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Office of
Emergency and
Remedial Response

EPA/ROD/R05-89/098
July 1989

EPA

Superfund Record of Decision:

Industrial Excess Landfill, OH

50272-101

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12. Sponsoring Organization Name and Address U.S. Environmental Protection Agency 401 M Street, S.W. Washington, D.C. 20460	13. Type of Report & Period Covered 800/000 14.

15. Supplementary Notes

16. Abstract (Limit: 200 words)

The 300-acre Industrial Excess Landfill site is in Uniontown, Stark County, Ohio. Several hundred residences are within a half mile of the site, and all residences and businesses in the Uniontown area rely on ground water from private well supplies. Surface water at the site flows to Metzger Ditch which is located along the eastern border of the site. The site was operated as a mixed industrial and refuse landfill from 1966 until 1980. Large amounts of fly ash and liquid wastes including latex and spent organic solvents were disposed of in the landfill between 1968 and 1972. To prevent the spread of contaminants associated with these wastes, several emergency actions have been undertaken. In 1986 an active methane extraction system was installed to prevent the offsite migration of explosive levels of methane gas. In April 1987 EPA installed air strippers in eight residences and two businesses due to the presence of low levels of volatile organic compounds. In September 1987 EPA signed a Record of Decision (ROD) to provide an alternate water supply to 100 homes west of the site to ensure that the community received safe drinking water while the final remedial action for the site was implemented. This ROD represents the final remedial action for the site and addresses the source area, gases generated within the source area, and contaminated ground water. The primary contaminants of concern affecting the soil, sediments, and ground water are VOCs including benzene, vinyl chloride, and PCE; other organics including carcinogenic PAHs; and metals. Air contamination by methane gas is

(Continued on next page)

17. Document Analysis a. Descriptors

Record of Decision - Industrial Excess Landfill, OH
Second Remedial Action - Final
Contaminated Media: soil, sediment, gw, air
Key Contaminants: VOCs (benzene, PCE), other organics (methane gas, PAHs), metals

b. Identifiers/Open-Ended Terms

c. COSATI Field/Group

18. Availability Statement	19. Security Class (This Report) None	21. No. of Pages 58
	20. Security Class (This Page) None	22. Price

(See ANSI-Z39.18) *See Instructions on Reverse* OPTIONAL FORM 272 (4-77) (Formerly NTIS-35) Department of Commerce

16. Abstract (Continued)

also present at the site.

The selected remedial action for this site includes installing a multilayer RCRA cap over the site to prevent surface water infiltration; expanding the existing methane venting system to accommodate the potential increase of landfill gas due to the cap; extracting and treating approximately 256 million gallons of contaminated ground water by air stripping, carbon adsorption, and flocculation/sedimentation/filtration to achieve compliance with Clean Water Act NPDES discharge criteria for surface water discharge; continuing the pumping of ground water to maintain a lowered water table and protect ground water from additional contamination by the landfill; treating surface water from ponds at the site, if necessary; and dredging sediment from the ponds and ditch and incorporating them under the cap; multimedia monitoring; and institutional controls restricting future use of the site. The estimated present worth cost for this selected remedial action is $18,548,000, which includes an estimated annual O&M cost of $440,000.

DECLARATION FOR THE RECORD OF DECISION

Site Name and Location

Industrial Excess Landfill, Inc.
Uniontown, Ohio

Statement of Basis and Purpose

This decision document presents the selected final remedial action for the Industrial Excess Landfill, Inc. site, in Uniontown, Ohio, developed in accordance with CERCLA, as amended by SARA, and, to the extent practicable, the National Contingency Plan. This decision is based on the administrative record for this site. The attached index identifies the items that comprise the administrative record upon which the selection of the final remedial action is based.

The State of Ohio has concurred on the selected remedy.

Description of the Selected Remedy

This remedial action is the final action for the Industrial Excess Landfill, Inc. (IEL) site. In September 1987, U.S. EPA signed a Record of Decision for provision of an alternate water supply to approximately 100 homes near IEL whose drinking water is affected or threatened by contaminants from IEL. This final remedial action addresses the waste disposal area and the landfill gas generation and groundwater contamination associated with the waste disposal area. The remedy addresses the principal threats posed by IEL by isolating and containing wastes within the landfill, expanding the existing methane venting system for the collection and flaring of landfill gas, and by extracting and treating contaminated ground water beneath and near the landfill. Additional studies of landfill gas generation and potential migration, surface stability and hydrology, and hydrogeologic characteristics and contaminant fate and transport must be conducted during the design phase of the remedy to collect appropriate information for design of the various treatment and containment systems.

The major components of the IEL remedy include:

* Installation of a RCRA Subtitle C compliant cap over the entire surface of the landfill with surface water drainage control and discharge;

* Expansion of the existing methane venting system;

* Extraction and treatment of contaminated groundwater beneath and near the landfill until cleanup levels are achieved;

* Pumping of groundwater to maintain the water table level beneath the bottom of the wastes in IEL in order to protect groundwater from additional contamination by the landfill;

* Installation of fencing around the perimeter of the site;

* Use restrictions on future use of the site property; and

* Monitoring of the cap, ground water extraction and treatment system, and methane venting system to ensure the remedy is effective.

Declaration

The selected final remedy is protective of human health and the environment; attains Federal and State requirements that are applicable or relevant and appropriate to the remedial action; and is cost effective. This remedy utilizes permanent solutions and alternative treatment (or resource recovery) technologies to the maximum extent practicable. A principal threat at the site, the disposal area itself, will be addressed through containment rather than treatment, and therefore, this portion of the remedy does not meet the statutory preference for treatment as a principal element of the remedy. Because of the disposal area size; the fact that there are no on-site hot spots representing major sources of contamination; and the difficulties, risk and cost involved with implementing a source treatment technology, it is not practicable to treat the source area. However, another principal threat, the groundwater contamination, will be addressed through treatment which permanently and significantly reduces the toxicity, mobility or volume of the existing groundwater contamination. In addition, landfill gas generated by the site will be collected and flared, providing additional reductions in contaminant toxicity, mobility, or volume.

Because this remedy will result in hazardous substances remaining on-site above health-based levels, a review will be conducted no less than once every five years after commencement of remedial action to ensure that the remedy continues to provide adequate protection of human health and the environment.

JUL 17 1989

Date

for Valdas V. Adamkus
Regional Administrator
U.S. EPA, Region V

DECISION SUMMARY

I. Site Name, Location, and Description

The Industrial Excess Landfill (IEL) site is located in the unincorporated community of Uniontown, Ohio. Uniontown is located in Lake Township of Stark County, approximately 10 miles southeast of Akron. The site is about four-tenths of a mile south of the intersection of Cleveland Avenue and State Route 619, at 12646 Cleveland Avenue (See Figure 1).

Located on a 30 acre tract of land east of Cleveland Avenue, the site is set back from the road by a strip of land approximately 250 feet wide. This strip is occupied by 2 businesses and 6 single-family homes, one of which had been converted into a real estate office. Presently, five of the homes are occupied; the real estate office is vacant.

An additional 6 homes are located at the northern edge of the site along Hilltop Avenue and the southern curve of Amber Circle. The eastern border of the site is formed by Metzger Ditch, which drains the peat soils east and southeast of the site. A sod farm is located on the east side of Metzger Ditch. The tract of land south of the site is occupied by a seldom used sand-blasting and paint shop.

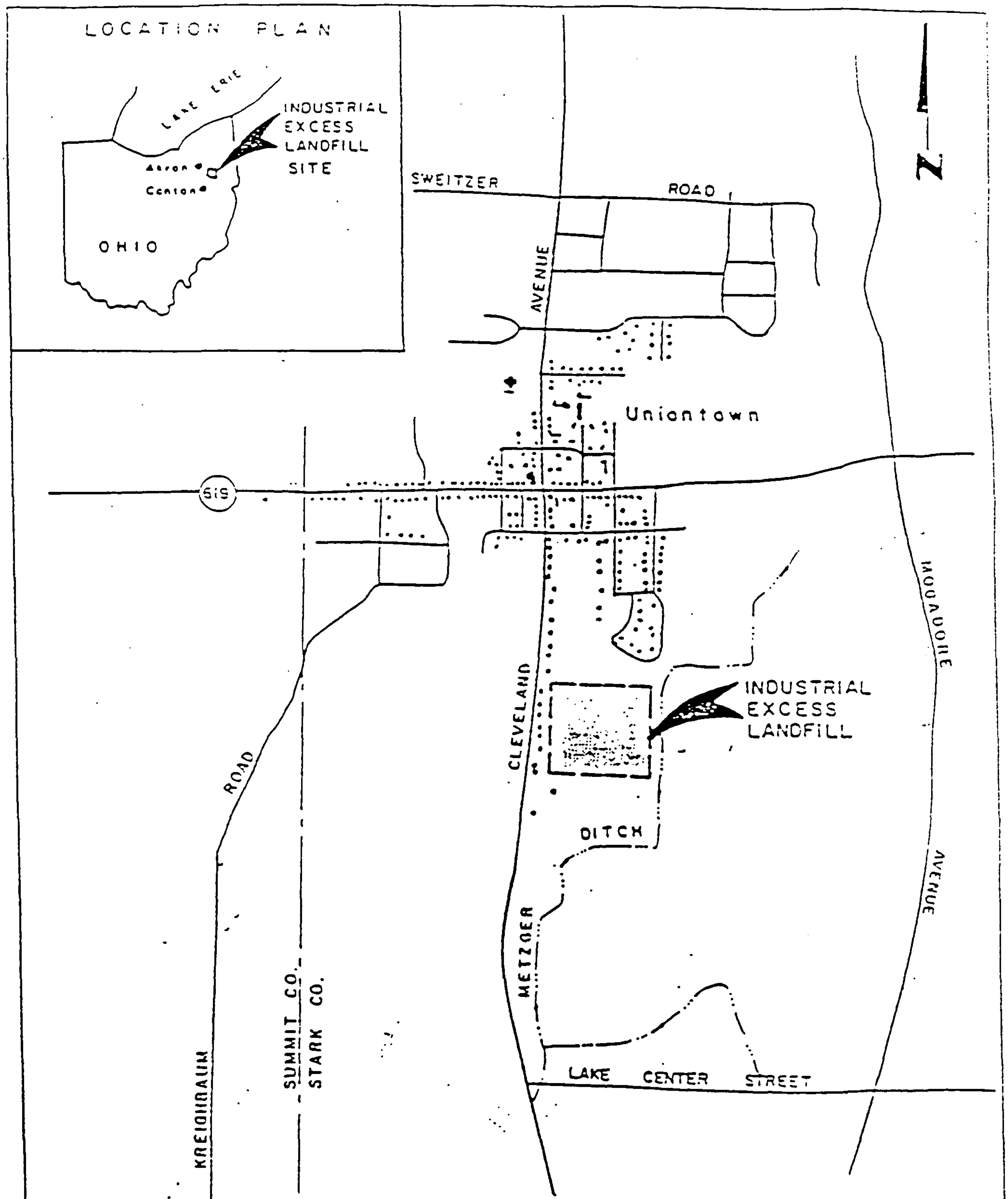
Several hundred residences are located within a half mile of the site, mainly to the north, west and southwest. All residences and businesses in the Uniontown area rely on groundwater obtained from individual or private well supplies.

Covered with grasses, small trees and shrubs, the site itself is gently rolling, with the highest elevation located at the northwest corner. The property slopes to the east and south, directing surface run-off to Metzger Ditch. The difference in elevation between the highest point and the lowest point, located at the southeast corner, is approximately 60 feet (Figure 2). There are four small ponds on the site located adjacent to Metzger Ditch.

II. Site History and Enforcement Activities

A. Operational History:

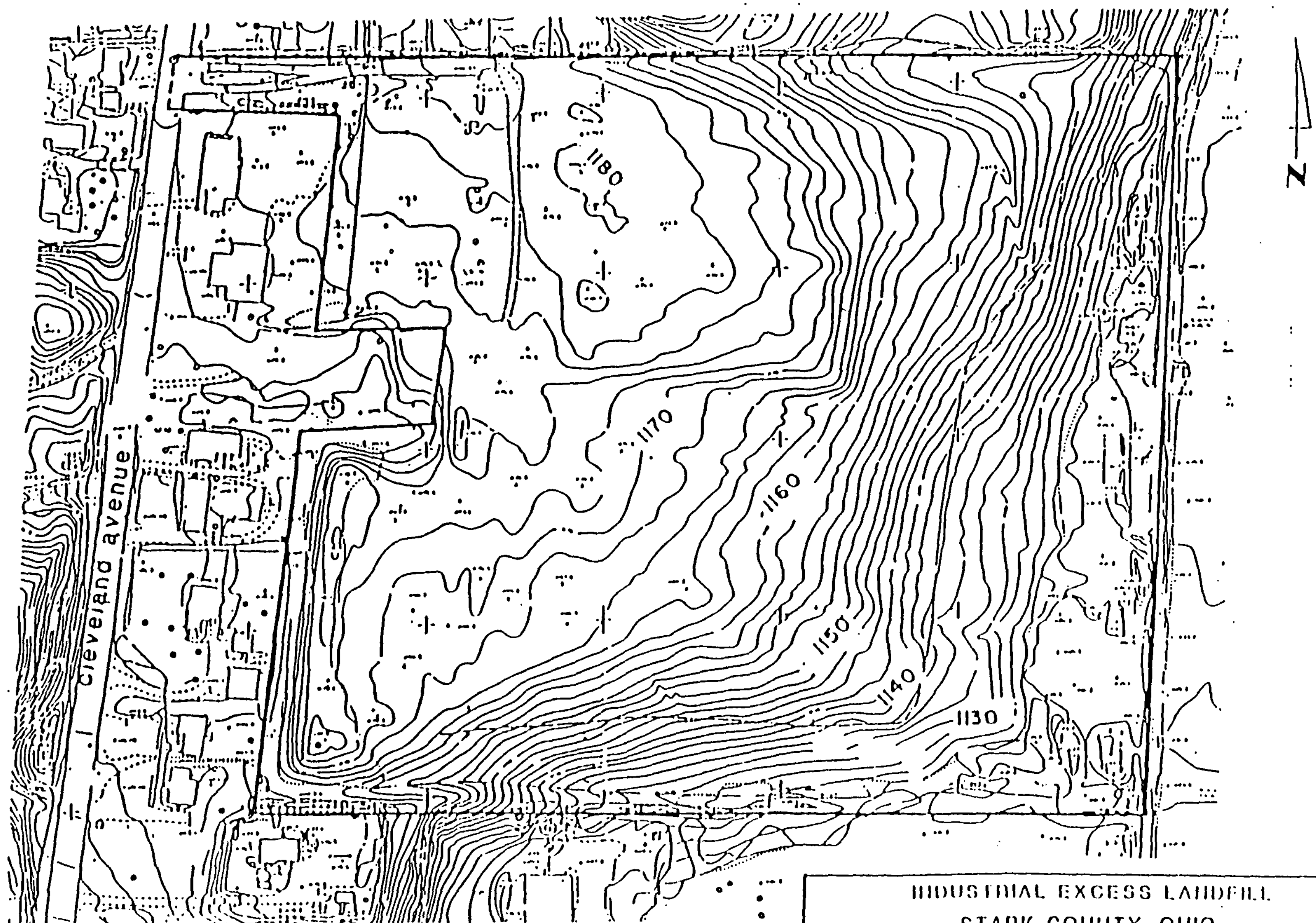
Formerly the site of a sand and gravel mining operation, IEL was operated as a mixed industrial and refuse landfill from 1966 to 1980, when it was ordered closed. During operation, the landfill accepted an assortment of household, commercial, industrial (sludges, liquids, and solids) and chemical wastes. Large amounts of flyash were accepted at IEL from 1966 until at least 1972. Most of the liquid industrial wastes, including latex, spent organic solvents, and off-spec product



scale approximate
1" : 1,550'

INDUSTRIAL EXCESS LANDFILL
STARK COUNTY, OHIO
FIGURE 1
LOCATION PLAN
C.C. JOHNSON & MALHOTRA P.C.

