STATE OF MICHIGAN
DEPARTMENT OF ENVIRONMENTAL QUALITY
LANSING

JENNIFER M. GRANHOLM
GOVERNOR

STEVEN E. CHESTER
DIRECTOR

September 29, 2006

Mr. Richard C. Karl, Director
Superfund Division
United States Environmental Protection Agency
Region 5
77 West Jackson Boulevard (S-6J)
Chicago, Illinois 60604

EPA Region 5 Records Ctr.
263851

Dear Mr. Karl:

SUBJECT: Waste Management Holland Lagoons (WMHL) Five-Year Review

The Michigan Department of Environmental Quality (MDEQ) has completed the Five-Year Review Report under the Cooperative Agreement V965855-01 with the United States Environmental Protection Agency (USEPA) for the above-mentioned site.

This comprehensive document was written to address all of the issues at the WMHL site, which is a State Lead Enforcement site in the National Priorities List process, and is provided to the USEPA. This final version of the document contains the September 26, 2006 editorial changes by both the USEPA and the MDEQ Compliance and Enforcement staff.

If you have any questions, please contact Ms. Cindy Fairbanks at fairbanc@michigan.gov or 517-335-4111, or you may contact me.

Sincerely,

Andrew W. Hogarth, Chief
Remediation and Redevelopment Division
517-335-1104

Attachment
cc: Ms. Wendy Carney, USEPA
Ms. Denise Boone, USEPA
Mr. David Kline, MDEQ
Mr. George Jackson, MDEQ
Mr. James Heinzman, MDEQ
Mr. William Bolio, MDEQ
Ms. Cindy Fairbanks, MDEQ
Superfund Site Files, WMHL, Ottawa County, (O1)

Five-Year Review Report

First Five-Year Review Report

for

Waste Management Holland Lagoons

Park Township

Ottawa County, Michigan

September 2006

Prepared by:

Michigan Department of Environmental Quality

Lansing, Michigan

Approved by:

Andrew W. Hogarth, Chief
Remediation and Redevelopment Division
Michigan Department of Environmental Quality

Date: 9/29/06

Concurrence:

Richard C. Karl, Director
Superfund Division
U.S. Environmental Protection Agency Region 5

Date:

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Prepared by:

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Lansing, Michigan

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Andrew W. Hogarth, Chief
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Michigan Department of Environmental Quality

Date: 9/25/06

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Prepared by:
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Lansing, Michigan

Approved by:

for Richard C. Karl, Director
Superfund Division, Region 5
U.S. Environmental Protection Agency

Date: 9/26/06

Five-Year Review Report

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List of Acronyms

AOC	Administrative Order of Consent
ARARs	Applicable or Relevant and Appropriate Requirements
bgs	Below ground surface
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CIC	Community Involvement Coordinator
EM	Electromagnetic
FS	Feasibility Study
gpm	Gallons per Minute
IC	Institutional Controls
IRA	Interim Remedial Action
MDAG	Michigan Department of Attorney General
MDEQ	Michigan Department of Environmental Quality
MDNR	Michigan Department of Natural Resources
MW	Monitoring Well
NCP	National Contingency Plan
NPL	National Priorities List
NREPA	Natural Resources and Environmental Protection Act
O&M	Operation and Maintenance
PCOR	Preliminary Closeout Report
PM	Project Manager
ppb	Parts per billion

List of Acronyms (cont.)

PW	Pumping Well
RAP	Remedial Action Plan
RC	Restrictive Covenant
RI	Remedial Investigation
ROD	Record of Decision
RPM	Regional Project Manager
SARA	Superfund Amendments and Reauthorization Act
SWOCLF	Southwest Ottawa County Landfill
TCE	Trichloroethylene
USEPA	United States Environmental Protection Agency
UST	Underground Storage Tank
UU/UE	Unrestricted Use/Unrestricted Exposure
VOC	Volatile Organic Compounds
WMHL	Waste Management Holland Lagoons
WMI	Waste Management, Inc.

Executive Summary

The remedies selected for the Waste Management Holland Lagoons (WMHL) site located in Ottawa County, Michigan included the following: source removal of wastes and contaminated soils from the six designated areas of the site; groundwater monitoring and treatment of the off-site groundwater plume by a treatment system installed west of the site as part of the remedy for the upgradient and adjacent Southwest Ottawa County Landfill (SWOCLF) Superfund site; and the development and implementation of a Restrictive Covenant as an institutional control for groundwater.

The trigger for this Five-Year Review was the signing of the Preliminary Closeout Report which was signed on September 26, 2001.

The assessment of this Five-Year Review determined that a direct soil contact threat no longer exists at the WMHL site, based on current information, and due to the removal actions conducted in the six identified source areas on the site. An additional source area may exist beneath the former office building and this potential source area may need to be evaluated and addressed as appropriate. A chain link fence encompasses the entire site and is monitored to provide for site security and protection for the on-site monitoring wells.

General degradation of the groundwater in the area has occurred from the upgradient SWOCL, as well as from past dewatering and dumping activities at the WMHL site. Waste Management, Inc. (WMI), the owner of the site since 1978, undertook soil excavation of the six identified source areas from 1994 through 2001. Post excavation soil samples from the source areas confirmed that soil contamination was removed above background screening values and Direct Contact Criteria of Part 201, Environmental Remediation, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (Part 201) for constituents analyzed. A groundwater treatment system installed by Ottawa County to capture and treat the groundwater contamination is located downgradient of both sites. Groundwater downgradient of the treatment system continues to contain contaminants that exceed Part 201 Drinking Water Criteria.

WMI has not provided groundwater monitoring data to determine that the WMHL site no longer contributes to existing groundwater contamination; however, a Remedial Action Plan (RAP), required under Part 201 has been recently submitted to the Michigan Department of Environmental Quality (MDEQ) Remediation and Redevelopment Division and is currently under technical review. Any subsequent deficiencies in the RAP must be addressed by WMI to meet the requirements of Part 201 for an MDEQ approved RAP. Further, any existing or proposed Institutional Controls (IC) included in the RAP must be evaluated to ensure that all areas that do not allow for unlimited use/unrestricted exposure have effective ICs.

The remedy is protective in the short-term. There is no evidence of exposure to site-related contaminants. Furthermore, interim ICs which serve to notify the public of the areas which do not allow for unlimited use and unrestricted exposure exist until the final RAP is complete. Long-term protectiveness is dependent upon effective ICs, or

additional remedial actions, if they are required by the final RAP.

Five-Year Review Summary Form

SITE IDENTIFICATION

Site name *(from WasteLAN)*: **Waste Management Holland Lagoons**

EPA ID *(from WasteLAN)*: **MID:060179587**

Region: 5 **State: MI** **City/County: Park Township, Ottawa County**

SITE STATUS

NPL status: Final

Remediation status (choose all that apply): Complete

Multiple OUs?* YES **Construction completion date:** 9/26/2001

Has site been put into reuse? NO

REVIEW STATUS

Lead agency: State - Michigan Department of Environmental Quality

Author name: Cindy Fairbanks

Author title: Environmental Quality Analyst 12 **Author affiliation:** Michigan Department of Environmental Quality

Review period:** 3/20/2006 to 9/30/2006

Date(s) of site inspection: 6/20/2006

Type of review:

fl Post-SARA □ Pre-SARA □ NPL-Removal only
□Non-NPL Remedial Action Site □NPL State/Tribe-lead
□ Regional Discretion

Review number: 1 (First)

Triggering action: **Construction Completion**

□ Actual RA Onsite Construction at OU #_____
□ Actual RA Start at OU#____
□ Construction Completion
□ Previous Five-Year Review Report
□ Other (specify)

Triggering action date *(from WasteLAN)*: 9/26/2001

Due date *(five years after triggering action date)*: 9/26/2006

* ["OU" refers to operable unit.]
** [Review period should correspond to the actual start and end dates of the Five-Year Review in WasteLAN.]

Five-Year Review Summary Form (cont.)

Issues:

The following issues exist at the Waste Management Holland Lagoons (WMHL) site:

- Non compliance with the Administrative Order of Consent (AOC) requiring the completion of a Part 201 approved Remedial Action Plan (RAP). Incomplete Michigan Department of Environmental Quality (MDEQ) approved RAP which meets all the requirements of Part 201, Environmental Remediation, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (Part 201).

- Waste Management, Inc. (WMI) must provide information to prove the six on-site source areas, due to the completion of past remediation activities, are no longer contributing contaminants to the groundwater plume migrating under the site and that all of the contaminants found in the groundwater plume originate from the adjacent and upgradient Southwest Ottawa County Landfill (SWOCLF) National Priorities List (NPL) site.

- Assure effective interim ICs are in place pending the final RAP.

- For the remedy to be protective in the long-term, effective Institutional Controls (ICs) may be implemented and maintained as part of the final RAP.

- A contamination source area may exist beneath the former office building.

Recommendations and Follow-up Actions:

The following recommendations and follow-up actions should be implemented:

- WMI is required to submit to the MDEQ a RAP to meet the requirements of Part 201 and the AOC.

- WMI is required to submit to the MDEQ a RAP which provides groundwater information to prove the six on-site source areas are no longer contributing contamination into the groundwater and that all the contamination detected in the groundwater plume is migrating from the adjacent and upgradient SWOCLF NPL site.

- To assure effective interim ICs are in place, USEPA will review the IC Study completed by WMI and USEPA will create IC maps.

- If required by the RAP, development of any ICs and an IC plan.

- Evaluate soils under the former office building and other areas as may be required under the RAP.

Five-Year Review Summary Form (cont.)

Protectiveness Statement(s):

The remedy is protective in the short-term. There is no evidence of exposure to site-related contaminants. Furthermore, interim ICs which serve to notify the public of the areas which do not allow for unlimited use and unrestricted exposure exist until the final RAP is complete. Long-term protectiveness is dependent upon effective ICs, or additional remedial actions, if they are required by the final RAP.

Other Comments:

None

Five-Year Review Report

I. Introduction

The MDEQ has conducted a Five-Year Review of the remedial actions implemented at the WMHL site located in Ottawa County, Michigan. The review was conducted from March 2006 through September 2006. This report documents the results of the Five-Year Review. The purpose of the Five-Year Review is to determine whether the remedy at the site is protective of human health and the environment. The methods, findings, and conclusions of the review are documented in the Five-Year Review Report. In addition, the Five-Year Review Report identifies issues found during the review, if any, and makes recommendations to address them.

This review is required by statute. The United States Environmental Protection Agency (USEPA) and the MDEQ perform reviews of remedies selected that result in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted purposes.

The Agency is preparing this Five-Year Review pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) §121 and the National Contingency Plan (NCP). CERCLA §121 states:

> If the President selects a remedial action that results in any hazardous substances, pollutants, or contaminants remaining at the site, the President shall review such remedial action no less often than each five years after the initiation of such remedial action to assure that human health and the environment are being protected by the remedial action being implemented. In addition, if upon such review it is the judgment of the President that action is appropriate at such site in accordance with Section [104] or [106], the President shall take or require such action. The President shall report to the Congress a list of facilities for which such review is required, the results of all such reviews, and any actions taken as a result of such reviews.

The Agency interpreted this requirement further in the NCP; Title 40 of the Code of Federal Regulations §300.430(f)(4)(ii) states:

> If a remedial action is selected that results in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure, the lead Agency shall review such action no less often than every five years after the initiation of the selected remedial action.

In addition, if the selected remedy does not allow for Unlimited Use and Unrestricted Exposure (UU/UE) (due to residual contamination that is present above Part 201 unrestricted residential criteria), then ICs are necessary to ensure the protectiveness of the remedy and Five-Year Reviews are required as a mechanism for evaluating the protectiveness of the remedy.

This is the first Five-Year Review for the WMHL site. The triggering action for this review is the date of the Preliminary Closeout Report (PCOR) as shown in USEPA's WasteLAN database dated September 26, 2001.

II. Site Chronology

Table 1: Chronology of Site Events

Event	Date
Operation of site by Jacobusse Refuse Service Company	1945 - 1981
Landfill operation at the site operated by Jacobusse Refuse Service Company	1957 - 1964
Burial of 43 55-gallon drums of chloral hydrate on site	1968
Jacobusse Refuse Service began hauling waste to the adjacent SWOCLF	1968
Truck Maintenance Facility operated on WMHL site	1968 - 1974
Triggering Mechanism: Initial discovery of trichloroethylene (TCE) contamination detected in the Thomas residential well, 2741 168th Avenue due west of the WMHL site	1970
Jacobusse Refuse Service Company receives license to haul and dispose of liquid industrial waste at the WMHL site; waste included cider vinegar tank settlings, solids from an organic pigment plant , calcium sulfate, aluminum hydroxides, wet mill and food processing bacterial digester sludges	1972
Issuance of stipulation of groundwater discharge permit from Michigan Department of Natural Resources (MDNR) to Jacobusse Refuse Service Company specifying allowable levels of metals and organics to be discharged into the groundwater and regulated pH levels in the lagoons	1972
Installation of four monitoring wells around the seepage lagoons as part of allowance for stipulation of groundwater discharge permit	1972
Refuse Service Inc. purchases Jacobusse Refuse Service Company	September 17, 1972
Refuse Service Inc. merged into Michigan Waste Systems Inc.	June 29, 1973
Issuance of second MDNR groundwater discharge permit superseding the 1972 permit with more stringent criteria	1976
MDNR enforced cessation of hauling liquid waste sludges to the Jacobusse Refuse Service Company site and dewatering of plating wastes via the seepage lagoons	1977
Michigan Waste Systems Inc. continued to accept liquid industrial waste, specifically tricalcuim phosphate waste, at the Jacobusse Refuse Service Company site	1978 - 1980
Sampling by MDNR of on-site monitoring wells detected lead from 70 to 140 parts per billion (ppb)	June 1979

Table 1: Chronology of Site Events (cont'd.)

Event	Date
Removal of the 43 drums of chloral hydrate	1980
Michigan Waste Systems ceased disposal of all liquid and solid wastes on the Jacobusse site	March 1980
MDNR collects periodic groundwater samples from four lagoon monitoring wells as well as additional monitoring wells installed on the site as part of the SWOCLF monitoring well network to investigate site groundwater conditions. Soil boring investigation conducted to search for buried drums	1979 - 1981
MDNR informs WMI (formerly Michigan Waste Systems, Incorporated) that the department is undertaking a series of investigations to determine if buried drums or other sources of potential contamination are located on the WMHL site	January 28, 1982
MDNR grants a renewal license to remove and transport liquid waste	March 4, 1982
Preliminary Assessment completed by Ecology and Environment	June 1, 1983
USEPA Potential Hazardous Waste Site Inspection Report	October 18, 1983
First documented information in site file for hook up of area residences to the expanded municipal water supply lines	1984
MDNR sampling of WMHL on-site monitoring wells	1984, 1985, 1988
Underground Storage Tank (UST) removal completed	1985
NPL Listing	June 10, 1986
State of Michigan Act 307 Listing	1996
Phase I Remedial Investigation (RI) included Electromagnetic (EM) survey, collection of soil and groundwater samples	1992-1994
State Memorandum of Agreement between the USEPA and the MDEQ concerning State Lead enforcement sites following the Part 201 RAP process rather than the Record of Decision (ROD) with an addendum added in 1997	1993 and 1997
Michigan Environmental Response Act, 1982 PA, as amended (Act 307) replaced by Part 201	1994
Administrative Order of Consent (AOC) signed	June 1994
Phase I, II, and III, RI /Removal Actions/Interim Response Actions included enclosing entire site with a fence, installation of three monitoring wells, groundwater sampling, soil boring sampling, soil excavation, and removal of debris	1994-1995
Phase I of RI Report completed	December 1995

Table 1: Chronology of Site Events (cont'd.)

Event	Date
Multi-phase RI Report submitted	January 1997
First RAP submitted	April 1997
MDEQ Acknowledgment of Receipt of Administratively Incomplete RAP letter	April 23, 1997
Declaration of Restrictive Covenant (RC) filed	August 18, 1997
Feasibility Study (FS) and RAP submitted	January 1998
MDEQ Acknowledgement of Receipt of Administratively Incomplete RAP letter	February 17, 1998
Phase IV Groundwater Sampling conducted and report submittal	March 3, 1998 and May 7, 1998
Phase V Groundwater Sampling RI conducted and report submittal	1999
Groundwater and Soil Analytical Data Report submittal	January 27, 2000
Preliminary Closeout Report (PCOR) signed	September 26, 2001
Final FS and RAP submittal	July 2001
MDEQ Acknowledgement of Receipt of Administratively Incomplete RAP letter	October 16, 2001
MDEQ correspondence concerning requirement for WMI to submit a RAP	June 28, 2005, July 21, 2005, December 29, 2005
WMI response letter stating a new RAP will be submitted by June 1, 2006	January 23, 2006
Initiation of First Five-Year Review	March 2006
Submittal of Fourth RAP	June 1, 2006
Second Five-Year Review due	September 26, 2011

I. Background

Site History

The WMHL Site was operated by Jacobusse Refuse Service Company as a municipal garbage dump, liquid waste dewatering facility, and headquarters for their hauling company from the mid 1940's until 1977. The company was purchased by Refuse Services, Incorporated in 1972 and the name of the site was changed to Holland Lagoons. Refuse Service, Incorporated merged into Michigan Waste Systems, Incorporated in 1973 and Michigan Waste Systems, Incorporated subsequently changed its name to WMI.

A portion of the site was originally used for the disposal of pickle waste, apple pulp, digester sludge, barrels of spent extracts, brine, the dewatering of liquid industrial

wastes, including aluminum and metal hydroxide wastes and wastewater treatment plant sludge, in up to as many as nine dewatering lagoons located in the north central area of the site. The dewatering of metallic wastes using these lagoons ceased in October 1977. Permits indicate that Jacobusse discontinued disposal of all liquid waste at the site in 1980. In addition, the southwest area of the site was used for the temporary burial of drums of chloral hydrate that were subsequently removed in 1980. Municipal refuse was hauled to a landfill located in the south central area of the site from 1957 to 1964. The landfill operated as an open burning dump. Finally the site was used as a maintenance facility for the Jacobusse fleet of trucks, focused in the northwest corner of the site.

The Thomas residential well, located due west of the site, was discovered to be contaminated with TCE in 1970. The TCE was suspected to have migrated from the WMHL site. The continued presence of elevated concentrations of TCE was confirmed in a MDNR follow-up sampling event in 1979. Park Township began to hook up residences located within the vicinity of the WMHL site, including the Thomas residence, to the expanded municipal water supply line by 1984. As part of the 2005 settlement agreement for the SWOCLF between Ottawa County and the MDEQ, both the county and township continue to hook up residences downgradient of both sites into the expanded municipal water supply system. Complete hook up of all residences is to be completed by March 2007. The MDNR continued to conduct periodic groundwater sampling events at the WMHL site in 1984, 1985, and 1988. The site was added to the NPL in June 1986, as well as the State of Michigan Act 307 list later in 1986.

From 1993 though 1997, both the USEPA and the MDEQ (formerly a part of MDNR), held discussions to allow NPL sites given a State Lead Enforcement designation to follow the Part 201 RAP process rather than the NPL ROD process. A Memorandum of Agreement was signed by the two Agencies in 1997. During this negotiation period, WMHL was designated as a State Lead Enforcement Site. (See Attachment A - Memorandum of Agreement).

In 1994, Michigan's Environmental Response Act 307 was replaced by Part 201. Previous to this time, any contaminant concentrations detected on the WMHL site were compared to the Act 307 criteria. However, because decision documents related to the clean up of the site post-date the enactment of Part 201, Part 201 provides the standards for the clean up. (See Attachment B - Act 307 and Part 201).

General degradation of the groundwater in the area occurred from another nearby NPL site, the SWOCLF, as well as from dewatering and dumping activities on the WMHL site. The plumes from the two sites were intermingled. Groundwater contamination above the Part 201 Residential Drinking Water Criteria included benzene, ethylbenzene, xylene, TCE, chlorobenzene, 1,1-dichloroethane,1,2-dichloroethane, and methylene chloride. Inorganic contamination in the groundwater above the Part 201 Residential Drinking Water Criteria included aluminum, antimony, beryllium, cadmium, iron, lead, manganese, vanadium, and zinc.

In 1994, the state and WMI entered into an AOC for WMI to undertake a RI/FS at the WMHL site. A multi-phase RI of the WMHL site was conducted from 1994 through 1995. Phase I of the RI included enclosing of the entire site by a chain link fence, conducting an electromagnetic (EM) survey, sampling visually contaminated soils, and collecting groundwater samples from the on-site monitoring wells. Phase II of the RI involved additional soil and groundwater sampling, test pit excavation, and Interim Response Actions (IRA) to eliminate impacts identified in the Phase I portion of the RI. This included the removal of drums and other surface debris to prevent direct contact hazards. The soil excavations were on-going and contaminated soil from the identified source areas were removed and completed by the end of 2000. The exception is the potentially contaminated soils which underlie the former office building currently leased to a sign business or other unidentified source areas. These soils will be analyzed and, if needed, removed, whenever the building is demolished. Phase III of the RI involved the collection of additional groundwater samples from on-site monitoring wells. A final groundwater investigation, identified as Phase V, which included the collection of designated background groundwater samples, was completed in 1999. Additional soil sampling was conducted on the site in 2001. Sample analytical data indicated no contaminants existed in concentrations exceeding Part 201 Direct Contact Criteria.

WMI submitted the initial RAP, which included the multiphase RI report and a Baseline Risk Assessment report to the MDEQ for review in April 1997. The MDEQ's review of the document determined that it did not address all the requirements of Part 201. An Acknowledgement of Receipt of an Administratively Incomplete RAP letter was sent to WMI, listing the items required, in April 1997. Subsequent RAP submittals were received in January 1998 and July 2001. Upon review, the documents were determined to be insufficient in meeting the requirements of Part 201. Administratively Incomplete RAP letters were sent for these documents on February 17, 1998, and October 16, 2001. The MDEQ notified WMI in a June 28, 2005, letter that WMI is not in compliance with the AOC and needs to perform an MDEQ approved Part 201 approved RAP. Recent communications between the MDEQ and WMI resulted in a letter sent by WMI, dated January 23, 2006, notifying the MDEQ they would complete and submit a RAP by June 1, 2006. The latest RAP submittal was received by the due date; however, the MDEQ will not complete the review of the latest RAP until after this Five-Year Review Report has been completed. The MDEQ is evaluating the proposed remedy including the need for ICs in the on-going RAP process that will address the potentially contaminated soils under the building and the groundwater plume.

Physical Characteristics

The WMHL site is located in an unincorporated area of Park Township in Ottawa County, Michigan approximately one mile east of Lake Michigan. (See Figure 1 - Site Location Map). The site is located on the east side of 168th Street and north of James Street. The site address is 2700 North 168th Street and the legal description is the north ½ of the southwest ¼ of Section 15, Township 5 north, Range 16 west of the Michigan Meridian. The WMHL site is approximately 80-acres in size within an area characterized as mixed residential, wooded, and agricultural lands. (See Figure 2 –

Adjoining Property Map) Properties adjoining the WMHL site include Riley Road Recreational Area, several small subdivisions of homes and privately held parcels, and a blueberry field to the southeast. The SWOCLF NPL site is located adjacent, northeast, and upgradient of the WMHL site. A groundwater plume migrating from the SWOCLF site impacts the groundwater southwest and downgradient of the landfill which includes the WMHL site. Groundwater contamination from the WMHL site intermingles with the SWOCLF plume before migrating westward toward the SWOCLF treatment system then Lake Michigan.

Land and Resource Use

The land area surrounding the WMHL site is zoned for residential, recreational, and agricultural use. (See Figure 3 - Park Township Zoning Map). As part of the RAP development for the site, a RC, covering only the area of the site, was filed with Ottawa County on August 18, 1997. The RC restricts use of the groundwater under the site for any purpose and limits residential use to uses consistent with the RC. As part of the on going RAP review process, the MDEQ has not accepted the RC as written. ICs that may be included in a final RAP will include a groundwater restriction for any use, address any future residential land use as subject to that groundwater restriction, as well as addressing any remaining contaminated soils, including potential soil contamination located under the site building when it is demolished. (See Attachment C – Restrictive Covenant).

The Ottawa County Environmental Code, Article VII, Section C-7 stipulates that the County Health Department has the authority to deny a permit to install a private water supply well if the water does not meet National Primary Drinking Water Regulations. The groundwater plume migrating from the SWOCLF site does not meet these regulations, and therefore, the County Health Department will not issue a permit to install a well in the area of the SWOCLF groundwater plume. This area includes the WMHL site. (See Attachment D - Ottawa County Health Code).

As part of the March 2005 settlement agreement between the MDEQ and Ottawa County for the SWOCLF, the county is to implement an area wide groundwater use restriction by March 2007. This groundwater restriction will include the WMHL site. In addition, all private wells within the restricted area are to be identified and properly abandoned. All area residents will be able to access the expanded municipal water supply within the area of the groundwater plume for drinking water, thus greatly reducing the exposure risk to groundwater contamination. (See Figure 4 - Municipal Line Map).

History of Contamination

The western half of the site was originally used for the disposal of pickle waste, apple pulp, digester sludge, barrels of spent extracts, brine, and municipal waste in an open burning landfill, and for the dewatering of liquid industrial wastes by means of several

dewatering lagoons, including aluminum and metal hydroxide wastes and wastewater treatment plant sludge at the site. In addition, the area was used for the temporary burial of drums of chloral hydrate that were subsequently removed in 1980. Finally the site was used as a maintenance facility for the Jacobusse fleet of trucks, focused in the northwest corner of the site. (See Figure 5 - Site Features Map). The site was added to the NPL in June 1986.

Basis for Taking Action

The Thomas residential well, located west of the site along 168th Street, was discovered to be contaminated with TCE in 1970. The MDNR's follow-up investigations in the area focused on both the WMHL site and the SWOCLF site as the potential sources for the TCE.

Initial Response

In 1977, the MDNR enforced cessation of hauling of liquid disposal wastes and sludges to the dewatering lagoons located on the Jacobusse site. The hauling and disposal finally terminated in 1980.

In 1979, four monitoring wells were installed around the dewatering lagoons. The MDNR began to sample these four monitoring wells and nine residential wells located along James Street and 168th Street that same year. The on-site monitoring wells showed lead levels of 70 to 140 ppb. The residential well sampling detected the continued presence of TCE in the Thomas well which was reconfirmed in July 1979 with TCE detected at 50 ppb. TCE however was not detected in any other on-site WMHL monitoring or residential well sampled. (See Attachment E - MDNR 1979 Groundwater Report).

In 1980, the buried drums of chloral hydrate were subsequently removed and Jacobusse informed the MDNR that it would no longer dispose of any liquid or solid waste at the WMHL site.

In 1981, the MDNR conducted a remedial soil boring investigation to locate additional alleged buried drums on the site. Results of this investigation did not locate additional buried drums. (See Attachment F - MDNR 1981 Soil Boring Report).

The MDNR continued to monitor the on-site wells and the Thomas residential well in a sampling event in 1984. (See Attachment G - MDNR Sampling Report 1984). Review of the data found copper at 30 ppb, lead at 190 ppb, and zinc ranging from 110 to 4100 ppb. TCE continued to be detected in the Thomas well with the highest concentration of 67 ppb until the residence was connected to the city of Holland Municipal Water Supply by Park Township around 1984. Additional MDNR sampling events were conducted in 1985 and 1988. (See Attachments H - MDNR Sampling Report 1985 and I - MDNR Sampling Report 1988). Lead and TCE were detected in the analytical results from 1985 at 100 ppb and 10 ppb, respectively.

The MDNR requested that WMI inspect, evaluate, remove, and dispose of four known USTs at the site. The investigation was conducted in 1985. (See Attachment J - Report on the Tank Removal Operation at the Former Jacobusse Site). Two of the USTs were located near the northwest corner of the building and two were located near the southwest corner of the building. Approximately three cubic yards of contaminated soil were removed from around the tank located near the northwest corner of the building. The analysis of the tank contents detected benzene, ethylbenzene, toluene, xylene, and 1,1,1 trichloroethane.

The WMHL site was listed to the NPL on June 10, 1986. The basis for the NPL listing was the potential groundwater impacts to area population from the intermingled contamination plume migrating from both the WMHL and SWOCLF sites. The NPL process was initiated in 1983 with the development of the following two reports:

- USEPA Field Investigation Team investigation report dated June 1, 1983.
- USEPA Hazard Ranking System score of the WMHL site on December 1, 1983.

By 1992, approximately twenty monitoring wells had been installed on the WMHL site by the Ottawa County Road Commission's contractor, Prein and Newhof. These wells were installed as part of the groundwater monitoring network for the SWOCLF. (See Figure 6 - SWOCLF Monitoring Well Locations from 1992 and Figure 6A - Current Monitoring Well Locations).

In 1993, a well point was located as part of an additional investigation on the site for suspected USTs. No USTs were found. The well point and surrounding soil was removed. *Post removal soil sampling analysis indicated that the removed soil was not* impacted with contamination above Act 307 Type B Criteria Risk Based Criteria for Unrestricted Residential Use. (See Attachment K - Well Point Removal Report).

Remedial Investigation

A Phase I RI was conducted at the site beginning in 1992 with the creation of the work plans. The primary objectives of the Phase I RI were to delineate both areas and contaminants of concern on the site, initiate both ecological and health risk assessments, and identify data gaps to be addressed in the Phase II and Phase III portion of the RI. In 1995 and 1996, the multi-phased RI was conducted on the site.

Phase I of the investigation involved a geophysical investigation, a preliminary hydrogeological assessment, soil sampling and analysis, and groundwater sampling and analysis.

Phase II involved additional soil and groundwater sampling and analysis, test pit excavation, the initiation of the IRA, which was performed concurrently with Phase II and III of the RI to eliminate impacts identified in the Phase I investigation.

Phase III involved collecting additional groundwater samples.

Included in the RI was an EM survey which was completed in September 1993 and soil and groundwater samples were collected in the summer of 1994. Selected monitoring wells were re-sampled for volatile organics compounds (VOCs) in August 1994 and again in January 1995.

Three new monitoring wells (MW) MW-4, MW-5, and MW-6 were installed on the WHML site in July 1995. A total of 11 MWs were sampled.

On July 10, 1995, six soil borings (B-03 through B-08) were drilled in the area of the former dewatering lagoons to a maximum depth of 10 feet below ground surface (bgs). Four hand auger soil borings (F-1 through F-4) were also collected.

The December 1995 Phase I Report Summary of the results of the Phase I RI includes the following:

- The EM survey found an anomaly that corresponded with the area that had previously been used as the landfill. A bermed area approximately 50 feet by 100 feet was found to contain several 55 gallon drums. No anomaly was associated with the former dewatering lagoon area and no other large anomalies were discovered that would indicate disposal of waste materials in areas not already identified in historical records. Five other anomalies were evaluated with test pits for the presence of buried drums. None were found. (See Attachment L - Electromagnetic Survey Investigation October 1993).

- The preliminary hydrogeological assessment of the WMHL site determined the area to be underlain by approximately 90 feet of sand which overlies glacial till. The water table in the sand is approximately five to 12 feet bgs but can be as much as 40 feet bgs. The groundwater flows toward the west-southwest with a gradient of approximately one foot in 350 feet. Hydraulic conductivity values for the sand average about 3x10-1cm/s and the average linear velocity of the groundwater is calculated to be approximately 1300 feet/year.

- The soil sampling results determined that the WMHL site had areas of surface soils with detections of heavy metals above Act 307 Type A Cleanup Criteria. The soil sampling analytical results from the Phase I Investigation found detections of heavy metal contaminants in the soils above Part 201 Criteria. (See Figure 7 - Site Areas of Concern and Figure 8 - 1994 Soil Sample Locations and Analytical Results). Smaller areas of suspected impacted soil, of less than 100 square feet, were located at the site entrance and the central part of the landfill. An area of bluish green soil was found on the haul road between the former dewatering lagoons and the SWOCLF site. All of the

organic soil sampling results were below Act 307 Type B Cleanup Criteria.

- Review of the groundwater analytical results collected from some of the groundwater monitoring wells, including monitoring wells upgradient of any of the identified former disposal areas, detected inorganic and organic contaminants above Act 307 Type B Cleanup Criteria. Elevated concentrations of lead and arsenic were detected in several upgradient monitoring wells, while aluminum, arsenic, iron, lead, and manganese were detected in several downgradient wells. Upgradient wells also had elevated concentrations of acetone, benzene, and heptachlor, while downgradient wells had elevated detections of acetone, benzene, 1,2 dichloroethane, chrysene, benzo(k)fluoranthene, and heptachlor. Groundwater sample results detected heavy metals, pesticides, and volatiles above Part 201 Residential Cleanup Criteria. (See Figure 10 - Phase I Groundwater Sample Locations and Analytical Results).

The RI identified six areas of concern. (See Figure 7 - Areas of Concern). A discussion of the major identified Areas of Concern follows.

Area A: Entrance

This area encompassed the area north of the site entrance and the driveway, approximately 96,000 square feet. Several sources of contamination were noted including the following: four USTs; oil-stained soil in the driveway; white powder substance on the ground surface north of the building; well point north of the building and abandoned in April 1993; EM anomalies identified during the EM Survey in September 1993; and a trench located south of the building.

Area B: Former Dewatering Lagoons,

This area covers approximately 110,400 square feet and is located in the north central section of the WMHL site. The dewatering lagoons were abandoned in 1980 and the sludges from the bottom of the lagoons were excavated and hauled to SWOCLF for disposal. The lagoons were then backfilled with sand from the nearby Barrow Pit Area, located north of the site.

Area C: Former Landfill

This area encompasses approximately 123,200 square feet. The eastern half of the landfill was used for disposal of household refuse which was also commonly burned. The EM survey of the western half discovered several buried drums. The former landfill was used to dispose of the remains of burned municipal refuse which was hauled to the site from 1945 to 1964. The ash and other non-burnable materials such as cans and bottles were then buried in the trenches.

Area D: Haul Road leading to the SWOCLF Site

The haul road, approximately 49,000 square feet, extended from the former dewatering lagoons to the SWOCLF site and was used to haul sludge from the dewatering lagoons to the landfill for disposal. A bluish green substance was found on the road surface which was assumed to be spilled sludge from the hauling process.

Area E: Former Drum Disposal Area

This is the area where the 43 drums of chloral hydrate were disposed in April 1968 under a permit issued by the MDNR. The drums were subsequently removed from this area in 1980 under the direction of the MDNR. The drums were removed intact and no evidence of chloral hydrate released to the environment was recorded. The area covers approximately 22,500 square feet.

Area F: Eastern Half of the Site, 1,820,000 square feet

The Eastern half of the site is not known to have been used for waste disposal during the operation of the WMHL. Background soil boring samples were collected from this area during the Phase I Investigation and additional soil borings were collected during the Phase II Investigation. No contaminants were found in the investigation above either Act 307 Type B or Part 201 criteria. (See Figure 8 - 1994 Soil Sample Locations and Analytical Results).

Groundwater Sampling Phase I RI

Prior to groundwater sampling in Phase I of the RI, three new MWs were installed to replace existing wells that could not be sampled. MW-01 and MW-02 were installed as a nest near the site entrance to replace MW-50 and a new MW-02. MW-03 was installed near W-43 which was partially filled with silt and could not be sampled. Two groundwater resampling events were conducted to collect VOCs from selected MWs on the WMHL site. The first resampling event took place on August 18, 1994 and involved collecting groundwater for VOC analysis from W-26, W-34, and W-48. The second resampling took place from January 3 through January 5, 1994, and involved collecting VOC samples from MW-01, MW-03, W-23, W-24, W-34, W-42, W-46, W-48, and W-51. (See Figure 9 - Groundwater Sample Results Above Act 307 Type B Criteria).

Acetone concentrations detected in both the upgradient (upgradient of the Areas of Concern) and downgradient monitoring wells (downgradient of the Areas of Concern) during the original RI sample event were not reproduced in the resampling events.

Several detections of benzene, however were noted in downgradient monitoring wells which were above the Act 307 Type B Criteria. Benzene was detected in W-46 and W-48.

The results of the groundwater investigation indicate that the groundwater was contaminated by several organic and inorganic contaminants at concentrations above

Act 307 Type B Criteria. (See Figure 10 - Phase I Groundwater Sample Locations and Analytical Results).

The results of the Phase I of the RI were incorporated into an RI report submitted in late 1995 and also included in the RAP submittal by WMI for the WMHL site, dated January 1997, (see Attachment M).

II. Remedial Actions

Remedy Selection

Phase II Investigation

After the Phase I Investigation was completed, the data was reviewed and gaps in the data which were needed for the Risk Assessment and FS were identified. The scope of work for the Phase II Investigation involved the following tasks:

- Drilling and sampling six borings in the former dewatering lagoon areas, including collecting a soil boring sample below the water table at three of the six locations. (See Figure 11 – Phase II Soil Sample Results and Locations).
- Collecting four soil borings from the eastern half of the site to determine if this area was used for waste disposal.
- Installing three new MWs to collect groundwater samples at specific locations where there had previously been no existing MWs.
- Collecting groundwater samples from wells located on and around the site and having the samples analyzed to determine background, anthropogenic backgrounds, and site groundwater conditions. (See Figure 12 - Phase II Groundwater Sample Locations and Results).
- Excavating five test pit areas in the locations of anomalies found during the EM survey conducted during the Phase I Investigation.
- Conduct an IRA to eliminate environmental liabilities at the site which were identified in the Phase I Investigation.

Removal Actions and IRA

Phase II Test Pit and Excavations

As part of the RI, several locations on the WMHL site were excavated between July 10 and July 31, 1995. These excavated areas included the haul road and test pit areas A-1, A-2, and C-1, along with two drum storage areas (C-2 and C-3). During these activities, stained soils were removed and disposed of off-site. Following the completion of each excavation, soil scraping samples were collected from the side walls and floor. (See Figure 13 –Phase II Test Pit Locations, Figure 14 - Phase II Soil Excavation Locations, and Figure 15 - Phase II Soil Scraping Locations).

The haul road was scraped and excavated as needed to remove any blue-green stained soils. Over 1,400 cubic yards of soil were removed.

Test pits A-1 and A-2 did not locate any metal debris, but a one to two-foot thick layer of dark blue-green burned debris was uncovered just below the ground surface. Approximately 200 cubic yards of stained soil were excavated from this area and disposed of off-site.

Test Pit C-1 uncovered miscellaneous burned debris including bottles and metal scraps. The layer of debris ranged from near the ground surface to approximately five feet bgs. More than 1,600 cubic yards were removed and disposed of off-site.

The final two test pits, C-2 and C-3, were located near a bermed area which contained several partially buried, empty 55-gallon drums. No additional buried drums were discovered during the excavation. (See Figure 16 - Phase II Drum Removal). Blue-green stained soil was detected from just below the surface to an approximate four-foot depth. Approximately 225 cubic yards of soil was excavated and removed and disposed of off-site along with the empty drums. A second drum storage area located south of the site building was excavated and approximately 40 cubic yards of soil were excavated and removed from this area and disposed of off-site.

Thirteen additional test pits requested by the MDNR were located adjacent to and south of the former dewatering lagoons. No stained soils were observed and no soil was removed.

During the RI in 1995, the site was fenced, obviously contaminated soils were sampled and excavated, and drums and other surface debris were removed to prevent direct contact hazards. The soil excavations were completed by the end of 2000. Additional soil sampling was conducted on the site in 2001. Sample analytical data indicated no contaminants existed in concentrations exceeding Part 201 Direct Contact Criteria.

After completion of the RI, the IRA involved excavating impacted soils, removing several empty drums, and conducting a general site cleanup which included the removal of four abandoned cars. Soil was removed from seven areas of the site based on either the results of the Phase I soil sampling or on a visual observation of impacted soil. Approximately 3,930 cubic yards of soil was excavated and disposed of off-site. Twenty-eight shallow soil scrapings were excavated from the surface of the former lagoon area and visually inspected to ensure that all of the soil impacted by the haul road was found and excavated. Six empty drums were also removed, crushed, and disposed of off-site.

Soil Boring Sampling Phase II and IRA

Soil samples were collected from the six identified Areas of Concern during the Phase I of the RI. Soil sampling results for each Area of Concern are discussed below. Background soil boring samples were also collected. All background soil boring

samples were below Act 307 Type A default background concentrations for inorganic contaminants.

Area A Site Entrance

Soil boring samples were collected and analyzed for inorganic parameters. Arsenic was found above both background and Act 307 Type B Risk Based Criteria for Unrestricted Residential Use (Act 307 Type B Criteria) in soil boring A1. Lead and zinc were also detected in soil boring A5. Several other inorganic parameters were also detected in the A2 boring but they were not above Act 307 Type B Criteria or the background values. The white powder found on the ground surface north of the site building appeared to be lime based on the elevated calcium level which was, however, below the background concentration in the sample collected at soil boring A3. No organic contaminants were detected above background or Act 307 Type B Criteria.

A trench approximately 80 feet by 10 feet was discovered during the Phase I Investigation in an area south of the building. A soil boring was collected and analysis detected lead and zinc at concentrations above background. The impacted soil was excavated, approximately 40 cubic yards, during the IRA. Verification samples show the soil that remained is below the background concentrations for the analytes tested.

Area B Former Dewatering Lagoon Area

Analysis of the soil boring samples collected from the former dewatering lagoon area did not detect any organic or inorganic contaminants above background or Act 307 Type B Criteria. The results of the soil borings and analysis from the Phase I and Phase II Investigations demonstrate that the lagoons were properly abandoned.

Area C Former Landfill Area

Analysis of the soil boring samples collected from the former landfill area did not detect any organic or inorganic contaminants above background or Act 307 Type B Criteria. The ash, metal cans, and glass bottles in the former landfill area were excavated during the IRA for disposal off-site. Approximately 1,855 cubic yards of material was removed from the area. Results of the analysis of verification samples showed there were two small areas with levels of inorganic parameters exceeding the background concentration. An additional 40 cubic yards of soil were removed during the interim response and disposed of off-site.

A bermed drum area was located in the south end of the former landfill. The berm was 70 by 30 feet and contained six old, rusted drums. These drums were removed during the IRA along with 224 cubic feet of bluish-green stained soil found at the bottom of the bermed area.

Area D Haul Road

The results of the soil boring sampling from the haul road indicated that the bluish-green soil found at the ground surface along parts of the road was contaminated with heavy metals. Analysis of the D1 soil sample detected chromium, copper, lead, nickel, selenium, zinc, and cyanide above their background values. The soil boring sample collected at the water table at D1 detected chromium, copper, and nickel above their background values. Sample D2 had concentrations of selenium above the background value. Impacted soil which was identified in the previous phased investigations was removed during the IRA. A 400 feet by 70 feet by 1.5 feet area was excavated, removing approximately 1,433 cubic yards of soil. Verification samples indicated the soil that remained was not impacted above background concentrations for heavy metals. An additional 30 cubic yards of soil were removed from the adjacent Ottawa County property.

Area E Former Drum Burial Area

Analysis of the soil boring samples collected from the former drum burial area did not detect any organic or inorganic contaminants above background or Act 307 Type B Criteria.

Area F Eastern Half of Site

The investigation of this area of concern involved collecting two soil samples from four boring locations. An additional four borings were collected from along the eastern edge of the area for background analysis. The results of the Phase I background borings and the Phase II borings indicated no contaminants were detected above the Part 201 Residential Criteria. No environmental hazard was found in the eastern half of the site.

The results of the soil boring sampling indicate that there is no widespread soil contamination on this portion of the WMHL site.

UST Additional Investigation

A review of the 1985 UST report did not indicate that the four USTs had been removed.

During the Phase I Investigation, a soil boring sample was collected from the area of the former UST #1 at the northeast corner of the building. A second soil boring sample was collected from the UST #4 location. The results of these soil boring samples did not detect any petroleum hydrocarbon contaminants above Part 201 Residential Criteria.

During Phase II, an additional investigation was conducted to determine if UST #3 and #4 located near the southwest corner of the building were removed. The investigation involved searching the area with an EM detector to determine if there were any buried large metal objects in the area. The results of the EM investigation detected no buried metal objects. Therefore, it was concluded that all four of the USTs had been removed and that no environmental impacts were associated with the former USTs.

Phase III Groundwater Sampling

In May 1996, Phase III groundwater samples were collected and analyzed to better establish the nature of the groundwater at the site. Groundwater samples were collected from 21 existing wells and analyzed for VOCs and heavy metals. (See Figure 17 - Phase III Groundwater Sample Locations and Results, Figure 17A - Aluminum, Figure 17B - Manganese, Figure 17C - Zinc, and Figure 17D - Total VOCs [benzene]). Review of the analytical data detected benzene above Part 201 Criteria in five of the monitoring wells, and heavy metals: aluminum, cadmium, lead, manganese, and zinc in numerous monitoring wells.

Phase IV Groundwater Sampling

The Phase IV groundwater sampling event was conducted at the request of the MDEQ to address total metals concentrations in groundwater at monitoring wells MW-02, MW-03, W-42, and W-48. These wells were sampled to provide additional information about concentrations of the metals mentioned in the MDEQ letter dated February 17, 1998. Groundwater samples were collected and analyzed for chromium, vanadium, and beryllium. The only exceedance was for cadmium in W-42. (See Attachment P - Phase IV Groundwater Sampling Results, May 7, 1998).

Five test pits were excavated to investigate several EM survey anomalies for the presence of buried drums. No drums were found in any of the test pits.

Phase V Groundwater and Soil Sampling

Additional groundwater and soil confirmation samples were also collected from the WMHL site in late 1999. Groundwater samples were collected from selected groundwater monitoring wells. Review of the groundwater analytical concluded that benzene continues to be found in the same wells in which it was detected in the past. The total heavy metals analytical results were also similar to past sampling events. For inorganics, aluminum, antimony, beryllium, lead, manganese, vanadium, and zinc were detected in concentrations which exceed Generic Residential Cleanup Criteria in one or more of the MWs located on the site. Of these, aluminum, antimony, lead, manganese, and zinc were also found in background or anthropogenic background wells (anthropogenic background levels are determined by analysis of groundwater that has already been impacted from an upgradient source such as the SWOCLF). However, these were found in several of the monitoring wells and at concentrations that are only slightly above the Generic Residential Cleanup Criteria.

For organics, benzene was the only contaminant detected in the on-site MWs above Part 201 criteria. Benzene has been detected in several of the on-site monitoring wells during the previous sampling events conducted on the WMHL site. All of these detections were found in wells located southwest of the site. Benzene was also found in one of the anthropogenic background wells at similar concentrations.

Selected locations and samples were designated as background samples. Background concentrations from these locations are those common to the groundwater that has not been impacted in any way from any source that is not natural. (See Figure 18 – Phase V Groundwater Sample Locations and Results and Attachment N - Phase III Groundwater Sampling Report, May 6, 1996).

An additional 540 cubic yards of soil was excavated from the haul road area and disposed of off-site. Soil confirmation sample analysis detected chromium, copper, lead, nickel, and zinc. Two additional soil samples were collected from the white powder material located on the northern side of this excavation. Analysis detected chromium, barium, copper, and zinc at concentrations which exceeded Part 201 Direct Contact Criteria. (See Figure 19 - Phase V Additional Soil Excavation Locations). In 2001, two soil samples were collected from the same location as the previous sample A-3 collected during the RI and consisted mostly of the white powder material. Analysis detected no inorganic at concentrations which exceeded Part 201 Direct Contact Criteria.

All of the additional investigations noted above were included in the Final FS and RAP report submitted to the MDEQ in July 2001. (See Attachment Q – Phase V Ground Water and Soil Analytical Data, January 27, 2000).

The initial RAP was submitted to the MDEQ for review in April 1997. Review of the document determined it to be insufficient. An Acknowledgement of Receipt of an Administratively Incomplete RAP letter was sent to WMI, listing the items required, on April 23, 1997. Subsequent RAP submittals were received in January 1998 (see Attachment O) and July 2001, (see Attachment R). Upon review by the MDEQ, both documents were determined to be insufficient. Administratively Incomplete RAP letters were sent for both documents on April 23, 1997, February 17, 1998, and the latter on October 16, 2001. (See Attachment S- MDEQ RAP Non acceptance letters 1997, 1998, and 2001).

Based upon discussions held between the MDEQ and WMI in 2005, WMI has agreed to submit a RAP by June 1, 2006, which will incorporate all the previous site remedial actions and investigations along with additional groundwater information as was required by the PCOR and Part 201. The latest RAP submittal was received on June 1, 2006. Per the requirements of Part 201, MDEQ staff has until December 2006 to determine if the latest RAP submittal is sufficient and complete. Therefore, information from this latest RAP submittal will not be included in this Five-Year Review Report.

Remedy Implementation

The IRA involved excavating impacted soil, removing several empty drums, and conducting a general Site Cleanup. Soil was removed from seven areas of the site, based on either the results of the Phase I and Phase II soil sampling or on visual observations of impacted soil. Approximately 3,930 cubic yards of soil was excavated and disposed of off-site. Twenty eight shallow soil scrapings were excavated from the

surface of the former lagoon area and visually inspected to ensure that all of the soil impacted by the haul road was found and excavated. (See Figure 15 - Soil Scraping Locations). Six empty drums were also removed, crushed, and disposed of off-site. The confirmation samples were collected from the excavated areas and analyzed according to MDEQ guidance. Based upon the results of the verification samples, four areas continued to exceed Part 201 Cleanup Criteria. Additional soil was excavated and the new confirmation samples collected demonstrated that the remaining soil met the Part 201 Generic Cleanup Criteria as well as background screening values for the inorganic contaminants.

Surface debris, including four abandoned cars, were also collected and disposed of off-site.

The groundwater extraction system installed to collect the impacted groundwater plume originating and migrating from the SWOCLF NPL site is also currently the primary discharge area for the groundwater migrating from beneath the WMHL site. The system was originally designed with seven extraction wells intended to pump approximately 1000 gallons per minute (gpm), a treatment system with a capacity of 700 gpm, and a National Pollution Discharge Elimination System permit allowing for up to 750 gpm. In 1990, an additional extraction well, (i.e., pumping well [PW]) PW8 was installed between wells PW3 and PW4 to capture groundwater that was not being captured by the two extraction wells. In 1992, additional enhancements were made to the treatment system. These enhancements included: additional extraction wells, and additional monitoring wells to monitor the effectiveness of the pump and treat/purge system.

The extraction system consists of four extraction wells (PW6, PW7, PW9, and PW10) located along James Street and three extraction wells (PW3, PW4, and PW8) located west of 168th Street and both of the NPL sites. (See Figure 20 - SWOCLF Groundwater Extraction Treatment System). The treatment facility is also located west of 168th Street. The treatment facility treats the water for iron and for organics using carbon adsorption. The treated groundwater is discharged to an unnamed tributary of Lake Macatawa located south of Lakewood Boulevard and between 106th and 168th Street. The treatment system will continue to operate until any groundwater contamination detected beyond the treatment system is below Part 201 Residential Drinking Water Criteria. Currently, the treatment system continues to operate both the carbon adsorption and the chemical oxidation and filtration system with limited efficiency.

More than 130 monitoring wells have been installed in the area of the WMHL site and the SWOCLF sites to monitor the water quality and determine the extent of the groundwater plume. Several of these wells have been installed on the WMHL site and are sampled annually by Ottawa County's consultant, Prein and Newhoff, as part of the remedy for the SWOCLF.

In addition, an institutional control in the form of a RC was implemented to prevent the installation of private wells to access the area groundwater on the WMHL site proper and to limit residential use. As part of the March 2005 Settlement Agreement between the MDEQ and Ottawa County for the SWOCLF in the matter of the *Attorney General of the State of Michigan, ex rel Michigan Department of Environmental Quality v County of Ottawa; Waste Management of Michigan, Inc., et al.* (Michigan Department of Attorney General [MDAG] v Ottawa County), an area wide land and resource use restriction is to be implemented by March 2007.

Annual System Operations/Operation and Maintenance Costs

Annual System Operations and Maintenance (O&M) costs have not been provided by WMI nor has the annual system cost to Ottawa County to operate the treatment system been provided. WMI has reported that it costs up to $10,000 to implement the RC on the WMHL site.

When the RAP process is completed, and if ICs are necessary as part of the final RAP, then MDEQ will require WMI to provide an O&M plan. The plan will include regular inspection of the ICs at the site, a communication plan, and annual certification to the USEPA and the MDEQ that the ICs are in place and effective.

V. Progress Since the Last Review

This is the first Five-Year Review Report to be written for the WMHL site.

VI. Five-Year Review Process

Administrative Components of the Five-Year Review Process

The MDEQ Project Manager (PM), Cindy Fairbanks, notified the USEPA and WMI of the initiation of the Five-Year Review process in a letter dated March 14, 2006. The PM headed the Five-Year Review Team and was assisted by the MDEQ Geologist, William Bolio, the USEPA Regional Project Manager (RPM), Denise Boone, the USEPA Attorney, Ann Coyle, and the USEPA Community Involvement Coordinator (CIC), Robert Paulson.

The review schedule included the following components:

- Community Notification
- Document Review
- Data Review
- Site Inspection
- Five-Year Review Report Development and Review.

Community Notification and Involvement

In March 2006, both the MDEQ PM and the USEPA RPM discussed the need to notify the community of the upcoming Five-Year Review with Robert Paulson. The need to complete the USEPA site file, as well as the site archive, was also discussed. Copies of the missing file information were made by the MDEQ and sent to the USEPA in April 2006. The USEPA ensured the site file archive located at the Herrick District Library, 300 S. River Avenue, Holland, Michigan was complete and up to date. In June 2006, the USEPA's Public Affairs Office placed an ad in the local newspaper announcing that the Five-Year Review was in progress and requesting that any interested parties contact either USEPA and/or MDEQ personnel for additional information. A copy of the newspaper notice is included in Appendix B. Since the announcement notice has been issued, no member of the community has notified the USEPA or the MDEQ of any interest in the Five-Year Review.

Document Review

The Five-Year Review consisted of a review of relevant documents including the following:

- 2003 Investigation Report for the Southwest Ottawa County Landfill Site, Park Township, Ottawa County, Michigan Volume I and II, prepared for the MDEQ, Remediation and Redevelopment Division, by Weston Solutions of Michigan Inc., September 2004
- Additional Groundwater Sample Results, Waste Management Holland Lagoons Letter with attachment, from WMI to MDEQ May 7, 1998
- Baseline Risk Assessment, Waste Management Holland Lagoons, Rust Environmental and Infrastructure January 1997
- Feasibility Study and Remedial Action Plan, Waste Management Holland Lagoons Volume I and Volume II, Rust Environmental and Infrastructure December 1995
- Feasibility Study and Remedial Action Plan, Waste Management Holland Lagoons, Rust Environmental and Infrastructure January 1998
- Final Feasibility Study and Remedial Action Plan, Waste Management Holland Lagoons, Earth Tech July 2001
- Groundwater and Soil Analytical Data, Waste Management Holland Lagoons Superfund Site, Earth Tech January 27, 2000
- Groundwater Profile MDNR 1981
- Groundwater Sampling Results Phase IV May 7, 1998

- Groundwater Sampling, Waste Management Holland Lagoons Superfund Site letter from WMI to MDEQ May 6, 1996
- Lime Deposits Waste Management Holland Lagoons Superfund Site letter from WMI to MDEQ March 20, 2001
- Report on the Tank Removal Operation at the Former Jacobusse site for Waste Management Incorporated October 1985
- Soil Analytical Data, Waste Management Holland Lagoons Superfund Site letter from Earth Tech to MDEQ August 19, 1999 Technical Memorandum for Oversight of Remedial Activities at the Holland Lagoons site December 27, 1995
- Metals Analysis for Soil Samples at Location A3, Waste Management Holland Lagoons site letter from Earth Tech to MDEQ July 31, 2001
- MDNR Groundwater Sampling Investigations from 1984, 1985, and 1988
- Phase I Remedial Investigation Report Waste Management Holland Lagoons Volume I and Volume II, Rust Environmental and Infrastructure December 1995
- Phase I Remedial Investigation Work Plan Volume I Waste Management Holland Lagoons Remedial Investigation/Feasibility Study, Rust Environmental and Infrastructure February 1993
- Phase I Remedial Investigation Work Plan Volume I of IV, Waste Management Holland Lagoons, Holland, Michigan May 1995
- Phase II Remedial Investigation Work Plan Work Plan Volume I and II, Waste Management Holland Lagoons, Holland, Michigan May 1995
- Remedial Investigation Report Waste Management Holland Lagoons Volume I and II, Rust Environmental and Infrastructure January 1997
- Report on the Tank Removal Operation at the Former Jacobusse site for Waste Management Incorporated October 1985
- Soil Analytical Data, Waste Management Holland Lagoons Superfund Site letter from Earth Tech to MDEQ August 19, 1999
- Technical Memorandum for Oversight of Remedial Activities at the Holland Lagoons site December 27, 1995
- USEPA Field Investigation Team Investigation Report, June 1, 1983
- USEPA Hazard Ranking System Score for the WMHL Site, December 1, 1983

Data Review

- Data included in the following documents were reviewed and discussed in this Five-Year Review Report:
- MDNR Groundwater Sampling Investigations from 1984, 1985, and 1988
- Phase I Remedial Investigation Report, WMHL, Holland, Michigan, prepared for WMI by Rust Environmental and Infrastructure December 1995
- Remedial Investigation Report, WMHL, Holland, Michigan, prepared for WMI by Rust Environmental and Infrastructure January 1997
- Baseline Risk Assessment, WMHL, Holland, Michigan, prepared for WMI by Rust Environment and Infrastructure January 1997
- 2003 Investigation Report for the Southwest Ottawa County Landfill Site, Park Township, Ottawa County, Michigan Volume I and II, prepared for the MDEQ, Remediation and Redevelopment Division, by Weston Solutions of Michigan Inc., September 2004
- Final FS and RAP, WMHL, Holland, Michigan, prepared for WMI by Earth Tech, Inc., July 2001

Site Inspection

The Five-Year Review site inspection of the WMHL site was conducted on June 20, 2006. The site inspection team included Cindy Fairbanks and William Bolio from the MDEQ, Denise Boone from the USEPA, and James Forney from WMI. The inspection included a walk-about of the site as well as the treatment system. The site inspection check list can be found in Appendix A.

Interviews

There were no interviews conducted or necessary during the Five-Year Review period as the community interest in this site is minimal.

Institutional Controls

ICs are non-engineered instruments, such as administrative and legal controls that help to minimize the potential for exposure to contamination and that protect the integrity of the remedy. ICs are required to assure long-term protectiveness for any areas which do not allow for UU/UE.

The groundwater currently does not allow for UU/UE. Until a final RAP is adopted by the MDEQ, the following interim ICs are effect:

Governmental ICs have been enacted for the site via the Ottawa County Environmental Code. Article VII, Section C-7 of the code stipulates that the County Health Department

has the authority not to issue a permit to install a private water supply well if the water does not meet National Primary Drinking Water Regulations. The groundwater plume migrating from the SWOCLF site does not meet these regulations, and therefore, the County Health Department will not issue a permit to install a well in the area of the SWOCLF groundwater plume. This area includes the WMHL site. (See Attachment D).

To assure that the County Health Department is aware of the WMHL site specific concerns including use restrictions, and progress with site remediation, the MDEQ recommends that a communication plan be developed by WMI as part of the IC Plan if it is determined that ICs are required in the final RAP.

Included in the Part 201 RAP process, a RC was filed with Ottawa County on August 18, 1997. The following restrictions are identified in the RC:

- restricts the use of the property to those uses compatible with the limited residential land use criteria as defined in Section 20120a(1)(f) of Part 201.

- prohibits groundwater well installation and groundwater use within the property boundary for all domestic, commercial, and industrial uses.

- prohibits the construction of groundwater fed impoundments.

- prohibits excavation of soil beyond the saturated zone.

- requires soil sampling if existing structure is razed and 30-days notice to MDEQ.

As part of the March 2005 settlement agreement between the MDAG v Ottawa County for the SWOCLF, the county is to implement an area wide groundwater use restriction by March 2007. This groundwater restriction will include the WMHL site. In addition, all private wells within the restricted area are to be identified and properly abandoned. All area residents will be able to access the expanded municipal water supply within the area of the groundwater plume for drinking water, thus greatly reducing the exposure risk to groundwater contamination. (See Figure 4 - Municipal Line Map).

For this Five-Year Review, a request from the USEPA, in a letter dated April 18, 2006, was made to WMI to conduct a study of the status of implementing the RC. The Institutional Controls report can be found in Appendix C. The USEPA is providing comments on the IC study to WMI and expects the study to be finalized by April 1, 2007. To assist the MDEQ, after review of the IC Study, U.S EPA will provide comments for the MDEQ's consideration in the final RAP. Additionally, IC maps which depict areas which do not allow for UU/UE will be created by USEPA and placed on the USEPA's Superfund Data Management System (SDMS) as an additional information institutional control by April 1, 2007.

VII. Technical Assessment

- *Question A: Is the remedy functioning as intended by the decision documents?*

Since the RAP for the site has not yet been finalized, it is not possible at the time of writing this Five-Year Review Report to ascertain if the final remedy is functioning as intended.

Remedial Action Performance

The removal of all known contaminated soils from the identified areas of concern, as well as removal of buried drums, other surface debris, and the enclosure of the site by a chain link fence has mitigated the Direct Contact threat on the site to Part 201 Residential Criteria. Remaining areas of potential concern are the soils underlying the site building. Those soils will be investigated at a future time after building demolition.

The expansion of the municipal water supply in the area and active participation of Ottawa County to hook up area residents to the water supply has reduced the threat of drinking the contaminated groundwater. WMI, however, must provide information in the RAP to support that contamination from the known areas of concern are no longer contributing to the groundwater plume originating from the adjacent and upgradient SWOCLF and migrating off-site.

- *Question B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives used at the time of remedy selection still valid?*

Yes. However, since the June 2006 draft RAP for the site has not yet been reviewed, it is not possible at the time of writing this Five-Year Review Report to ascertain if the final remedial action objectives are still functional and protective as intended.

Changes in Standards

When the WMHL site was listed on the NPL, the standards for cleanup were embodied in Act 307. Part 201 replaced Act 307 in 1994, at which point no decision documents related to the WMHL site yet had been issued. Cleanup standards for the WMHL site must comply with current Part 201 requirements and criteria in effect at the time the decision documents are issued.

Changes in Exposure Pathways, Toxicity, and Risk Assessment Methods

There have been no changes in the toxicity factors for the contaminants of concern that were used in the baseline risk assessment and there have been no changes to the standardized risk assessment methodology that could affect the protectiveness of the remedy. Compliance with State of Michigan Applicable or Relevant and Appropriate Requirements (ARARs) ensured compliance with Federal ARARs as the State ARARs are developed in accordance with the Federal requirements. Based upon the review of the ARARs which were identified for the WMHL site, the substantive requirements of the State ARARs address the substantive requirements of the corresponding Federal ARARs.

- *Question C: Has any other information come to light that could call into question the protectiveness of the remedy?*

No, not at this time. However, since the June 2006 draft RAP for the site has not yet been reviewed, it is not possible at the time of writing this Five-Year Review Report to ascertain if the final remedy is functional and protective as intended.

Technical Assessment Summary

According to the review of entire data set, ARARs, risk assumptions and the results of the Site Inspection and the intensive soil and debris removal actions conducted during the IRA, known soil contamination in excess of Part 201 criteria, including direct contact criteria, has been removed. Until WMI provides the necessary groundwater information required by the Part 201 RAP process and the PCOR, it cannot be determined as to whether the site continues to have contamination migration into the groundwater to intermingle with the groundwater plume originating from the SWOCLF and whether the SWOCLF current pump and treatment system is adequate in addressing that contamination. However, with the implementation of the RC and the placement of area residents on the municipal water supply line, the risk of exposure to contaminated groundwater has been reduced.

VIII. Issues

Table 2: Issues

Issues	Affects Current Protectiveness (Y/N)	Affects Future Protectiveness (Y/N)
Non compliance with the Administrative Order of Consent (AOC) requiring the completion of a Part 201 approved Remedial Action Plan (RAP). Incomplete Michigan Department of Environmental Quality (MDEQ) approved RAP which meets all the requirements of Part 201, Environmental Remediation, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (Part 201).	Y	Y
Waste Management, Inc. (WMI) must provide information to prove the six on-site source areas, due to the completion of past remediation activities, are no longer contributing contaminants to the groundwater plume migrating under the site and that all of the contaminants found in the groundwater plume originate from the adjacent and upgradient Southwest Ottawa County Landfill (SWOCLF) National Priorities List (NPL) site.	Y	Y
Assure effective interim ICs are in place pending the final RAP.	N	Y
For the remedy to be protective in the long-term, effective ICs may be implemented and maintained as part of the final RAP.	N	Y
A contamination source area may exist beneath the former office building.	Y	Y

IX. Recommendations and Follow-up Actions

Table 3: Recommendations and Follow-up Actions

	Recommendations	Responsible Party	Oversight Agency	Milestone Date	Affects Protectiveness	
					Current	Future
AOC and RAP	WMI is required to submit to the MDEQ a RAP to meet the requirements of Part 201 and the AOC.	PRP	MDEQ	April 2007	Y	Y
Groundwater	WMI is required to submit to the MDEQ a RAP which provides groundwater information to prove the six on-site source areas are no longer contributing contamination into the groundwater and that all the contamination detected in the groundwater plume is migrating from the adjacent and upgradient SWOCLF NPL site.	PRP	MDEQ	April 2007	Y	Y

Interim ICs	To assure effective interim ICs are in place, USEPA will review the IC Study completed by WMI and US EPA will create IC maps.	PRP	MDEQ	April 2007	N	Y
ICs	If required by the RAP, development of any ICs and an IC plan.	PRP	MDEQ	April 2008	N	Y
Former Office Building	Evaluate soils under the former office building and other areas as may be required under the RAP.	PRP	MDEQ	April 2008	Y	Y

X. Protectiveness Statement(s)

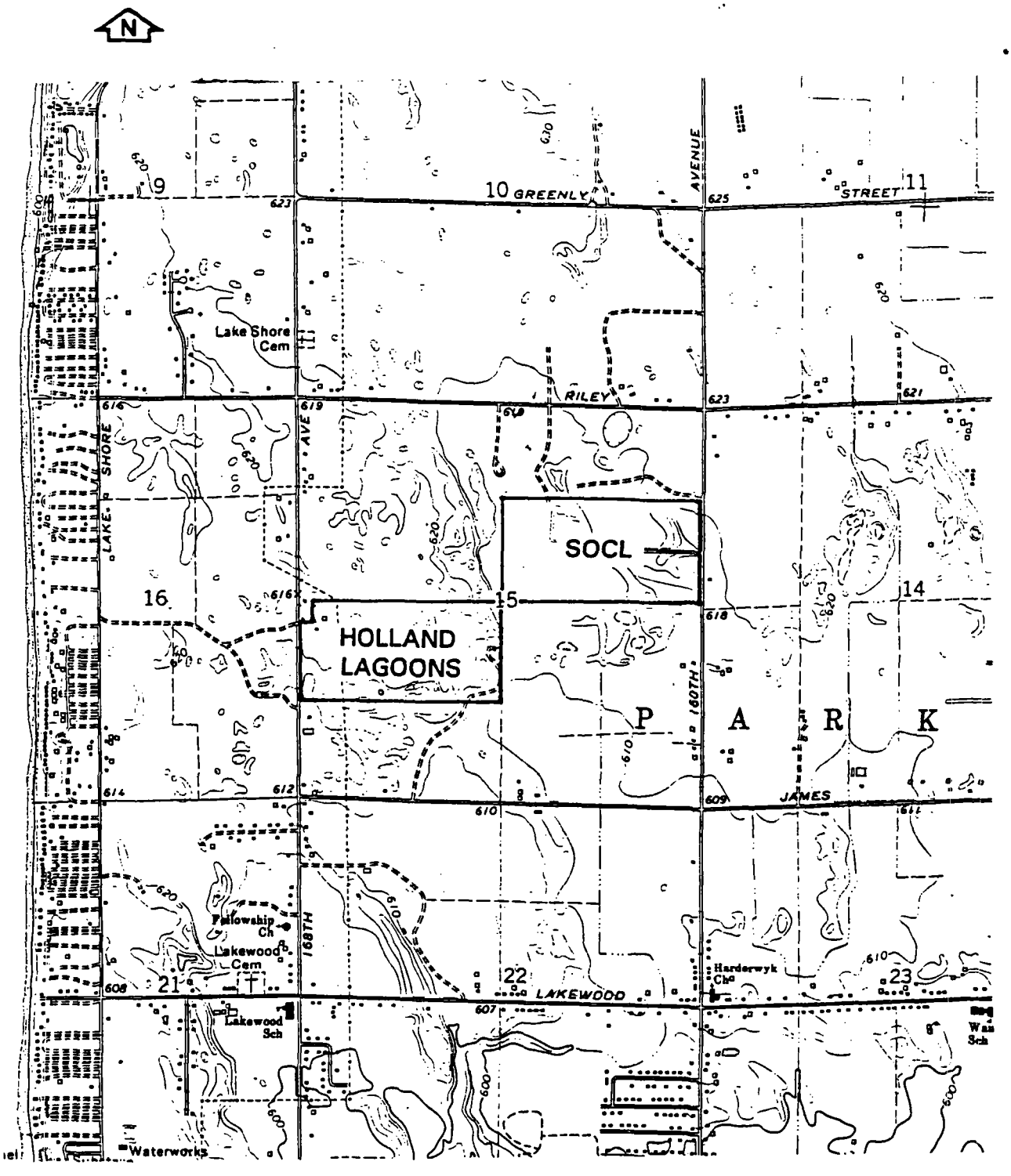
Protectiveness deferred:

The remedy is protective in the short-term. There is no evidence of exposure to site-related contaminants. Furthermore, interim ICs which serve to notify the public of the areas which do not allow for unlimited use and unrestricted exposure exist until the final RAP is complete. Long-term protectiveness is dependent upon effective ICs, or additional remedial actions, if they are required by the final RAP.

XI. Next Review

The next Five-Year Review for the WMHL Superfund site is required by September 26, 2011, five years from the date of this review.

FIGURES



SOURCE: USGS QUADRANGLE ENTITLED "HOLLAND WEST, MICHIGAN" 1972

RUST ENVIRONMENT & INFRASTRUCTURE

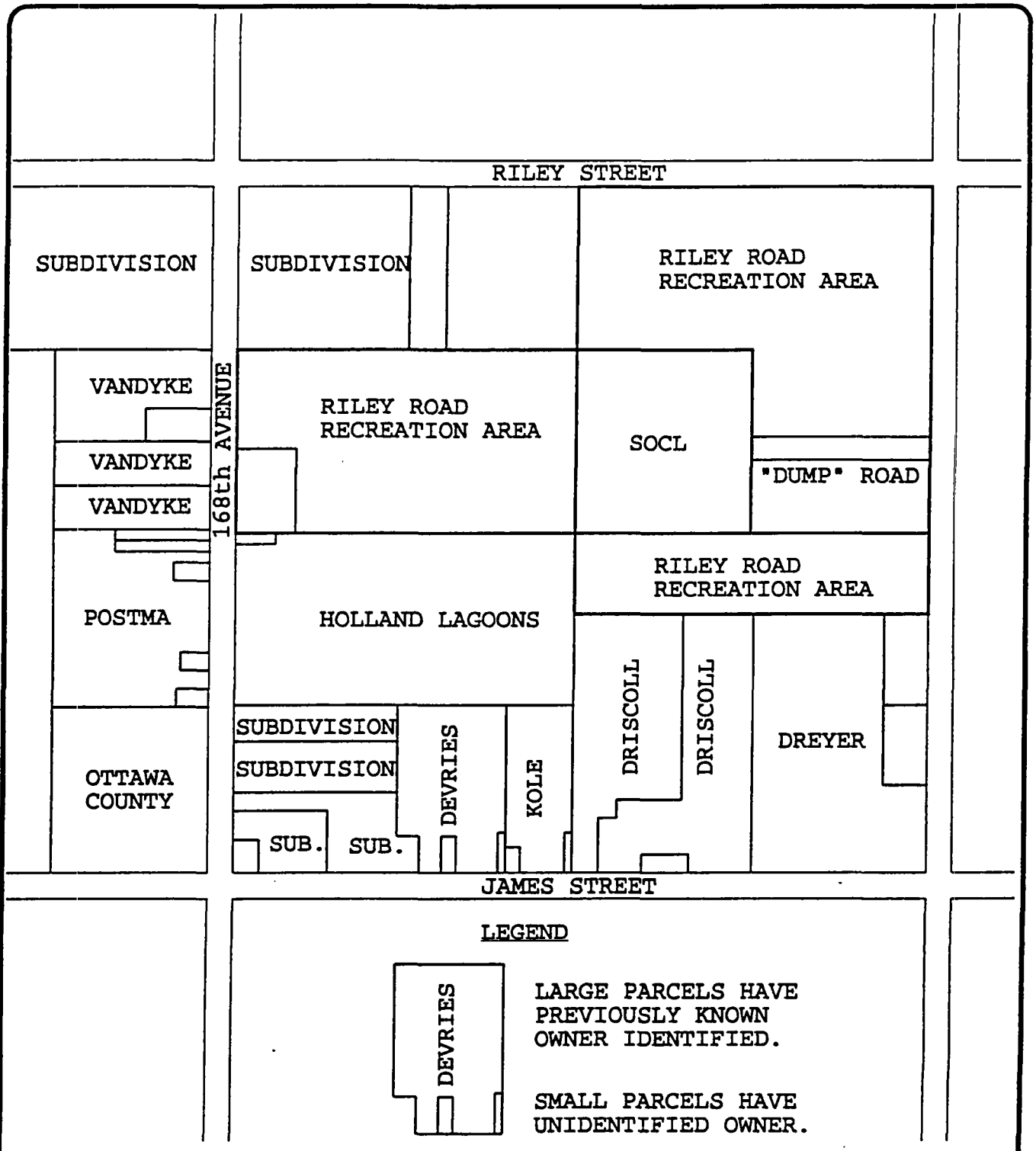
0 2000ft

DATE 10/04/92 JOB NO. M2302

CAD FILE NO. M2302FIG1

SITE LOCATION MAP

WASTE MANAGEMENT OF MICHIGAN
HOLLAND LAGOONS
FIGURE 1



SOURCE: LAND ATLAS AND PLOT BOOK
OTTAWA COUNTY, MICHIGAN
1993

ADJOINING PROPERTY MAP

WASTE MANAGEMENT OF MICHIGAN
HOLLAND LAGOONS
FIGURE 2

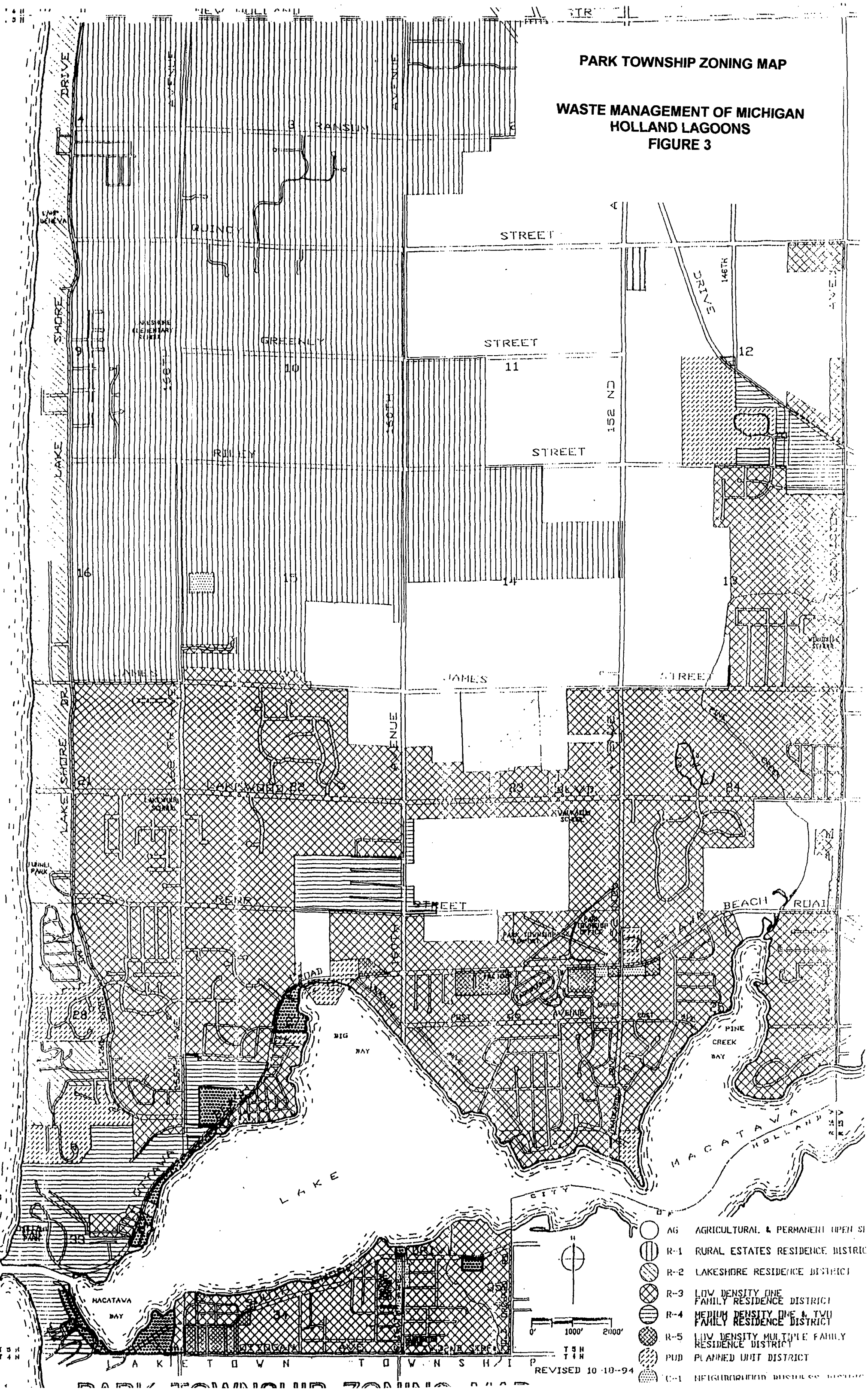
ACAD REF FILES

PRINT SCALE: 1"=1'
PEN TABLE: 042_ACAD
PRINT DATE: 07/09/96

DWG SIZE: 8.5x11
RUST OFFICE: OAK BROOK
FILENAME: 70691\ERA_1-2.DWG

PARK TOWNSHIP ZONING MAP

WASTE MANAGEMENT OF MICHIGAN
HOLLAND LAGOONS
FIGURE 3



SDMS US EPA Region V

Imagery Insert Form

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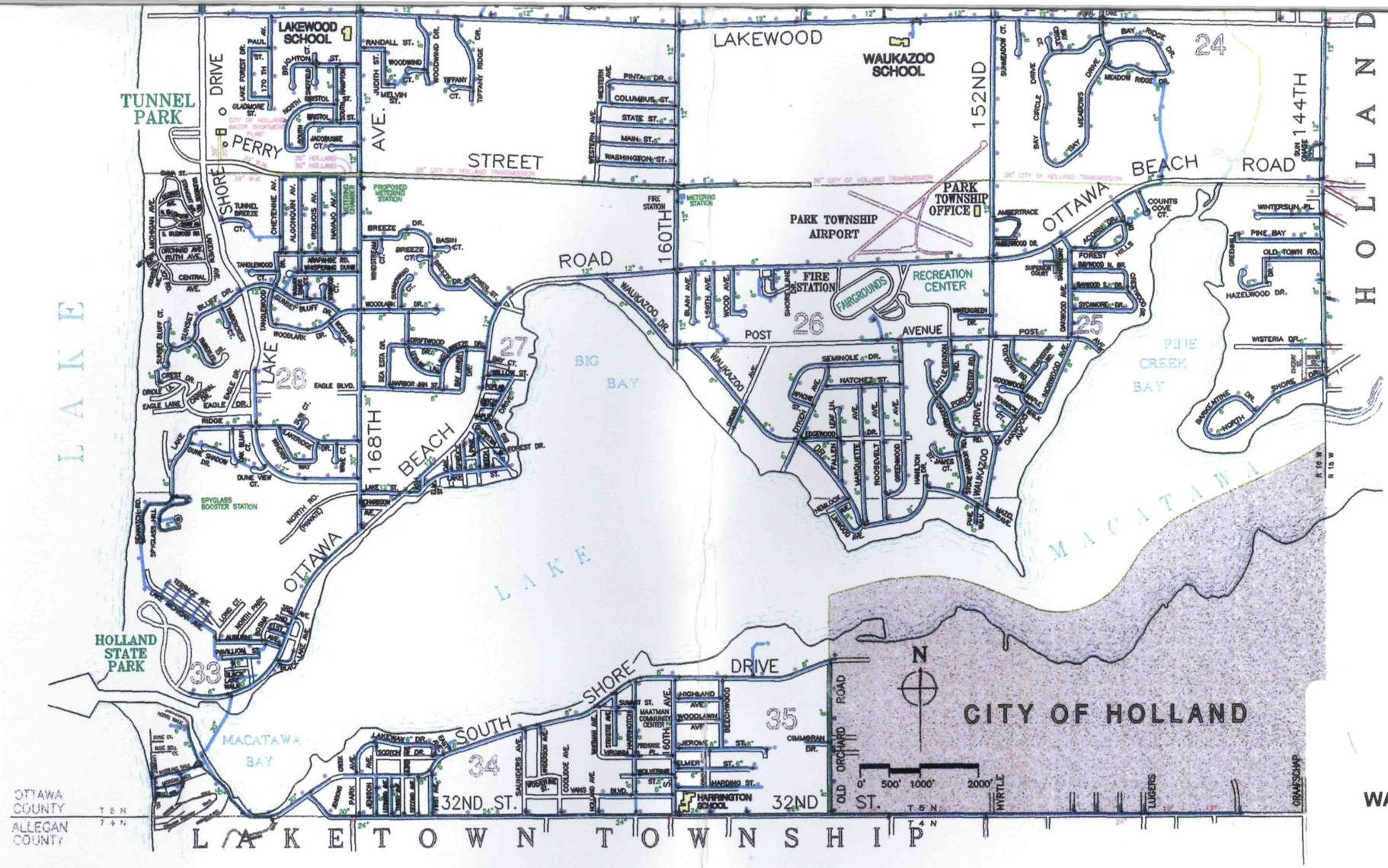
Specify Type of Document(s) / Comments:

FIGURE 4 - MUNICIPAL LINE MAP - PARTIALLY SCANNED

☐ Document is available at the EPA Region 5 Records Center.

Specify Type of Document(s) / Comments:



MUNICIPAL LINE MAP

WASTE MANAGEMENT OF MICHIGAN
HOLLAND LAGOONS
FIGURE 4

LEGEND

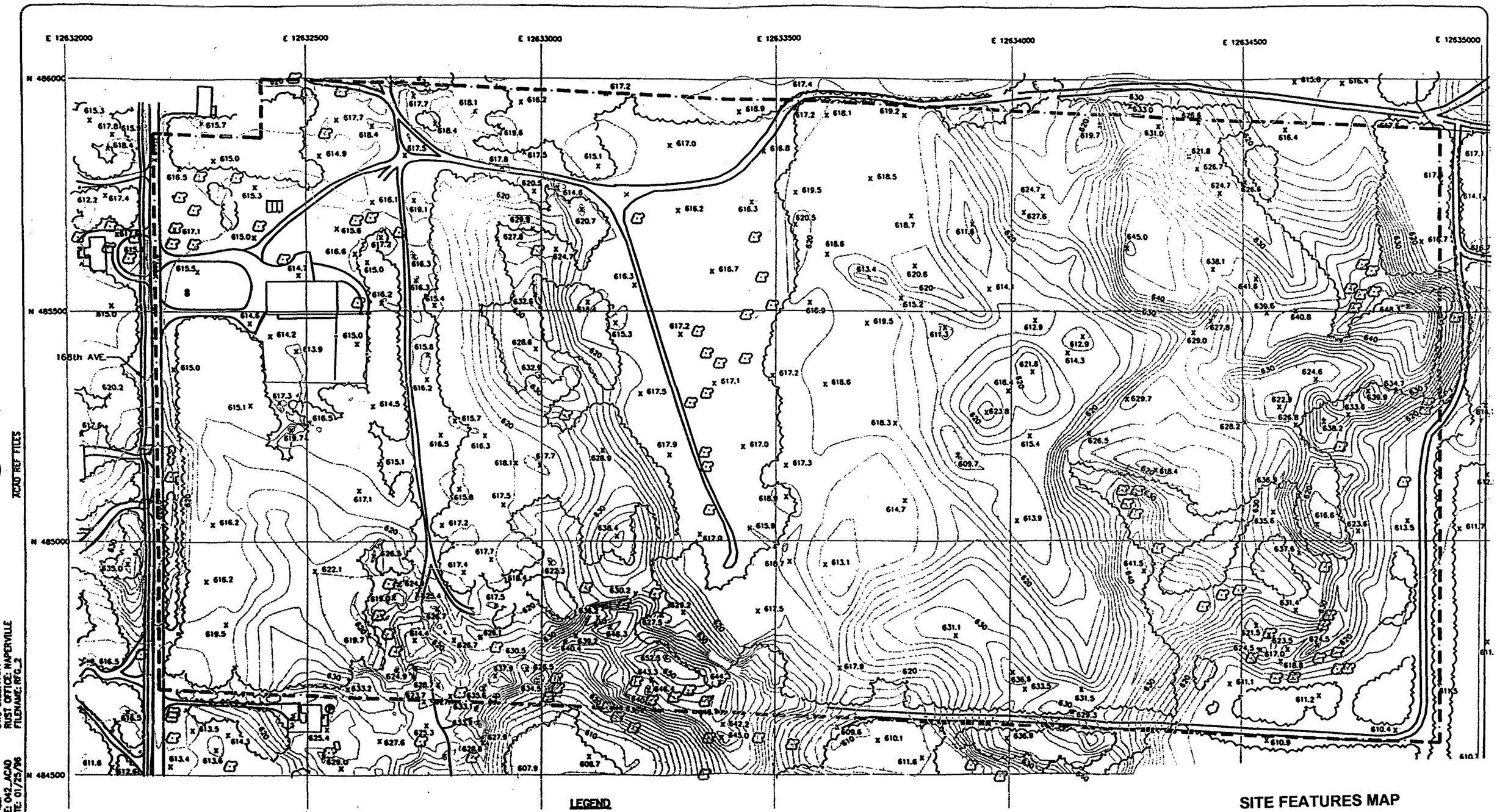
- EXISTING WATER MAIN
- LINE VALVE & VALVE NUMBER
- HYDRANT
- FUTURE WATERMAIN
- EXISTING WATER MAIN (CITY OF HOLLAND, HOLLAND TOWNSHIP & LAKETOWN TOWNSHIP)
- EXISTING TRANSMISSION (CITY OF HOLLAND)
- EXISTING TRANSMISSION (CITY OF WYOMING)

WATER SUPPLY SYSTEM

PARK TOWNSHIP
OTTAWA COUNTY, MICHIGAN

PREIN & NEWHOF
CONSULTING ENGINEERS
HOLLAND - MICHIGAN

FEBRUARY 1999



PRINT SCALE:
PEN TABLE: 042_ACAD
PRINT DATE: 01/25/96
DWG SIZE: 17x11
RUST OFFICE: NAPERVILLE
FILENAME: RFC_2
ACAD REF FILES

SITE FEATURES MAP

WASTE MANAGEMENT OF MICHIGAN
HOLLAND LAGOONS
FIGURE 5

E 12632000 E 12632500 E 12633000 E 12633500 E 12634000 E 12634500 E 12635000

N 486000 N 485500 N 485000 N 484500

W-23
W-24
W-26

APPROXIMATE LOCATION
OF FORMER LAGOONS

W-57
W-50
W-51
W-56

THOMAS
WELL

W-42
W-43

W-46

W-10

W-11

W-21
W-22

W-48

W-34
W-35

W-27
W-28
W-29

W-38
W-39

LEGEND

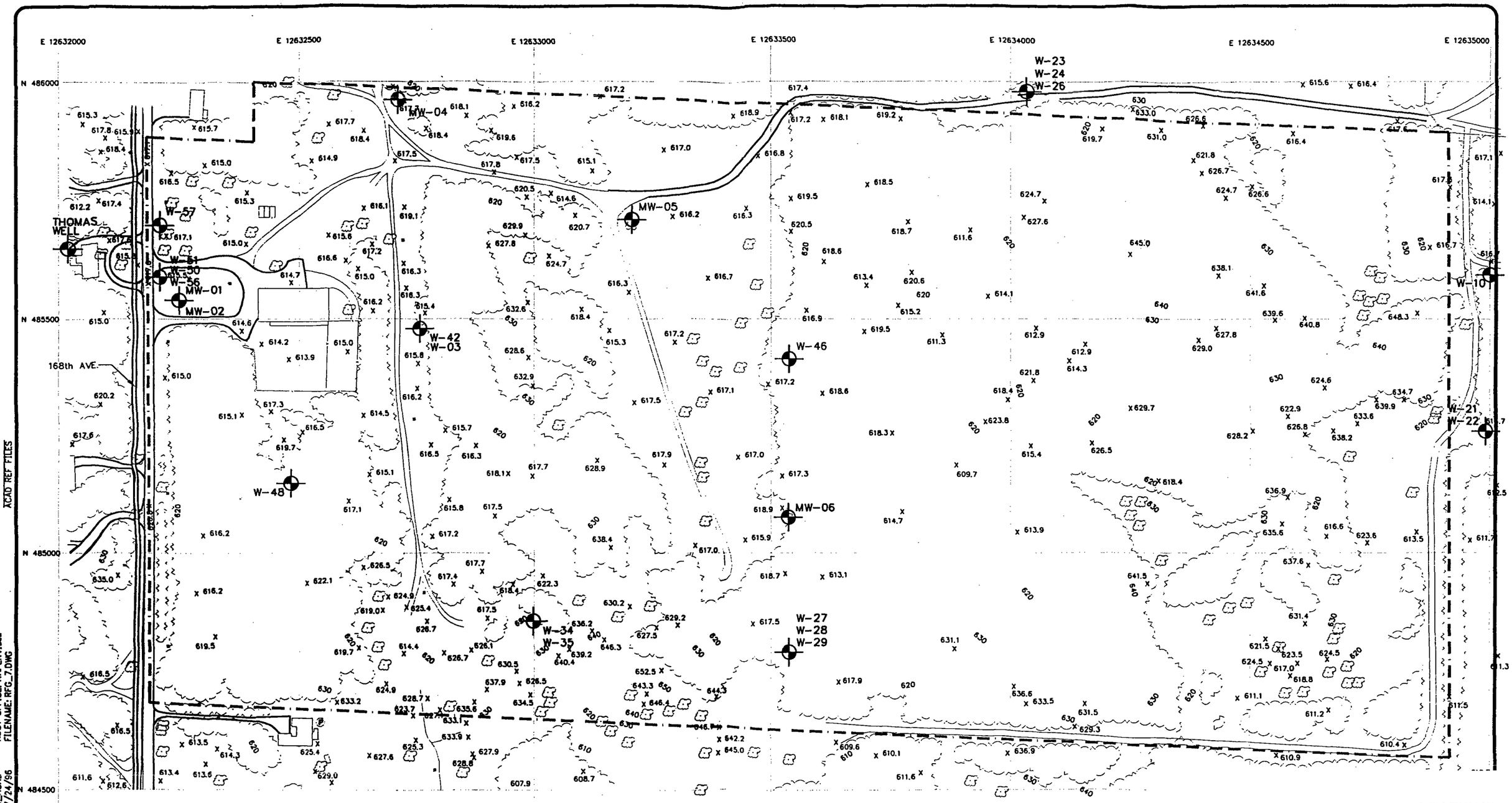
- SITE PROPERTY BOUNDARY
- TRAILS
- FOREST
- ELEVATION CONTOUR LINE
- W-48 MONITORING WELL
- THOMAS WELL WATER WELL

SWOCLF MONITORING WELL LOCATIONS FROM 1992

WASTE MANAGEMENT OF MICHIGAN
HOLLAND LAGOONS
FIGURE 6

SEC

DATE 11/23/9
CAD FILE NO. 2



LEGEND

- SITE PROPERTY BOUNDARY
- TRAILS
- FOREST
- 620 GROUND SURFACE ELEVATION CONTOUR LINE
- W-XX EXISTING MONITORING WELLS

CURRENT MONITORING WELL LOCATIONS

WASTE MANAGEMENT OF MICHIGAN
HOLLAND LAGOONS
FIGURE 6A

E 12632000 E 12632500 E 12633000 E 12633500 E 12634000 E 12634500 E 12635000

N 486000 N 485500 N 485000 N 484500

AREA A
SITE ENTRANCE

AREA B
FORMER
LAGOONS

AREA C FORMER
LANDFILL

AREA D
HAUL ROAD

AREA E
FORMER
DRUM BURIAL

AREA F
EASTERN HALF OF
SITE

168th AVE.

ACAD REF FILES

PRINT SCALE: 1"=200'
PEN TABLE: 042_ACAD
PRINT DATE: 07/09/96

DWG SIZE: 17x11
RUST OFFICE: OAK BROOK
FILENAME: 70691\ERA_3-2.DWG

LEGEND

- SITE PROPERTY BOUNDARY
- TRAILS
- FOREST
- 620 GROUND SURFACE ELEVATION CONTOUR LINE
- AREAS OF CONCERN

SITE AREAS OF CONCERN

WASTE MANAGEMENT OF MICHIGAN
HOLLAND LAGOONS
FIGURE 7

E 12632000 E 12632500 E 12633000 E 12633500 E 12634000 E 12634500 E 12635000

N 486000 N 485500 N 485000 N 484500

168th AVE

SURFACE SAMPLE: BELOW CRITERIA
WATER TABLE SAMPLE: BELOW CRITERIA

A-3

SURFACE SAMPLE: BELOW CRITERIA
WATER TABLE SAMPLE: BELOW CRITERIA

A-4

SURFACE SAMPLE: BELOW CRITERIA
WATER TABLE SAMPLE: BELOW CRITERIA

B-1

SURFACE SAMPLE: SELENIUM – 0.55 mg/kg
WATER TABLE SAMPLE: BELOW CRITERIA

D-2

SURFACE SAMPLE: BELOW CRITERIA
WATER TABLE SAMPLE: BELOW CRITERIA

A-2

SURFACE SAMPLE: ARSENIC – 5.9mg/kg
WATER TABLE SAMPLE: BELOW CRITERIA

A-1

SURFACE SAMPLE: BELOW CRITERIA
WATER TABLE SAMPLE: BELOW CRITERIA

X-1

SURFACE SAMPLE: CYANIDE – 0.42mg/kg
WATER TABLE SAMPLE: BELOW CRITERIA

C-2

SURFACE SAMPLE: BELOW CRITERIA
WATER TABLE SAMPLE: BELOW CRITERIA

C-1

SURFACE SAMPLE: BELOW CRITERIA
WATER TABLE SAMPLE: BELOW CRITERIA

B-2

SURFACE SAMPLE: CHROMIUM – 1060mg/kg
COPPER – 838mg/kg
LEAD – 58mg/kg
NICKEL – 478mg/kg
SELENIUM – 0.42mg/kg
ZINC – 171mg/kg
CYANIDE – 14.4mg/kg
WATER TABLE SAMPLE: CHROMIUM – 58.1mg/kg
COPPER – 50.1mg/kg
NICKEL – 24.2mg/kg

D-1

SURFACE SAMPLE: SELENIUM – 0.42mg/kg
WATER TABLE SAMPLE: BELOW CRITERIA

X-2

SURFACE SAMPLE: BELOW CRITERIA
DUPLICATE SURFACE SAMPLE: BELOW CRITERIA
WATER TABLE SAMPLE: BELOW CRITERIA

X-3

SURFACE SAMPLE: LEAD – 22.8mg/kg
ZINC – 59.8mg/kg
DUPLICATE SURFACE SAMPLE: ZINC – 53.2mg/kg
WATER TABLE SAMPLE: BELOW CRITERIA
DUPLICATE WATER TABLE SAMPLE: BELOW CRITERIA

SURFACE SAMPLE: BELOW CRITERIA
WATER TABLE SAMPLE: BELOW CRITERIA

C-3

SURFACE SAMPLE: BELOW CRITERIA
WATER TABLE SAMPLE: BELOW CRITERIA

E-1

SURFACE SAMPLE: BELOW CRITERIA
WATER TABLE SAMPLE: BELOW CRITERIA

X-4

SURFACE SAMPLE: BELOW CRITERIA
WATER TABLE SAMPLE: BELOW CRITERIA

X-5

SURFACE SAMPLE: BELOW CRITERIA
WATER TABLE SAMPLE: BELOW CRITERIA

AREA A

AREA B

AREA C

AREA D

AREA E

H-105

NOTES:

1) BELOW CRITERIA INDICATES:
INORGANICS: RESULTS WERE BELOW BACKGROUND CRITERIA FOR DEFAULT TYPE A.
ORGANICS: RESULTS WERE BELOW TYPE B CLEANUP OBJECTIVES.

LEGEND

- SITE PROPERTY BOUNDARY
- TRAILS
- FOREST
- 620 GROUND SURFACE ELEVATION CONTOUR LINE
- 607 WATER TABLE ELEVATION CONTOUR LINE
- AREAS OF CONCERN

SURFACE SAMPLE: BELOW CRITERIA
WATER TABLE SAMPLE: BELOW CRITERIA — SOIL SAMPLING RESULTS

C-3 — SOIL BORING

DATE:
CAD

1994 SOIL SAMPLE LOCATIONS AND RESULTS

WASTE MANAGEMENT OF MICHIGAN
HOLLAND LAGOONS
FIGURE 8

E 12632000 E 12632500 E 12633000 E 12633500 E 12634000 E 12634500 E 12635000

N 486000 N 485500 N 485000 N 484500

ORIGINAL SAMPLING: ARSENIC – 0.85 ug/l
LEAD – 5.1ug/l
1st RESAMPLING: NOT SAMPLED
2nd RESAMPLING: NOT SAMPLED

ORIGINAL SAMPLING: ACETONE – 1800ug/l
ARSENIC – 0.77ug/l
1st RESAMPLING: NOT SAMPLED
2nd RESAMPLING: NO DETECTIONS ABOVE TYPE B CRITERIA

ORIGINAL SAMPLING: ACETONE – 5700ug/l
ARSENIC – 1.4ug/l
IRON – 628ug/l
DUPLICATE OF ORIGINAL SAMPLING: ACETONE – 5200ug/l
ARSENIC – 1.6ug/l
IRON – 630ug/l
1st RESAMPLING: NOT SAMPLED
2nd RESAMPLING: NO DETECTIONS ABOVE TYPE B CRITERIA

ORIGINAL SAMPLING: ACETONE – 12000ug/l
ARSENIC – 2.8ug/l
IRON – 5480ug/l
1st RESAMPLING: ACETONE – 3300ug/l
2nd RESAMPLING: NOT SAMPLED

ORIGINAL SAMPLING: ACETONE – 17000ug/l
ARSENIC – 3.6ug/l
IRON – 1290ug/l
HEPTACHLOR – 0.04ug/l
1st RESAMPLING: NOT SAMPLED
2nd RESAMPLING: NO DETECTIONS ABOVE TYPE B CRITERIA

ORIGINAL SAMPLING: NOT SAMPLED
1st RESAMPLING: NOT SAMPLED
2nd RESAMPLING: NO DETECTIONS ABOVE TYPE B CRITERIA

ORIGINAL SAMPLING: ALUMINUM – 99.7ug/l
ARSENIC – 0.91ug/l
1st RESAMPLING: NOT SAMPLED
2nd RESAMPLING: NOT SAMPLED

ORIGINAL SAMPLING: ACETONE – 10000ug/l
CHRYSENE – 1ug/l
BENZO(K)FLUORANTHENE – 1ug/l
ALUMINUM – 63.1ug/l
ARSENIC – 0.82ug/l
LEAD – 6.4ug/l
1st RESAMPLING: NOT SAMPLED
2nd RESAMPLING: NO DETECTIONS ABOVE TYPE B CRITERIA

ORIGINAL SAMPLING: BENZENE – 2ug/l
ARSENIC – 2.5ug/l
IRON – 488ug/l
1st RESAMPLING: NOT SAMPLED
2nd RESAMPLING: NO DETECTIONS ABOVE TYPE B CRITERIA

ORIGINAL SAMPLING: ACETONE – 49000ug/l
ARSENIC – 4.1ug/l
IRON – 10000ug/l
MANGANESE – 209ug/l
DUPLICATE OF ORIGINAL SAMPLING: ACETONE – 28000ug/l
ARSENIC – 3.9ug/l
IRON – 11100ug/l
LEAD – 9.4ug/l
MANGANESE – 231ug/l
1st RESAMPLING: NO DETECTIONS ABOVE TYPE B CRITERIA
2nd RESAMPLING: BENZENE – 16ug/l
1,2-DICHLOROETHANE – 0.5ug/l
DUPLICATE OF 2nd RESAMPLING: BENZENE – 19ug/l
1,2-DICHLOROETHANE – 0.6ug/l

ORIGINAL SAMPLING: BENZENE – 12ug/l
ARSENIC – 7.0ug/l
IRON – 753ug/l
LEAD – 7.1ug/l
MANGANESE – 177ug/l
1,2-DICHLOROETHENE 4ug/l
1st RESAMPLING: BENZENE – 21ug/l
2nd RESAMPLING: BENZENE – 20ug/l

ORIGINAL SAMPLING: NOT SAMPLED
1st RESAMPLING: NOT SAMPLED
2nd RESAMPLING: BENZENE – 18ug/l

ORIGINAL SAMPLING: ARSENIC – 0.65ug/l
IRON – 896ug/l
1st RESAMPLING: NOT SAMPLED
2nd RESAMPLING: NOT SAMPLED

TW MW-01 MW-02 MW-3 W-5 W-10 W-22 W-23 W-24 W-25 W-26 W-27 W-28 W-29 W-34 W-42 W-43 W-45 W-46 W-51 V-4021

168th AVE.

H-105

NOTES:

1) THE ORIGINAL SAMPLING WAS PERFORMED IN JULY 1994. VOLATILES, SEMIVOLATILES, METALS AND PESTICIDES WERE SAMPLED.
2) THE 1st RESAMPLING WAS PERFORMED IN AUGUST 1994. VOLATILES WERE SAMPLED.
3) THE 2nd RESAMPLING WAS PERFORMED IN JANUARY 1995. VOLATILES WERE SAMPLED.

LEGEND

- SITE PROPERTY BOUNDARY
- TRAILS
- FOREST
- 620 GROUND SURFACE ELEVATION CONTOUR LINE
- 607 WATER TABLE ELEVATION CONTOUR LINE
- W-34 GROUNDWATER MONITORING WELL

ORIGINAL SAMPLING: ARSENIC – 0.65 ug/l
LEAD – 5.1ug/l
1st RESAMPLING: NOT SAMPLED
2nd RESAMPLING: NOT SAMPLED

GROUNDWATER SAMPLING RESULTS ABOVE TYPE B CRITERIA

DATE:
CAD F

GROUNDWATER SAMPLING RESULTS ABOVE TYPE B CRITERIA

WASTE MANAGEMENT OF MICHIGAN HOLLAND LAGOONS

FIGURE 9

MW-01(Phase I)	
Aluminum	3,700
Lead	15.2
Manganese	181
Acetone	1,800

MW-01 (2nd Resample)	
ND	NA

MW-02 (Phase I)	
Aluminum	49,000
Antimony	12.8
Beryllium	4.3
Lead	91.1
Manganese	2,030
Vanadium	149

MW-03 (Phase I)	
Aluminum	4,020
Lead	8.1
Manganese	289
Acetone	5,700

MW-03 (2nd Resample)	
ND	NA

W-24 (Phase I)	
Lead	114
Zinc	88,300
Acetone	17,000

W-24 (2nd Resample)	
ND	NA

W-23 (2nd Resample)	
ND	NA

W-26 (Phase I)	
Lead	9.8
Acetone	12,000

W-26 (1st Resample)	
Acetone	3,300

Thomas Well (Phase I)	
ND	NA

W-51 (Phase I)	
Aluminum	3,360
Lead	281
Zinc	17,000
Acetone	10,000

W-51 (2nd Resample)	
ND	NA

W-42 (Phase I)	
Lead	102

W-46 (2nd Resample)	
Benzene	22

W-48 (Phase I)	
Cadmium	5.2
Lead	98.6
Manganese	181
Zinc	18,400
Benzene	12

W-48 (1st Resample)	
Benzene	21

W-48 (2nd resample)	
Benzene	20

W-34 (Phase I)	
Manganese	208
Acetone	49,000

W-34 (1st Resample)	
ND	NA

W-22 (Phase I)	
Aluminum	1,350
Lead	30.6
Zinc	11,200

AVENUE

AVENUE

168TH

SOUTHWEST OTTAWA COUNTY
REFUSE SITE

THOMAS WELL

EVERGREEN PLANTINGS

W-13 W-51(20') MW-01(30') MW-02(8') MW-03(34') W-42(40') W-48(20') W-46(20') MW-06(20') W-34(20') W-24(20') W-23(40') W-26(8') W-10 W-22(20') W-16(20') W-15(40') W-18(20')

ACAD REF FILES

DWG SIZE:17x11
RUST OFFICE: NAPERVILLE
FILENAME: RFG_10o.DWG

PRINT SCALE:
PEN TABLE: 042_ACAD
PRINT DATE: 07/24/96

PHASE I GROUNDWATER SAMPLE LOCATIONS AND RESULTS

WASTE MANAGEMENT OF MICHIGAN
HOLLAND LAGOONS
FIGURE 10

HL-SS-A1-1	
Arsenic	5.9
Beryllium	0.15

HL-SS-A2-1	
Beryllium	0.63

HL-SS-A5-1	
Lead	22.8
Zinc	59.8

HL-SS-D1-1	
Chromium	1,080
Copper	838
Lead	59.0
Nickel	478
Zinc	171
Cyanide	14.4

HL-SS-D1-2	
Chromium	58.1
Copper	50.1
Nickel	24.2

LEGEND

- SITE PROPERTY BOUNDARY
- TRAILS
- FOREST
- 620 — GROUND SURFACE ELEVATION CONTOUR LINE
- C-3 — SOIL BORING

PHASE II SOIL SAMPLE LOCATIONS AND RESULTS

WASTE MANAGEMENT OF MICHIGAN
HOLLAND LAGOONS
FIGURE 11

PRINT SCALE:
PEN TABLE: 042_ACAD
PRINT DATE: 01/25/96
DWG SIZE:17x11
RUST OFFICE: NAPERVILLE
FILENAME: RFG_2-6
ACAD REF FILES

AVENUE

AVENUE

8TH

THOMAS WELL

HWEST OTTAWA COUNTY
REFUSE SITE

W-88 (Phase II)	
Antimony	11.2
Lead	6.8
Heptachlor	0.57
Aldrin	0.50
Dieldrin	1.3
Endrin	1.7
Aroclor-1254	2.2

W-13 (Phase II)	
Antimony	8.2

MW-04 (Phase II)	
Antimony	6.1

MW-05 (Phase II)	
Manganese	195

W-46 (Phase II)	
Antimony	10.0
Lead	4.2
Manganese	291

MW-06 (Phase II)	
Manganese	306
Benzene	14

W-89 (Phase II)	
Aluminum	1,800
Antimony	8.5
Lead	12.0
Sodium	197,000
Zinc	4,210
Benzene	19
Aldrin	0.10

W-16 (Phase II)	
ND	NA

W-18 (Phase II)	
ND	NA

W-15 (Phase II)	
ND	NA

MW-04(20')
MW-05(20')
W-51(20')
MW-01(30')
MW-02(8')
MW-03(34')
W-42(40')
W-46 (20')
W-48 (20')
W-34(20')
MW-06(20')
W-24(20')
W-23 (40')
W-26 (61')
W-88(40')
W-89(40')
W-13
W-16 (20')
W-15 (40')
W-18 (20')

ACAD REF FILES

DWG SIZE: 17x11
RUST OFFICE: NAPERVILLE
FILENAME: RFG_10b.DWG

PRINT SCALE:
PEN TABLE: 042_ACAD
PRINT DATE: 07/24/96

PHASE II GROUNDWATER SAMPLE LOCATIONS AND RESULTS

WASTE MANAGEMENT OF MICHIGAN
HOLLAND LAGOONS
FIGURE 12

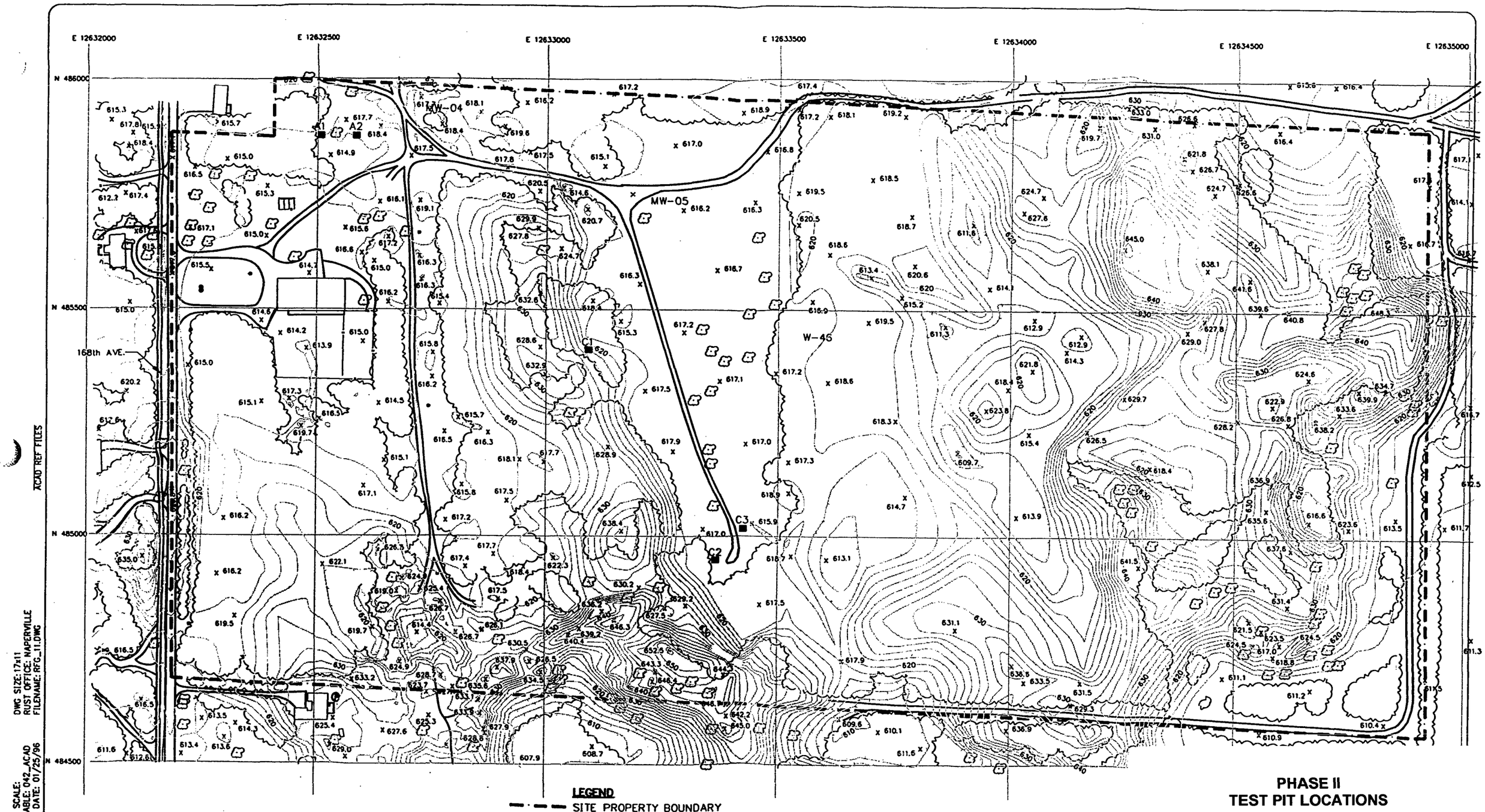
E 12632000 E 12632500 E 12633000 E 12633500 E 12634000 E 12634500 E 12635000

N 486000 N 485500 N 485000 N 484500

168th AVE.

MW-04 MW-05 W-46

A1 A2 C1 C2 C3



LEGEND

- SITE PROPERTY BOUNDARY
- TRAILS
- FOREST
- 620 GROUND SURFACE ELEVATION CONTOUR LINE
- C2 TEST PIT LOCATIONS

PHASE II
TEST PIT LOCATIONS

WASTE MANAGEMENT OF MICHIGAN
HOLLAND LAGOONS
FIGURE 13

PRINT SCALE:
PEN TABLE: 042_ACAD
PRINT DATE: 01/25/96

DWG SIZE: 17x11
RUST OFFICE: NAPERVILLE
FILENAME: RFG_11.DWG

ACAD REF FILES

E 12632000 E 12632500 E 12633000 E 12633500 E 12634000 E 12634500 E 12635000

N 486000 N 485500 N 485000 N 484500

ASH AREA NORTH OF BUILDING

HAUL ROAD AREA OFF-SITE

HAUL ROAD AREA ON-SITE

C4 AREA

C5 AREA

C1A AREA

168th AVE.

TRENCH SOUTH OF BUILING

BERMED DRUM AREA

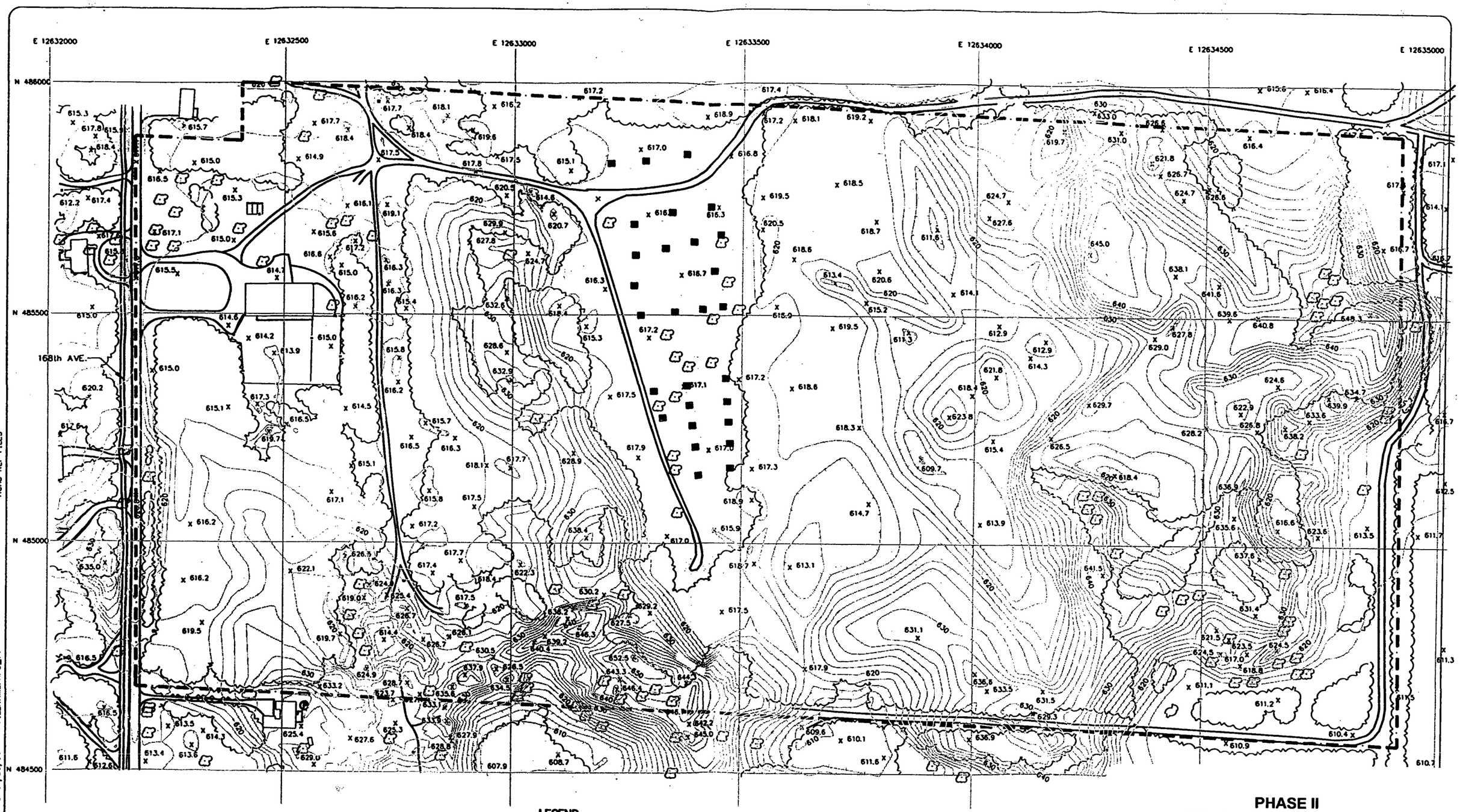
LEGEND

- SITE PROPERTY BOUNDARY
- TRAILS
- FOREST
- 620 GROUND SURFACE ELEVATION CONTOUR LINE
- AREA OF SOIL EXCAVATION

PHASE II
SOIL EXCAVATION LOCATIONS

WASTE MANAGEMENT OF MICHIGAN
HOLLAND LAGOONS
FIGURE 14

PRINT SCALE:
PEN TABLE: 042_ACAD
PRINT DATE: 01/25/96
DWG SIZE: 17x11
RUST OFFICE: NAPERVILLE
FILENAME: FIG_12
ACAD REF FILES



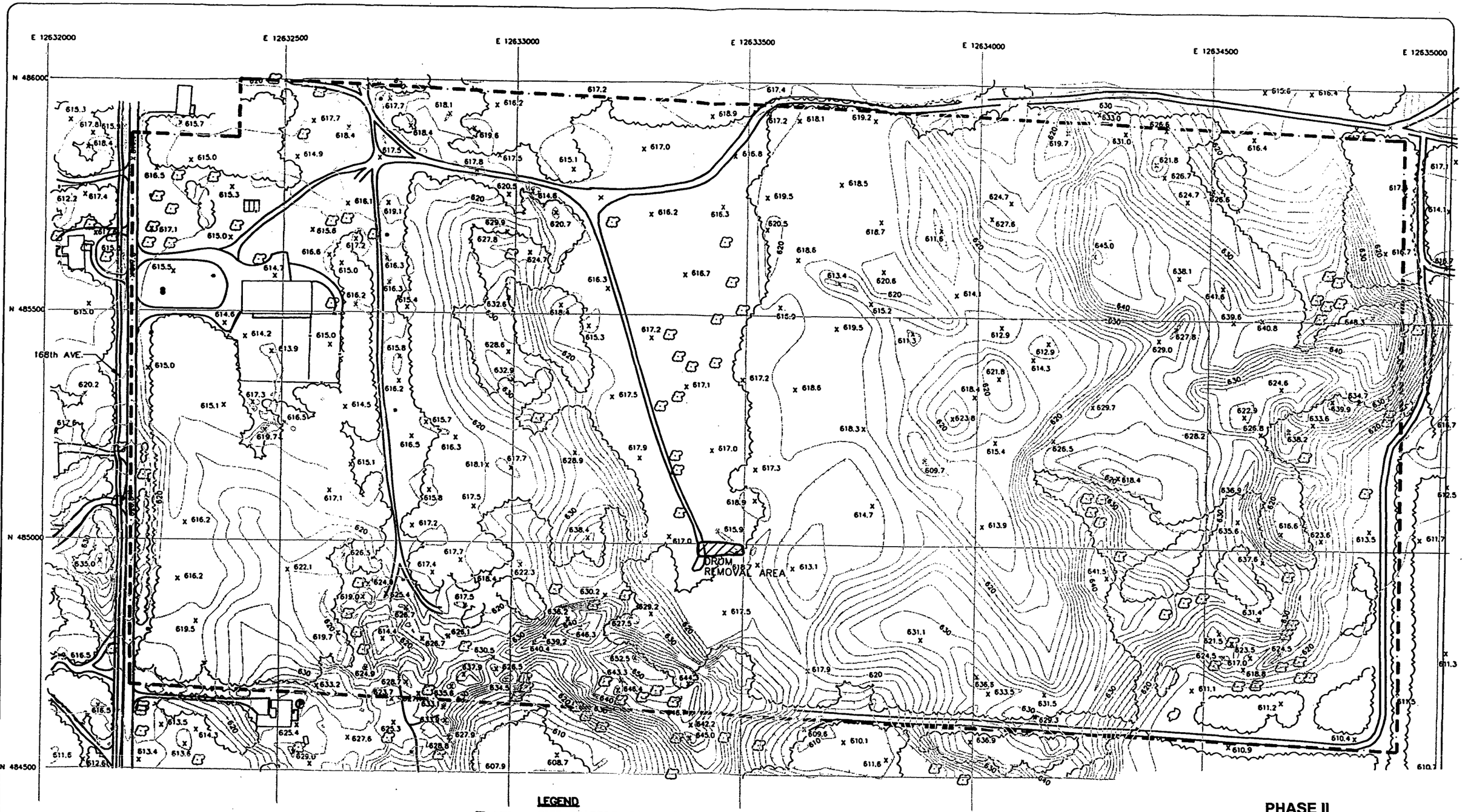
LEGEND

- SITE PROPERTY BOUNDARY
- TRAILS
- FOREST
- 620 GROUND SURFACE ELEVATION CONTOUR LINE
- SOIL SCRAPING LOCATION

PHASE II
SOIL SCRAPING LOCATIONS

WASTE MANAGEMENT OF MICHIGAN
HOLLAND LAGOONS
FIGURE 15

PRINT SCALE:
PEN TABLE: 042_ACAD
PRINT DATE: 01/25/96
DWG SIZE: 17x11
RUST OFFICE: NAPERVILLE
FILENAME: RFG_14
ACAD REF FILES



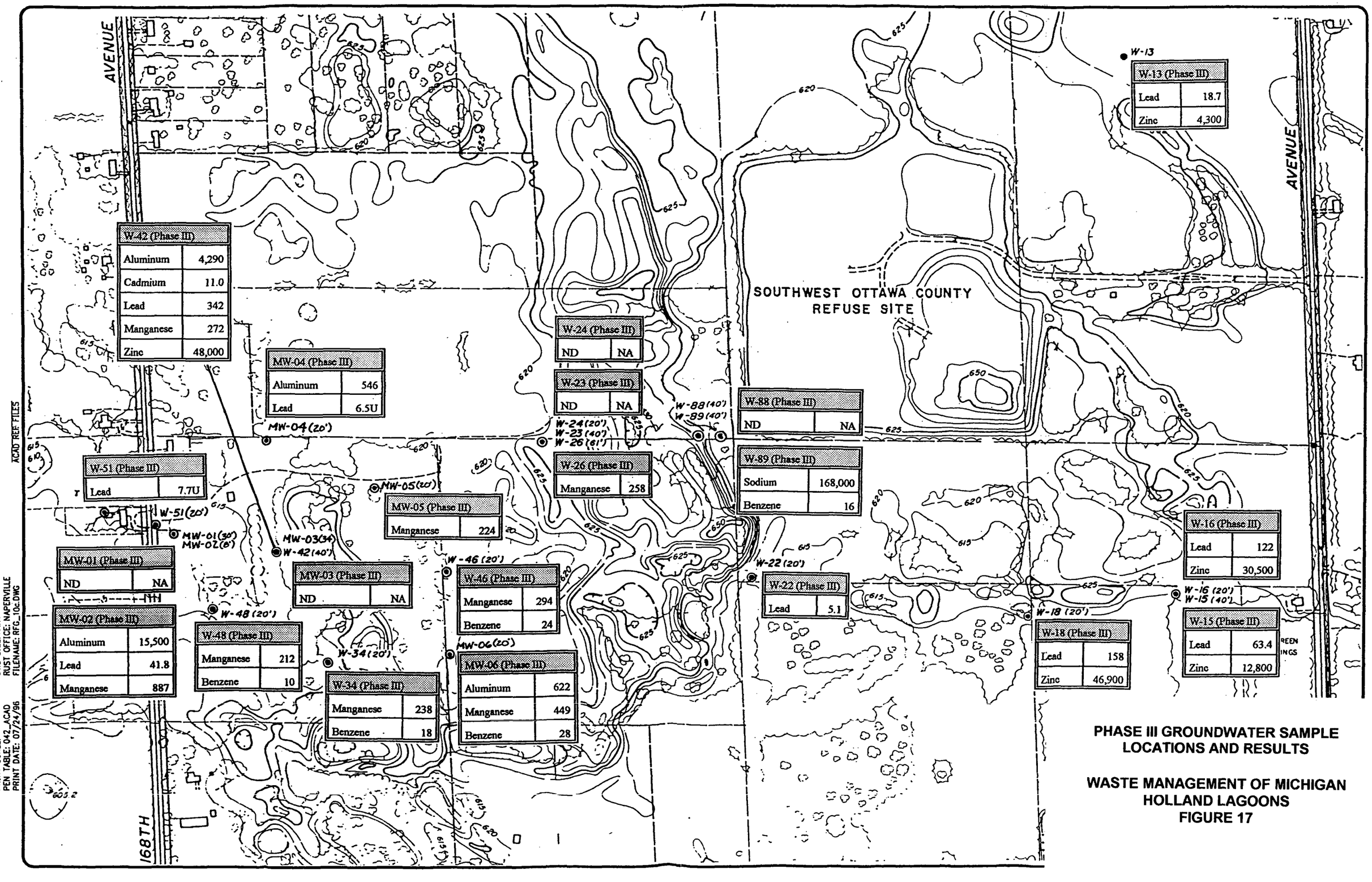
LEGEND

- SITE PROPERTY BOUNDARY
- TRAILS
- FOREST
- 620 GROUND SURFACE ELEVATION CONTOUR LINE
- DRUM REMOVAL AREA

PHASE II
DRUM REMOVAL

WASTE MANAGEMENT OF MICHIGAN
HOLLAND LAGOONS
FIGURE 16

PRINT SCALE:
PEN TABLE: 042_ACAD
PRINT DATE: 01/25/96
DWG SIZE: 17x11
RUST OFFICE: NAPERVILLE
FILENAME: RFG_13
ACAD REF FILES



PHASE III GROUNDWATER SAMPLE LOCATIONS AND RESULTS

WASTE MANAGEMENT OF MICHIGAN
HOLLAND LAGOONS
FIGURE 17

AVENUE

8TH

SOUTHWEST OTTAWA COUNTY
REFUSE SITE

EVERGREEN
PLANTINGS

MW-04(20') 546

MW-05(20') 261

MW-01(30') 164
MW-02(8') 15,500

MW-03(34') 115
W-42(40') 4,290

W-51(20') 86

W-48(20') 93

W-34(20') 82

W-46(20') 144

MW-06(20') 622

W-24(20') 69
W-23(40') 82
W-26(61') 82

W-88(40') 123
W-89(40') 110

W-22(20') 150

W-16(20') 125
W-15(40') 147

W-18(20') 169

W-13 221

PHASE III GROUNDWATER RESULTS
ALUMINUM

WASTE MANAGEMENT OF MICHIGAN
HOLLAND LAGOONS
FIGURE 17A

ACAD REF FILES

DWG SIZE: 17x11
RUST OFFICE: NAPERVILLE
FILENAME: RFG_106.DWG

PRINT SCALE:
PEN TABLE: 042_ACAD
PRINT DATE: 07/24/96

AVENUE

AVENUE

8TH

SOUTHWEST OTTAWA COUNTY
REFUSE SITE

EVERGREEN
PLANTINGS

W-13
30

MW-04(20')
119

W-24(20') 108
W-23(40') 110
W-26(61') 258

W-88(40') 113
W-89(40') 178

MW-05(20')
224

W-51(20') 12

MW-01(30') 80
MW-02(6') 887

MW-03(34') 272
W-42(40') 105

W-46(20')
294

W-48(20')
212

W-34(20')
238

MW-06(20')
449

W-22(20')
141

W-16(20') 102
W-15(40') 92

W-18(20')
12

PHASE III GROUNDWATER RESULTS
MANGANESE

WASTE MANAGEMENT OF MICHIGAN
HOLLAND LAGOONS
FIGURE 17B

ACAD REF FILES

DWG SIZE: 17x11
RUST OFFICE: NAPERVILLE
FILENAME: RFG_10b.DWG

PRINT SCALE:
PEN TABLE: 042_ACAD
PRINT DATE: 07/24/96

AVENUE

AVENUE

8TH

SOUTHWEST OTTAWA COUNTY
REFUSE SITE

W-13
4,300

MW-04(20')
26

MW-05(20')
21

W-51(20') 343

MW-01(30') 23
MW-02(6') 82

MW-03(34') 49
W-42(40') 48,000

W-48(20')
334

W-34(20')
850

W-46(20')
72

MW-06(20')
20

W-24(20') 60
W-23(40') 50
W-26(61') 325

W-88(40') 1,080
W-89(40') 275

W-22(20')
1,310

W-18(20')
46,000

W-16(20') 30,500
W-15(40') 12,800

EVERGREEN
PLANTINGS

PHASE III GROUNDWATER RESULTS
ZINC

WASTE MANAGEMENT OF MICHIGAN
HOLLAND LAGOONS
FIGURE 17C

ACAD REF FILES

DWG SIZE: 17x11
RUST OFFICE: NAPERVILLE
FILENAME: RFG_10b.DWG

PRINT SCALE:
PEN TABLE: 042_ACAD
PRINT DATE: 07/24/96

AVENUE

AVENUE

8TH

SOUTHWEST OTTAWA COUNTY
REFUSE SITE

W-13
ND

MW-04(20')
ND

W-24(20') 11
W-23(40') ND
W-26(61') 265

W-88(40') 6.5
W-89(40') 26

MW-05(20')
2.4

W-51(20') ND

MW-01(30') ND
MW-02(6') ND

MW-03(34') 2.7
W-42(40') 8.2

W-46(20')
24

W-48(20')
10

W-34(20')
27

MW-06(20')
28

W-22(20')
ND

W-16(20') 1.3
W-15(40') 1.7

W-18(20')
3.8

EVERGREEN
PLANTINGS

PHASE III GROUNDWATER RESULTS
TOTAL VOCs (Benzene)

WASTE MANAGEMENT OF MICHIGAN
HOLLAND LAGOONS
FIGURE 17D

ACAD REF FILES
DWG SIZE:17x11
RUST OFFICE: NAPERVILLE
FILENAME: RFG_10b.DWG
PRINT SCALE:
PEN TABLE: 042_ACAD
PRINT DATE: 07/24/96

E 12632000 E 12632500 E 12633000 E 12633500 E 12634000 E 12634500 E 12635000

N 486000 N 485500 N 485000 N 484500

ASH AREA NORTH OF BUILDING

HAUL ROAD AREA OFF-SITE

HAUL ROAD AREA ON-SITE

Area of additional Soil Excavation

C4 AREA

C5 AREA

C1A AREA

168th AVE.

TRENCH SOUTH OF BUILING

BERMED DRUM AREA

LEGEND

SITE PROPERTY BOUNDARY

TRAILS

FOREST

620 GROUND SURFACE ELEVATION CONTOUR LINE

AREA OF SOIL EXCAVATION IN 1995

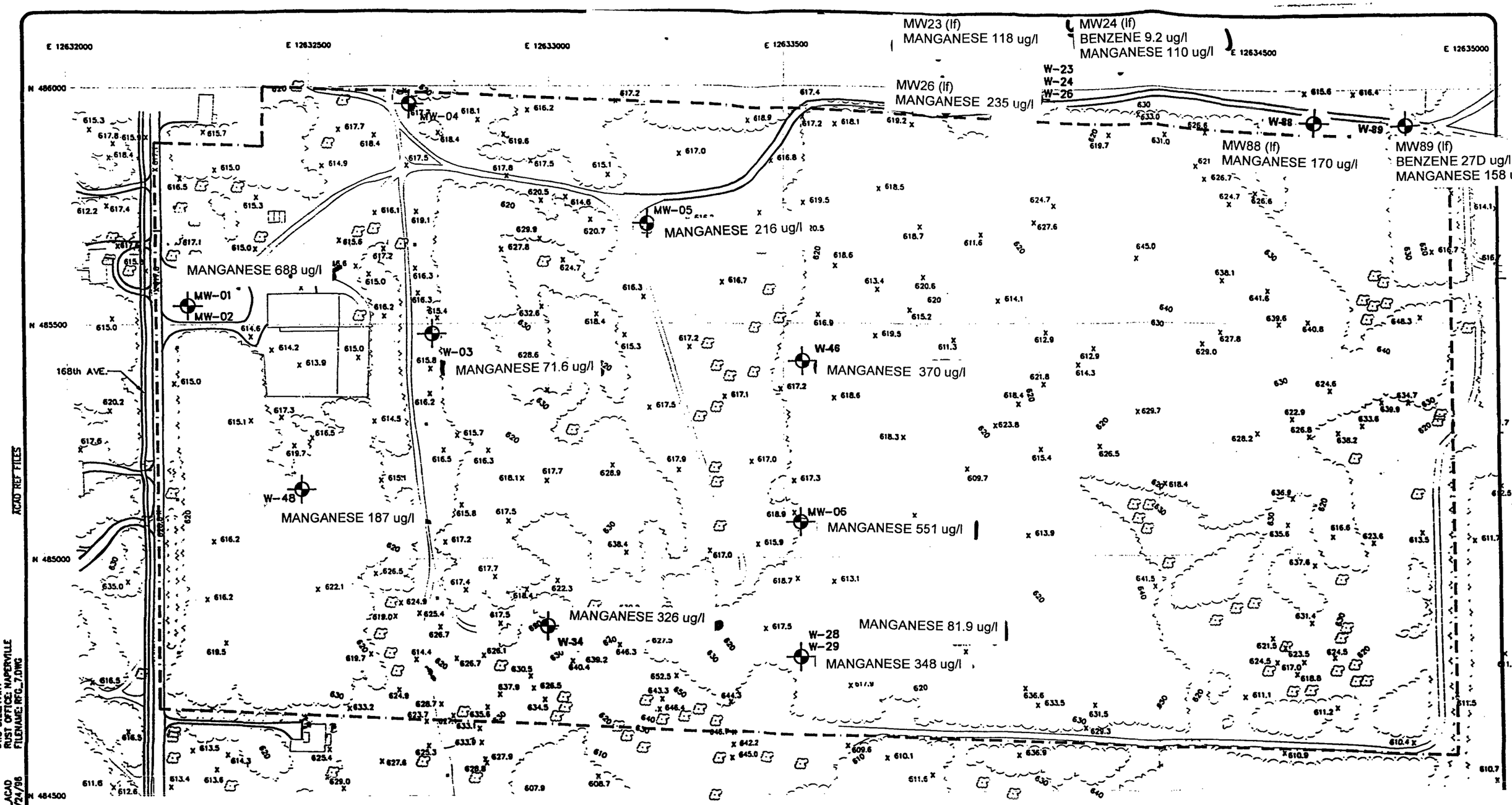
PHASE V ADDITIONAL SOIL EXCAVATION LOCATIONS

WASTE MANAGEMENT OF MICHIGAN
HOLLAND LAGOONS
FIGURE 19

PRINT SCALE:
PEN TABLE: 042_ACAD
PRINT DATE: 01/25/96

DWG SIZE:17x11
RUST OFFICE: NAPERVILLE
FILENAME: FIG_12

ACAD REF FILES



DWG SIZE:17x11
RUST OFFICE: NAPERVILLE
FILENAME: RFG_7.DWG

PRINT SCALE:
PEN TABLE: 042_ACAD
PRINT DATE: 07/24/96

ACAD REF FILES

LEGEND

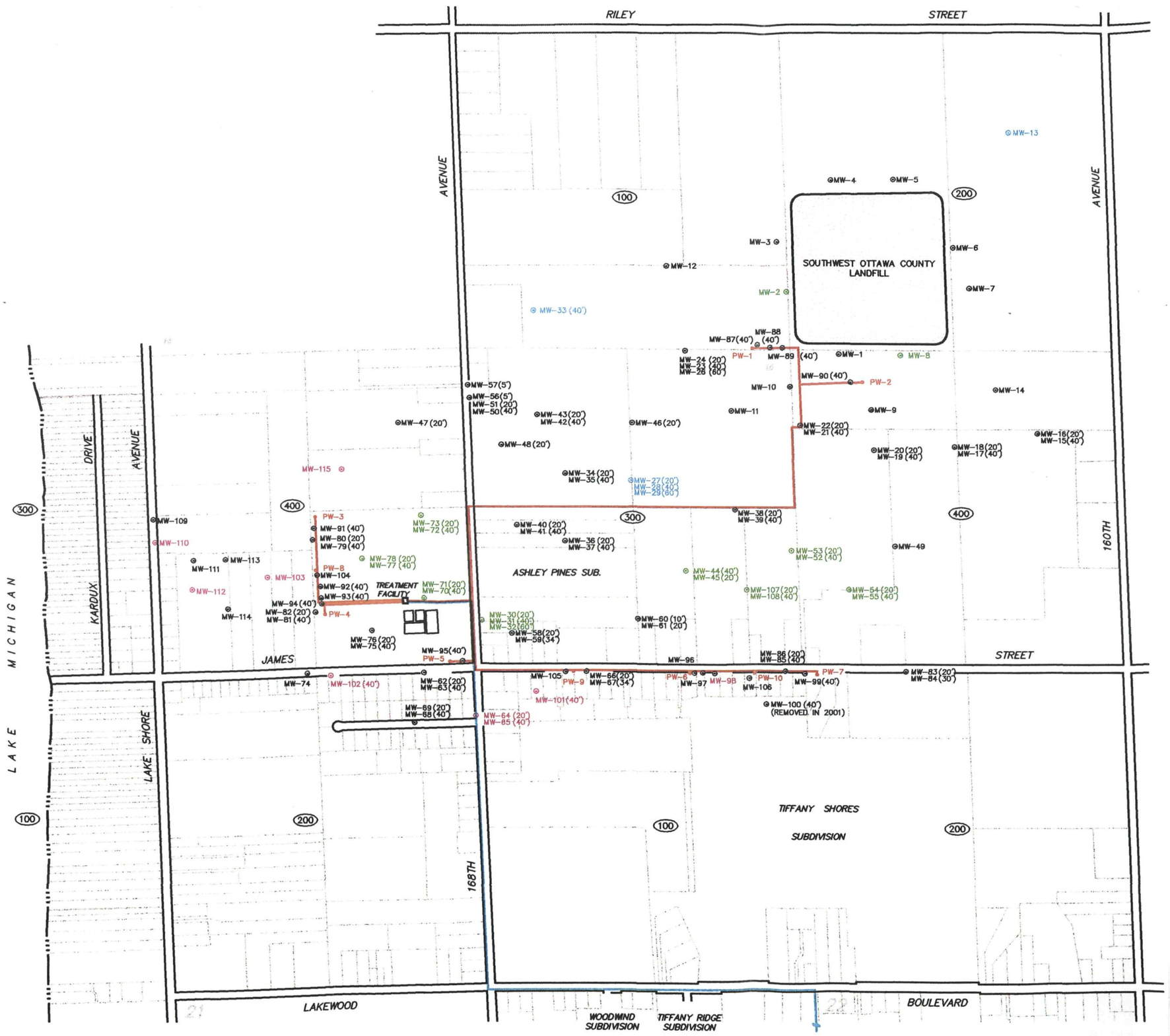
- SITE PROPERTY BOUNDARY
- TRAILS
- FOREST
- 620 GROUND SURFACE ELEVATION CONTOUR LINE
- W-XX EXISTING MONITORING WELLS

PART 201 RES DRINKING WATER CRITERIA

BENZENE 5 ug/l
MANGANESE 50 ug/l

PHASE V GROUNDWATER SAMPLE LOCATIONS

WASTE MANAGEMENT OF MICHIGAN
HOLLAND LAGOONS
FIGURE 18



N

SCALE : 1" = 800'

LEGEND

MW (40')	MONITORING WELL
PW	PURGE WELL
	PURGE WELL PIPING
	DISCHARGE PIPING
	CONE OF INFLUENCE WELLS
	UPGRADIENT & INTERMEDIATE WELLS
	PERIMETER WELLS (DOWNGRADIENT)

SWOCLF GROUNDWATER EXTRACTION SYSTEM

WASTE MANAGEMENT OF MICHIGAN HOLLAND LAGOONS

FIGURE 20

PREIN & NEWHOF
CONSULTING ENGINEERS
GRAND RAPIDS, MICHIGAN
79049

T:/Land Projects/79049/Fig1-00.dwg

ATTACHMENTS

ATTACHMENT A

SUPERFUND MEMORANDUM OF AGREEMENT ADDENDUM II BETWEEN THE MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY AND THE UNITED STATES ENVIRONMENTAL PROTECTION AGENCY, REGION 5

I. PURPOSE

The Michigan Department of Environmental Quality (MDEQ) and the United States Environmental Protection Agency, Region 5 (Region 5) have entered a Superfund Memorandum of Agreement (SMOA). Among other things, the SMOA establishes operating procedures for general coordination and communication between the MDEQ and Region 5 regarding the Superfund program. Pursuant to Part II.A. of the SMOA, the MDEQ has been designated lead agency for remedial activities at selected sites in the state of Michigan. The purpose of this addendum is to further define the roles and responsibilities of Region 5 and the MDEQ with respect to activities conducted at state enforcement lead sites.

II. BACKGROUND

The MDEQ and Region 5 recognize the importance of facilitating the cleanup of sites by Potentially Responsible Parties (PRPs). Both agencies agree that it is in the best interest of the environment and the Superfund program to exercise their authorities and use their resources in mutually complementary ways and to minimize the duplication of effort, especially in the area of remedial enforcement.

The MDEQ has long been involved in remedial enforcement activities at federal Superfund sites, as co-signatories with Region 5 on various consent decrees and through management assistance grants. In addition, using enforcement authority pursuant to Part 201 of the Natural Resources and Environmental Protection Act, 1994 PA 451 (formerly known as the Michigan Environmental Response Act), the MDEQ has entered into enforceable agreements with PRPs that require the PRPs to perform investigations and/or cleanups at sites of environmental contamination. Based on both of the above factors, the MDEQ has been designated as the lead agency at selected sites in the state of Michigan appearing on the National Priorities List (NPL). These sites are designated as state enforcement lead sites.

Region 5 recognizes that the MDEQ has implemented this law (Part 201), and has the ability to select and implement cleanups that are protective of human health and the environment.

III. PRINCIPLES

For those state enforcement lead sites in Michigan that have been investigated and/or remediated in compliance with Part 201 and for which the MDEQ has approved a Remedial Action Plan

(RAP), Region 5 will not plan or anticipate any federal response action under the Comprehensive Environmental Response, Compensation and Liability Act unless, in exceptional circumstances, conditions at the property are such that the site may pose an imminent and substantial endangerment to public health or welfare or the environment or an emergency situation. Region 5 will consult with the MDEQ, and give the MDEQ an opportunity to correct such non-compliance with the approved RAP, prior to making a determination that federal response action is necessary at any state enforcement lead site. The Region 5 decision not to take federal response action unless the site poses an imminent and substantial endangerment or emergency will apply to both current and future state enforcement lead investigations and cleanups.

When a state enforcement lead site has been remediated in compliance with Part 201 pursuant to a RAP approved by the MDEQ, MDEQ will request via letter to EPA that deletion from the NPL be initiated. In making a determination to delete a release from the NPL, EPA shall consider, in consultation with the state, whether any of the criteria in 300.425 (e) (1) has been met. After making this determination, Region 5 will initiate the process required to delete the site from the NPL.

Region 5 will work with the MDEQ to remove any concerns about federal activity under Superfund so as to encourage the investigation and/or remediation of NPL sites in Michigan by PRPs in accordance with Part 201 and under the direction of the MDEQ.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

Date 3/19/97

William E. Muno, Director
Superfund Division

STATE OF MICHIGAN

Date 3/24/97

Russell J. Harding, Director
Michigan Department of
Environmental Quality

DRAFT PROCEDURE

SUBJECT: Process to identify and obtain Superfund funding for investigation and mitigation of Michigan environmental contamination sites as State lead projects

INFORMATION: With State funds becoming limited for investigation and mitigation of contamination sites, more sites listed on the Michigan Sites of Environmental Contamination Priority Lists than State staff can respond to, and the desirability of obtaining Federal funds for orphan site mitigation, sites not currently in progress in the 201 Program could be addressed via new State Lead Superfund actions. This procedure describes the process whereby ERD staff will identify and initiate remedial activities at contamination sites via State Lead Site Assessment Teams resulting in Non Time-Critical Actions or nomination to the National Priorities List.

WHO	DOES WHAT
Superfund Section and District Office	Reviews Part 201 Sites List for candidate sites. Identifies sites not active in Part 201 program remedial action (either fund financed or PRP action) which have priority in the 201 list. Selection criteria: District priority, probable delay in assigning District staff due to other priorities, significant site (large amount of waste, off-site migration likely or occurring, complicated site conditions, environmental or human exposure likely or occurring), NPL caliber site?, site remedy cost probably high, orphan site preferred, or recalcitrant PRPs are associated with site.
Superfund Section and District Office	Agree on candidate sites for entry/activation in Superfund Program, tabulate need/justification, notify Division Chief of intent to identify PRPs, stakeholders, local officials interest, public interest. Make no contacts with potential interests.
Superfund Section	Inform Division Chief of potential interest groups, predict positions/attitudes if possible, request authority to contact potential interest groups.
Superfund Section	Polls potential interest groups on positions/attitudes concerning pursuing site as a State Lead action in the Superfund Program, tabulates findings, discuss findings with District Office, make mutual decision with District Office whether to recommend site entry into Superfund Program, forward recommendation to Division Chief. If recommendation is to submit a State Lead NPL Nomination, provide Governor's Support Letter Briefing Memo pursuant to Governor's Briefing Memo Procedure.
Division Chief	Consult with Superfund Section and District Office as necessary, decide whether to request site entry into Superfund Program, Consult with DEQ Management as appropriate.
Superfund Section	If decision is to enter Superfund Program and a PRP Group is involved, contact PRP Group about reaching settlement without entering Superfund Program. Inform PRP Group of intent to enter Superfund if Group refuses settlement.
Superfund Section	Request EPA to activate the site in the Superfund Program, form a State Lead Site Assessment Team to conduct investigations to determine best course of action (removal action, State Lead Non Time-Critical action, or State Lead NPL Nomination action).
Superfund Section	Undertake State Lead Site Assessment Team selected best course of action.

Unit Chiefs
Klein
WB 1/2

Date: November 2, 1993

Subject: Michigan SMOA

From: James Mayka, Chief
MI/WI Branch

To: All MI/WI Branch Staff

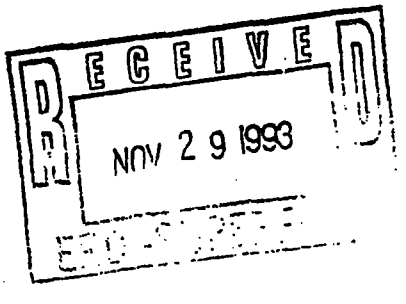
Attached is the latest version of the draft State Memorandum of Agreement (SMOA) we have negotiated with MDNR. Though there may be very slight changes prior to its final signature, and it may take some time before senior managers at MDNR sign the document, we have agreed with Bill Bradford and his Section Chiefs that both of our staffs will operate as if this particular draft were already executed.

I expect each of you to read the attached SMOA carefully, and begin immediately complying with its terms. Please pay particular attention to the review timeframes for various deliverables contained in the tables at the end of the document. You should assume that review timeframes refer to the time allowed after receipt of a particular document. I want there to be no doubt in your mind that we're honoring the SMOA now -- we're not waiting for final signatures. Each of Mary Pat, Wendy, Sue and Doug were involved in drafting and reviewing this draft and earlier drafts, to ensure that its provisions were realistic, understandable and in EPA's, as well as MDNR's, best interests for a predictable and accountable relationship.

If you have questions on the interpretation of the document, please raise them with your Section Chief and/or me. I plan to participate in one of your Section meetings in the coming weeks to answer any questions you may have on the SMOA.

In the near future, I'll be distributing a draft SMOA between EPA and WDNR also. Though the narrative portion of the WDNR SMOA is somewhat different than the MDNR SMOA, the tables of review timeframes are virtually identical -- which will allow you to plan the review of deliverables consistently on your sites, regardless of which State the particular site is in.

I will really appreciate your full cooperation in making these SMOAs a success.



Attachment

cc: Jodi Traub
John Kelley
Tom Mateer
Karen Yeates
Rose Freeman
Sue Coll

Superfund Memorandum of Agreement

The Michigan Department of Natural Resources and the United States Environmental Protection Agency, Region 5 hereby enter into the following Superfund Memorandum of Agreement.

I. INTRODUCTION - PURPOSE

A. Introduction

This Superfund Memorandum of Agreement ("SMOA") is entered into by the United States Environmental Protection Agency, Region 5 (EPA), and the State of Michigan by its Michigan Department of Natural Resources ("MDNR") (collectively "the Parties") pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA or Superfund), as amended, and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). To the extent this SMOA conflicts with 40 CFR part 35 or the NCP, Part 35 and the NCP are controlling. This agreement does not limit the ultimate enforcement authority of EPA, the United States Government, MDNR or the State of Michigan. This SMOA is not a legally enforceable document.

B. Purpose

This SMOA delineates the respective roles and responsibilities of each Party as they relate to the conduct of the Superfund program to identify and clean up hazardous waste sites in the State of Michigan. Specifically, the purposes of this SMOA are to:

1. Establish the MDNR/EPA relationship with respect to Superfund programmatic activities in order to construct and maintain a cooperative working relationship that best serves the EPA and the State interests. This document assumes adequate funding for the activities specified.

2. Outline the coordination and communication activities of, and the points of contact for, the MDNR and EPA for various phases of the removal program.

3. Define the process to identify, investigate and nominate environmental contamination sites to the National Priorities List (NPL) and to define the roles of the MDNR Pre-Remedial Project Manager (PPM), the EPA Site Assessment Manager (SAM), and the EPA Project Officer (PO).

4. Define the process to designate the "lead agency", the State Project Manager (SPM), the EPA Remedial Project Manager (RPM), the State Project Coordinator (SPC) and the Regional PO for each NPL site in Michigan.

5. Establish procedures for close cooperation and communication between the EPA and MDNR in planning for response activities for optimal use of the Parties' resources, minimizing conflicts and duplication of effort in conducting site-specific response activities.

6. Set the general framework for the MDNR/EPA relationship, so that programmatic and site-specific MDNR/EPA communication is enhanced.

II. AGREEMENT

NOW, THEREFORE, IT IS AGREED THAT:

A. Site-Specific Designation of Lead/Support Agency:

1. Pre-Remedial

As of the effective date of this SMOA, the MDNR and EPA will annually determine and mutually agree upon the number of site assessment activities to be performed utilizing State resources. This effort should occur prior to Region 5's receipt of Superfund Comprehensive Accomplishments Plan (SCAP) targets from Headquarters. The MDNR and EPA will discuss and agree on the status of each potential NPL site in the Pre-Remedial process. Site status may be reviewed at any decision point of the Pre-Remedial process and may be

changed by mutual consent, considering site condition, site response status in the State of Michigan Environmental Response Act, 1982 PA 307, as amended, or the EPA program guidance.

2. Remedial

As of the effective date of this SMOA the MDNR is the designated lead agency for remedial activities at selected NPL sites in the State of Michigan. Sites listed on the NPL that have been designated as Federal or State lead, including those which are State enforcement lead sites, are indicated in Attachment A. The MDNR and EPA will attempt to agree annually on the lead agency role for any new sites that are scheduled for remedial activity. In the event that the agencies cannot reach agreement, the EPA will designate the lead agency for a site. Determination of lead will occur prior to the commencement of any enforcement action or commitment of federal funds for response action.

Lead agency designation may be reviewed at any point in the response process. There may be a need to switch the lead agency role during the life of a site cleanup because of changing conditions such as funding needs or enforcement determinations. The switch in lead agency designation will be by mutual consent of the MDNR and EPA. The most logical and reasonable points for a change in the lead agency are prior to Remedial Investigation/Feasibility Study (RI/FS) and after

Record of Decision (ROD) concurrence but before the beginning of Remedial Design (RD) to maintain project continuity.

B. PPM/SAM and SPM/RPM Designations

The MDNR will designate a PPM and the EPA will designate a SAM for the Pre-Remedial program. The MDNR will designate a SPM and the EPA will designate an RPM whenever a site is scheduled for remedial activity.

The SPM/RPM designations for current Michigan NPL sites and the PPM and SAM designations are set forth in Attachment A to this SMOA. This attachment will be updated semiannually.

C. Points of Contact

1. Overall Program Communication, Coordination, and Planning -

The State's Superfund Section Chief and EPA's Michigan/ Wisconsin Branch Chief and Michigan Project Officer are responsible for overall program communication and coordination. They should meet quarterly to track progress of the program, to discuss any problems that may have arisen, and to plan for the future.

2. Significant Issues -

The Associate Division Director, Office of Superfund, and MDNR's Environmental Response Division Chief will involve themselves on significant issues that arise and will participate as issues warrant in the twice-yearly evaluation meetings held in the first and third quarters of the year.

3. Cooperative Agreement/SSC Coordination

The State Project Coordinator (SPC) is the primary liaison with the EPA Project Officer (PO).

a. The SPC:

1) Coordinates yearly and quarterly SCAP development to ensure adequate and accurate planning coordination with the EPA.

2) Coordinates application for, and tracks administration of, all Cooperative Agreements (CA) between the State and the EPA.

3) Reviews for completeness and transmits to the PO quarterly technical and financial progress reports for each CA 45 days after the end of each quarter of the Federal Fiscal year.

4) Coordinates State activities regarding resolution of program or CA audits.

5) Coordinates with the EPA relative to tracking of all work products under CAs.

6) Coordinates with the PO to schedule planning and evaluation meetings; prepares response to follow-up reports.

b. EPA Project Officer (PO):

1) Coordinates the EPA review of all draft and final applications for and amendments of CA and monitors all State CAs.

2) Coordinates with SPC, RPM and others within the EPA to ensure adequate and accurate planning coordination with the State related to State-lead projects under CAs, including coordination of SCAP development.

3) Receives all transmittal correspondence, and coordinates review of all work products under CAs, to ensure compliance with the CAs and documentation of that compliance.

4) Receives and coordinates review of all quarterly technical and financial progress reports as required by the CAs.

5) Coordinates the EPA Superfund Program activities regarding resolution of CA audits.

6) Schedules and conducts mid-year and year-end evaluation meetings with the State; prepares follow-up reports documenting agreements reached and discussing any issues.

7) Coordinates negotiation of Superfund State Contracts (SSCs) for any remedial action projects designated as "Federal-lead" projects.

4. SPM/RPM and PPM/SAM Interaction and Responsibilities

a. Interaction

The main route of communication and resolution of site-specific technical issues will be through the lead and support agency designated SPMs and RPMs for remedial actions, and the PPM and SAM for pre-remedial activity.

b. Responsibilities

1) The State SPM or PPM will, as appropriate:

a) Act as the State point of contact for all site-specific issues.

b) Manage pre-remedial activities for CERCLIS sites or manage remedial response

activities at State lead sites, including the development and administration of cooperative agreements, development and administration of contracts or contract subagreements, oversight of on-site activities, project documentation, and development and/or review of technical documents and recommendations for remedial response or pre-remedial activities.

c) Review and take appropriate actions on remedial or pre-remedial submittals from the EPA according to the event schedule in Attachment B of this SMOA.

d) Submit work products on State lead sites or pre-remedial activities to the EPA in accordance with the review schedules in Attachment B of this SMOA and the CAs.

e) Coordinate with appropriate State and Federal staff to ensure compliance with the CA-approved schedule.

f) Provide for community relations activities wherever the State has the lead for community relations at a site.

g) Coordinate with SPC and State staff to ensure adequate and timely resolution of SCAP budgeting and fiscal issues.

2) The EPA RPM or SAM will, as appropriate:

a) Act as the EPA point of contact for all pre-remedial or site-specific technical and enforcement issues.

b) Recommend approval or disapproval to the EPA PO of the technical and fiscal aspects of CA application, after consideration of site-specific needs.

c) Serve as the Regional Site Project Officer (RSPO) for SSCs on Federal-lead sites. This will include provision of reports and other documents to the SPM as provided for in the SSCs.

d) In coordination with the EPA Project Officer, review, comment and consult on technical aspects of remedial or pre-remedial submittals from the MDNR according to the event schedule in Attachment B.

Approve as appropriate, or recommend revisions of CA deliverables.

e) Coordinate with EPA PO and Federal staff to ensure adequate and timely resolution of SCAP budgeting and fiscal issues.

f) Coordinate with appropriate state and Federal staff to assure adequate progress is made pursuant to SSC and CA-approved schedules and Regional targets.

g) Submit work products on Federal lead Sites to the State in accordance with applicable SSCs and the review schedules in Attachment B of this SMOA.

h) Review, comment, recommend approval or revision of or approve as appropriate; technical aspects of submittals from the MDNR according to the event schedule in Attachment B of this SMOA.

5. Removal Program Coordination -

The State Regional Response Team representative and the Removal Branch Chief, assisted by the Chief of Response Section 1 at Grosse Ile, MI, are responsible for overall Removal Program coordination and communication. They will communicate through periodic telephone contacts and meetings, as well as through the Federal Regional Response Team meetings, to discuss issues, problems that may have arisen, progress of the program and to plan future response activities. In addition, the Chief of Response Section 1 at Grosse Ile, Michigan, will maintain a continuing dialogue with the MDNR.

D. Planning/Coordination Processes

1. Bi-annual Planning/Evaluation Processes

a. Participants in the bi-annual planning/evaluation processes will be at least the State and the EPA Superfund program first and second line supervisors.

b. Planning and evaluation sessions will be held in the 2nd and 4th quarters between the EPA and MDNR to plan and coordinate State-Federal activities for the coming fiscal year. Evaluation sessions will be held in the 1st and 3rd quarters to evaluate program management by the MDNR and EPA. Meetings shall include discussions and/or negotiations of the following items:

- EPA and State goals and objectives for the coming fiscal year for the removal, pre-remedial and remedial programs

- MDNR/EPA resources (staffing, dollars, workload)

- MDNR/EPA SCAP projections and SPMS targets

- CAs/SSCs

- Schedules for deliverables

- MDNR-lead enforcement sites

- Implementation hurdles:
  . site-specific
  . administrative
  . procedural

- Corrective actions for the EPA or State shortfalls/problems

- SMOA update

- Changes in lead agency designations

b. Results of these sessions shall include:

- Commitments/targets (both State and Federal)

- Schedules for new CAs and SSCs or major amendments

- Amendments to this SMOA

- Lead/Support agency designations

- A summary progress report prepared by the EPA PO, in in consultation with the State

2. Ongoing Program Coordination

a) Communication -

In addition to the bi-annual planning/evaluation sessions, the EPA and State Program representatives intend to engage in telephone *conference calls and meetings as needed. These calls and meetings* will provide opportunity to discuss ongoing and upcoming activities, to discover and resolve problems between the two parties, and to maintain open communication.

b) Program Status Data Management/Exchange -

The State and the EPA recognize and agree upon the need for a simple, effective system for compiling and maintaining Superfund program status data.

The parties agree to consider exchanging Superfund program status through the use of the CERCLIS data base system or another mutually agreed upon project/program data base system.

The Parties will work together to identify problems and to recommend solutions to the data exchange system as necessary.

3. Non-Site-Specific Documents

The EPA PO or the Remedial Response Branch Chief are responsible for providing the SPC or the Superfund Section Chief, as appropriate, with copies of all EPA guidance, policy, regulations, and laws that are made available to the PO and are relevant to Superfund activities.

The State SPC or Superfund Section Chief agree to submit to the EPA PO or Remedial Response Branch Chief, as appropriate, copies of all non-site-specific State guidance, policy, regulations and laws that are relevant to Superfund activities.

E. Inter-Agency Site-Specific Coordination

1. Review and Oversight

Attachment B contains a list of response process submittals which may be generated during the course of a Superfund investigation/response action and designates the base level of EPA/MDNR oversight for each of the submittals. The definitions of review/oversight activities for this attachment are as follows:

a. Review and approve -

Site work or the next response process phase does not proceed until the support agency reviews and provides written approval.

b. Review and comment -

Site work or the next phase may proceed but the lead agency shall incorporate support agency comments (if any), as appropriate, into the site work. Written comments not incorporated into the site work shall be responded to in writing prior to production of final documents, except that comments on draft Fact Sheets, etc., may be responded to by telephone.

c. Submit for information/maintenance of support agency files -

Lead agency submits a document to the support agency for information and maintenance of the support Lead agency file.

It should be noted the level of review/oversight activity established in this article and Attachment B represents the base level of support agency review/oversight. This base level therefore may be modified under various CAs, MSCAs or SSCs that may exist under this umbrella agreement, as site specific situations dictate.

2. Reasonable Notice of Important Activities

The lead agency shall attempt to consult with and provide reasonable notification to the support agency on the scheduling of public meetings, major site actions, negotiation meetings or conference calls, or issuance of press releases, Potentially Responsible Party (PRP) notice letters, and proposed actions under Section 104 and 106.

3. Project/Agency Decision Coordination

a. *Removal Activities*

The EPA and MDNR agree to share information, including data, for sites where removals have been or will be conducted or where preliminary assessments or site inspections indicate that removals may be required.

The MDNR agrees to identify Applicable or Relevant, and Appropriate Requirements (ARARs) to the EPA in a timely manner. To facilitate this, the MDNR will provide a generic ARARs package to the EPA that may be considered by the On Scene Coordinator (OSC). The State Regional Response Team representative and the OSC will consult on specific state ARARs for specific removal activities. The EPA agrees that, to the extent practicable, the EPA OSC will comply with ARARs.

b. Pre-Remedial Activities

It is agreed that the MDNR and EPA will coordinate their site evaluation and decision making process to accommodate each others' concerns. Specifically:

1) For other than Federal Facilities, the MDNR will conduct selected Preliminary Assessment/Site Inspection (PA/SI) activities and will conduct all final Hazard Ranking System (HRS), and NPL nomination activities for CERCLIS sites in the State of Michigan;

2) The MDNR and EPA will work together to set priorities for site activities at the PA, SI and Expanded Site Inspection (ESI) stage for each CERCLIS site under evaluation;

3) For State lead sites, the MDNR will provide a SI or an ESI work plan to the EPA at a minimum of one month before the planned event and the EPA will provide technical comments and approval within 10 working days of receipt;

4) The MDNR will provide PA, SI, and ESI reports and status recommendations according to a quarterly schedule and the EPA will provide technical comments and/or approval within 30 working days of receipt;

5) If the EPA and MDNR consider it necessary, the MDNR will identify candidate PA, SI, and ESI sites to the EPA for investigation by the EPA contractor to be performed according to a schedule agreed upon by the EPA and MDNR;

6) The MDNR will provide technical review on all EPA contractor SI or ESI work plans within 10 working days of receipt by the MDNR;

7) The MDNR will provide to EPA both a technical review and a site status recommendation for all reports submitted by the EPA contractor within 30 working days of receipt by the MDNR;

8) The EPA will not task preparation of final HRS score packages to its contractor nor nominate sites to the NPL without obtaining agreement from the MDNR;

9) The MDNR will provide concurrence to the EPA of all NPL nominations when the priorities outlined above have been agreed upon by the MDNR and EPA.

c. Remedy Development and Selection

1) It is agreed that the EPA and MDNR will discuss the Alternatives Array Document within 30 days of its receipt, at a meeting or conference call, to determine whether any remedies to be considered are inconsistent with the EPA or MDNR philosophies or policies or whether any additional remedies should be considered. If either party determines such an inconsistency or inadequacy to be present, it will communicate in writing, to the other party the nature of the inconsistency or inadequacy and what action(s) might be taken as a result.

2) It is agreed that the EPA and MDNR will coordinate their decision making process to best consider each other's concerns. This will include arranging for EPA Branch meetings and MDNR Division review meetings, as appropriate, within 45 days of receipt of the Agency Draft FS. The support agency will attempt to hold a meeting first, in order to have any concerns that may arise voiced at the lead agency meeting. Representatives of both agencies will be invited to participate in these meetings.

3) Within the 45 day period, the EPA Remedial Response Branch Chief and the MDNR Superfund Section Chief will confer to determine whether a remedy dispute exists.

d. Post-Remedy Selection Modifications

1) Whenever a significant remedy modification is being considered by the lead agency, the lead agency will notify the support agency in writing of the modification under consideration. This notification will include the reason that the modification is being considered, and a description of the proposed modification. After the lead agency and the support agency discuss the proposed modification, the EPA will determine whether the proposed modification will require an explanation of significant difference (ESD) or a ROD amendment.

2) If a significant remedy modification is considered during the course of negotiations with PRPs, in addition to the above, the following shall take place:

(a) The lead agency shall provide the support agency with copies of any proposals or other submittals relating to the proposed modification to the remedy upon receipt.

(b) The lead agency and the support agency shall consult on the proposed modification prior to the lead agency notifying the PRPs of their approval or disapproval of the proposal modification.

3) In considering whether a significant modification requires a ROD amendment or an ESD, the following shall apply:

(a) A ROD amendment shall be required whenever the proposed modification to the remedy fundamentally alters the hazardous waste management approach selected in the ROD,

(b) An ESD shall be required whenever the proposed modification to the remedy incrementally changes a component of a remedy with respect to scope, performance or cost, but does not fundamentally alter the hazardous waste management approach selected in the ROD.

e. Remedial Action Change Orders

Specific provisions to address support agency concerns over potential change orders, will be negotiated as part of site-specific SSCs.

f. Enforcement

It is agreed that the agencies will attempt to coordinate enforcement efforts for individual sites.

The support agency will be given the opportunity to participate in or be a party to negotiations or other enforcement action. When the support agency chooses to participate in negotiations or other enforcement actions, the lead agency will consult with the support agency prior to scheduling meetings or conference calls and prior to making any determinations which might affect the remedy (or other response action), the support agency's role in the conduct of the remedy (or other response action) or the support agency's cost recovery, natural resource damage or other claims. Neither agency may compromise the cost recovery or natural resource damage claim of the other.

1) RI/FS - The lead agency will notify the support agency of impending negotiations for the PRP lead RI/FS and provide an opportunity for the support agency to participate. Such notification shall occur at least 1 week prior to issuance of PRP notice letters.

2) Remedial Design/Remedial Action (RD/RA) - The EPA and the State will meet to discuss site specific enforcement strategy during the public comment period for the Proposed Plan or at least 1 month prior to any meetings with PRPs to initiate negotiations, whichever comes first.

Along with site specific enforcement issues, discussions will include preliminary decisions on whether the support agency will participate in negotiations and whether a 2 or 3 party agreement is appropriate for the site. Such meetings shall include appropriate technical staff, supervisors and legal counsel.

F. Resolution of Disputes

The agencies shall use their best efforts to resolve all differences of opinion informally, promptly, and in good faith. If a dispute arises which the agencies are unable to resolve informally, the agencies agree to initiate a formal dispute resolution process, as described herein. This dispute resolution process may be used for site specific issues to the extent it does not conflict with the dispute resolution process specified in a legally binding document controlling CERCLA activities at a particular site.

1. When State and Federal staff cannot resolve a disagreement, the dispute initiator will refer the issue to the first line supervisors at both agencies. This referral shall be in writing and shall set forth the specific points of the dispute. The receipt date of this referral by both agencies shall be the date which begins the formal dispute resolution process, and therefore starts the clock.

2. The first line supervisors will have 5 working days to resolve the dispute. At a minimum, there will be a conference call between the supervisors. If the first line supervisors cannot resolve the dispute within 5 working days, the first line supervisors shall prepare a written report on the dispute which shall set forth the specific points of the dispute, the positions of the respective agencies and the actions each agency considers necessary to resolve the dispute. These reports shall be prepared, submitted to the next supervisory level and copied to each Agency's management chain through the Division Director/Chief level, within 10 working days of receipt of the dispute referral.

3. Issues not resolved at the first line supervisor's level within the 5 working days will be escalated up the respective agency management chains in accordance with the table below. Each time an issue is escalated to the next higher level, the escalation notice shall be written and shall contain the information specified in #2 above.

EPA and MDNR Management Chain

EPA	MDNR	TIME FRAME
RPM/SAM	SPM/PPM	10 working days
Section Chief	Unit Chief	5 working days
Branch Chief	Section Chief	5 working days
Assoc. Div. Director	Division Chief	5 working days
Regional Administrator	Deputy Director	10 working days

4. The time frames referred to above may be extended by mutual, written agreement.

5. If the agencies reach agreement in step #3 during this process, that agreement/resolution shall be described in writing by the disputing agency and signed by both agencies.

6. If agreement is not reached after escalating the issue through the agencies' management chains, the EPA shall resolve the dispute by providing written notification of the resolution to the MDNR, with the Regional Administrator's signature. The EPA must set forth the basis for its decision in the written notice.

7. If the written resolution does not satisfy the MDNR, the agencies can jointly refer the dispute to the assistant Administrator for Solid Waste and Emergency Response, who will attempt to resolve the dispute. The EPA will endeavor to reach mutual resolution before any decision is made by the EPA to assert a management option. The MDNR understands that the EPA may take that option and, by this agreement, the MDNR does not waive any rights or responsibilities it has in regard to this issue.

G. Reporting

Quarterly progress, significant developments, and procurement reports for State-lead sites under CAs should be submitted in accordance with the new regulatory requirements of 40 CFR 35.6650, 35.6655, and 35.6665, respectively. Reports are due 45 days after the end of each quarter of the Federal fiscal year.

H. Exclusion of Third Party Benefits

This Agreement is intended to benefit only the State and EPA. It extends no benefits or rights to any party, including PRP's, not signatory to this Agreement.

I. Negation of Agency Relationship

Nothing contained in this Agreement shall be construed to create, either expressly or by implication, the relationship of agency between the EPA and the State.

The parties hereto have executed this Superfund Memorandum of Agreement in two (2) copies, each of which shall be deemed an original.

For the State of Michigan

_____ _____

Director, Department of Natural Resources — Date

For the Environmental Protection Agency

_____ _____

Regional Administrator — Date

ttachment B

U.S. EPA/MDNR
Remedial Investigation/Feasibility Study (RI/FS) Activities

Document	Maximum Review, Notice or Action Time (Calendar Days)	U.S. EPA Role: State-Lead Fund Project (S) (State recommends approvals)	U.S. EPA Role: *(See Note) State-Lead Enf. (2-Party) Project (PS) (No Federal Oversight Funding)	MDNR Role: U.S. EPA-Lead Fund Project (F)	MDNR Role: U.S. EPA Lead 2-Party Enforcement Project
1a) (RI/FS Scoping Meeting)	14	Consultation	Consultation	Consultation	Consultation
b) RI/FS Workplan (incl. CRP, HSP, SP) - (excl. QAPP)	---	----	----	----	----
Draft	30	Comment	Comment	Comment	Comment
Final	14	Approval	Comment	Comment	Comment
2a) (Pre-QAPP Meeting)	14	Consultation	Notified	Notified	Notified
b) QAPP	--	----			
1st Draft	30	Comment		-----	Comment
2nd Draft	14	Comment	----	-----	Comment
Final	7	Approval	File	File	Comment
3. Draft Health Assessement	21	Comment	Comment	Comment	Comment
4. RI Technical Memoranda	14	Comment	Comment	Comment	Comment
5. RI Report	-----	------	------	-----	------
Draft	30	Comment	Comment	Comment	Comment
Final	14	Approval	Comment	Comment	Comment

* Note: On a site-specific basis, U.S. EPA may or may not agree to provide comments to MDNR throughout the RI/FS process. The column represents U.S. EPA's role, should U.S. EPA elect to so participate.

Attachment B

U.S. EPA/MDNR
Remedial Investigation/Feasibility Study (RI/FS) Activities

		U.S. EPA Role		MDNR Role	
Document	Maximum Review, Notice or Action Time (Calendar Days)	State-Lead Fund Project (S) (State recommends approvals)	*(See Note) State-Lead Enf. (2-Party) Project (PS) (No Federal Oversight Funding)	U.S. EPA-Lead Fund Project (F)	U.S. EPA Lead 2-Party Enforcement Project
6a) Alternatives Array ARARs Solicitation)	30	Provide Federal ARARs to State	Provide Federal ARARs to State	Provide State ARARs to U.S. EPA	Provide State ARARs to U.S. EPA
b) Alternatives Array Meeting	30	Consultation	Consultation	Consultation	Consultation
7. Treatability Study Workplan	---	----	-----	-----	-----
Draft	30	Comment	Comment	Comment	Comment
Final	14	Approval	Comment	Comment	Comment
8. FS Report	---	-----	-----	-----	-----
a) Agency Draft FS	45	Comment	Comment	Comment	Comment
b) Public Comment FS	14	Approval	Comment	Comment	Comment
9a) Draft Proposed Plan	14	Comment	Comment	Comment	Comment
b) Final Proposed Plan	2	Approval	Comment	Comment	Comment
10a) Draft ROD	14	Comment	Comment	Comment	Comment
b) Draft Responsiveness Summary	14	Comment	Comment	Comment	Comment
c) Final ROD (incl. Resp. Summary	7	Approval/ Issuance	Concur/ Non-concur	Concur/ Non-concur	Concur/ Non-concur
11. Draft ESD	14	Comment	Comment	Comment	Comment
Final ESD	7	Approval	Concur/ Non-concur	Concur/ Non-concur	Concur/ Non-concur
12. Draft Fact Sheet/ Update/Progress Report	(2 working days)	Comment	Comment	Comment	Comment

* (Note Review times and agency roles for ROD Amendments are identical to those for RODs).

ttachment B

U.S. EPA/MDNR
Enforcement Activities

Document	Maximum Review Time (Calendar Days)	U.S. EPA Role * (See Note) State-Lead Enforcement (2-Party) Project (No Federal Oversight Funding) (PS)	MDNR Role U.S. EPA-Lead Enforcement (2-Party) Project (RP)
1. Draft RD/RA Consent Decree	30	Comment	Comment
2. Draft Scope of Work (SOW) for Consent Decree or Unilateral Admin. Order or Admin. Order by Consent	30	Comment	Comment
3. Revised SOW incorporating support Agency comments (as appropriate)	14	Comment	Comment
4. Proposed changes to SOW during PRP negotiations	As specified by lead Agency	Comment	Comment

* On a site-specific basis, U.S. EPA may or may not agree to provide comments to MDNR throughout the State-enforcement process. The column represents U.S. EPA's role, should U.S. EPA elect to so participate.

Attachment B

U.S. EPA/MDNR
Design, Construction, O & M, Deletion Activities

Document/Meeting	Maximum Review, Notice or Action Time (Calendar Days)	U. S. EPA Role		MDNR Role	
		State-Lead Fund Project (S)	* (See Note) State-Lead Enf. (2-party) Project (No Federal funds) (PS)	U.S. EPA - Lead Fund Project (F)	U.S. EPA Lead (2-Party) Enforcement Project (RP)
1. RD Pre-WorkPlan Meeting	14	Consultation	Consultation	Consultation	Consultation
2a) Draft RD Workplan	30	Comment	Comment	Comment	Comment
b) Final RD Workplan	14	Approval	Comment	Comment	Comment
3a) Preliminary (e.g. 30%) Design	30	Comment	Comment	Comment	Comment
b) Preliminary Design Meeting	14	Consultation	Consultation	Consultation	Consultatio
4a) Intermediate (e.g. 60%) Design (if required)	30	Comment	Comment	Comment	Comment
b) Intermediate Design Meeting	14	Consultation	Consultation	Consultation	Consultatio
5a) Pre-Final (e.g. 95%) Design	45	Comment	Comment	Comment	Comment
b) Pre-Final Design Meeting	14	Consultation	Consultation	Consultation	Consultatio
6. Final Design (incl. Bid Specs for "Fund" sites)	14	Approval	Comment	Approval	Comment
7a) Draft Superfund State Contract	21	--------	---------	Comment	--------
b) Final Superfund State Contract	7	--------	---------	Approval	--------

* On a site-specific basis, U.S. EPA may or may not agree to provide comments to MDNR throughout the Design, Construction and O&M process. The column represents U.S. EPA's role, should U.S. EPA elect to so participate.

Attachment B

U.S. EPA/MDNR
Design, Construction, O & M, Deletion Activities

Document/Meeting	Maximum Review, Notice or Action Time Calendar Days)	U.S. EPA ROLE		MDNR ROLE	
		State-Lead Fund Project (S)	* (See Notes) State-Lead Enf. (2-party) Project (No Federal funds) (PS)	U.S. EPA - Lead Fund Project (F)	U.S. EPA Lead (2-Party) Enforcement Project (RP)
8. Pre-Bid Meeting	14	Consultation	--------	Consultation	--------
9. Site Inspections					
a) Construction (periodic)	7	Consultation	Consultation	Consultation	Consultation
b) Pre-Final	7	Consultation	Consultation	Consultation	Consultation
c) Final	7	Consultation	Consultation	Consultation	Consultation
10. Draft RA Completion Report	30	Comment	Comment	Comment	Comment
11a) Draft O&M Plan	30	Comment	Comment	Comment	Comment
b) Final O&M Plan	30	Approval	Comment	Approval	Comment
12. Closeout Report	30	Approval	Comment	Approval	Comment
13a) Draft Deletion Package	21	Comment	Comment	Comment	Comment
b) Final Deletion Package	30	Approval	Approval	Approval	Approval

ACT 307
PUBLIC ACTS OF 1982, As Amended
"Environmental Response Act"
MCL 299.601 et seq.

