United States
Environmental Protection
Agency

Office of
Emergency and
Remedial Response

EPA/ROD/R02-90/118
September 1990

EPA

Superfund Record of Decision:

Higgins Farm, NJ

Printed on Recycled Paper

50272-101

REPORT DOCUMENTATION PAGE	1. REPORT NO. EPA/ROD/R02-90/118	2.	3. Recipient's Accession No.
4. Title and Subtitle SUPERFUND RECORD OF DECISION Higgins Farm, NJ First Remedial Action			5. Report Date 09/24/90 6.
7. Author(s)			8. Performing Organization Rept. No.
9. Performing Organization Name and Address			10. Project/Task/Work Unit No. 11. Contract(C) or Grant(G) No. (C) (G)
12. Sponsoring Organization Name and Address U.S. Environmental Protection Agency 401 M Street, S.W. Washington, D.C. 20460			13. Type of Report & Period Covered 800/000 14.

15. Supplementary Notes

16. Abstract (Limit: 200 words)

The 75-acre Higgins Farm site is a cattle farm in Franklin Township, Somerset County, New Jersey. The site is primarily pasture land with poor onsite drainage. Approximately 3,200 residents living within a three-mile radius of the site rely on ground water as their drinking water source. In 1985, after receiving reports of ground water contamination near the farm, the State investigated the area and found a drum burial area. In 1986, the site owner began to remove the drums from the site, and ten drums were removed, crushed and placed in a roll-off container. Later in 1986, another 50 drums were excavated, and during the excavation the drums were punctured and their contents spilled onto the ground. Fluids from the pit formed during excavation activities were subsequently pumped to a holding tank while excavation continued. In addition to excavating the drums, visibly contaminated soil was placed in roll-off containers. In late 1986, State site inspections revealed ground water and soil contamination by VOCs, pesticides, metals, and dioxins. Bottled water was temporarily provided to affected residents until 1989, when the State installed carbon filter units on affected wells. In 1987, EPA initiated stabilization

(See Attached Page)

17. Document Analysis a. Descriptors

Record of Decision - Higgins Farm, NJ
First Remedial Action
Contaminated Medium: gw
Key Contaminants: VOCs (benzene, PCE, TCE, xylenes), other organics, and metals (lead)

b. Identifiers/Open-Ended Terms

c. COSATI Field/Group

18. Availability Statement	19. Security Class (This Report) None	21. No. of Pages 46
	20. Security Class (This Page) None	22. Price

Abstract (Continued)

activities at the site, including construction of a barn to store dioxin-contaminated material such as overpacked drums and roll-off containers; draining, lining, and backfilling of the excavation pit; treatment of the pumped liquids and storage of the treated liquids in a holding tank; and implementing site access restrictions. This Record of Decision (ROD) provides a permanent safe drinking water supply source for affected residents as part of an interim remedy. A future ROD will address remediation of final ground water and all remaining onsite contamination including soil, sediment, surface water, and ground water. The primary contaminants of concern affecting the ground water are VOCs including benzene, PCE, TCE, and xylenes; other organics; and metals including lead.

The selected interim remedial action for this site includes developing, designing, and constructing a water main extension and distribution system; installing new carbon adsorption units, as necessary; operating and maintaining existing carbon adsorption units until construction is completed; conducting environmental sampling of residential wells; removing carbon units and private well connections once the permanent water supply is installed; and implementing institutional controls including ground water use restrictions. Since the propsed remedy would not restore ground water to beneficial use levels, an interim ARAR waiver will be invoked as part of this remedial action. The total present worth cost for this remedial action is $1,716,000, which includes a total O&M cost of $28,200 for 2 years.

PERFORMANCE STANDARDS OR GOALS: Chemical-specific ARARs for drinking water are based on SDWA MCLs and the more stringent State standards including benzene 1.0 ug/l (State MCL), PCE 1.0 ug/l (State MCL), and TCE 1.0 ug/l (State MCL).

ROD FACT SHEET.

SITE

Name : Higgins Farm
Location : Franklin Township, Somerset County, New Jersey
HRS Score (date):
NPL Rank :

ROD

Date signed : 9/24/90
Remedy : Provide alternate water source to 30 residences - extension of water main
Capital Cost : $1,258,000
O&M for 30 years $266,000
O&M Carbon filter unit already in place (2 years only) : $192,000

Present worth Total : $1,716,000

LEAD

Remedial
EPA
Contact : Joyce Harney x6313

WASTE

TYPE: VOCs, metals
Medium : gw
Origin : drums, waste disposed on farm
Est quantity - Unknown.

DECLARATION STATEMENT

RECORD OF DECISION

HIGGINS FARM

SITE NAME AND LOCATION

Higgins Farm Superfund Site
Franklin Township, Somerset County, New Jersey

STATEMENT OF BASIS AND RESPONSE

This decision document presents the selected interim remedial action for the Higgins Farm Superfund site developed in accordance with the requirements of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended by the Superfund Amendments and Reauthorization Act of 1986 and, to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan.

This decision document explains the factual and legal basis for selecting the interim remedy for this site. The information supporting this interim remedy is contained in the administrative record for the site.

ASSESSMENT OF THE SITE

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

DESCRIPTION OF REMEDY

This interim remedy will ensure that residents affected or potentially affected by ground water contamination from the site are provided with a safe drinking water supply. The final remedy for the site will address the contamination of soils, sediments, surface water and ground water. These actions will be the subject of a future Record of Decision.

The major components of the selected remedy include:

- Development and design of a water main extension and distribution system;

- Construction of the water main extension and connection to the existing water supply system;

- Continued operation and maintenance of existing carbon adsorption units until a permanent water supply is available;

- Installation, operation and maintenance, of additional carbon adsorption units, as necessary;

- Environmental sampling of appropriate residential wells; and

- Removal of carbon units and private well connections after the permanent water supply is installed;

DECLARATION

This interim action is protective of human health and the environment, complies with Federal and State applicable or relevant and appropriate requirements directly associated with this action, and is cost-effective. This action utilizes permanent solutions and alternative treatment technologies to the maximum extent practicable, given the limited scope of the action. Because this action does not constitute the final remedy for the site, the statutory preference for remedies that employ treatment that reduces toxicity, mobility, or volume as a principal element will be addressed at the time of the final response action. Subsequent actions are planned to address fully the principal threats posed by this site.

Constantine Sidamon-Eristoff
Regional Administrator

9/24/92
Date

DECISION SUMMARY

RECORD OF DECISION
HIGGINS FARM

I. SITE NAME, LOCATION, and DESCRIPTION

The Higgins Farm site (the "Site") is located in a rural area off Route 518 in Franklin Township, Somerset County, New Jersey. The Site is approximately 75 acres in size. The Site is owned by Mr. Clifford Higgins (Sr.), and is operated as a cattle farm. (See Figure 1.) The Site is primarily pasture land and is relatively flat and poorly drained. There are two residences on the farm, and other residences bordering the Site to the northeast and northwest. Trap Rock Industries Kingston Quarry borders the Site to the south.

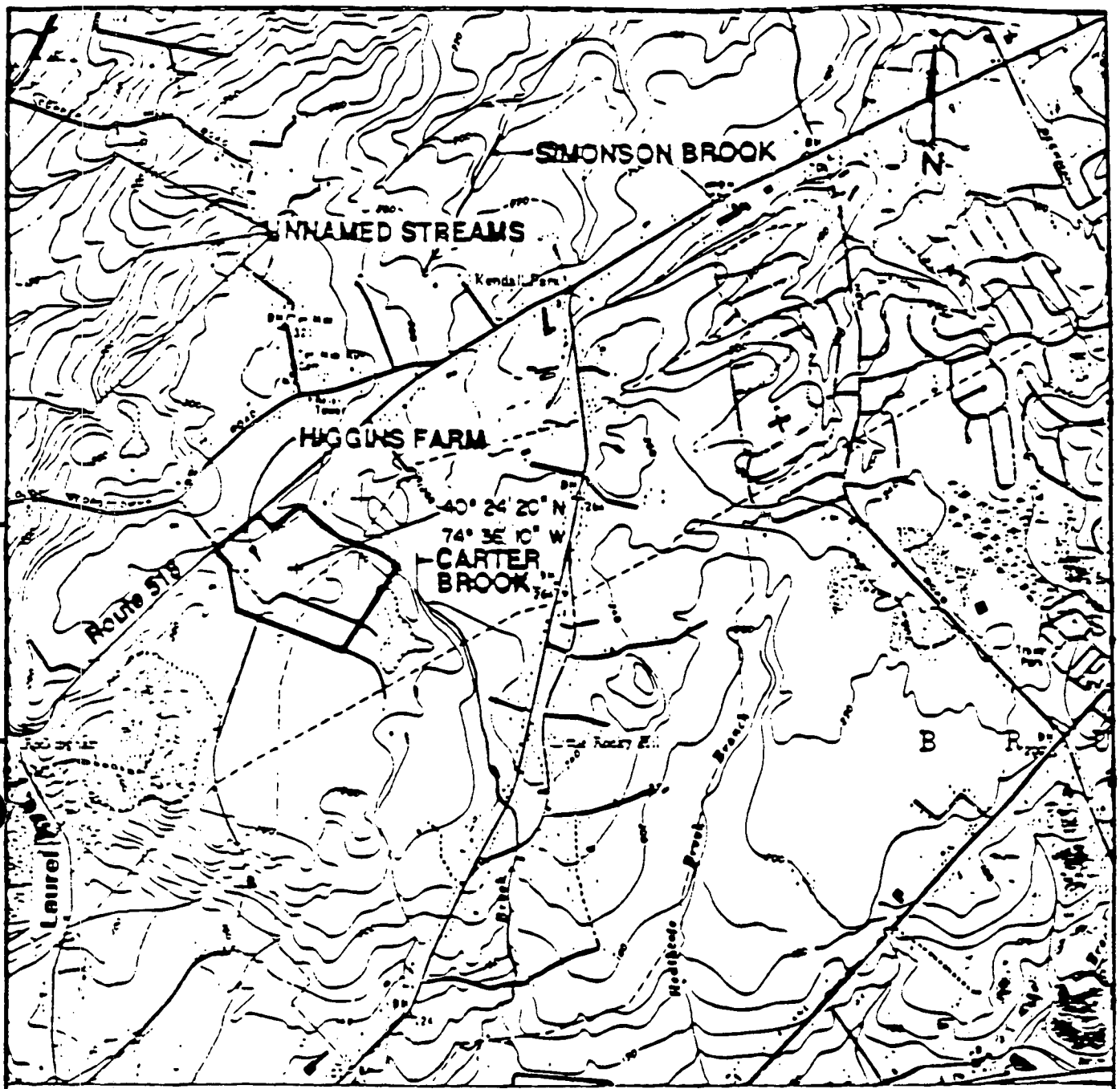
Two holding tanks containing contaminated water and a barn housing excavated drums and roll-off containers containing contaminated soils are located in the northern section of the Site. A chain link fence surrounds the tanks, the barn and the area where the drums were excavated. The tanks and the barn were installed during emergency response activities conducted by the Environmental Protection Agency (EPA). A berm was constructed to prevent runoff from this area onto the remainder of the Site.

