PB96-963112
EPA/AMD/R05-96/305
November 1996

EPA Superfund Record of Decision Amendment:

Metamora Landfill Site, Metamora, MI 8/28/1996

STATE OF MICHIGAN

JOHN ENGLER, Governor

DEPARTMENT OF ENVIRONMENTAL QUALITY

HOLLISTER BUILDING, PO BOX 30473, LANSING MI 48909-7973

RUSSELL J. HARDING, Director

August 7, 1996

Mr. Valdas V. Adamkus, R19J
Regional Administrator, Region 5
U.S. Environmental Protection Agency
77 West Jackson Boulevard
Chicago, Illinois 60604-3590

Dear Mr. Adamkus:

SUBJECT: Record of Decision Amendment
Metamora Landfill Superfund Site
Lapeer County, Michigan

The Michigan Department of Environmental Quality (MDEQ), on behalf of the State of Michigan, has determined that the proposed amendment to the 1986 Record of Decision (ROD) for the Metamora Landfill Superfund site complies with the cleanup criteria in Part 201 of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (formerly known as the Michigan Environmental Response Act), specifically Section 20118 (1). We therefore concur with the proposed amendment.

If you have any questions, please feel free to contact Mr. Ardon Toland, Chief, Superfund Section, Environmental Response Division, at 517-335-3393, or you may contact me.

Sincerely,

Russell J. Harding
Director
517-373-7917

cc: Mr. John Kuhns, EPA
Mr. Ken Glatz, EPA
Ms. Connie Puchalski, DOJ
Mr. Brian Devlin, DAG
Mr. Alan J. Howard, MDEQ
Mr. Ardon Toland, MDEQ
Mr. Walelign Wagaw, MDEQ
Mr. Robert MacLeod, MDEQ
Metamora Landfill File (J2)

RECEIVED
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SUPERFUND DIVISION
OFFICE OF DIRECTOR

RECORD OF DECISION AMENDMENT
METAMORA LANDFILL SUPERFUND SITE
OPERABLE UNIT 1

AUGUST 28, 1996

ROD AMENDMENT
OPERABLE UNIT ONE
METAMORA LANDFILL SITE
METAMORA, MICHIGAN

Introduction

The United States Environmental Protection Agency (U.S. EPA) is changing a portion of the remedy selected in the operable unit one (OU1) Record of Decision (ROD) dated September 30, 1986, for the Metamora Landfill Site.

Background

The Metamora Landfill Site is located in Metamora Township, Lapeer County, Michigan, approximately one-half mile east of the village of Metamora, and 8 miles east-southeast of Lapeer, Michigan (figure 1.1). The Site exists on a land parcel approximately 150 acres in size and contains a 25-acre landfill and two drum disposal areas adjacent to the landfill identified as Drum Area 1 and Drum Area 4 (figure 1.2). The Landfill was formed by filling pits created by earlier gravel mining operations. Drummed wastes were also deposited in the Landfill. There are many steep excavation faces and borrow pits on the Site. Gravel mining processing equipment exists on the Site immediately south of the landfill, and a licensed solid waste transfer station currently operates on the west side of the Site. There is a shallow and an intermediate aquifer present above the bedrock aquifer (the Marshall Sandstone Aquifer). The Marshall Sandstone is the primary aquifer for domestic wells in the Metamora area, although a few domestic wells obtain water from the lower sand gravel deposits above the bedrock.

Remediation at the Site has been handled through two discrete operable units. Operable Unit 1 ROD (OU1 ROD) addresses the remediation of drummed waste and contaminated soils in Drum Area 1 and Drum Area 4. Operable unit two (OU2) addresses the remediation of the landfill and contaminated groundwater. This ROD amendment applies to the OU1 ROD. Specifically this document presents an alternative for soil remediation in Drum Area 1. Drum Area 4 drums and soils have been remediated through the OU1 ROD. The remedy selection for OU2 dated September 28, 1990, is not changed in any way by this ROD amendment.

OU1 ROD selected off-site incineration of the drums and soils in Drum Area 1 and Drum Area 4. State lead remedial action work began in the spring of 1989 and continued until December 1990. During the summer of 1990, off-site incineration capacity became extremely limited and drums awaiting disposal began to accumulate at the site. In addition, many more drums were discovered than originally estimated in the Remedial Design. This, in combination with the new RCRA Land Ban regulations, began to affect remedy implementation.

In November 1990, negotiations began with Potentially Responsible Parties for the Remedial Design Remedial Action (RD/RA) for OU2. In April of 1991 a settlement was reached that addressed the completion of all remedial activity remaining at the site, including the completion of OU1. This settlement is embodied in the Consent Decree in the matter of The United States vs BASF-Inmont et al. In September 1991, an explanation of significant difference was issued, but never implemented, to allow for the option of on-site incineration of drummed waste and contaminated soils of Drum Area 1. Drum Area 4 had been completed. The consent decree was entered on March 17, 1993. Off-site incineration of Drum Area 1 drums and severely contaminated soils (soils containing mobile non-aqueous phase liquids {MNAPL}) continued in November of that same year, and was complete one year later.

Reasons for Issuing the ROD Amendment

The 1986 ROD specified that Drum Area 1 and Drum Area 4 would be excavated and incinerated off-site. As excavation activities progressed it became clear that the volume of soils in Drum Area 1 and Drum Area 4 greatly exceeded the volume estimated as part of the OU1 design. Since incineration is only required for certain types of contaminated soils, and given a volume of soils far greater than originally estimated, feasible technologies that could equally protect human health and the environment in a more cost effective manner needed to be considered. Soils containing MNAPL and soils with polychlorinated biphenyl (PCB) above 500 ppm content, had to be incinerated. These soil types were addressed under the Remedial Action completed at the Site in 1995. The Statement of Work (SOW), section I attached to the consent decree, allowed for the further analysis of Drum Area 1 soils, in addition to the soils in the Soil Staging Area. The results of the analysis of these soils are presented in the Soil Characterization Report by Conestoga Rovers & Associates, dated April 12, 1995. The SOW further allowed the Settling Defendants to propose and evaluate the remedial options available for these soils. The results of this study are contained in the Soil Remedial Alternatives Report. The results of the studies indicated that these soils did not require incineration. This ROD amendment evaluates remedial alternatives suitable for remediating these soils. As provided for in section 300.515(e) of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) a public comment period was open from January 29, 1996, through April 29, 1996. Public meetings were held on February 20, 1996 and April 23, 1996. The responses given to the comments received during the public comment period can be found in the responsiveness summary labeled as ATTACHMENT A to this document. This ROD Amendment will become part of the Administrative Record pursuant to the NCP Section 300.825 (a)(2) including responses to comments received during the public comment period. The Administrative Record can be found at the Site repositories located at:

Lapeer Library
Metamora Branch
4024 Oak Street
Metamora, MI

-and-

Marguerite deAngeli
Branch Library
921 West Nepessing Street
Lapeer, MI

The Soil Characterization Report

The objectives of the Soil Characterization Report were to characterize the nature and extent of the constituents left in Drum Area 1 soils, undisturbed soils located beneath Drum Area 1 and soils which are currently held in the Soil Staging Area; collect all data required to assess the potential applicability of soil treatment alternatives; and determine the physical properties of the soils in Drum Area 1.

Following completion of drum removal operations from Drum Area 1, the soils containing no MNAPL were replaced and covered with two feet of clean soil. Borehole sampling was completed at 25 locations across the areal extent of Drum Area 1. The boreholes were completed at approximate 50-foot centers to provide adequate chemical and physical characterization data for the Drum Area 1 soils. Figure 1.3 presents the typical sampling intervals and chemical analyses which were conducted for each borehole.

Volatile Organic Compounds (VOCs): Trichloroethene, toluene, ethylbenzene, styrene, total xylenes and other compounds were present in the Drum Area 1 soils. The highest concentrations of VOCs existed in the backfilled soils (to 12 foot depths), and the soils within the first several feet immediately below the bottom of the drum removal excavation (12 to 20-foot intervals). The analytical data indicates that the total VOC concentrations decrease with depth after 20 feet. For example, at BH-12, the total detected VOC concentrations in the fill material were 413 mg/kg, 1,832 mg/kg and 12,046 mg/kg at depths of 5, 10, and 20 feet below ground surface (BGS) respectively. Total VOC concentrations then decrease to 4 mg/kg at a depth of 30 feet BGS and are less than or equal to 1.5 mg/kg below 30 feet. Data for BH-3, BH-7, BH-9, BH-14, BH-17, BH-19, BH-21, BH-22 and BH-23 follow a similar trend showing greatly reduced VOC concentrations at depths greater than 30 feet BGS.

Data for BH-13 also shows a decrease in total VOC concentrations with depth; however, the data identifies a slightly different pattern. The data at BH-13 shows a significant, but less dramatic, decrease in total VOC concentrations in the backfilled soils. Total VOC concentrations in the fill material were 234 mg/kg, 28 mg/kg and 4.4 mg/kg at depths of 5, 10 and 20 feet BGS respectively. Total VOC concentrations decreased to 17 mg/kg at 30 feet BGS, 24 mg/kg at 40 feet BGS and were less than one mg/kg at depths greater than 40 feet BGS. Data for BH-8, BH-11, BH-16 and BH-18 also follow this trend.

Semi-volatile Organic Compounds (SVOCs): A pattern similar to VOCs was found for SVOCs. Concentrations of phenol, isophorone, naphthalene, Di-n-butyl phthalate, butyl benzyl phthalate and BIS(2-ethylhexyl)phthalate were consistently present. At the 40 to 42-foot intervals, the

concentrations of SVOCs and the number of detected contaminants, decreased substantially. The highest concentration of an SVOC compound in the 40 to 42-foot interval was benzoic acid (4.1 mg/kg) in BH-18. The remaining detections were at or below one mg/kg. There were no detections of SVOCs in the samples collected at 50 foot or below. This trend follows the VOC data.

Polychlorinated biphenyls (PCBs) and pesticides: PCBs, identified as Arochlors 1242, 1248, 1254 and 1260 were detected in the soil samples collected from the Drum Area 1 boreholes at the zero to 2-foot, 5 to-7 foot and 10 to-12 foot sample intervals. No PCBs were detected at the 40 to 42-foot, 50 to-52 foot or 60 to 62-foot sample intervals. Total PCB concentrations in all but three samples were less than 50 mg/kg. No pesticides were detected at any interval.

Inorganics: Zinc and Lead showed elevated concentrations in several samples. Zinc ranged from 12-610 ppm and lead ranged from 1.4-1,000 ppm. Concentrations of other inorganics were low.

Based on the data collected, an estimate of the volume of contaminated soils was performed. The volumes in cubic yards (CY) exceeding the following VOC Concentrations are as follows:

Total VOC Concentration	**Volume of soils with Greater than the Identified Total VOC Concentration**
10 mg/kg	20,000 - 34,000 CY
100 mg/kg	9,000 - 15,000 CY
1,000 mg/kg	3,500 - 6,000 CY

Soil Staging Area Characterization

Soil samples were collected from the soils currently stored in the Soil Staging Area (figure 1.2). The pile consists of soils with PCB concentrations below 100 ppm and containing no MNAPL. This soil is a combination of soils excavated from Drum Area 1 during the Remedial Action and soils stockpiled during the state lead remedial action. The pile was analyzed for VOCs, SVOCs, PCBs/Pesticides and Inorganics. The samples were taken from quadrants and the results are as follows. Total VOCs for Quadrants A and C were approximately 1,200/1,900 mg/kg (duplicate samples) and 1,300 mg/kg, respectively. Total VOCs for Quadrants B and D were approximately 80 mg/kg and 22 mg/kg, respectively. Total SVOCs for Quadrants A and C were approximately 1,900/1,500 mg/kg (duplicate samples) and 1,700 mg/kg, respectively. Total SVOCs for Quadrants B and D were approximately 290 mg/kg and 99 mg/kg, respectively. PCB concentrations were found throughout the pile and ranged from 66 mg/kg to 97 mg/kg. Elevated concentrations of several metals were detected in the soils, including barium at 640 mg/kg, cadmium at 8.7 mg/kg, chromium at 330 mg/kg, lead at 2,300 mg/kg and zinc at 870 mg/kg. Cyanide concentrations ranged from 0.62 mg/kg (Quadrant D) to 2.2 mg/kg (Quadrant C). Similar to the concentrations of VOCs and SVOCs, the highest concentrations of inorganics were detected in Quadrants A and C. The Soil Staging Area volume is about 900 cubic yards.

