Benzo(a)pyrene	650	240 J	120 J	1,200	2,300 J	2,600	1,600	4,500	2,500	2,200
Benzo(g,h,i)perylene	310 J	210 J	---	510	1,600 J	1,700 J	760	1,800 J	1,600 J	1,500 J
Benzoic Acid	---	---	---	---	---	---	---	---	---	---
Bis(2-Ethylhexyl)phthalate	130 JB	230 JB	400 J	5,900 B	1,100 JB	2,400 B	3,000 B	1,100 JB	720 B	700 JB
Butyl Benzyl Phthalate	---	---	---	540	---	---	420	---	---	---
Chrysene	880	350 J	160 J	730	2,600 J	3,200	1,600	5,100	3,400	2,800
Dibenzo(a,h)anthracene	---	---	---	---	540 J	890 J	270 J	490 J	690 J	620 J
Dibenzofuran	59 J	49 J	---	280 J	1,300 J	1,500 J	---	2,300	1,500 J	1,400 J
1,2-dichlorobenzene	---	---	---	160 J	---	---	---	---	---	---
1,4-dichlorobenzene	---	---	---	---	---	---	---	---	---	---
Di-n-butyl phthalate	---	75 J	64 J	400	---	---	210 J	450 J	---	---
Di-n-octyl phthalate	---	---	---	1,200	---	---	520	210 J	---	---
Fluoranthene	1,500	620	250 J	1,400	6,600	7,000	2,700	12,000	6,500	7,800
Fluorene	150 J	110 J	75 J	850	1,600 J	2,400	1,100	1,900	370 J	400 J
Indeno(1,2,3-cd)pyrene	270 J	160 J	- -	380 J	1,400 J	1,600 J	590	1,600 J	1,400 J	1,300 J
Isophorone	---	---	---	---	---	210 J	1,000	790 J	---	---
2-Methylnapthalene	67 J	64 J	---	3,400	1,700 J	1,800 J	2,300	2,700	910 J	790 J
Naphthalene	67 J	---	---	4,500	810 J	740 J	1,700	1,400 J	420 J	310 J
N-Nitrosodiphenylamine	---	---	---	---	---	---	---	---	---	---
Phenanthrene	980	520	260 J	2,600	7,500	8,800	3,000	15,000	9,200	8,800
Pyrene	1,400	580	240 J	2,800	5,800	6,800	4,500	12,000	6,600	5,400
1,2,4-trichlorobenzene	---	---	---	1,900	---	---	1,100	---	---	---
Pesticides and PCBs (ug/kg)										
PCB-1260	270.65+	---	---	3,583.33+	12,724.14+	179.03 J+	1,208.79+	583.52+	478.56+	---
Metals (mg/kg)										
Antimony	---	---	---	---	---	--	---	---	---	---
Arsenic	4.14	0.809	0.460	8.97	9.19	6.27	5.03	2.71	6.46	4.45
Beryllium	0.29	0.34	0.39	0.34	0.44	0.35	0.33	0.24	0.47	0.39
Cadmium	---	---	---	0.65	0.97	0.22	0.11	---	0.10	0.11
Chromium	9.69	12.9	13.3	26.6	23.4	15.8	8.50	8.06	11.3	7.97
Copper	8.96	17.2	7.32	33.9	41.5	93.8	19.2	19.4	17.1	8.33
Lead	40.2	29.1	32.7	167	134	56.9	58.0	34.7	35.8	25.8
Mercury	0.188	0.302	---	0.302	0.160	0.103	0.131	---	---	---
Nickel	8.71	5.13	5.73	10.5	11.1	9.90	6.32	5.73	26.0	5.73
Selenium	---	---	0.134	0.039	0.034	---	---	---	---	---
Silver	---	---	---	---	---	---	--	---	---	---
Thallium	---	---	---	---	---	---	---	---	---	---
Zinc	35.1	19.0	25.5	631	593	95.3	49.0	44.2	40.7	27.4
Miscellaneous										
Total Phenols (mg/kg)	*	*	*	*	*	*	*	*	*	*
Total Petroleum Hydrocarbons (mg/kg)	2,637	759	79	7,196	1,410	1,580	12,585	6,133	883	432

* Compound not analyzed for
** Analyte was detected at a concentration less than 10 times that found in any blank. The result is, therefore, questionable.
\+ Soil resampled June 8-9, 1987, reanalyzed June 9, 1987.
--- Compound analyzed for but not detected
J Estimated value
B Analyte found in blank as well as sample
II Denotes indistinguishable isomers

Source: BCM Eastern Inc. (BCM Project No. 00-4376-02)

GROUNDWATER INVESTIGATION

The groundwater investigation assessed the degree of existing contamination. Five groundwater monitoring wells were installed at the site to provide onsite groundwater quality data and help determine the direction of groundwater flow at the site. A seep in the stream bank was also sampled to supplement groundwater quality data. Three piezometers were installed in and adjacent to Mill Brook to monitor water table elevations close to the Brook.

The results of this investigation revealed that the groundwater on-site is contaminated with low levels of chloroethane and heavy metals. While chloroethane was not found in soil samples it is potentially a byproduct of degradation from 1,1,1-trichloroethane which was found in onsite soils previously sampled. For metals, cadmium and chromium slightly exceeded Federal and State requirements by 1 and 4 ppb respectively, in one of two sampling episodes and were not detected in the second sampling episode. Alternatively, there could be an upgradient source(s) of contamination. A summary of groundwater contamination is presented in Table 2.

The fate of the organic compounds at the site is largely controlled by the nature of the fill material, alluvium and weathered bedrock beneath the site. Many of the compounds detected at the site will adsorb moderately to very strongly to fine-grained solid particles containing organic matter prevalent in the fill/soil. In addition, the limited solubility of most of the contaminants and the limited vertical permeabilty due to the highly weathered, clay-rich bedrock underlying the site inhibit the vertical migration route and focuses groundwater toward Mill Brook.

Groundwater flows northwest and discharges into Mill Brook. Analysis of water level data collected from three different periods revealed fluctuations in water table elevations of less than 1 foot. Such slight differences in water elevations suggests minimal horizontal movement of groundwater occurs beneath the site. The stability of the water table combined with the low permeability of the soil has kept contamination of groundwater low. There has been no offsite migration of contaminants through groundwater.

SURFACE WATER AND SEDIMENTS INVESTIGATION

The only surface water body in proximity to the Renora site is Mill Brook, which flows to the southwest along the western boundry of the property. The brook receives surface and groundwater runoff from a 3.1 square mile watershed, which includes the Renora site and the Edison Glen property directly across Mill Brook and the site.

SUMMARY OF CHEMICAL ANALYSES
SEEP AND GROUNDWATER

RENORA SITE
EDISON TOWNSHIP, NEW JERSEY

Table 2

CompuChem No.:	92881	115134	92883	115123	92885	115124	115125	92888	115126	92889	115127	92891	115128
BCM No.:	86-12736	87-00971	86-12737	87-00960	86-12738	87-00961	87-00962	86-12740	87-00963	86-12741	87-00964	86-12742	87-00965
BCM I.D.:	SP-1	SP-1	RW-1-13	RW-1-13	RW-2-16	RW-2-16	RW-2D-16	RW-3-15	RW-3-15	RW-4-17	RW-4-17	RW-5-17	RW-5-17
Sampling Date:	07/09/86	01/14/87	07/09/86	01/14/87	07/09/86	01/14/87	01/14/87	07/09/86	01/14/87	07/09/86	01/14/87	07/09/86	01/15/87
Volatile Organics (ug/l)													
Acetone	---	---	---	---	---	7.9 J**	---	---	16**	---	---	---	---
Benzene	---	---	---	---	---	---	---	---	2.1 J	---	---	---	---
Chloroethane	---	---	---	---	15	7.5 J	7.1 J	240	130	42	37	16	7.5 J
Total Xylenes	---	---	---	---	16	---	---	---	---	---	---	---	---
Acid Extractables (ug/l)													
No compounds detected	---	*	---	*	---	*	*	---	*	---	*	---	*
Base/Neutral Extractables (ug/l)													
Acenaphthene	---	*	---	*	---	*	*	2.4 J	*	---	*	---	*
Bis(2-Ethylhexyl)phthalate	2.6 J	*	---	*	---	*	*	---	*	---	*	---	*
Isophorone	---	*	---	*	---	*	*	4.4 J	*	---	*	2.0 J	*
Naphthalene	---	*	---	*	---	*	*	6.2 J	*	---	*	---	*
Pesticides and PCBs (ug/l)													
No compounds detected	---	*	---	*	---	*	*	---	*	---	*	---	*
Metals (mg/l)													
Antimony	0.004	---	---	---	---	---	- -	---	---	---	---	---	---
Arsenic	0.04	0.024	0.009	---	---	0.011	0.011	0.031	0.070	0.011	0.006	0.025	0.016
Cadmium	0.011	---	---	---	0.0005	---	---	0.0009	---	---	---	---	---
Chromium	0.054	---	0.002	---	0.001	---	---	---	---	---	---	---	---
Copper	0.239	---	---	0.029	---	0.025	0.026	---	0.026	---	0.025	---	0.028
Lead	0.295	---	0.002	---	0.038	---	---	0.036	---	0.059	---	0.010	---
Mercury	---	---	- -	0.0005	---	---	- -	---	0.0002	0.0005	0.0007	---	0.0002
Selenium	---	---	0.009	---	0.006	---	---	0.006	---	0.009	---	0.007	---
Zinc	1.67	0.076	---	0.178	--	0.099	0.178	0.02	0.167	---	0.201	0.04	0.201
Miscellaneous													
Phenols as phenol (ug/l)	36	90	7	---	35	8	15	22	25	9	58	8	49

* Compounds not analyzed for

** Analyte was detected at a concentration less than 10 times that found in any blank. The result is, therefore, questionable.

--- Compound analyzed for but not detected

J Estimated value

Source: BCM Eastern Inc. (BCM Project No. 00-4376-02)

Surface water and sediment samples contained concentrations of phenols, PAHs and pesticides at both upstream and downstream locations. Concentrations were similar in all parameters except PAHs which showed a slight increase downstream. This could be due to either an on-site source of contamination or the tendency for water to pool in the downstream area. PAHs are transported in the stream water with suspended solids. Stream velocity is lower in the pooled area so suspended material is deposited. Higher concentrations of PAHs are therefore expected in the pooled area. Runoff from both the Renora site and the Edison Glen property tend to move toward the pooled area of Mill Brook and may serve to deposit contaminants there.

Heavy metals in surface water samples and pesticides in sediment samples were detected in first round sampling only and pesticides were not found in on-site soil samples. Chloroethane (present in groundwater samples) was not detected in surface water samples.

For both surface water and sediment, there appears to be no significant impact directly attributable to site operations. There are a multitude of potential upgradient sources of contamination including other commercial operations on the Clementi Brothers, Inc. property. Summaries of surface water and sediment contamination, the extent of which is minimal in both cases, are presented in Tables 6 and 7 respectively.

AIR QUALITY INVESTIGATION

Air quality was routinely monitored by portable sampling equipment at the site for toxic vapors as part of the health and safety plan. On-site monitoring indicated no detectable releases of airborne contaminants during RI activities.

RISK ASSESSMENT

To assist in determining the impact of the site on public health and the environment, an endangerment assessment was conducted for the site by EPA. The risk assessment indicated that substantial risks to human health exist under a number of exposure scenarios. In each of the exposure scenarios involving direct contact with soil, the dominant chemicals contributing to risk are PCBs and selected PAHs.

SUMMARY OF CHEMICAL ANALYSES
SURFACE WATER - MILL BROOK

RENORA SITE
EDISON TOWNSHIP, NEW JERSEY

Table 6

CompuChem No.:	92864	115130	92866	115131	92871	115132	92875	115133
BCM No.:	86-12731	87-00967	86-12732	87-00968	86-12733	87-00969	86-12734	87-00970
BCM I.D.:	SW-1	SW-1	SW-2	SW-2	SW-20	SW-20	SW-3	SW-3
Sampling Date:	07/09/86	01/14/87	07/09/86	01/14/87	07/09/86	01/14/87	07/09/86	01/14/87
Volatile Organics (ug/l)								
Acetone	---	---	14**	---	---	---	---	10**
Tetrachloroethene	1.1 J	2.6 J	---	2.3 J	---	2.7 J	---	2.6 J
Trichloroethene	1.2 J	2.1 J	1.4 J	---	---	2.5 J	---	2.4 J
Acid Extractables (ug/l)								
No compounds detected	---	*	---	*	---	*	---	*
Base/Neutral Organics (ug/l)								
Benzoic Acid	---	*	- -	*	---	*	2.4 J	*
Bis(2-Ethylhexyl)phthalate	---	*	---	*	3.2 J	*	---	*
Pesticides and PCBs (ug/l)								
No compounds detected	---	*	---	*	---	*	---	*
Metals (mg/l)								
Antimony	---	---	---	---	0.002	- -	---	---
Arsenic	0.019	0.001	0.021	0.001	0.009	0.001	---	0.001
Cadmium	0.0005	- -	---	- -	---	- -	0.0005	- -
Chromium	0.090	0.046	0.11	0.043	0.041	0.047	0.032	0.049
Copper	---	---	0.02	---	---	---	--	---
Lead	---	---	0.083	---	0.094	---	0.052	---
Mercury	---	0.0002	0.0003	---	---	---	--	---
Selenium	---	---	---	---	0.059	---	0.011	---
Zinc	0.02	0.133	0.09	0.122	0.05	0.133	0.04	0.144
Miscellaneous								
Phenols as phenol (ug/l)	19	---	20	---	11	--	15	---

* Compound not analyzed for
** Analyte was detected at a concentration less than 10 times that found in any blank. The result is, therefore, questionable.
--- Compound analyzed for but not detected
J Estimated value

Source: BCM Eastern Inc. (BCM Project No. 00-4376-02)

SUMMARY OF CHEMICAL ANALYSES
SEDIMENTS - MILL BROOK

RENORA SITE
EDISON TOWNSHIP, NEW JERSEY

Table 7

CompuChem No.:	92899	115115	92901	115116	92905	115117	92910	115118
BCM No.:	86-12748	87-00952	86-12749	87-00953	86-12750	87-00954	86-12751	87-00955
BCM I.D.:	SS-1	SS-1	SS-2	SS-2	SS-2D	SS-2D	SS-3	SS-3
Sampling Date:	07/09/86	01/14/87	07/09/86	01/14/87	07/09/86	01/14/87	07/09/86	01/14/87
Volatile Organics (ug/kg)								
Acetone	6.7 JB**	*	8.8 JB**	*	7.8 JB**	*	18 B**	*
Methylene Chloride	6.2 B**	*	5.1 JB**	*	29 B**	*	22 B**	*
Acid Extractables (ug/kg)								
2,4 Dimethyl phenol	---	220 J	---	79 J	---	---	--	---
Base/Neutral Organics (ug/kg)								
Acenaphthene	---	56 J	---	---	---	--	--	---
Anthracene	44 J	140 J	---	---	---	---	---	---
Benzo(a)anthracene	190 J	330 J	170 J	---	120 J	160 J	82 J	120 J
Benzo(b)fluoranthene	370 II	600 II	220 J	---	200 J	300 JII	100 J	220 JII
Benzo(k)fluoranthene	370 II	600 II	140 J	---	120 J	300 JII	63 J	220 JII
Benzo(a)pyrene	220 J	300 J	160 J	---	150 J	140 J	60 J	110 J
Benzo(g,h,i)perylene	140 J	130 J	91 J	---	---	---	41 J	---
Bis(2-Ethylhexyl)phthalate	150 J	360 J	230 J	530	170 J	620	250 J	530
Chrysene	240 J	420 J	340 J	---	140 J	190 J	74 J	170 J
Dibenzo(a,h)anthracene	48 J	---	--	---	---	---	---	---
Dimethyl Phthalate	---	---	44 J	- -	---	---	---	---
Di-n-butyl phthalate	---	47 J	---	---	37 J	46 J	---	44 J
Fluoranthene	300 J	920	200 J	---	230 J	290 J	89 J.	240 J
Indeno(1,2,3-cd)pyrene	110 J	---	80 J	---	---	---	---	---
N-Nitrosodiphenylamine	---	---	47 J	---	48 J	---	52 J	---
Phenanthrene	220. J	640	130 J	---	120 J	120 J	48 J	110 J
Pyrene	500	730	230 J	230 J	280 J	290 J	130 J	260 J
Fluorene	---	51 J	---	---	---	---	---	---
Pesticides (ug/kg)								
g-BHC	---	---	21	---	---	--	---	---
4,4'-DDD	263	---	285	---	195	---	---	---
4,4'-DDE	144	---	116	---	204	---	183	---
4,4'-DDT	304	---	154	---	---	---	397	---
PCBs (ug/kg)								
No compounds detected	---	---	---	---	---	---	---	---
Metals (mg/kg)								
Antimony	0.113	---	0.470	---	0.150	---	0.214	---
Arsenic	6.35	15.6	3.85	0.086	1.95	8.26	5.40	7.19
Beryllium	0.31	0.28	0.41	0.23	0.53	0.22	1.30	0.25
Cadmium	1.10	0.11	1.25	0.11	1.22	0.11	---	0.22
Chromium	21.4	13.2	14.0	16.8	11.3	15.5	17.1	16.8
Copper	58.7	33.4	52.0	22.2	61.9	24.4	20.5	25.5
Lead	63.6	65.5	78.5	55.2	91.9	47.6	85.9	56.9
Nickel	7.40	9.90	15.0	5.73	15.0	5.73	7.4	5.13
Silver	---	---	---	---	---	---	0.58	--
Zinc	112	122	167	78.7	170	87.7	225	92.4
Mercury	---	0.103	---	0.103	---	--	---	0.103
Miscellaneous								
Cyanide (mg/kg)	---	*	---	*	---	*	3.09	*
Phenols as phenol (mg/kg)	---	*	0.04	*	0.08	*	0.08	*
pH (Standard Units)	6.8	*	6.5	*	6.6	*	7.9	*

* Compound not analyzed for
** Analyte was detected at a concentration less than 10 times that found in any blank. The result is, therefore, questionable.
--- Compound analyzed for but not detected
J Estimated value
B Analyte found in blank as well as sample
II Denotes indistinguishable isomers

Source: BCM Eastern Inc. (BCM Project No. 00-4376-02)

Exposure scenarios of public health concern under current and future land-uses included the following:

- children trespassing the site who are exposed to soil contaminants by direct contact and subsequent incidental ingestion;

- on-site workers of light industrial establishments who are exposed to soil contaminants by direct contact and subsequent incidental ingestion if the site were re-used for commercial operations in the future;

- residents who are exposed to soil contaminants by direct contact and subsequent incidental ingestion if the site was re-used for residential development in the future

Under the current use scenario exposure of trespassers to on-site surface soil through direct contact with subsequent incidental ingestion results in potential excess lifetime cancer risks of $7x10^{-7}$ to $5x10^{-5}$ for the average and plausible maximum scenarios respectively.

