United States
Environmental Protection
Agency

Office of
Emergency and
Remedial Response

EPA/ROD/R02-85/022
September 1985

EPA

Superfund Record of Decision:

Bog Creek Farm, NJ

TECHNICAL REPORT DATA (Please read Instructions on the reverse before completing)		
1. REPORT NO. EPA/ROD/R02-85/022	2.	3. RECIPIENT'S ACCESSION NO.
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15. SUPPLEMENTARY NOTES		

16. ABSTRACT

The twelve-acre Bog Creek Farm is located in Howell Township, Monmouth County, New Jersey. The site consists of a four-acre disposal area, a manmade pond and a dike. Bog Creek Farm was purchased in June 1973 by Western Ranch Corporation, an entity owned by Fred and Margaret Barry. It is alleged that in 1973 and 1974 the Barry's dumped wastes at Bog Creek Farm generated from a paint manufacturing operation that they owned. ·se wastes, reportedly bulk liquids and sludges, were dumped on the ground and in a nch. Samples of the wastes taken during the RI confirmed the presence of a wide ·riety of organic compounds and heavy metals. Total Volatile Organic (TVO) concentrations in the soil were found as high as 44,000 ppm. The pond and a bog which lies just east of the site are particularly contaminated with TVO concentrations as high as 23 ppm and 494 ppm, respectively.

The cost-effective remedial actions selected for this site include: removing the waste water and sediments from the pond and bog; regrading and covering the pond and bog to prevent reponding; treating the waste water onsite and discharging to the nearby stream; excavating the waste deposits and contaminated soil > 10,000 ppm TVOs; incinerating excavated materials at a temporary facility onsite or at an offsite facility in accordance with RCRA; conducting a further analysis of the impact of the residual contaminated soil to determine the extent of additional site remediation necessary;

17. KEY WORDS AND DOCUMENT ANALYSIS		
a. DESCRIPTORS	b. IDENTIFIERS/OPEN ENDED TERMS	c. COSATI Field/Group
Record of Decision Bog Creek Farm, NJ Contaminated media: gw, soil, wetlands Key contaminants: heavy metals, inorganics, organics, remnant contamination, wetlands		
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ABSTRACT Continued

evaluating soil washing, segregation and other innovative technologies for the residual contaminated soil; covering the excavated area with a compacted soil cap; constructing a security fence surrounding the site and work areas; and implementing a monitoring program to assess the effectiveness and reliability of the remedial action. The estimated capital cost for the selected remedial alternative is $9.2 million and O&M costs are approximately $54,400 annually.

RECORD OF DECISION
REMEDIAL ALTERNATIVE SELECTION

Site: Bog Creek Farm, Howell Township, New Jersey

Documents Reviewed

I am basing my decision on the following documents describing the analysis of cost-effectiveness of remedial alternatives for the Bog Creek Farm site:

- Bog Creek Farm Remedial Investigation Report, NUS Corporation, August 1985
- Bog Creek Farm Feasibility Study of Alternatives, NUS Corporation, September 1985
- Staff summaries and recommendations
- Responsiveness Summary, September 1985

Description of Selected Remedy

- Remove the waste water and sediments from the pond and the bog.
- Regrade and cover the pond and the bog to prevent reponding.
- Treat the waste water on-site and discharge to the stream.
- Excavate the waste deposits and contaminated soil greater than 10,000 ppm of total volatile organics.
- Dispose of the excavated materials by incineration at a temporary facility on-site or at an off-site facility in accordance with RCRA.
- Perform a further analysis of the impact of the residual contaminated soil to determine the extent of additional site remediation necessary.
- Evaluate soil washing, soil segregation and other innovative technologies for the residual contaminated soil.
- Cover the excavated area with a compacted soil cap.
- Construct a security fence surrounding the site and work areas.
- Implement a monitoring program to assess the effectiveness and reliability of the remedial action.

Declarations

Consistent with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), and the National Oil and Hazardous Substances Contingency Plan (NCP), 40 CFR Part 300, I have determined that the remedy described above is an operable unit involving control of the source of the contamination which is cost-effective and consistent with a permanent remedy.

It is hereby determined that implementation of this interim remedial action is the lowest cost alternative that is technologically feasible and reliable, and which effectively mitigates and minimizes damages to and provides adequate protection of public health, welfare and the environment. Implementation of this operable unit is appropriate at this time, pending a determination of the need for any further remedial actions. It is also hereby determined that the selected remedy is appropriate when balanced against the availability of Trust Fund monies for use at other sites.

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

SEPTEMBER 30, 1983

Date

Christopher J. Daggett

Christopher J. Daggett
Regional Administrator

SUMMARY OF REMEDIAL ALTERNATIVE SELECTION

BOG CREEK FARM

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SUMMARY OF REMEDIAL ALTERNATIVE SELECTION

BOG CREEK FARM

HOWELL, NEW JERSEY

SITE LOCATION AND DESCRIPTION

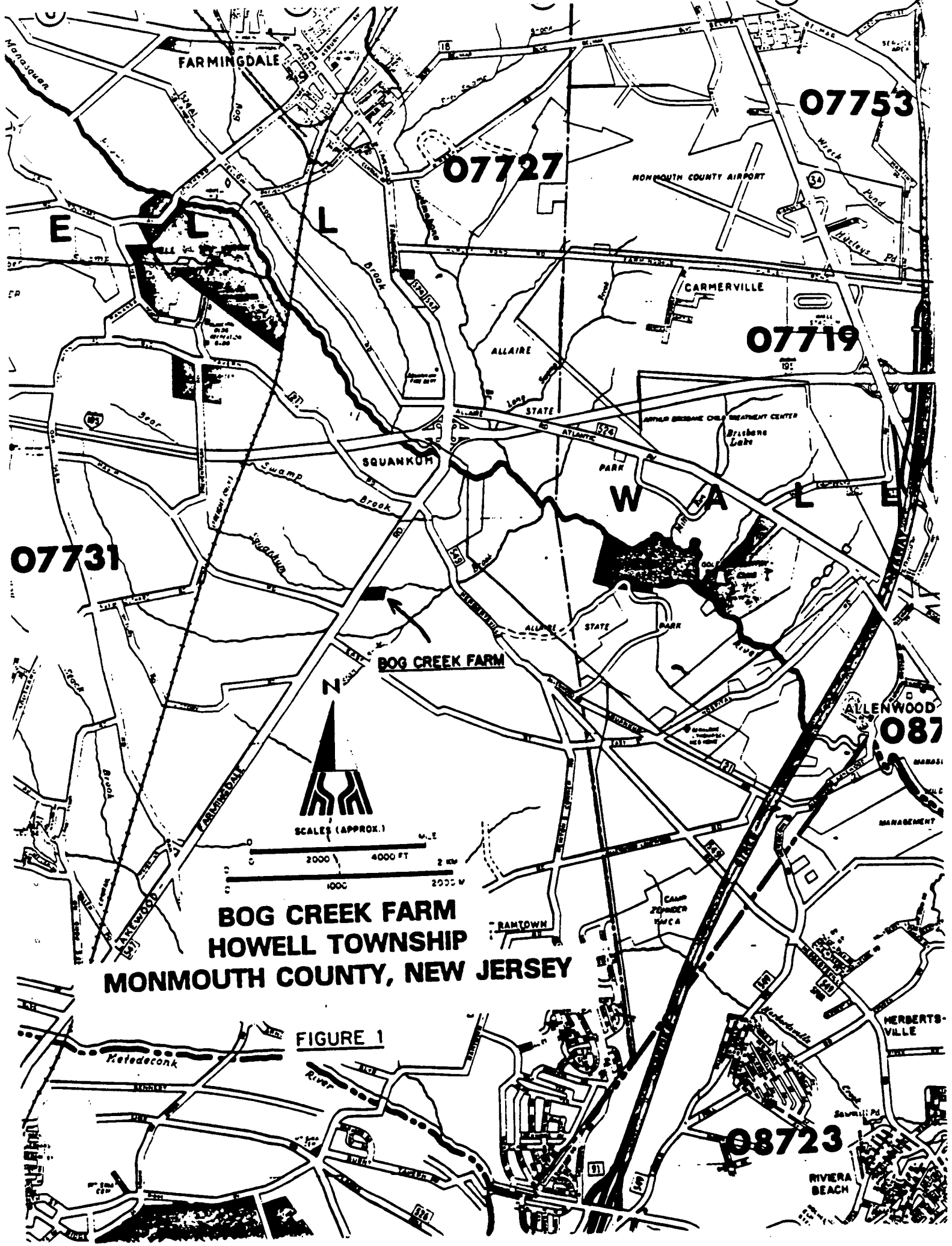
The Bog Creek Farm site is located on Monmouth County Road 547, also called the Lakewood-Farmingdale Road and Squankum Road, in Howell Township, Monmouth County, New Jersey. It is approximately one mile south of Interstate 195 and three miles west of the Garden State Parkway (Figure 1). The twelve-acre property is designated on tax maps as Block 46, Lot 29; the disposal area, comprising approximately four acres, lies in the eastern portion of the property.

Bog Creek Farm is located in a mostly wooded, rural, topographically level area of coastal plain. The site itself is cleared and slopes gently to the north, toward the North Branch of Squankum Brook. A man-made pond and a dike lie between the brook and the disposal area. There is a bog to the northeast of the site (Figure 2).

The western portion of the property contains two currently-occupied residences and a stable leased by Circle A Riding Stable. Horses, dogs, and geese are kept on the property. The property to the north of the site is wooded, while the property to the south and east of the site is farmed.

The nearest residences to the Bog Creek Farm site are the two dwellings on the western portion of the property. There are several other residences and businesses within one mile of the site on Lakewood-Farmingdale Road, Herbertsville Road, and Easy Street. The presence of agricultural businesses in the area of this site may be responsible for elevated background levels of pesticides and other contaminants.

Exploratory borings at Bog Creek Farm indicate the presence of the Kirkwood, Manasquan, and Vincentown geologic formations at the site. All but the most recently installed wells in the area are less than fifty-feet deep and draw from the Kirkwood formation. Newer wells are screened considerably deeper. Beneath the Bog Creek Farm site, the Kirkwood formation contains two distinct aquifers. The upper, water-table, aquifer has been contaminated by Bog Creek Farm. It flows north-northeast and discharges into the bog, the pond, and



BOG CREEK FARM
HOWELL TOWNSHIP
MONMOUTH COUNTY, NEW JERSEY

FIGURE 1

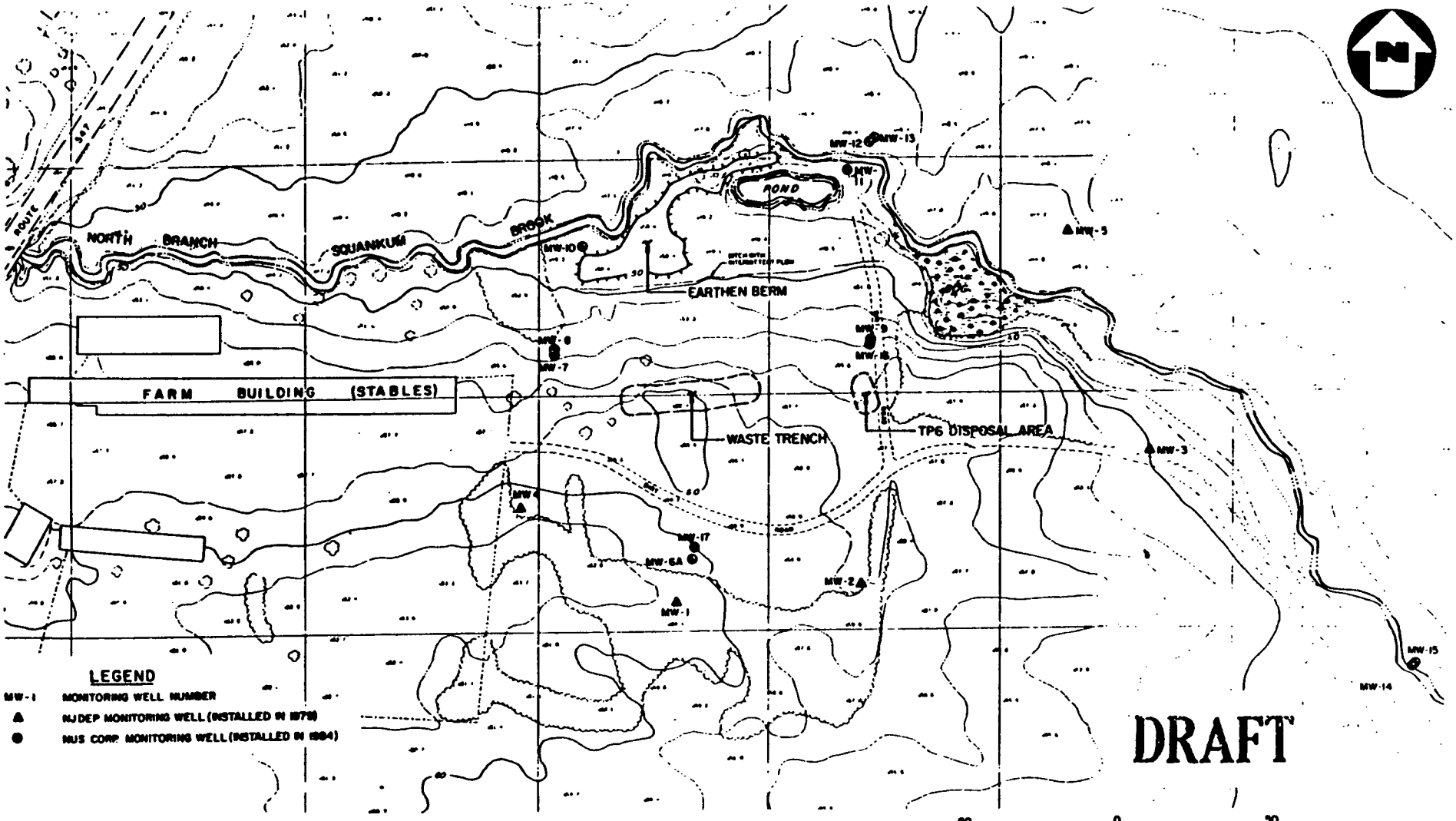


FIGURE 2

GENERAL ARRANGEMENT
BOG CREEK FARM SITE, HOWELL TWP., NJ

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the North Branch of Squankum Brook. The lower, confined, Kirkwood Aquifer is pressurized. The upward gradient of groundwater flow and the confining layer have prevented this aquifer from becoming contaminated by the site. The Lower Kirkwood Aquifer flows east-northeast toward the more significant discharge area of the Manasquan River.

The surface water on-site includes the pond, which is highly contaminated with volatile organic compounds and the bog, which is also contaminated and extends east of the site. The pond does not appear to support any life. The bog, which was also reported in the mid-1970's to be devoid of life, does support vegetation as well as some animal life, including insects and turtles.

SITE HISTORY

Bog Creek Farm was purchased in June 1973 by Western Ranch Corporation, an entity entirely owned by Fred and Margaret Barry. However, in February 1976, the title was changed to the Barrys themselves. They lost title to the property through mortgage foreclosure in 1981. It is currently owned by All Insurance Corporation of Old Bridge, New Jersey.

It is alleged that in 1973 and 1974, the Barrys dumped wastes at Bog Creek Farm generated from a paint manufacturing operation that they owned. These wastes, reportedly bulk liquids and sludges, were dumped on the ground and in a trench.

A fish kill occurred in the Manasquan River, downstream of the confluence with Squankum Brook, in March 1977. While this event was never conclusively linked to Bog Creek Farm, it did increase public awareness of the contaminants at the site.

There have been no response or enforcement actions at the Bog Creek Farm site to date. In 1983, NUS Corporation, under contract to the U.S. Environmental Protection Agency, compiled available information into a Remedial Action Master Plan. In 1984 and 1985, NUS performed a Remedial Investigation (RI) and Feasibility Study (FS) at the site. The findings of this study are presented in documents that provide the basis for this Summary of Remedial Alternatives Selection.

CURRENT SITE STATUS

The portion of the property which was used for waste disposal is not currently in use. However, riders from the stable on the western part of Bog Creek Farm, hunters, and local children routinely cross the waste disposal area.

The volume of wastes dumped at Bog Creek Farm is not known. However, from information gathered during the RI, the volume of the two waste-disposal trenches on-site was deduced to be 2,400 cubic yards. Six samples of the waste itself were taken from test pits during the RI. A wide variety of organic compounds and metals were found. Concentrations of volatile organics reached as high as 180,000 ppm (18%), for toluene. The data from these analyses are summarized in Table 1.

The RI/FS suffered from poor laboratory performance, both in terms of the timeliness and the quality of data produced. The non-volatiles data for soil samples were found to be invalid, because the samples were held too long before they were analyzed. For the same reason, the data from the first round of sediment sampling were also rejected. Despite this loss, is is believed that the site has been accurately characterized using valid Total Volatile Organics (TVOs) data. The surface water and the sediment were resampled in August 1985 to more accuratley define volatilization and contamination in Squankum Brook. These data will aid in designing a remedial action. It should be noted that the data used to develop and evaluate remedial alternatives are considered reliable and provide sufficient basis for the Record of Decision.

On-site soil contamination was defined using a three-dimensional sampling grid. Chemical data are reported in Figure 3 in terms of TVO concentrations. Non-volatile contaminants were not used to assess the extent of contamination because they did not migrate as significantly from the disposal trench as the volatiles due to their lower water solubilities and higher soil affinities. TVO concentrations in the soil were found as high as 44,000 ppm. Isoconcentration contours and site cross sections (Figures 4 through 9) show two levels of TVO concentrations: 10,000 ppm and 100 ppm. The drop in concentration as distance from the source increases is so abrupt from 1,000 ppm to background that the 100-ppm contour is nearly coincident with a 1,000-ppm contour and also represents a borderline to near-background levels. The cross-section figures show the extent of soil contamination both above and below the water table, as well as the relative locations of the waste-disposal trench and the water table.

Contamination has migrated from the disposal area downward, within the Upper Kirkwood Aquifer, and to the north and east with the groundwater flow. TVO concentrations in the groundwater ranged up to 269 ppm. Data from two rounds of sampling are displayed graphically in Figures 10 and 11.

Although residents of Howell Township receive their water from private supply wells, no potable wells are threatened by Bog Creek Farm. The hydrologeologic conditions are such that the groundwater contaminated by the site is entirely intercepted by the North Branch of Squankum Brook. Therefore, all private wells are either upgradient of the site or are protected by the natural groundwater barrier formed by the brook.

TABLE 1

CHEMICAL ANALYTICAL RESULTS: WASTE SAMPLES
BOG CREEK FARM SITE
SIX SAMPLES COLLECTED BY NUS CORPORATION 10/3-4/84

PP#	CAS #	Compound	Number of Occurrences	Concentration Range (ppm)
Organics				
	67-64-1	acetone	6	9 - 2,100
	78-93-3	2-butanone	3	16 - 5,200
44V	75-09-2	methylene chloride	2	2 - 26,000
11V	71-55-6	1,1,1-trichloroethane	3	5,300 - 8,800
87V	79-01-6	trichloroethene	3	4,700 - 5,500
85V	127-18-4	tetrachloroethene	3	840 - 6,800
10V	107-06-2	1,2-dichloroethane	1	6,800
6V	56-23-5	carbon tetrachloride	1	570
23V	67-66-3	chloroform	1	550
4V	107-06-2	benzene	4	30 - 8,900
86V	108-88-3	toluene	6	8 - 180,000
	1330-20-7	total xylenes	5	1 - 14,000
38V	100-41-4	ethylbenzene	4	30 - 4,700
65A	108-95-2	phenol	3	76 - 760
25B	95-50-1	1,2-dichlorobenzene	3	160 - 450
55B	91-20-3	naphthalene	3	120 - 380
54B	78-59-1	isophorone	4	39 - 890
	91-57-6	2-methylnaphthalene	2	21 - 88
61B	86-30-6	n-nitrosodiphenylamine	1	210
66B	117-81-7	bis(2-ethylhexyl)phthalate	5	10 - 1,400
68B	84-74-2	di-n-butylphthalate	4	82 - 1,400
67B	85-68-7	butylbenzylphthalate	2	96 - 260
Inorganics				
		aluminum	5	80 - 2,610
		barium	3	58 - 430
		calcium	6	1,120 - 36,400
		chromium	5	7 - 718
		cobalt	3	6 - 27
		copper	4	3 - 174
		iron	5	876 - 5,160
		lead	5	4.6 - 19,060
		manganese	5	7 - 78
		mercury	4	.27 - 2.2
		selenium	1	6.4
		thallium	1	[20]
		vanadium	4	4 - 13
		zinc	5	6 - 364

Notes:

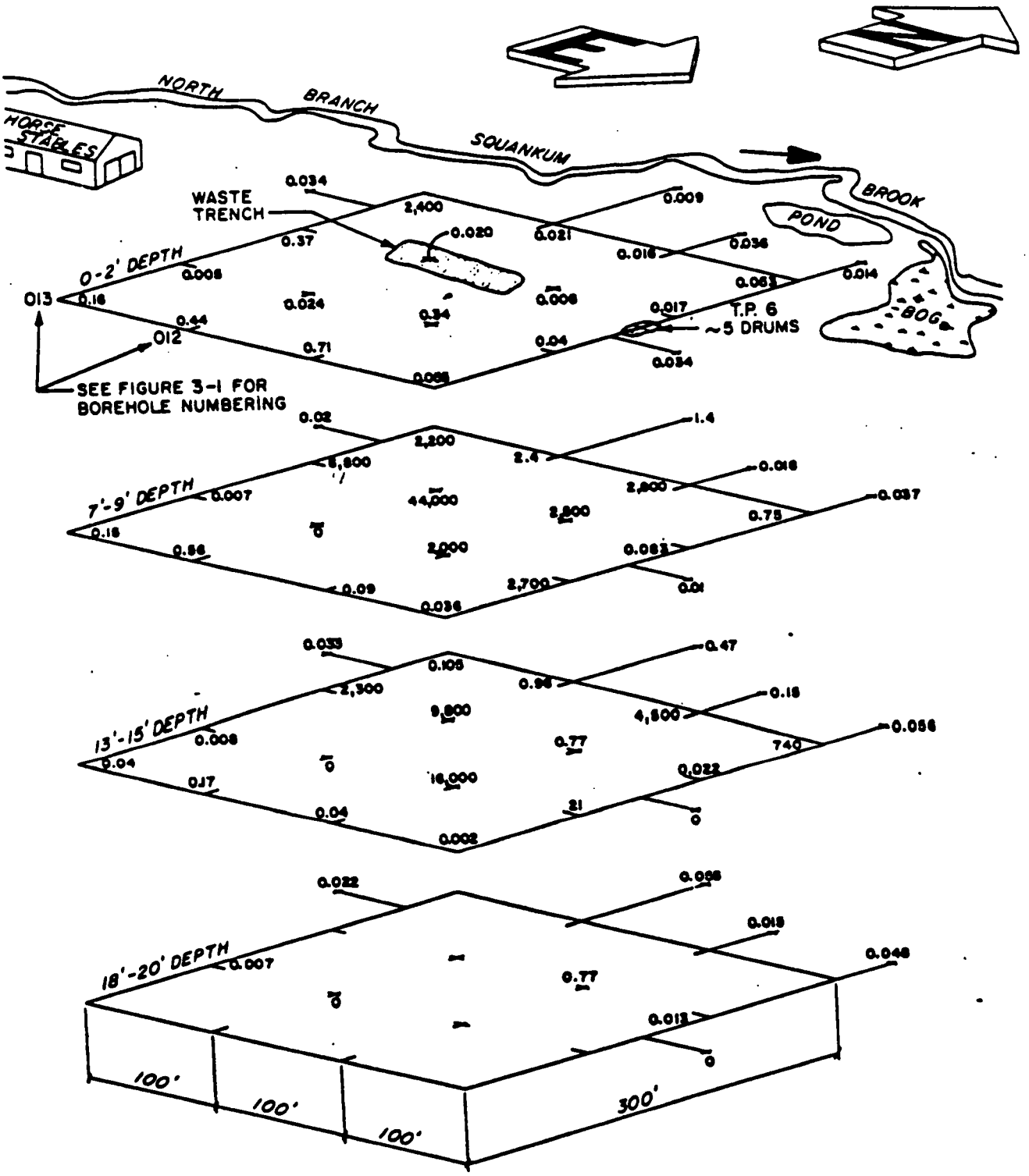
TABLE 1
PAGE TWO

TENTATIVELY IDENTIFIED COMPOUNDS - WASTE SAMPLES
BOG CREEK FARM SITE
(BASED ON SAMPLES OBTAINED BY NUS
IN OCTOBER 1984)

CAS#	Chemical	Fraction
108-87-2	methylcyclohexane	SV
108-88-3	toluene	SV
127-18-4	tetrachloroethene	SV
5129-56-6	10-methyl-methylester undecanoic acid	SV
	4-(tetramethylbutyl)-phenol	SV
	methylester octadecanoic acid	SV
590-01-2	butylester propanoic acid	SV
103-65-1	propylbenzene	SV
	ethylmethylbenzene	SV
110-80-5	2-ethoxyethanol	SV
108-10-1	4-methoxy-2-pentanone	SV
111-76-2	2-butoxyethanol	SV
111-77-3	2-(2-methoxyethoxy)ethanol	SV
101-84-4	1,1'-oxybisbenzene	SV
1640-89-7	ethylcyclohexane	SV
	dimethylbenzene	SV
7299-91-4	butylester-2-butanoic acid	SV
111-84-2	nonane	V
616-38-6	dimethylester carbonic acid	V
554-12-1	methylester propanoic acid	V
96-47-9	tetrahydro-2-methylfuran	V
107-87-9	2-pentanone	V
112-39-6	dimethoxydimethylsaline	V
623-42-7	methylester butanoic acid	V
111-76-2	2-butoxyethanol	V
124-18-5	decane	V

Notes:

SV - Semi-volatile fraction (Acid/Base/Neutral Extractable)
V - Volatile fraction



NOTES:
1. SAMPLES OBTAINED BY NUS CORP. IN OCTOBER, 1984.
2. ALL VALUES PRESENTED IN ppm (mg/kg)
3. THESE VALUES DO NOT REFLECT FINAL VALIDATION RESULTS. (SUBJECT TO REVISION).

FIGURE 3

TOTAL VOLATILE CONCENTRATIONS IN SOIL (PPM)
BOG CREEK FARM SITE, HOWELL TWP., NJ

NOT TO SCALE

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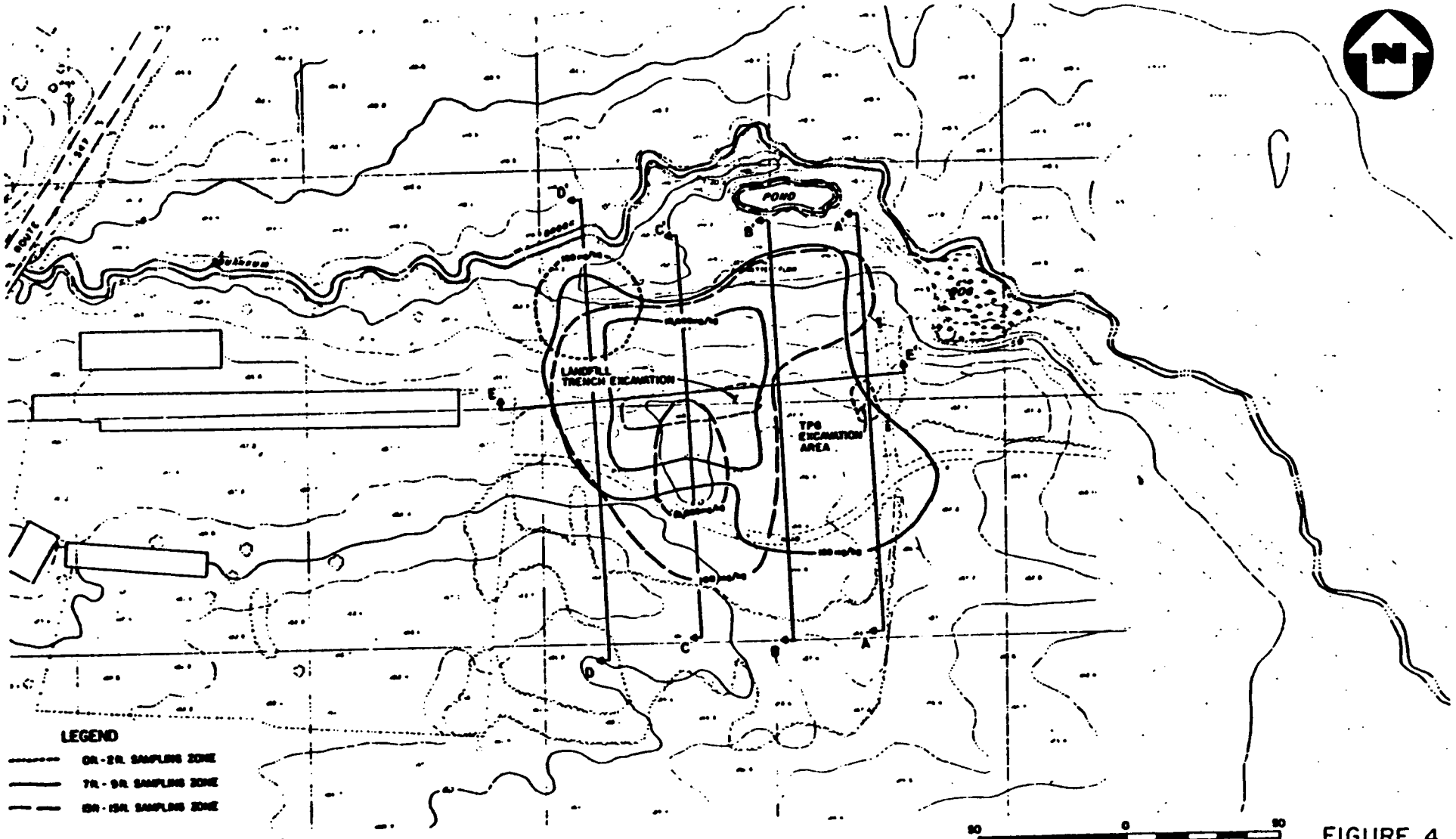

FIGURE 4

TVO ISOCONCENTRATIONS
BOG CREEK FARM SITE, HOWELL TWP., NJ

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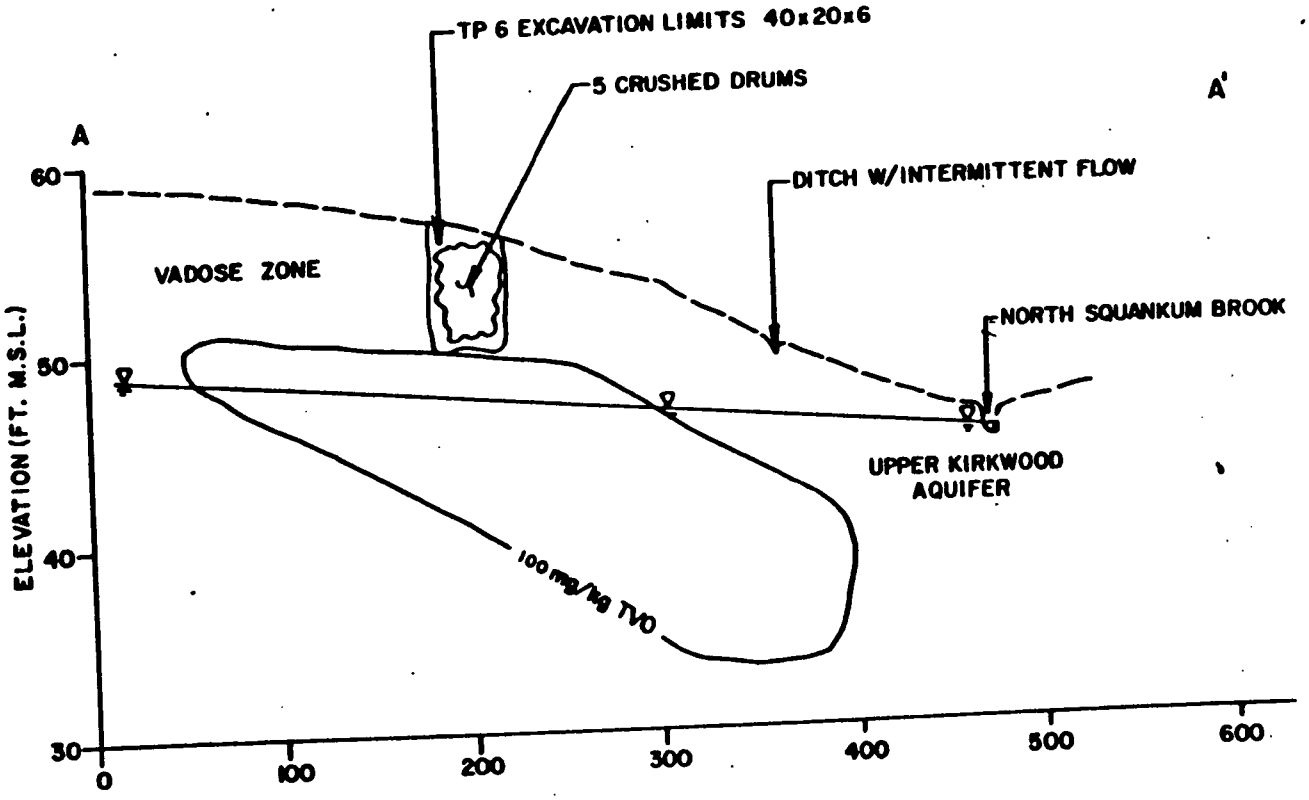

FIGURE 5

SECTION A-A'-TVO ISOCONCENTRATIONS
BOG CREEK FARM SITE, HOWELL TWP., NJ

SCALE: HORIZ. 1"=100', VERT. 1"=10'

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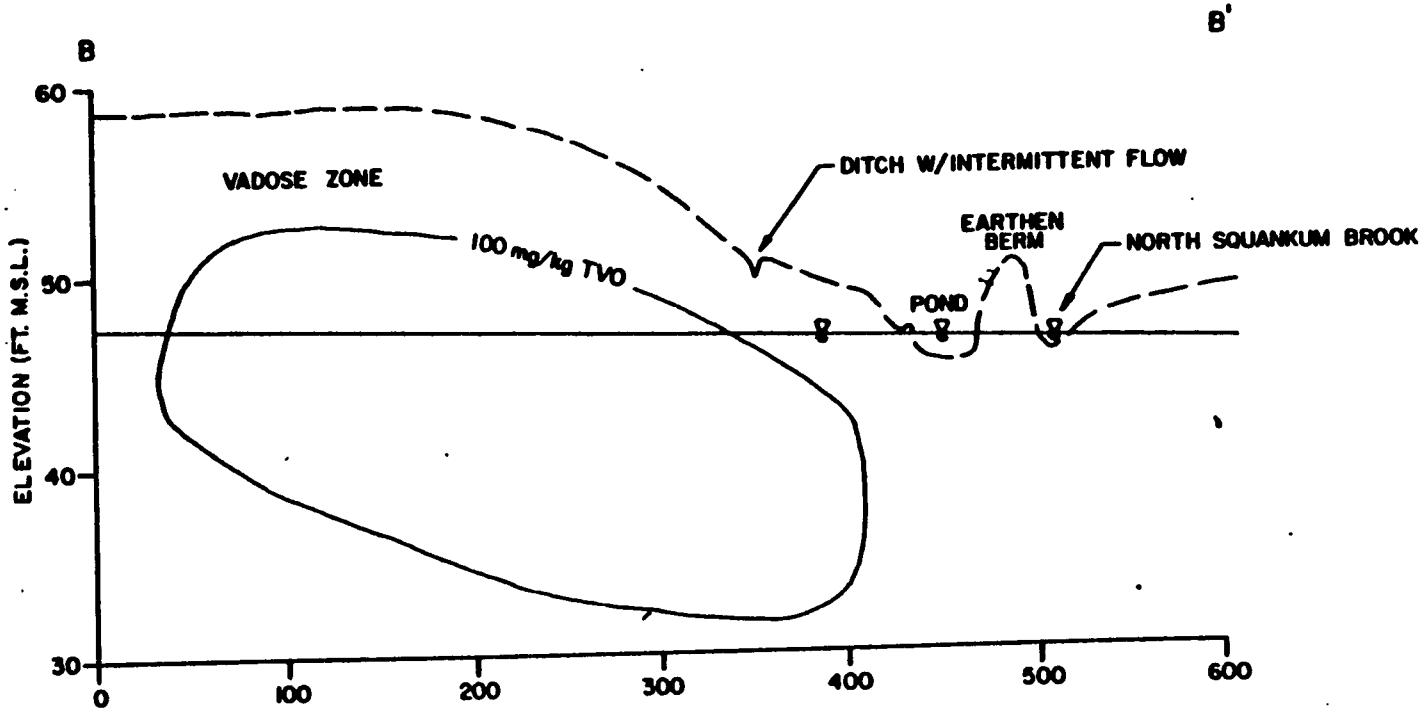

FIGURE 6

SECTION B-B'—TVO ISOCONCENTRATIONS
BOG CREEK FARM SITE, HOWELL TWP., NJ

SCALE: HORIZ. 1" = 100', VERT. 1" = 10'

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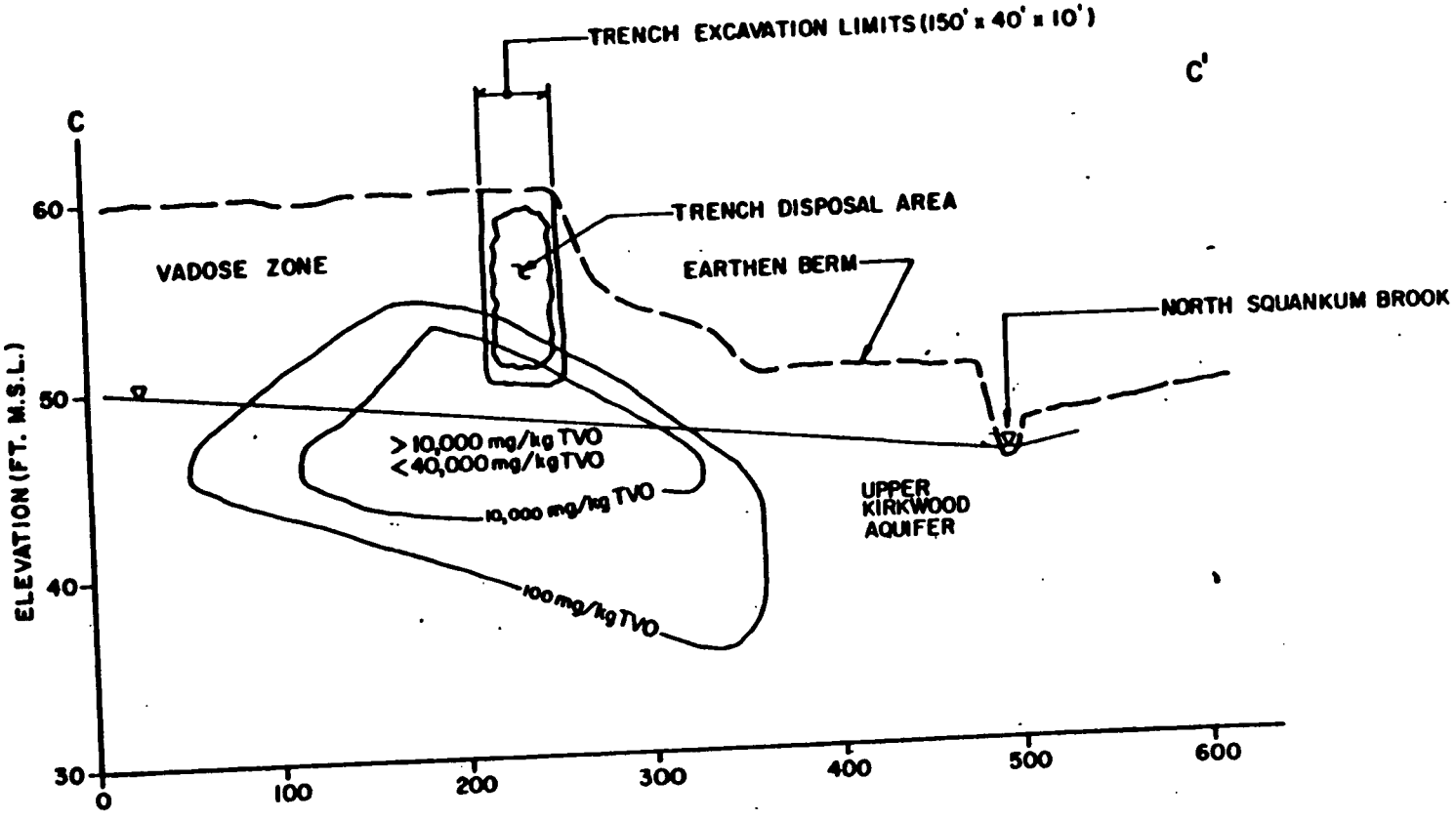

FIGURE 7

SECTION C-C'—TVO ISOCONCENTRATIONS
BOG CREEK FARM SITE, HOWELL TWP., NJ

SCALE: HORIZ. 1"=100', VERT. 1"=10'

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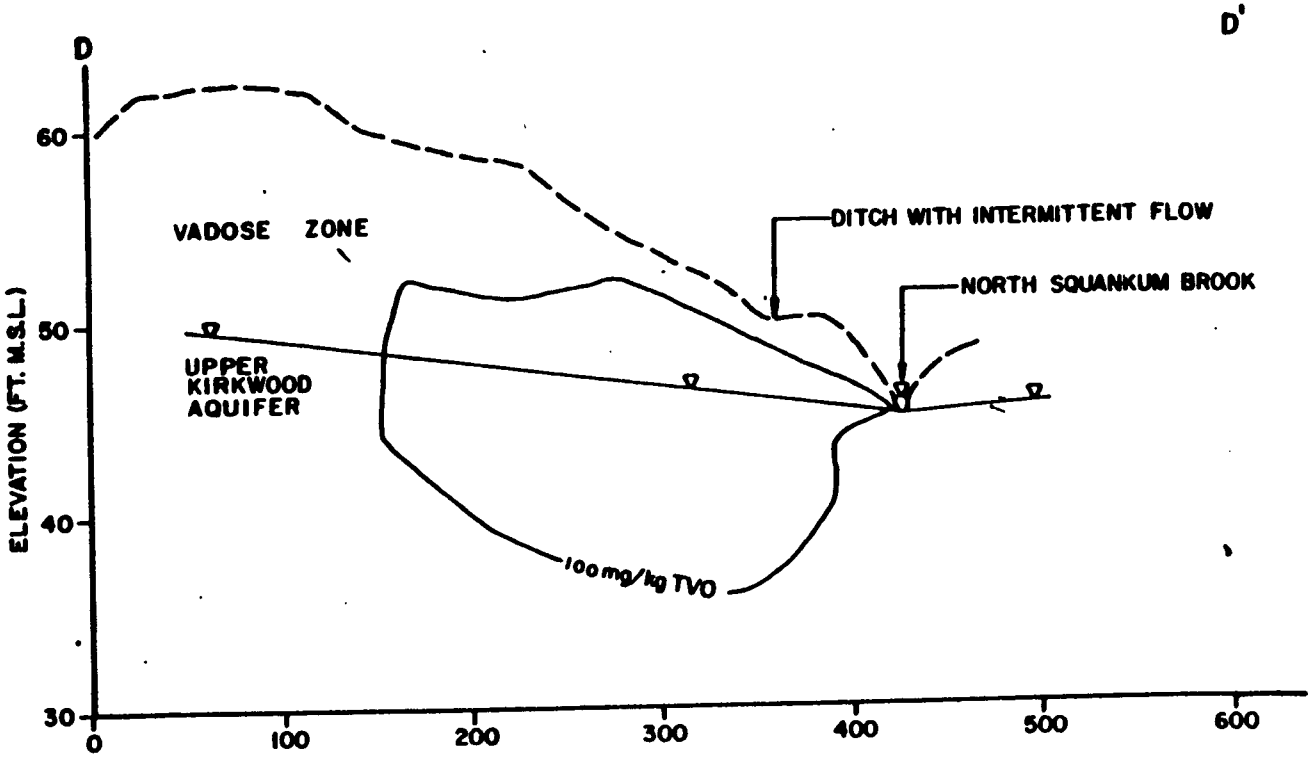

FIGURE 8

SECTION D-D'-TVO ISOCONCENTRATIONS
BOG CREEK FARM SITE, HOWELL TWP., NJ

SCALE: HORIZ. 1"=100', VERT. 1"=10'