Soil Remedial Alternatives

Pursuant to the SOW section I.2:

> "Upon U.S. EPA approval of the Soil Sampling Report, Settling Defendants shall submit to the U.S. EPA, a report entitled Soil Remedial Alternatives Report, proposing feasible technologies to remediate the contaminated soils...In this report, Settling Defendants may propose soil clean-up levels and/or performance standards based on ARARs."

Soil cleanup goals for Drum Area 1 soils were developed to prevent contaminants from leaching into the groundwater at levels above those specified in the Consent Decree. This approach was developed to ensure consistency with the ARARs defined for the Site in the ROD and to ensure that the final Drum Area 1 soil cleanup alternative will be developed and selected in a manner consistent with the Site-wide (OU2) remedy as identified in the ROD. The excavation of soils with contamination greater than the MDEQ soil clean-up levels (based on the 20 times the generic residential clean-up criteria) for groundwater (TABLE 1) indicates that this approach will achieve these goals as indicated by the analysis of the groundwater beneath Drum Area 1. Data from March 1989 compared to February 1994 for wells 17S and 17D and 31 (located in and down gradient of Drum Area 1) indicates that groundwater quality has not changed appreciably over five years. Excavation and capping of soils from Drum Area 1 having contaminant concentrations above the "20 times" criteria will achieve the clean-up goals for the Drum Area 1 soils. Based on the above, the following remedial objectives are identified to address the soils in Drum Area 1:

1. Eliminate or reduce the potential for direct contact with contaminated soils;
2. Eliminate or reduce the potential for volatization of organics to the atmosphere;
3. Eliminate or reduce either Contaminants of Concern (COC) concentrations, or mobility, to effect corresponding reductions in COC concentrations in the groundwater at the Site boundary; and
4. Provide an on-site, long-term solution, which will minimize Operation and Maintenance (O&M) requirements and is consistent with the Site-wide (OU2) remedy.

These objectives are also consistent with the goals established for sites with similar environmental conditions within the State of Michigan.

The proposed revised cleanup for Drum Area 1 Soils and the Soil Staging Area soils, contain the following components:

* The excavation of contaminated soils greater than the MDEQ soil clean-up levels based on the 20 times the generic residential clean-up criteria for groundwater (TABLE 1)
* The placement of excavated Drum Area 1 soils on the south slope of the landfill
* The placement of the Soils Pile soil on the south slope of the landfill, separated from Drum Area 1 soil.
* The capping of the landfill (OU2 remedy), including this relocated material, with a cap

equivalent in performance to the SOW cap design criteria.
* Long term groundwater monitoring (also part of OU2 remedy).

Comparative Analysis

This ROD amendment addresses the final remedy for remediation of contaminated soils which is one of the principle threats at the site. The remedy selected for OU2 will address the remaining principle threats, namely the landfill and contaminated groundwater. This amendment to the OU1 ROD incorporates the remediation of Drum Area 1 soils and the Soil Staging soils into the cap portion of the OU2 remedy. Upon completion of the OU2 remedy, remedial action will be complete at the site. Long term groundwater monitoring will commence following the completion of the remedial action.

The Nine Evaluation Criteria

Based on current information, the proposed amended remedy is protective and cost effective under the nine point criteria that the U.S. EPA uses to evaluate alternatives. This section compares the performance of the amended remedy with the remedy selected in the September 30, 1986, ROD, and provides the rationale for the selection of the amended remedy.

Overall Protection of Human Health and the Environment. Both of the alternatives provide protection of human health and the environment by eliminating, reducing or controlling risk through treatment, engineering controls, institutional controls, or a combination of these measures. The amended remedy in combination with the OU1 ROD remedy already performed, addresses the principle threat of source contamination to groundwater. Both alternatives prevent direct contact with contaminated material providing protection of human health and the environment. The groundwater extraction and treatment system will prevent off-site migration of the chemicals in the groundwater beneath Drum Area 1.

Compliance with ARARs. The amended remedy is designed to meet all applicable or relevant and appropriate substantive requirements (ARARs) of the Federal and State environmental laws. As the Soil Staging Area contains PCBs greater than 50 ppm, the TSCA waiver provisions under 40 CFR 761.75(c)(4) will be exercised. OSWER Directive No. 9355.4-01 Guidance on Remedial Action for Superfund Sites with PCB Contamination at 2.2.5, states "Where Superfund remedial actions will leave PCB's in place or where PCB-contaminated material is excavated, treated, and re-disposed at concentrations that still pose a threat, capping consistent with chemical waste landfill requirements is generally appropriate. (Long-term management controls for PCB-contaminated material generally will also parallel RCRA closure.) However some of the requirements specified under TSCA may not always be appropriate for existing waste disposal sites like those addressed by Superfund. When this is the case, it may be

appropriate to waive certain requirements, such as liners, under the TSCA waiver provisions, 761.75(c)(4). Requirements may be waived when it can be demonstrated that operation of the landfill will not present an unreasonable risk of injury to health or the environment. This demonstration may require column studies verifying that PCB movement through the soil will not adversely affect ground water." Long term monitoring of the groundwater will meet the substantative requirements of the column studies. Deed restrictions, pursuant to the terms of the Consent Decree will be placed on the landfill, and will eliminate possible incidental skin contact and ingestion. The substantive requirements of the 1990 OU2 ROD SOW cap design will meet RCRA cap closure requirements. Relocating and capping roughly 900 cubic yards of marginally contaminated PCB soils (less than 100 ppm PCBs) from the Soil Storage Area meets the substantive requirements of TSCA.

Soils that contained PCBs over 500 ppm were incinerated under OU 1. This is consistent with U.S. EPA's policy to treat hot spots of contamination when practicable. The original remedy would incinerate the soils at a TSCA compliant thermal treatment facility.

Both the amended remedy and the original remedy would require compliance with the substantive requirements of the clean air act and Part 55 of the Natural Resource and Environmental Protection Act, 1994 PA451, during the excavation portion of the remedy.

Long-term Effectiveness and Permanence. The analysis under this criterion, as required in the NCP, focuses on any residual risk remaining at the Site after completion of the remedial action (55 FR 8720). The amended remedy, in combination with the OU2 cap remedy, will eliminate the potential risks for direct contact/ingestion of Drum Area 1 and Soil Staging Area soils. Groundwater monitoring will alert and indicate that additional treatment is required, in the unlikely event of a contaminant breakthrough. Deed restrictions, pursuant to the terms of the Consent Decree, will eliminate any inadvertent use of these properties. The 1986 ROD remedy also provides long-term effectiveness and permanence.

Reduction of Toxicity, Mobility, or Volume of the Contaminants through Treatment. The amended remedy will effectively reduce the mobility of the chemicals under the cap by reducing the infiltration of rainwater through the soils, thereby decreasing the mobility of COCs. The 1986 ROD remedy reduces toxicity, mobility and volume through off-site treatment.

Short-term Effectiveness. The benefits of the amended remedy would be realized immediately upon completion of the remedy (two construction seasons). Dust production and VOC emissions during excavation is a concern for either remedy, but were successfully addressed during the first phase of OU1 ROD construction. VOC emissions can be effectively controlled by regulating the removal rate of the Drum Area 1 soils and

Soil Staging Area soils, or applying vapor control blankets during soil movement operations. Wetting agents and engineering controls will be used to control dusts. The amended remedy would also decrease local truck traffic, compared to the original remedy, by eliminating the off-site transportation of soils.

Implementability. Soil excavation technologies are common for implementation of either remedy. Excavation to the depth required is within the limits of standard construction equipment. Relocation of soils poses no additional cap implementation problems. Implementation of the proposed ROD amendment avoids off-site incineration problems, which may include incinerator capacity limitations, incinerator regulatory compliance considerations, increased personnel exposure, and shipping hazards.

Cost. Based on a combined Area 1 soils and Soil Staging soils volume of 30,900 cubic yards, the estimated capital cost for the amended remedy is $290,000; present worth $381,000, roughly 1% of the $29,000,000 cost estimate for off-site incineration of the 30,000 cubic yards. The cost estimate includes excavation costs, cost of additional material needed to cap the Drum Area 1 and Soil Staging Area soils, and regrading/seeding of Drum Area 1. The capital costs for capping the landfill as described in the OU2 ROD, is estimated to be $5,396,000.

State Acceptance. The State of Michigan Department of Environmental Quality has reviewed and supports the components of the amended remedy.

Community Acceptance. Community acceptance of the amended remedy has been evaluated in the Responsiveness Summary which is part of this ROD Amendment.

The Amended Remedy

U.S. EPA believes that the amended remedy is the most appropriate solution for the Site based on the evaluation of its performance against the nine evaluation criteria discussed. The major components of this remedial alternative include the following:

- excavation of approximately 30,000 cubic yards of Drum Area 1 contaminated soil,
- excavation of approximately 900 cubic yards of Soil Staging Area soils,
- placement in separated areas on the landfill, and capping of these materials under the OU2 landfill cap,
- regrading and seeding of Drum Area 1,
- implementation of the OU2 remedy, as described in the 1990 ROD, consisting of a landfill cap, groundwater pump and treat system and institutional controls.

The estimated cost for the amended remedy is approximately $290,000. Operation and Maintenance and present worth costs are more appropriate for the Site wide OU2 remedy as described in the September 28, 1990, ROD.

Statutory Determinations

Protection of Human Health and the Environment:
The amended remedy provides overall protection of human health and the environment by eliminating the direct contact/ingestion pathway and containing the contamination that could migrate to the groundwater. Any short term health risks associated with excavation will be minimized by the use of standard construction practices and limitations on the amount of soils handled at a given time. Air monitoring will be conducted to assess possible exposure during remedial action. Area 1 soils will be physically separated from the Storage Area soils to eliminate any possibility of VOC's in Area 1 soils from solubilizing PCB's in the Storage Area soils.

No environmental impacts have been identified for the Site, except to the groundwater and soil where drum disposal and landfill activities took place.

Attainment of ARARs:
The amended remedy will be designed to meet all the applicable or relevant and appropriate requirements (ARARs) of federal and more stringent state environmental laws. These consist mainly of the following:

> TSCA waiver provisions under 40 CFR 761.75(c)(4) will be exercised through section 2.2.4 of OSWER Directive No. 9355.4-01 Guidance on Remedial Action for Superfund Sites with PCB Contamination.
>
> Clean Air Act/Part 55 Natural Resource Environmental Protection Act PA 451 governing air emissions during excavation.

Cost Effectiveness:
The amended remedy provides overall cost effectiveness. The remedy effectively eliminates direct contact and ingestion risk and reduces migration of contaminants to the shallow aquifer at a fraction of the cost of the remedy selected in the 1986 ROD.

Utilization of Permanent Solutions and Alternative Treatment Technologies or Resource Recovery Technologies to the Maximum Extent Practicable:
The amended remedy utilizes permanent solutions and has evaluated alternative treatment technologies to the maximum extent practical for this site. The proposed amended remedy is protective and cost effective under the nine point criteria that the U.S. EPA uses to evaluate alternatives. With the presence of a landfill at the site, the inclusion of the Drum Area 1 soils is a logical outgrowth of the Site wide OU2 remedy which had not been conceived at the time of the OU1 ROD's creation. As clean closure cannot reasonably be an objective at this site, due to the presence of a landfill, the amended remedy provides equal protection for far less than the cost of the original remedy.

Preference for Treatment as a Principle Element:
Because treatment of the principle threat posed by the remaining soils was not found to be necessary to be protective of human health and the environment, this remedy does not satisfy the statutory preference for treatment as a principle element of the remedy. The size of the landfill and the fact that the OU1 ROD first phase remedial action already addressed hot spots (Areas 1 & 4) through treatment (which represented the major sources of contamination), precludes selecting an off-site disposal/treatment remedy.

Five Year Review
Because this amended remedy and the OU2 ROD remedy will result in hazardous substances remaining on-site, the statutory five-year review will be conducted at the site. As a five-year review has already occurred at the Site based on the first commencement of the OU1 ROD Remedial Action, the next scheduled review is due before September 30, 1998.