FIGURE 2



INDUSTRIAL EXCESS LANDFILL
STARK COUNTY, OHIO

from the rubber industry, were dumped between 1968 and 1972. Based on interviews with the former owner and depositions of various operators, it appears as if most of the liquid waste disposal occurred on the northern one-third of the landfill. The method of disposing of these liquids was direct dumping on the ground, either in a lagoon or mixed with other waste. In 1972, the Stark County Board of Health ordered the cessation of liquids disposal. However, community residents indicate that some liquids were disposed of after that date. General organic material, including waste from the general public, was disposed of at IEL throughout its operation.

Due to public concern, and because the site was approaching its volumetric limit, the landfill was ordered closed in 1980. Approximately 80 to 85 percent of the site is underlain with waste. Depths of landfilling ranged from 60 feet at the northwest corner, to only several feet along the east ad south portions of the site. Subsequent to closure, the site was covered with a sandy, gravelly soil and seeded. The site does not have an impermeable cap or liner.

B. CERCLA Removal Activities:

In October 1984, the IEL site was proposed for inclusion on U.S. EPA's National Priorities List (NPL) of abandoned or uncontrolled hazardous waste sites eligible for investigation and cleanup under the Superfund Program. A Work Assignment was issued on December 26, 1984, for a comprehensive remedial investigation/feasibility study at the site.

A Remedial Investigation, comprised of several phases of field work was conducted between 1985 and 1988. During the Remedial Investigation, surface soils, subsurface soils, and sediments, soil gas, and ground water samples were collected and analyzed. The Remedial Investigation Report, detailing the results of the investigation, was published in July 1988. A Feasibility Study, which examined and evaluated remedial alternatives for IEL, was released for public comment on December 21, 1988. The public comment period ended June 1, 1989.

While the RI/FS was conducted, several actions were taken at IEL by U.S. EPA. In early 1986, an active methane extraction system was installed on the site by U.S. EPA's Emergency Response Team, in order to prevent the off-site migration of explosive levels of methane gas to adjacent homes. The methane venting system (MVS) consists of a series of extraction wells which collect landfill gas from depths of about 40 feet, and direct it toward a central point where the gas is then flared. For the most part, the MVS has effectively prevented off-site migration of landfill gases since its installation. Off-site soil gas samples taken in late June and early July 1989 indicated off-site migration of methane. Adjustments in the operation of the MVS quickly corrected the problem.

During April 1987, U.S. EPA's Emergency Response Team also installed air-strippers in 8 residences and 2 businesses, in response to the presence of low levels of vinyl chloride and other volatile organics in several drinking water wells. The levels of vinyl chloride observed in 3 wells equal or exceed the Maximum Contaminant Level (MCL) for vinyl chloride of 2 parts per billion (ppb).

On September 30, 1987, U.S. EPA signed a Record of Decision to provide alternate water to 100 homes located west (downgradient) of the IEL site. This area includes those homes and businesses whose groundwater is currently contaminated by the site, and those who may be affected prior to the implementation of the final site remedy. The decision is considered to be one part, or an operable unit, of the overall site remedy. The Potentially Responsible Parties (PRPs) for the IEL site were ordered to design and construct the alternate water system. Design has begun and the system is expected to be on line by summer of 1990.

C. CERCLA Enforcement Activities:

U.S. EPA issued notice letters to the IEL owner/operator's and five generators of hazardous substances disposed of at IEL in April 1985, requesting these PRPs to conduct the RI/FS for IEL. Negotiations were not successful and U.S. EPA initiated a Fund-financed RI/FS.

In August 1987, U.S. EPA issued notice letters to 10 PRPs, asking them to submit a good faith proposal for the design and construction of the alternate water supply operable unit. Negotiations were unsuccessful and none of the PRPs submitted a good faith proposal. Consequently, in December 1987, U.S. EPA issued a Section 106 Unilateral Order to the ten PRPs, ordering them to implement the operable unit. In January 1988, four of the PRPs began to comply with the Order.

In March 1989, U.S. EPA issued a general notice letter to 12 PRPs, requesting them to implement the final remedy outlined in the IEL Proposed Plan. In May 1989, U.S. EPA issued special notice letters to 15 PRPs for the IEL final remedy, establishing the statutory 60-day period for submittal by the PRPs of a "good faith proposal" to conduct the final remedial action. During the 60-day period, U.S. EPA invokes a moratorium on conducting remedial action at IEL. If U.S. EPA receives a "good faith proposal" within the 60-day period, the moratorium will be extended an additional 60 days.

III. Community Relations History

U.S. EPA and OEPA have conducted extensive community relations activities at the site. The community near IEL has been very involved in site activities throughout the Superfund process. A community group, Concerned Citizens of Lake Township (CCLT), received the first Technical Assistant Grant (TAG) in the nation. U.S. EPA and OEPA have published many fact sheets, sponsored several public meetings, and held numerous availability sessions to keep the community informed of the IEL activities.

In accordance with CERCLA Section 113, U.S. EPA published a notice in a local newspaper in mid-December 1988 announcing the availability of the IEL FS and Proposed Plan, the date and time of the availability sessions and public meeting, and the duration of the public comment period. The announcement also included a brief analysis of the Proposed Plan and alternative plans that were considered.

A 120-day public comment period for the IEL FS was established from December 21, 1988 until April 19, 1989. The comment period was subsequently extended until June 1, 1989. The length of the public comment period well exceeded the 21 days required by the NCP. A public meeting was held on March 29, 1989 in Uniontown, Ohio in accordance with CERCLA Section 117. A transcript of the meeting is contained in the IEL Administrative Record. The Responsiveness Summary contains a response to each of the significant comments, criticisms, and new data submitted in written and oral presentations. This Record of Decision serves as the statement of the basis and purpose of the selected final remedial action for IEL.

IV. Scope and Role of this Response Action

This Record of Decision addresses the final remedial action for the IEL site. The action addresses the principal threats at the site, the 30-acre waste disposal/source area and gases generated within the source area, and contaminated groundwater.

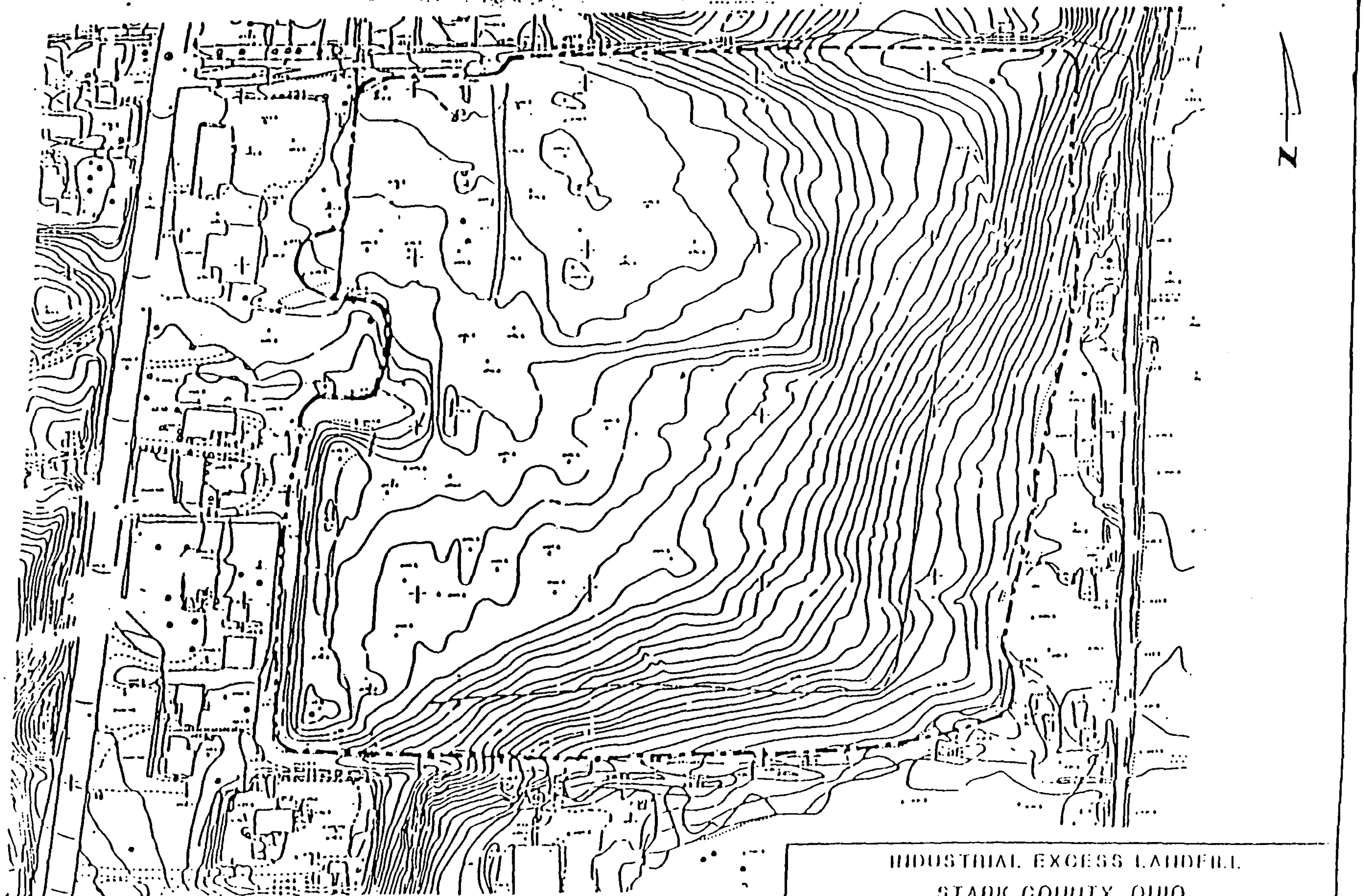
The Record of Decision (September 1987) for provision of alternate water to approximately 100 residences near the landfill will ensure safe drinking water is available to the community near the landfill before full implementation of the final remedial action.

V. Summary of Site Characteristics

A. Extent of Source:

Waste materials were disposed of throughout the entire area occupied by the landfill. Prior to the start of the RI, it was known that landfilling of household, commercial, and industrial wastes occurred over approximately 80 to 85 percent of the site property. Many of these industrial wastes are considered hazardous by current standards. Figure 3 shows the area of the landfill which is estimated to be underlain by buried wastes. At the IEL site, waste materials typically were buried immediately adjacent to the property line. During the installation of MVS monitoring wells, buried wastes also were noted in an off-site area behind the tire shop located close to the northwest corner of the site.

Due to the varying topography at the site, the depth of the fill ranges from approximately 60 feet at the northwest corner of the site to several feet along the south and east portions of the site. Wastes were not disposed in those areas where the water table was only several feet below the ground surface (the topographically low eastern portion of the



LEGEND

- - - - - APPROXIMATE LIMIT OF WASTE

INDUSTRIAL EXCESS LANDFILL
STARK COUNTY, OHIO

FIGURE 3

APPROXIMATE LIMIT OF WASTE

C.C. JOHNSON & MALHOTRA, P.C.

property).

Along with the landfilling of solid wastes, substantial quantities of liquid waste were dumped onto the ground either from 55-gallon drums or from tanker trucks. These liquids typically were mixed with flyash or dry refuse also disposed of at the site. Table 1 lists the chemicals known to be taken to IEL. Table 2 lists the chemicals found in samples from drums excavated during installation of the MVS. In addition, witnesses have described the disposal of what they believe had been solvents and industrial chemicals, which were volatile and/or had foul odors. According to a past employee, only those drums which could not be emptied of their contents were landfilled. Others were typically emptied and returned to the generator. While it is possible that liquid filled drums may have been disposed of at the landfill, the information provided by the past employee suggests that this would have been a rare occurrence.

B. RI Results:

The results of the RI conducted at the IEL site indicate the following:

- The most extensive body of contaminated materials consists of the wastes and waste-soil mixtures in the landfilled portions of the site. These waste materials were covered with clean soil during the site's closure.

- Sampling indicates that surface soil contamination on the site occurs at two small leachate seep areas. There was also an area just outside the site's property line which exhibited polycyclic aromatic hydrocarbons (PAHs). Clean soil materials, as placed on a portion of the site by U.S. EPA's Emergency Response Section following the installation of the MVS, covered this off-site PAH contaminated area.

- Off-site contaminant migration posing a threat to public health and the environment is associated with the groundwater.

Sampling of private residential and on-site/off-site monitoring wells has shown groundwater to be contaminated with volatile and semi-volatile organics and total metals. The most highly contaminated monitoring well exhibited a concentration of 400 ppb of assorted Hazardous Substance List (HSL) volatile and semi-volatile organic compounds and a total of 2,000 ppb of tentatively identified organic compounds (TICs). Compounds of greatest concern found in the monitoring wells include benzene and 1,2-dichloroethane. Vinyl chloride was found in three private wells located downgradient from the landfill. Barium levels also exceed the maximum contaminant level (MCL) as stipulated by the Federal Safe Drinking Water Act (SDWA). Nickel is present at higher than Ambient Water Quality Criteria (AWQC) levels in eight downgradient residential wells. The results from one sampling round showed elevated lead levels in some of the residential well samples. Data obtained from several

TABLE 1

LISTING OF SOLVENTS AND OTHER MATERIALS DISPOSED AT THE IEL SITE

<u>Information obtained from PRPs</u>

acetone
benzene
n-butanol
n-butyl acetate
ethanol
2-ethoxyethyl acetate
ethyl acetate
gasoline
hexane
n-heptane
isopropyl alcohol
isopropyl acetate
methanol
2-methoxyethanol
1,1,1-trichloroethane
methyl ethyl ketone
methyl isobutyl ketone
methylene chloride
monochlorobenzene
naptha
naptha (aliphatic)
sulfuric acid
tetrahydrofuran
toluene
xylene

TABLE 2

SUMMARY OF DRUM SAMPLING RESULTS - IEL

Organic Chemicals	Detected Range (ug/kg)	Frequency of Detection
1,1,1-Trichloroethane	1200 - 1700	3/24
1,1-Dichloroethane	230	1/24
2-Hexanone	6100	1/24
4-Methyl-2-Pentanone	1000 - 32,000	4/24
Acetone	5100 - 12,000	3/24
Benzene	2200 - 23,000	5/24
Chlorobenzene	1800 - 2300	2/24
Ethylbenzene	3900 - 1.3E7	8/24
Styrene	42,000 - 3,900,000	7/24
Tetrachloroethene	790 - 6200	6/24
Toluene	1000 - 1,100,000	11/24
Xylenes	1400 - 1.2E8	6/24
Trans-1,2-Dichloroethene	8700	1/24
Trichloroethene	1200 - 1400	3/24
1,2-Dichlorobenzene	41,000	1/24
1,4-Dichlorobenzene	11,000 - 15,000	3/24
2-Methylnaphthalene	2.4 - 3,200,000	3/24
2-Methylphenol	8300	1/24
4-Chloro-3-Methylphenol	2200 - 3200	2/24
4-Methylphenol	4900 - 43,000	3/24
Benzoic Acid	34,000	1/24
Bis(2-Chloroethyl)Ether	19,000	1/24
Bis(2-Ethylhexyl)Phthalate	16,000	1/24
Butylbenzyl Phthalate	2400 - 51,000	2/24
Di-N-Butyl Phthalate	8700 - 62,000	2/24
Di-N-Octyl Phthalate	4500 - 65,000	5/24
DiMethyl Phthalate	150,000	1/24
N-Nitrosodiphenylamine	2900 - 32,000	5/24
Naphthalene	2.1 - 2,500,000	5/24
Pentachlorophenol	86,000 - 620,000	2/24
Phenol	6000 - 280,000	7/24
Pyrene	1700 - 5900	2/24

previous and subsequent sampling events at these homes have not shown any evidence of elevated lead levels. Therefore, the set of analytical data exhibiting these elevated lead levels is considered to be an anomaly which is not truly representative of site conditions.

