



**Record of Decision
Remedial Alternative Selection**

SITE: Metamora Landfill, Metamora, Lapeer County, Michigan

STATEMENT OF BASIS AND PURPOSE

This decision document presents the selected remedial action for the Metamora Landfill Site, in Metamora, Lapeer County, Michigan, which was chosen in accordance with the Comprehensive Environmental Response Compensation and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA), and, to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). This decision is based on the administrative record for the site. The State of Michigan concurs with the selected remedy.

ASSESSMENT OF THE SITE

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

DESCRIPTION OF SELECTED REMEDY

This groundwater and landfill Operable Unit is the second of three operable units for the site. Operable Unit One is for source control of the two drum disposal units. The Record of Decision for Operable Unit One was signed on September 30, 1986. The remedial action is currently underway. Operable Unit Three and will be the final remedy will address subsurface soils primarily in the two drum disposal areas.

The selected Remedy consists of the following:

-Groundwater treatment through extraction utilizing precipitation/flocculation, air stripping, and recharge of the treated groundwater back into the shallow aquifer.

-Containment of the Landfill contents through a 90 centimeter clay cover meeting the requirements of Michigan Act 64, utilizing a passive gas collection system and flaring.

The Remedial Action for Operable Unit Two will address groundwater contamination, exposure to contaminated soils and potential contamination caused by leachate from the landfill. The response action will address the principal threats caused by the site, such as groundwater contamination of the shallow

aquifer, and the reduction of leachate from landfill contents into the shallow aquifer.

DECLARATIONS

The selected remedy is protective of human health and the environment, complies with Federal and State requirements that are legally applicable or relevant and appropriate to the remedial action, and is cost-effective. This remedy utilizes permanent solutions and alternative treatment technologies to the maximum extent practicable, and satisfies the statutory preference for remedies that employ treatment that reduce toxicity, mobility, or volume as a principal element.

Because this remedy will result in hazardous substances remaining on-site above health-based levels, a review will be conducted within five years after commencement of remedial action to ensure that the remedy continues to provide adequate protection of human health and the environment.

Date

9/28/10


Valdas V. Adamkus
Regional Administrator

RECORD OF DECISION
SUMMARY OF REMEDIAL ALTERNATIVE SELECTION
FOR THE
METAMORA LANDFILL SITE
METAMORA, TOWNSHIP
METAMORA, MICHIGAN

SEPTEMBER 1990

TABLE OF CONTENTS

	Page
1.0.	SITE LOCATION AND DESCRIPTION.....1
2.0.	SITE HISTORY.....1
2.1.	PREVIOUS SITE INVESTIGATIONS.....1
2.2.	ENFORCEMENT.....2
3.0.	COMMUNITY PARTICIPATION.....3
4.0.	SCOPE AND ROLE OF THE OPERABLE UNIT.....3
5.0.	SUMMARY OF SITE CHARACTERISTICS.....3
5.1.	RESULTS OF RI.....4
5.5.1.	SOIL.....4
5.1.2.	LEACHATE-CONTAMINATED SOILS.....4
5.1.3.	SEDIMENTS.....4
5.1.4.	SURFACE WATER.....5
5.1.5.	SOILS CONTAMINATED WITH BURNED WASTE.....5
5.1.5.	GROUNDWATER.....5
6.0.	SUMMARY OF SITE RISKS.....5
6.1.	CONTAMINANTS OF CONCERN.....5
6.2.	EXPOSURE ASSESSMENT.....6
6.3.	TOXICITY ASSESSMENT.....7
6.4.	SUMMARY OF SITE RISK CHARACTERIZATION.....8
6.4.1.	EXPOSURE TO SOILS.....8
6.4.2.	EXPOSURE TO GROUNDWATER THROUGH INGESTION.....8
6.4.3.	EXPOSURE TO GROUNDWATER THROUGH BATHING.....8
6.4.4.	EXPOSURE TO GROUNDWATER THROUGH SHOWERING.....8
6.5.	ENVIRONMENTAL RISKS.....9
6.5.1.	EXPOSURE TO TEMPORARY POOLS.....9
6.5.2.	EXPOSURE TO LEACHATE & LEACHATE CONT. SOILS.....9
7.0.	DESCRIPTION OF ALTERNATIVES.....9
7.1.	GROUNDWATER ALTERNATIVES.....11
7.2.	LANDFILL ALTERNATIVES.....13
7.3.	MAJOR ARARs.....14
8.0.	SUMMARY OF COMPARATIVE ANALYSIS OF ALTERNATIVES....15
8.1.	THRESHOLD CRITERIA.....16
8.2.	PRIMARY BALANCING CRITERIA.....17
8.3.	MODIFYING CRITERIA.....19
9.0.	THE SELECTED REMEDY.....19
10.0.	STATUTORY DETERMINATIONS.....21
11.0.	SUMMARY.....24

TABLE OF CONTENTS (continued)

Attachment 1.....STATE OF MICHIGAN LETTER OF CONCURRENCE
Attachment 2.....RESPONSIVENESS SUMMARY
Attachment 3.....ADMINISTRATIVE RECORD INDEX

Responsible Parties (PRPs) offering them the opportunity to undertake the Agency's remedy for operable unit one. The PRPs declined and negotiations were terminated. Therefore the remedial action became a State lead, Fund financed project. Through PRP searches and evidence uncovered during the implementation of Operable Unit One, approximately 70 PRPs have been identified. Special Notice letters will be sent in October 1990.

3.0 COMMUNITY PARTICIPATION

Community Relations activities have been conducted by the State. Project updates have been sent out regularly. The Public was given the opportunity to comment on the Proposed Plan and the Feasibility Study, for this operable unit, from July 12, 1990 to August 28, 1990. A Public meeting was also held to discuss the proposed remedial action for the site. Oral and written comments were recorded, summarized and addressed in the Responsiveness Summary of this document. The provisions of Sections 113(k)(2)(B)(i)-(v) and 117 of CERCLA have been satisfied.

An information repository has been established at the Lapeer Library, Metamora Branch, 4024 Oak Street, Metamora, MI 48455. According to Section 113(k)(1) of CERCLA, the Administrative Record has been made available to the public at the Lapeer Library.

4.0 SCOPE AND ROLE OF THE OPERABLE UNIT

The Remedial Action selected in this ROD (hereafter referred to as "Operable Unit Two") will address groundwater contamination, exposure to contaminated soils and potential contamination caused by leachate from the landfill. The response action will address the principal threats caused by the site, such as groundwater contamination of the shallow aquifer, and the production of leachate from the landfill. The operable unit two remedy will include a cap of the landfill and a groundwater pump and treat system. Since wastes will remain on-site, periodic monitoring will need to be maintained, as well as a review of conditions after 5 years.

5.0 SUMMARY OF SITE CHARACTERISTICS

The RI and FS Reports have adequately described the current conditions of the Metamora Landfill Site. The final RI Report was issued in March 1989 and the Final Draft FS was issued in March 1990. Field work for the RI began in October 1986 and was completed in June of 1988. The objectives of the RI were to evaluate the extent of contamination on-site, define pathways of contaminant migration and assess potential impacts on potential

receptors, identify features that would affect contaminant migration, containment or clean-up, and assess public health and environmental hazards.

The results of the RI are summarized below:

-The geology of the Metamora Site consists of sands and gravels with interbedded tills and silt layers which impede vertical groundwater flow. Groundwater is flowing primarily toward the north or northwest.

-The upper aquifer at the site has been contaminated by chemicals which have migrated from the drum areas and the landfill. The horizontal extent of groundwater contamination extends at least 550 feet from the northern boundary of the landfill. Since the furthest down gradient wells are contaminated, a model was run to estimate the extent of the plume. The numerical model estimated that contaminated groundwater may extend 2,500 to 3,500 feet north of the northern landfill boundary.

-It does not appear that the chemicals in the upper aquifer have migrated into deeper water-bearing zones. Even so, MDNR will periodically monitor these zones in the future.

-Soil samples contaminated with leachate from the landfill were analyzed during the RI, and several organic chemicals were detected. No site-related contaminants were identified in surface water or sediments collected from temporary pools which exist around the site.

5.1.1 Soil

The chemical data on soils around the drum areas indicates that they have not been severely contaminated by waste contained in the drum areas. It is likely, however, that soils directly beneath the drum areas and soils mixed with the drums contain high concentrations of chemicals. In general, the concentrations of inorganics detected in soil samples around the drum areas were comparable to those expected in background Michigan soils.

5.1.2 Leachate-Contaminated Soils

Leachate seeps are commonly visible around the Landfill. Twelve organic chemicals were detected in these soils. Inorganic concentrations were also comparative to background with the exception of Zinc (Table 1).

5.1.3 Sediments

Two common laboratory artifacts were detected in sediment samples collected around the Metamora Site. It is unlikely these are

TABLE 1 INORGANICS IN LEACHATE-CONTAMINATED SOIL
 METAMORA LANDFILL SITE, METAMORA TOWNSHIP, MICHIGAN

Sample Location:	SL-1	SL-2	SL-3	SLD-1 (DUP SL-1)	BACKGROUND CONCENTRATION RANGE
Traffic Report No	MEF-580	MEB-094	MEF 579	MEB-093	
ALUMINUM	1,060	1,850	1,590	1,670	1,110 - 10,750
ARSENIC	5.8	25.7	4.8	6.4	0.1 - 88
BARIUM	10	28	22	10.4	5.2 - 291
CADMIUM	2.5	2.5	2.3	2.9	0.1 - 3.5
CALCIUM	41,000	53,600	57,300	35,600	NA
CHROMIUM	4.8	6.1	4.8	6.5	1.0 - 53.0
COBALT	1.9	2	3.6	4.6	2.5 - 13.0
COPPER	6.4	5.5	7.6	8	1.2 - 82.5
IRON	12,000	10,600	9,600	14,900	2,320 - 21,900
LEAD	6.4 J	6.4 J	4.8 J	6.9 J	1.2 - 56.0
MAGNESIUM	9,300	12,900	16,800	12,400	NA
MANGANESE	105	212	256	176	31.0 - 835.0
NICKEL	5.1	4.6	7	9	1.6 - 53.0
POTASSIUM	140	144	229	182	NA
VANADIUM	0.4	12.4	10.6	11	NA
ZINC	86.8	32	31	333	4.7 - 90

Notes:

1. All concentrations in mg/kg.
2. Chemicals which were not detected in all samples are not listed (Sb, Be, Mo, Mg, Se, Ag, Tl, and Cr-6).
3. J - an estimated value.
4. Dashed lines indicate analyte was not detected.
5. Background concentration range reported by MDNR (12/21/87) for Michigan soils.
6. NA - not available.

TABLE 1

ORGANIC CHEMICALS IN LEACHATE-CONTAMINATED SOILS
METAMORA LANDFILL SITE, METAMORA TOWNSHIP, MICHIGAN

Sample number:	SL-1	SL-2	SL-3	SLB-1 (DUP SL-1)
Traffic Report Numbers:	EN-001	EN-199	EN-200	EN-198
METHYLENE CHLORIDE	25 J	16	19	30
ACETONE	710 J	...	...	240 uJB
1,1-DICHLOROETHENE	12 J	...	...	...
TRANS-1,2-DICHLOROETHENE	...	...	...	20
2-BUTANONE	920 J	...	...	150 J
TRICHLOROETHENE	...	...	...	2 J
TETRACHLOROETHENE	12 J	...	...	...
TOLUENE	46 J	...	...	35
ETHYLBENZENE	...	...	...	13
PHENANTHRENE	400 J	900	...	420 J
FLUORANTHENE	700 J	1,500	...	800
PYRENE	...	1,300	...	980

Notes:

1. All concentrations in ug/kg.
2. Chemicals which were not detected in all samples are not listed.
3. Dashed lines indicate the analyte was not detected.
4. J - an estimated value.
5. uJB - revised detection during data validation due to laboratory blank contamination.

site related. Inorganics detected in sediments were also comparable to background levels.

5.1.4 Surface Water

No site-related organic chemicals were found in surface water samples and inorganic concentrations were comparable to background levels.

5.1.5 Soils Contaminated with Burned Waste

Because drums containing burned wastes were found close to drums containing chlorinated wastes, there was a possibility of dioxins and dibenzofurans being present in the burned materials. Since the highest TCDD-equivalent at the Metamora Site was estimated at 0.105 ppb, it appears that further investigations of dioxins or dibenzofurans at Metamora Site is not necessary.

5.1.6 Groundwater

34 organic chemicals and 12 inorganic chemicals were detected in the shallow aquifer. Only one intermediate well was found to be affected, but this is attributed to cross contamination. The bedrock aquifer exhibited no signs of site-related contamination. This includes both monitoring wells and five downgradient domestic wells. The concentrations of all contaminants is found in Table 2.

6.0 SUMMARY OF SITE RISKS

6.1 Contaminants of Concern

CERCLA requires that U.S. EPA protect human health and the environment from current and potential exposure to hazardous substances found at the Site. The basis for this response action is the presence of VOCs exceeding Michigan Act 307 groundwater standards, Federal MCLs and health-based risk levels in groundwater which has the potential to serve as a source of drinking water for the affected area.

As part of the RI/FS for the Site, U.S. EPA has prepared a baseline risk assessment. The baseline risk assessment is based on unaltered conditions at the Site as contemplated by the No Action Alternative. The baseline risk assessment determines actual or potential risks or toxic effects the contaminants of concern at the Site pose under current conditions.

Table 3 lists the contaminants of concern. Arsenic, barium, benzene, 1,2-dichloroethane, trichloroethene and vinyl chloride exceeded their respective MCLs. All of these chemicals which exceed their MCLs were designated as contaminants of concern. In addition, three other compounds which are carcinogens, 1,1-

TABLE 2
 ORGANIC GROUNDWATER CONTAMINATION
 IN THE SHALLOW AQUIFER
 METAMORA LANDFILL
 (ppb)

<u>Contaminant</u>	<u>Minimum</u>	<u>Maximum</u>
Acetone	1.0	190
Benzene	1.9	20
Benzoic Acid	7.0	240
Bis(2-EH) phthalate	2.0	390
Bromochloromethane	-	1.0
2-Butanone	10	89
Butylbenzylphthalate	3.0	50
Chlorobenzene	1.0	2.0
Chloroethane	1.9	17
Chloroform	1.0	2.0
Delta-BHC	-	0.071
1,1-Dichloroethane	1.3	55
1,2-Dichloroethane	7.0	24
1,1-Dichloroethene	1.3	2.1
1,2-Dichloroethene	1.2	270
Diethylphthalate	2.0	6.2
2,4-Dimethylphenol	9.0	23
Di-N-Butylphthalate	2.0	3.0
Ethylbenzene	1.0	2,800
Heptachlor	0.07	0.1
2-Hexanone	1.0	24
Methylene Chloride	2.0	60
4-Methylene-2-Pentanone	2.0	140
2-Methylphenol	5.0	16
4-Methylphenol	12	110
Napthalene	2.0	2.6
Pentachlorophenol	5.0	130
Phenol	2.6	24
Toluene	1.0	670
1,1,1-Trichloroethane	2.8	17
1,1,2-Trichloroethane	1.0	6.0
Trichloroethene	1.3	14
Vinyl Chloride	1.0	6.0
Xylene	12,000	2.0

TABLE 2 (continued)
ORGANIC GROUNDWATER CONTAMINATION
IN THE INTERMEDIATE AQUIFER
METAMORA LANDFILL

<u>Contaminant</u>	<u>Minimum</u>	<u>Maximum</u>
Acetone	5.0	100
Benzene	-	1.0
Benzoic Acid	-	12
2-Butanone	2.0	100
Butylbenzylphthalate	-	4.0
1,1-Dichloroethane	4.0	9.0
1,2-Dichloroethane	3.0	7.0
1,2-Dichloroethene	31	97
Ethylbenzene	16	35
Methylene Chloride	-	14
4-Methylene-2-Pentanone	5.0	96
Pentachlorophenol	-	160
Toluene	1.0	77
1,1,2-Trichloroethane	3.0	12
Trichloroethene	19	44
Vinyl Chloride	1.0	47
Xylene	1.0	95

ORGANIC GROUNDWATER CONTAMINATION
IN THE BEDROCK AQUIFER
METAMORA LANDFILL

<u>Contaminant</u>	<u>Minimum</u>	<u>Maximum</u>
Acetone	4.0	13
Methylene Chloride	3.0	4.0
Toluene	1.0	2.0

TABLE 2 (Continued)
INORGANIC GROUNDWATER CONTAMINATION
METAMORA LANDFILL

<u>Contaminant</u>	<u>SHALLOW</u> <u>AQUIFER</u>		<u>INTERMEDIATE</u> <u>AQUIFER</u>		<u>BEDROCK</u> <u>AQUIFER</u>	
	<u>min.</u>	<u>max.</u>	<u>min.</u>	<u>max.</u>	<u>min.</u>	<u>max.</u>
Arsenic	2.1	260	2.0	10.1	14.3	34.1
Barium	53.8	2180	54.7	118	107	126
Beryllium	-	9.0	-	-	-	-
Cadmium	3.0	6.5	-	-	-	-
Chromium	5.4	9.0	-	-	-	-
Copper	5.0	33	-	-	-	-
Iron	14.5	18,700	194	2030	159	378
Lead	0.7	44	0.7	6.2	-	-
Nickel	6.0	260	-	-	-	-
Selenium	1.0	4.2	-	-	-	-
Silver	0.9	21.2	-	-	-	-
Zinc	47,500	138	-	-	-	-

A complete table of groundwater sampling data is found in the RI report.