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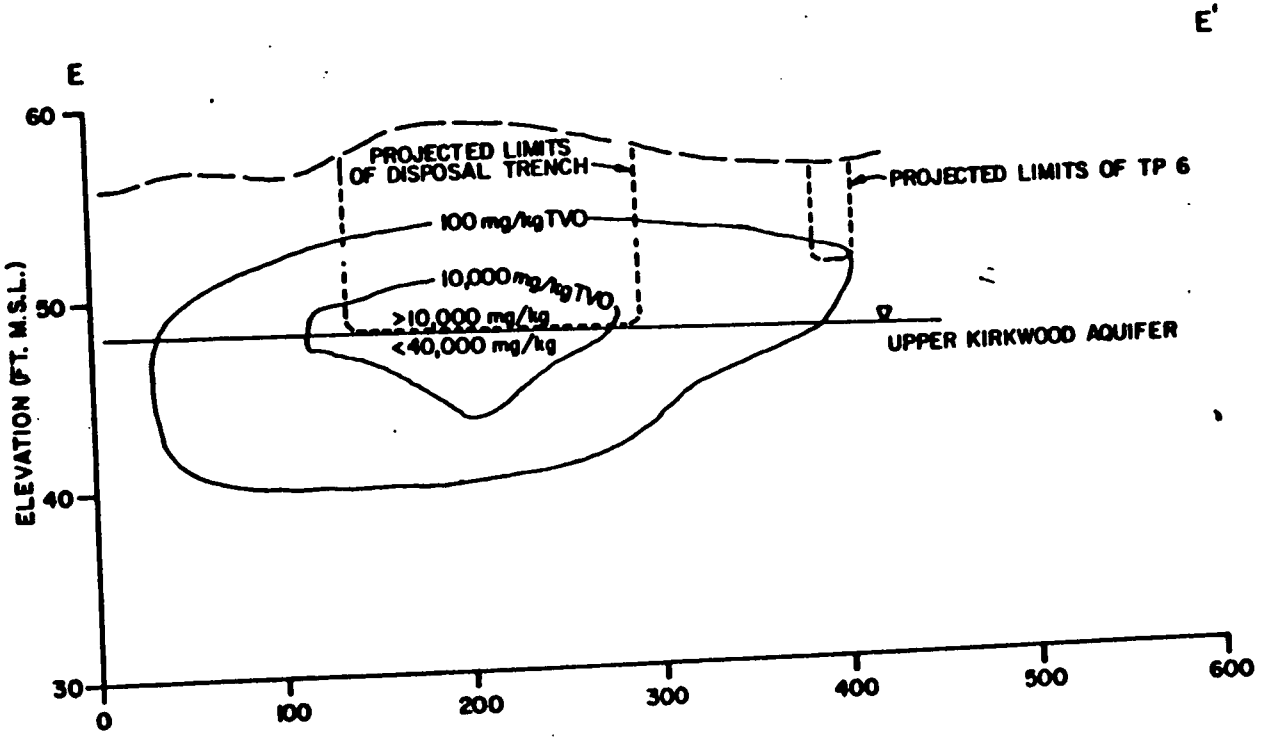

FIGURE 9

SECTION E-E' — TVO ISOCONCENTRATIONS
BOG CREEK FARM SITE, HOWELL TWP., NJ

SCALE: HORIZ. 1" = 100', VERT. 1" = 10'

NUS CORPORATION
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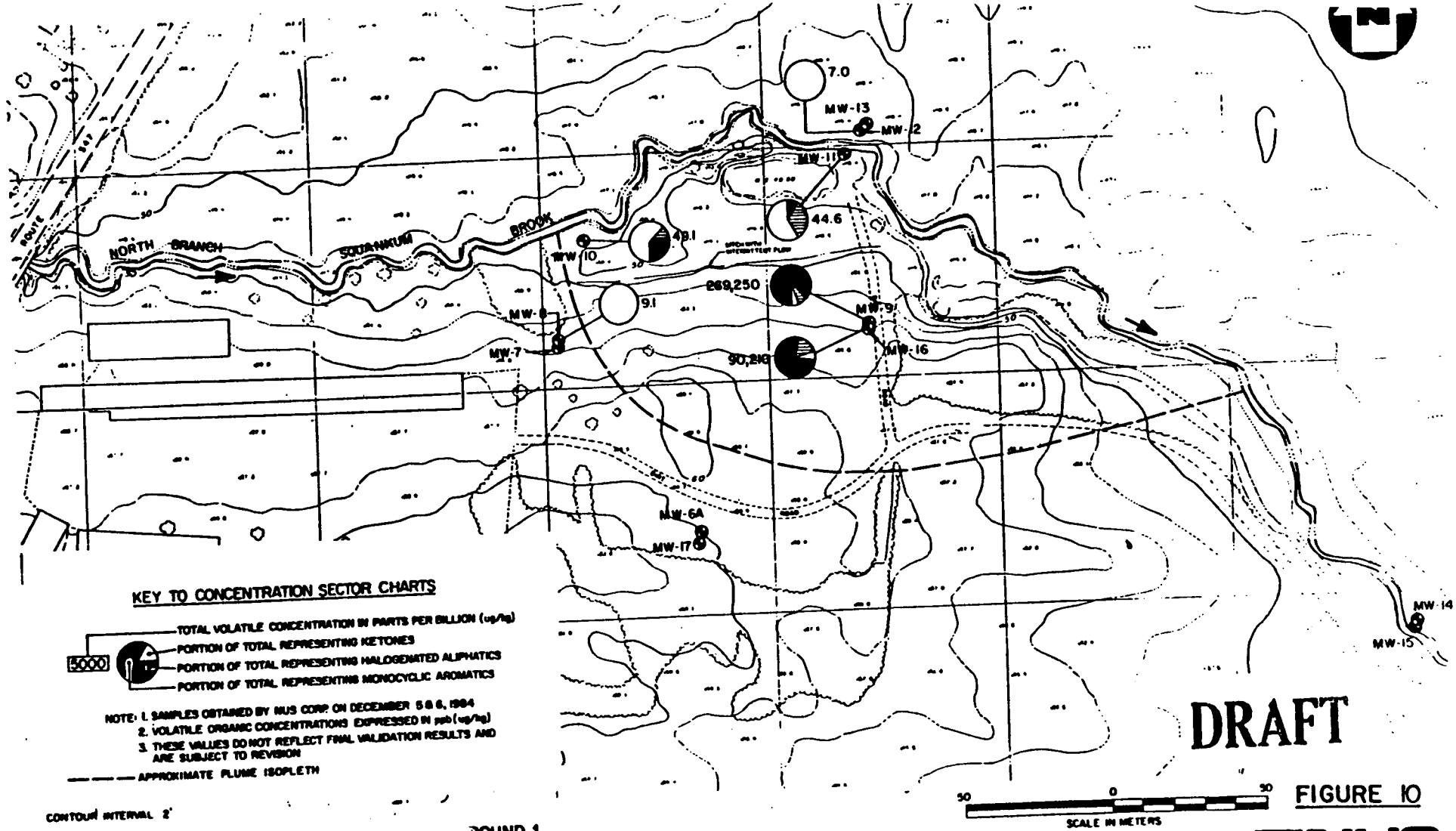

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FIGURE 10

ROUND 1

TOTAL VOLATILE CONCENTRATIONS IN GROUNDWATER (PPB)

BOG CREEK FARM SITE, HOWELL TWP., NJ

NUS CORPORATION

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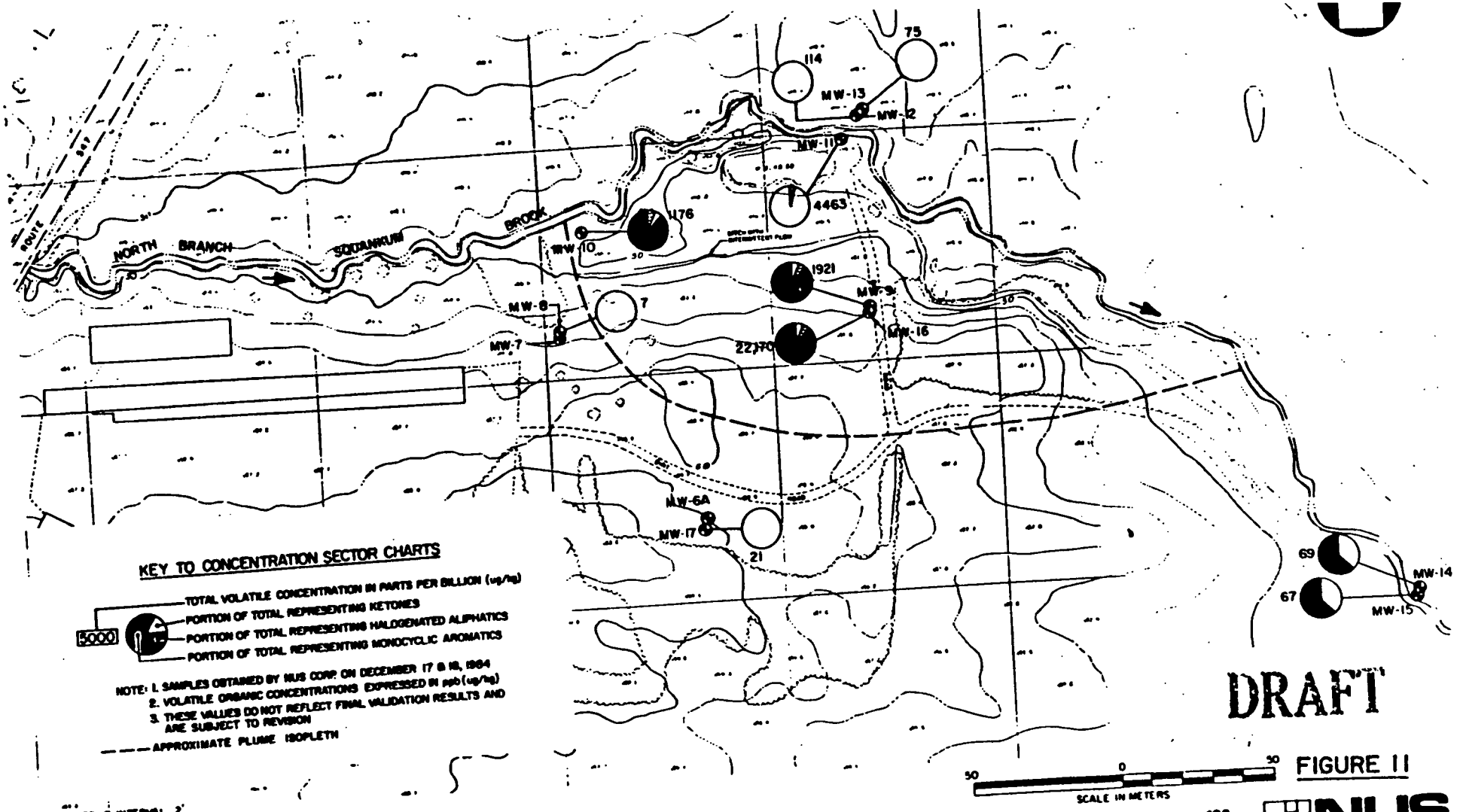

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FIGURE 11

ROUND 2

TOTAL VOLATILE CONCENTRATIONS IN GROUNDWATER (PPB)

BOG CREEK FARM SITE, HOWELL TWP., NJ

NUS CORPORATION

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The surface waters of concern at Bog Creek Farm are a pond on-site, a small bog to the east of the site, Squankum Brook, and the Manasquan River. The waters and sediments of these surface-water bodies were sampled twice during the RI by NUS. The pond and the bog are particularly contaminated, with TVO concentrations as high as 23 ppm in the pond and 494 ppm in the bog. TVO concentrations for two surface-water sampling rounds are shown in Figures 12 and 13, and data for sediment sampling are presented in Figures 14 and 15. Contaminants volatilize in Squankum Brook and are further diluted by groundwater discharge and tributary-stream flows so that the contamination in the brook just above the confluence with the Manasquan River is reduced to .017 ppm TVO. This relatively low concentration coupled with the insignificant flow of Squankum Brook as compared to that of the Manasquan River has kept the Bog Creek Farm site from significantly impacting the Manasquan River to date.

Public health concerns at the Bog Creek Farm site are summarized below.

- The bog, the pond, and the North Branch of Squankum Brook are contaminated but are not currently used as water supplies. Therefore, due to a lack of prolonged or regular exposure, these surface waters are not considered an exposure pathway of high risk through ingestion or dermal contact. The Manasquan River is used for recreation and a water intake for a new reservoir will be installed downstream from Squankum Brook. However, because of volatilization and dilution of contaminants in Squankum Brook, the Manasquan River has not been adversely impacted to date.

- Groundwater in the Upper Kirkwood Aquifer has been severely contaminated by the Bog Creek Farm site. However, hydrogeologic conditions have prevented contamination from affecting domestic water supplies. Although these conditions make groundwater a low-risk exposure pathway, groundwater discharge to the bog, the pond, and Squankum Brook continues to carry contaminants to the surface in these areas. In the event that groundwater at the site is ingested, the contamination that is now present could produce acute or chronic health effects.

- Inhalation of air-borne contaminants is not an exposure route of concern for people in the area around Bog Creek Farm. Contaminants are dispersed in the air rapidly enough to prevent any off-site, air-related health risks. However, air contamination on-site can be severe at times. For example, when the waste trench was disturbed, remedial investigation personnel required respiratory protection.

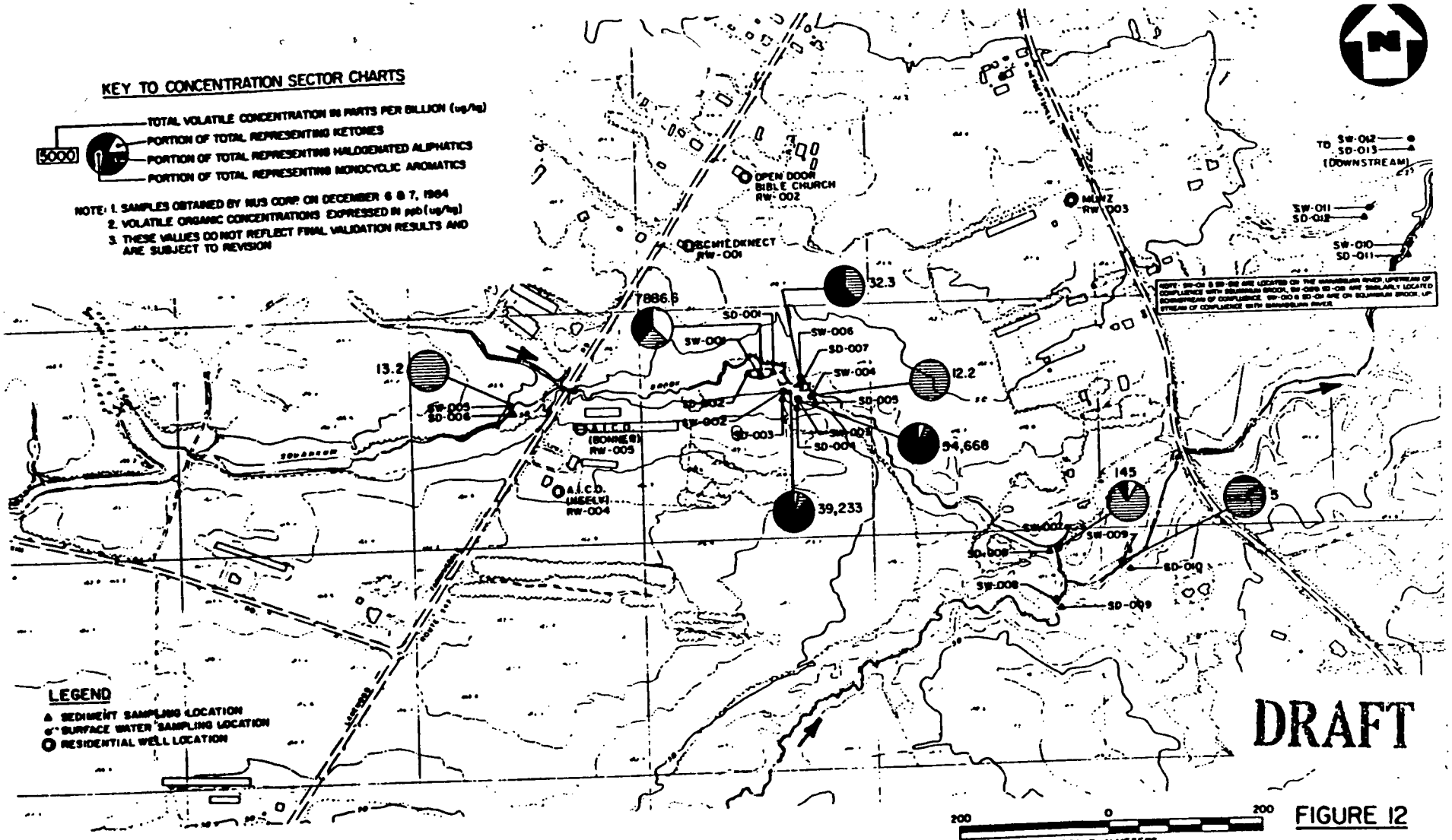

FIGURE 12

ROUND 1
TOTAL VOLATILE CONCENTRATIONS IN SURFACE WATER (PPB)
BOG CREEK FARM SITE, HOWELL TWP., NJ

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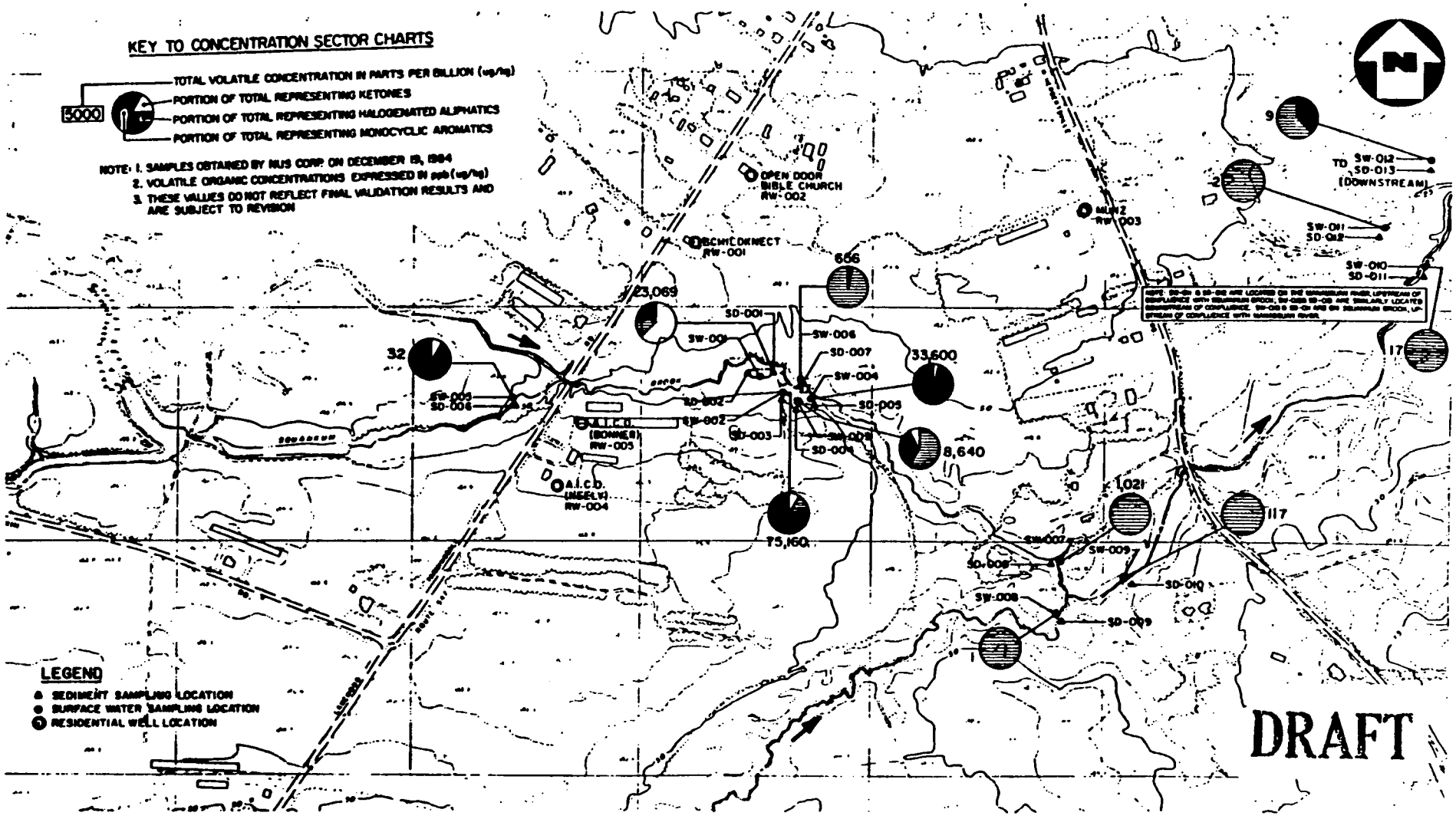