Groundwater contaminated with volatile and semi-volatile organic compounds and metals exists beneath and downgradient of the landfill. Based on monitoring and residential well sampling, this contamination has been shown to extend several hundred feet downgradient (west) of the site. Figure 4 shows the extent of inorganic and organic contamination plumes based on data from monitoring and residential wells. This sampling has also shown that the ground water contamination is presently confined to the shallow portions of the sand and gravel aquifer.

Organic and inorganic contaminated soils and sediments exist at scattered locations on the landfill property. The locations include two areas where leachate seeps have been noted and in the sediments of the on-site ponds.

Metzger Ditch flows southward along the east side of the landfill and continues southwest beyond the southern boundary of the site. Samples of surface water, sediment, and soil associated with Metzger Ditch indicate that site related contaminants have discharged into the ditch, but at concentrations detected to date which do not pose a risk to human health or the environment.

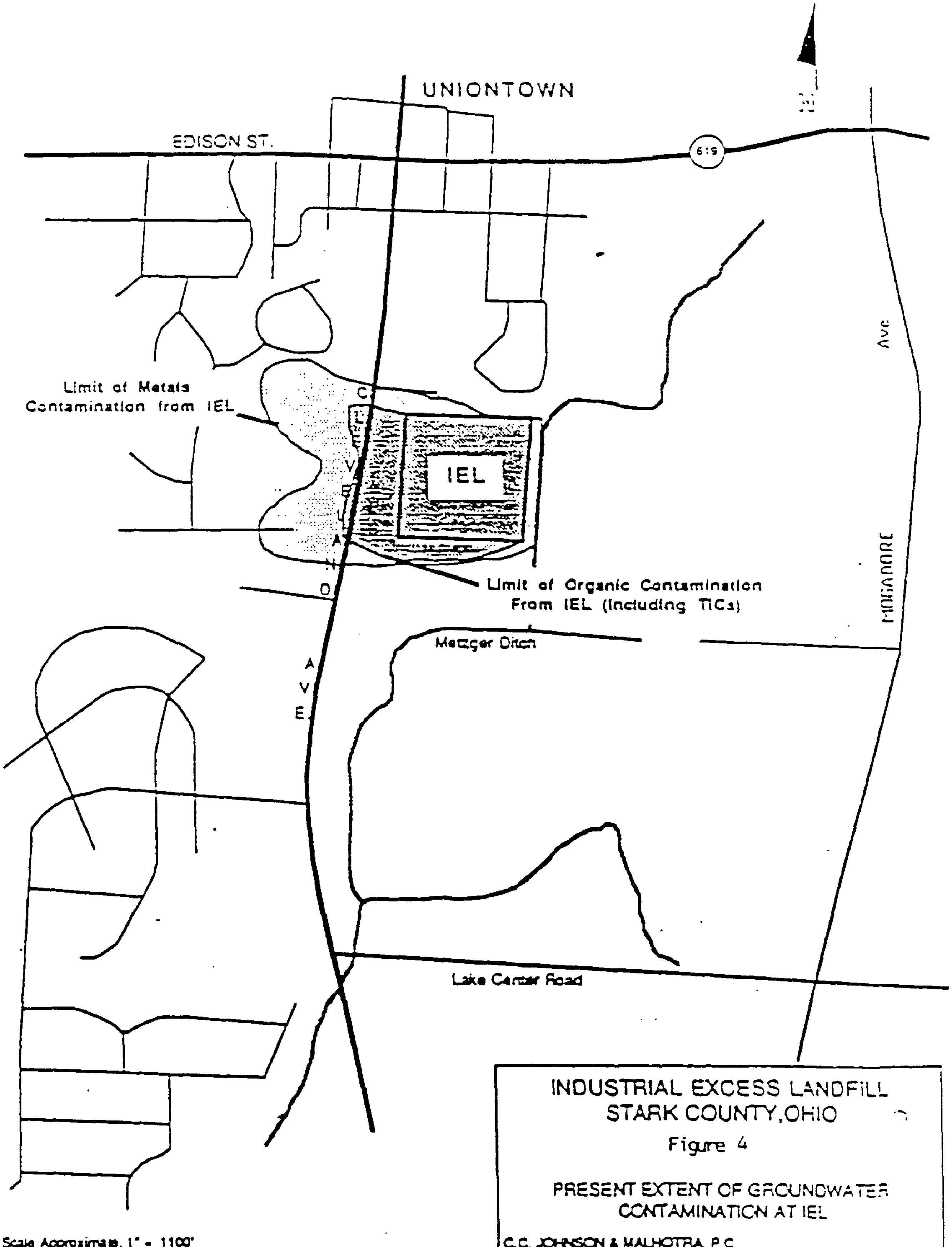
Contaminants of interest are the chemicals which have been detected in the site media and which can be associated with waste disposal activities at the site. Tables 3 through 5 summarize the concentrations of the contaminants of interest detected in soil, groundwater and landfill gas.

VI. Summary of Site Risks

As part of the RI at IEL, a Public Health Evaluation (PHE) was conducted to assess the potential impact on the public health and the environment from the release of hazardous substances from the site. As part of this process, quantitative risks assessments were made for the soils, groundwater, and air exposure pathways at the landfill.

The PHE notes the following contaminants of interest and respective media as possibly presenting an unacceptable risk at IEL, (where "unacceptable risk" is defined as a greater than 10^{-6} excess lifetime cancer risk or a hazard index for a critical effect subgroup exceeding one):

- o Under the assumed trespassing scenario, the upper bound excess lifetime cancer risks associated with soil contact (including ingestion) exceed the 10^{-6} level for children (2×10^{-6}) and adults (3×10^{-5}) under the plausible maximum case, but not for the average case. The risk in all cases is attributable



INDUSTRIAL EXCESS LANDFILL
STARK COUNTY, OHIO

Figure 4

PRESENT EXTENT OF GROUNDWATER CONTAMINATION AT IEL

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TABLE 3

ORGANIC CHEMICALS DETECTED IN SURFACE SOILS
INDUSTRIAL EXCESS LANDFILL SITE

Chemical	On Site Range[a] (ppb)	On Site Frequency[b] of Detection	Near Site & Down Gradient Range[a] (ppb)	Near Site & Down Gradient Frequency[b] of Detection	Off Site (Background) Range[a] (ppb)	Off Site (Background) Frequency[b] of Detection
1,4-Dichlorobenzene	43 (<330)	1/30	---	0/13	---	0/7
2-Butanone	<10-51	2/30	---	0/13	---	0/7
2-Methylnaphthalene	130-15,000	4/30	312-374	0/13	---	0/7
2-Methylphenol	190 (<330)	1/30	---	0/13	---	0/7
4,4-DDE	15-200	3/30	---	0/13	---	0/7
4,4-DDT	<16-170	3/30	<16-4,800	2/12	<16-220	1/7
4-Methyl-2-Pentanone	5 (<10)	1/30	---	0/13	---	0/7
4-Methylphenol	350-3,000	1/30	---	0/13	---	0/7
Acenaphthene	94 (<330)	1/30	---	0/13	---	0/7
Aldrin	<16-53	1/30	---	0/13	---	0/7
Anthracene	240-410	2/30	---	0/13	---	0/7
Benzene	2-9	2/30	---	0/13	---	0/7
Benzo(A)Anthracene	<350-1,100	1/30	---	0/13	---	0/7
Benzo(A)Pyrene	<350-900	1/30	---	0/13	---	0/7
Benzo(B)Fluoranthene	<350-1,400	1/30	---	0/13	---	0/7
Benzo(G,H,I)Perylene	<350-530	1/30	---	0/13	---	0/7
Benzo(K)Fluoranthene	<350-820	1/30	---	0/13	---	0/7
Benzoic Acid	117-122 (<400)	2/30	---	0/13	---	0/7
Bis(2-Ethylhexyl) Phthalate	110-680,000	6/30	585-754	4/13	---	0/7
Butylbenzylphthalate	68-2,100	3/30	---	0/13	12 (<330)	1/7
Chlordane	<25-280	1/30	---	0/13	---	0/7
Chlorobenzene	310	2/30	---	0/13	---	0/7

[a] <x = chemical not detected, where "x" is the detection limit. A number or range followed by a number in parentheses indicates detected values below the detection limit where the number in parentheses is the detection limit.

[b] = Frequency of detection is the number of samples in which the chemical was detected over the total number of samples analyzed.

TABLE 3 (Continued)

ORGANIC CHEMICALS DETECTED IN SURFACE SOILS
INDUSTRIAL EXCESS LANDFILL SITE

Chemical	On Site		Near Site & Down Gradient		Off Site (Background)	
	Range[a] (ppb)	Frequency[b] of Detection	Range[a] (ppb)	Frequency[b] of Detection	Range[a] (ppb)	Frequency[b] of Detection
Chrysene	<400-4,700	3/30	---	0/13	---	0/7
Di-N-Butyl Phthalate	250 (<330)	1/30	268-2,255	4/13	110-290 (<330)	3/7
Di-N-Octyl Phthalate	330 (<330)	1/30	---	0/13	---	0/7
Dibenzofuran	44 (<330)	1/30	---	0/13	---	0/7
Diethyl Phthalate	46-50 (<330)	2/30	---	0/13	---	0/7
Ethylbenzene	3-980,000	9/30	---	0/13	---	0/7
Fluoranthene	49-12,000	4/30	260-280 (<330)	1/13	93 (<330)	1/7
Fluorene	15-73 (<330)	2/30	---	0/13	---	0/7
Gamma-BHC (Lindane)	<8.0-61	1/30	---	0/13	---	0/7
Indeno(1,2,3-CD) Pyrene	<330-700	1/30	---	0/13	---	0/7
N-Nitrosodiphenylamine	120-4,300	7/30	---	0/13	---	0/7
Naphthalene	30-1,800	4/30	---	0/13	---	0/7
PCBs PCB-1016 PCB-1232 PCB-1248 PCB-1254	59-320	3/30	---	0/13	---	0/7
Phenanthrene	210-6,600	5/30	47-291	2/13	---	0/7
Phenol	94-590	2/30	---	0/13	---	0/7
Pyrene	<330-8,400	2/30	80-380	2/13	110 (<330)	1/7
Tetrachloroethene	<5-8	1/30	---	0/13	---	0/7
Toluene	3-20	4/30	<5-810	7/13	---	0/7
Total Xylenes	<5-13,000	8/30	<5-5	1/13	---	0/7
Trichloroethene	<5-16	1/30	<5-8	1/13	---	0/7

[a] <x = chemical not detected, where "x" is the detection limit. A number or range followed by a number in parentheses indicates detected values below the detection limit where the number in parentheses is the detection limit.

[b] = Frequency of detection is the number of samples in which the chemical was detected over the total number of samples analyzed.

TABLE 3 (Continued)

ORGANIC CHEMICALS OF INTEREST DETECTED IN SURFACE SOILS
INDUSTRIAL EXCESS LANDFILL SITE

Chemical	On Site		Near Site & Down Gradient		Off Site (Background)	
	Range[a] (ppm)	Frequency[b] of Detection	Range[a] (ppm)	Frequency[b] of Detection	Range[a] (ppm)	Frequency[b] of Detection
Antimony	---	0/30	<7.8-78.6	2/13	---	0/7
Arsenic	3.8-35	27/30	5.1-167	13/13	6.96-34	6/7
Barium	19-547	25/30	64-200	12/13	19-162	7/7
Beryllium	0.28-0.9	11/30	0.2-3.7	8/13	0.4-1.5 (<1.5)	3/7
Cadmium	<1.9-13.3	7/30	<0.67-9.4	8/13	<0.2-5.2	4/7
Chromium	4.1-53	23/30	<4.4-140	11/13	8-23	6/7
Cobalt	3.8-22	16/30	2.5-20	10/13	7.4-17	3/7
Copper	8.3-55	24/30	<5.6-335	12/13	8.25-36	6/7
Lead	<2.2-699	27/30	4.6-283	12/13	11-349	7/7
Manganese	29-1,560	29/30	233-1,900	10/13	242-1,540	7/7
Mercury	<0.041-0.23	10/30	<0.1-0.65	5/13	<0.05-0.2	2/7
Nickel	<6.1-48	21/30	7.4-36	11/13	<12-54	3/7
Selenium	---	0/30	<0.08-1.1	1/13	0.2 (<2.7)	1/7
Silver	1.8-3.5	4/30	<1.3-8.3	3/13	<1.3-3.5	1/7
Thallium	<1.1-2.1	2/30	0.23-0.68	6/13	0.26-0.35 (<1.3)	1/7
Tin	<5.2-50	3/30	NS	---	---	0/7
Vanadium	8.3-30	15/30	7.2-62	10/13	7.6-20 (<23)	6/7
Zinc	<3.5-1,960	29/30	15-362	13/13	46.9-107	7/7
Cyanide	0.95-22.1	5/30	<0.3-42	6/13	<0.36-1.3	1/7

[a] <x = chemical not detected, where "x" is the detection limit. A number or range followed by a number in parentheses indicates detected values below the detection limit where the number in parentheses is the detection limit.

[b] = Frequency of detection is the number of samples in which the chemical was detected over the total number of samples analyzed.

NS = not sampled.