Richard Karl for

William E. Muno
Director, Superfund Division

8-28-96
Date

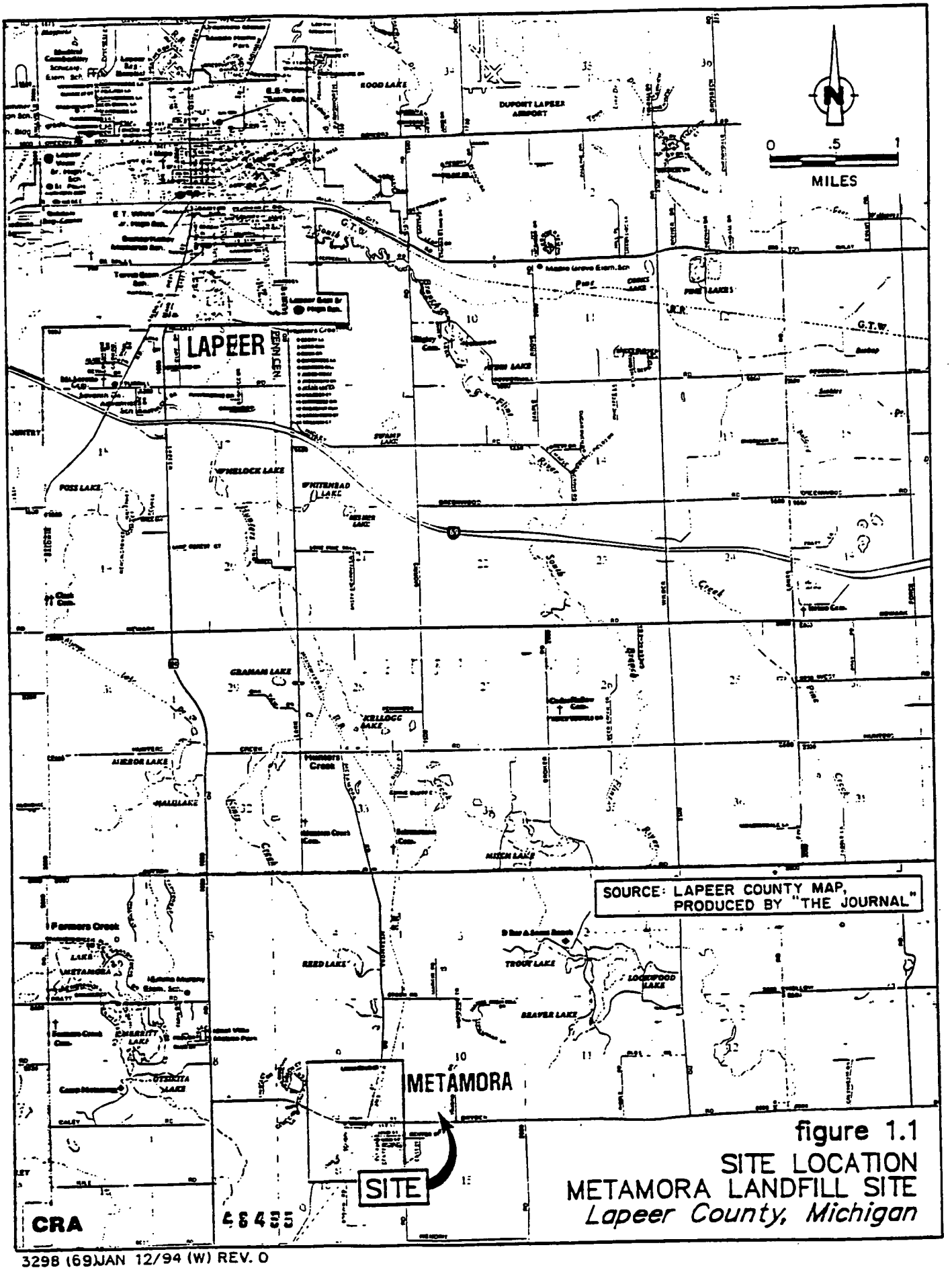
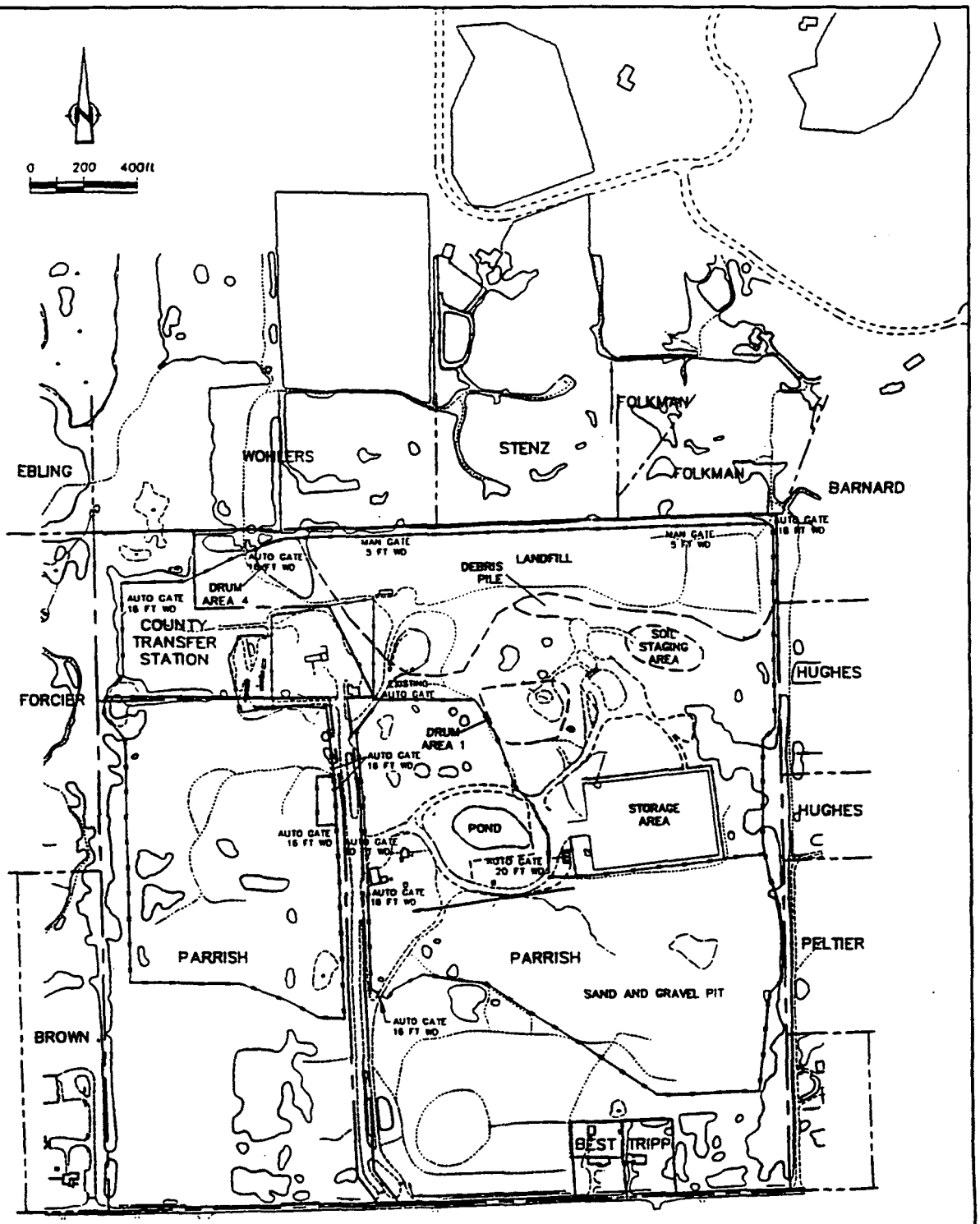


figure 1.1
SITE LOCATION
METAMORA LANDFILL SITE
Lapeer County, Michigan

3298 (69)JAN 12/94 (W) REV. 0



LEGEND

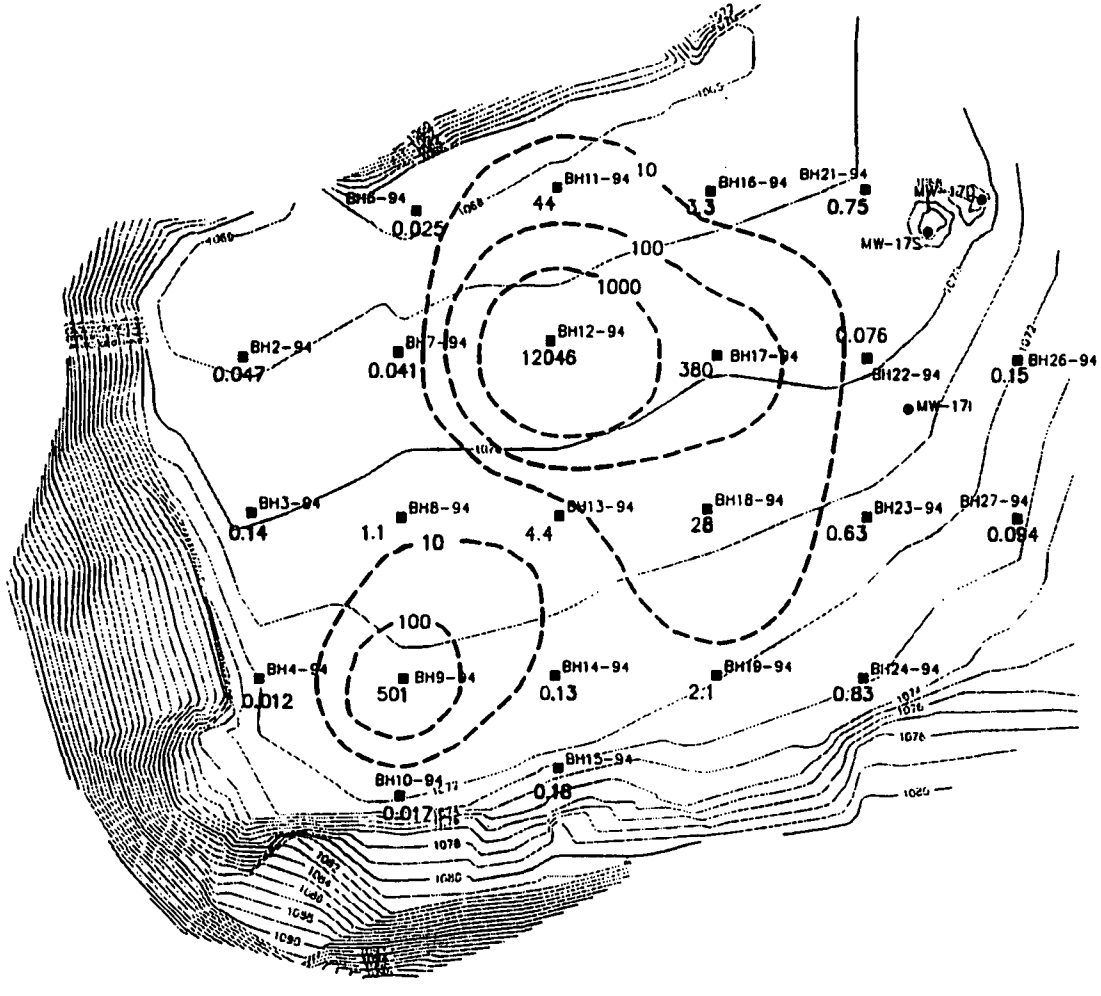
SITE SECURITY FENCING

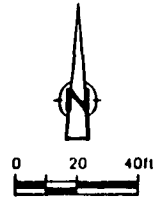
SOURCE:
DARRELL HUGHES AND ASSOCIATES
DECEMBER 22, 1992

figure 1.2
SITE PLAN
METAMORA LANDFILL SITE
Lapeer County, Michigan

CRA

3298 (69) JAN 18/95(W) REV.0 (P213)





LEGEND

MW-17S ●	MONITORING WELL
BH26-94 ■	BOREHOLE
0.094	TOTAL VOC CONCENTRATION (mg/kg)
10- - - -	ISOCONCENTRATION LINE (mg/kg)

TOPOGRAPHY IS OF THE CLEAN FILL CAP AS MAPPED ON 21 SEP. 1994

SOURCE
DARREL HUGHES AND ASSOCIATES
JANUARY 11, 1994

CRA

figure 1.3

TOTAL VOCs IN DRUM AREA 1 BOREHOLES
20 TO 22 FOOT INTERVAL
METAMORA LANDFILL SITE
Lapeer County, Michigan

329B (69) JAN 18/95(W) REV.0 (P242)

ATTACHMENT A

METAMORA ROD AMENDMENT
RESPONSE TO COMMENTS

This Responsiveness Summary was developed to respond to comments received during the public comment period regarding the ROD Amendment proposal for the Metamora Landfill Site located in Metamora, Michigan. An initial public comment period ran from January 29 to February 29, 1996, and was extended to April 29, 1996. Two public meetings were held to receive oral and written comments and to answer questions regarding the remedial options presented in the proposed ROD Amendment. These public meetings were held on February 20, 1996, and April 23, 1996 at the Metamora Township Hall. Since similar comments were received from several individuals, the comments are summarized in this Responsiveness Summary. A list of commentors precedes each comment. In addition, responses are also provided for comments submitted that are not specifically related to the proposed ROD Amendment, but are community concerns. The ROD Amendment also presents additional information on many of these issues and it should be consulted. Both the comments, and this Responsiveness Summary, will become part of the Administrative Record for this Site. All references to Michigan Department of Natural Resources (MDNR) have been replaced by Michigan Department of Environmental Quality (MDEQ) to reflect the reorganization of the State agency.