PURPOSE

An Act to provide for the identification, risk assessment, and priority evaluation of environmental contamination at certain sites in this state; to provide for response activity; to prescribe certain powers and duties of the Governor, certain state agencies and officials, and other persons; to provide for the promulgation of rules; to require record notice regarding the status of certain facilities; to create certain funds and provide for their expenditure; to provide for public participation; to provide for methods of dispute resolution; to authorize grants, loans, and awards; to create certain boards, councils, and offices and to prescribe their powers and duties; to provide for judicial review; and to provide certain remedies and penalties.

ADMINISTERING AGENCY
Michigan Department of Natural Resources
Environmental Response Division

ACT 307
PUBLIC ACTS OF 1982, As Amended
"Environmental Response Act"

APPLICABILITY DETERMINATION

1. **Substances Covered:** Chemicals or other material which is or may become injurious to the public health, safety, or welfare or to the environment

2. **Time Period Covered:** After July 1, 1990

3. **Types of Facilities Covered:** Facilities and sites with environmental contamination

4. **Persons Covered:** An individual, sole proprietorship, partnership, association, corporation, the state, or a political subdivision of the state

5. **Actions Covered:** Response activities with regard to the release of a hazardous substance, or the potential release of a discarded hazardous substance, in a quantity, which is or may become injurious to the environment, or to the public health, safety, or welfare

ACT 307
PUBLIC ACTS OF 1982, As Amended
"Environmental Response Act"

RELEVANCY AND APPROPRIATENESS DETERMINATION

1. **Requirement's Specific Goals and Objectives:** To protect the public health, safety, and welfare and the environment of this state

2. **Purpose of Requirement in Program of Origin:** To provide for appropriate response activity to eliminate the environmental contamination caused by the presence of hazardous substances at sites containing hazardous substances that pose a danger to the public health, safety, and welfare and to the environment of this state

3. **Regulated/Affected Media:** Air, ground water, surface water, soil

4. **Substances Covered:** Refer to Applicability Determination - No. 1

5. **Regulated/Affected Entities:** Facilities and sites with environmental contamination

6. **Regulated Action or Activity:** Refer to Applicability Determination - No. 5

7. **Variances, Waivers or Exemptions:** None

8. **Regulated/Affected Location:** Facilities and sites with environmental contamination

9. **Regulated/Affected Structure or Facility:** Facilities and sites with environmental contamination

10. **Affected Resource Use or Potential Use:** Air, groundwater, surface water, soil, recreational land

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Act 307 of 1982

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299.611d Science advisory council; creation; appointment, qualifications, and terms of members; removal of

member; restriction on employment; recommendations; information.

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299.611g Definitions; applicability of section; approval of remedial action plan; notice; list; commencement of allocation process; participation; schedule; plan; negotiations; agreement; copy; consent order; allocation review panel; information; determination; acceptance or rejection; funding uncollectible percentage; construction of section; evidence; jurisdiction; limitation; administrative order; action for reimbursement; costs; moratorium; authority not limited; recovery of costs; loans to small businesses; rules; creation and responsibility of orphan share administration; staff and services.

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THE ENVIRONMENTAL RESPONSE ACT
Act 307 of 1982

XXXX Act 307 of 1982.amended THIS AMENDED TITLE IS EFFECTIVE JULY 1, 1991 XXXX

AN ACT to provide for the identification, risk assessment, and priority evaluation of environmental contamination at certain sites in this state; to provide for response activity at certain facilities and sites; to prescribe the powers and duties of the governor, certain state agencies and officials, and other persons; to provide for the promulgation of rules; to require record notice regarding the status of certain facilities; to create certain funds and provide for their expenditure; to provide for public participation; to provide for methods of dispute resolution; to authorize grants, loans, and awards; to create certain boards, councils, and offices and to prescribe their powers and duties; to provide for judicial review; and to provide certain remedies and penalties.

History: 1982, Act 307, Imd. Eff. Oct. 13, 1982;--Am. 1987, Act 166, Eff. Jan. 1, 1988;--Am. 1989, Act 157, Imd. Eff. July 27, 1989--Am. 1990, Act 233, Eff. July 1, 1991.

The People of the State of Michigan enact:

XXXX 299.601.amended THIS AMENDED SECTION IS EFFECTIVE JULY 1, 1991 XXXX

299.601 Legislative finding and declaration.

Sec. 1. The legislature hereby finds and declares:

(a) That there exist in this state certain facilities containing hazardous substances that pose a danger to the public health, safety, or welfare, or to the environment of this state.

(b) That there is a need to provide for a method of eliminating the danger of environmental contamination caused by the existence of hazardous substances at sites within the state.

(c) That it is the purpose of this act to provide for appropriate response activity to eliminate the environmental contamination caused by the presence of hazardous substances at sites within the state.

(d) That there is a need for additional administrative and judicial remedies to supplement existing statutory and common law remedies.

(e) That the responsibility for the cost of response activities pertaining to a release or threat of release and repairing injury, destruction, or loss to natural resources caused by a release or threat of release should not be placed upon the public except when funds cannot be collected from, or a response activity cannot be undertaken by, a person liable under this act, in conjunction with an appropriate contribution, if applicable, from a fund administered by the orphan share administration.

(f) That to the extent possible, consistent with requirements under this act and rules promulgated under this act, response activities shall be undertaken by persons liable under this act.

(g) That this act is intended to provide remedies for facilities posing any threat to the public health, safety, or welfare, or to the environment, regardless of whether the release or threat of release

of a hazardous substance occurred before or after the effective date of this act, and for this purpose this act shall be given retroactive application. However, criminal and civil penalties provided in the amendatory act that added this subdivision shall only apply to violations of this act that occur after the effective date of the amendatory act that added this subdivision.

(h) That money should be appropriated by the legislature for response activities taking into consideration the order that sites are on the list described in section 6(1)(d) and applicable provisions of the environmental protection bond implementation act, Act No. 328 of the Public Acts of 1988, being sections 299.671 to 299.685 of the Michigan Compiled Laws.

(i) That a site that is owned by the federal government, the state, or a local unit of government, or a site where a release or threat of release is caused by the federal government, the state, or a local unit of government, should not be treated differently in terms of the expenditure of money for response activities than any other site on the list described in section 6(1)(d).

(j) That if a person that may be liable under section 12 is the state or a local unit of government, this act should be enforced by the attorney general and the department in the same manner as it would be for any other person that may be liable under section 12.

(k) That prior to expending money to undertake remedial action at a site, the department should assure a private or public funding source, or a combination of funding sources, that is sufficient to assure that the response activities at the site proceed without interruptions caused by insufficient financial resources until the site meets or exceeds the standards established by the department for that site.

(l) That this act is not intended to impose penalties or exemplary damages upon parties conducting response activities pursuant to a decree or order to which the United States is a party.

(m) That this act is intended to foster the redevelopment and reuse of vacant manufacturing facilities and abandoned industrial sites that have economic development potential, if that redevelopment or reuse assures the protection of the public health, safety, welfare, and the environment.

History: 1982, Act 307, Imd. Eff. Oct. 13, 1982;—Am. 1990, Act 234, Eff. July 1, 1991.

Cited in other sections: Section 299.601 et seq. is cited in §§ 299.419b, 299.678; 299.847, and 333.26219.

Administrative rules: R 299.5101 et seq. of the Michigan Administrative Code.

299.602 Short title.

Sec. 2. This act shall be known and may be cited as "the environmental response act".

History: 1982, Act 307, Imd. Eff. Oct. 13, 1982.

XXXX 299.603.amended THIS AMENDED SECTION IS EFFECTIVE JULY 1, 1991 XXXX

299.603 Definitions.

Sec. 3. As used in this act:

(a) "Act of God" means an unanticipated grave natural disaster or other natural phenomenon of an exceptional, inevitable, and irresistible character, the effects of which could not have been prevented or avoided by the exercise of due care or foresight.

(b) "Agricultural property" means real property used for farming in any of its branches, including cultivating of soil; growing and harvesting of any agricultural, horticultural, or floricultural commodity; dairying; raising of livestock, bees, fish, fur-bearing animals, or poultry; turf and tree farming; and performing any practices on a farm as an incident to, or in conjunction with, these farming operations. Agricultural property does not include property used for commercial storage, processing, distribution, marketing, or shipping operations.

(c) "Attorney general" means the department of the attorney general.

(d) "Commercial lending institution" means a state or nationally chartered bank, a state or federally chartered savings and loan association or savings bank, or a state or federally chartered credit union, or other state or federally chartered lending institution or a regulated affiliate or a regulated subsidiary of any of these entities.

(e) "Department" means the director of the department of natural resources or his or her designee.

(f) "Director" means the director of the department of natural resources.

(g) "Directors" means the directors or their designees of the departments of natural resources, public health, agriculture, and state police.

(h) "Disposal" means the discharge, deposit, injection, dumping, spilling, leaking, or placing of any hazardous substance into or on any land or water so that the hazardous substance or any constituent of the hazardous substance may enter the environment or be emitted into the air or discharged into any groundwater or surface water.

(i) "Enforcement costs" means court expenses, reasonable attorney fees of the attorney general, and other reasonable expenses of an executive department that are incurred in relation to enforcement under this act or rules promulgated under this act, or both.

(j) "Environment" or "natural resources" means any land, surface water, groundwater, subsurface, strata, air, fish, wildlife, or biota within the state.

(k) "Environmental contamination" means the release of a hazardous substance, or the potential release of a discarded hazardous substance, in a quantity, which is or may become injurious to the environment, or to the public health, safety, or welfare.

(l) "Evaluation" means those activities including but not limited to investigation, studies, sampling, analysis, development of feasibility studies, and administrative efforts, that are needed to

determine the nature, extent, and impact of a release or threat of release and necessary response activities.

(m) "Facility" means any area, place, or property where a hazardous substance has been released, deposited, stored, disposed of, or otherwise comes to be located.

(n) "Feasibility study" means a process for developing, evaluating, and selecting appropriate response activities.

(o) "Fund" means the environmental response fund established in section 9, except as otherwise provided in section 11f.

(p) "Hazardous substance" means 1 or more of the following:

(i) A chemical or other material which is or may become injurious to the public health, safety, or welfare or to the environment.

(ii) "Hazardous substance" as defined in the comprehensive environmental response, compensation, and liability act of 1980, Public Law 96-510, 94 Stat. 2767.

(iii) "Hazardous waste" as defined in the hazardous waste management act, Act No. 64 of the Public Acts of 1979, being sections 299.501 to 299.551 of the Michigan Compiled Laws.

(iv) "Petroleum" as defined in the leaking underground storage tank act, Act No. 478 of the Public Acts of 1988, being sections 299.831 to 299.850 of the Michigan Compiled Laws.

(q) "Interim response activity" means the cleanup or removal of a released hazardous substance or the taking of other actions, prior to the implementation of a remedial action, as may be necessary to prevent, minimize, or mitigate injury to the public health, safety, or welfare, or to the environment. Interim response activity also includes, but is not limited to, measures to limit access, replacement of water supplies, and temporary relocation of people as determined to be necessary by the department. In addition, interim response activity means the taking of other actions as may be necessary to prevent, minimize, or mitigate a threatened release.

(r) "Local health department" means that term as defined in section 1105 of the public health code, Act No. 368 of the Public Acts of 1978, being section 333.1105 of the Michigan Compiled Laws.

(s) "Local unit of government" means a county, city, township, or village, an agency of a local unit of government, an authority or any other public body or entity created by or pursuant to state law. Local unit of government does not include the state or federal government or a state or federal agency.

(t) "Operator" means a person that is in control of or responsible for the operation of a facility. Operator does not include any of the following:

(i) A person that, without participating in the management of the facility, holds indicia of ownership primarily to protect the person's security interest in the facility, including, but not limited to, a vendor's interest under a recorded land contract. For the purposes of this act, a commercial lending institution shall not be construed to be participating in the management of a facility by extending credit, providing financial services, providing financial advice, or supervising a plan to resolve financial difficulties for

an operator, or conducting or causing to be conducted a prudent or legally required review or investigation of environmental matters related to the facility or the operator of the facility, if the actions of the commercial lending institution do not suggest, condone, or encourage the treatment or handling of a hazardous substance by the operator in a manner that results in a release.

(*ii*) The state or a local unit of government that acquired ownership or control of the facility involuntarily through bankruptcy, tax delinquency, abandonment, or other circumstances in which the government involuntarily acquires title or control by virtue of its governmental function, a local unit of government to which ownership or control of the facility is transferred by the state, or the state or a local unit of government that acquired ownership or control of the facility by seizure, receivership, or forfeiture pursuant to the operation of law or by court order. In case of an acquisition described in this subparagraph by the state or a local unit of government, operator means a person that was in control of or responsible for operation of the facility immediately before the state or local unit of government acquired ownership or control. The exclusion provided in this subparagraph shall not apply to the state or a local unit of government that caused or contributed to the release or threat of a release from the facility.

(*iii*) The operator of an underground storage tank system, as defined in the leaking underground storage tank act, Act No. 478 of the Public Acts of 1988, being sections 299.831 to 299.850 of the Michigan Compiled Laws, from which there is a release or threat of release if all of the following conditions are met:

(A) The operator reported the release or threat of release to the department of state police, fire marshal division, within 24 hours after confirmation of the release or threat of release.

(B) The release or threat of release at the facility is solely the result of a release or threat of release of a regulated substance as defined in Act No. 478 of the Public Acts of 1988 from an underground storage tank system.

(C) The operator is in compliance with the requirements of Act No. 478 of the Public Acts of 1988, and any promulgated rules or any order, agreement, or judgment issued or entered into pursuant to that act.

(*iv*) A state or local unit of government that holds or acquires an easement interest in a facility, holds or acquires an interest in a facility by dedication in a plat, or by dedication pursuant to Act No. 283 of the Public Acts of 1909, being sections 220.1 to 239.6 of the Michigan Compiled Laws. The exclusion provided in this subparagraph shall not apply to the state or a local unit of government that holds an easement or dedication if the state or that local unit of government caused or contributed to a release or threat of release, or if equipment owned or operated by the state or that local unit of government caused or contributed to the release or threat of release.

(*v*) A person that holds an easement interest in a facility for the purpose of conveying or providing goods or services, including, but not limited to, utilities, sewers, roads, railways, and pipelines; or a person that acquires access through an easement. The exclusion provided in this subparagraph shall not apply to a person that holds an easement if that person caused or contributed to a release or threat of release, or if equipment owned or operated by that person caused or contributed to the release or threat of release.

(vi) A person that satisfies all of the following:

(A) The release was caused solely by a third party who is not an employee or agent of the person, or whose action was not associated with a contractual relationship with the person.

(B) The hazardous substance was not deposited, stored, or disposed of on the property upon which the person operates.

(C) The person at the time of transfer of the right to operate on the property discloses any knowledge or information concerning the general nature and extent of the release as required in section 10c.

(u) "Owner" means a person that owns a facility. Owner does not include any of the following:

(i) A person that, without participating in the management of the facility, holds indicia of ownership primarily to protect the person's security interest in the facility, including, but not limited to, a vendor's interest under a recorded land contract. For the purposes of this act, a commercial lending institution shall not be construed to be participating in the management of a facility by extending credit, providing financial services, providing financial advice, or supervising a plan to resolve financial difficulties for an owner, or conducting or causing to be conducted a prudent or legally required review or investigation of environmental matters related to the facility or the owner of the facility, if the actions of the commercial lending institution do not suggest, condone, or encourage the treatment or handling of a hazardous substance by the owner in a manner that results in a release.

(ii) The state or a local unit of government that acquired ownership or control of the facility involuntarily through bankruptcy, tax delinquency, abandonment, or other circumstances in which the government involuntarily acquires title or control by virtue of its governmental function, a local unit of government to which ownership or control of the facility is transferred by the state, or the state or *a local unit of government that acquired ownership or control of the* facility by seizure, receivership, or forfeiture pursuant to the operation of law or by court order. In case of an acquisition described in this subparagraph by the state or a local unit of government, *owner means any person who owned* or controlled activities at the facility immediately before the state or local unit of government acquired ownership or control. The exclusion provided in this subparagraph shall not apply to the state or a local unit of government that caused or contributed to the release or threat of a release from the facility.

(iii) A person that satisfies all of the following:

(A) The release was caused solely by a third party, who is not an employee or agent of the person, or whose action was not associated with a contractual relationship with the person.

(B) The hazardous substance was not deposited, stored, or disposed of on that person's property.

(C) The person at the time of transfer of the property discloses any knowledge or information concerning the general nature and extent of the release as required in section 10c.

(iv) The owner of an underground storage tank system, as defined in the leaking underground storage tank act, Act No. 478 of the

Public Acts of 1988, being sections 299.831 to 299.850 of the Michigan Compiled Laws, from which there is a release or threat of release if all of the following conditions are met:

(A) The owner reported the release or threat of release to the department of state police, fire marshal division, within 24 hours after confirmation of the release or threat of release.

(B) The release or threat of release at the facility is solely the result of a release or threat of release of a regulated substance as defined in Act No. 478 of the Public Acts of 1988 from an underground storage tank system.

(C) The owner is in compliance with the requirements of Act No. 478 of the Public Acts of 1988, and any promulgated rules or any order, agreement, or judgment issued or entered pursuant to that act.

(*v*) A state or local unit of government that holds or acquires an easement interest in a facility, holds or acquires an interest in a facility by dedication in a plat, or by dedication pursuant to Act No. 283 of the Public Acts of 1909, being sections 220.1 to 239.6 of the Michigan Compiled Laws. The exclusion provided in this subparagraph shall not apply to the state or a local unit of government that holds an easement or dedication if that state or local unit of government caused or contributed to a release or threat of release, or if equipment owned or operated by the state or that local unit of government caused or contributed to the release or threat of release.

(*vi*) A person that holds an easement interest in a facility for the purpose of conveying or providing goods or services, including, but not limited to, utilities, sewers, roads, railways, and pipelines; or a person that acquires access through an easement. The exclusion provided in this subparagraph shall not apply to a person that holds an easement if that person caused or contributed to a release or threat of release, or if equipment owned or operated by that person caused or contributed to the release or threat of release.

(*vii*) A person that holds only subsurface mineral rights to the property and has not caused or contributed to a release on the property.

(v) "Permitted release" means 1 or more of the following:

(*i*) A release in compliance with an applicable, legally enforceable permit issued under state law.

(*ii*) A lawful and authorized discharge into a permitted waste treatment facility.

(*iii*) A federally permitted release as defined in the comprehensive environmental response, compensation, and liability act of 1980, Public Law 96-510, 94 Stat. 2767.

(w) "Person" means an individual, sole proprietorship, partnership, joint venture, trust, firm, joint stock company, corporation, including a government corporation, association, local unit of government, commission, the state, a political subdivision of the state, an interstate body, the federal government, a political subdivision of the federal government, or any other legal entity.

(x) "Release" includes, but is not limited to, any spilling, leaking, pumping, pouring, emitting, emptying, discharging,

injecting, escaping, leaching, dumping, or disposing of a hazardous substance into the environment, or the abandonment or discarding of barrels, containers, and other closed receptacles containing a hazardous substance. Release does not include any of the following:

(i) A release that results in exposure to persons solely within a workplace, with respect to a claim that these persons may assert against their employers.

(ii) Emissions from the engine exhaust of a motor vehicle, rolling stock, aircraft, or vessel.

(iii) A release of source, by-product, or special nuclear material from a nuclear incident, as those terms are defined in the atomic energy act of 1954, chapter 1073, 68 Stat. 919, if the release is subject to requirements with respect to financial protection established by the nuclear regulatory commission under section 170 of the atomic energy act of 1954, chapter 1073, 71 Stat. 576, 42 U.S.C. 2210, or, any release of source by-product, or special nuclear material from any processing site designated under section 102(a)(1) title I or 302(a) of title III of the uranium mill tailings radiation control act of 1978, 42 U.S.C. 7912 and 7942.

(iv) If applied according to label directions and according to generally accepted agricultural and management practices, the application of a fertilizer, soil conditioner, agronomically applied manure, or a pesticide, or a combination of these substances. As used in this subparagraph, fertilizer and soil conditioner have the meaning given to these terms in the fertilizer act of 1975, Act No. 198 of the Public Acts of 1975, being sections 286.751 to 286.767, and pesticide has the meaning given to that term in the pesticide control act, Act No. 171 of the Public Acts of 1976, being sections 286.551 to 286.581 of the Michigan Compiled Laws.

(y) "Remedial action" includes, but is not limited to, cleanup, removal, containment, isolation, destruction, or treatment of a hazardous substance released or threatened to be released into the environment, monitoring, maintenance, or the taking of other actions that may be necessary to prevent, minimize, or mitigate injury to the public health, safety, or welfare, or to the environment.

(z) "Remedial action plan" means a work plan for performing remedial action under this act.

(aa) "Response activity" means evaluation, interim response activity, remedial action, or the taking of other actions necessary to protect the public health, safety, or welfare, or the environment, or the natural resources. Response activity also includes health assessments or health effect studies carried out under the supervision, or with the approval of, the department of public health, and enforcement actions related to any response activity.

(bb) "Response activity costs" or "costs of response activity" means all costs incurred in taking or conducting a response activity, including enforcement costs.

(cc) "Rule" means a rule promulgated pursuant to the administrative procedures act of 1969, Act No. 306 of the Public Acts of 1969, being sections 24.201 to 24.328 of the Michigan Compiled Laws.

(dd) "Science advisory council" means the science advisory council created in section 11d.

(ee) "Site" means the location of environmental contamination.

(ff) "Threatened release" or "threat of release" means any circumstance that may reasonably be anticipated to cause a release.

History: 1982, Act 307, Imd. Eff. Oct. 13, 1982;--Am. 1984, Act 388, Imd. Eff. Dec. 28, 1984;--Am. 1990, Act 234, Eff. July 1, 1991.

Cited in other sections: Section 299.603 is cited in §§ 213.54 and 299.621.

Administrative rules: R 299.5101 et seq. of the Michigan Administrative Code.

XXXX 299.604.amended THIS AMENDED SECTION IS EFFECTIVE JULY 1, 1991 XXXX

299.604 Federal assistance.

Sec. 4. The department shall seek federal assistance for response activities required at facilities in this state.

History: 1982, Act 307, Imd. Eff. Oct. 13, 1982;--Am. 1990, Act 234, Eff. July 1, 1991.

XXXX 299.605.amended THIS AMENDED SECTION IS EFFECTIVE JULY 1, 1991 XXXX

299.605 Coordination of activities; rules.

Sec. 5. The department shall coordinate all activities required under this act and shall promulgate rules to provide for the performance of response activities, to reflect and effectuate the powers and duties of the department under this act, and as otherwise necessary to carry out the requirements of this act.

History: 1982, Act 307, Imd. Eff. Oct. 13, 1982;--Am. 1990, Act 234, Eff. July 1, 1991.

Administrative rules: R 299.5101 et seq. of the Michigan Administrative Code.

XXXX 299.606.amended THIS AMENDED SECTION IS EFFECTIVE JULY 1, 1991 XXXX

299.606 Duties of department; removal of site from list; "list" defined.

Sec. 6. (1) The department shall do all of the following:

(a) Upon discovery of a site, identify and evaluate the site for the purpose of assigning to the site a priority score for response activities. Upon assignment to the site of a priority score for response activity, the site shall retain the same score assignment unless a substantial body of data is provided to or available to the department indicating to the department that a substantial change in the score is warranted, and a person requests rescoring for a site during the annual public comment period following the publication of the list, or the department determines that rescoring is appropriate.

(b) Develop 1 or more numerical risk assessment models for assessing the relative present and potential hazards posed to the public health, safety, or welfare, or to the environment by each site

identified pursuant to subdivision (a). The model, or models if more than 1 is developed, shall provide a fair and objective site specific numerical score designating the relative risk posed to the public health, safety, or welfare, or to the environment of each site.

(c) Include in rules promulgated under this act the numerical risk assessment model, or models if more than 1 is developed. The numerical risk assessment model or models shall be reviewed annually by the department to identify potential improvements.

(d) Submit to the legislature in November of each year a list strictly derived from the numerical risk assessment model or models provided for in this section that does all of the following:

(i) Includes all sites.

(ii) Categorizes sites according to the response activity at the site at the time of listing and according to categories established by rules.

(iii) Indicates whether the owner of a site is the federal government, the state, or a local unit of government.

(e) Maintain and make available to the public upon request records regarding sites where remedial actions have been completed, including sites where land use restrictions have been imposed, if the records are not otherwise protected from disclosure by law.

(f) Submit the list for public hearings geographically dispersed throughout the state. These hearings shall be completed at least 30 days before the governor's annual budget recommendations to the legislature.

(g) Report at least annually to the legislature and the governor those sites that have been removed from the list pursuant to this section and rules promulgated under this act and the source of the funds used to undertake the response activity at each of the sites.

(h) Publish a notice annually in the Michigan register of the availability of, and submit annually to the standing committees of the senate and the house of representatives that address legislation pertaining to the environment and the natural resources of this state, a report describing the response activity that is undertaken at each site where response activity is or has occurred during the reporting year and the nature of the contamination that resulted in the necessity for that response activity.

(2) Following the effective date of the amendatory act that added this subsection, if the department has information identifying the owner of property that may be listed as a site, the department shall make reasonable efforts to notify in writing the owner of the property and the local health department and the city, village, or township in which the site is located prior to including the site on the list. This subsection shall not be construed to provide a defense to liability.

(3) A site shall be removed from the list when the department's review of a site shows that the site does not meet the criteria specified in rules promulgated under this act. A site shall not be removed from this list until any necessary response activity that meets the standards specified in rules promulgated under this act is complete.

(4) A person may request that a site be removed from the list by submitting a petition to the department. A petition shall include all of the following information:

(a) A description and history of the site.

(b) A description of the nature and extent of the environmental contamination that existed at the site at the time the site was included on the list.

(c) A description of the response activity undertaken to remedy the release or threat of a release, consistent with rules promulgated under this act, or a description of the investigation conducted that supports the person's petition that the site should be removed from the list without further response activity.

(d) An analysis of the effectiveness of the response activity undertaken to remediate the release or threat of release. The analysis shall include site specific analytical data that documents the effectiveness of the response activity.

(e) Other site-specific information required by the department.

(5) A person seeking the removal of a site from the list shall prepare and submit to the department the documentation required by subsection (4). If response activities have been conducted by the department at the site, the department shall prepare the documentation required by subsection (4).

(6) Within 30 days after receipt of the petition, the department shall determine whether a petition submitted under subsection (4) is administratively complete. Within 60 days after a determination that a petition is administratively complete, the petitioner shall be notified by the department of the department's intent to remove the site from the list, or the petitioner shall be notified that the petition for removal of the site from the list does not meet the criteria for removal of the site from the list as determined by rule. Removal of sites from the list shall be accomplished as part of the process described in rules promulgated under this act. However, if the department concludes pursuant to subsection (3) that the circumstances warrant removal of the site from the list before or at the next regularly scheduled hearing to be held in accordance with rules promulgated under this act, the department shall prepare a notice of intent to remove the site from the list. A notice of intent shall include information considered appropriate by the department and shall be published in at least 1 newspaper of general circulation that serves the area of the site and the notice of intent shall be provided to the local health department and the city, village, or township in which the site is located. Public comment on the notice of intent to remove the site from the site list shall be accepted for a period of not less than 30 days from the date of publication. The department may hold a public hearing on the proposed action.

(7) The department shall make a final determination whether to include the site on the next list. The department shall consider any comments received in response to the notice described in subsection (6).

(8) The department shall notify the person who requested that the site be removed from the list and the local health department, and the city, village, or township in which the site is located of the decision within 45 days of the end of the public comment period provided for in the notice published pursuant to subsection (6).

(9) As used in this section, "list" means the list described in subsection (1)(d).

History: 1982, Act 307, Imd. Eff. Oct. 13, 1982;—Am. 1990, Act 234, Eff. July 1, 1991.

Cited in other sections: Section 299.606 is cited in § 299.507a.

Administrative rules: R 299.5101 et seq. of the Michigan Administrative Code.

XXXX 299.607.amended THIS AMENDED SECTION IS EFFECTIVE JULY 1, 1991 XXXX

299.607 Level of funding; recommendation of governor.

Sec. 7. (1) The governor shall include in his or her annual budget recommendations to the legislature a recommended level of funding to provide for the activities necessary to implement this act.

(2) The governor's recommendations under this section shall be accompanied by a site specific description of the extent of known or suspected environmental contamination, the recommended response activities to be undertaken, and an estimate of cost of those response activities.

History: 1982, Act 307, Eff. Jan. 1, 1983;—Am. 1990, Act 234, Eff. July 1, 1991.

XXOXX 299.608 THIS SECTION IS REPEALED EFFECTIVE JULY 1, 1991 XXOXX

299.608 Construction of act; seeking compensation and reimbursement from person whose action or negligence caused condition requiring expenditure of money.

Sec. 8. This act shall not be construed to relieve a person from any obligation for the cost of evaluation or response activity related to a site for which the person is responsible, or to relieve a person from the obligation to pay a fine, settlement, penalty, or damages. The attorney general shall seek compensation and reimbursement from a person whose action or negligence caused a condition requiring expenditure of money pursuant to this act.

History: 1982, Act 307, Imd. Eff. Oct. 13, 1982.

299.608a Tearing down, removing, or destroying sign or notice as misdemeanor; penalty.

Sec. 8a. A person who willfully tears down, removes, or destroys any sign or notice warning of the presence of hazardous substances or marking boundaries of a site of environmental contamination subject to response activity under this act is guilty of a misdemeanor, punishable by imprisonment for not more than 90 days, or a fine of not more than $500.00, or both.

History: Add. 1987, Act 166, Eff. Jan. 1, 1988.

XXXX 299.609.amended THIS AMENDED SECTION IS EFFECTIVE JULY 1, 1991 XXXX

299.609 Environmental response fund; establishment; administration; revenue; unexpended balance to be carried forward.

Sec. 9. (1) An environmental response fund is established in the department of the treasury. The environmental response fund shall be administered by the governor or the governor's designee.

(2) The fund shall receive as revenue any money from any source, as appropriated by the legislature and the interest and earnings of the fund shall be credited to the fund.

(3) In addition to the money received under subsection (2), the fund shall receive as revenue money collected by the attorney general in actions filed under this act, collected by the state under this act, or collected by a person under section 15(2).

(4) An unexpended balance within the fund at the close of the fiscal year shall be carried forward to the following fiscal year.

History: 1982, Act 307, Imd. Eff. Oct. 13, 1982;--Am. 1990, Act 234, Eff. July 1, 1991.

Cited in other sections: Section 299.609 is cited in § 299.866.

299.609a Michigan unclaimed bottle fund.

Sec. 9a. (1) A Michigan unclaimed bottle fund is established as a separate revolving fund in the state treasury. The money in the Michigan unclaimed bottle fund shall not revert to the general fund. The Michigan unclaimed bottle fund shall be administered by the department of treasury.

(2) The Michigan unclaimed bottle fund shall receive money as disbursed by the department of treasury from the bottle deposit fund under section 3c of the Initiated Law of 1976, being section 445.573c of the Michigan Compiled Laws.

(3) The money deposited in the Michigan unclaimed bottle fund shall be used in the manner and for the purposes described in subsection (5).

(4) The Michigan unclaimed bottle fund shall consist of the following:

(a) Money received from the bottle deposit fund under section 3c of the Initiated Law of 1976.

(b) Any interest earned on the money described in subdivision (a) while that money is in the Michigan unclaimed bottle fund.

(5) During the first 10 years that money is disbursed by the bottle deposit fund under section 3c of the Initiated Law of 1976, the money received by the Michigan unclaimed bottle fund and any interest earned on that money shall remain permanently in the Michigan unclaimed bottle fund and shall not be disbursed except that the legislature may appropriate from the unclaimed bottle fund an amount sufficient to cover the reasonable administrative costs incurred by the long-term maintenance trust fund board created in section 9b. After the expiration of those first 10 years, all of the money thereafter deposited annually in the Michigan unclaimed bottle fund, interest earned on the money thereafter deposited annually in the Michigan unclaimed bottle fund, and any interest earned on the money already in that fund shall be disbursed annually by the department of treasury in the following manner:

(a) One-third to the environmental response fund created in section 9.

(b) One-third to the long-term maintenance trust fund created in section 9c.

(c) One-third to the clean Michigan fund created in section 5 of the clean Michigan fund act, Act No. 249 of the Public Acts of 1986, being section 299.375 of the Michigan Compiled Laws.

History: Add. 1989, Act 157, Imd. Eff. July 27, 1989.

Cited in other sections: Section 299.609a is cited in § 445.573c.

299.609b Long-term maintenance trust fund board.

Sec. 9b. (1) Not earlier than 8 years after the effective date of the amendatory act that added this section, the long-term maintenance trust fund board shall be created within the department of natural resources and shall consist of 5 members, 1 of whom is the director of the department of natural resources, or his or her designee, as an ex officio voting member, and 4 of whom shall be appointed by the governor with the advice and consent of the senate in the following manner:

(a) One member of the general public representing the interests of persons involved in advancing the cause of conservation in all its phases including natural resources management, environmental education, enhancement of fish and wildlife population, and prevention of environmental degradation.

(b) One member of the general public representing the interests of environmentally concerned citizens and groups.

(c) Two members of the general public who are knowledgeable in scientific and technical areas of study that are relevant to the long-term monitoring and maintenance of environmental contamination sites.

(2) The term of each appointed member shall be 4 years, except that of those members first appointed 1 shall be appointed for a term of 4 years, 1 shall be appointed for a term of 3 years, 1 shall be appointed for a term of 2 years, and 1 shall be appointed for a term of 1 year. Vacancies shall be filled for the unexpired term in the same manner as the original appointment.

(3) Members of the long-term maintenance trust fund board shall receive per diem compensation and reimbursement for the actual and necessary expenses incurred through the performance of their duties as established annually by the legislature and shall not receive compensation for those expenses from any other source.

(4) The long-term maintenance trust fund board shall elect a chairperson and other officers as are necessary for conducting business.

(5) The long-term maintenance trust fund board shall promulgate rules pursuant to the administrative procedures act of 1969, Act No. 305 of the Public Acts of 1969, being sections 24.201 to 24.328 of the Michigan Compiled Laws, setting forth criteria for projects designed to implement the purposes for which the long-term maintenance trust fund was established.

(6) The long-term maintenance trust fund board shall meet not less than twice per year and shall consider and approve or disapprove recommendations by the department of natural resources for projects designed to implement the purposes for which the long-term maintenance trust fund was established.

(7) The business which the long-term maintenance trust fund board may perform shall be conducted at a public meeting held in compliance with the open meetings act, Act No. 267 of the Public Acts of 1976, being sections 15.261 to 15.275 of the Michigan Compiled Laws. Public notice of the time, date, and place of the meeting shall be given in a manner required by Act No. 267 of the Public Acts of 1976.

(8) The long-term maintenance trust fund board shall annually file a report with the governor and the legislature summarizing the project proposals reviewed, the amount of expenditures authorized, and the effectiveness of the expenditures in attaining the goals for which the long-term maintenance trust fund is established.

History: Add. 1989, Act 157, Imd. Eff. July 27, 1989.

Compiler's note: In subsection (5) of this section, the reference to "Act 305" evidently should be to Act 306.

299.609c Long-term maintenance trust fund.

Sec. 9c. (1) A long-term maintenance trust fund is established as a separate revolving fund in the state treasury. The money in the long-term maintenance trust fund shall not revert to the general fund. The long-term maintenance trust fund shall be administered by the long-term maintenance trust fund board.

(2) The long-term maintenance trust fund shall receive money as disbursed from the Michigan unclaimed bottle fund created in section 9a.

(3) The money deposited in the long-term maintenance trust fund shall be used in a manner and for the purposes described in rules promulgated by the department of natural resources pursuant to the administrative procedures act of 1969, Act No. 306 of the Public Acts of 1969, being sections 24.201 to 24.328 of the Michigan Compiled Laws, for 1 or more of the following:

(a) The operation, maintenance, and monitoring of sites where the department determines such activities are necessary.

(b) The enforcement of this act or the solid waste management act, Act No. 641 of the Public Acts of 1978, being sections 299.401 to 299.437 of the Michigan Compiled Laws, or both.

(c) Any project the long-term maintenance trust fund board determines by rule as having for its purpose the prevention of environmental contamination.

History: Add. 1989, Act 157, Imd. Eff. July 27, 1989.

299.609d Study.

Sec. 9d. Within 5 months after the effective date of the amendatory act that added this section, the department of management and budget shall enter into a contract for the preparation of a study that analyzes the public and private costs associated with various levels of cleanup standards for response activities under this act.

The study shall also include, but is not limited to, an analysis of how quickly various levels of cleanup have been and can be accomplished. The contract shall provide for the study to be completed within 6 months. Prior to entering into the contract, the department of management and budget shall consult with the department of natural resources, the chairperson of the house of representatives committee on conservation, recreation, and environment, and the chairperson of the senate committee on natural resources and environmental affairs regarding the design and the scope of the study. The study required under this section may be conducted in conjunction with other related studies. Upon completion of the study, the department of management and budget shall submit copies of the study to the legislature.

History: Add. 1989, Act 157, Imd. Eff. July 27, 1989.

XXXX 299.610.amended THIS AMENDED SECTION IS EFFECTIVE JULY 1, 1991 XXXX

299.610 Appropriation; purposes; use of fund; recommendation by governor.

Sec. 10. (1) Money required to pay for response activities recommended under this act and to reimburse state departments and agencies for expenditures for those purposes shall be appropriated from the fund and any other source the legislature considers necessary to carry out the requirements of this act.

(2) Money from the fund shall be appropriated only for response activities at facilities that have been subjected to the risk assessment process described in section 6.

(3) The fund may be used for match, operation, and maintenance purposes as required under the comprehensive environmental response, compensation, and liability act of 1980, Public Law 96-510, 94 Stat. 2767, and under subtitle I of the solid waste disposal act, title II of Public Law 89-272, 42 U.S.C. 6991 to 6991i.

(4) The governor shall recommend an annual appropriation for the fund in his or her annual budget recommendations to the legislature.

History: 1982, Act 307, Eff. Jan. 1, 1983;—Am. 1990, Act 233, Eff. July 1, 1991.

XXXX 299.610a.added THIS ADDED SECTION IS EFFECTIVE JULY 1, 1991 XXXX

299.610a Release; duties of owner, operator, or holder of easement interest; applicability of subsections (1) and (2); additional actions; completion of response activities; document; failure to notify department or submission of false or misleading information; civil fine; reimbursement of expenses of state or local unit of government; prohibitions.

Sec. 10a. (1) Except as provided in subsection (3), an owner or operator of a facility who obtains information that there may be a release at that facility shall immediately take appropriate action, consistent with applicable laws and rules promulgated by the department, to do all of the following:

(a) Confirm the existence of the release.

(b) Determine the nature and extent of the release.

(c) Report the release to the department within 24 hours after obtaining knowledge of the release. The requirements of this subdivision shall apply to reportable quantities of hazardous substances established pursuant to 40 C.F.R. 302.4 (1989), unless the department establishes through rules alternate or additional reportable quantities as necessary to protect the public health, safety, or welfare, or the environment.

(d) Immediately stop or prevent the release at the source.

(e) Immediately identify and eliminate any threat of fire or explosion or any direct contact hazards.

(f) Immediately initiate removal of a hazardous substance that is in a liquid phase, that is not dissolved in water, and that has been released.

(2) Except as provided in subsection (3), a person that holds an easement interest in a portion of a property that has knowledge that there may be a release within that easement shall report the release to the department within 24 hours after obtaining knowledge of the release. Unless the department establishes through rules alternate or additional reportable quantities as necessary to protect the public health, safety, or welfare, or the environment, this subsection shall apply to reportable quantities of hazardous substances established pursuant to 40 C.F.R. 302.4 (1989).

(3) The requirements of subsections (1) and (2) do not apply to a permitted release or a release in compliance with applicable federal, state, and local air pollution control laws.

(4) An owner or operator of a facility or a person notified by the department as potentially liable pursuant to section 12, upon written request by the director, shall take the following additional actions:

(a) Provide a plan for and undertake interim response activities.

(b) Provide a plan for and undertake evaluation activities.

(c) Take any other response activity determined by the department to be technically sound and necessary to protect the public health, safety, welfare, or the environment.

(d) Submit to the department for approval a remedial action plan that, when implemented, will achieve the cleanup levels specified in rules promulgated under this act.

(e) Implement an approved remedial action plan in accordance with a schedule approved by the department pursuant to this act.

(5) Upon a determination by the department that a person has completed all response activity at a facility pursuant to an approved remedial action plan prepared and implemented in compliance with rules promulgated under this act, the department, upon request of a person, shall execute and present a document stating that all response activities required in the approved remedial action plan have been completed.

(6) A person in charge of a facility from which a hazardous substance is released that is determined to be reportable under subsection (1)(c), other than a permitted release, that fails to

notify the department within 24 hours after obtaining knowledge of the release or that submits in such notification any information that the person knows to be false or misleading is subject to a civil fine of not more than $25,000.00 for each day in which the violation occurs or the failure to comply continues. A fine imposed under this subsection shall be based upon the seriousness of the violation and any good faith efforts by the violator to comply with this subsection.

(7) If a state or local unit of government obtains information that there is a release or threat of release on public property, and is requested by the department to undertake response activity, or takes emergency action that has been approved by the department, and the state or local unit of government incurs expenses in taking the actions, the expenses of the state or local unit of government shall be reimbursed from the Michigan environmental assurance fund if enabling legislation creating the fund is enacted into law and if each of the following is established:

(a) The release or threat of release was not discovered or should not have been discovered pursuant to section 12a(2)(b)(ii).

(b) The state or local unit of government did not cause or contribute to the release or threat of release.

(c) The state or local unit of government is not liable under section 12 for the release or threat of release.

(8) This section shall not do either of the following:

(a) Limit the authority of the department to take or conduct response activities pursuant to this act.

(b) Limit the liability of a person that may be liable under section 12.

History: Add. 1990, Act 233, Eff. July 1, 1991.

Administrative rules: R 299.5101 et seq. of the Michigan Administrative Code.

XXXX 299.610b.added THIS ADDED SECTION IS EFFECTIVE JULY 1, 1991 XXXX

299.610b Notifying department of agriculture; information; definition.

Sec. 10b. (1) The department, upon confirmation of a release or threat of release of a substance that is regulated by the department of agriculture, shall notify the department of agriculture. The department shall consult with the department of agriculture in the development of response activities if a release or threat of a release of a substance regulated by the department of agriculture occurs. The department of agriculture shall provide to the department information necessary to identify substances regulated by the department of agriculture. This information shall include but is not limited to the list of state registered pesticides.

(2) As used in this section, "substance regulated by the department of agriculture" means a fertilizer or soil conditioner as defined in the fertilizer act of 1975, Act No. 198 of the Public Acts of 1975, being sections 286.751 to 286.767 of the Michigan Compiled Laws, or a pesticide as defined in the pesticide control act, Act

No.171 of the Public Acts of 1976, being sections 286.551 to 286.581 of the Michigan Compiled Laws.

History: Add. 1990, Act 233, Eff. July 1, 1991.

XXXX 299.610c.added THIS ADDED SECTION IS EFFECTIVE JULY 1, 1991 XXXX

299.610c Transfer of interest in real property; notice; certification.

Sec. 10c. (1) A person that has knowledge or information or is on notice through a recorded instrument that a parcel of his or her real property is a facility at which there has been a release, in a quantity required to be reported pursuant to section 10a(1)(c), shall not transfer an interest in that real property unless he or she provides written notice to the purchaser or other person to whom the property is transferred that the real property is such a facility and discloses the general nature and extent of the release. The written notice provided by the transferor shall be a separate instrument and, if the instrument conveying the interest in real property is recorded, the written notice shall be recorded with the register of deeds in the same county.

(2) The owner of real property for which a notice required in subsection (1) has been recorded may, upon completion of all response activities for the facility as approved by the department, record with the register of deeds for the appropriate county a certification that all response activity required in an approved remedial action plan has been completed.

History: Add. 1990, Act 233, Eff. July 1, 1991.

XXXX 299.610d.added THIS ADDED SECTION IS EFFECTIVE JULY 1, 1991 XXXX

299.610d Duties of person required to furnish information; right to enter public or private property; purposes; duties of person entering public or private property; copies of sample analyses, photographs, or videotapes; completion of inspections and investigations; refusing entry or information; powers of attorney general; injunction; civil fine; availability of information to public; protection of information; administrative subpoena; witness fees and mileage; court order; contempt; "information" defined.

Sec. 10d. (1) To determine the need for response activity, or selecting or taking a response activity or otherwise enforcing this act or a rule promulgated under this act, the directors or their authorized representatives may upon reasonable notice require a person to furnish any information that the person may have relating to any of the following:

(a) The identification, nature, and quantity of materials that have been or are generated, treated, stored, handled, or disposed of at a facility or transported to a facility.

(b) The nature or extent of a release or threatened release at or from a facility.

(2) Upon reasonable notice, a person required to furnish information pursuant to subsection (1) shall either:

(a) Grant the directors or their authorized representatives access at all reasonable times to any place, property, or location to inspect and copy the related information.

(b) Copy and furnish to the directors or their authorized representatives the related information.

(3) If there is a reasonable basis to believe that there may be a release or threat of release, the directors or their authorized representatives shall have the right to enter at all reasonable times any public or private property for any of the following purposes:

(a) Identifying a facility.

(b) Investigating the existence, origin, nature, or extent of a release or threatened release.

(c) Inspecting, testing, taking photographs or videotapes, or sampling of any of the following: soils, air, surface water, groundwater, suspected hazardous substances, or any containers or labels of suspected hazardous substances.

(d) Determining the need for or selecting any response activity.

(e) Taking or monitoring implementation of any response activity.

(4) A person who enters public or private property pursuant to subsection (3) shall present credentials; make a reasonable effort to contact the person in charge of the facility or that person's designee; describe the nature of the activities authorized under subsection (3) to be undertaken; and inform the person that is in charge of the facility that he or she is entitled to participate in the collection of split samples, and is entitled to a copy of the results of any analysis of samples and a copy of any photograph or videotape taken. The person in charge or his or her agent may accompany the directors or their authorized representatives during the activities authorized under subsection (3) that take place and may participate in the collection of any split samples on the property. The absence or unavailability of the person in charge or that person's agent shall not delay or limit the authority of the directors or their authorized representatives to enter the property or proceed with the activities authorized under subsection (3).

(5) If the directors or their authorized representatives obtain any samples, before leaving the property they shall give to the person in charge of the property from which the samples were obtained a receipt describing the sample. A copy of the results of any analysis of the samples shall upon request be furnished promptly to the person in charge. A copy of any photograph or videotape taken pursuant to subsection (3)(c) shall upon request be furnished promptly to the person in charge.

(6) All inspections and investigations undertaken by the directors or their authorized representatives under this section shall be completed with reasonable promptness.

(7) If refused entry or information under subsections (1) to (4), for the purposes of enforcing the information gathering and entry authority provided in this section, the attorney general, on behalf of the state, may do either of the following:

(a) Petition the court of appropriate jurisdiction for a warrant authorizing access to property or information pursuant to this section.

(b) Commence a civil action to compel compliance with a request for information or entry pursuant to this section, to authorize information gathering and entry provided for in this section, and to enjoin interference with the exercise of the authority provided in this section.

(8) In a civil action brought pursuant to subsection (7), if there is a reasonable basis to believe there may be a release or a threatened release, the court shall in the case of interference or noncompliance with information requests pursuant to subsection (1), or with entry or inspection requests pursuant to subsection (3), enjoin interference with and direct compliance with the requests unless the defendant establishes that, under the circumstances of the case, the request is arbitrary and capricious, an abuse of discretion, or otherwise not in accordance with law.

(9) In a civil action brought pursuant to subsection (7), if there is a reasonable basis to believe there may be a release or a threatened release, the court may assess a civil fine not to exceed $25,000.00 for each day of noncompliance against a person who unreasonably fails to comply with the provisions of subsection (1), (2), or (3).

(10) Information obtained by the directors or their authorized representatives as authorized under subsection (1) or (2) shall be available to the public to the extent provided by the freedom of information act, Act No. 442 of the Public Acts of 1976, being sections 15.231 to 15.246 of the Michigan Compiled Laws. A person that provides information pursuant to subsection (1) or (2), or the person in charge of a facility at which photographs or videotapes are taken pursuant to subsection (3), may designate the information that the person believes to be entitled to protection as if the information was exempt from disclosure as being either trade secrets or information of a personal nature under section 13(1)(a) or (g) of the freedom of information act, Act No. 442 of the Public Acts of 1976, being section 15.243 of the Michigan Compiled Laws, and submit that specifically designated information separately from other information required to be provided under this section.

(11) Notwithstanding subsection (10), the following information obtained by the directors or their authorized representatives as required by this section shall be available to the public:

(a) The trade name, common name, or generic class or category of the hazardous substance.

(b) The physical properties of a hazardous substance, including its boiling point, melting point, flash point, specific gravity, vapor density, solubility in water, and vapor pressure at 20 degrees Celsius.

(c) The hazards to the public health, safety, or welfare, or the environment posed by a hazardous substance, including physical hazards, such as explosion, and potential acute and chronic health hazards.

(d) The potential routes of human exposure to the hazardous substance at the facility being investigated, entered, or inspected under this section.

(e) The location of disposal of any waste stream released or threatened to be released from the facility.

(f) Monitoring data or analysis of monitoring data pertaining to disposal activities related to the facility.

(g) Hydrogeologic data.

(h) Groundwater monitoring data.

(12) To collect information for the purpose of identifying persons that may be liable under section 12 or to otherwise enforce this act or a rule promulgated under this act, the attorney general may by administrative subpoena require the attendance and testimony of witnesses and production of papers, reports, documents, answers to questions, and other information the attorney general considers necessary. Witnesses shall be paid the same fees and mileage that are paid witnesses in the courts of this state. If a person fails or refuses to obey the administrative subpoena, the circuit court for the county of Ingham or for the county in which that person resides has jurisdiction to order that person to comply with the subpoena. A failure to obey the order of the court is punishable by the court as contempt.

(13) As used in this section, "information" includes, but is not limited to, documents, materials, records, photographs, and videotapes.

History: Add. 1990, Act 233, Eff. July 1, 1991.

Administrative rules: R 299.5101 et seq. of the Michigan Administrative Code.

XXXX 299.610e.added THIS ADDED SECTION IS EFFECTIVE JULY 1, 1991 XXXX

299.610e Response activity; purposes of remedial action; alternatives; preferred remedial actions; innovative cleanup technologies; notices and summary; public meeting; duties of department; publication; public inspection of administrative record; summary document; compilation and contents of administrative record; explanation of omitted comments or information.

Sec. 10e. (1) The department may take response activity or approve of response activity proposed by a person that is consistent with any rules promulgated under this act relating to the selection and implementation of response activity that the department concludes is necessary and appropriate to protect the public health, safety, welfare, or the environment.

(2) Remedial action undertaken under subsection (1) shall at a minimum accomplish all of the following:

(a) Assure the protection of the public health, safety, welfare, or the environment.

(b) Attain a degree of cleanup and control of hazardous substances that complies with all applicable or relevant and appropriate requirements, rules, criteria, limitations, and standards of state and federal environmental law.

(c) Be consistent with any cleanup standards incorporated in any rules promulgated under this act.

(3) The cost effectiveness of alternative means of complying with this section shall be considered by the department only in selecting among alternatives that meet all of the criteria of subsection (2).

(4) Remedial actions that permanently and significantly reduce the volume, toxicity, or mobility of the hazardous substances are to be preferred.

(5) The department shall encourage the use of innovative cleanup technologies. Before July 1, 1995, the department shall undertake 3 pilot projects to demonstrate innovative cleanup technologies at facilities where money from the fund is used.

(6) At a facility where state funds will be spent to plan or implement a remedial action plan or where the director determines there is a significant public interest, within 30 days after the completion of a remedial investigation for the facility, the department shall provide the county and the township, city, or village in which the facility is located a notice of the completion of the remedial investigation, a summary of the remedial investigation, and notice of an opportunity for the people in the local unit of government to meet with the department regarding the remedial investigation and any proposed feasibility study for the facility. Upon a request for a public meeting by the governing body of the local unit of government or by 25 citizens of the local unit of government, the department shall, within 30 days of the request, meet with persons in the local unit of government. The person or persons requesting the public meeting shall publicize and provide accommodations for the meeting. The meeting shall be held in the local unit of government in which the facility is located. The department shall provide copies of the notices and summary required in this subsection to the governing body of the local unit of government, to the known persons that may be liable under section 12, and to the main public library of the local unit of government in which the facility is located. The department shall send representatives to the meeting who are familiar with the facility and who are involved with determining the appropriate remedial actions to be taken at the facility. Persons that may be responsible under section 12 for the facility may send representatives to the meeting.

(7) Before approval of a proposed remedial action plan at a facility included on the list pursuant to section 6 that is not an interim response activity, if money from the fund is to be used or as specified in rules promulgated under this act, the department shall do all of the following:

(a) Publish a notice and brief summary of the proposed remedial action plan.

(b) Provide for public review and comment pertinent to documents relating to the proposed remedial action plan, including, if applicable, the feasibility study that outlines alternative remedial action measures considered.

(c) Provide an opportunity for a public meeting at or near the facility when any of the following occur:

(i) The department determines that there is a significant public interest or that for any other reason a public meeting is appropriate.

(ii) A city, township, or village in which the facility is located, by a majority vote of its governing body, requests a public meeting.

(iii) A local health department with jurisdiction in the area in which the facility is located requests a public meeting.

(d) Provide a document that summarizes the major issues raised by the public and how they are to be addressed by the final approved remedial action plan.

(8) For purposes of this section, publication shall include, at a minimum, publication in a major local newspaper of general circulation in this state. In addition, the administrative record shall be made available by the department for inspection by members of the public at or near the facility and in Lansing.

(9) The department shall prepare a summary document that explains the reasons for the selection or approval of a remedial action plan. In addition, the department shall compile an administrative record of the decision process that results in the selection of a remedial action plan. The administrative record shall contain all of the following:

(a) Remedial investigation data regarding the facility.

(b) If applicable, a feasibility study and potential remedial actions.

(c) If applicable, a summary document that explains the reasons why a remedial investigation or feasibility study was not conducted.

(d) Applicable comments and information received from the public, if any.

(e) If applicable, a document that summarizes the significant concerns raised by the members of the public and how they are to be addressed.

(f) Other information appropriate to the facility.

(10) If comments or information are submitted for inclusion in the administrative record that are not included in the administrative record, a brief explanation of why the information was not considered relevant shall be sent to the party by the department and included in the record.

History: Add. 1990, Act 233, Eff. July 1, 1991.

Administrative rules: R 299.5101 et seq. of the Michigan Administrative Code.

XXXX 299.610f.added THIS ADDED SECTION IS EFFECTIVE JULY 1, 1991 XXXX

299.610f Action to abate danger or threat; administrative order; noncompliance; liability; petition for reimbursement; action in court of claims; evidence.

Sec. 10f. (1) In accordance with this section, if the department determines that there may be an imminent and substantial endangerment to the public health, safety, welfare, or the environment, because of a release or threatened release, the department may require persons

that may be liable under section 12 to take such action as may be necessary to abate the danger or threat.

(2) The department may issue an administrative order to a person identified by the department as a person that may be liable under section 12 requiring that person to perform response activity relating to a facility for which that person may be liable, or to take any other action required by this act. An order issued under this section shall state with reasonable specificity the basis for issuance of the order and specify a reasonable time for compliance.

(3) Within 30 days after issuance of an administrative order under this section, a person to whom the order was issued shall indicate in writing whether the person intends to comply with the order.

(4) A person that, without sufficient cause, violates or fails to properly comply with an administrative order issued under this section shall be liable for either or both of the following:

(a) A civil fine of not more than $25,000.00 for each day in which the violation occurs or the failure to comply continues. A fine imposed under this subsection shall be based upon the seriousness of the violation and any good faith efforts by the violator to comply with the administrative order.

(b) For exemplary damages in an amount at least equal to the amount of any costs of response activity incurred by the state as a result of a failure to comply with an administrative order but not more than 3 times the amount of these costs.

(5) A person to whom an administrative order was issued under this section and who complied with the terms of the order who believes that the order was arbitrary and capricious or unlawful may petition the department, within 60 days after completion of the required action, for reimbursement from the fund for the reasonable costs of the action plus interest at the rate described in section 12(4) and other necessary costs incurred in seeking reimbursement under this subsection. If the department refuses to grant all or part of the petition, the petitioner may, within 30 days of receipt of the refusal, file an action against the department in the court of claims seeking this relief. A failure by the department either to grant or deny all or any part of a petition within 120 days of receipt shall constitute a denial of that part of the petition which shall be reviewable as final agency action in the court of claims. To obtain reimbursement, the petitioner shall establish by a preponderance of the evidence that the petitioner is not liable under section 12 or that the action ordered was arbitrary and capricious or unlawful, and in either instance that costs for which the petitioner seeks reimbursement are reasonable in light of the action required by and undertaken pursuant to the relevant order.

History: Add. 1990, Act 233, Eff. July 1, 1991.

XXOXX 299.611 THIS SECTION IS NOT APPLICABLE AFTER DECEMBER 31, 1989: See (3) of 'mcl.00299.00611 XXOXX

XXOXX 299.611 THIS SECTION IS REPEALED EFFECTIVE JULY 1, 1991 XXOXX

299.611 Replacement of contaminated potable water supply; circumstances for reimbursement; inability to produce receipts; applicability of section.

Sec. 11. (1) Money required to reimburse an individual who has temporarily or permanently replaced a potable water supply that was contaminated or was threatened to become contaminated by a hazardous substance may be disbursed by the governor's designee if all of the following circumstances exist:

(a) The expenditure for the replacement of a water supply was made after October 13, 1982, the effective date of this act.

(b) The site of the replaced water supply is a location which is on either of the 2 numerical risk assessment listings described in section 6.

(c) The individual presents to the governor's designee documentation from the department of public health or an authorized representative of a health department with responsibility for the individual's water supply indicating that the individual's water supply was unfit or was threatened to become unfit for consumption or any other domestic use and that a replacement of the water supply was necessary at the time that expenditures were made to temporarily or permanently replace or treat the water supply.

(d) The individual presents to the governor's designee receipts for expenses reasonably incurred in replacing a water supply, or in the event that the individual is unable to produce the receipts after making all reasonable efforts, submits a statement containing all of the following:

(i) The nature and cost of the water replacement that was undertaken.

(ii) Either the name and address of any person who worked for the individual to accomplish the replacement of the water supply or an explanation of why this information is not produced.

(iii) A statement from the department of public health or authorized representative of the individual's local health department indicating the condition of the individual's water following the replacement of the water supply.

(e) The individual is not the person whose action or negligence caused a condition that resulted in the contamination or threat of contamination of the water supply that was temporarily or permanently replaced or treated.

(f) The individual presents to the governor's designee documentation from the department of public health or from the local health department which is responsible for the individual's water supply indicating that the replacement water supply is acceptable for use and was constructed in accordance with applicable state and local statutes, rules, and policies.

(2) If an individual who seeks reimbursement pursuant to this section is unable to produce receipts as required by subsection (1)(d), a reimbursement to that individual under this section shall not exceed the cost of the least expensive comparable replacement or treatment of a water supply in the individual's area or, in the event there are no comparable local situations, then the amount to be reimbursed shall be based on the reasonable customary charge for a substantially similar replacement.

(3) This section shall not apply after December 31, 1989.

History: Add. 1984, Act 388, Imd. Eff. Dec, 28, 1984.

XXXX 299.611a.added THIS ADDED SECTION IS EFFECTIVE JULY 1, 1991; THIS ADDED SECTION IS REPEALED EFFECTIVE JULY 1, 1996 XXXX

299.611a Schedule; remedial action plan; notice; action by department.

Sec. 11a. (1) The department shall develop a proposed schedule for submittal of work plans for undertaking necessary response activity for sites identified on a list prepared pursuant to section 6. Each work plan submitted shall include a schedule for submittal of a proposed remedial action plan for the site. The proposed schedule shall be consistent with any schedule required under the leaking underground storage tank act, Act No. 478 of the Public Acts of 1988, being sections 299.831 to 299.850 of the Michigan Compiled Laws. The proposed schedule shall be reviewed by the commission of natural resources, and after a public hearing regarding the proposed schedule, the commission of natural resources shall establish a schedule. The department shall give written notice of the schedule to all identified persons that may be liable under section 12 and shall publish the schedule in the Michigan register listing each facility by township and range coordinates, address, and, if available, common identity. The department may grant an extension to a requirement in the schedule only after holding a public hearing in the county in which the facility subject to the schedule is located.

(2) The persons that may be liable under section 12 for a facility may submit a proposed remedial action plan to the department at any time in advance of the date provided in the schedule under subsection (1).

(3) A proposed remedial action plan submitted to the department under this act shall include a schedule for implementation of response activity at the facility. Within 6 months after receiving a proposed remedial action plan under this act, the department shall review the plan and shall either approve the plan or submit to the persons that may be liable under section 12 changes in the proposed remedial action plan that would result in approval of the plan. If the department submits changes to the proposed remedial action plan, within 60 days after the persons that may be liable under section 12 receive the department's changes, the persons that may be liable under section 12 may incorporate these changes into their proposed remedial action plan and resubmit the proposed remedial action plan to the department. Upon receipt of a proposed remedial action plan that meets the requirements of the department, the department shall approve the remedial action plan.

(4) If the department approves a remedial action plan under subsection (3), the persons that may be liable under section 12 shall implement the approved remedial action plan.

(5) If the participating persons that may be liable under section 12 reject the department's changes to the proposed remedial action plan under subsection (3), the persons that may be liable under section 12 shall notify the department within 60 days after receiving the department's changes. Within 60 days after the persons that may be liable under section 12 reject the department's changes, the department and the persons that may be liable under section 12 shall attempt to resolve their differences, or identify items of difference between them for submittal to the science advisory council pursuant to section 11c. If the department and the persons that may

be liable under section 12 are unable to jointly agree to the items of difference, the department shall notify the office of environmental cleanup facilitation and the list of items of difference shall be prepared as provided in section 11b(2).

(6) The department shall publish a notice in the Michigan register each quarter identifying those sites not in compliance with the schedule for submittal of response activity work plans and those sites in which the department has not acted on a proposed remedial action plan, as provided in this section.

(7) This section does not preclude the department from taking action as provided in sections 10e and 10f.

History: Add. 1990, Act 234, Eff. July 1, 1991.

XXXX 299.611b.added THIS ADDED SECTION IS EFFECTIVE JULY 1, 1991; THIS ADDED SECTION IS REPEALED EFFECTIVE JULY 1, 1996 XXXX

299.611b Office of environmental cleanup facilitation; creation; duties; assignment and duties of facilitator; sharing costs of facilitator.

Sec. 11b. (1) The office of environmental cleanup facilitation is created within the department of management and budget. The office of environmental cleanup facilitation shall contract with individuals who are impartial, qualified facilitators or contract with an organization that can provide impartial, qualified facilitators, who are capable of assisting in the resolution of disputes over the development of remedial action plans.

(2) Within 14 days after receiving notification of submittal to facilitation from the department under section 11a, the office of environmental cleanup facilitation shall randomly assign a facilitator to prepare a detailed list of items of difference between the department and the persons that may be liable under section 12. The facilitator assigned to the dispute shall conduct discussions to identify those items of difference and, within 30 days after being assigned, shall prepare the items of difference and shall forward this list to the science advisory council.

(3) Unless otherwise agreed by the department and the persons that may be liable under section 12 and except as provided in section 11c(3), the department and the persons that may be liable under section 12 shall each pay their costs associated with facilitation under this section and section 11c and they shall share equally the costs of the facilitator.

History: Add. 1990, Act 234, Eff. July 1, 1991.

XXXX 299.611c.added THIS ADDED SECTION IS EFFECTIVE JULY 1, 1991; THIS ADDED SECTION IS REPEALED EFFECTIVE JULY 1, 1996 XXXX

299.611c Recommendations for resolving items of difference; written statements; meeting; recommendations as part of administrative record; additional discussions; facilitation conference; facilitating agreement; remedial action plan; alternative plan; implementation; standing of participants in allocation process in civil action to challenge recommendations; assessing costs of facilitation; attorney fees; recovering costs of response activities; cost of remedial action; rebuttable presumption; action by department.

Sec. 11c. (1) Upon receipt of the items of difference pursuant to section 11a or 11b, the science advisory council shall appoint 3 of its members to provide recommendations for resolving the items of difference. Within 60 days of its receipt of the items of difference, for each item of difference, the department and the persons that may be liable under section 12 may submit a written statement not exceeding 20 pages in support of its position. An interested member of the general public may also submit a written statement, not exceeding 20 pages, in support of a position on any item of difference. The science advisory council shall schedule a meeting to deliberate and prepare recommendations on resolving the items of difference. A meeting of the science advisory council shall be held pursuant to the open meetings act, Act No. 267 of the Public Acts of 1976, being sections 15.261 to 15.275 of the Michigan Compiled Laws. The science advisory council shall, within 90 days of receiving the written statements allowed to be submitted in this subsection, forward its recommendations on the items of difference to the department, the persons that may be liable under section 12, and the facilitator. The recommendations of the science advisory council shall become part of the administrative record.

(2) Within 30 days after receipt of the recommendations of the science advisory council pursuant to subsection (1), the facilitator shall conduct additional discussions with the department and the persons that may be liable under section 12 and shall schedule a facilitation conference. Through these discussions, the facilitator shall attempt to facilitate an agreement between the department and the persons that may be liable under section 12 regarding the contents of a remedial action plan. If the department and the persons that may be liable under section 12 are unable to agree to a remedial action plan at the facilitation conference, the department shall approve a remedial action plan that includes the recommendations of the science advisory council, unless the department prepares and approves an alternative remedial action plan. The department shall approve a remedial action plan pursuant to this subsection within 90 days after the department receives the recommendations from the science advisory council. If the department does not approve a remedial action plan during this time period, the persons that may be liable under section 12 may implement a remedial action plan that includes all of the recommendations of the science advisory council and is otherwise in compliance with this act and the rules promulgated under this act. This remedial action plan shall be considered an approved remedial action plan.

(3) A person that participates in the allocation process under section 11f or 11g shall not have standing in a civil action to challenge the recommendations of the science advisory council, pursuant to subsection (1), which are included in an approved remedial action plan. Additionally, if a court later upholds the contents of the approved remedial action plan, the court shall assess against the persons that may be liable under section 12 for the facility the full costs of facilitation under this section and section 11b and enforcement costs. If the department approves a remedial action plan that does not contain the recommendations endorsed by a majority of the science advisory council and if a court later does not uphold the contents of that remedial action plan, the court shall assess against the department the full costs of facilitation under this section and section 11b, court costs, and the reasonable attorney fees for the persons that may be liable under section 12. Additionally, if the action is for cost recovery of response activities at a facility in which remedial action has been completed, the court shall only assess against the persons that may be liable under section 12 the cost of

remedial action that the court determines should have been undertaken.

(4) In any court proceeding pursuant to this section, there is a rebuttable presumption that the recommendations of the science advisory council on the items of difference are supported by a preponderance of scientific evidence.

(5) This section does not preclude the department from taking action as provided in sections 10e and 10f.

History: Add. 1990, Act 234, Eff. July 1, 1991.

Administrative rules: R 299.5101 et seq. of the Michigan Administrative Code.

XXXX 299.611d.added THIS ADDED SECTION IS EFFECTIVE JULY 1, 1991; THIS ADDED SECTION IS REPEALED JULY 1, 1996 XXXX

299.611d Science advisory council; creation; appointment, qualifications, and terms of members; removal of member; restriction on employment; recommendations; information.

Sec. 11d. (1) The science advisory council is created as an independent, autonomous entity within the department of management and budget. The council shall consist of 7 individuals appointed by the governor, with the advice and consent of the senate, who have expertise in 1 or more of the following areas:

(a) Toxicology.

(b) Environmental engineering.

(c) Biology.

(d) Environmental chemistry.

(e) Hydrogeology.

(f) Soil science.

(g) Statistics.

(2) A member of the science advisory council shall serve for a term of 3 years, or until a successor is appointed by the governor, whichever is later, except of the members first appointed, 3 shall serve for 3 years, 2 shall serve for 2 years, and 2 shall serve for 1 year.

(3) The governor may remove a member of the science advisory council for incompetency, dereliction of duty, malfeasance in office, or any other good cause.

(4) For a period of 6 months after an individual ceases to serve on the science advisory council, that individual shall not be employed by the department, a person that may be liable under section 12, or a consulting firm associated with the department or a person that may be liable under section 12.

(5) Three members of the science advisory council shall on a rotating basis make recommendations on resolving the items of difference between the department and the persons that may be liable under section 12 for a facility with regard to the contents of a remedial

action plan pursuant to this act. The science advisory council need not recommend a position advocated by either the department or the persons that may be liable under section 12, but may recommend an alternative that is supported by scientific evidence and is consistent with this act and the rules promulgated under this act.

(6) The science advisory council shall make recommendations only on the scientific and technical issues in dispute consistent with the rules promulgated under this act, including, but not limited to:

(a) Risk assessment assumptions and calculations.

(b) Data collection and interpretation.

(c) Technological effectiveness of remedial action alternatives.

(d) Chemical, biological, and physical properties.

(e) Impacts on various media.

(7) The science advisory council shall not make recommendations on issues that are not primarily scientific or technical in nature including, but not limited to, any of the following:

(a) Cost effectiveness of remedial action alternatives.

(b) Current and reasonably foreseeable uses of natural resources.

(c) Reasonably foreseeable uses of the facility.

(8) The members of the science advisory council who make recommendations regarding the contents of a remedial action plan for a facility shall not have any present or past personal, contractual, financial, business, or employment interest in matters related to the persons that have disputes before the science advisory council.

(9) Upon request of the science advisory council, the department shall provide the science advisory council with all information the department has in its possession related to a facility.

History: Add. 1990, Act 234, Eff. July 1, 1991.

Administrative rules: R 299.5101 et seq. of the Michigan Administrative Code.

XXXX 299.611e.added THIS ADDED SECTION IS EFFECTIVE JULY 1, 1991 XXXX

299.611e Report to legislature.

Sec. 11e. Within 3 years after the effective date of this section, the department shall report to the legislature on all of the following with regard to the dispute resolution process under sections 11a to 11d:

(a) Whether the dispute resolution process is effectively resolving disputes.

(b) The number of disputes addressed by the dispute resolution process.

(c) The results of disputes subject to the dispute resolution process.

(d) Recommendations regarding legislative action to improve the dispute resolution process.

(e) The cost of the resolution of disputes through the use of the dispute resolution process.

History: Add. 1990, Act 234, Eff. July 1, 1991.

XXXX 299.611f.added THIS ADDED SECTION IS EFFECTIVE WHEN SB 981 AND HB 5808 ARE ENACTED INTO LAW AND THE MICHIGAN ENVIRONMENTAL ASSURANCE CORPORATION FILES WITH THE SECRETARY OF STATE A CERTIFICATION THAT THE MICHIGAN ENVIRONMENTAL ASSURANCE CORPORATION IS FUNDED AND PREPARED TO UNDERTAKE ITS RESPONSIBLITIES UNDER SECTION 11f. XXXX

299.611f Definitions; applicability of section; approval of remedial action plan; notice; list; commencement of allocation process; participation; schedule; plan; negotiations; agreement; copy; consent order; allocation review panel; information; determination; acceptance or rejection; alternative allocation; construction of section; evidence; jurisdiction; limitation; administrative order; action for reimbursement; costs; moratorium; authority not limited; contribution by orphan share administration; recovery of costs; loans to small businesses; rules.

Sec. 11f. (1) As used in this section:

(a) "Allocation process" means a voluntary system for determining the percentage share of response costs pursuant to this section of each person that may be liable under section 12 and the orphan share, if any.

(b) "Allocation review panel" or "panel" means the allocation review panel appointed by the orphan share administration.

(c) "Fund" means the Michigan environmental assurance fund created in the Michigan environmental assurance corporation act.

(d) "Orphan share" means the percentage share of response costs for a facility that the orphan share administration agrees or the allocation review panel determines is not reasonably allocable to any person that may be liable under section 12 using the criteria in subsection (10).

(e) "Orphan share administration" means a person appointed pursuant to the Michigan environmental assurance corporation act to pay for the orphan share.

(f) "Response costs" means all costs incurred in taking or conducting a response activity, enforcement costs, and all costs incurred by the orphan share administration for the services of the allocation review panel.

(2) This section only applies to a facility where 2 or more persons that may be liable under section 12 are identified by the department. However, if only 1 person that may be liable under section 12 is identified for a facility by the department, that person may submit a written request within 14 days after the department approves a remedial action plan, or a remedial action plan is considered approved under section 11c to the orphan share administration to commence the allocation process. A facility for which only 1 person that may be liable under section 12 is identified shall be considered by the allocation review panel as provided in this section

in a manner and at a time that will not impede the allocation process for other facilities.

(3) After the department approves a remedial action plan, or a remedial action plan is considered approved under section 11c, for a facility pursuant to this act and any rules promulgated under this act, the department shall notify in writing each identified person that may be liable under section 12 for a facility and the orphan share administration of the approval of the remedial action plan for the facility. The department shall also send the orphan share administration a list of the names and addresses of all identified persons that may be liable under section 12, and if requested by the orphan share administration, the department shall at any time provide the orphan share administration with all information in the possession of the department that is related to the release. Upon the request of the orphan share administration, the allocation process may commence prior to the approval of the remedial action plan. A person that may be liable under section 12 may petition the orphan share administration to commence the allocation process prior to the approval of the remedial action plan or prior to the time the remedial action plan is considered approved under section 11c.

(4) Not later than 7 days after receipt of the notice of approval of a remedial action plan for the facility, the orphan share administration shall notify each of the persons that may be liable under section 12 in writing of the opportunity to participate in an allocation process. A person that may be liable under section 12 that intends to participate in the allocation process shall notify the orphan share administration in writing within 14 days of receiving notice from the orphan share administration.

(5) If, within the 14-day period during which a person that may be liable under section 12 may indicate the intention to participate in the allocation process, 1 or more of the persons that may be liable under section 12 identified in regard to a facility notify the orphan share administration that the person intends to participate in the allocation process, the orphan share administration shall develop a schedule and plan to facilitate negotiations to determine the percentage share of response costs of each person that may be liable under section 12 and any orphan share. The negotiations shall be completed within 21 days after the last day on which persons that may be liable under section 12 may notify the orphan share administration of the intent to participate, unless all of the participants agree to extend the negotiations. An extension of the negotiations shall not result in an extension of the time limitations provided in subsections (8) and (10).

(6) If, during the negotiation period provided in subsection (5), all of the persons that may be liable under section 12 participating in the allocation process and the orphan share administration agree in writing to a complete percentage allocation of response costs related to the facility, the orphan share administration shall, within 3 days of reaching the agreement, send a copy of the agreement to the director and the attorney general.

(7) The attorney general on behalf of the state may enter into a legally enforceable consent order with 1 or more of the participants in the allocation process providing for implementation of the remedial action plan, payment of response costs, and resolution of other potential liability under this act, including liability for damages and civil fines.

(8) If, within the negotiation period provided in subsection (5), all of the persons that may be liable under section 12 and the orphan share administration do not agree in writing to a complete percentage allocation of response costs related to the facility, the orphan share administration shall convene an allocation review panel to determine an allocation of the percentage share of response costs of each person that may be liable under section 12 including the orphan share, if any. Regardless of when the allocation process commences, the allocation review panel shall be convened no later than 50 days after notification of the persons that may be liable under section 12 of the approval of the remedial action plan for a facility. The allocation review panel shall consist of 3 members selected in the process established by the orphan share administration pursuant to the Michigan environmental assurance corporation act. In selecting the members for an allocation review panel, the orphan share administration shall determine that a member selected for a panel does not have a personal or financial interest in the outcome of the allocation process.

(9) According to the procedures established by the orphan share administration as provided in the Michigan environmental assurance corporation act, each of the participating persons that may be liable under section 12 and the orphan share administration may submit to the panel documentation and other information as considered relevant by a person that may be liable under section 12 or the orphan share administration. In addition, the director may submit to the panel information related to the facility or allocation process that the director considers relevant.

(10) Not later than 90 days after notification of the persons that may be liable under section 12 of approval of the remedial action plan for a facility, the allocation review panel shall issue a written determination allocating the percentage share of response costs of each person that may be liable under section 12 and the orphan share, if any. In reaching a determination, the allocation review panel shall do all of the following:

(a) Consider each of the following as these items relate to each person that may be liable under section 12 and the orphan share, if any:

(*i*) The volume of hazardous substances transported to the facility. For purposes of determining volume, a shipment of a hazardous substance shall be counted 1 time when allocating a percentage share of response costs between a generator and a transporter of a hazardous substance.

(*ii*) The anticipated impact of the hazardous substance on the cost of response activity at the facility.

(*iii*) The degree of care exercised in the disposal or treatment, or both of the hazardous substance by each person that may be liable under section 12.

(*iv*) The manner in which the facility was operated and the degree of care exercised by the owner or operator.

(*v*) The degree of involvement in facility operations.

(*vi*) Whether all applicable permits and licenses required by law were obtained and complied with.

(vii) The degree of cooperation by the person with federal, state, or local officials to prevent, minimize, respond to, or remedy the release or threat of release.

(viii) Any other aggravating or mitigating factor that the allocation review panel determines to be relevant.

(b) Consider the quality of documentation and other information submitted.

(c) If information gaps exist, make reasonable extrapolations from the available information as considered advisable by the allocation review panel.

(11) A copy of the written determination of the allocation review panel shall be forwarded by the panel to the director, the attorney general, and to each of the participants in the allocation process. Within 10 days of receipt of the determination of the allocation review panel, each participant shall notify the orphan share administration of the participant's acceptance or rejection of the panel's determination. The orphan share administration shall notify the allocation review panel, the director, and the attorney general of the participants' decision.

(12) The orphan share administration may reject the allocation review panel's determination if it believes that the percentage cost of response activity allocated to the orphan shares by the panel creates a substantial risk to the fiscal integrity of the fund. If the orphan share administration rejects the allocation review panel's determination it may negotiate with other participating persons that may be liable under section 12 to attempt to arrive at an alternative percentage allocation of response costs that is agreeable to all of the participants. The orphan share administration and the other participating persons that may be liable under section 12 have no more than 7 days to attempt to arrive at an alternative allocation.

(13) The attorney general on behalf of the state may enter into a legally enforceable consent order with 1 or more of the participants in the allocation process who are in agreement with the determination of the allocation review panel or who enter into a negotiated agreement pursuant to subsection (12) providing for implementation of the remedial action plan, payment of response costs, and resolution of other potential liability under this act, including liability for damages and civil fines.

(14) This section shall not be construed to limit the authority of the department or the attorney general at any time to enter into an agreement in the public interest to resolve in whole or in part the liability of a person under this act.

(15) Any allocation of percentage shares of response costs under this section shall not be admissible as evidence in any proceeding, except to prove, if disputed, the financial obligations under the terms of an allocation agreement pursuant to subsection (6) or (11) of a person who has limited its liability under subsection (16). A court shall not have jurisdiction to review an allocation or the procedures used to determine an allocation. The allocation of percentage share of response costs or the procedures used to determine an allocation shall not constitute an apportionment or other statement on the divisibility of harm or causation.

(16) The liability under this act of a person that may be liable under section 12 that accepts and pays its allocated share of

response activity costs as determined through a voluntary allocation agreement pursuant to subsection (6) or by the allocation review panel pursuant to subsection (10), and who by consent order or administrative order pays its allocated share which results in implementation of a remedial action plan approved by the department, shall with respect to matters covered by the order be limited to that person's allocated share of response costs. The department may issue an administrative order pursuant to section 10f to require a person that may be liable under section 12 to implement the plan approved by the department. To be enforceable, the order described in this subsection shall not require that the department determine that there may be an imminent and substantial endangerment to the public health, safety, or welfare, or the environment prior to issuance of the order. In an action for reimbursement pursuant to section 10f(5), if the court upholds the order, the court shall assess against the petitioner the full costs of defending this proceeding, including attorney fees.

(17) If a person that may be liable under section 12 participates in the allocation process set forth in this subsection, the director and the attorney general shall not commence an action under section 10f or 16 against the participating person for a period of 120 days after the persons that may be liable under section 12 have been notified of the approval of a remedial action plan. If the director and the attorney general determine that the parties are bargaining in good faith and that an extension of this moratorium would facilitate an agreement with the persons that may be liable under section 12 for taking response activity, they may extend the moratorium for an additional period of up to 30 days.

(18) Notwithstanding subsection (17), this section shall not limit the department's authority to undertake response activity at any time or the attorney general's authority to undertake enforcement action against any person that may be liable under section 12 that does not participate in the allocation process.

(19) When the allocation process is completed, the orphan share administration shall contribute the percentage of costs assigned to the orphan share plus the percentage share assigned to identified persons that may be liable under section 12 that refuse to participate in the allocation process, or to take remedial action, or to pay on the basis of their allocated share. This subsection shall apply when the remedial action is performed by the persons that may be liable under section 12 pursuant to a consent order or administrative order. The attorney general may file an action under section 16 to recover all costs incurred by the orphan share administration from persons that refuse to participate in the allocation process or in the remedial action on the basis of their allocated share.

(20) The orphan share administration shall promulgate rules establishing a loan program to provide loans to small businesses that may be liable under section 12. A loan shall be provided to assist a small business in fulfilling any of its responsibilities in undertaking a response activity in compliance with this act and with the rules promulgated under this act, except if the small business is convicted of violating section 16b. A loan shall not be made under this section until rules are promulgated establishing the loan program described in this subsection. To be eligible for a loan under this section, a small business shall submit to the orphan share administration evidence that is satisfactory to the orphan share administration that the small business has taken or is taking action necessary to prevent future releases and to otherwise comply with this act and applicable state and federal environmental law. As used in this subsection, small business means a business concern

incorporated or doing business in this state that has a net worth of less than $10,000,000.00, including the affiliates of the business concern that are independently owned and operated.

History: Add. 1990, Act 233, Eff. (pending).

Compiler's note: Section 2 of Act 233 of 1990 provides: "Section 11f of Act No. 307 of the Public Acts of 1982, as added by this amendatory act, shall take effect when the Michigan environmental assurance corporation act, Senate Bill No. 981, and its funding mechanism, House Bill No. 5808, are enacted into law and the Michigan environmental assurance corporation files with the secretary of state a certification that the Michigan environmental assurance corporation is funded and prepared to undertake its responsibilities under section 11f."

Senate Bill No. 981, referred to in Section 2, was filed with the Secretary of State _____, and became P.A. 1990, No. _____, _____.

House Bill No. 5808, also referred to in Section 2, was filed with the Secretary of State _____, and became P.A. 1990, No. _____, _____.

The certification referred to in Section 2 was filed with the Secretary of State on _____.

Administrative rules: R 299.5101 et seq. of the Michigan Administrative Code.

XXXX 299.611g.added THIS ADDED SECTION IS EFFECTIVE JULY 1, 1991; THIS ADDED SECTION IS REPEALED ON THE EFFECTIVE DATE OF SECTION 11f XXXX

299.611g Definitions; applicability of section; approval of remedial action plan; notice; list; commencement of allocation process; participation; schedule; plan; negotiations; agreement; copy; consent order; allocation review panel; information; determination; acceptance or rejection; funding uncollectible percentage; construction of section; evidence; jurisdiction; limitation; administrative order; action for reimbursement; costs; moratorium; authority not limited; recovery of costs; loans to small businesses; rules; creation and responsibility of orphan share administration; staff and services.

Sec. 11g. (1) As used in this section:

(a) "Allocation process" means a voluntary system for determining the percentage share of response costs pursuant to this section of each person that may be liable under section 12 and the orphan share, if any.

(b) "Allocation review panel" or "panel" means the allocation review panel appointed by the orphan share administration.

(c) "Orphan share" means the percentage share of response costs for a facility that the orphan share administration agrees or the allocation review panel determines is not reasonably allocable to any person that may be liable under section 12 using the criteria in subsection (10).

(d) "Orphan share administration" means the orphan share administration created in subsection (21).

(e) "Response costs" means all costs incurred in taking or conducting a response activity, enforcement costs, and all costs incurred by the orphan share administration for the services of the allocation review panel.

(2) This section only applies to a facility where 2 or more persons that may be liable under section 12 are identified by the department. However, if only 1 person that may be liable under section 12 is identified for a facility by the department, that person may submit a written request within 14 days after the department approves a remedial action plan, or a remedial action plan is considered approved under section 11c to the orphan share administration to commence the allocation process. A facility for which only 1 person that may be liable under section 12 is identified shall be considered by the allocation review panel as provided in this section in a manner and at a time that will not impede the allocation process for other facilities.

(3) After the department approves a remedial action plan, or a remedial action plan is considered approved under section 11c, for a facility pursuant to this act and any rules promulgated under this act, the department shall notify in writing each identified person that may be liable under section 12 for a facility and the orphan share administration of the approval of the remedial action plan for the facility. The department shall also send the orphan share administration a list of the names and addresses of all identified persons that may be liable under section 12, and if requested by the orphan share administration, the department shall at any time provide the orphan share administration with all information in the possession of the department that is related to the release. Upon the request of the orphan share administration, the allocation process may commence prior to the approval of the remedial action plan. A person that may be liable under section 12 may petition the orphan share administration to commence the allocation process prior to the approval of the remedial action plan or the remedial action plan is considered approved under section 11c.

(4) Not later than 7 days after receipt of the notice of approval of a remedial action plan for the facility, the orphan share administration shall notify each of the persons that may be liable under section 12 in writing of the opportunity to participate in an allocation process. A person that may be liable under section 12 that intends to participate in the allocation process shall notify the orphan share administration in writing within 14 days of receiving notice from the orphan share administration.

(5) If, within the 14-day period during which a person that may be liable under section 12 may indicate their intention to participate in the allocation process, 1 or more of the persons that may be liable under section 12 identified in regard to a facility notify the orphan share administration that the person intends to participate in the allocation process, the orphan share administration shall develop a schedule and plan to facilitate negotiations to determine the percentage share of response costs of each person that may be liable under section 12 and any orphan share. The negotiations shall be completed within 21 days after the last day on which persons that may be liable under section 12 may notify the orphan share administration of the intent to participate, unless all of the participants agree to extend the negotiations. An extension of the negotiations shall not result in an extension of the time limitations provided in subsections (8) and (10).

(6) If, during the negotiation period provided in subsection (5), all of the persons that may be liable under section 12 participating in the allocation process and the orphan share administration agree in writing to a complete percentage allocation of response costs related to the facility, the orphan share acministration shall, within 3 days of reaching the agreement, send a copy of the agreement to the director and the attorney general.

(7) The attorney general on behalf of the state may enter into a legally enforceable consent order with 1 or more of the participants in the allocation process providing for implementation of the remedial action plan, payment of response costs, and resolution of other potential liability under this act, including liability for damages and civil fines.

(8) If, within the negotiation period provided in subsection (5), all of the persons that may be liable under section 12 for a facility and the orphan share administration do not agree in writing to a complete percentage allocation of response costs related to the facility, the orphan share administration shall convene an allocation review panel to determine an allocation of the percentage share of response costs of each person that may be liable under section 12 including the orphan share, if any. Regardless of when the allocation process commences, the allocation review panel shall be convened no later than 50 days after notification of the persons that may be liable under section 12 of the approval of the remedial action plan for a facility. The allocation review panel shall consist of 3 members selected by the orphan share administration. In selecting the members for an allocation review panel, the orphan share administration shall determine that a member selected for a panel does not have a personal or financial interest in the outcome of the allocation process.

(9) According to the procedures established by the orphan share administration, each of the participating persons that may be liable under section 12 and the orphan share administration may submit to the panel documentation and other information as considered relevant by a person that may be liable under section 12 or the orphan share administration. In addition, the director may submit to the panel information related to the facility or allocation process that the director considers relevant.

(10) Not later than 90 days after notification of the persons that may be liable under section 12 of approval of the remedial action plan for a facility, the allocation review panel shall issue a written determination allocating the percentage share of response costs of each person that may be liable under section 12 and the orphan share, if any. In reaching a determination, the allocation review panel shall do all of the following:

(a) Consider each of the following as these items relate to each person that may be liable under section 12 and the orphan share, if any:

(*i*) The volume of hazardous substances transported to the facility. For purposes of determining volume, a shipment of a hazardous substance shall be counted 1 time when allocating a percentage share of response costs between a generator and a transporter of a hazardous substance.

(*ii*) The anticipated impact of the hazardous substance on the cost of response activity at the facility.

(iii) The degree of care exercised in the disposal or treatment, or both of the hazardous substance by each person that may be liable under section 12.

(iv) The manner in which the facility was operated and the degree of care exercised by the owner or operator.

(v) The degree of involvement in facility operations.

(vi) Whether all applicable permits and licenses required by law were obtained and complied with.

(vii) The degree of cooperation by the person with federal, state, or local officials to prevent, minimize, respond to, or remedy the release or threat of release.

(viii) Any other aggravating or mitigating factor that the allocation review panel determines to be relevant.

(b) Consider the quality of documentation and other information submitted.

(c) If information gaps exist, make reasonable extrapolations from the available information as considered advisable by the allocation review panel.

(11) A copy of the written determination of the allocation review panel shall be forwarded by the panel to the director, the attorney general, and to each of the participants in the allocation process. Within 10 days of receipt of the determination of the allocation review panel, each participant shall notify the orphan share administration of the participant's acceptance or rejection of the panel's determination. The orphan share administration shall notify the allocation review panel, the director, and the attorney general of the participants' decision.

(12) Upon completion of the allocation process under this section, the percentage allocated to the orphan share and the portion allocated to a person that is uncollectible for a facility, if any, shall be funded in full by the other persons that may be liable under section 12 for that facility in proportion to the percentage that each person was assigned pursuant to the allocation process.

(13) The attorney general on behalf of the state may enter into a legally enforceable consent order with 1 or more of the participants in the allocation process who are in agreement with the determination of the allocation review panel providing for implementation of the remedial action plan, payment of response costs, and resolution of other potential liability under this act, including liability for damages and civil fines.

(14) This section shall not be construed to limit the authority of the department or the attorney general at any time to enter into an agreement in the public interest to resolve in whole or in part the liability of a person under this act.

(15) Any allocation of percentage shares of response costs under this section shall not be admissible as evidence in any proceeding, except to prove, if disputed, the financial obligations under the terms of an allocation agreement pursuant to subsection (6) or (11) of a person who has limited its liability under subsection (16). A court shall not have jurisdiction to review an allocation or the procedures used to determine an allocation. The allocation of

percentage share of response costs or the procedures used to determine an allocation shall not constitute an apportionment or other statement on the divisibility of harm or causation.

(16) The liability under this act of a person that may be liable under section 12, that accepts and pays its allocated share of response activity costs as determined through a voluntary allocation agreement pursuant to subsection (6) or by the allocation review panel pursuant to subsection (10), and who by consent order or administrative order pays its portion of the orphan share and the uncollectible portion pursuant to subsection (12) which results in implementation of an approved remedial action plan shall with respect to matters covered by the order be limited to that person's allocated share of response costs. The department may issue an administrative order pursuant to section 10f to require a person that may be liable under section 12 to implement the plan approved by the department. To be enforceable, the order described in this subsection shall not require that the department determine that there may be an imminent and substantial endangerment to the public health, safety, or welfare, or the environment prior to issuance of the order. In an action for reimbursement pursuant to section 10f(5), if the court upholds the order, the court shall assess against the petitioner the full costs of defending this proceeding, including attorney fees.

(17) If a person that may be liable under section 12 participates in the allocation process set forth in this subsection, the director and the attorney general shall not commence an action under section 10f or 16 against the participating person for a period of 120 days after the persons that may be liable under section 12 have been notified of the approval of a remedial action plan. If the director and the attorney general determine that the parties are bargaining in good faith and that an extension of this moratorium would facilitate an agreement with the persons that may be liable under section 12 for taking response activity, they may extend the moratorium for an additional period of up to 30 days.

(18) Notwithstanding subsection (17), this section shall not limit the department's authority to undertake response activity at any time or the attorney general's authority to undertake enforcement action against any person that may be liable under section 12 that does not participate in the allocation process.

(19) The attorney general may file an action under section 16 to recover all costs incurred by the orphan share administration from persons that refuse to participate in the allocation process or in the remedial action on the basis of their allocated share.

(20) The orphan share administration shall promulgate rules establishing a loan program to provide loans to small businesses that may be liable under section 12. A loan shall be provided to assist a small business in fulfilling any of its responsibilities in undertaking a response activity in compliance with this act and the rules promulgated under this act, except if the small business is convicted of violating section 16b. A loan shall not be made under this section until rules are promulgated establishing the loan program described in this subsection. To be eligible for a loan under this section, a small business shall submit to the orphan share administration evidence that is satisfactory to the orphan share administration that the small business has taken or is taking action necessary to prevent future releases and to otherwise comply with this act and applicable state and federal environmental law. As used in this subsection, small business means a business concern incorporated or doing business in this state that has a net worth of less than

$10,000,000.00, including the affiliates of the business concern that are independently owned and operated.

(21) The orphan share administration is created within the department of management and budget. The orphan share administration shall administer the allocation process as provided in this section. The department of management and budget shall provide the orphan share administration with sufficient staff and services to allow it to carry out its responsibilities under this section.

History: Add. 1990, Act 233, Eff. July 1, 1991.

Administrative rules: R 299.5101 et seq. of the Michigan Administrative Code.

XXXX 299.612.added THIS ADDED SECTION IS EFFECTIVE JULY 1, 1991 XXXX

299.612 Liability for response activity costs; amounts recoverable; permitted release; obligations or liability under other state law; action to abate danger or threat; jurisdiction; evidence.

Sec. 12. (1) Notwithstanding any other provision or rule of law and subject only to the defenses set forth in sections 12a and 12b, if there is a release or threatened release from a facility that causes the incurrence of response activity costs, the following persons shall be liable under this section:

(a) The owner or operator of the facility.

(b) The owner or operator of the facility at the time of disposal of a hazardous substance.

(c) The owner or operator of the facility since the time of disposal of a hazardous substance not included in subdivision (a) or (b).

(d) A person that by contract, agreement, or otherwise arranged for disposal or treatment, or arranged with a transporter for transport for disposal or treatment, of a hazardous substance owned or possessed by the person, by any other person, at the facility owned or operated by another person and containing the hazardous substance.

(e) A person that accepts or accepted any hazardous substance for transport to the facility selected by that person.

(2) A person described in subsection (1) shall be liable for all of the following:

(a) All costs of response activity lawfully incurred by the state relating to the selection and implementation of response activity under this act.

(b) Any other necessary costs of response activity incurred by any other person consistent with rules relating to the selection and implementation of response activity promulgated under this act.

(c) Damages for the full value of injury to, destruction of, or loss of natural resources, including the reasonable costs of assessing the injury, destruction, or loss resulting from the release.

(3) The costs of response activity recoverable under subsection (2) shall also include:

(a) All costs of response activity reasonably incurred by the state prior to the promulgation of rules relating to the selection and implementation of response activity under this act, excepting those cases where cost recovery actions have been filed before July 11, 1990. A person challenging the recovery of costs under this subdivision shall have the burden of establishing that the costs were not reasonably incurred under the circumstances that existed at the time the costs were incurred. Recoverable costs include costs incurred reasonably consistent with the rules relating to the selection and implementation of response activity in effect on July 11, 1990.

(b) Any other necessary costs of response activity reasonably incurred by any other person prior to the promulgation of rules relating to the selection and implementation of response activity under this act. A person seeking recovery of these costs has the burden of establishing that the costs were reasonably incurred under the circumstances that existed at the time the costs were incurred.

(4) The amounts recoverable in an action under this section shall include interest on the amounts recoverable under subsections (2) and (3). This interest shall accrue from the date payment is demanded in writing, or the date of the expenditure or damage, whichever is later. The rate of interest on the outstanding unpaid balance of the amounts recoverable under this section shall be the same rate as is specified in section 6013(5) of the revised judicature act of 1961, Act No. 236 of the Public Acts of 1961, being section 600.6013 of the Michigan Compiled Laws.

(5) A person shall not be required under this act to undertake response activity for a permitted release. Recovery by any person for response activity costs or damages resulting from a permitted release shall be pursuant to other applicable law, in lieu of this act. This subsection shall not affect or modify in any way the obligations or liability of any person under any other state law, including common law, for damages, injury, or loss resulting from a release of a hazardous substance or for response activity or the costs of response activity.

(6) If the director determines that there may be an imminent and substantial endangerment to the public health or welfare or the environment because of an actual or threatened release from a facility, the attorney general may bring an action against any person described in subsection (1) or any other appropriate person to secure the relief that may be necessary to abate the danger or threat. The court has jurisdiction to grant such relief as the public interest and the equities of the case may require.

(7) In establishing liability under this section, the department shall bear the burden of proof. If the department proves a prima facie case against a person, the person shall bear the burden of showing by a preponderance of the evidence that they are not liable under this section.

History: Add. 1990, Act 233, Eff. July 1, 1991.

Administrative rules: R 299.5101 et seq. of the Michigan Administrative Code.

XXXX 299.612a.added THIS ADDED SECTION IS EFFECTIVE JULY 1, 1991 XXXX

299.612a Evidence establishing nonliability under § 299.612; "contractual relationship" defined; additional evidence required; effort to minimize liability; liability of previous owner or operator not diminished; liability of state or local unit of government; liability of commercial lending institution; disposal of property by commercial lending institution; assuming ownership or control of property as fiduciary; applicability of defenses to liability; "foreclosure environmental assessment" defined.

Sec. 12a. (1) A person shall not be liable under section 12 if that person establishes by a preponderance of the evidence that the release or threat of release was caused solely by:

(a) An act of God.

(b) An act of war.

(c) An act or omission of a third party other than an employee or agent of the person that may be liable under section 12, or other than one whose act or omission occurs in connection with a contractual relationship, existing directly or indirectly, with the person that may be liable under section 12 if the person that may be liable under section 12 establishes by a preponderance of the evidence both of the following:

(i) That he or she exercised due care with respect to the hazardous substance, taking into consideration the characteristics of the hazardous substance, in light of all relevant facts and circumstances.

(ii) That he or she took reasonable precautions against reasonably foreseeable acts or omissions of a third party and the consequences that foreseeably could result from those acts or omissions.

(d) Any combination of subdivision (a), (b), or (c).

(2) The term contractual relationship, as used in subsection (1)(c), includes, but is not limited to, land contracts, deeds, or other instruments transferring title or possession, unless both of the following are established:

(a) The real property on which the facility is located was acquired by the person that may be liable under section 12 after the disposal or placement of the hazardous substance on, in, or at the property.

(b) The person that may be liable under section 12 by a preponderance of the evidence proves 1 or more of the following:

(i) At the time the person that may be liable under section 12 acquired the property, that person did not know and had no reason to know that a hazardous substance that is the subject of the release or threat of a release was disposed of on, in, or at the facility.

(ii) The person that may be liable under section 12 is a state or local unit of government that acquired the property by purchase, gift, transfer, dedication, or condemnation, and, for property acquired after the effective date of this section, the state or local unit of government does all of the following:

(A) Conducts or causes to be conducted a visual inspection of the property and a review of the ownership and use history of the property to determine whether a probability exists that the property

is a facility. If the visual inspection or the ownership and use history, or both, show that there may be a release or threat of release, the state or local unit of government shall conduct, or cause to be conducted, an environmental assessment of the property that includes an on-site evaluation of the nature and extent, if any, of the release or threat of release, and an inspection of all permanent structures on the property for the presence of a hazardous substance.

(B) Prior to final acquisition, if the environmental assessment required in subparagraph (*ii*)(A) discloses a release or threat of release, the state or local unit of government shall do all of the following:

(I) Provide a report of the findings and conclusions of the environmental assessment to the governing body of the unit of government.

(II) Provide a public notice of the availability of the report of the findings and conclusions of the environmental assessment.

(III) Submit the report and the environmental assessment to the department.

(C) After final acquisition, if the environmental assessment required in subparagraph (*ii*)(A) disclosed a release or threat of release, the state or local unit of government shall provide the department with a right of entry to the property at all reasonable times for any of the purposes listed in section 10d(3)(a) through (e).

(D) After final acquisition, unless waived by the director through the exercise of his or her discretion, if the environmental assessment required in subparagraph (*ii*)(A) disclosed a release or threat of release, the state or local unit of government shall not transfer any legal interest, or any equitable or possessory interest that relinquishes control over that property for more than 45 days, unless the state or local unit of government does all of the following:

(I) Provide any transferee with a copy of the environmental assessment required in subparagraph (*ii*)(A) prior to the transfer of the property.

(II) Include in any contract for transfer of the property a statement that, absent a covenant not to sue from the state as provided by section 14a, the transferee will be a person that may be liable under section 12 of this act.

(III) Include as a condition to the transfer in any contract for the transfer of the property that the transferee agrees to provide the department with a right of entry to the property at all reasonable times for any of the purposes listed in section 10d(3)(a) through (e) related to a release or threat of release disclosed in the environmental assessment required in subparagraph (*ii*)(A).

(IV) Provide the department with a copy of the contract for transfer of the property and a description of the intended use of the property by the transferee within 14 days of the execution of the transfer.

(*iii*) The person that may be liable under section 12 acquired the property by inheritance.

(3) In addition to establishing 1 or more of the circumstances described in subsection (2)(b)(*i*), (*ii*), or (*iii*), the person that may be liable under section 12 shall establish that he or she has satisfied the requirements of subsection (1)(c)(*i*) and (*ii*).

(4) To establish that the person that may be liable under section 12 had no reason to know, as required under subsection (2)(b)(*i*), the person that may be liable under section 12 shall have undertaken, at the time of acquisition, all appropriate inquiry into the previous ownership and uses of the property consistent with good commercial or customary practice in an effort to minimize liability. For purposes of the preceding sentence, the court shall take into account any specialized knowledge or experience on the part of the person that may be liable under section 12, the relationship of the purchase price to the value of the property if uncontaminated by a hazardous substance, commonly known or reasonably ascertainable information about the property, the obviousness of the presence or likely presence of a release or threat of release at the property, and the ability to detect a release or threat of release by appropriate inspection.

(5) This section shall not diminish the liability of a previous owner or operator of a facility that would otherwise be liable under this act. Notwithstanding this section, if the person that may be liable under section 12 obtained actual knowledge of the release or threat of release at the facility when that person owned the real property and then transferred ownership of the property to another person without disclosing this knowledge, the person shall be liable under section 12 and a defense under this section shall not be available to that person. Nothing in this section shall affect the liability under this act of a person that may be liable under section 12 that, by an act or omission, caused or contributed to the release or threat of release that is the subject of a response activity at the facility.

(6) The state or a local unit of government shall not be liable under this act for costs or damages as a result of response activity taken in response to a release or threat of release. This subsection shall not preclude liability for costs or damages as a result of gross negligence, including reckless, willful, or wanton misconduct, or intentional misconduct by the state or local unit of government.

(7) A commercial lending institution that has not participated in the management of a facility prior to taking title acquires a property that is a facility through foreclosure or through acceptance of a deed in lieu of foreclosure for the sole purpose of realizing on a security interest shall not be liable under this act, if 1 or more of the following are true:

(a) The property is a residential property.

(b) The property is an agricultural property.

(c) The commercial lending institution acquired ownership or control of the property involuntarily through a court order or other involuntary circumstance.

(d) The commercial lending institution would otherwise be liable solely under section 12(1)(c) and the commercial lending institution acquired ownership or control of the property prior to August 1, 1990.

(8) If a commercial lending institution that has not participated in the management of a facility prior to taking title, other than those properties described in subsection (7)(a) or (b), conducts, within 180 days before or after taking title to the property, a valid foreclosure environmental assessment prior to disposition of that property, and that foreclosure environmental assessment does not indicate that there was a release or threat of release on the property, there is a rebuttable presumption that the commercial lending institution has satisfied the criteria specified in subsection (1)(c) with respect to that property. The defense to liability in this subsection does not apply to a release that started after the date on which the commercial lending institution acquired title to the property and during the time the commercial lending institution held title to the property.

(9) If a commercial lending institution that prior to taking title of a property through foreclosure or through acceptance of a deed in lieu of foreclosure has not participated in the management of property, other than a property described in subsection (7)(a) or (b), performs a foreclosure environmental assessment on the property within 180 days before or after taking title to the property, and that foreclosure environmental assessment indicates that there is a release or threat of release on that property, the commercial lending institution shall not dispose of that property unless the commercial lending institution provides the department with a complete copy of the results of the foreclosure environmental assessment, and the commercial lending institution enters into an agreement with the department regarding disposition of the property. If a commercial lending institution submits a proposal to the department regarding disposition of the property, the department shall, within 6 months, review the proposal and either approve the proposal or submit changes to the commercial lending institution that would result in approval of the proposal. However, if the commercial lending institution and the department are unable to reach an agreement pertaining to disposition of the property, the commercial lending institution shall not transfer the property, other than to the state. A commercial lending institution that establishes that it has met the requirements of this subsection shall not be liable under section 12 with respect to that property.

(10) A commercial lending institution or other person that has not participated in the management of a property prior to assuming ownership or control of the property as a fiduciary, as defined by section 5 of the revised probate code, Act No. 642 of the Public Acts of 1978, being section 700.5 of the Michigan Compiled Laws, and that is acting or has acted in a capacity permitted by the revised probate code, Act No. 642 of the Public Acts of 1978, being sections 700.1 to 700.993 of the Michigan Compiled Laws, shall not be personally liable as an owner or operator of the property under this act. This subsection shall not do either of the following:

(a) Relieve the fiduciary from personal liability as the result of the fiduciary's assumption of personal liability, or negligence, gross negligence, or reckless, willful, or intentional misconduct.

(b) Prevent claims against the assets that are part of or all of the estate or trust that contains the facility; any other estate or trust of the decedent, grantor, ward, or other person whose estate or trust contains the facility that is administered by the commercial lending institution or other person; or any other estate or trust of the decedent, grantor, ward, or other person whose estate or trust contains the facility. Such claims may be asserted against the

fiduciary in its representative capacity, whether or not the fiduciary is personally liable.

(11) A commercial lending institution that has not participated in the management of a property prior to assuming ownership or control of the property in a fiduciary capacity, and pursuant to a fiduciary agreement entered into on or before August 1, 1990 owns or controls the property in a fiduciary capacity that is not regulated by Act No. 642 of the Public Acts of 1978 but is authorized by the banking code of 1969, Act No. 319 of the Public Acts of 1969, being sections 487.301 to 487.598 of the Michigan Compiled Laws, or the national bank act, chapter 106, 13 Stat. 99, shall not be personally liable as an owner or operator of the property under this act. This subsection shall not do either of the following:

(a) Relieve the fiduciary from personal liability as the result of the fiduciary's assumption of personal liability, negligence, gross negligence, or reckless, willful, or intentional misconduct.

(b) Prevent claims against the assets that are part of or all of the estate or trust that contains the facility; any other estate or trust of the decedent, grantor, ward, or other person whose estate or trust contains the facility that is administered by the commercial lending institution; or any other estate or trust of the decedent, grantor, ward, or other person whose estate or trust contains the facility. Such claims may be asserted against the fiduciary in its representative capacity, whether or not the fiduciary is personally liable.

(12) A commercial lending institution that has not participated in the management of a property prior to assuming ownership or control of the property in a fiduciary capacity, and pursuant to a fiduciary agreement entered into after August 1, 1990 owns or controls the property in a fiduciary capacity that is not regulated by Act No. 642 of the Public Acts of 1978 but is authorized by the banking code of 1969, Act No. 319 of the Public Acts of 1969, being sections 487.301 to 487.598 of the Michigan Compiled Laws, or the national bank act, chapter 106, 13 Stat. 99, that has served only in an administrative, custodial, or financial capacity with respect to the property, and has not exercised sufficient involvement to control the owner's or operator's handling of a hazardous substance, shall not be personally liable as an owner or operator of the property under this act. This subsection shall not do either of the following:

(a) Relieve the fiduciary from personal liability as the result of the fiduciary's assumption of personal liability, negligence, gross negligence, or reckless, willful, or intentional misconduct.

(b) Prevent claims against the assets that are part of or all of the estate or trust that contains the facility; any other estate or trust of the decedent, grantor, ward, or other person whose estate or trust contains the facility that is administered by the commercial lending institution; or any other estate or trust of the decedent, grantor, ward, or other person whose estate or trust contains the facility. Such claims may be asserted against the fiduciary in its representative capacity, whether or not the fiduciary is personally liable.

(13) The defenses to liability under section 12 in subsections (7) to (12) in regard to a facility do not apply when a commercial lending institution, or its agent, employee, or a person retained by the commercial lending institution, caused or contributed to a release or threat of release.

(14) As used in subsections (8) and (9), "foreclosure environmental assessment" means to conduct, or cause to be conducted, a visual inspection of property and a review of the ownership and use history of the property to determine whether there is a release or threat of release. If a visual inspection or the ownership and use history, or both, show that there may be a release or threat of release, a site specific on-site evaluation of the nature and extent, if any, of the release or threat of release shall be conducted, and an inspection of all permanent structures on the property to determine the presence of a hazardous substance shall be conducted.

History: Add. 1990, Act 233, Eff. July 1, 1991.

XXXX 299.612b.added THIS ADDED SECTION IS EFFECTIVE JULY 1, 1991 XXXX

299.612b Liability of response activity contractor; effect of warranty; liability of employer to employee; exemption of governmental employer from liability; availability of defense; effect of section on liability; definitions.

Sec. 12b. (1) A person that is a response activity contractor for any release or threatened release is not liable to any person for injuries, costs, damages, expenses, or other liability, including, but not limited to, claims for indemnification or contribution and claims by third parties for death, personal injuries, illness, or loss of or damages to property or economic loss that result from the release or threatened release. This subsection shall not apply if a release or threatened release is caused by conduct of the response activity contractor that is negligent, grossly negligent, or that constitutes intentional misconduct.

(2) This section shall not affect the liability of a person under any warranty under federal, state, or common law. This subsection shall not affect the liability of an employer who is a response activity contractor to any employee of the employer under law, including any provision of law relating to worker's compensation.

(3) An employee of this state or a local unit of government who provides services relating to a response activity while acting within the scope of his or her authority as a governmental employee shall have the same exemption from liability as is provided to the response activity contractor under this section.

(4) The defense provided by section 12a(1)(c) is not available to any person that may be liable under section 12 with respect to any costs or damages caused by any act or omission of a response activity contractor. Except as provided in this section, this section shall not affect the liability under this act or under any other federal or state law of any person.

(5) This section shall not affect the plaintiff's burden of establishing liability under this act.

(6) As used in this section:

(a) "Response activity contract" means a written contract or agreement entered into by a response activity contractor with 1 or more of the following:

(*i*) The department.

(ii) The department of public health.

(iii) A person that may be liable under section 12 that is carrying out an agreement to undertake a response activity under this act.

(b) "Response activity contractor" means 1 or both of the following:

(i) A person that enters into a response activity contract with respect to a release or threatened release and is carrying out the terms of a contract.

(ii) A person that is retained or hired by a person described in subparagraph (i) to provide any service relating to a response activity.

History: Add. 1990, Act 233, Eff. July 1, 1991.

XXXX 299.612c.added THIS ADDED SECTION IS EFFECTIVE JULY 1, 1991 XXXX

299.612c Divisibility of harm and apportionment of liability; liability for indivisible harm; contribution; factors in allocating response activity costs and damages; reallocation of uncollectible amount; effect of consent order; effect of state obtaining less than complete relief; contribution from person not party to consent order; subordinate rights in action for contribution.

Sec. 12c. (1) If 2 or more persons acting independently cause a release or threat of release that results in response activity costs, or damages for injury to, destruction of, or loss of natural resources, and there is a reasonable basis for division of harm according to contribution of each person, each person is subject to liability under section 12 only for the portion of the total harm that the person caused. However, a person seeking to limit its liability on the ground that the entire harm is capable of division shall have the burden of proof as to the divisibility of the harm and as to the apportionment of liability.

(2) If 2 or more persons cause or contribute to an indivisible harm that results in response activity costs, or damages for injury to, destruction of, or loss of natural resources, each person is subject to liability under section 12 for the entire harm.

(3) A person may seek contribution from any other person who is liable or may be liable under section 12 during or following a civil action brought under this act. However, a person that is participating in the allocation process described in section 11f or 11g shall not be subject to a contribution action during the pendency of that allocation process. This subsection shall not diminish the right of a person to bring an action for contribution in the absence of a civil action by the state under this act. The court shall consider all of the following factors in allocating response activity costs and damages among liable persons:

(a) Each person's relative degree of responsibility in causing the release or threat of release.

(b) The principles of equity pertaining to contribution.

(c) The degree of involvement of and care exercised by the person with regard to the hazardous substance.

(d) The degree of cooperation by the person with federal, state, or local officials to prevent, minimize, respond to, or remedy the release or threat of release.

(e) Whether equity requires that the liability of some of the persons should constitute a single share.

(4) If, in an action for contribution under subsection (3), the court determines that all or part of a person's share of liability is uncollectible from that person, then the court may reallocate any uncollectible amount among the other persons according to the factors listed in subsection (3). A person whose share is determined to be uncollectible shall continue to be subject to contribution and to any continuing liability to the state.

(5) A person that has resolved its liability to the state in an administrative or judicially approved consent order shall not be liable for claims for contribution regarding matters addressed in the consent order. The consent order does not discharge any of the other persons liable under section 12 unless the terms of the consent order provide for this discharge, but the potential liability of the other persons is reduced by the amount of the consent order.

(6) If the state obtains less than complete relief from a person that has resolved its liability to the state in an administrative or judicially approved consent order under this act, the state may bring an action against any other person liable under section 12 that has not resolved its liabilities.

(7) A person that has resolved its liability to the state for some or all of a response activity in an administrative or judicially approved consent order may seek contribution from any person that is not a party to the consent order described in subsection (5).

(8) In an action for contribution under this section, the rights of any person that has resolved its liability to the state shall be subordinate to the rights of the state, if the state files an action under this act.

History: Add. 1990, Act 233, Eff. July 1, 1991.

XXXX 299.612d.added THIS ADDED SECTION IS EFFECTIVE JULY 1, 1991 XXXX

299.612d Indemnification, hold harmless, or similar agreement or conveyance; subrogation.

Sec. 12d. (1) An indemnification, hold harmless, or similar agreement or conveyance is not effective to transfer from a person that may be liable under section 12 to the state for evaluation or response activity costs or damages for a release or threat of release to any other person the liability imposed under this act. This section shall not bar an agreement to insure, hold harmless, or indemnify a party to the agreement for liability under this act.

(2) This act does not bar a cause of action that a person subject to liability under this act, or a guarantor, has or would have, by reason of subrogation or otherwise against any person.

History: Add. 1990, Act 233, Eff. July 1, 1991.

XXXX 299.613.added THIS ADDED SECTION IS EFFECTIVE JULY 1, 1991 XXXX

299.613 Limitations on liability; circumstances requiring total costs and damages.

Sec. 13. (1) Except as provided in subsection (2), the liability under this act for each release or threat of release shall not exceed the total of all the costs of response activities, fines, and exemplary damages, plus $50,000,000.00 damages for injury to, destruction of, or loss of natural resources resulting from the release or threat of release, including the reasonable costs of assessing the injury, destruction, or loss resulting from the release or threat of release.

(2) Notwithstanding the limitations in subsection (1), the liability of a person under this act shall be the full and total costs and damages listed in subsection (1), in either of the following circumstances:

(a) The release or threatened release of a hazardous substance was the result of willful misconduct or gross negligence of the party.

(b) The primary cause of the release or threat of release was a knowing violation of applicable safety, construction, or operating standards or regulations.

History: Add. 1990, Act 233, Eff. July 1, 1991.

XXXX 299.614.added THIS ADDED SECTION IS EFFECTIVE JULY 1, 1991 XXXX

299.614 Covenant not to sue generally; future enforcement action.

Sec. 14. (1) The state may, in its discretion, provide a person with a covenant not to sue concerning any liability to the state under this act, including future liability, resulting from a release or threatened release addressed by response activities, whether that action is on a facility or off a facility, if each of the following is met:

(a) The covenant not to sue is in the public interest.

(b) The covenant not to sue would expedite response activity consistent with rules promulgated under this act.

(c) There is full compliance with a consent order under this act for response to the release or threatened release concerned.

(d) The response activity has been approved by the department.

(2) The state shall provide a person to whom the department is authorized under subsection (1) to issue a covenant not to sue for the portion of response activity described in subdivision (a) or (b) with a covenant not to sue with respect to future liability to the state under this act for a future release or threatened release, and a person provided the covenant not to sue shall not be liable to the state under section 12 with respect to that release or threatened release at a future time. The portion of response activity to which the covenant not to sue pertains is either of the following:

(a) The transport and secure disposition off site of hazardous substances in a facility meeting the requirements of sections 3004(c), (d), (e), (f), (g), (m), (o), (p), (u), and (v) and 3005(c) of the solid waste disposal act, title II of Public Law 89-272, 42 U.S.C. 6924 and 6925, if the department has required off-site disposition and has rejected proposed remedial action that

is consistent with the rules promulgated under this act that does not include off-site disposition.

(b) The treatment of hazardous substances so as to destroy, eliminate, or permanently immobilize the hazardous constituents of the substances, so that, in the judgment of the department, the substances no longer present any current or currently foreseeable future significant risk to the public health, safety, or welfare, or to the environment, no by-product of the treatment or destruction process presents any significant hazard to the public health, safety, or welfare, or the environment, and all by-products are themselves treated, destroyed, or contained in a manner that assures that the by-products do not present any current or currently foreseeable future significant risk to the public health, safety, or welfare, or the environment.

(3) A covenant not to sue concerning future liability to the state shall not take effect until the department certifies that remedial action has been completed in accordance with the requirements of this act at the facility that is the subject of the covenant.

(4) In assessing the appropriateness of a covenant not to sue granted under subsection (1) and any condition to be included in a covenant not to sue under subsection (1) or (2), the state shall consider whether the covenant or condition is in the public interest on the basis of factors such as the following:

(a) The effectiveness and reliability of the remedial action, in light of the other alternative remedial actions considered for the facility concerned.

(b) The nature of the risks remaining at the facility.

(c) The extent to which performance standards are included in the consent order.

(d) The extent to which the response activity provides a complete remedy for the facility, including a reduction in the hazardous nature of the substances at the facility.

(e) The extent to which the technology used in the response activity is demonstrated to be effective.

(f) Whether the fund or other sources of funding would be available for any additional response activities that might eventually be necessary at the facility.

(g) Whether response activity will be carried out, in whole or in significant part, by persons that may be liable under section 12.

(5) A covenant not to sue under this section shall be subject to the satisfactory performance by a person of its obligations under the agreement concerned.

(6) Except for the portion of the remedial action that is subject to a covenant not to sue under subsection (2) or under section 11f or 11g, a covenant not to sue a person concerning future liability to the state shall include an exception to the covenant that allows the state to sue that person concerning future liability resulting from the release or threatened release that is the subject of the covenant if the liability arises out of conditions that are unknown at the time the department certifies under subsection (3) that remedial action has been completed at the facility concerned.

(7) In extraordinary circumstances, the state may determine, after assessment of relevant factors such as those referred to in subsection (4) and volume, toxicity, mobility, strength of evidence, ability to pay, litigative risks, public interest considerations, precedential value, and inequities and aggravating factors, not to include the exception in subsection (6) if other terms, conditions, or requirements of the agreement containing the covenant not to sue are sufficient to provide all reasonable assurances that the public health and the environment will be protected from any future releases at or from the facility.

(8) The state is authorized to include any provisions providing for future enforcement action under section 10f or 16 that in the discretion of the department are necessary and appropriate to assure protection of the public health, safety, welfare, and the environment.

History: Add. 1990, Act 234, Eff. July 1, 1991.

Administrative rules: R 299.5101 et seq. of the Michigan Administrative Code.

XXXX 299.614a.added THIS ADDED SECTION IS EFFECTIVE JULY 1, 1991 XXXX

299.614a Redevelopment or reuse of facility; covenant not to sue; conditions; demonstration; limitation; reservation of right to assert claims; irrevocable right of entry; monitoring compliance.

Sec. 14a. (1) The state may provide a person who proposes to redevelop or reuse a facility, including a vacant manufacturing or abandoned industrial site, with a covenant not to sue concerning liability under section 12, if all of the following conditions are met:

(a) The covenant not to sue is in the public interest.

(b) The covenant not to sue will yield new resources to facilitate implementation of response activity.

(c) The covenant not to sue would expedite response activity consistent with the rules promulgated under this act.

(d) Based upon available information, the department determines that the redevelopment or reuse of the facility is not likely to do any of the following:

(i) Exacerbate or contribute to the existing release or threat of release.

(ii) Interfere with the implementation of response activities.

(iii) Pose health risks related to the release or threat of release to persons who may be present at or in the vicinity of the facility.

(e) The proposal to redevelop or reuse the facility has economic development potential.

(2) A person that requests a covenant not to sue under subsection (1) shall demonstrate to the satisfaction of the state all of the following:

(a) That the person is financially capable of redeveloping and reusing the facility in accordance with the covenant not to sue.

(b) That the person is not affiliated in any way with any person that may be liable under section 12 for a release or threat of release at the facility.

(c) That the redevelopment or reuse of the facility by the person will not result in a release or threat of release.

(3) A covenant not to sue issued under this section shall address only past releases or threats of release at a facility and shall expressly reserve the right of the state to assert all other claims against the person who proposes to redevelop or reuse the facility, including, but not limited to, those claims arising from any of the following:

(a) The release or threat of release of any hazardous substance resulting from the redevelopment or reuse of the facility.

(b) Exacerbation or contribution of the existing release or threat of release.

(c) Interference with, or failure to cooperate with the department, its contractors, or other persons conducting response activities approved by the department.

(d) Failure to exercise due care with respect to any release or threat of release at the facility.

(4) A covenant not to sue issued under this section shall provide for an irrevocable right of entry to the department, its contractors, or other persons performing response activity related to the release or threat of release addressed by the covenant not to sue for the purposes listed in section 10d(3)(a) through (e) and for monitoring compliance with the covenant not to sue.

History: Add. 1990, Act 234, Eff. July 1, 1991.

Administrative rules: R 299.5101 et seq. of the Michigan Administrative Code.

XXXX 299.614b.added THIS ADDED SECTION IS EFFECTIVE JULY 1, 1991 XXXX

299.614b Consent order; settlement.

Sec. 14b. (1) The director and the attorney general may enter into a consent order with a person liable under section 12 or any group of persons liable under section 12 to perform a response activity if the director and the attorney general determine that the persons liable under section 12 will properly implement the response activity, and that the consent order is in the public interest, will expedite effective response activity, and will minimize litigation. The consent order may provide, as determined appropriate by the director and the attorney general, for implementation by a person or any group of persons liable under section 12 of any portion of response activity at the facility. A decision of the attorney general not to enter into a consent order under this act is not subject to judicial review.

(2) Whenever practicable and in the public interest, as determined by the director, the director and the attorney general shall as promptly as possible reach a final settlement with a person in an

administrative or civil action under this act if this settlement involves only a minor portion of the response costs at the facility concerned and, in the judgment of the director and the attorney general, the conditions in either of the following are met:

(a) Both of the following are minimal in comparison to other hazardous substances at the facility:

(i) The amount of the hazardous substances contributed by that person to the facility.

(ii) The toxic or other hazardous effects of the substances contributed by that person to the facility.

(b) Except as provided in subsection (3), the person meets all of the following conditions:

(i) The person is the owner of the real property on or in which the facility is located.

(ii) The person did not conduct or permit the generation, transportation, storage, treatment, or disposal of any hazardous substance at the facility.

(iii) The person did not contribute to the release or threat of release of a hazardous substance at the facility through any action or omission.

(3) A settlement shall not be made under subsection (2)(b) if the person purchased the real property with actual or constructive knowledge that the property was used for the generation, transportation, storage, treatment, or disposal of a hazardous substance.

(4) A settlement under subsection (2) may be set aside if information obtained after the settlement indicates that the person settling does not meet the conditions set forth in subsection (2)(a) or (b).

History: Add. 1990, Act 234, Eff. July 1, 1991.

XXXX 299.615.added THIS ADDED SECTION IS EFFECTIVE JULY 1, 1991 XXXX

299.615 Civil action; jurisdiction; conditions; notice; awarding costs and fees; rights not impaired; venue.

Sec. 15. (1) Except as otherwise provided in this act, a person, including a local unit of government on behalf of its citizens, whose health or enjoyment of the environment is or may be adversely affected by a release from a facility or threat of release from a facility, other than a permitted release or a release in compliance with applicable federal, state, and local air pollution control laws, by a violation of this act or a rule promulgated or order issued under this act, or by the failure of the directors to perform a nondiscretionary act or duty under this act, may commence a civil action against any of the following:

(a) An owner or operator for injunctive relief necessary to prevent irreparable harm to the public health, safety, or welfare, or the environment from a release or threatened release in relation to that facility.

(a) That the person is financially capable of redeveloping and reusing the facility in accordance with the covenant not to sue.

(b) That the person is not affiliated in any way with any person that may be liable under section 12 for a release or threat of release at the facility.

(c) That the redevelopment or reuse of the facility by the person will not result in a release or threat of release.

(3) A covenant not to sue issued under this section shall address only past releases or threats of release at a facility and shall expressly reserve the right of the state to assert all other claims against the person who proposes to redevelop or reuse the facility, including, but not limited to, those claims arising from any of the following:

(a) The release or threat of release of any hazardous substance resulting from the redevelopment or reuse of the facility.

(b) Exacerbation or contribution of the existing release or threat of release.

(c) Interference with, or failure to cooperate with the department, its contractors, or other persons conducting response activities approved by the department.

(d) Failure to exercise due care with respect to any release or threat of release at the facility.

(4) A covenant not to sue issued under this section shall provide for an irrevocable right of entry to the department, its contractors, or other persons performing response activity related to the release or threat of release addressed by the covenant not to sue for the purposes listed in section 10d(3)(a) through (e) and for monitoring compliance with the covenant not to sue.

History: Add. 1990, Act 234, Eff. July 1, 1991.

Administrative rules: R 299.5101 et seq. of the Michigan Administrative Code.

XXXX 299.614b.added THIS ADDED SECTION IS EFFECTIVE JULY 1, 1991 XXXX

299.614b Consent order; settlement.

Sec. 14b. (1) The director and the attorney general may enter into a consent order with a person liable under section 12 or any group of persons liable under section 12 to perform a response activity if the director and the attorney general determine that the persons liable under section 12 will properly implement the response activity, and that the consent order is in the public interest, will expedite effective response activity, and will minimize litigation. The consent order may provide, as determined appropriate by the director and the attorney general, for implementation by a person or any group of persons liable under section 12 of any portion of response activity at the facility. A decision of the attorney general not to enter into a consent order under this act is not subject to judicial review.

(2) Whenever practicable and in the public interest, as determined by the director, the director and the attorney general shall as promptly as possible reach a final settlement with a person in an

administrative or civil action under this act if this settlement involves only a minor portion of the response costs at the facility concerned and, in the judgment of the director and the attorney general, the conditions in either of the following are met:

(a) Both of the following are minimal in comparison to other hazardous substances at the facility:

(i) The amount of the hazardous substances contributed by that person to the facility.

(ii) The toxic or other hazardous effects of the substances contributed by that person to the facility.

(b) Except as provided in subsection (3), the person meets all of the following conditions:

(i) The person is the owner of the real property on or in which the facility is located.

(ii) The person did not conduct or permit the generation, transportation, storage, treatment, or disposal of any hazardous substance at the facility.

(iii) The person did not contribute to the release or threat of release of a hazardous substance at the facility through any action or omission.

(3) A settlement shall not be made under subsection (2)(b) if the person purchased the real property with actual or constructive knowledge that the property was used for the generation, transportation, storage, treatment, or disposal of a hazardous substance.

(4) A settlement under subsection (2) may be set aside if information obtained after the settlement indicates that the person settling does not meet the conditions set forth in subsection (2)(a) or (b).

History: Add. 1990, Act 234, Eff. July 1, 1991.

XXXX 299.615.added THIS ADDED SECTION IS EFFECTIVE JULY 1, 1991 XXXX

299.615 Civil action; jurisdiction; conditions; notice; awarding costs and fees; rights not impaired; venue.

Sec. 15. (1) Except as otherwise provided in this act, a person, including a local unit of government on behalf of its citizens, whose health or enjoyment of the environment is or may be adversely affected by a release from a facility or threat of release from a facility, other than a permitted release or a release in compliance with applicable federal, state, and local air pollution control laws, by a violation of this act or a rule promulgated or order issued under this act, or by the failure of the directors to perform a nondiscretionary act or duty under this act, may commence a civil action against any of the following:

(a) An owner or operator for injunctive relief necessary to prevent irreparable harm to the public health, safety, or welfare, or the environment from a release or threatened release in relation to that facility.

(b) A person that is alleged to be in violation of this act or a rule promulgated or order issued under this act in relation to that facility.

(c) One or more of the directors if it is alleged that 1 or more of the directors failed to perform a nondiscretionary act or duty under this act.

(2) The circuit court shall have jurisdiction in actions brought under subsection (1)(a) to grant injunctive relief necessary to protect the public health, safety, or welfare, or the environment from a release or threatened release. The circuit court shall have jurisdiction in actions brought under subsection (1)(b) to enforce this act or a rule promulgated or order issued under this act by ordering such action as may be necessary to correct the violation, and to impose any civil fine provided for in this act for the violation. A civil fine recovered under this section shall be deposited in the fund. The circuit court shall have jurisdiction in actions brought under subsection (1)(c) to order 1 or more of the directors to perform the nondiscretionary act or duty concerned.

(3) An action shall not be filed under subsection (1)(a) or (b) unless all of the following conditions exist:

(a) The plaintiff has given at least 60 days' notice in writing of the plaintiff's intent to sue, the basis for the suit, and the relief to be requested to each of the following:

(*i*) The department.

(*ii*) The attorney general.

(*iii*) The proposed defendants.

(b) The state has not commenced and is not diligently prosecuting an action under this act or under other appropriate legal authority to obtain injunctive relief concerning the facility or to require compliance with this act or a rule or an order under this act.

(4) An action shall not be filed under subsection (1)(c) until the plaintiff has given in writing at least 60 days' notice to the directors of the plaintiff's intent to sue, the basis for the suit, and the relief to be requested.

(5) In issuing a final order in an action brought pursuant to this section, the court may award costs of litigation, including reasonable attorney and expert witness fees to the prevailing or substantially prevailing party if the court determines that an award is appropriate.

(6) This section shall not affect or otherwise impair the rights of any person under federal, state, or common law.

(7) An action under subsection (1)(a) or (b) shall be brought in the circuit court for the circuit in which the alleged release, threatened release, or other violation occurred. An action under subsection (1)(c) shall be brought in the circuit court for Ingham county.

History: Add. 1990, Act 234, Eff. July 1, 1991.

Administrative rules: R 299.5101 et seq. of the Michigan Administrative Code.

XXXX 299.615a.added THIS ADDED SECTION IS EFFECTIVE JULY 1, 1991 XXXX

299.615a Grant program; rules; eligibility for grants; availability of appropriations.

Sec. 15a. (1) The department may promulgate rules to establish a grant program to provide grants to individuals who may be adversely affected by hazardous substances from a site that is listed under section 6, and who live within 2 miles of the listed site. The grants shall be provided only to enable individuals to obtain expert advice and technical assistance regarding the response activities at sites that affect them. Grants shall not be issued under this section until the department promulgates rules to establish criteria for the issuing of grants. In determining which applicants receive grants, the department shall consider the potential health impacts of the site on the applicant, the complexity and scope of the necessary remedial action at the site, and the ability of the applicant to obtain expert advice and technical assistance in the absence of the grant.

(2) Persons that may be liable under section 12 shall not be eligible for grants under this section.

(3) Grants shall be provided under this section subject to the availability of appropriations from the general fund.

History: Add. 1990, Act 234, Eff. July 1, 1991.

XXXX 299.616.added THIS ADDED SECTION IS EFFECTIVE JULY 1, 1991 XXXX

299.616 Additional relief; providing copy of complaint to attorney general; jurisdiction; judicial review; intervenor.

Sec. 16. (1) In addition to other relief authorized by law, the attorney general may, on behalf of the state, commence a civil action seeking 1 or more of the following:

(a) Temporary or permanent injunctive relief necessary to protect the public health, safety, or welfare, or the environment from the release or threat of release.

(b) Recovery of state response activity costs pursuant to section 12.

(c) Damages for the full value of injury to, destruction of, or loss of natural resources resulting from the release or threat of release, including the reasonable costs of assessing the injury, destruction, or loss resulting from the release or threat of release.

(d) A declaratory judgment on liability for future response costs and damages.

(e) A civil fine of not more than $1,000.00 for each day of noncompliance without sufficient cause with a written request of the director pursuant to section 10a(4). A fine imposed under this subdivision shall be based on the seriousness of the violation and any good faith efforts of the person to comply with the request of the director.

(f) A civil fine of not more than $10,000.00 for each day of violation of this act or a rule promulgated under this act. A fine imposed under this subdivision shall be based upon the seriousness of

the violation and any good faith efforts of the person to comply with this act or a rule promulgated under this act.

(g) A civil fine of not more than $25,000.00 for each day of violation of a judicial order or an administrative order issued pursuant to section 10f, including exemplary damages pursuant to section 10f.

(h) Enforcement of an administrative order issued pursuant to section 10f.

(i) Enforcement of information-gathering and entry authority pursuant to section 10d.

(j) Enforcement of the reporting requirements under section 10a(2) and (6).

(k) Any other relief necessary for the enforcement of this act.

(2) If an action is brought under this act by a plaintiff other than the attorney general, the plaintiff shall, at the time of filing, provide a copy of the complaint to the attorney general.

(3) Except as otherwise provided in this act, an action brought under this act may be brought in the circuit court for the county of Ingham, in the county in which the defendant resides, has a place of business, or in which the registered office of a defendant corporation is located, or in the county where the release occurred.

(4) A state court shall not have jurisdiction to review challenges to a response activity selected or approved by the department under this act, or to review an administrative order issued under this act in any action except an action that is 1 of the following:

(a) An action to recover response costs, damages, or for contribution.

(b) An action by the state to enforce an administrative order under this act or by any other person under section 15(1)(b) to enforce an administrative order or to recover a fine for violation of an order.

(c) An action pursuant to section 10f(5) for review of a decision by the department denying or limiting reimbursement.

(d) An action pursuant to section 15 challenging a response activity selected or approved by the department, if such action is filed after the completion of the response activity.

(e) An action by the state pursuant to section 12(6) to compel response activity.

(5) In any judicial action under this act, judicial review of any issues concerning the selection or adequacy of a response activity taken, ordered, or agreed to by the state shall be limited to the administrative record. If the court finds that the record is incomplete or inadequate, the court may consider supplemental material in the action. In considering objections raised in a judicial action under this act, the court shall uphold the state's decision in selecting a response activity unless the objecting party can demonstrate based on the administrative record that the decision was arbitrary and capricious or otherwise not in accordance with law. In reviewing alleged procedural errors, the court may disallow costs or damages only to the extent the errors were so serious and related to

matters of such central importance that the activity would have been significantly changed had the errors not been made.

(6) In an action commenced under this act, any person may intervene as a matter of right if that person claims an interest relating to the subject matter of the action and is situated so that the disposition of the action may, as a practical matter, impair or impede the person's ability to protect that interest, unless the court finds the person's interest is adequately represented by an existing party.

History: Add. 1990, Act 233, Eff. July 1, 1991.

Administrative rules: R 299.5101 et seq. of the Michigan Administrative Code.

XXXX 299.616a.added THIS ADDED SECTION IS EFFECTIVE JULY 1, 1991 XXXX

299.616a Unpaid costs and damages as lien on facility; priority; commencement and sufficiency of lien; petition; notice of hearing; increased value as lien; perfection, duration, and release of lien; document stating completion of response activities.

Sec. 16a. (1) All unpaid costs and damages for which a person is liable under section 12 shall constitute a lien in favor of the state upon a facility that has been the subject of response activity by the state and is owned by that person. A lien under this subsection shall have priority over all other liens and encumbrances except liens and encumbrances recorded before the date the lien under this subsection is recorded. A lien under this subsection arises when the state first incurs costs for response activity at the facility for which the person is responsible.

(2) If the attorney general determines that the lien provided in subsection (1) is insufficient to protect the interest of the state in recovering response costs at a facility, the attorney general may file a petition in the circuit court of the county in which the facility is located seeking either or both of the following:

(a) A lien upon the facility subject to response activity that takes priority over all other liens and encumbrances that are or have been recorded on the facility.

(b) A lien upon real or personal property or rights to real or personal property, other than the facility, owned by the person described in subsection (1), having priority over all other liens and encumbrances except liens and encumbrances recorded prior to the date the lien under this subsection is recorded. However, the following are not subject to the lien provided for in this subdivision:

(i) Assets of a qualified pension plan or individual retirement account under the internal revenue code.

(ii) Assets held expressly for the purpose of financing a dependent's college education.

(iii) Up to $500,000.00 in nonbusiness real or personal property or rights to nonbusiness real or personal property, except that not more than $25,000.00 of this amount may be cash or securities.

(3) A petition submitted pursuant to subsection (2) shall set forth with as much specificity as possible the type of lien sought, the property that would be affected, and the reasons the attorney

general believes the lien is necessary. Upon receipt of a petition under subsection (2), the court shall promptly schedule a hearing to determine whether the petition should be granted. Notice of the hearing shall be provided to the attorney general, the property owner, and any persons holding liens or perfected security interests in the real property subject to response activity.

(4) In addition to the lien provided in subsections (1) and (2), if the state incurs costs for response activity that increases the market value of real property that is the location of a release or threatened release, the increase in value caused by the state funded response activity, to the extent the state incurred unpaid costs and damages, shall constitute a lien in favor of the state upon the real property. This lien shall have priority over all other liens or encumbrances that are or have been recorded upon the property.

(5) A lien provided in subsection (1), (2), or (4) is perfected against real property when a notice of lien is filed by the department with the register of deeds in the county in which the real property is located. A lien upon personal property provided in subsection (2) is perfected when a notice of lien is filed by the department in accordance with applicable law and regulation for the perfection of a lien on that type of personal property. In addition, the department shall, at the time of the filing of the notice of lien, provide a copy of the notice of lien to the owner of that property by certified mail.

(6) A lien under this section shall continue until the liability for the costs and damages is satisfied or resolved or becomes unenforceable through the operation of the statute of limitations provided in section 17.

(7) Upon satisfaction of the liability secured by the lien, the department shall file a notice of release of lien in the same manner as provided in subsection (5).

(8) If the department, at or prior to the time of filing the notice of release of lien pursuant to subsection (7), has made a determination that the person liable under section 12 has completed all of the response activity at the real property pursuant to the approved remedial action plan, the department shall execute and file with the notice of release of lien a document stating that all response activities required in the approved remedial action plan have been completed.

History: Add. 1990, Act 233, Eff. July 1, 1991.

XXXX 299.616b.added THIS ADDED SECTION IS EFFECTIVE JULY 1, 1991 XXXX

299.616b Applicability of penalties; conduct constituting felony; penalties; jurisdiction; criminal liability for substantial endangerment to public health, safety, or welfare; determination; knowledge attributable to defendant; award; rules; definition.

Sec. 16b. (1) The penalties provided in this section only apply to a release that occurs after the effective date of this section.

(2) A person that knowingly releases or causes the release of a hazardous substance contrary to applicable federal, state, or local requirements or contrary to any permit or license held by that person, and that knew or should have known that the release could cause personal injury or property damage, or that intentionally makes

a false statement, representation, or certification in any application, record, report, plan, or other document filed or required to be maintained under this act and rules promulgated under this act, or that intentionally renders inaccurate any monitoring device or record required to be maintained under this act or a rule promulgated under this act, is guilty of a felony and shall be fined not less than $2,500.00 or more than $25,000.00 for each violation. The court may impose an additional fine of not more than $25,000.00 for each day during which the release occurred. If the conviction is for a violation committed after a first conviction of the person under this subsection, the court shall impose a fine of not less than $25,000.00 and not more than $50,000.00 per day of violation. Upon conviction, in addition to a fine, the court in its discretion may sentence the defendant to imprisonment for not more than 2 years or impose probation upon a person for a violation of this act. With the exception of the issuance of criminal complaints, issuance of warrants, and the holding of an arraignment, the circuit court for the county in which the violation occurred has exclusive jurisdiction.

(3) Upon a finding by the court that the action of a criminal defendant poses or posed a substantial endangerment to public health, safety, or welfare, the court shall impose, in addition to the penalties set forth in subsection (2), a fine of not less than $1,000,000.00 and, in addition to a fine, a sentence of 5 years' imprisonment.

(4) To find a defendant criminally liable for substantial endangerment under subsection (3), the court shall determine that the defendant knowingly or recklessly acted in such a manner as to cause a danger of death or serious bodily injury and that either of the following has occurred:

(a) The defendant had an actual awareness, or belief, or understanding, that his or her conduct would cause a substantial danger of death or serious bodily injury.

(b) The defendant acted in gross disregard of the standard of care that any reasonable person would observe in similar circumstances.

(5) Knowledge possessed by a person other than the defendant under subsection (4) may be attributable to the defendant if the defendant took affirmative steps to shield himself or herself from the relevant information.

(6) The department may pay an award of up to $10,000.00 to an individual who provides information leading to the arrest and conviction of a person for a violation of this section. The department shall promulgate rules that prescribe criteria for granting awards under this section. An award shall not be made under this section until rules are promulgated prescribing the criteria for making awards. Awards under this subsection may be paid from the Michigan environmental assurance fund if enabling legislation creating the fund is enacted into law.

(7) "Serious bodily injury" means bodily injury that involves a substantial risk of death, unconsciousness, extreme physical pain, protracted and obvious disfigurement, or protracted loss or impairment of the function of a bodily member, organ, or mental faculty.

History: Add. 1990, Act 233, Eff. July 1, 1991.

Administrative rules: R 299.5101 et seq. of the Michigan Administrative Code.

XXXX 299.617.added THIS ADDED SECTION IS EFFECTIVE JULY 1, 1991 XXXX

299.617 Limitation periods.

Sec. 17. (1) Except as provided in subsection (2), the limitation period for filing actions under this act shall be as follows:

(a) For the recovery of response activity costs and natural resources damages pursuant to section 12(2)(a), (b), or (c), within 6 years of initiation of physical on-site construction activities for the remedial action selected or approved by the department at a facility, except as provided in subdivision (b).

(b) For 1 or more subsequent actions for recovery of response activity costs pursuant to section 12, at any time during the response activity, if commenced not later than 3 years after the date of completion of all response activity at the facility.

(c) For civil fines under this act, within 3 years after discovery of the violation for which the civil fines are assessed.

(2) For recovery of response activity costs and natural resources damages that accrued prior to the effective date of this section, the limitation period for filing actions under this act shall be 3 years from that effective date.

History: Add. 1990, Act 234, Eff. July 1, 1991.

XXXX 299.618.added THIS ADDED SECTION IS EFFECTIVE JULY 1, 1991 XXXX

299.618 Citizens review board; establishment; appointment and qualifications of members; chairperson; report; recommendations; evaluation; disbanding of review board; funding; compensation.

Sec. 18. (1) Two years after the effective date of this section, a citizens review board shall be established. The review board shall consist of 6 members of the general public and the director of the legislative service bureau division of science and technology who shall serve as the nonvoting chairperson. The public members of the review board shall reflect a cross section of small business, large corporate business, local units of government, and environmental organizations. Specifically, the review board shall have 3 members representative of the environmental community and 3 members representative of business interests or local units of government, or both.

(2) Two members of the review board shall be appointed by the governor, 2 members shall be appointed by the speaker of the house of representatives, and 2 members shall be appointed by the senate majority leader.

(3) The review board shall submit to the standing committees of the senate and the house of representatives that address legislation pertaining to the environment and the natural resources of this state a report that contains a full review of the operation of the amendatory act that added this section. The report shall include a summary of the effectiveness of the amendatory act that added this section, recommendations for amendments to this act, and other information that the legislative committees described in this subsection may request at the time of the establishment of the review board.

(4) The department shall provide the review board with both of the following:

(a) The department's recommendations regarding amendments to this act that the department concludes would improve this act.

(b) The department's evaluation of the effectiveness of this act.

(5) Within 6 months after the establishment of the review board, the review board shall issue its report as provided in this section and the review board shall be disbanded. Funding for the review board shall be provided from the fund and shall not exceed $100,000.00. Members of the review board shall receive as compensation a per diem allotment equal to the per diem received by the commission of natural resources and shall receive actual and necessary expenses incurred by review board members in carrying out their responsibilities under this section.

History: Add. 1990, Act 233, Eff. July 1, 1991.

DEPARTMENT OF NATURAL RESOURCES
ENVIRONMENTAL CONTAMINATION RESPONSE ACTIVITY
ADMINISTRATIVE RULES FOR
1982 PA 307, as amended

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DEPARTMENT OF NATURAL RESOURCES

NATURAL RESOURCES COMMISSION

ENVIRONMENTAL CONTAMINATION RESPONSE ACTIVITY

Filed with the Secretary of State on JUN 26 1990
These rules take effect 15 days after filing with the Secretary of State

(By authority conferred on the department of natural resources and the commission of natural resources by section 5 of Act No. 307 of the Public Acts of 1982, as amended, section 13 of Act No. 328 of the Public Acts of 1988, and section 33 of Act No. 306 of the Public Acts of 1969, as amended, being §§299.605, 299.683, and 24.233 of the Michigan Compiled Laws)

PART 1. GENERAL PROVISIONS

R 299.5101 Definitions; A to I.

Rule 101. As used in these rules:

(a) "Act" means Act No. 307 of the Public Acts of 1982, as amended, being §299.601 et seq. of the Michigan Compiled Laws.

(b) "Ambient air" means that part of the atmosphere outside of buildings to which the general public has access.

(c) "Aquifer" means a geological formation, group of formations, or part of a formation capable of yielding a significant amount of groundwater to wells or springs.

(d) "Department" means the department of natural resources.

(e) "Department of public health" means the Michigan department of public health.

(f) "Direct contact" means exposure to hazardous substances through ingestion or dermal contact.

(g) "Director" means the director of the department.

(h) "Emergency response" means a response activity taken to eliminate or control an immediate public health threat or immediate environmental threat.

(i) "Feasibility study" means a process for developing, evaluating, and selecting an appropriate remedial action.

(j) "Free product" means a hazardous substance or hazardous substances in a liquid phase which are not dissolved in water and which have been released into the environment.

(k) "Fund" or "funds" means the environmental response fund created pursuant to the provisions of section 9 of the act or the environmental protection bond fund created pursuant to the provisions of section 6 of Act No. 328 of the

Public Acts of 1988, being §299.676 of the Michigan Compiled Laws, or both.

(l) "Groundwater" means water below the land surface in the zone of saturation.

(m) "Incident" means the subject of a report to the department which will be evaluated to determine whether there is sufficient evidence to conclude that a site of environmental contamination exists.

(n) "Indicator chemical" means a chemical or substance selected for monitoring and analysis during any phase of response activity for the purpose of characterizing the site or assessing the risk posed by hazardous substances. Indicator chemicals shall be representative of the hazardous substances at the site, taking into account the physical, chemical, and toxicological properties of the substances.

(o) "Interim response activity" means the cleanup or removal of released hazardous substances from the environment or the taking of such other actions, prior to the selection of a remedial action, as may be necessary to prevent, minimize, or mitigate injury to the public health, safety, or welfare, the environment, or natural resources, which injury might otherwise result from a release of a hazardous substance. The term also means the taking of such other actions as may be necessary to prevent, minimize, or mitigate the potential release of a discarded hazardous substance.

R 299.5103 Definitions; O to V.

Rule 103. As used in these rules:

(a) "Operation and maintenance" means the activities necessary to provide for continued effectiveness and integrity of a response activity after construction of the remedial action measure or measures is complete. The term includes long-term activities such as groundwater removal and treatment.

(b) "Potentially responsible party" means a person whose action or negligence may have caused a condition that requires response activity or who may be otherwise responsible for response activity under state or federal law.

(c) "Remedial action" means the cleanup, removal, containment, isolation, treatment, or monitoring of hazardous substances released into the environment, or the taking of such other actions as may be necessary to prevent, minimize, or mitigate injury to the public health, safety, or welfare, the environment, or natural resources, which injury may otherwise result from a release of a hazardous substance or a potential release of a discarded hazardous substance.

(d) "Remedial design" means the preparation of construction plans and specifications necessary for implementation of a remedial action.

(e) "Remedial investigation" means an evaluation of a site to determine the nature, extent, and impact of a release and the collection of data necessary to conduct a feasibility

study of alternate response activities. Such evaluations may include activities to determine any of the following:

(i) Geology.
(ii) Hydrology.
(iii) Soils.
(iv) Hydrogeology.
(v) Surface water and groundwater quality.
(vi) Air quality.
(vii) Identification and distribution of hazardous substances.
(vii) Pathways of exposure.

(f) "Site list" means the listings submitted to the legislature in November of each year pursuant to the provisions of section 6(d) of the act.

(g) "Volatile" means any compound that has a vapor pressure of more than 0.1 millimeter of mercury at standard conditions.

R 299.5105 Terms defined in act.

Rule 105. A term defined in the act has the same meaning when used in these rules.

R 299.5107 Applicability; authority of department or commission not limited by rules.

Rule 107. (1) These rules shall apply to all known sites of environmental contamination without regard to whether the property is publicly or privately owned. The provisions of parts 6 and 7 of these rules that deal with the selection of remedial action and cleanup criteria shall apply only to remedial actions undertaken after the effective date of these rules.

(2) Nothing in these rules shall be construed to limit the authority of the department or the natural resources commission to act pursuant to other existing statutes and rules.

R 299.5109 Compliance with other environmental statutes and rules required; facility utilization.

Rule 109. (1) Any action taken under the authority of these rules shall be in compliance with all applicable environmental statutes and rules.

(2) Any response activity that involves the storage, transport, treatment, or disposal of hazardous substances off-site shall utilize only vehicles or facilities licensed, if a license is required, under appropriate federal or state permits or authorization and other legal requirements.

R 299.5111 Construction of rules.

Rule 111. These rules shall not be construed to relieve a person from any obligation for the cost of evaluation or response activity related to a site for which the person is legally responsible or to relieve a person from the obligation to pay a fine, settlement, penalty, or damages.

R 299.5113 Identification of potentially responsible parties.

Rule 113. (1) The department shall, as soon as is practicable upon identification of a site, initiate appropriate actions to identify potentially responsible parties associated with the site.

(2) The department shall, as appropriate, use existing information-gathering authorities and coordinate such investigation with other state, local, and federal agencies.

R 299.5115 Notice to potentially responsible parties.

Rule 115. (1) Before beginning state-funded response activity at a site, the department shall provide notice to potentially responsible parties who have been identified.

(2) The notice, in the form of a letter mailed to the most recent known addresses of all identified potentially responsible parties, shall include the following information:

(a) A description of the action or actions being undertaken or proposed to be undertaken by the state and a request that the potentially responsible party carry out those actions in a timely manner. The time allowed for response shall be included in the letter and shall reflect the exigencies of the situation requiring response and the complexity of the requested action.

(b) A description of the nature and extent of contamination believed by the department to exist at the site.

(c) The names and addresses of other potentially responsible parties who have been or are being sent notice letters for the site in question.

(d) The location of files used by the department in developing the notice.

(e) Notification that if the potentially responsible parties fail to adequately implement the necessary response actions, the department may do either or both of the following:

(i) Request that the attorney general take enforcement action.

(ii) Take the required corrective actions utilizing public funding. Any expenditure of public funds for this purpose is subject to cost recovery actions by the state.

(3) The requirements of this rule shall not apply when the department has insufficient information to identify a potentially responsible party or parties or when the action being contemplated is an emergency response and the notice process would unreasonably delay the response.

(4) The notice described in subrule (1) of this rule shall be sent by a means which provides proof of delivery.

(5) A copy of the notice described in subrule (1) of this rule shall be provided to the local unit of government in which the site is located.

PART 2. SITE IDENTIFICATION AND LIST

R 299.5201 Site identification mechanisms.

Rule 201. (1) Incidents considered for inclusion on the site list pursuant to the provisions of section 6 of the act may be identified through a variety of mechanisms, including any of the following:

(a) Reports to, or investigations by, department staff.

(b) Reports from, or investigations by, department of public health staff.

(c) Reports from, or investigations by, local health departments or other local government agencies.

(d) Reports from, or investigations by, the state police or other law enforcement agencies.

(e) Reports from, or investigations by, the United States environmental protection agency or other federal agencies.

(2) Any person may report suspected contamination sites by mailing relevant information to: Director, Department of Natural Resources, Post Office Box 30028, Lansing, Michigan 48909.

(3) If the department believes that a public water supply may be threatened by an incident, the department shall inform the department of public health.

R 299.5203 List purpose.

Rule 203. The site list shall fulfill the requirements of section 6 of the act. The relative risk rankings established in the site list shall be 1 factor considered in the preparation of funding recommendations, consistent with the provisions of R 299.5301(7).

R 299.5205 Distribution of site list.

Rule 205. The department shall widely distribute the site list required to be submitted to the legislature pursuant to the provisions of section 6(d) of the act. Mailing lists shall be established to facilitate the distribution of the site list to interested persons.

R 299.5207 Site list hearings.

Rule 207. (1) Before adoption of the site list, public hearings shall be held on the previous year's site list and any changes proposed in that list as specified in section 6(e) of the act.

(2) Public notice shall be given not less than 30 days before the hearings. For the purposes of this rule, public notice shall be a display advertisement which includes the dates, times, and locations of the public hearings and a brief explanation of the purpose of the hearings. Such notice shall be published in not less than 3 newspapers, including 1 newspaper of general circulation in the state. Information equivalent to the public notice shall be mailed to persons on the mailing list described in R 299.5205.

(3) All comments given at the public hearings and written material received by the department during the comment period that are relevant to the site list will be considered by the department as to how they may affect site scoring and rankings.

(4) Government agencies, including the department, shall have full standing as persons who are eligible to make comments and any such comments shall be considered by the department.

(5) Recommended changes in the site list shall be compiled in a report to the director.

(6) Only sites which have been subject to public hearing may appear on the site list.

(7) The department shall consider information received during the public comment period.

R 299.5209 Notice to potentially responsible parties of site listing.

Rule 209. (1) The department shall make a reasonable effort to notify the potentially responsible party or parties for a site, if any, which have been identified at the time of the decision to propose a site for inclusion on the site list of that decision. This notice shall be provided not less than 15 days before the publication of the public notice required by R 299.5702(2).

(2) This rule shall apply only at the time a site is first proposed for inclusion on the site list. Sites which appeared on a site list in a previous year are not subject to this notice requirement.

(3) The inability or failure of the department to provide notice under this rule shall not limit the authority of the department to do any of the following:

(a) Proceed with listing a site.

(b) Proceed with state-funded response activity.

(c) Continue efforts to identify potentially responsible parties for the site in question.

(d) Request that potentially responsible parties who have been identified undertake necessary response activity consistent with part 5 of these rules.

R 299.5211 Inclusion of sites on site list; criteria.

Rule 211. (1) Incidents shall be considered by the department for inclusion on the site list if they meet the following criteria of subdivisions (a) and (b) or (a) and (c) of this subrule:

(a) The incident involves a hazardous substance that is present in a quantity which is or may become injurious to the environment or natural resources or to the public health, safety, or welfare. If a hazardous substance is present at concentrations above those determined pursuant to the provisions of R 299.5709 to R 299.5715 for the relevant media, the incident may be considered a site if a condition described in subdivision (b) or (c) of this subrule is also met. If a hazardous substance is present at levels above those determined pursuant to the provisions of R 299.5707, and there is insufficient information to conclude whether hazardous substance levels are above those determined pursuant to the provisions of R 299.5709 to R 299.5715, the incident may be considered a site if a condition described in subdivision (b) or (c) of this subrule is also met.

(b) There has been a release of a hazardous substance.

(c) There is a potential for the release of a discarded hazardous substance.

(2) Sites may be identified on the site list by the name or location of the facility where the release occurred, if it is known, or by the location of the environmental contamination if the location of the release is not known.

R 299.5213 Site list categories.

Rule 213. (1) Sites will be placed on the site list in the following categories:

(a) All sites of environmental contamination which are not included in the provisions of subdivisions (b) to (d) of this subrule.

(b) Sites where a remedial action plan has not been approved by the department and where interim response activity or evaluation has been or is being provided for by either of the following:

(i) The funds.

(ii) Responsible parties or other sources.

(c) Sites where a remedial action plan has been approved by the department and where a remedial action has been or is being provided for by either of the following:

(i) The funds.

(ii) Responsible parties or other sources.

(d) Sites where operation and maintenance has been or is being provided for by either of the following:

(i) The funds.

(ii) Responsible parties or other sources.

(2) The department shall maintain and, upon request, make available to the public records which are not otherwise protected from disclosure by law and which concern sites where remedial actions have been completed, including sites where land use restrictions have been imposed.

R 299.5215 Removal of sites from site list.

Rule 215. (1) A site shall be removed from the site list when the department's review of a site shows that the site did not meet, or no longer meets, the criteria specified in R 299.5209(1). Removal of a site from the site list shall proceed in accordance with the provisions of this rule when response activity which meets the criteria specified in R 299.5705, if such activity is necessary, has been completed.

(2) Any person may request that a site be removed from the site list by submitting a petition to the department. Such a petition shall include all of the following information:

(a) A description and history of the site.

(b) A description of the nature and extent of the contamination that existed at the site at the time of its listing.

(c) A description of the response activities undertaken to remediate the contamination, consistent with the requirements of part 7 of these rules, or of the investigation conducted to determine that the site should be removed from the list without further response activities.

(d) An analysis of the effectiveness of the response activities undertaken to remediate contamination, including a description of any residual contamination which may exist at the site. The analysis shall include analytical data that documents the effectiveness of the response activities.

(e) Other site-specific information required by the department to determine the adequacy of the response activity described in the petition.

(3) It shall be the responsibility of the person who seeks the removal of a site from the site list to prepare and submit, to the department, the documentation required by the provisions of subrule (2) of this rule, unless the response activity has been conducted by the state. When the response activity has been conducted by the state, the department shall prepare the necessary documentation.

(4) Removal of sites from the site list shall generally be accomplished as part of the process described in R 299.5203 to R 299.5207. However, if the director concludes that the criteria specified in subrule (1) of this rule have been met and that circumstances warrant removal of the site from the site list before the next regularly scheduled hearing to be held in accordance with the provisions of R 299.5207(1) and (2), he or she shall prepare a notice of intent to remove the site from the site list. Such notice shall be published in 1 newspaper of general circulation that serves the area of the site and shall be provided to the municipality in which the site is located. Public comment on the notice of intent to remove the site from the site list shall be accepted for a period of not less than 30 days from the date of publication. The director may hold a public hearing on the proposed action.

(5) The director shall make a final determination whether to include the site on the next site list. The director shall consider any comments received in response to the notice described in subrule (4) of this rule.

(6) The director shall notify the person who requested that the site be removed from the list of his or her decision within 45 days of the end of the public comment period in the notice published pursuant to the provisions of subrule (4) of this rule or, if the director decides that the criteria specified in subrule (1) of this rule have not been met, within 7 days after making his or her decision.

R 299.5217 Annual review of sites.

Rule 217. (1) The department shall annually review site information received from others or generated by itself since the previous listings that were prepared pursuant to the provisions of section 6(d) of the act and shall determine if the information provides a basis for the removal of any site from the site list in accordance with the provisions of R 299.5213 or results in a change in the relative risk rankings.

(2) Sites for which it is determined that the information supports a change in relative risk assessment shall be represented on the next site list according to the new assessment.

(3) Sites where there is no basis for a change in ranking shall be listed according to their previous assessments.

PART 3. FUNDING

R 299.5301 Funding recommendations.

Rule 301. (1) The director shall cooperate with the governor and the department of management and budget in developing funding recommendations required by the provisions of section 7 of the act.

(2) The director shall provide, to the governor, a list of sites which are believed to require monies from the funds for response activities.

(3) The director may implement response activities when a department division chief or 1 or more of the directors recommend that such an activity is necessary and appropriate. In evaluating the need for response activities, the director shall consider all of the following factors:

(a) Existing or potential human exposure to hazardous substances.

(b) Existing or potential environmental or natural resource damage.

(c) The appropriateness and scope of the proposed response activity.

(4) The list required by subrule (2) of this rule shall include recommendations for purposes such as response activities, program administration, and contingencies which may arise during the upcoming fiscal year.

(5) The recommendations shall show the estimated cost at each site, including the type of response activity to be taken. Categories of response activity considered shall include all of the following:

(a) Projected emergency response needs.

(b) Limited investigations at sites where funds have been spent for emergencies. The purpose of these limited investigations shall be to identify potentially responsible parties.

(c) Interim response activities.

(d) Investigations sufficient to prepare sites for remedial action.

(e) Response activities pursuant to a remedial action plan.

(f) Continuing necessary activities for previously funded projects.

(6) Estimated costs for activities described in subrule (5) of this rule shall be identified as a lump sum for each type of activity.

(7) In determining the funding priority for the recommendations described in subrule (2) of this rule, and in managing appropriated funds, the director shall generally address sites in rank order according to the most current site list, unless he or she determines that it is appropriate to fund a site out of rank order, taking into consideration all of the following factors:

(a) The availability of funding from other sources, such as private parties or federal programs.

(b) The readiness of a site for response activity.

(c) Whether concerns for current or imminent human exposure to hazardous substances or for environmental or natural resource damage indicate that the site should be funded out of rank order.

(d) The need to continue response activities at sites which have previously been funded.

(e) The availability of personnel to carry out response activities.

R 299.5303 Evaluation of alternative funding options.

Rule 303. Before recommending sites for funding and before funding sites, the department may consider the availability of alternate funding, including monies from any of the following:

(a) Private parties.

(b) The federal hazardous substance superfund established by the internal revenue code of 1986, 26 U.S.C. §9507.

(c) The leaking underground storage tank trust fund established by the internal revenue code of 1986, 26 U.S.C. §9508.

(d) Other sources.

R 299.5305 Site eligibility for funding.

Rule 305. Any site which has been subjected to the risk assessment process described in section 6(b) of the act and part 8 of these rules is eligible for funding.

PART 4. ALTERNATE WATER SUPPLIES

R 299.5401 Definitions.

Rule 401. As used in this part:

(a) "Public notification" means a letter to a property owner or notification at a public meeting as defined in Act No. 267 of the Public Acts of 1976, as amended, being §15.261 et seq. of the Michigan Compiled Laws, and known as the open meetings act.

(b) "Treatment system" means a facility or structure and associated appurtenances that are installed for the purpose of treating drinking water before delivery in a distribution system.

(c) "Type I water supply" means a public water supply which provides year-round service to not less than 15 living units or which regularly provides year-round service to not less than 25 residents.

(d) "Water supply system" means a system of pipes and structures through which water is obtained and distributed for the purpose of furnishing water for drinking or household purposes, including all of the following:

(i) Wells and well structures.

(ii) Intakes and cribs.

(iii) Pumping stations

(iv) Treatment plants.

(v) Storage tanks.

(vi) Pipelines and appurtenances.

(vii) A combination of the items specified in paragraphs (i) to (vi) of this subdivision.

R 299.5403 Department of public health approval of permanent alternate water supply; limitations on use of funds.

Rule 403. (1) When funds are used to provide a permanent alternate water supply, the new supply shall be approved by the department of public health pursuant to Act No. 399 of the Public Acts of 1976, as amended, being §325.1001 et seq. of the Michigan Compiled Laws.

(2) Money from the funds shall not be used to pay the cost of operation and maintenance of a permanent replacement water supply or treatment system or the cost of water supplied by such a system.

(3) Money from the funds shall not be used to pay for replacement of a water supply system unless the owner of that system has agreed in writing to plug the existing well or wells, if any, which are abandoned. Wells which are replaced shall be abandoned unless otherwise agreed by the department or the department of public health.

(4) Monies from the funds shall not be used to provide benefits such as alternate water supplies to persons whose

actions or negligence caused a condition necessitating response activity.

(5) Monies from the funds shall not be used to provide an alternate water supply if, in the judgment of the department of public health, illegal construction of a well contributed to its contamination, except that illegal construction of a water supply well or wells shall not be the basis for withholding funding if, in the judgment of the department of public health, the well would have been contaminated even if it had been properly constructed.

(6) If either of the following criteria are met, then sufficient basis is established to conclude that an incident is the result of self-contamination and funding shall not be provided:

(a) Hydrogeological data support the conclusion that the contaminated supply resulted from self-contamination.

(b) The department determines that an off-site source of contamination is not or was not evident, a probable source of the hazardous substance in question is or was located at the site, and activities or practices are known to have occurred at the site in the proximity of the affected well which could have resulted in the contamination documented in the well.

(7) Money from the funds shall be used to provide a well or water supply connection to a property only when a drinking water well or connection to a public water supply exists at the time that public notice is given regarding provision of a permanent alternate water supply.

(8) Money from the funds shall not be used to pay the cost of an alternate water supply system at any site that is included on the site list as a result of nitrate contamination from a non-point source or from a private septic tank and tile field system.

R 299.5405 Conditions for provision of alternate water supplies.

Rule 405. (1) Individual water supply system replacements shall be provided from the funds only when the water supply proposed for replacement meets the criteria specified in both of the following provisions:

(a) The water supply is contaminated, or threatened by contamination, with a hazardous substance as defined by the act.

(b) The department of public health has issued an advisory against the use of the current drinking water supply or has concurred with an advisory issued by a local health department against use of the current water supply.

(2) All water supply replacements or treatment systems that are provided by the funds shall be installed in accordance with department of public health specifications.

R 299.5407 Use of the funds to address contamination of local government-owned type I water supplies.

Rule 407. (1) A project to address contamination of a local government-owned type I water supply system shall be eligible to receive money from the funds if both of the following criteria are met:

(a) There is a hazardous substance present in the water supply system or component as a result of environmental contamination and the department of public health has issued an advisory against the use of the system or component as a result of that contamination.

(b) The project to be funded under this subrule is designed to reduce or eliminate a threat to the public health caused by environmental contamination.

(2) Projects to address state or federally owned type I water supply systems are not eligible to receive monies from the funds.

(3) Money from the funds shall be used to pay 1/3 of the cost of a project which is approved by the department and which meets the criteria in subrule (1) of this rule, except as provided for in subrule (5) of this rule. Two-thirds of the cost of the project shall be paid by the local unit of government.

(4) Only locally generated funds shall be used for the local government share of the project costs. Federal or other funds shall not be used for the local government share.

(5) The total amount of money from the funds that is available to any local unit of government for projects approved by the department under subrule (1) of this rule shall not be more than $500,000.00.

(6) Money from the funds shall not be used by a local unit of government for projects to investigate the source of groundwater contamination or to identify persons who are responsible for the water supply contamination.

(7) Monies expended by the local unit of government for activities completed before the approval by the department of a project under this rule shall not be eligible as the local government share of costs.

R 299.5409 Service area boundaries; establishment.

Rule 409. (1) Before the approval of funding by the department for extending or constructing a public water supply system, the department and the department of public health shall confer to determine the physical boundaries of the project service area.

(2) To the extent that information is available, boundaries shall be established considering all of the following minimum criteria:

(a) The extent of documented contamination.

(b) The nature, concentration, and mobility of the hazardous substances.

(c) The rate and direction of groundwater flow in the contaminated aquifer or aquifers.

(d) Whether the release of a hazardous substance has been controlled.

(e) If the project is an extension of water supply service, the attributes and limitations of the existing public water supply system.

(f) The probable impact of other remedial or control measures at the site, such as the shutdown of currently pumping wells and the effect of groundwater purge and treatment systems.

(3) The physical boundaries of the service area shall be established to protect water supply system owners from the current and projected impacts of the contaminated groundwater.

R 299.5411 Responsibilities of local governing entity.

Rule 411. (1) A public water supply construction or extension project shall not be funded unless the water supply owner has agreed, in writing, before fund authorization, to accept the responsibility for the ownership, operation, and maintenance of the proposed system.

(2) Monies from the funds shall not be used to support operation and maintenance costs for public water supply systems.

(3) It shall be the responsibility of the water supply owner to obtain all necessary permits for the construction or extension of the public water supply system.

R 299.5413 Distribution of monies from the funds for alternate water supplies; lowest cost alternative.

Rule 413. (1) Monies from the funds for public or individual alternate water supplies shall be used only for a water supply that is acceptable to the department of public health. When more than 1 alternative is acceptable to the department of public health, funding will be limited to the cost of the lowest-cost acceptable alternative.

(2) Alternatives to be evaluated include all of the following:

(a) Well replacement.

(b) Water supply treatment.

(c) Connection to an existing water system.

(d) Construction of a public water system.

(3) If the local governing entity or affected property owner chooses to implement an acceptable alternative in accordance with the provisions of subrule (1) of this rule other than the lowest-cost alternative specified in subrule (1) of this rule, monies from the funds up to the value of the lowest-cost acceptable alternative may be provided.

R 299.5415 Notice to property owners in area to be served by public water supply system or extension.

Rule 415. (1) All property owners in an area proposed to be served by a public water supply system or an extension of such a system that is to be paid for with money from the funds shall be given written notice of the state's action. Such notice shall include an explanation of the proposed project, including a description of the project area and the services proposed to be provided to each property owner at state expense. The notice shall also explain that state funding of the proposed project is not contingent on any local assessment, unless such an assessment is made to cover the local government cost share required by the provisions of R 299.5407(3).

(2) For the purposes of this rule, mailing of the required notice to the last known address of the property owner is sufficient notice.

PART 5. RESPONSE ACTIVITIES

R 299.5501 Objective.

Rule 501. (1) The principal objective of all response activities is to ensure prompt and adequate response to known sites of environmental contamination.

(2) To minimize impacts on the public health and the environment from hazardous substances, source control, abatement, or other interim response activities shall be undertaken when it is feasible and prudent, consistent with the provisions of R 299.5509.

R 299.5503 Determination of lead responsibility.

Rule 503. The director shall determine which division of the department shall take lead responsibility for securing appropriate response activity through enforcement activity or fund-financed activity, or both.

R 299.5505 Department request to potentially responsible parties to undertake response activities; department action.

Rule 505. (1) At any site where the department determines that there is a threat to the public health, safety, or welfare or to the environment or natural resources, the department may request that the potentially responsible party or parties, where identified, undertake appropriate response activities to abate, minimize, stabilize, mitigate, or eliminate the threat. Such response activities shall include any of the following activities, as appropriate:

(a) Immediately stop the release at the source.

(b) Immediately identify and eliminate any existing or potential threat of fire or explosion or any direct contact hazards.

(c) Immediately initiate the removal of free product.

(d) Identify, characterize, and provide a plan for the removal, treatment, or disposal of contaminated soils such that the requirements of part 7 of these rules will be met.

(e) Complete investigative activities as directed by the department, consistent with R 299.5509.

(f) Any other response activity determined by the department to be technically sound and necessary to protect the public health, safety, or welfare or the environment.

(g) Submit a remedial action plan to the department for approval, consistent with the requirements of R 299.5513, which, when implemented, will achieve the cleanup criteria specified in part 7 of these rules. A plan submitted pursuant to the requirements of this subrule may provide for phased activities. A phased plan shall generally describe the total remedial action and shall provide a detailed description of activities in the phase or phases to be initially undertaken. A plan that is submitted pursuant to the requirements of this subrule shall include a schedule for implementation of remedial actions.

(h) Implement the plan described by subdivision (g) of this subrule after approval of the plan by the department and in accordance with the schedule approved by the department.

(2) Within 90 days after submittal of a plan requested by the department pursuant to the provisions of this part, the department shall inform the person submitting the plan whether the plan is acceptable.

(3) The department may take any appropriate action to abate, minimize, stabilize, mitigate, or eliminate the release of a hazardous substance or the potential release of a discarded hazardous substance when no potentially responsible party or parties have carried out the necessary activities in a timely manner.

R 299.5507 Emergency response; use of monies from the funds.

Rule 507. Monies from the funds may be used at any site where the department determines that there is a threat to the public health, safety, or welfare or the environment or natural resources and that immediate action is necessary to abate, minimize, stabilize, mitigate, or eliminate the release of a hazardous substance or the potential release of a discarded hazardous substance, consistent with the provisions of R 299.5305.

R 299.5509 Interim response activities.

Rule 509. (1) The department may request that interim response activity be undertaken when the conditions described in R 299.5501(2) are met and the interim response activity is consistent, to the extent practicable, with the likely remedial action at a site. All of the following factors shall be considered, when information is available, in determining the appropriateness of an interim response activity:

(a) Actual or potential exposure to hazardous substances of nearby populations, animals, or food chain.

(b) Actual or potential contamination of drinking water supplies or sensitive ecosystems.

(c) The presence of discarded hazardous substances in drums, barrels, tanks, or other bulk storage containers that pose a threat of release.

(d) High levels of hazardous substances in soils largely at or near the surface that are likely to migrate.

(e) The likelihood that weather conditions will cause hazardous substances to migrate or be released.

(f) The threat of fire or explosion.

(g) The availability of other federal or state response mechanisms to respond to the release.

(h) Other factors which pose threats to the public health, safety, or welfare or to the environment.

(2) Interim response activities may include any of the following:

(a) Fences, warning signs, or other security or site control precautions where humans or animals have access to the release.

(b) Drainage controls where precipitation or runoff from other sources can enter the release area and spread hazardous substances.

(c) Stabilization of berms, dikes, or impoundments where needed to maintain the integrity of the structures.

(d) Capping of contaminated soils or sludges where needed to prevent the migration of hazardous substances into the environment.

(e) Using chemicals or other materials to retard the spread of a release or mitigate its effects.

(f) Removal of contaminated soils from drainage or other areas to reduce the spread of hazardous substances.

(g) Removal of drums, barrels, tanks, or other bulk storage containers that contain hazardous substances where it will reduce the likelihood of any of the following:

(i) Spillage.

(ii) Leakage.

(iii) Exposure to humans, animals, or the food chain.

(iv) Fire or explosion.

(h) Groundwater control or removal systems.

(i) Provision of an alternate water supply where it will reduce the risk to humans or animals from contaminated water.

(j) Temporary evacuation where necessary to protect the public health, safety, or welfare where imminent and substantial endangerment has been identified.

(k) Other measures judged by the department to be technically sound and necessary to protect the public health, safety, or welfare, the environment, or natural resources.

R 299.5511 Remedial investigation.

Rule 511. (1) The department may request that a remedial investigation be conducted, consistent with this part and sufficient to support determinations pursuant to parts 6 and 7 of these rules, at any site where response activities are to be undertaken.

(2) The department may request the preparation and approval of a remedial investigation plan before the initiation of a remedial investigation.

(3) A remedial investigation plan prepared, or remedial investigation conducted, pursuant to this rule shall address the following factors, as appropriate to the site:

(a) The nature and extent of contamination at the site.

(b) Risks to the public health, safety, and welfare and to the environment and natural resources.

(c) Routes of exposure.

(d) All of the following with respect to hazardous substances that are present:

(i) Amount.

(ii) Concentration.

(iii) Hazardous properties.

(iv) Environmental fate.

(v) Bioaccumulative properties.

(vi) Persistence.

(vii) Mobility.

(viii) Form.

(e) All of the following with respect to the physical setting of the site:

(i) Geology.

(ii) Hydrology.

(iii) Hydrogeology.

(iv) Depth to saturated zone.

(v) Hydrologic gradients.

(vi) Proximity to drinking water aquifers.

(vii) Proximity to surface water.

(viii) Proximity to floodplains.

(ix) Proximity to wetlands.

(f) Current and potential groundwater use.

(g) Climate.

(h) Source identification and characterization.

(i) Whether substances at the site can be reused or recycled.

(j) The likelihood of future releases if the substances remain on-site.

(k) The extent to which natural or human-made barriers currently contain the substances and the adequacy of the barriers.

(l) The extent to which the substances have migrated or are expected to migrate from the area of release.

(m) The extent and impact of future migration of the substances.

(n) An assessment of natural resource damage resulting from the release.

(o) Contribution of the substances to contamination of the air, land, water, or food chain.

(p) Legally applicable or relevant and appropriate state and federal cleanup requirements.

(q) Sampling design and rationale for parameter selection.

(r) A description of monitoring well construction.

(s) A description of, and rationale for, any geophysical techniques used in the investigation. The data from geophysical testing shall be made available to the department on request.

(t) Sample collection and preparation procedures.

(u) Identification of the laboratory or laboratories responsible for sample analysis.

(v) Laboratory methods used to generate all remedial investigation data, including method detection limits. The data used to determine method detection limits shall be made available to the department on request.

(w) Other matters appropriate to the site. Department requests for information pursuant to this subdivision shall be limited to factors not adequately addressed by information required by the provisions of other subdivisions of this rule and shall be accompanied by an explanation of the need for such additional information.

R 299.5513 Feasibility studies.

Rule 513. (1) The department may request that a feasibility study be conducted at a site where final response activities are to be undertaken.

(2) The feasibility study conducted pursuant to subrule (1) of this rule shall include the following factors, as appropriate to the site:

(a) Development of alternative final remedies in each of the following categories:

(i) Alternatives for the treatment, disposal, waste minimization, recycling or destruction at an off-site facility.

(ii) Alternatives for the treatment, disposal, waste minimization, recycling, or destruction at an on-site facility.

(iii) No action alternative.

(b) Development of alternative final remedies that provide for a reduction in risk that is sufficient to meet the criteria set forth in part 7 of these rules.

(3) An initial screening of alternatives to narrow the list of potential remedies for detailed evaluation in the feasibility study shall be conducted using all of the following broad criteria:

(a) The effectiveness in meeting the cleanup criteria of part 7 of these rules to protect the public health, safety, welfare or the environment.

(b) Cost of the remedial action.