A small area suspected of containing buried drums is fenced in the southwest portion of the Site. Demolition debris, including bricks, asphalt, metal scrap, and concrete, is also found near the suspected drum burial area.

Within a three-mile radius of the Site, approximately 3,200 people rely on ground water for their drinking water source. This includes 494 private wells in Franklin Township, Somerset County; 51 private wells in South Brunswick, Middlesex County; and the Rocky Hill Municipal Wells in Somerset County, which serve 285 residences.

A pond, located in the southeast portion of the Site, discharges through an unnamed tributary to Carter Brook, approximately 2,000 feet to the east. The closest downslope surface water is Carter Brook, which is used for recreation. The Delaware-Raritan Canal and the Millstone River flow to the west of the Site. There are no coastal wetland areas within 2 miles of the Site and there are no freshwater areas within a 1 mile radius. There are no known critical habitats for federally endangered species, or National Wildlife Refuges within a 1 mile radius of the Site. However, Washington's Headquarters, a national historic district, is located approximately 1.1 miles southwest of the Site.

Higgins Farm is believed to be underlain by two main water-bearing zones. These zones are an unconfined saturated zone in



MONMOUTH JUNCTION QUADRANGLE
NEW JERSEY
7.5 MINUTE SERIES (TOPOGRAPHIC)

QUADRANGLE LOCATION

SCALE 1:24000

1 MILE

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

CONTOUR INTERVAL 20 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

LOCATION MAP
HIGGINS FARM

FIGURE 1

unconsolidated sediments and a water-bearing zone in fractured bedrock. It is believed that ground water beneath the Higgins Farm site flows to the southwest. More definitive hydrogeologic data will be collected during the ongoing remedial investigation and feasibility study.

II. SITE HISTORY and ENFORCEMENT ACTIVITIES

In December 1985, the Franklin Township Health Department reported to NJDEP that elevated levels of chlorobenzene existed in a potable well located at Route 518, Franklin Township, Somerset County, New Jersey. NJDEP investigated and discovered the presence of a drum burial dump at the Site approximately forty yards from the contaminated well.

On January 2, 1986, NJDEP investigated drum excavation activities initiated by Mr. Higgins and his contractor at the Site. The excavation was halted by NJDEP as the activity was not approved by NJDEP. An estimated ten drums were removed, crushed and placed in a roll-off container.

On April 7, 1986, a contractor employed by Mr. Higgins commenced excavation of buried drums. The contractor located buried drums by probing the ground with a back hoe. Approximately fifty drums were excavated in this manner. During excavation activities, drums were punctured and their contents spilled onto the ground as the drums were excavated. The pit formed resulting from this activity is referred to as the excavation pit. Fluids were pumped from the excavation pit to a holding tank and excavation continued; visibly contaminated soils were placed in roll-off containers and approximately ten drums were overpacked.

On April 26, 1986, NJDEP sampled ten residential wells in the vicinity of the Site and discovered three wells exhibiting volatile organic contamination. Nine of the ten residential wells were resampled by NJDEP in August 1986. Analysis confirmed the presence of volatile organic contamination.

On May 8, 1986, NJDEP personnel inspected the Site and collected soil samples from the drum excavation pit area. Analysis of these samples indicated the presence of volatile organic compounds, pesticides, metals and dioxins in the soils at the Site.

On July 3, 1986, a repeat sample from the vicinity of the drum excavation pit was collected. Analysis confirmed the presence of dioxins and associated furans.

In November 1986, NJDEP established a "well impact area" near the Higgins Farm site, restricting installation of new wells within the affected area. Thirty-one residences were included within the well impact area at Higgins Farm.

In March 1987, EPA responded to the presence of contamination in drinking water wells neighboring the Site by providing bottled water to potentially impacted area residents. At that time, the EPA explained that it would provide bottled water as an interim solution until an alternate water supply could be arranged by NJDEP. Thereafter, NJDEP determined that the most appropriate method to supply potable water was to install individual carbon units at the potentially impacted homes. NJDEP installed the carbon filter units during the spring/summer of 1989, at which time bottled water delivery was discontinued. The carbon filter units were intended to limit ingestion of volatile organic compounds and mitigate the potential for human exposure via inhalation of volatile organic compounds through household use.

On April 8, 1987, EPA initiated activities to stabilize the Site and to control the release of hazardous substances into the environment. Actions taken included:

a. the construction of a barn to house material that may be dioxin contaminated, including, but not limited to, overpacked drums and roll-off containers;

b. the excavation pit was drained, lined and backfilled;

c. the pumped liquids were treated and stored in a holding tank; and

d. the drum burial area was fenced to prevent access by unauthorized persons.

In December 1989, NJDEP advised EPA that it could not monitor and maintain the carbon units beyond the spring of 1990. On February 2, 1990, EPA authorized $625,320 under the removal program to monitor and maintain the carbon filter units for approximately two years.

The Site was proposed for inclusion on the National Priorities List (NPL) in June 1988. EPA began investigations to identify potentially responsible parties (PRPs) for the contamination at the Site. In March 1989, the Site was formally placed on the NPL, thus making it eligible for federal funds to investigate the extent of contamination and to clean up the Site. In March 1989, EPA notified six PRPs of their potential liability. EPA offered these PRPs the opportunity to conduct or finance the RI/FS for the Site; however, the PRPs declined to undertake the RI/FS.

Because the PRPs declined to undertake the RI/FS, EPA allocated funds for the studies to be conducted under EPA supervision through its contractors. During the RI/FS, investigatory work is performed to determine the nature and extent of contamination and to determine to what extent the Site may have been impacted by the contaminant migration.

EPA has since identified one additional PRP, who also declined to undertake the RI/FS.

On October 17, 1989, EPA offered the PRPs the opportunity to install a waterline along Route 518 to service the residents impacted and potentially impacted by the Higgins Farm site to provide a more permanent solution to the water supply problem. In February 1990, EPA informed the seven PRPs that EPA had not received an acceptable offer to install the public water supply.

On March 20, 1990, EPA issued an Administrative Order to Mr. & Mrs. Clifford Higgins to install the waterline. Mr. & Mrs. Higgins have failed to comply with the order.

In June 1990, EPA released the Focused Feasibility Study Report ("FFS Report") and EPA's Proposed Plan for the construction of a water line extension to the public. A public comment period was provided, beginning on June 28 and ending on July 30, 1990.

III. HIGHLIGHTS OF COMMUNITY PARTICIPATION

A Community Relations Plan (CRP) for the Higgins Farm site was finalized in March 1990. The CRP lists contacts and interested parties throughout government and the local community. It also establishes communication pathways to ensure timely dissemination of pertinent information.

The Proposed Plan for the interim remedy was released to the public, including the seven identified PRPs, on June 25, 1990. The FFS Report was released to the public on June 28, 1990. Both the FFS Report and the Proposed Plan are contained in the administrative record at Information Repositories which are maintained at the Mary Jacobs Memorial Library, the Franklin Township Library and at EPA's Region II Office in New York City. The notice of availability for these two documents was published in The Home News on June 28, 1990. A public comment period was held from June 28 to July 30, 1990. In addition, a public meeting was held on July 2, 1990 to present the Proposed Plan for the Site. At this meeting, representatives from EPA answered questions regarding remedial alternatives under consideration and problems at the Site. All comments which were received by EPA prior to the end of the public comment period, including those expressed verbally at the public meeting, are addressed in the Responsiveness Summary which is attached as Appendix I to this Record of Decision.

IV. SCOPE AND ROLE OF INTERIM REMEDY

EPA has taken limited response actions related to the drinking water supply problem at the Site. Prior to listing the Site on the NPL, in March 1987, EPA responded to the presence of contamination in drinking water wells neighboring the Site by providing bottled water to potentially impacted area residents. In addition, EPA performed actions to stabilize the Site and control the releases of hazardous substances in April 1987. On February 2, 1990 EPA authorized funding under the removal program to monitor and maintain the carbon filter units installed by NJDEP for approximately two years.

These limited response actions have only partially addressed the problems at the Site. EPA has elected to address the drinking water supply problem through an interim remedy because of the threat posed by the actual and potential use of contaminated ground water. In this ROD, EPA is selecting an interim remedial action to provide a permanent alternate water supply to affected and potentially affected residents. Installation of an alternate water supply is considered an interim solution for ground water contamination, since it does not address the problem of restoring the ground water to its beneficial uses.

The goal of this interim action is to eliminate actual or potential exposure to contaminated ground water. Such a goal is consistent with any potential future remedy which EPA will select for the Site. The "final remedy" for the Site (addressing soils, sediments, surface water, and ground water) will be proposed at the conclusion of the RI/FS. The selected interim remedy will be part of a future permanent remedy which will protect human health and the environment.

V. SUMMARY OF SITE CHARACTERISTICS

The full extent of contamination at the Site is currently being evaluated in the ongoing RI/FS. However, several potential sources of contamination at the Site have been identified. The following provides a brief summary of the sampling and analyses conducted of ground water, soil, surface water, and containerized wastes at the Site. The complete results of all sampling activities are presented in further detail in the FFS Report.

Sampling of Containers at the Site

In 1987, various containers at the Site, including drums, roll-off containers, and tanks, as well as liquids from the excavation pit, were sampled by a contractor hired by Mr. Clifford Higgins, the Site owner. The analyses revealed the presence of numerous organic and inorganic chemical contaminants, including, but not limited to, chloroform, ethylbenzene, toluene, xylenes,. naphthalene, 2-methyl naphthalene, pentachlorophenol, arsenic,

cadmium, chromium, and lead. In addition, the analyses revealed that the wastes in several of the containers were "hazardous wastes" under the Resource Conservation and Recovery Act, due to corrosivity, toxicity, and flammability. Maximum concentrations of some of the contaminants detected are shown in Table 1, below.

Table 1
Example of Contaminants Detected: Containers at the Site

Compound	Maximum Concentration Detected (ppb)
Chloroform	35,300
Ethylbenzene	18,500
Toluene	37,500
Total Xylenes	224,000
2-Methyl naphthalene	90,000
Naphthalene	7,600
Pentachlorophenol	2,340,000
Arsenic	99,250
Cadmium	375
Chromium	57,500
Lead	7,000

Soils and Pond Sampling

In 1986, NJDEP collected and analyzed samples from the pond at the Site, as well as samples of surface soils. The analyses revealed that the soil at the Site is contaminated with volatile organic compounds, base/neutral compounds, metals, cyanide, dioxins and phenols. In addition, several of these contaminants were present in the pond.