FIGURE 13

ROUND 2
TOTAL VOLATILE CONCENTRATIONS IN SURFACE WATER(PPB)
BOG CREEK FARM SITE, HOWELL TWP., NJ

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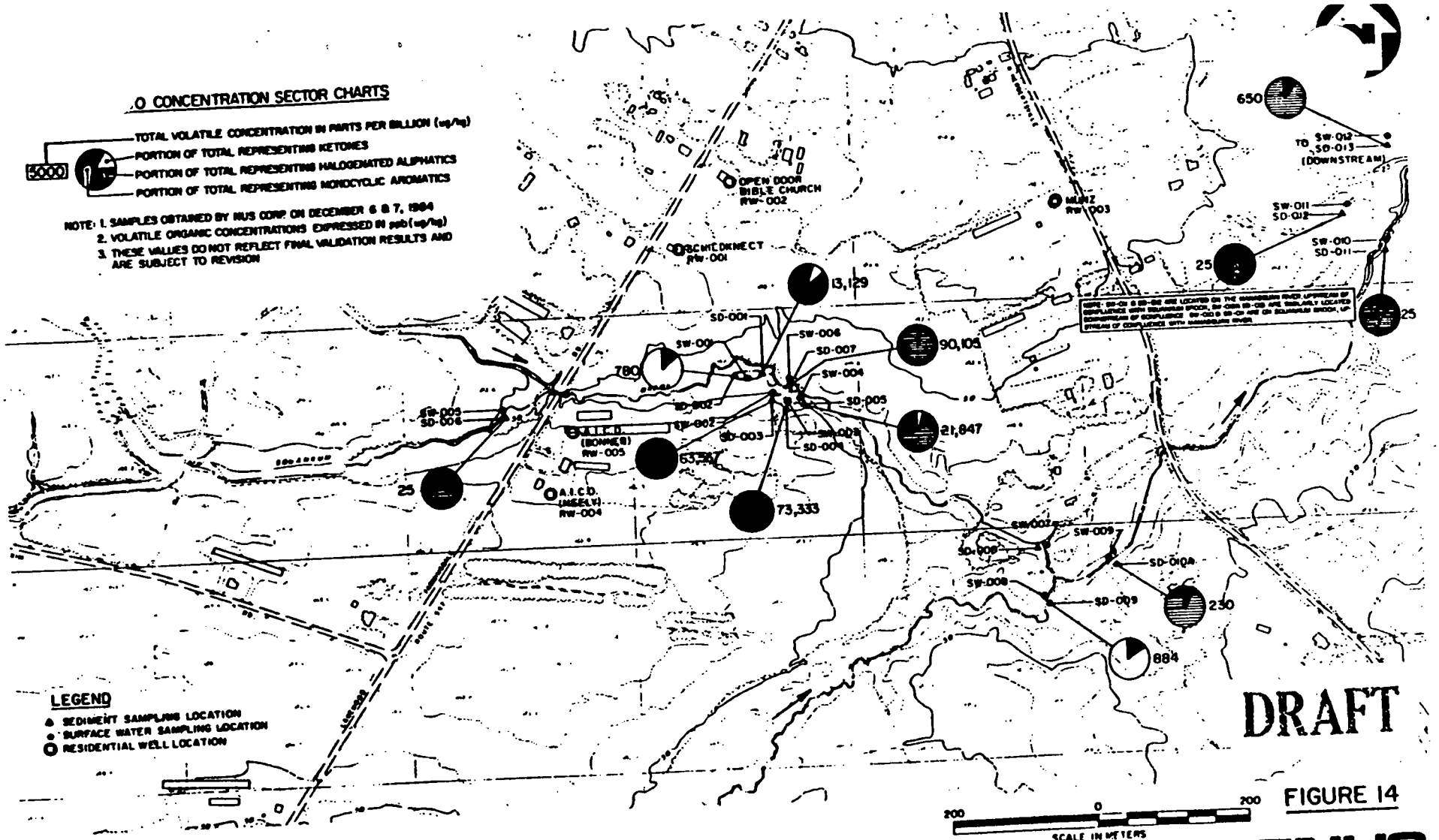

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FIGURE 14

ROUND 1
TOTAL VOLATILE CONCENTRATIONS IN SEDIMENT (PPB)
BOG CREEK FARM SITE, HOWELL TWP., NJ

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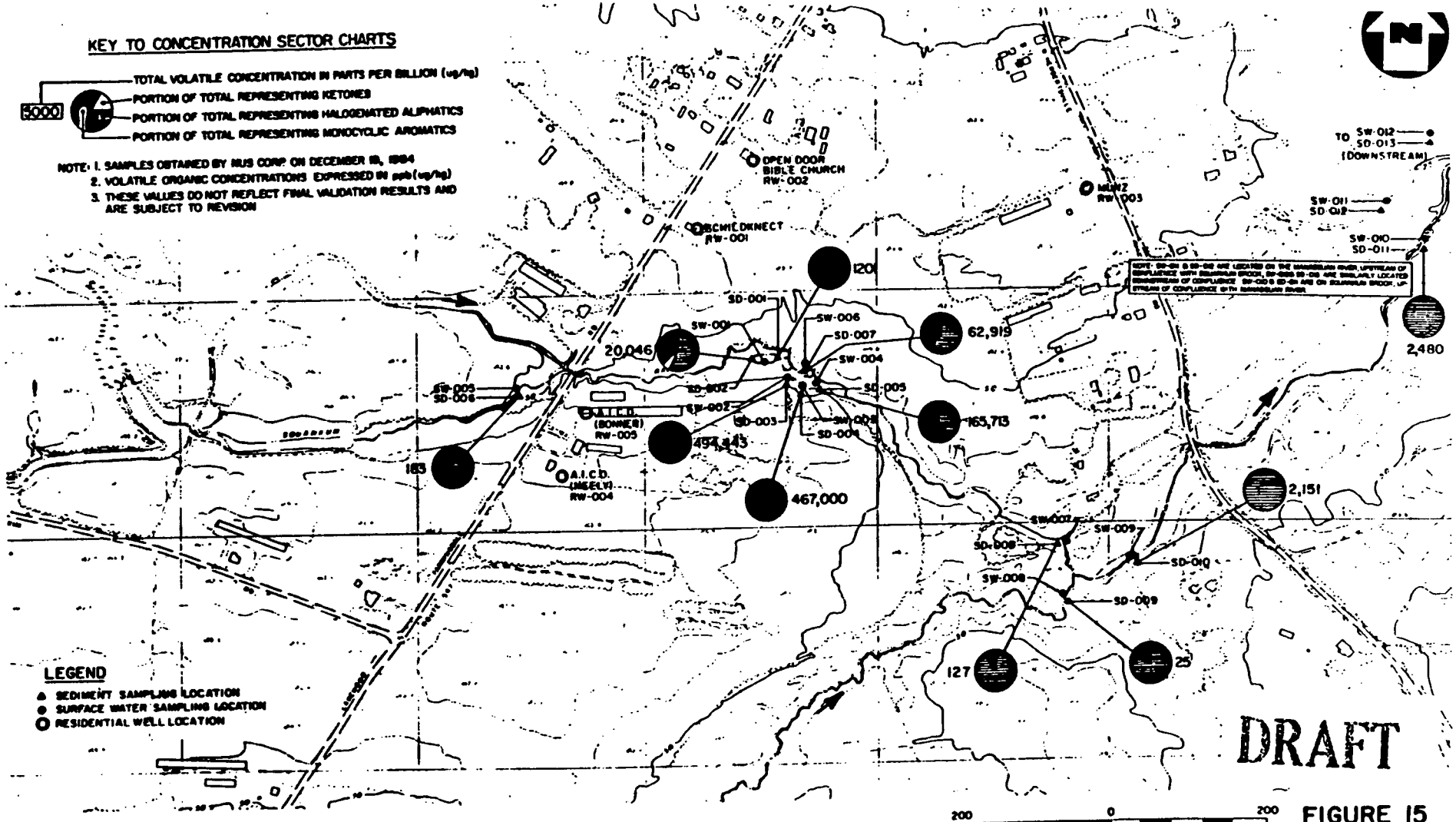

FIGURE 15

ROUND 2
TOTAL VOLATILE CONCENTRATIONS IN SEDIMENT (PPB)
BOG CREEK FARM SITE, HOWELL TWP., NJ

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- Extremely high concentrations of hazardous substances have been found below the surface in and around the waste-disposal trench at Bog Creek Farm. These contaminants could be uncovered by superficial digging at the site. In the event of a disturbance to the disposal area, people in the immediate vicinity would be endangered by potential direct contact with, or ingestion or inhalation of, the waste material.

- Contamination on the surface of the bog is sufficiently concentrated to affect humans or animals during a prolonged stay in this area. The bog is a small wetland of less than two-tenths of an acre. Although the area is thickly vegetated and animals have been sighted in the bog during field investigations, it constitutes an unhealthy environment due to elevated levels of metals and organic contaminants. The pond on-site is also contaminated and appears to be devoid of life.

Additional information regarding the nature and extent of contamination present at Bog Creek Farm and the health and environmental impacts associated with that contamination can be found in the Bog Creek Farm Remedial Investigation report, dated August 1985.

ENFORCEMENT

Previous investigations pertaining to Bog Creek Farm have indicated that Mr. Fred Barry, the former owner, was also the generator, transporter, and disposer of the hazardous waste at the site. The present owner of the site is AICO of Old Bridge, New Jersey.

In October of 1983, EPA sent Information Request letters, pursuant to Section 3007 of RCRA, 42 U.S.C. §6927, to Mr. Fred Barry, Mr. Sam Khoudary of AICO, and AICO requesting information pertaining to the site. The EPA did not receive any response to these letters. Due to the lack of response from the potentially responsible parties, the EPA did not issue any further information request letters.

A notice letter was sent on 26 September 1985 to Mr. Fred Barry, offering him the opportunity to conduct the remedial design and implementation of the proposed remedial action.

ALTERNATIVES EVALUATION

The feasibility study process involves, as a first step, selecting technologies that are appropriate for remedying the public health and environmental concerns associated with a particular site. In the case of Bog Creek Farm, the remedial objectives are to control the release of contaminants from the waste disposal area and to reduce the adverse public health and environmental

impacts associated with the high levels of contamination at the site. The remedial measure should be designed to alleviate the public health risks and environmental impacts associated with the buried wastes and contaminated soils present at Bog Creek Farm.

The remedial technologies selected for controlling the source of contamination at Bog Creek Farm fall into two categories: containment and removal. Considering available technologies and the site's physical conditions, several remedial alternatives were developed to effect source control. The preliminary remedial alternatives are listed and briefly described in Table 2. Capital costs and present worths for the alternatives are provided in Table 3. A more detailed description of the technology screening and remedial alternative development can be found in the Bog Creek Farm Feasibility Study report dated September 1985. The remedial alternative descriptions that follow identify each action, present the effectiveness and cost of the action, and address the action's consistency with other environmental laws. Consistency with other environmental laws is described more completely in a later section of this document.

Alternative 1 - No Action

The results of the remedial investigation indicate that there is significant contamination at Bog Creek Farm. The disposal trench contains waste deposits with high concentrations of hazardous substances: thirteen organic compounds and four metals have been found in concentrations exceeding 1,000 ppm. Approximately 9,000 cubic yards of soil at the site are contaminated with total volatile organic concentrations exceeding 10,000 ppm. Much of this contamination, in particular the volatile organics, is mobilized by the groundwater and has been migrating to the pond, the bog, and the North Branch of Squankum Brook. Four organic chemicals, chloroform, 1,2-dichloroethane, trichoroethene, and tetrachloroethene, were detected in the North Branch of Squankum Brook at ten times their ambient water quality criteria levels for human ingestion.. Ethylbenzene, benzene, xylene, and vinyl chloride were found in the bog at varying levels above their ambient water quality criteria.

If the site is left in its present condition, and no remedial action is taken, hazardous substances will continue to enter the groundwater and will then be carried to the surface. Furthermore, the presence of these contaminants constitutes a continued negative impact on the environment and a potential for negative public health impacts in the event of a natural or human disturbance of the disposal area. The No-Action Alternative provides a basis for elvaluating other remedial actions both in terms of their environmental benefits and their associated costs.

TABLE 2

DESCRIPTIONS OF REMEDIAL ALTERNATIVES

Alternative 1 - No Action
- Long-term, semi-annual monitoring of groundwater and surface water

Alternative 2 - Site Capping and Groundwater Treatment
- Cap waste disposal areas with multi-media cap
- Pump and treat groundwater

Alternatives 3 and 4 - Full Containment
- Containment options (using a multi-media cap and a sheet pile cutoff wall)
  1. Contain waste deposits (Alternative 3)
  2. Contain waste deposits and all contaminated soil to the 100-ppm Total Volatile Organic (TVO) limit (Alternative 4)

Alternatives 5,6, and 7 - Excavation
- Pond and bog remediation options
  1. Regrade both areas
  2. Regrade and cover both areas with soil
  3. Dredge both areas and cover with soil
- Excavation options
  1. Remove waste deposits
  2. Remove waste deposits and contaminated soil to the 10,000-ppm (TVO) limit above the water table only
  3. Remove waste deposits and contaminated soil to the 100-ppm (TVO) limit above the water table only
  4. Remove waste deposits and all contaminated soil to the 10,000-ppm (TVO) limit
  5. Remove waste deposits and all contaminated soil to the 100-ppm (TVO) limit
- Disposal options
  1. Off-site land disposal (Alternative 5)
  2. Off-site incineration (Alternative 5)
  3. On-site land-disposal (Alternative 6)
  4. On-site incineration (Alternative 7)

Actions common to Alternatives 2 through 7
- Fence Site
- Remove pond and bog water and regrade areas
- Perform long-term monitoring

TABLE 3

CAPITAL COSTS AND PRESENT WORTHS

Remedial Alternative	Capital Cost ($)	Present Worth ($)
1. No Action	-	396,000
2. Site Capping	733,000	3,768,000
3. Source Containment	1,452,000	2,027,000
4. Site Containment	2,819,000	3,282,000
5. Excavation with Off-site Disposal*•		
a. Source Option	1,874,000	2,201,000
b. Limited Option	6,367,000	6,761,000
c. Site Option	28,386,000	28,713,000
6. Excavation with On-site Land Disposal•		
a. Source Option	1,144,000	1,617,000
b. Limited Option	2,613,000	3,552,000
c. Site Option	7,438,000	8,334,000
7. Excavation with On-site Incineration	(This alternative has been significantl changed since the preparation of the Feasibility Study. Costs have not been prepared for this alternative in its final form. However, the Record of Decision specifies that both on- and off-site inceration will be given equal consideration, and the final selection of the dispoal option will be based on the availability of incinerator technology and capacity and the cost of disposal in either an on- or off-site incinerator.	

* Costs are provided for off-site land disposal. The incremental costs for incineration are estimated to be $470,000 for Source Excavation, $2,800,000 for Limited Excavation, and $13,700,000 for Site Excavation.

• Costs are based on dredging and regrading the pond and the bog (Option 3, Table 2).

The No-Action Alternative leaves a concentrated source of contamination in the ground which will continue to migrate. It also will fail to alleviate the threat of direct contact with the waste in the event of a disturbance of the disposal area.

Three containment alternatives were developed. One involves covering the site with an impermeable multimedia cap and then pumping and treating the groundwater. The other two alternatives involve the construction of full-containment systems of different sizes, each consisting of an impermeable cap and a sheet pile cutoff wall. The containment alternatives are evaluated below.

Alternative 2 - Cap Site and Treat Groundwater

The impermeable multi-media cap will reduce surface infiltration of precipitation, thus reducing the production of leachate in the waste disposal area. A properly maintained cap also reduces the risk of direct contact with the waste. This alternative also includes treating contaminated surface water in the bog and the pond on-site. These areas will then be covered with soil to prevent direct contact with existing contaminated soil. Groundwater will be extracted from the Upper Kirkwood Aquifer by pumping eighteen wells at the site. The extracted groundwater will also be treated on-site and released. The general site layout for this alternative is shown in Figure 16. Groundwater pumping will contain the contamination at the site and will further reduce leachate production but cannot be utilized as a means of removing the source of contamination. Whereas pumping groundwater to remove residual contamination from soils may be feasible in some instances where there is no concentrated source of contamination, the continued presence of the waste deposits, as in the scenario of this alternative, ensures the continued release of contaminants to the groundwater.

This alternative may meet the stated goal of CERCLA of "protecting public health, welfare, and the environment." It may also attain other applicable and relevant federal environmental standards. The exact reduction of leachate production cannot be predicted, so it is not possible to ensure that the release of contaminants from the site will not exceed background concentrations. The rate of contaminant release will be reduced by the construction of this alternative, but, since the source will still be present, it can be expected that the period of contaminant migration will be prolonged.

This alternative provides a means of controlling the release of contaminants from the site and reduces the risk of direct contact with the waste. The capital cost for construction of the alternative is very low. However, the pumping and treatment system is expensive and makes this alternative comparable in cost to the other alternatives developed. The capital cost for this alternative is $733,000. A 30-year present-worth analysis yields a total cost of $3,768,000.

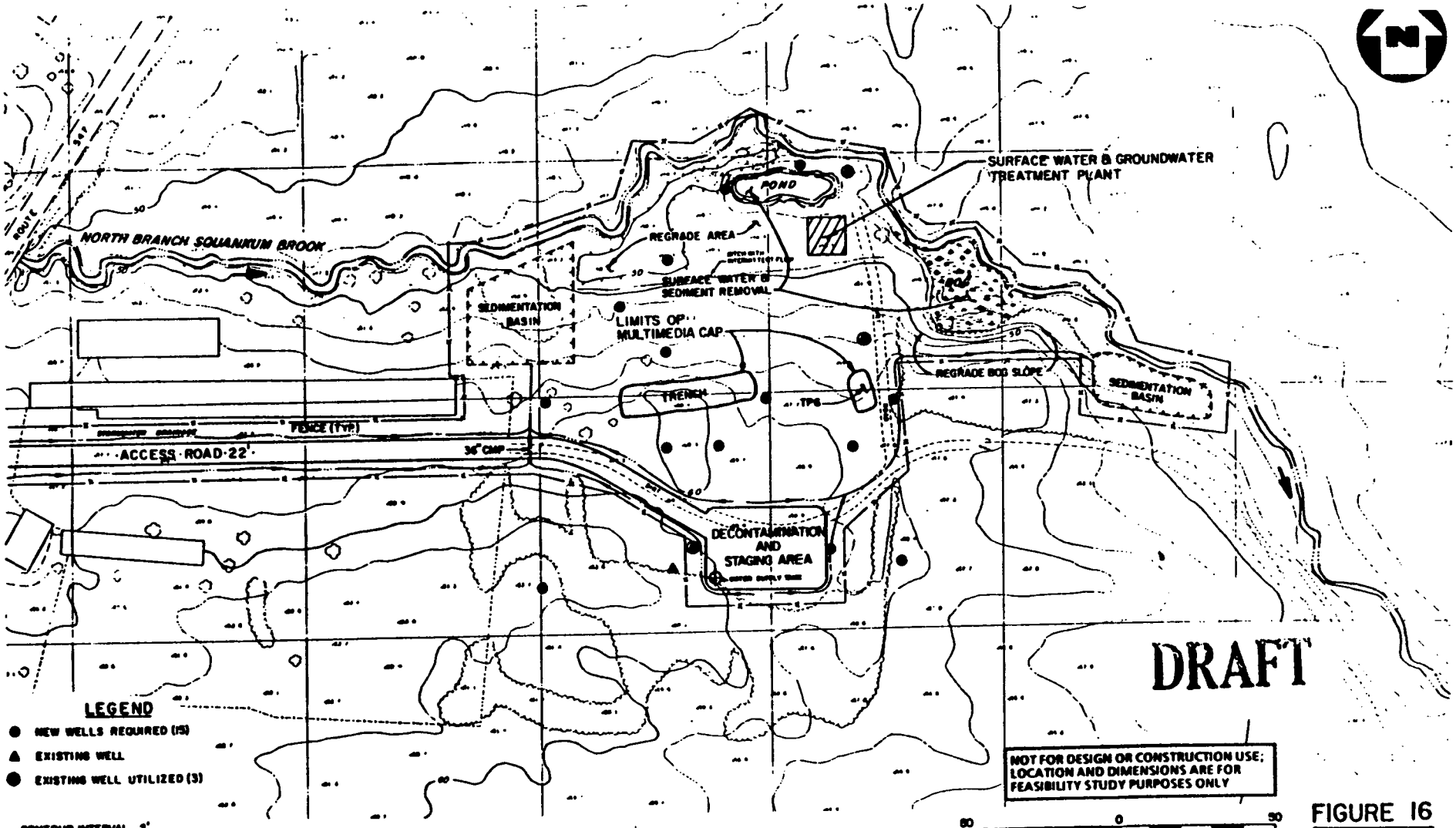

FIGURE 16

REMEDIAL ACTION 2

SITE CLOSURE W/ MULTIMEDIA CAPPING AND GROUNDWATER PUMPING

BOG CREEK FARM SITE, HOWELL TWP., NJ

SCALE: 1" = 100'

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Alternatives 3 and 4 - Encapsulation

Two encapsulation alternatives were developed for Bog Creek Farm. The Source Containment Alternative involves containing only the waste disposal area (Figure 17), whereas the Site Containment Alternative involves containing the waste-disposal area plus contaminated soils to the 100-ppm contour as defined in the Current Site Status section of this document (Figure 18). Both alternatives employ a multimedia cap and a sheet pile cutoff wall. The sheet pile cutoff wall was chosen rather than other vertical containment technologies because the hydraulic conditions at the site, particularly the pressurized lower aquifer, make these other techniques unreliable and difficult or impossible to construct. Both alternatives also involve removing pond and bog surface waters and regrading and covering these areas with soil.

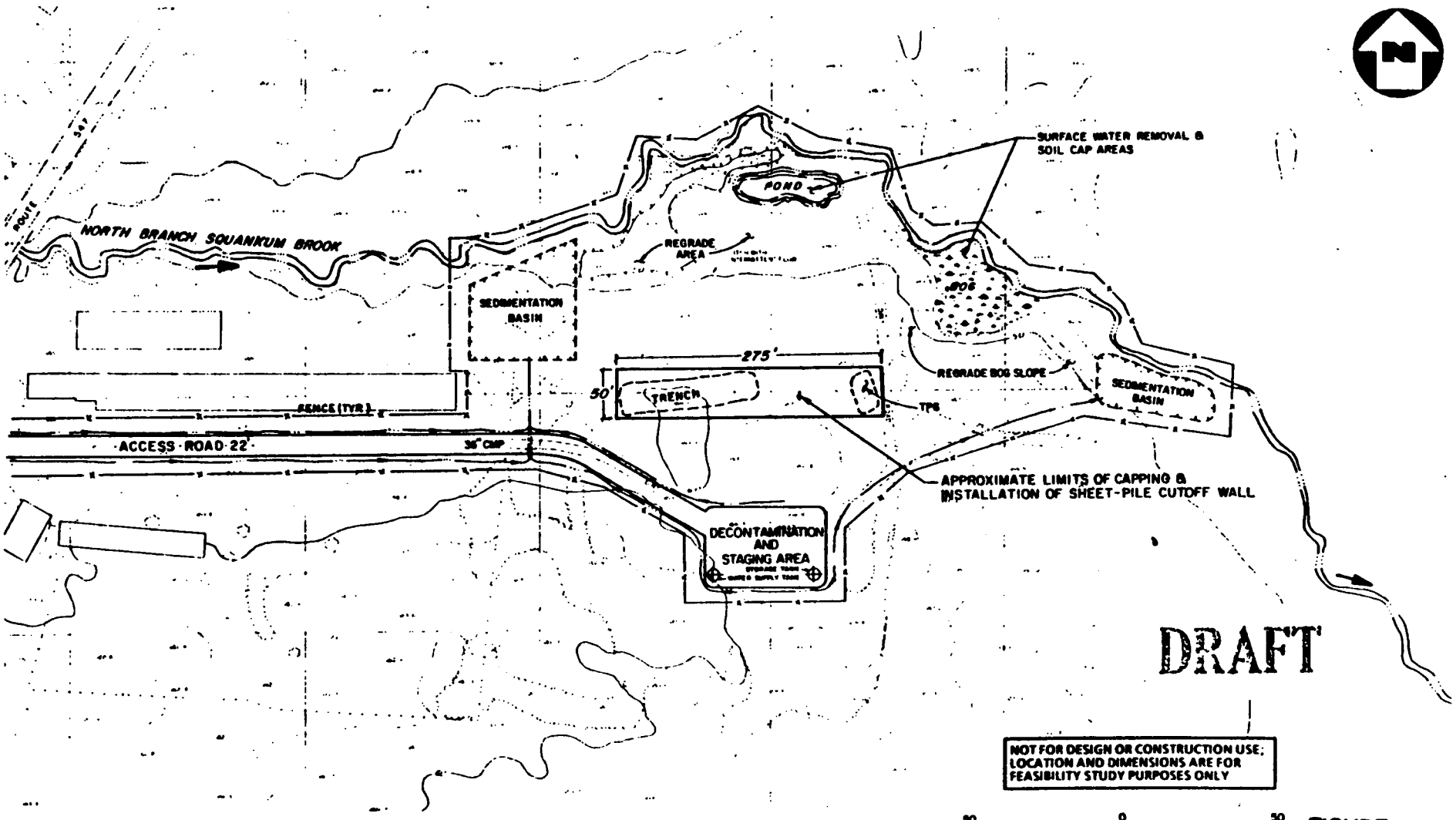
These alternatives are comparable in cost to many of the other alternatives developed for Bog Creek Farm (Table 3). However, the cutoff wall is not a reliable technology. The pressurized lower aquifer will tend to force leaks into the containment system, may lead to the formation of new bogs or marshes, and may cause contamination to spread to the currently-clean Lower Kirkwood Aquifer. Based on the unreliability of this technology and the potential for aggravating the environmental damage at the site, both of these containment alternatives were rejected in technical screening.