(c) Acceptable engineering practices based on all of the following criteria:

(i) Feasibility for the location and conditions of release.

(ii) Applicability to the problem.

(iii) Reliability.

(4) A detailed evaluation of the alternatives that will remain after initial screening is conducted. The detailed

analysis of each alternative shall, as appropriate, include the following:

(a) Assessment of the effectiveness of the alternative in protecting the public health, safety, or welfare or the environment.

(b) Refinement and specification of alternatives in detail.

(c) Detailed cost estimation, including operation and maintenance costs, distributed over time, of implementing the final remedy.

(d) Evaluation in terms of engineering implementation, reliability, and constructability.

(e) Evaluation of technical feasibility.

(f) Analysis of whether recycling, reuse, waste minimization, waste biodegradation, waste destruction, or other advanced, innovative, or alternative technologies are appropriate.

(g) An analysis of any adverse environmental impacts, methods of mitigation, and costs of mitigation.

(h) Analysis of the risks remaining after implementation of the remedy.

(i) Analysis of the extent to which the alternative attains or exceeds legally applicable or relevant and appropriate federal and state public health and environmental requirements.

R 299.5515 Remedial action plan.

Rule 515. (1) The department may request that a remedial action plan be developed for any remedial action undertaken pursuant to the provisions of these rules and be submitted to the department for approval. Such a plan shall include all of the following:

(a) A description of the remedial action to be implemented, including an explanation of how that action will meet the requirements of part 7 of these rules. The remedial action plan shall also include an analysis of the selection of indicator chemicals to be used in evaluating the implementation of the remedial action plan, if indicator chemicals are to be used. The remedial action plan shall include a description of ambient air quality monitoring activities to be undertaken during the remedial action, if such activities are appropriate during implementation of the remedial action.

(b) An operation and maintenance plan, if one is required pursuant to the provisions of R 299.5517.

(c) A monitoring plan, if one is required pursuant to the provisions of R 299.5519.

(d) An explanation of any land use restrictions imposed at the site, if such restrictions are required pursuant to the provisions of R 299.5719, and a plan for the monitoring and enforcement of such restrictions.

(e) A schedule for implementation of the remedial action plan.

(2) Remedial action plans shall be modified to address all of the following:

(a) Unanticipated site conditions.

(b) A change in site conditions.

(c) Proposed changes in any element described in subrule (1) of this rule.

(3) Proposed changes in the remedial action plan shall be submitted to the department. The department shall review and approve proposed modifications to the remedial action plan if they are consistent with the provisions of parts 5, 6, and 7 of these rules.

R 299.5517 Operation and maintenance plan.

Rule 517. (1) The department may request that an operation and maintenance plan be prepared for all response activities and be submitted to the department for approval.

(2) The operation and maintenance plan shall include all of the following:

(a) Name, phone number, and address of the person who is responsible for operation and maintenance.

(b) Operation and maintenance schedule.

(c) Written and pictorial plan of operation and maintenance.

(d) Design and construction plans.

(e) Equipment diagrams, specifications, and manufacturers' guidelines.

(f) Safety plan.

(g) Emergency plan, including emergency contact phone numbers.

(h) A list of spare parts available for emergency repairs.

(i) Other information required by the department to determine the adequacy of the operation and maintenance plan. Department requests for information pursuant to this subdivision shall be limited to factors not adequately addressed by information required by the provisions of other subdivisions of this rule and shall be accompanied by an explanation of the need for such additional information.

R 299.5519 Monitoring requirements.

Rule 519. (1) The department may request that monitoring of response activities be conducted to determine any of the following:

(a) The effectiveness of the response activities in protecting the public health, safety, and welfare and the environment and natural resources.

(b) The effectiveness of the response activities in minimizing, mitigating, or removing environmental contamination at a site.

(c) The cost effectiveness of the response activities.

(2) The department may request that a monitoring plan be prepared. The plan shall contain all of the following:

(a) Location of monitoring points.

(b) Environmental media to be monitored, such as soil, air, water, or biota.

(c) Monitoring schedule.

(d) Monitoring methodology, including sample collection procedures.

(e) Substances to be monitored, including an explanation of the selection of any indicator chemicals to be used.

(f) Laboratory methodology, including the name of the laboratory responsible for analysis of monitoring samples, method detection limits, and practical quantitation levels. Raw data used to determine method detection limits shall be made available to the department on request.

(g) Quality control/quality assurance plan.

(h) Data presentation and evaluation plan.

(i) Contingency plan to address ineffective monitoring.

(j) Operation and maintenance plan for monitoring.

(k) How the monitoring data will be used to demonstrate effectiveness of response activities.

(l) Other elements required by the department to determine the adequacy of the monitoring plan. Department requests for information pursuant to this subdivision shall be limited to factors not adequately addressed by information required by the provisions of other subdivisions of this rule and shall be accompanied by an explanation of the need for such additional information.

PART 6. SELECTION OF REMEDIAL ACTION

R 299.5601 Degree of cleanup; compliance with state and federal requirements; cost.

Rule 601. (1) All remedial actions carried out under these rules shall achieve a degree of cleanup which is protective of the public health, safety, and welfare and the environment and natural resources.

(2) Remedial actions shall meet legally applicable or relevant and appropriate state and federal requirements.

(3) The cost of a remedial action shall be a factor only in choosing among alternatives which adequately protect the public health, safety, welfare and the environment and natural resources, consistent with the requirements of part 7 of these rules.

R 299.5603 Evaluation of remedial action alternatives.

Rule 603. (1) In assessing remedial action alternatives, the department shall consider all of the following:

(a) The effectiveness of alternatives in protecting the public health, safety, and welfare and the environment and natural resources.

(b) The long-term uncertainties associated with the proposed remedial action.

(c) The goals, objectives, and requirements of Act No. 641 of the Public Acts of 1978, as amended, being §299.401 et seq. of the Michigan Compiled Laws, and known as the solid

waste management act, and Act No. 64 of the Public Acts of 1979, as amended, being §299.501 et seq. of the Michigan Compiled Laws, and known as the hazardous waste management act.

(d) The persistence, toxicity, mobility, and propensity to bioaccumulate of the hazardous substances.

(e) The short and long-term potential for adverse health effects from human exposure.

(f) Costs of remedial action, including long-term maintenance costs, except that costs shall only be considered as specified in R 299.5601(3).

(g) Reliability of the alternatives.

(h) The potential for future remedial action costs if an alternative fails.

(i) The potential threat to human health, safety, and welfare and the environment and natural resources associated with excavation, transportation, and redisposal or containment.

(j) The ability to monitor remedial performance.

(k) The public's perspective about the extent to which the proposed plan effectively addresses criteria specified in these rules.

(2) Remedial actions that permanently and significantly reduce the volume, toxicity, or mobility of the hazardous substances are to be preferred.

(3) The off-site transport and disposal of hazardous substances or contaminated materials without treatment shall be the least favored remedial action alternative where practicable treatment technologies are available.

R 299.5605 Public participation.

Rule 605. (1) Before approval of a proposed plan for remedial action at any site where monies from the funds are to be used, where type C criteria are being proposed, or where the director determines that there is significant public interest, the department shall do all of the following:

(a) Publish a notice and brief analysis of the recommended alternative. For purposes of this subrule, publication shall include, at a minimum, publication in a major local newspaper of general circulation. In addition, each item developed, received, published, or made available to the public shall be available for public inspection at or near the site at issue.

(b) Make the feasibility study which outlines alternative remedial measures available to the public for review and comment for a period of not less than 30 calendar days.

(c) Provide an opportunity for a public meeting at or near the site at issue regarding the possible remedial alternatives.

(d) Prepare a document which summarizes the major issues raised by the public and how they are to be addressed by the final approved plan.

(2) Notice of the remedial action selected or approved shall be published and the plan for the remedial action shall be made available to the public before commencement of any remedial action. The plan shall be accompanied by both of the following:

(a) A discussion of any significant changes in the proposed plan.

(b) A response to each of the significant comments, criticisms, and new data submitted as a result of the process described in subrule (1) of this rule.

(3) The department may provide an opportunity for public comment and review on any interim response activity to be undertaken by the state.

R 299.5607 Administrative record.

Rule 607. (1) The department shall compile an administrative record of the decision process leading to the selection of any final remedial action. The administrative record shall contain the following, as applicable:

(a) Remedial investigation data.

(b) The feasibility study and potential alternative actions.

(c) Public comments received, if any, and an explanation of how significant concerns are to be addressed.

(d) For remedial actions which have been completed in accordance with an approved remedial action plan, documentation prepared pursuant to the provisions of subrule (4) of this rule.

(e) Other information appropriate to the site.

(2) If neither a remedial investigation nor a feasibility study was conducted for a site subject to the requirements of R 299.5605, the department shall include, in the administrative record, an explanation of the basis for that decision.

(3) The department shall prepare a summary document which explains its decision regarding a remedial action plan which is subject to the requirements of R 299.5605.

(4) Upon a determination by the department that a person has completed all response activity at a site pursuant to an approved remedial action plan prepared and implemented in compliance with these rules, the department, upon request, shall execute a document stating that all response activities required in the approved remedial action plan have been completed.

PART 7. CLEANUP CRITERIA

R 299.5701 Definitions; A to I.

Rule 701. As used in this part:

(a) "Acceptable daily intake" or "ADI" means an estimate of the maximum daily dose of a toxicant expressed in milligrams per kilogram body weight per day which is not expected to result in adverse effects after lifetime exposure

to the general human population, including sensitive subgroups.

(b) "Acute toxicity" means the ability of a chemical to cause a debilitating or injurious change in an organism which results from a single or short-term exposure to the chemical.

(c) "Background" means the concentration or level of a hazardous substance which exists in the environment at or regionally proximate to a site that is not attributable to any release at or regionally proximate to the site.

(d) "Best available information" means data which serves as the basis for a risk assessment. Such information may be taken from the scientific literature or the integrated risk information system database maintained by the United States environmental protection agency or from other databases, as appropriate. The term includes other pertinent studies or reports containing data which the department finds to be of adequate quality for use in the risk assessment.

(e) "Carcinogen" means any of the following:

(i) Group A -- any substance for which there is sufficient evidence from human epidemiological studies to support a causal association between exposure to the agent and cancer.

(ii) Group B -- any substance for which the weight of evidence of human carcinogenicity based on epidemiological studies is limited evidence or for which the weight of evidence of carcinogenicity based on animal studies is sufficient evidence.

(iii) Group C -- any substance for which there is limited evidence of carcinogenicity in animals in the absence of human data and which causes a significant increased incidence of benign or malignant tumors in a single, well-conducted animal bioassay.

(f) "Chronic toxicity" means the ability of a chemical to cause an injurious or debilitating effect in an organism which results from repeated exposure to a chemical for a time period representing a substantial portion of the natural life expectancy of that organism.

(g) "Discarded hazardous substance" means a hazardous substance which has been disposed of or is not being properly managed in accordance with all applicable statutes and rules.

(h) "Genotoxic teratogen" means a substance which meets all of the following criteria:

(i) Is positive in tests for gene mutation, with or without metabolic activation.

(ii) It or its genotoxic metabolites are placentally transferred in a mammalian species through oral, dermal, or inhalation exposure.

(iii) It elicits a teratogenic response when administered orally, dermally, or by inhalation in at least 1 mammalian species.

(i) "Germ line mutagen" means a substance which has the ability to cause heritable change in the genome of the germinal cells through oral, dermal, or inhalation exposure in at least 1 mammalian species.

(j) "Human life cycle safe concentration (HLSC)" means the highest concentration of a chemical acting by a threshold mechanism to which humans are exposed continuously for a lifetime and which is not expected to result in observed adverse effects to any individual or progeny, expressed as a concentration in water. An HLSC may be based on a reference dose from the United States environmental protection agency.

(k) "Increased cancer risk of 1 in 1,000,000" means the 95% upper bound on the calculated risk of 1 additional cancer above the background cancer rate per 1,000,000 individuals continuously exposed to a carcinogen at a given average daily dose for a 70-year lifetime.

(l) "Institutional control" means a measure undertaken to limit or prohibit certain activities that may interfere with the integrity of a remedial action or result in exposure to hazardous substances at a site.

R 299.5703 Definitions; L to W.

Rule 703. As used in this part:

(a) "LD_{50}" means the dose of a chemical which is expected to cause death in 50% of the test animals.

(b) "Leachate" means liquid, including any suspended components in the liquid, that has percolated through or drained from a hazardous substance or soil contaminated with a hazardous substance.

(c) "Limited evidence," a term of art, means either of the following:

(i) In human epidemiological studies, the data indicate that a causal relationship between the agent and human cancer is credible, but that alternative explanations such as chance, bias, or confounding variables could not be adequately excluded.

(ii) In animal studies, data suggest a carcinogenic effect, but are limited because of any of the following:

(A) The studies involve a single species, strain, or experiment and do not meet criteria for sufficient evidence.

(B) The experiments are restricted by any of the following:

(1) Inadequate dosage levels.

(2) Inadequate duration or exposure to the agent.

(3) Inadequate period of follow-up.

(4) Poor survival.

(5) Too few animals.

(6) Inadequate reporting.

(C) The data show an increase in the incidence of benign tumors only.

(d) "Linearized multistage model" means a dose-response model which assumes that there are a number of distinct biological stages or changes that must occur for a normal cell to be transformed into a tumor and which assumes the dose-response relationship to be linear at low doses.

(e) "Maximum contaminant level" means the United States environmental protection agency's maximum contaminant level for public water supply systems as set forth in the

provisions of 40 C.F.R. part 141 (revised as of July 1, 1988), which are herein adopted by reference, and which are available for inspection at the Lansing office of the department. Copies of the provisions may be purchased, at a cost of $25.00, from the Superintendent of Documents, Government Printing Office, Washington, DC 20402, or from the Department of Natural Resources, Environmental Response Division, Post Office Box 30028, Lansing, Michigan 48909, at cost.

(f) "Method detection limit" means the minimum concentration of a substance which can be measured and reported, with 99% confidence, that the analyte concentration is greater than zero and is determined from analysis of a sample in a given matrix that contains the analyte.

(g) "Multistage coefficient" means a maximum likelihood estimate of a coefficient of the polynomial which is generated by the multistage model.

(h) "NOAEL" means the highest level of toxicant which results in no observable adverse effects in exposed test organisms.

(i) "Practical quantitation level" means the lowest level that can be reliably achieved within specified limits of precision and accuracy under routine laboratory conditions and based on quantitation, precision and accuracy, normal operation of the laboratory, and the practical need in a compliance monitoring program to have a sufficient number of laboratories available to conduct the analyses.

(j) "Reference dose" or "RfD" means a conservative estimate of the daily exposure to the human population, including sensitive subgroups, that is likely to be without appreciable risk of deleterious effect during a lifetime. The reference dose is expressed in units of milligrams per kilogram body weight per day.

(k) "Risk" means the probability that a chemical, when released into the environment, will cause an adverse effect in exposed humans, other living organisms, or abiotic environmental compartments.

(l) "Risk assessment" means the analytical process used to determine the level of risk.

(m) "Secondary maximum contaminant level" means the United States environmental protection agency's secondary maximum contaminant level for protection of the public welfare for substances which may adversely affect the taste, odor, color, appearance, or any aesthetic quality of drinking water, as set forth in the provisions of 40 C.F.R. part 143 (revised as of July 1, 1988), which are herein adopted by reference and which are available for inspection at the Lansing office of the department. Copies of the provisions may be purchased, at a cost of $25.00, from the Superintendent of Documents, Government Printing Office, Washington, DC 20402, or from the Department of Natural Resources, Environmental Response Division, Post Office Box 30028, Lansing, Michigan 48909, at cost.

(n) "Sufficient evidence," a term of art, means either of the following:

(i) In human epidemiological studies, that the data indicate that there is a causal relationship between the agent and human cancer.

(ii) In animal studies, the data suggest that there is an increased incidence of malignant tumors or combined malignant and benign tumors in any of the following:

(A) Multiple species or strains.

(B) Multiple experiments.

(C) To an unusual degree in a single experiment with regard to high incidence, unusual site or type of tumor, or early age at onset.

(o) "Toxicological interaction" means simultaneous exposure to 2 or more hazardous substances which will produce a toxicological response that is greater or less than their individual responses.

(p) "Type A" means the degree of cleanup which reduces hazardous substance concentrations such that those concentrations do not exceed background or method detection limits for a hazardous substance, consistent with the provisions of R 299.5707.

(q) "Type B" means the degree of cleanup which provides for hazardous substance concentrations that do not pose an unacceptable risk on the basis of standardized exposure assumptions and acceptable risk levels described in the provisions of R 299.5709 to R 299.5715.

(r) "Type C" means the degree of cleanup which provides for hazardous substance concentrations that do not pose an unacceptable risk, considering a site-specific assessment of risk as provided for in R 299.5717.

(s) "Weight of evidence," a term of art, means a description of the likelihood that a chemical is a human carcinogen based on evaluation of tumor data from human or animal studies and examination of relevant supporting information, including any of the following information:

(i) Structure-activity relationships.

(ii) Short-term test findings.

(iii) Results of appropriate physiological, biological, and toxicological observations.

(iv) Comparative metabolism and pharmacokinetic studies.

R 299.5705 Remedial actions; protection of public health and environment required; degree of cleanup; combination of types; review and approval of proposed type; type modification during implementation; aquifers; unacceptability of remedial action plan.

Rule 705. (1) All remedial actions shall be protective of the public health, safety, and welfare and the environment and natural resources.

(2) Removal, treatment, or containment measures shall be implemented to attain 1 or more of the following degrees of cleanup:

(a) Type A.
(b) Type B.
(c) Type C.

(3) A combination of types may be used at a single site to develop an acceptable remedial action.

(4) The remedial action type proposed shall be at the option of the person proposing the remedial action. The department shall approve of a remedial action plan that provides for a remedy which meets the applicable criteria set forth in this part and parts 5 and 6 of these rules. Approval shall be granted for type A, type B, or type C plans, or for plans which involve a combination of types, if all applicable requirements are satisfied.

(a) The remedial action type or types may be modified during implementation of a remedial action, consistent with the provisions of R 299.5515(2).

(5) The horizontal and vertical extent of hazardous substance concentrations in an aquifer above the higher of either the concentration allowed by R 299.5707 or the concentration allowed by R 299.5709 shall not increase after the initiation of remedial actions to address an aquifer, except as approved by the director.

(6) All remedial actions which address the remediation of an aquifer shall provide for removal of the hazardous substance or substances from the aquifer, either through active remediation or as a result of naturally occurring biological or chemical processes which can be documented to occur at the site.

R 299.5707 Compliance with type A criteria for all environmental media.

Rule 707. Compliance with type A criteria shall be attained when either of the following conditions is met for a specified hazardous substance in any environmental media, consistent with the provisions of R 299.5721:

(a) The hazardous substance concentration does not exceed background.

(b) The hazardous substance concentration does not exceed the method detection limit for the substance in question.

R 299.5709 Compliance with type B criteria for groundwater in aquifers.

Rule 709. (1) Compliance with type B criteria shall be attained when the conditions specified in subrule (2) of this rule are met, consistent with the provisions of R 299.5721.

(2) The concentration of a hazardous substance in an aquifer shall not exceed the lowest of the following:

(a) For a carcinogen acting by a threshold or a nonthreshold mechanism, the concentration which represents an increased cancer risk of 1 in 1,000,000 calculated according to the procedures in R 299.5723.

(b) For a hazardous substance which is not a carcinogen, a genotoxic teratogen, or a germ line mutagen, the

concentration which represents the human life cycle safe concentration calculated according to the procedures in R 299.5725, except as provided for in subdivision (c) or (d) of this subrule.

(c) For a hazardous substance which has a secondary maximum contaminant level, that level.

(d) For a hazardous substance which, singly or in combination with other hazardous substances present at the site, imparts adverse aesthetic characteristics to groundwater, the concentration which is documented as the taste or odor threshold or the concentration below which appearance or other aesthetic characteristics are not adversely affected. The criteria of this subdivision shall apply only when the level required by this subdivision is less than the level required by subdivision (a) or (b) of this subrule. A taste or odor threshold concentration or a concentration adversely affecting appearance shall be determined according to methods approved by the United States environmental protection agency.

(3) For the purposes of this rule, the point of exposure shall be presumed to be any point in the affected aquifer.

(4) Groundwater that is not in an aquifer shall be addressed by application of type B soil cleanup criteria as specified in R 299.5711 or by a type C remedial action. If groundwater that is not in an aquifer transports a hazardous substance into an aquifer in a concentration greater than permitted by the provisions of R 299.5707 or R 299.5709, that groundwater is subject to the provisions in subrules (1) to (3) of this rule.

R 299.5711 Compliance with type B criteria for soils.

Rule 711. (1) Compliance with type B criteria shall be attained when hazardous substance concentrations in soil do not exceed any of the following in migration pathways pertinent to the site, except as provided for in subrule (8) of this rule:

(a) Levels required to protect aquifers from the effects of contaminants in soil, as set forth in subrule (2) of this rule. All type B remedial actions shall consider migration to an aquifer as a pertinent pathway.

(b) Levels required to protect surface water from the effects of contaminants in soil, as set forth in subrule (3) of this rule.

(c) Levels required to protect against unacceptable risk through the inhalation of contaminants in, or released from, soil, as set forth in subrule (4) of this rule.

(d) Levels required to protect against unacceptable risk through direct human contact with contaminants in soil, as set forth in subrule (5) of this rule.

(e) Levels required to protect direct uses of the soil resource, if information is available to establish such levels, as set forth in subrule (6) of this rule.

(2) To assure that soils do not pose a threat of aquifer contamination, the concentration of the hazardous substance in soil shall be below that which produces a concentration in leachate that is equal to the highest of the groundwater criteria specified in R 299.5707, the groundwater criteria specified in R 299.5709, or the leachate concentration generated by background soil. Leachate testing shall not be required to demonstrate compliance with this subrule if the total concentration of a hazardous substance in soil does not exceed 20 times the criteria specified by R 299.5707 or R 299.5709. Leachate concentrations shall be determined by a method which best represents in-situ conditions. For the purposes of this rule, the following test methods shall be acceptable:

(a) The United States environmental protection agency's toxicity characteristic leaching procedure (TCLP) as set forth in the provisions of 40 C.F.R. part 261, appendix II (revised as of March 29, 1990), which are herein adopted by reference and which are available for inspection at the Lansing office of the department. Copies of the provisions may be purchased at a cost of $24.00 from the Superintendent of Documents, Government Printing Office, Washington, DC 20402, or from the Department of Natural Resources, Environmental Response Division, Post Office Box 30028, Lansing, Michigan 48909, at cost.

(b) Other test methods accepted by the department to more accurately simulate conditions at the site than the test methods specified in subdivision (a) of this subrule.

(3) To assure the protection of surface waters from transport or runoff of contaminated soil into surface waters, measures shall be implemented to prevent the transport of contaminated soil into surface waters which would result in hazardous substance levels that exceed relevant water quality standards specified in Act No. 245 of the Public Acts of 1929, as amended, being §323.1 et seq. of the Michigan Compiled Laws, or rules promulgated pursuant to that act, except that no mixing zone shall apply.

(4) To assure that unacceptable risks do not result from the inhalation of hazardous substances in or emanating from soil, hazardous substance concentrations shall not result in an air emission that causes an increased cancer risk of 1 in 1,000,000 or a concentration that causes, alone or through reaction with other air contaminants, injurious effects to human health, safety, or welfare; animal life; plant life of significant value; or to property.

(5) To assure that unacceptable risks do not result from direct contact with contaminated soils, hazardous substance concentrations in soil shall not exceed the concentration determined by the following algorithm:

$$Cs = \frac{\text{Target dose (mg/kg/d)} \times \text{WH} \times 1000 \text{ ug/mg}}{(\text{ID (g/day)} \times \text{AEI}) + (\text{DD (g/day)} \times \text{AED})}$$

Where:

Cs = acceptable exposure concentration, in parts per million

$$\text{Target dose (carcinogens)} = \frac{0.000001}{q_1^*}$$

Target dose (non-carcinogens) = RfD x 0.2 or MgT x 0.2

WH = 70 kilograms (assumed human weight)

ID = 0.09 grams per day (assumed ingested dose)

DD = 0.9 grams per day (assumed dermal contact dose)

AEI = known or assumed absorption efficiency via ingestion, determined according to the criteria specified in this subrule.

AED = known or assumed absorption efficiency via dermal contact, determined according to the criteria specified in this subrule.

and where:

q_1^* = cancer potency value for the hazardous substance and route of exposure being evaluated, based on best available information.

RfD = reference dose, based on best available information.

MgT = milligrams toxicant per day divided by 70 kilograms. Milligrams toxicant per day shall be calculated by the procedures specified in R 299.5725.

When chemical-specific data are not available, the absorption efficiency applicable to ingestion shall be either 100% for a volatile organic chemical or 50% for other organic chemicals, polychlorinated biphenyls, a pesticide, or an inorganic parameter. When chemical-specific data are not available, the absorption efficiency applicable to dermal contact shall be either 10% for a volatile organic chemical or 1% for other organic chemicals, polychlorinated biphenyls, a pesticide, or an inorganic parameter.

(6) To assure that hazardous substances in soil do not pose other unacceptable risks, the concentration of a hazardous substance in soil shall meet cleanup criteria based on sound scientific principles and determined by the director to be necessary to protect the public health, safety, and welfare and environment and natural resources from any of the following:

(a) Food chain contamination.

(b) Damage to soil or biota in the soil which would impair the use of such soil for agricultural purposes.

(c) Phytotoxicity.

(d) Physical hazards.

(e) Nonsystemic or acute toxic effects.

(f) Other injury which requires consideration.

(7) For the purposes of this rule, the point of exposure shall be assumed to be any location at the site or any location to which hazardous substances in, or emanating from, soil are transported by runoff, air dispersion, or other natural forces.

(8) In determining the adequacy of a type B response activity to address soils contaminated by polychlorinated biphenyls, the department shall not require response activity in addition to response activity which is subject to and complies with applicable federal regulations and policies that implement the toxic substance control act, 15 U.S.C. §2601 et seq. This subrule shall apply only to cleanups conducted in immediate response to a spill of polychlorinated biphenyls and shall not apply to pervasive or historical environmental contamination that involves polychlorinated biphenyls.

R 299.5713 Compliance with type B criteria for surface water.

Rule 713. (1) Compliance with type B criteria shall be attained when the conditions specified in subrule (2) of this rule are met.

(2) Hazardous substance concentrations in groundwater shall not result in a natural discharge of groundwater to surface water that exceeds the limits which would apply if that discharge were otherwise subject to a permit pursuant to the provisions of Act No. 245 of the Public Acts of 1929, as amended, being §323.1 et seq. of the Michigan Compiled Laws, or rules promulgated pursuant to that act, except that no mixing zone shall apply.

R 299.5715 Compliance with type B criteria for air quality.

Rule 715. (1) Compliance with type B criteria shall be attained when the conditions of subrule (2) of this rule are met.

(2) Hazardous substance concentrations shall not produce any emission which results in a violation of the provisions of Act No. 348 of the Public Acts of 1965, as amended, being §336.11 et seq. of the Michigan Compiled Laws, and known as the air pollution act, or the rules promulgated pursuant to that act.

R 299.5717 Compliance with type C criteria, all environmental media.

Rule 717. (1) Compliance with type C criteria shall be attained when a remedial action that includes type C elements has been fully implemented in accordance with an approved

remedial action plan pursuant to the provisions of R 299.5515.

(2) Type C criteria shall be developed on the basis of a site-specific risk assessment, taking into account the following factors:

(a) The party who proposes the type C remedial action shall demonstrate that the proposed criteria are appropriate for the site being considered.

(b) Type C criteria shall take into account reasonably foreseeable uses of the site and natural resources in question.

(c) Type C remedial actions shall take into account cost effectiveness.

(3) The party who proposes a type C remedial action shall provide information about, and the department shall consider, all of the following factors as appropriate to the site in question:

(a) Potential exposure of human and natural resource targets.

(b) Environmental media affected by contamination.

(c) All of the following with respect to the physical setting of the site:

(i) Geology.

(ii) Hydrology.

(iii) Soils.

(iv) Hydrogeology.

(v) Other aspects of the physical setting which have a bearing on the appropriateness of the proposed plan.

(d) Background groundwater, surface water, and air quality at the site.

(e) Current and reasonably foreseeable natural resource use.

(f) Potential pathways of hazardous substance migration.

(g) All of the following with respect to hazardous substances at the site:

(i) Amount.

(ii) Concentration.

(iii) Form.

(iv) Mobility.

(v) Persistence.

(vi) Bioaccumulative properties.

(vii) Environmental fate.

(viii) Other characteristics of the hazardous substances which have a bearing on the appropriateness of the proposed plan.

(h) The extent to which the hazardous substances have migrated or are expected to migrate from the area of release.

(i) The impact of future migration of the hazardous substances.

(j) Current or potential contribution of the hazardous substances to food chain contamination.

(k) Climate.

(l) The technical feasibility and cost-effectiveness of remedial action alternatives, including alternatives which comply with type B criteria.

(m) The evaluation of remedial action alternatives required by the provisions of R 299.5603.

(n) The uncertainties of the risk assessment.

(o) The ability to monitor remedial performance, including the limitations of analytical methods.

(p) For remedial action plans which may impact the Great Lakes, consistency with the Great Lakes water quality agreement of 1978, as amended by protocol signed November 18, 1987, and the Great Lakes toxic substances control agreement of 1986.

(q) Other factors appropriate to the site. Department requests for information pursuant to this subdivision shall be limited to factors not adequately addressed by information required by the provisions of other subdivisions of this rule and shall be accompanied by an explanation of the need for such additional information.

(4) Any remedial action which must address a genotoxic teratogen or a germ line mutagen, or both, shall use criteria established by the department on a chemical-specific basis. In determining criteria for these materials, a committee of scientists who are expert in the fields of germ line mutagens and genotoxic teratogens shall be established by the director, as needed. The department shall, as necessary, seek the advice of the committee regarding the mutagenic potential of a hazardous substance or the potential of a hazardous substance to act as a genotoxic teratogen.

(5) Any remedial action plan to address surface water or sediments shall include cleanup criteria established by the department on the basis of sound scientific principles considering the need to eliminate or mitigate the following use impairments, as appropriate to the site in question:

(a) Restrictions on fish or wildlife consumption

(b) Degraded fish or wildlife populations.

(c) Fish tumors or other deformities.

(d) Bird or animal deformities or reproductive problems.

(e) Degradation of benthos.

(f) Restrictions on dredging activities.

(g) Eutrophication or undesirable algae.

(h) Restrictions on drinking water consumption or taste or odor problems.

(i) Beach closings.

(j) Degradation of aesthetics.

(k) Degradation of phytoplankton or zooplankton populations.

(l) Loss of fish or wildlife habitat.

R 299.5719 Additional requirements for certain type C remedial actions.

Rule 719. (1) Any remedial action plan which involves on-site containment of a hazardous substance as a part of the

remedy shall include provisions for the long-term monitoring of the site to assure the effectiveness and integrity of the remedial action.

(2) If a remedial action which involves on-site containment of a hazardous substance as a part of the remedy is being undertaken by a responsible party, long-term monitoring, land use restrictions, and continued financial responsibility, if appropriate, shall be stipulated in a legally enforceable agreement with the department. The responsible party shall, through a financial mechanism acceptable to the department, provide funding to pay for monitoring, operation and maintenance, oversight, and other costs necessary to assure the effectiveness and integrity of the containment measures.

(3) If a remedial action relies on land use restrictions or other institutional controls to prohibit exposures which could result in unacceptable risk, such restrictions shall be described in a restrictive covenant that is executed by the property owner and recorded with the register of deeds for the county in which the site is located. Such restrictions shall run with the land and be binding on the owner's successors and assigns. The restrictive covenant shall be subject to approval by the state and shall include provisions to accomplish all of the following:

(a) Prohibit activities on the site that may interfere with a remedial action, operation and maintenance, long-term monitoring, or other measures necessary to assure the integrity of the remedial action.

(b) Prohibit activities that may result in human exposures above those specified by the provisions of R 299.5709 to R 299.5715 or that would result in the release of a hazardous substance which was contained as part of the remedial action.

(c) Require notice to the department of the owner's intent to convey any interest in the site. A conveyance of title, an easement, or other interest in the property shall not be consummated by the property owner without adequate and complete provision for the continued operation and maintenance of the remedy and the prevention of releases and exposures described in the provisions of subdivision (b) of this subrule.

(d) Grant to the department and its designated representatives the right to enter the property at reasonable times for the purpose of monitoring compliance with the remedial action plan, including the right to take samples, inspect the operation of remedial action measures, and inspect records.

(e) Allow the state to enforce the restrictions set forth in the covenant by legal action in a court of appropriate jurisdiction.

(f) Require the installation of a permanent marker on each side of the site which describes the restricted area and the nature of the prohibitions specified in the provisions of subdivisions (a) and (b) of this subrule.

(g) Describe uses of the property that are allowed.

R 299.5721 Evaluation of data to establish compliance with type A, type B, or type C criteria.

Rule 721. (1) If the criteria in question is below the practical quantitation level, in determining whether available data demonstrate compliance with type A, type B, or type C criteria, the following procedure shall be used:

(a) If a hazardous substance is not detected in a sample and the method detection limit is higher than the criteria to be achieved for that substance, the criteria shall be considered to have been achieved.

(b) If a hazardous substance is reported to be present in a sample above the method detection limit, but below the practical quantitation level, the significance of that data shall be determined by a method acceptable to the department, considering the number of samples, the distribution of data, and other factors influencing the selection of a statistical method.

R 299.5723 Determination of type B criteria for carcinogens in groundwater.

Rule 723. (1) Type B groundwater criteria shall be determined for each carcinogen according to the procedures specified in subrule (2) of this rule.

(2) The concentration corresponding to an increased cancer risk of 1 in 1,000,000 shall be calculated according to the following algorithm, using the procedure set forth in subdivision (a) or (b) of this subrule:

$$C = \frac{D \times W_h}{WC}$$

Where:

C = Concentration of the carcinogen (mg/l)
D = Dose as derived in subdivision (a) or (b) of this subrule
W_h = Weight of an average human (70 kg)
WC = Daily water consumption (2 liters per day)

The procedure used for calculations pursuant to this subrule is as follows:

(a) The dose (D) may be derived from appropriate human epidemiological data on a case-by-case basis. The department may seek the advice of experts in determining the dose.

(b) When appropriate human epidemiological data are not available, a nonthreshold mechanism shall be assumed for carcinogens which have not been adequately demonstrated to cause cancer by a threshold mechanism. The dose (D) shall be the concentration estimated to cause 1 additional cancer over the background rate in 1,000,000 individuals who are exposed to that concentration calculated using the following method:

(i) Cancer potency values (q_1^*) based on best available information.

(ii) All carcinogenesis bioassay data shall be reviewed and data of appropriate quality shall be used for the quantitative risk estimations.

(iii) The data shall be fitted into the multistage model using a linearized multistage computer model. The lower 95% confidence limit on dose at the 1 in 1,000,000 risk level shall determine the slope, q_1^* (animal). The slope q_1^* (animal) shall be taken as an upper bound of the potency of the chemical in inducing cancer at low doses. When the multistage model does not fit the data sufficiently, data at the highest dose shall be deleted and the model refitted to the rest of the data. This procedure shall be continued until an acceptable fit to the data is obtained. To determine whether a fit is acceptable, the chi-square statistic:

$$\chi^2 = \sum_{i=1}^{h} \frac{(X_i - N_i P_i)^2}{N_i P_i (1 - P_i)}$$

is calculated, where N_i is the number of animals in the ith dose group, X_i is the number of animals in the ith dose group with a tumor response, P_i is the probability of a response in the ith dose group estimated by fitting the multistage model to the data, and h is the number of remaining groups. The fit is determined to be unacceptable when chi-square is larger than the cumulative 99% point of the chi-square distribution with f degrees of freedom, where f equals the number of dose groups minus the number of nonzero multistage coefficients. If a single study in which a chemical induces more than 1 type of tumor is available, then the response for the tumor type predicting the highest estimate of q_1^* shall generally be used for the risk assessment. If 2 or more studies of equal quality are available, but vary in species, strain, sex, or tumor type, then the data set that gives the highest estimate of q_1^* shall generally be used for the risk assessment. If 2 or more studies exist which are identical with respect to species, strain, sex, and tumor type and are of equal quality, the geometric mean of the q_1^* values from these data sets shall be used. However, where 2 or more significantly elevated tumor sites or types are observed in the same study, extrapolations may be conducted on selected sites or types. These selections shall be made on biological grounds. To obtain a total estimate of carcinogenic risk, animals with 1 or more tumor sites or types that show significantly elevated tumor incidence may be pooled and used for extrapolation. The pooled estimates shall generally be used in preference to risk estimates based on single sites or types. Quantitative risk extrapolations shall generally not

be done on the basis of totals that include tumor sites without statistically significant elevations.

(iv) All doses shall be adjusted to give an average daily dose over the study duration.

(v) If the duration on experiment (L_e) is less than 78 weeks for mice or 90 weeks for rats, the slope, q_1^* (animal) shall be multiplied by the factor L^3/L_e, to account for unobserved tumors due to the short study duration. For mice, the natural expected lifespan (L) shall be 90 weeks and for rats the natural expected lifespan (L) shall be 104 weeks.

(vi) A species sensitivity factor shall be used to account for differences between test species and humans. It shall be assumed that milligrams per surface area per day is an equivalent dose between species. The species sensitivity factor may be calculated by dividing the average weight of a human by the average weight of the test species and taking the cube root of the resultant value; the slope q_1^* (animal) shall be multiplied by this factor to obtain the value q_1^* for humans. However, if adequate pharmacokinetic and metabolism studies are available, these data may be factored into the adjustment for species differences on a case-by-case basis. The department may seek the advice of experts outside the department as needed in calculating dose.

(vii) The dose corresponding to an estimated 1 additional cancer in 1,000,000 exposed humans shall be determined by dividing 0.000001 by the value of q_1^* (human).

R 299.5725 Calculation of type B criteria for noncarcinogens in groundwater.

Rule 725. (1) Derivation of the HLSC for substances not determined to cause cancer or to be a genotoxic teratogen or a germ line mutagen shall be conducted according to the following procedure set forth in subrule (2) of this rule.

(2) The minimum toxicity data requirement for derivation of an HLSC shall be an acute oral LD50 for rats, determined as follows:

(a) The HLSC shall be derived from appropriate toxicological data using the following formula, except as provided for in subdivision (b) of this subrule.

$$HLSC = \frac{MgT\ (mg/day) \times I_{dw}}{WC}$$

Where: MgT = Maximum amount of toxicant (in milligrams) per day causing no adverse effects to humans when ingested daily for a 70-year lifetime.

WC = Volume of water consumed daily in liters (2 liters)

I_{dw} = Intake of the chemical derived from drinking water. 20% shall be assumed for this value

unless data are available to demonstrate that a different source contribution is appropriate.

(b) The HLSC may be derived directly from either of the following provisions:

(i) The HLSC shall equal a maximum contaminant level, expressed in milligrams per liter, if a maximum contaminant level has been established by the United States environmental protection agency.

(ii) The HLSC may equal a final, lifetime health advisory, expressed in milligrams per liter, if such as advisory has been established by the United States environmental protection agency.

(c) The MgT shall be derived by 1 of the following methods depending on the type and quality of the toxicity database:

(i) If a scientifically valid reference dose (RfD) is available through best available information sources:

$$MgT = RfD(mg/kg/d) \times 70\ kg.$$

(ii) If a chronic or subchronic NOAEL for humans exposed to toxicant contaminated drinking water is available:

$$MgT = \frac{NOAEL\ (mg/l) \times V_h}{B}$$

Where:

B = Uncertainty factor, chosen according to the following criteria:

B = 10, if extrapolating from valid experimental results in studies using prolonged exposure to average healthy humans.

B = 100, if extrapolating from valid results of long-term studies on experimental animals when results of studies of human exposures are not available or are inadequate.

B = 1,000, if extrapolating from less than chronic results on experimental animals when useful long-term human data are not available.

B = 10,000, if deriving a reference dose from a lowest adverse effect level instead of a NOAEL.

V_h = Volume of water consumed daily by humans (2 liters per day).

(iii) If a scientifically valid acceptable daily intake (ADI) is available from the United States food and drug administration regulations:

$$MgT = ADI\ (mg/kg/d) \times 70\ kg.$$

(iv) If a chronic or subacute NOAEL from a mammalian test species exposed to toxicant-contaminated drinking water is available,

$$MgT = \frac{NOAEL\ (mg/l) \times \frac{V_w}{W_a} \times W_h}{B}$$

Where:

V_w = Volume of water consumed daily by test animal (in l/day).

W_a = Weight of test animal (kg).

W_h = Weight of human (70 kg).

B = Uncertainty factor, chosen according to the criteria in paragraph (ii) of this subdivision.

(v) If a chronic or subacute NOAEL from a mammalian test species exposed to toxicant-contaminant food is available,

$$MgT = \frac{NOAEL\ (ppm) \times C \times W_h}{B}$$

Where:

C = Daily food consumption expressed as a fraction of the animal's body weight.

(vi) If a chronic or subacute NOAEL from a mammalian test species exposed to a toxicant by gavage is available,

$$MgT = \frac{NOAEL\ (mg/kg) \times F_w \times W_h}{B}$$

Where:

F_w = Fraction of week dosed.

(vii) If an oral rat LD50 is available,

$$MgT = \frac{LD50\ (mg/kg) \times M \times W_h}{100}$$

Where:

M = Acute to chronic application factor (0.0001).

(viii) If an acceptable NOAEL is lacking, the lowest observed adverse effect level may be substituted in some cases with an additional uncertainty factor of 1 to 10.

(ix) An HLSC shall generally be derived from data that involve oral exposure. If available oral exposure data are insufficient, it may be useful to use data from other exposure routes. Use of such data shall depend on the pharmacokinetic and toxicological properties of each chemical.

R 299.5727 Special considerations for risk assessment.

Rule 727. (1) For the purposes of this part, all polychlorinated dibenzodioxins and dibenzofurans shall be considered as 1 hazardous substance, expressed as an equivalent concentration of 2,3,7,8-tetrachlorodibenzo-p-dioxin, based upon the relative potency of the isomers present at the site.

(2) For the purposes of this part, if 2 or more hazardous substances are present and known to result in toxicological interaction, the interactive effects shall be considered in establishing levels which are protective of the public health and welfare.

PART 8. SITE ASSESSMENT MODEL

R 299.5801 Definitions; A to I.

Rule 801. As used in this part:

(a) "Aquatic life" means all life forms which rely on surface water for existence.

(b) "Category" means any of the 6 major components of the site assessment model. A category shall be 1 of the following:

(i) Environmental contamination.

(ii) Mobility rating.

(iii) Sensitive environmental resource.

(iv) Population.

(v) Institutional population.

(vi) Toxicity/quantity.

(c) "Category subscores" means the points scored for a site for each of the 6 categories in the site screening model.

(d) "Confirmed contamination" means the component of the environmental contamination category scored when analytical data is available to confirm a release of a hazardous substance.

(e) "Containment structure" means any natural or human-made structure which is designed or used for the storage, transport, treatment, or disposal of hazardous substances, and from which substances may be released. The term may include soil and surface waters.

(f) "Contaminant mobility" means the category in which points are assigned based on the potential or actual migration of a hazardous substance.

(g) "Environmental contamination" means the category in which points are assigned for hazardous substance effects on environmental media.

(h) "Environmental media" means any of the following:

(i) Soil.

(ii) Groundwater.

(iii) Surface water.

(iv) Air.

(i) "Human exposure" means the component of the environmental contamination category scored when there is or may be human exposure to a hazardous substance.

(j) "Institutional population" means the category scored when an occupied school, hospital, nursing home, or licensed child care center is located within 1/2 mile of the site. Students or inhabitants of these facilities are not otherwise included in the population category.

R 299.5803 Definitions; M to W.

Rule 803. As used in this part:

(a) "Mobile solids" means a solid hazardous substance or a material that contains a hazardous substance which is less than 2,000 microns (2 millimeters) in diameter and which may be transported by the air.

(b) "Natural community" means the association of plants, animals, or combinations thereof found to have a natural symbiotic relationship to one another.

(c) "Population" means the category in which points are assigned on the basis of the population density for the area within 1/2 mile of the site.

(d) "Potential contamination" means the component of the environmental contamination category scored when there is a potential for a hazardous substance to contaminate the environmental media being evaluated.

(e) "Potential toxicity score" means the toxicity rating of a hazardous substance, as determined by the department, which may include its genotoxicity, acute and chronic toxicity, and other adverse effects.

(f) "Receptor" means an individual or a population which may be affected by the release of a hazardous substance.

(g) "Saturated soil" means soils where all voids are filled with liquid.

(h) "Semiliquid" means a substance which is intermediate in properties between a solid and a liquid, but which flows readily.

(i) "Semisolid" means a substance which is intermediate in properties between a solid and a liquid, but which will not flow readily.

(j) "Sensitive environmental resource" means the category in which points are assigned for either a natural community which occurs within 1/2 mile of the site and which has been

classified as uncommon, extremely rare, or rare or a plant or animal species which has been classified as endangered or threatened as defined in section 2(d) or (l) of Act No. 203 of the Public Acts of 1974, as amended, being §299.222(d) or (l) of the Michigan Compiled Laws. The term also includes plant and animal species classified as being of special concern. All such classifications are made by the endangered species unit of the wildlife division of the department.

(k) "Site" means the area bounded by the furthest migration of contamination in any direction from a release.

(l) "Site assessment model" means the numerical risk assessment model that is used to establish the relative risk rankings of sites.

(m) "Site score" means the sum of the 6 category subscores in the site screening model.

(n) "Surface impoundment" means a natural topographic depression, human-made excavation, or diked area which holds an accumulation of liquid that contains wastes. The term may include natural lakes, ponds, or wetlands.

(o) "Surface water" means any body of water and the associated sediments which has a top surface that is exposed to the atmosphere and which is not solely for wastewater conveyance, treatment, or control. Surface water may be any of the following:

(i) Any Great Lake or its connecting waters.

(ii) Any inland lake or pond.

(iii) A river or stream.

(iv) An impoundment.

(v) An open drain.

(vi) A wetland.

(p) "Surficial soil" means the top 6 inches of the ground surface.

(q) "Suspected contamination" means the component of the environmental contamination category scored when analytical data is not available to confirm a release of a hazardous substance, but a release can reasonably be judged to have occurred, based on visual or other evidence.

(r) "Target area" means that area within 1/2 mile of a site.

(s) "Toxicity/quantity" means the category in which points are assigned on the basis of the quantity of hazardous substance or waste and the potential toxicity of the hazardous substance or type of facility which produced the waste.

(t) "Vulnerable aquifer" means an aquifer that is not protected by an aquitard from contamination by hazardous substances.

(u) "Waste" means disposed of or discarded material which contains 1 or more hazardous substances.

(v) "Waste class" means the component of the toxicity/quantity concern category that is scored on the basis of the facility type or waste source.

(w) "Well log" means the record of earth materials and other data recorded by a licensed well driller pursuant to the provisions of part 127 of Act No. 368 of the Public Acts of 1978, as amended, being §333.12701 et seq. of the Michigan Compiled Laws.

(x) "Wetland" has the meaning defined in section 2(g) of Act No. 203 of the Public Acts of 1979, being §281.702(g) of the Michigan Compiled Laws, and known as the Goemaere-Anderson wetland protection act.

R 299.5805 Risk assessment model.

Rule 805. The numerical risk assessment model used for assessing the relative present and potential hazards of sites included in the listings provided to the legislature in accordance with the provisions of section 6(d) of the act shall be as described in this part.

R 299.5807 Scoring procedure.

Rule 807. (1) Category scores shall be determined for each site in accordance with the provisions of this rule and R 299.5801 to R 299.5805 and R 299.5809 to R 299.5821 and shall be recorded on a site scoring sheet illustrated in figure 1, as follows:

FIGURE 1
SITE SCORING SHEET

Site Name	Site ID	County	Score

CATEGORY						CATEGORY SUB-SCORE
Environmental Contamination (20 points Max)	Environmental Media	Potential Contamination	Suspected Contamination	Confirmed Contamination	Human Exposure	
	Soils	1	3	6	9	
	Ground Water	1	3	6	9 to 20	
	Surface Water	1	3	6	9 to 20	
	Air	1	3	6	9 to 20	

	Mobility Ratings				
Mobility Rating (5 points Max)	1	or	3	or	5

Sensitive Environmental Resource (3 points Max)	Natural Communities	Uncommon	Rare	Extremely Rare
	Plants/Animals	Special concern	Threatened	Endangered
	One occurrence	1	2	3
	Two occurrence	2	3	3
	Three or more	3	3	3

FIGURE 1 continued
SITE SCORING SHEET

CATEGORY			CATEGORY SUB-SCORE
Population (4 points Max)	Density per square mile	Points	
	1 - 10	1	
	11 - 100	2	
	101 - 1,000	3	
	1,001 or more	4	
Institutional Population (1 point Max)	Presence of one or more institutions in target area	1	

Method A

Identified Chemical(s)	Chemical Quantity (Kilograms)	Potential Toxicity Score < 10	10 - 19	10 - 29	30 - 50	> 50
	< 25	1	2	5	7	9
	25 - 2,500	3	5	7	9	11
	2,501 - 20,000	5	7	9	11	13
	> 20,000	7	9	11	13	15

FIGURE 1 continued
SITE SCORING SHEET

CATEGORY

CATEGORY SUB-SCORE

Method B

Unquantified Chemical	Chemical Concentration (Parts per billion)	Potential Toxicity Score < 10	10 - 19	10 - 29	30 - 50	> 50
	1 - 100	1	3	5	7	9
	101 - 1,000	3	5	7	9	11
	1,001 - 10,000	5	7	9	11	13
	> 10,000	7	9	11	13	15

Contaminant and concentration of which unquantifiable site's toxicity was based:

_____

Method C

Unidentified Chemical(s)	Quantity of waste (Cubic Meters)	or (Acres)	Waste Class D	C	B	A
	< 50	< 0.5	3	5	7	9
	50 - 500	0.5 - 10	5	7	9	11
	501 - 2,500	11 - 60	7	9	11	13
	> 2,500	> 60	9	11	13	15

Waste source on which unknown contaminant waste characterization was based:

_____

Special Wastes Severely Toxic Waste = 15 ☐

_____

Total possible points = 48 Total Site Points ☐

Scored by _____ Date _____

(2) Zero points shall be awarded to categories when the conditions of this rule and R 299.5809 to R 299.5821 are not met.

R 299.5809 Environmental contamination category.

Rule 809. (1) Environmental contamination includes all of the following subcategories:

(a) Potential contamination.

(b) Suspected contamination.

(c) Confirmed contamination.

(d) Human exposure.

(2) The environmental contamination category subscore shall be the sum of the highest point value applicable to each environmental media, not to exceed 20 points total.

(3) The potential contamination subcategory shall be scored according to the following criteria:

(a) One point shall be scored for soil if the containment structure or structures is of suspect or inadequate integrity and a release would contaminate soils.

(b) One point shall be scored for groundwater if a site overlies a vulnerable aquifer. The vulnerability of an aquifer shall be determined by consulting local well logs, hydrogeological studies, or published sources of information about geology and hydrogeology in the area of the site.

(c) One point shall be scored for surface water if a surface water body or wetland is located within 1/2 mile of the site.

(d) One point shall be scored for air if a containment structure which is located at or within 12 inches of the ground surface and which is judged to contain volatile liquids or mobile solids is of suspect or inadequate integrity. Zero points shall be scored for air if a containment structure is empty.

(e) When a hazardous product is stored in inadequate or suspect containment, it shall be considered to be a discarded hazardous substance and shall be scored under this subrule.

(4) The suspected contamination subcategory shall be scored according to the following criteria:

(a) Three points shall be scored for soil if there has been a release to soils or there is waste in the surficial soils, but the release has not been confirmed with analytical data.

(b) Three points shall be scored for groundwater if any 1 of the following conditions is judged to be attributable to a hazardous substance associated with the site:

(i) There has been a release to the groundwater, but the release has not been documented with analytical data.

(ii) A sheen is visible on an exposed groundwater surface.

(iii) A hazardous substance or waste is in contact with groundwater.

(c) Three points shall be scored for surface water if any 1 of the following conditions is judged to be attributable to a hazardous substance associated with the site:

(i) There has been a release to the surface water, but the release is not documented with analytical data.

(ii) Leachate or contaminated groundwater is entering surface water.

(iii) Stained soils are in contact with surface water.

(d) Three points shall be scored for air if any 1 of the following conditions is judged to be attributable to a hazardous substance associated with the site:

(i) There is an open container or surface impoundment that contains volatile compounds.

(ii) An obnoxious or chemical odor that is associated with a hazardous substance has been confirmed at the site by state or local agency personnel and is attributable to the site being scored.

(iii) Volatile compounds are present in uncovered surficial soils.

(iv) An emission of dust or particulate matter is observed from a known contamination area.

(v) A vapor cloud is observed emanating from a containment structure or contaminated area.

(5) The confirmed contamination subcategory shall be scored according to the following criteria when there is a release from a containment structure that is documented by quantitative analytical data:

(a) Six points shall be scored for soils if quantitative analytical data documents a release to soils.

(b) Six points shall be scored for groundwater if quantitative analytical data documents the presence of a hazardous substance in groundwater.

(c) Six points shall be scored for surface water if either of the following exists:

(i) Analytical data which document a hazardous substance in surface water or sediment.

(ii) A documented fish kill, fish tissue contamination, or other adverse impact on wildlife or aquatic life which is attributable, wholly or in part, to the site being scored.

(d) Six points shall be scored for air if air sampling data document the presence of a hazardous substance being transported by air beyond the property boundary and the hazardous substance is attributable to the site.

(6) The human exposure subcategory shall be scored according to the following criteria when there has been, or may be, a human exposure to contaminants:

(a) Nine points shall be scored for soil if hazardous substances are present at the soil surface and the area of contamination is accessible or efforts to restrict access to the area of contamination have been unsuccessful and the site is unlikely to be secured.

(b) Nine points shall be scored for groundwater if the department of public health has recommended that a potable water supply well that serves 59 or less people not be used due to hazardous substance contamination that is attributable

to the site and a permanent alternate water supply has not been provided.

(c) Twenty points shall be scored for groundwater if the department of public health has determined that 1 or more groundwater supplies that collectively serve 60 or more people are contaminated with a hazardous substance that is attributable to the site.

(d) Nine points shall be scored for surface water if any 1 of the following conditions exists:

(i) A bathing beach exists within the site boundaries on a surface water body with documented hazardous substance contamination.

(ii) The department of public health has issued a fish advisory for a water body and the cause of such an advisory can be attributed, in part, to the site.

(iii) If the department of public health has determined that at least 1 potable surface water intake that serves 59 or less people is contaminated with a hazardous substance attributable to the site and a permanent alternate water supply has not been provided.

(e) Twenty points shall be scored for surface water if either of the following conditions exists:

(i) The department of public health has determined that at least 1 potable surface water intake that serves 60 or more people is contaminated with a hazardous substance that is attributable to the site.

(ii) The department of public health has issued a fish advisory for a water body and the cause of such an advisory can be attributed wholly to the site.

(f) Nine points shall be scored for air if analytical data from air sampling, surficial soil, or other environmental samples indicate that airborne hazardous substances from the site have reached or affected a receptor beyond the property boundary of the source area.

(g) Twenty points shall be scored for air if 15 or more residences being receptors meet the criteria specified in subdivision (f) of this subrule.

R 299.5811 Mobility rating.

Rule 811. (1) The contaminant mobility score on the site scoring sheet illustrated in figure 1 of R 299.5807 shall be assigned using the mobility ratings in table 1.

(2) Mobility ratings shall be based on physical state at the time of disposal, unless a special condition in table 1 applies.

(3) A mobility rating of 5 shall be scored when there has been a documented release to the air, groundwater, or surface water.

(4) When more than 1 mobility rating applies to a site, the highest rating shall be used.

(5) The category subscore shall be of the highest mobility rating applicable to any hazardous substance at the site, not to exceed 5 points.

(6) Table 1 reads as follows:

Table 1
Mobility Ratings

Physical State of Hazardous Substance	Mobility Rating
Immobile solid (particle size greater than 2000 microns in diameter)	1
Semisolid	1
Semiliquid	1
Liquids and gases/mobile solids	3

Special Conditions	Mobility Rating
Contaminated soils	
Immobile dry solids	1
Saturated/mobile solids	3
Landfills	1
Landfills with leachate present	3
Hazardous substances in groundwater	5
Hazardous substances in surface water	5
Hazardous substance transport by air	5

R 299.5813 Sensitive environmental resource category.

Rule 813. (1) The sensitive environmental resource category shall be scored when either or both of the following conditions exist:

(a) A natural community that is located within 1/2 mile of the site has been classified by the department as extremely rare, rare, or uncommon.

(b) A plant or animal that is located within 1/2 mile of the site has been classified by the department as endangered, threatened, or of special concern.

(2) Points shall be assigned according to the criteria shown in figure 1 of R 299.5807.

(3) The sensitive environmental resource category subscore shall consist of the sum of the points shown in figure 1 of R 299.5807 for the number of occurrences of sensitive environmental resources. The sensitive environmental resource subscore shall not exceed 3 points.

R 299.5815 Population category.

Rule 815. (1) The population category subscore shall be determined from the criteria in the site scoring sheet illustrated in figure 1 of R 299.5807, considering the population density within 1/2 mile of the site or the number of people who are potentially exposed through an exposure pathway that extends outside the target area, whichever is greater.

(2) The determination of population densities shall be based upon the best data that is readily available to the department.

(3) Two points shall be scored when the population density within 1/2 mile of the site is less than 11 people per square mile, but more than 10, and less than 101, people are potentially exposed to a hazardous substance attributable to the site through an exposure pathway that extends outside the target area.

(4) Three points shall be scored when the population density within 1/2 mile of the site is less than 101 people per square mile, but more than 100, and less than 1,001, people are potentially exposed to hazardous substances attributable to the site through an exposure pathway that extends outside the target area.

(5) Four points shall be scored when the population density within 1/2 mile of the site is less than 1,001 people per square mile, but more than 1,000 people are potentially exposed to hazardous substance attributed to the site through an exposure pathway that extends outside the target area.

R 299.5817 Institutional population.

Rule 817. When at least 1 occupied school, hospital, licensed child care center, or nursing home exists within 1/2 mile of a site, the institutional population subscore shall be 1 point.

R 299.5819 Toxicity/quantity category.

Rule 819. (1) The toxicity/quantity category shall be scored on the site scoring sheet illustrated in figure 1 of R 299.5807 according to the criteria described in this rule.

(2) The total quantity of waste on site shall not include any material that is properly stored in compliance with all applicable state and federal laws and regulations.

(3) Scoring shall be done according to 1 or more of the following methods described in subdivisions (a), (b), and (c) of this subrule:

(a) Method A shall be used to score all hazardous substances at a site which have known identities and quantities or which can be determined from representative sample data. When more than 1 quantifiable hazardous substance is present at the site, a weighted average for the potential toxicity scores of the known compounds shall be calculated by multiplying the potential toxicity score for each quantified hazardous substance by the quantity in kilograms of that substance on the site, summing the values, and dividing by the total quantity of hazardous substances on the site. The toxicity/quantity category score shall be determined on the site scoring sheet illustrated in figure 1 of R 299.5807 using the potential toxicity score, or weighted average potential toxicity score, and the total chemical quantity.

(b) Method B shall be used when the identity of a hazardous substance is known, but the release cannot be quantified. When more than 1 hazardous substance is present at the same site, the hazardous substance that provides the highest score shall be used. The highest measured concentration from the most recent 12 months of sampling shall be used. The toxicity/quantity category score shall be determined by determining the applicable scoring ranges for potential toxicity and concentration on the site scoring sheet illustrated in figure 1 of R 299.5807.

(c) Method C shall be used to score all hazardous substances at a site which cannot be identified, but which have quantities that are known or can be estimated. For this method, the waste shall be characterized according to the type of facility or process associated with the production of the hazardous waste substance, as contained in table 2. If more than 1 type of facility or process is associated with a site, the classification which best characterizes the suspected source of the environmental contamination shall be used. If a facility or process which must be characterized is not found in table 2, the class which best approximates the facilities waste stream, when compared to other facilities in that class, shall be assigned. The toxicity/quantity category score shall be determined on the basis of the applicable scoring ranges for waste class and quantity on the site scoring sheet illustrated in figure 1 of R 299.5807.

(d) When the quantity of waste is unknown, but the identity of the suspected or failed containment structure is known, assume a onetime total volume loss, unless the contaminant is petroleum. Toxicity/quantity category scores for petroleum losses shall be scored according to the criteria set forth in subrule (5) of this rule.

(e) To estimate the volume of a lagoon when the depth is unknown, the depth shall be assumed to be 3 meters.

(f) To estimate the volume of contaminated soils when the depth of contamination is unknown, assume the depth to be 1 meter.

(g) When data availability allows for all of the hazardous substances at a site to be scored with 1 method, method A is the most preferred, and method C is the least preferred. The method shall be determined by the availability of data.

(h) When data availability requires that more than 1 method for scoring the toxicity/quantity category be used, hazardous substances at the site shall be combined on the basis of data availability and each group scored separately using the most appropriate method. The highest score of any 1 method shall be used as the toxicity/quantity score for the site.

(4) When hazardous substances are identified as gasoline or fuel oil, a potential toxicity score of 21 shall be used.

(5) When the quantity of petroleum released cannot be estimated, method A shall be used, based on the following quantity assumptions:

(a) Releases from incidental spills, transfer spills, residential tanks, or other small-volume releases shall be assumed to be 300 gallons.

(b) Releases from commercial underground storage tanks, tanker accidents, or other large-volume releases shall be assumed to be 3,000 gallons.

(6) Score 15 points for the toxicity/quantity category when any of the following severely toxic wastes are present at a site in concentrations above 1 part per billion in soils and 0.001 part per billion in groundwater or surface water:

(a) 2,3,7,8-tetrachlorodibenzo-p-dioxin and all other tetrachlorodibenzo-p-dioxins.

(b) 1,2,3,7,8-pentachlorodibenzo-p-dioxins and all other 2,3,7,8 substituted pentachlorodibenzo-p-dioxins.

(c) 1,2,3,6,7,8-hexachlorodibenzo-p-dioxin and all other 2,3,7,8 substituted hexachlorodibenzo-p-dioxins.

(d) 2,3,7,8-tetrachlorodibenzofuran and all other 2,3,7,8 substituted pentachlorodibenzofurans and hexachlorodibenzofurans.

(7) Table 2 reads as follows:

TABLE 2

Waste Class A

(Typical waste sources or facility types)

Pharmaceutical production
Chemical formulation
Explosives production
Heavy metals
Wood treatment
Chemical treating
Plating shops
Chemical bonding
Printed circuits
Large assembly plants
Polymer synthesis
Solvent storage
Chemical coating
Petroleum or natural gas production, storage, refining, and transportation facilities
Oil-based paint production
Petroleum bulk storage
Agricultural pesticides
Metal coating
Organic chemical production
Hazardous waste hauling, storage, or treatment facility
Dyes and pigments
Oil or solvent recycling

Landfill - more than 50% industrial waste

Waste Class B

(Typical waste sources or facility types)

Primary metals production
Metal processing
Small assembly plants
Iron mining
Inorganic chemical production
Copper mining
Adhesive/sealant production
Iron steel foundry
Body work and paint shops
Railroads
Pulp and paper production
Rubber products production
Gasoline station
Battery production/recycling
Auto manufacturing
Fuel transport
Leather tanning
Chemical transport
Barrel reclaiming
Engine component manufacturing
Charcoal manufacturing
Clay/glass production
Heavy manufacturing
Landfill - more than 10 to 50% industrial waste

Waste Class C

(Typical waste sources or facility types)

Product assembly
Boat assembly
Plastic molding
Medical/hospital
Soap and detergent production
Machining formulation
Tool and die
Metal stamping/forging
Aircraft assembly
Consumer packaging
Latex paint production
Furniture stripping
Laundry/dry cleaner
Laboratory waste
Coal gasification
Coal ash or foundry sands
Scrap metal yard

Cleaning transport vehicles
Appliance manufacturing
Plastics fabrication
Light manufacturing
Auto repair
Landfill - 1 to 10% industrial waste
Gas/oil drilling
Fertilizer storage and processing
Auto junkyard
Asphalt, roofing production

Waste Class D

(Typical waste sources or facility types)

Sanitary landfill - domestic or commercial wastes only
Dump - domestic or commercial wastes only
Recycling center
Salt storage
Food processing
Poultry farming
Printing
Brine use/disposal
Hog farming

R 299.5821 Site score.
Rule 821. The site score shall be the sum of the category subscores on the site scoring sheet illustrated in figure 1 of R 299.5807.

R 299.5823 Procedure for changing numerical risk assessment model.
Rule 823. (1) On an annual basis, the department shall review the numerical risk assessment model provided for pursuant to section 6(c) of the act. Such review shall consider public comments received at any time throughout the year that concern the numerical risk assessment model.
(2) Any changes in the numerical risk assessment model shall be made pursuant to the provisions of Act No. 306 of the Public Acts of 1969, as amended, being §24.201 et seq. of the Michigan Compiled Laws, and known as the administrative procedures act.

--- END ---

MICHIGAN DEPARTMENT OF NATURAL RESOURCES

RECEIVED
MAR 10 1994
ERD - SPECIAL SERVICES

INTEROFFICE COMMUNICATION

February 4, 1994

Jeff Crum
Special Services Secti
ERD

TO: Environmental Response Division Staff

FROM: Alan J. Howard, Chief, Environmental Response Division

SUBJECT: **MERA Operational Memorandum #8, Revision 3** -- Type B Criteria
Rules 299.5709, 299.5711(2), 299.5711(5) and 299.5713

The attached table lists Type B cleanup criteria which have been developed according to the algorithms set forth in the specific rules identified below. This table replaces the previously issued list of Type B criteria dated July 16, 1993. The criteria were developed using currently available toxicological and other data and are subject to change as new data become available. These criteria are presented in two significant figures; reference doses and slope factors used to generate the criteria were also reported in two significant figures. Cleanup criteria from the attached table should be compared to analytical data presented in two significant figures.

This list presents noncarcinogens and carcinogens together; carcinogens are presented in italics. Chemicals beginning with numbers (such as 1,1,2-trichloroethane) are incorporated alphabetically within the list. Criteria on these lists should be considered draft; final cleanup criteria will be confirmed by Environmental Response Division (ERD) toxicologists and approved as part of a site-specific remedial action plan. This table addresses only those rules which include a specific algorithm or regulatory standard. Staff are reminded that Type B remedial action plans must address all elements required by the rules, including those for which specific criteria are not shown here. Additional guidance for applying the criteria for each rule follows.

Note that in cases where Type B criteria are less than Type A criteria (either method detection limits or background), Type A criteria become the cleanup goal. Type B criteria are not applicable in these cases.

RULE 299.5709 -- GROUNDWATER IN AQUIFERS

Subrules (2)(a) and (b) of this rule specify the criteria for carcinogens and noncarcinogens, respectively. The values in the first column of the table were developed using the algorithms in Rules 299.5723 (for carcinogens) and 299.5725 (for noncarcinogens). The values in the second column of the table were established, where sufficient data are available, to protect against adverse aesthetic impacts of hazardous substances on groundwater.

The most restrictive of the values in the first two columns of the table is the cleanup criteria required to satisfy Rule 299.5709. Note that this rule requires that aquifer cleanup criteria take into account adverse aesthetic impacts resulting from one or a combination of hazardous substances. If adverse aesthetic impacts remain when health based criteria have been achieved, further remedial measures may be required. Consult your Supervisor if you encounter such a case.

RULE 299.5711 -- SOIL

The table presents values for the subrules that are most often expected to be the controlling factor in determining soil cleanup criteria. However, a Type B remedial action plan must include rationale that supports the conclusions drawn from the assessment of pertinent pathways (i.e., some discussion of each pertinent pathway must be included which assesses whether more restrictive criteria are required; See R 299.5711(1)(a-e) and Rule Interpretation Memo #5 dated March 8, 1991).

Note that the rules allow for a value higher than twenty times the groundwater cleanup criteria to be established as the soil cleanup criteria protective of groundwater through the use of a leachate test (refer to MERA Operational Memo #12 for guidance on appropriate leachate methods) or other method which better represents in situ conditions. The "20X" values in the table are provided for convenience and are not mandatory if leachate tests or other methods support the use of a higher value. For certain chemicals which strongly adsorb to soil and are known not to leach at significant concentrations (i.e., PCBs, carcinogenic PNAs and some chlorinated pesticides), the direct contact value is accepted as the soil cleanup criterion to protect groundwater in addition to the protection against direct contact hazards. Consult an ERD toxicologist if you have questions about whether other substances may be handled in this manner.

Staff should be aware that direct contact criteria only consider long-term exposure from ingestion and dermal contact of contaminated soil. Consequently, direct contact criteria for chemicals that are highly toxic on an acute basis (but not on a long-term basis) may not be protective against short-term exposure hazards. In addition, many chemicals at concentrations nearing saturation would pose a hazard to crops and plants. In these cases, the Department would be responsible for developing soil cleanup criteria based on Rule 299.5711(6). If you believe these issues will affect a project you are working on, consult your supervisor and/or an ERD toxicologist.

RULE 299.5713 -- IMPACTS OF GROUNDWATER CONTAMINANTS ON SURFACE WATER

The third column in the table lists values based on calculations done by Surface Water Quality Division (SWQD) in accordance with Rule 323.1057 of the Water Resources Commission Act, 1929 PA 245, as amended or on the National Toxics Rule (NTR; Federal Register, December 22, 1992. Vol. 57(246):60848-60923). For use in ERD programs, the criterion which protects surface water has been termed the groundwater surface water interface (GSI) value. The final GSI value is the more restrictive of the Rule 57 value and the NTR value, where both are available. Where only one of the two values is available, that number becomes the GSI value. Those chemicals which have GSI values based on the NTR are indicated with a footnote. The GSI values are the criteria used to judge compliance with Rule 299.5713. GSI values are developed for surface water which is not used as a drinking water source and also for surface water which serves as a source of drinking water. GSI values presented in the list are for surface waters not protected as a drinking water source. If the surface water at a site serves as a drinking water source, contact an ERD toxicologist to obtain the correct GSI value. In cases where data are inadequate to calculate a GSI value, the party proposing the remedial

action may generate the minimum data necessary to propose a value for Department review and approval.

Rule 299.5713 requires that the GSI value not be exceeded at a point where groundwater naturally discharges to surface water. Demonstration of compliance with this rule may be made by monitoring at the groundwater-surface water interface or by predictive modeling. It is not necessary that the GSI value be achieved throughout the aquifer; however, a remedial action plan which proposes to meet the GSI value throughout the aquifer in lieu of monitoring at the interface or modeling will be acceptable. Note that the sixth column on the table will show 20 times the GSI values. This value is shown for ease of reference in cases where soil is to be remediated to that level as a source control measure. Rule 299.5711 does not require that soil meet the "20 times GSI values", as long as the GSI value is not exceeded at the groundwater-surface water interface.

TARGET METHOD DETECTION LIMITS

The table also includes the target method detection limits for each hazardous substance, where one has been determined. These target method detection limits are taken from Operational Memorandum #6, dated February 4, 1994 and are provided to allow for convenient comparison between Type B criteria and potential Type A criteria. Consult Operational Memorandum #6 for a full description of the use of target method detection limits and proper methods for analysis.

Keep in mind that use of particular methods and detection limits listed in Operational Memorandum #6 are not mandatory. Other methods or detection limits may be approved as part of a site-specific remedial action plan.

These target method detection limits are applicable to environmental investigations and monitoring performed pursuant to Act 307 response activities. These detection limits may not be applicable to environmental monitoring activities performed pursuant to other environmental statutes. Facilities subject to regulation under other environmental statutes should consult with the appropriate DNR Division for further information regarding appropriate analytical detection limits.

This memo is intended to provide guidance to Division staff to foster consistent application of the Michigan Environmental Response Act, 1982 PA 307, as amended, and the Administrative Rules promulgated thereunder. This document is not intended to convey any rights to any parties nor create any duties or responsibilities under law. This document and matters addressed herein are subject to revision.

Questions about values in the attached table should be directed to one of the ERD toxicologists: Christine Flaga, telephone 517-373-0160, Jeffrey Crum, telephone 517-335-3092, or Linda Larsen, telephone 517-335-3161. Other questions about this memorandum should be directed to Lynelle Marolf at 517-373-9893.

Attachment
rev. 3

ACT 307 TYPE B CLEANUP CRITERIA FOR GROUNDWATER AND SOIL
REVISION 3
FEBRUARY 4, 1994
LIST OF CHANGES AND ADDITIONS

Please find below a list of additions and changes which appear on Revision 3 of Operational Memorandum #8. The changes to Revision 2 which were released in a previous memo dated January 7, 1994 have been incorporated into Revision 3. You may completely replace Revision 2 with Revision 3. Any questions on the following list of changes/corrections can be directed to one of our three division toxicologists: Christine Flaga, 517-373-0160; Jeffrey Crum, 335-3092; and Linda Larsen, 335-3161.

1. **Acetaldehyde**: MDL for soil changed to 500 ppb.

2. **Chloride**: MDL's changed to 10,000 and 200,000 ppb in groundwater and soil, respectively.

3. **Chlorpyrifos**: MDL's changed to 1.5 and 25 ppb in groundwater and soil, respectively.

4. **Cyanide (Free)**: MDL's changed to 20 and 500 ppb in groundwater and soil, respectively.

5. **Dacthal**: MDL's changed to 1 and 20 ppb in groundwater and soil, respectively.

6. **DDD, DDE, and DDT**: name changed to 4-4'-DDD, 4-4'-DDE, and 4-4'-DDT respectively.

7. **Diazinon**: MDL's changed to 0.5 and 10 ppb in groundwater and soil, respectively.

8. **Diethyl Ether**: MDL's changed to 50 and 100 ppb in groundwater and soil, respectively.

9. **Ethylene Glycol**: MDL's changed to 50 and 200 ppb in groundwater and soil, respectively.

10. **Hexachlorobenzene (C-66)**: Footnote {R} substituted for MDL: Two different target method detection limits are available for this chemical. Please refer to Operational Memorandum #6 for details.

11. **Hexachlorobutadiene (C-46)**: Footnote {R} substituted for MDL: Two different target method detection limits are available for this chemical. Please refer to Operational Memorandum #6 for details.

12. **Hexachlorocyclopentadiene (C-56)**: Footnote {R} substituted for MDL: Two different target method detection limits are available for this chemical. Please refer to Operational Memorandum #6 for details.

13. **Hexachloroethane**: Footnote {R} substituted for MDL: Two different target method detection limits are available for this chemical. Please refer to Operational Memorandum #6 for details.

14. **2-Methylnaphthalene**: health-based criteria eliminated based on reevaluation of the toxicological database and determination that the database was inadequate.

15. **Prometon**: MDL changed to 0.5 in groundwater.

16. **Propapchlor**: MDL changed to 0.2 in groundwater.

17. **Propazine**: MDL changed to 0.5 in groundwater.

18. **Propylene Glycol**: MDL's changed to 50 and 200 ppb in groundwater and soil, respectively.

19. **2,3,7,8-Tetrachlorodibenzo-p-dioxin**: direct contact value changed to 0.013 ppb.

20. **1,2,4-Trichlorobenzene**: Footnote (R) substituted for MDL: Two different target method detection limits are available for this chemical. Please refer to Operational Memorandum #6 for details.

21. **Trifluralin**: MDL's changed to 1 and 50 ppb in groundwater and soil, respectively.

22. The following chemicals have been added:

Acetic acid
n-Butanol
n-Butyl Acetate
Cyclohexanone
Diisopropylamine
N,N-Dimethylacetamide
Dimethylformamide
Dimethylsulfoxide
Ethanol
Formic acid
1-Formylpiperidine
N-Methy-morpholine
Piperidine
Propionic acid
Tributylamine

ACT 307 TYPE B CLEANUP CRITERIA FOR GROUNDWATER AND SOIL

Feb-94

(REVISION 3)

Type B criteria were calculated using currently available toxicological data and the algorithms set forth in the Act 307 Rules. These criteria may change as new toxicity data become available. They are not necessarily final cleanup standards. Please read the attached introduction for details. Carcinogenic chemicals are shown in italics. All values are expressed in units of parts per billion (ppb); ug/l in water and ug/kg in soil. Scientific notation is represented by E+ or E- a value, for example 2×10^6 is reported as 2E+6. Please refer to Operational Memorandum #6 for additional information concerning method detection limits.

	GROUNDWATER (ug/l)				SOIL (ug/kg)			
Chemical	Health-Based Drinking Water Value [R 709(2)(a)(b)]	Aesthetic Drinking Water Value [R 709(2)(c)(d)]	GSI Value {A} [R 713]	Target Method Detection Limit in Water {B}	20X Drinking Water Value [R 711(2)]	20X GSI Value	Direct Contact Value [R 711(5)]	Target Method Detection Limit in Soil {B}
Acenaphthene	1,200	NA	{D}	5	24,000	{D}	4.5E+7	330
Acenaphthylene	25	NA	{D}	5	500	{D}	9.3E+5	330
Acetaldehyde	910	NA	{D}	200	18,000	{D}	1.0E+7	500
Acetic acid	4,000	NA	{D}	18,000	80,000	{D}	4.4E+7	9.0E+5
Acetone	700	NA	500	50	14,000	10,000	7.8E+6	100
Acetonitrile	130	NA	810	10	2,600	16,000	1.5E+6	100
Acrolein	110	NA	2.5	5	2,200	50	1.2E+6	10
Acrylamide	0.0077	NA	9.1	0.5	0.15	180	280	5
Acrylic acid	580	NA	{D}	NA	12,000	{D}	6.4E+6	NA
Acrylonitrile	0.063	NA	2.2	1	1.3	44	700	10
Alachlor	0.42	NA	{D}	1	8.4	{D}	16,000	20
Aldrin	0.0021	NA	0.0014 {Q}	0.01	{G}	{G}	76	1.7
Aluminum	ID	50 {H}	{D}	20	1,000 {C}	{C,D}	ID	500
Aniline	6.3	NA	4	20	130	80	2.3E+5	1,700
Anthracene	7,000	NA	1.1E+5 {Q}	5	1.4E+5	2.2E+6	2.6E+8	330
Antimony	2.4 {C}	NA	4,300 {C,Q}	5	48 {C}	86,000	91,000	500

Chemical	GROUNDWATER (ug/l)				SOIL (ug/kg)			
	Health-Based Drinking Water Value [R 709(2)(a)(b)]	Aesthetic Drinking Water Value [R 709(2)(c)(d)]	GSI Value {A} [R 713]	Target Method Detection Limit in Water {B}	20X Drinking Water Value [R 711(2)]	20X GSI Value	Direct Contact Value [R 711(5)]	Target Method Detection Limit in Soil {B}
Arsenic	0.02 {C}	NA	1.4 {C,Q}	1	0.4 {C}	28 {C}	720 {C}	100
Atrazine	0.16	NA	{D}	1	3.2	{D}	5,800	50
Azobenzene	0.32	NA	{D}	NA	6.4	{D}	12,000	NA
Barium	2,400 {C}	NA	630 {C}	200	48,000 {C}	12,600	1.8E+7	1,000
Benzene	1.2	NA	60	1	24	1,200	13,000	10
Benzidine	0.00015	NA	0.0054 {Q}	50	0.003	0.11	5.6	5,000
Benzo(a)anthracene	0.0049	NA	0.31 {Q}	5	{G}	{G}	180	330
Benzo(b)fluoranthene	0.0049	NA	0.31 {Q}	5	{G}	{G}	180	330
Benzo(k)fluoranthene	0.0049	NA	0.31 {Q}	5	{G}	{G}	180	330
Benzo(g,h,i)perylene	25	NA	{D}	5	{G}	{G}	9.3E+5	330
Benzo(a)pyrene	0.0049	NA	0.31 {Q}	5	{G}	{G}	180	330
Benzoic acid	31,000	NA	{D}	50	6.2E+5	{D}	1E+9 {P}	3,300
Benzyl alcohol	9,800	NA	22	50	2E+5	440	1.1E+8	1,300
Benzyl chloride	0.21	NA	{D}	0.5	4.2	{D}	2,300	200
Bis(2-chloroethoxy)ethane	ID	NA	{D}	5	ID	{D}	ID	330
bis(2-Chloroethyl)ether	0.032	NA	4.2	5	0.64	84	350	330
bis(2-Ethylhexyl)phthalate	2.5	NA	59 {Q}	5	{G}	{G}	92,000	330
Boron	420 {C}	NA	{D}	10	8,400 {C}	{D}	1.6E+7	2,000
Bromobenzene	ID	NA	{D}	1	ID	{D}	ID	10
Bromodichloromethane	0.56	NA	24	1	11	480	6,200	10

	GROUNDWATER (ug/l)				SOIL (ug/kg)			
Chemical	Health-Based Drinking Water Value [R 709(2)(a)(b)]	Aesthetic Drinking Water Value [R 709(2)(c)(d)]	GSI Value {A} [R 713]	Target Method Detection Limit in Water {B}	20X Drinking Water Value [R 711(2)]	20X GSI Value	Direct Contact Value [R 711(5)]	Target Method Detection Limit in Soil {B}
Bromoform	4.6	NA	65	1	92	1,300	50,000	10
Bromomethane	9.8	NA	11	1	200	220	1.1E+5	10
n-Butanol	910	NA	{D}	40	18,000	{D}	1.0E+7	230
2-Butanone {MEK}	320	NA	4,100	50	6,400	82,000	3.6E+6	100
2-Butoxyethanol	ID	NA	{D}	NA	ID	{D}	ID	NA
n-Butyl acetate	530	NA	40	10	11,000	800	5.9E+6	20
t-Butyl alcohol	550	NA	{D}	NA	11,000	{D}	6.1E+6	NA
Butyl benzyl phthalate	1,100	NA	{D}	5	22,000	{D}	4.1E+7	330
Cadmium	3.5 {C}	NA	0.64 {C,E}	0.2	70 {C}	{D}	1.3E+5	50
Camphene	ID	NA	{D}	NA	ID	{D}	ID	NA
Caprolactam	5,800	NA	{D}	NA	1.2E+5	{D}	2.2E+8	NA
Carbon disulfide	770	NA	{D}	50	15,000	{D}	8.6E+6	100
Carbon tetrachloride	0.27	NA	21	1	5.4	420	3,000	10
Chlordane	0.027	NA	0.00053	0.02	{G}	{G}	1,000	3.3
Chloride	ID	250,000	{D}	10,000	5E+5 {I}	{D}	ID	2.0E+5
Chlorobenzene	130	NA	71	1	2,600	1,400	1.5E+6	10
Chloroethane	9.1	NA	{D}	1	180	{D}	1E+5	10
2-Chloroethyl vinyl ether	ID	NA	{D}	10	ID	{D}	ID	100
Chloroform	5.6	NA	43	1	110	860	62,000	10
Chloromethane	2.7	NA	{D}	1	54	{D}	30,000	10

	GROUNDWATER (ug/l)				SOIL (ug/kg)			
Chemical	Health-Based Drinking Water Value [R 709(2)(a)(b)]	Aesthetic Drinking Water Value [R 709(2)(c)(d)]	GSI Value {A} [R 713]	Target Method Detection Limit in Water {B}	20X Drinking Water Value [R 711(2)]	20X GSI Value	Direct Contact Value [R 711(5)]	Target Method Detection Limit in Soil {B}
2-Chlorophenol	43	NA	9.8	5	860	200	4.8E+5	330
o-Chlorotoluene	140	NA	{D}	1	2,800	{D}	1.6E+6	10
Chlorpyrifos	21	NA	{D}	1.5	420	{D}	7.8E+5	25
Chromium III {J}	37,000 {C}	NA	77 {C}	50	7.4E+5	1,500 {C}	3.9E+8	2,500
Chromium VI {J}	120 {C}	NA	7.3 {C}	1	2,400 {C}	150 {C}	1.2E+6	200
Chrysene	0.0049	NA	0.31 {Q}	5	{G}	{G}	180	330
Copper	1,300 {C}	1,000	18 {C,E}	25	20,000 {C}	370 {C}	9.8E+6	1,000
Cyanazine	9.8	NA	{D}	10	200	{D}	3.6E+5	500
Cyanide (Free)	150	NA	5.5	20	3,000 {C}	110 {C}	5.7E+6	500
Cyclohexanone	32,000	NA	{D}	NA	6.4E+5	{D}	3.5E+8	NA
Dacthal	5,300	NA	{D}	1	1.1E+5	{D}	2E+8	20
4-4'-DDD	0.15	NA	0.0084 {Q}	0.02	{G}	{G}	5,400	3.3
4-4'-DDE	0.1	NA	0.0059 {Q}	0.02	{G}	{G}	3,800	3.3
4-4'-DDT	0.1	NA	0.00023	0.02	{G}	{G}	3,800	3.3
Di-n-butyl phthalate	840	NA	{D}	5	17,000	{D}	3.1E+7	330
Di-n-octyl phthalate	130	NA	{D}	5	2,600	{D}	4.7E+6	330
Diacetone alcohol	ID	NA	{D}	NA	ID	{D}	ID	NA
Diazinon	0.63	NA	{D}	0.5	13	{D}	23,000	10
Dibenzo(a,h)anthracene	0.0049	NA	0.31 {Q}	5	{G}	{G}	180	330
Dibenzofuran	ID	NA	{D}	5	ID	{D}	ID	330

	GROUNDWATER (ug/l)				SOIL (ug/kg)			
Chemical	Health-Based Drinking Water Value [R 709(2)(a)(b)]	Aesthetic Drinking Water Value [R 709(2)(c)(d)]	GSI Value {A} [R 713]	Target Method Detection Limit in Water {B}	20X Drinking Water Value [R 711(2)]	20X GSI Value	Direct Contact Value [R 711(5)]	Target Method Detection Limit in Soil {B}
Dibromochloromethane	0.42	NA	29	1	8.4	580	4,700	10
Dibromomethane	77	NA	{D}	5	1,500	{D}	8.6E+5	10
1,2-Dichlorobenzene	600	NA	7	1	12,000	140	6.7E+6	10
1,3-Dichlorobenzene	600	NA	180	1	12,000	3,600	6.7E+6	10
1,4-Dichlorobenzene	1.5	NA	15	1	30	300	16,000	10
3,3'-Dichlorobenzidine	0.077	NA	0.063	20	1.5	1.3	2,800	2,000
Dichlorodifluoromethane	1,600	NA	{D}	1	32,000	{D}	1.8E+7	10
1,1-Dichloroethane	840	NA	{D}	1	17,000	{D}	9.3E+6	10
1,2-Dichloroethane	0.38	NA	560	1	7.6	11,000	4,300	10
1,1-Dichloroethylene	7	NA	32 {Q}	1	140	640	78,000	10
cis-1,2-Dichloroethylene	77	NA	{D}	1	1,500	{D}	8.6E+5	10
trans-1,2-Dichloroethylene	120	NA	300	1	2,400	6,000	1.3E+6	10
2,4-Dichlorophenol	21	NA	34	5	420	680	7.8E+5	330
2,4-Dichlorophenoxyacetic acid	70	NA	47	10	1,400	940	2.6E+6	200
1,2-Dichloropropane	0.52	NA	64	1	10	1,300	5,800	10
1,3-Dichloropropene {K}	0.2	NA	3	1	4	60	2,200	10
Dichlorovos	0.12	NA	{D}	0.1	2.4	{D}	4,400	50
Dicyclohexyl phthalate	ID	NA	{D}	5	ID	{D}	ID	330
Dieldrin	0.0022	NA	3.2E-5	0.02	{G}	{G}	80	3.3
Diethyl ether	3,500	NA	{D}	50	70,000	{D}	3.9E+7	100

	GROUNDWATER (ug/l)				SOIL (ug/kg)			
Chemical	Health-Based Drinking Water Value [R 709(2)(a)(b)]	Aesthetic Drinking Water Value [R 709(2)(c)(d)]	GSI Value {A} [R 713]	Target Method Detection Limit in Water {B}	20X Drinking Water Value [R 711(2)]	20X GSI Value	Direct Contact Value [R 711(5)]	Target Method Detection Limit in Soil {B}
Diethyl phthalate	5,200	NA	1.2E+5 {Q}	5	1E+5	2.4E+6	1.9E+8	330
Diethylene glycol monobutyl ether	84	NA	{D}	NA	1,700	{D}	3.1E+6	NA
Diisopropylamine	5.4	NA	{D}	NA	110	{D}	60,000	NA
N,N-Dimethylacetamide	180	NA	{D}	NA	3,600	{D}	1.9E+6	NA
N,N-Dimethylaniline	15	NA	{D}	NA	300	{D}	1.7E+5	NA
Dimethylformamide	670	NA	3,800	NA	13,000	76,000	7.5E+6	NA
2,4-Dimethylphenol	350	NA	31	5	7,000	620	1.3E+7	330
2,6-Dimethylphenol	4.2	NA	{D}	5	84	{D}	1.6E+5	330
3,4-Dimethylphenol	9.8	NA	{D}	5	200	{D}	3.6E+5	330
Dimethyl phthalate	70,000	NA	2.9E+6 {Q}	5	1.4E+6	5.8E+7	1E+9 {P}	330
Dimethylsulfoxide	2.1E+5	NA	{D}	NA	4.2E+6	6644	1.0E+9	NA
2,4-Dinitrotoluene	0.052	NA	91 {Q}	5	1	1,800	1,900	330
Dinoseb	7	NA	0.5 {F}	1	140	10	2.6E+5	20
1,4-Dioxane	3.2	NA	2,000	1	64	40,000	35,000	10
Endosulfan {L}	1.6	NA	0.056 {Q}	0.01	{G}	{G}	60,000	3.3
Endrin	1.2	NA	0.0023	0.02	{G}	{G}	44,000	3.3
Epichlorohydrin	3.5	NA	{D}	5	70	{D}	39,000	10
Ethanol	2.2E+6	NA	41,000	1,000	4.3E+7	8.2E+5	1.0E+9	1,000
Ethyl acetate	6,300	NA	1,000	NA	1.3E+5	20,000	7E+7	NA
Ethylbenzene	680	74	31	1	1,500	620	7.5E+6	10

	GROUNDWATER (ug/l)				SOIL (ug/kg)			
Chemical	Health-Based Drinking Water Value [R 709(2)(a)(b)]	Aesthetic Drinking Water Value [R 709(2)(c)(d)]	GSI Value {A} [R 713]	Target Method Detection Limit in Water {B}	20X Drinking Water Value [R 711(2)]	20X GSI Value	Direct Contact Value [R 711(5)]	Target Method Detection Limit in Soil {B}
Ethylene dibromide	0.00042	NA	1.1	1	0.0084	22	4.7	10
Ethylene glycol	14,000	NA	68,000	50	2.8E+5	1.4E+6	5.2E+8	200
Ethylene glycol acetate	ID	NA	{D}	NA	ID	{D}	ID	NA
1-Ethyl-2-methylbenzene	ID	NA	{D}	NA	ID	{D}	ID	NA
Fluoranthene	840	NA	370 {Q}	5	17,000	7,400	3.1E+7	330
Fluorene	840	NA	14,000 {Q}	5	17,000	2.8E+5	3.1E+7	330
Fluorine (soluble fluoride)	2,100 {C}	2,000	1,900	NA	42,000 {C}	38,000 {C	1.6E+7	NA
Formaldehyde	1,300	NA	170	100	26,000	3,400	1.4E+7	500
Formic acid	9,800	NA	{D}	18,000	2.OE+5	{D}	1.1E+8	9.0E+5
1-Formylpiperidine	77	NA	{D}	NA	1,500	{D}	8.6E+5	NA
Gentian violet	0.35	NA	{D}	NA	7	{D}	13,000	NA
Heptachlor	0.0077	NA	0.0016	0.01	{G}	{G}	280	1.7
Heptachlor epoxide	0.0038	NA	0.0011 {Q}	0.01	{G}	{G}	140	1.7
n-Heptane	31,000	NA	{D}	NA	6.2E+5	{D}	3.4E+8	NA
Hexabromobenzene	20	NA	{D}	0.1	400	{D}	7.3E+5	50
Hexachlorobenzene (C-66)	0.022	NA	0.0018	{R}	0.44	0.036	800	{R}
Hexachlorobutadiene (C-46)	0.46	NA	500 {Q}	{R}	9.2	10,000	17,000	{R}
alpha-Hexachlorocyclohexane	0.0056	NA	0.13 {Q}	0.01	0.11	2.6	210	1.7
beta-Hexachlorocyclohexane	0.02	NA	0.46 {Q}	0.01	0.4	9.2	720	1.7
Hexachlorocyclopentadiene (C-56)	50	NA	0.54	{R}	1,000	11	1.8E+6	{R}

Chemical	GROUNDWATER (ug/l)				SOIL (ug/kg)			
	Health-Based Drinking Water Value [R 709(2)(a)(b)]	Aesthetic Drinking Water Value [R 709(2)(c)(d)]	GSI Value {A} [R 713]	Target Method Detection Limit in Water {B}	20X Drinking Water Value [R 711(2)]	20X GSI Value	Direct Contact Value [R 711(5)]	Target Method Detection Limit in Soil {B}
Hexachloroethane	2.5	NA	13	{R}	50	260	28,000	{R}
n-Hexane	2,900	NA	{D}	NA	58,000	{D}	3.2E+7	NA
2-Hexanone	980	NA	{D}	50	20,000	{D}	1.1E+7	100
Indeno(1,2,3-cd)pyrene	0.0049	NA	0.31 {Q}	5	{G}	{G}	180	330
Iron	ID	300 {C}	{D}	100	6,000 {C}	{D}	ID	2,000
Isobutyl alcohol	2,200	NA	{D}	1,000	44,000	{D}	2.5E+7	1,000
Isophorone	38	NA	860	5	760	17,000	4.3E+5	330
Isopropyl alcohol	450	NA	21,000	400	9,000	4.2E+5	5E+6	400
Lead	4 {C,O}	NA	6.6 {C,E,Q}	3	80 {C}	130 {C}	4E+5	1,000
Lindane	0.027	NA	0.08 {Q}	0.01	0.54	1.6	1,000	1.7
Manganese	170 {C}	50 {C}	{D}	20	1,000 {C}	{D}	1.2E+6	2,000
Mercury (inorganic)	2.1 {C}	NA	0.0013 {C}	0.2	42 {C}	0.026 {C}	78,000	100
Methanol	3,500	NA	41,000	800	70,000	8.2E+5	3.9E+7	800
Methoxychlor	35	NA	{D}	0.5	700	{D}	1.3E+6	50
2-Methoxyethanol	28	NA	{D}	NA	560	{D}	3.1E+5	NA
2-Methyl-4-chlorophenoxyacetic acid	7	NA	{D}	0.5	140	{D}	2.6E+5	20
2-Methyl-4,6-dinitrophenol	2.4	NA	0.59	20	48	12	91,000	1,700
4-Methyl-2-pentanone {MIBK}	350	NA	{D}	50	7,000	{D}	3.9E+6	100
Methyl-tert-butyl ether (MTBE)	230	NA	380	50	4,600	7,600	2.6E+6	100
Methylcyclopentane	ID	NA	{D}	NA	ID	{D}	ID	NA

	GROUNDWATER (ug/l)				SOIL (ug/kg)			
Chemical	Health-Based Drinking Water Value [R 709(2)(a)(b)]	Aesthetic Drinking Water Value [R 709(2)(c)(d)]	GSI Value {A} [R 713]	Target Method Detection Limit in Water {B}	20X Drinking Water Value [R 711(2)]	20X GSI Value	Direct Contact Value [R 711(5)]	Target Method Detection Limit in Soil {B}
4,4'-Methylene-bis-2-chloroaniline {M}	0.035	NA	{D}	1	{G}	{G}	1,300	50
Methylene chloride	4.6	NA	59	1	92	1,200	51,000	10
N-Methyl-morpholine	19	NA	1,100	NA	380	{D}	2.1E+5	NA
2-Methylnaphthalene	ID	NA	{D}	5	ID	{D}	ID	330
2-Methylphenol	350	NA	38	5	7,000	760	3.9E+6	330
3-Methylphenol	350	NA	{D}	5	7,000	{D}	1.3E+7	330
4-Methylphenol	35	NA	24	5	700	480	1.3E+6	330
Metolachlor	1,600	NA	{D}	0.1	32,000	{D}	6E+7	20
Naphthalene	250	NA	29	5	5,000	580	9.3E+6	330
Nickel	530 {C}	NA	57 {C,E}	50	11,000 {C}	1,100 {C}	2E+7	1,000
Nitrate	10,000	NA	{D}	NA	2.0E+5	{D}	6.4E+7	NA
Nitrite	1,000	NA	{D}	NA	20,000	{D}	2.6E+7	NA
Nitrobenzene	3.2	NA	1,900 {Q}	5	64	38,000	36,000	330
n-Nitroso-di-n-Propylamine	0.0049	NA	{D}	5	0.098	{D}	54	330
N-Nitrosodiphenylamine	7	NA	160 {Q}	5	140	3,200	78,000	330
Pendimethalin	840	NA	{D}	0.1	17,000	{D}	3.1E+7	20
Pentachlorobenzene	5.8	NA	{D}	0.5	120	{D}	2.2E+5	50
Pentachlorophenol	0.29	NA	0.8 {F}	1	5.8	16	11,000	1,700
2-Pentene	ID	NA	{D}	NA	ID	{D}	ID	NA
Phenanthrene	25	NA	{D}	5	500	{D}	9.3E+5	330

	GROUNDWATER (ug/l)				SOIL (ug/kg)			
Chemical	Health-Based Drinking Water Value [R 709(2)(a)(b)]	Aesthetic Drinking Water Value [R 709(2)(c)(d)]	GSI Value {A} [R 713]	Target Method Detection Limit in Water {B}	20X Drinking Water Value [R 711(2)]	20X GSI Value	Direct Contact Value [R 711(5)]	Target Method Detection Limit in Soil {B}
Phenol	4,200	NA	1,100	5	84,000	22,000	4.7E+7	330
Piperidine	3.1	NA	{D}	NA	62	{D}	34,000	NA
Polybrominated biphenyls	0.0038	NA	{D}	0.01	0.076	{D}	140	50
Polychlorinated biphenyls {N}	0.018	NA	2E-5	0.2	{G}	{G}	1,000	330
Prometon	150	NA	{D}	0.5	3,000	{D}	5.7E+6	20
Propachlor	91	NA	{D}	0.2	1,800	{D}	3.4E+6	20
Propazine	190	NA	{D}	0.5	3,800	{D}	7E+6	20
Propionic acid	12,000	NA	{D}	18,000	2.4E+5	{D}	1.3E+8	9.0E+5
Propyl alcohol	1,300	NA	8.2E+5	NA	26,000	1.6E+7	1.5E+7	NA
Propylene glycol	1.4E+5	NA	1.9E+5	50	2.8E+6	3.8E+6	1E+9 {P}	200
Pyrene	520	NA	11,000	5	10,000	2.2E+5	1.9E+7	330
Pyridine	7	NA	20	10	140	400	78,000	330
Selenium	35 {C}	NA	5 {C,Q}	5	700 {C}	100 {C}	1.3E+6	500
Silver	33 {C}	100	0.1 {C}	0.5	660 {C}	2 {C}	1.2E+6	500
Sodium	1.5E+5	NA	{D}	NA	3E+6 {C}	{D}	1E+9 {P}	NA
Styrene	1.2	NA	19	1	24	380	13,000	10
Sulfate	ID	2.5E+5	{D}	NA	5E+6	{D}	ID	NA
Tebuthiuron	490	NA	{D}	NA	9,800	{D}	1.8E+7	NA
1,2,4,5-Tetrachlorobenzene	2,400	NA	0.4	0.1	48,000	8	8.8E+7	20
2,3,7,8-Tetrachlorodibenzo-p-dioxin {S}	4.6E-7	NA	1.4E-8	1E-5	{G}	{G}	0.013	0.001

	GROUNDWATER (ug/l)				SOIL (ug/kg)			
Chemical	Health-Based Drinking Water Value [R 709(2)(a)(b)]	Aesthetic Drinking Water Value [R 709(2)(c)(d)]	GSI Value {A} [R 713]	Target Method Detection Limit in Water {B}	20X Drinking Water Value [R 711(2)]	20X GSI Value	Direct Contact Value [R 711(5)]	Target Method Detection Limit in Soil {B}
1,1,1,2-Tetrachloroethane	1.3	NA	{D}	1	26	{D}	15,000	10
1,1,2,2-Tetrachloroethane	0.18	NA	32	1	3.6	640	1,900	10
Tetrachloroethylene	0.7	NA	22	1	14	440	7,800	10
Tetrahydrofuran	230	NA	3,300	NA	4,600	66,000	2.6E+6	NA
Thallium	0.58 {C}	NA	6.3 {C,Q}	2	12 {C}	130 {C}	22,000	500
Toluene	1,500	790	110	1	16,000	2,200	1.7E+7	10
p-Toluidine	0.18	NA	{D}	NA	3.6	{D}	6,900	NA
Toxaphene	0.032	NA	0.0002 {Q}	1	0.64	0.004	350	170
Triallate	91	NA	{D}	1	1,800	{D}	3.4E+6	20
Tributylamine	9.8	NA	{D}	NA	200	{D}	1.1E+5	NA
1,2,4-Trichlorobenzene	110	NA	22	{R}	2,200	440	1.2E+6	{R}
1,1,1-Trichloroethane	200	NA	120	1	4,000	2,400	2.2E+6	10
1,1,2-Trichloroethane	0.63	NA	65	1	13	1,300	7,000	10
Trichloroethylene	2.2	NA	94	1	44	1,900	24,000	10
Trichlorofluoromethane	2,400	NA	{D}	1	48,000	{D}	2.7E+7	10
2,4,5-Trichlorophenol	700	NA	{D}	50	14,000	{D}	2.6E+7	1,700
2,4,6-Trichlorophenol	3.2	NA	1.5	5	64	30	1.2E+5	330
2(2,4,5-Trichlorophenoxy)propionic acid	52	NA	21	1	1,000	420	1.9E+6	50
1,2,3-Trichloropropane	40	NA	{D}	1	800	{D}	4.4E+5	10
1,1,2-Trichloro-1,2,2-trifluoroethane	1.9E+5	NA	{D}	NA	3.8E+6	{D}	1E+9 {P}	NA

Chemical	GROUNDWATER (ug/l)				SOIL (ug/kg)			
	Health-Based Drinking Water Value [R 709(2)(a)(b)]	Aesthetic Drinking Water Value [R 709(2)(c)(d)]	GSI Value {A} [R 713]	Target Method Detection Limit in Water {B}	20X Drinking Water Value [R 711(2)]	20X GSI Value	Direct Contact Value [R 711(5)]	Target Method Detection Limit in Soil {B}
Trifluralin	4.6	NA	{D}	1	92	{D}	1.7E+5	50
2,2,4-Trimethyl-2-pentene	ID	NA	{D}	NA	ID	{D}	ID	NA
1,3,5-Trimethylbenzene	ID	NA	{D}	1	ID	{D}	ID	10
tris(2,3-Dibromopropyl)phosphate	0.02	NA	{D}	NA	0.4	{D}	720	NA
Vanadium	61 {C}	NA	8 {C}	20	1,200 {C}	160 {C}	2.2E+6	1,000
Vinyl acetate	620	NA	NA	50	12,000	{D}	6.6E+6	100
Vinyl chloride	0.016	NA	3.1	1	0.32	62	180	10
Xylenes	13,000	280	59	3	5,600	1,200	1.4E+8	30
Zinc	2,300 {C}	5,000 {C}	81 {C,E}	20	46,000 {C}	1,600 {C}	8.6E+7	1,000

Footnotes

{A} Groundwater surface water interface (GSI) values are based on Rule 57 of Act 245. The GSI values are presented only to establish groundwater criteria which are protective of surface water.

{B} Acceptable method detection limits for groundwater and soil samples, the latter expressed in ug/kg dry weight.

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

{D} Chemical has either not been evaluated or an inadequate data base precludes the development of a GSI value. MDNR should be contacted to determine whether a chemical is being evaluated or has been evaluated since this list was prepared. If no value exists, the responsible party (RP) may develop a proposed GSI value for MDNR review and approval. Guidance can be obtained from MDNR. If a GSI value cannot be developed from data in the scientific literature, the RP can either perform a Type A cleanup or generate the minimum toxicity data required to develop the GSI value.

{E} GSI value is dependant on water hardness. Value presented was calculated assuming a hardness of 178 mg/l of CaCO3. If site-specific water hardness is expected to be significantly different, contact an ERD toxicologist.

{F} GSI value is pH dependant. Value was calculated assuming a pH of 7.7. If site-specific pH is expected to be significantly different, contact an ERD toxicologist.

{G} Chemical, due to its physicochemical properties, is not expected to leach through soils to groundwater under most conditions. Therefore, the direct contact soil criterion is considered to be protective of groundwater. However, the presence of organic solvents in the soil may increase the solubility of these chemicals, thereby increasing their potential to leach from soil to groundwater. Under these conditions site-specific leachate testing may be required.

(H) Professional judgement used to determine that 50 ppb of aluminum in drinking water is protective of human health.

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

{J} 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.

{K} Criteria for 1,3-dichloropropene can be applied to the cis- and trans-1,3-dichloropropene isomers. The toxicity data used for criteria development was generated using a mixture of both isomers (Telone II).

{L} Criteria for endosulfan can be applied to endosulfan I (alpha-endosulfan) and endosulfan II (beta-endosulfan).

{M} Also known as MBOCA.

{N} If more than one PCB Aroclor is present, the total PCB concentration must be compared to the PCB criteria.

{O} 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.

{P} Direct contact criterion is at saturation in soil. Criterion is actually greater than 100% in soil, hence it is reduced to 100%.

{Q} Basis for the GSI value is the National Toxics Rule (NTR). The NTR value was either more restrictive than the Rule 57 value or a Rule 57 value was not available.

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

{S} Use 2,3,7,8-TCDD "toxicity equivalence factors" (TEFs) for other chlorinated dibenzo-p-dioxins and chlorinated dibenzofurans. Contact an ERD toxicologist for details.

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

MICHIGAN DEPARTMENT OF NATURAL RESOURCES

INTEROFFICE COMMUNICATION

June 5, 1995

TO: Environmental Response Division Staff

FROM: Alan J. Howard, Chief, Environmental Response Division

SUBJECT: **Interim Environmental Response Division Operational Memorandum #8, Revision 4:** Generic Residential Cleanup Criteria

THIS DRAFT, INTERIM OPERATIONAL MEMORANDUM HAS BEEN PREPARED TO FACILITATE IMPLEMENTATION OF THE 1995 AMENDMENTS TO PART 201 OF THE NATURAL RESOURCES AND ENVIRONMENTAL PROTECTION ACT, 1994 PA 451 (FORMERLY THE MICHIGAN ENVIRONMENTAL RESPONSE ACT). THIS OPERATIONAL MEMORANDUM WILL TAKE EFFECT *ONLY* WHEN HOUSE BILL 4596 IS SIGNED INTO LAW. INTERNAL REVIEW OF THIS MEMORANDUM IS ON-GOING, AND NO OUTSIDE REVIEW HAS BEEN COMPLETED. THE CONTENT OF THE MEMORANDUM, AND THE ATTACHED CRITERIA, ARE SUBJECT TO CHANGE AND SHOULD BE RELIED UPON ONLY AFTER CONFIRMATION WITH APPROPRIATE ERD STAFF.

Revision 4 of this Operational Memorandum reflects changes made as a result of two major legislative actions: (1) the incorporation of the Michigan Environmental Response Act (MERA), 1982 PA 307, as amended, (2) into the Natural Resources and Environmental Protection Code, 1994 PA 451, and the 1995 amendments to Part 201 contained in [House Bill 4596]. Enactment of the Natural Resources and Environmental Protection Act resulted in new section numbers for all of the former MERA, but did not make any substantive changes in the law. [House Bill 4596] substantially amends Part 201. Those amendments, particularly the changes in cleanup standards, are reflected in this revision of Operational Memorandum #8. Unless otherwise noted, Section references in this memorandum are to Part 201 of Act 451.

The attached table lists generic residential cleanup criteria which have been developed pursuant to Sections 20120A(1)(A) and (3), according to the updated algorithms presented in this memo. This table replaces the previously issued list of Type B criteria dated February 4, 1994. The label of "Type B" has been eliminated and the criteria are now referred to as generic residential criteria. The algorithms as presented in the administrative rules of the Michigan Environmental Response Act, 1982 Public Act 307, as amended, have been replaced by updated algorithms which represent current U.S. Environmental Protection Agency (EPA) guidance and a format consistent with the industrial/commercial equations and those used by the Underground Storage Tank Division (USTD).

The criteria were developed using currently available toxicological data, exposure data, and other data and are subject to change as new data become

available. These criteria are presented in two significant figures; reference doses and slope factors used to generate the criteria were also reported in two significant figures. Cleanup criteria from the attached table should be compared to analytical data presented in two significant figures, as well.

This list presents noncarcinogens and carcinogens together; carcinogens are presented in bold and italics. Chemicals beginning with numbers (such as 1,1,2-trichloroethane) are incorporated alphabetically within the list.

* → Criteria on these lists should be considered draft; final cleanup criteria will be confirmed by Environmental Response Division (ERD) toxicologists and approved as part of a specific remedial action plan (RAP). Staff are reminded that generic residential RAPs must address all elements required by Part 201 and the administrative rules, including those for which specific criteria have not been developed. Additional guidance follows.

Note that in cases where generic residential criteria are less than target method detection limits (MDLs) or background, target MDLs or background levels become the cleanup goal. Generic residential criteria are not relevant in these cases.

* The table presents values for the subrules that are most often expected to be
* the controlling factor in determining soil cleanup criteria. However, a
* generic residential RAP must include rationale that supports the conclusions drawn from the assessment of pertinent pathways (i.e., some discussion of each pertinent pathway must be included which assesses whether more restrictive criteria are required; See R 299.5711(1) and R 299.5711(6)).

HEALTH-BASED AND AESTHETIC DRINKING WATER VALUES

The values in the first column of the table were developed using the residential groundwater algorithms presented later in this memo for carcinogens and noncarcinogens. The values in the second column of the table were established, where sufficient data are available, to protect against adverse aesthetic impacts of hazardous substances on groundwater.

The most restrictive of the values in the first two columns of the table is the cleanup criterion required to satisfy Section 20120A(4) of Part 201. However, where a State Drinking Water Standard has been established, that standard will override the health-based drinking water criteria, as indicated in Sec. 20120A(5) of Part 201. A more restrictive aesthetic criterion will take precedence over the State Drinking Water Standard. Note that Rule 299.5709, referenced in Section 20120A(5), requires that aquifer cleanup criteria take into account adverse aesthetic impacts resulting from one or a combination of hazardous substances. If adverse aesthetic impacts remain when health-based criteria have been achieved, further remedial measures may be required. Consult your Supervisor if you encounter such a case.

IMPACTS OF GROUNDWATER CONTAMINANTS ON SURFACE WATER

The third column in the table lists values based on calculations done by Surface Water Quality Division (SWQD) in accordance with Rule 323.1057 of Part 4 of Part 31 of the Natural Resources and Environmental Protection Act, 1994 PA 451 (formerly known as the Water Resources Commission Act, 1929, PA 245, as amended) or on the National Toxics Rule (NTR; Federal Register, December 22, 1992. Vol. 57(246):60848-60923). For use in ERD programs, the criterion which protects surface water has been termed the groundwater surface water interface (GSI) value. The final GSI value is the more restrictive of the Rule 57 value and the NTR value, where both are available (with the exception of arsenic whose GSI value is the Rule 57 value even though it is greater than the NTR value). Where only one of the two values is available, that number becomes the GSI value.

The GSI values are the criteria used to judge compliance with Rule 299.5713. GSI values are developed for surface water which is not used as a drinking water source and also for surface water which serves as a source of drinking water. GSI values presented in the list are for surface waters not protected as a drinking water source. If the surface water at a site serves as a drinking water source, contact an ERD toxicologist to obtain the correct GSI value. In cases where data are inadequate to calculate a GSI value, the party proposing the remedial action may generate the minimum data necessary to propose a value for Department review and approval.

Prior to passage of the 1995 amendments, a mixing zone was not allowed when assessing the impact of groundwater venting to a surface water. A mixing zone is now allowed for venting groundwater at those sites where an additional load to the receiving stream of site-specific contaminants is allowable and where a mixing zone is appropriate for the receiving stream. If a RAP allows for venting groundwater, the discharge must comply with requirements of Part 31 of Act 451 and the relevant rules promulgated under that Part.

considering drought flow

Demonstration of compliance with surface water requirements may be made by assessing groundwater concentrations at the groundwater-surface water interface or through evaluation of mixing zone, whichever is appropriate for a particular site. Predictive modeling and direct monitoring are options to establish compliance with the GSI value at the groundwater-surface water interface. If the groundwater-surface water interface is the compliance point for a particular site, it is not necessary that the GSI value be achieved throughout the aquifer. However, a remedial action plan which proposes to meet the GSI value throughout the aquifer in lieu of monitoring at the interface or modeling will be acceptable.

Note that the sixth column on the table will show 20 times the GSI values. This value is shown for ease of reference in cases where soil is to be remediated to that level as a source control measure. Rule 299.5711 does not require that soil meet the "20 times GSI values", as long as the GSI value is not exceeded at the appropriate compliance point.

Add the language

SOIL CRITERIA PROTECTIVE OF GROUNDWATER

The "20X" values in the table are provided for convenience and are not mandatory if leachate tests or other methods which better represent in situ conditions support the use of a higher value (refer to Operational Memo #12 for guidance on appropriate leachate methods). For certain chemicals which strongly adsorb to soil and are known not to leach at significant concentrations (i.e., PCBs, carcinogenic polynuclear aromatic hydrocarbons and some chlorinated pesticides), the direct contact value is accepted as the soil cleanup criterion to protect groundwater in addition to the protection against long-term, systemic direct contact hazards. However, there are certain situations (i.e., presence of solvents or collection of unfiltered groundwater samples) which could result in the presence of these types of materials in groundwater. These other conditions should be evaluated before a chemical is considered nonmobile in soil. Consult an ERD toxicologist if you think direct contact values for other contaminants would be protective of groundwater or if you have questions about conditions that could cause the transport of a nonmobile contaminant through soil.

SOIL DIRECT CONTACT CRITERIA

Direct contact criteria only consider long-term, systemic exposure from ingestion of and dermal contact with contaminated soil. Consequently, there

are other potential concerns that may need to be addressed (see discussion of issues not addressed by the direct contact criteria presented below).

Compliance with direct contact criteria are required throughout the affected media in the unlimited residential land use category, but exposure controls and land use restrictions may be employed to prevent exposures to ~~more highly~~ above residential criteria contaminated soils at depth under the limited residential land use category.

Average on-site soil concentrations, represented as a 95% upper confidence level (UCL) on the arithmetic mean, may be used to determine compliance with the soil direct contact value. On-site 95% UCLs should, however, reasonably represent the areas over which exposures are expected to occur. Typically, the exposure area for a residential property is approximately one-quarter acre in size. Refer to EPA guidance on how to appropriately calculate the 95% UCL (EPA, 1992a).

Issues Not Addressed by the Direct Contact Criteria

Inhalation: All RAPs must document that they are protective of the public health, safety and welfare and the environment. As a result, they must contain some discussion of potential inhalation risks, and whether inhalation (i.e. exposure through volatile or particulate contaminant emissions) is a pertinent pathway for human exposure at the site in question. The direct contact criteria do not address and are not applicable for the inhalation pathway because they do not incorporate potential inhalation effects, long-term or acute, of hazardous substances in soil.

Chemical characteristics which are pertinent to this discussion include vapor pressure and/or Henry's Law constant, the potential to cause cancer via the inhalation route, the potential to cause irritation of respiratory tissue and special characteristics which may make a contaminant an inhalation hazard (e.g., friable asbestos). The RAP should indicate whether any materials with these characteristics are present. If such materials are present, it may be necessary to conduct a risk assessment of the inhalation pathway to determine if lower cleanup criteria are required for protection of human health. Consult an ERD toxicologist for guidance. If no significant inhalation risk exists, criteria and/or exposure control measures which are protective for other routes of exposure will be deemed protective for the inhalation pathway and a narrative assessment for the inhalation pathway will be sufficient.

Dermal Toxicity: The direct contact soil equation does not address acute skin toxicity or skin sensitization. These concerns may have to be addressed before chemicals with skin toxicity or sensitization characteristics can be left in place at the direct contact value. Contact an ERD toxicologist for guidance.

Ecological Concerns: RAPs must also address ecological concerns. The RAP should include a description of the physical setting of the site, including any natural resources which could be affected by the release(s) addressed in the plan. In general, potential ecological impacts are defined as adverse impacts on a community or a population of organisms rather than on an individual who is the focus of a human health risk assessment. An ecological risk assessment will be required only if there is a "sensitive environmental resource" present at or near the site, or if there are other special circumstances such as concern for persistent or bioaccumulative hazardous substances, which may adversely effect the food chain, or a physical feature that would attract wildlife to the site (e.g., migratory waterfowl habitat).

Professional judgment must be used to determine whether it is likely that criteria more restrictive than those required to protect public health, or those required pursuant to other applicable regulations (e.g., groundwater/surface water interface criteria), are necessary to protect natural resources at or near the site. If ERD staff believe that there is a need for an ecological assessment, this should be reviewed with your supervisor and other technical experts as appropriate. Ecological risk assessments will be the exception rather than the rule.

TARGET METHOD DETECTION LIMITS

The table also includes the target method detection limits (MDLs) for each hazardous substance, where one has been determined. These target MDLs are taken from Operational Memorandum #6, revision 4 and are provided to allow for convenient comparison between generic residential criteria and target MDLs. Consult Operational Memorandum #6 for a full description of the use of target MDLs and proper methods for analysis.

The use of particular methods and detection limits listed in Operational Memorandum #6 are not mandatory. Other methods or detection limits may be approved as part of a site-specific RAP.

These target MDLs are applicable to environmental investigations and monitoring performed pursuant to Part 201 response activities. These detection limits may not be applicable to environmental monitoring activities performed pursuant to other Parts of Act 451 or environmental statutes. Facilities subject to regulation under other environmental statutes should consult with the appropriate DNR Division for further information regarding appropriate analytical detection limits.

GENERIC RESIDENTIAL ALGORITHMS

RESIDENTIAL GROUNDWATER ALGORITHMS:

CARCINOGENS:

$$C_{dw} = \frac{10^{-5} \times BW \times AT \times CF}{SF \times (EF \times ED) \times IR_{dw}}$$

where,

C_{dw} (risk-based drinking water concentration)	= in ug/l (ppb)
10^{-5} cancer risk	= acceptable risk
BW (body weight)	= 70 kg
AT (averaging time in days)	= 25,550 days (70 x 365)
CF (conversion factor)	= 1000 ug/mg
SF (cancer slope factor, mg/kg-d^{-1})	= chemical-specific
EF (exposure frequency)	= 350 d/yr
ED (exposure duration)	= 30 yr
IR_{dw} (drinking water ingestion rate)	= 2 liter/day

NONCARCINOGENS:

$$C_{dw} = \frac{HQ \times RfD \times BW \times AT \times RSC \times CF}{EF \times ED \times IR_{dw}}$$

where,		
	C_{dw} (risk-based drinking water concentration)	= in ug/l (ppb)
	HQ (hazard quotient)	= 1
	RfD (oral reference dose, mg/kg/d)	= chemical-specific
	BW (body weight)	= 70 kg
	AT (averaging time)	= 10,950 days (30 x 365)
	RSC (relative source contribution)	= 0.2
	CF (conversion factor)	= 1000 ug/mg
	EF (exposure frequency)	= 350 d/yr
	ED (exposure duration)	= 30 yr
	IR_{dw} (drinking water ingestion rate)	= 2 liter/day

RESIDENTIAL DIRECT CONTACT SOIL CRITERION ALGORITHMS:

CARCINOGENS:

$$C_s = \frac{10^{-5} \times AT \times CF}{SF \times FC \times [(EF_i \times IF \times AE_i) + (EF_d \times DF \times AE_d)]}$$

where,		
	C_s (risk-based soil concentration)	= ug/kg (ppb)
	10^{-5} cancer risk	= acceptable risk
	AT (averaging time)	= 25,550 days (70 x 365)
	CF (conversion factor)	= 1E+9 ug/kg
	SF (cancer slope factor, $mg/kg\text{-}d^{-1}$)	= chemical-specific
	FC (fraction of soil contaminated)	= 1
	EF_i (ingestion exposure frequency)	= 350 d/yr
	EF_d (dermal exposure frequency)	= 245 d/yr
	IF (age-adjusted soil ingestion factor)	= 114 mg-yr/kg-d*
	AE_i (ingestion absorption efficiency)	= (see text)
	DF (age-adjusted soil dermal factor)	= 2442 mg-yr/kg-d**
	AE_d (dermal absorption efficiency)	= (see text)

NONCARCINOGENS:

$$C_s = \frac{HQ \times RfD \times AT \times CF \times RSC}{FC \times [(EF_i \times IF \times AE_i) + (EF_d \times DF \times AE_d)]}$$

where,		
	C_s (risk-based soil concentration)	= ug/kg (ppb)
	HQ (hazard quotient)	= 1
	RfD (oral reference dose, mg/kg/d)	= chemical-specific
	AT (averaging time)	= 10,950 days (30 x 365)
	CF (conversion factor)	= 1E+9 ug/kg
RSC = 1	FC (fraction soil contaminated)	= 1
	EF_i (ingestion exposure frequency)	= 350 d/yr
	EF_d (dermal exposure frequency)	= 245 d/yr
	IF (age-adjusted soil ingestion factor)	= 114 mg-yr/kg-d*
	AE_i (ingestion absorption efficiency)	= (see text)
	DF (age-adjusted soil dermal factor)	= 2442 mg-yr/kg-d**
	AE_d (dermal absorption efficiency)	= (see text)

$$*IF_{soil/age\text{-}adj.} = \frac{IR_{soil/age\ 1\text{-}6} \times ED_{age\ 1\text{-}6}}{BW_{age\ 1\text{-}6}} + \frac{IR_{soil/age\ 7\text{-}31} \times ED_{age\ 7\text{-}31}}{BW_{age\ 7\text{-}31}}$$

where,

$IR_{soil/age\ 1\text{-}6}$ (soil ingestion rate)	= 200 mg/day
$ED_{age\ 1\text{-}6}$ (exposure duration)	= 6 years
$BW_{age\ 1\text{-}6}$ (body weight)	= 15 kg
$IR_{soil/age\ 7\text{-}31}$ (soil ingestion rate)	= 100 mg/d
$ED_{age\ 7\text{-}31}$ (exposure duration)	= 24 yr
$BW_{age\ 7\text{-}31}$ (body weight)	= 70 kg

$$**DF_{soil/age\text{-}adj.} = \frac{SA_{age\ 1\text{-}6} \times AF \times ED_{age\ 1\text{-}6}}{BW_{age\ 1\text{-}6}} + \frac{SA_{age\ 7\text{-}31} \times AF \times ED_{age\ 7\text{-}31}}{BW_{age\ 7\text{-}31}}$$

where,

$SA_{age\ 1\text{-}6}$ (skin surface area)	= 1820 cm^2/day
AF (soil adherence factor)	= 1.0 mg/cm^2
$ED_{age\ 1\text{-}6}$ (exposure duration)	= 6 years
$BW_{age\ 1\text{-}6}$ (body weight)	= 15 kg
$SA_{age\ 7\text{-}31}$ (skin surface area)	= 5000 cm^2/day
AF (soil adherence factor)	= 1.0 mg/cm^2
$ED_{age\ 7\text{-}31}$ (exposure duration)	= 24 yr
$BW_{age\ 7\text{-}31}$ (body weight)	= 70 kg

The residential equations yield values which represent concentrations of contaminants in water in units of micrograms per liter (ug/l) and in soil in units of micrograms per kilogram (ug/kg), or parts per billion (ppb). To convert to units of parts per million or milligrams per liter (mg/l) in water and milligrams per kilogram (mg/kg) in soil, divide by 1,000.

All exposure assumptions represent current EPA guidance. The selection of an appropriate averaging time (AT) is dependent upon the type of toxic effect being evaluated. AT represents the number of days over which the exposure is averaged. When evaluating long-term exposure to noncarcinogenic compounds, exposures are calculated by averaging over the period of exposure (i.e., subchronic or chronic exposures). For carcinogenic compounds, exposures are calculated by prorating the total cumulative dose over a lifetime (also called lifetime average daily dose). The approach for carcinogens is based on the assumption that a high dose of a carcinogen received over a short period of time is equivalent to a corresponding low dose spread over a lifetime. The averaging time for carcinogens is 25,550 days (70 years x 365 days) and 10,950 days (30 years x 365 days) for noncarcinogens.

The acceptable level of risk for carcinogens has been changed from one in one million (10^{-6}) to one in one hundred thousand (10^{-5}). All criteria for carcinogens have been changed appropriately. The acceptable hazard quotient (HQ) for noncarcinogens has always been 1, although this parameter was not explicitly presented in the previous MERA equations. The HQ is the ratio of a single substance's exposure level over a specified time period to a reference dose for that substance derived from a similar exposure period. An HQ of 1 indicates that an exposure level greater than the reference dose is unacceptable.

The relative source contribution factor (RSC) of 20% remains a parameter within the equations for groundwater criteria for noncarcinogens to maintain consistency with the EPA and State of Michigan in their development of

drinking water standards. The 20% RSC represents a default value to be replaced with a chemical-specific value when data are available. The RSC has been eliminated from the equations for the direct contact soil criteria. (For additional discussion on the RSC, see Operational Memo #14.)

The exposure duration of 30 years represents a national upper-bound time (90th percentile) at one residence (EPA, 1989). The exposure frequency (EF) of 350 represents the number of days per year that a resident is exposed to drinking water at their home; it assumes that people spend approximately 15 days per year away from their homes for vacations or other reasons. Two separate EF values are used for exposure to soil, each specific to the ingestion and dermal routes of exposure.

For ingestion of soil, EPA guidance ("Standard Default Exposure Factors" OSWER Directive: 9285.6-03, March 25, 1991) recommends a daily intake rate of 200 mg/day for children aged 1-6 years and 100 mg/day for all others. These intake values are believed to represent upper-bound estimates of average soil ingestion rates.

The EPA-recommended soil ingestion rates account for ingestion of both outdoor soils and indoor dust. The values are derived primarily from fecal tracer studies which estimate the amount of soil ingested throughout a day's activities. As such, the intake rates are not event-specific (i.e. the rates do not represent the amount of soil ingested during outdoor activities). Data suggest that up to 80% of indoor dust consists of outdoor soils which have been brought into a residence by air deposition and foot traffic. Therefore, it may not be assumed that ingestion of contaminated soil is entirely precluded by climatic conditions such as snow cover.

There is no currently available method for determining the relative contribution of soil vs. dust to the daily total, or the effect of climatic conditions on the rate of soil ingestion. Therefore, a constant year round exposure is assumed and the appropriate EF value for ingestion of soil/dust for the residential soil direct contact criterion is 350 days per year.

The EPA recommends that local weather conditions such as snow cover be considered in determining the appropriate EF for dermal contact with soil. It is assumed that Michigan winters last for 4 months (120 days) making soil unavailable for contact. Therefore, the EF for dermal contact with soil for the residential soil direct contact criterion is 245 days per year (365-120).

Ingestion and dermal contact rates within the direct contact soil criterion equation are adjusted to account for both children and adults. It is assumed that during the 30 year exposure period, 6 years is spent as a child who ingests more soil/day and the remaining 24 years is spent as a child/adult ingesting less soil/day. The age-adjusted approach was previously used in the development of the Type B soil direct contact criteria (although the data and calculations were different) and is recommended by EPA (EPA, 1991).

The skin surface area for child and adult receptors in the age-adjusted dermal factor is equal to 25 percent of the 50th percentile of total skin surface area for the respective age group (EPA, 1992b). Dermal exposure to soil is expected to occur on the hands, arms, legs, neck and head, accounting for approximately 25% of the total skin surface area.

The absorption efficiencies are the same as those used previously. When chemical-specific data are not available, the absorption efficiency applicable

to ingestion (AE_i) shall be either 100% for volatile organic chemicals or 50% for other organic chemicals, polychlorinated biphenyls, pesticides, or inorganic parameters. When chemical-specific data are not available, the absorption efficiency applicable to dermal contact (AE_d) shall be either 10% for a volatile organic chemical or 1% for other organic chemicals, polychlorinated biphenyls, pesticides, or inorganic parameters.

This memo is intended to provide guidance to Division staff to foster consistent application of Part 201 of the Natural Resources and Environmental Protection Act, 1994 PA 451 and associated Administrative Rules. This document is not intended to convey any rights to any parties nor create any duties or responsibilities under law. This document and matters addressed herein are subject to revision.

Questions about values in the attached table should be directed to one of the ERD toxicologists: Christine Flaga, telephone 517-373-0160, Jeffrey Crum, telephone 517-335-3092, or Linda Larsen, telephone 517-335-3161. Other questions about this memorandum should be directed to District Supervisors.

Attachment
rev. 4

REFERENCES

EPA, 1992a. Supplemental Guidance to RAGS: Calculating the Concentration Term. OSWER Publication 9285.7-081. May, 1992.

EPA, 1992b. Dermal Exposure Assessment: Principles and Applications. Interim Report. EPA/600/8-91/011B. January, 1992.

PART 201 OF THE NATURAL RESOURCES AND ENVIRONMENTAL PROTECTION ACT, 1994
PA 451
GENERIC RESIDENTIAL CLEANUP CRITERIA FOR GROUNDWATER AND SOIL

(Revision 4)

Residential criteria were calculated using currently available toxicological data. These criteria may change as new toxicity data become available. They are not necessarily final cleanup standards. Please read the attached introduction for details. Carcinogenic chemicals are 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 represented by E+ or E- a value, for example 2×10^6 is reported as 2E+6. Please refer to Operational Memorandum #6 for additional information concerning analytical methods and method detection limits.

73 MCL-BASED GW #'s

	GROUNDWATER (ppb:ug/l)				SOIL (ppb:ug/kg)			
Chemical	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
Acenaphthene	1,300	NA	3.8	5	26,000	76	7.6E+7	330
Acenaphthylene	26	NA	{B}	5	520	{B}	1.5E+6	330
Acetaldehyde	950	NA	{B}	500	19,000	{B}	1.4E+7	2,500
Acetic acid	4,200	NA	{B}	18,000	84,000	{B}	6.3E+7	9.0E+5
Acetone	730	NA	25,000	100	15,000	5.0E+5	1.1E+7	100
Acetonitrile	140	NA	810	50	2,800	16,000	2.1E+6	100
Acrolein	120	NA	2.5	5	2,400	50	1.8E+6	10
[illegible]amide	0.19	NA	9.1	0.5	3.8	180	2,200	5
[illegible]ic acid	3,900	NA	{B}	NA	78,000	{B}	5.8E+7	NA
Acrylonitrile	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 {A}	{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}	6,000 ~~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
Benzo(b)fluoranthene (Q)	1.2	NA	0.31	5	{E}	{E}	14,000	330
[illegible](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

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
Benzo(a)pyrene (G)	0.2 (C)	NA	0.31	5	(E)	(E)	1,400	330
Benzoic acid	32,000	NA	(B)	50	6.4E+5	(B)	1E+9 (G)	3,300
Benzyl alcohol	10,000	NA	22	50	2.0E+5	440	1.8E+8	1,300
Benzyl chloride	5	NA	(B)	0.5	100	(B)	15,000	200
Beryllium	4 (C)	NA	(B)	1	80 {A}	(B)	2,300	200
Bis(2-chloroethoxy)ethane	ID	NA	(B)	5	ID	(B)	ID	330
Bis(2-Chloroethyl)ether	0.77	NA	4.2	5	15	84	2,300	330
Bis(2-Ethylhexyl)phthalate	6 (C)	NA	59	5	(E)	(E)	7.0E+5	330
Boron	440 (A)	NA	(B)	300	8,800 (A)	(B)	2.5E+7	8,000
Bromobenzene	ID	NA	(B)	1	ID	(B)	ID	10
Bromodichloromethane	100 (C,S)	NA	24	1	2,000 (S)	480	41,000	10
Bromoform	100 (C,S)	NA	65	1	2,000 (S)	1,300	3.2E+5	10
Bromomethane	10	NA	11	1	200	220	1.5E+5	10
n-Butanol	950	NA	(B)	800	19,000	(B)	1.4E+7	4,400
2-Butanone (MEK)	13,000	NA	7,200	50	2.6E+5	1.4E+5	2.0E+8	100
n-Butyl acetate	550	NA	40	10	11,000	800	8.3E+6	20
t-Butyl alcohol	3,900	NA	8,300	1,000	78,000	1.7E+5	5.9E+7	4,400
Butyl benzyl phthalate	1,200	NA	(B)	5	24,000	(B)	6.8E+7	330
Cadmium	5 (A,C)	NA	0.64 (A,D)	0.5	100 (A)	13 (A)	2.1E+5	50
Camphene	ID	NA	(B)	NA	ID	(B)	ID	NA
Caprolactam	5,600	NA	(B)	NA	1.2E+5	(B)	3.4E+8	NA
Carbaryl	700	NA	(B)	20	14,000	(B)	4.1E+7	1,000
Carbofuran	40 (C)	NA	1.6	20	800	32	5.5E+5	200
Carbon disulfide (R)	800	NA	(B)	50	16,000	(B)	1.2E+7	100
Carbon tetrachloride	5 (C)	NA	21	1	100	420	20,000	10
Chlordane	2 (C)	NA	0.00053	0.02	(E) 500 ppm	(E)	7,600	10
Chloride	ID	2.5E+5	(B)	10,000	5.0E+5	(B)	ID	2.0E+5
Chlorobenzene	100 (C)	NA	71	1	2,000	1,400	2.1E+6	10
Chloroethane	220	NA	(B)	1	4,400	(B)	6.7E+5	10
2-Chloroethyl vinyl ether	ID	NA	(B)	10	ID	(B)	ID	100
Chloroform	100 (C,S)	NA	80	1	2,000 (S)	1,600	4.2E+5	10
Chloromethane	66	NA	(B)	1	1,300	(B)	2.0E+5	10
4-Chloro-3-methylphenol	150	NA	4.4	5	3,000	88	2.2E+6	330
beta-Chloronaphthalene	1,600	NA	(B)	5	36,000	(B)	2.7E+7	330
2-Chlorophenol	45	NA	10	5	900	200	6.8E+5	330
o-Chlorotoluene	150	NA	(B)	1	3,000	(B)	2.2E+6	10
Chlorpyrifos	22	NA	0.002	0.2	440	0.04	1.3E+6	10
Chromium (III) (I)	100 (A,C,J)	NA	77 (A,D)	50	2,000 (A)	1,500 (A)	6.3E+8	2,500
Chromium (VI) (I)	100 (A,C,J)	NA	7.3 (A)	5	2,000 (A)	150 (A)	2.0E+6	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
Chrysene (Q)	120	NA	0.31	5	{E}	{E}	1.4E+6	330
Cobalt	37	NA	{B}	10	740	{B}	2.1E+6	500
Copper	1,400 {A}	1,000	18 {A,D}	25	20,000 {A}	360 {A}	1.6E+7	1,000
Cyanazine	1.5	NA	4.7	10	30	94	17,000	500
Cyanide {R}	200 {C}	NA	5.2	20	4,000	100	9.3E+6	500
Cyclohexanone	33,000	NA	{B}	50	6.6E+5	{B}	5.0E+8	100
Dacthal	73	NA	{B}	1	1,500	{B}	4.2E+6	20
Dalapon	200 {C}	NA	{B}	10	4,000	{B}	9.3E+6	100
4-4'-DDD	3.5	NA	0.0084	0.02	{E}	{E}	41,000 ?	20
4-4'-DDE	2.5	NA	0.0059	0.02	{E}	{E}	29,000	20
4-4'-DDT	2.5	NA	0.00023	0.02	{E}	{E}	29,000	20
Decabromodiphenyl ether	73	NA	{B}	10	1,500	{B}	4.2E+6	100
Di-n-butyl phthalate	880	NA	12,000	5	18,000	2.4E+5	5.1E+7	330
Di(2-ethylhexyl) adipate	400 {C}	NA	{B}	5	8,000	{B}	2.1E+6	330
Di-n-octyl phthalate	130	NA	{B}	5	2,600	{B}	7.6E+6	330
Diacetone alcohol	ID	NA	{B}	NA	ID	{B}	ID	NA
Diuron (Under review by EPA)	1.3	NA	0.002	0.5	26	0.04	76,000	10
Dibenzo(a,h)anthracene (Q)	0.12	NA	0.31	5	{E}	{E}	1,400	330
Dibenzofuran	ID	NA	{B}	5	ID	{B}	ID	330
Dibromochloromethane	100 {C,S}	NA	29	1	2,000 {S}	580	31,000	10
Dibromomethane	80	NA	{B}	5	1,600	{B}	4.6E+6	10
1,2-Dichlorobenzene	600 {C}	NA	7	1	12,000	140	9.4E+6	10
1,3-Dichlorobenzene	600 {C}	NA	180	1	12,000	3,600	9.4E+6	10
1,4-Dichlorobenzene	75 {C}	NA	15	1	1,500	300	1.1E+5	10
3,3'-Dichlorobenzidine	1.9	NA	0.063	20	38	1.3	5,700	2,000
Dichlorodifluoromethane	1,700	NA	{B}	1	34,000	{B}	2.5E+7	10
1,1-Dichloroethane	880	NA	{B}	1	18,000	{B}	1.3E+7	10
1,2-Dichloroethane	5 {C}	NA	560	1	100	11,000	28,000	10
1,1-Dichloroethylene	7 {C}	NA	32	1	140	640	1.1E+5	10
cis-1,2-Dichloroethylene	70 {C}	NA	{B}	1	1,400	{B}	1.2E+6	10
trans-1,2-Dichloroethylene	100 {C}	NA	300 ✓	1	2,000	6,000	1.9E+6	10
2,6-Dichloro-4-nitroaniline	2,200	NA	{B}	0.01	44,000	{B}	1.3E+8	0.1
2,4-Dichlorophenol	73	NA	34 {D}	5	1,500	680	4.2E+6	330
2,4-Dichlorophenoxyacetic acid	70 {C}	NA	47	10	1,400	940	4.2E+6	200
1,2-Dichloropropane	5 {C}	NA	64	1	100	1,300	38,000	10
1,3-Dichloropropene (J)	4.7	NA	3	1	96 94	60	14,000	10
Dicrotophos	2.9	NA	{B}	0.1	58	{B}	34,000	50
Dicyclohexyl phthalate	ID	NA	{B}	5	ID	{B}	ID	330
Dieldrin	0.053	NA	3.2E-5	0.02	{E}	{E}	620	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
Diethoxymethane	ID	NA	(B)	10	ID	(B)	ID	100
Diethyl ether	3,700	NA	(B)	50	74,000	(B)	5.5E+7	100
Diethyl phthalate	5,500	NA	1.2E+5	5	1.1E+5	2.4E+6	3.2E+8	330
Diethylene glycol monobutyl ether	88	NA	(B)	NA 5,000	1,800	(B)	5.1E+6	NA 3,200
Diisopropylamine	5.6	NA	(B)	NA	110	(B)	85,000	NA
Dimethyl phthalate	73,000	NA	2.9E+6	5	1.5E+6	5.8E+7	1E+9 (G)	330
N,N-Dimethylacetamide	180	NA	(B)	NA	3,600	(B)	2.7E+6	NA
N,N-Dimethylaniline	16	NA	(B)	NA	320	(B)	2.4E+5	NA
Dimethylformamide	700	NA	3,800	NA	14,000	76,000	1.1E+7	NA
2,4-Dimethylphenol	370	NA	31	5	7,400	620	2.1E+7	330
2,6-Dimethylphenol	4.4	NA	(B)	5	88	(B)	2.5E+5	330
3,4-Dimethylphenol	10	NA	(B)	5	200	(B)	5.9E+5	330
Dimethylsulfoxide	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
Dioxab	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) (E)	7.2E+6	NA
Endrin	2 (C)	NA	0.0023	0.02	(E)	(E)	72,000	20
Epichlorohydrin	88	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
Fluoride (soluble fluoride) 3.0	480 (C) 4,000	2,000	1,900	NA	8,000	38,000	2.5E+7	NA
Formaldehyde	1,300	NA	170	100	26,000	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

Need new footnote or replace (K) w/ following: "Closure" TMDL is provided for this compound.

GENERIC RESIDENTIAL CLEANUP CRITERIA

REVISION 4

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} 0.1?	400	{B}	1.2E+6	{K} 50
Hexachlorobenzene (C-66) Problem	1 {C}	NA	0.0019	{K}	20	0.038	6,200	{K}
Hexachlorobutadiene (C-46) Not problem	11	NA	500	{K} 5	220	10,000	1.3E+5	{K} 330
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 9.4	9.2	5,500	20
Hexachlorocyclopentadiene (C-56) Problem	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~~ 46,000	{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]	4 {A,L}	NA	6.6 {A,D}	3	80 {A}	130 {A}	4.0E+5	1,000
[illegible]ane	0.2 {C}	NA	0.06	0.01	4	1.6	7,600	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]denum	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)			
Chemical	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
Nitrate (F)	10,000 (C,F)	NA	(B)	100	2.0E+5 (F)	(B)	ID	NA
Nitrite (F)	1,000 (C,F)	NA	(B)	100	20,000 (F)	(B)	ID	NA
Nitrobenzene	3.4	NA	1,900	5	68	38,000	51,000	330
2-Nitrophenol	20	NA	(B)	5	400	(B)	1.2E+6	330
n-Nitroso-di-n-propylamine	0.12	NA	(B)	5	2.4	(B)	370	330
N-Nitrosodiphenylamine	170	NA	160	5	3,400	3,200	5.2E+5	330
Oxamyl	200 (C)	NA	(B)	NA	4,000	(B)	1.6E+7	NA
Oxo-hexyl acetate	73	NA	(B)	NA	1,500	(B)	1.1E+6	NA
Pendimethalin	880	NA	0.62	0.1	18,000	12	5.1E+7	20
Pentachlorobenzene	6.1	NA	(B)	2	120	(B)	3.5E+5	50
Pentachloronitrobenzene	55	NA	(B)	2	1,100	(B)	3.2E+6	50
Pentachlorophenol	1 (C)	NA	0.8 (D)	20	20	16	82,000	3,400
Perylene	ID	NA	(B)	100	ID	(B)	ID	1,000
2-Perylene	ID	NA	(B)	NA	ID	(B)	ID	NA
Phenanthrene	28	NA	(B)	5	520	(B)	1.5E+6	330
Phenol	4,400	NA	1,100	5	88,000	22,000	6.6E+7	330
Picloram	500 (C)	NA	(B)	10	10,000	(B)	3.0E+7	100
Piperidine	3.2	NA	(B)	NA	64	(B)	48,000	NA
Polybrominated biphenyls (J)	0.006	NA	(B)	NA	(E)	(E)	1,100	NA
Polychlorinated biphenyls (PCBs) (J,T)	0.5 (C)	NA	2.0E-5	0.2	(E)	(E)	2,300	330
Prometon	160	NA	(B)	0.5	3,200	(B)	9.3E+6	20
Propachlor	95	NA	(B)	1	1,900	(B)	5.5E+6	20
Propazine	200	NA	(B)	0.5	4,000	(B)	1.1E+7	20
Propionic acid	12,000	NA	(B)	100	2.4E+5	(B)	1.9E+8	6,700
Propyl alcohol	1,400	NA	15,000	NA	28,000	3.0E+5	2.1E+7	NA
Propylene glycol	1.5E+5	NA	1.9E+5	5,000	3.0E+6	3.8E+6	1.0E+9 (G)	5,000
Pyrene	550	NA	11,000	5	11,000	2.2E+5	3.2E+7	330
Pyridine	7.3	NA	20	20	150	400	1.1E+5	330
Selenium	50 (A,C)	NA	5 (A)	5	1,000 (A)	100 (A)	2.1E+6	500
Silver	34 (A)	100	0.1 (A)	0.5	680 (A)	2 (A)	2.0E+6	500
Simazine	4 (C)	NA	3.4	10	80	68	2.2E+6	40
Sodium	1.6E+5	NA	(B)	NA	3.2E+6	(B)	1.0E+9 (G)	NA
Styrene	100 (C)	NA	19	1	2,000	380	85,000	10
Sulfide	ID	2.5E+5	(B)	NA	5.0E+6	(B)	ID	NA
Tebuthiuron	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

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	3.6E+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~~ 61	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
(2,4,5-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 6.1	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

73 MCL-based GW #'s

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.~~ Not relevant since we use MCL for total Chromium

{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. up to 15 ppb

{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.

ENVIRONMENTAL RESPONSE DIVISION

OPERATIONAL MEMORANDUM #8, REVISION 4

ERRATA SHEET
JUNE 8, 1995

Page 1, Disclosure statement prior to paragraph 1
~~THIS OPERATIONAL MEMORANDUM WILL TAKE EFFECT *ONLY* WHEN HOUSE BILL 4596 IS SIGNED INTO LAW.~~ ***HOUSE BILL 4596, AS AMENDED BY THE SENATE, WAS SIGNED INTO LAW AND BECAME EFFECTIVE ON JUNE 5, 1995.***

Page 1, Paragraph 1
Revision 4 of this Operational Memorandum reflects changes made as a result of two major legislative actions: (1) the incorporation of the Michigan Environmental Response Act (MERA), 1982 PA 307, as amended, ~~(2)~~ into the Natural Resources and Environmental Protection Code, 1994 PA 451; and *(2)* the 1995 amendments to Part 201 contained in House Bill 4596, ***as amended by the Senate (1995 PA 71).***

Page 6, Residential Direct Contact Soil Criterion Algorithm
Insert the RSC into the equation for the direct contact soil criterion algorithm for noncarcinogens.

NONCARCINOGENS:

$$\frac{HQ \times RfD \times AT \times CF \times RSC}{FC \times [(EF_i \times IF \times AE_i) + (EF_d \times DF \times AE_d)]}$$

Insert the following in the list of default values for the direct contact soil criterion algorithm for noncarcinogens.

RSC (relative source contribution) ***= 1***

Page 7, Paragraph 2
The approach for carcinogens is based on the assumption that a high dose of a carcinogen received over a short period of ~~time~~ ***time*** is equivalent to a corresponding low dose spread over a lifetime.

Page 7, Paragraph 4
~~The relative source contribution factor (RSC) of 20% remains a parameter within the equations for groundwater criteria for noncarcinogens to maintain consistency with the EPA and State of Michigan in their development of drinking water standards. The 20% RSC represents a default value to be replaced with a chemical-specific value when data are available. The RSC has been eliminated from the equations for the direct contact soil criteria. (For additional discussion on the RSC, see Operational Memo #14.)~~

The relative source contribution factor (RSC) in the groundwater criteria equations for noncarcinogens is 20%. This is consistent with the EPA and the State of Michigan in the development of drinking water standards. The RSC for the direct contact soil criteria equations for noncarcinogens is 100%. These RSC values represent default values to be used unless compound and site-specific data are available to demonstrate that a different source contribution is appropriate. (For additional discussion on the RSC, see Operational Memo #14.)

Page 9, Paragraph 1

When chemical-specific data are not available, the absorption efficiency applicable to dermal contact (AE_d) shall be either 10% for a volatile organic chemical or 1% ~~for other organic chemicals, polychlorinated biphenyls, pesticides, or inorganic parameters.~~ ***for non-volatile organic chemicals or inorganic parameters.***

MICHIGAN DEPARTMENT OF NATURAL RESOURCES

INTEROFFICE COMMUNICATION

June 6, 1995

TO: Environmental Response Division Staff

FROM: Alan J. Howard, Chief, Environmental Response Division

SUBJECT: **Environmental Response Division Operational Memorandum #14 Revision 2:** Remedial Action Plans Using Generic Industrial or Generic Commercial Cleanup Criteria and Other Requirements

THIS DRAFT, INTERIM OPERATIONAL MEMORANDUM HAS BEEN PREPARED TO FACILITATE IMPLEMENTATION OF THE 1995 AMENDMENTS TO PART 201 OF THE NATURAL RESOURCES AND ENVIRONMENTAL PROTECTION ACT, 1994 PA 451 (FORMERLY THE MICHIGAN ENVIRONMENTAL RESPONSE ACT). THIS OPERATIONAL MEMORANDUM WILL TAKE EFFECT *ONLY* WHEN HOUSE BILL 4596 IS SIGNED INTO LAW. INTERNAL REVIEW OF THIS MEMORANDUM IS ON-GOING, AND NO OUTSIDE REVIEW HAS BEEN COMPLETED. THE CONTENT OF THE MEMORANDUM, AND THE ATTACHED CRITERIA, ARE SUBJECT TO CHANGE AND SHOULD BE RELIED UPON ONLY AFTER CONFIRMATION WITH APPROPRIATE ERD STAFF.

Revision 2 of this Operational Memorandum reflects changes made as a result of two major legislative actions: (1) the incorporation of the Michigan Environmental Response Act (MERA), 1982 PA 307, as amended, (2) into the Natural Resources and Environmental Protection Code, 1994 PA 451; and the 1995 amendments to Part 201 contained in [House Bill 4596]. Enactment of the Natural Resources and Environmental Protection Act resulted in new section numbers for all of the former MERA, but did not make any substantive changes in the law. [House Bill 4596] substantially amends Part 201. Those amendments, particularly the changes in cleanup standards, are reflected in this revision of Operational Memorandum #14. Unless otherwise noted, Section references in this memorandum are to Part 201 of Act 451.

This memorandum provides direction in the preparation and review of generic industrial and commercial land use remedial action plans (RAPs) to comply with Section 20120A(1)(B) and (D). The following information highlights some important aspects of generic land use cleanups:

- The preparation, review and approval of RAPs based on the generic industrial/commercial approach is anticipated to require less effort than a site-specific RAP for most sites. In general, it will not be necessary to develop site-specific cleanup criteria for those sites which can be appropriately and completely addressed with these generic criteria.

- Site-specific RAPs are also an option under Section 20120A(2). Site-specific RAPs require the development of exposure assumptions that are representative of the activities of human receptors at the site. Site-

** This is possible where the misconception arises concerning the inappropriate reliance of PRPs on only the criteria presented in this rule.

specific direct contact cleanup criteria may be developed by appropriately adjusting the exposure assumptions in the generic algorithms. Justification must be provided for the site-specific exposure assumptions identified.

- If a RAP relies on the attached generic risk assessment algorithms and criteria, the RAP must include a statement confirming that the generic exposure assumptions are representative of, or exceed, the expected exposure of workers at the site.

- In identifying which generic cleanup criteria are appropriate for a site, primary consideration should be given to the human receptors and the kinds of activities in which they engage. Land-use specific criteria can be used for a site not typically categorized under that specific land use, as long as the exposures do not exceed those identified in the algorithm used to derive the criteria.

* - These generic industrial and commercial criteria apply only to the assessment of human health risks for workers at these sites. The need for assessment of off-site human health risks will be determined based on an evaluation of exposure potential for off-site receptors.

The direction provided in this memo is intended to facilitate the preparation of RAPs by setting forth the Environmental Response Division's (ERD) expectations for the human health risk assessment assumptions which are used to generate acceptable cleanup criteria for specific land uses. Additional information about the applicability of this approach and the criteria listed in the attached tables follows.

The attached sections on the land use-specific categories explain the basis for the exposure assumptions used in the generic approaches. In general, the exposure assumptions were established to be protective for a "reasonable maximum exposure" (RME) of a worker under the scenarios established. The RME is defined as the highest exposure that is reasonably expected to occur at a site. These exposure assumptions would also be protective of other workers at the facility who are outdoors less often. If the workers at a commercial or industrial property have a greater exposure potential (e.g., the exposure duration or exposure frequency is greater than that assumed in the generic algorithms), a site-specific RAP which reflects the exposure potential at the site should be submitted. This can be done by adjusting the exposure assumptions within the generic equation.

The criteria in the attached tables have been calculated by ERD toxicologists for the convenience of parties preparing generic industrial or commercial RAPs. The criteria are not maximum allowable criteria; they are concentrations that may be allowable for exposure in certain industrial or commercial settings. Higher concentrations may be approved as part of a limited industrial/commercial RAP if exposure barriers or engineering controls prevent or limit exposure. The criteria in the tables can be used as a screening tool to determine which areas of a site may be addressed by land use restrictions alone, and which require additional remediation or control.

recall that the criteria presented do not account for other exposure pathways that may be ...

The values in the table are useful in determining acceptable concentrations protective of human health through exposure pathways characterized by standardized assumptions. The text of the attachment describing the

so caution should be taken in using solely these criteria as a screening tool

remove the word

algorithms includes discussions of other human exposure pathways which may require additional consideration in exceptional circumstances (e.g., inhalation pathway if a hazardous substance present in shallow soils is a carcinogen via inhalation but not ingestion or risks from contaminated subsurface materials to construction workers). When these special circumstances exist, contact an ERD toxicologist for guidance.

Generic Industrial and Commercial Cleanup Criteria
Groundwater and Soil Direct Contact

The attached tables list the generic industrial and comm...teria in a format similar to the table of residential cri... Memorandum #8. The applicability of values from the g... industrial tables may vary depending, for example, on ... reasonably foreseeable groundwater use, and the nature ... proposed. Additional guidance on the applicability of ... follows.

ATTACH BAFs & SFs for next revision & also maybe the equations

HEALTH-BASED AND AESTHETIC DRINKING WATER CRITERIA

These criteria apply to groundwater in an aquifer. The ... whether each saturated zone underlying the site is an aquifer. Any ... which serves or may serve as a drinking water source meets the definition of "aquifer" in R 299.5101(c). Cleanup criteria for groundwater not in an aquifer must be determined by consideration of potential public health and environmental impacts associated with contamination of that groundwater (see discussion of Groundwater/Surface Water Interface Values below).

The health-based values in the attached table were calculated using the generic land use algorithms which are designed to protect workers whose drinking water is from an on-site groundwater source. If groundwater is the source of drinking water at the property, and the values in the table are exceeded, a remedial action to address groundwater will be necessary. If a state drinking water standard is available for an on-site contaminant, the drinking water standard overrides the health-based criterion and becomes the cleanup goal. In addition, if the affected groundwater is the source of drinking water at the industrial/commercial site, the aesthetic criterion (as defined by R 299.5709(2)(c) or (d)) must be met if that criterion is more restrictive than the health-based criterion unless an assessment is presented that justifies an alternative criterion. The state drinking water standard would not, however, override a more restrictive aesthetic criterion. This assures that the groundwater will ~~not~~ be unusable because of aesthetic impacts. If groundwater is not the source of drinking water at the property, but it is or may be the source for off-site drinking water, then the need for remedial action to address the groundwater would be determined by other rules (e.g., R 299.5709). Groundwater beyond the property boundary would need to be addressed either by remediation or exposure controls.

delete this sentence

Consider this example: A RAP using the generic criteria is proposed for an industrial site where groundwater is used as the source of drinking water for that facility and for private wells off-site. The groundwater concentrations on site (current and expected concentrations, based on information about migration potential developed during the Remedial Investigation and explained in the RAP) do not exceed the applicable drinking water criteria in the attached table. Remedial actions to address on-site groundwater would be

determined by the requirements of R 299.5705(5) and (6) (unless the Department makes a finding pursuant to Section 20118(5) and (6) that compliance with those subrules is not required) and/or compliance with GSI criteria. However, if hazardous substance concentrations in groundwater exceed the generic residential criteria at the industrial site boundary, groundwater remediation or exposure controls, or both, may be required to address potential off-site risks.

GROUNDWATER SURFACE WATER INTERFACE (GSI) CRITERIA

The GSI values included in the attached table are the same GSI values as presented in Op Memo #8. See Op Memo #8 for a complete explanation of GSI values. The GSI values are included here because they define the maximum allowable hazardous substance concentration at the groundwater surface water interface or at the edge of the mixing zone, whichever is applicable for a specific site, in industrial/commercial situations as well as residential situations. This is a function of applicable requirements of Part 31 of Act 451. Judgments about the applicability of GSI values and the compliance point for GSI criteria are the same for residential and commercial/industrial situations.

Prior to passage of the 1995 amendments, a mixing zone was not allowed when assessing the impact of groundwater venting to a surface water. A mixing zone is now allowed for venting groundwater at those sites where an additional load to the receiving stream of site-specific contaminants is allowable and where a mixing zone is appropriate for the receiving stream. If a RAP allows for venting groundwater, the discharge must comply with requirements of Part 31 of Act 451 and the relevant rules promulgated under that Part.

TARGET METHOD DETECTION LIMITS IN WATER AND SOIL

The values in these columns are identical to those in Operational Memorandum #8 and Operational Memorandum #6. See Op Memo #6 for a complete explanation of "target method detection limits" and analytical methodology.

SOIL CRITERIA PROTECTIVE OF GROUNDWATER

The determination of a soil concentration protective of groundwater in an aquifer can be more complex at industrial/commercial sites than for some residential sites, consequently, these values are not presented on the list. If groundwater contamination is confined (and will remain) on-site, and the groundwater at the site is used as a source of drinking water, then the soil cleanup criteria protective of groundwater can be determined in one of the following ways: 1) through the use of leachate test (see Operational Memorandum #12), comparing the leachate results to the industrial/commercial health-based drinking water value or aesthetic value, whichever is more restrictive, or if available, the state drinking water standard (unless the aesthetic criterion is more restrictive); 2) by comparing the concentration in soil (i.e., measured as a total, not leachable concentration) to 20 times the appropriate groundwater criterion; or 3) by the use of other methods, such as fate and transport modeling or perched in-situ groundwater evaluation, that demonstrate that hazardous substances in soil will not result in relevant groundwater criteria being exceeded. However, if off-site groundwater is or may be used as a source of drinking water, the groundwater must meet residential criteria at the property boundary or exposure controls must be provided. In that case, on-site soils may need to be cleaned up to a level more restrictive than that described above in order to assure that residential

criteria will be met at the appropriate location, unless groundwater remediation is being used to achieve the residential groundwater criteria off-site. It is possible that acceptable soil criteria protective of groundwater may vary across the site.

For certain chemicals which strongly adsorb to soil and are known not to leach at significant concentrations (i.e., PCBs, carcinogenic polynuclear aromatic hydrocarbons and some chlorinated pesticides), the direct contact value is accepted as the soil cleanup criterion to protect groundwater in addition to the protection against long-term, systemic, direct contact hazards. However, there are certain situations (i.e., presence of solvents or collection of unfiltered groundwater samples) which could result in the presence of these types of materials in groundwater. These other conditions should be evaluated before a chemical is considered nonmobile in soil. Consult an ERD toxicologist if you think direct contact values for other contaminants would be protective of groundwater or if you have questions about conditions that could cause the transport of a nonmobile contaminant through soil.

SOIL CRITERIA PROTECTIVE OF SURFACE WATER

The default values are shown in Op Memo #8 as 20 times the GSI value. If the GSI value is the controlling factor for groundwater and/or aquifers at an industrial/commercial site, the 20 times GSI value would be applied here in the same way it would be at a residential site. See Operational Memorandum #8 for a full discussion of this issue. Since the GSI value applies only at the groundwater surface water interface it is not necessary that soil concentrations throughout the site be less than or equal to 20 times the GSI number. However, in some cases, it may be simplest to make this comparison in judging the need for soil remediation to protect surface water. Generic industrial/commercial soil cleanup criteria protective of surface water can be developed using the same approaches that apply to the soil criteria protective of drinking water (i.e., leachate tests, 20 times water concentrations, comparison of perched water quality to GSI values or fate and transport modeling). This accounts only for leaching of hazardous substances from soil into groundwater and the subsequent impact of that groundwater on surface water. If there is significant potential for runoff to carry contaminated soil into surface water (i.e., this pathway is pertinent in the risk assessment), the impact of that runoff should be characterized in the risk assessment using fate and transport modeling. This type of analysis may be necessary in cases where the hazardous substances present at the site are highly persistent and/or bioaccumulative, since transport of substances with these properties may result in unacceptable impact on surface water sediments or in the food chain.

DIRECT CONTACT CRITERIA

These values protect workers at the site against long-term, systemic health effects from ingestion and dermal absorption of hazardous substances in soil. The exposure assumptions used in the algorithms are discussed in the generic industrial and commercial sections. The generic land-use direct contact criteria are applied like the residential direct contact values, except that the requirement that direct contact concentrations be met throughout the affected media will not always apply to industrial/commercial cleanups. It is possible for a generic industrial/commercial RAP to combine the application of these values for shallow soils and land use restrictions to protect against exposure to higher concentrations in deeper soils to provide for a remedy that is, when considered in total, protective of public health. In general,

surface soils are considered to be the top 0-6 inches, unless activities at a site indicate that a greater depth is more appropriate. However, unless use restriction are in place for contaminated subsurface materials, contaminant concentrations cannot exceed the appropriate soil concentration to protect public health.

Average on-site soil concentrations, represented as a 95% upper confidence level (UCL) on the arithmetic mean, may be used to determine compliance with the soil direct contact value. On-site 95% UCLs should, however, reasonably represent the areas over which exposures are expected to occur. Refer to EPA Guidance (EPA, 1992b) on appropriate methodology for calculating the 95% UCL.

ISSUES NOT ADDRESSED BY THE DIRECT CONTACT CRITERIA

Inhalation: Since all RAPs must document that they are protective of the public health, safety and welfare and the environment, they must contain some discussion of potential inhalation risks, and whether inhalation is a pertinent pathway for human exposure at the site in question. The direct contact criteria do not address and are not applicable for the inhalation pathway because they do not incorporate the potential inhalation effects, long-term or acute, of hazardous substances in soil.

In many cases, the inhalation pathway will be addressed by a simple description of the physical characteristics of the site such as pavement, vegetative cover, depth to contamination, or characteristics of on-site contaminants, which would allow for its elimination as a pertinent pathway. Characteristics of the contaminants that should be considered are vapor pressure and/or Henry's Law constant, the potential to cause cancer via the inhalation route, the potential to cause irritation of respiratory tissue and special characteristics which may make a contaminant an inhalation hazard (e.g., friable asbestos). The RAP should indicate whether any materials with these characteristics are present. If such materials are present, it may be necessary to conduct a risk assessment of the inhalation pathway, pursuant to Rules 299.5717(3)(a) and (f) in general, and to include criteria or exposure controls which are protective under the inhalation scenario. If not, criteria and/or exposure control measures which are protective for other routes of exposure will be deemed protective for the inhalation pathway and a narrative assessment for the inhalation pathway will be sufficient. EPA guidance should be followed when evaluating the inhalation pathway (EPA, 1991).

Dermal Toxicity: The direct contact soil equations do not address acute skin toxicity or skin sensitization. These concerns may have to be addressed before chemicals with these characteristics can be left in place at the direct contact concentration.

Ecological Concerns: Industrial/commercial RAPs also must address ecological concerns. The RAP should include a description of the physical setting of the site, including any natural resources which could be affected by the release(s) addressed in the plan. In general, potential ecological impacts are defined as adverse impacts on a community or a population of organisms rather than on an individual who is the focus of a human health risk assessment. An ecological risk assessment will be required only if there is a "sensitive environmental resource" (See Rule 299.5803(j)) present at or near the site, or if there are other special circumstances such as concern for persistent or bioaccumulative hazardous substances which may adversely effect the food chain, or a physical feature that would attract wildlife to the site

(e.g., migratory waterfowl habitat). Professional judgment must be used to determine whether it is likely that criteria more restrictive than those required to protect public health, or those required pursuant to other applicable regulations (e.g., groundwater/surface water interface criteria), are necessary to protect natural resources at or near the site. If ERD staff believe that there is a need for an ecological assessment, this should be reviewed with your supervisor and other technical experts as appropriate. Ecological risk assessments will be the exception rather than the rule.

Other Requirements for Industrial and Commercial RAPs

The generic industrial and commercial cleanup criteria will simplify the human health risk assessment component of the RAP when they are applicable. If the site meets the criteria for application of the generic approach, the human health risk assessment can consist of a comparison to the generic criteria when they are proposed for use at the site. If other criteria are proposed, they must be justified as protective of public health, safety, welfare and the environment. Regardless of whether generic or site-specific criteria are proposed, the RAP must also contain a demonstration that it satisfies all other requirements of Part 201 and the administrative rules, including applicable or relevant and appropriate requirements (ARARs) from other environmental laws. You should review Rules 299.5717, 299.5719 which contain requirements applicable specifically to industrial/commercial (formerly "Type C") cleanups. Also review Rules 299.5601 and 299.5603 which describe the factors the Department must consider in deciding whether to approve a RAP. Parties preparing industrial/commercial RAPs should directly and succinctly address how the RAP is responsive to all requirements of Rules 299.5601, 299.5603, 299.5717, and 299.5719 (or explain why the requirement is not applicable to the site).

Important components of an industrial/commercial RAP, in addition to the risk assessment, include:

- a thorough description of the proposed exposure controls (including a proposed restrictive covenant which addresses the factors called for in Rule 299.5719(3)). Exposure controls can be as simple as a commitment, through the restrictive covenant, that the land use of the site will remain consistent with the industrial or commercial risk assessment assumptions. More complex controls will be required if, for example, an engineered containment structure is part of the remedy.

- an explanation of how the proposed controls will be reliable, effective and satisfy other requirements of law.

- an operation and maintenance plan (see Rule 299.5517) and a monitoring plan (see Rule 299.5519), or both, if necessary. These plans may be conceptual (e.g., they need not specify manufacturers for equipment to be used, but must describe the function of the equipment). However, the plans must be presented in sufficient detail to allow us to judge their adequacy. The plans must also include cost estimates for implementation of the operation and maintenance and/or monitoring work. The cost estimates, which will be used, in part, to determine the amount of financial assurances required pursuant to Rule 299.5719(2), should be

based on work being done by contractor personnel rather than by employees of the party responsible for implementation of the RAP. This allows us to be confident that financial assurances would cover necessary costs if the state must take over these activities.

This memo is intended to provide guidance to Division staff to foster consistent application of Part 201 of the Natural Resources and Environmental Protection Act, 1994 PA 451 and associated Administrative Rules. This document is not intended to convey any rights to any parties nor create any duties or responsibilities under law. This document and matters addressed herein are subject to revision.

Questions about the generic industrial and commercial algorithms and criteria should be directed to ERD toxicologists (Chris Flaga, at 517-373-0160; Jeff Crum, at 517-335-3092; or Linda Larsen at 517-335-3161). Questions about other aspects of generic industrial and commercial RAPs should be directed to District Supervisors.

GENERIC INDUSTRIAL LAND USE CATEGORY

A generic industrial site will include sites with the following characteristics:

- The primary activity at the site is industrial in nature (e.g., manufacturing; utilities; industrial research and development; petroleum bulk storage) and access to the site is reliably restricted consistent with its use (e.g., by fences or security personnel or both). The term industrial site does not include farms, gasoline service stations or other commercial establishments where children may commonly be present. Inactive or abandoned sites are included if the property use was industrial, as described above.

- The current zoning of the property is industrial, the zoning is anticipated to be industrial (see below), or the RAP includes documentation that the current industrial use is a legal non-conforming use. This may include different zoning designations, depending on the community, such as "light industrial" or "heavy industrial". Documentation of zoning must be provided in the form of a map or current property record card which shows the zoning status of the site and all adjacent properties. If the RAP is based on anticipated zoning changes, discussion of this issue must indicate how and when the zoning changes are to be accomplished. The RAP must identify (preferably on a map) the nearest current residential land uses and nearest parcels which are zoned for residential use. Any non-conforming land uses in the vicinity of the site must be identified in the RAP (e.g., residential use on a parcel zoned "transitional industrial").

Generic Industrial Cleanup Criteria Algorithms

The following equations represent a reasonable and conservative approach for deriving generic cleanup criteria for an industrial facility. Assumptions are conservative to include a reasonable maximum exposure. The population protected are those industrial workers who spend a significant percentage of

their work time outdoors. Algorithms are presented for both the ingestion of groundwater and for direct contact with soil.

The generic industrial equations follow.

Generic Groundwater Algorithms:

CARCINOGENS:
$$\frac{10^{-5} \times BW \times AT \times CF}{SF \times EF \times ED \times IR_{dw}}$$

where,

10^{-5} cancer risk	= acceptable risk
BW (body weight)	= 70 kg
AT (averaging time in days)	= 25,550 (70 x 365)
CF (conversion factor)	= 1000 ug/mg
SF (cancer slope factor, mg/kg-d^{-1})	= chemical-specific
EF (exposure frequency)	= 245 d/yr
ED (exposure duration)	= 21 yr
IR_{dw} (drinking water ingestion rate)	= 1 liter/day

NONCARCINOGENS:
$$\frac{HQ \times RfD \times BW \times AT \times RSC \times CF}{EF \times ED \times IR_{dw}}$$

where,

HQ (hazard quotient)	= 1
RfD (oral reference dose, mg/kg/d)	= chemical-specific
BW (body weight)	= 70 kg
AT (averaging time)	= 7,665 days (21 x 365)
CF (conversion factor)	= 1000 ug/mg
RSC (relative source contribution)	= 0.2
EF (exposure frequency)	= 245 d/yr
ED (exposure duration)	= 21 yr
IR_{dw} (drinking water ingestion rate)	= 1 liter/day
ED (exposure duration)	= 21 yr
IR_{dw} (drinking water ingestion rate)	= 1 liter/day

These equations yield values which represent concentrations of contaminants in water in units of parts per billion (ppb) or micrograms per liter (ug/l). To convert to units of parts per million (ppm) or milligrams per liter (mg/l) in water, divide by 1,000.

The selection of an appropriate averaging time (AT) is dependent upon the type of toxic effect being evaluated. EPA guidance is followed on this issue (USEPA, 1989; USEPA, 1991). AT represents the number of days over which the exposure is averaged. When evaluating long-term exposure to noncarcinogenic compounds, exposures are calculated by averaging over the period of exposure (i.e., subchronic or chronic exposures). For carcinogenic compounds, exposures are calculated by prorating the total cumulative dose over a lifetime (also called lifetime average daily dose). The approach for carcinogens is based on the assumption that a high dose of a carcinogen received over a short period of time is equivalent to a corresponding low dose spread over a lifetime. The averaging time for carcinogens is 25,550 days (70 years x 365 days) and 7,665 days (21 years x 365 days) for noncarcinogens.

MDNR's recommendation of 21 years as the exposure duration (ED) for a worker is based on 1991 statistics from the U.S. Dept. of Labor. However, since the Dept. of Labor statistics did not detail the distribution for employees

working greater than 19 years at one location, the EPA 95th percentile estimate of 25 years was assumed. The 90th percentile was estimated to be 21 years. Although an ED of 21 years differs from EPA's recommendation of 25 years, our value represents more recent data. In addition, we follow general EPA guidance which recommends using a combination of exposure assumptions which represent 50th, 90th and 95th percentiles.

The exposure frequency (EF) for the drinking water scenario is derived assuming 260 work days per year minus 3 work weeks (15 days) of vacation and sick time. The assumed amount of water ingested at work (1 liter/day) is based on EPA's recommendation (USEPA, 1991). It is pointed out, however, that workers engaged in hard, physical labor could ingest a greater volume of water and this should be considered before finalizing the criteria to be used at a specific site.

The RSC of 0.2 (20%) assumes that a worker gets 80% of his/her exposure to on-site contaminants from other sources. The RSC represents a default value, and if chemical-specific data are available, they should be used in place of the default. Use of the RSC is consistent with the algorithms for the residential cleanup criteria. Justification for use of a RSC follows. There are many chemicals to which people are exposed through a variety of media and activities. For example, solvents, which are common industrial contaminants, are also commonly found in products routinely used by the general consumer. Ignoring exposures from other sources could underestimate the risk posed by that type of chemical. However, other chemicals may not occur at significant levels, or may not occur at all, outside of the work place. In light of the fact that chemical-specific data pertaining to this issue is extremely limited and significant exposures to certain chemicals do occur outside of the work place, it is necessary to identify a conservative default for this generic approach. As data suggesting something other than 20% becomes available, they will be incorporated into the chemical-specific criteria calculations.

no, it is not at 1

An RSC is only used for groundwater criteria; it has been eliminated from the direct contact soil equations. It's use for the industrial/commercial scenario is consistent with the residential equations. A 20% RSC for groundwater criteria is consistent with the approach taken by U.S. EPA for establishing Maximum Contaminant Level goals (MCLg) for noncarcinogens (previously known as RMCLs). Twenty percent is used by EPA "as a reasonable approximation of the actual exposure and recognizes that this value may somewhat either overestimate or underestimate the actual drinking water contribution. EPA does not believe that it is appropriate to set the RMCL at 100 percent of the ADI, as drinking water is not the sole contributor to total exposure, and using 100 percent of the ADI would underestimate the other sources of exposure" (U.S. EPA, 1985). An RSC has also been incorporated into the Great Lakes Initiative risk assessment process and has been informally used by the Waste Management Division in establishing groundwater permit limits for noncarcinogens.

In those cases where a State Drinking Water Standard is available, it will replace the health-based drinking water criterion, unless a more conservative aesthetic criterion is available.

Generic Industrial Direct Contact Soil Criterion Algorithms

CARCINOGENS:

$$\frac{10^{-5} \times BW \times AT \times CF}{SF \times (EF \times FD) \times ED \times FC \times [(IR_s \times AE_i) + (SA \times AF \times AE_d)]}$$

where,

10^{-5} cancer risk	= acceptable risk
BW (body weight)	= 70 kg
AT (averaging time)	= 25,550 days
CF (conversion factor)	= 1E+9 ug/kg
SF (cancer slope factor, mg/kg-d^{-1})	= chemical-specific
EF (exposure frequency)	= 112 d/yr
ED (exposure duration)	= 21 yr
FC (fraction of soil contaminated)	= 1
IR_s (soil ingestion rate)	= 50 mg/day
AE_i (ingestion absorp. efficiency)	= (see text)
SA (skin surface area)	= 2570 cm^2/day
AF (soil adherence factor)	= 1.0 mg/cm^2
AE_d (dermal absorption efficiency)	= (see text)
FD (	= 1

NONCARCINOGENS:

$$\frac{HQ \times RfD \times BW \times AT \times CF \times RSC}{EF \times ED \times FC \times [(IR_s \times AE_i) + (SA \times AF \times AE_d)]}$$

where,

HQ (hazard quotient)	= 1
RfD (oral ref. dose, mg/kg/day)	= chemical-specific
BW (body weight)	= 70 kg
AT (averaging time)	= 7,665 days (21 x 365)
CF (conversion factor)	= 1E+9 ug/kg
EF (exposure frequency)	= 112 d/yr
ED (exposure duration)	= 21 yr
FC (fraction soil contam'd)	= 1
Ir_s (soil ingestion rate)	= 50 mg/day
Ae_i (ingestion absorp. efficiency)	= (see text)
SA (skin surface area)	= 2570 cm^2/day
AF (soil adherence factor)	= 1.0 mg/cm^2
AE_d (dermal absorption efficiency)	= (see text)

RSC = 1

These equations yield values representative of concentrations of contaminants in soil in units of ppb or micrograms/kilogram (ug/kg). To convert to units of ppm or milligrams/kilogram (mg/kg) in soil, divide by 1,000.

The exposure frequency (EF) for the direct contact scenario was derived considering climatic factors (e.g., snow cover, frozen soil) and inclement weather conditions (e.g., rain) as well as variation in daily activities in which industrial workers participate. It is assumed that Michigan winters last for 4 months (120 days) making soil unavailable for contact. Allowing three weeks off for vacations and sick leave, and adjusting for a standard five day work week yields a maximum number of 160 days per year of industrial outdoor exposure in Michigan. The assumptions represent high-end values within a range of potential exposures.

365 - 120 - 21 x 5/7 = 160

Data from the Air Quality Division indicate that, on average, precipitation exceeds 0.25 inch one day per week during the months of March through October. These data represent average values from a 30 year period, 1951 through 1980. It is assumed that rainfall which exceeds 0.25 inches makes working outdoors difficult. Incorporating this factor also assumes that this significant rainfall occurs during the work week and during the eight hour work shift, which may not always be the case. However, this assumption may be balanced or "corrected" by a few low temperature days or snow days in March or October which could prevent a worker from working outdoors. This factor results in the number of days per week which a worker comes into contact with soil to be reduced from 5 to 4.

Activity patterns of a reasonable maximum exposed worker are not likely to bring the individual into contact with bare soil each and every day, since many different duties may be performed at any given facility. As a conservative estimate, it is assumed that one half day per week is spent performing some activity which does not bring the worker into contact with bare site soil. The incorporation of this factor results in a reasonable maximum EF value of 3.5 days per week or 112 days per year.

$$160 \times 3.5/5 = 112$$

The soil ingestion rate recommended by MDNR is 50 mg/day, which follows EPA's recommendation for industrial/commercial workers.

The oral absorption efficiency default is assumed to be 100% for volatiles and 50% for semi- and nonvolatile chemicals. When chemical-specific data are available, they will be used in place of the defaults. This policy is consistent with the Type B algorithms.

The skin surface area was estimated in the following manner:

skin surface area (cm^2) =	u SA forearms	= 1140
	u SA face (1/2 head)	= 590
	u SA hands	= 840
		2570

The amount of exposed skin surface area identified represents an average scenario, realizing that at times a worker could have more or less skin exposed. For example, there may be times when a worker is working without a shirt and times when a worker may be working in a long-sleeved shirt and/or a coat. The average scenario assumes that a worker is working in a short-sleeved shirt and long pants with hair or a hat covering part of his/her head. This scenario estimates a skin surface area value of 2,570 cm^2/day. In addition to the above discussion, surface area is strongly correlated with body weight. Since the assumed body weight represents an average value, surface area should be represented by an average value as well.