TABLE 3
CONTAMINANTS OF CONCERN
METAMORA LANDFILL SITE, METAMORA TOWNSHIP, MICHIGAN

	GROUNDWATER SHALLOW AQUIFER PLUME		LEACHATE-CONTAMINATED SOIL	
	<u>INGESTION</u>	<u>INHALATION OF SHOWER-GENERATED AIR CONTAMINANTS</u>	<u>DERMAL ABSORPTION OF CONTAMINANTS IN RAIN WATER</u>	<u>DERMAL CONTACT AND INCIDENTAL INGESTION</u>
<u>INORGANICS</u>				
Arsenic	X		X	
Berium	X		X	
<u>YOCE</u>				
Benzene	X	X	X	
2-Butenone (MEK)				X
1,1-Dichloroethane (1,1-DCA)	X	X	X	
1,2-Dichloroethane (1,2-DCA)	X	X	X	
1,1-Dichloroethene (1,1-DCE)	X	X	X	X
1,2-Dichloroethene (1,2-DCE)	X	X	X	
Ethylbenzene	X	X	X	
Tetrachloroethene (PCE)				X
Trichloroethene (TCE)	X	X	X	X
1,1,2-Trichloroethane (1,1,2-TCA)	X	X	X	
Vinyl Chloride	X	X	X	
Xylene	X	X	X	

dichloroethane, 1,1-dichloroethene and 1,1,2-trichloroethane were also included. The remaining chemicals, all non-carcinogens, were reviewed for possible inclusion by considering the frequency of detection and assessing the relative toxicity by using a dose-response value such as U.S. EPA risk reference dose (RfD).

Table 4 identifies the concentration of the contaminants of concern to potential ARARs.

6.2 Exposure Assessment

There are three known contaminant sources at the Metamora Site; Drum disposal area 4, located in the northwest corner of the site; drum disposal area 1, located in the north-central portion of the site; and the landfill which is situated in the northeast corner. The distribution of chemical contaminants at the Metamora Landfill Site indicates that both drum areas and the landfill are contributing contaminants to the groundwater. The drum areas can be considered specific sources and the landfill can be considered a non-point source. At this time, there is insufficient data to confirm specific point sources from the landfill. These chemicals move through the soil under gravity, or they percolate down through the soil (due to precipitation) in a continuing series of cycles of adsorption to soil and extraction into water. After the chemicals reach the aquifer, they are transported downgradient by groundwater flow.

The Risk Assessment has identified the following routes of exposure:

- ingestion of groundwater;
- inhalation of volatilized contaminants during showering or bathing;
- dermal absorption of contaminants during showering or bathing; and
- dermal adsorption and ingestion of leachate-contaminated soil.

The area around the Metamora Landfill is primarily agricultural. Thirteen residential homes and a Boy Scout camp are located within a one-half mile radius of the site. The residential area near the site is considered typical and likely at any point in time to consist of a mix of adults and children. Additionally, the Boy Scout camp provides an area that short-term visitors would inhabit in the summer. Because the site is not restricted it may be accessed by the population. Portions of the site are highly attractive areas for dirt bike riding and other recreational activities. No endangered species are located in

TABLE 4

COMPARISON OF MAXIMUM GROUNDWATER CONCENTRATIONS
TO POTENTIAL ARARs FOR INGESTION
SHALLOW AQUIFER PLUME
METAMORA LANDFILL SITE, METAMORA TOWNSHIP, MICHIGAN

	NO. DETECTABLE	MAX. CONCENTRATION (ug/l)	USEPA MCL (ug/l)	MAX. EXCEEDS USEPA MCL
Arsenic	21/43	260	50	YES
Barium	39/43	2,170	1,000	YES
Benzene	4/43	11	5	YES
1,1-Dichloroethane	25/43	55	NA	NA
1,2-Dichloroethane	15/43	19	5	YES
1,1-Dichloroethylene	2/43	2.1	7	NO
1,2-Dichloroethylene	7/43	270	70 ¹	YES
Ethylbenzene	5/43	2,800	NA	NA
Trichloroethylene	6/43	14	5	YES
1,1,2-Trichloroethane	5/43	6	NA	NA
Vinyl Chloride	6/43	6	2	YES
Xylene	5/43	12,000	NA	NA

NA - Not Available/Not Applicable

¹ MCL for 1,2-Dichloroethene is a proposed standard.

the vicinity of the site.

As stated before, only the shallow aquifer is shown to be contaminated. Because contamination was detected in the northern-most monitoring wells, it was assumed that contamination has migrated north of these well locations. The northern-most extent of contamination was estimated by using a three-dimensional dispersion model for slug input. The model estimated that the plume may extend 2,500 to 3,500 feet north of the northern landfill boundary (Figure 3). Figure 4 presents a cross-sectional view of this interpretation.

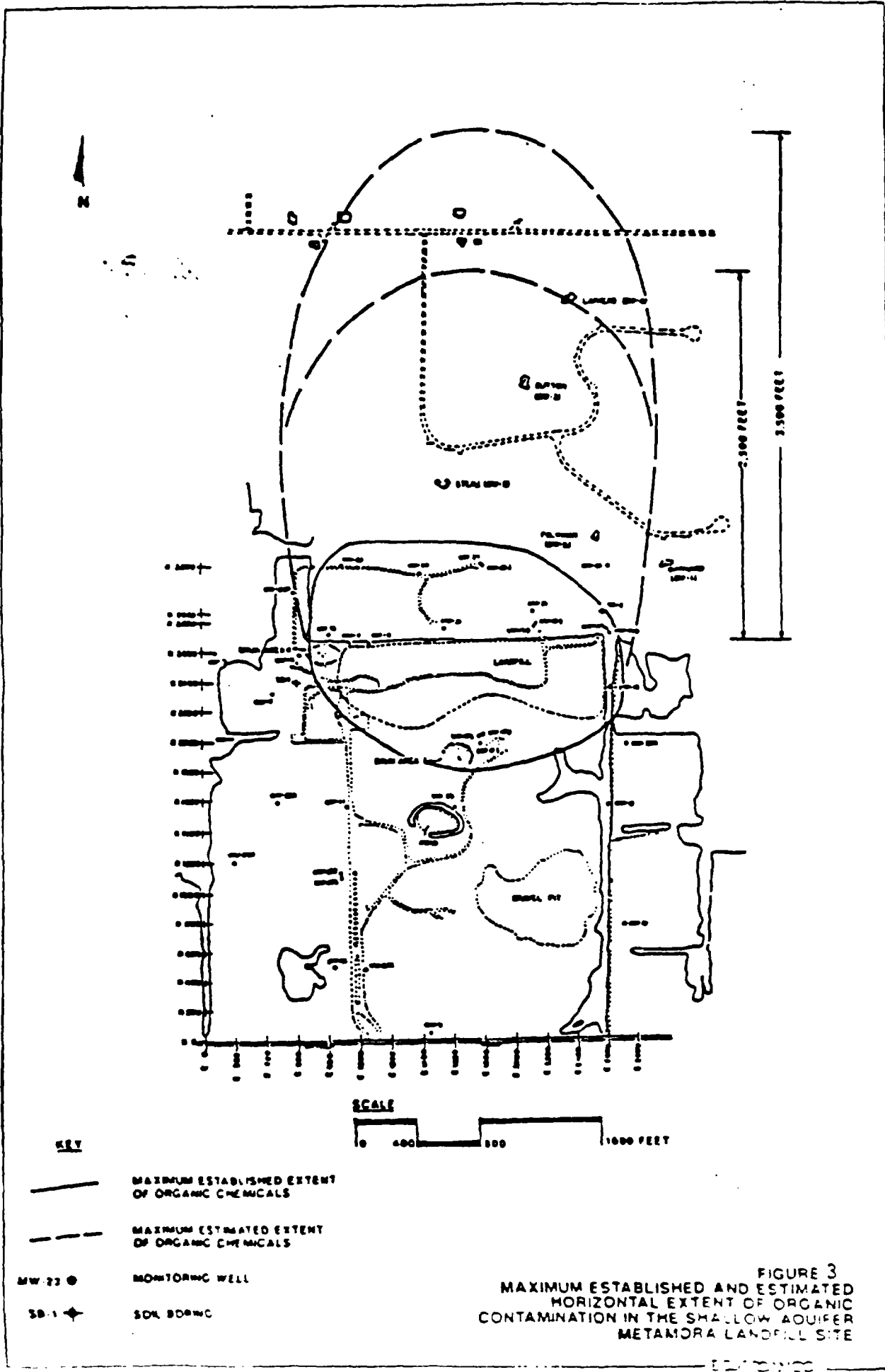
6.3 Toxicity Assessment

Using data generated during the RI, U.S. EPA conducted a site-specific baseline risk assessment to characterize the current threat to human health from ingestion of contaminated groundwater and exposure to leachate contaminated soils. The results of the risk assessment establish acceptable levels for the contaminants of concern in groundwater.

Toxic substances may pose certain types of hazards to human and animal populations. Typically, hazards to human health are expressed as carcinogenic and non-carcinogenic toxic effects. Carcinogenic risk, numerically presented as an exponential factor (e.g., 1×10^{-6}), is the increased chance a person may have in contracting cancer in his or her lifetime. For example, a 1×10^{-6} risk due to a lifetime of drinking water that contains the contaminants of concern means that a person's chance of contracting cancer is increased by 1 in 1 million. The U.S. EPA attempts to reduce risks at Superfund sites to a range of 1×10^{-4} to 1×10^{-6} (1 in 10,000 to 1 in 1 million), with emphasis on the lower end (1×10^{-6}) of the scale. For this operable unit, a risk of 1×10^{-6} is determined to be protective of human health.

The Hazard Index is an expression of non-carcinogenic toxic effects and measure whether a person is being exposed to adverse levels of non-carcinogens. Any Hazard Index (HI) value greater than 1.0 suggests that a non-carcinogen presents a potentially unacceptable toxic effect. HIs are calculated using U.S. EPA-verified reference doses, which are derived from no adverse effect levels from animal experiments using safety factors that range from 100 to 1,000. Thus hazard indices that only slightly exceed 1.0 do not cause as great a concern as those that exceed 1.0 by multiple orders of magnitude. In addition, HIs are more significant if all of the contaminants posed risks that affected the same target tissues.

Based on toxicological studies, 1,2 Dichloroethane, Tetrachloroethene, and Trichloroethylene are classified as Group B2- Probable Human Carcinogens. There is sufficient evidence of carcinogenicity in animals but inadequate evidence of



KEY

- MAXIMUM ESTABLISHED EXTENT OF ORGANIC CHEMICALS
- - - MAXIMUM ESTIMATED EXTENT OF ORGANIC CHEMICALS
- MW-22 ● MONITORING WELL
- SB-1 ◆ SOIL BORING



FIGURE 3
MAXIMUM ESTABLISHED AND ESTIMATED
HORIZONTAL EXTENT OF ORGANIC
CONTAMINATION IN THE SHALLOW AQUIFER
METAMORA LANDFILL SITE

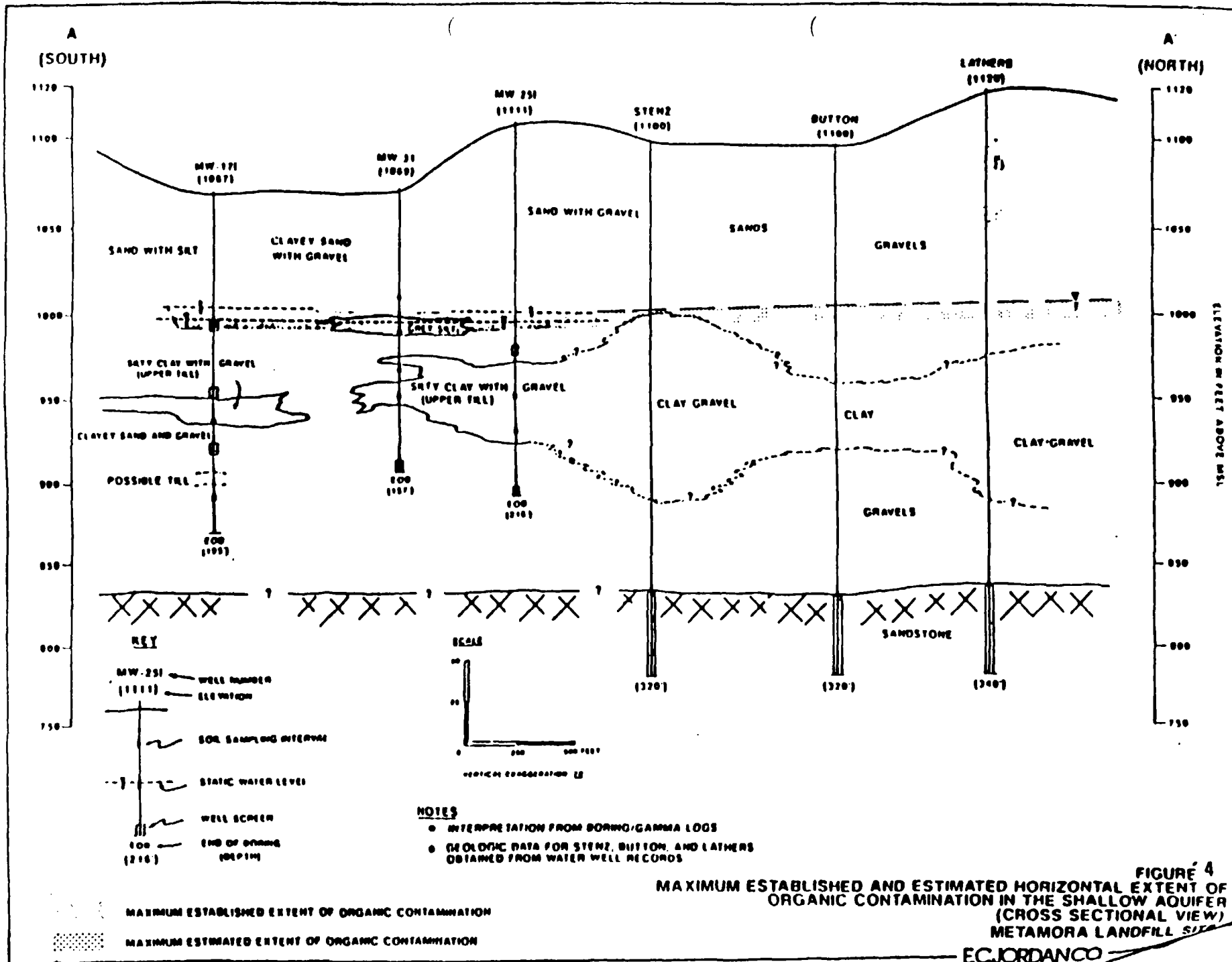


FIGURE 4
 MAXIMUM ESTABLISHED AND ESTIMATED HORIZONTAL EXTENT OF ORGANIC CONTAMINATION IN THE SHALLOW AQUIFER (CROSS SECTIONAL VIEW) METAMORA LANDFILL SITE

EC.JORDANCO

carcinogenicity in humans. 1,1 Dichloroethane and 1,1,2-Trichloroethane are classified as Group C - Probable Human Carcinogens. There is limited evidence of carcinogenicity in animals. Arsenic, Benzene and Vinyl Chloride are classified as Group A- Human Carcinogens.

6.4 Summary of Site Risk Characterization

The Risk Assessment and an Ecological Risk Assessment performed during the RI arrived at the following conclusions:

-No risks to human health were found due to dermal adsorption or ingestion of leachate-contaminated soils.

-The ingestion of contaminated groundwater was found to pose a potential risk to human health.

-Very little risk was associated with bathing in contaminated groundwater, or inhaling contaminants while showering with contaminated groundwater.

-The only potential ecological risk associated with the site was direct contact or ingestion of leachate-contaminated soils by terrestrial organisms.

Table 5 summarizes the quantitative risk estimates by media and exposure scenario for the Metamora Landfill Site.

6.4.1 Exposure to Soil - The Hazard Index for both scenarios was less than 1.0, and estimated incremental cancer risks did not exceed U.S. EPA's target range for either scenario. Cancer risk under the worst-case assumptions is below U.S. EPA's target range.

6.4.2 Exposure to Groundwater through Ingestion - Lifetime incremental cancer risks exceed the upper bound of the U.S. EPA target range for both scenarios. The majority of the risk is attributed to vinyl chloride and arsenic. The quantitative risk assessment results indicate that non-carcinogenic risks posed by the most-probable scenario are not significant. In the realistic worst-case scenario, however, the HI exceeds 1.0. The HI is 3.2 with 47 percent of the risk attributed to barium.

6.4.3 Exposure to Groundwater through Bathing - The bath scenario contributes a negligible level of risk relative to ingestion. Carcinogenic risks are at the low end of the U.S. EPA target range for both scenarios.

6.4.4 Exposure to Groundwater through Showering - Inhalation risks due to the shower scenario exposure contributes a smaller level of risk relative to ingestion. Inhalation carcinogenic risks due to showering are at the mid to high end of the U.S. EPA

TABLE 5
 RISK ASSESSMENT SUMMARY
 METAMORA LANDFILL SITE, METAMORA TOWNSHIP, MICHIGAN

Summary of Future Potential
 Incremental Carcinogenic Risk

<u>Scenario</u>	<u>Most-Probable Case</u>	<u>Realistic Worst-Case</u>
Drinking Water	5.1 E-4	2.0 E-3
Bathing	9.9 E-7	8.9 E-6
Showering	6.5 E-5	1.3 E-4

Summary of Future Potential
 Noncarcinogenic Hazard Index

<u>Scenario</u>	<u>Most-Probable Case</u>	<u>Realistic Worst-Case</u>
Drinking Water	2.0 E-1	3.2 E+0
Bathing	1.6 E-3	5.7 E-2
Showering	4.6 E-2	1.1 E+0

Summary of Current Potential
 Incremental Carcinogenic Risk

<u>Scenario</u>	<u>Most-Probable Case</u>	<u>Realistic Worst-Case</u>
Soil Contact	1.1 E-10	1.8 E-08

Summary of Current Potential
 Noncarcinogenic Hazard Index

<u>Scenario</u>	<u>Most-Probable Case</u>	<u>Realistic Worst-Case</u>
Soil Contact	1.6 E-06	1.8 E-04

target range for both scenarios.