Among the contaminants detected in soil samples were numerous hazardous substances including, but not limited to, chloroform, 1,1,2,2, tetrachloroethane, naphthalene, pentachlorophenol, phenanthrene, pyrene, bis(2-ethylhexyl)phthalate, phenols, dieldrin, endrin, arsenic, cadmium, chromium, lead, zinc, and dioxins.

Maximum concentrations of some of the contaminants detected are listed in Table 2, below.

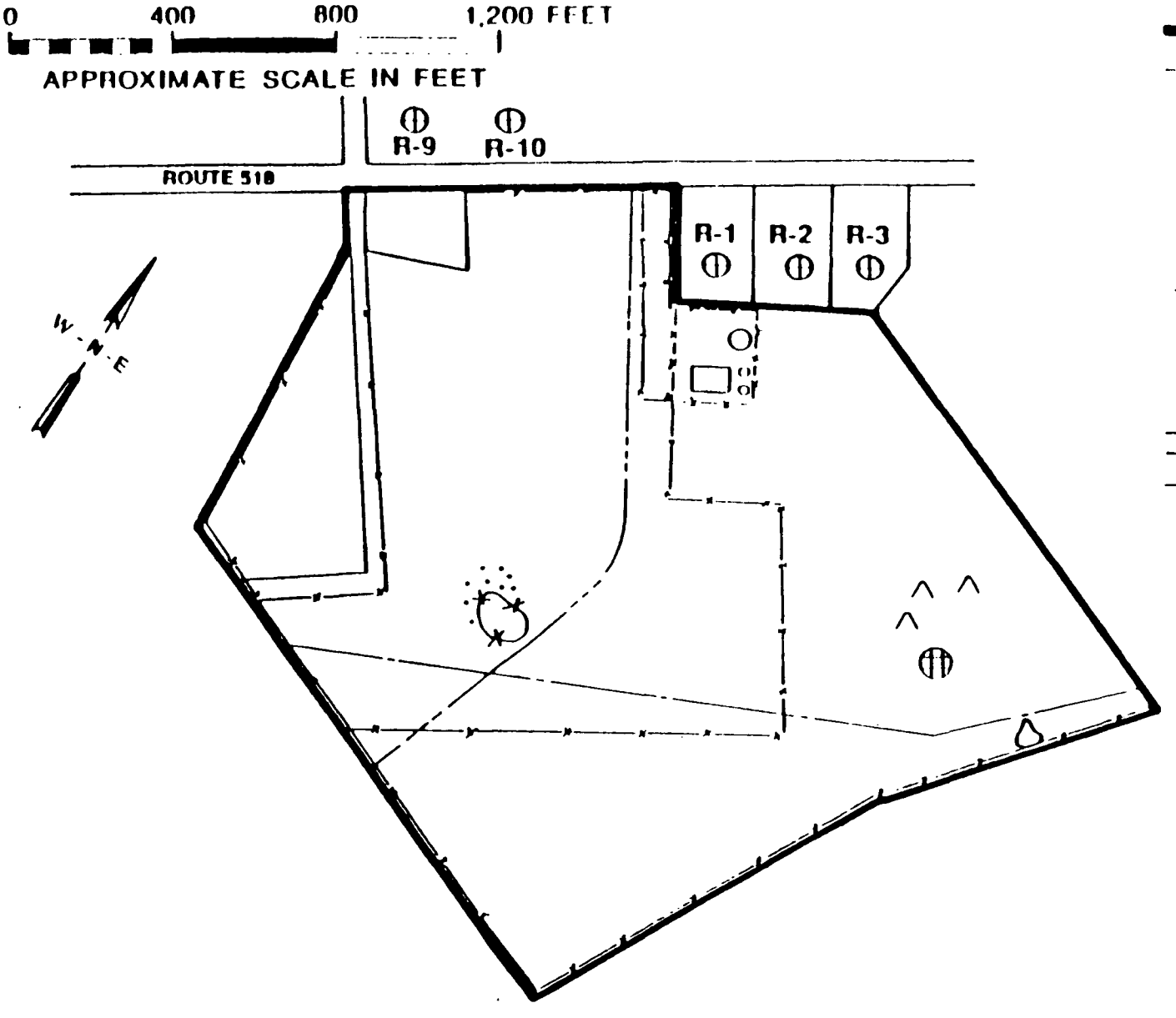
Table 2
Example of Contaminants Detected: Soils/Pond at the Site

Compound	Maximum Concentration Detected (ppb)
Chloroform	11
1,1,2,2, Tetrachloroethane	4.4
Naphthalene	58
Pentachlorophenol	77,000
bis(2-ethylhexyl) Phthalate	1,500
Total Phenols	1,900,000
Dieldrin	11,000
Endrin	150
Arsenic	15,000,000
Cadmium	1,900,000
Chromium	18,000,000
Lead	140,000,000
Zinc	81,000,000

Additional sampling conducted by NJDEP during 1986 confirmed the presence of numerous dioxins and furans.

Ground water

Ground water samples from residential wells on or near the Site have been collected on several occasions between 1986 and 1990. Figures 2 and 3 show the locations of the residences sampled. Numerous organic contaminants have been detected in several of these wells, including, but not limited to, benzene, chlorobenzene, 1,2-dichloroethane, 1,1,2-trichloroethane, tetrachloroethene, trichloroethene, 1,2-dichlorobenzene, and xylenes. In addition, numerous other contaminants, including phthalates, naphthalenes, and metals such as chromium, mercury and lead, which are hazardous substances pursuant to Section 101(14) of CERCLA, 42 USC §9601(14), were detected in the residential wells.



Legend:

- Site boundary
- Fence line
- Site pond
- Barn
- Suspected source area
- Approximate location of domestic well sampled in 1985
- Gas pipeline
- Demolition debris
- Excavation pit
- Holding tanks
- Dirt road
- Telephone line
- Area of nine drums
- Mound

Notes:

1. All locations are approximate
2. Site boundary based on tax map in HRS (EPA 1986)

FIGURE 2

DOMESTIC WELLS SAMPLED IN DECEMBER 1985 AND JANUARY 1986

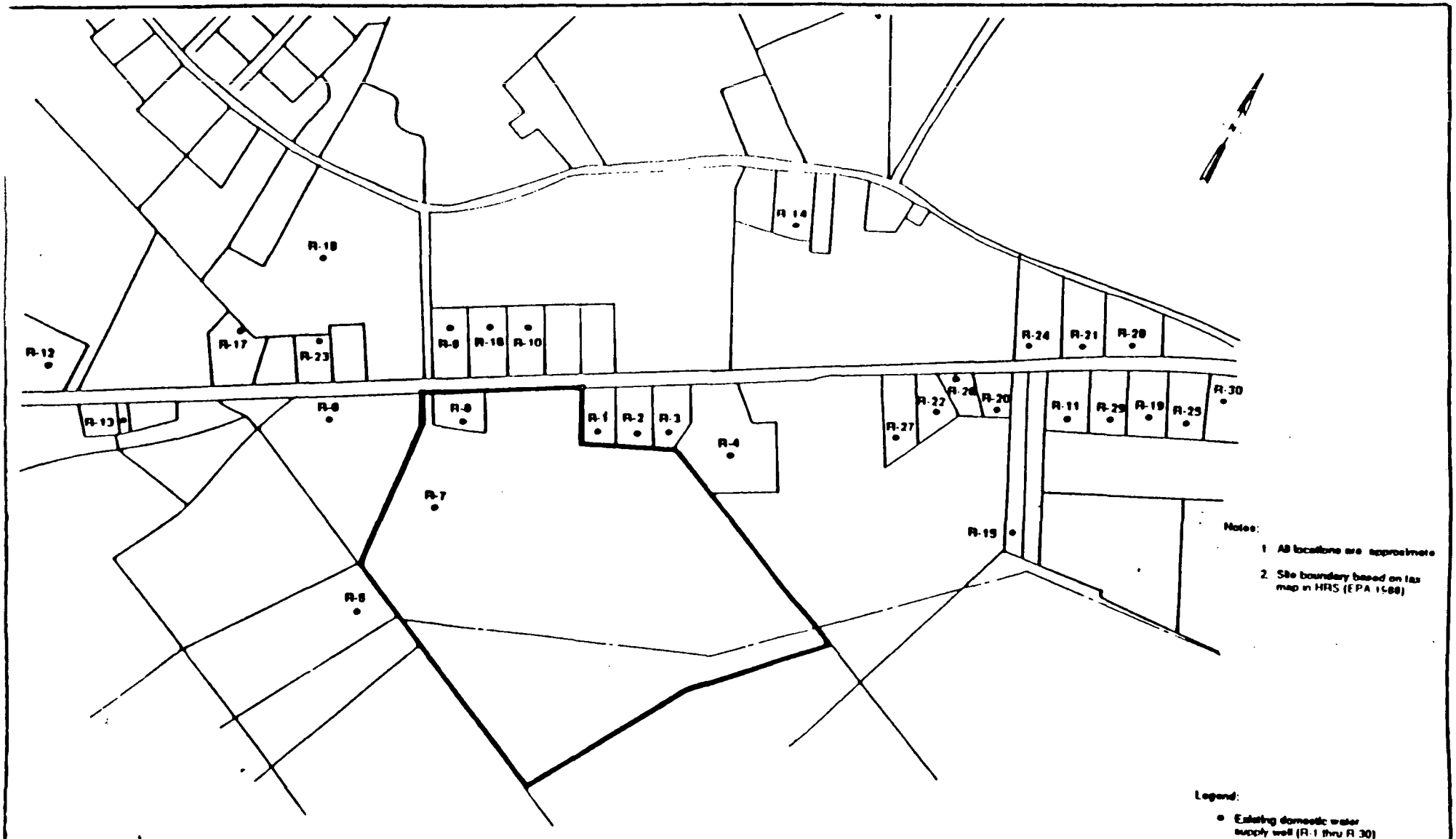


FIGURE 3

RESIDENTIAL WELLS SAMPLED BY CDM-NOVEMBER 1988 HIGGINS FARM

BASED ON TAX MAP
FRANKLIN TOWNSHIP
SOMERSET COUNTY, N.J.