The attenuation factor of 1.0 mg/cm^2 is the value recommended by EPA (EPA, 1991). After evaluating the available soil adherence studies, EPA concludes that all of the studies considered have uncertainties thereby making a recommendation difficult. The studies provide a possible range from 0.2 to 1.5 mg/cm^2. A conservative central value of 1.0 mg/cm^2 is recommended until better data are available.

The dermal absorption efficiency is assumed to be 10% for volatiles and 1% for semi- and nonvolatiles as assumed in the Type B algorithm. All absorption values represent defaults which will be replaced if chemical-specific data are or become available.

As indicated earlier, EPA provides general guidance on how to characterize exposures and risks when conducting risk assessments. For Superfund exposure assessments, intake and exposure values should be selected so that the combination of all variables results in an estimate of the reasonable maximum exposure (RME) for that pathway. The RME is the maximum exposure that is reasonably expected to occur at a site. Under this approach, some intake variables may not be at their individual maximum values, but when in combination with other variables, will result in estimates of the RME (USEPA, 1989). More recent EPA guidance (USEPA, 1992), recommends estimating the high end exposure by "...identifying the most sensitive parameters and using maximum or near-maximum values for one or a few of these variables, leaving others at their mean values". This guidance applies when only limited information on the distribution of the exposure or dose factors is available. The basis for this recommendation is that maximizing all variables will result in an estimate that is above the range of actual values seen in the population. The algorithms presented in this document follow EPA guidance by combining exposure assumptions which represent a mix of high-end and mid-range values. For example, when evaluating the direct contact equation, a 70 year life span, body weight and surface area all represent a 50th percentile, while the exposure duration of 21 years and the soil ingestion rate represent the 90th percentile.

Since no distributions exist for frequency of exposure to soil, it's difficult to estimate a value and its associated percentile. However, it's reasonable to assume that the value chosen (112 days) is representative of the higher end of the range of possible exposures. Data supporting the dermal contact rate is also lacking, making it difficult to estimate the percentile that it represents. Although we are using average skin surface area values as presented by EPA (USEPA, 1990), estimation of those areas which are exposed to soil is strictly based upon best professional judgment. Although a significant amount of uncertainty surrounds the estimated exposure frequency and the dermal contact rate, the exposure assumptions selected are reasonable and conservative for the purpose of developing state-wide, generic cleanup criteria for industrial facilities.

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GENERIC COMMERCIAL LAND USE CATEGORY

The commercial land use category is extremely varied and broad, encompassing everything from day care centers and schools to gas stations and warehouse operations. The physical setting of commercial properties and the activities which workers and the general public engage in at these sites are also extremely variable. Given the breadth of the commercial land use category, it is impossible to assign a single set of "typical" or generic exposure assumptions to characterize the activities of all potentially exposed populations.

In order to facilitate the development of generic commercial criteria, the universe of commercial land uses has been divided into four subcategories based on factors which are critical to the assessment of potential risk. These factors include the potentially exposed populations (workers or general public) and the nature, duration, and frequency of the exposures likely to occur when people occupy, work at, visit, or patronize the site. The division of the commercial land use category into subcategories allows for some useful generalizations to be made.

A substantial degree of variability remains even within the subcategories of commercial land use. It will be the responsibility of the party proposing a remedy to demonstrate that the site and exposure setting is consistent with the characteristics of the subcategory closely enough to warrant use of the criteria. Similarly, the party proposing the remedy will have to describe in the RAP those measures that will be put in place (institutional controls, restrictive covenants, access restrictions, etc.) to assure that the exposure setting of the site is maintained consistent with the exposure characteristics of the subcategory. This will serve to guarantee that uses of the site which might yield unacceptable exposures will be precluded in the future. Conversely, land uses consistent with a subcategory may not possess exposures that are similar to those used to define the category. Proper characterization of those site-specific activities or exposures may warrant the use of generic criteria from another subcategory or category.

In the following sections, exposure assumptions protective for the set of site and exposure characteristics described below for subcategory III and IV sites have been developed. Some commercial subcategory III and IV sites may be located in or near residential areas and, therefore, may be used by other populations for purposes other than the intended commercial use (e.g. recreational). It may be inappropriate to apply the generic criteria developed for a given subcategory of commercial land use, if anticipated exposure from unintended uses exceeds the exposures assumed under that subcategory. Adjustments can be made to the exposure assumptions to represent these other uses or criteria for a more representative category can be used. Alternatively, the RAP may denote measures designed to preclude unintended uses.

For the purpose of determining if the generic commercial criteria presented in this memorandum are applicable, the party proposing a remedy must first determine that the site falls within the definition of commercial land use or that the site-related exposures are similar to those assumed for this category. The definition of commercial land use includes the following two elements:

- The primary activity at the site is commercial in nature (e.g., retail; warehouse; office/business space, etc.). This could include abandoned or inactive commercial facilities as long as they fit both the definition of a commercial facility and one of the subcategory definitions described below.

- The current zoning of the property is commercial, future zoning is anticipated to be commercial, or the RAP includes documentation that the current commercial use is a legal non-conforming use. This may include different zoning designations, depending on the community, such as "community commercial", "regional commercial", "retail", or "office-business". Documentation of zoning must be provided in the form of a map or current property record card which shows the zoning status of the site and all adjacent properties. If the RAP is based on anticipated zoning changes, discussion of this issue must indicate how and when the zoning changes are to be accomplished. The RAP must identify (preferably on a map) the nearest current residential land uses and nearest parcels which are zoned for residential use. Any non-conforming land uses in the vicinity of the site must be identified in the RAP (e.g., residential use on a parcel zoned "transitional commercial").

Caution should be used when categorizing sites on the basis of facility or business type. We expect that activities may vary considerably even among facilities of the same type. Activities and exposures should be the primary considerations when determining a land use category for a specific site.

If the site meets the definition of commercial land use, the party proposing the remedy must determine which of the four subcategories of commercial land use defined below is most representative of the exposure setting of the subject site. The subcategories and the features which define them are described below:

Subcategory I: This commercial land use subcategory is characterized by any use which is intended to house, educate, or provide care for children, the elderly, the infirm, or other sensitive subpopulations. The activities engaged in by these populations at the site are characterized by exposures of relatively significant duration and/or frequency approximating the magnitude of exposures used to develop the residential criteria. The site setting may include unpaved or landscaped areas containing contaminated surficial soils which may be frequented by potentially exposed populations (e.g. play areas). Any soil contaminants present may therefore be readily accessible to the resident populations. If relied on for drinking water, exposure to groundwater would also be significant. In addition, this subcategory of commercial land use is usually, but not always, located in or near residential areas and, therefore, may be used by other populations for purposes other than the intended commercial use (e.g. recreational). This subcategory could include, but is not limited to, the following uses:

- day care centers
- any form of educational facility
- hospitals, elder care facilities, and nursing homes.

Although a site-specific risk assessment may be conducted on sites within this category, no generic commercial cleanup criteria will be developed because in

most cases, the site setting and uses will warrant the application of residential criteria. There are forms of subcategory I commercial land uses that do not possess the exposure characteristics of the residential exposure setting, for example, long-term or convalescent care facilities where patients are not expected to come into contact with soils on a frequent basis. In such cases, site-specific cleanup criteria or criteria from another subcategory can be utilized with proper justification.

Subcategory II: This commercial land use subcategory is characterized by the following features. Access to the public is reliably restricted, consistent with its use, by fences, security, or both. Affected surficial soils are located in unpaved or landscaped areas that are frequently contacted by worker populations such as groundskeepers, maintenance workers, or other employees whose primary duties are performed outdoors. If site groundwater is relied on for drinking water, worker populations would receive half of their total exposure from on site drinking water.

This subcategory could include, but is not limited to, the following uses:

- large-scale commercial warehouse operations
- wholesale lumber yards
- building supply warehouses

The degree of exposure for such employees under Subcategory II property is assumed to be equivalent to the exposures used to model outdoor activities in the development of the generic industrial criteria. As a result, a unique set of generic criteria has not been defined for this subcategory of commercial land use. Sites which fall into this subcategory should be addressed through the application of the generic industrial criteria or through a site-specific risk assessment.

Subcategory III: A subcategory III commercial site is characterized by the following features. Access to the public is unrestricted, however, the general public's occupancy of the site is expected to be intermittent and significantly less in frequency and duration relative to the population working at the site. Although some of the activities for both worker populations and the general public at a subcategory III commercial site are conducted indoors, a significant component of their activity will likely be outdoors. Affected surficial soils are located in unpaved or landscaped areas that may be contacted frequently, primarily by the worker populations (as may be the cases at gas stations, auto dealerships or building supply warehouses with unpaved or landscaped areas). If site groundwater is relied on for drinking water, worker populations would receive about half of their total exposure from the site.

This subcategory could include, but is not limited to, the following uses:

- Retail gas stations
- Auto service stations
- Auto dealerships
- Retail warehouses selling the majority of their merchandise indoors but including some limited storage or stockpiling of materials in a rear yard (building supply, retail flower and garden shops not involving on site plant horticulture and excluding open air nurseries, tree farms and sod farms which would fall into an agricultural land use).

- Repair and service establishments including but not limited to, lawn mower, boat, snowmobile, or small appliance repair shops that have small outdoor yards.
- Small warehouse operations

Subcategory IV: A subcategory IV commercial site is characterized by the following features. Access to the public is unrestricted, however, the general public's occupancy of the site is intermittent in frequency and of short duration relative to the worker populations resident at the site (i.e. the frequency and duration of general public occupancy at the site is typified by the time necessary to transact business at a retail establishment or to receive personal services). The predominant activities performed by both workers and the general public at this type of commercial property are conducted indoors. Affected surficial soils are located in unpaved or landscaped areas that are contacted by worker populations on an occasional basis, such as outdoor break or eating areas. General public contact with these areas is anticipated to be significantly less than the worker's contact, both in terms of frequency and duration. If site groundwater is relied on for drinking water, worker populations would receive one-half of their total exposure at the site.

This subcategory could include, but is not limited to, the following uses:

- Professional offices (lawyers, architects, engineers, real estate, insurance, etc.)
- Medical/dental offices and clinics (not including hospitals)
- Banks, credit unions, savings and loan institutions, etc.
- Publicly owned office buildings
- Any retail business whose principal activity is the sale of food or merchandise within an enclosed building
- Personal service establishments which perform services indoors (health clubs, barber/beauty salons, mortuaries, photographic studios, etc.).

Generic Commercial Cleanup Criteria Algorithms

The following section provides justification for the exposure assumptions used under the generic commercial subcategories III and IV. The methods used to establish the generic commercial cleanup criteria for commercial subcategories III and IV are briefly summarized below.

Groundwater: The worker population was used to establish exposure parameters for the generic commercial groundwater criteria. Because workers are expected to spend the most time on site, their exposures are assumed to be greater than exposures to the general public. Protection of the more highly exposed population assures protection of the general public.

Unlike soil exposures, the exposure assumptions which serve as the basis for the generic groundwater criteria were not varied between subcategories (except for subcategory I which assumes the ingestion of 2 liters of water/day). No meaningful distinctions could be made between commercial land use subcategories and water ingestion rates. The exposure assumptions and the resulting groundwater criteria do not differ from those developed for the generic industrial scenario. Please refer to the narrative on groundwater

exposure assumptions in the generic industrial section for details. When available, State Drinking Water Standards serve as the ultimate drinking water criterion, unless a more restrictive aesthetic cleanup criterion is available.

Soil: The exposure assumptions used in the direct contact algorithms are protective for a "reasonable maximum exposure". The focus was the worker population within each subcategory that spends the largest amount of time outdoors engaged in activities that permit contact with affected soils. The worker population in both commercial subcategory III and subcategory IV represents the segment of the population within the subcategory with the highest potential exposures. Protection of less significantly exposed populations, like customers or workers who spend less time outdoors, is thereby assured.

Generic Commercial Direct Contact Soil Algorithm

The direct contact soil algorithm for the commercial scenario is the same as the industrial direct contact soil algorithm with the exception of different values for two exposure parameters, specifically, exposure frequency (EF) and the skin surface area (SA), and incorporation of an exposure time parameter. Please refer to the generic industrial section for details on the exposure assumptions that have not changed.

CARCINOGENS:

$$\frac{10^{-5} \times BW \times AT \times CF}{SF \times (EF \times FD) \times ED \times FC \times [(IR_s \times AE_i) + (SA \times AF \times AE_d)]}$$

where,

10^{-5} cancer risk	= acceptable risk
BW (body weight)	= 70 kg
AT (averaging time)	= 25,550 days
CF (conversion factor)	= 1E+9 ug/kg
SF (cancer slope factor, mg/kg-d^{-1})	= chemical-specific
EF (exposure frequency)	= (see text)
FD (fraction of work day)	= (see text)
ED (exposure duration)	= 21 yr
FC (fraction of soil contaminated)	= 1
IR_s (soil ingestion rate)	= 50 mg/day
AE_i (ingest. absorption efficiency)	= (see text)
SA (skin surface area)	= (see text)
AF (soil adherence factor)	= 1.0 mg/cm^2
AE_d (dermal absorption efficiency)	= (see text)

NONCARCINOGENS:

$$\frac{HQ \times RfD \times BW \times AT \times CF \times RSC}{(EF \times FD) \times ED \times FC \times [(IR_s \times AE_i) + (SA \times AF \times AE_d)]}$$

where,

HQ (hazard quotient)	= 1
RfD (oral reference dose, mg/kg day)	= chemical specific
BW	= 70 kg
AT	= 7,665 days
CF	= 1E+9 ug/kg
EF	= (see text)
ED	= 21 yr
FD	= (see text)
FC (fraction soil contam'd)	= 1

RSC = 1

Ir_s	= 50 mg/day
AE_i	= (see text)
SA	= (see text)
AF	= 1.0 mg/cm^2
AE_d	= (see text)

These equations yield values which represent concentrations of contaminants in soil in units of ppm or mg/kg. To convert to units of ppb or micrograms/kilogram in soil (ug/kg), multiply by 1,000.

Commercial Subcategory III

A typical receptor in this subcategory is a gas station attendant who must perform a combination of indoor and outdoor activities. The EF of 160 days/year was derived assuming that four months of winter would preclude an individual from coming into contact with soil. Rain and other inclement weather factors were not considered because it is assumed that this type of worker must still perform his/her outdoor duties. Allowing for three weeks off per year for vacations and sick leave and adjusting for a standard five day work week yields a maximum number of 160 days per year of potential exposure (i.e., 365 - 120 - 21 x 5/7 = 160). Having both indoor and outdoor responsibilities, this type of commercial worker is conservatively expected to spend four out of eight hours per work day outdoors. The FD parameter is equal to 0.5 (4/8 hours).

The area of skin exposed is assumed to be the same as for the generic industrial worker, 2570 cm^2/day. This assumes that the face, hands and forearms of the receptor are available for exposure, typified by a worker wearing a short-sleeved shirt and long pants.

Commercial Subcategory IV

The typical worker in this subcategory may be represented by an office worker who eats lunch and takes breaks outdoors. The EF was derived assuming that four months of winter would preclude an individual from coming into contact with soil. Allowing three weeks off for vacations and sick leave and adjusting for a standard five day work week yields 160 days/year. As in the generic industrial scenario, it is also assumed that it rains one day out of the week. This results in a value of 128 days/year. Since this type of receptor is outdoors only a small portion of the work day, reasonably 1.5 hours/day, a fraction of day parameter (FD) (1.5 hours out of 8) is incorporated into the algorithm. FD is equal to 0.19 (1.5/8).

This type of receptor is assumed to be a person with face, hands, forearms and lower legs exposed. This represents an individual wearing a short-sleeved shirt and a dress or skirt. The total skin surface area for these exposed areas is 4575 cm^2/day.

The assumed EF, FD, and SA values for the two commercial subcategories are summarized as follows:

	Exposure Frequency	Fraction of Day	Surface Area
Commercial Subcat. III	160	0.50	2570
Commercial Subcat. IV	128	0.19	4575

Attached as a table is a matrix presenting all commercial category and subcategory definitions and exposure assumptions. Use this table when trying to determine the most appropriate commercial land use subcategory for the site in question.

Table 1. Definitions of industrial and commercial categories and commercial subcategories and associated exposure assumptions.

LAND USE CATEGORIES AND SUBCATEGORIES	EXPOSURE ASSUMPTIONS				
	Exposure Frequency (d/year)	Fraction of Day (unitless)	Exposure Duration (years)	Soil Ingestion Rate (mg/day)	Skin Surface Area (cm^2/day)
INDUSTRIAL primary activity is industrial; property has landscaped and/or unpaved areas maintained by employees on a regular basis or employees are present whose primary duties are performed outdoors; access to general public is restricted; zoning is industrial	≤112	≤1	≤21	≤50	≤2570
COMMERCIAL primary activity is commercial; access is unrestricted; zoning is commercial; see subcategories					
~~SUBCATEGORY I~~ RESIDENTIAL a property where children, the elderly, the infirm or other sensitive subpopulations are housed, educated or otherwise cared for, e.g., schools, nursing homes, day cares; residential cleanup required	≤365	≤1	≤70	≤90	varies for different age grps.
SUBCATEGORY II activities similar to those characterized in industrial category; industrial cleanup required	≤112	≤1	≤21	≤50	≤2570
SUBCATEGORY III property has landscaped or unpaved areas in which some employees will spend approximately half of their work time, e.g., gas station attendants	≤160	≤0.5	≤21	≤50	≤2570
SUBCATEGORY IV a property with unpaved or landscaped areas that will be frequented by employees on an occasional basis, e.g., outdoor eating areas	≤128	≤0.19	≤21	≤50	≤4575

- Change Subcategory I on page 22
- DCV heading footnote (only consider exposure to [illegible] individual [illegible] [illegible] [illegible] may be required

PART 201 OF THE NATURAL RESOURCES AND ENVIRONMENTAL PROTECTION ACT, 1994
PA 451
GENERIC INDUSTRIAL AND COMMERCIAL CLEANUP CRITERIA
FOR GROUNDWATER AND SOIL

(REVISION 2)

These criteria were calculated using currently available toxicological data. Criteria may change as new toxcity data become available. They are not necessarily final cleanup standards. The determination of a soil concentration protective of surface water and/or groundwater in an aquifer is more complex than for residential sites, consequently, there are no values shown on the list. PLEASE READ THE ATTACHED OPERATIONAL MEMORANDUM FOR DETAILS. Carcinogenic chemicals are shown in bold italics. All values are expressed in units of parts per billion (ppb); ug/l in water and ug/kg in soil. (Values are converted from units of parts per million (ppm) as generated by algorithms). Scientific notation is represented by E+ or E- a value, for example 2×10^6 is reported as 2E+6. Please refer to Operational Memorandum #6 and #8 for information concerning method detection limits and residential cleanup criteria, respectively.

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	Direct Contact Value			Target Method Detection Limit in Soil
					Industrial	Commercial Subcategory III	Commercial Subcategory IV	
Acenaphthene	3,800	NA	3.8	5	8.1E+8	1.0E+9 {G}	1.0E+9 {G}	330
Acenaphthylene	75	NA	{B}	5	1.6E+7	2.3E+7	5.4E+7	330
Acetaldehyde	2,700	NA	{B}	500	9.7E+7	1.4E+8	2.7E+8	2,500
Acetic acid	12,000	NA	{B}	18,000	4.2E+8	5.9E+8	1.0E+9 {G}	9.0E+5
Acetone	2,100	NA	25,000	100	7.4E+7	1.0E+8	2.1E+8	100
etonitrile	400	NA	810	50	1.4E+7	2.0E+7	3.9E+7	100
Acrolein	330	NA	2.5	5	1.2E+7	1.7E+7	3.3E+7	10
Acrylamide	0.78	NA	9.1	0.5	33,000	47,000	1.1E+5	5
Acrylic acid	11,000	NA	{B}	NA	3.9E+8	5.5E+8	1.0E+9 {G}	NA
Acrylonitrile	6.4	NA	2.2	1	46,000	64,000	1.3E+5	10
Alachlor	2 {C}	NA	48	1	1.9E+6	2.6E+6	6.2E+6	20
Aldicarb	3 {C}	NA	{B}	2	4.5E+6	6.3E+6	1.5E+7	50
Aldicarb sulfoxide	4 {C}	NA	{B}	2	5.9E+6	8.2E+6	1.9E+7	50
Aldicarb sulfone	2 {C}	NA	{B}	2	5.0E+6	7.0E+6	1.6E+7	50
Aldrin	0.2	NA	0.0014	0.01	8,800	12,000	29,000	20
Aluminum	ID	50 {A,F}	{B}	100	ID	ID	ID	700
Ammonia	ID {P}	NA	20 {D}	50	ID {P}	ID {P}	ID {P}	1,000
Aniline	610	NA	4	20	2.6E+7	3.7E+7	8.7E+7	1,700
Anthracene	21,000	NA	1.1E+5	5	1.0E+9 {G}	1.0E+9 {G}	1.0E+9 {G}	330
Antimony	6 {A,C}	NA	50 {A}	5	1.6E+6	2.2E+6	5.2E+6	500
Arsenic	50 {A,C}	NA	11 {A}	5	~~83,000~~ 1.0E+5	~~1.2E+5~~ 1.4E+5	~~2.8E+5~~ 3.9E+5	100
Atrazine	3 {C}	NA	7.8	1	6.8E+5	9.5E+5	2.3E+6	50
Azobenzene	32	NA	{B}	NA	1.4E+6	1.9E+6	4.5E+6	NA
Barium	2,000 {A,C}	NA	630 {A,D}	200	3.2E+8	4.4E+8	1.0E+9 {G}	1,000
Benzene	5 {C}	NA	53	5	8.5E+5	1.2E+6	2.4E+6	10

Chemical	GROUNDWATER (ppb:ug/l)				SOIL (ppb:ug/kg)			
					Direct Contact Value			
	Health-Based Drinking Water Value	Aesthetic Drinking Water Value	GSI Value	Target Method Detection Limit in Water	Industrial	Commercial Subcategory III	Commercial Subcategory IV	Target Method Detection Limit in Soil
Benzidine	0.015	NA	0.0054	50	650	910	2,200	1,000
Benzo(a)anthracene (C)	4.8	NA	0.31	5	2.1E+5	2.9E+5	6.8E+5	330
Benzo(b)fluoranthene (C)	4.8	NA	0.31	5	2.1E+5	2.9E+5	6.8E+5	330
Benzo(k)fluoranthene (C)	48	NA	0.31	5	2.1E+6	2.9E+6	6.8E+6	330
Benzo(g,h,i)perylene	75	NA	(B)	5	1.6E+7	2.3E+7	5.4E+7	330
Benzo(a)pyrene (C)	0.2 (C)	NA	0.31	5	21,000	29,000	68,000	330
Benzoic acid	82,000	NA	(B)	50	1.0E+9 (G)	1.0E+9 (G)	1.0E+9 (G)	3,300
Benzyl alcohol	28,000	NA	22	50	1.0E+9 (G)	1.0E+9 (G)	1.0E+9 (G)	1,300
Benzyl chloride	20	NA	(B)	0.5	1.5E+5	2.0E+5	4.1E+5	200
Beryllium	4 (C)	NA	(B)	1	35,000	49,000	1.2E+5	200
Bis(2-chloroethoxy)ethane	ID	NA	(B)	5	ID	ID	ID	330
Bis(2-Chloroethyl)ether	3.2	NA	4.2	5	23,000	32,000	63,000	330
Bis(2-Ethylhexyl)phthalate	6 (C)	NA	59	5	1.1E+7	1.5E+7	3.5E+7	330
Boron	1,300 (A)	NA	(B)	300	2.7E+8	3.8E+8	8.9E+8	8,000
Bromobenzene	ID	NA	(B)	1	ID	ID	ID	10
Bromodichloromethane	100 (C,S)	NA	24	1	4.0E+5	5.6E+5	1.1E+6	10
Bromoform	100 (C,S)	NA	85	1	3.1E+6	4.4E+6	8.7E+6	10
Bromomethane	29	NA	11	1	1.0E+6	1.5E+6	2.9E+6	10
n-Butanol	2,700	NA	(B)	800	9.7E+7	1.4E+8	2.7E+8	4,400
2-Butanone (MEK)	36,000	NA	7,200	50	1.0E+9 (G)	1.0E+9 (G)	1.0E+9 (G)	100
n-Butyl acetate	1,800	NA	40	10	5.7E+7	7.9E+7	1.6E+8	20
t-Butyl alcohol	11,000	NA	8,300	1,000	4.0E+8	5.6E+8	1.0E+9 (G)	4,400
Butyl benzyl phthalate	3,300	NA	(B)	5	7.2E+8	1.0E+9 (G)	1.0E+9 (G)	330
Cadmium	5 (A,C)	NA	0.64 (A,D)	0.5	2.3E+6	3.2E+6	7.4E+6	50
Camphene	ID	NA	(B)	NA	ID	ID	ID	NA
Caprolactam	17,000	NA	(B)	NA	1.0E+9 (G)	1.0E+9 (G)	1.0E+9 (G)	NA
Carbaryl	2,000	NA	(B)	20	4.3E+8	6.1E+8	1.0E+9 (G)	1,000
Carbofuran	40 (C)	NA	1.6	20	3.7E+6	5.2E+6	1.0E+7	200
Carbon disulfide (R)	2,300	NA	(B)	50	8.2E+7	1.1E+8	2.3E+8	100
Carbon tetrachloride	5 (C)	NA	21	1	1.9E+5	2.7E+5	5.3E+5	10
Chlordane	2 (C)	NA	0.00053	0.02	1.2E+5	1.6E+5	3.6E+5	10
Chloride	ID	2.5E+5	(B)	10,000	ID	ID	ID	2.0E+5
Chlorobenzene	100 (C)	NA	71	1	1.4E+7	2.0E+7	3.9E+7	10
Chloroethane	910	NA	(B)	1	6.5E+6	9.1E+6	1.8E+7	10
2-Chloroethyl vinyl ether	ID	NA	(B)	10	ID	ID	ID	100
Chloroform	100 (C,S)	NA	80	1	4.1E+6	5.7E+6	1.1E+7	10
Chloromethane	270	NA	(B)	1	1.9E+6	2.7E+6	5.3E+6	10
4-Chloro-3-methylphenol	420	NA	4.4	5	1.5E+7	2.1E+7	4.1E+7	330
beta-Chloronaphthalene	5,200	NA	(B)	5	1.9E+8	2.6E+8	5.2E+8	330

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	Direct Contact Value			Target Method Detection Limit in Soil
					Industrial	Commercial Subcategory III	Commercial Subcategory IV	
2-Chlorophenol	130	NA	10	5	4.6E+6	6.5E+6	1.3E+7	330
o-Chlorotoluene	420	NA	{B}	1	1.5E+7	2.1E+7	4.1E+7	10
Chlorpyrifos	63	NA	0.002	0.2	1.4E+7	1.9E+7	4.5E+7	10
Chromium (III) {I}	100 {A,C,J}	NA	77 {A,D}	50	1.0E+9 {G}	1.0E+9 {G}	1.0E+9 {G}	2,500
Chromium (VI) {I}	100 {A,C,J}	NA	7.3 {A}	5	2.2E+7	3.0E+7	7.1E+7	200
Chrysene (Q)	480	NA	0.31	5	2.1E+7	2.9E+7	6.8E+7	330
Cobalt	100	NA	{B}	10	2.3E+7	3.2E+7	7.4E+7	500
Copper	4,000 {A}	1,000	18 {A,D}	25	1.7E+8	2.4E+8	5.6E+8	1,000
Cyanazine	6	NA	4.7	10	2.6E+5	3.6E+5	8.5E+5	500
Cyanide {R}	200 {C}	NA	5.2	20	9.9E+7	1.4E+8	3.3E+8	500
Cyclohexanone	94,000	NA	{B}	50	1.0E+9 {G}	1.0E+9 {G}	1.0E+9 {G}	100
Dacthal	210	NA	{B}	1	4.5E+7	6.3E+7	1.5E+8	20
Dalapon	200 {C}	NA	{B}	10	6.3E+7	8.8E+7	1.8E+8	100
4-4'-DDD	14	NA	0.0084	0.02	6.3E+5	8.8E+5	2.1E+6	20
4-4'-DDE	10	NA	0.0059	0.02	4.4E+5	6.2E+5	1.5E+6	20
4-4'-DDT	10	NA	0.00023	0.02	4.4E+5	6.2E+5	1.5E+6	20
Decabromodiphenyl ether	200	NA	{B}	10	4.5E+7	6.3E+7	1.5E+8	100
Di-n-butyl phthalate	2,500	NA	12,000	5	5.4E+8	7.6E+8	1.0E+9 {G}	330
Di(2-ethylhexyl) adipate	400 {C}	NA	{B}	5	2.1E+7	2.9E+7	5.8E+7	330
Di-n-octyl phthalate	380	NA	{B}	5	8.1E+7	1.1E+8	2.7E+8	330
Diacetone alcohol	ID	NA	{B}	NA	ID	ID	ID	NA
Diazinon	3.8	NA	0.002	0.5	8.1E+5	1.1E+6	2.7E+6	10
Dibenzo(a,h)anthracene (Q)	0.48	NA	0.31	5	21,000	29,000	68,000	330
Dibenzofuran	ID	NA	{B}	5	ID	ID	ID	330
Dibromochloromethane	100 {C,S}	NA	29	1	3.0E+5	4.1E+5	8.2E+5	10
Dibromomethane	230	NA	{B}	5	5.0E+7	6.9E+7	1.6E+8	10
1,2-Dichlorobenzene	600 {C}	NA	7	1	6.4E+7	9.0E+7	1.8E+8	10
1,3-Dichlorobenzene	600 {C}	NA	180	1	6.4E+7	9.0E+7	1.8E+8	10
1,4-Dichlorobenzene	75 {C}	NA	15	1	1.0E+6	1.4E+6	2.9E+6	10
3,3'-Dichlorobenzidine	7.7	NA	0.063	20	55,000	77,000	1.5E+5	2,000
Dichlorodifluoromethane	4,800	NA	{B}	1	1.7E+8	2.4E+8	4.8E+8	10
1,1-Dichloroethane	2,500	NA	{B}	1	8.9E+7	1.3E+8	2.5E+8	10
1,2-Dichloroethane	5 {C}	NA	560	1	2.7E+5	3.8E+5	7.6E+5	10
1,1-Dichloroethylene	7 {C}	NA	32	1	7.4E+5	1.0E+6	2.1E+6	10
cis-1,2-Dichloroethylene	70 {C}	NA	{B}	1	8.2E+6	1.1E+7	2.3E+7	10
trans-1,2-Dichloroethylene	100 {C}	NA	300	1	1.3E+7	1.8E+7	3.5E+7	10
2,6-Dichloro-4-nitroaniline	6,300	NA	{B}	0.01	1.0E+9 {G}	1.0E+9 {G}	1.0E+9 {G}	0.1
2,4-Dichlorophenol	210	NA	34 {D}	5	4.5E+7	6.3E+7	1.5E+8	330
2,4-Dichlorophenoxyacetic acid	70 {C}	NA	47	10	4.5E+7	6.3E+7	1.5E+8	200

Chemical	GROUNDWATER (ppb:ug/l)				SOIL (ppb:ug/kg)			
					Direct Contact Value			
	Health-Based Drinking Water Value	Aesthetic Drinking Water Value	GSI Value	Target Method Detection Limit in Water	Industrial	Commercial Subcategory III	Commercial Subcategory IV	Target Method Detection Limit in Soil
1,3-Dichloropropane	5 (C)	NA	64	1	3.6E+5	5.1E+5	1.0E+6	10
1,3-Dichloropropene (J)	19	NA	3	1	1.4E+5	1.9E+5	3.8E+5	10
Dichlorvos	12	NA	(B)	0.1	5.2E+5	7.2E+5	1.7E+6	50
Dicyclohexyl phthalate	ID	NA	(B)	5	ID	ID	ID	330
Dieldrin	0.22	NA	3.2E-5	0.02	9,400	13,000	31,000	20
Diethoxymethane	ID	NA	(B)	10	ID	ID	ID	100
Diethyl ether	10,000	NA	(B)	50	3.7E+8	5.2E+8	1.0E+9 (G)	100
Diethyl phthalate	16,000	NA	1.2E+5	5	1.0E+9 (G)	1.0E+9 (G)	1.0E+9 (G)	330
Diethylene glycol monobutyl ether	250	NA	(B)	NA	5.4E+7	7.6E+7	1.6E+8	NA
Diisopropylamine	16	NA	(B)	NA	5.7E+5	8.0E+5	1.6E+6	NA
Dimethyl phthalate	2.1E+5	NA	2.9E+6	5				
N,N-Dimethylacetamide	520	NA	(B)	NA				
N,N-Dimethylaniline	46	NA	(B)	NA				
Dimethylformamide	2,000	NA	3,800	NA				
2,4-Dimethylphenol	1,000	NA	31	5				
2,6-Dimethylphenol	13	NA	(B)	5				
3,4-Dimethylphenol	29	NA	(B)	5				
Dimethylsulfoxide	6.3E+5	NA	(B)	NA				
2,4-Dinitrotoluene	5.1	NA	91	5				
Dinoseb	7 (C)	NA	0.5 (D)	1				
1,4-Dioxane	320	NA	2,000	1				
Diquat	20 (C)	NA	(B)	1				
Endosulfan (J)	4.8	NA	(B)	0.01				
Endothall	100 (C)	NA	(B)	20				
Endrin	2 (C)	NA	0.0023	0.02	7.7E+5	1.1E+6	2.5E+6	20
Epichlorohydrin	350	NA	(B)	5	2.5E+6	3.5E+6	7.0E+6	10
Ethanol	5.8E+6	NA	41,000	1,000	1.0E+9 (G)	1.0E+9 (G)	1.0E+9 (G)	4,400
Ethyl acetate	19,000	NA	1,000	NA	6.7E+8	9.4E+8	1.0E+9 (G)	NA
1-Ethyl-2-methylbenzene	ID	NA	(B)	NA	ID	ID	ID	NA
Ethylbenzene	700 (C)	74	31	1	7.2E+7	1.0E+8	2.0E+8	10
Ethylene dibromide	0.05 (C)	NA	1.1	1	290	410	810	10
Ethylene glycol	42,000	NA	66,000	5,000	1.0E+9 (G)	1.0E+9 (G)	1.0E+9 (G)	5,000
Ethylene glycol acetate	ID	NA	(B)	NA	ID	ID	ID	NA
Ethylene glycol monobutyl ether	270	NA	(B)	NA	9.7E+6	1.4E+7	2.7E+7	NA
Fluoranthene	2,500	NA	370	5	5.4E+8	7.6E+8	1.0E+9 (G)	330
Fluorene	2,500	NA	14,000	5	5.4E+8	7.6E+8	1.0E+9 (G)	330
Fluoride	400 (C)	2,000	1,900	NA	2.7E+8	3.8E+8	8.9E+8	NA
Formaldehyde	3,800	NA	170	100	1.3E+8	1.9E+8	3.7E+8	500
Formic acid	29,000	NA	(B)	18,000	1.0E+9 (G)	1.0E+9 (G)	1.0E+9 (G)	9.0E+5

Mike Metzger (619) 569-3272
Footnote P → Combine sources of Nitrogen
Soil [ ]'s

6/26

Jeff Cook/Richard OP Mgr 314-MO
-051's 216-771-3040 2-TMP

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	Direct Contact Value			Target Method Detection Limit in Soil
					Industrial	Commercial Subcategory III	Commercial Subcategory IV	
1-Formylpiperidine	230	NA	{B}	NA	8.2E+6	1.1E+7	2.3E+7	NA
Gentian violet	35	NA	{B}	NA	1.5E+6	2.1E+6	5.0E+6	NA
Glyphosate	700 {C}	NA	{B}	100	4.5E+8	6.3E+8	1.0E+9 {G}	NA
Heptachlor	0.4 {C}	NA	0.0016	0.01	33,000	47,000	1.1E+5	20
Heptachlor epoxide	0.2 {C}	NA	0.0011	0.01	16,000	23,000	54,000	20
n-Heptane	92,000	NA	4	NA	1.0E+9 {G}	1.0E+9 {G}	1.0E+9 {G}	NA
Hexabromobenzene	58	NA	{B}	{K}	1.3E+7	1.8E+7	4.2E+7	{K}
Hexachlorobenzene (C-88)	1{C}	NA	0.0019	{K}	94,000	1.3E+5	3.1E+5	{K}
Hexachlorobutadiene (C-46)	45	NA	500	{K}	1.9E+6	2.7E+6	6.4E+6	{K}
alpha-Hexachlorocyclohexane	0.55	NA	0.13	0.01	24,000	33,000	79,000	20
beta-Hexachlorocyclohexane	1.9	NA	0.46	0.01	83,000	1.2E+5	2.8E+5	20
Hexachlorocyclopentadiene (C-56)	50 {C}	NA	0.54	{K}	3.2E+7	4.5E+7	1.1E+8	{K}
Hexachloroethane	250	NA	13	2	1.8E+6	2.5E+6	4.9E+6	50
n-Hexane	8,600	NA	{B}	NA	3.1E+8	4.3E+8	8.5E+8	NA
2-Hexanone	2,900	NA	{B}	50	1.0E+8	1.5E+8	2.9E+8	100
Indeno(1,2,3-cd)pyrene (Q)	4.8	NA	0.31	5	2.1E+5	2.9E+5	6.8E+5	330
Iron	ID	300 {A}	{B}	100	ID	ID	ID	2,000
Isobutyl alcohol	6,700	NA	{B}	1,000	2.4E+8	3.3E+8	6.6E+8	4,400
Isophorone	3,700	NA	860	5	2.6E+7	3.7E+7	7.3E+7	330
Isopropyl alcohol	1,300	NA	21,000	400	4.8E+7	6.7E+7	1.3E+8	4,400
Lead	4 {A,L}	NA	6.6 {A,D}	3	4.0E+5 {L}	4.0E+5 {L}	4.0E+5 {L}	1,000
Lindane	0.2 {C}	NA	0.08	0.01	1.2E+5	1.6E+5	3.8E+5	20
Magnesium	1.2E+6	NA	{B}	30	1.0E+9 {G}	1.0E+9 {G}	1.0E+9 {G}	3,000
Manganese	500 {A}	50 {A}	{B}	20	2.2E+7	3.0E+7	7.1E+7	2,000
Mercury (Inorganic)	2 {A,C}	NA	0.0013 {A}	0.2	1.4E+6	1.9E+6	4.5E+6	100
Methanol	10,000	NA	41,000	1,000	3.7E+8	5.2E+8	1.0E+9 {G}	4,400
Methoxychlor	40 {C}	NA	{B}	0.5	2.3E+7	3.2E+7	7.4E+7	50
2-Methoxyethanol	83	NA	{B}	NA	3.0E+6	4.2E+6	8.3E+6	NA
2-Methyl-4-chlorophenoxyacetic acid	21	NA	{B}	0.5	4.5E+6	6.3E+6	1.5E+7	100
2-Methyl-4,6-dinitrophenol	7.3	NA	0.59	20	1.6E+6	2.2E+6	5.2E+6	1,700
4-Methyl-2-pentanone (MIBK)	1,000	NA	{B}	50	3.7E+7	5.2E+7	1.0E+8	100
Methyl-tert-butyl ether (MTBE)	690	NA	380	50	2.5E+7	3.4E+7	6.8E+7	100
N-Methyl-morpholine	56	NA	{B}	NA	2.0E+6	2.8E+6	5.6E+6	NA
Methylcyclopentane	ID	NA	{B}	50	ID	ID	ID	500
4,4'-Methylene-bis-2-chloroaniline (M)	3.6	NA	{B}	1	1.6E+5	2.2E+5	5.1E+5	50
Methylene chloride	5 {C}	NA	59	5	3.3E+6	4.6E+6	9.2E+6	10
2-Methylnaphthalene	ID	NA	{B}	5	ID	ID	ID	330
2-Methylphenol	1,000	NA	38	5	3.7E+7	5.2E+7	1.0E+8	330
3-Methylphenol	1,000	NA	{B}	5	2.3E+8	3.2E+8	7.4E+8	330

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	Direct Contact Value			Target Method Detection Limit in Soil
					Industrial	Commercial Subcategory III	Commercial Subcategory IV	
4-Methylphenol	100	NA	6.2	5	2.3E+7	3.2E+7	7.4E+7	330
Metolachlor	670	NA	150	10	2.9E+7	4.0E+7	9.5E+7	50
Molybdenum	100 (A)	NA	800 (A)	10	2.3E+7	3.2E+7	7.4E+7	100
Naphthalene	750	NA	29	5	1.8E+6	2.3E+6	5.4E+6	330
Nickel	100 (A,C)	NA	57 (A,D)	50	3.4E+6	4.8E+6	1.0E+9 (G)	1,000
Nitrate (F)	10,000 (C,F)	NA	(B)	100	ID	ID	ID	NA
Nitrite (F)	1,000 (C,F)	NA	(B)	100	ID	ID	ID	NA
Nitrobenzene	9.8	NA	1,900	5	3.4E+5	4.8E+5	9.5E+5	330
2-Nitrophenol	58	NA	(B)	5	1.3E+7	1.8E+7	4.2E+7	330
n-Nitroso-di-n-propylamine	0.5	NA	(B)	5	3,500	5,000	9,900	330
N-Nitrosodiphenylamine	710	NA	160	5	5.1E+6	7.1E+6	1.4E+7	330
Oxamyl	200 (C)	NA	(B)	NA	1.7E+6	2.4E+6	5.8E+6	NA
Oxo-hexyl acetate	210	NA	(B)	NA	7.4E+6	1.0E+7	2.1E+7	NA
Pendimethalin	2,500	NA	0.62	0.1	5.4E+6	7.6E+6	1.0E+9 (G)	20
Pentachlorobenzene	17	NA	(B)	2	3.7E+6	5.2E+6	1.2E+7	50
Pentachloronitrobenzene	160	NA	(B)	2	3.4E+7 63,000	4.7E+7 87,000	1.1E+8 1.7E+5	50
Pentachlorophenol	1 (C)	NA	0.8 (D)	20	~~1.3E+6~~	~~1.8E+6~~	~~4.1E+6~~	3,400
Pentane	ID	NA	(B)	100	ID	ID	ID	1,000
2-Pentene	ID	NA	(B)	NA	ID	ID	ID	NA
Phenanthrene	75	NA	(B)	5	1.8E+7	2.3E+7	5.4E+7	330
Phenol	13,000	NA	1,100	5	4.5E+8	6.2E+8	1.0E+9 (G)	330
Picloram	500 (C)	NA	(B)	10	3.2E+8	4.4E+8	1.0E+9 (G)	100
Piperidine	9.2	NA	(B)	NA	3.3E+5	4.6E+5	9.1E+5	NA
Polybrominated biphenyls (J)	0.39	NA	(B)	NA	17,000	24,000	56,000	NA
Polychlorinated biphenyls (PCBs) (J,T)	0.5 (C)	NA	2.0E-5	0.2	21,000	30,000	58,000	330
Prometon	460	NA	(B)	0.5	9.9E+7	1.4E+8	3.3E+8	20
Propachlor	270	NA	(B)	1	5.9E+7	8.2E+7	1.9E+8	20
Propazine	560	NA	(B)	0.5	1.2E+8	1.7E+8	4.0E+8	20
Propionic acid	35,000	NA	(B)	100	1.0E+9 (G)	1.0E+9 (G)	1.0E+9 (G)	6,700
Propyl alcohol	4,000	NA	15,000	NA	1.4E+8	2.0E+8	3.9E+8	NA
Propylene glycol	4.2E+5	NA	1.9E+5	5,000	1.0E+9 (G)	1.0E+9 (G)	1.0E+9 (G)	5,000
Pyrene	1,800	NA	11,000	5	3.4E+8	4.7E+8	1.0E+9 (G)	330
Pyridine	21	NA	20	20	7.4E+5	1.0E+6	2.1E+6	330
Selenium	50 (A,C)	NA	5 (A)	5	2.3E+7	3.2E+7	7.4E+7	500
Silver	98 (A)	100	0.1 (A)	0.5	2.1E+7	3.0E+7	7.0E+7	500
Simazine	4 (C)	NA	3.4	10	2.3E+7	3.3E+7	7.7E+7	40
Sodium	4.5E+5	NA	(B)	NA	1.0E+9 (G)	1.0E+9 (G)	1.0E+9 (G)	NA
Styrene	100 (C)	NA	19	1	8.3E+5	1.2E+6	2.3E+6	10
Sulfate	ID	2.5E+5	(B)	NA	ID	ID	ID	NA

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	Direct Contact Value			Target Method Detection Limit in Soil
					Industrial	Commercial Subcategory III	Commercial Subcategory IV	
Tebuthiuron	1,500	NA	{B}	NA	3.2E+8	4.4E+8	1.0E+9 {G}	NA
2,3,7,8-Tetrabromodibenzo-p-dioxin {O}	{O}	NA	{O}	0.0001	{O}	{O}	{O}	0.01
1,2,4,5-Tetrachlorobenzene	7,100	NA	0.4	0.1	1.0E+9 {G}	1.0E+9 {G}	1.0E+9 {G}	20
2,3,7,8-Tetrachlorodibenzo-p-dioxin {O}	3.0E-5 {C}	NA	1.4E-8	1.0E-5	0.99 ppb	1.4	2.9	0.001
1,1,1,2-Tetrachloroethane	130	NA	{B}	1	9.5E+5	1.3E+6	2.7E+6	10
1,1,2,2-Tetrachloroethane	17	NA	32	1	1.2E+5	1.7E+5	3.5E+5	10
Tetrachloroethylene	5 {C}	NA	22	1	4.9E+5	6.8E+5	1.4E+6	10
Tetrahydrofuran	690	NA	3,300	1,000	2.5E+7	3.4E+7	6.8E+7	10,000
Thallium	2 {A,C}	NA	5.4 {A}	2	3.0E+5	4.2E+5	1.0E+6	500
Toluene	1,000 {C}	790	110	1	1.6E+8	2.3E+8	4.6E+8	10
p-Toluidine	16	NA	{B}	NA	7.9E+5	1.1E+6	2.6E+6	NA
Toxaphene	3 {C}	NA	0.0002	1	23,000	32,000	63,000	170
Trialate	270	NA	{B}	1	5.9E+7	8.2E+7	1.9E+8	20
Tributylamine	29	NA	{B}	NA	1.0E+6	1.5E+6	2.9E+6	NA
1,2,4-Trichlorobenzene	70 {C}	NA	22	5	6.8E+7	9.5E+7	2.2E+8	330
1,1,1-Trichloroethane	200 {C}	NA	120	1	2.1E+7	2.9E+7	5.8E+7	10
1,1,2-Trichloroethane	5 {C}	NA	65	1	4.4E+5	6.1E+5	1.2E+6	10
richloroethylene	5 {C}	NA	94	1	1.6E+6	2.2E+6	4.3E+6	10
richlorofluoromethane	7,300	NA	580	1	2.6E+8	3.6E+8	7.3E+8	10
2,4,5-Trichlorophenol	2,100	NA	25	50	4.5E+8	6.3E+8	1.0E+9 {G}	1,700
2,4,6-Trichlorophenol	320	NA	27 {D}	5	1.4E+7	1.9E+7	4.5E+7	330
2(2,4,5-Trichlorophenoxy)propionic acid {N}	50 {C}	NA	21	1	3.4E+7	4.7E+7	1.1E+8	50
1,2,3-Trichloropropane	120	NA	{B}	1	2.6E+7	3.6E+7	8.5E+7	10
1,1,2-Trichloro-1,2,2-trifluoroethane	5.6E+5	NA	33	NA	1.0E+9 {G}	1.0E+9 {G}	1.0E+9 {G}	NA
Triethanolamine	10,000	NA	{B}	NA	3.7E+8	5.2E+8	1.0E+9 {G}	NA
3-Trifluoromethyl-4-nitrophenol	13,000	NA	32 {D}	NA	1.0E+9 {G}	1.0E+9 {G}	1.0E+9 {G}	NA
Trifluralin	450	NA	{B}	1	2.0E+7	2.7E+7	6.4E+7	50
2,2,4-Trimethyl pentane	ID	NA	{B}	50	ID	ID	ID	500
2,2,4-Trimethyl-2-pentene	ID	NA	{B}	NA	ID	ID	ID	NA
1,2,4-Trimethylbenzene	86	NA	22	1	3.1E+6	4.3E+6	8.5E+6	10
1,3,5-Trimethylbenzene	65	NA	26	1	2.3E+6	3.2E+6	6.4E+6	10
tris(2,3-Dibromopropyl)phosphate	1.9	NA	{B}	NA	83,000	1.2E+5	2.8E+5	NA
Urea	ID {P}	NA	{B}	400	ID {P}	ID {P}	ID {P}	20,000
Vanadium	180 {A}	NA	8 {A}	20	3.9E+7	5.5E+7	1.3E+8	1,000
Vinyl acetate	1,800	NA	{B}	50	6.5E+7	9.2E+7	1.8E+8	100
Vinyl chloride	2 {C}	NA	3.1	1	11,000	16,000	31,000	10
White phosphorus {R}	0.31	NA	{B}	NA	68,000	95,000.	2.2E+5	NA
Xylenes	10,000 {C}	280	59	3	1.0E+9 {G}	1.0E+9 {G}	1.0E+9 {G}	30
Zinc	6,900 {A}	5,000 {A}	81 {A,D}	20	1.0E+9 {G}	1.0E+9 {G}	1.0E+9 {G}	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, except when statistically calculated background is higher.

{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.

ENVIRONMENTAL RESPONSE DIVISION

OPERATIONAL MEMORANDUM #14, REVISION 2

ERRATA SHEET
JUNE 8, 1995

Page 1, Disclosure statement prior to paragraph 1
~~THIS OPERATIONAL MEMORANDUM WILL TAKE EFFECT *ONLY* WHEN HOUSE BILL 4596 IS SIGNED INTO LAW.~~ ***HOUSE BILL 4596, AS AMENDED BY THE SENATE, WAS SIGNED INTO LAW AND BECAME EFFECTIVE ON JUNE 5, 1995.***

Page 1, Paragraph 1
Revision 4 of this Operational Memorandum reflects changes made as a result of two major legislative actions: (1) the incorporation of the Michigan Environmental Response Act (MERA), 1982 PA 307, as amended, ~~(2)~~ into the Natural Resources and Environmental Protection Code, 1994 PA 451; and *(2)* the 1995 amendments to Part 201 contained in House Bill 4596, ***as amended by the Senate (1995 PA 71).***

Page 12, Last Paragraph
The ~~attenuation~~ ***adherence*** factor of 1.0 mg/cm^2 is the value recommended by EPA (EPA, 1991).

Page 10, Paragraph beginning with "An RSC is only..."
~~An RSC is only used for groundwater criteria; it has been eliminated from the direct contact soil equations. It's use for the industrial/commercial scenario is consistent with the residential equations.~~

Add the following sentences at the end of this paragraph:
The RSC for the direct contact soil equations is 100%. These RSC values represent default values to be used unless compound and site-specific data are available to demonstrate that a different source contribution is appropriate.

Page 11, Generic Industrial Direct Contact Soil Criterion Algorithm
Insert the RSC into the equation for the industrial direct contact soil criterion algorithm for noncarcinogens.

NONCARCINOGENS:
$$\frac{HQ \times RfD \times BW \times AT \times CF \times RSC}{EF \times ED \times FC \times [(IR_s \times AE_i) + (SA \times AF \times AE_d)]}$$

Insert the following in the list of default values for the industrial direct contact soil criterion algorithm for noncarcinogens.

RSC (relative source contribution) $= 1$

Page 19, Generic Commercial Direct Contact Soil Algorithm
Insert the RSC into the equation for the commercial direct contact soil criterion algorithm for noncarcinogens.

NONCARCINOGENS:
$$\frac{HQ \times RfD \times BW \times AT \times CF \times RSC}{(EF \times FD) \times ED \times FC \times [(IR_s \times AE_i) + (SA \times AF \times AE_d)]}$$

Insert the following in the list of default values for the commercial direct contact soil criterion algorithm for noncarcinogens.

RSC (relative source contribution) $= 1$

MICHIGAN DEPARTMENT OF NATURAL RESOURCES

INTEROFFICE COMMUNICATION

September 30, 1993

TO: Environmental Response Division Staff

FROM: Alan J. Howard, Chief, Environmental Response Division

SUBJECT: MERA Operational Memorandum #15: Default Type A Cleanup Criteria

In order to facilitate cleanup decisions at sites at which naturally occurring metals may be of concern, the following acceptable default Type A soil cleanup criteria have been established. These values are based on analysis of the database for the Michigan Background Soil Survey (April 1991) which is maintained by Waste Management Division (WMD). They represent the mean plus one standard deviation for WMD data from combined clay, topsoil and sand categories. The values are presented in two significant figures. Data should be rounded to two significant figures for comparison.

Table 1: ACCEPTABLE DEFAULT VALUES TYPE A SOIL CLEANUP CRITERIA

Substance	Acceptable Concentration (mg/kg)	Substance	Acceptable Concentration (mg/kg)
Aluminum	6900	Iron	12000
Arsenic	5.8	Mercury	0.13
Barium	75	Lithium	9.8
Cadmium	1.2	Manganese	440
Cobalt	6.8	Nickel	20
Chromium (total)	18	Lead	21
Copper	32	Selenium	0.41
Cyanide	0.39	Silver	1.0
		Zinc	47

The default values apply as follows:

1. If measured concentrations at a site do not exceed the values listed in Table 1, site specific samples to establish background are not required.

2. The values apply to all soil types, statewide.

3. It is acceptable to establish a site-specific background concentration higher than the default values. Such sampling should be conducted according to requirements in existence before the issuance of this memorandum. Comparison of site values is made against the mean plus three standard deviations calculated from background samples as provided for in existing ERD guidance regarding verification of soil remediation.

4. Staff also may approve Type A cleanups based on a regionally proximate background value higher than the default values. Comparison should be made as in #3, above.

This memorandum is intended to provide guidance to Division staff to foster consistent application of the Michigan Environmental Response Act (1982 PA 307, as amended) and the Administrative Rules promulgated thereunder. This document is not intended to convey any rights to any parties nor create any duties or responsibilities under law. This document and matters addressed herein are subject to revision.

Any questions about this memorandum should be directed to Bill Iversen at 517-373-0907.

rev. 0
cc: Dennis Drake, Air Quality Division
Bob Miller, Surface Water Quality Division
Tom Segall, Geological Survey Division
Jim Sygo, Waste Management Division

PART 201
Environmental Remediation

This document contains Part 201 (Environmental Remediation) of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended - -an act to protect the environment and natural resources of the state of Michigan. This document replaces and updates the revised September 1996 printing of Part 201 in its entirety to now include the April 1 and June 29, 2000 amendments (65 PA of 2000; 254 PA of 2000 respectively), the May 27 and December 17, 1999 amendments (30 PA of 1999; 196 PA of 1999 respectively) and the July 7, 1997 amendments (61 PA of 1997) to Part 201.

For further information, contact:

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Environmental Response Division
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Telephone: 517-373-9837
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*John Engler, Governor * Russell J. Harding, Director*

PREFACE

Part 201 of the Natural Resources and Environmental Protection Act is reprinted under the editorial direction of the Legislative Service Bureau from the text of the *Michigan Compiled Laws*, supplemented through Act 254 of the 2000 Regular Session of the Michigan Legislature.

Materials in boldface type, particularly catchlines and annotations to the statutes, are not part of the statutes as enacted by the Legislature.

Legal Editing and Law Publications Division
Legislative Service Bureau

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NATURAL RESOURCES AND ENVIRONMENTAL PROTECTION ACT (EXCERPTS)

Act 451 of 1994

AN ACT to protect the environment and natural resources of the state; to codify, revise, consolidate, and classify laws relating to the environment and natural resources of the state; to regulate the discharge of certain substances into the environment; to regulate the use of certain lands, waters, and other natural resources of the state; to prescribe the powers and duties of certain state and local agencies and officials; to provide for certain charges, fees, and assessments; to provide certain appropriations; to prescribe penalties and provide remedies; to repeal certain parts of this act on a specific date; and to repeal certain acts and parts of acts.

History: 1994, Act 451, Eff. Mar. 30, 1995;—Am. 1996, Act 434, Imd. Eff. Dec. 2, 1996.

The People of the State of Michigan enact:

ARTICLE II POLLUTION CONTROL

CHAPTER 7: REMEDIATION

PART 201 ENVIRONMENTAL REMEDIATION

324.20101 Definitions.

Sec. 20101. (1) As used in this part:

(a) "Act of God" means an unanticipated grave natural disaster or other natural phenomenon of an exceptional, inevitable, and irresistible character, the effects of which could not have been prevented or avoided by the exercise of due care or foresight.

(b) "Agricultural property" means real property used for farming in any of its branches, including cultivating of soil; growing and harvesting of any agricultural, horticultural, or floricultural commodity; dairying; raising of livestock, bees, fish, fur-bearing animals, or poultry; turf and tree farming; and performing any practices on a farm as an incident to, or in conjunction with, these farming operations. Agricultural property does not include property used for commercial storage, processing, distribution, marketing, or shipping operations.

(c) "Attorney general" means the department of the attorney general.

(d) "Baseline environmental assessment" means an evaluation of environmental conditions which exist at a facility at the time of purchase, occupancy, or foreclosure that reasonably defines the existing conditions and circumstance at the facility so that, in the event of a subsequent release, there is a means of distinguishing the new release from existing contamination.

(e) "Board" means the brownfield redevelopment board created in section 20104a.

(f) "Department" means the director of the department of environmental quality or his or her designee to whom the director delegates a power or duty by written instrument.

(g) "Director" means the director of the department of environmental quality.

(h) "Directors" means the directors or their designees of the departments of environmental quality, community health, agriculture, and state police.

(i) "Disposal" means the discharge, deposit, injection, dumping, spilling, leaking, or placing of any hazardous substance into or on any land or water so that the hazardous substance or any constituent of the hazardous substance may enter the environment or be emitted into the air or discharged into any groundwater or surface water.

(j) "Enforcement costs" means court expenses, reasonable attorney fees of the attorney general, and other reasonable expenses of an executive department that are incurred in relation to enforcement under this part or rules promulgated under this part, or both.

(k) "Environment" or "natural resources" means land, surface water, groundwater, subsurface, strata, air, fish, wildlife, or biota within the state.

(*l*) "Environmental contamination" means the release of a hazardous substance, or the potential release of a discarded hazardous substance, in a quantity which is or may become injurious to the environment or to the public health, safety, or welfare.

(m) "Evaluation" means those activities including, but not limited to, investigation, studies, sampling, analysis, development of feasibility studies, and administrative efforts that are needed to determine the nature, extent, and impact of a release or threat of release and necessary response activities.

(n) "Exacerbation" means the occurrence of either of the following caused by an activity undertaken by the person who owns or operates the property, with respect to existing contamination:

(*i*) Contamination that has migrated beyond the boundaries of the property which is the source of the release at levels above cleanup criteria specified in section 20120a(1)(a) unless a criterion is not relevant because exposure is reliably restricted pursuant to section 20120b.

(*ii*) A change in facility conditions that increases response activity costs.

(o) "Facility" means any area, place, or property where a hazardous substance in excess of the concentrations which satisfy the requirements of section 20120a(1)(a) or (17) or the cleanup criteria for unrestricted residential use under part 213 has been released, deposited, disposed of, or otherwise comes to be located. Facility does not include any area, place, or property at which response activities have been completed which satisfy the cleanup criteria for the residential category provided for in section 20120a(1)(a) and (17) or at which corrective action has been completed under part 213 which satisfies the cleanup criteria for unrestricted residential use.

(p) "Feasibility study" means a process for developing, evaluating, and selecting appropriate response activities.

(q) "Foreclosure" means possession of a property by a lender on which it has foreclosed on a security interest or the expiration of a lawful redemption period, whichever occurs first.

(r) "Free product" means a hazardous substance in a liquid phase equal to or greater than 1/8 inch of measurable thickness that is not dissolved in water and that has been released into the environment.

(s) "Fund" means the cleanup and redevelopment fund established in section 20108.

(t) "Hazardous substance" means 1 or more of the following, but does not include fruit, vegetable, or field crop residuals or processing by-products, or aquatic plants, that are applied to the land for an agricultural use or for use as an animal feed, if the use is consistent with generally accepted agricultural management practices developed pursuant to the Michigan right to farm act, Act No. 93 of the Public Acts of 1981, being sections 286.471 to 286.474 of the Michigan Compiled Laws:

(*i*) Any substance that the department demonstrates, on a case by case basis, poses an unacceptable risk to the public health, safety, or welfare, or the environment, considering the fate of the material, dose-response, toxicity, or adverse impact on natural resources.

(*ii*) Hazardous substance as defined in the comprehensive environmental response, compensation, and liability act of 1980, Public Law 96-510, 94 Stat. 2767.

(*iii*) Hazardous waste as defined in part 111.

(*iv*) Petroleum as described in part 213.

(u) "Interim response activity" means the cleanup or removal of a released hazardous substance or the taking of other actions, prior to the implementation of a remedial action, as may be necessary to prevent, minimize, or mitigate injury to the public health, safety, or welfare, or to the environment. Interim response activity also includes, but is not limited to, measures to limit access, replacement of water supplies, and temporary relocation of people as determined to be necessary by the department. In addition, interim response activity means the taking of other actions as may be necessary to prevent, minimize, or mitigate a threatened release.

(v) "Lender" means any of the following:

(*i*) A state or nationally chartered bank.

(*ii*) A state or federally chartered savings and loan association or savings bank.

(*iii*) A state or federally chartered credit union.

(*iv*) Any other state or federally chartered lending institution or regulated affiliate or regulated subsidiary of any entity listed in this subparagraph or subparagraphs (*i*) to (*iii*).

(*v*) An insurance company authorized to do business in this state pursuant to the insurance code of 1956, Act No. 218 of the Public Acts of 1956, being sections 500.100 to 500.8302 of the Michigan Compiled Laws.

(*vi*) A motor vehicle finance company subject to the motor vehicle finance act, Act No. 27 of the Extra Session of 1950, being sections 492.101 to 492.141 of the Michigan Compiled Laws, with net assets in excess of $50,000,000.00.

(*vii*) A foreign bank.

(*viii*) A retirement fund regulated pursuant to state law or a pension fund regulated pursuant to federal law with net assets in excess of $50,000,000.00.

(*ix*) A state or federal agency authorized by law to hold a security interest in real property or a local unit of government holding a reversionary interest in real property.

(*x*) A nonprofit tax exempt organization created to promote economic development in which a majority of the organization's assets are held by a local unit of government.

(*xi*) Any other person who loans money for the purchase of or improvement of real property.

(*xii*) Any person who retains or receives a security interest to service a debt or to secure a performance obligation.

(w) "Local health department" means that term as defined in section 1105 of the public health code, Act No. 368 of the Public Acts of 1978, being section 333.1105 of the Michigan Compiled Laws.

(x) "Local unit of government" means a county, city, township, or village, an agency of a local unit of government, an authority or any other public body or entity created by or pursuant to state law. Local unit of government does not include the state or federal government or a state or federal agency.

(y) "Operator" means a person who is in control of or responsible for the operation of a facility. Operator does not include either of the following:

(*i*) A person who holds indicia of ownership primarily to protect the person's security interest in the facility, unless that person participates in the management of the facility as described in section 20101a.

(*ii*) A person who is acting as a fiduciary in compliance with section 20101b.

(z) "Owner" means a person who owns a facility. Owner does not include either of the following:

(*i*) A person who holds indicia of ownership primarily to protect the person's security interest in the facility, including, but not limited to, a vendor's interest under a recorded land contract, unless that person participates in the management of the facility as described in section 20101a.

(*ii*) A person who is acting as a fiduciary in compliance with section 20101b.

(aa) "Permitted release" means 1 or more of the following:

(*i*) A release in compliance with an applicable, legally enforceable permit issued under state law.

(*ii*) A lawful and authorized discharge into a permitted waste treatment facility.

(*iii*) A federally permitted release as defined in the comprehensive environmental response, compensation, and liability act of 1980, Public Law 96-510, 94 Stat. 2767.

(bb) "Release" includes, but is not limited to, any spilling, leaking, pumping, pouring, emitting, emptying, discharging, injecting, escaping, leaching, dumping, or disposing of a hazardous substance into the environment, or the abandonment or discarding of barrels, containers, and other closed receptacles containing a hazardous substance. Release does not include any of the following:

(*i*) A release that results in exposure to persons solely within a workplace, with respect to a claim that these persons may assert against their employers.

(*ii*) Emissions from the engine exhaust of a motor vehicle, rolling stock, aircraft, or vessel.

(*iii*) A release of source, by-product, or special nuclear material from a nuclear incident, as those terms are defined in the atomic energy act of 1954, chapter 1073, 68 Stat. 919, if the release is subject to requirements with respect to financial protection established by the nuclear regulatory commission under section 170 of chapter 14 of title I of the atomic energy act of 1954, chapter 1073, 71 Stat. 576, 42 U.S.C. 2210, or any release of source by-product or special nuclear material from any processing site designated under section 102(a)(1) of title I or 302(a) of title III of the uranium mill tailings radiation control act of 1978, Public Law 95-604, 42 U.S.C. 7912 and 7942.

(*iv*) If applied according to label directions and according to generally accepted agricultural and management practices, the application of a fertilizer, soil conditioner, agronomically applied manure, or pesticide, or fruit, vegetable, or field crop residuals or processing by-products, aquatic plants, or a combination of these substances. As used in this subparagraph, fertilizer and soil conditioner have the meaning given to these terms in part 85, and pesticide has the meaning given to that term in part 83.

(*v*) A release does not include fruits, vegetables, field crop processing by-products, or aquatic plants, that are applied to the land for an agricultural use or for use as an animal feed, if the use is consistent with generally accepted agricultural and management practices developed pursuant to the Michigan right to farm act, Act No. 93 of the Public Acts of 1981, being sections 286.471 to 286.474 of the Michigan Compiled Laws.

(cc) "Remedial action" includes, but is not limited to, cleanup, removal, containment, isolation, destruction, or treatment of a hazardous substance released or threatened to be released into the environment, monitoring, maintenance, or the taking of other actions that may be necessary to prevent, minimize, or mitigate injury to the public health, safety, or welfare, or to the environment.

(dd) "Remedial action plan" means a work plan for performing remedial action under this part.

(ee) "Response activity" means evaluation, interim response activity, remedial action, demolition, or the taking of other actions necessary to protect the public health, safety, or welfare, or the environment or the natural resources. Response activity also includes health assessments or health effect studies carried out under the supervision, or with the approval of, the department of public health and enforcement actions related to any response activity.

(ff) "Response activity costs" or "costs of response activity" means all costs incurred in taking or conducting a response activity, including enforcement costs.

(gg) "Security interest" means any interest, including a reversionary interest, in real property created or established for the purpose of securing a loan or other obligation. Security interests include, but are not limited to, mortgages, deeds of trusts, liens, and title pursuant to lease financing transactions. Security interests may also arise from transactions such as sale and leasebacks, conditional sales, installment sales, trust receipt transactions, certain assignments, factoring agreements, accounts receivable financing arrangements, consignments, or any other transaction in which evidence of title is created if the transaction creates or establishes an interest in real property for the purpose of securing a loan or other obligation.

(hh) "Site" means the location of environmental contamination.

(ii) "Threatened release" or "threat of release" means any circumstance that may reasonably be anticipated to cause a release.

(2) As used in this part, the phrase "a person who is liable" includes a person who is described as being subject to liability in section 20126. The phrase "a person who is liable" does not presume that liability has been adjudicated.

History: 1994, Act 451, Eff. Mar. 30, 1995;—Am. 1995, Act 71, Imd. Eff. June 5, 1995;—Am. 1995, Act 117, Imd. Eff. June 29, 1995;—Am. 1996, Act 115, Imd. Eff. Mar. 6, 1996;—Am. 1996, Act 380, Imd. Eff. July 24, 1996;—Am. 1996, Act 383, Imd. Eff. July 24, 1996.

324.20101a Participation in management of facility by lender; "workout" defined.

Sec. 20101a. (1) For purposes of this part, a lender holding a security interest in a facility participates in the management of the facility if that lender engages in acts of facility management that constitute actual participation in the management or operational affairs of a facility and that exceed the mere capacity to influence, or ability to influence, or the unexercised right to control facility operations. A lender holding a security interest is participating in the management of a facility, while the borrower is still in possession of the facility encumbered by the security interest, if the lender holding a security interest does any of the following:

(a) Exercises decision making control over the borrower's environmental compliance.

(b) Undertakes responsibility for the borrower's hazardous substance handling or disposal practices.

(c) Exercises control at a level comparable to that of a manager of the borrower's enterprise, such that the holder has assumed or manifested responsibility for the overall management of the enterprise encompassing the day-to-day decision making of the enterprise with respect to either or both of the following:

(*i*) Environmental compliance.

(*ii*) All, or substantially all, of the operational aspects of the enterprise other than environmental compliance. As used in this subparagraph, "operational aspects of the enterprise" includes functions such as that of facility or plant manager, operations manager, chief operating officer, or chief executive officer. Operational aspects of the enterprise do not include the financial or administrative aspects of the enterprise such as that of credit manager, accounts payable or receivable manager, personnel manager, controller, chief financial officer, or similar functions.

(2) For purposes of this part, the following do not constitute participation in the management of a facility by a lender holding a security interest in the facility:

(a) The mere capacity to influence, or ability to influence, or the unexercised right to control facility operations.

(b) An act or omission prior to the time that indicia of ownership are held primarily to protect a security interest.

(c) Undertaking or requiring an environmental inspection of the facility in which indicia of ownership are to be held, or requiring a prospective borrower to undertake response activities at a facility or to comply or come into compliance, whether prior or subsequent to the time that indicia of ownership are held primarily to protect a security interest, with any applicable law, rule, or regulation.

(d) Actions that are consistent with holding ownership indicia primarily to protect a security interest. The authority of the lender holding a security interest to take such actions may, but need not, be contained in contractual or other documents specifying requirements for financial, environmental, and other warranties, covenants, conditions, representations, or promises from the borrower. Loan policing and workout activities cover and include all activities up to foreclosure and its equivalents.

(e) Engaging in policing activities prior to foreclosure if the lender holding a security interest does not by such actions participate in the management of the facility as described in subsection (1)(a) to (c). Permissible actions include, but are not limited to, requiring the borrower to undertake response activities at the facility during the term of the security interest; requiring the borrower to comply or come into compliance with applicable federal, state, and local environmental and other laws, rules, and regulations during the term of the security interest; and securing or exercising authority to monitor or inspect the facility in which indicia of ownership are maintained, including on-site inspections, or the borrower's business or financial condition, during the term of the security interest. A lender holding a security interest that engages in workout activities prior to foreclosure and its equivalents will remain within the exemption if the lender holding a security interest does not by such action participate in the management of the facility.

(3) As used in this section, "workout" refers to those actions by which a lender holding a security interest, at any time prior to foreclosure or its equivalent, seeks to prevent, cure, or mitigate a default by the borrower or obligor or to preserve, or prevent the diminution of, the value of the security. Workout activities include, but are not limited to, restructuring or renegotiating the terms of the security interest; requiring payment of additional rent or interest; exercising forbearance; requiring or exercising rights pursuant to an assignment of accounts or other amounts owing to an obligor; requiring or exercising rights pursuant to an escrow agreement pertaining to amounts owing to an obligor; and providing specific or general financial or other advice, suggestions, counseling, or guidance.

History: 1994, Act 451, Eff. Mar. 30, 1995;—Am. 1995, Act 71, Imd. Eff. June 5, 1995

324.20101b Liability of lender as fiduciary or representative for disabled person; responsibilities.

Sec. 20101b. (1) A lender or other person who has not participated in the management of a property as described in section 20101a before assuming ownership or control of the property as a fiduciary, as defined by section 1104 of the estates and protected individuals code, 1998 PA 386, MCL 700.1104, or in a representative capacity for a disabled person under section 5501 of the estates and protected individuals code, 1998 PA 386, MCL 700.5501, and that is acting or has acted in a capacity permitted by the estates and protected individuals code, 1998 PA 386, MCL 700.1101 to 700.8102, is not personally liable as an owner or operator of the property under this part. This subsection does not do either of the following:

(a) Relieve the fiduciary from personal liability as the result of the fiduciary's assumption of personal liability, or negligence, gross negligence, or reckless, willful, or intentional misconduct.

(b) Prevent a claim against the assets that are part of or all of the estate or trust that contains the facility; another estate or trust of the decedent, grantor, ward, or other person whose estate or trust contains the facility that is administered by the lender or other person; or another estate or trust of the decedent, grantor, ward, or other person whose estate or trust contains the facility. Such a claim may be asserted against the fiduciary in its representative capacity, whether or not the fiduciary is personally liable.

(2) A lender that has not participated in the management of a property as described in section 20101a before assuming ownership or control of the property in a fiduciary capacity, and under a fiduciary agreement entered into on or before August 1, 1990 owns or controls the property in a fiduciary capacity that is authorized by the banking code of 1969, 1969 PA 319, MCL 487.301 to 487.598, or the national bank act, chapter 106, 13 Stat. 99, is not personally liable as an owner or operator of the property under this part. This subsection does not do either of the following:

(a) Relieve the fiduciary from personal liability as the result of the fiduciary's assumption of personal liability, negligence, gross negligence, or reckless, willful, or intentional misconduct.

(b) Prevent a claim against the assets that are part of or all of the estate or trust that contains the facility; another estate or trust of the decedent, grantor, ward, or other person whose estate or trust contains the facility that is administered by the lender; or another estate or trust of the decedent, grantor, ward, or other person whose estate or trust contains the facility. Such a claim may be asserted against the fiduciary in its representative capacity, whether or not the fiduciary is personally liable.

(3) A lender that has not participated in the management of a property as described in section 20101a before assuming ownership or control of the property in a fiduciary capacity, and under a fiduciary agreement entered into after August 1, 1990 owns or controls the property in a fiduciary capacity that is authorized by the banking code of 1969, 1969 PA 319, MCL 487.301 to 487.598, or the national bank act, chapter 106, 13 Stat. 99, that has served only in an administrative, custodial, or financial capacity with respect to the property, and has not exercised sufficient involvement to control the owner's or operator's handling of a hazardous substance, is not personally liable as an owner or operator of the property under this part. This subsection does not do either of the following:

(a) Relieve the fiduciary from personal liability as the result of the fiduciary's assumption of personal liability, negligence, gross negligence, or reckless, willful, or intentional misconduct.

(b) Prevent a claim against the assets that are part of or all of the estate or trust that contains the facility; another estate or trust of the decedent, grantor, ward, or other person whose estate or trust contains the facility that is administered by the lender; or another estate or trust of the decedent, grantor, ward, or other person whose estate or trust contains the facility. Such a claim may be asserted against the fiduciary in its representative capacity, whether or not the fiduciary is personally liable.

History: Add. 1995, Act 71, Imd. Eff. June 5, 1995;—Am. 2000, Act 65, Eff. Apr. 1, 2000.

324.20102 Legislative finding and declaration.

Sec. 20102. The legislature hereby finds and declares:

(a) That there exist in this state certain facilities containing hazardous substances that pose a danger to the public health, safety, or welfare, or to the environment of this state.

(b) That there is a need to provide for a method of eliminating the danger of environmental contamination caused by the existence of hazardous substances at facilities within the state.

(c) That it is the purpose of this part to provide for appropriate response activity to eliminate unacceptable risks to public health, safety, or welfare, or to the environment from environmental contamination at facilities within the state.

(d) That there is a need for additional administrative and judicial remedies to supplement existing statutory and common law remedies.

(e) That the responsibility for the cost of response activities pertaining to a release or threat of release and repairing injury, destruction, or loss to natural resources caused by a release or threat of release should not be placed upon the public except when funds cannot be collected from, or a response activity cannot be undertaken by, a person liable under this part.

(f) That liability for response activities to address environmental contamination should be imposed upon those persons who are responsible for the environmental contamination.

(g) That to the extent possible, consistent with requirements under this part and rules promulgated under this part, response activities shall be undertaken by persons liable under this part.

(h) That this part is intended to provide remedies for facilities posing any threat to the public health, safety, or welfare, or to the environment, regardless of whether the release or threat of release of a hazardous substance occurred before or after October 13, 1982, the effective date of the former environmental response act, Act No. 307 of the Public Acts of 1982, and for this purpose this part shall be given retroactive application. However, criminal and civil penalties provided in this part shall apply to violations of this part that occur after July 1, 1991.

(i) That a facility that is owned by the federal government, the state, or a local unit of government, or a facility where a release or threat of release is caused by the federal government, the state, or a local unit of government, should not be treated differently in terms of the expenditure of money for response activities than any facility.

(j) That if a person who is liable under section 20126 is the state or a local unit of government, this part should be enforced by the attorney general and the department in the same manner as it would be for any other person who is liable under section 20126.

(k) That this part is not intended to impose penalties or exemplary damages upon parties conducting response activities pursuant to a decree or order to which the United States is a party.

(l) That this part is intended to foster the redevelopment and reuse of vacant manufacturing facilities and abandoned industrial sites that have economic development potential, if that redevelopment or reuse assures the protection of the public health, safety, welfare, and the environment.

(m) That it is the intent of the legislature that, in implementing this part, the department shall act reasonably in its exercise of professional judgment.

History: 1994, Act 451, Eff. Mar. 30, 1995;—Am. 1995, Act 71, Imd. Eff. June 5, 1995.

324.20102a Applicability of provisions in effect on May 1, 1995 to certain actions; incorporation by reference; approval of changes in response activity plan.

Sec. 20102a. (1) Notwithstanding any other provision of this part, the following actions shall be governed by the provisions of this part that were in effect on May 1, 1995:

(a) Any judicial action or claim in bankruptcy that was initiated by any person on or before May 1, 1995 under this part.

(b) An administrative order that was issued on or before May 1, 1995 pursuant to section 20119.

(c) An enforceable agreement with the state entered into on or before May 1, 1995 by any person under this part.

(2) For purposes of this section, the provisions of this part that were in effect on May 1, 1995 are hereby incorporated by reference.

(3) Notwithstanding subsection (1), upon request of a person implementing response activity, the department shall approve changes in a plan for response activity to be consistent with sections 20118 and 20120a.

History: Add. 1995, Act 71, Imd. Eff. June 5, 1995.

324.20103 Federal assistance.

Sec. 20103. The department shall seek federal assistance for response activities required at facilities in this state.

History: 1994, Act 451, Eff. Mar. 30, 1995.

324.20104 Coordination of activities; rules; damages; use of nonuse valuation methods; applicability of provisions to certain bankruptcy actions or claims.

Sec. 20104. (1) The department shall coordinate all activities required under this part and shall promulgate rules to provide for the performance of response activities, to provide for the assessment of damages for injury to, destruction of, or loss of natural resources resulting from a release, and to implement the powers and duties of the department under this part, and as otherwise necessary to carry out the requirements of this part.

(2) Claims for natural resource damages may be pursued prior to promulgation of rules but only in accordance with principles of scientific and economic validity and reliability. Contingent nonuse valuation methods or similar nonuse valuation methods shall not be utilized and damages shall not be recovered for nonuse values unless and until rules are promulgated that establish an appropriate means of determining such damages.

(3) A contingent nonuse valuation method or similar nonuse valuation method shall not be utilized for natural resource damage calculations unless a determination is made by the department that such a method satisfies principles of scientific and economic validity and reliability and rules for utilizing a contingent nonuse valuation method or a similar nonuse valuation method are subsequently promulgated.

(4) The provisions in this section related to natural resource damages as added by the 1995 amendatory act that amended this section do not apply to any judicial or administrative action or claim in bankruptcy initiated on or before March 1, 1995.

History: 1994, Act 451, Eff. Mar. 30, 1995;—Am. 1995, Act 71, Imd. Eff. June 5, 1995.

324.20104a Brownfield redevelopment board; creation; membership; quorum; business conducted at public meeting; writings subject to freedom of information act; duties and responsibilities.

Sec. 20104a. (1) The brownfield redevelopment board is created within the department of environmental quality.

(2) The board shall consist of the following members:

(a) The director of the department of environmental quality or his or her designee.

(b) The director of the department of management and budget or his or her designee.

(c) The chief executive officer of the jobs commission or his or her designee.

(3) A majority of the members of the board constitute a quorum for the transaction of business at a meeting of the board.

(4) The business which the board may perform shall be conducted at a public meeting of the board held in compliance with the open meetings act, Act No. 267 of the Public Acts of 1976, being sections 15.261 to 15.275 of the Michigan Compiled Laws.

(5) A writing prepared, owned, used, in the possession of, or retained by the board in the performance of an official function is subject to the freedom of information act, Act No. 442 of the Public Acts of 1976, being sections 15.231 to 15.246 of the Michigan Compiled Laws.

(6) The board shall implement the duties and responsibilities as provided in this part and as otherwise provided by law.

History: Add. 1996, Act 383, Imd. Eff. July 24, 1996.

324.20105 Duties of department; notification of inclusion on list; removal of site from list; "list" defined.

Sec. 20105. (1) The department shall do all of the following:

(a) Upon discovery of a site, identify and evaluate the site for the purpose of assigning to the site a priority score for response activities. Upon assignment to the site of a priority score for response activity, the site shall retain the same score assignment unless a substantial body of data is provided to or available to the department indicating to the department that a substantial change in the score is warranted, and a person requests rescoring for a site during the annual public comment period following the publication of the list, or the department determines that rescoring is appropriate.

(b) Develop 1 or more numerical risk assessment models for assessing the relative present and potential hazards posed to the public health, safety, or welfare, or to the environment by each site identified pursuant to subdivision (a). The model, or models if more than 1 is developed, shall provide a fair and objective site specific numerical score designating the relative risk posed to the public health, safety, or welfare, or to the environment of each site.

(c) Include in rules promulgated under this part the numerical risk assessment model or models if more than 1 is developed. The numerical risk assessment model or models shall be reviewed annually by the department to identify potential improvements.

(d) Except as provided in subsection (9), submit to the legislature in November of each fourth year a list strictly derived from the numerical risk assessment model or models provided for in this section that does all of the following:

(*i*) Includes all sites.

(*ii*) Categorizes sites according to the response activity at the site at the time of listing and according to categories established by rules.

(*iii*) Indicates whether the owner of a site is the federal government, the state, or a local unit of government.

(*iv*) Indicates a change in the status of a site since the last previously prepared list.

(e) Maintain and make available to the public upon request records regarding sites where remedial actions have been completed, including sites where land use restrictions have been imposed, if the records are not otherwise protected from disclosure by law.

(f) Submit the list for public hearings geographically dispersed throughout the state. These hearings shall be completed at least 30 days before the governor's annual budget recommendations to the legislature.

(g) Report to the legislature and the governor those sites that have been removed from the list pursuant to this section and rules promulgated under this part and the source of the funds used to undertake the response activity at each of the sites.

(h) Publish a notice each fourth year in the Michigan register of the availability of, and submit to the standing committees of the senate and the house of representatives that primarily consider issues pertaining to the protection of natural resources and the environment, a report describing the response activity that is undertaken at each site where response activity is or has occurred during the reporting period and the nature of the contamination that resulted in the necessity for that response activity.

(2) Following July 1, 1991, if the department has information identifying the owner of property that may be listed as a site, the department shall make reasonable efforts to notify in writing the owner of the property and the local health department and the municipality in which the site is located prior to including the site on the list. This subsection does not provide a defense to liability.

(3) A site shall be removed from the list when the department's review of a site shows that the site does not meet the criteria specified in rules promulgated under this part. A site shall not be removed from this list until any necessary response activity that meets the standards specified in rules promulgated under this part is complete.

(4) A person may request that a site be removed from the list by submitting a petition to the department. A petition shall include all of the following information:

(a) A description and history of the site.

(b) A description of the nature and extent of the environmental contamination that existed at the site at the time the site was included on the list.

(c) A description of the response activity undertaken to remedy the release or threat of a release, consistent with rules promulgated under this part, or a description of the investigation conducted that supports the person's petition that the site should be removed from the list without further response activity.

(d) An analysis of the effectiveness of the response activity undertaken to remediate the release or threat of release. The analysis shall include site specific analytical data that documents the effectiveness of the response activity.

(e) Other site-specific information required by the department.

(5) A person seeking the removal of a site from the list shall prepare and submit to the department the documentation required by subsection (4). If response activities have been conducted by the department at the site, the department shall prepare the documentation required by subsection (4).

(6) Within 30 days after receipt of the petition, the department shall determine whether a petition submitted under subsection (4) is administratively complete. Within 60 days after a determination that a petition is administratively complete, the petitioner shall be notified by the department of the department's intent to remove the site from the list, or the petitioner shall be notified that the petition for removal of the site from the list does not meet the criteria for removal of the site from the list as determined by rule. Removal of sites from the list shall be accomplished as part of the process described in rules promulgated under this part. However, if the department concludes pursuant to subsection (3) that the circumstances warrant removal of the site from the list before or at the next regularly scheduled hearing to be held in accordance with rules promulgated under this part, the department shall prepare a notice of intent to remove the site from the list. A notice of intent shall include information considered appropriate by the department and shall be published in at least 1 newspaper of general circulation that serves the area of the site and the notice of intent shall be provided to the local health department and the municipality in which the site is located. Public comment on the notice of intent to remove the site from the site list shall be accepted for a period of not less than 30 days from the date of publication. The department may hold a public hearing on the proposed action.

(7) The department shall make a final determination whether to include the site on the next list. The department shall consider any comments received in response to the notice described in subsection (6).

(8) The department shall notify the person that requested that the site be removed from the list, the local health department, and the municipality in which the site is located of the decision within 45 days of the end of the public comment period provided for in the notice published pursuant to subsection (6).

(9) If the department provides the information required to be included on the list prepared under this section on a computer data base that is accessible through public access computer terminals in each county in the state, the department need not prepare a printed copy of the list.

(10) As used in this section, "list" means the list described in subsection (1)(d).

History: 1994, Act 451, Eff. Mar. 30, 1995;—Am. 1995, Act 71, Imd. Eff. June 5, 1995.

Compiler's note: For transfer of authority, powers, duties, functions, and responsibilities of the Environmental Response Division to the Director of the Michigan Department of Environmental Quality, see E.R.O. No. 1995-16, compiled at §324.99981 of the Michigan Compiled Laws.

324.20105a Sites receiving state funds to conduct response activities; compilation, arrangement, and submission of list.

Sec. 20105a. The department shall annually compile a list of sites that are receiving state funds to conduct response activities. This list shall be arranged in alphabetical order. The department shall annually submit this list to the legislature.

History: Add. 1995, Act 71, Imd. Eff. June 5, 1995.

324.20106 Level of funding; recommendation of governor.

Sec. 20106. (1) The governor shall include in his or her annual budget recommendations to the legislature a recommended level of funding to provide for the activities necessary to implement this part.

(2) The governor's recommendations under this section shall be accompanied by a site specific description of the extent of known or suspected environmental contamination, the recommended response activities to be undertaken, and an estimate of cost of those response activities.

History: 1994, Act 451, Eff. Mar. 30, 1995.

324.20107 Tearing down, removing, or destroying sign or notice as misdemeanor; penalty.

Sec. 20107. A person who willfully tears down, removes, or destroys any sign or notice warning of the presence of hazardous substances or marking boundaries of a facility subject to response activity under this part is guilty of a misdemeanor punishable by imprisonment for not more than 90 days or a fine of not more than $500.00, or both.

History: 1994, Act 451, Eff. Mar. 30, 1995;—Am. 1995, Act 71, Imd. Eff. June 5, 1995.

324.20107a Duties of owner or operator having knowledge of facility; liability for costs and damages; compliance with section; applicability of subsection (1).

Sec. 20107a. (1) A person who owns or operates property that he or she has knowledge is a facility shall do all of the following with respect to hazardous substances at the facility:

(a) Undertake measures as are necessary to prevent exacerbation of the existing contamination.

(b) Exercise due care by undertaking response activity necessary to mitigate unacceptable exposure to hazardous substances, mitigate fire and explosion hazards due to hazardous substances, and allow for the intended use of the facility in a manner that protects the public health and safety.

(c) Take reasonable precautions against the reasonably foreseeable acts or omissions of a third party and the consequences that foreseeably could result from those acts or omissions.

(2) Notwithstanding any other provision of this part, a person who violates subsection (1) is liable for response activity costs and natural resource damages attributable to any exacerbation of existing contamination and any fines or penalties imposed under this part resulting from the violation of subsection (1) but is not liable for performance of additional response activities unless the person is otherwise liable under this part for performance of additional response activities. The burden of proof in a dispute as to what constitutes exacerbation shall be borne by the party seeking relief.

(3) Compliance with this section does not satisfy a person's obligation to perform response activities as otherwise required under this part.

(4) Subsection (1) does not apply to the state or to a local unit of government that is not liable under section 20126(3)(a), (b), (c), or (e) or to a local unit of government that acquired property by purchase, gift, transfer, or condemnation prior to the effective date of this section or to a person who is exempt from liability under section 20126(4)(c).

(5) Subsection (1) does not apply to a person who is exempt from liability under section 20126(3)(c) or (d) except with regard to that person's activities at the facility.

History: Add. 1995, Act 71, Imd. Eff. June 5, 1995;—Am. 1996, Act 115, Imd. Eff. Mar. 6, 1996;—Am. 1996, Act 380, Imd. Eff. July 24, 1996;—Am. 1996, Act 383, Imd. Eff. July 24, 1996.

324.20108 Cleanup and redevelopment fund; creation; deposit of assets into fund; subaccounts; unexpended balance to be carried forward.

Sec. 20108. (1) The cleanup and redevelopment fund is created in the state treasury.

(2) The state treasurer may receive money or other assets from any source for deposit into the fund. The state treasurer shall direct the investment of the fund. The state treasurer shall credit to the fund interest and earnings from fund investments.

(3) In addition to the money received under subsection (2), the fund shall receive as revenue money collected by the attorney general in actions filed under this part, collected by the state under this part, or collected by a person under section 20135(2). Money collected and placed into the fund under this subsection may be earmarked by the department for use at specific sites.

(4) The state treasurer may establish subaccounts within the fund, and shall establish a subaccount for all money in the former environmental response fund on the effective date of the 1996 amendments to this section. Proceeds of all cost recovery actions taken and settlements entered into pursuant to this part, excluding natural resource damages, by the department or the attorney general, or both, shall be credited to this subaccount.

(5) An unexpended balance within the fund at the close of the fiscal year shall be carried forward to the following fiscal year.

History: 1994, Act 451, Eff. Mar. 30, 1995;—Am. 1996, Act 380, Imd. Eff. July 24, 1996.

324.20108a Revitalization revolving loan fund; creation; deposit of assets into fund; investment; interest and earnings; carrying forward unexpended balance; lump-sum appropriation; expenditure.

Sec. 20108a. (1) The revitalization revolving loan fund is created within the state treasury.

(2) The state treasurer may receive money or other assets from any source for deposit into the revitalization revolving loan fund. The state treasurer shall direct the investment of the revitalization revolving loan fund. The state treasurer shall credit to the revitalization revolving loan fund interest and earnings from revitalization revolving loan fund investments.

(3) An unexpended balance within the revitalization revolving loan fund at the close of the fiscal year shall be carried forward to the following fiscal year.

(4) The department shall annually submit to the governor a request for a lump-sum appropriation from the revitalization revolving loan fund for loans pursuant to the revitalization revolving loan program under section 20108b.

(5) The department shall expend money from the revitalization revolving loan fund, upon appropriation, only for the revitalization loan program created in section 20108b.

History: Add. 1996, Act 380, Imd. Eff. July 24, 1996.

324.20108b Revitalization revolving loan program.

Sec. 20108b. (1) The department shall create a revitalization revolving loan program for the purpose of making loans to certain local units of government to provide for eligible activities at certain properties in order to promote economic redevelopment.

(2) To be eligible for a loan, applications must meet the following requirements:

(a) The applicant is a county, city, township, or village, or an authority established pursuant to the brownfield redevelopment financing act, provided that the municipality which created the authority pursuant to the brownfield redevelopment financing act commits to secure the loan with a pledge of the municipality's full faith and credit.

(b) The application is for eligible activities at a property within the applicant's jurisdiction that is a facility or is suspected to be a facility based on current or historic use.

(c) The application is complete and submitted on a form provided by the department.

(d) The application is received by the deadline established by the department.

(e) The application is for eligible activities only as provided for in subsection (3).

(3) Eligible activities are limited to evaluation and demolition at the property or properties in an area-wide zone, and interim response activities required to facilitate evaluation and demolition conducted prior to redevelopment of a property or properties in an area-wide zone. Eligible activities include only those necessary to facilitate redevelopment. Eligible activities do not include activities necessary only to design or complete a remedial action that fully complies with the requirements of section 20120a. All eligible activities must be consistent with a work plan or remedial action plan approved in advance by the department under this part or pursuant to section 15 of the brownfield redevelopment financing act. Unless otherwise approved by the director, only activities carried out and costs incurred after execution of a loan agreement are eligible.

(4) The department shall provide for at least 1 application cycle per fiscal year. Prior to each application cycle, the department shall develop written instructions for prospective applicants including the criteria that will be used in application review and approval.

(5) Final application decisions shall be made by the department within 4 months of the application deadline.

(6) A complete application shall include the following:

(a) A description of the proposed eligible activities.

(b) An itemized budget for the proposed eligible activities.

(c) A schedule for the completion of the proposed eligible activities.

(d) Location of the property.

(e) Current ownership and ownership history of the property.

(f) Current use of the property.

(g) A detailed history of the use of the property.

(h) Existing and proposed future zoning of the property.

(i) If the property is not owned by the applicant, a draft of an enforceable agreement between the property owner and the applicant that commits the property owner to cooperate with the applicant, including a commitment to allow access to the property to complete at a minimum the proposed activities.

(j) A description of the property's economic redevelopment potential.

(k) A resolution from the local governing body of the applicant committing to repayment of the loan according to the terms of this section.

(*l*) Other information as specified by the department in its written instructions.

(7) To receive loan funds, approved applicants must enter into a loan agreement with the department. At a minimum, the loan agreement shall contain all of the following:

(a) The approved eligible activities to be undertaken with loan funds.

(b) The loan interest rate, terms, and repayment schedule as determined by the department pursuant to subsection (10).

(c) A commitment that the loan is secured by a full faith and credit pledge of the applicant, or if the applicant is an authority established pursuant to the brownfield redevelopment financing act, the commitment shall be from the municipality that created the authority pursuant to that act.

(d) An implementation schedule.

(e) Reporting requirements, including at a minimum the following:

(*i*) The recipient shall submit a progress status report to the department every 6 months during the implementation schedule.

(*ii*) The recipient shall provide a final report within 3 months of completion of the loan funded activities that includes documentation of project costs and expenditures, including invoices and proof of payment.

(f) If the property is not owned by the recipient, an executed agreement that has been approved by the department that meets the requirements of subsection (6)(i).

(g) Other provisions as considered appropriate by the department.

(8) If an approved applicant fails to sign a loan agreement within 90 days of a written loan offer by the department, the department may cancel the loan offer. The applicant may not appeal or contest a cancellation pursuant to this subsection.

(9) The department may terminate a loan agreement and require immediate repayment of the loan if the recipient uses loan funds for any purpose other than for the approved eligible activities specified in the loan agreement. The department shall provide written notice 30 days prior to the termination.

(10) Loans shall have the following terms:

(a) A loan interest rate of not more than 50% of the prime rate as determined by the department as of the date of approval of the loan.

(b) Loan recipients shall repay loans in equal annual installments of principal and interest beginning not later than 5 years after execution of a loan agreement and concluding not later than 15 years after execution of a loan agreement.

(11) Loan payments and interest shall be deposited back into the revitalization revolving loan fund created in section 20108a.

(12) Upon default of a loan, as determined by the department, or upon the request of the loan recipient as a method to repay the loan, the department of treasury shall withhold state payments from the loan recipient in amounts consistent with the repayment schedule in the loan agreement until the loan is repaid. The department of treasury shall deposit these withheld funds into the revitalization revolving loan fund created in section 20108a until the loan is repaid.

History: Add 1996, Act 383, Imd. Eff. July 24, 1996.

324.20108c State site cleanup fund; creation; deposit of assets into fund; investment; interest and earnings; money remaining in fund; lapse; use of money; state sites cleanup program; establishment; purpose; expenditure; list of facilities with state liability; prioritized list; payment for necessary response activities; carrying forward unexpended funds; compliance with §18.1451; report.

Sec. 20108c. (1) The state site cleanup fund is created within the state treasury.

(2) The state treasurer may receive money or other assets from any source for deposit into the state site cleanup fund. The state treasurer shall direct the investment of the state site cleanup fund. The state treasurer shall credit to the state site cleanup fund interest and earnings from fund investments.

(3) Money in the state site cleanup fund at the close of the fiscal year shall remain in the fund and shall not lapse to the general fund.

(4) Money in the state site cleanup fund shall be used for the state sites cleanup program established under this section.

(5) The department shall establish a state sites cleanup program for the purpose of expending money in the state sites cleanup fund, including the $20,000,000.00 appropriated by the legislature for state site cleanup pursuant to Act No. 265 of the Public Acts of 1994.

(6) The department shall expend money appropriated for state site cleanup only for response activities at facilities where the state is liable as an owner or operator under section 20126 or where the state has licensure or decommissioning obligations as an owner or possessor of radioactive materials that are regulated by the nuclear regulatory commission. Money expended for the state sites cleanup program shall not be used to pay fines, penalties, or damages.

(7) Six months after the effective date of this section, and annually thereafter by October 1 of each year, each state executive department and agency shall provide to the department a detailed list of all facilities where the state executive department or agency is liable as an owner or operator under section 20126. Subsequent lists do not need to include facilities identified in a previous list. This list shall include the following information for each facility:

(a) The facility name.

(b) Location.

(c) Use history of the facility.

(d) A detailed summary of available information regarding the source, nature, and extent of the contamination at the facility.

(e) A detailed summary of available information on any public health or environmental impacts at the facility.

(f) A detailed summary of available information on the resale and redevelopment potential of the facility.

(g) A description of and estimated cost of the response activities needed at the facility, if known.

(8) Within 12 months after the effective date of this section and by February 1 of each year thereafter, the board shall develop a prioritized list of the facilities identified pursuant to subsection (3). Sites posing the greatest risk to the public health, safety, welfare, or the environment and those having high resale and redevelopment potential shall be given the highest priority. The list shall include the following information for each facility:

(a) The facility's priority order.

(b) Response activities to be completed at the facility.

(c) Estimated cost of the response activities.

(d) The state executive department or agency that is liable as an owner or operator under section 20126.

(9) All state executive departments and agencies that are liable as an owner or operator under section 20126 are responsible for undertaking and paying for all necessary response activities that cannot be addressed with money appropriated to the department for state site cleanup as described in subsection (1) or any money appropriated to the department specifically for the purpose of response activities at facilities for which the state is liable as an owner or operator. The existence of these funds does not affect the liability of any person under this part or any state or federal law.

(10) The $20,000,000.00 appropriated pursuant to Act No. 265 of the Public Acts of 1994 and to be expended pursuant to this section shall carry over to succeeding fiscal years. The unexpended portion of the appropriation is considered a work project appropriation, and any unencumbered or unallotted funds are carried forward to the succeeding fiscal year. The following is in compliance with section 451(3) of the management and budget act, Act No. 431 of the Public Acts of 1984, being section 18.1451 of the Michigan Compiled Laws:

(a) The purpose of the project to be carried forward is to provide for contaminated site cleanups.

(b) The project will be accomplished by contracts.

(c) The total estimated cost of the project will be $20,000,000.00.

(d) The tentative completion date is September 30, 1999.

(11) The department shall submit an annual report to the governor and the legislature on the status of the response activities being conducted with money appropriated to the department to implement this section and the need for additional funds to conduct future response activities.

History: Add. 1995, Act 300, Imd. Eff. July 24, 1996.

324.20109 Repealed. 1996, Act 380, Imd. Eff. July 24, 1996.

Compiler's note: The repealed section pertained to Michigan underground tanks fund.

324.20109a Municipal landfill cost-share grant program.

Sec. 20109a. (1) A municipal landfill cost-share grant program is established for the purpose of making grants to reimburse local units of government for a portion of the response activity costs at certain municipal solid waste landfills as provided in this section.

(2) The municipal landfill cost-share grant program shall be administered by the board. The board shall provide for at least 1 application cycle per fiscal year. Prior to each application cycle, the board shall develop written instructions for prospective applicants including the criteria that will be used in application review and approval.

(3) To be eligible for a cost-share grant under this section, the following requirements shall be met:

(a) The applicant is a local unit of government.

(b) The application is only for eligible response activity costs at a municipal solid waste landfill.

(c) The application is complete and submitted on a form provided by the board.

(d) The application is submitted by the deadline established by the board.

(4) A complete application shall include the following:

(a) The landfill name and brief history.

(b) The rationale that explains why the applicant incurred the response activity costs.

(c) An analysis of the local unit of government's insurance coverage for the response activity costs at the landfill and any available documentation that supports the analysis.

(d) A brief narrative description of the overall response activities completed or to be completed at the landfill.

(e) A list and narrative description of all eligible costs incurred by the applicant for which it is seeking a grant, including all of the following:

(*i*) A demonstration that each eligible cost is consistent with a work plan or remedial action plan that has been approved by the department or the United States environmental protection agency or has been ordered by a state or federal court. The demonstration shall relate each cost for which reimbursement is being sought to a specific element of the approved work plan or remedial action plan. A copy of the plan and documentation of approval or court order of the plan shall be included with the application.

(*ii*) Documentation that the costs have been incurred by the applicant, including itemized invoices that clearly list each cost and proof of payment of each invoice by the applicant.

(*iii*) A resolution passed by the governing body for the local unit of government attesting that it has not received reimbursement for any of the costs for which it is seeking a grant from any other sources.

(f) A list of persons the applicant believes may be liable under section 20126 or the comprehensive environmental response, compensation, and liability act of 1980, Public Law 96-510, 94 Stat. 2767 for a substantial portion of the response activity costs at the landfill and any available supporting documentation.

(5) The board shall allocate the funds available for cost-share grants under this section to eligible facilities according to the following criteria, which are listed in priority order:

(a) Facilities posing a risk to public health.

(b) Facilities posing a risk to the environment.

(c) Facilities in which the local unit of government has taken steps to identify environmental contamination at the facility or caused by the facility or facilities in which remedial action measures have been implemented in accordance with a remedial action plan approved by the department or the United States environmental protection agency.

(d) Facilities in which the local unit of government has implemented appropriate measures to effect proper closure of the facility.

(6) Once a complete application has been submitted and approved by the board, applications submitted by the same applicant for the same landfill, in subsequent application cycles shall only include updated information that was not in the original application, including all of the following:

(a) An updated list of eligible costs incurred by the applicant for which the applicant is seeking a grant and for which the applicant was not approved to receive grant funds in a preceding grant cycle.

(b) Supporting documentation that the costs have been incurred as described in subsection (4)(e)(*ii*).

(c) Any other information needed to update information in the original application.

(7) A cost-share grant under this section shall not exceed 50% of the total eligible costs.

(8) A local unit of government may not receive more than 1 grant for the same municipal landfill during each application cycle.

(9) A recipient of a cost-share grant under this section has an obligation to do all of the following:

(a) Provide timely notification to the department if it receives money or any other form of compensation from any other source to pay for or compensate the local unit of government for any of the response activity costs for which it is liable. Sources of money or compensation include, but are not limited to, the federal government, other liable persons, or insurance policies. The notice shall include all of the following:

(*i*) Source of the money or compensation.

(*ii*) Amount of money or dollar value of the compensation.

(*iii*) Why the local unit of government received the money or compensation.

(*iv*) Any conditions or terms associated with the money or compensation.

(*v*) A detailed estimate of the total eligible response costs at the landfill for which the local unit of government is seeking a grant that are consistent with a work plan or remedial action plan that has been approved by the department or the United States environmental protection agency or has been ordered by a state or federal court and documentation of those costs that have been incurred.

(*vi*) Documentation of the costs incurred by the local unit of government to obtain the funds or compensation.

(*vii*) The amount of money to be repaid to the state based on the formula in subdivision (b).

(b) If the recipient receives money or compensation from any other source as described in subdivision (a), the recipient shall repay the department an amount of money not to exceed the grant amount based on the following formula:

(A minus B) multiplied by (C divided by D)
with A, B, C, and D defined as follows:

A = The total amount of money received from the other source or dollar value of the compensation.

B = All reasonable costs incurred by the recipient to obtain the money or compensation.

C = The total amount of grant funds received.

D = The total amount of response activity costs that the applicant has or will incur that meet all of the following requirements:

(*i*) The costs are for response activities, excluding fees for the services of a licensed attorney.

(*ii*) The costs are required to implement a work plan or remedial action plan for the landfill that has been approved by the department or the United States environmental protection agency or ordered by a state or federal court. The work plan or remedial action plan can be a plan update that was approved or ordered subsequent to the plan that was included in the local unit of government's grant application.

(*iii*) The costs were or will be incurred by the local unit of government after the date of enactment of the amendatory act that added this section.

(*iv*) The department has determined that the costs incurred by a local unit of government are reasonable taking into consideration the rationale provided in the application, the existence of other persons liable under section 20126 or the comprehensive environmental response, compensation, and liability act of 1980, Public Law 96-510, 94 Stat. 2767, and the need for the local unit of government to proceed with the response activity.

(*v*) The costs are for response activities that are or will be all or part of a cost-effective remedy consistent with this part.

(*vi*) The costs were or will be incurred for work that was competitively bid.

(*vii*) The costs, once incurred, can be documented with invoices and proof of payment by the local unit of government.

(c) All documentation of costs and the calculations and assumptions used by the recipient to determine the amount of money to be repaid shall be submitted to the board and are subject to review and approval by the board. The money shall be repaid to the department within 60 days of board approval of the documentation, calculations, and assumptions.

(d) Funds repaid to the department under this section shall be placed into the fund.

(10) To receive a cost-share grant under this section, approved applicants shall enter into an agreement with the board. The agreement shall contain at a minimum all of the following:

(a) A list of board-approved eligible costs for which the recipient will be reimbursed up to 50%.

(b) The agreement period.

(c) A resolution passed by the governing body for the local unit of government committing to make reasonable efforts to pursue any insurance coverage for the eligible costs.

(d) Grant repayment provisions under subsection (9).

(11) Upon execution of a grant agreement, grant funds shall be disbursed by the department within 45 days.

(12) If a local unit of government fails to sign a grant agreement within 90 days of a written grant offer by the board, the board may cancel the grant offer. The local unit of government may not appeal or contest cancellation of a grant pursuant to this subsection.

(13) The existence of this grant program does not in any way affect the liability of any person under this part or any other state or federal law. The state, the board, and the fund are not liable or in any way obligated to make grants for eligible costs, if funds are not appropriated by the legislature for this purpose or if the funds are insufficient. The availability of this program shall not be used by any liable person as a basis to delay necessary response activities.

(14) Funds granted to local units of government under this section shall be considered response activity costs incurred by the state. The state may pursue recovery or a claim for contribution of the grant funds from persons other than the grant recipient who are liable under section 20126. In addition, a local unit of government may pursue recovery or a claim for contribution from persons liable under section 20126 for the costs it has incurred but for which it has not received grant funds. This subsection does not in any way affect a local unit of government's eligibility to make a claim for insurance for any response activity costs, including the costs for which it received a grant.

(15) As used in this section:

(a) "Municipal solid waste landfill" means a landfill that as of the effective date of this section is on the national priority list or is proposed by the governor for inclusion on the national priority list.

(b) "National priority list" has the meaning attributed to this term in section 105(a)(8)(b) of the comprehensive environmental response, compensation, and liability act of 1980, Public Law 96-510, 94 Stat. 2767.

(c) "Eligible costs" or "eligible response activity costs" means response activity costs, excluding all fees for the services of a licensed attorney, that meet all of the following criteria:

(*i*) The costs have been incurred by a local unit of government after the date of enactment of the amendatory act that added this section.

(*ii*) The costs incurred by a local unit of government are reasonable taking into consideration the rationale provided in the application, the existence of other persons liable under section 20126 or the comprehensive environmental response, compensation, and liability act of 1980, Public Law 96-510, 94 Stat. 2767, and the need for the local unit of government to proceed with the response activity.

(*iii*) The costs are consistent with a work plan or remedial action plan that was approved by the department or the United States environmental protection agency or was ordered by a state or federal court prior to the work being conducted.

(*iv*) The costs were incurred for response activities that are part of a cost-effective remedy consistent with the requirements of this part.

(*v*) The costs were incurred for work that was competitively bid.

(16) This section shall not take effect until the earlier of the 2 following dates:

(a) The effective date of reauthorization of the comprehensive environmental response, compensation, and liability act of 1980, Public Law 96-510, 94 Stat. 2767.

(b) Twelve months after the date of enactment of the amendatory act that added this section.

(17) Following reauthorization of the comprehensive environmental response, compensation, and liability act of 1980, Public Law 96-510, 94 Stat. 2767, if a federal cost-share program is established that is similar to the program in this section, a grant under this section shall not be made for any response activity cost until the United States environmental protection agency makes a final determination that the response activity cost will not be paid for under the federal program.

History: Add. 1996, Act 383, Imd. Eff. July 24, 1996.

324.20110, 324.20111 Repealed. 1996, Act 380, Imd. Eff. July 24, 1996.

Compiler's note: The repealed sections pertained to long-term maintenance trust fund board and long-term maintenance trust fund.

324.20112 Repealed. 1995, Act 71, Imd. Eff. June 5, 1995.

Compiler's note: The repealed section pertained to study of cleanup costs.

324.20112a Report to legislature.

Sec. 20112a. Within 2 years after the effective date of this section and biennially thereafter, the department shall report to the legislature on the effectiveness of the amendatory act that added this section in restoring the economic value of sites of environmental contamination. The report shall include but not be limited to an examination of the effectiveness of the categorical cleanup criteria and liability provisions in encouraging the redevelopment of sites of environmental contamination. In preparing this report, the department shall consult the chairpersons of the senate and house of representatives standing committees with jurisdiction over issues pertaining to natural resources and the environment.

History: Add. 1995, Act 71, Imd. Eff. June 5, 1995.

324.20113 Appropriation; purposes; request to governor; list of sites; use of fund; expenditures; limitation; providing list of projects to governor and legislative committees.

Sec. 20113. (1) Money required to implement the programs described under this part and to pay for response activities recommended under this part shall be appropriated from the fund and any other source the legislature considers necessary to implement the requirements of this part.

(2) Money from the fund shall be appropriated only for response activities at sites that have been subjected to the risk assessment process described in section 20105.

(3) The department shall annually submit to the governor a request for appropriation from the fund. The request will include a lump sum amount for the purposes of subsection (4)(a) and a lump sum amount for the purposes of subsection (4)(f). For the purposes set forth in subsection (4)(b), (c), (d), and (e), the request shall include a list of sites where the department is proposing to expend funds. The list shall include the following information for each site: the common name of the site, the response activities that are planned to be conducted, and the estimated amount of money that is needed to conduct the response activities. The legislature shall approve by law the list of sites to be addressed and shall provide a lump sum appropriation for these sites based on the total estimated amount needed for the approved sites.

(4) Money from the fund may be used, upon appropriation, for the following as determined by the department:

(a) National priority list municipal landfill cost-share grants to be approved by the board pursuant to section 20109a.

(b) Superfund match, which includes funding for any response activity that is required to match federal dollars at a superfund site as required under the comprehensive environmental response, compensation, and liability act of 1980, Public Law 96-510, 94 Stat. 2767.

(c) Response activities to address actual or potential public health or environmental problems.

(d) Completion of response activities initiated by the state using environmental protection bond funds or completion of response activities at facilities initiated by a person who was liable under this part prior to Public Act 71 of 1995 but is not liable under section 20126 of this part, where such response activities have ceased.

(e) Response activities at sites that will facilitate redevelopment.

(f) Emergency response actions for sites to be determined by the department.

(5) Money in the fund shall be expended first for the purposes described in subsection (4)(b) and (f) and health or environmental problems under subsection (4)(c) that are related to acute health or environmental problems. Following these expenditures, not less than 50% of the remaining money expended under this section shall be expended for response activities that facilitate redevelopment of urbanized areas. All additional expenditures under this section shall be expended following the expenditures described in this subsection. As used in this subsection, "urbanized area" means an urbanized area as determined by the economics and statistics administration, United States bureau of census, according to the 1990 census.

(6) The total amount of funds expended by the department for national priority list municipal landfill cost-share grants shall not exceed the lesser of 12% of the funds appropriated from the fund in a fiscal year or $6,000,000.00 in a fiscal year.

(7) Not later than December 31 of each year, the department shall provide to the governor, the senate and house of representatives standing committees with jurisdiction over issues pertaining to natural resources and the environment, and the senate and house of representatives appropriations committees a list of all projects financed under this part through the preceding fiscal year. The list shall include the project site and location, the nature of the project, the total amount of money authorized, the total amount of money expended, and project status.

History: 1994, Act 451, Eff. Mar. 30, 1995;—Am. 1995, Act 71, Imd. Eff. June 5, 1995;—Am. 1996, Act 380, Imd. Eff. July 24, 1996;—Am. 1996, Act 383, Imd. Eff. July 24, 1996.

324.20114 Owner or operator of facility; duties; response activity without prior approval; easement; applicability of subsections (1) and (3); completion of response activities; document; failure to notify department or submission of false or misleading information; civil fine; limitations; approval of plan.

Sec. 20114. (1) Except as provided in subsection (4), an owner or operator of property who has knowledge that the property is a facility and who is liable under section 20126 shall do all of the following:

(a) Determine the nature and extent of a release at the facility.

(b) Report the release to the department within 24 hours after obtaining knowledge of the release. The requirements of this subdivision shall apply to reportable quantities of hazardous substances established pursuant to 40 C.F.R. 302.4 and 302.6 (1989), unless the department establishes through rules alternate or additional reportable quantities as necessary to protect the public health, safety, or welfare, or the environment.

(c) Immediately stop or prevent the release at the source.

(d) Immediately implement source control or removal measures to remove or contain hazardous substances that are released after the effective date of the 1995 amendments to this section if those measures are technically practical, cost effective, and provide protection to the environment. At a facility where hazardous substances are released after the effective date of the 1995 amendments to this section, and those hazardous substances have not affected groundwater but are likely to, groundwater contamination shall be prevented if it can be prevented by measures that are technically practical, cost effective, and provide protection to the environment.

(e) Immediately identify and eliminate any threat of fire or explosion or any direct contact hazards.

(f) Immediately initiate removal of a hazardous substance that is in a liquid phase, that is not dissolved in water, and that has been released.

(g) Diligently pursue response activities necessary to achieve the cleanup criteria specified in this part and the rules promulgated under this part. For a period of 2 years after the effective date of the 1995 amendments to this section, fines and penalties shall not be imposed under this part for a violation of this subdivision.

(h) Upon written request by the department, take the following actions:

(*i*) Provide a plan for and undertake interim response activities.

(*ii*) Provide a plan for and undertake evaluation activities.

(*iii*) Take any other response activity determined by the department to be technically sound and necessary to protect the public health, safety, welfare, or the environment.

(*iv*) Submit to the department for approval a remedial action plan that, when implemented, will achieve the cleanup criteria specified in this part and the rules promulgated under this part.

(*v*) Implement an approved remedial action plan in accordance with a schedule approved by the department pursuant to this part.

(2) A person may undertake response activity without prior approval by the department unless that response activity is being done pursuant to an administrative order or agreement or judicial decree which requires prior department approval. Any such action shall not relieve any person of liability for further response activity as may be required by the department.

(3) Except as provided in subsection (4), a person who holds an easement interest in a portion of a property who has knowledge that there may be a release within that easement shall report the release to the department within 24 hours after obtaining knowledge of the release. Unless the department establishes through rules alternate or additional reportable quantities as necessary to protect the public health, safety, or welfare, or the environment, this subsection shall apply to reportable quantities of hazardous substances established pursuant to 40 C.F.R. 302.4 and 302.6 (1989).

(4) The requirements of subsections (1) and (3) do not apply to a permitted release or a release in compliance with applicable federal, state, and local air pollution control laws.

(5) Upon a determination by the department that a person has completed all response activity at a facility pursuant to an approved remedial action plan prepared and implemented in compliance with this part and the rules promulgated under this part, the department, upon request of a person, shall execute and present a document stating that all response activities required in the approved remedial action plan have been completed.

(6) An owner or operator of a facility from which a hazardous substance is released that is determined to be reportable under subsection (1)(b), other than a permitted release, who fails to notify the department within 24 hours after obtaining knowledge of the release or who submits in such notification any information that the person knows to be false or misleading, is subject to a civil fine of not more than $25,000.00 for each day in which the violation occurs or the failure to comply continues. A fine imposed under this subsection shall be based upon the seriousness of the violation and any good faith efforts by the violator to comply with this subsection.

(7) This section does not do either of the following:

(a) Limit the authority of the department to take or conduct response activities pursuant to this part.

(b) Limit the liability of a person who is liable under section 20126.

(8) Any request for approval of a plan shall be granted or denied within 6 months of submittal of the information necessary or required for the department to make its decision. If the department does not approve the plan, the reasons for the denial shall be provided by the department in writing with a complete and specific statement of the conditions or requirements necessary to obtain approval. The department may not add additional items to this statement after it has been issued. Failure of the department to act within the specified time period shall result in the request being considered approved. The time frame for decision may be extended by the mutual consent of the department and the person submitting the plan.

History: 1994, Act 451, Eff. Mar. 30, 1995;—Am. 1995, Act 71, Imd. Eff. June 5, 1995.

324.20114a Person subject to civil fine; exception.

Sec. 20114a. (1) A person who, after June 5, 1995, is responsible for an activity causing a release in excess of the concentrations that satisfy the criteria established pursuant to section 20120a(1)(a) through (e), as appropriate for the use of the property, is subject to a civil fine as provided in this part unless a fine or penalty has already been imposed for the release under another part of this act. However, a civil fine shall not be imposed under this section against a person who made a good faith effort to prevent the release and to comply with the provisions of this part.

(2) This section does not apply to a release from an underground storage tank system as defined in part 213.

History: Add. 1995, Act 71, Imd. Eff. June 5, 1995;—Am. 1996, Act 115, Imd. Eff. Mar. 6, 1996.

324.20115 Notice to department of agriculture; information; "substance regulated by the department of agriculture" defined; response activities to be consistent with §324.8714(2).

Sec. 20115. (1) The department, upon confirmation of a release or threat of release of a substance that is regulated by the department of agriculture, shall notify the department of agriculture. The department of agriculture shall undertake or ensure the initiation of the necessary response activity to immediately stop or prevent further releases at the site. The department of agriculture shall consult with the department in the development of response activities if a release or threat of a release of a substance regulated by the department of agriculture occurs. The department of agriculture shall provide to the department information necessary to identify substances regulated by the department of agriculture. This information shall include but is not limited to the list of state registered pesticides.

(2) As used in this section, "substance regulated by the department of agriculture" means a fertilizer or soil conditioner as defined in part 85, or a pesticide as defined in part 83.

(3) Response activities conducted under this section shall be consistent with the requirements of section 8714(2).

History: 1994, Act 451, Eff. Mar. 30, 1995;—Am. 1995, Act 71, Imd. Eff. June 5, 1995;—Am. 1995, Act 117, Imd. Eff. June 29, 1995.

324.20115a Release or threat of release from underground storage tank system; corrective actions.

Sec. 20115a. (1) Notwithstanding any other provision of this part, if a release or threat of release at a facility is solely the result of a release or threat of release from an underground storage tank system regulated under part 213, the response activities implemented at the facility shall be the corrective actions required under part 213, and the requirements of section 20114 shall not apply to that release.

(2) Notwithstanding any other provision of this part, if a release or threat of release at a facility is not solely the result of a release or threat of release from an underground storage tank system, the owner or operator of the underground storage tank system as defined in part 213 may choose to conduct corrective actions of the release from the underground storage tank system pursuant to part 213, and the requirements of section 20114 shall not apply to that release.

History: Add. 1996, Act 115, Imd. Eff. Mar. 6, 1996.

324.20115b Release from disposal area; corrective actions; exception.

Sec. 20115b. Notwithstanding any other provision of this part, if a release at a disposal area licensed under part 115 is solely a release from that disposal area and the release is discovered through the disposal area's hydrogeological monitoring plan, the response activities implemented at the disposal area shall be the corrective actions required under part 115. This section does not apply to releases from a disposal area after completion of the postclosure monitoring period of the disposal area.

History: Add. 1996, Act 358, Eff. Oct. 1, 1996.

324.20116 Transfer of interest in real property; notice; certification; disclosure of restrictions.

Sec. 20116. (1) A person who has knowledge or information or is on notice through a recorded instrument that a parcel of his or her real property is a facility shall not transfer an interest in that real property unless he or she provides written notice to the purchaser or other person to which the property is transferred that the real property is a facility and discloses the general nature and extent of the release.

(2) The owner of real property for which a notice required in subsection (1) has been recorded may, upon completion of all response activities for the facility as approved by the department, record with the register of deeds for the appropriate county a certification that all response activity required in an approved remedial action plan has been completed.

(3) A person shall not transfer an interest in real property unless the person fully discloses any land or resource use restrictions that apply to that real property as a part of remedial action that has been or is being implemented in compliance with section 20120a.

History: 1994, Act 451, Eff. Mar. 30, 1995;—Am. 1995, Act 71, Imd. Eff. June 5, 1995.

324.20117 Information required to be furnished; requirements; right to enter public or private property; purposes; duties of person entering public or private property; copies of sample analyses, photographs, or videotapes; completion of inspections and investigations; refusing entry or information; powers of attorney general; injunction; civil fine; availability of information to public; protection of information; administrative subpoena; witness fees and mileage; court order; contempt; "information" defined.

Sec. 20117. (1) To determine the need for response activity or selecting or taking a response activity or otherwise enforcing this part or a rule promulgated under this part, the directors or their authorized representatives may upon reasonable notice require a person to furnish any information that the person may have relating to any of the following:

(a) The identification, nature, and quantity of materials that have been or are generated, treated, stored, handled, or disposed of at a facility or transported to a facility.

(b) The nature or extent of a release or threatened release at or from a facility.

(2) Upon reasonable notice, a person required to furnish information pursuant to subsection (1) shall either:

(a) Grant the directors or their authorized representatives access at all reasonable times to any place, property, or location to inspect and copy the related information.

(b) Copy and furnish to the directors or their authorized representatives the related information.

(3) If there is a reasonable basis to believe that there may be a release or threat of release, the directors or their authorized representatives have the right to enter at all reasonable times any public or private property for any of the following purposes:

(a) Identifying a facility.

(b) Investigating the existence, origin, nature, or extent of a release or threatened release.

(c) Inspecting, testing, taking photographs or videotapes, or sampling of any of the following: soils, air, surface water, groundwater, suspected hazardous substances, or any containers or labels of suspected hazardous substances.

(d) Determining the need for or selecting any response activity.

(e) Taking or monitoring implementation of any response activity.

(4) A person that enters public or private property pursuant to subsection (3) shall present credentials; make a reasonable effort to contact the person in charge of the facility or that person's designee; describe the nature of the activities authorized under subsection (3) to be undertaken; and inform the person that is in charge of the facility that he or she is entitled to participate in the collection of split samples, and is entitled to a copy of the results of any analysis of samples and a copy of any photograph or videotape taken. The person in charge or his or her agent may accompany the directors or their authorized representatives during the activities authorized under subsection (3) that take place and may participate in the collection of any split samples on the property. The absence or unavailability of the person in charge or that person's agent shall not delay or limit the authority of the directors or their authorized representatives to enter the property or proceed with the activities authorized under subsection (3).

(5) If the directors or their authorized representatives obtain any samples, before leaving the property they shall give to the person in charge of the property from which the samples were obtained a receipt describing the sample. A copy of the results of any analysis of the samples shall upon request be furnished promptly to the person in charge. A copy of any photograph or videotape taken pursuant to subsection (3)(c) shall upon request be furnished promptly to the person in charge.

(6) All inspections and investigations undertaken by the directors or their authorized representatives under this section shall be completed with reasonable promptness.

(7) If refused entry or information under subsections (1) to (4), for the purposes of enforcing the information gathering and entry authority provided in this section, the attorney general, on behalf of the state, may do either of the following:

(a) Petition the court of appropriate jurisdiction for a warrant authorizing access to property or information pursuant to this section.

(b) Commence a civil action to compel compliance with a request for information or entry pursuant to this section, to authorize information gathering and entry provided for in this section, and to enjoin interference with the exercise of the authority provided in this section.

(8) In a civil action brought pursuant to subsection (7), if there is a reasonable basis to believe there may be a release or a threatened release, the court shall in the case of interference or noncompliance with information requests pursuant to subsection (1), or with entry or inspection requests pursuant to subsection (3), enjoin interference with and direct compliance with the requests unless the defendant establishes that, under the circumstances of the case, the request is arbitrary and capricious, an abuse of discretion, or otherwise not in accordance with law.

(9) In a civil action brought pursuant to subsection (7), if there is a reasonable basis to believe there may be a release or a threatened release, the court may assess a civil fine not to exceed $25,000.00 for each day of noncompliance against a person that unreasonably fails to comply with subsection (1), (2), or (3).

(10) Information obtained by the directors or their authorized representatives as authorized under subsection (1) or (2) shall be available to the public to the extent provided by the freedom of information act, Act No. 442 of the Public Acts of 1976, being sections 15.231 to 15.246 of the Michigan Compiled Laws. A person who provides information pursuant to subsection (1) or (2), or the person in charge of a facility at which photographs or videotapes are taken pursuant to subsection (3), may designate the information that the person believes to be entitled to protection as if the information was exempt from disclosure as being either trade secrets or information of a personal nature under section 13(1)(a) or (g) of the freedom of information act, Act No. 442 of the Public Acts of 1976, being section 15.243 of the Michigan Compiled Laws, and submit that specifically designated information separately from other information required to be provided under this section.

(11) Notwithstanding subsection (10), the following information obtained by the directors or their authorized representatives as required by this section shall be available to the public:

(a) The trade name, common name, or generic class or category of the hazardous substance.

(b) The physical properties of a hazardous substance, including its boiling point, melting point, flash point, specific gravity, vapor density, solubility in water, and vapor pressure at 20 degrees Celsius.

(c) The hazards to the public health, safety, or welfare, or the environment posed by a hazardous substance, including physical hazards, such as explosion, and potential acute and chronic health hazards.

(d) The potential routes of human exposure to the hazardous substance at the facility being investigated, entered, or inspected under this section.

(e) The location of disposal of any waste stream released or threatened to be released from the facility.

(f) Monitoring data or analysis of monitoring data pertaining to disposal activities related to the facility.

(g) Hydrogeologic data.

(h) Groundwater monitoring data.

(12) To collect information for the purpose of identifying persons who are liable under section 20126 or to otherwise enforce this part or a rule promulgated under this part, the attorney general may by administrative subpoena require the attendance and testimony of witnesses and production of papers, reports, documents, answers to questions, and other information the attorney general considers necessary. Witnesses shall be paid the same fees and mileage that are paid witnesses in the courts of this state. If a person fails or refuses to obey the administrative subpoena, the circuit court for the county of Ingham or for the county in which that person resides has jurisdiction to order that person to comply with the subpoena. A failure to obey the order of the court is punishable by the court as contempt.

(13) As used in this section, "information" includes, but is not limited to, documents, materials, records, photographs, and videotapes.

History: 1994, Act 451, Eff. Mar. 30, 1995;—Am. 1995, Act 71, Imd. Eff. June 5, 1995.

324.20118 Response activity; purposes of remedial action; alternatives; referred remedial actions; approval of plan; conditions; record; analysis of source control measures; liability; aquifer monitoring plan; innovative cleanup technologies.

Sec. 20118. (1) The department may take response activity or approve of response activity proposed by a person that is consistent with this part and the rules promulgated under this part relating to the selection and implementation of response activity that the department concludes is necessary and appropriate to protect the public health, safety, or welfare, or the environment.

(2) Remedial action undertaken under subsection (1) at a minimum shall accomplish all of the following:

(a) Assure the protection of the public health, safety, and welfare, and the environment.

(b) Except as otherwise provided in subsections (5) and (6), attain a degree of cleanup and control of hazardous substances that complies with all applicable or relevant and appropriate requirements, rules, criteria, limitations, and standards of state and federal environmental law.

(c) Except as otherwise provided in subsections (5) and (6), be consistent with any cleanup criteria incorporated in rules promulgated under this part.

(3) The cost effectiveness of alternative means of complying with this section shall be considered by the department only in selecting among alternatives that meet all of the criteria of subsection (2).

(4) Remedial actions that permanently and significantly reduce the volume, toxicity, or mobility of the hazardous substances are to be preferred.

(5) The department may select or approve of a remedial action plan meeting the criteria provided for in section 20120a that does not attain a degree of control or cleanup of hazardous substances that complies with R 299.5705(5) or R 299.5705(6) of the Michigan administrative code, or both, if the department makes a finding that the remedial action is protective of the public health, safety, and welfare, and the environment. Notwithstanding any other provision of this subsection, the department shall not approve of a remedial action plan that does not attain a degree of control or cleanup of hazardous substances that complies with R 299.5705(5) or R 299.5705(6) of the Michigan administrative code if the remedial action plan is being implemented by a person who is liable under section 20126 and the release was grossly negligent or intentional, unless attaining that degree of control is technically infeasible, or the adverse environmental impact of implementing a remedial action to satisfy the rule would exceed the environmental benefit of that remedial action.

(6) A remedial action plan may be selected or approved pursuant to subsection (5) with regard to R 299.5705(5) or R 299.5705(6), or both, of the Michigan administrative code, if the department determines, based on the administrative record, that 1 or more of the following conditions are satisfied:

(a) Compliance with R 299.5705(5) or R 299.5705(6), or both, of the Michigan administrative code is technically impractical.

(b) The remedial action selected or approved will, within a reasonable period of time, attain a standard of performance that is equivalent to that required under R 299.5705(5) or R 299.5705(6) of the Michigan administrative code.

(c) The adverse environmental impact of implementing a remedial action to satisfy R 299.5705(5) or R 299.5705(6), or both, of the Michigan administrative code would exceed the environmental benefit of the remedial action.

(d) The remedial action provides for the reduction of hazardous substance concentrations in the aquifer through a naturally occurring process that is documented to occur at the facility and both of the following conditions are met:

(*i*) It has been demonstrated that there will be no adverse impact on the environment as the result of migration of the hazardous substances during the remedial action, except for that part of the aquifer specified in and approved by the department in the remedial action plan.

(*ii*) The remedial action includes enforceable land use restrictions or other institutional controls necessary to prevent unacceptable risk from exposure to the hazardous substances, as defined by the cleanup criteria approved as part of the remedial action plan.

(7) If the department approves of a remedial action plan pursuant, in part, to subsections (5) and (6), the administrative record for the facility shall include a complete explanation of the basis of the department's decision under subsections (5) and (6). In addition, the intent of and the basis for the exercise of authority provided for in subsections (5) and (6) shall be part of an analysis of the recommended alternatives if 1 is required pursuant to R 299.5605(1)(a) of the Michigan administrative code.

(8) A remedial action plan approved by the department shall include an analysis of source control measures already implemented or proposed, or both. A remedial action plan may incorporate by reference an analysis of source control measures provided in a feasibility study.

(9) Any liability a person may have under this part shall be unaffected by a decision of the department pursuant to subsection (5), (6), or (7), including liability for natural resources damages pursuant to section 20126a(1)(c).

(10) An aquifer monitoring plan shall be part of all remedial action plans that address aquifer contamination. The aquifer monitoring plan shall include all of the following:

(a) Information addressed by R 299.5519(2)(a) to (*l*) of the Michigan administrative code.

(b) Identification of points of compliance for judging the effectiveness of the remedial action.

(c) Identification of points of compliance if standards based on section 20120a(1)(a) are required to be met as part of the remedial action.

(11) The department may determine that a monitoring plan is not required pursuant to subsection (10) if the person conducting the remedial action demonstrates that the horizontal and vertical extent of hazardous substance concentrations in the aquifer above those allowed by the criteria based on section 20120a(1)(a) will not significantly increase in the absence of active removal of those hazardous substances from the aquifer. The department's determination pursuant to this subsection shall be based on the administrative record and include an explanation of the basis for the determination.

(12) The department shall encourage the use of innovative cleanup technologies. Before July 1, 1995, the department shall undertake 3 pilot projects to demonstrate innovative cleanup technologies at facilities where money from the fund is used.

History: 1994, Act 451, Eff. Mar. 30, 1995;—Am. 1995, Act 71, Imd. Eff. June 5, 1995.

324.20119 Action to abate danger or threat; administrative order; noncompliance; liability; petition for reimbursement; action in court of claims; evidence.

Sec. 20119. (1) In accordance with this section, if the department determines that there may be an imminent and substantial endangerment to the public health, safety, or welfare, or the environment, because of a release or threatened release, the department may require persons who are liable under section 20126 to take necessary action to abate the danger or threat.

(2) The department may issue an administrative order to a person identified by the department as a person who is liable under section 20126 requiring that person to perform response activity relating to a facility for which that person is liable or to take any other action required by this part. An order issued under this section shall state with reasonable specificity the basis for issuance of the order and specify a reasonable time for compliance.

(3) Within 30 days after issuance of an administrative order under this section, a person to which the order was issued shall indicate in writing whether the person intends to comply with the order.

(4) A person who, without sufficient cause, violates or fails to properly comply with an administrative order issued under this section is liable for either or both of the following:

(a) A civil fine of not more than $25,000.00 for each day in which the violation occurs or the failure to comply continues. A fine imposed under this subsection shall be based upon the seriousness of the violation and any good faith efforts by the violator to comply with the administrative order.

(b) Exemplary damages in an amount at least equal to the amount of any costs of response activity incurred by the state as a result of a failure to comply with an administrative order but not more than 3 times the amount of these costs.

(5) A person, to which an administrative order was issued under this section and that complied with the terms of the order, who believes that the order was arbitrary and capricious or unlawful may petition the department, within 60 days after completion of the required action, for reimbursement from the fund for the reasonable costs of the action plus interest at the rate described in section 20126a(3) and other necessary costs incurred in seeking reimbursement under this subsection. If the department refuses to grant all or part of the petition, the petitioner may, within 30 days of receipt of the refusal, file an action against the department in the court of claims seeking this relief. A failure by the department either to grant or deny all or any part of a petition within 120 days of receipt constitutes a denial of that part of the petition, which denial is reviewable as final agency action in the court of claims. To obtain reimbursement, the petitioner shall establish by a preponderance of the evidence that the petitioner is not liable under section 20126 or that the action ordered was arbitrary and capricious or unlawful, and in either instance that costs for which the petitioner seeks reimbursement are reasonable in light of the action required by and undertaken pursuant to the relevant order.

History: 1994, Act 451, Eff. Mar. 30, 1995;—Am. 1995, Act 71, Imd. Eff. June 5, 1995.

324.20120 Repealed. 1995, Act 71, Imd. Eff. June 5, 1995.

Compiler's note: The repealed section pertained to schedule of remedial action plans.

324.20120a Cleanup criteria.

Sec. 20120a. (1) The department may establish cleanup criteria and approve of remedial actions in the categories listed in this subsection. The cleanup category proposed shall be the option of the person proposing the remedial action, subject to department approval, considering the appropriateness of the categorical criteria to the facility. The categories are as follows:

(a) Residential.

(b) Commercial.

(c) Recreational.

(d) Industrial.

(e) Other land use based categories established by the department.

(f) Limited residential.

(g) Limited commercial.

(h) Limited recreational.

(i) Limited industrial.

(j) Other limited categories established by the department.

(2) The department may approve a remedial action plan based on site specific criteria that satisfy the applicable requirements of this part and the rules promulgated under this part. The department shall utilize only reasonable and relevant exposure pathways in determining the adequacy of a site specific criterion. Additionally, the department may approve a remedial action plan for a designated area-wide zone encompassing more than 1 facility, and may consolidate remedial actions for more than 1 facility.

(3) The department shall develop cleanup criteria pursuant to subsection (1) based on generic human health risk assessment assumptions determined by the department to appropriately characterize patterns of human exposure associated with certain land uses. The department shall utilize only reasonable and relevant exposure pathways in determining these assumptions. The department may prescribe more than 1 generic set of exposure assumptions within each category described in subsection (1). If the department prescribes more than 1 generic set of exposure assumptions within a category, each set of exposure assumptions creates a subcategory within a category described in subsection (1). The department shall specify site characteristics that determine the applicability of criteria derived for these categories or subcategories.

(4) If a hazardous substance poses a carcinogenic risk to humans, the cleanup criteria derived for cancer risk under this section shall be the 95% upper bound on the calculated risk of 1 additional cancer above the background cancer rate per 100,000 individuals using the generic set of exposure assumptions established under subsection (3) for the appropriate category or subcategory. If the hazardous substance poses a risk of an adverse health effect other than cancer, cleanup criteria shall be derived using appropriate human health risk assessment methods for that adverse health effect and the generic set of exposure assumptions established under subsection (3) for the appropriate category or subcategory. A hazard quotient of 1.0 shall be used to derive noncancer cleanup criteria. For the noncarcinogenic effects of a hazardous substance present in soils, the intake shall be assumed to be 100% of the protective level, unless compound and site-specific data are available to demonstrate that a different source contribution is appropriate. If a hazardous substance poses a risk of both cancer and 1 or more adverse health effects other than cancer, cleanup criteria shall be derived under this section for the most sensitive effect.

(5) If a cleanup criterion derived under subsection (4) for groundwater in an aquifer differs from either: (a) the state drinking water standard established pursuant to section 5 of the safe drinking water act, Act No. 399 of the Public Acts of 1976, being section 325.1005 of the Michigan Compiled Laws, or (b) criteria for adverse aesthetic characteristics derived pursuant to R 299.5709 of the Michigan administrative code, the cleanup criterion shall be the more stringent of (a) or (b) unless the department determines that compliance with this rule is not necessary because the use of the aquifer is reliably restricted pursuant to section 20120b(4) or (5).

(6) The department shall not approve of a remedial action plan in categories set forth in subsection (1)(b) to (j), unless the person proposing the plan documents that the current zoning of the property is consistent with the categorical criteria being proposed, or that the governing zoning authority intends to change the zoning designation so that the proposed criteria are consistent with the new zoning designation, or the current property use is a legal nonconforming use. The department shall not grant final approval for a remedial action plan that relies on a change in zoning designation until a final determination of that zoning change has been made by the local unit of government. The department may approve of a remedial action that achieves categorical criteria that is based on greater exposure potential than the criteria applicable to current zoning. In addition, the remedial action plan shall include documentation that the current property use is consistent with the current zoning or is a legal nonconforming use. Abandoned or inactive property shall be considered on the basis of zoning classifications as described above.

(7) Cleanup criteria from 1 or more categories in subsection (1) may be applied at a facility, if all relevant requirements are satisfied for application of a pertinent criterion.

(8) Except as provided in subsection (4) and subsections (9) to (13), compliance with the residential category in subsection (1)(a) shall be based on R 299.5709 through R 299.5711(4), R 299.5711(6) through R 299.5715 and R 299.5727 of the Michigan administrative code. R 299.5711(5), R 299.5723, and R 299.5725 of the Michigan administrative code shall not apply for calculations of residential criteria under subsection (1)(a).

(9) The need for soil remediation to protect an aquifer from hazardous substances in soil shall be determined by R 299.5711(2) of the Michigan administrative code, considering the vulnerability of the aquifer or aquifers potentially affected if the soil remains at the facility. Migration of hazardous substances in soil to an aquifer is a pertinent pathway if appropriate based on consideration of site specific factors.

(10) The department may establish cleanup criteria for a hazardous substance using a biologically based model developed or identified as appropriate by the United States environmental protection agency if the department determines all of the following:

(a) That application of the model results in a criterion that more accurately reflects the risk posed.

(b) That data of sufficient quantity and quality are available for a specified hazardous substance to allow the scientifically valid application of the model.

(c) The United States environmental protection agency has determined that application of the model is appropriate for the hazardous substance in question.

(11) If the cleanup criterion for a hazardous substance determined by R 299.5707 of the Michigan administrative code is greater than a cleanup criterion developed for a category pursuant to subsection (1), the criterion determined pursuant to R 299.5707 of the Michigan administrative code shall be the cleanup criterion for that hazardous substance in that category.

(12) In determining the adequacy of a land-use based response activity to address sites contaminated by polychlorinated biphenyls, the department shall not require response activity in addition to that which is subject to and complies with applicable federal regulations and policies that implement the toxic substances control act, Public Law 94-469, 15 U.S.C. 2601 to 2629, 2641 to 2656, 2661 to 2671, and 2681 to 2692.

(13) Response activity to address the release of uncontaminated mineral oil satisfies R 299.5709 for groundwater or R 299.5711 for soil under the Michigan administrative code if all visible traces of mineral oil are removed from groundwater and soil.

(14) Approval by the department of a remedial action plan based on 1 or more categorical standard in subsection (1)(a) to (e) shall be granted only if the pertinent criteria are satisfied in the affected media. The department shall approve the use of probabilistic or statistical methods or other scientific methods of evaluating environmental data when determining compliance with a pertinent cleanup criterion if the methods are determined by the department to be reliable, scientifically valid, and best represent actual site conditions and exposure potential.

(15) If a remedial action allows for venting groundwater, the discharge shall comply with requirements of part 31, and the rules promulgated under that part or an alternative method established by rule. If the discharge of venting groundwater is provided for in a remedial action plan that is approved by the department, a permit for the discharge is not required. As used in this subsection, "venting groundwater" means groundwater that is entering a surface water of the state from a facility.

(16) A remedial action plan shall provide response activity to meet the residential categorical criteria, or provide for acceptable land use or resource use restrictions pursuant to section 20120b.

(17) A remedial action plan that relies on categorical cleanup criteria developed pursuant to subsection (1) shall also consider other factors necessary to protect the public health, safety, and welfare, and the environment as specified by the department, if the department determines based on data and existing information that such considerations are relevant to a specific facility. These factors include, but are not limited to, the protection of surface water quality and consideration of ecological risks if pertinent to the facility based on the requirements of R 299.5717 of the Michigan administrative code.

(18) The department shall annually evaluate and revise, if appropriate, the cleanup criteria derived under this section. The evaluation shall incorporate knowledge gained through research and studies in the areas of fate and transport and risk assessment. The department shall prepare and submit to the legislature a report detailing revisions made to cleanup criteria under this section.

History: Add. 1995, Act 71, Imd. Eff. June 5, 1995.

324.20120b Remedial action plan.

Sec. 20120b. (1) If a remedial action plan is selected or approved by the department based on criteria for the residential category provided for in section 20120a(1)(a), land use restrictions or monitoring are not required once those standards have been achieved by the remedial action.

(2) If a remedial action plan is selected or approved by the department based on criteria in categories provided for in section 20120a(1)(b) to (e), a notice of approved environmental remediation shall be recorded with the register of deeds for the county in which the facility is located within 21 days after selection or approval by the department of the remedial action, or within 21 days after completion of construction of the remedial action as appropriate to the circumstances. A notice shall be filed pursuant to this section only by the property owner or by another person who has the express written permission of the property owner. The form and content of the notice are subject to approval by the state. Any restrictions contained in the notice shall be binding on the owner's successors, assigns, and lessees, and shall run with the land. A notice of environmental remediation recorded pursuant to this subsection shall state which of the categories of land use specified in section 20120a(1)(b) to (d) are consistent with the environmental conditions at the property to which the notice applies, and that a change from that land use or uses may necessitate further evaluation of potential risks to the public health, safety, or welfare, or the environment. The notice of approved environmental remediation shall include a survey and property description that define the areas addressed by the remedial action plan if land use or resource use restrictions apply to less than the entire parcel or if different restrictions apply to different areas of a parcel, and the scope of any land use or resource

use limitations. Additional requirements for financial assurance, monitoring, or operation, and maintenance do not apply if a remedial action complies with criteria provided for in section 20120a(1)(b) to (e), unless monitoring or operation and maintenance are required to assure the compliance with criteria that apply outside the boundary of the property that is the source of the release.

(3) If a remedial action plan is selected or approved by the department based on criteria provided for in section 20120a(1)(f) to (j) or (2), provisions concerning subdivisions (a) through (e) shall be stipulated in a legally enforceable agreement with the department. If the department concurs with an analysis provided in a remedial action plan that 1 or more of the requirements specified in subdivisions (b) to (e) is not necessary to protect the public health, safety, or welfare, or the environment and to assure the effectiveness and integrity of the remedial action, that element may be omitted from the agreement. If provisions for any of the following, determined by the department to be applicable for a facility, lapse or are not complied with as provided in the agreement or remedial action plan, the department's approval of the remedial action plan is void from the time of the lapse or violation, unless the lapse or violation is corrected to the satisfaction of the department:

(a) Land use or resource use restrictions.

(b) Monitoring.

(c) Operation and maintenance.

(d) Permanent markers to describe restricted areas of the site and the nature of any restrictions.

(e) Financial assurance, in a mechanism acceptable to the department to pay for monitoring, operation and maintenance, oversight, and other costs determined by the department to be necessary to assure the effectiveness and integrity of the remedial action.

(4) If a remedial action plan relies in whole or in part on cleanup criteria approved pursuant to section 20120a(1)(f) to (j) or (2), land use or resource use restrictions to assure the effectiveness and integrity of any containment, exposure barrier, or other land use or resource use restrictions necessary to assure the effectiveness and integrity of the remedy shall be described in a restrictive covenant. The restrictive covenant shall be recorded with the register of deeds for the county in which the property is located within 21 days of the department's selection or approval of the remedial action plan, or within 21 days of the completion of construction of the containment or barrier, as appropriate to the circumstances. The restrictive covenant shall be filed by the property owner or with the express written permission of the property owner. The restrictions shall run with the land and be binding on the owner's successors, assigns, and lessees. Such restrictions shall apply until the department determines that hazardous substances that are controlled by the barrier or contained no longer present an unacceptable risk to the public health, safety, or welfare, or the environment as defined by the cleanup criteria and exposure control requirements set forth in the remedial action plan. The restrictive covenant shall include a survey and property description that define the areas addressed by the remedial action plan and the scope of any land use or resource use limitations. The form and content of the restrictive covenant are subject to approval by the department and shall include provisions to accomplish all of the following:

(a) Restrict activities at the facility that may interfere with a remedial action, operation and maintenance, monitoring, or other measures necessary to assure the effectiveness and integrity of the remedial action.

(b) Restrict activities that may result in exposures above levels established in the remedial action plan.

(c) Require notice to the department of the owner's intent to convey any interest in the facility 14 days prior to consummating the conveyance. A conveyance of title, an easement, or other interest in the property shall not be consummated by the property owner without adequate and complete provision for compliance with the terms and conditions of the agreement described in subsection (3) and the prevention of releases and exposures described in subdivision (b).

(d) Grant to the department the right to enter the property at reasonable times for the purpose of determining and monitoring compliance with the remedial action plan, including the right to take samples, inspect the operation of the remedial action measures, and inspect records.

(e) Allow the state to enforce the restriction set forth in the covenant by legal action in a court of appropriate jurisdiction.

(f) Describe generally the uses of the property that are consistent with the categorical criteria and limitations approved as part of a remedial action plan.

(5) If the department determines that exposure to hazardous substances may be reliably restricted by an institutional control in lieu of a restrictive covenant, and that imposition of land use or resource use restrictions through restrictive covenants is impractical, the department may approve of a remedial action plan under section 20120a(1)(f) to (j) or (2) that relies on such institutional control. Mechanisms that may be considered under this subsection include, but are not limited to, an ordinance that prohibits the use of groundwater or an aquifer in a manner and to a degree that protects against unacceptable exposures as defined by the cleanup criteria approved as part of the remedial action plan. An ordinance that serves as an exposure control pursuant to this subsection shall be published and maintained in the same manner as zoning ordinances and shall include a requirement that the local unit of government notify the department at least 30 days prior to adopting a modification to the ordinance, or to the lapsing or revocation of the ordinance.

(6) Selection or approval by the department of a remedial action does not relieve a person who is liable under section 20126 of that person's responsibility to report and provide for response activity to address a subsequent release or threat of release at the facility.

(7) A remedial action shall not be considered approved by the department unless a remedial action plan is submitted to the department and the department approves the plan. Implementation by any person of response activity without department approval does not relieve that person of an obligation to undertake response activity or limit the ability of the department to take action to require response activity necessary to comply with this act by a person who is liable under section 20126.

(8) A person shall not file a notice of approved environmental remediation indicating approval or a determination of the department unless the department has approved of the filing of the notice.

(9) A person who implements a remedial action plan approved by the department pursuant to subsections (2) to (5) shall provide notice of the land use restrictions that are part of the remedial action plan to the zoning authority for the local unit of government in which the facility is located within 30 days of approval of the plan.

(10) The state, with the approval of the state administrative board, may place restrictive covenants related to land or resource use on deeds of state owned property.

History: Add. 1995, Act 71, Imd. Eff. June 5, 1995.

324.20120c Relocation of soil.

Sec. 20120c. (1) An owner or operator shall not remove soil, or allow soil to be removed, from a facility to an off-site location unless that person determines that the soil can be lawfully relocated without posing a threat to the public health, safety, or welfare, or the environment. The determination shall consider whether the soil is subject to regulation pursuant to part 111.

(2) For the purposes of subsection (1), soil poses a threat to the public health, safety, or welfare, or the environment if concentrations of hazardous substances in the soil exceed the cleanup criterion determined pursuant to section 20120a(1) or (2) that apply to the location to which the soil will be moved or relocated, except that if the soil is to be removed from the facility for disposal or treatment, the soil shall satisfy the appropriate regulatory criteria for disposal or treatment. Any land use restrictions that would be required for the application of a criterion pursuant to section 20120a(1) or (2) shall be in place at the location to which the soil will be moved. Soil may be relocated only to another location that is similarly contaminated, considering the general nature, concentration, and mobility of hazardous substances present at the location to which contaminated soil will be moved. Contaminated soil shall not be moved to a location that is not a facility unless it is taken there for treatment or disposal in conformance with applicable laws and regulations.

(3) An owner or operator shall not relocate soil, or allow soil to be relocated, within a site of environmental contamination where a remedial action plan has been approved unless that person assures that the same degree of control required for application of the criteria of section 20120a(1) or (2) is provided for the contaminated soil.

(4) The prohibition in subsection (3) against relocation of contaminated soil within a site of environmental contamination does not apply to soils that are temporarily relocated for the purpose of implementing response activity or utility construction if the response activity or utility construction is completed in a timely fashion and the short-term hazards are appropriately controlled.

(5) If soil is being moved off-site from, moved to, or relocated on-site at a facility where a remedial action plan has been approved by the department based on a categorical cleanup criterion in section 20120a(1)(f) to (j) or (2), the soil shall not be moved without prior department approval.

(6) If soil is being relocated in a manner not addressed by subsection (5), the owner or operator of the facility from which soil is being moved must provide notice to the department within 14 days after the soil is moved. The notice shall include all of the following:

(a) The location from which soil will be removed.

(b) The location to which the soil will be taken.

(c) The volume of soil to be moved.

(d) A summary of information or data on which the owner or operator is basing the determination required in subsection (2) that the soil does not present a threat to the public health, safety, or welfare, or the environment.

(e) If land use restrictions would apply pursuant to section 20120a(1) to the soil when it is relocated, the notice shall include documentation that those restrictions are in place.

(7) The determination required by subsections (1) and (3) shall be based on knowledge of the person undertaking or approving of the removal or relocation of soil, or on characterization of the soil for the purpose of compliance with this section.

(8) This section does not apply to soil that is designated as an inert material pursuant to section 11507(3) of the natural resources and environmental protection act, Act No. 451 of the Public Acts of 1994, being section 324.11507 of the Michigan Compiled Laws.

History: Add. 1995, Act 71, Imd. Eff. June 5, 1995.

324.20120d Public meeting; notice; publication; summary document; administrative record; comments or information not included in record.

Sec. 20120d. (1) At a facility where state funds will be spent to develop or implement a remedial action plan or where the department determines there is a significant public interest, within 30 days after the completion of a remedial investigation for the facility, the department shall provide the county and the township, city, or village in which the facility is located a notice of the completion of the remedial investigation, a summary of the remedial investigation, and notice of an opportunity for the people in the local unit of government to meet with the department regarding the remedial investigation and any proposed feasibility study for the facility. Upon a request for a public meeting by the governing body of the local unit of government or by 25 citizens of the local unit of government, the department shall, within 30 days of the request, meet with persons in the local unit of government. The person or persons requesting the public meeting shall publicize and provide accommodations for the meeting. The meeting shall be held in the local unit of government in which the facility is located. The department shall provide copies of the notices and summary required in this subsection to the governing body of the local unit of government, to the known persons who are liable under section 20126, and to the main public library of the local unit of government in which the facility is located. The department shall send representatives to the meeting who are familiar with the facility and who are involved with determining the appropriate remedial actions to be taken at the facility. Persons who are liable under section 20126 for the facility may send representatives to the meeting.

(2) The department shall maintain, and periodically publish, a list of remedial action plans submitted for approval that comply with the requirements of R 299.5515 of the Michigan administrative code.

(3) Before approval of a proposed remedial action plan which is to be implemented with money from the fund, or is based on categorical criteria provided for in section 20120a(1)(f) to (j) or (2), or if section 20118(5) or (6) applies, or the department determines that there is significant public interest, the department shall do all of the following:

(a) Publish a notice and brief summary of the proposed remedial action plan.

(b) Provide for public review and comment pertinent to documents relating to the proposed remedial action plan, including, if applicable, the feasibility study that outlines alternative remedial action measures considered.

(c) Provide an opportunity for a public meeting at or near the facility when any of the following occur:

(*i*) The department determines that there is a significant public interest or that for any other reason a public meeting is appropriate.

(*ii*) A city, township, or village in which the facility is located, by a majority vote of its governing body, requests a public meeting.

(*iii*) A local health department with jurisdiction in the area in which the facility is located requests a public meeting.

(d) Provide a document that summarizes the major issues raised by the public and how they are to be addressed by the final approved remedial action plan.

(4) For purposes of this section, publication shall include, at a minimum, publication in a local newspaper or newspaper of general circulation in this state. In addition, the administrative record shall be made available by the department for inspection by members of the public at or near the facility and in Lansing.

(5) The department shall prepare a summary document that explains the reasons for the selection or approval of a remedial action plan. In addition, the department shall compile an administrative record of the decision process that results in the selection of a remedial action plan. The administrative record shall contain all of the following:

(a) Remedial investigation data regarding the facility.

(b) If applicable, a feasibility study and potential remedial actions.

(c) If applicable, a summary document that explains the reasons why a remedial investigation or feasibility study was not conducted.

(d) Applicable comments and information received from the public, if any.

(e) If applicable, a document that summarizes the significant concerns raised by the members of the public and how they are to be addressed.

(f) Other information appropriate to the facility.

(6) If comments or information are submitted for inclusion in the administrative record that are not included in the administrative record, a brief explanation of why the information was not considered relevant shall be sent to the party by the department and included in the record.

History: Add. 1995, Act 71, Imd. Eff. June 5, 1995;—Am. 1996, Act 388, Imd. Eff. July 24, 1996;—Am. 1996, Act 383, Imd. Eff. July 24, 1996.

324.20121-324.20125 Repealed. 1995, Act 71, Imd. Eff. June 5, 1995.

Compiler's note: The repealed sections pertained to creation of office of environmental cleanup facilitation, creation and duties of science advisory council, report to legislature, and approval of remedial action plans.

324.20126 Liability under part.

Sec. 20126. (1) Notwithstanding any other provision or rule of law and except as provided in subsections (2), (3), (4), and (5) and section 20128, the following persons are liable under this part:

(a) The owner or operator of a facility if the owner or operator is responsible for an activity causing a release or threat of release.

(b) The owner or operator of a facility at the time of disposal of a hazardous substance if the owner or operator is responsible for an activity causing a release or threat of release.

(c) An owner or operator of a facility who becomes an owner or operator on or after June 5, 1995, unless the owner or operator complies with both of the following:

(*i*) A baseline environmental assessment is conducted prior to or within 45 days after the earlier of the date of purchase, occupancy, or foreclosure. For purposes of this section, assessing property to conduct a baseline environmental assessment does not constitute occupancy.

(*ii*) The owner or operator discloses the results of a baseline environmental assessment to the department and subsequent purchaser or transferee if the baseline environmental assessment confirms that the property is a facility.

(d) A person who by contract, agreement, or otherwise arranged for disposal or treatment, or arranged with a transporter for transport for disposal or treatment, of a hazardous substance owned or possessed by the person, by any other person, at a facility owned or operated by another person and containing the hazardous substance. This subdivision does not include any of the following:

(*i*) A person who, on or after June 5, 1995, arranges for the sale or transport of a secondary material for use in producing a new product. As used in this subparagraph, secondary material means scrap metal, paper, plastic, glass, textiles, or rubber, which has demonstrated reuse or recycling potential and has been separated or removed from the solid waste stream for reuse or recycling, whether or not subsequent separation and processing is required, if substantial amounts of the material are consistently used in the manufacture of products which may otherwise be produced from a raw or virgin material.

(*ii*) A person who, prior to June 5, 1995, arranges for the sale or transport of a secondary material for use in producing a new product unless the state has incurred response activity costs associated with these secondary materials prior to the effective date of the 1999 amendments to this section. As used in this subparagraph, secondary material means scrap metal, paper, plastic, glass, textiles, or rubber, which has demonstrated reuse or recycling potential and has been separated or removed from the solid waste stream for reuse or recycling, whether or not subsequent separation and processing is required, if substantial amounts of the material are consistently used in the manufacture of products which may otherwise be produced from a raw or virgin material.

(*iii*) A person who arranges the lawful transport or disposal of any product or container commonly used in a residential household, which is in a quantity commonly used in a residential household, and which was used in the person's residential household.

(e) A person who accepts or accepted any hazardous substance for transport to a facility selected by that person.

(f) The estate or trust of a person described in subdivisions (a) to (e).

(2) Subject to section 20107a, an owner or operator who complies with subsection (1)(c) is not liable for contamination existing at the facility at the earlier of the date of purchase, occupancy, or foreclosure, unless the person is responsible for an activity causing the contamination existing at the facility. Subsection (1)(c) does not alter a person's liability with regard to a subsequent release or threat of release at a facility if the person is responsible for an activity causing the subsequent release or threat of release.

(3) Notwithstanding subsection (1), the following persons are not liable under this part unless the person is responsible for an activity causing a release at the facility:

(a) The state or a local unit of government that acquired ownership or control of a facility involuntarily through bankruptcy, tax delinquency, abandonment, a transfer from a lender pursuant to subsection (7), or other circumstances in which the government involuntarily acquires title or control by virtue of its governmental function or as provided in this part, a local unit of government to which ownership or control of a facility is transferred by the state or by another local unit of government that is not liable under subsection (1), or the state or a local unit of government that acquired ownership or control of a facility by seizure, receivership, or forfeiture pursuant to the operation of law or by court order.

(b) A state or local unit of government that holds or acquires an easement interest in a facility, holds or acquires an interest in a facility by dedication in a plat, or by dedication pursuant to 1909 PA 283, MCL 220.1 to 239.6, or otherwise holds or acquires an interest in a facility for a transportation or utility corridor or public right of way.

(c) A person who holds an easement interest in a facility or holds a utility franchise to provide service, for the purpose of conveying or providing goods or services, including, but not limited to, utilities, sewers, roads, railways, and pipelines; or a person that acquires access through an easement.

(d) A person who owns severed subsurface mineral rights or severed subsurface formations or who leases subsurface mineral rights or formations.

(e) The state or a local unit of government that leases property to a person if the state or the local unit of government is not liable under this part for environmental contamination at the property.

(f) A person who owns or occupies residential real property if hazardous substance use at the property is consistent with residential use.

(g) A person who acquires a facility as a result of the death of the prior owner or operator of the facility, whether by inheritance, devise, or transfer from an inter vivos or testamentary trust.

(h) A person who did not know and had no reason to know that the property was a facility. To establish that the person did not know and did not have a reason to know that the property was a facility, the person shall have undertaken at the time of acquisition all appropriate inquiry into the previous ownership and uses of the property consistent with good commercial or customary practice. A determination of liability under this section shall take into account any specialized knowledge or experience on the part of the person, the relationship of the purchase price to the value of the property if uncontaminated by a hazardous substance, commonly known or reasonable ascertainable information about the property, the obviousness of the presence or likely presence of a release or threat of release at the property, and the ability to detect a release or threat of release by appropriate inspection.

(i) A utility performing normal construction, maintenance, and repair activities in the normal course of its utility service business. This subsection does not apply to property owned by the utility.

(j) A lessee who uses property for retail, office, or commercial purpose.

(4) Notwithstanding subsection (1), the following persons are not liable under this part:

(a) The owner or operator of a hazardous waste treatment, storage, or disposal facility regulated pursuant to part 111 from which there is a release or threat of release solely from the treatment, storage, or disposal facility, or a waste management unit at the facility and the release or threat of release is subject to corrective action under part 111.

(b) A lender that engages in or conducts a lawful marshalling or liquidation of personal property if the lender does not cause or contribute to the environmental contamination. This includes holding a sale of personal property on a portion of the facility.

(c) The owner or operator of property onto which contamination has migrated unless that person is responsible for an activity causing the release that is the source of the contamination.

(d) A person who owns or operates a facility in which the release or threat of release was caused solely by 1 or more of the following:

(*i*) An act of God.

(*ii*) An act of war.

(*iii*) An act or omission of a third party other than an employee or agent of the person or a person in a contractual relationship existing either directly or indirectly with a person who is liable under this section.

(5) Notwithstanding any other provision of this part, the state or a local unit of government or a lender who has not participated in the management of the facility is not liable under this part for costs or damages as a result of response activity taken in response to a release or threat of release. For a lender, this subsection applies only to response activity undertaken prior to foreclosure. This subsection does not preclude liability for costs or damages as a result of gross negligence, including reckless, willful, or wanton misconduct, or intentional misconduct by the state or local unit of government.

(6) In establishing liability under this section, the department bears the burden of proof. If the department proves a prima facie case against a person, the person shall bear the burden of showing by a preponderance of the evidence that he or she is not liable under this section.

(7) A lender that is not responsible for an activity causing a release at a facility and that establishes that it has met the requirements of subsection (1)(c) with respect to that facility may immediately transfer to the state the property on which there has been a release or a threat of a release if the lender complies with all of the following:

(a) Within 9 months following foreclosure and for a period of at least 120 days, the lender either lists the facility with a broker, dealer, or agent who deals with the type of property in question, or advertises the facility as being for sale or disposition on at least a monthly basis in either a real estate publication, a trade or other publication suitable for the facility in question, or a newspaper of general circulation of over 10,000 covering the area where the property is located.

(b) The lender has taken reasonable care in maintaining and preserving the real estate and permanent fixtures.

(c) The lender provides to the department all environmental information related to the facility that is available to the lender.

(d) If the department has issued an order pursuant to section 20119, the lender has complied with the order to the department's satisfaction.

(e) If conditions on the property pose a threat of fire or explosion or present an imminent hazard through direct contact with hazardous substances, the lender has undertaken appropriate response activities to abate the threat or hazard.

(8) The department shall establish minimum technical standards for baseline environmental assessments conducted under this section in guidelines pursuant to the administrative procedures act of 1969, 1969 PA 306, MCL 24.201 to 24.328.

(9) Notwithstanding subsection (1)(c), if the owner or operator of the facility became the owner or operator of the facility on or after June 5, 1995 and prior to March 6, 1996, and the facility contains an underground storage tank system as defined in part 213, that owner or operator is liable under this part only if the owner or operator is responsible for an activity causing a release or threat of release.

History: 1994, Act 451, Eff. Mar. 30, 1995;—Am. 1995, Act 71, Imd. Eff. June 5, 1995;—Am. 1996, Act 115, Imd. Eff. Mar. 6, 1996;—Am. 1999, Act 196, Imd. Eff. Dec. 17, 1999.

324.20126a Joint several liability; costs of amounts recoverable; interest; recovery; permitted release; action by attorney general; action brought by state or other person.

Sec. 20126a. (1) Except as provided in section 20126(2), a person who is liable under section 20126 is jointly and severally liable for all of the following:

(a) All costs of response activity lawfully incurred by the state relating to the selection and implementation of response activity under this part.

(b) Any other necessary costs of response activity incurred by any other person consistent with rules relating to the selection and implementation of response activity promulgated under this part.

(c) Damages for the full value of injury to, destruction of, or loss of natural resources, including the reasonable costs of assessing the injury, destruction, or loss resulting from the release.

(2) The costs of response activity recoverable under subsection (1) shall also include all of the following:

(a) All costs of response activity reasonably incurred by the state prior to the promulgation of rules relating to the selection and implementation of response activity under this part, excepting those cases where cost recovery actions have been filed before July 12, 1990. A person challenging the recovery of costs under this subdivision has the burden of establishing that the costs were not reasonably incurred under the circumstances that existed at the time the costs were incurred. Recoverable costs include costs incurred reasonably consistent with the rules relating to the selection and implementation of response activity in effect on July 12, 1990.

(b) Any other necessary costs of response activity reasonably incurred by any other person prior to the promulgation of rules relating to the selection and implementation of response activity under this part. A person seeking recovery of these costs has the burden of establishing that the costs were reasonably incurred under the circumstances that existed at the time the costs were incurred.

(3) The amounts recoverable in an action under this section shall include interest. This interest shall accrue from the date payment is demanded in writing, or the date of the expenditure or damage, whichever is later. The rate of interest on the outstanding unpaid balance of the amounts recoverable under this section shall be the same rate as is specified in section 6013(5) of the revised judicature act of 1961, Act No. 236 of the Public Acts of 1961, being section 600.6013 of the Michigan Compiled Laws.

(4) In the case of injury to, destruction of, or loss of natural resources under subsection (1)(c), liability shall be to the state for natural resources belonging to, managed by, controlled by, appertaining to, or held in trust by the state or a local unit of government. Sums recovered by the state under this part for natural resource damages shall be retained by the department, for use only to restore, repair, replace, or acquire the equivalent of the natural resources injured or acquire substitute or alternative resources. There shall be no double recovery under this part for natural resource damages, including the costs of damage assessment or restoration, rehabilitation, replacement, or acquisition, for the same release and natural resource.

(5) A person shall not be required under this part to undertake response activity for a permitted release. Recovery by any person for response activity costs or damages resulting from a permitted release shall be pursuant to other applicable law, in lieu of this part. With respect to a permitted release, this subsection does not affect or modify the obligations or liability of any person under any other state law, including common law, for damages, injury, or loss resulting from a release of a hazardous substance or for response activity or the costs of response activity.

(6) If the department determines that there may be an imminent and substantial endangerment to the public health, safety, or welfare, or to the environment because of an actual or threatened release from a facility, the attorney general may bring an action against any person who is liable under section 20126 or any other appropriate person to secure the relief that may be necessary to abate the danger or threat. The court has jurisdiction to grant such relief as the public interest and the equities of the case may require.

(7) The costs recoverable under this section may be recovered in an action brought by the state or any other person.

History: Add. 1995, Act 71, Imd. Eff. June 5, 1995.

324.20127 Repealed. 1995, Act 71, Imd. Eff. June 5, 1995.

Compiler's note: The repealed section pertained to liability.

324.20128 Liability of response activity contractor; effect of warranty; liability of employer to employee; governmental employee exempt from liability; definitions; liability of person in rendering care, assistance, or advice on release of petroleum; effect of exception under subsection (6); burden of establishing liability.

Sec. 20128. (1) Except as otherwise provided in this section, a person who is a response activity contractor for any release or threatened release is not liable to any person for injuries, costs, damages, expenses, or other liability, including, but not limited to, claims for indemnification or contribution and claims by third parties for death, personal injuries, illness, or loss of or damages to property or economic loss that result from the release or threatened release. This subsection does not apply if a release or threatened release is caused by conduct of the response activity contractor that is negligent, grossly negligent, or that constitutes intentional misconduct.

(2) Subsection (1) does not affect the liability of a person under any warranty under federal, state, or common law. This subsection does not affect the liability of an employer who is a response activity contractor to any employee of the employer under law, including any law relating to worker's compensation.

(3) An employee of this state or a local unit of government who provides services relating to a response activity while acting within the scope of his or her authority as a governmental employee has the same exemption from liability as is provided to the response activity contractor under subsection (1).

(4) Except as provided in this section, this section does not affect the liability under this part or under any other federal or state law of any person.

(5) As used in subsections (1) to (4):

(a) "Response activity contract" means a written contract or agreement entered into by a response activity contractor with 1 or more of the following:

(*i*) The department.

(*ii*) The department of public health.

(*iii*) A person who is arranging for response activity under this part.

(*b*) "Response activity contractor" means 1 or both of the following:

(*i*) A person who enters into a response activity contract with respect to a release or threatened release and is carrying out the terms of a contract.

(*ii*) A person who is retained or hired by a person described in subparagraph (*i*) to provide any service relating to a response activity.

(6) Notwithstanding any other provision of law, a person is not liable for response activity costs or damages that result from an act or a failure to act in the course of rendering care, assistance, or advice with respect to a release of petroleum into or on the surface waters of the state or on the adjoining shorelines to the surface waters of the state if the act or failure to act was consistent with the national contingency plan or as otherwise directed by the federal on-scene coordinator or the director. This subsection does not apply to any of the following:

(a) A person who is liable under section 20126 who is a responsible party.

(b) An action with respect to personal injury or wrongful death.

(c) A person that is grossly negligent or engages in willful misconduct.

(7) A person who is liable under section 20126 who is a responsible party is liable for any response activity costs and damages that another person is relieved of under subsection (6).

(8) As used in this subsection and subsections (6) and (7):

(a) "Damages" means damages of any kind for which liability may exist under the laws of this state resulting from, arising out of, or related to the release or threatened release of petroleum.

(b) "Federal on-scene coordinator" means the federal official predesignated by the United States environmental protection agency or the United States coast guard to coordinate and direct federal responses under the national contingency plan, or the official designated by the lead agency to coordinate and direct response activity under the national contingency plan.

(c) "National contingency plan" means the national contingency plan prepared and published under section 311 of title III of the federal water pollution control act, chapter 758, 86 Stat. 862, 33 U.S.C. 1321.

(d) "Petroleum" means that term as it is defined in part 213.

(e) "Responsible party" means a responsible party as defined under section 1001 of title I of the oil pollution act of 1990, Public Law 101-380, 33 U.S.C. 2701.

(9) This section does not affect a plaintiff's burden of establishing liability under this part.

History: 1994, Act 451, Eff. Mar. 30, 1995;—Am. 1995, Act 71, Imd. Eff. June 5, 1995.

324.20129 Divisibility of harm and apportionment of liability; liability for indivisible harm; contribution; factors in allocating response activity costs and damages; reallocation of uncollectible amount; effect of consent order; resolution of liability in approved settlement; contribution protection; effect of state obtaining less than complete relief; contribution from person not party to consent order; subordinate rights in action for contribution.

Sec. 20129. (1) If 2 or more persons acting independently are liable under section 20126 and there is a reasonable basis for division of harm according to the contribution of each person, each person is subject to liability under this part only for the portion of the total harm attributable to that person. However, a person seeking to limit his or her liability on the grounds that the entire harm is capable of division has the burden of proof as to the divisibility of the harm and as to the apportionment of liability.

(2) If 2 or more persons are liable under section 20126 for an indivisible harm, each person is subject to liability for the entire harm.

(3) A person may seek contribution from any other person who is liable under section 20126 during or following a civil action brought under this part. This subsection does not diminish the right of a person to bring an action for contribution in the absence of a civil action by the state under this part. In a contribution action brought under this part, the court shall consider all of the following factors in allocating response activity costs and damages among liable persons:

(a) Each person's relative degree of responsibility in causing the release or threat of release.

(b) The principles of equity pertaining to contribution.

(c) The degree of involvement of and care exercised by the person with regard to the hazardous substance.

(d) The degree of cooperation by the person with federal, state, or local officials to prevent, minimize, respond to, or remedy the release or threat of release.

(e) Whether equity requires that the liability of some of the persons should constitute a single share.

(4) If, in an action for contribution under subsection (3), the court determines that all or part of a person's share of liability is uncollectible from that person, then the court may reallocate any uncollectible amount among the other liable persons according to the factors listed in subsection (3). A person whose share is determined to be uncollectible continues to be subject to contribution and to any continuing liability to the state.

(5) A person who has resolved his or her liability to the state in an administrative or judicially approved consent order is not liable for claims for contribution regarding matters addressed in the consent order. The consent order does not discharge any of the other persons liable under section 20126 unless the terms of the consent order provide for this discharge, but the potential liability of the other persons is reduced by the amount of the consent order.

(6) A person who is not liable under this part, including a person who is issued a written determination under section 20129a affirming that the person meets the criteria for an exemption from liability, and who is otherwise in compliance with section 20107a, shall be considered to have resolved his or her liability to the state in an administratively approved settlement under the comprehensive environmental response, compensation, and liability act of 1980, Public Law 96-510, 94 Stat. 2767 and shall by operation of law be granted contribution protection under section 113(f)(2) of title I of the comprehensive environmental response, compensation, and liability act of 1980, Public Law 96-510, 42 U.S.C. 9613 and under this part in the same manner that contribution protection is provided pursuant to subsection (5).

(7) If the state obtains less than complete relief from a person who has resolved his or her liability to the state in an administrative or judicially approved consent order under this part, the state may bring an action against any other person liable under section 20126 who has not resolved his or her liability.

(8) A person who has resolved his or her liability to the state for some or all of a response activity in an administrative or judicially approved consent order may seek contribution from any person who is not a party to the consent order described in subsection (5).

(9) In an action for contribution under this section, the rights of any person who has resolved his or her liability to the state is subordinate to the rights of the state, if the state files an action under this part.

History: 1994, Act 451, Eff. Mar. 30, 1995;—Am. 1995, Act 71, Imd. Eff. June 5, 1995.

324.20129a Exemption from liability.

Sec. 20129a. (1) A person may petition the department within 6 months after completion of a baseline environmental assessment for a determination that that person meets the requirements for an exemption from liability under section 20126(1)(c) and, in conjunction with that exemption, a determination that the proposed use of the facility satisfies the person's obligations under section 20107a. This request may be made by a prospective purchaser or transferee prior to actual transfer of ownership or other interest to that person or by a lender prior to foreclosure. The request shall be submitted on a form provided by the department along with the fee provided in subsection (4). The person petitioning the department under this subsection shall attach the baseline environmental assessment, a detailed description of the proposed use of the facility, a plan for any response activities that are necessary to assure that the proposed use of the facility satisfies the requirements of section 20107a if a determination regarding compliance with that section is requested, and the qualifications of the environmental professionals who have made the recommendations.

(2) Within 15 business days after receipt of a petition under subsection (1), the department shall issue a written determination to the person submitting the petition that does either of the following:

(a) Affirms that the criteria for obtaining the exemption have been met and affirms that the proposed use of the facility would satisfy the person's obligations under section 20107a provided that the person complies with the plan for the proposed use of the facility submitted under subsection (1).

(b) Provides that the criteria for obtaining the exemption have not been met, or that the proposed use of the facility does not satisfy the person's obligation under section 20107a, the specific reasons for the denial, and how the applicant could meet the criteria and satisfy the person's obligations under section 20107a, if possible.

(3) A determination by the department under this section may be conditioned on completion of response activities described in the petition.

(4) Until June 5, 2003, a petition submitted under subsection (1) shall be accompanied by a fee of $750.00. The department shall deposit all fees collected under this section into the fund. The department shall annually submit a report to the legislature that details all of the following:

(a) The number of petitions received pursuant to this section.

(b) The average length of time which the department has taken to issue written determinations pursuant to this section.

(c) The number of times in which written determinations were not issued within the required time period.

(d) The approximate amount of department staff time necessary to issue a written determination under this section.

(5) A person who is provided an affirmative determination under this section is not liable for a claim for response activity costs, fines or penalties, natural resources damages, or equitable relief under part 17, part 31, or common law resulting from the contamination identified in the petition or from contamination existing on the property on the date in which ownership or control of the property was transferred to the person. The liability protection afforded in this subsection does not extend to a violation of any permit issued under state law. This subsection does not alter a person's liability for a violation of section 20107a for a use or activity of property that is inconsistent with the determination.

History: Add. 1995, Act 71, Imd. Eff. June 5, 1995;—Am. 1997, Act 64, Imd. Eff. July 7, 1997;—Am. 1999, Act 30, Imd. Eff. May 27, 1999.

324.20130 Indemnification, hold harmless, or similar agreement or conveyance; subrogation.

Sec. 20130. (1) An indemnification, hold harmless, or similar agreement or conveyance is not effective to transfer from a person who is liable under section 20126 to the state for evaluation or response activity costs or damages for a release or threat of release to any other person the liability imposed under this part. This section does not bar an agreement to insure, hold harmless, or indemnify a party to the agreement for liability under this part.

(2) This part does not bar a cause of action that a person subject to liability under this part, or a guarantor, has or would have by reason of subrogation or otherwise against any person.

History: 1994, Act 451, Eff. Mar. 30, 1995;—Am. 1995, Act 71, Imd. Eff. June 5, 1995.

324.20131 Limitations on liability; circumstances requiring total costs and damages.

Sec. 20131. (1) Except as provided in subsection (2), the liability under this part for each release or threat of release shall not exceed the total of all the costs of response activities, fines, and exemplary damages, plus $50,000,000.00 damages for injury to, destruction of, or loss of natural resources resulting from the release or threat of release, including the reasonable costs of assessing the injury, destruction, or loss resulting from the release or threat of release.

(2) Notwithstanding the limitations in subsection (1), the liability of a person under this part shall be the full and total costs and damages listed in subsection (1), in either of the following circumstances:

(a) The release or threatened release of a hazardous substance was the result of willful misconduct or gross negligence of the party.

(b) The primary cause of the release or threat of release was a knowing violation of applicable safety, construction, or operating standards or regulations.