6.5 Environmental Risks

There are four areas which are considered sources of potential exposure to contaminants originating from the Metamora Landfill Site (Figure 5):

- The siltation pond
- Temporary pool areas
- Open field areas
- Forested areas

There appears to be relatively little risk for organisms inhabiting the siltation pond or forested areas. Only the wildlife migrating onto the landfill site and coming into contact with leachate-contaminated soil are at potential risk.

Table 6 identifies media of exposure, route of exposure and populations exposed. The summary of exposure for fauna is as follows:

-Dermal contact with, or ingestion of contaminated surface water from the temporary pools; and

-Dermal contact with, or ingestion of, leachate contaminated soil and leachate in the open field areas of the landfill.

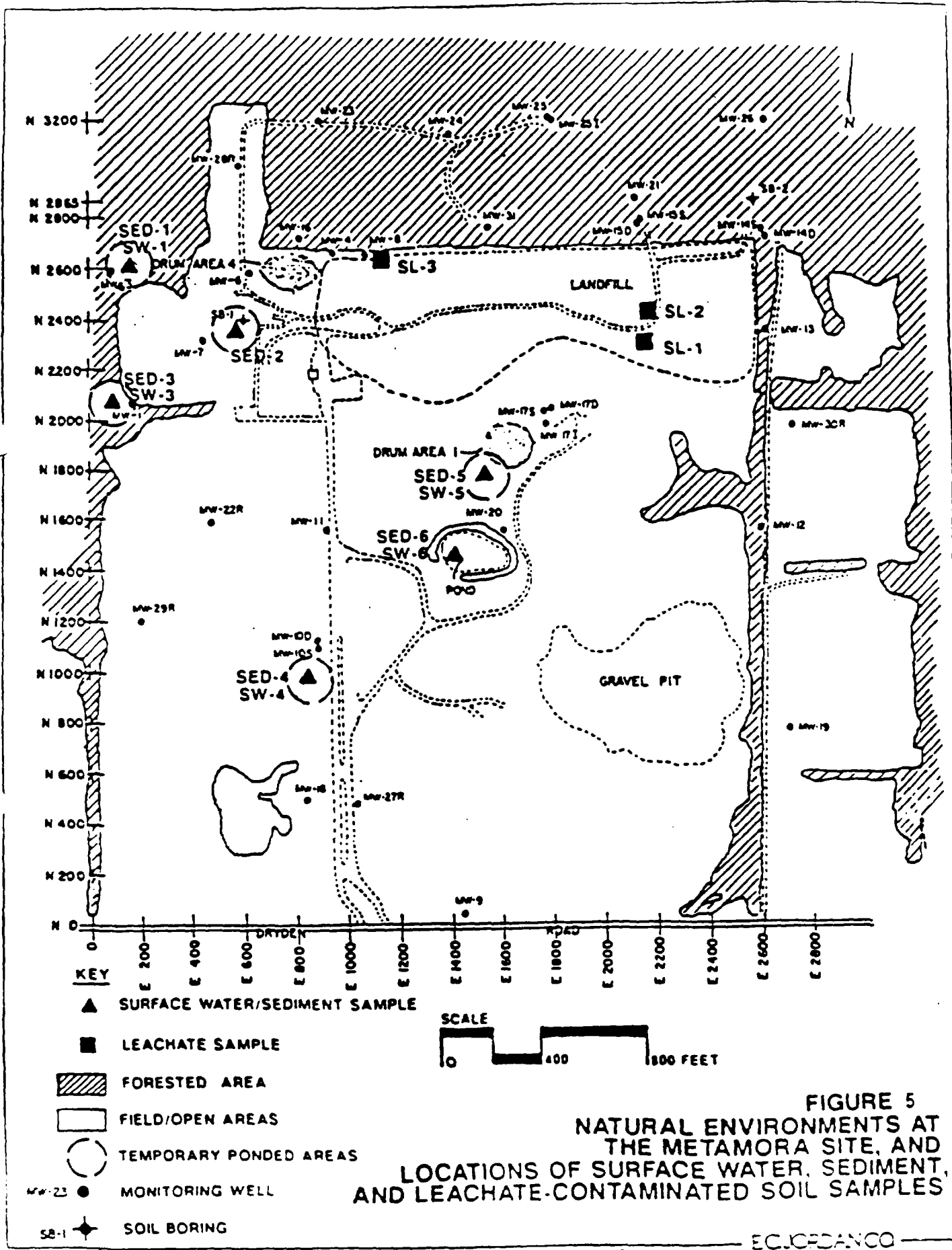
6.5.1 Exposure to Temporary Pools - Toxicity to freshwater organisms could be occurring in the temporary pool due to exposure to copper; however since these pools are temporary and copper is not site related, the overall risk is minimal.

Terrestrial organisms may also be exposed to the copper via ingestion or dermal contact, however toxicity data on wildlife is lacking, making a risk determination impossible.

6.5.2 Exposure to Leachate and Leachate-Contaminated Soils - Due to the limited information available on the toxicity of contaminants on wildlife, magnitude of risk cannot be determined. There is a potential risk for terrestrial organism due to exposure to Polyaromatic hydrocarbons (PAHs) in leachate soils. Information suggests that avian embryos exposed to high levels of PAHs such as those detected in the soil may experience toxic and adverse sublethal effects.

7.0 DESCRIPTION OF ALTERNATIVES

The FS, based on the findings of the RI and Risk Assessment, has identified and evaluated an array of remedial alternatives that could be used to mitigate or correct the contamination problems



**TABLE 6 PRIMARY ROUTES OF EXPOSURE FOR ORGANISMS ON OR
NEAR THE METAMORA LANDFILL SITE
METAMORA LANDFILL SITE, METAMORA TOWNSHIP, MICHIGAN**

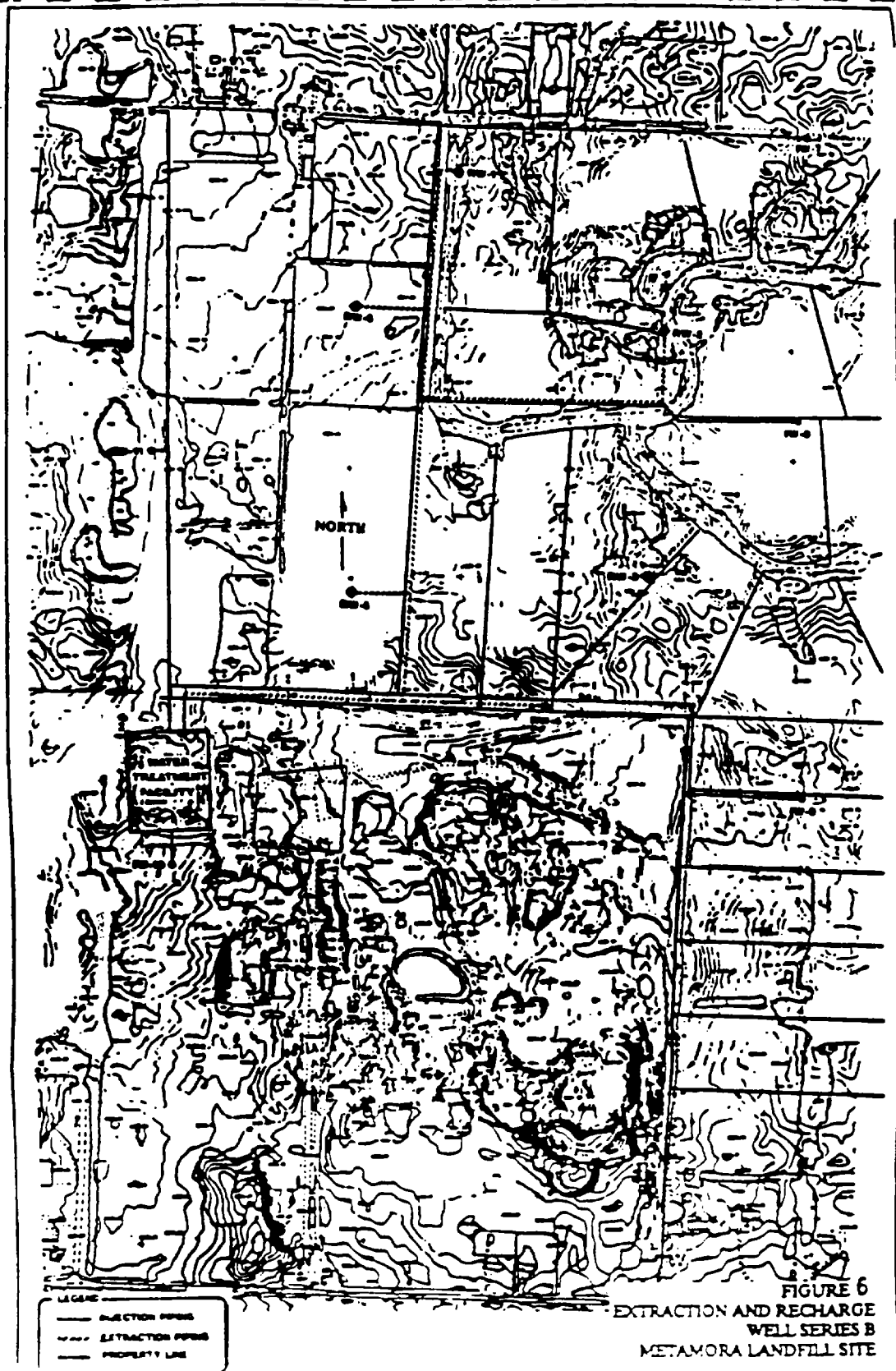
MEDIA OF EXPOSURE	ROUTE OF EXPOSURE	POPULATIONS EXPOSED
Soil	Dermal contact with contaminated soil/organic matter.	Burrowing mammals, reptiles, amphibians, invertebrates, and dust-bathing birds.
Soil	Ingestion of contaminated soil/organic matter.	Earthworms and insects.
Soil	Consumption of animals that have contact with contaminated soil/organic matter.	Predatory and omnivorous mammals, birds, reptiles, amphibians, and insects.
Surface Water/ Leachate	Dermal contact with contaminated water.	Terrestrial animals, reptiles, and amphibians.
Surface Water/ Leachate	Ingestion of contaminated water.	Most terrestrial animals.
Surface Water	Ingestion of reptiles, birds and mammals contaminated as above.	Mammals and birds.

at the Site. Since the Site is a large municipal type landfill, the development of a complete range of options is not practical because remedies involving treatment of wastes, or removal of the entire site are very expensive and difficult to implement at sites such as this. The alternatives have been separated into two categories; 1) Groundwater (GW) Alternatives that address the contaminated groundwater at and near the site, and 2) Landfill (LF) Alternatives that address landfill closure. Applicable or relevant and appropriate requirements (ARARs), such as Federal and State regulations governing proper landfill closure, must be considered in evaluating each of the alternatives. The alternatives considered for the Site are presented within the FS and are summarized below. For a more detailed description of the alternatives, please refer to the FS Report.

The Groundwater Alternatives that are presented below consist of a no action alternative and pump and treat alternatives. Each of the groundwater treatment alternatives consists of an extraction and recharge system. The groundwater extraction system will capture contaminated groundwater and pump the water to the treatment system. The recharge or injection system would consist of injecting the treated water back into the shallow aquifer through the use of injection wells to be placed up gradient, side gradient and down gradient of the landfill, which will facilitate the movement of contaminated groundwater to the extraction wells and prevent spreading of the contaminated area beyond existing limits. The treatment of the inorganic contaminants would occur first and then the water will be pumped to the organic treatment system. The residuals will be tested to determine whether they exhibit the RCRA toxicity characteristic (TC) for constituents regulated by the Land Disposal Restrictions (LDRs). LDR notification and certification requirements (and manifesting requirements) will be met to ship any characteristic wastes off-site. The off-site treatment and disposal facility will treat and dispose of the waste in accordance with RCRA subtitle C requirements, including LDRs. A map showing the preliminary design of the extraction/injection system is illustrated in Figure 6.

For all groundwater alternatives, there is a 20 year or 40 year time frame for pumping and treating groundwater. There is some increase in cost between the 20 and 40 year cleanup time frame. The NCP states that the goal of Superfund's approach to contaminated groundwater is to return usable ground waters to their beneficial uses within a time frame that is reasonable given the circumstances of the site. The Metamora shallow aquifer falls under the NCP's groundwater class II B; groundwater potentially used as drinking water. EPA's preference is for rapid restoration of contaminated groundwater that can be used for drinking water wherever practical. Therefore the 20 year time frame for remediation is preferred by EPA. A shorter time

FIGURE 6



frame will reduce the potential for human exposure by ingestion and be protective to human health and the environment.

7.1 GROUNDWATER ALTERNATIVES

Alternative GW-1: No Action

The Superfund program requires that the "no action" alternative be evaluated to establish a baseline for comparison. If no action is taken at the site, the contaminants in the shallow groundwater will continue to disperse until they are degraded by natural mechanisms and dilution. This no action alternative requires the installation of 10 additional monitoring wells. If the No-Action alternative is selected, a five-year review of the site will be required under Section 121(c) of SARA because the alternative results in hazardous contaminants remaining in the groundwater. ARARs regarding groundwater contamination would not be met.

Estimated Construction Cost:	\$ 109,080
Estimated Annual O & M Cost:	\$ 124,000
Estimated 20 Year Present Worth:	\$ 2,015,000

Alternative GW-2: Groundwater Extraction, Ion Exchange, UV/Oxidation, Recharge

The groundwater extraction component is identical for each of the pump, treat, and discharge alternatives. It is estimated that the extraction and injection system would utilize six recovery wells encircled by six injection wells. The total flow rate would be 210 gpm. Approximately four years would be required to recover one pore volume. It is estimated that five groundwater pore volumes will be required to achieve the Target Clean-up levels (Table 7), therefore operating time would be approximately 20 years. Ion exchange is utilized for the inorganic treatment method. The collected water would be pumped through a resin-filled column. An interchange of ions between the insoluble resin and contaminants would occur resulting in the removal of inorganic contaminants from the groundwater. Spent resin would be reduced by proper off-site treatment or disposal in compliance with Michigan Act 64/RCRA regulations. The water would then be pumped to the UV/Oxidation organic treatment system. UV/Oxidation chemically oxidizes organic compounds in water with a combination of ultraviolet light (UV), ozone and/or hydrogen peroxide. No secondary waste stream is created. ARARs would be met.

Estimated Construction Cost:	\$ 2,976,920
Estimated Annual O & M Cost:	\$ 997,307
Estimated 20 year Present Worth:	\$15,405,538

**TABLE 7
CLEAN-UP GOALS FOR GROUNDWATER
METAMORA LANDFILL
(ppb)**

<u>Contaminant</u>	<u>MCL</u>	<u>MCLG</u>	<u>Michigan Act 307</u>	<u>Clean-up Goal</u>
* Arsenic	-	0	0.02	0.02/BKG
Barium	5000	5000	5000	5000
* Benzene	5.0	0	1.0	1.0
2-Butanone	-	-	350	350
1,1-Dichloroethane	-	-	700	700
* 1,2-Dichloroethane	5.0	0	0.4	0.4
1,1-Dichloroethene	7.0	7.0	0.06	0.06
trans-1,2-DCE	100	100	140	100
cis-1,2-DCE	70	70	1.0	1.0
Ethylbenzene	700	700	30	30
* Tetrachloroethene	5.0	0	0.7	0.7
* 1,1,2-TCA	5.0	3.0	0.6	0.6
* Trichlorethene	5.0	0	3.0	3.0
* Vinyl Chloride	2.0	0	0.02	0.02
Xylene	10,000	10,000	20	20

* = carcinogen

MCL = Federal Safe Drinking Water Act, Maximum Contaminant Level

MCLG = Maximum Contaminant Level Goal

Act 307 = Michigan's Act 307, Type B, 1×10^{-6} Levels or Human Life Cycle Safe Concentration Levels

BKG = Background Concentration

This chart is not conclusive, as it represents only the contaminants identified as the contaminants of primary concern at the time the RI was conducted.

If the best available detection limit is higher than the Clean-up Goal, then the detection limit will replace the stated Clean-up Goal.

If background concentration is higher than the Clean-up Goal, then background concentration will replace the stated Clean-up Goal.

**Alternative GW-3: Groundwater Extraction,
Precipitation/Flocculation, UV/Oxidation,
Recharge**

This alternative utilizes the precipitation/flocculation technology for the removal of inorganic contaminants. Precipitation is a physiochemical process by which a substance in solution is transformed into the solid phase. Flocculating aids may be added to increase floc size and promote settling. Treatability testing and trial batches prior to system design and during start-up must be performed to determine optimum operating conditions. The sludge end-product of this procedure would be reduced by proper off-site disposal in compliance with Michigan Act 64/RCRA regulations. This alternative is identical to Alternative 2 for the organic treatment method (UV/Oxidation) and the extraction/injection system. ARARs would be met.

Estimated Construction Cost:	\$ 3,213,170
Estimated Annual O & M Cost:	\$ 812,073
Estimated 20 year Present Worth:	\$13,333,366

Alternative GW-4: Groundwater extraction, Ion Exchange, Carbon Adsorption, Recharge

This alternative is identical to GW-2 for the inorganic treatment method (Ion Exchange) and the extraction/injection system. However, this alternative utilizes Carbon Adsorption for the treatment of organic contaminants. The water is pumped through a packed column, the organic constituents adsorb to internal pores of a carbon granule packing. Over time, the carbon packing will lose treatment capacity and will require regeneration or disposal at an off-site RCRA permitted facility. ARARs would be met.

Estimated Construction Cost:	\$ 2,759,064
Estimated Annual O & M Cost:	\$ 846,191
Estimated 20 Year Present Worth:	\$13,304,445

**Alternative GW-5: Groundwater Extraction,
Precipitation/Flocculation, Carbon
Adsorption, Recharge**

This alternative is identical to Alternative GW-3 for inorganic treatment (Precipitation/Flocculation) and Alternative GW-4 for organic treatment. This alternative also utilizes the same extraction/injection system as alternative GW-2. ARARs would be met.