If the site is reused for light industrial purposes in the future, workers may be exposed to on-site contaminants through direct contact with subsequent incidental ingestion of soil. Estimation of risks to workers associated with this exposure scenario indicates that the potential excess cancer risks are $1x10^{-6}$ and $1x10^{-4}$ for the average and plausible maximum scenarios respectively.

If the site were developed with residential dwellings, the potential excess lifetime cancer risks associated with direct contact and subsequent incidental ingestion of soil over a lifetime are $2x10^{-5}$ and $1x10^{-3}$ for the average and plausible maximum scenarios respectively.

The endangerment assessment considered exposure to contaminants via groundwater and determined that there was not a viable pathway of exposure for the reasons that follow. There is no current or expected future exposure to site groundwater through ingestion. Drinking water in the area is provided by a public supply system. There are no local wells utilizing site groundwater and site groundwater discharges into the Mill Brook.

The endangerment assessment also considered as a pathway of exposure the possibility that children may be likely to play in Mill Brook on occasion. The potential for significant exposure to result through dermal absorption and incidental ingestion was determined to be negligible. Since Mill Brook is very shallow, wading in the brook is unlikely to result in exposure to much skin surface area. The only chemicals detected in both brook water and sediment are metals, which are not readily absorbed through the skin. Although the organic compounds detected in sediments that may be site related (PAHs) have some, albeit a small potential (on the order of 1%) to absorb through skin, absorption through the skin from Mill Brook sediments is expected to be minimal because of the constant dilution afforded by water contacting the skin and the very slow absorption of chemicals through feet.

Therefore, the pathways of exposure considered to be significant by the endangerment assessment are as follows:

- children trespassing the site who are exposed to soil contaminants by direct contact and subsequent incidental ingestion;
- on-site workers of light industrial establishments who are exposed to soil contaminants by direct contact and subsequent incidental ingestion if the site were re-used for commercial operations in the future and;
- residents who are exposed to soil contaminants by direct contact and subsequent incidental ingestion if the site is re-used in the future for residential development.

It should be noted that there are uncertainties associated with the estimates of risks and the assumptions made in developing these estimates tend to be conservative, i.e., with a tendency towards over estimation. The actual risks are not likely to exceed those calculated; but may be substantially lower. The critical toxicity values incorporate uncertainty factors that provide a margin of safety against adverse health effects.

ENFORCEMENT ASPECTS

NJDEP and the Edison Township Department of Health had conducted enforcement actions against Renora, Inc. from 1978 - 1984. EPA, in conjunction with NJDEP determined the need for a Removal Action in 1984. Potential responsible parties (PRPs) were found and an Administrative Order was issued to conduct a Removal Action. The PRPs completed the Removal Action, which was conducted between October 1984 and May 1985. In May 1985 an Administrative Consent Order between EPA and the PRPs was signed for the PRPs to conduct an RI/FS under oversight by EPA. The RI was completed in May 1987 and the FS was completed in August 1987.

Based on the results of the feasibility study submitted by the PRPs and discussions between EPA and the PRPs to date, there appears to a strong interest on the part of the PRPs to implement the selected remedy. The PRPs, represented to EPA as the Renora RI/FS Trust, are comprised of a number of financially viable companies who could implement the selected remedy. At this time, it is likely that the PRPs will implement the selected remedy.

Special notice is expected to be issued to the PRPs in October or November 1987. It is expected that a "good faith offer" would be submitted by the PRPs during the initial sixty day moratorium period and that an agreement for RD/RA can be consumated during the subsequent sixty day period allowed by the special notice procedures of SARA.

A detailed chronologic account of enforcement activities is provided as an Addendum II.

COMMUNITY RELATIONS HISTORY

Although local officials have been concerned about site conditions, general public awareness appears to be relatively limited. Several articles in local newspapers have been printed since 1981 concerning site conditions, operations, violations, response and cleanup activities.

On November 12, 1985 an initial public meeting was held at the Edison Township Municipal Complex in order for EPA to explain the status of the site and the scope of the RI/FS that were to be conducted. The public meeting was part of the regular township council meeting. Primary areas of questioning by local officials and the general public included 1) the nature of the waste, 2) identification of responsible parties and 3) the scope of work for the RI/FS.

One possible source of increased public awareness regarding the site may result from occupation of two residential developments built in close proximity to the site during the period of time the RI/FS was conducted. A public meeting discussing the results of the RI/FS and the proposed remedial action plan was held on September 1, 1987. Outstanding community concerns are reflected in the Responsivehess Summary, which represents the final portion of the Record of Decision (ROD).

ALTERNATIVES EVALUATION

Listed below is a description of each of the eight alternatives evaluated in the feasibility study. This is followed by an evaluation and comparison of the alternatives in terms of nine key criteria which directly relate to factors SARA §121(b)(1) (A-G) mandates the Agency to assess. The nine criteria are:

1. compliance with applicable or relevant and appropriate requirements (ARARs),

2. reduction of toxicity, mobility or volume,

3. short-term effectiveness,

4. long-term effectiveness and permanence,

5. implementability,

6. cost,

7. community acceptance,

8. state acceptance and

9. overall protection of human health and the environment

Addendum I provides a summary of the alternatives evaluation including costs.

ALTERNATIVE 1 -- NO ACTION, PERIODIC MONITORING

This alternative consists of the following:

- no on-site remediation

- a groundwater monitoring program which includes groundwater sampling and analysis for volatile organic compounds (VOCs), National Interim Primary Drinking Water Standards Metals (metals) and total petroleum hydrocarbons (TPH) on a quarterly basis for 30 years

- an annual on-site inspection to evaluate effects of the alternative on other environmental media, i.e., soil, air, or surface water and to inspect the integrity of the perimeter fence

- the estimated present worth cost is $270,000

1. Compliance with ARARs

During development of the feasibility study, ARARs and/or Criteria, Guidances and Advisories to be considered were established for site remediation. Table 3-1 represents recommended cleanup objectives for soils in the State of New Jersey which were considered in the FS. Since the soil cleanup objectives are not promulgated requirements under state law, they cannot be considered ARARs. However, the soil cleanup objectives have been classified as Criteria, Guidances and Advisories and were considered heavily in determining the level of soil cleanup.

Implementation of the No Action alternative would not result in attainment of the state soil cleanup objectives considered for site remediation since the source of contamination would remain. Specifically, the levels of polynuclear aromatic hydrocarbons (PAHs), and PCBs would be exceeded in the surface and subsurface soils.

With respect to groundwater; its classification as Class IIb-type groundwater based on EPA's guidelines for groundwater classification makes Maximum Contaminant Levels (MCLs) set under the Safe Drinking Water Act and New Jersey Groundwater Standards relevant and appropriate as cleanup standards. In addition, the State of New Jersey has established Criteria, Guidances and Advisories (i.e. New Jersey Interim Groundwater Cleanup Guidance) which were considered.

The No Action alternative would not result in attainment of groundwater ARARs or Criteria, Guidances and Advisories considered. Specifically, the levels of chloroethane, chromium, cadmium, lead, and arsenic would be exceeded at one or more monitoring well locations.

2. Reduction of Toxicity, Mobility or Volume

The No Action alternative would not employ any active treatment processes for soils. The toxicity and volume of contaminants in soils is expected to be unchanged. There may be increased mobility of some contaminants (e.g. VOCs) from the surface through the subsurface of the soil as a result of precipitation or other environmental factors.

BCM

TABLE 3-1

NJDEP SUMMARY OF APPROACHES TO CLEANUP LEVELS

Chemical[1]	Concentration (ppm)
Total Volatile Organics	1
Total Base Neutrals	10
Total Petroleum Hydrocarbons	100
Cadmium	3
Zinc	350
PCBs	5

(1) NJDEP surrogate or action levels/chemical class cleanup objectives.

For the groundwater, the No Action alternative would also not employ any active treatment processes. However, the process of natural attenuation would be a factor that may effect the toxicity, mobility and volume of contaminants over time.

3. Short-Term Effectiveness

There would be no short-term effectiveness associated with the implementation of the No Action alternative. The No Action alternative, except for access restrictions due to the perimeter fence would not mitigate existing risks.

4. Long-Term Effectiveness and Permanence

Implementation of the No Action alternative would not reduce the volume, toxicity or mobility of hazardous substances at the site by employing any active treatment processes. Therefore, the magnitude of risk associated with the site would remain unchanged. Long-term management at the site would involve quarterly groundwater sampling and analysis and an annual site inspection to evaluate the effects of No Action on other environmental media as well as to examine the integrity of the perimeter fence.

The long-term reliability of this approach is dependent on the maintenance of the perimeter fence which would preclude direct contact and subsequent incidental ingestion of contaminated soils, the enforcement of any other land-use restrictions imposed and the results of groundwater monitoring which would serve as an indicator of environmental degradation. Evaluation of these factors would determine the need for replacement of the No Action alternative, if it were implemented.

5. Implementability

The relative ease of implementing the No Action alternative is based on the following:

a. ease in construction or repair of fence or additional wells, if necessary,

b. operational reliability of monitoring wells and,

c. readily available equipment and personnel to implement the alternative.

Cost

The No Action alternative estimated cost breakdown is as follows:

Capital	$ 0
Operation and Maintenance	$ 26,000
Present Worth	$ 270,000

The potential for future remedial action would be determined based on the groundwater monitoring, annual site inspection and land use changes at or in the vicinity of the site. Changes in any of the aforementioned factors that increase the magnitude of risk to public health or the environment would require a re-assessment of the need for further remedial action. Based on the feasibility study, present worth costs of any further remedial action could range from $450,000 to $77,000,000 depending on the remedial action that would be implemented.

7. Community Acceptance

Implementation of the No Action alternative would neither mitigate the public health risk nor the groundwater contamination problem present at the site. With a recently constructed residential development in close proximity to the site (just across the Mill Brook), it is anticipated that community acceptance would be low.

8. State Acceptance

The No Action alternative would not reduce the public health and environmental risks posed by the site. In addition, by taking no action at the site, neither federal nor state applicable or relevant and appropriate requirements nor Criteria, Advisories and Guidances that were considered, would be met. Therefore, State acceptance of this alternative is anticipated to be low.

9. Overall Protection of Human Health and the Environment

The implementation of the No Action alternative would not result in reducing the magnitude of public health and environmental risk asssociated with the site. Specifically, under current land-use conditions exposure of trespassers to on-site surface soils through direct contact and subsequent incidental ingestion would result in a potential excess lifetime cancer risk (upperbound) of 7×10^{-7} and 5×10^{-5} for the average and plausible maximum scenario evaluated.

Under future land-use scenarios evaluated, it was determined that for light industrial uses; workers may be exposed to on-site contaminants through direct contact and subsequent incidental ingestion of soil. Estimation of risks to workers associated with this exposure scenario indicates that the potential excess cancer risks are 1×10^{-6} and 1×10^{-4} under conditions and assumptions of the average and plausible maximum scenarios, respectively.

If the site were developed with residential dwellings, the potential excess lifetime cancer risks (upperbound) associated with direct contact and subsequent incidental ingestion of soil are 2×10^{-5} and 1×10^{-3} under conditions and assumptions of the average and plausible maximum exposure scenarios. In each of the exposure scenarios involving direct contact with subsequent incidental ingestion of soils, the dominant chemicals contributing to the risk were PCBs and PAHs.

Based on the endangerment assessment, exposure to contaminants in groundwater, surface water and sediments were determined not to pose a risk to public health or the environment.

ALTERNATIVE 2 -- CLAY-SOIL CAP, REVEGETATION, PERIODIC MONITORING

This alternative consists of the following:

- site preparation including removal of existing vegetation and regrading site
- installation of a clay-soil cap as shown in Figure 3-3 consisting from bottom to top of:
  - 6" gravel vent layer
  - layer of geotextile filter fabric
  - 12" compacted clay
  - 18" clean fill
  - 6" topsoil
- revegetation
- periodic monitoring as described for Alternative 1

1. Compliance with ARARs

This alternative would not result in attainment of Federal and State ARARs or Criteria, Guidances or Advisories that were considered. Soil and groundwater contamination would remain at the site although this alternative would serve to reduce the potential for further groundwater degradation by channelling surface water run-on and run-off away from contaminated areas of the site.

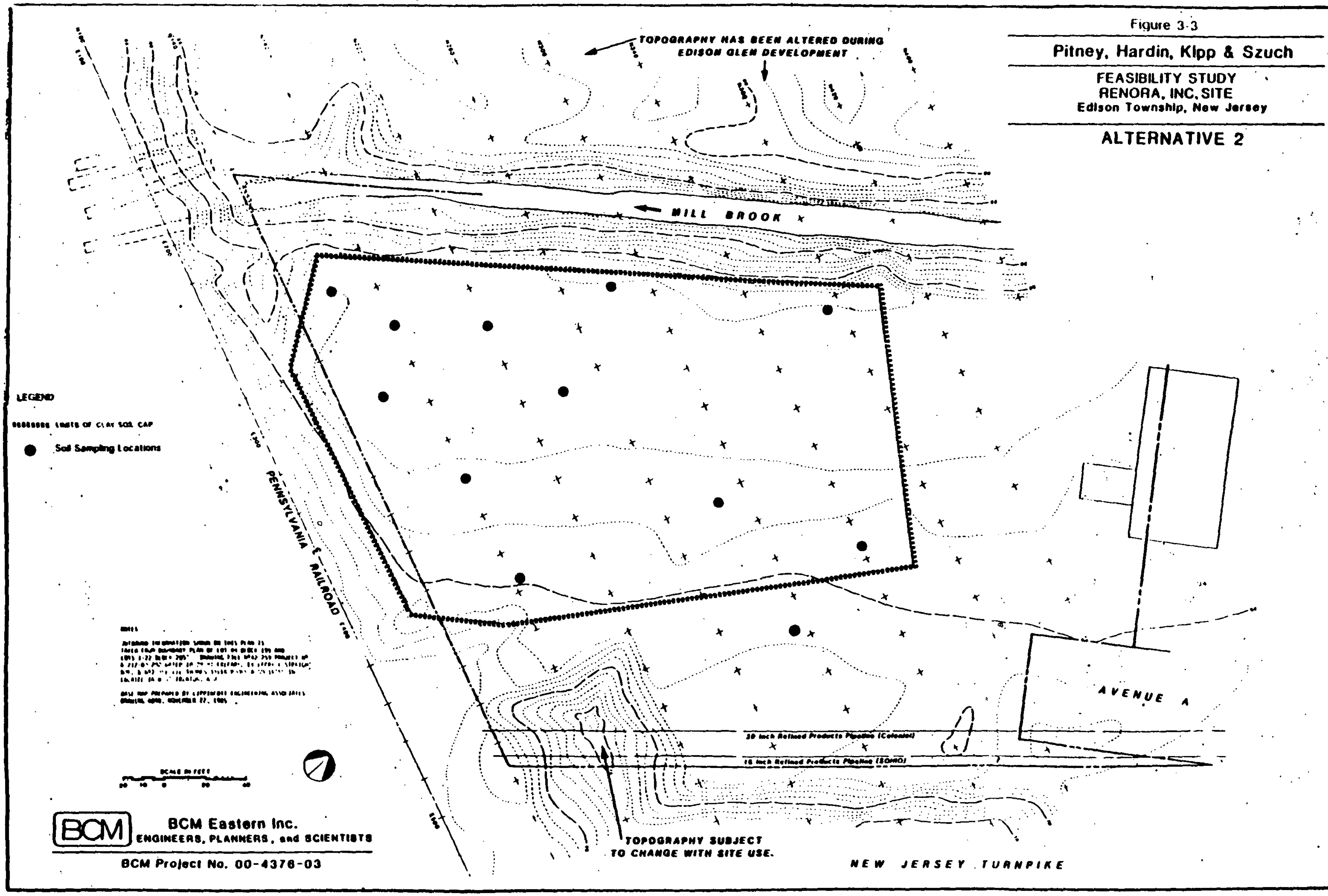


Figure 3-3

Pitney, Hardin, Kipp & Szuch

FEASIBILITY STUDY
RENORA, INC. SITE
Edison Township, New Jersey

ALTERNATIVE 2

2. Reduction of Toxicity, Mobility or Volume

Capping the site would not utilize any active treatment processes for soils and/or groundwater. The toxicity and volume of the contaminants in soils is expected to be unchanged. Installation of the cap would reduce the ability of soil contaminants to migrate into groundwater since surface water run-on and run-off would be channelled away from the site.

3. Short-term Effectiveness

The short-term effectiveness in terms of magnitude of risk reduction is that installation of a cap on the site would reduce the magnitude of risk by not allowing the potential for direct contact and subsequent incidental ingestion of soil contaminants. In addition, compaction of the clay layer must be periodically tested during installation to ensure proper permeability is achieved.

Site preparation activities may generate dust that could cause short-term negative public health and/or environmental impacts. The use of dust suppressants would sufficiently minimize such impacts. In addition, on-site workers could be exposed to contaminants in surface soils, but this exposure can be effectively reduced by the use of proper personnel protective equipment and proper worker health and safety protocols.

4. Long-Term Effectiveness and Permanence

Implementation of this alternative would not reduce the toxicity and volume of soil contaminants. Capping the site would reduce the mobility of contaminants by routing surface water run-off or run-on away from the site thereby preventing surface water run-on or run-off from washing soil contaminants into groundwater. The long-term effectiveness and permanence of the cap in preventing direct contact with soil contaminants is dependent upon maintenance of its integrity.

Long-term management of the site would involve quarterly groundwater sampling and analysis and an annual site inspection to evaluate the effects on other environmental media as well as to examine the integrity of the perimeter fence. In addition, installation of the cap requires long-term maintenance to assure proper permeability of the clay layer is achieved; that any stabilization (use of riprap or stone) of the cap done along the stream bank remains intact and that no depressions result at the site which would allow surface ponding. Any future land-use restrictions imposed would have to be monitored to assure compliance.

5. Implementability

There are no constraints to the relative ease of implementation of this alternative. The expected operational technology of this alternative is high; requiring no special techniques or equipment.

6. Cost

The estimated cost breakdown for this alternative is as follows:

Capital	$ 234,000
Operation and Maintenance	$ 21,000
Present Worth	$ 453,000

The potential for future remedial action would be determined based on the integrity of the cap, groundwater monitoring and the annual site inspection. Changes in any of these factors that result in an increased risk to public health or the environment would require an assessment of the need for further remedial action. Based on the feasibility study, present worth costs of any further remedial action could range from $1,200,000 to $77,000,000 depending on the remedial action that would be implemented.

7. Community Acceptance

The implementation of this alternative would isolate soil contaminants from the potential exposure to the public through direct contact. Low-level groundwater contamination does not pose a public health or environmental risk. Reduction in the level of groundwater contaminants would occur only through natural attenuation. Although the magnitude of the public health risk is minimized, the fact that the alternative does not remediate soil contamination at the site may result in some reservations in acceptance of this alternative on the part of the community.