History: 1994, Act 451, Eff. Mar. 30, 1995.

324.20132 Covenant not to sue generally; future enforcement action.

Sec. 20132. (1) The state may provide a person with a covenant not to sue concerning any liability to the state under this part, including future liability, resulting from a release or threatened release addressed by response activities, whether that action is on a facility or off a facility, if each of the following is met:

(a) The covenant not to sue is in the public interest.

(b) The covenant not to sue would expedite response activity consistent with rules promulgated under this part.

(c) There is full compliance with a consent order under this part for response to the release or threatened release concerned.

(d) The response activity has been approved by the department.

(2) The state shall provide a person, to which the department is authorized under subsection (1) to issue a covenant not to sue for the portion of response activity described in subdivision (a) or (b), with a covenant not to sue with respect to future liability to the state under this part for a future release or threatened release, and a person provided the covenant not to sue is not liable to the state under section 20126 with respect to that release or threatened release at a future time. The portion of response activity to which the covenant not to sue pertains is either of the following:

(a) The transport and secure disposition off site of hazardous substances in a facility meeting the requirements of sections 3004(c), (d), (e), (f), (g), (m), (o), (p), (u), and (v) and 3005(c) of subtitle C of the solid waste disposal act, title II of Public Law 89-272, 42 U.S.C. 6924 and 6925, if the department has required off-site disposition and has rejected proposed remedial action that is consistent with the rules promulgated under this part and that does not include off-site disposition.

(b) The treatment of hazardous substances so as to destroy, eliminate, or permanently immobilize the hazardous constituents of the substances, so that, in the judgment of the department, the substances no longer present any current or currently foreseeable future significant risk to the public health, safety, or welfare, or the environment; no by-product of the treatment or destruction process presents any significant hazard to the public health, safety, or welfare, or the environment; and all by-products are themselves treated, destroyed, or contained in a manner that assures that the by-products do not present any current or currently foreseeable future significant risk to the public health, safety, or welfare, or the environment.

(3) A covenant not to sue concerning future liability to the state shall not take effect until the department certifies that remedial action has been completed in accordance with the requirements of this part at the facility that is the subject of the covenant.

(4) In assessing the appropriateness of a covenant not to sue granted under subsection (1) and any condition to be included in a covenant not to sue under subsection (1) or (2), the state shall consider whether the covenant or condition is in the public interest on the basis of factors such as the following:

(a) The effectiveness and reliability of the remedial action, in light of the other alternative remedial actions considered for the facility concerned.

(b) The nature of the risks remaining at the facility.

(c) The extent to which performance standards are included in the consent order.

(d) The extent to which the response activity provides a complete remedy for the facility, including a reduction in the hazardous nature of the substances at the facility.

(e) The extent to which the technology used in the response activity is demonstrated to be effective.

(f) Whether the fund or other sources of funding would be available for any additional response activities that might eventually be necessary at the facility.

(g) Whether response activity will be carried out, in whole or in significant part, by persons who are liable under section 20126.

(5) A covenant not to sue under this section is subject to the satisfactory performance by a person of his or her obligations under the agreement concerned.

(6) Except for the portion of the remedial action that is subject to a covenant not to sue under subsection (2), a covenant not to sue a person concerning future liability to the state shall include an exception to the covenant that allows the state to sue that person concerning future liability resulting from the release or threatened release that is the subject of the covenant if the liability arises out of conditions that are unknown at the time the department certifies under subsection (3) that remedial action has been completed at the facility concerned.

(7) In extraordinary circumstances, the state may determine, after assessment of relevant factors such as those referred to in subsection (4) and volume, toxicity, mobility, strength of evidence, ability to pay, litigative risks, public interest considerations, precedential value, and inequities and aggravating factors, not to include the exception in subsection (6) if other terms, conditions, or requirements of the agreement containing the covenant not to sue are sufficient to provide all reasonable assurances that the public health and the environment will be protected from any future releases at or from the facility.

(8) The state may include any provisions providing for future enforcement action under section 20119 or 20137 that in the discretion of the department are necessary and appropriate to assure protection of the public health, safety, welfare, and the environment.

History: 1994, Act 451, Eff. Mar. 30, 1995;—Am. 1995, Act 71, Imd. Eff. June 5, 1995.

324.20133 Redevelopment or reuse of facility; covenant not to sue; conditions; demonstration; limitation; *reservation of right to assert claims; irrevocable right of entry; monitoring compliance.*

Sec. 20133. (1) The state may provide a person who proposes to redevelop or reuse a facility, including a vacant manufacturing or abandoned industrial site, with a covenant not to sue concerning liability under section 20126 and 20107a, if all of the following conditions are met:

(a) The covenant not to sue is in the public interest.

(b) The covenant not to sue will yield new resources to facilitate implementation of response activity.

(c) The covenant not to sue would, when appropriate, expedite response activity consistent with the rules promulgated under this part.

(d) Based upon available information, the department determines that the redevelopment or reuse of the facility is not likely to do any of the following:

(*i*) Exacerbate or contribute to the existing release or threat of release.

(*ii*) Interfere with the implementation of response activities.

(*iii*) Pose health risks related to the release or threat of release to persons who may be present at or in the vicinity of the facility.

(e) The proposal to redevelop or reuse the facility has economic development potential.

(2) A person who requests a covenant not to sue under subsection (1) shall demonstrate to the satisfaction of the state all of the following:

(a) That the person is financially capable of redeveloping and reusing the facility in accordance with the covenant not to sue.

(b) That the person is not affiliated in any way with any person who is liable under section 20126 for a release or threat of release at the facility.

(3) A covenant not to sue issued under this section shall address only past releases or threats of release at a facility and shall expressly reserve the right of the state to assert all other claims against the person that proposes to redevelop or reuse the facility, including, but not limited to, those claims arising from any of the following:

(a) The release or threat of release of any hazardous substance resulting from the redevelopment or reuse of the facility to the extent such claims otherwise arise under this part.

(b) Interference with or failure to cooperate with the department, its contractors, or other persons conducting response activities approved by the department.

(c) Failure to comply with section 20107a.

(4) A covenant not to sue issued under this section shall provide for an irrevocable right of entry to the department, its contractors, or other persons performing response activity related to the release or threat of release addressed by the covenant not to sue for the purposes listed in section 20117(3)(a) through (e) and for monitoring compliance with the covenant not to sue.

History: 1994, Act 451, Eff. Mar. 30, 1995;—Am. 1995, Act 71, Imd. Eff. June 5, 1995.

324.20134 Consent order; settlement.

Sec. 20134. (1) The department and the attorney general may enter into a consent order with a person who is liable under section 20126 or any group of persons who are liable under section 20126 to perform a response activity if the department and the attorney general determine that the persons who are liable under section 20126 will properly implement the response activity and that the consent order is in the public interest, will expedite effective response activity, and will minimize litigation. The consent order may, as determined appropriate by the department and the attorney general, provide for implementation by a person or any group of persons who are liable under section 20126 of any portion of response activity at the facility. A decision of the attorney general not to enter into a consent order under this part is not subject to judicial review.

(2) Whenever practical and in the public interest, as determined by the department, the department and the attorney general shall as promptly as possible reach a final settlement with a person in an administrative or civil action under this part if this settlement involves only a minor portion of the response costs at the facility concerned and, in the judgment of the department and the attorney general, the conditions in either of the following are met:

(a) Both of the following are minimal in comparison to other hazardous substances at the facility:

(*i*) The amount of the hazardous substances contributed by that person to the facility.

(*ii*) The toxic or other hazardous effects of the substances contributed by that person to the facility.

(b) Except as provided in subsection (3), the person meets all of the following conditions:

(*i*) The person is the owner of the real property on or in which the facility is located.

(*ii*) The person did not conduct or permit the generation, transportation, storage, treatment, or disposal of any hazardous substance at the facility.

(*iii*) The person did not contribute to the release or threat of release of a hazardous substance at the facility through any action or omission.

(3) A settlement shall not be made under subsection (2)(b) if the person purchased the real property with actual or constructive knowledge that the property was used for the generation, transportation, storage, treatment, or disposal of a hazardous substance.

(4) A settlement under subsection (2) may be set aside if information obtained after the settlement indicates that the person settling does not meet the conditions set forth in subsection (2)(a) or (b).

History: 1994, Act 451, Eff. Mar. 30, 1995;—Am. 1995, Act 71, Imd. Eff. June 5, 1995.

324.20134a Repealed. 1995, Act 71, Imd. Eff. June 5, 1995.

Compiler's note: The repealed section pertained to transfer of exempt status by state or local unit of government.

324.20135 Civil action; jurisdiction; conditions; notice; awarding costs and fees; rights not impaired; venue.

Sec. 20135. (1) Except as otherwise provided in this part, a person, including a local unit of government on behalf of its citizens, whose health or enjoyment of the environment is or may be adversely affected by a release from a facility or threat of release from a facility, other than a permitted release or a release in compliance with applicable federal, state, and local air pollution control laws, by a violation of this part or a rule promulgated or order issued under this part, or by the failure of the directors to perform a nondiscretionary act or duty under this part, may commence a civil action against any of the following:

(a) An owner or operator who is liable under section 20126 for injunctive relief necessary to prevent irreparable harm to the public health, safety, or welfare, or the environment from a release or threatened release in relation to that facility.

(b) A person who is liable under section 20126 for a violation of this part or a rule promulgated under this part or an order issued under this part in relation to that facility.

(c) One or more of the directors if it is alleged that 1 or more of the directors failed to perform a nondiscretionary act or duty under this part.

(2) The circuit court has jurisdiction in actions brought under subsection (1)(a) to grant injunctive relief necessary to protect the public health, safety, or welfare, or the environment from a release or threatened release. The circuit court has jurisdiction in actions brought under subsection (1)(b) to enforce this part or a rule promulgated or order issued under this part by ordering such action as may be necessary to correct the violation and to impose any civil fine provided for in this part for the violation. A civil fine recovered under this section shall be deposited in the fund. The circuit court has jurisdiction in actions brought under subsection (1)(c) to order 1 or more of the directors to perform the nondiscretionary act or duty concerned.

(3) An action shall not be filed under subsection (1)(a) or (b) unless all of the following conditions exist:

(a) The plaintiff has given at least 60 days' notice in writing of the plaintiff's intent to sue, the basis for the suit, and the relief to be requested to each of the following:

(*i*) The department.

(*ii*) The attorney general.

(*iii*) The proposed defendants.

(b) The state has not commenced and is not diligently prosecuting an action under this part or under other appropriate legal authority to obtain injunctive relief concerning the facility or to require compliance with this part or a rule or an order under this part.

(4) An action shall not be filed under subsection (1)(c) until the plaintiff has given in writing at least 60 days' notice to the directors of the plaintiff's intent to sue, the basis for the suit, and the relief to be requested.

(5) In issuing a final order in an action brought pursuant to this section, the court may award costs of litigation, including reasonable attorney and expert witness fees to the prevailing or substantially prevailing party if the court determines that an award is appropriate.

(6) This section does not affect or otherwise impair the rights of any person under federal, state, or common law.

(7) An action under subsection (1)(a) or (b) shall be brought in the circuit court for the circuit in which the alleged release, threatened release, or other violation occurred. An action under subsection (1)(c) shall be brought in the circuit court for Ingham county.

History: 1994, Act 451, Eff. Mar. 30, 1995;—Am. 1995, Act 71, Imd. Eff. June 5, 1995.

324.20135a Access to property; action by court.

Sec. 20135a. (1) A person who is liable under section 20126 or a lender that has a security interest in all or a portion of a facility may file a petition in the circuit court of the county in which the facility is located seeking access to the facility in order to conduct response activities approved by the department. If the court grants access to property under this section, the court may do any of the following:

(a) Provide compensation to the property owner or operator for damages related to the granting of access to the property, including compensation for loss of use of the property.

(b) Enjoin interference with the response activities.

(c) Grant any other appropriate relief as determined by the court.

(2) If a court grants access to property under this section, the owner or operator of the property to which access is granted is not liable for either of the following:

(a) A release caused by the response activities for which access is granted unless the owner or operator is otherwise liable under section 20126.

(b) For conditions associated with the response activity that may present a threat to public health or safety.

History: Add. 1995, Act 71, Imd. Eff. June 5, 1995.

324.20136 Repealed. 1995, Act 71, Imd. Eff. June 5, 1995.

Compiler's note: The repealed section pertained to grant programs.

324.20137 Additional relief; providing copy of complaint to attorney general; jurisdiction; judicial review; intervenor.

Sec. 20137. (1) In addition to other relief authorized by law, the attorney general may, on behalf of the state, commence a civil action seeking 1 or more of the following:

(a) Temporary or permanent injunctive relief necessary to protect the public health, safety, or welfare, or the environment from the release or threat of release.

(b) Recovery of state response activity costs pursuant to section 20126a.

(c) Damages for the full value of injury to, destruction of, or loss of natural resources resulting from the release or threat of release, including the reasonable costs of assessing the injury, destruction, or loss resulting from the release or threat of release.

(d) A declaratory judgment on liability for future response costs and damages.

(e) A civil fine of not more than $1,000.00 for each day of noncompliance without sufficient cause with a written request of the department pursuant to section 20114(1)(h). A fine imposed under this subdivision shall be based on the seriousness of the violation and any good faith efforts of the person to comply with the request of the department.

(f) A civil fine of not more than $10,000.00 for each day of violation of this part or a rule promulgated under this part. A fine imposed under this subdivision shall be based upon the seriousness of the violation and any good faith efforts of the person to comply with this part or a rule promulgated under this part.

(g) A civil fine of not more than $25,000.00 for each day of violation of a judicial order or an administrative order issued pursuant to section 20119, including exemplary damages pursuant to section 20119.

(h) Enforcement of an administrative order issued pursuant to section 20119.

(i) Enforcement of information gathering and entry authority pursuant to section 20117.

(j) Enforcement of the reporting requirements under section 20114(1), (3), and (6).

(k) Any other relief necessary for the enforcement of this part.

(2) If an action is brought under this part by a plaintiff other than the attorney general, the plaintiff shall, at the time of filing, provide a copy of the complaint to the attorney general.

(3) Except as otherwise provided in this part, an action brought under this part may be brought in the circuit court for the county of Ingham, in the county in which the defendant resides, has a place of business, or in which the registered office of a defendant corporation is located, or in the county where the release occurred.

(4) A state court does not have jurisdiction to review challenges to a response activity selected or approved by the department under this part or to review an administrative order issued under this part in any action except an action that is 1 of the following:

(a) An action to recover response costs, damages, or for contribution.

(b) An action by the state to enforce an administrative order under this part or by any other person under section 20135(1)(b) to enforce an administrative order or to recover a fine for violation of an order.

(c) An action pursuant to section 20119(5) for review of a decision by the department denying or limiting reimbursement.

(d) An action pursuant to section 20135 challenging a response activity selected or approved by the department, if the action is filed after the completion of the response activity.

(e) An action by the state pursuant to section 20126a(6) to compel response activity.

(5) In any judicial action under this part, judicial review of any issues concerning the selection or adequacy of a response activity taken, ordered, or agreed to by the state are limited to the administrative record. If the court finds that the record is incomplete or inadequate, the court may consider supplemental material in the action. In considering objections raised in a

judicial action under this part, the court shall uphold the state's decision in selecting a response activity unless the objecting party can demonstrate based on the administrative record that the decision was arbitrary and capricious or otherwise not in accordance with law. In reviewing alleged procedural errors, the court may disallow costs or damages only to the extent the errors were so serious and related to matters of such central importance that the activity would have been significantly changed had the errors not been made.

(6) In an action commenced under this part, any person may intervene as a matter of right if that person claims an interest relating to the subject matter of the action and is situated so that the disposition of the action may, as a practical matter, impair or impede the person's ability to protect that interest, unless the court finds the person's interest is adequately represented by an existing party.

History: 1994, Act 451, Eff. Mar. 30, 1995;—Am. 1995, Act 71, Imd. Eff. June 5, 1995.

324.20138 Unpaid costs and damages as lien on facility; priority; commencement and sufficiency of lien; petition; notice of hearing; increased value as lien; perfection, duration, and release of lien; document stating completion of response activities.

Sec. 20138. (1) All unpaid costs and damages for which a person is liable under section 20126 constitute a lien in favor of the state upon a facility that has been the subject of response activity by the state and is owned by that person. A lien under this subsection has priority over all other liens and encumbrances except liens and encumbrances recorded before the date the lien under this subsection is recorded. A lien under this subsection arises when the state first incurs costs for response activity at the facility for which the person is responsible.

(2) If the attorney general determines that the lien provided in subsection (1) is insufficient to protect the interest of the state in recovering response costs at a facility, the attorney general may file a petition in the circuit court of the county in which the facility is located seeking either or both of the following:

(a) A lien upon the facility subject to response activity that takes priority over all other liens and encumbrances that are or have been recorded on the facility.

(b) A lien upon real or personal property or rights to real or personal property, other than the facility, owned by the person described in subsection (1), having priority over all other liens and encumbrances except liens and encumbrances recorded prior to the date the lien under this subsection is recorded. However, the following are not subject to the lien provided for in this subdivision:

(*i*) Assets of a qualified pension plan or individual retirement account under the internal revenue code.

(*ii*) Assets held expressly for the purpose of financing a dependent's college education.

(*iii*) Up to $500,000.00 in nonbusiness real or personal property or rights to nonbusiness real or personal property, except that not more than $25,000.00 of this amount may be cash or securities.

(3) A petition submitted pursuant to subsection (2) shall set forth with as much specificity as possible the type of lien sought, the property that would be affected, and the reasons the attorney general believes the lien is necessary. Upon receipt of a petition under subsection (2), the court shall promptly schedule a hearing to determine whether the petition should be granted. Notice of the hearing shall be provided to the attorney general, the property owner, and any persons holding liens or perfected security interests in the real property subject to response activity. A lien shall not be granted under subsection (2) against the owner of the facility if the owner is not liable under section 20126.

(4) In addition to the lien provided in subsections (1) and (2), if the state incurs costs for response activity that increases the market value of real property that is the location of a release or threatened release, the increase in value caused by the state funded response activity, to the extent the state incurred unpaid costs and damages, constitutes a lien in favor of the state upon the real property. This lien has priority over all other liens or encumbrances that are or have been recorded upon the property.

(5) A lien provided in subsection (1), (2), or (4) is perfected against real property when a notice of lien is filed by the department with the register of deeds in the county in which the real property is located. A lien upon personal property provided in subsection (2) is perfected when a notice of lien is filed by the department in accordance with applicable law and regulation for the perfection of a lien on that type of personal property. In addition, the department shall, at the time of the filing of the notice of lien, provide a copy of the notice of lien to the owner of that property by certified mail.

(6) A lien under this section continues until the liability for the costs and damages is satisfied or resolved or becomes unenforceable through the operation of the statute of limitations provided in section 20140.

(7) Upon satisfaction of the liability secured by the lien, the department shall file a notice of release of lien in the same manner as provided in subsection (5).

(8) If the department, at the time or prior to the time of filing the notice of release of lien pursuant to subsection (7), has made a determination that the person liable under section 20126 has completed all of the response activity at the real property pursuant to the approved remedial action plan, the department shall execute and file with the notice of release of lien a document stating that all response activities required in the approved remedial action plan have been completed.

History: 1994, Act 451, Eff. Mar. 30, 1995;—Am. 1995, Act 71, Imd. Eff. June 5, 1995.

324.20139 Applicability of penalties; conduct constituting felony; penalties; jurisdiction; criminal liability for substantial endangerment to public health, safety, or welfare; determination; knowledge attributable to defendant; award; rules; definition.

Sec. 20139. (1) The penalties provided in this section only apply to a release that occurs after July 1, 1991.

(2) A person who does any of the following is guilty of a felony and shall be fined not less than $2,500.00 or more than $25,000.00 for each violation:

(a) Knowingly releases or causes a release contrary to applicable federal, state, or local requirements or contrary to any permit or license held by that person, if that person knew or should have known that the release could cause personal injury or property damage.

(b) Intentionally makes a false statement, representation, or certification in any application, record, report, plan, or other document filed or required to be maintained under this part and rules promulgated under this part.

(c) Intentionally renders inaccurate any monitoring device or record required to be maintained under this part or a rule promulgated under this part.

(d) Misrepresents his or her qualifications in a document prepared pursuant to section 20129a.

(3) In addition to a fine imposed under subsection (2), the court may impose an additional fine of not more than $25,000.00 for each day during which the release occurred. If the conviction is for a violation committed after a first conviction of the person under this subsection, the court shall impose a fine of not less than $25,000.00 and not more than $50,000.00 per day of violation. Upon conviction, in addition to a fine, the court in its discretion may sentence the defendant to imprisonment for not more than 2 years or impose probation upon a person for a violation of this part. With the exception of the issuance of criminal complaints, issuance of warrants, and the holding of an arraignment, the circuit court for the county in which the violation occurred has exclusive jurisdiction.

(4) Upon a finding by the court that the action of a criminal defendant prosecuted under this section poses or posed a substantial endangerment to public health, safety, or welfare, the court shall impose, in addition to the penalties set forth in subsections (2) and (3), a fine of not less than $1,000,000.00 and, in addition to a fine, a sentence of 5 years' imprisonment.

(5) To find a defendant criminally liable for substantial endangerment under subsection (4), the court shall determine that the defendant knowingly or recklessly acted in such a manner as to cause a danger of death or serious bodily injury and that either of the following has occurred:

(a) The defendant had an actual awareness, belief, or understanding that his or her conduct would cause a substantial danger of death or serious bodily injury.

(b) The defendant acted in gross disregard of the standard of care that any reasonable person would observe in similar circumstances.

(6) Knowledge possessed by a person other than the defendant under subsection (5) may be attributable to the defendant if the defendant took affirmative steps to shield himself or herself from the relevant information.

(7) The department may pay an award of up to $10,000.00 to an individual that provides information leading to the arrest and conviction of a person for a violation of this section. The department shall promulgate rules that prescribe criteria for granting awards under this section. An award shall not be made under this section until rules are promulgated prescribing the criteria for making awards. Awards under this subsection may be paid from the Michigan environmental assurance fund, if enabling legislation creating the fund is enacted into law.

(8) As used in this section, "serious bodily injury" means bodily injury that involves a substantial risk of death, unconsciousness, extreme physical pain, protracted and obvious disfigurement, or protracted loss or impairment of the function of a bodily member, organ, or mental faculty.

History: 1994, Act 451, Eff. Mar. 30, 1995;—Am. 1995, Act 71, Imd. Eff. June 5, 1995.

324.20140 Limitation periods; effect of subsection (3).

Sec. 20140. (1) Except as provided in subsections (2) and (3), the limitation period for filing actions under this part is as follows:

(a) For the recovery of response activity costs and natural resources damages pursuant to section 20126a(1)(a), (b), or (c), within 6 years of initiation of physical on-site construction activities for the remedial action selected or approved by the department at a facility, except as provided in subdivision (b).

(b) For 1 or more subsequent actions for recovery of response activity costs pursuant to section 20126, at any time during the response activity, if commenced not later than 3 years after the date of completion of all response activity at the facility.

(c) For civil fines under this part, within 3 years after discovery of the violation for which the civil fines are assessed.

(2) For recovery of natural resources damages that accrued prior to July 1, 1991, the limitation period for filing actions under this part is July 1, 1994.

(3) For recovery of response activity costs that were incurred prior to July 1, 1991, the limitation period for filing actions under this part is July 1, 1994.

(4) Subsection (3) is curative and intended to clarify the original intent of the legislature and applies retroactively.

History: 1994, Act 451, Eff. Mar. 30, 1995;—Am. 1995, Act 71, Imd. Eff. June 5, 1995;—Am. 2000, Act 254, Imd. Eff. June 29, 2000.

324.20141 Repealed. 1995, Act 71, Imd. Eff. June 5, 1995.

Compiler's note: The repealed section pertained to citizens review board.

324.20142 Compliance as bar to certain claims; exceptions.

Sec. 20142. (1) Except as provided in section 20126a(5), a person who has complied with the requirements of this part or is exempt from liability under this part is not subject to a claim in law or equity for performance of response activities under part 17, part 31, or common law.

(2) This section does not bar any of the following:

(a) Tort claims unrelated to performance of response activities.

(b) Tort claims for damages which result from response activities.

(c) Tort claims related to the exercise or failure to exercise responsibilities under section 20107a.

History: Add. 1995, Act 71, Imd. Eff. June 5, 1995.

TABLE 1. GROUNDWATER: RESIDENT. ND INDUSTRIAL-COMMERCIAL PART 201 GENERIC CLEANUP CRITERIA AND SCREENING LEVELS; PART 213 TIER 1 RISK-BASED SCREENING LEVELS (RBSLs)

All criteria, unless otherwise noted, are expressed in units of parts per billion (ppb). One ppb is equivalent to one microgram per liter (ug/L). Criteria with six or more digits are expressed in scientific notation. For example, 200,000 ppb is presented as 2.0E+5. The lowest generic groundwater criterion for a given hazardous substance is presented in a bold box. A footnote is designated by a letter in parentheses and is explained in the footnote pages that follow the criteria tables. When the risk-based criterion is less than the target detection limit (TDL), the TDL is listed as the criterion (R 299.5707). In these cases, two numbers are presented in the cell. The first number is the criterion (i.e., TDL), and the second number is the risk-based or solubility value, whichever is lower (R 299.5708). Criteria were promulgated December 21, 2002 within the Administrative Rules for Part 201, Environmental Remediation, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended. These tables reflect modifications to the TDLs and new criteria consistent with the provisions of R299.5103(l) and R299.5706a, respectively.

Guidesheet Number →		#1	#2	#3	#4	#5	#6	#7	#8	#9
	Chemical Abstract Service Number	Residential & Commercial I Drinking Water Criteria & RBSLs	Industrial & Commercial II, III & IV Drinking Water Criteria & RBSLs	Groundwater Surface Water Interface Criteria & RBSLs	Residential & Commercial I Groundwater Volatilization to Indoor Air Inhalation Criteria & RBSLs	Industrial & Commercial II, III & IV Groundwater Volatilization to Indoor Air Inhalation Criteria & RBSLs	Groundwater Contact Criteria & RBSLs	Water Solubility	Flammability and Explosivity Screening Level	Acute Inhalation Screening Level
Acenaphthene	83329	1,300	3,800	19	4,200 (S)	4,200 (S)	4,200 (S)	4,240	ID	ID
Acenaphthylene	208968	52	180	ID	3,900 (S)	3,900 (S)	3,900 (S)	3,930	ID	ID
Acetaldehyde (I)	75070	950	2,700	130	1.1E+6	2.3E+6	4.2E+7	1.0E+9	8.9E+6	2.6E+7
Acetate	71501	4,200	12,000	(G)	ID	ID	ID	ID	ID	ID
Acetic acid	64197	4,200	12,000	1,000 (M); 360	NLV	NLV	1.8E+8	6.0E+8	1.0E+9 (D)	1.0E+9 (D)
Acetone (I)	67641	730	2,100	1,700	1.0E+9 (D,S)	1.0E+9 (D,S)	3.1E+7	1.0E+9	1.5E+7	1.0E+9 (D)
Acetonitrile	75058	140	400	NA	2.4E+7	4.5E+7	5.6E+6	2.60E+8	2.1E+7	2.0E+6
Acetophenone	98862	1,500	4,400	ID	6.1E+6 (S)	6.1E+6 (S)	6.1E+6 (S)	6.1E+6	ID	ID
Acrolein (I)	107028	120	330	NA	2,100	4,200	3.4E+6	2.10E+8	6.7E+6	3.4E+5
Acrylamide	79061	0.5 (A)	0.5 (A)	NA	NLV	NLV	13,000	2.20E+9	NA	ID
Acrylic acid	79107	3,900	11,000	NA	1.2E+7	2.6E+7	7.6E+7	1.0E+9	1.0E+9 (D)	ID
Acrylonitrile (I)	107131	2.6	11	4.9 (X)	34,000	1.9E+5	14,000	7.50E+7	6.4E+6	ID
Alachlor	15972608	2.0 (A)	2.0 (A)	11 (X)	NLV	NLV	1,700	1.83E+5	ID	ID
Aldicarb	116063	3.0 (A)	3.0 (A)	NA	NLV	NLV	1.2E+5	6.00E+6	ID	ID
Aldicarb sulfoxide	1646873	4.0 (A)	4.0 (A)	NA	NLV	NLV	2.7E+6	2.80E+7	ID	ID
Aldicarb sulfone	1646884	2.0 (A)	2.0 (A)	NA	NLV	NLV	2.1E+6	7.80E+6	ID	ID
Aldrin	309002	0.099	0.4	0.01 (M,X); 8.7E-6	180 (S)	180 (S)	0.34 (AA)	180	ID	ID
Aluminum (B)	7429905[b]	50 (V)	50 (V)	NA	NLV	NLV	6.4E+7	NA	ID	ID
Ammonia	7664417	10,000 (N)	10,000 (N)	(CC)	3.2E+6	7.1E+6	ID	5.30E+8	ID	3.5E+6

TABLE 1. GROUNDWATER: RESIDENTIAL AND INDUSTRIAL-COMMERCIAL PART 201 GENERIC CLEANUP CRITERIA AND SCREENING LEVELS; PART 213 TIER 1 RISK-BASED SCREENING LEVELS (RBSLs)

Guidesheet Number →		#1	#2	#3	#4	#5	#6	#7	#8	#9
	Chemical Abstract Service Number	Residential & Commercial I Drinking Water Criteria & RBSLs	Industrial & Commercial II, III & IV Drinking Water Criteria & RBSLs	Groundwater Surface Water Interface Criteria & RBSLs	Residential & Commercial I Groundwater Volatilization to Indoor Air Inhalation Criteria & RBSLs	Industrial & Commercial II, III & IV Groundwater Volatilization to Indoor Air Inhalation Criteria & RBSLs	Groundwater Contact Criteria & RBSLs	Water Solubility	Flammability and Explosivity Screening Level	Acute Inhalation Screening Level
t-Amyl methyl ether (TAME)	994058	190 (E)	190 (E)	NA	2.8E+6	5.7E+6	2.8E+6 (S)	2.64E+6	NA	NA
Aniline	62533	83	220	4	NLV	NLV	1.4E+6	3.60E+7	NA	ID
Anthracene	120127	43 (S)	43 (S)	ID	43 (S)	43 (S)	43 (S)	43.4	ID	ID
Antimony	7440360	6.0 (A)	6.0 (A)	130 (X)	NLV	NLV	66,000	NA	ID	ID
Arsenic	7440382	50 (A)	50 (A)	150 (X)	NLV	NLV	4,300	NA	ID	ID
Asbestos (SS)	1332214	7.0E+6 f/mL (A)	7.0E+6 f/mL (A)	NA	NLV	NLV	ID	NA	NA	ID
Atrazine	1912249	3.0 (A)	3.0 (A)	7.3 (X)	NLV	NLV	8,400	70,000	ID	ID
Azobenzene	103333	23	94	NA	8,400 (S)	8,400 (S)	1,800	8,400	ID	ID
Barium (S)	7440393	2,000 (A)	2,000 (A)	(Q,X)	NLV	NLV	1.4E+7	NA	ID	ID
Benzene (I)	71432	5.0 (A)	5.0 (A)	200 (X)	5,600	36,000	11,000	1.75E+6	68,000	67,000
Benzidine	92875	0.3 (M); 0.0007	0.3 (M); 0.016	ID	NLV	NLV	7.1	5.20E+5	ID	ID
Benzo(a)anthracene (Q)	56553	2.1	8.8	ID	NLV	NLV	9.4 (S,AA)	9.4	ID	ID
Benzo(b)fluoranthene (Q)	205992	1.8 (S, AA)	1.8 (S, AA)	ID	ID	ID	1.8 (S,AA)	1.8	ID	ID
Benzo(k)fluoranthene (Q)	207089	1.0 (M); 0.8 (S)	1.0 (M); 0.8 (S)	NA	NLV	NLV	1.0 (M,AA); 0.8 (S)	0.8	ID	ID
Benzo(g,h,i)perylene	191242	1.0 (M); 0.26 (S)	1.0 (M); 0.26 (S)	NA	NLV	NLV	1.0 (M,AA); 0.26 (S)	0.26	ID	ID
Benzo(a)pyrene (Q)	50328	5.0 (A)	5.0 (A)	ID	NLV	NLV	1.0 (M,AA); 0.64	1.62	ID	ID
Benzoic acid	65850	32,000	92,000	NA	NLV	NLV	3.8E+6 (S)	3.80E+6	ID	ID
Benzyl alcohol	100516	10,000	29,000	NA	NLV	NLV	4.4E+7 (S)	4.40E+7	ID	ID
Benzyl chloride	100447	7.7	32	NA	12,000	77,000	3,600	4.90E+6	NA	ID
Beryllium	7440417	4.0 (A)	4.0 (A)	(Q)	NLV	NLV	2.9E+6	NA	ID	ID
bis(2-Chloroethoxy)ethane	112265	ID	ID	ID	NLV	NLV	ID	1.99E+7	ID	ID
bis(2-Chloroethyl)ether (I)	111444	2.0	8.3	15 (X)	38,000	2.1E+6	5,700	1.72E+7	1.7E+7 (S)	1.7E+7 (S)
bis(2-Ethylhexyl)phthalate	117817	6.0 (A)	6.0 (A)	32	NLV	NLV	320 (AA)	340	NA	340 (S)
Boron (S)	7440428	600 (F)	600 (F)	1,900	NLV	NLV	6.2E+7	NA	ID	ID
Bromobenzene (I)	108861	18	80	NA	1.8E+6	3.9E+6	12,000	4.13E+6	ID	ID
Bromodichloromethane	75274	80 (A,W)	80 (A,W)	ID	4,800	37,000	14,000	6.74E+6	ID	ID

TABLE 1. GROUNDWATER: RESIDENTIAL AND INDUSTRIAL-COMMERCIAL PART 201 GENERIC CLEANUP CRITERIA AND SCREENING LEVELS; PART 213 TIER 1 RISK-BASED SCREENING LEVELS (RBSLs)

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4-Chloro-3-methylphenol	59507	150	420	7.4	NLV	NLV	79,000	3.90E+6	ID	ID
beta-Chloronaphthalene	91587	1,800	5,200	NA	ID	ID	6,700 (S)	6,740	ID	ID
2-Chlorophenol	95578	45	130	22	ID	ID	94,000	2.20E+7	ID	ID
o-Chlorotoluene (I)	95498	150	420	ID	2.2E+5	3.7E+5 (S)	44,000	3.73E+5	ID	ID
Chlorpyrifos	2921882	22	63	2.0 (M); 0.002	2.9	6.6	1,100 (S)	1,120	ID	ID
Chromium (III) (B,H)	16065831	100 (A)	100 (A)	(G,X)	NLV	NLV	2.9E+6	NA	ID	ID
Chromium (VI)	18540299	100 (A)	100 (A)	11	NLV	NLV	4.6E+5	NA	ID	ID
Chrysene (Q)	218019	1.6 (S)	1.6 (S)	ID	ID	ID	1.6 (S,AA)	1.6	ID	ID
Cobalt	7440484	40	100	100	NLV	NLV	2.4E+6	NA	ID	ID
Copper (B)	7440508	1,000 (E)	1,000 (E)	(G)	NLV	NLV	7.4E+6	NA	ID	ID
Cyanazine	21725462	2.3	9.4	56 (X)	NLV	NLV	2,800	1.70E+5	ID	ID
Cyanide (P,R)	57125	200 (A)	200 (A)	5.2	NLV	NLV	57,000	NA	ID	ID
Cyclohexanone	108941	33,000	94,000	NA	1,500	3,300	2.3E+7 (S)	2.30E+7	NA	ID
Dacthal	1861321	73	210	NA	NLV	NLV	500 (S)	500	ID	ID
Dalapon	75990	200 (A)	200 (A)	NA	NLV	NLV	1.2E+7	5.02E+6	ID	ID
4-4'-DDD	72548	9.1	37	NA	NLV	NLV	44 (AA)	90	ID	ID
4-4'-DDE	72559	4.3	15	NA	NLV	NLV	27 (AA)	120	ID	ID
4-4'-DDT	50293	3.6	10	0.02 (M); 1.1E-5	NLV	NLV	13 (AA)	25	NA	ID
Decabromodiphenyl ether	1163195	30 (S)	30 (S)	NA	30 (S)	30 (S)	30 (S)	30	ID	ID
Di-n-butyl phthalate	84742	880	2,600	9.7	NLV	NLV	11,000 (S)	11,200	NA	ID
Di(2-ethylhexyl) adipate	103231	400 (A)	400 (A)	ID	NLV	NLV	470 (S)	471	ID	ID
Di-n-octyl phthalate	117840	130	380	ID	NLV	NLV	400	3,000	ID	ID
Diacetone alcohol (I)	123422	ID	ID	NA	NLV	NLV	ID	1.0E+9	1.0E+9 (S)	ID
Diazinon	333415	1.3	3.8	NA	NLV	NLV	1,300	60,800	NA	ID
Dibenzo(a,h)anthracene (Q)	53703	2.0 (M); 0.21	2.0 (M); 0.85	ID	NLV	NLV	2.0 (M,AA); 0.31	2.49	ID	ID
Dibenzofuran	132649	ID	ID	4	ID	ID	ID	10,000	ID	ID

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romoform	75252	80 (A,W)	80 (A,W)	ID	4.7E+6	3.1E+6 (S)	1.4E+6	3.10E+6	ID	ID
romomethane	74839	10	29	36	4,000	9,000	70,000	1.46E+7	ID	ID
-Butanol (I)	71363	960	2,700	NA	NLV	NLV	8.8E+6	7.40E+7	4.7E+7	7.4E+7 (S)
-Butanone (MEK) (I)	78933	13,000	36,000	2,200	2.4E+6 (S)	2.4E+6 (S)	2.4E+6 (S)	2.40E+6	ID	2.4E+6 (S)
-Butyl acetate	123864	960	1,600	NA	6.7E+6 (S)	6.7E+6 (S)	1.8E+6	6.70E+6	2.6E+6	6.7E+6 (S)
Butyl alcohol	75650	3,900	11,000	NA	1.0E+6 (D,S)	1.0E+6 (D,S)	7.9E+7	1.0E+6	6.1E+7	ID
utyl benzyl phthalate	85687	1,200	2,700 (S)	14 (X)	NLV	NLV	2,700 (S)	2,690	ID	ID
-Butylbenzene	104518	80	220	ID	ID	ID	8,900	NA	ID	ID
ec-Butylbenzene	135988	80	220	ID	ID	ID	4,400	NA	ID	ID
rt-Butylbenzene (I)	98066	80	220	ID	ID	ID	8,900	NA	ID	ID
admium (S)	7440439	5.0 (A)	5.0 (A)	(Q,X)	NLV	NLV	1.9E+6	NA	ID	ID
amphene (I)	79925	ID	ID	NA	ID	ID	ID	33,400	ID	ID
aprolactam	105602	6,900	17,000	NA	NLV	NLV	3.9E+6	6.25E+6	NA	1.0E+6 (D)
arbaryl	63252	700	2,000	NA	ID	ID	1.3E+6 (S)	1.26E+6	ID	ID
arbazole	86748	95	380	10 (M); 3.9	NLV	NLV	7,400	7,480	ID	ID
arbofuran	1563662	40 (A)	40 (A)	NA	NLV	NLV	3.4E+6	7.00E+6	ID	ID
arbon disulfide (I,R)	75150	800	2,300	ID	2.5E+6	5.5E+6	1.2E+6 (S)	1,19E+6	13,000	ID
arbon tetrachloride	56235	5.0 (A)	5.0 (A)	45 (X)	370	2,400	4,800	7.93E+6	ID	96,000
hlordane (J)	57749	2.0 (A)	2.0 (A)	NA	86 (S)	86 (S)	15 (AA)	56	ID	ID
hloride	16887006	2.5E+6 (E)	2.5E+6 (E)	(FF)	NLV	NLV	ID	NA	ID	ID
hlorobenzene (I)	108907	100 (A)	100 (A)	47	2.1E+6	4.7E+6 (S)	86,000	4,72E+6	1.6E+6	ID
Chloro-1,1-difluoroethane	75683	16,000	44,000	NA	3.9E+6 (S)	3.9E+6 (S)	3.9E+6 (S)	3.9E+06	NA	ID
hloroethane	75003	430	1,700	ID	5.7E+6 (S)	5.7E+6 (S)	4.4E+6	5.74E+6	1.1E+6	ID
Chloroethyl vinyl ether	110758	ID	ID	NA	ID	ID	ID	1.50E+7	ID	ID
hloroform	67663	80 (A,W)	80 (A,W)	170 (X)	28,000	1.8E+6	1.5E+6	7.92E+6	ID	ID
hloromethane (I)	74873	260	1,100	ID	8,600	45,000	4.9E+6	6.34E+6	36,000	2.1E+6

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)ibromochloromethane	124481	80 (A,W)	80 (A,W)	ID	14,000	1.1E+5	18,000	2.60E+6	ID	ID
)ibromochloropropane	96128	0.2 (A)	0.2 (A)	NA	1,200 (S)	1,200 (S)	390	1,230	NA	ID
)ibromomethane	74953	80	230	NA	ID	ID	5.3E+5	1.10E+7	ID	ID
)icamba	1918009	220	630	NA	NLV	NLV	5.9E+5	4.5E+6	ID	ID
,2-Dichlorobenzene	95501	600 (A)	600 (A)	16	1.6E+5 (S)	1.6E+5 (S)	1.6E+5 (S)	1.56E+6	NA	1.6E+5 (S)
,3-Dichlorobenzene	541731	6.8	19	38	ID	ID	2,000	1.11E+6	ID	ID
,4-Dichlorobenzene	106467	75 (A)	75 (A)	13	16,000	74,000 (S)	6,400	73,800	NA	ID
,3'-Dichlorobenzidine	91941	1.1	4.3	0.3 (X)	NLV	NLV	180	3,110	ID	ID
)ichlorodifluoromethane	75718	1,700	4,800	ID	2.2E+5	3.0E+5 (S)	3.0E+5 (S)	3.00E+5	ID	ID
,1-Dichloroethane	75343	880	2,500	740	1.0E+6	2.3E+6	2.4E+6	5.06E+6	3.8E+5	ID
,2-Dichloroethane (I)	107062	5.0 (A)	5.0 (A)	360 (X)	9,600	59,000	19,000	8.52E+6	2.5E+6	ID
,1-Dichloroethylene (I)	75354	7.0 (A)	7.0 (A)	65 (X)	200	1,300	11,000	2.25E+6	97,000	1.4E+5
is-1,2-Dichloroethylene	156592	70 (A)	70 (A)	620	93,000	2.1E+5	2.0E+5	3.50E+6	5.3E+5	ID
rans-1,2-Dichloroethylene	156605	100 (A)	100 (A)	1,500	85,000	2.0E+5	2.2E+5	6.30E+6	2.3E+5	ID
2,6-Dichloro-4-nitroaniline	99309	2,200	6,300	NA	NLV	NLV	7,000 (S)	7,000	ID	ID
2,4-Dichlorophenol	120832	73	210	19	NLV	NLV	48,000	4.50E+6	ID	ID
2,4-Dichlorophenoxyacetic acid	94757	70 (A)	70 (A)	220	NLV	NLV	1.2E+5	6.80E+5	ID	ID
1,2-Dichloropropane (I)	78875	5.0 (A)	5.0 (A)	290 (X)	16,000	36,000	16,000	2.80E+6	5.5E+5	2.8E+6 (S)
1,3-Dichloropropene	542756	8.5	36	NA	3,900	26,000	5,500	2.80E+6	1.3E+5	ID
Dichlorovos	62737	1.6	6.7	NA	NLV	NLV	5,900	1.60E+7	NA	ID
Dicyclohexyl phthalate	84617	ID	ID	NA	ID	ID	ID	4,000	ID	ID
Dieldrin	60571	0.11	0.43	0.02 (M); 6.5E-6	200 (S)	200 (S)	2.4 (AA)	195	ID	ID
Diethyl ether	60297	10 (E)	10 (E)	ID	6.1E+7 (S)	6.1E+7 (S)	3.5E+7	6.10E+7	6.5E+5	6.1E+7 (S)
Diethyl phthalate	84662	5,500	16,000	110	NLV	NLV	1.1E+6 (S)	1.08E+6	NA	ID
Diethylene glycol monobutyl ether	112345	88	260	NA	NLV	NLV	4.0E+6	1.0E+9	ID	ID
Diisopropyl ether	108203	30	86	ID	8,000 (S)	8,000 (S)	8,000 (S)	8,041	8,000 (S)	ID

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Diisopropylamine (I)	108189	8.8	16	NA	ID	ID	21,000	3.66E+7	4.8E+6	ID
Dimethyl phthalate	131113	73,000	2.1E+6	NA	NLV	NLV	4.2E+6 (S)	4.19E+6	NA	ID
N,N-Dimethylacetamide	127195	160	820	4,100 (X)	NLV	NLV	2.3E+7	1.0E+6	NA	ID
N,N-Dimethylaniline	121697	16	46	NA	2.4E+6	1.3E+6 (S)	20,000	1.27E+6	NA	1.3E+6 (S)
Dimethylformamide (I)	68122	700	2,000	NA	NLV	NLV	1.1E+6	1.0E+6	ID	ID
2,4-Dimethylphenol	105679	370	1,000	380	NLV	NLV	5.2E+6	7.87E+6	ID	ID
2,6-Dimethylphenol	576261	4.4	13	NA	NLV	NLV	8,300	6.14E+6	ID	ID
3,4-Dimethylphenol	95658	10	29	NA	NLV	NLV	18,000	4.93E+6	ID	ID
Dimethylsulfoxide	67685	2.2E+6	6.3E+6	1.9E+6	NLV	NLV	1.7E+6 (S)	1.66E+6	ID	ID
2,4-Dinitrotoluene	121142	7.7	32	NA	NLV	NLV	8,800	2.70E+6	ID	ID
Dinoseb	88857	7.0 (A)	7.0 (A)	1.0 (M); 0.48	NLV	NLV	7,000	52,000	ID	ID
1,4-Dioxane (I)	123911	85	360	2,900 (X)	NLV	NLV	1.7E+6	9.00E+6	1.4E+6	ID
Diquat	85007	20 (A)	20 (A)	NA	NLV	NLV	7.0E+6 (S)	7.00E+5	ID	ID
Diuron	330541	31	90	NA	NLV	NLV	37,000 (S)	37,300	ID	ID
Endosulfan (J)	115297	44	130	0.09	ID	ID	510 (S)	510	ID	ID
Endothall	145733	100 (A)	100 (A)	NA	NLV	NLV	2.5E+7 (AA)	1.00E+6	ID	ID
Endrin	72208	2.0 (A)	2.0 (A)	NA	NLV	NLV	180 (AA)	250	ID	ID
Epichlorohydrin (I)	106898	5.0 (M); 2.0 (A)	5.0 (M); 2.0 (A)	NA	3.2E+6	6.3E+6	11,000	6.60E+7	4.7E+7	ID
Ethanol (I)	64175	1.9E+6	3.8E+6	NA	NLV	NLV	1.0E+6 (S)	1.0E+6	9.7E+7	ID
Ethyl acetate (I)	141786	6,800	19,000	NA	6.4E+7 (S)	6.4E+7 (S)	6.4E+7 (S)	6.40E+7	4.2E+6	ID
Ethyl-tert-butyl ether (ETBE)	637923	48 (S)	48 (S)	NA	2.9E+6	5.6E+6 (S)	ID	5.03E+6	ID	ID
Ethylbenzene (I)	100414	74 (S)	74 (S)	18	1.1E+6	1.7E+6 (S)	1.7E+6 (S)	1.69E+6	43,000	1.7E+6 (S)
Ethylene dibromide	106934	0.05 (A)	0.05 (A)	0.2 (X)	2,400	15,000	25	4.20E+6	ID	ID
Ethylene glycol	107211	15,000	42,000	1.9E+6 (X)	NLV	NLV	1.0E+6 (S)	1.0E+6	NA	1.0E+6 (S)
Ethylene glycol monobutyl ether	111762	3,700	10,000	NA	2.9E+6	6.5E+6	6.3E+7	2.24E+6	NA	ID
Fluoranthene	206440	210 (S)	210 (S)	1.6	210 (S)	210 (S)	210 (S)	206	ID	ID

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Fluorene	86737	880	2,000 (S)	12	2,000 (S)	2,000 (S)	2,000 (S)	1,980	ID	ID
Fluorine (soluble fluoride) (B)	7782414	2,000 (E)	2,000 (E)	NA	NLV	NLV	1.2E+7	NA	ID	ID
Formaldehyde	50000	1,300	3,800	120	63,000	3.6E+6	3.0E+7	5.50E+6	ID	61,000
Formic acid (I,U)	64186	10,000	29,000	ID	7.7E+6	1.5E+7	6.0E+8	1.0E+9	1.0E+9 (D)	3.5E+8
1-Formylpiperidine	2591868	80	230	NA	ID	ID	ID	NA	ID	ID
Gentian violet	548629	15	63	NA	NLV	NLV	1.0E+6 (S)	1.00E+6	ID	ID
Glyphosate	1071836	700 (A)	700 (A)	NA	NLV	NLV	1.2E+7 (S,AA)	1.16E+7	ID	ID
Heptachlor	76448	0.4 (A)	0.4 (A)	0.01 (M,X); 0.0018	180 (S)	180 (S)	2.9 (AA)	180	ID	ID
Heptachlor epoxide	1024573	0.2 (A)	0.2 (A)	ID	NLV	NLV	9.0 (AA)	200	ID	ID
n-Heptane	142825	2,700 (S)	2,700 (S)	NA	2,700 (S)	2,700 (S)	2,700 (S)	2,690	200	2,700 (S)
Hexabromobenzene	87821	0.17 (S); 20	0.17 (S); 58	ID	ID	ID	0.17 (S); 1,500	0.17	ID	ID
Hexachlorobenzene (C-66)	118741	1.0 (A)	1.0 (A)	0.2 (M); 0.0003	440	3,000	4.6	6,200	ID	ID
Hexachlorobutadiene (C-46)	87683	15	42	0.05	1,800	3,200 (S)	400	3,230	ID	ID
alpha-Hexachlorocyclohexane	319846	0.43	1.7	NA	2,000 (S)	2,000 (S)	60	2,000	ID	ID
beta-Hexachlorocyclohexane	319857	0.88	3.6	ID	NLV	NLV	120	240	ID	ID
Hexachlorocyclopentadiene (C-56)	77474	50 (A)	50 (A)	ID	130	420	1,800	1,800	ID	ID
Hexachloroethane	67721	7.3	21	6.7 (X)	27,000	50,000 (S)	1,900	50,000	ID	ID
n-Hexane	110543	3,000	8,800	NA	12,000 (S)	12,000 (S)	12,000 (S)	12,000	12,000 (S)	ID
2-Hexanone	591786	1,000	2,900	NA	4.2E+6	8.7E+6	5.2E+6	1.60E+7	NA	ID
Indeno(1,2,3-cd)pyrene (Q)	193395	2.0 (M); 0.022 (S)	2.0 (M); 0.022 (S)	ID	NLV	NLV	2.0 (M, AA); 0.022 (S)	0.022	ID	ID
Iron (B)	7439896	300 (E)	300 (E)	NA	NLV	NLV	5.8E+7	NA	ID	ID
Isobutyl alcohol (I)	78831	2,300	6,700	NA	7.6E+7 (S)	7.6E+7 (S)	2.5E+7	7.60E+7	ID	ID
Isophorone	78591	770	3,100	570 (X)	NLV	NLV	9.9E+6	1.20E+7	ID	1.2E+7 (S)
Isopropyl alcohol (I)	67630	470	1,300	57,000 (X)	NLV	NLV	1.3E+7	1.0E+8	6.0E+7	1.0E+9 (S)
Isopropyl benzene	98828	800	2,300	ID	56,000 (S)	56,000 (S)	56,000 (S)	56,000	29,000	ID
Lead (B)	7439921	4.0 (L)	4.0 (L)	(G,X)	NLV	NLV	ID	NA	ID	ID

TABLE 1. GROUNDWATER: RESIDENTIAL AND INDUSTRIAL-COMMERCIAL PART 201 GENERIC CLEANUP CRITERIA AND SCREENING LEVELS; PART 213 TIER 1 RISK-BASED SCREENING LEVELS (RBSLs)

Guidesheet Number →		#1	#2	#3	#4	#5	#6	#7	#8	#9
	Chemical Abstract Service Number	Residential & Commercial I Drinking Water Criteria & RBSLs	Industrial & Commercial II, III & IV Drinking Water Criteria & RBSLs	Groundwater Surface Water Interface Criteria & RBSLs	Residential & Commercial I Groundwater Volatilization to Indoor Air Inhalation Criteria & RBSLs	Industrial & Commercial II, III & IV Groundwater Volatilization to Indoor Air Inhalation Criteria & RBSLs	Groundwater Contact Criteria & RBSLs	Water Solubility	Flammability and Explosivity Screening Level	Acute Inhalation Screening Level
Lindane	58899	0.2 (A)	0.2 (A)	0.03	ID	ID	190	6,800	ID	ID
Lithium (B)	7439932	170	360	96	NLV	NLV	5.4E+6	NA	ID	ID
Magnesium (B)	7439954	4.0E+6	1.1E+6	NA	NLV	NLV	1.0E+9 (D)	NA	ID	ID
Manganese (B)	7439965	80 (E)	80 (E)	(G,X)	NLV	NLV	9.1E+6	NA	ID	ID
Mercury (Total) (B,Z)	Varies	2.0 (A)	2.0 (A)	0.0013	56 (S)	56 (S)	56 (S)	56	ID	ID
Methane (K)	74828	ID	ID	NA	(K)	(K)	ID	NA	520	ID
Methanol	67561	3,700	10,000	480	2.9E+7 (S)	2.9E+7 (S)	2.9E+7 (S)	2.90E+7	4.9E+6	2.9E+7 (S)
Methoxychlor	72435	40 (A)	40 (A)	NA	ID	ID	45 (S)	45	ID	ID
2-Methoxyethanol (I)	109864	7.3	21	NA	NLV	NLV	8.3E+6	1.0E+9	ID	ID
2-Methyl-4-chlorophenoxyacetic acid	94746	7.3	21	NA	NLV	NLV	9,200	9.24E+5	ID	ID
2-Methyl-4,6-dinitrophenol	534521	20 (M); 2.8	20 (M); 7.3	NA	NLV	NLV	9,500	2.00E+6	ID	ID
N-Methyl-morpholine (I)	109024	20	56	NA	NLV	NLV	1.5E+6	1.0E+9	ID	ID
Methyl parathion	298000	1.8	5.2	NA	NLV	NLV	3,000	60,000	ID	ID
4-Methyl-2-pentanone (MIBK) (I)	108101	1,900	5,200	ID	2.0E+7 (S)	2.0E+7 (S)	1.3E+7	2.00E+7	ID	2.0E+7 (S)
Methyl-tert-butyl ether (MTBE)	1634044	40 (E)	40 (E)	730 (X)	4.7E+7 (S)	4.7E+7 (S)	6.1E+6	4.88E+7	ID	ID
Methylcyclopentane (I)	96377	ID	ID	NA	ID	ID	ID	73,890	ID	ID
4,4'-Methylene-bis-2-chloroaniline (MBOCA)	101144	1.1	4.8	NA	NLV	NLV	110 (AA)	14,000	ID	ID
Methylene chloride	75092	5.0 (A)	5.0 (A)	940 (X)	2.2E+6	1.4E+6	2.2E+6	1.70E+7	ID	ID
2-Methylnaphthalene	91576	280	750	ID	ID	ID	25,000 (S)	24,600	ID	ID
Methylphenols (J)	1319773	370	1,000	71	NLV	NLV	8.1E+6	2.90E+7	NA	ID
Metolachlor	51218452	240	980	NA	NLV	NLV	91,000	5.30E+6	ID	ID
Metribuzin	21087649	180	520	NA	ID	ID	1.2E+6 (S)	1.2E+6	ID	ID
Mirex	2385855	0.02 (M); 6.8E-6 (S)	0.02 (M); 6.8E-6 (S)	0.02 (M); 6.8E-6 (S)	ID	ID	0.02 (M); 6.8E-6 (S)	6.8E-6	NA	ID
Molybdenum (B)	7439987	73	210	800 (X)	NLV	NLV	9.7E+6	NA	ID	ID
Naphthalene	91203	620	1,600	13	31,000 (S)	31,000 (S)	31,000 (S)	31,000	NA	31,000 (S)
Nickel (B)	7440020	100 (A)	100 (A)	(G)	NLV	NLV	7.4E+7	NA	ID	ID

TABLE 1. GROUNDWATER: RESIDENTIAL AND INDUSTRIAL-COMMERCIAL PART 201 GENERIC CLEANUP CRITERIA AND SCREENING LEVELS; PART 213 TIER 1 RISK-BASED SCREENING LEVELS (RBSLs)

Guidesheet Number →		#1	#2	#3	#4	#5	#6	#7	#8	#9
	Chemical Abstract Service Number	Residential & Commercial I Drinking Water Criteria & RBSLs	Industrial & Commercial II, III & IV Drinking Water Criteria & RBSLs	Groundwater Surface Water Interface Criteria & RBSLs	Residential & Commercial I Groundwater Volatilization to Indoor Air Inhalation Criteria & RBSLs	Industrial & Commercial II, III & IV Groundwater Volatilization to Indoor Air Inhalation Criteria & RBSLs	Groundwater Contact Criteria & RBSLs	Water Solubility	Flammability and Explosivity Screening Level	Acute Inhalation Screening Level
Propazine	139402	200	880	NA	NLV	NLV	8,600 (S)	8,600	ID	ID
Propionic acid	79094	12,000	36,000	ID	NLV	NLV	2.8E+8	1.0E+9	1.0E+9 (D)	ID
Propyl alcohol (I)	71238	1,400	4,000	NA	NLV	NLV	2.8E+7	1.0E+9	7.1E+7	1.0E+9 (S)
n-Propylbenzene (I)	103651	80	230	ID	ID	ID	15,000	NA	ID	ID
Propylene glycol	57556	1.5E+6	4.2E+6	2.9E+6	NLV	NLV	1.0E+9 (D,S)	1.0E+9	ID	ID
Pyrene	129000	140 (S)	140 (S)	ID	140 (S)	140 (S)	140 (S)	135	ID	ID
Pyridine (I)	110861	20 (M); 7.3	21	NA	5,500	12,000	94,000	3.00E+5	61,000	ID
Selenium (B)	7782492	50 (A)	50 (A)	5.0	NLV	NLV	9.7E+5	NA	ID	ID
Silver (B)	7440224	34	98	0.2 (M); 0.06	NLV	NLV	1.5E+6	NA	ID	ID
Silvex (2,4,5-TP)	93721	50 (A)	50 (A)	30	NLV	NLV	43,000	1.40E+5	ID	ID
Simazine	122349	4.0 (A)	4.0 (A)	NA	NLV	NLV	4,500 (S)	4,470	ID	ID
Sodium	17341252	1.2E+6	3.6E+6	NA	NLV	NLV	1.0E+9 (D)	NA	ID	ID
Sodium azide	26628228	88	260	NA	ID	ID	ID	NA	ID	ID
Strontium (B)	7440246	4,600	13,000	2,300 (X)	NLV	NLV	1.2E+8	NA	ID	ID
Styrene	100425	100 (A)	100 (A)	80	1.7E+6	3.1E+6 (S)	9,700	3.10E+5	1.4E+5	3.1E+5 (S)
Sulfate	14808798	2.5E+6 (E)	2.5E+6 (E)	NA	NLV	NLV	ID	NA	ID	ID
Tebuthiuron	34014181	510	1,800	NA	NLV	NLV	2.5E+6 (S)	2.50E+6	ID	ID
2,3,7,8-Tetrabromodibenzo-p-dioxin (O)	50585416	(O)	(O)	(O)	NLV	NLV	(O)	0.00996	ID	ID
1,2,4,5-Tetrachlorobenzene	95943	1,300 (S)	1,300 (S)	2.9 (X)	ID	ID	1,300 (S)	1,300	ID	ID
2,3,7,8-Tetrachlorodibenzo-p-dioxin (O)	1746016	3.0E-5 (A)	3.0E-5 (A)	1.0E-5 (M); 3E-9	NLV	NLV	1.0E-5 (M,O,AA)	0.019	ID	ID
1,1,1,2-Tetrachloroethane	630206	77	320	ID (X)	15,000	96,000	30,000	1.10E+6	ID	ID
1,1,2,2-Tetrachloroethane	79345	8.5	36	78 (X)	12,000	77,000	4,700	2.97E+6	ID	ID
Tetrachloroethylene	127184	5.0 (A)	5.0 (A)	45 (X)	25,000	1.7E+5	12,000	2.0E+5	ID	2.0E+5 (S)
Tetrahydrofuran	109999	95	270	11,000 (X)	6.9E+6	1.6E+7	1.6E+6	1.0E+9	60,000	3.6E+6
Tetranitromethane	509148	ID	ID	NA	580	3,200	ID	85,000	ID	ID
Thallium (B)	7440280	2.0 (A)	2.0 (A)	3.7 (X)	NLV	NLV	13,000	NA	ID	ID

TABLE 1. GROUNDWATER: RESIDENTI.. .ND INDUSTRIAL-COMMERCIAL PART 201 GENERIC CLEANUP CRITERIA AND SCREENING LEVELS; PART 213 TIER 1 RISK-BASED SCREENING LEVELS (RBSLs)

Guidesheet Number →		#1	#2	#3	#4	#5	#6	#7	#8	#9
	Chemical Abstract Service Number	Residential & Commercial I Drinking Water Criteria & RBSLs	Industrial & Commercial II, III & IV Drinking Water Criteria & RBSLs	Groundwater Surface Water Interface Criteria & RBSLs	Residential & Commercial I Groundwater Volatilization to Indoor Air Inhalation Criteria & RBSLs	Industrial & Commercial II, III & IV Groundwater Volatilization to Indoor Air Inhalation Criteria & RBSLs	Groundwater Contact Criteria & RBSLs	Water Solubility	Flammability and Explosivity Screening Level	Acute Inhalation Screening Level
itrate (S,N)	14797558	10,000 (A,N)	10,000 (A,N)	NA	NLV	NLV	3.1E+6	NA	ID	ID
itrite (S,N)	14797650	1,000 (A,N)	1,000 (A,N)	NA	NLV	NLV	ID	NA	ID	ID
itrobenzene (I)	98953	3.4	9.8	180 (X)	2.8E+6	8.8E+6	11,000	2.09E+6	NA	ID
-Nitrophenol	88755	20	68	ID	NLV	NLV	79,000	2.80E+6	ID	ID
-Nitroso-di-n-propylamine	621647	5.0 (M); 0.18	5.0 (M); 0.77	NA	NLV	NLV	360	9.86E+6	ID	ID
-Nitrosodiphenylamine	86306	270	1,100	NA	NLV	NLV	35,000 (S)	35,100	ID	ID
-amyl	23138220	200 (A)	200 (A)	NA	NLV	NLV	6.2E+7	2.80E+6	ID	ID
xo-hexyl acetate	88230357	73	210	NA	ID	ID	ID	NA	ID	ID
ndosulfan	40487421	280 (S)	280 (S)	NA	NLV	NLV	280 (S)	275	ID	ID
ntachlorobenzene	608935	8.1	17	5.0 (M); 0.019	ID	ID	240	660	ID	ID
ntachloronitrobenzene	82688	32 (S)	32 (S)	NA	32 (S)	32 (S)	32 (S)	32	ID	ID
ntachlorophenol	87865	1.0 (A)	1.0 (A)	(C,X)	NLV	NLV	200	1.85E+6	ID	ID
ntane	109660	ID	ID	NA	38,000 (S)	38,000 (S)	ID	38,200	340	38,000 (S)
-Pentene (I)	109682	ID	ID	NA	ID	ID	ID	2.03E+6	ID	ID
H	NA	6.5 to 8.5 (E)	6.5 to 8.5 (E)	6.5 to 9.0	NA	NA	NA	NA	NA	NA
henanthrene	85018	82	180	2.4	1,000 (S)	1,000 (S)	1,000 (S)	1,000	ID	ID
henol	108952	4,400	13,000	210	NLV	NLV	2.9E+7	8.28E+7	NA	ID
hosphorus (Total)	7723140	83,000	2.4E+6	(EE)	NLV	NLV	ID	NA	ID	ID
hthalic acid	88993	14,000	40,000	NA	NLV	NLV	1.4E+7 (S)	1.42E+7	ID	ID
hthalic anhydride	85449	15,000	44,000	NA	NLV	NLV	6.2E+6 (S)	6.2E+6	NA	ID
icloram	1918021	500 (A)	500 (A)	46	NLV	NLV	4.3E+6 (S)	4.30E+6	ID	ID
iperidine	110894	3.2	9.2	NA	NLV	NLV	34,000	1.0E+9	ID	ID
olybrominated biphenyls (J)	67774327	0.09	0.09	NA	NLV	NLV	ID	1.98E+7	ID	ID
olychlorinated biphenyls (PCBs) (T)	1336363	0.5 (A)	0.5 (A)	0.2 (M); 2.6E-6	45 (S)	45 (S)	3.3 (AA)	44.7	ID	ID
rometon	1610180	100	460	NA	NLV	NLV	1.8E+6	7.60E+6	ID	ID
ropachlor	1918167	96	270	NA	NLV	NLV	4.4E+6	6.55E+6	ID	ID

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Toluene (I)	108883	790 (E)	790 (E)	140	5.3E+5 (S)	5.3E+5 (S)	5.3E+5 (S)	5.26E+5	61,000	ID
p-Toluidine	106490	15	62	NA	NLV	NLV	24,000	7.60E+6	NA	ID
Total dissolved solids (TDS)	NA	5.0E+5 (E)	5.0E+5 (E)	(EE)	NA	NA	NA	NA	NA	NA
Toxaphene	8001352	3.0 (A)	3.0 (A)	1.0 (M); 6.8E-5	NLV	NLV	44	740	ID	740 (S)
Triallate	2303175	95	270	NA	ID	ID	4,000 (S)	4,000	ID	ID
Tributylamine	102829	10	29	ID	14,000	32,000	2,300	75,400	ID	ID
1,2,4-Trichlorobenzene	120821	70 (A)	70 (A)	30	3.0E+5 (S)	3.0E+5 (S)	19,000	3.00E+5	NA	3.0E+5 (S)
1,1,1-Trichloroethane	71556	200 (A)	200 (A)	200	6.6E+6	1.3E+6 (S)	1.3E+6 (S)	1.33E+6	ID	1.3E+6 (S)
1,1,2-Trichloroethane	79005	5.0 (A)	5.0 (A)	330 (X)	17,000	1.1E+5	21,000	4.42E+6	NA	ID
Trichloroethylene	79016	5.0 (A)	5.0 (A)	200 (X)	15,000	97,000	22,000	1.10E+6	ID	1.1E+6 (S)
Trichlorofluoromethane	75694	2,600	7,300	NA	1.1E+6 (S)	1.1E+6 (S)	1.1E+6 (S)	1.10E+6	ID	1.1E+6 (S)
2,4,5-Trichlorophenol	95954	730	2,100	NA	NLV	NLV	1.7E+6	1.20E+6	ID	ID
2,4,6-Trichlorophenol	88062	120	470	4.4	NLV	NLV	10,000	8.00E+5	ID	ID
1,2,3-Trichloropropane	96184	42	120	NA	ID	ID	84,000	1.90E+6	NA	ID
1,1,2-Trichloro-1,2,2-trifluoroethane	76131	1.7E+5 (S)	1.7E+5 (S)	32	1.7E+5 (S)	1.7E+5 (S)	1.7E+5 (S)	1.70E+5	ID	1.7E+5 (S)
Triethanolamine	102716	3,700	10,000	NA	NLV	NLV	1.0E+9 (D,S)	1.0E+9	ID	ID
Triethylene glycol	112276	4,300	12,000	NA	NLV	NLV	1.0E+6 (S)	1.00E+6	ID	ID
3-Trifluoromethyl-4-nitrophenol	88302	4,500	13,000	NA	NLV	NLV	5.0E+6 (S)	5.00E+6	ID	ID
Trifluralin	1582098	37	110	NA	ID	ID	2,400	8,100	ID	ID
2,2,4-Trimethyl pentane	540841	ID	ID	NA	ID	ID	ID	2,330	160	ID
2,4,4-Trimethyl-2-pentene (I)	107404	ID	ID	NA	ID	ID	ID	11,900	ID	ID
1,2,4-Trimethylbenzene (I)	95636	63 (E)	63 (E)	17	56,000 (S)	56,000 (S)	56,000 (S)	55,890	56,000 (S)	ID
1,3,5-Trimethylbenzene (I)	108678	72 (E)	72 (E)	46	61,000 (S)	61,000 (S)	61,000 (S)	61,180	ID	ID
Triphenyl phosphate	115866	1,200	1,400 (S)	NA	NLV	NLV	1,400 (S)	1,430	ID	ID
tris(2,3-Dibromopropyl)phosphate	126727	10 (M); 0.71	10 (M); 2.9	NA	4,700 (S)	4,700 (S)	2,100	4,700	ID	ID
Urea	57136	ID (N)	ID (N)	NA	NLV	NLV	ID	NA	ID	ID

TABLE 1. GROUNDWATER: RESIDENTIAL AND INDUSTRIAL-COMMERCIAL PART 201 GENERIC CLEANUP CRITERIA AND SCREENING LEVELS; PART 213 TIER 1 RISK-BASED SCREENING LEVELS (RBSLs)

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Vanadium	7440622	4.8	82	12	NLV	NLV	9.7E+6	NA	ID	ID
Vinyl acetate (I)	108054	840	1,800	NA	4.1E+6	8.9E+6	8.0E+6	2.00E+7	1.8E+6	4.8E+6
Vinyl chloride	75014	2.0 (A)	2.0 (A)	15	1,100	13,000	1,000	2.76E+6	33,000	ID
White phosphorus (R)	12185103	0.11	0.81	NA	NLV	NLV	2,900	NA	ID	ID
Xylenes (I)	1330207	280 (E)	280 (E)	35	1.9E+6 (S)	1.9E+6 (S)	1.9E+6 (S)	1.86E+6	70,000	1.9E+6 (S)
Zinc (S)	7440666	2,400	6,000 (E)	(G)	NLV	NLV	1.1E+6	NA	ID	ID
Water Quality Characteristic										
Dissolved oxygen (DO)	NA	NA	NA	(EE)	NA	NA	NA	NA	NA	NA

TABLE 2. SOIL: RESIDENTIAL AND COMMERCIAL I
PART 201 GENERIC CLEANUP CRITERIA AND SCREENING LEVELS;
PART 213 TIER 1 RISK-BASED SCREENING LEVELS (RBSLs)

All criteria, unless otherwise noted, are expressed in units of parts per billion (ppb). One ppb is equivalent to one microgram per kilogram (ug/kg). Criteria with six or more digits are expressed in scientific notation. For example, 200,000 ppb is presented as 2.0E+5. The lowest generic soil criterion for a given hazardous substance is presented in a bold box. A footnote is designated by a letter in parentheses and is explained in the footnote pages that follow the criteria tables. When the risk-based criterion is less than the target detection limit (TDL), the TDL is listed as the criterion (R 299.5707). In these cases, two numbers are presented in the cell. The first number is the criterion (i.e., TDL), and the second number is the risk-based value. Criteria were promulgated December 21, 2002 within the Administrative Rules for Part 201, Environmental Remediation, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended. These tables reflect modifications to the TDLs and new criteria consistent with the provisions of R299.5103(l) and R299.5706a, respectively.

			Groundwater Protection			Indoor Air	Ambient Air (Y)				Direct Contact	
Guidesheet Number →		#10	#11	#12	#13	#14	#15	#16	#17	#18	#19	#20
Hazardous Substance	Chemical Abstract Service Number	Statewide Default Background Levels	Drinking Water Protection Criteria & RBSLs	Groundwater Surface Water Interface Protection Criteria & RBSLs	Groundwater Contact Protection Criteria & RBSLs	Soil Volatilization to Indoor Air Inhalation Criteria & RBSLs	Infinite Source Volatile Soil Inhalation Criteria (VSIC) & RBSLs	Finite VSIC for 5 Meter Source Thickness	Finite VSIC for 2 Meter Source Thickness	Particulate Soil Inhalation Criteria & RBSLs	Direct Contact Criteria & RBSLs	Soil Saturation Concentration Screening Levels
Acenaphthene	83329	NA	3.0E+5	4,400	9.7E+5	1.9E+8	8.1E+7	8.1E+7	8.1E+7	1.4E+10	4.1E+7	NA
Acenaphthylene	208968	NA	5,900	ID	4.4E+5	1.6E+6	2.2E+6	2.2E+6	2.2E+6	2.3E+9	1.6E+6	NA
Acetaldehyde (I)	75070	NA	19,000	2,600	1.1E+8 (C)	2.2E+5	1.7E+5	1.7E+5	2.8E+5	6.0E+8	2.9E+7	1.1E+8
Acetate	71501	NA	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID
Acetic acid	64197	NA	84,000	3.6E+5	6.5E+8 (C)	NLV	NLV	NLV	NLV	1.7E+10	1.3E+8	6.5E+8
Acetone (I)	67641	NA	15,000	34,000	1.1E+8 (C)	1.1E+8 (C)	1.3E+8	1.3E+8	1.9E+8	3.9E+11	2.3E+7	1.1E+8
Acetonitrile	75058	NA	2,800	NA	2.2E+7 (C)	4.8E+6	1.6E+6	1.6E+6	2.1E+6	4.0E+9	4.3E+6	2.2E+7
Acetophenone	98862	NA	30,000	NA	1.1E+6 (C)	1.1E+6 (C)	4.4E+7	4.4E+7	4.4E+7	3.3E+10	1.1E+6 (C)	1.1E+6
Acrolein (I)	107028	NA	2,400	NA	2.3E+7 (C)	410	310	310	610	1.3E+6	3.6E+6	2.3E+7
Acrylamide	79061	NA	10	NA	2.6E+5	NLV	NLV	NLV	NLV	2.4E+6	1,900	NA
Acrylic acid	79107	NA	78,000	NA	1.1E+8 (C)	2.4E+6	1.9E+5	2.3E+5	2.3E+5	6.7E+7	3.5E+7 (DD)	1.1E+8
Acrylonitrile (I)	107131	NA	100 (M); 52	100 (M,X); 96	2.8E+5	6,600	5,000	5,100	10,000	4.6E+7	16,000	8.3E+6
Alachlor	15972608	NA	52	290 (X)	44,000	NLV	NLV	NLV	NLV	ID	93,000	NA
Aldicarb	116063	NA	60	NA	2.4E+6	NLV	NLV	NLV	NLV	ID	2.3E+5	NA
Aldicarb sulfoxide	1646873	NA	200 (M)	NA	5.4E+7	NLV	NLV	NLV	NLV	ID	2.9E+5	NA
Aldicarb sulfone	1646884	NA	200 (M); 40	NA	4.2E+7	NLV	NLV	NLV	NLV	ID	2.5E+5	NA
Aldrin	309002	NA	NLL	NLL	NLL	1.3E+6	58,000	58,000	58,000	6.4E+5	1,000	NA
Aluminum (B)	7429905	6.9E+6	1,000	NA	1.0E+9 (D)	NLV	NLV	NLV	NLV	ID	5.0E+7 (DD)	NA
Ammonia	7664417	NA	ID	(CC)	ID	ID	ID	ID	ID	6.7E+9	ID	1.0E+7

TABLE 2. SOIL: RESIDENTIAL AND COMMERCIAL I
PART 201 GENERIC CLEANUP CRITERIA AND SCREENING LEVELS;
PART 213 TIER 1 RISK-BASED SCREENING LEVELS (RBSLs)

			Groundwater Protection			Indoor Air	Ambient Air (Y)				Direct Contact	
Guidesheet Number →		#10	#11	#12	#13	#14	#15	#16	#17	#18	#19	#20
Hazardous Substance	Chemical Abstract Service Number	Statewide Default Background Levels	Drinking Water Protection Criteria & RBSLs	Groundwater Surface Water Interface Protection Criteria & RBSLs	Groundwater Contact Protection Criteria & RBSLs	Soil Volatilization to Indoor Air Inhalation Criteria & RBSLs	Infinite Source Volatile Soil Inhalation Criteria (VSIC) & RBSLs	Finite VSIC for 5 Meter Source Thickness	Finite VSIC for 2 Meter Source Thickness	Particulate Soil Inhalation Criteria & RBSLs	Direct Contact Criteria & RBSLs	Soil Saturation Concentration Screening Levels
t-Amyl methyl ether (TAME)	994058	NA	3,900	NA	4.4E+5 (C)	58,000	3.4E+5	7.6E+5	1.8E+6	4.1E+9	4.4E+5 (C)	4.4E+5
Aniline	62533	NA	1,100	330 (M); 90	2.8E+6	NLV	NLV	NLV	NLV	6.7E+7	3.3E+5	4.6E+6
Anthracene	120127	NA	41,000	ID	41,000	1.0E+9 (D)	1.4E+9	1.4E+9	1.4E+9	6.7E+10	2.3E+5	NA
Antimony	7440360	NA	4,300	94,000	4.9E+7	NLV	NLV	NLV	NLV	1.3E+7	1.8E+5	NA
Arsenic	7440382	5,800	23,000	70,000 (X)	2.0E+6	NLV	NLV	NLV	NLV	7.2E+5	7,600	NA
Asbestos (SB)	1332214	NA	NLL	NLL	NLL	NLV	NLV	NLV	NLV	1.0E+7 (M); 66,000	ID	NA
Atrazine	1912249	NA	60	150 (X)	1.1E+5	NLV	NLV	NLV	NLV	ID	71,000 (DD)	NA
Azobenzene	103333	NA	4,200	NA	3.0E+5	6.1E+6	6.3E+5	ID	ID	1.0E+6	1.4E+5	NA
Barium (B)	7440393	75,000	1.3E+6	(G,X)	1.0E+9 (D)	NLV	NLV	NLV	NLV	3.3E+6	3.7E+7	NA
Benzene (I)	71432	NA	100	4,000 (X)	2.2E+5	1,600	13,000	34,000	79,000	3.6E+6	1.8E+5	4.0E+5
Benzidine	92875	NA	1,000 (M); 6.0	ID	1,000 (M); 140	NLV	NLV	NLV	NLV	46,000	1,000 (M); 23	NA
Benzo(a)anthracene (Q)	56553	NA	NLL	NLL	NLL	NLV	NLV	NLV	NLV	ID	20,000	NA
Benzo(b)fluoranthene (Q)	205992	NA	NLL	NLL	NLL	ID	ID	ID	ID	ID	20,000	NA
Benzo(k)fluoranthene (Q)	207089	NA	NLL	NLL	NLL	NLV	NLV	NLV	NLV	ID	2.0E+5	NA
Benzo(g,h,i)perylene	191242	NA	NLL	NLL	NLL	NLV	NLV	NLV	NLV	6.0E+6	2.5E+6	NA
Benzo(a)pyrene (Q)	50328	NA	NLL	NLL	NLL	NLV	NLV	NLV	NLV	1.5E+6	2,000	NA
Benzoic acid	65850	NA	6.4E+6	NA	7.0E+7	NLV	NLV	NLV	NLV	ID	9.9E+6	NA
Benzyl alcohol	100516	NA	2.0E+6	NA	5.5E+6 (C)	NLV	NLV	NLV	NLV	3.3E+11	5.5E+6 (C)	5.5E+6
Benzyl chloride	100447	NA	150	NA	72,000	6,300	14,000	14,000	17,000	6.2E+7	48,000	2.3E+5
Beryllium	7440417	NA	51,000	(G)	1.0E+9 (D)	NLV	NLV	NLV	NLV	1.3E+6	4.1E+5	NA
bis(2-Chloroethoxy)ethane	112265	NA	ID	ID	ID	NLV	NLV	NLV	NLV	ID	ID	2.7E+6
bis(2-Chloroethyl)ether (I)	111444	NA	100	300	1.1E+5	6,300	3,900	3,900	3,900	9.4E+6	13,000	2.2E+6
bis(2-Ethylhexyl)phthalate	117817	NA	NLL	NLL	NLL	NLV	NLV	NLV	NLV	7.0E+6	2.8E+6	1.0E+7
Boron (B)	7440428	NA	10,000	38,000	1.0E+9 (D)	NLV	NLV	NLV	NLV	ID	4.8E+7 (DD)	NA

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Bromobenzene (I)	108861	NA	550	NA	3.6E+5	3.1E+5	4.5E+5	4.5E+5	4.5E+5	5.3E+8	5.4E+5	7.6E+5
Bromodichloromethane	75274	NA	1,600 (W)	ID	2.8E+5	1,200	9,100	9,700	19,000	8.4E+7	1.1E+5	1.5E+6
Bromoform	75252	NA	1,600 (W)	ID	8.7E+5 (C)	1.5E+5	9.0E+5	9.0E+5	9.0E+5	2.8E+9	8.2E+5	8.7E+5
Bromomethane	74839	NA	200	700	1.4E+6	860	11,000	57,000	1.4E+6	3.3E+8	3.2E+5	2.2E+6
n-Butanol (I)	71363	NA	19,000	NA	8.7E+6 (C)	NLV	NLV	NLV	NLV	2.3E+10	8.7E+6 (C)	8.7E+6
2-Butanone (MEK) (I)	78933	NA	2.6E+6	44,000	2.7E+7 (C)	2.7E+7 (C)	2.9E+7	2.9E+7	3.5E+7	6.7E+10	2.7E+7 (C,DD)	2.7E+7
n-Butyl acetate	123864	NA	11,000	NA	1.1E+6 (C)	1.1E+6 (C)	1.1E+8	2.6E+8	3.2E+8	4.7E+11	1.1E+6 (C)	1.1E+6
t-Butyl alcohol	75650	NA	78,000	NA	1.1E+6 (C)	1.1E+6 (C)	9.7E+7	2.0E+8	2.0E+8	1.3E+11	1.1E+6 (C)	1.1E+6
Butyl benzyl phthalate	85687	NA	3.1E+5 (C)	26,000 (X)	3.1E+5 (C)	NLV	NLV	NLV	NLV	4.7E+10	3.1E+5 (C)	3.1E+5
n-Butylbenzene	104518	NA	1,600	ID	1.2E+5	ID	ID	ID	ID	ID	2.5E+6	1.0E+7
sec-Butylbenzene	135988	NA	1,600	ID	88,000	ID	ID	ID	ID	ID	2.5E+6	1.0E+7
t-Butylbenzene (I)	98066	NA	1,600	NA	1.8E+5	ID	ID	ID	ID	ID	2.5E+6	1.0E+7
Cadmium (B)	7440439	1,200	6,000	(G,X)	2.3E+8	NLV	NLV	NLV	NLV	1.7E+6	5.5E+5	NA
Camphene (I)	79925	NA	ID	NA	ID	ID	ID	ID	ID	ID	ID	NA
Caprolactam	105602	NA	1.2E+8	NA	1.0E+9 (D)	NLV	NLV	NLV	NLV	6.7E+8	5.3E+7 (DD)	NA
Carbaryl	63252	NA	14,000	NA	2.6E+6	ID	ID	ID	ID	ID	2.2E+7	NA
Carbazole	86748	NA	9,400	1,100	8.2E+5	NLV	NLV	NLV	NLV	ID	5.3E+5	NA
Carbofuran	1563662	NA	800	NA	6.6E+6	NLV	NLV	NLV	NLV	ID	1.1E+6	NA
Carbon disulfide (I,R)	75150	NA	16,000	ID	2.6E+5 (C)	76,000	1.3E+6	7.9E+6	1.9E+7	4.7E+10	2.6E+5 (C,DD)	2.8E+5
Carbon tetrachloride	56235	NA	160	900 (X)	92,000	190	3,500	12,000	28,000	1.3E+8	96,000	3.9E+5
Chlordane (J)	57749	NA	NLL	NLL	NLL	1.1E+7	1.2E+6	1.2E+6	1.2E+6	3.1E+7	31,000	NA
Chloride	16887006	NA	5.0E+6	2.5E+6 (X)	ID	NLV	NLV	NLV	NLV	ID	5.0E+5 (F)	NA
Chlorobenzene (I)	108907	NA	2,000	940	2.6E+5 (C)	1.2E+5	7.7E+5	9.9E+5	2.1E+6	4.7E+9	2.6E+5 (C)	2.6E+5
1-Chloro-1,1-difluoroethane	75683	NA	3.0E+6	NA	9.6E+5 (C)	9.6E+5 (C)	7.9E+7	5.6E+8	1.4E+9	3.3E+12	9.6E+5 (C)	9.6E+5

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PART 213 TIER 1 RISK-BASED SCREENING LEVELS (RBSLs)

			Groundwater Protection			Indoor Air	Ambient Air (Y)				Direct Contact	
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Chloroethane	75003	NA	8,800	ID	9.5E+5 (C)	9.5E+5 (C)	3.0E+7	1.2E+8	2.5E+8	6.7E+11	9.5E+5 (C)	9.5E+5
2-Chloroethyl vinyl ether	110758	NA	ID	NA	ID	ID	ID	ID	ID	ID	ID	1.9E+6
Chloroform	67663	NA	1,900 (W)	3,400 (X)	1.5E+5 (C)	7,200	46,000	1.2E+8	2.7E+8	1.3E+9	1.2E+6	1.5E+5
Chloromethane (I)	74873	NA	5,200	ID	1.1E+6 (C)	2,300	40,000	4.1E+5	1.0E+6	4.9E+9	1.1E+6 (C)	1.1E+6
4-Chloro-3-methylphenol	59507	NA	6,800	280	3.0E+6	NLV	NLV	NLV	NLV	ID	4.6E+6	NA
beta-Chloronaphthalene	91587	NA	6.2E+5	NA	2.3E+6	ID	ID	ID	ID	ID	5.9E+7	NA
2-Chlorophenol	95578	NA	900	440	1.9E+5	ID	ID	ID	ID	ID	1.4E+6	1.9E+7
o-Chlorotoluene (I)	95498	NA	3,300	NA	5.0E+5 (C)	2.7E+5	1.2E+6	2.9E+6	6.3E+6	4.7E+9	5.0E+5 (C)	5.0E+5
Chlorpyrifos	2921882	NA	17,000	1,800	8.4E+5	130	4,800	23,000	55,000	1.3E+8	1.1E+7	NA
Chromium (III) (B,H)	16065831	15,000 (total)	1.0E+9 (D)	(G,X)	1.0E+9 (D)	NLV	NLV	NLV	NLV	3.3E+8	7.9E+8	NA
Chromium (VI)	18540299	NA	30,000	3,300	1.4E+8	NLV	NLV	NLV	NLV	2.6E+5	2.5E+6	NA
Chrysene (Q)	218019	NA	NLL	NLL	NLL	ID	ID	ID	ID	ID	2.0E+6	NA
Cobalt	7440484	6,800	800	2,000	4.8E+7	NLV	NLV	NLV	NLV	1.3E+7	2.6E+6	NA
Copper (B)	7440508	32,000	6.5E+6	(G)	1.0E+9 (D)	NLV	NLV	NLV	NLV	1.3E+8	2.0E+7	NA
Cyanazine	21725462	NA	200	1,100 (X)	56,000	NLV	NLV	NLV	NLV	ID	14,000	NA
Cyanide (P,R)	57125	390 (total)	4,000	100	2.5E+5	NLV	NLV	NLV	NLV	2.5E+5	12,000	NA
Cyclohexanone	108941	NA	5.2E+6	NA	2.2E+8 (C)	17,000	1.0E+6	1.1E+7	2.7E+7	6.7E+10	2.2E+8 (C)	2.2E+6
Dacthal	1861321	NA	60,000	NA	3.4E+5	NLV	NLV	NLV	NLV	ID	2.3E+6	NA
Dalapon	75990	NA	4,000	NA	5.9E+7 (C)	NLV	NLV	NLV	NLV	ID	1.9E+7	5.9E+7
4-4'-DDD	72548	NA	NLL	NLL	NLL	NLV	NLV	NLV	NLV	4.4E+7	66,000	NA
4-4'-DDE	72559	NA	NLL	NLL	NLL	NLV	NLV	NLV	NLV	3.2E+7	45,000	NA
4-4'-DDT	50293	NA	NLL	NLL	NLL	NLV	NLV	NLV	NLV	3.2E+7	57,000	NA
Decabromodiphenyl ether	1163195	NA	1.4E+5	NA	1.4E+5	1.0E+9 (D)	5.6E+7	5.6E+7	5.6E+7	2.3E+9	3.8E+6	NA
Di-n-butyl phthalate	84742	NA	7.6E+5 (C)	11,000	7.6E+5 (C)	NLV	NLV	NLV	NLV	3.3E+9	7.6E+5 (C)	7.6E+5

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			Groundwater Protection			Indoor Air	Ambient Air (Y)				Direct Contact	
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Di(2-ethylhexyl) adipate	103231	NA	9.6E+5 (C)	NA	9.6E+5 (C)	NLV	NLV	NLV	NLV	9.2E+9	9.6E+5 (C,DD)	9.6E+5
Di-n-octyl phthalate	117840	NA	1.0E+6	ID	1.4E+6 (C)	NLV	NLV	NLV	NLV	ID	6.9E+6	1.4E+6
Diacetone alcohol (I)	123422	NA	ID	NA	ID	NLV	NLV	NLV	NLV	1.6E+11	ID	1.1E+6
Diazinon	333415	NA	95	NA	95,000	NLV	NLV	NLV	NLV	ID	12,000 (DD)	3.1E+5
Dibenzo(a,h)anthracene (Q)	53703	NA	NLL	NLL	NLL	NLV	NLV	NLV	NLV	ID	2,000	NA
Dibenzofuran	132649	NA	ID	1,700	ID	ID	ID	ID	ID	ID	ID	NA
Dibromochloromethane	124481	NA	1,600 (W)	ID	3.6E+5	3,600	24,000	24,000	33,000	1.3E+8	1.1E+5	6.1E+5
Dibromochloropropane	96128	NA	10 (M); 4.0	NA	1,200 (C)	1,200 (C)	13,000	13,000	13,000	1.3E+7	1,200 (C)	1,200
Dibromomethane	74953	NA	1,600	NA	2.0E+6 (C)	ID	ID	ID	ID	ID	2.0E+6 (C)	2.0E+6
Dicamba	1918009	NA	4,400	NA	1.2E+7	NA	NLV	NLV	NLV	ID	3.4E+6	NA
1,2-Dichlorobenzene	95501	NA	14,000	360	2.1E+5 (C)	2.1E+5 (C)	3.9E+7	3.9E+7	5.2E+7	1.0E+11	2.1E+5 (C)	2.1E+5
1,3-Dichlorobenzene	541731	NA	170	1,100	51,000	ID	ID	ID	ID	ID	1.7E+5 (C)	1.7E+5
1,4-Dichlorobenzene	106467	NA	1,700	290	1.4E+5	19,000	77,000	77,000	1.1E+5	4.6E+8	4.0E+5	NA
3,3'-Dichlorobenzidine	91941	NA	2,000 (M); 28	2,000 (M,X); 510	4,600	NLV	NLV	NLV	NLV	6.5E+6	6,600	NA
Dichlorodifluoromethane	75718	NA	95,000	ID	1.0E+6 (C)	9.0E+5	5.3E+7	5.5E+8	1.4E+9	3.3E+12	1.0E+6 (C)	1.0E+6
1,1-Dichloroethane	75343	NA	18,000	15,000	8.9E+5 (C)	2.3E+5	2.1E+6	5.9E+6	1.4E+7	3.3E+10	8.9E+5 (C)	8.9E+5
1,2-Dichloroethane (I)	107062	NA	100	7,200 (X)	3.8E+5	2,100	6,200	11,000	26,000	1.2E+8	91,000	1.2E+6
1,1-Dichloroethylene (I)	75354	NA	140	1,300 (X)	2.2E+5	62	1,100	5,300	13,000	6.2E+7	2.0E+5	8.7E+5
cis-1,2-Dichloroethylene	156592	NA	1,400	12,000	6.4E+5 (C)	22,000	1.8E+5	4.2E+5	9.9E+5	2.3E+9	6.4E+5 (C)	6.4E+5
trans-1,2-Dichloroethylene	156605	NA	2,000	30,000	1.4E+6 (C)	23,000	2.8E+5	6.3E+5	2.0E+6	4.7E+9	1.4E+6 (C)	1.4E+6
2,6-Dichloro-4-nitroaniline	99309	NA	44,000	NA	1.4E+6	NLV	NLV	NLV	NLV	ID	6.8E+7	NA
2,4-Dichlorophenol	120832	NA	1,600	380	9.6E+5	NLV	NLV	NLV	NLV	5.1E+9	6.6E+5 (DD)	1.8E+6
2,4-Dichlorophenoxyacetic acid	94757	NA	1,400	4,400	2.4E+6	NLV	NLV	NLV	NLV	6.7E+9	2.5E+6	NA
1,2-Dichloropropane (I)	78875	NA	100	5,600 (X)	3.2E+5	4,000	25,000	50,000	1.1E+6	2.7E+8	1.4E+5	5.5E+5

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1,3-Dichloropropene	542756	NA	170	NA	1.1E+6	1,000	18,000	68,000	1.6E+6	7.6E+8	10,000	6.2E+6
Dichlorvos	62737	NA	50 (M); 32	NA	1.2E+6	NLV	NLV	NLV	NLV	3.3E+7	10,000	2.2E+6
Dicyclohexyl phthalate	84617	NA	ID	NA	ID	ID	ID	ID	ID	ID	ID	NA
Dieldrin	60571	NA	NLL	NLL	NLL	1.4E+6	19,000	19,000	19,000	6.6E+6	1,100	NA
Diethyl ether	60297	NA	200	ID	7.4E+6 (C)	7.4E+6 (C)	8.5E+7	1.5E+8	3.4E+8	8.0E+11	7.4E+6 (C)	7.4E+6
Diethyl phthalate	84662	NA	1.1E+6	2,200	7.4E+6 (C)	NLV	NLV	NLV	NLV	3.3E+9	7.4E+6 (C)	7.4E+6
Diethylene glycol monobutyl ether	112345	NA	1,800	NA	8.0E+7	NLV	NLV	NLV	NLV	1.3E+9	2.7E+6	1.1E+6
Diisopropyl ether	108203	NA	600	ID	1,300 (C)	1,300 (C)	3.4E+6	7.6E+6	1.6E+6	4.1E+9	1,300 (C)	1,300
Diisopropylamine (I)	108189	NA	110	NA	4.2E+6	ID	ID	ID	ID	ID	1.7E+6	6.7E+6
Dimethyl phthalate	131113	NA	7.9E+6 (C)	NA	7.9E+6 (C)	NLV	NLV	NLV	NLV	3.3E+9	7.9E+6 (C)	7.9E+6
N,N-Dimethylacetamide	127195	NA	3,600	82,000 (X)	1.1E+8 (C)	NLV	NLV	NLV	NLV	ID	5.6E+6	1.1E+8
N,N-Dimethylaniline	121697	NA	320	NA	4.0E+6	1.7E+6	1.5E+6	1.5E+6	1.6E+6	2.6E+8	5.0E+6	8.0E+6
Dimethylformamide (I)	68122	NA	14,000	NA	1.1E+8 (C)	NLV	NLV	NLV	NLV	2.0E+9	2.2E+7	1.1E+8
2,4-Dimethylphenol	105679	NA	7,400	7,600	1.0E+7	NLV	NLV	NLV	NLV	4.7E+9	1.1E+7	NA
2,6-Dimethylphenol	576261	NA	330 (M); 66	NA	1.3E+6	NLV	NLV	NLV	NLV	ID	1.4E+6	NA
3,4-Dimethylphenol	95658	NA	330 (M); 200	NA	3.6E+6	NLV	NLV	NLV	NLV	ID	3.2E+6	NA
Dimethylsulfoxide	67685	NA	4.4E+8	3.6E+8	1.6E+7 (C)	NLV	NLV	NLV	NLV	ID	1.6E+7 (C)	1.6E+7
2,4-Dinitrotoluene	121142	NA	430	NA	1.7E+6	NLV	NLV	NLV	NLV	1.6E+7	49,000	NA
Dinoseb	88857	NA	300	200 (M); 43	1.4E+6 (C)	NLV	NLV	NLV	NLV	ID	66,000 (DD)	1.4E+6
1,4-Dioxane (I)	123911	NA	1,700	56,000	3.4E+7	NLV	NLV	NLV	NLV	5.7E+8	5.3E+6	9.7E+7
Diquat	85007	NA	400	NA	1.4E+7	NLV	NLV	NLV	NLV	ID	5.0E+6	NA
Diuron	330541	NA	620	NA	7.4E+6	NLV	NLV	NLV	NLV	4.7E+8	9.7E+6	NA
Endosulfan (J)	115297	NA	NLL	NLL	NLL	ID	ID	ID	ID	ID	1.4E+6	NA
Endothall	145733	NA	NLL	NLL	NLL	NLV	NLV	NLV	NLV	2.3E+9	3.8E+6	NA

TABLE 2. SOIL: RESIDENTIAL AND COMMERCIAL I PART 201 GENERIC CLEANUP CRITERIA AND SCREENING LEVELS; PART 213 TIER 1 RISK-BASED SCREENING LEVELS (RBSLs)

			Groundwater Protection			Indoor Air	Ambient Air (Y)				Direct Contact	
Guidesheet Number →		#10	#11	#12	#13	#14	#15	#16	#17	#18	#19	#20
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Endrin	72208	NA	NLL	NLL	NLL	NLV	NLV	NLV	NLV	ID	65,000	NA
Epichlorohydrin (I)	106898	NA	100	NA	2.2E+5	64,000	31,000	31,000	35,000	6.7E+7	8,900	7.3E+6
Ethanol (I)	64175	NA	3.8E+7	NA	1.1E+8 (C)	NLV	NLV	NLV	NLV	1.3E+12	1.1E+8 (C,DD)	1.1E+8
Ethyl acetate (I)	141786	NA	1.3E+5	NA	7.5E+6 (C)	7.5E+6 (C)	4.9E+7	4.9E+7	9.8E+7	2.1E+11	7.5E+6 (C)	7.5E+6
Ethyl-tert-butyl ether (ETBE)	637923	NA	980	ID	ID	5.4E+5	1.9E+6	4.5E+6	1.1E+7	2.5E+10	ID	6.5E+5
Ethylbenzene (I)	100414	NA	1,500	360	1.4E+5 (C)	87,000	7.2E+5	1.0E+6	2.2E+6	1.0E+10	1.4E+5 (C)	1.4E+5
Ethylene dibromide	106934	NA	20 (M); 1.0	20 (M); 4.0	500	670	1,700	1,700	3,300	1.4E+7	92	8.9E+5
Ethylene glycol	107211	NA	3.0E+5	NA	1.1E+8 (C)	NLV	NLV	NLV	NLV	6.7E+10	1.1E+8 (C)	1.1E+8
Ethylene glycol monobutyl ether	111762	NA	74,000	NA	4.1E+7 (C)	7.4E+5	1.8E+7	1.5E+8	3.6E+8	8.7E+11	4.1E+7 (C)	4.1E+7
Fluoranthene	206440	NA	7.3E+5	5,500	7.3E+5	1.0E+9 (D)	7.4E+8	7.4E+8	7.4E+8	9.3E+9	4.6E+7	NA
Fluorene	86737	NA	3.9E+5	5,300	8.9E+5	5.8E+8	1.3E+8	1.3E+8	1.3E+8	9.3E+9	2.7E+7	NA
Fluorine (soluble fluoride) (B)	7782414	NA	40,000	NA	2.4E+8	NLV	NLV	NLV	NLV	ID	9.0E+8 (DD)	NA
Formaldehyde	50000	NA	26,000	2,400	6.0E+7 (C)	12,000	13,000	23,000	52,000	2.4E+8	4.1E+7	6.0E+7
Formic acid (I,U)	64186	NA	2.0E+5	ID	1.1E+8 (C)	1.5E+6	2.1E+5	1.4E+5	1.4E+5	1.3E+8	1.1E+8 (C)	1.1E+8
1-Formylpiperidine	2591868	NA	1,600	NA	ID	ID	ID	ID	ID	ID	2.5E+6	1.0E+7
Gentian violet	548629	NA	300	NA	2.0E+7	NLV	NLV	NLV	NLV	ID	96,000	NA
Glyphosate	1071836	NA	NLL	NLL	NLL	NLV	NLV	NLV	NLV	ID	1.1E+7 (DD)	NA
Heptachlor	76448	NA	NLL	NLL	NLL	3.5E+5	62,000	62,000	62,000	2.4E+6	8,600	NA
Heptachlor epoxide	1024573	NA	NLL	NLL	NLL	NLV	NLV	NLV	NLV	1.2E+6	3,100	NA
n-Heptane	142825	NA	2.4E+5 (C)	NA	2.4E+5 (C)	2.4E+5 (C)	2.1E+7	4.4E+7	1.0E+8	2.3E+11	2.4E+5 (C)	2.4E+5
Hexabromobenzene	87821	NA	5,400	ID	5,400	ID	ID	ID	ID	ID	1.1E+6	NA
Hexachlorobenzene (C-66)	118741	NA	1,800	360	8,200	41,000	17,000	17,000	17,000	6.8E+6	8,900	NA
Hexachlorobutadiene (C-46)	87683	NA	26,000	91	3.5E+5 (C)	1.3E+5	1.3E+5	1.3E+5	1.3E+5	1.4E+8	1.0E+5	3.5E+5
alpha-Hexachlorocyclohexane	319846	NA	18	NA	2,600	30,000	12,000	22,000	25,000	1.7E+6	2,600	NA

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PART 213 TIER 1 RISK-BASED SCREENING LEVELS (RBSLs)

			Groundwater Protection			Indoor Air	Ambient Air (Y)				Direct Contact	
Guidesheet Number —		#10	#11	#12	#13	#14	#15	#16	#17	#18	#19	#20
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beta-Hexachlorocyclohexane	319857	NA	37	ID	5,100	NLV	NLV	NLV	NLV	5.9E+6	5,400	NA
Hexachlorocyclopentadiene (C-56)	77474	NA	3.2E+6	ID	7.2E+6 (C)	30,000	50,000	50,000	50,000	1.3E+7	7.2E+6 (C)	7.2E+6
Hexachloroethane	67721	NA	480	1,900 (X)	1.1E+6	40,000	5.5E+6	9.3E+6	9.3E+6	2.3E+8	2.3E+6	NA
n-Hexane	110543	NA	44,000 (C)	NA	44,000 (C)	44,000 (C)	3.0E+6	3.2E+6	6.2E+6	1.3E+10	44,000 (C)	44,000
2-Hexanone	591786	NA	20,000	NA	2.5E+6 (C)	6.9E+6	1.1E+6	1.1E+6	1.4E+6	2.7E+8	2.5E+6 (C)	2.5E+6
Indeno(1,2,3-cd)pyrene (Q)	193395	NA	NLL	NLL	NLL	NLV	NLV	NLV	NLV	ID	20,000	NA
Iron (B)	7439896	1.2E+7	8,000	NA	1.0E+9 (D)	NLV	NLV	NLV	NLV	ID	1.6E+8	NA
Isobutyl alcohol (I)	78831	NA	46,000	NA	8.9E+6 (C)	8.9E+6 (C)	7.9E+7	7.9E+7	7.9E+7	1.0E+11	8.9E+6 (C)	8.9E+6
Isophorone	78591	NA	16,000	11,000 (X)	2.4E+6 (C)	NLV	NLV	NLV	NLV	1.2E+10	2.4E+6 (C)	2.4E+6
Isopropyl alcohol (I)	67630	NA	9,400	1.1E+6 (X)	1.1E+6 (C)	NLV	NLV	NLV	NLV	1.5E+10	1.4E+7	1.1E+6
Isopropyl benzene	98828	NA	91,000	ID	3.9E+6 (C)	3.9E+6 (C)	1.7E+6	1.7E+6	2.8E+6	5.8E+9	3.9E+6 (C)	3.9E+6
Lead (B)	7439921	21,000	7.0E+6	(G,X)	ID	NLV	NLV	NLV	NLV	1.0E+8	4.0E+6	NA
Lindane	58899	NA	20 (M); 7.0	20 (M); 0.99	7,100	ID	ID	ID	ID	ID	9,200	NA
Lithium (B)	7439932	9,800	3,400	1,900	1.1E+6	NLV	NLV	NLV	NLV	ID	4.2E+6 (DD)	NA
Magnesium (B)	7439954	NA	8.0E+6	NA	1.0E+9 (D)	NLV	NLV	NLV	NLV	6.7E+9	1.0E+9 (D)	NA
Manganese (B)	7439965	4.4E+6	1,000	(G,X)	1.8E+6	NLV	NLV	NLV	NLV	3.3E+6	2.6E+7	NA
Mercury (Total) (B,Z)	Varies	180	1,700	50 (M); 1.2	47,000	48,000	52,000	52,000	52,000	2.0E+7	1.6E+5	NA
Methane	74828	NA	ID	NA	ID	6.4E+5 ug/m3 (GG)	ID	ID	ID	ID	ID	ID
Methanol	67561	NA	74,000	9,800	3.1E+6 (C)	3.1E+6 (C)	3.1E+7	4.4E+7	9.6E+7	2.2E+11	3.1E+6 (C)	3.1E+6
Methoxychlor	72435	NA	18,000	NA	18,000	ID	ID	ID	ID	ID	1.9E+6	NA
2-Methoxyethanol (I)	109864	NA	180	NA	1.7E+7	NLV	NLV	NLV	NLV	1.3E+9	2.3E+5	1.1E+6
2-Methyl-4-chlorophenoxyacetic acid	94746	NA	390	NA	4.9E+6	NLV	NLV	NLV	NLV	ID	2.3E+6	NA
2-Methyl-4,6-dinitrophenol	534521	NA	830 (M); 400	NA	1.9E+6	NLV	NLV	NLV	NLV	ID	79,000	NA
N-Methyl-morpholine (I)	109024	NA	400	NA	3.0E+7	NLV	NLV	NLV	NLV	ID	6.1E+5	1.1E+6

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PART 213 TIER 1 RISK-BASED SCREENING LEVELS (RBSLs)

			Groundwater Protection			Indoor Air	Ambient Air (Y)				Direct Contact	
Guidesheet Number →		#10	#11	#12	#13	#14	#15	#16	#17	#18	#19	#20
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Methyl parathion	298000	NA	46	NA	76,000	NLV	NLV	NLV	NLV	ID	56,000	NA
4-Methyl-2-pentanone (MIBK) (I)	108101	NA	36,000	ID	2.7E+6 (C)	2.7E+6 (C)	4.5E+7	4.5E+7	6.7E+7	1.4E+11	2.7E+6 (C)	2.7E+6
Methyl-tert-butyl ether (MTBE)	1634044	NA	800	15,000 (X)	5.9E+6 (C)	5.9E+6 (C)	2.5E+7	3.9E+7	6.7E+7	2.0E+11	1.5E+6	5.9E+6
Methylcyclopentane (I)	96377	NA	ID	NA	ID	ID	ID	ID	ID	ID	ID	3.5E+5
4,4'-Methylene-bis-2-chloroaniline (MBOCA)	101144	NA	NLL	NLL	NLL	NLV	NLV	NLV	NLV	8.4E+7	6,600	NA
Methylene chloride	75092	NA	100	19,000 (X)	2.3E+6 (C)	45,000	2.1E+5	5.9E+5	1.4E+6	6.6E+9	1.3E+6	2.3E+6
2-Methylnaphthalene	91576	NA	57,000	ID	5.5E+6	ID	ID	ID	ID	ID	8.1E+6	NA
Methylphenols (J)	1319773	NA	7,400	1,400	1.6E+7	NLV	NLV	NLV	NLV	6.7E+9	1.1E+7	NA
Metolachlor	51218452	NA	4,600	NA	4.4E+5 (C)	NLV	NLV	NLV	NLV	ID	4.4E+5 (C,DD)	4.4E+5
Metribuzin	21087649	NA	3,600	NA	2.4E+7	ID	ID	ID	ID	ID	9.8E+6	NA
Mirex	2385855	NA	NLL	NLL	NLL	ID	ID	ID	ID	ID	9,600	NA
Molybdenum (B)	7439987	NA	1,600	16,000 (X)	1.9E+7	NLV	NLV	NLV	NLV	ID	2.6E+6	NA
Naphthalene	91203	NA	35,000	870	2.1E+6	2.5E+5	3.0E+5	3.0E+5	3.0E+5	2.0E+8	1.6E+7	NA
Nickel (B)	7440020	20,000	1.0E+5	(G)	1.0E+9 (D)	NLV	NLV	NLV	NLV	1.3E+7	4.0E+7	NA
Nitrate (B,N)	14797558	NA	2.0E+5 (N)	NA	1.0E+9 (D)	NLV	NLV	NLV	NLV	ID	ID	NA
Nitrite (B,N)	14797650	NA	20,000 (N)	NA	3.8E+8	NLV	NLV	NLV	NLV	ID	ID	NA
Nitrobenzene (I)	98953	NA	330 (M); 68	3,600 (X)	2.2E+5	91,000	54,000	54,000	54,000	4.7E+7	1.0E+5	4.9E+5
2-Nitrophenol	88755	NA	400	ID	1.6E+6	NLV	NLV	NLV	NLV	ID	6.3E+5	NA
n-Nitroso-di-n-propylamine	621647	NA	330 (M); 100	NA	7,200	NLV	NLV	NLV	NLV	1.6E+6	1,200	1.5E+6
N-Nitrosodiphenylamine	86306	NA	5,400	NA	7.0E+5	NLV	NLV	NLV	NLV	ID	1.7E+6	NA
Oxamyl	23135220	NA	4,000	NA	1.0E+9 (D)	NLV	NLV	NLV	NLV	ID	8.6E+6	NA
Oxo-hexyl acetate	88230357	NA	1,600	NA	ID	ID	ID	ID	ID	5.4E+9	2.3E+6	1.0E+7
Pendimethalin	40487421	NA	1.1E+6	NA	1.1E+6	NLV	NLV	NLV	NLV	ID	4.6E+7	NA
Pentachlorobenzene	608935	NA	29,000	9,500	1.9E+5 (C)	ID	ID	ID	ID	ID	1.9E+5 (C)	1.9E+5

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Pentachloronitrobenzene	82688	NA	37,000	NA	37,000	1.2E+6	2.3E+6	2.3E+6	2.3E+6	3.3E+6	1.7E+6	NA
Pentachlorophenol	87865	NA	22	(G,X)	4,300	NLV	NLV	NLV	NLV	1.0E+6	90,000	NA
Pentane	109660	NA	ID	NA	ID	2.4E+6 (C)	3.7E+7	3.1E+6	5.6E+6	1.2E+12	ID	2.4E+6
2-Pentene (l)	109682	NA	ID	NA	ID	ID	ID	ID	ID	ID	ID	2.2E+6
Phenanthrene	85018	NA	56,000	6,300	1.1E+6	2.6E+6	1.6E+6	1.6E+6	1.6E+6	6.7E+6	1.6E+6	NA
Phenol	108952	NA	58,000	4,200	1.2E+7 (C)	NLV	NLV	NLV	NLV	4.0E+10	1.2E+7 (C,DD)	1.2E+7
Phosphorus (Total)	7723140	NA	1.3E+6	(EE)	ID	NLV	NLV	NLV	NLV	ID	1.0E+9 (D)	NA
Phthalic acid	88993	NA	2.6E+6	NA	1.7E+6 (C)	NLV	NLV	NLV	NLV	ID	1.7E+6 (C)	1.7E+6
Phthalic anhydride	85449	NA	3.0E+6	NA	1.1E+6 (C)	NLV	NLV	NLV	NLV	ID	1.1E+6 (C)	1.1E+6
Picloram	1918021	NA	10,000	920	8.6E+6	NLV	NLV	NLV	NLV	ID	1.6E+7	NA
Piperidine	110894	NA	84	NA	6.6E+5	NLV	NLV	NLV	NLV	9.3E+9	99,000	1.2E+6
Polybrominated biphenyls (J)	67774327	NA	NLL	NLL	NLL	NLV	NLV	NLV	NLV	ID	1,200	NA
Polychlorinated biphenyls (PCBs) (J,T)	1336363	NA	NLL	NLL	NLL	3.0E+6	2.4E+5	7.9E+6	7.9E+6	5.2E+6	(T)	NA
Prometon	1610180	NA	4,900	NA	5.5E+6	NLV	NLV	NLV	NLV	ID	5.0E+6	NA
Propachlor	1918167	NA	1,900	NA	8.8E+6	NLV	NLV	NLV	NLV	ID	2.9E+6	NA
Propazine	139402	NA	4,000	NA	1.7E+6	NLV	NLV	NLV	NLV	ID	6.1E+6	NA
Propionic acid	79094	NA	2.4E+6	NA	1.1E+6 (C)	NLV	NLV	NLV	NLV	2.0E+10	1.1E+6 (C)	1.1E+6
Propyl alcohol (I)	71238	NA	29,000	NA	1.1E+6 (C)	NLV	NLV	NLV	NLV	4.9E+10	1.3E+7 (DD)	1.1E+6
n-Propylbenzene (I)	103651	NA	1,900	NA	3.0E+6	ID	ID	ID	ID	1.3E+9	2.6E+6	1.0E+7
Propylene glycol	57556	NA	3.0E+6	5.8E+6	1.1E+6 (C)	NLV	NLV	NLV	NLV	4.0E+11	1.1E+6 (C)	1.1E+6
Pyrene	129000	NA	4.8E+6	ID	4.8E+6	1.0E+9 (D)	6.5E+6	6.5E+6	6.5E+6	6.7E+9	2.9E+7	NA
Pyridine (I)	110861	NA	400	NA	37,000 (C)	1,100	8,200	40,000	97,000	2.3E+9	37,000 (C)	37,000
Selenium (S)	7782492	410	4,000	400	7.9E+7	NLV	NLV	NLV	NLV	1.3E+6	2.6E+6	NA
Silver (S)	7440224	1,000	4,500	100 (M); 27	2.0E+6	NLV	NLV	NLV	NLV	6.7E+6	2.6E+6	NA

TABLE 2. SOIL: RESIDENTI. .ND COMMERCIAL I
PART 201 GENERIC CLEANUP CRITERIA AND SCREENING LEVELS;
PART 213 TIER 1 RISK-BASED SCREENING LEVELS (RBSLs)

			Groundwater Protection			Indoor Air	Ambient Air (Y)				Direct Contact	
Guidesheet Number →		#10	#11	#12	#13	#14	#15	#16	#17	#18	#19	#20
Hazardous Substance	Chemical Abstract Service Number	Statewide Default Background Levels	Drinking Water Protection Criteria & RBSLs	Groundwater Surface Water Interface Protection Criteria & RBSLs	Groundwater Contact Protection Criteria & RBSLs	Soil Volatilization to Indoor Air Inhalation Criteria & RBSLs	Infinite Source Volatile Soil Inhalation Criteria (VSIC) & RBSLs	Finite VSIC for 5 Meter Source Thickness	Finite VSIC for 2 Meter Source Thickness	Particulate Soil Inhalation Criteria & RBSLs	Direct Contact Criteria & RBSLs	Soil Saturation Concentration Screening Levels
Silvex (2,4,5-TP)	93721	NA	3,600	2,200	3.1E+6	NLV	NLV	NLV	NLV	ID	1.7E+6	NA
Simazine	122349	NA	80	NA	90,000	NLV	NLV	NLV	NLV	ID	1.2E+6	NA
Sodium	17341252	NA	2.5E+6	NA	1.0E+9 (D)	NLV	NLV	NLV	NLV	ID	1.0E+9 (D)	NA
Sodium azide	26628228	NA	1,600	NA	ID	ID	ID	ID	ID	ID	2.7E+6	NA
Strontium (B)	7440246	NA	92,000	46,000 (X)	1.0E+9 (D)	NLV	NLV	NLV	NLV	ID	3.3E+8	NA
Styrene	100425	NA	2,700	2,200	2.7E+5	2.5E+5	9.7E+5	9.7E+5	1.4E+6	5.5E+9	4.0E+5	5.2E+5
Sulfate	14808798	NA	5.0E+6	NA	ID	NLV	NLV	NLV	NLV	ID	ID	NA
Tebuthiuron	34014181	NA	10,000	NA	5.0E+7	NLV	NLV	NLV	NLV	ID	4.6E+6 (DD)	NA
2,3,7,8-Tetrabromodibenzo-p-dioxin (O)	50585416	NA	NLL	NLL	NLL	NLV	NLV	NLV	NLV	(O)	(O)	NA
1,2,4,5-Tetrachlorobenzene	95943	NA	1.5E+6	3,400 (X)	1.5E+6	ID	ID	ID	ID	ID	7.7E+7	NA
2,3,7,8-Tetrachlorodibenzo-p-dioxin (O)	1746016	NA	NLL	NLL	NLL	NLV	NLV	NLV	NLV	71 (O)	0.09 (O)	NA
1,1,1,2-Tetrachloroethane	630206	NA	1,600	ID (X)	4.4E+5 (C)	6,200	36,000	54,000	1.0E+5	4.2E+8	4.4E+5 (C)	4.4E+5
1,1,2,2-Tetrachloroethane	79345	NA	170	1,600 (X)	94,000	4,300	10,000	10,000	14,000	5.4E+7	53,000	8.7E+5
Tetrachloroethylene	127184	NA	100	900 (X)	88,000 (C)	11,000	1.8E+5	4.8E+5	1.1E+6	5.4E+9	88,000 (C)	88,000
Tetrahydrofuran	109999	NA	1,900	2.2E+5 (X)	3.2E+7	1.3E+6	1.3E+7	6.7E+7	1.6E+8	3.9E+11	2.9E+6	1.2E+8
Tetranitromethane	509148	NA	ID	ID	ID	500 (M); 110	500 (M); 51	ID	ID	2.1E+5	ID	ID
Thallium (B)	7440280	NA	2,300	4,200 (X)	1.5E+7	NLV	NLV	NLV	NLV	ID	35,000	NA
Toluene (I)	108883	NA	16,000	2,800	2.5E+5 (C)	2.5E+5 (C)	2.8E+6	5.1E+6	1.2E+7	2.7E+10	2.5E+5 (C)	2.5E+5
p-Toluidine	106490	NA	660 (M); 300	NA	4.6E+5	NLV	NLV	NLV	NLV	1.0E+8	94,000	1.2E+6
Toxaphene	8001352	NA	24,000	860	3.6E+5	NLV	NLV	NLV	NLV	9.7E+6	20,000	NA
Triallate	2303175	NA	95,000	NA	2.5E+5 (C)	ID	ID	ID	ID	ID	2.5E+5 (C)	2.5E+5
Tributylamine	102829	NA	7,800	ID	1.8E+6	5.8E+6	6.0E+5	6.0E+5	6.0E+5	4.7E+8	7.9E+5	3.7E+6
1,2,4-Trichlorobenzene	120821	NA	4,200	1,800	1.1E+6	1.1E+6 (C)	2.8E+7	2.8E+7	2.8E+7	2.5E+10	9.9E+5 (DD)	1.1E+6
1,1,1-Trichloroethane	71556	NA	4,000	4,000	4.6E+5 (C)	2.6E+6	3.8E+6	1.2E+7	2.8E+7	6.7E+10	4.6E+5 (C)	4.6E+5

TABLE 2. SOIL: RESIDENTIAL AND COMMERCIAL I
PART 201 GENERIC CLEANUP CRITERIA AND SCREENING LEVELS;
PART 213 TIER 1 RISK-BASED SCREENING LEVELS (RBSLs)

			Groundwater Protection			Indoor Air	Ambient Air (Y)				Direct Contact	
Guidesheet Number →		#10	#11	#12	#13	#14	#15	#16	#17	#18	#19	#20
Hazardous Substance	Chemical Abstract Service Number	Statewide Default Background Levels	Drinking Water Protection Criteria & RBSLs	Groundwater Surface Water Interface Protection Criteria & RBSLs	Groundwater Contact Protection Criteria & RBSLs	Soil Volatilization to Indoor Air Inhalation Criteria & RBSLs	Infinite Source Volatile Soil Inhalation Criteria (VSIC) & RBSLs	Finite VSIC for 5 Meter Source Thickness	Finite VSIC for 2 Meter Source Thickness	Particulate Soil Inhalation Criteria & RBSLs	Direct Contact Criteria & RBSLs	Soil Saturation Concentration Screening Levels
1,1,2-Trichloroethane	79005	NA	100	6,000 (X)	4.2E+5	4,600	17,000	21,000	44,000	1.9E+9	1.6E+5	9.2E+5
Trichloroethylene	79016	NA	100	4,000 (X)	4.4E+5	7,100	78,000	1.7E+6	3.9E+6	1.8E+9	5.0E+5 (C,DD)	5.0E+5
Trichlorofluoromethane	75694	NA	52,000	NA	5.6E+5 (C)	5.6E+5 (C)	9.2E+7	6.3E+8	1.5E+9	3.8E+12	5.6E+5 (C)	5.6E+5
2,4,5-Trichlorophenol	95954	NA	39,000	NA	9.1E+6	NLV	NLV	NLV	NLV	2.3E+10	2.3E+7	NA
2,4,6-Trichlorophenol	88062	NA	2,400	NA	2.0E+5	NLV	NLV	NLV	NLV	1.0E+9	7.1E+5	NA
1,2,3-Trichloropropane	96184	NA	840	NA	6.3E+5 (C)	ID	ID	ID	ID	ID	6.3E+5 (C)	6.3E+5
1,1,2-Trichloro-1,2,2-trifluoroethane	76131	NA	6.5E+5 (C)	1,700	6.5E+5 (C)	6.5E+5 (C)	1.8E+8	8.8E+8	2.1E+9	5.1E+12	6.5E+5 (C)	6.5E+5
Triethanolamine	102716	NA	74,000	NA	1.1E+6 (C)	NLV	NLV	NLV	NLV	3.3E+9	1.1E+6	1.1E+6
Triethylene glycol	112276	NA	1.1E+5 (C)	NA	1.1E+5 (C)	NLV	NLV	NLV	NLV	ID	1.1E+5 (C,DD)	1.1E+5
3-Trifluoromethyl-4-nitrophenol	88302	NA	1.1E+5	NA	1.2E+6	NLV	NLV	NLV	NLV	ID	4.1E+7 (DD)	NA
Trifluralin	1582098	NA	1.9E+5	NA	1.2E+7	ID	ID	ID	ID	ID	2.0E+6	NA
2,2,4-Trimethyl pentane	540841	NA	ID	NA	ID	ID	ID	ID	ID	ID	ID	18,000
2,4,4-Trimethyl-2-pentene (I)	107404	NA	ID	NA	ID	ID	ID	ID	ID	ID	ID	56,000
1,2,4-Trimethylbenzene (I)	95636	NA	2,100	570	1.1E+5 (C)	1.1E+5 (C)	2.1E+7	5.0E+8	5.0E+8	8.2E+10	1.1E+5 (C)	1.1E+5
1,3,5-Trimethylbenzene (I)	108678	NA	1,900	1,100	94,000 (C)	94,000 (C)	1.6E+7	3.8E+8	3.8E+8	8.2E+10	94,000 (C)	94,000
Triphenyl phosphate	115866	NA	1.1E+5 (C)	NA	1.1E+5 (C)	NLV	NLV	NLV	NLV	ID	1.1E+5 (C)	1.1E+5
tris(2,3-Dibromopropyl)phosphate	126727	NA	930	NA	27,000 (C)	27,000 (C)	18,000	18,000	18,000	5.9E+6	4,400	27,000
Urea	57136	NA	ID (N)	NA	ID	NLV	NLV	NLV	NLV	ID	ID	NA
Vanadium	7440622	NA	72,000	1.9E+5	1.0E+9 (D)	NLV	NLV	NLV	NLV	ID	7.5E+5 (DD)	NA
Vinyl acetate (I)	108054	NA	13,000	NA	2.4E+6 (C)	7.9E+5	1.7E+6	2.9E+6	5.9E+6	1.3E+10	2.4E+6 (C,DD)	2.4E+6
Vinyl chloride	75014	NA	40	300	20,000	270	4,200	30,000	73,000	3.5E+6	3,800	4.9E+5
White phosphorus (R)	12185103	NA	2.2	NA	58,000	NLV	NLV	NLV	NLV	ID	2,300 (DD)	NA
Xylenes (I)	1330207	NA	5,900	700	1.5E+5 (C)	1.5E+5 (C)	4.6E+7	6.1E+7	1.3E+8	2.9E+11	1.5E+5 (C)	1.5E+5
Zinc (S)	7440666	47,000	2.4E+6	(G)	1.0E+9 (D)	NLV	NLV	NLV	NLV	ID	1.7E+6	NA

TABLE 3. SOIL: INDUSTRIAL AN. OMMERCIAL II, III, AND IV PART 201 GENERIC CLEANUP CRITERIA AND SCREENING LEVELS; PART 213 TIER 1 RISK-BASED SCREENING LEVELS (RBSLs)

criteria, unless otherwise noted, are expressed in units of parts per billion (ppb). One ppb is equivalent to one microgram per kilogram (ug/kg). Criteria with six or more digits are expressed in scientific ation. For example, 200,000 ppb is presented as 2.0E+5. A footnote is designated by a letter in parentheses and is explained in the footnote pages that follow the criteria tables. When the risk-based erion is less than the target detection limit (TDL), the TDL is listed as the criterion (R 299.5707). In these cases, two numbers are presented in the cell. The first number is the criterion (i.e., TDL), and the cond number is the risk-based value. Criteria were promulgated December 21, 2002 within the Administrative Rules for Part 201, Environmental Remediation, of the Natural Resources and Environmental tection Act, 1994 PA 451, as amended. These tables reflect modifications to the TDLs and new criteria consistent with the provisions of R299.5103(l) and R299.5706a, respectively.

			Groundwater Protection				Indoor Air	Ambient Air (Y)				Direct Contact			
Guidesheet Number →		#10	#21		#12	#13	#22	#23	#24	#25	#26	#27	#28	#29	#30
Hazardous Substance	Chemical Abstract Service Number	Statewide Default Background Levels	Residential Drinking Water Protection Criteria & RBSLs	Industrial and Commercial Drinking Water Protection Criteria & RBSLs	Groundwater Surface Water Interface Protection Criteria & RBSLs	Groundwater Contact Protection Criteria & RBSLs	Soil Volatilization to Indoor Air Inhalation Criteria & RBSLs	Infinite Source Volatile Soil Inhalation Criteria (VSIC) & RBSLs	Finite VSIC for 5 Meter Source Thickness	Finite VSIC for 2 Meter Source Thickness	Particulate Soil Inhalation Criteria & RBSLs	Industrial and Commercial II	Commercial III	Commercial IV	Soil Saturation Concentration Screening Levels
phthene	83329	NA	3.0E+6	8.8E+6	4,400	9.7E+5	3.5E+6	9.7E+7	9.7E+7	9.7E+7	6.2E+9	1.3E+8	1.8E+8	1.5E+8	NA
phthylene	208968	NA	5,900	17,000	ID	4.4E+5	3.0E+6	2.7E+6	2.7E+6	2.7E+6	1.0E+9	5.2E+6	7.2E+6	6.1E+6	NA
dehyde (I)	75070	NA	19,000	54,000	2,600	1.1E+6 (C)	4.0E+6	2.1E+5	2.1E+5	2.9E+5	2.6E+9	9.5E+7	1.1E+8 (C)	1.1E+8	1.1E+8
te	71501	NA	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID
acid	64197	NA	84,000	2.4E+5	3.6E+5	6.5E+8 (C)	NLV	NLV	NLV	NLV	7.4E+9	4.2E+6	5.8E+8	4.9E+8	6.5E+8
ne (I)	67641	NA	15,000	42,000	34,000	1.1E+6 (C)	1.1E+6 (C)	1.6E+8	1.6E+8	2.0E+8	1.7E+11	7.3E+7	1.0E+8	8.6E+7	1.1E+8
nitrile	75058	NA	2,800	8,000	NA	2.2E+7 (C)	8.6E+6	1.9E+6	1.9E+6	2.2E+6	1.6E+9	1.4E+7	1.9E+7	1.6E+7	2.2E+7
phenone	98862	NA	30,000	86,000	NA	1.1E+6 (C)	1.1E+6 (C)	5.2E+7	5.2E+7	5.2E+7	1.4E+10	1.1E+6 (C)	1.1E+6 (C)	1.1E+6 (C)	1.1E+6
in (I)	107028	NA	2,400	6,800	NA	2.3E+7 (C)	780	370	370	630	5.9E+6	1.2E+7	1.6E+7	1.4E+7	2.3E+7
mide	79061	NA	10	10	NA	2.6E+6	NLV	NLV	NLV	NLV	3.0E+6	8,700	12,000	10,000	NA
c acid	79107	NA	78,000	2.2E+6	NA	1.1E+8 (C)	6.5E+6	2.2E+5	2.7E+5	2.7E+6	2.9E+7	1.1E+8 (C,DD)	1.1E+8 (C,DD)	1.1E+8 (C,DD)	1.1E+8
nitrile (I)	107131	NA	100 (M); 52	220	100 (M,X); 66	2.8E+6	35,000	17,000	17,000	31,000	5.8E+7	74,000	1.0E+6	87,000	8.3E+6
lor	15972608	NA	52	52	280 (X)	44,000	NLV	NLV	NLV	NLV	ID	3.9E+5	6.9E+5	5.1E+5	NA
arb	116063	NA	60	60	NA	2.4E+6	NLV	NLV	NLV	NLV	ID	7.3E+5	1.0E+6	8.6E+5	NA
arb sulfoxide	1646873	NA	200 (M)	200 (M)	NA	5.4E+7	NLV	NLV	NLV	NLV	ID	9.5E+5	1.3E+6	1.1E+6	NA
arb sulfone	1646884	NA	200 (M); 40	200 (M); 40	NA	4.2E+7	NLV	NLV	NLV	NLV	ID	8.0E+5	1.1E+6	9.4E+5	NA
	309002	NA	NLL	NLL	NLL	NLL	7.1E+6	2.0E+5	2.0E+5	2.0E+5	8.0E+5	4,300	7,700	5,600	NA
num (B)	7429905	6.9E+6	1,000	1,000	NA	1.0E+9 (D)	NLV	NLV	NLV	NLV	ID	3.7E+8 (DD)	4.1E+8 (DD)	3.9E+8 (DD)	NA
onia	7664417	NA	ID	ID	(CC)	ID	ID	ID	ID	ID	2.9E+9	ID	ID	ID	1.0E+7

TABLE 3. SOIL: INDUSTRIAL AND COMMERCIAL II, III, AND IV PART 201 GENERIC CLEANUP CRITERIA AND SCREENING LEVELS; PART 213 TIER 1 RISK-BASED SCREENING LEVELS (RBSLs)

			Groundwater Protection				Indoor Air	Ambient Air (V)				Direct Contact			
Guidesheet Number →		610	621		612	613	622	623	624	625	626	627	628	629	630
Hazardous Substance	Chemical Abstract Service Number	Statewide Default Background Levels	Residential Drinking Water Protection Criteria & RBSLs	Industrial and Commercial Drinking Water Protection Criteria & RBSLs	Groundwater Surface Water Interface Protection Criteria & RBSLs	Groundwater Contact Protection Criteria & RBSLs	Soil Volatilization to Indoor Air Inhalation Criteria & RBSLs	Infinite Source Volatile Soil Inhalation Criteria (VSIC) & RBSLs	Finite VSIC for 5 Meter Source Thickness	Finite VSIC for 2 Meter Source Thickness	Particulate Soil Inhalation Criteria & RBSLs	Industrial and Commercial II	Commercial III	Commercial IV	Soil Saturation Concentration Screening Levels
yl methyl ether (TAME)	994058	NA	3,900	3,900	NA	4.4E+6 (C)	1.1E+6	4.0E+6	7.8E+6	1.6E+6	1.6E+6	4.4E+6 (C)	4.4E+6 (C)	4.4E+6 (C)	4.4E+6
ne	62533	NA	1,100	4,400	330 (M); 60	2.8E+6	NLV	NLV	NLV	NLV	2.9E+7	1.6E+6	2.1E+6	1.6E+6	4.8E+6
racene	120127	NA	41,000	41,000	ID	41,000	1.0E+9 (D)	1.6E+6	1.6E+6	1.6E+6	2.9E+10	7.3E+6	1.0E+6	9.6E+6	NA
mony	7440360	NA	4,300	4,300	84,000	4.9E+7	NLV	NLV	NLV	NLV	5.9E+6	8.7E+5	7.3E+5	7.0E+6	NA
enic	7440382	5,800	23,000	23,000	76,000 (X)	2.0E+6	NLV	NLV	NLV	NLV	9.1E+6	37,000	48,000	41,000	NA
estos (SB)	1332214	NA	NLL	NLL	NLL	NLL	NLV	NLV	NLV	NLV	1.0E+7 (M); 86,000	ID	ID	ID	NA
ium	1912249	NA	60	60	180 (X)	1.1E+6	NLV	NLV	NLV	NLV	ID	3.3E+5 (DD)	4.6E+5 (DD)	3.9E+5 (DD)	NA
benzene	100333	NA	4,200	17,000	NA	3.0E+6	3.2E+7	2.1E+6	ID	ID	1.3E+9	6.6E+5	9.2E+5	7.7E+5	NA
um (S)	7440393	75,000	1.3E+6	1.3E+6	(G,X)	1.0E+9 (D)	NLV	NLV	NLV	NLV	1.6E+6	1.3E+5	1.6E+6	1.4E+6	NA
zene (I)	71432	NA	100	100	4,000 (X)	2.2E+5	8,400	46,000	99,000	2.3E+5	4.7E+6	4.0E+5 (C)	4.0E+5 (C)	4.0E+5 (C)	4.0E+5
idine	92875	NA	1,000 (M); 6.0	1,000 (M); 6.0	ID	1,000 (M); 140	NLV	NLV	NLV	NLV	56,000	1,000 (M); 110	1,000 (M); 150	1,000 (M); 120	NA
zo(a)anthracene (Q)	56553	NA	NLL	NLL	NLL	NLL	NLV	NLV	NLV	NLV	ID	80,000	1.6E+6	1.1E+6	NA
zo(b)fluoranthene (Q)	205992	NA	NLL	NLL	NLL	NLL	ID	ID	ID	ID	ID	80,000	1.6E+6	1.1E+6	NA
zo(k)fluoranthene (Q)	207089	NA	NLL	NLL	NLL	NLL	NLV	NLV	NLV	NLV	ID	8.0E+6	1.6E+6	1.1E+6	NA
zo(g,h,i)perylene	191242	NA	NLL	NLL	NLL	NLL	NLV	NLV	NLV	NLV	9.6E+6	7.0E+6	1.4E+7	9.6E+6	NA
zo(a)pyrene (Q)	50328	NA	NLL	NLL	NLL	NLL	NLV	NLV	NLV	NLV	1.9E+6	8,000	16,000	11,000	NA
zoic acid	65850	NA	6.4E+6	1.6E+6	NA	7.0E+7	NLV	NLV	NLV	NLV	ID	1.0E+9 (D)	1.0E+9 (D)	1.0E+9 (D)	NA
zyl alcohol	100516	NA	2.0E+6	5.6E+6	NA	5.6E+6 (C)	NLV	NLV	NLV	NLV	1.6E+11	5.6E+6 (C)	5.6E+6 (C)	5.6E+6 (C)	5.6E+6
zyl chloride	100447	NA	160	640	NA	72,000	33,000	46,000	46,000	92,000	7.0E+7	2.2E+5	2.3E+5 (C)	2.3E+5 (C)	2.3E+5
yllium	7440417	NA	51,000	51,000	(G)	1.0E+9 (D)	NLV	NLV	NLV	NLV	6.9E+5	1.6E+6	1.6E+6	1.6E+6	NA
2-Chloroethoxy)ethane	112265	NA	ID	ID	ID	ID	NLV	NLV	NLV	NLV	ID	ID	ID	ID	2.7E+6
2-Chloroethyl)ether (I)	111444	NA	100	170	300	1.1E+6	44,000	13,000	13,000	13,000	1.2E+7	56,000	81,000	66,000	2.2E+6
2-Ethylhexyl)phthalate	117817	NA	NLL	NLL	NLL	NLL	NLV	NLV	NLV	NLV	6.9E+6	1.0E+7 (C)	1.0E+7 (C)	1.0E+7 (C)	1.0E+7
on (S)	7440428	NA	10,000	10,000	38,000	1.0E+9 (D)	NLV	NLV	NLV	NLV	ID	3.5E+6 (DD)	3.9E+6 (DD)	3.7E+6	NA

TABLE 3. SOIL: INDUSTRIAL AN..)MMERCIAL II, III, AND IV PART 201 GENERIC CLEANUP CRITERIA AND SCREENING LEVELS; PART 213 TIER 1 RISK-BASED SCREENING LEVELS (RBSLs)

			Groundwater Protection				Indoor Air	Ambient Air (Y)				Direct Contact			
Guidesheet Number →		#10	#21		#12	#13	#22	#23	#24	#25	#26	#27	#28	#29	#30
Hazardous Substance	Chemical Abstract Service Number	Statewide Default Background Levels	Residential Drinking Water Protection Criteria & RBSLs	Industrial and Commercial Drinking Water Protection Criteria & RBSLs	Groundwater Surface Water Interface Protection Criteria & RBSLs	Groundwater Contact Protection Criteria & RBSLs	Soil Volatilization to Indoor Air Inhalation Criteria & RBSLs	Infinite Source Volatile Soil Inhalation Criteria (VSIC) & RBSLs	Finite VSIC for 5 Meter Source Thickness	Finite VSIC for 2 Meter Source Thickness	Particulate Soil Inhalation Criteria & RBSLs	Industrial and Commercial II	Commercial III	Commercial IV	Soil Saturation Concentration Screening Levels
obenzene (I)	108861	NA	550	1,500	NA	3.6E+5	5.9E+6	5.4E+5	5.4E+6	5.4E+6	2.4E+8	7.6E+5 (C)	7.6E+5 (C)	7.6E+5 (C)	7.6E+6
odichloromethane	75274	NA	1,600 (W)	1,600 (W)	ID	2.6E+5	6,400	31,000	31,000	57,000	1.1E+8	4.9E+5	6.8E+5	5.7E+5	1.5E+6
oform	75252	NA	1,600 (W)	1,600 (W)	ID	8.7E+5 (C)	7.7E+5	3.1E+6	3.1E+6	3.1E+6	3.6E+9	8.7E+5 (C)	8.7E+5 (C)	8.7E+5 (C)	8.7E+6
omethane	74839	NA	200	560	700	1.4E+6	1,600	13,000	57,000	1.4E+6	1.5E+8	1.0E+6	1.4E+6	1.2E+6	2.2E+6
anol (I)	71363	NA	19,000	54,000	NA	8.7E+6 (C)	NLV	NLV	NLV	NLV	1.0E+10	8.7E+6 (C)	8.7E+6 (C)	8.7E+6 (C)	8.7E+6
anone (MEK) (I)	78933	NA	2.6E+6	7.6E+6	44,000	2.7E+7 (C)	2.7E+7 (C)	3.5E+7	3.5E+7	3.6E+7	2.9E+10	2.7E+7 (C,DD)	2.7E+7 (C,DD)	2.7E+7 (C,DD)	2.7E+7
yl acetate	123864	NA	11,000	32,000	NA	1.1E+6 (C)	1.1E+6 (C)	1.4E+8	3.1E+8	3.5E+8	2.1E+11	1.1E+6 (C)	1.1E+6 (C)	1.1E+6 (C)	1.1E+6
yl alcohol	75650	NA	78,000	2.2E+5	NA	1.1E+8 (C)	1.1E+8 (C)	1.2E+8	2.4E+8	2.4E+8	5.6E+10	1.1E+8 (C)	1.1E+8 (C)	1.1E+8 (C)	1.1E+8
benzyl phthalate	85687	NA	3.1E+6 (C)	3.1E+6 (C)	26,000 (X)	3.1E+6 (C)	NLV	NLV	NLV	NLV	2.1E+10	3.1E+6 (C)	3.1E+6 (C)	3.1E+6 (C)	3.1E+6
ylbenzene	104518	NA	1,600	4,600	ID	1.2E+5	ID	ID	ID	ID	ID	8.0E+6	1.0E+7 (C)	9.4E+6	1.0E+7
Butylbenzene	135988	NA	1,600	4,600	ID	86,000	ID	ID	ID	ID	ID	8.0E+6	1.0E+7 (C)	9.4E+6	1.0E+7
ylbenzene (I)	98066	NA	1,600	4,600	NA	1.6E+5	ID	ID	ID	ID	ID	8.0E+6	1.0E+7 (C)	9.4E+6	1.0E+7
nium (B)	7440439	1,200	6,000	6,000	(G,X)	2.3E+6	NLV	NLV	NLV	NLV	2.2E+6	2.1E+6	2.1E+6	2.1E+6	NA
phene (I)	79925	NA	ID	ID	NA	ID	ID	ID	ID	ID	ID	ID	ID	ID	NA
olactam	105602	NA	1.2E+6	3.4E+6	NA	1.0E+8 (D)	NLV	NLV	NLV	NLV	2.9E+8	3.1E+8 (DD)	4.6E+8 (DD)	3.8E+8 (DD)	NA
aryl	63252	NA	14,000	40,000	NA	2.6E+6	ID	ID	ID	ID	ID	7.0E+7	9.8E+7	8.2E+7	NA
azole	86748	NA	9,400	39,000	1,100	8.2E+5	NLV	NLV	NLV	NLV	ID	2.4E+6	3.4E+6	2.9E+6	NA
ofuran	1563662	NA	800	800	NA	8.8E+6	NLV	NLV	NLV	NLV	ID	3.6E+6	5.1E+6	4.3E+6	NA
on disulfide (I,R)	75150	NA	16,000	46,000	ID	2.8E+5 (C)	1.4E+5	1.6E+6	8.0E+6	1.9E+7	2.1E+10	2.8E+5 (C,DD)	2.8E+5 (C,DD)	2.8E+5 (C,DD)	2.8E+5
on tetrachloride	56235	NA	100	100	900 (X)	92,000	990	12,000	34,000	79,000	1.7E+8	3.9E+5 (C)	3.9E+5 (C)	3.9E+5 (C)	3.9E+5
rdane (J)	57749	NA	NLL	NLL	NLL	NLL	5.9E+7	4.2E+6	4.2E+6	4.2E+6	2.1E+7	1.6E+6	2.0E+6	1.7E+6	NA
ride	16887006	NA	5.0E+6	5.0E+6	2.6E+6 (X)	ID	NLV	NLV	NLV	NLV	ID	5.0E+5 (F)	5.0E+5 (F)	5.0E+5 (F)	NA
robenzene (I)	106907	NA	2,000	2,000	940	2.6E+6 (C)	2.2E+5	9.2E+5	1.1E+6	2.1E+6	2.1E+8	2.6E+5 (C)	2.6E+5 (C)	2.6E+5 (C)	2.6E+5
loro-1,1-difluoroethane	75683	NA	3.0E+5	8.8E+05	NA	9.6E+6 (C)	9.6E+6 (C)	9.4E+7	8.7E+8	1.4E+9	1.5E+12	9.6E+5 (C)	9.6E+5 (C)	9.6E+5 (C)	9.6E+5

TABLE 3. SOIL: INDUSTRIAL AND COMMERCIAL II, III, AND IV PART 201 GENERIC CLEANUP CRITERIA AND SCREENING LEVELS; PART 213 TIER 1 RISK-BASED SCREENING LEVELS (RBSLs)

			Groundwater Protection				Indoor Air	Ambient Air (Y)				Direct Contact			
Guidesheet Number →		#10	#21		#12	#13	#22	#23	#24	#25	#26	#27	#28	#29	#30
Hazardous Substance	Chemical Abstract Service Number	Statewide Default Background Levels	Residential Drinking Water Protection Criteria & RBSLs	Industrial and Commercial Drinking Water Protection Criteria & RBSLs	Groundwater Surface Water Interface Protection Criteria & RBSLs	Groundwater Contact Protection Criteria & RBSLs	Soil Volatilization to Indoor Air Inhalation Criteria & RBSLs	Infinite Source Volatile Soil Inhalation Criteria (VSIC) & RBSLs	Finite VSIC for 5 Meter Source Thickness	Finite VSIC for 2 Meter Source Thickness	Particulate Soil Inhalation Criteria & RBSLs	Industrial and Commercial II	Commercial III	Commercial IV	Soil Saturation Concentration Screening Levels
roethane	75003	NA	8,800	34,000	ID	9.6E+6 (C)	9.6E+6 (C)	3.6E+7	1.2E+8	2.9E+8	2.9E+11	9.6E+6 (C)	9.6E+6 (C)	9.6E+6 (C)	9.6E+6
hloroethyl vinyl ether	110758	NA	ID	ID	NA	ID	ID	ID	ID	ID	ID	ID	ID	ID	1.9E+6
roform	67663	NA	1,600 (W)	1,600 (W)	3,400 (X)	1.6E+6 (C)	36,000	1.6E+6	3.4E+6	7.9E+6	1.6E+6	1.6E+6 (C)	1.6E+6 (C)	1.6E+6 (C)	1.6E+6
romethane (I)	74873	NA	8,200	22,000	ID	1.1E+6 (C)	10,000	1.2E+6	1.0E+6	2.6E+6	2.6E+6	1.1E+6 (C)	1.1E+6 (C)	1.1E+6 (C)	1.1E+6
hloro-3-methylphenol	59507	NA	8,800	18,000	280	3.0E+6	NLV	NLV	NLV	NLV	ID	1.6E+7	2.0E+7	1.7E+7	NA
1-Chloronaphthalene	91587	NA	6.2E+6	1.6E+6	NA	2.3E+6	ID	ID	ID	ID	ID	1.6E+6	2.6E+6	2.1E+6	NA
hlorophenol	95578	NA	800	2,600	440	1.9E+6	ID	ID	ID	ID	ID	4.6E+6	6.3E+6	5.3E+6	1.9E+7
hlorotoluene (I)	95498	NA	3,300	9,200	NA	5.0E+6 (C)	5.0E+6 (C)	1.6E+6	3.1E+6	6.4E+6	2.1E+9	5.0E+6 (C)	5.0E+6 (C)	5.0E+6 (C)	5.0E+6
xpyrifos	2921882	NA	17,000	48,000	1,800	6.4E+6	240	6,600	23,000	56,000	6.9E+7	3.4E+7	6.0E+7	4.4E+7	NA
omium (III) (S,H)	16065831	18,000 (total)	1.0E+9 (D)	1.0E+9 (D)	(O,X)	1.0E+9 (D)	NLV	NLV	NLV	NLV	1.6E+6	1.0E+9 (D)	1.0E+9 (D)	1.0E+9 (D)	NA
omium (VI)	18540299	NA	30,000	30,000	3,300	1.4E+6	NLV	NLV	NLV	NLV	2.4E+6	9.2E+6	1.0E+7	9.6E+6	NA
ysene (Q)	218019	NA	NLL	NLL	NLL	NLL	ID	ID	ID	ID	ID	8.0E+6	1.6E+7	1.1E+7	NA
alt	7440484	6,600	600	2,000	2,000	4.6E+7	NLV	NLV	NLV	NLV	5.6E+6	9.0E+6	1.0E+7	1.0E+7	NA
per (B)	7440508	32,000	5.6E+6	5.6E+6	(G)	1.0E+9 (D)	NLV	NLV	NLV	NLV	5.6E+7	7.3E+7	7.9E+7	7.6E+7	NA
nazine	21725462	NA	200	200	1,100 (X)	66,000	NLV	NLV	NLV	NLV	ID	66,000	92,000	77,000	NA
nide (P,R)	57125	390 (total)	4,000	4,000	100	2.6E+6	NLV	NLV	NLV	NLV	2.6E+6	2.6E+6	2.6E+6	2.6E+6	NA
lohexanone	108941	NA	5.2E+6	1.6E+7	NA	2.2E+6 (C)	32,000	1.3E+6	1.1E+7	2.7E+7	2.9E+10	2.2E+6 (C)	2.2E+6 (C)	2.2E+6 (C)	2.2E+6
thal	1861321	NA	80,000	1.4E+6	NA	3.4E+6	NLV	NLV	NLV	NLV	ID	7.3E+6	1.0E+7	8.6E+6	NA
pon	75990	NA	4,000	4,000	NA	5.9E+7 (C)	NLV	NLV	NLV	NLV	ID	5.9E+7 (C)	5.9E+7 (C)	5.9E+7 (C)	5.9E+7
-DDD	72548	NA	NLL	NLL	NLL	NLL	NLV	NLV	NLV	NLV	5.6E+7	4.0E+6	7.1E+6	5.2E+6	NA
-DDE	72559	NA	NLL	NLL	NLL	NLL	NLV	NLV	NLV	NLV	4.0E+7	1.9E+6	3.3E+6	2.4E+6	NA
-DDT	50293	NA	NLL	NLL	NLL	NLL	NLV	NLV	NLV	NLV	4.0E+7	2.6E+6	3.4E+6	3.1E+6	NA
abromodiphenyl ether	1163195	NA	1.4E+6	1.4E+6	NA	1.4E+6	1.0E+9 (D)	1.0E+6	1.0E+6	1.0E+6	1.0E+9	1.1E+7	2.0E+7	1.6E+7	NA
-butyl phthalate	84742	NA	7.6E+6 (C)	7.6E+6 (C)	11,000	7.6E+6 (C)	NLV	NLV	NLV	NLV	1.6E+9	7.6E+6 (C)	7.6E+6 (C)	7.6E+6 (C)	7.6E+6

TABLE 3. SOIL: INDUSTRIAL AN.. OMMERCIAL II, III, AND IV PART 201 GENERIC CLEANUP CRITERIA AND SCREENING LEVELS; PART 213 TIER 1 RISK-BASED SCREENING LEVELS (RBSLs)

			Groundwater Protection				Indoor Air	Ambient Air (Y)				Direct Contact			
Guidesheet Number →		#10	#21		#12	#13	#22	#23	#24	#25	#26	#27	#28	#29	#30
Hazardous Substance	Chemical Abstract Service Number	Statewide Default Background Levels	Residential Drinking Water Protection Criteria & RBSLs	Industrial and Commercial Drinking Water Protection Criteria & RBSLs	Groundwater Surface Water Interface Protection Criteria & RBSLs	Groundwater Contact Protection Criteria & RBSLs	Soil Volatilization to Indoor Air Inhalation Criteria & RBSLs	Infinite Source Volatile Soil Inhalation Criteria (VSIC) & RBSLs	Finite VSIC for 5 Meter Source Thickness	Finite VSIC for 2 Meter Source Thickness	Particulate Soil Inhalation Criteria & RBSLs	Industrial and Commercial II	Commercial III	Commercial IV	Soil Saturation Concentration Screening Levels
thylhexyl) adipate	103231	NA	9.6E+5 (C)	9.6E+5 (C)	NA	9.6E+5 (C)	NLV	NLV	NLV	NLV	1.2E+10	9.6E+5 (C,DD)	9.6E+5 (C,DD)	9.6E+5 (C,DD)	9.6E+5
ctyl phthalate	117840	NA	1.0E+6	1.4E+6 (C)	ID	1.4E+6 (C)	NLV	NLV	NLV	NLV	ID	2.0E+7	3.6E+7	2.6E+7	1.4E+6
one alcohol (I)	123422	NA	ID	ID	NA	ID	NLV	NLV	NLV	NLV	7.1E+10	ID	ID	ID	1.1E+6
on	333415	NA	96	260	NA	96,000	NLV	NLV	NLV	NLV	ID	70,000 (DD)	1.1E+6 (DD)	86,000 (DD)	3.1E+5
zo(a,h)anthracene (Q)	53703	NA	NLL	NLL	NLL	NLL	NLV	NLV	NLV	NLV	ID	8,000	16,000	11,000	NA
zofuran	132649	NA	ID	ID	1,700	ID	ID	ID	ID	ID	ID	ID	ID	ID	NA
mochloromethane	124481	NA	1,600 (W)	1,600 (W)	ID	3.6E+5	21,000	80,000	80,000	96,000	1.6E+6	5.0E+5	6.1E+5 (C)	5.8E+5	6.1E+5
mochloropropane	96128	NA	10 (M); 4.0	10 (M); 4.0	NA	1,200 (C)	1,200 (C)	15,000	15,000	15,000	5.9E+6	1,200 (C)	1,200 (C)	1,200 (C)	1,200
momethane	74953	NA	1,600	4,600	NA	2.0E+6 (C)	ID	ID	ID	ID	ID	2.0E+6 (C)	2.0E+6 (C)	2.0E+6 (C)	2.0E+6
ba	1918009	NA	4,400	13,000	NA	1.2E+7	NLV	NLV	NLV	NLV	ID	1.7E+7	3.5E+7	2.3E+7	NA
ichlorobenzene	95501	NA	14,000	14,000	360	2.1E+6 (C)	2.1E+6 (C)	4.6E+7	4.6E+7	5.5E+7	4.4E+10	2.1E+6 (C)	2.1E+6 (C)	2.1E+6 (C)	2.1E+6
ichlorobenzene	541731	NA	170	480	1,100	51,000	ID	ID	ID	ID	ID	1.7E+6 (C)	1.7E+6 (C)	1.7E+6 (C)	1.7E+6
ichlorobenzene	106467	NA	1,700	1,700	280	1.4E+6	1.0E+6	2.6E+6	2.6E+6	3.4E+6	5.7E+6	1.9E+6	2.6E+6	2.2E+6	NA
ichlorobenzidine	91941	NA	2,000 (M); 28	2,000 (M); 110	2,000 (M,X); 510	4,600	NLV	NLV	NLV	NLV	8.2E+6	30,000	43,000	36,000	NA
rodifluoromethane	75718	NA	95,000	2.7E+6	ID	1.0E+6 (C)	1.7E+6	6.3E+7	5.5E+8	1.4E+9	1.5E+12	1.0E+6 (C)	1.0E+6 (C)	1.0E+6 (C)	1.0E+6
ichloroethane	75343	NA	18,000	50,000	15,000	8.9E+5 (C)	4.3E+5	2.5E+6	6.0E+6	1.4E+7	1.5E+10	8.9E+5 (C)	8.9E+5 (C)	8.9E+5 (C)	8.9E+5
ichloroethane (I)	107062	NA	100	100	7,200 (X)	3.6E+5	11,000	21,000	33,000	74,000	1.5E+6	4.2E+5	5.9E+5	4.9E+5	1.2E+6
ichloroethylene (I)	75354	NA	140	140	1,300 (X)	2.2E+5	330	3,700	15,000	37,000	7.8E+7	5.7E+5 (C)	5.7E+5 (C)	5.7E+5 (C)	5.7E+5
2-Dichloroethylene	156592	NA	1,400	1,400	12,000	6.4E+5 (C)	41,000	2.1E+6	4.3E+6	1.0E+6	1.0E+9	6.4E+5 (C)	6.4E+5 (C)	6.4E+5 (C)	6.4E+5
1,2-Dichloroethylene	156605	NA	2,000	2,000	30,000	1.4E+6 (C)	43,000	3.3E+6	8.4E+6	2.0E+6	2.1E+9	1.4E+6 (C)	1.4E+6 (C)	1.4E+6 (C)	1.4E+6
ichloro-4-nitroaniline	99309	NA	44,000	1.3E+6	NA	1.4E+5	NLV	NLV	NLV	NLV	ID	2.2E+6	3.1E+6	2.6E+6	NA
ichlorophenol	120832	NA	1,500	4,200	380	9.6E+5	NLV	NLV	NLV	NLV	2.3E+9	1.8E+6 (C,DD)	1.8E+6 (C,DD)	1.8E+6 (C,DD)	1.8E+6
ichlorophenoxyacetic acid	94757	NA	1,400	1,400	4,400	2.4E+6	NLV	NLV	NLV	NLV	2.9E+9	8.6E+6	1.0E+7	9.4E+6	NA
ichloropropane (I)	78875	NA	100	100	5,800 (X)	3.2E+5	7,400	30,000	51,000	1.2E+6	1.2E+9	5.5E+5 (C)	5.5E+5 (C)	5.5E+5 (C)	5.5E+5

TABLE 3. SOIL: INDUSTRIAL AND COMMERCIAL II, III, AND IV PART 201 GENERIC CLEANUP CRITERIA AND SCREENING LEVELS; PART 213 TIER 1 RISK-BASED SCREENING LEVELS (RBSLs)

			Groundwater Protection				Indoor Air	Ambient Air (Y)				Direct Contact			
Guidesheet Number —		#10	#11		#12	#13	#22	#23	#24	#25	#26	#27	#28	#29	#30
Hazardous Substance	Chemical Abstract Service Number	Statewide Default Background Levels	Residential Drinking Water Protection Criteria & RBSLs	Industrial and Commercial Drinking Water Protection Criteria & RBSLs	Groundwater Surface Water Interface Protection Criteria & RBSLs	Groundwater Contact Protection Criteria & RBSLs	Soil Volatilization to Indoor Air Inhalation Criteria & RBSLs	Infinite Source Volatile Soil Inhalation Criteria (VSIC) & RBSLs	Finite VSIC for 5 Meter Source Thickness	Finite VSIC for 2 Meter Source Thickness	Particulate Soil Inhalation Criteria & RBSLs	Industrial and Commercial II	Commercial III	Commercial IV	Soil Saturation Concentration Screening Levels
Dichloropropane	542756	NA	170	700	NA	1.1E+6	5,400	60,000	2.0E+6	4.7E+6	6.9E+9	2.4E+6	3.4E+6	2.9E+6	6.2E+6
oroxon	62737	NA	80 (M); 82	130	NA	1.2E+6	NLV	NLV	NLV	NLV	1.6E+7	47,000	66,000	56,000	2.2E+6
clonexyl phthalate	84617	NA	ID	ID	NA	ID	ID	ID	ID	ID	ID	ID	ID	ID	NA
rin	60571	NA	NLL	NLL	NLL	NLL	7.2E+6	64,000	64,000	64,000	6.9E+6	4,700	6,300	6,100	NA
yl ether	60297	NA	200	200	ID	7.4E+6 (C)	7.4E+6 (C)	1.0E+9	1.6E+9	3.8E+9	3.8E+11	7.4E+6 (C)	7.4E+6 (C)	7.4E+6 (C)	7.4E+6
yl phthalate	84662	NA	1.1E+6	3.2E+6	2,200	7.4E+6 (C)	NLV	NLV	NLV	NLV	1.6E+9	7.4E+6 (C)	7.4E+6 (C)	7.4E+6 (C)	7.4E+6
lene glycol monobutyl ether	112345	NA	1,800	5,000	NA	8.0E+7	NLV	NLV	NLV	NLV	6.9E+9	8.7E+6	1.2E+7	1.0E+7	1.1E+9
propyl ether	108203	NA	600	1,300 (C)	ID	1,300 (C)	1,300 (C)	3.2E+6	4.9E+6	1.0E+7	1.1E+10	1,300 (C)	1,300 (C)	1,300 (C)	1,300
propylamine (I)	108189	NA	110	320	NA	4.2E+5	ID	ID	ID	ID	ID	5.9E+5	7.9E+5	6.9E+5	8.7E+6
ethyl phthalate	131113	NA	7.9E+6 (C)	7.9E+6 (C)	NA	7.9E+6 (C)	NLV	NLV	NLV	NLV	1.6E+9	7.9E+6 (C)	7.9E+6 (C)	7.9E+6 (C)	7.9E+6
Dimethylacetamide	127195	NA	3,600	10,000	82,000 (X)	1.1E+8 (C)	NLV	NLV	NLV	NLV	ID	1.6E+7	2.6E+7	2.1E+7	1.1E+9
-Dimethylaniline	121697	NA	320	820	NA	4.0E+5	8.0E+5 (C)	5.2E+5	5.2E+5	5.2E+5	3.3E+6	8.0E+5 (C)	8.0E+5 (C)	8.0E+5 (C)	8.0E+5
ethylformamide (I)	68122	NA	14,000	40,000	NA	1.1E+8 (C)	NLV	NLV	NLV	NLV	6.9E+9	7.0E+7	9.6E+7	8.2E+7	1.1E+9
Dimethylphenol	105679	NA	7,400	20,000	7,600	1.0E+7	NLV	NLV	NLV	NLV	2.1E+9	3.6E+7	5.1E+7	4.3E+7	NA
Dimethylphenol	576261	NA	330 (M); 66	330 (M); 260	NA	1.3E+6	NLV	NLV	NLV	NLV	ID	4.4E+6	6.1E+6	5.1E+6	NA
Dimethylphenol	95658	NA	330 (M); 200	660	NA	3.6E+6	NLV	NLV	NLV	NLV	ID	1.0E+6	1.4E+6	1.2E+6	NA
ethylsulfoxide	67685	NA	4.4E+6	1.9E+7	3.6E+6	1.6E+7 (C)	NLV	NLV	NLV	NLV	ID	1.6E+7 (C)	1.6E+7 (C)	1.6E+7 (C)	1.6E+7
Dinitrotoluene	121142	NA	430	640	NA	1.7E+6	NLV	NLV	NLV	NLV	2.0E+7	2.2E+6	3.1E+6	2.6E+6	NA
seb	88857	NA	300	300	200 (M); 49	1.4E+6 (C)	NLV	NLV	NLV	NLV	ID	1.4E+6 (C,DD)	1.4E+6 (C,DD)	1.4E+6 (C,DD)	1.4E+6
Dioxane (I)	123911	NA	1,700	7,000	86,000	3.4E+7	NLV	NLV	NLV	NLV	7.1E+9	2.4E+6	3.4E+6	2.9E+6	9.7E+7
at	86007	NA	400	400	NA	1.4E+7	NLV	NLV	NLV	NLV	ID	1.6E+6	2.2E+6	1.9E+6	NA
on	330541	NA	620	1,800	NA	7.4E+6	NLV	NLV	NLV	NLV	2.1E+9	3.1E+6	4.4E+6	3.7E+6	NA
osulfan (J)	115297	NA	NLL	NLL	NLL	NLL	ID	ID	ID	ID	ID	4.4E+6	6.1E+6	5.1E+6	NA
othall	145733	NA	NLL	NLL	NLL	NLL	NLV	NLV	NLV	NLV	1.0E+9	1.2E+7	1.7E+7	1.5E+7	NA

TABLE 3. SOIL: INDUSTRIAL AN_ OMMERCIAL II, III, AND IV PART 201 GENERIC CLEANUP CRITERIA AND SCREENING LEVELS; PART 213 TIER 1 RISK-BASED SCREENING LEVELS (RBSLs)

			Groundwater Protection				Indoor Air	Ambient Air (Y)				Direct Contact			
Guidesheet Number →		#10	#21		#12	#13	#22	#23	#24	#26	#28	#27	#26	#29	#30
Hazardous Substance	Chemical Abstract Service Number	Statewide Default Background Levels	Residential Drinking Water Protection Criteria & RBSLs	Industrial and Commercial Drinking Water Protection Criteria & RBSLs	Groundwater Surface Water Interface Protection Criteria & RBSLs	Groundwater Contact Protection Criteria & RBSLs	Soil Volatilization to Indoor Air Inhalation Criteria & RBSLs	Infinite Source Volatile Soil Inhalation Criteria (VSIC) & RBSLs	Finite VSIC for 5 Meter Source Thickness	Finite VSIC for 2 Meter Source Thickness	Particulate Soil Inhalation Criteria & RBSLs	Industrial and Commercial II	Commercial III	Commercial IV	Soil Saturation Concentration Screening Levels
	72208	NA	NLL	NLL	NLL	NLL	NLV	NLV	NLV	NLV	ID	1.9E+5	3.4E+5	2.5E+5	NA
rohydrin (I)	106898	NA	100	100	NA	2.2E+5	1.2E+5	37,000	37,000	37,000	2.9E+7	41,000	58,000	48,000	7.3E+6
(I)	64175	NA	3.6E+7	7.6E+7	NA	1.1E+8 (C)	NLV	NLV	NLV	NLV	5.6E+11	1.1E+8 (C,DD)	1.1E+8 (C,DD)	1.1E+8 (C,DD)	1.1E+8
tate (I)	141786	NA	1.3E+6	3.6E+6	NA	7.6E+6 (C)	7.5E+6 (C)	5.9E+7	5.9E+7	1.0E+8	9.4E+10	7.5E+6 (C)	7.5E+6 (C)	7.5E+6 (C)	7.5E+6
rt-butyl ether (ETBE)	637923	NA	960	960	ID	ID	6.5E+5 (C)	2.3E+6	4.6E+6	1.1E+7	1.1E+10	ID	ID	ID	6.5E+5
nzene (I)	100414	NA	1,500	1,500	380	1.4E+5 (C)	1.4E+5 (C)	2.4E+6	3.1E+6	6.5E+6	1.3E+10	1.4E+5 (C)	1.4E+5 (C)	1.4E+5 (C)	1.4E+5
e dibromide	106934	NA	20 (M); 1.0	20 (M); 1.0	20 (M); 4.0	500	3,600	5,800	5,800	9,800	1.6E+7	430	600	500	8.9E+5
e glycol	107211	NA	3.0E+6	8.4E+6	NA	1.1E+8 (C)	NLV	NLV	NLV	NLV	2.9E+10	1.1E+8 (C)	1.1E+8 (C)	1.1E+8 (C)	1.1E+8
e glycol monobutyl ether	111762	NA	74,000	2.0E+6	NA	4.1E+7 (C)	1.4E+6	2.1E+7	1.5E+8	3.6E+8	3.6E+11	4.1E+7 (C)	4.1E+7 (C)	4.1E+7 (C)	4.1E+7
thene	206440	NA	7.3E+5	7.3E+5	5,500	7.3E+5	1.0E+9 (D)	8.9E+8	8.8E+8	8.8E+8	4.1E+9	1.3E+8	2.4E+8	1.7E+8	NA
e	86737	NA	3.9E+5	8.9E+5	5,300	8.9E+5	1.0E+9 (D)	1.5E+8	1.5E+8	1.5E+8	4.1E+9	8.7E+7	1.2E+8	1.0E+8	NA
e (soluble fluoride) (B)	7782414	NA	40,000	40,000	NA	2.4E+8	NLV	NLV	NLV	NLV	ID	6.7E+7 (DD)	7.4E+7 (DD)	7.0E+7 (DD)	NA
dehyde	50000	NA	26,000	76,000	2,400	6.0E+7 (C)	65,000	43,000	69,000	1.5E+6	3.0E+8	6.0E+7 (C)	6.0E+7 (C)	6.0E+7 (C)	6.0E+7
acid (I,U)	64186	NA	2.0E+6	5.6E+6	ID	1.1E+8 (C)	2.6E+6	2.6E+5	1.6E+5	1.6E+5	5.9E+7	1.1E+8 (C)	1.1E+8 (C)	1.1E+8 (C)	1.1E+8
ylpiperidine	2591868	NA	1,600	4,600	NA	ID	ID	ID	ID	ID	ID	8.0E+6	1.0E+7 (C)	9.4E+6	1.0E+7
n violet	548629	NA	300	1,300	NA	2.0E+7	NLV	NLV	NLV	NLV	ID	4.4E+5	6.2E+5	5.2E+5	NA
sate	1071836	NA	NLL	NLL	NLL	NLL	NLV	NLV	NLV	NLV	ID	5.7E+7 (DD)	1.2E+8 (DD)	7.8E+7 (DD)	NA
hlor	76448	NA	NLL	NLL	NLL	NLL	1.9E+6	2.1E+5	2.1E+5	2.1E+5	3.0E+6	23,000	42,000	30,000	NA
hlor epoxide	1024573	NA	NLL	NLL	NLL	NLL	NLV	NLV	NLV	NLV	1.5E+6	9,500	17,000	12,000	NA
ane	142825	NA	2.4E+5 (C)	2.4E+5 (C)	NA	2.4E+5 (C)	2.4E+5 (C)	2.5E+7	4.5E+7	1.0E+8	1.0E+11	2.4E+5 (C)	2.4E+5 (C)	2.4E+5 (C)	2.4E+5
romobenzene	87821	NA	5,400	5,400	ID	5,400	ID	ID	ID	ID	ID	3.1E+6	5.6E+6	4.1E+6	NA
hlorobenzene (C-66)	118741	NA	1,800	1,800	360	8,200	2.2E+5	66,000	66,000	66,000	8.5E+6	37,000	67,000	49,000	NA
hlorobutadiene (C-46)	87683	NA	26,000	72,000	91	3.5E+5 (C)	3.5E+5 (C)	4.6E+5	4.6E+5	4.6E+5	1.9E+8	3.5E+5 (C)	3.5E+5 (C)	3.5E+5 (C)	3.5E+5
Hexachlorocyclohexane	319846	NA	18	71	NA	2,800	1.6E+5	41,000	66,000	66,000	2.1E+6	12,000	17,000	14,000	NA

TABLE 3. SOIL: INDUSTRIAL AND COMMERCIAL II, III, AND IV PART 201 GENERIC CLEANUP CRITERIA AND SCREENING LEVELS; PART 213 TIER 1 RISK-BASED SCREENING LEVELS (RBSLs)

			Groundwater Protection				Indoor Air	Ambient Air (Y)				Direct Contact			
Guidesheet Number —		#10	#21		#12	#13	#22	#23	#24	#25	#26	#27	#28	#29	#30
Hazardous Substance	Chemical Abstract Service Number	Statewide Default Background Levels	Residential Drinking Water Protection Criteria & RBSLs	Industrial and Commercial Drinking Water Protection Criteria & RBSLs	Groundwater Surface Water Interface Protection Criteria & RBSLs	Groundwater Contact Protection Criteria & RBSLs	Soil Volatilization to Indoor Air Inhalation Criteria & RBSLs	Infinite Source Volatile Soil Inhalation Criteria (VSIC) & RBSLs	Finite VSIC for 5 Meter Source Thickness	Finite VSIC for 2 Meter Source Thickness	Particulate Soil Inhalation Criteria & RBSLs	Industrial and Commercial II	Commercial III	Commercial IV	Soil Saturation Concentration Screening Levels
-Hexachlorocyclohexane	319857	NA	37	160	NA	6,100	NLV	NLV	NLV	NLV	7.4E+6	28,000	36,000	29,000	NA
achlorocyclopentadiene (C,56)	77474	NA	3.2E+6	3.2E+6	ID	7.2E+6 (C)	86,000	80,000	80,000	80,000	6.9E+6	7.2E+6 (C)	7.2E+6 (C)	7.2E+6 (C)	7.2E+6
achloroethane	67721	NA	430	1,900	1,900 (X)	1.1E+6	79,000	6.6E+6	1.4E+6	1.4E+6	1.0E+6	7.3E+6	1.0E+6	6.6E+6	NA
exane	110543	NA	44,000 (C)	44,000 (C)	NA	44,000 (C)	44,000 (C)	3.6E+6	3.6E+6	6.4E+6	6.9E+9	44,000 (C)	44,000 (C)	44,000 (C)	44,000
exanone	591786	NA	30,000	66,000	NA	2.6E+6 (C)	1.6E+6	1.6E+6	1.6E+6	1.6E+6	1.2E+9	2.6E+6 (C)	2.6E+6 (C)	2.6E+6 (C)	2.6E+6
no(1,2,3-cd)pyrene (Q)	193395	NA	NLL	NLL	NLL	NLL	NLV	NLV	NLV	NLV	ID	80,000	1.6E+6	1.1E+6	NA
(B)	7439965	1.2E+7	6,000	6,000	NA	1.0E+6 (D)	NLV	NLV	NLV	NLV	ID	6.6E+6	6.2E+6	6.0E+6	NA
utyl alcohol (I)	78831	NA	46,000	1.3E+6	NA	6.9E+6 (C)	6.9E+6 (C)	9.6E+7	9.6E+7	9.6E+7	4.4E+10	6.9E+6 (C)	6.9E+6 (C)	6.9E+6 (C)	6.9E+6
norene	75691	NA	16,000	62,000	11,000 (X)	2.4E+6 (C)	NLV	NLV	NLV	NLV	6.2E+9	2.4E+6 (C)	2.4E+6 (C)	2.4E+6 (C)	2.4E+6
ropyl alcohol (I)	67630	NA	9,400	28,000	1.1E+6 (X)	1.1E+6 (C)	NLV	NLV	NLV	NLV	6.6E+9	4.7E+7	6.6E+7	6.6E+7	1.1E+6
ropyl benzene	98828	NA	91,000	2.6E+6	ID	3.9E+6 (C)	3.9E+6 (C)	2.0E+6	2.0E+6	3.0E+6	2.6E+9	3.9E+6 (C)	3.9E+6 (C)	3.9E+6 (C)	3.9E+6
d (B)	7439921	21,000	7.0E+6	7.0E+6	(G,X)	ID	NLV	NLV	NLV	NLV	4.4E+7	9.0E+6 (DD)	4.0E+6	4.0E+6	NA
fene	69699	NA	20 (M); 7.0	20 (M); 7.0	20 (M); 0.99	7,100	ID	ID	ID	ID	ID	42,000	49,000	45,000	NA
ium (B)	7439932	9,800	3,400	7,000	1,900	1.1E+6	NLV	NLV	NLV	NLV	ID	3.1E+7 (DD)	3.6E+7 (DD)	3.3E+7 (DD)	NA
nesium (B)	7439954	NA	6.0E+6	2.2E+7	NA	1.0E+9 (D)	NLV	NLV	NLV	NLV	2.6E+9	1.0E+9 (D)	1.0E+9 (D)	1.0E+9 (D)	NA
ganese (B)	7439965	4.4E+5	1,000	1,000	(G,X)	1.6E+6	NLV	NLV	NLV	NLV	1.6E+6	9.0E+7	9.6E+7	9.4E+7	NA
cury (Total) (B,Z)	Varies	130	1,700	1,700	80 (M); 1.2	47,000	86,000	62,000	62,000	62,000	6.6E+6	6.6E+5	6.2E+5	6.0E+5	NA
hane	74828	NA	ID	ID	NA	ID	6.4E+6 ug/m3 (GG)	ID	ID	ID	ID	ID	ID	ID	ID
henol	87861	NA	74,000	2.0E+6	9,800	3.1E+6 (C)	3.1E+6 (C)	3.7E+7	4.6E+7	9.7E+7	9.6E+10	3.1E+6 (C)	3.1E+6 (C)	3.1E+6 (C)	3.1E+6
noxychlor	72435	NA	16,000	16,000	NA	16,000	ID	ID	ID	ID	ID	6.6E+6	1.0E+7	7.3E+6	NA
ethoxyethanol (I)	109864	NA	160	420	NA	1.7E+7	NLV	NLV	NLV	NLV	6.9E+6	7.3E+5	1.0E+6	6.6E+5	1.1E+6
ethyl-4-chlorophenoxyacetic acid	94746	NA	360	1,100	NA	4.9E+5	NLV	NLV	NLV	NLV	ID	7.3E+5	1.0E+6	6.6E+5	NA
ethyl-4,6-dinitrophenol	534521	NA	630 (M); 400	630 (M); 400	NA	1.9E+5	NLV	NLV	NLV	NLV	ID	2.6E+5	3.6E+5	3.0E+5	NA
ethyl-morpholine (I)	109024	NA	400	1,100	NA	3.0E+7	NLV	NLV	NLV	NLV	ID	2.0E+6	2.6E+6	2.3E+6	1.1E+6

TABLE 3. SOIL: INDUSTRIAL AN.)MMERCIAL II, III, AND IV PART 201 GENERIC CLEANUP CRITERIA AND SCREENING LEVELS; PART 213 TIER 1 RISK-BASED SCREENING LEVELS (RBSLs)

			Groundwater Protection				Indoor Air	Ambient Air (Y)				Direct Contact			
Guidesheet Number →		#10	#21		#12	#13	#22	#23	#24	#25	#26	#27	#28	#29	#30
Hazardous Substance	Chemical Abstract Service Number	Statewide Default Background Levels	Residential Drinking Water Protection Criteria & RBSLs	Industrial and Commercial Drinking Water Protection Criteria & RBSLs	Groundwater Surface Water Interface Protection Criteria & RBSLs	Groundwater Contact Protection Criteria & RBSLs	Soil Volatilization to Indoor Air Inhalation Criteria & RBSLs	Infinite Source Volatile Soil Inhalation Criteria (VSIC) & RBSLs	Finite VSIC for 5 Meter Source Thickness	Finite VSIC for 2 Meter Source Thickness	Particulate Soil Inhalation Criteria & RBSLs	Industrial and Commercial II	Commercial III	Commercial IV	Soil Saturation Concentration Screening Levels
yl parathion	298000	NA	46	130	NA	76,000	NLV	NLV	NLV	NLV	ID	1.8E+5	2.6E+5	2.1E+5	NA
hyl-2-pentanone (MIBK) (I)	108101	NA	36,000	1.0E+6	ID	2.7E+6 (C)	2.7E+6 (C)	5.3E+7	5.3E+7	7.0E+7	6.0E+10	2.7E+6 (C)	2.7E+6 (C)	2.7E+6 (C)	2.7E+6
yl-tert-butyl ether (MTBE)	1634044	NA	800	800	15,000 (X)	5.9E+6 (C)	5.9E+6 (C)	3.0E+7	4.1E+7	8.9E+7	8.8E+10	5.9E+6 (C)	5.9E+6 (C)	5.9E+6 (C)	5.9E+6
ylcyclopentane (I)	96377	NA	ID	ID	NA	ID	ID	ID	ID	ID	ID	ID	ID	ID	3.5E+5
lethylene-bis-2-chloroaniline CA)	101144	NA	NLL	NLL	NLL	NLL	NLV	NLV	NLV	NLV	1.1E+8	32,000	44,000	37,000	NA
ylene chloride	75092	NA	100	100	19,000 (X)	2.3E+6 (C)	2.4E+5	7.0E+5	1.7E+6	4.0E+6	8.3E+9	2.3E+6 (C)	2.3E+6 (C)	2.3E+6 (C)	2.3E+6
thylnaphthalene	91576	NA	57,000	1.7E+6	ID	5.8E+6	ID	ID	ID	ID	ID	2.6E+7	3.7E+7	3.1E+7	NA
ylphenols (J)	1319773	NA	7,400	20,000	1,400	1.6E+7	NLV	NLV	NLV	NLV	2.9E+9	3.6E+7	5.1E+7	4.3E+7	NA
lachlor	51218452	NA	4,600	20,000	NA	4.4E+5 (C)	NLV	NLV	NLV	NLV	ID	4.4E+5 (C,DD)	4.4E+5 (C,DD)	4.4E+5 (C,DD)	4.4E+5
buzin	21087649	NA	3,600	10,000	NA	2.40E+07	ID	ID	ID	ID	ID	2.8E+7	5.0E+7	3.6E+7	NA
	2385855	NA	NLL	NLL	NLL	NLL	ID	ID	ID	ID	ID	40,000	72,000	52,000	NA
bdenum (B)	7439987	NA	1,600	4,200	16,000 (X)	1.9E+7	NLV	NLV	NLV	NLV	ID	9.6E+6	1.0E+7	1.0E+7	NA
thalene	91203	NA	35,000	1.0E+5	870	2.1E+6	4.7E+5	3.5E+5	3.5E+5	3.5E+5	8.8E+7	5.2E+7	7.2E+7	6.1E+7	NA
l (B)	7440020	20,000	1.0E+5	1.0E+5	(G)	1.0E+9 (D)	NLV	NLV	NLV	NLV	1.6E+7	1.5E+8	1.6E+8	1.5E+8	NA
e (B,N)	14797558	NA	2.0E+5 (N)	2.0E+5 (N)	NA	1.0E+9 (D)	NLV	NLV	NLV	NLV	ID	ID	ID	ID	NA
e (B,N)	14797650	NA	20,000 (N)	20,000 (N)	NA	3.8E+8	NLV	NLV	NLV	NLV	ID	ID	ID	ID	NA
benzene (I)	98953	NA	330 (M); 68	330 (M); 190	3,600 (X)	2.2E+5	1.7E+5	64,000	64,000	64,000	2.1E+7	3.4E+5	4.7E+5	3.9E+5	4.9E+5
rophenol	88755	NA	400	1,200	ID	1.6E+6	NLV	NLV	NLV	NLV	ID	2.0E+6	2.9E+6	2.4E+6	NA
roso-di-n-propylamine	621647	NA	330 (M); 100	330 (M); 100	NA	7,200	NLV	NLV	NLV	NLV	2.0E+6	5,400	7,600	6,400	1.5E+6
rosodiphenylamine	86306	NA	5,400	22,000	NA	7.0E+6	NLV	NLV	NLV	NLV	ID	7.8E+6	1.1E+7	9.2E+6	NA
nyl	23135220	NA	4,000	4,000	NA	1.0E+9 (D)	NLV	NLV	NLV	NLV	ID	2.6E+7	3.9E+7	3.3E+7	NA
hexyl acetate	88230357	NA	1,500	4,200	NA	ID	ID	ID	ID	ID	2.4E+9	7.3E+6	1.0E+7	8.6E+6	1.0E+7
rimethalin	40487421	NA	1.1E+6	1.1E+6	NA	1.1E+6	NLV	NLV	NLV	NLV	ID	1.3E+8	2.4E+8	1.7E+8	NA
achlorobenzene	608935	NA	29,000	81,000	9,800	1.9E+5 (C)	ID	ID	ID	ID	ID	1.9E+5 (C)	1.9E+5 (C)	1.9E+5 (C)	1.9E+5

TABLE 3. SOIL: INDUSTRIAL AND COMMERCIAL II, III, AND IV PART 201 GENERIC CLEANUP CRITERIA AND SCREENING LEVELS; PART 213 TIER 1 RISK-BASED SCREENING LEVELS (RBSLs)

			Groundwater Protection				Indoor Air	Ambient Air (Y)				Direct Contact			
Guidesheet Number —		#10	#21		#12	#13	#22	#23	#24	#25	#26	#27	#28	#29	#30
Hazardous Substance	Chemical Abstract Service Number	Statewide Default Background Levels	Residential Drinking Water Protection Criteria & RBSLs	Industrial and Commercial Drinking Water Protection Criteria & RBSLs	Groundwater Surface Water Interface Protection Criteria & RBSLs	Groundwater Contact Protection Criteria & RBSLs	Soil Volatilization to Indoor Air Inhalation Criteria & RBSLs	Infinite Source Volatile Soil Inhalation Criteria (VSIC) & RBSLs	Finite VSIC for 5 Meter Source Thickness	Finite VSIC for 2 Meter Source Thickness	Particulate Soil Inhalation Criteria & RBSLs	Industrial and Commercial II	Commercial III	Commercial IV	Soil Saturation Concentration Screening Levels
achloronitrobenzene	82688	NA	37,000	37,000	NA	37,000	2.2E+6	2.9E+6	2.9E+6	2.9E+6	1.9E+6	5.9E+6	7.7E+6	6.4E+6	NA
achlorophenol	87865	NA	22	22	(Q,X)	4,300	NLV	NLV	NLV	NLV	1.3E+6	3.2E+6	9.2E+6	4.9E+6	NA
lane	108980	NA	ID	ID	NA	ID	1.9E+6	4.4E+7	3.4E+6	6.0E+06	5.3E+11	ID	ID	ID	2.4E+6
enene (I)	108952	NA	ID	ID	NA	ID	ID	ID	ID	ID	ID	ID	ID	ID	2.2E+6
nanthrene	85018	NA	56,000	1.6E+6	5,500	1.1E+6	5.1E+6	1.9E+6	1.9E+6	1.9E+6	2.9E+6	5.2E+6	7.2E+6	6.1E+6	NA
nol	108952	NA	56,000	2.6E+6	4,300	1.2E+7 (C)	NLV	NLV	NLV	NLV	1.6E+10	1.2E+7 (C,DD)	1.2E+7 (C,DD)	1.2E+7 (C,DD)	1.2E+7
sphorus (Total)	7723140	NA	1.3E+6	4.6E+6	(EE)	ID	NLV	NLV	NLV	NLV	ID	1.0E+6 (D)	1.0E+6 (D)	1.0E+6 (D)	NA
talic acid	88993	NA	2.6E+6	8.0E+6	NA	1.7E+6 (C)	NLV	NLV	NLV	NLV	ID	1.7E+6 (C)	1.7E+6 (C)	1.7E+6 (C)	1.7E+6
talic anhydride	85449	NA	3.0E+6	8.6E+6	NA	1.1E+6 (C)	NLV	NLV	NLV	NLV	ID	1.1E+6 (C)	1.1E+6 (C)	1.1E+6 (C)	1.1E+6
oram	1918021	NA	10,000	10,000	920	8.6E+6	NLV	NLV	NLV	NLV	ID	8.1E+7	7.1E+7	8.0E+7	NA
idine	110894	NA	64	180	NA	8.9E+6	NLV	NLV	NLV	NLV	4.1E+6	3.2E+6	4.6E+6	3.6E+6	1.2E+6
brominated biphenyls (J)	67774327	NA	NLL	NLL	NLL	NLL	NLV	NLV	NLV	NLV	ID	4,600	6,600	6,300	NA
chlorinated biphenyls (PCBs))	1336363	NA	NLL	NLL	NLL	NLL	1.6E+7	8.1E+6	2.9E+7	2.9E+7	8.6E+6	(T)	(T)	(T)	NA
neton	1610180	NA	4,900	14,000	NA	8.6E+6	NLV	NLV	NLV	NLV	ID	1.6E+7	2.2E+7	1.9E+7	NA
osphor	1918167	NA	1,900	5,400	NA	8.6E+6	NLV	NLV	NLV	NLV	ID	9.6E+6	1.3E+7	1.1E+7	NA
azine	136402	NA	4,000	11,000	NA	1.7E+6	NLV	NLV	NLV	NLV	ID	2.0E+7	2.8E+7	2.3E+7	NA
lonic acid	79094	NA	2.4E+6	7.0E+6	NA	1.1E+6 (C)	NLV	NLV	NLV	NLV	9.9E+9	1.1E+6 (C)	1.1E+6 (C)	1.1E+6 (C)	1.1E+6
yl alcohol (I)	71238	NA	28,000	80,000	NA	1.1E+6 (C)	NLV	NLV	NLV	NLV	2.1E+10	7.4E+7 (DD)	1.1E+6 (DD)	9.1E+7(DD)	1.1E+6
opylbenzene (I)	103651	NA	1,800	4,800	NA	3.0E+6	ID	ID	ID	ID	8.9E+6	8.0E+6	1.0E+7 (C)	9.4E+6	1.0E+7
ylene glycol	57556	NA	3.0E+6	8.4E+6	8.6E+6	1.1E+6 (C)	NLV	NLV	NLV	NLV	1.6E+11	1.1E+6 (C)	1.1E+6 (C)	1.1E+6 (C)	1.1E+6
ne	129000	NA	4.6E+6	4.6E+6	ID	4.6E+6	1.0E+6 (D)	7.9E+6	7.9E+6	7.9E+6	2.9E+6	8.4E+7	1.6E+6	1.1E+6	NA
dine (I)	110861	NA	400	420	NA	37,000 (C)	2,000	9,800	40,000	97,000	1.0E+6	37,000 (C)	37,000 (C)	37,000 (C)	37,000
inium (B)	7782492	410	4,000	4,000	400	7.6E+7	NLV	NLV	NLV	NLV	8.6E+7	9.6E+6	1.0E+7	1.0E+7	NA
r (B)	7440224	1,000	4,800	13,000	100 (M); 27	2.0E+6	NLV	NLV	NLV	NLV	2.9E+6	9.0E+6	9.6E+6	9.4E+6	NA

TABLE 3. SOIL: INDUSTRIAL AN. OMMERCIAL II, III, AND IV PART 201 GENERIC CLEANUP CRITERIA AND SCREENING LEVELS; PART 213 TIER 1 RISK-BASED SCREENING LEVELS (RBSLs)

			Groundwater Protection				Indoor Air	Ambient Air (Y)				Direct Contact			
Guidesheet Number —		#10	#21		#12	#13	#22	#23	#24	#25	#26	#27	#28	#29	#30
Hazardous Substance	Chemical Abstract Service Number	Statewide Default Background Levels	Residential Drinking Water Protection Criteria & RBSLs	Industrial and Commercial Drinking Water Protection Criteria & RBSLs	Groundwater Surface Water Interface Protection Criteria & RBSLs	Groundwater Contact Protection Criteria & RBSLs	Soil Volatilization to Indoor Air Inhalation Criteria & RBSLs	Infinite Source Volatile Soil Inhalation Criteria (VSIC) & RBSLs	Finite VSIC for 5 Meter Source Thickness	Finite VSIC for 2 Meter Source Thickness	Particulate Soil Inhalation Criteria & RBSLs	Industrial and Commercial II	Commercial III	Commercial IV	Soil Saturation Concentration Screening Levels
(2,4,5-TP)	93721	NA	3,600	3,600	2,200	3.1E+6	NLV	NLV	NLV	NLV	ID	5.5E+6	7.7E+6	6.4E+6	NA
ine	122349	NA	80	80	NA	90,000	NLV	NLV	NLV	NLV	ID	3.8E+6	5.3E+6	4.5E+6	NA
n	17341252	NA	2.5E+6	7.0E+6	NA	1.0E+9 (D)	NLV	NLV	NLV	NLV	ID	1.0E+9 (D)	1.0E+9 (D)	1.0E+9 (D)	NA
n azide	26628228	NA	1,800	5,000	NA	ID	ID	ID	ID	ID	ID	8.70E+06	1.20E+07	1.00E+07	NA
ium (B)	7440246	NA	92,000	2.6E+6	46,000 (X)	1.0E+9 (D)	NLV	NLV	NLV	NLV	ID	1.0E+9 (D)	1.0E+9 (D)	1.0E+9 (D)	NA
ne	100425	NA	2,700	2,700	2,200	2.7E+5	5.2E+5 (C)	3.3E+6	3.3E+6	4.2E+6	6.8E+9	5.2E+5 (C)	5.2E+5 (C)	5.2E+5 (C)	5.2E+5
e	14808798	NA	5.0E+6	5.0E+6	NA	ID	NLV	NLV	NLV	NLV	ID	ID	ID	ID	NA
hiuron	34014181	NA	10,000	30,000	NA	5.0E+7	NLV	NLV	NLV	NLV	ID	2.7E+7 (DD)	4.2E+7 (DD)	3.3E+7 (DD)	NA
8-Tetrabromodibenzo-p-dioxin	50585416	NA	NLL	NLL	NLL	NLL	NLV	NLV	NLV	NLV	(O)	(O)	(O)	(O)	NA
5-Tetrachlorobenzene	95943	NA	1.5E+6	1.5E+6	3,400 (X)	1.5E+6	ID	ID	ID	ID	ID	2.5E+6	3.5E+6	2.9E+6	NA
8-Tetrachlorodibenzo-p-dioxin	1746016	NA	NLL	NLL	NLL	NLL	NLV	NLV	NLV	NLV	89 (O)	0.99 (O)	1.4 (O)	2.9 (O)	NA
2-Tetrachloroethane	630206	NA	1,500	6,400	ID (X)	4.4E+5 (C)	33,000	1.2E+5	2.1E+5	3.3E+5	5.3E+6	4.4E+5 (C)	4.4E+5 (C)	4.4E+5 (C)	4.4E+5
2-Tetrachloroethane	79345	NA	170	700	1,600 (X)	94,000	23,000	34,000	34,000	34,000	6.8E+7	2.4E+5	3.4E+5	2.9E+5	8.7E+5
chloroethylene	127184	NA	100	100	900 (X)	88,000 (C)	60,000	6.0E+5	1.4E+6	3.3E+6	6.8E+9	88,000 (C)	88,000 (C)	88,000 (C)	88,000
hydrofuran	109999	NA	1,900	5,400	2.2E+5 (X)	3.2E+7	2.4E+6	1.5E+7	6.7E+7	1.6E+8	1.7E+11	9.6E+6	1.3E+7	1.1E+7	1.2E+8
nitromethane	509148	NA	ID	ID	ID	ID	600	500 (M); 180	ID	ID	2.6E+6	ID	ID	ID	ID
um (B)	7440280	NA	2,300	2,300	4,200 (X)	1.5E+7	NLV	NLV	NLV	NLV	ID	1.3E+5	1.4E+5	1.3E+5	NA
ne (I)	108883	NA	16,000	16,000	2,800	2.5E+5 (C)	2.5E+5 (C)	3.3E+6	3.6E+7	3.6E+7	1.2E+10	2.5E+5 (C)	2.5E+5 (C)	2.5E+5 (C)	2.5E+5
uidine	106490	NA	660 (M); 300	1,200	NA	4.9E+5	NLV	NLV	NLV	NLV	1.3E+6	4.3E+5	6.1E+5	5.1E+5	1.2E+6
phene	8001352	NA	24,000	24,000	660	3.6E+5	NLV	NLV	NLV	NLV	1.2E+7	85,000	1.5E+5	1.1E+5	NA
ate	2303175	NA	95,000	2.5E+6 (C)	NA	2.5E+5 (C)	ID	ID	ID	ID	ID	2.5E+5 (C)	2.5E+5 (C)	2.5E+5 (C)	2.5E+5
tylamine	102829	NA	7,900	23,000	ID	1.8E+6	1.1E+6	7.2E+5	7.2E+5	7.2E+5	2.1E+6	2.6E+6	3.6E+6	3.0E+6	3.7E+6
-Trichlorobenzene	120821	NA	4,200	4,200	1,800	1.1E+6	1.1E+6 (C)	3.4E+7	3.4E+7	3.4E+7	1.1E+10	1.1E+6 (C,DD)	1.1E+6 (C,DD)	1.1E+6 (C,DD)	1.1E+6
-Trichloroethane	71556	NA	4,000	4,000	4,000	4.6E+5 (C)	4.6E+6	4.6E+6	1.5E+7	3.1E+7	2.9E+10	4.6E+5 (C)	4.6E+5 (C)	4.6E+5 (C)	4.6E+5

TABLE 3. SOIL: INDUSTRIAL AND COMMERCIAL II, III, AND IV
PART 201 GENERIC CLEANUP CRITERIA AND SCREENING LEVELS;
PART 213 TIER 1 RISK-BASED SCREENING LEVELS (RBSLs)

			Groundwater Protection				Indoor Air	Ambient Air (Y)				Direct Contact			
Guidesheet Number →		#10	#21		#12	#13	#22	#23	#24	#25	#26	#27	#28	#29	#30
Hazardous Substance	Chemical Abstract Service Number	Statewide Default Background Levels	Residential Drinking Water Protection Criteria & RBSLs	Industrial and Commercial Drinking Water Protection Criteria & RBSLs	Groundwater Surface Water Interface Protection Criteria & RBSLs	Groundwater Contact Protection Criteria & RBSLs	Soil Volatilization to Indoor Air Inhalation Criteria & RBSLs	Infinite Source Volatile Soil Inhalation Criteria (VSIC) & RBSLs	Finite VSIC for 5 Meter Source Thickness	Finite VSIC for 2 Meter Source Thickness	Particulate Soil Inhalation Criteria & RBSLs	Industrial and Commercial II	Commercial III	Commercial IV	Soil Saturation Concentration Screening Levels
2-Trichloroethane	79005	NA	100	100	6,600 (X)	4.2E+6	34,000	87,000	87,000	1.2E+6	2.5E+6	9.4E+6	9.2E+6 (C)	9.2E+6 (C)	9.2E+6
nloroethylene	79016	NA	100	100	4,000 (X)	4.4E+6	37,000	2.6E+6	4.4E+6	1.1E+6	2.3E+6	5.0E+6 (C,DD)	5.0E+6 (C,DD)	5.0E+6 (C,DD)	5.0E+6
nlorofluoromethane	75694	NA	82,000	1.5E+6	NA	5.6E+6 (C)	5.6E+6 (C)	1.1E+6	1.4E+11	1.4E+11	1.7E+12	5.6E+6 (C)	5.6E+6 (C)	5.6E+6 (C)	5.6E+6
5-Trichlorophenol	95954	NA	39,000	1.1E+6	NA	9.1E+6	NLV	NLV	NLV	NLV	1.0E+10	7.3E+7	1.0E+8	8.6E+7	NA
6-Trichlorophenol	88062	NA	2,400	9,400	230 (M); 100	2.0E+6	NLV	NLV	NLV	NLV	1.3E+8	3.3E+6	4.6E+6	3.9E+6	NA
3-Trichloropropane	96184	NA	840	2,400	NA	8.3E+6 (C)	ID	ID	ID	ID	ID	8.3E+6 (C)	8.3E+6 (C)	8.3E+6 (C)	8.3E+6
2-Trichloro-1,2,2-trifluoroethane	76131	NA	5.6E+6 (C)	5.6E+6 (C)	1,700	5.6E+6 (C)	5.6E+6 (C)	2.1E+6	5.9E+6	2.1E+8	2.3E+12	5.6E+6 (C)	5.6E+6 (C)	5.6E+6 (C)	5.6E+6
inanolamine	102716	NA	74,000	2.0E+6	NA	1.1E+8 (C)	NLV	NLV	NLV	NLV	1.5E+9	1.1E+8 (C)	1.1E+8 (C)	1.1E+8 (C)	1.1E+8
ylene glycol	112276	NA	1.1E+6 (C)	1.1E+6 (C)	NA	1.1E+6 (C)	NLV	NLV	NLV	NLV	ID	1.1E+6 (C,DD)	1.1E+6 (C,DD)	1.1E+6 (C,DD)	1.1E+6
fluoromethyl-4-nitrophenol	88302	NA	1.1E+6	3.1E+6	NA	1.2E+8	NLV	NLV	NLV	NLV	ID	2.4E+6 (DD)	3.7E+6 (DD)	3.0E+6 (DD)	NA
uralin	1582098	NA	1.9E+6	5.7E+6	NA	1.2E+7	ID	ID	ID	ID	ID	5.7E+6	1.0E+7	7.4E+6	NA
4-Trimethyl pentane	540841	NA	ID	ID	NA	ID	ID	ID	ID	ID	ID	ID	ID	ID	19,000
4-Trimethyl-2-pentene (l)	107404	NA	ID	ID	NA	ID	ID	ID	ID	ID	ID	ID	ID	ID	86,000
4-Trimethylbenzene (l)	95636	NA	2,100	2,100	870	1.1E+6 (C)	1.1E+6 (C)	2.6E+7	6.0E+6	6.0E+6	3.6E+10	1.1E+6 (C)	1.1E+6 (C)	1.1E+6 (C)	1.1E+6
5-Trimethylbenzene (l)	108678	NA	1,800	1,800	1,100	94,000 (C)	94,000 (C)	1.9E+7	4.6E+6	4.6E+6	3.6E+10	94,000 (C)	94,000 (C)	94,000 (C)	94,000
henyl phosphate	115866	NA	1.1E+6 (C)	1.1E+6 (C)	NA	1.1E+6 (C)	NLV	NLV	NLV	NLV	ID	1.1E+6 (C)	1.1E+6 (C)	1.1E+6 (C)	1.1E+6
2,3-Dibromopropyl)phosphate	126727	NA	930	930	NA	27,000 (C)	27,000 (C)	60,000	60,000	60,000	7.4E+6	30,000	27,000 (C)	24,000	27,000
e	57136	NA	ID (N)	ID (N)	NA	ID	NLV	NLV	NLV	NLV	ID	ID	ID	ID	NA
edium	7440622	NA	72,000	9.9E+6	1.9E+6	1.0E+6 (D)	NLV	NLV	NLV	NLV	ID	5.5E+6 (DD)	9.2E+6 (DD)	5.9E+6 (DD)	NA
l acetate (l)	108054	NA	13,000	36,000	NA	2.4E+6 (C)	1.5E+6	2.0E+6	2.7E+6	5.9E+6	5.9E+9	2.4E+6 (C,DD)	2.4E+6 (C,DD)	2.4E+6 (C,DD)	2.4E+6
l chloride	75014	NA	40	40	900	20,000	2,900	29,000	1.7E+6	4.2E+6	5.9E+6	34,000	47,000	40,000	4.9E+6
le phosphorus (R)	12185103	NA	2.2	6.0	NA	58,000	NLV	NLV	NLV	NLV	ID	17,000 (DD)	18,000 (DD)	18,000 (DD)	NA
nes (l)	1330207	NA	5,800	5,800	700	1.5E+6 (C)	1.5E+6 (C)	5.4E+7	6.5E+7	1.3E+9	1.3E+11	1.5E+6 (C)	1.5E+6 (C)	1.5E+6 (C)	1.5E+6
(B)	7440666	47,000	2.4E+6	5.0E+6	(G)	1.0E+6 (D)	NLV	NLV	NLV	NLV	ID	6.3E+6	6.9E+6	6.6E	NA

FOOTNOTES

FOR THE PART 201 CRITERIA/ PART 213 RISK-BASED SCREENING LEVELS RRD OPERATIONAL MEMORANDUM No. 1

(A) Criterion is the state of Michigan drinking water standard established pursuant to Section 5 of 1976 PA 399, MCL 325.1005.