Table 4
Contaminants Detected in Soils at the Higgins Farm Site

Compound	Location Detected Site[a]	Ground Water[b]
Chrysene	●J	---
N-Nitrosodiphenylamine	●J	●
Total phenols	●	●
Dioxins	●	---
Furans	●	---
VOCs:		
Chloroform	●	●
Ethylbenzene	●	●
1.1.2.2-Tetrachloroethane	●	●
Trichloroethene	●	●
Total xylenes	●	●
Methylene chloride	●	●J
Toluene	●	●J
METALS:		
Antimony	●	---
Arsenic	●	---
Barium	●	●
Beryllium	●	---
Cadmium	●	---
Chromium	●	●
Copper	●	●
Cyanide	●	---
Lead	●	●
Magnesium	---	●

Table 4 Contaminants Detected in Soils at the Higgins Farm Site		
Compound	Location Detected Site[a]	Ground Water[b]
Pesticides:		
Endrin	●	---
Chlordane	●	---
Dieldrin	●	---
beta-BHC	●	---
BNAs:		
Acenaphthene	●	---
Acenaphthylene	●	---
bis(2-ethylhexyl)phthalate	●	---
Naphthalene	●	●
2-Methyl naphthalene	●	●
2.4-Dimethylphenol	●	---
Pentachlorophenol	●	---
4-Methylphenol	●	---
Di-n-butyl phthalate	●	---
2.4-Dinitrotoluene	●	---
Fluorene	●	---
Dibenzofuran	●	---
Dimethylphthalate	●J	---
Phenanthrene	●J	---
Fluoranthene	●J	---
Anthracene	●J	---
Pyrene	●J	---
Benzo(a)anthracene	●J	---

Table 4 Contaminants Detected in Soils at the Higgins Farm Site		
Compound	Location Detected Site[a]	Ground Water[b]
Manganese	---	●
Mercury	●	●
Nickel	●	---
Selenium	●	●
Silver	●	---
Zinc	●	●

J - Estimated value - Concentration detected is less than the method detection limit.
--- - Not reported.
[a]Based on presence in any of the following: drums, roll-off, holding tank, excavation pit. soils. and pond sampling events. Because analyses for the listed contaminants were performed on various media, the numerical results are not directly comparable and thus are not listed. See applicable tables in Section 1 of this report.
[b]Based on presence in any residential well samples.

Maximum concentrations of some of the contaminants are shown in Table 3, below.

Table 3
Example of Contaminants Detected: Ground Water at or Near the Site

Compound	Maximum Concentration Detected (ppb)
Benzene	480
Chlorobenzene	880
1,2-Dichloroethane	395
1,1,2-Trichloroethane	2,924
Tetrachloroethane	370
Trichloroethene	23
1,2-Dichlorobenzene	67
Total Xylenes	9
Naphthalene	8
Chromium	43
Mercury	0.6
Lead	12

In summary, chemical contamination has been found in ground water and surface soil samples on and near the Site. In addition, contaminants have been detected in containers at the Site. Those contaminants included volatile organics, base/neutral compounds, metals, pesticides, and dioxins. Although the hydrogeology at the Site has not yet been fully characterized, the substances present at the Site, in containers and soils, have been demonstrated to migrate to ground water.

Table 4 summarizes those chemicals which have been found in either containers, including drums, rolloff containers and tanks, or soils at the Site, and those found in ground water. As evidenced by this table, the volatile organic compounds detected on the Site have all been found in residential wells. Similarly, many of the metals found at the Site were also found in ground water. However, none of the base/neutral compounds, pesticides, dioxins, or furans have as yet, been found in the ground water. This is because these compounds are generally lower in mobility and less soluble than the volatile organics. However, in time, these compounds could mobilize, and migrate to area ground water.

VI. SUMMARY OF SITE RISKS

An analysis of the residential ground water sample results was conducted by EPA through its contractor during the FFS to determine health impacts which could potentially result from the contamination at the Higgins Farm site.

Table 5
CONTAMINANT - SPECIFIC CRITERIA AND TBCs FOR GROUND WATER

			Federal SDWA[a]					
Compound	Highest Concentration Detected (ppb)	Location Where Highest Concentration Was Detected	MCLG (ppb)	MCL (ppb)	SMCL (ppb)	USEPA Health Advisory[b] (ppb)	New Jersey SDWA MCL[c] (ppb)	Health Risk-Based Level[d] (ppb)
VOCs:								
Benzene	480	R-1	0	5		---	1	
Chlorobenzene	880	R-1	100*	100*	100*	---	4	
Chloroform	0.23	R-7	---	100[e]		---	---	
Dibromochloromethane	1.17	R-7	---	100[e]		100	---	
Ethylbenzene	0.59	R-1	700*	700*	30*	700	---	
1,1-Dichloroethene	6	R-6	7*	7*		7	2	
1,2-Dichloropropane	1J	R-6	0*	5*		---		
1,2-Dichloroethane	395	R-6	0	5		2,600	2	
1,1-Dichloroethane	2	R-1	---	---		---	---	0.38-38 0.5***
1,1,2,2-Tetrachloroethane	11	R-6	---	---		---	---	0.013-1.3 0.5***
Tetrachloroethene	370	R-5	0*	5*		5,000	1	
trans-1,2-Dichloroethene	47	R-1	100*	100*		100	10	
1,1,2-Trichloroethane	2,924	R-6	3**	3**		3	---	
Trichloroethene	23J	R-1	0	5		---	1	
Vinyl chloride	120	R-6	0	2		50	2	
Carbon disulfide	7	R-8	---	---		---	---	3,500
Total xylenes	9	R-1	10,000*	10,000*	20*	100,000	44	

Table 5
CONTAMINANT - SPECIFIC CRITERIA AND TBCs FOR GROUND WATER

Compound	Highest Concentration Detected (ppb)	Location Where Highest Concentration Was Detected	Federal SDWA[a] MCLG (ppb)	Federal SDWA[a] MCL (ppb)	Federal SDWA[a] SMCL (ppb)	USEPA Health Advisory[b] (ppb)	New Jersey SDWA MCL[c] (ppb)	Health Risk-Based Level[d] (ppb)
BNAs:								
1,2-Dichlorobenzene (ortho)	67	R-1	600*	600*	10*	600	600	
1,4-Dichlorobenzene (para)	39.8[f]	R-1	75	75	5*	75		
Naphthalene	8J	R-10	---	---		300	---	140
N-Nitrosodiphenylamine	4J	R-9	---	---		---	---	7-700
2-Methyl naphthalene	17	R-10	---	---		---	---	1,400
Total phenols	82	R-1	---	---		4,000	---	21,000
METALS:								
Aluminum	44	R-6	---	---	50*	---	---	
Barium	48	R-3	5,000*	1,000, 5,000*		5,000	1,000	
Calcium	57,910	R-6	---	---		---	---	NA
Chromium	43	R-2	100*	50, 100*		100	50	
Copper	46	R-7	1,300*	1,300*	1,000	---	1,000[g]	
Iron	72,100	R-19	---	---	300	---	300[g]	
Lead	12	R-3	---	50, 5*		---	50	
Magnesium	20,610	R-6	---	---		---	---	NA
Manganese	480	R-19	---	---	50	---	50[g]	
Mercury	0.6	R-8	---	2		2	2	
Potassium	971	R-3	---	---		---	---	NA
Selenium	26	R-7	50*	10, 50*		---	10	
Sodium	21,650	R-2	---	---		---	50,000[g]	

Table 5
CONTAMINANT - SPECIFIC CRITERIA AND TBCs FOR GROUND WATER

			Federal SDWA[a]					
Compound	Highest Concentration Detected (ppb)	Location Where Highest Concentration Was Detected	MCLG (ppb)	MCL (ppb)	SMCL (ppb)	USEPA Health Advisory[b] (ppb)	New Jersey SDWA MCL[c] (ppb)	Health Risk-Based Level[d] (ppb)
Vanadium	4.6	R-6	---	---		---	---	320
Zinc	5,899	R-3	---	---	5,000	---	5,000[g]	

All compounds detected in ground water samples up to April 1990 are included in this table except for acetone, 2-butanone, bis(ethylhexyl)phthalate, di-n-butyl phthalate, methylene chloride, and toluene as these were estimated below the method detection limit and are common laboratory or field sampling contaminants.

--- Currently, there is no established guideline or standard for this parameter.

[a]Safe Drinking Water Act, National Primary Drinking Water Regulations, Maximum Contaminant Levels (MCLs) (40 CFR 141.11 - 141.16, 141.50 - 141.61), Maximum Contaminant Level Goals (MCLGs), and Secondary Maximum Contaminant Levels (SMCLs). MCLs are the enforceable standards.

[b]Drinking Water Regulations and Health Advisories, Office of Drinking Water, U.S. Environmental Protection Agency, April 1990. Levels noted represent the health advisories for lifetime exposure of an adult. In the absence of lifetime health advisory, the health advisory for longer-term exposure of an adult was used.

[c]New Jersey Safe Drinking Water Act Maximum Contaminant (MCLs) (NJAC 7:10-5, 7:10-16).

[d]Levels for 1,1-dichloroethane, 1,1,2,2-tetrachloroethane, and N-nitrosodiphenylamine are calculated ranges based on excess lifetime cancer risk of from 10^{-6} to 10^{-4}. For remaining non-carcinogenic parameters a concentration was calculated which, when ingested, corresponds to the reference dose for health effects. Calcium, potassium, and magnesium are nutrients for which there are no identified health risk levels.

[e]This is the standard for trihalomethanes. Trihalomethanes include chloroform, bromoform, bromodichloromethane, and chlorodibromomethane.

[f]Result assumed to be for 1,4-dichlorobenzene (para isomer).

[g]Recommended upper limit for secondary contaminant (NJAC 7:10-7).

* - Proposed in Fed Reg Vol 54, 97:22062 (5/22/89).

** - Released by USEPA prior to proposal in Phase V Status Report, Office of Drinking Water, October 10, 1989.

*** - Method detection limit historically achieved in sampling homeowner's granular activated carbon units.

J - Estimated value. The concentration detected is less than the detection limit used for the analysis.