8. State Acceptance

Implementation of a capping alternative would reduce the potential health risk of direct contact with subsequent incidental ingestion of soil contaminants. However, this alternative would not attain Federal and State ARAR's and/or Criteria, Advisories and Guidances that were considered. Therefore, state acceptance of this alternative is considered low.

9. Overall Protection of Human Health and the Environment

Capping the site would reduce the risk to public health due to exposure of soil contaminants via direct contact and subsequent incidental ingestion. The remedy would not be considered permanent since the toxicity and volume of contaminants in the soil would remain essentially unchanged. Future land use of the site would be restricted due to the presence of the cap and the contamination that remains on-site. Overall, the remedy would be protective of public health and the environment. However, it would not be considered a permanent remedy and it would require long-term management.

ALTERNATIVE 3 -- PCB EXCAVATION, PARTIAL PAH EXCAVATION, OFFSITE DISPOSAL (LANDFILL/INCINERATION), PERIODIC MONITORING

The components of this alternative are as follows:

- excavation of PCB-contaminated soils containing concentrations above 5 ppm (1100 cy) and offsite disposal (landfilling or incineration)

- excavation of PAH-contaminated soils containing concentrations above 10 ppm from the top 4 feet of the site (2600 cy) and off-site disposal (landfilling or incineration)

- backfill with clean fill, grading and revegetation

- periodic monitoring of groundwater

Figure 3-4 illustrates Alternative 3.

1. Compliance with ARARs

Implementation of this alternative would not result in attainment of all Federal and State ARARs or Criteria, Guidance and Advisories that were considered. However, the excavation of PCBs would attain the State soil cleanup objective for PCBs that was considered for the site. Excavation of all PCB contaminated soils and, PAH contaminated soils to a depth of approximately four (4) feet would remove a significant volume of contamination. However, subsurface residual PAH contamination would remain in soils that exceeds State Criteria, Guidance and Advisories that were considered.

The potential for further groundwater degradation may be reduced since the volume of soil contaminants (a potential source of groundwater contamination) are reduced by excavation. Source removal, in conjunction with natural attenuation may serve to attain groundwater ARARs.

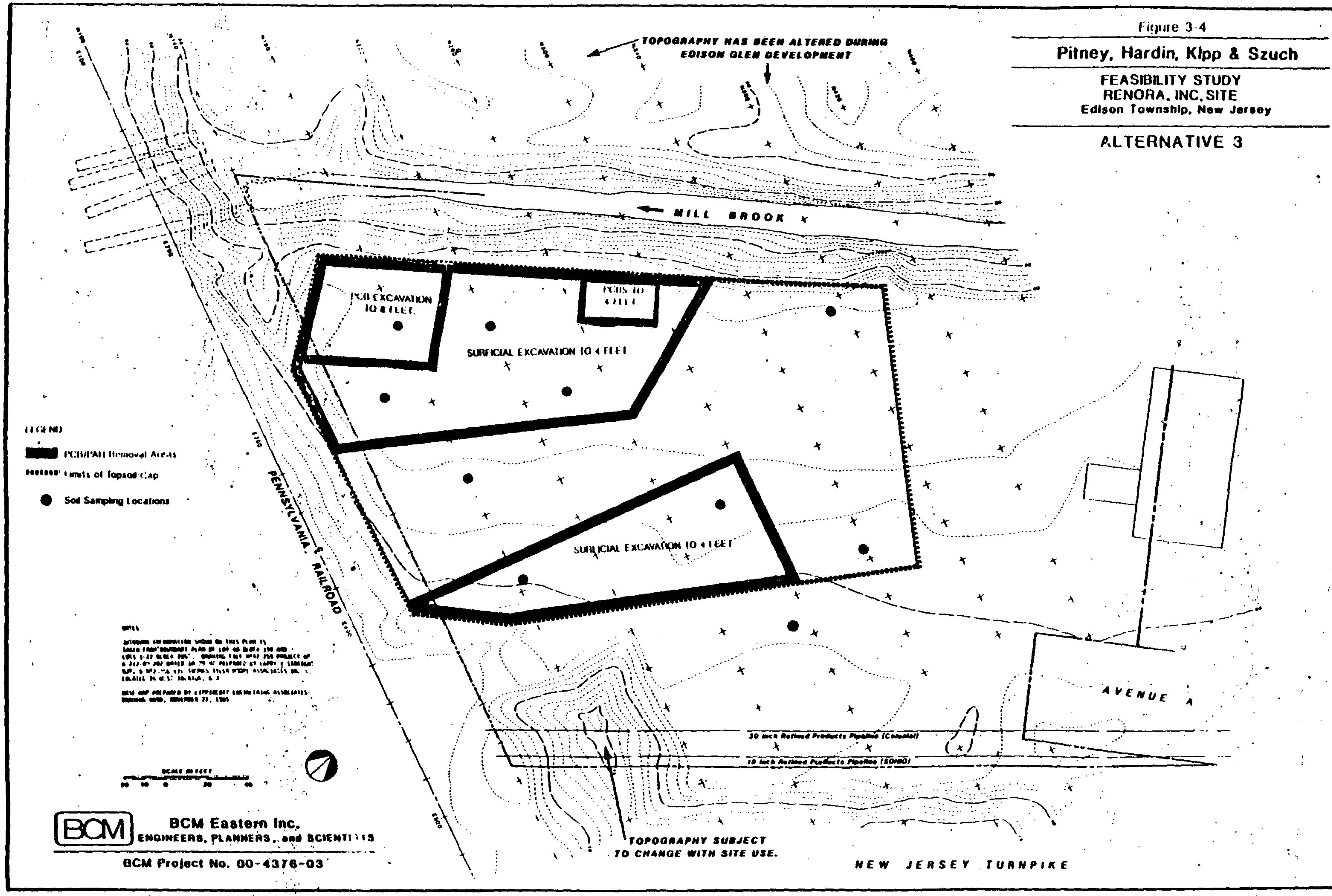


Figure 3-4
Pitney, Hardin, Kipp & Szuch
FEASIBILITY STUDY
RENORA, INC. SITE
Edison Township, New Jersey
ALTERNATIVE 3
TOPOGRAPHY HAS BEEN ALTERED DURING EDISON GLEN DEVELOPMENT
MILL BROOK
PCB EXCAVATION TO 4 FEET
PCBS TO 4 FEET
SURFICIAL EXCAVATION TO 4 FEET
SURFICIAL EXCAVATION TO 4 FEET
LEGEND
PCB/PAH Removal Areas
Limits of Topsoil Cap
Soil Sampling Locations
PENNSYLVANIA RAILROAD
AVENUE A
30 inch Refined Products Pipeline (Colonial)
16 inch Refined Products Pipeline (SOHIO)
TOPOGRAPHY SUBJECT TO CHANGE WITH SITE USE.
NEW JERSEY TURNPIKE
BCM Eastern Inc.
ENGINEERS, PLANNERS, and SCIENTISTS
BCM Project No. 00-4376-03

2. Reduction of Toxicity, Mobility or Volume

All contaminated soils with PCBs in excess of 5 ppm would be removed (1100 cy). The volume of contaminated soils with PAHs greater than 10 ppm in the upper 4 feet of the site which would be removed, totals approximately 2600 cy. This volume (2600 cy) is approximately 60% of the total volume of contaminated soils with PAHs greater than 10 ppm found at the site. If excavated soils were incinerated instead of landfilled, there would be a permanent reduction in the toxicity, volume and mobility of soil contaminants. Excavation of a significant volume of contaminated soil would reduce the potential for further groundwater contamination.

3. Short-Term Effectiveness

For this alternative, the excavation phase will present the most significant potential short-term public health and/or environmental impacts. Emissions of dust generated during site preparation activities, excavation activities and loading/unloading of contaminated soils will be minimized by dust suppression measures and by avoiding loading/unloading large amounts of soil. In addition, on-site workers who could be exposed to soils during excavation can effectively reduce their potential exposure by following proper worker health and safety protocols.

Disturbance of soils during excavation could lead to deposition in the Mill Brook in times of heavy precipitation and run-off from the site. This can be minimized by installation of surface water diversion swales around the site perimeter to prevent site run-on and control run-off. There are short-term risks associated with the transport and redisposal of excavated soils. However, following appropriate hazardous waste transportation and off-site disposal procedures should effectively mitigate the risks.

4. Long-Term Effectiveness and Permanence

The implementation of this alternative would significantly reduce the volume of soil contaminants. If off-site disposal by incineration were utilized, there would be a permanent reduction in the toxicity and mobility of the soils as well. Excavation of soils as described for this alternative would remove the direct contact and subsequent incidental ingestion risk posed by the surface soils. However, absent any restrictions, future land-use scenarios involving commercial or residential development would pose a potential risk to on-site workers or residents through exposure to the residual PAH contaminated soils that remained.

Long-term management of the site would involve groundwater monitoring to evaluate the effectiveness of the alternative and to monitor the effects of natural attenuation. The prospect for long-term reliability of the alternative would be established by the soil verification study, groundwater monitoring which would be expected to show no significant impact by the site since the residual contaminants are highly immobile in the soil and the effectiveness of site-use restrictions imposed where necessary. Absent site disturbance, the potential need for replacement of the remedy is low.

5. Implementability

The following factor may constrain the relative ease of implementing this alternative:

- decontamination of the largest pieces of debris (i.e. slabs of concrete) would result in generation of a liquid containing hazardous substances that may require treatment or disposal.

The expected operational technology of this alternative is high with no special techniques or equipment being required.

6. Cost

The estimated cost of this alternative is as follows:

Capital when landfilling excavated soils	$ 1,947,000
Capital when incinerating excavated soils	$17,960,000
Operation and Maintenance	$ 21,000
Present Worth utilizing landfill	$ 2,166,000
Present Worth utilizing incineration	$18,179,000

The verification sampling program for soils would establish that the remedy was conducted properly. Groundwater monitoring would help evaluate any changes at the site.

7. Community Acceptance

Implementation of this alternative would remove the most significant levels of contamination as well as isolate residual contamination from their potential exposure to the public through direct contact. Low-level groundwater contamination does not pose a public health or environmental risk. Reduction in the level of groundwater contaminants would only occur through natural alternation. Although the magnitude of the public health risk is minimized, the fact that the alternative does not permanently remediate all the soil contamination at the site may result in some reservations in acceptance of this alternative on the part of the community.

8. State Acceptance

This alternative would not meet State Criteria, Guidance and Advisories considered for this site due to the fact that subsurface soil contamination remains. Therefore, State acceptance of this alternative is considered low.

9. Overall Protection of Human Health and the Environment

The risk of exposure via direct contact and subsequent incidental ingestion would be minimized by implentation of this alternative. However, future land-use scenarios involving commercial or residential development would require restrictions to preclude disturbance or potential exposure to contaminated subsurface soils which remain. The fact that the residual contaminants (PAHs) are highly immobile in soil in conjunction with source removal and, natural attenuation resulting from discharge of groundwater to the Mill Brook would be expected to reduce the level of groundwater contaminants over time. This remedy would not be considered permanent since there is residual subsurface soil contamination. Additionally, reduction of contaminants in groundwater would only be through natural attenuation.

The implementation of this alternative would be protective of public health and the environment. However, it would not be considered a permanent remedy and requires long-term management.

ALTERNATIVE 4 -- PCB EXCAVATION, OFF-SITE DISPOSAL (LANDFILL INCINERATION), PARTIAL EXCAVATION AND BIO-DEGRADATION OF PAHs, PERIODIC MONITORING

This alternative is comprised of the following components:

- excavation of all PCB-contaminated soils containing concentrations above 5 ppm (1100 cy) and off-site disposal (landfilling or incineration)
- biodegradation of PAH-contaminated soils containing concentrations above 10 ppm (2600 cy) from the top four (4) feet of the site
- use of groundwater as an irrigation medium for the bioremediation system
- backfilling, grading and revegetation
- periodic monitoring of groundwater

Figure 3-5 illustrates Alternative 4.

1. Compliance with ARARs

This alternative would not result in attainment of all Federal and State ARARs or Criteria, Guidances and Advisories that were considered for soils. However, excavation of all PCB-contaminated soils containing concentrations above 5 ppm would attain the State soil cleanup objective for PCBs that was considered for the site. Excavation of all PCB-contaminated soils, and bioremediation of PAH contaminated soils to a depth of four (4) feet would remove a significant volume of contamination. There would be attainment of the State soil cleanup objective for PAHs considered for the site in the top four feet of the site. Subsurface residual PAH contamination would remain in soils that exceeds State Criteria, Guidances and Advisories that were considered.

The potential for further groundwater contamination is reduced for three reasons. First, excavation and bioremediation of contaminated soils remove a significant volume of contaminants which serve as a source of groundwater contamination. Second, use of groundwater as an irrigation medium for the bioremediation system will serve to reduce groundwater contaminants. Third, natural attentuation in conjunction with source removal and utilization of groundwater as an irrigation medium for bioremediation would facilitate reduction in the levels of groundwater contaminants over time. Therefore, it is expected that there would be attainment of groundwater ARARs and Criteria, Guidances and Advisories that were considered.

2. Reduction of Toxicity, Mobility or Volume

If the excavated PCB contaminated soils are incinerated instead of landfilled, there would be a permanent reduction in the toxicity, mobility and volume of contaminants in soils. Biodegradation of contaminated soils in excess of 10 ppm would significantly reduce the toxicity, volume and mobility of the contaminants.

3. Short-term effectiveness

Dust suppression measures and personal protective clothing for on-site workers would mitigate potential exposure to on-site workers and nearby residents from emissions of contaminant-laden dusts that could be generated during site preparation activities, excavation and loading of trucks.

There are short-term risks associated with the transport and redisposal of excavated soils. However, adherence to appropriate hazardous waste transportation and off-site disposal procedures should effectively mitigate the risk.

The bioremediation aspect of the alternative is an innovative technology and a pre-design treatability study would be required to refine operating parameters prior to implementation.

Through the use of proper personal protective equipment on-site workers can be prevented from exposure to air emissions from the site. Air monitoring throughout the period of implementation can help prevent exposure of nearby residents to airborne contaminants from the site. During implementation of the alternative groundwater and soil sampling would be conducted to assure there are no short-term environmental impacts.

4. <u>Long-Term Effectiveness and Permanence</u>

Implementation of this alternative would permanently reduce the toxicity, volume and mobility of soil contaminants. Excavation and bioremediation of soils described for this alternative would remove the direct contact and subsequent incidental ingestion risk posed by surface soils. However, absent any restrictions, future land-use scenarios involving commercial or residential development would pose a potential risk to on-site workers or residents through exposure to residual PAH contaminated soils that remain.

Long-term management of the site would involve groundwater monitoring to evaluate the effectiveness of the alternative and to monitor the effects of natural attenuation. The prospect for the long-term reliability of the alternative would be established by the pre-design treatability work, soil sampling verification study and groundwater monitoring. The residual contaminants are highly immobile and would be expected to provide no further impact. However, failure of the bioremediation system to meet the expected performance criteria as developed in the treatability study or site disturbance after remedy is implemented would be situations which might create a potential for replacement of the remedy.

5. Implementability

Factors which may constrain the relative ease of implementing this alternative are as follows:

- decontamination of the debris would result in generation of a liquid which containing hazardous substances which may require treatment or disposal

- bioremediation of soils is considered an innovative technology in the area of hazardous waste management and therefore a pre-design treatability to refine operating parameters is required.

6. Cost

Costs are broken down to reflect the differential in cost between landfilling and incineration of contaminated soils. The cost of bioremediation is not listed separately. Bioremediation costs are common to both the landfilling and incineration options of the alternative.

The estimated cost of implementing this alternative is as follows:

Capital when landfilling PCB-contaminated soils	$1,029,000
Capital when incinerating PCB-contaminated soils	$5,649,000
Operation and maintenance	$ 21,000
Present Worth utilizing landfill	$1,248,000
Present Worth utilizing incinerator	$5,868,000

A verification sampling program for soils would establish that the remedy was effectively implemented. Groundwater monitoring will evaluate changes at the site.

7. Community Acceptance

Implementation of this alternative would remove the most significant levels of contamination as well as isolate residual contamination from their potential exposure through direct contact. Low level groundwater contamination does not pose a public health or environmental risk. However, use of groundwater as an irrigation medium for the bioremediation system will result in reduction of concentrations of groundwater contaminants. Although the magnitude of the public health risk is minimized, the fact that the alternative does not permanently deal with all the soil contamination at the site may result in some reservations in acceptance of this alternative on the part of the community.

In addition, the use of an innovative technology at the site may result in further reservations on the part of the community.

8. State Acceptance

This alternative would not meet State Criteria, Guidance and Advisories considered for this site since subsurface PAH contaminated soils will remain. Based on this, State acceptance of this alternative is considered low.

9. Overall Protection of Human Health and the Environment

The direct contact and subsequent incidental ingestion risk posed by the site would be mitigated by implementation of this alternative. Future land-use scenarios involving commerical or residential development would require restrictions to prohibit disturbance of contaminanted site soils below four feet. This would be required to prevent exposure to workers or nearby residents.

Groundwater contamination is expected to be mitigated by source removal through soil excavation, use of groundwater as an irrigation medium in the bioremediation system and through natural attenuation. The principal method of contaminant reduction would be through use of groundwater as an irrigation medium in the bioremediation system. Therefore, this groundwater is currently neither used for potable purposes nor is it expected to be used in the future; no risk to public health is expected and no adverse environmental impact is anticipated.

Overall, implementation of this alternative would be protective of public health and the environment. An innovative treatment technology is utilized and there is a significant reduction in the toxicity, mobility and volume of contamination. However, since there is residual subsurface soil contamination; the remedy would not be considered permanent and long-term management would be necessary.

ALTERNATIVE 5 -- PCB EXCAVATION, OFF-SITE DISPOSAL (LANDFILL/ INCINERATION, EXCAVATION AND BIODEGRADATION OF PAHs

Alternative 5 consists of the following:

- excavation of all PCB-contamination soils containing concentrations above 5 ppm (1100 cy) and off-site disposal (landfill or incineration)
- biodegradation of all PAH-contaminated soils containing concentrations above 10 ppm (4400 cy) which would extend to a 12 foot depth in same locations
- use of groundwater as an irrigation medium for the bio-remediation system
- backfilling, grading and revegetation

Figure 3-6 illustrates Alternative 5.

1. Compliance with ARARs.

Implementation of this alternative would result in attainment of Federal and State ARARs and Criteria, Guidances and Advisories that were considered for soils and groundwater. Excavation of all PCB-contaminated soils and bioremediation of PAH contaminated soils would significantly reduce the volume of PCBs and permanently treat PAHs at the site.

Groundwater contamination and the likelihood of further degradation would be significantly reduced for the reasons presented in Alternative 4. They are:

a. principally, utilization of groundwater as an irrigation medium for the bioremediation system,

b. contaminant source removal by soil excavation and off-site disposal and,

c. natural attenuation via discharge of groundwater to the Mill Brook, to a lesser degree.