(B) Background, as defined in R 299.5701(b), may be substituted if higher than the calculated cleanup criterion. Background levels may be less than criteria for some inorganic compounds.

(C) Value presented is a screening level based on the chemical-specific generic soil saturation concentration (C_{sat}) since the calculated risk-based criterion is greater than C_{sat}. Concentrations greater than C_{sat} are acceptable cleanup criteria for this pathway where a site-specific demonstration indicates that free-phase material containing a hazardous substance is not present.

(D) Calculated criterion exceeds 100 percent, hence it is reduced to 100 percent or 1.0E+9 parts per billion (ppb).

(E) Criterion is the aesthetic drinking water value, as required by Section 20120a(5) of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (NREPA). A notice of aesthetic impact may be employed as an institutional control mechanism if groundwater concentrations exceed the aesthetic drinking water criterion, but do not exceed the applicable health-based drinking water value provided in the following table:

Hazardous Substance	Chemical Abstract Service Number	Residential Health-Based Drinking Water Value	Industrial-Commercial Health-Based Drinking Water Value
Aluminum	7429905	300	4,100
tertiary Amyl methyl ether	994058	910	2,600
Copper	7440508	1,400	4,000
Diethyl ether	60297	3,700	10,000
Ethylbenzene	100414	700	700
Iron	7439896	2,000	5,600
Manganese	7439965	860	2,500
Methyl-tert-butyl ether (MTBE)	1634044	240	690
Toluene	108883	1,000	1,000
1,2,4-Trimethylbenzene	95636	1,000	2,900
1,3,5-Trimethylbenzene	108678	1,000	2,900
Xylenes	1330207	10,000	10,000

(F) Criterion is based on adverse impacts to plant life and phytotoxicity.

(G) Groundwater surface water interface (GSI) criterion depends on the pH or water hardness, or both, of the receiving surface water. The final chronic value (FCV) for the protection of aquatic life shall be calculated based on

the pH or hardness of the receiving surface water. Where water hardness exceeds 400 mg $CaCO_3$/L, use 400 mg $CaCO_3$/L for the FCV calculation. The FCV formula provides values in units of ug/L or ppb. The generic GSI criterion is the lesser of the calculated FCV, the wildlife value (WV), and the surface water human non-drinking water value (HNDV). The soil GSI protection criteria for these hazardous substances are the greater of the 20 times the GSI criterion or the GSI soil-water partition values using the GSI criteria developed with the procedure described in this footnote.

Hazardous Substance	FCV Formula ug/L	FCV Conversion Factor (CF)	WV ug/L	HNDV ug/L
Acetate	EXP(0.2732*(pH) + 7.0362)	NA	NA	1.3E+6
Barium●	EXP(1.0629*(LnH)+1.1869)	NA	NA	1.6E+5
Beryllium	EXP(2.5279*(LnH)-10.7689)	NA	NA	1,200
Cadmium●	(EXP(0.7852*(LnH)-2.715))*CF	1.101672-((LnH)*(0.041838))	NA	130
Chromium (III)●	(EXP(0.819*(LnH)+0.6848))*CF	0.86	NA	9,400
Copper	(EXP(0.8545*(LnH)-1.702)) *CF	0.96	NA	64,000
Lead●	(EXP(1.273*(LnH)-3.296))*CF	1.46203-((LnH)*(0.14571))	NA	190
Manganese	EXP(0.8784*(LnH)+3.5199)	NA	NA	59,000
Nickel	(EXP(0.846*(LnH)+0.0584))*CF	0.997	NA	2.1E+5
Pentachlorophenol	EXP(1.005*(pH)-5.134)	NA	NA	2.8
Zinc	(EXP(0.8473*(LnH)+0.884))*CF	0.986	NA	22,000

where,

EXP(x) = The base of the natural logarithm raised to power x (e^x).
LnH = The natural logarithm of water hardness in mg $CaCO_3$/L.
* = The multiplication symbol.
● = The GSI criterion developed here may not be protective for surface water that is used as a drinking water source. Refer to footnote (X) for further guidance.

A spreadsheet that may be used to calculate GSI and GSI protection criteria for (G)-footnoted hazardous substances is available on the Department of Environmental Quality (DEQ) internet web site.

(H) Valence-specific chromium data (Cr III and Cr VI) shall be compared to the corresponding valence-specific cleanup criteria. If both Cr III and Cr VI are present in groundwater, the total concentration of both cannot exceed the drinking water criterion of 100 ug/L. If analytical data are provided for total chromium only, they shall be compared to the cleanup criteria for Cr VI. Cr III soil cleanup criterion for protection of drinking water can only be used at sites where groundwater is prevented from being used as a public water supply, currently and in the future, through an approved land or resource use restriction.

(I) Hazardous substance may exhibit the characteristic of ignitability as defined in 40 C.F.R. §261.21 (revised as of July 1, 2001), which is adopted by reference in these rules and is available for inspection at the DEQ, 525 West Allegan Street, Lansing, Michigan. Copies of the regulation may be purchased, at a cost as of the time of adoption of these

rules of $45, from the Superintendent of Documents, Government Printing Office, Washington, DC 20401 (stock number 869-044-00155-1), or from the DEQ, Remediation and Redevelopment Division (RRD), 525 West Allegan Street, Lansing, Michigan 48933, at cost.

(J) Hazardous substance may be present in several isomer forms. Isomer-specific concentrations shall be added together for comparison to criteria.

(K) Hazardous substance may be flammable or explosive, or both.

(L) Criteria for lead are derived using a biologically based model, as allowed for under Section 20120a(10) of the NREPA, and are not calculated using the algorithms and assumptions specified in pathway-specific rules. The generic residential drinking water criterion of 4 ug/L is linked to the generic residential soil direct contact criterion of 400 mg/kg. A higher concentration in the drinking water, up to the state action level of 15 ug/L, may be allowed as a site-specific remedy and still allow for drinking water use, under Section 20120a(2) of the NREPA if soil concentrations are appropriately lower than 400 mg/kg. If a site-specific criterion is approved based on this subdivision, a notice shall be filed on the deed for all property where the groundwater concentrations will exceed 4 ug/L to provide notice of the potential for unacceptable risk if soil or groundwater concentrations increase. Acceptable combinations of site-specific soil and drinking water concentrations are presented in the following table:

Acceptable Combinations of Lead in Drinking Water and Soil

Drinking Water Concentration (ug/L)	Soil Concentration (mg/kg)
5	386-395
6	376-385
7	376-385
8	366-375
9	356-365
10	346-355
11	336-345
12	336-345
13	326-335
14	316-325
15	306-315

(M) Calculated criterion is below the analytical target detection limit, therefore, the criterion defaults to the target detection limit.

(N) The concentrations of all potential sources of nitrate-nitrogen (e.g., ammonia-N, nitrite-N, nitrate-N) in groundwater that is used as a source of drinking water shall not, when added together, exceed the nitrate drinking water criterion of 10,000 ug/L. Where leaching to groundwater is a relevant pathway, soil concentrations of all potential sources of nitrate-nitrogen shall not, when added together, exceed the nitrate drinking water protection criterion of 2.0E+5 ug/kg.

(O) The concentration of all polychlorinated and polybrominated dibenzodioxin and dibenzofuran isomers present at a facility, expressed as an equivalent

concentration of 2,3,7,8-tetrachlorodibenzo-p-dioxin based upon their relative potency, shall be added together and compared to the criteria for 2,3,7,8-tetrachlorodibenzo-p-dioxin. The generic cleanup criteria for 2,3,7,8-tetrachlorodibenzo-p-dioxin are not calculated according to the algorithms presented in R 299.5714 to R 299.5726. The generic cleanup criteria are being held at the values that the DEQ has used since August 1998, in recognition of the fact that national efforts to reassess risks posed by dioxin are not yet complete. Until these studies are complete, it is premature to select a revised slope factor and/or reference dose for calculation of generic cleanup criteria.

(P) Amenable cyanide methods or method OIA-1677 shall be used to quantify cyanide concentrations for compliance with all groundwater criteria. Total cyanide methods or method OIA-1677 shall be used to quantify cyanide concentrations for compliance with soil criteria. Industrial-commercial direct contact criteria may not be protective of the potential for release of hydrogen cyanide gas. Additional land or resource use restrictions may be necessary to protect for the acute inhalation concerns associated with hydrogen cyanide gas.

(Q) Criteria for carcinogenic polycyclic aromatic hydrocarbons were developed using relative potential potencies to benzo(a)pyrene.

(R) Hazardous substance may exhibit the characteristic of reactivity as defined in 40 C.F.R. §261.23 (revised as of July 1, 2001), which is adopted by reference in these rules and is available for inspection at the DEQ, 525 West Allegan Street, Lansing, Michigan. Copies of the regulation may be purchased, at a cost as of the time of adoption of these rules of $45, from the Superintendent of Documents, Government Printing Office, Washington, DC 20401 (stock number 869-044-00155-1), or from the DEQ, RRD, 525 West Allegan Street, Lansing, Michigan 48933, at cost.

(S) Criterion defaults to the hazardous substance-specific water solubility limit.

(T) Refer to the federal Toxic Substances Control Act (TSCA), 40 C.F.R. §761, Subpart D and 40 C.F.R. §761, Subpart G, to determine the applicability of TSCA cleanup standards. Subpart D and Subpart G of 40 C.F.R. §761 (July 1, 2001) are adopted by reference in these rules and are available for inspection at the DEQ, 525 West Allegan Street, Lansing, Michigan. Copies of the regulations may be purchased, at a cost as of the time of adoption of these rules of $55, from the Superintendent of Documents, Government Printing Office, Washington, DC 20401, or from the DEQ, RRD, 525 West Allegan Street, Lansing, Michigan 48933, at cost. Alternatives to compliance with the TSCA standards listed below are possible under 40 C.F.R. §761 Subpart D. New releases may be subject to the standards identified in 40 C.F.R. §761, Subpart G. Use Part 201 soil direct contact cleanup criteria in the following table if TSCA standards are not applicable.

Land Use Category	TSCA, Subpart D Cleanup Standards	Part 201 Soil Direct Contact Cleanup Criteria
Residential & Commercial I	1,000 ppb, or 10,000 ppb if capped	4,000 ppb
Industrial & Commercial II	1,000 ppb, or 10,000 ppb if capped	16,000 ppb
Commercial III	1,000 ppb, or 10,000 ppb if capped	33,000 ppb
Commercial IV	1,000 ppb, or 10,000 ppb if capped	22,000 ppb

(U) Hazardous substance may exhibit the characteristic of corrosivity as defined in 40 C.F.R. §261.22 (revised as of July 1, 2001), which is adopted by reference in these rules and is available for inspection at the DEQ, 525 West Allegan Street, Lansing, Michigan. Copies of the regulation may be purchased, at a cost as of the time of adoption of these rules of $45, from the Superintendent of Documents, Government Printing Office, Washington, DC 20401 (stock number 869-044-00155-1), or from the DEQ, RRD, 525 West Allegan Street, Lansing, Michigan 48933, at cost.

(V) Criterion is the aesthetic drinking water value as required by Section 20120(a)(5) of the NREPA. Concentrations up to 200 ug/L may be acceptable, and still allow for drinking water use, as part of a site-specific cleanup under Section 20120a(2) of the NREPA.

(W) Concentrations of trihalomethanes in groundwater shall be added together to determine compliance with the Michigan drinking water standard of 80 ug/L. Concentrations of trihalomethanes in soil shall be added together to determine compliance with the drinking water protection criterion of 1,600 ug/kg.

(X) The GSI criterion shown in the generic cleanup criteria tables is not protective for surface water that is used as a drinking water source. For a groundwater discharge to the Great Lakes and their connecting waters or discharge in close proximity to a water supply intake in inland surface waters, the generic GSI criterion shall be the surface water human drinking water value (HDV) listed in the table in this footnote, except for those HDV indicated with an asterisk. For HDV with an asterisk, the generic GSI criterion shall be the lowest of the HDV, the WV, and the calculated FCV. See formulas in footnote (G). Soil protection criteria based on the HDV shall be as listed in the table in this footnote, except for those values with an asterisk. Soil GSI protection criteria based on the HDV shall be as listed in the table in this footnote, except for those values with an asterisk. Soil GSI protection criteria for compounds with an asterisk shall be the greater of 20 times the GSI criterion or the GSI soil-water partition values using the GSI criteria developed with the procedure described in this footnote.

Hazardous Substance	Chemical Abstract Service Number	Surface Water Human Drinking Water Values (HDV) (ug/L)	Soil GSI Protection Criteria for HDV (ug/kg)
Acrylonitrile	107131	2.0 (M); 0.87	100 (M); 17
Alachlor	15972608	3.5	91
Antimony	7440360	2	1,400
Arsenic	7440382	50	23,000
Atrazine	1912249	4.3	86
Barium	7440393	1,900*	*
Benzene	71432	12	240
bis(2-Chloroethyl)ether	111444	1 (M); 0.79	100 (M); 20
Butyl benzyl phthalate	85687	6.9	13,000
Cadmium	7440439	2.5*	*
Carbon tetrachloride	56235	5.6	110
Chloride	16887006	50,000	1.0E+6
Chloroform	67663	77	1,500
Chromium (III)	16065831	120*	*
Cyanazine	21725462	2 (M); 0.93	200 (M); 40
3,3'-Dichlorobenzidine	91941	0.3 (M); 0.14	2,000 (M); 7.7
1,2-Dichloroethane	107062	6	120
1,1-Dichloroethylene	75354	24	480
1,2-Dichloropropane	78875	9.1	180
N,N-Dimethylacetamide	127195	700	14,000
1,4-Dioxane	123911	34	680
Ethylene dibromide	106934	0.05 (M); 0.006	20 (M); 1.0
Ethylene glycol	107211	56,000	1.1E+6
Heptachlor	76448	0.01 (M); 0.0017	NLL
beta-Hexachlorocyclohexane	319857	0.024	20 (M)
Hexachloroethane	67721	5.3	310
Isophorone	78591	310	6,200
Isopropyl alcohol	67630	28,000	5.6E+5
Lead	7439921	14*	*
Manganese	7439965	3600	72,000
Methyl-tert-butyl ether (MTBE)	1634044	100	2,000
Methylene chloride	75092	47	940
Mirex	2385855	0.02 (M); 1.6E-5	NLL
Molybdenum	7439987	120	2,400
Nitrobenzene	98953	4.7	330 (M); 94
Pentachlorophenol	87865	1.8*	*
1,2,4,5-Tetrachlorobenzene	95943	2.8	3,300
1,1,1,2-Tetrachloroethane	630206	19	380
1,1,2,2-Tetrachloroethane	79345	3.2	64
Tetrachloroethylene	127184	11	220
Tetrahydrofuran	109999	350	7,000
Thallium	7440280	2.0 (M); 1.2	2,300
1,1,2-Trichloroethane	79005	12	240
Trichloroethylene	79016	29	580

(Y) Source size modifiers shown in the following table shall be used to determine soil inhalation criteria for ambient air when the source size is not one-half acre. The modifier shall be multiplied by the generic soil

inhalation criteria shown in the table of generic cleanup criteria to determine the applicable criterion.

Source Size sq. feet or acres	Modifier
400 sq feet	3.17
1000 sq feet	2.2
2000 sq feet	1.76
1/4 acre	1.15
1/2 acre	1
1 acre	0.87
2 acre	0.77
5 acre	0.66
10 acre	0.6
32 acre	0.5
100 acre	0.43

(Z) Mercury is typically measured as total mercury. The generic cleanup criteria, however, are based on data for different species of mercury. Specifically, data for elemental mercury, chemical abstract service (CAS) number 7439976, serve as the basis for the soil volatilization to indoor air criteria, groundwater volatilization to indoor air, and soil inhalation criteria. Data for methyl mercury, CAS number 22967926, serve as the basis for the GSI criterion; and data for mercuric chloride, CAS number 7487947, serve as the basis for the drinking water, groundwater contact, soil direct contact, and the groundwater protection criteria. Comparison to criteria shall be based on species-specific analytical data only if sufficient facility characterization has been conducted to rule out the presence of other species of mercury.

(AA) Comparison to these criteria may take into account an evaluation of whether the hazardous substances are adsorbed to particulates rather than dissolved in water and whether filtered groundwater samples were used to evaluate groundwater.

(BB) The state drinking water standard for asbestos is in units of fibers per milliliter of water (f/mL) longer than 10 millimicrons. Soil concentrations of asbestos are determined by polarized light microscopy.

(CC) Groundwater: The generic GSI criteria are based on the toxicity of unionized ammonia (NH_3); the criteria are 29 ug/L and 53 ug/L for cold water and warm water surface water, respectively. As a result, the GSI criterion shall be compared to the percent of the total ammonia concentration in the groundwater that will become NH_3 in the surface water. This percent NH_3 is a function of the pH and temperature of the receiving surface water and can be estimated using the following table, taken from Emerson, et al., (Journal of the Fisheries Research Board of Canada, Volume 32(12):2382, 1975).

Percent NH_3 in Aqueous Ammonia Solutions for 0-30 °C and pH 6-10

Temp (°F)	Temp (°C)	pH 6.0	6.5	7.0	7.5	8.0	8.5	9.0	9.5	10.0
32.0	0	0.00827	0.0261	0.0826	0.261	0.820	2.55	7.64	20.7	45.3
33.8	1	0.00899	0.0284	0.0898	0.284	0.891	2.77	8.25	22.1	47.3
35.6	2	0.00977	0.0309	0.0977	0.308	0.968	3.00	8.90	23.6	49.4
37.4	3	0.0106	0.0336	0.106	0.335	1.05	3.25	9.60	25.1	51.5
39.2	4	0.0115	0.0364	0.115	0.363	1.14	3.52	10.3	26.7	53.5
41.0	5	0.0125	0.0395	0.125	0.394	1.23	3.80	11.1	28.3	55.6
42.8	6	0.0136	0.0429	0.135	0.427	1.34	4.11	11.9	30.0	57.6
44.6	7	0.0147	0.0464	0.147	0.462	1.45	4.44	12.8	31.7	59.5
46.4	8	0.0159	0.0503	0.159	0.501	1.57	4.79	13.7	33.5	61.4
48.2	9	0.0172	0.0544	0.172	0.542	1.69	5.16	14.7	35.3	63.3
50.0	10	0.0186	0.0589	0.186	0.586	1.83	5.56	15.7	37.1	65.1
51.8	11	0.0201	0.0637	0.201	0.633	1.97	5.99	16.8	38.9	66.8
53.6	12	0.0218	0.0688	0.217	0.684	2.13	6.44	17.9	40.8	68.5
55.4	13	0.0235	0.0743	0.235	0.738	2.30	6.92	19.0	42.6	70.2
57.2	14	0.0254	0.0802	0.253	0.796	2.48	7.43	20.2	44.5	71.7
59.0	15	0.0274	0.0865	0.273	0.859	2.67	7.97	21.5	46.4	73.3
60.8	16	0.0295	0.0933	0.294	0.925	2.87	8.54	22.8	48.3	74.7
62.6	17	0.0318	0.101	0.317	0.996	3.08	9.14	24.1	50.2	76.1
64.4	18	0.0343	0.108	0.342	1.07	3.31	9.78	25.5	52.0	77.4
66.2	19	0.0369	0.117	0.368	1.15	3.56	10.5	27.0	53.9	78.7
68.0	20	0.0397	0.125	0.396	1.24	3.82	11.2	28.4	55.7	79.9
69.8	21	0.0427	0.135	0.425	1.33	4.10	11.9	29.9	57.5	81.0
71.6	22	0.0459	0.145	0.457	1.43	4.39	12.7	31.5	59.2	82.1
73.4	23	0.0493	0.156	0.491	1.54	4.70	13.5	33.0	60.9	83.2
75.2	24	0.0530	0.167	0.527	1.65	5.03	14.4	34.6	62.6	84.1
77.0	25	0.0569	0.180	0.566	1.77	5.38	15.3	36.3	64.3	85.1
78.8	26	0.0610	0.193	0.607	1.89	5.75	16.2	37.9	65.9	85.9
80.6	27	0.0654	0.207	0.651	2.03	6.15	17.2	39.6	67.4	86.8
82.4	28	0.0701	0.221	0.697	2.17	6.56	18.2	41.2	68.9	87.3
84.2	29	0.0752	0.237	0.747	2.32	7.00	19.2	42.9	70.4	88.3
86.0	30	0.0805	0.254	0.799	2.48	7.46	20.3	44.6	71.8	89.0

The generic approach for estimating NH_3 assumes a default pH of 8 and default temperatures of 68°F and 85°F for cold water and warm water surface water, respectively. The resulting percent NH_3 is 3.8 percent and 7.2 percent for cold water and warm water, respectively. This default percentage shall be multiplied by the total ammonia-nitrogen (NH_3-N) concentration in the groundwater and the resulting NH_3 concentration

compared to the applicable GSI criterion. As an alternative, the maximum pH and temperature data from the specific receiving surface water can be used to estimate, from the table in this footnote, a lower percent unionized ammonia concentration for comparison to the generic GSI.

Soil: The generic soil GSI protection criteria for unionized ammonia are 580 ug/kg and 1,100 ug/kg for cold water and warm water surface water, respectively.

(DD) Hazardous substance causes developmental effects. Residential and commercial I direct contact criteria are protective of both prenatal and postnatal exposure. Industrial and commercial II, III and IV direct contact criteria are protective for a pregnant adult receptor.

(EE) The following are applicable generic GSI criteria as required by Section 20120a(15) of the NREPA.

Hazardous Substance	GSI (ug/L)	Notes
Phosphorus	1,000	Criteria applicable unless receiving water is a surface water that has a phosphorus waste load allocation or is an inland lake. In those cases, contact the department for applicable values.
Total dissolved solids (TDS)	5.0E+5	If TDS data are not available, the TDS criterion may be used a screening level for the sum of the concentrations of the following substances: Calcium, Chlorides, Iron, Magnesium, Potassium, Sodium, Sulfate.
Dissolved Oxygen (DO): Cold receiving waters Warm receiving waters	 ≥ 7,000 ≥ 5,000	Since a low level of DO can be harmful to aquatic life, the criterion represents a minimum level that on-site samples must exceed. This is in contrast to other criteria which represent "not to exceed" concentrations. DO criteria are not applicable if groundwater Carbonaceous Biochemical Oxygen Demand (CBOD) is less than 10,000 ug/L and groundwater ammonia concentration is less than 2,000 ug/L.

(FF) The chloride GSI criterion shall be 125 mg/l when the discharge is to surface waters of the state designated as public water supply sources or 50 mg/l when the discharge is to the Great Lakes or connecting waters. Chloride GSI criteria shall not apply for surface waters of the state that are not designated as a public water supply source, however, the total dissolved solids criterion is applicable.

(GG) Risk-based criteria are not available for methane due to insufficient toxicity data. An acceptable soil gas concentration (presented for both residential and commercial/industrial land uses) was derived utilizing 25 percent of the lower explosive level for methane. This equates to 1.25 percent or 8.4E+6 ug/m^3.

"ID" means insufficient data to develop criterion.
"NA" means a criterion or value is not available or, in the case of background and CAS numbers, not applicable.

"NLL" means hazardous substance is not likely to leach under most soil conditions.

"NLV" means hazardous substance is not likely to volatilize under most conditions.

LIBER 2256 PG 75

ATTACHMENT C

5
Waste Management
17250 Newburgh Rd.
Suite 100
Livonia 48152

RECORDED
97 AUG 18 AM 11:28
REGISTER OF DEEDS
OTTAWA COUNTY, MI

DECLARATION OF RESTRICTIVE COVENANT

This Restrictive Covenant has been recorded with the Ottawa County Register of Deeds for the purpose of protecting public health, safety and welfare and the environment.

Waste Management of Michigan, Inc. has submitted to the Michigan Department of Environmental Quality (MDEQ) a Remedial Action Plan (RAP) prepared by Rust Environment and Infrastructure, Inc. dated July, 1997 that includes land use-based cleanup criteria as defined and set forth in Section 20120a(1)(f) of Part 201 of the Natural Resources and Environmental Protection Act (NREPA), 1994 PA 451, as amended, MCL 324.20101 et seq, for the environmental remediation associated with the property located in the Township of Park, Ottawa County, (Property) more particularly described as:

See Attachment A for legal description of Property and a survey of the property subject to the land-use restrictions

Real Estate Property Tax ID Number of Property: 70-15-15-300-002
70-15-15-300-003
70-15-15-300-004

As used herein, the term "Owner" shall mean at any given time the then current title holder of the Property.

Now therefore Waste Management of Michigan, Inc. 17250 Newburgh Rd. Livonia, MI 48152, pursuant to Section 20120b(4) of NREPA, hereby imposes restrictions on the Property and covenants and agrees that:

1. The Owner shall restrict the uses of the Property to those uses compatible with the limited residential land use criteria as defined in Section 20120a(1)(f) of Part 201 of NREPA, as amended in June 1995, and MDEQ Environmental Response Division Operational Memorandum #14, Revision 2, dated June 6, 1995 or other use that is consistent with the assumptions and basis for the cleanup criteria established pursuant to Section 20120a.

Cleanup criteria and associated land use descriptions are located in the Government Documents section of the State of Michigan Library.

2. The Owner shall restrict activities at the Property that may interfere with a remedial action, operation and maintenance, monitoring, or other measures necessary to assure the effectiveness and integrity of the remedial action.

3. The Owner shall restrict activities at the Property that may result in exposures above levels established in the MDEQ approved RAP. Since the exposure media at the site is limited to the groundwater, the restricted activities include:

- Prohibition of groundwater well installation and groundwater use within the property boundary for all domestic, commercial, and industrial uses.
- The groundwater restriction applies to all waterbearing aquifers within the property boundary.
- Prohibit construction of groundwater fed impoundments within the property boundary.
- Prohibit excavation of soils beyond the saturated zone within the property boundary, unless properly trained according to 29 CFR 1910.120.
- If the existing structure located on the property is razed, four (4) soil samples will be collected and analyzed for parameters to be negotiated with MDEQ and the Owner at the time of soil collection.
- Owner will supply 30 day notice to MDEQ prior to razing of structure.

4. The Owner shall provide notice to the MDEQ of the Owner's intent to convey any interest in the Property 14 days prior to consummating the conveyance. A conveyance of title, an easement, or other interest in the Property shall not be consummated by the Property owner without adequate and complete provision for compliance with the terms and conditions of the Covenant.

5. The Owner shall grant to the MDEQ and its designated representatives the right to enter the Property at reasonable times for the purpose of determining and monitoring compliance with the RAP, including the right to take samples, inspect the operation of the remedial action measures and inspect records.

6. The Owner acknowledges contaminated groundwater which is migrating under the Property from an off-site source shall not be used for any domestic, commercial, or industrial purpose.

The State may enforce the restrictions set forth in this Restrictive Covenant by legal action in a court of appropriate jurisdiction.

The restrictions shall run with the Property and shall be binding upon all future owners, successors, lessees or assigns and their authorized agents, employees, or persons acting under their direction and control, and shall continue until the MDEQ or its successor approves modifications or rescission of this Restrictive Covenant. A copy of this Restrictive Covenant shall be provided to all future owners, heirs, successors, lessees, assigns and transferees by the person transferring the interest.

If any provision of this Restrictive Covenant is held to be invalid by any court of competent jurisdiction, the invalidity of such provision shall not affect the validity of any other provisions hereof. All such other provisions shall continue unimpaired in full force and effect.

The undersigned person executing this Restrictive Covenant is the Owner, or has the express written permission of the Owner, and represents and certifies that he or she is duly authorized and has been empowered to execute and deliver this Restrictive Covenant.

IN WITNESS WHEREOF, the said Owner of the above described Property has caused this Restrictive Covenant to be executed on this 31ST day of JULY, 1997.

Waste Management of Michigan, Inc.

By: _____

Title: PRESIDENT

Signed in the presence of:

_____
Lori Swanson

_____
Sharon Stahl

STATE OF MICHIGAN)
COUNTY OF)

The foregoing instrument was acknowledged before me this 31ST day of July, 1997, by RONALD S. BAKER of Waste Management of Michigan, Inc., a Michigan Corporation, on behalf of the corporation.

_____
Notary Public

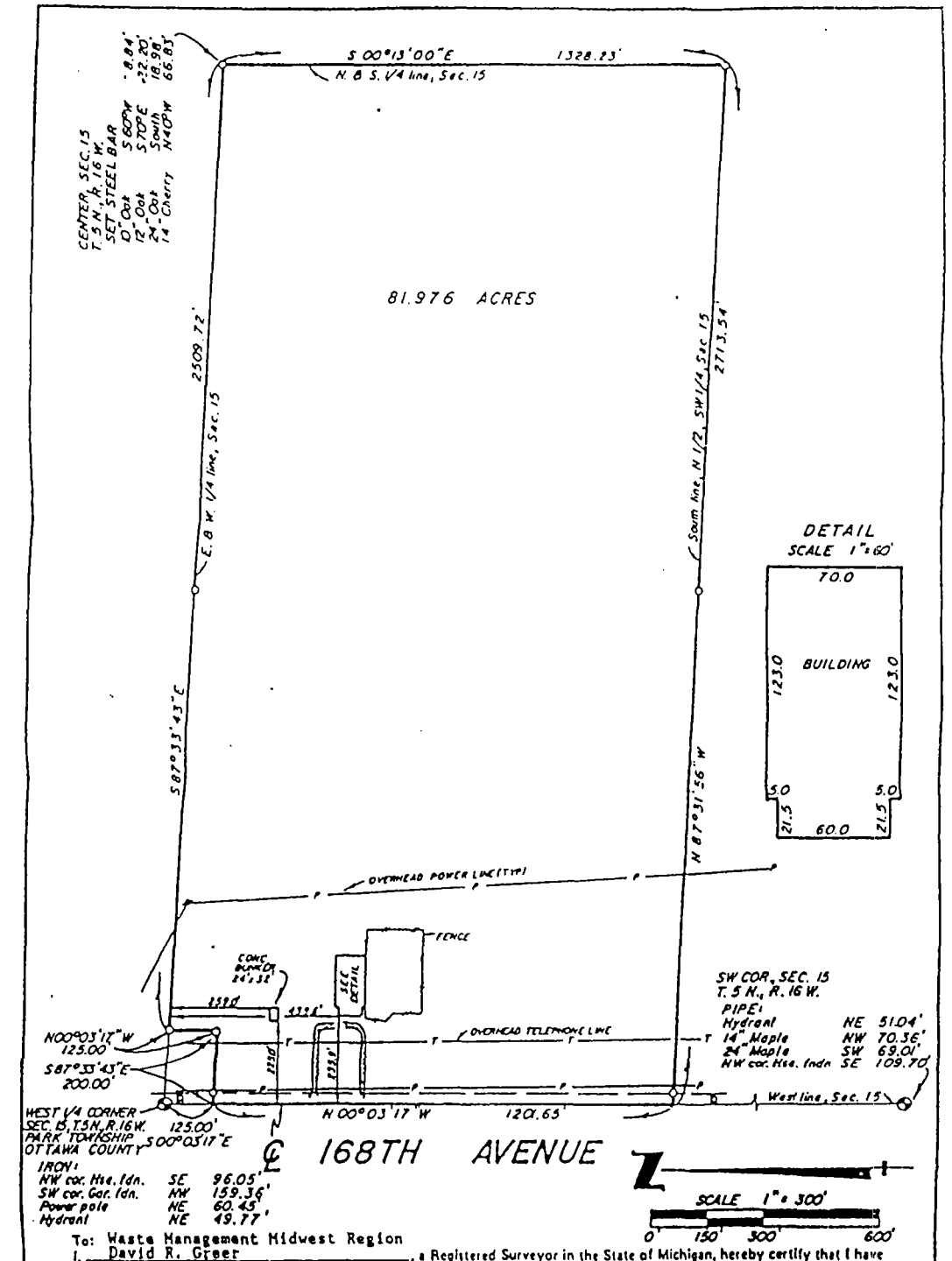
Deanna McDermott
NOTARY PUBLIC - WAYNE COUNTY, MI
MY COMMISSION EXPIRES 09/04/98

My Commission Expires: _____

Prepared by: Phillip M. Mazor
Remedial Project Manager
Waste Management of Michigan, Inc.
700 - 56th Ave
Zeeland, MI 49464

DESCRIPTION OF SURVEY

Part of the North 1/2 of the Southwest 1/4 of Section 15, Town 5 North, Range 16 West, Park Township, Ottawa County, Michigan described as beginning at a point on the West line of Section 15 distant South 00 degrees 03 minutes 17 seconds East 125.00 feet from the West 1/4 corner of Section 15 and proceeding thence South 87 degrees 33 minutes 43 seconds East 200.00 feet; thence North 00 degrees 03 minutes 17 seconds West 125.00 feet; thence South 87 degrees 33 minutes 43 seconds East 2509.72 feet along the East and West 1/4 line of Section 15; thence South 00 degrees 13 minutes 00 seconds East 1328.23 feet along the North and South 1/4 line of Section 15; thence North 87 degrees 31 minutes 56 seconds West 2713.54 feet along the South line of the North 1/2 of the Southwest 1/4 of Section 15; thence North 00 degrees 03 minutes 17 seconds West 1201.65 feet along the West line of Section 15 to the point of beginning, containing 81.976 acres except any part taken, used or deeded for road purposes, AND BEING SUBJECT TO easements of record.



To: Waste Management Midwest Region

I, David R. Greer, a Registered Surveyor in the State of Michigan, hereby certify that I have surveyed the parcel(s) of land described and delineated hereon; that said plat is true representation of the survey as performed by me; that there are no encroachments other than as shown hereon; that said survey was performed with an error of closure not greater than 1 in 5000; and that I have fully complied with the requirements of Section 3, Act #132, P.A. 1970. This survey was made from the attached legal description. The description was given to us by the person certified to, or was prepared by us from information or documents given to us by the person certified to, and should be compared with the Abstract of Title or Title insurance policy for accuracy, easements or exceptions. This survey was based on the title description of this property and any written or unwritten rights of adjoiners are unknown unless specifically noted.

David R. Greer

Registered Land Surveyor No. 16042

LEGEND

- ○ SET WOOD STAKE
- ○ SET CAPPED IRON BAR
- ● FOUND IRON STAKE
- P PLAT
- M MEASURED
- D DESCRIPTION

HOLLAND ENGINEERING, INC.
418 E. 8TH STREET
HOLLAND, MICHIGAN 49423/392-5938

Date	Drawn By	Surveyed By
5-29-92	VCB	SL

Sec. 15 T. 5 N.R. 16 W. Park Twp.

Sheet 1 of 2 Sheets

Job No. 92-05-304

STATE OF MICHIGAN

JOHN ENGLER, Governor

DEPARTMENT OF ENVIRONMENTAL QUALITY

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

INTERNET: http://www.deq.state.mi.us

RUSSELL J. HARDING, Director

REPLY TO

ENVIRONMENTAL RESPONSE DIVISION
KNAPPS CENTRE
PO BOX 30426
LANSING MI 48909-7926

April 23, 1997

CERTIFIED MAIL

Mr. Phil Mazor
Waste Management of North America
700 56th Avenue
Zeeland, Michigan 49464

Dear Mr. Mazor:

SUBJECT: Acknowledgment of Receipt of an Administratively Incomplete Remedial Action Plan for the Waste Management-Holland Lagoons Superfund Site, Ottawa County, Michigan.

The Department of Environmental Quality (DEQ) has received a Remedial Action Plan (RAP) dated April 1997 for the Waste Management-Holland Lagoons Superfund site. This RAP was received by the Superfund Section in Lansing on April 10, 1997.

Section 20114(8) of Part 201 of the Natural Resources and Environmental Protection Act (NREPA), 1994 PA 451, as amended , states that the DEQ shall either approve or deny the RAP within six months of the submittal of the information necessary or required for the department to make its decision. The DEQ considers a RAP administratively complete when all information necessary or required to approve the RAP in its entirety has been submitted.

The above-mentioned RAP has been reviewed for completeness by staff from the Lansing office and has been found to be administratively incomplete. The following items are required and will need to be submitted to the Lansing Office before the DEQ can make a decision regarding RAP approval:

(1) Please provide a copy of the restrictive covenant for all areas where groundwater contamination attributable to the Waste Management-Holland Lagoon site exceeds Generic Residential Criteria. Attached is a copy of model language for a restrictive covenant acceptable to the Department. Properties included in the restrictive covenant will have to be identified with legal descriptions or property surveys.

(2) Please provide the DEQ with a copy of the Ottawa County Environmental Health Code, Article VII, Section C-7 and other documentation such as a County Ordinance that demonstrates that the county has the authority and ability to grant or deny the installation of all types of wells within the groundwater contaminant plume. The DEQ will review and discuss this health code with Ottawa County staff.

(3) The RAP must clearly specify under which category of Section 20120(b) it is being submitted. In addition, in accordance with Section 20120a(6) demonstration that the land use is consistent with current and reasonably foreseeable future use is required. Please provide a copy of Ottawa County's zoning designations for the area covered by the RAP.

(4) Please demonstrate compliance with R299.5705(5) and 705(6).

(5) Please demonstrate compliance with Part 201, Section 18 (5) and (6).

(6) Please provide a monitoring plan to assure groundwater restrictions placed on property(ies) will continue to be protective under the provisions of the RAP.

(7) Please provide a financial assurance mechanism to carry out the monitoring component of the RAP.

(8) Section 20120(b)(2) requires that a Notice of Approved Environmental Remediation (NAER) be recorded with the register of deeds for the county for the implementation of RAPs in the categories defined by Sections 20120a(b)-(e). Please find attached a copy of the current model NAER utilized by the DEQ to satisfy the statutory requirements of Section 20120(b)(2).]

(9) Section 20120(b)(3) requires that a legal agreement and restrictive covenant are necessary for implementation of RAPs in the categories defined by Sections 20120a(1)(f)-(j) and 20120a(2). Please find attached copies of current model legal agreements and restrictive covenant(s) utilized by the DEQ to satisfy the statutory requirements of Section 20120(b)(3).

Pursuant to Section 20114(8) of NREPA, the DEQ will either approve or deny the RAP within six months of the date that the administratively complete RAP is received in its entirety at the Lansing Office. DEQ staff will continue to review the technical merits of the RAP and provide comments to you at a later date. If you have any questions you may contact Ms. Lisa Summerfield at 517-335-3388, or you can contact me.

Sincerely,

Dennis Eagle

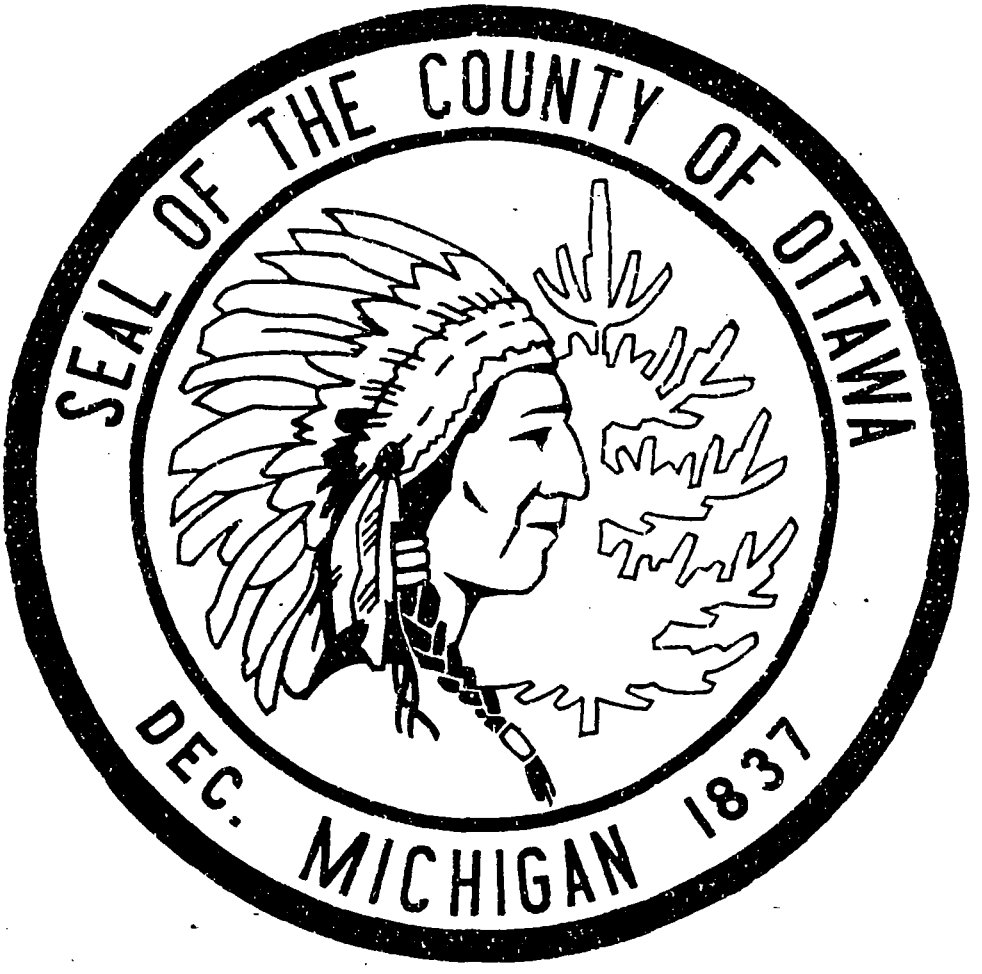
Dennis Eagle, Acting Unit Chief
Superfund Section
Environmental Response Division
517-373-8195

Attachments

cc: Mr. Dan Schultz, DEQ
Ms. Pat McKay, DEQ
Mr. Mitch Adelman, DEQ
Ms. Lisa Summerfield, DEQ (w/Attachments)

ATTACHMENT D

Environmental Health Code



Governing:

Sewage Disposal

Water Supplies

Nuisance Abatement

Enforcing Acency:

Ottawa County Health Department
Environmental Health Section
Room 106
County Building
Grand Haven, Michigan 49417
Phone: (616) 846-8350

Effective: January 28, 1983

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OTTAWA COUNTY ENVIRONMENTAL HEALTH CODE

ARTICLE 1. AUTHORITY, JURISDICTION AND ADMINISTRATION

A. Title

These regulations shall be identified by the title "Environmental Health Code for Ottawa County, Michigan".

B. Purpose

To provide Regulations for the purpose of protecting public health and safety; to establish minimum criteria for the installation of sewage disposal and water supply systems; to establish minimum criteria for the prevention and abatement of nuisances; to establish permits for the installation of sewage disposal and water supply systems; to establish a schedule of fees, licenses, permits or other services and to establish provisions for penalties for violations thereof.

C. Authority

These Regulations hereby adopted by virtue of the Authority conferred to the Ottawa County Health Department by Section 2441 (1) of the Michigan Public Health Code Act 368, of the Public Acts of 1978, as amended.

D. Jurisdiction

The Health Officer shall have jurisdiction throughout Ottawa County, including all cities, villages, and townships, in the administration and enforcement of these regulations and amendments adopted hereafter.

E. Enforcement - Inspection

All premises affected by these Regulations shall be subject to inspection by the Health Officer who may collect such samples for laboratory examination or perform such tests or examinations as he deems necessary for the enforcement of the provisions hereof. These Regulations are intended to be used by Environmental Sanitarians who, by virtue of their education, training, and experience, are qualified to exercise the professional judgement necessary to uniformly enforce the provisions adopted herein.

F. Right of Entry and Inspection

The Health Officer and/or his authorized representative, after proper identification, may enter and inspect, at reasonable hours, any public or private premise in the discharge of his duty for the protection of the public health and safety.

G. Interference With Notice

No person shall remove, mutilate or conceal any notice or placard posted by the Health Officer except by written permission of the Health Officer.

H. Abatement of Nuisances

Nothing stated in these regulations may be construed to limit the power of the Health Officer to order the immediate and complete abatement of a public nuisance or menace to the public health.

I. Fees

All fees collected by the Health Officer shall be receipted for and deposited in the general fund of the county by the Treasurer of Ottawa County to the credit of the Health Department. A schedule of fees for licenses, permits, and other services authorized by these Regulations shall be as from time to time adopted, revised, and approved by the Ottawa County Board of Commissioners, pursuant to Act 368, of the Public Acts of 1978 as amended.

J. Penalty - Appearance Citations/Civil Penalty

Any person who fails to comply with or who violates any Regulation or provision adopted herein or any written order of the Health Officer or permit issued by the Health Officer as provided for herein, shall be deemed guilty of a misdemeanor and upon conviction thereof shall be punished by a fine not exceeding the sum of two hundred dollars ($200.00) and/or six months in the County Jail. In addition thereto, each and every day during which any illegal installation, construction, violation, re-construction, alteration or use shall continue which is not in compliance with these Regulations, shall constitute a separate offense. In addition to other means of bringing said charges, the Health Officer and his designated agents are specifically granted authority to issue appearance citations requiring an appearance in District Court for violations of this Code and its Regulations.

K. Injunctive Proceedings

Notwithstanding the existence or pursuit of any other remedy, the Health Officer may maintain an action in his own name in a court of competent jurisdiction for an injunction or other process against any person to restrain or prevent violations of this regulation.

L. Validity

If any section, subsection, clause or phrase of these Regulations is for any reason judged unconstitutional or invalid or is subsequently amended and approved, it is hereby provided that the remaining portions of these Regulations shall not be affected.

M. Other Laws and Regulations

These regulations are supplemental to laws of the State of Michigan relating to public health, and shall supercede all local regulations and ordinances not conforming with the minimum standards as set forth in these regulations.

N. Effective Date

These regulations or amendments thereto shall become effective on the 45th day after the date of approval by the Ottawa County Board of Commissioners and shall apply to all premises.

O. Pre-existing Violations

No violation of any repealed section or provision shall be made legal by virtue of a new effective date of these regulations. Any act, situation or condition of premises or things which, when created or first allowed to exist was a violation of the Ottawa County Regulations, shall continue to be a violation of these Regulations if a similar section or provision is a part of these Regulations. Any action, issuance of permit, or maintenance of a condition that was mandatory, under the provisions of the Regulations now repealed, shall continue to be required if the same or similar provision is contained in these Regulations.

ARTICLE II. APPEALS AND INTERPRETATION

A. Board of Appeals

In order to provide for reasonable and equitable interpretations of the provisions in the private sewage disposal and private water supply section of these Regulations and their prospective application but not for violations thereof, there is hereby created an "Appeals Board". The Board of Appeals shall consist of not less than seven members who shall be representative of major interests as they exist in the County but limited to agriculture, education, public health, commerce, and local government. The composition of the Board of Appeals shall consist of the following: Five qualified electors from the County at large representing the four geographic quadrants: the Supervisor or manager representing the local governing body from which the appeal originates; and the Supervising Sanitarian of the Environmental Health Division representing the Ottawa County Health Department. All members shall be selected upon the basis of their respective qualifications and fitness to serve as members of the Appeals Board without consideration of their political activities. Appointment of members to the Board of Appeals, with the exception of the individuals representing local governing jurisdictions and the Ottawa County Health Department, shall be made by the Chairman of the Ottawa County Board of Commissioners in concurrence with the full Board of Commissioners. Terms of office shall be staggered with eligibility for re-appointment. The Board of Appeals shall select a chairman and shall hear and maintain records of all appeals presented in accordance with rules and procedures established by said Board.

B. Hearing of Appeals

The appellant shall pay a fee upon filing a request for a hearing. The amount of the fee shall be stated in the Health Department Fee Schedule, Article X. Opportunity for a hearing shall be granted by the chairman thereof at a regular meeting or at a special meeting called for the purpose; provided that no hearing shall be scheduled within less than three (3) days nor more than thirty (30) days after receipt of written request and fee. The Board shall furnish the appellant with a written report of its findings and decision within thirty (30) days following the hearing of any appeal. The Appeals Board may grant individual variances from the requirements of these regulations only when said Board has determined that all of the following conditions exist: (1) that no substantial health hazard or nuisance is likely to occur therefrom: (2) that strict compliance with Regulations and requirements would result in unnecessary or unreasonable hardship; (3) that no state statute, or other applicable laws would be violated by such variance; and (4) that the proposed variance would provide essentially equivalent protection for the public health and would be in the public interest.

C. Interpretation

When not inconsistent with the context, words used in the present tense include the future, words in singular number include the plural number, and words in the plural number include the singular number..the word "shall" is always mandatory and not merely directory. Words and terms not defined herein shall be interpreted in the manner of their common usage. General definitions, words and terms used in these Regulations, unless otherwise stated, shall have the following meaning:

ARTICLE III. GENERAL DEFINITIONS
WORDS, TERMS & TECHNICAL DEFINITIONS

A. Board of Health

The term "Board of Health" shall mean the Board appointed by the respective Board of Commissioners of Ottawa County.

B. Dwelling

A "dwelling" shall mean any house, building, structure, tent, watercraft, shelter, trailer, or vehicle, or portion thereof, which is occupied in whole or in part as a home residence, or living and sleeping place for one or more human beings either permanently or transiently except such tent, watercraft, trailer, or vehicle having a holding tank system which receives and contains all sewage generated therein shall not be subject to this code nor shall any use of a latrine in connection with camping be considered in violation unless the use constitutes a sewage related nuisance.

C. Habitable Building

The term "habitable building" shall mean any building, structure or other place where human beings reside, are employed, or congregate.

D. Health Department

The term "Health Department" shall mean the Ottawa County Health Department.

E. Health Officer

The term "Health Officer" shall mean the director or acting director of the Ottawa County Health Department and/or his authorized representatives.

F. Owner

The term "Owner" and "person owning premise" shall mean owner of title or record, or person legally occupying or in possession of any property or premise.

G. Person

The term "Person" shall mean an individual, individuals, partnership, firm, company, corporation, society, association, trustee, or any other private or public entity having ownership, control or operation of a premise.

H. Premise

The term "Premise" shall mean any tract of land, piece of real estate, house or building and its land.

ARTICLE IV. WORDS, TERMS AND TECHNICAL DEFINITIONS

A. Approved

"Approved" shall mean acceptable for intended use as judged by the Health Officer by utilizing public health rules, regulations and technical data.

B. Automatic Siphon or Pump

An "automatic siphon or pump" is a device which will automatically cause a liquid entering a receptacle to be retained until a predetermined high water level has been attained after which it is automatically released or pumped from the receptacle until a second predetermined low water level has been reached at which time the flow from such receptacle ceases until the high water level has again been attained.

C. Dosing Chamber

A "dosing chamber" is a watertight receptacle used for the purpose of receiving and retaining the overflow or effluent from a septic tank, pending its automatic discharge to a selected point by an automatic siphon or pump.

D. Drywell or Block Trench

A "drywell or block trench" is an underground enclosure connected to the outlet of a septic tank, commercially pre-cast or constructed of concrete blocks, bricks or similar material loosely laid with open joints and surrounded with washed stone so as to allow the septic tank overflow or effluent to be absorbed directly into the surrounding soil.

E. Experimental Sewage Disposal System

A "Experimental Sewage Disposal System" possesses unique features relating to its design, location or principles of operation not specifically covered by these Regulations.

F. Garbage

"Garbage" shall mean rejected food wastes including waste accumulation of animal fruit, or vegetable matter used or intended for food or that attend the preparation, use, cooking, dealing in or storing of meat, fish, fowl, fruit or vegetable.

G. Garbage Disposal Unit

A "garbage disposal unit" is a mechanical device generally located in a sink drain and so designed to macerate garbage prior to discharge into a sewer.

H. Groundwater Contamination

"Groundwater contamination" is the degradation and/or impairment of water quality beneath the earth's surface in saturated soil and rock by chemical or bacterial pollution to a degree that creates an actual hazard to public health.

I. High Groundwater Elevation

"High groundwater elevation" means the elevation of the groundwater at the upper surface of the zone of saturation as may occur during wettest periods. Highest groundwater elevation shall be determined by using generally accepted soils evaluation practices and shall be consistent with practices used by the U.S. Soils Conservation Service. Data used in determining highest groundwater elevation shall include the Soils Survey of Ottawa County, site drainage, and observation of actual soil characteristics as observed during on-site investigations.

J. Michigan Guidelines for Subsurface Sewage Disposal

"Michigan Guidelines for Subsurface Sewage Disposal" shall mean the Michigan Department of Public Health publication adopted December, 1977, to provide minimum uniform standards of design and construction for such systems in Michigan.

K. National Interim Primary Drinking Water Evaluations

"National Interim Primary Drinking Water Regulations" shall mean the Federal Environmental Protection Agency publication which established primary drinking water Regulations pursuant to section 1412 of the Public Health Service Act, as amended by the Safe Drinking Water Act, Public Law 93-523(1974).

L. New Use

"New Use" shall mean any change in the status of the original intended use of a habitable building whereby an increased demand is or would be placed on the existing water supply and/or sewage disposal systems.

M. Percolation Test

"Percolation Test" is a method of estimating the capacity of an existing soil to receive, disperse, and absorb (percolate) the anticipated quantities of effluent (outflow) from a septic tank or other treatment device. The percolation test shall determine the "stabilized percolation rate" which is the effective time in minutes for the water level in a six inch diameter hole; properly pre-soaked for a minimum of six-hours, to be lowered one inch within the range from top to bottom of the proposed soil absorption system in parent soil, unless other test methods are approved by the Health Officer. The rate the water level is lowered may be optionally expressed in terms of inches per hour.

N. Private Water Supply

A "Private Water Supply" means a waterworks system which provides water for drinking or household purposes intended for use only in a single family dwelling and where waters produced are not intended for use by the public or in any dwelling other than the owner's.

O. Public Water Supply

A "Public Water Supply" means a waterworks system which provides water for drinking or household purposes to persons other than the supplier of the water, but excludes those waterworks systems which supply water to only one single family dwelling.

P. Rubbish

"Rubbish" shall mean solid wastes including but not limited to paper, cardboard, tin cans, plastics, glass, crockery, wood, bedding or other discarded material that is or will be detrimental to the public health and safety. Specificall excluded from this definition is machinery, farm implements, automobile bodies and their related parts.

Q. Septic Tank

A "Septic Tank" is a watertight tank or receptacle used for the purpose of receiving sewage, having an inlet and outlet and so designed to permit the separation of solids in suspension and to permit such retained solids to undergo decomposition therein prior to releasing the treated effluent or outflow to an approved soil absorption system.

R. Sewage

"Sewage" is a combination of the domestic liquid or semi-solid wastes conducted away from a dwelling or habitable building. This includes human excreta, garbage disposal wastes, dish water, bath water, laundry wastes, basement drains, etc. but excludes roof storm water, water softener discharge, footing drains and storm water discharge.

S. Sewage Disposal System

A "Sewage Disposal System" shall mean a system, other than a public sanitary sewer system, as defined by Act 98 of the Public Acts of 1913, which receives sewage. Included within the scope of this definition are septic tank-soil absorption systems, aeration systems, package treatment plants, lagoons, privies, chemical toilets, composting toilets, portable toilets, or any similar contrivance used in the treatment and/or disposal of sewage as may be approved by the Health Officer.

T. Sewage Related Nuisance

A "Sewage Related Nuisance" shall include, but not be limited to, any condition where sewage or effluent from any sewage disposal system is exposed to the surface of the ground or is permitted to drain on or to the surface of the ground, into any ditch, county drain, storm sewer, lake, river or stream, and/or where seepage may endanger or contaminate surface waters or ground water used for a public or private water supply; or when the odor, appearance, or presence of sewage or effluent has an obnoxious or detrimental effect on or to the senses and/or health of persons, or when it shall obstruct the comfortable use or sale of adjacent property, except those systems such as lagoons, sand filters, etc. specifically approved by the Health Officer.

U. Sewer

A "sewer" is a watertight conduit used for transporting sewage.

V. Site Evaluation

"Site Evaluation" means an evaluation conducted by the Health Officer of a parcel of land, for the purpose of determining the suitability of such land as a site for the installation of a sewage disposal or water supply system meeting the requirements of these Regulations.

W. Soil Absorption System

A "soil absorption system" is a means of utilizing the soil for subsequent absorption of septic tank effluent; e.g., a block trench, dry well, drainfield bed, absorption trench.

X. Stone

"Stone" means clean or washed stone, crushed stone, crushed rock or other aggregate approved by the Health Officer and in a size range from 1/4" to 2".

Y. Variance

Variance shall mean a deviation or modification from the rules and regulations printed herein as may be permitted by the Health Officer and/or Appeals Board.

ARTICLE V. GENERAL SEWAGE DISPOSAL REQUIREMENTS

A. Separate Systems for Each Family or Establishment

Unless otherwise specifically approved by the Health Officer, each habitable building or dwelling shall be served by its own individual sewage disposal system.

B. Connections Required

All facilities such as flush toilets, urinals, lavatories, sinks, bathtubs, showers, wash machines or any other facility from which sewage emanates shall be connected to a sewage disposal system except that any such facilities hereafter installed on a premise where public sewer is available and reasonably accessible shall be connected to said public sewer.

C. Connection Required to a Mumcipal Sewerage System

In the absence of a publicly operated sewerage system, connection shall be made to a sewage disposal system constructed in accordance with the provisions of these regulations.

When any existing sewage disposal system serving any premise where a publicly operated sewerage system is available and reasonably accessible, as defined in Act 288, Public Acts of 1972, is found in violation of any provision of these regulations, or of any other applicable health law, the owner shall correct the violation by proper connection to said publicly operated sewerage system. Such connection shall be made within a time limitation, as specified by the Health Officer.

D. Abandonment of Existing Sewage Disposal Systems

When any sewage disposal system is abandoned or its use terminated, the Health Officer may require the septic tank(s), dry well(s), cess pool(s), etc. to be pumped out and filled with sand.

E. Permits

No person shall construct, alter, or extend any private or semi-public sewage disposal system unless he has obtained a permit issued by the Health Officer and/or authorized representative. All permit forms shall be provided by the Ottawa County Health Department, Environmental Health Division.

F. Necessity of Permit Prior to Commencement of Construction

No person shall commence construction or otherwise allow commencement of construction of any habitable building requiring an on-site sewage disposal system without first obtaining a permit issued by the Health Officer and/or authorized representative.

G. Application for Permit

Application for permit to construct, alter, or extend a private or semi-public sewage disposal system shall by made in writing by the property owner or his authorized representative to the Health Officer. The application shall include the name and address of the applicant, the description of the property on which said construction, alteration, or extension is proposed. At his discretion the Health Officer may require substantiating data including, but not limited to, engineering drawings, maps, soil analysis test borings, percolation tests, ground water and flood elevations and detailed plans of the proposed sewage disposal system. The actual or proposed use of the property shall be indicated in all instances. The Health Officer may at his discretion require that the design plans and specification for a sewage disposal system be prepared by a registered professional engineer, registered architect, or registered sanitarian.

H. Termination of Permits

Any permit issued pursuant to the requirements of the preceding sections shall be valid for the term of one year from the date of issuance and void thereafter unless sooner declared void as provided in the following, and no construction, alteration, and/or extension shall continue without renewal of a valid permit.

I. Void Permits

The permit, issued by the Ottawa County Health Department, for a private sewage disposal system may be declared void by the Health Officer because of, but not limited to, any of the following conditions:

1. The area designated on the permit for the soil absorption system is disturbed by major, unapproved filling, excavating, paving, or flooding.
2. The area designated encroaches on the required isolation distances from an existing water supply well, property lines, dwelling, footing drains, surface water, etc..
3. The water supply well serving the premise does not meet depth and/or construction requirements.
4. Increase or other alteration in the scope of the project prior to, during, or following construction of said system which was disclosed on the permit.

J. Transfer of Permits

Should there be a change in ownership of the property for which a permit has been issued, the permit may be transferred to the new owner. Such transfer shall be documented in writing on forms to be provided by the Health Officer, signed by the permit holder and the transferee and filed within seven (7) days with the Health Officer. Upon filing the Transfer, the new owner (Transferee) assumes all duties, responsibilities, and requirements under these regulations and the permit. Copies of all transferred permits and applicable correspondence shall be forwarded to the political jurisdiction involved.

K. Rejection of Application

The Health Officer shall have the right to reject a sewage disposal system application because of, but not limited to, one or more of the following conditions: However, variances may be granted for existing structures where sewage disposal repairs, corrections and/or alterations are necessary.

1. Where a publicly operated sewage system is available as defined by Act 288, Public Acts of 1972.
2. Where the septic tank would be inaccessible for cleaning or inspection purposes.
3. Where the property served is too small for proper isolation distances as for example from existing water wells, the premise water well, surface waters, footing and storm drains, or has insufficient sewage absorption area and reserve area.
4. Where maximum ground water levels, surface flooding, or surfacing materials would adversely effect the operation of the system. (Minimum requirements specified in Article VI, Section H & N).
5. Where the stabilized percolation rate is in excess of forty-five (45) minutes per inch of fall. (Variances may be granted under Article VI, Section O).
6. Where the soil classification or conditions are deemed to be unsatisfactory for the disposal of sewage.
7. Where conditions exist or may be created which may endanger the public health or the environment.
8. Where the premise water supply cannot comply with the laws of the State of Michigan or the requirements of these Regulations.
9. Where the proposed site is subject to flooding and/or within the ten (10) year flood plain.

L. Building Site Acceptance Criteria

The following specifications shall be used in determining the suitability of the site to provide satisfactory operation of a sewage disposal system utilizing one or more septic tanks and an absorption field, absorption bed, block trench or dry well.

1. Soil analysis -The soil classification system and interpretations as provided by the United States Department of Agriculture, Soil Conservation Service, and the use limitations pertaining to that soil classification may be considered by the Health Officer and used as part of the soil and drainage evaluation.
2. Soil borings- Test borings or excavations shall be made within the area proposed for the sewage disposal system in order to determine the highest indicated groundwater level and soil formations. The Health Officer may request that excavations or borings to a minimum depth of five feet be made available for inspection and evaluation of soil types and conditions.
3. High groundwater -High Groundwater shall be at least two feet below the bottom of the trench or bed except where sub-division or semi-public restrictions require greater isolation distances.
4. Hardpan, clay, impervious material -Impervious hardpan or clay, stone or shale, if present, shall be at least two feet below the bottom of the trench or bed.
5. Filled ground -Filled ground or "made land" shall be acceptable only under specific written approval of the Health Officer and shall not be allowed over or on soils having a stabilized percolation rate over 45 min/in., flooded land, unstable soil, peat, muck, organic material or within fifty (50) feet of any lake, stream, pond or other surface body of water, including sites located within the ten year flood plain elevation as determined by D.N.R.

6. Percolation tests - In addition to evaluation of the data required above, the Health Officer may require stablized percolation rate tests when deemed necessary to determine the absorption capacity of the soil. The Health Officer shall specify the procedures to be followed in performing acceptable stabilized percolation rate tests.
7. Reserve area -Sufficient area meeting the requirements of this code shall be set aside or put on reserve for a future replacement system. Such replacement system area shall at least equal the area required for the initial system and any required fill unless otherwise specified by the Health Officer.

M. Inspection and Approval

An inspection and approval by the Health Officer is required after the sewage disposal system has been completed but before any portion of the system has been covered and/or placed in operation. It shall be the responsibility of the permit applicant or installer to notify the Health Officer that the sewage disposal system is ready for inspection. Any sewage disposal system disapproved by the Health Officer shall be brought into compliance with these Regulations within a period of time specified by the Health Officer.

N. Certification

After construction of the sewage disposal system has been completed to the extent of the placement of all sewer lines, septic tanks, stone, distribution tile lines and before any portion of the system has been covered or placed in operation, request for an inspection shall be made to the Health Officer. Thirty-six (36) hours shall be allowed for inspection after completion of the sewage disposal system during regular working days excluding weekends and legal holidays. If the inspection has not been made within thirty-six (36) hours after notification t the Health Officer that the system is complete and ready for inspection, the installe may proceed to cover the system and place it into operation. The installer in such an instance shall furnish a written statement to the Health Officer certifying that the system was installed exactly as shown on the permit.

O. Premise Occupancy

It shall be unlawful for any person to occupy or permit to be occupied any premise which is not provided with an approved sewage disposal system as required by these Regulations. Such premise may be declared unfit for human habitation and may be so posted by the Health Officer and ordered vacated.

P. Condemnation of Existing Sewage Disposal System Installations

The Health Officer may condemn any existing or hereafter constructed sewage disposal system when such system constitutes a sewage related nuisance. Such a sewage disposal system as condemned, shall be repaired, rebuilt, or replaced by a system constructed in accordance with the provisions of these Regulations within a period of time specified by the Health Officer. In addition, the premise may be declared unfit for human habitation and may be so posted by the Health Officer and ordered vacated.

Q. Drains

Whenever the Health Officer shall determine that sewage or sewage effluent is flowing into any public or private drain creating a sewage related nuisance, he may issue public notices requiring persons owning premises from which such sewage originated, to connect such sewage flow to a publicly operated sewerage system, if available, or in the absence thereof to comply with provisions of these Regulations. Public notice shall consist of the posting of at least five (5) conspicuous notices in the probable area served by said drain. After not less than thirty (30) days following posting of the notices, the Health Officer may plug, or cause to be plugged the outlet of said drain until such time as the sources of the sewage have been located. Owners of properties known to be discharging improperly treated sewage in such drain posted by the Health Officer, shall be given written

notice of corrections required within the time allowed by the Health Officer. Failure to comply with this notice and/or malicious destruction or removal of public notices shall be considered a violation of these regulations. The Health Officer shall not be liable for any damage which results or might result from action authorized by this section.

R. Replaced, Altered or Repaired Existing Buildings

Sewage disposal systems may be made to conform to the full requirements of these regulations when existing habitable buildings are substantially replaced, altered, and/or repaired. Substantially replaced, altered, and/or repaired shall mean a building in which repairs, alterations, or replacement costs exceed 50% of the fair market value.

S. Exceptions for Repairs of Sewage Disposal Systems on Premises with Existing Dwellin

At the discretion of the Health Officer, modifications of the required distances, materials, or size as stated in this code may be applied if local conditions warrant and in cases where dimensions or features of the premises create a physical impossibility for compliance. In such event, if the Health Officer finds that public health would not be jeopardized, he may approve a modified sewage disposal system if, in his opinion, it would provide equal or better treatment than the minimum requirements of this code.

T. Maintenance

Every private sewage disposal system shall be maintained in a satisfactory operating condition at all times. Every septic tank shall be serviced by having sludge pumped out at such intervals that will prevent carry over of solids into the absorption field.

U. New Use of Existing Buildings

At such time that a new use is proposed for an existing dwelling and/or habitable building, the Health Officer may require upgrading of the sewage disposal system as deemed necessary.

ARTICLE VI. SPECIFIC REQUIREMENTS FOR A SEWAGE DISPOSAL SYSTEM

A. Sewers

1. Materials. All sewer lines located within fifty (50) feet of any well, spring, or water suction line shall be constructed of cast iron soil pipe with sealed joints, or other State approved materials. All buried sewer line shall be located at least ten (10) feet from any well, spring, or water line and be smooth wall and water tight construction.
2. Size. The size of sewer lines shall be based upon fixture units as set forth in the State Plumbing Code.
3. Grade. Sewer lines installed prior to connection to a septic tank shall be lai at a grade of not less than one-eighth (1/8) inch per foot or not more than on half (1/2) inch per foot unless otherwise approved by the Health Officer.
4. Sewer lines located between the building and septic tank shall be limited to a total of 135° in bends unless clean outs are provided at each bend of 45° or greater.

B. Septic Tanks

1. Location. No septic tank shall be located where it is inaccessible for cleanin or inspection purposes, nor shall any structure be placed over any existing tank making the same inaccessible for cleaning and inspection purposes. Septic tanks shall be located on the same side of a building that the sewer line leave the wall, unless otherwise approved by the Health Officer. A septic tank shall be installed in a level position on a firm base, and the surrounding excavation shall be properly backfilled. Septic tanks must be located on the property being served unless otherwise approved by the Health Officer.

2. Manholes. Every septic tank shall be provided with two (2) suitable openings (one having a minimum diameter of eighteen inches) with covers fitted with hand grips located over the inlet and outlet ends of the tank. Where the top of septic tank is located more than eighteen (18) inches below the finished grade, manholes shall be built up to within eighteen (18) inches of the finished grade.
3. Inlets and Outlets. The bottom of the inlet line into the septic tank shall be at least two (2) inches above the operating water level of the tank. The outlet shall be constructed to permit withdrawal of liquid from the middle third of the depth of the liquid in the tank to prevent the escape of floating or settled solids and must have a minimum scum clearance of eight (8) inches. The inlet must be so designed to permit gas above the liquid level to pass through the inlet line and out the vent pipe servicing the sewer line leading to the tank. All pipe connections to a septic tank shall be watertight and sturdy.

C. Construction Material
1. Concrete prefabricated tanks shall be constructed of washed aggregate, properly vibrated and reinforced. Tanks constructed of concrete blocks shall be laid on a three (3) inch reinforced cement bottom and mortar joints shall be well filled. The interior of the tank shall have a smooth cemented surface and be watertight. The top is to be three (3) inch reinforced concrete. Liquid depth from bottom of tank to bottom of outlet pipe shall be a minimum of 36".
2. Steel tanks used as sewage treatment devices shall meet construction standard No. C.S. 177-62 of the U.S. Department of Commerce.
3. Tanks constructed of fiberglass, plastic or other materials shall not be installed without prior written approval of the Health Officer.

D. Number and Capacities for Single Family Dwellings
1. Minimum septic tanks hereafter installed shall have a liquid capacity of at least the average volume of sewage flowing into it during any twenty-four (24) hour period, but in no case shall the liquid capacity of any primary septic tank be less than 800 gallons.
2. The following minimum capacity for septic tanks shall be required for single family dwellings except where in the opinion of the Health Officer increased capacities may be required:

No. of Bedrooms	Minimum Liquid Capacity
1	800 gallons
2&3	1,000 gallons
4	1,250 gallons
5	1,500 gallons
6	1,750 gallons

3. For each additional bedroom over six (6) add 250 gallons of liquid capacity.
4. An additional tank of 800 gallon capacity shall be required where adverse soil conditions exist as determined by the Health Officer.
5. A two-tank system may be substituted providing the primary tank has a minimum capacity of 800 gallons.
6. If a garbage disposal unit is planned or installed, one additional septic tank shall be required and an increased absorption area may be required as determined by the Health Officer.
7. Footing drain water, roof water, storm drainage, water softener and swimming pool backwash shall not be connected to or discharged into a sewage disposal system without the specific permission of the Health Officer as granted on the Sewage Disposal PERMIT.

E. Public Sewage Disposal System Requirements

1. Minimum septic tank capacity, number of tanks, and size of sub-surface absorption area for facilities other than single and two family dwellings shall be determined in accordance with the "Michigan Guidelines for Sub-Surface Sewage Disposal", adopted December 1977 by the Bureau of Environmental and Occupational Health, Michigan Department of Public Health.

F. Subsurface Disposal System

1. Location. In no case shall any driveway, parking area, paved surface, stockpiled material or building be placed over the disposal system or reserve area. The disposal system must be located on the property being served unless otherwise approved by the Health Officer. All surface drainage must be diverted around the soil absorption system.
2. Distribution Header. A header or distribution box plus return header shall be required in all tile absorption systems. A header or distribution box shall be set true so as to afford an even distribution of all septic tank effluent throughout the subsurface disposal laterals.
3. Dosing Tanks and Automatic Siphons. The Health Officer shall require that dosing tanks with easily accessible automatic siphons or pumps be used in installations where the liquid waste flow to the system is over 2,000 gallons/24 hours or where adverse soil conditions or elevation deem it necessary. An alarm system may be required at the discretion of the Health Officer. The capacity of the dosing tank and required pump size shall be determined by the Health Officer.
4. Distribution System. The absorption field may be constructed of open joint clay or cement drain tile or perforated, non-metallic pipe approved by the Health Officer. Stone must be placed level beneath and above all distribution drain tile throughout entire trench or bed. Drain tile shall be laid with one-fourth (1/4) to one-half (1/2) inch open joints, the top half of which shall be covered with tar paper or other approved material. Perforated plastic pipe shall have a minimum of 1/4 inch diameter perforations having a minimum open area of 2 sq. inches per lineal foot. Straw or other approved materials and at a depth specified by the Health Officer shall be placed between the stone and final cover of dirt to prevent dirt from filtering into the stone.
5. Approval of a Tile Distribution System may be withheld if one or more of the following conditions exist:
   a. Tile or perforated pipe does not meet acceptable construction criteria.
   b. Tile are not laid at a uniform grade.
   c. Tile are in poor condition.
   d. Dirt has been allowed to fill up the air spaces around the stone.
   e. Insufficient amount of tile in absorption system.
   f. Distance between tile lines do not meet code requirements.
   g. Insufficient depth of stone around, under, or above tile.
   h. Insufficient isolation between bottom of absorption bed and highest ground water level.
   i. Slope of tile exceeds code requirements.
   j. Any other violation of the construction requirements as specified herein.
   k. The size and design of public sub-surface disposal systems shall be determined in accordance with good engineering practice and based upon the Michigan Guidelines for Sub-Surface Sewage Disposal. The Health Officer may require the owner to obtain specifications from a registered professional engineer or registered sanitarian.

G. Required Minimum Isolation Distances in Feet***

	To Septic Tank	Absorption Field	Block Trench	Absorption Bed	Sewer Line**
Well & Unprotected Suction Lines*	50	50	50	50	10
Property Line	10	10	10	10	10
Basement Wall	10	15	15	15	5
Pressurized Water Lines	10	10	10	10	10
Bank, Drop-off, Storm & Footing Drains & Drainage Ditches	15	25	25	25	10
Lake or Stream	50	50	50	50	25
Swimming Pools	10	10	10	10	10

* Seventy-five (75) feet isolation required in all cases except single family dwellings.

** See Health Department for sewers of approved materials for use within the above isolation distances.

*** If deemed necessary, the Health Officer may require greater isolation distance.

H. Subsurface Absorption Trench Construction Requirements

Items	Maximum	Minimum
Number of Lateral Trenches	-	2
Size of Gravity Distribution Conduit	-	3 in.
Size of Pressurized Distribution Conduit	-	1 in.
Length of Trenches	100 ft.	-
Width of Trenches	36 in.	12 in.
Space between Trenches, Wall to Wall	-	4 ft.
Number of Distribution Lines per Trench	-	1
Depth of Tile Lines below Finished Grade	36 in.	12 in.
Slope of Tile Lines	6 in./100 ft.	Level Preferred
Depth of Stone over Tile	-	2 in.
Depth of Stone under Tile	12 in.	6 in.
Size of Stone	2 in.	½ in.
Depth to Highest Indicated Ground Water from Bottom of Stone in Trench	-	2 ft.

I. Subsurface Absorption Bed Construction Requirements Same as Absorption Trench Construction Requirements with the Following Additions:

Items	Maximum	Minimum
Distance between Distribution Lines	3 ft.	18 in.
Distance between Distribution Lines and the Bed Wall	2 ft.	12 in.

J. Subsurface Block Trench & Pre-Cast Units - Construction Requirements

Items	Maximum	Minimum
Length of trenches	100 ft.	-
Space between trenches (undisturbed soil)	-	6 ft.
Distance between pre-cast units	2 ft.	3 in.
Distance from top of unit to finished grade	3 ft.	6 in.
Working depth (from bottom of inlet to bottom of trench)	2 ft.	16 in.
Size of stone	2 in.	½ in.
Width of stone between excavation wall and unit	-	12 in.
Depth of stone	-	Top of Inlet
Depth of highest indicated ground water from bottom of unit	-	2 ft.

K. Subsurface Absorption Bed - Minimum Absorption Area Requirements in sq.ft. of bottom area.

Stabilized Percolation Rate		Single Family Residence(Number of Bedrooms)			
Min./In.	12 or more	1	2&3	4	5
0-5	12 or more	300	400	500	600
5+ to 15	12-4	400	500	600	700
15+ to 25	4-2.4	550	650	750	850
25+ to 35	2.4-1.7	750	850	950	1050
35+ to 45	1.7-1.33	1000	1100	1200	1300
Over 45	1.33	Not approved except as provided in Article VI, Sec.N			

L. Subsurface Absorption Trench - Minimum Trench Area Requirements in sq.ft. of bottom area.

Stabilized Percolation Rate		Single Family Residence(Number of Bedrooms)			
Min./In.	In./Hr.	1	2&3	4	5
0-5	12 or more	225	300	375	450
5+ to 15	12-4	300	375	450	525
15+ to 25	4-2.4	415	490	565	640
25+ to 35	2.4-1.7	565	640	715	790
35+ to 45	1.7-1.33	750	825	900	975
Over 45	1.33	Not approved except as provided in Art. VI, Sec.O			

M. Subsurface Block Trench & Pre-Cast Units- Minimum Bottom Area Requirements (sq.ft

Stabilized Percolation Rate		Single Family Residence (Number of Bedrooms)			
Min./In	In./Hr.	1	2&3	4	5
0-5	12 or more	150	200	250	300
5+ to 15	12-4	200	250	300	350
15+ to 25	4-2.4	250	300	350	400
25+ to 35	2.4-1.7	300	350	400	450
35+ to 45	1.7-1.33	350	400	450	500
Over 45	1.33	Not approved.			

N. Private Sewage Disposal in Good to Moderately Permeable Soils Having High Ground Water Conditions.

Minimum requirements for proposed sewage disposal systems on sites having ground water elevations within two feet of existing grade in soils having good to moderate permeability but limited to percolation rates of less than 45 minutes/inch.

1. The owner of property in problem areas on which a sewage disposal system is proposed, shall apply in person for the sewage disposal permit, be given an opportunity to discuss the proposed construction requirements and potential problems, and sign the necessary permit. In addition, an affidavit may be required to be filed with the deed.
2. Proposed sewage disposal systems sites exposed to periodic flooding; containing muck, marl, peat, clay, or clay-loam type soils; or having slopes exceeding 30% within 50 feet of the proposed sewage disposal system shall not be approved.
3. On proposed sites where the highest indicated ground water elevation is less than six (6) inches below natural grade, issuance of a sewage disposal system shall be denied.
4. Filling in the area of the proposed sewage disposal system shall not be allowed when such an area exists below the 10 year floodplain elevation as determined by the Michigan Department of Natural Resources Water Management Division.
5. Fill required on acceptable sites shall consist of uniform, clean, coarse sand having a percolation rate of less than 10 minutes/inch.

6. Sand fill shall be placed in the area of the proposed sewage disposal system at a depth that will provide a minimum of two feet of isolation between the bottom of the stone bed and the highest indicated ground water elevation and/or limiting soil conditions, as determined by the Health Officer.
7. The elevated absorption area shall be sized in accordance with the absorption bed area requirement for the underlying soils as specified on Page 15 of this code and constructed on top of the required depth of sand fill as determined by the Health Officer.
8. The sand fill shall extend away from all sides of the finished grade of the absorption bed and maintain a slope of 1:7.
9. The top of the elevated absorption system shall be covered with a minimum of 6" of topsoil, sufficiently crowned to divert surface water away from the area.

O. Private Sewage Disposal in Heavy, Slowly Permeable Soils

On sites where adverse soil conditions exist and limited to soils having percolation rates exceeding 45 minutes/inch, but not more than 95 min./in., issuance of a sewage disposal system permit may be considered at the discretion of the Health Officer pending compliance of all other requirements pertaining thereto.

During the evaluation of proposed sites for on-site sewage disposal, the Health Officer may require the applicant to provide mechanical equipment for site excavations; and/or require percolation tests, soil borings, soil analysis, preparation of a design plan, or other supportive data from an engineer, architect, soil scientist, sanitarian or equivalent.

Minimum requirements and specifications on marginal sites having adverse soil conditions with percolation rates exceeding 45 min./inch.

1. The owner of property in problem areas on which a sewage disposal system is proposed shall apply in person for the sewage disposal system permit, be given an opportunity to discuss the proposed construction requirements and potential problems, and sign the necessary permit.
2. In addition to the requirements in Item No. 1, an affidavit form furnished by the Health Department, Environmental Health Division, shall be completed, signed by the property owner, and filed with the property deed.
3. The minimum subsurface absorption trench area shall be determined by the Health Officer according to the following table:

No. of Bedrooms	Effective Subsurface Absorption Trench Area (sq. Ft.)
1	1200-1800
2&3	1800-2400
4	2400-3000
5	3000-3600

(add 600 sq. ft. for each additional bedroom)

4. The property shall have a reserve absorption area equal to twice the size of the approved absorption area in the event of failure in the initially constructed sewage disposal system.

P. Use of Experimental Sewage Disposal System

Experimental types of sewage disposal systems not specifically addressed herein may be approved by the Health Officer with conditions as authorized under the provisions of a controlled test program.

ARTICLE VII. WATER SUPPLIES

A. **Water Supply - Scope**

These regulations relating to water supply systems shall apply to all premises and residential and commercial lots.

B. **Authority**

1. Requirements with respect to water well construction and water pump installations for new water wells within the County of Ottawa shall be those requirements as set forth in Part 127 of Act No. 368, Public Acts of 1978 (MSA 14.15) and State of Michigan Safe Drinking Water Act, Act No. 399, Public Acts of 1976. The source of water for each dwelling or commercial establishment shall be an approved well constructed in accordance with Act 368, P.A. 1978 or Act 399, P.A. 1976 respectively.

C. **General Well Construction Requirements**

1. **Separate Systems for Each Dwelling or Premise.**

Unless otherwise specifically approved by the Health Officer and recorded as a restrictive covenant with the Register of Deeds, each dwelling, habitable building, or premise shall be served by its own individual water supply system.

2. **Well Depth Measurement**

Well depths shall be measured from the lowest natural elevations within fifty (50) feet of the well to the top of the well screen.

3. **Permits**

No person shall construct any private water supply system unless he has first obtained a permit issued by the Health Officer and/or authorized representative.

4. **Application for Permits**

Application for permit to construct a private or public water well shall be made in writing by the property owner or his authorized representative to the Health Officer. The application shall include the name, address, and telephone number of the applicant, and the description of the property on which said construction is proposed. At his discretion, the Health Officer may require substantiating data from professional sources. The actual or proposed use of the property shall be indicated in all instances.

5. **Test Well**

The Health Officer may require the installation of a test well on any premise for purposes of measuring well depth and/or analyzing water quality when documented data or other evidence indicate acceptable depth or water quality may not be able to be obtained.

6. **Termination of Permits**

Any permit issued pursuant to the requirements of this section shall be valid for the term of one year from the date of issuance and void thereafter unless sooner declared void by the Health Officer for failure to comply with requirements stated herein.

7. **Connection Required to a Public Water Supply System**

When any existing well serving other than a private, single family dwelling is found to produce water which does not meet current acceptable water quality standards as indicated in the National Primary Drinking Water Regulations, or is a violation of construction or depth requirements which cannot be brought into compliance, the owner shall be ordered to make proper connection to an approved Public Water Supply System providing it is available and reasonably accessible. Public water will be considered

reasonably accessible when it is located within 200 feet of the property to be served. Such connection shall be made within a time limitation specified by the Health Officer but in no event shall that time period be less than thirty (30) days.

8. Abandonment of Existing Water Supply Systems

When any existing well is abandoned or its use terminated, the entire existing well casing may be ordered to be removed and/or sealed with cement as determined by the Health Officer.

9. Rejection of Water Supply System

The Health Officer shall not approve any water supply system because of, but not limited to, one or more of the following conditions:

1. Where the property served is too small to maintain required distances.
2. Where the proposed site is subject to flooding and/or within the ten (10) year flood plain.
3. Where the well serving the premise cannot meet minimum depth requirements.
4. Where water produced does not meet the current acceptable water quality standards as indicated in the National Interim Primary Drinking Water Regulations.

10. Inspection and Sampling Required

After the water supply system has been completed, but before it is placed into operation or used for human consumption, it shall be inspected, sampled, and approved by the Health Officer. It shall be the responsibility of the permit applicant or the well driller to notify the Health Officer that the water supply is ready for inspection.

11. It shall be unlawful for any person to occupy, or permit to be occupied, any premise which is not equipped with an approved water supply system as provided for by these Regulations. Such water supply systems shall be constructed in accordance with the provisions of these Regulations and water produced must meet the current acceptable water quality standards as indicated in the National Interim Primary Drinking Water Regulations. Such premise may be declared unfit for human habitation and may be so posted by the Health Officer and ordered vacated.

12. Replaced, Altered, or Repaired Existing Buildings

Water supply systems may be made to conform to the full requirements of these regulations when existing habitable buildings are substantially replaced, altered, and/or repaired. Substantially replaced, altered, and/or repaired shall mean a building in which repairs, alterations, or replacement costs exceed 50% of the fair market value.

13. New Use of Existing Buildings

At such time that a new use is proposed for an existing dwelling and/or habitable building, the Health Officer may require upgrading of the water supply system as deemed necessary.

14. Necessity of Permit Prior to Commencement of Construction

No person shall commence construction or otherwise allow commencement of construction of any habitable building requiring an on-site water supply system without first obtaining approval and a permit issued by the Health Officer and/or his authorized representative.

D. Variances

With the written approval of the Health Officer, a well obtaining water at a depth of less than twenty-five (25) feet, but not less than fifteen (15) feet may be approved for use in private, single-family dwellings providing all of the following conditions can be satisfied:

1. The well must be capable of meeting the following isolation requirements:

Well Depth (feet)	Isolation Distance Required (feet) Property Line	Sewage Disposal System and Other Sources of Contamination
<25–22½	75	75
<22½–20	75	100
<20–17½	100	125
<17½–15	100	150
Less than 15 ft.	(No variance granted)	

2. A written agreement shall be recorded with the Register of Deeds and the Health Department indicating the depth of the well and the applicant's agreement to keep said property at the size necessary to maintain approved isolation distances. Should the approved water supply be replaced with another approved source not requiring increased isolation, the Health Officer, upon review of the changes, will declare a new statement of recession to be filed with the Register of Deeds.
3. Upon sampling of the water following completion of the water supply systems, the Health Officer shall make a determination of acceptability based on current acceptable water quality standards as indicated in the National Interim Primary Drinking Water Regulations.

ARTICLE VIII.
SALE OR TRANSFER OF EXISTING DWELLINGS AND/OR HABITABLE BUILDINGS

Prior to the sale or transfer of ownership of any existing dwelling and/or habitable building, the owner or his designated agent shall contact and request the Health Officer to sample the water produced by the existing on-site water supply system and evaluate the existing on-site sewage disposal system. Evaluation results shall be furnished to the purchaser and/or transferer as part of the transaction.

ARTICLE IX. NUISANCES

A. Authority

The Health Officer, after determining a nuisance or danger to the health and lives of individuals exists, may order specific action to be taken to avoid, correct, or remove said nuisance utilizing state and local health laws, rules, regulations, or ordinances applicable thereto.

B. Nuisances Defined and Prohibited

The work "nuisance" as used in these regulations shall mean nuisance as known to the common law and shall include public, private, and mixed nuisances. Nuisances shall include, but not limited to, any condition where rubbish, garbage, or vermin have an obnoxious, offensive, injurious, annoying, or detrimental effect on or to the senses and/or health of persons, or when it shall obstruct the comfortable use or sale of adjacent property.

C. Emergency Abatement

The Health Officer may take such action as may be immediately necessary to commence the abatement of any nuisance if the public safety and health requires such action. He may thereafter take such other action under Article I, Section J as is necessary to complete the abatement of the nuisance. With permission granted by the Board of Health and the Ottawa County Board of Commissioners or by order of the court he may charge the cost of such abatement to the premises and the owners and occupiers thereof.

D. Habitable Building and Premises

Every habitable building and every part thereof shall be kept clean and shall b

kept free from any accumulation of garbage or rubbish on the same, in the yard, court passages, areas or alleys connected therewith or belonging to the same. The owner of every habitable building shall be responsible for keeping the entire premises free from vermin except that the tenants or other occupants shall be responsible for the cleanliness of those parts of the premises that they occupy and control. All premises not included above shall be kept free from any accumulation of garbage or rubbish in or on the same, to a degree that a nuisance shall not exist to the detriment of public health. The owner or person in responsible control of any habitable building or premise where a nuisance exists in violation of this section shall be required to remove, abate, or correct the conditions which constitute said nuisance.

E. Animals and Vermin

It shall be unlawful for any person to create or maintain a vermin, rodent, or insect infested condition on premises owned or occupied by him. With respect to all property within the jurisdiction of this Code, whenever the Health Officer shall find an infestation of rodents, insects, or other vermin detrimental to public health, or the potential for such infestation on or within such property, the Health Officer may order the owner or other responsible person to take whatever measures are deemed necessary to abate the condition. If such an order has not been complied with by the owner or other responsible person, the Health Officer may utilize appropriate means at his disposal to abate the condition, and the costs thereof shall be reimbursed by the owner of the property, or in an event of a condition which in his opinion constitutes an immediate emergency, the Health Officer may waive all notice and billing procedures and pay said costs from designated County funds.

F. Dead Animals

It shall be unlawful for any person to allow a dead animal(s) to remain for over twenty-four (24) hours after death on premises owned or occupied by him. Such animals shall be buried to a depth of four (4) feet at a location approved by the Health Officer, or as otherwise specified by the Health Officer.

ARTICLE X. APPROVAL OF OTTAWA COUNTY ENVIRONMENTAL HEALTH CODE AS REVISED.

A. Adoption and Approval

The preceding revised Environmental Health Code was adopted and approved by action of the Health Committee of the Ottawa County Board of Commissioners on September 21, 1982, and approved by action of the Ottawa County Board of Commissioners on December 14, 1982.

Environmental Health Services Division

1990 Fee Schedule

FOOD ESTABLISHMENT	
Per establishment	$175.00
Temp. Food Est.	$ 40.00
FOOD PLAN REVIEW	
Ventilation	$250.00
Without ventilation	$125.00
VENDING FOOD	
Per location	$40.00
Each machine	$ 2.00
SUBDIVISION PLAT REVIEW	
Per review	$200.00
each lot over 25	$ 2.00
Preliminary Site eval.	$ 75.00
***CAMPGROUND**	
Per campground	$ 25.00
PRIVATE SEWAGE DISPOSAL PERMIT	
Single Family	$ 80.00
Lagoon Construction	$200.00
Annual Lagoon inspection and evaluation	$000.00
Repair Permit	$ 35.00
VACANT LAND EVALUATION	
Per evaluation	$ 35.00
WATER/SEWAGE REAL ESTATE	
Per evaluation (both)	$ 40.00
Per evaluation (water or sewer)	$ 30.00
PRIVATE WATER SUPPLY	
Collection	$ 30.00
Permit	$ 35.00
NON COMMERCIAL WATER	
Permit	$ 75.00
***PUBLIC POOL**	
Per pool	$ 25.00
PUBLIC SEWAGE DISPOSAL	
Sys disc 400g/day	$ 80.00
401-2000g/day	$ 90.00
Sys Discharge	
2001-10,000g/day	$100.00
BOARD OF APPEALS	
Per appeal	$350.00

*CURRENTLY SET BY STATE STATUTE

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J. . . . . and upon conviction thereof shall be punished by a fine not exceeding five hundred dollars ($500) and/or 90 days in the County Jail.

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U. Sewage Treatment Stabilization Pond (Lagoon)

A shallow artificial constructed pond for the storage and treatment of sewage.

Page 12

6. If a garbage disposal unit is planned or installed, or if toilet or wastewater facilities are to be installed in the basement necessitating a pump, one additional 800 gallon septic tank shall be required and an increased absorption area may be required as determined by the Health Officer.

Page 15

N. The above minimum area requirements are based upon a maximum residence size of 1500 square feet. 100 additional square feet of bottom area shall be added to these footages for every additional 250 square feet of house size.

Page 16

Q. Use of Sewage Treatment Stabilization Ponds (Lagoons)

Lagoons may be utilized as an alternative on sites with heavy, slowly permeable soils which exceed the allowable percolation rates for a conventional soil absorption system.

1. The lagoon shall be installed according to the guidelines developed by the Ottawa County Health Department.
2. The applicant shall sign and file the required property deed affidavit agreeing to maintain said property at the minimum size necessary to maintain the required isolation distances.
3. The applicant shall maintain the lagoon as required.
4. The applicant shall allow such inspections as deemed necessary by the Ottawa County Health Department to ensure proper operation.
5. The applicant shall submit such annual inspection fees as required by the Ottawa County Health Department.

Page 20

Article X. Approval of Ottawa County Environmental Health Code as Revised

A. Adoption and Approval

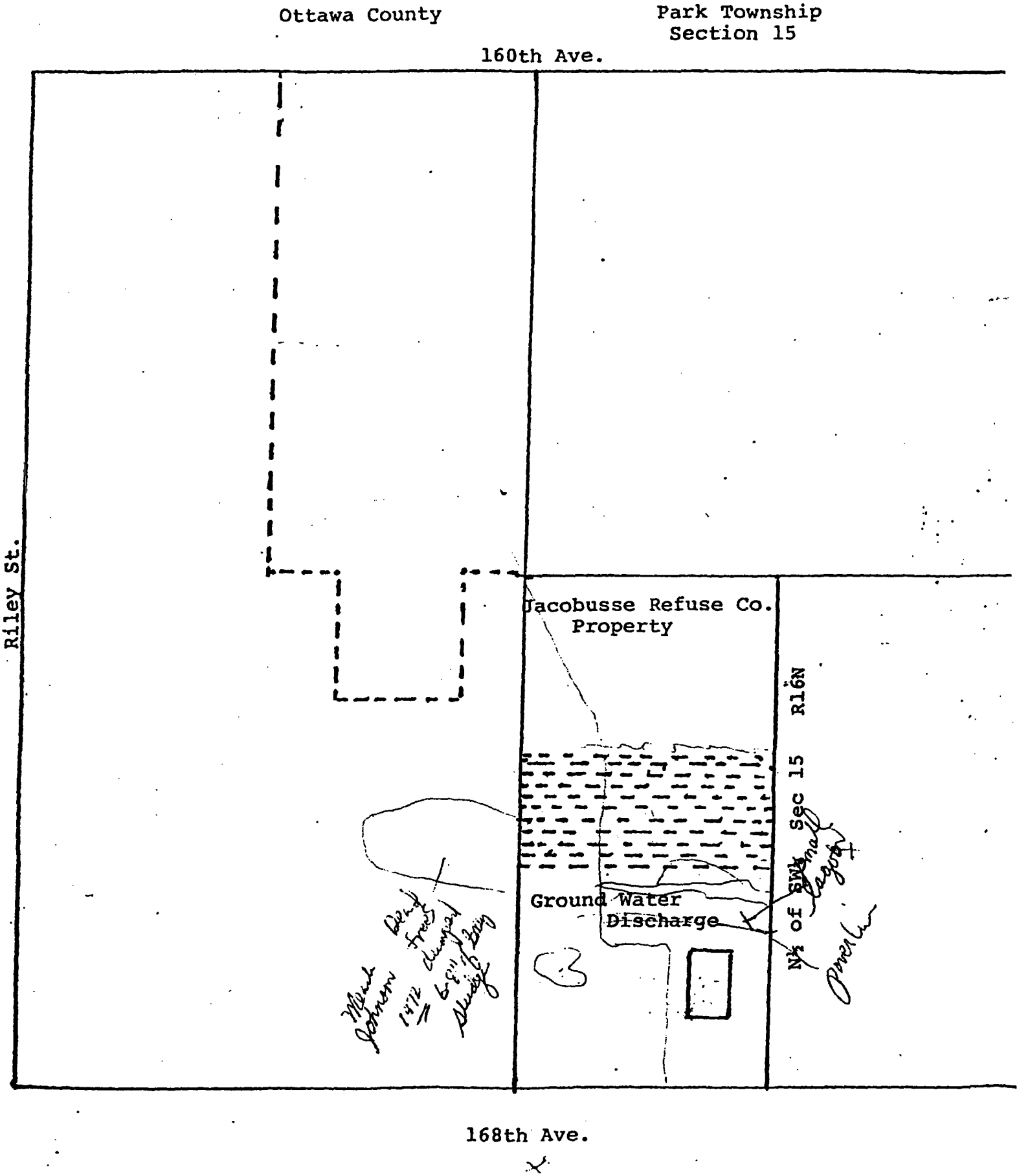
The preceding revised environmental health code and fee schedule was adopted and approved by action of the Ottawa County Board of Commissioners on December 10, 1985.

ATTACHMENT E

Jacobusse's Refuse Service
A Waste Management Company
2700 N. 168th Avenue • Holland, Michigan 49423 • 616/335-5868

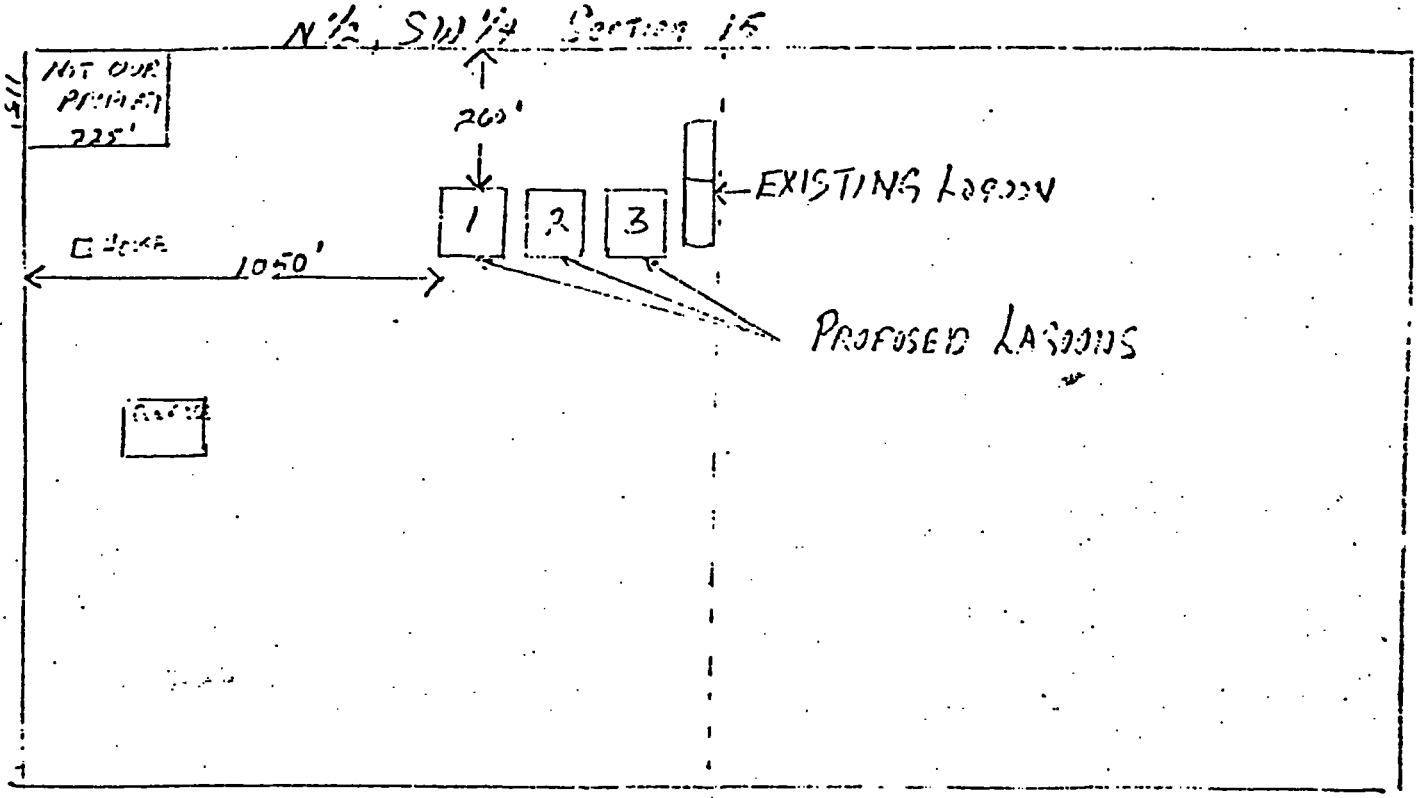
1979/1980

MDNR 1979 Groundwater Report



ENGINEERED INSPECTION COMPANY

2700 N. 168th AVENUE • HOLLAND, MICHIGAN 49423 • PHONE 335-5869



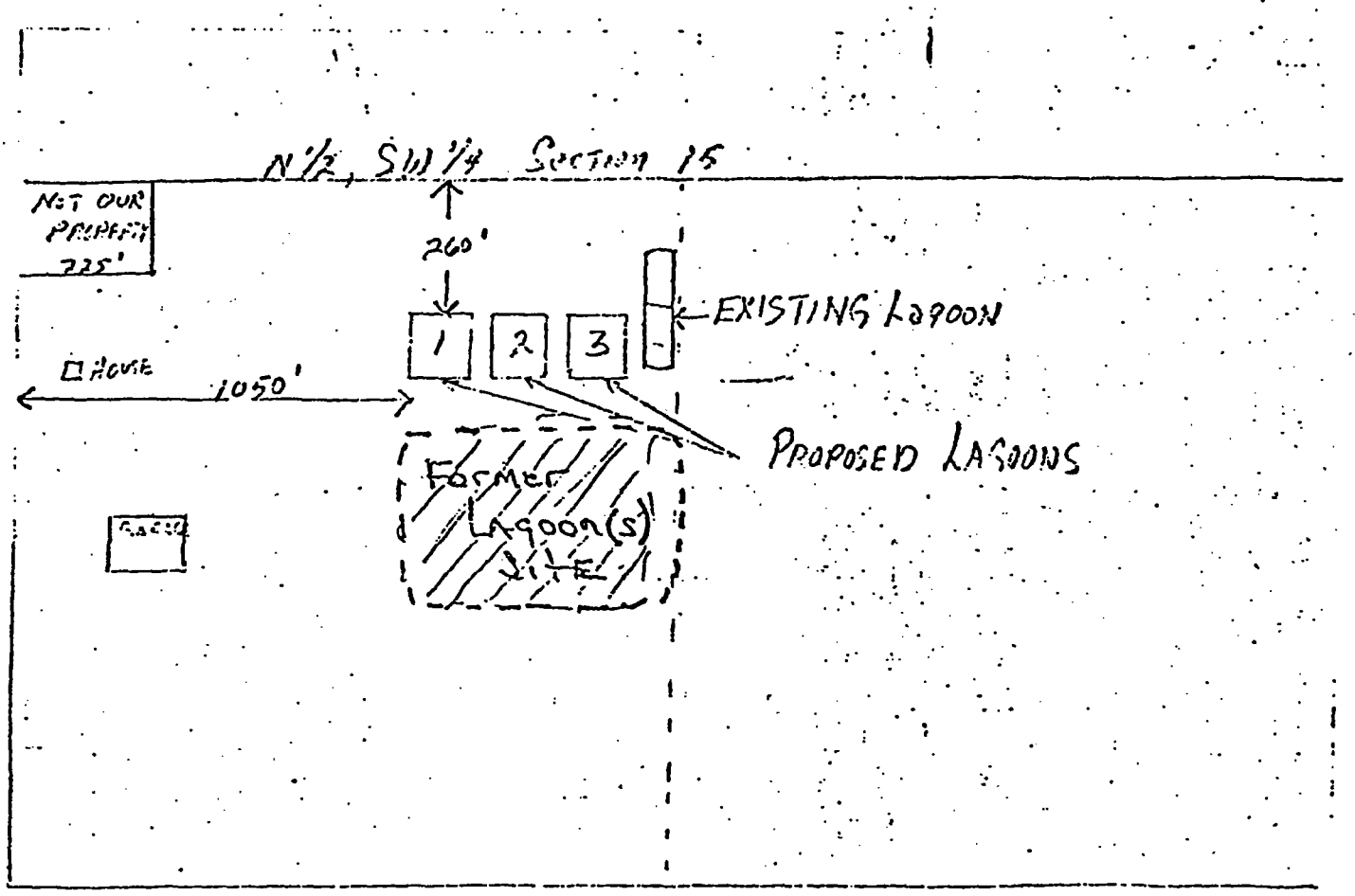
Proposed lagoon system

Lagoon # 1 45' X 100' - Hienz, Miles, Mead Johnson
2 45' X 100' - Holland Diecasting
3 70' X 100' - Chemetron

There are ten feet between lagoons, with a distinct separation to assure no mixing of materials.

The three monitoring wells to be installed fifty to seventy-five feet to the south, south-east, and south-west of the existing lagoon respectively.

FIGURE 2. Schematic showing layout of existing lagoon facility at Jacobusse's Refuse Service Company, Holland.



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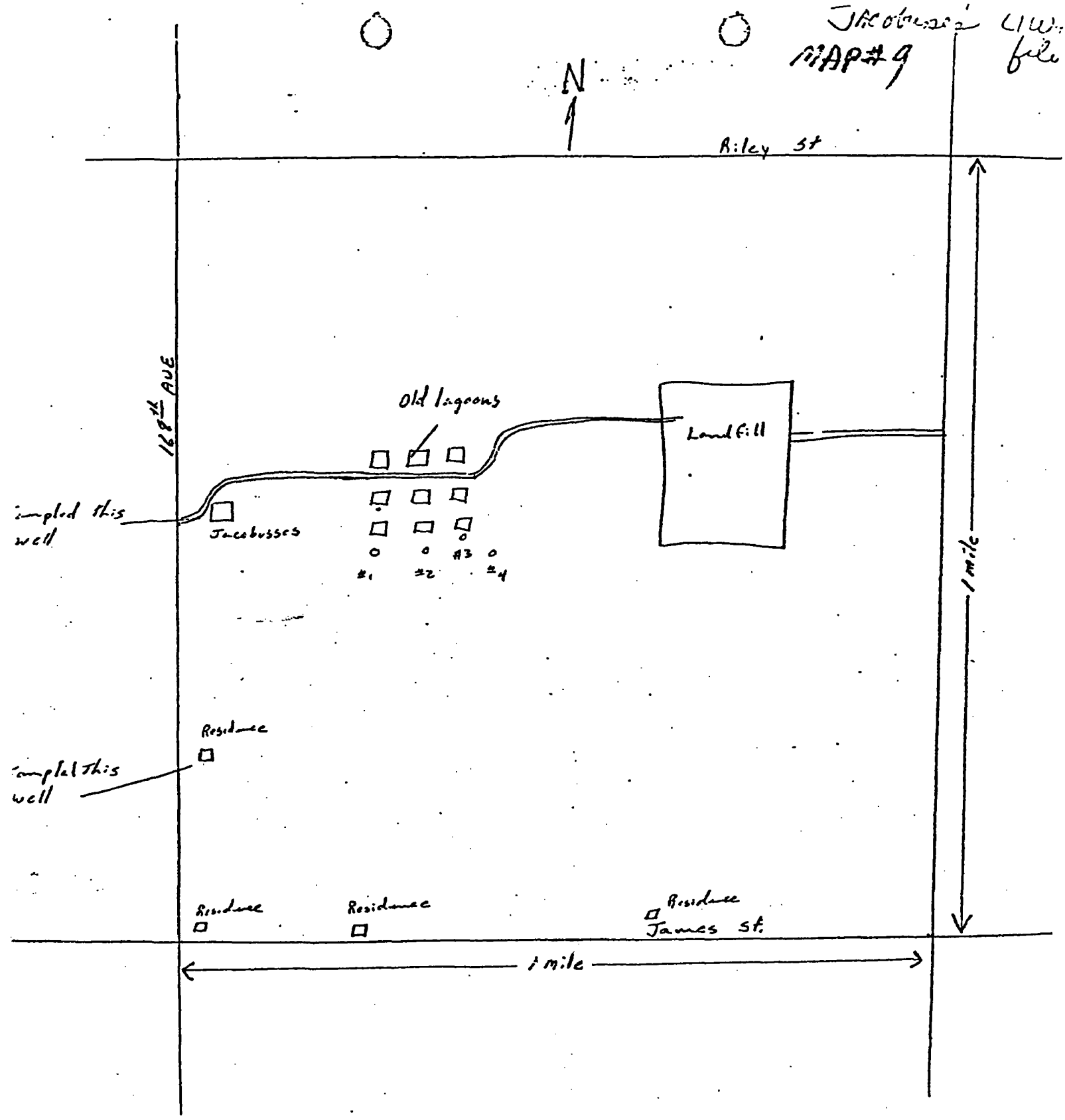


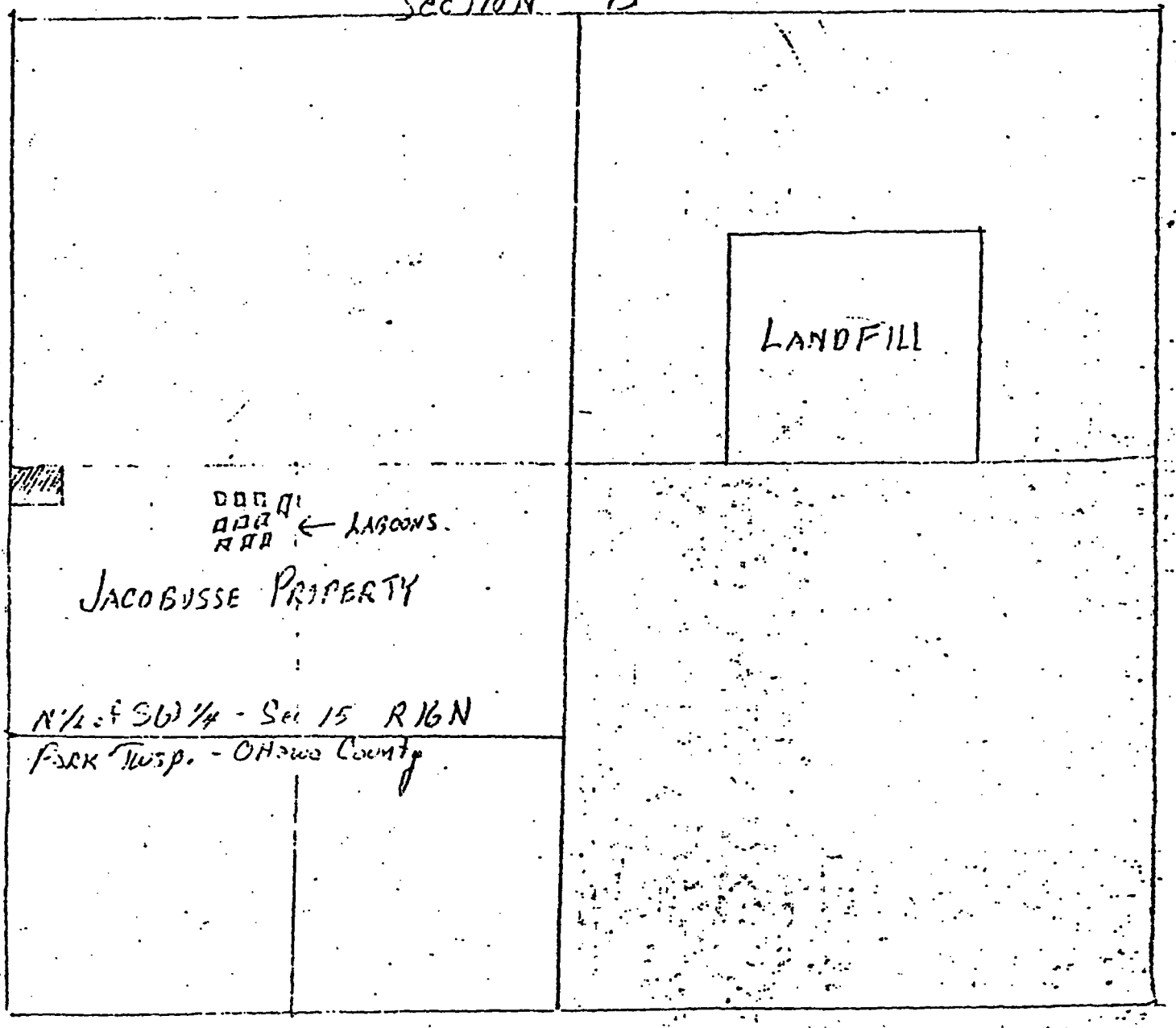
o Location of monitoring wells

□ not a complete notation of all residences

MAPS

Jacobusse's Refuse Service Company

2700 N. 168th AVENUE • HOLLAND, MICHIGAN 49423 • PHONE 335-5869



A-3

MICHIGAN DNR, ENVIRONMENTAL LAB — WATER QUALITY ANALYSIS - WASTE WATERS

LAB LOG NO. 2963 COLLECTED BY Brian Monroe / JERRY HEAT TRANSFERED TO _____ RECEIVED AT LAB 9/3

DATA FOR JACOBUSSES - 168th St. - Holland EXAMINER J. Kenneth Pelon SEND RESULTS TO (NAME &SECTION) BRIAN MONROE HAZARDOUS MATERIALS CONTROL

REF. NUM. P	STATION NUMBERS	DATE YYMMDD	TIME TTTT	DEPTH F	LAB NO. 00008	FLOW MGD 50050	TEMP. CENT. 00010	BOD-5 TOTAL* 00310	C.O.D. MG/L 00335	T.O.C MG/L 00680	PH S.U. 00400	S.S. MG/L 00530	NO3NO2 MG/L N 00630
I 01	1	790619	16:05		4204				17	7.3	6.7		2.8
I 02	2		16:10		4205				8	3.1	6.9		0.15
I 03	3		16:15		4206				13	3.2	7.5		0.17
I 04	4		16:20		4207				22	6.7	6.8		0.05
I 05	5		17:00		4208				19	7.6	7.0		0.07

REF. NO.	"DO NOT PUNCH" STATION DESCRIPTION	NH3 MG/L N 00610	ORG N MG/L N 00605	TOT P MG/L P 00665	CL MG/L 00940	SO4TOT MG/L 00945	00095 SP COND
01	M. Well #1 - West	0.01	C 1.1	0.08	1.9	19	107
02	M. Well #2 - Center	<0.01	C 0.80	0.05	1.9	11	69
03	M. Well #3 - Woods	<0.01	C 0.28	0.02	1.3	11	127
04	M. Well #4 - East	<0.01	C 1.2	0.13	1.7	9.8	68
05	OFFICE - Domestic	3.9	C 1.1	0.05	146.	16	935

REF. NO.	"DO NOT PUNCH" STATION DESCRIPTION
01	
02	
03	
04	
05	

* UNITS ARE MG/L

ESD-00800 01/78

MICHIGAN DNR, ENVIRONMENTAL LAB — ORGANIC CONTAMINANT ANALYSIS - WASTE WATERS

LAB LOG NO. 2963 COLLECTED BY Brian Monroe TRANSFERED TO Jerry Heyt RECEIVED AT LAB JB

DATA FOR EXAMINER Nordlund SEND RESULTS TO (NAME &SECTION) BRIAN MONROE OIL & HAZARDOUS MATERIALS Control

P	REF. NUM.	STATION NUMBERS	DATE YYMMDD	TIME TTTT	DEPTH F	LAB 2 NO. 00008	A1242 UG/L 39496	A1254 UG/L 39504	A1260 UG/L 39508	PBB UG/L 39521	FE-OIL MG/L 00560	MBAS MG/L 38260	VHC
I	01	1	790619	1605		20443					KI		
I	02	2		1610		20444					KI		
I	03	3		1615		20445					KI		
	04	4		1630		20446					KI		
I	05	5		1700		20447					KI		

"DO NOT PUNCH"

REF. NO.	STATION DESCRIPTION
01	M. Well #1
02	M. Well #2
03	M. Well #3
04	M. Well #4
05	OFFICE - Domestic

"DO NOT PUNCH"

REF. NO.	STATION DESCRIPTION
01	
02	
03	
04	
05	

ESD-01000 01/78

MICHIGAN DNR, ENVIRONMENTAL LAB — ORGANIC CONTANINANT ANALYSIS - WASTE WATERS

LAB LOG NO. 2963 COLLECTED BY _____ TRANSFERED TO _____ RECEIVED AT LAB JD

DATA FOR Jacobussi EXAMINER JC SEND RESULTS TO (NAME &SECTION) B. Monroe 04M

REF. NUM. P	STATION NUMBERS	DATE YYMMDD	TIME TTTT	DEPTH F	LAB NO. 00008	A1242 UG/L 39496	A1254 UG/L 39504	A1260 UG/L 39508	PBB UG/L 39521	MBAS mg/l 38260	VHC
I 01					13291						None detected
I 02					13292						
I 03					13293						
I 04					13294						
I					13295						

"DO NOT PUNCH"

REF. NO.	STATION DESCRIPTION
01	
02	
03	
04	
05	

"DO NOT PUNCH"

REF. NO.	STATION DESCRIPTION
01	
02	
03	
04	
05	

ESD-01000 01/78

MICHIGAN DNR, ENVIRONMENTAL LAB — INORGANIC CONTAMINANT ANALYSIS — WASTE WATERS

LAB LOG NO. 2963 COLLECTED BY [illegible] TRANSFERED TO _____ RECEIVED AT LAB JB

DATA FOR JACOBUSSES - 168TH ST. Holland EXAMINER RW SEND RESULTS TO (NAME &SECTION) BRIAN [illegible]

P	REF. NUM.	STATION NUMBERS	DATE YYMMDD	TIME TTTT	DEPTH F	LAB 2 NO. 00008	PHENOL UG/L 32730	CN-TOT MG/L 00720	CD-TOT UG/L 01027	CR-TOT UG/L 01034	CR-HEX UG/L 01032	CU-TOT UG/L 01042	FE-TOT UG/L 01045	NI-TOT UG/L 01067
I	01	1	190619	1605		13830			K10	K10		K10	4000	K50
I	02	2		1610		13831			K10	K10		K10	2700	K50
I	03	3		1615		13832			K10	K10		K10	640	K50
	4	4		1630		13833			K10	10		10	7200	K50
I	05	5		1700		13834			K10	K10		10	4700	K50

34B

"DO NOT PUNCH"

REF. NO.	STATION DESCRIPTION	PB-TOT UG/L 01051	ZN-TOT UG/L 01092
01	M. Well #1	70	390
02	M. Well #2	140	80
03	M. Well #3	80	180
04	M. Well #4	K50	1500
05	OFFICE - Domestic	K50	150

"DO NOT PUNCH"

REF. NO.	STATION DESCRIPTION
01	
02	
03	
04	
05	

ESD-00900 01/78

MICHIGAN DEPARTMENT OF NATURAL RESOURCES

INTEROFFICE COMMUNICATION

October 17, 1979

TO: Brian Monroe, Resource Specialist, Oil and Hazardous Waste Section

FROM: Gerard J. Heyt, Jr., District Sanitarian, District 9

SUBJECT: Southwest Ottawa County Landfill, Ottawa County

Attached is a copy of the lastest analyses of groundwater samples collected from the on-site monitoring/observation wells. The wells sampled are the latest installed by Prein-Newhoff under contract with Ottawa County to evaluate the groundwater contamination emanating from the landfill. They are located approximately 150 feet east of Jacobassis and progressing southerly from that point.

As previously discussed, none of the wells sampled showed the presence of volitile hydrocarbons which negates the landfill's contribution to the contaminated domestic well located at 2741 - 168th Avenue, Park Township.

If you have any questions, feel free to contact this office.

GJH:bjc
attachment

cc: D. Montgomery

MICHIGAN D.N.R. ENVIRONMENTAL LAB — WATER QUALITY ANALYSIS — WASTE WATERS

LAB LOG NO. 3579 COLLECTED BY G. HEYT D. MONTGOMERY TRANSFERED TO _____ RECEIVED AT LAB _____

DATA FOR S.W. OTTAWA CO. LANDFILL EXAMINER _____ SEND RESULTS TO (NAME &SECTION) Resource Recovery D. MONTGOMERY

REF. NUM. P	STATION NUMBERS	DATE YYMMDD	TIME TTTT	DEP TH F	LAB 2 NO. 00008	FLOW MGD 50050	TEMP. CENT. 00010	BOD-5 TOTAL* 00310	C.O.D. MG/L 00335	T.O.C. MG/L 00680	PH S.U. 00400	S.S. MG/L 00530	NO3NO2 MG/L N 00630
I 01	W-43	790904	1415		26505				18	6.9	7.5		0.042
I 02	W-40	790904	1430		26506				10	4.3	7.9		0.065
I 03	W-41	790904	1445		26507				11	4.8	7.9		0.090
04	W-45	790904	1500		26508				14	2.7	8.0		0.039
I 05	W-44	790904	1515		26509				14	5.2	7.7		0.009
	[Blank. TOC-COD]				26510				<3	0.6			

"DO NOT PUNCH" REF. NO.	STATION DESCRIPTION	NH3 MG/L N 00610	ORG N MG/L N 00605	TOT P MG/L P 00665	CL MG/L 00940	SO4TOT MG/L 00945	00095 SP. COND			
01	43 - downstream - SHALLOW well	6.5	C 7.5	0.05	79	220	1045			
02	40 - " " - SHALLOW well	0.077	C 0.50	0.03	26	55	365			
03	41 - " " - DEEP well	0.029	C 0.28	0.06	7.5	12	215			
04	45 - " " - SHALLOW "	0.034	C 0.26	0.12	2.4	11	160			
05	44 - " " - DEEP well	0.074	C 0.26	0.04	1.8	5.7	210			

"DO NOT PUNCH" REF. NO.	STATION DESCRIPTION
01	
02	
03	
04	
05	

* UNITS ARE MG/L

ESD-00800 01/78

MICHIGAN DNR, ENVIRONMENTAL LAB -- ORGANIC CONTANINANT ANALYSIS - WASTE WATERS

LAB LOG NO. 3579 COLLECTED BY G. HEXT D. MONTGOMERY TRANSFERED TO _____ RECEIVED AT LAB _____

DATA FOR SW. OTTAWA CO. LANDFILL EXAMINER _____ SEND RESULTS TO (NAME &SECTION) D. MONTGOMERY RESOURCE RECOVERY

REF. NUM. F	STATION NUMBERS	DATE YYMMDD	TIME TTTT	DEPTH F	LAB NO. 00008	A1242 UG/L 39496	A1254 UG/L 39504	A1260 UG/L 39508	PBB UG/L 39521	MBAS mg/l 38260	VOLATILE HYDROCARBONS		FE
I 01	W-43	790904	1415		14814						Trace unknown		K1
I 02	W-40	790904	1430		14815						U		↓
I 03	W-41	790904	1445		14816						↓		1
I 04	W-45	790904	1500		14817								1
I 05	W-44	790904	1515		14818								K1

"DO NOT PUNCH"

REF. NO.	STATION DESCRIPTION
01	43 - downstream - SHALLOW well
02	40 - " " - " "
03	41 - " " - Deep "
04	45 - " " - SHALLOW "
05	44 - " " - Deep "

"DO NOT PUNCH"

REF. NO.	STATION DESCRIPTION
01	
02	
03	
04	
05	

ESD-01000 01/78

TAL LAB — INORGANIC CONTAMINANT ANALYSIS - WASTE WATERS

LECTED BY D. MONTGOMERY G. HENT TRANSFERED TO _____ RECEIVED AT LAB _____

NDFILL _____ EXAMINER Nordlund SEND RESULTS TO (NAME &SECTION) D. MONTGOMERY Resource Recovery

	TIME TTTT	DEPTH F	LAB NO. 00008	PHENOL UG/L 32730	CN-TOT MG/L 00720	CD-TOT UG/L 01027	CR-TOT UG/L 01034	CR-HEX UG/L 01032	CU-TOT UG/L 01042	FE-TOT UG/L 01045	NI-TOT UG/L 01067
	1415		16022	16	K.01	K10	K10		K10	2200	K50
"	1430		16023	K10	"	"	"		60	1300	"
"	1445		16024	11	"	"	20		140	1000	"
"	1500		16025	K10	"	"	K10		30	3800	"
"	1515		16026	K10	"	"	10		180	2200	"
"			16027	—	—	"	K10		K10	K50	"

	PB-TOT UG/L 01051	ZN-TOT UG/L 01092
HALLOW WELL	K50	400
" "	"	250
DEEP WELL	"	8000
SHALLOW WELL	"	340
DEEP WELL	"	3600
	"	K50

AN DEPT. OF NATURAL RESOURCES, ENVIRONMENTAL LABORATORY -- HAZARDOUS WASTE IDENTIFICATION

529 PROJ CODE _____ PR _____ COLLECTED BY D. MONTGOMERY -G-HEYT- TRANSFERED TO _____ RECEIVED AT LAB _____ EXAMINER _____

N SW OTTAWA LANDFILL SUSPECTED SOURCE OR CONTAMINANT LANDFILL LEACHATE SEND RESULTS TO (NAME & SECTION) Resource Recovery D. MONTGOM

INFO & TYPE OF ANALYSIS DESIRED

<--'DO NOT PUNCH' DESCRIPTION OF SAMPLING SITE OR SAMPLE	REF. NUM. P	STORET NUMBERS	START DATE YYMMDD	TIME TTTT	DEP TH F	LAB 2 NO. 00008	FE-OIL MG/L 00560	GC-IR SCAN	PETRO. PROD. IDENT.
3 - DOWNSTREAM - SHALLOW well	I 01		790904	1415			K1		
2 - " " - " " "	I 02		790904	1430			↓		
4 - " " - DEEP well	I 03		790904	1445			1		
5 - " " - SHALLOW "	I 04		790904	1500			1		
1 - " " - DEEP "	I 05		790904	1515			K1		
	I 06								
	I 07								
	I 08								
	I 09								

LABORATORY USE ONLY BELOW

ESD-03700 05/78

PROJECT 11

MICHIGAN DEPT. OF NATURAL RESOURCES, ENVIRONMENTAL LABORATORY ANALYSIS -- ENVIRONMENTAL QUALITY - WATER - GENERAL USAGE

LOG# 4652 PROJ CODE 68 COST CENTER ------ PR 2 COLLECTED BY Hoyt Hartman Montgomery Bats TRANSFERED TO ---------- RECEIVED AT LAB 080ct EXAMINER [illegible]

LOCATION SHIPPED SW Ottawa Landfill Ottawa Co SAMPLE REMARKS Groundwater monitoring wells supernatant analyzed SEND RESULTS TO (NAME & SECTION) D. Montgomery Resource Recovery

FIELD ID.	"DO NOT PUNCH" DESCRIPTION OF SAMPLING SITE OR SAMPLE	REF NO. P	STORET NUMBER	START DATE YYMMDD	TIME MIL TTTT	DEPTH FEET	LAB NO. 2 00008	TEMP. DEGREE CENT. 00010	OXYGEN DIS. MG/L 00300	PH STAND. UNITS 00400	COND. 25 C US/CM 00095	BOD-5 TOTAL MG/L 00310	C.O.D. LOW MG/L 00335	T.O.C. AMPUL MG/L 00680
40	monitoring well (downstream) 9'	I01		80 03 10	12:20		5766			8.3	405		13	2.6
41	" 4'	I02		80 03 10	12:35		5767			8.8	145		15	4.9
43	" 2'	I03		80 03 10	12:50		5768			7.8	800		12	3.3
45	"	I04	---	80 03 10	13:05		—			NO	SAMPLE			
29	" 62'	I05		80 03 10	13:25		5769			7.9	200		8	2.2
28	" 40'	I06		80 03 10	13:40		5770			6.8	1680		48	20
27	" 20'	I07		80 03 10	14:00		5771			7.2	1940		35	13.7
14	" 20'	I08		80 03 10	14:20		5772			9.5	88		15	3.9
15	" 40'	I09		80 03 10	14:30		5773			8.2	160		3	2.8
1	"	I10		80 03 10	15:15		5774			6.7	1780		110	33

F D.	NO3 TOTAL MG/L N 00620	NO2 TOTAL MG/L N 00615	NH3 TOTAL MG/L N 00610	KJEL N TOTAL MG/L N 00625	ORTH. P TOTAL MG/L P 70507	PHOS. TOTAL MG/L P 00665	CA TOTAL MG/L 00916	MG TOTAL MG/L 00927	NA TOTAL MG/L 00929	K TOTAL MG/L 00937	F TOTAL MG/L 00951	CL TOTAL MG/L 00940	SI REACT. MG/L 00958	S= TOTAL MG/L S 00745	SO4= TOTAL MG/L 00945	ALK. TOTAL MG/L 00410	Total as CaCO3 00900
01	C 0.001	0.00-	0.87	0.35		0.010	50	14	5.6	2.2		73			30		178
02	C 0.038	0.04	0.076	0.35		0.042	20	6.5	3.1	1.7		9.0			10		72
03	C 0.017	0.00	7.2	8.6		0.01	48	6.0	68.	80.		48.			200		140
04	C NO			SAMPLE		—											
05	C 0.006	0.003	0.053	0.18		0.025	33	6.7	2.1	1.4		1.5			11		105
06	C 0.001	0.00	2.6	4.0		0.025	170	51.	170.	8.0		230.			43		600
07	C 0.004	K0.001	0.021	0.97		0.015	210	84.	160.	8.0		300.			34		815
08	C 0.003	0.00	0.010	0.14		0.005	10	3.6	4.9	0.57		2.4			6.2		42
09	C 0.005	0.00	0.016	0.08		0.034	25	5.1	5.0	1.1		2.2			12.		82
10	C 0.005	0.003	44.	51.		K0.05	130	32.	140.	92.		155.			0.9		465

FSD-03200 10/79

TRIOXICY II

MICHIGAN DEPT. OF NATURAL RESOURCES, ENVIRONMENTAL LABORATORY ANALYSIS -- ENIVRONMENTAL QUALITY - WATER - GENERAL USAGE

LAB LOG# 4688 PROJ CODE 68 COST CENTER ____ PR 2 COLLECTED BY Kent Hartman, Montgomery, Bols TRANSFERED TO ____ RECEIVED AT LAB 9 Feb 80 EXAMINER [illegible]

LOCATION SAMPLED SW Ottawa Landfill Ottawa Co SAMPLE REMARKS supernatant analyzed SEND RESULTS TO (NAME & SECTION) D. Montgomery Resource Recovery

FIELD ID.	"DO NOT PUNCH" DESCRIPTION OF SAMPLING SITE OR SAMPLE	REF NO. P	STORET NUMBER	START DATE YYMMDD	TIME MIL TTTT	DEPTH FEET	LAB NO. 2 00008	TEMP. DEGREE CENT. 00010	OXYGEN DIS. MG/L 00300	PH STAND. UNITS 00400	COND. 25 C US/CM 00095	BOD-5 TOTAL MG/L 00310	C.O.D. LOW MG/L 00335	T.O.C. AMPUL MG/L 00680	N T N O
W-5	Shallow upstream well (13)	I01		800310	1125		5777			6.4	123		14	2.2	
W-24	20' downstream well	I02		80 0310	1150		5779			6.9	1630		44.	9.7	
W-23	40' downstream well	I03		80 0310	1210		5779			6.8	1540		36	9.1	
)-26	60' downstream well	I04		80 0310	1205		5778			6.5	2000		67	22.	
)-10	shallow downstream well	I05		80 03 10	1235		5770			7.9.	140		3	0.4	
)-22	20' downstream well	I06		80 0310	1310		5780			5.7	465		27	7.2	
)-21	40' downstream well	I07		80 0310	1300		[illegible]			6.6	2150		93	22	
)-38	20' downstream well	I08		80 0310	1355		5782			7.9	187		4	0.8	
W-39	40' downstream well	I09		80 0310	1345		5783			7.5	535		17	4.8	
W-19	40' downstream well	I10		80 0310	1455		5784			7.1	1100		31	8.7	

REF NO.	NO3 TOTAL MG/L N 00620	NO2 TOTAL MG/L N 00615	NH3 TOTAL MG/L N 00610	KJEL N TOTAL MG/L N 00625	ORTH.P TOTAL MG/L P 70507	PHOS. TOTAL MG/L P 00665	CA TOTAL MG/L 00916	MG TOTAL MG/L 00927	NA TOTAL MG/L 00929	K TOTAL MG/L 00937	F TOTAL MG/L 00951	CL TOTAL MG/L 00940	SI REACT. MG/L 00958	S= TOTAL MG/L S 00745	SO4= TOTAL MG/L 00945	ALK. TOTAL MG/L 00410	T Hardness $CaCO_3$ 00900
01	K 0.001	0.00	0.041	0.24		0.024	15	3.3	3.3	0.91		3.2			20		58
02	C 0.002	0.00	5.4	5.8		K0.01	190	73	85.	27.		68.			3.4		760
03	C 0.007	0.00	4.6	4.9		0.005	170	53	120	8.0		142.			4.1		635
04	C 0.005	0.00	1.00	2.8		0.030	330	89	72	1.2		96.			2.3		1130
05	C 0.136	0.00	0.003	0.07		0.006	21	3.3	1.3	6.0		1.6			12.		70
06	C 0.006	0.00	0.008	0.75		0.013	37	7.0	26.	1.2		92.			5.9		140
07	C 0.009	0.00	25.	37.		K0.05	200	53.	160.	6.5.		240.			1.3		730
08	K 0.001	0.00	0.015	0.05		0.048	28	6.2	1.0	0.78		1.9			9.7		98
09	K 0.001	0.00	0.118	0.61		0.016	80	18.	13.	0.14		30.			4.5		275
10	C 0.76	0.00	0.235	1.3		0.010	140	36.	54.	2.5		94.			1.6		510

FSD-03200 10/79

PRIORITY II

MICHIGAN DEPT. OF NATURAL RESOURCES, ENVIRONMENTAL LABORATORY ANALYSIS -- ENIVRONMENTAL QUALITY - WATER - GENERAL USAGE

LAB OG# 4683 PROJ CODE 66 COST CENTER ------ PR 2 COLLECTED BY Heyt Hartman Montgomery 150's TRANSFERED TO ---------- RECEIVED AT LAB 81 Jan EXAMINER [illegible]

LOCATION SAMPLED SW Ottawa Landfill Ottawa Co. SAMPLE REMARKS supernatant analyzed SEND RESULTS TO (NAME & SECTION) D. Montgomery Resource Recovery D

FIELD ID.	"DO NOT PUNCH" DESCRIPTION OF SAMPLING SITE OR SAMPLE	REF NO. P	STORET NUMBER	START DATE YYMMDD	TIME MIL TTTT	DEPTH FEET	LAB NO. 2 00008	TEMP. DEGREE CENT. 00010	OXYGEN DIS. MG/L 00300	PH STAND. UNITS 00400	COND. 25 C US/CM 00095	BOD-5 TOTAL MG/L 00310	C.O.D. LOW MG/L 00335	T.O.C. AMPUL MG/L 00680	NO TOTAL MG/L N 00620	NO2 TOTAL MG/L N 00615	NH3 TOTAL MG/L N 00610	KJEL N TOTAL MG/L N 00625	ORTH.P TOTAL MG/L P 70507	PHOS. TOTAL MG/L P 00665	CA TOTAL MG/L 00916	MG TOTAL MG/L 00927	NA TOTAL MG/L 00929	K TOTAL MG/L 00937	F TOTAL MG/L 00951	CL TOTAL MG/L 00940	SI REACT. MG/L 00958	S= TOTAL MG/L S 00745	SO4= TOTAL MG/L 00945	ALK. TOTAL MG/L 00410	T. Hardness as $CaCO_3$ 00900
01-20	20' downstream well	I01		800310	1500		5785			7.7	205		9	2.0																	
01-2	shallow downstream well	I02		800310	1520		5786			6.5	2700		140	35																	
0	COD-TOC Blank	I03		800310			[illegible]						4	K0.1																	
		I04		800310																											
		I05		800310																											
		I06																													
		I07																													
		I08																													
		I09																													
		I10																													

REF NO.	
01	C
02	C
03	C
04	C
05	C
06	C
07	C
08	C
09	C
10	C

FSD-03200 10/79

PRIORITY II

Water - General Usage

MICHIGAN DEPT. OF NATURAL RESOURCES, ENVIRONMENTAL LABORATORY ANALYSIS -- INORGANIC CONTAMINANTS - ~~POINT SOURCE STUDIES SEC~~

LAB LOG# 4683 PROJ CODE 68 COST CENTER ------ PR 2 COLLECTED BY Hoyt Hartman Montgomery Bols TRANSFERED TO ---------- RECEIVED AT LAB Al Jenks EXAMINER Nordby

LOCATION SAMPLED S.W. Ottawa Landfill Ottawa Co SAMPLE REMARKS Groundwater monitoring wells SEND RESULTS TO (NAME & SECTION) D. Montgomery Resource Recovery Div.

FIELD ID.	"DO NOT PUNCH" DESCRIPTION OF SAMPLING SITE OR SAMPLE	REF NO. P	STORET NUMBER	START DATE YYMMDD	TIME MIL TTTT	S,T OR B	NUM SAMPLES	END DATE YYMMDD	TIME MIL TTTT	DEPTH FEET	LAB NO. 2 00008	PHENOL T. REC UG/L 32730	CN FREE MG/L 00722	CN TOTAL MG/L 00720	CD TOTAL UG/L 01027
40	monitoring well (downstream) 40'	C01		80 03 10	12:20						5766	18		K.01	K20
41	" 40'	C02		80 03 10	12:35						5767	K10		ϕ	
43	" 20'	C03		80 03 10	12:50						5768	22		.04	
		C04		80 03 10	13:05						—	NO	SAMPLE		
29	" 62'	C05		80 03 10	13:25						5769	10		K.01	
28	" 40'	C06		80 03 10	13:40						[illegible]	12			
27	" 20'	C07		80 03 10	14:00						5771	21			
44	" 20'	C08		80 03 10	14:20						5772	13			
45	" 40'	C09		80 03 10	14:30						5773	13			
1	"	C10		80 03 10	15:15						5774	34			

REF ID.	CR HEXVAL UG/L 01032	CR TRIVAL UG/L 01033	CU TOTAL UG/L 01042	NI TOTAL UG/L 01067	PB TOTAL UG/L 01051	ZN TOTAL UG/L 01092	CD DISS UG/L 01025	CR DISS UG/L 01030	CU DISS UG/L 01040	NI DISS UG/L 01065	ZN DISS UG/L 01090	FE TOTAL UG/L 01045
01		C	K20	K50	K50	1600						600
02		C	40		140	9000						15000
03		C	K20		K50	200						1300
04		C	NO		SAMPLE							
05		C	K20		K50	1800						6900
06		C	↓		↓	900						7600
07		C	↓		↓	400						3000
08		C	30		50	3400						9300
09		C	K20		K50	300						900
10		C	↓		↓	600						20000

PRIORITY II

MICHIGAN DEPT. OF NATURAL RESOURCES, ENVIRONMENTAL LABORATORY ANALYSIS -- INORGANIC CONTAMINANTS - WATER - GENERAL USAGE

JOB/SO# 4688 PROJ CODE CB COST CENTER ____ PR 2 COLLECTED BY Hyt Huetman Montgomery Bols TRANSFERED TO ____ RECEIVED AT LAB BFeb EXAMINER Nordlund

LOCATION SAMPLED SW Ottawa Landfill Ottawa Co SAMPLE REMARKS ____ SEND RESULTS TO (NAME & SECTION) D. Montgomery Resource Recovery Div.

FIELD	"DO NOT PUNCH" DESCRIPTION OF SAMPLING SITE OR SAMPLE	REF NO. P	STORET NUMBER	START DATE YYMMDD	TIME MIL TTTT	DEPTH FEET	LAB NO. 2 00008	PHENOL T. REC UG/L 32730	CN TOTAL MG/L 00720	CD TOTAL UG/L 01027	CR TOTAL UG/L 01034	CR HEXVAL UG/L 01032	CU TOTAL UG/L 01042	FE TOTAL UG/L 01045	NI TOTAL UG/L 01067
5	shallow upstream well (13)	I01		800310	1125		5775	16	K.01	K20	K50		30	870	K5
24	20' downstream well	I02		800310	1150		5776	K10	6		K50		170	19000	
23	40' downstream well	I03		800310	1210		5777	12	K.01		K50		K20	12000	
26	60' downstream well	I04		800310	1205		5778	K10	K.01				110	25000	
10	shallow downstream well	I05		800310	1235		5779	K10					60	630	
22	20' downstream well	I06		800310	1310		5780	K10					20	5000	
21	40' downstream well	I07		800310	1300		5781	K10					K20	36000	
38	20' downstream well	I08		800310	1355		5782	K10					40	1200	
39	40' downstream well	I09		800310	1345		5783	K10					670	5300	
19	40' downstream well	I10		800310	1455		5784	K10	↓	↓	↓		K20	5000	↓

REF NO.	FE TOTAL UG/L 01051	AL TOTAL UG/L 01092
01	90	1400
02	K50	1000
03	↓	1200
04	↓	1200
05	130	750
06	K50	7000
07	K50	310
08	↓	170
09	↓	1000
10	↓	140

PRIORITY II

Water - General Us.

MICHIGAN DEPT. OF NATURAL RESOURCES, ENVIRONMENTAL LABORATORY ANALYSIS -- INORGANIC CONTAMINANTS - ~~POINT SOURCE STUDIES~~ SEC

LAB LOG# 4638 PROJ CODE 66 COST CENTER ------ PR 2 COLLECTED BY Hart Hartman Montgomery Bols TRANSFERED TO ---------- RECEIVED AT LAB Altenko EXAMINER Nor

LOCATION SAMPLED SW Ottawa Landfill Ottawa Co SAMPLE REMARKS ---------- SEND RESULTS TO (NAME & SECTION) D. Montgomery Resource Recovery Div.

FIELD ID.	DESCRIPTION OF SAMPLING SITE OR SAMPLE	REF NO. P	STORET NUMBER	START DATE YYMMDD	TIME MIL TTTT	S,T OR B	NUM SAMPLES	END DATE YYMMDD	TIME MIL TTTT	DEPTH FEET	LAB NO. 2 00008	PHENOL T. REC UG/L 32730	CN FREE MG/L 00722	CN TOTAL MG/L 00720	CD TOTAL UG/L 01027
W-20	20' downstream well	C01		800310	1500						5785	K10		K.01	K20
W-2	shallow well downstream	C02		800310	1520						5786	22		↓	↓
0	METALS Blank	C03		800310	—						5787				
0	CN-Phenols Blank	C04		800310	—						5787	ACC		K.01	
		C05													
		C06													
		C07													
		C08													
		C09													
		C10													

REF NO.	CR HEXVAL UG/L 01032	CR TRIVAL UG/L 01033	CU TOTAL UG/L 01042	NI TOTAL UG/L 01067	PB TOTAL UG/L 01051	ZN TOTAL UG/L 01092	CD DISS UG/L 01025	CR DISS UG/L 01030	CU DISS UG/L 01040	NI DISS UG/L 01065	ZN DISS UG/L 01090	Fe Total ug/l 01045
01		C	K20	K50	K50	310						2000
02		C	↓	↓	↓	600						5600
03		C				K50						260
04		C										
05		C										
06		C										
07		C										
08		C										
09		C										
10		C										

ESD-00402 REV. 10/79

Priority II

MICHIGAN DEPT. OF NATURAL RESOURCES, ENVIRONMENTAL LABORATORY ANALYSIS -- ORGANICS - WATER - GENERAL USAGE

LAB LOG# 4688 PROJ CODE 6B COST CENTER ------ FR 2 COLLECTED BY HEYT HARTMAN Montgomery BOLS TRANSFERED TO ---------- RECEIVED AT LAB AP Jab EXAMINER

LOCATION SAMPLED SW OTTAWA LANDFILL Ottawa Co SAMPLE REMARKS Groundwater monitoring wells SEND RESULTS TO (NAME & SECTION) D Montgomery Resource Recovery

FIELD ID.	"DO NOT PUNCH" DESCRIPTION OF SAMPLING SITE OR SAMPLE	REF NO. P	STORET NUMBER	START DATE YYMMDD	TIME MIL TTTT	DEPTH FEET	LAB NO. 2 00008	FE-OIL MG/L 00560	MBAS MG/L 38260	A-1242 PCB UG/L 39496	A-1254 PCB UG/L 39504	A-1260 PCB UG/L 39508	BP-6 PBB UG/L 39521	volatile Hydrocarbons
40	monitoring well (downstream) 20'	I01		80 03 10	12:20		5766							U
41	" 40'	I02		80 03 10	12:35		5767							↓
43	"	I03		80 03 10	12:50		5768							↓
[illegible]	—	I04		80 03 10	13:05		—							NOSAMPLE
29	" 62'	I05		80 03 10	13:25		5769							U
28	" 40	I06		80 03 10	13:40		5770							↓
27	" 20	I07		80 03 10	14:00		5771							↓
14	" 20'	I08		80 03 10	14:20		5772							↓
15	" 40'	I09		80 03 10	14:30		5773							↓
1	"	I10		80 03 10	15:15		5774							↓

REF NO.														
01														
02														
03														
04														
05														
06														
07														
08														
09														
10														

ESD-01001 REV. 10/79

Priority II

MICHIGAN DEPT. OF NATURAL RESOURCES; ENVIRONMENTAL LABORATORY ANALYSIS -- ORGANICS - WATER - GENERAL USAGE

LAB LOG# 4688 PROJ CODE 68 COST CENTER ------ PR 2 COLLECTED BY Jeff Hartman Montgomery TRANSFERED TO ---------- RECEIVED AT LAB [illegible] EXAMINER [illegible]

LOCATION SAMPLED SW Ottawa Landfill Ottawa Co SAMPLE REMARKS ---------- SEND RESULTS TO (NAME & SECTION) D. Montgomery Resource Recovery

<"DO NOT PUNCH"> FIELD ID.	DESCRIPTION OF SAMPLING SITE OR SAMPLE	REF NO. P	STORET NUMBER	START DATE YYMMDD	TIME MIL TTTT	DEPTH FEET	LAB NO. 2 00008	FE-OIL MG/L 00560	MBAS MG/L 38260	A-1242 PCB UG/L 39496	A-1254 PCB UG/L 39504	A-1260 PCB UG/L 39508	RP-6 PBB UG/L 39521	Volitile Hydro Carbon
5	upstream well (13)	I01		800310	1125		5775							U
24	20 Downstream	I02		800310	1150		5776							
23	40 "	I03		800310	1210		5777							
26	60 "	I04		800310	1205		5778							
16	Shallow Downstream	I05		800310	1235		5779							
22	20' "	I06		800310	1310		5780							
21	40 "	I07		800310	1300		5781							
38	20 "	I08		800310	1355		5782							
39	40 "	I09		800310	1345		5783							
19	40 "	I10		800310	1455		5784							

REF NO.																		
01																		
02																		
03																		
04																		
05																		
06																		
07																		
08																		
09																		
10																		

Priority II

Water - General usage

MICHIGAN DEPT. OF NATURAL RESOURCES, ENVIRONMENTAL LABORATORY ANALYSIS -- ORGANICS - ~~SEDIMENT~~

LAB LOG# 4683 PROJ CODE 66 COST CENTER ____ PR 2 COLLECTED BY Hoyt Hartman Montgomery-Bols TRANSFERED TO ____ RECEIVED AT LAB 11/6 EXAMINER ____

LOCATION SAMPLED SW Ottawa Landfill Ottawa Co. SAMPLE REMARKS ____ SEND RESULTS TO (NAME & SECTION) D. Montgomery Resource Recovery

<"DO NOT PUNCH"> FIELD ID.	DESCRIPTION OF SAMPLING SITE OR SAMPLE	REF NO. P	STORET NUMBER	START DATE YYMMDD	TIME MIL TTTT	S,T OR B	NUM SAMPLES	END DATE YYMMDD	TIME MIL TTTT	DEPTH FEET	LAB NO. 2 00008	TOTAL SOLIDS PERCNT 70318	VOLITL SOLIDS % T.S. 70322	FE-OIL MG/KG 00561	A-124 PCB UG/KG 39490
W-20	20' downstream well	C01		800310	1520						5785				
W-2	shallow well downstream	C02		800310	1520						5786				
		C03													
		C04													
		C05													
		C06													
		C07													
		C08													
		C09													
		C10													

REF NO.	A-1260 PCB UG/KG 39511	DDE P,P'- UG/KG 39321	DDD P,P'- UG/KG 39311	DDT O,P'- UG/KG 39306	DDT P,P'- UG/KG 39301	DILDRN UG/KG 39383	CHLRDN UG/KG 39351	HCB UG/KG 39701	Volatile Hydro Carbon U
01									
02									
03									
04									
05									
06									
07									
08									
09									
10									

ESD-01303 REV. 12/79

ATTACHMENT F

October 15, 1981

TO: William Murphy
Criminal Investigation
Environmental Enforcement Division

FROM: Brian Monroe, Water Quality Specialist
Emergency Response and Waste Hauler Licensing Section BM
Water Quality Division

SUBJECT: Waste Management of Michigan - Holland Division (formerly Jacobusse's Refuse) Investigation

During our August 27, 1981 field investigation at the above facility, in an attempt to locate alleged buried drums of industrial waste, several borings were made to approximately nine foot in depth. These borings were taken in the area of the roadway indicated by information obtained by you. All of these borings revealed that the subgrade soil (sand) was undisturbed in appearance. However, in the roadway area itself the first one to one and a half feet of soil appears to be fill material probably intended to improve the road for use by large trucks traversing it. This fill layer contained metal shavings, metal scrap and had a distinct oil odor and oil appearance to it. A sample was collected from this layer and analyzed (see attached results). As you can see three chlorinated solvents including trichloroethylene (TCE) were detected.

I suggest that we set up a meeting or get together as soon as possible to determine our next step in this investigation. If you have any questions please see me.

tkr
Attachment
cc: D. Batchelor
R. Boyce
T. Leep
File

MICHIGAN DEPT. OF NATURAL RESOURCES, ENVIRONMENTAL LABORATORY ANALYSIS -- ORGANICS - SEDIMENTS -DRY WT. BASIS

LAB LOG# 8256 PROJ CODE IL COST CENTER ____ FR 4 COLLECTED BY [illegible] TRANSFERED TO ____ RECEIVED AT LAB [illegible] EXAMINER [illegible]

LOCATION SAMPLED Waste Mgt - Holland (Landfill) SAMPLE REMARKS Start at 1248 Hrs. SEND RESULTS TO (NAME & SECTION) [illegible]

FIELD ID.	DESCRIPTION OF SAMPLING SITE OR SAMPLE	REF NO. P	STORET NUMBER	START DATE YYMMDD	TIME MIL TTTT	S.T OR B	NUM SAMPLES	END DATE YYMMDD	TIME MIL TTTT	DEPTH FEET	LAB NO. 2 00008	TOTAL SOLIDS PERCNT 70318	VOLITL SOLIDS % T.S. 70322	TE-OIL MG/KG 00561	A-1242 PCB UG/KG 39488	A-1254 PCB UG/KG 39507
1	Soil Boring (1'-12') 10's. of ft. Line	C01		870827	1520						7986					
	235' Mark, File: 051-70-81	C02														
		C03														
		C04														
		C05														
		C06														
		C07														
		C08														
		C09														
		C10														

REF NO.	A-1260 PCB UG/KG 39511	DDE P,P'- UG/KG 39321	DDD P,P'- UG/KG 39311	DDT O,P'- UG/KG 39308	DDT P,P'- UG/KG 39301	DILDRN UG/KG 39383	CHLRDN UG/KG 39351	HCB UG/KG 39701	Beam 1 *	Scan 2 **
01										U
02									1,1,1-TCE, TCE, + Dichloroethane present	
03										
04										
05										
06										
07										
08										
09										
10										

ESD-01303 REV. 12/79

*Purgeable Halocarbon **Purgeable Aromatic Hydrocarbon

MICHIGAN DEPT. OF NATURAL RESOURCES, ENVIRONMENTAL LABORATORY ANALYSIS -- ORGANICS - SEDIMENTS -DRY WT. BASIS

LAB LOG# 8256 PROJ CODE HL COST CENTER _____ PR 4 COLLECTED BY Jim Monroe TRANSFERED TO _____ RECEIVED AT LAB [illegible] EXAMINER [illegible]

LOCATION SAMPLED Waste Mgmt. - Holland (Jacobsen's) 2208 N. 168th Ave. SAMPLE REMARKS _____ SEND RESULTS TO (NAME & SECTION) BRIAN MONROE OIL & HAZARDOUS MATERIALS

FIELD ID.	DESCRIPTION OF SAMPLING SITE OR SAMPLE	REF NO. P	STORET NUMBER	START DATE YYMMDD	TIME MIL TTTT	S.T OR B	NUM SAMPLES	END DATE YYMMDD	TIME MIL TTTT	DEPTH FEET	LAB NO. 2 00008	TOTAL SOLIDS PERCNT 70318	VOLTL SOLIDS % T.S. 70322	PE-OIL MG/KG 00561	A-1242 PCB UG/KG 39499	A-1254 PCB UG/KG 39507
1	Soil Boring (1"-12") 10's. of A" Line @ 35' Mark, File #051-70-81	C01		810627	1520						7986					
		C02														
		C03														
		C04														
		C05														
		C06														
		C07														
		C08														
		C09														
		C10														

REF NO.	A-1260 PCB UGXKG 39511	DDE P,P'- UG/KG 39321	DDD P,P'- UG/KG 39311	DDT O,P'- UG/KG 39308	DDT P,P'- UG/KG 39301	DILDRN UG/KG 39383	CHLRDN UG/KG 39351	HCB UG/KG 39701	Scan 1 *	Scan 2 **
01										
02										U
03										
04										
05										
06										
07										
08										
09										
10										

1,1,1-TCE, TCE, & Dichlorobenzene present

ESD-01303 REV. 12/79

January 28, 1982

Mr. William J. Kozuh, Regional Engineer
Waste Management, Inc.
Great Lakes Region
555 Metro Place, North
Suite 525
Dublin, Ohio 43017

Dear Mr. Kozuh:

As you are aware, the Department of Natural Resources has been conducting a series of investigations to determine if buried drums or other sources of potential contamination exist on your corporation's property. On August 27, 1981 several borings were made to approximately 9 feet in depth. These borings were taken in and near the driveway area between the stored roll-off units at your facility. In the roadway area itself, it was noted that the first 1-1½ feet of soil appeared to be fill material. This fill layer contained metal shavings, metal scrap and had a distinct oil odor and oil appearance to it. A sample was taken of this material and the unquantified analysis indicated 1,1,1-trichloroethane, trichloroethylene and 1,2-dichloropropane present in this fill layer (copy enclosed). This sample was collected on the "A" line at the 19.5 foot marker corresponding to the previous grid supplied to you after our May 13, 1981 site investigation.

A follow-up site investigation was conducted on November 12, 1981 to ascertain the presence of contaminants on the site by re-taking a soil sample near the same approximate location at 3 depths (boring 1 in attached analyses). As can be seen, trichloroethylene (TCE) was present at two of the depths. The units of measurement on the analysis sheets are micrograms per kilogram or parts per billion. Borings 2, 3 and 4 taken at surface locations elsewhere in the vicinity of the roll-off units revealed no chlorinated solvents present.

Based upon the finding of trichloroethylene at boring 1, the Department of Natural Resources is requiring the following by March 1, 1982.

1. A monitoring well be installed at this location. A 4-5 foot stainless steel screen should be used and should be set with the top of the screen 1-2 feet below the water table surface.

2. When the well is properly installed, please contact me at (517) 373-2794 so that a split sample may be taken from this well for analysis.

If you have any questions feel free to contact me at (517) 373-2794.