= Remedial Criterion

NJR56/014R56.51

Table 6
Summary of Residential Well Sampling Results and Remedial Criteria for Contaminants of Concern (ppb)

	R-1				R-2				R-3				R-5				R-6				Remedial Criterion
	4/96	8/96	11/96	4/97	4/96	8/96	11/96	4/97	4/96	8/96	11/96	4/97	4/96	8/96	11/96	4/97	4/96	8/96	11/96	4/97	
Benzene	26	490	514	110	--	--	--	NS	--	--	--	NS	--	--	--	--	68	59	NS	22	1.0
Chlorobenzene	412	770	540	880	--	--	--	NS	--	--	--	NS	--	--	--	--	24	12	NS	--	4.0
1,1-Dichloroethene	23	--	1.90	--	--	--	--	NS	--	--	--	NS	9J	--	--	--	6	6	NS	--	2.0
1,2-Dichloroethane	--	--	1.62	--	--	--	--	NS	--	--	--	NS	--	--	--	--	9J	210	NS	360	2.0
1,1-Dichloroethane	--	--	1.98	--	--	--	--	NS	--	--	--	NS	--	--	--	--	--	--	NS	--	0.38 - 38
1,1,2,2-Tetrachloroethane	--	--	--	--	--	--	--	NS	--	--	--	NS	--	--	--	--	11	8	NS	--	0.013 - 1.3
Tetrachloroethene	30	9J	5.18	--	1J	--	--	NS	1J	--	--	NS	300	110	62.9	370	15	11	NS	--	1.0
trans-1,2-Dichloroethene	2B	30	43.9	--	--	--	--	NS	--	--	--	NS	--	2J	1.05	--	--	2J	NS	--	10.0
1,1,2-Trichloroethane	--	30	--	--	--	--	--	NS	--	--	--	NS	--	--	2.93	--	2,920	2,300	NS	1,900	1.0
Trichloroethene	22	23J	12.98	--	1J	--	--	NS	--	--	--	NS	17	5	5.90	--	5	3J	NS	--	1.0
Vinyl Chloride	--	--	--	--	--	--	--	NS	--	--	--	NS	--	--	--	--	--	13B	NS	4J	2.0
Selenium	7	--	NS	NS	--	--	NS	NS	1B	--	NS	NS	--	--	NS	NS	3B	--	NS	NS	10.0

	R-7				R-8				R-9				R-12				R-14				Remedial Criterion
	4/96	8/96	11/96	4/97	4/96	8/96	11/96	4/97	4/96	8/96	11/96	4/97	4/96	8/96	11/96	11/96*	4/97	4/96	8/96	11/96	4/97	
Benzene	--	NS	--	--	--	--	--	--	--	--	--	NS	NS	NS	--	--	--	NS	NS	--	NS	1.0
Chlorobenzene	--	NS	--	--	--	--	--	--	--	--	--	NS	NS	NS	--	--	--	NS	NS	--	NS	4.0
1,1-Dichloroethene	--	NS	--	--	--	--	--	--	--	--	--	NS	NS	NS	--	--	--	NS	NS	--	NS	2.0
1,2-Dichloroethane	--	NS	11.0	1.4	--	--	--	--	--	--	--	NS	NS	NS	--	--	--	NS	NS	--	NS	2.0
1,1-Dichloroethane	--	NS	--	--	--	--	--	--	--	--	--	NS	NS	NS	--	--	--	NS	NS	--	NS	0.38 - 38
1,1,2,2-Tetrachloroethane	--	NS	--	--	--	--	--	--	--	--	--	NS	NS	NS	--	--	--	NS	NS	--	NS	0.013 - 1.3
Tetrachloroethene	1J	NS	1.95	3.2	--	--	--	--	--	--	--	NS	NS	NS	13.3	12.1	--	NS	NS	--	NS	1.0
trans-1,2-Dichloroethene	--	NS	--	--	--	--	--	--	--	--	--	NS	NS	NS	0.10	1.56	--	NS	NS	--	NS	10.0
1,1,2-Trichloroethane	--	NS	70.0	--	--	--	--	--	--	--	--	NS	NS	NS	--	--	--	NS	NS	2.26	NS	3.0
Trichloroethene	--	NS	0.56	0.56	--	--	0.58	--	--	--	--	NS	NS	NS	1.68	--	1.3	NS	NS	--	NS	1.0
Vinyl Chloride	--	NS	--	--	--	--	--	--	--	--	--	NS	NS	NS	--	--	--	NS	NS	--	NS	2.0
Selenium	3B	NS	NS	NS	8	--	NS	NS	6	--	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	10.0

*Duplicate -- Not detected J - Estimated value - Concentration detected is less than the method detection limit.
B - Compound also detected in laboratory method blank. NS - Well not sampled or not sampled for this analyte

- Exceeds remedial criterion or is within remedial range

The data revealed that at least 23 chemicals and several metals were detected in the residential wells. Some of these chemicals are suspected carcinogens in humans or are known carcinogens in animals (1,2-dichloroethane, tetrachloroethylene, trichloroethylene). Other chemicals detected in the samples are known human carcinogens (vinyl chloride and benzene). All of these compounds are hazardous substances within the meaning of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA).

To date, no quantitative Risk Assessment has been performed, however, the contaminant levels in the ground water were compared to federal drinking water standards (Maximum Contaminant Levels (MCLs) established under the Safe Drinking Water Act), State MCLs, EPA Health Advisories, and other criteria. In the absence of federal or state standards, EPA has used an "excess cancer risk" range of $1x10^{-4}$ to $1x10^{-6}$ (i.e., as an upper bound, an individual has a one in one million chance of developing cancer as a result of Site-related exposure to a carcinogen over a 70-year lifetime under the specific exposure conditions at a site) to determine if remedial action is necessary. The criteria used by EPA are summarized in Table 5. Upon comparison, eleven of these chemicals exceeded the standards and guidelines in a total of five homes within the well impact area. (See Table 6.)

As evidenced by the data collected to date, there has been migration of contaminants from the Site into residential wells. Pathways of migration of these hazardous substances to human receptors include ingestion and household use of ground water. Because the full extent of the contaminant plume and the migration pathway to residents has not been determined, all residences in the well impact area may be potentially at risk of exposure and therefore potentially affected by the contamination at the Site. Actual or threatened releases of hazardous substances from the Site, if not addressed by implementing the response action selected in this ROD, may present an imminent and substantial endangerment to public health, welfare, or the environment.

VII. DESCRIPTION OF ALTERNATIVES

The following four alternatives were evaluated for the interim remedy:

ALTERNATIVE 1: No Further Action

Capital Cost:	$ 42,000
Annual Operation and Maintenance (O&M) Costs:	$ 94,200
Present Worth:	$ 930,000

Months to Design and Construct: 0 months

The Superfund Program requires that the No Further Action alternative be evaluated at every Site to establish a baseline against which other alternatives may be compared. Under this alternative, EPA would discontinue maintenance of the carbon adsorption units at the residences. EPA would perform periodic sampling and report the contaminant levels to residents. No further action would be taken with respect to household use of ground water.

ALTERNATIVE 2: Connect to Existing Water Supply

Capital Cost:	$ 1,257,700
O&M Costs:	$ 28,200
Present Worth:	$ 1,716,000

Months to Design and Construct: 6 - 24 months

This alternative involves supplying the residences with uncontaminated water from an existing water supply. The residences would be connected to an existing public water supply, such as the South Brunswick Water and Sewer system, through an extension of the watermain. The Franklin Township Water Department, which would purchase the water supply from the South Brunswick Water and Sewer, would assume responsibility for distributing the water to the residents and maintaining the watermain extension. The Franklin Township Water Department would also be responsible for setting rates, in accordance with State regulations.

To ensure residents have a clean water supply during the time period to needed design and install the watermain extension, the carbon adsorption units would be monitored and maintained. The existing carbon adsorption units would be removed after the homes are hooked-up and the water supply is functioning.

Because the use of affected or potentially affected wells may present a long-term risk to public health, when the water main is constructed, the affected and potentially affected wells will be disabled. Furthermore, NJDEP would continue to restrict and regulate future construction or use of private wells within the area previously designated by NJDEP as the well impact area.

The anticipated time to design and construct a water main extension and distribution system is approximately six months. However, permitting procedures and other implementation constraints could increase the installation time period to two years.

ALTERNATIVE 3: Development of New Community Well

Capital Cost:	$ 1,428,000
O&M Costs:	$ 47,600
Present Worth:	$ 2,069,000

Months to Design and Construct: 1 - 2 years

This alternative is similar to Alternative 2. It involves locating and installing a new well in the vicinity of Higgins Farm, and storing and distributing the water to the residences. For the purposes of preparing a cost estimate, it was assumed that the water would require treatment (an air stripper located at the supply well) prior to storage or distribution. A pipeline would be constructed to deliver the water to the homes. As in Alternative 2, the Franklin Township Water Department would assume responsibility for distributing the water supply and ensuring water quality.

As with Alternative 2, the existing carbon units would be monitored and maintained until the water supply is operational. Upon completion of the water supply system, the affected and potentially affected private wells will be disconnected. Future construction of wells within the well impact area would also be restricted by NJDEP, as in Alternative 2.

The anticipated time to locate and install a supply well and the water distribution system is approximately one year. However, permitting procedures and other implementation constraints could increase the installation time period to two years.

ALTERNATIVE 4: Continued Treatment of Ground Water

Capital Cost:	$ 151,000
O&M Costs:	$ 114,700
Present Worth:	$ 1,232,000

Months to Design and Construct: 0 months.

Under this alternative, in-home ground water treatment would be utilized to provide a potable water supply until ground water quality is restored. At that time, the in-home treatment units could be removed. Ground water restoration methods, if feasible, will be proposed in the final remedy upon the completion of the RI/FS for the Site.

This alternative provides for the continued treatment of ground water at all residences affected or potentially affected by the contamination from the Site through the use of carbon adsorption units. The carbon adsorption process involves contacting the contaminated ground water with activated carbon; the contaminants are then held on the carbon by chemical/physical forces. The

carbon units would treat ground water to an acceptable level protective of human health and provide a clean source of potable water.

The dual carbon adsorption units installed by NJDEP would be monitored and maintained under this alternative. Iron filtering devices necessary to ensure the effectiveness of the carbon adsorption units would also be maintained. Samples would be collected 5 times annually for VOCs and 1 time annually for priority pollutants from the carbon adsorption units to permit detection of contaminant breakthrough. Carbon adsorption units would be replaced upon detection of contaminants between the units.

For the purposes of this alternative, it is assumed that ground water treatment through carbon adsorption units would be required at all affected or potentially affected residences for thirty years.

VIII. SUMMARY OF COMPARATIVE ANALYSIS OF ALTERNATIVES

The selected remedy is to take interim action at the Site by implementing Alternative 2. This alternative provides reliable protection of human health and appears to provide the best balance of tradeoffs with respect to the criteria that EPA uses to evaluate alternatives. This section profiles the four alternatives developed for the interim action against the performance criteria which apply to this action.

Overall Protection of Human Health and the Environment:

This criterion addresses whether or not a remedy provides adequate protection and describes how risks are eliminated, reduced or controlled through treatment, engineering controls or institutional controls.

Alternative 1 would not be protective of human health and the environment. Discontinuing maintenance of the carbon units would result in actual and potential human exposure to contaminated ground water in excess of health advisory levels and Maximum Contaminant Levels established under by the Federal Safe Drinking Water Act and State drinking water regulations.