Estimated Construction Cost:	\$ 2,995,314
Estimated Annual O & M Cost:	\$ 660,957
Estimated 20 Year Present Worth:	\$11,232,273

Alternative GW-6: Groundwater Extraction, Ion Exchange, Air Stripping, Recharge

The inorganic treatment method will be Ion Exchange as described in Alternative GW-2. The organic treatment method will be Air Stripping which is a mass transfer of VOCs from the liquid (water) phase to the gas phase. Air stripping occurs in a packed tower, contaminated groundwater enters the top of the column while air is blown in from the bottom. Air exiting from the top of the column (the "off-gases") contains VOCs stripped from the groundwater. The off-gases will be captured on granulated carbon to meet state and Federal air stripper emission ARARs. Spent carbon will be regenerated or disposed of at a RCRA permitted facility. This alternative also utilizes the same extraction/injection system as alternative GW-2. ARARs would be met.

Estimated Construction Cost:	\$ 2,318,204
Estimated Annual O & M Cost:	\$ 770,512
Estimated 20 Year Present Worth:	\$11,920,377

Alternative GW-7: Groundwater Extraction, Precipitation/Flocculation, Air Stripping, Recharge

The inorganic treatment method will be Precipitation/Flocculation as described in Alternative GW-3 and the organic treatment will be Air Stripping as described in Alternative GW-6. This alternative also utilizes the same extraction/injection system alternative GW-2. ARARs would be met.

Estimated Construction Cost:	\$ 2,554,454
Estimated Annual O & M Cost:	\$ 585,278
Estimated 20 Year Present Worth:	\$ 9,848,205

7.2 LANDFILL ALTERNATIVES

Alternative LF-1: No Action

The Superfund program requires that the "no action" alternative be evaluated to establish a baseline for comparison. Under this alternative, no further action would take place other than continuing on-site inspections and a groundwater monitoring program. ARARs would not be met.

Estimated Construction Cost:	\$ 28,080
Estimated Annual O & M Cost:	\$ 14,000
Estimated 20 Year Present Worth:	\$ 243,294

Alternative LF-2: Act 64 Cover, Passive Gas Collection, Flaring

The landfill cover will comply with Michigan Act 64 requirements

consisting of a minimum of 90 centimeters of clay, a 12 inch drainage layer, and a 12 inch layer of soil. The passive collection system would capture off-gases generated by waste decomposition. Gravel-filled trenches and a piping network would be constructed to collect gas by natural mechanisms. The off-gases would be destroyed by flaring. ARARs would be met. A preliminary design of the landfill cap is shown in Figure 7.

Estimated Construction Cost: \$ 5,395,596
Estimated Annual O & M Cost: \$ 271,666
Estimated 20 Year Present Worth: \$ 9,505,845
Implementation Timeframe: Construction of landfill cap and passive gas collection system approximately 6 months to a year to complete. Construction of flaring system 1-2 months.

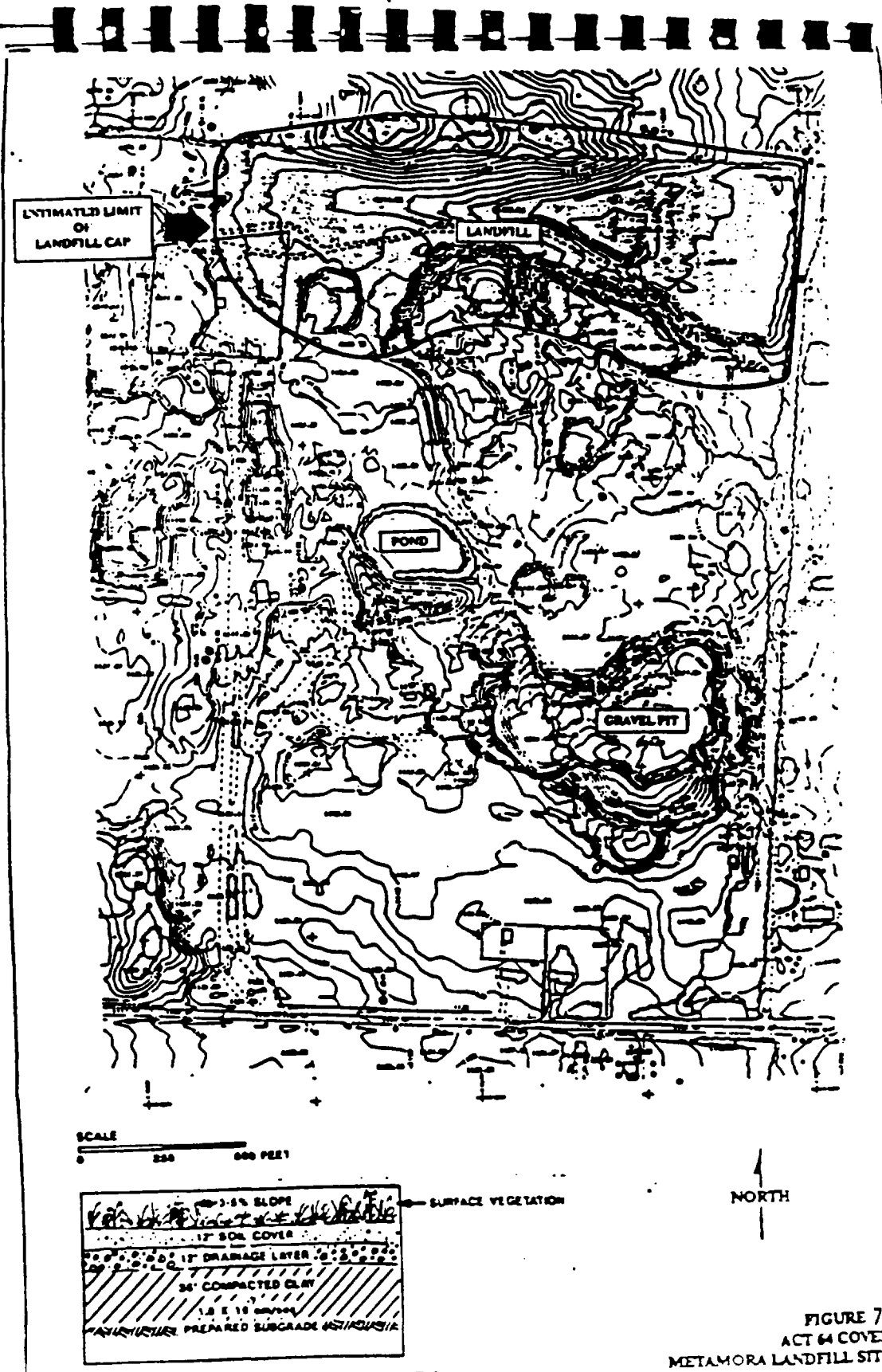
Alternative LF-3: Act 64 Cover, Active Gas Collection, Flaring

The landfill cap is the same design as described above. However, this alternative considers an active off-gas collection system. The active system involves the construction of extraction wells to draw gas from the landfill and a piping network. The off gases would then be destroyed by flaring. ARARs would be met.

Estimated Construction Cost: \$ 5,716,035
Estimated Annual O & M Cost: \$ 305,801
Estimated 20 Year Present Worth: \$10,352,539
Implementation Timeframe: Construction of landfill cap and Active gas collection system 9-15 months. Construction of flaring system 1-2 months.

7.3 The FS identifies the potential applicable or relevant and appropriate requirements (ARARs) for each of the alternatives mentioned in sections 7.1 and 7.2 above. The major ARARs for groundwater remedial actions are the Federal Safe Drinking Water Act, Rules of Michigan's Act 307, promulgated July 11, 1990. The Federal Safe Drinking Water Act is relevant and appropriate to any groundwater contamination, assuring that no groundwater suitable for drinking water supplies exceeds the Maximum Contaminant Levels or Maximum Containment Level Goals. The substantive provisions of Parts 6 and 7 of the rules promulgated under the Michigan Environmental Response Act (Act 307) are considered an ARAR for the remedial action to be undertaken at this site. These rules provide, inter alia that remedial action be protective of human health, safety and the environment, (Rule 299.5705(1)). The rules specify that this standard is achieved by a degree of cleanup which conforms to one or more of three cleanup types (Rule 299.5707(2)). A type A cleanup generally achieves cleanup to background (Rule 299.5707); a type B cleanup meets specified risk-based levels in all media (Rule 299.5709); and a type C cleanup is based on a site-specific risk assessment which considers specified criteria. U.S. EPA has decided that

FIGURE 7



the selected remedy will meet the criteria for a type B cleanup for the groundwater. The EPA has further decided that for the containment of the landfill wastes, the selected remedy will meet the criteria for a type C clean-up since no "hot spots" of wastes were discovered during the RI; so containment by capping is the most feasible approach to address the release of contaminants from the landfill. LDRs are applicable to the disposal of any sludges or residuals produced by on-site treatment. The State has identified Act 245 part 22 as an ARAR, and has stated that in applying Act 307's requirements to the treated groundwater to be reinjected to the aquifer, the remedy selected will satisfy the requirements of Act 245. The United States disagrees that Act 245, as interpreted and applied by the State in this matter, is an ARAR. This issue is the subject of litigation in U.S. v. Akzo Coatings of America, appellate case numbers 89-2902 and 89-2137, and may be reassessed after a decision has been rendered. Nonetheless, it is the State's judgement that the selected remedial action for this site will provide for attainment of all ARARs including the Michigan Water Resources Commission Act and Part 22 Rules. The remedial action will halt the migration of contaminated groundwater and restore the aquifer to a usable condition. In addition, the purged water will be treated prior to reinjection and then hydraulically contained by the purge wells in a manner that will prevent degradation of groundwater quality, consistent with the Water Resources Commission Act and Part 22 Rules. For the landfill containment remedial actions, the major ARAR of concern is Michigan's Act 64. Act 64 is relevant and appropriate since it addresses the closure of the landfills that have accepted hazardous wastes for disposal, such as this Site.

8.0 SUMMARY OF COMPARATIVE ANALYSIS OF ALTERNATIVES

The alternatives for the Metamora Landfill Site have been evaluated within the FS using nine criteria. The nine criteria are summarized as follows:

Overall Protection of Human Health and the Environment - addresses whether or not a remedy provides adequate protection and describes how risks posed through each pathway are eliminated, reduced or controlled through treatment, engineering controls, or institutional controls.

Compliance with ARARs (Applicable or Relevant and Appropriate Requirements) - addresses whether or not a remedy will meet all of the applicable or relevant and appropriate requirements of other Federal and State environmental statutes and/or provide grounds for invoking a waiver.

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 cleanup goals have been met.

Reduction of Toxicity, Mobility, or Volume - is the anticipated performance of the treatment technologies a remedy may employ.

Short-Term Effectiveness - addresses the period of time needed to achieve protection, and any adverse impacts on human health and the environment that may be posed during the construction and implementation period until cleanup goals are achieved.

Implementability - is the technical and administrative feasibility of a remedy, including the availability of materials and services needed to implement a particular option.

Cost - includes estimated capital and operation and maintenance costs, and net present worth costs.

State Acceptance - indicates whether, based on its review of the RI/FS and Proposed Plan, the State concurs in, opposes, or has no comment on the preferred alternatives at the present time. The State's acceptance is addressed later within this ROD.

Community Acceptance - will be addressed later within the Responsiveness Summary.

The FS describes in detail how all the alternatives stand up to seven of the nine evaluation criteria (excluding state acceptance and community acceptance). State and community acceptance will be discussed later in this ROD.

The following briefly describes how the alternatives for the Metamora Landfill Site stand up to the nine criteria.

8.1 Threshold Criteria

OVERALL PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT: Each of the groundwater treatment alternatives, with the exception of the no action alternative, would provide protection of human health and the environment by reducing and/or eliminating the contaminants in the shallow aquifer in a timely manner. Public health risks due to the potential ingestion of groundwater from the shallow aquifer would be reduced to target clean-up levels and the potential of the lower aquifers being impacted would be eliminated. Alternatives 2-7 are equally protective.

Both Landfill alternatives 2 and 3 would reduce the release of landfill leachate into the shallow aquifer. In addition, the potential risks to terrestrial organisms posed by contact with leachate-contaminated surface soil will be eliminated. The no action alternative would not achieve the above. Alternatives 2 and 3 are equally protective.

Since the no action alternatives are not protective, they will not be considered further.

COMPLIANCE WITH ARARS: All groundwater treatment alternatives would meet their respective applicable or relevant and appropriate requirements of Federal and State environmental laws. Federal drinking water standards would be achieved. The treatment systems would be designed and operated in compliance with ARARS.

Both landfill alternatives will meet the Michigan Act 64 closure requirements and RCRA closure requirements by reference.

8.2 Primary Balancing Criteria

LONG-TERM EFFECTIVENESS AND PERMANENCE: Long-term protection of human health and the environment will be provided by all the groundwater treatment alternatives. The groundwater will be restored to the target clean-up levels and no unacceptable residual risk will remain in the groundwater. The Ion Exchange inorganic treatment method would require the regeneration of contaminated resin. The Precipitation and Flocculation inorganic treatment method produces residual sludge which would require offsite disposal or destruction. Carbon adsorption and Air Stripping treatment methods would require the regeneration of spent carbon. The UV/Oxidation treatment method produces no secondary waste stream. All the alternatives mentioned above are equally effective.

The landfill cap would reduce future contaminant migration into the shallow aquifer by restricting infiltration of precipitation. In addition, the management of landfill gas would reduce long-term public health risks by reducing gas emissions to the atmosphere. The landfill cover and gas collection/flaring system will require long-term maintenance to ensure system effectiveness. Since hazardous substances are remaining on-site, a five-year review will be required under the Superfund program to ensure protection of public health and the environment.

REDUCTION OF TOXICITY, MOBILITY OR VOLUME: The toxicity and the volume of the inorganic contaminants in groundwater would be reduced with the Ion Exchange and Precipitation/Flocculation treatment methods. Any residual wastes from these treatments would be treated off-site. The UV/Oxidation treatment component (GW-2 & GW-3) does not produce a secondary waste stream requiring disposal or an air emission to treat and, therefore, would not cause exposure risks from residuals. The Carbon Adsorption and Air Stripping treatment methods (GW-4,5,6,7) would require the regeneration of spent carbon. The toxicity of the organic contaminants would be permanently reduced by the UV/Oxidation organic treatment method; and by thermal regeneration of the

carbon in the Carbon Adsorption method and the carbon adsorption unit on top of the air stripper. All of the above alternatives are equally protective.

Since capping addresses waste through containment rather than destruction or treatment, this criteria is not applicable to the Landfill alternatives.

SHORT-TERM EFFECTIVENESS: It is not anticipated that the installation and implementation of the groundwater extraction, treatment and recharge system will impact the community or workers. Standard health and safety measures shall be followed by the workers. The construction timeframes of the treatment facilities of each technology is as follows:

UV/Oxidation	6-8 months
Carbon Adsorption	6-8 months
Air Stripping	4-6 months
Ion Exchange	1 month
Precipitation/Flocculation	1 month with a start up period of 2-4 weeks

It is estimated that it will take 20 years for the groundwater to reach target clean-up levels. Alternatives 6 and 7 best meet this criteria.

Landfill Alternative construction timeframes are presented in Section 7.2 of this document.

IMPLEMENTABILITY: Each of the groundwater treatment alternatives are easily implemented and require conventional and readily available materials. For the Carbon adsorption technology, if vinyl chloride is present, carbon utilization will increase substantially in order to meet target clean-up levels. Precipitation/flocculation technology is fully developed and commonly available for many metals. The effectiveness of this technology in achieving target clean-up levels for arsenic and barium can not be fully assessed without bench scale testing. Reducing these chemicals to part-per-billion concentrations may not be practical or cost effective using this technology. Treatability studies are necessary prior to full-scale treatment. Air Stripping requires the placement of a carbon adsorption unit to catch off-gases. A treatability study is also required for the UV/Oxidation technology.

Both landfill cap options are proven to be implementable. The active gas recovery system is more difficult to implement than the passive system.

COSTS: The cost estimates were prepared using costs considered appropriate for typical construction operations. It is intended for use in comparing the relative costs of preliminary remedial

alternatives. Actual construction costs may vary from those identified in section 7 of this document.

Maintenance is based on a 20-year design life of equipment, systems and the landfill cap system. Because of the inherent unknown timing of maintenance activities, these costs have been proportioned on an annual basis over the anticipated design life. Actual annual costs may vary from those identified in section 7 of this document.

The proposed alternatives are compared to each other with regard to the criteria listed above and then when two or more remedies achieve the same goal (ie., achieve ARARs), cost can become a determining factor. Overall, Groundwater alternative 7 and Landfill alternative 2 are most cost effective.

8.3 Modifying Criteria

These two criteria reflect the comment and concerns of the State and local communities on the alternatives presented to address the Metamora Landfill contamination.

STATE ACCEPTANCE

The State of Michigan concurs with the selected remedy for the Metamora Landfill Site (Attachment 1).

COMMUNITY ACCEPTANCE

The comments and concerns from the public regarding the Metamora Landfill Site are addressed within the Responsiveness Summary which is Attachment 2 to this ROD.

9.0 THE SELECTED REMEDY

Based on the findings of the RI/FS and the documents within the Administrative Record and the results of the public comment period, the selected remedy for the Metamora Landfill Site is Groundwater Alternative 7 and Landfill Alternative 2. The Selected Remedy components to be implemented include:

- * The precipitation/flocculation treatment method will require a bench scale test during the design to determine if the target clean-up levels can be achieved. If it is determined that it is not technically practical or cost effective then Ion Exchange will be the selected inorganic treatment method.
- * Installation, operation and maintenance of a network of groundwater extraction wells designed to capture all

contaminated groundwater within and downgradient from the Facility.