1. Commentors

Gloria Rossi

State Rep. Karen Willard

Comment #1: **Not all concerned citizens were informed in a timely manner about the public comment period. An extension of the public comment period, and an additional public meeting, was requested.**

Response #1: Typically, a comment period extension lasts only an additional 30 days. However at the request of Representative Willard, the public comment period was extended for 60 additional days. The second public meeting was held April 23, 1996, six days prior to the close of the extended comment period.

2. Commentors

Citizens United
Elizabeth & David Weisler
U.S. Rep. Dale E. Kildee
Kevin Strasser
Ward Hodge
Robert Kahle
Elizabeth Friedberg
Gary Bireta
Paul Pellerito

Comment #2: **What has changed since 1986 that no longer makes these soils a principle threat (source soil)? Why is the U.S. EPA deviating from the 1986 ROD remedy? Why is the U.S. EPA placing our community at unnecessary risk by proposing that these soils be contained on-site**

rather than being incinerated off-site as specified in the 1986 ROD?

Response #2: The 1986 ROD recognized that as additional remedial investigation (RI) information was generated, a re-evaluation of the final remedial action for the Site might be necessary. The 1986 ROD states "This Record of Decision (ROD) recommends the selection of the excavation of areas one and four with off-site thermal destruction. However, the possibility exists that at the time of implementation of the selected alternative, the cost of waste disposal will change the recommended (cost effective) alternative. If such a situation arises, this ROD may be amended." Further evaluation of Drum Area 1 soils and Soil Staging Area soils both met this condition, leading to the proposed ROD Amendment.

The following information summarizes the history and current status of the Drum Area 1 soils and the Soil Staging Area soils:

Drum Area 1 Soils-

The ROD was written with the expectation that the soils co-mingled with the drums would require incineration. Because only limited data was collected for soils prior to the 1986 ROD, the remedy selected for these soils was a conservative one - it was assumed that these soils would be highly saturated with hazardous chemicals. The 1986 ROD states "Some material between the drums [interstitial soil] may be highly saturated with hazardous chemicals from leaking drums. For the purpose of the Phased Feasibility Study (PFS) this interstitial material was considered to be waste, rather than soil. This waste material would be disposed of along with the drummed material." In addition, it was assumed for purposes of the 1986 ROD that this "highly saturated" soil was a potential source of groundwater contamination, thereby characterizing it as "source soil." Incineration was an appropriate remedy for soils of this nature at that time.

In 1994, contaminated soil remaining in Drum Area 1 was tested to determine if mobile non-aqueous phase liquids (MNAPL) were present, one requirement of "source soil." No MNAPL were present. In addition, further chemical testing of this interstitial soil showed that this soil did not meet the general criteria for "source soil." Specifically the results, which can be found in the Soil Characterization Report issued in 1995, indicated that these soils did not contain PCB's above 500 ppm or have a halogenated organic content (HOC) above 1000 ppm. These are conditions which, if exceeded, frequently lead to an incineration remedy. Furthermore, only a few chemicals were present in these soils above concentrations MDEQ has established for soil clean-up goals for the protection of groundwater. These results indicated that the soils needed to

be remediated, but they were not contaminated to the extent that they must be incinerated. A comparison of the alternate remedies studied, using the nine point criteria, resulted in the proposed ROD Amendment.

Soil Staging Area soils-

The Soil Staging Area soils are a separate issue. These soils were accumulated during the drum removal activities and stored on a bermed, lined pad, with the expectation that these soils were more contaminated than the bulk of Drum Area 1 soils. They did not contain MNAPL. These soils were also subjected to the same chemical characterization as Drum Area 1 soils. The analytical results, available for review in the Soil Characterization Report of 1995, also indicated that these soils did not need to be incinerated, but did contain PCB content above 50 ppm. As the Soil Staging Area contains PCBs greater than 50 ppm, the TSCA waiver provisions under 40 CFR 761.75(c)(4) will be exercised. OSWER Directive No. 9355.4-01 Guidance on Remedial Action for Superfund Sites with PCB Contamination at 2.2.5, states "Where Superfund remedial actions will leave PCB's in place or where PCB-contaminated material is excavated, treated, and re-disposed at concentrations that still pose a threat, capping consistent with chemical waste landfill requirements is generally appropriate. (Long-term management controls for PCB-contaminated material generally will also parallel RCRA closure.) However some of the requirements specified under TSCA may not always be appropriate for existing waste disposal sites like those addressed by Superfund. When this is the case, it may be appropriate to waive certain requirements, such as liners, under the TSCA waiver provisions, 761.75(c)(4). Requirements may be waived when it can be demonstrated that operation of the landfill will not present an unreasonable risk of injury to health or the environment. This demonstration may require column studies verifying that PCB movement through the soil will not adversely affect groundwater." Long term monitoring of the groundwater will meet the substantative requirements of the column studies. Deed restrictions, pursuant to the terms of the Consent Decree will be placed on the landfill, and will eliminate possible incidental skin contact and ingestion. The substantive requirements of the 1990 OU2 ROD SOW cap design will meet RCRA cap closure requirements. Relocating and capping roughly 900 cubic yards of marginally contaminated PCB soils (less than 100 ppm PCBs) from the Soil Storage Area is consistent with TSCA waiver provisions.. Because the Soil Pile Soils contained PCBs above 50 ppm this soil will be relocated to an area separate from the Drum Area 1 soils, in the unlikely event that a PCB breakthrough to groundwater should occur. Because of the relatively similar chemical make-up between the The Drum Area 1 Soils and the Soil Staging Area soils (adjusting for the PCB content

discussed above) they were considered as one source for purposes of remedy evaluation.

Remedies Evaluation-

As specified in the Statement of Work (SOW) attached to the 1991 Consent Decree between the U.S. EPA and the Settling Defendants, remedial alternatives for the contaminated soil in Drum Area 1 and the Soil Staging Area were evaluated in the Drum Area 1 Soil Remedial Alternatives Report. This evaluation was conducted specifically to examine remedial alternatives for contaminated soil and was based on detailed chemical characterization data collected from samples of the soil remaining in Drum Area 1 and the Soil Staging Area. The following remedial alternatives were evaluated: 1) biotreatment; 2) capping; 3) soil vapor extraction; 4) soil flushing; 5) solidification. Biotreatment, soil flushing and solidification were determined to be inappropriate technologies for the contaminated soil. Capping and soil vapor extraction were evaluated in detail in the Drum Area 1 Soil Remedial Alternatives Report. Capping was determined to be the preferred remedial alternative based on the evaluation of the nine point criteria. (See the ROD Amendment Fact Sheet for a summary of this evaluation, or the Drum Area 1 Soil Remedial Alternatives Report for a more thorough discussion). Capping is protective of human health and the environment, is easily integrated into the 1990 ROD remedy (which deals with groundwater treatment and the landfill cap), and is cost effective. Copies of the Drum Area 1 Soil Remedial Alternatives Report are available for review in the information repositories located in the Metamora and Lapeer branches of the County Library. In addition, copies of this report and the detailed chemical characterization data were provided to the Technical Assistance Grant (TAG) consultant, Dr. Stuart Batterman. Dr. Batterman also provided comments that are supportive of the proposed remedy.

3. Commentors

Norm Hughes
Richard Pullicin
Norm & Karen Camanagno
Elizabeth & David Weisler
Mr.& Mrs. Robert Kahle
U. S. Rep. Dale E. Kildee
Paul Pellerito

Comment #3: **If soils (Drum Area 1 soils, and drums, and Soil Staging Area soils) are to be relocated to the south face of the landfill as part of the remedy, place a RCRA liner beneath the soils prior to capping.**

Response #3 All drums have been removed from Drum Areas 1 and 4.

A RCRA liner is not proposed for a number of reasons. The soil in Drum Area 1 and the Soil Staging Area exceed the proposed clean-up criteria, therefore these soils require remediation. Relocating them to the south face of the landfill and covering them with the landfill cap, is in agreement with past remedial practice at CERCLA Municipal Landfill sites, and is the proposed ROD Amendment.

In addition, the combined volume of these soils is small compared to the volume in the landfill, and does not appreciably add to the risk of the landfill proper. Building a landfill cell to contain this relatively small volume of soil, complete with liner, leachate collection and independent monitoring systems, offers only marginal additional protection, if any, over the remedy as proposed, which includes a cap over the entire landfill and relocated soils.

Furthermore the landfill cap will limit water infiltration into the fill, and effectively eliminate the migration of chemicals to groundwater.

Also, United States District Judge Stuart A. Newblat wrote in his findings of March 17, 1993, in United States of America v. BASF-Inmont et.al., in upholding the decision to limit drum excavation to Drum Area 1 and Drum Area 4, that "U.S. EPA made this decision, based on the recommendation of the consulting firm that performed the Remedial Investigation/Feasibility Study (RI/FS), that it would be more dangerous to perform excavation of the other areas [2,3 and 5] than to cap the landfill, <u>while leaving open the possibility of additional clean-up activities if leakage to the environment occurs."</u> (emphasis added).

It should also be noted that the Resource Conservation and Recovery Act (RCRA) regulations were put into effect after the landfill stopped accepting waste, therefore RCRA is not an applicable requirement (ARAR) at the Site. For the reasons stated above, the liner is not relative and appropriate for this site. All regulatory requirements pertinent to the relocation of the soils at the Metamora Site are being observed.

Additionally since waste is, and will be left on the Site, and in accordance with Section 121 of CERCLA, a statutory Five-Year Review was completed in August, 1993. Subsequent Five-Year Reviews will be conducted as warranted pursuant to OSWER (Office of Solid Waste and Emergency Response) Directive 9355.7-02 ("Structure and Components of Five-Year Reviews") and/or other applicable requirements and guidance. The next statutory Five-Year Review will be conducted prior to September, 1998.

Finally, in addition to the Five-Year Review requirement, it should be noted that the groundwater at the Site and downgradient of the landfill will be monitored at least annually for many years. (The details of the long range monitoring program will be part of the groundwater remediation plan).

4. Commentors

Cynthia Bader
Norm Hughes
Robert Kahle
Norm & Karen Camamagno

Comment #4: **The drinking water aquifer will become contaminated from the chemicals in the soils if these soils are left on Site.**

Response # 4: Limited contamination of the groundwater on the Site and north of the landfill has been found, but is moving north toward the residential wells more slowly than the groundwater modeling predicted. There is preliminary evidence that biochemical natural attenuation is occurring in the groundwater at the Site, evidence of nature healing itself. Other chemical processes (hydrolysis) and physical chemical processes (retardation) may also be occurring in the groundwater that could account for the unexpected slow contaminant movement. No contamination above background has been found in any residential drinking water wells north of the Site. Additional groundwater studies north of the landfill are planned this year, to establish the baseline for the long range Operation and Maintance (O&M) plan. However if contamination is observed above health-based standards during these studies, or at any time during the long range O&M monitoring period (this typically consists of annual sampling for thirty years), the groundwater contamination will be addressed.

The groundwater immediately down gradient of Drum Area 1 is contaminated and will be remediated by a "pump-and-treat" system, as specified in the 1990 ROD. This 1990 ROD[1] addresses remediation of the landfill and contaminated groundwater.

5. Commentors

Stuart Batterman

Comment #5: **There is support for the proposed ROD Amendment.**

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[1] There are two operable units for this Site. The 1986 ROD and the proposed ROD Amendment deal with a Operable Unit 1 (OU 1), the remediation of drums and soils from Drum Areas 1 and 4. The 1990 ROD deals with OU2, treatment of groundwater and construction of a cap over all landfilled material.