Alternatives 2, 3 and 4 would be protective of human health. The water distributed to the residents would meet or exceed Federal and State drinking water standards. Alternative 2 would provide the greatest protection of human health, without monitoring, by eliminating the exposure pathway to human receptors (i.e., in-home use of ground water); a municipal water supply is also periodically tested, as required by the State, to ensure that drinking water standards are met.

While Alternative 3 is expected to be protective of human health, there is a potential for contaminated ground water to impact the new water supply well developed in the area of the Site, since the full extent of ground water contamination from the Higgins Farm site has not yet been determined.

Alternative 4 removes contaminants from potable water supplies, but requires constant monitoring and maintenance to ensure its effectiveness. With Alternative 4, there is a possibility that significant changes in influent concentrations of contaminants could result in premature contaminant breakthrough, thus creating exposure to contaminants above Federal and State standards.

Overall, Alternative 2 is most protective as it will provide a consistent and reliable source of potable water.

Compliance with ARARs:

This criterion addresses whether or not a remedy will meet all of the applicable or relevant and appropriate requirements of other environmental statutes and/or provide grounds for invoking a waiver. There are several types of Applicable or Relevant and Appropriate Requirements (ARARs): action-specific, chemical-specific, and location-specific. Action-specific ARARs are technology or activity-based requirements or limitations related to various activities. Chemical-specific ARARs are usually numerical values which establish the amount or concentrations of a chemical that may be found in, or discharged to, the ambient environment. Location-specific ARARs are restrictions placed on the concentrations of hazardous substances or the conduct of activities solely because they occur in a special location.

CERCLA provides that if an interim measure is conducted, certain ARARs may be waived for the duration of the interim action, since these requirements will be achieved upon completion of the permanent remedy. Because Alternatives 1, 2, 3 and 4 constitute interim actions, final cleanup standards for contaminants in soils and ground water do not have to be set or achieved during this action; the final remedy for the Site will address soil treatment and ground water restoration as well as potential impacts to wetland areas, cultural resources, or endangered species.

However, other ARARs related to implementation of the interim action would have to be achieved.

Alternative 1 would not meet federal or state drinking water standards since without maintenance of the carbon adsorption units, some of the potable wells would exhibit levels of contamination above Maximum Contaminant Levels.

Alternatives 2 and 3 will comply with drinking water ARARs. The water to be supplied by the Franklin Township Water Department under Alternatives 2 and 3 would consistently meet federal and state standards. Periodic sampling would be required of the Franklin Township Water Department, which would operate the water supply, to ensure that drinking water standards are met.

Alternative 4 is expected to comply with drinking water ARARs, but as stated above, changes in contaminant concentrations could cause a failure of the filter units, and result in human exposure to water which does not meet drinking water ARARs. Recovery or disposal of the spent carbon units generated under this Alternative would have to comply with the federal Resource Conservation and Recovery Act and New Jersey hazardous waste regulations. Although less likely than Alternative 4, Alternative 3 could also result in exposure to contaminants in excess of drinking water ARARs, in the event that the ground water in the area of the new supply well is affected by the Site.

Franklin Township and Somerset County have review procedures concerning municipal water supply extensions. While such procedures are not ARARs, they are To Be Considered (TBC) criteria. Compliance with TBCs is not required; however, EPA would attempt to comply with substantive permit requirements.

Long-term Effectiveness and Permanence:

This criterion refers to the ability of the remedy to maintain reliable protection of human health and the environment over time once cleanup goals have been met.

Alternative 1 is not effective as residents would be exposed to contaminants in their water supply.

Alternative 2 would be the most permanent action and would provide the most reliable protection of human health over time. Connection to an existing water supply would eliminate the potential exposure of residents to contaminated ground water through ingestion or other household uses.

Alternative 3 would also be a permanent action and would provide reliable protection of human health over time. However, there is a potential for contaminants to migrate from the Site and affect a new water supply well in the area of Higgins Farm, since the hydrogeology has not been characterized at this time. If such contamination were to affect the new well, it is unknown whether the proposed treatment system (air stripping) would be able to effectively treat the contaminants. Therefore, the potential exists for human exposure to the contaminants not treated by the system.

Alternative 4 is an effective action which reduces potential exposure to contaminants by removing contaminants from ground water. Carbon adsorption technology has been demonstrated to be effective in removing volatile organic compounds from the ground water. However, Alternative 4 requires long-term monitoring and maintenance to ensure the quality of the water delivered to residences. Since the full extent of the contaminant plume has not been delineated, significant changes in influent concentrations of contaminants could result in premature contaminant breakthrough, and thus human exposure to contaminants. Also, it must be noted that contaminants other than volatile organics have been detected at the Site, and have migrated or may migrate to area ground water. Alternative 4 merely reduces the risk of potential exposure to contaminated ground water.

Unlike Alternative 2, Alternative 4 does not eliminate the potential for exposure, and Alternative 3 poses uncertainties about long-term reliability.

Alternatives 2, 3 and 4 will be consistent with any future action taken at the Site with respect to ground water, since they attain the goal of eliminating actual or potential exposure to contaminated ground water until a final ground water remedy can be implemented.

Reduction of Toxicity, Mobility, or Volume:

This criterion addresses the degree to which a remedy utilizes treatment technologies to reduce the toxicity, mobility or volume contaminants.

Although not designed to reduce toxicity, mobility or volume of contaminants in the ground water, Alternative 4, through carbon filtration, does provide a minimal degree of treatment, which should remove some contaminants from the potable water. Similarly, Alternatives 2 and 3 also provide such treatment during the period prior to development or connection to the new water supply.

This criterion will be considered fully following the completion of the RI/FS, when the extent of contamination has been defined and treatment technologies will have been evaluated.

Short-term Effectiveness:

This criterion considers the period of time needed to achieve protection and any adverse impacts on human health and the environment that may be posed during the construction and implementation period until cleanup goals are achieved.

Alternative 2 provides reliable protection of human health by providing a permanent alternate water supply most quickly, followed by Alternative 3.

Alternative 4 requires only continued maintenance of the existing carbon filter units. Since Alternatives 2 and 3 also require continued maintenance of the carbon units until the public water supply is operational, Alternatives 2, 3 and 4 have similar short-term risks with respect to the potential for human exposure to contaminated ground water, since carbon filter units will be maintained as in Alternative 4 until a new potable water system is in place.

Implementability:

This criterion examines the technical and administrative feasibility of a remedy, including availability of materials and services needed to implement the chosen solution.

All of the alternatives are implementable. Alternatives 2 and 3 would require coordination with Franklin Township and the community with respect to substantive permit requirements, obtaining variances along the right-of-way for the water line and the water tank, and access to residents' property to connect each home to the water line.

Maintenance of the carbon units on an interim basis, as outlined in Alternatives 2, 3 and 4, is simplified since the carbon adsorption units are owned by NJDEP and are already in place.

Alternative 3 would require additional study to locate and develop an alternate water supply well. This requirement would increase the time necessary for implementation of the alternative.

Alternative 4 would require considerable coordination with the community with respect to obtaining continued access to monitor and maintain the carbon adsorption units for 30 years.

Cost:

This criterion includes special capital and operation and maintenance costs.

The cost of implementing each alternative is as follows:

Alternative 1: $ 930,000
Alternative 2: $ 1,716,000
Alternative 3: $ 2,069,000
Alternative 4: $ 1,232,000

It should be noted that the costs were developed to cover a thirty year implementation period. In addition, Alternatives 2 and 3 have the highest capital costs, while Alternative 4 has a higher annual O & M cost.

State Acceptance:

This criterion indicates whether, based on its review of the FFS and the Proposed Plan, the State concurs with, opposes, or has no comment on the proposed alternative. The State of New Jersey has not yet concurred with the selected remedy.

Community Acceptance:

The results of the public comment period and the discussion during the public meeting held on July 2, 1990 indicate that the residents and the Township support the remedy proposed by EPA, Alternative 2, Connection to an Existing Water Supply. The community expressed its opposition to the possible selection of Alternative 4, Continued (in-home) Ground Water Treatment. Individual concerns regarding the interim action are addressed in the Responsiveness Summary, which is attached as Appendix I.

IX. THE SELECTED REMEDY

The remedial action alternatives included in the final analysis were No Further Action, Connection to an Existing Water Supply, Development of a New Water Supply, and Continued Treatment of Ground Water.

The selected remedial alternative for the Interim Action is Alternative 2, Connection to Existing Water Supply. The selected remedial alternative meets the goal of the interim action by eliminating actual or potential human exposure to contaminated ground water through ingestion or household uses.

The selected remedy will include the following activities:

1. Development and design of a water main extension and distribution system to connect to an existing water supply for the purpose of providing a permanent alternate water supply to homes affected and potentially affected by the contamination from the Higgins Farm site. The water main extension may include a booster pumping station, storage tank, and the expansion of the interconnection between the Franklin Township Water Department (FTWD) and the water supplier selected during the design of the interim action, if necessary.

2. Construction of the water main extension and distribution system.

Table 7 Estimated Cost To Connect South Brunswick Township Water System		
Item	Capital Cost	Annual O & M
Force Main	$620,000	
House Services and Meters	68,000	
Booster Pump Station/Storage	60,000	$ 11,700*
Electrical Service	13,000	500*
Water Service Connection Fee*	9,800	
Water Use Charges*		16,000
In-House Carbon System Removal	9,000	
Residential Well Sampling	2,200	
Well Sample Analysis	36,000	
Total	818,000	28,200
Bid Contingency (15%)	122,700	
Scope Contingency (10%)	81,800	
Subtotal	1,022,500	
Permitting & Legal (5%)	51,100	
Engineering Design (10%)	102,300	
Service During Construction (8%)	81,800	
Total Capital Cost	$1,257,700	

Cost Summary	
Item	Cost (Rounded to the Nearest $1,000)
Total Capital Cost	$1,258,000
Present Worth of O&M for 30 Years at 10% Discount Rate	266,000
In-House Carbon System Maintenance (2 years only)	192,000
Total Capital & O&M	$1,716,000

* EPA is estimating these fees, but is not responsible for their funding.