2. Reduction of Toxicity, Mobility and Volume

If PCB contaminated soils were incinerated vs. landfilled at an off-site disposal facility; there would be a permanent reduction in the toxicity, mobility and volume of contaminated soils. Biodegradation of contaminated soils in excess of 10 ppm would significantly reduce the toxicity, mobility and volume of the contaminants.

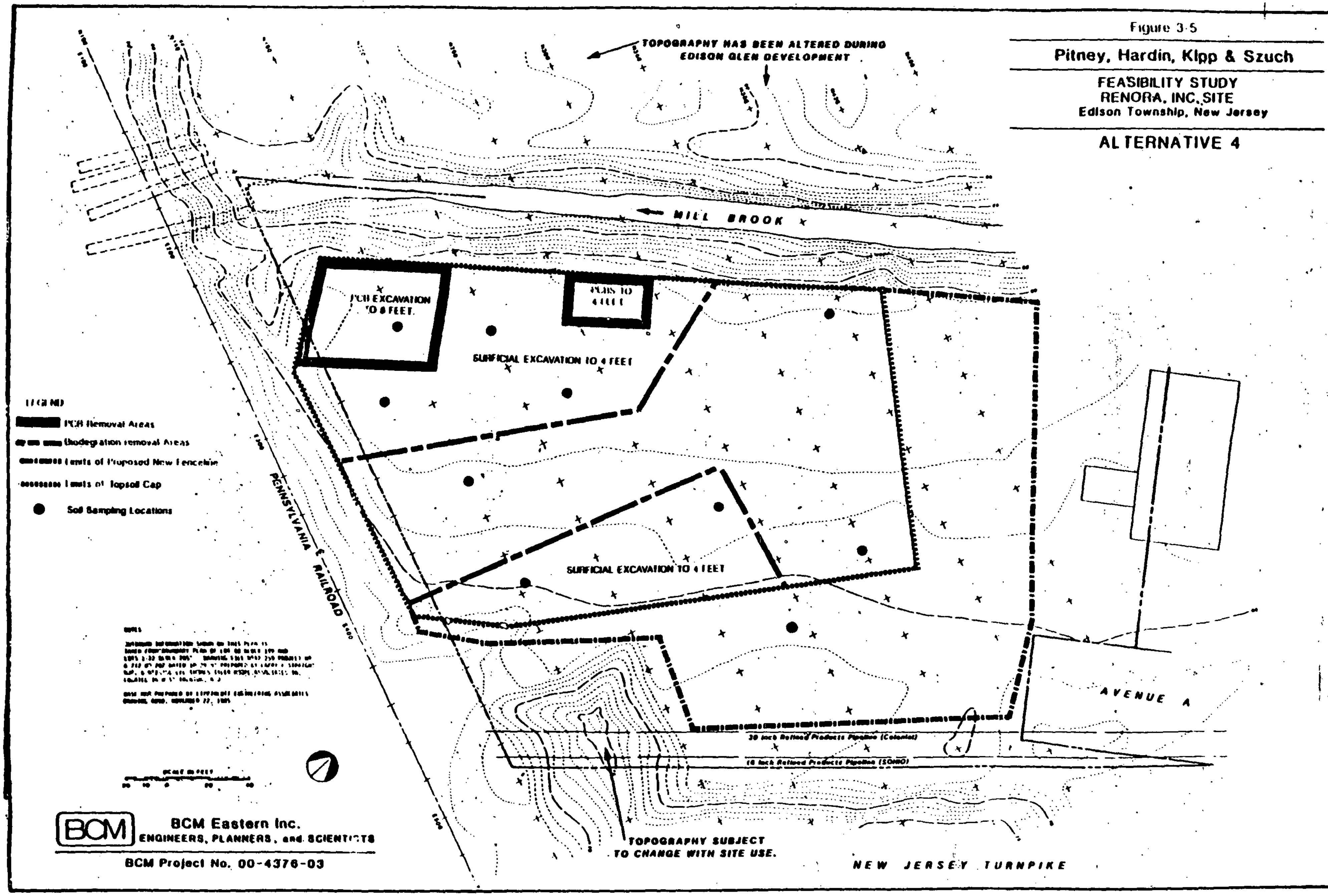


Figure 3-5
Pitney, Hardin, Kipp & Szuch
FEASIBILITY STUDY
RENORA, INC. SITE
Edison Township, New Jersey
ALTERNATIVE 4
TOPOGRAPHY HAS BEEN ALTERED DURING EDISON GLEN DEVELOPMENT
MILL BROOK
PCB EXCAVATION TO 8 FEET
SURFICIAL EXCAVATION TO 4 FEET
SURFICIAL EXCAVATION TO 4 FEET
LEGEND
PCB Removal Areas
Biodegradation removal Areas
Limits of Proposed New Fenceline
Limits of Topsoil Cap
Soil Sampling Locations
PENNSYLVANIA RAILROAD
AVENUE A
30 Inch Refined Products Pipeline (Colonial)
16 Inch Refined Products Pipeline (SOHIO)
TOPOGRAPHY SUBJECT TO CHANGE WITH SITE USE.
NEW JERSEY TURNPIKE
BCM
BCM Eastern Inc.
ENGINEERS, PLANNERS, and SCIENTISTS
BCM Project No. 00-4376-03

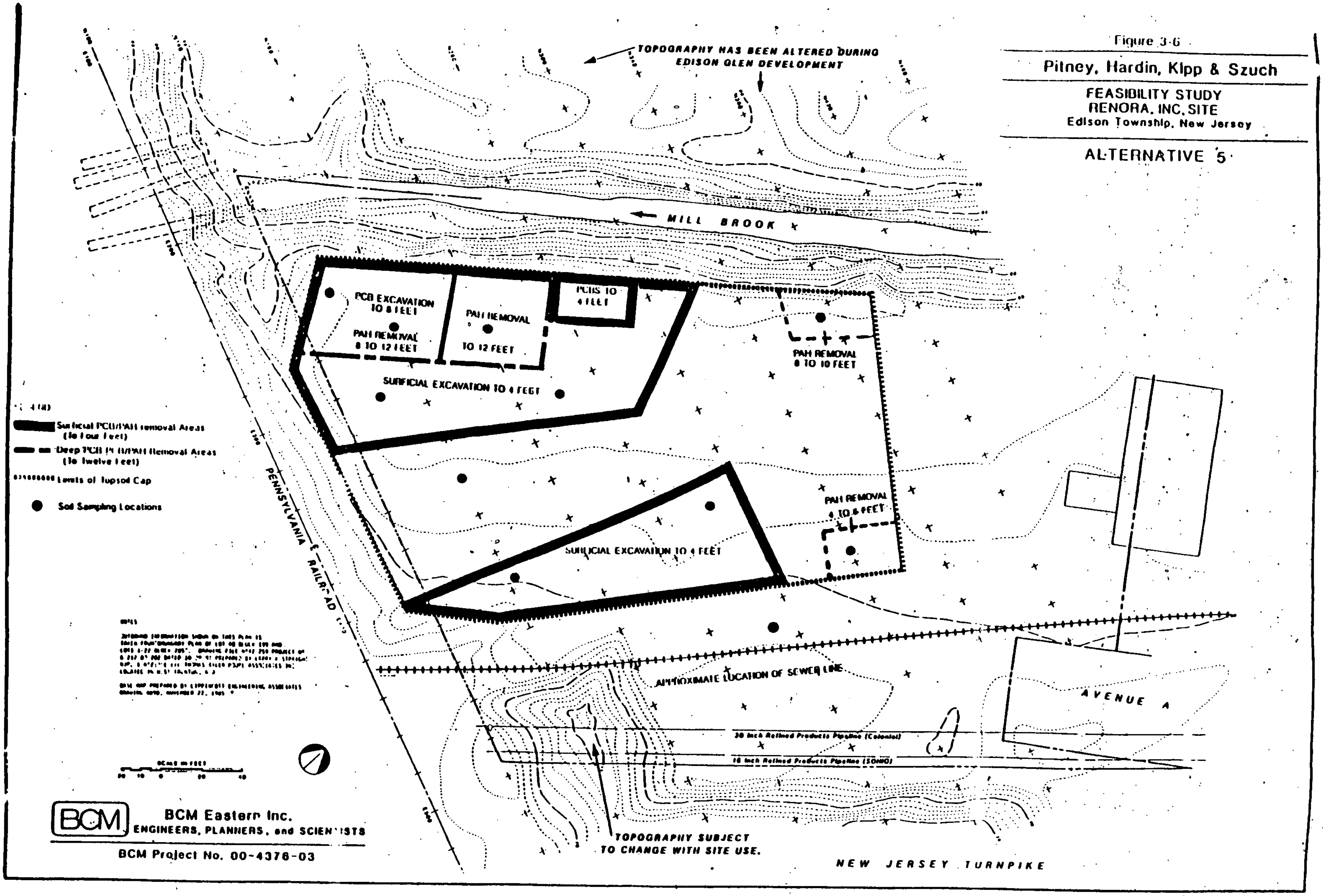


Figure 3-6
Pitney, Hardin, Kipp & Szuch
FEASIBILITY STUDY
RENORA, INC. SITE
Edison Township, New Jersey
ALTERNATIVE 5
TOPOGRAPHY HAS BEEN ALTERED DURING EDISON GLEN DEVELOPMENT
MILL BROOK
PCB EXCAVATION TO 8 FEET
PAH REMOVAL 8 TO 12 FEET
PAH REMOVAL TO 12 FEET
PCBS TO 4 FEET
SURFICIAL EXCAVATION TO 4 FEET
PAH REMOVAL 8 TO 10 FEET
PAH REMOVAL 4 TO 6 FEET
SURFICIAL EXCAVATION TO 4 FEET
Surficial PCB/PAH removal Areas (To Four Feet)
Deep PCB/PAH Removal Areas (To Twelve Feet)
Limits of Topsoil Cap
Soil Sampling Locations
PENNSYLVANIA RAILROAD
APPROXIMATE LOCATION OF SEWER LINE
AVENUE A
30 Inch Refined Products Pipeline (Colonial)
16 Inch Refined Products Pipeline (SOHIO)
TOPOGRAPHY SUBJECT TO CHANGE WITH SITE USE.
NEW JERSEY TURNPIKE
BCM
BCM Eastern Inc.
ENGINEERS, PLANNERS, and SCIENTISTS
BCM Project No. 00-4376-03

3. Short-term Effectiveness

Dust suppression measures and use of proper protective equipment would minimize potential exposure to contaminants via air emissions during site preparation, excavation and truck loading/unloading of contaminated soils.

Transport and redisposal of contaminated soils may also be a source of a short-term public health or environmental impact. The adherence to proper hazardous waste transport and off-site disposal protocols should effectively reduce this risk.

A prerequisite to implementation of the bioremediation portion of the alternative is a pre-design treatability study to refine parameters of the operation. Proper personal protective equipment as well as an air monitoring program throughout implementation of the alternative will serve to significantly reduce the potential for exposure to any air emissions from the site. A potential constraint to successful completion of this alternative is the potential for insufficient reduction of the levels of groundwater contaminants via its use as an irrigation medium in the bioremediation system. This problem can be effectively mitigated through the use of a carbon filtration unit as a pre- or post- bioremediation step prior to return of the groundwater to the site. During implementation, groundwater and soil sampling would be conducted to verify there are no short-term environemntal impacts.

4. Long-term Effectiveness and Permanence

Implementation of this alternative would result in a signifcant, permanent reduction in the toxicity, mobility and volume of contamination through bioremediation.

Excavation of PCB-contaminated soils and bioremediaton of PAH contaminated soils would permanently remove the direct contact and subsequent incidental ingestion risk posed by the site. In addition, future land use scenarios involving commercial or residential development would not be precluded. Therefore, the site would have unrestricted land uses from the standpoint of concern about any hazardous waste contamination.

Utilizing groundwater as an irrigation medium for the bioremediation system is the principal mechanism for reduction of groundwater contaminant levels. This, and to a lesser degree, source removal control and natural attenuation are expected to restore groundwater quality to levels of potable water standards; although groundwater is not currently or anticipated to be used for potable purposes.

A need for long-term management of the site should not be necessary once verification sampling indicates that the alternative has met its performance criteria. The prospect for long-term reliability of the alternative would be established by the pre-design treatability work and subsequent verification sampling. However, as this remedy is permanent and substantially reduces the toxicity, mobility and volume of contaminations the likelihood of remedy replacement is low.

5. Implementability

The relative ease with which this alternative can be implemented may be constrained by:

- decontamination of debris may result in generation of a liquid containing hazardous substances requiring treatment and/or disposal

- bioremediation of soils is considered an innovative treatment technology in the field of hazardous waste management and therefore, a pre-design treatability study is required to refine operating parameters

Although available scientific literature indicates implementation of the bioremediation portion of the alternative is feasible; a pre-design treatability study would be required to confirm the operational reliability of the alternative.

6. Cost

Costs are broken down to reflect the differential in cost between landfilling and incineration of contaminated soils. The cost of bioremediation is not listed ~~separately~~. Bioremediation costs are common to both the landfilling and incineration options of the alternative.

Estimated costs for implementation of this alternative are as follows:

Capital when landfilling PCB-contaminated soils	$1,344,000
Capital when incinerating PCB-contaminated soils	$5,964,000
Operation and maintenance	variable
Present Worth utilizing landfill for PCBs	$1,401,000
Present Worth utilizing incinerator for PCBs	$6,021,000

7. Community Acceptance

The alternative would mitigate the public health risk associated with the site. This remedy is considered permanent and significantly reduces the toxicity mobility and volume of contaminants. There will be no residual contamination above target treatment levels.

The use of an innovative treatment technology at the site may raise community concerns regarding its effectiveness. Overall, community acceptance is anticipated since the problem would be permanently resolved once the remedy has been completely implemented, allowing unrestricted site use.

8. State Acceptance

Since the alternative is expected to meet or exceed State ARARs and Criteria, Guidance and Advisories and the remedy is permanent; State acceptance is considered high.

9. Overall Protection of Human Health and the Environment

Under current use conditions, the risk of exposure to children by direct contact and subsequent incidental ingestion of soil contaminants is completely mitigated. Future land-use scenarios involving commercial or residential development would not require any restrictions since the magnitude of risk posed under such conditions to on-site workers and residents is mitigated.

Groundwater contamination is expected to be mitigated by virtue of source removal, using groundwater as an irrigation medium and natural attenuation. These processes are expected to restore groundwater quality to potable water standards. However, groundwater does not pose a potential current or future threat to public health since it discharges directly into Mill Brook and as not used for potable purposes.

Overall, this alternative is protective of public health and the environment. An innovative treatment technology would be utilized as a major portion of the remedy. There is complete reduction of the toxicity, mobility and volume of the contamination. The remedy is permanent and would not require long-term management.

ALTERNATIVE 6 -- PCB/PAH EXCAVATION, OFF-SITE DISPOSAL (LANDFILL/INCINERATION), SLURRY WALL INSTALLATION, GROUNDWATER PUMP AND ONSITE TREATMENT

This alternative is composed of:

- excavation of all PCB contaminated soils containing concentrations above 5 ppm (1100 cy) and off-site disposal (landfilling or incineration)
- excavation of all PAH contaminated soils containing concentrations above 10 ppm (4400 cy) and off-site disposal (landfilling or incineration)

- slurry wall installation to isolate groundwater
- collection, pump and onsite treatment of groundwater through carbon filtration units
- backfilling, grading and revegetation

Figure 3-7 illustrates Alternative 6.

1. <u>Compliance w/ARARs</u>

This alternative would result in attainment of all Federal and State ARARs and Criteria, Guidances and Advisories that were considered. Excavation of soils contaminated with PCBs and PAHs plus onsite pumping and treatment of groundwater would result in no residual contamination above target treatment levels remaining at the site.

2. <u>Reduction of Toxicity, Mobility or Volume</u>

Excavation of PCBs and PAHs would entail more extensive excavation; to a level of 12 feet in some areas of the site contaminated with PAHs. Excavation and incineration would provide a permanent reduction in the toxicity, mobility and volume of soil contamination. In soils there would be no contamination remaining above target treatment/residual levels.

3. <u>Short-term effectiveness</u>

The more extensive excavation of soils required under this alternative present a greater opportunity for short-term risks to public health and the environment due to the longer duration of excavation, the potential for dust generation and the greater amount of loading/unloading contaminated soils. In addition, slurry wall installation may require special excavation techniques such as "shoring" to prevent collapse of sidewall in the vicinity of the Mill Brook embarkment. This presents a potential short-term safety hazard to address.

Transport and redisposal of this larger volume of contaminated soils (5500 cy vs. 3700 cy in Alt. 3 e.g.) may be a source of a short-term risk as well. The adherence to proper transportation and off-site disposal protocols should effectively reduce any short-term risk.