Alternatives 5, 6, and 7 - Excavation and Disposal

General Discussion of Excavation Options:

Several excavation options were developed for Bog Creek Farm. In all of these options, the surface water from the pond and the bog will be pumped, treated on-site and released into Squankum Brook. Both of these areas will then be either regraded, regraded and covered with additional soil, or dredged to remove contaminated sediments and then regraded and covered. Regrading is the minimum action required to prevent contaminated groundwater from ponding again in these areas. Long-term environmental monitoring is also common to all options.

Source Excavation, of approximately 2,400 cubic yards, would remove the actual waste disposal trench thereby removing all of the hazardous material which has not yet migrated. The waste trench contains, in part, deposits of elastic and resinous waste that were observed and sampled during test pitting. Total organic concentrations for these samples reached as high as 208,000 ppm (20.8%). At the time of disposal, only the sludges and semi-solid wastes were confined to the trench. The thinner liquids, mostly solvents, infiltrated the sand around



REMEDIAL ACTION 3
CONTAINMENT OF WASTE DEPOSITS W/ A MULTIMEDIA CAP AND GROUNDWATER BARRIER
BOG CREEK FARM SITE, HOWELL TWP., NJ

FIGURE 17

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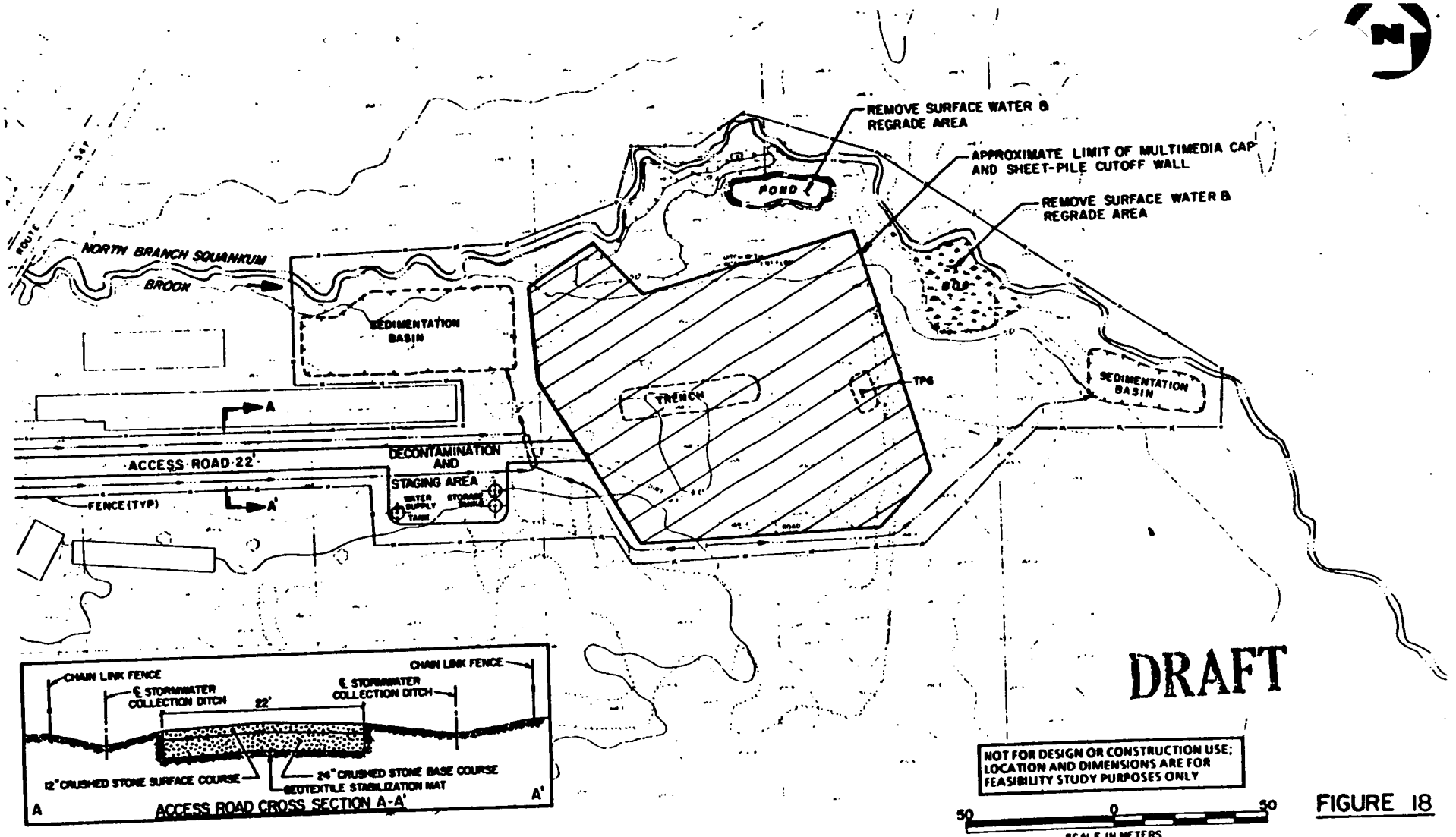

FIGURE 18

REMEDIAL ACTION 4

CONTAINMENT OF SITE CONTAMINANTS W/ A MULTIMEDIA CAP AND GROUNDWATER BARRIER

BOG CREEK FARM SITE, HOWELL TWP., NJ

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the trench filling voids between soil particles and running into the Upper Kirkwood Aquifer. This inundation of soil by organic liquids is a separate mechanism of migration from the convection of contaminants with the groundwater and accounts for the extremely high levels of TVOs in the ground immediately around the trench. Further away from the trench, soil contamination is due to the transport of chemicals in the groundwater. This migration depends on both the solubility of a given contaminant in water and the affinity of the soil for the contaminant.

Some contaminants, notably ethyl benzene and 2-butanone, have been found in the soil at the site but not in the brook indicating high soil affinities or rapid volatilization in the brook. Other contaminants, particularly non-volatile constituents such as isophorone and several phthalates have been found commonly in the soil but not in the groundwater or surface water. These contaminants will be most effectively removed by excavation. However, contaminants such as trichloroethene, tetrachloroethene, 1,1,1-trichloroethane, and 4-methyl-2-pentanone were not found in many soil samples but were common in groundwater samples and surface water samples from the bog and the brook. Benzene was also not common in soil samples but was found in the groundwater and in the bog. Excavation of residually contaminated soils will not remove these contaminants from the aquifer, but removal of the waste source will prevent future contamination of the aquifer, and removal of bog and pond waters and sediments will protect the public and the environment from high levels of these chemicals at the surface. The dewatering operation required for the more extensive excavation options will remove much of the contaminated water from the aquifer.

To prevent continual, long-term contamination of the groundwater and surface water, it is essential, as part of an excavation alternative, that the waste source be removed. Excavating only the waste trenches will not remove the soils that are highly contaminated with the more fluid wastes. This excavation will therefore fail to meet the CERCLA goal of adequately protecting public health and the environment, since a massive source of hazardous chemicals would continue to enter the groundwater and migrate to the surface even after implementation. Four additional excavation options, which involve excavating the waste trench and additional contaminated soils, are discussed below.

The 10,000-ppm TVO and 100-ppm TVO concentration contours described earlier define the horizontal limits for the four remaining excavation options. The other distinction is related to the ease of implementing the alternatives. The site is divided vertically

into a stratum above the water table, the vadose zone, and a stratum below the water table, the saturated zone. Excavating soils in the saturated zone requires dewatering the site. This involves installing a temporary sheet pile cutoff wall and pumping wells to lower the water table. The five excavation options include: excavating the waste trench only, the "Source Excavation"; excavating to the 10,000-ppm TVO contour in the vadose zone only; excavating all soil within the 10,000-ppm TVO contour above and below the water table, this option has been termed the "Limited Excavation;" excavating to the 100-ppm TVO contour in the vadose zone only; and excavating all soils within the 100-ppm TVO contour, which has been termed the "Site Excavation."

The vadose zone excavation options were both eliminated from further consideration in the technical screening stage. An analysis of the soil data shows that contaminants have tended to migrate downward into the saturated zone. The cross-sections (Figures 5 through 9) help illustrate how a deeper excavation, into the saturated zone, is required to remove the bulk of the residual contamination. Figure 19 presents approximate percentages of residual contamination removed versus the cost of hauling and disposing of the material offsite. This cost/benefit analysis, while utilizing off-site disposal costs for comparison, is relevant to the excavation discussion in general, regardless of the disposal option utilized. The percentages given in this figure are based on the estimated volume of waste material outside of the trench only. The material within the trench is too heterogeneous for its mass to be calculated. The most striking comparison can be made between the Limited Excavation which removes 50% of the residual contamination for one-half the cost of the 100-ppm vadose excavation, which removes only 20%. The vadose zone excavations are less effective than the corresponding total excavations and are not significantly less expensive. For this reason, vadose zone excavations were eliminated from further consideration.

THE REMAINING EXCAVATION OPTIONS ARE LIMITED EXCAVATION AND SITE EXCAVATION.

Limited Excavation will remove the most contaminated soils as well as the waste deposits. TVO concentration data from the three-dimensional sampling grid has allowed the determination of approximate limits for a 10,000-ppm excavation. The actual limits may need to be refined during design by additional sampling. In any event, field measurement of TVO concentration will need to be used during implementation to ensure that all soils with concentrations above 10,000 ppm are removed. Excavating additional contaminated soil will further protect public health and the environment by removing high concentrations of hazardous contaminants that would present a health threat if exposed. The

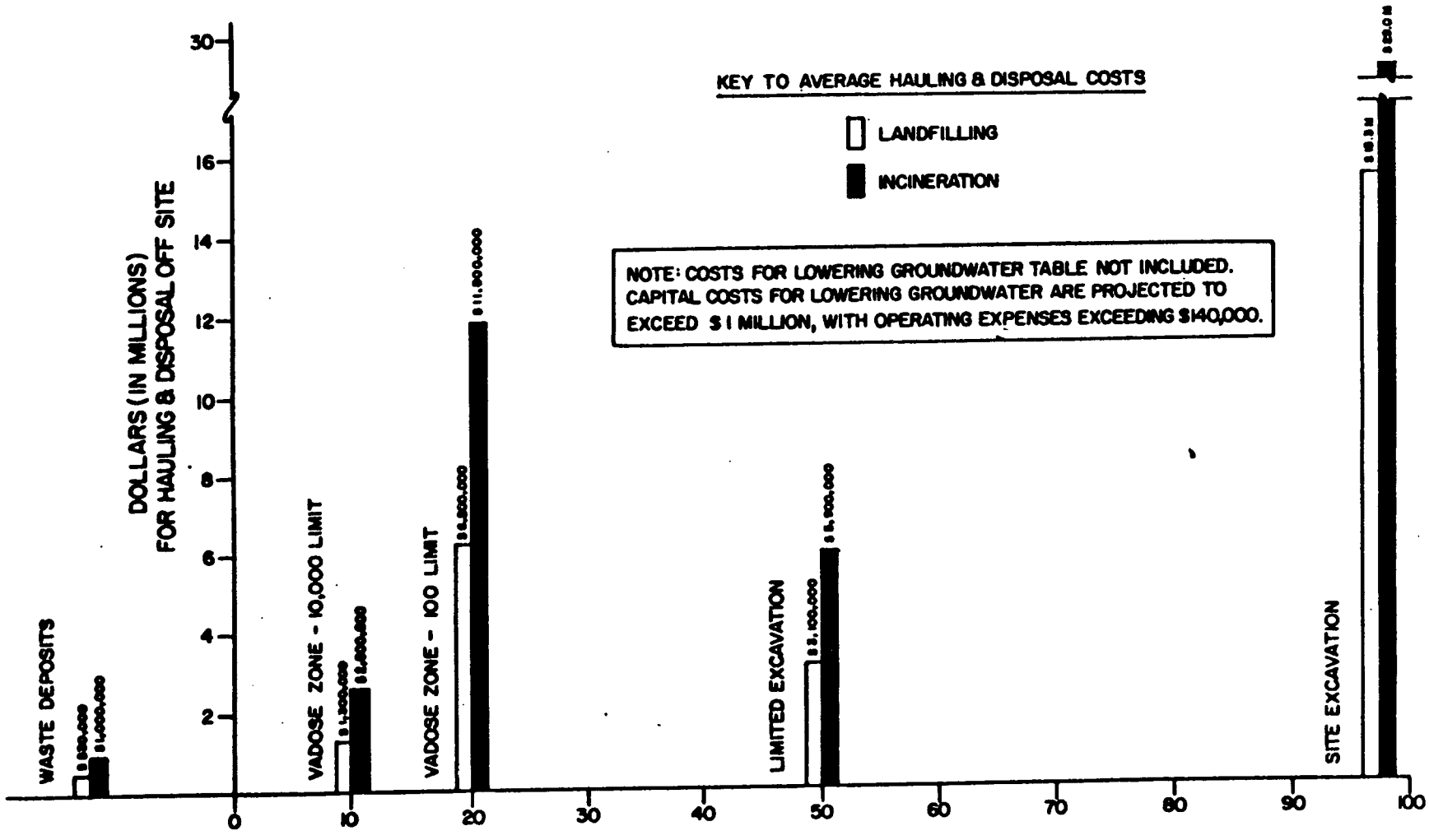

FIGURE 19

RELATIVE EFFECTIVENESS SUMMARY
BOG CREEK FARM SITE, HOWELL TWP., NJ

additional excavation will also aid the restoration of the shallow aquifer thereby accelerating the return of Squankum Brook to background condition. Compliance with other environmental statutes will depend on the effectiveness of the additional excavation with regard to reducing releases from the site to background levels. It is possible that this option will comply with all other environmental laws.

The Limited Excavation involves the removal of 14,000 cubic yards of highly contaminated material. Much of this material contains only residual contamination which may be removable by some form of soil washing or soil air stripping. Using a soil washing technology and returning treated soils to the site would eliminate the need to dispose of large quantities of hazardous material. As such disposal is extremely expensive, on-site soil washing offers a most advantageous alternative for the handling of this waste. However, there is a lack of information regarding the feasibility of using soil washing at this site. EPA's Office of Research and Development (ORD) has been approached in regard to conducting a study to determine the applicability of this technology. ORD maintains a mobile soil-washing unit in Edison, New Jersey that may be usable at the site. An evaluation of soil washing should be conducted concurrently with the design for the rest of this remedial action.

Site Excavation at Bog Creek Farm will remove virtually all soil contamination to background levels. The risks associated with direct contact of wastes or contaminated soils will be eliminated.

Some contamination may remain in the Upper Kirkwood Aquifer, although much of the affected water will be removed by the dewatering operation. The residual contaminants will migrate in small amounts to the North Branch of Squankum Brook until any residual contamination has flushed from the aquifer. This release may never be detectable above background levels in Squankum Brook. In this event, this option would be in compliance with all other compliance with all other environmental laws. If some release of contaminants does continue, this option may still attain standards of other environmental laws through the setting of Alternate Concentration Limits. This topic is more completely addressed later in this document.

The effectiveness of the Site Excavation alternative exceeds that of all other excavation options. However, the cost of implementing this alternative is much greater than the cost of implementing Limited Excavation. The higher cost is due to the increased volume of material to be handled and disposed. The volume of material to be managed may be significantly reduced by segregating clean and contaminated soils, soil washing the less contaminated soils, and returning the treated soils to the site. An evaluation of the feasibility and cost of implementing soil washing will be conducted concurrently with the remedial design.

Figure 20 provides a site layout for Alternative 5 and approximate limits for all of the excavation options.

Alternative 5 - Excavation With Off-Site Disposal

This alternative considers both disposal at an off-site landfill and incineration at an approved facility. It should be specifically noted that the intent of this Record of Decision is to consider both off-site and on-site incineration disposal options, depending on applicable costs at the time of implementation. On-site disposal is considered in the final two alternatives.

Off-site land disposal has several problems associated with it. It may cause project delays if RCRA landfill space is not immediately available, it is very expensive, and it is an unreliable means of disposal for material with high concentrations of very mobile compounds such as the Bog Creek Farm waste. In contrast, incineration offers destruction of the hazardous chemicals in the waste deposits and soils. The high concentrations of volatile chemicals make this waste more amenable to incineration since less heat is required to vaporize the chemicls for burning. Despite its higher cost, incineration is a more environmentally sound means of disposal for the Bog Creek Farm waste. As mentioned previously, these costs may be reduced by implementing soil segregation and soil washing.

Compliance with other environmental laws is dependent on the level of excavation chosen. The facility chosen to receive the waste from the site must be in compliance with all environmental laws. As discussed previously, Limited and Site Excavations implemented as part of this alternative should attain or exceed all applicable and relevant Federal standards.

A summary of the costs associated with both of these disposal options for each level of excavation is presented graphically in Figure 19. Capital costs and present worths for each excavation option are presented in Table 3.

Alternative 6 - Excavation With On-Site Disposal in a Landfill

On-site disposal of excavated waste and contaminated soil was also developed as an alternative. This alternative includes all the elements of excavation with off-site disposal as discussed (bog and pond removal and subsequent cover, fencing the site, and covering the site) except for disposal at an off-site facility. This alternative will create a RCRA-approved landfill at Bog Creek Farm. The draft feasibility study performed by NUS only considered utilizing an on-site landfill for the Source and Limited Excavation options. The area needed for landfilling of the material generated by the Site Excavation option exceeded the property boundary and for this reason, the option was not considered. This artificial constraint has been eliminated, and the relevant costs for

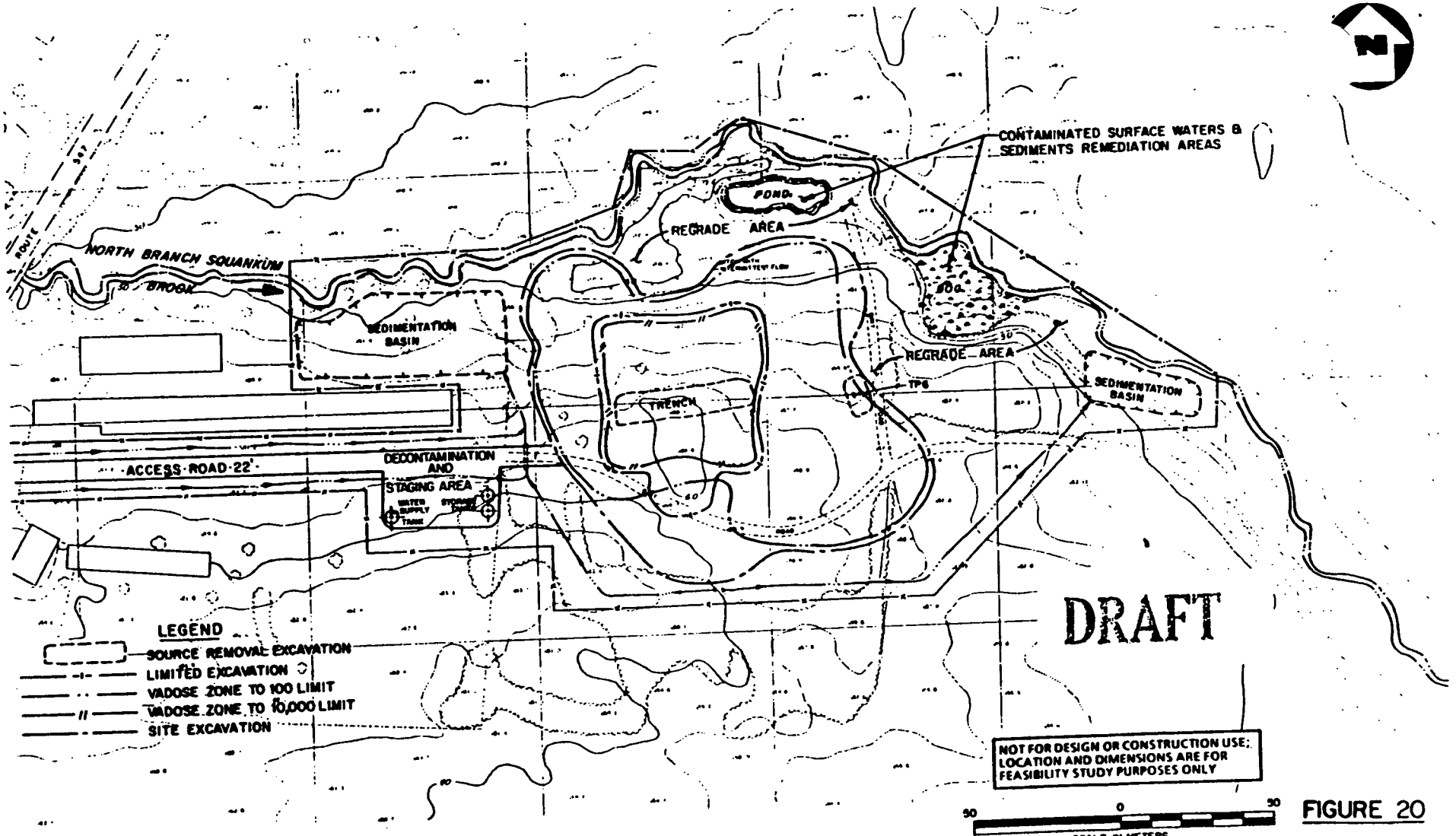

FIGURE 20

REMEDIAL ACTION ALTERNATIVE 5
EXCAVATION OF WASTE DEPOSITS WITH OFFSITE DISPOSAL IN AN APPROVED FACILITY
BOG CREEK FARM SITE, HOWELL TWP., NJ

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on-site landfilling of the material removed in the Site Excavation option have been developed by NUS and included in Table 3 of this document. This information will be included in an addendum to the final feasibility study report. The site layout is shown in Figure 21.