- * Installation, operation and maintenance of the groundwater treatment system and treatment of extracted groundwater to reduce concentrations of hazardous substances, pollutants and contaminants prior to discharging such extracted groundwater into the aquifer as described in Alternative GW-7. Contamination in the Aquifer will be reduced to the target clean-up levels that corresponds to Michigan Act 307 type B clean-up standards. Groundwater will be pumped and treated until contaminants do not exceed an individual excess cancer risk of 1×10^{-6} based on Michigan Act 307 Type B clean-up and a hazard index value greater than 1 (or comparable Michigan Act 307 HLSC). If MCLs or non-zero MCLGs are more stringent than the Michigan Act 307 values, than they are the clean-up levels. If background or best available detection limit values are higher than the clean-up levels, than they will substitute for the clean-up levels. Collectively, these values will comply with the 10^{-4} to 10^{-6} risk level as required by the NCP.
- * Monitoring of groundwater to detect hazardous substances, pollutants and contaminants that may be present and to document the effect of the remedial action herein on groundwater quality.
- * Installation of an Act 64 Cover.
- * Installation, operation and maintenance of a landfill passive gas collection and flaring system.
- * Installation of fencing to restrict access to areas of the Site where certain remedial measures are to be installed.
- * Establishment of institutional controls, including deed restrictions to limit use of groundwater at and down gradient from the Site and to assure that future use of the Site will not damage or otherwise impair the effectiveness of the cap, gas collection and flaring system and groundwater extraction and injection wells.
- * Estimated Costs:

<u>Media</u>	<u>Capital Cost</u>	<u>Annual Cost</u>	<u>Present Worth</u>
Groundwater	\$ 2,554,454	\$ 585,278	\$ 9,848,205
Landfill	\$ 5,395,596	\$ 271,666	\$ 9,505,845
Total	\$ 7,950,050	\$ 856,944	\$19,354,050

10.0 STATUTORY DETERMINATIONS

The selected alternatives for the Metamora Landfill Site, as listed in Section 9.0 of this ROD, meet the statutory requirements in that they are protective of human health and the environment, attain ARARs, utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable and have a preference for treatment as a principal element, as described below:

Protection of Human Health and the Environment:

The selected remedy, a combination of a groundwater and landfill alternative, will be protective of human health and the environment through reduction of leachate formation, and extraction and treatment of contaminated groundwater.

Protectiveness will be achieved by capping the landfill and assuring proper maintenance and management of landfill gases. The cap will alleviate the direct contact threat from the site's contents and will also help in reducing leachate generation, thereby reducing the amount of contamination reaching the shallow aquifer. Since untreated wastes will remain within the site, a review will be conducted within five years after commencement of remedial action to ensure that the remedy continues to provide adequate protection of human health and the environment.

Protectiveness will also be achieved by extraction, treatment and injection of contaminated groundwater. Groundwater will be pumped and treated until contaminants do not exceed an individual excess cancer risk of 1×10^{-6} based on Michigan Act 307 Type B clean-up and a hazard index value greater than 1 (or comparable Michigan Act 307 HLSC). If MCLs or non-zero MCLGs are more stringent than the Michigan Act 307 values, than they are the clean-up levels. If background or best available detection limit values are higher than the clean-up levels, than they will substitute for the clean-up levels. Collectively, the clean-up levels will comply with the 10^{-4} to 10^{-6} risk range as required by the NCP. Treatment of the groundwater will eliminate the risk posed by ingestion of contaminated groundwater and prevent contamination from impacting the deeper aquifers.

No short-term risks or cross-media impacts will be caused by implementation of this remedy.

Attainment of ARARs:

The selected remedy will be designed to meet all the applicable, or relevant and appropriate requirements (ARARs) of Federal and more stringent State environmental laws. A list of the probable ARARs for the Metamora site is listed within the FS. The primary

ARARs that will be achieved by the selected remedy are as follows.

Landfill Remedy Requirements:

Federal

- RCRA Closure regulations (40 CFR 264.110 et seq.).
- Air emissions from flaring CAA (40 CFR 50).

State

- Capping requirements as stated by Michigan Act 64.
- Monitoring, collection, or treatment of emissions depending on the actual landfill gas constituents as required by Michigan Act 348.
- Subparts G, Closure and Post Closure and N, Landfills of RCRA as referenced by Michigan Act 64.
- Limitations of fugitive dust as required by BACT R336 rules 701 & 702.
- Michigan Air Pollution Control Commission General Rules (R336 Part 9).

Groundwater Remedy Requirements:

Extraction-

- Construction and use of wells for the supply of potable water as required by SDWA (40 CFR 141) and Michigan Act 399.

Recharge-

Federal

- Groundwater recharge quality as required by SDWA (40 CFR 141.11-141.16) MCLs.

State

- Mi Act 245 of 1929 (The Water Resources Commission Act), Part 21, states the effluent discharge permitting and monitoring requirements. (See Page 15, Section 7.3 of this ROD regarding MI Act 307 satisfying the requirements of MI Act 245).

Treatment System-

Federal

- Air emission standards as required by CAA Regs (40 CFR 50).
- Environmental Performance of Miscellaneous Treatment Units as required by RCRA (40 CFR 264 Subpart X), RCRA Standards for Chemical, Physical and Biological treatment units (40 CFR 265 Subpart Q).
- Deed notices as required by RCRA closure regulations (40 CFR 264.119).
- Disposal of spent carbon or sludge from inorganic

treatment as required by RCRA (40 CFR 263), DOT (49 CFR Parts 107, 171.1-171.5).

State

- Air emission standards as required by Michigan Air Pollution Control Regulations (R336, Part 201).
- Disposal of spent carbon or sludge from inorganic treatment as required by Act 64 and Michigan transportation regs.
- Deed notices as required by Act 64.

Clean-up Levels-

Federal

- Groundwater remediation clean-up levels as required by SDWA - Maximum Contaminant Levels (MCLs) (40 CFR 141.11 - 141.16).

State

- Michigan Act 307 Type B (Michigan Environmental Response Act), requires remediation of groundwater to 1×10^{-6} for carcinogens and for non-carcinogens, levels representing the human life cycle safe concentration will not be exceeded.

Cost Effectiveness:

The Selected Remedy for the Metamora Landfill Site is considered cost effective when compared to the alternatives not chosen, which have had a similar degree of protectiveness to the environment and to public health. The alternatives yield results similar to the Selected Remedy, but were not as inexpensive as the Selected Remedy. The total cost of the Selected Remedy for the Metamora Landfill Site is estimated at approximately 19.3 million dollars.

Utilization of Permanent Solutions and Alternative Treatment Technologies or Resource Recovery Technologies to the Maximum Extent Practicable:

The alternative chosen represents the best balance of alternatives evaluated to address the contamination problems found at the Metamora Landfill Site. By extracting, treating and recharging the contaminated groundwater, the potential health threats to neighboring residents will be drastically reduced, if not totally eliminated. Also, the potential of contamination spreading to the lower aquifers is eliminated. The capping alternative chosen is not permanent, and will require appropriate amount of monitoring and maintenance to assure the effectiveness of the cap. Capping the Landfill will reduce the risk of direct contact with leachate contaminated soils and reduce the further

production of leachate that would further impact the shallow aquifer. The Selected Remedy represents the maximum extent to which permanent solutions and treatment can be practicably utilized for this action. Due to the quantity of the Landfill contents and the level of risk posed by them, alternatives involving treatment or removal of these wastes were deemed impracticable and were not carried forward. Treatment of the identified source areas is being conducted in the ongoing Remedial Action at the Site.

Preference for Treatment as a Principal Element:

Ingestion of contaminated groundwater was identified in the Remedial Investigation as being the principal threat posed by the Metamora Landfill Site. Direct contact with leachate contaminated soils was also identified in the RI as an ecological risk. Though treatment of the Landfill contents was deemed impracticable, as described in the previous paragraph, the Selected Remedy does give preference to treatment in that the groundwater contamination will be addressed via treatment technology. The groundwater will be extracted and treated by air stripping and precipitation flocculation (GW Alternative 7) and the Landfill will be capped with an Act 64 cover, passive gas collection and flaring (LF Alternative 2).

11.0 SUMMARY

The presence of groundwater contamination and significant leachate production from the landfill at the Metamora Landfill Site, requires that remedial action be implemented to reduce the risk to public health and the environment. The U.S. EPA believes, based on the RI/FS and the Administrative Record, that the selected alternative provides the best balance of trade-offs among alternatives with respect to the criteria used to evaluate the remedies. Based on the information available at this time, the U.S. EPA believes that the selected remedy will be protective of human health and the environment, will attain ARARs and will utilize permanent solutions and alternative treatment technologies or resources recovery technologies to the maximum extent practicable.

The total estimated cost for the remedial action at the Metamora Landfill site is as follows:

<u>Media</u>	<u>Capital Cost</u>	<u>Annual Cost</u>	<u>Present Worth</u>
Groundwater	\$ 2,554,454	\$ 585,278	\$ 9,848,205
Landfill	\$ 5,395,596	\$ 271,666	\$ 9,505,845
Total	\$ 7,950,050	\$ 856,944	\$19,354,050

ATTACHMENT 1

STATE OF MICHIGAN



JAMES J. BLANCHARD, Governor

DEPARTMENT OF NATURAL RESOURCES

STEVEN T. MASON BUILDING
P.O. BOX 30028
LANSING, MI 48208

DAVID F. MALES, Director

NATURAL RESOURCES COMMISSION

THOMAS J. ANDERSON
MARLENE J. FLIMMARTY
GORDON E. BUYER
KERRY KAMMER
ELLWOOD A. MITCHELL
O. STEWART MYERS
RAYMOND POLPORA

September 27, 1990

Mr. Valdas Adamkus, Regional Administrator
U.S. Environmental Protection Agency
Region V, 5RA-14
230 South Dearborn Street
Chicago, Illinois 60604

Dear Mr. Adamkus:

The Michigan Department of Natural Resources (MDNR), on behalf of the State of Michigan, has reviewed the proposed Record of Decision (ROD) for the Metamora Landfill Operable Unit 2, Lapeer County, which we received September 21, 1990. Michigan concurs with the action described in the proposed ROD consisting of groundwater extraction and treatment, containment of the landfill, installation and operation of a passive gas collection system, and institutional controls.

We agree that the groundwater treatment system must meet the cleanup goals for the indicator compounds that are shown on Table 7 in the proposed ROD. These groundwater cleanup goals are consistent with Type B cleanup criteria for our Act 307 Rules. The groundwater precipitation/flocculation cleanup method will require a bench scale test during remedial design to determine if target cleanup levels can be achieved. If the bench scale test shows that precipitation/flocculation treatment is not technically feasible or cost effective, then ion exchange will be the selected method for inorganic treatment.

The Water Resources Commission Act and the Part 22 Rules are applicable or relevant and appropriate requirements (ARAR's) for this remedial action. It is the Department's judgement that the selected remedial action will provide for attainment of all ARAR's, including the Water Resources Commission Act and Part 22 Rules.

We concur with the remaining elements of the selected remedy outlined in the ROD. These include:

- a. installation, operation, and maintenance of a groundwater extraction well network to capture all contaminated groundwater within and downgradient of Metamora Landfill;
- b. installation, operation, and maintenance of a groundwater treatment system to reduce concentrations of groundwater contaminants prior to discharging back to the aquifer, and groundwater monitoring of the shallow and deep aquifers;

Mr. Valdas Adamkus

-2-

September 27, 1990

- c. installation of an Act 64 cover on the landfill;
- d. installation, operation, and maintenance of a landfill passive gas collection and flaring system;
- e. installation of a six-foot chain link fence around the perimeter of the landfill, in addition to posting warning signs around the fence perimeter; and
- f. placement of deed/use restrictions to limit the use of groundwater and to restrict future land use that may impair the groundwater/landfill treatment systems.

If you or your staff have any questions, please contact Mr. Gary Hoffmaster at 517-373-8195, or you may contact me directly.

Sincerely,



Delbert Rector
Deputy Director
517-373-7917

cc: Mr. Jonas Dikinis, EPA
Ms. Linda Nachowicz, EPA
Dr. James Truchan, MDNR
Mr. William Bradford, MDNR
Mr. Peter Ollila, MDNR
Mr. Gary Hoffmaster, MDNR/Metamora Landfill File

ATTACHMENT 2

RESPONSIVENESS SUMMARY

Metamora Landfill Site Metamora, Michigan

The U.S. Environmental Protection Agency (U.S. EPA) has gathered information on the types and extent of contamination found, has evaluated remedial measures, and has recommended remedial actions to address the contamination found at and near the Metamora Landfill, located in the village of Metamora, Lapeer County, Michigan. As part of the remedial action process, a public meeting was held at the Metamora Township Hall on August 1, 1990, and was attended by about 35 people. The purpose of the meeting was to explain the intent of the project, to describe the results of the Feasibility Study (FS), and to receive comments from the public. A court reporter was present to record the proceedings of the public meeting. A copy of the transcript is included in the Administrative Record.

Public participation in Superfund projects is required by the Superfund Amendments and Reauthorization Act of 1986 (SARA). Comments received from the public are considered in the selection of the remedial action for the site. The Responsiveness Summary serves two purposes: To provide the U.S. EPA with information about the community preferences and concerns regarding the remedial alternatives and to show members of the community how their comments are incorporated into the decision-making process. Comments not directly related to the selection of the remedial alternatives have not been addressed within this Responsiveness Summary, which includes all comments relating to operable unit one.

This document summarizes the oral comments received at the August 1, 1990 public meeting, and written comments received during the public comment period running from July 12, 1990, through August 28, 1990. Please refer to Appendix A for a list of commentors.

The comments from the community have been summarized and responded to as follows:

Comment #1:

I live near the Metamora Landfill. The way the groundwater samples have been collected can not have possibly given you the information you need. The contamination is heading for my shallow well and the Lapeer County Health Dept "is not really concerned about the water testing out here because this is the DNR's project." Can't the health dept. receive some monies from the Superfund. I think you should let us know more about this before you present a solution. We can't approve of something we know nothing about.

Response #1:

The MDNR and U.S. EPA will continue to monitor your shallow well. Should your water become unfit for consumption a replacement water supply will be

provided for you at no cost. This ROD will directly address the contamination within the groundwater and, if installed properly, should prevent any contamination from reaching the residential walls. Due to changes in staff, communications with the community have been erratic. MNR and U.S. EPA have and will be working with the community through continued meetings with concerned citizens.

Comment #2:

The Metamora Landfill site was listed in 1984 and since that time we have had earthmoving equipment on our property clearing trails and locations for monitoring wells. After which the DNR performed various tests on our property, one of which involved actual dynamiting. Currently, we have the daily roar and smell of diesel engines digging barrels of toxic waste. At one time we could only hear the sound of nature, now at 6:00 a.m. we hear the beep-beep of end loaders backing up.

We do appreciate the tireless efforts and professionalism of the MNR and understand that they are performing an extremely important service in cleaning up the landfill. However, we would like to ask about the rights of residents living next to this landfill in terms of lost property values and quality of life due to the illegal actions of irresponsible parties. We feel that a crime has been committed and we are the unfortunate victims.

The EPA and MNR have spent millions of dollars in cleaning this site and adjacent residents have suffered financial losses as well as the loss of the comfort of our property. What actions can be or are being done criminally and/or civilly against the responsible parties? Who are the responsible parties and shouldn't they, rather than taxpayers, pay for cleanup?

Response #2:

It is the goal of U.S. EPA to recover all past costs through consent decree or civil suits filed against responsible parties. It is also a goal of U.S. EPA to enforce the implementation of remedial actions by Responsible Parties. U.S. EPA is currently involved in an extensive Potentially Responsible Party (PRP) search. PRPs are the generators and transporters of hazardous waste/substances and the owner/operators of the site. Approximately 550 information requests have been sent to gather more information on the type of wastes disposed of and by whom. As a result, 94 PRPs have been noticed of their potential liability. PRP lists will be made available to the public through the administrative record.

Comment #3:

We have heard from sources, that we consider fairly reliable, that low level nuclear waste has been deposited in the landfill from the local hospital, and this is one resident, anyway, that will never be happy until that particular site is addressed.

Response #3:

The MDNR's investigations at the site have never indicated nuclear waste was present in the landfill. If you have reliable evidence to the contrary, you should disclose this information to the MDNR or the U.S. EPA. Excavation of wastes was eliminated early in the FS because the estimated cost of the remedy was \$200 million. Excavation is the least preferred remedy because it only relocates the problem. To excavate the landfill would not be cost effective and RCRA land disposal restrictions would make disposal of such excavations highly impractical. There would also be a greater risk of exposure in removing the material from the landfill. The MI Act 64 cap will contain landfill wastes that are contributing to the groundwater problem at Metamora.

Comment #4:

What is going to happen to the properties bordering the site during and after the implementation of the Remedial Action?

Response #4:

A more accurate extent of the use of neighboring property will be outlined in the Remedial Design. Essentially, extraction or injection wells will be installed in strategic locations surrounding the site. Piping will be laid to and from these wells underground below the frost line. Pumping units near these wells will be installed and will be fairly unobtrusive. Construction contractors hired by U.S. EPA and MDNR to perform work are required to restore any property damaged during implementation of the remedial action. The U.S. EPA and MDNR will have a public meeting to discuss the outcome of the proposed design and make appropriate changes.

Comment #5:

I really don't feel that the plan you have presented is of sufficient detail and comprehension to be able to really make an intelligent recommendation, or any feeling of consent on behalf of the residents. It is just not thorough enough and succinct enough to be able to tell what you are trying to do. You've got all these wish lists and ideas and proposed budgets and timetables, but you don't have any technical information or any technical solutions to be able to resolve it. I think you need to go back and do a little more work and define it better before you ask for comments on it.

Response #5:

The plan presented at the public meeting is a simplified version of the technical issues presented in the Proposed Plan and Feasibility Study and is based on data presented within the Remedial Investigation Report and Administrative Record. We simplified these issues in order to give the public a better understanding of what we are proposing to do. The U.S. EPA and MDNR will continue to convey information to the public as it is developed during the Remedial Design. MDNR and U.S. EPA feel this site has been studied sufficiently to propose a remedial alternative for the site and sign a Record

of Decision. The complete Remedial Investigation Report, Feasibility Study and Administrative Record are available for review in the repository.