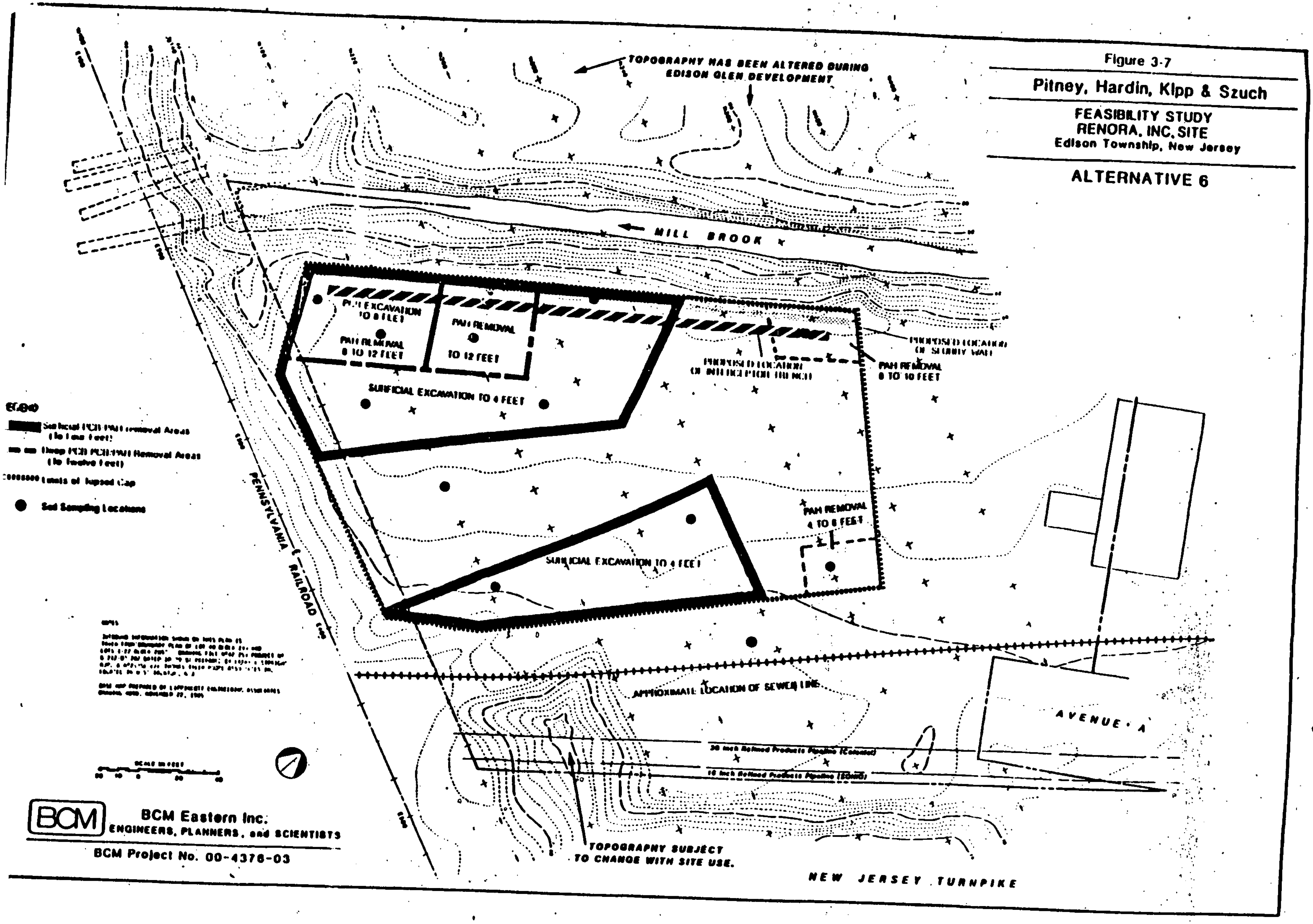


Figure 3-7
Pitney, Hardin, Kipp & Szuch
FEASIBILITY STUDY
RENORA, INC. SITE
Edison Township, New Jersey
ALTERNATIVE 6
TOPOGRAPHY HAS BEEN ALTERED DURING EDISON GLEN DEVELOPMENT
MILL BROOK
PCB EXCAVATION TO 8 FEET
PAH REMOVAL 8 TO 12 FEET
PAH REMOVAL TO 12 FEET
SURFICIAL EXCAVATION TO 4 FEET
PROPOSED LOCATION OF INTERCEPTOR TRENCH
PROPOSED LOCATION OF SLURRY WALL
PAH REMOVAL 8 TO 10 FEET
PAH REMOVAL 4 TO 8 FEET
SURFICIAL EXCAVATION TO 4 FEET
PENNSYLVANIA RAILROAD
APPROXIMATE LOCATION OF SEWER LINE
AVENUE A
TOPOGRAPHY SUBJECT TO CHANGE WITH SITE USE.
NEW JERSEY TURNPIKE
Soil Sampling Locations
BCM
BCM Eastern Inc.
ENGINEERS, PLANNERS, and SCIENTISTS
BCM Project No. 00-4376-03

4. Long-term Effectiveness and Permanence

The implementation of this alternative would result in a permanent reduction in the volume of contamination at the site through excavation of contaminated soils. Treatment of groundwater would result in a permanent reduction the toxicity, mobility and volume of groundwater contamination. There will be no residual contamination above target treatment levels at the site. The potential for exposure of human or environmental receptors to contaminants is mitigated under current or future exposure scenarios.

Once the treatment system for groundwater has met its performance criteria long-term management of the site would be unecessary. The likelihood for replacement of the remedy is low.

5. Implementability

The potential constraints in implementing this alternative are as follows:

- decontamination of a greater volume of debris will result in generation of a greater volume of liquid which may contain hazardous substances requiring treatment or disposal

- disposal of a significantly greater volume of contaminated soils in light of available landfill capacity

The techniques to be employed have been extensively and successfully used at other sites. Therefore, the expected operational reliability of the technologies is high.

6. Cost

Costs are broken down to reflect the differential in cost between landfilling and incineration of contaminated soils. The cost of bioremediation and groundwater treatment is not listed separately. Bioremediation and groundwater treatment are common to both the landfilling and incineration options.

The estimated cost of this alternative is as follows:

Capital when landfilling contaminated soils	$ 3,076,000
Capital when excavating contaminated soils	$26,203,000
Operation and maintenance	$ 2,000
Present Worth when landfilling	$ 3,047,000
Present Worth when incinerating	$26,244,000

Excavation and off-site disposal of contaminated soils entails a significant incremental cost increase mainly due to the transportation and disposal costs associated with off-site landfilling or incineration. However, since there is no additional removal of contaminated soils above target treatment/residual levels, the remedy does not provide any additional protection of public health or the environment to justify the incremental cost increase.

7. Community Acceptance

Implementation of the alternative addresses all soil and groundwater contamination. The risk to public health and the environment is mitigated for potential current and future use exposure scenarios. Therefore, community acceptance of the alternative is expected to be high.

8. State Acceptance

Since the alternative meets State ARARs and Criteria, Guidances and Advisories considered; State acceptance of this alternative is expected to be high.

9. Overall Protection of Human Health and the Environment

The risks to public health and the environment under potential current and future exposure scenarios is mitigated. The remedy is considered permanent and the would be no restrictions to future land-use. No long-term management at the site would be required.

ALTERNATIVE 7 -- PCB EXCAVATION, OFFSITE DISPOSAL (LANDFILL/INCINERATION), EXCAVATION AND BIODEGRADATION OF PAHs, SLURRY WALL INSTALLATION, GROUNDWATER PUMPING AND ONSITE TREATMENT

Alternative 7 is comprised of the following:

- excavation of all PCB-contaminated soils containing concentrations above 5 ppm (1100 cy) and offsite disposal (landfill or incineration)
- biodegradation of all PAH-contaminated soils containing concentrations above 10 ppm (4400 cy), which extends to 12 feet at the same locations
- slurry wall installation to isolate groundwater
- collection, pump and onsite treatment of groundwater through carbon filtration units
- backfilling, grading and revegetation

Figure 3-8 illustrates Alternative 7.

1. Compliance with ARARs

Implementation of this alternative would result in attainment of all Federal and State ARARs as well as Criteria, Guidances, and Advisories that were considered. Excavation of PCBs contaminated soils, bioremediation of PAH contaminated soils and onsite treatment of groundwater would result in no residual contamination above target treatment levels remaining at the site.

2. Reduction of Toxicity, Mobility or Volume

If offsite disposal involved incineration vs. landfilling; there would be a permanent reduction in the toxicity, mobility and volume of the PCBs. Bioremediation of soils contaminated with PAHs significantly reduces the toxicity, mobility and volume of contamination. Onsite treatment of groundwater would result in a permanent reduction of the toxicity, mobility and volume of contaminants. In both soils and groundwater there would be no residual contamination above target treatment levels remaining at the site.

3. Short-term Effectiveness

Short-term impacts to on-site workers or nearby residents could occur as part of the excavation phase of the alternative . Dust suppression measures and proper personnel with protective equipment will mitigate any potential risks during site preparation or loading/unloading of excavated soils. Transport and redisposal of contaminated soils may also be a source of short-term pubic health or environmental impact. Adherence to proper transport and off-site disposal protocols should effectively mitigate this polential risk.

Slurry wall installation may require special excavation techniques such as "shoring" to prevent collapse of sidewalls in the vicinity of the Mill Brook embankment. This presents a potential short-term risk to onsite workers which would have to be addressed by following proper safety protocols.

4. Long-term Effectiveness and Permanence

Implementation of this alternative would result in a permanent reduction in the volume of contamination via the soil excavation. If the excavated PCB contaminated soils were disposed offsite by incineration; there would also be a permanent reduction in the toxicity and of mobility contaminants.

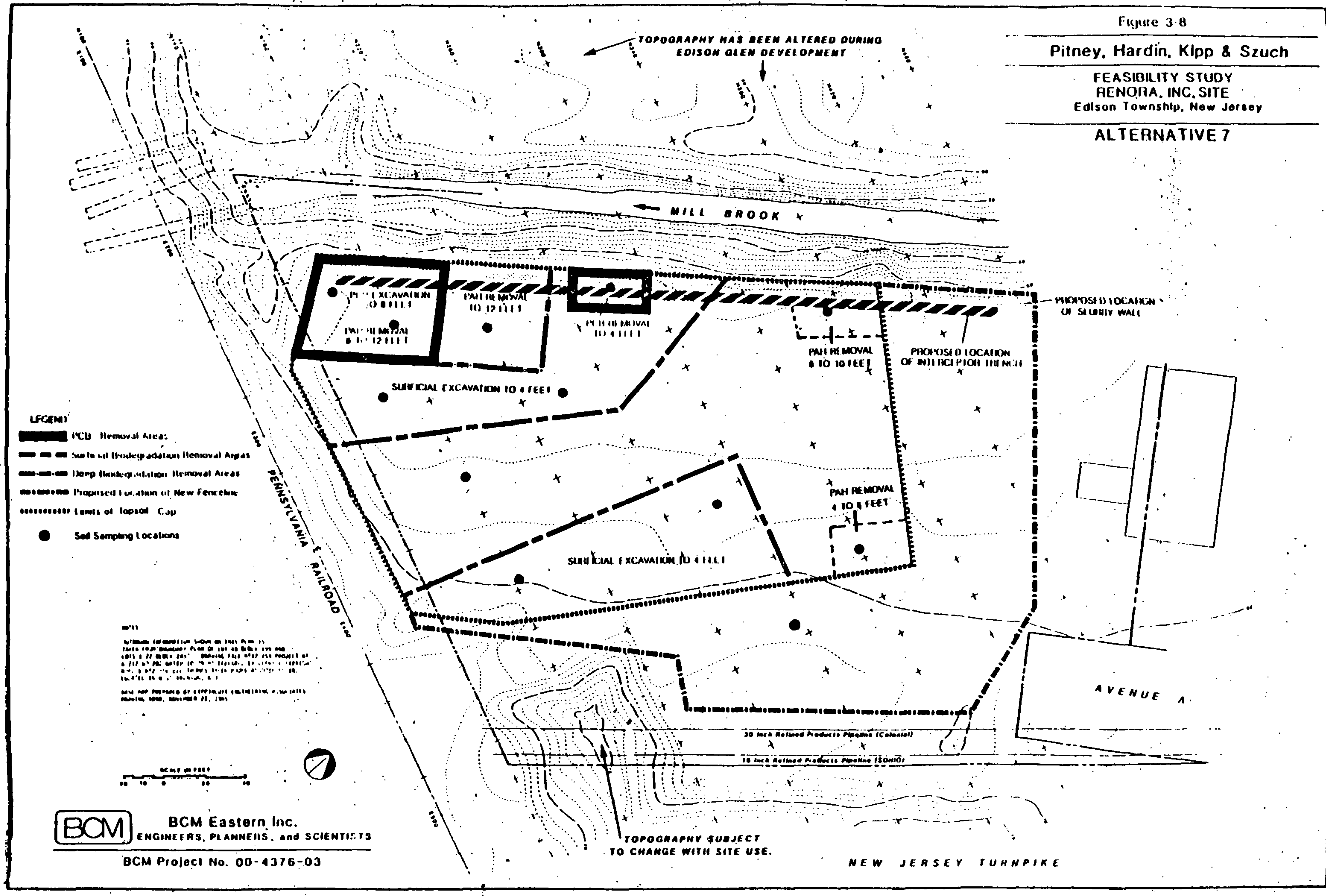


Figure 3-8
Pitney, Hardin, Kipp & Szuch
FEASIBILITY STUDY
RENORA, INC. SITE
Edison Township, New Jersey
ALTERNATIVE 7
TOPOGRAPHY HAS BEEN ALTERED DURING EDISON GLEN DEVELOPMENT
MILL BROOK
PROPOSED LOCATION OF SLURRY WALL
PROPOSED LOCATION OF INTERCEPTOR TRENCH
PAH REMOVAL TO 12 FEET
PAH REMOVAL 8 TO 10 FEET
SURFICIAL EXCAVATION TO 4 FEET
PAH REMOVAL 4 TO 6 FEET
SURFICIAL EXCAVATION TO 4 FEET
LEGEND
PCB Removal Areas
Surficial Biodegradation Removal Areas
Deep Biodegradation Removal Areas
Proposed Location of New Fenceline
Limits of Topsoil Cap
Soil Sampling Locations
PENNSYLVANIA RAILROAD
AVENUE A
30 Inch Refined Products Pipeline (Colonial)
16 Inch Refined Products Pipeline (SOHIO)
TOPOGRAPHY SUBJECT TO CHANGE WITH SITE USE.
NEW JERSEY TURNPIKE
BCM
BCM Eastern Inc.
ENGINEERS, PLANNERS, and SCIENTISTS
BCM Project No. 00-4376-03

Treatment of groundwater would result in a permanent reduction in the toxicity, mobility and volume of contaminants. No residual contamination in the soils or groundwater would remain above target treatment levels. The potential for exposure of human or environmental receptors to contaminants is mitigated for current or future land use scenarios.

Long-term management of the site is expected to be low once all performance criteria have been met. Therefore, the likelihood for replacement of the remedy is low.

Implementability

Potential constraints in implementing the alternative are as follows:

- decontamination of this debris will result in generation of a liquid which may contain hazardous substances that may require disposal

- bioremediation of soils is considered an innovative treatment technology in the field of hazardous waste management and therefore a pre-design treatability study to refine operating parameters is required.

Excavation and slurry wall installation techniques to be employed have been successfully used at other sites. Although available scientific literature indicates implementation of the bioremediation portion of the alternative is feasible; a pre-design treatability study would be required to confirm the operational reliability of the altenative.

6. Cost

Costs are broken down to reflect the differential in cost between landfilling and incineration of contaminated soils. The cost of bioremediation and groundwater treatment is not listed separately. Bioremediation and groundwater treatment are common to both the landfilling and incineration options.

Estimated costs of this alternative are as follows:

Capital when landfilling contaminated soils	$1,600,000
Capital when incinerating contaminated soils	$5,992,000
Operation and Maintenance	$ 2,000
Present Worth when landfilling	$1,621,000
Present Worth when incinerating	$6,013,000

7. Community Acceptance

Implementation of this alternative addresses all soil and groundwater contamination at the site. The risk to public health and the environment is mitigated for potential current and future land use exposure scenarios. Therefore, community acceptance of this alternative is expected to be high.

8. State Acceptance

Since this alternative meets State ARARs and Criteria, Guidances and Advisories considered; State acceptance of this alternative is expected to be high.

9. Overall Protection of Human Health and the Environment

The risks to public health and the environment under potential current and future exposure scenarios is mitigated. The remedy would be considered permanent and there would be no restrictions to future land use. There would be no long-term management of the site required.

There is an incremental cost increase associated with this alternative due to slurry wall installation and groundwater treatment via use of carbon filters. However, since there is not expected to be additional removal of groundwater contaminants above target treatment/residual levels, the remedy does not provide any additional protection of public health and the environment to justify the incremental cost increase.

ALTERNATIVE 8 -- COMPLETE EXCAVATION, OFFSITE DISPOSAL (LANDFILL/ INCINERATION), SLURRY WALL INSTALLATION, GROUND WATER PUMP AND ONSITE TREATMENT

This alternative would consist of the following:

- excavation and offsite disposal (landfill or incineration) of all soils with concentrations of contaminants above background levels (approximately 16,000 cy)
- slurry wall installation to isolate groundwater
- collection, pump and onsite treatment of groundwater through four granulated activated carbon filtration units
- backfilling, grading and revegetation

1. Compliance with ARARs

Implementation of this alternative would result in attainment or exceedance of all Federal and State ARARs and Criteria, Guidances and Advisories that were considered. There would be no residual contamination above target treatment levels remaining at the site.

2. Reduction of Toxicity, Mobility or Volume

Complete excavation with offsite incineration would permanently reduce the toxicity, mobility and volume of contaminants. Groundwater treatment would significantly reduce the toxicity, mobility and volume of contaminants. For both soils and groundwater excavation, offsite disposal and treatment would result in no residual contamination above target treatment levels remaining at the site.

3. Short-term Effectiveness

This alternative provides the most extensive excavation of contaminated soils. Therefore, this alternative provides the greatest opportunity for short-term risks to public health and the environment due to the longer duration of excavation, the potential for generation of dust and the amount of loading/unloading that will occur.

In addition, slurry wall installation may require special excavation techniques such as "shoring" to prevent collapse of sidewalls in the vicinity of the Mill Brook. This presents a potential short-term safety hazard.

Transport and disposal of an estimated 16,000 cy of waste material may be a source of short-term risk as well. Adherence to proper transport and offsite disposal protocols will mitigate the potential risk.

4. Long-term Effectiveness and Permanence

The implementation of this alternative would result in a permanent reduction in the volume of the contaminated soils if they are landfilled. Incineration of contaminated soils would permanently reduce the toxicity, mobility and volume of the contaminants. Treatment of groundwater will result in a permanent reduction of the toxicity, mobility and volume of contaminants. There will be no residual contamination above target treatment levels since levels of contaminants will be reduced to background concentrations. The potential for exposure of human or environmental receptors to contaminants is mitigated under current and future use exposure scenarios. No long-term management at the site is anticipated. The likelihood for replacement of remedy is low.

5. Implementability

Potential constraints in implementing this alternative are as follows:

- staging of what is anticipated to be a large volume of material in a limited area
- decontamination of debris and disposition of a liquid containing hazardous substances may require treatment or disposal
- land disposal of a large volume of waste material

The techniques to be employed have been extensively and successfully used at other sites. The expected operational reliability is expected to be high.

6. Cost

Costs are broken down to reflect the differential in cost between landfilling and incineration of contaminated soils. The cost of bioremediation and groundwater treatment is not listed separately. Bioremediation and groundwater treatment are common to both landfilling and incineration options.

The estimated costs of this alternative are as follows:

Capital when landfilling	$ 8,615,000
Capital when incinerating	$76,655,000
Operation & maintenance	$ 2,000
Present Worth when landfilling	$ 8,617,000
Present Worth when incinerating	$76,657,000

Excavation and off-site disposal of contaminated soils entails a significant incremental cost increase mainly due to the transportation and disposal costs associated with landfilling or incineration. However, since there is no additional removal of contaminated soils above target treatment/residual levels, the remedy does not provide any additional protection of public health and the environment to justify the cost increase.

7. Community Acceptance

Community acceptance to this alternative is expected to be high since the remedy completely restores the site. No contaminants above target treatment levels will remain and the potential for risk to public health and the environment is mitigated.

8. State Acceptance

All State ARARs and Criteria, Guidances, and Advisories that were considered are met or exceeded. Since there is complete site restoration, State acceptance of this alternative is anticipated to be high.

9. Overall Protection of Human Health and the Environment

The risks to public health and the environment under potential current and future exposure scenarios is mitigated. The remedy is permanent. Complete site restoration allows for unrestricted future land uses. Long-term management of the site would not be necessary.