Environmental considerations peculiar to this option relate to the presence of a landfill at Bog Creek Farm. Constructing a landfill at the site will greatly increase operation and maintenance costs and responsibilities. In addition to environmental monitoring, the landfill will require perpetual, periodic maintenance, and replacement or overhauling at the end of its useful life. Failure to provide essential maintenance would endanger public health and the environment; and the site would revert to its present condition. Negative aspects of off-site landfilling which do not apply to this alternative are the use of limited space in a RCRA landfill and the associated costs and delays encountered in implementing such an alternative.

For Limited and Site Excavation, on-site landfilling is considerably less expensive than off-site disposal. Capital costs and present-worth analyses are provided for all three excavation options in Table 3.

This alternative may comply with other environmental laws. However, the performance of the landfill is critical to meeting this goal. The potential for leakage of the highly mobile contaminants present at the site makes this alternative less reliable than Alternative 5.

Alternative 7 - Excavation With On-Site Treatment and Disposal

The final remedial alternative considered for Bog Creek Farm in the draft feasibility study prepared by NUS includes performing the Site Excavation option, reducing the volume and hazardous quality of the excavated material by incinerating it in a temporary on-site incinerator, and disposing of the end product in an on-site RCRA landfill. Several points need to be made relating to this option. First, there is a great likelihood that the by-product of incineration will not be hazardous and will not require the environmental controls mandated by RCRA. This will reduce the costs to implement this alternative. Second, the NUS study only estimated the costs associated with the incineration of the material generated by the full Site Excavation option, not the lesser volume associated with the Source and Limited Excavation options. Although the feasibility study did not consider on-site incineration for the less extensive excavations, it is not the intent of this Record of Decision to limit the disposal of this material to off-site incineration. On-site incineration will be fully considered as a disposal option regardless of the volume of material to be handled.

Compliance with other environmental laws is the same for this alternative as for Alternative 5.

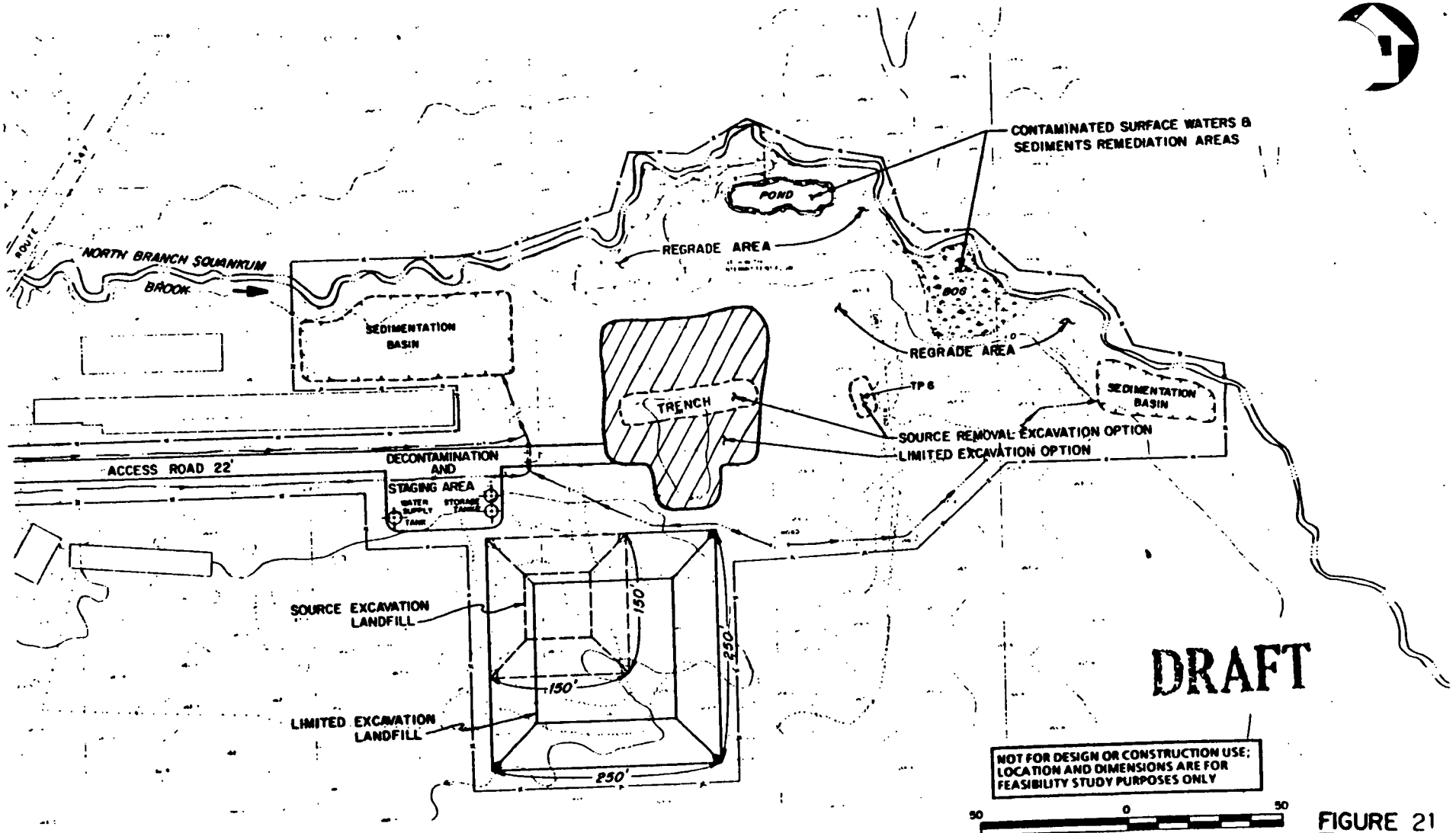

FIGURE 21

REMEDIAL ACTION ALTERNATIVE 6
EXCAVATION OF WASTE DEPOSITS WITH ONSITE DISPOSAL IN A DOUBLE-LINED, MULTIMEDIA-CAPPED LANDFILL
BOG CREEK FARM SITE, HOWELL TWP., NJ

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Figure 22 presents the site layout for the alternative as developed in the feasibility study, that is, the layout includes the placement of an on-site incinerator as well as the siting of a RCRA landfill as needed for the Site Excavation.

Discussion

The alternatives developed for Bog Creek Farm fulfill the National Contingency Plan requirement in that at least one alternative from each of the following groups is considered: the no-action alternative; alternatives that do not attain applicable or relevant environmental standards but provide significant protection to public health, welfare, and the environment; alternatives that exceed applicable or relevant environmental standards; alternatives that attain applicable or relevant environmental standards; and alternatives that use treatment or disposal at an off-site facility. In accord with the off-site policy, alternatives that utilize treatment in addition to, or in place of land disposal have been carried through the screening process. Alternatives that utilize only on-site treatment and disposal have also been developed.

Several alternatives were dropped from further consideration in initial screening. The reasons for eliminating these alternatives were discussed previously and are summarized as follows:

- the two alternatives that employed caps and sheet pile cutoff walls to contain the wastes were eliminated due to a lack of effectiveness and the potential for detrimental environmental effects,

- the two vadose-zone excavation options were eliminated because of their low effectiveness compared to other excavation options with similiar costs,

- the No Action Alternative and the Source Excavation option fail to meet any of the remedial objectives and would allow at least part of the source of concentrated hazardous materials to remain at the site threatening public health, welfare, and the environment.

One of the remaining alternatives is Site Closure with Multimedia Cap and Groundwater Pumping. The containment associated with Site Closure is relatively unreliable and ineffective. This alternative would reduce leachate production by eliminating infiltration, but depends on groundwater pumping to contain the contaminated groundwater plume. Since the source deposits of waste would remain at the site, groundwater pumping would be required indefinitely. During high water-table periods, the waste itself may be located within the saturated zone, causing leachate production to increase. As a result, the periodic

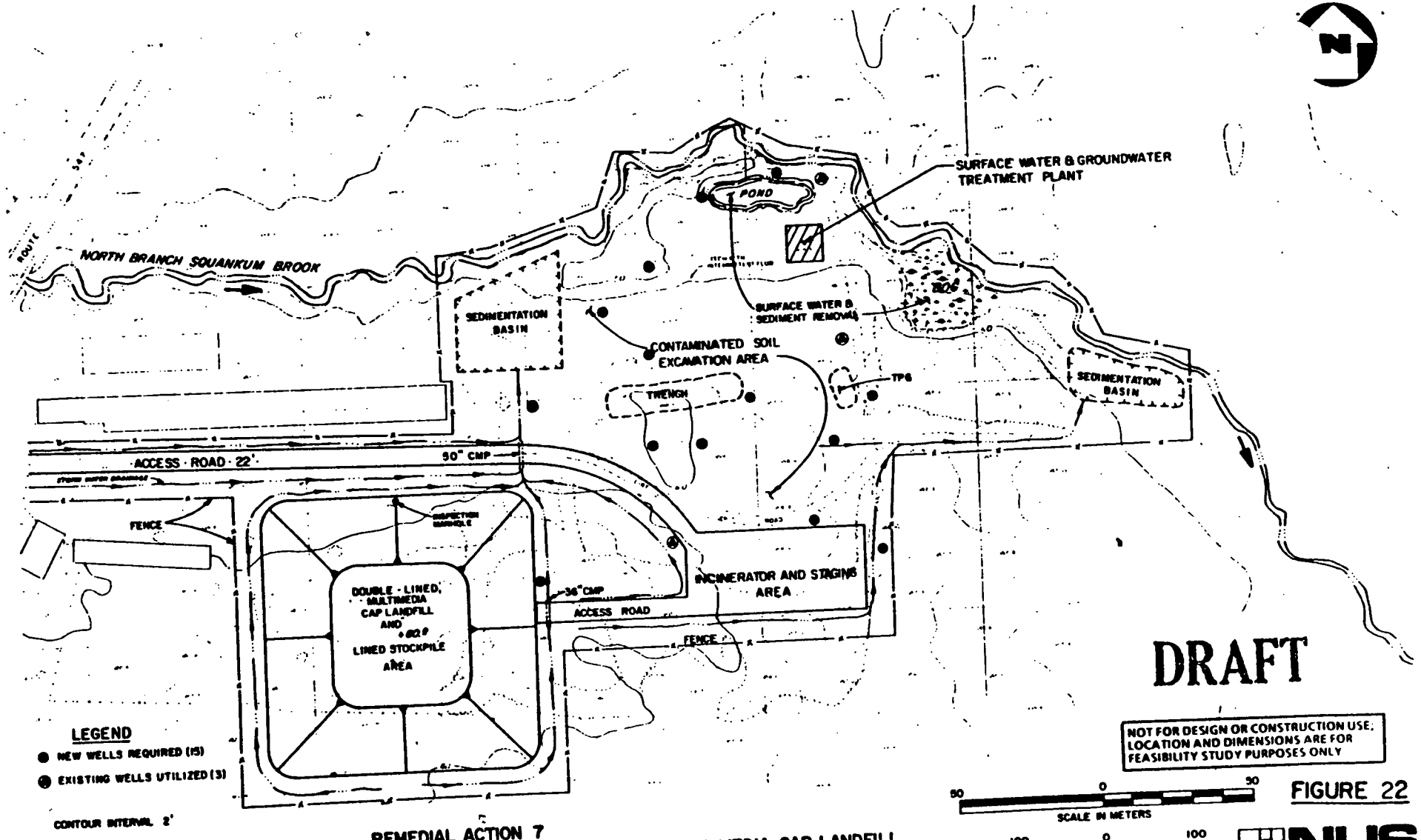

FIGURE 22

REMEDIAL ACTION 7

FULL SCALE EXCAVATION WITH ONSITE INCINERATION AND DOUBLE - LINED, MULTIMEDIA CAP LANDFILL

BOG CREEK FARM SITE, HOWELL TWP., NJ

NUS CORPORATION

A Halliburton Company

release of contaminants to Squankum Brook would continue. If the groundwater pumping system proves ineffective or if it is ever discontinued, continuous release of contaminants to Squankum Brook will resume. This would probably constitute a violation of applicable RCRA regulations.

The final two alternatives to be considered are the Limited and Site Excavations utilizing various means of disposal. Both alternatives remove the waste deposits and offer protection from future exposure of this hazardous material. They differ in the amount of contaminated soil to be removed.

If the Limited Excavation option is implemented, soils with total volatile organic concentrations approaching 10,000 ppm will remain on-site. Direct contact with this level of contamination is possible and some of the contaminants left in the soil will leach into the groundwater and migrate to the North Branch of Squankum Brook. Based on preliminary modeling, the migration of contaminants will be less severe than it is currently. A decision to pursue the Limited Excavation option will require additional site-specific risk/transport modeling to ensure that the continued release does not pose any threat to public health or the environment.

Site Excavation will remove virtually all contaminated soil from the site. Furthermore, contaminants in the groundwater will be mostly removed by the dewatering operation. It is possible that no future release of contaminants will occur if this alternative is implemented. Site Excavation is considerably more expensive than Limited Excavation, but the environmental benefits are greater.

The cost of excavation and the problems associated with disposal of a tremendous quantity of waste may be significantly reduced by utilizing on-site soil segregation and soil washing. For example, in the case of Site Excavation, an estimated 35,000 cubic yards of excavated soil may be clean. If this soil can be separated and returned to the site, and if soils containing less than 10,000 ppm TVO can be soil washed and returned to the site, only 10,000 cubic yards of material may need to be hauled off-site to a landfill or incinerator. This would substantially reduce the cost for disposal. The cost of the alternative will be increased by the additional costs of soil segregation and soil washing, but the hauling and disposal savings may be more significant, resulting in a net cost reduction. Similarly some savings could also be realized if this approach were applied to the Limited Excavation option. Recovering chemicals from the waste trench for reuse has been dismissed as an infeasible approach to achieving a net cost reduction despite the high levels of chemical contaminants present.

The feasibility and cost of soil segregation will need to be determined during detailed design of the alternative, and the feasibility and cost of soil washing will need to be determined by a study of this technology. EPA's Office of Research and Development has already been approached with regard to conducting such an analysis.

There are basically four disposal options which can be applied to the material excavated from the Bog Creek Farm site:

- disposal in an on-site RCRA landfill,
- disposal in an off-site RCRA landfill,
- destruction in an on-site incinerator, and
- destruction in an off-site incinerator.

The major negative aspect of the on-site landfill involves the the permanent maintenance requirement which potentially lowers the reliability of this alternative, and the eventual need to overhaul or replace the landfill which increases its long-term cost.

The off-site landfill disposal option is subject to overall capacity constraints, high cost, and potential delay due to unavailable disposal capacity at the time of construction. In addition, the material at Bog Creek Farm is highly concentrated and mobile and would best be handled by total destruction rather than by land disposal, with all its associated monitoring and maintenance costs.

Incineration offers the best alternative in terms of reducing any long-term environmental threat, although the cost is greater. The Bog Creek Farm material, being highly concentrated, is particularly amenable to incineration. Both on-site and off-site incineration are believed to be technically and environmentally sound alternatives and need not be differentiated at this time. Selection of on-site versus off-site incineration should be a function of the technology available and cost at the time of project implementation.

COMMUNITY RELATIONS

On 14 August 1985, EPA made the draft RI/FS available for public comment by placing three copies of these documents in public repositories at the Howell Township Municipal Building and the Howell Township Public Library. The public was notified of the availability of the documents by a letter to the township administration and a news release sent to all those on the Bog Creek Farm mailing list. The public comment period began on this date and extended through September 13.

A public meeting was held on 5 September 1985 to present the findings of the RI/FS, propose a remedial action, and respond to public comment. This meeting was attended by four representatives of EPA, three employees of NUS Corporation, the NJDEP site manager, a representative of the Monmouth County Health Department, the Howell Township administration and several residents of Howell. Public concern centered on the availability of Superfund money in light of the impending need for CERCLA to be reauthorized and rapid implementation of the EPA's selected alternative. Public involvement and interest in

this site have been very limited. A Responsiveness Summary, based on comments from the public meeting, is attached to this document.

CONSISTENCY WITH OTHER ENVIRONMENTAL LAWS

Wetlands Assessment

The bog at Bog Creek Farm is a very small wetland occupying less than two-tenths of an acre. In accordance with Executive Order 11990, the present condition of this wetland, the likelihood of successful remediation, and the environmental and public health threats presented by its continued existence were considered. Also, the plans for remediating this site were made available to the public on 14 August 1985 and a public meeting was held on 5 September 1985 to discuss remediation of Bog Creek Farm. The public comment period ran through 13 September 1985. At this time, the surface of the bog is highly contaminated with organic and metalic chemicals. In the interest of protecting public health and the environment, contaminated waters and sediments should be removed from this bog.

The contamination in the bog is the result of groundwater discharge from the Upper Kirkwood Aquifer. Therefore, draining and dredging the bog would only temporarily solve the problem. It is essential to regrade and cover this area to prevent it from re-forming as a contaminated wetland. Other wetlands, some much larger than this one, are present nearby along Squankum Brook and the Manasquan River, therefore it appears that this bog does not provide a unique environment or habitat.

Compliance With RCRA

The remedial alternatives developed for Bog Creek Farm were examined to determine to what extent residual contamination would continue to migrate from the site. For the purpose of evaluating compliance of these alternatives with RCRA, the property line was used as the facility boundary. Alternatives were assessed with regard to the potential for contamination to migrate beyond this boundary. The mechanism for such migration is convection with the groundwater. This migration could also carry site contaminants into the North Branch of Squankum Brook which could constitute a violation of Clean Water Act regulations as well. Since RCRA requires the more stringent requirement that releases not exceed background levels, this criterion was used as a goal for all remedial alternatives.

Site Excavation may immediately reduce releases from the site to below background levels, thereby exceeding relevant environmental standards. Limited Excavation may allow some release of contaminants from the site until the aquifer has flushed. Accelerated aquifer remediation was examined to determine if

the duration of these releases could be shortened. The limited yield of the Upper Kirkwood Aquifer precludes high pumping rates, severely limiting the effectiveness of this remediation scheme. The contaminants released after Site Excavation will be less concentrated than current levels, and within five to ten years, Bog Creek Farm will not contribute to contamination of the brook. Other than Limited and Site Excavations, all alternatives considered allow permanent migration of some level of contamination from the site.

The contamination of Squankum Brook may be reduced below background levels or may require setting an Alternate Concentration Limit (ACL) in accordance with RCRA. A determination as to the allowable level of residual soil contamination will be made using site-specific exposure/risk modeling to demonstrate that any residual poses no threat to health or the environment. Preliminary groundwater modeling has indicated that Limited Excavation may reduce contaminant loading to the North Branch of Squankum Brook to sufficiently low levels to justify setting an ACL.

RECOMMENDED ALTERNATIVE

The National Oil and Hazardous Substances Pollution Contingency Plan, in 40 CFR Part 300.68(i), specifies that the lead agency will select "... a cost-effective remedial alternative which effectively mitigates and minimizes threats to and provides adequate protection of public health, welfare and the environment. This will require selection of a remedy which attains or exceeds applicable or relevant Federal public health or environmental standards..." In addition, 40 CFR Part 300.68(d) states that "Response action may be conducted in operable units. ...In some instances, implementation of operable units can and should begin before selection of an appropriate final remedial action if such measures are cost-effective and consistent with a permanent remedy." Evaluation of the suggested remedial alternatives leads to the conclusion the action described below is a cost-effective operable unit consistent with a permanent remedy for the Bog Creek Farm site.

The various aspects of the recommended alternative are described below along with the rationale for selection:

Three levels of remediation were evaluated for the bog and the pond, both of which are highly contaminated at the surface, At a minimum, both the bog and the pond must be regraded to prevent groundwater discharge from re-forming contaminated wetlands in these areas. However, this action would afford only minimal protection from future contact with the highly contaminated materials left behind. A slightly more expensive action would be to regrade and then cover the areas with clean fill or a compacted cap. Although this would offer additional protection from direct contact or eventual exposure and migration of the waste, it was found that for a minimal

additional cost, the contaminated bog and pond sediments can be removed. The cost-effective remedial action for the pond and the bog involves dredging to a depth of approximately three feet, regrading, and covering with additional fill as necessary to prevent reponding.

Several levels of excavation were considered for the waste-disposal area. Site Excavation offers removal of nearly all contaminated material and immediate reduction of contamination of Squankum Brook. Limited Excavation leaves highly contaminated soils below the surface at the site, but preliminary modeling indicates that contamination migrating from the site may be reduced from current levels.

Limited Excavation is considerably less expensive than Site Excavation and is the recommended alternative. However, it must be considered an interim remedy pending the results of more extensive groundwater modeling. Currently, compliance with RCRA requires removal or treatment of contaminated material down to background levels, a maximum contaminant level, or an ACL. Until the site-specific modeling is fully performed, no decision will be made as to an allowability of an ACL. This approach is described in the 8 July 1985 memorandum from John J. Stanton, Director, CERCLA Enforcement Division to David Buente, Chief, Environmental Enforcement Section, DOJ. Environmental monitoring will be required after implementing Limited Excavation to confirm the predictions of groundwater modeling and assure the effectiveness of the remedy. If it is found that Limited Excavation fails to provide adequate protection of public health and the environment, additional excavation may be required.