Sincerely yours,

WATER QUALITY DIVISION

Brian Monroe

Brian Monroe
Water Quality Specialist
Emergency Response and Waste Hauler
Licensing Section

BM:tkr
Enclosure
cc: J. Iwema-Waste Management, Holland
W. Murphy
R. Noyce
D. Montgomery
D. Dennis
T. Leep
File

Waste Management, Inc.
Ohio District Office
933 Frank Road
Columbus, Ohio 43223
614/272-0066

March 1, 1982

Mr. Brian Monroe
Department of Natural Resources
Water Quality Division
Stevens T. Mason Building
Box 30028
Lansing, MI 48909

Dear Mr. Monroe:

I am in receipt of your January 28, 1982 letter and the analytical results from your borings of November 21, 1981. As I understand your letter and the soils analyses, you sampled the roadway at Jacobusse's at three locations along a 60-foot east-west line, and you took a sample from a fourth location just north of the roadway. One of the roadway sampling locations was sampled at three depths (1A, 1B, 1C): one surficial (0"-6"); one intermediate (48"-54"); and one deep (96"-102"). The other two roadway locations (2 and 3) and the off-road location (4) were sampled only surficially.

The analytical reports indicate you conducted gas chromatographic scans of the soil samples with detection of no purgable organics in any samples except from location 1. In the surficial sample the analysis shows 33 parts per billion (ppb) of trichloroethylene; in the intermediate zone, no detectable presence; and in the lower zone, 7 ppb of TCE.

I trust I have accurately restated the analytical findings.

Your letter goes on to say that Michigan Waste Systems, Inc. is required to establish a groundwater monitoring well at some unspecified location by March 1. Presumably your intent is to locate the well near sampling location 1.

Before we can respond to your requirement we must ask you for more rationalization of both the requirement and the authority under which it is made. As we read the data it is simply too insignificant to serve as the basis for another groundwater monitoring well. (You are probably aware that Prein and Newhoff has already established a monitoring well approximately 75 feet away and downgradient from your location 1).

Once you receive this letter, give me a call so we can discuss your findings further.

Sincerely,

Matt Davies
Environmental Specialist
Regional Environmentalist Management Department

MD:gb

cc: John Baker
Rich Evenhouse
Ray Kellas
Jeff Diver
Bill Kozuh/File: Jacobusse's

ATTACHMENT G

STATE OF MICHIGAN

NATURAL RESOURCES COMMISSION
THOMAS J. ANDERSON
E. B. CAROLLO
MARLENE J. FLUHARTY
STEPHEN F. MONSMA
O. STEWART MYERS
RAYMOND POUPORE
HARRY H. WHITELEY

JAMES J. BLANCHARD, Governor

DEPARTMENT OF NATURAL RESOURCES

RONALD O. SKOOG, Director

350 Ottawa Avenue, N. W.
Grand Rapids, Michigan 49503

December 12, 1984

Mr. Jeff Passeno
Waste Management, Inc.
22200 W. Nine Mile Road
Southfield, Michigan 48034

Re: Jacobuse Refuse Service
Ottawa County

Dear Mr. Passeno:

This correspondence is intended to confirm our telephone conversation of December 11, 1984, relative to groundwater and tank sampling at Jacobusse's located in Holland, As discussed, we are tentatively scheduled to sample monitoring wells on January 22, 1985, which are upgradient and downgradient of the old sludge lagoons as wells as the building area. In addition, at least three underground tanks which exist at the facility will also be sampled.

At the present time I anticipate sampling approximately four wells in the vicinity of the lagoons and up to five in the vicinity of the plant. The wells associated with the lagoons will be analyzed for dissolved metals and those around the building, including the tanks, will be analyzed for trichloroethylene and some for dissolved metals.

If you have any questions, or wish to discuss this matter further, feel free to contact this office.

Sincerely

Gerard J. Heyt
District Supervisor
Groundwater Quality Division
(616) 456-5071

GJH:bjc

NATURAL RESOURCES COMMISSION
THOMAS J. ANDERSON
E. R. CAROLLO
MARLENE J. FLUHARTY
STEPHEN F. MONSMA
O STEWART MYERS
RAYMOND POUPORE
HARRY H. WHITELEY

STATE OF MICHIGAN

JAMES J. BLANCHARD, Governor

DEPARTMENT OF NATURAL RESOURCES

RONALD O. SKOOG, Director

350 Ottawa Avenue, N. W.
Grand Rapids, Michigan 49503

May 21, 1985

Mr. Jeff Passeno
Waste Management, Inc.
22200 W. Nine Mile Rd.
Southfield, MI 48034

Dear Mr. Passeno:

Enclosed are the results of the samples collected on January 31, 1985, at the Jacobusse's site in Holland, Michigan and a map with the monitoring well locations. Mr. Heyt and I will be available Thursday, May 30, 1985, to discuss these results with you and to review the status of various Waste Management facilities in the Grand Rapids District.

If you have any questions regarding these results, feel free to contact me at this office. Otherwise, we'll see you Thursday, May 30th.

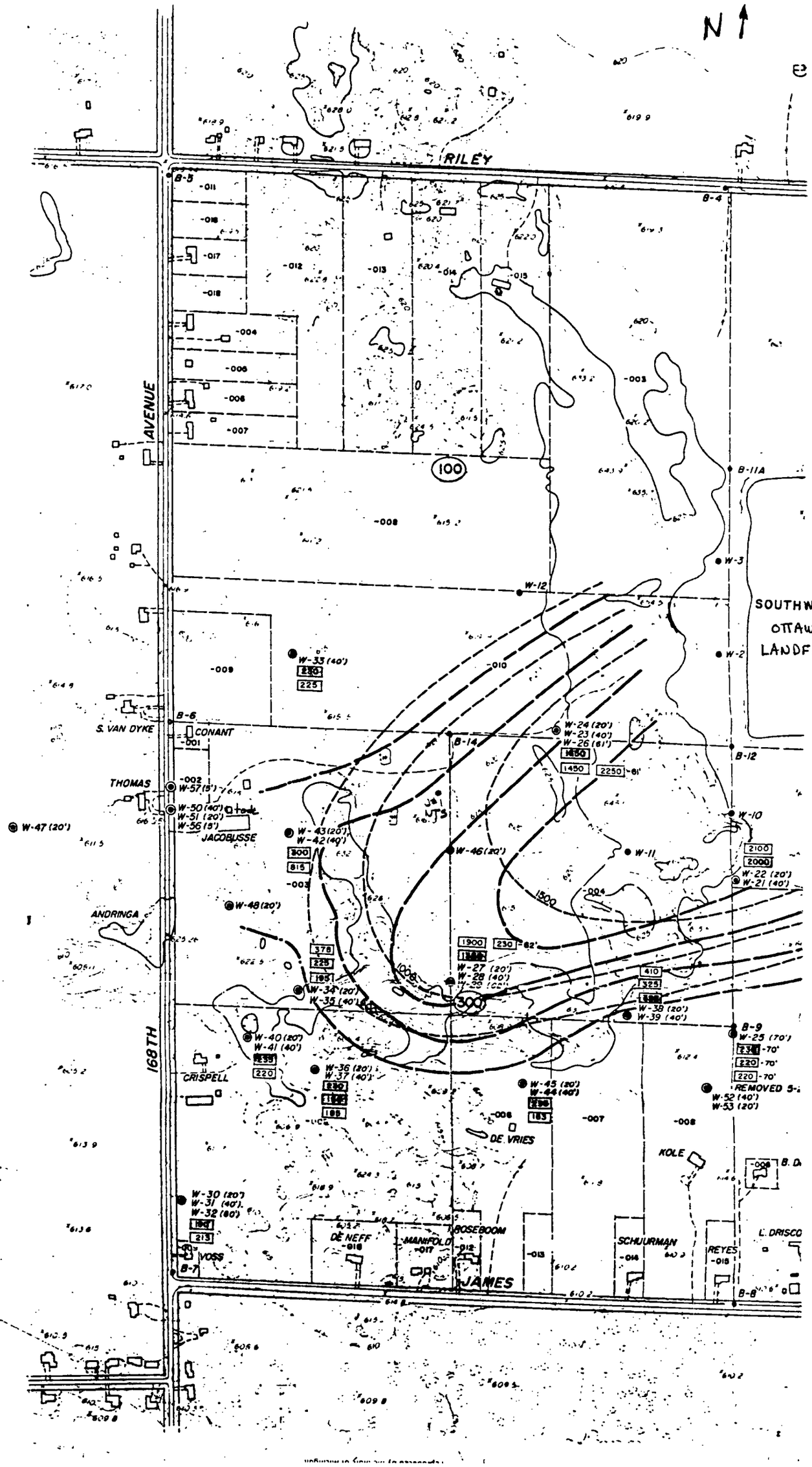
Sincerely,

Marge Spruit

Marge Spruit
Water Quality Specialist
Groundwater Quality Division
(616) 456-5071

MS:bjc

enc.


N
RILEY
AVENUE
168TH
JAMES
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SOUTHWE
OTTAWA
LANDFIL
S. VAN DYKE
CONANT
THOMAS
JACOBUSSE
ANDRINGA
CRISPELL
DE VRIES
KOLE
DE NEFF
MANIFOLD
ROSEBOOM
SCHUURMAN
REYES
L. DRISCO
VOSS
B-5
B-4
B-11A
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W-39 (40')
W-25 (70')
W-40 (20')
W-41 (40')
W-36 (20')
W-37 (40')
W-45 (20')
W-44 (40')
W-52 (40')
W-53 (20')
W-30 (20')
W-31 (40')
W-32 (60')
REMOVED 5-
1500
1000

ANALYTICAL RESULTS[1]
OF SAMPLES COLLECTED AT

Jacobusse's
Holland, Michigan
January 31, 1985

	Conductivity umhos/cm	pH[2]	Arsenic, Dissolved	Cadmium, Dissolved	Chromium, Dissolved	Copper, Dissolved	Nickel, Dissolved	Lead, Dissolved	Zinc, Dissolved	Purgeable Halocarbons	Pugeable Aromatic Hydrocarbons
Monitoring Well #23	1320	7.2	.7	K 20.0	K 50.0	K 20.0	K 50.0	K 50.0	4100	K 1.0 1.2 dichloroethane K 3.0	K 5.0
Monitoring Well #24	554	7.3	4.5	"	"	30.0	"	190.0	3900	K 1.0 1.2 dichloroethane K 10.0	6.1 Benzene
Jacobusse's #1	107	7.5	K .5	"	"	K 20.0	"	K 50.0	2700	K 1.0	K 5.0
Monitoring Well #43	179	9.4	"	"	"	"	"	"	110	"	"
Monitoring Well #42	681	8.7	3.3	"	"	"	"	"	1300	"	"
Monitoring Well #51	170	7.8	K .5	"	"	"	"	"	430	"	"
Monitoring Well #50	191	7.9	.9	"	"	"	"	"	220	"	"
Underground tank[3]	-	-	-	-	-	-	-	-	-	Methylene Chloride; 1,1,1 trichloroethane	Toluene ethylbenzene xylene

yc b. Fleder, EPA

K = less than
1 results in ug/l unless noted
2 holding time exceeded
3 results qualified, not quantified

Michigan Department of Natural Resources

Environmental Laboratory

Inorganic Unit

Log # 5481 Sampling Location: JACOBUSSE'S - HOLLAND Matrix: WATER

Send Results To: M. SPRUIT, GWQD Received 85-02-01

Proj Code GC GWQD COMPLIANCE

Lab # 45167 To 75* 8 Samples Priority II

FIELD FILTERED AND PRES
Cost Code 00*00*0000*000000000 Approx Cost $ 736.00

19-Feb-84

MICHIGAN DEPARTMENT OF NATURAL RESOURCES
ENVIRONMENTAL LABORATORY
INORGANIC UNIT

EXAMINER .....Nordlund.....

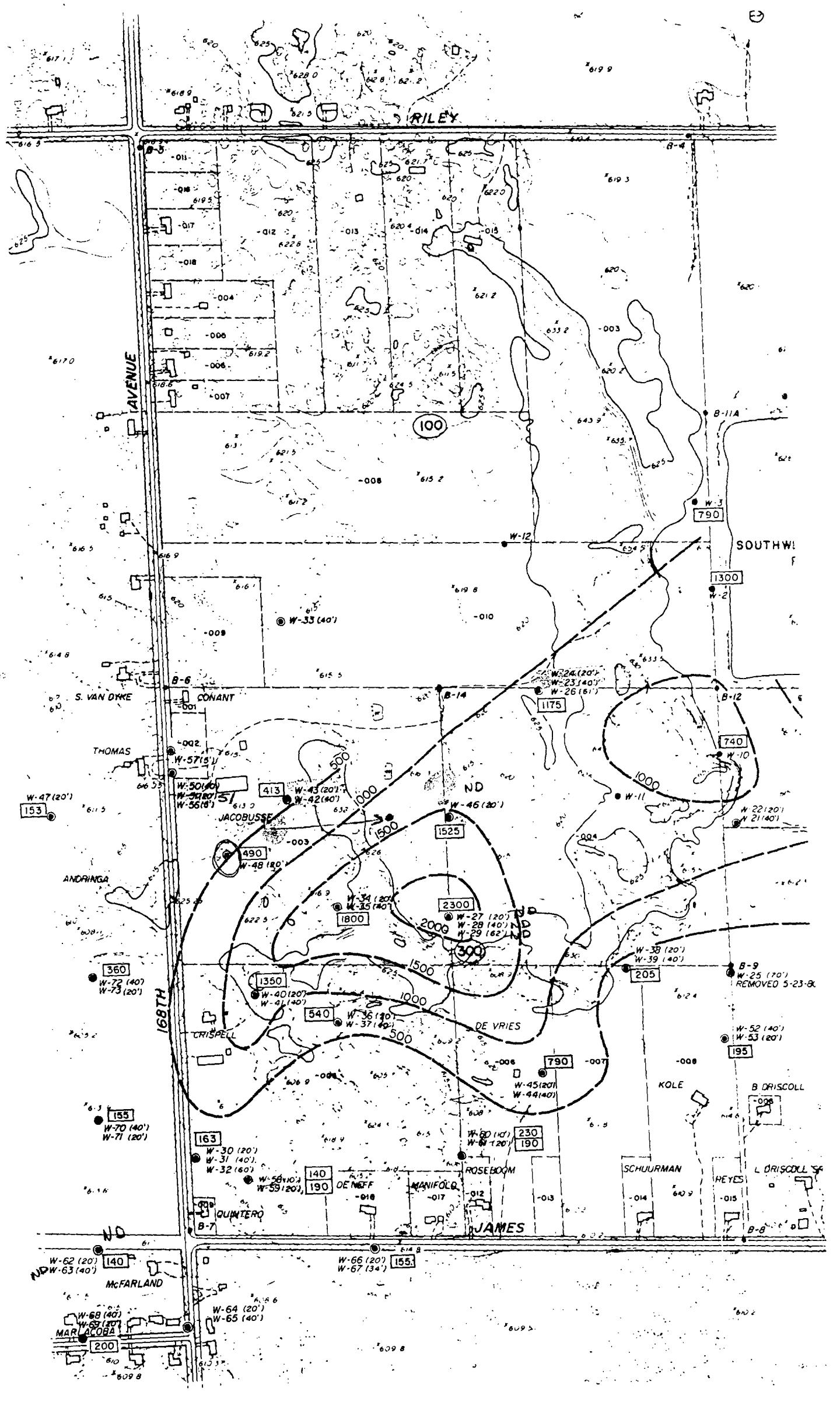
LOG #	LAB #	ELEMENT		RESULTS	UNITS	ANALYSIS	MATRIX	RUN #
5481	45167	CONDUCTIVITY		170.0	UMHOS/CM	TOTAL	WATER	125
5481	45167	PH	HT	7.8	PH	TOTAL	WATER	125
5481	45167 D	ARSENIC	K	.5	UG/L	DISSOLVED	WATER	170
5481	45167 D	CADMIUM	K	20.0	UG/L	DISSOLVED	WATER	00519
5481	45167 D	CHROMIUM	K	50.0	UG/L	DISSOLVED	WATER	00519
5481	45167 D	COPPER	K	20.0	UG/L	DISSOLVED	WATER	00519
5481	45167 D	NICKEL	K	50.0	UG/L	DISSOLVED	WATER	00519
5481	45167 D	LEAD	K	50.0	UG/L	DISSOLVED	WATER	00519
5481	45167 D	ZINC		430.0	UG/L	DISSOLVED	WATER	00519
5481	45168	CONDUCTIVITY		191.0	UMHOS/CM	TOTAL	WATER	125
5481	45168	PH	HT	7.9	PH	TOTAL	WATER	125
5481	45168 D	ARSENIC		.9	UG/L	DISSOLVED	WATER	170
5481	45168 D	CADMIUM	K	20.0	UG/L	DISSOLVED	WATER	00519
5481	45168 D	CHROMIUM	K	50.0	UG/L	DISSOLVED	WATER	00519
5481	45168 D	COPPER	K	20.0	UG/L	DISSOLVED	WATER	00519
5481	45168 D	NICKEL	K	50.0	UG/L	DISSOLVED	WATER	00519
5481	45168 D	LEAD	K	50.0	UG/L	DISSOLVED	WATER	00519
5481	45168 D	ZINC		220.0	UG/L	DISSOLVED	WATER	00519
5481	45169	CONDUCTIVITY		1,320.0	UMHOS/CM	TOTAL	WATER	125
5481	45169	PH	HT	7.2	PH	TOTAL	WATER	125
5481	45169 D	ARSENIC		.7	UG/L	DISSOLVED	WATER	170
5481	45169 D	CADMIUM	K	20.0	UG/L	DISSOLVED	WATER	00519
5481	45169 D	CHROMIUM	K	50.0	UG/L	DISSOLVED	WATER	00519
5481	45169 D	COPPER	K	20.0	UG/L	DISSOLVED	WATER	00519
5481	45169 D	NICKEL	K	50.0	UG/L	DISSOLVED	WATER	00519
5481	45169 D	LEAD	K	50.0	UG/L	DISSOLVED	WATER	00519
5481	45169 D	ZINC		4,100.0	UG/L	DISSOLVED	WATER	00519
5481	45170	CONDUCTIVITY		554.0	UMHOS/CM	TOTAL	WATER	125
5481	45170	PH	HT	7.3	PH	TOTAL	WATER	125
5481	45170 D	ARSENIC		4.5	UG/L	DISSOLVED	WATER	170
5481	45170 D	CADMIUM	K	20.0	UG/L	DISSOLVED	WATER	00519
5481	45170 D	CHROMIUM	K	50.0	UG/L	DISSOLVED	WATER	00519
5481	45170 D	COPPER		30.0	UG/L	DISSOLVED	WATER	00519
5481	45170 D	NICKEL	K	50.0	UG/L	DISSOLVED	WATER	00519
5481	45170 D	LEAD		190.0	UG/L	DISSOLVED	WATER	00519
5481	45170 D	ZINC		3,900.0	UG/L	DISSOLVED	WATER	00519
5481	45171	CONDUCTIVITY		107.0	UMHOS/CM	TOTAL	WATER	125
5481	45171	PH	HT	7.5	PH	TOTAL	WATER	125
5481	45171 D	ARSENIC	K	.5	UG/L	DISSOLVED	WATER	170
5481	45171 D	CADMIUM	K	20.0	UG/L	DISSOLVED	WATER	00519
5481	45171 D	CHROMIUM	K	50.0	UG/L	DISSOLVED	WATER	00519
5481	45171 D	COPPER	K	20.0	UG/L	DISSOLVED	WATER	00519
5481	45171 D	NICKEL	K	50.0	UG/L	DISSOLVED	WATER	00519
5481	45171 D	LEAD	K	50.0	UG/L	DISSOLVED	WATER	00519
5481	45171 D	ZINC		2,700.0	UG/L	DISSOLVED	WATER	00519

19-Feb-84

MICHIGAN DEPARTMENT OF NATURAL RESOURCES
ENVIRONMENTAL LABORATORY
INORGANIC UNIT

EXAMINER BW

LOG #	LAB #	ELEMENT	RESULTS		UNITS	ANALYSIS	MATRIX	RUN #
5481	45172	CONDUCTIVITY		179.0	UMHOS/CM	TOTAL	WATER	125
5481	45172	PH	HT	9.4	PH	TOTAL	WATER	125
5481	45172 D	ARSENIC	K	.5	UG/L	DISSOLVED	WATER	170
5481	45172 D	CADMIUM	K	20.0	UG/L	DISSOLVED	WATER	00519
5481	45172 D	CHROMIUM	K	50.0	UG/L	DISSOLVED	WATER	00519
5481	45172 D	COPPER	K	20.0	UG/L	DISSOLVED	WATER	00519
5481	45172 D	NICKEL	K	50.0	UG/L	DISSOLVED	WATER	00519
5481	45172 D	LEAD	K	50.0	UG/L	DISSOLVED	WATER	00519
5481	45172 D	ZINC		110.0	UG/L	DISSOLVED	WATER	00519
5481	45173	CONDUCTIVITY		681.0	UMHOS/CM	TOTAL	WATER	125
5481	45173	PH	HT	8.7	PH	TOTAL	WATER	125
5481	45173 D	ARSENIC		3.3	UG/L	DISSOLVED	WATER	170
5481	45173 D	CADMIUM	K	20.0	UG/L	DISSOLVED	WATER	00519
5481	45173 D	CHROMIUM	K	50.0	UG/L	DISSOLVED	WATER	00519
5481	45173 D	COPPER	K	20.0	UG/L	DISSOLVED	WATER	00519
5481	45173 D	NICKEL	K	50.0	UG/L	DISSOLVED	WATER	00519
5481	45173 D	LEAD	K	50.0	UG/L	DISSOLVED	WATER	00519
5481	45173 D	ZINC		1,300.0	UG/L	DISSOLVED	WATER	00519
5481	45175 D	ARSENIC	K	.5	UG/L	DISSOLVED	WATER	170
5481	45175 D	CADMIUM	K	20.0	UG/L	DISSOLVED	WATER	00519
5481	45175 D	CHROMIUM	K	50.0	UG/L	DISSOLVED	WATER	00519
5481	45175 D	COPPER	K	20.0	UG/L	DISSOLVED	WATER	00519
5481	45175 D	NICKEL	K	50.0	UG/L	DISSOLVED	WATER	00519
5481	45175 D	LEAD	K	50.0	UG/L	DISSOLVED	WATER	00519
5481	45175 D	ZINC	K	50.0	UG/L	DISSOLVED	WATER	00519


RILEY
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168TH
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THOMAS
JACOBUSSE
ANDRINGA
CRISPELL
DE VRIES
KOLE
B DRISCOLL
ROSEBOOM
MANIFOLD
DE NEFF
QUINTERO
SCHUURMAN
REYES
L DRISCOLL
JAMES
McFARLAND
MARLACOBA
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REMOVED 5-23-8
W-72 (40')
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W-64 (20')
W-65 (40')
790
1300
1175
740
413
1525
490
1800
2300
360
1350
540
205
195
790
155
163
140
190
230
190
140
200
155
153
1 gal/ft.

2 tanks

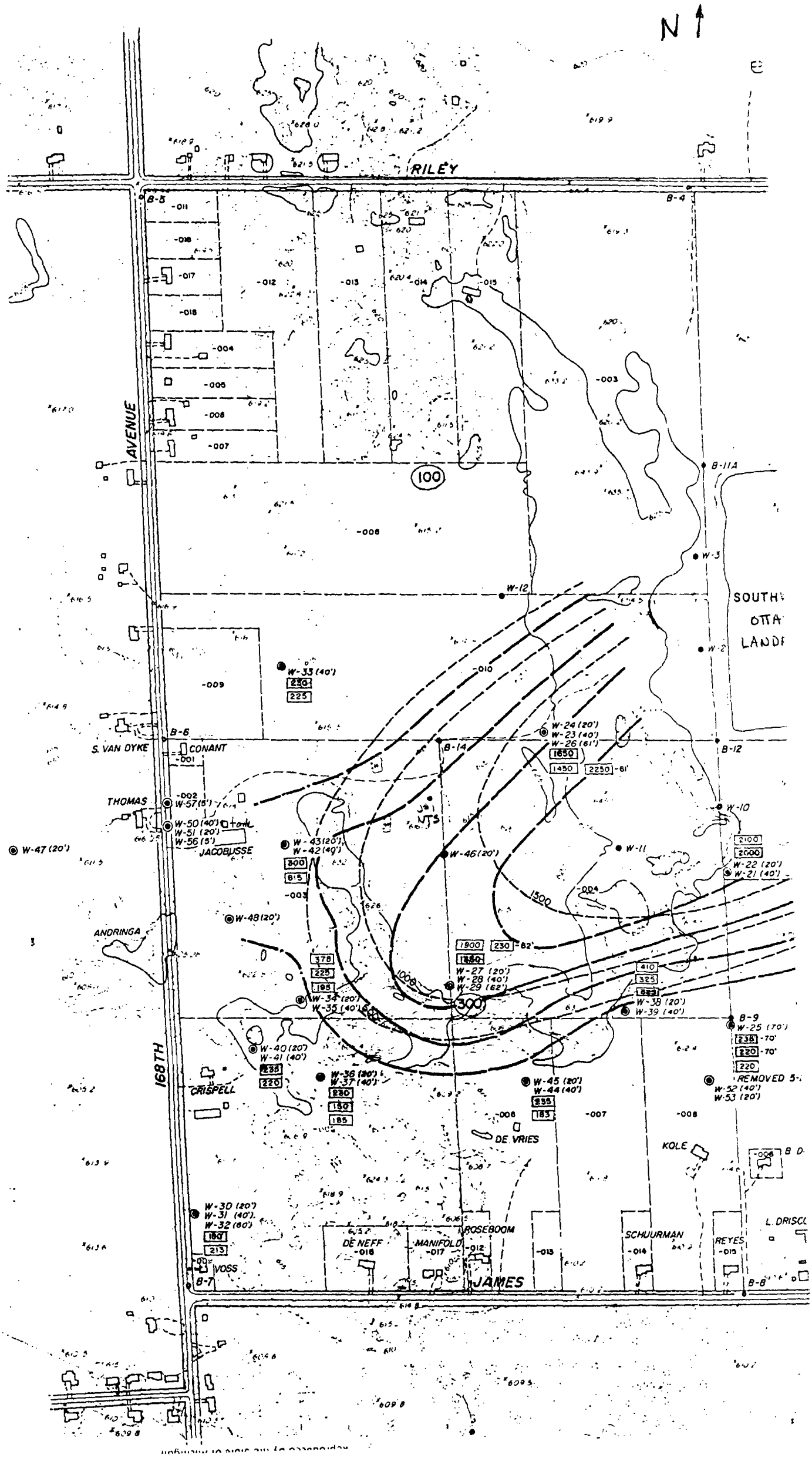
ANALYTICAL RESULTS[1]
OF SAMPLES COLLECTED AT

Jacobusse's
Holland, Michigan
January 31, 1985

	Conductivity umhos/cm	pH[2]	Arsenic, Dissolved	Cadmium, Dissolved	Chromium, Dissolved	Copper, Dissolved	Nickel, Dissolved	Lead, Dissolved	Zinc, Dissolved	Purgeable Halocarbons	Pugeable Aromatic Hydrocarbons
Monitoring Well #23	1320	7.2	.7	K 20.0	K 50.0	K 20.0	K 50.0	K 50.0	4100	K 1.0 1.2 dichloroethane K 3.0	K 5.0
Monitoring Well #24	554	7.3	4.5	"	"	30.0	"	190.0	3900	K 1.0 1.2 dichloroethane K 10.0	6.1 Benzene
Jacobusse's #1	107	7.5	K .5	"	"	K 20.0	"	K 50.0	2700	K 1.0	K 5.0
Monitoring Well #43	179	9.4	"	"	"	"	"	"	110	"	"
Monitoring Well #42	681	8.7	3.3	"	"	"	"	"	1300	"	"
Monitoring Well #51	170	7.8	K .5	"	"	"	"	"	430	"	"
Monitoring Well #50	191	7.9	.9	"	"	"	"	"	220	"	"
Underground tank[3]	-	-	-	-	-	-	-	-	-	Methylene Chloride; 1,1,1 trichloroethane	Toluene ethyl-benzene xylene

K = less than
1 results in ug/l unless noted
2 holding time exceeded
3 results qualified, not quantified

Reproduced by the State of Michigan


N
RILEY
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168TH
JAMES
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W-45 (20')
W-44 (40')
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W-53 (20')
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W-32 (60')
REMOVED 5-
S. VAN DYKE
CONANT
THOMAS
JACOBUSSE
ANDRINGA
CRISPELL
DE VRIES
KOLE
VOSS
DE NEFF
MANIFOLD
ROSEBOOM
SCHUURMAN
REYES
L. DRISCO

LL070

11/84 MICHIGAN DEPT OF NATURAL RESOURCES ENVIRONMENTAL LABORATORY — Sample #8

MATRIX = WATER — ANALYSIS REQUEST SHEET — (YES) NO - INFO ON BACK — ***** SAFETY WARNING *****

LAB LOG# 5481 — PROJ CODE GC — COST CENTER 90375 — PR II — RECEIVED AT LAB RM — DATE TIME 2/1/85 1100 (AM) PM

LOCATION SAMPLED: Jacobusse's - Holland — COLLECTED BY: Sprunt/Heyt — TRANSFERED TO: Przybyla

SAMPLE REMARKS — SEND RESULTS TO (NAME & SECTION): M. Sprunt - GWQD - Grand Rapids

LAB USE ONLY	#	FIELD ID OR DESCRIPTION	SAMPLE INFORMATION	YY/MM/DD	HH:MM
45167	01	mw #~~54~~ (7.51)	front well 20'	85-1-31	5^00 PM
45168	02	mw #50	front well 55'	"	5^30 PM
45169	03	mw #23	back well 55'	"	11^30 AM
45170	04	mw #24	back well 36'	"	12^30 PM
45171	05	Jacobusse's #1	east well 18'	"	1^30 PM
45172	06	mw #43	power line 35'	"	2^00 PM
45173	07	mw #42	power line 42'	"	4^15 PM
45174	08	tank (oily)	north of green bldg		5^30 PM
45175	09	blank			
	10				

ORGANIC

PO1 #1 HALOCARBONS.... 1 2 3 4 5 6 7 8 (9) 10
PO2 #2 AROMATIC HC.... 1 2 3 4 5 6 7 8 (9) 10
OBN #3 CL HC&PEST &PCB. 1 2 3 4 5 6 7 8 9 10
#6 PHTHALATES..... 1 2 3 4 5 6 7 8 9 10
#7 PNA..... 1 2 3 4 5 6 7 8 9 10
..... 1 2 3 4 5 6 7 8 9 10
..... 1 2 3 4 5 6 7 8 9 10
1 2 3 4 5 6 7 8 9 10
OA #8 PHENOLS..... 1 2 3 4 5 6 7 8 9 10
OG OIL & GREASE-IR.... 1 2 3 4 5 6 7 8 9 10
OIL & GREASE-GRAV.. 1 2 3 4 5 6 7 8 9 10
1 2 3 4 5 6 7 8 9 10
..... 1 2 3 4 5 6 7 8 9 10
1 2 3 4 5 6 7 8 9 10
..... 1 2 3 4 5 6 7 8 9 10
1 2 3 4 5 6 7 8 9 10
..... 1 2 3 4 5 6 7 8 9 10
1 2 3 4 5 6 7 8 9 10
..... 1 2 3 4 5 6 7 8 9 10

INORGANIC

MAD FIELD FILTER+PRES. 1 2 3 4 5 6 7 8 9 10
HD LAB FILTRATION..... 1 2 3 4 5 6 7 8 9 10
(MA) CA MG NA K..... 1 2 3 4 5 6 7 8 9 10
CD CR CU NI PB ZN. 1 2 3 4 5 6 7 8 (9) 10
HG MERCURY..... 1 2 3 4 5 6 7 8 9 10
AS ARSENIC..... 1 2 3 4 5 6 7 8 (9) 10
SE SELENIUM..... 1 2 3 4 5 6 7 8 9 10
SB ANTIMONY..... 1 2 3 4 5 6 7 8 9 10
OTHERS (CIRCLE)
AG AL BA BE CO FE.. 1 2 3 4 5 6 7 8 9 10
LI MN MO TI V..... 1 2 3 4 5 6 7 8 9 10
FURNACE CD..... 1 2 3 4 5 6 7 8 9 10
* CR CU NI PB..... 1 2 3 4 5 6 7 8 9 10
(MN) PH, CONDUCTANCE... 1 2 3 4 5 6 7 8 9 10
CL SO4 TOTAL ALK... 1 2 3 4 5 6 7 8 9 10
FLUORIDE..... 1 2 3 4 5 6 7 8 9 10
CR+6..... 1 2 3 4 5 6 7 8 9 10
HCO3- CO3=..... 1 2 3 4 5 6 7 8 9 10
CA MG NA K -DISS. 1 2 3 4 5 6 7 8 9 10
MB BRINE (CIRCLE)
* CL SO4 BR 1 2 3 4 5 6 7 8 9 10
* ALK HCO3- CO3=.. 1 2 3 4 5 6 7 8 9 10
* CA MG NA K 1 2 3 4 5 6 7 8 9 10

GENERAL CHEMISTRY

DO DISS OXYGEN.... 1 2 3 4 5 6 7 8 9 10
GN O-PHOS NO2-.... 1 2 3 4 5 6 7 8 9 10
RES-NF (SS).... 1 2 3 4 5 6 7 8 9 10
RES-TF (TDS)... 1 2 3 4 5 6 7 8 9 10
1 2 3 4 5 6 7 8 9 10
BOD TOT 5 DAY. 1 2 3 4 5 6 7 8 9 10
BOD CARB 5 DAY. 1 2 3 4 5 6 7 8 9 10
1 2 3 4 5 6 7 8 9 10
GA COD..... 1 2 3 4 5 6 7 8 9 10
TOC..... 1 2 3 4 5 6 7 8 9 10
NO3+NO2 NH3.... 1 2 3 4 5 6 7 8 9 10
KJEL N, TOT P.. 1 2 3 4 5 6 7 8 9 10
PHENOLICS..... 1 2 3 4 5 6 7 8 9 10
1 2 3 4 5 6 7 8 9 10
GB TOTAL CN..... 1 2 3 4 5 6 7 8 9 10
FREE CN..... 1 2 3 4 5 6 7 8 9 10
BC FECAL COLI..... 1 2 3 4 5 6 7 8 9 10
TOTAL COLI..... 1 2 3 4 5 6 7 8 9 10
1 2 3 4 5 6 7 8 9 10
CA CHLOROPHYLL.... 1 2 3 4 5 6 7 8 9 10
1 2 3 4 5 6 7 8 9 10

MICH DNR ENVIRONMENTAL LAB
ORGANIC RESULTS FOR LAB LOG #5481

LAB# 45167	ug/L	SCAN 1	COMMENTS
	1.00	Detection limit	
LAB# 45167	ug/L	SCAN 2	COMMENTS
	5.00	Detection limit	
LAB# 45168	ug/L	SCAN 1	COMMENTS
	1.00	Detection limit	
LAB# 45168	ug/L	SCAN 2	COMMENTS
	5.00	Detection limit	
LAB# 45169	ug/L	SCAN 1	COMMENTS
		1*2-DICHLOROETHANE K3	INT K3
	1.00	Detection limit	
LAB# 45169	ug/L	SCAN 2	COMMENTS
	5.00	Detection limit	
LAB# 45170	ug/L	SCAN 1	COMMENTS
		1*2-DICHLOROETHANE K10	INT K10
	1.00	Detection limit	

LAB LOG #5481 cont.

LAB# 45170	ug/L	SCAN 2	COMMENTS
	6.10	BENZENE	* * * *
	5.00	Detection limit	

LAB# 45171	ug/L	SCAN 1	COMMENTS
	1.00	Detection limit	

LAB# 45171	ug/L	SCAN 2	COMMENTS
	5.00	Detection limit	

LAB# 45172	ug/L	SCAN 1	COMMENTS
	1.00	Detection limit	

LAB# 45172	ug/L	SCAN 2	COMMENTS
	5.00	Detection limit	

LAB# 45173	ug/L	SCAN 1	COMMENTS
	1.00	Detection limit	

LAB# 45173	ug/L	SCAN 2	COMMENTS
	5.00	Detection limit	

LAB LOG #5481 cont.

LAB# 45174	ug/L	SCAN 1	COMMENTS
		METHYLENE CHLORIDE	M (Qualified, not quantified)
		1*1*1-TRICHLOROETHANE	M
		Detection limit	
LAB# 45174	ug/L	SCAN 2	COMMENTS
		TOLUENE	M
		ETHYLBENZENE	M
		XYLENE	M
		Detection limit	
LAB# 45175	ug/L	SCAN 1	COMMENTS
	1.00	Detection limit	
LAB# 45175	ug/L	SCAN 2	COMMENTS
	5.00	Detection limit	

Unless noted above under COMMENTS, analyses were performed for the compounds on attached scan list. Concentrations are rounded to 2 significant figures.

Approved D Long

FEB 8 1985

ATTACHMENT H

Waste Management of North America, Inc.
Mideast District Office
22180 West Nine Mile Road
Southfield, Michigan 48034
313/352-7840

December 31, 1985

Mr. Richard Rudolph
Michigan DNR, Site Assessment Unit
Remedial Action Section
Groundwater Quality Division
Stevens T. Mason Bldg.
Allegan & Pine Streets
Lansing, MI 48909

RECEIVED

RE: November, 1985 Proposed Priority List Michigan Act 307
(Michigan Environmental Response Act)
Jacobusse Refuse, Ottawa County

Dear Mr. Rudolph:

The subject proposed listing indicated that the Jacobusse Refuse was last scored in October, 1984. Since that score date, specific remedial investigations and actions have been taken at the facility. The nature of these investigations is detailed in the attached report prepared by Dell Engineering, Holland, Michigan. Additionally, attached is groundwater monitoring results from January, 1985.

Waste Management, Inc. (the facility owner) requests that the Department re-score the facility incorporating the enclosed information. This information establishes that no specific impact from the facility has been documented and that the potential sources of contamination at the site (e.g., underground storage tanks) have been properly removed.

Should you require additional information in your re-scoring of this facility, please feel free to contact me.

Very truly yours,

W. Jeff Passeno, P.E.
District Engineer

WJP/lab

cc: Gerald Heyt

ORGANIC SCAN LIST
MATRIX: WATER
OCTOBER 1984

SCAN 1 - Purgeable Halocarbons

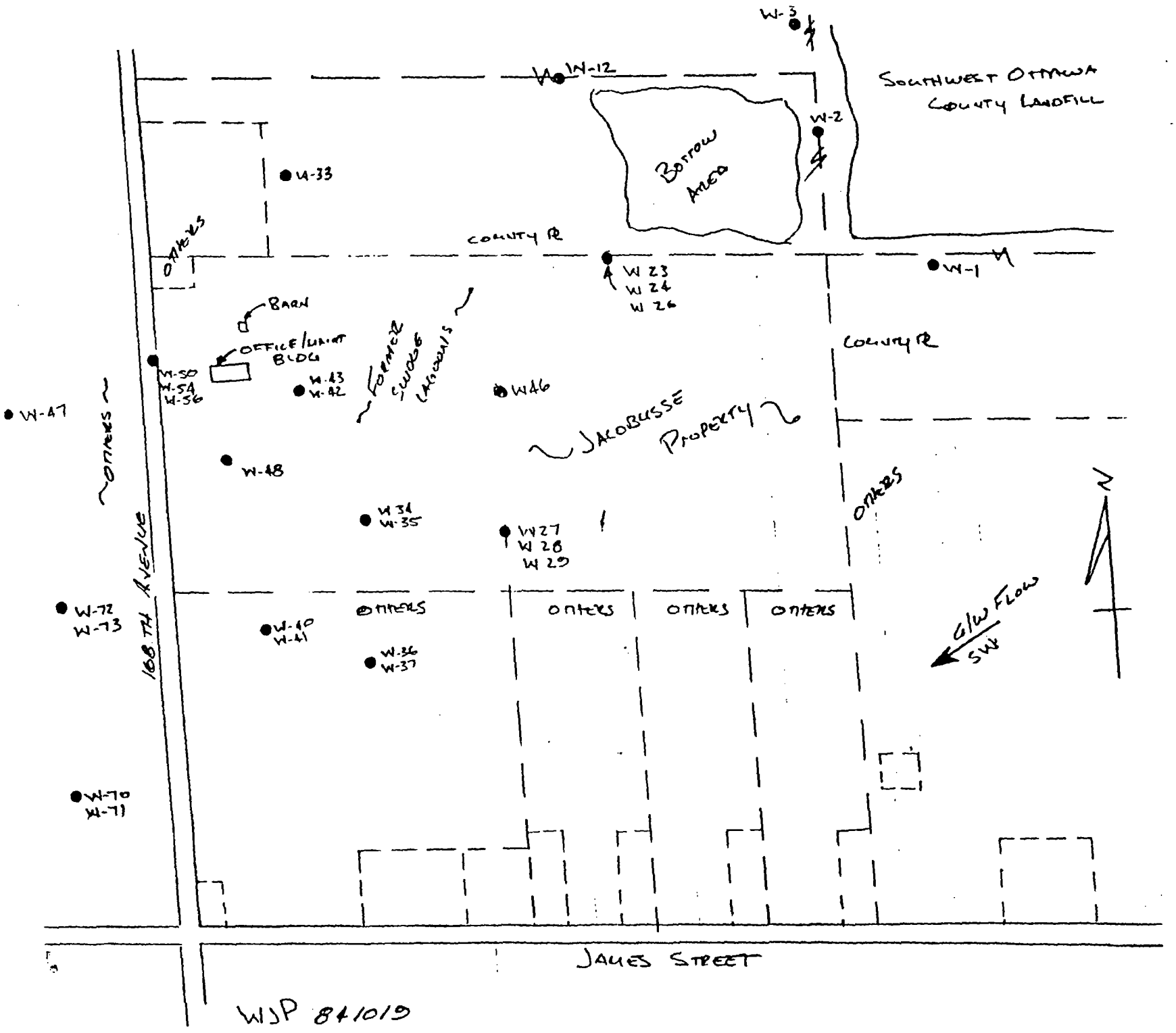
Bromodichloromethane
Bromoform
Carbon tetrachloride
Chlorobenzene
Chloroform
Dibromochloromethane
1,1-Dichloroethane
1,2-Dichloroethane
1,1-Dichloroethene
1,2-Dichloroethene (cis & trans)
1,2-Dichloropropane
1,3-Dichloropropene (cis & trans)
Methylene chloride (request only)
1,1,2,2-Tetrachloroethane
Tetrachloroethene
1,1,1-Trichloroethane
1,1,2-Trichloroethane
Trichloroethene

SCAN 2 - Purgeable Aromatic Hydrocarbons

Benzene
Ethylbenzene
Styrene
Toluene
Xylene isomers (o, m, and p)

SCAN 3 - Chlorinated Hydrocarbons, PCBs & Organochlorine Pesticides

Aldrin
*Aroclor 1016
*Aroclor 1221
*Aroclor 1232
Aroclor 1242
*Aroclor 1248
Aroclor 1254
Aroclor 1260
*Aroclor 1262
*Aroclor 1268
g-BHC (lindane)
BP-6 (PBB)
a-Chlordane
g-Chlordane
2-Chloronaphthalene
4,4'-DDD
4,4'-DDE
1,4'-DDT
4,4'-DDT
1,2-Dichlorobenzene
1,3-Dichlorobenzene
1,4-Dichlorobenzene
Heptachlor
Heptachlor epoxide
Hexabromobenzene
Hexachlorobenzene
Hexachlorobutadiene
Hexachlorocyclopentadiene
Hexachloroethane
Methoxychlor
Mirex
Octachlorocyclopentene
Pentachloronitrobenzene
*Toxaphene
1,2,4-Trichlorobenzene


W-3
W-12
SOUTHWEST OTTAWA COUNTY LANDFILL
W-2
BORROW AREA
W-33
OTHERS
COUNTY R
W-1
W 23
W 24
W 26
BARN
OFFICE/LUNCH BLDG
FORMER SWDOG LAGOONS
W-50
W-54
W-56
W-43
W-42
W46
W-47
JACOBUSSE PROPERTY
COUNTY R
OTHERS
W-48
W 31
W-35
W27
W 28
W 29
OTHERS
168TH AVENUE
W-72
W-73
W-40
W-41
W-36
W-37
OTHERS
OTHERS
OTHERS
OTHERS
G/W FLOW SW
W-70
W-71
JAMES STREET
WJP 84/019

ETC ENVIRONMENTAL TESTING and CERTIFICATION

DATA MANAGEMENT SUMMARY REPORT
(DM-1H) - History of All Parameters Present, Selected Sample Point

February 25, 1985
Page 1

Chain of Custody Data Required for ETC Data Management Summary Report

See Below	WASTE MANAGEMENT, INC.	000		See Below
ETC Sample No.	*Company*	*Facility*	*Sample Point*	*Date*

arameters	*Units*	*Sample Points, Sampling Dates, and ETC Sample No.'s*							
		W 01 850131 G7053							
P Metals									
admium	ug/l	4							
W Met., Pest., & Herb.									
admium	ug/l	4							
odium	ug/l	2000							
W Conventionals									
hloride	mg/l	2.9							
itrate as N	mg/l	0.12							
ulfate as S04	mg/l	16							
otal Organic Carbon	mg/l	3							
otal Organic Carbon	mg/l	3.2							
is .aneous Parameters									
icarbonate as CaC03	mg/l	36							
alcium	ug/l	20000							
emical Oxygen Demand (COD)	mg/l	11							
epth to Water	Feet	17							
agnesium	ug/l	2700							
ecific Conductance (Field)	um/cm	85.6							
ecific Conductance (Field)	um/cm	77.6							
mperature	Deg. C	4							
ell Depth	Feet	18							
(Field)	std	7.8							
(Field)	std	7.62							

Notes: BMDL=Below Method Detection Limit ND=Parameter not detected '-'=Parameter not tested

ETC ENVIRONMENTAL TESTING and CERTIFICATION

DATA MANAGEMENT SUMMARY REPORT
(DM-1H) - History of All Parameters Present, Selected Sample Point

February 25, 1985
Page 1

Chain of Custody Data Required for ETC Data Management Summary Report

See Below	WASTE MANAGEMENT, INC.	000		See Below
ETC Sample No.	*Company*	*Facility*	*Sample Point*	*Date*

Parameters	*Units*	*Sample Points, Sampling Dates, and ETC Sample No.'s*							
		W 23 850131 G7052							
PP Volatile Compounds									
Trichloroethylene	ug/l	10							
PP Metals									
Cadmium	ug/l	4							
Lead	ug/l	100							
GW Met., Pest., & Herb.									
Cadmium	ug/l	4							
Lead	ug/l	100							
Iron	ug/l	6700							
Sodium	ug/l	61200							
General Conventionals									
Chloride	mg/l	37							
Total Organic Carbon	mg/l	14							
Total Organic Carbon	mg/l	14							
Miscellaneous Parameters									
Ammonia as N	mg/l	56							
Bicarbonate as CaCO3	mg/l	530							
Calcium	ug/l	72700							
Chemical Oxygen Demand (COD)	mg/l	43							
Depth to Water	Feet	14							
Magnesium	ug/l	24900							
Specific Conductance (Field)	um/cm	787							
Specific Conductance (Field)	um/cm	871							

Footnotes: BMDL=Below Method Detection Limit ND=Parameter not detected '-'=Parameter not tested

ETC ENVIRONMENTAL TESTING and CERTIFICATION

DATA MANAGEMENT SUMMARY REPORT
(DM-1H) - History of All Parameters Present, Selected Sample Point

Chain of Custody Data Required for ETC Data Management Summary Report

See Below	WASTE MANAGEMENT, INC.	000		See Below
ETC Sample No.	*Company*	*Facility*	*Sample Point*	*Date*

		Sample Points, Sampling Dates, and ETC Sample No.'s							
Parameters	*Units*	W 23 850131 G7052							
Temperature	Deg. C	7							
Well Depth	Feet	55							
pH (Field)	std	7.06							
pH (Field)	std	6.94							

Footnotes: BMDL=Below Method Detection Limit ND=Parameter not detected '-'=Parameter not tested

ETC ENVIRONMENTAL TESTING and CERTIFICATION

DATA MANAGEMENT SUMMARY REPORT
(DM-1H) - History of All Parameters Present, Selected Sample Point

February 25, 1985
Page 1

Chain of Custody Data Required for ETC Data Management Summary Report

See Below	WASTE MANAGEMENT, INC.	000		See Below
ETC Sample No.	*Company*	*Facility*	*Sample Point*	*Date*

Parameters	Units	Sample Points, Sampling Dates, and ETC Sample No.'s: W 24 B50131 G7051
PP Metals		
Phenolics, Total	ug/l	4000
GW Met., Pest., & Herb.		
Iron	ug/l	6600
Sodium	ug/l	9200
GW Conventionals		
Chloride	mg/l	11
Sulfate as SO4	mg/l	4
Phenolics, Total	mg/l	4
Total Organic Carbon	mg/l	16
Total Organic Carbon	mg/l	16
M llaneous Parameters		
Ammonia as N	mg/l	18
Bicarbonate as CaCO3	mg/l	240
Calcium	ug/l	36300
Chemical Oxygen Demand (COD)	mg/l	38
Depth to Water	Feet	15.6
Magnesium	ug/l	19100
Specific Conductance (Field)	um/cm	376
Specific Conductance (Field)	um/cm	378
Specific Conductance (Field)	um/cm	375
Specific Conductance (Field)	um/cm	379
Temperature	Deg. C	5
Well Depth	Feet	36
pH (Field)	std	7.09
pH (Field)	std	7.21

Footnotes: BMDL=Below Method Detection Limit ND=Parameter not detected '-'=Parameter not tested

RECD MAR 6 1985

ETC ENVIRONMENTAL TESTING and CERTIFICATION

DATA MANAGEMENT SUMMARY REPORT
(DM-1H) - History of All Parameters Present, Selected Sample Point

Chain of Custody Data Required for ETC Data Management Summary Report

See Below	WASTE MANAGEMENT, INC.	000		See Below
ETC Sample No.	*Company*	*Facility*	*Sample Point*	*Date*

Parameters	Units	Sample Points, Sampling Dates, and ETC Sample No.'s							
		W 24 850131 G7051							
pH (Field)	std	7.24							
pH (Field)	std	7.25							

Footnotes: BMDL=Below Method Detection Limit ND=Parameter not detected '-'=Parameter not tested

ETC ENVIRONMENTAL TESTING and CERTIFICATION

DATA MANAGEMENT SUMMARY REPORT
(DM-1H) - History of All Parameters Present, Selected Sample Point

February 25, 1985
Page 1

Chain of Custody Data Required for ETC Data Management Summary Report

See Below	WASTE MANAGEMENT, INC.	000		See Below
ETC Sample No.	Company	Facility	Sample Point	Date

'arameters	Units	Sample Points, Sampling Dates, and ETC Sample No.'s							
		W 30 850131 G7055							
'P Metals									
'henolics, Total	ug/l	23000							
W Met., Pest., & Herb..									
odium	ug/l	4000							
W Conventionals									
hloride	mg/l	7.6							
litrate as N	mg/l	0.12							
ulfate as SO4	mg/l	23							
henolics, Total	mg/l	23							
otal Organic Carbon	mg/l	3							
otal Organic Carbon	mg/l	2.7							
is laneous Parameters									
alcium	ug/l	21000							
hemical Oxygen Demand (COD)	mg/l	6							
epth to Water	Feet	16.7							
agnesium	ug/l	5010							
pecific Conductance (Field)	um/cm	127							
pecific Conductance (Field)	um/cm	129							
emperature	Deg. C	8							
ell Depth	Feet	55							
H (Field)	std	8.24							
H (Field)	std	8.21							

S/ Jacobsen
G/CC

otnotes: BMDL=Below Method Detection Limit ND=Parameter not detected '-'=Parameter not tested

REC'D MAR 01 1985

ETC ENVIRONMENTAL TESTING and CERTIFICATION

DATA MANAGEMENT SUMMARY REPORT
(DM-1H) - History of All Parameters Present, Selected Sample Point

February 25, 1985
Page 1

Chain of Custody Data Required for ETC Data Management Summary Report

See Below	WASTE MANAGEMENT, INC.	000		See Below
ETC Sample No.	*Company*	*Facility*	*Sample Point*	*Date*

Parameters	Units	Sample Points, Sampling Dates, and ETC Sample No.'s: W 42 850131 G7049
GW Met., Pest., & Herb.		
Sodium	ug/l	36900
GW Conventionals		
Chloride	mg/l	39
Nitrate as N	mg/l	0.38
Sulfate as S04	mg/l	4
Total Organic Carbon	mg/l	10
Total Organic Carbon	mg/l	10
Miscellaneous Parameters		
Ammonia as N	mg/l	0.07
Bicarbonate as CaC03	mg/l	190
Ca[illegible]um	ug/l	83900
Ch[illegible]cal Oxygen Demand (COD)	mg/l	27
Depth to Water	Feet	10
Magnesium	ug/l	20400
Specific Conductance (Field)	um/cm	472
Specific Conductance (Field)	um/cm	470
Temperature	Deg. C	8
Well Depth	Feet	42
pH (Field)	std	8.53
pH (Field)	std	8.58

Footnotes: BMDL=Below Method Detection Limit ND=Parameter not detected '-'=Parameter not tested

ETC ENVIRONMENTAL TESTING and CERTIFICATION

DATA MANAGEMENT SUMMARY REPORT
(DM-1H) - History of All Parameters Present, Selected Sample Point

February 25, 1985
Page 1

Chain of Custody Data Required for ETC Data Management Summary Report

See Below	WASTE MANAGEMENT, INC.	000		See Below
ETC Sample No.	*Company*	*Facility*	*Sample Point*	*Date*

Parameters	*Units*	*Sample Points, Sampling Dates, and ETC Sample No.'s*							
		W 43 850131 G7048							
GW Met., Pest., & Herb.									
Sodium	ug/l	12300							
GW Conventionals									
Chloride	mg/l	20							
Nitrate as N	mg/l	0.1							
Total Organic Carbon	mg/l	13							
Total Organic Carbon	mg/l	14							
Miscellaneous Parameters									
Ammonia as N	mg/l	0.07							
Bicarbonate as CaCO3	mg/l	42							
Calcium	ug/l	16000							
Chemical Oxygen Demand (COD)	mg/l	38							
Depth to Water	Feet	13.8							
Magnesium	ug/l	4520							
Specific Conductance (Field)	um/cm	177							
Specific Conductance (Field)	um/cm	197							
Temperature	Deg. C	6							
Well Depth	Feet	34.5							
pH (Field)	std	8.52							
pH (Field)	std	8.55							

Footnotes: BMDL=Below Method Detection Limit ND=Parameter not detected '-'=Parameter not tested

ETC ENVIRONMENTAL TESTING and CERTIFICATION

DATA MANAGEMENT SUMMARY REPORT
(DM-1H) - History of All Parameters Present, Selected Sample Point

DATE: 08/01/85
PAGE: 1

Chain of Custody Data Required for ETC Data Management Summary Report

See Below	WASTE MANAGEMENT, INC.	000	50	See Below
ETC Sample No.	*Company*	*Facility*	*Sample Point*	*Date*

Parameters	*Units*	*Sample Points, Sampling Dates, and ETC Sample No.'s*							
		W 50 850131 G7055							
Metals									
Phenolics, Total	ug/l	23000							
Conventionals									
Chloride	mg/l	7.6							
Nitrate as N	mg/l	.12							
Sulfate as S04	mg/l	23							
Total Organic Carbon	mg/l	3							
Total Organic Carbon	mg/l	2.7							
Miscellaneous Parameters									
Calcium	ug/l	21000							
Chemical Oxygen Demand (COD)	mg/l	6							
Depth to Water	Feet	16.7							
Magnesium	ug/l	5010							
Sodium	ug/l	4000							
Specific Conductance (Field)	um/cm	127.3							
Spec. Conductance (Field)	um/cm	128.5							
Temperature	Deg. C	8							
Well Depth	Feet	55							
pH (Field)	std	8.24							
pH (Field)	std	8.21							

notes: BMDL=Below Method Detection Limit ND=Parameter not detected '-'=Parameter not tested

ETC ENVIRONMENTAL TESTING and CERTIFICATION

DATA MANAGEMENT SUMMARY REPORT
(DM-1H) - History of All Parameters Present, Selected Sample Point

DATE: 08/01/85
PAGE: 1

Chain of Custody Data Required for ETC Data Management Summary Report

See Below	WASTE MANAGEMENT, INC.	000	51	See Below
ETC Sample No.	*Company*	*Facility*	*Sample Point*	*Date*

Parameters	*Units*	*Sample Points, Sampling Dates, and ETC Sample No.'s* W 51 850131 G7054
W Conventionals		
Chloride	mg/l	1.6
Nitrate as N	mg/l	.12
Sulfate as S04	mg/l	40
Total Organic Carbon	mg/l	2
Total Organic Carbon	mg/l	2
Miscellaneous Parameters		
Bicarbonate as CaC03	mg/l	60
Calcium	ug/l	25000
Chemical Oxygen Demand (COD)	mg/l	6
Depth to Water	Feet	15.7
Magnesium	ug/l	5130
Sodium	ug/l	1700
Specific Conductance (Field)	um/cm	120.4
Specific Conductance (Field)	um/cm	117.8
Temperature	Deg. C	7
Well Depth	Feet	35
pH (Field)	std	8.47
pH (Field)	std	8.36

Footnotes: BMDL=Below Method Detection Limit ND=Parameter not detected '-'=Parameter not tested

ETC ENVIRONMENTAL TESTING and CERTIFICATION

DATA MANAGEMENT SUMMARY REPORT
(DM-1H) - History of All Parameters Present, Selected Sample Point

February 25, 1985

Chain of Custody Data Required for ETC Data Management Summary Report

See Below	WASTE MANAGEMENT, INC.	000		See Below
ETC Sample No.	*Company*	*Facility*	*Sample Point*	*Date*

Parameters	*Units*	*Sample Points, Sampling Dates, and ETC Sample No.'s*							
		W 54 850131 G7054							
GW Met., Pest., & Herb.									
Sodium	ug/l	1700							
GW Conventionals									
Chloride	mg/l	1.6							
Nitrate as N	mg/l	0.12							
Sulfate as SO4	mg/l	40							
Total Organic Carbon	mg/l	2							
Total Organic Carbon	mg/l	2							
Miscellaneous Parameters									
Bicarbonate as CaCO3	mg/l	60							
Calcium	ug/l	25000							
Chemical Oxygen Demand (COD)	mg/l	6							
Depth to Water	Feet	15.7							
Magnesium	ug/l	5130							
Specific Conductance (Field)	um/cm	120							
Specific Conductance (Field)	um/cm	118							
Temperature	Deg. C	7							
Well Depth	Feet	35							
pH (Field)	std	8.47							
pH (Field)	std	8.36							

Footnotes: BMDL=Below Method Detection Limit ND=Parameter not detected '-'=Parameter not tested

RECEIVED MAR 11 1985

ATTACHMENT I

Waste Management of North America, Inc.
Northeast Region
22200 W. Nine Mile Road • Southfield, Michigan 48034
313/351-5800

ENV. RESPONSE DIV.
GRAND RAPIDS

JAN 25 1988

RECEIVED

January 20, 1988

Ms. Marge Spruit
Michigan Department of Natural Resources
State Office Building
350 Ottawa Street, N.W.
Grand Rapids, Michigan 49503

RE: Groundwater Monitoring Results from Jacobusse Refuse (aka: Waste Management of Holland)

Dear Ms. Spruit:

Attached are the analyses of groundwater samples obtained on October 21, 1987 at the Jacobusse Refuse facility in Holland, Michigan. In general, the results show greater impact to the groundwater upgradient of the exhumed lagoons at the facility, than downgradient. These results are similar to results obtained in January, 1986 from samples obtained from the same monitoring wells.

I would be interested in obtaining a copy of the State's analysis of the samples split on October 21, 1987. If you have any comments or questions, please call.

Very truly yours,

David R Miller /jm

David R. Miller
District Engineer

/jm
Attachment
F: JAC/GW

xc. BElder-EPA 1-26-88
B. Remunk - P'eN

RECD DEC 30 1987

DATA MANAGEMENT STATUS REPORT

For

WASTE MANAGEMENT, INC.
JACOBUSSE

OCTOBER, 1987

DM-OL
Summary of results for all parameters tested, by order link.

ETC ENVIRONMENTAL TESTING and CERTIFICATION

DATA MANAGEMENT SUMMARY REPORT
(DM-OL) - All Parameters Tested, Samples Linked by Order

DATE: 12/17/8
PAGE: 1

Chain of Custody Data Required for ETC Data Management Summary Report

See Below	WASTE MANAGEMENT, INC.	JACOBUSSE	See Below	
ETC Sample No.	*Company*	*Facility*	*Sample Point*	*Date*

Sample Points, Sampling Dates, and ETC Sample No.'s

Parameters	*Units*	W 01FB 871021 BC2794	W J01 871021 BC2787	W W23 871021 BC2788	W W24 871021 BC2789	W W42 871021 BC2791	W W43 871021 BC2792	W W50 871021 BC2790	W W51 871021 BC2793
Priority Poll. Volatiles GC/MS									
Acrolein	ug/l	< 100	< 100	< 100	< 100	< 100	< 100	< 100	-
Acrylonitrile	ug/l	< 100	< 100	< 100	< 100	< 100	< 100	< 100	-
Benzene	ug/l	< 4.4	< 4.4	< 4.4	< 4.4	< 4.4	< 4.4	< 4.4	< 4.4
bis(Chloromethyl)ether	ug/l	< 10	< 10	< 10	< 10	< 10	< 10	< 10	-
Bromoform	ug/l	< 4.7	< 4.7	< 4.7	< 4.7	< 4.7	< 4.7	< 4.7	< 4.7
Carbon tetrachloride	ug/l	< 2.8	< 2.8	< 2.8	< 2.8	< 2.8	< 2.8	< 2.8	< 2.8
Chlorobenzene	ug/l	< 6.0	< 6.0	< 6.0	< 6.0	< 6.0	< 6.0	< 6.0	< 6.0
Chlorodibromomethane	ug/l	< 3.1	< 3.1	< 3.1	< 3.1	< 3.1	< 3.1	< 3.1	< 3.1
Chloroethane	ug/l	< 10	< 10	< 10	< 10	< 10	< 10	< 10	-
2-Chloroethylvinyl ether	ug/l	< 10	< 10	< 10	< 10	< 10	< 10	< 10	-
Chloroform	ug/l	< 1.6	< 1.6	< 1.6	< 1.6	< 1.6	< 1.6	< 1.6	< 1.6
Dichlorobromomethane	ug/l	< 2.2	< 2.2	< 2.2	< 2.2	< 2.2	< 2.2	< 2.2	< 2.2
Dichlorodifluoromethane	ug/l	< 10	< 10	< 10	< 10	< 10	< 10	< 10	-
1,1-Dichloroethane	ug/l	< 4.7	< 4.7	< 4.7	< 4.7	< 4.7	< 4.7	< 4.7	< 4.7
1,2-Dichloroethane	ug/l	< 2.8	< 2.8	< 2.8	< 2.8	< 2.8	< 2.8	< 2.8	< 2.8
1,1-Dichloroethylene	ug/l	< 2.8	< 2.8	< 2.8	< 2.8	< 2.8	< 2.8	< 2.8	< 2.8
1,2-Dichloropropane	ug/l	< 6.0	< 6.0	< 6.0	< 6.0	< 6.0	< 6.0	< 6.0	< 6.0
cis-1,3-Dichloropropylene	ug/l	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	-
Ethylbenzene	ug/l	< 7.2	< 7.2	< 7.2	< 7.2	< 7.2	< 7.2	< 7.2	< 7.2
Methyl bromide	ug/l	< 10	< 10	< 10	< 10	< 10	< 10	< 10	-
Methyl chloride	ug/l	< 10	< 10	< 10	< 10	< 10	< 10	< 10	10
Methylene chloride	ug/l	< 2.8	< 2.8	< 2.8	< 2.8	< 2.8	< 2.8	< 2.8	-
1,1,2,2-Tetrachloroethane	ug/l	< 6.9	< 6.9	< 6.9	< 6.9	< 6.9	< 6.9	< 6.9	-
Tetrachloroethylene	ug/l	< 4.1	< 4.1	< 4.1	< 4.1	< 4.1	< 4.1	< 4.1	-
Toluene	ug/l	< 6.0	< 6.0	< 6.0	< 6.0	< 6.0	< 6.0	< 6.0	< 6.0
1,2-Trans-dichloroethylene	ug/l	< 1.6	11.2	< 1.6	< 1.6	< 1.6	7.35	< 1.6	< 1.6
1,1,1-Trichloroethane	ug/l	< 3.8	< 3.8	< 3.8	< 3.8	< 3.8	< 3.8	< 3.8	-
1,1,2-Trichloroethane	ug/l	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Trichloroethylene	ug/l	< 1.9	< 1.9	< 1.9	< 1.9	< 1.9	< 1.9	< 1.9	< 1.9
Trichlorofluoromethane	ug/l	< 10	< 10	< 10	< 10	< 10	< 10	< 10	-
Vinyl chloride	ug/l	< 10	< 10	< 10	< 10	< 10	< 10	< 10	-
trans-1,3-Dichloropropylene	ug/l	< 10	< 10	< 10	< 10	< 10	< 10	< 10	-

Footnotes: BMDL=Below Method Detection Limit ND=Parameter not detected '-'=Parameter not tested

ETC ENVIRONMENTAL TESTING and CERTIFICATION

DATA MANAGEMENT SUMMARY REPORT
(DM-OL) - All Parameters Tested, Samples Linked by Order

Chain of Custody Data Required for ETC Data Management Summary Report

See Below — *ETC Sample No.* | WASTE MANAGEMENT, INC. — *Company* | JACOBUSSE — *Facility* | See Below — *Sample Point* | *Date*

Parameters	Units	Sample Points, Sampling Dates, and ETC Sample No.'s							
		X 01FB 871021 BC2794	W J01 871021 BC2787	W W23 871021 BC2788	W W24 871021 BC2789	W W42 871021 BC2791	W W43 871021 BC2792	W W50 871021 BC2790	W W51 871021 BC2793
Groundwater Metals									
Cadmium	ug/l	< 5	< 5	5	< 5	< 5	< 5	< 5	< 5
Chromium	ug/l	< 7.5	< 7.5	< 7.5	< 7.5	< 7.5	< 7.5	< 7.5	< 7.5
Lead	ug/l	< 10	< 10	< 10	< 10	< 10	< 10	< 10	20
Iron	ug/l	< 40	< 40	12000	2200	< 40	< 40	< 40	< 40
Sodium	ug/l	< 20	1000	60000	9200	51000	11000	3200	1000
Groundwater Conventionals									
Chloride	mg/l	< 1.0	1.1	80	10	95	7.6	6.9	1.6
Nitrate as N	mg/l	< .10	< .10	< .10	< .10	< .10	.11	< .10	< .10
Sulfate as S04	mg/l	< 1.0	9.1	5.9	2.3	10	13	17	17
Phenolics, Total	mg/l	< .010	< .010	.010	< .010	.028	.014	.010	< .01(
Total Organic Carbon	mg/l	< 1.0	1.1	12.0	5.1	5.8	2.6	3.5	1.3
Total Organic Carbon	mg/l	< 1.0	1.2	12.5	5.2	5.8	2.6	3.7	1.3
Field Parameters									
pH (Field)	std	7.03	8.28	6.96	7.52	8.65	8.41	7.98	7.72
Specific Conductance (Field)	um/cm	1.58	83.7	1180	389	654	294	173	169
th to Water	Feet	-	12.02	14.59	15.49	12.16	11.98	15.82	14.71
Miscellaneous Parameters									
Ammonia as N	mg/l	< .05	< .05	23	8.3	.07	.14	< .05	< .05
Bicarbonate as CaC03	mg/l	< 1.5	29	530	190	220	140	66	67
Calcium	ug/l	< 30	16000	130000	46000	71000	37000	24000	23000
Chemical Oxygen Demand (COD)	mg/l	< 3.7	< 3.7	19	3.7	< 3.7	< 3.7	< 3.7	< 3.7
Magnesium	ug/l	< 20	2000	21000	9000	20000	10000	5300	4900
Styrene	ug/l	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
m-Xylene	ug/l	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
o+p-Xylenes	ug/l	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10

Footnotes: BMDL=Below Method Detection Limit ND=Parameter not detected '-'=Parameter not tested

MICHIGAN DEPARTMENT OF NATURAL RESOURCES
ENVIRONMENTAL LABORATORY

REPORT Environmental Response Div.
TO Grand Rapids District Office
Grand Rapids, MI

ATTEN MARGE SPRUIT

LABORATORY WORK ORDER # 87-10-119
WORK ID JACOBUSSE'S
P.O. # 90165 COST $ 205.00
RECEIVED 10/22/87 CLIENT ER GR
REPORTED _____ NUMBER OF SAMPLES 1
LAB CONTACT BN MATRIX EP TOX/LEACHATE

TEST / UNITS	JACOBUSSE	
Cadmium in Leachate mg/kg (dry)	K .1	1
Chromium in Leachate mg/kg (dry)	4.32	5
Copper in Leachate mg/kg (dry)	.12	100
Nickel in Leachate mg/kg (dry)	.39	20
Lead in Leachate mg/kg (dry)	K .3	5
Zinc in Leachate mg/kg (dry)	K .3	500
Total Solids - Inorganic %TS	66.2	
Cadmium by E. P. Tox ug/l	K.100	1
Chromium by E. P. Tox ug/l	.463	5
Copper by E. P. Tox ug/l	24000	100
Nickel by E. P. Tox ug/l	15700	~ 50
Lead by E. P. Tox ug/l	.359	5
Zinc by E. P. Tox ug/l	16200	500

- Sample: sludge
- non hazardous
- to be excavated and disposed of

Report prepared By: Louis C. Wessels

ENV. RESPONSE DIV.
GRAND RAPIDS
DEC 1 1987
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EL 086
4/87

MICHIGAN DEPT OF NATURAL RESOURCES
ENVIRONMENTAL LABORATORY
ANALYSIS REQUEST SHEET

MATRIX = EP TOX / ASTM LEACHATE

SAFETY WARNING
YES / NO - INFO ON BACK

LAB ORDER# 8710-119 PROJ CODE 3411 PRIORITY II RECEIVED AT LAB BY JV DATE TIME 10/22/87 12:00 AM/PM

SUBMITTER DIVISION ERD DISTRICT OR OFFICE Grand Rapids CONTACT PERSON FOR QUESTIONS M. Spruit PHONE (616) - 456-5071

LOCATION SAMPLED MICHIGAN COLLECTED BY M. Spruit TRANS TO [illegible]

COST CENTER 90165 SEND RESULTS TO ATTENTION OF M. Spruit AT ADDRESS Grand Rapids (if different than above office)

SAMPLE REMARKS

SAMPLE NUMBER	FIELD ID OR DESCRIPTION	SAMPLE COLLECTED YY/MM/DD	HH:MM	SAMPLE INFORMATION
01	MICHIGAN	87/10/21	1300	in driveway
02				
03				
04				
05				
06				
07				
08				

GENERAL CHEMISTRY

GS	Ortho P, NO2	1 2 3 4 5 6 7 8
		1 2 3 4 5 6 7 8
A	COD	1 2 3 4 5 6 7 8
S		1 2 3 4 5 6 7 8
T	TOC	1 2 3 4 5 6 7 8
M		1 2 3 4 5 6 7 8
	NO3+NO2, NH3	1 2 3 4 5 6 7 8
L		1 2 3 4 5 6 7 8
E	KJEL N, Tot P	1 2 3 4 5 6 7 8
A		1 2 3 4 5 6 7 8
C	Phenolics	1 2 3 4 5 6 7 8
H		1 2 3 4 5 6 7 8
A	Total CN	1 2 3 4 5 6 7 8
T		1 2 3 4 5 6 7 8
E	% TS	1 2 3 4 5 6 7 8
		1 2 3 4 5 6 7 8
		1 2 3 4 5 6 7 8
		1 2 3 4 5 6 7 8
		1 2 3 4 5 6 7 8

ORGANICS

	1 2 3 4 5 6 7 8
	1 2 3 4 5 6 7 8
	1 2 3 4 5 6 7 8
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	1 2 3 4 5 6 7 8
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	1 2 3 4 5 6 7 8
	1 2 3 4 5 6 7 8

INORGANIC

✓MS	ASTM Leaching	(1) 2 3 4 5 6 7 8
		1 2 3 4 5 6 7 8
A	Cl, SO4, Alk	1 2 3 4 5 6 7 8
S	Cr+6	1 2 3 4 5 6 7 8
T	Ca, Mg, Na, K	1 2 3 4 5 6 7 8
M	Cd Cr Cu Ni Pb Zn	(1) 2 3 4 5 6 7 8
	Fe Co Li Mn	1 2 3 4 5 6 7 8
	Al Ba Be Mo T	1 2 3 4 5 6 7 8
	Hg, As, Se, Sb	1 2 3 4 5 6 7 8
✓MS	EP Tox Extraction	(1) 2 3 4 5 6 7 8
		1 2 3 4 5 6 7 8
E	Cd Cr Cu Ni Pb Zn	(1) 2 3 4 5 6 7 8
P	Ag - Silver	1 2 3 4 5 6 7 8
	Ba - Barium	1 2 3 4 5 6 7 8
T	Hg - Mercury	1 2 3 4 5 6 7 8
O	As - Arsenic	1 2 3 4 5 6 7 8
X	Se - Selenium	1 2 3 4 5 6 7 8
	Sb - Antimony	1 2 3 4 5 6 7 8

MICHIGAN DEPARTMENT OF NATURAL RESOURCES
ENVIRONMENTAL LABORATORY

REPORT Environmental Response Div.
TO Grand Rapids District Office
Grand Rapids, MI

ATTEN MARGE SPRUIT

LABORATORY WORK ORDER # 87-10-117
WORK ID JACOBUSSE'S
P.O. # 90395 COST $ 1212.00
RECEIVED 10/22/87 CLIENT ER GR
REPORTED _____ NUMBER OF SAMPLES 8
LAB CONTACT BN JP RW MATRIX WATER

TEST / UNITS	MW 23	MW 24	J 1	MW 42
Alkalinity of Water mg CaCO3/l	540	200	50	169
Chloride in Water mg/l	79	10	K 1.0	90
COD mg/l	60	17	6	16
Conductivity of Water umho/cm	1206	419	124	673
Arsenic - Dissolved ug/l (Diss)	K 2.0	4.4	K 2.0	K 2.0
Cadmium - Dissolved ug/l (Diss)	K 20	K 20	K 20	K 20
Chromium - Dissolved ug/l (Diss)	K 50	K 50	K 50	K 50
Copper - Dissolved ug/l (Diss)	K 20	K 20	K 20	K 20
Nickel - Dissolved ug/l (Diss)	K 50	K 50	K 50	K 50
Lead - Dissolved ug/l (Diss)	K 50	K 50	K 50	K 50
Zinc - Dissolved ug/l (Diss)	2300	955	330	210
pH of Water pH	6.96	7.47	8.12	8.77
Sulfate in Water mg/l	4	2	12	8

TEST / UNITS	MW 43	MW 50	MW 51	BLANK
Alkalinity of Water mg CaCO3/l	139	67	67	K 5.0
Chloride in Water mg/l	8	7	2	K 1.0
COD mg/l	10	10	5	K 3
Conductivity of Water umho/cm	302	183	169	2.00

ENV. RESPONSE DIV.
GRAND RAPIDS
NOV 24 1987
RECEIVED

D. Miller - Waste Management Inc
xc B. Eleder - EPA (w/ map)
R. Reimink - Prein & Newhof

TEST UNITS	MW 43	MW 50	MW 51	BLANK
Arsenic - Dissolved ug/l (Diss)	K 2.0	K 2.0	K 2.0	K 2.0
Cadmium - Dissolved ug/l (Diss)	K 20	K 20	K 20	K 20
Chromium - Dissolved ug/l (Diss)	K 50	K 50	K 50	K 50
Copper - Dissolved ug/l (Diss)	K 20	K 20	K 20	K 20
Nickel - Dissolved ug/l (Diss)	K 50	K 50	K 50	K 50
Lead - Dissolved ug/l (Diss)	K 50	K 50	K 50	K 50
Zinc - Dissolved ug/l (Diss)	1500	420	570	K 50
pH of Water pH	8.31	8.42	8.54	INT
Sulfate in Water mg/l	10	14	16	K 1.0

Report prepared By: Lewis C. Utess

SAMPLE ID MW 23 FRACTION 01B TEST CODE SC 1 NAME Scan 1 Water
Date & Time Collected 10/21/87 16:30:00 Category

ANALYST KAJIYA
ANALYZED 10/28/87
DILUTION 1

UNITS ug/L ppb

CAS#	COMPOUND	RESULT	REMARK	DETECTION LIMIT
75-01-4	Vinyl chloride			5.0
74-83-9	*Bromomethane			5.0
75-00-3	*Chloroethane			5.0
75-69-4	*Trichlorofluoromethane			5.0
75-35-4	1,1-Dichloroethene			1.0
75-09-2	*Methylene chloride			5.0
156-60-5	trans-1,2-Dichloroethene			1.0
75-34-3	*1,1-Dichloroethane			1.0
156-59-2	cis-1,2-Dichloroethene			1.0
67-66-3	*Chloroform			1.0
71-55-6	*1,1,1-Trichloroethane			1.0
56-23-5	*Carbon tetrachloride			1.0
107-06-2	*1,2-Dichloroethane			1.0
79-01-6	Trichloroethene			1.0
78-87-5	*1,2-Dichloropropane			1.0
75-27-4	*Bromodichloromethane			1.0
10061-01-5	cis-1,3-Dichloropropene			1.0
10061-02-6	trans-1,3-Dichloropropene			1.0
79-00-5	*1,1,2-Trichloroethane			1.0
127-18-4	Tetrachloroethene			1.0
124-48-1	*Dibromochloromethane			1.0
108-90-7	Chlorobenzene			5.0
75-25-2	*Bromoform			1.0
79-34-5	*1,1,2,2-Tetrachloroethane			1.0

COMMENTS

* Compound identity not confirmed by second independent technique.
Unless otherwise noted, sample was analyzed for ALL compounds listed.

SAMPLE ID MW 23 FRACTION 01B TEST CODE SC 2 NAME Scan 2 Water
Date & Time Collected 10/21/87 16:30:00 Category

ANALYST KAJIYA
ANALYZED 10/28/87
DILUTION 1

UNITS ug/L ppb

CAS#	COMPOUND	RESULT	REMARK	DETECTION LIMIT
71-43-2	Benzene			1.0
108-88-3	Toluene			1.0
100-41-4	Ethylbenzene			1.0
108-38-3	Xylene isomers		INT	2.0

COMMENTS UnID PEAK

Unless otherwise noted, sample was analyzed for ALL compounds listed.

SAMPLE ID MW 24 FRACTION 02B TEST CODE SC 1 NAME Scan 1 Water
Date & Time Collected 10/21/87 15:05:00 Category

ANALYST KAJIYA
ANALYZED 10/28/87
DILUTION 1

UNITS ug/L ppb

CAS#	COMPOUND	RESULT	REMARK	DETECTION LIMIT
75-01-4	Vinyl chloride			5.0
74-83-9	*Bromomethane			5.0
75-00-3	*Chloroethane			5.0
75-69-4	*Trichlorofluoromethane			5.0
75-35-4	1,1-Dichloroethene			1.0
75-09-2	*Methylene chloride			5.0
156-60-5	trans-1,2-Dichloroethene			1.0
75-34-3	*1,1-Dichloroethane			1.0
156-59-2	cis-1,2-Dichloroethene			1.0
67-66-3	*Chloroform			1.0
71-55-6	*1,1,1-Trichloroethane			1.0
56-23-5	*Carbon tetrachloride			1.0
107-06-2	*1,2-Dichloroethane			1.0
79-01-6	Trichloroethene			1.0
78-87-5	*1,2-Dichloropropane			1.0
75-27-4	*Bromodichloromethane			1.0
10061-01-5	cis-1,3-Dichloropropene			1.0
10061-02-6	trans-1,3-Dichloropropene			1.0
79-00-5	*1,1,2-Trichloroethane			1.0
127-18-4	Tetrachloroethene			1.0
124-48-1	*Dibromochloromethane			1.0
108-90-7	Chlorobenzene			5.0
75-25-2	*Bromoform			1.0
79-34-5	*1,1,2,2-Tetrachloroethane			1.0

COMMENTS

* Compound identity not confirmed by second independent technique.
Unless otherwise noted, sample was analyzed for ALL compounds listed.

SAMPLE ID MW 24 FRACTION 02B TEST CODE SC 2 NAME Scan 2 Water
Date & Time Collected 10/21/87 15:05:00 Category

ANALYST KAJIYA
ANALYZED 10/28/87
DILUTION 1 UNITS ug/L ppb

CAS#	COMPOUND	RESULT	REMARK	DETECTION LIMIT
71-43-2	Benzene	2.0	UC	1.0
108-88-3	Toluene			1.0
100-41-4	Ethylbenzene		INT	1.6
108-38-3	Xylene isomers		INT	2.0

COMMENTS

Unless otherwise noted, sample was analyzed for ALL compounds listed.

SAMPLE ID J 1 FRACTION 03B TEST CODE SC 1 NAME Scan 1 Water
Date & Time Collected 10/21/87 13:20:00 Category

ANALYST KAJIYA
ANALYZED 10/28/87
DILUTION 1 UNITS ug/L ppb

CAS#	COMPOUND	RESULT	REMARK	DETECTION LIMIT
75-01-4	Vinyl chloride			5.0
74-83-9	*Bromomethane			5.0
75-00-3	*Chloroethane			5.0
75-69-4	*Trichlorofluoromethane			5.0
75-35-4	1,1-Dichloroethene			1.0
75-09-2	*Methylene chloride			5.0
156-60-5	trans-1,2-Dichloroethene			1.0
75-34-3	*1,1-Dichloroethane			1.0
156-59-2	cis-1,2-Dichloroethene			1.0
67-66-3	*Chloroform			1.0
71-55-6	*1,1,1-Trichloroethane			1.0
56-23-5	*Carbon tetrachloride			1.0
107-06-2	*1,2-Dichloroethane			1.0
79-01-6	Trichloroethene			1.0
78-87-5	*1,2-Dichloropropane			1.0
75-27-4	*Bromodichloromethane			1.0
10061-01-5	cis-1,3-Dichloropropene			1.0
10061-02-6	trans-1,3-Dichloropropene			1.0
79-00-5	*1,1,2-Trichloroethane			1.0
127-18-4	Tetrachloroethene			1.0
124-48-1	*Dibromochloromethane			1.0
108-90-7	Chlorobenzene			5.0
75-25-2	*Bromoform			1.0
79-34-5	*1,1,2,2-Tetrachloroethane			1.0

COMMENTS

* Compound identity not confirmed by second independent technique.
Unless otherwise noted, sample was analyzed for ALL compounds listed.

SAMPLE ID J 1 FRACTION 03B TEST CODE SC 2 NAME Scan 2 Water
Date & Time Collected 10/21/87 13:20:00 Category

ANALYST KAJIYA
ANALYZED 10/28/87
DILUTION 1

UNITS ug/L ppb

CAS#	COMPOUND	RESULT	REMARK	DETECTION LIMIT
71-43-2	Benzene			1.0
108-88-3	Toluene			1.0
100-41-4	Ethylbenzene			1.0
108-38-3	Xylene isomers			1.0

COMMENTS

Unless otherwise noted, sample was analyzed for ALL compounds listed.

SAMPLE ID MW 42 FRACTION 04B TEST CODE SC 1 NAME Scan 1 Water
Date & Time Collected 10/21/87 12:20:00 Category

ANALYST KAJIYA
ANALYZED 10/28/87
DILUTION 1

UNITS ug/L ppb

CAS#	COMPOUND	RESULT	REMARK	DETECTION LIMIT
75-01-4	Vinyl chloride			5.0
74-83-9	*Bromomethane			5.0
75-00-3	*Chloroethane			5.0
75-69-4	*Trichlorofluoromethane			5.0
75-35-4	1,1-Dichloroethene			1.0
75-09-2	*Methylene chloride			5.0
156-60-5	trans-1,2-Dichloroethene			1.0
75-34-3	*1,1-Dichloroethane			1.0
156-59-2	cis-1,2-Dichloroethene			1.0
67-66-3	*Chloroform			1.0
71-55-6	*1,1,1-Trichloroethane			1.0
56-23-5	*Carbon tetrachloride			1.0
107-06-2	*1,2-Dichloroethane			1.0
79-01-6	Trichloroethene			1.0
78-87-5	*1,2-Dichloropropane			1.0
75-27-4	*Bromodichloromethane			1.0
10061-01-5	cis-1,3-Dichloropropene			1.0
10061-02-6	trans-1,3-Dichloropropene			1.0
79-00-5	*1,1,2-Trichloroethane			1.0
127-18-4	Tetrachloroethene			1.0
124-48-1	*Dibromochloromethane			1.0
108-90-7	Chlorobenzene			5.0
75-25-2	*Bromoform			1.0
79-34-5	*1,1,2,2-Tetrachloroethane			1.0

COMMENTS

* Compound identity not confirmed by second independent technique.
Unless otherwise noted, sample was analyzed for ALL compounds listed.

SAMPLE ID MW 42 FRACTION 04B TEST CODE SC 2 NAME Scan 2 Water
Date & Time Collected 10/21/87 12:20:00 Category

ANALYST KAJIYA
ANALYZED 10/28/87
DILUTION 1

UNITS ug/L ppb

CAS#	COMPOUND	RESULT	REMARK	DETECTION LIMIT
71-43-2	Benzene			1.0
108-88-3	Toluene			1.0
100-41-4	Ethylbenzene			1.0
108-38-3	Xylene isomers			1.0

COMMENTS

Unless otherwise noted, sample was analyzed for ALL compounds listed.

SAMPLE ID MW 43 FRACTION 05B TEST CODE SC 1 NAME Scan 1 Water
Date & Time Collected 10/21/87 12:25:00 Category

ANALYST KAJIYA
ANALYZED 11/02/87
DILUTION 1

UNITS ug/L ppb

CAS#	COMPOUND	RESULT	REMARK	DETECTION LIMIT
75-01-4	Vinyl chloride			5.0
74-83-9	*Bromomethane			5.0
75-00-3	*Chloroethane			5.0
75-69-4	*Trichlorofluoromethane			5.0
75-35-4	1,1-Dichloroethene			1.0
75-09-2	*Methylene chloride			5.0
156-60-5	trans-1,2-Dichloroethene			1.0
75-34-3	*1,1-Dichloroethane			1.0
156-59-2	cis-1,2-Dichloroethene	4.6		1.0
67-66-3	*Chloroform			1.0
71-55-6	*1,1,1-Trichloroethane			1.0
56-23-5	*Carbon tetrachloride			1.0
107-06-2	*1,2-Dichloroethane			1.0
79-01-6	Trichloroethene			1.0
78-87-5	*1,2-Dichloropropane			1.0
75-27-4	*Bromodichloromethane			1.0
10061-01-5	cis-1,3-Dichloropropene			1.0
10061-02-6	trans-1,3-Dichloropropene			1.0
79-00-5	*1,1,2-Trichloroethane			1.0
127-18-4	Tetrachloroethene			1.0
124-48-1	*Dibromochloromethane			1.0
108-90-7	Chlorobenzene			5.0
75-25-2	*Bromoform			1.0
79-34-5	*1,1,2,2-Tetrachloroethane			1.0

COMMENTS

* Compound identity not confirmed by second independent technique.
Unless otherwise noted, sample was analyzed for ALL compounds listed.

SAMPLE ID MW 43 FRACTION 05B TEST CODE SC 2 NAME Scan 2 Water
Date & Time Collected 10/21/87 12:25:00 Category

ANALYST KAJIYA
ANALYZED 10/28/87
DILUTION 1 UNITS ug/L ppb

CAS#	COMPOUND	RESULT	REMARK	DETECTION LIMIT
71-43-2	Benzene			1.0
108-88-3	Toluene			1.0
100-41-4	Ethylbenzene			1.0
108-38-3	Xylene isomers			1.0

COMMENTS

Unless otherwise noted, sample was analyzed for ALL compounds listed.

SAMPLE ID MW 50 FRACTION 06B TEST CODE SC 1 NAME Scan 1 Water
Date & Time Collected 10/21/87 10:30:00 Category

ANALYST KAJIYA
ANALYZED 10/28/87
DILUTION 1 UNITS ug/L ppb

CAS#	COMPOUND	RESULT	REMARK	DETECTION LIMIT
75-01-4	Vinyl chloride			5.0
74-83-9	*Bromomethane			5.0
75-00-3	*Chloroethane			5.0
75-69-4	*Trichlorofluoromethane			5.0
75-35-4	1,1-Dichloroethene			1.0
75-09-2	*Methylene chloride			5.0
156-60-5	trans-1,2-Dichloroethene			1.0
75-34-3	*1,1-Dichloroethane			1.0
156-59-2	cis-1,2-Dichloroethene			1.0
67-66-3	*Chloroform			1.0
71-55-6	*1,1,1-Trichloroethane			1.0
56-23-5	*Carbon tetrachloride			1.0
107-06-2	*1,2-Dichloroethane			1.0
79-01-6	Trichloroethene			1.0
78-87-5	*1,2-Dichloropropane			1.0
75-27-4	*Bromodichloromethane			1.0
10061-01-5	cis-1,3-Dichloropropene			1.0
10061-02-6	trans-1,3-Dichloropropene			1.0
79-00-5	*1,1,2-Trichloroethane			1.0
127-18-4	Tetrachloroethene			1.0
124-48-1	*Dibromochloromethane			1.0
108-90-7	Chlorobenzene			5.0
75-25-2	*Bromoform			1.0
79-34-5	*1,1,2,2-Tetrachloroethane			1.0

COMMENTS

* Compound identity not confirmed by second independent technique.
Unless otherwise noted, sample was analyzed for ALL compounds listed.

SAMPLE ID MW 50 FRACTION 06B TEST CODE SC 1 NAME Scan 1 Water
Date & Time Collected 10/21/87 10:30:00 Category

ANALYST KAJIYA
ANALYZED 10/28/87
DILUTION 1

UNITS ug/L ppb

CAS#	COMPOUND	RESULT	REMARK	DETECTION LIMIT
75-01-4	Vinyl chloride			5.0
74-83-9	*Bromomethane			5.0
75-00-3	*Chloroethane			5.0
75-69-4	*Trichlorofluoromethane			5.0
75-35-4	1,1-Dichloroethene			1.0
75-09-2	*Methylene chloride			5.0
156-60-5	trans-1,2-Dichloroethene			1.0
75-34-3	*1,1-Dichloroethane			1.0
156-59-2	cis-1,2-Dichloroethene			1.0
67-66-3	*Chloroform			1.0
71-55-6	*1,1,1-Trichloroethane			1.0
56-23-5	*Carbon tetrachloride			1.0
107-06-2	*1,2-Dichloroethane			1.0
79-01-6	Trichloroethene			1.0
78-87-5	*1,2-Dichloropropane			1.0
75-27-4	*Bromodichloromethane			1.0
10061-01-5	cis-1,3-Dichloropropene			1.0
10061-02-6	trans-1,3-Dichloropropene			1.0
79-00-5	*1,1,2-Trichloroethane			1.0
127-18-4	Tetrachloroethene			1.0
124-48-1	*Dibromochloromethane			1.0
108-90-7	Chlorobenzene			5.0
75-25-2	*Bromoform			1.0
79-34-5	*1,1,2,2-Tetrachloroethane			1.0

COMMENTS

* Compound identity not confirmed by second independent technique.
Unless otherwise noted, sample was analyzed for ALL compounds listed.

SAMPLE ID MW 50 FRACTION 06B TEST CODE SC 2 NAME Scan 2 Water
Date & Time Collected 10/21/87 10:30:00 Category

ANALYST KAJIYA
ANALYZED 10/28/87
DILUTION 1 UNITS ug/L ppb

CAS#	COMPOUND	RESULT	REMARK	DETECTION LIMIT
71-43-2	Benzene			1.0
108-88-3	Toluene			1.0
100-41-4	Ethylbenzene			1.0
108-38-3	Xylene isomers			1.0

COMMENTS

Unless otherwise noted, sample was analyzed for ALL compounds listed.

SAMPLE ID MW 5| FRACTION 07B TEST CODE SC 1 NAME Scan 1 Water
Date & Time Collected 10/21/87 10:15:00 Category

ANALYST KAJIYA
ANALYZED 10/28/87
DILUTION 1

UNITS ug/L ppb

CAS#	COMPOUND	RESULT	REMARK	DETECTION LIMIT
75-01-4	Vinyl chloride			5.0
74-83-9	*Bromomethane			5.0
75-00-3	*Chloroethane			5.0
75-69-4	*Trichlorofluoromethane			5.0
75-35-4	1,1-Dichloroethene			1.0
75-09-2	*Methylene chloride			5.0
156-60-5	trans-1,2-Dichloroethene			1.0
75-34-3	*1,1-Dichloroethane			1.0
156-59-2	cis-1,2-Dichloroethene			1.0
67-66-3	*Chloroform			1.0
71-55-6	*1,1,1-Trichloroethane			1.0
56-23-5	*Carbon tetrachloride			1.0
107-06-2	*1,2-Dichloroethane			1.0
79-01-6	Trichloroethene			1.0
78-87-5	*1,2-Dichloropropane			1.0
75-27-4	*Bromodichloromethane			1.0
10061-01-5	cis-1,3-Dichloropropene			1.0
10061-02-6	trans-1,3-Dichloropropene			1.0
79-00-5	*1,1,2-Trichloroethane			1.0
127-18-4	Tetrachloroethene			1.0
124-48-1	*Dibromochloromethane			1.0
108-90-7	Chlorobenzene			5.0
75-25-2	*Bromoform			1.0
79-34-5	*1,1,2,2-Tetrachloroethane			1.0

COMMENTS

* Compound identity not confirmed by second independent technique.
Unless otherwise noted, sample was analyzed for ALL compounds listed.

SAMPLE ID MW 5| FRACTION 07B TEST CODE SC 2 NAME Scan 2 Water
Date & Time Collected 10/21/87 10:15:00 Category

ANALYST KAJIYA
ANALYZED 10/28/87
DILUTION 1 UNITS ug/L ppb

CAS#	COMPOUND	RESULT	REMARK	DETECTION LIMIT
71-43-2	Benzene			1.0
108-88-3	Toluene			1.0
100-41-4	Ethylbenzene			1.0
108-38-3	Xylene isomers			1.0

COMMENTS

Unless otherwise noted, sample was analyzed for ALL compounds listed.

SAMPLE ID BLANK FRACTION 08B TEST CODE SC 1 NAME Scan 1 Water
Date & Time Collected 10/21/87 Category

ANALYST KAJIYA
ANALYZED 11/02/87
DILUTION 1 UNITS ug/L ppb

CAS#	COMPOUND	RESULT	REMARK	DETECTION LIMIT
75-01-4	Vinyl chloride			5.0
74-83-9	*Bromomethane			5.0
75-00-3	*Chloroethane			5.0
75-69-4	*Trichlorofluoromethane			5.0
75-35-4	1,1-Dichloroethene			1.0
75-09-2	*Methylene chloride			5.0
156-60-5	trans-1,2-Dichloroethene			1.0
75-34-3	*1,1-Dichloroethane			1.0
156-59-2	cis-1,2-Dichloroethene			1.0
67-66-3	*Chloroform			1.0
71-55-6	*1,1,1-Trichloroethane			1.0
56-23-5	*Carbon tetrachloride			1.0
107-06-2	*1,2-Dichloroethane			1.0
79-01-6	Trichloroethene			1.0
78-87-5	*1,2-Dichloropropane			1.0
75-27-4	*Bromodichloromethane			1.0
10061-01-5	cis-1,3-Dichloropropene			1.0
10061-02-6	trans-1,3-Dichloropropene			1.0
79-00-5	*1,1,2-Trichloroethane			1.0
127-18-4	Tetrachloroethene			1.0
124-48-1	*Dibromochloromethane			1.0
108-90-7	Chlorobenzene			5.0
75-25-2	*Bromoform			1.0
79-34-5	*1,1,2,2-Tetrachloroethane			1.0

COMMENTS

* Compound identity not confirmed by second independent technique.
Unless otherwise noted, sample was analyzed for ALL compounds listed.

SAMPLE ID BLANK FRACTION 088 TEST CODE SC 2 NAME Scan 2 Water
Date & Time Collected 10/21/87 Category

ANALYST KAJIYA
ANALYZED 11/02/87
DILUTION 1 UNITS ug/L ppb

CAS#	COMPOUND	RESULT	REMARK	DETECTION LIMIT
71-43-2	Benzene			1.0
108-88-3	Toluene			1.0
100-41-4	Ethylbenzene			1.0
108-38-3	Xylene isomers			1.0

COMMENTS

Unless otherwise noted, sample was analyzed for ALL compounds listed.

MICHIGAN DE. ..MENT OF NATURAL RESOURCES
ENVIRONMENTAL LABORATORY

REPORT Environmental Response Div.
TO Grand Rapids District Office
Grand Rapids, MI

ATTEN MARGE SPRUIT

LABORATORY WORK ORDER # 87-10-152
WORK ID JACOSUSSE"S
P.O. # 90395 COST $ 151.50
RECEIVED 10/28/87 CLIENT ER GR
REPORTED _____ NUMBER OF SAMPLES 1
LAB CONTACT BN JP RW MATRIX WATER

TEST / UNITS	MW 56 BOTTLE - #8
Alkalinity of Water mg CaCO3/l	94
Chloride in Water mg/l	1
COD mg/l	16
Conductivity of Water umho/cm	332
Arsenic - Dissolved ug/l (Diss)	K 2.0
Cadmium - Dissolved ug/l (Diss)	K 20
Chromium - Dissolved ug/l (Diss)	K 50
Copper - Dissolved ug/l (Diss)	K 20
Nickel - Dissolved ug/l (Diss)	K 50
Lead - Dissolved ug/l (Diss)	K 50
Zinc - Dissolved ug/l (Diss)	1500
pH of Water pH	7.53
Sulfate in Water mg/l	73

Report prepared By: Dawn Harley 12/7/87

ENV. RESPONSE DIV.
GRAND RAPIDS
DEC 9 1987
RECEIVED

D Miller - Waste Management Inc
KC B. Elder - EPA

SAMPLE ID MW 56 BOTTLE #8 FRACTION 01B TEST CODE SC 1 NAME Scan 1 Water
Date & Time Collected 10/27/87 14:45:00 Category

ANALYST WILFORD
ANALYZED 11/20/87
DILUTION 1

UNITS ug/L ppb

CAS#	COMPOUND	RESULT	REMARK	DETECTION LIMIT
75-01-4	Vinyl chloride			5.0
74-83-9	*Bromomethane			5.0
75-00-3	*Chloroethane			5.0
75-69-4	*Trichlorofluoromethane			5.0
75-35-4	1,1-Dichloroethene			1.0
75-09-2	*Methylene chloride			5.0
156-60-5	trans-1,2-Dichloroethene			1.0
75-34-3	*1,1-Dichloroethane			1.0
156-59-2	cis-1,2-Dichloroethene			1.0
67-66-3	*Chloroform			1.0
71-55-6	*1,1,1-Trichloroethane			1.0
56-23-5	*Carbon tetrachloride			1.0
107-06-2	*1,2-Dichloroethane			1.0
79-01-6	Trichloroethene			1.0
78-87-5	*1,2-Dichloropropane			1.0
75-27-4	*Bromodichloromethane			1.0
10061-01-5	cis-1,3-Dichloropropene			1.0
10061-02-6	trans-1,3-Dichloropropene			1.0
79-00-5	*1,1,2-Trichloroethane			1.0
127-18-4	Tetrachloroethene			1.0
124-48-1	*Dibromochloromethane			1.0
108-90-7	Chlorobenzene			5.0
75-25-2	*Bromoform			1.0
79-34-5	*1,1,2,2-Tetrachloroethane			1.0

COMMENTS

* Compound identity not confirmed by second independent technique.
Unless otherwise noted, sample was analyzed for ALL compounds listed.

SAMPLE ID MW 56 BOTTLE #8 FRACTION 01B TEST CODE SC 2 NAME Scan 2 Water
Date & Time Collected 10/27/87 14:45:00 Category

ANALYST WILFORD
ANALYZED 11/20/87
DILUTION 1

UNITS ug/L ppb

CAS#	COMPOUND	RESULT	REMARK	DETECTION LIMIT
71-43-2	Benzene			1.0
109-88-3	Toluene			1.0
100-41-4	Ethylbenzene			1.0
108-38-3	Xylene isomers			1.0

COMMENTS UnID PEAK

Unless otherwise noted, sample was analyzed for ALL compounds listed.

file

EL 070
4/87
MATRIX = WATER

MICHIGAN DEPT OF NATURAL RESOURCES
ENVIRONMENTAL LABORATORY
ANALYSIS REQUEST SHEET

SAFETY WARNING
YES (NO) - INFO ON BACK

LAB ORDER# 8710-117 PROJ CODE 3461 PRIORITY II RECEIVED AT LAB BY JV DATE TIME 10,22,87 12:20 (AM) PM

SUBMITTER (GW) DISTRICT DIVISION ERD OR OFFICE GrandRapids CONTACT PERSON FOR QUESTIONS Marge Sprunt PHONE (616) - 456-5071

LOCATION SAMPLED WICIOIGUISISIEIS COLLECTED BY M.Sprunt TRANS TO

COST CENTER 90395 SEND RESULTS TO ATTENTION OF M.Sprunt AT ADDRESS (if different than above office)

SAMPLE REMARKS

SAMPLE NUMBER	FIELD ID OR DESCRIPTION	SAMPLE COLLECTED YY/MM/DD	HH:MM	SAMPLE INFORMATION
01	WM123	87/10/21	1630	
02	WM124	" "	1505	
03	WM125	" "	1320	
04	WM142	" "	1220	
05	WM143	" "	1225	

GENERAL CHEMISTRY

DO Diss Oxygen ... 1 2 3 4 5
GN o-Phos NO2- ... 1 2 3 4 5 (GN1)
Residue SS 1 2 3 4 5
Residue TDS ... 1 2 3 4 5
..... 1 2 3 4 5
BOD Tot 5 day 1 2 3 4 5
BOD Carb 5 day 1 2 3 4 5
..... 1 2 3 4 5
✓GA COD ..... (1 2 3 4 5)
TOC 1 2 3 4 5
NO3+NO2, NH3 .. 1 2 3 4 5 (GA2)
KJEL N, Tot P . 1 2 3 4 5
..... 1 2 3 4 5
GG Phenolics 1.2.3.4.5
GB Total CN 1.2.3.4.5
Free CN 1.2.3.4.5
BC Fecal Coli 1.2.3.4.5
Total Coli 1.2.3.4.5
CA Chlorophyll 1.2.3.4.5

ORGANICS

✓PO1 #1 Halocarbons (1 2 3 4 5)
✓PO2 #2 Aromatic HC (1 2 3 4 5)
..... 1 2 3 4 5
ON #3 Chloro HC + Pest & PCB . 1 2 3 4 5
..... 1 2 3 4 5
OB GC/MS Base Neut 1 2 3 4 5
..... 1 2 3 4 5
OA #8 Phenols 1 2 3 4 5
..... 1 2 3 4 5
OG Oil & Grease .. 1 2 3 4 5

*** * * * SPECIAL REQUESTS * * * ***

..... 1 2 3 4 5
..... 1 2 3 4 5
..... 1 2 3 4 5
..... 1 2 3 4 5
..... 1 2 3 4 5
..... 1 2 3 4 5
..... 1 2 3 4 5

INORGANIC

MA Total Metals 1 2 3 4 5
✓MAD Diss-Field Filtered ... (1 2 3 4 5)
MD Diss-Lab Filtered 1 2 3 4 5
Ca Mg Na K 1 2 3 4 5 (MA1)
Cd Cr Cu Ni Pb Zn ..... (1 2 3 4 5) (MA2)
Fe Co Li Mn 1 2 3 4 5 (MA3)
Al Ba Be Mo Ti V 1 2 3 4 5 (MA4)
..... 1 2 3 4 5
Hg - Mercury 1 2 3 4 5
As - Arsenic ..... (1 2 3 4 5)
Se - Selenium 1 2 3 4 5
Sb - Antimony 1 2 3 4 5
..... 1 2 3 4 5
LOW LEVEL Hg 1 2 3 4 5
" " Cd 1 2 3 4 5
" " Cr Cu Ni Pb .. 1 2 3 4 5 (MF1)
..... 1 2 3 4 5
✓MN pH, Conductance ..... (1 2 3 4 5) (MN1)
Cl, SO4, Total Alk .... (1 2 3 4 5) (MN2)
HCO3- CO3= 1 2 3 4 5 (MN3)
CR+6 ..... 1 2 3 4 5
Fluoride 1 2 3 4 5
..... 1 2 3 4 5

②

EL 070
4/87
MATRIX = WATER

MICHIGAN DEPT OF NATURAL RESOURCES
ENVIRONMENTAL LABORATORY
ANALYSIS REQUEST SHEET

SAFETY WARNING
YES / (NO) - INFO ON BACK

LAB ORDER# 8710-117 PROJ CODE 3461 PRIORITY II RECEIVED AT LAB BY JL DATE TIME 10/22/87 12:20 AM (PM)

SUBMITTER DIVISION ERD DISTRICT OR OFFICE Grand Rapids CONTACT PERSON FOR QUESTIONS M. Spruit PHONE (616) - 456-5071

LOCATION SAMPLED JACOBUSSE'S COLLECTED BY M Spruit TRANS TO [signature]

COST CENTER 90395 SEND RESULTS TO ATTENTION OF M. Spruit AT ADDRESS (if different than above office)

SAMPLE REMARKS

SAMPLE NUMBER	FIELD ID OR DESCRIPTION	SAMPLE COLLECTED YY/MM/DD	HH:MM	SAMPLE INFORMATION
06	MW 50	87/10/21	10:30	
07	MW 51	" " "	10:15	
~~03~~	~~MW 56~~	" " "	18:00	
09	BLANK	" " "		
05		" " "		

GENERAL CHEMISTRY

			=J=
O	Diss Oxygen ...	1 2 3 4 5	
			-K-
N	α-Phos NO2- ...	1 2 3 4 5	GN1
	Residue SS	1 2 3 4 5	
	Residue TDS ...	1 2 3 4 5	
	.....	1 2 3 4 5	
	BOD,Tot 5 day	1 2 3 4 5	
	BOD Carb 5 day	1 2 3 4 5	
	.....	1 2 3 4 5	
			-L-
A	COD	(1 2) 3 (4) 5	
	TOC	1 2 3 4 5	
	NO3+NO2, NH3 ..	1 2 3 4 5	GA2
	KJEL N, Tot P .	1 2 3 4 5	
	.....	1 2 3 4 5	
			-M-
G	Phenolics	1.2.3.4.5	
			-N-
B	Total CN	1.2.3.4.5	
	Free CN	1.2.3.4.5	
			-P-
C	Fecal Coli	1.2.3.4.5	
	Total Coli	1.2.3.4.5	
			-Q-
	Chlorophyll	1.2.3.4.5	

ORGANICS

			=R=
✓PO1	#1 Halocarbons	(1 2) 3 (4) 5	
✓PO2	#2 Aromatic HC	(1 2) 3 (4) 5	
	.....	1 2 3 4 5	
			-S-
ON	#3 Chloro HC + Pest & PCB .	1 2 3 4 5	
	.....	1 2 3 4 5	
			-T-
OB	GC/MS Base Neut	1 2 3 4 5	
	.....	1 2 3 4 5	
			-U-
OA	#8 Phenols	1 2 3 4 5	
	.....	1 2 3 4 5	
			-V-
OG	Oil & Grease ..	1 2 3 4 5	

* * * * SPECIAL REQUESTS * * * *

.....	1 2 3 4 5
.....	1 2 3 4 5
.....	1 2 3 4 5
.....	1 2 3 4 5
.....	1 2 3 4 5
.....	1 2 3 4 5
.....	1 2 3 4 5

INORGANIC

			=X=
MA	Total Metals	1 2 3 4 5	
✓MAD	Diss-Field Filtered ...	(1 2) 3 (4) 5	
MD	Diss-Lab Filtered	1 2 3 4 5	
	Ca Mg Na K	1 2 3 4 5	MA1
	Cd Cr Cu Ni Pb Zn	(1 2) 3 (4) 5	MA2
	Fe Co Li Mn	1 2 3 4 5	MA3
	Al Ba Be Mo Ti V	1 2 3 4 5	MA4
	.....	1 2 3 4 5	
	Hg - Mercury	1 2 3 4 5	
	As - Arsenic	(1 2) 3 (4) 5	
	Se - Selenium	1 2 3 4 5	
	Sb - Antimony	1 2 3 4 5	
	.....	1 2 3 4 5	
	LOW LEVEL Ag	1 2 3 4 5	
	" " Cd	1 2 3 4 5	
	" " Cr Cu Ni Pb ..	1 2 3 4 5	MF1
	.....	1 2 3 4 5	
			-Y-
✓MN	pH, Conductance	(1 2) 3 (4) 5	MN1
	Cl, SO4, Total Alk	(1 2) 3 (4) 5	MN2
	HCO3- CO3=	1 2 3 4 5	MN3
	CR+6	1 2 3 4 5	
	Fluoride	1 2 3 4 5	
	.....	1 2 3 4 5	

EL 070
4/87
MATRIX = WATER

MICHIGAN DEPT OF NATURAL RESOURCES
ENVIRONMENTAL LABORATORY
ANALYSIS REQUEST SHEET

SAFETY WARNING
YES / (NO) - INFO ON BACK

LAB ORDER# 8710152 PROJ CODE 3461 PRIORITY III RECEIVED AT LAB BY RAA DATE TIME 10/28/87 16-25 (AM) PM

SUBMITTER DIVISION ERD DISTRICT OR OFFICE Grand Rapids CONTACT PERSON FOR QUESTIONS M. Sprunt PHONE (616) -456-5071

LOCATION SAMPLED MACKINAC ISLE COLLECTED BY M Sprunt/D Hartung TRANS TO Monet

COST CENTER 90395 SEND RESULTS TO ATTENTION OF M. Sprunt AT ADDRESS (if different than above office)

SAMPLE REMARKS

SAMPLE NUMBER	FIELD ID OR DESCRIPTION	SAMPLE COLLECTED YY/MM/DD	HH:MM	SAMPLE INFORMATION
01	MW 156	87-10-27	2^45	bottle numbered #8
02				
03				
04				
05				

GENERAL CHEMISTRY

DO Diss Oxygen ... 1 2 3 4 5 | -K-
GN o-Phos NO2- ... 1 2 3 4 5 | GN1
Residue SS 1 2 3 4 5
Residue TDS ... 1 2 3 4 5
..... 1 2 3 4 5
BOD Tot 5 day 1 2 3 4 5 | -L-
BOD Carb 5 day 1 2 3 4 5
..... 1 2 3 4 5
✓GA COD .....(1) 2 3 4 5
TOC 1 2 3 4 5
NO3+NO2, NH3 .. 1 2 3 4 5 | GA2
KJEL N, Tot P . 1 2 3 4 5 | -M-
..... 1 2 3 4 5
GG Phenolics .....1.2.3.4.5 | -N-
GB Total CN 1.2.3.4.5
Free CN .....1.2.3.4.5 | -P-
BC Fecal Coli 1.2.3.4.5
Total Coli .....1.2.3.4.5 | -Q-
CA Chlorophyll 1.2.3.4.5

ORGANICS

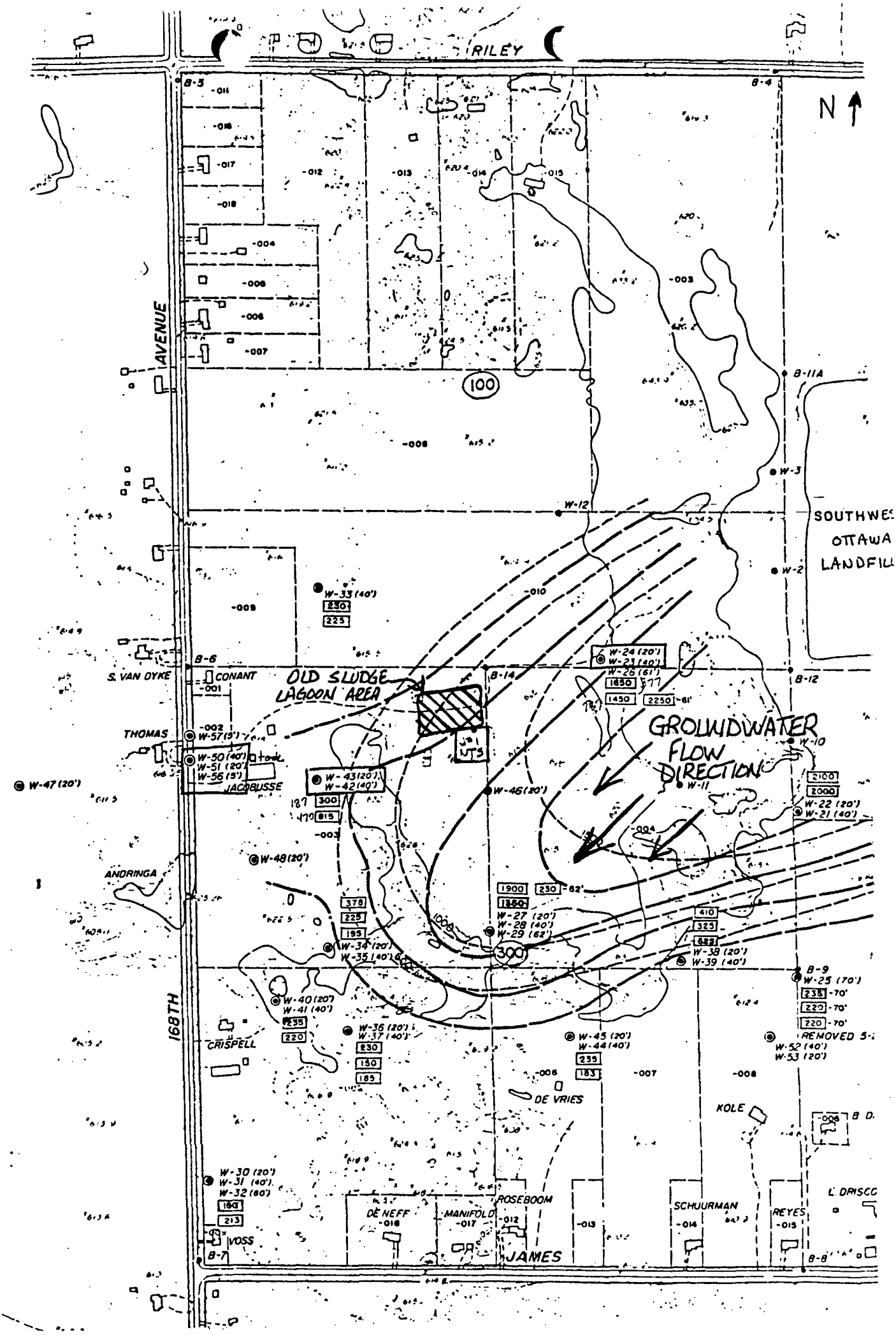
✓PO1 #1 Halocarbons (1) 2 3 4 5 | -R-
✓PO2 #2 Aromatic HC (1) 2 3 4 5
..... 1 2 3 4 5 | -S-
ON #3 Chloro HC + Pest & PCB . 1 2 3 4 5
..... 1 2 3 4 5 | -T-
OB GC/MS Base Neut 1 2 3 4 5
..... 1 2 3 4 5 | -U-
OA #8 Phenols 1 2 3 4 5
..... 1 2 3 4 5 | -V-
OG Oil & Grease .. 1 2 3 4 5

*** * * * SPECIAL REQUESTS * * * ***

..... 1 2 3 4 5
..... 1 2 3 4 5
..... 1 2 3 4 5
..... 1 2 3 4 5
..... 1 2 3 4 5
..... 1 2 3 4 5
..... 1 2 3 4 5

INORGANIC

MA Total Metals ..... 1 2 3 4 5 | -X-
✓MAD Diss-Field Filtered ...(1) 2 3 4 5
MD Diss-Lab Filtered 1 2 3 4 5
Ca Mg Na K ..... 1 2 3 4 5 | MA1
Cd Cr Cu Ni Pb Zn .....(1) 2 3 4 5 | MA2
Fe Co Li Mn ..... 1 2 3 4 5 | MA3
Al Ba Be Mo Ti V ..... 1 2 3 4 5 | MA4
..... 1 2 3 4 5
Hg - Mercury 1 2 3 4 5
As - Arsenic .....(1) 2 3 4 5
Se - Selenium 1 2 3 4 5
Sb - Antimony 1 2 3 4 5
..... 1 2 3 4 5
LOW LEVEL Ag 1 2 3 4 5
" " Cd 1 2 3 4 5
" " Cr Cu Ni Pb .. 1 2 3 4 5 | MF1
..... 1 2 3 4 5 | -Y-
✓MN pH, Conductance .....(1) 2 3 4 5 | MN1
Cl, SO4, Total Alk ....(1) 2 3 4 5 | MN2
HCO3- CO3= ..... 1 2 3 4 5 | MN3
CR+6 ..... 1 2 3 4 5
Fluoride 1 2 3 4 5
..... 1 2 3 4 5


RILEY
N
AVENUE
168TH
S. VAN DYKE
CONANT
THOMAS
JACOBUSSE
ANDRINGA
CRISPELL
VOSS
DE NEFF
MANIFOLD
ROSEBOOM
DE VRIES
KOLE
SCHUURMAN
REYES
JAMES
L. DRISCO
SOUTHWES
OTTAWA
LANDFILL
OLD SLUDGE LAGOON AREA
GROUNDWATER FLOW DIRECTION
100
300
B-3
B-4
B-5
B-6
B-7
B-8
B-9
B-11A
B-12
B-14
W-1
W-2
W-3
W-10
W-11
W-12
W-21 (40')
W-22 (20')
W-23 (40')
W-24 (20')
W-25 (70')
W-26 (61')
W-27 (20')
W-28 (40')
W-29 (62')
W-30 (20')
W-31 (40')
W-32 (60')
W-33 (40')
W-34 (20')
W-35 (40')
W-36 (20')
W-37 (40')
W-38 (20')
W-39 (40')
W-40 (20')
W-41 (40')
W-42 (40')
W-43 (20')
W-44 (40')
W-45 (20')
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W-48 (20')
W-50 (40')
W-51 (20')
W-52 (40')
W-53 (20')
W-56 (5')
W-57 (5')
REMOVED 5-
-001
-002
-003
-004
-005
-006
-007
-008
-009
-010
-011
-012
-013
-014
-015
-016
-017
-018

ATTACHMENT J

REPORT ON THE TANK REMOVAL OPERATIONS AT THE FORMER JACOBUSSE'S SITE FOR WASTE MANAGEMENT, INC. HOLLAND, MICHIGAN

October, 1985

Project 85065

Dell Engineering
245 East Lakewood Blvd.
Holland, Michigan 49423
(616) 396-1209

(DLC/ck:RRV)

INTRODUCTION

The Michigan Department of Natural Resources (DNR) has requested that Waste Management, Inc. (WMI) inspect, evaluate, remove, and dispose of the contents of underground storage tanks, and the tanks themselves if feasible, at the former Jacobusse site in Holland, Michigan. Dell Engineering was retained by WMI to oversee removal of some of the tanks, sample and analyze the tank contents, assess the impact, if any, the tanks have had on the surrounding soil, and coordinate disposal of waste materials, e.g., liquids, soils, tanks. A total of four (4) underground storage tanks were believed present on-site.

FIELD INVESTIGATION

On July 2, 1985, Dell Engineering inspected the removal of two (2) underground tanks on-site. Personnel from WMI operated a backhoe in removing the tanks, beginning with Tank 2, as located on the attached drawing. Tank 2 was approximately five (5) feet in diameter and six (6) feet long. This tank contained approximately three (3) inches of what was believed to be old gasoline. A graduated pole was used in determining the depth of liquid. A sample of the tank contents was obtained and submitted to Western Michigan Environmental Services, Inc. (ESI) for analysis and characterization. The tank was viewed to be in excellent shape with no visual signs of cracks or stress. The underlying soils did not smell or show evidence of staining.

Tank 1 was next excavated, brought to the surface, and found to contain approximately eighteen (18) inches of waste oil which had a slight solvent odor. This tank was approximately three and one-half (3.5) feet in diameter by six (6) feet long. This tank appeared to be structurally intact, with no visual signs of cracks. However, "stained" soils were evident upon removal of the tank. It appears that, on occasion, this tank was overfilled, thus causing waste oil to overflow through an uncapped vent in the top of the tank. A sample of "stained" soil was collected, along with a sample of the liquid within the tank, and submitted to ESI.

A roll-off was brought to the site to temporarily hold the "stained" soils excavated from beneath Tank 1. Excavation of the soils proceeded well into "unstained" soils in all directions. An estimated volume of 4-5 yd^3 of contaminated soil and over-excavated soils was contained in the roll-off. After inspection of the excavated area and collection of soil samples, the area was backfilled with clean sand. A soil sample of the bottom of the excavated area was taken prior to backfilling.

An additional tank was thought to have been near the power pole, approximately fifty (50) feet west of the main building. On further investigation, it was determined that only a sprinkler well existed here.

Two additional tanks, Tanks 3 and 4, on the south side of the building appeared to contain four (4) inches of diesel fuel and approximately four (4) inches of gasoline, respectively. Tank 3 was determined to be approximately seven (7) feet in diameter and Tank 4 approximately five (5) feet in diameter.

The lengths of the tanks could not be determined since these tanks were not removed, however, based on experience, lengths were assumed in order to estimate approximate recoverable liquid volumes.

During the period from September 13-19, 1985, personnel from Dell Engineering were on-site to pump the contents of the tanks into 55-gallon drums for proper disposal. An ISCO peristatic pump was used in conjunction with flexible Tygon tubing for pumping liquids out of all the tanks. A small diameter length of PVC pipe was used to direct the flexible tubing to the bottom of the tank. Some solids were encountered in Tanks 1 and 2, however attempts were made to recover as much free liquid as possible. A summary of the pumping results is as shown below. Assumed tank lengths for Tanks 3 and 4 were greater than what was actually encountered.

Tank No.	Estimated Recoverable Volume (gallons)	Actual Recovered Volume (gallons)	No. of Drums Filled
1	~177	~127	2.5
2	~16	~10	---
3	~110	~86	1.5
4	~66	~20	---

Recovered gasoline from Tanks 2 and 4 was taken to the Quality Oil Company Terminal, on Ottawa Avenue, in Holland, where it was placed with similar product acquired from on-going recovery operations at that site. This material will eventually be taken to a refinery for recycling. The remainder of the recovered materials (waste oil and waste diesel fuel) are currently being stored onsite in fifty-five (55) gallon drums prior to proper disposal off-site.

LABORATORY ANALYSIS

To further identify the liquids in the tanks, Volatile Organic Analysis (VOA) was performed on samples collected from each. VOA's were also performed on a sample of the "contaminated" soil at Tank 1. The analysis confirmed that Tank 2 and Tank 4 were basically gasoline products. Based on the analysis and visual observation of the samples from Tanks 1 and 3, their contents were excluded from addition to the recovery operations at the Quality Oil Company site and drummed separately. Chemical laboratory data is attached. Very low levels of VOA's were detected in the contaminated soil that had been excavated. Also, a PCB check on this soil sample found none present at a detection limit of 0.5 mg/kg.

An EP Toxicity study was performed on the soil tainted with waste oil to determine leachability of its constituents for purposes of disposal. The results of this study are also attached. As can be seen from the results of this study, the concentrations of metals and cyanide are well below DNR limits for classification as hazardous waste.

DISPOSAL RECOMMENDATIONS

As previously stated, the results of the EP Toxicity test indicate that the contaminated soil, based on this test, is not classified as a hazardous waste. Thus, it is our recommendation that the oil stained soil be taken to a licensed Type II Sanitary Landfill. Currently, the soil remains in the original covered roll-off container at the WMI office at Holland, Michigan.

As described earlier, the contents of Tanks 2 and 4 were taken to the recovery system at the Quality Oil Company, in Holland, Michigan. The contents of the two (2) remaining tanks have been drummed and are temporarily being stored at the Jacobusse's site. These five (5) drums (approximately 200 gallons) will necessarily have to be transported as liquid industrial waste by a licensed waste hauler. Dell Engineering is currently investigating the possibility of having a licensed hauler pick up the drums concurrent with hauling of additional local industrial waste. In addition, efforts are currently underway to secure approval of a disposal facility for this waste.

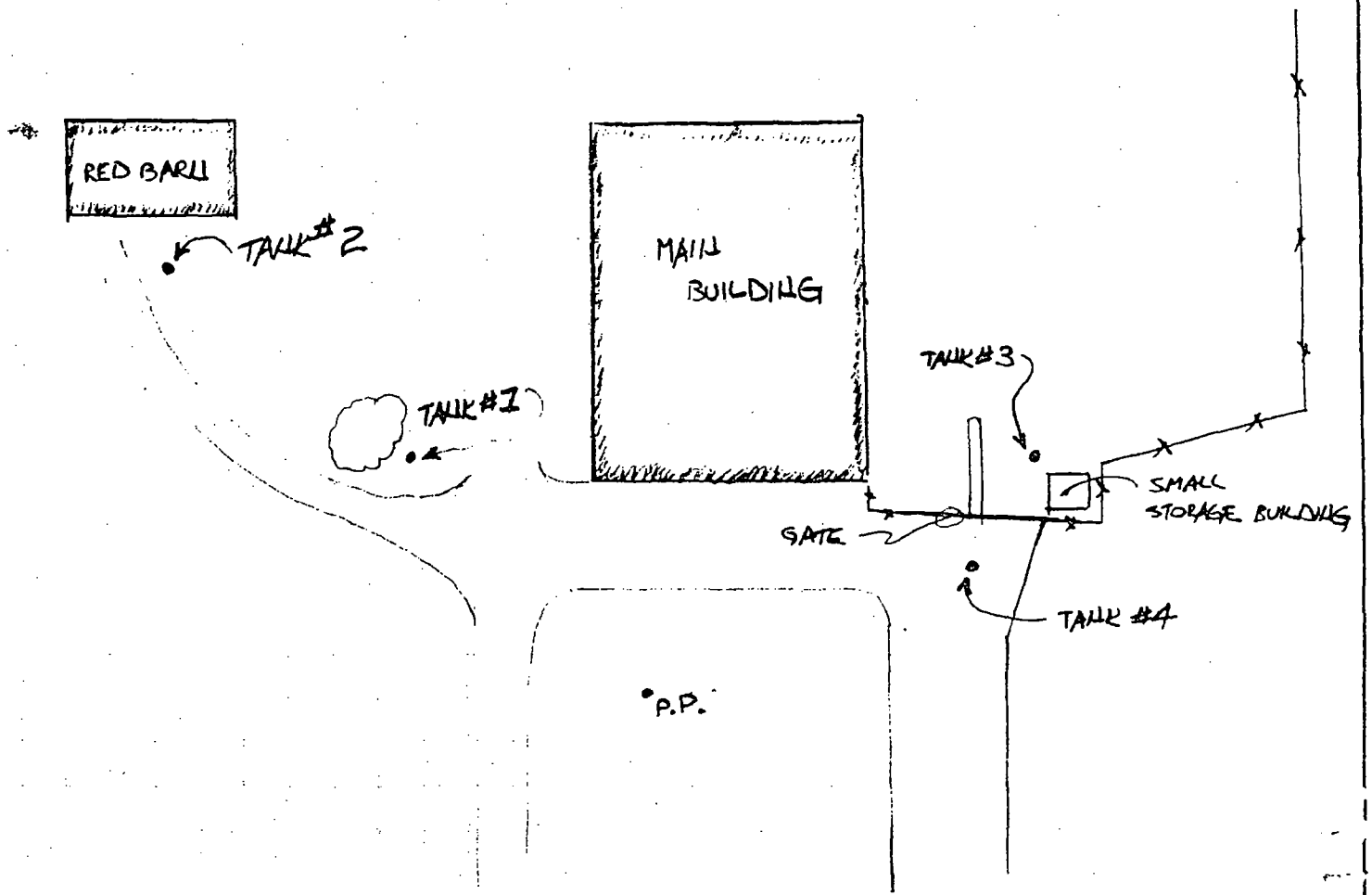
Tanks 3 and 4, which remain in the ground, have essentially been pumped dry (i.e., less than ½-inch of material remains in each). Tank 2 has essentially been pumped dry and can thus be disposed of in a Type II Landfill or be recycled off-site at a scrap metal facility. Tank 1 has some solids remaining in the bottom which are believed to be primarily soils which have dropped in through the opening on the top. This tank should be disposed of at a Type II Landfill or the solids should be removed for disposal and the tank recycled at a scrap metal facility.

Given the current environmental regulatory concerns regarding underground storage tanks, and potential liabilities associated with such tanks, it is recommended that WMI remove Tanks 3 and 4, which remain in the ground. These tanks could possibly be recycled at a scrap metal facility.

APPENDICES

JACOBUSSEE SITE
D.C.
JULY 2, 1985
NO SCALE

N



SHEET NO. ____ OF ____
CALCULATED BY ____ DATE ____
CHECKED BY ____ DATE ____
SCALE ____

DELL ENGINEERING
245 EAST LAKEWOOD BLVD.
HOLLAND, MI 49423-2066
PHONE 616-396-1296

WESTERN MICHIGAN ENVIRONMENTAL SERVICES, INC.
245 EAST LAKEWOOD BLVD.
HOLLAND, MI 49423-2066
PHONE 616-396-1209

TO: Dell Engineering
245 East Lakewood Boulevard
Holland, Michigan 49423

Attn: Ron Vriesman
Re: Jacobusse's (85065)

DATE: September 10, 1985

ANALYSIS: OF SOIL AND LIQUID SAMPLES

CERTIFIED BY: Robert W. Hamm
Robert W. Hamm, Laboratory Director

SAMPLING DATE: Received from client on July 2 and 3, 1985.

RESULTS: Expressed as noted.

ESI #	SAMPLE I.D.	PARAMETER	CONCENTRATION
850706-1	Contaminated Soil	VOA's	SEE ATTACHED TABLE
		EP Toxicity	SEE ATTACHED REPORT
		PCB's (mg/kg)	<0.5
-2	Clean Soil	VOA's	HOLD
-3	Liquid, Tank 1	VOA's	SEE ATTACHED TABLE
		Flashpoint (°F)	158
-4	Liquid, Tank 2	VOA's	SEE ATTACHED TABLE
		Flashpoint (°F)	85
-5	Liquid, Tank 4	VOA's	SEE ATTACHED TABLE
		Flashpoint (°F)	80
-6	Liquid, Tank 3	VOA's	SEE ATTACHED TABLE
		Flashpoint (°F)	152

WESTERN MICHIGAN ENVIRONMENTAL SERVICES, INC.

TABLE OF RESULTS FOR VOLATILE ORGANIC ANALYSIS
Dell Engineering
Re: Jacobusse's (85065)

Received July 2 and 3, 1985. Reported September 10, 1985.
Expressed as milligrams per liter (mg/ℓ).
Limit of detection is noted under sample identification.

Parameter	Contaminated Soil* (0.002)	Clean Soil	Liquid Tank 1 (250)	Liquid Tank 2 (250)	Liquid Tank 4 (250)	Liquid Tank 3 (250)
bromodichloromethane	N.D.	~~~	N.D.	N.D.	N.D.	N.D.
bromoform	N.D.	~~~	N.D.	N.D.	N.D.	N.D.
carbon tetrachloride	N.D.	~~~	N.D.	N.D.	N.D.	N.D.
chlorobenzene	N.D.	~~~	N.D.	N.D.	N.D.	N.D.
chlorodibromomethane	N.D.	~~~	N.D.	N.D.	N.D.	N.D.
chloroform	N.D.	~~~	N.D.	N.D.	N.D.	N.D.
1,1-dichloroethane	N.D.	~~~	N.D.	N.D.	N.D.	N.D.
1,2-dichloroethane	N.D.	~~~	N.D.	N.D.	N.D.	N.D.
1,1-dichloroethene	N.D.	~~~	N.D.	N.D.	N.D.	N.D.
1,2-dichloroethene	N.D.	~~~	N.D.	N.D.	N.D.	N.D.
1,2-dichloropropane	N.D.	---	N.D.	N.D.	N.D.	N.D.
methylene chloride	0.120	---	N.D.	N.D.	N.D.	N.D.
1,1,2,2-tetrachloroethane	N.D.	---	N.D.	N.D.	N.D.	N.D.
tetrachloroethene	0.058	---	N.D.	N.D.	N.D.	N.D.
1,1,1-trichloroethane	0.300	---	1750	970	350	890
1,1,2-trichloroethane	N.D.	---	N.D.	N.D.	N.D.	N.D.
trichloroethene	N.D.	---	N.D.	N.D.	N.D.	N.D.
benzene	N.D.	---	N.D.	N.D.	7000	N.D.
ethylbenzene	N.D.	---	1600	15000	4750	3300
toluene	N.D.	---	610	45000	29000	288
styrene	N.D.	---	N.D.	N.D.	N.D.	N.D.
xylenes	N.D.	---	9000	88000	24000	1400
ESI #850706	-1	-2	-3	-4	-5	-6

*Expressed as milligrams per kilogram (mg/kg).

EVALUATION OF EP TOXICITY STUDY
OF
CONTAMINATED SOIL
FROM JACOBUSSE'S
FOR
DELL ENGINEERING

September 10, 1985

Dell Job 85065

By: Western Michigan Environmental
Services, Inc.
245 East Lakewood Blvd.
Holland, Michigan 49423
(616) 396-1209

PURPOSE

The purpose of this study is to evaluate the contaminated soil from Jacobusse's, for Dell Engineering, to determine the nature of the leachable constituents for waste disposal. This evaluation will define the possible waste classification in accordance with the criteria set forth in the May 19, 1980, Federal Register, Volume 45, Number 98, 40 CFR Part 261.24, Characteristics of EP Toxicity, Appendix II to that subpart, and the Michigan Department of Natural Resources (DNR), Act No. 64, of the Public Acts of 1979.

METHOD AND PARAMETER LIST SELECTION

The method selected was the EP Toxicity Study using the Michigan DNR parameters listed in Act 64, P.A. 1979, excluding the Pesticide/Herbicides.

The method and parameter list was provided to Western Michigan Environmental Services, Inc. (ESI) by Ron Vriesman, of Dell Engineering.

PROCEDURE

The soil was prepared for analysis by the procedure of the Environmental Protection Agency (EPA) Test Methods for Evaluating Solid Waste, Second Edition, Physical/Chemical Methods, July, 1982, EP Toxicity Test.

The equipment utilized was an ESI EP Toxicity 6 solid waste rotary extractor operating at 29 rpm for 24 hours, as specified by the procedure. The solid portion of the sample and 16 times the original sample weight of deionized water were placed into a one gallon (four liter) glass container.

During the extraction period, 0.5N Acetic Acid was added to adjust the pH to 5.0 $\pm$ 0.2. After the extraction period, the volume was adjusted to 20 times the original sample weight with deionized distilled water. The solid was then separated from the liquid phase by decantation and filtration through a 0.45 µm membrane filter. The resulting filtrate was then analyzed for the parameters listed on the Table of Results.

The analytical procedures and/or instruments utilized were as follows:

Solids, all forms	EPA Methods 160.3 and 160.4
Cyanide[1]	EPA Method 335.2.
Metals, general	EPA Method 4.1.1-4.1.4 utilizing an Atomic Absorption Spectrophotometer[2] (dual beam with background correction).
Arsenic	EPA Method 206.2.
Barium	EPA Method 208.2.
Cadmium	EPA Method 213.1.
Chromium	EPA Method 218.2.

[1]Note: Total Cyanide analysis was performed on the gross sample due to the potential for destruction of any cyanide present in the extraction procedure. To provide an estimate of the maximum leachable cyanide potentially present as an EP Toxicity Leach, the gross concentration can be divided by twenty (20) to represent the 20:1 dilution of the procedure.

[2]Atomic Absorption Spectrophotometer
Perkin Elmer Model 403 with Flame
Perkin Elmer Model 5000 with an HGA 500 Graphite Furnace

Copper	EPA Method 220.1.
Lead	EPA Method 239.2.
Mercury	Cold Vapor Procedure, EPA Method 245.1.
Nickel	EPA Method 249.1.
Selenium	EPA Method 270.2.
Silver	EPA Method 272.1.
Zinc	EPA Method 289.1.

DESCRIPTION

This sample consisted of a black soil with the appearance of topsoil. The sample required 2.4% of the maximum amount of 0.5N Acetic Acid to be added to adjust the pH from 7.5.

The original sample contained 99.56% total solids, of which 0.08% were volatile and 99.02% were ash.

WESTERN MICHIGAN ENVIRONMENTAL SERVICES, INC.

EP TOXICITY - TABLE OF RESULTS

Leachate Concentration
of
Contaminated Soil
from Jacobusse's
for
Dell Engineering
Job 85065

September 10, 1985
Results expressed as milligrams per liter (mg/ℓ) unless otherwise noted.

PARAMETER	CONCENTRATION	MAXIMUM CONCENTRATION	
		EPA	DNR
Arsenic	<0.005	5.0	5.0
Barium	0.030	100.0	100.0
Cadmium	<0.01	1.0	1.0
Chromium	<0.005	5.0	5.0
Copper	<0.02	---	100.0
Cyanide	0.26 mg/kg as received	---	20.0
Lead	0.29	5.0	5.0
Mercury	<0.0005	0.2	0.2
Nickel	<0.05	20.0*	---
Selenium	<0.005	1.0	1.0
Silver	<0.01	5.0	5.0
Zinc	27	---	500.0

Original Sample:

Total Solids	99.56% of sample
Volatile Solids	0.08% of total solids
Ash	99.02% of total solids

ESI #850706-1

*Proposed EPA Maximum Concentration

CONCLUSION

The parameter evaluated, based on this study (9/10/85), has fallen below the maximum levels set by the EPA and DNR for EP Toxicity. Therefore, this sample does not show characteristics of EP Toxicity.

REPORT ON THE
TANK REMOVAL OPERATIONS
AT THE FORMER JACOBUSSE'S SITE
FOR WASTE MANAGEMENT, INC.
HOLLAND, MICHIGAN

October, 1985
Project 85065

Dell Engineering
245 East Lakewood Blvd.
Holland, Michigan 49423
(616) 396-1209

(DLC/ck:RRV)

INTRODUCTION

The Michigan Department of Natural Resources (DNR) has requested that Waste Management, Inc. (WMI) inspect, evaluate, remove, and dispose of the contents of underground storage tanks, and the tanks themselves if feasible, at the former Jacobusse site in Holland, Michigan. Dell Engineering was retained by WMI to oversee removal of some of the tanks, sample and analyze the tank contents, assess the impact, if any, the tanks have had on the surrounding soil, and coordinate disposal of waste materials, e.g., liquids, soils, tanks. A total of four (4) underground storage tanks were believed present on-site.

FIELD INVESTIGATION

On July 2, 1985, Dell Engineering inspected the removal of two (2) underground tanks on-site. Personnel from WMI operated a backhoe in removing the tanks, beginning with Tank 2, as located on the attached drawing. Tank 2 was approximately five (5) feet in diameter and six (6) feet long. This tank contained approximately three (3) inches of what was believed to be old gasoline. A graduated pole was used in determining the depth of liquid. A sample of the tank contents was obtained and submitted to Western Michigan Environmental Services, Inc. (ESI) for analysis and characterization. The tank was viewed to be in excellent shape with no visual signs of cracks or stress. The underlying soils did not smell or show evidence of staining.

Tank 1 was next excavated, brought to the surface, and found to contain approximately eighteen (18) inches of waste oil which had a slight solvent odor. This tank was approximately three and one-half (3.5) feet in diameter by six (6) feet long. This tank appeared to be structurally intact, with no visual signs of cracks. However, "stained" soils were evident upon removal of the tank. It appears that, on occasion, this tank was overfilled, thus causing waste oil to overflow through an uncapped vent in the top of the tank. A sample of "stained" soil was collected, along with a sample of the liquid within the tank, and submitted to ESI.

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An additional tank was thought to have been near the power pole, approximately fifty (50) feet west of the main building. On further investigation, it was determined that only a sprinkler well existed here.

Two additional tanks, Tanks 3 and 4, on the south side of the building appeared to contain four (4) inches of diesel fuel and approximately four (4) inches of gasoline, respectively. Tank 3 was determined to be approximately seven (7) feet in diameter and Tank 4 approximately five (5) feet in diameter.

The lengths of the tanks could not be determined since these tanks were not removed, however, based on experience, lengths were assumed in order to estimate approximate recoverable liquid volumes.

During the period from September 13-19, 1985, personnel from Dell Engineering were on-site to pump the contents of the tanks into 55-gallon drums for proper disposal. An ISCO peristatic pump was used in conjunction with flexible Tygon tubing for pumping liquids out of all the tanks. A small diameter length of PVC pipe was used to direct the flexible tubing to the bottom of the tank. Some solids were encountered in Tanks 1 and 2, however attempts were made to recover as much free liquid as possible. A summary of the pumping results is as shown below. Assumed tank lengths for Tanks 3 and 4 were greater than what was actually encountered.

Tank No.	Estimated Recoverable Volume (gallons)	Actual Recovered Volume (gallons)	No. of Drums Filled
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Recovered gasoline from Tanks 2 and 4 was taken to the Quality Oil Company Terminal, on Ottawa Avenue, in Holland, where it was placed with similar product acquired from on-going recovery operations at that site. This material will eventually be taken to a refinery for recycling. The remainder of the recovered materials (waste oil and waste diesel fuel) are currently being stored onsite in fifty-five (55) gallon drums prior to proper disposal off-site.

LABORATORY ANALYSIS

To further identify the liquids in the tanks, Volatile Organic Analysis (VOA) was performed on samples collected from each. VOA's were also performed on a sample of the "contaminated" soil at Tank 1. The analysis confirmed that Tank 2 and Tank 4 were basically gasoline products. Based on the analysis and visual observation of the samples from Tanks 1 and 3, their contents were excluded from addition to the recovery operations at the Quality Oil Company site and drummed separately. Chemical laboratory data is attached. Very low levels of VOA's were detected in the contaminated soil that had been excavated. Also, a PCB check on this soil sample found none present at a detection limit of 0.5 mg/kg.

An EP Toxicity study was performed on the soil tainted with waste oil to determine leachability of its constituents for purposes of disposal. The results of this study are also attached. As can be seen from the results of this study, the concentrations of metals and cyanide are well below DNR limits for classification as hazardous waste.

DISPOSAL RECOMMENDATIONS

As previously stated, the results of the EP Toxicity test indicate that the contaminated soil, based on this test, is not classified as a hazardous waste. Thus, it is our recommendation that the oil stained soil be taken to a licensed Type II Sanitary Landfill. Currently, the soil remains in the original covered roll-off container at the WMI office at Holland, Michigan.

As described earlier, the contents of Tanks 2 and 4 were taken to the recovery system at the Quality Oil Company, in Holland, Michigan. The contents of the two (2) remaining tanks have been drummed and are temporarily being stored at the Jacobusse's site. These five (5) drums (approximately 200 gallons) will necessarily have to be transported as liquid industrial waste by a licensed waste hauler. Dell Engineering is currently investigating the possibility of having a licensed hauler pick up the drums concurrent with hauling of additional local industrial waste. In addition, efforts are currently underway to secure approval of a disposal facility for this waste.

Tanks 3 and 4, which remain in the ground, have essentially been pumped dry (i.e., less than ½-inch of material remains in each). Tank 2 has essentially been pumped dry and can thus be disposed of in a Type II Landfill or be recycled off-site at a scrap metal facility. Tank 1 has some solids remaining in the bottom which are believed to be primarily soils which have dropped in through the opening on the top. This tank should be disposed of at a Type II Landfill or the solids should be removed for disposal and the tank recycled at a scrap metal facility.

Given the current environmental regulatory concerns regarding underground storage tanks, and potential liabilities associated with such tanks, it is recommended that WMI remove Tanks 3 and 4, which remain in the ground. These tanks could possibly be recycled at a scrap metal facility.

APPENDICES

JOB _____ OF _____

SHEET NO. _____

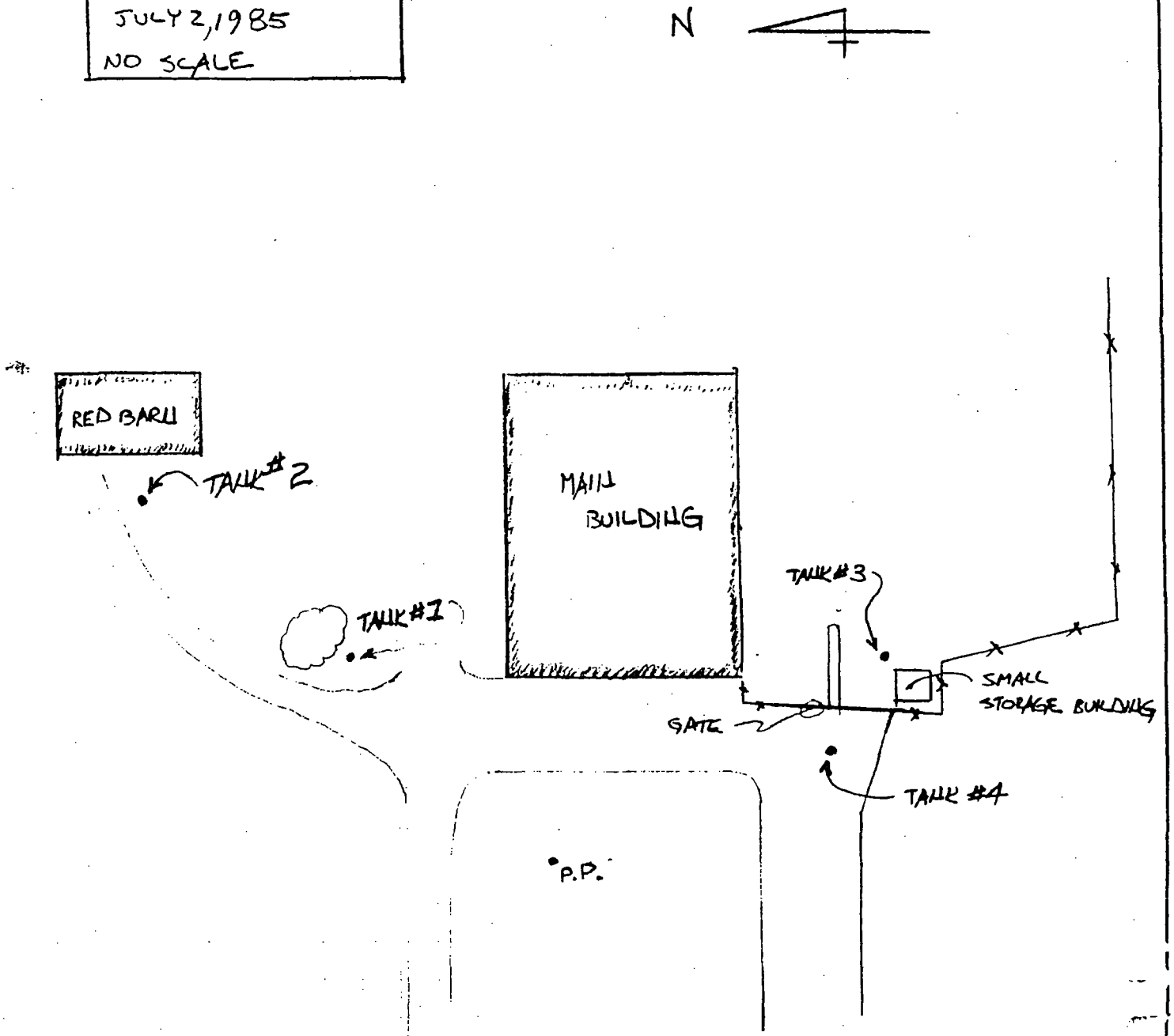
CALCULATED BY _____ DATE _____

CHECKED BY _____ DATE _____

SCALE _____

DELL ENGINEERING
245 EAST LAKEWOOD BLVD.
HOLLAND, MI 49423-2066
PHONE 616-396-1296

JACOBUSSEE SITE
D.C.
JULY 2, 1985
NO SCALE



esi

WESTERN MICHIGAN
ENVIRONMENTAL SERVICES, INC.
245 EAST LAKEWOOD BLVD.
HOLLAND, MI 49423-2066
PHONE 616-396-1209

TO: Dell Engineering
245 East Lakewood Boulevard
Holland, Michigan 49423

Attn: Ron Vriesman
Re: Jacobusse's (85065)

DATE: September 10, 1985

ANALYSIS: OF SOIL AND LIQUID SAMPLES

CERTIFIED BY: Robert W. Hamm
Robert W. Hamm, Laboratory Director

SAMPLING DATE: Received from client on July 2 and 3, 1985.

RESULTS: Expressed as noted.

ESI #	SAMPLE I.D.	PARAMETER	CONCENTRATION
850706-1	Contaminated Soil	VOA's	SEE ATTACHED TABLE
		EP Toxicity	SEE ATTACHED REPORT
		PCB's (mg/kg)	<0.5
-2	Clean Soil	VOA's	HOLD
-3	Liquid, Tank 1	VOA's	SEE ATTACHED TABLE
		Flashpoint (°F)	158
-4	Liquid, Tank 2	VOA's	SEE ATTACHED TABLE
		Flashpoint (°F)	85
-5	Liquid, Tank 4	VOA's	SEE ATTACHED TABLE
		Flashpoint (°F)	80
-6	Liquid, Tank 3	VOA's	SEE ATTACHED TABLE
		Flashpoint (°F)	152

WESTERN MICHIGAN ENVIRONMENTAL SERVICES, INC.

TABLE OF RESULTS FOR VOLATILE ORGANIC ANALYSIS
Dell Engineering
Re: Jacobusse's (85065)

Received July 2 and 3, 1985. Reported September 10, 1985.
Expressed as milligrams per liter (mg/ℓ).
Limit of detection is noted under sample identification.

Parameter	Contaminated Soil* (0.002)	Clean Soil	Liquid Tank 1 (250)	Liquid Tank 2 (250)	Liquid Tank 4 (250)	Liquid Tank 3 (250)
bromodichloromethane	N.D.	---	N.D.	N.D.	N.D.	N.D.
bromoform	N.D.	---	N.D.	N.D.	N.D.	N.D.
carbon tetrachloride	N.D.	---	N.D.	N.D.	N.D.	N.D.
chlorobenzene	N.D.	---	N.D.	N.D.	N.D.	N.D.
chlorodibromomethane	N.D.	---	N.D.	N.D.	N.D.	N.D.
chloroform	N.D.	---	N.D.	N.D.	N.D.	N.D.
1,1-dichloroethane	N.D.	---	N.D.	N.D.	N.D.	N.D.
1,2-dichloroethane	N.D.	---	N.D.	N.D.	N.D.	N.D.
1,1-dichloroethene	N.D.	---	N.D.	N.D.	N.D.	N.D.
1,2-dichloroethene	N.D.	---	N.D.	N.D.	N.D.	N.D.
1,2-dichloropropane	N.D.	---	N.D.	N.D.	N.D.	N.D.
methylene chloride	0.120	---	N.D.	N.D.	N.D.	N.D.
1,1,2,2-tetrachloroethane	N.D.	---	N.D.	N.D.	N.D.	N.D.
tetrachloroethene	0.058	---	N.D.	N.D.	N.D.	N.D.
1,1,1-trichloroethane	0.300	---	1750	970	350	890
1,1,2-trichloroethane	N.D.	---	N.D.	N.D.	N.D.	N.D.
trichloroethene	N.D.	---	N.D.	N.D.	N.D.	N.D.
benzene	N.D.	---	N.D.	N.D.	7000	N.D.
ethylbenzene	N.D.	---	1600	15000	4750	3300
toluene	N.D.	---	610	45000	29000	288
styrene	N.D.	---	N.D.	N.D.	N.D.	N.D.
xylenes	N.D.	---	9000	88000	24000	1400
ESI #850706	-1	-2	-3	-4	-5	-6

*Expressed as milligrams per kilogram (mg/kg).

EVALUATION OF EP TOXICITY STUDY
OF
CONTAMINATED SOIL
FROM JACOBUSSE'S
FOR
DELL ENGINEERING

September 10, 1985

Dell Job 85065

By: Western Michigan Environmental
Services, Inc.
245 East Lakewood Blvd.
Holland, Michigan 49423
(616) 396-1209

PURPOSE

The purpose of this study is to evaluate the contaminated soil from Jacobusse's, for Dell Engineering, to determine the nature of the leachable constituents for waste disposal. This evaluation will define the possible waste classification in accordance with the criteria set forth in the May 19, 1980, Federal Register, Volume 45, Number 98, 40 CFR Part 261.24, Characteristics of EP Toxicity, Appendix II to that subpart, and the Michigan Department of Natural Resources (DNR), Act No. 64, of the Public Acts of 1979.

METHOD AND PARAMETER LIST SELECTION

The method selected was the EP Toxicity Study using the Michigan DNR parameters listed in Act 64, P.A. 1979, excluding the Pesticide/Herbicides.

The method and parameter list was provided to Western Michigan Environmental Services, Inc. (ESI) by Ron Vriesman, of Dell Engineering.

PROCEDURE

The soil was prepared for analysis by the procedure of the Environmental Protection Agency (EPA) Test Methods for Evaluating Solid Waste, Second Edition, Physical/Chemical Methods, July, 1982, EP Toxicity Test.

The equipment utilized was an ESI EP Toxicity 6 solid waste rotary extractor operating at 29 rpm for 24 hours, as specified by the procedure. The solid portion of the sample and 16 times the original sample weight of deionized water were placed into a one gallon (four liter) glass container.

During the extraction period, 0.5N Acetic Acid was added to adjust the pH to 5.0 ± 0.2. After the extraction period, the volume was adjusted to 20 times the original sample weight with deionized distilled water. The solid was then separated from the liquid phase by decantation and filtration through a 0.45 µm membrane filter. The resulting filtrate was then analyzed for the parameters listed on the Table of Results.

The analytical procedures and/or instruments utilized were as follows:

Solids, all forms	EPA Methods 160.3 and 160.4
Cyanide[1]	EPA Method 335.2.
Metals, general	EPA Method 4.1.1-4.1.4 utilizing an Atomic Absorption Spectrophotometer[2] (dual beam with background correction).
Arsenic	EPA Method 206.2.
Barium	EPA Method 208.2.
Cadmium	EPA Method 213.1.
Chromium	EPA Method 218.2.

[1]Note: Total Cyanide analysis was performed on the gross sample due to the potential for destruction of any cyanide present in the extraction procedure. To provide an estimate of the maximum leachable cyanide potentially present as an EP Toxicity Leach, the gross concentration can be divided by twenty (20) to represent the 20:1 dilution of the procedure.

[2]Atomic Absorption Spectrophotometer
Perkin Elmer Model 403 with Flame
Perkin Elmer Model 5000 with an HGA 500 Graphite Furnace

Copper	EPA Method 220.1.
Lead	EPA Method 239.2.
Mercury	Cold Vapor Procedure, EPA Method 245.1.
Nickel	EPA Method 249.1.
Selenium	EPA Method 270.2.
Silver	EPA Method 272.1.
Zinc	EPA Method 289.1.

DESCRIPTION

This sample consisted of a black soil with the appearance of topsoil. The sample required 2.4% of the maximum amount of 0.5N Acetic Acid to be added to adjust the pH from 7.5.

The original sample contained 99.56% total solids, of which 0.08% were volatile and 99.02% were ash.

WESTERN MICHIGAN ENVIRONMENTAL SERVICES, INC.

EP TOXICITY - TABLE OF RESULTS

Leachate Concentration
of
Contaminated Soil
from Jacobusse's
for
Dell Engineering
Job 85065

September 10, 1985
Results expressed as milligrams per liter (mg/ℓ) unless otherwise noted.

PARAMETER	CONCENTRATION	MAXIMUM CONCENTRATION	
		EPA	DNR
Arsenic	<0.005	5.0	5.0
Barium	0.030	100.0	100.0
Cadmium	<0.01	1.0	1.0
Chromium	<0.005	5.0	5.0
Copper	<0.02	---	100.0
Cyanide	0.26 mg/kg as received	---	20.0
Lead	0.29	5.0	5.0
Mercury	<0.0005	0.2	0.2
Nickel	<0.05	20.0*	---
Selenium	<0.005	1.0	1.0
Silver	<0.01	5.0	5.0
Zinc	27	---	500.0

Original Sample:

Total Solids	99.56% of sample
Volatile Solids	0.08% of total solids
Ash	99.02% of total solids

ESI #850706-1

*Proposed EPA Maximum Concentration

CONCLUSION

The parameter evaluated, based on this study (9/10/85), has fallen below the maximum levels set by the EPA and DNR for EP Toxicity. Therefore, this sample does not show characteristics of EP Toxicity.

ATTACHMENT K

RUST ENVIRONMENT & INFRASTRUCTURE

RUST Environment & Infrastructure Inc.
1240 East Diehl Road
Naperville, IL 60563
Tel. (708) 955-6600 • FAX (708) 955-6601

October 20, 1993

Phil Mazor
Waste Management, Inc.
Autumn Hills RDF
700 56th Avenue
Zeeland, MI 49464

Re: Well Point Removal
Holland Lagoons, Holland, MI

Dear Mr. Mazor:

This letter discusses the removal of a well point from the subject site. The well point was found during a search for a suspected underground storage tank (UST). The results from the search indicated that there was no UST present at the site and that the suspected UST was really the well point. The UST search was documented in a letter dated September 7, 1993.

The well point was removed by Piedmont Environmental Services on August 26, 1993 by excavating the well pit with a backhoe and then removing the well point with the backhoe. The soil from the excavation was staged at the site on HDPE sheeting while waiting for the results of the soil sample analyses.

The well point consisted of a 3 foot long by 1-1/4 inch diameter galvanized steel well point and 1-1/4 inch diameter galvanized steel riser pipe. The well point was set at a depth of approximately 15 feet below the ground surface. The well pit consisted of several 4 foot diameter concrete rings with a broken concrete cover. The pump was not present at the time the well point was removed, but underground electrical service and a 1-1/4 inch HDPE discharge pipe were noted. The electrical service and discharge pipe were not removed. A diagram showing the approximate location of the well point is included as an attachment.

Soil samples were collected during the excavation to determine if the soil around the well had been impacted by site activities. A soil sample was collected from the inside of the well pit before it was excavated and soil samples were collected from the east and west side walls of the excavation at a depth of 4 feet and from the bottom of the excavation at a depth of 8 feet. It was not practical to excavate to the water table to collect a water sample so a water sample was obtained from the water inside the well point. A figure showing the sample locations is included as an attachment.

The soil samples were analyzed for benzene, ethylbenzene, toluene, and xylene (BETX), polynuclear aromatic hydrocarbons (PNAs), polychlorinated biphenyls (PCBs), trichloroethene (TCE), 1, 2 dichloroethane (DCA), cadmium, chromium, and lead. None of the soil samples had levels of these analytes above the method detection limits except for the metals. The water sample was analyzed for BETX, TCE, and DCA. The water showed levels of benzene, toluene, xylene, and TCE that are slightly above the method detection levels. The results of the analysis are included as an attachment to this letter report.

The results of this investigation demonstrate that the soil that remained at the site after the well pit was removed is not impacted above MDNR Type B soil criteria as established by MERA Operational Memorandum #8, Revision #2. The soil sample collected from the well pit before the pit was excavated (S-01 Well Bottom) showed elevated lead levels. The samples from the excavation sidewalls and bottom did not show elevated lead levels which demonstrates that all of the contaminated soil associated with the well point was removed.

A composite sample of the soil that was stockpiled from the excavation was collected and analyzed for TCLP lead. The results of the analysis show that the soil is not contaminated with leachable lead above the method detection level of 0.1 ppm. The soil was removed from the site and was disposed of in the Autumn Hills Recycling and Disposal Facility, Zeeland, Michigan. The result of the TCLP lead analysis is included with the laboratory results.

The water sample collected from the well point showed slightly elevated levels of BETX and TCE. These levels are all near or below the Type B criteria for groundwater. However, the sample may not be representative of the groundwater in the area.

If you have any questions or comments, please contact me at (708) 955-6787.

Sincerely,

Carl G Shaw

Carl Shaw
Project Manager

Attachments: Well Point Location Diagram
Soil Sample Location Diagram
Laboratory Results

RUST ENVIRONMENT & INFRASTRUCTURE

CALCULATION SHEET

PAGE 1 OF 1

PROJECT NO. _____

CLIENT WMI

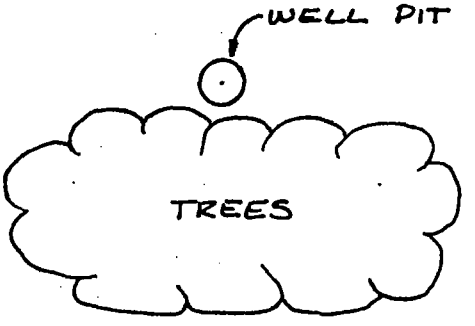
SUBJECT Site Location Plan

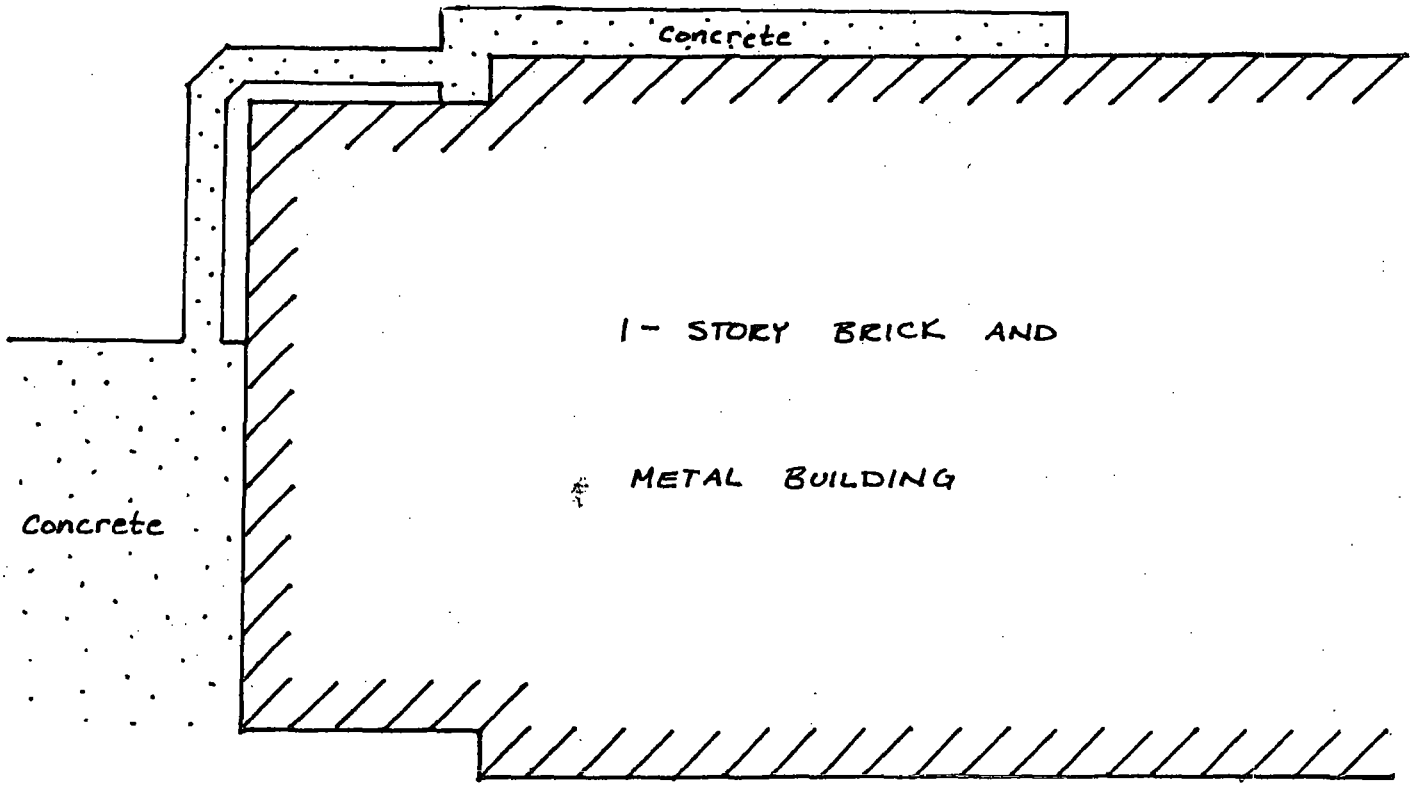
Prepared By CGS Date 9/16

PROJECT Holland Lagoons UST Search

Reviewed By _____ Date _____

Approved By _____ Date _____





0 20'

SCALE

RUST

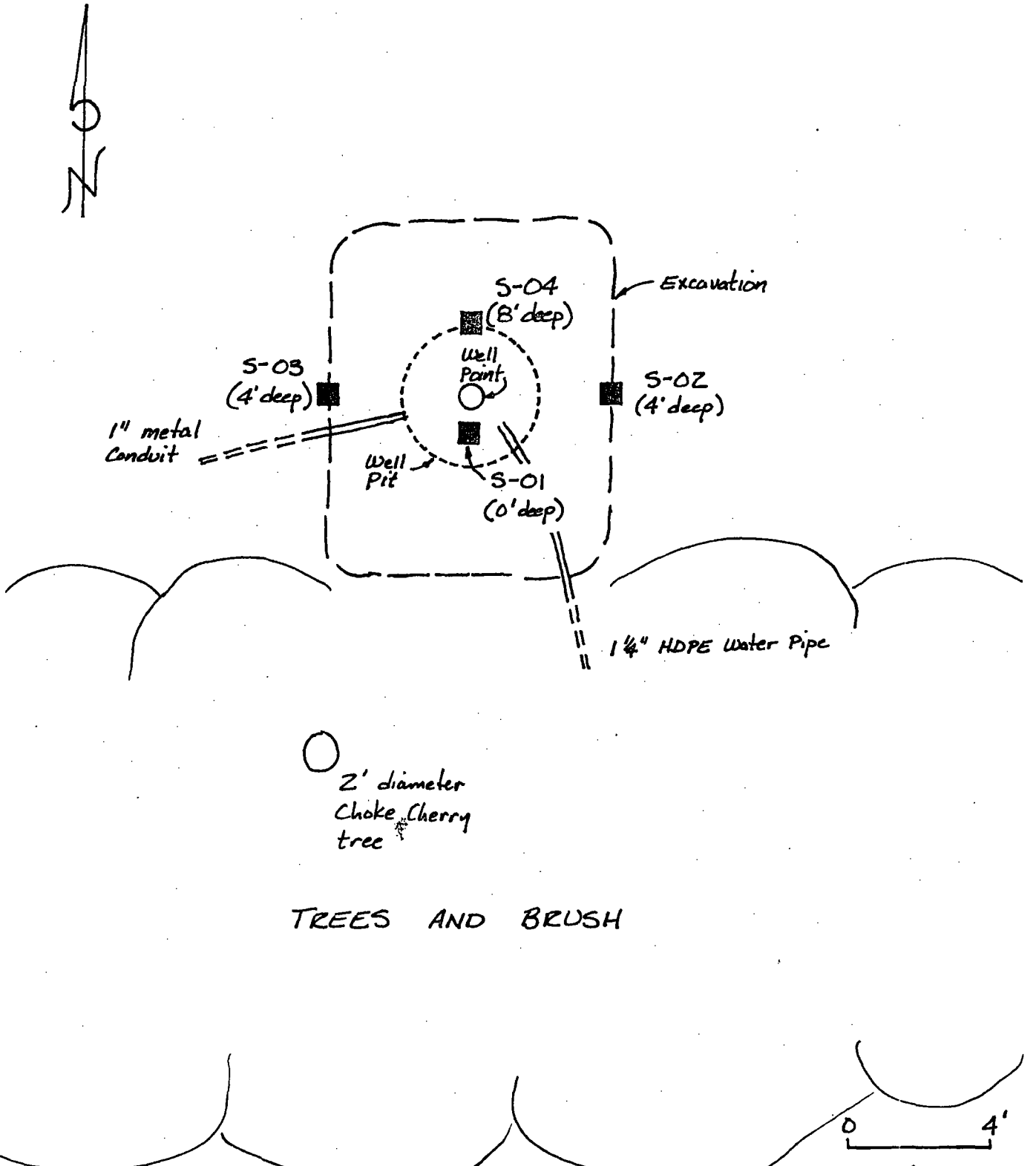
CALCULATION SHEET

PAGE 1 OF 1

CLIENT WM1 SUBJECT Soil Sample ORIG. BY CGS DATE 9/16

PROJECT Holland Lagoons Location Diagram REVIEWED BY ____ DATE ____

UST Search ADDITIONAL ____ DATE ____



ANATECH

Analytical Laboratories

Analytical Report

Lab I.D. :	33729
Report Date :	09/07/1993
Project :	WMI-Holland Lagoons 71719.100
Client :	Rust Environment & Infrastructure
	1240 East Diehl Road
	Naperville, IL 60563
Attention :	Mr. Carl Shaw

10 pages including cover sheet

ANATECH
Analytical Laboratories

Rust Environment & Infrastructure

Sample:	33729-6291	Matrix:	Soil / Grab
Client Sample:	S-01 Well Bottom	Location:	
COLLECTED:	08/26/1993 :	Project:	WMI-Holland Lagoons 71719.100
RECEIVED:	08/27/1993 16:13	Sampled By:	Carl Shaw

Test Description	Result	Unit	Detection Limit	Method	Date/Analyst
TOTAL METALS ANALYSIS					
Cadmium (GFAA)	12	mg/kg	0.01	SW-846 Mtd. 7131	09/01/1993 SRO
Chromium, Total (ICAP)	38	mg/kg	0.2	SW-846 Mtd. 6010	09/02/1993 GCP
Lead (ICAP)	380	mg/kg	2	"	09/02/1993 GCP
PURGEABLE HALOCARBONS					
1,2-Dichloroethane	ND	ug/kg	10	SW-846 Mtd. 8010	08/31/1993 EE
Trichloroethene	ND	ug/kg	10	"	08/31/1993 EE
VOLATILE AROMATIC HYDRO.					
Benzene	ND	ug/kg	10	SW-846 Mtd. 8020	08/31/1993 EE
Toluene	ND	ug/kg	10	"	08/31/1993 EE
Ethylbenzene	ND	ug/kg	10	"	08/31/1993 EE
Xylenes (Total)	ND	ug/kg	30	"	08/31/1993 EE
POLYNUCLEAR AROMATIC HYDRO.					
Benzo (a) Anthracene	ND	ug/kg	330	SW-846 Mtd. 8270	09/03/1993 RJW
Benzo (a) Pyrene	ND	ug/kg	330	"	09/03/1993 RJW
Benzo (b) Fluoranthene	ND	ug/kg	330	"	09/03/1993 RJW
Benzo (g,h,i) Perylene	ND	ug/kg	330	"	09/03/1993 RJW
Benzo (k) Fluoranthene	ND	ug/kg	330	"	09/03/1993 RJW
Dibenzo (a,h) Anthracene	ND	ug/kg	330	"	09/03/1993 RJW
Indeno (1,2,3-cd) Pyrene	ND	ug/kg	330	"	09/03/1993 RJW
Naphthalene	ND	ug/kg	330	"	09/03/1993 RJW
Acenaphthene	ND	ug/kg	330	"	09/03/1993 RJW
Acenaphthylene	ND	ug/kg	330	"	09/03/1993 RJW
Fluorene	ND	ug/kg	330	"	09/03/1993 RJW
Phenanthrene	ND	ug/kg	330	"	09/03/1993 RJW
Anthracene	ND	ug/kg	330	"	09/03/1993 RJW
Fluoranthene	ND	ug/kg	330	"	09/03/1993 RJW
Pyrene	ND	ug/kg	330	"	09/03/1993 RJW
Chrysene	ND	ug/kg	330	"	09/03/1993 RJW
POLYCHLORINATED BIPHENYLS (PCBs)					
Aroclor-1016	ND	mg/kg	0.1	SW-846 Mtd. 8080	09/07/1993 JA
Aroclor-1221	ND	mg/kg	0.1	"	09/07/1993 JA

ND = Non Detectable

Reported : 09/07/1993

Sample:	33729-6291	Matrix:	Soil / Grab
Client Sample:	S-01 Well Bottom	Location:	
COLLECTED:	08/26/1993 :	Project:	WMI-Holland Lagoons 71719.100
RECEIVED:	08/27/1993 16:13	Sampled By:	Carl Shaw

Test Description	Result	Unit	Detection Limit	Method	Date/Analyst
POLYCHLORINATED BIPHENYLS (PCBs)					
Aroclor-1232	ND	mg/kg	0.1	SW-846 Mtd. 8080	09/07/1993 JA
Aroclor-1242	ND	mg/kg	0.1	"	09/07/1993 JA
Aroclor-1248	ND	mg/kg	0.1	"	09/07/1993 JA
Aroclor-1254	ND	mg/kg	0.1	"	09/07/1993 JA
Aroclor-1260	ND	mg/kg	0.1	"	09/07/1993 JA
Aroclor-1262	ND	mg/kg	0.1	"	09/07/1993 JA
Aroclor-1268	ND	mg/kg	0.1	"	09/07/1993 JA

ND = Non Detectable

Laboratory Manager

C. David Hainer

Reported : 09/07/1993

Rust Environment & Infrastructure

Sample:	33729-6292	Matrix:	Soil / Grab
Client Sample:	S-02 East Sidewall	Location:	
COLLECTED:	08/26/1993 :	Project:	WMI-Holland Lagoons 71719.100
RECEIVED:	08/27/1993 16:13	Sampled By:	Carl Shaw

Test Description	Result	Unit	Detection Limit	Method	Date/Analyst
TOTAL METALS ANALYSIS					
Cadmium (GFAA)	1.1	mg/kg	0.01	SW-846 Mtd. 7131	09/01/1993 SRO
Chromium, Total (ICAP)	2.9	mg/kg	0.2	SW-846 Mtd. 6010	09/02/1993 GCP
Lead (GFAA)	21	mg/kg	0.1	SW-846 Mtd. 7421	09/01/1993 SRO
PURGEABLE HALOCARBONS					
1,2-Dichloroethane	ND	ug/kg	10	SW-846 Mtd. 8010	08/31/1993 EE
Trichloroethene	ND	ug/kg	10	"	08/31/1993 EE
VOLATILE AROMATIC HYDRO.					
Benzene	ND	ug/kg	10	SW-846 Mtd. 8020	08/31/1993 EE
Toluene	ND	ug/kg	10	"	08/31/1993 EE
Ethylbenzene	ND	ug/kg	10	"	08/31/1993 EE
Xylenes (Total)	ND	ug/kg	30	"	08/31/1993 EE
POLYNUCLEAR AROMATIC HYDRO.					
Benzo (a) Anthracene	ND	ug/kg	330	SW-846 Mtd. 8270	09/03/1993 RJW
Benzo (a) Pyrene	ND	ug/kg	330	"	09/03/1993 RJW
Benzo (b) Fluoranthene	ND	ug/kg	330	"	09/03/1993 RJW
Benzo (g,h,i) Perylene	ND	ug/kg	330	"	09/03/1993 RJW
Benzo (k) Fluoranthene	ND	ug/kg	330	"	09/03/1993 RJW
Dibenzo (a,h) Anthracene	ND	ug/kg	330	"	09/03/1993 RJW
Indeno (1,2,3-cd) Pyrene	ND	ug/kg	330	"	09/03/1993 RJW
Naphthalene	ND	ug/kg	330	"	09/03/1993 RJW
Acenaphthene	ND	ug/kg	330	"	09/03/1993 RJW
Acenaphthylene	ND	ug/kg	330	"	09/03/1993 RJW
Fluorene	ND	ug/kg	330	"	09/03/1993 RJW
Phenanthrene	ND	ug/kg	330	"	09/03/1993 RJW
Anthracene	ND	ug/kg	330	"	09/03/1993 RJW
Fluoranthene	ND	ug/kg	330	"	09/03/1993 RJW
Pyrene	ND	ug/kg	330	"	09/03/1993 RJW
Chrysene	ND	ug/kg	330	"	09/03/1993 RJW
POLYCHLORINATED BIPHENYLS (PCBs)					
Aroclor-1016	ND	mg/kg	0.03	SW-846 Mtd. 8080	09/02/1993 TJ
Aroclor-1221	ND	mg/kg	0.03	"	09/02/1993 TJ

ND = Non Detectable

Reported : 09/07/1993

ANATECH
Analytical Laboratories

Rust Environment & Infrastructure

Sample:	33729-6292	Matrix:	Soil / Grab
Client Sample:	S-02 East Sidewall	Location:	
COLLECTED:	08/26/1993 :	Project:	WMI-Holland Lagoons 71719.100
RECEIVED:	08/27/1993 16:13	Sampled By:	Carl Shaw

Test Description	Result	Unit	Detection Limit	Method	Date/Analyst
POLYCHLORINATED BIPHENYLS (PCBs)					
Aroclor-1232	ND	mg/kg	0.03	SW-846 Mtd. 8080	09/02/1993 TJ
Aroclor-1242	ND	mg/kg	0.03	"	09/02/1993 TJ
Aroclor-1248	ND	mg/kg	0.03	"	09/02/1993 TJ
Aroclor-1254	ND	mg/kg	0.03	"	09/02/1993 TJ
Aroclor-1260	ND	mg/kg	0.03	"	09/02/1993 TJ
Aroclor-1262	ND	mg/kg	0.03	"	09/02/1993 TJ
Aroclor-1268	ND	mg/kg	0.03	"	09/02/1993 TJ

ND = Non Detectable

Laboratory Manager

C. David Hainer

Reported : 09/07/1993

Rust Environment & Infrastructure

Sample:	33729-6293	Matrix:	Soil / Grab
Client Sample:	S-03 West Sidewall	Location:	
COLLECTED:	08/26/1993 :	Project:	WMI-Holland Lagoons 71719.100
RECEIVED:	08/27/1993 16:13	Sampled By:	Carl Shaw

Test Description	Result	Unit	Detection Limit	Method	Date/Analyst
TOTAL METALS ANALYSIS					
Cadmium (GFAA)	0.21	mg/kg	0.01	SW-846 Mtd. 7131	09/01/1993 SRO
Chromium, Total (ICAP)	3.5	mg/kg	0.2	SW-846 Mtd. 6010	09/02/1993 GCP
Lead (GFAA)	1.0	mg/kg	0.1	SW-846 Mtd. 7421	09/01/1993 SRO
PURGEABLE HALOCARBONS					
1,2-Dichloroethane	ND	ug/kg	10	SW-846 Mtd. 8010	08/31/1993 EE
Trichloroethene	ND	ug/kg	10	"	08/31/1993 EE
VOLATILE AROMATIC HYDRO.					
Benzene	ND	ug/kg	10	SW-846 Mtd. 8020	08/31/1993 EE
Toluene	ND	ug/kg	10	"	08/31/1993 EE
Ethylbenzene	ND	ug/kg	10	"	08/31/1993 EE
Xylenes (Total)	ND	ug/kg	30	"	08/31/1993 EE
POLYNUCLEAR AROMATIC HYDRO.					
Benzo (a) Anthracene	ND	ug/kg	330	SW-846 Mtd. 8270	09/03/1993 RJW
Benzo (a) Pyrene	ND	ug/kg	330	"	09/03/1993 RJW
Benzo (b) Fluoranthene	ND	ug/kg	330	"	09/03/1993 RJW
Benzo (g,h,i) Perylene	ND	ug/kg	330	"	09/03/1993 RJW
Benzo (k) Fluoranthene	ND	ug/kg	330	"	09/03/1993 RJW
Dibenzo (a,h) Anthracene	ND	ug/kg	330	"	09/03/1993 RJW
Indeno (1,2,3-cd) Pyrene	ND	ug/kg	330	"	09/03/1993 RJW
Naphthalene	ND	ug/kg	330	"	09/03/1993 RJW
Acenaphthene	ND	ug/kg	330	"	09/03/1993 RJW
Acenaphthylene	ND	ug/kg	330	"	09/03/1993 RJW
Fluorene	ND	ug/kg	330	"	09/03/1993 RJW
Phenanthrene	ND	ug/kg	330	"	09/03/1993 RJW
Anthracene	ND	ug/kg	330	"	09/03/1993 RJW
Fluoranthene	ND	ug/kg	330	"	09/03/1993 RJW
Pyrene	ND	ug/kg	330	"	09/03/1993 RJW
Chrysene	ND	ug/kg	330	"	09/03/1993 RJW
POLYCHLORINATED BIPHENYLS (PCBs)					
Aroclor-1016	ND	mg/kg	0.03	SW-846 Mtd. 8080	09/02/1993 TJ
Aroclor-1221	ND	mg/kg	0.03	"	09/02/1993 TJ

ND = Non Detectable

Reported : 09/07/1993

Rust Environment & Infrastructure

Sample:	33729-6293	Matrix:	Soil / Grab
Client Sample:	S-03 West Sidewall	Location:	
COLLECTED:	08/26/1993 :	Project:	WMI-Holland Lagoons 71719.100
RECEIVED:	08/27/1993 16:13	Sampled By:	Carl Shaw

Test Description	Result	Unit	Detection Limit	Method	Date/Analyst
POLYCHLORINATED BIPHENYLS (PCBs)					
Aroclor-1232	ND	mg/kg	0.03	SW-846 Mtd. 8080	09/02/1993 TJ
Aroclor-1242	ND	mg/kg	0.03	"	09/02/1993 TJ
Aroclor-1248	ND	mg/kg	0.03	"	09/02/1993 TJ
Aroclor-1254	ND	mg/kg	0.03	"	09/02/1993 TJ
Aroclor-1260	ND	mg/kg	0.03	"	09/02/1993 TJ
Aroclor-1262	ND	mg/kg	0.03	"	09/02/1993 TJ
Aroclor-1268	ND	mg/kg	0.03	"	09/02/1993 TJ

ND = Non Detectable

Laboratory Manager

C. David Hainer

C. David Hainer

Reported : 09/07/1993

Rust Environment & Infrastructure

Sample:	33729-6294	Matrix:	Soil / Grab
Client Sample:	S-04 Bottom	Location:	
COLLECTED:	08/26/1993 :	Project:	WMI-Holland Lagoons 71719.100
RECEIVED:	08/27/1993 16:13	Sampled By:	Carl Shaw

Test Description	Result	Unit	Detection Limit	Method	Date/Analyst
TOTAL METALS ANALYSIS					
Cadmium (GFAA)	0.10	mg/kg	0.01	SW-846 Mtd. 7131	09/01/1993 SRO
Chromium, Total (ICAP)	3.1	mg/kg	0.2	SW-846 Mtd. 6010	09/02/1993 GCP
Lead (GFAA)	1.1	mg/kg	0.1	SW-846 Mtd. 7421	09/01/1993 SRO
PURGEABLE HALOCARBONS					
1,2-Dichloroethane	ND	ug/kg	10	SW-846 Mtd. 8010	08/31/1993 EE
Trichloroethene	ND	ug/kg	10	"	08/31/1993 EE
VOLATILE AROMATIC HYDRO.					
Benzene	ND	ug/kg	10	SW-846 Mtd. 8020	08/31/1993 EE
Toluene	ND	ug/kg	10	"	08/31/1993 EE
Ethylbenzene	ND	ug/kg	10	"	08/31/1993 EE
Xylenes (Total)	ND	ug/kg	30	"	08/31/1993 EE
POLYNUCLEAR AROMATIC HYDRO.					
Benzo (a) Anthracene	ND	ug/kg	330	SW-846 Mtd. 8270	09/03/1993 RJW
Benzo (a) Pyrene	ND	ug/kg	330	"	09/03/1993 RJW
Benzo (b) Fluoranthene	ND	ug/kg	330	"	09/03/1993 RJW
Benzo (g,h,i) Perylene	ND	ug/kg	330	"	09/03/1993 RJW
Benzo (k) Fluoranthene	ND	ug/kg	330	"	09/03/1993 RJW
Dibenzo (a,h) Anthracene	ND	ug/kg	330	"	09/03/1993 RJW
Indeno (1,2,3-cd) Pyrene	ND	ug/kg	330	"	09/03/1993 RJW
Naphthalene	ND	ug/kg	330	"	09/03/1993 RJW
Acenaphthene	ND	ug/kg	330	"	09/03/1993 RJW
Acenaphthylene	ND	ug/kg	330	"	09/03/1993 RJW
Fluorene	ND	ug/kg	330	"	09/03/1993 RJW
Phenanthrene	ND	ug/kg	330	"	09/03/1993 RJW
Anthracene	ND	ug/kg	330	"	09/03/1993 RJW
Fluoranthene	ND	ug/kg	330	"	09/03/1993 RJW
Pyrene	ND	ug/kg	330	"	09/03/1993 RJW
Chrysene	ND	ug/kg	330	"	09/03/1993 RJW
POLYCHLORINATED BIPHENYLS (PCBs)					
Aroclor-1016	ND	mg/kg	0.03	SW-846 Mtd. 8080	09/02/1993 TJ
Aroclor-1221	ND	mg/kg	0.03	"	09/02/1993 TJ

ND = Non Detectable

Reported : 09/07/1993

ANATECH
Analytical Laboratories

Rust Environment & Infrastructure

Sample:	33729-6294	Matrix:	Soil / Grab
Client Sample:	S-04 Bottom	Location:	
COLLECTED:	08/26/1993 :	Project:	WMI-Holland Lagoons 71719.100
RECEIVED:	08/27/1993 16:13	Sampled By:	Carl Shaw

Test Description	Result	Unit	Detection Limit	Method	Date/Analyst
POLYCHLORINATED BIPHENYLS (PCBs)					
Aroclor-1232	ND	mg/kg	0.03	SW-846 Mtd. 8080	09/02/1993 TJ
Aroclor-1242	ND	mg/kg	0.03	"	09/02/1993 TJ
Aroclor-1248	ND	mg/kg	0.03	"	09/02/1993 TJ
Aroclor-1254	ND	mg/kg	0.03	"	09/02/1993 TJ
Aroclor-1260	ND	mg/kg	0.03	"	09/02/1993 TJ
Aroclor-1262	ND	mg/kg	0.03	"	09/02/1993 TJ
Aroclor-1268	ND	mg/kg	0.03	"	09/02/1993 TJ

ND = Non Detectable

Laboratory Manager

C. David Hainer

C. David Hainer

Reported : 09/07/1993

Rust Environment & Infrastructure

Sample:	33729-6295	Matrix:	Water / Grab
Client Sample:	W-01 Well Riser	Location:	
COLLECTED:	08/26/1993 :	Project:	WMI-Holland Lagoons 71719.100
RECEIVED:	08/27/1993 16:23	Sampled By:	Carl Shaw

Test Description	Result	Unit	Detection Limit	Method	Date/Analyst
PURGEABLE HALOCARBONS					
1,2-Dichloroethane	ND	ug/L	1	SW-846 Mtd. 8010	08/31/1993 EE
Trichloroethene	3	ug/L	1	"	08/31/1993 EE
VOLATILE AROMATIC HYDRO.					
Benzene	1	ug/L	1	SW-846 Mtd. 8020	08/31/1993 EE
Toluene	28	ug/L	1	"	08/31/1993 EE
Ethylbenzene	ND	ug/L	1	"	08/31/1993 EE
Xylenes (Total)	37	ug/L	1	"	08/31/1993 EE

ND = Non Detectable

Laboratory Manager

C. David Hainer

Reported : 09/07/1993

ENVIRONMENTAL MONITORING AND TECHNOLOGIES, INC.