Response #5: U.S. EPA appreciates this support.

6. Commentors

Richard Espenshade	Citizens United
Robert Kahle	Norm Hughes
Gary Bireta	

Comment #6: **Take the soils off-site for disposal.**

Response #6: The cost to remove the contaminated soil to an off-site landfill is estimated to be $5 million. This option did not pass the initial screening evaluation, and does not meet the cost effectiveness criteria when compared to the capping option. As discussed in the responses provided above, detailed analytical data shows that the soil is not "source soil." Consolidation of the contaminated soil under the landfill cap is consistent with U.S. EPA guidance and past practice and meets the nine point criteria. Capping the contaminated soil is protective of human health and the environment.

7. Commentors

Norm & Karen Camamagno	Cynthia Bader
Peter Stansen II	Citizens United

Comment #7: **The commentors are opposed to the concept of incorporating General Motors Saginaw Metal Casting Operations (GM) foundry sand into the landfill cap.**

Response #7: The Settling Defendants, with oversight by U.S. EPA and MDEQ, are considering the use of foundry sand from the GM Saginaw operations in the construction of the landfill cap. GM Saginaw facility uses sand molds to cast engine blocks. The material used in the mold operation is a blend of fine beach sand, finely ground coal and clay. No additional organic chemicals are added. During the process of manufacturing the molds, part of the sand blend becomes air-born. This sand is captured in a negative pressure duct system, removed from the air stream while passing through a hydro-clone scrubber, and the washed solids conveyed to a storage area. This recovered material is identified as "Washed Classified Sand," and is not suitable for recycling at the plant.

Reuse of foundry sand is regulated by the MDEQ under R299.4112, Rule 112(2)(b) and R299.4114, Rule 114(2)(g) of Michigan Act 451, Part 115. This rule requires that the foundry sand meet "Type B" criteria before it can be reused. Type B criteria were established by the MDEQ to be protective for residential use. GM tests the foundry sand frequently. The data base covers the time period 1983 through 1996. It meets the Type B

criteria and MDEQ has approved the foundry sand for use at the Metamora Landfill Site. In addition, shipments to the Metamora Landfill Site would be sampled weekly to ensure Type B standards are continuously met.

The suggestion made at the April 23 public meeting that this foundry sand contains PCB material is without foundation. The "Zilwaukee incident," mentioned during the April public meeting, referred to the use of foundry sand that had become contaminated with PCBs while being temporarily stored at a PCB contaminated location, off the GM Saginaw property.

Dr. Stuart Batterman, the community Technical Assistance Grant (TAG) technical consultant, is aware of the possibility of using this material in the cap construction. He has not expressed a technical concern about its use. This "Washed Classified Sand" material is available for inspection at the Saginaw facility.

Recovered foundry sand from the Saginaw facility is currently being used at six landfill sites in Michigan and is being considered for use at additional sites. The decision as to whether "Washed Classified Sand" will be used at Metamora will be made in the near future and will be incorporated into the Remedial Design/Remedial Action documents for the Site as the documents are developed.

8. Commentors

Citizens United
U.S. Rep. Dale E. Kildee
Norm Hughes

Comment #8: **Additional studies need to be conducted to realistically characterize the Site.**

Response #8: The Metamora Landfill Site has been investigated since the mid 1980s. A significant amount of data regarding groundwater quality, soil quality and content of the drummed waste has been collected. For example, 50 monitoring wells have been installed and 9 rounds of groundwater sampling have been conducted (approximately 230 samples). The soil has been characterized through drilling of soil borings, digging test trenches (approximately 65 total) and collection of approximately 250 soil samples. The results of these site characterization efforts are documented in the following reports (available in the information repositories):

- Site Investigation Final Report, E.C. Jordan, February 1986
- Remedial Investigation Report, E.C. Jordan, March 1989
- Baseline Groundwater Monitoring Report, CRA, February 1994
- Soil Characterization Report, CRA, April 1995

- Pre-Design Hydrogeologic Investigation Report, CRA, August 1995
- Bi-Annual Groundwater Monitoring Report, CRA, December 1995

While the Remedial Investigation Report identified data gaps concerning groundwater contamination, those data gaps have been filled by subsequent investigations. Additionally, more groundwater quality information will be obtained during the O&M baseline groundwater studies to be conducted later this year. The amount of information available concerning the Metamora Landfill Site is consistent with that available for other Superfund sites and is sufficient for remedy selection and design purposes.

It has been stated during the public meetings that "hundreds of thousands" of drums still remain in the landfill. In consideration of this concern, the RI was reviewed for the expressed purpose of establishing if this concern had been overlooked. The following comments summarize this review.

In 1982 the MDEQ conducted a magnetometer survey in five locations at the Site where drums were alleged to have been disposed. The presence of drums was confirmed by visual evidence in Drum Areas 1 and 4. The magnetometer results showed that Drum Areas 1 and 4 likely contained the highest number of drums and that the drums were present at shallow depths. Drums were not confirmed by visual evidence in the other areas. The magnetometer results indicated that drums may be present in these areas, but that the drums were present at depths of greater than 30 feet and were covered by tires and refuse. In addition, areas 2, 3 and 5 had magnetic interference which may have been in part caused by white goods, steel belted tires and refuse, making positive identification of drums impossible.

The magnometer data presented by E.C. Jordan in the Phased Feasibility Study was reviewed by the Region 5 Technical Assistance Group. They did not find fault with the results presented in the report. They further indicated that there have been no major advancements in equipment or techniques since 1986, and an effective method to "see" into a highly chaotic landfill environment is not available.

The 1986 ROD did not consider that the evidence of the presence of drums in areas 2, 3 and 5 (no visual confirmation), combined with the significant depth of the potential drums, warranted excavation of these areas. United States District Judge Stuart A. Newblat wrote in his findings of March 17, 1993, in United States of America v. BASF-Inmont et.al., that "U.S. EPA made this decision, based on the recommendation of the consulting firm

that performed the RI/FS, that it would be more dangerous to perform excavation of the other areas [2, 3 and 5] than to cap the landfill, while leaving open the possibility of additional clean-up activities if leakage to the environment occurs." The groundwater quality data supports this conclusion. Significant contamination to groundwater quality has not occurred at this Site.

Finally, the photographic evidence available for the Site, obtained from the Aerial Photographic Analysis of Eight Priority CERCLA Hazardous Waste Sites in Southeast Michigan, does not indicate any evidence of massive drum disposal in any of the areas of concern. The pictures were taken during flyovers of the Site on July 26, 1964; June 17, 1972; August 17, 1978; August 18, 1982; June 12, 1984 (two views). The 1978 photograph indicates a fairly large area in the northeast corner of the landfill, identified as a "sludge pit" which may in actuality be the "tire pit," and may have been the fuel source for one of the large fires experienced at the Site. The pit was not evident in the 1982 photograph.

9. Commentors

Richard Pullicin
Elizabeth Friedberg
Stuart Batterman
Peter Stazen II
Robert Kahle

Comment #9: **Use local sources for fill materials, in place of G.M. foundry sand. The increased truck traffic caused by importing G.M. foundry sand will impede the construction of the local sewer system and interfere with the resurfacing of M24. It will also compromise the safety of our children.**

Response #9: All material used in the construction of the landfill cap will pass through the Village of Metamora. The only exception would be if John R Sand & Gravel material were used, which would eliminate some of the truck traffic through the village. The Defendants have expended considerable effort attempting to negotiate purchase of the fill material from John R Sand & Gravel. These negotiations have failed. As such, the fill material must be obtained from an off-site source; truck traffic on local roads is unavoidable. This is the situation whether the fill comes from local sources or from Saginaw. The Defendants have met with the township trustees and the county road commissioner to discuss the issue of truck traffic with the hope of establishing alternate routes in and out of the landfill. It does not appear that an alternate to Dryden Road, through the Village of Metamora, is available at this time.

The proposed schedule for shipment of foundry sand to the Metamora

Landfill Site is based on approximately 1500 cubic yards per day. Assuming a five-day work week, approximately six months would be required to complete delivery of the sand to the Site. Local roads would have approximately five additional trucks per hour as a result of delivery of the material. Material shipped from a local source may result in more frequent truck traffic for a shorter period of time.

In an effort to minimize disruption to other local activities, including resurfacing of M24, local traffic, and construction of the local sewer system, the Defendants will be flexible concerning the shipping schedule, and will coordinate transportation issues with local officials.

On a positive note, one approved cap design modification will result in more than 2000 fewer truck trips through the Village. The landfill cap will use a geosynthetic clay layer (GCL) as an alternate to part of the clay layer identified in the initial remedial design.

10. Commentors

Gary Bireta Citizens United

Comment #10: **There is no community acceptance for this proposed ROD Amendment.**

Response #10: The National Contingency Plan (NCP) at 300.430(f)(1)(i)(A) requires that all remedies meet the threshold criteria of protection of human health and the environment and compliance with ARARs. The NCP uses the criteria of overall protection, short term effectiveness, long term effectiveness, reduction of toxicity, mobility or volume, implementability, and cost as balancing criteria. The balancing criteria are given equal weight in the evaluation. The proposed remedy offers the best balance of these criteria.

The NCP uses the criteria of State acceptance and community acceptance as modifying criteria. The State of Michigan has accepted the proposed remedy. The community has offered comments on the remedy that are both pro and con. The TAG technical consultant supports the proposed remedy. Others have provided comments that are not supportive of the remedy and these comments are addressed and evaluated in this Responsiveness Summary. U.S. EPA has considered all public comments submitted, but has not been made aware of any compelling technical considerations that would warrant a change to the proposed ROD Amendment.

11. Commentors

Gloria Ross Gary Bireta

Comment #11: **The contents of the landfill should be removed, and replaced with clean material.**

Response #11: As noted in responses #2 and #6, various alternatives were evaluated against the nine criteria. In addressing the Drum Area 1soils and Soil Staging Area soils, relocation and capping were determined to best fit the nine criteria, and are protective of human health and the environment. In addition, there were no comments supporting removal of the landfill contents during the public comment period for the 1990 ROD, the appropriate time to have documented this concern. Eighteen commentors presented this position during the public comment period for the 1991 Consent Decree. The full response to the public comments for the 1991 Consent Decree can be found in the Metamora Consent Decree Reply to Comments, dated March 13, 1992. A few of the response highlights are reproduced here:

"The landfill remedy selected for the Site is consistent with remedies at similar sites across the state and throughout the country."

"Metamora is not unique in its landfill volume and contents. Old landfills that operated before the institution of more rigorous or comprehensive environmental regulations not only accumulated hazardous material but also an extremely large amount of municipal waste."

"It is not practical or prudent to excavate a landfill the size of Metamora. Not only does the volume of waste cause difficulties in excavation, but the build-up of menthane gas within a landfill of this age and size would pose an unacceptable risk if the landfill were to be excavated. Methane is highly ignitible, and in large quantities could cause an explosion releasing hazardous substances into the air."

"However, due to the large amount of landfill wastes and the high cost (approximately $200 million) of excavation of the landfill, U.S. EPA guidance ("Conducting Remedial Investigation/Feasibility studies for CERCLA Municipal Landfill Sites," February 1991, EPA /540/P-91, Section 4.2.3-4.2.3.1) states that removal of contaminated soils at municipal landfill sites is generally limited to hot spots (such as drum disposal areas 1 and 4 at Metamora) or, where practicable, to landfills with low to moderate volume of waste (e.g., less than 100,000 cubic yards). There is an estimated 700,000 cubic yards to 1.5 million cubic yards of waste at Metamora. U.S. EPA, in selecting the remedy for this Site, did address the hot spots at the Site by excavating and incinerating Drum areas 1 and 4, estimated to contain 74% of all drummed material."

"It should also be remembered that capping of the landfill was selected by the U.S. EPA as the appropriate remedial action by the 1990 ROD. Prior to the selection of this remedial option, U.S. EPA provided the statutorily mandated public comment period on the proposed remedy. U.S. EPA received very few citizen comments on this remedy, and none suggested that the landfill should be completely excavated."

Commentors

Stuart Batterman

Comment #12: **U.S. EPA should provide more regular communication to the community regarding Site progress and scheduling. The Site information repositories, particular the one at Metamora Library, need attention.**

Response #12: U.S. EPA has plans to provide more regular communication with the community including providing update letters and fact sheets on construction progress. U.S. EPA personnel have visited the Site information repositories and provided updates. The effort to improve the organization of materials at the information repository at the Metamora library is limited by shelf space. Room to peruse repository material will continue to be extremely limited until the new library is built in Metamora. Repository users are asked to contact the U.S. EPA Community Involvement Coordinator, Bri Bill, when materials are found to be in disarray or missing. The toll-free number is 1-800-621-8431.