The remedial design will determine whether it is feasible to segregate excavated material from the waste disposal area, the bog, and the pond. Concurrent with the remedial design, a study will be conducted in conjunction with the Office of Research and Development to determine the feasibility of using some form of soil washing at the site. If it is found that such a technology can be cost-effectively applied, treatable soils may be decontaminated and returned to the excavation pits. Soil segregation and soil washing are two innovative technologies that, if implemented, will enhance the cost-effectiveness of this alternative by reducing its overall cost or by reducing the amount of material which will need to be handled.

Contaminated water will be removed from the pond and the bog, and groundwater will be pumped to facilitate the deeper excavation at the site. This water will be treated on-site in a temporary unit utilizing air stripping and activated-carbon treatment. This option was compared to off-site treatment in the feasibility study and found to offer equivalent protection at lower cost.

After consideration of the nature of the contaminated material at Bog Creek Farm, it is recommended that this material be totally destroyed by incineration rather than disposed of in a RCRA landfill. Consistent with EPA's CERCLA off-site policy, it is believed that the long-term environmental and public health benefit outweighs the additional cost. No differentiation is being made at this time relative to on-site versus off-site incineration. Both methods are technically feasible and environmentally sound. Final selection will be based upon the availability of technology and capacity and the cost at the time of implementation.

After the contaminated soil has been excavated and any clean material returned to the excavation area, the site will be backfilled and regraded to prevent ponding, and revegetated.

During implementation, monitoring will be conducted to ensure compliance with this Record of Decision. At the completion of the remedial work, a follow-up monitoring program will be initiated to ensure the effectiveness of the action. This program will involve monitoring groundwater, surface water, and sediments periodically.

Prior to initiating remedial work at the site, a security fence, an access road, a contamination reduction area, and any other support facilities needed will be constructed.

A detailed cost summary is provided in Table 4. Note that these costs are based on off-site landfilling. As illustrated in Figure 19, the cost for off-site incineration is approximately 2,800,000 dollars greater.

OPERATION AND MAINTENANCE (O&M)

Operation and maintenance of the site will include long-term monitoring and maintenance of the vegetation and soil cover. The costs for these two activities are anticipated to be $38,800 per year for sampling and anlysis and $15,600 per year for site maintenance. Environmental monitoring will be required until the effectiveness of the remedy is assured. Operation and Maintenance will be funded as specified in CERCLA and the NCP.

SCHEDULE

Project Milestone	Date
- Approve Remedial Action	September 1985
- Complete Enforcement Negotiations	14 October 1985
- Award State Contract	Pending CERCLA Reauthorization or State Funding

- Initiate Design	Pending CERCLA Reauthorization or State Funding
- Complete Design	Pending CERLA Reauthorization or State Funding

FUTURE ACTIONS

Additional studies required to implement the selected alternative have been discussed above. In summary, they include:

- An evaluation of the feasibility of using soil segregation to reduce the volume of excavated material to be incinerated. This analysis should be conducted as part of the detailed design of this alternative,

- An evaluation of the feasibility of using soil washing to reduce the volume of excavated material to be incinerated. This study will be conducted in conjunction with ORD, and

- A more detailed site-specific exposure/risk modeling to better define the threat that residual contaminants pose to public health or the environment. This modeling effort will aid in setting an ACL or deciding to remove all material down to bakcground levels.

An environmental monitoring program, which calls for sampling groundwaters, surface waters, and sediments impacted by the site will be initiated as part of the implementation of the selected alternative. If sampling results indicate that the implemented remedy is failing to meet the stated goal of CERCLA, of protecting public health and the environment, a second operable unit will be selected and implemented. The second unit may include performing addtional excavation if it is determined that such an action is required. To assure consistency with this potential additional remedial measure, the design of the alternative selected in this Record of Decision should consider extending the excavation to the soils within the 100-ppm contour and upgradient from the recommended excavation limit. This precaution is considered prudent so that material used as backfill in the first operable unit can be segregated as clean material should a second operable unit involving excavation be required.

Table 4

Detailed Costs Of Recommended Alternative

BOG CREEK SITE PREP
ACCESS ROADS,EBS CONTROLS
[illegible] STAGING PAD
PERIMETER
SUBSTATION

ITEM	QUANTITY		DIRECT UNIT PRICE MATERIALS	LABOR	EQUIPMENT	SUB.	DIRECT COST MATERIALS	LABOR	EQUIPMENT	SUB.	ITEM DIRECT COST	COMMENTS
ACCESS ROADS												
GRAVEL ROADBASE	4200	CY	$10.00	$1.70	$2.83		42000	5040	11886		58926	
GEOTEXTILE MAT	1900	SF	$1.15	$0.16			2185	304			2489	
EXCAVATION & GRADING	2100	CY		$1.67	$2.58			3507	5418		8925	
LEEDS STAGING PAD												
EXCAVATION & GRADING	50	CY		$1.67	$2.58			84	129		213	
FLANGED FOOTERS/PADS	50	CY				$200.00				10000	10000	
EBS CONTROLS												
EXCAVATION	5000	CY		$1.67	$2.58			8350	12900		21250	
SILT FENCES	1500	SF	$2.25	$0.16			3375	240			3615	
CHAINLINK FENCE	3440	LF				$9.76				33574	33574	
Total							47560	17525	30333	43574	138992	
Subcontractor @ 10% of Sub										4357	4357	
Burden @ 13% of Labor Cost								2278			2278	
Labor @ 15% of Labor Cost								2629			2629	
Material @ 5% of Material Cost							2378				2378	
Total Direct Costs (TDC)							49938	22431	30333		150634	
Indirects 75% of Labor TDC								16824			16824	
Profit @ 10% of TDC											15063	
Total							49938	39255	30333		182521	
Working Level: D=.15											10438	
Health & Safety Monitoring at .1											10296	
Total Field Cost (TFC)											212255	
Contingency @ 20% of TFC											42451	
Engineering @ 5% of TFC											10613	
CAPITAL COST THIS PAGE											265319	
CONTAM. MATERIAL EXCAV.												
LANDFILLED MATERIAL / SED.	15300	CY			$1.48	$3.59		22644	54927		77571	
HAULING	15300	CY				$110.00				1683000	1683000	HLG-ROCT/TR.$2200/TR
DISPOSAL	15300	CY				$110.00				1683000	1683000	DSP-$110/CY
AIR STRIPPER UNIT												
REMOVAL	242	MGL			$3.00	$22.50		726	5445		6171	
UNIT INSTALLATION	1	UNIT	$10100.00	$7500.00			13130	9750			22880	
RENTAL FEE	2	MO				$4500.00				9000	9000	
TOPSOIL	200	CY	$5.50	$1.20	$2.83		1100	240	566		1906	
RECLAMATION												
BACKFILL	15300	CY	$1.50	$1.20	$2.83		22950	18360	43299		84609	
SITE GRDG	1200	CY		$1.20	$2.83			1440	3396		4836	
REVEGETATION	44	MSF	$24.60	$5.60	$4.45		1082	246	196		1525	
DECON OPERATIONS												
STEAM STRIPPER	90	DYS	$246.03	$96.00	$40.00		22143	8640	3600		34383	
AIR STRIPPER	1	MO				$4500.00				5850	5850	
Total							60405	62046	111429	3380850	3614730	
Subcontractor @ 10% of Sub										338085	338085	
Burden @ 13% of Labor Cost								8066			8066	
Labor @ 15% of Labor Cost								9307			9307	
Material @ 5% of Material							3020				3020	
Total Direct Costs (TDC)							63426	79419	111429	3718935	3973209	
Indirects 75% of Labor TD								59565			59565	
Profit @ 10% of TDC											397321	
Total							63426	138984	111429	3718936	4430894	
Working Level: C=0.70											176299	
Health & Safety Monitoring at .06											276323	
Total Field Cost (TFC)											4881706	
Contingency @ 20% of TFC											976341	
Engineering @ 5% of TFC											244085	
CAPITAL COST THIS PAGE											6102133	

PRESENT WORTH ANALYSIS

SITE: BOG CREEK
ALTERNATIVE NO.: 5A / SUBOPTION 3
6761

COST COMPONENT	COST/YEAR COST OCCURS ($000's) 0	1	2	3	4	5	6	7	8	9	10	11
1. CAPITAL COSTS	6367											
2. O & M COSTS	---	76	76	76	76	76	76	76	76	76	76	13
3. ANNUAL COSTS	6367	76	54	54	54	54	54	54	54	54	54	13
4. ANNUAL DISCOUNT RATE=10%	1	0.909	0.826	0.751	0.683	0.621	0.564	0.513	0.467	0.424	0.386	0.35
PRESENT WORTH =	6367	69	45	41	37	34	30	28	25	23	21	5

	12	13	14	15	16	17	18	19	20	21	22	23
O & M COSTS	13	13	13	13	13	13	13	13	13	13	13	13
ANNUAL DISCOUNT RATE=10%	0.319	0.29	0.263	0.239	0.218	0.198	0.18	0.164	0.149	0.135	0.123	0.112
PRESENT WORTH =	4	4	3	3	3	3	2	2	2	2	2	1

	24	25	26	27	28	29	30	TOTAL PRESENT WORTH ($000's)
O & M COSTS	13	13	13	13	13	13	13	
ANNUAL DISCOUNT RATE=10%	0.101	0.092	0.084	0.076	0.069	0.063	0.057	
PRESENT WORTH =	1	1	1	1	1	1	1	6761

ATTACHMENT 1

Responsiveness Summary

Public Meeting

5 September 1985

REMEDIAL INVESTIGATION/FEASIBILITY STUDY
RESPONSIVENESS SUMMARY FOR THE
BOG CREEK FARM SITE

HOWELL TOWNSHIP, MONMOUTH COUNTY, NEW JERSEY

BASED ON COMMENTS FROM
PUBLIC MEETING OF
SEPTEMBER 5, 1985

Topic: **Public Health Concerns**

Issue: What is going to be done during the 6 to 8 month period, when the bid document is being prepared, to prevent human contact with the soil and to reduce the danger to the environment? Is the site fenced? I know that area children, Boy Scouts, and campers go back there and play in those streams. Are there going to be warning signs put up, and if so, what will they say?

Discussion: There are warning signs at the site. They are large white signs, posted on all 4 corners of the site. They warn that the area is a hazardous waste site and that it is a project of the Environmental Protection Agency and the New Jersey Department of Environmental Protection. The signs also include EPA's phone number in case anyone should have any questions. Incidentally, these signs were put up as a result of public input.

Issue: My concern relates to the middle of the site between the signs--that is, where there are no signs posted. Children may not see the signs on the corners of the site. My opinion is that if it is going to take 6 to 8 months before construction, then that area of the site should be fenced to keep people out of that area and away from the stream. I don't think a sign is good enough.

Discussion: Thank you. We will take your comment into consideration.

Issue: Could you tell me what chemical was detected in the largest concentration at this site?

Discussion: Toluene. In the actual waste, one sample showed toluene at about 18 percent, but that was not an environmental sample, such as soil, air, groundwater, or surface water. That was an actual sample of a resin that we dug out of a test pit.

Issue: Can my child walk to that place?

Discussion: No. That sample would have been between 10 and 20 feet below the surface; we obtained that sample from a small-diameter boring that we made into the ground, which is now sealed. We found no contamination at that high of a level on the surface. The highest levels of surface contamination that we found were in the bog, where the total of all volatiles reached as high as 200 parts per million.

Topic: Technical/Remedial Action Considerations

Issue: What was the total area included in this study?

Discussion: The area under study was roughly 4 to 5 acres. We found out that the contamination was limited to about 2 acres.

Issue: In that trench that you identified, is the contamination [contained] in barrels, or was it dumped loosely?

Discussion: The 150 foot trench was used for uncontained chemical wastes. The other disposal area did contain about 6 drums, but they were crushed and empty. There may have been some residual waste in the drums. Most of the contaminated materials were from uncontained chemical wastes.

Issue: If you have canoed or hiked down the Manasquan River, you would notice that there is a difference in the water color and that there is a putrid chemical odor where the Squankum Brook enters the Manasquan River. Did you investigate that?

Discussion: We conducted our testing all the way down to the confluences of the Squankum and Manasqaun. We took two rounds of samples and evaluated the site-related chemical compounds--roughly 150 different chemical compounds that we normally test for on these types of sites--and we did not see any appreciable change in water quality in the Manasquan as a function of the Squankum input.

Comment: Squankum Brook is the major southern drainage of the Manasquan River, and there is definitely a different color and clarity of the water, as well as a lot less life--especially as the seasons change and there is more rainfall.

Comment: I ride my horse quite frequently, and one day I took him down to that area. When we came to the brook, my horse started to snort and stomp and would not cross that stream. Obviously, he smelled something that was foul to him, and this is the first time a horse has ever acted this way with me. I ended up having him jump the brook.

Comment: We say these things to point out that we feel that there is contamination in that area. Also, with regard to air pollution, there is a rotten, noxious odor. During hot, humid weather, you have to leave your windows down. Sometimes, you even get sick.

Issue: We feel that this pond really helped us to identify the problem. I would not be opposed to keeping a pond as a way of knowing when and where the contamination is occurring. It is a key indicator.

Discussion: By removing the pond, we are going to be removing the chemicals as well. The removal will clean up the site. Also, all of the alternatives include long-term monitoring. We have monitoring wells that directly bring water out of the aquifer, which is where the pond water is coming from. We would be sampling the water from those monitoring wells periodically and as necessary. We would also be sampling the surface water. At the site, we have noticed the orange color, which our stream hydrologists classified as iron spots and which are not that uncommon.

We also completed another round of surface water sampling last week--an even more extensive round than we did before. We sampled the surface water in the north branch of Squankum Brook at four points between the site and confluence with the south branch. The reason we did even more points in that area was because we noticed an increase in the contamination between where the brook goes past the bog and where it has its confluence with the south branch. We feel that the reason for the occurrence is because the groundwater is flowing into the brook in that area and contributing more contamination, even though contamination along that brook is volatizing and thus leaving the brook.

Issue: A phrase I hear mentioned frequently at these public meetings is "long-term monitoring." How long is it, who pays for it, and who is in charge of it?

Discussion: It continues for 20 to 30 years, the State pays for it, and the State is completely in charge of it. Under existing legislation, the State is responsible for any operation and maintenance costs after the first year that the system is built. Under new legislation that is being proposed, the Federal government could be responsible for these operation and maintenance costs for a longer period of time, maybe up to five years after the system is built.

Issue: I don't see an option listed on the handout for onsite treatment with offsite disposal.

Discussion: If you look at Alternative No. 5, there is an optional soil washing; that is a remedial action that we are going to explore. Removing the waste trench itself would, as we indicated earlier, remove the vast majority of contamination. It would considerably reduce the public health threat and the environmental impact from the site as it exists now. Therefore, it is a very attractive option because it is not as large an excavation as the other ones mentioned.

If we were to implement that alternative, the soil washing mentioned here as an option is something that would require further study to determine its effectiveness. We could try to flush those contaminanted soils that surround the waste trench by injecting and pumping water from wells; essentially recirculating it through the site, treating it as we draw it from the wells. Or we could excavate the waste trench itself, which is very highly contaminated and which may not be suitable for treatment in this way, and take it to an offsite disposal facility--either an incinerator or an offsite landfill.

With the remaining contaminants on site, we could actually excavate them and try using a treatment unit above ground to either wash or airstrip those soils. If we could get them sufficiently clean, we would then be able to return them to the site at a much lower cost than if we took the contaminated materials off site. That is an option we are considering as part of Alternatives No. 5 and 6, listed in the handout.

Issue: Would incineration be more efficient than the other proposed alternatives?

Discussion: We explored incineration on site as opposed to landfilling the contaminated soils. The only reason we did not go with incineration is because it costs almost twice as much as the other alternatives. However, it is still a consideration.

Issue: Have you thought about flushing the toxics out of the dirt?

Discussion: Yes. The trench contains about 5,000 cubic yards of very concentrated material--in our minds, too concentrated to try to treat. We'd rather dig that material up and move it out. There are approximately 25,000 additional cubic yards of soil which had become somewhat contaminated as a result of this material that was put into the trench and allowed to leak out. It is that large volume of soil that we think we may be able to wash or somehow treat.

The intent is two-fold. We want to get the grossly contaminated material out of there and we then want to see if we can treat the larger volume of material so that we do not have to pick it up and haul it away.

Issue: What is the depth of the contamination?

Discussion: The depth of the contamination could extend to 20 feet, but the trench itself is only about 10 feet deep, with a little material that seeps down further. The main contamination is within 10 feet.

Issue: Do you have any idea how many cubic yards you have to remove?

Discussion: The trench contains about 5,000 cubic yards. In the bog, we would probably remove 10,000 to 15,000 cubic yards of material.

Issue: Where are you going to get the dirt to replace the dirt that you excavate?

Discussion: We can get dirt and fill; that is not a problem.

Issue: Once this place is excavated, will you revegetate the area?

Discussion: We will revegetate the area.

Issue: If you are going to take this material to another place, what will prevent that contaminated material from polluting the air and groundwater at the new place?

Discussion: We have a regulatory program under the Resource Conservation Recovery Act, and under that program, hazardous waste landfills have to be built and operated under certain procedures that protect against material leaking out of the landfill. The landfills are constructed with double-liners and with leachate collection systems to protect the environment.

The problem with this site is that it didn't have a lined bottom. The materials were just dumped loosely in the trenches.

Issue: You discounted pesticides from your study, and that really bothers me.

Discussion: We've taken a good look at the wastes on this site. What we're looking at is the impact of this site on the environment. We've identified mostly volatile organics. We do not feel there is a pesticide problem at this site.

Issue: Did you conduct any studies on the effects of the chemicals in the plants and animals in the food chain? Are plants and insects contaminated?

Discussion: We did not have the time or the money to conduct a biota study. Our main concern is to remove the chemicals and contaminated soils.

Topic: **Cost/Funding Issues**

Issue: If this $7 million option that you are recommending turned out to be satisfactory, what is the estimated time for bidding that work out? (State Senator Gagliano speaking)

Discussion: The next step in this process, once Christopher Daggett makes a decision, is to prepare the design plans. My best estimate is that it would take 6 to 8 months to advertise and contract this work. The work would actually start sometime late next spring or early summer.

Issue: Considering the present situation with respect to Superfund, can this cleanup be funded for $7 million; that is, assuming Christopher Daggett makes a decision and that you are able to prepare the proper Requests for Bids and secure a contractor to perform the work? (State Senator Gagliano speaking)

Discussion: We have been proceeding in the last month or so as if Congress would reauthorize the Superfund at somewhere between the $5 and 10 billion level. That hasn't occurred yet; Congress is not yet back in session. Under the timetable we're looking at, it won't be until mid-October before we could get a bill.

Issue: Are you saying that the present funding would not be sufficient for a cleanup? (State Senator Gagliano speaking)

Discussion: Present funding is between $300 and 500 million; that is, there is that amount of money in the bank. Lee Thomas, EPA Administrator, would have to decide how that $300 to 500 million would be spent. The belief is that even if Congress doesn't quickly pass the new bill, there would be some type of continuing resolution that would at least continue to collect tax at a rate of somewhere between $300 and 400 million a year. So one source of funding is Federal funds and that would be subject to some priority setting by the administrator.

The second avenue is through the State of New Jersey, which has up to $250 million in available money for such activity. The State has already agreed to fund the preparation of the design plans and bid document, which will take about 6 to 8 months. That would roughly cost about a half a million dollars. That gives us 6 to 8 months to at least get Superfund reauthorized, and if that doesn't happen in 6 to 8 months, there is going to be a lot of significant slowdowns in the area. We totally expect that the $7 million will be there when we need to spend it. If it were not for the State of New Jersey and their funding sources, which are unique in the country, when we would sign the Record of Decision, work would essentially stop at this site. What New Jersey allows us to do is to continue with that work.

Issue: If in fact we are not going to have reauthorization in 12 days, then should that decision be made by Chris Daggett as to what option will be chosen or should it be made by the State, at least on a temporary basis, since they are going to be paying the costs. I don't want the State to be precluded. (Assemblyman John O. Bennett speaking)

Discussion: Any decision that Chris Daggett makes for that Record of Decision must concur with the State of New Jersey. We've already briefed the State on this particular project and they are in general agreement with our recommendation.

Issue: Will there be a continuation of you as the lead agency if Federal funding discontinues and the State pays for the cleanup?

Discussion: We expect that if funding were to stop, it would be short term. We don't feel that the State could support a long-term project.

Issue: As long as decisions are going to be made with maximum State participation and public input will be accepted, then it's okay. I just want to see it cleaned up. We're giving you the money, and I'd like to see us get something in return.

Topic: Administrative Issues

Issue: I just want to say for the record that as a representative of the legislature of this district, we have several sites. We are totally frustrated. We've been to hearings like this. We would like to see one site totally cleaned up and then invite people there so that we could say, "This is what we've done with our state money and with Superfund money, and with local cooperation, we have taken a site and cleaned it rather than just studying it." I think the option for $7 million, though it's a lot of money, is worth it. Could we somehow get Christopher Daggett to use it on one site? This one seems ideal--it is small and manageable, and something we can show to people that we've done the job. (State Senator Gagliano speaking)

Discussion: I have a lot of confidence that Chris will agree to our recommendation.

Issue: I'm somewhat pleased to hear that we're talking about removing the stuff from the site. Quite frankly, I continue to have a great deal of skepticism when it comes to the performance (implementation) of any plans. Two years ago we talked about the options that we were going to implement at one time, and yesterday, the status is about the same as it was two years ago as far as onsite work. The only difference is that now that the fence is gone, you can drive your motorbike right onto the site. I have a few concerns.

The maximum amount of time should be permitted for the local municipality to review the alternatives and allow them to give maximum input. As I understand, we've only had the report for a week and now Chris Daggett will be making a decision in a couple of weeks. I would like, if possible, the opportunity for the local people to provide input. (Assemblyman John O. Bennett speaking)

Issue: My name is Charles F. Doyle, Jr. [mayor of Howell Township] How many years ago were you here?

Discussion: March 1984.

Issue: The reason I asked that question is because we identified the problem in 1975 and 10 years later, we're still studying the problem. What is the cost so far?

Discussion: About $500,000 so far.

Issue: You don't have a site at which to dump this stuff once you excavate it. One of the things Superfund has dragged its feet on is in locating a place to dump this. You haven't resolved the problem.

Discussion: It's not part of Superfund to provide a place to dispose the material. It is the State's responsibility to find or procure a secure landfill.

Issue: We're happy to see EPA here. We are not satisfied with the NJDEP.

Discussion: There is a representative here, Beth Muhler.