The following are written comments received from the Potentially Responsible Parties (PRPs) and their consulting firm, and are summarized as follows.

Comment #6:

The risk assessment is flawed. There is no present risk or probably future risk. The risk assessment erroneously assumed exposure would involve ingesting water within the municipal waste landfill. Moreover, the contaminants in the shallow water table will not migrate because the area of contamination has not been defined and there is a 150 foot thick confining clay layer between the shallow water table and the drinking water aquifer.

Vinyl chloride should not be considered in the Risk Assessment because it was only detected in 10% of the total samples, it was never detected in the landfill, and MDNR used an improper high detection limit for vinyl chloride which resulted in the calculation of an artificially high risk level despite the fact vinyl chloride was not detected throughout the landfill or most of the site.

Arsenic should not be considered in the risk assessment because it is not present downgradient at levels exceeding background levels.

Response #6:

The risk assessment is a baseline risk, taking into account contamination presently at the site and evaluating actual or future exposure scenarios based on this data. As a future scenario, a residential exposure is assumed and one may place a drinking water well on or near the site. Contaminants found in the shallow aquifer below the landfill present a potential risk to not only nearby residents that utilize the shallow aquifer for their drinking water supply, but the contamination will most likely worsen if no remedial actions are taken; i.e., the extent of contamination may expand vertically and/or horizontally. Contaminant migration, particularly vertical migration, is a distinct possibility. Although the Remedial Investigation (RI) identified the presence of a thick confining clay layer between the shallow water table and the deeper drinking water aquifer, it could not be determined that this clay layer was continuous, and therefore a possible route for contaminants to reach the deeper aquifer must be considered.

Arsenic has been detected well above background levels downgradient of source areas.

The data collected in the RI was analyzed by the Contract Laboratory Program (CLP). An improperly high detection limit was not used since the CLP, Routine Analytical Services (RAS) detection limit for vinyl chloride is 10 ppb for groundwater. Even if vinyl chloride was completely eliminated from the risk assessment, the order of magnitude from other contaminants would drive the cumulative risk out of the range acceptable in the NCP.

Comment #7:

The Groundwater Target Clean-up Levels (TCLs) are incorrect because the NCP explicitly requires the MCLs be used unless the additive risk of the clean up levels exceed a 10^{-4} risk level and that practical technical considerations need to be considered, such as the practical quantification limit (PQL). None of these factors requires lowering the TCLs below the MCLs here.

The use of method or instrument detection limits is not consistent with EPA policy. Rather, PQLs instead of instrument detection limits, should be considered in setting action levels where no MCL is available.

The Michigan Act 307 Type C risk-based cleanup should be selected for this site.

Response #7:

Comprehensive Environmental Response Compensation, and Liability Act (CERCLA) requires that remedial actions comply with all requirements that are applicable or relevant and appropriate. Therefore, a remedial action has to comply with the most stringent requirement that is Applicable Relevant and Appropriate Requirements (ARAR) to ensure that all ARARs are attained. Due to the type of contaminants found at the site, U.S. EPA and MDNR have selected clean-up levels which comply with type B clean-up standards. TCLs are below MCLs because Michigan Act 307 Type B clean-up standards, the contaminant specific ARAR for this site, are more stringent than MCLs. Further explanations of the clean-up goals are found in section 9.0 and 10.0 of the ROD. Provisions in Act 307 type B clean-up state that the best available detection limits will be used when a 10^{-6} concentration is not technically achievable. Please note that the clean-up levels presented in the FS are not Michigan Act 307 type B clean-up standards. Please refer to table 7 of this ROD for the current clean-up levels.

Comment #8

The Groundwater extraction and treatment system as proposed is contrary to the National Contingency Plan (NCP), not required by law, and is arbitrary and capricious.

The proposed groundwater extraction and treatment system requires treatment of groundwater beneath the landfill, treatment for contaminants (arsenic and barium) which pose no risk above local background based upon Site data, and treatment of TCLs which are not justified by site conditions.

The risk at the site is below the level accepted by EPA at many other Superfund sites. The extent of the groundwater contamination was not properly measured, but was estimated using a model that the National Academy of Science has specifically rejected for such applications.

TCLs were erroneously selected. The groundwater below the landfill is not required to be cleaned up as a matter of EPA policy. The RI/FS and Proposed

Plan violate this policy by requiring even the groundwater within the municipal landfill to be cleaned up below drinking water levels. Rather, an alternative point of compliance downgradient from the landfill should be selected.

The treatment system is unlikely to achieve the clean-up levels selected for the site. No bench scale treatability studies have been conducted to test the feasibility of any of the remedies which were evaluated.

Implementation of the proposed system will not reduce the risk from ingesting groundwater from the area because the risk associate with the background level of naturally occurring arsenic (6.9×10^{-5}) in the drinking water aquifer, which is unaffected by the site, is greater than the reasonable worst-case risk from the Site.

Response #8:

Based on the risk assessment that indicated an incremental carcinogenic risk of 2.0×10^{-3} , which is outside the risk range of the NCP, TCLs were developed using State and Federal ARARs, whichever is more stringent. Superfund sites in other states may not require as extensive clean-up standards as required in the State of Michigan, if other ARARs are not more stringent than the federal requirements. For this site, Michigan Act 307 Type B clean-up was chosen as explained in the ROD. Arsenic was found in the shallow aquifer on site above MCLs which would warrant clean-up. The TCL for arsenic will be set at background, as explained in the ROD, due to the unusually high naturally occurring levels.

The model was simply used as a estimation of the plume and was qualified as such in the RI. Addition groundwater sampling is scheduled to fully characterize the plume.

It is true that groundwater below the landfill will not have to meet TCLs; however, the NCP and the State of Michigan requires TCLs to be met at the site boundary and all points beyond. State and Federal regulations are exceeded at the boundary of the site, therefore, remedial action is required. The pump and treat system will be designed to treat the contamination in the shallow aquifer to meet the State of Michigan's and the NCP's points of compliance.

Although it is ideal for items such as pump tests and treatability studies to be incorporated as part of the RI or FS, they were delayed because of the work required for the on-going Remedial Action Operable Unit One.

Comment #9:

The proposed hazardous waste cap is contrary to the NCP, is not required by law and is arbitrary and capricious. The landfill is improperly characterized as a hazardous waste disposal site. Michigan Act 641 Standards should apply to this site and failure of the FS to consider the adequacy of Act 641 is a fatal flaw in the report. The Application of Act 64 standards, rather than Act 641 standards, results in selection of a remedy which is not appropriate

or cost-effective for the site.

Response #9:

The MDNR has consistently applied MI Act 64 to landfills that have accepted hazardous wastes and have been on the National Priorities List (NPL). Metamora did receive hazardous waste evidenced by the thousands of buried drums on the site and the mingling of waste from area 4 and the landfill. MI Act 641 and Act 64 are not considered conflicting requirements but ones that are in succession to each other. For this site, since hazardous wastes were accepted for disposal and groundwater is contaminated by the wastes within the site, Act 64 should and does take precedence over Act 641 if the facility has accepted hazardous wastes. If the site accepted hazardous wastes after 1980, then the Act 64 is applicable; if the site accepted hazardous wastes prior to 1980, then Act 64 is relevant and appropriate for the Metamora Landfill, Act 64 is relevant and appropriate. This is consistent with the requirements of the NCP. Cost-effectiveness comes into play only when two remedies perform similarly, then the more cost-effective of the two would be selected. In this case, Act 641, an ARAR since it deals with the closure of municipal solid waste landfills, does not achieve the standards as set by Act 64, the ARAR that is relevant and appropriate for this site since the site accepted hazardous wastes.

Comment #10:

The FRP group has sought every opportunity to cooperate with EPA to reach an expeditious cost-effective remediation of the Metamora site. The FRPs have been hampered in this effort because many were notified so late in the process. We request EPA notify the manufacturers of defective tires disposed at the site that they are FRPs in this case. EPA has provided no rationale for its failure to do so.

Response #10:

Since most FRP evidence was uncovered late in the first remedial action, it was impossible to notify FRPs of their liability any earlier. The liability of tire manufacturers is being looked into. This and other legal issues will be addressed in negotiations for this operable unit.

Comment #11:

Based upon site-specific conditions and the application of these acceptable risk levels at other Superfund sites, it is inappropriate for residual risk levels to be set at a 10^{-6} level for the Metamora Site. The NCP states explicitly that the 10^{-6} level shall be used as the point of departure for determining remediation goals for alternatives when ARARs are not available or are not sufficiently protective because of the presence of multiple contaminants at a site or multiple pathways of exposure.

Response #11:

ARARs are available for this site and have been determined to be the rules of Michigan Act 307 type B clean-up.

Comment #12:

The exposure scenario is flawed since shallow aquifer wells will not be developed within the property boundaries. This will not occur because access to the site will be restricted and be continually managed for years to come.

Response #12:

A risk assessment considers the risk posed by no action being taken at the site. In order to restrict well placement, institutional controls must be implemented. The NCP states that institutional controls cannot replace treatment technologies as a remedy to address contamination. The contamination does not stop at the landfill boundaries. The groundwater needs treatment to protect human health and the environment in accordance with the NCP.

Comment #13:

It is improper to assume chemical exposure will occur at levels which are measured under the site. TCLs should be applied to groundwaters at the site boundary.

Response #13:

As stated before, the State of Michigan point of compliance is defined as the site boundary and all points beyond. It is here, and not under the landfill, that TCLs will be met.

Comment #14:

The NCP does not necessitate a 10^{-6} residual risk level for Superfund cleanups. The TCLs should be consistent with U.S. EPA directives.

Response #14:

Clean-up standards are consistent with U.S. EPA requirements, as stated in the NCP, by meeting the more stringent of state and federal ARARs.

Comment #15:

The option to discharge extracted groundwater to a surface water body was eliminated from further consideration solely because three of the closest surface water bodies are located on Boy Scout property. Other surface water bodies suitable for discharge exist in proximity to the site. Based on the stated objectives of this section, surface water discharge is not "clearly precluded" and, therefore, was eliminated prematurely. Surface water discharge should be compared with the groundwater recharge technology. The comparison needs to include an evaluation of whether the increased cost associated with groundwater recharge is justified by the presumed reduction in

aquifer cleanup time.

Response #15:

Aquifer reinjection is the favored discharge method, but the use of a surface water body as an option for reinjection will be evaluated in the design phase. The more cost-effective option which meets ARARs will be implemented.

Comment #16:

The FS is incomplete in its assessment of the capping requirement for this site. The lack of information with respect to the availability of capping materials needs to be addressed.

Response #16:

The cost of clay was based on construction cost index, and industry average. These are estimates and can vary from -30% to +50%. The location of a local clay source is probable because of the area's geology. This would likely reduce costs.

Comment #17:

Precipitation/flocculation would require disposal of sludge at an off-site Resource Conservation and Recovery Act (RCRA) facility which does not appear to be included in the Appendix B cost estimates. The MDNR has not conducted an evaluation of disposal options for the generated sludge, how the sludge generated could be disposed, the availability of disposal capacity for the sludge, or the cost of sludge disposal. This incomplete evaluation may result in inappropriate remedy selection, and operation and management problems throughout the life of the remedy.

Response #17:

All treatment systems, with the exception of UV/Oxidation, have a secondary waste stream that will have to be tested, and perhaps treated or disposed of at a RCRA compliant facility as required by RCRA land disposal restrictions. This is repeatedly mentioned in the ROD and the Proposed Plan. The amount of sludge generation requiring RCRA disposal cannot be determined at this time and, therefore, cost estimates cannot be given.

Comment #18:

While the two conceptual plans which are presented (system A and system B) are described in the FS, a detailed evaluation and comparison between the two alternatives is not presented. System B (the 20 year system) is eventually selected in the Proposed Plan without adequate evaluation.

Response #18:

The FS evaluated two conceptual plans to determine the cost differences

between cleaning up the aquifer in a shorter time frame, and eliminating operation and maintenance cost associated with the longer timeframes. The Proposed Plan and the ROD selected the shorter timeframe because the cost difference is minimal. The NCP also states that an aquifer should be returned to its natural state in the shortest timeframe practicable.

Comment #19:

The FS improperly concludes that "plume" stabilization would likely occur well into the future only after site-related constituents have spread over a significantly larger area than is currently involved. The RI data base, however, does not contain any information regarding the area currently involved. There is no basis for discussing stabilization of a "plume" until there is good demonstration that a "plume" exists. Simple mathematical models are no substitute for accurate field data in determining the presence and extent of a plume.

The FS states that five pore volumes must be removed to reach TCLs. It is very unlikely that the very low TCLs will be met at all, let alone after five pore volumes. The 20-year cleanup scenario has not been substantiated. The cost implications for not achieving the TCLs in a 20-year timeframe should be evaluated.

Page 8-24 states: "The capital and annual expenditures, as well as the time required to achieve TCLs, must be evaluated to evaluate which system can better serve the Metamora Site". There is no evaluation presented of how a 210 gpm system was selected. This selection is not presented in the FS. The Proposed Plan states that the shorter time period is preferred, but there is no evaluation of the two.

The summary states that recharge will minimize extraction time and thereby speed up remediation of the Site. The cost of the surface water discharge alternative, which was prematurely eliminated in Table 4.2, is not presented. The time saving of recharge over surface water discharge is insinuated, but not evaluated. The evaluation of the 20 and 40 year alternatives requires a cost benefit analysis. Surface water discharge was prematurely eliminated and thus should be considered in the detailed analysis.

It is unclear in the FS whether vapor phase treatment is expected to be needed at this time. Page 8-53 says "if deemed necessary," later on Page 8-56 it says: "because air stripping produces off gases that must be treated, a vapor phase carbon adsorption unit is added to the system." It is not clear at this time whether there is even a need for vapor phase treatment, as the contaminant plume and thus the mass of contaminants that will be removed from the aquifer, is unknown due to the incomplete RI data base. Vapor phase carbon treatment does not appear to be in Table B-6 capital cost estimate; however, it does appear in the annual cost. The annual costs do not appear to reflect operation in a four season climatic area.

The laboratory studies required to determine ion exchange vs precipitation/flocculation should have been conducted as part of the FS.

The report does not indicate whether land disposal of the treatment sludge will be possible. An evaluation of alternative disposal options and the related costs is required.

Response #19:

The issue of plume definition is discussed in response #8.

The 20 and 40-year systems achieve the same goal, the difference being the length of time required for pumping and treating. The 20-year system was chosen because it would take less time to remediate the aquifer. The NCP states that the goal of Superfund's approach to contaminated groundwater is to return usable groundwaters to their beneficial uses within a time frame that is reasonable given the circumstances of the site. The 40-year system will be considered if evidence suggests that the 20-year system is not reasonable for the site. A containment system is needed to keep contamination from spreading. If after a time period agreed upon by the U.S. EPA in consultation with the MDNR, the TCLs are not met, further remediation may be called for or alternate clean-up goals may be established.

The FS touches on the issue of surface water reinjection and states it would not be cost effective to utilize a surface water reinjection point. As stated before, the option for surface water injection will be left open for the design phase if all ARARs are met.

State and Federal regulations limit the emissions from air strippers; therefore, a vapor phase carbon adsorption unit would be necessary to meet the ARARs as identified in the ROD. Cost figures for the vapor phase carbon unit are estimates and may change based on seasonal variation. This does not have an impact on selection of a groundwater treatment option, as the alternative selected was the most cost effective.

The comment on laboratory studies on the inorganic treatment systems has been addressed in response #8.

The ROD discusses land-disposal options for treatment sludge on page 10.

Comment #20:

The FS does not adequately describe the landfill area to be covered, and does not provide any details with respect to the areas to be capped and the volume of the fill materials required to achieve desired grades. Considering the extreme topographic conditions present at the site, it is necessary to provide additional details on the geometry of the cover system. In addition, there is no mention of stormwater management of runoff from the completed cap.

Landfill gases can be safely vented to the atmosphere, as is common practice at most landfill sites. An evaluation of why flaring is considered to be necessary at the site should be presented.

Response #20:

The landfill cap is simply illustrated in the FS and some material-need estimates are given in appendix B. Further details on the cap will be addressed in the remedial design.

Landfill gas emissions must be in compliance with the ARARs identified in the ROD. If treatment of the gas is determined to be needed to comply with ARARs, then it will be required to be implemented.

Comment #21:

Costs in the Proposed Plan for capital and annual costs are incorrect. There is an error in seeding cost for the landfill as presented in the FS.

Response #21:

Thank you for your comment. These errors have been addressed in the ROD and the Administrative Record.

Comment #22:

The U.S. EPA is planning to designate the subsurface soils beneath the drum removal areas as Operable Unit Three. Considering that Drum Area Number 4 excavation has been completed for some time, it would be prudent to initiate the investigation of that area as soon as possible, as contaminants which are located in these soils may be continually leached further and deeper into the soil.

Response #22:

Drum Area 4 is currently under study and those soils requiring removal will be incinerated as part of Operable Unit One. Therefore, the soils that are most heavily contaminated will be removed which will minimize the leaching of contaminants downward into the soil. The final remedy, for the drum areas and the site, can then be addressed in Operable Unit Three.