Table 8 Key Cost Assumptions			
Item	Criteria/Origin	Unit Cost/Assumptions	Relevant Alternatives
Force Main	9,500 feet of ductile iron pipe, 8" diameter, required by FTWD	$65.26/foot assuming 20% rock excavation, from E-Town and FTWD recent experience	2, 3
Water Storage	15,000 gallons (one-day average consumption by 30 houses) required by NJDEP NJAC 7:10-11.8	$2/gallon, estimate based on vendor experience with small system storage	2, 3
Water Use Charges	500 gallons per day per house, average day use based on current approximate use in FTWD service area	$2.80/1,000 gallons, current FTWD water rate -- 90% of these fees ($13,800/year) are assumed to offset O&M costs	2, 3
Water Services	150 feet of 1" PVC pipe per residence	$15/foot installed (includes cost of meter ($150) and tap ($941))	2, 3
Water Service Connection Fee	Franklin Township	$327.71/residence	2, 3
POE GAC Unit Replacement	15-year life assumed, 30 units	$2,000/unit	4
Initial Well Sampling	30 home wells sampled for priority pollutants	$1,200/analysis	1, 2, 3, 4
POE GAC O&M Sampling	30 home wells sampled 5 times annually for VOCs, 1 time annually for priority pollutants	Average of $450/ analysis*	4

*USEPA 1/30/90 memo from M. Pane to C. Sidamon-Eristoff, S. Luftig, requesting cost ceiling increase

3. Continued operation and maintenance, until the permanent alternate water supply is developed, of carbon adsorption units installed at homes affected or potentially affected by contamination from the Higgins Farm site.

4. Installation, operation, and maintenance, until the water main extension is installed and operating, of carbon adsorption units at homes potentially affected by contamination from the Higgins Farm site that are not currently equipped with carbon adsorption units.

5. Chemical sampling of homes potentially affected by contamination from the Higgins Farm site, and installation, operation, and maintenance of carbon adsorption units at homes which become affected by the contamination from the Higgins Farm site.

6. Disconnecting homes hooked into the water main extension from their private water wells and removing the carbon adsorption units after the permanent alternate water supply is installed.

The estimated costs for the selected remedial alternative are indicated in Table 7 with cost assumptions identified in Table 8.

X. STATUTORY DETERMINATIONS

A. Protection of Human Health and the Environment

The selected interim remedy is protective of human health. The interim remedy, extension of the municipal water supply system with monitoring and maintenance of carbon adsorption units until the water line is functional, will eliminate the potential exposure of residents through ingestion and household of to contaminated ground water. The use of carbon adsorption units in the short-term are a proven method of reducing the concentrations of volatile organic compounds to acceptable levels.

B. Attainment of ARARs

Given the limited scope of this interim action, the selected interim remedy will attain applicable or relevant and appropriate requirements by preventing the future ingestion or household use of ground water containing contaminants in excess of drinking water standards.

The selected interim remedy will not effectively restore the ground water to its beneficial uses. The restoration of ground water will be addressed in one or more future operable units for the Site, at the conclusion of the RI/FS.

C. Cost Effectiveness

The selected interim remedy, Alternative 2, is the most cost-effective when compared to the other alternatives. While Alternative 1, No Action, is the least expensive remedy, it is not protective of human health and the environment. Alternative 4, which is the next least expensive, does not provide reliable long-term protection of human health and the environment. Although Alternatives 2 and 3 are similar in cost, Alternative 3 is not as reliable or protective of human health and the environment. Therefore, Alternative 2 is the most cost effective remedy that will provide reliable protection of human health and the environment.

D. Utilization of Permanent Solutions Employing Alternatives Technologies to the Maximum Extent Practicable

The selected interim action does not represent a permanent solution with respect to the remediation of soils or ground water. However, this interim action does represent a permanent solution for human exposure to contaminated ground water.

Since a permanent source of clean drinking water to residents affected or potentially affected by the Site will be installed, the selected interim action does utilize permanent solutions to the maximum extent practicable, given the limited scope of this action. Selection of permanent solutions and alternative treatment technologies to the maximum extent practicable will be addressed further in the final remedy for the Site.

E. Preference for Treatment as a Principle Element

Since this action constitutes a measure to eliminate and prevent exposure to contaminated ground water, and does not constitute the final remedy for the Site, the statutory preference for treatment as a principle element will be addressed in the selection of the final remedy for the Site.

XI. Explanation of Significant Changes

The Proposed Plan for the interim action for the Higgins Farm site was released for public comment on June 28, 1990. The Proposed Plan identified Alternative 2, Connection to Existing Water Supply, as the preferred alternative. EPA reviewed all written and verbal comments submitted during the public comment period. Upon review of these comments, it was determined that no significant changes to the remedy, as it was originally identified in the Proposed Plan, were necessary.

INTRODUCTION

In June 1990, EPA completed a Focused Feasibility Study (FFS) and Proposed Plan for providing an alternate source of drinking water to residents affected by ground water contamination originating at the Higgins Farm Site. The alternatives discussed were:

- Alternative 1--No Further Action
- Alternative 2--Connection of Residences to an Existing Water Supply
- Alternative 3--Development of a New Community Well
- Alternative 4--Continued In-Home Treatment of Ground Water

The preferred alternative proposed by EPA is Alternative 2. Under this alternative, a water main would be extended from an existing system, such as the South Brunswick Water and Sewer System, and connected to the affected residents. Franklin Township Water Department would assume responsibility for maintaining the water main extension.

This document summarizes EPA's responses to comments received on the FFS and Proposed Plan. The comments addressed are those made during the public meeting held in Franklin Township on July 2, 1990 and those received during the public comment period of June 28 to July 30, 1990 (Reference A). Five comment letters were received during the public comment period. One commenter, from the law firm representing FMC Corporation, opposed Alternative 2 in favor of Alternative 4 (Reference B). The remaining four letters were all in support of Alternative 2 (References C, D, E, and F). No comments were received in support of Alternative 1 or 3.

Comments are grouped by topic and referenced by letter to the source documents identified above and listed at the end of this summary. The source documents are part of the administrative record file and are available for review by the public at the following locations:

Mary Jacobs Memorial Library
64 Washington Street
Rocky Hill, NJ 08835
(609) 924-7073

Franklin Public Library
485 DeMott Lane
Somerset, NJ 08873
(201) 873-8700

USEPA, Region II
Superfund File Room
26 Federal Plaza - 29th Floor
New York, NY 10278
Monday through Friday: 9:00 am to 4:30 pm

1. STATUS OF RI/FS AND ITS RELATIONSHIP TO THE FFS

Comment: Have the limits of the ground water plume been defined? If not, when will they be defined? (A, p. 20)

EPA Response: A remedial investigation and feasibility study (RI/FS) of the entire site is ongoing. One aspect of the RI/FS is the delineation of ground water contamination. The RI/FS is currently expected to be completed in the fall of 1991.

Comment: Because there is little information on ground water flow rate and direction, EPA should await the outcome of the RI/FS before considering implementation of Alternative 2. The new water line would not be constructed until the RI/FS is completed. The information obtained in the RI/FS may suggest that Alternative 2 is not justified. (B, p. 5)

EPA Response: While it is true that there is little information on the site hydrogeology, there is significant information from sampling the site and residential wells. These data show that contaminants associated with the site appear in 10 residential wells. In six of these cases, the levels of contamination are above the remedial criteria. In five cases, there are repeated occurrences of contamination of the same magnitude in different sampling events suggesting the plume has not moved significantly away from these residences in the past five years. Because of the fractured bedrock geology in the area, there is potential for contaminants to spread to many additional homes. Therefore, it would not be prudent to wait until the RI/FS is complete. The information available now is sufficient to justify Alternative 2.

2. CURRENT OPERATION OF THE CARBON UNITS

Comment: Are the carbon units being used to treat the water or detect contamination? (A, pp. 36-38)

EPA Response: Primarily, the granular activated carbon (GAC) units are being used for treatment of the contaminated ground water. GAC adsorbs contaminants from the water as it passes through the

unit. The unit effluents are being sampled once every 1 to 3 months to check whether the carbon's adsorptive capacity has been exceeded. Sampling results are sent directly to the homeowner and are available in the administrative record file.

Comment: What wells are contaminated? Have there been any additional wells showing contamination since sampling began? (A, pp. 38-39)

EPA Response: The wells which show contamination above the remedial criteria are well R-7 on the Higgins property, wells R-1, R-3, R-5, and R-6 on properties adjoining the Higgins property, and well R-12. (See Figure 1-10 of the FFS for the locations of these wells.) Based on the results of the April 1990 sampling, no new wells have been added to this list.

3. PROTECTION OF PUBLIC HEALTH

Comment: Information provided in the FFS is adequate to show that GAC units are and will be protective of public health. (B, pp. 2-4 and 6)

EPA Response: There are contaminants which may not be absorbed by the GAC units. In addition, the fact that the GAC system requires constant monitoring and maintenance creates a less protective scenario than provision of an alternate water supply.

Comment: EPA's preference for Alternative 2 over Alternative 4 appears to be based upon its belief that while both would be consistent with any future action taken at the site, Alternative 4 reduces but does not eliminate the risk of potential exposure to contaminated ground water. However, the potential for contact with contaminated water exists as much with the public water supplies as with the residential wells. The fact the law requires water suppliers to achieve MCLs does not mean that it will happen. The potential for contact still exists. (B, p. 3)

EPA Response: The residential GAC units are being sampled once every one to three months depending on the location of each residence relative to the site. The units are currently being monitored for only volatile organic compounds. In the evaluation of Alternative 4, the current program was assumed to continue with a full priority pollutant scan being performed once per year. More comprehensive and frequent testing is required by public suppliers of potable water.

More comprehensive and more frequent monitoring of the residential units could be performed, but not without significant cost increases as discussed under Topic 4. Also, the more frequent the monitoring, the more intrusive the program becomes on the lives of the residents who must make arrangements to allow access to their treatment units for every sampling event.

In regard to the public water supply, there is theoretically a potential for contamination entering the system between sampling events. However, public water supplies often supply water to its system from multiple sources. In the case of South Brunswick, water provided from its own wells (which do not draw water from beneath the site) are supplemented by water from the Elizabethtown Water Company. Therefore, a contaminant accidentally entering the system from one of these sources would be diluted and result in a smaller exposure to a resident than would be likely from a resident's well drawing water from an aquifer directly underlying the site.

Finally, it is important to note that GAC units can desorb contaminants if the contaminant concentrations in the ground water decrease. Therefore, the mere existence and monitoring of the units does not ensure there will be no potential for exposure over the long term.

Comment: EPA proposes to rely on GAC units to protect the health of the residents during the design and construction of the new water line under Alternative 2, but is unwilling to rely on them while completing the RI/FS to determine whether Alternative 2 is necessary. (B, p. 6)

EPA Response: As discussed under Topic 1, sufficient information is currently available to justify selection of Alternative 2. Any data obtained through completion of the RI/FS would not yield the basis for a different decision. Therefore, it is prudent to select Alternative 2 as the best overall solution now.

During the period of design and construction of the water line, the GAC units will continue to be used because they are the second best approach to providing uncontaminated water to the residents. However, as discussed above, there are reliability problems with using such units which make them an unacceptable long-term solution.