Issue: May I ask what part of this sprawling bureaucracy you're from?

Discussion: I represent the State's lead; I am the State's project officer for this project. I have the State input, and I am responsible for coordinating the review of all our reports. State input has been directly given in this project; a meeting was held two weeks ago going over the different alternatives and we (NJDEP) agreed to what EPA is recommending.

Issue: Nobody from the State involved with potable water is here tonight. This site is close to major drinking water supplies for the whole county and the NJDEP doesn't seem to have any concern. I bring this up because those folks are hellbent on building a reservoir yet they aren't concerned with any serious environmental reports.

Discussion: The Division of Water Resources has reviewed all of these reports. I can guarantee it, because I'm the one who has relayed their comments to the EPA. They have thoroughly reviewed all of these reports and they also agree with the recommendation of the EPA.

Issue: A lot of people have spent a great deal of time delivering their input to you. What I want to know is if you are willing to take citizen input and possibly change your mind because of it. If you have already decided on the $7 million alternative, say so now and let's get on with it. Don't waste the valuable time of the people. I want to see something accomplished; I don't want to delay anything.

Discussion: We're making a tentative recommendation based on what we know now; our evaluation is that this $7 million option here is the most effective remedy. We'll be glad to sit down with you next week, and if you can present us with information that would cause us to change our minds, we'll change our minds.

Issue: Even if you go with the $7 million option, it would still take approximately one year to prepare bid documents.

Discussion: It would be approximately 6 to 8 months.

Issue: This is a nice site environmentally, small and contained--yet we spend half a million dollars to study it and we haven't done anything with it. When will you start to clean it up?

Discussion: After 18 months, that's the point we have now reached. When you go out to these sites, there's no getting around that you walk onto an empty field. There's no way to stand on top of that field and know how much is there, where it is, how deep it is, which way the groundwater moves, whether it goes up, down, north, east, south or west, toward wells or away from wells, into streams, and at what rate, and how fast. Before you can start making a decision on what to do about it, you have to know those answers. And to get an answer concerning the groundwater, you have to install wells.

It's time consuming, expensive, and a slow process. Sampling takes time and it is very expensive--at $1000 a sample. The sampling and analytics take 60-90 days. There are an enormous number of samples. We've had some delays in this project which have frustrated us, but our Feasibility Studies do tend to take about 18 months to complete. We're not having a lot of success getting them completed under that time period. It's simply the nature of the business. We just don't want to go out there and start digging.

Issue: Is criminal prosecution taking place against the owner?

Discussion: Our priority is to clean up the site and then worry about who is to blame.

ATTACHMENT 2

Written Public Comments

TOWNSHIP of HOWELL

Post Office Box 580 Howell, New Jersey 07731 201-938-4500

September 18, 1985

Mayor and Township Committee
Township of Howell

Dear Mayor and Township Committee:

Attached are comments regarding Bog Creek Farm which I commented on at the recent meeting on this subject.

Very truly yours,

MICHAEL FERGUSON
VICE CHAIRMAN
HOWELL TOWNSHIP ENVIRONMENTAL COMMISSION

MF/ac

cc: John Czapor, U.S. EPA
S. Thomas Gagliano, Senator
John Bennett, Assemblyman

WELCOME TO HOWELL. I HAVE SOME QUESTIONS CONCERNING THE STUDY.

PAGE 1-9. "IT IS EMPHASIZED WITH THE SITE IS A FUNCTION OF EXISTING CONDITIONS." "PUBLIC HEALTH RISK COULD INCREASE SIGNIFICANTALLY WITH CHANGE IN LAND USE. EXAMPLES INCLUDE EXCAVATION OF CONSTRUCTION ON SITE, RESIDENTIAL DEVELOPMENT CONTIGUOUS WITH THE SITE AND INSTALLATION OF NEW GROUNDWATER SUPPLY WELLS."

THIS LOW RISK IS ATTRIBUTABLE TO THE FACT THAT THERE IS VERY LITTLE HUMAN EXPOSURE TO THE SITE CONTAMINATION.

WILL THE AGENCY PREVENT OR ASSIST IN PREVENTING DEVELOPMENT AND THE INCREASED HEALTH RISKS?

THE WILDLIFE SECTION IS VERY MINIMAL CONSIDERING THE FACT THAT FOUR ENDANGERED OR THREATENED SPECIES OCCUR WITHIN ONE MILE OF THE SITE.

THEY SHOULD BE CAREFULLY CONSIDERED IN THE PUMPING ALTERNATIVE, CONSIDERING YOU PROPOSE TO PUMP FOR 30 YEARS, DROPPING THE LEVEL OF THE AQUIFER. ALSO THE EFFECT ON EXISTING SHALLOW WELLS IN THE AREA MUST BE ADDRESSED.

THE DRAFT WARNS THAT THE STUDY'S CONCLUSION MUST BE VIEWED AS APPROXIMATE DUE TO FINANCIAL CONSIDERATION.

PAGE 1-11. "ALL ENGINEERING CALCULATIONS, GRAPHICS, COST ESTIMATES, AND CONCLUSIONS PRESENTED IN FS REPORT ARE ONLY APPROXIMATE." COUPLED WITH THE FACT THAT THERE IS PRESENTLY NO MONEY FOR THE PROJECT LEAVES US MORE THAN A LITTLE SKEPTICAL. ARE YOU ABLE TO REASSURE US AT THIS TIME?

WERE STUDIES CONDUCTED OF THE SOIL BIOTA? IS IT STERILE? HAVE ORGANISMS MUTATED, ARE THEY ACCUMULATING CONTAMINANTS? IN PARTICULAR, WE WOULD BE FEED UPON BY MIGRATING WOODCOCK WHO HAVE LONG USED THIS SITE. OPENING YET ANOTHER AVENUE OF RECEPTION, AS THESE BIRDS COULD EASILY BE HUNTED AND CONSUMED IN SOUTH CAROLINA OR MASSACHUSETTS FOR THAT MATTER. IN ADDITION DO ANY PLANTS STORE THESE SUBSTANCES OR DO THEY INDUCE ANY CHEMICAL CHANGES IN THE PLANTS THAT WOULD MAKE THEM MORE ATTRACTIVE OR DANGEROUS TO CONSUMER SPECIES?

THIS SAME QUESTION WOULD APPLY TO INSECTS.

THE PERTINANCE OF THESE QUESTIONS IS THE FACT THAT DISPERSAL ROUTES WERE NOT DISCUSSED ADEQUATELY, INCLUDING THROUGH AQUATIC ORGANISMS. HOWEVER THESE AVENUES SEEM TO HAVE BEEN OVERLOOKED.

IN VIEW OF THE REFRESHINGLY HONEST STATEMENT OF APPROXIMATION, HOW COME THE RESERVOIR AUTHORITIES CONTINUE TO BE CERTAIN THAT THERE WILL BE NO EFFECT? HAVE CONSULTATIONS BEEN HELD WITH THOSE RESPONSIBLE FOR THE RESERVOIR?

WILL THE E.P.A. CONSIDER PURCHASING ADJACENT LANDS?

ALTHOUGH YOU STATE FLOW IN THE UPPER KIRKWOOD IS TO THE NORTHEAST, YOUR MAPS SHOW SOIL AND WATER CONTORINATION EXTEND TO THE SOUTH OF THE PIT. CAN YOU EXPLAIN THIS?

DOES THE ENTIRE SURFICIAL AQUIFER EMPTY TO THE WATERCOURSES OR DOES SOME BYPASS THEM?

THE STUDY SAYS THE OWNER WAS A MR. FRED BARRY. WILL EITHER CIVIL OR CRIMINAL PROSECUTION TAKE PLACE AGAINST HIM OR THE COMPANIES OF ORIGIN?

PLEASE CONSIDER ELIMINATION OF THE NO ACTION, AND ON SITE DISPOSAL ALTERNATIVES.

PAGE 4-51. STATED THERE WAS NO CONTAMINATION IN THE SHILDNECHT WELL, BUT THE COUNTY BOARD OF HEALTH TOLD THEM IT WAS CONTAMINAGED.

PAGE 7-15 STATES THERE IS CONTAMINATION. A STUDY OF MINGANAHONE BROOKS FISH POPULATION IS SHOWN AND STATEMENT MADE THAT SQUANKUM SHOULD BE THE SAME. A STUDY OF SQUANKUM BROOKS' FISH AND AQUATIC BIOTA SHOULD BE DONE AND THIS COMPARED TO THE MINGAMAHONE STUDY TO PROVIDE INFORMATION ON THE EFFECTS ON LIFE IN SQUANKUM. THE STATEMENT ON 7-33 THAT LEVELS IN THE BROOKS ARE SUITABLE SHOULD BE SUBSTANTIATED BY AN INVENTORY OF THE AQUATIC BIOTA.

MICHAEL FERGUSON
VICE CHAIRMAN
HOWELL TOWNSHIP ENVIRONMENTAL COMMISSION

9/5/85

TOWNSHIP of HOWELL

Post Office Box 580 Howell, New Jersey 07731-0580 (201) 938-4500

September 17, 1985

Mr. John Czapor
U.S. Environmental Protection Agency
New Jersey Remedial Action Branch
26 Federal Plaza, Room 402
New York, New York 10278

RE: Bog Creek Farm (Howell Township) Remedial Design and Remedial Action

Dear Mr. Czapor:

The enclosed summation deals with the wildlife populations found within the drainage of the North and South Branches of Squankum Brook and the probable impacts that Bog Creek has had on them.

Sincerely yours,

Alfred C. Sauer

ALFRED C. SAUER
Chairman, Sub-Committee
Farmland Preservation and Wildlife Management
Howell Environmental Commission

ACS/ac

cc: New Jersey DEP
Assemblyman John O. Bennett, III
Senator S. Thomas Gagliano
Mayor and Township Committee, w/o enc.
Members of the Commission, w/o enc.

enc.

A SUMMATION OF WILDLIFE

WITHIN THE

SQUANKUM BROOK SYSTEM

BOTH

PAST AND PRESENT

BY

ALFRED C. SAUER
HOWELL ENVIRONMENTAL COMMISSION

A SUMMATION OF WILDLIFE WITHIN THE SQUANKUM BROOK SYSTEM, BOTH PAST AND PRESENT

BY

ALFRED C. SAUER
HOWELL ENVIRONMENTAL COMMISSION

The following text should afford the reader a better understanding of the wildlife that exists within this sub watershed system.

Woodcock (*Philohela minor*): A small game bird with a long bill, principal food is earthworms, migratory with some nesting range in New Jersey.

Prior to Bog Creek Farm the bog area and the area that lies inbetween the pond and the North Branch of Squankum Brook was a prime resting and feeding area for woodcock during their fall migration. However, after 1975 field surveys produced no woodcock in this area. In addition, traditional nesting areas 3/4's of a mile south west of the site were suddenly devoid of any birds, both resident and migratory. At this time we felt that the woodcock population might be declining. However, we were informed via correspondence with the New Jersey Division of Fish and Game that the state's woodcock population, both resident and migratory was indeed well and stable.

An area of prime concern is the transfer of lead and/or other contaminants to feeding woodcock via the existing earthworm population. The question still remains, is Bog Creek Farm the cause or a contributing factor in the decline of woodcock in this area.

Bob-White (*Colinus virginianus*): A small game bird, not migratory, principal foods insects, seeds, soybeans, and corn when feeding on cultivated lands.

Three coveys of Bob-White quail could normally be found in the soybean field adjacent to Bog Creek Farm with one covey of about 15 birds utilizing the bog area for cover. These birds used the higher ridges north of the North Branch of Squankum Brook to covey during the night. The second covey utilized the area around the old pig farm at about the confluance of the North and South Branches, while the third covey utilized a heavy thicket of briars and pine southwest of the pig farm. Our concern here is the transfer of contaminants via plants to insects during the summer when these birds feed on insects and airborne concentrations of contaminantss in field crops during the fall when the coveys are using standing crops as a food source.

The average number of combined birds in these three coveys was about 50. Later field surveys showed a marked decline in all three coveys. Although this decline could have been caused by a number of natural things, such as poor nesting conditions or extremely severe winter conditions, the possibility still exists of contamination of the food chain.

Ruffed Grouse (*Bonasa umbellus*): A large game bird, found in heavy woodlands of mixed pine and oak, foods consist of acorns and berries.

Although these birds are quite numerous in the woodlands to the east and southeast of the Bog Creek Farm site, they never seemed to range onto the site or the woodlands adjacent to the North Branch of Squankum Brook. We feel that the site poses little, if any threat to this game bird.

Ring-Necked Pheasant (*Phasianus calchicus torquatus*): A large game bird, frequents open fields and woodland edges.

The Ring-Necked Pheasant has not reproduced in the Squankum Brook drainage since the mid 1950's. This has been due to changes in land use, and the loss of wild overgrown meadows on the South Branch of Squankum Brook east of Route 547. Although occasional birds are found, they have normally been released somewhere else and have traveled to the site. A single bird was collected in November of 1971 from the bog area.

Whitetail Deer: The North Branch of Squankum Brook from the bog to its confluance with the South Branch is primarily a crossing area and is utilized to travel to and from feeding and bedding areas. Deer populations are normally high in the Squankum Brook drainage with the heaviest traveled areas located on the east side of the South Branch. Estimated populations are 20 deer per square mile of undeveloped land.

The South Branch of Squankum Brook supports the following amphibians and reptiles. We will list only those species which have been captured within the drainage.

Salamanders:
Red Backed (*P. cinereus*)
Eastern Mud Salamander (*Pseudotriton montanus montanus*)

Turtles:
Eastern Box (*Terrapene carolina carolina*)
Spotted (*Clemmys guttata*)
Bog turtle (*Clemmys Muhlenbergi*)
Eastern Painted (*C. picta picta*)
Red-Bellied (*Chrysemys rubriventris*)
Snapping turtle (*Chelydra serpentina*)

Frogs:

Wood Frog (*R. sylvatica*)

Pickerel Frog (*R. palustris*)

Southern Leopard Frog (*R. utricularia*)

Green Frog (*R. clamitans melanota*)

Snakes:

Eastern Milk Snake (*Lampropeltis triangulum triangulum*)

Northern Water Snake (*Natrix sipedon sipedon*)

Red Bellied Snake (*Stororia occipitomaculata*)

Northern Brown Snake (*Storeria dekayi dekayi*)

Eastern Garter Snake (*T. sirtalis sirtalis*)

Rough Green Snake (*Opheodrys aestirus*)

Northern Black Racer (*C. constrictor constrictor*)

Eastern Kingsnake (*L. getulus getulus*)

Fish species within the South Branch of Squankum Brook:

Grass Pickerel (*Esox americannus vermiculatus*)

A small member of the Pike family, average length 10 to 11 inches.

American Eel (*Anguilla rostrata*)

A snake like catadromeus fish.

Brown Bullhead (*Ictalurus nebulosus*)

A medium sized catfish.

Golden Shinner (*Notemigonus crysoleucas*)

A medium sized bait fish.

Bluegill (*Lepomis macrochirus*)

A small panfish.

Pumpkinseed (*Lepomis gibbosus*)

A panfish smaller than the Bluegill, 6 to 7 inches.

Largemouth Bass (*Micropterus salmoides*)

A large game fish reaching 7 to 8 pounds.

Brook trout (*Salvelinus fontinalis*)

Brown trout (*Salmo trutta*)

Rainbow trout (*Salmo gairdneri*)

The predominant species east of Route 547 and prior to the confluance of the North Branch are Grass Pickerel, American Eel and Brown Bullhead. The presence of Brown Bullhead in comparatively high numbers is due to the breaching of a dike on an upstream irrigation system west of Route 547.

Prior to the establishment of the upstream irrigation pond Brown Bullhead existed within the South Branch of Squankum Brook, but were extremely rare. The presence of Golden Shinner and an occasional Large Mouth Bass and Bluegill are once again due to the existence of the upstream impoundment. Pumkinseeds have always been within the system; but like the Brown bullhead they were originally quite rare. We have received reports of trout captures from within the irrigation pond as recently as two years ago, although we did not verify these captures. However, in the fall of 1963 a trout escaped from our bait sein while we were gathering Golden Shinners from this pond.

Prior to Bog Creek Farm the South Branch contained all three species of trout with the highest populations appearing in late summer and early fall. Although Brook trout was the predominant species, Brown and Rainbow trout were also numerous. We feel that a great many of these fish migrated upstream from the Manasquan River. The South Branch of Squankum Brook, not only affords cold water temperatures, but also a compatible pH factor.

It would appear that the discharge from Bog Creek Farm via the North Branch has severed the link between the upper reaches of the South Branch and the Manasquan River. Although this discharge may or may not be toxic to trout, we feel that they will avoid entering

it simply because of its chemical nature.

Additional animals that have been sighted within the Squankum Brook system.

Grey Fox	Weasel
Red Fox	Rabbit
Grey Squirrel	Redtail Hawk
Red Squirrel	Coopers Hawk
Opossum	Sharpshin Hawk
Raccoon	Great Horned Owl

There are a great many other species of small animals and birds that could be added to this list. However we feel that we have listed the principle animals of the system. We are sure that you will agree that the Squankum Brook system is rich in wildlife and that any cleanup plan must give consideration to these existing populations.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

DATE: SEP 30 1985

SUBJECT: Comment Letter on Bog Creek Farm RI/FS from Michael Ferguson, Howell Township Environmental Commision

FROM: Eric Schwarz, Project Manager
Northern New Jersey Remedial Action Section

TO: File

Mr. Ferguson's letter raises several questions, many of which were addressed during the public meeting. The responses to these questions are contained in the Responsiveness Summary in Attachment 1 to the Summary of Remedial Alternative Selection for Bog Creek Farm. The questions that were not raised at the public meeting are addressed below.

The selected alternative will remove the source of contamination from the site as well as any contaminated material present at the surface. The recommendation also calls for additional study to ensure that health risks are adequately addressed.

The purchase of adjacent lands is not required to protect public health or the environment. Adjacent lands, with the exception of the bog, which is to be removed, have not been significantly impacted by the site. The remedial action to be taken at the site will prevent any future contamination of adjacent properties.

The Upper Kirkwood Aquifer flows to the north and east at the site. Measurements of water levels in shallow wells on both sides of the North Branch of Squarkum Brook indicate that the brook entirely intercepts the flow of this aquifer. Small amounts of contaminants have migrated south, against the flow of the aquifer. This migration is due to diffusion of the chemicals in the aquifer.

ATTACHMENT 3

State Intergovernmental Review

STATE OF NEW JERSEY

JOHN P. RENNA
COMMISSIONER

DEPARTMENT OF COMMUNITY AFFAIRS
DIVISION OF LOCAL GOVERNMENT SERVICES

363 WEST STATE STREET
CN 803
TRENTON, N. J. 08625-0803

September 23, 1985

Mr. John Czapor, Chief
Northern New Jersey Remedial Action Section
U.S. Environmental Protection Agency
26 Federal Plaza, Room 402
New York, N Y 10278

RE: **SAI NUMBER:** NJ 85-9033
APPLICANT: U.S. Environmental Protection Agency
New Jersey Remedial Action Branch
26 Federal Plaza, Room 402
New York, N Y 10278

CONTACT PERSON: John Czapor
CFDA NUMBER: 66.802
FEDERAL PROGRAM: Hazardous Substance Response Trust Fund
PROJECT: Bog Creek Farm (Howell Township)Remedial Design & Remedial Action

Pursuant to the system developed in New Jersey for the intergovernmental review of applications for Federal financial assistance and direct Federal development activities, the above referenced project has been submitted to the State Review Process and comments from the Reviewing Agencies identified on Page 2 have been received and are transmitted herewith.

Should you have any questions, please do not hesitate to contact us at (609) 292-9025.

Sincerely,

Nelson S. Silver, PP
Administrator
Intergovernmental Review and
Assistance Unit

for the Single Point of Contact
NEW JERSEY STATE REVIEW PROCESS

cc: Applicant (without comments)

016S/0547

COUNTY REVIEWING AGENCIES:

( )Atlantic	( )Cape May	( )Hudson	(X)Monmouth	( )Salem
( )Bergen	( )Cumberland	( )Hunterdon	( )Morris	( )Somerset
( )Burlington	( )Essex	( )Mercer	( )Ocean	( )Sussex
( )Camden	( )Gloucester	( )Middlesex	( )Passaic	( )Union
				( )Warren

( )ALL 21 COUNTIES

STATE REVIEWING AGENCIES:

( )Agriculture	( )Environmental Protection	( )Law
( )Commerce	( )Governor's Office	( )Pinelands Commission
( )Community Affairs	( )Hackensack Meadowlands Development Commission	( )Public Advocate
( )Corrections	( )Health	( )SLEPA
( )Defense	( )Higher Education	( )Transportation
( )Education	( )Human Services	
( )Energy	( )Labor	

AREAWIDE AGENCY:

( )Wilmington Metropolitan Area Planning Commission

OTHER REVIEWING AGENCIES:

( )Air Force ( )Army ( )Navy

NJ 85-9033

REVIEWING AGENCY COMMENT LETTER

Completion of all of the information required in items 6-12 is essential before the Single Point of Contact will forward your comments to the Federal funding agency. The information for items 1-5 relating to this particular application has been completed by the State Review Process.

RE: (1) State Application Identifier: NJ 85-9033
(2) Name of Applicant: U.S. Environmental Protection Agency
New Jersey Remedial Action Branch
(3) CFDA Number: 66.802
(4) Federal Program: Hazardous Substance Response Trust Fund

(5) Project Name: Bog Creek Farm (Howell Township)Remedial Design & Remedial Action

(6) The above identified application for Federal financial assistance or Direct Development Activity has been reviewed by this agency as required by the State Review Process. Our specific recommendation is that the application or activity be:

X Approved.
___ Approved with the conditions set forth below.
___ Disapproved for the reasons set forth below.

COMMENTS

REVIEWING AGENCY IDENTIFICATION

Should you have any questions regarding these comments, please contact:

(7) Name: Robert H[illegible]
(8) Title: [illegible]
(9) Agency: Monmouth County [illegible]
(10) Address: P.O. Box 1255, Freehold, N.J. 07728-1255

(11) Telephone Number: (201) 431-7460

Robert H. Hughey, 9/13/85
(12) Signature Date

cc: STATE REVIEW PROCESS, Division of Local Government Services, CN 803, Trenton, NJ 08625-0803

0569/01-85

MONMOUTH COUNTY PLANNING BOAR
HALL OF RECORDS ANNEX
POST OFFICE BOX 1255
FREEHOLD, NEW JERSEY 07728-1255