TABLE 4

HSL CONTAMINANTS OF INTEREST DETECTED IN GROUNDWATER - IEL

CONSTITUENT	CONCENTRATION RANGE (ppb)
Monitoring Wells	
Acenapthene	2
Benzene	1.2 - 10
Butylbenzylphthalate	1 - 6
Benzoic Acid	9
Chlorobenzene	<5 - 27
4-Chloro-3-Methylphenol	1 - 5.2
1,2-Dichloroethane	<5 - 10
1,1-Dichloroethane	<5 - 25
1,4-Dichlorobenzene	10 - 13
2,4-Dimethylphenol	3
Di-n-Octylphthalate	1
Ethylbenzene	<5 - 110
2-Methylnapthalene	2.7 - 3.0
4-Methylphenol	3
n-Nitrosodiphenylamine	<10 - 15
Napthalene	7.9 - 10
Phenol	3.7
Trans-1,2-Dichloroethene	3.8 - 4.3
Toluene	0.9 - 13
Total Xylenes	<5 - 355
Barium	75 - 1,430
Cadmium (Total)	21
Copper (Total)	<19 - 575

TABLE 4 (Continued)

HSL CONTAMINANTS OF INTEREST DETECTED IN GROUNDWATER - IEL

CONSTITUENT	CONCENTRATION RANGE (ppb)
Monitoring Wells	
Chromium (Elemental)	5 - 9.2
Lead (Total)	<3 - 11
Manganese	39 - 3,060
Nickel (Total)	<14 - 48
Selenium (Total)	<3 - 6.8
Vanadium	3.1 - 17

CONSTITUENT	CONCENTRATION RANGE (ppb)
Residential Wells	
Chloroethane	1.0 - 2.0
Tetrachloroethene	1 - 1.3
Vinyl Chloride	1.5 - 7
Barium	2.1 - 1,370
Cobalt	<5 - 16
Cadmium (Total)	0.1 - 0.58

TABLE 4 (Continued)

HSL CONTAMINANTS OF INTEREST DETECTED IN GROUNDWATER - IEL

CONSTITUENT	CONCENTRATION RANGE (ppb)
Residential Wells	
Chromium (Elemental)	<5 - 11
Cyanide (Total)	<2.3 - 26
Copper (Total)	<4 - 356
Lead (Total)	<1 - 15.5
Nickel (Total)	<7 - 48
Silver	0.4 - 12
Selenium (Total)	<2 - 20
Vanadium	<5 - 22
Zinc (Total)	<8 - 733

TABLE 5

CONTAMINANTS OF INTEREST DETECTED IN EXTRACTION SYSTEM GAS SAMPLES FROM THE INDUSTRIAL EXCESS METHANE VENTING SYSTEM

Compound	Tenax Collection	Summa Canister
Vinyl Chloride	ND 1/	6.7 ppm
1,1-Dichloroethylene	>14 ppb 1/	
trans 1,2-Dichloroethene	ND	
1,1-Dichloroethane	630 ppb 2/	
1,2-Dichloroethane	ND	
Benzene	2200 ppb 2/	
Trichloroethylene	280 ppb 2/	
Toluene	1500 ppb 2/	
Tetrachloroethylene	300 ppb 2/	
Ethyl Benzene	1200 ppb 2/	
Xylenes	1860 ppb 2/	
Styrene	65 ppb	
m-Ethyl Toluene	73 ppb 3/	
C3 Alkyl Benzene	400 ppb 3/	
Methylene Chloride	Det.	
1,1,1-Trichloroethane	Det.	
Chlorobenzene	Det.	
C5 Hydrocarbons	310 ppb 3/	
C6 Hydrocarbons	14 ppm 3/	
C7 Hydrocarbons	8.9 ppm 3/	
C8 Hydrocarbons	8.0 ppm 3/	
C9 Hydrocarbons	3.3 ppm 3/	
C10 Hydrocarbons	1.9 ppm 3/	

TABLE 5 (Continued)

CONTAMINANTS OF INTEREST DETECTED IN EXTRACTION SYSTEM GAS SAMPLES FROM THE INDUSTRIAL EXCESS METHANE VENTING SYSTEM

Compound	Tenax Collection	Summa Canister
Methane		20%
Ethane		60 ppm
Propane		4.4 ppm
Propylene		10 ppm
Radon		516 picocuries/liter

Notes: Anal. 1 - GC/MS Analysis of Tenax Portion of collected tubes.
Anal. 2 - Analyses of Summa Canister.

1/ Either not detected in analysis or reported concentration biased low due to breakthrough of target compound to non-analyzed CMS portion of tube.

2/ Compound signal greater than the range of the instrument calibration.

3/ Reported values are sums of all measured concentrations of individual compounds belonging to the specific family of chemical compounds.

Det. - Compound detected but not quantified because of either interferences in its spectra or no calibration curve for the compound.

to carcinogenic PAHs which were found in surface soil samples outside the site boundary. It does not appear that these contaminants are related to waste disposal activities at the site. This area is presently covered with clean fill which mitigates the threat to public health from direct contact. For noncarcinogenic effects, hazard indices are all less than one, for both on-site soils and off-site soil analyzed.

- Long-term (lifetime) consumption of groundwater containing maximum measured levels of landfill-derived carcinogens exceeds the 10^{-6} risk level. The risks are associated with 1,2-dichloroethane (3×10^{-5}), benzene (1×10^{-5}), tetrachloroethane (4×10^{-6}), and vinyl chloride (5×10^{-4}). Two year exposure hazard indices for children exceed one for critical effects subgroups for combined concentrations of barium and zinc, and lead and manganese.

- Upper bound excess lifetime cancer risk from exposure to contaminants in air, based on the modeling of emissions from the landfill flare to the nearest house, are above the 10^{-6} level for both children (3×10^{-6}) and adults (6×10^{-6}). Virtually all of the risk is associated with the presence of 1,1-dichloroethene (up to 5×10^{-6} risk alone) and 1,2-dichloroethane (up to 2×10^{-6} risk alone).

Table 6 summarizes the contaminants of interest that exceed allowable exposure based on the risk assessment.

With regard to the risks associated with the air contaminants discussed above, it should be noted that the data used for this assessment was obtained during the direct and downwind sampling of the plume produced by a candle flare which was initially installed at the site. This flare has since been replaced with a ground flare which is expected to achieve an increased destruction of the chlorinated organics responsible for the calculated upper bound cancer risk levels. Sampling data obtained subsequent to replacement of the candle flare has shown undetected contaminants in the exhaust gases of the ground flare.

VII. Description of Alternatives

Based on information gathered during the remedial investigation, it was determined that the remedial alternatives considered should address two major areas of concern: 1) the landfill waste/soil mixtures, coupled with the resulting landfill gas production; and 2) the contaminated groundwater.

During the FS, numerous technologies were identified and evaluated to address the problems at IEL. Applicable technologies were screened in more detail to limit the number to be retained for detailed evaluation. The technologies retained for the areas of concern at IEL are presented

TABLE 6

CONTAMINANTS OF INTEREST
THAT EXCEED ALLOWABLE EXPOSURES
BASED ON THE RISK ASSESSMENT

Soils/Waste	Groundwater
Carcinogenic PAHs	1,2-Dichloroethane
	Benzene
	Tetrachloroethene
	Vinyl Chloride
	Barium
	Nickel

Air

1,1-Dichloroethene
1,2-Dichloroethane

below:

Media/Area	Technology
Contaminated Ground water	Extraction; Air Stripping; Precipitation/Flocculation/Sedimentation; Filtration; Carbon Adsorption; Discharge to Metzger Ditch
Landfill Gas	Active Collection and Flaring
Waste/soil mixture	Capping

All waste/soil mixture treatment technologies were eliminated before the detailed evaluation portion of the FS. The treatment technologies were not practicable to implement because of the large volume (2 million cubic yards) of heterogenous waste, the lack of "hot spots" of concentrated contamination, and the difficulty, risk, and cost associated with conducting a treatment operation. As with nearly every landfill site on the NPL, containment was found to be the most effective technology for the waste/soil mixture.

Three alternatives were evaluated in the detailed evaluation portion of the FS and are briefly described below.

A. **Alternative 1 - No Action:**

The only response actions associated with the No Action alternative are the installation of a fence to restrict site access; institutional controls; and continual monitoring. No further corrective actions would be taken at the site. Operation and maintenance on the existing methane venting system (MVS) would be continued by OEPA. the proposed alternate water system would be implemented as planned, and the in-home air strippers would remain in place until the water system is on line. Operation and maintenance would consist of routine monitoring in order to assess changes in the location and concentration of the contaminant plume.

Construction Cost: $88,000
Annual O & M: $94,000
Total Present Worth: $864,000
Time to implement: 3 months

B. **Alternative 2A - RCRA Cap, Expanded MVS, Ground water Pump & Treat:**

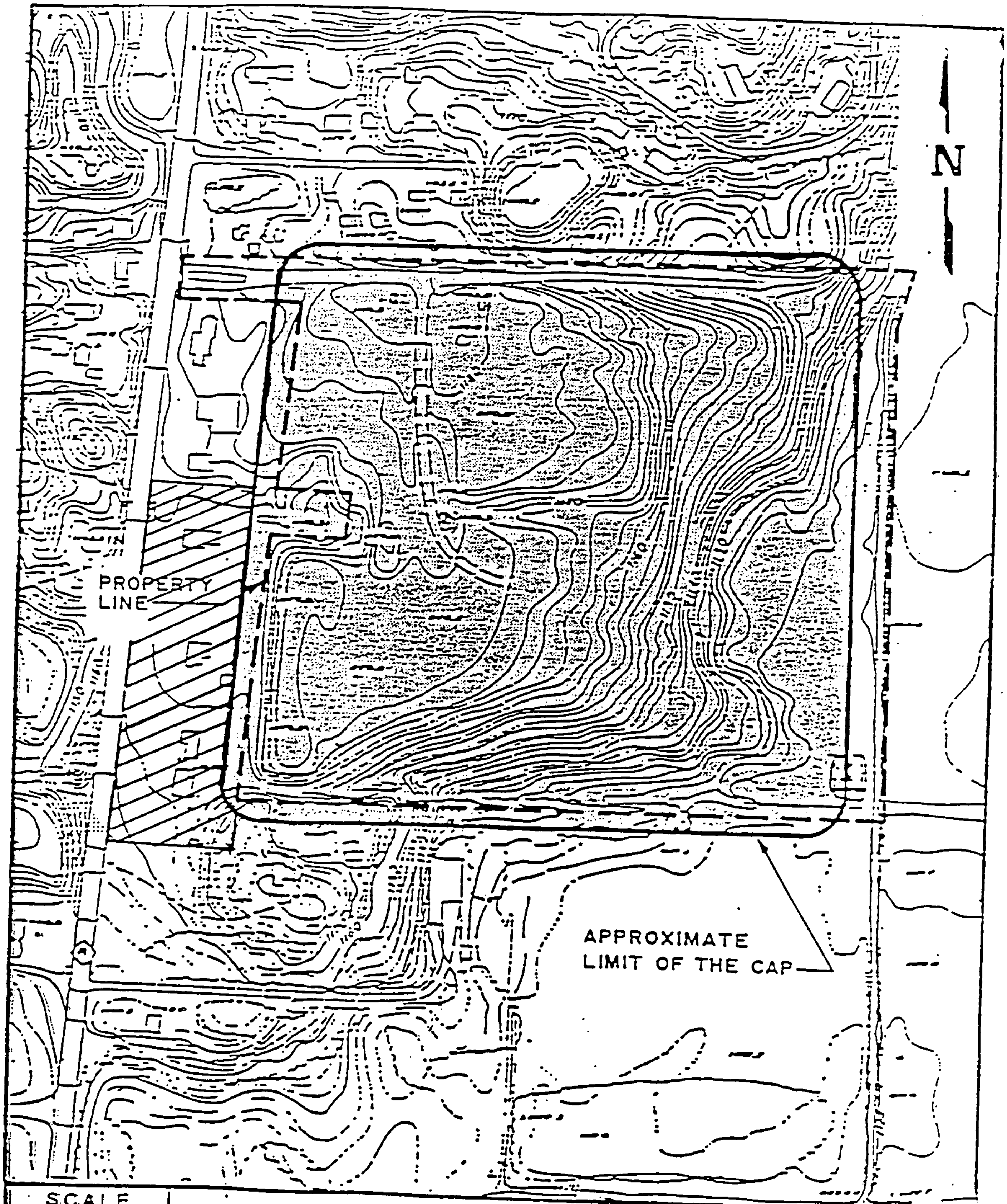
The major components of this alternative are: Fence, institutional controls, monitoring, RCRA cap, expanded MVS, groundwater collection, treatment, and discharge to Metzger Ditch.

A fence would be installed to restrict site access. A multilayer cap would be placed over the site to prevent direct contact with waste materials, and prevent infiltration of surface water into contaminated materials. The cap would be constructed in accordance with RCRA regulation and guidance, and seeded following construction. Institutional controls would be imposed to restrict future use of the site property. For example, the site could not be used as a park, or for any type of construction. Upon completion of the remedy, the site would essentially appear as it does now, a large grassy field.

The existing methane venting system (MVS) would be expanded to accommodate increased potential for lateral landfill gas migration due to the cap.

Groundwater would be collected by a number of extraction wells. The collected water would be treated, as necessary, by air stripping, carbon adsorption and flocculation/ sedimentation/filtration to achieve compliance with the Clean Water Act discharge criteria. The groundwater collection system would remove the contaminant plume. Indirect containment would be achieved by lowering the water table, thereby preventing contact between groundwater and landfill waste materials. Preventing infiltration by capping the site should result in a lowering of the groundwater table. In order to protect groundwater from additional contamination by the landfill, perpetual groundwater extraction to maintain a depressed water table may be necessary. Groundwater treatment would continue only as long as necessary to attain discharge criteria as required by the Clean Water Act. The criteria are developed during design and are based on specific site characteristics such as influent concentrations, location of discharge point, volume and flow of water in Metzger Ditch, usage of Metzger Ditch, relationship to other surface water bodies, etc. These criteria may or may not be less stringent than Safe Drinking Water Act criteria, and the possibility exists that the extracted groundwater will not need to be treated or will only be treated for a limited period of time.

As stated above, the purpose of installing a cap over the landfill is to prevent surface water from coming into contact with buried wastes. Because wastes were dumped right up to the edge of IEL's property lines, the proposed cap will have to extend beyond the perimeter of the site in order to be fully effective. Based on the conceptual cap design, U.S. EPA will need at least fifty feet of land adjacent to the northern, western and southern boundaries of the landfill. U.S. EPA may need additional footage to ensure continued access to the cap over the long term. In addition, U.S. EPA proposes to use land along Cleveland Avenue as a staging area for construction activities and for a water treatment facility. Current projections indicate that the following properties would be needed: the staging area would comprise six properties along Cleveland Avenue - a vacant lot, four occupied residences, and one vacant real estate office (See Figure 5). Other properties necessary for the construction of the cap and future access include three residences and one vacant lot immediately adjacent to the site along Hilltop Avenue, one residence adjacent to the northwest corner of the site, two businesses immediately west of the site on Cleveland Avenue,



SCALE 1" = 300'	REM II INDUSTRIAL EXCESS LANDFILL STARK COUNTY, OHIO CAP OPTION I	FIGURE 5
DATE OCT. 1988		

the home at the southwest corner of the site, two residences and two vacant lots immediately adjacent to the site along Amber Circle, and the property adjacent to the southern site boundary. U.S. EPA will use the conceptual design estimates to proceed with the necessary land acquisition immediately.

Land acquisition at IEL will be handled in accordance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act, 42 U.S.C. 4601 et seq., and corresponding regulations (40 CFR Part 4). The Uniform Act is designed (1) to ensure that citizens whose land is needed for a federal project are justly compensated; and (2) to enable those homeowners and businesses who are forced to move to relocate with as little hardship as possible. In those cases where the Agency needs only a portion of a landowner's property and the owner will be left with "an uneconomic remnant," the Agency will offer to acquire the entire property. 42 U.S.C. §4651(9). The Uniform Act defines an uneconomic remnant as "a parcel of real property in which the owner is left with an interest after the partial acquisition of the owner's property and which the head of the Federal agency concerned has determined has little or no value or utility to the owner." U.S. EPA has determined that the following properties will be left with an uneconomic remnant: one residence at the northwest corner of the landfill, three residences and one vacant lot adjacent to the landfill along Hilltop Ave., 2 businesses adjacent to the landfill along Cleveland Ave., and one residence at the southwest corner of the landfill. The details of property acquisition will be worked out with individual owners on a case-by-case basis. Where an uneconomic remnant will result from the Agency's acquisition, some owners may nevertheless prefer to sell only that portion of their property required for the landfill cap, while others may elect to sell their entire property.