4. COSTS AND COST-EFFECTIVENESS

Comment: What would be the costs to homeowners if Alternative 2 were selected?

EPA Response: The homeowners would bear the cost of the water service connection fee. A recent quote from the Township was $327.71 per residence. The homeowners would also be responsible for payment of their water bills the amount of which will depend on water usage. The current Township rate is $2.80 per 1000 gallons.

Comment: EPA's total projected costs under Alternative 4, which are almost exclusively O&M costs, result from EPA's assumption that the GAC units must be used for 30 years. This assumption is not valid and can only be explained by EPA's having prejudged the outcome of the RI/FS or EPA's willingness to artificially inflate the costs of Alternative 4. (B, p. 7)

EPA Response: The 30-year period was used because the standard approach for present worth cost analyses is to compare alternatives over a time period equivalent to the useful life of the longest-lived alternative. In this case, the longest-lived alternative is Alternative 2 in which the water line can be expected to last for about 30 years. Therefore, 30 years is used for comparison purposes. In addition, it can be anticipated that ultimate restoration of the ground water (that will be addressed as part of the final remedy of the site) could require as long as 30 years.

Comment: EPA has failed to provide a meaningful and accurate comparison between Alternatives 2 and 4 and has failed to meet its statutory mandate to select a remedial action which is cost effective (See U.S.C. §9621) Clearly, the costs of Alternative 4 are not proportional to the effectiveness achieved (See Preamble to the NCP, 55 FR 8724-5 and 40 CFR § 300.430 (f) (1) ii (D) and (E)).

EPA Response: The cited NCP section regarding the selection of the final remedy requires that the remedy's costs be proportional to its overall effectiveness. It also defines overall effectiveness as including long-term effectiveness and permanence and goes on to say that special emphasis should be afforded to alternatives that meet this criterion. Clearly, Alternative 2 is the most permanent of the remedies considered and is the most effective in that it removes the threat of exposure to site contaminants. In

addition, the costs of Alternative 2 are not excessive when compared to Alternative 4 (as defined in 55 FR 8714-5) for the additional effectiveness provided. Therefore, the cost-effectiveness of Alternative 2 is well within the bounds defined by the NCP and Alternative 2 can legally be selected as the remedy.

Comment: EPA is proposing Alternative 2 as an interim remedy with a present worth total cost, which is over $700,000 greater than that of Alternative 4. This alone should be basis enough to reject Alternative 2 in favor of Alternative 4. (B, p. 6)

EPA Response: The term "interim remedy" in the context of the Superfund program means that the remedy is not the final remedy for a particular site. In this case, the water line represents an interim remedy for ground water as it does not address restoration of the ground water to its beneficial uses. "Interim remedy" does not necessarily mean that the remedy must be temporary or lowest in cost. In fact, under the NCP, EPA is obligated to evaluate other factors, including effectiveness and protection of human health. Alternative 2 is more effective and provides the greatest degree of protection of human health.

Also, it is important to note that there is an error in the costs listed in Proposed Plan for Alternatives 2 and 3. The costs provided in the FFS are correct. Thus, the bottom line difference between Alternatives 2 and 4 is less than $500,000.

Comment: Even if the capital costs of Alternative 2 and 4 could be considered close, EPA has failed to focus upon the fact that the total 30-year costs of Alternative 4 will be exceeded by the capital cost component above under Alternative 2 in just two years. On the other hand, none of the projected capital cost of Alternative 4 will be incurred for 15 years. (B, p. 6)

EPA Response: As discussed in the preceding response, costs and when those costs would be incurred are not the only factors of concern. In particular, the protection of public health differs significantly under Alternatives 2 and 4. Somewhat closer agreement in the level of protection of the alternatives could be achieved by increasing the scope and frequency of sampling under Alternative 4 to include, say, volatile organics scans for each residence once per month. This sampling frequency could then be argued to provide protection equivalent to that afforded residents on a

public supply, such as South Brunswick, yet the 30-year projected costs for Alternative 4 would rise to over $1.8 million (see
Table 1).

This cost is higher than that for Alternative 2 and the GAC units would still be unreliable for certain contaminants as discussed in Topic 3.

Comment: The capital cost of Alternative 2 appears understated by $151,000, which according to Table 4-4 of the FFS, is the capital cost of the existing GAC unit that EPA proposed to scrap upon connecting residences to a public water supply. (B, p. 7)

EPA Response: The costs are not understated. Of the $151,000, $38,200 plus contingencies and markups is common to both alternatives for sampling and analysis of the residential wells. The remaining capital cost for Alternative 4 is only $60,000 plus contingencies and markups. This amount is the present worth of the cost to be paid after 15 years to replace the units per the manufacturer's guidelines. Alternative 2 does not include this cost because the GAC units are new and will not need to be replaced during the two-year design and construction period.

Comment: The costs of monitoring the GAC units under Alternative 2 appear to be understated by $37,400. (Compare two years of O&M costs in FFS Table 4-2 ($192,000) with two years' O&M costs in FFS Table 4-2 ($229,400).) (B, p. 7)

EPA Response: The costs are not understated. The present worth of two years of operation and maintenance (O&M) of the GAC units is calculated by taking the estimated cost for one year without the community education program (which was specific to Alternative 4) or $110,700, and multiplying by the present worth factor for two years at a 10% discount rate, or 1.7355, for a cost of about $192,000.

5. SUPPORT OF THE ADMINISTRATIVE RECORD

Comment: The administrative record shows that the GAC units have decreased contaminant concentrations to acceptable levels.

Therefore, there is no reason to believe that a significant potential for exposure to ground water contamination exists and no demonstrated need to abandon use of the GAC units. (B, p. 4)

EPA Response: While it is true that the historical data show the units have worked, it is important to recognize that the data include no results for semi-volatiles or heavy metals since August 1986. Yet, these contaminants are the ones most likely to pass through the units and cause exposure. EPA is currently developing a modified sampling protocol which will address this problem. However, in the meantime, the only conclusion that can be reached is that the units have worked for those compounds for which samples have been analyzed.

EPA's basis for concluding that the potential for exposure exists is based on two factors. First, it is based on the knowledge of the limits of the reliability of the GAC technology, particularly the inappropriateness of GAC for removal of vinyl chloride and selenium and its potential to desorb contaminants (see Topic 3). Second, it is based on the close proximity of the source of ground water contamination to the residents.

Comment: NJDEP adopted a conservative approach in providing GAC units for 30 homes when only 5 of the 30 have shown any sign of contamination. It is inconceivable that EPA would at this time, propose to spend approximately $2,000,000 to serve only 5 homes when the GAC units have been shown to be effective. The administrative record provides no support for the 5 homes, much less the 25 additional homes included under Alternative 2. (B, p.4)

EPA Response: The NJDEP well impact area was established in November 1986 as the area in which ground water was believed to be potentially impacted by the site. The limits drawn have been justified by the sampling data collected since 1986. Five wells on or adjacent to Higgins Farm (R-1, R-3, R-5, R-6, and R-7) were found to be contaminated above the remedial criteria. A sixth well, R-12, the furthest west of the 30, was also found to be contaminated above the remedial criteria. Providing a water main extension to these 6 homes instead of continuing the use of GAC is an appropriate long-term remedy as discussed in Topic 3. Furthermore, EPA believes that residences within the well impact area are at risk because they may be in the path of ground water migration, and as stated previously, there are contaminants which may not be absorbed by the GAC units.

6. IMPLEMENTATION PROCESS FOR ALTERNATIVE 2

Comment: When would the 6-24 month implementation period begin? What roles will the State and PRPs play? (A, pp. 21-23, 31-32)

EPA Response: The 6-24 month period would begin once EPA has issued its Record of Decision (ROD). The PRPs were given the opportunity to comment on the FFS and Proposed Plan during the public comment period. They will not be further directly involved once the ROD is issued. The State also is requested to concur with the proposed remedy.

Comment: Why will implementation take 6-24 months? (A, pp. 33-35)

EPA Response: While construction of the water line may only take a few months, the additional time is required to reach agreement with Franklin Township and the selected water purveyor, prepare the detailed design, procure a construction contractor, and make the necessary access arrangements.

Comment: Who would be responsible for sealing and abandoning the wells? Who would be responsible for connecting homes to the new water line? (A, p. 36)

EPA Response: For each home, EPA will connect the home to the new water line and attempt to seal the wells. Wells will not be grouted or removed from the ground.

7. HOMES INCLUDED IN ALTERNATIVE 2

Comment: Which homes would be connected to the new water line? (A, pp. 23-25 and 36)

EPA Response: The approximately 30 homes which currently have carbon treatment units would be connected. Prior to design of the water line, sampling of wells for up to 30 additional homes in the area may be performed. Any of these homes with contaminants in excess of the remedial criteria would also be connected to the water line.

Comment: Could the municipality allow others to be connected to the water line? Could residents have the option of paying for hookup if they are not among the group designated by EPA? (A, pp. 27-28)

EPA Response: Franklin Township would be responsible for determining who else would be allowed to connect into the new water line. The Township would also be responsible for determining who would pay for such connections.

8. DESIGN OF ALTERNATIVE 2

Comment: Would there be enough water capacity available with the new water line? (A, p. 28)

EPA Response: Based on a preliminary discussion with a South Brunswick engineer, enough capacity would likely be available in the South Brunswick system to supply the 30 homes.

Comment: Why is a pump station required? Where would the new pump station be located? (A, p.33)

EPA Response: If the system selected for connection is South Brunswick, the line pressure at the interconnection, which would be located at the intersection of Routes 27 and 518, would be about 30 psi. This pressure is not adequate to supply the 30 homes. Although South Brunswick anticipates making some improvements to its system in the future which may increase this pressure, the existing hydraulic grade was assumed for the FFS. Therefore, a pump station would be required in the vicinity of the interconnection. The exact location would be determined through discussions with Franklin Township.

SOURCES

A. Transcript from the Public Meeting Concerning the Focused Feasibility Study and Proposed Plan for an Interim Ground Water Action at the Higgins Farm Site. July 2, 1990.

B. Kenneth N. Klass of the law firm Blank, Rome, Comisky, and McCauley, representing FMC Corporation. Letter to Ms. Joyce Harney, U.S. EPA Region II. July 27, 1990.

C. Cherry Spague. Letter to Environmental Protection Agency. July 5, 1990.

D. Edward and Kathryn Flynn. Letter to Ms. Joyce Harney, U.S. EPA. July 10, 1990.

E. John and June Lewis. Letter to Ms. Joyce Harney, U.S. EPA. July 15, 1990.

F. Edward and Judy Schnabel. Letter to Ms. Joyce Harney, U.S. EPA. July 16, 1990.