VI. SELECTED REMEDY

Preface

EPA's selection of a remedial alternative must be in accordance with the requirements of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), 42 U.S.C. Secs. 9601 et se., as amended by the Superfund Amendments and Reauthorization Act (SARA) (enacted October 17, 1986), and the requirements of its governing regulations, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 C.F.R. Part 300. Accordingly, the Agency has selected a remedy that is consistent with its governing statute.

Under its legal authorities, EPA's responsibility at Superfund sites is to undertake remedial actions that are necessary in order to protect the public health, welfare and the environment. In Section 121 of CERCLA, Congress provides guidelines which the Agency must follow in selecting remedies that assure protection of human health and the environment. These guidelines are discussed below.

In Section 121(b), Congress creates a statutory preference for remedial actions in which treatment permanently and significantly reduces the volume, toxicity or mobility of the hazardous substance, pollutants or contaminants. In assessing various permanent solutions, EPA must specifically address the long-term effectiveness of the different alternatives. EPA shall, at a minimum, take into account:

(A) the long-term uncertainties associated with land disposal;

(B) the goals and requirements of the Resource Conservation and Recovery Act (RCRA);

(C) the persistence, toxicity, mobilty and propensities of the hazardous substances and constituents to bioaccumulate;

(D) the short and long-term potential for adverse health effects from human exposure;

(E) long-term maintenance costs;

(F) the potential for future remedial action costs if the alternative remedial action in question were to fail;

(G) the potential threat to human health and the environment associated with excavation, transportation, and redisposal, or containment.

Congress prescribes that in choosing its final remedy, EPA must select a remedial action that uses solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable.

In Section 121(d)(2), Congress provides that EPA's remedial action, when conducted on-site, must comply with applicable or relevant and appropriate environmental standards established under Federal and State environmental laws (such applicable or relevant and appropriate requirement sometimes will be referred to as ARARs).

In Section 121(d)(3), Congress established requirements for actions involving the transfer of any hazardous substances or pollutants or contaminants off-site (e.g., to an off-site commercial treatment or disposal facility). This Section requires that the off-site facility be operating in compliance with Section 3004 and 3005 of RCRA (or, where in compliance with other applicable Federal law) and with all State requirements. In addition, this Section provides further restrictions regarding the use of off-site land disposal facilities that are releasing hazardous waste or hazardous waste constituents to groundwater, surface water or soil.

Section 121(a) requires the selection of a remedy which, in addition to meeting all other criteria of Section 121, provides for cost-effective response. In evaluation cost-effectiveness of remedial alternatives, EPA must take into account the short-term and long-term costs of these alternatives including the costs of operation and maintenance for the entire period during which such activities will be required.

The alternatives evaluation portion of this document compared and evaluated the alternatives in terms of nine key criteria which directly relate to factors CERCLA §121 mandates the Agency to assess. The nine criteria summarize CERCLA §121(b)(1) (A-G) and are as follows:

1. compliance with applicable or relevant and appropriate requirements (ARARs),

2. reduction of toxicity, mobility or volume,

3. short-term effectiveness,

4. long-term effectiveness and permanence,

5. implementability,

6. cost,

7. community acceptance,

8. state acceptance and

9. overall protection of human health and the environment.

The narrative which follows will describe the selected remedy in further detail.

A) Description of the selected remedy.

1. Scope and function of the remedy.

The selected remedy for the Renora, Inc. site is Alternative 5. This alternative consists of the following components:

- excavation of all PCB-contaminated soils containing concentrations above 5 ppm (approximately 1100 cy) and off-site landfill disposal

- biodegradation of all PAH-contaminated soils containing concentrations above 10 ppm (approximately 4400 cy)

- use of groundwater as an irrigation medium for the bioremediation system

- backfilling, grading and revegetation

Figure 3-6 illustrates the areas of soil excavation and bioremediation for Alternative 5.

2. Performance Goals

a. Management of Migration

The Remedial Investigation (RI), completed May, 1987, includes investigations of soils, groundwater, surface water, sediments and air. The results of the RI indicate that there are no off-site public health and/or environmental impacts directly attributable to the Renora site operations.

With respect to each environmental media investigated a determination that no management of migration measures were necessary as part of the overall remedy is based on the following rationale.

Surficial soils (0-2 feet) are primarily contaminated with PCBs and PAHs and to a lesser extent with volatile organic compounds, acid extractable compounds, other base neutral compounds and heavy metals. The southwest corner of the site contains the most extensive horizontal and vertical distribution of contaminant groups. However, contaminants are found to a depth of 12 feet at some other locations on-site. The results of the RI confirm other information concerning the site history (including aerial photographs) which show that the nature of the Renora operations involved surface storage of waste that was confined to the area of the Clementi property currently enclosed by a perimeter fence. There was no movement of soil contaminants attributable to the site from the fenced area. Therefore, no management of migration measures for soils were determined to be necessary as part of the overall remedy.

The shallow groundwater beneath the site is contaminated with chloroethane, (a volatile organic compound) and low levels of heavy metals. This contamination is likely to have resulted from leaks and spills from storage containers (drums, tankers) that were abandoned at the site. The groundwater investigation revealed that shallow groundwater flows northwest directly discharging into the Mill Brook. Piezometer data adjacent to Mill Brook indicated that groundwater northwest of Mill Brook (on the Edison Glen residential complex side of the Brook) also flows toward Mill Brook. Based on this information, no movement of shallow groundwater is expected beneath the Mill Brook.

There is limited vertical permeability due to highly weathered, clay-rich bedrock which underlies alluvial material at the site. There are two other factors acting in conjunction with highly weathered, clay-rich bedrock to limit vertical permeability. They are the low hydraulic conductivity of the fill and alluvium beneath the site and absorption and very limited solubility of most the contaminants identified in site soil/fill which are responsible for the greater concentrations of some contaminants (primary PCBs and PAHs) in the surficial soil and the lack of all but chloroethane and heavy metals in the shallow groundwater. Therefore, no management of migration measures for groundwater were determined to be necessary as part of the overall remedy.

Surface water and sediment sampling and analysis revealed similar levels of containment groups in upstream and downstream locations with the exception of PAHs in sediments. PAH concentrations were somewhat higher at the downstream sediment sampling location. Stormwater run-off crosses the site which could erode surficial soil and transport to other locations on the site or the Mill Brook. PAHs adsorbed to soil could be transported by this process and would probably accumulate in stream channel or flood plain sediments downstream. The PAH compounds in the stream sediment, which are also found in site soil/fill, may also be from an offsite upgradient sources including but not necessarily limited to other commercial operations on the Clementi property. It is possible that the greater concentrations in the downstream sediment sample are due to a greater accumulation of fine-grained sediments from the lower stream velocity. Therefore, the lack of significantly greater downstream surface water and sediment concentrations of contaminants and the multitude of potential sources contributing PAHs to the Mill Brook were determinants that no management of migration measures are necessary as part of the overall remedy.

Air quality monitoring conducted as part of the health and safety program during the remedial investigation did not reveal any site-related volatile organic emissions. Therefore, no management of migration measures were deemed necessary as part of the overall remedy.

On-site soils and groundwater are the environmental media addressed by the selected remedy. The remedial investigation showed that there are no off-site impacts directly attributable to site operations. Therefore, no management of migration measures were selected as part of the overall remedy for any environmental media.

b. <u>Source Control</u>
   i. contaminated media and,
   ii. type and volume of waste

At the Renora, Inc. facility, on-site surface and subsurface soils as well as groundwater have been shown to be contaminated.

Twelve soil sampling locations (sampled at 2-3 depths per location) were selected based on the site history, test pit program results and removal action observations and results. For surface soils and PAHs and PCBs are the predominant contaminants, (0-2 feet), but there is surficial soil contamination with other contaminant groups to a lesser groups degree. The bulk of the contamination is limited to surficial soil as a result of the contaminants high rate of adsorption and low solubility.

Subsurface soils are contaminated with PAHs to a depth of twelve feet at some locations. Volatile organic coumpounds, PCBs and acid extractable compounds are found to a lesser degree, to a depth of eight feet. The southwest corner of the site contains the most extensive lateral and vertical distribution of contaminant groups in surface and subsurface soils. Figure 5-2 illustrates the distribution of contaminant groups in soils at the site.

The volume of PCB-contaminated soils to be excavated and landfilled off-site, which also include soils containing PAHs, volatile organics and acid extractable compounds is approximately 1100 cubic yards.

The volume of PAH-contaminated soils, which would also include soils containing volatile organics and acid extractable compounds, to be bioremediated is approximately 4400 cubic yeards.

Figure 3-6 delineates those areas designated for PCB excavation and PAH bioremediation.

The nature and extent of groundwater contamination was assessed via installation of five monitoring wells and three piezometers. The results of the investigation indicate that groundwater flows toward Mill Brook. There is limited vertical migraton of groundwater contaminants due to; 1) adsorption and limited solubility of most of the contaminants identified, 2) the low hydraulic conductivity of the fill and alluvium and 3) the limited vertical permeability of highly weathered, clay-rich bedrock underlying the alluvium. Groundwater at the site has been shown to be primarily contaminated with chloroethane, a volatile organic compound and slightly elevated concentrations of chromium, cadmium, lead, and arsenic. Figure 11-4 provides as illustration of the distribution of contaminants in groundwater.

iii. <u>target treatment levels</u>
iv. <u>target residual levels</u>

Criteria were established to provide performance levels for on-site treatment alternatives. During development of the feasibility study, Federal and State applicable or relevant and appropriate requirements (ARARs) as well as Federal and State Criteria, guidances and Advisories were considered for site remediation. ARARs were utilized in conjunction with anticipated performance capabilities of the technologies evaluated to establish target treatment/residual levels. A more detailed discussion of establishment of ARARs is found in the subsequent portion of this document addressing consistency with other environmental laws. Surface water, sediments and air were environmental media determined not to warrant remedial action based on the results of the remeidal investigation and endangerment assessment.

Target treatment/residual levels for soil contaminants are as follows:

total volatile organics	1 ppm
total PAHs	10 ppm
total petroleum hydrocarbons	100 ppm
cadmium	3 ppm
zinc	350 ppm
PCBs	5 ppm

Excavation of PCB-contaminated soils and bioremediation of PAH contaminated soils are expected to provide clean-up to the target treatment/residual levels. The excavation and off-site landfilling of PCB contaminated soils can be conducted in a relatively short time frame. This removes contaminated soils not readily amenable to bioremediation. However, by removing PCB-contaminated soils, the bulk of the contaminated soils (approximately 60% of the total) which remain are amenable to onsite bioremediation. Available scientific literature and its use in the oil refining industry indicate that the bioremediaton aspect of the selected alternative will achieve the target treatment/residual levels. However, a pre-design treatability study will be necessary to refine the operating parameters for the system to be utilized at the site.

Target treatment/residual levels for groundwater contaminants are as follows:

total volatile organics	50 ppb
arsenic	50 ppb
cadmium	10 ppb
chromium (hexavalent)	50 ppb
lead	50 ppb

For the selected remedy, utilization of groundwater as an irrigation medium for the bioremediation system is the principal mechanism by which achievement of target treatment/residual levels is expected. Contaminant source removal (contaminated soils) and natural attenuation via discharge of groundwater to the Mill Brook are secondary, yet importment mechanisms which will provide reduction of contaminants in groundwater. Although groundwater does not pose a public health risk, achievement of target treatment/residual levels will result in restoration of groundwater quality to potable water standards.

v. estimated time

Excavation and off-site landfilling of PCB-contaminated soils is expected to be completed in a relatively short time frame (6 mos. - 1 year) after signing of the ROD. Rapid completion of the PCB-contaminated soils removal leaves PAH-contaminated soils which are amenable to bioremediation. The critical path to completion of the remedy becomes completing a pre-design treatability study to refine the operating parameters of the bioremediation system followed by design and construction of the bioremediation system. The treatability study can be conducted simultaneously with implementation of the PCB-contaminated soils excavation and off-site landfilling phase of the remedy. Therefore, the estimated time frame for implementation of the entire remedy is 1-2 years after signing of the ROD.

(B) Statutory Determinations

1. Protectiveness

To assist in determining the impact of the site on public health and the environment, an endangerment assessment was conducted for the site. It was determined that substantial risks to human health exist under a number of exposure scenarios based on the current and anticipated future land uses of the site.

For current and future land uses of the site, exposure scenarios evaluated assumed no remediation at the site and no site access restrictions, although the site is currently fenced. Under current land-use conditions evaluated, there is a potential risk of exposure to children trespassing the site, via direct contact and subsequent incidental ingestion of soil contaminants. Future land-use conditions evaluated showed a potential risk of exposure to residents or workers in light industrial operations via direct contact and subsequent incidental ingestion should the site be used for residential or commercial purposes, respectively.

The endangerment assessment considered ingestion of groundwater as a potential pathway of exposure. Drinking water in the area is provided by a public supply system. There are no local domestic wells utilizing site groundwater. Site groundwater discharges directly to the Mill Brook. Therefore, it was determined that there is no current or expected future exposure to groundwater through ingestion.

Children playing in the Mill Brook was also considered in the endangerment assessment as a potential pathway of exposure. Although children may be likely to play in Mill Brook on occasion, the potential for significant exposure to result through dermal absorption and incidental ingestion is determined to be negligible. Since Mill Brook is very shallow, wading in the Brook is unlikely to result in exposure to much skin surface area. The only chemicals detected in both brook water and sediment are metals, which are not readily absorbed through the skin. Although the organic compounds detected in sediments that may be site related (PAHs) have some, albeit a small potential (on the order of 1%) to absorb through skin, absorption through the skin from Mill Brook sediments is expected to be minimal because of the constant dilution afforded by water contacting the skin and the very slow absorption of chemicals through feet.

It should be noted that there are uncertainties associated with the estimated of risks and the assumptions made in developing these estimates tend to be conservative, ie., with a tendency towards over estimations. The actual risks are not likely to exceed those calculated, but may be substantially lower. The critical toxicity values incorporate uncertainty factors that provide a margin of safety against adverse health effects.

The selected remedy will mitigate potential public health and environmental risks determined to be significant by the endangerment assessment. Excavation of PCB contaminated soils and off-site landfilling will physically remove hazardous substances, pollutants and contaminants from the site. Bio-remediation of PAH-contaminated soils will permanently and significantly reduce the toxicity, volume and mobility of hazardous substances, pollutants and contaminants via on-site treatment. Upon successful completion of the remedy, on-site surface and subsurface soils will have been remediated to the aforementioned target/residual levels which are protective of public health and the environment and provide for unrestricted use at the site.

Although groundwater at the site does not present a public health risk there will be treatment of groundwater principally through its use as an irrigation medium in the bioremediation system. Additionally, removal of contaminated soils which could serve as a source of groundwater contamination and natural attenuation by virtue of groundwater discharge to the Mill Brook are mechanisms which will aid in the reduction of contaminant levels to the target treatment/residual levels, while not significantly impacting the Mill Brook.

Therefore there is overall protection of public health and the environment. Successful completion of the selected remedy will result in unrestricted use of the site.

2. Consistency with other laws

During development of the feasibility study, applicable or relevant and appropriate requirements (ARARs) and Criteria, Guidances and Advisories to be considered were established for site remediation. Table 3-1 and 3-3 list ARARs and/or Criteria, Guidances that are expected to be attained or exceeded by the selected remedy.

Table 3-1 presents a "New Jersey Department of Environmental Protection (NJDEP) Summary of Approaches to Soil Cleanup Levels." The listed soil cleanup levels were established by NJDEP as chemical class cleanup objectives for use as a surrogate or action level. These are conservatively set up to indicate if a closer look at the individual chemicals comprising the waste is warranted. In the case of PCBs, risk assessment methodology was used to establish the cleanup objective. For individual metals, cleanup levels have been established based on expected background concentrations in New Jersey soils. The soil cleanup levels were submitted by NJDEP as proposed ARARs.

EPA's "Interim Guidance on Compliance with Applicable or Relevant and Appropriate Requirements," (OSWER 9234.0-05) provides guidance on identifying State ARARs. As specifically mandated by CERCLA §121(d)(2)(A), remedies must comply with "any promulgated standard, requirement, criteria, or limitation under a State environmental or facility siting law that is more stringent than any Federal standard, requirement, criteria, or limitation "if the former is applicable or relevant and appropriate to the hazardous substance or release in question.

Applicable requirements are defined as those cleanup standards, standards of control, and other substantive environmental protection requirements, criteria, or limitations promulgated under Federal or State law that specifically address a hazardous substance, pollutant, contaminant, remedial action, location or other circumstance at a CERCLA site.

Relevant and appropriate requirements are defined as those cleanup standards of control, and other substantive environmental protection requirements, criteria, or limitations promulgated under Federal of State law that, while not "applicable" to a hazardous substance, pollutant, contaminant, remedial action, location or other circumstance at a CERCLA site, address problems or situations sufficiently similar to those encountered at the CERCLA site that their use is well suited to the particular site.

Non-promulgated advisories or guidance documents issued by Federal or State governments do not have the status of potential ARARs. However, they may be considered in determining the necessary level of cleanup for protection of public health and the environment.

EPA has taken this guidance into consideration in order to carefully evaluate NJDEP's submittal of their ARARs. For both the soil and groundwater ARARs, proposed ARARs submitted by NJDEP are outside the scope of state requirements the statute considers promulgated. "Promulgated" requirements are laws imposed by State legislative bodies and regulations developed by state agencies that are of general applicability and are legally enforceable. Therefore, proposed ARARs submitted which represent State cleanup approaches in the case of soils and interim groundwater cleanup guidance cannot be treated as ARARs under SARA.

However, NJDEP's proposed ARARs have been considered heavily both in the remedial investigation (RI) and in the feasibility study (FS). In the RI, the proposed ARARs submitted by NJDEP have been utilized to aid in the evaluation of the extent of contamination at the site. For the FS, alternatives evaluated address remediation of soils and groundwater to the levels submitted as proposed ARARS by NJDEP. Therefore, NJDEP proposed ARARs were categorized as Criteria, Guidances and Advisories to be considered for remediation.

Table 3-3 lists both Federal and State ARARs as well as Criteria, Guidances and Advisories which were considered for groundwater. According to "Guidelines for Groundwater Classification under the EPA Groundwater Protection Strategy" - Final Draft (Office of Groundwater Protection - WH-550G), groundwater at the site is considered Class IIb. Therefore, Maximum Contaminant Levels (MCLs) set under the Safe Drinking Water Act and New Jersey Groundwater Standards (NJAC 7::9-6.6) are Federal and State relevant and appropriate requirements. In addition, Federal and State (e.g. New Jersey Interim Groundwater Cleanup Guidance) Criteria, Guidances and Advisories were considered.

Although the site is not a RCRA facility, the selected remedy involves on-site hazardous waste land treatment. Therefore, 40 CFR 264 Part M of RCRA is a relevant and appropriate requirement. Treated soil and groundwater should also meet the requirements of RCRA corrective action, which are also relevant and appropriate. The selected remedy is expected to meet or exceed these RCRA requirements.