ACRONYM GUIDE FOR THE ADMINISTRATIVE RECORD
Metanora Landfill
Metanora, Michigan

ACRONYM DEFINITION

RCRA	Resource, Conservation and Recovery Act
RD/RA	Remedial Design/Remedial Action Plan
RI/FS	Remedial Investigation/ Feasibility Study
ROD	Record of Decision
RPM	Remedial Project Manager
SARA	Superfund Amendment and Reauthorization Act of 1986
TAG	Technical Assistance Grant
TAT	Technical Assistance Team
USEPA	United States Environmental Protection Agency

Administrative Record Index Update No. 1
USEPA Remedial Action Superfund site
Metamora Landfill, Metamora Michigan
OPERABLE UNIT 2

FICHE/FRAME	PAGES	DATE	TITLE	AUTHOR	RECIPIENT	DOCUMENT TYPE	DOCNUMBER
975	89/03/00		Metamora Landfill site Remedial Investigation Report with Appendices	E.C. Jordan Co.	MDNR	Reports/Studies	1
159	89/08/00		Metamora Landfill site Feasibility Study- Alternatives Array document	E.C. Jordan Co.		Reports/Studies	2

ACRONYM GUIDE FOR THE ADMINISTRATIVE RECORD
Metamora Landfill
Metamora, Michigan

ACRONYM DEFINITION

RCRA	Resource, Conservation and Recovery Act
RD/RA	Remedial Design/Remedial Action Plan
RI/FS	Remedial Investigation/ Feasibility Study
ROD	Record of Decision
RPM	Remedial Project Manager
SARA	Superfund Amendment and Reauthorization Act of 1986
TAG	Technical Assistance Grant
TAT	Technical Assistance Team
USEPA	United States Environmental Protection Agency

ADMINISTRATIVE RECORD INDEX - UPDATE #1
USEPA Remedial Action Superfund site
Metamora Landfill Metamora, Michigan
OPERABLE UNIT #1

FRANE	PAGES	DATE	TITLE	AUTHOR	RECIPIENT	DOCUMENT TYPE	DOCNUMBER
3		89/08/11	Letter re: USEPA approval of use of compliant state regulated (non-RCRA) cement kilns at the Metamora site	Phillips, MDNR	Oakes, USEPA	Correspondence	1
1		89/08/22	Letter re: USEPA approval of use of compliant State regulated cement kilns	Oaks, USEPA	Phillips, MDNR	Correspondence	2

Administrative Record Index
 USBPA Remedial Action Superfund site
 Metamora Landfill, Metamora Michigan
 OPERABLE UNIT NO.2

IR/FRAME	PAGES	DATE	TITLE	AUTHOR	RECIPIENT	DOCUMENT TYPE	DOCUMENT NUMBER
10 C3	2	87/01/05	Metamora Progress Report #8	MDNR		Reports/Studies	31
10 C5	64	87/04/00	Technical Memo #3: Drum Sampling, Metamora RI/FS, conducted March and April 87	Jordan Co., Engineering Consultants	MDNR	Reports/Studies	32
11 D11	23	87/04/00	Technical Memo #6: Surface Water, Sediment and Leachate Sampling-Task 16, Metamora RI/FS	Jordan Co., Engineering Consultants	MDNR	Reports/Studies	33
11 G2	48	87/04/00	Technical Memo #4: Groundwater Sampling, Task 15, Event 1, Metamora RI/FS	Jordan Co., Engineering Consultants	MDNR	Reports/Studies	34
12 D6	4	87/04/16	Metamora Progress Report #9	MDNR		Reports/Studies	35
12 D10	12	87/05/00	Technical Memo #7: Shallow Soil/Waste Sampling for Dioxin Analysis, Part of Task 13 (Modified) Metamora RI/FS	Jordan Co., Engineering Consultants	MDNR	Reports/Studies	36
12 E13	68	87/05/00	Technical Memo #5: Soil/Soil Gas Sampling-Task 11, Pilot Soil Gas Survey-Task 12, Metamora RI/FS	Jordan Co., Engineering Consultants	MDNR	Reports/Studies	37
13 E9	132	87/08/00	Technical Memo #1: Geophysics Surveys, Metamora RI/FS	Jordan Co., Engineering Consultants	MDNR	Reports/Studies	38
15 F9	2	87/08/26	Metamora Progress Report #10	MDNR		Reports/Studies	39
15 F11	49	87.12/00	Technical Memo #2: Monitoring Well Installation Task-14, Metamora RI/FS	Jordan Co., Engineering Consultants	MDNR	Reports/Studies	40

Administrative Record Index
USEPA Remedial Action Superfund site
Metamora Landfill, Metamora Michigan
OPERABLE UNIT NO.2

IB/FRAME	PAGES	DATE	TITLE	AUTHOR	RECIPIENT	DOCUMENT TYPE	DOCNUMBER
6 C6	151	88/00/00	Technical Memo #9: Groundwater Sampling-task 15, Events 2 and 3, Metamora RI/FS	Jordan Co., Engineering Consultants	MDNR	Reports/Studies	41
8 C5	34	88/00/00	Technical Memo #10: In-Situ Hydraulic Conductivity Testing, Metamora RI/FS, conducted January & February 88	Jordan Co., Engineering Consultants	MDNR	Reports/Studies	42
8 E10	130	88/02/00	Design Report for Metamora Drum Removal Operable Unit	Jordan Co., Consulting Engineers	MDNR	Reports/Studies	43
0 C3	4	88/02/24	Metamora Progress Report #11	MDNR		Reports/Studies	44
0 C7	3	88/09/07	Michigan Environmental Protection Progress Report # 12	MDNR		Reports/Studies	45
0 C10	2	88/10/31	Michigan Environmental Protection Progress Report # 13	MDNR		Reports/Studies	46
0 C12	6	89/01/25	Preliminary Health Assessment for Metamora	ATSDR	USEPA	Reports/Studies	47
0 D4	42	89/03/01	Investigation Report, US Chemical Co., Review of Waste Transactions with forwarding letter	Halfen, Env. Consultations, Inc.	MDNR, USEPA	Reports/Studies	48
0 G3	3	89/03/16	Michigan Environmental Protection Progress Report # 14	MDNR		Reports/Studies	49



Administrative Record Index
USEPA Remedial Action Superfund site
Metamora Landfill, Metamora Michigan
OPERABLE UNIT NO.2

SE/PAGE	PAGES	DATE	TITLE	AUTHOR	RECIPIENT	DOCUMENT TYPE	DOCNUMBER
			Documents dated on or before 9-30-86 are available for review in Metamora Operable Unit No.1 Administrative Record.				
2		00/00/00	Request for Information letter	Gade, USEPA	Greenway, US Chemical Co.	Correspondence	
1		82/10/04	Letter forwarding 9-7-82 water well sampling results and stating that water wells at depths ranging from 250-400' are safe	Lovato, MDPH	Liptak, Cty. Health Dept.	Correspondence	
6		85/06/20	Letter informing PRPs that they are PRPs and of USEPA intended action, also requesting information	Constantelos, USEPA	PRPs	Correspondence	
5		86/01/02	Generic letter sent to PRPs requesting information	Constantelos, USEPA	PRPs	Correspondence	
2		86/01/03	Update and review of PPS alternatives	Phillips, MDNR	Cit. Comm.	Correspondence	
5		86/04/22	Generic letter sent to PRPs requesting information	Constantelos, USEPA	PRPs	Correspondence	
5		86/04/30	Letter re: USEPA's intended actions at the Metamora site	Constantelos, USEPA	see listing	Correspondence	
5		86/08/18	News re: Requirements of Michigan Act 64	Phillips, MDNR	Tanaka, USEPA	Correspondence	
6		86/08/22	Letter commenting on the Phased Feasibility Study	Attys. representing Sea Ray Boats	Phillips, MDNR	Correspondence	

Administrative Record Index
 USEPA Remedial Action Superfund site
 Metamora Landfill, Metamora Michigan
 OPERABLE UNIT NO. 2

FRANK	PAGES	DATE	TITLE	AUTHOR	RECIPIENT	DOCUMENT TYPE	DOCNUMBER
			report				
	10	86/08/22	Letter commenting on the draft Phased Feasibility Study	Consulting Engineers for Chrysler	Grice, Chrysler Corp.	Correspondence	
	3	86/08/22	Letter commenting on draft Phased Feasibility Study	Grice, Chrysler Corp.	Phillips, MDNR	Correspondence	
	7	86/08/25	Letter commenting on the Phased Feasibility Study report	Attys. for Sea Ray Boats, Inc.	Nelson, USEPA	Correspondence	
	1	86/08/27	Correction on technical comments to draft PFS	Bergstrom-Meyer	Grice	Correspondence	
	1	86/09/24	Letter coordinating MDNR and USEPA funding for cleanup	Guyer, MDNR	Adams, USEPA	Correspondence	
A1	2	87/01/12	Letter informing USEPA of PRPs involved based on drum removal	Phillips, MDNR	Tanaka, USEPA	Correspondence	1
A3	1	87/01/27	Letter requesting that another PRP be added, based on findings from excavated drums	Phillips, MDNR	Tanaka, USEPA	Correspondence	2
A4	12	87/05/04	Generic Request for Information letter	Constantelos, USEPA	PRPs	Correspondence	3
B2	9	88/05/18	Letter re: QAPP for additional groundwater sampling work	Phillips, MDNR	Allans, USEPA	Correspondence	4
B12	2	88/07/12	Letter in response to Petition to Reopen the 9-30-86 Record of Decision denying the petition	Adams, USEPA	Maurer, PRP atty.	Correspondence	5
-B14	1	88/07/12	Letter in response to the Supplemental Petition to Reopen the 9-30-86 Record of Decision	Schaefer, USEPA	Shwartz, PRP atty.	Correspondence	6

No. 3
/89

Administrative Record Index
USEPA Remedial Action Superfund site
Metamora Landfill, Metamora Michigan
OPERABLE UNIT NO.2

FRAME	PAGES	DATE	TITLE	AUTHOR	RECIPIENT	DOCUMENT TYPE	DOCNUMBER
			denying the petition				
2 C1	3	88/08/03	Letter re: The release of Grice, Chrysler hazardous substances at the Metamora site		Haff, USEPA	Correspondence	7
2 C4	3	89/01/06	Letter re: USEPA's selection of a remedy at the Metamora site	David Maurer	Constantelos, USEPA	Correspondence	8
2 C4	4	89/01/24	Letter re: Enforcement at the Metamora site	David Maurer	Nelson, USEPA	Correspondence	9
2 C11	10	89/02/15	Letter requesting info. about the release of hazardous substances at the Metamora site	Gade, USEPA	PRPs	Correspondence	10
2 D7	2	89/03/08	Letter re: Enforcement activities at Metamora site	Nelson, USEPA	David Maurer	Correspondence	11
2 D9	2	89/03/23	Letter re: USEPA remedy selection for the Metamora site	Gade, USEPA	David Maurer	Correspondence	12
2 D11	3	89/04/21	Letter re: Analytical protocol for Metamora site	Darlene Donanik	Allans, USEPA	Correspondence	13
2 D14	7	89/05/03	Letter re: Analytical protocol for Metamora site	Allans, USEPA	Darlene Donanik	Correspondence	14
2 A1	8	87/00/00	Haps re: Metamora Drum Removal	Jordan Co., Consulting Engineers	MDNR	Haps	15
2 E8	1	88/02/23	Sign-in sheet for 2-23-88 Metamora meeting in Chicago			Meeting Notes	16
	1	85/09/18	Memo forwarding the draft Phillips "Community Relations Plan"		concerned citizens	Memorandum	
	2	85/10/24	Memo updating the Metamora Landfill Project Citizens Information Committee	Phillips, MDNR	concerned citizens	Memorandum	

Administrative Record Index
USEPA Remedial Action Superfund site
Metamora Landfill, Metamora Michigan
OPERABLE UNIT NO. 2

B/P/RANK	PAGES	DATE	TITLE	AUTHOR	RECIPIENT	DOCUMENT TYPE	DOCNUMBER
1		85/11/13	Memo re: Preliminary Investigation Data	Phillips, MDNR	concerned citizens	Memorandum	
1		85/11/27	Memo re: The upcoming CIC meeting and forwarding related materials	Phillips, MDNR	concerned citizens	Memorandum	
2		86/01/23	Memo updating the Metamora Landfill Project Citizens Information Committee and info. on review of the Phased Feasibility Study	Phillips, MDNR	concerned citizens	Memorandum	
2		86/03/31	Memo updating the Metamora Landfill Citizen Information Committee Members on the Preliminary Investigation Project Status	Phillips, MDNR	concerned citizens	Memorandum	
1		86/04/10	Memo forwarding the Preliminary Investigation	Phillips, MDNR	concerned citizens	Memorandum	
1		86/04/22	Memo forwarding the final work plan for the Remedial Investigation/ Feasibility Study (RI/FS)	Phillips, MDNR	concerned citizens	Memorandum	
2		86/07/28	Memo re: Termination of Negotiations for RD/RA, based on Feasibility Study	Whippo & Nelson, USEPA	File	Memorandum	
2		86/08/01	Memo forwarding the draft Phased Feasibility Study Report for review and comment	Phillips, MDNR	concerned citizens	Memorandum	
1		86-11-05	Memo re: Notification of meeting scheduled for 11-12-86 at the Metamora Township Hall	Phillips, MDNR	concerned citizens	Memorandum	17

Administrative Record Index
 USEPA Remedial Action Superfund site
 Metamora Landfill, Metamora Michigan
 OPERABLE UNIT NO.2

HE/FRANK	PAGES	DATE	TITLE	AUTHOR	RECIPIENT	DOCUMENT TYPE	DOCNUMBER
2 E10	33	88/06/00	Technical memo 11: Groundwater Sampling - Task 15, Event 4, Metamora RI/FS	EC Jordan Co.	USEPA	Memorandum	18
3 B10	23	88/06/03	Memo re: Response to Petitions to Reopen the 9-30-86 Record of Decision for Metamora	Nelson and Allans, USEPA	File	Memorandum	19
3 D5	7	00/00/00	Metamora PRP list			Other	20
3 D12	7	00/00/00	Metamora site Chronology of events			Other	21
3 E5	2	00/00/00	Info. re: Iron oxide dust disposition	Chrysler Corp.	USEPA	Other	22
3 E7	25	00/00/00	Invoices: Haul and disposal of Iron oxide dust from 1979 and 1980	Metal Alloys Corp.	Chrysler Corp.	Other	23
3 G4	2	88/06/29	Phone record re: Sampling Allans, USEPA at Metamora			Phone Record	24
3	3	88/07/26	Phone Record re: Sampling Allans, USEPA at Metamora with report from NDR re: another case with similar contamination			Phone Record	25
3 G9	115	87/09/11	Petition to the Administrator to Reopen the Original ROD (signed 9-30-86) and initiate a new Remedy Selection Process	Grice, Chrysler Corp.		Pleadings/Orders	26
5 A14	234	87/09/11	Exhibits to the Memorandum in Support of the Petition	Grice, Chrysler Corp.		Pleadings/Orders	27
7 E13	77	88/12/02	Deposition of Russell Farrish	Russell Farrish		Pleadings Orders	29

Administrative Record Index
 USEPA Remedial Action Superfund site
 Metamora Landfill, Metamora Michigan
 OPERABLE UNIT NO.2

RE/PRAME	PAGES	DATE	TITLE	AUTHOR	RECIPIENT	DOCUMENT TYPE	DOCNUMBER
	13	00/00/00	Metamora Landfill site Community Involvement Plan			Reports/Studies	
	7	00/00/00	Potential Groundwater Contaminated Source Identification and Preliminary Assessment	MDNR		Reports/Studies	
	7	00/00/00	PFS Responsiveness Summary	USEPA		Reports/Studies	
	64	79/02/02	Hydrogeological Report on Metamora	Keck Consulting Services, Inc.		Reports/Studies	
	5	83/04/18	Preliminary Assessment	Lentzen of Ecology & Environment		Reports/Studies	
	14	83/07/21	Site Investigation	Sroonian of Ecology & Environment		Reports/Studies	
	3	85/05/16	Progress Report #3	Phillips, MDNR	Cit. Comm.	Reports/Studies	
	2	85/11/27	Progress report #5	Phillips, MDNR		Reports/Studies	
	295	86/02/00	Metamora Site Investigation Final Report with Appendix	Jordan Co., Engineering Consultants	MDNR	Reports/Studies	
	279	86/03/00	RI/FS Workplan	B.C. Jordan		Reports/Studies	
	178	86/05/00	Phased Feasibility Report	B.C. Jordan		Reports/Studies	
	2	86/08/01	Metamora Progress Report #6	MDNR		Reports/Studies	
	307	86/09/26	QAPP	B.C. Jordan		Reports/Studies	
	35	86/09/30	Record of Decision	Adamkus, USEPA		Reports/Studies	
3 D5	4	86/10/31	Metamora Progress Report #7	MDNR		Reports/Studies	29
09	125	86/12/00	Technical Memo #2, Pollutant Characterization- Task 13, Metamora RI/FS	Jordan Co., Engineering Consultants	MDNR	Reports/Studies	30

File No. 1

11/90

7/11/90



ADMINISTRATIVE RECORD INDEX UPDATE No. 2
USEPA Remedial Action Superfund site
Metanora Metanora, Michigan
OPERABLE UNIT No. 1

CHE/FRAME	PAGES	DATE	TITLE	AUTHOR	RECIPIENT	DOCUMENT TYPE	DOCUMENT NUMBER
	2	90/05/03	Letter re: Eligibility to receive CERCLA wastes from a CERCLA site in EPA Region V	D. Wagoner - USEPA	J. Kuipers-Indus. Fuels	Correspondence	1
	1	90/05/10	Memo re: Acceptability of the Industrial Fuels Facility in Region 7 to Receive CERCLA Wastes	L. Starfield - USEPA	C. Puchalski - USEPA	Memorandum	2
	4	90/05/21	Memo re: Shipment of Metanora Waste to Industrial Fuels site in Missouri	C. Puchalski - USEPA	File	Memorandum	3
	100	89/09/29	TES IV RCRA Preliminary Assessment Report Industrial Fuels Incorp.	Jacobs Engineering Group Inc.	USEPA	Reports/Studies	4
	341	90/04/00	Feasibility Study for Metanora site	E.C. Jordan Co.	KDRR	Reports/Studies	5
	28	90/06/13	Proposed Plan for Metanora Operable Unit I	USEPA		Reports/Studies	6

ACRONYM GUIDE for the Administrative Record
USEPA Remedial Action Superfund Site
Metamora Metamora, Michigan

ACRONYM	DEFINITION
AO	Administrative Order
AR	Administrative Record
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act of 1980
FS	Feasibility Study
MDNR	Michigan Department of Natural Resources
PRP	Potential Responsible Party
R	Resource, Conservation and Recovery Act
RI	Remedial Investigation
RI/FS	Remedial Investigation/ Feasibility Study
TES	Technical Enforcement Support
USEPA	United States Environmental Protection Agency

ADDITIONAL GUIDANCE DOCUMENTS : INDEX
PROVIDED BY THE OFFICE OF REGIONAL COUNSEL
UNITED STATES ENVIRONMENTAL PROTECTION AGENCY - REGION V.