Commentors

Gary Bireta	Citizens United
Norm Hughes	Cynthia Bader
U.S. Rep. Dale E. Kildee	

Comment #13: **Several commentors noted leachate seeps are present at the Site.**

Response #13: Leachate seeps are present at the Site; however, these seeps tend to be ephemeral, lasting only a short time. Seeps are caused by infiltration of water into the landfill. Reducing or eliminating the infiltration of water into the landfill will eliminate the seeps. Because capping will greatly limit the amount of water infiltrating into the landfill, capping the landfill is the appropriate remedy for the seeps. The following table shows the infiltration of water through the various capping options:

Landfill "as-is"	8 inches per year
SOW Cap	1.63 inches per year
GCL/Clay composite cap	1.37 inches per year (selected design)

These numbers translate to 4,900,000 gallons per year infiltration for the "as-is" case; 993,000 gallons per year for the cap specified in the SOW; and 835,300 gallons per year for the geosynthetic clay layer (GCL/Clay) composite cap. (All based on a 25 acre landfill).

The presence of the seeps supports the position that the remedy should be implemented as soon as possible.

14. Commentors

Citizens United Ann Deuteron

Comment #14: **Include the residents in the decision making process.**

Response #14: The residents and other members of the public have had the opportunity to participate in the decision making activities at the Metamora Site through two avenues. Serving as a member of the TAG committee is one avenue. The second avenue is through attendance at public meetings, and submission of comments. All comments are considered, compared to the tenets of the Superfund program, and are responded to in the Responsiveness Summary.

15. Commentors

James Phillips Norm Hughes

Comment #15: **The cap will infringe on the abbutors property.**

Response #15: Negotiations are underway with the affected property owners for purchase of the land required for the cap construction. A suggestion to relocate some of the landfill to avoid intrusion upon private property was investigated. The preliminary study indicated that 250,000 cubic yards to 370,000 cubic yards would have to be moved to accomplish this. Relocating this amount of material would create a serious health problem during the six to eight month period required for this effort. Furthermore, movement of this quantity of the landfill is contrary to U.S. EPA policy for CERCLA Landfill Sites (U.S. EPA guidance "Conducting Remedial Investigation/Feasibility studies for CERCLA Municipal Landfill Sites," February 1991, EPA /540/P-91, Section 4.2.3-4.2.3.1). The guidance calls for removal of drums and/or heavily contaminated soils, that serve as "source" material for contaminating groundwater, and the construction of a site specific landfill cap. This is the remedial action being pursued at the Metamora Site.

16. Commentors

Norm Hughes Citizens United

Comment #16: **Faulty cost estimates were used in the decision making process.**

Response #16: The cost estimates need only to be within a +50%, -30% range of the "true" cost, to be suitable for ranking the remedial alternates. U.S. EPA is confident that the estimates used to rank the alternates for this proposed ROD Amendment are within this range. The proposed remedy was subjected to detailed analysis and comparison against all of the NCP evaluation criteria. The proposed remedy is protective of human health and the environment and is cost effective. The proposed ROD Amendment is commensurate with the low levels of contaminants found in Drum Area 1 and the Soil Staging Area.

17. Commentors

Robert Kahle

Comment #17: **Cap only the soils. Leave the landfill uncapped for possible future removal of contaminants.**

Response #17: The proposed ROD Amendment deals only with the Drum Area 1 soils and the soils located in the Soil Staging Area (as part of Operable Unit 1). Capping of the landfill (as part of Operable Unit 2) is not addressed in this proposed ROD Amendment, but addressed instead in the 1990 ROD.

Capping of the landfill was selected by the U.S. EPA as the appropriate remedial action as published in the 1990 ROD. Prior to the selection of this remedial option, U.S. EPA provided the statutorily mandated public comment period on the proposed remedy. U.S. EPA received very few citizen comments during the 1990 ROD public comment period, and none suggested that the landfill should not be capped.

18. Commentors

James Phillips

Comment #18: **More cap details should be supplied, especially the vent pipes.**

Response #18: To the extent possible the cap design was presented during the April 23, 1996, public meeting. The actual design details will be part of the 95% design document. To date only the 30% design is available, and although it addresses the cap vents, the details are not yet available. All design concepts and calculations will be reviewed, stamped, and signed by a Registered Professional Engineer in the State of Michigan. A copy of the 95% Design Report will be placed in the site information repositories for review. The TAG technical representative will review these documents and comments, if any, will be evaluated. Appropriate changes will be made

as required.

19. Commentors

Elizabeth Friedberg James Phillips

Comment #19: **The TAG committee should design the cap.**

Response #19: The TAG program was established in 1986 to assist affected communities to understand and comment on site-related information. The technical advisor hired by the TAG committee may review site-related documents, meet with the community to explain technical information, provide assistance in communicating the community's concerns, interpret technical information, and participate in site visits, when possible, to better understand clean-up activities. It is not within the scope of the TAG committee's responsibility or authority to design the cap. In the case at Metamora, it is the responsibility of the Defendants to design a cap that meets the regulatory requirements. These regulatory requirements are included in the Consent Decree between the U.S. EPA and the Settling Defendants, as the Statement of Work (SOW). The design format being followed at the Metamora Site is consistent with the Superfund program.

TABLE 1

PART 201 OF THE NATURAL RESOURCES AND ENVIRONMENTAL PROTECTION ACT, 1994

PA 451

GENERIC RESIDENTIAL CLEANUP CRITERIA FOR GROUNDWATER AND SOIL

(Revision 4)

sidential criteria were calculated using currently available toxicological data. These criteria may change as new toxicity data become ailable. They are not necessarily final cleanup standards. Please read the attached introduction for details. Carcinogenic chemicals shown in bold italics. All values are expressed in units of parts per billion (ppb); ug/l in water and ug/kg in soil. Scientific notation is presented by E+ or E- a value, for example 2 x 10^6 is reported as 2E+6. Please refer to Operational Memorandum #6 for additional ormation concerning analytical methods and method detection limits.

	GROUNDWATER (ppb:ug/l)				SOIL (ppb:ug/kg)			
hemical	Health-Based Drinking Water Value	Aesthetic Drinking Water Value	GSI Value	Target Method Detection Limit in Water	20X Drinking Water Value	20X GSI Value	Direct Contact Value	Target Method Detection Limit in Soil
cenaphthene	1,300	NA	3.8	5	26,000	76	7.6E+7	330
cenaphthylene	26	NA	(B)	5	520	(B)	1.5E+6	330
cetaldehyde	950	NA	(B)	500	19,000	(B)	1.4E+7	2,500
cetic acid	4,200	NA	(B)	18,000	84,000	(B)	6.3E+7	9.0E+5
cetone	730	NA	25,000	100	15,000	5.0E+5	1.1E+7	100
cetonitrile	140	NA	810	50	2,800	16,000	2.1E+6	100
crolein	120	NA	2.5	5	2,400	50	1.8E+6	10
[illegible]ide	0.19	NA	9.1	0.5	3.8	180	2,200	5
crylic acid	3,900	NA	(B)	NA	78,000	(B)	5.8E+7	NA
crylonitrile	1.6	NA	2.2	1	32	44	4,700	10
Alachlor	2 (C)	NA	48	1	40	960	1.2E+5	20
Aldicarb	3 (C)	NA	(B)	2	60	(B)	4.2E+5	50
Aldicarb sulfoxide	4 (C)	NA	(B)	2	80	(B)	5.5E+5	50
Aldicarb sulfone	2 (C)	NA	(B)	2	40	(B)	4.6E+5	50
Aldrin	0.05	NA	0.0014	0.01	(E)	(E)	580	20
Aluminum	ID	50 (A,F)	(B)	100	1,000	(B)	ID	700
Ammonia	ID (P)	NA	20 (D)	50	ID (P)	400	ID (P)	1,000
Aniline	150	NA	4	20	3,000	80	1.7E+6	1,700
Anthracene	7,300	NA	1.1E+5	5	1.5E+5	2.2E+6	4.2E+8	330
Antimony	6 (A,C)	NA	50 (A)	5	120 (A)	1,000	1.5E+5	500
Arsenic	50 (A,C)	NA	11 (A)	5	1,000 (A)	220 (A)	5,500 (A)	100
Atrazine	3 (C)	NA	7.8	1	60	160	45,000	50
Azobenzene	7.7	NA	(B)	NA	150	(B)	90,000	NA
Barium	2,000 (A,C)	NA	630 (A,D)	200	40,000 (A)	13,000 (A)	3.0E+7	1,000
Benzene	5 (C)	NA	53	5	100	1,100	88,000	10
Benzidine	0.0037	NA	0.0054	50	0.074	0.11	43	1,000
Benzo(a)anthracene (Q)	1.2	NA	0.31	5	(E)	(E)	14,000	330
[illegible]zo(b)fluoranthene (Q)	1.2	NA	0.31	5	(E)	(E)	14,000	330
[illegible]zo(k)fluoranthene (Q)	12	NA	0.31	5	(E)	(E)	1.4E+5	330
Benzo(g,h,i)perylene	26	NA	(B)	5	(E)	(E)	1.5E+6	330

	GROUNDWATER (ppb:ug/l)				SOIL (ppb:ug/kg)			
emical	Health-Based Drinking Water Value	Aesthetic Drinking Water Value	GSI Value	Target Method Detection Limit in Water	20X Drinking Water Value	20X GSI Value	Direct Contact Value	Target Method Detection Limit in Soil
rate (P)	10,000 (C,P)	NA	(B)	100	2.0E+5 (P)	(B)	ID	NA
rite (P)	1,000 (C,P)	NA	(B)	100	20,000 (P)	(B)	ID	NA
robenzene	3.4	NA	1,900	5	68	38,000	51,000	330
itrophenol	20	NA	(B)	5	400	(B)	1.2E+6	330
itroso-di-n-propylamine	0.12	NA	(B)	5	2.4	(B)	370	330
Nitrosodiphenylamine	170	NA	160	5	3,400	3,200	5.2E+5	330
amyl	200 (C)	NA	(B)	NA	4,000	(B)	1.6E+7	NA
o-hexyl acetate	73	NA	(B)	NA	1,500	(B)	1.1E+6	NA
ndimethalin	880	NA	0.62	0.1	18,000	12	5.1E+7	20
ntachlorobenzene	6.1	NA	(B)	2	120	(B)	3.5E+5	50
ntachloronitrobenzene	55	NA	(B)	2	1,100	(B)	3.2E+6	50
ntachlorophenol	1 (C)	NA	0.8 (D)	20	20	16	82,000	3,400
ntane	ID	NA	(B)	100	ID	(B)	ID	1,000
Pentane	ID	NA	(B)	NA	ID	(B)	ID	NA
enanthrene	26	NA	(B)	5	520	(B)	1.5E+6	330
enol	4,400	NA	1,100	5	88,000	22,000	6.6E+7	330
cloram	500 (C)	NA	(B)	10	10,000	(B)	3.0E+7	100
peridine	3.2	NA	(B)	NA	64	(B)	48,000	NA
olybrominated biphenyls (J)	0.096	NA	(B)	NA	(E)	(E)	1,100	NA
olychlorinated biphenyls (PCBs) (J,T)	0.5 (C)	NA	2.0E-5	0.2	(E)	(E)	2,300	330
romacil	160	NA	(B)	0.5	3,200	(B)	9.3E+6	20
ropachlor	95	NA	(B)	1	1,900	(B)	5.5E+6	20
ropazine	200	NA	(B)	0.5	4,000	(B)	1.1E+7	20
ropionic acid	12,000	NA	(B)	100	2.4E+5	(B)	1.9E+8	6,700
ropyl alcohol	1,400	NA	15,000	NA	28,000	3.0E+5	2.1E+7	NA
ropylene glycol	1.5E+5	NA	1.9E+5	5,000	3.0E+6	3.8E+6	1.0E+9 (G)	5,000
yrene	550	NA	11,000	5	11,000	2.2E+5	3.2E+7	330
yridine	7.3	NA	20	20	150	400	1.1E+5	330
elenium	50 (A,C)	NA	5 (A)	5	1,000 (A)	100 (A)	2.1E+6	500
ilver	34 (A)	100	0.1 (A)	0.5	680 (A)	2 (A)	2.0E+6	500
imazine	4 (C)	NA	3.4	10	80	68	2.2E+6	40
odium	1.8E+5	NA	(B)	NA	3.2E+6	(B)	1.0E+9 (G)	NA
tyrene	100 (C)	NA	19	1	2,000	380	85,000	10
ulfate	ID	2.5E+5	(B)	NA	5.0E+6	(B)	ID	NA
ebuthiuron	510	NA	(B)	NA	10,000	(B)	3.0E+7	NA
2,3,7,8-Tetrabromodibenzo-p-dioxin (O)	(O)	NA	(O)	0.0001	(E)	(E)	(O)	0.01
1,2,4,5-Tetrachlorobenzene	2,500	NA	0.4	0.1	50,000	8	1.4E+8	20
2,3,7,8-Tetrachlorodibenzo-p-dioxin (O)	3E-5 (C)	NA	1.4E-8	1.0E-5	(E)	(E)	0.09	0.001
1,1,1,2-Tetrachloroethane	33	NA	(B)	1	660	(B)	99,000	10