Operation and maintenance will include regular inspection of the cap for signs of settling, damage due to burrowing animals, deep-rooted plants, etc., and any necessary repairs. Periodic fertilization and mowing of the vegetative cover will be required. Continual operation and monitoring of the ground water extraction system will include equipment maintenance, sludge removal, replacement of spent carbon, and sampling and analysis of effluent. The performance of the MVS will be monitored through routine sampling of gas monitoring wells. Regular inspections will be conducted and equipment will be replaced as necessary.

Construction Cost: $14,957,000
Annual O & M: $440,000
Total Present Worth: $18,548,000
Time to implement: 12 - 18 months

C. Alternative 2B - RCRA Cap with Retaining Wall, Expanded MVS, Groundwater Pump & Treat

The major components of this alternative are: Fence, institutional controls, monitoring, RCRA cap with retaining wall, expanded MVS, groundwater collection, treatment and discharge to Metzger Ditch.

The components of this alternative are identical to those of Alternative 2A, excepting the addition of a retaining wall to the cap design, which would reduce the amount of adjacent land required for implementation. There are no functional differences between the alternative. The retaining wall would be used to limit the extent of the cap along all of the western and portions of the northern and southern boundaries of the site. The retaining wall would be 6 to 8 feet in height and designed to contain the material comprising the RCRA cap. This alternative would require the acquisition of approximately 25 feet of the properties adjoining the portion of the site with the retaining wall. Approximately 50 feet would be required of the properties immediately north and south of the site which are not adjacent to the retaining wall. The staging area and water treatment facility would be located in the same location and require the same property acquisition as described in Alternative 2A (see Figure 5).

Operation and maintenance for this alternative would be similar to that which was described in Alternative 2A. Additional maintenance would be required for the retaining wall.

Construction Cost: $15,845,000
Annual O & M: $462,000
Total Present Worth: $19,644,000
Time to implement: 12-18 months

VIII. Summary of Comparative Analysis of Alternatives

The three alternatives carried through to the detailed evaluation portion of the FS were evaluated against the nine criteria listed below:

1. Overall Protection of Human Health and the Environment addresses whether or not a remedy adequately eliminates existing or potential risks, and describes how risks are eliminated, reduced through treatment; engineering controls, or institutional controls.

2. Compliance with ARARs addresses whether or not a remedy will meet all of the applicable or relevant and appropriate requirements (ARARs) of other environmental statutes and/or provide grounds for invoking a waiver.

3. Long-term effectiveness and permanence refers to the ability of a remedy to maintain reliable protection of human health and the environment over time, once the remedial goals have been met.

4. Reduction of toxicity, mobility, or volume evaluates the anticipated performance of the treatment technologies a remedy may employ.

5. Short-term effectiveness involves the period of time needed to

achieve protection and any adverse impacts on human health and the environment that may be posed during the construction and implementation period until remedial goals are achieved.

6. Implementability is the technical and administrative feasibility of a remedy, including the availability of goods and services needed to implement the chosen solution.

7. Cost includes capital and operation and maintenance (O&M) costs.

8. Support Agency Acceptance indicates whether, based on its review of the remedy, the support agency (OEPA) concurs, opposes, or has no comment on the Record of Decision.

9. Community Acceptance are assessed in the Responsiveness Summary of this Record of Decision.

Each of the three alternatives was evaluated against the nine criteria and then compared to one another. A tabular summary of the comparison is presented in Table 7 and a narrative summary is presented below:

* Overall Protection of Human Health and the Environment: Alternative 2A and 2B are protective of human health and the environment, by extracting and treating contaminated groundwater and landfill gas, and by containing the landfill wastes. The no action alternative allows for continued infiltration of surface water into the waste and continued contamination of groundwater from the wastes.

* Compliance with ARARs: Alternatives 2A and 2B comply with identified ARARs. The no action alternative does not comply with ARARs and does not qualify for a statutory ARAR waiver.

* Long-term Effectiveness and Permanence: Alternatives 2A and 2B provide long-term effectiveness through a well designed and operated and maintained containment system. The water table level will be lowered because infiltration of surface water will be minimized. In addition, in order to protect groundwater from any additional contamination by the landfill, the groundwater will be pumped to lower further the water table. The expanded MVS system will control landfill gas and increase the effectiveness of the cap. Long term operation, maintenance, and monitoring is required for Alternatives 2A and 2B. The groundwater treatment system provides the only permanence associated with these alternatives. The no action alternative is not effective in the long-term and has no permanent components.

* Reduction of Toxicity, Mobility, or Volume:
The principal component of alternative 2A and 2B is containment, with elements of treatment. These alternatives

TABLE 7

COMPARATIVE SUMMARY OF REMEDIAL ALTERNATIVES

Evaluation Criteria	ALTERNATIVE 1 No Action	ALTERNATIVE 2 w/Cap Option 1 without Wall	ALTERNATIVE 2 w/Cap Option 2 with Wall
Short-term Effectiveness	Not effective	Provides short-term effectiveness	Provides short-term effectiveness
Long-term Effectiveness	Not effective	Provides long-term effectiveness	Provides long-term effectiveness
Reduction of toxicity, mobility and volume (TMV)	No reduction in TMV except for the partial destrution of landfill gases by the existing MVS and flaring.	The flaring of landfill gases provides a reduction of toxicity, mobility, and volume for the gaseous media.	The flaring of landfill gases provides a reduction of toxicity, mobility, and volume for the gaseous media.
Implementability	Not applicable	Implementable, but requires land acquisition.	Land acquisition requirements are less than those for Option 1.
Cost (a)	$864,000	$18,548,000	$19,644,000
Compliance with ARARs	Does not attain ARARs existing conditions are not altered.	Complies with ARARs	Complies with ARARs
Overall Protection of Human Health and the Environment	Results in unacceptable health risks which exceeds 10^{-6}	Provides overall protection of human health and the environment.	Provides overall protection of human health and the environment.
State Acceptance	Does not accept	Accepts	Accepts
Community Acceptance	Does not accept	Very limited acceptance	Very limited acceptance

provide no treatment to reduce the toxicity, mobility or volume of contaminants associated with the landfill waste material. Alternatives 2A and 2B utilize treatment to reduce the toxicity, mobility and volume of contaminants in the landfill gas through the continual operation of the MVS, which effectively destroys gaseous contaminants via combustion. The mobility of contaminants in ground water is reduced by extraction and treatment. Volume and toxicity of contaminants are reduced, to a lesser degree, through the regeneration of spent carbon used in the treatment of groundwater. The no action alternative provides no reduction in the toxicity, mobility, or volume of contaminants.

* Short-term Effectiveness: The time to implement Alternatives 2A and 2B is 12 - 18 months. Increased volume of construction traffic will present some short term risks to the community, as will the excavation of landfill material necessary to expand the existing MVS. Construction of the containment system and water treatment facility will present little risk to the community. It is estimated that extraction and treatment of the existing groundwater contamination will take approximately 3 years. Thereafter, the pumping of groundwater may need to continue indefinitely in order to protect groundwater from additional contamination by the landfill. The no action alternative takes only 3 months to implement and has no additional short-term risks.

* Implementability: All components of Alternatives 2A and 2B are proven technologies which are widely used and easily implementable. Delays due to technical difficulties are not likely. However, administrative delays are possible, with regard to the acquisition of privately owned property. The no action alternative presents no implementability problems.

* Cost: Alternative 2A is less expensive than Alternative 2B. The no action alternative is the least costly as it requires only fencing, monitoring, and operation of the existing MVS.

* State Acceptance: The State of Ohio concurs with the selected remedy. No action is not acceptable to the State.

* Community Acceptance: The community's comments are summarized and responded to in the Responsiveness Summary.

IX. Selected Remedy

A: Remedy

Based on the evaluation of the alternatives, U.S. EPA selects Alternative 2A - fence, use restrictions, RCRA cap, expanded MVS, ground water extraction and treatment, and in order to protect groundwater from additional contamination by the landfill, continual groundwater pumping to maintain lowered water table - as the remedy for the IEL Site. The selected remedy is protective of human health and the environment, attains ARARs, and provides the best balance among the nine evaluation criteria. By containing the source area to prevent further groundwater contamination, extracting and treating already contaminated groundwater, and extracting and flaring landfill gas, the selected remedy reduces the risk posed by the landfill to an acceptable level. In combination with the alternate water supply operable unit, the selected remedy eliminates the threat of exposure to contaminated groundwater. The chemical specific ARARs and TBCs must be attained in the groundwater beneath the IEL site and at all points beyond the site where contaminated groundwater has migrated. Landfill gas concentrations beyond the site boundary shall not exceed 5 percent methane. The cleanup levels and performance standards to be achieved by the selected remedy are presented in Section IX(B).

B. Detailed Remedy and Design Phase Studies Descriptions:

The following is a detailed description of the selected remedy and the minimim design studies necessary to collect information for design of the various remedy components. Detailed work plans will be developed for the design studies to be conducted.

1) The Groundwater Component:

The two main objectives of the groundwater pump and treat component of the remedy is to:

- o Maintain a lowered water table in order to protect groundwater from additional contamination by the landfill,
- o Ensure that the existing contaminated groundwater within, beneath, and off the site is intercepted, before it has a chance to move downgradient, and extracted. Extracted groundwater will be treated to meet discharge criteria.

As mentioned in the RI Report, the water levels in installed monitoring wells indicate a mounding of groundwater within the landfill. This situation is most likely due to the accumulation of precipitation which has percolated through the permeable soil materials used to cover the site. As a result, portions of the wastes and contaminated soil in the landfill are likely saturated with groundwater. To alleviate this situation, A RCRA cap will be installed to prevent surface water infiltration and, in order to protect groundwater from additional contamination by the landfill, groundwater extraction wells will be installed to further lower the water table beneath the landfill. As a result, there will be reduced contact between the wastes/contaminated soils and groundwater.

a) <u>Groundwater Extraction</u>

The conceptual strategy for groundwater extraction was developed using site specific information from the Remedial Investigation (RI) Report. During the RI, hydrogeologic characteristics were determined from rising head tests, water level measurements and logs from monitoring well borings.

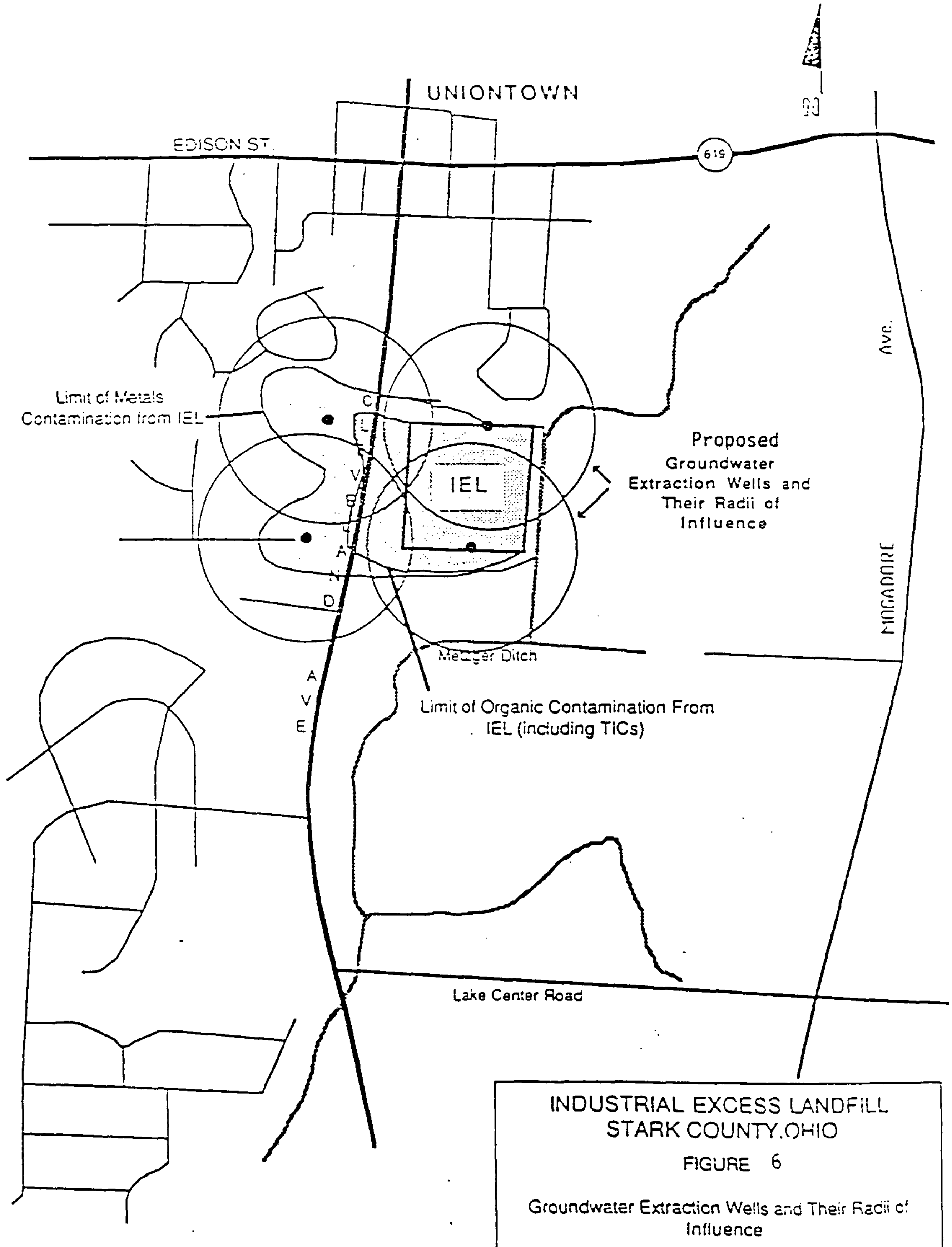
Extraction rates are based on equilibrium flow conditions in an unconfined (water table) aquifer. Steady state conditions were used since pumping is expected to be steady and continuous. The objective was to design a well system that will be effective over the entire zone of contamination while still minimizing the total quantity of water needing to be extracted. The throughput rate at which the water can be economically treated was also considered. The conceptual system used for cost estimating purposes consists of four extraction wells located on and around the landfill as shown on Figure 6. Each well will be pumped at a rate of approximately 400 gallons per minute.

Contamination was found in the shallow monitoring wells, with the wells located closest to the actual landfill waste (MW01S, MW03S, MW04S, MW04S, MW05S, and MW07S) showing the most contamination. In addition residential wells RW05, RW38, RW39, RW07, RW08, RW09, RW40, and RW11 also exhibited various levels of contamination. The shallow monitoring wells were screened at 5 to 42 feet below the surface of the ground. Figure 7 shows the locations of all groundwater samples taken at the site. This includes installed monitoring wells, the residential wells sampled, and two existing irrigation wells (located due east of the landfill) used as monitoring wells. At the IEL site, large variations in surface elevation and the depth to the water table exists, varying from a few feet to approximately 45 feet below the ground surface.

Assuming that all groundwater less than 40 feet below the surface of the water table is contaminated, the bottom of the extraction well screen will be set at a maximum depth of approximately 85 feet.