8100 North Austin Avenue
Morton Grove, Illinois 60053-3203
708/967-6666
FAX: 708/967-6735

LABORATORY REPORT

82583

RUST E&I
1240 East Diehl Road
Naperville, IL 60563

Report Date: 10/18/93
Sample Received: 10/14/93

Project Name: Holland, Michigan
Sample Description: Soil Composite S-05
Sample No.: 63721

Analysis performed on TCLP extract

Lead	<0.1

All results expressed as ppm unless otherwise indicated.

Methods performed according to SW-846, "Test Methods for Evaluating Solid Waste".

Kate E. Chi

LABORATORY DIRECTOR

ANATECH ANALYTICAL LABORATORIES

Chain of Custody Record / Work Authorization
1200 Conrad Industrial Drive, Ludington, MI 49431
Phone # 800-733-8715

Laboratory Reference # 33729 Page 1 of 1

Note: Please use permanent ink pen (If same leave blank)

Results To: Name & Address
Carl Shaw
RUST Environment & Infrastructure
1240 East Diehl Road
Naperville IL 60563
Telephone # (708) 955-6787 FAX # (708) 955-6601
Fax results: (yes) no

Invoice To
Telephone #

Project Name UMI - Holland Lagoons Project # 71719.102 State MI Work Authorization *
(State in which samples were collected)

Sample Containers: (CTY/Size/Type/pH) (Lab use only)

VOA:	2	2	2	O&G HCL:	1	1	1	
Amber:	1	1	1	Bacti:	1	1	1	
HNO3:	1	1	1	Soil:	2	1	2	1
None:	1	1	1		1	1	1	
H2SO4:	1	1	1		1	1	1	

Test Methods

*Authorizes Anatech to perform the work requested on this form and acknowledges the terms and conditions of payment; which are listed on the reverse side of this form.

Required Completion Date: 9/03/93
Sampled By (name): Carl Shaw

Lab I.D.	Client Sample ID	Sampling Location	Collection Date	Collection Time am/pm	Method comp. or grab	Drinking Water Sample Matrix	Drinking Water Y/N	BETX	PNAs	PCBs	TCE	DCA	Lead	Cadmium	Chromium
33729	S-01	Wall bottom	8/26	0900	G	Soil	N	X	X	X	X	X	X	X	X
33730	S-02	East Sidewall	8/26	1030	G	Soil									
33731	S-03	West Sidewall	8/26	1030	G	Soil									
33732	S-04	Bottom	8/26	1030	G	Soil									
33733	W-01	Well Water	8/26	1030	G	Water	Y								

Notes / Special Request

* All work to be conducted under terms and conditions of the Subcontract agreement between RUST and Anatech dated June 14, 1993

Relinquished by: (signature)	Date	Time am/pm	Received by: (signature)	Relinquished by: (signature)	Date	Time am/pm	Received by: (signature)	Courier Tech: / Courier #:
Carl Shaw	8/26/93	1300						
Relinquished by: (signature)	Date	Time am/pm	Received by: (signature)	Relinquished by: (signature)	Date	Time am/pm	Received for Lab by:	Date / Time am/pm

Pink copy - client Yellow copy - Managers White copy - Lab

ENVIRONMENTAL MONITORING AND TECHNOLOGIES, INC.

Chain of Custody Record

8100 North Austin Avenue
Morton Grove, Illinois 60053-3203

708-967-6666
FAX: 708/967-6735

Due Date: 10-18-93 COC #: _____

Company: RUST E&I
Address: 1240 East Diehl Road
Naperville IL 60563

Phone #: (708) 955-6787 Fax #: (708) 955-6601
P.O. #: _____ Proj. #: 71719.100
Client Contact: Carl Shaw
Project ID / Location: Holland, Michigan

Sample Type:
1. Water
2. Soil
3. Sludge
4. Oil
5. Tissue
Other : _____

Container Type:
P - Plastic
G - Glass
V - VOC

Preservative:
1. None 3. HNO3
2. H2SO4 4. NaOH

Sample I.D. (10 Characters ONLY)	Sample Type	Container Size	Container Type	Container No.	Sampling Date	Sampling Time	Preservative	Lab I.D.	Analyses: TCLP Lead	Comments
S-05 (comp)	Soil	1 l	G		10/13	1530	N	63721	X	All work to be conducted according to subcontract agreement between RUST & EMT dated June 2, 1992

Relinquished By:	Date:	Time:	Received By:	Date:	Time:	Witness:
Carl G Shaw	10-14-93	11:25		10-14-93	12:30	
Relinquished By:	Date:	Time:	Received For Lab By:	Date:	Time:	
	10-14-93	4:00		10-14-93	17:30	

TURNAROUND TIME:
☒ RUSH
____ day turnaround
☐ ROUTINE

SPECIAL INSTRUCTIONS:

ATTACHMENT L

Electromagnetic Survey Investigation
Waste Management of Michigan

Holland Lagoons Site
Holland, Michigan

October, 1993

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2.0 Electromagnetic Survey Technique	1
3.0 Electromagnetic Survey Procedure	2
4.0 Electromagnetic Survey Analysis and Results	3
5.0 Summary and Conclusion	6

LIST OF FIGURES

1 General Location Map
2 Conductivity Data Point Locations
3 Conductivity Contour Map
4 Conductivity Surface Plot
5 In-Phase Contour Map
6 In-Phase Surface Plot

1.0 INTRODUCTION AND PURPOSE

This report presents the results of an electromagnetic (EM) survey conducted at the Waste Management of Michigan Holland Lagoons Site located near Holland Michigan. The specific location of the site is in Park Township within the SW 1/4, Section 15, T5N, R16E at 2700 North 168th Street.

The Holland site was investigated by an EM survey for the purpose of identifying the nature and extent of potential subsurface contamination. Potential contamination is reported to be associated with former waste disposal activities including open burning and burial of the ash and disposal of liquid waste via dewatering lagoons. A general location map of the EM study area is presented in Figure 1.

The EM investigation was completed as part of the Phase I Remedial Investigation for the Holland Lagoons Site. The survey was conducted as an assessment of subsurface environmental concerns at locations determined from a historical records search regarding past waste disposal activities at the site.

The extent of the EM survey covered approximately 25 acres which encompassed target areas determined from the historical records search. EM data was acquired from the study area by an EM survey conducted on October 11-13, 1993.

2.0 ELECTROMAGNETIC SURVEY TECHNIQUE

The EM survey was conducted at the Holland site using a Geonics EM-31D Terrain conductivity meter. Terrain conductivity is obtained by measuring the variances in electrical current, which is electromagnetically induced into the earth by a transmitter coil in the quadrature phase. Current variation is detected electromagnetically by a receiver coil. The center of each coil is set apart at a known distance and oriented in a vertical dipole mode. This allows for a continuous depth of investigation of approximately 20 feet. The EM technique measures composite electrical conductivity of subsurface soil, rock, and ground water. The measured subsurface conductivity is a function of physical and chemical properties of soil and/or rock, its porosity, moisture content in the pore spaces, and the conductivity of moisture (fluids) that fill the pore spaces. EM conductivity values of the underlying soils are measured in millimhos/meter (mmhos/m) or the equivalent millisiemens/meter (ms/m).

In addition to the measurement of conductivity in the quadrature phase, readings more sensitive to metal detection were also obtained with the in-phase component of the instrument. EM values of the in-phase component are measured as a proportion of conductivity in parts per thousand (ppt). Both quadrature and in-phase readings were simultaneously recorded in the field.

A homogeneous soil formation will have soil constituents that are somewhat similar in physical chemical composition. Pore openings, texture, particle size, and moisture content will be relatively constant throughout the formation. If the soils have been altered, such as during

excavation or fill placement, the physical characteristics of the soils will also be altered and, in turn, affect the pore openings and moisture content of the soil. If an area of land has been disturbed (i.e., buried waste), the conductivity of the altered soils would likely differ from the surrounding in-situ undisturbed soils. Comparison of relative changes in conductivity or in-phase response can be used to map the extent of the soil impacted by past excavation and/or waste disposal activities.

The occurrence of buried wastes, metals or buried metal drums and their more conductive nature will have a significant effect on conductivity or in-phase values obtained from the EM survey.

3.0 ELECTROMAGNETIC SURVEY PROCEDURES

Results of the historical records search indicate a variety of wastes have been disposed of at the site. The site was operated between 1945 and 1981 as an industrial waste hauling and sludge dewatering operation (Jacobusse Inc.). It is also reported to have conducted liquid waste disposal activities and open burning of refuse. According to available information the disposal of waste materials were into seepage lagoons and in various "landfill" areas within the site. Locations of these waste disposal areas are not well defined. It is also reported that sediment from the dewatering lagoons has since been excavated and backfilled with surrounding soils; however, the extent of remediation remains uncertain.

Based on the results of the historical records search, concerns regarding the locations and extent of past waste disposal activities were further investigated by an EM survey. The EM survey was designed to obtain conductivity information to a depth of approximately 20 feet over the entire 25 acre study area. This coverage provided the EM data required to delineate potential occurrences of buried wastes, soils altered from past excavation and backfilling, or metal drum disposal.

Individual values of EM data are not necessarily diagnostic in themselves but comparative variations in conductivity or in-phase data are significant. Therefore, measurements influenced by items or waste will exhibit an anomalous trend in EM values in comparison to that of values associated with natural or non-impacted soils.

It is anticipated that the 25 acre coverage at the site would provide the comparative variation of conductivity and in-phase data required for the investigation. The site is currently open land with some wooded areas. A small metal building and an adjoining fenced storage yard are located in the western portion of the site, near 168th Street.

The EM survey at the Holland Site was conducted on 65 north-south traverse lines. Each traverse line was spaced 20 feet apart, with EM values recorded electronically at 20 foot increments along each line, resulting in a 20 x 20 foot grid.

Orientation of traverse lines were maintained by a previously staked 40 x 40 foot grid. The EM survey grid was incorporated into the Michigan State Plane Coordinate System.

4.0 EM SURVEY ANALYSIS AND RESULTS

Quadrature (Conductivity) Data:

The location of the EM survey grid at the Holland Site is provided in Figure 2. Also included are the conductivity values obtained at each station. The conductivity data obtained from the EM survey have been contoured for the area of interest as shown in Figure 3. A corresponding three-dimensional surface plot of conductivity data is provided in Figure 4.

The contoured data indicates a good correlation in areas with lower and consistent conductivity values associated with background soils, in contrast to areas of relatively high or low anomalous conductivity associated with impacted soils. Positive conductivity values for the study area ranged from a low of 2 mmhos/m to a high of 88 mmhos/m. Negative conductivity values were also encountered at various locations with values ranging from -101 to -1 mmhos/m. Negative conductivity responses may be attributed to buried or surface metal items. Metal items can cause a reversal of induced current as the EM instrument passes over, resulting in a negative response at some data point locations.

Figures 3 and 4 described conductivity trends and anomalies that represent various effects on soil conditions. Identified trends and anomalies have also been compared to observed surface features and their potential impact on the conductivity readings. Most noticeable are the effects of the metal building and fencing in the western portion of the site. Surface features such as power poles and above ground power lines, at locations shown in Figure 3, were found not be have influenced conductivity readings.

Analysis of EM data indicates areas of natural or background soils are represented by relatively low conductivity values between 5 and 10 mmhos/m. The 5 to 10 mmhos/m range of background soils is most likely associated with the soil's varying sand and silty sand content. Background soils are indicated by open areas between the 5 and 10 mmhos/m contours shown in Figure 3 and the more level corresponding surface shown in Figure 4. Background soils are located throughout most areas of the site with conductivity values most often ranging between 6 to 8 mmhos/m.

Areas of anomalous conductivity data are defined by values either less than 5 mmhos/m or greater than 10 mmhos/m. The range of anomalous conductivity data is in response to the instrument's orientation to suspected metal object(s) at a given grid coordinate. At some locations the instrument was more parallel to a metal object resulting in a positive response, whereas at other locations the instrument appears to have encountered a metal object(s) in a perpendicular direction, resulting in a negative response.

Numerous isolated areas of anomalous conductivity data were identified at the site. Most anomalies were attributed to metal debris observed on the surface and are not considered representative of subsurface soil conditions. Typically, the cause of these anomalies are associated from the effects of scattered metal objects such as an abandoned car, an old culvert

pipe, abandoned equipment, and old empty drums. Cultural items causing anomalous conductivity responses include the metal building and fencing in the western portion of the site. Anomalies attributed to observed surface debris and items are noted in Figures 3 and 4.

Eight areas of anomalous conductivity data where found not to correlate with observed surface items. These areas, as shown in Figures 3 and 4, infer the locations of suspected buried waste material.

One area, within the northwestern portion of the study area is comprised of a grouping of anomalous conductivity data. The grouping of these anomalies is approximately centered around coordinates N485,880/E12,632,540. Each anomaly is associated with a negative conductivity response and are situated in an apparent systematic pattern indicating a grouping of relatively isolated buried waste items. The negative anomalies infer the buried wastes are items of metallic composition.

Two isolated north-south trending anomalies were identified in the north central and south central portions of the study area, at coordinates N485,820/E12,632,800 and N485,320/E12,632,920 respectively. Both anomalies are comprised of high and low conductivity values in a linear north-south configuration. The configuration of anomalous conductivity at both locations suggests the existence of buried wastes within two separate trench like excavations.

More extensive areas of anomalous conductivity data were found in the eastern portion of the study area. This portion of the study area includes areas of reported buried wastes and former lagoon locations identified in the historical records search. Anomalous conductivity trends have been identified at five general locations within the eastern portion of the study area, as shown in Figures 3 and 4. The areas of anomalous conductivity data tend to be situated near the base of an old sand dune and near an abandoned north-south road.

The configuration of the four anomalous areas immediately west of the road shown in Figure 3 suggests former area-fill methods of waste disposal. The locations of these anomalies correlate with waste disposal areas reported to have existed along the eastern base of the sand dune. The predominance of negative conductivity values at all three locations infers the existence of numerous metal items within each suspect buried waste area.

An area of anomalous conductivity data was also identified within the southeastern portion of the study area. This area is comprised of a grouping of conductivity anomalies centered near coordinates N485,040/E12,633,440 at the end of an abandoned road, as shown in Figure 3. The grouping of anomalous conductivity data suggests the locations of isolated buried wastes within a general disposal area. Buried wastes in this area is suspected to consist of buried metal drums. The existence of buried drums in this area is based in part on the grouping of isolated positive and negative conductivity values which are suspected to be in response to individual buried drums or groups of buried drums. A few drums were also observed to be imbedded in surface soils in this area, further substantiating the occurrence of additional buried drums.

Conductivity data in reported former lagoon locations did not exhibit anomalous conductivity data. The former lagoon locations, as shown in Figure 3 appear to be comprised of soils similar to natural or background soil conditions where conductivity values are typically between 6 to 8 mmhos/m.

The records search had noted that sediment from the lagoons had been previously excavated and removed from the site. Backfilling of the excavated lagoons was then completed using native soils consisting of sand. Based on the lack of anomalous conductivity data at both lagoon locations, it would appear that the removal of impacted soil for both lagoon areas was completed as reported.

In-Phase Data:

Additional in-phase data were acquired with the EM31 simultaneously with the conductivity (quadrature) data acquisition. As discussed previously in Section 2.0, the in-phase component is substantially more sensitive to metal objects than in the quadrature phase. Units of the in-phase component are parts per thousand (ppt). In-phase responses were encountered at numerous locations in the study area, indicating the occurrence of buried metal or effects from metal debris laying on the surface.

Anomalous in-phase data included both positive and negative responses ranging from 3 to 45 ppt and -32 to -3 ppt. The positive and negative values are a result of induced current reversals when the EM instrument passed over metal objects. In-phase values between -2 and 2 ppt are considered as zero readings due to minor variation about the sensitive zero setting of the EM instrument. Variation of $\pm$ 2 ppt are not considered representative of subsurface conditions.

The contoured results of the in-phase data and a corresponding three-dimensional surface plot of in-phase data are provided in Figures 5 and 6, respectively. An evaluation of contoured results at the site, indicates a good correlation of anomalous in-phase data with most anomalous conductivity data.

As with conductivity data, numerous areas of anomalous in-phase data were identified within the study area. Most anomalies are attributed to metal debris on the surface and to cultural effects such as the metal building and fencing and are not representative of subsurface conditions. In-phase anomalies attributed to these effects are identified in both Figures 5 and 6.

Seven areas of anomalous in-phase data, however, are not associated with the effects of observed surface features. These areas, as also shown in Figures 5 and 6, infer the location of buried metal items.

All seven anomalies were found to correlate closely with seven of the eight identified conductivity anomalies. This correlation further indicates the existence of metal material within the areas of buried wastes as inferred from the evaluation of conductivity data.

The one conductivity anomaly not correlating with anomalous in-phase data occurs near coordinates N485,320/E12,632,940. The lack of correlating in-phase data at this location infers that potential buried wastes identified from conductivity data, is comprised of conductive waste material other than metal.

5.0 SUMMARY AND CONCLUSIONS

Conductivity trends and anomalies determined from the EM survey have identified two representative soil categories at the Holland Lagoons Site. These categories include:

1) Background soil conditions between 5 to 10 mmhos/m.

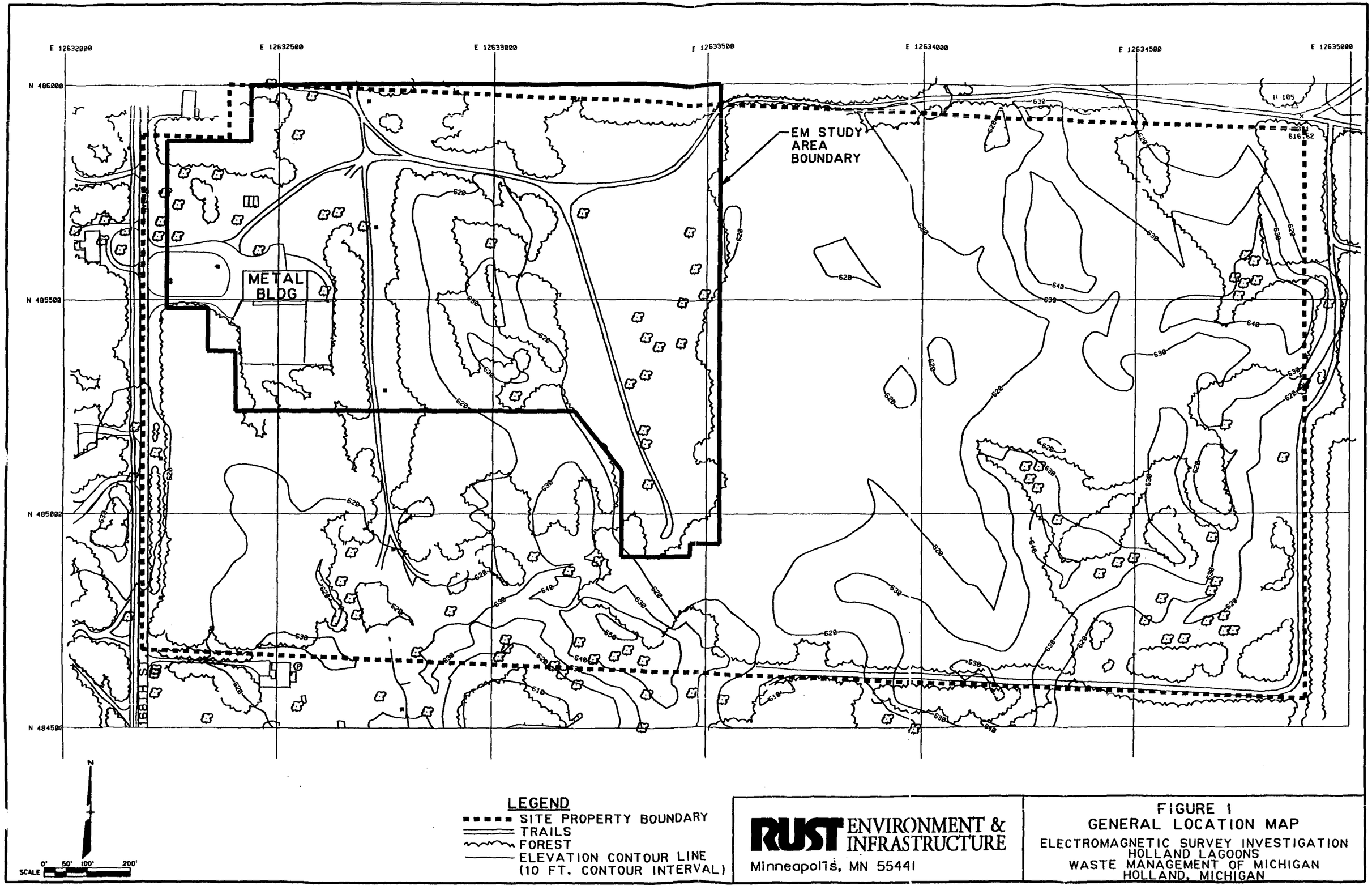
2) Impacted soils associated with buried waste materials at values less than 5 mmhos/m or greater than 10 mmhos/m.

Background soil conditions were identified for most areas of the site with conductivity values most often from 6 to 9 mmhos/m. Anomalous positive and negative values were found at various locations of the study area. Most of the anomalies were attributed to observed surface debris and/or cultural effects (ie. metal bldg.). However, eight areas of anomalous data infer the existence of buried waste materials.

Three of the eight areas within the central portion of the site, as shown in Figures 3 and 5, are relatively large in areal extent. These areas were found to correlate with reported waste disposal operations identified in the historical records search. The remaining five areas of anomalous data infer relatively isolated buried waste materials or disposal areas at previously unknown locations. These locations are within the northwestern, south central, and southeastern portions of the study area, as also shown in Figures 3 and 5.

Conductivity data within the two former lagoon locations were found to be at background levels. The lack of anomalous data at both locations supports reported removal of impacted soil and backfilling with native soils (sand).

Areas of anomalous in-phase data were found to correlate with most areas of anomalous conductivity data. The correlation of data suggests the existence of metal material within the inferred buried waste mass.



RUST ENVIRONMENT & INFRASTRUCTURE
Minneapolis, MN 55441

FIGURE 1
GENERAL LOCATION MAP
ELECTROMAGNETIC SURVEY INVESTIGATION
HOLLAND LAGOONS
WASTE MANAGEMENT OF MICHIGAN
HOLLAND, MICHIGAN

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ATTACHMENT M

1995 Phase I Remedial Investigation Report Waste Management Holland Lagoons, December 1995

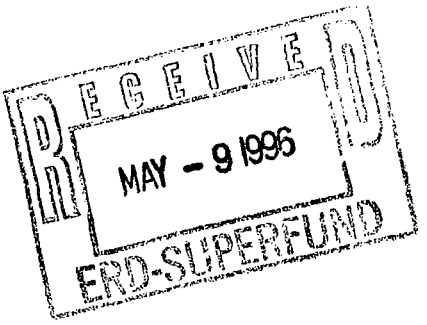
Due to the size of this report, a copy will not be included with this Five-Year Review Report. Copies of this report can be found in both the MDEQ and USEPA site files.

ATTACHMENT N

RUST Rust Environment & Infrastructure Inc.

A Rust International Company
1240 East Diehl Road
Naperville, IL 60563

Phone 708.955.6600
Fax 708.955.6601



May 6, 1996

Ms. Lisa Summerfield
Michigan Department of Natural Resources
Knapp's Office Center
P. O. Box 30028
Lansing, MI 48909

Subject: Groundwater Sampling
Waste Management - Holland Lagoons Superfund Site

Dear Ms. Summerfield:

On behalf of SC Holdings, Inc. (SCH), Rust Environment & Infrastructure, Inc. (Rust) is submitting this letter to describe additional groundwater sampling to be conducted at the Waste Management - Holland Lagoons Superfund Site (Site). The scope of work outlined in this letter involves collecting an additional round of groundwater samples from selected monitoring wells and analyzing the samples for volatile organic compounds (VOCs) and total inorganics.

Project Plans have already been developed which describe in detail the methods which will be used to collect and analyze the samples. This letter will discuss only the wells which will be sampled and the analyses which will be performed on the samples. The existing Project Plans will be referenced, as appropriate, in this letter to describe the procedures which will be used to collect the samples. The existing Project Plans are:

- Phase II Remedial Investigation Work Plan, Waste Management-Holland Lagoons, Holland, Michigan, Prepared for SC Holdings, Inc., Prepared by Rust Environment & Infrastructure, Inc. October, 1995.
- Phase II Remedial Investigation Field Sampling Plan, Waste Management-Holland Lagoons, Holland, Michigan, Prepared for SC Holdings, Inc., Prepared by Rust Environment & Infrastructure, Inc. October, 1995.
- Phase II Remedial Investigation Quality Assurance Project Plan, Waste Management-Holland Lagoons, Holland, Michigan, Prepared for SC Holdings, Inc., Prepared by Rust Environment & Infrastructure, Inc. October, 1995.
- Phase II Remedial Investigation Site Specific Health and Safety Plan, Waste Management-Holland Lagoons, Holland, Michigan, Prepared for SC Holdings, Inc., Prepared by Rust Environment & Infrastructure, Inc. October, 1995.

The following sections describe the wells which will be sampled, the analytes for which the samples will be analyzed, and the methods which will be used to collect the samples.

WELLS TO BE SAMPLED

Groundwater samples will be collected from 21 existing wells located on and around the Site. The wells are a combination of existing wells installed by Prein & Newhof to monitor the Southwest Ottawa County Landfill (SOCL) and existing wells installed by Rust during the Phase I and Phase II Investigations. The wells which will be sampled are summarized in Table 1 and the locations of the wells are shown on Figure 1.

SAMPLE ANALYSIS

The wells will be sampled for the target compound list (TCL) volatile organic compounds and for total target analyte list (TAL) inorganics. The analytes which will be sampled are summarized in Table 2 and the bottles which will be used to collect the samples are summarized in Table 3.

SAMPLING METHODS

The procedures which will be used to collect the samples will be the same procedures described in the Phase II Remedial Investigation Field Sampling Plan (FSP). As discussed in the preceding sections, the only changes to the procedures are the wells which will be sampled and the analytes which will be tested. All other purging and sampling methods will be the same as those described in the FSP.

SCHEDULE

SCA would like to conduct the additional sampling as soon as possible to minimize the impact on the project schedule. Rust is planning to conduct the sampling in late May 1996.

If you have any questions or comments concerning this addition to the Project Plans, please contact either Phil Mazor at (616) 688-5777 or me at (708) 955-6787.

Sincerely,

Carl G. Shaw, P.G.
Project Manager

TABLE 2
GROUNDWATER SAMPLING SUMMARY

Sample Matrix	Analytical Parameters	DQO Level	Field Samples	Field Blanks	Field Duplicates	Trip Blanks	Total to Lab	Lab MS/MSD
Groundwater	TCL VOCs	IV	21	3	3	1	28	2
	TAL Inorganics (Total)	IV	21	3	3	---	27	2
	Groundwater Parameters[1]	III	21	3	3	---	27	2

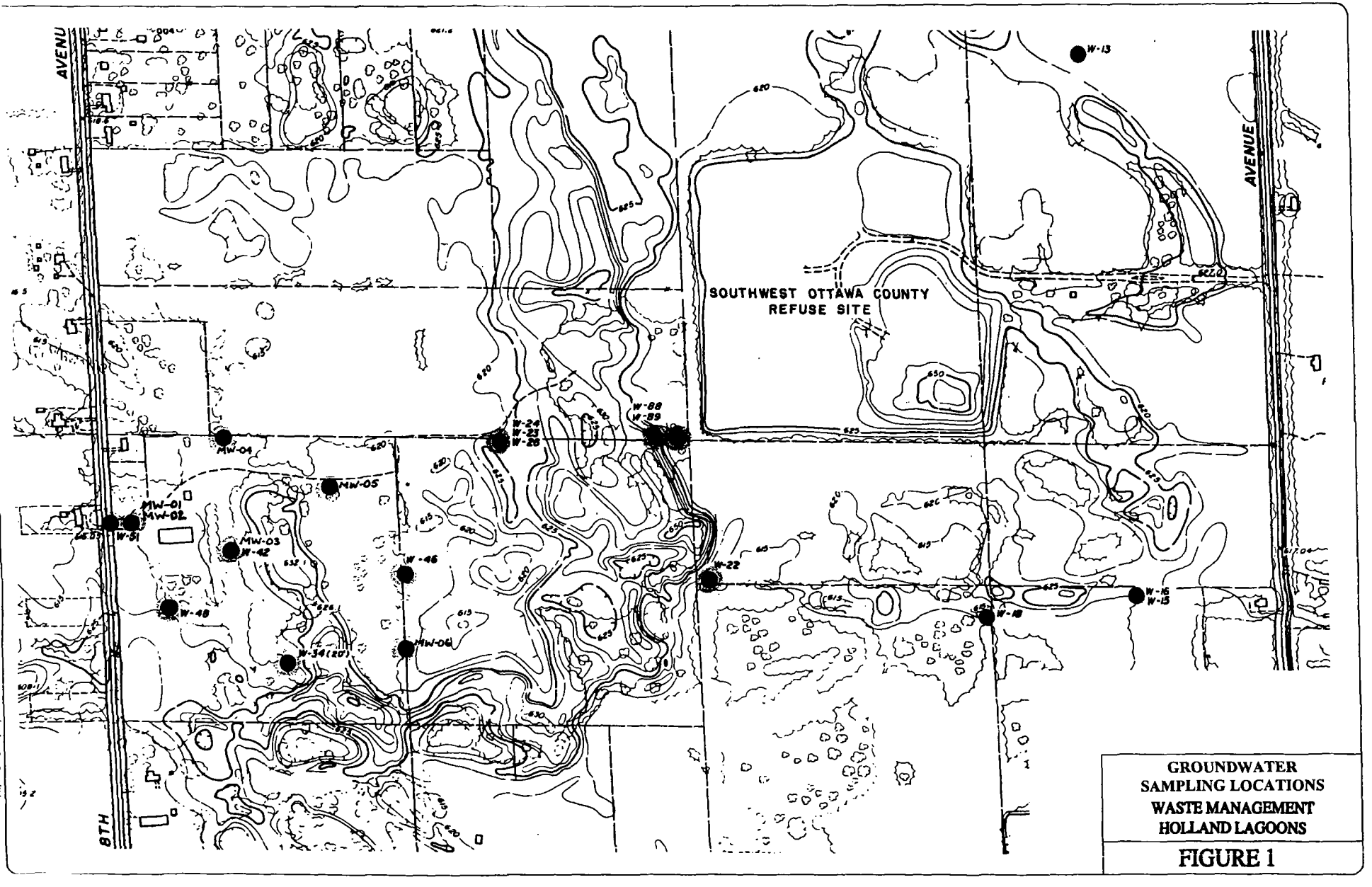
[1] TDS, TSS, chloride, sulfate, alkalinity-bicarbonate, alkalinity-carbonate.

TABLE 3
GROUNDWATER SAMPLE BOTTLE SUMMARY

ANALYTE	BOTTLE	PRESERVATIVE	HOLDING TIME	MS/MSD
TCL volatile organics	2-40 ml glass vials with teflon lined septa	Cool to 4°C No headspace	7 days	6
TAL Inorganics				
Metals - Total	1-1 liter polyethylene	Cool to 4°C	6 months, mercury:26 days	0
Cyanide	1-1 liter polyethylene	Cool to 4°C and NaOH to pH > 12	12 days	0
Groundwater Parameters				
TDS, TSS	1-1000ml plastic	Cool to 4°C	7 days	0
Anions	1-2000ml plastic	Cool to 4°C	28 days	0

TABLE 1
MONITORING WELL SUMMARY

Observation Well Number	Date Installed	ELEVATION			Depth Below Water Table	Relationship to Former Lagoon Area
		Ground	Casing	Screen		
W-13	NA	NA	NA	NA	10	Background
W-15	NA	NA	NA	NA	40	Background
W-16	NA	NA	NA	NA	20	Background
W-18	NA	NA	NA	NA	20	Background
W-22	NA	612.9	614.84	588	20	Anthropogenic Background
W-23	4/26/79	620.0	622.00	567	40	Anthropogenic Background
W-24	4/26/79	619.8	622.88	588	20	Anthropogenic Background
W-26	NA	619.8	620.20	547	61	Anthropogenic Background
W-34	5/24/79	618.9	619.91	583	20	Down Gradient
W-42	8/28/79	615.5	616.55	NA	40	Down Gradient
W-46	NA	616.8	617.99	584	20	On-Site
W-48	1/7/80	615.6	617.83	579	25	Down Gradient
W-51	NA	NA	NA	NA	20	Down Gradient
W-88	NA	NA	NA	NA	40	Anthropogenic Background
W-89	NA	NA	NA	NA	40	Anthropogenic Background
MW-01	7/14/94	615.1	617.89	574	30	Down Gradient
MW-02	7/14/94	615.1	617.65	596	8	Down Gradient
MW-03	7/13/94	615.4	617.65	572	34	Down Gradient
MW-04	7/10/95	618.6	621.29	586	20	Cross Gradient
MW-05	7/10/95	615.6	618.20	583	20	Down Gradient
MW-06	7/10/95	617.5	620.02	585	20	On-Site



GROUNDWATER
SAMPLING LOCATIONS
WASTE MANAGEMENT
HOLLAND LAGOONS

FIGURE 1

= BACKGROUND

= ANTHROPOGENIC BACKGROUND

= DOWNGRADIENT ON SITE CROSSGRADIENT

1997 Remedial Investigation Report and Base Line Risk Assessment Report Waste Management Holland Lagoons, January 1997

Due to the size of this report, a copy will not be included with this Five-Year Review Report. Copies of this report can be found in both the MDEQ and USEPA site files.

RUST Rust Environment & Infrastructure Inc.

A Rust International Company
3121 Butterfield Road
Oak Brook, IL 60523

Phone 630.574.2006
Fax 630.574.2007

May 7, 1998

Ms. Lisa Summerfield
Michigan Department of Environmental Quality
P. O. Box 30028
Lansing, MI 48909

Subject: Additional Ground Water Sampling Results
Waste Management-Holland Lagoons

Dear Ms. Summerfield:

Enclosed, please find the results of the recent ground water sampling event conducted at the subject site. Ground water samples were collected from wells MW-02, MW-03, W-42, and W-48 on March 23, 1998. The samples were collected according to the procedures in the Phase II Field Sampling Plan and were analyzed for total (no field filtering) beryllium, cadmium, and vanadium. The results were validated according to the procedures outlined in the Phase II QAPP. SC Holdings is currently preparing a submittal to MDEQ outlining the procedures and results of the sampling event.

If you have any questions or comments, please contact Phil Mazor at 616-688-5777 me at 630-574-4779.

Sincerely,

Carl G. Shaw, P.G.
Project Manager

Attachment: as noted

TABLE 1
Ground Water Sampling Results For March 23, 1998
Waste Management - Holland Lagoons

Sample Number	Result (ug/l)		
	Beryllium	Cadmium	Vanadium
Res. Criteria	4.0	5.0	64
MW-02	<1.2	<0.077	14.3 J
MW-03	<1.2	0.345 J	10.6 J
W-42	<1.2	**6.3**	56
W-48	<1.2	1.22	<5.1
W-48 Duplicate	<1.2	0.08	<5.1
W-48 Blank	<1.2	<0.077	<5.1

3121 Butterfield Road, Oak Brook, Illinois 60523

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January 27, 2000

Ms. Judy Gapp
Michigan Department of Environmental Quality
Knapp's Office Center
P. O. Box 30028
Lansing, MI 48909

Subject: Ground Water and Soil Analytical Data
Waste Management - Holland Lagoons Superfund Site

Dear Ms. Gapp:

Telephone
630.574.2006
Facsimile
630.574.2007

On behalf of SC Holdings, Inc., Earth Tech, Inc. is submitting the attached analytical data for ground water and soil confirmations samples collected at the Waste Management - Holland Lagoons Superfund site in October 1999. The following sections provide additional discussion of the submittal.

Ground Water Sample Data

Ground water samples were collected from selected ground water monitoring wells according to the Work Plan for Ground Water Sampling under the oversight of Bill Bolio of MDEQ. The samples were submitted to Lancaster Laboratories for analysis and the results were validated by Marcia Kuehl. The locations of the wells that were sampled are shown on Figure 1. The ground water analytical results are summarized in Tables 1, 2, and 3. The data validation memoranda are included as attachment 1 and the validated laboratory sheets are included as attachment 2.

The ground water sample results from the wells that have been sampled in the past are similar or improved from the results found in the past.

- Benzene generally continues to be found in the same wells in which it has been found in the past. However, benzene was also found in anthropogenic well W-24 and it has not been found in this well in the past.
- Total metals results are also very similar to past sampling events. Manganese was generally found in the same wells as benzene. Aluminum was not found in any of the wells but had been found in several wells in the past. Lead was found in site well MW-03 and anthropogenic well W-89 but had not been found in these wells in the past.
- There were no detections of SVOCs in any of the wells, which is similar to past results.

The ground water sample results from the wells that have not been sampled in the past (W-28 and W-29) did have some detections of metals that are not generally found in other site wells. These wells are screened deeper than other wells in the area and this may account for the difference in the results.

- Barium, lead, and sodium were found in well W-28.
- Manganese and zinc were found in well W-29. This well also had a detection of 0.3 ug/L for benzene.

Soil Excavation and Confirmation Sample Data

Approximately 540 cubic yards of soil was excavated from the haul road area and disposed of at the Autumn Hills RDF according to the Work Plan for Removal of Additional Soil. Soil confirmation samples were collected and analyzed for chromium, copper, lead, nickel, and zinc by Lancaster Laboratories using Level 3 data quality objectives. The extent of the soil excavation is shown on Figure 2 and the locations of the confirmation samples are shown on Figure 3. The analytical results are summarized in Table 4 and the laboratory sheets are included in attachment 3.

In addition to the soil confirmation samples, two samples were collected of some white material on the north side of the excavation. The material appeared to be lime and it was assumed that it would not require excavation. The samples were analyzed for Michigan 10 metals by Lancaster Laboratories using Level 3 data quality objectives. The laboratory results show that the white material contains chromium, cadmium, barium, copper, and zinc at concentrations that exceed site cleanup objectives. The approximate extent of the white material is shown on Figure 2. The laboratory data is summarized in Table 5 and the laboratory data sheets are included in attachment 3.

Request for Meeting

Based on the results of the sampling data summarized in this letter, SC Holdings requests a meeting with MDEQ to discuss possible strategies to close the site. SC Holdings believes that it may be more easily acceptable to MDEQ to close the site by determining an appropriate end use scenario and closing the site consistent with that end use, rather than continuing to seek a residential closure for the entire site. To this end, SC Holdings is currently discussing possible future development and end use of the site with several developers who have experience developing environmentally impaired property. SC Holdings would like to discuss some of the possible end uses that have been suggested by the developers and would like feedback from MDEQ on the steps necessary to close the site under the various end use scenarios.

SC Holdings will call concerning arrangements for the proposed meeting. In the mean time, if you have any questions, please contact either Phil Mazor at (616) 688-5777 or me at (630) 574-4779.

Sincerely,

Earth Tech, Inc.

Carl G. Shaw, P.G.
Project Manager

cc: Phil Mazor (WMI)
Jim Forney (WMI)

Summary of VOCs Detected in Ground Water at Holland Lagoons, ug/l
Phase V - September 1999

Analytes	MW010999	MW020999	MW030999	MW040999	MW050999	MW050999D	MW050999B	MW060999
Chloromethane	1.0 U	0.1 UJ	1.0 U	1.0 U	0.2 UJ	0.2 UJ	0.5 J	1.0 U
Vinyl Chloride	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Bromomethane	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Chloroethane	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	0.2 J
1,1-Dichloroethene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Acetone	2.3 UJB	1.9 UJB	2.6 UJB	2.4 UJB	5.0 U	5.0 U	9.8 U	3.8 UJB
Carbon Disulfide	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Methylene Chloride	0.1 UJB	0.2 UJB	0.1 UJB	0.1 UJB	0.1 UJB	0.2 UJB	0.1 UJB	0.1 UJB
1,2-Dichloroethene (total)	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,1-Dichloroethane	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
2-Butanone	5.0 UJ	5.0 UJ	5.0 UJ	5.0 UJ	5.0 UJ	5.0 UJ	2.4 J	5.0 UJ
Bromochloromethane	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Chloroform	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 J	1.0 U
1,1,1-Trichloroethane	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Carbon Trichloride	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Benzene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	35 D
1,2-Dichloroethane	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Trichloroethene	1.0 U	0.1 J	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,2-Dichloropropane	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	0.2 J
Bromodichloromethane	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	0.5 J	1.0 U
1,3-Dichloropropene (total)	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
4-Methyl-2-Pentanone	5.0 UJ	5.0 UJ	5.0 UJ	5.0 UJ	5.0 UJ	5.0 UJ	5.0 UJ	5.0 UJ
Toluene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,1,2-Trichloroethane	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Tetrachloroethene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
2-Hexanone	5.0 UJ	5.0 UJ	5.0 UJ	5.0 UJ	5.0 UJ	5.0 UJ	0.7 J	0.2 J
Dibromochloromethane	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	0.2 J	1.0 U
1,2-Dibromoethane	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Chlorobenzene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Ethylbenzene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Total Xylenes	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Styrene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Bromoform	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,1,2,2-Tetrachloroethane	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,3-Dichlorobenzene	1.0 U	1.0 U	0.5 J	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,4-Dichlorobenzene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,2-Dichlorobenzene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,2-Debromo-3-Chloropropane	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
TICs								
Ethyl Ether								3 NJ
Diisopropyl ether								2 JN

Summary of VOCs Detected in Ground Water at Holland Lagoons, ug/l
Phase V - September 1999

Analytes	W230999	W240999	W260999	W280999	W290999	W340999	W460999	W480999
Chloromethane	0.2 J	0.1 J	0.1 J	1.0 U	0.1 J	0.1 J	1.0 U	0.2 J
Vinyl Chloride	0.2 J	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Bromomethane	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Chloroethane	0.1 J	1.0 U	1.0 U	1.0 U	1.0 U	0.3 J	0.3 J	1.0 U
1,1-Dichloroethene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Acetone	5 U	4.4 JU	5.3 U	5.0 U	3.2 UJ	1.2 UJ	3.5 UJ	1.9 UJB
Carbon Disulfide	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Methylene Chloride	0.2 JU	2.0 U	0.3 UJB	0.1 UJB	2.0 U	0.1 UJB	0.1 UJ	0.2 UJB
1,2-Dichloroethene (total)	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	0.1 J	1.0 U	0.1 J
1,1-Dichloroethane	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	0.3 J	0.3 J	1.0 U
2-Butanone	5.0 U	5.0 UJ	5.0 UJ	5.0 UJ	5.0 UJ	5.0 U	5.0 U	5.0 UJ
Bromochloromethane	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Chloroform	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,1,1-Trichloroethane	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Carbon Trichloride	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Benzene	0.1 J	9.2	1.0 U	0.3 J	1.0 U	35 D	35 D	25 D
1,2-Dichloroethane	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Trichloroethene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,2-Dichloropropane	1.0 U	0.1 J	1.0 U	1.0 U	1.0 U	1.0 U	0.5 J	1.0 U
Bromodichloromethane	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,3-Dichloropropene (total)	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
4-Methyl-2-Pentanone	5.0 U	5.0 UJ	5.0 UJ	5.0 UJ	5.0 UJ	5.0 U	5.0 U	5.0 UJ
Toluene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,1,2-Trichloroethane	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Tetrachloroethene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
2-Hexanone	5.0 U	5.0 UJ	0.4 J	5.0 UJ	5.0 UJ	0.4 J	5.0 U	5.0 UJ
Dibromochloromethane	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,2-Dibromoethane	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Chlorobenzene	1.0 U	24 D	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Ethylbenzene	1.0 U	0.2 J	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Total Xylenes	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Styrene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Bromoform	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,1,2,2-Tetrachloroethane	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,3-Dichlorobenzene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,4-Dichlorobenzene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,2-Dichlorobenzene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,2-Debromo-3-Chloropropane	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
TICs								
Ethyl Ether				4 JN				
Diisopropyl ether	8 JN					4 JN	2 JN	

Summary of VOCs Detected in Ground Water at Holland Lagoons, ug/l
Phase V - September 1999

Analytes	W880999	W890999	W890999D	W890999B	Trip Blank
Chloromethane	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Vinyl Chloride	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Bromomethane	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Chloroethane	0.9 J	0.9 J	0.9 J	1.0 U	1.0 U
1,1-Dichloroethene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Acetone	5.0 U	5.0 U	5.0 U	10 U	7.3 B
Carbon Disulfide	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Methylene Chloride	0.2 UJB	0.2 JU	2.0 U	0.1 UJ	0.4 UJB
1,2-Dichloroethene (total)	0.1 J	0.1 J	0.1 J	1.0 U	1.0 U
1,1-Dichloroethane	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
2-Butanone	5.0 UJ	5.0 U	5.0 U	5.0 U	5.0 UJ
Bromochloromethane	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Chloroform	1.0 U	1.0 U	1.0 U	0.8 J	1.0 U
1,1,1-Trichloroethane	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Carbon Trichloride	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Benzene	1.0 U	27 D	27 D	1.0 U	1.0 U
1,2-Dichloroethane	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Trichloroethene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,2-Dichloropropane	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Bromodichloromethane	1.0 U	1.0 U	1.0 U	0.4 J	1.0 U
1,3-Dichloropropene (total)	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
4-Methyl-2-Pentanone	5.0 UJ	5.0 U	5.0 U	5.0 U	5.0 UJ
Toluene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,1,2-Trichloroethane	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Tetrachloroethene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
2-Hexanone	5.0 UJ	5.0 U	5.0 U	5.0 U	0.1 J
Dibromochloromethane	1.0 U	1.0 U	1.0 U	0.2 J	1.0 U
1,2-Dibromoethane	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Chlorobenzene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Ethylbenzene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Total Xylenes	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Styrene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Bromoform	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,1,2,2-Tetrachloroethane	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,3-Dichlorobenzene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,4-Dichlorobenzene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,2-Dichlorobenzene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,2-Debromo-3-Chloropropane	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
TICs					
Ethyl Ether	8 JN	17 JN	17 JN		
Diisopropyl ether	15 JN	23 JN	21 JN		

Table C-3. Summary of SVOCs Detected in Ground Water at Holland Lagoons, ug/l
Phase V - September 1999

Analytes	MW010999	MW020999	MW030999	MW040999	MW050999	MW050999D	MW050999B	MW060999
SVOCs								
2,4-Dinitrophenol	24 U	24 U	24 U	25 U	25 U	24 U	24 U	24 U
Butylbenzylphthalate	10 U	10 U	10 U	10 U	10 U	10 U	10 U	9 U
bis (2-Ethylhexyl) Phthalate	10 U	1 J	2 J	10 U	10 U	2 J	10 U	4 J
Di-n-Octyl Phthalate	10 U	10 U	10 U	10 U	10 U	10 U	10 U	9 U
TICS								
Sulfur. mol. (S8)	510 NJBU	610 NJBU	440 NJBU	320 NJBU	1400 NJBU	560 NJBU	510 NJ	33 NJBU
Ethosuximide			2 NJ					4 NJ
2-Pentanone, 4-hydroxy-4-met						12 NJ		
Benzoic acid, 4-chloro-								
1,4-Hexadiene, 2-methyl								
Saccharin								
Di-n-Octyl Phthalate								
Benzo (k) Fluoranthene								
Benzoic acid, 2,5-dimethyl								
Benzenamine, 3-methyl								
Unknown carboxylic acid								
2-Propanamine, N-(phenylmeth								
Phosphoric acid, triethy								
Benzeneacetic acid, alpha								
2,4-Imidazolidinedione, 5,5								

Table C-3. Summary of SVOCs Detected in Ground Water at Holland Lagoons, ug/l
Phase V - September 1999

Analytes	W230999	W240999	W260999	W280999	W290999	W340999	W460999	W480999
SVOCs								
2,4-Dinitrophenol	24 UJ	24 U	24 U	25 U	25 U	24 U	25 UJ	24 U
Butylbenzylphthalate	10 UJ	10 U	10 U	10 U	10 U	10 U	10 UJ	10 U
bis (2-Ethylhexyl) Phthalate	10 UJ	4 J	2 J	9 J	3 J	2 J	10 UJ	2 J
Di-n-Octyl Phthalate	10 UJ	10 U	10 U	10 U	10 U	10 U	10 UJ	10 U
TICS								
Sulfur. mol. (S8)	52 NJBU	26 NJBU					61 NJBU	600 NJBU
Ethosuximide			30 NJ	78 NJ	30 NJ	3 NJ		
2-Pentanone, 4-hydroxy-4-met								
Benzoic acid, 4-chloro-				5 JX	3 JX			
1,4-Hexadiene, 2-methyl				8 JX				
Saccharin				14 NJ	2 NJ			
Di-n-Octyl Phthalate								
Benzo (k) Fluoranthene								
Benzoic acid, 2,5-dimethyl								
Benzenamine, 3-methyl								
Unknown carboxylic acid								
2-Propanamine, N-(phenylmeth								
Phosphoric acid, triethy								
Benzeneacetic acid, alpha								
2,4-Imidazolidinedione, 5,5								

Table C-3. Summary of SVOCs Detected in Ground Water at Holland Lagoons, ug/l
Phase V - September 1999

Analytes	W880999	W890999	W890999D	W890999B
SVOCs				
2,4-Dinitrophenol	24 U	25 U	24 U	24 U
Butylbenzylphthalate	10 U	10 U	10 U	10 U
bis (2-Ethylhexyl) Phthalate	1 J	2 J	1 J	10 U
Di-n-Octyl Phthalate	10 U	10 U	10 U	10 U
TICS				
Sulfur. mol. (S8)				380 NJ
Ethosuximide	8 NJ	12 NJ		
2-Pentanone, 4-hydroxy-4-met				
Benzoic acid, 4-chloro-				
1,4-Hexadiene, 2-methyl				
Saccharin				
Di-n-Octyl Phthalate				
Benzo (k) Fluoranthene				
Benzoic acid, 2,5-dimethyl	4 JX			
Benzenamine, 3-methyl		40 JX	60 JX	
Unknown carboxylic acid		13 J		
2-Propanamine, N-(phenylmeth		27 JX		
Phosphoric acid, triethy			6 NJ	
Benzeneacetic acid, alpha			12 NJ	
2,4-Imidazolidinedione, 5,5			35 NJ	

Summary of Inorganics Detected in Ground Water at Holland Lagoons, ug/l
Phase V - September 1999

Analytes	MW010999	MW020999	MW030999	MW040999	MW050999	MW050999D	MW050999B	MW060999
Total Metals								
Aluminum	30.3 UJ	30.3 UJ	30.3 UJ	30.3 J	30.3 UJ	30.3 UJ	30.3 UJ	30.3 UJ
Antimony	0.72 UJN	0.72 UNJ	0.72 UWNJ	0.72 UNJ	0.84 BNUJ	0.72 UNJ	0.72 UNJ	0.72 UWNJ
Arsenic	0.86 UJ	0.86 UJ	0.86 UJ	0.86 UJ	2 BJ	1 BWJ	0.86 UJ	5.1 BWJ
Barium	10.2 B	25.9 B	73.7 B	5 B	6.6 B	6.7 B	0.12 U	112 B
Beryllium	0.38 U	0.38 U	0.38 U	0.38 U	0.38 U	0.38 U	0.38 U	0.38 U
Cadmium	0.097 U	0.097 U	2 B	0.097 U	0.097 U	0.097 U	0.097 U	0.097 U
Calcium	25000	41400	45100	21500	25600	26100	65.4 BU	75500
Chromium	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U
Cobalt	0.83 U	0.83 U	0.83 U	0.83 U	0.83 U	0.83 U	0.83 U	2.3 B
Copper	1.5 BU	3.1 BU	0.93 BU	0.64 U	1.7 BU	1.3 BU	5.8 BU	1.5 BU
Iron	170 J	15.1 UJ	503 J	15.1 UJ	185 J	198 J	15.1 UJ	9100 J
Lead	0.98 U	0.98 U	18.4 S	0.98 U	0.98 U	1.4 BU	0.98 U	0.98 U
Magnesium	5790	12000	9730	5130	6090	6210	26.6 U	9160
Manganese	68.8	0.21 U	71.6	27.4	216	220	0.44 BU	551
Mercury	0.039 UJ	0.039 UJ	0.039 UJ	0.039 UJ	0.039 UJ	0.039 UJ	0.079 BJ	0.039 UJ
Nickel	1.3 U	1.3 U	1.3 U	1.3 U	1.3 U	1.3 U	1.3 U	5.7 BU
Potassium	962 B	1990 B	1370 B	1150 B	1220 B	1250 B	132 U	9720
Selenium	0.7 U	2.3 B	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U
Silver	0.049 U	0.049 U	0.049 U	0.049 U	0.049 U	0.049 U	0.049 U	0.049 U
Sodium	782 BJ	1050 BJ	15500 J	994 BJ	1190 BJ	1330 BJ	147 UJ	9200 J
Thallium	3.8 U	3.8 U	3.8 U	3.8 U	3.8 U	3.8 U	3.8 U	3.8 U
Vanadium	0.76 U	0.76 U	0.76 U	0.76 U	0.76 U	0.76 U	0.76 U	0.76 U
Zinc	2.2 UEJ	17.5 BEUJ	2.4 BEUJ	5.7 BEUJ	2.2 UEJ	3.5 BEUJ	3.9 BEUJ	6.7 BEUJ
Cyanide	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Phosphorus (Total)	<0.04	<0.04	<0.04	<0.04	0.348	0.337	<0.04	0.04
Total Organic Carbon	1.4 UBJ	5.3 J	2.6 J	1.3 UBJ	1.1 UBJ	1.5 UBJ	0.4 J	5 J
Hexavalent Chromium	<5.0 R	<5.0 R	<5.0 R	<5.0 R	<5.0 R	<5.0 R	<5.0 R	<5.0 R

Summary of Inorganics Detected in Ground Water at Holland Lagoons, ug/l
Phase V - September 1999

Analytes	W230999	W240999	W260999	W280999	W290999	W340999	W460999	W480999
Total Metals								
Aluminum	30.3 UJ	30.3 UJ	30.3 UJ	30.3 UJ	30.3 UJ	30.3 UJ	30.3 UJ	30.3 UJ
Antimony	0.72 UNJ	0.72 UNJ	0.72 UNJ	0.72 UWNJ	0.72 UNJ	0.72 UWNJ	0.72 UNJ	0.72 UNJ
Arsenic	1.7 BJ	4.9 BJ	0.86 UJ	3.9 BJ	0.86 UJ	1.5 BJ	5.5 BJ	4.8 BWJ
Barium	52.6 B	33.9 B	334	2720	591	137 B	117 B	17.7 B
Beryllium	0.38 U	0.38 U	0.38 U	0.38 U	0.38 U	0.38 U	0.38 U	0.38 U
Cadmium	0.097 U	0.3 B	0.097 U	2.2 B	0.16 B	0.097 U	0.097 U	0.097 U
Calcium	79900	70400	143000	213000	124000	74900	87600	26400
Chromium	1.1 U	1.1 U	1.1 U	1.9 BU	1.1 U	1.1 U	1.1 U	1.1 U
Cobalt	0.83 U	0.83 U	0.83 U	1.4 B	0.83 U	0.95 B	0.83 U	0.83 U
Copper	1.3 BU	0.7 BU	1.1 BU	1 BU	1.2 BU	2.5 BU	1.6 BU	0.64 U
Iron	5910 J	1950 J	9070 J	20200 J	9680 J	12800 J	12000 J	645 J
Lead	0.98 U	0.98 U	0.98 U	10.8 S	1.9 BU	0.98 U	1.1 BU	0.98 U
Magnesium	12600	8160	30200	66900	29300	7970	8620	6320
Manganese	118	116	233	81.9	348	326	370	187
Mercury	0.039 UJ	0.039 UJ	0.039 UJ	0.039 UJ	0.051 BJ	0.039 UJ	0.039 UJ	0.039 UJ
Nickel	1.3 U	1.3 U	1.3 U	12.4 B	1.9 BU	1.3 U	2.8 BU	1.3 U
Potassium	2580 B	2560 B	1280 B	29200	1380 B	8880	6390	1540 B
Selenium	0.7 UW	0.7 U	1.2 BW	2.3 BW	1.1 B	0.7 UW	0.7 U	0.7 U
Silver	0.049 U	0.049 U	0.049 U	0.049 U	0.049 U	0.049 U	0.049 U	0.049 U
Sodium	2140 BJ	1660 BJ	81700 J	252000 J	90500 J	5550 J	4350 BJ	1130 BJ
Thallium	3.8 U	3.8 U	3.8 U	19 U	3.8 UW	3.8 UW	3.8 U	3.8 U
Vanadium	0.76 U	0.76 U	0.76 U	0.92 BU	0.76 U	0.76 U	0.76 U	0.76 U
Zinc	112 EJ	62.4 EJ	552 EJ	1560 EJ	4290 EJ	316 EJ	132 EJ	173 EJ
Cyanide	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Phosphorus (Total)	0.042	<0.04	0.04	0.1	0.056	<0.04	0.046	<0.04
Total Organic Carbon	3 UB	2.4 UB	6.9	25.7	8.1	3.5	3.41	1.6 UB
Hexavalent Chromium	<5.0 R	<5.0 R	<5.0 R	<5.0 R	<5.0 R	<5.0 R	<5.0 R	<5.0 R

Summary of Inorganics Detected in Ground Water at Holland Lagoons, ug/l
Phase V - September 1999

Analytes	W880999	W890999	W890999D	W890999B
Total Metals				
Aluminum	30.3 UJ	30.3 U	30.3 UJ	30.3 UJ
Antimony	0.72 UNJ	0.72 UNJ	0.72 UWNJ	0.72 UNJ
Arsenic	3.5 BWJ	5.2 BJ	5.1 BJ	0.86 UJ
Barium	726	513	517	0.23 BU
Beryllium	0.38 U	0.38 U	0.38 U	0.38 U
Cadmium	0.097 U	0.097 UWJ	4.3 BSJ	0.097 U
Calcium	114000	127000	128000	49.2 BU
Chromium	2.1 BU	1.7 BJ	3.2 BJ	1.1 U
Cobalt	3.2 B	2.9 B	3 B	0.83 U
Copper	0.71 BU	0.64 UJ	0.82 BUJ	7.4 BU
Iron	24400 J	24800 J	25100 J	15.1 UJ
Lead	0.98 UW	0.98 UWJ	11.5 SJ	0.98 U
Magnesium	36000	35000	35400	26.6 U
Manganese	170	158	160	0.22 BU
Mercury	0.039 UJ	0.039 UJ	0.039 UJ	0.039 UJ
Nickel	8.9 BU	12.4 B	12.5 B	1.3 U
Potassium	47400	63800	64000	132 U
Selenium	1.1 BW	2.2 BW	2.1 BW	0.7 U
Silver	0.049 U	0.049 U	0.049 U	0.049 U
Sodium	67400 J	181000 J	183000 J	147 UJ
Thallium	3.8 U	3.8 UW	3.8 UW	3.8 U
Vanadium	1 BU	0.87 BJ	1.8 BUJ	0.76 U
Zinc	614 EJ	188 EJ	186 EJ	5.3 BEUJ
Cyanide	10 U	10 U	10 U	10 U
Phosphorus (Total)	0.071	0.103	0.093	<0.04
Total Organic Carbon	17.2	27.3	24.5	0.68 J
Hexavalent Chromium	<5.0 R	<5.0 R	<5.0 R	<5.0 R

* Data Qualifiers:

J - The result is an estimated quantity.
B - The analyte was present in the associated method blank as well as in the sample.
D - The analysis was run at a secondary dilution factor.
U- The analyte was found below detection (based upon the accuracy of the laboratory equipment or field blanks)

SOIL VERIFICATION SAMPLES
Waste Management Holland Lagoons
Former Haul Road Area - October 1999

Analyte	Criteria	SS01	SS02	SS03	SS04	SS05	SS06	SS07	SS08
Chromium	18	**24.8**	15.3	12.9	3.64	3.33	12.5	3.44	10.9
Copper	32	14.5	7.33	6.10	1.69	1.47	6.56	1.34	8.03
Lead	21	1.62	1.44	2.03	<1.00	<1.00	1.19	1.21	1.45
Nickel	20	7.33	4.97	4.90	1.90	2.16	4.38	2.41	5.09
Vanadium	*15	4.58	7.21	8.24	3.91	6.84	6.11	5.75	6.49
Zinc	47	7.05	6.19	6.36	4.40	4.30	6.05	5.02	6.86

* This is a site specific criteria based on background samples. There is no default background value. The Residential value is 0.24 mg/Kg

"LIME SAMPLES"
Waste Management Holland Lagoons
Former Haul Road Area - October 1999

Analyte	Criteria	SS09	SS10
Chromium	18	**79.8**	**59.8**
Barium	75	**80.8**	54.7
Copper	32	**105**	**67.7**
Lead	21	10.4	5.79
Silver	1.0	<0.5	<0.5
Zinc	47	**75**	**67.4**
Mercury	0.13	0.0589	0.061
Arsenic	5.8	<0.24	<0.24
Cadmium	1.2	**2.89**	**2.40**
Selenium	*1.0	<0.5	0.84

* This is a site specific criteria based on background samples.
The default background value is 0.41 mg/Kg

EARTH TECH

A tyco INTERNATIONAL LTD. COMPANY

CALCULATION SHEET

PAGE 1 OF 1

CLIENT WMI

SUBJECT Soil Excavation & Sample Locations

PROJECT Holland Lagoons

PROJECT NO. 29753.10.120

Prepared by CGS Date 9/30/99

Reviewed by _____ Date _____

Approved by _____ Date _____

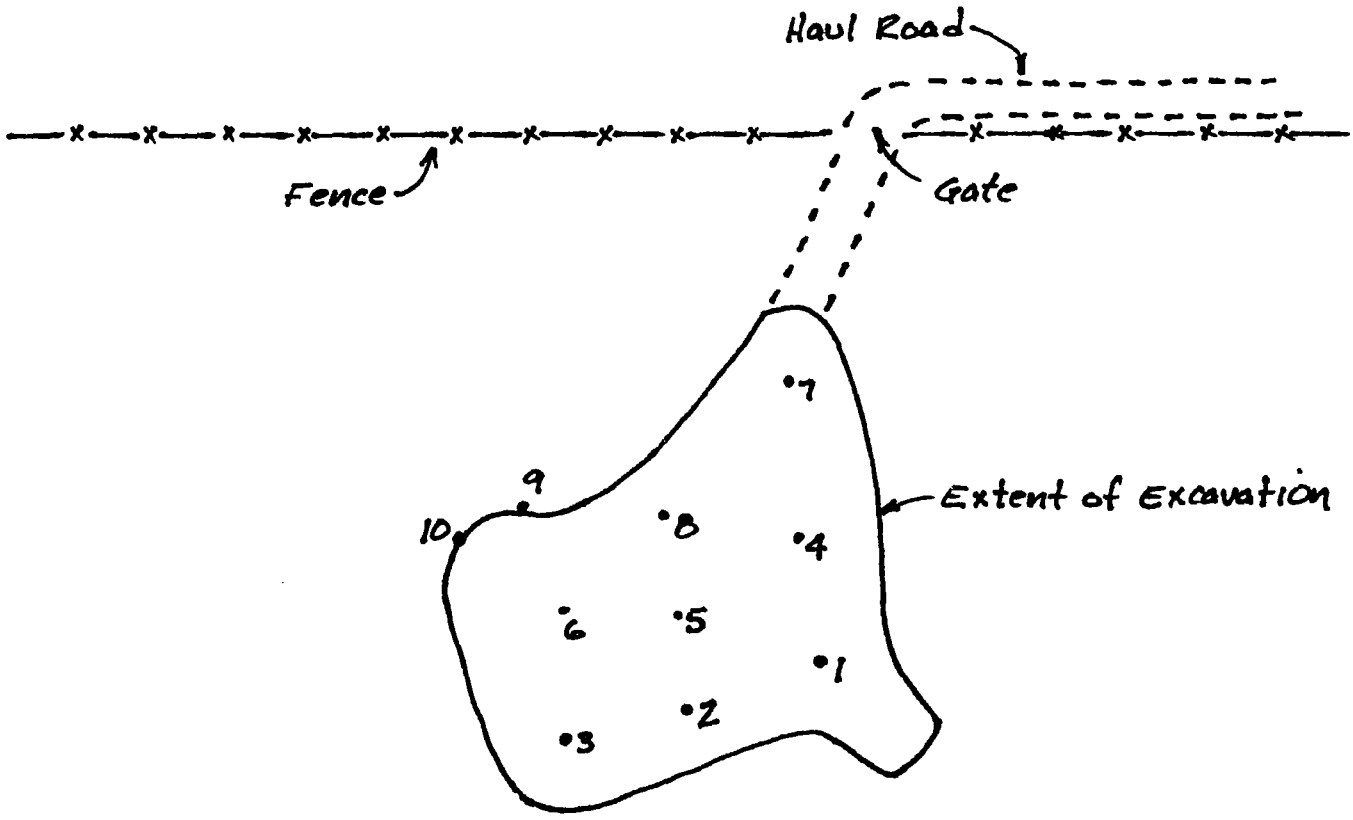

FIGURE 3

SCALE: 5 sq./cm

Final Feasibility Study and Remedial Action Plan Report for Waste Management Holland Lagoons, July 2001

Due to the size of this report, a copy will not be included with this Five-Year Review Report. Copies of this report can be found in both the MDEQ and USEPA site files.

STATE OF MICHIGAN

JOHN ENGLER, Governor

DEPARTMENT OF ENVIRONMENTAL QUALITY

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

INTERNET: http://www.deq.state.mi.us

RUSSELL J. HARDING, Director

ATTACHMENT S

REPLY TO

ENVIRONMENTAL RESPONSE DIVISION
KNAPPS CENTRE
PO BOX 30426
LANSING MI 48909-7926

April 23, 1997

CERTIFIED MAIL

Mr. Phil Mazor
Waste Management of North America
700 56th Avenue
Zeeland, Michigan 49464

Dear Mr. Mazor:

SUBJECT: Acknowledgment of Receipt of an Administratively Incomplete Remedial Action Plan for the Waste Management-Holland Lagoons Superfund Site, Ottawa County, Michigan.

The Department of Environmental Quality (DEQ) has received a Remedial Action Plan (RAP) dated April 1997 for the Waste Management-Holland Lagoons Superfund site. This RAP was received by the Superfund Section in Lansing on April 10, 1997.

Section 20114(8) of Part 201 of the Natural Resources and Environmental Protection Act (NREPA), 1994 PA 451, as amended , states that the DEQ shall either approve or deny the RAP within six months of the submittal of the information necessary or required for the department to make its decision. The DEQ considers a RAP administratively complete when all information necessary or required to approve the RAP in its entirety has been submitted.

The above-mentioned RAP has been reviewed for completeness by staff from the Lansing office and has been found to be administratively incomplete. The following items are required and will need to be submitted to the Lansing Office before the DEQ can make a decision regarding RAP approval:

(1) Please provide a copy of the restrictive covenant for all areas where groundwater contamination attributable to the Waste Management-Holland Lagoon site exceeds Generic Residential Criteria. Attached is a copy of model language for a restrictive covenant acceptable to the Department. Properties included in the restrictive covenant will have to be identified with legal descriptions or property surveys.

(2) Please provide the DEQ with a copy of the Ottawa County Environmental Health Code, Article VII, Section C-7 and other documentation such as a County Ordinance that demonstrates that the county has the authority and ability to grant or deny the installation of all types of wells within the groundwater contaminant plume. The DEQ will review and discuss this health code with Ottawa County staff.

(3) The RAP must clearly specify under which category of Section 20120(b) it is being submitted. In addition, in accordance with Section 20120a(6) demonstration that the land use is consistent with current and reasonably foreseeable future use is required. Please provide a copy of Ottawa County's zoning designations for the area covered by the RAP.

(4) Please demonstrate compliance with R299.5705(5) and 705(6).

(5) Please demonstrate compliance with Part 201, Section 18 (5) and (6).

(6) Please provide a monitoring plan to assure groundwater restrictions placed on property(ies) will continue to be protective under the provisions of the RAP.

(7) Please provide a financial assurance mechanism to carry out the monitoring component of the RAP.

(8) Section 20120(b)(2) requires that a Notice of Approved Environmental Remediation (NAER) be recorded with the register of deeds for the county for the implementation of RAPs in the categories defined by Sections 20120a(b)-(e). Please find attached a copy of the current model NAER utilized by the DEQ to satisfy the statutory requirements of Section 20120(b)(2).]

(9) Section 20120(b)(3) requires that a legal agreement and restrictive covenant are necessary for implementation of RAPs in the categories defined by Sections 20120a(1)(f)-(j) and 20120a(2). Please find attached copies of current model legal agreements and restrictive covenant(s) utilized by the DEQ to satisfy the statutory requirements of Section 20120(b)(3).

Pursuant to Section 20114(8) of NREPA, the DEQ will either approve or deny the RAP within six months of the date that the administratively complete RAP is received in its entirety at the Lansing Office. DEQ staff will continue to review the technical merits of the RAP and provide comments to you at a later date. If you have any questions you may contact Ms. Lisa Summerfield at 517-335-3388, or you can contact me.

Sincerely,

Dennis Eagle

Dennis Eagle, Acting Unit Chief
Superfund Section
Environmental Response Division
517-373-8195

Attachments

cc: Mr. Dan Schultz, DEQ
Ms. Pat McKay, DEQ
Mr. Mitch Adelman, DEQ
Ms. Lisa Summerfield, DEQ (w/Attachments)

STATE OF MICHIGAN

JOHN ENGLER, Governor

DEPARTMENT OF ENVIRONMENTAL QUALITY

"Better Service for a Better Environment"

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

INTERNET: www.deq.state.mi.us

RUSSELL J. HARDING, Director

REPLY TO:

ENVIRONMENTAL RESPONSE DIVISION
KNAPPS CENTRE
PO BOX 30426
LANSING MI 48909-7926

February 17, 1998

FEB 23 RECD

Mr. Phil Mazor
Waste Management of North America
700 56th Avenue
Zeeland, Michigan 49464

SUBJECT: Incomplete Remedial Action Plan for the Waste Management Holland Lagoons Superfund site, Ottawa County, Michigan.

The Department of Environmental Quality (DEQ) has reviewed the Remedial Action Plan (RAP) dated January 1998 for the Waste Management Holland Lagoons Superfund site. This RAP was received by the Lansing Superfund Section office on January 21, 1998.

Section 20114(8) of Part 201 Environmental Remediation, of the Natural Resources and Environmental Protection Act (NREPA), 1994 PA 451, as amended, states that the DEQ shall either approve or deny the RAP within six months of the submittal of the information necessary or required for the department to make its decision regarding RAP approval This timeline only applies to those RAPs that contain all of the information required by the department to make a decision as to its adequacy.

The above mentioned RAP has been reviewed by staff from the Lansing Superfund Section office and has been found to be lacking some necessary or required information for the DEQ to make a decision. Specifically, since the above-mentioned RAP is classified as a limited residential RAP, the following items are required and will need to be submitted to the Lansing Superfund Section office before the DEQ can make a decision regarding RAP approval:

- **The Remedial Investigation Report identified beryllium, cadmium, and vanadium as contaminants that were found only in on-site wells above generic residential criteria and not found in any of the background or anthropogenic background wells. A conceptual review of the previously submitted insufficient RAP identified these contaminants as being associated with the site in soils and groundwater and their need to be monitored to ensure the contaminants are not migrating off the property and will not impact any public health or environmental receptors. It is acknowledged that interim response actions have removed the source(s) from the soils however, that action does not abate what has already leached to the groundwater. The RAP relies on a deed restriction to restrict groundwater use on the property but does not cover any off property migration of contaminants that may be occurring. In addition,**

FEB 23 RECD

the RAP also relies on the adjacent Southwest Ottawa County Landfill's groundwater purge and treatment system to capture any migration of groundwater contamination from both sites. At a very minimum, the RAP would have to include a contingency to address what will happen if Ottawa County closes the system down. There is not enough data at this time for the determination that the contaminant concentrations of V, Cd and Be are due to natural variations in the groundwater and therefore do not constitute a contaminant plume. A groundwater monitoring plan is needed to demonstrate these contaminants do not constitute a contaminant plume.

- A financial assurance mechanism will be required to carry out the monitoring component of the RAP.

- Section 20120(b)(3) specifies that a legal agreement is required for implementation of RAPs in the categories defined by Sections 20120a(1)(f)-(j) and 20120a(2). Please submit a draft of the following document to the DEQ so that the RAP can be reviewed in its entirety.

  1) Legal Agreement (Please find attached a copy of the current model legal agreement utilized by the DEQ to satisfy the statutory requirements of Section 20120(b)(3).]4

Please submit the above mentioned elements to the Lansing Superfund Section office to continue the RAP approval process. A final decision regarding RAP approval will be reached within six months of the date that the above mentioned RAP elements are received in the Lansing Superfund Section office.

If you have any questions, please contact Ms. Lisa Summerfield, Project Manager at 517-335-3388. Thank you.

Sincerely,

Mitch Adelman, Supervisor
Superfund Section
Environmental Response Division
517-373-8436

Attachments

cc: Field Operations Section, DEQ
Assistant Division Chief Secretary, DEQ
Ms. Lisa Summerfield, DEQ

JOHN ENGLER, Governor
DEPARTMENT OF ENVIRONMENTAL QUALITY
"Better Service for a Better Environment"
HOLLISTER BUILDING, PO BOX 30473, LANSING MI 48909-7973
INTERNET: www.deq.state.mi.us
RUSSELL J. HARDING, Director

REPLY TO:
ENVIRONMENTA
KNAPPS CENTRI
PO BOX 30426
LANSING MI 48

October 16, 2001

Mr. Phillip M. Mazor
Waste Management
Autumn Hill Recycling and Disposal Facility
700 56th Avenue
Zeeland, Michigan 49464

Dear Mr. Mazor:

SUBJECT: Incomplete Remedial Action Plan for the Waste Management, Inc. – Holland Lagoons Site, Ottawa County, Michigan.

The Department of Environmental Quality (DEQ) has reviewed the Remedial Action Plan (RAP) dated July 2001 for the Waste Management, Inc. – Holland Lagoons Site. This RAP was received by the Superfund Section office on August 10, 2001.

Section 20114(8) of Part 201, Environmental Remediation, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (NREPA), states that the DEQ shall either approve or deny the RAP within six months of the submittal of the information necessary or required for the department to makes its decision regarding RAP approval.

The above-mentioned RAP has been reviewed by staff from the Superfund Section office and has been found to be lacking some necessary or required information for the DEQ to make a decision. Specifically, since the above-mentioned RAP is classified as a limited residential RAP, the following items are required and will need to be submitted to the Superfund Section office before the DEQ can make a decision regarding RAP approval:

- Section 20120(b)(3) of the NREPA requires that a legal agreement and restrictive covenant are required for implementation of RAPs in the categories defined by Sections 20120a(1)(f)-(j) and 20120a(2). Also, a plan should be developed for monitoring compliance with the terms of the restrictive covenant. Please submit drafts of the following documents to the DEQ so that the RAP can be reviewed in its entirety.

  (1) Legal Agreement
  (2) Plan for monitoring compliance with the restrictive covenant
  (3) Escrow Agreement or other acceptable financial assurance mechanism, as necessary

Please submit the above mentioned elements to the Superfund Section office to continue the RAP approval process. A final decision regarding RAP approval will be reached within six months of the date that the above mentioned RAP elements are received in the Superfund Section office.

If you have any questions, please feel free to contact me. Thank you.

Sincerely,

David Kline, Chief
Site Management Unit 2
Superfund Section
Environmental Response Division
517-373-8354

cc: Mr. Kevin Adler, U.S. EPA
Mr. Philip Schrantz, DEQ
Ms. Claudia Kerbawy, DEQ
WMHL Site File (J1)

APPENDIX A

FIVE-YEAR REVIEW SITE INSPECTION REPORT

INTERVIEW RECORD

Site Name: Waste Mgt - Holland Lagoons		EPA ID No.: MID006017958
Subject:	Time:	Date:
Type: 9 Telephone 9 Visit 9 Other Location of Visit:	9 Incoming 9 Outgoing	

Contact Made By:

Name:	Title:	Organization:

Individual Contacted:

Name:	Title:	Organization:

Telephone No: Fax No: E-Mail Address:	Street Address: City, State, Zip:

Summary Of Conversation

No site interviews were conducted as part of the Five Year Review Site Inspection.

INTERVIEW DOCUMENTATION FORM

The following is a list of individual interviewed for this five-year review. See the attached contact record(s) for a detailed summary of the interviews.

Name	Title/Position	Organization	Date
Name	Title/Position	Organization	Date
Name	Title/Position	Organization	Date
Name	Title/Position	Organization	Date
Name	Title/Position	Organization	Date
Name	Title/Position	Organization	Date

No interviews were held as part of the Five Year Review Site Inspection.

Site Inspection Checklist

I. SITE INFORMATION	
Site name: Waste Mgt - Holland Lagoon	**Date of inspection:** June 20, 2006
Location and Region: Ottawa County, MI	**EPA ID:** MID060179587
Agency, office, or company leading the five-year review:	**Weather/temperature:** Sunny, warm ~80°F

Remedy Includes: (Check all that apply)

- G Landfill cover/containment
- X Access controls
- X Institutional controls
- X Groundwater pump and treatment as part of SWOCLF
- G Surface water collection and treatment
- G Other _____

- G Monitored natural attenuation
- G Groundwater containment
- G Vertical barrier walls

Attachments: X *Inspection team roster attached* X *Site map attached*

II. INTERVIEWS (Check all that apply)

1. **O&M site manager** N/A _____ _____ _____
   Name Title Date
   Interviewed G at site G at office G by phone Phone no. _____
   Problems, suggestions; G Report attached _____

2. **O&M staff** N/A _____ _____ _____
   Name Title Date
   Interviewed G at site G at office G by phone Phone no. _____
   Problems, suggestions; G Report attached _____

3. **Local regulatory authorities and response agencies** (i.e., State and Tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices, etc.) Fill in all that apply.

Agency MDEQ
Contact Cindy Fairbanks — Project Mgr — 6/20/06 — (517) 335-4111
Name — Title — Date — Phone no.
Problems; suggestions; G Report attached _____

Agency Ottawa County Police Department
Contact N/A — — — 911
Name — Title — Date — Phone no.
Problems; suggestions; G Report attached _____

Agency _____
Contact _____ — — — —
Name — Title — Date — Phone no.
Problems; suggestions; G Report attached _____

Agency _____
Contact _____ — — — —
Name — Title — Date — Phone no.
Problems; suggestions; G Report attached _____

4. **Other interviews** (optional) G Report attached.

III. ON-SITE DOCUMENTS & RECORDS VERIFIED (Check all that apply)

1. **O&M Documents** N/A
   - G O&M manual — G Readily available — G Up to date — G N/A
   - G As-built drawings — G Readily available — G Up to date — G N/A
   - G Maintenance logs — G Readily available — G Up to date — G N/A

   Remarks

2. **Site-Specific Health and Safety Plan** — G Readily available — G Up to date — G N/A
   - G Contingency plan/emergency response plan — G Readily available — G Up to date — G N/A

   Remarks N/A

3. **O&M and OSHA Training Records** — G Readily available — G Up to date — G N/A

   Remarks N/A

4. **Permits and Service Agreements** N/A
   - G Air discharge permit — G Readily available — G Up to date — G N/A
   - G Effluent discharge — G Readily available — G Up to date — G N/A
   - G Waste disposal, POTW — G Readily available — G Up to date — G N/A
   - G Other permits — G Readily available — G Up to date — G N/A

   Remarks

5. **Gas Generation Records** — G Readily available — G Up to date — G N/A

   Remarks N/A

6. **Settlement Monument Records** — G Readily available — G Up to date — G N/A

   Remarks N/A

7. **Groundwater Monitoring Records** — G Readily available — G Up to date — G N/A

   Remarks N/A

8. **Leachate Extraction Records** — G Readily available — G Up to date — G N/A

   Remarks N/A

9. **Discharge Compliance Records**
   - G Air — G Readily available — G Up to date — G N/A
   - G Water (effluent) — G Readily available — G Up to date — G N/A

   Remarks N/A

10. **Daily Access/Security Logs** — G Readily available — G Up to date — G N/A

    Remarks N/A

O&M activites are not ongoing at the site. Site is secured by chain link fence. Access to site via locked gate behind former facility Building. Key to lock held by WMI representatives.

None of the above documents, if needed, are stored onsite. File records are held by MDEQ in Lansing, MI and WMI at Autum Hills offices.

IV. O&M COSTS

1. **O&M Organization**

G State in-house G Contractor for State
X PRP in-house G Contractor for PRP
G Federal Facility in-house G Contractor for Federal Facility
G Other _____

LWM owns the site property and maintains security fence and locked gate.

2. **O&M Cost Records** N/A

G Readily available G Up to date
G Funding mechanism/agreement in place
Original O&M cost estimate _____ G Breakdown attached

Total annual cost by year for review period if available

From _____ To _____ _____ G Breakdown attached
Date Date Total cost

From _____ To _____ _____ G Breakdown attached
Date Date Total cost

From _____ To _____ _____ G Breakdown attached
Date Date Total cost

From _____ To _____ _____ G Breakdown attached
Date Date Total cost

From _____ To _____ _____ G Breakdown attached
Date Date Total cost

3. **Unanticipated or Unusually High O&M Costs During Review Period**

Describe costs and reasons: N/A

V. ACCESS AND INSTITUTIONAL CONTROLS X Applicable G N/A

A. Fencing Fence surrounds entire site; no breaches observed

1. **Fencing damaged** G Location shown on site map G Gates secured G N/A
Remarks No damage to fence observed

B. Other Access Restrictions

1. **Signs and other security measures** G Location shown on site map G N/A
Remarks Locked gate behind former facility Buildings;

C. Institutional Controls (ICs)

1. **Implementation and enforcement**

Site conditions imply ICs not properly implemented G Yes X No G N/A

Site conditions imply ICs not being fully enforced G Yes X No G N/A

Type of monitoring (*e.g.*, self-reporting, drive by) Fencing around site, ground water use on site restricted

~~Frequency~~

Responsible party/agency WMI through Restrictive Covenant

Contact Phil Mazor (Name) P (Title) 6/20/06 (Date) _____ (Phone no.)

Reporting is up-to-date N/A G Yes G No G N/A

Reports are verified by the lead agency N/A G Yes G No G N/A

Specific requirements in deed or decision documents have been met X Yes G No G N/A

Violations have been reported G Yes X No G N/A

Other problems or suggestions: G Report attached

2. **Adequacy** X ICs are adequate G ICs are inadequate G N/A

Remarks RC currently in place restricts use of groundwater on the site. Security fence surrounds site preventing site access. Locked gate secured behind facility Building

D. General

1. **Vandalism/trespassing** G Location shown on site map X No vandalism evident

Remarks _____

2. **Land use changes on site** X N/A

Remarks _____

3. **Land use changes off site** X N/A

Remarks _____

VI. GENERAL SITE CONDITIONS

A. Roads X Applicable G N/A

1. **Roads damaged** G Location shown on site map X Roads adequate G N/A

Remarks On site road leading to all the Areas of Concern was adequate.

B. Other Site Conditions

Remarks Fence around site secure; no breaches detected

VII. LANDFILL COVERS G Applicable X N/A

A. Landfill Surface

1. **Settlement** (Low spots) G Location shown on site map G Settlement not evident
   Areal extent_____ Depth_____
   Remarks_____

2. **Cracks** G Location shown on site map G Cracking not evident
   Lengths_____ Widths_____ Depths_____
   Remarks_____

3. **Erosion** G Location shown on site map G Erosion not evident
   Areal extent_____ Depth_____
   Remarks_____

4. **Holes** G Location shown on site map G Holes not evident
   Areal extent_____ Depth_____
   Remarks_____

5. **Vegetative Cover** G Grass G Cover properly established G No signs of stress
   G Trees/Shrubs (indicate size and locations on a diagram)
   Remarks_____

6. **Alternative Cover (armored rock, concrete, etc.)** G N/A
   Remarks_____

7. **Bulges** G Location shown on site map G Bulges not evident
   Areal extent_____ Height_____
   Remarks_____

8.	**Wet Areas/Water Damage**	G Wet areas/water damage not evident	
	G Wet areas	G Location shown on site map	Areal extent_____
	G Ponding	G Location shown on site map	Areal extent_____
	G Seeps	G Location shown on site map	Areal extent_____
	G Soft subgrade	G Location shown on site map	Areal extent_____
	Remarks_____		
9.	**Slope Instability** G Slides	G Location shown on site map	G No evidence of slope instability
	Areal extent_____		
	Remarks_____		
B. Benches	G Applicable G N/A		
	(Horizontally constructed mounds of earth placed across a steep landfill side slope to interrupt the slope in order to slow down the velocity of surface runoff and intercept and convey the runoff to a lined channel.)		
1.	**Flows Bypass Bench**	G Location shown on site map	G N/A or okay
	Remarks_____		
2.	**Bench Breached**	G Location shown on site map	G N/A or okay
	Remarks_____		
3.	**Bench Overtopped**	G Location shown on site map	G N/A or okay
	Remarks_____		
C. Letdown Channels	G Applicable G N/A		
	(Channel lined with erosion control mats, riprap, grout bags, or gabions that descend down the steep side slope of the cover and will allow the runoff water collected by the benches to move off of the landfill cover without creating erosion gullies.)		
1.	**Settlement**	G Location shown on site map	G No evidence of settlement
	Areal extent_____	Depth_____	
	Remarks_____		
2.	**Material Degradation**	G Location shown on site map	G No evidence of degradation
	Material type_____	Areal extent_____	
	Remarks_____		
3.	**Erosion**	G Location shown on site map	G No evidence of erosion
	Areal extent_____	Depth_____	
	Remarks_____		

4. **Undercutting** G Location shown on site map G No evidence of undercutting
Areal extent_____ Depth_____
Remarks_____
_____

5. **Obstructions** Type_____ G No obstructions
G Location shown on site map Areal extent_____
Size_____
Remarks_____
_____

6. **Excessive Vegetative Growth** Type_____
G No evidence of excessive growth
G Vegetation in channels does not obstruct flow
G Location shown on site map Areal extent_____
Remarks_____
_____

D. Cover Penetrations G Applicable ☒ N/A

1. **Gas Vents** G Active G Passive
G Properly secured/locked G Functioning G Routinely sampled G Good condition
G Evidence of leakage at penetration G Needs Maintenance
G N/A
Remarks_____
_____

2. **Gas Monitoring Probes**
G Properly secured/locked G Functioning G Routinely sampled G Good condition
G Evidence of leakage at penetration G Needs Maintenance G N/A
Remarks_____
_____

3. **Monitoring Wells** (within surface area of landfill)
G Properly secured/locked G Functioning G Routinely sampled G Good condition
G Evidence of leakage at penetration G Needs Maintenance G N/A
Remarks_____
_____

4. **Leachate Extraction Wells**
G Properly secured/locked G Functioning G Routinely sampled G Good condition
G Evidence of leakage at penetration G Needs Maintenance G N/A
Remarks_____
_____

5. **Settlement Monuments** G Located G Routinely surveyed G N/A
Remarks_____
_____

E. Gas Collection and Treatment G Applicable G N/A

1. **Gas Treatment Facilities**
   G Flaring G Thermal destruction G Collection for reuse
   G Good condition G Needs Maintenance
   Remarks_____

2. **Gas Collection Wells, Manifolds and Piping**
   G Good condition G Needs Maintenance
   Remarks_____

3. **Gas Monitoring Facilities** (*e.g.*, gas monitoring of adjacent homes or buildings)
   G Good condition G Needs Maintenance G N/A
   Remarks_____

F. Cover Drainage Layer G Applicable G N/A

1. **Outlet Pipes Inspected** G Functioning G N/A
   Remarks_____

2. **Outlet Rock Inspected** G Functioning G N/A
   Remarks_____

G. Detention/Sedimentation Ponds G Applicable G N/A

1. **Siltation** Areal extent_____ Depth_____ G N/A
   G Siltation not evident
   Remarks_____

2. **Erosion** Areal extent_____ Depth_____
   G Erosion not evident
   Remarks_____

3. **Outlet Works** G Functioning G N/A
   Remarks_____

4. **Dam** G Functioning G N/A
   Remarks_____

H. Retaining Walls G Applicable G N/A

1. **Deformations** G Location shown on site map G Deformation not evident
   Horizontal displacement_____ Vertical displacement_____
   Rotational displacement_____
   Remarks_____

2. **Degradation** G Location shown on site map G Degradation not evident
   Remarks_____

I. Perimeter Ditches/Off-Site Discharge G Applicable G N/A

1. **Siltation** G Location shown on site map G Siltation not evident
   Areal extent_____ Depth_____
   Remarks_____

2. **Vegetative Growth** G Location shown on site map G N/A
   G Vegetation does not impede flow
   Areal extent_____ Type_____
   Remarks_____

3. **Erosion** G Location shown on site map G Erosion not evident
   Areal extent_____ Depth_____
   Remarks_____

4. **Discharge Structure** G Functioning G N/A
   Remarks_____

VIII. VERTICAL BARRIER WALLS G Applicable G N/A

1. **Settlement** G Location shown on site map G Settlement not evident
   Areal extent_____ Depth_____
   Remarks_____

2. **Performance Monitoring** Type of monitoring_____
   G Performance not monitored
   Frequency_____ G Evidence of breaching
   Head differential_____
   Remarks_____

C. Treatment System ☒ Applicable ☐ N/A

1. **Treatment Train** (Check components that apply)
   ☒ Metals removal ☐ Oil/water separation ☐ Bioremediation
   ☐ Air stripping ☐ Carbon adsorbers
   ☐ Filters
   ☐ Additive (*e.g.*, chelation agent, flocculent)
   ☐ Others
   ☐ Good condition ☐ Needs Maintenance
   ☐ Sampling ports properly marked and functional
   ☐ Sampling/maintenance log displayed and up to date
   ☐ Equipment properly identified
   ☐ Quantity of groundwater treated annually
   ☐ Quantity of surface water treated annually
   Remarks
   Downgradient treatment system for SWOCLF also part of LCMHL remedy, System operated and maintained by Ottawa County.

2. **Electrical Enclosures and Panels** (properly rated and functional)
   ☐ N/A ☒ Good condition ☐ Needs Maintenance
   Remarks

3. **Tanks, Vaults, Storage Vessels**
   ☒ N/A ☐ Good condition ☐ Proper secondary containment ☐ Needs Maintenance
   Remarks

4. **Discharge Structure and Appurtenances**
   ☐ N/A ☒ Good condition ☐ Needs Maintenance
   Remarks

5. **Treatment Building(s)**
   ☐ N/A ☒ Good condition (esp. roof and doorways) ☐ Needs repair
   ☐ Chemicals and equipment properly stored
   Remarks

6. **Monitoring Wells** (pump and treatment remedy)
   ☒ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
   ☒ All required wells located ☐ Needs Maintenance ☐ N/A
   Remarks On site monitoring wells are in place. Only a few are currently sampled as part of SWOCLF annual sampling

D. Monitoring Data N/A for LCMHL site, no current gw ongoing monitoring

1. Monitoring Data
   ☐ Is routinely submitted on time ☐ Is of acceptable quality

2. Monitoring data suggests:
   ☐ *Groundwater plume is effectively contained* ☐ *Contaminant concentrations are declining*

On site monitoring wells have not be sampled since the late 1990s. Several of the monitoring wells are included in the SWOCLF annual sampling events. Currently, the last Annual groundwater report from Ottawa County is from 2003.

D. Monitored Natural Attenuation N/A Not selected remedy for the site

1. **Monitoring Wells** (natural attenuation remedy)

G Properly secured/locked G Functioning G Routinely sampled G Good condition
G All required wells located G Needs Maintenance G N/A
Remarks

X. OTHER REMEDIES

If there are remedies applied at the site which are not covered above, attach an inspection sheet describing the physical nature and condition of any facility associated with the remedy. An example would be soil vapor extraction.

XI. OVERALL OBSERVATIONS

A. Implementation of the Remedy

Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is to accomplish (i.e., to contain contaminant plume, minimize infiltration and gas emission, etc.).

Current remedy for the site includes:

+ Restricted access via chain link fence and locked gate

+ Restrictive Covenant on file with Ottawa County preventing groundwater use on the site and access to the site.

+ Groundwater treated by downgradient treatment system as part of SWOCLF remedy.

B. Adequacy of O&M N/A

Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy.

Currently no active OEM plan is in place for the site.

All identified onsite source areas have been remediated.

Groundwater contamination from the site, if any, is treated by the down gradient treatment system installed for the SWOCLF.

C.	Early Indicators of Potential Remedy Problems
	Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs, that suggest that the protectiveness of the remedy may be compromised in the future. The following issues need to be met at the site: 1) Complete RAP as required by Part 201 2) Complete requirements of AOC (i.e. complete RAP) 3) Provide current groundwater data/monitoring to complete the RAP.
D.	**Opportunities for Optimization**
	Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy. 1) MDEQ is requesting UMI conduct groundwater investigation as part of the requirements to complete a Part 201 RAP.

ATTACHMENT 1 SITE INSPECTION TEAM

STATE OF MICHIGAN
DEPARTMENT OF ENVIRONMENTAL QUALITY
REMEDIATION AND REDEVELOPMENT DIVISION

CINDY FAIRBANKS
ENVIRONMENTAL QUALITY ANALYST
SITE EVALUATION UNIT, SUPERFUND SECTION

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PHONE: (517) 335-4111
FAX: (517) 335-4887
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www.michigan.gov/deq

STATE OF MICHIGAN
DEPARTMENT OF ENVIRONMENTAL QUALITY
REMEDIATION AND REDEVELOPMENT DIVISION

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

ENVIRONMENTAL PROTECTION AGENCY

Denise Boone
Remedial Project Manger
Superfund Division

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E-mail: boone.denise@epa.gov

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WASTE MANAGEMENT

James C. Forney
Director - Closed Sites

WASTE MANAGEMENT
3965 Okemos Road Suite B4 Okemos, MI 48864
(517) 381-0177 (517) 381-0176 Fax
(517) 974-3104 Mobile jforney@wm.com

ATTACHEMENT 2 SITE INSPECTION PHOTOGRAPH LOG

WASTE MANAGEMENT HOLLAND LAGOONS PHOTO LOG

FIVE YEAR REVIEW SITE VISIT JUNE 20, 2006

PHOTO 1: Entrance to site from 168th Street, Old WMI (formerly Jacobussee Facility Building)

PHOTO 2: Site Entrance Building now occupied by MTS Graphics

PHOTO 3: Monitoring Well MW1 and MW2 located in northwest corner of the site

PHOTO 4: Monitoring Well MW4 located in the northwest corner of the site and northwest of the former lagoons

PHOTO 5: Monitoring Well MW4

PHOTO 6: Monitoring Well MW3

PHOTO 7: Monitoring Well MW3

PHOTO 8: Monitoring Well MW 6

PHOTO 9: Monitoring Well MW 5 located south of Haul Road

PHOTO 10: Monitoring Well MW 6

PHOTO 11: Monitoring Well MW 11

PHOTO 12: Monitoring Well Cluster MW 27, 28, 29 located in the south central area of the site

PHOTO 13: Monitoring Well Cluster MW 27, 28, 29 located in the south central area of the site

PHOTO 14: Monitoring Wells MW 34, 35 located east of the former drum burial area

PHOTO 15: Monitoring Wells MW 34, 35 located east of the former drum burial area

PHOTO 16: Monitoring Wells MW 42, 43 located south of former lagoons and west of facility building

PHOTO 17: Monitoring Well 46 located east of the former lagoon area

PHOTO 18: Monitoring Well 48 located south of the facility building

PHOTO 19: Former Dewatering Lagoons Area

PHOTO 20: Former Dewatering Lagoons Area

PHOTO 21: Former Dewatering Lagoons with Haul Road leading to SWOCLF

PHOTO 22: Berm and Former Drum Burial Area

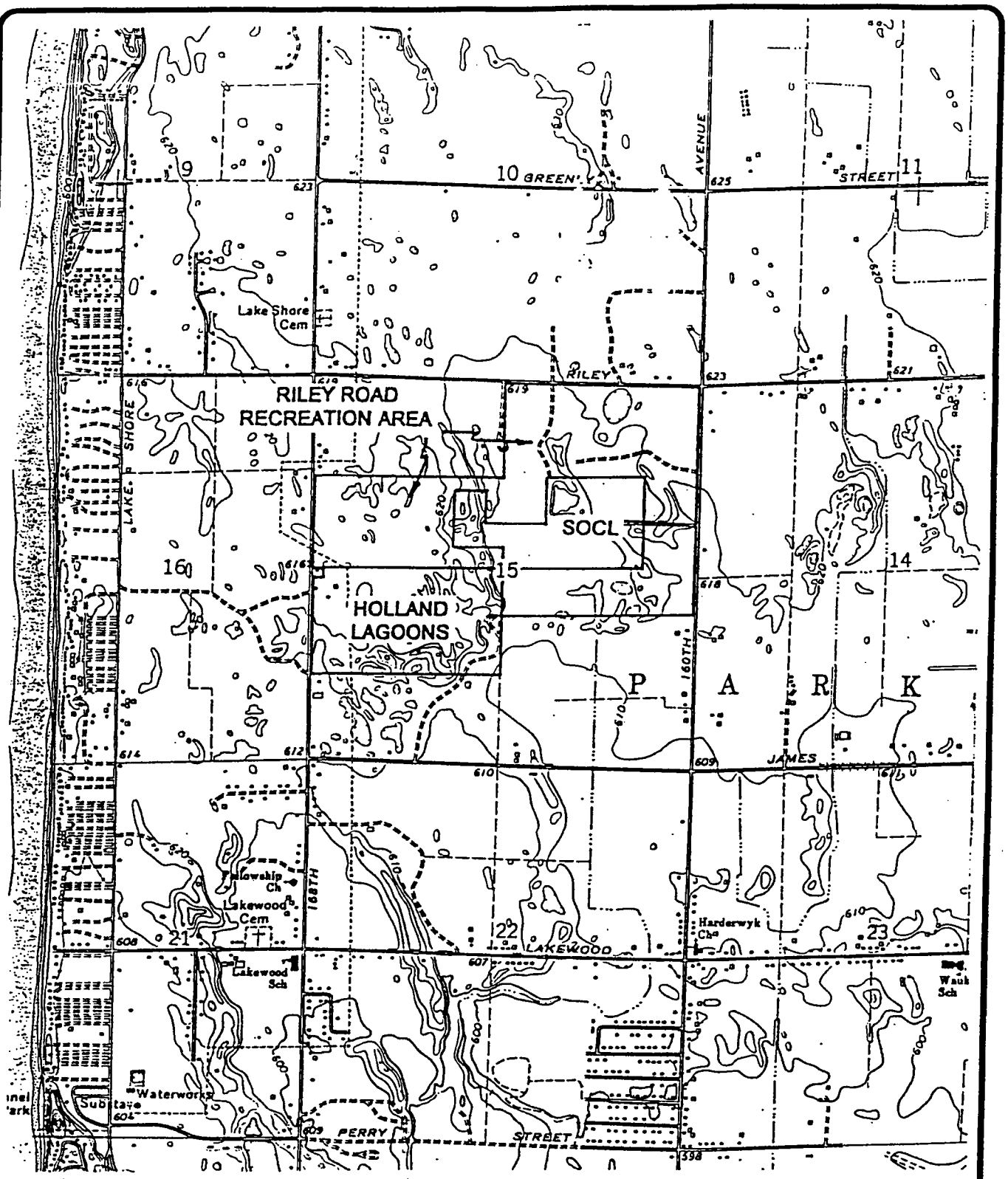
PHOTO 23: Former Landfill Area

PHOTO 24: Portion of Site Fence at southeast corner of the site

MTS GRAPHICS

ZAHN
JAMES A. COOK

MW-04



SITE LOCATON MAP
WASTE MANGEMENT
HOLLAND LAGOONS

FIGURE 1

PRINT SCALE: SCALE
PEN TABLE: PEN_TBL
PRINT DATE: DATE

DWG SIZE: SIZE
RUST OFFICE: OFFICE
FILENAME: FILENAME

ACAD REF FILES
REF_1
REF_2
REF_3
REF_4

E 12632000 E 12632500 E 12633000 E 12633500 E 12634000 E 12634500 E 12635000

N 486000

N 485500

N 485000

N 484500

168th AVE.

LEGEND

SITE PROPERTY BOUNDARY

TRAILS

FOREST

620 GROUND SURFACE ELEVATION CONTOUR LINE

SITE FEATURES
WASTE MANAGEMENT
HOLLAND LAGOONS

FIGURE 2

ACAD REF FILES

DWG SIZE:17x11
RUST OFFICE: NAPERVILLE
FILENAME: RFG_2

PRINT SCALE:
PEN TABLE: 042_ACAD
PRINT DATE: 01/25/96

E 12632000 E 12632500 E 12633000 E 12633500 E 12634000 E 12634500 E 12635000

N 485600 N 485550 N 485500

168th AVE.

APPROXIMATE EXTENT OF THE FORMER HAUL ROAD

APPROXIMATE LOCATIONS OF LIQUID INDUSTRIAL WASTE DISPOSAL LAGOONS

APPROXIMATE LOCATION OF FORMER MUNICIPAL WASTE LANDFILL

APPROXIMATE EXTENT OF FORMER TRUCK MAINTENANCE FACILITY

APPROXIMATE LOCATION OF AREA USED FOR TEMPORARY BURIAL OF DRUMS OF CHLORAL HYDRATE

LEGEND

SITE PROPERTY BOUNDARY

TRAILS

FOREST

620 GROUND SURFACE ELEVATION CONTOUR LINE

0 100' 200'

SCALE: 1"= 100'-0"

N

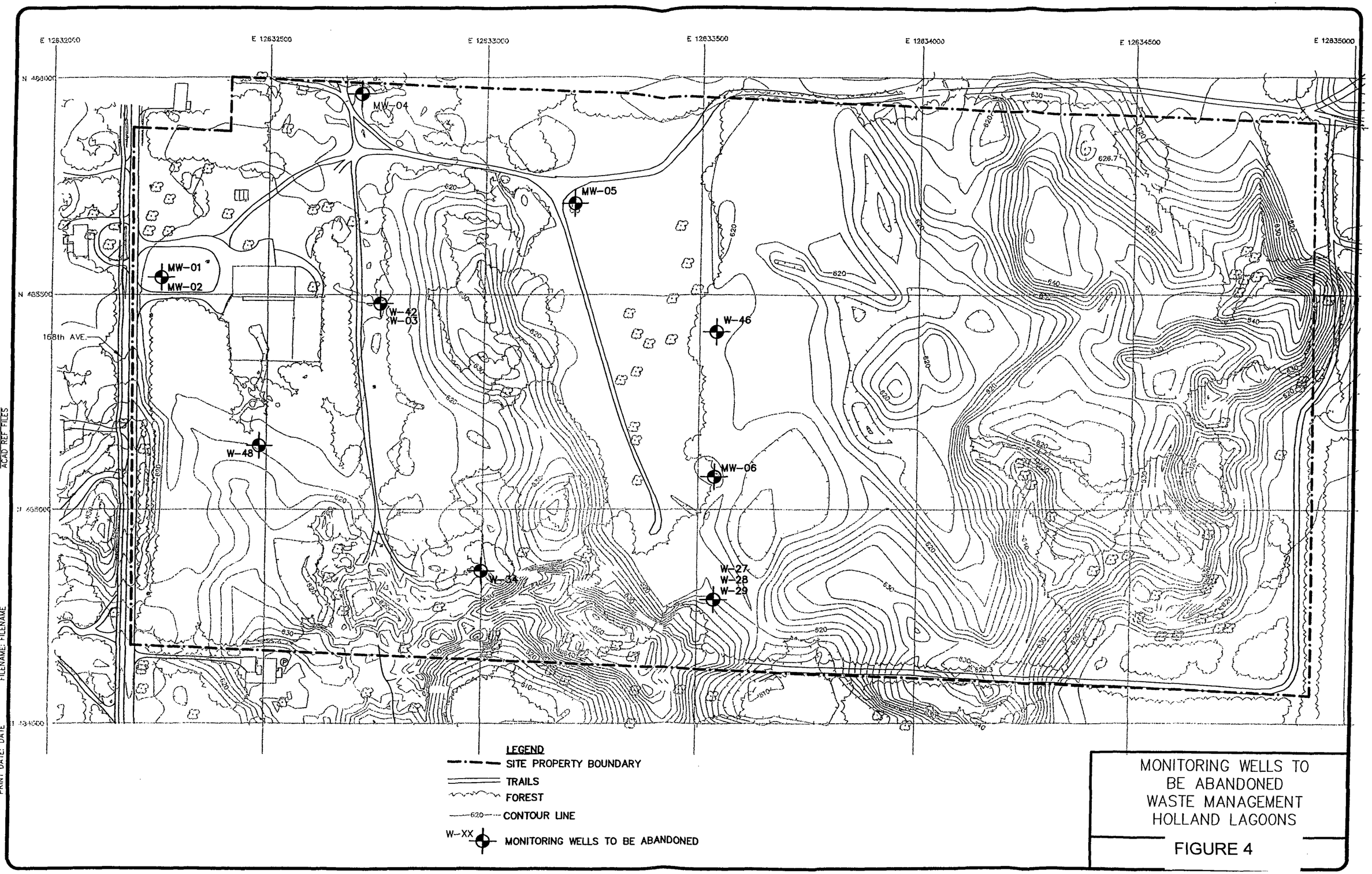
AREAS INVESTIGATED
DURING THE REMEDIAL INVESTIGATION
WASTE MANAGEMENT
HOLLAND LAGOONS

FIGURE 3

ACAD REF FILES

DWG SIZE: 17x11
RUST OFFICE: NAPERVILLE
FILENAME: RFG_2

PRINT SCALE:
PEN TABLE: 042_ACAD
PRINT DATE: 01/25/96



MONITORING WELLS TO BE ABANDONED
WASTE MANAGEMENT
HOLLAND LAGOONS

FIGURE 4

REF_4 REF_2 ACAD REF FILES
REF_3 REF_1
DWG SIZE: SIZE
RUST OFFICE: OFFICE
FILENAME: FILENAME
PRINT SCALE: SCALE
PEN TABLE: PEN_TBL
PRINT DATE: DATE

APPENDIX B
COPY OF FIVE-YEAR REVIEW NEWSPAPER PUBLIC NOTICE

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Region 5
77 West Jackson Boulevard
Chicago, Illinois 60604

Superfund Division

Facsimile Cover Sheet
Fax Telephone Number
(312) 886-4071

Date: 8/1/2006

Number of Pages: 2

To: **Cindy Fairbanks**
Michigan Department of Environmental Quality
Fax: (517) 335-4887

From: Denise Boone
Phone Number: (312) 886-6217

Subject: Waste Management of Michigan (Holland Lagoons) Five Year Review Newspaper Announcement

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EPA

Will Start a Five-Year Review of the Waste Management of Michigan Superfund Site

Ottawa County, Michigan

U.S. Environmental Protection Agency, with assistance from Michigan Department of Environmental Quality, is conducting a five-year review of the cleanup at the Waste Management of Michigan Landfill Superfund site at 2700 N. 168th Ave., Ottawa County. The site is also known as Holland Lagoons. This review will check the site operations and maintenance plan for monitoring ground-water quality and overall effectiveness of the cleanup, which included removal of contaminated soil and underground storage tanks. This review is required to ensure the selected plan continues to protect human health and the environment. This review is scheduled to be completed by September 2006.
The next five-year review will be in 2011.

Site information can be found at: Herrick District Library
300 S. River Ave.
Holland, Mich.

Public comment is highly encouraged. Written comments should be postmarked no later than July 19, 2006. Written or oral comments should be addressed to Robert Paulson or Cindy Fairbanks. Additional site information can be requested from the team members listed below.

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APPENDIX C

INSTITUTIONAL CONTROL INVESTIGATION/STUDY

WASTE MANAGEMENT

WASTE MANAGEMENT

June 12, 2006

JUN 14 2006

Denise Boone
Remedial Project Manger
United States Environmental Protection Agency
Region V
77 West Jackson
Chicago, Illinois 60604

Subject: Waste Management, Inc, Holland Lagoons Superfund Site
Institutional Controls Investigation/Study
Holland, Michigan
MDNR Docket No.: AOC-ERD-94-025

Dear Ms. Boone;

As requested in your correspondence received on April 17, 2006, I am responding to your request for an Institutional Controls Investigation/Study for the Holland Lagoons Site. Our responses to your seven (7) specific areas of inquiry are stated below. As a preface to those responses, background information about the Holland Lagoons Site will be helpful.

Waste Management of Michigan, Inc (WMMI) has completed several interim response activities at the Holland Lagoons site over the past ten (10) years. A Remedial Action Plan (RAP) was submitted to the Michigan Department of Environmental Quality (MDEQ) in 1997, but was not approved. Another RAP was submitted in 2001. In a letter dated October 16, 2001, the MDEQ did not approve the 2001 RAP.

Both the 1997 and 2001 RAP called for limited residential closure of the site, and after submitting the 1997 RAP, WMMI executed a deed restriction on groundwater use due to groundwater contamination from the upgradient Southwest Ottawa County Landfill (SOCL). The deed restriction explicitly referenced both the SOCL (as the source of groundwater contamination) and the 1997 RAP (which also identified the SOCL as the source of contamination). The Holland Lagoons Site Remedial Investigation, Feasibility Study, and RAP did not identify any contamination of the groundwater due to the Holland Lagoons Site.

WMMI and the MDEQ continued to negotiate in an attempt to resolve the future of the site. A meeting was held with the MDEQ in late 2001 and WMMI was awaiting a

response from the MDEQ. No responsive correspondence was received from MDEQ until the June 28, 2005. As a result of that correspondence, two meetings took place and several correspondences were exchanged between WMMI and the MDEQ during 2005 and 2006. As a result of the activities in 2005 and 2006, it was agreed between WMMI and the MDEQ that a revised RAP would be submitted to the MDEQ by June 1, 2006. The revised RAP is attached to this response for an Institutional Controls Investigation/Study for your file.

Like its predecessors, the 2006 RAP identifies no contamination to soils or groundwater from the Site and recommends that no further action for the Site is required. It also identifies the site closure as an Unlimited Residential Closure under PA 451 Part 201 Section 20120a(1)(a). As such, the RAP does not propose any deed restrictions for the site due to Site-related contaminants.

As discussed in the 2006 RAP, the existing deed restrictions on the Holland Lagoons Site are not related to any activities or conditions related to the Holland Lagoons Site and the existing deed restrictions will need to be removed/replaced due to the inappropriate reference to the 1997 RAP that was never approved by the MDEQ and the incorrect inference that the groundwater use restriction on the Holland Lagoons Site is due to the Holland Lagoons Site.

Listed below are Waste Management's responses to the seven (7) itemized tasks from your letter in April 2006 regarding the Institutional Controls Investigation/Study. Please consider the foregoing information as you evaluate these responses.

1. **Demonstrate that existing proprietary controls have been properly recorded and are free and clear of all liens and encumbrances.**

   Response: The *Chicago Title Insurance Company Commitment for Title Insurance* for the Holland Lagoon Site is located in Attachment A.

2. **Demonstrate that existing proprietary controls were signed by a person or entity that owned the property at the time of signature.**

   Response: This property was, and still is, owned by Waste Management of Michigan, Inc. Ron Baker, who signed the 1997 restrictive covenant, was the President of Waste Management of Michigan Inc. in 1997. The relevant Corporate Minutes listing the company officers is contained in Attachment B. The Corporate Minutes identify Ronald S. Baker as the President of Waste Management of Michigan, Inc.

3. **Evaluate whether existing controls cover the entire area that needs to restricted.**

Response: As described above, no controls are necessary with respect to the Holland Lagoons Site itself. The area covered by the deed restriction is identified as Parcel 1 and Parcel 2 in the Title Commitment document in Attachment A. Both parcels are down gradient and within the contaminant plume from the SOCL. Plume maps supplied by Prein and Newhof, consultant for the SOCL site, were utilized to determine the extent of the controls to be placed on the Waste Management of Michigan, Inc property.

With respect to the SOCL site, the entire area that should be subject to restriction, due to groundwater contamination from that site, is greater than just the Holland Lagoons Site.

5. **Assess Objectives, Restrictions and Performance Standards of the Institutional Controls.**

Response: The deed restriction restricts use of groundwater at the Holland Lagoon Site. The existing deed restriction will be replaced with a deed restriction that removes any reference to the RAP for the Holland Lagoons Site, appropriately references the SOCL site, and continues to restrict the use of groundwater at the property.

6. **Assess Monitoring and compliance with Institutional Controls**

Response: Waste Management of Michigan Inc. remains the owner of the property. No groundwater use has been or will be permitted on the property. The property is serviced by municipal water.

7. **Discuss effectiveness of Institutional Controls**

Response: See response to #6.

8. **Recommendations**

Response: As set forth in the 2006 RAP, Waste Management of Michigan, Inc has recommended to MDEQ that the current Declaration of Restrictive Covenant be removed from Parcels 1 and 2 and replaced with a Declaration of Restrictive Covenant that is accurate and more appropriately worded and focused.

If you have any additional questions, please contact me at 616.688.5777.

Respectfully,

Phillip M. Mazor

Phillip M. Mazor
Remedial Project Manager
Waste Management, Inc.

Attachments

Cc: Jim Forney (WM) w/attachments
Rachel Schneider (Quarles & Brady) w/attachments
Cindy Fairbanks (MDEQ) w/attachments
Ann L. Cole (EPA) w/attachments

"ATTACHMENT A"

PRINTED - May 4, 2006 at 04:54 PM

FILE NO.: 700427469CML

ADDRESS: 2700 168th Ave./0- 168th Ave.
BUYER/BOR: To be determined
SELLER: Park Service Company

AMERICAN LAND TITLE ASSOCIATION COMMITMENT - 1966

CHICAGO TITLE INSURANCE COMPANY
COMMITMENT FOR TITLE INSURANCE

CHICAGO TITLE INSURANCE COMPANY, herein called the Company, for a valuable consideration, hereby commits to issue its policy or policies of title insurance, as identified in Schedule A, in favor of the proposed Insured named in Schedule A, as owner or mortgagee of the estate or interest covered hereby in the land described or referred to in Schedule A, upon payment of the premiums and charges therefor; all subject to the provisions of Schedules A and B to the Conditions and Stipulations hereof.

This Commitment shall be effective only when the identity of the proposed Insured and the amount of the policy or policies committed for have been inserted in Schedule A hereof by the Company, either at the time of the issuance of this Commitment or by subsequent endorsement.

This Commitment is preliminary to the issuance of such policy or policies of title insurance and all liability and obligations hereunder shall cease and terminate 90 days after the effective date hereof or when the policy or policies commited for shall issue, whichever first occurs, provided that the failure to issue such policy or policies is not the fault of the Company.

IN WITNESS WHEREOF, CHICAGO TITLE INSURANCE COMPANY has caused this Commitment to be signed and sealed as of the effective date of Commitment shown in Schedule A, the Commitment to become valid when countersigned by an authorized signatory.

CHICAGO TITLE OF MICHIGAN

Countersigned: By _____
Authorized Signatory

EFFECTIVE DATE: APRIL 5, 2006 AT 08:00 AM

CTIC/NBU: 020601355
KATIE MORAN
171 N. CLARK ST., ML: 03ND
CHICAGO, IL 60601

INQUIRIES SHOULD BE DIRECTED TO:
Chicago Title of Michigan
941 W. Milham Rd
Portage, MI 49024
PHONE: (269)321-3055
FAX: (269)321-3051

STANDARD EXCEPTIONS FOR OWNER'S POLICY

The owner's policy will be subject to the mortgage, if any, noted under item one of Section 1 of Schedule B hereof and to the following exceptions: (1) rights or claims of parties in possession not shown by the public records; (2) encroachments, overlaps, boundary line disputes, and any matters which would be disclosed by an accurate survey and inspection of the premises; (3) easements, or claims of easements, not shown by the public records; (4) any lien, or right to a lien, for services, labor, or material heretofore or hereafter furnished, imposed by law and not shown by the public records; (5) taxes or special assessments which are not shown as existing liens by the public records.

CONDITIONS AND STIPULATIONS

1. The term "mortgage," when used herein, shall include deed of trust, trust deed or other security instrument.

2. If the proposed Insured has or acquires actual knowledge of any defect, lien, encumbrance, adverse claim or other matter affecting the estate or interest or mortgage thereon covered by this Commitment other than those shown in Schedule B hereof, and shall fail to disclose such knowledge to the Company in writing, the Company shall be relieved from liability for any loss or damage resulting from any act of reliance hereon to the extent the Company is prejudiced by failure to so disclose such knowledge. If the proposed Insured shall disclose such knowledge to the Company, or if the Company otherwise acquires actual knowledge of any such defect, lien, encumbrance, adverse claim or other matter, the Company at its option may amend Schedule B of this Commitment accordingly, but such amendment shall not relieve the Company from liability previously incurred pursuant to paragraph 3 of these Conditions and Stipulations.

3. Liability of the Company under this Commitment shall be only to the named proposed Insured and such parties included under the definition of Insured in the form of policy or policies committed for and only for actual loss incurred in reliance hereon in undertaking in good faith (a) to comply with the requirements hereof, or (b) to eliminate exceptions shown in Schedule B, or (c) to acquire or create the estate or interest or mortgage thereon covered by this Commitment. In no event shall such liability exceed the amount stated in Schedule A for the policy or policies committed for and such liability is subject to the insuring provisions, the Exclusions from Coverage and the Conditions and Stipulations of the form of policy or policies committed for in favor of the proposed Insured which are hereby incoporated by reference and are made a part of this Commitment except as expressly modified herein.

4. Any action or actions or rights of action that the proposed Insured may have or may bring against the Company arising out of the status of the title to the estate or interest or the status of the mortgage thereon covered by this Commitment must be based on and are subject to the provisions of this Commitment.

REQUIREMENTS FOR ISSUANCE OF MORTGAGE POLICIES:

FOR ALL MORTGAGE POLICIES:
Requirement: Estoppel certificate on form provided by the Company signed by or on behalf of all mortgagors acknowledging receipt of the mortgage consideration and making representations as to the ages of individual mortgagors and such other matters as are therein set forth.

FOR A.L.T.A. MORTGAGE POLICIES WITHOUT EXCEPTIONS:
Requirement: Proper sworn statements and waivers showing payment or release of lien rights covering improvements made on subject land in the past 90 days or satisfactory proof that no improvements have been made within the last 90 days.

Requirements: Survey satisfactory to the insurer made by surveyor acceptable to it showing no variation in location or dimensions, encroachments, or adverse rights, and such evidence of possession as may be required.

If any requirement is not satisfied, the policy will be issued subject to the exceptions which would otherwise be eliminated by compliance with such requirement. The policy will also contain such further exceptions, if any, as to interests, rights, liens, encumbrances, or taxes, which may arise or be created subsequent to the date hereof and which have not been eliminated to our satisfaction. This commitment is subject to the terms, provisions, conditions and stipulations of the kind of policy applied for by the respective applicants. Owner's Policies and Mortgage Policies with Exceptions will be issued with the standard exceptions set forth herein.

CHICAGO TITLE INSURANCE COMPANY

A.L.T.A. COMMITMENT

File No.: 700427469CML

SCHEDULE A

Effective Date: April 5, 2006 at 08:00 AM

1. Policy or Policies To Be Issued: AMOUNT:

   OWNER'S: TBD
   Policy Form: ALTA Owners (10/17/1992)

   (a) Proposed Insured:
   To Be Determined

   LOAN: *TBD*
   Policy Form: ALTA Loan (10/17/1992)

   (b) Proposed Insured:
   To Be Determined

2. The estate or interest in the land described or referred to in this Commitment and covered herein is a Fee Simple, and title thereto is at the effective date hereof vested in:

   Park Service Company, a Michigan corporation; Subject to the interest of Waste Management of Michigan, Inc., the present tax assessed owner.

3. The land referred to in this Commitment is located in Township of Park, Ottawa County, State of Michigan, and is described as follows:

   SEE EXHIBIT A ATTACHED HERETO AND MADE A PART HEREOF

CHICAGO TITLE OF MICHIGAN
941 W. MILHAM RD
PORTAGE, MI 49024
PHONE: (269)321-3055
FAX: (269)321-3051

SEE SCHEDULE B ATTACHED HERETO

FILE NO.: 700427469CML

SCHEDULE B

I. THE FOLLOWING ARE THE GENERAL REQUIREMENTS TO BE COMPLIED WITH:

1. **Payment of the full consideration to, or for the account of, the grantors or mortgagors.**
2. **Payment of all taxes, charges, assessments, levied and assessed against subject premises, which are due and payable.**
3. **For all Loan Policies: Estoppel certificate on form provided by this company signed by or on behalf of all mortgagors acknowledging receipt of the mortgage consideration and making representations as to the ages of individual mortgagors and such other matters as are therein set forth.**
4. **For ALTA Loan Policies without the exceptions in Schedule B, II hereof: Proper sworn statements and waivers showing payment or release of all lien rights covering improvements made on subject land in the last 90 days or satisfactory proof that no improvements have been made within the last 90 days; and, satisfactory survey by an approved surveyor showing no variation in location or dimensions, encroachments, or adverse rights, and such evidence or possession as may be required.**
5. **Instruments necessary to create the estate or interest to be insured must be properly executed, delivered and duly filed for record.**
6. Please immediately verify that the description as shown herein covers all of the intended property. Any additions or deletions should immediately be communicated to the issuing office.
7. Submit to the insurer the purchase price or the amount of any mortgage to be insured and identify any proposed insured. This commitment is made subject to such Exceptions and/or Requirements as may be deemed necessary after the submission of said requested information.
8. In regard to Park Service Company, the Company must be furnished the following documentation:

   A. certified copy of the Articles of Incorporation.

   B. certified copy of the proper corporate resolution(s) authorizing the sale of the land and directing the proper officers to execute the proposed transaction on behalf of said corporation.

   C. Certificate of Good Standing or Certificate of Existence from the Secretary of State of Michigan, attesting to the current good standing.

9. Record a Warranty Deed from Park Service Company, a Michigan corporation to Waste Management of Michigan, Inc., a Michigan corporation.
10. In regard to Waste Management of Michigan, Inc., the Company must be furnished the following documentation:

    A. certified copy of the Articles of Incorporation.

    B. certified copy of the proper corporate resolution(s) authorizing the sale of the land and directing the proper officers to execute the proposed transaction on behalf of said corporation.

    C. Certificate of Good Standing or Certificate of Existence from the Secretary of State of Michigan, attesting to the current good standing.

11. Record a Warranty Deed from Waste Management of Michigan, Inc., a Michigan corporation to the

party to be insured.

12. All deeds delivered at closing must comply with the recording requirements of the Subdivision Control Act Amendment of 1996 regarding Farm Operations and Land Division.

13. Record the Mortgage to be insured.

14. Submit to the Company a current ALTA/ACSM "Minimum Standards" Survey, certified to the Company and the proposed insured. This Commitment is made subject to such matters as may be disclosed by said survey.

15. Submit to the insurer a properly executed Owner's Affidavit and Gap Personal Undertaking. The Policy to be issued may take exception to such matters as may be disclosed therein.

16. If the proposed parcel to be insured has a public water or sewer supply, meter readings should be obtained and adjusted between the parties involved, and additional investigation by the parties involved in this transaction should be made to determine if : 1. Current charges are being paid on a timely basis, 2. Deferred installation or connection charges are still owing, and 3. Future installation charges would be incurred to connect to the system. The Policy to be issued will not insure against any loss or damage arising from these charges.

17. Provide proof of payment of taxes and special assessments, if any, or same will appear as an exception on the final title policy. For clarification of tax information, please contact the Park Township Treasurer at 616-399-4520 and the Ottawa County Treasurer at 800-764-4111, Ext. 8230 or 616-846-8230.

    Taxes paid through 2005 Winter tax
    2005 Summer tax paid in the amount of $327.12
    2005 Winter tax paid in the amount of $63.35
    Special Assessments: None
    2005 SEV: $37,100.00
    2005 Taxable Value: $8,993.00
    Tax Identification Number: 70-15-15-300-002 (Parcel 1)
    Commonly known as: N. 168th Ave.

    Taxes paid through 2005 Winter tax
    2005 Summer tax paid in the amount of $6,424.07
    2005 Winter tax paid in the amount of $1,244.77
    Special Assessments: None
    2005 S.E.V.- $378,600.00
    2005 Taxable value- $176,595.00
    Tax Identification Number: 70-15-15-300-031 (Parcel 2)
    Commonly known as: 2700 N. 168th Ave.

    Taxes and special assessment information is provided to the Company and is shown herein for informational purposes only. The accuracy of same is neither guaranteed nor insured. Please note that personal property taxes have not been searched. Please verify taxes prior to any closing.

II. THE POLICY OR POLICIES TO BE ISSUED WILL CONTAIN EXCEPTIONS TO THE FOLLOWING MATTERS UNLESS THE SAME ARE DISPOSED OF TO THE SATISFACTION OF THE COMPANY.

1. **Defects, liens, encumbrances, adverse claims or other matters, if any, created, first appearing in the public records or attaching subsequent to the effective date hereof but prior to the date the proposed insured acquires for value of record the estate or interest or mortgage thereon**

covered by this commitment.

2. **Any Loan Policy issued pursant hereto will contain under Schedule B thereof the following exceptions:**

   (a) *Rights or claims of parties in possession not shown by the public records.*

   (b) Encroachments, overlaps, boundary line disputes, and any other matters which would be discovered by an accurate survey and inspection of the premises.

   (c) Any lien, or right to a lien for services, labor, or material heretofore or hereafter furnished, imposed by law and not shown by the public records.

3. **Any owner's policy will be subject to the mortgage, if any, noted under item one of Section 1 of Schedule B hereof and to the following exceptions (also set forth at the inside cover hereof): (1) rights or claims of parties in possession not shown by the public records; (2) encroachments, overlaps, boundary line disputes, and any matters which would be disclosed by an accurate survey and inspection of the premises; (3) easements, or claims of easements, not shown by the public records; (4) any lien, or right to a lien, for services, labor, or material heretofore or hereafter furnished, imposed by law and not shown by the public records; (5) any and all oil, gas, mineral, mining rights and/or reservations thereof; (6) taxes or special assessments which are not shown as existing liens by the public records.**

4. Right of way in favor of Consumers Power Company (now known as Consumers Energy) as recorded in Liber 325, page 561. (Parcels 1 and 2)

5. Right of way in favor of Consumers Power Company (now known as Consumers Energy) as recorded in Liber 544, page 75. (Parcels 1 and 2)

6. Easement to the County of Ottawa for utility line(s) purposes as recorded in Liber 1720, page 344. (Parcel 2)

7. Declaration of Restrictive Covenant, dated July 31, 1997, recorded August 18, 1997 in liber 2256, page 75. (Parcels 1 and 2)

8. Rights of the public and of any governmental unit in any part of the land described in Schedule A taken, used or deeded for street, road or highway purposes.

9. Rights of tenants under unrecorded leases and any and all parties claiming by, through and thereunder.

10. The Policy does not insure against unpaid water, sewer, electric or gas charges, if any, that have not been levied as taxes against these lands.

11. Taxes and/or assessments which become a lien or become due and payable subsequent to the effective date herein.

EXHIBIT A
LEGAL DESCRIPTION

Your Reference No.: 700427469CML

Land located in the Township of Park, Ottawa County, State of Michigan, and described as follows:

Parcel 1:

The South 310.6 feet of the North 435.6 feet of the West 200 feet of the Northwest 1/4 of the Southwest 1/4 of Section 15, Town 5 North, Range 16 West, Park Township, Ottawa County, Michigan.

P.P. #70-15-15-300-002

Parcel 2:

The North 1/2 of the Southwest 1/4 of Section 15, Town 5 North, Range 16 West, Park Township, Ottawa County, Michigan, EXCEPT the North 435.6 feet of the West 200 feet thereof.

P.P. #70-15-15-300-031

Fidelity National Financial Group of Companies' Privacy Statement

July 1, 2001

We recognize and respect the privacy expectations of today's consumers and the requirements of applicable federal and state privacy laws. We believe that making you aware of how we use your non-public personal information ("Personal Information"), and to whom it is disclosed, will form the basis for a relationship of trust between us and the public that we serve. This Privacy Statement provides that explanation. We reserve the right to change this Privacy Statement from time to time consistent with applicable privacy laws.

In the course of our business, we may collect Personal Information about you from the following sources:

- From applications or other forms we receive from you or your authorized representative;
- From your transactions with, or from the services being performed by us, our affiliates, or others;
- From our internet web sites;
- From the public records maintained by government entities that we either obtain directly from those entities, or from our affiliates or others; and
- From consumer or other reporting agencies.

Our Policies Regarding the Protection of the Confidentiality and Security of Your Personal Information

We maintain physical, electronic and procedural safeguards to protect your Personal Information from unauthorized access or intrusion. We limit access to the Personal Information only to those employees who need such access in connection with providing products or services to you or for other legitimate business purposes.

Our Policies and Practices Regarding the Sharing of Your Personal Information

We may share your Personal Information with our affiliates, such as insurance companies, agents, and other real estate settlement service providers. We also may disclose your Personal Information:

- to agents, brokers or representatives to provide you with services you have requested;
- to third-party contractors or service providers who provide services or perform marketing or other functions on our behalf; and
- to others with whom we enter into joint marketing agreements for products or services that we believe you may find of interest.

In addition, we will disclose your Personal Information when you direct or give us permission, when we are required by law to do so, or when we suspect fraudulent or criminal activities. We also may disclose your Personal Information when otherwise permitted by applicable privacy laws such as, for example, when disclosure is needed to enforce our rights arising out of any agreement, transaction or relationship with you.

One of the important responsibilities of some of our affiliated companies is to record documents in the public domain. Such documents may contain your Personal Information.

Right to Access Your Personal Information and Ability To Correct Errors Or Request Changes Or Deletion

Certain states afford you the right to access your Personal Information and, under certain circumstances, to find out to whom your Personal Information has been disclosed. Also, certain states afford you the right to request correction, amendment or deletion of your Personal Information. We reserve the right, where permitted by law, to charge a reasonable fee to cover the costs incurred in responding to such requests.

All requests must be made in writing to the following address:

Privacy Compliance Officer
Fidelity National Financial, Inc.
4050 Calle Real, Suite 220
Santa Barbara, CA 93110

Multiple Products or Services

If we provide you with more than one financial product or service, you may receive more than one privacy notice from us. We apologize for any inconvenience this may cause you.

Liber 1720, pg. 344

Tax Description No. [illegible]
Tax Map

UTILITY LINE EASEMENT

THIS INDENTURE, made and entered into this 12th day of September 19 99, by and between [illegible], party of the first part, and COUNTY OF OTTAWA, a body corporate as authorized by the Constitution of the State of Michigan, acting by and through its Board of County Road Commissioners, of 616 North Sixth Street, Grand Haven, Michigan 49417, party of the second part;

WITNESSETH:

For and in consideration of the sum of [illegible] ($1.00) Dollar(s) paid to first party, the receipt of which is hereby acknowledged, first party does hereby grant, bargain, convey and assign unto second party, its successors and assigns, a non-exclusive, perpetual and permanent easement and right-of-way under, through and across a certain piece or parcel of land situated in the [illegible] of [illegible], in the County of Ottawa and State of Michigan, the piece or parcel of land being owned by first party in fee simple and described as follows:

The Description:
The North ½ of the Southwest ¼, except the North 435.6 feet of the West 800 feet thereof, Section 25, Town 5 North, Range 16 West.

Easement Description:
A twenty (20) foot wide permanent easement over the South 20 feet and also the East 20 feet of the South 800 feet. A temporary construction easement Ten (10) feet wide over the North 10 feet of the South 30 feet and the West 10 feet of the East 30 feet of the South 800 feet of the above description.

Said easement and right-of-way shall be for the purpose of the construction and installation of a sewer line or lines and other utility lines, including water line or lines, storm sewer lines, drains and drain tiles and their appurtenant valves, hydrants, and accessories, under, through, and across the above described easement and right-of-way for the purpose of construction operation, maintaining, repairing.

replacing, reinstalling, inspecting, and keeping in working order the sewer lines, water lines, utility lines, storm sewer lines, and other utility lines, including their appurtenant valves, hydrants, and accessories, which are running under, through, and across the above described easement and right-of-way, all hereinafter collectively referred to as "utility lines".

Said easement and right-of-way shall include the right to enter upon sufficient land adjacent to the same, owned by first party, as is required for the construction, installation, maintenance, repair, replacement, reinstallation, operation, and inspection of said utility lines, together with the right to install intersecting utility lines therein.

TO HAVE AND TO HOLD said easement and right of way under, through, and across the above described place or parcel of land unto second party, its successors and assigns for the use and benefit of second party, its successors and assigns, FOREVER.

First party warrants that they have the right and authority to grant this easement as above described and own the lands covered by the easement and right-of-way.

The easement and right of way shall include, but not be limited to, the right to enter upon the same at any time that second party may see fit for the purpose of construction, maintaining, repairing, replacing, reinstalling, and inspecting its utility line or lines across, through, and under the above described place or parcel of land, together with the right to excavate a trench or ditch for the location of said utility line or lines and with the further right to remove trees, brush, and undergrowth, and other obstruction situated upon the above described place or parcel of land interfering with the location, construction, maintenance, or repair of said utility line or lines. Second party, as a consideration for the granting of the right to construct and install said utility line or lines shall be obligated to fill and grade to ground level the trench or ditch occupied by said utility line or lines and to restore the drives, parking areas, shrubs, or grass to their former condition insofar as is reasonably possible. Second party does further covenant and agree that in the event it shall at any time become necessary to enter upon the above described place or parcel of land for the purpose of maintenance, repair, replacement, construction, or reinstallation of said utility line or lines, it shall return said place or parcel of land to a similar condition as before such maintenance or repair upon the completion of the same insofar as is reasonably possible.

Any existing buildings, structures, fences, the removal or demolition of which shall be required for the reasonable execution of the foregoing powers, shall be removed or demolished at the expense of second party.

Second party agrees to fully indemnify, save, and keep harmless first party from any and all claims for damage to real and personal property and injuries and death suffered by persons in any manner caused by or growing out of the construction, installation, repair, or maintenance or presence of said utility line or lines, under and across the place or parcel of land of first party. First party agrees that they will not construct a building, structure, or other permanent improvement on said easement and right of way without first obtaining the written consent of second party and this conveyance includes a release of any and all claims to damage arising from or incidental to the exercise of any of the foregoing powers except as above provided.

The pronouns and relative words herein are written in the masculine and singular only. If more than one join in, or be either of the feminine sex or a business entity, such words shall be read as if written in plural, feminine or neuter, respectively.

IN WITNESS WHEREOF, the first party has caused these presents to be signed the day and year first above written; and this instrument shall be binding upon and inure to the benefit of the parties hereto, their heirs, representatives, successors, and assigns.

Signed in the Presence of:

MICHIGAN WASTE SYSTEMS, INC.

Sign here: BY: [signature]
Type here: ROGER R. [illegible], Asst. Sec.

Sign here: BY: [signature]
Type here: [illegible], Vice President
Address: 3003 Butterfield Road
Oak Brook, IL 60521

Sign here: _____
Type here: _____

Sign here: _____
Type here: _____
Address: _____

STATE OF ILLINOIS }
COUNTY OF DU PAGE } ss.

On this 19th day of September, 1989, before me, a Notary Public, in and for said County, personally appeared [illegible], Vice President and Roger R. [illegible], Assistant Secretary of Michigan Waste Systems, Inc.

to me known to be the same person(s) described in and who executed the within instrument, who each acknowledged the same to be their own free act and deed.

Sign here: [signature]
Type here: [illegible]
Notary Public

My Commission Expires
9/13/90

UR2256 M 75

5
Waste Management
17250 Newburgh Rd.
Suite 100
Livonia 48152

RECORDED
97 AUG 18 AM 11:28
REGISTER OF DEEDS
OTTAWA COUNTY, MI

DECLARATION OF RESTRICTIVE COVENANT

This Restrictive Covenant has been recorded with the Ottawa County Register of Deeds for the purpose of protecting public health, safety and welfare and the environment.

Waste Management of Michigan, Inc. has submitted to the Michigan Department of Environmental Quality (MDEQ) a Remedial Action Plan (RAP) prepared by Rust Environment and Infrastructure, Inc. dated July, 1997 that includes land use-based cleanup criteria as defined and set forth in Section 20120a(1)(f) of Part 201 of the Natural Resources and Environmental Protection Act (NREPA), 1994 PA 451, as amended, MCL 324.20101 et seq. for the environmental remediation associated with the property located in the Township of Park, Ottawa County, (Property) more particularly described as:

See Attachment A for legal description of Property and a survey of the property subject to the land-use restrictions

Real Estate Property Tax ID Number of Property: 70-15-15-300-002
70-15-15-300-003
70-15-15-300-004

As used herein, the term "Owner" shall mean at any given time the then current title holder of the Property.

Now therefore Waste Management of Michigan, Inc. 17250 Newburgh Rd, Livonia, MI 48152, pursuant to Section 20120b(4) of NREPA, hereby imposes restrictions on the Property and covenants and agrees that:

1. The Owner shall restrict the uses of the Property to those uses compatible with the limited residential land use criteria as defined in Section 20120a(1)(f) of Part 201 of NREPA, as amended in June 1996, and MDEQ Environmental Response Division Operational Memorandum #14, Revision 2, dated June 8, 1995 or other use that is consistent with the assumptions and basis for the cleanup criteria established pursuant to Section 20120a.

Cleanup criteria and associated land use descriptions are located in the Government Documents section of the State of Michigan Library.

2. The Owner shall restrict activities at the Property that may interfere with a remedial action, operation and maintenance, monitoring, or other measures necessary to assure the effectiveness and integrity of the remedial action.

[illegible]
[illegible], 10:58 AM

3. The Owner shall restrict activities at the Property that may result in exposures above levels established in the MDEQ approved RAP. Since the exposure media at the site is limited to the groundwater, the restricted activities include:

- Prohibition of groundwater well installation and groundwater use within the property boundary for all domestic, commercial, and industrial uses.
- The groundwater restriction applies to all waterbearing aquifers within the property boundary.
- Prohibit construction of groundwater fed impoundments within the property boundary.
- Prohibit excavation of soils beyond the saturated zone within the property boundary, unless properly trained according to 29 CFR 1910.120.
- If the existing structure located on the property is razed, four (4) soil samples will be collected and analyzed for parameters to be negotiated with MDEQ and the Owner at the time of soil collection.
- Owner will supply 30 day notice to MDEQ prior to razing of structure.

4. The Owner shall provide notice to the MDEQ of the Owner's intent to convey any interest in the Property 14 days prior to consummating the conveyance. A conveyance of title, an easement, or other interest in the Property shall not be consummated by the Property owner without adequate and complete provision for compliance with the terms and conditions of the Covenant.

5. The Owner shall grant to the MDEQ and its designated representatives the right to enter the Property at reasonable times for the purpose of determining and monitoring compliance with the RAP, including the right to take samples, inspect the operation of the remedial action measures and inspect records.

6. The Owner acknowledges contaminated groundwater which is migrating under the Property from an off-site source shall not be used for any domestic, commercial, or industrial purpose.

The State may enforce the restrictions set forth in this Restrictive Covenant by legal action in a court of appropriate jurisdiction.

The restrictions shall run with the Property and shall be binding upon all future owners, successors, lessees or assigns and their authorized agents, employees, or persons acting under their direction and control, and shall continue until the MDEQ or its successor approves modifications or rescission of this Restrictive Covenant. A copy of this Restrictive Covenant shall be provided to all future owners, heirs, successors, lessees, assigns and transferees by the person transferring the interest.

If any provision of this Restrictive Covenant is held to be invalid by any court of competent jurisdiction, the invalidity of such provision shall not affect the validity of any other provisions hereof. All such other provisions shall continue unimpaired in full force and effect.

The undersigned person executing this Restrictive Covenant is the Owner, or has the express written permission of the Owner, and represents and certifies that he or she is duly authorized and has been empowered to execute and deliver this Restrictive Covenant.

IN WITNESS WHEREOF, the said Owner of the above described Property has caused this Restrictive Covenant to be executed on this 31st day of July, 1997

Waste Management of Michigan, Inc.

By: [signature]

Title: President

Signed in the presence of:

[signature]
Lori Swanson

[signature]
Sharon Stahl

STATE OF MICHIGAN)
COUNTY OF)

The foregoing instrument was acknowledged before me this 31st day of July, 1997, by Ronald S. Barker of Waste Management of Michigan, Inc., a Michigan Corporation, on behalf of the corporation.

[signature]
Notary Public

Deanne McDermott
NOTARY PUBLIC - WAYNE COUNTY, MI
MY COMMISSION EXPIRES 10/04/98

My Commission Expires: _____

Prepared by: Phillip M. Mazor
Remedial Project Manager
Waste Management of Michigan, Inc.
700 - 56th Ave
Zeeland, MI 49464

[illegible]
7/30/97, 10:50 AM

LIBER 2256 PAGE 78

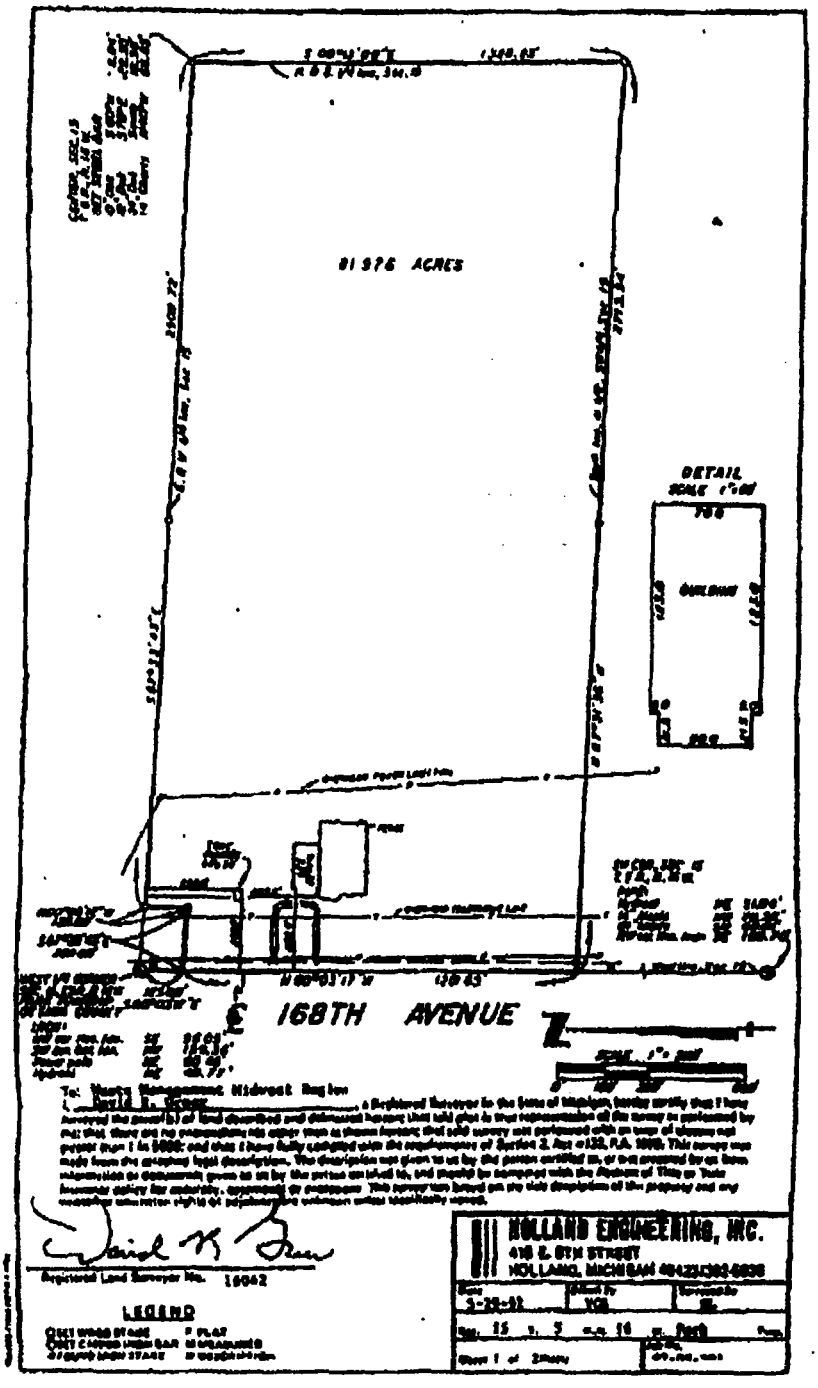
DESCRIPTION OF SURVEY

Part of the North 1/2 of the Southwest 1/4 of Section 15, Town 5 North, Range 16 West, Park Township, Ottawa County, Michigan described as beginning at a point on the West line of Section 15 distant South 00 degrees 02 minutes 17 seconds East 135.09 feet from the West 1/4 corner of Section 15 and proceeding thence South 87 degrees 33 minutes 43 seconds East 208.69 feet; thence North 00 degrees 02 minutes 17 seconds West 135.00 feet; thence South 87 degrees 33 minutes 43 seconds East 2608.72 feet along the East and West 1/4 line of Section 15; thence South 00 degrees 13 minutes 00 seconds East 1338.28 feet along the North and South 1/4 line of Section 15; thence North 87 degrees 31 minutes 56 seconds West 2713.54 feet along the South line of the North 1/2 of the Southwest 1/4 of Section 15; thence North 00 degrees 02 minutes 17 seconds West 1201.65 feet along the West line of Section 15 to the point of beginning, containing 81.876 acres except any part taken, used or deeded for road purposes, AND BEING SUBJECT TO easements of record.

4

[illegible]

LIBER 2256 PAGE 79



Form 44-00-000 RIGHT OF WAY Parcel No. 6.

Reginald A. Woodall and Edna L. Woodall, his wife; William John Woodall and Florence Fayen Woodall, his wife and in her own right

first part, in consideration of One Dollars ($ 1.00) to them paid by the CONSUMERS POWER COMPANY, a Maine corporation authorized to do business in Michigan, party of the second part, hereinafter called Company, and Warrant to the second party, its successors and assigns, Forever, the easement and right to erect, by and maintain lines consisting of necessary poles, wires, cables, conduits and other fixtures and appurtenances for the purpose of transmitting and distributing electricity and/or conducting a communication business on, over, under and across the following described parcel of land, including all public highways upon or adjacent to said parcel, of land, which parcel is in the Township of Park County of Ottawa, and State of Michigan, to-wit:

The Northwest one-quarter (¼) of the Southwest one-quarter (¼) of Section Fifteen (15) Township Five (5) North, Range Sixteen (16) West.

The route to be taken by said lines of towers, poles, wires, cables and conduits across, over and under said land being more specifically described as follows:

Second party may identify said route East of and not more than fifty (50) feet from the centerline of the highway on the West side of said above described land; also conveying the right to erect and maintain lines of poles and wires traversing laterally from said route to the centerline of said highway.

With full right and authority to the second party, its successors, lessees, lessees or assigns, and its and their agents and employees, to enter on all lands upon said premises for the purpose of constructing, reconstructing, repairing, replacing, improving, enlarging and maintaining such towers, poles and cables, guys and other supports, with all necessary braces, guys, anchors, foundations and attachments, and cables thereon and supporting and suspending therefrom lines of wire, cables or other conductors for the transmission of electrical energy and/or communication, and to trim or remove any trees which in any case may interfere or threaten to interfere with the maintenance of said lines. It is expressly understood that no buildings or other structures will be placed under such wires and/or over such cables without the written consent of said second party. It is expressly understood that non-use or a limited use of this easement by second party shall not prevent second party from later making use of the easement to the full extent herein authorized.

Second party to pay first party for any damage to crops in erecting and maintaining said lines of poles and wires.

WITNESS the hand s. and seal s of the parties of the first part, this 19th day of February, A.D. 19 51.

Signed, Sealed and Delivered in Presence of

Nellie Vanderwarf Warner
Nellie Vanderwarf Warner

Clarence Clarke Warner
Clarence Clarke Warner

O. E. Vanderwarf
O. E. Vanderwarf

Ellen Vanderwarf
Ellen Vanderwarf

William John Woodall (L.S.)
William John Woodall

Florence Fayen Woodall (L.S.)
Florence Fayen Woodall

Reginald A. Woodall (L.S.)
Reginald A. Woodall

Edna L. Woodall (L.S.)
Edna L. Woodall

7994 PM

Reginald A. Woodall, et al

to

Consumers Power Company

325 PAGE 562

State of Michigan Ottawa County
REGISTER'S OFFICE
Received for record the 25th
day of September A.D. 1945
at 9 o'clock A.M. and
recorded in Liber 325
of Deeds on page 562
Register of Deeds

Mrs. L. R. B. Palmer
Consumers Power Co.
Ottawa, Mich.

STATE OF MICHIGAN
County of Manatee } ss

On this 20 day of February 1945, before me, a Notary Public of [illegible] County, Michigan, acting in Manatee County, personally appeared Reginald A. Woodall & Edna L. Woodall to me known to be the same person named in and who executed the foregoing instrument, and severally acknowledged the execution of the same to be their free act and deed.

Notary Public, [illegible] Co., Mich.

Notary Public, State of Florida at Large, My commission expires Feb. 16, 1948. Bonded by American Surety Co. of N. Y.

My commission expires

NOTARY PUBLIC STATE OF FLORIDA AT LARGE

STATE OF MICHIGAN,
County of Ottawa } ss.

On this 13th day of February 1945, before me, a Notary Public of Kent County, Michigan, acting in Ottawa County, personally appeared William John Woodall and Florence Fayne Woodall to me known to be the same persons named in and who executed the foregoing instruments, and severally acknowledged the execution of the same to be their free act and deed.

Garret Vandenberg

Notary Public, Kent Co., Mich.

My commission expires May 18, 1948.

Form 327 [illegible]

File #5096

Parcel #35

RIGHT OF WAY

Recorded [illegible] day of [illegible] A.D. 19[illegible] at [illegible] o'clock [illegible] M. Liber [illegible] Page [illegible]

Robert J. [illegible]
Register of Deeds

Peter Jacobusse and Dorothy Jacobusse, his wife, [illegible] North 168th Street, Holland, Michigan ... first parties ... in consideration of ... One and no/100 ... Dollars ($ 1.00 ...) to ... then ... said by the CONSUMERS POWER COMPANY, a Maine corporation authorized to do business in Michigan, at 212 W. Michigan Ave., Jackson, Michigan, second party, receipt of which is hereby acknowledged, Convey ... and Warrant ... to the second party, its successors and assigns, Forever, the easement and right to erect, lay and maintain lines consisting of masses, poles, wires, cables, conduits and other fixtures and appurtenances for the purpose of transmitting and distributing electricity and/or conducting a communication business on, over, under and across the following described parcel ... of land, including all public highways upon or adjacent to said parcel ... of land, which parcel ... is ... situate in the ... Township, of ... Park ... County of ... Ottawa ..., and State of Michigan, to-wit:

The Northwest 1/4 of the Southwest 1/4 of Section 15, Township 5 North, Range 16 West.

The route to be taken by said lines of [illegible], poles, wires, cables and conduits across, over and under said land being more specifically described as follows:

Along or adjoining as near as practicable a line desc. as beg. on the South line of Section 15, T5N, R16W, at a point not more than 700 ft. nor less than 650 ft. East of the SW corner of sd. Section, run. th. North to a point not more than 37 ft. nor less than 34 ft. North of the South line of sd. Section, at a point not more than 700 ft. nor less than 650 ft. East of the West line of sd. Section, run. th. N'ly to a point not more than 40 ft. nor less than 25 ft. South of the East and West ¼ line of sd. Section 15, at a point not more than 600 ft. nor less than 450 ft. East of the West line of sd. Section, run. th. NW'ly to a point not more than 500 ft. nor less than 450 ft. North of the East and West ¼ line of Section 16 of sd. Twp., at a point not more than 450 ft. nor less than 350 ft. West of the East line of sd. Section 16. With full right and authority to the second party, its successors, licensees, lessees or assigns, and its and their agents and employees, to enter at all times upon said premises for the purpose of constructing, repairing, removing, replacing, patrolling, inspecting, enlarging and maintaining such cables, conduits and appurtenances and other supports, with all necessary bracing, guys, anchors, manholes and transformers, and enlarging thereon and supporting and suspending therefrom lines of wire, cables or other constructors for the transmission of electrical energy and/or communication, and to wire, remove, destroy or otherwise control any trees and brush which may, in the opinion of said second party, interfere or threaten to interfere with or be hazardous to the construction, operation and maintenance of said lines. It is expressly understood that no buildings or other structures will be placed under such wires and/or over such cables without the written consent of said second party. It is expressly understood that non-use or a limited use of this easement by second party shall not prevent second party from later making use of the easement to the full extent herein authorized.

Second party to pay first party for any damage to crops in erecting and maintaining said line of poles and wires.

WITNESS the hand ... and seal ... of the part ... of the first part, this ... fourth ... day of ... August ... 19 65.

Signed, Sealed and Delivered in Presence of

Frank A. Usman
Frank A. Usman

Ben W. Johnson
Ben W. Johnson

Peter Jacobusse (L.S.)
Peter Jacobusse

Dorothy Jacobusse (L.S.)
Dorothy Jacobusse

(L.S.)

(L.S.)

STATE OF MICHIGAN)
) ss.
County of Ottawa)

On this 4th day of August 19 65 before me, a Notary Public of Kent County, Michigan, acting in Ottawa County, personally appeared

Peter Jacobusse and Dorothy E. Jacobusse

to me known to be the same person ... named in and who executed the foregoing instrument, and severally acknowledged the execution of the same to be their free and deed.

Frank A. Usman
Notary Public, Kent Co., Mich.
My commission expires May 3, 1969

PREPARED BY J. J. [illegible], CONSUMERS POWER CO., [illegible] MICHIGAN AVENUE, JACKSON, MICHIGAN

LIBER 544 PAGE 75

Liber 589 pg. 414

Received for Record [illegible] 1969 at 3:25 o'clock P. M., and recorded in Liber 589 Page 414

Robert J. Kammerand, Register of Deeds, Ottawa County, Michigan.

WARRANTY DEED—Corporation Form—DSC

This Indenture, Made this 9th day of April 1969

WITNESSETH, That DOROTHY JACOBUSSE, as survivor of PETER JACOBUSSE and DOROTHY JACOBUSSE, husband and wife, of 5692 143rd Avenue, Holland, Michigan,

for the sum of FIFTEEN THOUSAND and 00/100 ($15,000.00) DOLLARS Convey and Warrant to PARK SERVICE COMPANY, a Michigan Corporation, of 2150 Marlacoba Drive, Holland, Michigan,

the following described lands and premises situated in Township of Park County of Ottawa and State of Michigan, viz:

The Northwest one-quarter of the Southwest one-quarter except the North 433.6 feet of the West 200 feet, Section 15, Town 5 North, Range 16 West, Township of Park, County of Ottawa, State of Michigan.

Dept. of Treasury — Ottawa County — Tax Exempt — $16.50

Signed in Presence of: Ronald L. Dalman, Gail A. Lawson

Signed on the date first above written: Dorothy Jacobusse

STATE OF MICHIGAN, } ss.
County of OTTAWA } On this 9th day of April 1969 before me, a Notary Public in and for said County personally appeared Dorothy Jacobusse,

to me known to be the same person described in and who executed the within instrument, who acknowledged the same to be her free act and deed.

Gail A. Lawson
Notary Public Ottawa County, Michigan.

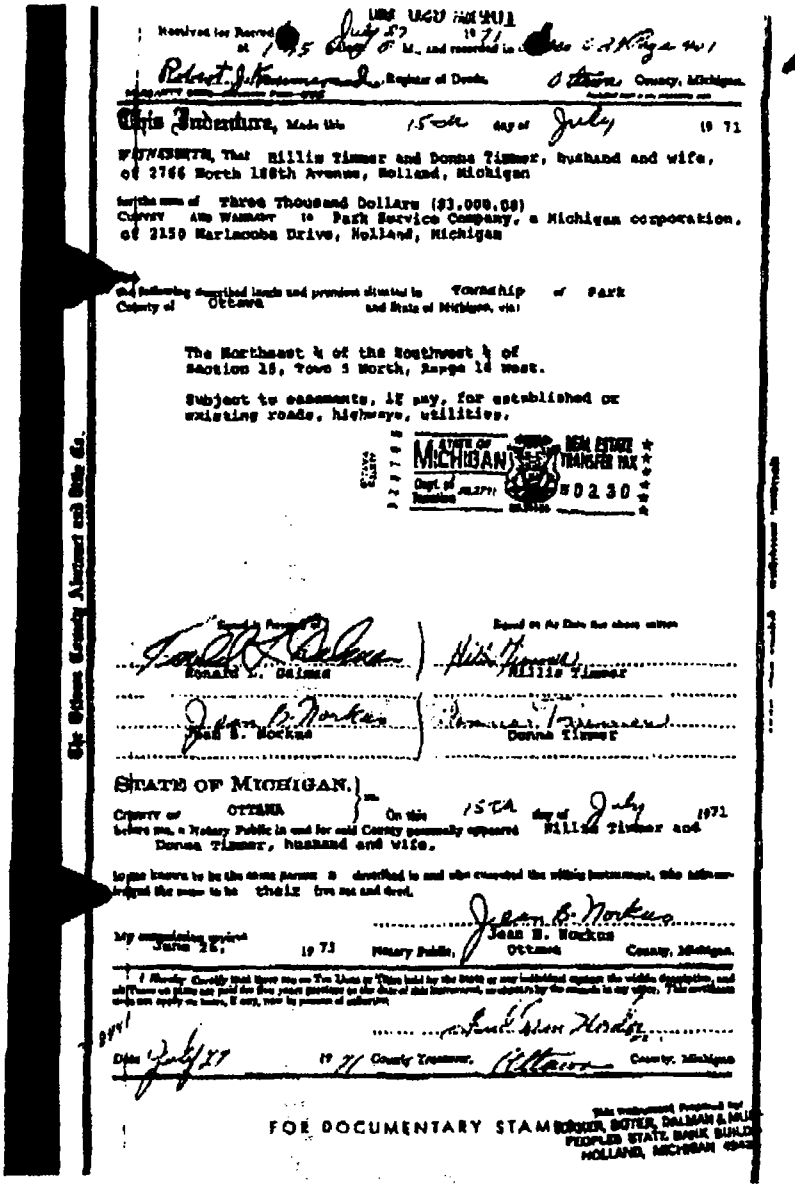
My commission expires May 18, 1972

I hereby Certify that there are no Tax Liens or Titles held by the State or any individual against the within description, and all taxes on same are paid for five years previous to the date of this instrument, as appears by the records in my office. This certificate does not apply on taxes, if any, not in process of collection.

Date April 16 1969 County Treasurer, Ottawa County, Michigan

This Instrument Prepared by: [illegible] FOR DOCUMENTARY STAMPS

Fee
Pt. of Parcel B



Liber 629 pg. 401

Pa
pt. Parcel B

Received for Record July 27 1971 at 1:45 o'clock P. M., and recorded in Liber 629 Page 401

Robert J. Kammerand, Register of Deeds, Ottawa County, Michigan.

This Indenture, Made this 15th day of July 1971

WITNESSETH, That Willis Timmer and Donna Timmer, husband and wife, of 2766 North 188th Avenue, Holland, Michigan

for the sum of Three Thousand Dollars ($3,000.00) Convey and Warrant to Park Service Company, a Michigan corporation, of 2150 Marlacoba Drive, Holland, Michigan

the following described lands and premises situated in Township of Park County of Ottawa and State of Michigan, viz:

The Northeast ¼ of the Southwest ¼ of Section 15, Town 5 North, Range 16 West.

Subject to easements, if any, for established or existing roads, highways, utilities.

STATE OF MICHIGAN REAL ESTATE TRANSFER TAX Dept. of Treasury 0230

Signed in Presence of: Ronald L. Dalman, Jean B. Norkus

Signed on the Date first above written: Willis Timmer, Donna Timmer

STATE OF MICHIGAN, } ss.
County of OTTAWA } On this 15th day of July 1971 before me, a Notary Public in and for said County personally appeared Willis Timmer and Donna Timmer, husband and wife,

to me known to be the same person s described in and who executed the within instrument, who acknowledged the same to be their free act and deed.

Jean B. Norkus
Jean B. Norkus
Notary Public, Ottawa County, Michigan.

My commission expires June 26, 1973

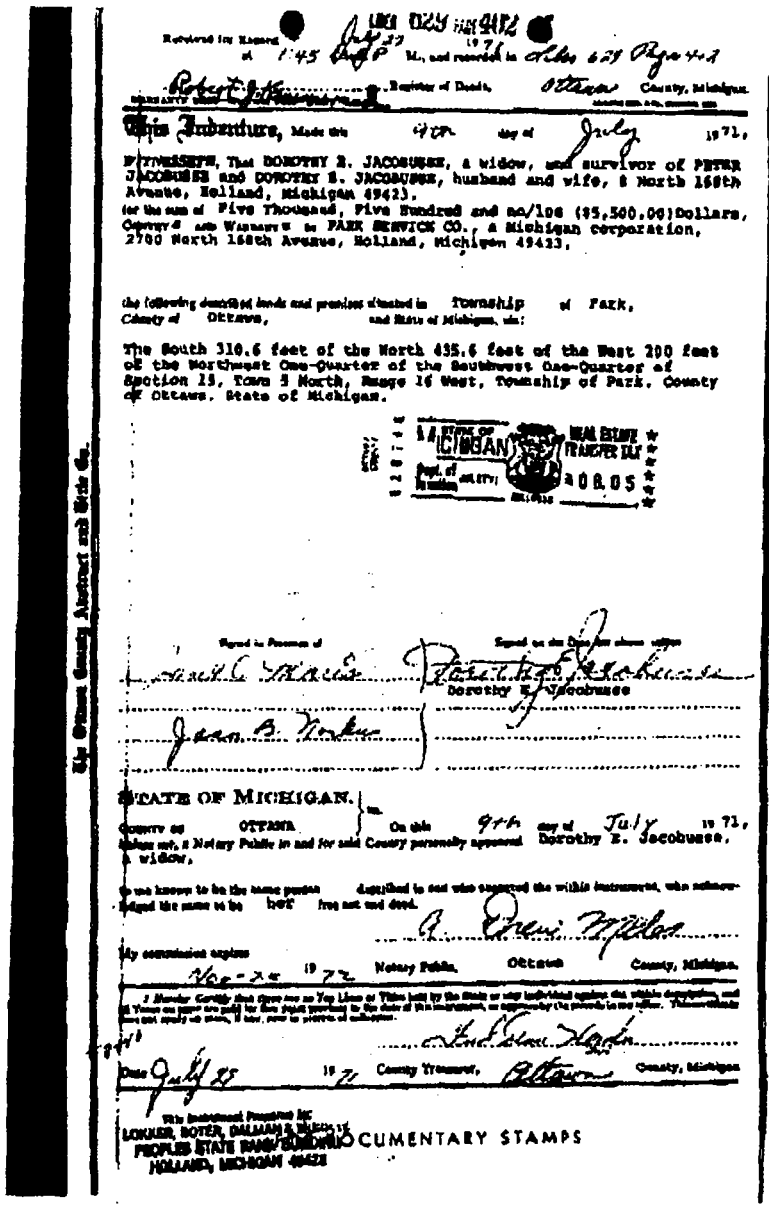
I Hereby Certify that there are no Tax Liens or Titles held by the State or any individual against the within description, and all Taxes on same are paid for five years previous to the date of this instrument, as shown by the records in my office. This certificate does not apply on bonds, if any, now in process of collection.

Date July 27 1971 County Treasurer, Ottawa County, Michigan

FOR DOCUMENTARY STAMPS

This instrument Prepared by: BORKER, BOTER, DALMAN & MUL... PEOPLES STATE BANK BUILD... HOLLAND, MICHIGAN 4942...

The Ottawa County Abstract and Title Co.



Liber 629 Pg. 402

Fee Parcel A

Received for Record at 1:45 P.M. July 27 1971 and recorded in Liber 629 Page 402

Robert J. Tellman, Register of Deeds, Ottawa County, Michigan.

This Indenture, Made this 9th day of July 1971,

BETWEEN, That DOROTHY E. JACOBUSSE, a widow, and survivor of PETER JACOBUSSE and DOROTHY E. JACOBUSSE, husband and wife, 8 North 168th Avenue, Holland, Michigan 49423,

for the sum of Five Thousand, Five Hundred and no/100 ($5,500.00) Dollars, Conveyed and Warrants to PARK SERVICE CO., a Michigan corporation, 2700 North 168th Avenue, Holland, Michigan 49423,

the following described lands and premises situated in Township of Park, County of Ottawa, and State of Michigan, viz:

The South 310.6 feet of the North 435.6 feet of the West 200 feet of the Northwest One-Quarter of the Southwest One-Quarter of Section 15, Town 5 North, Range 16 West, Township of Park, County of Ottawa, State of Michigan.

STATE OF MICHIGAN DEPT. OF TREASURY REAL ESTATE TRANSFER TAX 008.05

Signed in Presence of

Janet C. Marcus

Jean B. Norkus

Signed on the Date first above written

Dorothy E. Jacobusse

STATE OF MICHIGAN, } ss.
County of OTTAWA }

On this 9th day of July 19 71, Dorothy E. Jacobusse, a widow,

to me known to be the same person described in and who executed the within instrument, who acknowledged the same to be her free act and deed.

A. Dawn Miller

My commission expires Nov. 2 19 72 Notary Public, Ottawa County, Michigan.

I Hereby Certify that there are no Tax Liens or Titles held by the State or any individual against the within description, and all Taxes on same are paid for five years previous to the date of this instrument, as appears by the records in my office. Taxes not yet due, if any, are to be prorated at settlement.

Date July 28 19 71 County Treasurer, Ottawa County, Michigan

When Instrument Recorded Mail To: LOHUIS, BOTER, DALMAN & BOSMAN PEOPLES STATE BANK BUILDING HOLLAND, MICHIGAN 49423

DOCUMENTARY STAMPS

The Ottawa County Abstract and Title Co.

"ATTACHMENT B"

Waste Management of Michigan, Inc.

Action by Written Consent
of the Board of Directors

The undersigned, being all of the directors of Waste Management of Michigan, Inc., a Michigan corporation (the "Corporation") hereby consent to the taking of the following action in lieu of a meeting of the Board of Directors of the Corporation and hereby waive any notice whatsoever required to be given in connection therewith.

RESOLVED, by the Board of Directors of the Corporation, that each of the following persons is elected an officer of the Corporation to hold the office set forth opposite his or her name until his or her successor is elected and shall qualify or until he or she shall resign or shall have been removed from office.

Name	Office
Ronald S. Baker	President
Gregg A. Asciutto	Vice President
John O. Lychos	Vice President
Jeffrey C. Poole	Vice President
Michael K. Slattery	Vice President
Michael K. Slattery	Secretary
Carrie L. Cozzi	Assistant Secretary
David A. Domzal	Assistant Secretary
Jeffrey C. Everett	Assistant Secretary
Thomas R. Frank	Assistant Secretary
Donald S. Haufe	Assistant Secretary
Robert E. Leininger	Assistant Secretary
Dale B. Tauke	Assistant Secretary
John O. Lychos	Treasurer
Cindy Giacona	Assistant Treasurer
H. Vaughn Hooks	Assistant Treasurer
William C. Keightley	Assistant Treasurer
Lorna M. Turner	Assistant Treasurer

* * *

The Secretary or Assistant Secretary of the Corporation is directed to file a copy of this written consent with the minutes of the proceedings of the Board of Directors of the Corporation.

Dated: May 9, 1997

Michael K. Slattery

John O. Lychos

Ronald S. Baker