	GROUNDWATER (ppb:ug/l)				SOIL (ppb:ug/kg)			
emical	Health-Based Drinking Water Value	Aesthetic Drinking Water Value	GSI Value	Target Method Detection Limit in Water	20X Drinking Water Value	20X GSI Value	Direct Contact Value	Target Method Detection Limit in Soil
rysene (Q)	120	NA	0.31	5	(E)	(E)	1.4E+6	330
alt	37	NA	(B)	10	740	(B)	2.1E+6	500
per	1,400 (A)	1,000	18 (A,D)	25	20,000	360 (A)	1.6E+7	1,000
nazine	1.5	NA	4.7	10	30	94	17,000	500
nide (R)	200 (C)	NA	5.2	20	4,000	100	9.3E+6	500
clohexanone	33,000	NA	(B)	50	6.6E+5	(B)	5.0E+8	100
ethal	73	NA	(B)	1	1,500	(B)	4.2E+6	20
ipon	200 (C)	NA	(B)	10	4,000	(B)	9.3E+6	100
'-DDD	3.5	NA	0.0084	0.02	(E)	(E)	41,000	20
'-DDE	2.5	NA	0.0059	0.02	(E)	(E)	29,000	20
'-DDT	2.5	NA	0.00023	0.02	(E)	(E)	29,000	20
ciabromodiphenyl ether	73	NA	(B)	10	1,500	(B)	4.2E+6	100
-n-butyl phthalate	880	NA	12,000	5	18,000	2.4E+5	5.1E+7	330
(2-ethylhexyl) adipate	400 (C)	NA	(B)	5	8,000	(B)	2.1E+6	330
-n-octyl phthalate	130	NA	(B)	5	2,600	(B)	7.6E+6	330
etone alcohol	ID	NA	(B)	NA	ID	(B)	ID	NA
n	1.3	NA	0.002	0.5	26	0.04	76,000	10
benzo(a,h)anthracene (Q)	0.12	NA	0.31	5	(E)	(E)	1,400	330
benzofuran	ID	NA	(B)	5	ID	(B)	ID	330
bromochloromethane	100 (C,S)	NA	29	1	2,000	580	31,000	10
bromomethane	80	NA	(B)	5	1,600	(B)	4.6E+6	10
2-Dichlorobenzene	600 (C)	NA	7	1	12,000	140	9.4E+6	10
3-Dichlorobenzene	600 (C)	NA	180	1	12,000	3,600	9.4E+6	10
4-Dichlorobenzene	75 (C)	NA	15	1	1,500	300	1.1E+5	10
3'-Dichlorobenzidine	1.9	NA	0.063	20	38	1.3	5,700	2,000
lchlorodifluoromethane	1,700	NA	(B)	1	34,000	(B)	2.5E+7	10
,1-Dichloroethane	880	NA	(B)	1	18,000	(B)	1.3E+7	10
,2-Dichloroethane	5 (C)	NA	560	1	100	11,000	28,000	10
,1-Dichloroethylene	7 (C)	NA	32	1	140	640	1.1E+6	10
is-1,2-Dichloroethylene	70 (C)	NA	(B)	1	1,400	(B)	1.2E+6	10
ans-1,2-Dichloroethylene	100 (C)	NA	300	1	2,000	6,000	1.9E+6	10
,6-Dichloro-4-nitroaniline	2,200	NA	(B)	0.01	44,000	(B)	1.3E+8	0.1
,4-Dichlorophenol	73	NA	34 (D)	5	1,500	680	4.2E+6	330
,4-Dichlorophenoxyacetic acid	70 (C)	NA	47	10	1,400	940	4.2E+6	200
,2-Dichloropropane	5 (C)	NA	64	1	100	1,300	38,000	10
,3-Dichloropropene (J)	4.7	NA	3	1	96	60	14,000	10
rpyrifos	2.9	NA	(B)	0.1	58	(B)	34,000	50
cyclohexyl phthalate	ID	NA	(B)	5	ID	(B)	ID	330
Dieldrin	0.053	NA	3.2E-5	0.02	(E)	(E)	620	20

	GROUNDWATER (ppb:ug/l)				SOIL (ppb:ug/kg)			
hemical	Health-Based Drinking Water Value	Aesthetic Drinking Water Value	GSI Value	Target Method Detection Limit in Water	20X Drinking Water Value	20X GSI Value	Direct Contact Value	Target Method Detection Limit in Soil
ethoxymethane	ID	NA	(B)	10	ID	(B)	ID	100
ethyl ether	3,700	NA	(B)	50	74,000	(B)	5.5E+7	100
ethyl phthalate	5,500	NA	1.2E+5	5	1.1E+5	2.4E+6	3.2E+8	330
ethylene glycol monobutyl ether	88	NA	(B)	NA	1,800	(B)	5.1E+6	NA
iisopropylamine	5.6	NA	(B)	NA	110	(B)	85,000	NA
imethyl phthalate	73,000	NA	2.9E+6	5	1.5E+6	5.8E+7	1E+9 (G)	330
,N-Dimethylacetamide	180	NA	(B)	NA	3,600	(B)	2.7E+6	NA
,N-Dimethylaniline	16	NA	(B)	NA	320	(B)	2.4E+5	NA
imethylformamide	700	NA	3.800	NA	14,000	76.000	1.1E+7	NA
,4-Dimethylphenol	370	NA	31	5	7,400	620	2.1E+7	330
,6-Dimethylphenol	4.4	NA	(B)	5	88	(B)	2.5E+5	330
,4-Dimethylphenol	10	NA	(B)	5	200	(B)	5.9E+5	330
imethylsulfoxide	2.2E+5	NA	(B)	NA	4.4E+6	(B)	1.0E+9 (G)	NA
2,4-Dinitrotoluene	1.3	NA	91	5	26	1,800	15,000	330
inoseb	7 (C)	NA	0.5 (D)	1	140	10	4.2E+5	20
1,4-Dioxane	77	NA	2,000	1	1,500	40,000	2.3E+5	10
Diquat	20 (C)	NA	(B)	1	400	(B)	9.3E+5	NA
Endosulfan (J)	1.7	NA	(B)	0.01	(E)	(E)	97,000	3.3
Endothall	100 (C)	NA	(B)	20	2,000	(B)	7.2E+6	NA
Endrin	2 (C)	NA	0.0023	0.02	(E)	(E)	72,000	20
Epichlorohydrin	86	NA	(B)	5	1,700	(B)	2.6E+5	10
Ethanol	2.0E+6	NA	41,000	1,000	4.0E+7	8.2E+5	1.0E+9 (G)	4,400
Ethyl acetate	6,800	NA	1,000	NA	1.3E+5	20,000	9.9E+7	NA
1-Ethyl-2-methylbenzene	ID	NA	(B)	NA	ID	(B)	ID	NA
Ethylbenzene	700 (C)	74	31	1	1,500	620	1.1E+7	10
Ethylene dibromide	0.05 (C)	NA	1.1	1	1	22	30	10
Ethylene glycol	15,000	NA	68,000	5,000	3.0E+5	1.4E+6	8.4E+8	5,000
Ethylene glycol acetate	ID	NA	(B)	NA	ID	(B)	ID	NA
Ethylene glycol monobutyl ether	95	NA	(B)	NA	1,900	(B)	1.4E+6	NA
Fluoranthene	880	NA	370	5	18,000	7,400	5.1E+7	330
Fluorene	880	NA	14,000	5	18,000	2.8E+5	5.1E+7	330
Fluorine	400 (C)	2,000	1,900	NA	8,000	38,000	2.5E+7	NA
Formaldehyde	1,300	NA	170	100	28,000	3,400	2.0E+7	500
Formic acid	10,000	NA	(B)	18,000	2.0E+5	(B)	1.5E+8	9.0E+5
1-Formylpiperidine	80	NA	(B)	NA	1,600	(B)	1.2E+6	NA
Gentian violet	8.5	NA	(B)	NA	170	(B)	99,000	NA
Glyphosate	700 (C)	NA	(B)	100	14,000	(B)	4.2E+7	NA
Heptachlor	0.4 (C)	NA	0.0016	0.01	(E)	(E)	2,200	20
Heptachlor epoxide	0.2 (C)	NA	0.0011	0.01	(E)	(E)	1,100	20

Chemical	GROUNDWATER (ppb:ug/l)				SOIL (ppb:ug/kg)			
	Health-Based Drinking Water Value	Aesthetic Drinking Water Value	GSI Value	Target Method Detection Limit in Water	20X Drinking Water Value	20X GSI Value	Direct Contact Value	Target Method Detection Limit in Soil
n-Heptane	32,000	NA	4	NA	6.4E+5	80	4.8E+8	NA
Hexabromobenzene	20	NA	(B)	(K)	400	(B)	1.2E+6	(K)
Hexachlorobenzene (C-88)	1 (C)	NA	0.0019	(K)	20	0.038	6,200	(K)
Hexachlorobutadiene (C-46)	11	NA	500	(K)	220	10,000	1.3E+5	(K)
alpha-Hexachlorocyclohexane	0.14	NA	0.13	0.01	2.8	2.6	1,600	20
beta-Hexachlorocyclohexane	0.47	NA	0.46	0.01	9.6	9.2	5,500	20
Hexachlorocyclopentadiene (C-56)	50 (C)	NA	0.54	(K)	1,000	11	3.0E+6	(K)
Hexachloroethane	61	NA	13	2	1,200	260	1.8E+5	50
n-Hexane	3,000	NA	(B)	NA	60,000	(B)	4.5E+7	NA
2-Hexanone	1,000	NA	(B)	50	20,000	(B)	1.5E+7	100
Indeno(1,2,3-cd)pyrene (Q)	1.2	NA	0.31	5	(E)	(E)	14,000	330
Iron	ID	300 (A)	(B)	100	6,000 (A)	(B)	ID	2,000
Isobutyl alcohol	2,300	NA	(B)	1,000	48,000	(B)	3.5E+7	4,400
Isophorone	900	NA	860	5	18,000	17,000	2.7E+6	330
Isopropyl alcohol	470	NA	21,000	400	9,400	4.2E+5	7.0E+6	4,400
[illegible]id	4 (A,L)	NA	6.6 (A,D)	3	80 (A)	130 (A)	4.0E+5	1,000
[illegible]ene	0.2 (C)	NA	0.08	0.01	4	1.6	7,800	20
Magnesium	4.2E+5	NA	(B)	30	8.4E+6	1.0E+9	1.0E+9 (G)	3,000
Manganese	180 (A)	50 (A)	(B)	20	1,000 (A)	(B)	2.0E+6	2,000
Mercury (Inorganic)	2 (A,C)	NA	0.0013 (A)	0.2	40 (A)	0.026 (A)	1.3E+5	100
Methanol	3,700	NA	41,000	1,000	74,000	8.2E+5	5.5E+7	4,400
Methoxychlor	40 (C)	NA	(B)	0.5	80	(B)	2.1E+6	50
2-Methoxyethanol	29	NA	(B)	NA	580	(B)	4.4E+5	NA
2-Methyl-4-chlorophenoxyacetic acid	7.3	NA	(B)	0.5	150	(B)	4.2E+5	100
2-Methyl-4,6-dinitrophenol	2.6	NA	0.59	20	52	12	1.5E+5	1,700
4-Methyl-2-pentanone (MIBK)	370	NA	(B)	50	7,400	(B)	5.5E+6	100
Methyl-tert-butyl ether (MTBE)	240	NA	380	50	4,800	7,600	3.6E+6	100
N-Methyl-morpholine	20	NA	(B)	NA	400	(B)	3.0E+5	NA
Methylcyclopentane	ID	NA	(B)	50	ID	(B)	ID	500
4,4'-Methylene-bis-2-chloroaniline (M)	0.88	NA	(B)	1	(E)	(E)	10,000	50
Methylene chloride	5 (C)	NA	59	5	100	1,200	3.4E+5	10
2-Methylnaphthalene	ID	NA	(B)	5	ID	(B)	ID	330
2-Methylphenol	370	NA	38	5	7,400	760	5.5E+6	330
3-Methylphenol	370	NA	(B)	5	7,400	(B)	2.1E+7	330
4-Methylphenol	37	NA	6.2	5	740	120	2.1E+6	330
Metolachlor	160	NA	150	10	3,200	3,000	1.9E+6	50
[illegible]bdenum	37 (A)	NA	800 (A)	10	740	16,000 (A)	2.1E+6	100
Naphthalene	260	NA	29	5	5,200	580	1.5E+7	330
Nickel	100 (A,C)	NA	57 (A,D)	50	2,000 (A)	1,100 (A)	3.2E+7	1,000