Utilizing the previously stated assumptions, the volume of contaminated groundwater was calculated to be approximately 256 million gallons. For the purpose of estimating the duration of treatment, it is assumed that three pore volumes of water (768 million gallons) will have to be extracted to reduce contamination in the aquifer to drinking water criteria.

Based on a total pumping rate of 1,600 gpm and a total volume of 768 million gallons, the duration of pumping is estimated to be 3 years. However, in order to maintain the lowered water table, pumping may continue indefinitely, but at least as long as necessary to protect groundwater from additional contamination by the landfill. Treatment of these extracted groundwaters will be necessary until the discharge concentrations meet NPDES

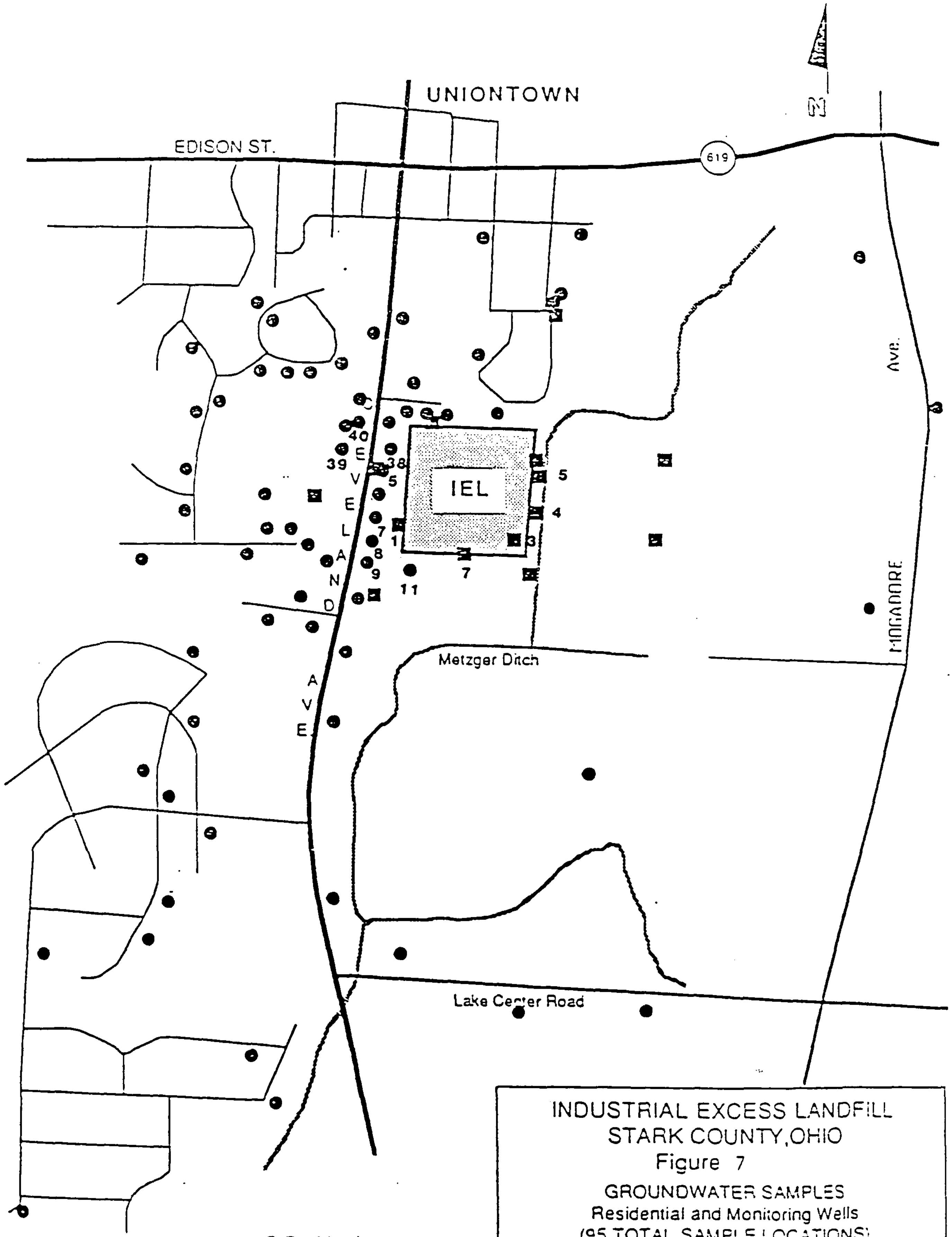


INDUSTRIAL EXCESS LANDFILL
STARK COUNTY, OHIO

FIGURE 6

Groundwater Extraction Wells and Their Radii of Influence

C.C. JOHNSON & MALHOTRA, P.C.



INDUSTRIAL EXCESS LANDFILL
STARK COUNTY, OHIO
Figure 7
GROUNDWATER SAMPLES
Residential and Monitoring Wells
(95 TOTAL SAMPLE LOCATIONS)

C.C. JOHNSON & MALHOTRA, P.C.

● Residential Well Location
▣ Monitoring Well Location

Scale Approximate, 1" = 1100'

requirements.

The following presents a preliminary recommendation for a monitoring program which may be implemented at the IEL site: eight wells (five shallow, three deep) would be installed downgradient (west) of the landfill and four (two shallow, one deep and one intermediate) installed upgradient (east) of the site. In addition, wells should be installed both to the north (two shallow and one deep) and the south (two shallow and one deep) of the landfill. The exact number and location of these wells will be determined as the initial wells are installed. The depth of these wells will be dependent upon their location. Shallow wells should be installed at the top of the water table with deep wells installed in bedrock.

The new monitoring wells will be installed to serve multiple purposes. The exact location of these wells will be selected to assist in further defining the specific areal and vertical extent of groundwater contamination at the IEL site. They will also be located to provide additional definition of the "mound" at IEL. Water level elevation measurements obtained from the array of existing and newly installed monitoring wells will be used to provide information concerning flow interactions between Metzger Ditch and local/regional groundwater.

These wells will also serve to define the eastern extent of potentially contaminated groundwater flowing from the mound before changing direction and becoming part of the western regional flow. The new and the existing monitoring wells will be sampled and analyzed to further define the groundwater characteristics at and around IEL. The exact location of the new wells and the monitoring program will be determined during the RD phase. At this time the sampling and analysis of groundwater are assumed to be performed on a quarterly basis druing the first 5 years and semiannually thereafter. Samples would be analyzed for the full CLP RAS organic and inorganic compound list in the beginning of the program and for compounds of concern later on. Conventional parameters shuch as chloride, sulfate, nitrate, nitrite, specific conductivity, and alkalinity will also be determined. Radiological scans will be conducted in accordance with the Safe Drinking Water Act (i.e. Gross Alpha and Gross Beta) and Analytical Labs will be requested to tentatively identify compounds. Water levels of the monitoring wells would be taken at the time of sampling and hydraulic gradients would be calculated and compared to existing data.

The extraction well system conceptual design is based on a number of assumptions. During design, a more complete evaluation of the hydrogeologic characteristics of the site and surrounding area will be conducted. During the RD phase, pump tests and computer modeling will be necessary to design the optimum extraction system.

At least two such tests will be conducted, one to the north and one to the south of the landfill. In the performance of the pumping tests, piezometer wells will be installed and monitored to evaluate the drawdown resulting from various pumping scenarios. These piezometers will also serve to establish water levels and assist in the definition of groundwater flow north, east and south of the site ("the mound" and the affects of Metzger Ditch). This testing program used in conjunction with data from the monitoring well program will determine the ultimate location of the extraction wells. The information collected during the design may indicate modification of the conceptual design is necessary. Such modifications may affect the number, location, and pumping rate of the groundwater wells and the number of pore volumes of water to be removed in order to achieve cleanup levels.

The capital/construction costs for the conceptual groundwater extraction system are estimated to be $925,430. The annual O&M costs for this system are estimated to be $154,034. Present worth costs, based on a 10% discount rate, and carried over a three year period (the estimated duration of groundwater treatment activities), are estimated to be $550,710.

b) Groundwater Treatment

The groundwater will be treated to NPDES effluent discharge standards established for Metzger Ditch. The treatment system would consist of a countercurrent, packed stripping column, activated charcoal and flocculation, sedimentation and filtration. The treated effluent will then be pumped and discharged into Metzger Ditch. If treatment is not necessary, it will not be provided. Contaminant concentrations in extracted groundwater may be below NPDES effluent discharge standards allowing for direct discharge to Metzgers Ditch without treatment.

Flocculation, Sedimentation Filtration - Flocculation/sedimentation/filtration are combined with air stripping and carbon adsorption to treat the inorganic contaminants of concern (e.g. barium and nickel) as well as other metals that may be present. Flocculation and sedimentatiaon will be used to remove these compounds. Lime will be used as a coagulant because it is able to achieve 88 to 95 percent removal of all of these compounds. The additon of lime would raise the pH to between 8 and 9 causing dissolved metals to form insoluble metal hydroxides. With the aid of polymer, insoluble constituents of the waste stream will aggregate and settle in the settling tank. The treated water will be filtered to remove residual floc, and acid will be added to readjust the pH. Sulfuric acid was used to calculate the cost of pH adjustment. To reduce pressure loss through the filter, it must be periodically backwashed. This backwash from filtration would be recycled through the treatment system. The effluent from the neutralization tank will then be pumped to the air stripper and granular activated carbon unit to remove VOCs.

The other effluent stream for this treatment system is sludge from the sedimentation process. A plate and frame filter press will used to dewater this sludge. This sludge, which will likely contain elevated concentrations of barium, nickel and other metals may be considered a hazardous waste. As such, it must be managed as a hazardous waste (i.e., solidified prior to disposal in an approved, RCRA compliant landfill). The liquid filtrate from this process will be recycled through the treatment system.

Air Stripper - A pre-designed, portable package-type air stripping unit, available from several vendors, will be utilized to treat the groundwater. Based on a flow rate of 1600 gpm, an air stripper 5 feet in diameter containing 20 feet of packing material (1.5 inch polypropylene rings) will be required. This configuration assumes an air to water ratio of 30:1. The air stripper will be constructed of Fiberglass reinforced plastic and can be placed onsite on a concrete pad.

Following installation, groundwater will be pumped to the top of the air stripping column at a rate of approximately 1600 gpm where the influent water will spread thinly over the plastic packing media in the column as it falls. Air blown upwards through the packing removes the VOCs from the water by mass transfer. The discharges from the air stripper shall comply with Federal and State regulations and requirements.

Mass balance analysis of air and water flows will be used to monitor the air stripper's performance and efficiency. The results of these analyses would be used to adjust air to water ratios.

Following the air stripper the groundwater will pass through a granular activated carbon adsorption (GAC) unit.

Granulated Activated Charcoal - The GAC adsorption system would be a package unit consisting of two two-in-series 10 feet diameter carbon columns operated in parallel. Each vessel will contain approximately 20,000 lbs. of carbon and will operate at an individual flow rate of 800 gpm (1,600 gpm overall) in series configuration. When the carbon has reached its capacity for effective contaminant removal (breakthrough) in the lead column, that column will be refilled with virgin or regenerated carbon. Effluent from the second carbon column will be discharged to the Metzger Ditch along the eastern boundary of the site. Through the use of the two two-in-series units greater flexibility and performance capabilities are possible.

The exhausted carbon will be returned to the vendor supplying the carbon for regeneration. The carbon can be regenerated if PCBs, dioxin or dibromochloropropane are not present in the contaminated carbon. IEL's groundwater does not contain any of these contaminants. Therefore, regeneration will be possible. The treated groundwater will than be discharged to the Metzger Ditch.

c) Groundwater Disposal

The treated groundwater effluent will be pumped from the onsite treatment system to the Metzger Ditch which flows along the eastern portion of the landfill. Water will be conveyed to the ditch through approximately 600 feet of ten-inch diameter ductile iron pipe. The effluent will be continually monitored to ensure compliance with NPDES discharge criteria for Metzger Ditch.

The Metzger ditch flows through two counties, Stark County and Summit County, and ultimately flows into the Tuscarawas River. The portion of the ditch within the Stark County boundary was last dredged in 1975 to facilitate drainage of the surrounding farm lands and residential property.

The ditch was constructed to handle a maximum flow rate of approximately 100 ft^3/sec. In Summit County, it is estimated that the ditch is able to handle similar flow rates. The effect of a 1,600 gpm discharge from the water treatment system to the Metzger Ditch should be minimal even if 50 percent deterioration of the ditch capacity is assumed. The Tuscarawas River is the discharge point of the Metzger Ditch. The river is designated a warm water aquatic life habitat and is mainly utilized for agricultural, industrial and recreational activities.

The system will be required to meet the National Pollutant Discharge Elimination System (NPDES) requirements for surface discharge. Daily collection of effluent samples and flow measurements will be required to ensure compliance with these requirements. Sampling and flow monitoring will be the responsibility of the treatment system operating personnel.

d) Groundwater Monitoring

Groundwater monitoring will be required during and after the implementation of each of the remedial alternatives. Monitoring will help determine the effectiveness of the remedy and ensure that further migration is not occurring. Installation of additional monitoring wells will be required at the IEL site. Compliance monitoring to determine when groundwater cleanup levels have been achieved shall be conducted at points beneath the landfill and along the contaminant plume extending from the landfill to off-site areas. The exact number and location of these wells will be determined during performance of the design study. A monitoring program will be developed to check the effectiveness of the cleanup and to determine if adjustments to the extraction system are necessary. The monitoring frequency and analytical parameters will be determined based on the system design to ensure adequate information is collected.

2) The Soil/Waste Component

This remedy requires the installation of a RCRA cap over the surface of the landfill. In order to maintain the appropriate side slopes, this design requires substantial intrusion onto the adjacent property.

RCRA Cap

Installation of the cap will involve the excavation and removal of the highest areas, filling in the low lying areas with landfill surface materials (including wastes) removed during grading/excavation operations, grading the area, and then capping. Following excavation/filling the site will be graded and the operation begun.

Capping techniques are used when materials are to be buried or left in place. These techniques are particularly applicable when the waste is an extensive subsurface deposit and excavation and removal are not practicable. Multilayer caps are preferred, especially in the midwest where swelling and shrinking of the clay layer is a problem. The synthetic layer helps to prevent excessive swelling shrinking of the clay layer. The IEL cap design will appropriate site specific factors into account, including erosion, water balance, settling, and permeability.