3. Cost-effectiveness and Utilization of Permanent Solutions and Alternative Treatment Technologies or Resource Recovery Technologies to the Maximum Extent Practicable

The principal potential risks posed by the site under current and future use conditions involve residential and worker exposure to contaminated soils via direct contact and subsequent incidental ingestion. The two principal contaminants of concern are PCBs and PAHs. The risks are mitigated by the selected remedy.

Excavation of contaminated soils with PCBs greater than 5 ppm and offsite landfill disposal removes 1100 cy of contaminated soils to an offsite, landfill. This excavation permanently reduces the volume of contaminants from the site. Short-term effectiveness concerns including generation of contaminant laden dusts, transport, and redisposal of contaminated soils are minimal and can be effectively mitigated through dust suppression, adherence to proper worker health and safety protocols and adherence to proper hazardous waste transport and off-site disposal protocols. The removal of PCB-contaminated soils to an offsite landfill can be conducted initially and in a relatively short time frame. The PCB-contaminated soils are not readily amenable to bioremediation. Removal and disposal of these soils via off-site landfilling leaves behind the larger volume of PAH-contaminated soils which are amenable to bioremediation.

Bioremediation of soils contaminated with PAHs greater than 10 ppm requires a pre-design treatability study to refine the operating parameters of the system. Upon completion of the treatability study, implementation of the bioremediation system will significantly and permanently reduce the toxicity, volume and mobility of approximately 5500 cy of contaminated soils, which represents 60% of contaminated soils at the site.

The relative ease with which this portion of the alternative can be implemented may be constrained by factors encountered as result of deeper excavation and treatment of PAH contaminated soils. For example, the mixture of fill and what appears to be demolition debris encountered during excavation my include large pieces of debris (i.e., concrete) that will require decontamination. Decontamination of such debris could result in generation of a liquid that contain hazardous substances that may require treatment and/or disposal.

Bioremediation of soils is considered an innovative treatment technology in the field of hazardous waste management. As a pre-requiste to implementation, a treatability study is necessary to refine operating parameters of the bioremediation system. However, available information on use of bioremediation at other hazardous waste sites and in the oil refining industry indicates that bioremediation can significantly and permanently reduce the levels of PAHs to the target treatment/residual levels which are protective of public health and the environment.

Groundwater does not pose a public health risk. However, utilizing groundwater as an irrigation medium for the bioremediation system, source removal (contaminated soils) and natural attenuation via discharge of groundwater to the Mill Brook are expected to restore groundwater quality to potable water quality standards. Groundwater used an irrigation medium in the bioremediation system is the principal mechanism that would permanently and significantly reduce the toxicity, volume and mobility of groundwater contaminants.

A potential constraint to successful implementation of this aspect of the selected alternative is the potential for insufficient reduction of the levels of groundwater contaminants via its use as an irrigation medium in the bioremediation system. This problem can be effectively mitigated through the use of an activated carbon unit as a pre-or post-bioremediation step prior to return of groundwater to the site.

The need for long-term management of the site should not be necessary once verification samples indicates that the alternative has met its performance criteria. The prospect for long-term reliability of the alternative would be established by the pre-design treatability work and subsequent verification sampling. However, as this remedy is permanent and substantially reduces the toxicity, mobility and volume of contamination the likelihood of remedy replacement is low.

Implementation of the selected remedy (Alternative 5) represents the best combination of the factors evaluted to achieve a preference for treatment to the maximum extent practicable.

Alternatives 1 through 4 are not considered permanent remedies that are protective of public health and the environment nor do these remedies provide a significant and permanent reduction of the toxicity, mobility and volume of contaminated soils and groundwater.

Alternatives 6 through 8 are considered permanent remedies (if offsite disposal is by incineration for Alternatives 6 and 8) that are equally effective and protective of public health and the environment. These remedies significantly reduce the toxicity, (if offsite disposal is by incineration for Alternative 6 and 8) mobility and volume of contaminants at the site. In fact, these remedies would greatly exceed the clean-up criteria established for the site but would not provide any significantly greater degree of protectiveness of public health and the environment or permanence once the remedy was implemented. The incremental costs associated with implementing any of these alternatives does not result in any greater removal of contaminants above target treatment/residual levels. Implementation of any of these alternatives would not result in providing any greater protection of public health or the environment that would justify the incremental cost increase.

Therefore, based on the alternatives evaluation, Alternative 5 was selected as the remedy to be implemented at the site. Alternative 5 reduces the contaminant load at the site to the same extent as Alternatives 6 through 8. The excavation and off-site landfilling of PCB-contaminated soils is the most rapid, cost effective way to remove a relatively small contaminant load thereby allowing on-site treatment of the larger volume of PAH-contaminated soils. The selected remedy provides a cost effective, permanent solution to the contamination problems attributable to the site by employing an innovative treatment technology as a major portion of the total remedy to permanently and significantly reduce the toxicity, volume and mobility of the contaminants at the site. It will eliminate the potential exposure pathways of public health and environmental concern thereby eliminating the risk posed by the site. Implementation of the remedy can be accomplished relatively quickly (1-2 years) without creating any significant inconvenience or additional risk to nearby residents. The selected clean-up criteria established for the site will be met or exceeded. Upon completion of the remedy future site uses will be unrestricted.

ADDENDUM I

RENORA, INC. FEASIBILITY STUDY SUMMARY

REMEDIAL ALTERNATIVE	PRESENT WORTH COST ($1,000)	TIME TO IMPLEMENT	COMMENTS
1. No Action with Periodic Monitoring	270	---	No physical on-site remediation, groundwater monitoring program quarterly up to 30 years if necessary for VOCs, metals of concern and total petroleum hydrocarbons, annual on-site inspection for (e.g. fence maintenance), risk to public health & environment not mitigated ALTERNATIVE DOES NOT ATTAIN ANY ARARs OR CRITERIA, GUIDANCES, ADVISORIES CONSIDERED
2. Clay-Soil Cap, Revegetation and Periodic Monitoring	453	1 year	1) 6" gravel vent layer (bottom) 2) layer of geotextile filter fabric 3) 12" compacted clay 4) 18" clean fill 5) 6" topsoil (top) 6) diversion swales 7) revegetation groundwater monitoring as per Alt. #1, on-site inspection (e.g. fence maintenance), reduces risk to public health & environment ALTERNATIVE DOES NOT ATTAIN ANY ARARs OR CRITERIA, GUIDANCES, ADVISORIES CONSIDERED
3. PCB/PAH Soil Excavation off-site Disposal (Landfill/Incineration) Periodic Monitoring	2,166-LF 18,179-Incin	1 year	All PCB contaminated soils > 5ppm removed (1,100 cy) PAH contaminated soils > 10ppm removed to a depth of 4 ft. (2,600 cy), post-excavation verification sampling, quarterly groundwater monitoring, constraints include segregation of large pieces of demolition debris (e.g. concrete slabs) risk to public health mitigated, site re-use allowed for light industrial uses ALTERNATIVE DOES NOT ATTAIN ALL ARARs OR CRITERIA, GUIDANCES, ADVISORIES CONSIDERED

REMEDIAL ALTERNATIVE	PRESENT WORTH COST ($1,000)	TIME TO IMPLEMENT	COMMENTS
4. PCB Soil Excavation with off-site Disposal (Landfill/Incineration), Excavation and Biodegradation of PAHs, Revegetation, Periodic Monitoring	1,248 - LF 5,868-Incin. cost of LF & Incineration incl. biodegradation	1-2 yrs.	All PCB contaminated soils removed to 5 ppm (1100 cy), on-site biodegradation of PAH contaminated soils to a depth of 4 feet (2600 cy), Passive groundwater treatment via its use during biodegradation, verifiification sampling of soils and groundwater monitoring, constraints include potential lack of available working space, segregation of large pieces of demolition debris, and need for treatability study to determine optimal biodegradation technology, risk to public health mitigated, significantly reduces volume, toxicity & mobility of waste by employing innovative technology, allows for future light industrial uses, ALTERNATIVE DOES NOT ATTAIN ALL ARARs OR CRITERIA, GUIDANCES, ADVISORIES CONSIDERED
5. PCB Soil Excavation with off-site Disposal (Landfill/Incineration), Excavation and Biodegradation of PAHs, Treatment of groundwater via its use as an irrigation medium in bioremediation system, Soil cap & revegetation	1,401 - LF 6,021 - Incin. cost of LF & Incineration includes biodegradation.	1-2 yrs.	Preferred alternative, all PCB contaminated soils (1,100 cy) removed to 5ppm, for landfill/incineration, all PAH contaminated soils (4,400 cy) excavated and subject to biodegradation, groundwater dewatering and use as an irrigation medium for biodegradation system, constraints include soil excavation below water table, lack of adequate staging area, segregation of demolition debris and need for treatability study, significantly reduces volume, toxicity & mobility via innovative technology & mitigates public health risks, future re-use of site allowed ALTERNATIVE ATTAINS ALL ARARs & CRITERIA, ADVISORIES, GUIDANCES CONSIDERED

REMEDIAL ALTERNATIVE	PRESENT WORTH COST ($1,000)	TIME TO IMPLEMENT	COMMENTS
6. PCB Soil Excavation with off-site disposal (Landfill/Incineration), Excavation and Off-site Disposal (Landfill/Incineration) of PAHs, slurry wall installation, groundwater pump & on-site treatment	3,047 - LF 26,244-Incin. cost of LF & Incineration includes groundwater treatment	1-2 yrs.	All PCB contaminated soils removed to 5 ppm (1,100 cy), all PAH contaminated soils above 10 ppm removed (4,400 cy), slurry wall installation to isolate groundwater flowing through site, collected groundwater flows through series of carbon filtration units to remove volatiles and low levels of metals, constraints include segregation of demolition debris, maintenance of carbon for groundwater treatment, need for treatability study for groundwater, alternative mitigates public health risk & allows for future light industrial uses, this alternative does not provide any additional protection of public health & the environment to justify the significant increase in cost, ALTERNATIVE ATTAINS ALL ARARs & CRITERIA, GUIDANCES, ADVISORIES CONSIDERED
7. PCB Excavation of Soils/Off-site Disposal (Landfill Incineration), Excavation and Biodegradation of PAHs, Slurry Wall Installation, Groundwater pump & on-site treatment, Soil cap, revegetation	1,621-LF 6,013-Incin. cost of LF & Incineration includes biodegradation and groundwater treatment	1-2 yrs	All PCB contaminated soils (1100 cy) removed to 5 ppm for landfill/incineration, all PAH contaminated soils (4400 cy) excavated and subject to biodegradation, groundwater pumping as described in Alt.6, treatment of groundwater involves its utilization as an irrigation medium slurry wall installation to isolate groundwater, constraints include soil excavation below the water table, lack of adequate staging area, segregation of demolition debris and need for treatability Alternative significantly reduces volume, mobility and toxicity via an innovative technology and mitigates public health risk future re-use of site for light industries, this alternative does not provide any additional protection of public health & the environment to justify the significant increase in cost ALTERNATIVE ATTAINS ALL ARARs & CRITERIA, ADVISORIES AND GUIDANCES CONSIDERED

REMEDIAL ALTERNATIVE	PRESENT WORTH COST ($1,000)	TIME TO IMPLEMENT	COMMENTS
8. Complete Excavation with Off-site Disposal (Landfill/Incineration Slurry Wall Installation, Groundwater pumping On-site Treatment, Soil Cap, Revegetation	8,617-LF 76,657-Incin. cost of LF & Incineraton includes groundwater treatment	1-2 yrs.	Removal of all contaminated soils to background concentrations (16,000 cy) for landfilling/incineration, groundwater pump and treat as per Alt. 6, Constraints include soil excavation below water table, segregation of demolition debris, need for treatability study, Alt. completely restores site and mitigates public health risk, this alternative does not provide any additional protection of public health & the environment to justify the significant increase in cost, ALTERNATIVE EXCEEDS ARARs & CRITERIA, GUIDANCES ADVISORIES CONSIDERED

ADDENDUM II

ENFORCEMENT ASPECTS

In October, 1977 Renora, Inc. was issued a certificate of Public Convenience and Necessity by the New Jersey Department of Public Utilities to engage in the business of solid waste collection. Operations apparently began in 1978 when Ronald Kaschner, President of Renora, Inc. leased a portion of the Clementi property through an oral agreement.

The first recorded facility inspection was by NJDEP in July, 1978. It was found that the facility was accepting wastes that were not consistent with its registration. This was based on observations of oil spills and storage of drums, some of which were leaking. Renora was determined to be operating as a special waste transfer facility without proper registration.

Renora submitted a Special Waste Facility Application and was granted a Temporary Operating Authorization (TOA) as a Special Waste Facility in December, 1978 by the NJDEP. Under the TOA Renora was able to accept wastes including, but not limited to waste oil, waste oil sludges and hazardous waste liquids. The TOA expired in April 1979 and as a result of inspections by the NJDEP and the Edison Township Department of Health; the TOA was not renewed.

Subsequent inspection reports by the Edison Township Department of Health and NJDEP through March 1980 indicated that there was storage of drums in fluctuating numbers at the site and that the general condition of the site was deteriorating. In late March 1980 the NJDEP Solid Waste Administration (SWA) issued a Notice of Prosecution ordering that Renora halt all operations and implement remediation at the site. There was minimal compliance with the Notice of Prosecution.

In July 1980, the NJDEP-Office of Hazardous Substance Control (OHSC) sent a directive/notice of violation concerning the increasingly deteriorating conditions at the site. In August 1980 Kaschner/Renora and the NJDEP entered into an Order and Settlement Agreement for site cleanup which would address concerns of the NJDEP-SWA and the NJDEP-OHSC. Due to insufficient compliance with the terms of the agreement, NJDEP sent a Notice of Revocation in November 1980 which revoked Renora's registration to collect and haul solid and hazardous waste.

From November 1980 through July 1981, numerous site inspections by the NJDEP and the Edison Township Department of Health revealed that conditions at the site had progressively deteriorated. In late July 1981, NJDEP filed a Verified Complaint, supporting affidavits and an Order to Show Cause against Kaschner, Renora and the Clementis' requesting closure of the facility, unannounced access by NJDEP, requiring that the facility be secured, and requiring posting of a performance bond. The business records of Renora were seized by NJDEP in September 1981.

The facility was placed on EPA's National Priority List in December, 1982.

The Clementis subsequently filed a third-party action against a number of the PRPs who were involved in the RI/FS. On or about August 1, 1983, a consent order was entered pursuant to which further proceedings were stayed while NJDEP and the other parties attempted to negotiate a settlement of the lawsuit. Currently, the litigation is in an inactive status.

Negotiations between NJDEP and a group of responsible parties continued until August 1984. In April 1984, NJDEP had sent a directive letter to the responsible parties requesting a cleanup proposal, which was submitted in June 1984.

However, in August 1984 the NJDEP, in consultation with EPA determined the need for a removal action at the Renora site based on the potential for imminent and substantial endangerment to the public health, welfare and the environment.

EPA sent official notification to approximately seventy (70) potential responsible parties (PRPs) on September 17, 1984 that EPA would conduct an Immediate Removal Action (Removal Action) as defined in the National Contingency Plan, 40 C.F.R. Part 300 at the site. On September 28, 1984 EPA issued an Administrative Order pursuant to §106 of the Comprehensive Environmental Response, Compensation and Liability Act, 42 U.S.C. §9606 (Docket No.: II-CERCLA-50112) to conduct the Removal Action. The PRPs immediately formed the Renora Surficial Cleanup Trust (Cleanup Trust) and entered into negotiations with EPA concerning the Removal Action at the site.

On October 22, 1984 EPA initiated the Removal Action by installing a perimeter fence and securing leaks from drums and tankers. On October 28, 1984 the Removal Action was assumed by a contractor for the Cleanup Trust. The Removal Action was completed in compliance with the Administrative Order on April 17, 1985.

A cost recovery action was initiated against PRPs who elected not to participate in the removal action. The case was referred for litigation by EPA to the Department of Justice in September 30, 1985. A lawsuit was filed on September 4, 1986. A settlement has been reached between the United States and a group of recalcitrant parties for approximately $78,000 costs incurred by EPA. In addition, the State of New Jersey and the defendants reached a settlement for $10,500 representing State cost expenditures. There are other recalcitrant parties to be pursued for remaining costs incurred by EPA.

In December 1984 negotiations were initiated between EPA and the PRPs to discuss performance of the RI/FS by the PRPs. On May 29, 1985, an Administrative Consent Order (Docket Number: II-CERCLA-50112) was entered into between EPA and a group of thirty-five (35) PRPs to have the PRPs conduct the RI/FS under oversight by EPA. The RI/FS report was submitted to EPA in August, 1987.

Based on the feasibility study submitted and the on-going discussions between EPA and the PRPs; there appears to be a strong interest on the part of the PRPs to implement the proposed remedy. Special notice will be expected to be issued to the PRPs in October or November, 1987. It is expected that a "good faith offer" would be submitted by the PRPs during the initial sixty day moratorium period and that an agreement for RD/RA can be consumated during the subsequent sixty day period allowed by the special notice procedures of SARA.

RENORA, INC. SITE
EDISON TOWNSHIP, NEW JERSEY

FINAL RESPONSIVENESS SUMMARY

The U.S. Environmental Protection Agency (EPA) held a public comment period from August 18, 1987 through September 10, 1987 for interested parties to comment on EPA's Remedial Investigation and Feasibility Study (RI/FS) and Proposed Remedial Action Plan (PRAP) for the Renora, Inc. site.

EPA also held a meeting with Edison Township officials on August 4, 1987 at the Edison Municipal Complex in Edison Township, New Jersey to brief Edison Township officials on the remedial investigation (RI) of the Renora, Inc. site. In addition, EPA held a public meeting on September 1, 1987 at the Edison Township Senior Citizens Building to present the findings of the RI/FS and to address questions concerning EPA's remedial alternatives for cleanup of the Renora, Inc. site.

A responsiveness summary is required by Superfund for the purpose of providing EPA and the public with a summary of citizen comments and concerns about the site, and EPA's responses to those concerns.

This community relations responsiveness summary for the Renora, Inc. site is divided into the following sections:

I. Responsiveness Summary Overview. This section briefly outlines the proposed remedial alternatives and presents EPA's preferred remedial alternative for the Renora, Inc. site.

II. Background on Community Involvement and Concerns. This section provides a brief history of community interest and concerns regarding the Renora, Inc. site.

III. Summary of Major Questions and Comments Received During the Public Comment Period and EPA Responses to these Comments. This section presents both oral and written comments submitted to EPA during the public meeting and the public comment period, and provides EPA's responses to these comments.

IV. Correspondence. This section serves as an attachment for correspondence received and responded to during the public comment period.