TITLE	AUTHOR	DATE
and Appropriate Requirements. 52 FR 32495 (8/27/87).		
Listing Municipal Landfills on the NPL. Memo from the Director of the office of Emergency and Remedial Response.	Henry L. Longest II-USEPA	87/08/21
RI/FS Statements of Work (SOW). Memo from Chief of C&S, MI/WI unit.	Paul Bitter-USEPA	87/09/28
Interim Guidance on PRP's participation in RI/FS.	OWSER Dir. 9835.1a	87/10/02
Interim Final Guidance on Removal Action Levels at Contaminated Drinking Water Sites.	OWSER Dir. 9860.1-10	87/10/06
Interim Guidance on Administrative records for Decisions on Selection of CERCLA Response Actions.	OWSER Dir. 9832.4	87/11/09
Revised Procedures for Planning and Implementing Off Site Response Actions.	OWSER Dir. 9834.11	87/11/13
FY '88 Region V ROD Process Guidance. Memo from Chief of the Emergency & Remedial Response Branch- Waste Mgmt. Div.	Mary Gace-USEPA	88/01/20
Draft Guidance on Preparing Superfund Decision Documents: The Proposed Plan and ROD.	OWSER Dir. 9355.3-02	88/03/00
Draft Guidance on PRP Participation in the RI/FS.	OWSER Dir. 9835.1A	88/04/00
Record of Decision Questions & Answers - Draft.		88/04/01

ACRONYM GUIDE FOR THE ADMINISTRATIVE RECORD
Metamora Landfill
Metamora, Michigan

ACRONYM DEFINITION

ATSDR Agency for Toxic
Substance and Disease
Registry

CERCLA Comprehensive Environmental
Response, Compensation and
Liability Act of 1980

CORPS United States Army Corp
of Engineers

CRP Community Relations Plan

DLPC Division of Land Pollution
Control

DWPC Division of Water Pollution
Control

FY Fiscal Year

HRS Hazard Ranking System

MDNR Michigan Department of Natural
Resources

MDPH Michigan Department of Public
Health

MOU Memorandum of Understanding

NPL National Priorities List

OSWER USEPA Office of Solid
Waste and Emergency
Response

PFS Phased Feasibility Study

PI Preliminary Investigation

PRP Potential Responsible Party

QAC Quality Control

QAEP Quality Assurance Project
Plan

Administrative Record Index
USEPA Remedial Action Superfund site
Metamora Landfill, Metamora Michigan
OPERABLE UNIT NO.1

ICBE/FRAME	PAGES	DATE	TITLE	AUTHOR	RECIPIENT	DOCUMENT TYPE	DOCNUMBER
			<i>Remedial Investigation/ Feasibility Study (RI/FS)</i>				
B8	2	86/07/28	Memo re: Termination of Negotiations for RD/RA, based on Feasibility Study	Whippo & Nelson, USEPA	File	Memorandum	21
B10	2	86/08/01	Memo forwarding the draft Phased Feasibility Study Report for review and comment	Phillips, NDNR	concerned citizens	Memorandum	22
B12	7	00/00/00	Metamora PRP list			Other	23
F5	7	00/00/00	Metamora site Chronology of events			Other	24
F12	13	00/00/00	Metamora site Community Involvement Plan			Reports/Studies	25
A8	7	00/00/00	Potential Groundwater Contaminated Source Identification and Preliminary Assessment	NDNR		Reports/Studies	26
B1	7	00/00/00	PFS Responsiveness Summary	USEPA		Reports/Studies	27
B8	64	79/02/02	Hydrogeological Report on Metamora	Keck Consulting Services, Inc.		Reports/Studies	28
G5	5	83/04/18	Preliminary Assessment	Lentzen of Ecology & Environment		Reports/Studies	29
G10	14	83/07/19	Site Inspection Report	USEPA		Reports/Studies	30
A10	61	85/08/00	Phased Feasibility Study Conceptual Design and Specifications	E.C. Jordan Co.	NDNR	Reports/Studies	31
F4	295	86/02/00	Metamora Site Investigation Final Report with Appendix	Jordan Co., Engineering Consultants	NDNR	Reports/Studies	32
G3	279	86/03/00	RI/FS Workplan	E.C. Jordan		Reports Studies	33
G7	2	86/08/01	Metamora Progress Report	NDNR		Reports Studies	34

Administrative Record Index
USEPA Remedial Action Superfund site
Metamora Landfill, Metamora Michigan
OPERABLE UNIT NO.1

FICHE/FRAME	PAGES	DATE	TITLE	AUTHOR	RECIPIENT	DOCUMENT TYPE	DOCNUMBER
			#6				
11 C9	307	86/09/26	QAPP	E.C. Jordan		Reports/Studies	35
14 D11	35	86/09/30	Record of Decision	Adankus, USEPA		Reports/Studies	36

Administrative Record Index
USEPA Remedial Action Superfund site
Metamora Landfill, Metamora Michigan
OPERABLE UNIT NO.1



ICBE/FRAME	PAGES	DATE	TITLE	AUTHOR	RECIPIENT	DOCUMENT TYPE	DOCUMENT NUMBER
A1	2	00/00/00	Request for Information letter	Gade, USEPA	Greenway, US Chemical Co.	Correspondence	1
A3	1	82/10/04	Letter forwarding 9-7-82 water well sampling results and stating that water wells at depths ranging from 250-400' are safe	Lovato, MDPH	Liptak, Cty. Health Dept.	Correspondence	2
A4	6	85/06/20	Letter informing PRPs that they are PRPs and of USEPA intended action, also requesting information	Constantelos, USEPA	PRPs	Correspondence	3
A10	5	86/01/02	Generic letter sent to PRPs requesting information	Constantelos, USEPA	PRPs	Correspondence	4
B1	5	86/04/22	Generic letter sent to PRPs requesting information	Constantelos, USEPA	PRPs	Correspondence	5
B6	5	86/04/30	Letter re: USEPA's intended actions at the Metamora site	Constantelos, USEPA	see listing	Correspondence	6
B11	6	86/08/22	Letter commenting on the Phased Feasibility Study report	Attys. representing Sea Ray Boats	Phillips, MDNR	Correspondence	7
C3	10	86/08/22	Letter commenting on the draft Phased Feasibility Study	Consulting Engineers for Chrysler	Grice, Chrysler Corp.	Correspondence	8
C13	3	86/08/22	Letter commenting on draft Phased Feasibility Study	Grice, Chrysler Corp.	Phillips, MDNR	Correspondence	9
D2	7	86 08 25	Letter commenting on the Phased Feasibility Study	Attys. for Sea Ray Boats, Inc. Nelson	USEPA	Correspondence	10

Administrative Record Index
 USEPA Remedial Action Superfund site
 Metamora Landfill, Metamora Michigan
 OPERABLES UNIT NO.1

FICHE/FRAME	PAGES	DATE	TITLE	AUTHOR	RECIPIENT	DOCUMENT TYPE	DOCNUMBER
			report				
2 D9	1	86/08/27	Letter correcting mistake made on 8-22-86 letter	Consulting Engineers for Chrysler	Grice, Chrysler	Correspondence	11
2 D10	1	86/09/24	Letter coordinating and USEPA funding for cleanup	Guyer, MDNR	Adamkus, USEPA	Correspondence	12
2 D11	1	85/09/18	Memo forwarding the draft "Community Relations Plan"	Phillips	concerned citizens	Memorandum	13
2 D12	2	85/10/24	Memo updating the Metamora Landfill Project Citizens Information Committee	Phillips, MDNR	concerned citizens	Memorandum	14
2 D14	1	85/11/13	Memo re: Preliminary Investigation Data	Phillips, MDNR	concerned citizens	Memorandum	15
2 E1	1	85/11/27	Memo re: The upcoming CIC meeting and forwarding related materials	Phillips, MDNR	concerned citizens	Memorandum	16
2 E2	2	86/01/23	Memo updating the Metamora Landfill Project Citizens Information Committee and info. on review of the Phased Feasibility Study	Phillips, MDNR	concerned citizens	Memorandum	17
2 E4	2	86/03/31	Memo updating the Metamora Landfill Citizen Information Committee Members on the Preliminary Investigation Project Status	Phillips, MDNR	concerned citizens	Memorandum	18
2 E6	1	86/04/10	Memo forwarding the Preliminary Investigation	Phillips, MDNR	concerned citizens	Memorandum	19
2 E7	1	86/04/20	Memo forwarding the final work plan for the	Phillips, MDNR	concerned citizens	Memorandum	20

APPENDIX A

**LIST OF COMMENTORS DURING THE PUBLIC COMMENT PERIOD
FOR THE METAMORA LANDFILL SITE
FROM JULY 12 THROUGH AUGUST 28, 1990**

<u>COMMENT #</u>	<u>NAME AND AFFILIATION</u>	<u>SOURCE OF COMMENT</u>
COMMENTS FROM RESIDENTS:		
COMMENT 1:	NANCY A. RAY, RESIDENT	LETTER
COMMENT 2:	RONALD A. BARNARD, RESIDENT	LETTER, DATED AUGUST 3, 1990
COMMENT 3:	MR. HUGHES, RESIDENT	STATEMENT MADE AT THE AUGUST 1, 1990 PUBLIC HEARING
COMMENT 4:	MR. FOLKMAN, RESIDENT	STATEMENT MADE AT THE AUGUST 1, 1990 PUBLIC HEARING
COMMENT 5:	MR. HUGHES, RESIDENT	STATEMENT MADE AT THE AUGUST 1, 1990 PUBLIC HEARING
COMMENTS FROM PRPS:		
COMMENTS 6-10:	PRP - METAMORA LANDFILL COMMITTEE CONSISTING OF 11 PRPS, LETTER SIGNED BY JACK D. SHUMATE SPOKESMAN, STEERING COMMITTEE. ATTACHMENTS	LETTER, DATED AUGUST 28, 1990
COMMENTS 11-22:	CONESTOGA-ROVERS & ASSOCIATES, GRADIENT CORPORATION REPORT "COMMENTS ON THE FEASIBILITY STUDY FINAL DRAFT REPORT AND PROPOSED PLAN" METAMORA LANDFILL SITE LAPEER COUNTY, MICHIGAN	ATTACHMENT TO LETTER

ATTACHMENT 3
Administrative Record Index
USEPA Remedial Action Superfund site
Metanora Landfill, Metanora Michigan
OPERABLE UNIT NO. 1



REF	PAGES	DATE	TITLE	AUTHOR	RECIPIENT	DOCUMENT TYPE	DOCUMENT#
1	2	09/00/00	Request for Information letter	Gade, USEPA	Greenway, US Chemical Co.	Correspondence	1
3	1	02/10/04	Letter forwarding 9-7-02 water well sampling results and stating that water wells at depths ranging from 250-400' are safe	Lovato, NDRR	Liptak, Cty. Health Dept.	Correspondence	2
4	6	05/06/20	Letter informing PRPs that they are PRPs and of USEPA intended action, also requesting information	Constantelos, USEPA	PRPs	Correspondence	3
10	5	06/01/02	Generic letter sent to PRPs requesting information	Constantelos, USEPA	PRPs	Correspondence	4
1	5	06/04/22	Generic letter sent to PRPs requesting information	Constantelos, USEPA	PRPs	Correspondence	5
16	5	06/04/30	Letter re: USEPA's intended actions at the Metanora site	Constantelos, USEPA	see listing	Correspondence	6
111	6	06/08/22	Letter commenting on the Phased Feasibility Study report	Attys. representing Sea Ray Boats	Phillips, NDRR	Correspondence	7
03	10	06/08/22	Letter commenting on the draft Phased Feasibility Study	Consulting Engineers for Chrysler	Grice, Chrysler Corp.	Correspondence	8
013	3	06/08/22	Letter commenting on draft Phased Feasibility Study	Grice, Chrysler Corp.	Phillips, NDRR	Correspondence	9
02	7	06/08/25	Letter commenting on the Phased Feasibility Study	Attys. for Sea Ray Boats, Inc. Nelson, USEPA		Correspondence	10

ADMINISTRATIVE RECORD GUIDANCE INDEX
Metamora Landfill Metamora Township, Michigan.
Guidance documents available for review at
USEPA Region V Chicago, IL

TITLE	AUTHOR	DATE
OSWER Guidance Checklist	OSWER, USEPA	00/00/00
List of Guidance Documents for RPM Activities during Responsible Party Onsite Response		00/00/00
Standard Sampling and Sample Handling Procedures		86/01/00

ADDITIONAL GUIDANCE DOCUMENTS : INDEX
PROVIDED BY THE OFFICE OF REGIONAL COUNSEL
UNITED STATES ENVIRONMENTAL PROTECTION AGENCY - REGION V.

TITLE	AUTHOR	DATE
MOU Between the ATSDR & EPA	OWSER Dir. 9295.1-01	82/12/00
Federal Lead Remedial Project Management Manual.	OWSER Dir. 9355.1-01	86/12/00
Guidance Document for Providing Alternative Water Supplies	OWSER Dir. 9355.3-01	86/12/00
Standard RI/FS Tasks Under REM Contracts	OWSER Dir. 9242.3-7	86/11/13
The Role of expitited response actions under SARA	OWSER Dir. 9360.9-15	87/02/00
Interim Guidance on State Participation in Pre-Remedial and remedial response.	OWSER Dir. 9375.1-09	87/12/00
Interim Guidance: Streamlining the CERCLA Settlement Decision Process.	OWSER Dir. 9205.4	87/02/12
Guidance on Implementation of the "Contribute to Remedial Performance" Provision.	OWSER 9360.3-13	87/14/00
Memo:from Chief of CERCLA Enforcement New Feasability Study Statements of Work.	N.Niedergang-USEPA	87/04/14
Final Guidance for the Cooperation of ATSDR Health Assessment Activities with the Superfund Remedial Process.	OWSER Dir. 9295.4-02	87/04/22
Superfund Selection of Remedy: Background Documentation on Remaining Issues.		87/05/12
Superfund Remedial Action Evaluation Manual.	OWSER Dir. 9255.4-1	87/07/00
Interim Guidance on Compliance with Administrative Requirements	OWSER Dir. 9214.4-5	87/07/19

ADMINISTRATIVE RECORD GUIDANCE INDEX
Metanora Landfill Metanora Township, Michigan.
Guidance documents available for review at
USEPA Region V Chicago, IL

TITLE	AUTHOR	DATE
OSWER Guidance Checklist	OSWER, USEPA	00/00/00
List of Guidance Documents for RPM Activities during Responsible Party Onsite Response		00/00/00
Standard Sampling and Sample Handling Procedures		86/01/00

ADDITIONAL GUIDANCE DOCUMENTS : INDEX
PROVIDED BY THE OFFICE OF REGIONAL COUNSEL
UNITED STATES ENVIRONMENTAL PROTECTION AGENCY - REGION V.

TITLE	AUTHOR	DATE
MOU Between the ATSDR & EPA	OWSER Dir. 9295.1-01	82/12/00
Federal Lead Remedial Project Management Manual.	OWSER Dir. 9355.1-01	86/12/00
Guidance Document for Providing Alternative Water Supplies	OWSER Dir. 9355.3-01	86/12/00
Standard RI/FS Tasks Under REM Contracts	OWSER Dir. 9242.3-7	86/11/13
The Role of expedited response actions under SARA	OWSER Dir. 9380.0-15	87/02/00
Interim Guidance on State Participation in Pre-Remedial and remedial response.	OWSER Dir. 9376.1-09	87/02/00
Interim Guidance: Streamlining the CERCLA Settlement Decision Process.	OWSER Dir. 9433.4	87/02/12
Guidance on Implementation of the "Contribute to Remedial Performance" Provision.	OWSER 9380.0-13	87/04/00
Memo:from Chief of CERCLA Enforcement New Feasibility Study Statements of work.	N. Niedergang-USEPA	87/04/04
Final Guidance for the Cooperation of ATSDR Health Assessment Activities with the Superfund Remedial Process.	OWSER Dir. 9225.4-02	87/04/22
Superfund Selection of Remedy: Background Documentation on Remaining Issues.		87/05/12
Superfund Public Hearing Evaluation Manual.	OWSER Dir. 9225.4-1	87/07/00
Interim Guidance on Compliance with Applicable or Relevant	OWSER Dir. 9225.4-5	87/07/03

ADMINISTRATIVE RECORD INDEX - UPDATE #2
OPERABLE UNIT 2
METAMORA LANDFILL SITE
METAMORA, MICHIGAN

HE/FRAME	PAGES	DATE	TITLE	AUTHOR	RECIPIENT	DOCUMENT TYPE	DOCNUMBER
	36	90/08/01	Meeting notes re- Metamora Landfill Site	USEPA		Transcript	1
	3	90/08/02	Letter re: On 8/1/90 the MDNR conducted a public hearing in order to receive comments on the proposed remedial action	Barnard, R. <i>N. Ray</i>	O'Riordan, D.	Public Comments	2
	39	90/08/28	PRP Group's Comments To The Metamora Landfill Superfund Site Operable Unit No. 2 FS Final Draft Report and Proposed Plan; dated from 8/28 - 7/13	Shumate, J.	Wachowicz & Hoffmaster	Correspondence	3
	177	90/08/27	Comments On The FS; Final Draft Report and Proposed Plan	Conestoga - Rovers & Ass.	Metamora Landfill	Reports/Studies	4