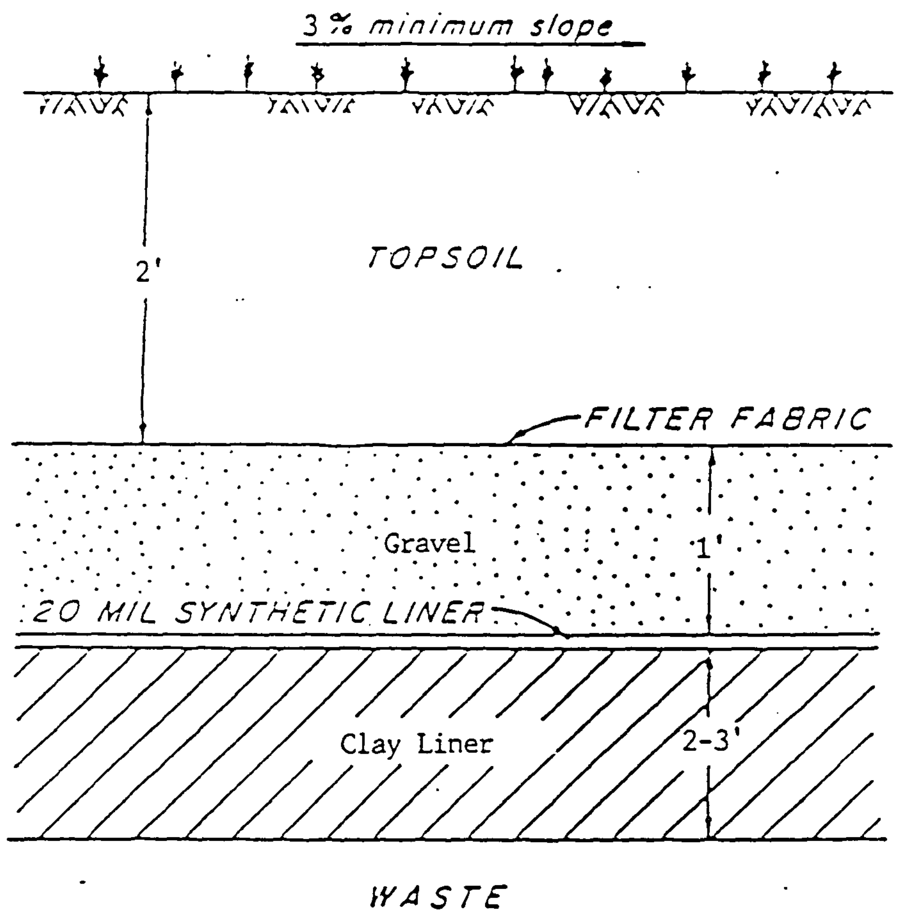
Capping of the contaminated area presently calls for the construction of a three-layered cap conforming to RCRA guidelines (See Figure 8). The area to be capped is outlined on Figure 5 and encompasses approximately 30.0 acres. This operation will first consist of the placement of a two to three foot clay liner, compacted in six inch lifts. A twenty-mil synthetic liner will then be placed over the clay. Next, a one-foot thick drainage layer of gravel will be spread and overlain with geotextile fabric. The geotextile fabric will maintain the drainage layer and help to stabilize a final layer of two feet of top soil by keeping fine top soil particles from filling the pore space of the gravel layer. The top soil will be vegetated to prevent erosion. A drainage channel will be constructed to direct surface run-off to the present site drainage (Metzger ditch).

Precipitation that percolates through the top soil will flow laterally through the gravel and over the impermeable synthetic and clay barrier and into the drainage channels.

While constructing the cap, provision will be made to retain the present MVS, and extend it as described later in this ROD.

FIGURE 8

TYPICAL CROSS-SECTION OF A CAP



The engineering considerations for a cap include:

- Determination of total area to be covered by defining the vertical and horizontal boundaries of the waste to be capped
- Determination of the volume of material required for cut/fill
- Design and construction of the cap to prevent erosion or subsidence as per RCRA guidelines/standards
- Site preparation to achieve required slopes
- Location of a collection system for stabilization of cap surface water run-off before being discharged
- Extension of the present Methane Venting System.

The major construction equipment required for the implementation of this alternative include:

- Bulldozer
- Hydraulic excavator
- Front end loader
- Dump trucks
- Compactor
- Hydroseeding equipment

Due to the presence of very marshy and peaty conditions along the eastern portion of IEL (along Metzger Ditch), the soil may require stabilization for heavy equipment to work.

The cap will be inspected on a regular basis for signs of erosion, settlement, or subsidence. It is recommended that inspections be conducted frequently in the first six months because problems are most likely to appear during this period. Maintenance of the final cap would include application of fertilizer and periodic mowing to prevent invasion by deep rooted vegetation. Any signs of unexpected settling or subsidence should be addressed immediately by removing the overburden and repairing the affected areas.

Air monitoring will be required during construction to ensure that a safe working environment is maintained and that no threat to public health or the environment is created by air emissions from the site during construction.

It may be necessary to install a clay liner which is thicker than that usually recommended for a RCRA cap. The additional clay will be designed to provide extra coverage for the manifold piping if the design of the extended MVS call for the piping to be below the cap.

3) The Air/Gaseous Emission Component

The remedy calls for installing active gas extraction wells at selected locations at the landfill. The number and locations of wells to be installed within the landfill will be determined as a result of gas extraction tests conducted during the RD phase. The extraction wells will be connected using a head/manifold piping system which will ultimately end up at the blowerhouse and ground flare. Thus, this extended methane venting system (EMVS) will be interconnected with the MVS currently in place.

The purpose of these wells will be to: 1) relieve gas pressures within the landfill, and 2) extract methane and other volatile gases emanating from within the landfill and to direct these gases so that they do not migrate offsite.

During the RD phase gas extraction tests will be performed at the IEL site. These tests should consist of several installed extraction wells and corresponding gas monitoring probes. The exact number and location of these extraction wells will be determined prior to initiation of this program. At this time, U.S. EPA estimates that at least three such extraction test wells will be installed at IEL. Around each test extraction well, at least five pressure probe nests (3 wells each) will be installed. These nests will be located to measure pressure changes (as well as static pressure) throughout the depth of the landfill.

These tests will be used in a model to determine the existing gas pressure within the landfill (static pressure) and to design the MVS at IEL. The objective of the tests is to ensure that the MVS will be adequate in capacity and location to prevent migration of the landfill gasses from the site. The system will also be designed to ensure the integrity of the RCRA cap, (e.g., problems due to pressure build-ups). It is important to realize that to achieve both of these objectives the pressure beneath the cover needs to be slightly higher than atmospheric to prevent the flow of oxygen and nitrogen into the landfill. The MVS system must also be designed to ensure that this pressure differential is maintained without excessive buildup. The existing MVS monitoring well system will be expanded as part of the design of the overall MVS.

It will also be necessary during these tests to collect additional gas samples to define the specific gas characteristics to ensure the designed system will be effective in the collection and treatment of these gases. During the drilling of the on-site groundwater monitoring wells, gas samples will be collected at various depths within the landfill ranging from the surface to maximum depth of waste disposal or to groundwater, whichever is encountered first. These samples will be analyzed for HSL compounds, Radon, and will be screened for gross radiation. Additional radioactive isotopes will be analyzed in the event the gross screening indicates the potential presence of radioactive elements. In the course of implementation of this system, ambient air monitoring will be conducted as necessary.

4) Surface Water/Sediment Component

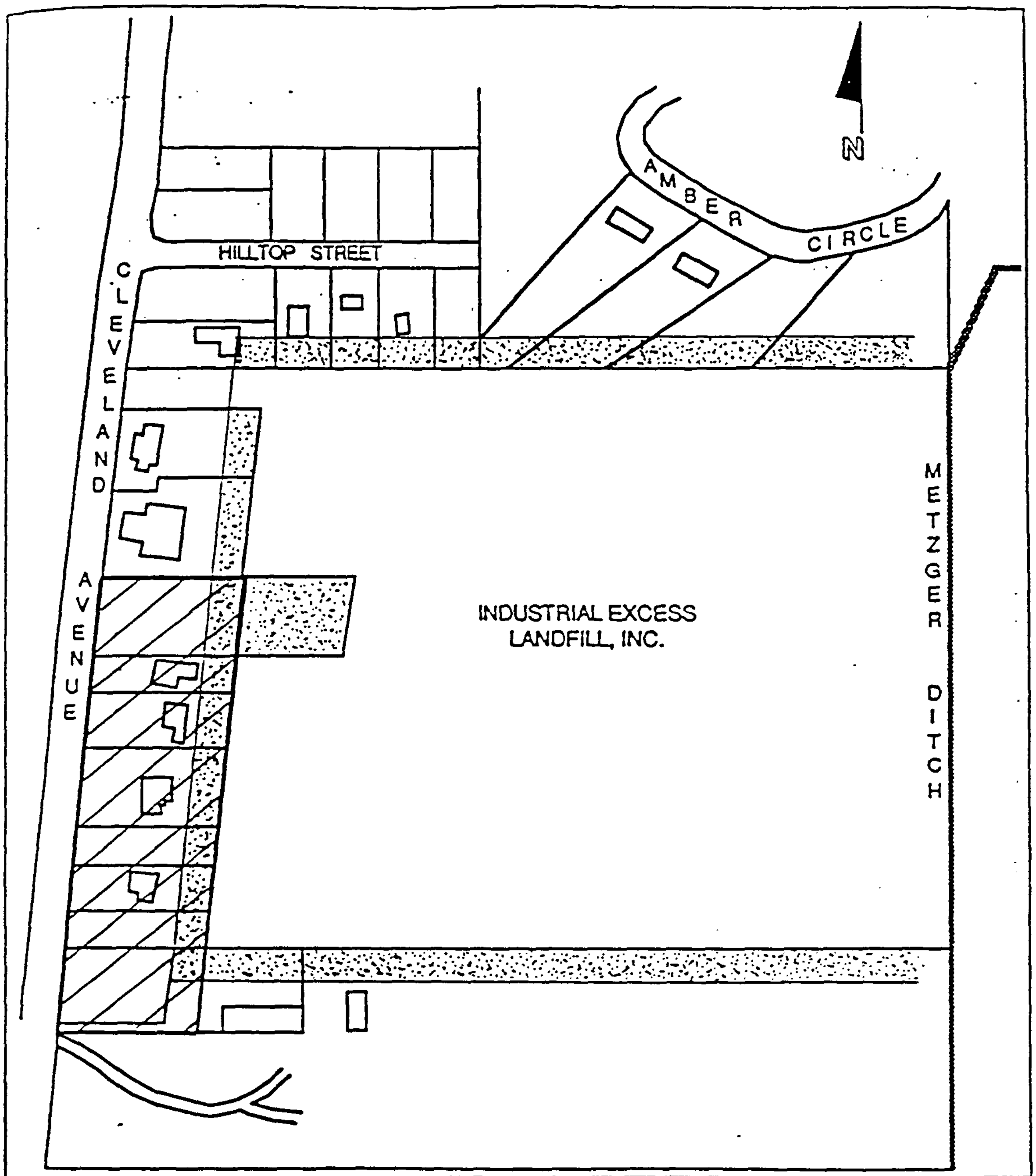
Surface waters contained in the ponds at IEL will be pumped to the groundwater treatment system as necessary to meet NPDES discharge criteria for Metzger Ditch. With the removal of the free water above the sediments in the on-site ponds, these materials will be dredged from the ponds and incorporated into the soil/waste mixture for additional remediation. As necessary, these materials will be dewatered.

As necessary, the sediments from Metzger Ditch will be dredged and incorporated with the dredged pond sediments. Proper controls will be exercised to minimize potential risks of releases from these operations. An initial part of these monitoring efforts will be the core sampling of sediments in Metzger Ditch adjacent to the site to ensure RD/RA activities do not adversely impact the ditch, and to refine previous data on contaminant movement into the ditch. Core samples will be analyzed for HSL organic and inorganic compounds as determined in the sampling plan.

Monitoring of Metzger Ditch and all surface water discharges from site operations during remediation will be performed and remedial actions taken as necessary.

5) Land Requirements

Additional land will be required during implementation of the remedial action at the IEL site. A staging area will be needed in order to accommodate the large equipment which will be used during site remediation. Land will also be needed for construction of the groundwater treatment plant. Figure 9 shows the location of the land that needs to be obtained in order to effect the remedial action at the site. In addition, approximately 50 feet along the north, south and western boundaries of the site are necessary for construction of the RCRA cap at 4:1 side slope, drainage ditches, roadways and fencing as required to implement this alternative. U.S. EPA will use the conceptual design estimates to proceed with the land acquisition immediately after issuance of this ROD.



Approximate area of cap beyond IEL site

Area for staging & treatment plant

Scale Approximate, 1" = 280'

INDUSTRIAL EXCESS LANDFILL
STARK COUNTY, OHIO

FIGURE 9

C. Community Participation During RD/RA

The community group at IEL, Concerned Citizens of Lake Township (CCLT), has requested U.S. EPA to provide a mechanism for meaningful community input during the IEL remedial design and implementation. U.S. EPA will form a Technical Advisory Committee (TAC) made up of CCLT representatives, other community members, local officials, Ohio EPA representatives and U.S. EPA representatives. Providing the TAC member's stipulation to confidentiality and commitment to a schedule, U.S. EPA will provide the TAC members the opportunity to review and comment on draft design and other technical documents generated during the IEL RD/RA. The TAC will hold regular meetings to review the progress of the RD/RA and to discuss technical issues. All TAC comments on draft documents will be submitted to U.S. EPA. U.S. EPA will consider all comments received, but retains final decision authority on the content of all documents. The Community Relations Plan for RD/RA will be amended to reflect this agreed upon level of community participation.

X. Documentation of Significant Changes

A. RCRA Cap

The containment portion of the preferred alternative described the conceptual design of a RCRA multilayer cap consisting (from bottom to top) of:

- clay liner
- 20 ml synthetic liner
- sand drainage layer
- filter fabric
- top soil and vegetation

Several public comments were submitted to U.S. EPA regarding the multilayer cap's integrity in light of differential settling within the landfill. The comment noted that differential settling may cause cracks to form in the clay liner and rupturing of the synthetic liner. As a result of this comment, U.S. EPA is clarifying the containment portion of the preferred alternative to provide assurance that all appropriate site specific factors will be considered during the design of the RCRA cap, including settling, erosion, water balance, and permeability.

B. Groundwater Extraction and Treatment System and Design Studies

The FS and Proposed Plan described the conceptual design of a groundwater extraction and treatment system. The conceptual design is based on currently available information. The FS and Proposed Plan also outlined the type of design study necessary to collect information to design the extraction and treatment system. U.S. EPA is modifying the ROD to clarify that the conceptual design of the extraction and treatment system may need to be modified based on information collected during the design study. Such modifications may affect the number, location, and pumping rates of the extraction wells. In addition, other extraction methods, such as trenches or french drains may be used in conjunction with extraction wells. The design study will examine hydrogeologic conditions within, beneath and near the landfill and whether NAPLs are present. U.S. EPA believes this clarification is necessary to provide enough flexibility to design the most efficient and effective extraction and treatment system.

C. Groundwater Extraction

The FS presented a groundwater extraction scenario which called for perpetual pumping in order to maintain a lowered water table level. However, if the RCRA cap is effective in preventing and reducing the infiltration into the site, the groundwater level may be lowered without the need for pumping or with only minimal pumping. In addition, as a result of the groundwater design study, U.S. EPA may be able to design an extraction and treatment system that provides for cleanup of that portion of the landfill which may remain in the groundwater after the cap is installed. U.S. EPA is modifying the remedy to clarify that pumping of groundwater to lower the water table will be conducted in order to protect groundwater from additional contamination by the landfill. This length of time may be less than perpetuity. If the extraction system is terminated, it will be started again should contaminant levels indicate groundwater quality may be compromised. This clarification is necessary to provide for cessation to groundwater pumping in the future if circumstances warrant it.

D. Land Acquisition

U.S. EPA is modifying the IEL remedy to clarify when the necessay land acquisition shall commence. U.S. EPA is confident that at least 50 feet of the properties on the northern, southern, and western borders of the site must be acquired to install an effective RCRA cap and that six complete properties adjacent to the western boundary must be acquired for a staging area and to construct a groundwater treatment plant. Accordingly, U.S. EPA will begin the acquisition procedures immediately after the ROD is issued and the State of Ohio has given assurances that it will accept transfer of the property following completion of the remedial action in accordance with Section 104(j)(2) of CERCLA.