I. RESPONSIVENESS SUMMARY OVERVIEW

The Renora, Inc. site, a former, privately owned and operated special waste facility, is located in the Bonhamtown section of Edison Township in Middlesex County, New Jersey. The site was put on EPA's National Priorities List of hazardous waste sites in December 1982. A group of hazardous waste generators and transporters whose wastes were handled by the Renora facility formed the Renora Surficial Cleanup and RI/FS Trust (Trust) to address cleanup issues at the site. With EPA oversight, the Trust initiated a removal action at the site in October 1984. The removal action included installation of a perimeter fence and removal of approximately 1,000 drums and their contents, 20-30 tankers and truck trailers and their contents, and approximately 200 tons of visibly contaminated soils. The removal action was completed in April 1985. An Administrative Consent Order to conduct a Remedial Investigation/Feasibility Study (RI/FS) was signed between EPA and the trust in May 1985. The RI was completed in May 1987. The FS was completed in August 1987.

The results of the RI indicate that several contaminants, including polychlorinated byphenyls (PCBs), polynuclear aromatic hydrocarbons (PAHs), and volatile organic compounds (VOCs), were present in soils at the site. Chloroethane (a volatile organic compound) and heavy metals were found in the groundwater at the site.

This responsiveness summary addresses public comments on the feasibility study (FS) for the site. The FS for the Renora, Inc. site evaluates the following alternatives as remedies for the soil and groundwater contamination at the site. Summaries of the remedial alternatives were also presented in the August 1987 Proposed Remedial Action Plan (PRAP) for the Renora Inc., site.

ALTERNATIVE 1 -- NO ACTION WITH PERIODIC MONITORING

Alternative 1 would provide no physical on-site remediation but would involve a groundwater monitoring program. This alternative would not mitigate the risk to the public health and environment, but the monitoring would serve as an early warning system to detect impending health risks or environmental impacts. An annual site inspection would be conducted to evaluate the effectiveness of the fence and to determine if there is any further deterioration of the site. The cost of this alternative is estimated at approximately $270,000.

ALTERNATIVE 2 -- CLAY-SOIL CAP, REVEGETATION, AND PERIODIC MONITORING

Alternative 2 would provide for the installation of a clay-soil cap over the surface of the site which would isolate and contain contaminants. This alternative would involve the installation of swales (drainage trenches) and regrading the surface of the site to facilitate drainage. The site would be capped with layers of gravel, geotextile filter fabric, compacted clay, common fill, and, finally, topsoil. The site would be revegetated and groundwater monitoring would be conducted to determine the effectiveness of the cap. Although this would not totally destroy or remove on-site contaminants, this alternative would mitigate the public health risk by minimizing direct contact with contaminated soils. The cost for this alternative is estimated to be $450,000.

ALTERNATIVE 3 -- PCB EXCAVATION, PARTIAL PAH EXCAVATION, OFFSITE DISPOSAL (LANDFILL/INCINERATION), AND PERIODIC MONITORING

Alternative 3 would involve excavating all polychlorinated biphenyl (PCB) contaminated soils above 5 parts per million (ppm), 1,100 cubic yards (cy), and all polynuclear aromatic hydrocarbons (PAH) contaminated soils above 10 ppm, 2,600 cy, to a depth of 4 feet. The excavated areas would then be backfilled with clean fill, regraded and revegetated. Contaminated soil would be transported to an offsite landfill or incinerator, for ultimate disposal. Therefore, the major source of groundwater contamination would be removed. A groundwater monitoring program similar to that described for Alternatives 1 and 2 would be conducted.

This alternative would also mitigate public health risks, remove the most significant areas of soil contamination and potentially allow future use of the site for light industrial structures. However, PAH contamination would remain in subsurface soils. The estimated cost of this alternative is $2,200,000 if disposal is by landfilling, and $18,200,000 if disposal is by incineration.

ALTERNATIVE 4 -- PCB EXCAVATION, OFFSITE DISPOSAL (LANDFILL/ INCINERATION), EXCAVATION AND BIODEGRADATION OF PAH'S, AND PERIODIC MONITORING

Alternative 4 would provide cleanup of PCB and PAH contaminated soils to the same levels (4 feet deep) as Alternative 3. The difference between the alternatives is that Alternative 4 would provide treatment of PAH contaminated soil on-site through biodegradation techniques rather than excavation of the soils for offsite disposal. Offsite disposal of PCB's and on-site treatment of PAH's would remove the major source of groundwater contamination. Groundwater would be used as an irrigation medium in the bioremediation process. This would also reduce groundwater contamination.

A pre-design treatability study would be required for this alternative. This alternative would mitigate the public health risk, significantly reduce the volume and toxicity of the waste by employing an innovative technology and allow for future light industrial use at the site. The estimated cost for this alternative is $1,200,000 if PCB contaminated soils are landfilled and $6,000,000 if they are incinerated.

ALTERNATIVE 5 -- PCB EXCAVATION, OFFSITE DISPOSAL (LANDFILL/ INCINERATION), EXCAVATION AND BIODEGRADATION OF PAH'S

Alternative 5 is similar to Alternative 4 except that the depth of excavation and biodegradation of PAH's is more extensive (12 feet for Alternative 5 vs. 4 feet for Alternative 4). Therefore, this alternative would excavate and/or treat a larger volume of soil (5,500 cy which includes 1,100 cy of PCB's and 4,400 cy of PAH's). Offsite disposal of PCB's and on-site treatment of PAH's would remove the major source of groundwater contamination.

Since groundwater may be encountered during the excavations in the southeastern portion of the site, a well point system may be necessary in limited areas to allow unimpeded excavation activities. The groundwater removed as part of the dewatering activities would then be utilized as an irrigation medium for the bioremediation of soil. Utilizing the groundwater as an irrigation medium will further reduce the low levels of contaminants that were present in the groundwater.

A pre-design treatability study would be required for this alternative. This alternative would mitigate the public health risk and permanently reduce the toxicity and volume of waste at the site by employing an innovative treatment technology allowing for future light industrial uses of the site. The estimated cost of this alternative is $1,400,000 if PCB contaminated soils are landfilled and $6,000,000 if PCB contaminated soils are incinerated.

ALTERNATIVE 6 -- PCB/PAH EXCAVATION, OFFSITE DISPOSAL (LANDFILL/ INCINERATION), SLURRY WALL INSTALLATION, GROUNDWATER PUMPING AND ON-SITE TREATMENT

Alternative 6 would involve excavation of all PCB contaminated soil above 5 ppm (1,100 cy) and all PAH contaminated soil above 10 ppm (4,400 cy) to a depth of 12 feet. This more extensive excavation would remove the source of contamination. Backfilling of excavated areas and disposal of contaminated soil would be handled in the same manner as in Alternative 3.

In addition to excavation of contaminated soil, a pump and treat system would be installed to remedy groundwater contamination. A slurry wall for groundwater isolation would also be included. A pre-design treatability study would be required for the groundwater aspect of the alternative. This alternative would mitigate the public health risk and reduce the volume of waste at the site. The estimated cost for this alternative is $3,000,000 if contaminated soils are landfilled and $26,000,000 if they are incinerated.

ALTERNATIVE 7 -- PCB EXCAVATION, OFFSITE DISPOSAL (LANDFILL/ INCINERATION), EXCAVATION AND BIODEGRADATION OF PAH'S, SLURRY WALL INSTALLATION, GROUNDWATER PUMPING AND ON-SITE TREATMENT

Alternative 7 is similar to Alternative 4 except that the biodegradation process is done to a greater depth. All PAH contaminated soils above 10 ppm (4,400 cy) will be subject to biodegradation, which means biodegradation would be to a depth of twelve (12) feet. This more extensive on-site treatment of soils would remove the source of contamination. In addition, a slurry wall, as in Alternative 6, would be installed. Groundwater would be pumped and used as an irrigation medium to biodegrade the contaminated soils and reduce groundwater contaminants through microbial activity. Backfilling of excavated areas and disposal of contaminated soil would be handled in the same manner as in Alternative 3.

A pre-design treatability study would be required for this alternative. This alternative would mitigate the public health risk, permanently reduce the toxicity of the waste by employing an innovative treatment technology, and allow for future light industrial use at the site. The estimated cost of this alternative is $1,600,000 if PCB contaminated soils are landfilled and $6,000,000 if PCB contaminated soils are incinerated.

ALTERNATIVE 8 -- COMPLETE EXCAVATION, OFFSITE DISPOSAL (LANDFILL/INCINERATION), SLURRY WALL INSTALLATION, GROUNDWATER PUMP, AND ON-SITE TREATMENT

Alternative 8 would provide for excavation and offsite disposal via landfilling or incineration of all soil which exhibits contamination above background levels. Backfilling of excavated areas would be handled in the same manner as in Alternative 3. Complete excavation would remove the source of groundwater contamination. A slurry wall would be constructed along the Mill Brook stream bank and sumps or well points would be established to pump groundwater and dewater areas below the water table. A pump and treat system would then be used to remediate groundwater contamination as in Alternative 6.

A pre-design treatability study would be required for the groundwater aspect of this alternative. This alternative would mitigate the public health risk, remove all soil/fill material from the site, and allow for unrestricted site use. Therefore, this alternative would completely restore the site. The estimated cost is $8,600,000 to landfill all contaminated material and $76,600,000 to incinerate all contaminated material.

PREFERRED ALTERNATIVE

At the public meeting for the Renora, Inc. site on September 1, 1987, EPA presented their preferred remedial alternative for the cleanup of the Renora, Inc. site. After careful consideration of the alternatives, EPA recommends Alternative 5 as the choice for the site remedy. Components of this remedy are:

-- Excavation of all PCB contaminated soil containing concentrations above 5 ppm with disposal of excavated soil to an offsite landfill consistent with EPA policy for off-site disposal facilities;

-- Excavation of all PAH contaminated soil containing concentrations above 10 ppm with on-site treatment of excavated soil by bioremediation, using groundwater as an irrigation medium; and

-- Periodic monitoring of site groundwater.

This alternative will provide protection of public health, welfare and the environment, remove the major source of groundwater contamination and allow for future use of the site.

II. BACKGROUND ON COMMUNITY INVOLVEMENT AND CONCERN

The Edison Township community has been aware of contamination problems at the Renora, Inc. site since 1978, the same year that waste transfer operations began there. The New Jersey Department of Environmental Protection (NJDEP) and the Edison Township Department of Health and Human Resources (ETDHHR) began conducting site inspections in 1978 which led to several enforcement actions and the eventual revocation of Renora, Inc.'s operating authority in 1980. The facility was ultimately abandoned in 1982.

At the time of abandonment, there were 20-30 tankers, tank trucks and trailers and approximately 1000 containers and drums with their contents left on-site. The EPA included the Renora, Inc. site on its National Priorities List of hazardous waste sites in December 1982.

After abandonment, NJDEP and EPA located hazardous waste generators and transporters whose wastes were handled by the Renora facility. A group of these responsible parties formed the Renora Surficial Cleanup and RI/FS Trust (Trust) to address site contamination problems. The Trust performed a removal action in October 1984 that was completed in April 1985. An Administrative Consent Order to conduct a Remedial Investigation/Feasibility Study (RI/FS) was signed between EPA and the Trust in May 1985.

III. SUMMARY OF MAJOR QUESTIONS AND COMMENTS RECEIVED DURING THE PUBLIC COMMENT PERIOD AND EPA RESPONSES TO THESE COMMENTS

EPA held a public comment period from August 18, 1987 through September 10, 1987 to receive comments on the FS and the PRAP. EPA held a public meeting on September 1, 1987 as an opportunity for the public and other interested parties to present oral comments to EPA. These comments are recorded in a transcript available at the Edison Township Public Library - Main Branch located at 340 Plainfield Avenue in Edison. The comments received during the comment period are summarized and categorized below by the following topics:

A. remedial alternatives;

B. enforcement issues;

C. future land uses; and

D. health effects.

A. REMEDIAL ALTERNATIVES

1. Comment: A local official asked how much time would be required to arrive at a final cleanup remedy and, then, to complete the cleanup.

   EPA Response: EPA expects to sign a Record of Decision by the end of September 1987. A final remedy also will be announced at that time. EPA then will work with the responsible parties to initiate design and final construction. If necessary, EPA will conduct the remedial design and construction with Superfund monies. EPA's goal is to work closely with Edison Township so that design and construction of the preferred alternative can be finalized by the fall of 1989.

2. Comment: A local official asked what the extent of the biodegradation treatment process would be under Alternative 5.

   EPA Response: The areas indicated for PAH removal on the diagram included in the PRAP (see Attachment A) define the limits of the biodegradation treatment area. Those limits were determined by analyzing soil samples from the site for contamination.

3. Comment: A local official also asked if the site would be revegetated.

   EPA Response: Under Alternative 5, the preferred alternative, the site would be graded and revegetated.

B. ENFORCEMENT ISSUES

1. Comment: A local official asked how many companies that are potentially responsible for site contamination are involved in the cleanup and how many actually were identified. In a related

question in a letter to EPA, provided as Attachment B, a local resident asked who will pay for the cleanup.

EPA Response: There are thirty-five companies participating in the cleanup of the Renora, Inc. site. The companies are identified through various sources including records of the site operator and records from the state's mandatory system for tracking hazardous wastes. If EPA decides that a company is a potentially responsible party (PRP), the company is offered the opportunity to do the study and cleanup. The company is informed at the same time that it can be held accountable for the costs through litigation. That is essentially the process that resulted in formation of the thirty-five company trust. The Trust has paid for cleanup and study costs to-date.

2. Comment: A reporter from the News Tribune newspaper asked if all identified potentially responsible parties participated in the cleanup and, if not, how this situation will be resolved legally.

EPA Response: Both EPA and those companies that did participate in the cleanup can seek to recover some of their costs from the non-participating companies. The process of recovering these costs may require litigation. Nonetheless, all PRP's may share some liability for the cleanup costs, depending on the judgement of the courts.

C. FUTURE LAND USES

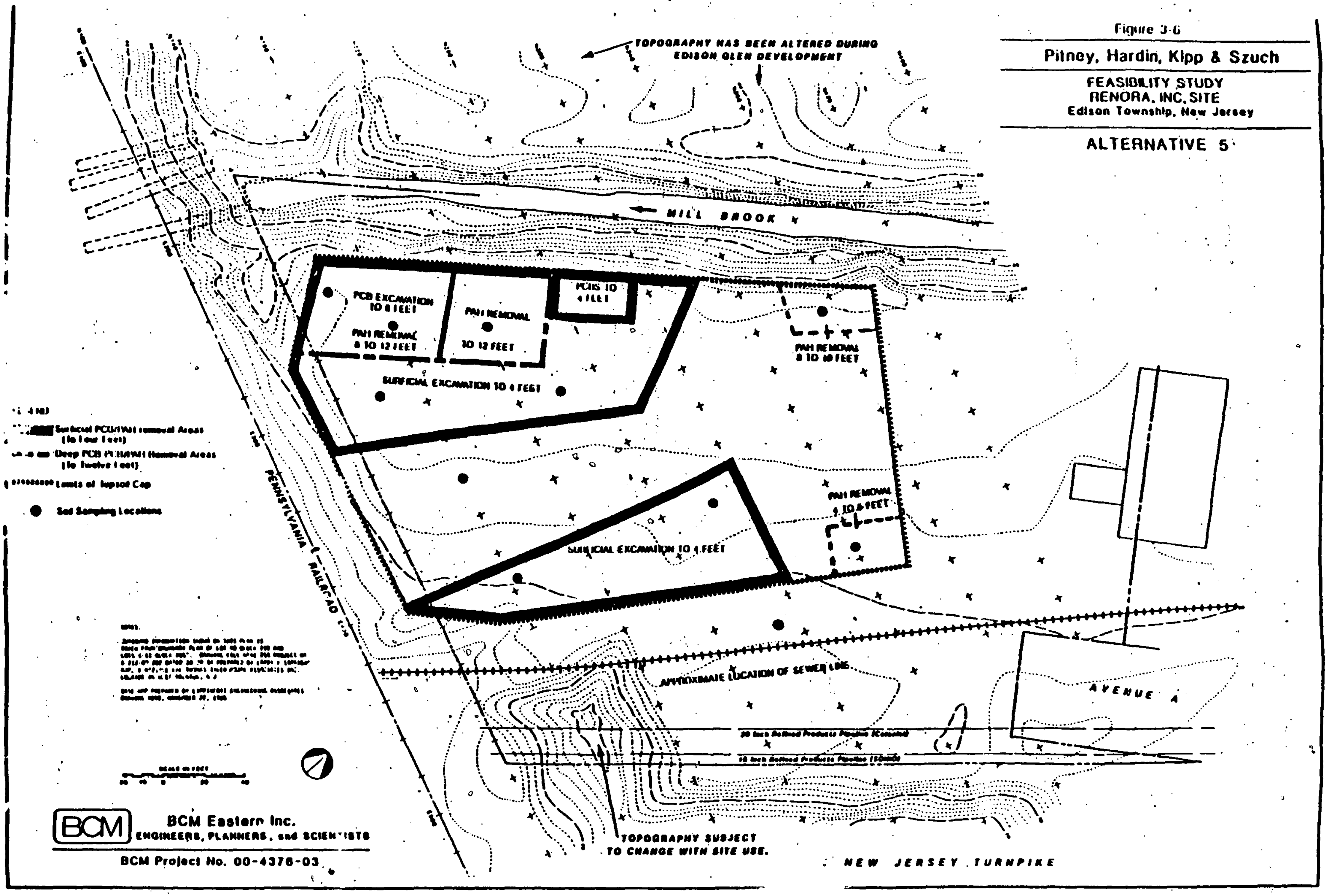
1. Comment: A local official requested guidance from EPA about potential land uses for the site. He also indicated that Township officials would like this information in writing.

EPA Response: Land uses for the Renora, Inc. site should be almost unrestricted if the preferred remedial alternative is successfully implemented. When EPA finishes their work at the site, it should be considered fully remediated. Information about the site's potential land uses will be documented in the Record of Decision.

D. HEALTH EFFECTS

1. Comment: A local official asked what health effects would result from contact with contaminated soil at the site. The official asked if the contact poses an immediate health threat.

EPA Response: EPA's calculations of the potential health risks resulting from exposure to contaminated soils at the site are based on assumptions of long-term exposure. The potential for adverse health affects from one contact is low. In addition, the site has been fenced to prevent any opportunities for direct contact exposure to contaminants.



Attachment A

Attachment B

Sept 8, 1987

U.S. Environmental Protection Agency
Emergency and Remedial Response Div.
26 Federal Plaza - Rm 737
New York, N.Y. 10278

Dear Sir:

I am writing in regard to the Kenova Inc Site.

Regarding the meeting that was advertised in the Star Ledger. This is not a local paper and I did not have occasion to see your ad therefore did not know about your meeting of Sept 1, 198
I think I speak for many from my area.

I am located about 1/2 mile from site. I'm surprised we even had a place like that since it is so close to homes.

I read your proposals. I have no expertise on this subject; only that it is not a healthy enviroment. Very interested in knowing your decision on clean up.

One important question: Who pays for all of this clean up? I'd be interested to know.