	GROUNDWATER (ppb:ug/l)				SOIL (ppb:ug/kg)			
mical	Health-Based Drinking Water Value	Aesthetic Drinking Water Value	GSI Value	Target Method Detection Limit in Water	20X Drinking Water Value	20X GSI Value	Direct Contact Value	Target Method Detection Limit in Soil
o(a)pyrene (Q)	0.2 (C)	NA	0.31	5	(E)	(E)	1,400	330
ic acid	32,000	NA	(B)	50	6.4E+5	(B)	1E+9 (G)	3,300
yl alcohol	10,000	NA	22	50	2.0E+5	440	1.6E+8	1,300
yl chloride	5	NA	(B)	0.5	100	(B)	15,000	200
ilium	4 (C)	NA	(B)	1	80	(B)	2,300	200
l-chloroethoxy)ethane	ID	NA	(B)	5	ID	(B)	ID	330
l-Chloroethyl)ether	0.77	NA	4.2	5	15	84	2,300	330
l-Ethylhexyl)phthalate	6 (C)	NA	59	5	(E)	(E)	7.0E+5	330
n	440 (A)	NA	(B)	300	8,800 (A)	(B)	2.5E+7	8,000
nobenzene	ID	NA	(B)	1	ID	(B)	ID	10
modichloromethane	100 (C,S)	NA	24	1	2,000 (S)	480	41,000	10
soform	100 (C,S)	NA	65	1	2,000 (S)	1,300	3.2E+5	10
romethane	10	NA	11	1	200	220	1.5E+5	10
utanol	950	NA	(B)	800	19,000	(B)	1.4E+7	4,400
utanone (MEK)	13,000	NA	7,200	50	2.6E+5	1.4E+5	2.0E+8	100
utyl acetate	550	NA	40	10	11,000	800	8.3E+6	20
utyl alcohol	3,900	NA	8,300	1,000	78,000	1.7E+5	5.9E+7	4,400
yl benzyl phthalate	1,200	NA	(B)	5	24,000	(B)	6.8E+7	330
dmium	5 (A,C)	NA	0.84 (A,D)	0.5	100 (A)	13 (A)	2.1E+5	50
mphene	ID	NA	(B)	NA	ID	(B)	ID	NA
prolactam	5,800	NA	(B)	NA	1.2E+5	(B)	3.4E+8	NA
rbaryl	700	NA	(B)	20	14,000	(B)	4.1E+7	1,000
rbofuran	40 (C)	NA	1.6	20	800	32	5.5E+5	200
rbon disulfide (R)	800	NA	(B)	50	16,000	(B)	1.2E+7	100
rbon tetrachloride	5 (C)	NA	21	1	100	420	20,000	10
lordane	2 (C)	NA	0.00053	0.02	(E)	(E)	7,800	10
hloride	ID	2.5E+5	(B)	10,000	5.0E+5	(B)	ID	2.0E+5
hlorobenzene	100 (C)	NA	71	1	2,000	1,400	2.1E+6	10
hloroethane	220	NA	(B)	1	4,400	(B)	6.7E+5	10
-Chloroethyl vinyl ether	ID	NA	(B)	10	ID	(B)	ID	100
hloroform	100 (C,S)	NA	80	1	2,000 (S)	800	4.2E+5	10
hloromethane	66	NA	(B)	1	1,300	(B)	2.0E+5	10
-Chloro-3-methylphenol	150	NA	4.4	5	3,000	88	2.2E+6	330
ta-Chloronaphthalene	1,800	NA	(B)	5	36,000	(B)	2.7E+7	330
-Chlorophenol	45	NA	10	5	900	200	6.8E+5	330
-Chlorotoluene	150	NA	(B)	1	3,000	(B)	2.2E+6	10
hlorpyrifos	22	NA	0.002	0.2	440	0.04	1.3E+6	10
hromium (III) (T)	100 (A,C,J)	NA	77 (A,D)	50	2,000 (A)	1,500 (A)	6.3E+8	2,500
							[illegible]	200

Chemical	GROUNDWATER (ppb:ug/l)				SOIL (ppb:ug/kg)			
	Health-Based Drinking Water Value	Aesthetic Drinking Water Value	GSI Value	Target Method Detection Limit in Water	20X Drinking Water Value	20X GSI Value	Direct Contact Value	Target Method Detection Limit in Soil
1,1,2,2-Tetrachloroethane	4.3	NA	32	1	86	640	13,000	10
Tetrachloroethylene	5 (C)	NA	22	1	100	440	50,000	10
Tetrahydrofuran	240	NA	3,300	1,000	4,800	66,000	3.8E+6	10,000
Thallium	2 (A,C)	NA	5.4 (A)	2	40 (A)	110 (A)	28,000	500
Toluene	1,000 (C)	790	110	1	16,000	2,200	2.4E+7	10
p-Toluidine	4.5	NA	(B)	NA	90	(B)	52,000	NA
Toxaphene	3 (C)	NA	0.0002	1	60	0.004	2,300	170
Triallate	95	NA	(B)	1	1,900	(B)	5.5E+6	20
Tributylamine	10	NA	(B)	NA	200	(B)	1.5E+5	NA
1,2,4-Trichlorobenzene	70 (C)	NA	22	5	1,400	440	6.3E+6	330
1,1,1-Trichloroethane	200 (C)	NA	120	1	4,000	2,400	3.1E+6	10
1,1,2-Trichloroethane	5 (C)	NA	65	1	100	1,300	45,000	10
Trichloroethylene	5 (C)	NA	94	1	100	1,900	1.6E+5	10
Trichlorofluoromethane	2,600	NA	580	1	52,000	12,000	3.8E+7	10
2,4,5-Trichlorophenol	730	NA	25	50	15,000	500	4.2E+7	1,700
2,4,6-Trichlorophenol	77	NA	27 (D)	5	1,500	540	9.0E+5	330
[illegible],4,5-Trichlorophenoxy)propionic acid (N)	50 (C)	NA	21	1	1,000	420	3.2E+6	50
1,2,3-Trichloropropane	42	NA	(B)	1	840	(B)	2.4E+6	10
1,1,2-Trichloro-1,2,2-trifluoroethane	2.0E+5	NA	33	NA	4.0E+6	660	1.0E+9 (G)	NA
Triethanolamine	3,700	NA	(B)	NA	74,000	(B)	5.5E+7	NA
3-Trifluoromethyl-4-nitrophenol	4,500	NA	32 (D)	NA	90,000	640	2.6E+8	NA
Trifluralin	110	NA	(B)	1	2,200	(B)	1.3E+6	50
2,2,4-Trimethyl pentane	ID	NA	(B)	50	ID	(B)	ID	500
2,2,4-Trimethyl-2-pentene	ID	NA	(B)	NA	ID	(B)	ID	NA
1,2,4-Trimethylbenzene	30	NA	22	1	600	440	4.5E+5	10
1,3,5-Trimethylbenzene	23	NA	26	1	460	520	3.4E+5	10
tris(2,3-Dibromopropyl)phosphate	0.47	NA	(B)	NA	9.4	(B)	5,500	NA
Urea	ID (P)	NA	(B)	400	ID (P)	(B)	ID (P)	20,000
Vanadium	64 (A)	NA	8 (A)	20	1,300 (A)	160 (A)	3.7E+6	1,000
Vinyl acetate	640	NA	(B)	50	13,000	(B)	9.7E+6	100
Vinyl chloride	2 (C)	NA	3.1	1	40	62	1,200	10
White phosphorus (R)	0.11	NA	(B)	NA	2.2	(B)	6,300	NA
Xylenes	10,000 (C)	280	59	3	5,600	1,200	2.0E+8	30
Zinc	2,400 (A)	5,000 (A)	81 (A,D)	20	48,000 (A)	1,600 (A)	1.4E+8	1,000

Footnotes

{A} Background, as defined in Rule 701(c), may be substituted if higher than the cleanup criteria.

{B} Chemical has either not been evaluated or an inadequate data base precludes the development of a GSI value. Contact an ERD toxicologist for assistance.

{C} State of Michigan Drinking Water Standard established pursuant to Section 5 of the Safe Drinking Water Act, Act No. 399 of the Public Acts of 1976 used as the default.

{D} GSI value is pH, temperature, or water hardness dependent. Contact an ERD toxicologist for details.

{E} Chemical, due to its physicochemical properties, is not expected to leach through soils to groundwater under most conditions.

{F} Professional judgment used to determine that 50 ppb of aluminum in drinking water is protective of human health.

{G} Criteria exceeds 100% in soil, hence it is reduced to 100%.

{H} Criteria is based on agricultural impacts (phytotoxicity), not 20X groundwater criterion.

{I} Valence-specific chromium data (Cr III and Cr VI) must be compared to the same valence-specific cleanup criteria. If analytical data are provided for "total" chromium only, then values for chromium VI must be applied as the cleanup criteria. Chromium III cleanup criteria can only be used at sites where groundwater is prevented from being used as a public water supply, currently or in the future.

{J} Chemical may be present in several isomer forms. Isomer specific concentrations must be combined for comparison to criteria. Contact an ERD toxicologist for further explanation.

{K} Two different analytical methods and target method detection limits are available for this chemical. Refer to Operational Memorandum #6 for details.

{L} Criteria developed using the U.S. EPA Integrated Uptake Biokinetic Model for children. No risk assessment method(s) is currently available to evaluate lead toxicity in adults. Higher level may be acceptable if soil concentration is less than 400 ppm and groundwater migrating off-site will not impact adjacent properties. Contact an ERD toxicologist for further explanation.

{M} Also known as MBOCA.

{N} Also known as Silvex.

{O} Use 2,3,7,8-TCDD "toxicity equivalence factors" (TEFs) for other chlorinated and /or brominated dibenzo-p-dioxins and chlorinated and/or brominated dibenzofurans for comparison to cleanup criteria. Contact an ERD toxicologist for details.

{P} All potential sources of nitrogen-nitrate must be combined and compared to nitrate criteria. Contact an ERD toxicologist for details.

{Q} Criteria for carcinogenic polynuclear aromatic hydrocarbons (PAHs) were developed using "relative potential potencies" (RPPs) to benzo[a]pyrene.

{R} Chemical may be reactive in soil.

{S} Concentrations of trihalomethanes in groundwater must be combined to determine compliance with the health-based drinking water value of 100 ppb.

{T} Toxic Substances Control Act, Subpart G - PCB Spill Cleanup Policy standards may be more restrictive.

ID = Inadequate data to develop criterion; NA = Not available.

U.S. EPA ADMINISTRATIVE RECORD
METAMORA LANDFILL SITE
METAMORA, MICHIGAN
OPERABLE UNIT #1
UPDATE #7
02/15/96

DOC#	DATE	AUTHOR	RECIPIENT	TITLE/DESCRIPTION	PAGES
1	04/00/95	Conestoga-Rovers & Associates	U.S. EPA	Soil Characterization Report	434
2	08/00/95	Conestoga-Rovers & Associates	U.S. EPA	Soil Remedial Alternatives Report for Drum Area 1	90
3	01/00/96	U.S. EPA	Public	Fact Sheet: "U.S. EPA Recommends Change in Soil Cleanup Decision" w/Announcement of a Public Comment Period and the February 20, 1996 Public Meeting	8