In those cases where the Agency needs only a portion of a landowner's property and the owner will be left with "an uneconomic remnant," the Agency will offer to acquire the entire property. 42 U.S.C. §4651(9). The Uniform Act defines an uneconomic remnant as "a parcel of real property in which the owner is left with an interest after the partial acquisition of the owner's property and which the head of the Federal agency concerned has determined has little or no value or utility to the owner." U.S. EPA has determined that the following properties will be left with an uneconomic remnant: one residence at the northwest corner of the landfill, three residences and one vacant lot adjacent to the landfill along Hilltop Ave., 2 businesses adjacent to the landfill along Cleveland Ave., and one residence at the southwest corner of the landfill. The details of property acquisition will be worked out with individual owners on a case-by-case basis. Where an uneconomic remnant will result from the Agency's acquisition, some owners may nevertheless prefer to sell only that portion of their property required for the landfill cap, while others may elect to sell their entire property.

All other portions of the Proposed Plan are incorporated into this Record of Decision without significant change.

XI. Statutory Determinations

The selected remedy is protective of human health and the environment; attains ARARs; is cost effective, and utilizes permanent solutions and alternative treatment technologies or resource recovery to the maximum extent practicable. The selected remedy does not use treatment that reduces the toxicity, mobility, or volume of the source of contaminants as a principal element, however it does use treatment to address other principal threats, contaminated groundwater and landfill gas.

The following is a summary of how the selected remedy meets or addresses each of the five (5) statutory requirements:

A. Protection of Human Health and the Environment: The selected remedy will protect human health and the environment by a combination of engineered containment, treatment, and institutional controls. The IEL site is a source of ground water contamination. Drinking water wells down gradient from the landfill are contaminated with vinyl chloride, low levels of organic solvents, and/or metals. Landfill gas generated within the site contains volatile organic compounds. The selected remedy will contain the wastes at the site and reduce significantly the infiltration of surface water into the waste. The existing methane venting system will be expanded to ensure landfill gas is collected and prevented from building up beneath the RCRA cap. Existing contaminated groundwater will be extracted and treated in an on-site treatment plant. In order to protect groundwater from contamination by the landfill, the groundwater beneath the site may need to be pumped continually to maintain the water table beneath the bottom of the site wastes. Land use restrictions will be imposed on the site to prevent incompatible future use of the property. The selected remedy does not pose unacceptable short-term risks and will not cause cross-media contamination.

B. Attainment of the Applicable or Relevant and Appropriate Requirements: The selected remedy will attain Federal and State ARARs in accordance with Section 121(d)(1) of CERCLA. In addition, the selected remedy will proceed in accordance with certain Federal and State environmental criteria, guidance or policy to be considered (TBCs).

Applicable requirements are cleanup standards, standards of control, and other substantive environmental protection requirements, criteria or limitations promulgated under Federal or State law that specifically address a hazardous substance, pollutant, contaminant, remedial action, location or other circumstance at a site. A requirement is "applicable" if the remedial action or circumstances at the site satisfy all of the jurisdictional prerequisites of the requirement.

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

"A requirement that is judged to be relevant and appropriate must be complied with to the same degree as if it were applicable. However there is more discretion in this determination: it is possible for only part of a requirement to be considered relevant and appropriate, the rest being dismissed if judged not to be relevant and appropriate in a given case." (Interim Guidance on Compliance with Applicable or Relevant and Appropriate Requirements, 52 FR 32496 (August 27, 1987).

While non-promulgated advisories, guidance documents or proposed rules issued by Federal or State governments do not have the status of potential ARARs, they may be considered in determining the necessary level of cleanup for protection of human health and the environment. (Interim Guidance on Compliance with Applicable or Relevant and Appropriate Requirements, 52 FR 32496 (August 27, 1987).

The following listing of ARARs and TBCs is divided into three broad categories: those relating to specific chemicals, those relating to specific actions, and those relating to the location of the site. As new standards are promulgated, the remedy will be reviewed and the cleanup level may need to be adjusted to ensure protection of public health.

1. Chemical Specific ARARs and TBCs Groundwater

   a) MCLs for the following compounds [Relevant and Appropriate]

Maximum Contaminant Levels (MCLs) are established under the Safe Drinking Water Act. These are the maximum contaminant concentrations allowed in regulated public water supplies. Levels are based on a chemical's toxicity, treatability, (including cost consideration), and analytical limits of detection.

MCLs are "relevant" to the remedial action at the IEL site because groundwater at the site is or may be used for drinking water. MCLs are "appropriate" because they set enforceable drinking water standards for public water supplies. As MCLs apply to water at its point of distribution ("at the tap"), these levels are appropriate for groundwater at this site because residential wells that might use the aquifers underlying the site generally have minimal or no treatment. Thus, these standards will have to be applied in the groundwater itself to ensure safe levels at the tap.

Compound	Concentration ug/l
*Vinyl chloride	2
*1,2-Dichloroethane	5
*Benzene	5
1,4-Dichlorobenzene	75
Barium	1000
Chromium	50
Lead	50
Arsenic	50
Cadmium	10
Selenium	10
Silver	50
Copper	1000 (secondary MCL)
Iron	300 (secondary MCL)
Manganese	50 (secondary MCL)
Zinc	5000 (secondary MCL)

   b) Proposed MCLs for the following compounds [To Be Considered]

Proposed MCLs for into the "To Be Considered" category because, until adopted, they do not constitute promulgated standards. Nevertheless, the Agency intends to meet and/or consider the proposed standards for the following compounds.

Compound	Concentration ug/l
Toluene	2000
*Tetrachloroethene	5

Chlorobenzene	100
Ethylbenzene	700
Xylenes	10000
Barium	5000
Chromium	100
Lead	5
Arsenic	30
Cadmium	5
Selenium	50

c) Ambient Quality Criteria Adjusted for Drinking Water [To Be Considered]

Ambient Water Quality Criteria for Human Health (WQC) are established under the Clean Water Act. The original WQC assumed that people drank contaminated surface water and ate contaminated fish that lived in that water. The Superfund program adapted these criteria to groundwater by calculating the corresponding contaminant concentration for exposure to contaminated drinking water alone. (Superfund Public Health Evaluation Manual, October 1986).

Compound	Concentration ug/l
Nickel	15.4
Cyanide	200

d) 1×10^{-6} cumulative cancer risk based on the summation of the cancer risk from all carcinogenic compounds of concern. [To Be Considered]

In accordance with the Superfund Public Health Evaluation Manual, carcinogenic risks are additive. When a mixture of carcinogenic compounds is found at a site, reduction in the concentrations of those compounds to a level whereby the sum of the carcinogenic risk is 1×10^{-6} is necessary to protect public health. The compounds above marked with an asterisk are known or suspected carcinogens (arsenic is a known carcinogen but shall not be included in the calculation because the levels at the site are considered to be naturally occurring) and, in accordance with the SPHEM methodology for risk calculations, the risk from the sum of the concentrations of these compounds should not exceed 1×10^{-6}.

2. Action Specific ARARs and TBCs

Landfill Cap

a) RCRA Section 3004, 40 CFR 264 and 265, Subpart N. Establishes technical requirements for landfill closure, including cap specifications, sloping, surface drainage etc. [Relevant and Appropriate]

b) Ohio Air Pollution Control Standards, OAC 3745-15 through, 3745-25. Requires control of fugitive dust emissions. [Applicable]

Methane Venting System Expansion

a) Ohio Air Pollution Control Standards, OAC 3745-15 through 3745-25. Requires the use of Best Available Technology to control new sources of air pollution. [Applicable]

b) National Ambient Air Quality Standards, 40 CFR 50 - 3 hour average for hydro-carbons is 0.160 mg/m^3. [Relevant and Appropriate]

c) RCRA Section 4004 Criteria. Requires methane concentrations at compliance wells (at boundary of landfill) to be 5 percent by volume or less. [To Be Considered]

Ground Water Extraction and Treatment

a) NPDES discharge limitations Clean Water Act Section 402 40 CFR 122, 123, 125 and Subchapter N. Regulates discharge of water into public water. Includes contaminated groundwater pumped, treated, and discharged to surface water. Permit limits shall be established in accordance with the Ohio EPA Aquatic Life Water Quality Criteria applicable to Metzgers Ditch. Table 8 presents the criteria to be used for establishing NPDES discharge limitations. [Applicable]

b) RCRA Subtitle C, 40 CFR 260. Regulates the generation, transport, storage, treatment, and disposal of hazardous waste in the course of remedial action. Any spent carbon and/or sludge from the on-site treatment plant considered to be a hazardous waste must be managed in accordance with RCRA. [Relevant and Appropriate]

c) RCRA Section 3003, 40 CFR 262 and 263, 40 CFR 170 to 179. Regulating the transport of hazardous waste. Any spent carbon and/or sludge from the on-site treatment plant considered to be a hazardous waste must be transported in accordance with RCRA transportation regulations. [Applicable]

d) RCRA Section 3004(d) and (e). RCRA Land disposal restrictions. Any spent carbon or sludge from the treatment plant considered to be a land ban regulated

TABLE 8

OHIO EPA AQUATIC LIFE WATER QUALITY CRITERIA
(all concentrations in ug/l)

Compound	AAC*	CAC**
Acenaphthene	67	67
Acetone	550,000	78,000
Acrylonitrile	460	430
Aniline	10	0.44
Antimony	650	190
Arsenic	360	190
Benzene	1,100	560
Bis(2-ethylhexyl)phthalate	1,100	8.4
Bromoform	1,500	[illegible]
2-Butanone	160,000	7,100
Butyl benzyl phthalate	230	49
Carbon tetrachloride	1,800	280
Chlorobenzene	590	26
Chloroform	1,800	79
2-Chlorophenol	200	8.8
1,2-Dichlorobenzene	160	11
1,3-Dichlorobenzene	250	87
1,4-Dichlorobenzene	110	43
1,2-Dichloroethane	12,000	3,500
1,1-Dichloroethylene	1,500	78
1,2-trans-Dichloroethylene	7,000	310

a Pentachlorophenol AAC = $e^{[1.005(pH) - 4.8725]}$

b Pentachlorophenol CAC = $e^{[1.005(pH) - 5.3799]}$

* Acute Aquatic Criterion (AAC), ug/l; maximum concentration.

** Chronic Aquatic Criterion (CAC), ug/l; 30 day average.

TABLE 8 (Continued)

OHIO EPA AQUATIC LIFE WATER QUALITY CRITERIA
(all concentrations in ug/l)

Compound	AAC*	CAC**
2,4-Dichlorophenol	200	18
Diethylamine	5,600	250
Diethyl phthalate	2,600	120
Dimethyl phthalate	1,700	73
Di-n-butyl phthalate	350	190
2,6-Dinitrotoluene	950	42
Ethylbenzene	1,400	62
Ethylene glycol	4,100,000	180,000
Fluoranthene	400	8.9
Isophorone	6,000	900
Methylene chloride	9,700	430
2-Methylphenol	500	22
4-Methylphenol	140	6.2
Napthalene	160	44
Nitrobenzene	1,350	740
4-Nitrophenol	790	35
N-Nitrosodiphenylamine	290	13
Pentachlorophenol	a	b
Phenol (Warmwater Habitat)	5,300	370
(Coldwater Habitat)	5,000	200

a Pentachlorophenol AAC = $e^{[1.005(pH) - 4.8725]}$

b Pentachlorophenol CAC = $e^{[1.005(pH) - 5.3799]}$

* Acute Aquatic Criterion (AAC), ug/l; maximum concentration.

** Chronic Aquatic Criterion (CAC), ug/l; 30 day average.

TABLE 8 (Continued)

OHIO EPA AQUATIC LIFE WATER QUALITY CRITERIA
(all concentrations in ug/l)

Compound	AAC*	CAC**
Styrene	1,250	56
1,1,2,2-Tetrachloroethane	1,000	360
Tetrachloroethylene	540	73
Thallium	71	16
Toluene	2,400	1,700
1,2,4-Trichlorobenzene	150	77
1,1,1-Trichloroethane	2,000	88
1,1,2-Trichloroethane	2,000	650
Trichloroethylene	1,700	75
2,4,6-Trichlorophenol	16	2.5

a Pentachlorophenol AAC = $e^{[1.005(pH) - 4.8725]}$

b Pentachlorophenol CAC = $e^{[1.005(pH) - 5.3799]}$

* Acute Aquatic Criterion (AAC), ug/l; maximum concentration.

** Chronic Aquatic Criterion (CAC), ug/l; 30 day average.

waste must be managed in accordance with RCRA. [Relevant and Appropriate]

e) U.S. EPA Groundwater Protection Strategy, August 1984. Identifies groundwater quality to be achieved during remedial actions based on aquifer characteristics and use. [To Be Considered]

f) CERCLA Section 121(d)(3). Sets forth requirements that an off-site facility accepting CERCLA hazardous substances must meet. [Applicable]

g) Ohio Administrative Code 3745-52, 53. Regulates the manifesting and transporting of hazardous waste. [Applicable]

h) Ohio Water Quality Standards, OAC 3745-1. Establishes minimum requirements for surface water quality. [Applicable]

i) Ohio Water Pollution Control, OAC 3745-33. Regulates point source discharges to surface waters of the State. [Applicable]

j) Ohio Water Pollution Control, OAC 3745-31. Establishes requirement for Best Available Technology for any new source of pollution and an anti-degradation policy for waters of the State. [Applicable]

k) Ohio Regulations for Naturally occurring Radioactive Materials OAC 3701-70, 71, and 38 if lead-210 concentrations on spent carbon exceed limits. [Applicable]

l) Federal Stream Dredging Requirements, Section 404 CWA, if Metzger Ditch needs to be dredged. [Applicable]

m) State Stream Dredging Requirements, 401 Certification of dredging projects, if Metzger Ditch needs to be dredged. [Applicable]

3. Location Specific ARARs

The Agency has identified no location specific ARARs. The site does not contain a wetland. Nor is it a National Historic Site.

C. Cost Effectiveness: The selected remedy is cost effective. It is protective of human health and the environment, attains ARARs, and through a variety of measures, ensures long-term effectiveness with proper operation and maintenance. The selected remedy is less costly than Alternative 2B while providing equal protectiveness. Although the no action alternative is the least expensive, it does not provide overall protection of human health or the environment and does not attain ARARs. The selected remedy provides a degree of protectiveness proportionate to its cost.

D. Utilization of Permanent Solutions and Alternative Treatment or Resource Recovery Technologies to the Maximum Extent Practicable: Although permanent treatment technologies are used to address the existing groundwater contamination and landfill gas generated in the landfill, the primary source will be addressed by containment. The selected remedy represents the maximum extent to which permanent solutions and treatment can be practicably utilized for this action. Because of the disposal area size; the fact that there are no on-site hot spots representing major sources of contamination; and the difficulties, risk, and cost involved with implementing a source treatment remedy, it is not practicable to treat the source area. Compared to the no action alternative and Alternative 2B, the selected remedy represents the best balance among the nine criteria and is the most appropriate solution for the site.

E. Preference for Treatment as a Principal Element: Only a portion of the selected remedy, ground water extraction and treatment and landfill gas collection and flaring, satisfies the statutory preference for treatment. A principal threat, the landfill/source area will be contained rather than treated. Because of the disposal area size; the fact that there are no on-site "hot spots" representing major sources of contamination; and the difficulties, risk, and cost involved with implementing a source treatment remedy, it is not practicable to treat the disposal area.